

"QUARTZ" LLC

**SAFETY FUSES
PKE AND PKEN SERIES**

Technical description and user manual

UITSG. 674351.005 TO

1. Introduction

1.1. This technical description and user manual (UM) are guidelines for the installation, operation, transportation and storage of PKT and PKN fuses of (hereinafter referred to as "fuses") manufactured by "Quartz" LLC according to TU U 3.49-19274160-017-95 and DSTU EN 60282-1:2016.

1.2. The structure of the symbol for fuses is given in Appendix A.

2. Purpose

2.1. The PKE series fuses are designed to protect electric circuits of excavators and other mobile units. Fuses are designed for installation in three-phase alternating current networks of 50 and 60 Hz frequencies with rated voltages of 6, 10 and 35 kV. The PKE fuses are designed for protection of power transformers, the PKEN fuses - for protection of measuring circuits of voltage transformers in distribution devices of excavators and mobile power plants. Fuses PKEN 016-10 U2 and PKEN 016-12 T2 can also be used to protect measuring voltage transformers at 6 and 7,2 kV. Fuses of the PKE series are produced with or without a trigger indicator.

2.2. The fuses belong to class 2 in accordance with DSTU EN 60282-1:2016 and provide disconnection of currents in the normalized range. If necessary, fuses are used together with other devices capable of switching off currents that are lower than the rated minimum fuse breaking current.

2.3. Climatic performance and category of fuse placement - U2, XL2 and T2 according to GOST 15150-69.

2.4. Fuses should be used in electrical installations under the following conditions:

- the operating temperature of the ambient air, depending on the climatic version:

- category U2 from -45 to +45 °C;
- category HL2 from -60 to +40 °C;
- category T2 from -10 to +50 °C;
- altitude above sea level - no more than 1000 m;
- working position in space - vertical, deviation from the vertical by 15° is allowed;

The environment is non-explosive, does not contain conductive dust, aggressive gases and vapors in a concentration that destroys metals and insulation;

2.5. The fuses according to the operating conditions are vibration resistant and allow mechanical impacts of single shocks with acceleration of 3g and a pulse duration of no more than 20 ms, and vibration in the frequency range from 0,5 to 100 Hz with an acceleration amplitude of 1g.

3. Technical data

3.1. The main technical data of fuses are given in the table. In this case, for equivalent fuses with two chucks, an equivalent resistance value is indicated, taking into account the parallel connection of the cartridges.

3.2. The overall, mounting, connection dimensions and weight of the fuses are shown in Appendix 2.

3.3. The fuses are disconnected without damage to the currents from the rated minimum tripping current to the rated breaking current.

3.4. The amplitude value of the voltage occurring between the fuse terminals when the currents are disconnected does not exceed the following values:

- for fuses at 6 kV - not more than 15 kV;
- for fuses at 10 kV - not more than 25 kV;
- for fuses at 35 kV - not more than 85 kV.

