

Pro Trace[®]

EXPERT ON INTEGRATED SOLUTION OF
ELECTRIC HEAT TRACING SYSTEM

PROTRACE

product manual for electric
heat tracing system



DrexmaTM
industries
inc.





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Marques de commerce
Certificat d'enregistrement

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Trade-marks
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This is to certify that the trade-mark, identified in the attached extract from the register of trade-marks, has been registered and that the said extract is a true copy of the record of its registration. In accordance with the provisions of the *Trade-marks Act*, this trade-mark is subject to renewal every 15 years from the registration date.

pro trace

Numéro d'enregistrement
Registration Number **TMA892,389**

Numéro de dossier
File Number **1559606**

Registraire des marques de commerce
Registrar of Trade-marks

Date d'enregistrement
Registration Date **16 déc/Dec 2014**

Canada 

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Contents

ABOUT THE COMPANY

Self-limiting Heating Cable

Self-limiting Heating cable HTLe	01
Self-limiting Heating cable HTL	03
Self-limiting Heating cable HTP	05
Self-limiting Heating cable HTS	07
Self-limiting Heating cable HTU	09
Self-limiting Heating cable Connecting System	11

Constant Power Heating cable

Parallel Constant Power Heating cable FCW.....	13
Series Constant Power Heating cable ESF.....	17
High Current Connector.....	21
Mineral Insulating Heat Tracing Cable MSF	22

On-site Intelligent Temperature Control System

Single-channel Digital Displaying Controller.....	27
Multi-channel Digital Temperature Controller	28

Accessories

Heating Accessory Series	29
--------------------------------	----

Skin&Effect Cable

Skin&Effect Cable	31
-------------------------	----

Integrated Tube Cable

Integrated Tube Cable.....	33
----------------------------	----

Industrial Electric Heater

Industrial Electric Heater	35
----------------------------------	----

Electric Heat Tracing Intelligent Control System

Electric Heat Tracing Intelligent Control System.....	42
---	----

Low Temperature Cylinder Bottom Heat Tracing Application

Industrial Application of Low Temperature Storage Cylinder.....	43
---	----

Project performance

Project performance	44
---------------------------	----

Project Consultancy Form

Project Consultancy Form.....	45
-------------------------------	----



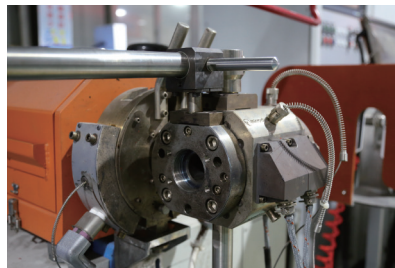
15-year
quality
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Protrace is a famous brand in North American industrial heat tracing field, originating from Canada, owned by North America Drexma Industries Inc. industrial group, and selling through the North American and European developed countries. Protrace series have been certified by internationally authoritative testing or certification organizations, including Canadian Standards Association (CSA), Underwriters Laboratories Inc. (UL), German TUV, European Union CE, and Switzerland SGS, as well as internationally explosion - proof certification, like IECEX and ATEX. Protrace keep up with international Top 500 companies in terms of product quality, technical level and service professional degree in Europe and the United States industrial heat tracing field.

Drexma Industries Inc., is located in Montreal, Canada. Montreal used to be Canada' s capital city, is now the second largest city in Canada, only 190 kilometers from Ottawa. Drexma's predecessor is a Family-owned enterprises, with a long history. The group currently has four brands, including Protrace, Electrace, Warmfeet, Just Warm It, and a number of sub-brand. Its thermal control products are throughout the industrial, commercial, residential areas. Drexma Group has now achieved global procurement, global manufacturing, committed to creating a global customer service system.

Drexma (Shanghai) International Trade Co., Ltd., the China Operation Center of Drexma Industries INC in Shanghai, is founded to collaboratively develop the business in China (including Hong Kong, Macao and Taiwan). Wuhu Jiahong New Material Co., Ltd. (stock code 870541), the central plant of Drexma Industries Inc. in Asia Pacific, is now the largest heating cable manufacturer in this region, mainly engaged in product packaging, assembling and deep processing, and qualified for the general contract of instrumental and electrical installation.

Marc Marengoire





15-year
quality
assurance



Marc Marengere President Drexma Industries Inc.

Marc Marengere

Chairman of Drexma Industries Inc.

Served as member of the Canadian Standards

Committee for CSA



Umesh k Sopory

Protrace industrial heat tracing series CTO

Served as Raychem Corp. Application Research Manager

IEEE (member IEEE std. committee 515 and 515-1)



Steven Xu

President of Drexma Industries Inc.

Wuhu Jiahong new materials Limited by Share

Ltd CEO

Drexma Industries Inc





Maximum exposure temperature range (°C)												Product	Technology
50	100	150	200	250	300	350	400	450	500	600	900		
												HTLe	Parallel Self-limiting Heating cable
												HTR	Parallel Self-limiting Heating cable
												HTP	Parallel Self-limiting Heating cable
												HTS	Parallel Self-limiting Heating cable
												HTU	Parallel Self-limiting Heating cable
												FCW	Parallel Self-limiting Heating cable
												ESF	Series constant power Heating cable
												MSF	Copper sheath
												MSF	Stainless steel sheath
												MSF	Alloy 825

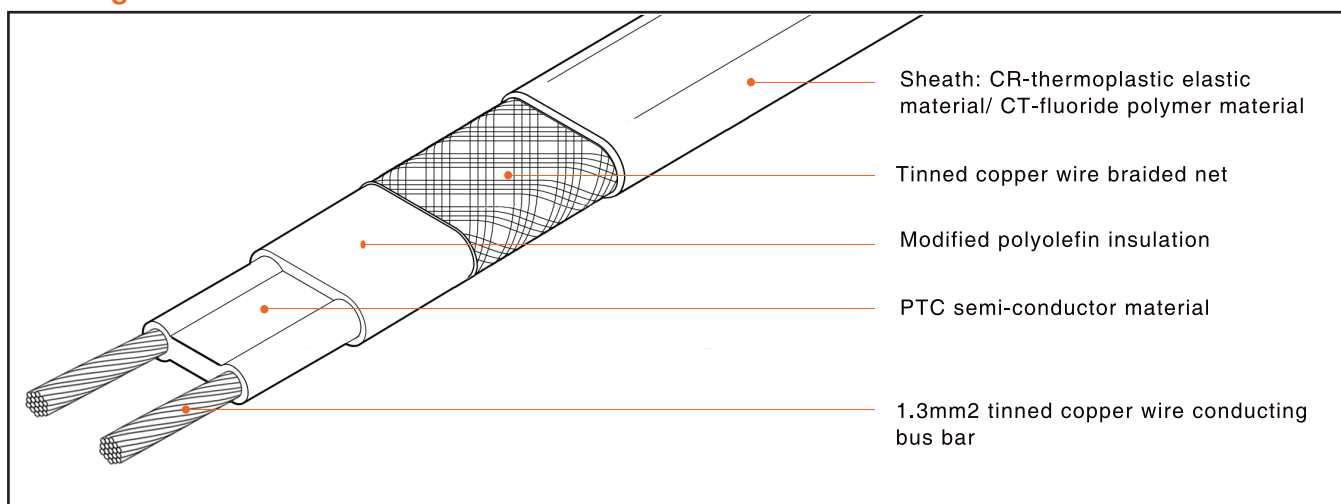
HEATING CABLE TYPE SELECTION

	Maximum exposure temperature range (°C) Power-off	Temperature grade design method			Optimal control mode				Chemical resistance		Mechanical strength		Page
		No condition	Reliable design	Temperature limiter used	No control	Environmental sensing control	Wide temperature range control	Narrow temperature range control	Organic chemistry	None	Common	High	
	85	●			●	●	●	●	●	●	●		01
	85	●			●	●	●	●	●	●	●		03
	135	●	●		●	●	●	●	●	●	●		05
	200		●		●	●	●	●	●	●	●		07
	232		●		●	●	●	●	●	●	●		09
	260		●	●		●	●	●	●	●	●		13
	260		●	●		●	●	●	●	●	●		17
	200		●	●			●	●		●	●	●	22
	600		●	●			●	●	●	●	●	●	22
	850		●	●			●	●	●	●	●	●	22

SELF-LIMITING HEATING CABLE

- HTLe Self-limiting Heating cable is applicable for civil and commercial buildings for anti-freezing application without steam purging. The PTC parallel structure is applicable for pipeline anti-freezing protection and process maintaining. It can be used in any environment with or without explosion-proof.
- The Heating cable power output can be self-regulated and limited, the Heating cable can be freely cut into any length required, the fluorine polymer protective sheath is resistant against corrosion and chemical erosion, and the tinned copper net provides electrical and mechanical protection. It can be installed flexibly and conveniently.
- HTLe Self-limiting Heating cable can be used in the explosion-proof environment, and the technical maintenance temperature up to +65°C.

Heating cable Structure



Application

Application situation	Dangerous Area 2 (gas), Area 21, and Area 22 (dust) Common area		
Heat tracing surface type	Metal/Non-metal		
Heating cable type selection	In any inorganic environment: CR-thermoplastic elastic sheath material In any organic, corrosive or gas environment: CT-fluoride polymer sheath material (Please consult a technical representative of Protrace for the application in any environment with highly or seriously corrosive organics)		
Voltage	220V		
Certification	Ex e IIC Gb, Ex t IIIC DbIECEX LCI 11.0070U II 2 GD, Ex e IIC Gb Ex t IIIC Db IP65 LCIE 11 ATEX 3095 U IEEE515, IEEE515.1CSA C22.2 No.130 Ex e IIC Gb, Ex tD A21 IP65 GYB17.1746U	CSA C22.2No.130 ГOCT IEC 61241 ГOCT31610 IEEE515, IEEE515.1CSA C22.2 No.130 BY16P2002	

Specification

Maximum maintenance temperature	+65°C
Maximum exposure temperature	+85°C
Temperature grade	T6: 85°C
Minimum installation temperature	-40°C
Minimum bending radius	HTLe-CR: 13mm, HTLe-CT: 13mm

Grounding protection

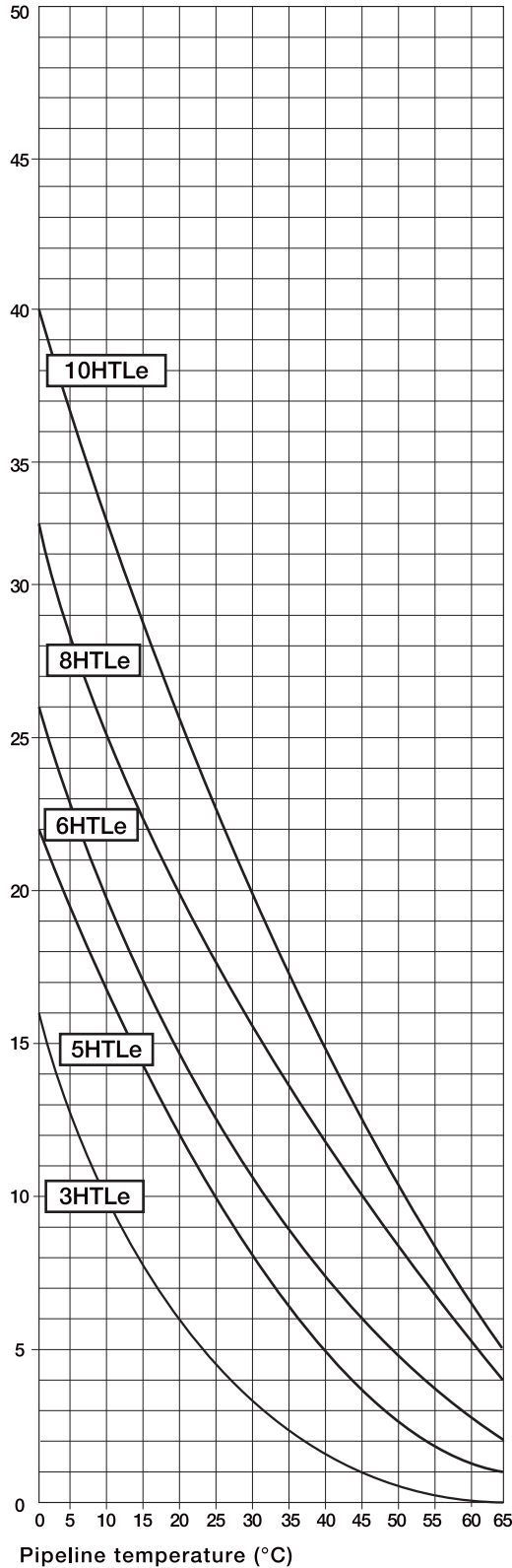
Grounding protection devices are required to be installed to prevent the fault caused by any damaged or improperly installed Heating cable.

Rated heat power output

The power output is obtained from the Heating cable placed on a heat insulated steel pipe at 220V.

Heating cable type	3HTLe	5HTLe	6HTLe	8HTLe	10HTLe
Power output @+10°C	10W/m	17W/m	20W/m	25W/m	33W/m

Power output: W/m



Maximum Circuit Length Of Type "C" Circuit Breaker According To Iec 60898

Maximum heat tracing circuit length @220V (with characteristic C switch)						
Switch capacity (with characteristic C switch)	Power-on temperature	3HTLe	5HTLe	6HTLe	8HTLe	10HTLe
16A	+10°C	184m	149m	113m	98m	67m
	-20°C	110m	110m	80m	66m	45m
20A	+10°C	184m	151m	131m	112m	88m
	-20°C	148m	106m	95m	74m	60m
25A	+10°C	184m	151m	137m	117m	101m
	-20°C	184m	151m	133m	112m	91m
32A	+10°C	184m	151m	137m	117m	101m
	-20°C	184m	151m	137m	112m	101m

HTLe Heating cable type selection

Description	Sheath material	Type		Order code
HTLe Heating cable	Fluoride polymer	3HTLe	10w/m	3HTLe-CT
		5HTLe	17w/m	5HTLe-CT
		6HTLe	20w/m	6HTLe-CT
		8HTLe	25w/m	8HTLe-CT
		10HTLe	33w/m	10HTLe-CT
-Self-regulated temperature -Explosion-proof -Metal sheath	Thermoplastic elastic material	3HTLe	10w/m	3HTLe-CR
		5HTLe	17w/m	5HTLe-CR
		6HTLe	20w/m	6HTLe-CR
		8HTLe	25w/m	8HTLe-CR
		10HTLe	33w/m	10HTLe-CR

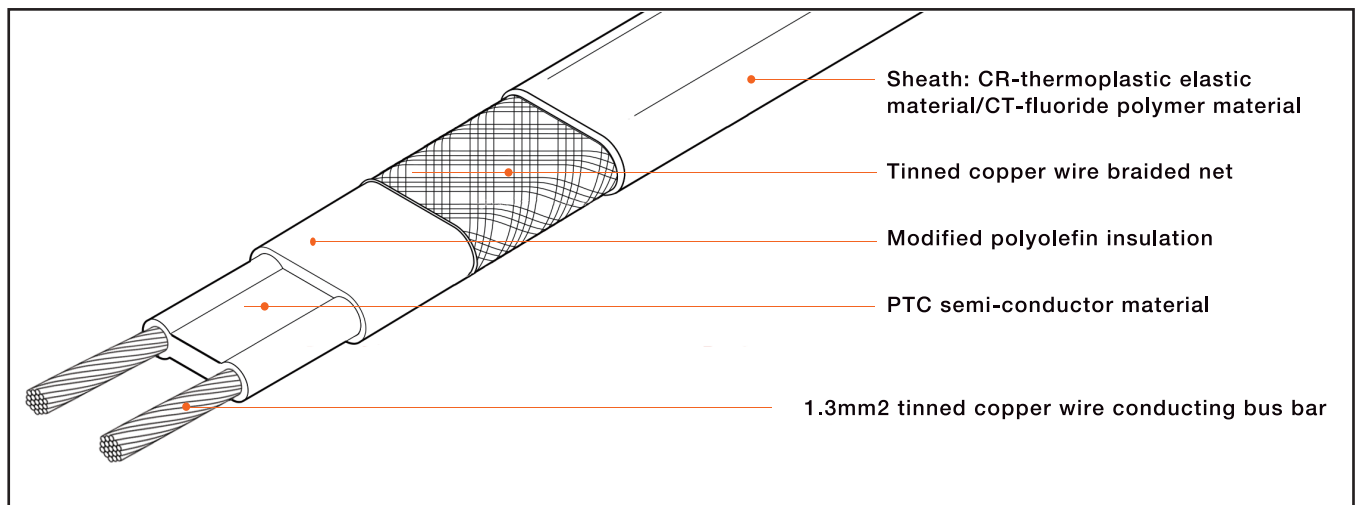
The above data are only for estimating the circuit length, and please consult a technical representative of Protrace for more information. The recommended current leakage protection devices of 30mA are used for safety protection and fault prevention to the maximum extent. All safety performances must be verified.

Protrace provides a complete set of installing fittings including connectors and end temperature control systems. Please consult a technical representative of Protrace for any special application

SELF-LIMITING HEATING CABLE

- HTR Self-limiting Heating cable is applicable for anti-freezing application against steam purging. The PTC parallel structure is applicable for pipeline anti-freezing protection and process maintaining.
- The Heating cable power output can be self-regulated and limited, the Heating cable can be freely cut into any length required, the fluorine polymer protective sheath is resistant against corrosion and chemical erosion, and the tinned copper net provides electrical and mechanical protection. It can be installed flexibly and conveniently.
- The Self-limiting Heating cable HTR can be used in the explosion-proof environment, and the technical maintenance temperature up to +65°C.

Heating cable Structure



Application

Application situation	Dangerous areas, Area 2 (gas), Area 21, and Area 22 (dust) Common area		
Heat tracing surface type	Metal Non-metal		
Heating cable type selection	In any inorganic environment: CR-thermoplastic elastic sheath material In any organic, corrosive or gas environment: CT-fluoride polymer sheath material (Please consult a technical representative of Protrace for the application in any environment with highly or seriously corrosive organics)		
Voltage	220V		
Certification	Ex e IIC Gb, Ex t IIIC Db IECEx LCI 11.0070U II 2 GD, Ex e IIC Gb Ex t IIIC Db IP65 LCIE 11 ATEX 3095 U IEEE515, IEEE515.1 CSA C22.2 No.130 Ex e IIC Gb, Ex tD A21 IP65 GYB17.1746U	CSA C22.2 No.130 ГOCT IEC 61241 ГOCT31610 IEEE515, IEEE515.1 CSA C22.2 No.130 BY16P2002	

Specification

Maximum maintenance temperature	+65°C
Maximum exposure temperature	+85°C
Temperature grade	T6: 85°C
Minimum installation temperature	-40°C
Minimum bending radius	HTR-CR: 13mm, HTR-CT: 13mm

Grounding protection

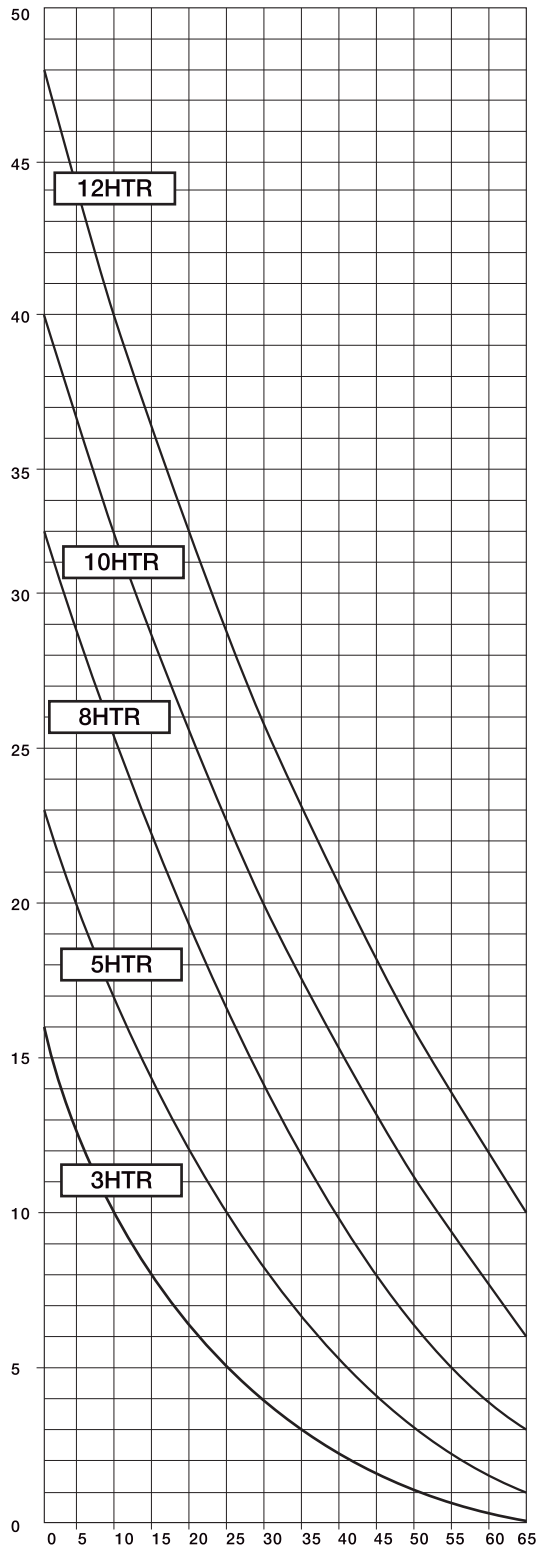
Grounding protection devices are required to be installed to prevent the fault caused by any damaged or improperly installed Heating cable.

