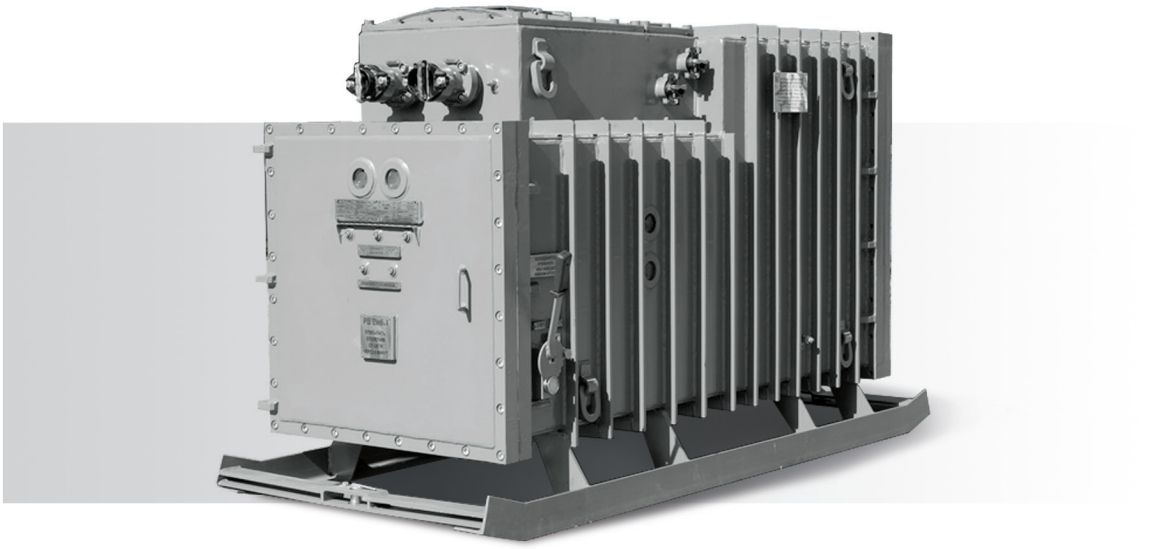
HIGH-VOLTAGE MINING CAPACITOR UNIT OF УКРВ-6,3-ХХХ-К-УХЛ5 TYPE TECHNICAL DATA

Private Joint Stock Company «DEG»



High-voltage mining capacitor unit of УКРВ-6,3 type (hereinafter “unit”) is designed to compensate reactive power in electrical networks of 6 kV, 50 Hz underground power supply system of mines, including those hazardous of gas (methane) and coal dust. The capacitor unit is designed to operate in the three-phase AC electrical networks with insulated neutral.

IDENTIFICATION CODE STRUCTURE

У — unit;
К — capacitor;
Р — mining;
В — high-voltage;
6,3 — rated voltage of capacitors in kilovolts;
ХХХ — rated power in kilovolt-amperes reactive;
К — version according to the operation mode:
K — with built-in contactor, automatic connection and disconnection to the power supply network while changing the load reactive power value.
УХЛ — climatic version according to standard ГОСТ 15150-69;
5 — location category according to standard ГОСТ 15150-69.

Capacitor unit of УКРВ-6,3 type corresponds to the technical conditions ТУ У 32.1-23189879-009:2007.

OPERATION CONDITIONS

- ambient temperature from 0 °C to plus 35 °C;
- relative humidity up to 100 % with wet condensation at temperature of plus 35 °C;
- no knocks and strokes allowed;
- ambient dustiness up to 300 mG/m^3;
- altitude above the sea level — not more than 1000 m;
- operation position — slides on the horizontal plane, installation deviation in any direction from the operation position up to 15° is allowed.

CONSTRUCTION

Unit of УКРВ-6,3 type is an independent product, which can be connected to a power supply cable crosscut of high-voltage distribution substation or transformer substation group, as well as to switchgear unit of high-voltage distribution substation or central underground substation.

