

Overcurrent and Earth Fault Relay for Primary and Secondary Distribution



Main characteristics

- The SIL-A is an overcurrent and earth fault protection relay for primary and secondary distribution with auxiliary power supply 24-220 Vdc/ 48-230 Vac). The current measurement is obtained either by standard current transformers /1 or /5, or by special Low Power Current Transformers (LPCT).
- Many protection functions: 50(2), 50N/G (2)⁽¹⁾, 50/51, 50/51N/G⁽¹⁾, 50BF, 46, 52, 79, 74TCS, COLD LOAD PICK-UP, 86, 49T and optionally 49, 74CT, 37, 46 BC, trip block for switch disconnector.
- Metallic box with high electromagnetic compatibility level (EMC) and wide range of operating temperature.
- Direct signalling/control both of the circuit breaker (52 function), both of the recloser (79 function).
- Trip bus protection function is available through configurable inputs and outputs thanks to the programmable logic.
- To allow the communication, relays have a communication port on the front of the equipment and remote communication with different options:
 - One rear port on the back with the following options respect to communication protocols:
 - RS 485 PORT: IEC60870-103 or Modbus RTU selectable by settings
 - RJ 45 PORT: IEC 61850, DNP 3.0 or IEC 60870-5-104 (depending on model).
- The SIL-A has configurable inputs and outputs: 6 inputs (74TCS through configurable inputs) and 4 outputs
- SIL-A is fitted with the demand of current with the following characteristics:

Number of records: 168

Recording mode circular

Sampling rate (interval): configurable through communications: 1 - 60 min



SIL-A relays installed in Azadi Football Stadium's electrical substation.

(1) Note:

- LPCT model: neutral current is calculated so overcurrent protection functions are 50N(2) and 50/51N
- Compact model: neutral current is measured so overcurrent protection functions are 50N/G(2) and 50/51 N/G



 5 Oscillographic records, 20 fault reports and 200 events saved in non-volatile RAM memory with date / time even without power supply thanks to its internal RTC (Real Time Clock).

DE E S	
and the second second	• 13=
	17 <u> </u>
	一時時時期時期時期時
-	TYM WWW WI WI WI WI WI WI WI WI WI
	- · · · · · · · · · · · · · · · · · · ·
-	
12-	-
Without I	

Additional information to fault reports



Technical specifications

Technical parameters SIL-A

	Function permission: Yes/No							
	Operating range: 0.10 to 30 xln (step 0.01)							
	Operating time: 0.02 to 300 s (step 0.01 s)							
50(2)	Activation level 100%							
	Deactivation level 95%							
	Instantaneous deactivation							
	Timing accuracy: ±30 ms or ±0.5% (greater of both)							
	Function permission: Yes/No							
	Operating range: 0.10 to 30 xln (step 0.01)							
	Operating time: 0.02 to 300 s (step 0.01 s)							
50N/G(2) (1)	Activation level 100%							
	Deactivation level 95%							
	Instantaneous deactivation							
	Timing accuracy: ±30 ms or ±0.5% (greater of both)							
	Function permission: Yes/No							
	Operating range: 0.10 to 7 xln (step 0.01)							
	Curves IEC 60255-151 and ANSI							
	Operating time: IEC Inverse curve, IEC very inverse curve, IEC							
	extremely inverse curve IEC long time inverse, ANSI Inverse							
	curve, ANSI very inverse curve, ANSI extremely inverse curve.							
50/51	Defined time : 0.02 to 300 s (step 0.01 s)							
30/51	Dial: 0.02 to 2.20 (step 0.01)							
	Curve, activation level 110%							
	Curve, deactivation level 100%							
	Defined time, activation level 100%							
	Defined time, deactivation level 95%							
	Instantaneous deactivation							
	Timer accuracy: ±5% or ±30 ms (whichever is greater)							
	Function permission: Yes/No							
	Operating range: 0.10 to 7 xln (step 0.01)							
	Curves IEC 60255-151 and ANSI							
	Operating time: IEC Inverse curve, IEC very inverse curve, IEC extremely inverse curve IEC long time inverse, ANSI Inverse curve, ANSI very inverse curve, ANSI extremely inverse curve.							
	Defined time : 0.02 to 300 s (step 0.01 s)							
50/51N/G 17	Dial: 0.02 to 2.20 (step 0.01)							
	Curve, activation level 110%							
	Curve, deactivation level 100%							
	Defined time, activation level 100%							
	Defined time, deactivation level 95%							
	Timer accuracy: +5% or +30 ms (whichever is greater)							
	Function permission: ves/no							
	Operating range: 0.10 to 7.00 vip (stop 0.01)							
	Operating time: IEC Inverse autors IEC versioners and IEC							
	extremely inverse curve IEC long time inverse. ANSI Inverse							
	curve, ANSI very inverse curve, ANSI extremely inverse curve.							
	Defined time : 0.02 to 300 s (step 0.01 s)							
46	Dial: 0.02 to 2.20 (step 0.01)							
	Curve, activation level 110%							
	Curve, deactivation level 100%							
	Defined time, activation level 100%							
	Defined time, deactivation level 95%							
	Instantaneous deactivation							
	Timer accuracy ±5% or ±20 ms (which over is greater)							
	Timer accuracy. ±370 or ±30 ms (whichever is greater)							
	Excessive number of openings: 1 to 10000 (step 1)							
	Maximum accumulated amps: 0 to 100000 (M(A ²)) (step 1)							
Circuit breaker	Opening time: 0.02 to 30 s (step 0.01 s)							
monitoring	Closing time: 0.02 to 30 s (step 0.01 s)							
	Excessive repeated openings: 1 to 10000 (step 1)							

