

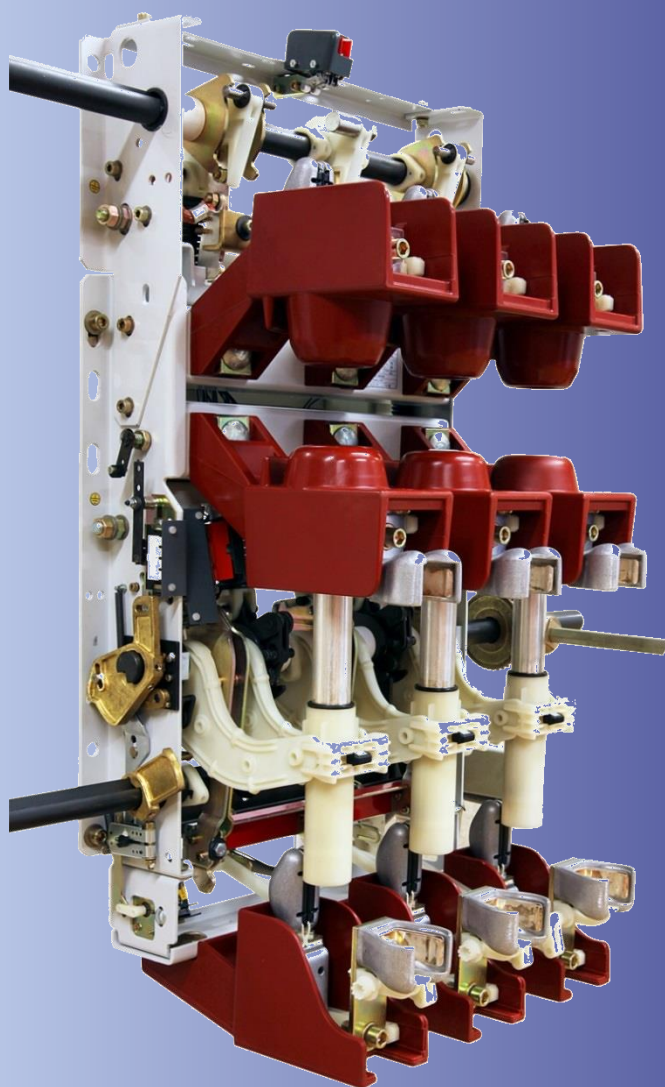
# SZM

Schaltanlagen  
Zubehör

Bad Muskau  
**ZUSCHA Boss**



*Reliable Switching of Higher Voltage Current*



## Rod type Switch- Disconnectors Type C3

Type series 12 kV / 24 kV –  
400 A / 630 A  
<CK3; CR3 and CS3>

# Rod type Switch- Disconnectors Type C3

- Assured arc-extinction due to the well-proven hard-gas principle; no injection of hot gas
- High breaking and making capacity, providing ample reserves
- Heavy duty construction with a long working life
- Compact space saving design thanks to vertical or horizontal installation options, yet easy connection of cables or connectors of all types; Available versions include increased distance between pole centres
- Ancillary equipment in modular form comprises of:
  - Tripping device
  - Earthing switch with snap action and interlock
  - Fuse baseson the existing fixing centres
- Options available for local and remote operation
- All the usual types of actuator on either side; remote motor operation
- Adapted for auxiliary switches and shunt & undervoltage releases
- Actuators can be fitted on either side of the switch
- Practically maintenance-free

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## Design and operation

The switch-disconnectors of type C3 combine the functions of an isolator and a switch in one unit. They constitute multi-purpose switch-disconnectors conforming to DIN VDE- Regulation 0670, Part 3 and IEC-Publication 265 and are suitable for switching transformers, capacitors, cables, overhead lines, feeder lines and ring circuits on load and under no-load conditions. In the open position, the switches feature a visible break of enhanced dielectric strength. Each of the three pole assemblies is attached to the rigid rolled steel support frame by two cast-resin insulators. The geometry of the component parts is designed to promote optimum field distribution so that, even without interphase barriers, the pole assemblies can be mounted on small pole

