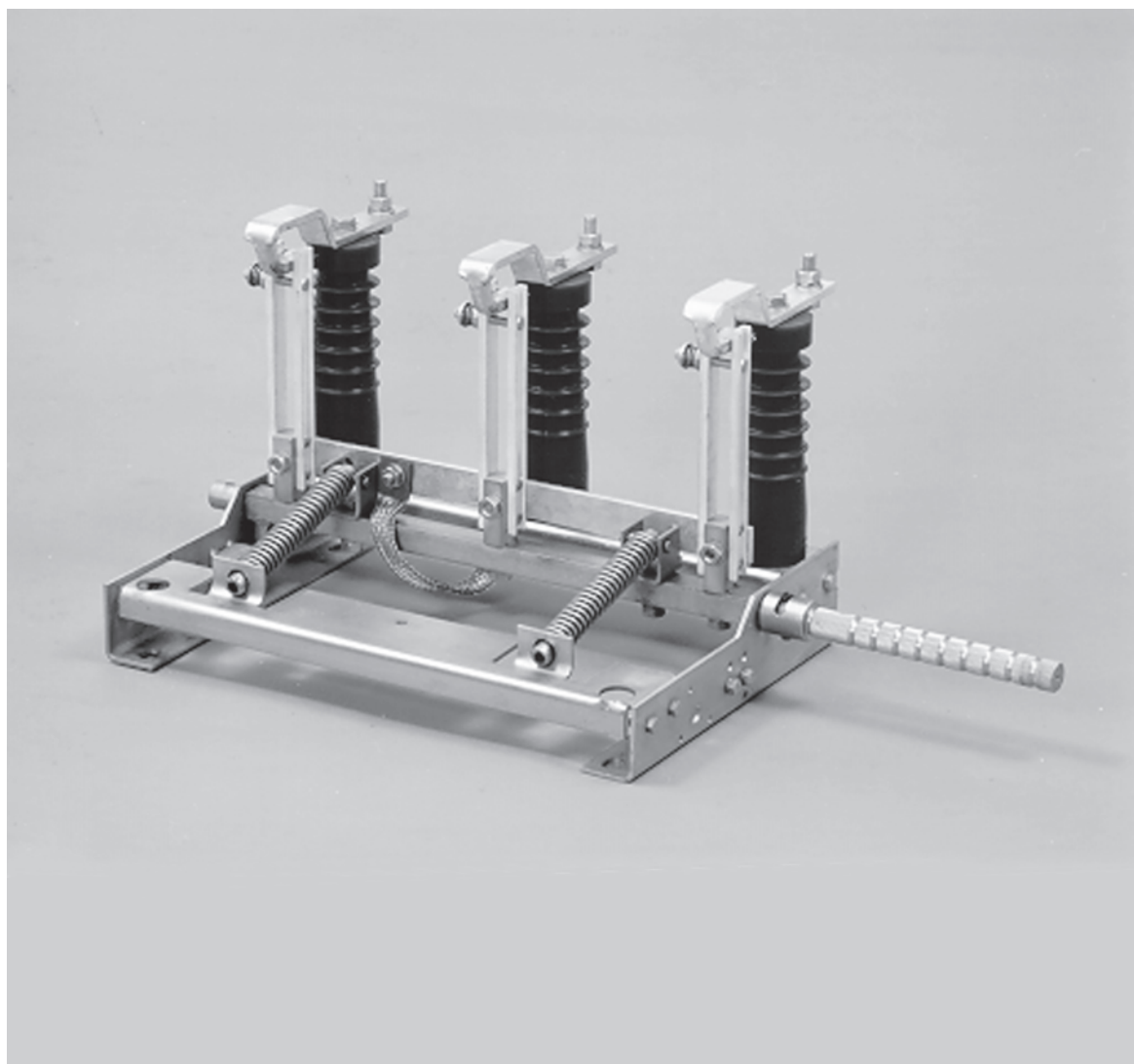


# Earthing switches with fault making capacity

OJWN\_

Installation and operating guide



**ABB**

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This guide covers

OJWN 12/63	A_
	B_
	AJ_
	BJ_
OJWN 17.5/63	B_
OJWN 24/63	A_
	B_
	AJ_
	BJ_
OJWN 12/100	A_
and voltage indicators delivered with earthing switches	
lamp box	NTGU-ZL 1
test lamp	NTGU-ZLA 1
post insulators with HV-resistor	NTGU 12 A1
	NTGU 24 A1

1. General

These earthing switches are equipped with a snap action spring device which ensures an independent closing speed. They can make and withstand short-circuit currents from both feeding directions without a latching operating mechanism.

2. Transport and storage

During transport and storage the blades of the earthing switch must be in the closed position. In the open position the springs are charged and may cause an accident during handling.

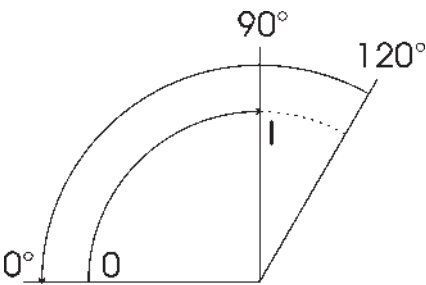
Protection the earthing switch from dust, humidity and mechanical damages.

3. Operating

The minimum operating angle of the earthing switch is 90° and max. 120°.

Extra operating angle (excluding 90°) shall be placed to the end of the closing movement (see fig.).

The operating torques are given in table 2.



## Manual operating

OJWN\_ earthing switches can be operated by means of the manual operating devices.

UEKO 2 C 1	(rear wall mounting)
UEKO-ZA 7	(side wall mounting, clockwise closed)
UEKO-ZA 15	(side wall mounting, anti clockwise closed)

Operating handle UEKO-ZK 1.

UEKO-ZK 3 eye hook stick can be used alternatively with an insulated rod NWA-ZS 5 + NWA-ZH 6 for rear wall mounting.

