



VEIVACUUM F

MEDIUM VOLTAGE VACUUM CIRCUIT BREAKER
FOR PRIMARY DISTRIBUTION

UP TO 24kV 3150A 40kA



Fortum



IBERDROLA



Enel



Grupo Endesa



UNION FERROVA



S



E



T



TI



KEMA



CESI



ISO 9001
ISO 14001

ELECTRICAL FEATURES

Rated voltage	Ur[kV]	12	17,5	24
Dielectric withstand voltage to earth and between phases (50/60 Hz 1 min)	Ud[kV]	28	38	50
Impulse withstand voltage	Up[kV]	75	95	125
Rated frequency	fr[Hz]	50÷60	50÷60	50÷60
Rated current	Ir[A]	630-2500-3150	630-2500-3150	630-2500
Rated breaking capacity	Isc[A]	20-40	20-40	16-25
Rated short time withstand current 3 sec.	Ik[kA]	20-40	20-40	16-25
Making capacity	Ima[kA]	50-100	50-100	40-63
Operation sequence	-	O-0,3 sec. CO - 15 sec. CO		
Opening time	[ms]	50	50	50
Arcing time	[ms]	7÷12	7÷12	7÷12
Total breaking time	[ms]	57÷62	57÷62	57÷62
Closing time	[ms]	65	65	65
Normal ambient operating temperature	[°C]	-5°...+40°	-5°...+40°	-5°...+40°



VEIVACUUM F circuit-breaker

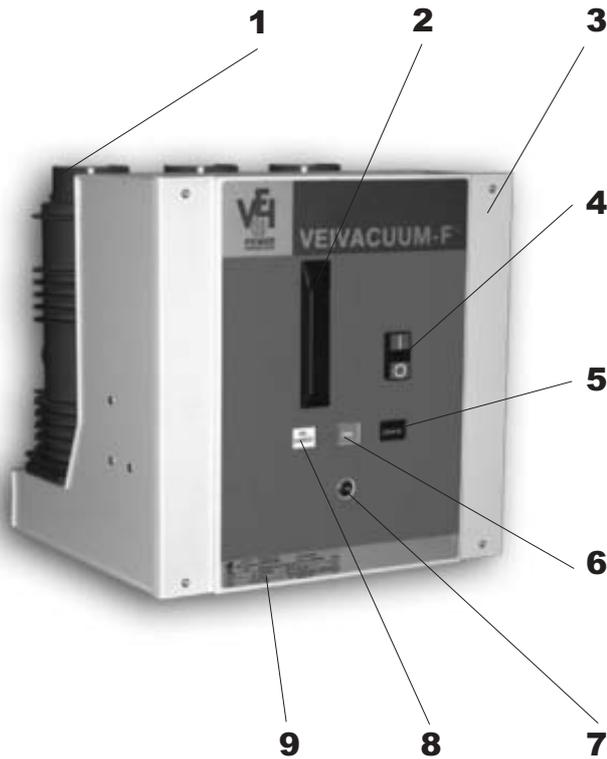
INNOVATION, CONTINUITY AND RELIABILITY

The new vacuum circuit-breaker series VEIVACUUM F is born from VEI's 40 years of experience and collaboration with the two most important MV circuit-breaker facilities in the world. The VEIVACUUM F medium voltage circuit-breakers use vacuum interrupters inserted in epoxy and polyester resin poles. The vacuum interrupter houses the contacts and makes up the interrupting chamber.

Current interruption in vacuum

The vacuum circuit-breaker does not require an interrupting and insulating medium. In fact, the interrupter does not contain ionisable material. In any case, on separation of the contacts a metal vapour arc is generated made up exclusively of melted and vaporised contact material. The metal vapour only remains supported by the external energy until the current is cancelled in the vicinity of natural zero. At that instant, the rapid reduction in the load density carried and the rapid condensation of the metallic vapour, leads to extremely rapid recovery of the dielectric properties. The vacuum interrupter therefore recovers the insulating capacity and the capacity to withstand the transient return voltage, definitively extinguishing the arc.

