

Fusesaver™ medium-voltage circuit breaker

Now with 6.3 kA fault interrupting and Open-Close-Open functionality (O-CO)

Description

Able to interrupt faults up to 6.3 kA, Fusesaver is a new class of intelligent, compact and low cost single-phase circuit breakers that minimize lost customer minutes by protecting lateral line fuses from blowing on transient faults. About 80 percent of a rural network's faults are transient, with the result that 80 percent of its fuses are blown unnecessarily, causing downstream customers to lose power and requiring a line crew to inspect the line and replace the fuse link.

At only 12 lbs (5.5 kg), Fusesaver is extremely light and hangs directly from the medium-voltage line or crossarm. Easily handled by one operator, installation can be completed in less than 30 minutes per phase.

Fusesaver can be connected in series with a partner fuse or replace the fuse completely to clear transient faults and lockout on permanent faults.

With on-board microprocessor control and wireless connectivity, Fusesaver has configurable protection, multi-phase operation functions, on-board event history and can be integrated into a SCADA system for remote control.

Fusesaver can detect, open and clear a fault in one cycle or less, normally clearing at the first current zero after contact part, which is less time than it takes the fuse to melt for moderate faults. After a predefined dead time, the Fusesaver automatically closes, reconnecting the supply. If the fault is transient, the load is unaffected. If the fault is permanent, Fusesaver then either allows the fuse to operate (OC mode) or locks out (O-CO mode).

To address reliability, operator safety, and fire prevention concerns, many utilities worldwide have chosen to remove fuses from their overhead network entirely. Fusesaver with O-CO functionality allows fuses to be replaced while maintaining network protection.

As the fuse is no longer necessary to clear a permanent fault, Fusesaver with O-CO functionality is the ultimate fuse saver as the fuse is not required at all. If fuse protection is desired, however, Fusesaver can be configured to operate with a partner fuse.

O-CO protection

Each "O" of the O-CO can be set with either the normal or fast time-current curve. The first open of a sequence can be configured to be as fast as a half-cycle clearing time (8.3 ms) after contact part. This is also true when in a single-shot protection mode.

Load breaking capability

Fusesaver minimizes consumer disruption when operated by being able to break line currents up to 200 A. Disruption of an operation is limited by not having to unload or de-energize the line.

Operate and reconfigure with wireless connectivity

Local operation, real-time line current monitoring, and device settings are accessed using a wirelessly connected laptop with Siemens Connect application installed. Should load characteristics and protection requirements change, Fusesavers can be reconfigured while in service without needing a bucket truck. Operator safety is improved by allowing time to clear the area before the Fusesaver operates.

Load profile and event log

Greater network knowledge is gained from a data logger that captures minimum, maximum, and average load current daily.

Important reliability indices such as System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI) can be calculated using the outage and fault operation statistics stored in Fusesaver. To assist troubleshooting and fault analysis, an event log stores up to 3,000 operator, network, and fault events.

SCADA connectivity

Remote control and monitoring over SCADA is possible with the optional remote communications unit, which connects wirelessly to the Fusesavers. Space is provided for radio installation. Using DNP3 over serial or IP, Fusesaver can be operated remotely and provide status and alarms using report-by-exception. Integrated battery backup ensures the unit remains operational for more than 48 hours in the event auxiliary supply is lost.

Feature	Unit	Data					
Rated voltage	kV	15.5			27.6		
Rated current	A	100	200	200	100	200	200
Partner fuse ratings	A	≤50	≤100	≤100	≤50	≤100	≤100
Rated short-circuit breaking current, symmetrical	kA	4	4	6.3	4	4	6.3
Rated short-circuit making current, peak	kA	10	10	16	10	10	16
Rated short-time current duration	s	0.2	1	0.5	0.2	1	0.5
Fault-break operations at 100%		70	70	30	70	70	30
Minimum line current for operation	A	0.5	1.0	1.0	0.5	1.0	1.0
Rated lightning-impulse withstand voltage	kV	110	110	110	125	125	125
Minimum tripping current (configurable)		0.5x fuse rating					
Rated operating sequence		O-2 s-CO/O-1 s-C					
Mechanical operations		2,000					
Rated frequency	Hz	50/60					
Weight	lbs/kg	12.1/5.5					

Feature	Description
O-CO reclose sequence	The Fusesaver with O-CO functionality is capable of closing onto a fault, detecting the fault current and tripping again. Further, the Fusesaver with O-CO functionality runs protection even when a line is de-energized such that if a fault occurs it will trip with a single shot protection mode.
Normal and fast curves configurable for all protection operations	The Fusesaver with O-CO functionality maintains two fully configurable protection curves that can be applied to any protection trip.
Protection mode control improvements	The user now has much greater configurability of protection functionality depending upon status of the external lever. Not only can the protection curve be changed, but also the protection sequence and the three phase lockout and pseudo three phase trip functions can be enabled or disabled. The protection sequence can be configured to OFF, single shot or O-CO and this can be changed via SCADA control if a remote control unit (RCU) is installed.
Thermal-overload protection	Provides self protection against excessive load current. Thermal-overload protection is always active.
Fault-passage indication functionality	When a Fusesaver trips to lockout on a permanent fault, the LED of the communications module will blink every three seconds for a user defined period of time up to seven hours.
Radio-communications encryption	Encryption has been added to the peer-to-peer communications.
Increased battery capacity	The battery capacity in the communications module has been increased to improve service life.
Capacity charging configurability	The user can now configure whether the capacitor charge shall always default to the battery when a communications module is fitted. This increases the battery life on lines with extreme numbers of line-current off events.
-40 °F (-40 °C) operation	The Fusesaver with O-CO functionality low-temperature operating range has been extended to -40 °F (-40 °C).

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