

SIL-C

Line, Feeder & Generator Protection Relay

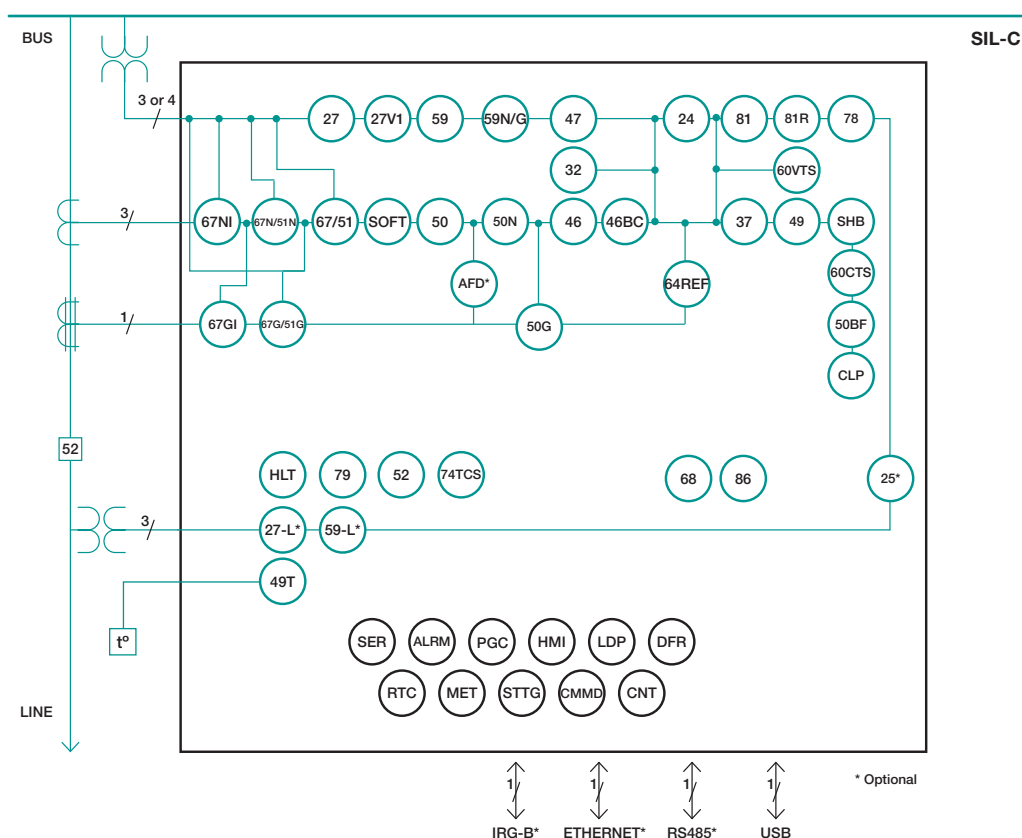
Primary & Secondary Distribution Protection



- The SIL-C is a feeder relay with current, voltage and frequency functions for primary and secondary distribution with auxiliary power supply of 24- 230 Vdc/ac.
- 4 current channels and up to 5 voltage channels for conventional VTs.
- Capability of measuring up to 1.000 volts when it is connected directly to the low voltage line.
- 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-C 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 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: IEC60870-5-103, Modbus RTU or DNP3.0 Serial (selectable by general settings).
 - » Rear RJ45 Port: Modbus TCP/IP, DNP3.0 TCP/IP or IEC60870-5-104 (selectable by general settings) + SNTP Protocol + Web Server.

- Synchronization through IRIG-B optional depending on model.
- The SIL-C is provided with 11 configurable inputs and 5 configurable outputs.
- The SIL-C 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.
- SIL-C 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 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.)
- Each oscillographic record contains 10 analogue channels and up to 96 configurable digital channels. The oscillography is downloaded by communications port. The SiCom communications program allows the oscillography record to be downloaded and saved in COMTRADE format (IEEE C37.111-1991).

