

Operating Instructions

EKL heat shrink technology Type: 05-0091-0195

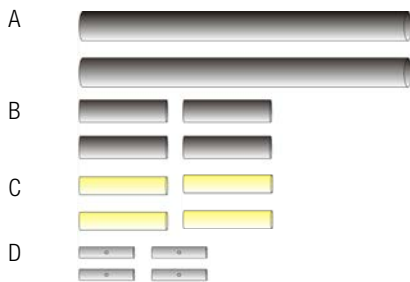
Intended use

EKL heat shrink technology is suitable for terminating or connecting EKL light and EKL medium. It is used in industrial and commercial areas.

The set serves to connect two cold leads or to connect two heating cables. The heat conductor and the protective braid are electronically connected by means of a crimp connection. The connection is sealed by means of the heat-shrink tubing

Product description

EKL heat shrink technology comprises the following components.



Safety instructions

Marking

Particularly important points in these instructions are marked with a symbol:

⚠ DANGER

DANGER draws attention to a danger, which will lead to death or serious injury if it is not avoided.

⚠ WARNING

WARNING draws attention to a danger, which can lead to death or serious injury if not avoided.

⚠ CAUTION

CAUTION draws attention to a danger, which can lead to an injury if not avoided.

ℹ NOTICE

ATTENTION draws attention to measures to be taken to prevent damage to property.

ℹ NOTE

Important instructions and information on effective, economical & environmentally compatible handling.

- The applicable EU standards and directives, national regulations and the applicable safety provisions for electrical installations must be complied with.
- The installation and assembly should be carried out by a qualified electrician who has been appropriately trained in the handling of trace heating systems.
- All generally applicable statutory regulations and other binding guidelines relating to occupational health and safety, accident prevention and environmental protection must be complied with.
- Incorrect assembly of the heat shrink technology and the adjacent system components or damaged equipment may result in a short circuit and risk of fire during operation.

⚠ CAUTION

Do not use in areas with high mechanical load or impact stress.

The presentation of a correctly prepared and completed acceptance report is essential for warranty claims.

The standard BARTEC acceptance report can be found in the “Assembly and operation of parallel heating cables” documentation (www.bartec.de).

Guidelines for handling heat shrink technology

ℹ NOTE

Storage

- The heat shrink technology must be stored in protected, clean and dry places.
- The storage temperature must be between -20 °C and +60 °C.

Assembly and installation

ℹ NOTE

Instructions for assembly

The surface of the tube must be dry and clean.

- The intended operating voltage must be checked.
- The temperature must not fall below the minimum installation temperature.
- The heat shrink technology must not be painted over.

Installation

⚠ CAUTION

- Switch all power circuits off before installation or maintenance work. To switch the power off, all line conductors, i.e. also the neutral conductor, should be disconnected from the power supply.
- **Before and during** installation: keep the heat shrink technology dry.
- The operating instructions for the heating cable used should also be followed.

Electrical protective device

⚠ CAUTION

Overcurrent protective device

- Please only use automatic circuit breakers for overcurrent protection in agreement with the project planning and technical documents from BARTEC. Deviations from this can lead to the false tripping of the automatic circuit breakers and impairment of the efficacy of the overcurrent.
- If different protection is used to that specified in the plans and the BARTEC technical documents, please get in touch with the BARTEC technical office.

Leakage current protective device

- A leakage current circuit breaker is required for each circuit.

Electrical connection

⚠ CAUTION

- Pay attention to the rated voltage of the heat shrink technology.
- The metal protective braid of the trace heating system must be connected to a suitable earth connection.
- Cable glands, enclosure and connecting components that are suitable for the application and which have been correctly mounted must be used to connect the cold leads to external power circuits.

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Tests and commissioning

CAUTION

The following tests should be conducted both after installing the trace heating and after installing the heat insulation, and then documented in a test report. These test data should be produced in the event of a complaint.

Measurement of the insulation resistance

- This test procedure serves to identify damage to the heating cable and the possible assembly faults on terminals or connections.
- An insulation test instrument with a min. test voltage of DC 500 V and a max. test voltage of DC 2500 V is used.

The insulation resistance per heating circuit, irrespective of the length, may not be less than 20 MΩ (in accordance with EN 62395-1).

- Conducting the measurement:
 - Measurements are taken between the heat conductor and the protective braid.
 - A further measurement is taken between the protective braid and the earthed pipe.

Checking the electrical protective device

The requirements for protecting external circuits as set out in the "Electrical protective device" chapter of these Operating Instructions must be checked.

Checking the design data

After switching on, the layout data specified when designing the trace heating system - such as the applied voltage, the resulting current and the pipe temperature - must be checked using suitable procedures and equipment.

Operation, maintenance, repair

The company operating an electrical installation must keep the equipment in good condition, operate it as intended, monitor it and carry out maintenance and repair work. Each item of electrical equipment must be selected in accordance with its suitability for use in the corresponding area.

The applicable laws and guidelines must be complied with before putting the installation back into operation. The specified safety instructions must be heeded before maintenance and/or troubleshooting work.