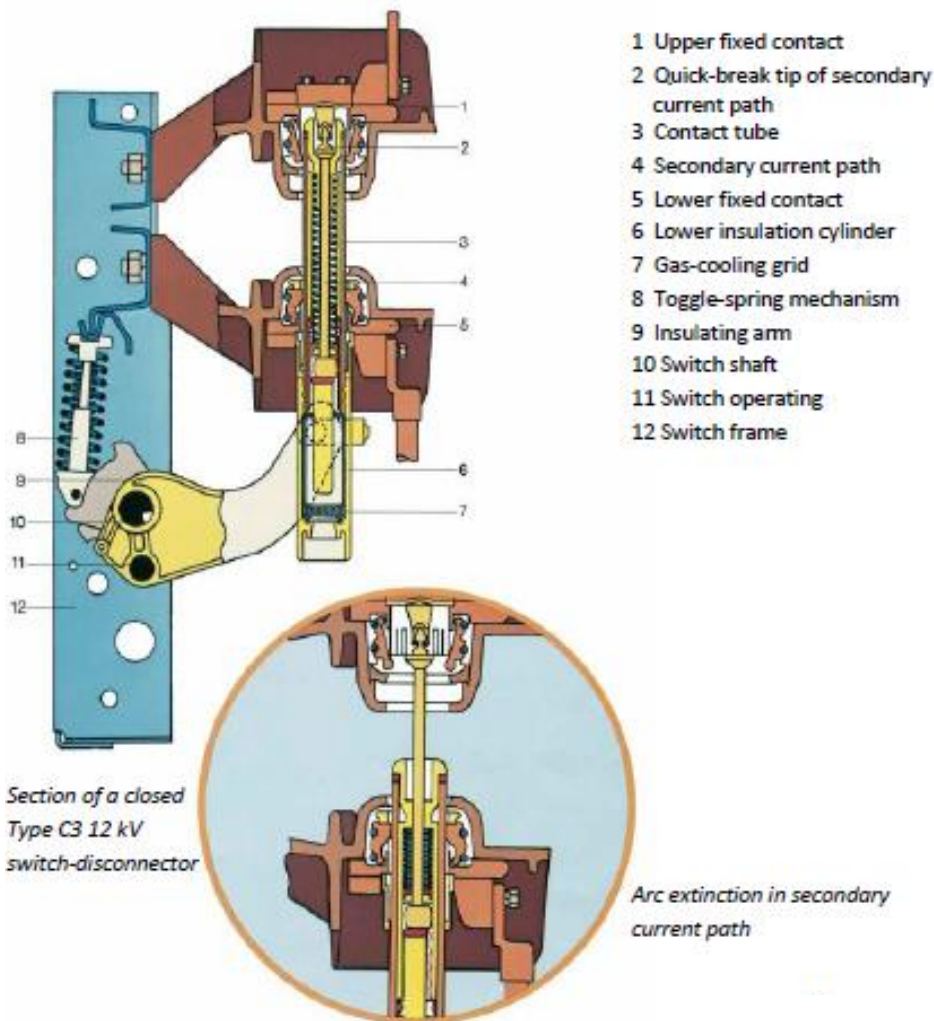
centres (e.g. 125 mm for 12 kV) to from very compact switch units. The switches can, of course, also be supplied with larger pole centre distances. The rod-type construction offers the additional advantage of small depth dimensions resulting in very compactly designed panels. In the closed condition of the switch, contact tubes constituting the main current path, establish the connection between the fixed contacts mounted in the upper and lower cast-resin insulators (see sectional view). The contact tubes enclose a secondary current path with the arc-quenching system. The contact tubes are actuated by insulating arms driven by the mechanism so that a definite opening and closing independent of the type of operation is ensured.

