

# Protection and control

## HV/MV substation **Sepam 2000** Installation Use Commissioning



**GROUPE SCHNEIDER**

■ Merlin Gerin ■ Modicon ■ Square D ■ Telemecanique

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# Installation

## Equipment identification

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### Installation of Sepam 2000

Each Sepam 2000 comes in a single package which contains:

- Sepam,
- mounting accessories,
- connection accessories (connectors).

The other optional accessories come in a separate package.

We recommend that you follow the instructions given in this document for quick, correct installation of your Sepam 2000:

- equipment identification,
- assembly,
- connection of current and voltage inputs, temperature sensors,
- microswitch setting,
- connection of power supply and earth,
- checking prior to commissioning.

### Identification of Sepam 2000

Each Sepam is identified by a 14-character reference which describes its equipment and functional components in accordance with the chart below.

series	model	type	variant	communication	number of ESTOR boards	working language	current sensor	auxiliary supply	operating temperature
S26	CC	A = Overhead	1 to 99	X = none	0 = 0	F = French	C = CS	A = 24 Vdc	N = -5/55 °C
S36	LT	B = Busbars		J = JBUS	1 = 1	A = English	T = CT	B = 38/125 Vdc	
	KR	C = Capacitor			2 = 2	I = Italian		C = 220 Vdc	
	XR	L = Line			3 = 3	E = Spanish			
	YR	R = RTU							
	LR	S = Substation							
	TR	T = Transformer							
	CR	U = Underground							

There are five labels for identifying Sepam:

- two labels on the right side panel which give the product equipment features <sup>(1)</sup>,
- a label on the front of the cartridge which gives the functional features <sup>(2)</sup>,
- a label on the left side of the cartridge which gives the references <sup>(3)</sup>,
- a label on the right side of the cartridge which gives the references of non standard program logic schemes <sup>(4)</sup>.

Example of Sepam reference:

S36	Sepam 2036
XR	type
S	substation
62	62
X	no communication
2	2 ESTOR boards
A	English
T	TC
A	24 V
N	-5/+55 °C

model

equipment reference (Sepam, model and application)

serial no.

<sup>(1)</sup> Example of labels on right side panel

equipment upgrading label

spaces reserved for equipment changes e.g. addition of an ESTOR board

spaces reserved for after-sales service interventions e.g. replacement of an ECM board

board name

intervention dates

compatible Sepam model

type of application

control logic diagram reference

S36 : standard Sepam  
XR : model  
S62 : type

6 : Sepam S36  
XR : model  
S62 : type  
A : English  
A : rev. level

<sup>(2)</sup> Example of label on front of cartridge.

program logic diagram reference

Sepam ref.:

Proj ref.:

Drwg n°:

Cubicle ID:

Date

Version

<sup>(4)</sup> Label on right side of cartridge  
Identification of non standard program logic

03143764FA-B0-01-9740208

<sup>(3)</sup> Example of label on left side of cartridge.

# Installation

## Equipment identification (cont'd)

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### Accessories supplied with Sepam 2000

Each Sepam comes with the following accessories.

#### CCA 660 connector for connection of 1 A or 5 A CTs:

- for 4 mm eye lugs,
  - for max. 6 mm<sup>2</sup> wire (awg 10)
- or CCA 601 BNC/BNC wire, length 5.5 m., for connection to CSP sensors.



#### CCA 604 connector

4-pin. Connection of power supply:

- screw terminals,
- 0.6 to 2.5 mm<sup>2</sup> wire (awg 20 to awg 14).



#### CCA 606 connector

6-pin. Connection of a core balance CT:

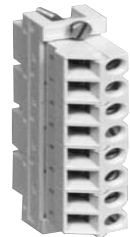
- screw terminals,
- 0.6 to 2.5 mm<sup>2</sup> wire (awg 20 to awg 14).



#### CCA 608 connector (according to type of Sepam)

8-pin. Connection of VTs:

- screw terminals,
- 0.6 to 2.5 mm<sup>2</sup> wire (awg 20 to awg 14).



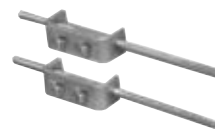
#### CCA 621 connector

21-pin. Connection of logic inputs/outputs and temperature sensors:

- screw terminals,
- 0.6 to 2.5 mm<sup>2</sup> wire (awg 20 to awg 14).



#### 2 Sepam mounting lugs



## Optional accessories

### TSM 2001 pocket terminal

Used to make Sepam 2000 settings. It does not have a battery since it is supplied with power by the Sepam 2000.



### SFT 2801 kit

Software tool installed on PC microcomputer which may be used instead of the TSM 2001 pocket terminal.

It comprises:

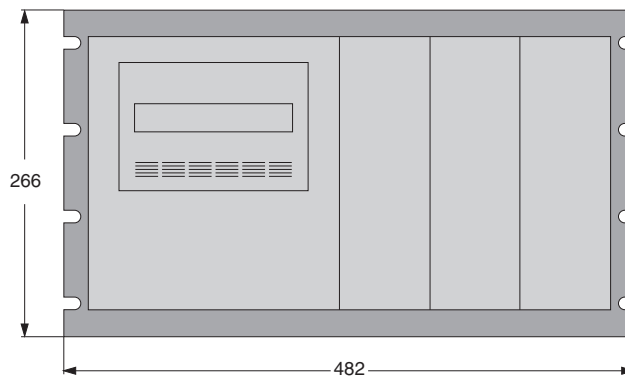
- a 3"1/2 diskette,
- an instruction manual,
- a connection kit (ACE 900 adapter + cord).



ACE 900 adapter to be connected to the pocket terminal socket.

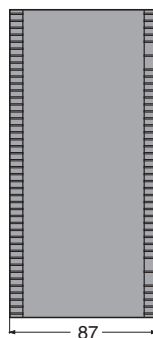
### AMT 819 plate

Used to mount Sepam 2000 on a 19" rack.



### AMT 820 shield

Used to block off the space between Sepam and the edge of the AMT 819 plate.





# Installation

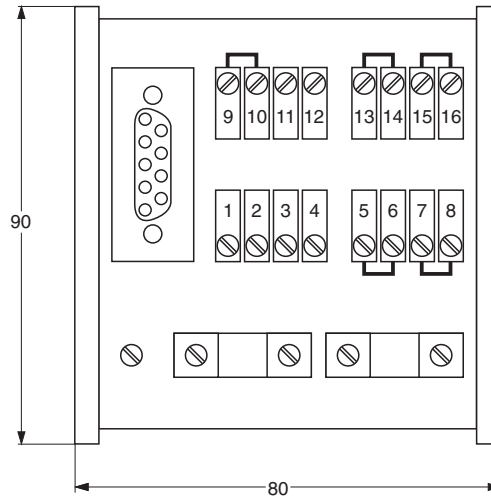
## Equipment identification (cont'd)

### Optional Jbus communication accessories

#### CCA 609 connection box and CCA 802 cable (3 m)

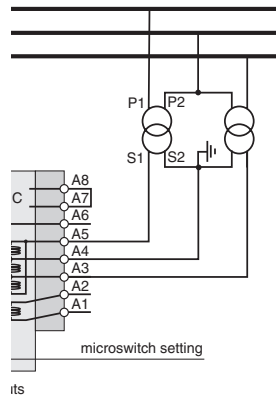
Connection to the Jbus communication network.  
These accessories simplify the wiring of the communication network:

- the network is connected to the screw terminals of the CCA 609 box,
- the CCA 609 box is mounted on a DIN rail,
- the CCA 602 box provides the link between the CCA 609 box and Sepam.