	Function permission: Yes/No								
	Opening fault time: 0.02 to 1.00 s (step 0.01 s)								
50BF	Open circuit breaker activation threshold: 8% In								
	Open circuit breaker reset threshold: 10% In								
	Function Pickup configurable: Equipment trip, activation of the opening fault input, circuit breaker open control activation.								
	Function Permission: yes/no								
	Hold permission: yes/no								
	Number of reclosings: 1 to 5								
70	Reclosing time 1, 2, 3, 4, 5 : 0.02 to 300 s (step 0.01 s)								
19	Hold time: 0.02 to 300 s (step 0.01 s)								
	Locking possibilities: pulse inputs, level inputs, commands.								
	Replacement time: 0.02 to 300 s (step 0.01 s)								
	Definitive opening time: 0.02 to 300 s (step 0.01 s)								
	Function permission: Yes/No								
74700	Operating time: 0.02 to 300 s (step 0.01 s)								
74105	Trip continuity, in circuits A and B								
	Configurable inputs								
	Permission: Yes/No								
	Settings group: 1 to 4 (step 1)								
CLD	No load Time: 0.02 to 300 s (step 0.01 s)								
CLP	Cold load Time: 0.02 to 300 s (step 0.01 s)								
	CLP activation threshold: 8% In								
	CLP reset threshold: 10% In								
PLC OR4, OR4_LATCH, OR4_PULSES, OR4_TIMERUP, PULSE, NOR4, NOR4_LATCH, NOR4_TIMERUP, N PULSE, AND4, AND4_PULSES, AND4_TIMERUP, A PULSE, NAND4, NAND4_TIMERUP, NAND4 PULSE									
86	Allows to latch (lock out) the contact trip due to programmable logic (PLC: LATCH).								
49T	Available through configurable inputs thanks to the programmable logic								
	Function permission: Yes/No								
	Operating range: 0.1 to 2.4 xln (step 0.01)								
	ζ heating: 3 to 600 min (step 1 min)								
	ζ cooling: 1 to 6 ζ heating (step 1)								
40 (*)	Alarm: 20 to 99 % (step 1%)								
49 (^)	Trip level: 100%								
	Deactivation level: 95% of alarm level								
	Trip time accuracy: ± 5% over the theoretical value								
	Trip time curves are valid under 20 times the adjusted tap. With currents higher than 20 times the adjusted tap, trip time and thermal image value are truncated to 20 times the adjusted tap.								
	Function permission: Yes/No								
74CT (*)	Operating time: 0.02 to 300 s (step 0.01 s)								
	Timing accuracy: ±30 ms or ±0.5% (greater of both)								