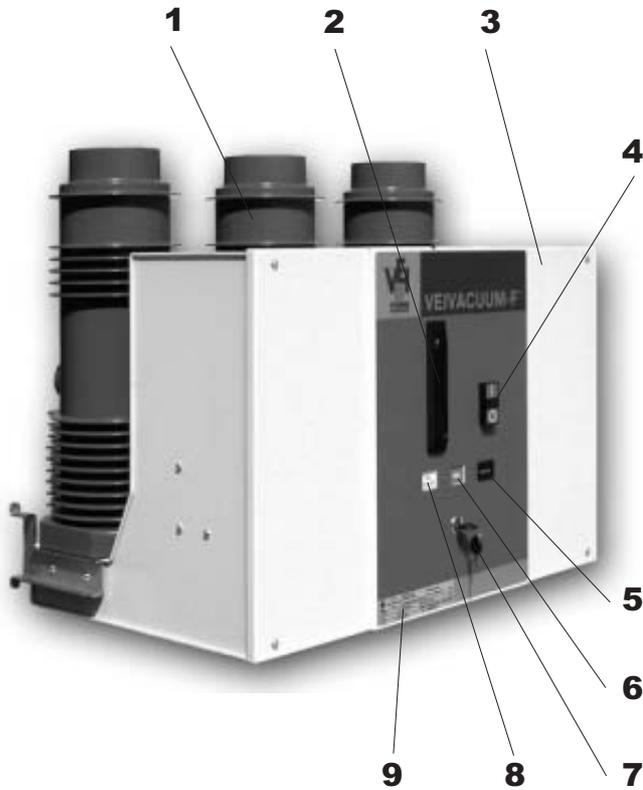




CIRCUIT-BREAKER (12kV)

- 1 - Pole insulator
- 2 - Charged manual lever
- 3 - Metallic frame
- 4 - Open/Close push button
- 5 - Operation counter
- 6 - Open/Close indicator
- 7 - Key lock
- 8 - Springs charged/discharged indicator
- 9 - Rating plate

VEIVACUUM F vacuum circuit-breaker 12kV



CIRCUIT-BREAKER (24kV)

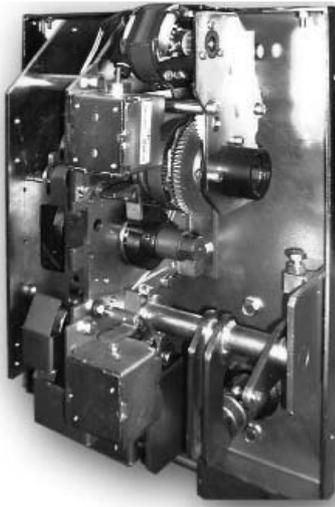
- 1 - Pole insulator
- 2 - Charged manual lever
- 3 - Metallic frame
- 4 - Open/Close push button
- 5 - Operation counter
- 6 - Open/Close indicator
- 7 - Key lock
- 8 - Springs charged/discharged indicator
- 9 - Rating plate

VEIVACUUM F vacuum circuit-breaker 24kV





Separate poles epoxy resin mounted on a robust metallic frame



Operating mechanism

CONSTRUCTIONAL FEATURES

The circuit breaker is constructed with three separate poles mounted on a robust metallic frame with the operating mechanism front mounted. The geometric configuration allows an easy and practical installation within the cubicles, with reduced dimensions. The poles are composed of a finned epoxy resin enclosure where the following is placed:

- fixed upper contacts
- Vacuum Interrupter
- connection to lower outgoing conductor
- insulation rods for the activation of the mobile contact in the Vacuum Interrupter

The extinguishing chamber is composed of a hermetic ceramic enclosure, in which inside is produced a high level of upper vacuum of 10^{-7} bar, where there occurs interruption of electric arc. The operating mechanism is of energy accumulation, free release, opening and closing operation of the independent type operator activation. It is possible to manoeuvre the remote operation of the circuit breaker by means of the assembly of the relative accessories (gearing motor, shunt opening release, etc...). The rated carrying capacity is of 630A and 2500A. The circuit breaker is supplied in two versions, fixed and withdrawable.