#### CCA 619 chaining connector

Connector used to connect to the Jbus field bus by chaining.



#### CCA 600 connector, 9-pin sub D type

Used to connect the communication network.  
This is an alternative to using the CCA 609 box and CCA 602 cable.  
The network wires are to be welded to the connector terminals.

#### CCA 602 cable

3 m long cable with connectors.

#### N.B.

For further information, please refer to Jbus documentation no. 3140751.

# Installation

## Assembly and wiring

### Dimensions and drilling

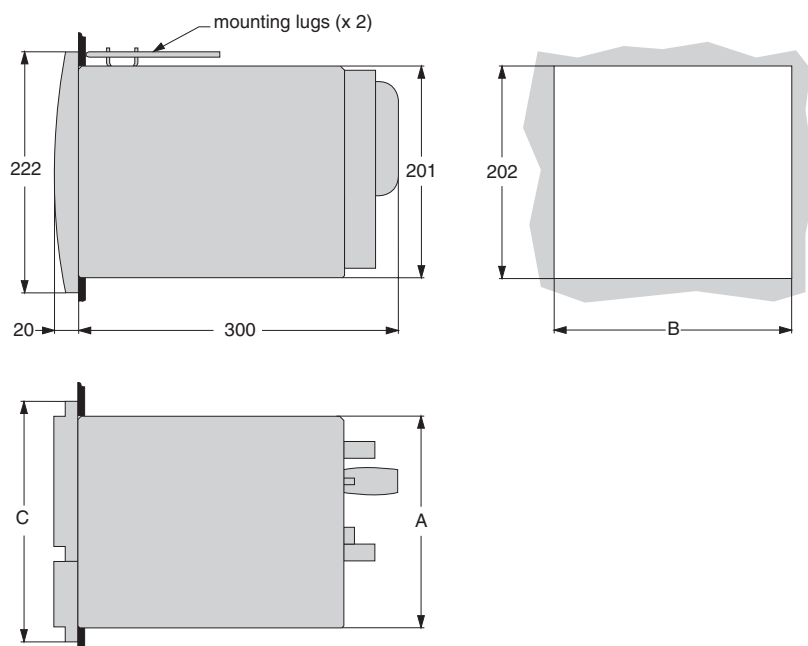
Sepam 2000 is flush-mounted in a rectangular cut-out.

Maximum thickness of mounting: 3 mm.

Sepam	A (mm)	B (mm)	C (mm)
S26 *	244	250	264
S36 *	332	338	352

\* S25, S35 for earlier versions

### drilling diagram

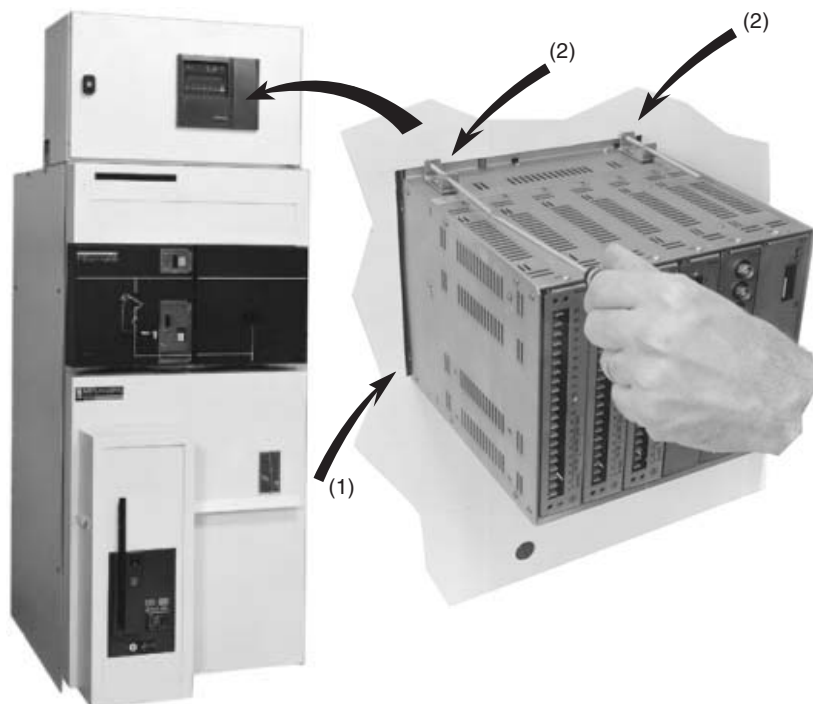


### Assembly

■ insert Sepam 2000 through the front of the cut-out. Slide it into the cut-out until the front of Sepam 2000 is in contact with the mounting plate. The 2 notches (1) at the base of the Sepam 2000 case allow it to hold by its own weight.

■ position the 2 lugs (2) in the holes on the top of Sepam. Tighten the threaded studs of the lug.

■ make sure not to block the ventilation openings on the top and bottom of Sepam. Leave a space of at least 5 cm above and below Sepam.



# Installation

## Assembly and wiring (cont'd)

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### Sepam 2000 components

slot	1	2	3	4	5	6		
	CE40	ECM <sup>(2)</sup>		ESB	ESTOR1	ESTOR2		
<b>S26 model</b>								
LT	CE40	ECM	3U/Vo	ESB	ESTOR	ESTOR		
slot	1	2	3	4	5	6	7	8
	CE40	ECM <sup>(2)</sup>		3U/Vo	ESB	ESTOR1	ESTOR2	ESTOR3 <sup>(1) (3)</sup>
<b>S36 model</b>								
XR	CE40	ECM	–	3U/Vo	ESB	ESTOR	ESTOR	ESTOR
LR	CE40	ECM	ECM	3U/Vo	ESB	ESTOR	ESTOR	ESTOR
KR	CE40	ECM	ECM	–	ESB	ESTOR	ESTOR	ESTOR
YR	CE40	ECM	–	–	ESB	ESTOR	ESTOR	ESTOR
TR	CE40	ECM	3U/Vo	3U/Vo	ESB	ESTOR	ESTOR	ESTOR
CR	CE40	ECMD	ECMD	–	ESB	ESTOR	ESTOR	ESTOR
CC	CE40	ECMD	ECMD	ECMD	ESB	ESTOR	ESTOR	ESTOR

<sup>(1)</sup> the ESTOR board may be installed, depending on the application,

<sup>(2)</sup> or ECA for CSP sensors,

<sup>(3)</sup> option for ESTOR board.

\* S25, S25 for earlier versions.

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## Connections

The Sepam 2000 connections are made on the removable connectors located on the rear of the device. All the connectors are screw-lockable.