Rated heat power output

The power output is obtained from the Heating cable placed on a heat insulated steel pipe at 220V.

Heating cable type	3HTR	5HTR	8HTR	10HTR	12HTR
Power output @+10°C	10W/m	17W/m	25W/m	32W/m	40W/m

Power output: W/m



Pipeline temperature (°C)

Protrace provides a complete set of installing fittings including connectors and end temperature control systems. Please consult a technical representative of Protrace for any special application

Maximum circuit length of type "C" circuit breaker according to IEC 60898

Maximum heat tracing circuit length @220V (with characteristic C switch)						
Switch capacity (with characteristic C switch)	Power-on temperature	3HTR	5HTR	8HTR	10HTR	12HTR
16A	+10°C	184m	129m	84m	56m	45m
	-20°C	110m	80m	56m	45m	34m
20A	+10°C	184m	151m	112m	88m	75m
	-20°C	148m	106m	74m	60m	45m
25A	+10°C	184m	151m	117m	101m	87m
	-20°C	184m	151m	112m	91m	78m
32A	+10°C	184m	151m	117m	101m	87m
	-20°C	184m	151m	117m	101m	87m

HTLe Heating cable type selection

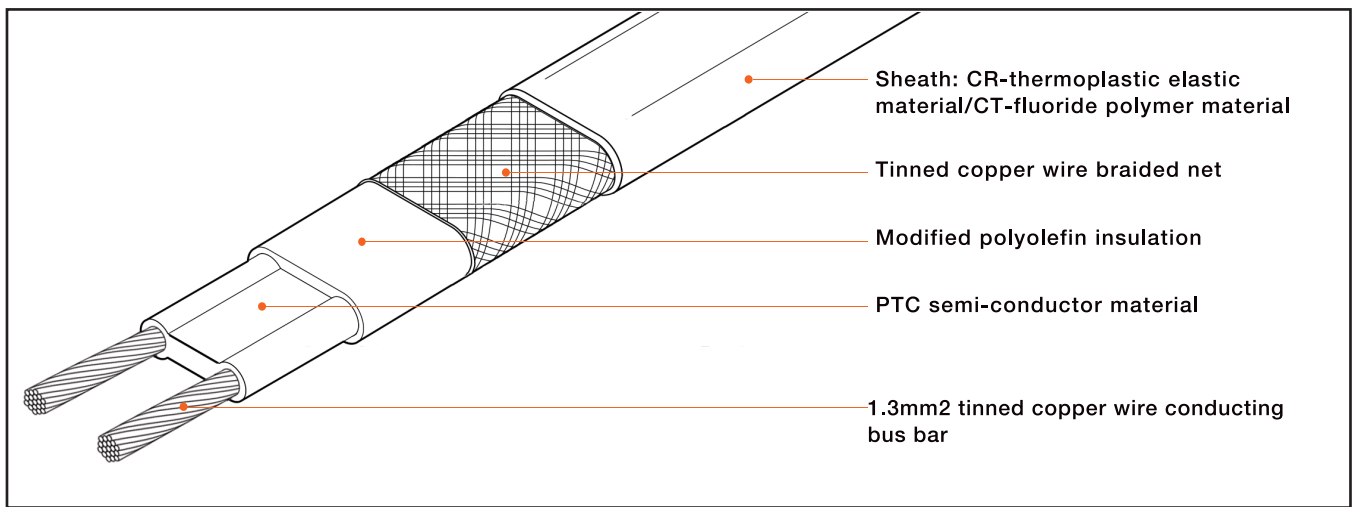
Description	Sheath material	Type		Order code
HTLe Heating cable	Fluoride polymer	3HTR	10w/m	3HTRCT
		5HTR	17w/m	5HTR-CT
		8HTR	25w/m	8HTR-CT
		10HTR	32w/m	10HTR-CT
		12HTR	40w/m	12HTR-CT
-Self-regulated temperature -Explosion-proof -Metal sheath	Thermoplastic elastic material	3HTR	10w/m	3HTR-CR
		5HTR	17w/m	5HTR-CR
		8HTR	25w/m	8HTR-CR
		10HTR	32w/m	10HTR-CR
		12HTR	40w/m	12HTR-CR

The above data are only for estimating the circuit length, and please consult a technical representative of Protrace for more information. The recommended current leakage protection devices of 30mA are used for safety protection and fault prevention to the maximum extent. All safety performances must be verified.

SELF-LIMITING HEATING CABLE

- HTP Self-limiting Heating cable is applicable for anti-freezing application against steam purging. The PTC parallel structure is applicable for pipeline anti-freezing protection and process maintaining.
- The Heating cable power output can be self-regulated and limited, the Heating cable can be freely cut into any length required, the fluorine polymer protective sheath is resistant against corrosion and chemical erosion, and the tinned copper net provides electrical and mechanical protection. It can be installed flexibly and conveniently.
- HTP Self-limiting Heating cable can be used in the explosion-proof environment, and the technical maintenance temperature up to +110°C. The maximum exposure temperature is 135°C.

Heating cable Structure



Application

Application situation	Dangerous Area 2 (gas), Area 21, and Area 22 (dust) Common area		
Heat tracing surface type	Metal Non-metal		
Voltage	220V		
Certification	Ex e IIC Gb, Ex t IIIC Db IECEx LCI 11.0070U	ГOCT IEC 61241 ГOCT31610	
	II 2 GD, Ex e IIC Gb, Ex t IIIC Db IP65 LCIE 11 ATEX 3095 U	IEC 60800: 2009	
	Ex e IIC Gb, Ex tD A21 IP65 GYB17.1746U	BY16P2002	

Specification

Maximum maintenance temperature	+110°C
Maximum exposure temperature	+135°C
Temperature grade	T4: 135°C
Minimum installation temperature	-40°C
Minimum bending radius	HTP-CT: 13mm

Grounding protection

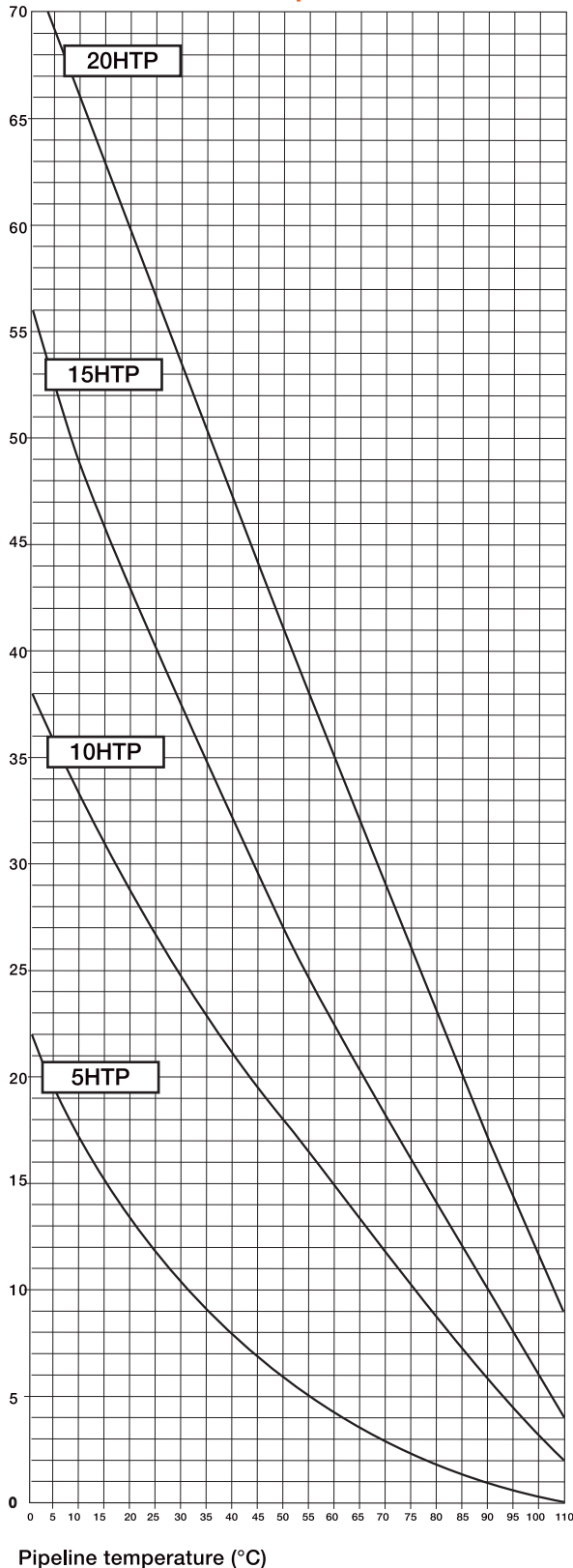
Grounding protection devices are required to be installed to prevent the fault caused by any damaged or improperly installed Heating cable.

Rated heat power output

The power output is obtained from the Heating cable placed on a heat insulated steel pipe at 220V.

Heating cable type	5HTP	10HTP	15HTP	20HTP
Power output @+10°C	17W/m	33W/m	49W/m	66W/m

Power output: W/m



Maximum circuit length of type "C" circuit breaker according to IEC 60898

Maximum heat tracing circuit length @220V (with characteristic C switch)					
Switch capacity (with characteristic C switch)	Power-on temperature	5HTP	10HTP	15HTP	20HTP
16A	+10°C	109m	56m	45m	34m
	-20°C	95m	45m	35m	27m
25A	+10°C	109m	74m	59m	45m
	-20°C	106m	59m	47m	35m
32A	+10°C	109m	109m	89m	67m
	-20°C	109m	59m	71m	53m
40A	+10°C	109m	109m	195m	89m
	-20°C	109m	109m	95m	71m

HTLe Heating cable type selection

Description	Sheath material	Type		Order code
HTP Heating cable -Self-regulated temperature -Explosion-proof -Metal sheath -Against steam purging	Fluoride polymer	5HTP	17w/m	5HTP-CT
		10HTP	33w/m	10HTP-CT
		15HTP	49w/m	15HTP-CT
		20HTP	66w/m	20HTP-CT

The above data are only for estimating the circuit length, and please consult a technical representative of Protrace for more information. The recommended current leakage protection devices of 30mA are used for safety protection and fault prevention to the maximum extent. All safety performances must be verified.

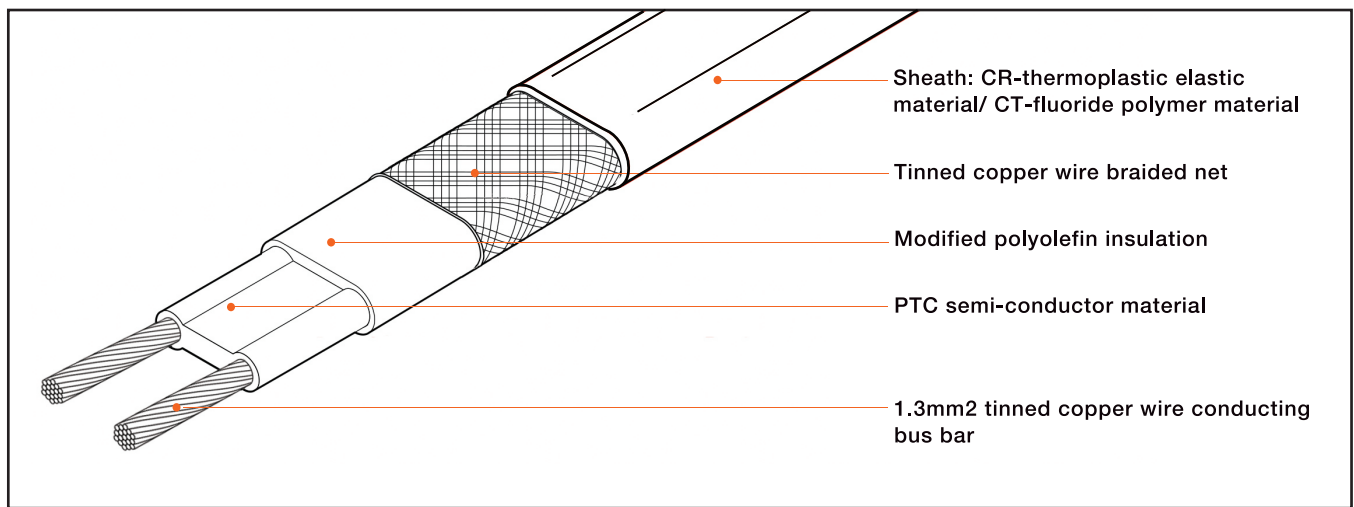
Pipeline temperature (°C)

Protrace provides a complete set of installing fittings including connectors and end temperature control systems. Please consult a technical representative of Protrace for any special application

SELF-LIMITING HEATING CABLE

- HTS Self-limiting Heating cable is applicable for anti-freezing application against steam purging. The PTC parallel structure is applicable for pipeline anti-freezing protection and process maintaining.
- The Heating cable power output can be self-regulated and limited, the Heating cable can be freely cut into any length required, the fluorine polymer protective sheath is resistant against corrosion and chemical erosion, and the tinned copper net provides electrical and mechanical protection. It can be installed flexibly and conveniently.
- HTS Self-limiting Heating cable can be used in the explosion-proof environment, and the technical maintenance temperature up to +120°C. The maximum exposure temperature is 200°C.

Heating cable Structure



Application

Application situation	Dangerous Area 2 (gas), Area 21, and Area 22 (dust) Common area	
Heat tracing surface type	Metal	
Voltage	220V	
Certification	Ex e IIC Gb, Ex t IIIC Db IECEX LCI 11.0070U	ГOCT IEC 61241 ГOCT31610
	II 2 GD, Ex e IIC Gb, Ex t IIIC Db IP65 LCIE 11 ATEX 3095 U	IEC 60800: 2009
	Ex e IIC Gb, Ex tD A21 IP65 GYB17.1746U	BY16P2002

Specification

Maximum maintenance temperature	+120°C
Maximum exposure temperature	+200°C
Temperature grade	T3: 200°C
Minimum installation temperature	-40°C
Minimum bending radius	HTS-CT: 13mm

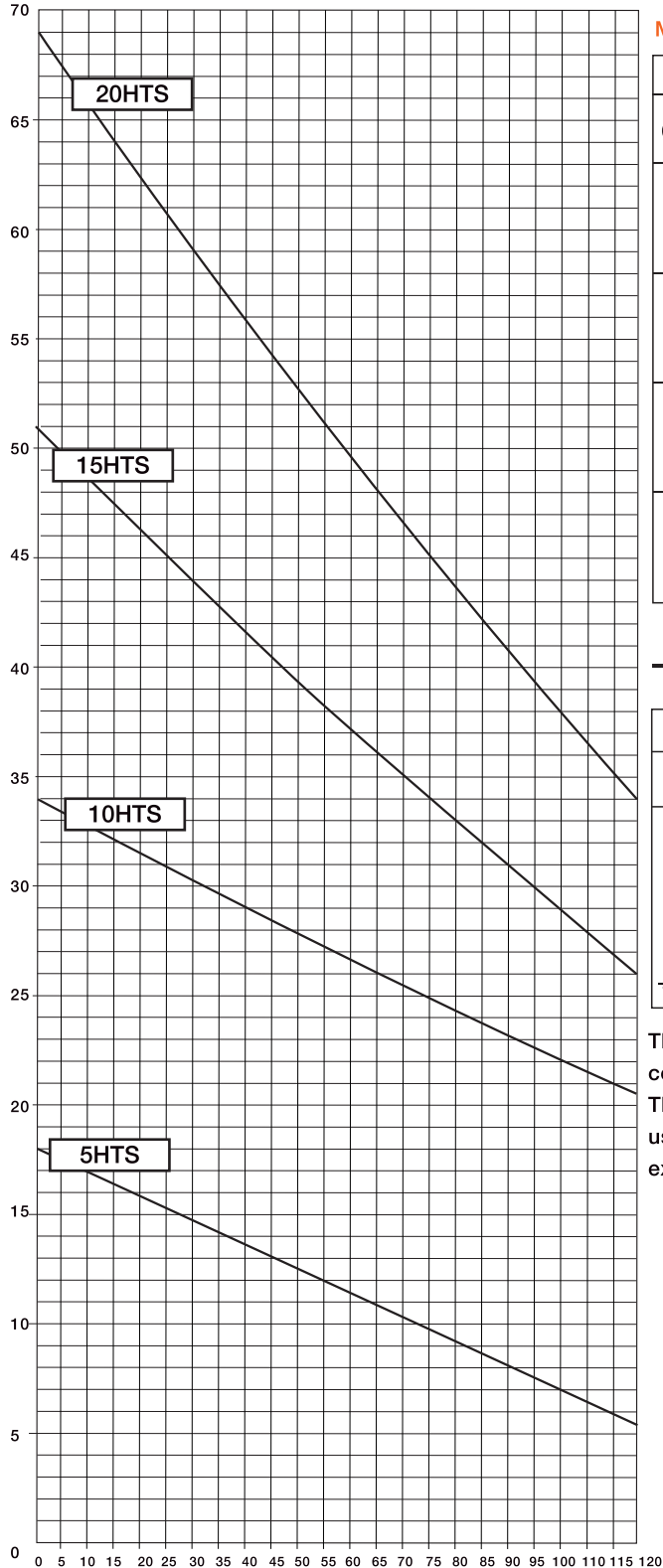
Grounding protection Grounding protection devices are required to be installed to prevent the fault caused by any damaged or improperly installed Heating cable.

Rated heat power output

The power output is obtained from the Heating cable placed on a heat insulated steel pipe at 220V.

Heating cable type	5HTS	10HTS	15HTS	20HTS
Power output @+10°C	17W/m	33W/m	49W/m	66W/m

Power output: W/m



Maximum circuit length of type "C" circuit breaker according to IEC 60898

Maximum heat tracing circuit length @220V (with characteristic C switch)					
Switch capacity (with characteristic C switch)	Power-on temperature	5HTS	10HTS	15HTS	20HTS
16A	+10°C	101m	61m	39m	32m
	-20°C	88m	54m	36m	28m
25A	+10°C	134m	82m	56m	43m
	-20°C	117m	73m	49m	39m
32A	+10°C	201m	123m	88m	68m
	-20°C	175m	108m	77m	60m
40A	+10°C	214m	151m	88m	77m
	-20°C	175m	135m	88m	77m

HTLe Heating cable type selection				
Description	Sheath material	Type		Order code
HTP Heating cable -Self-regulated temperature -Explosion-proof -Metal sheath -Against steam purging	Fluoride polymer	5HTS	17w/m	5HTS-CT
		10HTS	33w/m	10HTS-CT
		15HTS	49w/m	15HTS-CT
		20HTS	66w/m	20HTS-CT

The above data are only for estimating the circuit length, and please consult a technical representative of Protrace for more information. The recommended current leakage protection devices of 30mA are used for safety protection and fault prevention to the maximum extent. All safety performances must be verified.

