

OJWN Earthing switches with fault making capacity

Indoor Installation, 12...24 kV, 63...110 kA

Technical Brochure

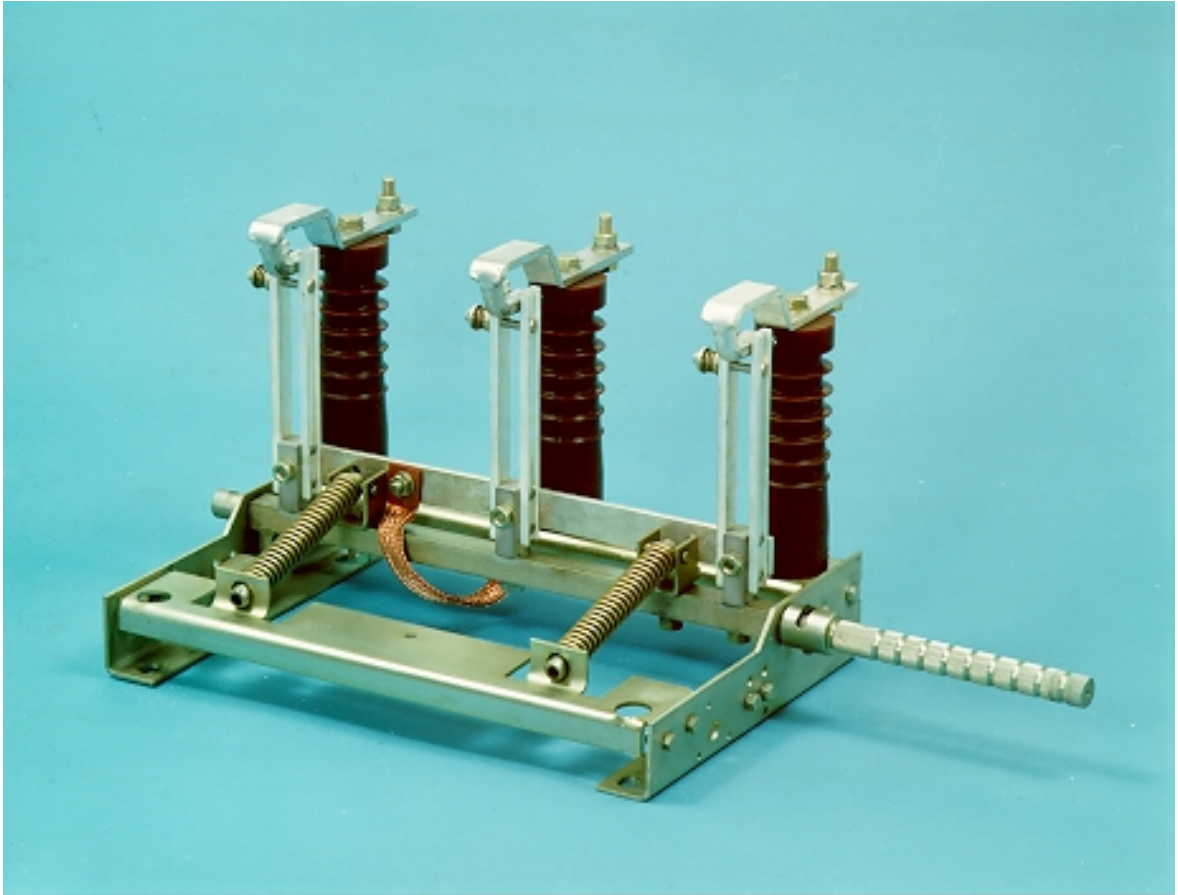


ABB Power Distribution





OJWN Earthing switches with fault making capacity

Indoor Installation
12...24 kV, 63...110 kA

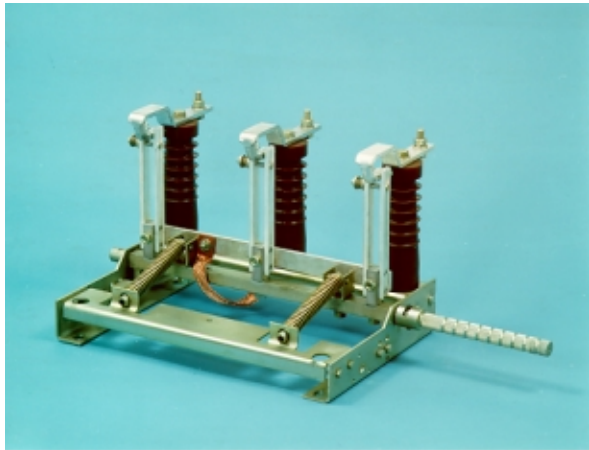
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OJWN Earthing switches with fault making capacity

Indoor Installation
12...24 kV, 63...110 kA



86-1506

Earthing switch

Description

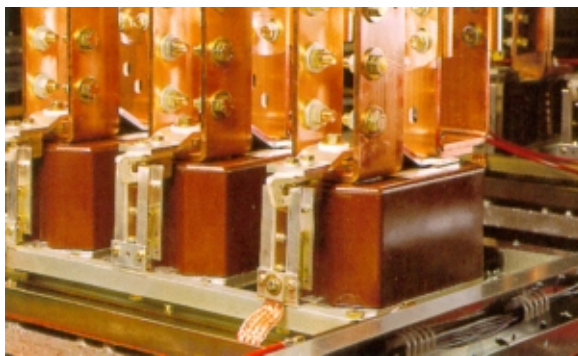
Earthing switches with fault making capacity can be reliably closed against short circuit currents, thus protecting the operator and switchgear in the cause of inadvertent operation. Naturally, operation behind a closed compartment door forms part of the overall cubicle safety.

There are two forms of earthing switch: independent earthing switches and combined earthing switches with integral current transformers. The current transformers of the combined version form the mounting base for the earthing switch contacts thus reducing the space required in the cubicle.

Every earthing switch is fitted with a spring operating device which makes the closing capacity independent of the operating speed. The control side of the earthing switch and direction of current flow can usually be chosen without limitations except for a few models with integral current transformers.

Standards

IEC Publication 129 (1984)
IEC Publication 694 (1980)



97-1059

**Earthing switch integrated with
current transformers**

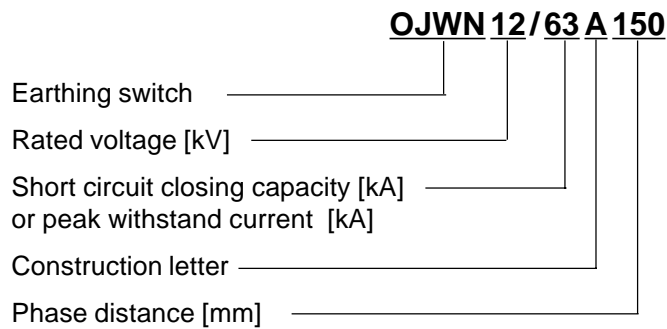
Materials

The frame is zinc plated steel plate. The current carrying parts are silver plated copper and the insulators are made of cast epoxy resin.