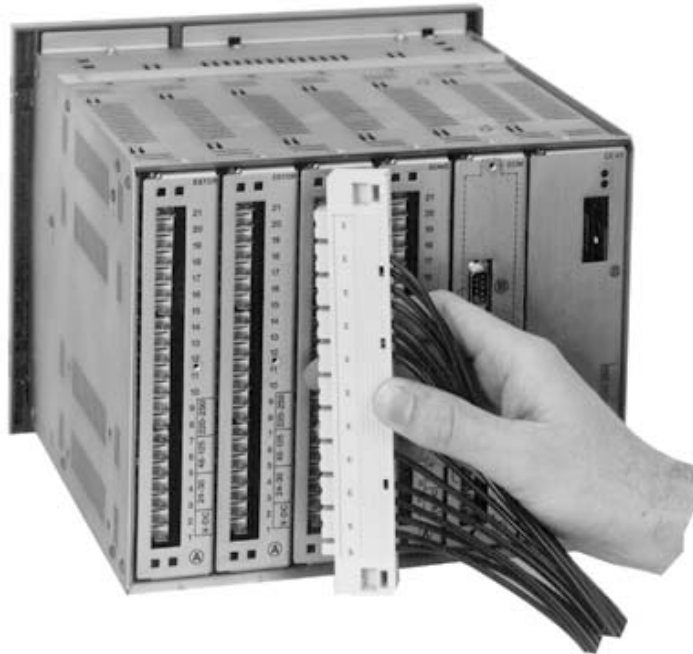
Wiring of screw connectors:

- recommended wire fitting:
- Telemecanique DZ5CE0155 for 1.5 mm<sup>2</sup>,
- DZ5C0253 for 2.5 mm<sup>2</sup>.

Stripped length with fitting: 17 mm without fitting:

- stripped length: 10 to 12 mm,
- maximum 2 wires per terminal.

21-pin connectors must be plugged in correctly by hand before locking with the 2 screws provided (top/bottom).



## Terminal identification principle

- slots 1 to 8
- A or B connector
- terminals 1 to 21.

Each connector is used specifically for a Functional assembly identified on the top right according to the function:

- CE40: auxiliary power supply and communication option,
- ECM: current sensor (CT) interface,
- ECA: current sensor (CSP) interface,
- 3U/Vo: voltage sensor interface,
- ESB: circuit breaker control interface,
- ESTOR: auxiliary control circuit interface,

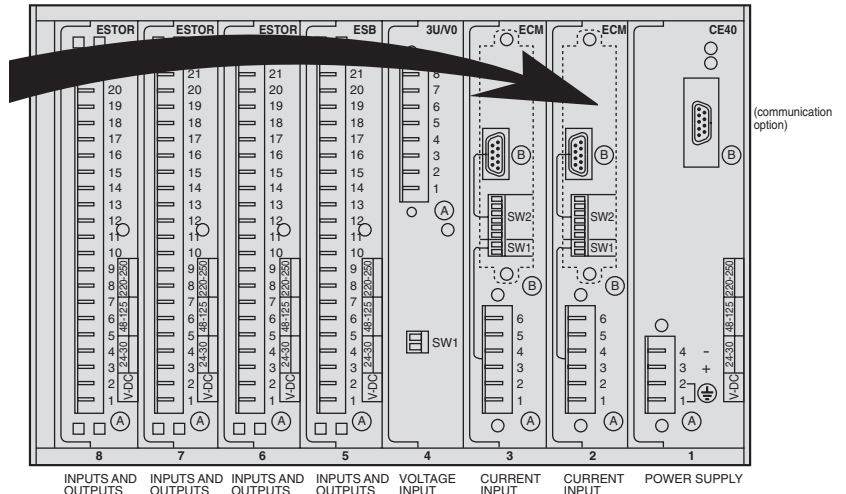
The relative position of the assemblies depends on the Sepam 2000 model.

\* S25, S25 for earlier versions.

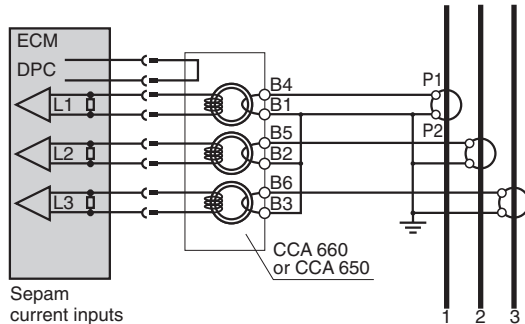
# Installation

## Connection of current inputs to 1 A or 5 A CTs

The current transformer (1 A or 5 A) secondary circuits are connected to the CCA 660 connector of the ECM module. This connector contains 3 interposing ring CTs with through primaries, which ensure impedance matching and isolation between the 1 A or 5 A circuits and Sepam 2000. The connector may be disconnected with the power on since disconnection does not open the CT secondary circuits.



### 1 A or 5 A CT block and connection diagram

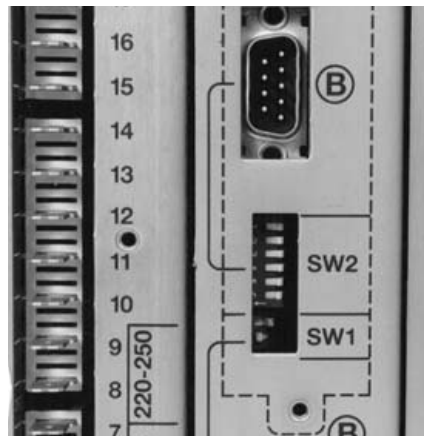


### Selection of SW1 and SW2 (microswitches) operating modes

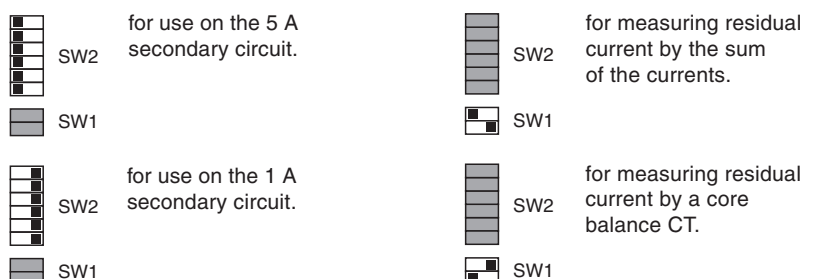
Sepam 2000 has several possible operating modes. The operating mode is selected via microswitches on the rear of the device. They must be set before Sepam 2000 is switched on, i.e. Sepam 2000 is de-energized.

The microswitches are hidden by the CCA 660 connector once it has been installed.

**N.B.** Sepam S36, models LR, LS, KR, KZ, CR and CC, have 2 or 3 inputs for connecting CTs. Remember to set the microswitches for the 2 or 3 inputs.



### Microswitch setting



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## CCA 660 connector

- open the 2 side shields for access to the connection terminals. The shields may be removed, if necessary, to facilitate wiring. If removed, replace them after wiring.
- remove the bridging strap, if necessary. The strap links terminals 1, 2 and 3.
- connect the wires using 4 mm eye lugs. The connector accommodates wire with cross-sections of 1.5 to 6 mm<sup>2</sup> (awg 16 to awg 10).
- close the side shields.



- plug the connector into the 9-pin inlet on the rear of the device. Item B of the ECM module.



