

Outdoor load disconnectors Fla 15/6400 Fla 15/6410

three-pole design
rated voltage 25 and 38.5 kV
rated current 400 and 630 A



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ISO 9001
BUREAU VERITAS
Certification



Outdoor load disconnectors Fla 15/6400 and Fla 15/6410

Outdoor load disconnectors, produced in accordance with the Driescher company's documentation, used for many years on high-voltage long-distance lines, have proven their high reliability and safety of operation. Load disconnectors are intended particularly for terminal branching in radial arrangement.

Load disconnectors satisfy standards EN 60129, EN 62271-1 and EN 60265-1. Used insulators satisfy the fourth grade of contamination area.

Simple load disconnectors of a sturdy structure proved themselves in an excellent way under very different climatic conditions.

The basic welded frame is made of open steel profiles that guarantee perfect surface protection from corrosion caused by heat zinc coating that can be controlled on all places. Heat zinc coating protects the shafts of the load disconnectors mounted in bronze bearings as well as all other steel components.

Switching takes place in a tightly closed extinguishing chamber, filled either with Shell Diala D transformer oil or biologically degradable Shell FLUID 4600 transformer oil.

With regard to this fact, Fla type load disconnectors meet the extreme environmental requirements.

The biological degradation ability of the Shell FLUID 4600 oil was tested and is guaranteed by the Deutsche Shell AG company. Measurements were carried out in accordance with the international methodics CEC-L-33-A.93.

The construction of the load disconnectors, the quality level of material used and care exercised in the production process, which is governed by the principles of the ISO 9001:2000 standard, is a guarantee for low operation and maintenance costs in the future.

Under normal operating conditions it is not necessary for the load disconnectors to undergo a preventive maintenance during the period of twenty years for hand operated devices and ten years for motor operated devices (remote control).

All current conduction components are made of silver plated electrolytical copper and constitute a loop less current conduction path.

The cross-section of the conductors on the current conduction path is sufficiently dimensioned. Appropriate contact pressures of the stainless steel springs ensure optimum prerequisites for faultless switching even after many years of the load disconnector operation under extreme operating conditions as well as under rime.

The load disconnectors are delivered with insulators made of a cycloaliphatic resin or porcelain.

The load disconnectors can be provided with earthing switches located on the under side. The use of earthing switches requires a double or triple drive with a sturdy blocking mechanism preventing incorrect handling. The number of pull rods and pendulum bearings is correspondingly increased.

Control of the load disconnectors and earthing switches is ensured by means of hand or motor outdoor drives.

The load disconnectors can be provided with encased auxiliary switches (IP 44 protection) installed directly on the frame of the device ensuring thus reliable switching-on and switching-off signalling.

The values of the short-circuit resistance are kept so as to ensure an adequately large reserve. These values apply both for the disconnectors and built-in earthing switches.

The load disconnectors can be optionally equipped with overvoltage limiters.

Technical data

Rated voltage	U _r	kV	25		38,5	
			Fla 15/6400	Fla 15/6410	Fla 15/6400	Fla 15/6410
Type load disconnector						
rated current	I _r	A	630	400	630	400
rated short-time current	I _k	kA ¹⁾	20	16	20	16
rated peak withstand current	I _p	kA	50	40	50	40
rated making current	I _{ma}	kA ²⁾		10		10
rated breaking current – cos φ 0,7	I ₁	A		630		400
rated breaking current of closed loop	I ₂	A		400		400
rated breaking current off unloaded transformer	I ₃	A		53		10
rated breaking current when switching - off unloaded cables	I ₄	A		20		20
rated breaking current of the earth fault	I _{6a}	A		56		40

¹⁾ In short circuit time „t“ in range from 1 to 5 seconds, it is necessary to multiply one second short-time current by factor $\frac{1}{\sqrt{t}}$.

²⁾ At a sufficiently quick hand control.