Technical parameters SIL-A

Operating range: 0.10 to 30 xln (step 0.01) Operating time: 0.02 to 300 s (step 0.01 s) Activation level: 100% Deactivation level: 105% Instantaneous reset Timing accuracy: ±30 ms or ±0.5% (greater of both) Gurrent tap: 15 to 100 %(step 1%) Operating time: 0.02 to 300 s (step 0.01 s) Trip block (*) Blocking: Yes/No Blocking: Yes/No Blocking: Yes/No Blocking: Yes/No Settings tables Activated by inputs or by general settings. Activated by inputs or by general settings. RTC Operation with no auxiliary voltage: 72 hours 16 samples/cycle Fault int configurable 5 records of 100 cycles: 3 prefault and 97 postfault cycles COMTRADE IEEE C37.111-1991 4 analog channels y 48 digital channels Fault reports Default ports with 24 events each one Demand of current with the following characteristics: • Number of records: 168 • Record format: Dat/Time IMAX (in interval): IMAX (in interval): INAX (actual)		Function permission : yes/no					
37 (*) Operating time: 0.02 to 300 s (step 0.01 s) Activation level: 100% Deactivation level: 105% Instantaneous reset Timing accuracy: ±30 ms or ±0.5% (greater of both) 46BC (*) Current tap: 15 to 100 %(step 1%) Operating time: 0.02 to 300 s (step 0.01 s) Timing accuracy: ±30 ms or ±0.5% (greater of both) Block (*) Blocking: Yes/No Block (*) Blocking: Yes/No 88 Available through configurable inputs and outputs thanks to programmable logic 8ttings tables Activated by inputs or by general settings. RTC Operation with no auxiliary voltage: 72 hours 16 samples/cycle Fault init configurable Fault reports 20 fault reports with 24 events each one Demand of current with the following characteristics: • Number of records: 168 • Number of records: 168 • Record format: • Number of records: 168 • Record format: • Number of current with the following characteristics: • Number of records: 168 • Number of current interval) • Number of current is 0 min • Record format: • Sampling rate (interval): configurable through comfigurable inputs • Output 2 and output 4: NO <th></th> <td>Operating range: 0.10 to 30 xln (step 0.01)</td>		Operating range: 0.10 to 30 xln (step 0.01)					
37 (*) Activation level: 100% Deactivation level: 105% Instantaneous reset Timing accuracy: ±30 ms or ±0.5% (greater of both) 46BC (*) Current tap: 15 to 100 %(fep 1%) Operating time: 0.02 to 300 s (step 0.01 s) Timing accuracy: ±30 ms or ±0.5% (greater of both) Block(*) Blocking limit: 1.5 to 20 x ln (step 0.01 s) 68 Available through configurable inputs and outputs thanks to programmable logic Settings tables Activated by inputs or by general settings. RTC Operation with no auxillary voltage: 72 hours 16 samples/cycle Fault init configurable Fault reports 20 fault reports with 24 events each one Demand of current with the following characteristics: • Number of records: 168 Number of records: 168 • Recording mode circular • Sampling rate (interval): configurable through comfigurable through in the following characteristics: • Number of records: 168 Configurable Same voltage as the auxiliary power supply 6 configurable inputs Configurable Same voltage as the auxiliary power supply 6 configurable inputs Configurable Same voltage as the auxiliary power supply 6 configurable inputs 20 400 - 5 A 4 configu		Operating time: 0.02 to 300 s (step 0.01 s)					
Deactivation level: 105% Instantaneous reset Timing accuracy: ±30 ms or ±0.5% (greater of both) 46BC (*) Current tap: 15 to 100 %(step 1%) Operating time: 0.02 to 300 s (step 0.01 s) Trinip alcouracy: ±30 ms or ±0.5% (greater of both) Blocking: Yes/No Trip block (*) Blocking: Yes/No Blocking: Yes/No Settings tables Available through configurable inputs and outputs thanks to programmable logic Poration with no auxiliary voltage: 72 hours 16 samples/cycle Fault init configurable 5 records of 100 cycles: 3 prefault and 97 postfault cycles COMTRADE IEEE C37.111-1991 4 analog channels y 48 digital channels Fault intic configurable 0 fault reports 20 fault reports with 24 events each one Demand of current with the following characteristics: • Number of records: 188 • Record format: • Sampling rate (interval); configurable through communications: 1 - 60 min • Record format: • Sampling rate (interval); configurable through communications: 1 - 60 min • Record format: • Conf	37 (*)	Activation level: 100%					
Instantaneous reset Timing accuracy: ±30 ms or ±0.5% (greater of both) 46BC (1) Gurrent tap: 15 to 100 %(step 1%) Operating time: 0.02 to 300 s (step 0.01 s) Trip block (') Blocking: Yes/No Blocking: Yes/No Blocking: Yes/No Blocking: Yes/No Settings tables Available through configurable inputs and outputs thanks to programmable logic Available through configurable inputs and outputs thanks to programmable logic Settings tables Activated by inputs or by general settings. Capacitor charge time: 10 minutes Operation with no auxiliary voltage: 72 hours 16 samples/cycle Fault init configurable 5 records of 100 cycles: 3 prefault and 97 postfault cycles COMTRADE IEEE C37.111-1991 4 analog channels y 48 digital channels Fault reports 20 fault reports with 24 events each one Demand of current with the following characteristics: Number of records: 168 • Record format: Date/Time IMAX (in interval) IMAX (actual) IA		Deactivation level: 105%					
Image accuracy: ±30 ms or ±0.5% (greater of both) 46BC (*) Function permission : yes/no Current tap: 15 to 100 %(step 1%) Operating time: 0.02 to 300 s (step 0.01 s) Trip block (*) Blocking: Yes/No Blocking limit: 1.5 to 20 x ln (step 0.01) Available through configurable inputs and outputs thanks to programmable logic Settings tables Available through configurable inputs and outputs thanks to programmable logic Settings tables Capacitor charge time: 10 minutes Oscillography Test of a samples/cycle Fault init configurable Gamma of current with no auxiliary voltage: 72 hours Set of a samples/cycle Fault init configurable Fault reports 20 fault reports with 24 events each one Demand of current with the following characteristics: Number of records: 168 Record format: Date/Time NaX (in interval): MAX (in a output 2: NC + NO Output 1 and output 2: NC		Instantaneous reset					
