Maximize protection

Sepam series 10, 20, 40, 60, 80

Modular range of digital protection relays

Fast

Dependable

Simple

Schneider Electric

Increase energy availability

Fast response

+

Maximum dependability

=

100% available energy

Your electrical equipment is under control. With Sepam protection relays, your get maximum energy availability for your process.

Sepam protection relays
Number one in dependability

Maximize energy availability and the profits generated by your installation while protecting life and property.

Keep informed to manage better

With Sepam, you get intuitive access to all system information in your language so that you can manage your electrical installation effectively. If a problem occurs, clear and complete information puts you in a position to make the right decisions immediately. The electrical supply is restored without delay.

Maintain installation availability

Sepam maintains high energy availability thanks to its diagnostics function that continuously monitors network status.
In-depth analysis capabilities and high reliability ensure that equipment is de-energized only when absolutely necessary.
Risks are minimized and servicing time reduced by programming maintenance operations.

Enhance installation dependability

Sepam series 80 is the first digital protection relay to deliver dependability and behaviour in the event of failure meeting the requirements of standard IEC 61508. All Sepam boards and electronic components are industrially conformal coated.
This manufacturing allows Sepam to be used in the most severe industrial environments including off-shore oil rigs and chemical factories (IEC 60062-2-60).

1982

Launch of first multi-functional digital protection relay

2010

Over 600,000 Sepam units installed around the world

Standard IEC 61508

Electric utilities, petrochemical plants, hospitals, infrastructures, shopping centres, small industry.

Improve satisfaction

+

=

100% satisfaction

A set of simple and effective functions suited to your customer's application

Fast response from Schneider Electric: save time at every step in your project

With Sepam protection relays, you can count on simple, high-performance products and the support of top-notch Schneider Electric teams. Meet your obligations the easy way.

Sepam protection relays

Save time at every step in project development and installation to consistently meet your project deadlines.

Go for simplicity

With multi-functional Sepam protection relays, you can measure, manage, analyze and produce diagnostics for all applications in an installation. Range modularity makes it easy to select the relay corresponding exactly to your needs.
The range is structured for typical applications (substations, transformers, generators, capacitors, busbars and motors) and provides the necessary functions for each application (protection, metering, control and monitoring, etc.).
Starting with a Sepam base unit, complete solutions can be built up by adding input/output modules, sensors and communication modules.

Make settings easily

A single PC software tool for the entire Sepam range makes system start-up and operation particularly easy. The user-friendly program guides you step by step from the initial programming on through to final commissioning. Sepam produces a detailed report on system configuration and all the activated protection functions.
On Sepam series 80, the entire setup is saved to a memory cartridge that can be accessed in front, for instance when replacing a unit.

Communicate the open way

In addition to the DNP3, IEC 60870-5-103 and Modbus standards, Sepam complies with IEC 61850 (GOOSE messages, TCP/IP redundancy) and uses the communication protocol that is today's market standard to interface with all brands of electrical-distribution devices.

Standard IEC 61850

190

Schneider Electric does business in 190 countries

72 hours

The time required to make a Sepam unit available in our international distribution center

Installation

Setup

Local display

Supervision

What level of safety? For what applications?

