Vertical Break Disconnectors
Type ONS 245 and ONS 420
Earthing Switch Type OZP 420

for Outdoor Installation

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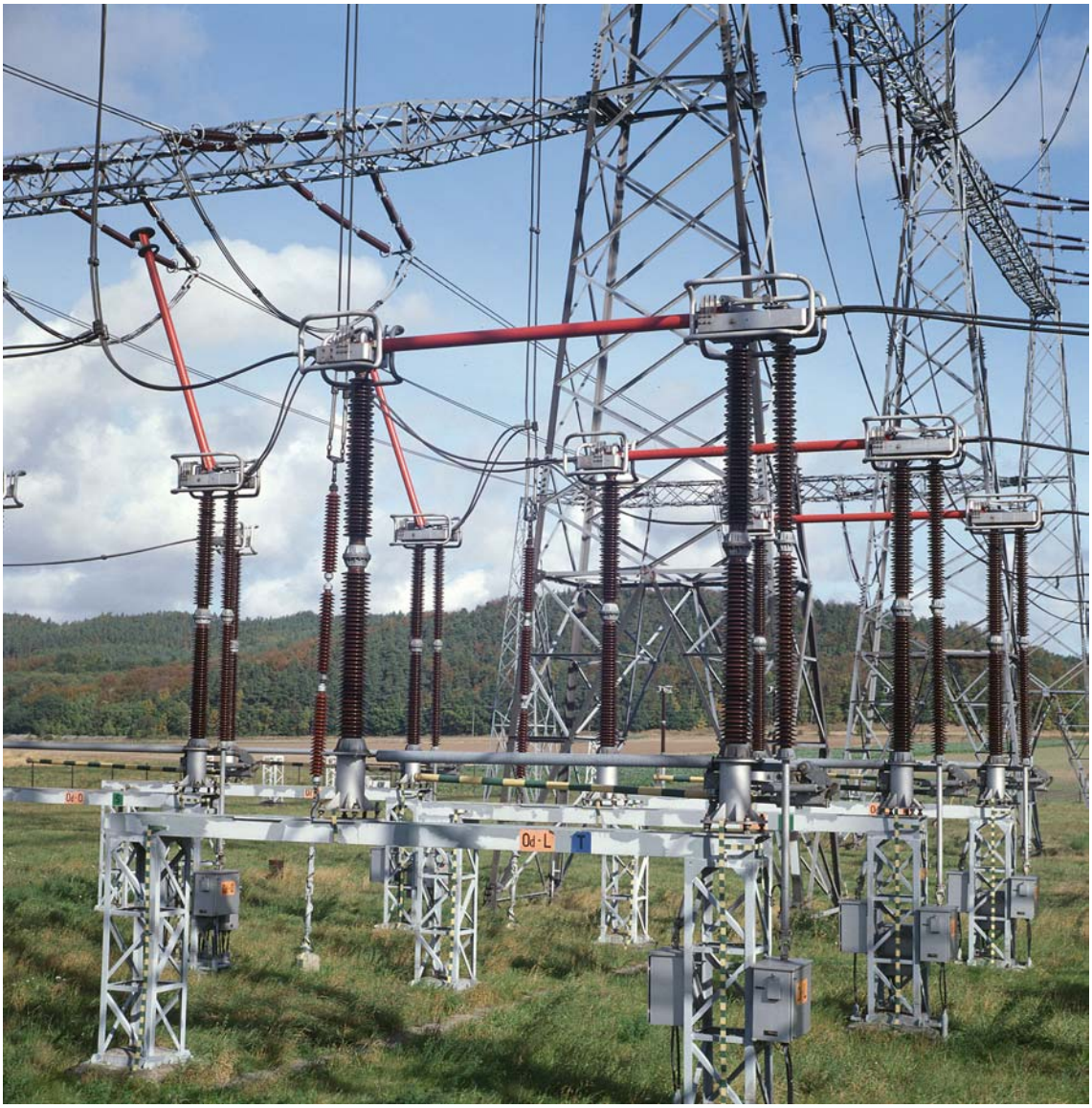

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Application

Disconnectors type ONS... are vertical-break isolating switches designed for operation in outdoor substations 420 kV. They are capable of opening and closing electric circuits when either negligible current is broken or made or when no signification change in the voltage across the terminals of the disconnector occurs. The disconnectors are intended to operate as single-pole switches with individual electrical operating mechanism type MT50 for each pole. They may also be fitted with one or two earthing switches type OZP.