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## Arc extinction

The opening action starts with the contact tube which separates from the upper fixed contact without striking an arc because the current transfers to the secondary current path. The latter proceeds from the quick-break tip which is retained for a brief period in the upper fixed contact, via a contact rod and a sliding transfer contact to the internal face of the contact tube. In the further course of the opening action, the sliding contact of the secondary current path is separated from the contact tube. The resulting arc, struck between two arcing contacts, is drawn into a narrow annular slot formed by two insulating cylinders where the

heat generated by the arc causes gas to be liberated from the insulant (expulsion or hard-gas quenching principle). The cooling of the gas in conjunction with the rapid elongation of the gap ensure positive extinction of the arc. Operating speeds and distances are so graded that the arc is fully quenched before the quickbreak tip is extracted from the upper fixed contact and the entire secondary current path snaps back into the contact tube under the action of the compression spring charged during the opening stroke. The gas generated flows into the lower insulating cylinder and escapes downwards through a cooling grid so that hot gas never enters the break.



# Rod type Switch- Disconnectors Type C3

## Application

Three basic versions, differing in the type of mechanism, are available:

- Type CK3: Toggle-spring mechanism opens and closes the switch (up to 1250 A)
  - Type CR3: Toggle-spring mechanism for closing; tripping spring OFF separately charged (up to 630 A)
  - Type CS3: Toggle-spring mechanism for closing; tripping spring storage mechanism for tripping (up to 630 A)
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## Integrated fuses

The three types of disconnector can be equipped with fuse bases for HRC fuses to DIN 43 625. These are mounted in the lower part of the switch in such a way that the installed height is hardly increased and the fixing dimensions remain unchanged. The fixing dimensions remain unaltered when modified fuse bases for 24 kV HRC fuses to DIN 43 625 are fitted to 12 kV switches. The fuse bases can be added at a later stage. The operation of a fuse can be indicated by an auxiliary switch.

In CR3 and CS3 switches, the operation of the striker pin of a fuse actuates a trip link causing the three poles of the switch-disconnector to trip simultaneously. In C3 switches mounted on the side wall of a panel, a special fuse base enables the fuses to be withdrawn towards the front. This type of fuse base is suitable for switches with pole centres of 210 mm for 12 kV, or 275 mm on 24 kV switches.

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## Earthing switch

All versions can be equipped with one or two fault-making snap-action quick-closing earthing switches which may also be added at a later stage. The earthing switch on the outgoing side is mounted within the confines of the disconnector framework and, therefore, requires no additional space, leaving the overall and fixing dimensions unaltered. In the

standard version, a mechanical interlock prevents the earthing switch being closed when the associated switch-disconnector is closed, and vice versa. If required, the interlock may be omitted. For busbar earthing, a second earthing switch can be mounted on the frame above the switch-disconnector. No mechanical interlock with the switch-disconnector is, however, provided in this case.

# Rod type Switch- Disconnectors Type C3

## Ease of maintenance

Thanks to their robust construction and the generously designed quenching system, the C3 switch-disconnectors require, under normal operating conditions, practically no maintenance for long periods. Their mechanical life extends to 3000 make-break

operations. The electrical endurance depends on the magnitude of the current interrupted. If load currents are frequently broken, inspection and, if necessary, replacement of the contact tubes and upper fixed contact can be easily effected without having to remove the switch.

## Choice of actuators

Thanks to their ease of operation, C3 switch-disconnectors require only relatively small forces. The operating organs may be fitted on either the right or left hand side as required. The simplest form of actuator is the lever arm made of steel or insulating material which is operated by means of a rod with the panel door open. In addition, there are a number of

other actuators where the mechanism box is always mounted immediately behind the panel front or the side wall so that the switch can be operated with the panel door closed. The motion is transmitted from the mechanism box to the C3 switch or the earthing switch by means of the following elements:

- Shaft with bevel gear transmission
- Manual bevel gear operation
- Shaft with coupling
- Flexball-transmission
- Manual rotary operation
- Socket mechanisms KS21 and KS23

To enable the switch to be operated remotely from a control board, a driving motor is mounted behind the panel front. The various actuators necessitate switch shafts or earthing

switch shafts projecting different distances beyond the switch frame. C3 switches are therefore supplied with three different shaft lengths.

## Releases, blocking magnets and auxiliary switches

To initiate three-pole tripping of the CR3 and CS3 switches (with tripping device), undervoltage- and shunt-releases can be mounted on the switch frame.

In addition, blocking magnets and auxiliary switches can be fitted for control, indication and interlocking purposes.



