



EAC  
TC RU C-DE.ГБ06.B.00230



## Operation Manual/Installation Instructions





## 1. Product description

The Ex electrical heating system PSB type 27-1680-...00/... with the PSB (type 07-5801-...) self-limiting parallel heating tape, assembled with a connection and remote end termination or joining system with BARTEC heat shrink technology (installation kit 05-0091-0097), the Ex electrical heating system PSB type 27-1680-...70/... with the PSB (type 07-5801-...) self-limiting parallel heating tape, assembled with a connection and remote end termination or joining system with BARTEC PLEXO TCS and BARTEC heat shrink technology (installation kit 05-0091-0097) is set up as a stationary resistance heating system for pipelines, tanks or surfaces in hazardous areas.

It is used in Zones 1, 2, 21 or 22 in accordance with the certified explosion group II and temperature class T5 or T6.

The supply conductors and the protective braiding on the heating tape are connected in an enclosure in conformance with the protection by "increased safety e" with the installation instructions (in compliance with the relevant standards IEC/EN 60079-0, IEC/EN 60079-7 and IEC/EN 60079-14).

## 2. Technical data

### Rated voltage

110 to 120 V or 208 to 254 V

### Rated current

max. 32 A

### Reference rated power output

max. 33 W/m at 10 °C

## Explosion protection

### ATEX Ex protection type

II 2G Ex e IIC T5, T6 Gb  
II 2D Ex tb IIIC T95 °C, T80 °C Db

### Certification

KEMA 08 ATEX 0111 X

### IECEx Ex protection type

Ex e IIC T5, T6 Gb  
Ex tb IIIC T95 °C, T80 °C Db

### Certification

IECEx KEM 09.0084X

### EAC Certification

TC RU C-DE.ГБ06.В.00230

### Protection class

IP 65

### Conformity to standards

EN 60079-0:2012, EN 60079-7:2007, EN 60079-30-1:2007,  
EN 60079-31:2009, EN 62395-1:2006;  
IEC 60079-0:2007, IEC 60079-7:2006, IEC 60079-30-1:2007,  
IEC 60079-31:2008, IEC 62395-1:2006

### Min. bending radius

25 mm

### Min. bending radius

+65 °C power on

### Max. withstand temperature

+85 °C power off (heating tape with end termination)

### System ambient temperature

-40 °C to +55 °C

### Max. cross section of supply cable

6 mm<sup>2</sup>

## 3. Safety instructions

The relevant installation and operating regulations must be observed for electrical systems in hazardous areas (e.g. Directive 1999/92/EC, Directive 94/9/EC, IEC/EN 60079-14 and the DIN VDE0100 series).

The requirements under IEC/EN 60519-1 and IEC/EN 60519-2 must be adhered to. Thermal Safety Class 0 under IEC/EN 60519-2 Section 13 is met by the heating tapes design characteristics.

The Cu braid with a resistance of < 18.2 Ω/km is suitable as a protective conductor. The minimum requirements for circuit protection and control requirements are defined in IEC/EN 60079-30-1, clause 4.3 and 4.4. The operator of an electrical system in a hazardous environment has to keep the equipment in an orderly condition, operate it correctly, monitor it and do the required maintenance and repairs (EN/IEC 60079-14, EN/IEC 60079-17).

Read these instructions to avoid lethal injuries and damage to property by use of the HTSB heating tape assembled with the connection technology.

### NOTICE

The following documents must be observed:

Operation manual heating tape: 05-0390-0042

Operation manual PLEXO TCS: 21-59P0-7D0001

This operation manual: 21-1680-7D0002

Operating instructions Self-Limiting Parallel Circuit Heating Tapes

and Installation systems on Pipes: 01-5800-7N0002

Installation systems on Pipes and Self-Limiting Parallel Heating Tapes

and Installation Systems on Tanks and Vessels: 01-5800-7N0001.

### Special conditions for safe use

Supply cables shall be selected per installation instructions supplied with the PLEXO TCS for appropriate conductor size and temperature range.

## 4. Assembly of heating circuits

The assembly of all heat trace connections must be completed carefully according to the manufacturer's installation manual supplied with the connection sets.