OJWN Earthing switches with fault making capacity

Technical Details

Key to type number



Description of construction letter

- A = Short circuit withstand current rating for 1s
- B = Short circuit withstand current rating for 3s
- AJ or BJ = Earthing switch fitted with voltage indicator
- D or E = Support insulators replaced with KOFA current transformers
- H or J = Support insulators replaced with KOFD current transformers

Insulation levels

Table 1

Rated voltage kV	Test voltage kV	
	Withstand voltage 1 min 50 Hz	Impulse test voltage 1,2 / 50 μ s
12	28	75
17,5	38	95
24	50	125

OJWN Earthing switches with fault making capacity

Technical Details

Technical Details

Separate Earthing Switches

Table 2

Type	Rated voltage Un kV	Short time withstand current		Peak withstand current kA	Short circuit closing capacity kA	Operating torque Nm		Weight kg
		1 s	3 s			Open	Closed	
OJWN 12 / 63 A 150 OJWN 12 / 63 A 210	12	25		63	63	90	50	17
OJWN 12 / 63 B 150 OJWN 12 / 63 B 210	12		25	63	63	90	50	18
OJWN 17,5 / 63 B 210	17,5		25	63	63	120	50	18
OJWN 24 / 63 A 210 1) OJWN 24 / 63 A 260	24	25		63	63	140	50	20
OJWN 24 / 63 B 210 1) OJWN 24 / 63 B 260	24		25	63	63	140	50	21
OJWN 12 / 100 A 150 210 260	12	40		100	100	120	50	20
OJWN 12 / 110 B 150 210 260	12		40	110		120	50	22
OJWN 17,5 / 100 A 210	17,5	40	31,5	100	100	130	50	21
OJWN 17,5 / 100 B 210	17,5		40	100		130	50	23
OJWN 12 / 63 AJ 150 OJWN 12 / 63 AJ 210	12	25		63	63	90	50	18
OJWN 12 / 63 BJ 150 OJWN 12 / 63 BJ 210	12		25	63	63	90	50	18
OJWN 24 / 63 AJ 210 1) OJWN 24 / 63 AJ 260	24	25		63	63	140	50	18
OJWN 24 / 63 BJ 210 1) OJWN 24 / 63 BJ 260	24		25	63	63	140	50	20

Frequency 50...60 Hz.

Ambient temperature $-40...+60$ °C.

- 1) 24 kV / 210 mm models require insulated busbars.
The contact are fitted with additional phase barrier insulation.

OJWN_ earthing switches can be mounted in any position.

The closing capacity is not dependent on the direction of power flow.

OJWN Earthing switches with fault making capacity

Technical Details

Earthing Switches with Integrated Current transformers

Table 3

Type	Rated Voltage Un kV	Short time Withstand Current			Peak Withstand Current Nm kA	Short Circuit Closing Capacity kA	Operating Torque		Weight ²⁾ kg
		1 s	2 s	3 s			Open	Closed	
OJWN 12 / 63 E 210 OJWN 12 / 63 E 260	12	25			63	63	90	50	26 30
OJWN 24 / 63 E 260	24	25			63	63	140	50	32
OJWN 12 / 100 D 210 OJWN 12 / 100 D 260	12	40			100	100	120	50	28 34
OJWN 17,5 / 100 D 210 OJWN 17,5 / 100 D 260	17,5	40			100	100	130	50	28 34
OJWN 12 / 100 H 200 3) OJWN 12 / 100 H 275 3)	12		40		100	100	120	50	29 35
OJWN 24 / 63 J 200 1) 3) OJWN 24 / 63 J 275 3)	24			40	63	63	140	50	28 34

Frequency 50...60 Hz.

Ambient temperature -40...+60 °C.

Note: Some switches with integrated current transformers are sensitive to the direction of power flow. Please refer to corresponding dimension drawing.

- 1) 24 kV / 200 mm models require insulated busbars and phase barriers.
- 2) Weight without current transformers.
- 3) Direction of current, page 15.

Auxiliary Switches

Table 4

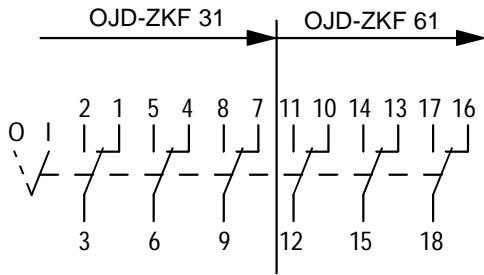
Rated voltage	500 V
Continuous loading current	16 A
Breaking capacity for over 5000 operations, when time constants is ≤ 40 ms	
24 VDC	16 A
60 VDC	10 A
110 VDC	5 A
220 VDC	2 A
Mechanical life: 10.000 operations	

Auxiliary switches, maintenance and spare parts

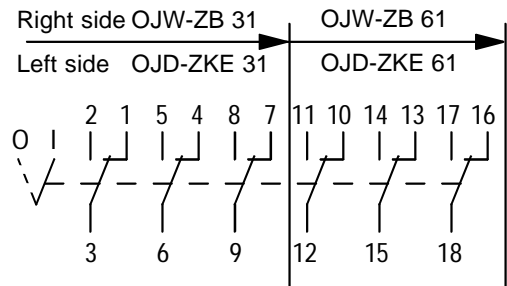
Technical Details

Auxiliary Switches

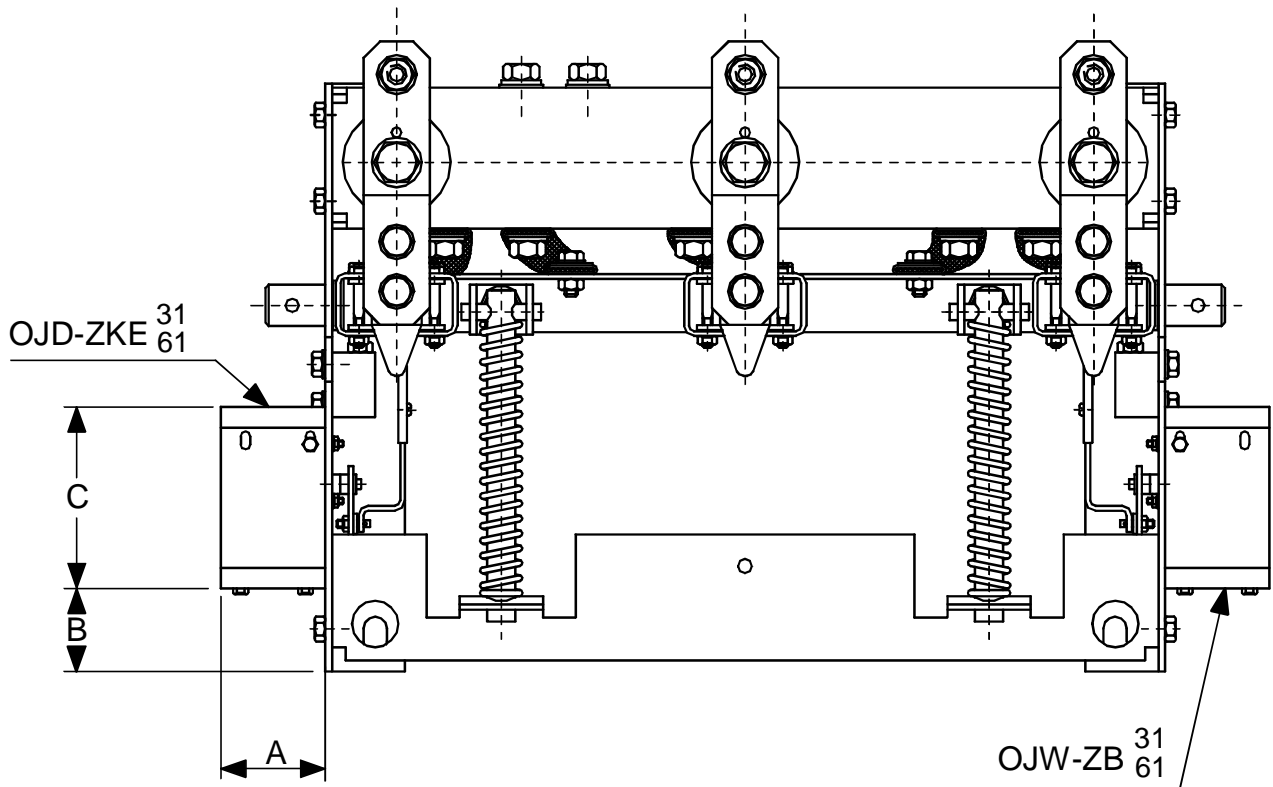
The auxiliary switch can be fitted on either the left hand or right hand side of the earthing switch and has three or six change-over contacts. On earthing switches with integral current transformers the auxiliary switches are normally factory fitted.