Functions diagram SIL-C



ANSI CODE PROTECTIONS

50	Instantaneous phase overcurrent
67/51	Inverse Time Directional* Phase Overcurrent
50N	Instantaneous calculated neutral overcurrent
50G	Instantaneous measured neutral overcurrent
67N/51N	Inverse Time Directional* Calculated Neutral Overcurrent
67G/51G	Inverse Time Directional* Measured Neutral Overcurrent
67NI	Directional isolated calculated neutral overcurrent
67GI	Directional isolated measured neutral overcurrent
SOTF	Switch On To Fault
46	Phase balance current protection
46BC	Broken Conductor Detection
64REF	Restricted earth fault
37	Instantaneous phase undercurrent
49	Thermal overload
49T	External Trip
SHB	Second Harmonic Blocking
59	Instantaneous phase overvoltage (Bus Bar)
59N/G	Instantaneous Calculated/Measured neutral overvoltage (Bus Bar)
59L	Instantaneous phase overvoltage (Line)
47	Phase Balance voltage protection (Bus Bar)
27	Instantaneous Phase undervoltage (Bus Bar)

27L	Instantaneous phase undervoltage (Line)
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)
24	Overfluxing
CLP	Cold Load pickup
79	AC Reclosing device
HLT	Hot Line Tag
52	Breaker Wear Monitoring
25	Synchro Check
50BF	Circuit Breaker Failure
74TCS	Trip Circuit Supervision
60CTS	Phase CT Supervision
60VTS	Phase VT Supervision
86	Trip Lockout
68	Zone Selection Interlocking (ZSI)
PGC	Programmable logic control

* ANSI 67, ANSI 67G and ANSI 67N can be converted into ANSI 51, ANSI 51G 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-C

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
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
Function 50G-1	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
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: 0.05 to 1.00 (step 0.01)
	If Curve type IEEE: 0.10 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 359° (step 1°)
	Halfcone angle: 10 to 170° (step 1°)
	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: 0.05 to 1.00 (step 0.01)
	If Curve type IEEE: 0.10 to 25.00 (step 0.01)
	Current tap: 0.050 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 359° (step 1°)
	Halfcone angle: 10 to 170° (step 1°)
	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)

Technical parameters SIL-C

Function 67G/51G-1 Function 67G/51G-2	Function enable: No/Alarm/Trip/SHB Trip	Function 67GI	Function enable: No/Alarm/Trip/SHB Trip
	Curve Type: IEC 60255-151 and IEEE curves.		Directionality: No/Forward/Reverse
	IEC (Definite time, standard inverse, very inverse, extremely inverse, long-time inverse, short time inverse) and IEEE (Moderately inverse, very inverse, extremely inverse).		Low Current Tap: 0.010 to 30.000 xIn (step 0.001xIn)
	Time delay: 0.000 to 300.000 s (step 0.001 s)		High Current Tap: 0.010 to 30.000 xIn (step 0.001xIn)
	Time dial (TMS): 0.05 to 25.00 (step 0.01)		Low Voltage Tap: 0.08 to 2.00 xUn (step 0.01xUn)
	If Curve type IEC: 0.05 to 1.00 (step 0.01)		High Voltage tap: 0.08 to 2.00 xUn (step 0.01xUn)
	If Curve type IEEE: 0.10 to 25.00 (step 0.01)		Time delay: 0.000 to 300.000 s (step 0.001 s)
	Current tap: 0.010 to 20.000 xIn (step 0.001xIn)		Operating angle: 0 to 359° (step 1°)
	Directionality: No/Forward/Reverse		Halfcone angle: 10 to 170° (step 1°)
	Polarization voltage: 0.08 to 2.00 xUn (step 0.01xUn)		Activation level: 100%
Function 67NI	Operating angle: 0 to 359° (step 1°)	Function 64REF	Deactivation level: 95%
	Halfcone angle: 10 to 170° (step 1°)		Temporized deactivation
	Curve, current activation level: 110%		Timing accuracy: ± 30 ms or ± 5% (greater of both)
	Curve, current deactivation level: 100%		Function enable: No/Alarm/Trip/ SHB Trip
	Defined time, current activation level: 100%		Current tap: 0.050 to 20.000 xIn (step 0.001xIn)
	Defined time, current deactivation level: 95%	Function SOTF	Time delay: 0.020 to 300.000 s (step 0.001 s)
	Voltage activation level: 100%		Neutral SHB Tap: 5 to 50% (step 1%)
	Voltage deactivation level: 95%		Activation level: 100%
	Temporized deactivation		Deactivation level: 95%
	Timing accuracy for IEC and IEEE curves selection: ± 30 ms or ± 5% (greater of both)		Temporized deactivation
	Timing accuracy for defined time curve selection: ± 35 ms or ± 0.5% (greater of both)		Timing accuracy: ± 35 ms or ± 0.5% (greater of both)
	Function enable: No/Alarm/Trip/SHB Trip	Function 49	Function enable: No/Alarm/Trip
	Directionality: No/Forward/Reverse		Current tap: 0.100 to 2.400 In (step 0.001xIn)
	Low Current Tap: 0.050 to 30.000 xIn (step 0.001xIn)		ζ heating: 3 to 600 min (step 1 min)
	High Current Tap: 0.050 to 30.000 xIn (step 0.001xIn)		ζ cooling: 1 to 6 xζ heating (step 1)
	Low Voltage Tap: 0.08 to 2.00 xUn (step 0.01xUn)		Alarm: 20 to 99% (step 1%)
Function 67NI	High Voltage tap: 0.08 to 2.00 xUn (step 0.01xUn)	Function SHB	Trip level: 100%
	Time delay: 0.000 to 300.000 s (step 0.001 s)		Deactivation level: 95% of alarm level
	Operating angle: 0 to 359° (step 1°)		Timing accuracy: ± 5% respect of theoretical value.
	Halfcone angle: 10 to 170° (step 1°)		Function enable: No/Yes
	Activation level: 100%		Current Tap: 5 to 50% (step 1%)
	Deactivation level: 95%	Function CLP	Reset Time: 0.000 to 300.000 (step 0.001 s)
	Temporized deactivation		Block Threshold: 0.010 to 30.000xIn (step 0.001xIn)
	Timing accuracy: ± 30 ms or ± 5% (greater of both)		Activation level: 100%
			Deactivation level: 95%
			Temporized deactivation
			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 0.8% In and reset threshold: 1% In

