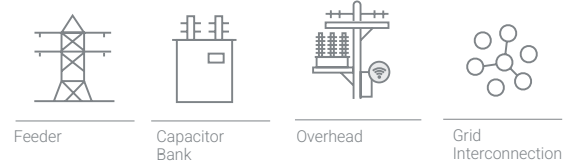


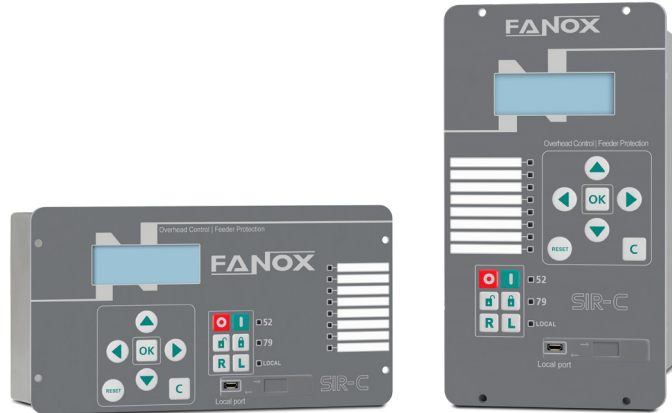
SIR-C

OVERHEAD CONTROL & FEEDER PROTECTION RELAY

Primary & Secondary Distribution Protection



PM I V f CI Std. CTs /1/5 VI Voltage sensors

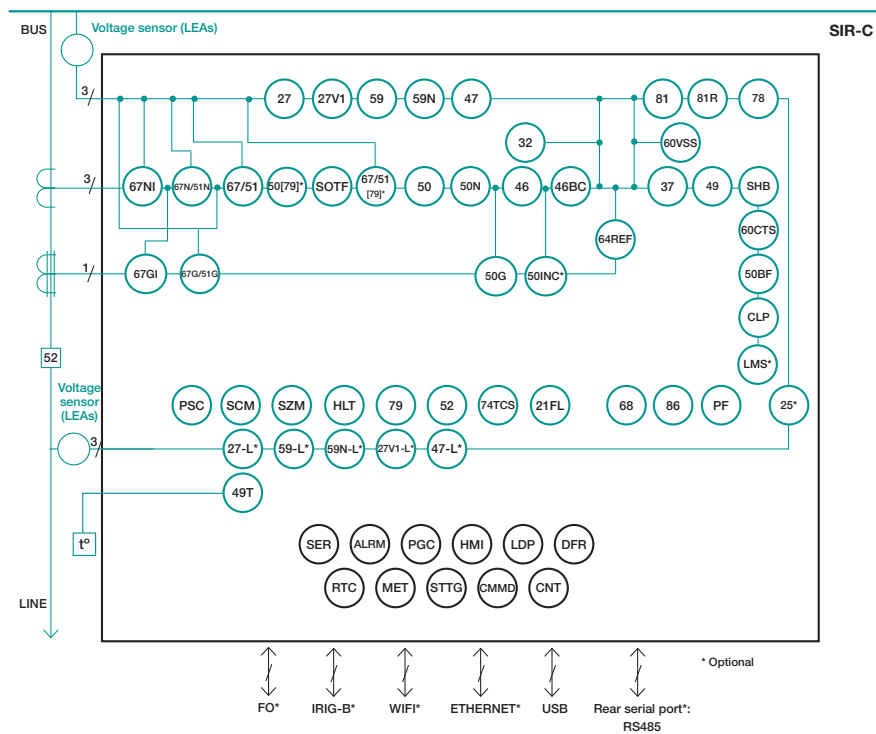


KEMA Labs

G99 Compliant

- The SIR-C is an overhead control and feeder protection relay that includes current, voltage, and frequency functions for primary and secondary distribution, fitted with an auxiliary power supply of 24-230 Vdc/ac.
- 4 current channels for conventional /1 and /5 current transformers and 6 voltage channels for capacitive and resistive low power voltage sensors (LEAs).
- Metal housing with a high electromagnetic compatibility level (EMC) and a wide range of operating temperature.
- Protection against 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. In case this situation is not detected, a network safety hazard can be present if the generator remains connected since an automatic reconnection of the generator may occur, causing damage to the generator and the network. SIR-C relay detects this hazardous situation thanks to its voltage and frequency functions based on the Rate of change of frequency (ROCOF) method.
- Signalling and control of the circuit breaker (52 function) and the recloser (79 function).
- The front part of the SIR-C relay is provided with a navigation keypad made of 7 keys (including the RESET key), 6 programmable hot keys that by default are configured: two (2) keys to open and close the CB, two (2) keys to block and unblock the recloser and two (2) keys to put the relay in local or remote mode with their associated three (3) configurable control LEDs. Besides, there are eight (8) programmable alarm LEDs.
- 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 through the SOTF function.
- To allow the communication, the SIR-C relays are provided with a local micro-USB front port and with remote communication options (ports and protocols) on the rear side:
 - » Rear Serial 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.
- Wireless communication (Wi-Fi) and synchronization through IRIG-B are optional (depending on the model).
- Alarms panel is available.
- The SIR-C is provided with (depending on the model):
 - » 8 configurable inputs and 7 configurable outputs.
 - » 11 configurable inputs and 5 configurable outputs.
- The SIR-C is fitted with demand of power (LDP - Load Data Profiling) with the following characteristics:
 - » Number of records: 2160.
 - » Circular recording mode.
 - » Sampling rate (interval): configurable through communications (1-60 min).
- The SIR-C is provided with non-volatile RAM memory in order to store up to 3072 events and the disturbance fault recording (DFR), maintaining date & time thanks to its internal RTC (Real Time Clock). The configurable options are:
 - » 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 program allows the oscillography record to be downloaded and saved in COMTRADE format (IEEE C37.111-1991).