Humag declaraby Large No 46BC (*) Function permission : yes/no Current tap: 15 to 100 %(step 1%) Operating time: 0.02 to 300 s (step 0.01 s) Trip block (*) Blocking: Yes/No Blocking limit: 1.5 to 20 x ln (step 0.01) Blocking: Yes/No Settings tables Available through configurable inputs and outputs thanks to programmable logic Settings tables 4 settings tables Activated by inputs or by general settings. Capacitor charge time: 10 minutes Operation with no auxillary voltage: 72 hours 16 samples/cycle Fault reports 20 fault reports with 24 events each one Fault reports 20 fault reports with 24 events each one Demand of current with the following characteristics: • Number of records: 168 • Recording mode circular • Sampling rate (interval): configurable through communications: 1 - 60 min • Record format: Date/Time Same voltage as the auxiliary power supply 6 configurable for offigurable through in tha doutput 2: NC + NO • Output 1 and output 2: NC + NO • Output 2 and output 2: NC + NO • Output 2 and output 4: NO • Output 1 and output 2: NC + NO • Output 2 and output 4: NO • Output 1 and output 2: NC + NO • Output 2 and output 4: NO • Output 2 an		Timing accuracy: ± 30 ms or $\pm 0.5\%$ (greater of both)					
46BC (1) Current tap: 15 to 100 %(step 1%) Operating time: 0.02 to 300 s (step 0.01 s) Trip block (*) Blocking: Yes/No Blocking: Yes/No Blocking: Yes/No 88 Available through configurable inputs and outputs thanks to programmable logic Settings tables 4 settings tables Activated by inputs or by general settings. Capacitor charge time: 10 minutes Operation with no auxiliary voltage: 72 hours 16 samples/cycle Fault rint configurable 5 records of 100 cycles: 3 prefault and 97 postfault cycles COMTRADE IEEE C37.111-1991 4 analog channels y 48 digital channels Fault reports 20 fault reports with 24 events each one Demand of current with the following characteristics: • Number of records: 168 • Record format: Date/Time IMAX (in interval) IMAX (in interval): IMAX (actual) IA • Record format: Date/Time IMAX (in interval) IMAX (in interval) IMAX (in interval) · A configurable inputs f configurable inputs 50/S00 Hz selectable by general settings Frequency 50/K00 Hz selectable by general settings Frequency 50/K00 Hz selectable by general settings Phase current (A, IA, IC), neutral (IA), positive se							
46BC (*) Derating time: 0.02 to 300 s (step 0.01 s) Trip block (*) Blocking: Yes/No Blocking limit: 1.5 to 20 x ln (step 0.01) 68 Available through configurable inputs and outputs thanks to programmable logic Settings tables Activated by inputs or by general settings. Activated by inputs or by general settings. Capacitor charge time: 10 minutes Poeration with no auxiliary voltage: 72 hours 16 samples/cycle Fault init configurable Forcords of 100 cycles: 3 prefault and 97 postfault cycles COMTRADE IEEE C37.111-1991 4 analog channels y 48 digital channels Fault reports 20 fault reports with 24 events each one Demand of current with the following characteristics: • Number of records: 168 • Recording mode circular • Sampling rate (interval): configurable through communications: 1 – 60 min • Record format: Date/Time IMAX (in interval) IMAX (actual) IA IB IC Configurable inputs 250 Vac - 8 A 30 Vdc - 5 A 4 configurable outputs • Output 1 and output 2: NC + NO • Output 2 and output 4: NO Frequency<		Current tan: 15 to 100 %(step 1%)					
Demand of current Demand of Configurable outputs Demand of Configurable inputs Demand of Configurable inputs Demand of Configurable inputs Demand of Configurable inputs Configurable inputs Same voltage as the auxiliary power supply 6 configurable inputs Same voltage inputs Current measurement Same voltage as the auxiliary power supply 6 configurable inputs Same voltage inputs Current measurement Same voltage as the auxiliary power supply 6 configurable inputs Same voltage as the auxiliary power supply 6 configurable inputs Configurable inputs Same voltage as the auxiliary power supply 6 configurable inputs Same voltage as the auxiliary power supply 6 configurable inputs Current measurement Same voltage as the auxiliary power supply 6 configurable inputs Same voltage as the auxiliary power supply 6 configurable inputs Frequency 50/60 Hz selectable by general settings Phase current (A, B, IC), neutral (N), positive sequence (II), negative sequence(I2), maximum current (Imax) and thermal image (II) Real RMS Sampling: 16 samples/cycle 2% Accuracy over as band of ±20% over the nominal current and 4% over the rest of the range	46BC (*)	Operating time: 0.02 to 300 s (step 0.01 s)					
Trip block (*) Blocking: Yes/No Blocking: Yes/No Blocking: Yes/No Settings tables Available through configurable inputs and outputs thanks to programmable logic Settings tables 4 settings tables Activated by inputs or by general settings. Capacitor charge time: 10 minutes Operation with no auxillary voltage: 72 hours 0 Bioscillography 16 samples/cycle Fault init configurable 5 records of 100 cycles: 3 prefault and 97 postfault cycles COMTRADE IEEE C37.111-1991 4 analog channels y 48 digital channels Fault reports 20 fault reports with 24 events each one Demand of current with the following characteristics: • Number of records: 168 • Recording mode circular • Sampling rate (interval): configurable through communications: 1 – 60 min • Record format: Date/Time Date/Time IMAX (in interval) IMAX (in interval) IMAX (in interval) IMAX (in interval) IMAX (in interval) IMAX (in output 2: NC + NO • Output 1 and output 2: NC + NO outputs • Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings <		Timing accuracy: +30 ms or +0.5% (greater of both)					
Trip block (*) Biocking limit: 1.5 to 20 x ln (step 0.01) 68 Available through configurable inputs and outputs thanks to programmable logic Settings tables 4 settings tables Activated by inputs or by general settings. Capacitor charge time: 10 minutes Operation with no auxillary voltage: 72 hours 16 samples/cycle Fault init configurable 5 records of 100 cycles: 3 prefault and 97 postfault cycles COMTRADE IEEE C37.111-1991 4 analog channels y 48 digital channels Fault reports 20 fault reports with 24 events each one Demand of current with the following characteristics: • Number of records: 168 • Recording mode circular • Sampling rate (interval): configurable through communications: 1 - 60 min • Record format: DatrTime DateTime IMAX (in interval) INAX (in interval) IMAX (interval) INAX (in interval) INAX (in interval) INAX (in interval) IA IB 250 Vac - 8 A 30 Vdc - 5 A 4 configurable outputs • Output 1 and output 2: NC + NO • Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings P		Blocking: Yes/No					
