

Intended use

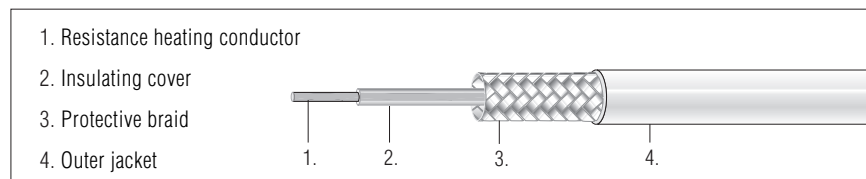
The serial heating and cooling cables of the types 27-582.-756F....., 27-582.-756G.....; 27-582.-756H....., 27-582.-756J....., 27-582.-756K....., 27-582.-756L..... (referred to in the following as serial heating cables) form an electrical resistance trace heating system for use in a potentially explosive atmosphere, that is used to raise temperature or maintain the temperature of a component to which it is applied externally. These serial heating and cooling cables must be used with suitable, separately certified connection systems.

Safety information

- Please ensure before commissioning that the heating cable used is suitable for the intended use according to its ex protection type.
- With respect to electrical plant, the pertinent erection and operating provisions must be observed (e. g. Directive 1999/92/EC, Directive 94/9/EC, EN 60079-0, EN 60079-14, EN 60079-30-2, EN 61241-0 and EN 61241-14 and the series DIN VDE 0100 or other relevant national provisions).
- The operator of electrical plant in a potentially explosive environment must keep operating equipment in the proper state, operate it correctly, monitor it and carry out maintenance and repair work.
- The installation of the serial cooling and heating cables may only be performed by qualified personnel. The installation may only be executed under the supervision of a qualified electrician who has completed further training for electrical trace heating systems in potentially explosive atmospheres. It is essential to comply with the information contained in the operating instructions provided by the manufacturer.
- All generally applicable statutory regulations and other binding guidelines on occupational health and safety, on accident prevention and on environmental protection must be complied with.
- Incorrect assembly of the trace heating system and adjacent plant components or damage to the heating cable can lead to short circuiting and a fire hazard during operation.

Product description

Serial heating cables involve fixed resistor heating cables with the following typical heating cable structure:



The heating cables with plastic insulation are characterised by the fact that their specific heat output depends on the design parameters such as length of installed cable and supply voltage.

A distinction must be made between the following type ranges:

a) Heating cable types 27-582.-756F....., 27-582.-756G.....; 27-582.-756H..... (≙ EKL medium):

This type range is exclusively licensed for use in areas with little mechanical stress (up to 4 Joules).

b) Heating cable types 27-582.-756J....., 27-582.-756K....., 27-582.-756L..... (≙ EKL premium):

This type range is licensed for use in areas with high mechanical stress (up to 7 Joules).

Mounting instructions

The following points must be observed for the type 27-582.-756..... serial heating cables in potentially explosive atmospheres:

- It must be ensured that the highest jacket temperature has not yet been determined. For this reason the highest jacket temperature of the system must be determined at a specified point and certified. There are two methods available for this.
 - Using a temperature monitoring system in accordance with EN 60079-30-1 (Section 4.4.3 a).
 - Using the system method, draft test procedure in accordance with EN 60079-30-1 Section 5.1.13.2
- Junctions or contact points on the single core heating cables are not permitted because the limit temperature or the maximum permissible operating temperature can be exceeded.
- The connectors and joints used for the serial Type 27-582.-756..... heating cables must be approved according to the requirements of standards for types of ignition protection to be deployed in potentially explosive gas atmospheres or in areas with flammable dust and also as integrated parts of the heating system according to the requirements of EN 60079-30-1.
- In the case of TT and TN systems a leakage current protective device should be installed in accordance with EN 60079-30-1, Section 4.3 Point d). In the case of IT systems a monitoring mechanism for the electrical insulation should be installed in accordance with EN 60079-30-1, Section 4.3 Point e).

Guidelines when dealing with heating cables

1. Storage

- The cooling and heating cables must be stored in protected, clean and dry areas.
- It must be ensured that the heating cable is protected from mechanical damage and environmental influences.
- The storage temperature must be between -60 °C and +60 °C.