Connections and terminations for installation with this self-limiting heating tape shall be certified according to the requirements of the applicable standards for their types of protection for potential explosive gas and combustible dust atmospheres, as well as the requirements of IEC/EN 60079-0, IEC/EN 60079-7, IEC/EN 60079-30-1 and IEC/EN 60079-31 as integral parts of this electrical trace heating system.

For the connection of the BARTEC self-limiting heating tapes type PSB to power certified cable glands, enclosures and terminals shall be used that are suitable for the application and are correctly installed. The cable glands shall be mounted in an enclosure in such a way that the ingress protection rating IP 65 for use in explosive atmospheres caused by the presence of flammable gas and/or vapours, IP 6X for use in explosive atmospheres caused by the presence of combustible dust is ensured. Ingress of protection ratings is according to IEC/EN 60529.

The minimum circuit protection requirements for trace heating systems for use in hazardous area follows always IEC EN 60079-30-1 clause 4.3:

1. A means of isolating line conductors from the supply.
2. Over-current protection provided for each branch circuit.
3. A means of protecting against earth faults which depend on the type of system earthing (see IEC 60364-5-55 for definitions).
4. The copper braid must be used as a ground wire, especially as the electrical resistance is less than 18.2 Ω/km.

5. For TT and TN systems: a residual-current protective device for each branch circuit having a rated residual operating current not greater than 300 mA. The device shall have a trip-time not exceeding 150 ms at five times the rated residual operating current. Values of 30 mA and 30 ms are preferred unless there is evidence that this will result in a marked increase in nuisance tripping. Always refer to IEC/EN 60079-30-1 clause 4.3.
6. For IT systems: an electrical monitoring device shall be installed to disconnect the supply whenever the electrical resistance is not greater than  $50 \Omega/V$  of rated voltage. Always refer to IEC/EN 60079-30-1 clause 4.3.

Power supply cables used for fixed wiring of the electrical heating circuit in hazardous area shall be appropriate for the ambient conditions in service (IEC/EN 60079-14).

Power supply cables according to IEC/EN 60079-14 clause 9, 9.3.1, 9.3.8 and 12.2.2.4

- 1) shall be sheathed with thermoplastic or elastomeric material, circular, compact and shall have extruded bedding and fillers.
- 2) shall be bonded to the equipotential bonding system when these are armoured cables, via suitable cable glands or equivalent, at each end of the cable run. In the event that armour is required not to be bonded to the equipotential bonding system at any interposing point, care shall be taken to ensure that the electrical continuity of the armour from end to end of the complete cable run is maintained. Where bonding of the armour at a cable entry point is not practical, or where design requirements make this not permissible, care shall be taken to avoid any potential difference which may arise between the armour and the equipotential bonding system.

The protective copper braid of the PSB (type 07-5801-....) self-limiting parallel heating tape shall be included into the fixed wiring for earth wire.

**WARNING**

Do not connect the heating tapes two supply wires >> short circuit! <<

**WARNING**

The surface temperature of cables shall not exceed the temperature class for the installation.

**5. Mounting and commissioning****5.1 Assembly**

The relevant installation and operating regulations must be observed when setting up or operating explosion-protected systems (e.g. IEC/EN60079-14, IEC/EN 60079-30-2 and the DIN VDE 0100 series).

The heating tape must be installed on the heated surface in accordance with the project engineering specifications. Only qualified specialists may do any of the work on the machine. Before any work is done on the machine, it must have come to a complete stop, be disconnected and precautions must be taken to ensure that it cannot be switched on again.

Before and during installation: keep the ends and connection components of the heating system dry. The metallic braiding in this electrical heating system must be connected to a suitable earthing terminal.

The bending radius may not be less than the minimum of 25 mm and the heating tape may not be bent on its narrow side. The heating tape is attached to the heated surface by means of a temperature resistant adhesive with a maximum distance of 200 mm. Use only plasticiser-free adhesive cables (no PVC adhesive cables)!

To ensure efficient heat transmission, the heating tape must have even contact over the entire length of the surface. If necessary, the distances between fastenings must be reduced. The cable is laid on the pipelines either parallel to the axis of the pipe or in spiral form (in accordance with the project engineering instructions).