3.5. The electrical strength of insulation of fuses meets the requirements of GOST 1516.1.

3.6. Fuses of the PKEN allow for a long current of the load current up to 0,5 A.

3.7. Fuse chucks are protected against moisture.

3.8. According to the characteristics, fuses are current limiting.

Table of main parameters

Type of Fuse	Rated Voltage, kV	Maximum operational Voltage, kV	Rated fuse current, A	Rated breaking current, kA	Minimum breaking current, A	Power loss, Wt
1	2	3	4	5	6	7
PKE 116-6-5-40 U2 PKE 016-6-5-40 U2	6	7,2	5	40	15	8
PKE 116-6-8-40 U2 PKE 016-6-8-40 U2			8	40	24	13
PKE 116-6-10-40 U2 PKE 016-6-10-40 U2			10	40	30	14
PKE 116-6-16-40 U2 PKE 016-6-16-40 U2			16	40	160	30
PKE 116-6-20-40 U2 PKE 016-6-20-40 U2			20	40	200	35
PKE 116-6-31,5-20 U2 PKE 016-6-31,5-20 U2			31,5	20	315	58
PKE 116-10-5-12,5 U2 PKE 016-10-5-12,5 U2			10	12	5	12,5
PKE 116-10-8-12,5 U2 PKE 016-10-8-12,5 U2	8	12,5			24	22
PKE 116-10-10-12,5 U2 PKE 016-10-10-12,5 U2	10	12,5			30	23
PKE 116-10-16-31,5 U2 PKE 016-10-16-31,5 U2	16	31,5			160	40
PKE 116-10-20-31,5 U2 PKE 016-10-20-31,5 U2	20	31,5			200	45
PKE 116-10-31,5-31,5 U2 PKE 016-10-31,5-31,5 U2	31,5	31,5			315	75
PKE 117-6-31,5-31,5 U2 PKE 017-6-31,5-31,5 U2	6	7,2			31,5	31,5
PKE 117-6-40-31,5 U2 PKE 017-6-40-31,5 U2			40	31,5	400	55
PKE 117-6-50-31,5 U2 PKE 017-6-50-31,5 U2			50	31,5	500	70
PKE 117-6-63-31,5 U2 PKE 017-6-63-31,5 U2			63	31,5	630	90
PKE 117-6-80-20 U2 PKE 017-6-80-20 U2			80	20	800	120
PKE 117-10-31,5-31,5 U2 PKE 017-10-31,5-31,5 U2	10	12	31,5	31,5	315	50
PKE 117-10-40-31,5 U2 PKE 017-10-40-31,5 U2			40		400	67
PKE 117-10-50-31,5 U2 PKE 017-10-50-31,5 U2			50		500	90

1	2	3	4	5	6	7
PKE 117-10-63-31,5 U2 PKE 017-10-63-31,5 U2	10	12	63	31,5	630	120
PKE 118-6-80-31,5 U2 PKE 018-6-80-31,5 U2	6	7,2	80		800	110
PKE 118-6-100-31,5 U2 PKE 018-6-100-31,5 U2			100		1000	135
PKE 118-6-125-31,5 U2 PKE 018-6-125-31,5 U2			125		1250	180
PKE 118-6-160-20 U2 PKE 018-6-160-20 U2			160	20	1600	240
PKE 118-10-80-31,5 U2 PKE 018-10-80-31,5 U2	10	12	80	31,5	800	145
PKE 118-10-100-31,5 U2 PKE 018-10-100-31,5 U2			100	31,5	1000	180
PKE 116-6-5-20 HL2 PKE 016-6-5-20 HL2	6	7,2	5	20	15	8
PKE 116-6-8-20 HL2 PKE 016-6-8-20 HL2			8	20	24	13
PKE 116-6-10-20 HL2 PKE 016-6-10-20 HL2			10	20	30	14
PKE 116-6-16-40 HL2 PKE 016-6-16-40 HL2			16	40	160	30
PKE 116-6-20-40 HL2 PKE 016-6-20-40 HL2			20	40	200	35
PKE 116-6-31,5-20 HL2 PKE 016-6-31,5-20 HL2			31,5	20	315	58
PKE 116-10-5-12,5 HL2 PKE 016-10-5-12,5 HL2	10	12	5	12,5	15	14
PKE 116-10-8-12,5 HL2 PKE 016-10-8-12,5 HL2			8	12,5	24	22
PKE 116-10-10-12,5 HL2 PKE 016-10-10-12,5 HL2			10	12,5	30	23
PKE 116-10-16-31,5 HL2 PKE 016-10-16-31,5 HL2			16	31,5	160	40
PKE 116-10-20-31,5 HL2 PKE 016-10-20-31,5 HL2			20	31,5	200	45
PKE 116-10-31,5-31,5 HL2 PKE 016-10-31,5-31,5 HL2			31,5	31,5	315	75
PKE 116-35-3,2-8 HL2 PKE 016-35-3,2-8 HL2	35	40,5	3,2	8	20	30
PKE 116-35-3,2-16 HL2 PKE 016-35-3,2-16 HL2			3,2	16	20	30
PKE 117-6-40-31,5 HL2 PKE 017-6-40-31,5 HL2	6	7,2	40	31,5	400	55
PKE 117-6-50-31,5 HL2 PKE 017-6-50-31,5 HL2			50	31,5	500	70
PKE 117-10-31,5-31,5 HL2 PKE 017-10-31,5-31,5 HL2	10	12	31,5	31,5	315	50
PKE 117-10-40-31,5 HL2 PKE 017-10-40-31,5 HL2			40	31,5	400	67
PKE 116-35-5-8 HL2 PKE 016-35-5-8 HL2	35	40,5	5	8	30	38

