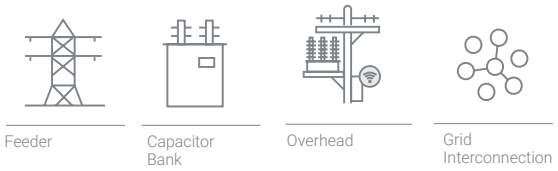
SIR-C

OVERHEAD CONTROL & FEEDER PROTECTION RELAY

Primary & Secondary Distribution Protection



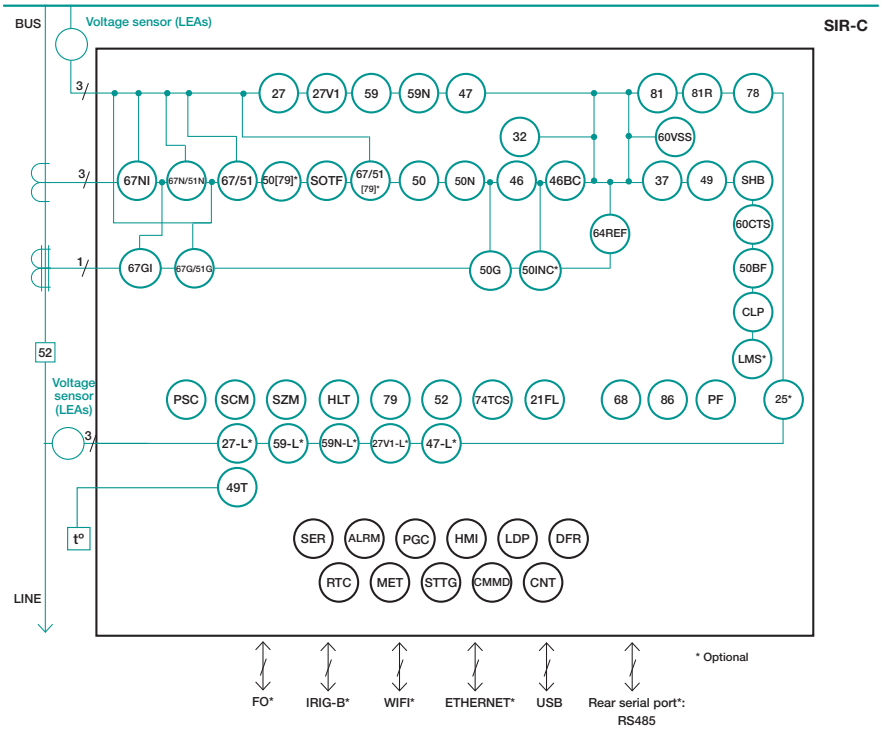
PM I V f CI Std. CTs /1 /5 VI Voltage sensors

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)
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)

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 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
	Timing accuracy: ± 35 ms or ± 0.5% (greater of both)
Function 50N	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 50G	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 67/51-1 **Function 67/51-2 (*)** **Function 67/51-3 (*)** **Function 67/51-4 (*)**	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 359º (step 1º)
	Halfcone angle: 10 to 170º (step 1º)
	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 ± 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: 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 359º (step 1º)
	Halfcone angle: 10 to 170º (step 1º)
	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 ± 5% (greater of both) Timing accuracy for defined time curve selection: ± 35 ms or ± 0.5% (greater of both)