FUNCTIONS DIAGRAM SIR-C



ANSI CODE PROTECTIONS

50	Instantaneous phase overcurrent
67/51	Inverse time directional phase overcurrent
50[79] (*)	Instantaneous phase overcurrent – Adjustment by reclosing cycle
67/51[79] (*)	Inverse time directional phase overcurrent - Adjustment by reclosing cycle
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
50INC (*)⁽¹⁾	Incipient/Intermittent Fault detection
37	Instantaneous phase undercurrent
49	Thermal overload
49T	External trip
SHB	Second Harmonic Blocking
59	Instantaneous phase overvoltage (Bus bar)
59N	Instantaneous calculated neutral overvoltage (Bus bar)
59-L	Instantaneous phase overvoltage (Line)
59N-L	Instantaneous calculated neutral overvoltage (Line)
47	Phase balance voltage protection (Bus bar)
47-L	Phase Balance voltage protection (Line)
27	Instantaneous phase undervoltage (Bus bar)
27-L	Instantaneous phase undervoltage (Line)
27V1	Instantaneous positive sequence undervoltage (Bus bar)

ADDITIONAL FUNCTIONS

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

27V1-L	Instantaneous positive sequence undervoltage (Line)
32	Directional overpower
81O/U	Under/Overfrequency
81R	Rate of Change of Frequency (ROCOF)
78	Out of Step (Vector Shift)
SCM	Sequence Coordination Mode
SZM	Sectionalizer Mode
CLP	Cold Load Pickup
79	AC Reclosing device
52	Breaker wear monitoring
25	Synchro Check
HLT	Hot Line Tag
50BF	Circuit Breaker Failure
74TCS	Trip Circuit Supervision
60CTS	Phase CT Supervision
60VSS	Phase LPVT Supervision
21FL	Fault Locator
LMS (*)⁽¹⁾	Load Management System
PF⁽¹⁾	Power Flow
86	Trip lockout
68	Zone Selection Interlocking (ZSI)
PR⁽²⁾	Phase Rotation
PSC	Power Supply Control
PGC	Programmable logic control

(*) Optional depending on the model

⁽¹⁾ Available from version 1.22.00 onwards⁽²⁾ Available from version 1.23.00 onwards.

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.

ANSI 50G, ANSI 67G and ANSI 67GI will be converted into ANSI 50GS, ANSI 67GS and ANSI 67GSI in the model with neutral current measurement digit 1 (IN = 0.1A or 1A)

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

TECHNICAL PARAMETERS SIR-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	Timing accuracy: ± 35 ms or $\pm 0.5\%$ (greater of both)
	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%
Function 50G	Temporized deactivation
	Timing accuracy: ± 35 ms or $\pm 0.5\%$ (greater of both)
	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%
Function 67/51-1 Function 67/51-2 (*) Function 67/51-3 (*) Function 67/51-4 (*)	Deactivation level: 95%
	Temporized deactivation
	Timing accuracy: ± 35 ms or $\pm 0.5\%$ (greater of both)
	Function enable: No/Alarm/Trip/SHB Trip
	Curve Type: IEC60255-151 (Definite time, standard inverse, very inverse, extremely inverse, long-time inverse, short time inverse), IEEE (Moderately inverse, very inverse, extremely inverse), U, SMU and RC curves.
	User defined curves (curve 1, curve 2, curve 3, curve 4) ⁽²⁾
	For IEC Definite time curve, 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)
	If Curve type U: 0.05 to 15.00 (step 0.01)
	If Curve type RC: 0.10 to 2.00 (step 0.01)
	Current tap: 0.010 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 359° (step 1°)
	Halfcone angle: 10 to 170° (step 1°)
	Curve, current activation level: 110%
	Curve, current deactivation level: 100%
	Definite time, current activation level: 100%
	Definite 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 $\pm 5\%$ (greater of both)
	Timing accuracy for defined time curve selection: ± 35 ms or $\pm 0.5\%$ (greater of both)

Function 67N/51N-1 Function 67N/51N-2	Function enable: No/Alarm/Trip/SHB Trip
	Curve Type: IEC60255-151 (Definite time, standard inverse, very inverse, extremely inverse, long-time inverse, short time inverse), IEEE (Moderately inverse, very inverse, extremely inverse), U, SMU and RC curves.
	User defined curves (curve 1, curve 2, curve 3, curve 4) ⁽²⁾
	For IEC Definite time curve, time delay: 0.000 to 300.000 s (step 0.001 s)
	Time dial (TMS): 0.01 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)
	If Curve type U: 0.05 to 15.00 (step 0.01)
	If Curve type RC: 0.10 to 2.00 (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 359° (step 1°)
	Halfcone angle: 10 to 170° (step 1°)
	Curve, current activation level: 110%
	Curve, current deactivation level: 100%
	Definite time, current activation level: 100%
	Definite 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 $\pm 5\%$ (greater of both)
	Timing accuracy for defined time curve selection: ± 35 ms or $\pm 0.5\%$ (greater of both)

TECHNICAL PARAMETERS SIR-C

Function 67G/51G-1	Function enable: No/Alarm/Trip/SHB Trip
	Curve Type: IEC60255-151 (Definite time, standard inverse, very inverse, extremely inverse, long-time inverse, short time inverse), IEEE (Moderately inverse, very inverse, extremely inverse), U, SMU, and RC curves.
	User defined curves (curve 1, curve 2, curve 3, curve 4) ⁽²⁾
	For IEC Definite time curve, time delay: 0.000 to 300.000 s (step 0.001 s)
	Time dial (TMS): 0.01 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)
	If Curve type U: 0.05 to 15.00 (step 0.01)
	If Curve type RC: 0.10 to 2.00 (step 0.01)
	Current tap: 0.010 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 359° (step 1°)
	Halfcone angle: 10 to 170° (step 1°)
	Curve, current activation level: 110%
	Curve, current deactivation level: 100%
	Definite time, current activation level: 100%
	Definite time, current deactivation level: 95%
	Voltage activation level: 100%
	Voltage deactivation level: 95%
Function 67NI	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 enable: No/Alarm/Trip/SHB Trip
	Directionality: No/Forward/Reverse
	Low Current Tap: 0.010 to 30.000 xIn (step 0.001xIn)
	High Current Tap: 0.010 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 359° (step 1°)
	Halfcone angle: 10 to 170° (step 1°)
	Activation level: 100%
	Deactivation level: 95%
	Temporized deactivation
	Timing accuracy: ± 30 ms or ± 5% (greater of both)

Function 67GI	Function enable: No/Alarm/Trip/SHB Trip
	Directionality: No/Forward/Reverse
	Low Current Tap: 0.010 to 30.000 xIn (step 0.001xIn)
	High Current Tap: 0.010 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 359° (step 1°)
	Halfcone angle: 10 to 170° (step 1°)
	Activation level: 100%
50[79] (*)	Deactivation level: 95%
	Temporized deactivation
	Timing accuracy: ± 30 ms or ± 5% (greater of both)
	Function enable: No/Alarm/Trip/SHB Trip
	Current tap: 0.010 to 30.000 xIn (step 0.001xIn)
	5 independent tap settings for each reclose number (79-0, 79-1, 79-2, 79-3, 79-4)
	Time delay: 0.000 to 300.000 s (step 0.001 s)
	5 independent time delay settings for each reclose number (79-0, 79-1, 79-2, 79-3, 79-4)
	Activation level: 100%
	Deactivation level: 95%
	Temporized deactivation
	Timing accuracy: ± 35 ms or ± 0.5% (greater of both)