2. Use

The following points must be observed when unrolling:

- Only pull straight from the coil
- Avoid excessive tensile forces
- Avoid buckling and squashing the cables
- Do not tread on the cables or use for climbing
- Particular care must be taken to prevent damage to the insulation in the case of sharp corners and edges such as flanges or clamping systems.
- It is not permitted to drive over the cables with vehicles or other transport equipment.
- A stable mechanism that is suitable for the coil should be used to unroll the cable. The size and weight of the coil should be taken into account.
- The radius must not fall below the minimum bending radius.

Assembly and installation

1. Assembly instructions

- The tube surface must be dry and clean.
- The operating voltage provided must be checked.
- The temperature must not fall below the minimum installation temperature.
- The cables must not be painted over.

2. Inspection before assembly

- Take a measurement of the insulation resistance before you begin to assemble the heating cable.
- On the basis of the resistance measurement, check whether the heating cable supplied corresponds to project plans.

3. Installation of the heating cable

Depending on the situation the heating cable can be placed alongside the object or placed in a spiral form around the object to be heated. The heating cable should be installed alongside the pipe in order to guarantee better heating performance.

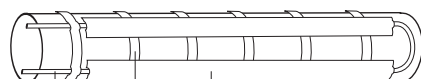


Fasten the heating cable at least every 200 mm using temperature-resistant adhesive tape or plastic cable ties.



Please heed the following information on selecting the correct mounting material:

- Heating cables should preferably be mounted using BARTEC adhesive tapes/cable ties.
- When using adhesive tapes/cable ties ensure sufficient temperature resistance and resistance to chemical influences.
- Do not use any metal fastenings that are not suitable for mounting.
- When heating plastic pipes, aluminium adhesive tape or aluminium foil should be provided under or under and over the heating cable for better heat transfer and distribution.

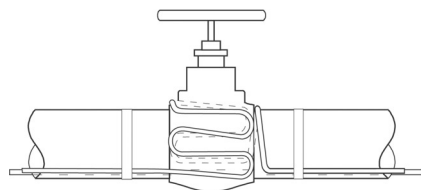


1. Heating cable
2. Aluminium adhesive tape
3. Adhesive tape

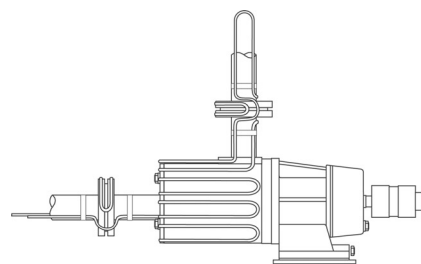
4. Installation on fittings, flanges and pumps

- When installing the heating cable always ensure compliance with the permissible bending radii!
- Heating cables on fittings, valves etc. must be installed so that these are easily accessible and replaceable during maintenance and servicing work and so that heating circuits do not have to be dissected. This is best achieved with sufficiently large heating cable loops.
- As a result of the higher heat losses on fittings, valves etc. the requisite length of the heating cable is increased. The additional quantity required can be found in the project planning information.
- The heating cables should be mounted such that they have the tightest contact possible with the surface to be heated. Where this contact is not possible, for example on valves, a suitable heat conducting cladding made from temperature-resistant metal foil or other conducting materials may be used.
- Typical types of installation can be found in the following figures

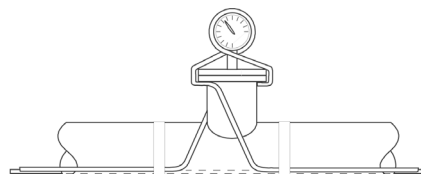
Installation on valves



Installation on pumps



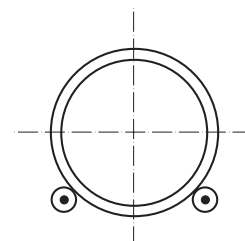
Installation on manometers



Installation on supports



5. Straight installation



With double wiring on the pipe install the heating cable in approximately the „half past four“ or „half past 7“ position.

Do not install the heating cable at the lowest point on horizontal pipes.

6. Installation

- Deactivate all electrical circuits prior to installation or maintenance work. To deactivate all outer conductors, i.e. also the neutral conductors must be disconnected from the power supply. It is essential to heed the ex protection type on the heating cable.