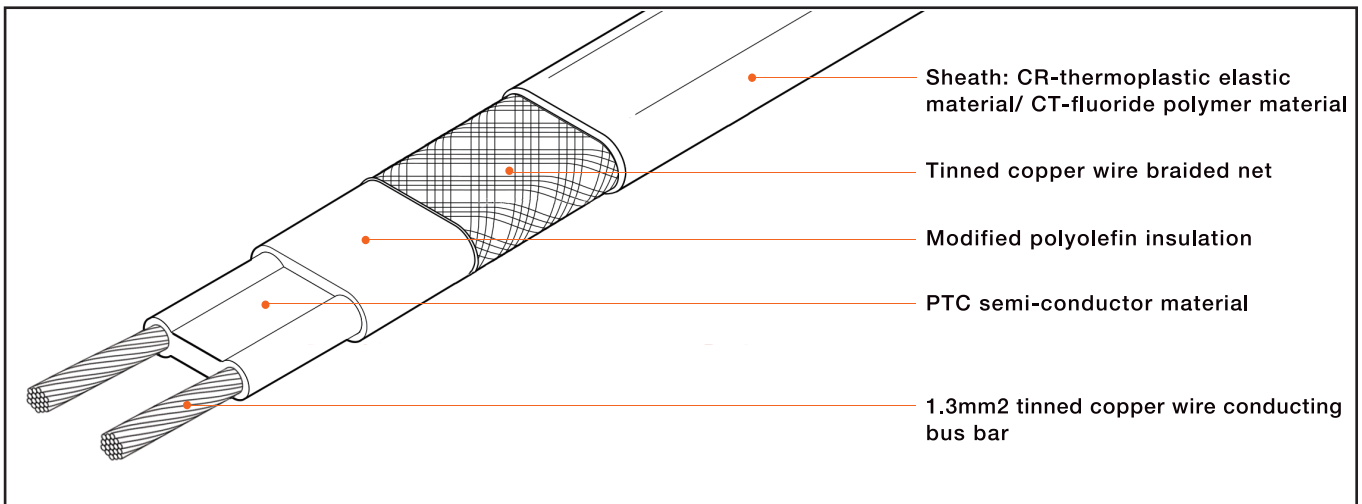
Pipeline temperature (°C)

Protrace provides a complete set of installing fittings including connectors and end temperature control systems. Please consult a technical representative of Protrace for any special application

SELF-LIMITING HEATING CABLE

- HTU Self-limiting Heating cable is applicable for anti-freezing application against steam purging. The PTC parallel structure is applicable for pipeline anti-freezing protection and process maintaining.
- The Heating cable power output can be self-regulated and limited, the Heating cable can be freely cut into any length required, the fluorine polymer protective sheath is resistant against corrosion and chemical erosion, and the tinned copper net provides electrical and mechanical protection. It can be installed flexibly and conveniently.
- HTU Self-limiting Heating cable can be used in the explosion-proof environment, and the technical maintenance temperature up to +190°C. The maximum exposure temperature is 232°C.

Heating cable Structure



Application

Application situation	Area with explosion-proof Area without explosion-proof
Heat tracing surface type	Metal
Voltage	220V

Specification

Maximum maintenance temperature	+190°C
Maximum exposure temperature	+232°C
Temperature grade	T2/T3
Minimum bending radius	HTU-CT: 13mm

Certification



Grounding protection

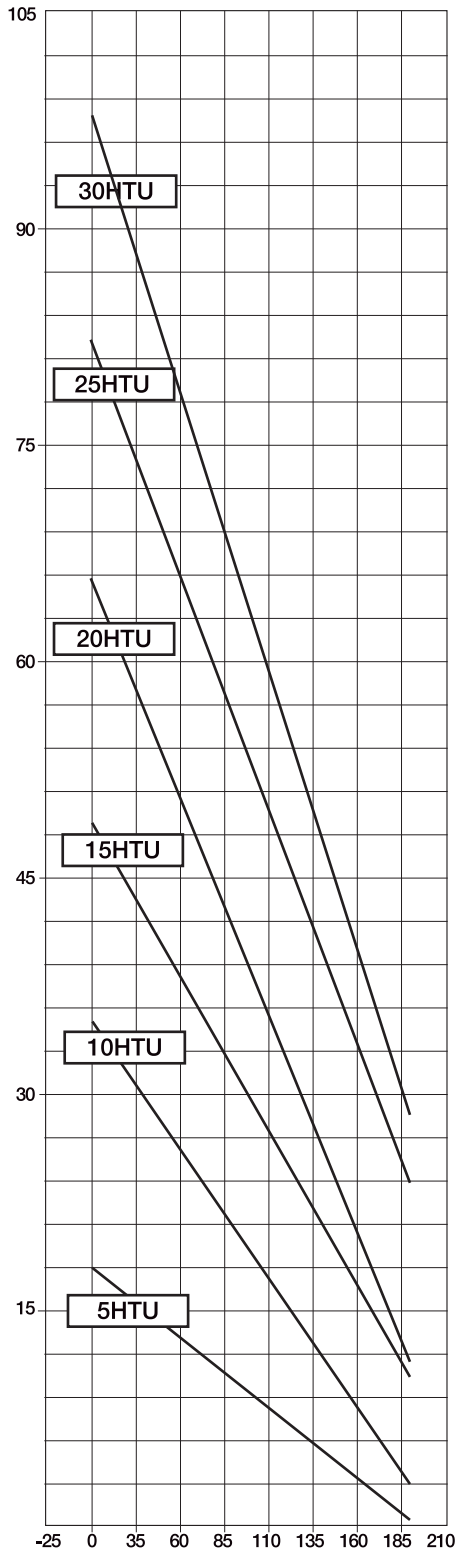
Grounding protection devices are required to be installed to prevent the fault caused by any damaged or improperly installed Heating cable.

Rated heat power output

The power output is obtained from the Heating cable placed on a heat insulated steel pipe at 220V.

Heating cable type	5HTU	10HTU	15HTU	20HTU	25HTU	30HTU
Power output @+10°C	16w/m	33w/m	49w/m	66w/m	82w/m	98w/m

Power output: W/m



Maximum Circuit Length Of Type "C" Circuit Breaker According To Iec 60898

Maximum heat tracing circuit length @220V (with characteristic C switch)							
Switch capacity (with characteristic C switch)	Power-on temperature	5HTU	10HTU	15HTU	20HTU	25HTU	30HTU
16A	+10°C	101m	67m	45m	32m	25m	22m
	-20°C	91m	64m	39m	30m	22m	21m
20A	+10°C	134m	90m	59m	42m	36m	27m
	-20°C	120m	85m	51m	40m	28m	25m
25A	+10°C	143m	96m	67m	53m	42m	33m
	-20°C	136m	93m	63m	51m	36m	32m
32A	+10°C	151m	101m	75m	64m	47m	38m
	-20°C	151m	101m	75m	61m	44m	38m

HTLe Heating cable type selection

Description	Sheath material	Type		Order code
Heating cable HTS -Self-regulated temperature -Explosion-proof -Metal sheath -Against steam purging	Fluoride polymer	5HTU	16w/m	5HTU-CT
		10HTU	33w/m	10HTU-CT
		15HTU	49w/m	15HTU-CT
		20HTU	66w/m	20HTU-CT
		25HTU	82w/m	25HTU-CT
		30HTU	98w/m	30HTU-CT

The above data are only for estimating the circuit length, and please consult a technical representative of Protrace for more information. The recommended current leakage protection devices of 30mA are used for safety protection and fault prevention to the maximum extent. All safety performances must be verified.

Pipeline temperature (°C)

Protrace provides a complete set of installing fittings including connectors and end temperature control systems. Please consult a technical representative of Protrace for any special application

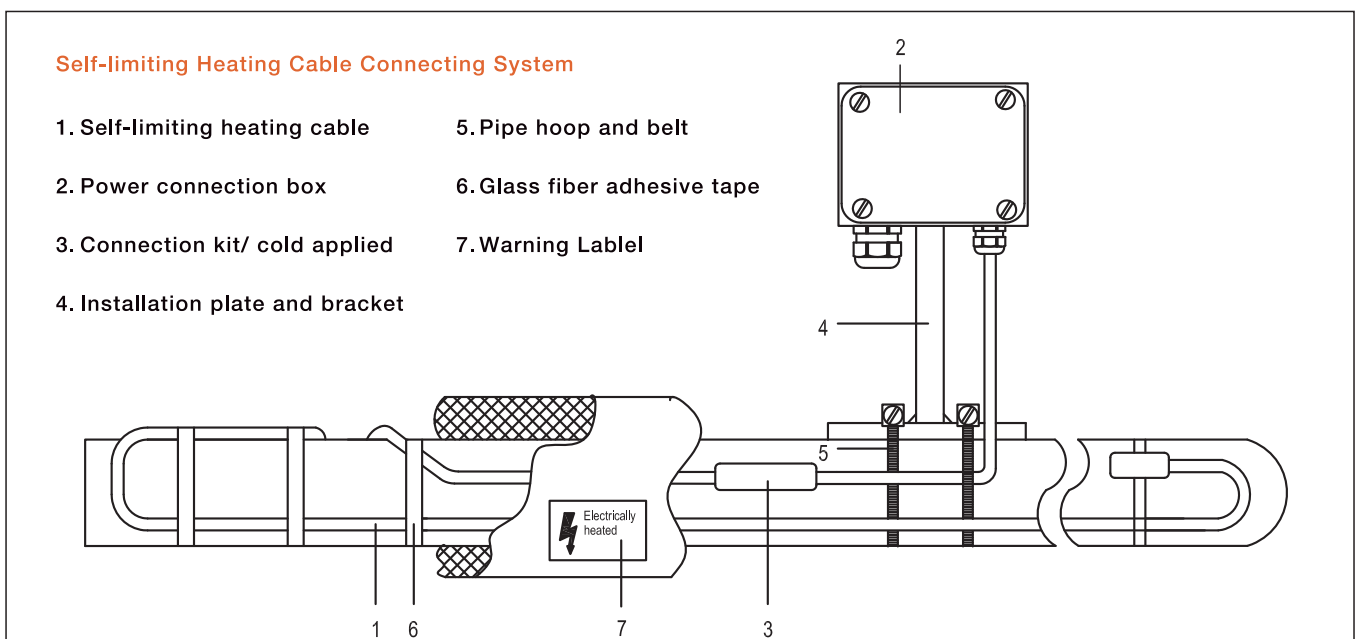
SELF-LIMITING HEATING CABLE CONNECTING SYSTEM

Demand for heat tracing in different applications of the Self-limiting heat tracing system

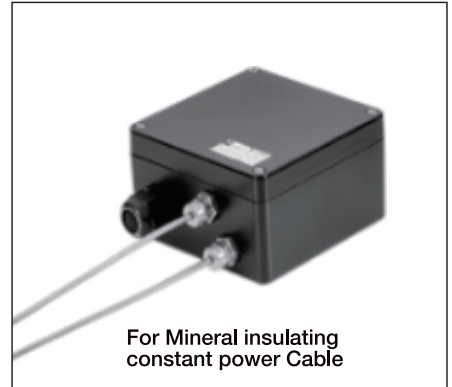
- Anti-freezing protection
- Temperature maintaining
- Space heating
- Heating and temperature maintaining

The Heating cable can be freely cut on site as required without influencing the power output each meter. Different types of Heating cable can meet different demands for heat loss control. The parallel structure of Heating cable is applicable for installing on pipelines and devices. The circuit can be installed in only one layer without returning. Heat tracing systems with different sheaths can be chosen for different environmental conditions. The firm structure enables it to be used in any extreme environment. The system can be matched with the corresponded connecting system, and used in any dangerous area.

Our systems can be used safely without any on-site temperature limiter




HEATING CONNECTION BOX

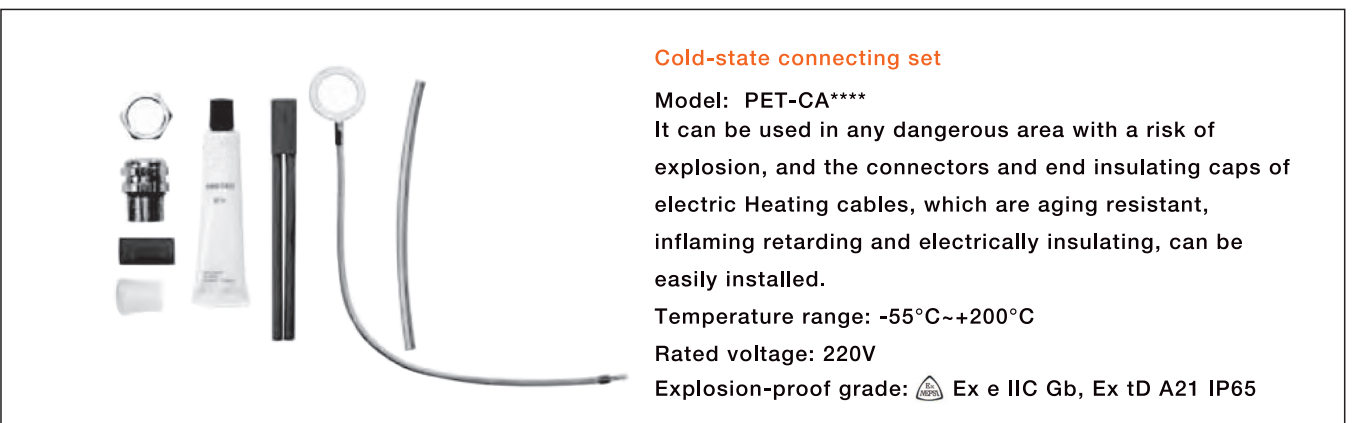
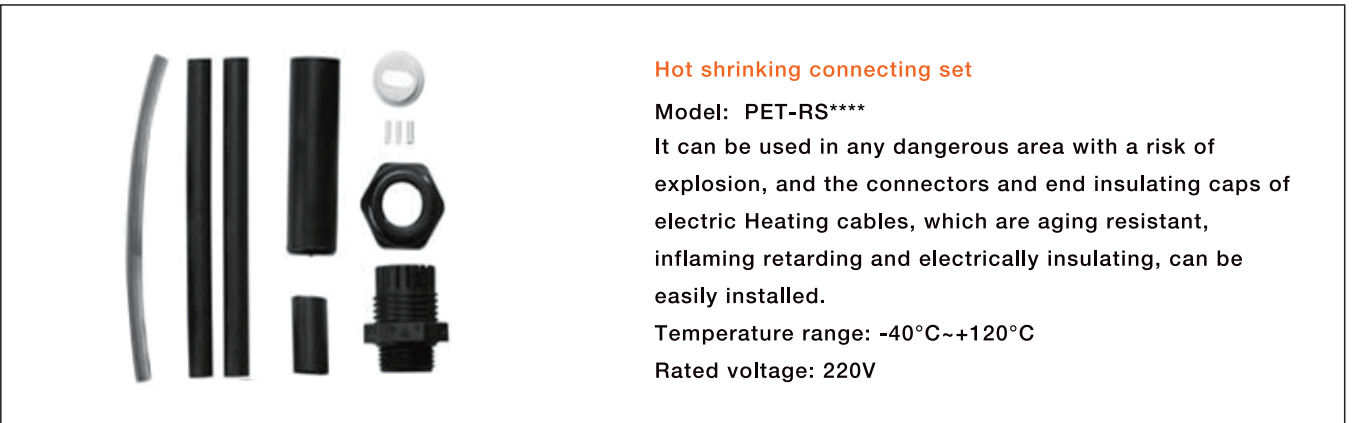


Features

- Use with Self-limiting/ constant power Heating cable
- Connected into one or more Heating cable circuits
- Casing material, glass polyester fiber

Explosion-proof grade:  Ex e IIC Gb, Ex tD A21 IP66 Protection grade : IP66

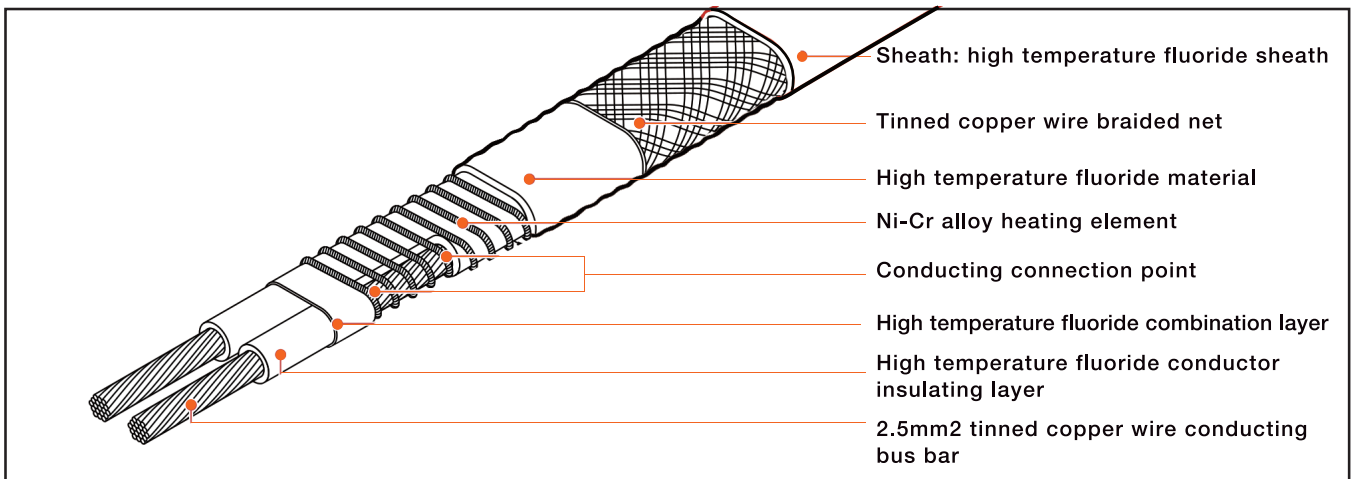
Connecting set



PARALLEL CONSTANT POWER HEATING CABLE

- FCW parallel constant power Heating cable is applicable for the technical maintenance and anti-freezing protection for pipelines, storage cylinders and devices.
- It can be used in explosion-proof environment, and the power output each meter of Heating cable is constant. The heating unit length is determined by the contacting distance between the heating element and the conducting bus bar, and it can be cut on site according to the heating unit length. The fluorine polymer sheath is resistant against corrosion and chemical erosion, power is supplied from a single point, and a maximum 250m long electric heat tracing circuit can be installed.
- FCW parallel constant power Heating cable is easy to bend, and can be conveniently wound on any complicated technical pipeline or device. It has a favorable mechanical performance, and the startup current is low. It resists high temperature 260°C at maximum, and can be used in most cases involved with chemical corrosion. It has excellent electrical and thermal performances.

Heating cable Structure



Application

Application situation	Dangerous areas, Area 2 (gas), Area 21, and Area 22 (dust) Common area
Heat tracing surface type	Carbon steel, stainless steel, painted or non-painted metal
Chemical resistance	Organic and corrosive substance Please consult a technical representative of Protrace for the application with any specially corrosive organic or any other specially corrosive substance

Specification

Rated voltage	220V (please consult Protrace for any other voltage)
Minimum installation temperature	-40°C
Minimum bending radius	30mm
Maximum exposure temperature (power-off)	200°C-260°C
Temperature grade	T3

Certification



II 2 GD, Ex e IIC Gb, Ex t IIIC Db IP65 LCIE 11 ATEX 3094 U



Ex e IIC Gb, Ex t IIIC Db IECEx LCI 11.0071U



Ex e IIC Gb, Ex tD A21 IP65

Grounding protection

Grounding protection devices are required to be installed to prevent the fault caused by any damaged or improperly installed Heating cable.

Type	Power W/m	Voltage V	Maximum usable length m	Maximum maintained temperature °C	Maximum exposure temperature (Power off) °C
FCW-10	10	220	210	150	260
FCW-20	20	220	180	120	260
FCW-30	30	220	150	90	260
FCW-40	40	220	140	65	260

The recommended current leakage protection devices of 30mA are used for safety protection and fault prevention to the maximum extent. All safety performances must be verified.

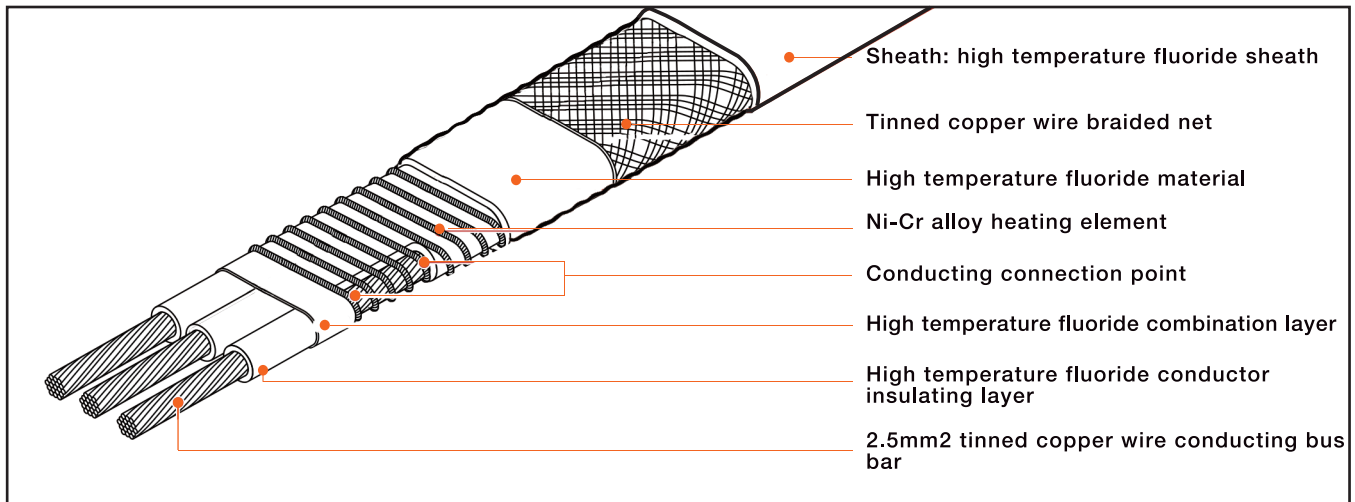
Protrace provides a complete set of installing fittings including connectors and end temperature control systems. Please consult a technical representative of Protrace for any special application

3FCW

PARALLEL CONSTANT POWER HEATING CABLE

- 3FCW parallel constant power Heating cable is applicable for the technical maintenance and anti-freezing protection for pipelines, storage cylinders and devices.
- It can be used in the explosion-proof environment, and the power output each meter of Heating cable is constant. The heating unit length is determined by the contacting distance between the heating element and the conducting bus bar, and it can be cut on site according to the heating unit length. The fluorine polymer sheath is resistant against corrosion and chemical erosion, power is supplied from a single point, and a maximum 250m long electric heat tracing circuit can be installed.
- 3FCW parallel constant power Heating cable is easy to bend, and can be conveniently wound on any complicated technical pipeline or device. It has a favorable mechanical performance, and the startup current is low. It resists high temperature 260°C at maximum, and can be used in most cases involved with chemical corrosion. It has excellent electrical and thermal performances.

