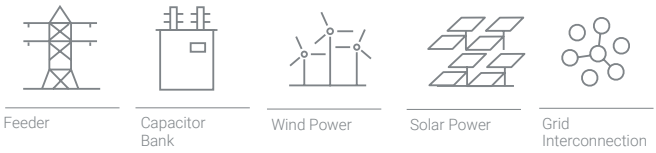
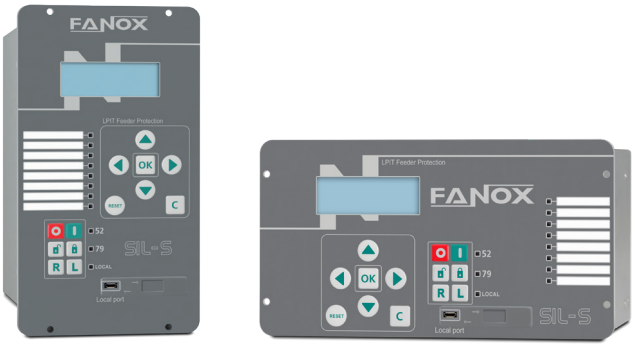
SIL-S

FEEDER PROTECTION RELAY WITH CURRENT & VOLTAGE SENSORS

Primary & Secondary Distribution Protection



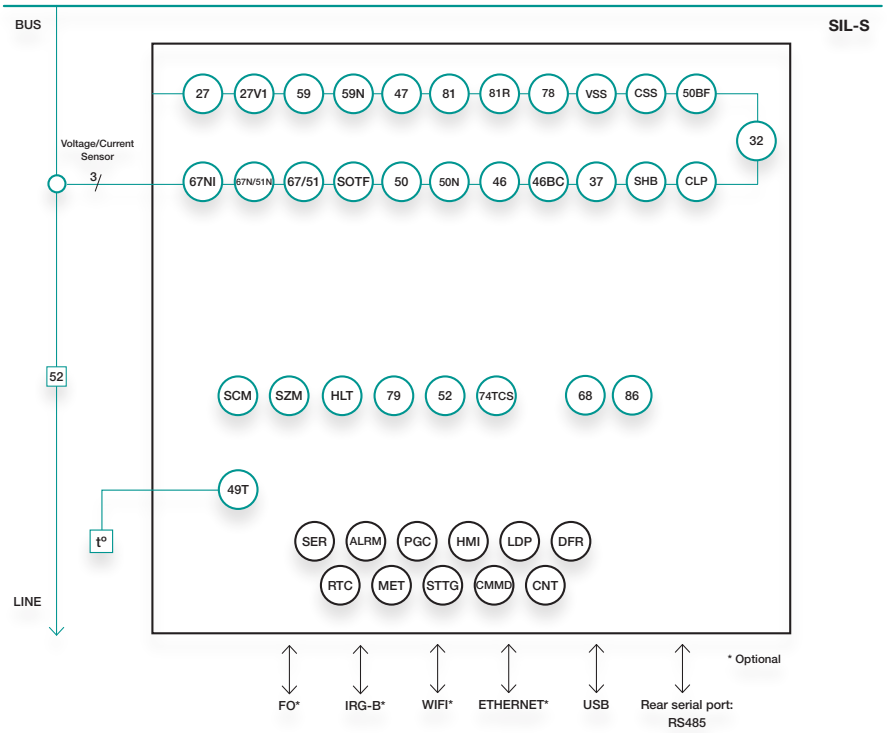
PM I V f CI Current sensors VI Voltage sensors