TECHNICAL PARAMETERS SIR-C

51/67[79] (*)	Function enable: No/Alarm/Trip/SHB Trip	Function 50INC (*) ⁽¹⁾	Function enable: No/Alarm/Trip
	Curve Type: IEC60255-151 (Definite time, standard inverse, very inverse, extremely inverse, long-time inverse, short time inverse), IEEE (Moderately inverse, very inverse, extremely inverse), U, SMU, and RC curves.		Phase Current Tap: 0.500 to 20.000 xIn (step 0.001xIn)
	User defined curves (curve 1, curve 2, curve 3, curve 4) ⁽²⁾		Pickup Peaks number: 1 to 10 (step 1)
	5 independent curve type settings for each reclose number (79-0, 79-1, 79-2, 79-3, 79-4)		Trip Peak number: 1 to 10 (step 1)
	For IEC Definite time curve, time delay: 0.000 to 300.000 s (step 0.001 s)	Function 49	Function enable: No/Alarm/Trip
	5 independent time delay settings for each reclose number (79-0, 79-1, 79-2, 79-3, 79-4)		Current tap: 0.100 to 2.400 In (step 0.001xIn)
	Time dial (TMS): 0.01 to 25.00 (step 0.01)		ζ heating: 3 to 600 min (step 1 min)
	If Curve type IEC: 0.01 to 1.00 (step 0.01)		ζ cooling: 1 to 6 xζ heating (step 1)
	If Curve type IEEE: 0.01 to 25.00 (step 0.01)		Alarm: 20 to 99% (step 1%)
	If Curve type U: 0.05 to 15.00 (step 0.01)		Trip level: 100%
	If Curve type RC: 0.10 to 2.00 (step 0.01)		Deactivation level: 95% of alarm level
	5 independent time dial settings for each reclose number (79-0, 79-1, 79-2, 79-3, 79-4)	Function SHB	Timing accuracy: ± 5% respect of theoretical value.
	Current tap: 0.010 to 20.000 xIn (step 0.001xIn)		Function enable: No/Yes
	5 independent tap settings for each reclose number (79-0, 79-1, 79-2, 79-3, 79-4)		Current Tap: 5 to 50% (step 1%)
	Directionality: No/Forward/Reverse		Reset Time: 0.000 to 300.000 (step 0.001 s)
	Polarization voltage: 0.04 to 2.00 xUn (step 0.01xUn)	Function CLP	Block Threshold: 0.010 to 30.000xIn (step 0.001xIn)
	Operating angle: 0 to 359° (step 1°)		Activation level: 100%
	Halfcone angle: 10 to 170° (step 1°)		Deactivation level: 95%
	Curve, current activation level: 110%		Temporized deactivation
	Curve, current deactivation level: 100%	Function 46	Function enable: Yes/No
	Definite time, current activation level: 100%		Settings group: 1 to 6 (step 1)
	Definite time, current deactivation level: 95%		No load time: 0.020 to 300.000 s (step 0.001 s)
	Voltage activation level: 100%		Cold load time: 0.020 to 300.000 s (step 0.001 s)
	Voltage deactivation level: 95%		Open breaker activation 0.8% In and reset threshold: 1% In
	Temporized deactivation		Function enable: No/Alarm/Trip/SHB Trip
	Timing accuracy for IEC and IEEE curves selection: ± 30 ms or ± 5% (greater of both)		Curve Type: IEC60255-151 (Definite time, standard inverse, very inverse, extremely inverse, long-time inverse, short time inverse), IEEE (Moderately inverse, very inverse, extremely inverse), U, SMU, and RC curves.
	Timing accuracy for defined time curve selection: ± 35 ms or ± 0.5% (greater of both)		User defined curves (curve 1, curve 2, curve 3, curve 4) ⁽²⁾
Function 64REF	Function enable: No/Alarm/Trip/ IN SHB Trip		For IEC Definite time curve, time delay: 0.000 to 300.000 s (step 0.001 s)
	Current tap: 0.050 to 20.000 xIn (step 0.001xIn)		Time dial (TMS): 0.01 to 25.00 (step 0.01)
	Time delay: 0.020 to 300.000 s (step 0.001 s)		If Curve type IEC: 0.01 to 1.00 (step 0.01)
	Neutral SHB Tap: 5 to 50% (step 1%)		If Curve type IEEE: 0.01 to 25.00 (step 0.01)
	Activation level: 100%		If Curve type U: 0.05 to 15.00 (step 0.01)
	Deactivation level: 90%		If Curve type RC: 0.10 to 2.00 (step 0.01)
	Temporized deactivation		Current tap: 0.010 to 20.000 xIn (step 0.001xIn)
Function SOTF	Timing accuracy: ± 35 ms or ± 5% (greater of both)		Curve, current activation level: 110%
	Function enable: No/Alarm/Trip/SHB Trip		Curve, current deactivation level: 100%
	Current tap: 0.010 to 30.000 xIn (step 0.001xIn)		Definite time, current activation level: 100%
	Time delay: 0.000 to 295.000 s (step 0.001 s)		Definite time, current deactivation level: 95%
	Safe Time: 0.020 to 300.000 s (step 0.001 s)		Temporized deactivation
	Activation level: 100%		Timing accuracy for IEC and IEEE curves selection: ± 30 ms or ± 5% (greater of both)
	Deactivation level: 95%		Timing accuracy for defined time curve selection: ± 35 ms or ± 0.5% (greater of both)

TECHNICAL PARAMETERS SIR-C

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%
	Temporized deactivation
	Timing accuracy: ± 30 ms or $\pm 0.5\%$ (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%
	Timing accuracy: ± 30 ms or $\pm 0.5\%$ (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%
Function 27-L (*)	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%
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%

Function 27V1-L (*)	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%
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%
	Timing accuracy: ± 30 ms or $\pm 0.5\%$ (greater of both)
Function 59-L (*)	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%
	Timing accuracy: ± 30 ms or $\pm 0.5\%$ (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%
	Timing accuracy: ± 30 ms or $\pm 0.5\%$ (greater of both)
Function 59N-L (*)	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%
	Timing accuracy: ± 30 ms or $\pm 0.5\%$ (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%
	Timing accuracy: ± 30 ms or $\pm 0.5\%$ (greater of both)