Heating cable Structure



Application

Application situation	Dangerous areas, Area 2 (gas), Area 21, and Area 22 (dust) Common area
Heat tracing surface type	Carbon steel, stainless steel, painted or non-painted metal
Chemical resistance	Organic and corrosive substance Please consult a technical representative of Protrace for the application with any specially corrosive organic or any other specially corrosive substance

Specification

Rated voltage	380V (please consult Protrace for any other voltage)
Minimum installation temperature	-40°C
Minimum bending radius	30mm
Maximum exposure temperature	200°C-260°C
Temperature grade	T3

Certification

	II 2 GD, Ex e IIC Gb, Ex t IIIC Db IP65 LCIE 11 ATEX 3094 U
	Ex e IIC Gb, Ex t IIIC Db IECEx LCI 11.0071U
	Ex e IIC Gb, Ex tD A21 IP65

Grounding protection

Grounding protection devices are required to be installed to prevent the fault caused by any damaged or improperly installed Heating cable.

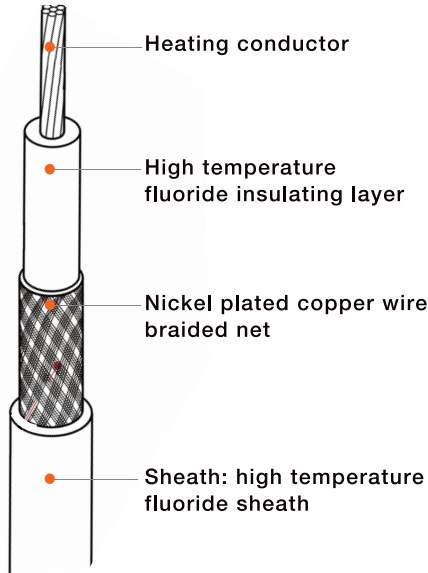
Type	Power W/m	Voltage V	Maximum usable length m	Maximum maintained temperature °C	Maximum exposure temperature (Power off) °C
3FCW-30	30	380	330	120	260
3FCW-40	40	380	280	100	260
3FCW-50	50	380	275	80	260
3FCW-60	60	380	250	60	260

The recommended current leakage protection devices of 30mA are used for safety protection and fault prevention to the maximum extent. All safety performances must be verified.

Protrace provides a complete set of installing fittings including connectors and end temperature control systems. Please consult a technical representative of Protrace for any special application

1ESF

SINGLE-CORE SERIES CONSTANT POWER HEATING CABLE



Heat Tracing Belt Structure

- 1ESF single-core series constant power Heating cable is extensively used to meet the demand for technical maintenance with anti-freezing protection, high power output or high exposure temperature. It is mainly applicable for device and long distance pipeline heat tracing.
- It can be used in the explosion-proof environment, the power output each meter is constant, the cable can be easily installed and used against steam purging and chemical corrosion.
- 1ESF single-core series constant power Heating cable can be used with single point power supply, and installed for heat tracing on a 3.6Km pipeline at maximum. It can resist purging with steam at 260°C at power off.

Application

Application situation	Explosion-proof area Common area
Chemical resistance	Organic and corrosive substance Please consult a technical representative of Protrace for the application with any specially corrosive organic or any other specially corrosive substance

Specification

Rated voltage	220V、380V、660V
Minimum installation temperature	-40°C
Temperature grade	T1-T6
Maximum exposure temperature	260°C
Minimum bending radius	25mm

Certification

- Ex e II T4 Gb
- II 2 GD, Ex e IIC Gb Ex t IIIC Db IP65
- Ex e IIC Gb, Ex tD A21 IP65

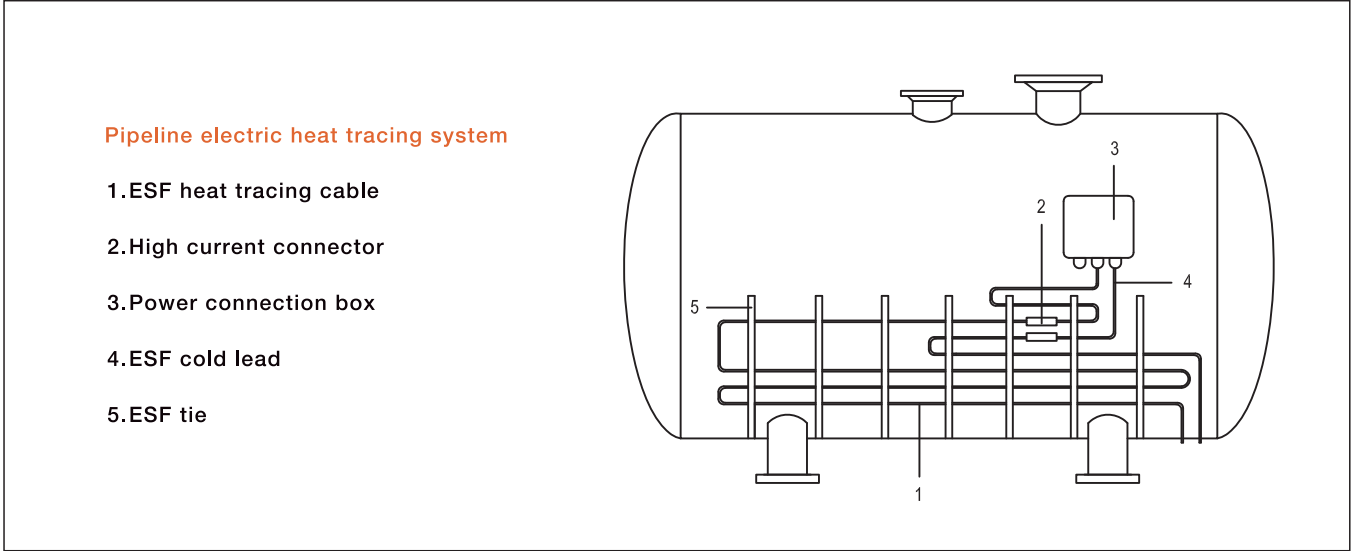
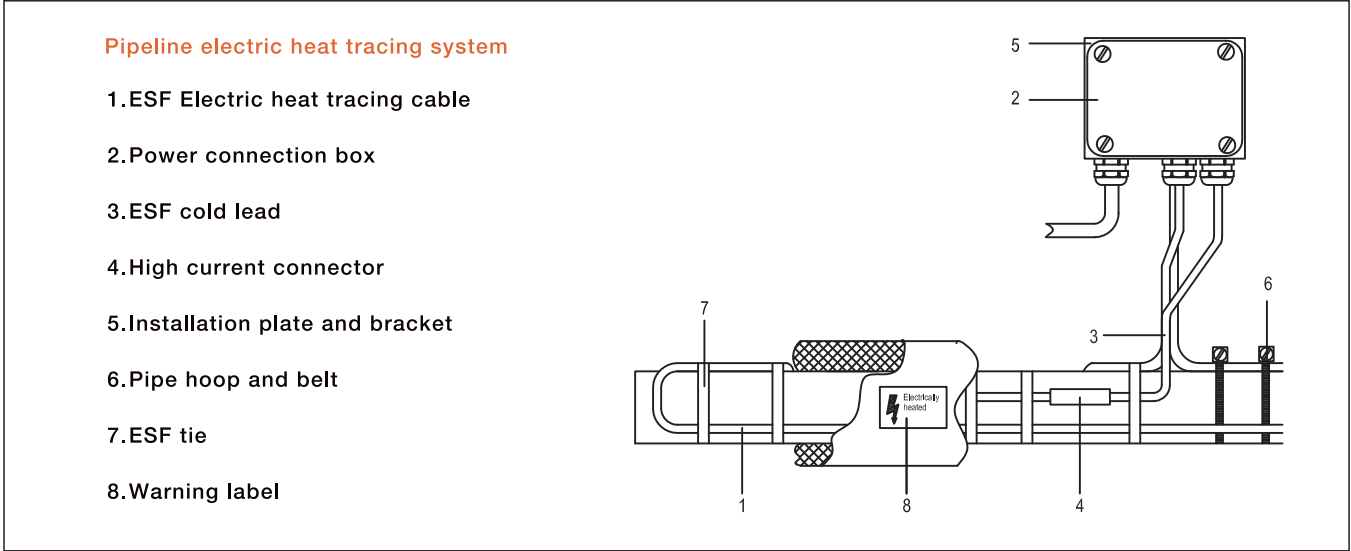
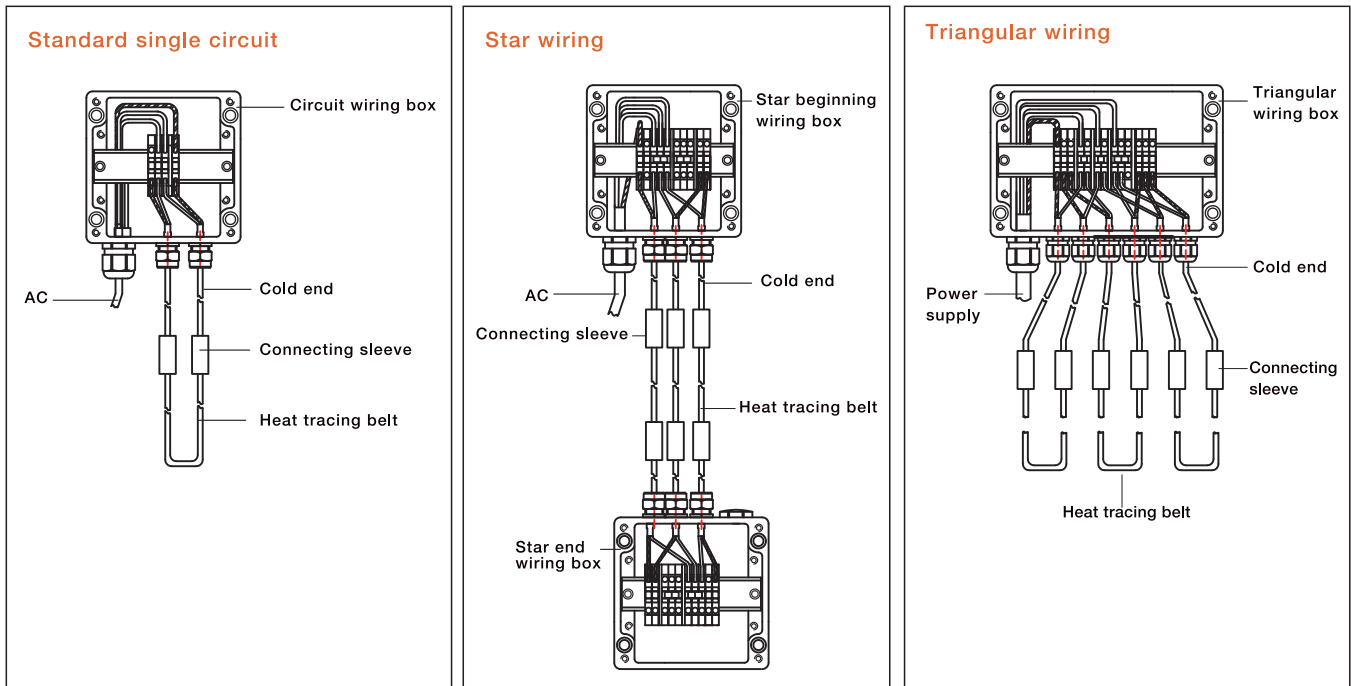
Grounding protection

Grounding protection devices are required to be installed to prevent the fault caused by any damaged or improperly installed Heating cable.

Specification

Type	Resistance at 20°CΩ/Km	Outer diameter mm	Type	Resistance at 20°CΩ/Km	Outer diameter mm
1ESF00P8	0.80	11	1ESF0230	230	4.8
1ESF01P1	1.10	9.7	1ESF0250	250	4.6
1ESF01P8	1.80	8.3	1ESF0280	280	4.6
1ESF02P9	2.90	6.9	1ESF0360	360	4.8
1ESF03P9	3.90	6.7	1ESF0480	480	4.7
1ESF04P4	4.40	6.4	1ESF0650	650	4.6
1ESF06P0	6.00	6.1	1ESF0700	700	4.5
1ESF07P0	7.00	5.8	1ESF0800	800	4.6
1ESF08P8	8.80	5.2	1ESF1000	1000	4.5
1ESF11P7	11.7	5.0	1ESF1300	1300	4.4
1ESF15P0	15.0	4.8	1ESF1470	1470	4.4
1ESF19P2	19.2	4.6	1ESF1750	1750	4.3
1ESF36P0	36.0	4.3	1ESF1900	1900	4.6
1ESF50P0	50.0	4.9	1ESF2900	2900	4.4
1ESF65P0	65.0	4.8	1ESF4000	4000	4.2
1ESF80P0	80.0	5.1	1ESF5160	5160	4.3
1ESF0100	100.0	5.2	1ESF6000	6000	4.2
1ESF0150	150.0	4.9	1ESF7000	7000	4.2
1ESF0180	180.0	4.7	1ESF8000	8000	4.1
1ESF0200	200.0	4.8			

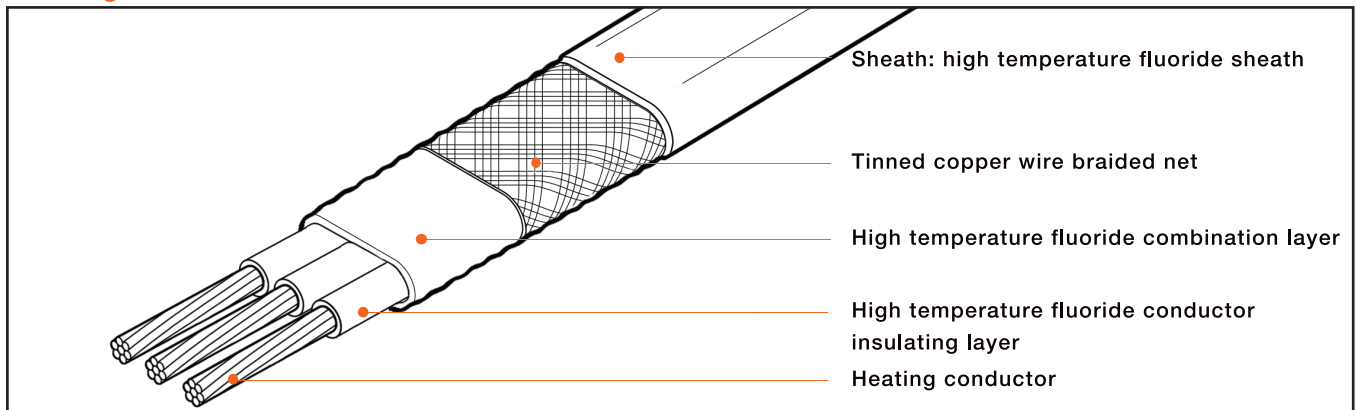
Protrace provides a complete set of installing fittings including connectors and end temperature control systems. Please consult a technical representative of Protrace for any special application



THREE-CORE SERIES CONSTANT POWER HEATING CABLE

- 3ESF three-core series constant power Heating cable is extensively used to meet the demand for technical maintenance with anti-freezing protection, high power output or high exposure temperature. It is mainly applicable for device and long distance pipeline heat tracing.
- It can be used in the explosion-proof environment, the power output each meter is constant, the cable can be easily installed and used against steam purging and chemical corrosion.
- 3ESF three-core series constant power Heating cable can be used with single point power supply, and installed for heat tracing on a 3.6Km pipeline at maximum. It can resist purging with steam at 260°C at power off.

Heating cable Structure



Application

Application situation	Explosion-proof area Common area
Chemical resistance	Organic and corrosive substance Please consult a technical representative of Protrace for the application with any specially corrosive organic or any other specially corrosive substance

Specification

Rated voltage	220V、380V、660V
Minimum installation temperature	-40°C
Temperature grade	T1-T6
Maximum exposure temperature	260°C
Minimum bending radius	30mm

Certification



Ex e II T4 Gb



Ex e IIC Gb
Ex tD A21 IP65



II 2 GD, Ex e IIC
Gb Ex t IIIC Db IP65

Grounding protection

Grounding protection devices are required to be installed to prevent the fault caused by any damaged or improperly installed Heating cable.

Specification

Type and Specification	Resistance at 20°C (Ω/Km)	Cable diameter (length+width mm)	Type and Specification	Resistance at 20°C (Ω/Km)	Cable diameter (length, width mm)
3ESF-19P2	19.2	10.0*5.1	3ESF-06P0	6.0	12.4*5.9
3ESF-15P0	15.0	10.4*5.6	3ESF-04P4	4.4	14.0*6.4
3ESF-08P9	8.9	11.5*5.6	3ESF-03P9	3.9	14.5*6.6
3ESF-07P0	7.0	12.3*5.8	3ESF-02P9	2.9	17.5*7.6



HIGH CURRENT CONNECTOR

PET-HD High current connector

Description

The PET-HD high current connector is used for explosion-proof press-molding sealed Heating cable connection system. Such new connection mode can save a lot of installation time and expense, and meanwhile, it makes the maintenance and modification of a heat tracing system easier.

There are two models of PET-HD high current connector

PET-HD-54A/E

PET-HD-54A/3E

Connected cable in 2.9Ω/km (MAX 6mm), 54A

PET-HD-129 A/E

PET-HD-129 A/3E

Connected cable in 0.8Ω/km (MAX 25mm),129A

Features

- Quick and easy installation
- Convenient on-site assembling
- Applicable in Area 1 and Area 2
- Against strong chemical corrosion
- Low cost but high performance

Explosion-proof

Explosion-proof grade Exe IIC T3-T6 Gb

Certification



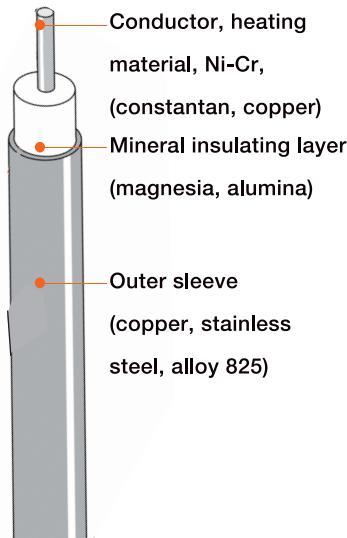
Ex e IIC Gb, Ex tD A21 IP65

Technical parameters

Rated voltage	750 V	
Ambient temperature	Min. (power on) -30°C, Max. (power off) +200°C Minimum installation temperature 0°C	
Protection grade	IP65	
Order code	PET-HD-54A/E	PET-HD-129A/E
	PET-HD-54A/3E	PET-HD-129A/3E

MSF

MSF SINGLE-CORE MINERAL INSULATION HEAT TRACING CABLE



Heat Tracing Belt Structure

- MSF high performance mineral insulating Heating cable is extensively used in places with high temperature maintenance, high temperature exposure and high power density. It is mainly applicable for device and long distance pipeline heat tracing.
- It can be used in any environment where explosion-proof is required, the power output per meter is constant, the cable has a high mechanical strength, and can be easily installed and used against strong chemical corrosion. Heating is uniform, the temperature difference of the whole length is very small, and the heating power is as high as 50w/m above. This cable will not be frozen when the steam supply is off as the power supply can be switched on if necessary. It can withstand low temperature, will not be broken in low temperature installation, and is easy for installation and maintenance in winter. The maximum maintenance temperature can be up to 580°C, the maximum exposure temperature can be up to 850°C, and the rated voltage is 600V. It is suitable for long pipeline electric heat tracing with a single power supply point.
- The alloy 825 series MSF mineral insulating heat tracing cable, made of high content Ni-Cr alloy, is highly applicable for high temperature application, as it is highly resistant against corrosion in fluoride, acid, alkali, and salt conditions. It is highly resistant against any damage under stress, and can withstand high temperature at 850°C.