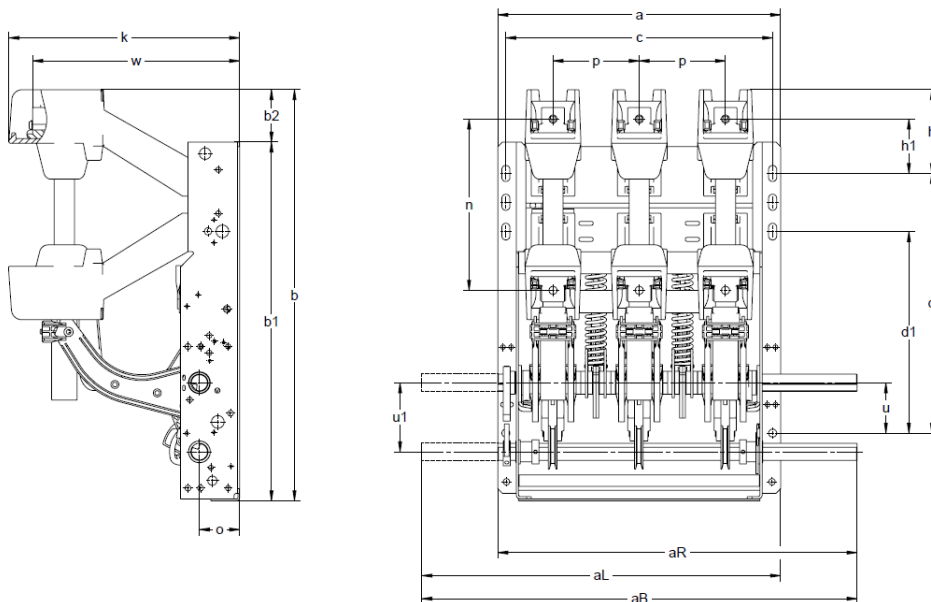
# Rod type Switch- Disconnectors Type C3

## Dimensions

### Switch disconnectors with or without integrated earthing switch

Rated voltage	Rated normal current	p	a	$a_R^{1)} = a_L^{1)}$		$a_B^{4)}$		b	b <sub>1</sub>	b <sub>2</sub>	c	
kV	A		Shaft index			Shaft index						
			0 <sup>2)</sup>	1 <sup>3)</sup>	2	0	2					
12	400	125	442	576	486	596	710	750	636	573	63	414
	and	150	492	626	536	726	760	960	636	573	63	464
	630	210	612	746	656	846	880	1080	636	573	63	584
24	400	150	492	626	536	726	760	960	713	623	90	464
	and	210	612	746	656	846	880	1080	713	623	90	584
	630	275	742	876	786	976	1010	1210	713	623	90	714
Rated voltage	Rated normal current	p										
kV	A		d	d <sub>1</sub>	h	h <sub>1</sub>	k	n	o	u	u <sub>1</sub>	w
12	400	125	400	280	118	67	332	248	70	88	120	290
	and	150	400	280	118	67	332	248	70	88	120	290
	630	210	400	280	118	67	332	248	70	88	120	290
24	400	150	450	350	145	94	402	298	70	88	120	360
	and	210	450	350	145	94	402	298	70	88	120	360
	630	275	450	350	145	94	402	298	70	88	120	360

Footnotes 1) to 4) are explained in the table for switch disconnectors with fuses.