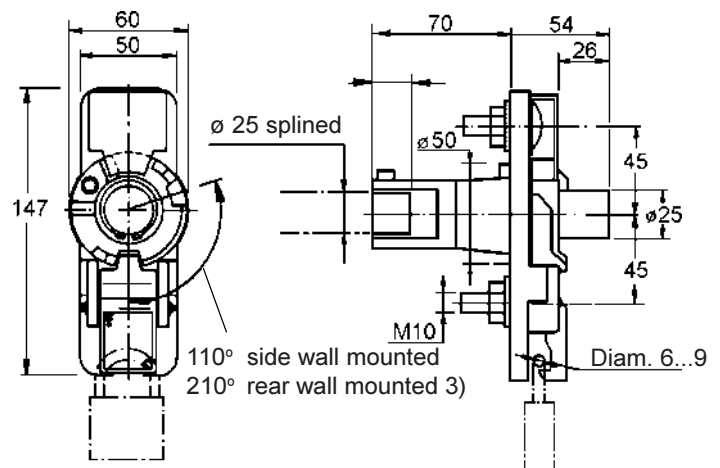
## Motor operating

UEMC 40\_ motor operating device can be used for OJWN\_ earthing switches.

Installation and operation guide 34 UEMC 36 GB.

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

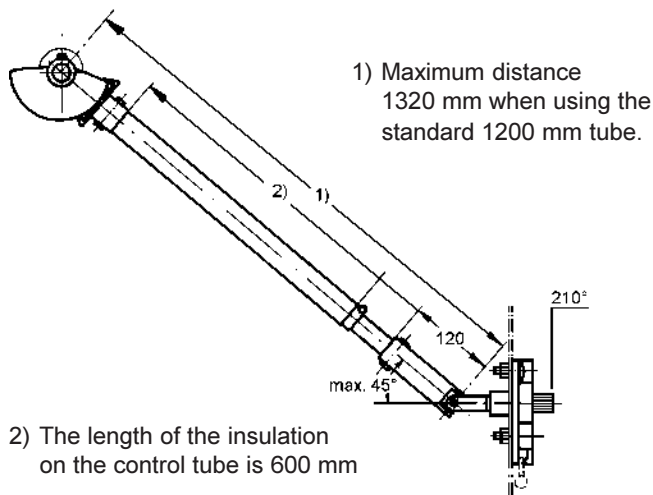
### Mounted on side wall



Can be padlocked in both positions.

## Manual control device, type UEKO 2C1

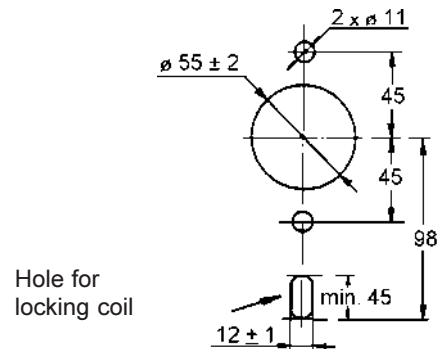
### Mounted on rear wall



1) Maximum distance 1320 mm when using the standard 1200 mm tube.

2) The length of the insulation on the control tube is 600 mm

Mounting holes required



- 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

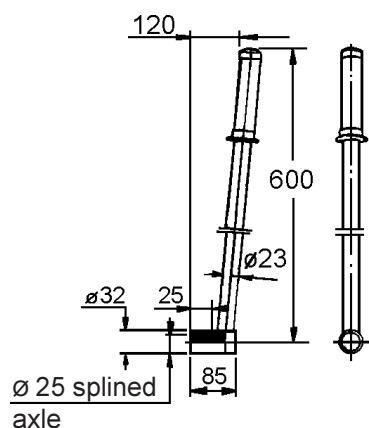
The unit includes:

- 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

## Control devices

### Operating handle, type UEKO ZK1

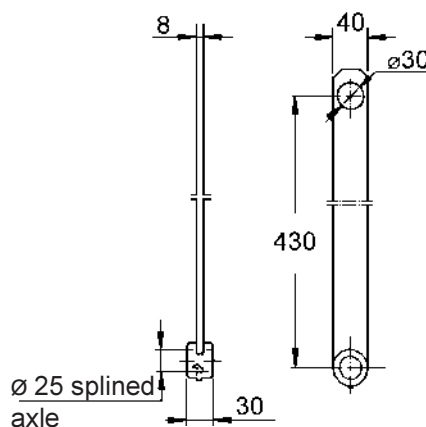
The operating handle is suitable for the  $\varnothing 25$  mm splined axle in both manual and motor operated switches. The handle has an insulated grip.



**Operating handle  
type UEKO-ZK 1**

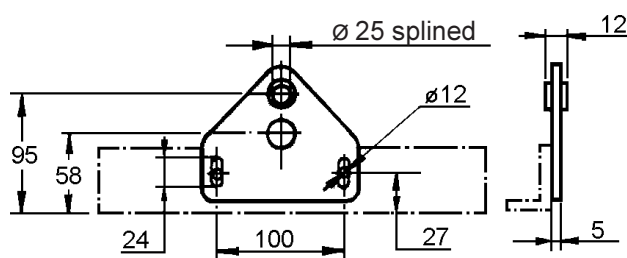
### Eye Hook Stick lever, type UEKO ZK 3

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.



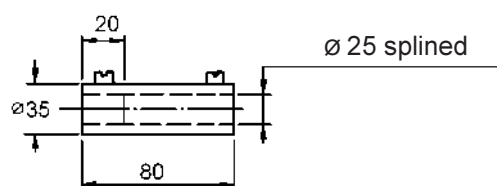
**Eye hook stick lever  
type UEKO-ZK 3**

### Support bearing, type UEKO-ZX 8



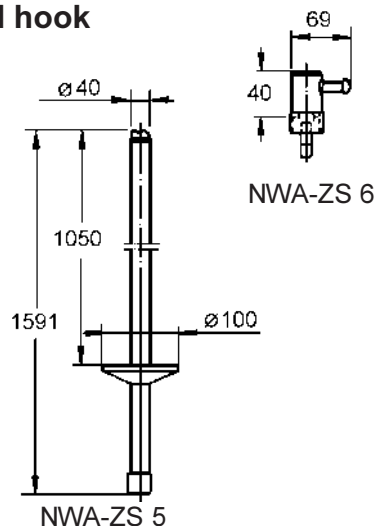
For use when supporting an extended axle, or if the end of the axle is over 250 mm from the fixing hole of the switch. The customer is to supply any fixing hardware required for the support bearing.