Withstand voltages of Fla 15/6400 and Fla 15/6410 load disconnectors

rated voltage	kV	25	38,5
rated short-time withstand power frequency voltage / 1min. to be applied in both dry and wet environmental conditions			
against the earth, across the poles and between disconnected contacts	kV	50	80
across the isolating distance	kV	60	90
rated lightning pulse withstand voltage			
against the earth, across the poles and between disconnected contacts	kV	125	180
across the isolating distance	kV	145	210

Climatic conditions

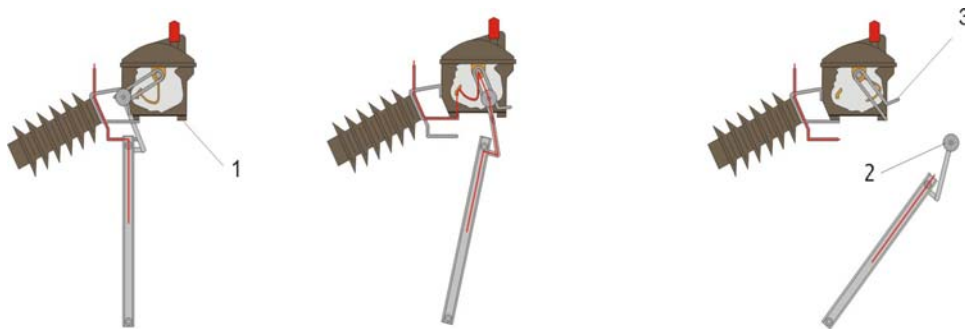
highest temperature	°C	+ 40
lowest temperature	°C	- 30
highest relative humidity	%	100
highest wind pressure	Pa (m/s)	700 (34)
admissible hoar frost	mm	20
typical altitude	m a. s.	up to 1000

Usages in higher altitudes please consult with producer.

Function description

Tried and tested oil extinguishing chambers, parallelly connected to the main circuit, are provided with a quick-action switching mechanism. The extinguishing chambers are of an adequately sturdy

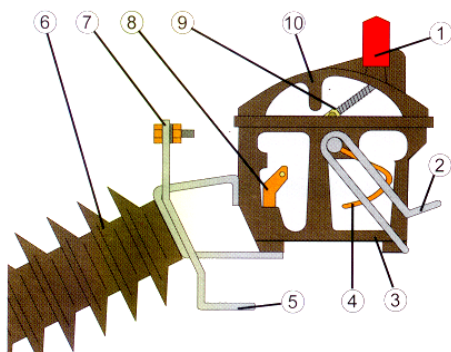
structure ensuring that their tightness remains undamaged even under extreme service conditions. Each extinguishing chamber is filled with a quantity of about 0,5 l of Shell Diala D or Shell Fluid 4600 oil.



The above drawings show the current flow during switching in switched-on position, intermediate position and switched-off position of the disconnector. The contact arm mounted on the pendulum bearing is provided, on its end, with two rollers (2) their concave sides being inwards oriented. The extinguishing chamber (1) is controlled by the stainless-steel forked contact (3). When controlling the switch, the roller both during switching-on and switching-off positively entrains