1	2	3	4	5	6	7
PKE 116-35-8-8 HL2 PKE 016-35-8-8 HL2	35	40,5	8	8	48	57
PKE 118-6-80-31,5 HL2 PKE 018-6-80-31,5 HL2	6	7,2	80	31,5	800	110
PKE 118-6-100-31,5 HL2 PKE 018-6-100-31,5 HL2			100	31,5	1000	135
PKE 118-10-80-31,5 HL2 PKE 018-10-80-31,5 HL2	10	12	80	31,5	800	145
PKE 116-7,2-5-40 T2 PKE 016-7,2-5-40 T2	6	7,2	5	40	15	8
PKE 116-7,2-8-40 T2 PKE 016-7,2-8-40 T2			8	40	24	13
PKE 116-7,2-10-40 T2 PKE 016-7,2-10-40 T2			10	40	30	14
PKE 116-7,2-16-40 T2 PKE 016-7,2-16-40 T2			16	40	160	30
PKE 116-7,2-20-40 T2 PKE 016-7,2-20-40 T2			20	40	200	35
PKE 116-7,2-31,5-20 T2 PKE 016-7,2-31,5-20 T2			31,5	20	315	58
PKE 116-12-5-12,5 T2 PKE 016-12-5-12,5 T2			10	12	5	12,5
PKE 116-12-8-12,5 T2 PKE 016-12-8-12,5 T2	8	12,5			24	22
PKE 116-12-10-12,5 T2 PKE 016-12-10-12,5 T2	10	12,5			30	23
PKE 116-12-16-31,5 T2 PKE 016-12-16-31,5 T2	16	31,5			160	40
PKE 116-12-20-31,5 T2 PKE 016-12-20-31,5 T2	20	31,5			200	45
PKE 116-12-31,5-31,5 T2 PKE 016-12-31,5-31,5 T2	31,5	31,5			315	75
PKE 117-7,2-31,5-31,5 T2 PKE 017-7,2-31,5-31,5 T2	6	7,2			31,5	31,5
PKE 117-7,2-40-31,5 T2 PKE 017-7,2-40-31,5 T2			40	31,5	400	55
PKE 117-7,2-50-31,5 T2 PKE 017-7,2-50-31,5 T2			50	31,5	500	70
PKE 117-12-31,5-31,5 T2 PKE 017-12-31,5-31,5 T2	10	12	31,5	31,5	315	50
PKE 117-12-40-31,5 T2 PKE 017-12-40-31,5 T2			40	31,5	400	67
PKE 118-7,2-80-31,5 T2 PKE 018-7,2-80-31,5 T2	6	7,2	80	31,5	800	110
PKE 118-7,2-100-31,5 T2 PKE 018-7,2-100-31,5 T2			100	31,5	1000	135
PKE 118-12-80-31,5 T2 PKE 018-12-80-31,5 T2	10	12	80	31,5	800	145
PKEN 016-10 U2	10	12	Not standardized			
PKEN 016-10 HL2						
PKEN 016-35 HL2						
PKEN 016-12 T2						

4. Package Contents

4.1. The fuses consist of a replaceable fusible element, supporting insulators and contacts, which are supplied as separate components. The designations and list of fuse components are given in Appendix B. The fusible element of fuses PKE 116, PKE 016, PKE 117, PKE 017 and PKN 016 consists of one chuck; fuses PKE 018 and PKT 118 - from two soldered chucks; fuses PKT 014 and PKT 114 - from four chucks.

4.2. A complete set of fuses includes:

- replaceable fusible element;
- two supporting insulators;
- two contacts;
- a set of fasteners according to the design documentation;
- Passport for a batch of similar fuses, supplied to one address.
- Technical description and user manual for a batch of similar fuses, supplied to one address, in agreement with the manufacturer.

Note. At the request of the consumer, fuses can be supplied in any packaging set.