### Extension bushing, type UEKO ZX 2



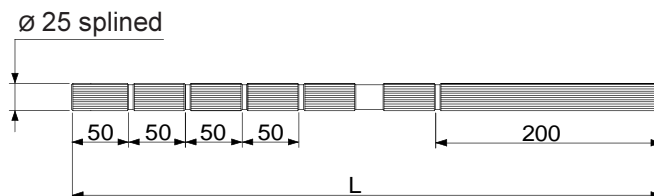
Suitable for extending  $\varnothing 25$  splined axles without the need for drilling, Complete with locking screws.

### Insulated rod and disconnector Control hook



Application voltage max. 52 kV

### Extension axle, UEKO ZB 3 x L



L = 700 mm or 1000 mm

### Motor operating device UEMC 40\_

See catalogue 34 UEMC 36\_.

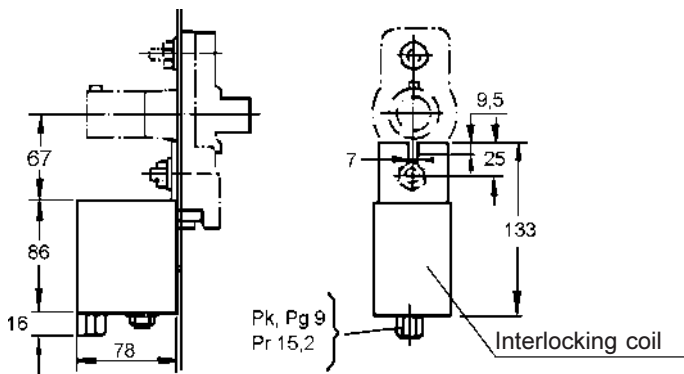
## Interlocking Coil, type UEKO ZL 1

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.



## 4. Mounting

Ensure the earthing switch is in the closed position.

The mounting base must be even. Use washers between the earthing switch frame and the mounting base if there is a gap.

Adjust the busbars so that they do not stress the terminals or insulators.

Greasing is not necessary. The contact are dry greased in the factory.

Ensure that the control axel operates smoothly and does not stick due to possible stress caused by the operating devices.

Earthing can be made through the fixing points of the frame if the switchgear frame and its connections are good conductors (not painted).

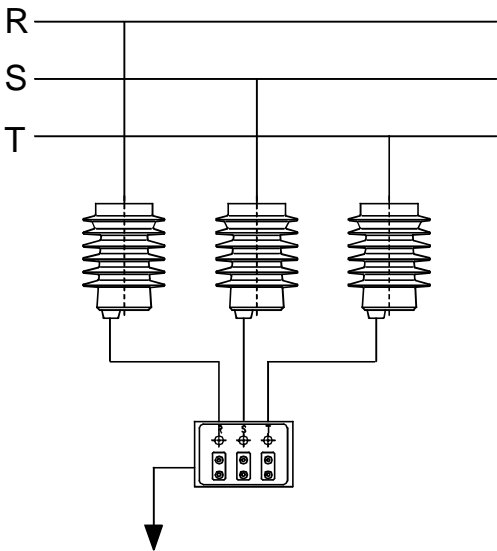
Alternatively use the earthing terminal. Both earthing terminals of OJWN 12/100\_ shall be connected parallel.

5. Voltage indication  
(OJWN\_ AJ\_, BJ\_

Earthing switches types OJWN\_ AJ\_ and OJWN\_ BJ\_ are equipped with special insulators including resistors and a lamp box including lamps and capacitors. These resistors and capacitors form a voltage divider, which supplies 220 V to the lamps and keeps possible fault current to a safe level below 0.5 mA.

Wire the terminal at the bottom of the insulators to the lamp box with standard low voltage installation wire. The low voltage circuits shall be shrouded from the high voltage side, for example by an earthed metal flexible tube. The lamp box shall be earthed. The bottom terminals of the insulators should be earthed, if for some reasons they are not connected to the lamp box, to avoid partial discharges.

The voltage condition of the main circuit before earthing switch is indicated by the fixed lamps. The condition of the fixed lamps can be checked by inserting the test lamp NTGU-ZLA 1 into the parallel test plugs below. The condition of the test lamp can be checked using 220 V AV 50 Hz.

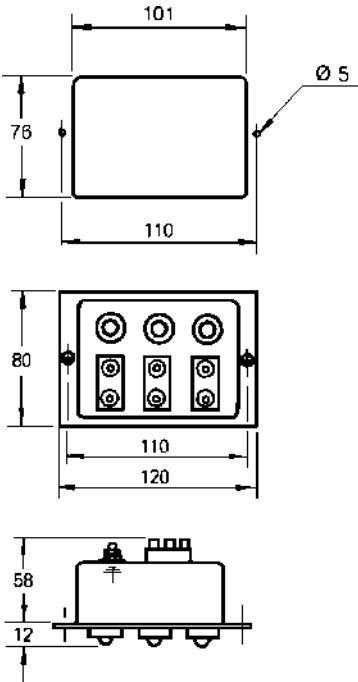


The minimum voltage of the high voltage circuit to light the lamp:

OJWN 12_	4 kV
OJWN 24_	8 kV

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.

The resistance shall be checked after the tests by a suitable meter for insulating resistances, for ex. Megger at the 5 kV scale.



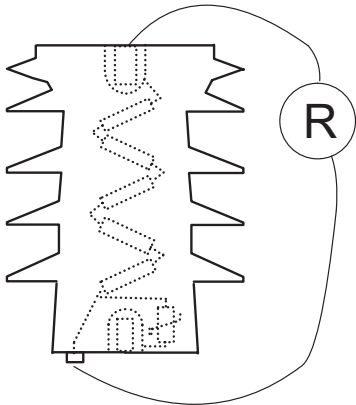
Dimensions of the lamp box.

Rated voltage kV	Max. testing voltage 50 Hz 1 min kV	Rated resistance Mohm	Minimum accepted resistance Mohm
12	28	20	16.6
24	50	40	36.4

If the measured resistance does not exceed the minimum value, one or more of the resistors inside the insulator may be short-circuited due to thermal overload. Such insulators would probably fail in service at one or later, for ex. in earth-fault conditions.

The specified test voltage or duration shall not be exceeded. The tests shall not be repeated within 2 hours.