Free-standing earthing switches type OZP are designed for operation in outdoor substations for 420 kV voltage and are intended for single or double-side earthing parts of a circuit being in de-energised state. As single-pole switches they are operated with individual electric operating mechanisms type MT50 for each pole. They are designed to be combined with disconnectors type ONS... or as free-standing apparatus

Regulations

The disconnectors are designed according to the publication IEC 62271-102 and IEC 60 694and most other national regulations.

ANSI specifications can be met on request.

Tests

The type tests on the disconnectors were performed successfully in our own and also in independent test laboratories in accordance with the latest regulations. During manufacture all components are continuously subjected to quality tests in order to ensure consistent high quality of the products.

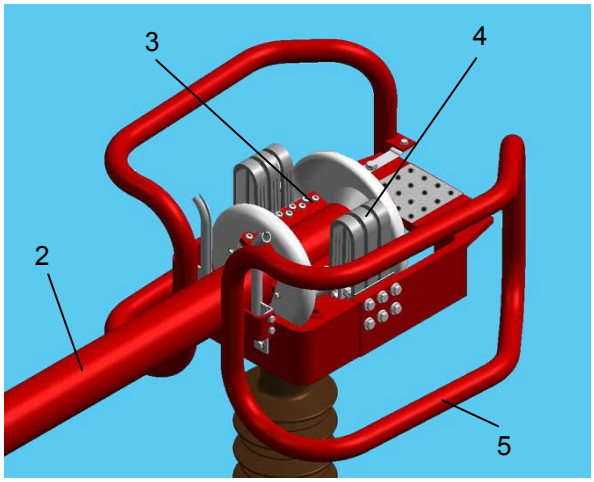
After completion of the disconnector poles a comprehensive electrical and mechanical routine test is carried out on the poles and associated operating mechanisms, so that their perfect functioning is guaranteed.

Features

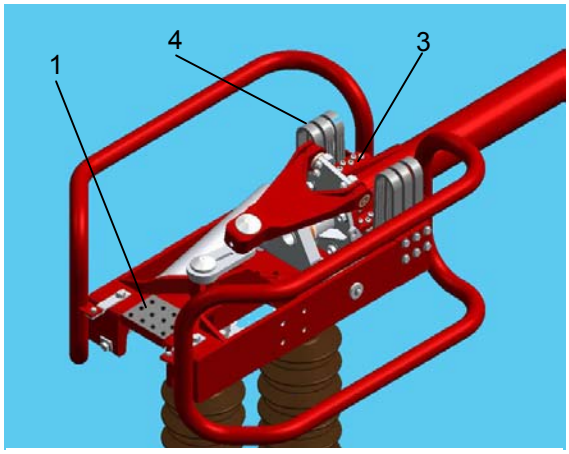
- ✓ **high technical performance;**
- ✓ **vertical action of the contact arms enables the phase-to-phase clearance to be reduced to a minimum;**
- ✓ **kinematic's desingning of the disconnector's operating mechanism prevents inadvertent opening or closing of the disconnector by external forces;**
- ✓ **number of control cables connected with single-pole of the disconnector can be minimalized by using connection box;**
- ✓ **high endurance and reliability;**
- ✓ **high quality protective coatings, corrosion-proof components and maintenance-free bearings reduce the maintenance requirements to a minimum, after the long period operation without any maintenance works;**
- ✓ **disconnectors can be mounted on foundation bolts or on supporting structure;**
- ✓ **minimum work at erection and adjustment.**

Design and Mode of Operaton

Disconnectors type ONS are outdoor vertical-break switches. They are manufactured only in an individually motor driven single-pole version. Two tubular steel posts coupled together by means of a tubular rod work as its supporting structure. They enable fixing of the supporting insulator, the rotary insulator of the disconnector, and the operating mechanism as well as one or two earthing switches with their operating mechanisms. The main circuit of a disconnector incorporates two contact heads with flat terminals (1) and a moving knife (2), made of aluminium tube. Both ends of the knife are fitted with silver-plated contact plates (3) which form contact with springy silvered contact bars (4) of the head. During final phase of closing the knife makes a rotation about the longitudinal axis. Both contact head and the free-end of the contact knife are provided with suitable corona-shields (5) to reduce radio interference.