G99 Compliant

- The SIL-S is a feeder relay with current, voltage, and frequency functions for primary and secondary distribution designed to work with LPIT technology (Low Power Instrument Transformers).
- Auxiliary power supply of 24- 230 Vdc/ac
- 3 combined current/voltage channels for current sensors (LPCT and Rogowski) and capacitive and resistive low power voltage sensors (LEA).
- Metallic box with high electromagnetic compatibility level (EMC) and wide range of operating temperature.
- Protection of decoupling, load shedding, and loss of main (islanding). Loss of Main (islanding) occurs when part of the public utility network loses connection with the rest of the system. If this situation is not detected, then the generator could remain connected, causing a safety hazard within the network. Automatic reconnection of the generator to the network may occur, causing damage to the generator and the network. SIL-S protection relay detects this situation thanks to its voltage and frequency functions focused on the Rate of change of frequency (ROCOF) method.
- Signaling/control of the circuit breaker (52 function) and the recloser (79 function).
- In case a CB is manually closed, a switch on to an existing fault may occur. This fault condition is critical if the overcurrent protection function does not clear the fault until the adjusted time delay is finished. It is necessary, in those cases, to clear the fault quickly by means of the SOTF function.
- To allow the communication, relays are provided with a local micro-USB front port and with remote communication with different options (ports and protocols) on the rear side:
  - » Rear RS485 Port: Modbus RTU, DNP3.0 Serial or IEC60870-5-103(selectable by general settings).
  - » Rear Ethernet Port (RJ45 or FO-LC): Modbus TCP/IP, DNP3.0 TCP/IP, IEC60870-5-104 or IEC61850 (selectable by general settings) + SNTP Protocol + Web Server.
- Synchronization through IRIG-B optional depending on model.
- The SIL-S is provided with (depending on the model):
  - » 8 configurable inputs and 7 configurable outputs.
  - » 11 configurable inputs and 5 configurable outputs.
- The SIL-S is fitted with the demand of power (Load Data Profiling) with the following characteristics:
  - » Number of records: 2160.
  - » Recording mode circular.
  - » Sampling rate (interval): configurable through communications (1-60 min).
- Alarms panel is available.
- The SIL-S is provided with non-volatile RAM memory in order to store up to 3072 events and disturbance fault recording (DFR), maintaining date & time thanks to its internal RTC (real Time Clock).
  - » 5 records in data and COMTRADE format (300 cycles each record): 1 to 8 pre-fault cycles + 292 to 299 post-fault cycles.
  - » 25 records in data and COMTRADE format (60 cycles each record): 1 to 8 pre-fault cycles + 52 to 59 post-fault cycles.
  - » 50 records in data and COMTRADE format (30 cycles each record): 1 to 8 pre-fault cycles + 22 to 29 post-fault cycles.
  - » 100 records in data and COMTRADE format (15 cycles each record): 1 to 8 pre-fault cycles + 7 to 14 post-fault cycles.)
- Each oscillographic record contains 10 analogue channels and up to 96 configurable digital channels. The oscillography is downloaded by a communications port. The SICom Communications Software allows the oscillography record to be downloaded and saved in COMTRADE format (IEEE C37.111-1991).

FUNCTIONS DIAGRAM SIL-S



ANSI CODE PROTECTIONS	
50	Instantaneous phase overcurrent
67/51	Inverse Time Directional* Phase Overcurrent
50N	Instantaneous calculated neutral overcurrent
67N/51N	Inverse Time Directional* Calculated Neutral Overcurrent
67NI	Directional isolated calculated neutral overcurrent
SOTF	Switch On To Fault
46	Phase balance current protection
46BC	Broken Conductor Detection
49T	External Trip
37	Instantaneous phase undercurrent
SHB	Second Harmonic Blocking
59	Instantaneous phase overvoltage (Bus bar)
59N	Instantaneous Calculated neutral overvoltage (Bus bar)
47	Phase Balance voltage protection (Bus bar)
27	Instantaneous Phase undervoltage (Bus bar)
27V1	Instantaneous Positive sequence undervoltage (Bus bar)

32	Directional Overpower
81O/U	Under/Overfrequency
81R	Rate of change of Frequency (ROCOF)
78	Out of Step (Vector Shift)
CLP	Cold Load pickup
79	AC Reclosing device
SCM	Sequence Coordination Mode
SZM	Sectionalizer Mode
HLT	Hot Line Tag
52	Breaker Wear monitoring
50BF	Circuit Breaker Failure
74TCS	Trip Circuit Supervision
CSS	Phase Current Sensors Supervision
VSS	Phase Voltage Sensors Supervision
86	Trip lockout
68	Zone selection interlocking (ZSI)
PGC	Programmable logic control

* ANSI 67and ANSI 67N can be converted into ANSI 51 and ANSI 51N respectively by setting the “Directionality” parameter to NO.

ADDITIONAL FUNCTIONS	
CNT	Counters
RTC	Real Time Clock
ALRM	Alarm panel
PGC	Programmable Logic Control
HMI	Human Machine Interface
SER	Sequential Event Recording

DFR	Disturbance Fault Recording
LDP	Load Data Profiling
MET	Metering
STTG	Settings Groups
CMMD	Commands

