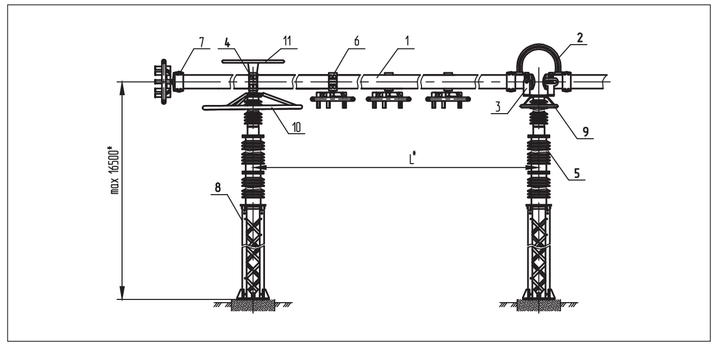
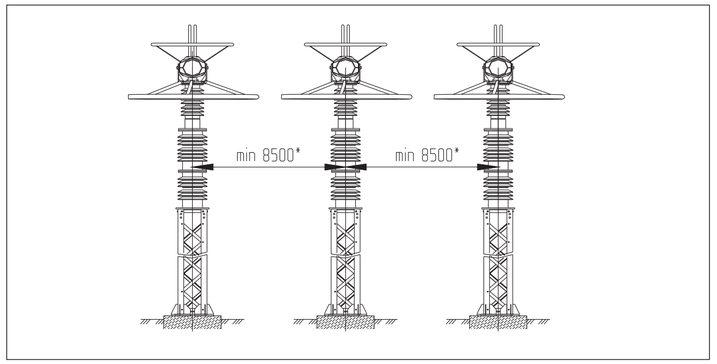
Overall, mounting and connecting dimensions of rigid busbars 750 kV



1 - rigid busbars (collecting buses);
2 - current compensator;
3,4 - bus holder;
5 - post insulator;
6 - clamp;
7 - end clamp;
8 - pillar;
9,10,11 - screen.

Version type	L*, мм
SHN(K)-1...15-750/3150 UKHL1	max 19000 min 5000



* It is possible to supply metal structures of installation height, length of span and interphase distance required by customer but not more than values indicated in the figure.

Parameter ORU-110 kV

Parameter	ORU-110 kV	ORU-220 kV	ORU-330 kV	ORU-500 kV	ORU-750 kV
Rated voltage (linear), kV	110	220	330	500	750
Maximum operating voltage, kV	126	252	363	525	787
Rated current of busbars and currernt compensators, A	2000	2000	3150	3150	3150
Maximum admissible current of one wire flexible descent, A*					
- for AS - 120/19 wire,	390				
- for AS - 150/24 wire,	450				
- for AS - 185/29 wire,	510				
- for AC - 240/32 wire,	610				
- for AC - 300/39 wire,	710				710
- for AC - 400/51 (AC - 400/64) wire	825 (860)	825 (860)	825 (860)	825 (860)	
- for AC - 500/26 (AC - 500/127, AC - 500/64) wire	960 (960, 945)	960 (960, 945)	960 (960, 945)	960 (960, 945)	
Rated short-time withstand current, kA	40	50	63	63	63
Peak withstand current, kA	102	125	160	160	160
Duration of short-time withstand current, s	3	3	3	3	3

Notes: * Total current in flexible descents must not exceed:
- for 110, 220, kV - 2000 A;
- for 330, 500, 750 kV - 3150 A.

Design features

Rigid busbar sets for 110-750 kV outdoor switchgears are designed by CJSC ZETO in cooperation with Nizhegorodskenergoset'proekt , CJSC scientific production association Technoservis-Electro, research and development centre EDTS, JSC research and development centre Electric power industry.

All the equipment is certified and recommended for application on the objects of JSC FGC UES.
Busbar is made as a system of rigid buses. The design of each phase of collecting buses is made of a row of single-span buses resting with their ends on post insulators. Support insulation structures for 110-750 kV manufactured on porcelain indulators as well as on polymeric (110 kV) ones are provided for busbars' fastenings. Single-bay buses of intra-bay couplings are fixed on the terminals of high-voltage equipment of outdoor switchgears.

