

User Machine Interfaces

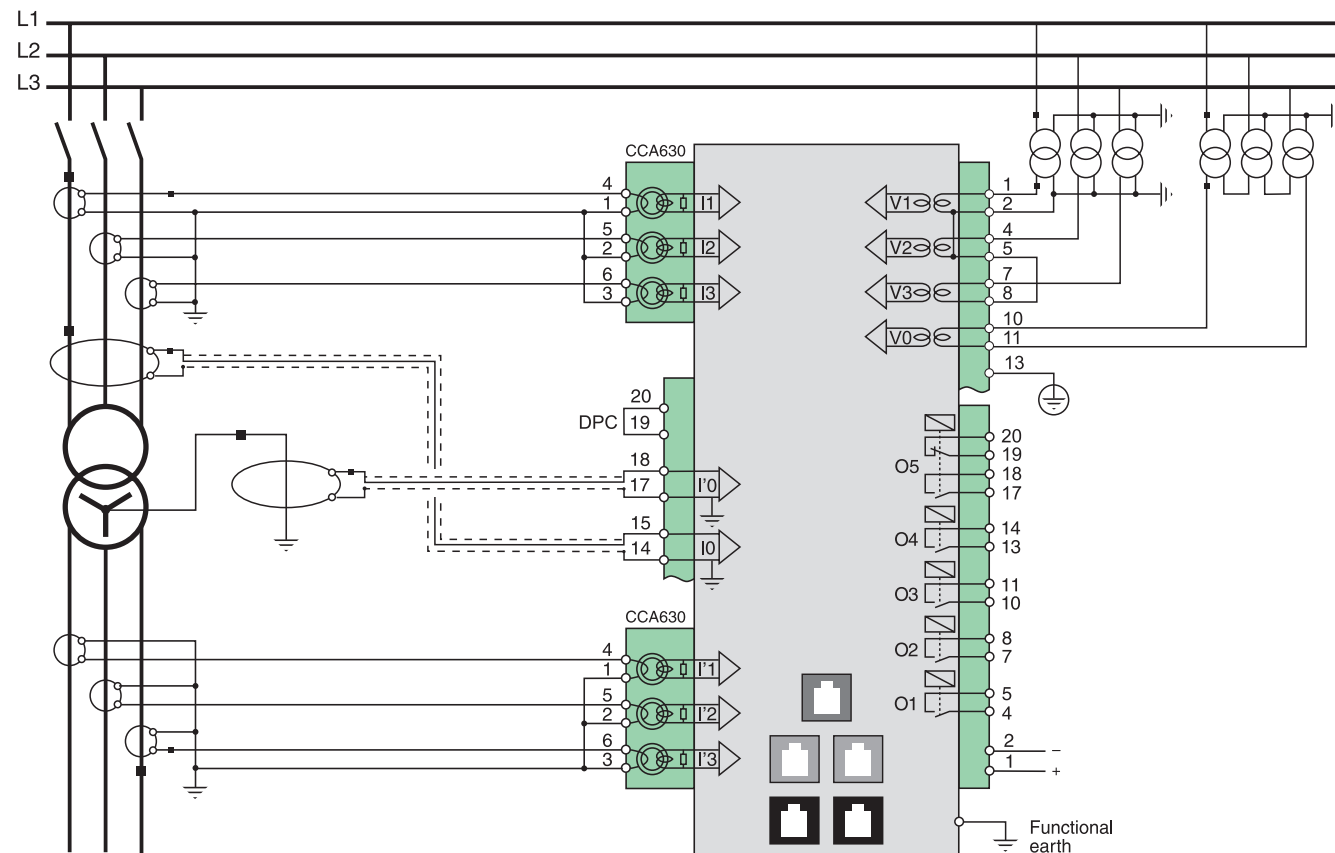
Sepam series 80 is available with two different types of User Machine Interfaces(UMI):

- an advanced User Machine Interface that provides users with complete information
- a mimic-based User Machine Interface that also allows local switchgear control.

Integrated mimic-based UMI Integrated advanced UMI Remote advanced UMI



Sepam series 80 base unit



Connection diagram for Sepam T87: differential protection of two-winding transformer.

Schneider Electric Industries SAS
35, rue Joseph Monier
CS 30323
F- 92506 Rueil Malmaison Cedex

RCS Nanterre 954 503 439
Capital social 896 313 776 €
www.schneider-electric.com

As standards, specifications and designs change from time to time, please ask for confirmation of the information given in this publication.