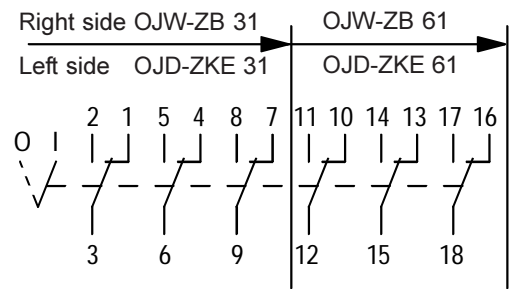
Several resistors are connected in series inside the insulator. In some special cases only a part of the resistors may be short-circuited by overloading. Such as a partial failure is not observed as a flash-over by the testing equipment during the power-frequency withstand voltage test.



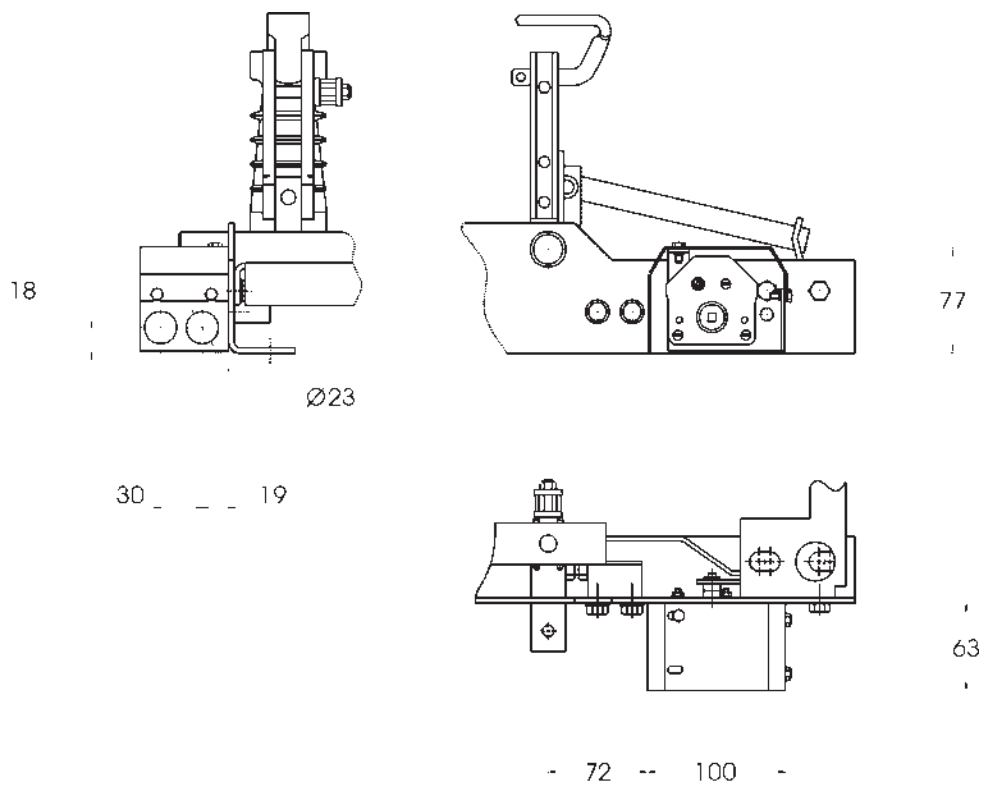
## 6. Auxiliary switch

Table 1

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



Auxiliary switch numbering.



Auxiliary switch

## 7. Technical data

**Table 2a**

		150 210 OJWN 12/63 A	150 210 OJWN 12/63 B	210 260 OJWN 12/63 E	210 260 OJWN 12/100 A	150 210 260 OJWN 12/110 B	210 260 OJWN 12/100 D	200 275 OJWN 12/100 H	
Rated voltage	kV	<b>12</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>12</b>	
Withstand voltage									
1 min. 50 Hz	kV	28	28	28	28	28	28	28	
1.2/50 µs	kV	75	75	75	75	75	75	75	
Short-time withstand current									
1 s	kA	25	-	25	40	-	40	-	
2 s	kA	-	-	-	-	-	-	40	
3 s	kA	-	25	-	-	40	-	-	
Peak withstand current	kA	63	63	63	100	110	100	100	
Short-circuit closing capacity	kA	63	63	63	100	100	100	100	
Operating torque, opening	Nm	90	90	90	120	120	120	120	
Operating torque, closing	Nm	50	50	50	50	50	50	50	
Weight	kg	17	18		20	22			
Ambient temperature		-40 °C...+60 °C							
Frequency		50 Hz, 60 Hz							

**Table 2b**

		OJWN 17.5/63 B210	OJWN 17.5/100 A210 **)	OJWN 17.5/100 B210 **)	OJWN 17.5/100 D210 260 **)	210 260 OJWN 24/63 A *)	210 260 OJWN 24/63 B *)	OJWN 24/63 E 260	200 275 OJWN 24/63 J
Rated voltage	kV	<b>17.5</b>	<b>17.5</b>	<b>17.5</b>	<b>17.5</b>	<b>24</b>	<b>24</b>	<b>24</b>	<b>24</b>
Withstand voltage									
1 min. 50 Hz	kV	38	38	38	38	50	50	50	50
1.2/50 us	kV	95	95	95	95	125	125	125	125
Short-time withstand current									
1 s	kA	-	40	-	40	25	-	25	-
3 s	kA	25	-	40	-	-	25	-	25
Peak withstand current	kA	63	100	100	100	63	63	63	63
Short-circuit closing capacity	kA	63	100	100	100	63	63	63	63
Operating torque, opening	Nm	120	130	130	130	140	140	140	140
Operating torque, closing	Nm	50	50	50	50	50	50	50	50
Weight	kg	18	21	23		20	21		
Ambient temperature		-40 °C...+60 °C							
Frequency		50 Hz, 60 Hz							

\*) 24 kV/210 mm models require insulated busbars. Contacts are fitted phase barriers to increase insulation.

\*\*) Note the feeding direction.



## 8. Maintenance and spare parts

The earthing switch, in normal use, does not require maintenance. It will withstand 2000 unloaded control operations and two short-circuit current making operations. Contacts and blades are to be replaced if the contact surface between them, when in the closed position is not in good condition. Moderate erosion of the blade edge of fixed contact tip where the arc starts, does not effect the making capacity.