The busbar of collecting buses of outdoor switchgear is made of tubular buses from 1915T aluminium alloy , being of high strength, resistant to corrosion and of good welding properties . Electrical connection of collecting buses among one another is carried out by current compensators of swaging type. Joining of clamps for pressure moulding of flexible descents , subbranches to collecting buses is provided by bolted connections at the installation site. The design of busbar ensures reliable operation under dynamic loads occurring at short circuits.

Disconnectors of pantograph, half-pantograph and horizontal- rotating types of RPV, RPG and RG series are used with rigid busbar sets in configuration of outdoor switchgears.
The arrangement of equipment and building structure of outdoor switchgear makes it possible to expand outdoor switchgears both within the limits of the initially accepted scheme and in case of transition to a more complicated scheme.
Supply package contains:
- tubular buses,
- post insulators ,
- current compensators,
- bus holders ,
- holders for intra-bay couplings,
- clamps for flexible descents' joining,
- metal structures for support insulation.

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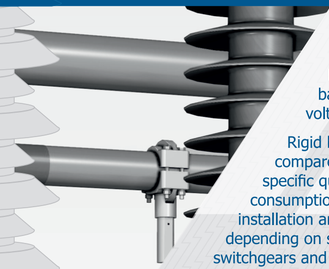
Rigid busbars



Intended use

Rigid busbar is designed for the accomplishment of multiple-bay collecting buses and electrical connections among high-voltage equipment in switchgears .

Rigid busbar of fully shop-assembled equipment as compared to flexible busbars makes it possible to reduce specific quantity of metal of switchgear by 30-50%, consumption of reinforced concrete by 10-20%, volume of installation and construction work and labour costs up to 25% depending on schematic circuit diagrams of outdoor switchgears and specific conditions of construction area .

Switchgears with rigid busbar do not require the construction of gantries, they are located not high from the ground, easy for assembly and preventive inspection.

Operation conditions

- Bus bars are manufactured in UKHL1 climatic version as per GOST 15150.
- Altitude above sea-level is not more than 1000 m.
- Ambient temperature is from minus 60°C up to plus 40°C.
- Seismic stability of busbar is 9 scores on the scale MSK-64.
- Maximum wind velocity is 40 m/s.
- Ice crust thickness is 20 mm.
- The content of corrosive agent must not exceed values for atmosphere II as per GOST 15150.

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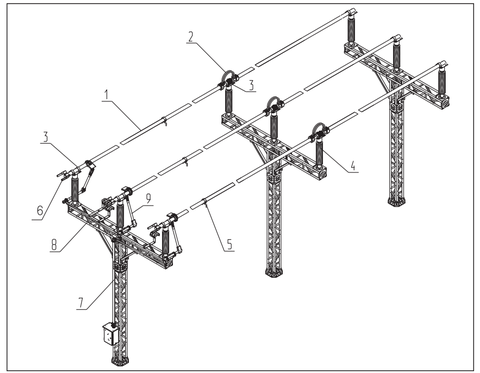
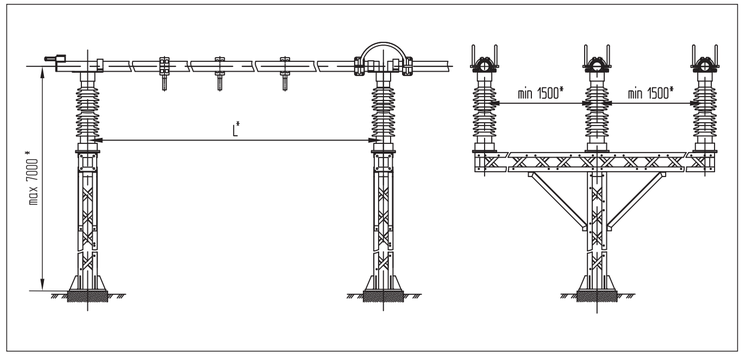
Overall, mounting and connecting dimensions of rigid busbars 110 kV and earthing switch:



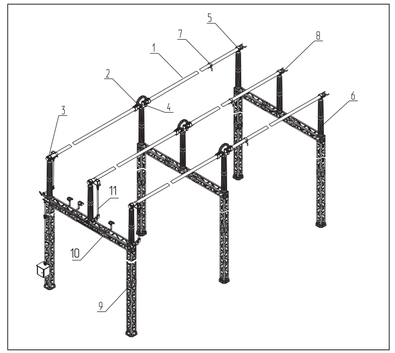
1 - rigid busbars (collecting buses);
2 - current compensator;
3 - bus holder;
4 - post insulator;
5 - clamp;
6 - end clamp;
7 - pillar;
8 - cross-arm;
9 - earthing switch (on request).