Auxiliary switches for earthing switches fitted with current transformers



Separate earthing switch auxiliary switches



The position of auxiliary switches on the earthing switch frame

	A	B	C
3 change-over contacts	63	50	110
6 change-over contacts	96	50	110

Control devices, earthing switches, interlocking coils

Technical Details

Control Devices

The position of the earthing switch in the cubicle effects the selection of the control devices. **The description below does not cover earthing switches fitted with integral current transformers.**

Operation with manual control lever

Earthing switch mounted on rear wall of cubicle

Manual operating device type UEKO 2C1 includes a bevel gear wheel set for the axle of the switch, position indication device for the front of the cubicle and control tubes for connecting the parts. The control tubes are supplied in two lengths: 1200mm (Standard) or 2500mm (to be mentioned in the order).

Earthing switch mounted on side wall of cubicle

In its simplest form manual control comprises just the position indicating device which is pushed directly onto the end of the splined operating axle. If the axle is not long enough, extension axles and bushings can be supplied.

The type of position indicating device used depends on which side of the cubicle the earthing switch is mounted.

Type: UEKO ZA 7, when mounted on right hand side wall of cubicle
UEKO ZA 15, when mounted on left hand side wall of cubicle

For possible extension of the axle, depending on the position of the earthing switch, the following can be used:

- extension bushing, type UEKO ZX 2
- extension bushing, type UEKO ZB 3 x 700, length 700 mm or
type UEKO ZB 3 x 1000, length 1000 mm
- support bearing, type UEKO ZX 8

Irrespective of the method of mounting, operation is made using the removable control handle UEKO ZK 1.

Interlocking coils

In conjunction with the position indicating device it is possible to fit an interlocking coil type UEKO-ZL 1/U. The coil voltage U is to be advised when ordering. A selection of normal voltages available are detailed on page 18.

Operation with an Eye Hook stick

The simplest method of operation the earthing switch is to use eye ring fitted to the axle and operated with a hook stick. Refer to page 17 for more details.

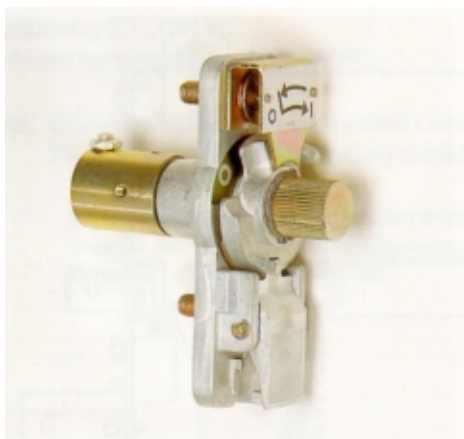
Control with a motor operating device

The earthing switch can also be motor operated using a UEMC 40_ device. Further details including installation and operating instructions are given in document 34 UEMC 36_.



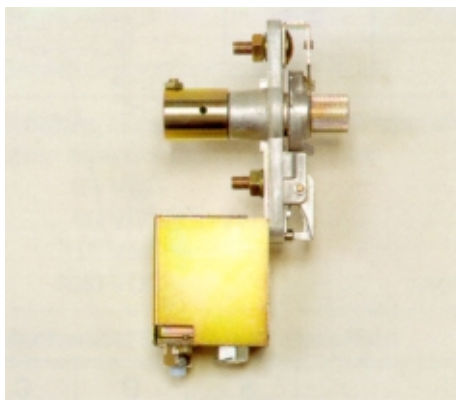
97-1049

Manual control, rear wall mounting



97-1048

Manual control, side wall mounting

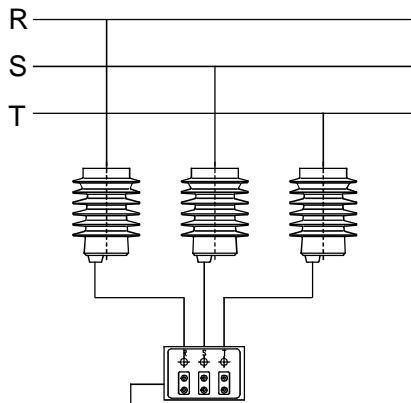


97-1055

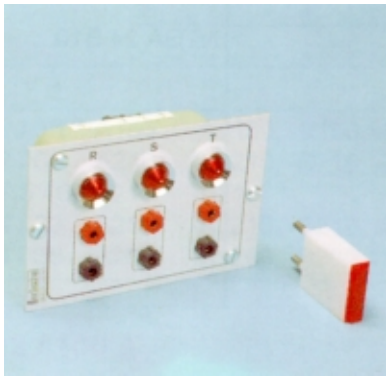
Interlocking coil fitted to a manual control system

Earthing switches fitted with voltage indicators

Technical Details

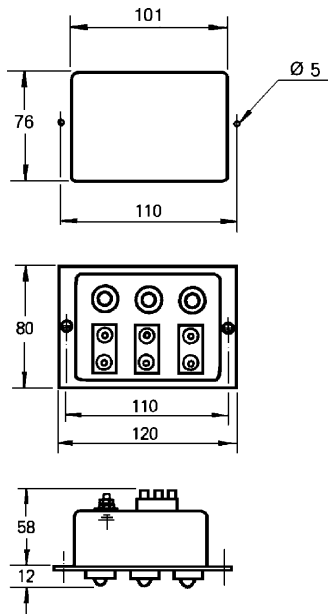


The minimum voltage of the H.V. circuit to lit the lamp
OJWN 12_ 4 kV
OJWN 24_ 8 kV



86-1683

Indicating lamp box and test lamp



Lamp box dimensions and cut-out hole size

Voltage indication is simple and safe

Models fitted with voltage indication have resistors built in to the insulators and capacitors in the lamp box which enable continuous monitoring of the voltage state of each phase. The resistors act as voltage dividers and the capacitors reduce the voltage to the rated voltage of the lamps and test sockets which is 220 V. The current during testing or possible short circuit situations is only 0,5 mA.

When the lamp is lit it indicates there is a voltage present on that phase. The condition of an unlit lamp can be tested by inserting a test lamp, type NTGU-ZLA 1 into the test socket. The test lamp can in turn be tested by inserting into any 220 V wall plug.

Electrical safety regulations do not require confirmation of the isolated state with an approved voltage tester when the earthing is achieved with an earthing switch which has fault making capacity. A fixed voltage indicator therefore provides an additional safety feature.

The indicating lamp box NTGUZL 1 is included when ordering earthing switches fitted with voltage indication.

A transparent plastic cover NTGZ 1 can be fitted over the lamp box and it does not prevent the test lamp being used. The full type number for the indicating lamp box fitted with a cover is NTGUZL 2.

Note

During possible power-frequency voltage tests, above the rated voltage, the lamp box should be disconnected or the test plugs short-circuited to protect the lamps.

Spares and Maintenance Technical Details

Spares

Table 5. Spare parts

Earthing switch	Knife type	Contact type	Insulator type
OJWN 12/63 A_ B_	OJWZMB 4	OJDZMZ 4	NTGA 12 B5
OJWN 12/63 AJ_ BJ_	OJWZMB 4	OJWZWA 1	NTGU 12 A1
OJWN 17,5/63 B_	OJWZMZ 7	OJDZMZ 4	NTGA 17,5 B5
OJWN 24/63 A_ B_	OJWZMZ 6	OJDZWA 2	NTGA 24 B5
OJWN 24/63 AJ_ BJ_	OJWZMZ 6	OJDZWA 3	NTGU 24 A1
OJWN 12/100 A_	OJWZMB 2	OJDZWA 3	NTGA 12 B10
OJWN 12/110 B_	OJWZ 143 rivi 3	OJDZWA 4	NTGA 12 B10
OJWN 17,5/100 A_	OJWMB 5	OJDZWA 4	NTGA 24 B10
OJWN 17,5/100 B_	OJWZ 143 rivi 2	OJDZWA 4	NTGA 24 B10
OJWN 12/63 E_	OJDZMZ 11	OJDZWA 8	-
OJWN 12/100	OJWZMB 2	OJDZWA 4	-
OJWN 17,5/100 D_	OJWZMB 5	OJDZWA 4	-
OJWN 24/63 J_	OJDZMZ 12	OJDZWA 10	-

For models fitted with voltage indicators
 – bulb for indicating lamp box
 – test lamp for above, type NTGU-ZLA 1

Maintenance

Earthing switches do not need maintenance in normal service. They can withstand 2000 operations without load and two operations under the full short current rating. The contacts and knives can be changed if the closed position contact surface is badly worn. A reasonable amount of switching arc burning around the knife edge or contact tips will not effect the closing capacity of the earthing switches.