TECHNICAL PARAMETERS SIR-C

Function 67G/51G-1 **Function 67G/51G-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: 0.010 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 359º (step 1º)
	Halfcone angle: 10 to 170º (step 1º)
	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 ± 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: 0.010 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 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 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 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)
50[79] (*)	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
	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]
	5 independent curve type settings for each reclose number (79-0, 79-1, 79-2, 79-3, 79-4)
	For IEC Definite time curve, 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)
	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)
	5 independent time dial settings for each reclose number (79-0, 79-1, 79-2, 79-3, 79-4)
	Current tap: 0.010 to 20.000 xIn (step 0.001xIn)
	5 independent tap settings for each reclose number (79-0, 79-1, 79-2, 79-3, 79-4)
	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%
	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 ± 5% (greater of both)
	Timing accuracy for defined time curve selection:
	± 35 ms or ± 0.5% (greater of both)
Function 64REF	Function enable: No/Alarm/Trip/ IN SHB Trip
	Current tap: 0.050 to 20.000 xIn (step 0.001xIn)
	Time delay: 0.020 to 300.000 s (step 0.001 s)
	Neutral SHB Tap: 5 to 50% (step 1%)
	Activation level: 100%
	Deactivation level: 90%
	Temporized deactivation
	Timing accuracy: ± 35 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)

Function 50INC (*) [1]	Function enable: No/Alarm/Trip
	Phase Current Tap: 0.500 to 20.000 xIn (step 0.001xIn)
	Pickup Peaks number; 1 to 10 (step 1)
	Trip Peak number: 1 to 10 (step 1)
Function 49	Function enable: No/Alarm/Trip
	Current tap: 0.100 to 2.400 In (step 0.001xIn)
	ζ heating: 3 to 600 min (step 1 min)
	ζ cooling: 1 to 6 xζ heating (step 1)
	Alarm: 20 to 99% (step 1%)
	Trip level: 100%
	Deactivation level: 95% of alarm level
	Timing accuracy: ± 5% respect of theorical value.
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 6 (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
Function 46	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)
	Curve, current activation level: 110%
	Curve, current deactivation level: 100%
	Definite time, current activation level: 100%
	Definite 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)

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 ± 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 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%
	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 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%
	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 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%
	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 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%
	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)

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 ± 0.5% (greater of both)
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 81-5** **Function 81-6**	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 25º (step 1º)
	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: ±1º 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 º (step 1º)
	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 ± 0.5% (greater of both)
	Open breaker activation and reset threshold: 0.8% In
	Detection of the loss of one phase CT
Function 60VSS	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)

TECHNICAL PARAMETERS SIR-C

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 21FL	Function enable: No/Yes
	Line length 0.1 to 100.0 km (step 01 km)
	Z1 line magnitude: 0.001 to 5.000 (step 0.001 Ω/km)
	Z1 line angle: 1 to 90º (step 1º)
	Z0 line magnitude: 0.001 to 5.000 (step 0.001 Ω/km)
	Z0 line angle: 1 to 90º (step 1º)
LMS (*) [1]	Function enable: No/Yes
	No Peak Mode: Alarm/Trip
	Peak mode: Alarm/Trip
	Peak period starting month: January to December
	Peak period starting day: 1 to 31 (step 1)
	Peak period ending month: January to December
	Peak period ending day: 1 to 31 (step 1)
	Peak period starting hour: 0 to 23 (step 1 hour)
	Peak period starting minute: 0 to 59 (step 1 minute)
	Peak period ending hour: 0 to 23 (step 1 hour)
	Peak period ending minute: 0 to 59 (step 1 minute)
	Peak period starting day of week: Monday to Sunday
	Peak period ending day of week: Monday to Sunday
	Reset Time: 0 to 18000 s (step 1 s)
	Peak period Tap: 0.010 to 30.000 xIn (step 0.001xIn)
	Peak trip Time 1: 0 to 18000 s (step 1 s)
	Peak trip Time 2: 0 to 18000 s (step 1 s)
	Peak trip Time 3: 0 to 18000 s (step 1 s)
	Peak trip Time 4+: 0 to 18000 s (step 1 s)
	Peak Number of recloses: 0 to 247 (Step 1)
	Peak Interval Time 1: 0 to 18000 s (Step 1 s)
	Peak Interval Time 2: 0 to 18000 s (Step 1 s)
	Peak Interval Time 3: 0 to 18000 s (Step 1 s)
	Peak Interval Time 4+: 0 to 18000 s (Step 1 s)
	No Peak period Tap: 0.010 to 30.000 xIn (step 0.001xIn)
	No Peak trip Time 1: 0 to 18000 s (step 1 s)
	No Peak trip Time 2: 0 to 18000 s (step 1 s)
	No Peak trip Time 3: 0 to 18000 s (step 1 s)
	Peak trip Time 4+: 0 to 18000 s (step 1 s)
	No Peak Number of recloses: 0 to 247 (Step 1)
	No Peak Interval Time 1: 0 to 18000 s (Step 1 s)
	No Peak Interval Time 2: 0 to 18000 s (Step 1 s)
	No Peak Interval Time 3: 0 to 18000 s (Step 1 s)
	No Peak Interval Time 4+: 0 to 18000 s (Step 1 s)
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