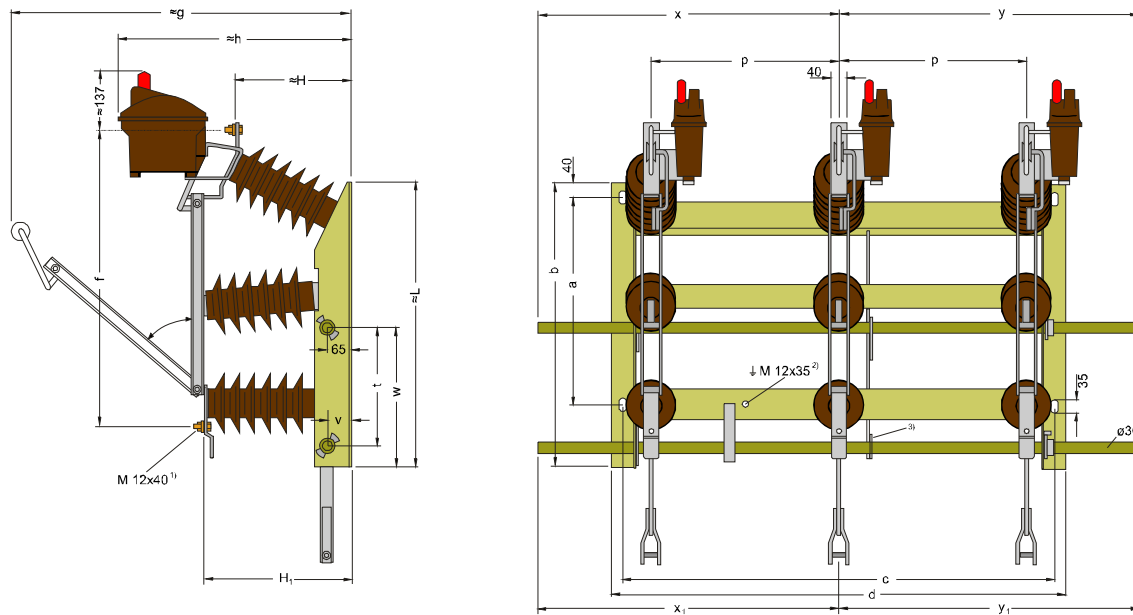
the fork. The snap-action mechanism connected with the said fork acts on the contact system inside the chamber and closes or opens immediately the contacts of the extinguishing chamber independently on the speed of the hand control. When switching-off, first of all the main contacts are opened and only after having achieved the safety switching-off distance the contact system inside the extinguishing chamber is opened by the snap-action mechanism.

Sectional view of the extinguishing chamber



1. closure of the filling opening with the gauge and the air release valve
2. control lever (made of stainless steel)
3. bottom part of the extinguishing chamber (sectional view)
4. contact rod
5. main contact
6. supporting insulator
7. connecting clamp with a screw
8. auxiliary contact
9. snap-action mechanism
10. upper part of the extinguishing chamber (sectional view)

Three-pole outdoor load disconnectors Fla 15/6400



- 1) Hexagon head screw with nut, washer and spring washer
- 2) Head screw with nut, washer and spring washer
- 3) Supporting bearing for earthing switch shaft only for rated voltage 38,5 kV

without earthing switch

Rated voltage kV	Rated current A	Part no.	a	b	c	d	f	≈ g	≈ h	≈ H	H ₁	p	v	x	y	Weight approx. [kg]
25	630	763 64003	550	760	1150	1210	793	905	620	311	392	500	375	800	800	104
38,5	630	763 94004	750	960	1550	1610	1044	1068	699	390	472	700	450	950	950	147