On plastic pipes, which conduct heat less efficiently than metal pipes do, aluminium foil or aluminium adhesive cable is put under or over the heating tape. This substantially improves the distribution of heat, prevents a local accumulation of heat and at the same time it partly compensates for the lower heat dissipation and associated reduction in the capacity of the heating tape.

After installation, the electrical heating system shall be subjected to an insulation resistance test according to IEC/EN 60079-30-2, clause 8.3.4, using a minimum test voltage of DC 500 V (DC 2500 V recommended), applied between the live conductors and the metallic braid of the power or heating tapes. The measured insulation resistance shall not be less than 20 M $\Omega$ . When used in TT and TN systems a residual current device according to IEC/EN 60079-30-1, clause 4.3, point e) shall be used.

**NOTICE**

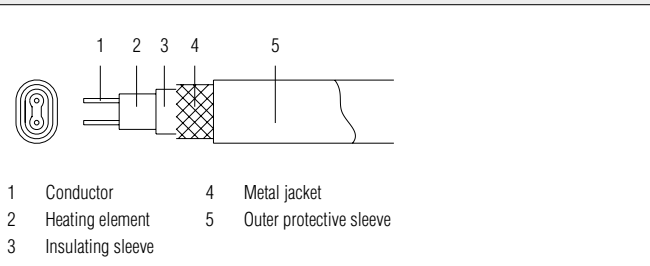
All warranty claims are subject to the submission of a correctly and completely filled-in acceptance report.

Make sure to add date and signature. The report is part of the operating instructions Self-Limiting Parallel Circuit Heating Tapes and Installation systems on Pipes and Self-Limiting Parallel Heating Tapes and Installation Systems on Tanks and Vessels.

**Set 05-0091-0097**

<b>a</b>	
<b>b</b>	
<b>c</b>	
<b>d</b>	
<b>e</b>	
<b>f</b>	
<b>g</b>	
<b>h</b>	
<b>i</b>	
<b>j</b>	

**Self-limiting parallel heating**

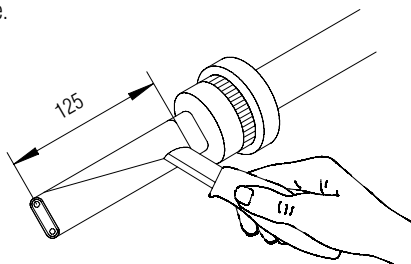


**NOTICE**

The dimensions specified in the installation instructions must be strictly observed!

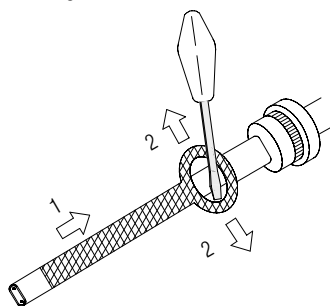
**Connection**

Cut the heating tape with a straight cut. Push on the cap for screw connection **a** and sealing **d**. Remove 125 mm of the protective outer sheath from the heating tape.



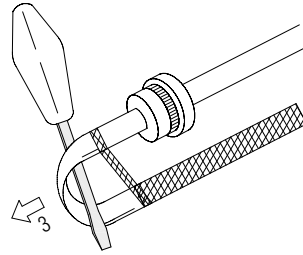
**1**

Push the protective braid back (1). Use the screwdriver to form an eyelet (2). Be careful not to damage the insulation.



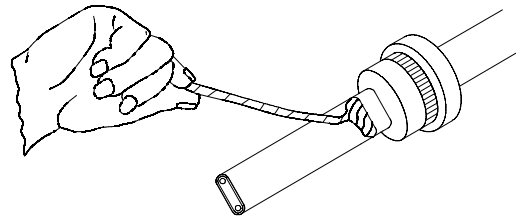
**2**

Pull the heating tape out of the protective braid (3).



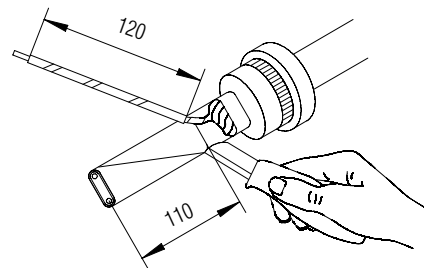
**3**

Twist the metal braid covering.