- Carry out a visual inspection on coils for transport damage and contamination. While doing so ensure that the ex protection type of the cables corresponds to the ex protection type of the coil.

Before and during installation:

Keep the ends of heating and cooling cables as well as connection components of the trace heating system dry. Cable ends that are not connected must be closed off in the field using a suitable end termination.

- The resistor heating cable should basically be mounted to the component to be heated in a manner that is stable from a mechanical and temperature point of view in order to ensure safe thermal coupling. This should take place using corresponding temperature-resistant adhesive tape (e.g. aluminium adhesive tape) or similar materials.
- The object supplied with trace heating (component, the part of the plant) must be clearly identified as such after installation of the heat insulation by affixing warning signs or labels to suitable places and/or at regular intervals along the heating circuit.

Electrical protective device

1. Over-current protective device

With respect to the over-current protection, please only use automatic circuit breakers that comply with the project plans and technical documents of BARTEC. Deviations from this can lead to false triggering of the automatic circuit breakers and to impairment of the effectiveness of the over-current protection.

If other fuses are used to those specified in the project plans and technical documents of BARTEC, please contact your BARTEC technical office.

2. Leakage current protective device

In the case of TT and TN systems a leakage current protective device should be installed in accordance with EN 60079-30-1, Section 4.3 Point d).

Electrical connection

- Observe the rated voltage according to the ex protection type on the heating cable.
- Only operate the respective heating cables with the intended rated voltage that has been determined when designing the heating circuit.
- When connecting the cooling cables to heating cables or when extending heating cables, only the connection systems that are approved for them may be used.
- The metal protective braid on the trace heating system must be connected to a suitable earth connection.
- When connecting the cooling cables to external circuits, cable entries, enclosure and connecting parts should be deployed that are certified for the application and are correctly mounted.



Explosion protection

Approvals

Explosion protection

EC type examination certificate
KEMA 10 ATEX 0035 U

Ex protection type

 II 2G Ex e
 II 2D Ex tD A21

Certification

IECEx Ex e II
IECEx Ex tD A21

Technical data

Operating temperature

-60 °C to +260 °C

Minimum installation temperature

-60 °C

Rated voltage

U_0 / U 450/750 V

Mechanical strength

4 Joules

Type 27-582.-756F....., 27-582.-756G.....;
27-582.-756H.....

Mechanical strength

7 Joules

Type 27-582.-756J....., 27-582.-756K.....,
27-582.-756L.....

Testing and commissioning

The following tests should be conducted after installation of the trace heating system and also after installation of the heating insulation, and should be documented in a test report. These test data should be presented if there are any complaints.

1. Measurement of the insulation resistance:

This test procedure serves to establish damage to the heating cable as well as any faults in the assembly of connectors or joints.

Insulation testing equipment is used that has a minimum test voltage of DC 500 V and a maximum test voltage of DC 2500 V. Irrespective of length the insulation resistance per heating circuit may not be less than 20 MΩ (corresponding to EN 60079-30-2).

Conducting the measurement:

- Measurements are taken between the heating conductor and the protective braid.
- A further measurement is taken between the protective braid and the earthed pipeline.

2. Checking the electrical protective device

The requirements for protection against external circuits (refer to the chapter „Electrical protective device“ in these instructions) must be checked.

3. Checking the design data

The draft data specified when designing the trace heating system, such as the voltage applied, the ensuing current and the pipe temperature, must be checked using suitable measures and equipment after switching on.

Operating, maintenance, servicing

The operator of electrical plant used in a potentially explosive atmosphere must maintain operating equipment in a proper state, operate it correctly, monitor it and carry out servicing and repair work. All electrical operating equipment must be selected according to its suitability for use in the potentially explosive area.

The applicable laws and guidelines must be heeded before recommissioning. The specified safety instructions must be observed before maintenance work and/or fault clearance.

1. Fault location


Special fault location procedures are helpful when locating faults in electrical trace heating systems installed under heat insulation. The engineer planning the electrical trace heating system should be consulted here. Faults are frequently caused by mechanical damage, corrosion, overheating or penetration of humidity. The tests required for commissioning should be repeated as the basis for fault location.

2. Repair work, servicing

These operating instructions should be complied with when carrying out repairs to the heating and cooling cables. According to assessment, short cooling and heating cables should be completely replaced on site. Suitable, separately approved connection systems should be used to replace pieces of heating cable. The new piece of cable must be exactly the same type and resistance value as the damaged cable.