- tighten the CT connector fastening screws on the rear of Sepam.



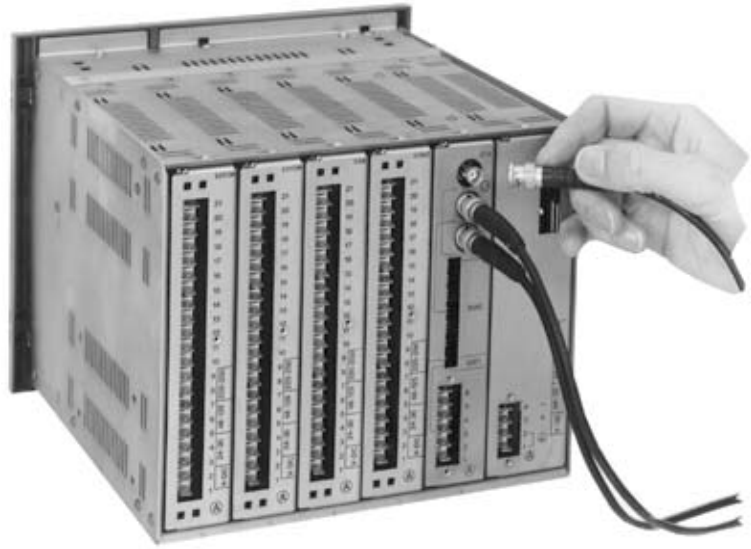
# Installation

## Connection of current inputs to CSPs

The CSP sensors are connected by prefabricated coaxial cables, part no. CCA 601, supplied with Sepam.

The cables are plugged into:

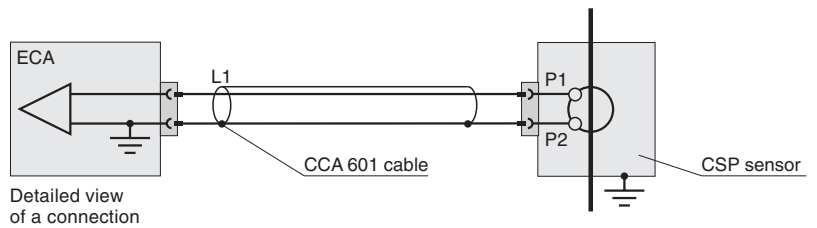
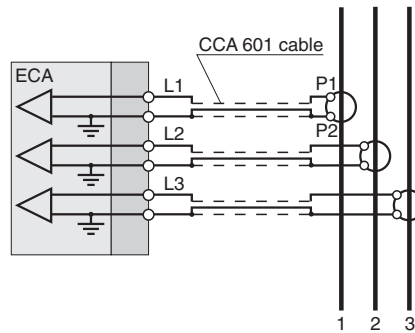
- Sepam 2000, in the BNC inlets on the rear of the device, identified L1, L2 and L3 of the ECA modules,
- the CSP sensors, in the BNC outlet on each sensor,
- the 3 BNC outlets are not equipped with the plugged detector detection system.



### CSP connection diagram

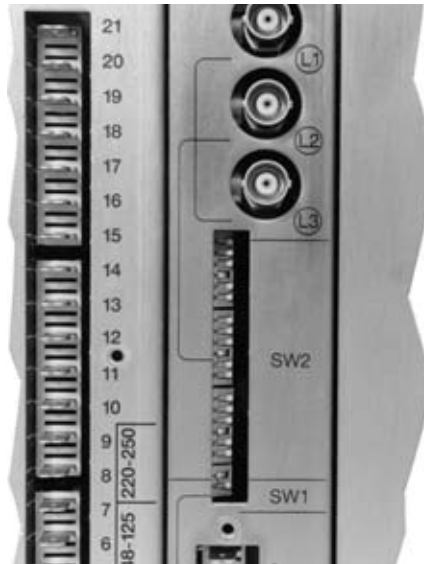
The CCA 601 cable shielding is earthed naturally by the connection to Sepam 2000's BNC inlets. Do not earth by any other means.

The CSP sensors should be earthed via the grounding screw on the side of the device.



## Selection of SW1 and SW2 (microswitches) operating modes

The operating mode is selected by setting the microswitches on the rear of the device. They must be set before Sepam 2000 is switched on, while it is de-energized.



Set microswitches SW1 and SW2 in accordance with the chart opposite. They are to be set according to:

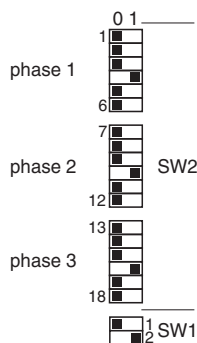
- the CSP model used (30 A-300 A, 160 A-1600 A, 500 A-2500 A),
- the rated current of the protected installation,
- the earth fault current measurement method (sum or core balance CT).

**N.B.** When the rated current of the electrical installation to be protected does not appear in the chart, choose the column that corresponds to the current rating immediately above.

### Example of microswitch setting

This example indicates the microswitch setting in the following case:

- network rated current: 160 A,
- CSP sensor used: model 160-1600 A,
- residual current measured by the sum of the 3 phase currents.



## Microswitch setting chart

### CSP 31-10: 30 to 300 A

30	36	45	60	75	90	120	150	180	225	300
----	----	----	----	----	----	-----	-----	-----	-----	-----

### CSP 32-10: 160 to 640 and CSP 33-10: 160 to 1600 A

160	192	240	320	400	480	640	800	960	1200	1600
-----	-----	-----	-----	-----	-----	-----	-----	-----	------	------

### CSP 34-10: 500 to 2500 A

500	600	750	1000	1250	1500	2000	2500
-----	-----	-----	------	------	------	------	------

### SW2 : for selection of the phase current range

0 1	0 1	0 1	0 1	0 1	0 1	0 1	0 1	0 1	0 1	0 1	0 1

### SW1: residual current by the sum of the 3 phase currents

SOM 1						SOM 2				
0 1	0 1	0 1	0 1	0 1	0 1	0 1	0 1	0 1	0 1	0 1

### SW1: residual current measured by core balance CT

0 1	0 1	0 1	0 1	0 1	0 1	0 1	0 1	0 1	0 1	0 1

SOM 1 and SOM 2 are parameters to be set in the status menu of the pocket terminal.



# Installation

## Use of CSH 120 and CSH 200 core balance CTs

The only difference between the CSH 120 and CSH 200 core balance CTs is their inner diameter (120 mm and 200 mm). Due to their low voltage isolation, they may only be used on cables.

