## Technical data sheet

## LF circuit breaker is used to protect and control MV public or industrial distribution network.

LF is an indoor switchgear
■ Rated voltage from 7.2 to 17.5 kV
■ Rated short-circuit breaking current up to 50 kA
■ Rated normal current from 630 to 3150 A .
LF is available in 2 versions:
■ Withdrawable with MC cassette
■ Fixed: can be completed by kits and delivered in separate components.

## SF6 breaking up to 17.5 kV



## Conformity with standards

- IEC 62 271-1: common specifications for high voltage switchgear and controlgear standards
- IEC 62 271-100: high voltage alternating current circuit breaker
- IEC 62 271-200 (previously IEC 60298): AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV .


## Certification

■ By independent laboratories in accordance with ISO/IEC 17025 and EN 45011 standards
■ Our factories implement a quality system certified to ISO 9001: 2000 and ISO 14000 standards by IQNET.

## Installation

- Fixed
- Designed for retrofit

■ MC cassette can be delivered separately.

## Operation

■ The operating mechanism is identical to that of the Schneider Electric SF6 MV circuit breaker SF ranges

- Metal protection shutter on cassette
- Racking in/out operation possible in the cubicle with the door closed.
- A position indication device by mechanical indicator (black and white)

■ A double contact pressure switch is activated when the gas pressure reduces below:
$\square$ 1st stage: 0.18 Mpa (relative pressure: 1.8 bar )
$\square$ 2nd stage: 0.1 Mpa (relative pressure: 1 bar )

## A full range of accessories and auxiliaries factory-mounted or delivered separately

- Electric motor (M)
- Undervoltage release (YM)
- Shunt opening releases (YO1, YO2)
- Low energy release (MITOP)
- Shunt closing release (YF)
- Auxiliary contacts
- Operations counter

■ Locking by padlocks and/or keylocks/sealing.


Electrical characteristics according to IEC 62271-100

| LF fixed |  |  |  |
| :---: | :---: | :---: | :---: |
| Rated voltage | Ur | kV 50/60 Hz |  |
| Insulation level |  |  |  |
| - power frequency withstand | Ud | kV 50 Hz 1 min (*) |  |
| - lightning impulse withstand | Up | kV peak |  |
| Rated current | Ir | A | 630 |
|  |  |  | 1250 |
|  |  |  | 2000 |
|  |  |  | 2500 |
|  |  |  | 3150 |
| Short circuit current | Isc | kA |  |
| Short time withstand current | lk/tk | kA/3 s |  |
| Short-circuit making current | Ip | Peak kA | 50 Hz |
|  |  |  | 60 Hz |
| Rated switching sequence |  | O-3 min-CO-3 min-CO |  |
|  |  | O-0.3 s-CO-3 min-CO |  |
|  |  | O-0.3 s-CO-15 s-CO |  |

LF withdrawable (circuit breaker/cassette)

| Rated voltage | Ur | kV 50/60 Hz |  |
| :---: | :---: | :---: | :---: |
| Insulation level |  |  |  |
| - power frequency withstand | Ud | kV 50 Hz 1 min (*) |  |
| - lightning impulse withstand | Up | kV peak |  |
| Rated current | Ir | A | 630 |
|  |  |  | 1250 |
|  |  |  | 1600 |
|  |  |  | 2500 |
| Short circuit current | Isc | kA | 3150 |
| Short time withstand current | Ik/tk | kA/3 s, kA/1 s |  |
| Short-circuit making current | Ip | Peak kA |  |
|  |  |  | 50 Hz |
| Rated switching sequence |  | O-3 min-CO-3 min-CO | 60 Hz |
|  |  | O-0.3 s-CO-3 min-CO |  |
|  |  | O-0.3 s-CO-15 s-CO |  |
|  |  | O-0.3 s-CO-15 s-CO |  |



| Common characteristics |  |  |
| :--- | :--- | :--- |
| Operating times | Opening ms | $<54$ |
|  | Breaking ms | $<70$ |
|  | Closing ms | $<72$ |
| Service temperature | ${ }^{\circ} \mathrm{C}$ | -25 to +40 |
| Mechanical endurance | Class | M 2 |
|  | Number of switching operations | 10,000 |
| Electrical endurance | Class | E 2 |
| Capacitive current breaking capacity | Class | C 2 |

(*) Ud 42 kV 50 Hz , 1 min possible
(**) Rated short-circuit breaking duration (tk): 1 s
Available