TECHNICAL PARAMETERS SIL-S

Function 50-1 **Function 50-2**	Function enable: No/Alarm/Trip/SHB Trip
	Current tap: 0.010 to 30.000 xIn (step 0.001xIn)
	Time delay: 0.000 to 300.000 s (step 0.001 s)
	Activation level: 100%
	Deactivation level: 95%
	Temporized deactivation
	Timing accuracy: ± 35 ms or ± 0.5% (greater of both)
Function 50N-1	Function enable: No/Alarm/Trip/SHB Trip
	Current tap: 0.050 to 30.000 xIn (step 0.001xIn)
	Time delay: 0.000 to 300.000 s (step 0.001 s)
	Activation level: 100%
	Deactivation level: 95%
	Temporized deactivation
	Timing accuracy: ± 35 ms or ± 0.5% (greater of both)
Function 67/51-1 **Function 67/51-2** **Function 67/51-3** **Function 67/51-4**	Function enable: No/Alarm/Trip/SHB Trip
	Curve Type: IEC 60255-151 and IEEE curves. IEC (Definite time, standard inverse, very inverse, extremely inverse, long-time inverse, short time inverse) and IEEE (Moderately inverse, very inverse, extremely inverse).
	Time delay: 0.000 to 300.000 s (step 0.001 s)
	Time dial (TMS): 0.05 to 25.00 (step 0.01) If Curve type IEC: 0.01 to 1.00 (step 0.01) If Curve type IEEE: 0.01 to 25.00 (step 0.01)
	Current tap: 0.010 to 20.000 xIn (step 0.001xIn)
	Directionality: No/Forward/Reverse
	Polarization voltage: 0.08 to 2.00 xUn (step 0.01xUn)
	Operating angle: 0 to 359º (step 1º)
	Halfcone angle: 10 to 170º (step 1º)
	Curve, current activation level: 110%
	Curve, current deactivation level: 100%
	Defined time, current activation level: 100%
	Defined time, current deactivation level: 95%
	Voltage activation level: 100%
	Voltage deactivation level: 95%
	Temporized deactivation
	Timing accuracy for IEC and IEEE curves selection: ± 30 ms or ± 5% (greater of both) Timing accuracy for defined time curve selection: ± 35 ms or ± 0.5% (greater of both)

Function 67N/51N-1 **Function 67N/51N-2**	Function enable: No/Alarm/Trip/SHB Trip
	Curve Type: IEC 60255-151 and IEEE curves. IEC (Definite time, standard inverse, very inverse, extremely inverse, long-time inverse, short time inverse) and IEEE (Moderately inverse, very inverse, extremely inverse).
	Time delay: 0.000 to 300.000 s (step 0.001 s)
	Time dial (TMS): 0.05 to 25.00 (step 0.01) If Curve type IEC: 0.01 to 1.00 (step 0.01) If Curve type IEEE: 0.01 to 25.00 (step 0.01)
	Current tap: 0.050 to 20.000 xIn (step 0.001xIn)
	Directionality: No/Forward/Reverse
	Polarization voltage: 0.04 to 2.00 xUn (step 0.01xUn)
	Operating angle: 0 to 359º (step 1º)
	Halfcone angle: 10 to 170º (step 1º)
	Curve, current activation level: 110%
	Curve, current deactivation level: 100%
	Defined time, current activation level: 100%
	Defined time, current deactivation level: 95%
	Voltage activation level: 100%
	Voltage deactivation level: 95%
	Temporized deactivation
	Timing accuracy for IEC and IEEE curves selection: ± 30 ms or ± 5% (greater of both) Timing accuracy for defined time curve selection: ± 35 ms or ± 0.5% (greater of both)
Function 67NI	Function enable: No/Alarm/Trip/SHB Trip
	Directionality: No/Forward/Reverse
	Low Current Tap: 0.050 to 30.000 xIn (step 0.001xIn)
	High Current Tap: 0.050 to 30.000 xIn (step 0.001xIn)
	Low Voltage Tap: 0.04 to 2.00 xUn (step 0.01xUn)
	High Voltage tap: 0.04 to 2.00 xUn (step 0.01xUn)
	Time delay: 0.000 to 300.000 s (step 0.001 s)
	Operating angle: 0 to 359º (step 1º)
	Halfcone angle: 10 to 170º (step 1º)
	Activation level: 100%
	Deactivation level: 95%
	Temporized deactivation
	Timing accuracy: ± 30 ms or ± 5% (greater of both)
Function SOTF	Function enable: No/Alarm/Trip/SHB Trip
	Current tap: 0.010 to 30.000 xIn (step 0.001xIn)
	Time delay: 0.000 to 295.000 s (step 0.001 s)
	Safe Time: 0.020 to 300.000 s (step 0.001 s)
	Activation level: 100%
	Deactivation level: 95%
	Temporized deactivation
	Timing accuracy: ± 35 ms or ± 0.5% (greater of both)