It is recommended to grease the indicating and operating device bushing, for example, every 5 years using synthetic motor oil 10W40.

The contacts are greased by a special paraffin and normally no greasing is required during service. If the friction during opening is higher than normal the contacts may be using a grease bar OJDZ 60. Conventional greases may increase the friction.

**Table 3**

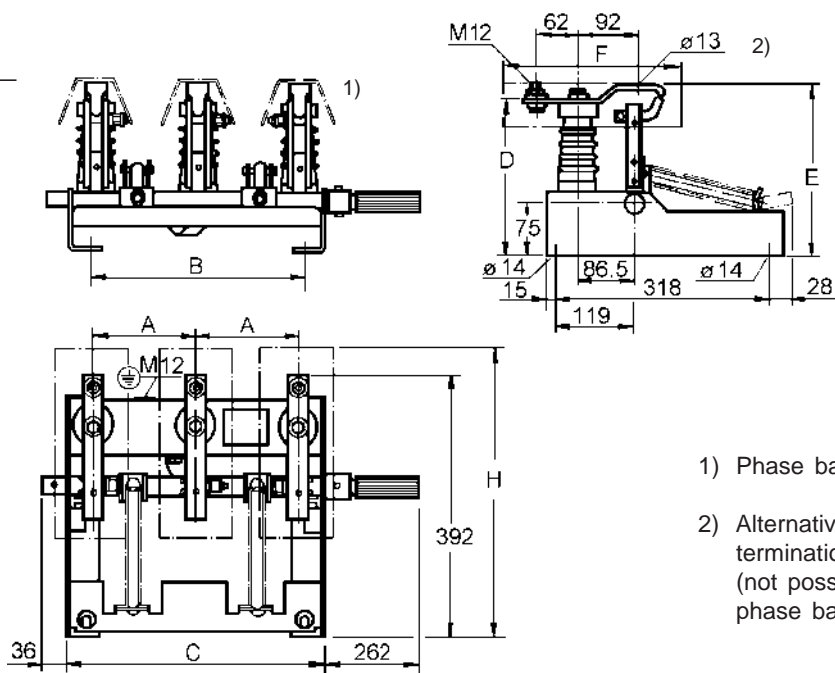
Type	Blades	Contacts	Pcs/switch
OJWN 12/63 A B_	OJWZMB 4	OJDZMZ 4	3
OJWN 12/63 AJ BJ_	OJWZMB 4	OJWZWA 1	3
OJWN 17.5/63 B_	OJWZMZ 7	OJDZMZ 4	3
OJWN 24/63 A B_	OJWZMZ 6	OJDZWA 2	3
OJWN 24/63 A_	OJWZMZ 6	OJDZWA 3	3
OJWN 12/100 A_	OJWZMB 2	OJDZWA 4	3

## Dimension drawings

**OJWN 12 / 63**

**OJWN 17,5 / 63\_**

**OJWN 24 / 63**

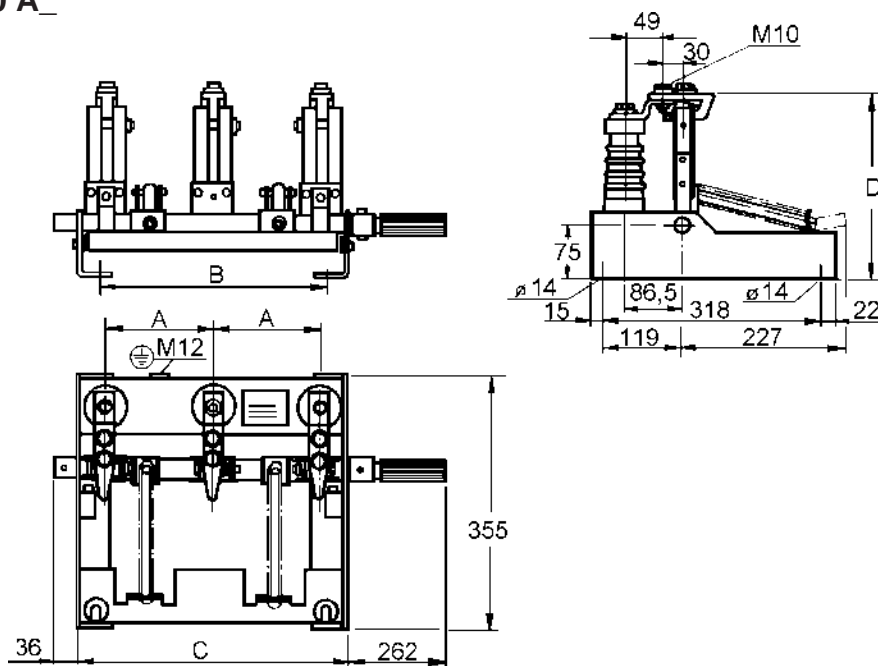


- 1) Phase barriers
- 2) Alternative fixing hole for termination  
(not possible to use when phase barriers fitted)

**Table 4**

Type	A	B	C	D	E	F 1)	H 1)
OJWN 12 / 63 A150 -AJ150, -B150, -BJ150	150	326	386	226	246	280	442
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)		
OJWN 24 / 63 A260 -AJ260, -B260, -BJ260	260	546	606	306	344		