Contact head B



Contact head A

The main circuit of the earthing switch incorporates a tubular aluminium knife from one side connected by means of a flexible copper-tinned lead to the supporting structure, from the other side ended with a spherical, silver-plated contact. During closing operation the knife first swings out to the vertical position and then inserts axially into a tulip-like contact. The latter is made of springy silvered copper bars and fixed to the contact head. The contact head is provided with suitable corona-shields. A tubular steel post works as a base and supporting structure. Bottom flange of the post is designed to be mounted directly on the foundation bolts. The upper flange enables fixing of the supporting insulator with its contact head as well as the earthing gear. The post is fitted with a set of brackets for fixing the operating mechanism and a connection box at level comfortable for the operating personnel. The earthing switches type OZP are also manufactured in version for erection on the user's supporting structure – with short supporting post, and in version for mounting on disconnector type ONS. The latter version is not equipped with a supporting post, head nor insulators and is adapted to be mounted on either post of the disconnector.

The disconnector and the earthing switch are driven by motor operating mechanisms type MT100. Gears of both the disconnector and the earthing switch pass beyond the dead points in extreme positions. The interlocking between the disconnector and the earthing switch is made in the operating mechanisms by appropriate connections of contacts in auxiliary circuit.

Technical data

Disconnector		ONS 245	ONS 420
Rated voltage	kV	245	420
Rated normal current type p type pc type q	 A A A	 2500 3150 4000	 2500 3150 4000
Rated peak withstand current of disconnector and earthing switch	kA	100 /125 / 160	100 / 125 / 160
Rated short-time withstand current (r.m.s.)	kA	40 / 50 / 63	40 / 50 / 63
Rated power-frequency withstand voltage 50 Hz, 1min to earth and between poles across open switching device	 kV kV	 460 530	 520 610
Rated lighting impulse withstand voltage 1,2 / 50μs to earth and between poles across open switching device	 kV kV	 1050 1200	 1425 1425(+240)*
Rated switching impulse withstand voltage 250/2500 μs to earth and between poles across open switching device	 kV kV	 - -	 1050 900(+345)
Discharge inception voltage	kV	>160	>270
Radio interference voltage	μV	<2500	<2500
3- phase breaking capacity inductive / capacitive	A	1,5	1
Bus-transfer switching ability according to IEC 1128**	A / V	1600 / 200	1600 / 300
Inducted current switching ability according to IEC1129 class A ** for electromagnetic coupling for electrostatic coupling	 A / kV A / kV	 80 / 1,4 1,25 / 5	 80 / 2 1,25 / 5
Insulator design: minimum failing load overall height minimum creepage distance	 kN mm mm	 4,0-6,0-8,0 2100 / 2300 4900	 8,0-10,0 3150 / 3350 10500
Admissible mechanical terminal load: static and dynamic static portion	 kN kN	 3,2-5,1-6,0 1,5-2,5-2,5	 5,1-6,0 1,5-1,5

* Values in brackets are peak values of power frequency voltage applied to the opposite terminal
** As an option