68 Available through configurable inputs and outputs thanks to programmable logic Settings tables 4 settings tables Activated by inputs or by general settings. Capacitor charge time: 10 minutes Operation with no auxiliary voltage: 72 hours 0 68 16 samples/cycle Fault reports 16 samples/cycle Fault reports 20 fault reports with 24 events each one COMTRADE IEEE C37.111-1991 4 analog channels y 48 digital channels Fault reports 20 fault reports with 24 events each one Demand of current with the following characteristics: • Number of records: 168 • Necording mode circular • Sampling rate (interval): configurable through communications: 1 - 60 min • Record format: Date/Time IMAX (in interval) IMAX (actual) IA IB IC IN Configurable inputs Same voltage as the auxiliary power supply 6 configurable inputs • Output 1 and output 2: NC + NO output 1 and output 2: NC + NO • Output 1 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (1), n	Trip block (*)	Blocking limit: 1.5 to 20 x In (step 0.01)					
68 programmable logic Settings tables 4 settings tables Activated by inputs or by general settings. Capacitor charge time: 10 minutes Operation with no auxiliary voltage: 72 hours 16 samples/cycle Fault init configurable 5 records of 100 cycles: 3 prefault and 97 postfault cycles COMTRADE IEEE C37.111-1991 4 analog channels y 48 digital channels Fault reports 20 fault reports with 24 events each one Demand of current with the following characteristics: • Number of records: 168 • Recording mode circular • Sampling rate (interval): configurable through communications: 1 – 60 min • Record format: Date/Time IMAX (in interval) IMAX (actual) IA IB IC IN Configurable inputs Same voltage as the auxiliary power supply 6 configurable inputs • Configurable outputs • Output 1 and output 2: NC + NO • Output 1 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (1), negative sequence(2), maximum current (Imax) and thermal image (T) Current Real RMS Sampling:		Available through configurable inputs and outputs thanks to					
Settings tables 4 settings tables Activated by inputs or by general settings. Capacitor charge time: 10 minutes Operation with no auxilliary voltage: 72 hours 0 Base of the samples/cycle Fault init configurable 5 records of 100 cycles: 3 prefault and 97 postfault cycles COMTRADE IEEE C37.111-1991 4 analog channels y 48 digital channels 20 fault reports 20 fault reports 20 fault reports with 24 events each one Demand of current with the following characteristics: • Number of records: 168 • Record format: • Sampling rate (interval): configurable through communications: 1 - 60 min • Record format: Date/Time IMAX (in interval) IMAX (actual) IA IB IC IN Configurable outputs Same voltage as the auxiliary power supply 6 configurable inputs forurent Same voltage as the auxiliary power supply 6 configurable outputs output 1 and output 2: NC + NO • Output 1 and output 2: NC + NO output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermal image (I1) <th>68</th> <th>programmable logic</th>	68	programmable logic					
Settings tables Activated by inputs or by general settings. RTC Capacitor charge time: 10 minutes Operation with no auxiliary voltage: 72 hours 16 samples/cycle Fault init configurable 5 records of 100 cycles: 3 prefault and 97 postfault cycles COMTRADE IEEE C37.111-1991 4 analog channels y 48 digital channels Fault reports 20 fault reports with 24 events each one Demand of current with the following characteristics: • Number of records: 168 • Recording mode circular • Sampling rate (interval): configurable through communications: 1 - 60 min • Record format: Date/Time Date/Time IMAX (actual) IA IB IC IN Configurable 5ame voltage as the auxiliary power supply 6 configurable inputs 250 Vac - 8 A 30 Vdc - 5 A 30 Vdc - 5 A 30 Vdc - 5 A 30 Vdc - 5 N 9 Output 1 and output 2: NC + NO • Output 1 and output 2: NC + NO • Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermat image (I1)	Sattinga tablaa	4 settings tables					
Capacitor charge time: 10 minutes Operation with no auxiliary voltage: 72 hours I6 samples/cycle Fault init configurable 5 records of 100 cycles: 3 prefault and 97 postfault cycles COMTRADE IEEE C37.111-1991 4 analog channels y 48 digital channels Fault reports 20 fault reports with 24 events each one Demand of current with the following characteristics: Number of records: 168 • Recording mode circular • Sampling rate (interval): configurable through communications: 1 - 60 min • Record format: Date/Time IMAX (actual) IA IA B IC IN Configurable inputs Same voltage as the auxiliary power supply 6 configurable inputs 250 Vac - 8 A 30 Vdc - 5 A 4 configurable outputs • Output 1 and output 2: NC + NO • Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2),	Settings tables	Activated by inputs or by general settings.					
Operation with no auxiliary voltage: 72 hours Oscillography 16 samples/cycle Fault init configurable 5 records of 100 cycles: 3 prefault and 97 postfault cycles COMTRADE IEEE C37.111-1991 4 analog channels y 48 digital channels Fault reports 20 fault reports with 24 events each one Demand of current with the following characteristics: • Number of records: 168 • Recording mode circular • Sampling rate (interval): configurable through communications: 1 - 60 min • Record format: Date/Time Date/Time IMAX (actual) IA IB IC IN Configurable Same voltage as the auxiliary power supply 6 configurable inputs 250 Vac - 8 A 30 Vdc - 5 A 4 configurable outputs • Output 1 and output 2: NC + NO • Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermal image (T1) Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated curre	BTC	Capacitor charge time: 10 minutes					