Unit of УКРВ-6,3 type explosion-proof enclosure is a welded steel construction mounted on a sled. The enclosure is divided into two explosion-proof sec-tions: network section and capacitor unit section.

Network section is designed to connect the unit to the network and consists of the inlet box divided into two parts. It has two power cable glands to connect cables with an external diameter up to 67 mm, four cable glands to connect control cables with the external diameter up to 32 mm and two removable covers.

Information of the load current users is received from the built-in current transformer of 400/5 A (while connecting to the cable line), from the current transformer of the outcoming connection switchgear unit or from the current transformer of the 6 kV power supply switchgear unit.

Capacitor unit section consists of interconnected control and capacitor sections closed with covers.

Control section includes control and protection equipment, the interlock which disables the high-voltage section of the supplying switchgear unit while ope ning the front cover, 6 kV carriage-type power contactor providing two visual circuit breaks, 6 kV auxiliary voltage transformer to supply the contactor and control scheme.

Capacitors section includes 3-phase cosine power capacitors of the required power (1 or 2 pieces), 6 kV, 100/5 A current transformers, capacitor shells explosion prevention device (in

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case of excessive swelling) based on a microswitch, capacitors protection temperature sensor, additional external cosine power capacitors discharge unit.

6 kV power circuits connection is made with the single-core high-voltage flexible cable.

Unit control elements (five buttons and two inspection windows) are placed onto the control section cover external surface.

The unit enclosure is equipped with the external and the internal earthing clips.

Removable and openable enclosure covers are provided with a warning label: “Open in 5 minutes after power supply disconnection”.

Unit has the following lockouts:

- preventing unit repeated switch on immediately after its switch off. The repeated unit switch on is possible through the programmable time delay;
- switching off 6 kV power supply switchgear unit while opening the network section cover, control section cover and capacitors section cover of the capacitor unit;
- switching off unit high-voltage contactor while attempt of rolling out the contactor switched on.

Unit connection:

a) unit is an independent product, which can be connected to a power supply cable crosscut of high-voltage distribution substation or transformer substation group, as well as to power supplying or outcoming switchgear unit of high-voltage distribution substation or central underground substation.
Unit can be used with any type of switchgear unit.

b) information of the load current users is received from the built-in current transformer (while connecting to the cable line), from the outcoming con-nection switchgear unit current transformer or from the power supply switchgear unit current transformer of high-voltage distribution substation or central underground substation where УКРВ unit is connected to.

Electric circuit of the units provides the following kinds of protections, lockouts, alarms and monitoring:

a) operational local unit switching on and off;
b) capacitors overload protection while increasing the current through the capacitors above the 130 % of the rated one;
c) explosion prevention protection of the power cosine capacitor banks while their sides swelling;
d) switching off the high-voltage section of switchgear unit supplying the УКРВ unit while opening the network section cover or capacitor section cover;
e) switching off the unit high-voltage contactor while attempt of rolling out the contactor switched on;
f) unit current measurement in the (three phases);
g) separate alarms on:
   - control and protection circuits supply AC voltage presence;
   - 6 kV contactor switched on (capacitors connected);
   - 6 kV contactor switched off (capacitors disconnected);
   - overload protection actuation;
   - capacitor explosion protection actuation.

Short-circuit currents protection of capacitor unit is performed by power supplying switchgear unit.

The capacitor unit corresponds to class I electrical shock protection according to the Standard of ГОСТ 12.2.007.0-75.

Overall dimensions of the capacitor unit are given in drawing 1.

The electrical circuit diagram of the capacitor unit is given in drawing 2.

Connection diagrams of the unit are given in drawings 3-8.