The operating mechanism

The VEIVACUUM F circuit-breakers use a mechanical operating mechanism, with stored energy and free release. These characteristics allow opening and closing operations independent of the operator. The mechanical operating mechanism is of simple conception and use and can be customised with a wide range of accessories which are easy and rapid to install. This simplicity converts into greater reliability of the apparatus. The ease of applying accessories makes circuit-breaker customisation possible during its whole lifespan in order to upgrade it to any new installation requirement.

The structure

The operating mechanism and the poles are fixed to a metal frame which is also the support for the fixed version of the circuit-breaker. The compact structure ensures sturdiness and mechanical reliability. Apart from the isolating contacts and the cord with plug for connection of the auxiliary circuits, the withdrawable version is completed with the truck for racking it into and out of the switchboard or enclosure with the door closed.

Versions available

The VEIVACUUM F circuit-breakers are available in the fixed and withdrawable version with front operating mechanism. The withdrawable version is available for type Veiclad switchboards.



Fields of application

Fields of application

The VEIVACUUM F circuit-breakers are used in electrical distribution for control and protection of cables, overhead lines, transformer and distribution substations, motors, transformers, generators and capacitor banks.

Standards and approvals.

The VEIVACUUM F circuit-breakers comply with the IEC 62271-100, CEI 17-1 file 1375 Standards and with those of the major industrialised countries.

The VEIVACUUM F circuit-breakers have undergone the tests indicated below and guarantee the safety and reliability of the apparatus in service in any installation.

Type tests: heating, withstand insulation at industrial frequency, withstand insulation at atmospheric impulse, short-time and peak withstand current, mechanical life, short-circuit current making and breaking capacity.

Individual tests: insulation of the main circuits with voltage at industrial frequency, auxiliary circuit and operating mechanism insulation, measurement of the main circuit resistance, mechanical and electrical operation.

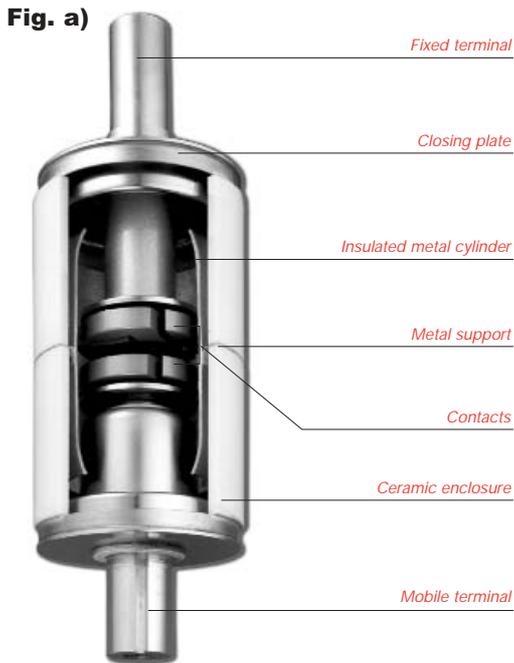


Fig. b)



Fig. c)

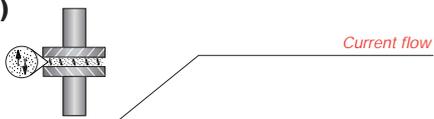
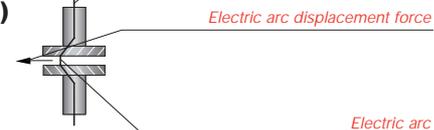


Fig. d)



FUNCTIONAL FEATURES

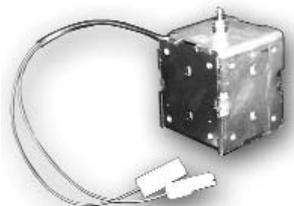
CIRCUIT BREAKER INTERRUPTION PRINCIPLE

The electric arc extinction takes place internally within a high level vacuum chamber ($<10^{-7}$ bar). The vacuum interrupter (Fig. a) is made up of a closed hermetic container.

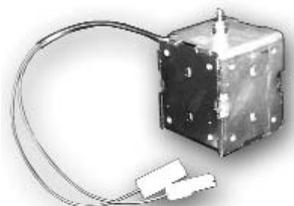
Within the container can be found a fixed contact, a mobile contact, a metal cylinder and metallic supports, which close the extremes of the bottle. The elevated dielectric rigidity of the vacuum allows for a very much reduced separation of the contacts (from 6÷14mm) (Fig. b). When the contacts separate, the current produces an electric arc that generates metallic vapours (or plasma). Through this plasma of metallic vapours flows the current until its following course through to zero, i.e. the moment of interruption.