Locating faults

Special procedures for locating faults are helpful when detecting faults on electrical trace heating systems installed under heat insulation. Advice should be sought from the engineer who planned the electrical trace heating system. Faults are often caused by mechanical damage, corrosion, overheating or the penetration of moisture. The checks required for commissioning should be repeated as a foundation for locating faults.

Repair

After an assessment on site, the heat shrink technology should be completely replaced.

Technical data

Max. rated voltage	750 V
Max. rated current	25 A
Max. connection capacity	2.5 mm ²
Operating temperature	-55 °C to +200 °C
Mechanical strength	4 Joules
Dimensions (length)	150 mm
Outer diameter of cable	2.9 mm to 6.0 mm
Min. installation temperature	-20 °C

Installation



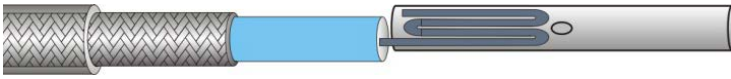
Please note

Suitable crimping pliers must be used to crimp the butt connector.

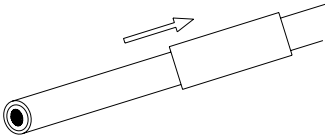
Suitable pliers can be ordered using BARTEC order no. 03-5545-0002. A crimping die from 1.5 to 2.5 should be deployed for cables with a cross-section of less than 2.5 mm².

Overview of versions of crimps

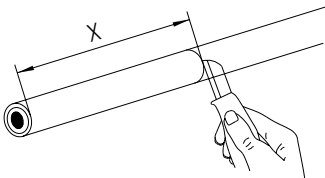
Which cable is used for which variant, see Tables 2 and 3.

Crimp version	Conductor cross-section of heating cable [mm ²]	Crimping die
1 Crimp conductor directly 	1.0 - 2.5	1.5 - 2.5
2 Fold conductor once (2 layer) 	0.41 - 1.0	1.5 - 2.5
3 Fold conductor twice (4 layer) 	0.13 - 0.4	1.5 - 2.5

1. Slide heat-shrink tube **A**, L = 150 mm onto the cold lead/heating cable or heating cable. In the case of heating cables with an outer diameter of less than 3.5 mm, a heat-shrink tube **B**, L = 40 mm must additionally be slid on as an adapter

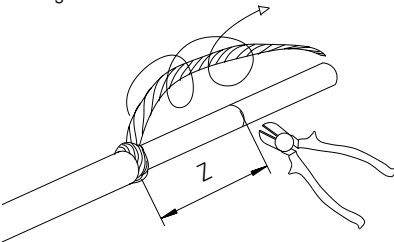


2. Strip the outer jacket of the cold lead/heating cable. Strip the outer jacket of the heating cable. The protective braid must not be damaged during cutting.



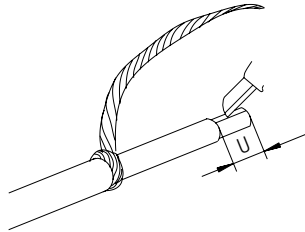
Dimensions see Table 1

3. Splay and twist the braid. Shorten the cold lead/heating cable. Do not shorten the heating cable.



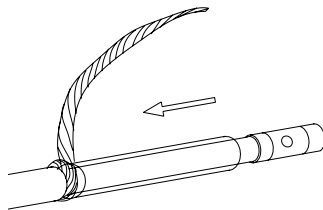
Dimensions see Table 1

4. Strip the cold lead/heating cable and heating cable, depending on the version used. See overview of crimp versions. The cable must not be damaged.

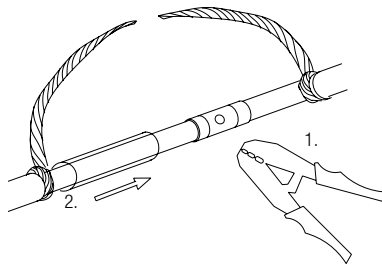


Dimensions see Table 1

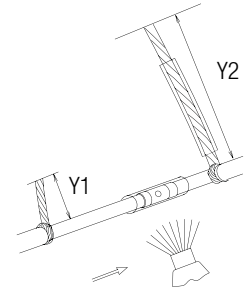
5. Crimp butt connector **D** on heating cable - refer to the overview to see which crimp version. Then slide on heat-shrink tube **C**, L = 35 mm.



6. Crimp cold lead/heating cable on butt connector - refer to the overview to see which crimp version.

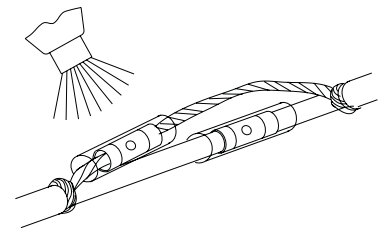


7. Slide heat-shrink tube **C** over butt connector and shrink. Shorten the protective braid of heating cable and cold lead/heating cable. Push on 2. heat-shrink tube **C**, L=35 mm.