**OJWN 12 / 100 A**

**Table 5**

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

## OJWN 12 / 110 B\_

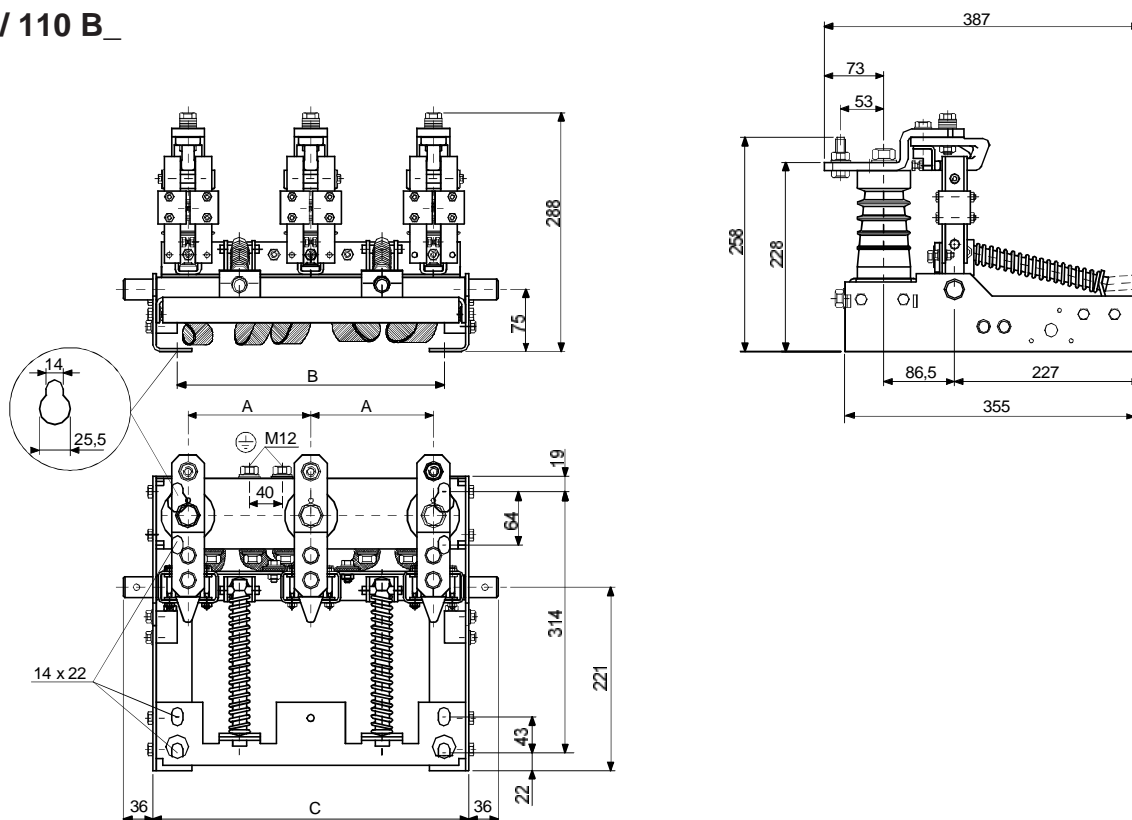
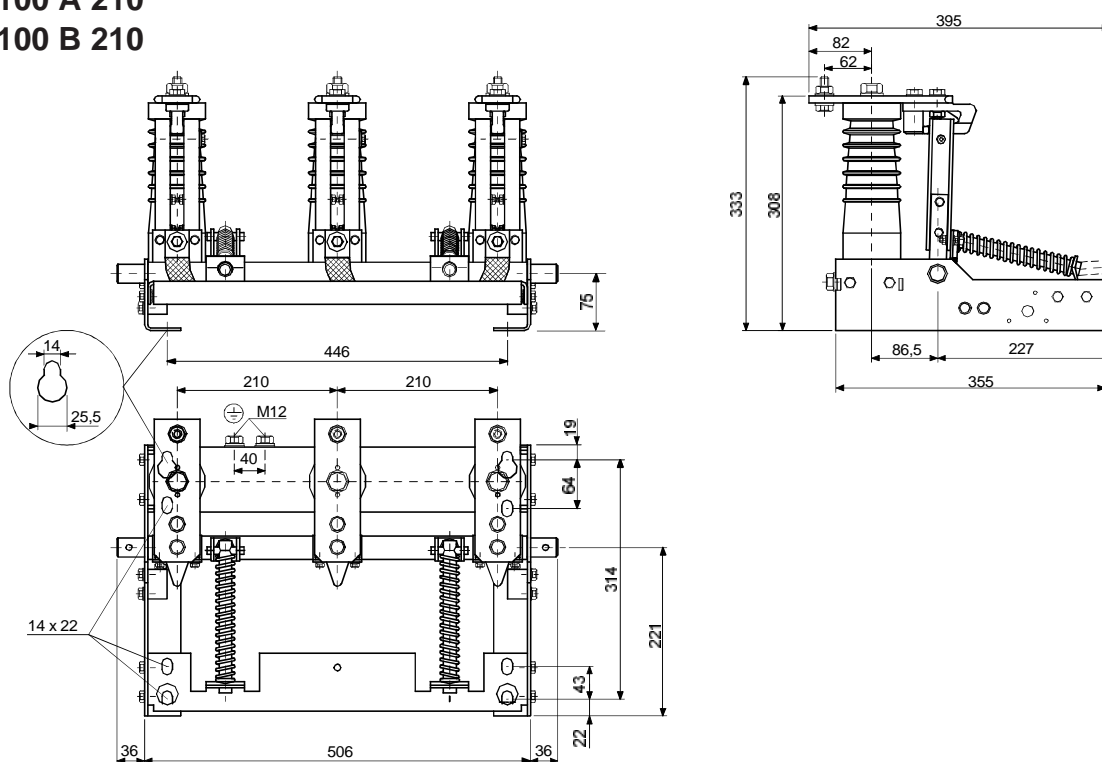