Application

Application situation	Dangerous area/ non-dangerous area
Type selection	The mineral insulating heat tracing cable can be customized as per the pipeline length and service conditions.

Rated temperature

Temperature grade	Withstanding temperature: 200°C Stainless steel sheath: 600°C Alloy 825 sheath: 850°C The data above is only for reference, and a higher withstanding temperature can be designed for practical application.
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Temperature grade	T1-T6
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Certification



Ex e II T4 Gb



Ex e IIC Gb
Ex tD A21 IP65



II 2 GD, Ex e IIC
Gb Ex t IIIC Db IP65

MSF single-core "EX" heat tracing circuit type selection form

Abbr.	Complete order code	Abbr.	Complete order code		
MSF CuNi	PET-HS-MSF/CuNi****	MSF SS <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>SS1 304</td></tr> <tr><td>SS2 316</td></tr> </table>	SS1 304	SS2 316	PET-HS-MSF/SS****
SS1 304					
SS2 316					

MSF copper nickel CuNi type selection form

PET-HS-MSF/SS1 304 PET-HS-MSF/SS2 316

Type	Resistance at 20°C (Ω/Km)	Outer diameter mm	Type	Resistance at 20°C (Ω/Km)	Outer diameter mm
MSF CuNi 0004	4	5.9	MSF CuNi 0188	188	4.7
MSF CuNi 0007	7	5.3	MSF CuNi 0250	250	4.4
MSF CuNi 0011	11	4.9	MSF CuNi 0312	0312	4.2
MSF CuNi 0017	17	4.6	MSF CuNi 0400	0400	4.0
MSF CuNi 0025	25	3.7	MSF CuNi 0480	0480	3.8

MSF Copper Nickel CuNi type selection form

Type	Resistance at 20°C (Ω/Km)	Outer diameter mm	Type	Resistance at 20°C (Ω/Km)	Outer diameter mm
MSF CuNi 0040	40	3.4	MSF CuNi 0630	0630	3.7
MSF CuNi 0063	63	3.2	MSF CuNi 1000	1000	3.4
MSF CuNi 0082	82	5.7	MSF CuNi 1600	1600	3.2
MSF CuNi 0122	122	5.2	MSF CuNi 2400	2400	3.1
MSF CuNi 0160	160	4.9	MSF CuNi 4150	4150	3.0

MSF stainless steel (SS) NO.1.4541 type selection form

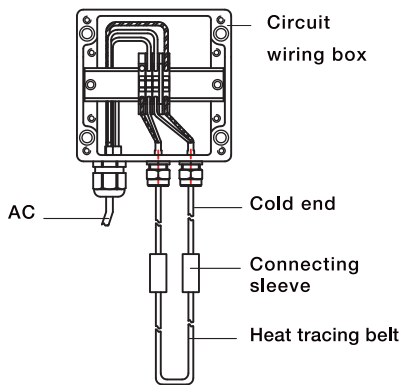
Type	Resistance at 20°C (Ω/Km)	Outer diameter mm	Type	Resistance at 20°C (Ω/Km)	Outer diameter mm
MSF SS 0002	2.1	6.8	MSF SS 0100	100	4.7
MSF SS 0003	3.4	5.9	MSF SS 0120	120	4.5
MSF SS 0005	5.3	5.3	MSF SS 0153	153	4.2
MSF SS 0007	7	5.0	MSF SS 0160	160	6.5
MSF SS 0008	8.5	4.8	MSF SS 0200	200	5.9
MSF SS 0011	11	4.5	MSF SS 0250	250	5.3
MSF SS 0013	13	4.3	MSF SS 0400	400	4.7
MSF SS 0017	17	4.2	MSF SS 0500	500	4.5
MSF SS 0021	21	4.0	MSF SS 0630	630	4.3
MSF SS 0025	25	4.7	MSF SS 1000	1000	3.9
MSF SS 0037	37	5.8	MSF SS 1600	1600	3.6
MSF SS 0040	40	5.8	MSF SS 2500	2500	3.4
MSF SS 0047	47	5.4	MSF SS 2800	2800	3.4
MSF SS 0050	50	5.4	MSF SS 3300	3300	3.4
MSF SS 0060	60	5.2	MSF SS 4000	4000	3.2
MSF SS 0063	63	5.0	MSF SS 5200	5200	3.2
MSF SS 0074	74	4.8	MSF SS 6300	6300	3.2
MSF SS 0080	80	4.8	MSF SS 10K0	10000	3.2
MSF SS 0095	95	4.7			

MSF alloy 825 type selection form

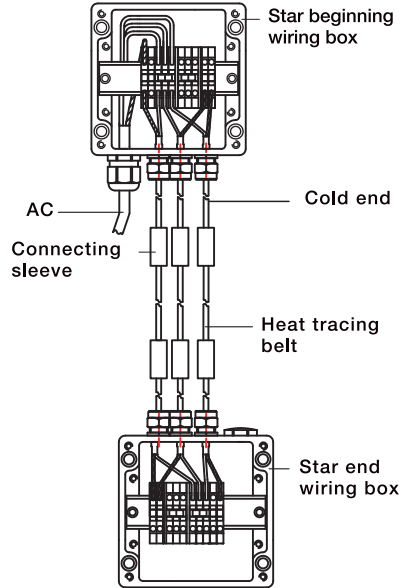
Type	Resistance at 20°C (Ω/Km)	Outer diameter mm	Type	Resistance at 20°C (Ω/Km)	Outer diameter mm
MSF In 0002	2.1	6.8	MSF In 0160	160	6.5
MSF In 0003	3.4	5.9	MSF In 0200	200	5.9
MSF In 0005	5.3	5.3	MSF In 0250	250	5.3
MSF In 08R5	8.5	4.8	MSF In 0400	400	4.7
MSF In 0013	13	4.3	MSF In 0500	500	4.5
MSF In 0021	2.1	4.0	MSF In 0630	630	4.3
MSF In 0037	37	5.8	MSF In 1000	1000	3.9
MSF In 0047	47	5.4	MSF In 1600	1600	3.6
MSF In 0050	50	5.4	MSF In 2500	2500	3.4
MSF In 0060	60	5.2	MSF In 2800	2800	3.4
MSF In 0075	75	4.8	MSF In 3300	3300	3.4
MSF In 0080	80	4.8	MSF In 4000	4000	3.2
MSF In 0095	95	4.7	MSF In 5200	5200	3.2
MSF In 0100	100	4.7	MSF In 6300	6300	3.2
MSF In 0120	120	4.5	MSF In 10K0	10000	3.2
MSF In 0153	153	4.2			

Protrace provides a complete set of installing fittings including connectors and end temperature control systems. Please consult a technical representative of Protrace for any special application

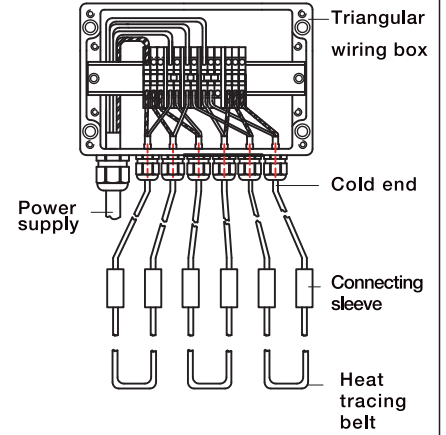
Standard single circuit



Star wiring

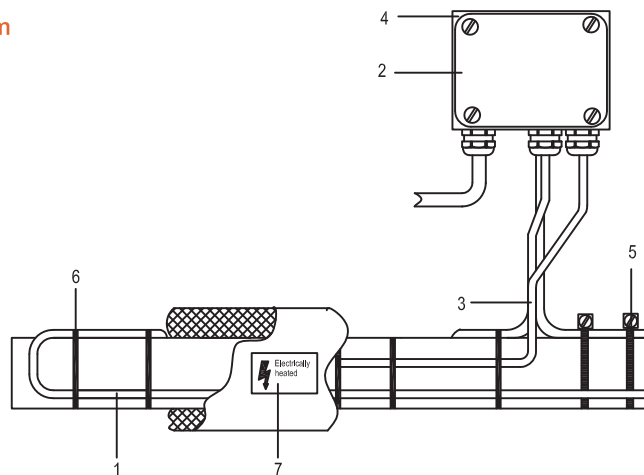


Triangular wiring



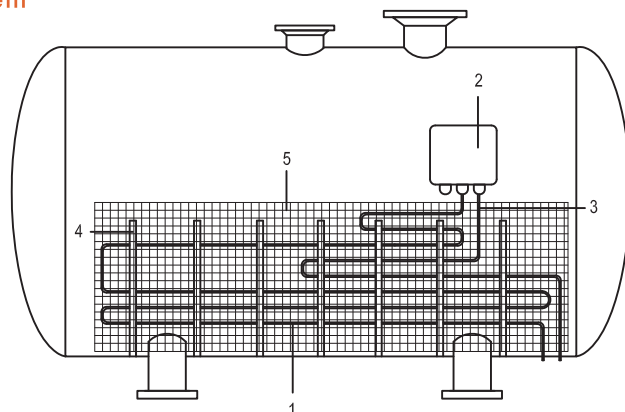
Pipeline electric heat tracing system

1. MSF electric heat tracing cable
2. Power connection box
3. MSF cold end
4. Installation panel and support set
5. Pipe hoop and cutting sleeve
6. Stainless steel wire
7. Warning label

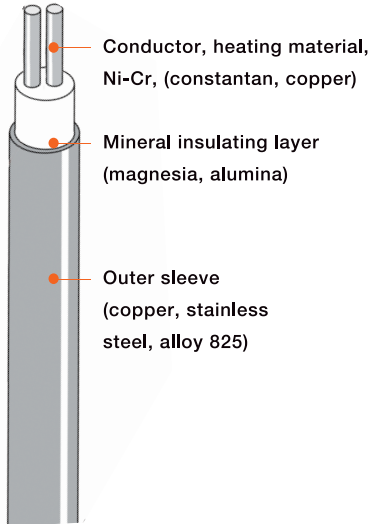


Storage cylinder heat tracing system

1. MSF heat tracing cable
2. Power connection box
3. MSF cold lead
4. Stainless steel wire
5. Stainless steel wire net



MSF SINGLE-CORE MINERAL INSULATING HEAT TRACING CABLE



Heat Tracing Belt Structure

- MSFD high performance mineral insulating Heating cable is extensively used in places with high temperature maintenance, high temperature exposure and high power density. It is mainly applicable for device and long distance pipeline heat tracing.
- It can be used in any environment where explosion-proof is required, the power output per meter is constant, the cable has a high mechanical strength, and can be easily installed and used against strong chemical corrosion. Heating is uniform, the temperature difference of the whole length is very small, and the heating power is as high as 50w/m above. This cable will not be frozen when the steam supply is off as the power supply can be switched on if necessary. It can withstand low temperature, will not be broken in low temperature installation, and is easy for installation and maintenance in winter. The maximum maintenance temperature can be up to 580°C, the maximum exposure temperature can be up to 850°C, and the rated voltage is 600V. It is suitable for long pipeline electric heat tracing with a single power supply point.
- The alloy 825 series MSFD mineral insulating heat tracing cable, made of high content Ni-Cr alloy, is highly applicable for high temperature application, as it is highly resistant against corrosion in fluoride, acid, alkali, and salt conditions. It is highly resistant against any damage under stress, and can withstand high temperature at 850°C.

Application

Application situation	Dangerous area Non-dangerous area
Type selection	The mineral insulating heat tracing cable can be customized as per the pipeline length and service conditions.

Rated temperature

Withstanding temperature	Stainless steel sheath: 600°C Alloy 825 sheath: 850°C The data above is only for reference, and a higher withstanding temperature can be designed for practical application.
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Certification



Ex e II T4 Gb



II 2 GD, Ex e IIC Gb Ex t IIIC Db IP65



Ex e IIC Gb, Ex tD A21 IP65

Product types

MSFE double-core "EX" heat tracing circuit type selection form

Abbr.	Complete order code
MSFD CuNi	PET-HS-MSFD/CuNi**** PET-HS-MSFD/SS****
MSFD SS	SS1 304 SS2 316

Stainless steel sheath mineral insulating heat tracing cable: the stainless steel sheath series mineral insulating heat tracing cable can meet the demand for high temperature and high power (up to 269W/m) application. The maximum withstanding temperature of stainless steel sheath heat tracing cable is 600°C, the conductor resistance is 28,000~19.2 Ω/Km, and the mineral insulating cable has favorable mechanical strength and corrosion resistance.

Alloy 825 sheath mineral insulating heat tracing cable: the alloy 825 sheath series mineral insulating heat tracing cable can meet the demand for high temperature and long oil transmission pipeline heat tracing application. The maximum withstanding temperature of Cu-Ni alloy sheath heat tracing cable is 850°C, the conductor resistance is 28,000~19.2Ω/Km, and the mineral insulating cable has favorable mechanical strength and corrosion resistance.

MSFD stainless steel (S/S) No.1.4541 type selection form

Type	Resistance at 20°CΩ/Km	Outer diameter mm	Type	Resistance at 20°CΩ/Km	Outer diameter mm
MSFD SS 0008	8.4	11.8	MSFD SS 1000	1000	5.7
MSFD SS 0013	13.4	9.8	MSFD SS 1300	1300	6.2
MSFD SS 0021	21	8.8	MSFD SS 2000	2000	5.8
MSFD SS 0034	34	8.0	MSFD SS 3300	3300	5.4
MSFD SS 0054	54	7.1	MSFD SS 4600	4600	5.8
MSFD SS 0085	85	6.4	MSFD SS 8000	8000	5.4
MSFD SS 0130	130	6.0	MSFD SS 013K	13000	5.0
MSFD SS 0180	180	7.9	MSFD SS 027K	27000	4.8
MSFD SS 0260	260	7.4	MSFD SS 040K	40000	4.6
MSFD SS 0360	360	6.8	MSFD SS 060K	60000	4.4
MSFD SS 0500	500	6.4	MSFD SS 072K	72000	4.2
MSFD SS 0650	650	5.9			

MSFD alloy 825 type selection form

Type	Resistance at 20°CΩ/Km	Outer diameter mm	Type	Resistance at 20°CΩ/Km	Outer diameter mm
MSFD In 0008	8.4	11.8	MSFD In 1000	1000	5.7
MSFD In 0013	13.4	9.8	MSFD In 1300	1300	6.2
MSFD In 0021	21	8.8	MSFD In 2000	2000	5.8
MSFD In 0034	34	8.0	MSFD In 3300	3300	5.4
MSFD In 0054	54	7.1	MSFD In 4600	4600	5.8
MSFD In 0085	85	6.4	MSFD In 8000	8000	5.4
MSFD In 0130	130	6.0	MSFD In 013K	13000	5.0
MSFD In 0180	180	7.9	MSFD In 027K	27000	4.8
MSFD In 0260	260	7.4	MSFD In 040K	40000	4.6
MSFD In 0360	360	6.8	MSFD In 060K	60000	4.4
MSFD In 0500	500	6.4	MSFD In 072K	72000	4.2
MSFD In 0650	650	5.9			

Protrace provides a complete set of installing fittings including connectors and end temperature control systems. Please consult a technical representative of Protrace for any special application

**SINGLE CHANNEL
DIGITAL DISPLAYING CONTROLLER**



The STC economical three-digit single channel digital displaying controller in a modularization structure can be easily operated with a high performance cost ratio, it can be used for light industry machines, ovens and experimental devices and other devices that temperature control within 0~999°C in heating or cooling. The instrument displays through a double-row three-digit nixie tube, various thermal resistance and thermocouple input signals are provided for option, the measurement accuracy is 0.3%FS; 5 external dimensions can be available, 2-route warning is supported, and transformed transmission can be realized. The input end, output end and power supply end are photoelectrically isolated, the power supply is 100~240V AC/DC or 12~36V DC, it can be installed through standard plug-in, the ambient temperature is 0~50°C, and relative humidity is 5~85%RH without condensing.

Functions

- Single-route input, three-digit double-row nixie tube displaying
- Various thermal resistance and thermocouple input signals for option
- Upper and lower limit warning, LED warning indicator
- The thermal resistance and thermocouple signal resolution can be switched: 1°C or 0.1°C
- Optional voltage and current transformed output signals
- RS485 communication interface, standard MODBUSRTU communication protocol
- Input, output, power supply and communication are photoelectrically isolated
- Parameter setting locked by password, parameters set permanently protected against power failure

Features

- Double display
- Factory default parameters resettable
- Sensor monitor

Technical parameters

Service environment	0~50°C; away from any strong corrosive gas
Relative humidity	5—85%RH
Measurement accuracy	0.3%FS
Setting mode	Touch panel setting by number keys; well set parameters protected by password, and permanently saved against any power failure
Displaying mode	-Measured value displaying within -999~999; LED working state displaying
Power supply voltage	100~240V AC/DC or 12~36V DC
Structure	Standard plug-in embedding
Digital communication	The digital communication displayer communicates with PC or a computer network system, so an isolating interface panel should be used, or the communication may be influenced by any disturbance or earth potential difference. The conducting wire should be shielded twisted pair wire

MULTI-CHANNEL DIGITAL TEMPERATURE CONTROLLER



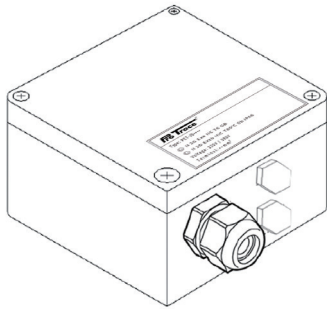
MTC multi-channel digital temperature controller with 1~48 route universal input (optional input: standard voltage, standard current, thermocouple, thermal resistance, millivolt, etc.). It provides 18-route warning output or 12-route analog transformed output, RS232/485 communication interface, Ethernet interface, micro-printer interface and USB interface, SD card socket; sensor power supply, powerful displaying function, real-time curve displaying, history curve recalling, column chart displaying, and warning list displaying, etc. It is integrated with humanized appearance design, complete functions, reliable hardware, exquisite manufacture process, and higher performance price ratio.

Functions

- 7-inch 800M 80 lattice wide screen TFT high brightness colorful graphic LCD
- The operating interface can be freely switched between Chinese and English, it can be easily used, the configuration is simple and reliable, and the software password lock protects the configuration safety
- High speed and high performance 32-digit ARM micro-processor, built-in embedded operating system, real-time detecting displaying, recording and warning;
- Parameters and history data saved in a large capacity FLASH memory chip, permanently saved against power failure
- Full aluminum casing ensures the instrument can normally work in bad conditions

Technical parameters

Service environment	-10~+50°C
Relative humidity	10~90%RH
Control accuracy	±0.2%FS
Setting mode	Touch panel setting by number keys; well set parameters protected by password, and permanently saved against any power failure
Displaying mode	7-inch 800×480 lattice wide screen TFT high brightness colorful graphic LCD, LED backlight, clear picture, wide angle of view. The content displayed can be composed of Chinese characters, numbers, process curves and column charts, etc. Page turning, history data searching and curve time mark modifying, etc. can be realized through keys on the panel
Power supply voltage	85~264VAC or 12~36VDC
Memory capacity	Internal Flash memory capacity 64M Byte
Signal input	48-channel isolated universal signal input, 250VAC above for isolating between channels, and 500VAC above for isolating between channels and the ground.
Communication setting	Standard serial communication interface, ModBus-RTU communication protocol, 10M Ethernet standard RJ45 interface, ModBus-TCP communication protocol



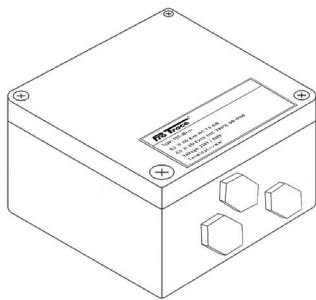
Safety enhanced explosion-proof power supply connection box

ACCESSORIES

Type: PET-JB****

Safety enhanced explosion-proof power supply connection box. The connection between the power supply line and electric Heating cable in the explosion-proof area is generally fixed to the pipeline. It can be used with the Heating cable in Area 1 and Area 2 of plant involved with explosive gas mixture T4. The casing is made of glass fiber polyester with high corrosion resistance, high mechanical strength and high insulating intensity, etc., and the sealing element is made of silicon rubber which resists high temperature at 300°C and high pressure. Multiple circuits can be output at the same time through the explosion-proof power supply connection box.