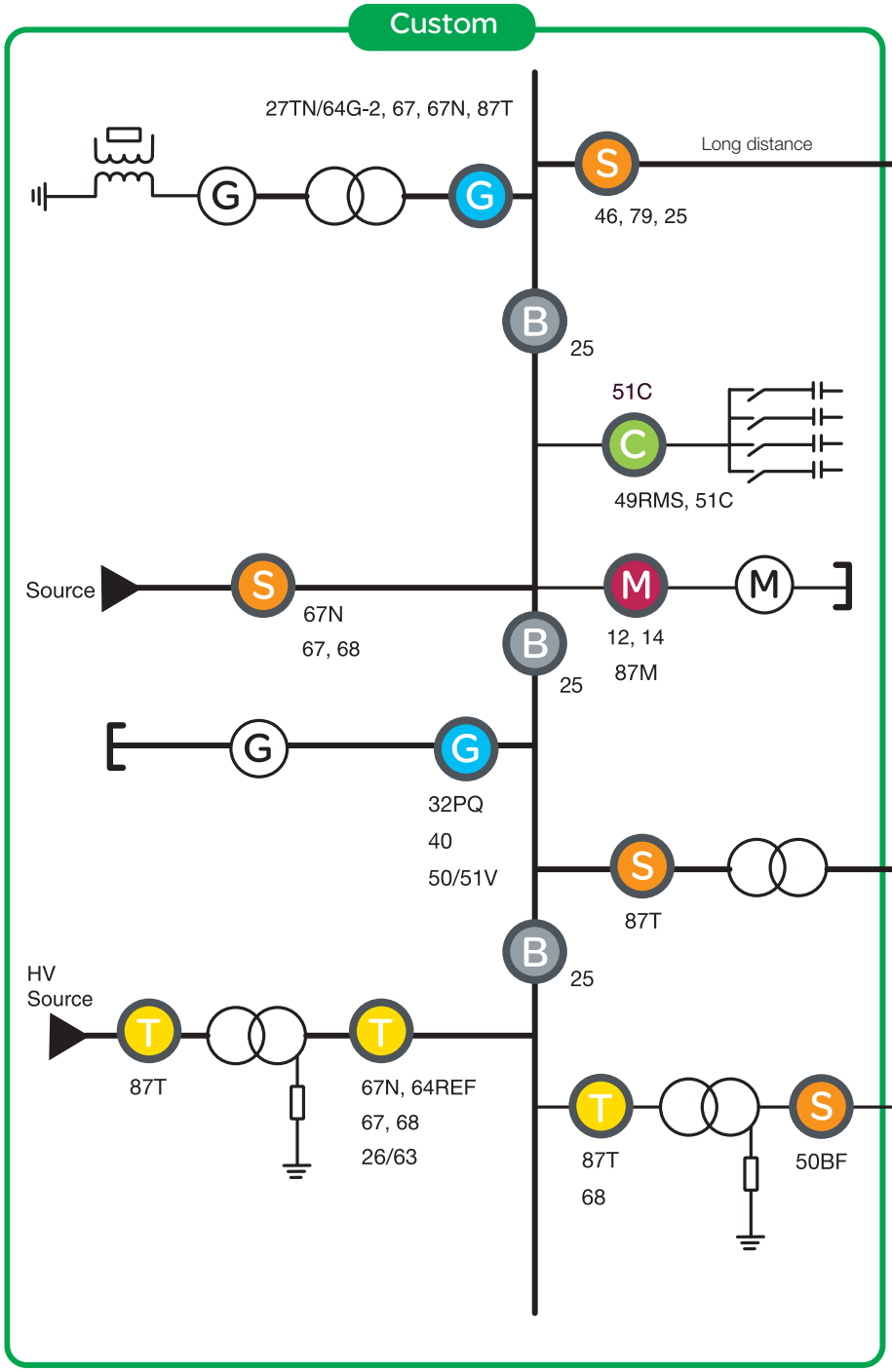
Sepam range design is based on a simple idea. All users should be able to find a solution corresponding exactly to their needs and offering the right balance between performance, simplicity and cost.

A Sepam relay for each application...