5. The device and operation

The fuse consists of a replaceable fusible element (chuck), contacts and supporting insulators, which are connected mechanically and electrically, according to the dimensional-installation drawing, at the installation site. The chuck is installed in the contacts and fixed with a special latch.

The chuck is non-separable, contains a porcelain case with metal caps on the faces. Inside the chuck there is a conductive fusible element, electrically connected to the cap and a fine-grained filler (quartz sand), which provides intensive damping of the electric arc when the current is cut off.

Fuses with an alarm device for triggering have a recessed spring-loaded peg (indicator) at one end, closed by a thin metal membrane. When activated, the peg breaks through the membrane and extends from the chuck to a height of at least 8 mm.

6. Packaging

6.1. The components of the fuses are subjected to conservation by the manufacturer, which ensures their safety during the warranty period (two years). Metal parts of chucks and insulators, uncovered by paint, are covered with protective grease, the chuck caps are wrapped with wrapping paper.

Fuse chucks and supporting insulators are packed in a container and laid with a soft packing material (for example, chips), which protects them from shocks and displacement. Contacts of fuses and fasteners are separately packed in polyethylene bags or wrapped in wrapping paper.

7. Transportation and storage

7.1. Fuses in the manufacturer's packaging can be transported by any type of closed transport (vans, wagons, ship holds, etc.). It is allowed to transport fuses in containers without additional packaging, provided that measures are taken to ensure that they are not damaged (by laying chip or sawdust).

7.2. Conditions of transportation and storage with regard to the influence of climatic factors of the external environment - according to the storage conditions group 5 (OZH 4) in accordance with GOST 15150 (temperature from -50 to + 50 °C, humidity - not more than 98% at + 35 °C).

7.3. Transport conditions in terms of the influence of mechanical factors - for group C according to GOST 23216. During loading and unloading, do not allow sudden shocks and impacts.

7.4. Small batches of fuses (up to 25 pcs.) can be shipped to the packaging of the customer, provided that measures are taken to exclude the possibility of damage during transportation.

7.5. The period of preservation of the component parts of the fuses in the package is two years from the date of shipment under the conditions of transportation and storage. After this period, the fuses must be inspected by the consumer and, if necessary, re-preserved.

8. Installation of fuses

8.1. Before installing the fuses, the following operations must be carried out:

- unlock the components by removing the grease with rags moistened with gasoline or a solvent;

- wipe the surface of insulators and chucks with napkins that do not leave a pile;
- with an external inspection, make sure that there are no cracks or chips on porcelain parts of fuses and insulators;
- check the compliance of the operating conditions with the parameters of the fuses indicated in the chuck marking (voltage class, currents, climatic performance);
- check the serviceability of the chucks by the continuity of the electrical circuit.

8.2. Install fuses in accordance with the design documentation and the rules for the setup of electrical installations (SEI).

8.3. Install fuses in the following order:

- install fuse contacts on supporting insulators;
- to install supporting insulators with contacts on structural elements with observance of inter-center distances indicated on the fuse-mounting dimensions, the distance between the phases must comply with the requirements of the SEI;
- adjust the installation of the supporting insulators and contacts so that the longitudinal axes of both contacts of the fuse match and tighten the mounting bolts;
- Attach the supply lines or wires to the fuse terminals, and the external conductors must not transfer significant forces to the insulators;
- install the chucks in the contacts, slowly pressing them until the contact is fully covered by the contacts, selecting the position of the pickup indicator (up or down) from the condition of its best view during the external inspection, and close the latch;
- check the reliability of fastening the chucks in the contacts; when the latch is closed, the chucks should not be turned, and, if necessary, adjust the contacts by clamping or dilating the ends.

When mounting fuses, the fasteners included in the scope of delivery are used.

8.4. The cross section of the external copper conductors connected to the fuse contacts must be at least:

- at a rated current up to 20 A - $20 \div 30 \text{ mm}^2$;
- at a rated current from 31,5 to 63 A - $40 \div 60 \text{ mm}^2$;
- at a rated current from 80 to 200 A - $120 \div 160 \text{ mm}^2$.