Rated voltage: 220V/380V Protection grade : IP66
Rated current: 40A Explosion-proof mark; Exe IIT4Gb

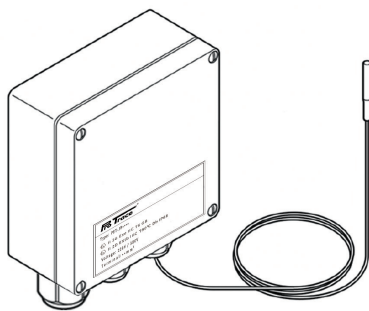


Explosion-proof type T connection box (commonly known as T-piece)

Type: PET-JB****

It is used for installing the Heating cable at a T position of the pipeline in an explosion-proof area. The casing is made of glass fiber polyester with high corrosion resistance, high mechanical strength and high insulating intensity, etc., and the sealing element is made of silicon rubber which resists high temperature at 300°C and high pressure.

Rated voltage: 220V/380V
Rated current: 40A
Protection grade : IP66
Explosion-proof grade: Exe IIT4Gb



Explosion-proof mechanical temperature controller

Type: PTMC-****

The temperature controller provides temperature control in the dangerous area 2. It can be directly connected to the Heating cable.

20 - 50°C, 32A PTMC-50/32A

0~120°C, 32A PTMC-120/32A

0-200°C, 32A PTMC-200/32A

Application area: explosion-proof dangerous area 2

Minimum ambient temperature: -55°C

Power supply voltage: 230V+10%-15%/50/60Hz

Maximum switch current: 32A250VAC

Protection grade : IP66



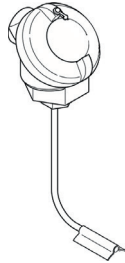
Warning label

Chinese and English warning label, circuit

Chinese and English warning label, connector

Chinese and English warning label, terminal

ACCESSORIES



PT100 thermometer

Type: PET-PT100

PT100 thermometer is applicable for explosion-proof application, it is also in the explosion-proof structure, and the probe can be bent.

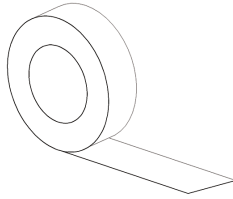
The sensor is a three-wire resistance temperature probe usually used with a monitor system for precise temperature control.

Resistance: 100Ω at 0°C Sensor casing: 316 L

Test voltage: 10~100V Temperature range: -200°C~450°C

Measuring current: ≤5mA Explosion-proof type: Ex d IIC T1~T6Gb IP65

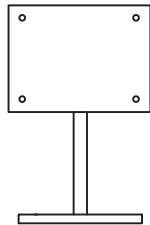
Ex d IIB T1~T6Gb IP65



Heat resistant pressure sensitive adhesive tape

Type: PET-GAT

The heat resistant pressure sensitive adhesive tape is the tape that painted a layer of special adhesive agent on the glass fiber cable, the tape is 20mm wide and 20m long, it is used to fix the electric Heating cable radially along the pipeline, the length is provided as per the heat tracing pipeline outer diameter and length, the space is fixed as per the pipeline diameter and is usually 0.5~0.8mm, and the consumption of the pressure sensitive tap is usually the pipeline perimeter × pipeline length × 8 (comprehensive coefficient).

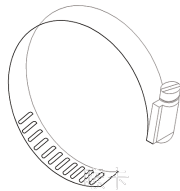


Installation plate and bracket set

Type: PET-JBM****

It is used to fix a connection box or a temperature controller onto a pipeline or container.

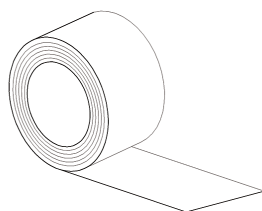
Material: stainless steel 304



Pipe hoop

Type: PET-SST

The pipe hoop consists of a stainless steel cable and adjusting screws, and it is used to fix an explosion-proof power supply connection box and its accessories onto a pipeline. The steel cable can be cut at 1.1 times the actual length fixed according to the pipeline outer diameter. Fix the front and back ends of the adjusting screw into the small hole at both ends, and then tighten the screw.



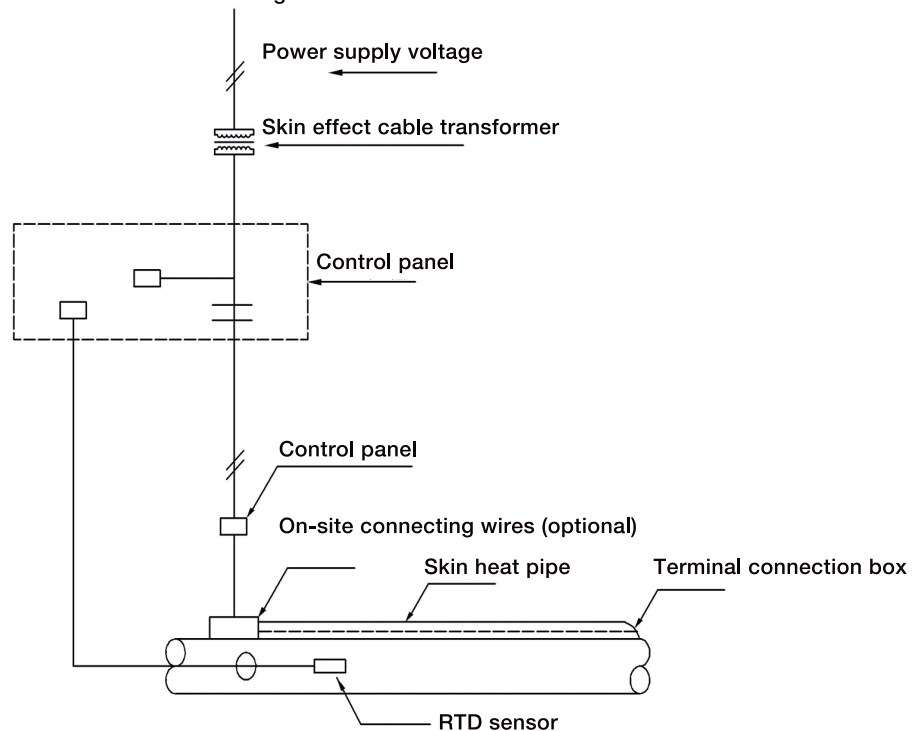
Aluminum adhesive tape

Type: PET-AT

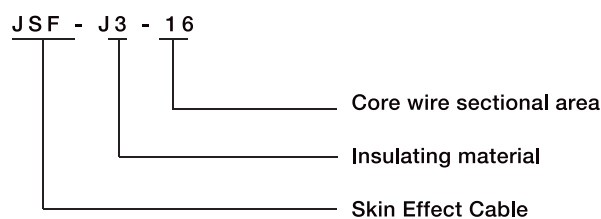
The aluminum adhesive tape is made of aluminum foil tape with a special adhesive agent painted. It is used to fix the Heating cable along, and the temperature sensing pack of the temperature controller, thus to facilitates installation, and the main function is to fix the Heating cable, enlarge the heat emitting area and improve the heat conductance. This tape is 50mm wide and 50m long per reel. The consumption of aluminum adhesive tape is 1.2 times of the electric Heating cable quantity.

SKIN EFFECT CABLE

- The skin effect system is a safe, reliable and effective solution for long distance pipeline in dangerous and explosive areas, underground and underwater pipelines.
- It can be used for long distance pipelines, the power is supplied from a single end, it is electrically safety, and can be installed easily and reliably with a low heat surface resistance.
- Comparing with the application of any traditional resistance heat tracing material on a long transmission pipeline, the skin effect system provides a more economical and effective heat tracing option. It is an exclusive system which can heat a pipeline as long as 25km by single-end other than parallel power supply. It is also the most effective and economical solution for any long pipeline in a parallel power supply network. The power output can reach 200w/m, and the operating temperature can up to 200°C. The heat energy generated in the "heating pipe" is through the impedance from the current flowing on the inner surface of the "heating pipe". There is no voltage or current on the outer surface of the "heating pipe".
- The working principle of skin effect is based on the "skin effect" and "proximity effect" of AC. As the carbon steel pipe has a strong magnetism, there will be significant skin effect even under the working frequency voltage. The skin effect is a phenomenon that AC will gradually attached to the conductor surface when it flows through a carbon steel conductor. The proximity effect is an electromagnetic phenomenon between a pair of conductor with equivalent but opposite currents (the magnetic field intensity is equal, the polarities are opposite, and electrons are attracted because the currents are equivalent but the current directions are opposite). When the system is energized the current will flows from one end of the conductor line to the other end, the current is centralized on the inner wall surface of the heating pipe by the skin effect and proximity effect, and the joule generated from the thin inner wall is used to meet the demand for heat tracing.

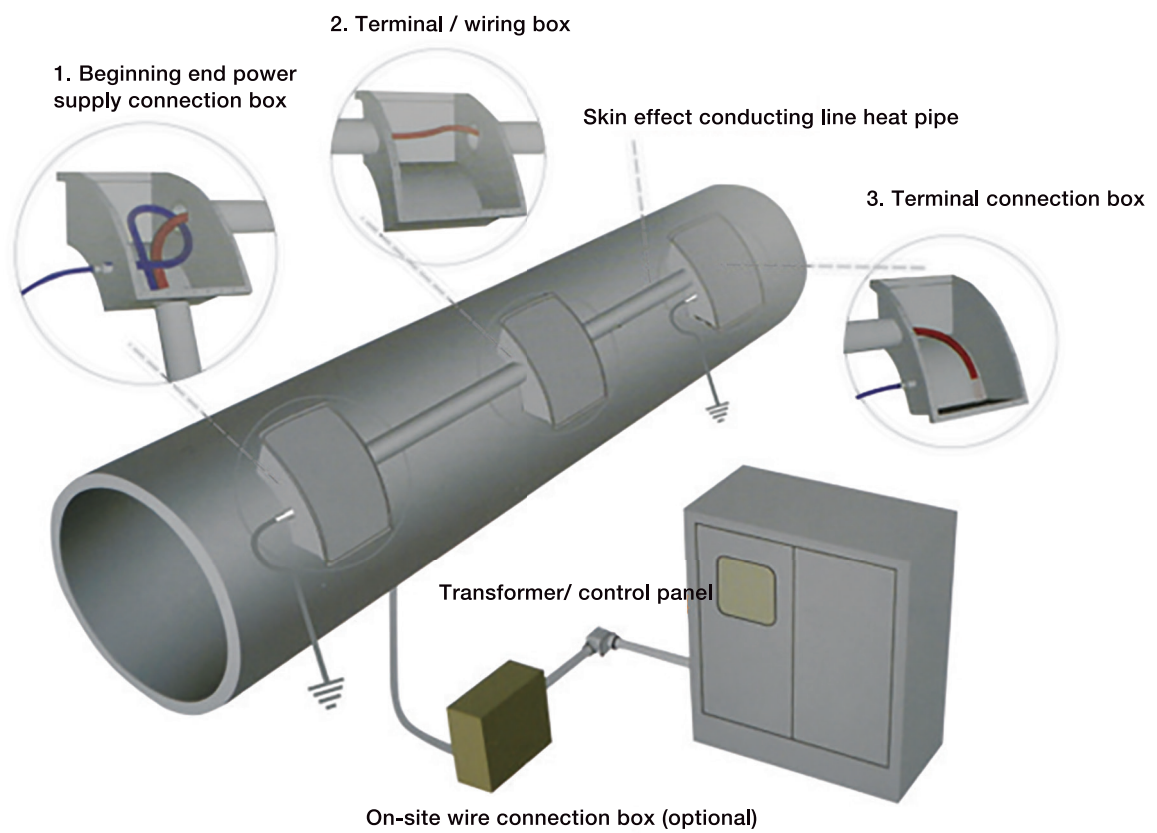
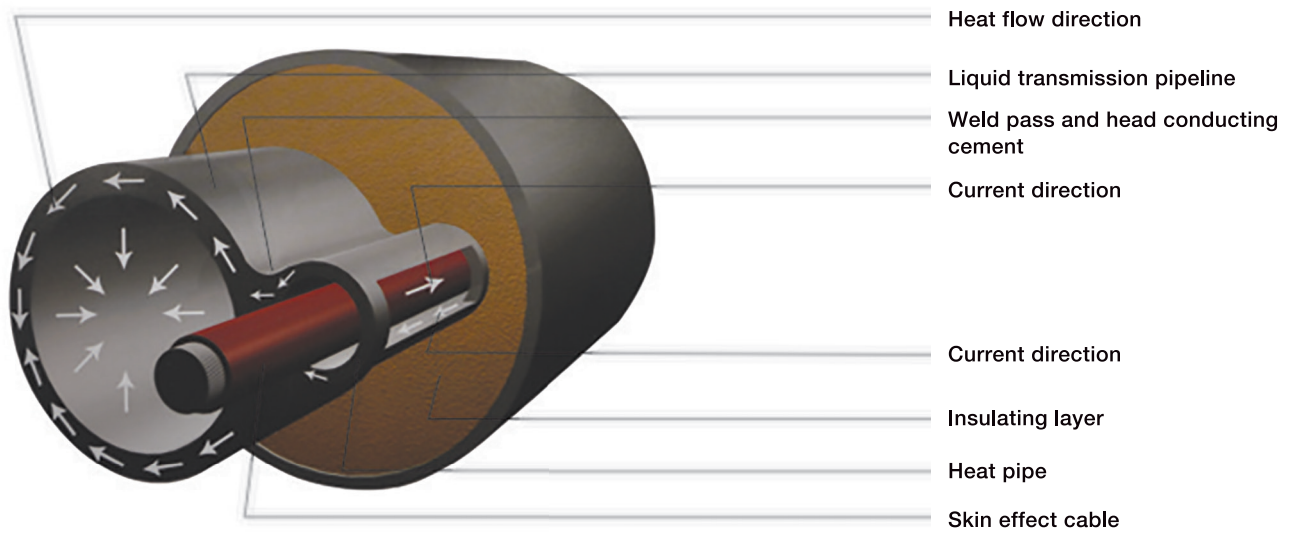


Product types description



To order the skin effect cable accurately, please consult a technical representative of Protrace.

Heat conductance map



Protrace provides a complete set of installing fittings including connectors and end temperature control systems. Please consult a technical representative of Protrace for any special application

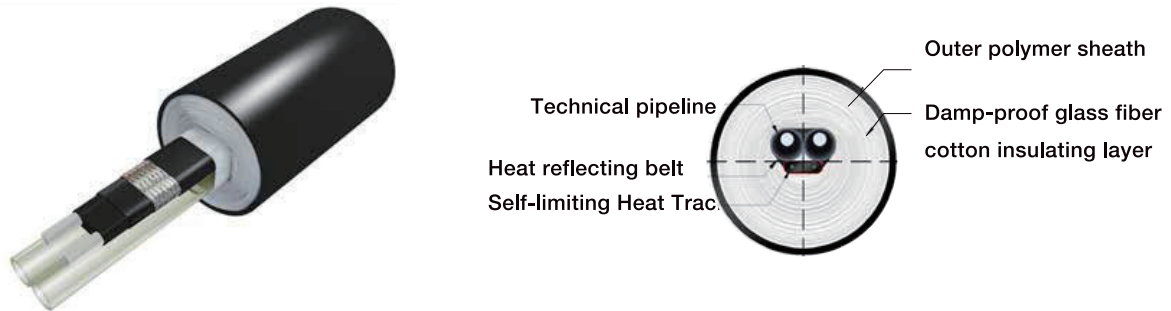
INTEGRATED TUBE CABLE

Description of the Self-limiting cable product

The integrated tube cable is a heat tracing and insulating tube cable product integrated with small-size material conducting tube, electric Heating cable, heat insulating material and outer sheath. The sampling tube can be made of different materials. Including: PFA, FEP, PTFE or stainless steel tubes. The Heating cable can be intermediate or high temperature Self-limiting Heating cable with compensating conducting cables and power supply cables, etc. additionally.

Features of the Self-limiting tube cable product

- It can be freely cut into any length
- The heat output from the Heating cable varies with the change of ambient temperature
- It is applicable for common (non-classified) situations and dangerous area 1 and 2 (classified) in Class 2.



Self-limiting tube cable product type selection

SN	Name	Specification	Electrical indication test		Remarks
			In-pipe temperature maintained	Pipeline surface temperature	
1	Integrated Tube Cable	PG-HA6*1-40W/D38	100°C-130°C	40°C±2°C	F: Constant power heat tracing; A/B: Fluoride tube material; S: Stainless steel tube material; 40w: pipeline power; 38/42: outer diameter; Please contact a technical representative of Protrace for any other configuration.
2	Integrated Tube Cable	PG-HA6*2-40W/D38	100°C-130°C	40°C±2°C	
3	Integrated Tube Cable	PG-HA8*1-40W/D38	100°C-130°C	40°C±2°C	
4	Integrated Tube Cable	PG-HA8*2-40W/D38	100°C-130°C	40°C±2°C	
5	Integrated Tube Cable	PG-HA10*1-40W/D42	100°C-130°C	40°C±2°C	
6	Integrated Tube Cable	PG-HA10*2-40W/D42	100°C-130°C	40°C±2°C	
7	Integrated Tube Cable	PG-HA6*2-60W/D42	150°C-180°C	40°C±2°C	
8	Integrated Tube Cable	PG-HA8*2-60W/D42	150°C-180°C	40°C±2°C	
9	Integrated Tube Cable	PG-HA10*2-60W/D42	150°C-180°C	40°C±2°C	
10	Integrated Tube Cable	PG-HB8*1-20W/D38	50°C-80°C	20°C±2°C	
11	Integrated Tube Cable	PG-HB6*2-35W/D38	100°C-130°C	35°C±2°C	
12	Integrated Tube Cable	PG-HB10*2-60W/D45	150°C-180°C	40°C±2°C	

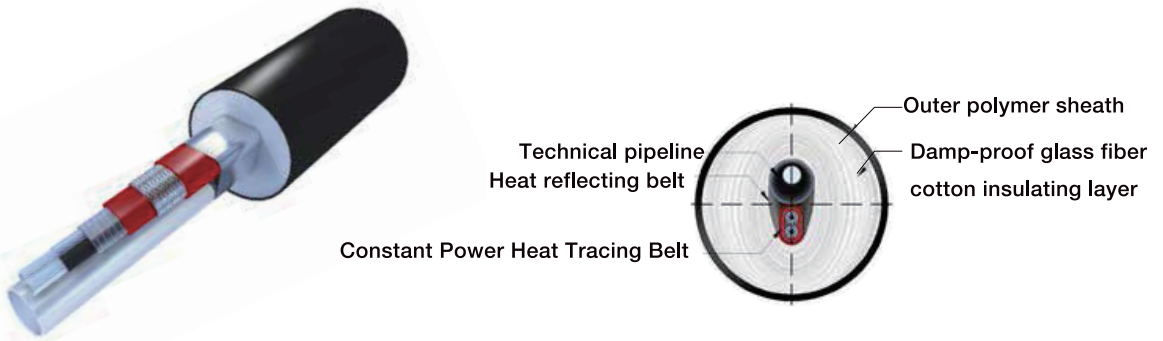
INTEGRATED TUBE CABLE

Description of the constant power tube cable product

The integrated tube cable is a heat tracing and insulating tube cable product integrated with small-size material conducting tube, electric Heating cable, heat insulating material and outer sheath. The sampling tube can be made of different materials. Including: PFA, FEP, PTFE or stainless steel tubes. The parallel constant power Heating cable with different power can be chosen as per the demand for temperature, and compensating conducting cable and power supply cable can be provided additionally.

Product features of the constant power tube cable

- It can be cut on site as per the heating unit length
- The power output is constant at different temperatures
- It is more suitable for heating



Constant power composite tube bundle type selection

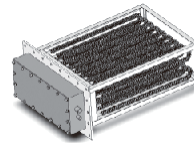
SN	Name	Specification	Electrical indication test		Remarks
			In-pipe temperature maintained	Pipeline surface temperature	
1	Integrated Tube Cable	PG-FA6*1-40W/D38	120°C-180°C	40°C±2°C	F: Constant power heat tracing; A/B: Fluoride tube material; S: Stainless steel tube material; 40w: pipeline power; 38/42: outer diameter; Please contact a technical representative of Protrace for any other configuration.
2	Integrated Tube Cable	PG-FA6*2-40W/D38	120°C-180°C	40°C±2°C	
3	Integrated Tube Cable	PG-FA8*1-40W/D38	120°C-180°C	40°C±2°C	
4	Integrated Tube Cable	PG-FA8*2-40W/D38	120°C-180°C	40°C±2°C	
5	Integrated Tube Cable	PG-FA10*1-40W/D42	120°C-180°C	40°C±2°C	
6	Integrated Tube Cable	PG-FA10*2-40W/D42	120°C-180°C	40°C±2°C	
7	Integrated Tube Cable	PG-FB6*2-60W/D42	150°C-180°C	40°C±2°C	
8	Integrated Tube Cable	PG-FB8*2-60W/D42	150°C-180°C	40°C±2°C	
9	Integrated Tube Cable	PG-FB10*2-60W/D42	150°C-180°C	40°C±2°C	
10	Integrated Tube Cable	PG-FS8*1-60W/D42	120°C-180°C	40°C±2°C	
11	Integrated Tube Cable	PG-FS6*1-60W/D42	120°C-180°C	40°C±2°C	
12	Integrated Tube Cable	PG-FS10*1-60W/D45	120°C-180°C	40°C±2°C	

INDUSTRIAL ELECTRIC HEATER



Channel Electric Heater

It is mainly used for air heating in a duct, and low temperature type, intermediate temperature type and high temperature type are provided.