It is recommended that the bearing of the position indicating device is lubricated at five year intervals with oil such as synthetic motor oil 10W40.

The contacts have been lubricated with **special paraffin** which does not normally need to be renewed. If required the contact surfaces can be greased with lubricating stick OJDZ 60 to reduce friction.

Separate Earthing Switches Dimension drawings

OJWN 12 / 63_
OJWN 17,5 / 63_
OJWN 24 / 63_

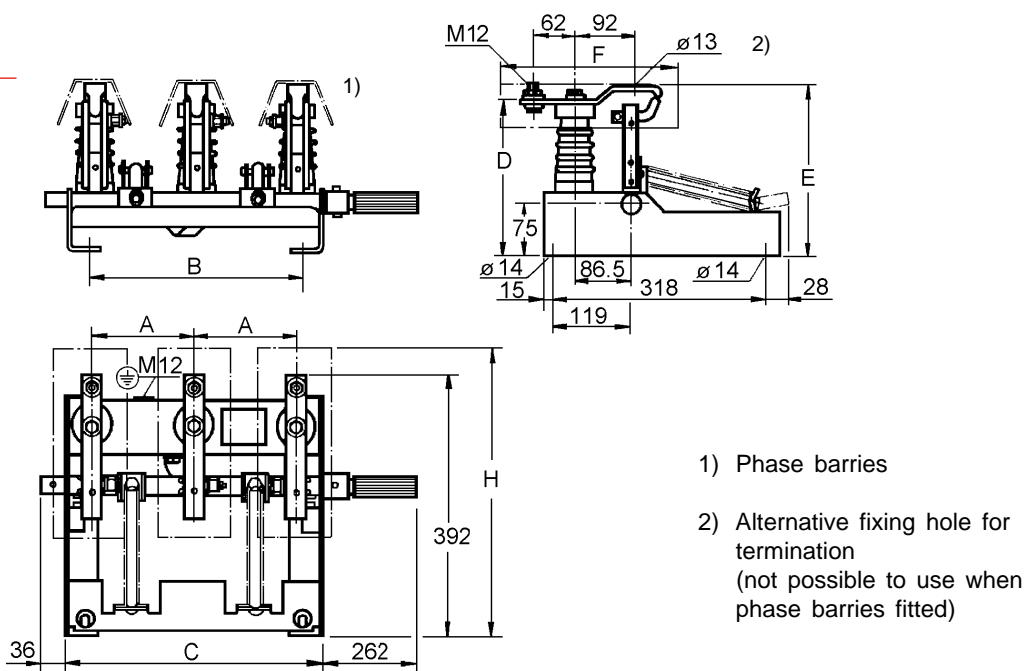


Table 6

Type	A	B	C	D	E	F 1)	H 1)
OJWN 12 / 63 A150 -AJ150, -B150, -BJ150	150	326	386	226	246		
OJWN 12 / 63 A210 -AJ210, -B210, -BJ210	210	446	506	226	246		
OJWN 17,5 / 63 A210 -B210	210	446	506	271	294		
OJWN 24 / 63 A210 -AJ210, -B210, -BJ210	210	446	506	306	(354)	280	442
OJWN 24 / 63 A260 -AJ260, -B260, -BJ260	260	546	606	306	344		

