

DR-6

COMPACT AND EXTENSIBLE RING MAIN UNIT



DR-6 compact and extensible SF₆ insulated Ring Main Unit

SAFETY, RELIABILITY, VERY COMPACT AND INSENSIBLE TO THE ENVIRONMENT IN THE FIELD OF ELECTRICITY DISTRIBUTION FROM 6 TO 24 KV.



SwitchGear Company

THE SPECIALIST IN MEDIUM VOLTAGE SWITCHGEAR

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DR-6 DEVELOPMENT AND MANUFACTURING PHILOSOPHY

SGC nv invested important R&D human and financial resources in developing the new SF₆ insulated compact and extensible medium voltage ring main unit for 12, 17,5 and 24 kV . Answering the most severe quality and environmental requirements, the production process of the DR-6 range is made with the newest developed laser machinery that was installed for the sole purpose to insure a permanent quality and reliability. The DR-6 range was developed and is produced in line with the ISO 9001 requirements. Security, reliability, environmental respect are characterizing the DR-6 range of cubicles of which most of the components are recyclable.



DR-6 FIELD OF APPLICATION

DR-6 switchgears are used in number of applications combining all possible functions, protecting transformers up to 2500 kVA in all concepts of networks. The city distribution, rural distribution, renewable energy applications, small factories, shopping malls, hospitals may be part of the possible field of application of the DR-6 range of products.



Laser welding



Robot Bending cell



Leak detector



ELECTRICAL CHARACTERISTICS

Rated voltage	kV	12	17.5	24
General specifications				
Impulse withstand voltage 1,2 / 50 µsec.				
To earth and between phases	kV	75	95	125
Over the insulation distance	kV	85	110	145
Power frequency voltage test 1 min.				
To earth and between phases	kV	28	38	50
Over the insulation distance	kV	32	45	60
Rated frequency	Hz	50/60		
Rated current	A	630		400/630
Rated short time current 1 sec.	kA	25	20	12,5/16/20
Rated peak value of the current	kÂ	63	50	40/50
Breaking capacity (IEC 62271-103)		Class E3		
Rated current	A	630	630	400/630
Closed loop	A	630	630	400/630
No load cable	A	30	30	30
Earth leakage fault	A	100	100	100
Internal arc 1 sec. IEC 62271-200 (5 criteria)	kA	20	20	20
Degree of protection				
HV-compartment		IP6X		
LV- and cable compartment		IP4X		
Rated gas pressure at 20°C	Bar	0.3 bar overpressure		
Line Feeder				
Rated current	A	630	630	630
Rated short time current 1 sec.	kA	25	20	12,5/16/20
Rated peak value of the current	kÂ	63	50	31,5/40/50
Transformer feeder				
Rated current	A	200	200	200
Fuse switch				
Short circuit breaking capacity (limited by the fuse)	kA	25	25	16/20
Making capacity	kÂ	63	63	40/50
Circuit breaker				
Short circuit breaking capacity 1 sec.	kA	25	20	20
Making capacity	kÂ	63	50	50

FUSE SELECTION TABLE

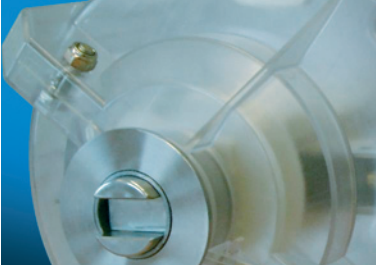
Standard	kV	Power of the distribution transformer (kVA)													
		100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000
UTE	10	16	16	31.5	31.5	31.5	63	63	63	63					
	15	16	16	16	16	16	43	43	43	43	43	63			
	20	16	16	16	16	16	16	43	43	43	43	43	63		
DIN 10	10	16	20	25	25	31.5	40	50	50	63	80	100	125		
	11	16	20	20	25	25	40	40	50	50	63	80	100	125	
DIN 20	13.8	10	16	16	20	25	31.5	40	40	50	50	63	100		
	15	10	10	16	20	25	31.5	31.5	40	50	50	63	80	100	
	20	10	10	16	16	20	25	25	31.5	40	40	63	63	80	100
	22	10	10	10	16	16	20	25	31.5	40	40	50	63	80	100

DESCRIPTION OF THE MAIN COMPONENTS OF THE DR-6C AND DR-6E

The DR-6 range offers a compact , safe, reliable and economical design, free of any possible environmental aggression. Extensions on site are at any time possible without any special tooling nor particular surrounding conditions.