At the moment of electric arc extinction, the metallic plasma, conductor, is absorbed by the contacts and in a minor part by the metallic cylinder which encircles them so that within a matter of microseconds insulation is regenerated. In the case of small current interruption (<10 kA) the electric arc is distributed uniformly over the entire contact surface avoiding localized overheating (Fig. c).

On the other hand, if the interruption current is of an elevated value (>10 kA) the electric arc roots concentrate themselves on a sole point of the contacts. To avoid excessive localized overheating with the formation of an elevated amount of metallic vapour, the contacts are produced in a constructive form so that, a radial magnetic field is generated, which interacting with the arc current provokes a rapid rotation of itself reducing the formation of metallic vapour to an acceptable level for reabsorption (Fig. d).



Shunt closing release



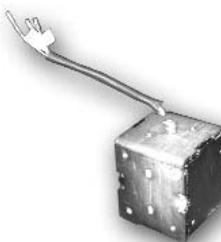
Shunt open release



Spring charging geared motor



Operation counter



Undervoltage release



Relay protection

SPARE PARTS

CONTACT FOR SIGNALLING CLOSING SPRINGS CHARGED OR DISCHARGED (S33M)

Connected in an electric circuit, this signals the state of the operating mechanism closing springs. It is available in two alternative versions:

- Contact for signalling springs charged
- Contact for signalling springs discharged

SHUNT CLOSING RELEASE (YC)

This is an electromechanical device with an electromagnet that, when energised, operates the release lever of the operating mechanism, closing the circuit-breaker. The circuit-breaker operating mechanism is fitted with an antipumping device as standard.

(*) Voltage	Asorbed power rush
24 V - c.c.	300 W
48 V - c.c.	300 W
110 V - c.c.	300 W
220 V - c.c.	300 W
110 V~ - 50 Hz	300 VA
220 V~ - 50 Hz	300 VA
110 V~ - 60 Hz	300 VA
220 V~ - 60 Hz	300 VA

SHUNT OPEN RELEASE (YO)

This is an electromechanical device with an electromagnet that, when energised, operates the release lever of the operating mechanism, open the circuit-breaker.

(*) Voltage	Asorbed power rush
24 V - c.c.	300 W
48 V - c.c.	300 W
110 V - c.c.	300 W
220 V - c.c.	300 W
110 V~ - 50 Hz	300 VA
220 V~ - 50 Hz	300 VA
110 V~ - 60 Hz	300 VA
220 V~ - 60 Hz	300 VA

SPRING CHARGING GEARED MOTOR (M)

Charges the operating mechanism springs automatically after a closing cycle.

(*) Voltage	Asorbed power continual rush
24 V - c.c.	700 W 100 W
48 V - c.c.	700 W 100 W
110 V - c.c.	700 W 100 W
220 V - c.c.	700 W 100 W
110 V~ - 50 Hz	1050 VA 150 VA
220 V~ - 50 Hz	1050 VA 150 VA
110 V~ - 60 Hz	1050 VA 150 VA
220 V~ - 60 Hz	1050 VA 150 VA

OPERATION COUNTER

This is a mechanical device installed on the operating mechanism. It carries out overall counting of the closing-opening cycles of the circuit-breakers.

UNDERVOLTAGE RELEASE

This is a device which opens the circuit-breaker when the auxiliary power supply voltage drops (35%) or falls. It is available in the following versions.

- Undervoltage release with power supply branched on the supply side of the circuit-breaker
- Undervoltage release with power supply branched on the load side of the circuit-breaker.

(*) Voltage	Asorbed power continual rushe
24 V - c.c.	150 W 15 W
48 V - c.c.	150 W 15 W
110 V - c.c.	150 W 15 W
220 V - c.c.	150 W 15 W
110 V~ - 50 Hz	180 VA 25 VA
220 V~ - 50 Hz	180 VA 25 VA
110 V~ - 60 Hz	180 VA 25 VA
220 V~ - 60 Hz	180 VA 25 VA

TRIPLE PHASE TOROIDAL TRANSFORMER

It can be supplied in the following configurations:

Model CT3; for the survey of the phase currents and 50-51 protection functions.