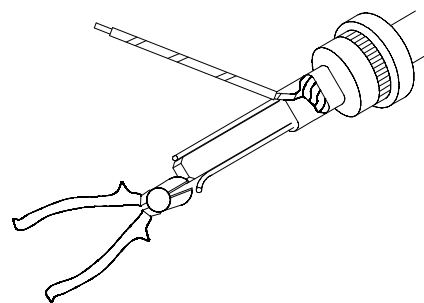
**4**

Push the green/yellow heat shrinkable tubing **g** (120 mm) onto the twisted metal braid covering. Make an incision into the insulating jacket at a point 110 mm from the beginning of the heating tape and remove that amount.



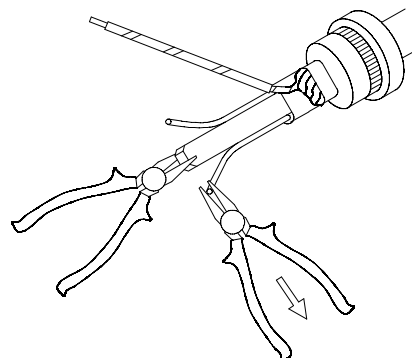
**5**

Make an incision into the edges of the heating element.



**6**

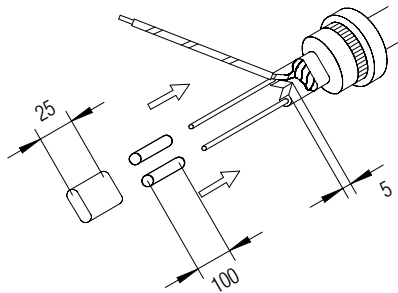
Pull the strands out and twist them. Remove the remaining heating element.



**7**

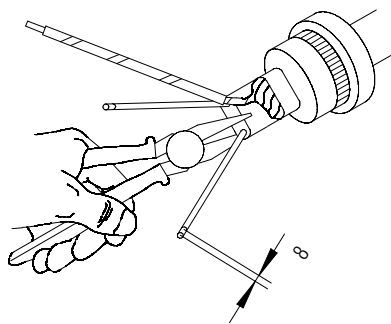
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Cut out a triangle (5 mm) between the strands. Push and heat-shrink the tubings **f** (100 mm) over the exposed, tin plated supply wires to the heating element.



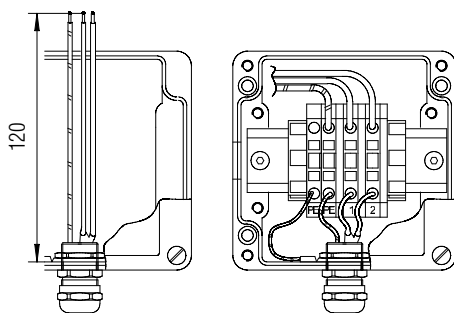
8

Push the heat shrinkable tubing **e** (25 mm) over the wedge shaped incision, shrink-fit and then press together with a pair of needle-nosed pliers. Attach wire end ferrules **h** 1.5 mm<sup>2</sup> for supply wires and 2.5 mm<sup>2</sup> for braiding. Cut off any protruding strands and braid.



9

Screw the screw connection body **a** in the enclosure. Fix the grounding strap **c** and nut **b** at the gland and connect it to the PE-terminal. Insert the heating tape with the placed sealing **d** into the screw connection body **a**. The stretched length of the connection wires is 120 mm starting at the housing inside. Tighten the screw cap. Connect the heating tape in the junction box to L, N and PE.



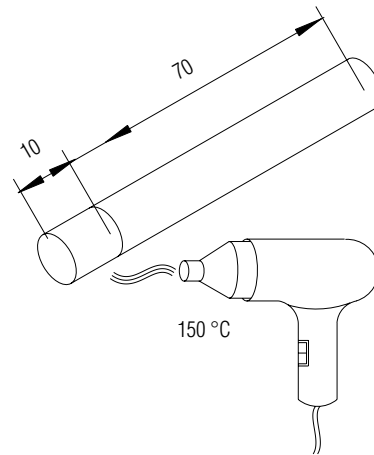
10

**Notice for the shrinking process**

The shrinking temperature is between 125 °C and 150 °C for the black shrink tubes and 90 °C for the green/yellow shrink tube. Care must be taken that the heating is as even as possible and extends around the circumference. This prevents overheating at individual points (local), which would impair the shrinking effect. After shrinking process a visual inspection must be done. Thereby no errors like cracking, dismantle, bubbles etc. should be visible.