Technical parameters SIL-C

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: 0.05 to 1.00 (step 0.01)
	If Curve type IEEE: 0.10 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)
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%
Function 37	Timing accuracy: ± 30 ms or ± 0.5% (greater of both)
	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%
Function 27-1 Function 27-2	Deactivation level: 105%
	Temporized deactivation
	Timing accuracy: ± 30 ms or ± 0.5% (greater of both)
	Function enable: No/Alarm/Trip
	Voltage tap: 0.08 to 2.00 xUn (step 0.01xUn)
Function 27-1 Function 27-2	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
Function 27L (*)	Timing accuracy: ± 30 ms or ± 0.5% (greater of both)
	Function enable: No/Alarm/Trip
	Voltage tap: 0.08 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%
Function 59-1 Function 59-2	Temporized deactivation
	Timing accuracy: ± 30 ms or ± 0.5% (greater of both)
	Function enable: No/Alarm/Trip
	Voltage tap: 0.08 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%
Function 59N/G-1 Function 59N/G-2	Temporized deactivation
	Timing accuracy: ± 30 ms or ± 0.5% (greater of both)
	Function enable: No/Alarm/Trip
	Voltage tap: 0.08 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%
Function 47	Temporized deactivation
	Timing accuracy: ± 30 ms or ± 0.5% (greater of both)
	Function enable: No/Alarm/Trip
	Voltage tap: 0.08 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%
Function 59L (*)	Temporized deactivation
	Timing accuracy: ± 30 ms or ± 0.5% (greater of both)
	Function enable: No/Alarm/Trip
	Voltage tap: 0.08 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%