OJWN 12 / 100 A_

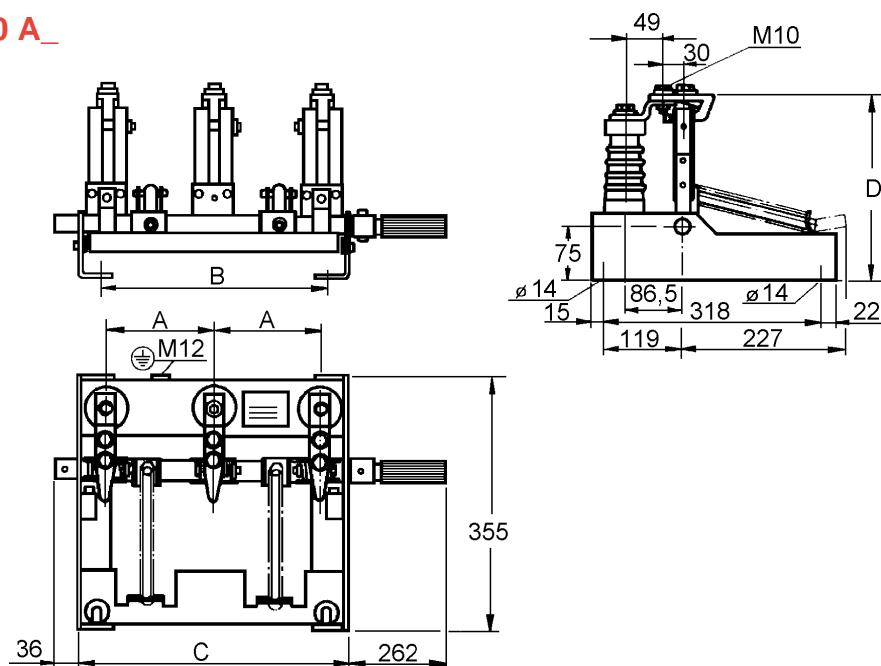


Table 7

Type	A	B	C	D
OJWN 12 / 100 A 260	260	546	606	259
OJWN 12 / 100 A 210	210	446	506	259
OJWN 12 / 100 A 150	150	326	386	259

Separate Earthing Switches Dimension Drawings

OJWN 12 / 110 B_

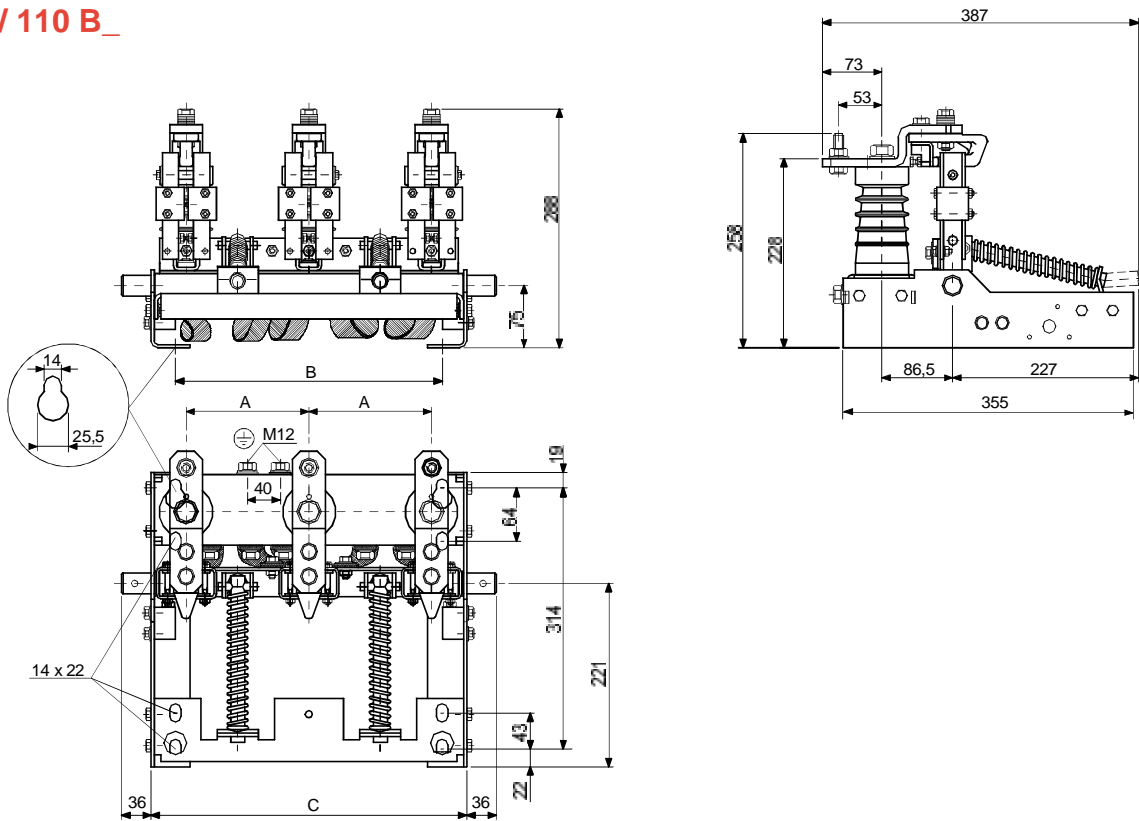
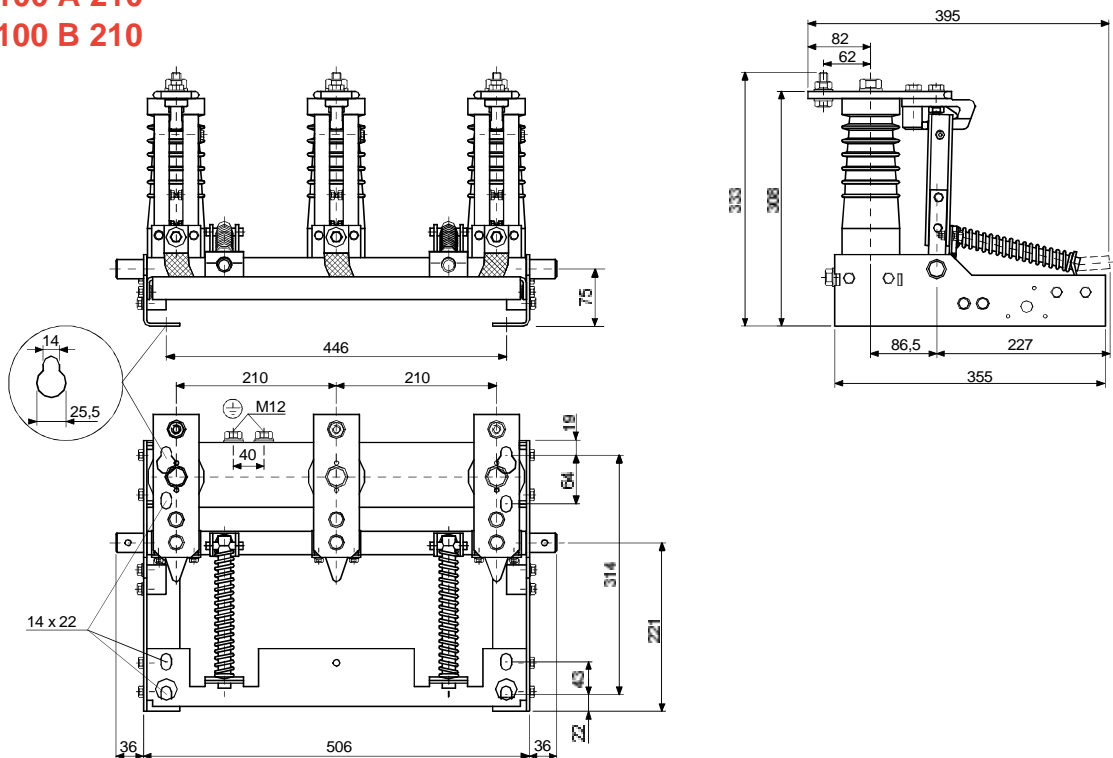


Table 8

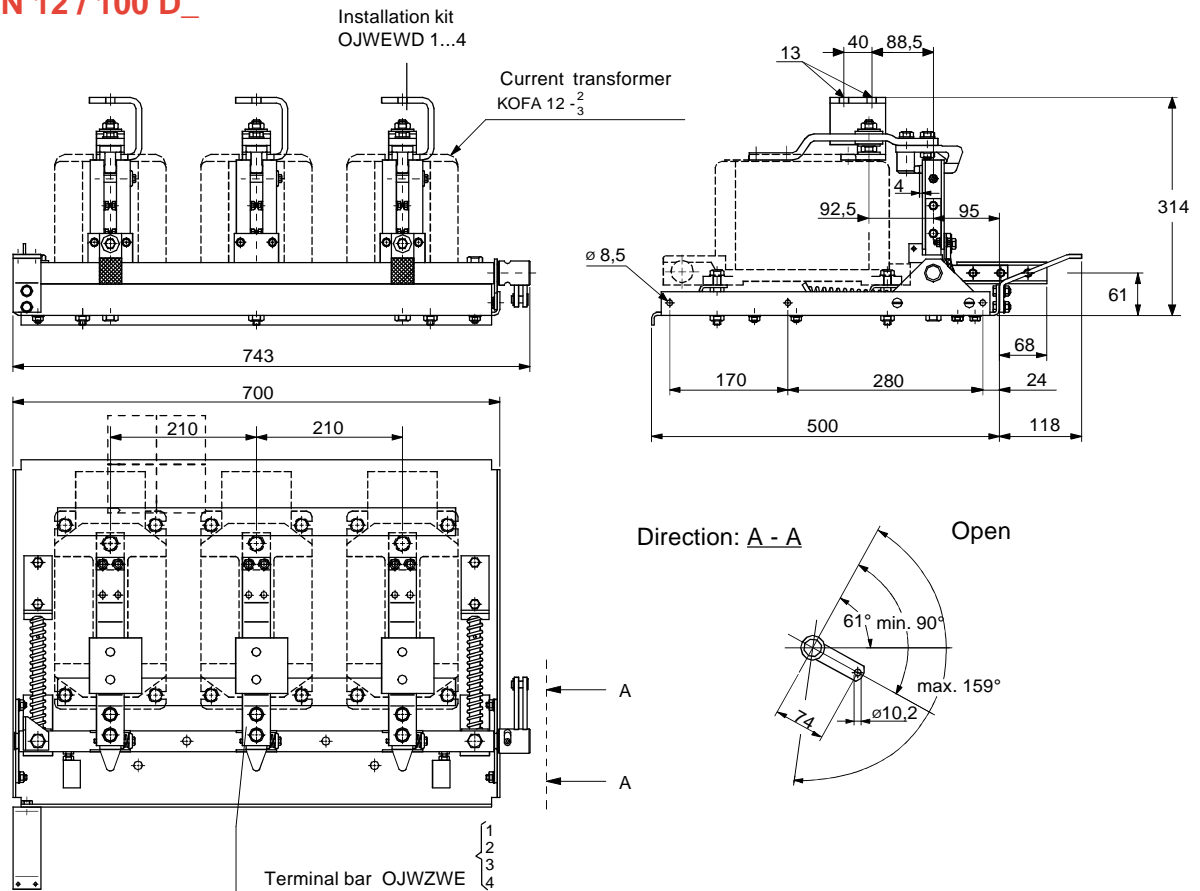
Type	A	B	C
OJWN 12 / 110 B 150	150	326	386
OJWN 12 / 110 B 210	210	446	506
OJWN 12 / 110 B 260	260	546	606

OJWN 17,5 / 100 A 210 OJWN 17,5 / 100 B 210



Earthing switches with Integral Current transformers Dimension drawings

OJWN 12 / 100 D_



Terminal bar OJWZWE 1...4 and installation kit OJWZWD 1...4 are to be ordered separately.