Ex protection type

The heating cables are labelled as indicated in the following example:

BARTEC D-97980 Bad Mergentheim / Type <<Type/resistance value>> / Ohm/km / 750 V / 0044 /
 II 2 GD Ex e II Ex tD A21 / KEMA 10 ATEX 0035 U / IECEx KEM 10.0011U / -60 ≤ T serv ≤ +260 °C /
<<Serial Number>> see instructions 21-5820-7D001 / <<Details of metres >> m

<<Type/resistance value>>	See Table 1 or 2
<<Serial Number>>	production number directly followed by two-digit production year (e. g. 10)
<<Details of metres>>	5-digit length indication in m

Standards applied

Explosion protection:

EN 60079-0: 2006	EN 61241-1: 2004	IEC 60079-0 (Ed. 4.0)	IEC 61241-0 (Ed. 1)
EN 60079-30-1: 2007	EN 62086-1: 2005	IEC 60079-30 (Ed. 1)	IEC 61241-1 (Ed. 1)
EN 61241-0: 2006			

Electrical safety:

EN 62395-1:2006

Table 1:

Type range EKL medium (4 Joule version)

Type number	Resistance at 20°C [Ω/km]	Flexible wire diameter [mm]	Cross-section resistance flexible wire [mm ²]	External diameter [mm]	Bending radius min. [mm]
27-5821-756G07R2	7.2	1.940	2.45	4.94	15
27-5821-756G0010	10	1.750	1.81	4.75	15
27-5821-756G11R7	11.7	1.600	1.47	4.60	15
27-5821-756G0015	15	1.420	1.16	4.42	15
27-5821-756G17R8	17.8	1.300	1.00	4.30	15
27-5822-756G0025	25	1.269	0.98	4.27	15
27-5822-756G31R5	31.5	1.590	1.54	4.59	15
27-5822-756G0050	50	1.269	0.98	4.27	15
27-5822-756F0050	50	1.330	1.06	4.33	15
27-5822-756G0065	65	1.110	0.75	4.11	15
27-5822-756G0080	80	1.010	0.61	4.01	15
27-5822-756H0100	100	1.560	1.48	4.56	15
27-5822-756G0100	100	0.900	0.49	3.90	15
27-5822-756G0150	150	1.269	0.98	4.27	15
27-5822-756G0180	180	0.960	0.56	3.96	15
27-5822-756G0200	200	1.098	0.73	4.10	15
27-5826-756G0320	320	1.230	0.92	4.23	15
27-5822-756G0360	360	0.819	0.41	3.82	15
27-5826-756G0380	380	1.128	0.77	4.13	15
27-5826-756G0480	480	1.010	0.62	4.01	15
27-5826-756G0600	600	0.900	0.49	3.90	15
27-5826-756G0650	650	0.864	0.46	3.87	15
27-5826-756G0700	700	0.831	0.42	3.83	15
27-5822-756G0810	810	0.987	0.59	3.99	15
27-5822-756G1000	1000	0.888	0.48	3.89	15
27-5822-756G1440	1440	0.738	0.33	3.74	15
27-5822-756F1750	1750	0.700	0.28	3.70	15
27-5822-756G1750	1750	0.672	0.28	3.67	15
27-5824-756G2000	2000	0.915	0.51	3.92	15
27-5824-756G3000	3000	0.747	0.34	3.75	15
27-5824-756G8000	8000	0.465	0.13	3.47	15

Table 2:

Type range EKL premium (7 Joules version)