Table 6

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

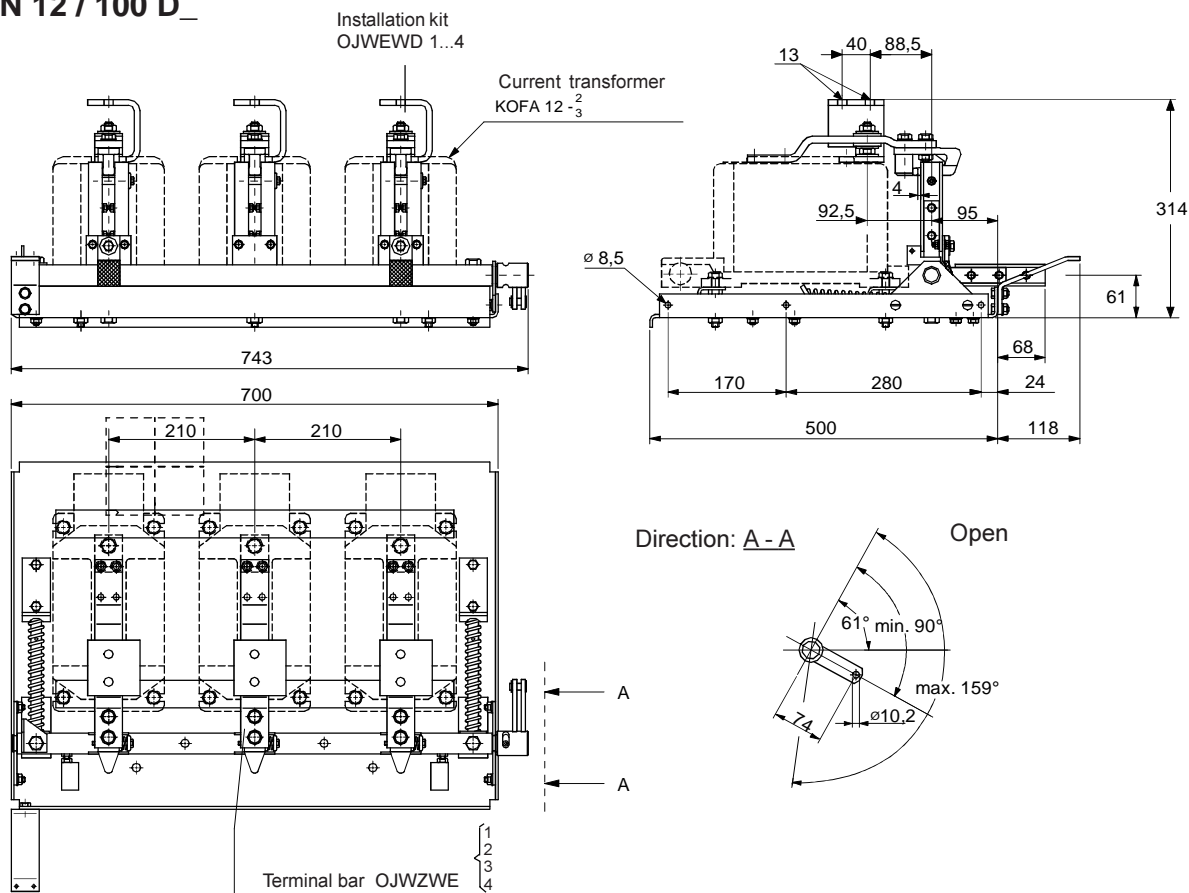
## OJWN 17,5 / 100 B 210



# 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 7

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

## OJWN 12 / 63 E<sub>-</sub>

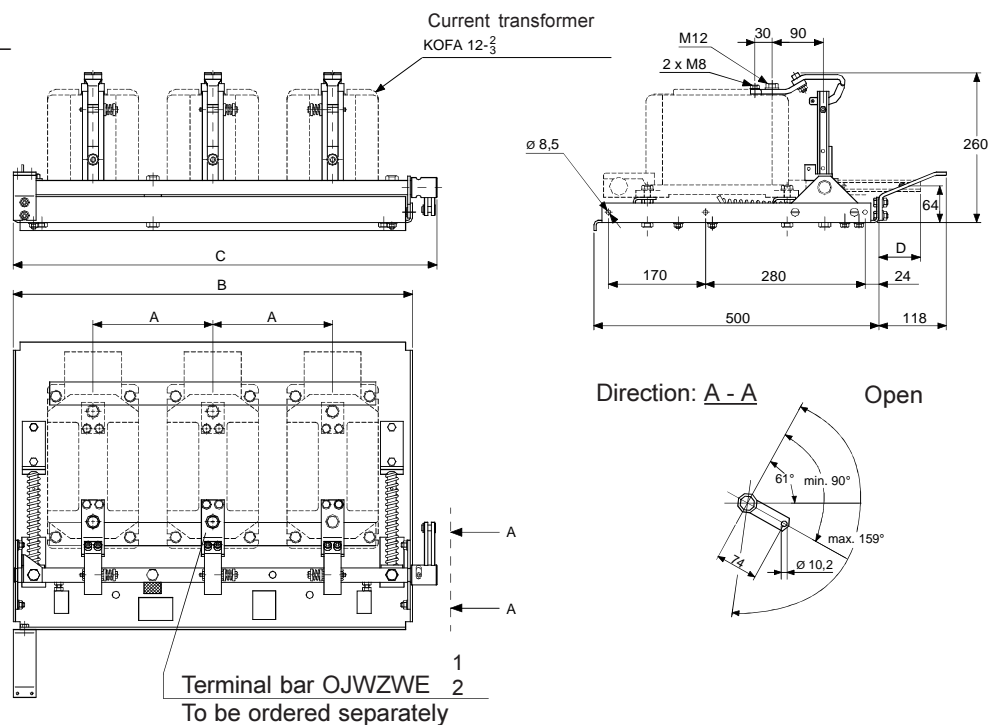


Table 8

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<sub>-</sub>