TECHNICAL PARAMETERS SIR-C

Function 47-L (*)	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 $\pm 0.5\%$ (greater of both)
Function 32-1	Function enable: No/Alarm/Trip
Function 32-2	Activation level: 0.02 to 2.00 xSn (step 0.01xSn)
Function 32-3	Operating angle: 0 to 359° (step 1°)
Function 32-4	Time delay: 0.020 to 300.000 s (step 0.001 s)
Function 81-1 Function 81-2 Function 81-3 Function 81-4 Function 81-5 Function 81-6	Activation level: 100%
	Deactivation level: 95%
	Instantaneous deactivation
	Timing accuracy: ± 30 ms or $\pm 0.5\%$ (greater of both)
	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 6% of the LEA Vrms maximum value (Vrms is 2.8, 5.2, 8 or 16 Vrms depending on model)
	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 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 6% of the LEA Vrms maximum value (Vrms is 2.8, 5.2, 8 or 16 Vrms depending on model)
	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 6% of the LEA Vrms maximum value (Vrms is 2.8, 5.2, 8 or 16 Vrms depending on model)
	Temporized deactivation
	Measurement accuracy: $\pm 1^\circ$ or 10% (greater of both)

Function 25 (*)	Dead tap: 0.04 to 2.00 xUn (step 0.01xUn)
	Live tap: 0.04 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)
	Synchro check time: 0.020 to 300.000 s (step 0.001 s)
Function 79	Number of recloses: 0 to 4 (step 1)
	Reclose times 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 0.001 s)
	Safe time: 0.020 to 2000.000 s (step 0.001 s)
	Locking possibilities: pulse inputs, level inputs, commands.
Function SCM	Number of shots: 0 to 4 (step 1)
	Reset time: 0.020 to 2000.000 s (step 0.001 s)
Function SZM	Number of shots: 0 to 4 (step 1)
	Reset time: 0.020 to 2000.000 s (step 0.001 s)
	Max open time: 0.020 to 2000.000 s (step 0.001 s)
	Max close time: 0.020 to 2000.000 s (step 0.001 s)
	Fault current: 0.010 to 20.000 s (step 0.001 xIn)
	Voltage supervision time: 0.000 to 300.000 s (step 0.001 s)
	Dead tap: 0.04 to 2.00 xUn (step 0.01 xUn)
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: 0.8% 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 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
Function 60VSS	Detection of the loss of one phase CT
	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 $\pm 0.5\%$ (greater of both)

TECHNICAL PARAMETERS SIR-C

Function 50BF	Function enable: No/Yes	Function 86	It allows to latch (lockout) the contact trip due to programmable logic (PGC: RSFF or SRFF).
	Time delay: 0.020 to 1.000 s (step 0.001 s)		
	Open breaker activation and reset threshold: 0.8% In		
Function 21FL	Function enable: No/Yes	Function 68	Available through configurable inputs and outputs thanks to the programmable logic (PGC).
	Line length 0.1 to 100.0 km (step 01 km)	Function Phase Rotation ⁽²⁾	Available by selecting "phase rotation" and "CT polarity" settings in general settings menu.
	Z1 line magnitude: 0.001 to 5.000 (step 0.001 Ω /km)		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 and NON-VOLATILE FF. RSFF, RSFF_1PULSE, RSFF_PULSES, RSFF_BLINKING, RSFF_TIMER UP, RSFF_TIMER DOWN and NON-VOLATILE FF. R_EDGE, R_EDGE_1PULSE F_EDGE, F_EDGE_1PULSE
	Z1 line angle: 1 to 90° (step 1°)	Programmable logic control (PGC)	
	Z0 line magnitude: 0.001 to 5.000 (step 0.001 Ω /km)		
	Z0 line angle: 1 to 90° (step 1°)		
LMS (*) ⁽¹⁾	Function enable: No/Yes	Settings groups	6 settings groups
	No Peak Mode: Alarm/Trip		Selectable by input, communications, user commands or general setting.
	Peak mode: Alarm/Trip	SER	3072 events
	Peak period starting month: January to December	Disturbance Fault Recording (DFR)	32 samples/cycle
	Peak period starting day: 1 to 31 (step 1)		10 analog channels and 96 configurable digital channels
	Peak period ending month: January to December		Configurable DFR start
	Peak period ending day: 1 to 31 (step 1)		Configurable number of records depending on the size:
	Peak period starting hour: 0 to 23 (step 1 hour)		5 records in data and COMTRADE format (300 cycles each record): 1 to 8 pre-fault cycles + 292 to 299 postfault cycles.
	Peak period starting minute: 0 to 59 (step 1 minute)		25 records in data and COMTRADE format (60 cycles each record): 1 to 8 pre-fault cycles + 52 to 59 postfault cycles.
	Peak period ending hour: 0 to 23 (step 1 hour)		50 records in data and COMTRADE format (30 cycles each record): 1 to 8 pre-fault cycles + 22 to 29 postfault cycles.
	Peak period ending minute: 0 to 59 (step 1 minute)		100 records in data and COMTRADE format (15 cycles each record): 1 to 8 pre-fault cycles + 7 to 14 postfault cycles.)
	Peak period starting day of week: Monday to Sunday		COMTRADE IEEE C37.111-1991
	Peak period ending day of week: Monday to Sunday		Up to 100 fault reports (data format) with 29 events each one
	Reset Time: 0 to 18000 s (step 1 s)	Load Data Profiling (LDP)	Demand of power with the following characteristics:
	Peak period Tap: 0.010 to 30.000 xIn (step 0.001xIn)		- Number of records: 2160
	Peak trip Time 1: 0 to 18000 s (step 1 s)		- Circular recording mode
	Peak trip Time 2: 0 to 18000 s (step 1 s)		- Sampling rate (interval): configurable through communications (1-60 min)
	Peak trip Time 3: 0 to 18000 s (step 1 s)		
	Peak trip Time 4+: 0 to 18000 s (step 1 s)	Inputs (*)	Depending on Model:
	Peak Number of recloses: 0 to 247 (Step 1)		- 8 configurable inputs
	Peak Interval Time 1: 0 to 18000 s (Step 1 s)		- 11 configurable inputs
	Peak Interval Time 2: 0 to 18000 s (Step 1 s)		The voltage of the inputs is the same as the auxiliary power supply
	Peak Interval Time 3: 0 to 18000 s (Step 1 s)		Burden: 24 Vdc: <20 mW
	Peak Interval Time 4+: 0 to 18000 s (Step 1 s)		230 Vdc: <200 mW
	No Peak period Tap: 0.010 to 30.000 xIn (step 0.001xIn)		24 Vac: <50 mW
	No Peak trip Time 1: 0 to 18000 s (step 1 s)		230 Vac: <500 mW
Power supply control	Function enable: No/Yes		
	V supply alarm 1: 19 to 220 Vdc (step 1 V)		
	V supply alarm 2: 19 to 220 Vdc (step 1 V)		
Function 49T	Available through configurable inputs thanks to the programmable logic		
Power Flow ⁽¹⁾	Function enable: No/Yes		
	Settings Group: 1-6		
	Interval Time: 0.02 to 300 s (step 0.001)		
	Power Flow Direction: ABC to RST or RST to ABC		