Dimensions see Table 1

8. Crimp protective braid of cold lead/heating cable. Slide heat-shrink tube **C** over 2. butt connector and shrink.



9. Shrink heat-shrink tube **A** and if necessary heat-shrink tube **B**.

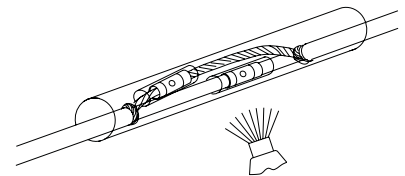


Table 1

Crimp versions	Length of wire stripping on cold lead/heating cable [mm]				Length of wire stripping on heating cable [mm]			
	X	Y2	Z	U	X	Y1	Z	U
1	50	50	25	7	40	20	40	7
2	57	50	32	14	47	20	47	14
3	71	50	46	28	61	20	61	28

Table 2

Crimp versions EKL light

Type	Nominal resistance at 20 °C [Ohm/km]	Cross-section heat conductor [mm ²]	Outer diameter [mm]	Crimp version
27-5821-5A6A0007	7	2.50	5.0	1
27-5821-5A6A0010	10	1.80	4.4	1
27-5821-5A6A11R7	11.7	1.50	4.3	1
27-5822-5A6A0015	15	1.20	4.1	1
27-5822-5A6A17R8	17.8	1.00	4.0	1
27-5822-5A6A0025	25	0.98	4.0	2
27-5822-5A6A31R5	31.5	1.54	4.3	1
27-5822-5A6A0050	50	0.98	4.0	2
27-5822-5A6A0065	65	0.75	3.8	2
27-5822-5A6A0080	80	0.62	3.6	2
27-5822-5A6A0100	100	0.50	3.6	2
27-5822-5A6A0150	150	0.98	4.0	2
27-5822-5A6A0180	180	0.56	3.6	2
27-5822-5A6A0200	200	0.49	3.5	2
27-5822-5A6A0250	250	0.39	3.6	3
27-5822-5A6A0320	320	0.92	4.0	2
27-5822-5A6A0380	380	0.41	3.7	2
27-5822-5A6A0480	480	0.46	3.8	2
27-5822-5A6A0600	600	0.49	3.7	2
27-5822-5A6A0700	700	0.42	3.6	2
27-5822-5A6A0810	810	0.60	3.8	2
27-5822-5A6A1000	1000	0.48	3.8	2
27-5824-5A6A1440	1440	0.33	3.6	3
27-5824-5A6A1750	1750	0.28	3.5	3
27-5824-5A6A2000	2000	0.51	3.8	2
27-5824-5A6A3000	3000	0.35	3.6	3
27-5824-5A6A4000	4000	0.26	3.5	3
27-5824-5A6A4400	4400	0.24	3.4	3
27-5824-5A6A5160	5160	0.21	3.4	3
27-5824-5A6A5600	5600	0.19	3.4	3
27-5824-5A6A6000	6000	0.18	3.4	3
27-5824-5A6A7000	7000	0.15	3.4	3
27-5824-5A6A8000	8000	0.13	3.4	3

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Table 3

Crimp versions EKL medium

Type	Nominal resistance at 20 °C [Ohm/km]	Cross-section heat conductor [mm ²]	Outer diameter [mm]	Crimp version
27-5821-756G07R2	7.2	2.45	4.9	1
27-5821-756G0010	10	1.81	4.8	1
27-5821-756G11R7	11.7	1.47	4.6	1
27-5821-756G0015	15	1.16	4.4	1
27-5821-756G17R8	17.8	1.00	4.3	2
27-5822-756G0025	25	0.98	4.3	2
27-5822-756G0040	40	1.25	4.4	1
27-5822-756G31R5	31.5	1.54	4.6	1
27-5822-756G0050	50	0.98	4.3	2
27-5822-756G0065	65	0.75	4.1	2
27-5822-756G0080	80	0.61	4.0	2
27-5822-756G0100	100	0.49	3.9	2
27-5822-756G0150	150	0.98	4.3	2
27-5822-756G0180	180	0.56	4.0	2
27-5822-756G0200	200	0.73	4.1	2
27-5822-756G0250	250	0.39	3.8	3
27-5826-756G0320	320	0.92	4.2	2
27-5822-756G0360	360	0.41	3.8	2
27-5826-756G0380	380	0.77	4.1	2
27-5826-756G0480	480	0.62	4.0	2
27-5826-756G0600	600	0.49	3.9	2
27-5826-756G0650	650	0.46	3.9	2
27-5826-756G0700	700	0.42	3.8	2
27-5822-756G0810	810	0.59	4.0	2
27-5822-756G1000	1000	0.48	3.9	2
27-5822-756G1440	1440	0.33	3.7	3
27-5822-756G1750	1750	0.28	3.7	3
27-5824-756G2000	2000	0.51	3.9	3
27-5824-756G3000	3000	0.34	3.8	3
27-5824-756G4000	4000	0.26	3.7	3
27-5824-756G4400	4400	0.24	3.6	3
27-5824-756G5160	5160	0.21	3.6	3
27-5824-756G5600	5600	0.19	3.6	3
27-5824-756G6000	6000	0.18	3.6	3
27-5824-756G7000	7000	0.15	3.5	3
27-5824-756G8000	8000	0.13	3.5	3

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