Function 86	It allows to latch (lockout) 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).
Function Phase Rotation [2]	Available by selecting “phase rotation” and “CT polarity” settings in general settings menu.
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 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
Settings groups	6 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 29 events each one
Load Data Profiling (LDP)	Demand of power with the following characteristics: - Number of records: 2160 - Circular recording mode - 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

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 VA (1 A) & <0.375 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: 24-230 Vdc/Vac: < 12 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, 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): ±2% precision in a band covering ±20% of nominal current and ±4% or ±5 mA in the rest of the range Neutral (0.1 A): ±2% precision in a band covering ±20% of nominal current and ±4% or ±0.5 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 ±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 x LEA Maximum voltage x Ratio) to 2.4xUn Calculated voltage: From (0.013 x LEA Maximum voltage x Ratio) to 2.4xUn

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: ±2º
	Angle measurement range: From 0 to 359º
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 ±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
	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 + 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 the model

(1) Available from fw version 1.22.00 onwards.

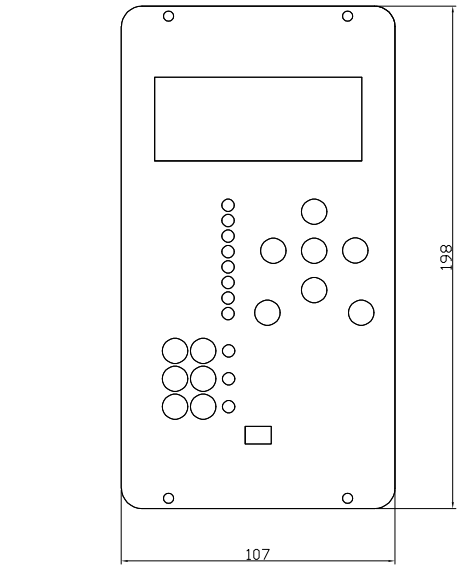
(2) Available from fw version 1.23.00 onwards.

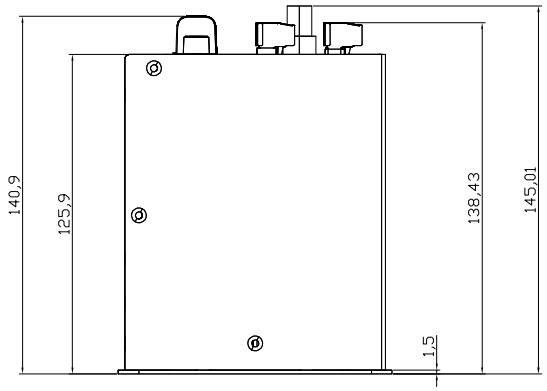
NOTE: ANSI 67, ANSI 67G, and ANSI 67N can be converted into ANSI 51, ANSI 51G, and ANSI 51N, respectively, by setting the “Directionality” parameter to NO.