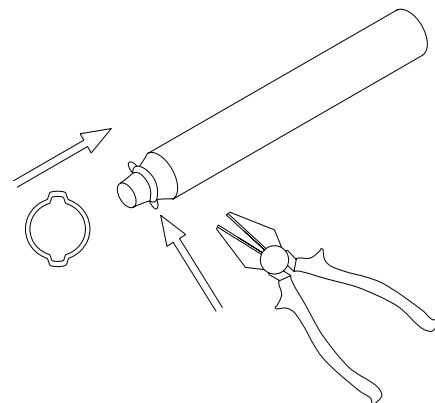
**End termination**

The black shrinkable tubing **i** has to be prepared. Approximately 10 mm in length of one end of the shrinkable tubing must be shrunk at a temperature of about 150 °C until it can be pushed through the enclosed terminal **h**.



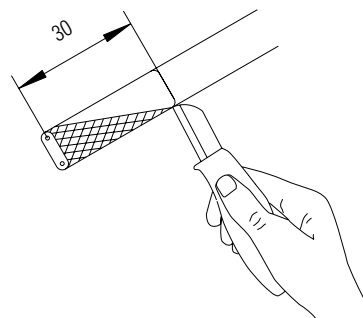
11

The terminal **j** can be positioned and crimped firmly with flat pliers in a heated state. Cut the heating tape with a straight cut.

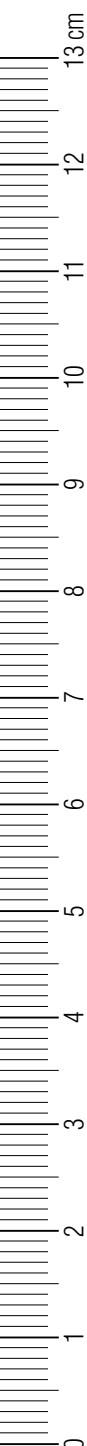


12

Remove the protective outer sheath at a distance of 30 mm from the end of the heating tape.

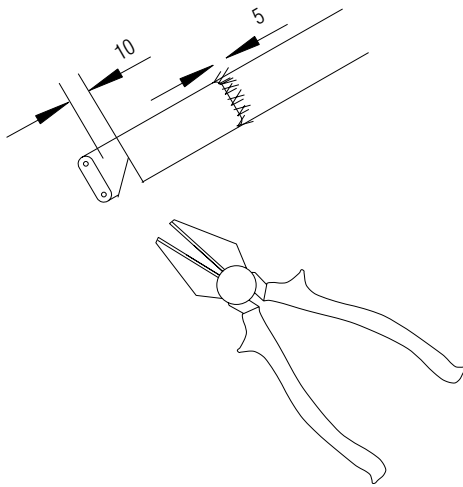


13



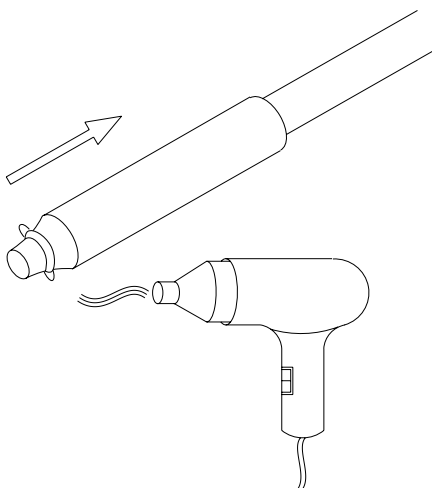
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The remaining 5 mm of braiding must be folded cover in the direction of the insulation and away from the end. Recess in the heating element in accordance to the drawing.



14

The prepared heat-shrink end cap can be pushed over the end of the heating tape and the folded braiding. It is important to ensure that the shrinkable tubing will not be damaged by any of the conductor strands. Finally, the prepared heatshrink end cap which has been pulled over the end must be shrunk-fit starting at the end (at 150 °C). Any exuding adhesive residue must be removed.