The components

Load break switch



The three position load break switch (ON / OFF / Earth) is in accordance with the IEC requirements. The concept insures a natural interlock of the primary functions of the cubicle. The arc extinction is insured by the SF₆ gas, associated to a short arcing time due to an optimized opening speed of the mechanical drive and a patented arc blowing principle that combines optimal revolution of the gas with perfect electrical contacts. Deba's experience in the load break switch RV44 of the DF-2 range finds here a perfect application. It is of the class E3/M1 (100 CO and 1000 mechanical operations) following IEC 62271-103.

The fuse holders



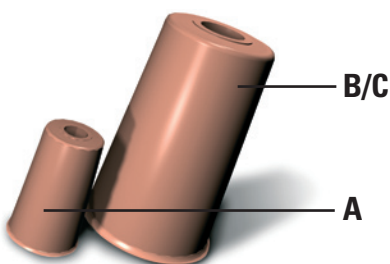
The fuse holders are made for HRC fuses of the DIN and UTE type for voltages of 10, 17,5 and 24 kV. A simple intelligent artifice allows the change without any particular tooling. Fuse holders are made from epoxy with a non-losable cover, and a fuse supporting structure firmly fixed to the cover. Earthing on both sides of the fuses is clearly marked on the synoptic diagram. The fuse holder is water tight and besides the IEC standard also tested in accordance with the EDF HN64-S-52 standards. The access to the fuse holders is facilitated by a simple and logic interlock system allowing the opening of the door only after earthing of the cubicle.

The mechanical drives



Deba Components mechanical drives have already been subject to intensive tests and usage in the DF-2 range of products. The same design has been implemented in the DR-6. The steel used for the drives has been chosen because of their high tensile force, toughness and resistance to bending. The mechanical drive accommodates both the operating axles (LBS and earth) and the interlocks. The spring type drive is operating independently of the operator and does not allow any function violation. The switch position indicator shows at any time the real status of the switch. The forces needed to control the mechanism are low which results in a high user-friendliness. The drive can be motorized and can receive a number of options, allowing remote control, remote position indication and integration into a SCADA operated network.

The table of the connection interfaces (cable and extension bus bars)



Type	Rated Current	Short circuit withstand
A	200 A	12,5 kA 1sec
B	400 A	16 kA 1 sec
C	630 A	25 kA 1 sec

Cable connection



The cables are connected to the cubicles by means of bushings with M16 screwed contacts and for connectors according to EN 50 181 / DIN 50 standards. They may be of the type A / B or C (200, 400 630A). They are defined in function of their applications. The cable compartment size allows one connector per bushing with a maximum of 400 mm² per cable (On request, lightning arrestors can also be accommodated in the cable box as well as two cables per bushing).

The extensibility concept



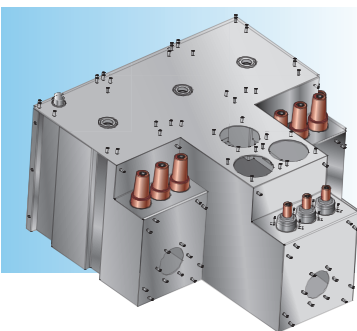
Extensibility of the ring main unit is ensured by top placed bushings of the C- type. An insulated and screened extension device connects the two sets to be extended. Extension requires no special tooling nor special on site condition. The bushings are directly molded on a stainless steel plate avoiding any risk of leakage caused by mechanical assembly.

The synoptic diagram and the accessories



A clear, logic and well understandable synoptic diagram is placed in front of each of the functions. This diagram also supports the voltage indicator of the type HR-2, showing the presence of the voltage on the cables and allowing the use of phase concordance units. Short circuit indicators can find their place in the LV compartment and the associated ring type CT's in the cable box. Complementary accessories can be accommodated in a well designed LV box to be placed on the top of the concerned function(s).