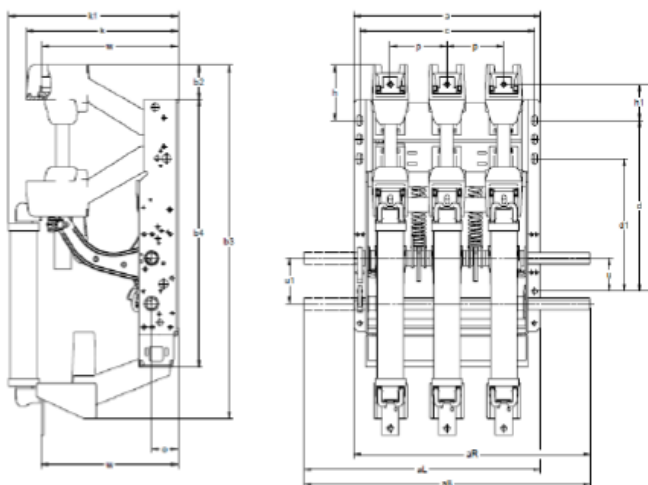
Drawn 12 kV version

# Rod type Switch- Disconnectors Type C3

Disconnecter with fuse; with or without an integrated earthing switch

Rated voltage	Rated normal current	p	a	$a_R^{1)} = a_L^{1)}$			$a_B^{4)}$		$b_2$	$b_3$	$b_4$	c	
kV	A		Shaft index			Shaft index							
			0 <sup>2)</sup>	1 <sup>3)</sup>	2	0	2						
12	400	125	442	576	486	596	710	750	63	784	658		414
	and	150	492	626	536	726	760	960	63	784	658		464
	630	210	612	746	656	846	880	1080	63	784	658		584
24	400	150	492	626	536	726	760	960	90	931	705		464
	and	210	612	746	656	846	880	1080	90	931	705		584
	630	275	742	876	786	976	1010	1210	90	931	705		714
Rated voltage	Rated normal current	p											
kV	A		max.										
			d	d <sub>1</sub>	h	h <sub>1</sub>	k	k <sub>1</sub>	n <sub>1</sub>	o	u	u <sub>1</sub>	w
12	400	125	400	280	118	67	332	381	700	70	88	120	290
	and	150	400	280	118	67	332	381	700	70	88	120	290
	630	210	400	280	118	67	332	381	700	70	88	120	290
24	400	150	450	350	145	94	402	451	900	70	88	120	360
	and	210	450	350	145	94	402	451	900	70	88	120	360
	630	275	450	350	145	94	402	451	900	70	88	120	360

- 1) Dimensions apply to switch disconnectors with the operating protruding right and left shafts and for switch disconnectors with integrated earthing switch when the load break switch and earthing switch are operated in the same place. In latter, however, limitations to the usable drives accordance with the footnotes 2) and 3) are met.
- 2) Only for mounting of rotary awnings can be motorized or bevel manual or motor drive with about Plummer mounted bevel gear.
- 3) Only for mounting of rotary awnings can be motorized or bevel manual or motor drive with directly on the switch frame mounted bevel gear.
- 4) Dimensions are valid for operating the circuit breaker and the integrated earthing switch to different pages.



Drawn 12 kV version

# Rod type Switch- Disconnectors Type C3

## Technical Data

<b>Rated voltage to DIN VDE 0670</b>	<b>U</b>	<b>kV</b>	<b>12</b>	<b>24</b>
Rtd. lightning impulse withst. voltage	$U_p$	kV	85	145
Rated power frequency withstand voltage	$U_d$	kV	32	60
<b>Switch disconnector C3</b>	1)	2)		
Rated normal current	$I_n$	$I_r$ A	400 630	400 630
Rated mainly active load breaking current	$I_{LN}$	$I_1$ A	400 630	400 630
Mainly active load breaking current	$I_{L200}$	A	63 63	40 40
Mainly active load breaking current	$I_{L3}$	A	800 1250	800 1250
Rated closed loop breaking current	$I_{R20}$	$I_{2a}$ A	400 630	400 630
Rated no-load transformer breaking current	$I_{T20}$	A	16 16	16 16
Rated single capacitor bank breaking current	$I_{C20}$	A	25 25	25 25
Rated cable-charging breaking current	$I_c$	$I_{4a}$ A	25 25	25 25
Rated short-circuit making current	$I_e$	$I_{ma}$ kA	50 63	40 40
Rated short-time withstand current	$I_{th}$	$I_k$ kA	20 25	16 16
Rated duration of short-circuit	$t_{th}$	$t_k$ s	1 1	3 3
<b>Earthing switch</b>	1)	2)		
Rated short-circuit making current (peak)	$I_e$	$I_{ma}$ kA	50 50	40 40
Short-time current	$I_{th}$	$I_k$ kA	20 20	16 16
Duration of short-circuit	$t_{th}$	$t_k$ s	1 1	1 1

5) Designation according to DIN VDE 0670

6) Designation according to EN 62271-103





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