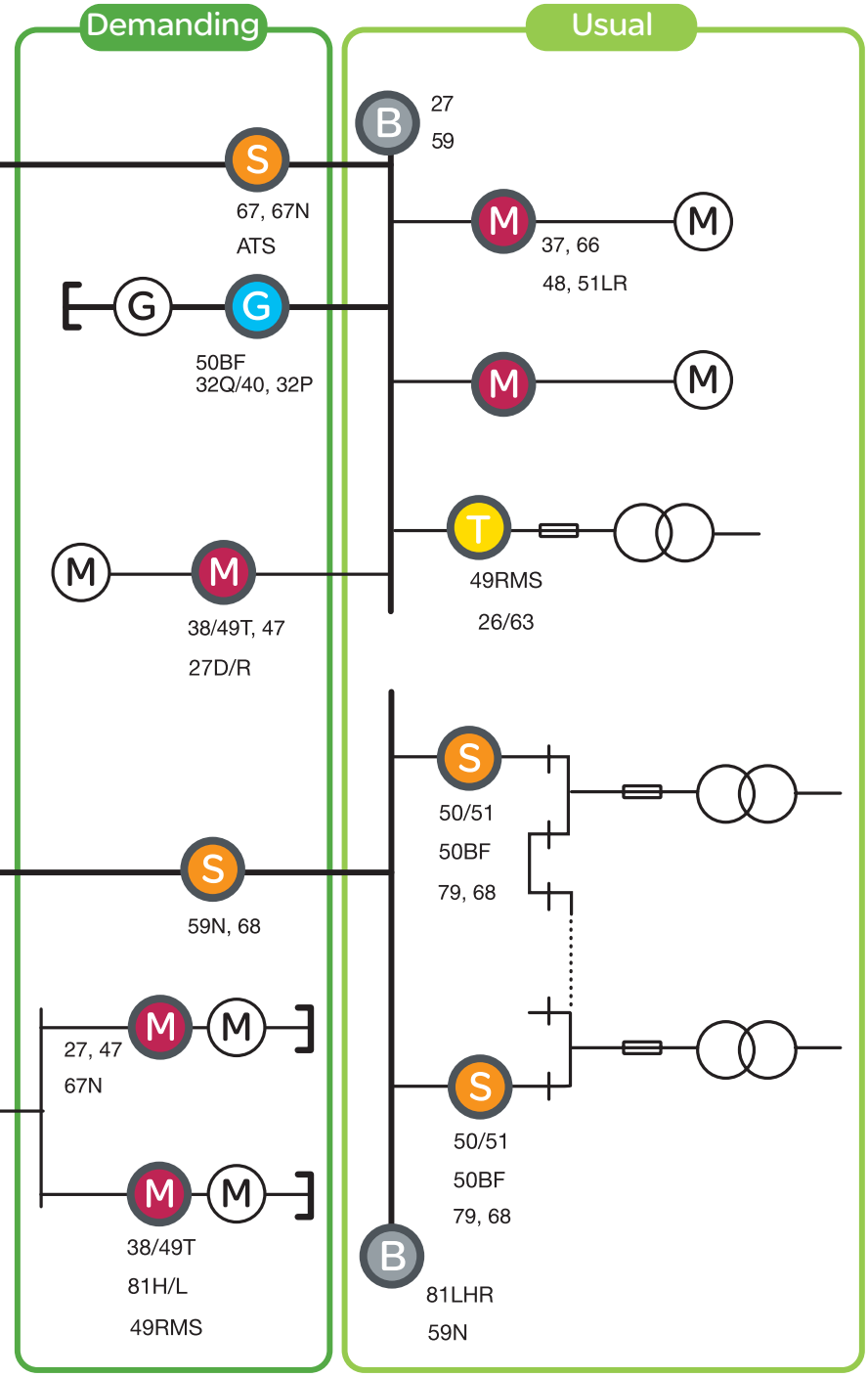
- S Substations
- T Transformers
- G Generators
- C Capacitors
- B Busbars
- M Motors

... and different levels of protection

> Thermal protection based on temperature rise calculations, with predictive indications to optimize process control.
> Directional phase-overcurrent protection for closed-loop networks.
> Directional earth-fault protection for all types of neutral systems.
> Fast and highly-sensitive protection of transformers, motors and generators using differential functions with restraint.



Sepam series 80 | Sepam series 60 | Sepam series 40 | Sepam series 20



For custom applications

Sepam series 80

> Standardized dimensions for enhanced protection of incomers/feeders, transformer, motor, generator, bus, capacitor-bank applications
> Differential protection of transformer or machine transformer units
> Differential protection of motors and generators
> Protection for incomers, couplings and important feeders
> Expanded logic-equation capabilities
> Graphical assistance for setting software
> Battery backup for historical and fault waveform data retention
> Optional mimic-based display units are available to view a portion of single-line and phasor diagrams
> 42 binary inputs and 23 outputs

For demanding applications

Sepam series 60

> Directional over-current protection for dual incomers, couplings and closed-loop feeders
> Current and voltage inputs
> Setting software with Boolean logic equation assistance
> CT/VT and trip circuit supervision
> Sixteen seconds of fault recording configurable for multiple captures, detailed history of last 5 trip reports and retention of last 200 time-tagged alarms
> Optional mimic-based display units are available to view a portion of single-line and phasor diagrams
> Battery backup for historical and fault waveform data retention
> Synchro-checks module available
> 16 RTD inputs
> 28 binary inputs and 16 outputs