9. Security measures

9.1. Install fuses in accordance with the rules for the setup of electrical installations (SEI).

9.2. Operational maintenance of fuses in the process of operation shall be carried out in accordance with the rules for the safe operation of consumers' electrical installations.

9.3. Replacement of chucks must be performed with the equipment disconnected and grounded.

10. Instructions for use

10.1. After completing the installation work, it is necessary to check the resistance and the electrical strength of the insulation of the entire electrical installation, including the fuses, in the volume and in accordance with the standards stipulated in the rules for the mounting of electrical installations before switching on the fuses.

10.2. While operating the fuses, periodic preventative maintenance should be carried out in the following volume:

- perform an external inspection to identify mechanical damage or fuses that have tripped;
- wipe the surface of insulation parts;
- check the reliability of the connections and, if necessary, tighten them;
- check the integrity of the fuse chucks;
- check the resistance and electrical strength of insulation of supporting insulators.

Scheduled preventive maintenance work should be carried out at least once a year, in addition to checking the insulation, which must be carried out at the time and according to the standards for the electrical installation as a whole.

10.3. In the event of a fuse operating in one or two phases of a three-phase network, it is recommended to replace the chucks in all three phases, unless there is a firm belief that the breaking current has not passed through the fuse that has not melted.

10.4. It is recommended to repair the burnt fuses at the manufacturer's factory. This requires special technological equipment and special materials.

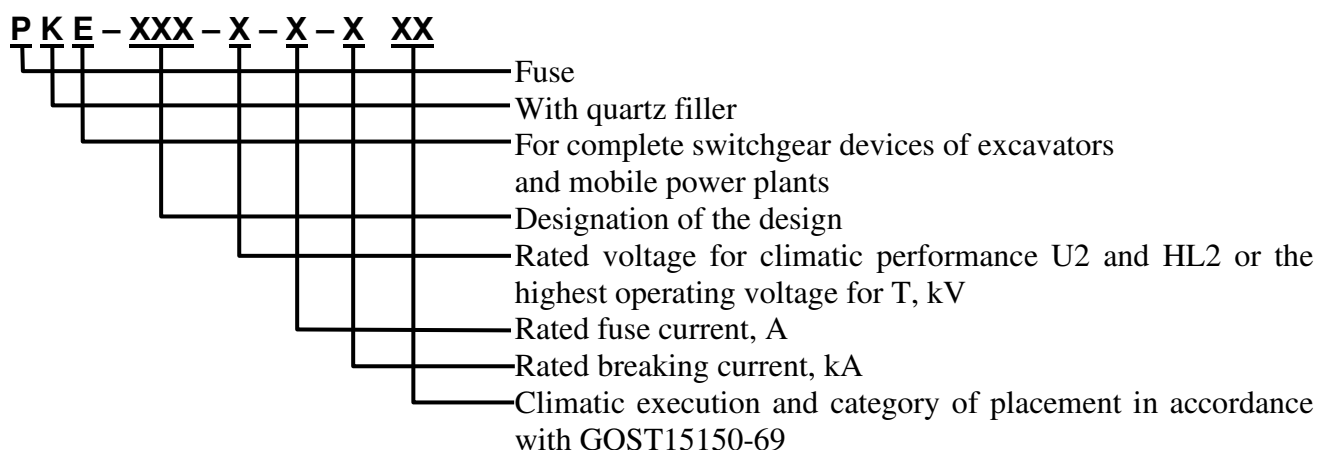
10.5. Fuses do not contain harmful substances and materials. The utilization of fuses must be carried out in accordance with the procedure provided for by the decisions of the regional organization of sanitary and epidemiological surveillance.