Model CTO3; like model CT3 in addition incorporated toroid for the survey of homopolar fault currents and 51N protection.

FEATURES

Primary rated current from	40A up to 400A
Secondary rated current	1A
Performance	2,5VA
Precision class	5P10
Differential rated current	1,3A
Withstand voltage of 50Hz	3kV60s
Rated frequency	50-60Hz
Rated insulation level	0,72kV
Standards	CEI EN 60044-1
Dimensions in (mm)	L=400 P=160 H=130

PROTECTION RELAY

Monitors the tripping of the circuit-breaker for functions of:

- short circuit (50)
- overcharging (51)
- earth fault (51N)

The possible configurations are:

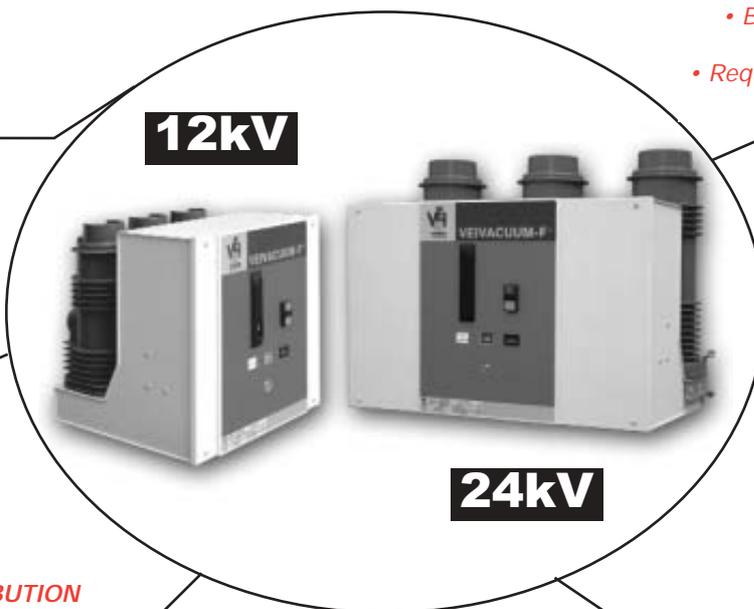
- with function 50/51 combined with VEI CT3 transformer
- with function 50/51-51N combined with VEI CTO3 transformer

(*) For other supply voltage ask VEI

**EASY AND SAFE
TO OPERATE**

**EASY
INSTALLATION**

**SATISFIES ALL DISTRIBUTION
REQUIREMENTS**



- Breaking vacuum technique
 - Short arcing time
 - Requires less operating energy
- HIGH RELIABILITY**

- 100 interruptions at maximum power
 - 30000 mechanical operations
- LONG LIFE**