- Not available

| LF2 |  |  |  |  |  |  |  |  | LF3 |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 7.2 |  |  |  | 12 |  |  | 17.5 |  | 7.2 |  |  |  | 12 |  |  |  | 17.5 |  |  |
| 20 |  |  |  | 28 |  |  | 38 |  | 20 |  |  |  | 28 |  |  |  | 38 |  |  |
| 60 |  |  |  | 75 |  |  | 95 |  | 60 |  |  |  | 75 |  |  |  | 95 |  |  |
| $\square$ | $\square$ |  |  | $\square$ |  |  | $\square$ | ■ | - | - | - | - | - | - | - | - | - | - | - |
| $\square$ | $\square$ |  |  | $\square$ |  |  | $\square$ | $\square$ | - | - | - | - | - | - | - | $\square$ | - | - | $\square$ |
| $\square$ | $\square$ |  |  | $\square$ |  |  | $\square$ | $\square$ | - | - | - | - | - | - | - | - | - | - | - |
| - | - |  |  | - |  |  | - | - | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| - | - |  |  | - |  |  | - | - | - | $\square$ | $\square$ | $\square$ | - | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| 40 | 50 |  |  | 40 |  |  | 25 | 31.5 | 25 | 31.5 | 40 | 50 | 25 | 31.5 | 40 | 50 | 25 | 31.5 | 40 |
| 40 | 50 |  |  | 40 |  |  | 25 | 31.5 | 25 | 31.5 | 40 | 50 | 25 | 31.5 | 40 | 50 | 25 | 31.5 | 40 |
| 100 | 125 |  |  | 100 |  |  | 63 | 79 | 63 | 79 | 100 | 125 | 63 | 79 | 100 | 125 | 63 | 79 | 100 |
| 104 | 130 |  |  | 104 |  |  | 65 | 82 | 65 | 82 | 104 | 130 | 65 | 82 | 104 | 130 | 65 | 82 | 104 |
| $\square$ | - |  |  | ■ |  |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| $\square$ | $\square$ |  |  | $\square$ |  |  | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | - |
| ■ | ■ |  |  | $\square$ |  |  | - | - | $\square$ | $\square$ | - | $\square$ | - | $\square$ | $\square$ | ■ | $\square$ | $\square$ | - |
| LF2/MC2 |  |  |  |  |  |  |  |  | LF3/MC3 |  |  |  |  |  |  |  |  |  |  |
| 7.2 |  |  |  | 12 |  |  | 17.5 |  | 7.2 |  |  |  | 12 |  |  |  | 17.5 |  |  |
| 20 |  |  |  | 28 |  |  | 38 |  | 20 |  |  |  | 28 |  |  |  | 38 |  |  |
| 60 |  |  |  | 75 |  |  | 95 |  | 60 |  |  |  | 75 |  |  |  | 95 |  |  |
| - | - | $\square$ | - (**) | - | - | - | $\square$ | $\square$ | - | - | - | - | - | - | - | - | - | - | - |
| - | - | $\square$ | -(**) | - | - | $\square$ | $\square$ | $\square$ | - | - | - | - | - | - | - | - (**) | - | - | $\square$ |
| $\square$ | $\square$ | $\square$ | - (**) | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | - | - | - | - | - | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - | - | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | ■ | $\square$ | $\square$ | $\square$ |
| - | - | - | - | - | - | - | - | - | - | $\square$ | $\square$ | $\square$ | - | $\square$ | $\square$ | $\square$ | $\square$ | - | - |
| 25 | 31.5 | 40 | 50 | 25 | 31.5 | 40 | 25 | 31.5 | 25 | 31.5 | 40 | 50 | 25 | 31.5 | 40 | 50 | 25 | 31.5 | 40 |
| 25 | 31.5 | 40 | 50 (**) | 25 | 31.5 | 40 | 25 | 31.5 | 25 | 31.5 | 40 | 50 | 25 | 31.5 | 40 | 50 | 25 | 31.5 | 40 |
| 63 | 79 | 100 | 125 | 63 | 79 | 100 | 63 | 79 | 63 | 79 | 100 | 125 | 63 | 79 | 100 | 125 | 63 | 79 | 100 |
| 65 | 82 | 104 | 130 | 65 | 82 | 104 | 65 | 82 | 65 | 82 | 104 | 130 | 65 | 82 | 104 | 130 | 65 | 82 | 104 |
| $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | - |
| $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | - | $\square$ | - | - |

## Specific applications

## Protection of generators and power station auxiliaries

All circuit breakers in the LF range break short circuit currents with an asymmetry of at least $30 \%$.
In cases where the network constant $X / R$ is greater than 45 ms , the asymmetry to be broken is higher; this is often the case of circuit breakers protecting nuclear or thermal power station auxiliaries or circuit breakers that are close to generator sets or large transformers.
Specific tests have been carried out:

| Circuit breakers | kV | kA | Asymmetry |
| :--- | :--- | :--- | :--- |
| LF2 | 7.2 | 43.5 | $50 \%$ |
| LF3 | 7.2 | 43.5 | $50 \%$ |
|  | 12 | 40 | $50 \%$ |
|  | 17.5 | 25 | $100 \%$ |

Switching and protection of capacitor banks
LF range circuit breakers are particularly well suited to switching and protection of capacitor banks; they are classed C2 according to standard IEC 62271-100. Tests carried out according to the standard for breaking at 400 A with making and breaking cycles in case of a capacitor bank with a making current of 20 kA . Additional tests have been carried out: please consult us.

## Dimensions and weights

Device
Basic fixed


Basic withdrawable