TECHNICAL PARAMETERS SIR-C

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: $<0.015 \text{ VA (1 A) \& } <0.375 \text{ VA (5 A)}$ Burden of voltage inputs (depending on the model): SIR001 (8 Vrms – 1 MOhm) → Burden= 0.064 mVA SIR002 (5.2 Vrms – 2 MOhms) → Burden= 0.01352 mVA SIR003 (16 Vrms – 2 MOhms) → Burden= 0.128 mVA SIR004 (2.8 Vrms – 20 MOhms) → Burden= 0.000392 mVA Burden of power supply unit: $24\text{-}230 \text{ Vdc/Vac: } < 12 \text{ VA}$ Burden for binary inputs: 24 Vdc: $<20 \text{ mW}$ 230 Vdc: $<200 \text{ mW}$ 24 Vac: $<50 \text{ mW}$ 230 Vac: $< 500 \text{ mW}$
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, I-N2H), current total harmonic distortion (THD-A, THD-B and THD-C). Fundamental values (DFT) Sampling: 32 samples/cycle Phase and Neutral (1 A or 5 A): $\pm 2\%$ precision in a band covering $\pm 20\%$ of nominal current and $\pm 4\%$ or $\pm 5 \text{ mA}$ in the rest of the range Neutral (0.1 A): $\pm 2\%$ precision in a band covering $\pm 20\%$ of nominal current and $\pm 4\%$ or $\pm 0.5 \text{ mA}$ in the rest of the range Current measurement range: From 0.01 to 30 times the nominal current
Voltage measurements	Phase voltage (V-A, V-B, V-C), line voltage (VL-A, VL-B, VL-C), phase-phase voltage (UAB, UBC, UCA), neutral voltage (VR, 3-V0), neutral line voltage (3-VL0), positive sequence voltage (V-1) and negative sequence voltage (V-2), line positive sequence (VL-1) and line negative sequence (VL-2), maximum voltage (VMAX) and maximum line voltage (VLMAX). Fundamental values (DFT) Sampling: 32 samples/cycle 1% precision in a band covering $\pm 20\%$ of nominal 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. Voltage measurement range: Measured voltage: From $(0.01282 \times \text{LEA Maximum voltage} \times \text{Ratio})$ to $2.4 \times \text{Un}$ Calculated voltage: From $(0.013 \times \text{LEA Maximum voltage} \times \text{Ratio})$ to $2.4 \times \text{Un}$

Angle measurements	Current Angles: IA, IB, IC, IN and 3I0. Voltage Angles: VA, VB, VC, VR, VLA, VLB, VLC, 3V0, UAB, UBC and UCA. Power factor: Cos PHI-A, Cos-PHI-B and Cos-PHI-C Accuracy: $\pm 2^\circ$ Angle measurement range: From 0 to 359°
Power measurements	Total and per phase active power Total and per phase reactive power Total and per phase apparent power Power factor: Cos PHI-A, Cos-PHI-B and Cos-PHI-C 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: 5.77% of the LEA Vrms maximum value (2.8, 5.2, 8 or 16 Vrms depending on model) Accuracy: $\pm 0.005 \text{ Hz}$ Frequency measurement range: From 45 to 65 Hz
Communications	Local port (micro-USB): Modbus RTU Wireless communication (Wi-Fi) (*) Rear Serial Port (RS485): Modbus RTU, DNP3.0 and IEC60870-5-103 (selectable by general settings) (*) Rear Ethernet Port (RJ45 (10/100 Base-Tx) or FO-LC(10/100 Base-Fx)): Modbus TCP/IP, DNP3.0 TCP/IP, IEC60870-5-104 or IEC61850 (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: $< 20 \text{ VA}$
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 the model

⁽¹⁾ Available from fw version 1.22.00 onwards.

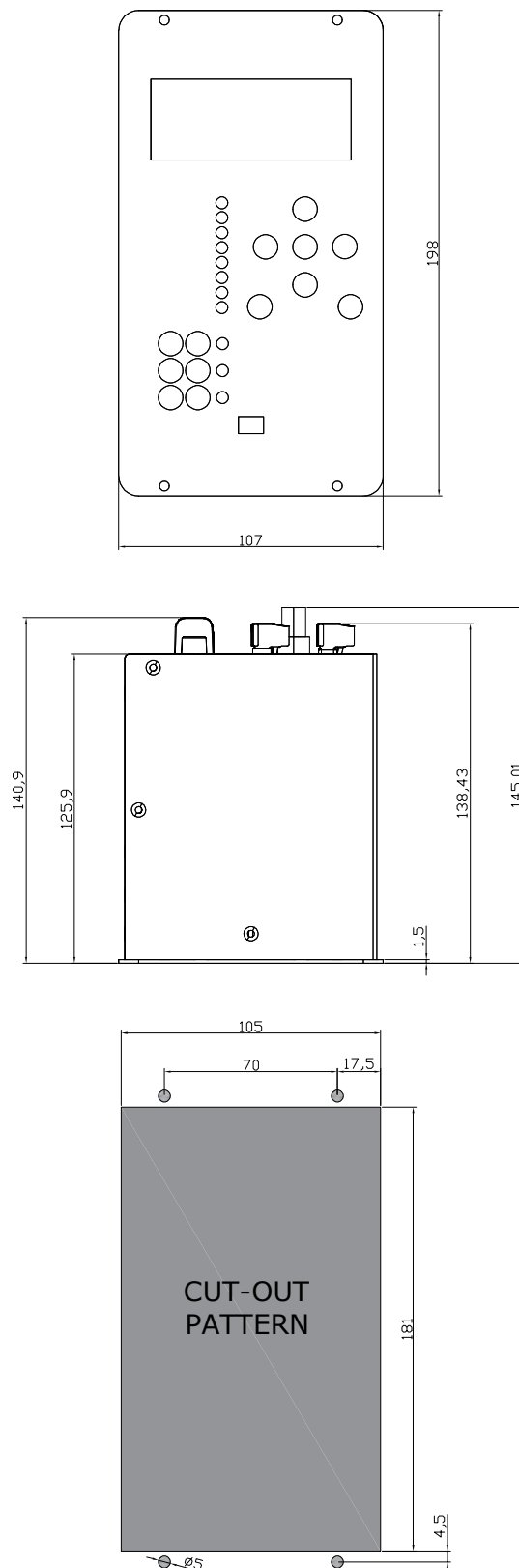
⁽²⁾ Available from fw version 1.23.00 onwards.

NOTE: 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.