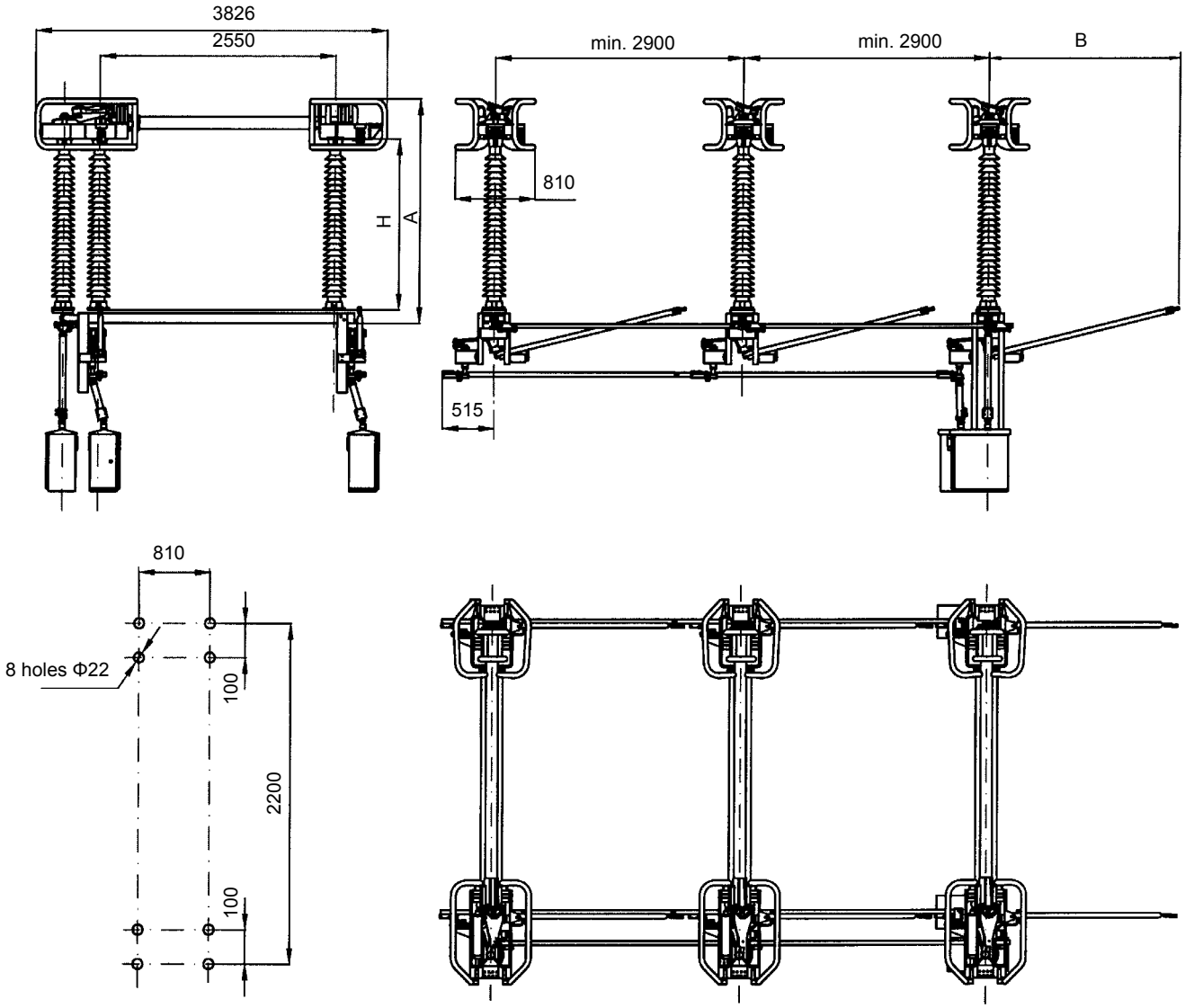
Type designation is complemented by the data for rated current (p - 2500A; pc - 3150A ; q -4000A) and peak withstand current.