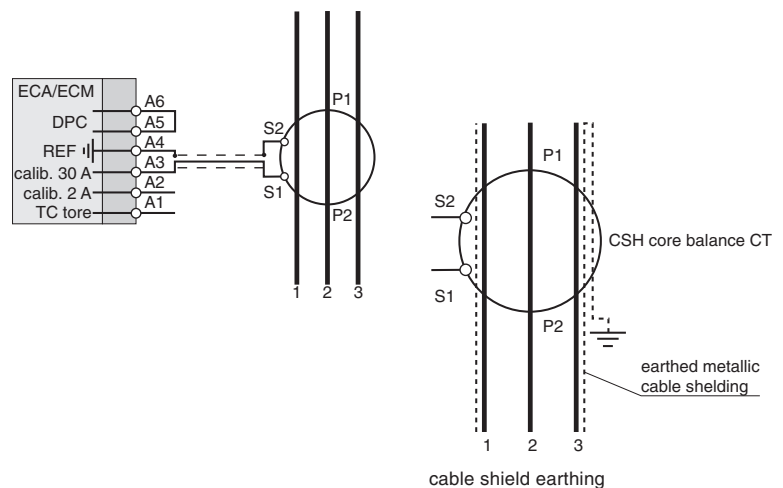


### Mounting direction

It is imperative to comply with the mounting direction of the core balance CTs in order for the protections to work correctly. The core balance CTs should be mounted with the printed side of the CT (P2 side) on the cable side and the unmarked side (P1 side) on the busbar side. Core balance terminal 2 is always connected to terminal A4 of the 6-pin connector.

### CSH 120 and CSH 200 connection diagram

To measure residual current up to 20 A, connect the core balance CT to the «2A rating» input.  
To measure residual current up to 300 A, connect the core balance CT to the «30A rating» input.



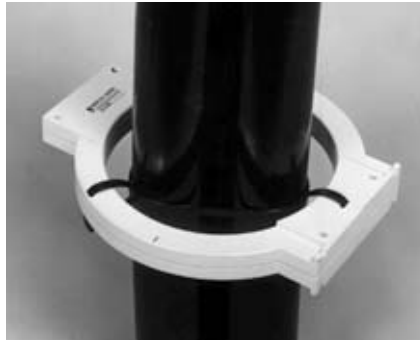
### Selection of operating modes (microswitches)

■ Set the corresponding Sepam 2000 switches. The switches concerned are found on the input module.  
Refer to the chapter entitled «connection of current inputs», «selection of operating modes».

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## Assembly

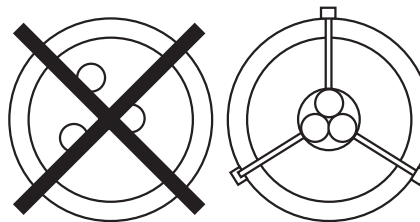
Assembly on MV cables.



Assembly on mounting plate.



Group the MV cable (or cables) in the middle of the core balance CT. Use non-conductive binding to hold the cable.  
Remember to insert the 3 medium voltage cable shielding earthing cables through the core balance CT.



## Cabling

The CSH 120 or CSH 200 core balance CT is connected to the CCA 606 6-pin connector (item B) of the current input module.

Recommended cable:

- sheathed, shielded cable,
- min. cable cross-section  $0.93 \text{ mm}^2$  (awg 18),
- resistance per unit length  $< 100 \text{ m}\Omega/\text{m}$ ,
- min. dielectric strength: 1000 V.

Connect the connector cable shielding in the shortest manner possible to the Sepam 2000 6-pin connector.

Flatten the connection cable shielding against the metal frames of the cubicle.

The cable shielding is grounded in Sepam 2000.

Do not ground the cable by any other means.

# Installation

## Use of the CSH 30 interposing ring CT

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The CSH 30 interposing ring CT should be used when residual current is measured by a current transformer with a secondary circuit (1 A or 5 A).

It acts as an interface between the current transformer and the Sepam residual current input. The CSH 30 interposing ring CT is mounted on a symmetric DIN rail. It may also be mounted on a plate by means of the mounting holes in its base.



### Assembly

The cable must pass through the CSH 30 in the right direction in order for directional earth fault protection to function correctly: the cable leaving the S2 terminal of the current transformer should enter through the P2 side of the CSH 30 interposing ring CT.

### Cabling

The secondary winding of the CSH 30 is connected to the 6-pin connector of the CCA 606.

Cable to be used:

- sheathed, shielded cable,
- min. cable cross-section 0.93 mm<sup>2</sup> (awg 18) (max. 2.5 mm<sup>2</sup>),
- resistance per unit length < 100 mΩ/m,
- min. dielectric strength: 1000 V.

Connect the CSH 30 interposing ring CT connector cable shielding in the shortest manner possible to the Sepam 2000 6-pin connector.

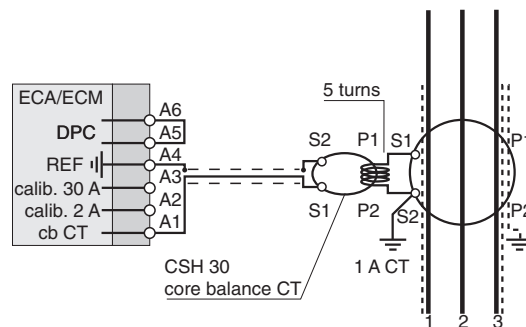
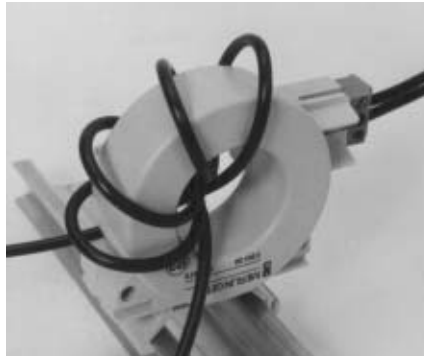
Flatten the connection cable shielding against the metal frames of the cubicle.

The cable shielding is grounded in Sepam 2000.

Do not ground the cable by any other means.

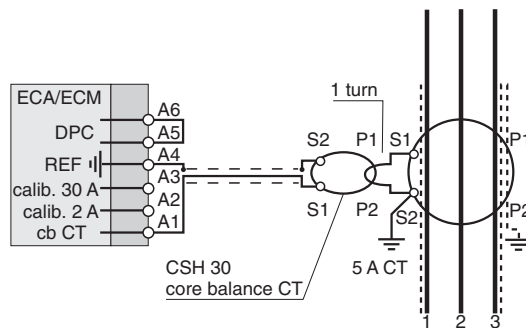
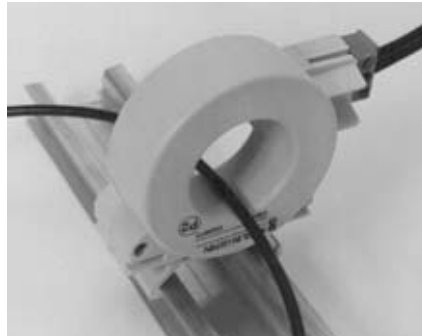
## Connection to 1 A secondary circuit

- plug into the CCA 606 connector.
- wind the transformer secondary wire 5 times around the CSH 30 interposing ring CT.



## Connection to 5 A secondary circuit

- plug into the CCA 606 connector.
- wind the transformer secondary wire just once around the CSH 30 interposing ring CT.



## Selection of operating modes (microswitches)

Set the microswitches, referring to the chapter entitled «connection of current inputs», «selection of operating modes».

# Installation

## Connection of voltage inputs

This concerns types of Sepam 2000 which have voltage inputs.

Types S26\* LT.

S36\* XR, LR, TR.

The phase and residual voltage transformers (VTs) are connected to the CCA 8-point connector of the 3U/V0 module. Sepam 2000 can function with 1, 2 or 3 VTs.