NOTE: ANSI 50G, ANSI 67G and ANSI 67GI will be converted into ANSI 50GS, ANSI 67GS and ANSI 67GSI in the model with neutral current measurement digit 1 (IN = 0.1A or 1A)

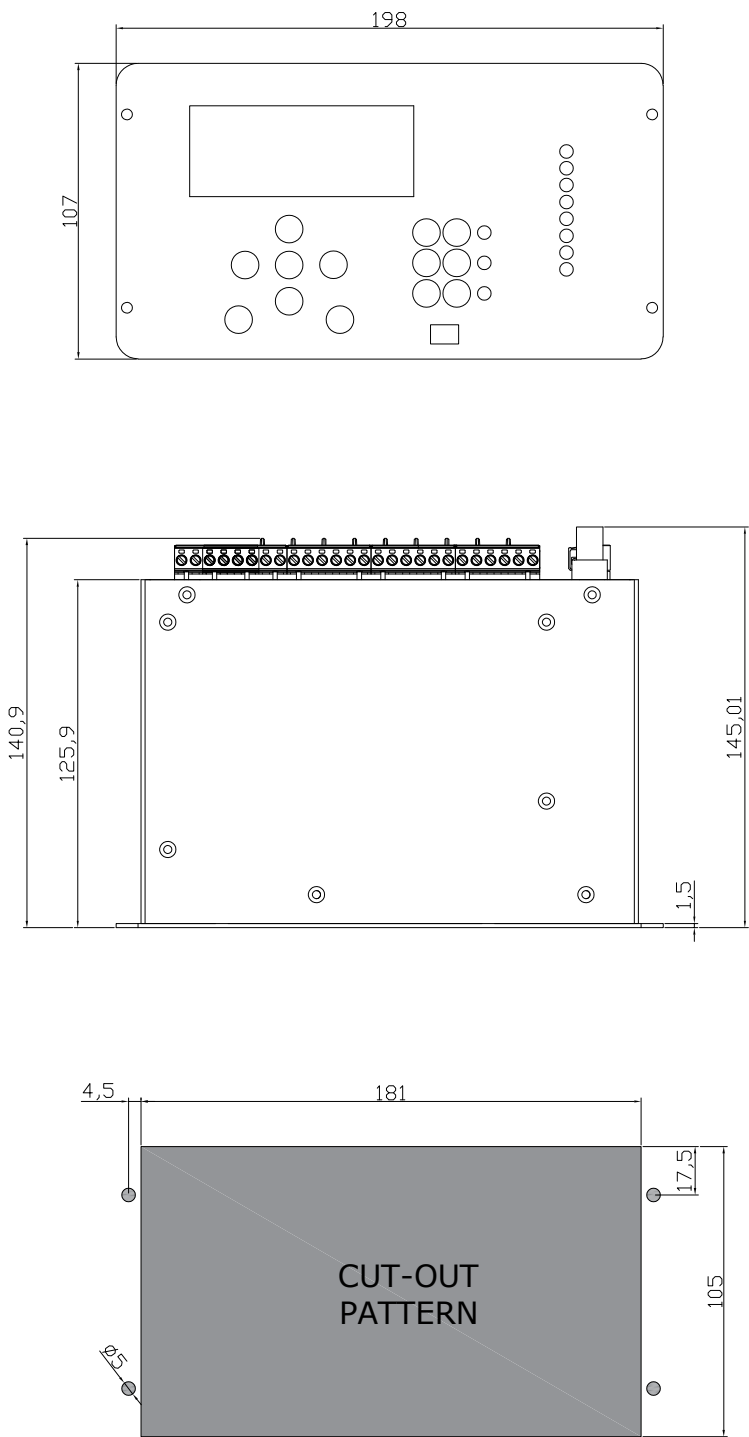
DIMENSIONS AND CUTOUT SIR-C