The enclosure

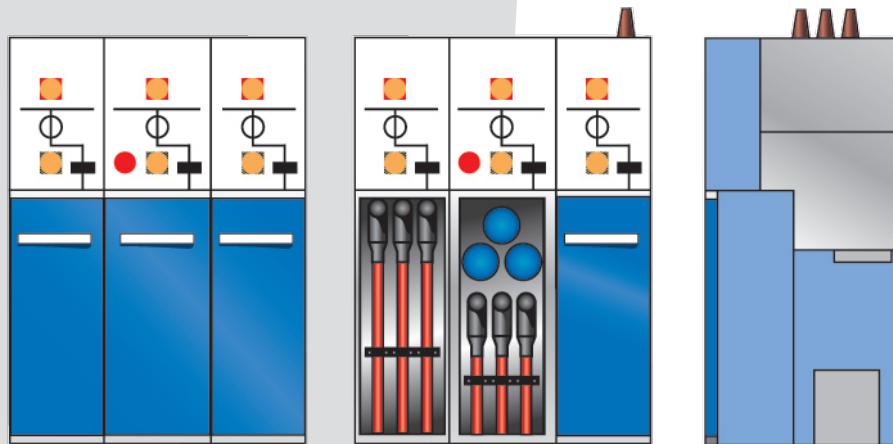


The stainless steel enclosure is manufactured on brand new, up to date machines associating lasercutting, robotised bending and 3-D laser welding. The welded tank is sealed for life and tested under vacuum, in strict conditions with experienced equipment. The enclosure accommodates the life components and is foreseen of a rupture disk avoiding any problem in the improbable case of an internal overpressure.