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Function SHB	Function enable: No/Yes
	Current Tap: 5 to 50% (step 1%)
	Reset Time: 0.000 to 300.000 (step 0.001 s)
	Block Threshold: 0.010 to 30.000xIn (step 0.001xIn)
	Activation level: 100%
	Deactivation level: 95%
	Temporized deactivation
Function CLP	Function enable: Yes/No
	Settings group: 1 to 4 (step 1)
	No load time: 0.020 to 300.000 s (step 0.001 s)
	Cold load time: 0.020 to 300.000 s (step 0.001 s)
	Open breaker activation 1% In and reset threshold: 1.2% In
Function 46	Function enable: No/Alarm/Trip/SHB Trip
	Curve Type: IEC 60255-151 and IEEE curves. IEC (Definite time, standard inverse, very inverse, extremely inverse, long time inverse, short time inverse) and IEEE (Moderately inverse, very inverse, extremely inverse).
	Time delay: 0.000 to 300.000 s (step 0.001 s)
	Time dial (TMS): 0.05 to 25.00 (step 0.01) If Curve type IEC: 0.01 to 1.00 (step 0.01) If Curve type IEEE: 0.01 to 25.00 (step 0.01)
	Current tap: 0.050 to 20.000 xIn (step 0.001xIn)
	Curve, current activation level: 110%
	Curve, current deactivation level: 100%
	Defined time, current activation level: 100%
	Defined time, current deactivation level: 95%
	Temporized deactivation
	Timing accuracy for IEC and IEEE curves selection: ± 30 ms or ± 5% (greater of both) Timing accuracy for defined time curve selection: ± 35 ms or ± 0.5% (greater of both)
Function 46BC	Function enable: No/Alarm/Trip
	Tap: 15 to 100 % (step 1%)
	Time delay: 0.030 to 300.000 s (step 0.001 s)
	Activation level: 100%
	Deactivation level: 95%
	Timing accuracy: ± 30 ms or ± 0.5% (greater of both)
Function 37	Function enable: No/Alarm/Trip
	Current tap: 0.010 to 30.000 xIn (step 0.001xIn)
	Minimum level: 0.000 to 1.000 xIn (step 0.001xIn)
	Time delay: 0.060 to 300.000 s (step 0.001 s)
	Activation level: 100%
	Deactivation level: 105%
	Temporized deactivation
	Timing accuracy: ± 30 ms or ± 0.5% (greater of both)

Function 27-1 **Function 27-2**	Function enable: No/Alarm/Trip
	Voltage tap: 0.04 to 2.00 xUn (step 0.01xUn)
	Minimum level: 0.00 to 1.00 xUn (step 0.01xUn)
	Time delay: 0.060 to 300.000 s (step 0.001 s)
	Reset time: 0.020 to 300.000 s (step 0.001 s)
	Activation level: 99%
	Deactivation level: 101%
	Temporized deactivation
	Timing accuracy: ± 30 ms or ± 0.5% (greater of both)
Function 27V1	Function enable: No/Alarm/Trip
	Voltage tap: 0.15 to 2.00 xUn (step 0.01xUn)
	Minimum level: 0.00 to 1.00 xUn (step 0.01xUn)
	Time delay: 0.060 to 300.000 s (step 0.001 s)
	Reset time: 0.020 to 300.000 s (step 0.001 s)
	Activation level: 99%
	Deactivation level: 101%
	Temporized deactivation
	Timing accuracy: ± 30 ms or ± 0.5% (greater of both)
Function 59-1 **Function 59-2**	Function enable: No/Alarm/Trip
	Voltage tap: 0.04 to 2.00 xUn (step 0.01xUn)
	Time delay: 0.045 to 300.000 s (step 0.001 s)
	Reset time: 0.020 to 300.000 s (step 0.001 s)
	Activation level: 101%
	Deactivation level: 99%
	Temporized deactivation
	Timing accuracy: ± 30 ms or ± 0.5% (greater of both)
Function 59N-1 **Function 59N-2**	Function enable: No/Alarm/Trip
	Voltage tap: 0.04 to 2.00 xUn (step 0.01xUn)
	Time delay: 0.045 to 300.000 s (step 0.001 s)
	Reset time: 0.020 to 300.000 s (step 0.001 s)
	Activation level: 101%
	Deactivation level: 99%
	Temporized deactivation
	Timing accuracy: ± 30 ms or ± 0.5% (greater of both)
Function 47	Function enable: No/Alarm/Trip
	Voltage tap: 0.04 to 2.00 xUn (step 0.01xUn)
	Time delay: 0.045 to 300.000 s (step 0.001 s)
	Reset time: 0.020 to 300.000 s (step 0.001 s)
	Activation level: 101%
	Deactivation level: 99%
	Temporized deactivation
	Timing accuracy: ± 30 ms or ± 0.5% (greater of both)