Residual voltage can be measured by two methods:

- calculated by Sepam 2000 based on the phase voltages,

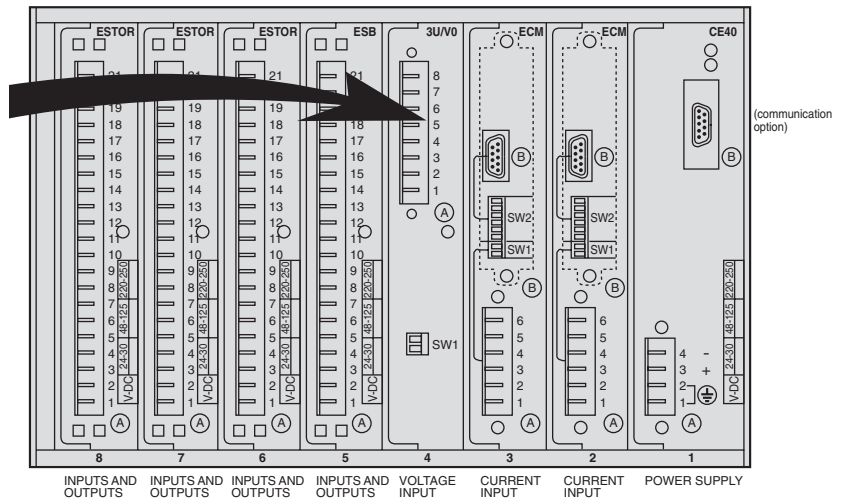
- wired directly to Sepam 2000 from a transformer with open delta-star windings.

SW1 microswitch setting:

The microswitches are set, with Sepam de-energized, according to the chosen connection diagram.

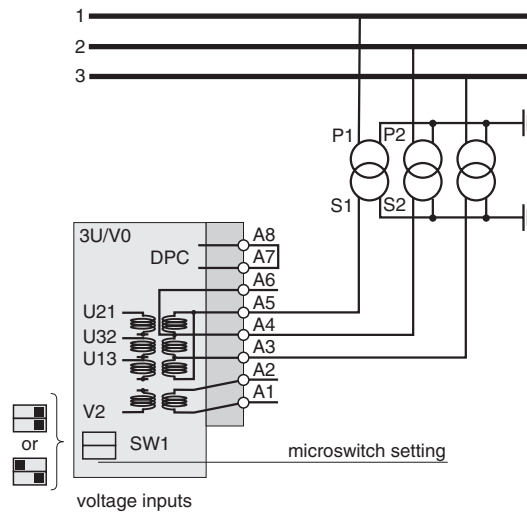
**N.B.** Sepam S36, TR model, have 2 inputs for connecting VTs.

Remember to set the microswitches for both inputs.



### Connection of 3 VTs

This arrangement does not allow residual voltage measurement by the sum of the 3 phase voltages.

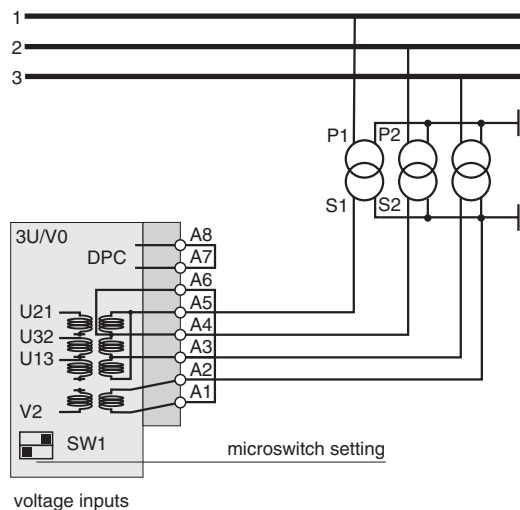


### Connection of 3 VTs (residual voltage measurement)

This arrangement enables Sepam 2000 to measure the system voltages and calculate the residual voltage based on the VT secondary voltages.

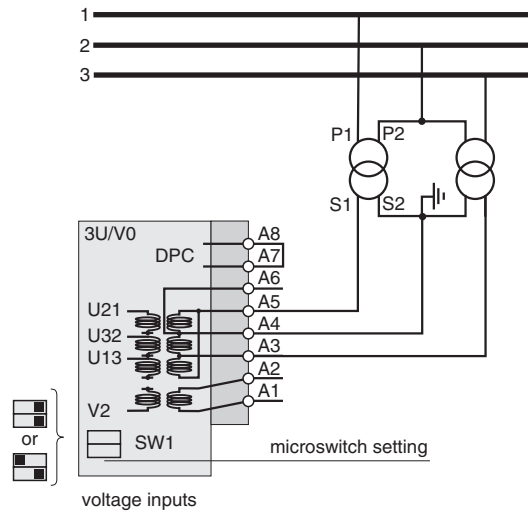
It requires the uses of 3 VTs with the primary between phase and earth.

Terminals 1 and 6 must be strapped in order for Sepam to calculate the residual voltage.



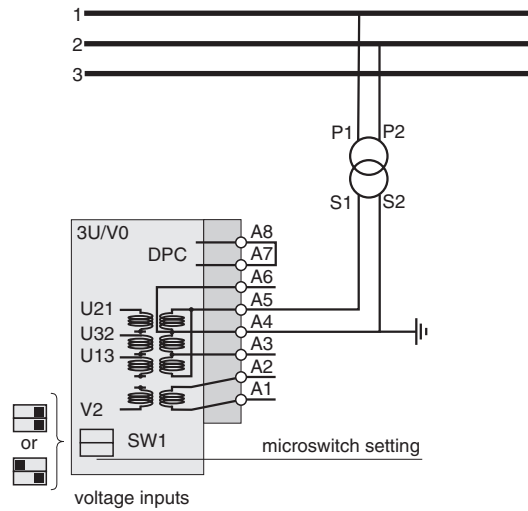
## Connection of 2 VTs

This arrangement does not allow residual voltage to be measured by the sum.



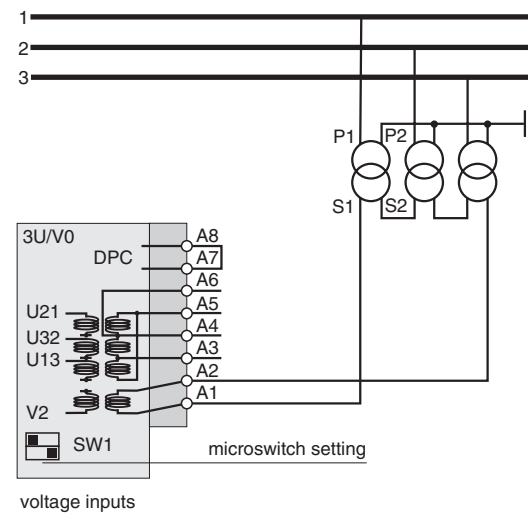
## Connection of 1 VT

This arrangement does not allow residual voltage to be measured by the sum.



## Connection of residual voltage input

This arrangement is used to connect the residual voltage measured outside Sepam 2000 via a transformer with open delta-star windings. The connection is made to terminals A1 and A2 of the 8-pin connector.