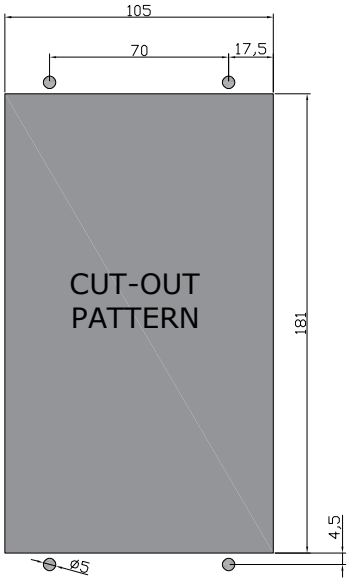
NOTE: ANSI 50G, ANSI 67G and ANSI 67GI will be converted into ANSI 50GS, ANSI 67GS and ANSI 67GSI in the model with neutral current measurement digit 1 (IN = 0.1A or 1A)

DIMENSIONS AND CUTOUT SIR-C

Vertical assembly

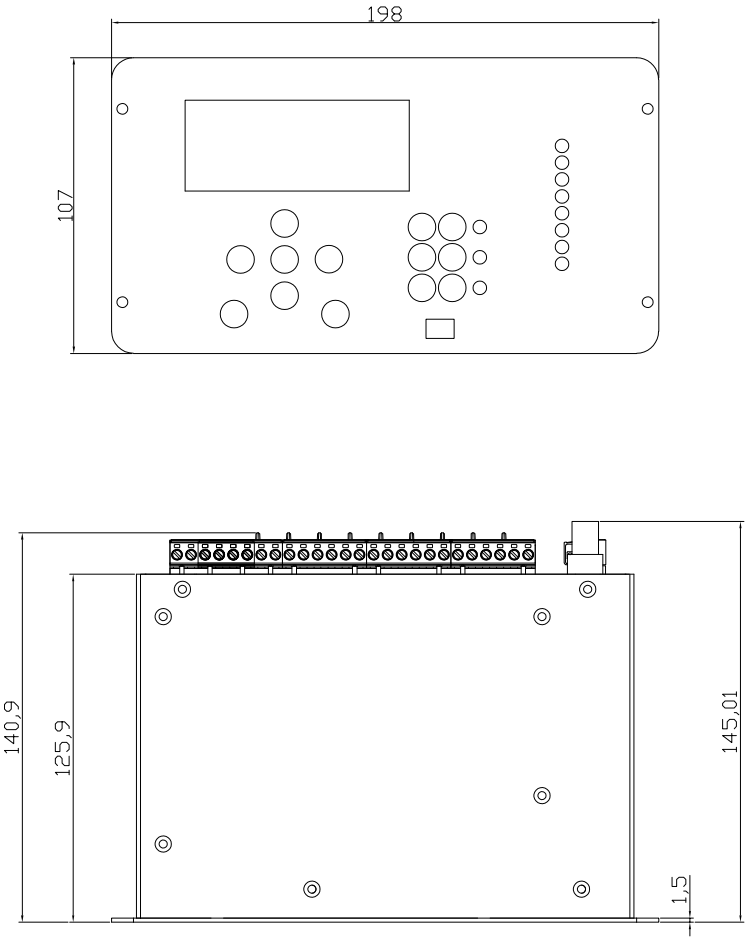






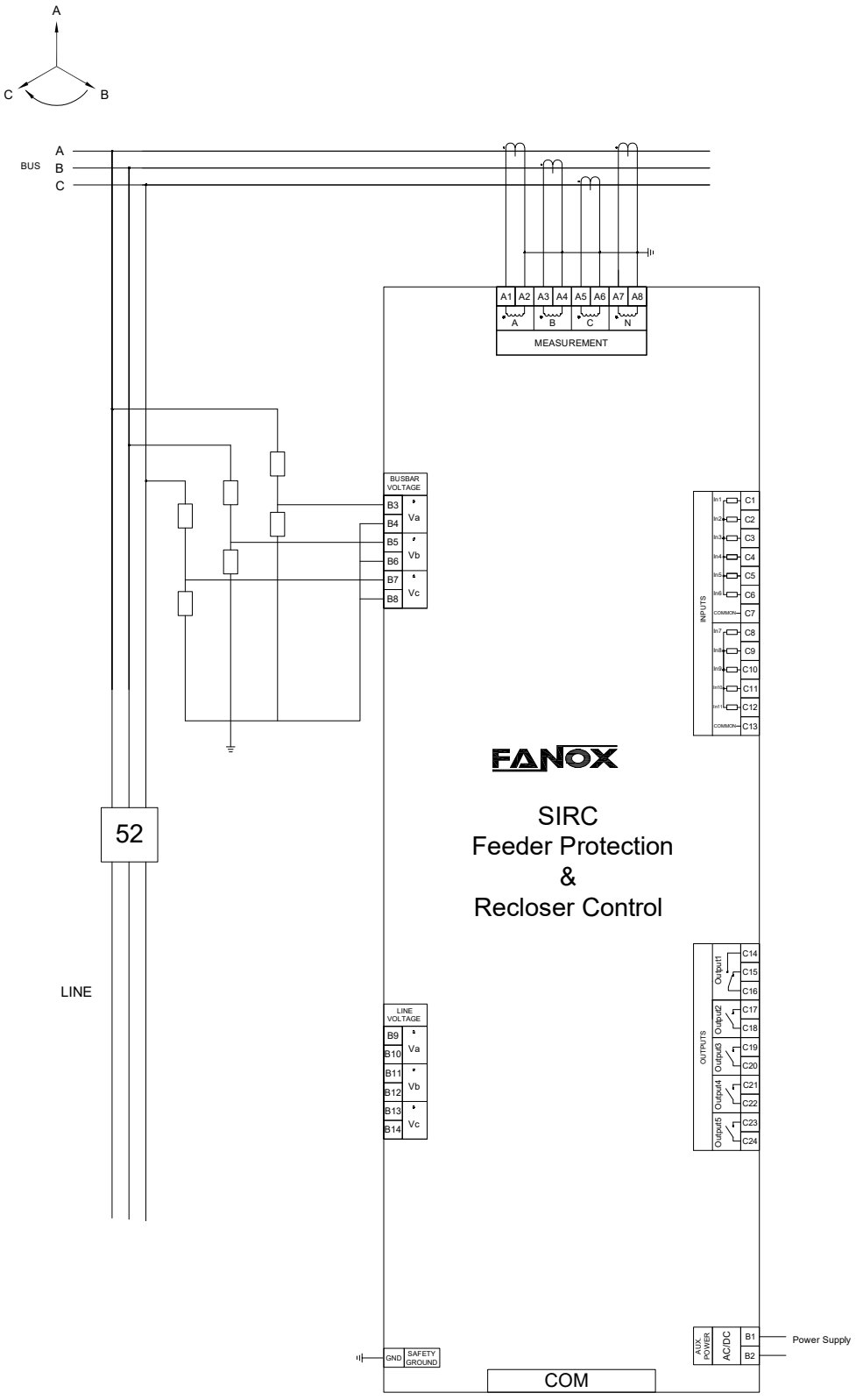