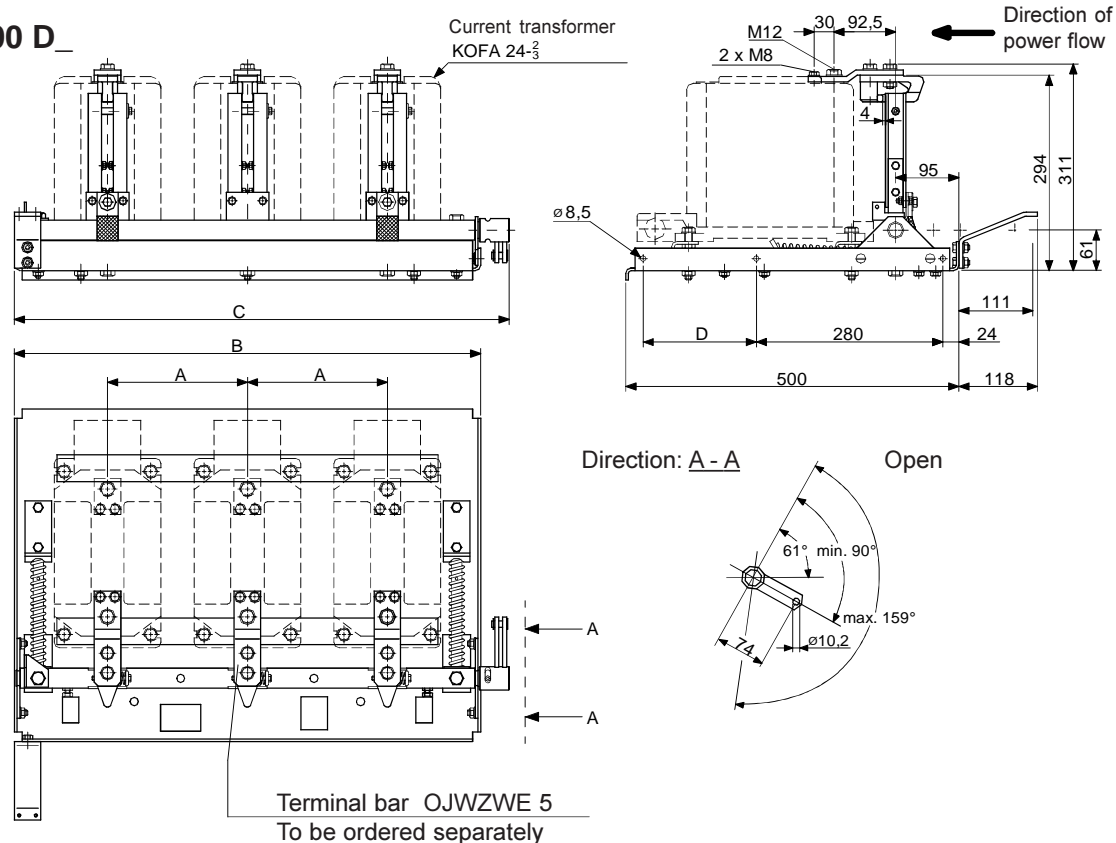


Table 9

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

OJWN 12 / 100 H\_

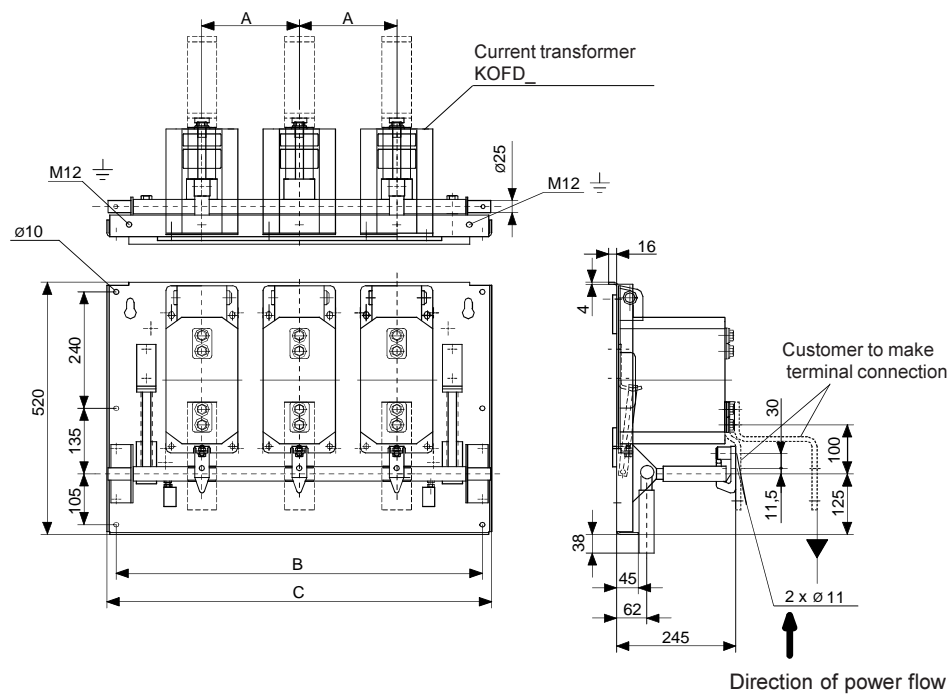


Table 10

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

OJWN 24 / 63 J\_

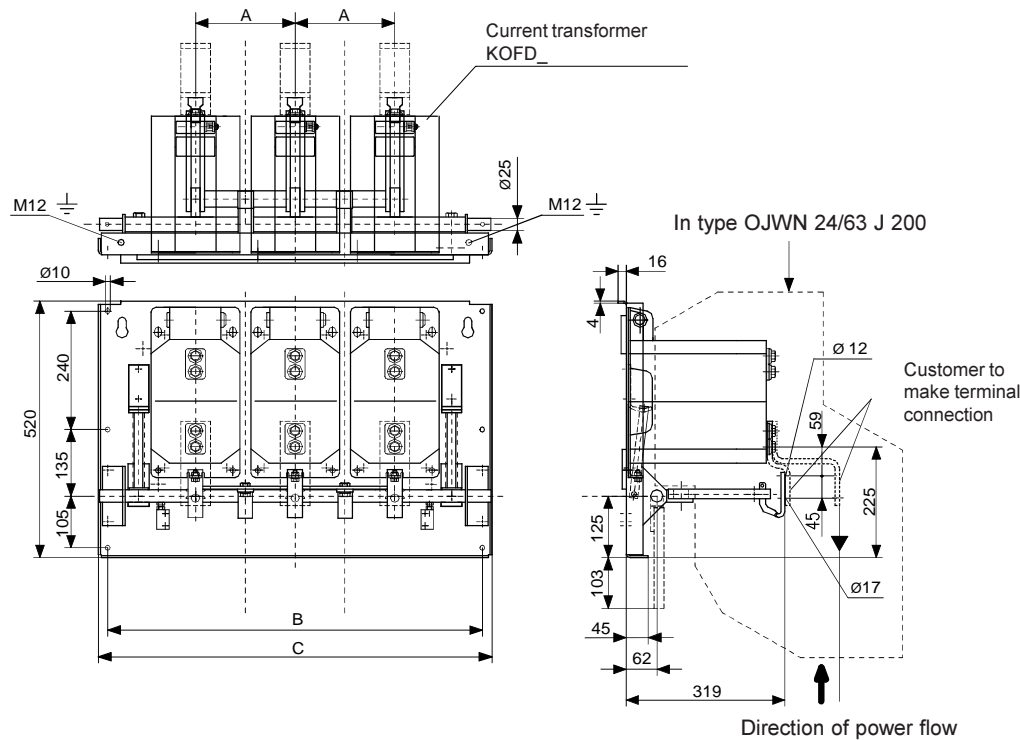


Table 11

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





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