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Function 32-1 **Function 32-2** **Function 32-3** **Function 32-4**	Function enable: No/Alarm/Trip
	Activation level: 0.02 to 2.00 xSn (step 0.01xSn)
	Operating angle: 0 to 359º (step 1º)
	Time delay: 0.020 to 300.000 s (step 0.001 s)
	Activation level: 100%
	Deactivation level: 95%
	Instantaneous deactivation
	Timing accuracy: ± 30 ms or ± 0.5% (greater of both)
Function 81-1 **Function 81-2** **Function 81-3** **Function 81-4**	Function enable: No/Alarm/Trip
	Type: Underfrequency or overfrequency
	Activation level: 45.000 to 65.000 Hz (step 0.001 Hz)
	Time delay: 0.020 to 300.000 s (step 0.001 s)
	Reset time: 0.020 to 300.000 s (step 0.001 s)
	Function blocked if phase B voltage is lower than 20 volts P-N (35 volts P-P)
	Activation level: 100%
	Underfrequency reset level: activation level + 50mHz Overfrequency reset level: activation level - 50 mHz
	Temporized deactivation
	The frequency measurement is an average value of the frequency measured during 8 cycles. The accuracy of the Time Delay is the adjusted value plus the necessary time to achieve the measurement during 8 cycles.
Function 81R-1 **Function 81R-2** **Function 81R-3** **Function 81R-4**	Function enable: No/Alarm/Trip
	Type: Increase/Decrease
	Activation level: 0.100 to 5.000 Hz/s (step 0.001 Hz/s)
	Time delay: 0.060 to 40.000 s (step 0.001 s)
	Reset time: 0.020 to 300.000 s (step 0.001 s)
	Function blocked if phase B voltage is lower than 20 volts P-N (35 volts P-P)
	Activation level: 100%
	Temporized deactivation
	The frequency measurement is an average value of the frequency measured during 8 cycles. The accuracy of the Time Delay is the adjusted value plus the necessary time to achieve the measurement during 8 cycles.
Function 78	Function enable: No/Alarm/Trip
	Activation level: 1 to 25º (step 1º)
	Reset time: 0.020 to 300.000 s (step 0.001 s)
	Function blocked if phase B voltage is lower than 20 volts P-N (35 volts P-P)
	Temporized deactivation
	Measurement accuracy: ±1º or ±10% (greater of both)

Function 79	Number of recloses: 0 to 4 (step 1)
	Reclose time 1, 2, 3, 4: 0.020 to 2000.000 s (step 0.001 s)
	Hold Enable: No/Yes/No Time
	Hold time: 0.000 to 2000.000 s (step 0.001 s)
	Reset time: 0.020 to 2000.000 s (step 0.01 s)
	Safe time: 0.020 to 2000.000 s (step 0.001 s)
	Locking possibilities: pulse inputs, level inputs, commands.
Function 52	Maximum number of openings: 1 to 100,000 (step 1)
	Maximum accumulated amperes: 1 to 100,000 M(A2) (step 1)
	Repetitive number of openings: 1 to 100,000 (step 1)
	Time for repetitive number of openings: 1 to 300 min (step 1 min)
	Maximum opening time: 0.020 to 300.000 s (step 0.001 s)
	Maximum closing time: 0.020 to 300.000 s (step 0.001 s)
	Circuit breaker status monitoring: Current measurements: Open breaker activation and reset threshold: 1%-1.2% In (Without using contacts) Using contacts: 52a or 52b and 52a and 52b
Function 74TCS	Function enable: No/Yes
	Time delay: 0.020 to 300.000 s (step 0.001 s)
	Continuity in circuits A and B through configurable inputs
Function CSS	Function enable: No/Yes
	Time delay: 0.020 to 300.000 s (step 0.001 s)
	Timing accuracy: ± 30 ms or ± 0.5% (greater of both)
	Open breaker activation and reset threshold: 1% -1.2% In
	Detection of the loss of one phase CT
Function VSS	Function enable: No/Yes
	Time delay: 0.020 to 300.000 s (step 0.001 s)
	V1, V2 and VP Tap: 0.04 to 2.00 xUn (step 0.001xUn)
	I1, I2 and 3I0 Tap: 0.010 to 20.000 xIn (step 0.001xIn)
	Timing accuracy: ± 30 ms or ± 0.5% (greater of both)
Function 50BF	Function enable: No/Yes
	Time delay: 0.020 to 1.000 s (step 0.001 s)
	Open breaker activation and reset threshold: 0.8% In
Function 49T	Available through configurable inputs thanks to the programmable logic
Function 86	It allows to latch (lock out) the contact trip due to programmable logic (PGC: RSFF or SRFF).
Function 68	Available through configurable inputs and outputs thanks to the programmable logic (PGC).