DIMENSIONS AND CUTOUT SIR-C

Horizontal assembly



CONNECTIONS DIAGRAM SIR-C

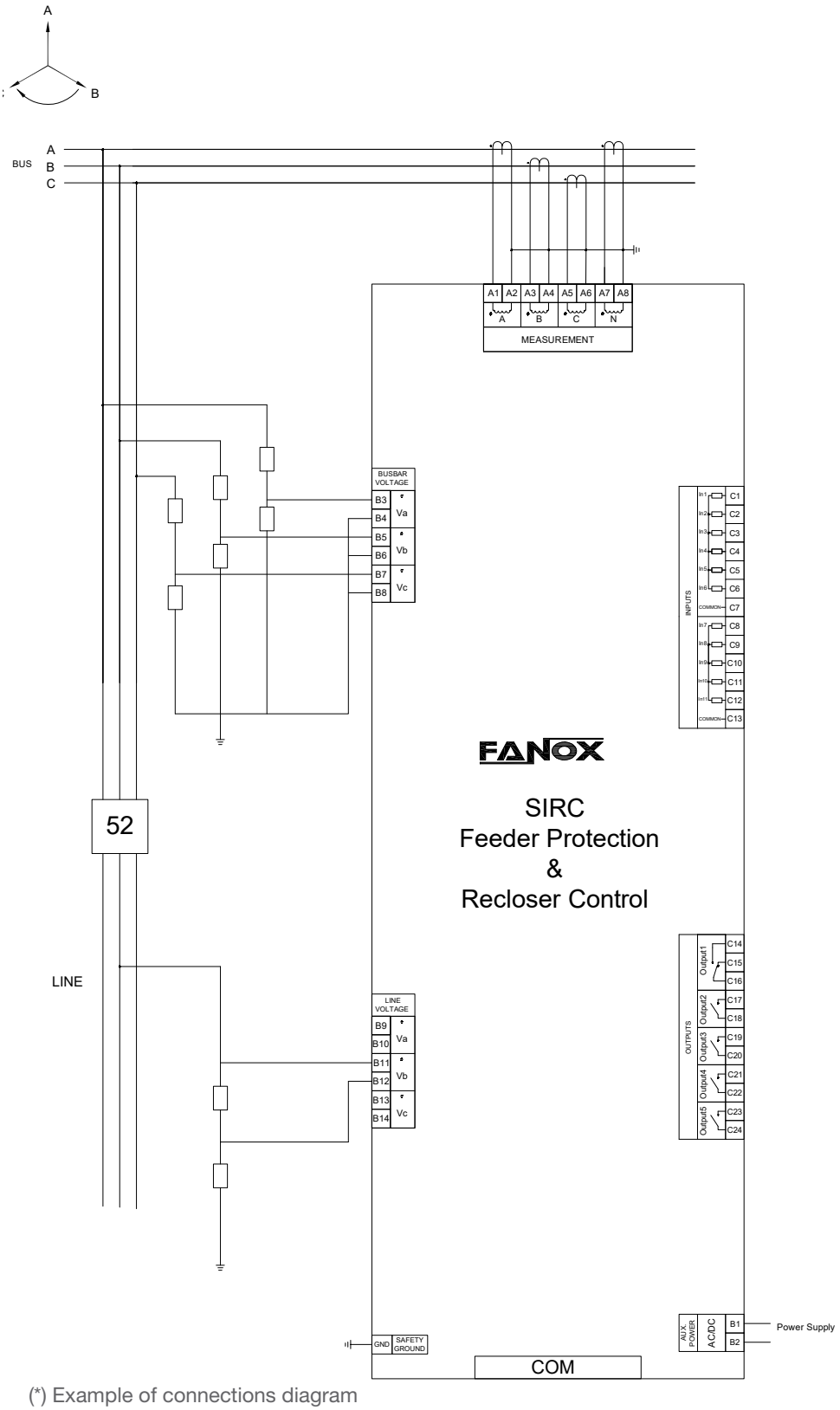
3 resistive sensors + 4 current transformers