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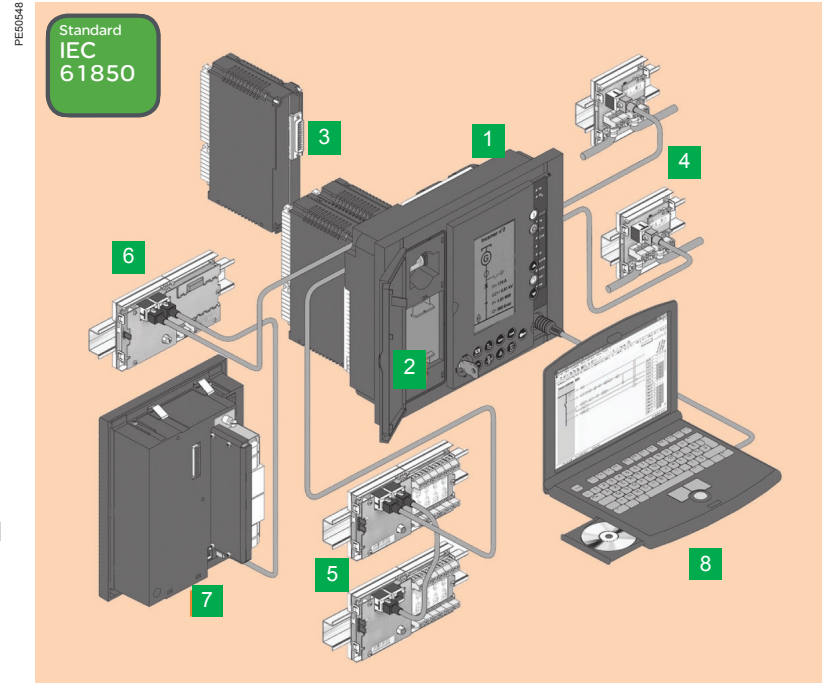


Electrical network protection Sepam series 80

Sepam series 80 and its optional modules

- 1 Base unit, with two types of User Machine Interfaces (UMI):**
 - integrated mimic-based UMI
 - integrated or remote advanced UMI..
- 2 Parameters and protection settings saved on removable memory cartridge.**
- 3 42 logic inputs and 23 relay outputs, including 5 outputs on the base unit + 3 optional modules each providing 14 inputs and 6 outputs.**
- 4 2 independent communication ports:**
 - connection of each port to 1 or 2 S-LAN and/or E-LAN networks
 - Modbus, Modbus TCP/IP, IEC60870-5-103, DNP3 and IEC 61850 communication protocols
 - GOOSE messages and TCP/IP redundancy
 - RS485(2or 4 wire) or fiber optic network.
- 5 Temperature data from 16 sensors, Pt100, Ni100, or Ni120.**
- 6 1 analog output, 0-10mA, 4-20mA or 0-20mA.**
- 7 Synchro-check module**
- 8 Software tools:**
 - Sepam parameter and protection setting and control function customization
 - programming of specific functions (Logipam)
 - recovery and display of disturbance recording data
 - local or remote operation via an E-LAN.

Sepam *series 80* is a family of *high performance* digital protection relays, for all public or industrial distribution network protection applications.



Characteristics

Conformity to standards

IEC 60255 - Protection relays	
IEC 60529 - Degree of protection	IP52 on front panel
IEC 60068 - Operating temperature	-25°C to +70°C (-13°F to +158°F)
IEC 61508 - Functional safety	SIL 2
IEC 61850-6, 7-1, 7-2, 7-3, 7-4 and 8-1	Communication networks and system in substation

Certifications

CE, UL508, CSA C22.2

Auxiliary power supply

24-250 V DC

Overall size of base units (H x W x D)

264 X 222 X 220 mm

Selection table

Protection	ANSI code	Substation				Transformer			Motor			Generator			Busbar			Cap.
		S80	S81	S82	S84	T81	T82	T87	M81	M87	M88	G82	G87	G88	B80	B83	C86	
Phase overcurrent ⁽¹⁾	50/51	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Earth fault / Sensitive earth fault ⁽¹⁾	50N/51NG 50G/51	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Breaker failure	50BF	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Negative sequence / unbalance	46	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Thermal overload for cables	49RMS		1	1	1													
Thermal overload for machines ⁽¹⁾	49RMS					2	2	2	2	2	2	2	2	2				
Thermal overload for capacitors	49RMS																	1
Capacitor bank unbalance	51C																	8
Restricted earth fault	64REF					2	2	2				2		2				
Two-winding transformer differential	87T							1			1			1				
Machine differential	87M								1				1					
Directional phase overcurrent ⁽¹⁾	67		2	2		2	2					2	2	2				
Directional earth fault ⁽¹⁾	67N/67NC	2	2	2		2	2	2	2	2	2	2	2	2				
Directional active overpower	32P	2	2	2		2	2	2	2	2	2	2	2	2				
Directional reactive overpower	32Q								1	1	1	1	1	1				
Directional active underpower	37P		2								2							
Phase undercurrent	37								1	1	1							
Excessive starting time, locked rotor	48/51LR								1	1	1							
Starts per hour	66								1	1	1							
Field loss (underimpedance)	40								1	1	1	1	1	1				
Pole slip	78PS								1	1	1	1	1	1				
Overspeed (2 set points) ⁽²⁾	12																	
Underspeed (2 set points) ⁽²⁾	14																	
Voltage-restrained overcurrent	50V/51V								2	2	2							
Underimpedance	21B								1	1	1	1	1	1				
Inadvertent energization	50/27								1	1	1	1	1	1				
Third harmonic undervoltage / 100 % stator earth fault	27TN/64G2 64G								2	2	2							
Overfluxing (V / Hz)	24						2					2	2	2				
Undervoltage (L-L or L-N)	27	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Positive sequence undercurrent	27D	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Remanent undervoltage	27R	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Overvoltage (L-L or L-N)	59	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Neutral voltage displacement	59N	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Negative sequence overvoltage	47	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Overfrequency	81H	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Underfrequency	81L	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Rate of change of frequency	81R				2													
Recloser (4 cycles) ⁽²⁾	79																	
Thermostat / Buchholz ⁽²⁾	26/63																	
Temperature monitoring (16 RTDs) ⁽³⁾	38/49T																	
Syncho-check ⁽⁴⁾	25																	
Control and monitoring																		
Circuit breaker / contactor control	94/69																	
Automatic transfer (AT) ⁽²⁾																		
Load shedding / automatic restart																		
De-excitation																		
Genset shutdown																		
Capacitor step control ⁽²⁾																		
Logic discrimination ⁽²⁾	68																	
Latching / acknowledgement	86																	
Annunciation	30																	
Switching of groups of settings																		
Adaptation using logic equations																		
Logipam programming (Ladder language)																		