Version type	L*, мм
SHN(K)-1...5-110/2000 UKHL1	max 9000 min 5000



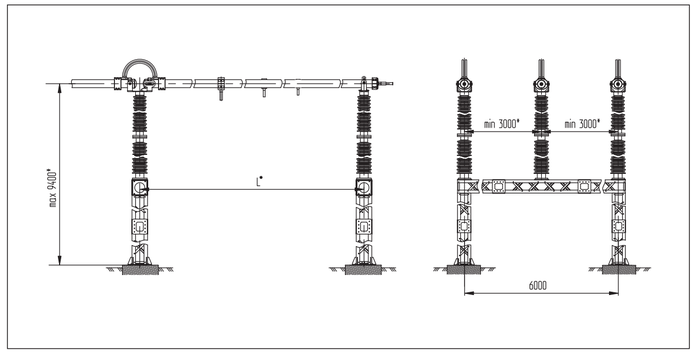
* It is possible to supply metal structures of installation height, length of span and interphase distance required by customer but not more than values indicated in the figure.

Overall, mounting and connecting dimensions of rigid busbars 220 kV and earthing switch:



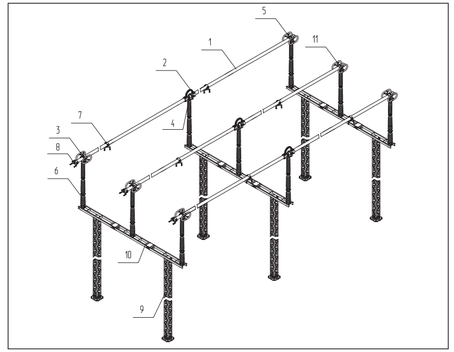
1 - rigid busbars (collecting buses);
2 - current compensator;
3,4,5 - bus holder;
6 - post insulator;
7 - clamp;
8 - end clamp;
9 - pillar;
10 - cross-arm;
11 - earthing switch (on request).

Version type	L*, мм
SHN(K)-1...13-220/2000 UKHL1	max 16000 min 4000



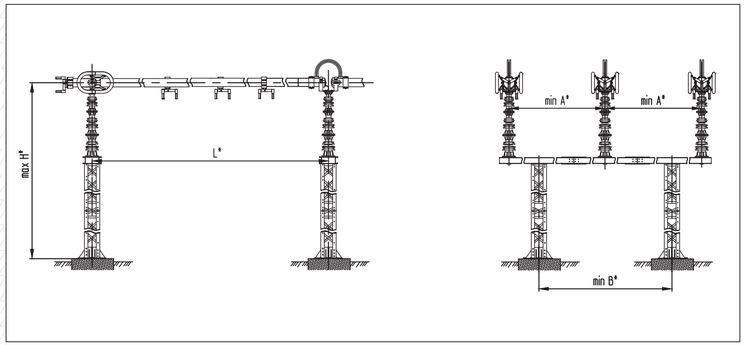
* It is possible to supply metal structures of installation height, length of span and interphase distance required by customer but not more than values indicated in the figure.

Overall, mounting and connecting dimensions of rigid busbars 330, 500 kV



1 - rigid busbars (collecting buses);
2 - current compensator;
3,4,5 - bus holder;
6 - post insulator;
7 - clamp;
8 - end clamp;
9 - pillar;
10 - base;
11 - screen (for 500 kV).

Version type	L*, мм	H*, мм	A*, мм	B*, мм
SHN(K)-1...17-330/3150 UKHL1	max 18000 min 4000	12500	3500	5100
SHN(K)-1...17-500/3150 UKHL1	max 18000 min 4000	15300	5000	7155



* It is possible to supply metal structures of installation height, length of span and interphase distance required by customer but not more than values indicated in the figure.