with earthing switch with mechanical locking

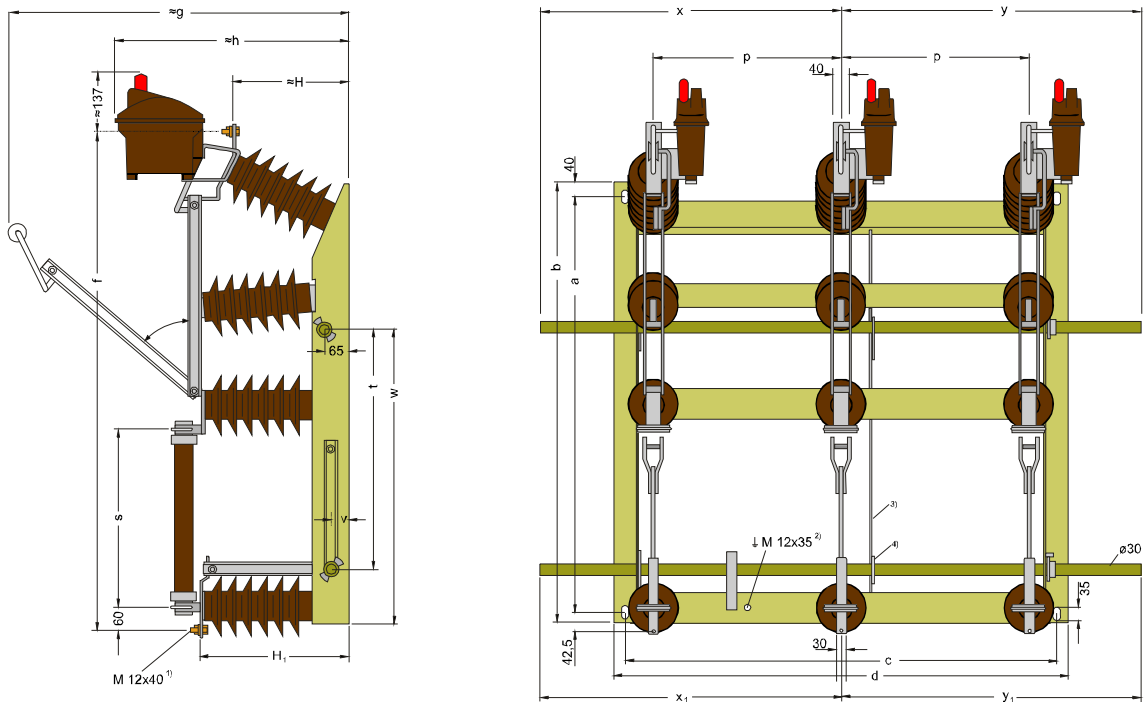
Rated voltage kV	Rated current A	Part no.	≈ L	t	v	x ₁	y ₁	Weight approx. [kg]	
25	630	763 64103	1017	315	65	for missing measures	800	800	119
38,5	630	763 94104	1297	390	65	see table above	950	950	165

The switching devices can further be complemented with the following auxiliary equipment:

- motor operated drives,
- auxiliary switches.

Three-pole outdoor load disconnectors Fla 15/6410

with fuse holders mounted upright below
for HV HBC fuses to 200 A rated current



- 1) Hexagon head screw with nut, washer and spring washer
- 2) Head screw with nut, washer and spring washer
- 3) Strut only for rated voltage 38,5 kV
- 4) Supporting bearing for earthing switch shaft only for rated voltage 38,5 kV

without earthing switch

Rated voltage kV	Rated current A	Part no.	a	b	c	d	f	≈g	≈h	≈H	H ₁	p	s	w	x	y	Weight approx. [kg]
25	400	763 56003	1105	1167	1150	1210	1330,5	905	620	311	392	500	475	782	800	800	133
38,5	400	763 86004	1400	1462	1550	1610	1676,5	1068	699	390	472	700	570	952	950	950	182

with earthing switch with mechanical locking

Rated voltage kV	Rated current A	Part no.	t	v	x ₁	y ₁	Weight approx. [kg]
24		763 56103	632,5	65	for missing measures		148
38,5		763 86104	802,5	65	see table above		200

The switching devices can further be complemented with the following auxiliary equipment:

- motor operated drives,
- auxiliary switches.