Oscillography 16 samples/cycle Fault init configurable 5 records of 100 cycles: 3 prefault and 97 postfault cycles COMTRADE IEEE C37.111-1991 4 analog channels y 48 digital channels Fault reports 20 fault reports with 24 events each one Demand of current with the following characteristics: Number of records: 168 Recording mode circular Sampling rate (interval): configurable through communications: 1 – 60 min Record format: Date/Time IMAX (in interval) IMAX (actual) IA IB IC IN Configurable outputs 250 Vac – 8 A 30 Vdc – 5 A 30 Vdc – 5 A 30 Vdc – 5 A Output 2 and output 2: NC + NO Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermal image (I1) Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current		Operation with no auxiliary voltage: 72 hours					
Oscillography Fault init configurable 5 records of 100 cycles: 3 prefault and 97 postfault cycles COMTRADE IEEE C37.111-1991 4 analog channels y 48 digital channels Fault reports 20 fault reports with 24 events each one Demand of current with the following characteristics: Number of records: 168 Recording mode circular Sampling rate (interval): configurable through communications: 1 – 60 min Record format: Date/Time IMAX (actual) IA IB IC IN Configurable ot configurable inputs 250 Vac – 8 A 30 Vdc – 5 A 30 Vdc – 5 A Output 1 and output 2: NC + NO Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermal image (TI) Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current		16 samples/cycle					
5 records of 100 cycles: 3 prefault and 97 postfault cycles COMTRADE IEEE C37.111-1991 4 analog channels y 48 digital channels Fault reports 20 fault reports with 24 events each one Demand of current with the following characteristics: Number of records: 168 Record format: Sampling rate (interval): configurable through communications: 1 – 60 min Record format: Date/Time IMAX (in interval) IMAX (actual) IA IB IC IN Configurable outputs 250 Vac – 8 A 30 Vdc – 5 A 30 Vdc – 5 A Output 1 and output 2: NC + NO Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermal image (TI) Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range	Oscillography	Fault init configurable					
COMTRADE IEEE C37.111-1991 4 analog channels y 48 digital channels Fault reports 20 fault reports with 24 events each one Demand of current with the following characteristics: Number of records: 168 Recording mode circular Sampling rate (interval): configurable through communications: 1 – 60 min Record format: Date/Time IMAX (in interval) IMAX (actual) IA IB IC IN Configurable inputs Same voltage as the auxiliary power supply 6 configurable inputs 250 Vac – 8 A 30 Vdc – 5 A Configurable outputs 250/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermal image (TI) Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current	••••••••••••••••••••••••••••••••••••••	5 records of 100 cycles: 3 prefault and 97 postfault cycles					
Fault reports 20 fault reports with 24 events each one Demand of current with the following characteristics: • Number of records: 168 • Recording mode circular • Sampling rate (interval): configurable through communications: 1 – 60 min • Record format: Date/Time Date/Time IMAX (in interval) IMAX (in interval) IMAX (actual) IA IB IC IN Configurable inputs Same voltage as the auxiliary power supply 6 configurable inputs 250 Vac – 8 A 30 Vdc – 5 A 4 configurable outputs • Output 1 and output 2: NC + NO • Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermal image (TI) Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current		COMTRADE IEEE C37.111-1991					
Fault reports 20 fault reports with 24 events each one Demand of current with the following characteristics: • Number of records: 168 • Recording mode circular • Sampling rate (interval): configurable through communications: 1 – 60 min • Record format: Date/Time Date/Time IMAX (in interval) IMAX (in interval) IMAX (actual) IA IB IC IN Configurable inputs Same voltage as the auxiliary power supply 6 configurable inputs 250 Vac – 8 A 30 Vdc – 5 A 4 configurable outputs • Output 1 and output 2: NC + NO • Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermal image (TI) Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current		4 analog channels y 48 digital channels					
Demand of current with the following characteristics: • Number of records: 168 • Recording mode circular • Sampling rate (interval): configurable through communications: 1 – 60 min • Record format: Date/Time IMAX (in interval) IMAX (actual) IA IB IC IN Configurable inputs Same voltage as the auxiliary power supply 6 configurable inputs 250 Vac - 8 A 30 Vdc - 5 A 4 configurable outputs • Output 1 and output 2: NC + NO • Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermal image (TI) Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current	Fault reports	20 fault reports with 24 events each one					
Demand of current • Recording mode circular • Record format: Date/Time IMAX (in interval): configurable through communications: 1 – 60 min • Record format: Date/Time IMAX (in interval) IMAX (actual) IA IB IC IN Configurable inputs Same voltage as the auxiliary power supply 6 configurable inputs Configurable outputs Same voltage as the auxiliary power supply 6 configurable outputs 250 Vac - 8 A 30 Vdc - 5 A 30 Vdc - 5 A 4 configurable outputs • Output 1 and output 2: NC + NO • Output 1 and output 4: NO • Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermal image (TI) Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current		Demand of current with the following characteristics:					
Demand of current • Sampling rate (interval): configurable through communications: 1 – 60 min • Record format: Date/Time IMAX (in interval) IMAX (actual) IA IB IC IN IMAX (actual) IA IB IC IC IN Configurable inputs Same voltage as the auxiliary power supply 6 configurable inputs Configurable outputs Same voltage as the auxiliary power supply 6 configurable outputs 250 Vac - 8 A 30 Vdc - 5 A 30 Vdc - 5 A 4 configurable outputs • Output 1 and output 2: NC + NO • Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermat image (TI) Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current Saturation limit: 30 times rated current		Recording mode circular					