Technical parameters SIL-C

Function 32-1	Function enable: No/Alarm/Trip
	Activation level: 0.02 to 2.00 xSn (step 0.01xSn)
	Operating angle: 0 to 359° (step 1°)
Function 32-2	Time delay: 0.020 to 300.000 s (step 0.001 s)
Function 32-3	Activation level: 100%
Function 32-4	Deactivation level: 95%
	Instantaneous deactivation
	Timing accuracy: ± 30 ms or $\pm 0.5\%$ (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 25° (step 1°)
	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: $\pm 1^\circ$ or $\pm 10\%$ (greater of both)
Function 24-1 Function 24-2	Function enable: No/Alarm/Trip
	Curve Type: Inverse A, Inverse B, Inverse C and Defined Time.
	Time delay: 0.020 to 300.000 s (step 0.001 s)
	Time dial (TMS): 0.10 to 25.00 (step 0.01)
	Activation level: 0.50 to 2.00 xUn/Fn (step 0.01 xUn/Fn)
	Time delay: 0.020 to 300.000 s (step 0.001 s)
	Reset Time: 0.00 to 300.000 s (step 0.001 s)
	Curve, activation level: 110%
	Curve, deactivation level: 100%
	Defined time, activation level: 100%
Function 25 (*)	Defined time, deactivation level: 95%
	Temporized deactivation
	Timing accuracy for curves selection:
	± 30 ms or $\pm 5\%$ (greater of both)
	Timing accuracy for defined time curve selection:
	± 30 ms or $\pm 0.5\%$ (greater of both)
Function 79	Dead tap: 0.08 to 2.00 xUn (step 0.01xUn)
	Live tap: 0.08 to 2.00 xUn (step 0.01xUn)
	Voltage supervision time: 0.060 to 300.000 s (step 0.001 s)
	Voltage difference: 0.05 to 2.00 xUn (step 0.01xUn)
	Phase difference: 2 to 90 ° (step 1°)
	Frequency difference: 0.060 to 10.000 Hz (step 0.001 Hz)
Function 52	Synchro check time: 0.020 to 300.000 s (step 0.001 s)
	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.
	Maximum number of openings: 1 to 100,000 (step 1)
	Maximum accumulated amperes: 1 to 100,000 M(A2) (step 1)
Function 24-1 Function 24-2	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: 0.8% In (Without using contacts)
	Using contacts: 52a or 52b and 52a and 52b

Technical parameters SIL-C

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 60CTS	Function enable: No/Yes
	Time delay: 0.020 to 300.000 s (step 0.001 s)
	Timing accuracy: ± 30 ms or $\pm 0.5\%$ (greater of both)
	Open breaker activation and reset threshold: 0.8% In
	Detection of the loss of one phase CT
Function 60VTS	Function enable: No/Yes
	Time delay: 0.020 to 300.000 s (step 0.001 s)
	V1, V2 and VP Tap: 0.08 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 $\pm 0.5\%$ (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).
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
Settings tables	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
	4 settings groups
SER	Selectable by input, communications, user commands or general setting.
	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.
Load Data Profiling (LDP)	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
Inputs	Demand of power with the following characteristics:
	- Number of records: 2160
	- Recording mode circular
	- Sampling rate (interval): configurable through communications (1-60 min)
	11 configurable inputs
Outputs	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
Frequency	5 configurable outputs
	Output 1: NO-NC; the rest of the outputs: NO.
	250 V AC – 8 A; 30 V DC – 8 A
	Contact current short duration: 30A – 200ms
	50/60Hz
Energizing Quantities	Burden of current inputs:
	<0.015 VA (1 A) & <0.375 VA (5 A)
	Burden of voltage inputs:
	< 70 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