Example: **ONS 420 p 125**

peak withstand current of 125 kA
rated current 2500 A
rated voltage 420 kV

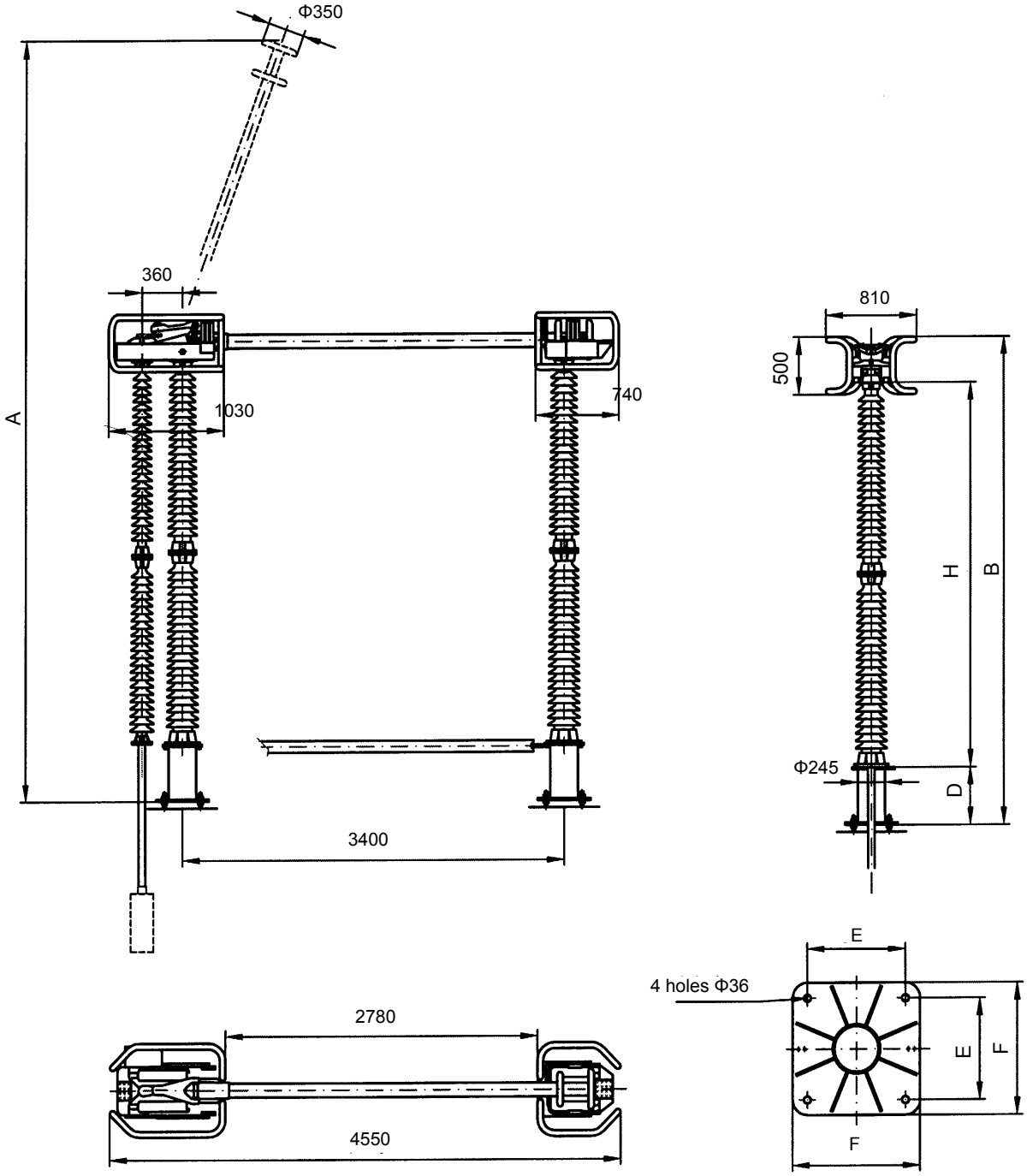
Main dimensions, Weights

Disconnector type ONS 245



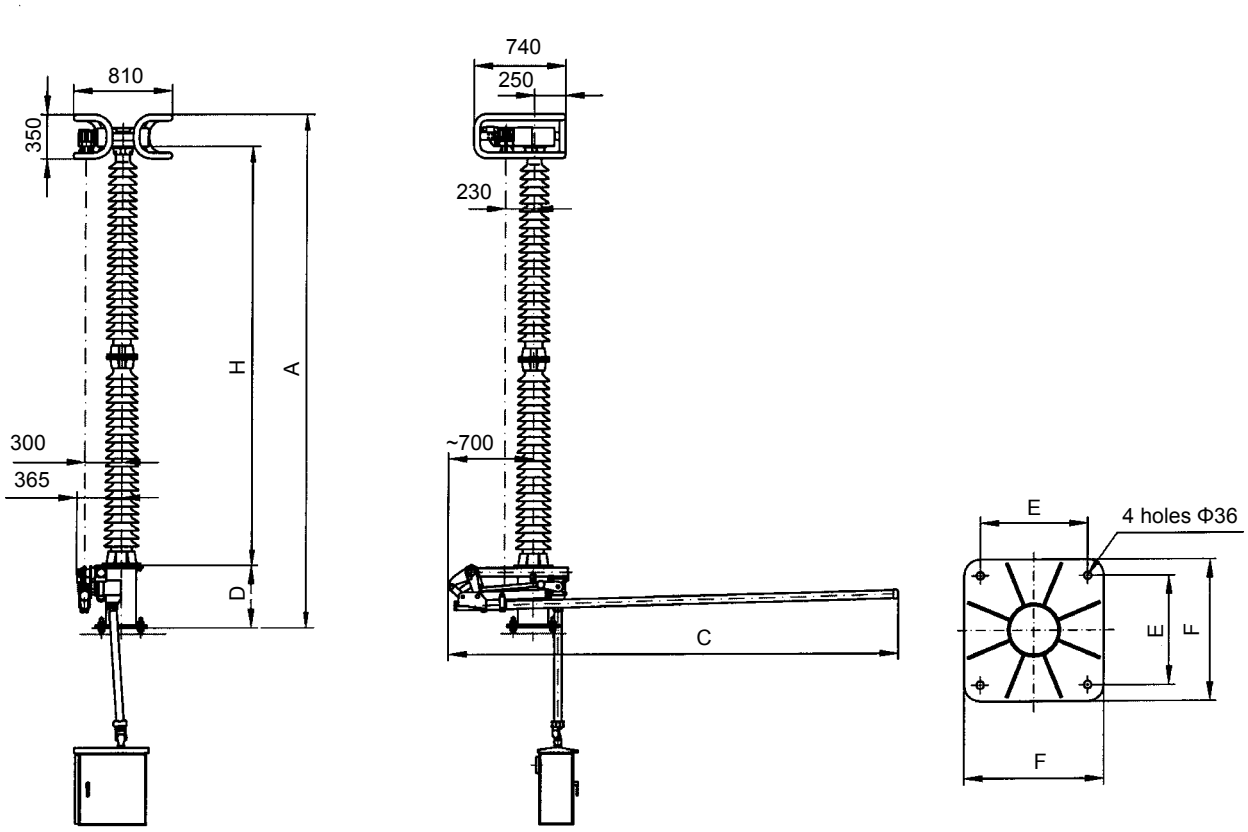
			ONS 245	
H	Height of post and rotary insulators	mm	2100	2300
A	Total height of disconnector in close position	mm	2640	2840
B	Total width earthing switch in open position	mm	2345	2545
Weight of one pole of disconnector with insulators		kg	380	390
Weight of build on earthing switch (one pole)		kg	50	

Disconnector type ONS 420



			installed directly on foundation		installed on support structure designed by user	
H	Height of post and rotary insulators	mm	3150	3350	3150	3350
A	Total height of disconnector in open position	mm	9280	9480	7230	7430
B	Total height of disconnector in close position	mm	6095	6295	4045	4245
D	Height of supporting post of supporting post	mm	2550		500	
E	Hole distance of bottom flange of supporting post	mm	500		320	
F	Dimension of bottom flange of supporting post	mm	650		420	
Weight of disconnector with insulators		kg	1570	1630	1090	1150
Weight of build on earthing switch		kg	75			

Earthing switch type OZP 420



			installed directly on foundation		installed on support structure designed by user	
H	Height of post insulator	mm	3150	3350	3150	3350
A	Total height of earthing switch	mm	5955	6155	3905	4105
C	Total width earthing switch in open position	mm	3230	3430	3230	3430
D	Height of supporting post of supporting post	mm	2550		500	
E	Hole distance of bottom flange of supporting post	mm	500		320	
F	Dimension of bottom flange of supporting post	mm	650		420	
Weight of earthing switch with insulator		kg	720	740	480	500

This catalogue describes our standard product and does not show variations in design, which may be available. If additional details are required, contact your local HAPAM representative. HAPAM reserves the right to make changes or improvements to the product shown in this bulletin without notice or obligation.

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