Table 9

Type	A	B	C	
OJWN 12 / 100 D 210	210	700	743	
OJWN 12 / 100 D 260	260	900	943	

Earthing switches with Integral Current Transformers

Dimension drawings

OJWN 12 / 63 E_

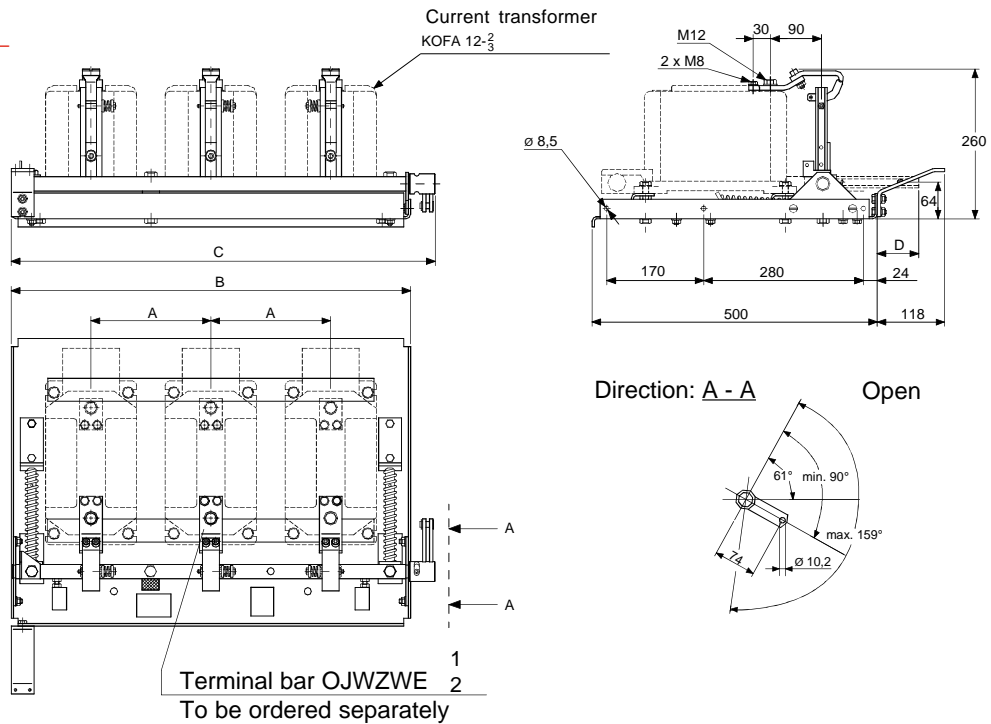


Table 10

Type	A	B	C	D
OJWN 12 / 63 E 210	210	700	743	73
OJWN 12 / 63 E 260	260	900	943	133

OJWN 17,5 / 100 D_

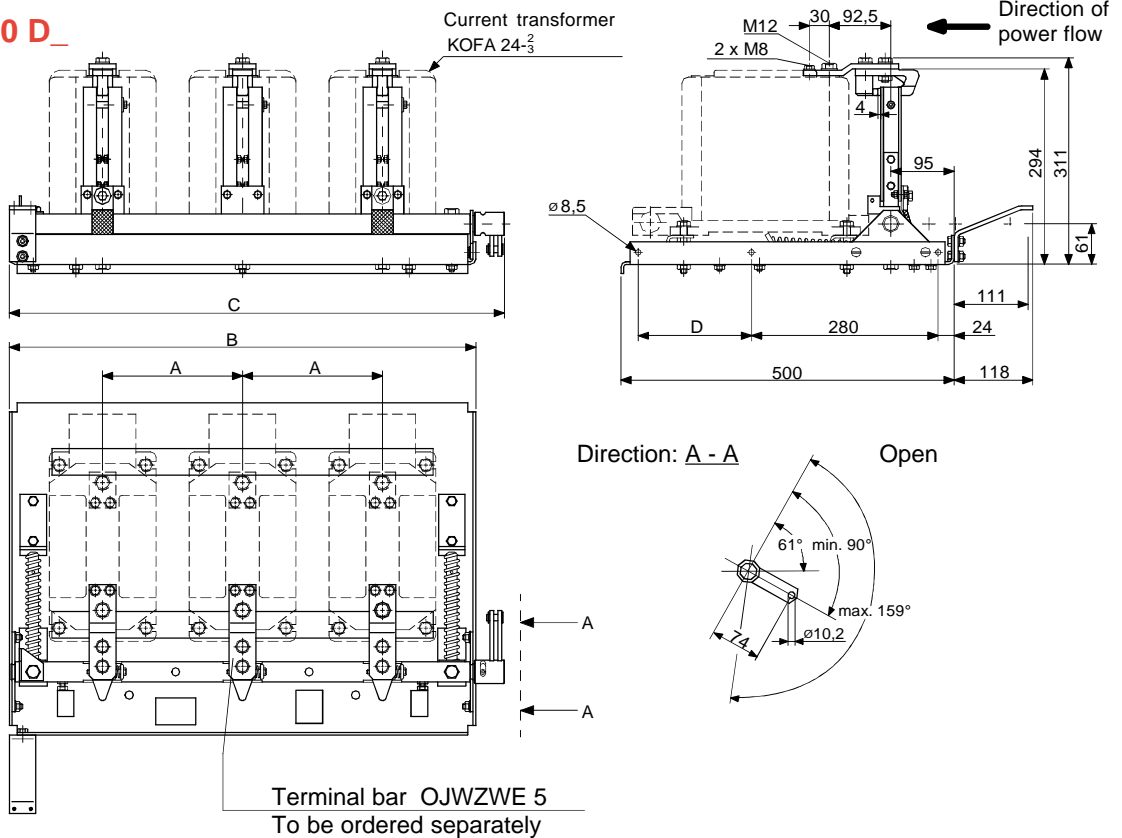


Table 11

Type	A	B	C	D
OJWN 17,5 / 100 D 210	210	700	743	170
OJWN 17,5 / 100 D 260	260	900	943	200

Earthing switches with Integral Current Transformers

Dimension drawings

OJWN 12 / 100 H_

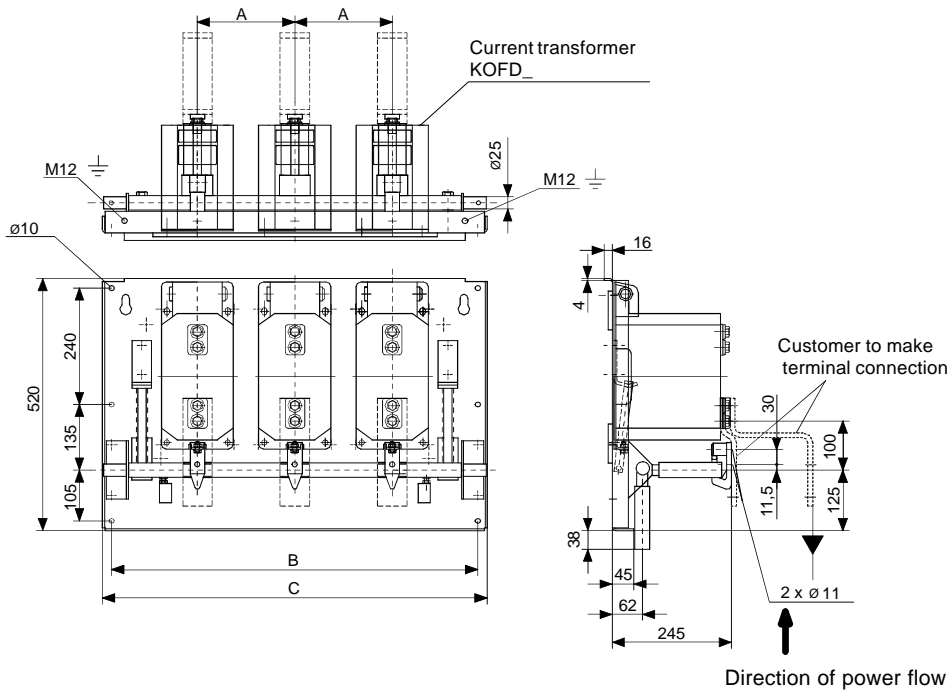


Table 12

Type	A	B	C
OJWN 12 / 100 H 200	200	752	790
OJWN 12 / 100 H 275	275	902	940

OJWN 24 / 63 J_

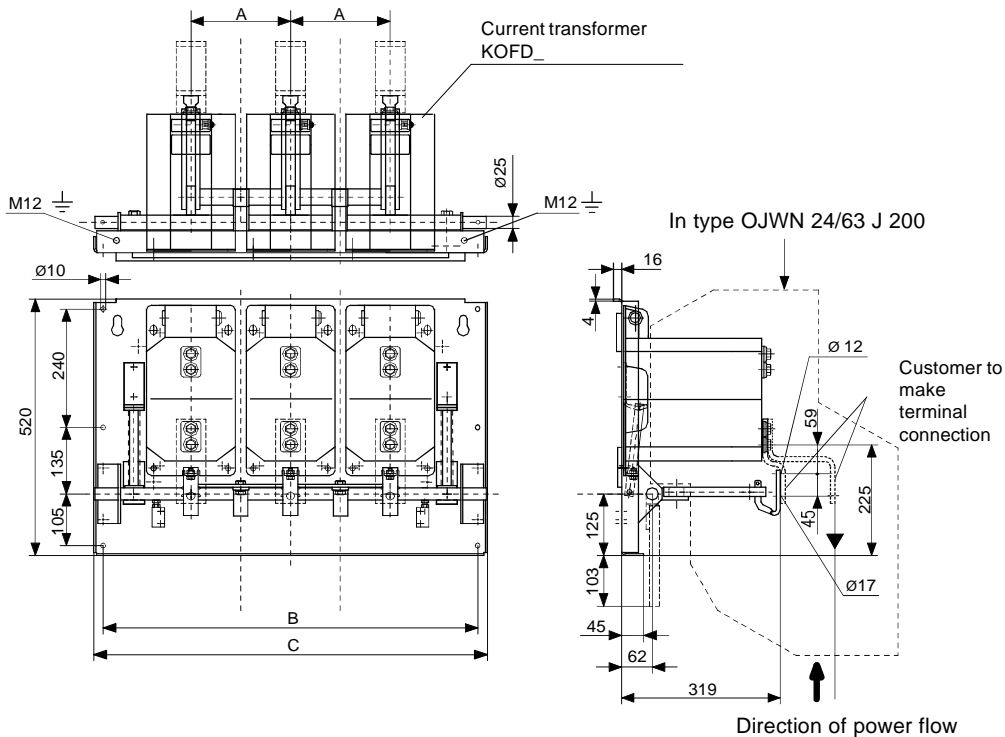


Table 13

Type	A	B	C
OJWN 24 / 63 J 200	200	752	790
OJWN 24 / 63 J 275	275	902	940

Control Devices

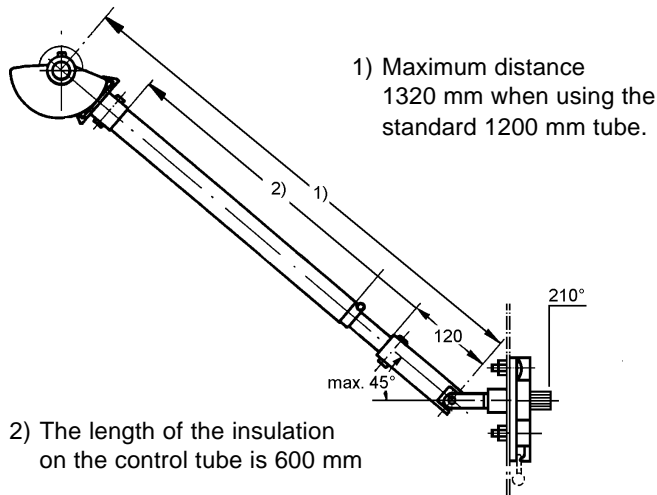
Dimension drawings

Manual control device, type UEKO 2C1

Mounted on rear wall