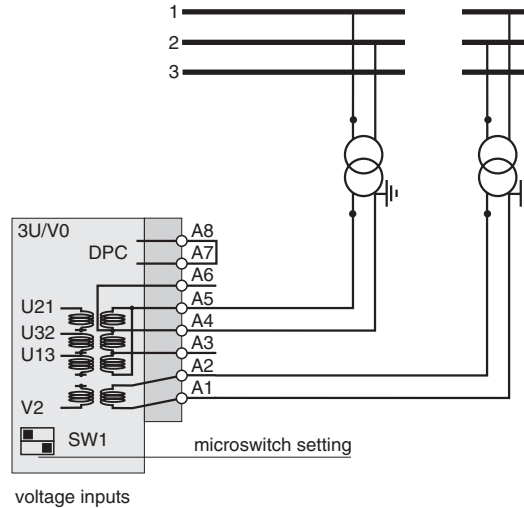
# Installation

## Connection of voltage inputs (cont'd)

### Connection of 2 system voltages (synchro-check function)

The connections are made so that the voltages applied to inputs 5 and 4 (U<sub>sync1</sub>) and 2 and 1 (U<sub>sync2</sub>) correspond to the same phases.

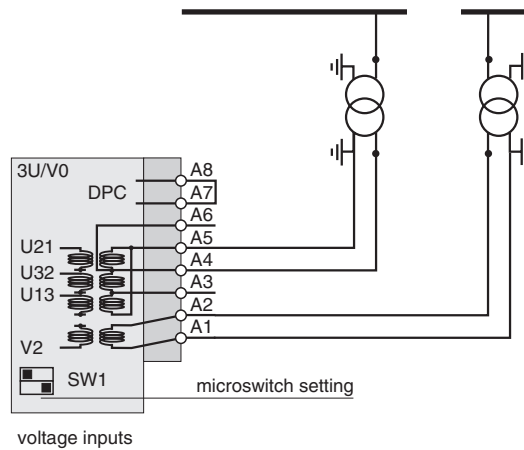
example : U<sub>21</sub>  
U'21



### Connection of 2 phase voltages (synchro-check function)

The connections are made so that the voltages applied to inputs 5 and 4 (U<sub>sync1</sub>) and 2 and 1 (U<sub>sync2</sub>) correspond to the same phases.

example : V<sub>1</sub>  
V'1

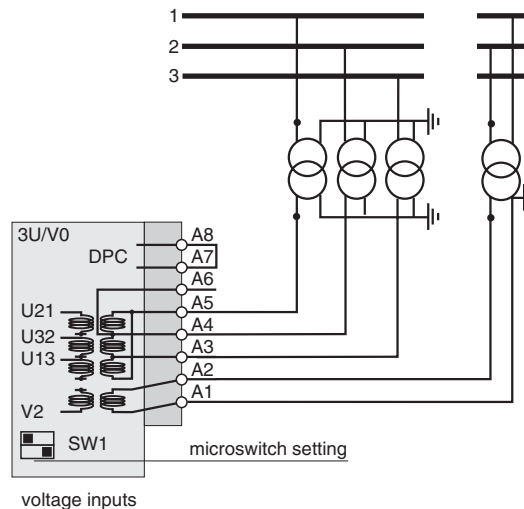


### V-connection of 3 VTs or 2 VTs (synchro-check function)

The connections are made so that the voltages applied to inputs 5 and 4 (U<sub>sync1</sub>) and 2 and 1 (U<sub>sync2</sub>) correspond to the same phases.

V<sub>1</sub>, V<sub>2</sub>, V<sub>3</sub> or U<sub>21</sub>, U<sub>32</sub> and U<sub>21</sub>

This arrangement enables Sepam 2000 to measure voltage and power.



# Installation

## Connection of power supply and logic inputs and outputs

### Connection of power supply and earth

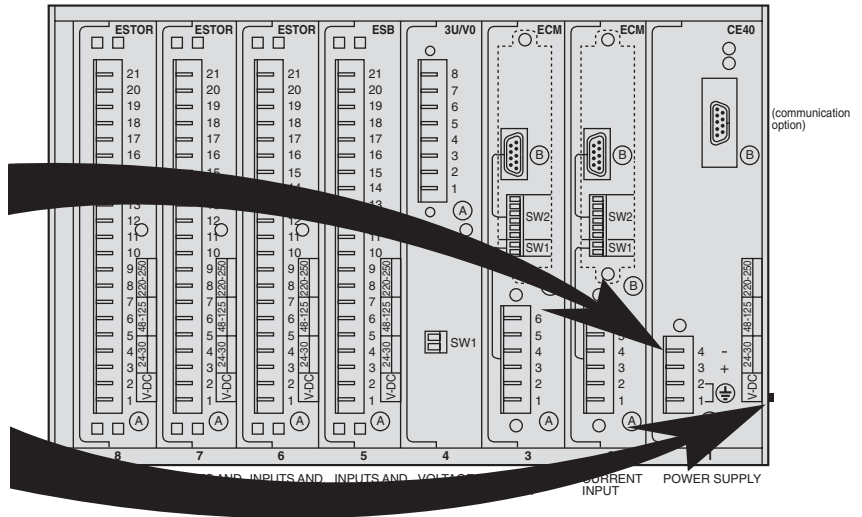
The Sepam 2000 power supply is connected to the CCA 604 4-pin connector on the CE40 module situated on the rear of the device. The power supply input is protected against accidental polarity inversion.



**Safety:**

The Sepam 2000 chassis must be earthed via the grounding screw situated on the right side panel (rear view).

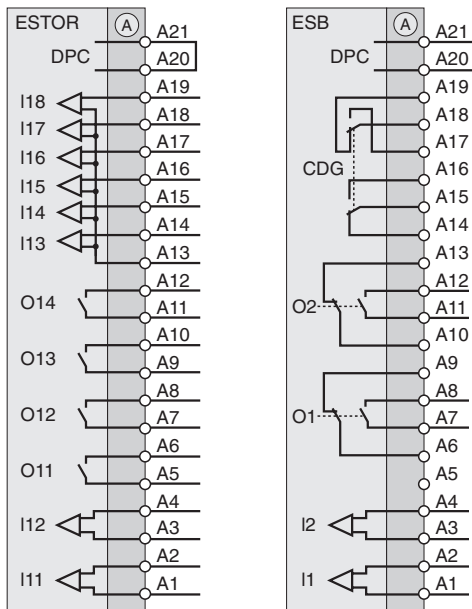
Use a braid or cable fitted with a 4 mm eye lug. The eye lug fastening screw is already mounted on Sepam when it is delivered. (Should this screw be lost, never replace it by a screw longer than 8 mm).