11. Warranties

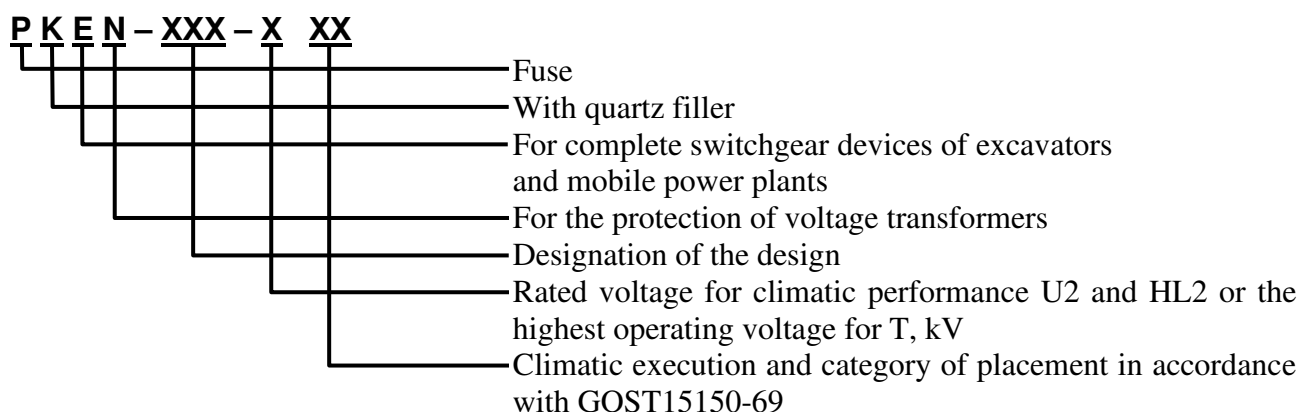
11.1. The manufacturer guarantees that the quality of the fuses meets the requirements of TU U 3.49-19274160-017-95 if the user observes the conditions of transportation, storage, installation and operation in this operating manual.

11.2. Warranty period - 24 months from the date of commissioning, but not later than 36 months from the date of manufacture. For fuses supplied abroad, the guaranteed service life is 12 months from the date of commissioning, but not later than 24 months from the time of the crossing the State Border of Ukraine.

Decoding of the conventional designation of fuses PKE:



Decoding of the conventional designation of fuses PKEN:



Designation of the design of the fuse

First digit:

0 – without triggering indicator;

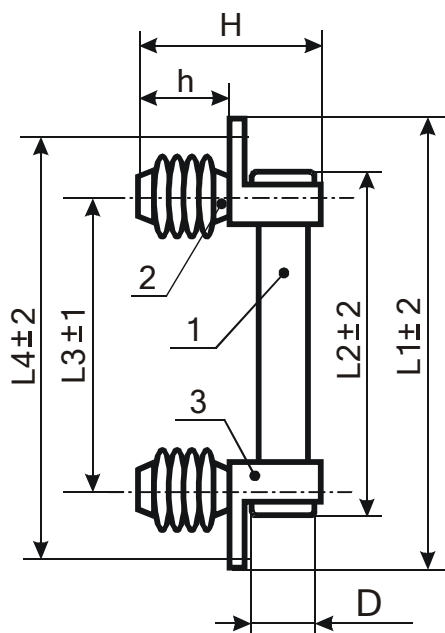
1 – with triggering indicator;

The second and third digits:

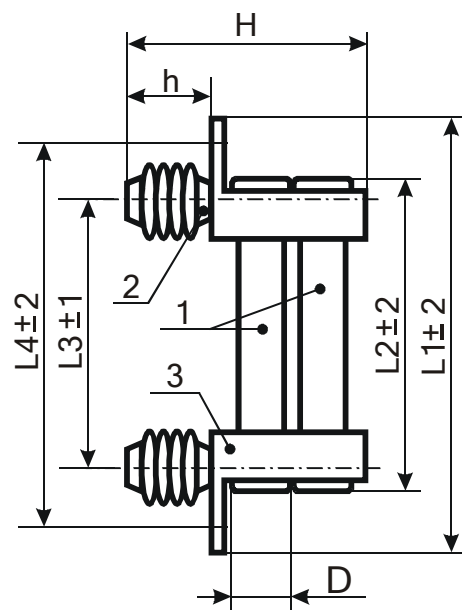
16 – I gauge (one chuck Ø54 mm);

17 – II overall dimensions (one chuck Ø70 mm);

18 – III overall dimensions (two chucks Ø70 mm).



1 – chuck; 2 – insulator; 3 – contact.
Figure 1.



1 – chuck; 2 – insulator; 3 – contact.
Figure 2.