For demanding applications

Sepam series 40

> Compact case provides standardized dimensions (< 100 mm deep)
> Directional over-current protection for dual incomers, couplings and closed-loop feeders
> Current and voltage inputs
> Setting software with Boolean logic equation assistance
> CT/VT and trip circuit supervision
> Sixteen seconds of fault recording configurable for multiple captures, detailed history of last 5 trip reports and retention of last 200 time-tagged alarms
> 16 RTD inputs

For usual applications

Sepam series 20

> Backlit LCD graphic bitmap display
> 16 inverse time over-current characteristic curves
> Easy software setup
> Two 86-cycle fault records, last trip fault values and last 64 time-tagged alarms
> Self-test diagnostics
> Wide range of control power inputs (AC/DC)
> Breaker/Failure function for S24 and T24

Sepam protection relays

Three relay series with increasing protection capabilities for six types of applications to provide all possible protection configurations.

	Series 10	Series 20	Series 40
Applications			
Substations	Current	Current, Temperature	Current, Voltage, Frequency, Temperature
Transformers			
Motors			
Generators			
Busbars		Voltage, Frequency	
Capacitors			
			+ directional protection
Protection functions	49RMS, 50/51, 50N/51N, 68, 86	26/63, 27/27S, 27D, 27R, 30, 37, 38/49T, 46, 48, 49RMS, 50/51, 50BF, 50G/51G, 50N/51N, 51LR, 59, 59N, 66, 68, 79, 81H, 81L, 81R, 86, 94/69, CPLU 50/51, CPLU 50N/51N	25, 26/63, 27/27S, 27D, 27R, 30, 32P, 32Q/40, 37, 38/49T, 46, 47, 48, 49RMS, 50/51, 50BF, 50G/51G, 50N/51N, 50V/51V, 51LR, 59, 59N, 60/60FL, 66, 67, 67N/67NC, 68, 79, 81H, 81L, 81R, 86, 94/69, 21FL, 46BC, CPLU 50/51, CPLU 50N/51N
Characteristics			
Logic input/outputs	Inputs 0 to 4	Inputs 0 to 10	Inputs 0 to 10
	Outputs 3 to 7	Outputs 4 to 8	Outputs 4 to 8
Temperature sensors	N/A	0 to 8	0 to 16
Channels	Current 3I + Io	Current 3I + Io	Current 3I + Io
		Voltage 3V + Vo	Voltage 3V + Vo
		LPCT (1) Yes	LPCT (1) Yes
Communication ports	0 to 1	1 to 2	1 to 2
	Modbus, IEC 103	Modbus, IEC 103, DNP3, IEC 61850	Modbus, IEC 103, DNP3, IEC 61850
			Redundancy
Control		Matrix (2) Yes	Matrix (2) Yes
			Logic equation editor Yes
Other	Backup lithium battery (4) Yes		Backup 48 hours (capacitor)

(1) LPCT: low-power current transducer complying with standard IEC 60044-8.

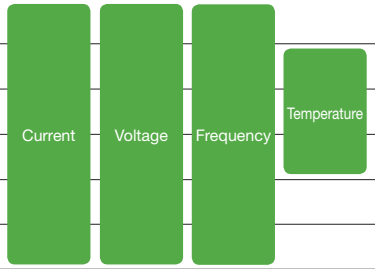
(2) Control matrix for simple assignment of information from the protection, control and monitoring functions.

ANSI codes

Codes and definitions

12	Overspeed (2 set points)	46BC	Broken conductor detection
14	Underspeed (2 set points)	47	Negative sequence overvoltage
21B	Underimpedance	48	Excessive starting time
21FL	Fault Locator	49RMS	Thermal overload
24	Overfluxing (V/Hz)	50/27	Inadvertent energization
25	Synch-check	50/51	Phase overcurrent
26/63	Thermostat / Buchholz	50BF	Breaker failure
27/27S	Undervoltage (L-L/L-N)	50G/51G	Ground sensitive
27D	Positive-sequence undervoltage	50N/51N	Ground fault
27R	Remanent undervoltage	50V/51V	Voltage restrained overcurrent
30	Annunciation	51C	Capacitor bank unbalance
32P	Directional real overpower	51LR	Locked rotor
32Q/40	Directional reactive overpower	59	Overvoltage (L-L or L-N)
37	Phase undercurrent	59	Overvoltage (L-L)
37P	Directional active underpower	59N	Neutral voltage displacement
38/49T	Temperature monitoring	60/60FL	CT/VT supervision
40	Field loss (underimpedance)	64G	100% stator earth fault
46	Unbalance/negative sequence	64REF	Restricted earth fault