Technical parameters SIL-C

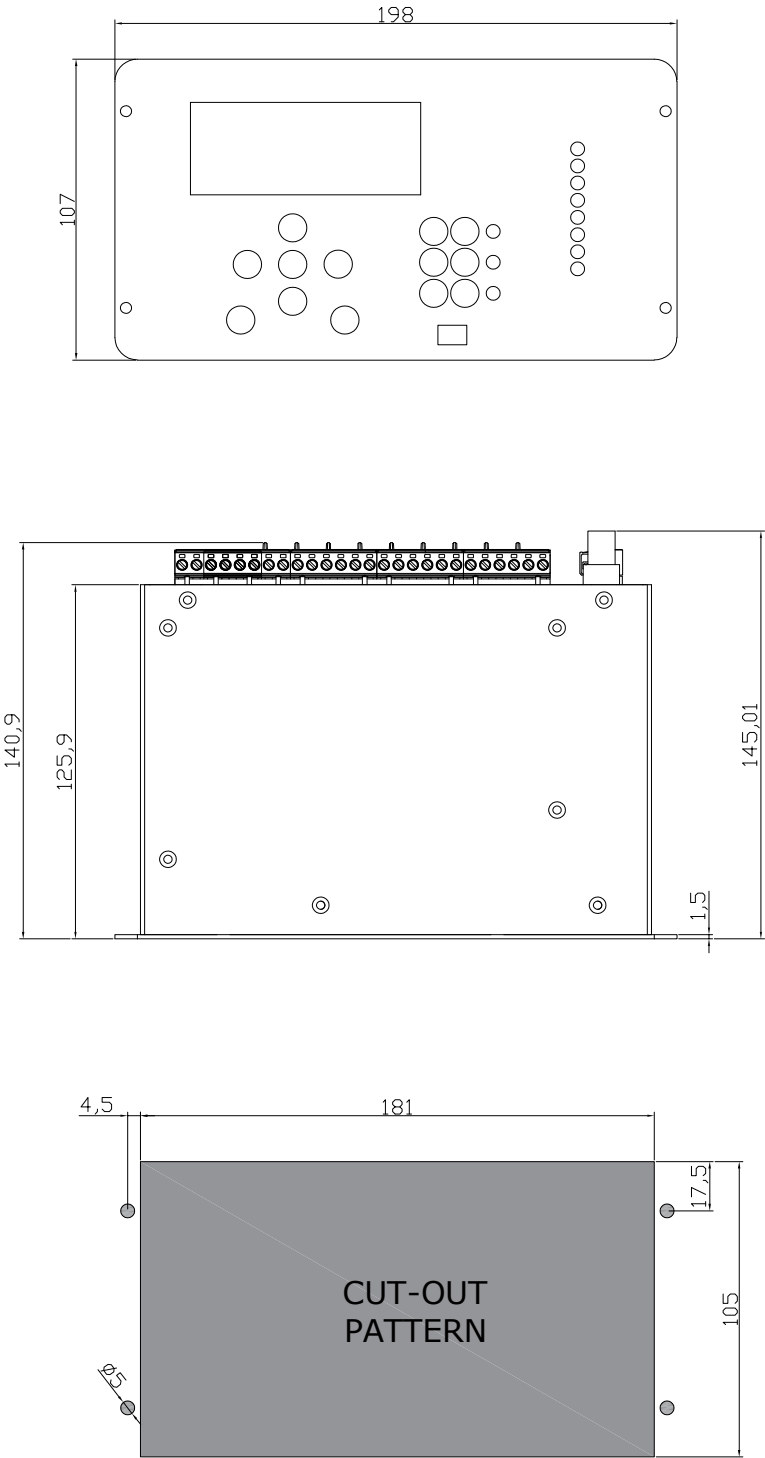
Current measurements	Phase currents (IA, IB, IC), neutral (IN, 3I0), positive sequence (I1) and negative sequence (I2) I2/I1 Maximum current (Imax), thermal Image (TI), Second harmonic (IA2H, IB2H IC2H), Current Total Harmonic Distortion (THD-A, THD-B and THD-C).
	Fundamental values (DFT)
	Sampling: 32 samples/cycle
	2% precision in a band covering $\pm 20\%$ of nominal current and $\pm 4\%$ in the rest of the range
	Current measurement range: From 0.01 to 30 times the nominal current
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
	Measured voltage: 1% precision in a band covering $\pm 20\%$ of nominal voltage and 4% in the rest of the range (ambient temperature)
	Calculated voltage: 2% precision in a band covering $\pm 20\%$ of nominal voltage and 4% in the rest of the range (ambient temperature)
	- With VTs: 3-250 V measured voltage (6-250 V calculated voltage) - Direct connection: From 12 to 1000 V
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: $\pm 2^\circ$
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 $\pm 45^\circ$).
Energy measurement	Positive and negative active energy
	Positive and negative reactive energy
Frequency measurements	Busbar Frequency, Line Frequency, df/dt
	Minimum voltage: 20V P-N (35 P-P)
	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): DNP3.0 TCP/IP, Modbus TCP/IP or IEC60870-5-104 (selectable by general settings) + SNTP Protocol + Web Server + IIRIG-B (*)
Power supply	24-230 Vac/dc (24-220 Vdc ($\pm 20\%$) / 100-230 Vac ($\pm 15\%$)) Burden: 24-230 Vdc/Vac: < 20 VA
Environmental conditions	Operating temperature: -40 to 70°C
	Storage temperature: -40 to 80°C
	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, ANSI 67G and ANSI 67N can be converted into ANSI 51, ANSI51G and ANSI 51N respectively by setting the "Directionality" parameter to NO.