Arrangement of single and double actuators

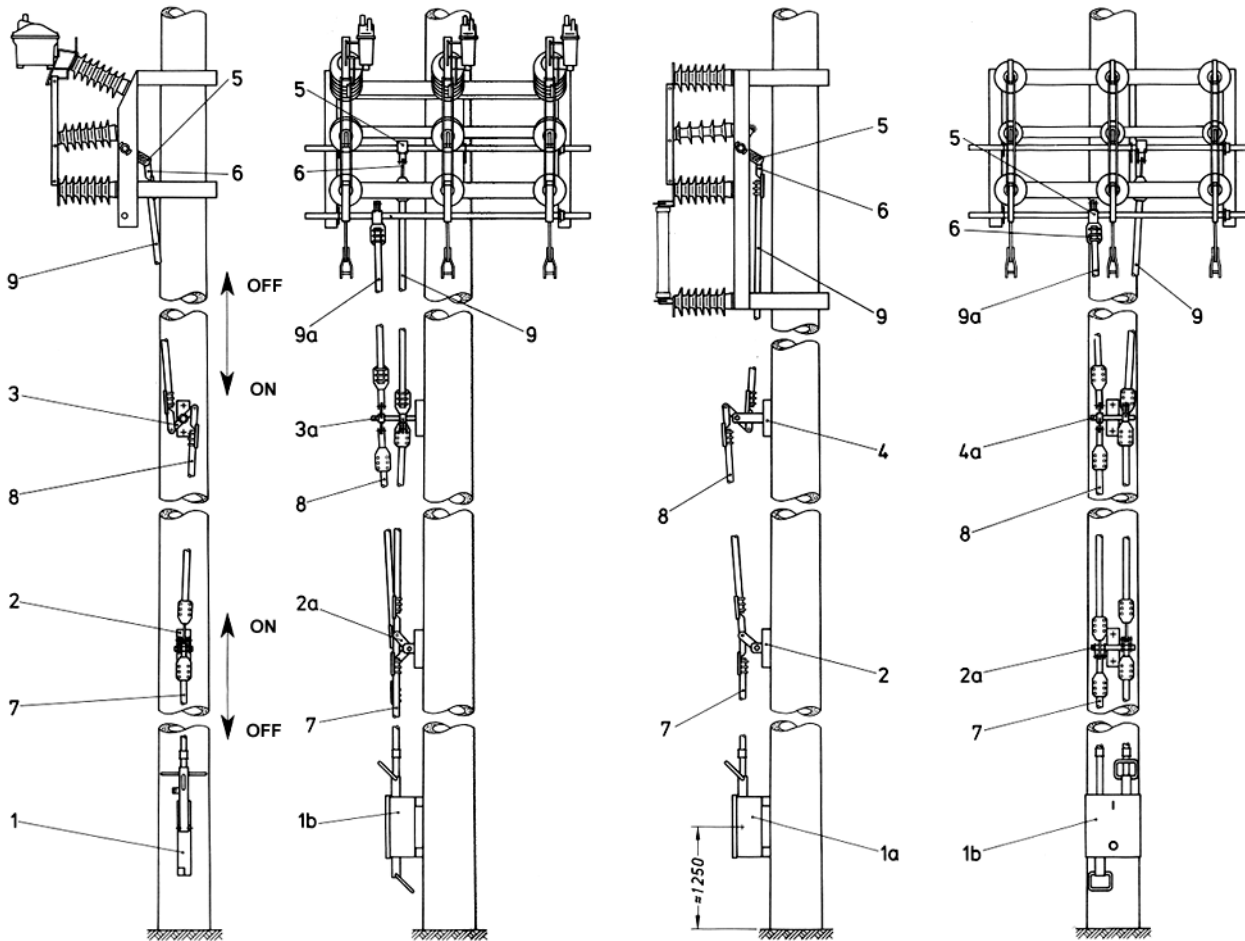
for outdoor load disconnectors Fla 15/6400 and Fla 15/6410

Figure 1

Figure 2

Figure 3

Figure 4



Figure

1. Load disconnector Fla 15/6400
2. Load disconnector Fla 15/6400 with earthing switch mounted below
3. 6410 with fuse holders mounted below
4. Disconnector 6400 with earthing switch mounted below

Item

- 1 Single-actuator L, stroke 140 mm
- 1a Single box-type actuator, stroke 110 or 140 mm
- 1b Double box-type actuator
- 2 Single intermediate bearing
- 2a Double intermediate bearing
- 3 Single reversible bearing
- 3a Double reversible bearing
- 4 Single reversible bearing
- 4a Double reversible bearing
- 5 Forked clamping crank (gauge from 73 to 132.5 mm; hole matrix 8.5 mm)
- 6 Single stub head (with link bush)
- 7 Lower linkage rod, with thread
- 8 Linkage rod
- 9 Upper linkage rod for isolator or load-break switch
- 9a Upper linkage rod for earthing switch

Earthing switch operating lever (left-hand lever) mechanically locked to the disconnector operating lever.