Type of Fuse	Dimensions, mm							Weight, kg
	L1	L2	L3	L4	H	h	D	
PKE 116-6; 016-6	404	318	267	380	186	100	54	3,8
PKE 117-6; 017-6	454	368	317	430	198	100	70	5,0
PKE 118-6; 018-6	454	368	317	430	270	100	70	7,7
PKE 116-10; 016-10	504	418	367	480	206	120	54	5,1
PKE 117-10; 017-10	554	468	417	530	218	120	70	6,6
PKE 118-10; 018-10	554	468	417	530	290	120	70	9,9
PKE 116-35; 016-35	734	618	562	710	458	372	54	27,8
PKEN 016-10	404	318	267	380	206	120	54	4,8
PKEN 016-35	734	618	562	710	458	372	54	27,8

The dimensions and weight of the fuses are shown in the figures:
Figure 1. Fuses PKE 116, PKE 016, PKE 117, PKE 017, PKEH 016;
Figure 2. Fuses PKE 118, PKE 018.

Composition of fuses

Marking (conventional designation) of fuse chucks, insulators and contacts

Type of Fuse	Climatic execution	Chuck type	Marking contacts	Marking insulators
PKE 116-6, PKE 016-6	U2	PE 116-6, PE 016-6	K16-10 U2	IOR-6-3,75 UHL2
PKE 116-10, PKE 016-10	U2	PE 116-10, PE 016-10	K16-10 U2	IOR-10-3,75 UHL2
PKE 116-6, PKE 016-6	HL2	PE 116-6, PE 016-6	K16-10 HL2	IOR-6-3,75 UHL2
PKE 116-10, PKE 016-10	HL2	PE 116-10, PE 016-10	K16-10 HL2	IOR-10-3,75 UHL2
PKE 116-35, PKE 016-35	HL2	PE 116-35, PE 016-35	K16-35 HL2	IOR-35-3,75 UHL2
PKE 116-7,2	T2	PE 116-7,2	K16-12 T2	IOR-6-3,75 T2
PKE 116-12	T2	PE 116-12	K16-12 T2	IOR-10-3,75 T2
PKE 117-6, PKE 017-6	U2	PE 117-6, PE 017-6	K17-10 U2	IOR-6-3,75 UHL2
PKE 117-10, PKE 017-10	U2	PE 117-10, PE 017-10	K17-10 U2	IOR-10-3,75 UHL2
PKE 117-6, PKE 017-6	HL2	PE 117-6, PE 017-6	K17-10 HL2	IOR-6-3,75 UHL2
PKE 117-10, PKE 017-10	HL2	PE 117-10, PE 017-10	K17-10 HL2	IOR-10-3,75 UHL2
PKE 117-7,2 PKE 017-7,2	T2	PE 117-7,2 PE 017-7,2	K17-12 T2	IOR-6-3,75 T2
PKE 117-12 PKE 017-12	T2	PE 117-12 PE 017-12	K17-12 T2	IOR-10-3,75 T2
PKE 118-6, PKE 018-6	U2	PE 117-6, PE 017-6	K18-10 U2	IOR-6-3,75 UHL2
PKE 118-10, PKE 018-10	U2	PE 117-10, PE 017-10	K18-10 U2	IOR-10-3,75 UHL2
PKE 118-6, PKE 018-6	HL2	PE 117-6, PE 018-6	K18-10 HL2	IOR-6-3,75 UHL2
PKE 118-10, PKE 018-10	HL2	PE 117-10, PE 017-10	K18-10 HL2	IOR-10-3,75 UHL2
PKE 118-7,2, PKE 018-7,2	T2	PE 117-7,2 PE 017-7,2	K18-7,2 T2	IOR-6-3,75 T2
PKEN 016-10	U2	PN 016-10	K16-10 U2	IOR-10-3,75 UHL2
PKEN 016-10	HL2	PN 016-10	K16-10 HL2	IOR-10-3,75 UHL2
PKEN 016-35	HL2	PN 016-35	K16-35 HL2	IOR-35-3,75 UHL2
PKEN 016-35	T2	PN 016-35	K16-35 T2	IOR-35-3,75 T2

The type of chuck in the table in Appendix 3 is indicated without the rated current of the fuse, the rated breaking current and the climatic version, which are listed in the table of main parameters.