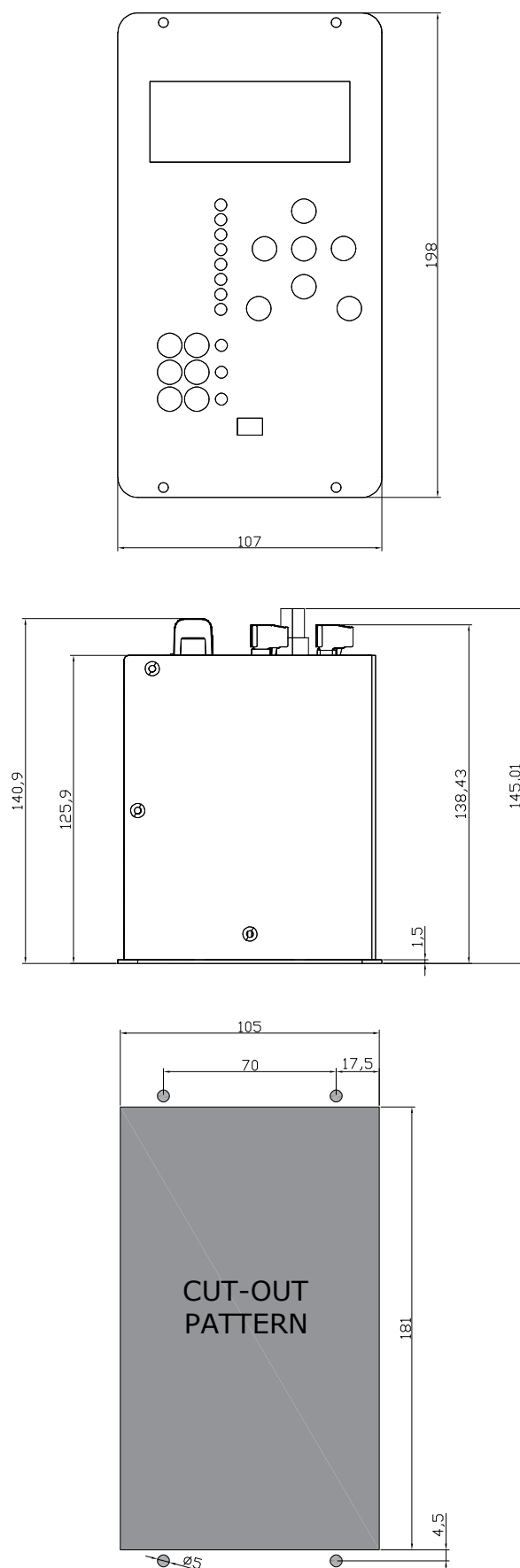
Dimensions and cutout SIL-C

Horizontal assembly



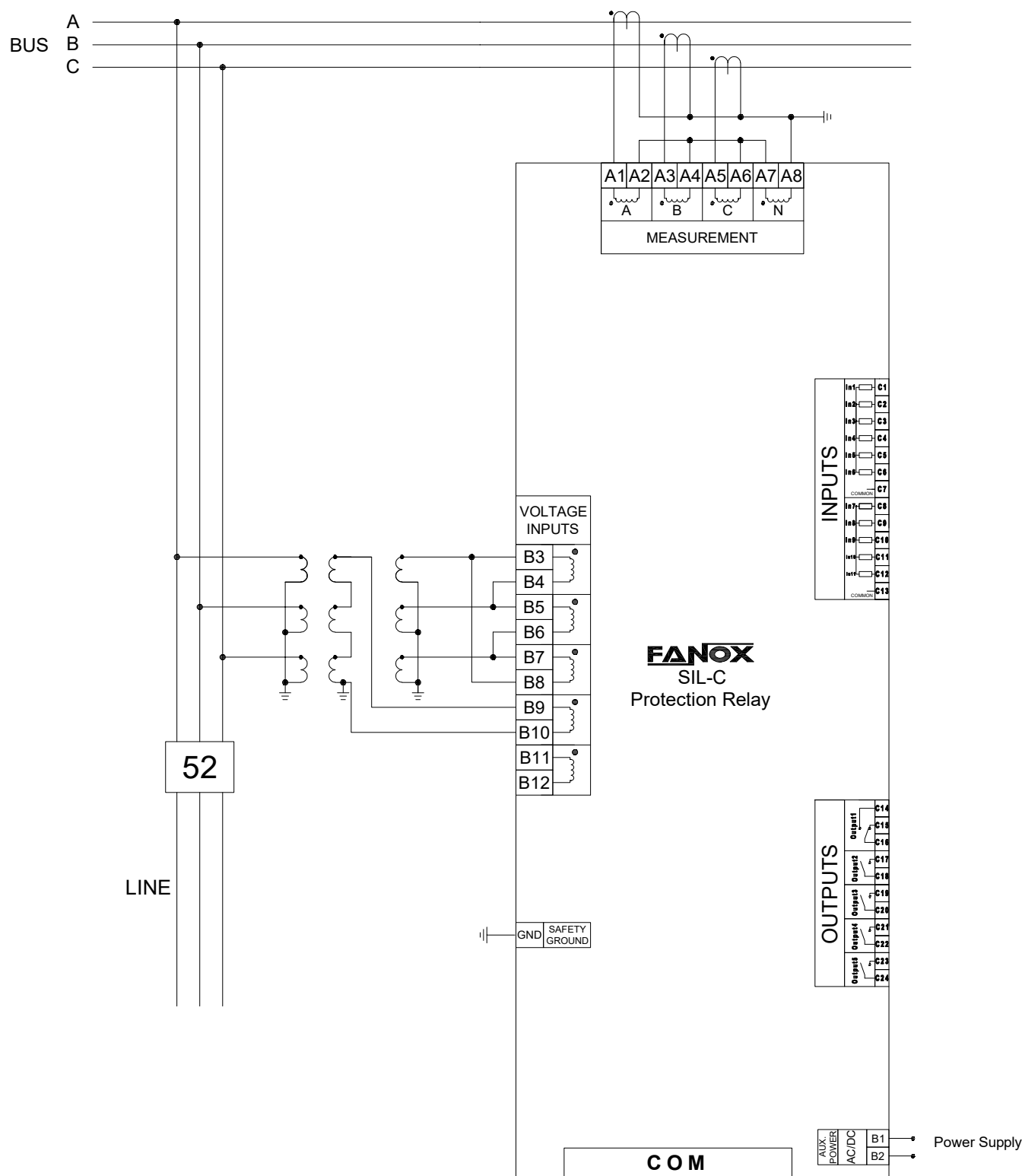
Dimensions and cutout SIL-C

Vertical assembly



Connections diagram SIL-C

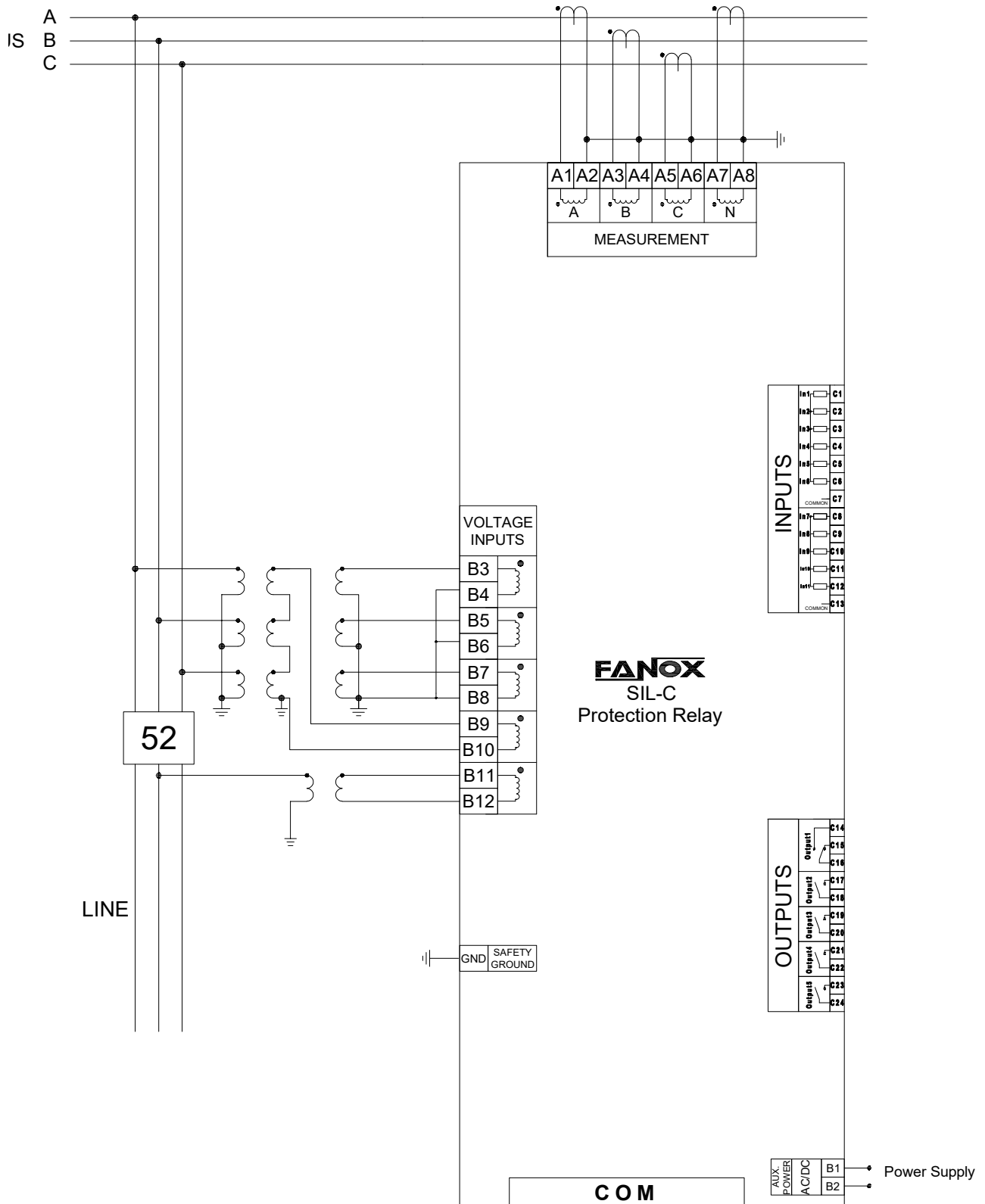
Phase-phase + residual voltage, 3 current transformers



(*) Example of connections diagram

Connections diagram SIL-C

3 VTs (Phase-neutral) + residual voltage + 1 VT for synchronism , 4 current transformers



(*) Example of connections diagram

Selection & Ordering data SIL-C

SIL-C

Feeder & Generator Protection Relay									