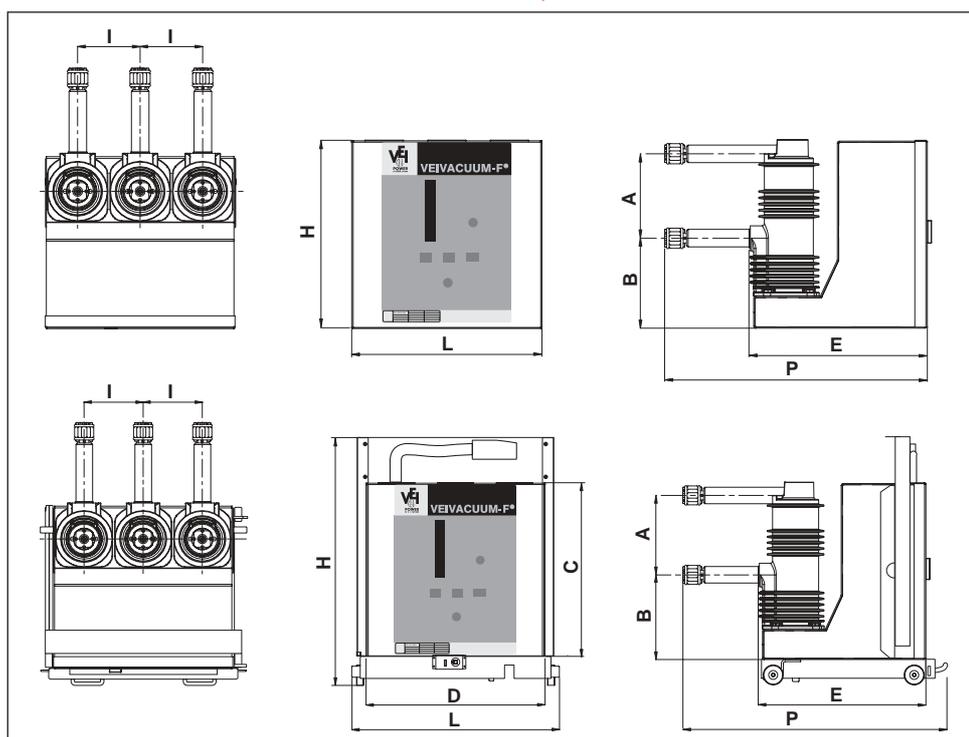
**MECHANICAL TRIP-FREE
OPERATING
MECHANISM**

OVERALL DIMENSIONS

(Dimensions expressed in mm)

*VEIVACUUM F
circuit-breaker
fixed version*

*VEIVACUUM F
circuit-breaker
withdrawable version*

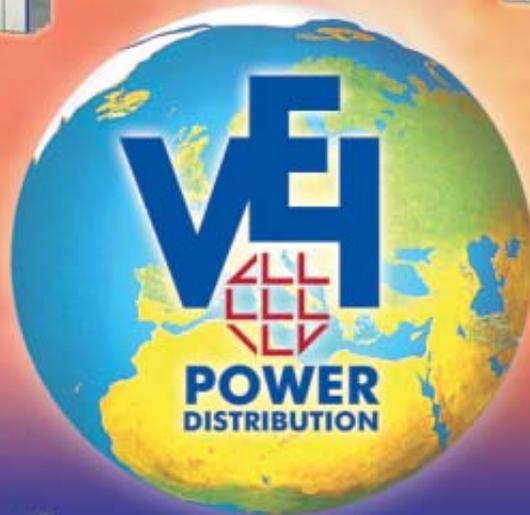


Rated voltage	A	B	C	D	E	H	I	L	P
12-17,5 kV									
fixed version	203,5	216,5	-	-	426	452,5	150	455	609
withdrawable version	203,5	266,5	452,5	455	426	624	150	531	662
24 kV									
fixed version	267,5	282,5	-	-	431	452,5	275	708	749
withdrawable version	267,5	332,5	452,5	708	431	775	275	853	802

SWITCHES - CIRCUIT BREAKERS SWITCHGEAR

3/36 kV - 400/3150 A - 12,5/40 kA
AIR - SF6 - VACUUM

ITALIAN LEADER IN MEDIUM VOLTAGE
40 YEARS OF EXPERIENCE AT YOUR SERVICE



MODULARC
Modular system
with SF6 LBS LARC
36 kV

UNISARC
Modular system
with air LBS ISARC
12/24 kV

LARC
SF6 insulated LBS
36 kV

UNIFLUVAC
Metal-clad switchgear with
vacuum circuit-breaker
gas insulated type FLUVAC
12/24 kV

UNIFLUORC
Modular system
with SF6 LBS FLUORC
12/24 kV

FLUVAC
Vacuum circuit breaker,
disconnecter and earthing switch
up to 24 kV

FLUORC
SF6 insulated LBS
12/24 kV

VEIVACUUM L
Medium voltage
vacuum
circuit breaker
12/24 kV

FLUSARC
SF6 insulated RMU
12/24/36 kV

FLUSARC F
SF6 gas insulated
RMU outdoor
36 kV

FLUSARC PLA
SF6 insulated
outdoor LBS
12/24 kV

VEIVACUUM F
Medium voltage
vacuum circuit breaker
12/24 kV

FLUCOMP
SF6 LBS earth systems
for primary substation
12/24 kV

VEICLAD
Air insulated Metal-Clad
12/24 kV

MOBILE CONTAINER
FOR PRIMARY SUBSTATION - 50 MVA



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