Series 60

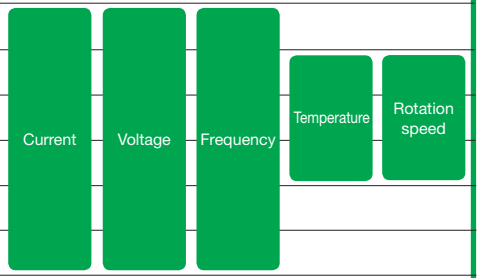


+ directional protection

25, 26/63, 27/27S, 27D, 27R, 30, 32P, 32Q/40, 37, 38/49T, 46, 47, 48, 49RMS, 50/51, 50BF, 50G/51G, 50N/51N, 50V/51V, 51LR, 59, 59N, 60/60FL, 66, 67, 67N/67NC, 68, 79, 81H, 81L, 81R, 86, 94/69

Inputs	0 to 28
Outputs	4 to 16
	0 to 16
Current	3I + Io
Voltage	3V + Vo
LPCT (1)	Yes
	1 to 2
Modbus, IEC 103, DNP3, IEC 61850	
Redundancy	
Goose Message	
Matrix (2)	Yes
Logic equation editor	Yes
Front memory cartridge with settings	Yes
Backup lithium battery (4)	Yes

Series 80



+ directional and differential protection

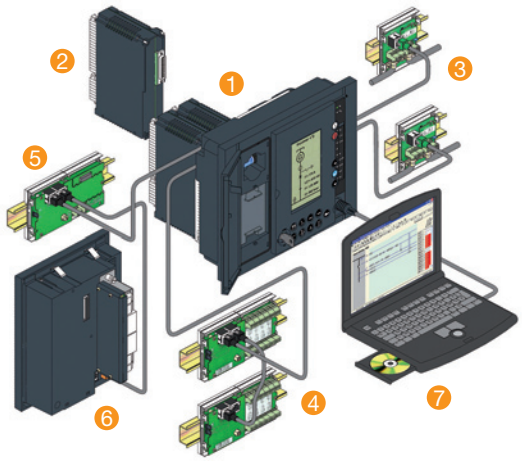
12, 14, 21B, 24, 25, 26/63, 27/27S, 27D, 27R, 30, 32P, 32Q/40, 37, 37P, 38/49T, 40, 46, 47, 48, 49RMS, 50/27, 50/51, 50BF, 50G/51G, 50N/51N, 50V/51V, 51C, 51LR, 59, 59N, 60/60FL, 64G, 64REF,a 66, 67, 67N/67NC, 68, 74, 78PS, 79, 81H, 81L, 81R, 86, 87M, 87T, 94/69

Inputs	0 to 42
Outputs	5 to 23
	0 to 16
Current	2x 3I + 2x Io
Voltage	2x 3V + Vo
LPCT (1)	Yes
	2 to 4
Modbus, IEC 103, DNP3, IEC 61850	
Redundancy	
Goose Message	
Matrix (2)	Yes
Logic equation editor	Yes
Logipam (3)	Yes
Front memory cartridge with settings	Yes
Backup lithium battery (4)	Yes

(3) Logipam ladder language (PC programming environment) to make full use of Sepam series 80 functions.

(4) Standard lithium battery 1/2 AA format 3,6 V front face exchangeable.

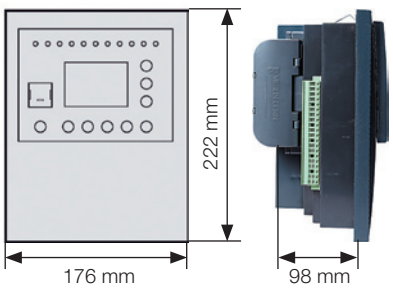
66	Starts per hour
67	Directional phase overcurrent
67N/67NC	Directional ground fault
68	Logic discrimination / zone selective interlocking
74	Circuit connection supervision
78PS	Pole slip
79	Recloser (4 cycles)
81H	Overfrequency
81L	Underfrequency
81R	Rate of change of frequency (df/dt)
86	Latching / acknowledgement
87M	Machine differential
87T	Two-winding transformer differential
94/69	Circuit breaker / contactor control
CLPU 50/51	Cold load pick-up with phase overcurrent protection
CLPU 50N/51N	Cold load pick-up with earth fault protection