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TECHNICAL DATA

Parameter	Value
Rated supply voltage, V	6300
Rated frequency, Hz	50
Rated power, kVAr:	100...600...900*
Rated current of the transit load transformer, A	400
Control and protection circuits AC supply voltage, V	~ 100; 110; 127; 220 (from the built-in high-voltage transformer)
Voltage tolerance allowed in the control circuits, %	-15 ÷ +10
Operation mode	continuous
Ex marking	PB ExdI
Protection class	IP 54
Overall dimensions, mm, not more:	2700x1100x1500
Weight, kg, not more:	1850

Note:
* — Power recommended, kVA: 200; 225; 300; 400; 450; 500; 550; 600;700;800;900.

MANUFACTURER WARRANTY

Warranty operation life is 12 months from the date of commissioning. Warranty operation life of the installations exported is not more than 18 months from the date of the state border crossing.

DELIVERY SET

Delivery set includes the following: capacitor unit of УКРВ-6,3–ХХХ-К-УХЛ5 type, registration certificate, operation instructions.

Designer and Manufacturer:
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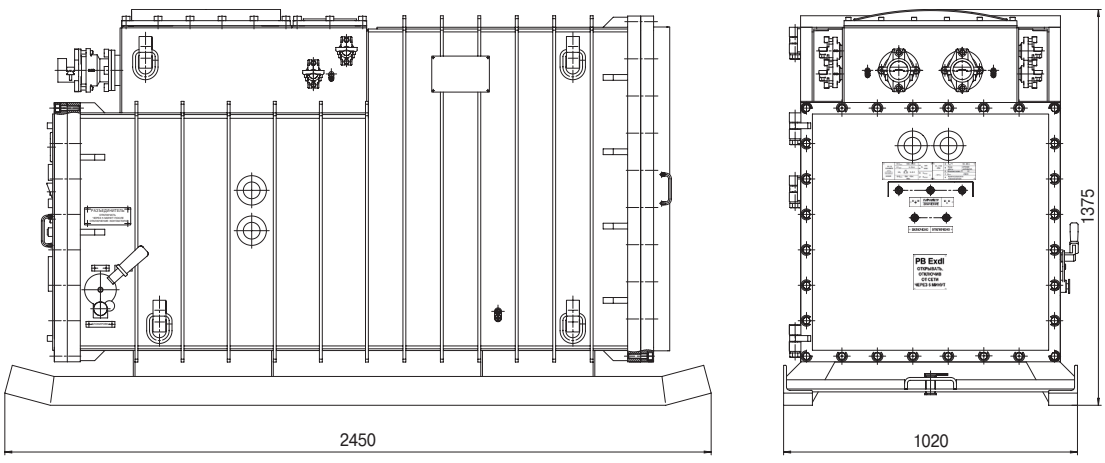