Demand of current communications: 1 – 60 min • Record format: Date/Time IMAX (in interval) IMAX (actual) IA Date/Time IMAX (actual) IA IB IB IC IN Configurable inputs Same voltage as the auxiliary power supply 6 configurable inputs Configurable outputs 250 Vac – 8 A 30 Vdc – 5 A 4 configurable outputs • Output 1 and output 2: NC + NO • Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermal image (TI) Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current		Sampling rate (interval): configurable through					
Demand of current • Record format: Date/Time IMAX (in interval) IMAX (actual) IA IB IC IN Configurable inputs Same voltage as the auxiliary power supply 6 configurable inputs Configurable outputs Same voltage as the auxiliary power supply 6 configurable inputs 250 Vac - 8 A 30 Vdc - 5 A 4 configurable outputs • Output 1 and output 2: NC + NO • Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermal image (TI) Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current		communications: 1 – 60 min					
current Date Time IMAX (in interval) IMAX (actual) IA IB IC IN Configurable inputs Same voltage as the auxiliary power supply 6 configurable inputs 6 configurable inputs Configurable outputs 250 Vac - 8 A 30 Vdc - 5 A 30 Vdc - 5 A 4 configurable outputs • Output 1 and output 2: NC + NO • Output 2 and output 4: NO • Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermal image (TI) Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current	Demand of	Record format: Date/Time					
Configurable inputs IMAX (actual) IA IB IC IN Configurable inputs Same voltage as the auxiliary power supply 6 configurable inputs Configurable outputs Same voltage as the auxiliary power supply 6 configurable inputs Configurable outputs 250 Vac - 8 A 30 Vdc - 5 A 4 configurable outputs • Output 1 and output 2: NC + NO • Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermat image (TI) Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current	current	IMAX (in interval)					
IA IB IB IC IN Same voltage as the auxiliary power supply 6 configurable 6 configurable inputs Configurable 250 Vac - 8 A 30 Vdc - 5 A 30 Vdc - 5 A 4 configurable outputs 0 Utput 1 and output 2: NC + NO • Output 2 and output 4: NO • Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermal image (TI) Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current		IMAX (actual)					
IB IC IN Same voltage as the auxiliary power supply fonfigurable 6 configurable inputs Configurable 250 Vac - 8 A 30 Vdc - 5 A 30 Vdc - 5 A 4 configurable outputs 0 utput 1 and output 2: NC + NO • Output 1 and output 2: NC + NO • Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermal image (TI) Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current		IA					
IC IN Configurable inputs Same voltage as the auxiliary power supply 6 configurable inputs Configurable outputs 250 Vac – 8 A 30 Vdc – 5 A 4 configurable outputs • Output 1 and output 2: NC + NO • Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermal image (TI) Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current		IB					
Configurable inputs Same voltage as the auxiliary power supply 6 configurable inputs Configurable outputs 250 Vac - 8 A 30 Vdc - 5 A Configurable outputs 4 configurable outputs • Output 1 and output 2: NC + NO • Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermal image (TI) Current measurement Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current							
Configurable outputs 6 configurable inputs 250 Vac - 8 A 30 Vdc - 5 A 4 configurable outputs • Output 1 and output 2: NC + NO • Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermal image (TI) Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current	Configurable	Same voltage as the auxiliary power supply					
Configurable outputs 250 Vac - 8 A outputs 4 configurable outputs • Output 1 and output 2: NC + NO • Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermal image (TI) Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current	inputs	6 configurable inputs					
30 Vdc - 5 A 4 configurable outputs • Output 1 and output 2: NC + NO • Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermal image (TI) Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current		250 Vac – 8 A					
4 configurable outputs outputs • Output 1 and output 2: NC + NO • Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermal image (TI) Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current	Configurable	30 Vdc – 5 A					
• Output 1 and output 2: NC + NO • Output 2 and output 4: NO Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermal image (TI) Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current	outputs	4 configurable outputs					
Frequency 50/60 Hz selectable by general settings Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2), maximum current (Imax) and thermal image (TI) Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current		Output 1 and output 2: NC + NO					
Current Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range	F						
Current Real RMS measurement Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current	Frequency	50/60 Hz selectable by general settings					
Current Real RMS measurement Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current		Phase current (IA, IB, IC), neutral (IN), positive sequence (I1), negative sequence(I2) maximum current (Imax) and thermal					
Current measurement Real RMS Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current		image (TI)					
measurement Sampling: 16 samples/cycle ±2% Accuracy over a band of ±20% over the nominal current and 4% over the rest of the range Saturation limit: 30 times rated current	Current	Real RMS					
$\pm 2\%$ Accuracy over a band of $\pm 20\%$ over the nominal currentand 4% over the rest of the rangeSaturation limit: 30 times rated current	measurement	Sampling: 16 samples/cycle					
and 4% over the rest of the range Saturation limit: 30 times rated current		±2% Accuracy over a band of ±20% over the nominal current					
Saturation limit: 30 times rated current		and 4% over the rest of the range					
		Saturation limit: 30 times rated current					