15

**Notice to the shrinking process**

The shrinking temperature is between 125 °C and 150 °C for the black shrink tube. Care must be taken that the heating is as even as possible and extends around the circumference. This prevents overheating at individual points (local), which would impair the shrinking effect. After the shrinking process a visual inspection must be done. Thereby no errors like cracking, dismantle, bubbles etc. should be visible.

**Thermal insulation**

After the placement of the thermal insulation an insulation resistance test according to IEC/EN 60079-30-2, clause 8.3.4, using a minimum test voltage of DC 500 V (DC 2500 V recommended), applied between the live conductors and the metallic braid of the power or heating tapes must be done. This helps to find out any damage that might have occurred during the installation of the thermal insulation.

**5. 2 Commissioning**

The equipment may only be operated if it is clean and free of any damage. Electrical systems must be examined by an electrician before commissioning and afterwards at certain intervals of time.

Refer to IEC EN 60079-30-1 clause 4.3.and 4.4 pre-installation testing shall include:

- Individual controls shall be tested to ensure correct calibration including, but not limited to set points, operating temperature range and span.
- Vendor fabricated and assembled control panels shall include documentation certifying that all wiring, layout and functions are correct and have been tested. Upon receipt of the control panels at the work site, a general inspection shall be made to be confirm that no damage has occurred in transit.

**6. Operation, maintenance and fault clearance**

The heating systems must be used only in accordance with their intended purpose and within the operating data specified by BARTEC. The operator of an electrical system in a hazardous environment must keep it in good condition, operate it properly, monitor it and do inspection, maintenance and repairs (IEC/EN 60079-14, IEC/EN 60079-17).

Only an electrician may do the maintenance work and fault clearance. Before restarting operation, check compliance with the applicable laws and directives. Before maintenance or troubleshooting, make sure that the specified safety regulations are adhered to. Only use BARTEC components and spare parts.



Don't touch the surface of the BARTEC PSB type 07-5801-.... while it is energized. First-/second-/third-degree burn can occur. Don't touch also the heated areas. Warning signs shall be installed.

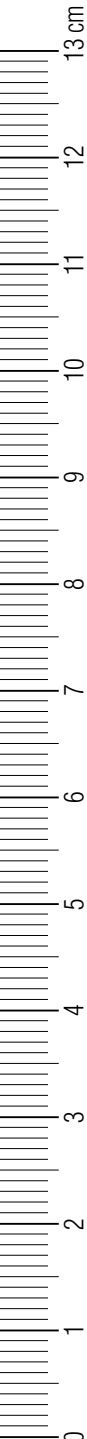


All the silicone-seals of the cable glands that have been in use for electrical heat trace connections must be replaced while reassembling.

**7. Accessories and Equipment**

Accessories and equipment see BARTEC catalogue

BARTEC GmbH  
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 Phone +49 7931 597-0  
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 info@bartec.de  
 www.bartec-group.com



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**8. Heating circuit length**

Maximum heating circuit length (m) and definition of the circuit breaker (C- tripping characteristic)										
Type	Start-up Temperature (°C)	W/m	Rated voltage AC 120 V				Rated voltage AC 254 V			
			16 A	20 A	25 A	32 A	16 A	20 A	25 A	32 A
			m	m	m	m	m	m	m	m
PSB 10 07-5801-.10.	+10	10	95	95	95	95	205	205	205	205
	-15		69	90	92	95	139	186	190	195
	-30		58	75	85	95	120	150	170	195
PSB 13 07-5803-.13.	+10	15	78	86	86	86	169	179	179	179
	-15		55	72	80	86	111	149	160	174
	-30		47	59	72	86	94	124	150	174
PSB 15 07-5803-.15.	+10	25	67	80	80	80	145	162	162	162
	-15		45	60	70	80	93	125	142	160
	-30		39	49	65	80	77	106	135	160
PSB 26 07-5803-.26.	+10	45	43	58	60	63	88	117	120	126
	-15		30	38	45	55	58	75	95	117
	-30		26	31	42	53	45	64	82	100
PSB 33 07-5803-.33.	+10	60	33	45	50	54	70	90	98	108
	-15		25	32	38	45	49	64	80	95
	-30		21	26	34	43	43	52	65	82

**9. Type label heating system**

The type label is to be filled in manually on the basis of the shown points. The blanks in the heating system's type number must be filled on the basis of the components used. A water-proof and lightfast marker must be used (e.g.: Staedtler Lumocolor permanent special marker or BARTEC no.: 02-7140-0001).