Type number	Resistance at 20°C [Ω/km]	Flexible wire diameter- [mm]	Cross-section-resistance flexible wire [mm ²]	External diameter [mm]	Bending radius min. [mm]
27-5821-756K1R08	1.08	5.800	16.14	10.20	25
27-5821-756K1R71	1.71	4.600	10.24	8.60	25
27-5821-756K02R9	2.9	3.600	5.93	7.60	15
27-5821-756K0004	4	2.750	4.45	6.55	15
27-5821-756K04R4	4.4	2.900	3.95	6.70	15
27-5821-756K07R2	7.2	1.940	2.45	5.54	15
27-5821-756K0010	10	1.750	1.81	5.35	15
27-5821-756K11R7	11.7	1.600	1.47	5.20	15
27-5821-756K0015	15	1.420	1.16	5.02	15
27-5821-756K17R8	17.8	1.300	1.00	4.90	15
27-5822-756K0025	25	1.269	0.98	4.87	15
27-5822-756K31R5	31.5	1.590	1.54	5.19	15
27-5822-756K0050	50	1.269	0.98	4.87	15
27-5822-756J0050	50	1.330	0.98	4.93	15
27-5822-756K0065	65	1.110	0.75	4.71	15
27-5822-756K0080	80	1.010	0.61	4.61	15
27-5822-756L0100	100	1.560	1.48	5.16	15
27-5822-756K0100	100	0.900	0.49	4.50	15
27-5822-756K0150	150	1.269	0.98	4.84	15
27-5822-756K0180	180	0.960	0.56	4.56	15
27-5822-756K0200	200	1.098	0.73	4.70	15
27-5826-756K0320	320	1.230	0.92	4.83	15
27-5822-756K0360	360	0.819	0.41	4.42	15
27-5826-756K0380	380	1.128	0.77	4.73	15
27-5826-756K0480	480	1.010	0.62	4.61	15
27-5826-756K0600	600	0.900	0.49	4.50	15
27-5826-756K0650	650	0.864	0.46	4.46	15
27-5826-756K0700	700	0.831	0.42	4.43	15
27-5822-756K0810	810	0.987	0.59	4.59	15
27-5822-756K1000	1000	0.888	0.48	4.49	15
27-5822-756K1440	1440	0.738	0.33	4.34	15
27-5822-756J1750	1750	0.700	0.28	4.40	15
27-5822-756K1750	1750	0.672	0.28	4.27	15
27-5824-756K2000	2000	0.915	0.51	4.52	15
27-5824-756K3000	3000	0.747	0.34	4.35	15
27-5824-756K8000	8000	0.465	0.13	4.07	15

Erklärung der Konformität
Declaration of Conformity
Attestation de conformité

N° 21-5820-7C0001



BARTEC GmbH
Max-Eyth-Straße 16
97980 Bad Mergentheim
Germany

Wir	We	Nous
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BARTEC GmbH,

erklären in alleiniger Verantwortung, dass das Produkt	declare under our sole responsibility that the product	attestons sous notre seule responsabilité que le produit
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**Einader – Kunststoff -
Leitung**

**EKL Medium /
EKL Premium**

**Single core heating
cable**

**EKL Medium /
EKL Premium**

**Ruban chauffant
unifilaire**

**EKL Medium /
EKL Premium**

27-582*-756F-**** / 27-582*-756G-**** / 27-582*-756H-****
27-582*-756J-**** / 27-582*-756K-**** / 27-582*-756L-****

auf das sich diese Erklärung bezieht den Anforderungen der folgenden Richtlinien (RL) entspricht	to which this declaration relates is in accordance with the provision of the following directives (D)	se référant à cette attestation correspond aux dispositions des directives (D) suivantes
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**ATEX- Richtlinie
94/9/EG**

**ATEX-Directive
94/9/EC**

**ATEX-Directive
94/9/CE**

und mit folgenden Normen oder normativen Dokumenten übereinstimmt

and is in conformity with the following standards or other normative documents

et est conforme aux normes ou documents normatifs ci-dessous

EN 60079-0:2006
EN 60079-30-1:2007

EN 61241-0:2006
EN 61241-1 :2004

EN 62395-1 :2006

Kennzeichnung

Marking

Marquage

**II 2 G Ex e II
II 2 D Ex tD A21**

**Verfahren der EG-
Baumusterprüfung /
Benannte Stelle**

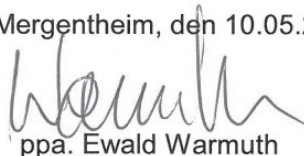
**Procedure of EC-Type
Examination / Notified
Body**

**Procédure d'examen
CE de type /
Organisme Notifié**

KEMA 10 ATEX 0035 U
0344, KEMA Quality B.V., Utrechtseweg 310, 6812 Arnhem, NL

0044

Bad Mergentheim, den 10.05.2010



ppa. Ewald Warmuth
Geschäftsleitung / General Manager