(*) Example of connections diagram

CONNECTIONS DIAGRAM SIR-C

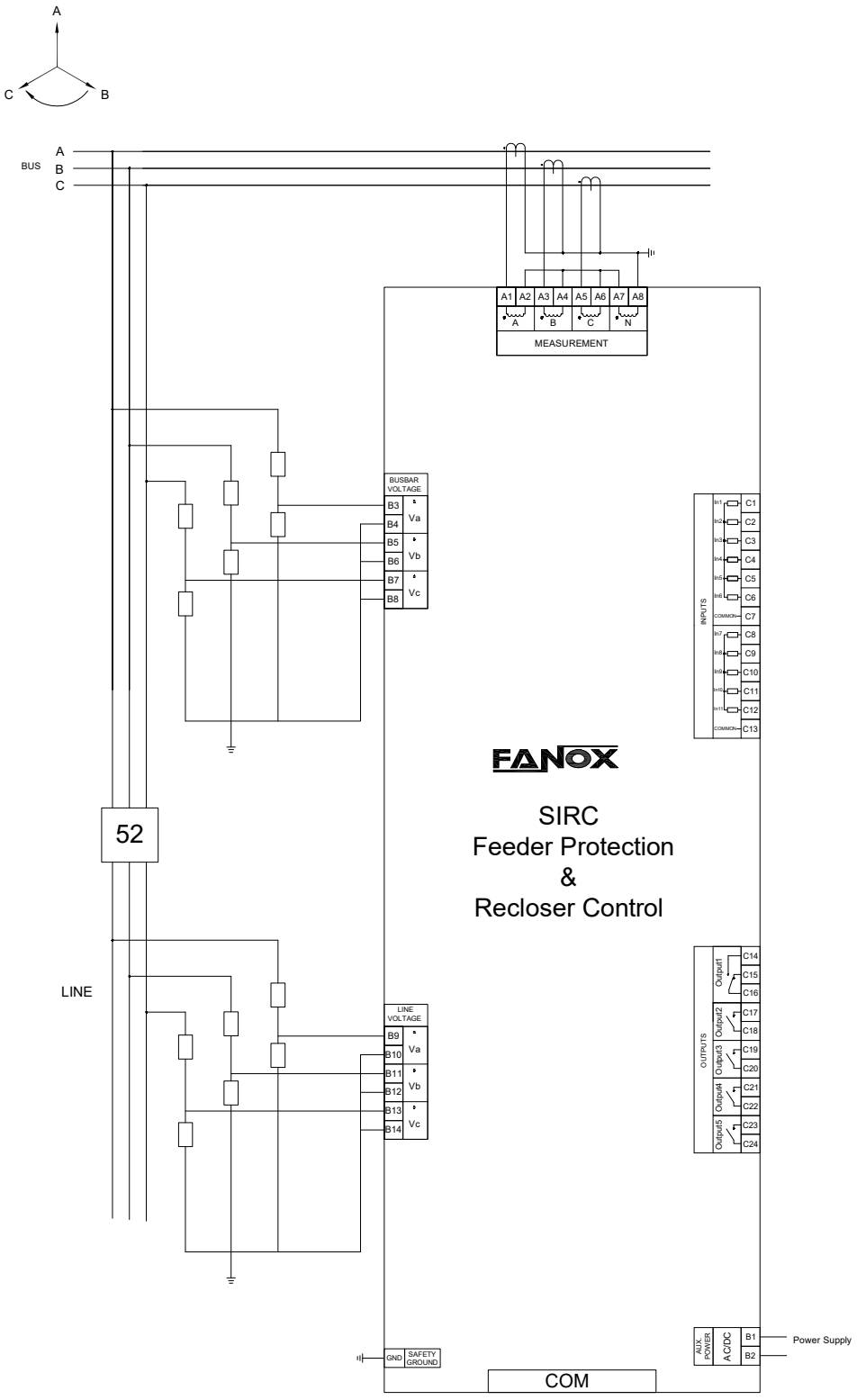
4 resistive sensors + 4 current transformers



(*) 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 24-230 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 + (1) 50 + (3) 67/51 + 50INC + LMS
					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 Port (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 G: USB (Modbus RTU) + WiFi + Rear Serial Port (Modbus RTU, IEC60870-5-103 or DNP3.0 Serial) + 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) + 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) + 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) + 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) + 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

SELECTION & ORDERING DATA SIR-C

									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 + 21 FL + 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										

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)
- » Not all combinations are possible. Please, confirm with Fanox the chosen model.