The serial number (of the connection and termination set) must and the TAG number can be filled in by the person setting up the heating-circuit. A practical example of a filled-in type label is given further on.

The type label must be stuck onto the lid of the junction box. The surface must be cleaned first before the label is applied. Care must be taken that the sticker is to be put on carefully. It may not jut out over the correct area and it may not have any air bubbles.

Type	Rated voltage	Supply voltage <sup>④</sup>	T-class <sup>①</sup>	Temperature <sup>②</sup>
07-5801-110.	120 V	Impressed voltage	T5	T95 °C
07-5801-113.	120 V		T5	T95 °C
07-5801-115.	120 V		T5	T95 °C
07-5801-126.	120 V		T5	T95 °C
07-5801-133.	120 V		T5	T95 °C
07-5801-210.	245 V		T6	T80 °C
07-5801-213.	245 V		T6	T80 °C
07-5801-215.	245 V		T6	T80 °C
07-5801-226.	245 V		T5	T95 °C
07-5801-233.	245 V		T5	T95 °C

CE 0044  
Segurança  
INMETRO OCP 0004  
TUV 13.1681  
KEMA 08 ATEX 0111 X  
IECEx KEM 09.0084X  
Ex II 2G Ex e IIC T 1Gb  
II 2D Ex tb IIC T 2 °C Db  
Protective device <sup>③</sup> A  
Breaker size max. 32 A  
Supply voltage <sup>④</sup> V  
Frequency <sup>⑤</sup> Hz

**PSB Heating system**  
Type 27-1680 -

**BARTEC**  
97980 Bad Mergentheim  
Germany

0 - heat-shrink set  
Ta -40°C to +55°C  
1 - cold-applied set  
Ta -55°C to +55°C  
1 - PA box 27-5452-4\*\*\*\*  
2 - AL box 27-5452-5\*\*\*\*  
3 - SS box 27-5452-6\*\*\*\*  
9 - custom junction box  
0 - 110V to 120V  
1 - 208V to 254V

IP65  
Serial no.: \_\_\_\_\_  
TAG no.: \_\_\_\_\_  
Construction <sup>⑥</sup> / \_\_\_\_\_ week/year

- <sup>⑤</sup> **Protection device**  
16 A, 20 A, 25 A, 32 A
- <sup>⑦</sup> **Frequency**  
50 or 60 Hz
- <sup>⑧</sup> **Construction week/year**  
03/2014 (for example)



**Practical example**

The following components were used: PSB, AC 254 V, 26 W/m, cold-applied connection and termination technology, BARTEC Polyester junction box. It was filled in accordance to the grey-shaded line in the table.

<p><b>CE</b> 0044                  Segurança                    TÜV 13.1681  <b>KEMA 08 ATEX 0111 X</b>  <b>IECEx KEM 09.0084X</b>                    II 2G Ex e IIC T<sub>5</sub> Gb                  II 2D Ex tb IIC T<sub>95</sub> °C Db                  Protective device <u>32</u> A                  Breaker size max. 32 A                  Supply voltage <u>254</u> V                  Frequency <u>50</u> Hz</p>	<p><b>PSB Heating system</b>                  Type 27-1680 - <u>0</u></p> <p><b>BARTEC</b>                  97980 Bad Mergentheim                  Germany</p> <p>TC RU C-DE.FE06.B.00230</p>	<p>0 - heat-shrink set  <b>Ta -40°C to +55°C</b>                  1 - cold-applied set  <b>Ta -55°C to +55°C</b>                  1 - PA box 27-5452-4****/****                  2 - AL box 27-5452-5****/****                  3 - SS box 27-5452-6****/****                  9 - custom junction box                  0 - 110V to 120V                  1 - 208V to 254V</p> <p>IP65                  Serial no.: <u>1231456/14</u>                  TAG no.: _____                  Construction <u>30/2014</u> week/year</p>
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**10. Customer Box**

If an enclosure from another company is used, all requirements specified in the checklist must be fulfilled.

The enclosure material is limited to the selection indicated. The external dimensions of the enclosure must conform to the specific minimum dimensions.