Build your own solution

1. Base unit
   > with integrated or remote advanced user-machine interface (UMI),
   > or integrated mimic-based UMI (Sepam series 60 and 80).
2. Additional input/output modules for integral equipment control.
3. Connection to RS485 (2 or 4 wire) or optic-fibre communication network. Protocols include Modbus, IEC 60870-5 103, DNP3 and IEC 61850.
4. Module for eight temperature measurements via Pt100, Ni100 or Ni120 sensors, to protect transformers, motors and generators.
5. Low-level analog output (0-10, 4-20, 0-20 mA) for transmission of Sepam measurements in analog form.
6. Module to check synchronization between two voltages (Sepam series 60 and 80).
7. Software
   > Sepam parameter settings, protection settings and personalization of control functions,
   > local or remote operation of the installation,
   > disturbance recording data display.

Compact and light, Sepam fits anywhere



Start-up was never so easy

The Sepam programming and operating software provides a single environment for the entire range. The result is a simple, user-friendly approach for fast system commissioning.

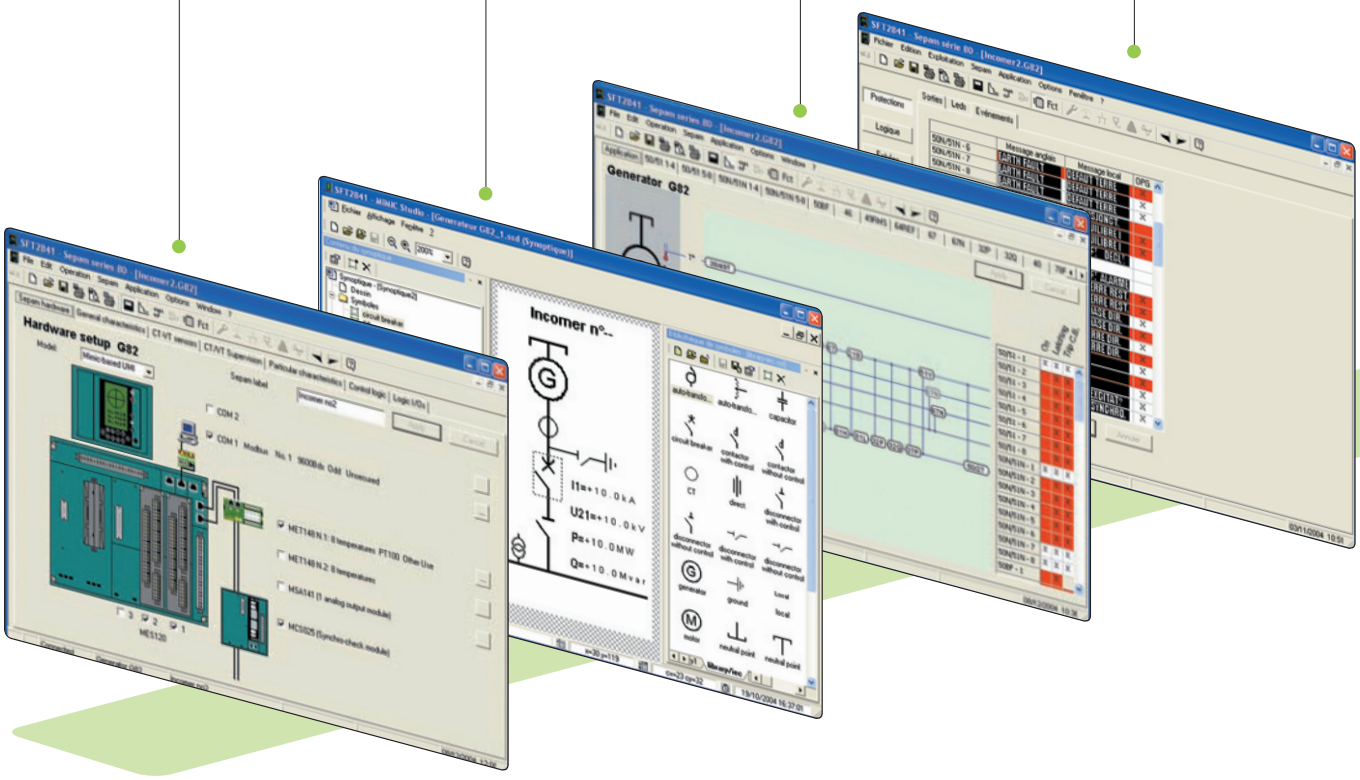
Setup

Equipment setup
Set up the various modules (input/outputs, display, communication, sensors).