Vertical assembly



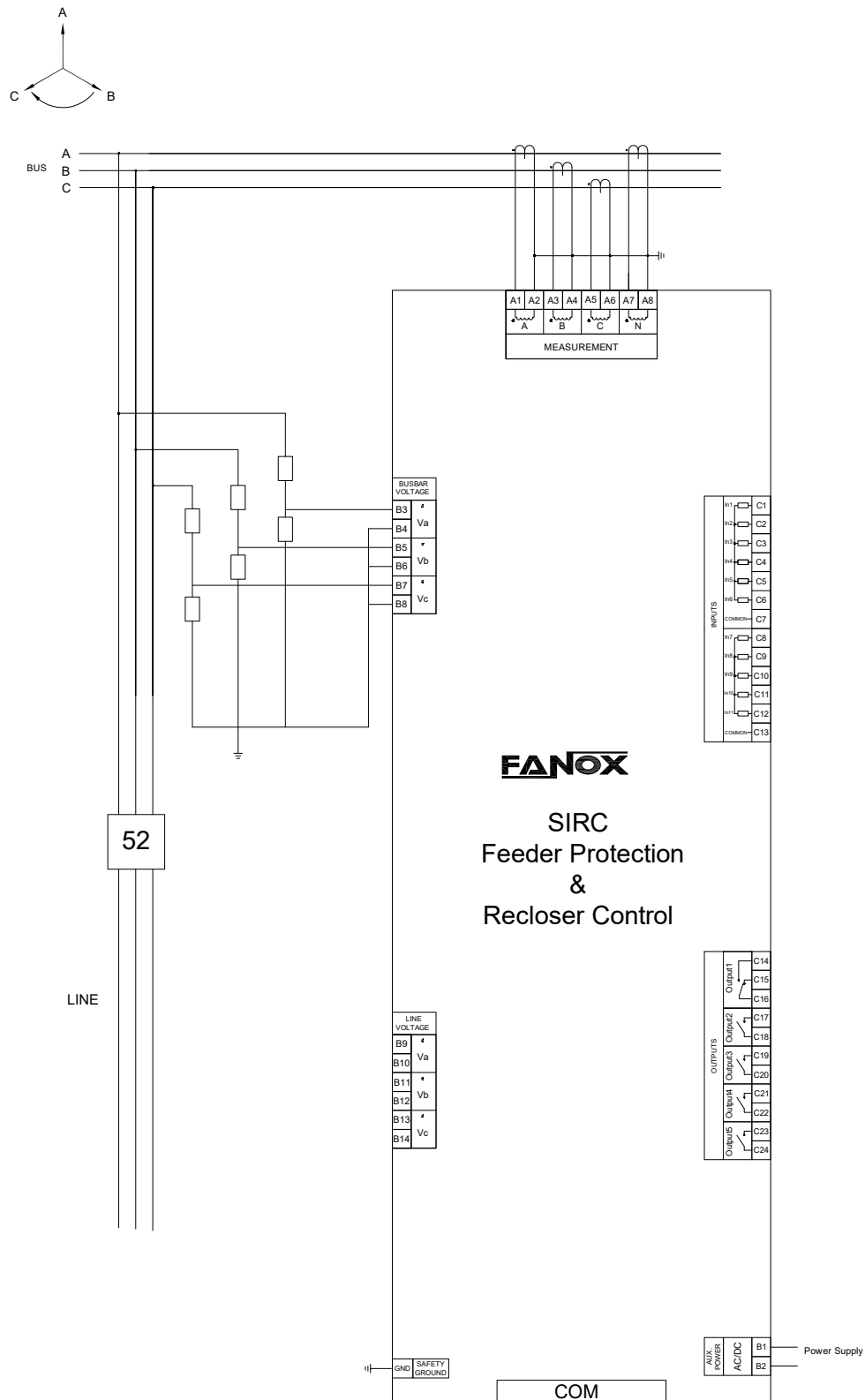
DIMENSIONS AND CUTOUT SIR-C

Horizontal assembly



CONNECTIONS DIAGRAM SIR-C

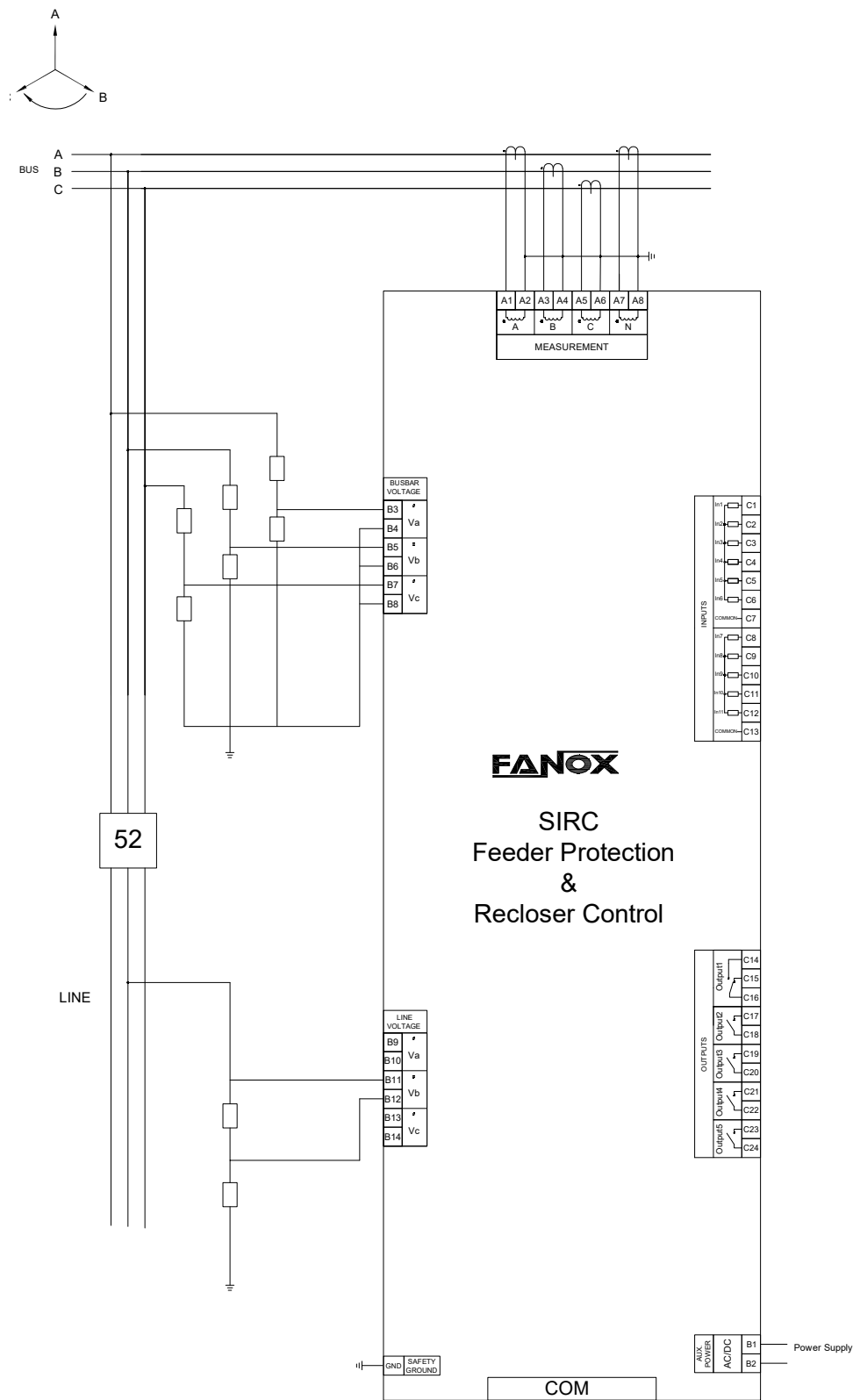
3 resistive sensors + 4 current transformers