Low temperature type Gas heated $\leq 160^{\circ}\text{C}$ Intermediate temperature type Gas heated $\leq 260^{\circ}\text{C}$ High temperature type Gas heated $\leq 500^{\circ}\text{C}$



Circulating electric heater

The fluid is heated by forced convection. It is a heating mode by forced circulating through a pump.

Features

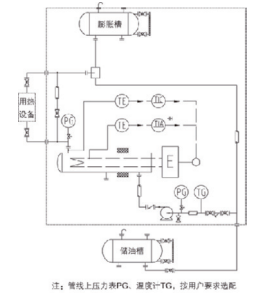
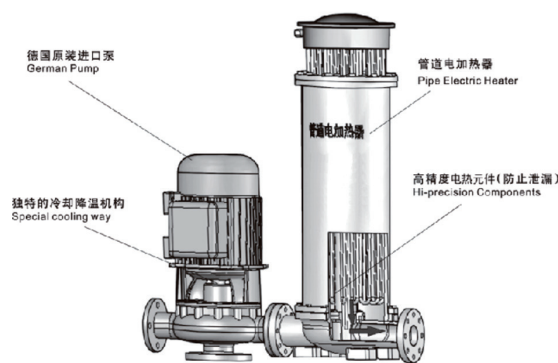
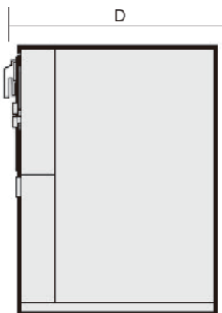
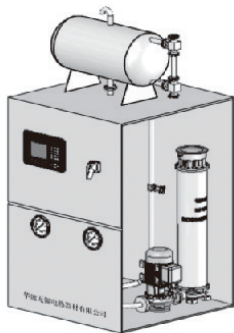
- Small cubage but large power;
- Fast heat response, high temperature control accuracy, and high integrated heat efficiency;
- Extensive application, high applicability, suitable for explosion-proof situations, and Grade C explosion-proof;
- High heating temperature, 700°C ;
- Fully automatic control, connected to a computer for man-machine dialog;
- Long service life and high safety and reliability.

Conducting oil electric heating system

It is a new, energy saving and special industrial heater which can provide high temperature heat energy.

Principle of heat supply

A conducting oil is used as the carrier which is forced to circulate by a pump and the heat energy will be provided to the heat consuming device.



系统P & ID图



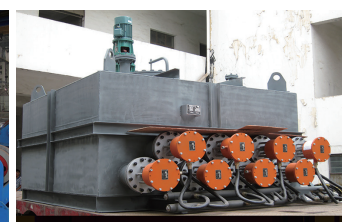
Air heater



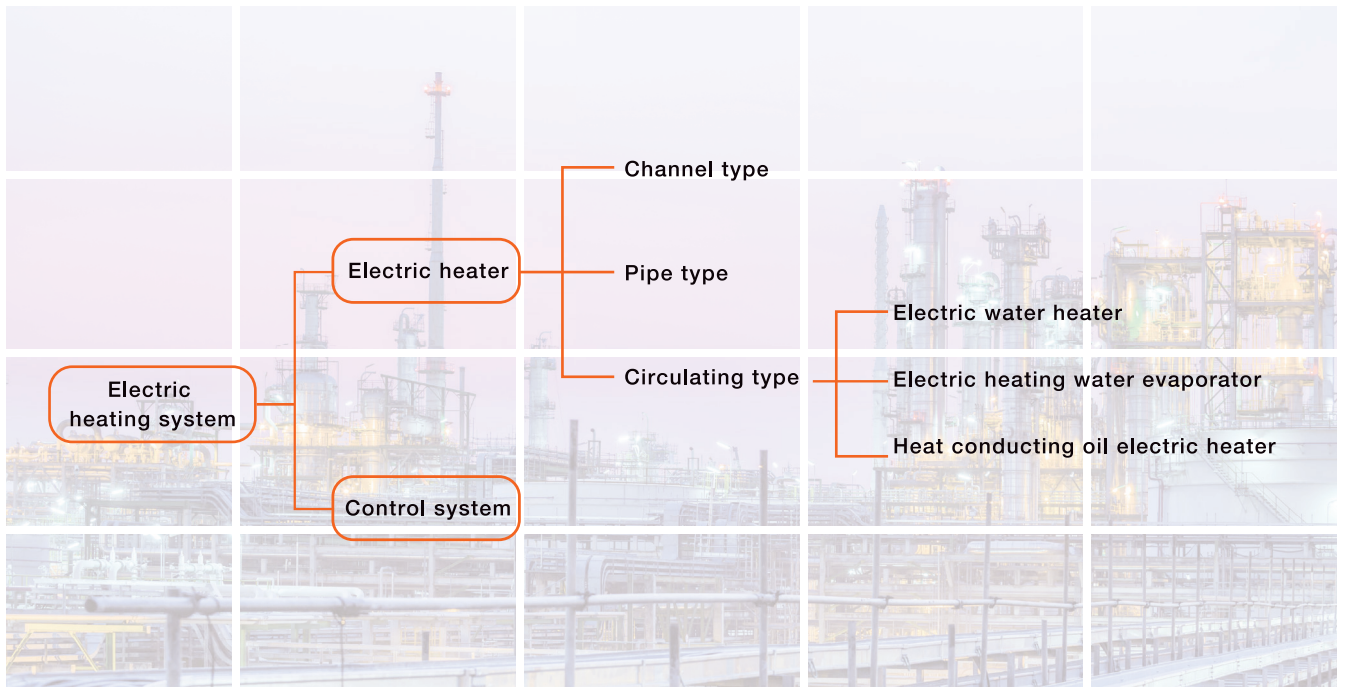
Ocean electric heater block



Synthetic ammonia HV electric heater



Molten salt electric heater



Certification of qualification

1. Class A2 pressure vessel manufacture license

2. EX

3. ATEX

4. 3C

5. ISO9001

6. S014000

7. CE

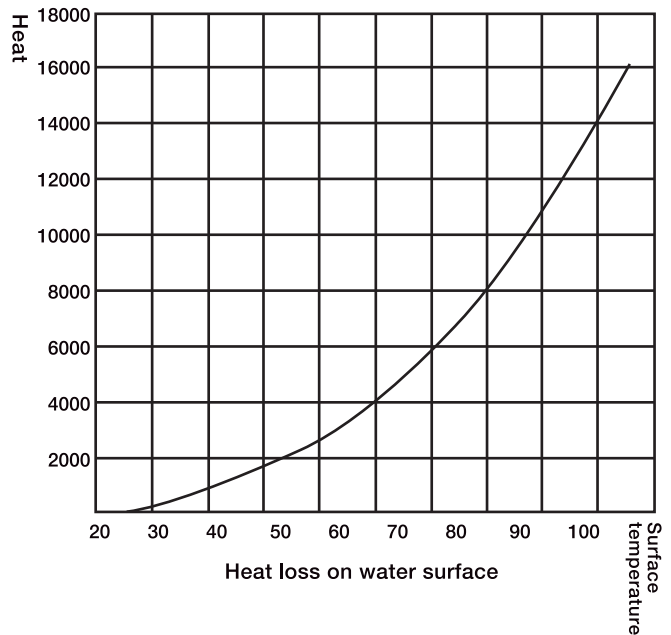
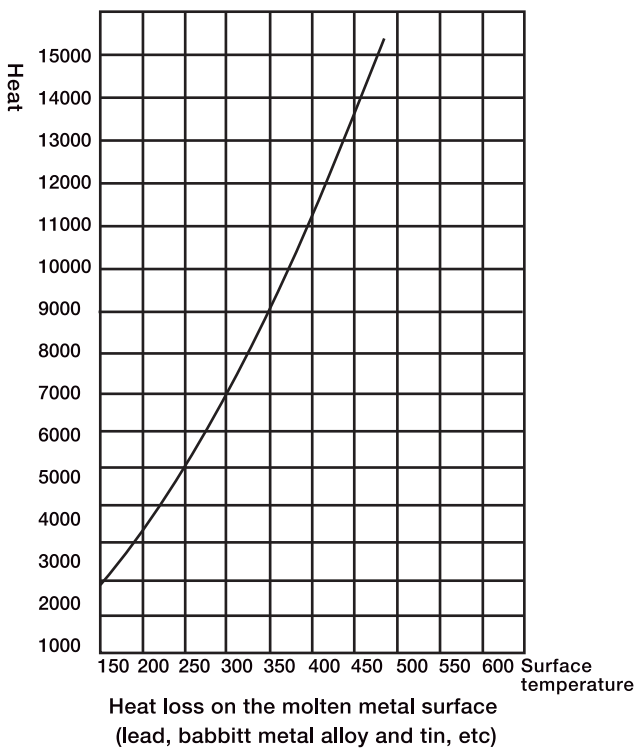
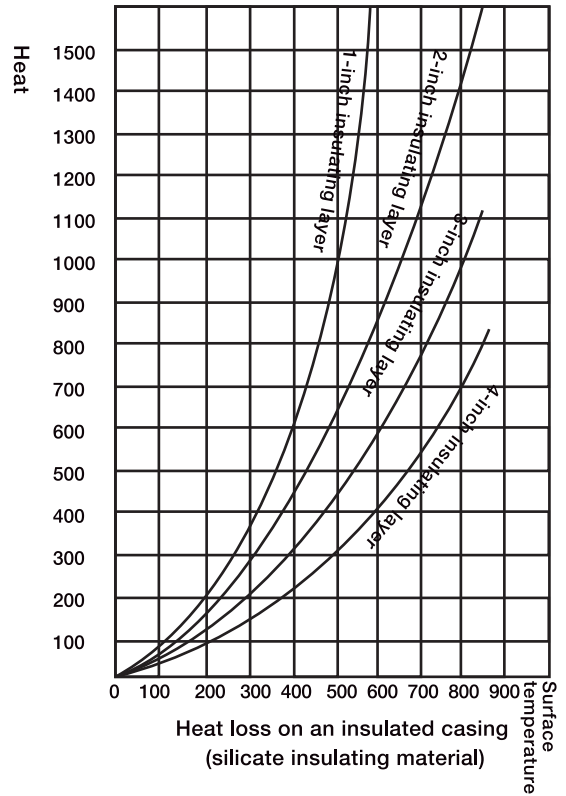
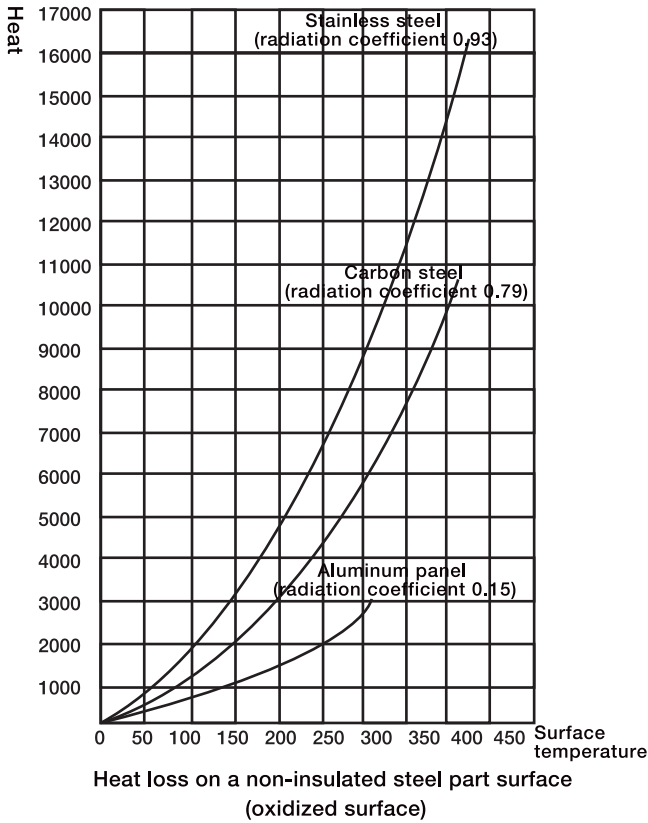
8. BV

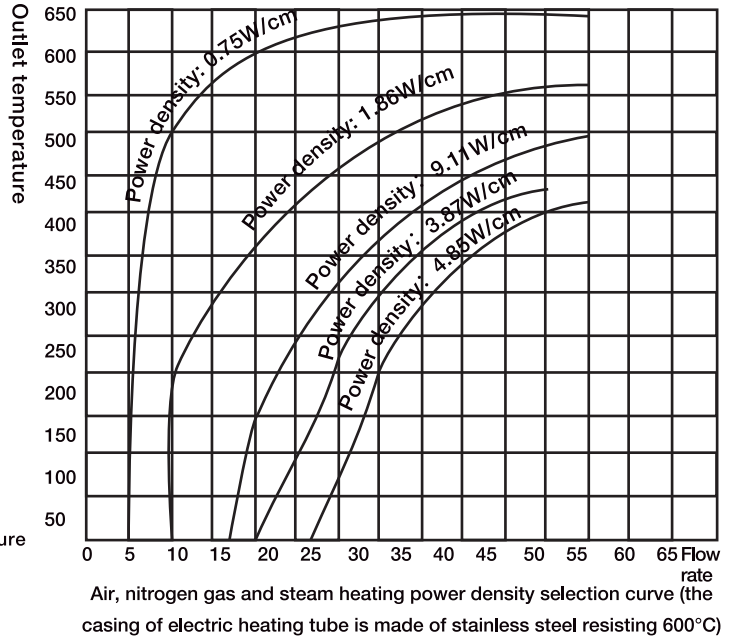
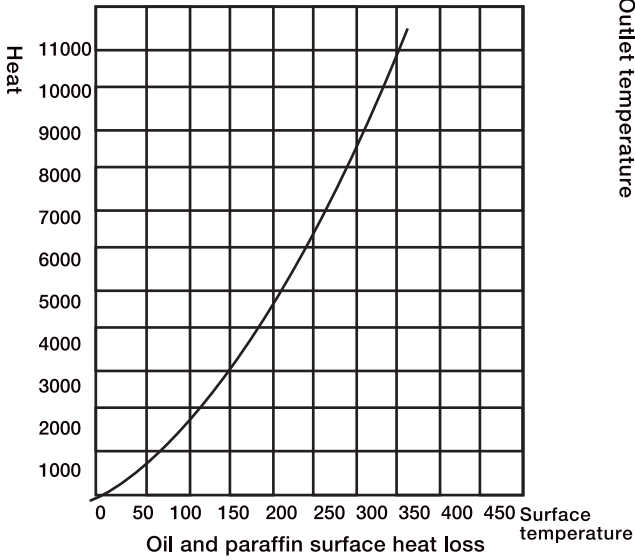
9. ABS

10. CCS

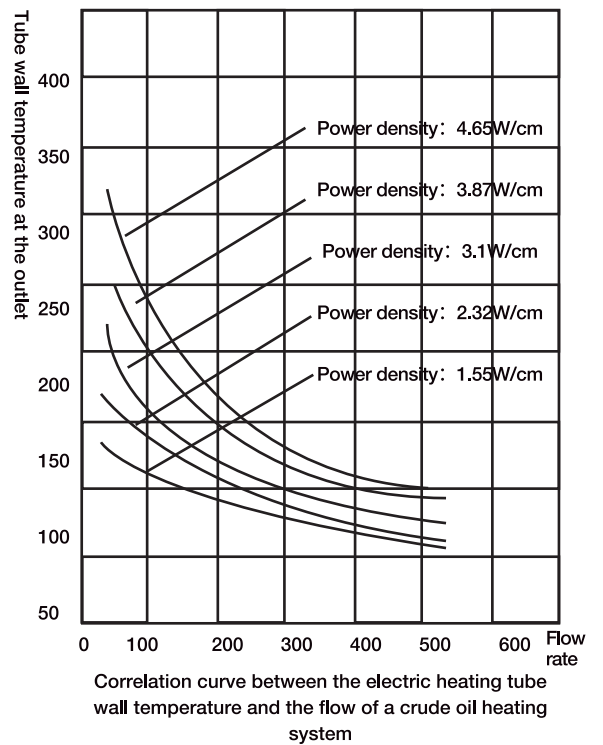
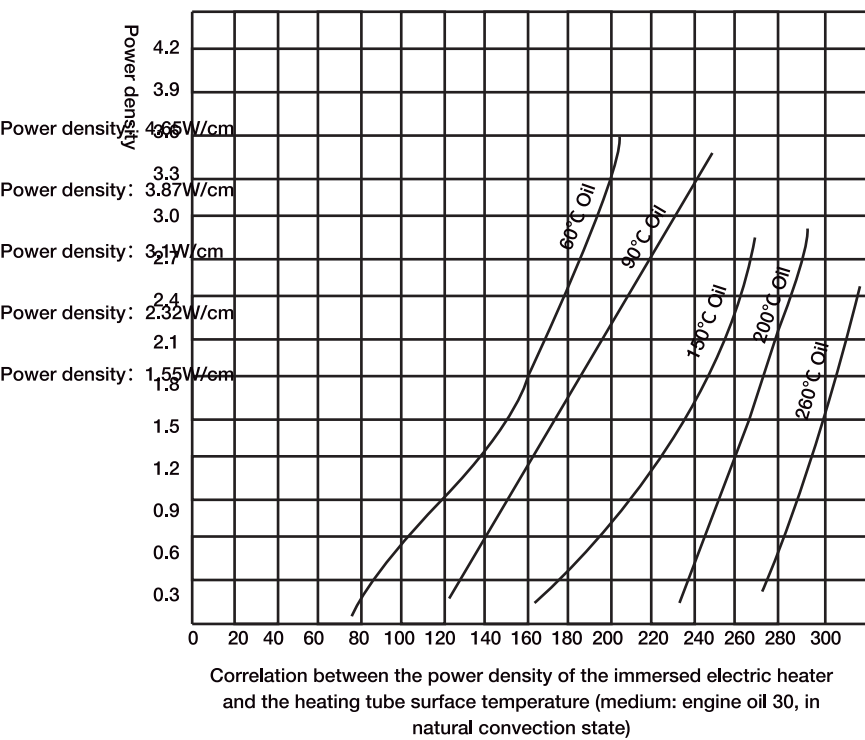


REFERENCE OF COMMON PERFORMANCE CURVE AND COMMON MEDIA PROPERTIES

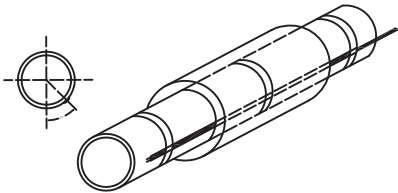




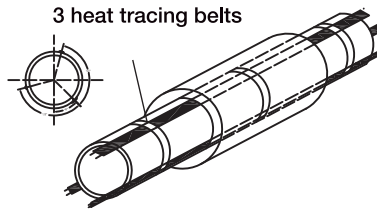
Air, nitrogen gas and steam heating power density selection curve (the casing of electric heating tube is made of stainless steel resisting 600°C)