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Programmable logic control (PGC)	OR, OR_1PULSE, OR_PULSES, OR_BLINKING, OR_TIMER UP, OR_TIMER DOWN NOR, NOR_1PULSE, NOR_PULSES, NOR_ BLINKING, NOR_TIMER UP, NOR_TIMER DOWN AND, AND_1PULSE, AND_PULSES, AND_ BLINKING, AND_TIMER UP, AND_TIMER DOWN NAND, NAND_1PULSE, NAND_PULSES, NAND_ BLINKING, NAND_TIMER UP, NAND_TIMER DOWN XOR, OR_1PULSE, XOR_PULSES, XOR_BLINKING, XOR_TIMER UP, XOR_TIMER DOWN SRFF, SRFF_1PULSE, SRFF_PULSES, SRFF_ BLINKING, SRFF_TIMER UP, SRFF_TIMER DOWN, SRFF_NON VOLATIL RSFF, RSFF_1PULSE, RSFF_PULSES, RSFF_ BLINKING, RSFF_TIMER UP, RSFF_TIMER DOWN, RSFF_NON VOLATIL R_EDGE, R_EDGE_1PULSE F_EDGE, F_EDGE_1PULSE
Settings tables	4 settings groups Selectable by input, communications, user commands or general setting.
SER	3072 events
Disturbance fault recording (DFR)	32 samples/cycle 10 analog channels and 96 configurable digital channels Configurable DFR Start Configurable number of records depending on the size: 5 records in data and COMTRADE format (300 cycles each record): 1 to 8 pre-fault cycles + 292 to 299 postfault cycles. 25 records in data and COMTRADE format (60 cycles each record): 1 to 8 pre-fault cycles + 52 to 59 postfault cycles. 50 records in data and COMTRADE format (30 cycles each record): 1 to 8 pre-fault cycles + 22 to 29 postfault cycles. 100 records in data and COMTRADE format (15 cycles each record): 1 to 8 pre-fault cycles + 7 to 14 postfault cycles.) COMTRADE IEEE C37.111-1991 Up to 100 fault reports (data format) with maximum 29 events each one
Load Data Profiling (LDP)	Demand of power with the following characteristics: - Number of records: 2160 - Recording mode circular - Sampling rate (interval): configurable through communications (1-60 min)
Inputs (*)	Depending on Model: - 8 configurable inputs - 11 configurable inputs The voltage of the inputs is the same as the auxiliary power supply Burden: 24 Vdc: <20 mW 230 Vdc: <200 mW 24 Vac: <50 mW 230 Vac: <500 mW

Outputs (*)	Depending on Model: - 5 configurable outputs - 7 configurable outputs 250 V AC – 8 A; 30 V DC – 8 A Contact current short duration: 30A – 200ms
	Output 1: NO-NC; the rest of the outputs: NO Model with 7 outputs: Output 1 NC; the rest of the outputs: NO
Frequency	50/60Hz
Energizing Quantities	Burden of current inputs: 0.2215 mVA Burden of voltage inputs (depending on the model): SILS001 (8 Vrms – 1 MOhm)→ Burden= 0.064 mVA SILS002 (5.2 Vrms – 2 MOhms)→ Burden= 0.01352 mVA SILS003 (16 Vrms – 2 MOhms)→ Burden= 0.128 mVA SILS004 (2.8 Vrms – 20 MOhms)→ Burden= 0.000392 mVA Burden of power supply unit: 24-230 Vdc/Vac: < 20 VA Burden for binary inputs: 24 Vdc: <20 mW 230 Vdc: <200 mW 24 Vac: <50 mW 230 Vac: < 500 mW
Current measurements	Phase currents (IA, IB, IC), neutral (IN, 3I0), positive sequence (I1) and negative sequence (I2) I2/I1 Maximum current (Imax), thermal Image (TI), Second harmonic (IA2H, IB2H IC2H), Current Total Harmonic Distortion (THD-A, THD-B and THD-C).
	Fundamental values (DFT)
	Range: 0.005-256 times the sensor primary current over 3 scales. Neutral current is internally calculated. Accuracy: • Phase (accuracy class 0.5): ○ ±2% or ±0.0125 mV, whichever is greater up to 0.05xIsensor primary. ○ ±1.5% from 0.05xIsensor primary to 0.2xIsensor primary. ○ ±0.75% from 0.2xIsensor primary to 1xIsensor primary. ○ ±0.5% from 1xIsensor primary upwards. • Neutral: ±2% or ±0.025 mV, whichever is greater. The accuracy values in mV and the accuracy ranges (0.05, 0.2 and 1xIprimary sensor), are for current scale no.1, for no.2 the values are x4 and for no.3 they are x16.
	Sampling: 32 samples/cycle