Protection setup
Prepare the single-line diagram either by reworking a mimic diagram from the library or by creating a new one.

Protection activation
Graphically create the links between sensors and the measurements carried out by the relays.

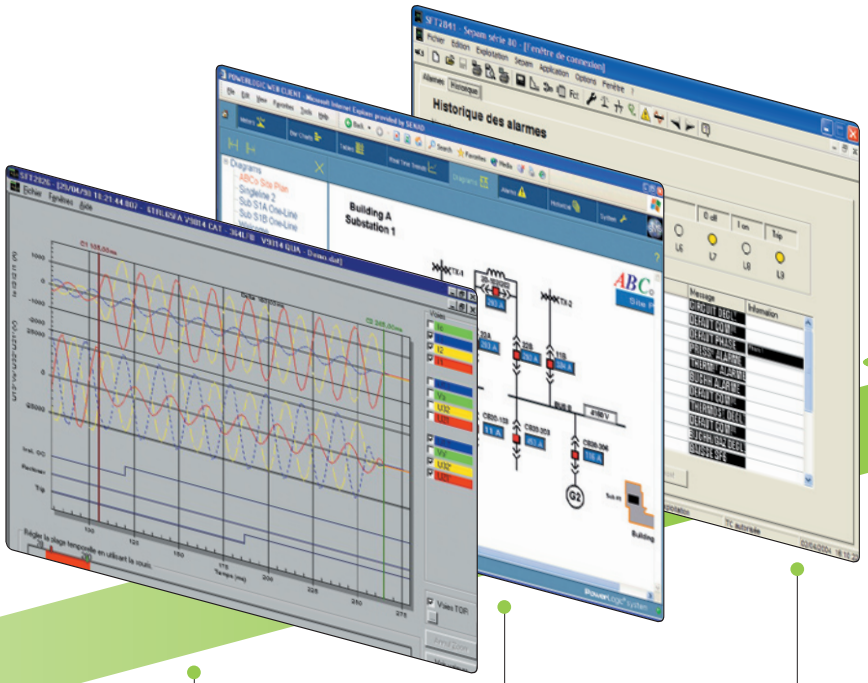
Summary of functions
Assign easily and quickly the various protection, control and monitoring functions.



10 minutes — 5 minutes — 5 minutes — 40 minutes

Operation

The setup is now ready to be deployed on all the Sepam units in the installation.



Analysis of waveform capture

Display, analysis and printing of disturbance-recording data.

Real-time supervision

Supervision of the status of all the relays in the electrical installation.

Management of alarms and events

Automatic generation of the relay setup report.

15 years of peace of mind

Sepam protection relays

Services to optimize performance of your protection plan

Custom services

Creation of an electrical installation with a control-monitoring architecture requires more than correct analysis of needs. The best balance between technical aspects and cost issues is the product of in-depth know-how and long experience.

Your Schneider Electric representative is on hand to propose tailored services:
> training for technicians,
> discrimination studies for your network,
> design of the control and monitoring architecture,
> personalized Sepam units for your application,
> system tests and commissioning,
> installation upgrades and maintenance.

Via your Schneider Electric representative, access all the resources and know-how of Schneider Electric, including the certified COFRAC test lab, software for network simulations, short-circuit calculations and dynamic stability studies, etc. These resources cover all types of situations and provide solutions that fit your needs.

Retrofit

Sepam functions make it particularly suitable for retrofit projects. It adapts to all types of sensors and its programming is so flexible that any type of control scheme can be implemented.

Our service teams are on hand to help you design upgrades for your installation and maintain the highest level of performance.

Training is available worldwide, near you.

For more information:
www.sepamrelay.com

> Make the most of your energy

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