Drawing 1 *– Overall dimensions of УКРВ-6,3-ХХХ-К-УХЛ5 capacitor unit*

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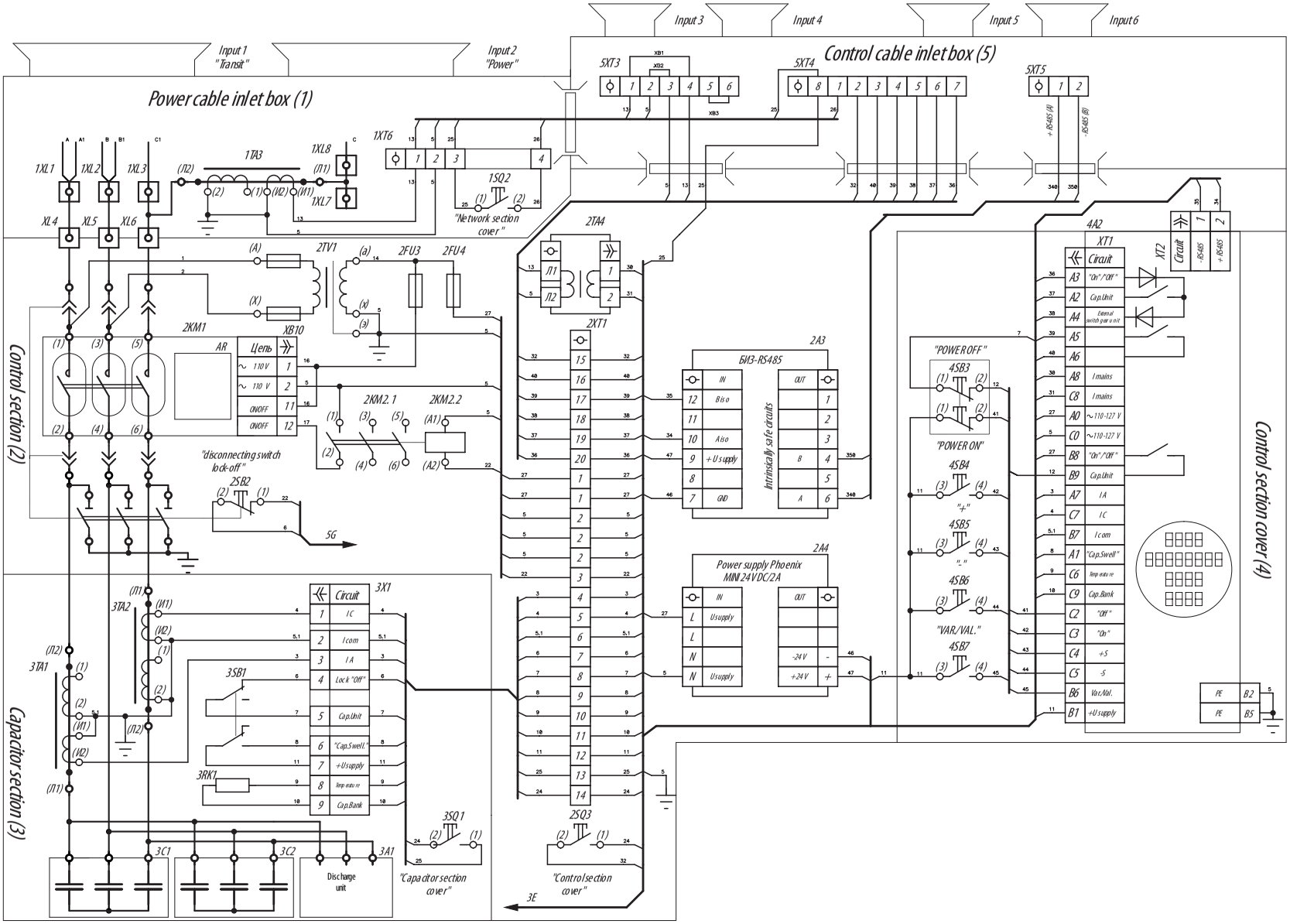
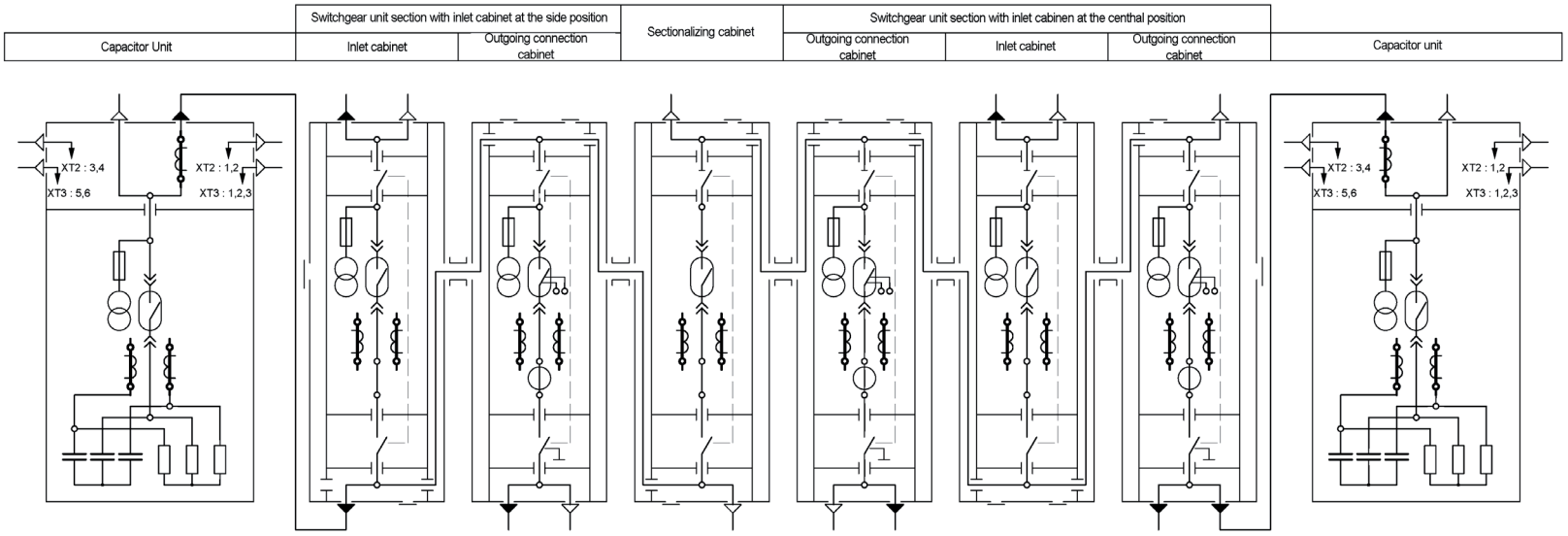
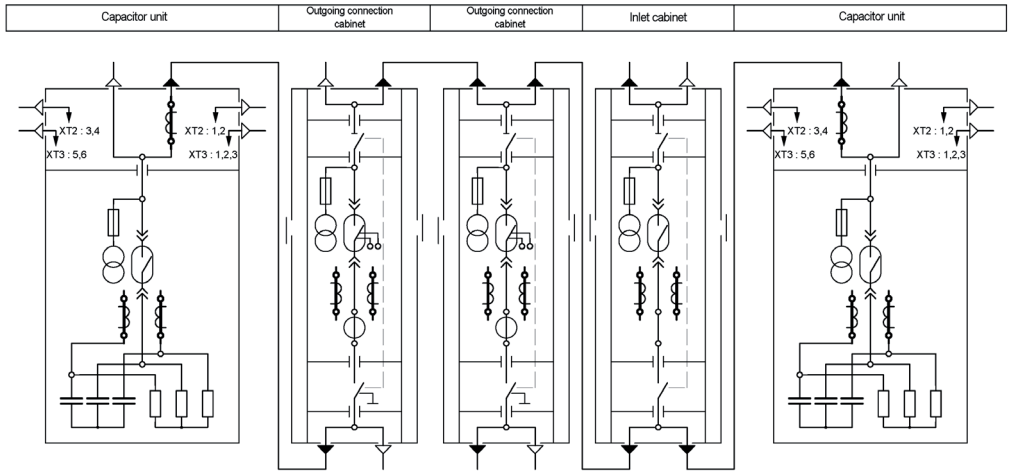