	LOCAL COMMUNICATION 1 Local port RS232: ModBus RTU						
Communications	 REMOTE COMMUNICATION (*) 1 remote port with the following options : 1 Remote port RS485: ModBus RTU, IEC 60870-5-103 or DNP3.0 Serial (by general settings) 1 Remote port RJ45: IEC 61850, DNP3.0 TCP/IP, Modbus TCP/IP or IEC 60870-5-104 (depending on model) 						
Auxiliary power	24-220 Vdc /48-230 Vac ±20%						
Environmentel	Operating temperature : -10 to 70°C						
conditions	Storage temperature: -20 to 80°C						
Contactionic	Relative humidity: 95%						
Transformers	Measurement 3 or 4 CT /5 or /1						
Transformers	Measurement 3 LPCT (current transformers with voltage output)						
	Metallic box						
Marchaniaal	Panel mounted.						
Characteristics	Height x Width: 177 x 107 mm						
	Depth: 122.1 mm						
	IP-54 on pannel						

(*) Optional depending on the model

(1) LPCT model→50N/G, 50/51N: calculated neutral; Standard model→50N/G, 50/51N/G: measured neutral

Technical specifications Connections diagram SIL-A

• 3 LPCT Transformers



• 3 Standard Current Transformers





LPCT

• 4 Standard Current Transformers





Connections diagram SIL-A



Selection & Ordering data SIL-A

	Overcurrent & Earth Fault Protection Relay for									_	PROTECTION FUNCTIONS
SIL-A									elay f	or	(2) 50 + 50/51 + (2) 50N/G(1) + 50/51 N/G(1) + 52 + 50BF + 46 + 79
						0000	ndary				+ 74TCS + CLP + 86 + 49T
											PHASE MEASUREMENT
	X										LPCT In (Primary) = 50 – 800A.
	0										Standard In= 1A or 5A; (0.1 – 30A) / (0.5 – 150A)
	S										Sensitive In= ½ A or 5/2 A; (0.05–15A) / (0.25–75A)
											NEUTRAL MEASUREMENT
		Х									LPCT: Neutral Internally Calculated.
		0									Standard In= 1A / 5A; (0.1–30A) / (0.5–150A)
		S									Sensitive In=1/10 A or 5/10 A; (0.01–3A) / (0.05–15A)
											NET FREQUENCY
			0								Defined by Setting
											POWER SUPPLY
				С							24-220 Vdc/48-230Vac
											ADDITIONAL FUNCTIONS
					0						-
					2						+ 49 + 74CT + 37 + 46BC + Trip Block
						A					RS232 (Modbus RTU) + RS485 (Modbus RTU or IEC 60870-5-103)
						В					RS232 (Modbus RTU) + RJ45 (IEC 61850)
											RS232 (Modbus RTU) + RJ45 (IEC 60870-5-104)
						1					RS232 (Modbus RTU) + RS485 (Modbus RTU or DNP3.0 serial)
						8					RS232 (Modbus RTU) + RJ45 (Modbus TCP/IP or DNP3.0 TCP/IP)
							4				Classific J. 4 Outputs
							-				
								2			Vertical assembly
								~			
									•		English Spanish and German
									B		English, Spanish and Turkish
									c		English, Spanish and French
									F		English Turkish and Russian
									-		
										в	-
						1					P

Example of ordering code:											
SIL A	0	0	0	С	2	Α	1	2	В	В	SILA 0 0 0 C 2 A 1 2 B B