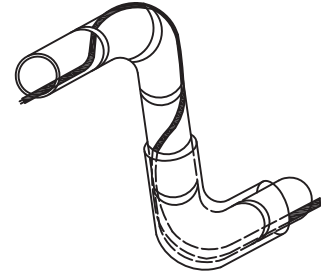
PAVING METHOD OF SELF-LIMITING HEATING CABLE



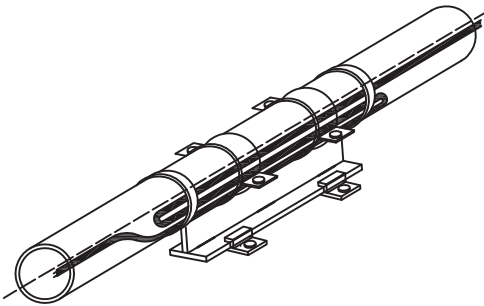
Straight tube



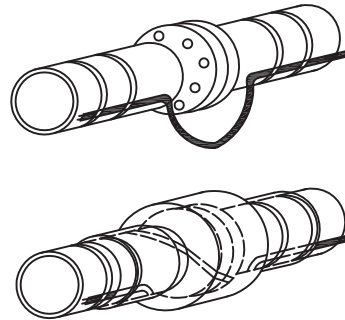
Straight tube



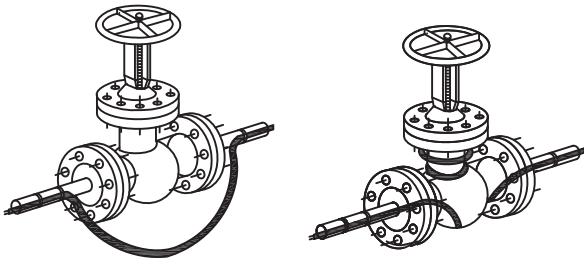
Bend



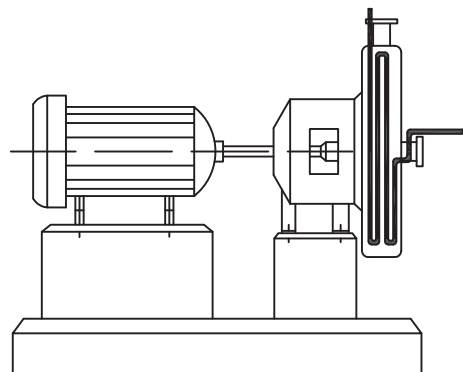
Support



Flange

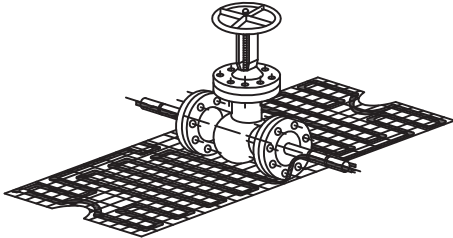


Valve

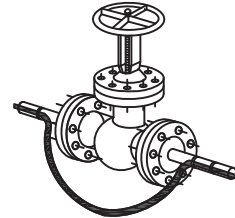
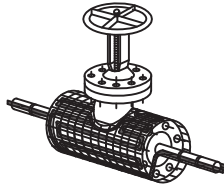


Pump

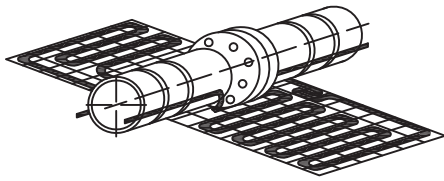
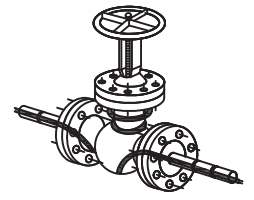
PAVING METHOD OF CONSTANT POWER HEATING CABLE



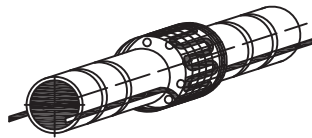
Valve



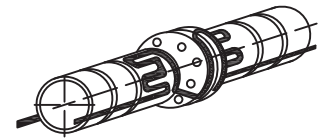
Valve



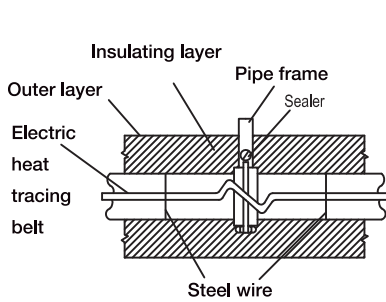
Flange



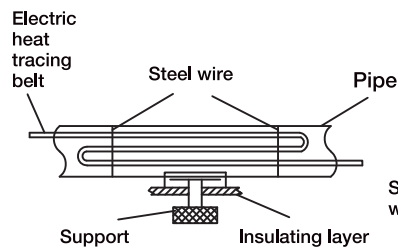
Flange



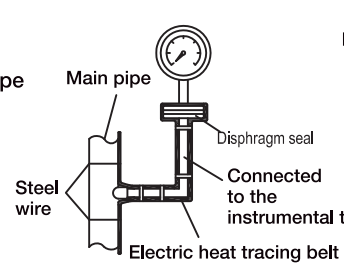
Flange



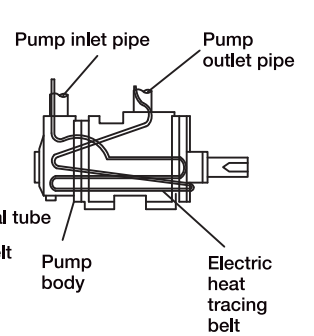
Pipe frame



Support

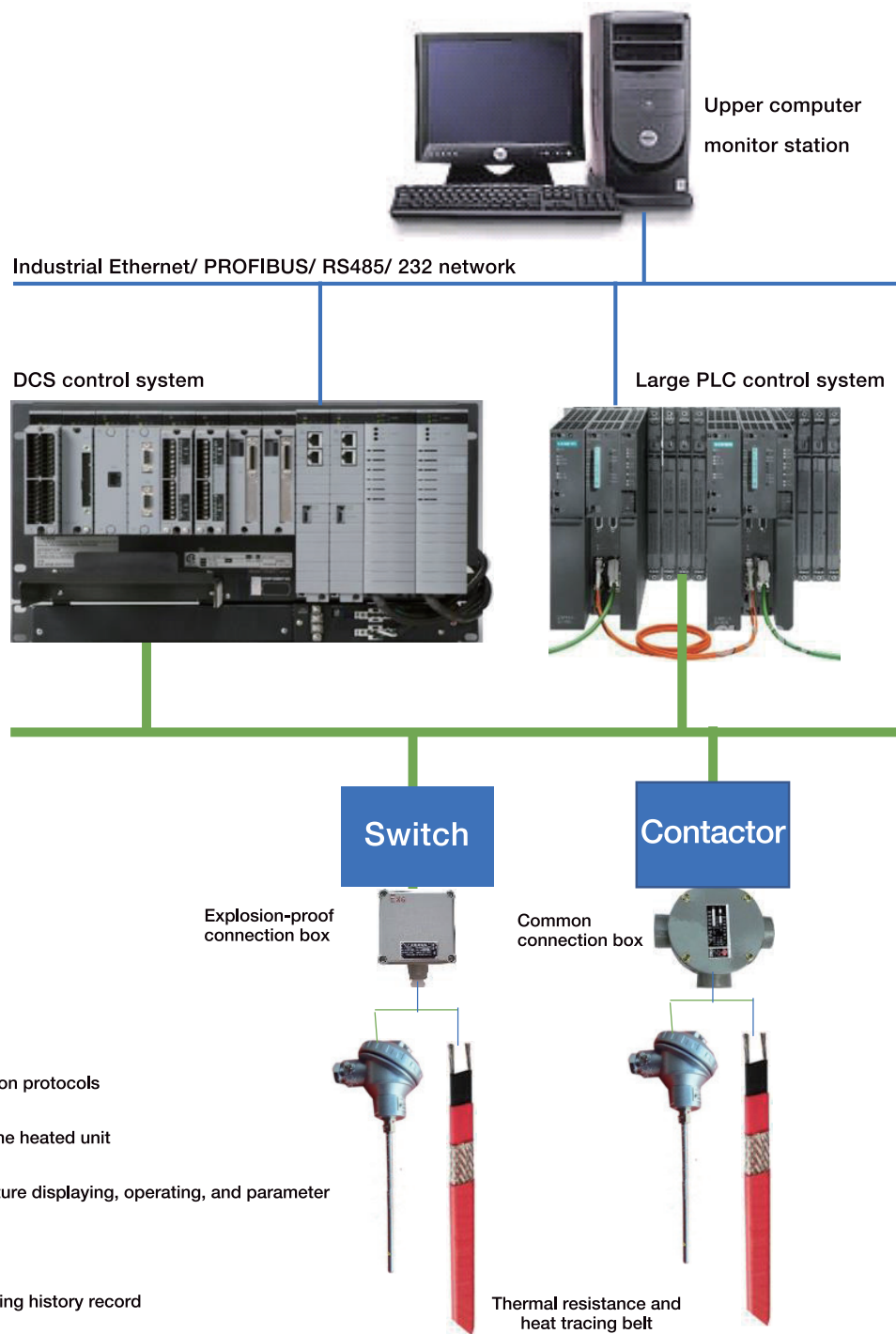


Pressure gauge



Pump

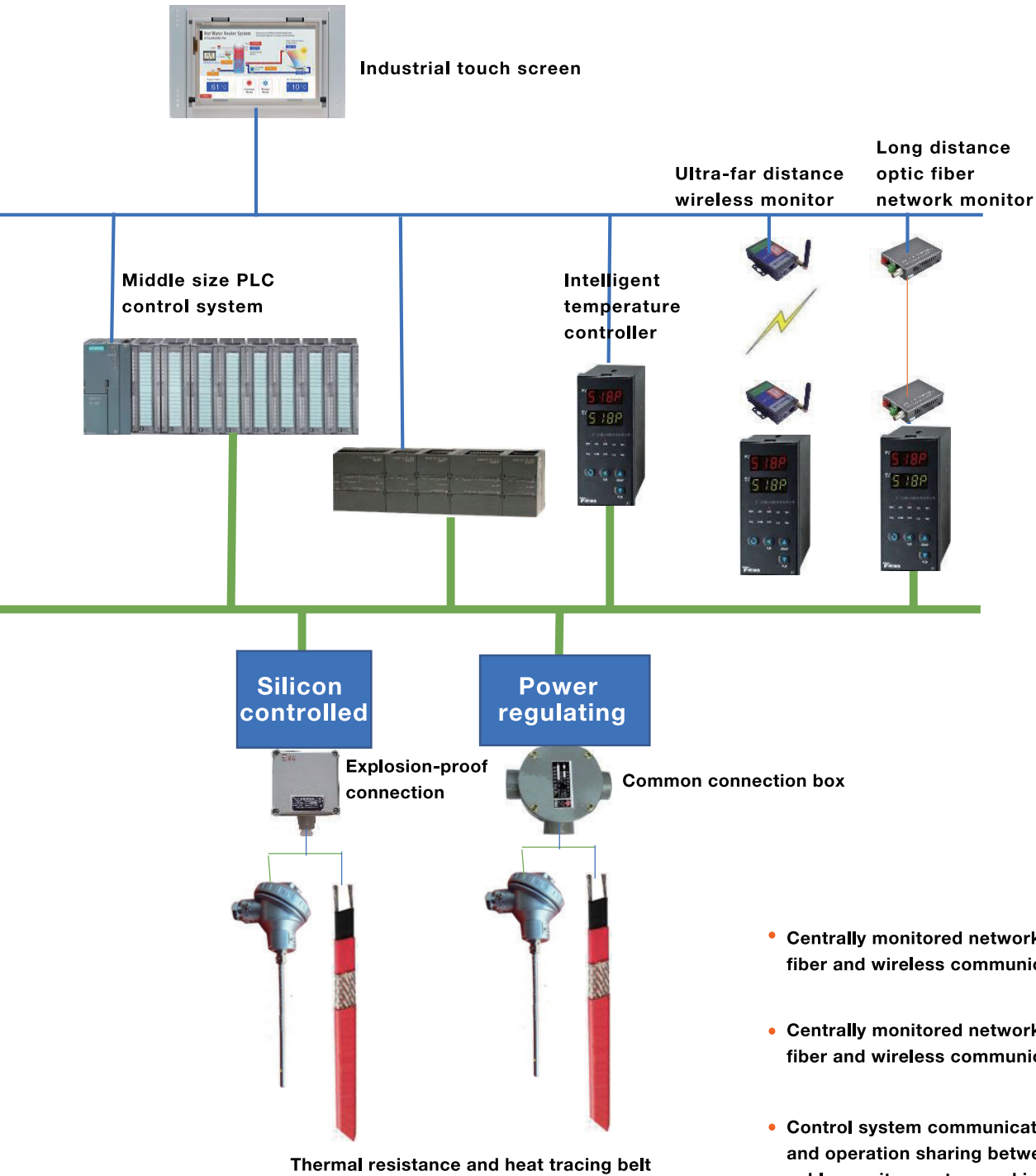
The Heating cable monitor system is used to meet various demands for fine control, and the control system solution can be customized for accurate, scattered or centralized temperature control for the Heating cable.



System functions:

- Network structure with various communication protocols
- Accurate temperature control in $\pm 0.5^{\circ}\text{C}$ for the heated unit
- Rich functions including monitor system picture displaying, operating, and parameter
- History temperature data inquiring
- High and low temperature warning and warning history record
- RS485 network centralized monitor within 1km

ELECTRIC HEAT TRACING INTELLIGENT CONTROL SYSTEM



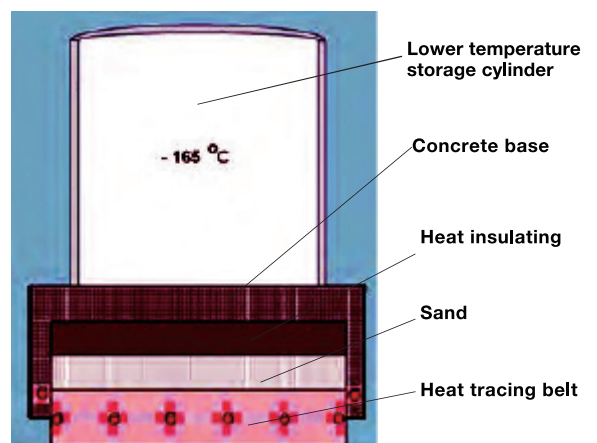
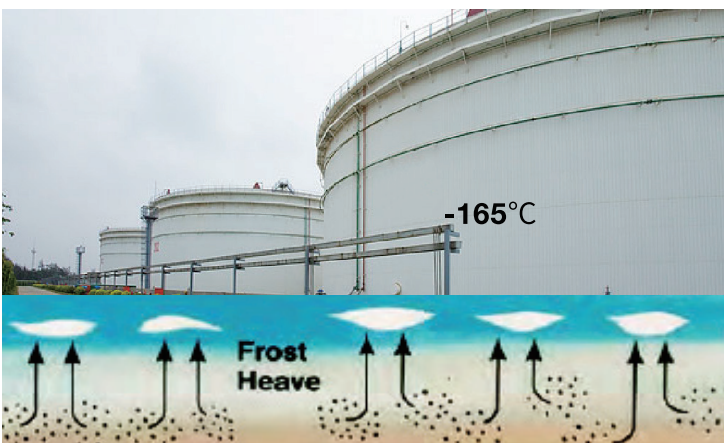
- Centrally monitored network solution with optic fiber and wireless communication within 20km
- Centrally monitored network solution with optic fiber and wireless communication beyond 20km
- Control system communication, data exchange and operation sharing between the Heating cable monitor system and industrial production devices

INDUSTRIAL APPLICATION OF LOW TEMPERATURE STORAGE CYLINDERS



Ice crystal formation and harm

If there is no auxiliary heating under the low temperature cylinder, ice crystal will form and frost heaving will happen. As a result, the cylinder base will be damaged.



Industrial Application of Low Temperature Storage Cylinders

Material which must be compressed and stored in a low temperature cylinder below 0°C

- LNG
- Liquid
- Butane
- Ammonia
- LNG
- Liquid hydrogen
- Propane

Heating cable type

- Self-limiting Heating cable
- Parallel constant power
- Serial constant power
- Skin effect

low temperature cylinder bottom heat tracing

A Heating cable must be installed under the cylinder to prevent ice crystal formation

Type of cylinder with bottom heat tracing

- Aboveground cylinder
- Underground cylinder
- derwater/ floating cylinder

ENGINEERING CASE





15-year quality assurance

Project Consultancy Form

Project Information

Project name: _____

Medium Properties

Name of fluid in the pipe: _____ Temperature maintained for the fluid: _____

Minimum ambient temperature: _____ Maximum ambient temperature: _____

Limit temperature of the fluid in the pipe: _____

Pipeline and Cylinder Parameters

Pipeline length: _____ m or cylinder height: _____ m

Pipeline material: _____

Pipeline diameter: _____ mm or cylinder diameter: _____ mm, please provide a drawing as much as possible

If the pipeline has steam purging: Yes _____ No _____

If it has, the maximum temperature for steam purging is: _____ °C

Maximum temperature of the pipeline (occasional): _____ °C

Normal working temperature of the pipeline (continuous): _____ °C

Heat Insulating Material

Heat insulating layer material: _____ Heat insulating layer heat conducting coefficient: _____ W/mC@10°C

Heat insulating layer thickness: _____ mm

Electrical Parameters

Power supply voltage: _____ V _____ Hz

If corrosion prevention and explosion-proof are required: _____ Required Not required _____

Explosion-proof grade _____

Service environment

Our supply and quotation range required (please tick):

1: Electric Heating cable _____ 2: Control power distribution cabinet _____ 3: Heat insulating material _____

4: Waterproof aluminum sheet _____ 5: Construction _____ 6: Installation direction _____

PS: if there are various pipelines, please list, and designate the explosion-proof grade of the power distributing cabinet:

IP protection grade: _____

Project Performance

Shanhaiguan Ship building Heavy Industry Heat Tracing Project

UPC group - Dock Heat Tracing Project

Kaisai (Wusu) Electric Heat Tracing Project

Shandong Shengxing 180,000,000T/Y Hydrogenated Cracking Heat Tracing Project

Yumen Oil Field Heat Tracing Project

Boiler Heat Tracing Project of CSSC-MES Diesel Co., Ltd.

Nanjing Global Trade Square Heat Tracing Project

Baoji 600,000T/Y Methanol Engineering Electric Heat Tracing Project of Xuzhou Coal Mining Group

Oil Transmission Pipeline Heat Tracing Project of PetroChina Ningxia Petrochemical Company

Urumchi Container Central Station Heat Tracing Project

Changqing Oil Field Electric Heat Tracing Project

Hami Power Plant 4x660MW Electric Heat Tracing Project of Shenhua Guoneng Energy Group

2x660MW Electric Heat Tracing Project of Huaneng Jiexiang Power Generation Co., Ltd.

2x660MW Electric Heat Tracing Project of Guohua Taicang Power Generation Co., Ltd.

Anqing Wanjiang Power Generation Co., Ltd. 2x1000MW, 2x300MW

Phase I 30,000T/Y Polysilicon Electric Heat Tracing Project of Xinjiang East Hope New Energy Co., Ltd.

Fume Ultra-low Emission Reconstruction Electric Heat Tracing Project of CNPC Fushun Petrochemical Thermal Power Plant

Xinmiao Station Reconstruction Electric Heat Tracing Project of Jilin Northern Construction Co., Ltd.

230,000T/Y Waste Chlorine Hydride Recovery Electric Heat Tracing Project of Chongqing Feihua Environmental Science and Technology Co., Ltd.

2x630MW Electric Heat Tracing Project of Datang Shaanxi Binchang Power Generation Co., Ltd.

Upgrading, Reconstructing and supporting Electric Heat Tracing Project of CNOOC Dongying Petrochemical Co., Ltd.

Electric Heat Tracing Project of Inner Mongolia Datang International Keshiketeng Coal Gas Co., Ltd.

General Contracted Electric Heat Tracing Project of Guohua Ningdong 2x660MW Auxiliary Device Workshop and Air Cooling Island

Polyester Workshop Heat Tracing Belt Project of Dongfang Yuhong Tangshan Plant

Integrated Electric Heat Tracing Project for the Computer Room Engineering Design and Construction of Jilin TV Media Information Transmission Center

Electric Heat Tracing Project of Shenhua Direct Coal Liquefaction Phase I Production Line Water Purification Plant

Phase I line II 15,000T/Year Polysilicon Electric Heat Tracing Project of Xinjiang East Hope New Energy Co., Ltd.

Chad Electric Heat Tracing Project of CNPC Liaohe Engineering Co., Ltd.

Glycol Electric Heat Tracing Project of CNPC Jilin Petrochemical Company

25kt/a Yingkou Sintered Regenerated Gas Acid Making System Electric Heat Tracing Project of Shandong Luxin Design Engineering Co., Ltd.

No. 1 and 2 (2x150MW) Circulating Fluidized Bed Unit Fume Ultra-low Emission Reconstruction Electric Heat Tracing Project of Inner Mongolia Huadian Wuda Thermal Power Co., Ltd.

Electromechanical Supportive Construction in Floor 7 and 8 and Device Installation Electric Heat Tracing Project in Floor 7 of the General Building of the National Center

Phase II Unit Fume Denitration Reconstruction Electric Heat Tracing Project of Datang Qitaihe Power Generation Co., Ltd.

400,000T/Y Isooctane and 100,000T/Y Normal Butane Isomerization United Device Electric Heat Tracing Project of Panjin Yuanfu Chemical Industry Co., Ltd. Liaobing Branch

Pro Trace[®]

**EXPERT ON INTEGRATED SOLUTION OF
ELECTRIC HEAT TRACING SYSTEM**

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