Drawing 2 *– Electrical circuit diagram of the УКРВ-6,3-ХХХ-К-УХЛ5 capacitor unit*



Drawing 3 *– Power circuits connection diagram of 6 kV УКРВ-6,3-ХХХ-К-УХЛ5 (group switchgear unit)*



Drawing 4 *– Power circuits connection diagram of 6 kV УКРВ-6,3-ХХХ-К-УХЛ5 (single switchgear unit)*

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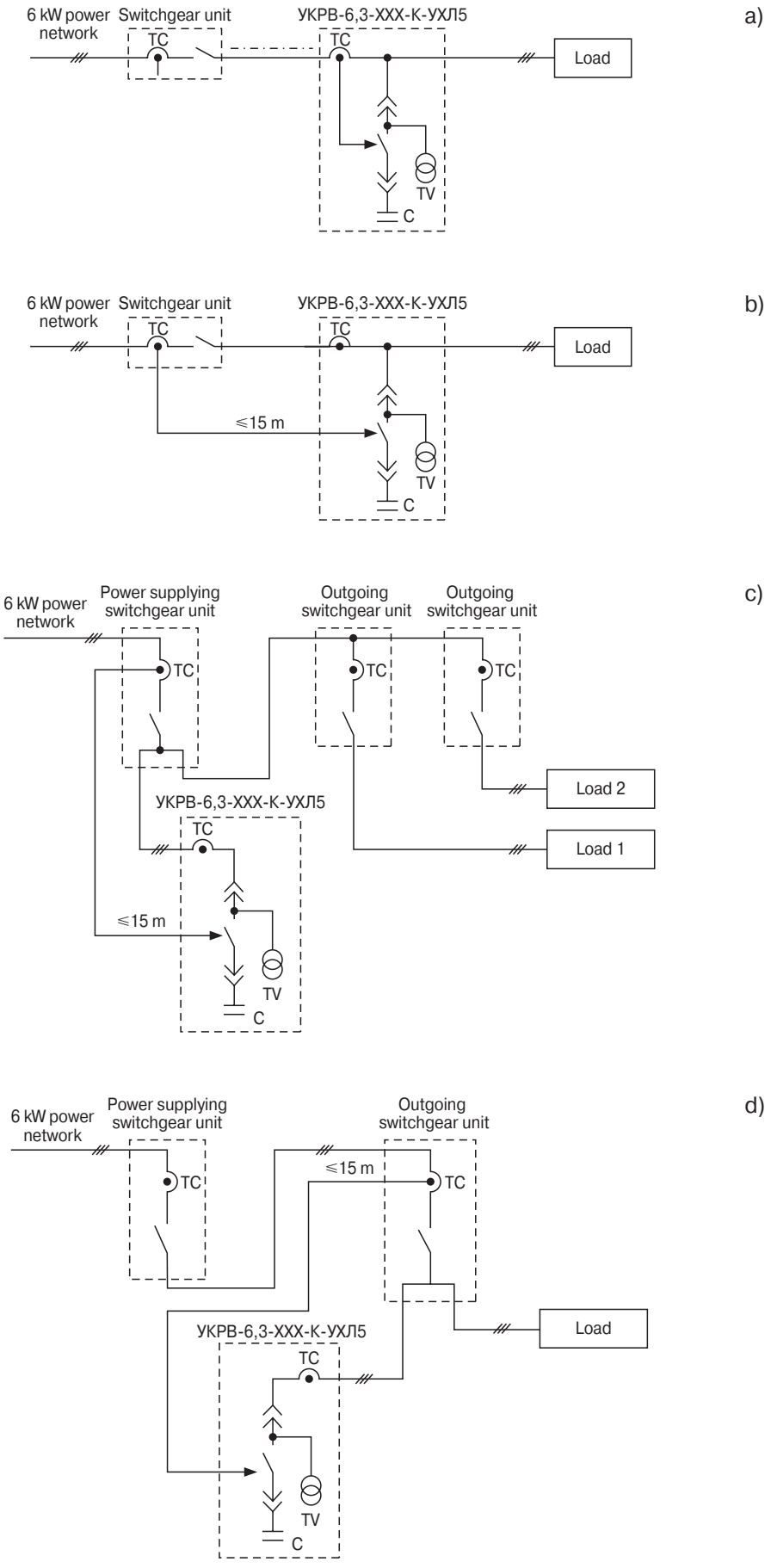

Drawing 5 — *Power circuits connection diagram of 6 kV УКРВ-6,3-ХХХ-К-УХЛ5:*
a) directly to a power supply cable crosscut;
b) to a power supplying switchgear unit and outgoing connections switchgear unit;
c) to a switchgear unit inlet cabinet;
d) to a switchgear unit outgoing connection cabinet

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