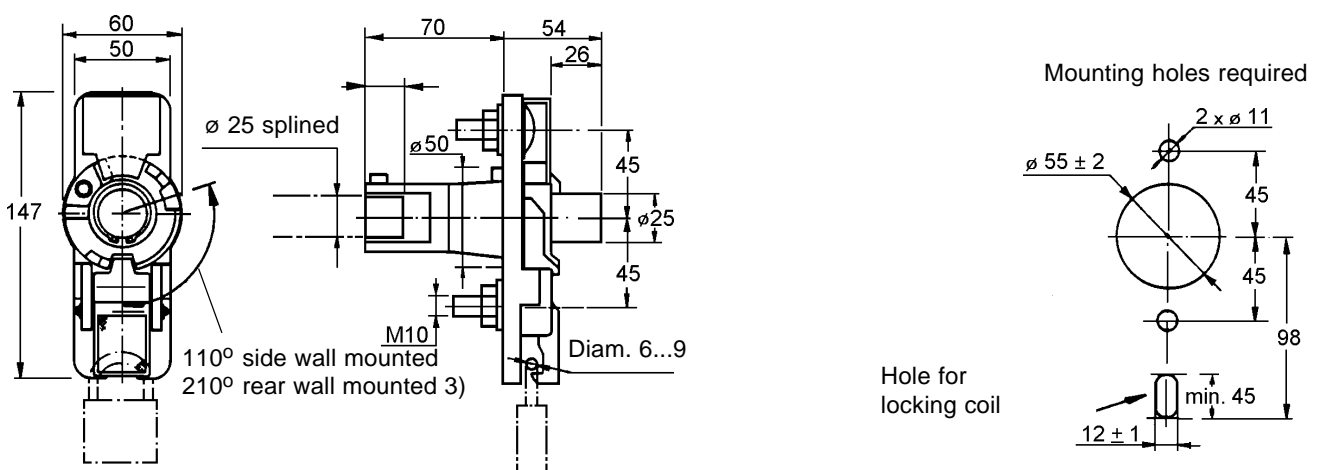
The unit includes:

- position indicating device UEKO-ZA 9 which comprises the hinged gear wheel which allows mounting of the control tube at up to 45 degrees from the horizontal level.
- Control tube UEKO-ZP 1 x 1200. As standard the tube is 1200 mm long. A longer tube of 2500 mm is also available when detailed in the order.
- Beveled gear wheel pair UEKO-ZH 1



Manual control devices, type UEKO-ZA 7 and UEKO-ZA 15

Mounted on side wall

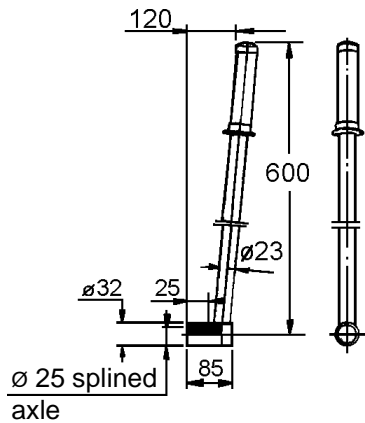


- UEKO-ZA 7, when switch is mounted on the right hand wall of cubicle
 UEKO-ZA 15, when switch is mounted on the left hand wall of cubicle
 3) UEKO-ZA 9, included in part UEKO 2C1 for rear wall mounting

Control Devices Dimension drawings

Operating handle, type UEKO ZK1

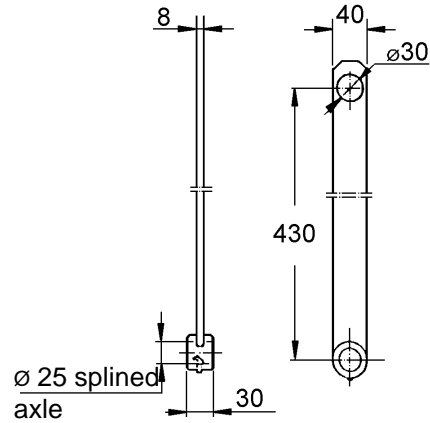
The operating handle is suitable for the $\varnothing 25$ mm splined axle in both manual and motor operated switches. The handle has an insulated grip.