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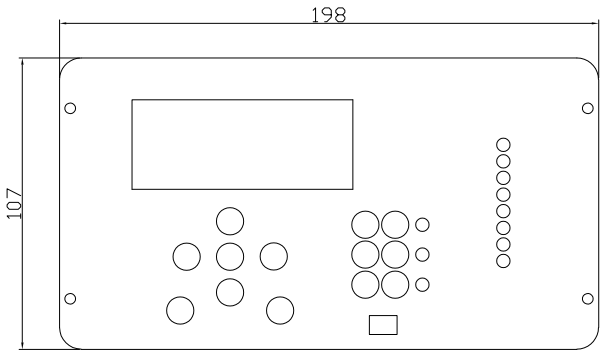
Voltage measurements	Phase voltage (VA, VB, VC), Line Voltage (VL)*, phase-phase voltage (UAB, UBC, UCA), neutral voltage (VR, 3V0), positive sequence (V1) and negative sequence (V2), Maximum voltage (VMAX) and V/f.
	Fundamental values (DFT)
	Sampling: 32 samples/cycle
	Range: • Measured voltage: From 0,01282 x LEA Maximum voltage x Ratio up to 2,4 xUn • Calculated voltage: From 0,013 x LEA Maximum voltage x Ratio up to 2,4 xUn Accuracy: • Measured voltage: ±0.5% accuracy in a band covering ±20% of the sensor primary voltage (accuracy class 0.5) and ±4% in the rest of the range. • Calculated voltage: ±2% accuracy in a band covering ±20% of the sensor primary voltage and ±4% in the rest of the range.
	Voltage sensors: LEA of 2.8Vrms LEA of 8Vrms, LEA of 5.2Vrms or LEA of 16Vrms.
Angle measurements	Current Angles: IA, IB, IC, IN and 3I0. Voltage Angles: VA, VB, VC, VR, VL*, 3V0, UAB, UBC and UCA. Power factor: Cos PHI-A, Cos-PHI-B and Total Cos-PHI-C
	Accuracy: ±2º
Power measurements	Total and per phase active power
	Total and per phase reactive power
	Total and per phase apparent power
	2% accuracy in rated values with power factor between 1 and 0.7 (phase shift from 0 to ±45º).
Energy measurement	Positive and negative active energy
	Positive and negative reactive energy
Frequency measurements	Busbar Frequency, Line Frequency, df/dt
	Minimum voltage: 5.77% of the LEA Vrms maximum value (2.8, 5.2, 8 or 16 Vrms depending on model)
	Accuracy: ±0.005 Hz
	Frequency measurement range: From 45 to 65 Hz
Communications	Local port (micro-USB): Modbus RTU
	Remote port RS485: Modbus RTU, DNP3.0 and IEC60870-5-103 (selectable by general settings)
	Remote port (RJ45 (10/100 Base-Tx) or FO-LC(10/100 Base-Fx)): DNP3.0 TCP/IP, Modbus TCP/IP IEC60870-5-104 or IEC61850 (selectable by general settings) + SNTP Protocol + Web Server + IRIG-B (*)
Power supply	24-230 Vac/dc (24-220 Vdc (±20%) / 100-230 Vac (±15%)) Burden: 24-230 Vdc/Vac: < 20 VA
Environmental conditions	Operating temperature: -40 to 70ºC
	Storage temperature: -40 to 80ºC
	Relative humidity: 95%

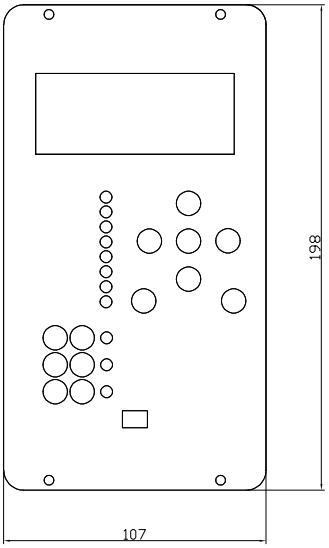
Mechanical characteristics	Metallic box
	Panel mounted
	Vertical assembly: HxWxD: 198x107x145.01 (mm) Horizontal assembly: HxWxD: 107x198x145.01 (mm)
	IP-54
	The required screws to fix the relay should be M4

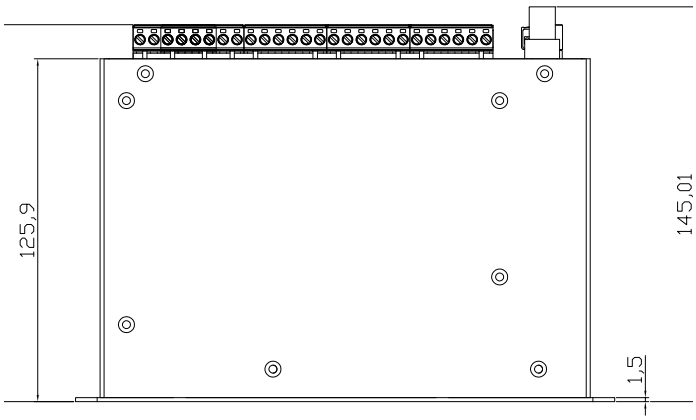
(*) Optional depending on model

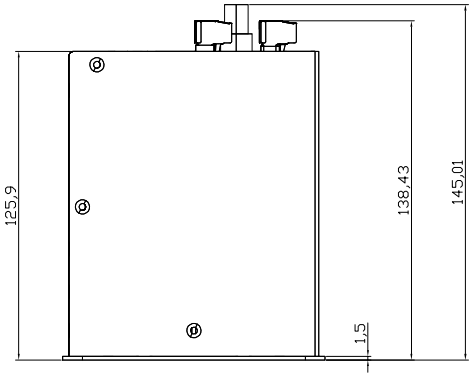
NOTE: ANSI 67 and ANSI 67N can be converted into ANSI 51 and ANSI 51N respectively by setting the “Directionality” parameter to NO.