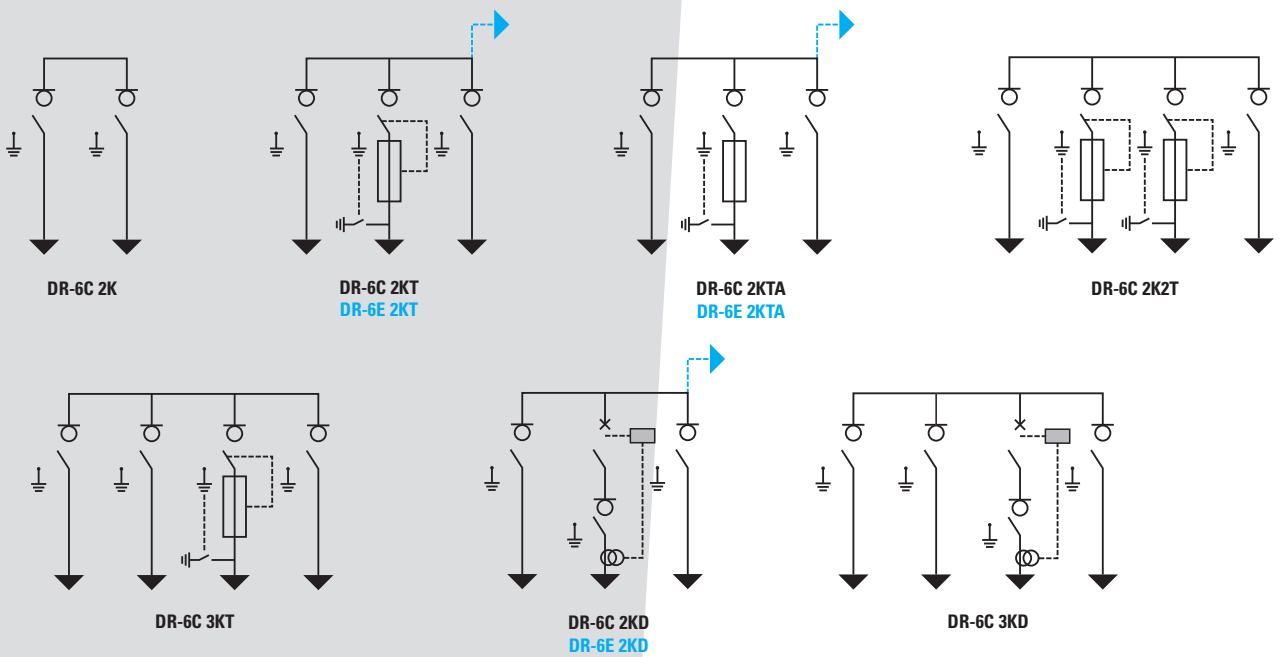
Applicable standards

IEC 62271-200	AC metal enclosed switchgear and controlgear above 1kV up to 52 kV
IEC 62271-102	HV AC disconnectors and earthing switches
IEC 62271-105	HV AC Fuse switch combination
IEC 62271-100	HV AC circuit breakers
IEC 62271-1	Common specifications for HV switchgear and controlgear
IEC 61243-5	Voltage detection systems (VDS)