(*) Example of connections diagram

CONNECTIONS DIAGRAM SIR-C

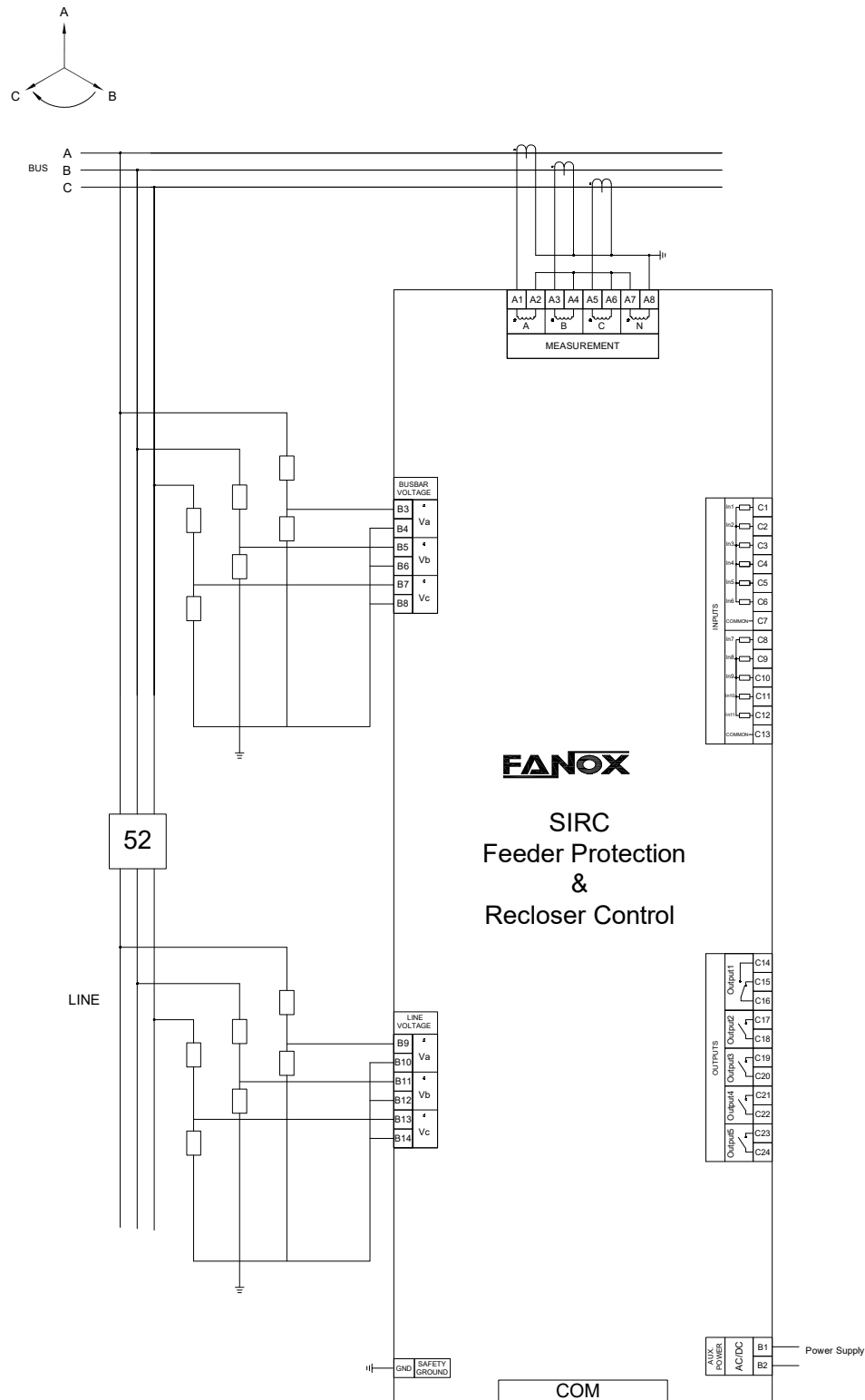
4 resistive sensors + 4 current transformers



(*) Example of connections diagram

CONNECTIONS DIAGRAM SIR-C

6 resistive sensors + 3 current transformers



(*) Example of connections diagram

SELECTION & ORDERING DATA SIR-C

SIR-C

Feeder & Recloser Control

0										PHASE CURRENT MEASUREMENT 1 A or 5 A
	0 1									NEUTRAL CURRENT MEASUREMENT 1 A or 5 A 1 A or 0.1 A
		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 24-220 Vdc / 100-230Vac
				0 1 2 3 4 5 6						ADDITIONAL FUNCTIONS + (1) 50 + (3) 67/51 + (1) 50 + (3) 67/51 + LMS + (1) 50 + (3) 67/51 + 25 + 27-L + 59-L + 47-L + 27V1-L + 59N-L + 50[79] + 67[79] + 50[79] + 67[79] + 25 + 27-L + 59-L + 47-L + 27V1-L + 59N-L + (1) 50 + (3) 67/51 + 50INC (21FL) ³ + (1) 50 + (3) 67/51 + 50INC (21FL) ³ + LMS
					A B 2 E G 3 J M N O P Q R U V					COMMUNICATIONS A: 1xUSB + 1xRS485 B: 1xUSB + 1xRS485 + 1xRJ45 + IRIG-B 2 : 1xUSB + 1xRS485 + 1xRJ45 + HSR/PRP RJ45 + IRIG-B E: 1xUSB + 1xRS485 + 1xRJ45 + HSR/PRP SFP Cages + IRIG-B G: 1xUSB + WiFi + 1xRS485 + 1xRJ45 + IRIG-B 3 : 1xUSB + WiFi + 1xRS485 + 1xRJ45 + HSR/PRP RJ45 + IRIG-B J: 1xUSB + WiFi + 1xRS485 + 1xRJ45 + HSR/PRP SFP Cages + IRIG-B M: 1xUSB + 1xRS485 + 2xRJ45 + IRIG-B N: 1xUSB + WiFi + 1xRS485 + 2xRJ45 + IRIG-B O: 1xUSB + 1xRS485 + 1xRJ45 + IRIG-B P: 1xUSB + WiFi + 1xRS485 + 1xRJ45 + IRIG-B Q: 1xUSB + 1xRS485 + 1xFO-LC+ IRIG-B R: 1xUSB + WiFi + 1xRS485 + 1xFO-LC + IRIG-B U: 1xUSB + 1xRS485 + 1xRJ45 + 1xSFP Cage + IRIG-B V: 1xUSB + WiFi + 1xRS485 + 1xRJ45 + 1xSFP Cage + 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 50 + SOTF + 50G + 50N + 67/51 + (2) 67G/51G + (2) 67N/51N + 67GI + 67NI + 64REF + 46 + 46BC + 49 + 49T + 37 + (2) 27 + 27V1 + (2) 59 + (2) 59N + 47 + (4) 32 + (6) 81U/O + (2) 81R + 78 + 79 + 74TCS + 60CTS + 60VSS + 50BF + SHB + CLP + 52 + 86 + SCM+ SZM + HLT + 21FL ³ + Power Supply Control + Power Flow + Phase Rotation

Example of ordering code:

0	0	2	C	0	A	0	C	A	B	SIR C 0 0 2 C 0 A 0 C A B
SIR-C										

SELECTION & ORDERING DATA SIR-C

PORTS	PROTOCOLS	
USB	Modbus RTU	
WiFi	Modbus TCP	
RS485	Modbus RTU, IEC60870-5-103 or DNP3.0 Serial	
FO-LC	Modbus TCP or DNP3.0 TCP, IEC60870-5-104 or IEC61850 + SNTP Protocol	
SFP Cage	Modbus TCP, DNP3.0 TCP, IEC60870-5-104 or IEC61850, SNTP Protocol	
RJ45	Communications digits B and G	Communications digits 2, E, 3, J, M, N, O, P, U and V:
	RJ45: Modbus TCP, DNP3.0 TCP or IEC60870-5-104 + SNTP Protocol	RJ45: Modbus TCP or DNP3.0 TCP, IEC60870-5-104 or IEC61850, SNTP Protocol

Not all combinations are possible. Please, confirm with Fanox chosen model.

NOTES:

- » 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.
- » ANSI 50G, ANSI 67G and ANSI 67GI will be converted into ANSI 50GS, ANSI 67GS and ANSI 67GSI in the model with neutral current measurement digit 1 (IN = 0.1A or 1A).
- » ³ Available from FW version 1.21.00 onwards
- » For communication digits E, J, U and V, SFP transceivers will be installed by the user, and the following specifications must be fulfilled:
 - Supply: 3.3v.
 - Speed: 100BASE-FX, Fast Ethernet.
 - The SFP module must support SerDes.