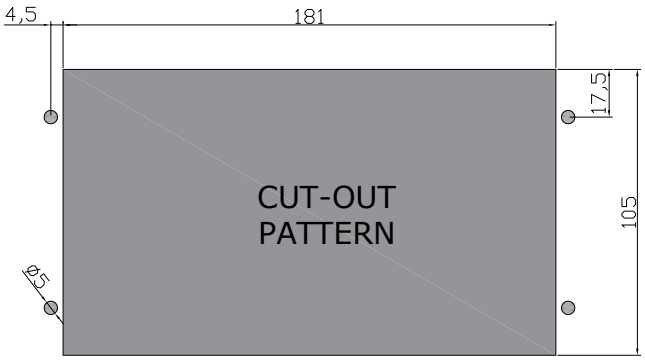
DIMENSIONS AND CUTOUT SIL-S

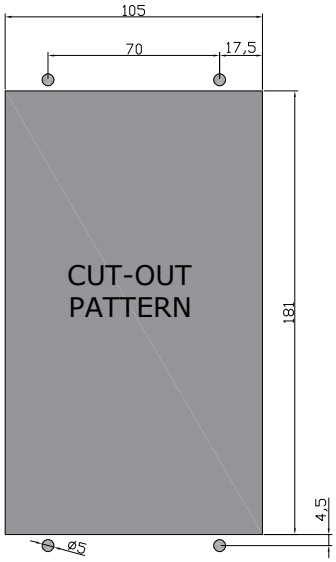












SELECTION & ORDERING DATA SIL-S

SIL-S

Feeder Protection with voltage and current sensors

1										PHASE CURRENT MEASUREMENT Phase current sensors (22.5 mV)
	0									NEUTRAL CURRENT MEASUREMENT Internally calculated
		1 2 3 4								VOLTAGE MEASUREMENT 8 Vrms LEA maximum, 1 MOhm 5.2 Vrms LEA maximum, 2 MOhms 16 Vrms LEA maximum, 2 MOhms 2.8 Vrms LEA maximum, 20 MOhms
			C							POWER SUPPLY 24-230 Vdc/Vac
				0						ADDITIONAL FUNCTIONS -
					A B G O P Q R					COMMUNICATIONS A: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) B: USB (Modbus RTU) + Rear Serial (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45) (Modbus TCP or DNP3.0 TCP or IEC60870-5-104) + Web Server + SNTP Protocol + IRIG-B G: USB (Modbus RTU) + WiFi + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45) (Modbus TCP, DNP3.0 TCP or IEC60870-5-104) + Web Server SNTP Protocol + IRIG-B O: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45) (Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server SNTP Protocol + IRIG-B P: USB (Modbus RTU) + WiFi + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (RJ45) (Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server SNTP Protocol + IRIG-B Q: USB (Modbus RTU) + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (FO-LC) (Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server SNTP Protocol + IRIG-B R: USB (Modbus RTU) + WiFi + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + Rear Ethernet Port (FO-LC) (Modbus TCP, DNP3 TCP, IEC 60870-5-104 or IEC61850) + Web Server SNTP Protocol + IRIG-B
						0 1				INPUTS AND OUTPUTS 8 Inputs + 7 Outputs 11 Inputs + 5 Outputs
							C D E F			MECHANICAL ASSEMBLY Vertical Assembly Horizontal Assembly Vertical Assembly with anticorrosive treatment Horizontal Assembly with anticorrosive treatment
								A E F		LANGUAGE English, Spanish, German and French English, Spanish, Turkish and Russian English, Spanish, German and Portuguese
									B	ADAPTATION (2) 50 + SOTF + 50N + (4) 67/51 + (2) 67N/51N + 67NI + 46 + 46BC + 49T + 37 + (2) 27 + 27V1 + (2) 59 + (2) 59N + 47 + (4) 32 + (4) 81U/O + (4) 81R + 78 + 79 + 74TCS + CSS + VSS + 50BF + SHB + CLP + 52 + 86 + SCM + SZM + HLT

Example of ordering code:

0	0	2	C	0	A	1	C	A	B	SIL S 0 0 2 C 0 A 1 C A B
SIL-S										

(*) ANSI 67 and ANSI 67N can be converted into ANSI 51 and ANSI 51N respectively by setting the “Directionality” parameter to NO.