0									PHASE CURRENT MEASUREMENT 1 A or 5 A
	0								NEUTRAL CURRENT MEASUREMENT 1 A or 5 A
		0							VOLTAGE MEASUREMENT Up to 1000 V (direct connection) or 250 V (with VTs)
			C						POWER SUPPLY 24-230 Vac/dc
				0 1					ADDITIONAL FUNCTIONS - +25 + 27-L + 59-L
					A B				COMMUNICATIONS A: USB (Modbus RTU) + RS485: (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) B: USB (Modbus RTU) + RS485 (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + RJ45 (Modbus TCP or DNP3.0 TCP or IEC60870-5-104)) + Web Server + SNTP Protocol + IRIG-B
						1			INPUTS AND 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
									ADAPTATION B (2) 50 + SOTF + 50G + 50N + (4) 67/51 + (2) 67G/51G + (2) 67N/51N + 67GI + 67NI + 64REF + 46 + 46BC + 49 + 49T + 37 + (2) 27 + 27V1 + (2) 59 + (2) 59N/G + 47 + (4) 32 + (4) 81U/O + (4) 81R + 78 + (2) 24 + 79 + 74TCS + 60CTS + 60VTS + 50BF + SHB + CLP + 52 + 86 + HLT

Example of ordering code:

0	0	0	C	0	A	1	C	A	B	SIL C 0 0 0 C 0 A 1 C A B
SIL-C										

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



永岳機電科技有限公司 YONGYEA TECHNOLOGY LTD.

242003新北市新莊區景德路308號2樓

T : (02)8791-9737

F : (02)8791-9738

Mail : sales@yongyea.com.tw Http : //www.yongyea.com.tw

永岳機電