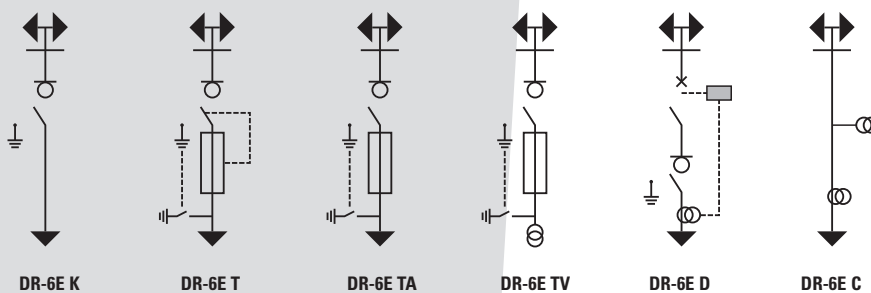
DESCRIPTION OF THE DR-6 RANGE



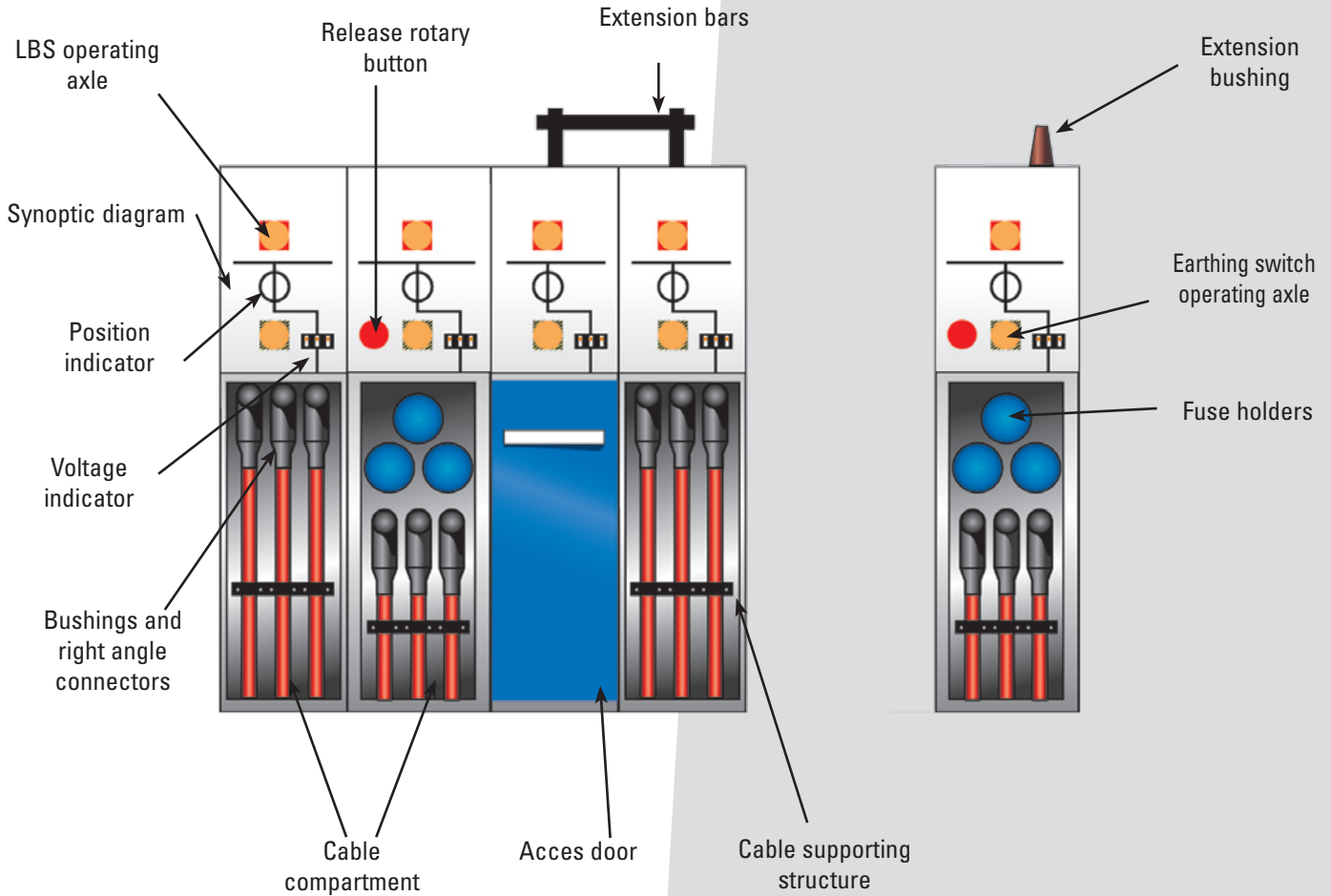
DR-6C /DR-6E COMPACT - NON EXTENSIBLE / EXTENSIBLE RING MAIN UNITS



DR-6E EXTENSIBLE FUNCTIONAL UNITS



DR-6 DIMENSIONS AND DESCRIPTIONS



DR-6C / DR-6E COMPACT - NON EXTENSIBLE/ EXTENSIBLE RING MAIN UNITS				
Type	Height	Width	Depth	Weight
DR-6C 2K	1400 mm	600 mm	720 mm	280 kg
DR-6C 2KT	1400 mm	950 mm	720 mm	450 kg
DR-6E 2KT	1400 mm	950 mm	720 mm	470 kg
DR-6C 2KTA	1400 mm	950 mm	720 mm	450 kg
DR-6E 2KTA	1400 mm	950 mm	720 mm	470 kg
DR-6C 2K2T	1400 mm	1300 mm	720 mm	640 kg
DR-6C 3KT	1400 mm	1250 mm	720 mm	600 kg
ODR-6C 2KD	1400 mm	950 mm	720 mm	530 kg
DR-6E 2KD	1400 mm	950 mm	720 mm	550 kg
DR-6C 3KD	1400 mm	1250 mm	720 mm	660 kg

DR-6E EXTENSIBLE FUNCTIONAL UNITS				
Type	Height	Width	Depth	Weight
DR-6E K	1400 mm	300 mm	720 mm	140 kg
DR-6E T	1400 mm	350 mm	720 mm	180 kg
DR-6E TA	1400 mm	350 mm	720 mm	170 kg
DR-6E TV	1400 mm	350 mm	720 mm	195 kg
DR-6E D	1400 mm	350 mm	720 mm	250 kg
DR-6E C	1400 mm	500 mm	720 mm	240 kg

FUNCTION DESCRIPTION

- K - Incoming/ outgoing cubicle
- T - Fuse protection cubicles (combined)
- TA - Fuse protection cubicles (associated)

- TV - Fuse protection cubicles (auxiliary voltage feeding)
- D - Circuit breaker cubicle
- C - Metering cubicle SF₆ insulated



SGC, the name of permanent safety in medium voltage

SGC supplies, since 30 years, reliable products for the distribution of electricity. Innovative thinking and environment sensibility are at SGC the most important drive. The use of a minimum of components is targeting in the development of efficient complete solutions having all an exceptional life expectancy.

The SGC organisation stands for high valuable quality and customer orientated strategy, whereby the customer specificities and his targets are our main concerns.

With the use of an exclusive machine park and production lines with a high automation degree, we are developing "state of the art" systems of which the DF-2, DR-6 and DF-3 are answering the highest quality standards.

We are making true what we are promising in the field of delivery times, prices and quality of products.



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