**Operating handle
type UEKO-ZK 1**

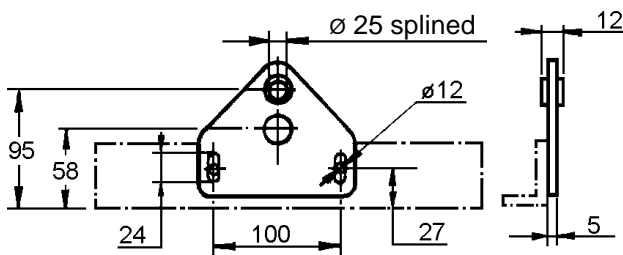
Eye Hook Stick, type UEKO ZK 3

Suitable for $\varnothing 25$ mm splined axles. For rear wall mounted switches the insulated rod type NWAZS 5 and control hook type NWAZH 6 are to be used.



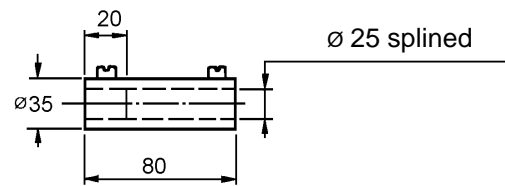
**Eye Hook Stick
type UEKO-ZK 3**

Support bearing, type UEKO-ZX 8



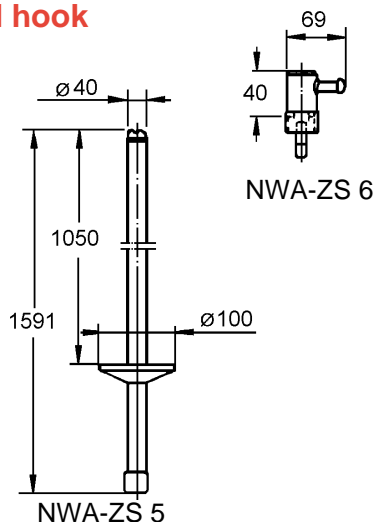
For use when supporting an extended axle, or if the end of the axle is over 250 mm from the fixing hole of the switch. The customer is to supply any fixing hardware required for the support bearing.

Extension bushing, type UEKO ZX 2



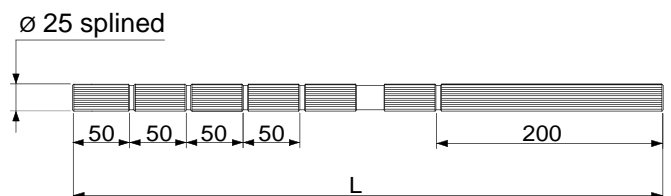
Suitable for extending $\varnothing 25$ mm splined axles without the need for drilling, Complete with locking screws.

Insulated staff and disconnector Control hook



NWA-ZS 5

Extension axle, UEKO ZB 3 x L



L = 700 mm or 1000 mm

Motor operating device UEMC 40_

See catalogue 34 UEMC 36_.

Application voltage max. 52 kV

Interlocking Coils Dimension drawings

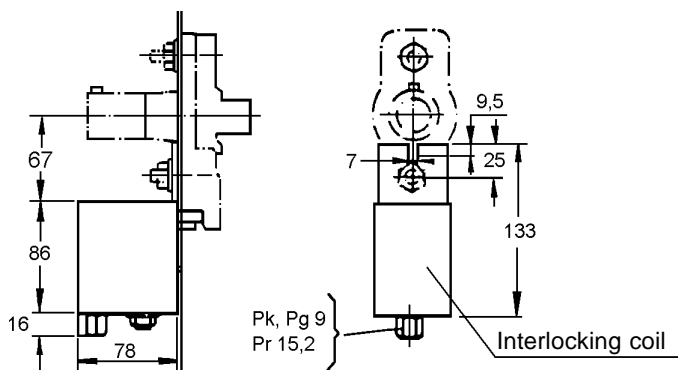
Interlocking Coil, type UEKO ZL 1

The interlocking coil is suitable for use on all types of manual operating and indicating device. UEKO-ZA 7, UEKO-ZA 9 and UEKO-ZA 15. The coil locks the operating device only when without voltage and is suitable for continuous use.

- Power consumption 15 W
- Voltages ($\pm 10\%$), 24 VDC, 48 VDC, 60 VDC, 110 VDC, 125 VDC, 220 VDC, 110 VAC 50 Hz, 110 VAC 60 Hz, 230 VAC 50 Hz.

Ordering details: UEKO-ZL 1/U, where U = coil voltage.

The interlocking coil can also be overridden by using a screwdriver.



Terminal connection bars for current transformer models

Table 14

Earthing switch	Transformers	Terminal bar	Qty / switch
OJWN 12/63 E OJWN 24/63 E	KOFA 12 B1 KOFA 24 D2, F3	OJWZWE 2	3
OJWN 12/63 E OJWN 24/63 E	KOFA 12 A3 KOFA 24 C3, E3	OJWZWE 1	3
OJWN 12/100 D	KOFA 12 B1, D1, F1	OJWZWE 4	3
OJWN 12/100 D	KOFA 12 B2, D2, F2	OJWZWE 3	3
OJWN 12/100 D	KOFA 12 B3, D3, F3	OJWZWE 2	3
OJWN 12/100 D	KOFA 12 A3, C3, F3	OJWZWE 1	3
OJWN 17,5/100 D	KOFA 24-2, 3	OJWZWE 5	3

When different length current transformers are used in the earthing switch a fixing bracket type OJWZAK 1, phase distance 210 mm, is also required for the CT. Bracket OJWZAK 2 has a phase distance of 260 mm. The number of brackets required is as follows:

- 1pc when transformers of two different lengths fitted.
- 2 pcs when transformers of three different lengths fitted.

Installation set OJWZD 1...4

Ordering Details

Ordering details

1. Earthing switch type number.

2. Operating device (for separate earthing switches)

a) Manual operation with handle

- for rear wall mounting UEKO 2C1 (standard tube length 1200 mm, 2500 mm available on request)
- for side eall mounting on the left UEKOZA 15
on the right UEKOZA 7
- operating handle UEKOZK 1

b) Manual operation using an eye hook stick

- eye hook stick UEKOZK 3
- control stick NWAZS 5
- hook for the above NWAZH 6

Note. For current transformer models, the customer is to design and purchase the manual operating device according to the switchgear cubicle.

c) Additional items for manual operations

- extension bushing UEKOZX 2
- extension axle UEKOZB 3 x L (L = 700, 1000 mm)
- support bearing UEKOZX 8
- interlocking coil UEKOZL 1/U
(U = 24, 48, 60, 110, 125, 220 VDC, 110 VAC 50 Hz, 110 VAC 60 Hz, 230 VAC 50 Hz)

d) Motor operating device type UEMC 40_, see catalogue 34 UEMC 36_.

3. Auxiliary Switches

a) Separate earthing switches

- on the right hand side 3 change-over contacts OJWZB 31
6 " OJWZB 61
- on the left hand side 3 change-over contacts OJWZKE 31
6 " OJWZKE 61

b) For earthing switches with integral current transformers

- 3 change-over contacts OJDZKF 31
- 6 " OJDZKF 61

4. Voltage indicator accessories

- Test lamp with indicator lamp box NTGUZLA 1
- Plastic cover for the lamp box NTGZ 1

5. Terminal connection bars for the current transformers models (refer to page 18, table 14)



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