■ standard, □ options.
⁽¹⁾ Protection functions with 2 groups of settings.
⁽²⁾ According to parameter setting and optional MES120 input/output modules.
⁽³⁾ With optional MET148-2 temperature input modules.
⁽⁴⁾ With optional MCS025 syncho-check module.
 Note: the figures (in the table) give the number of independant protection sets for each protection function.

Selection table

Metering	Substation				Transformer			Motor			Generator			Busbar			Cap.
	S80	S81	S82	S84	T81	T82	T87	M81	M87	M88	G82	G87	G88	B80	B83	C86	
Phase current I1, I2, I3 RMS																	
Calculated residual current I0Σ																	
Demand current I1, I2, I3																	
Peak demand current IM1, IM2, IM3																	
Measured residual current I0, I'0																	
Voltage U21, U32, U13, V1, V2, V3																	
Residual voltage V0																	
Positive sequence voltage Vd / rotation direction																	
Negative sequence voltage V1																	
Frequency																	
Active power P, P1, P2, P3																	
Reactive power Q, Q1, Q2, Q3																	
Apparent power S, S1, S2, S3																	
Peak demand power PM, QM																	
Power factor																	
Calculated active and reactive energy (± Wh, ± VARh)																	
Active and reactive energy by pulse counting (2) (± Wh, ± VARh)	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	
Phase current I'1, I'2, I'3 RMS																	
Calculated residual current I'0Σ																	
Voltage U'21, V'1 and frequency																	
Voltage U'21, U'32, U'13, V'1, V'2, V'3, V'd, V'i and frequency																	
Residual voltage V'0																	
Temperature (16 RTDs) ⁽³⁾					□	□	□	□	□	□	□	□	□	□	□	□	
Rotation speed ⁽²⁾																	
Neutral point voltage Vnt																	
Network and machine diagnosis																	
Tripping context																	
Tripping current Trip1, Trip2, Trip3																	
Phase fault and earth fault trip counters																	
Unbalance ratio / negative sequence current Ii																	
Harmonic distortion (THD), current and voltage Ithd, Uthd																	
Phase displacement φ0, φ'0, φ0Σ																	
Phase displacement φ1, φ2, φ3																	
Disturbance recording																	
Thermal capacity used																	
Remaining operating time before overload tripping																	
Waiting time after overload tripping																	
Running hours counter / operating time																	
Starting current and time																	
Start inhibit time																	
Number of starts before inhibition																	
Unbalance ratio / negative sequence current I'i																	
Differential current Idiff1, Idiff2, Idiff3																	
Through current It1, It2, It3																	
Current phase displacement θ																	
Apparent positive sequence impedance Zd																	
Apparent phase-to-phase impedances Z21, Z32, Z13																	
Third harmonic voltage, neutral point or residual																	
Difference in amplitude, frequency and phase of voltages compared for syncho-check ⁽⁴⁾	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	
Capacitor unbalance current and capacitance																	
Switchgear diagnosis																	
ANSI code																	
CT / VT supervision	60/60FL																
Trip circuit supervision ⁽²⁾	74																
Auxiliary power supply monitoring																	
Cumulative breaking current																	
Number of operations, operating time, charging time, number of racking out operations ⁽²⁾																	
Communication port																	
Measurement readout ⁽⁵⁾	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	
Remote indication and time tagging of events ⁽⁵⁾	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	
Remote control orders ⁽⁵⁾	□	□	□	□	□	□	□	□									