Certification of „e“ for increased safety type of protection in compliance with IEC/EN 60079-7 must be present for all components.

It is not allowed to connect any other electrical loads in the junction box than the heating tapes.

**Requirements set for connecting terminals**

**Material**

Polyester

Aluminium

Stainless Steel

**External dimensions of enclosure**

1 Heating circuit (Material: Polyester, Aluminium)  
 min. 122 mm x 120 mm x 90 mm

1 Heating circuit (Material: stainless steel)  
 min. 150 mm x 150 mm x 100 mm

1 to 3 Heating circuits (Material: Polyester, Aluminium)  
 min. 220 mm x 120 mm x 90 mm

1 to 3 Heating circuits (Material: stainless steel)  
 min. 200 mm x 200 mm x 120 mm

**Ambient temperature range** -40 °C to +55 °C

**Operating temperature range** -40 °C to +70 °C

**Protection class** (IEC/EN 60079-31) min. IP 65

**Requirements set for connecting terminals**

**Rated cross-section** 6 mm<sup>2</sup>

**Working temperature** -40 °C to +100 °C

**Minimum distance** between  
 conducting terminals and wall 25 mm

**Requirements set for the cable gland**

**Working temperature** -40 °C to +70 °C

Erklärung der Konformität  
Declaration of Conformity  
Attestation de conformité

N° 21-1680-7C0001\_B

**BARTEC**

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



Wir

We

Nous

**BARTEC** GmbH,

erklären in alleiniger Ver-  
antwortung, dass das  
Produkt

declare under our sole  
responsibility that the  
product

attestons sous notre seule  
responsabilité que le pro-  
duit

PSB Heizsystem

PSB Heating system

PSB système de  
chauffage

Typ 27-1680-\*\*\*0/\*\*\*\*

auf das sich diese Erklä-  
rung bezieht den Anforde-  
rungen der folgenden  
**Richtlinien (RL)**  
entspricht

**ATEX-Richtlinie  
94/9/EG**

**RoHS-Richtlinie  
2011/65/EU**

und mit folgenden Normen  
oder normativen Doku-  
menten übereinstimmt

**EN 60079-0:2012  
EN 60079-31:2009**

**Kennzeichnung  
II 2G Ex e IIC T5, T6 Gb  
II 2D Ex tb IIIC T95 °C, T80 °C Db**

**Verfahren der EG-  
Baumusterprüfung /  
Benannte Stelle  
KEMA 08 ATEX 0111 X**

**0344, DEKRA Certification B.V., Meander 1051, 6825 MJ Arnhem, NL**

to which this declaration  
relates is in accordance  
with the provision of the  
following **directives (D)**

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

**RoHS-Directive  
2011/65/EU**

and is in conformity with  
the following standards or  
other normative docu-  
ments

**EN 60079-7:2007  
EN 62395-1:2006**

**Marking**

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

se référant à cette attesta-  
tion correspond aux dispo-  
sitions des  
**directives (D)** suivantes

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

**Directive-RoHS  
2011/65/UE**

et est conforme aux  
normes ou documents  
normatifs ci-dessous

**EN 60079-30-1:2007**

**Marquage**

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

Ein oder mehrere der in der o.g. EG-Baumusterprüfbescheinigung genannten Normen wurden bereits durch neue Ausgaben ersetzt. Die Produkte stimmen auch mit den Anforderungen der neuen Normenausgaben überein, da die veränderten Anforderungen der neuen Normenausgaben für diese Produkte nicht relevant sind.  
One or more of the standards stated in the EC-Type-Examination-Certificate (see above) have already been replaced by more recent editions. The products are conform to the requirements of the new editions, since the requirements of the new editions are not relevant for these products.

Un ou plusieurs des normes énoncées dans le Certificat de Conformité ont déjà été remplacés par des éditions plus récentes. Les produits sont conformes aux exigences des nouvelles éditions, dès que ces exigences ne sont pas pertinentes pour ces produits.

**CE 0044**

Bad Mergentheim, den 06.10.2015

ppa. Ewald Warmuth  
Geschäftsleitung / General Manager



## Reservation

Technical data subject to change without notice.  
No claims for damages arising from alternations, errors or missprints shall be allowed.

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