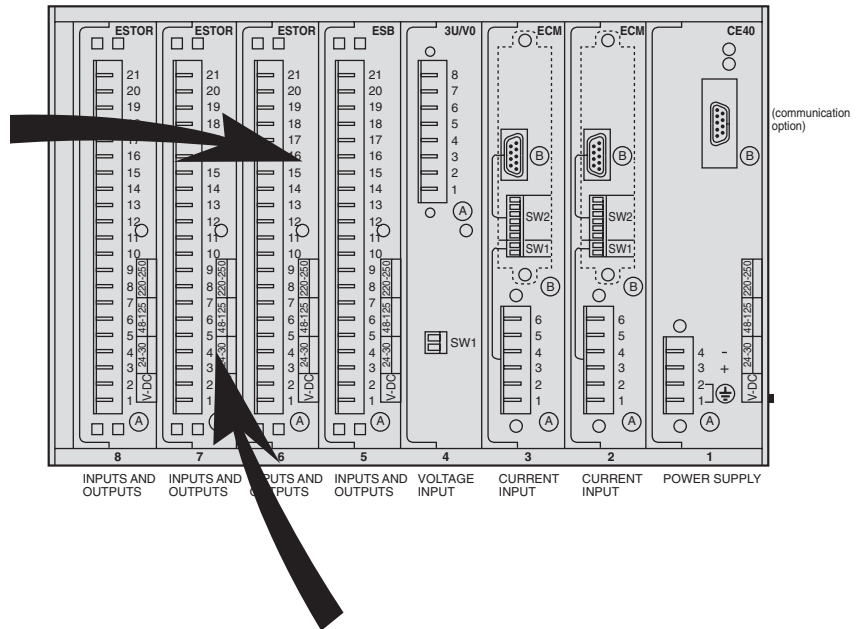
### Connection of logic inputs and outputs

The logic data are connected to the CCA 621 connector on the ESB and ESTOR modules.

Cabling should be done in accordance with the diagram for your application.



Example: ESTOR 1 and ESB.



Check that the voltage applied to the inputs is compatible with the voltage indication given on a dot on the subassembly.



# Installation

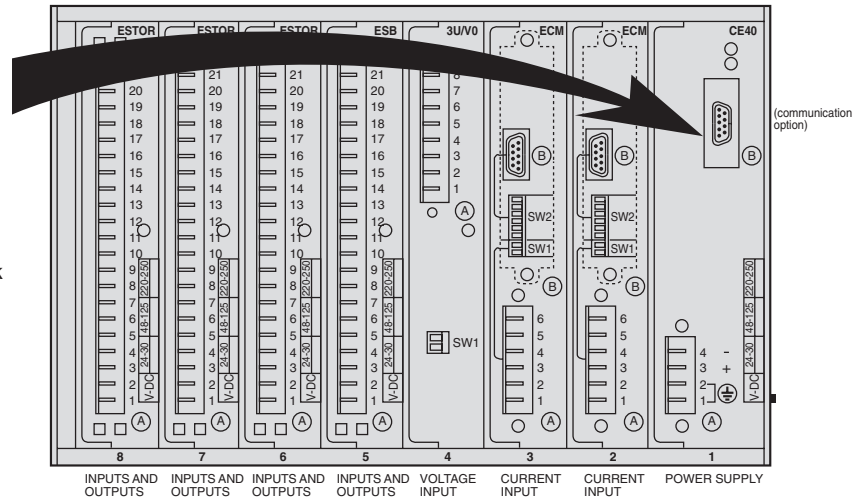
## Connection of the Jbus communication coupler

Sepam 2000 can be equipped, as an option, with a communication coupler situated on the CE40 module.

Please refer to the «Sepam 2000, Jbus communication» document for instructions on commissioning.

A CCA 602 cable (option), 3 meters long, fitted with a 9-pin connector at either end, may be used to connect the coupler directly to the CCA 609 network connection box (option).

This box allows quick connection to the Jbus network and ensures all earthing required for safe operation.



# Use - commissioning

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# Use - commissioning

## Description / use

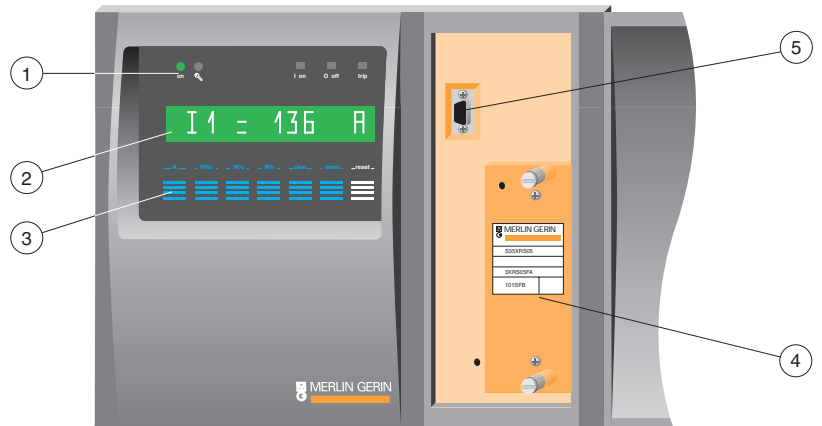
Your Sepam 2000 is a multifunction, microprocessor based device which includes, in the same case:

- control and monitoring of the associated circuit breaker or contactor,
- measurement of electrical variables,
- display of operating messages,
- protection of the network and the machines it supplies.

Sepam 2000 may be equipped (as an option) with a communication link with the remote monitoring station.

There are two models of Sepam.

### Front face



- ① status indicators
- ② display
- ③ keys for access to measurements and alarm processing
- ④ cartridge
- ⑤ pocket terminal socket




Standard model: Sepam 2000 S36 (for all types)



Compact model: Sepam 2000 S26 (for certain types)

#### Status indicators ① :

- green **on** indicator lamp shows that Sepam 2000 is energized,
- red **trip** indicator lamp: Sepam has tripped the circuit breaker after detecting a fault. A related alarm message indicates the cause of tripping.
- red  indicator lamp shows internal Sepam faults. All the output relays are dropped out (fail-safe position). Refer to the chapter on maintenance.
- yellow **I on** / green **O off** indicator lamps show the position of the circuit breaker:
  - I = circuit breaker closed,
  - O = circuit breaker open.

## Display ②

The display unit indicates:

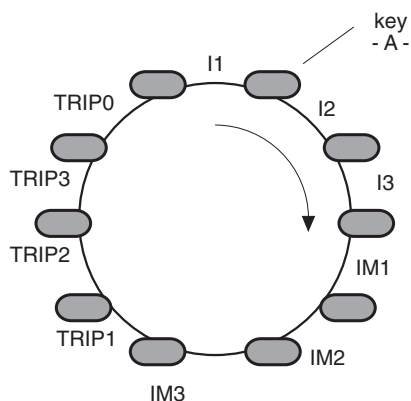
- measurements,
- operating messages.

## Keys for access to measurements and alarm processing ③

### ■ metering key

The measurements may be accessed by pressing the **A**, **V/Hz**, **W/j**, **Wh/°C** metering keys.

Each key provides access to a set of measurements according to the following method:



Example: current measurement

When a measurement is not available in a type of Sepam, ----- is displayed.

### ■ clear key:

this key erases the stored value being displayed (reset):

- maximum demand current **IM1**, **IM2**, **IM3**,
- tripping currents **TRIP1**, **TRIP2**, **TRIP3**, **TRIP0**,
- peak demand voltage **PM**, **QM**;

### ■ alarm processing key

#### □ alarm key:

each time tripping or another event occurs, an alarm message appears on the display.

This key provides access to step by step reading of the list of stored alarm messages.

The previous message may be displayed by pressing this key.

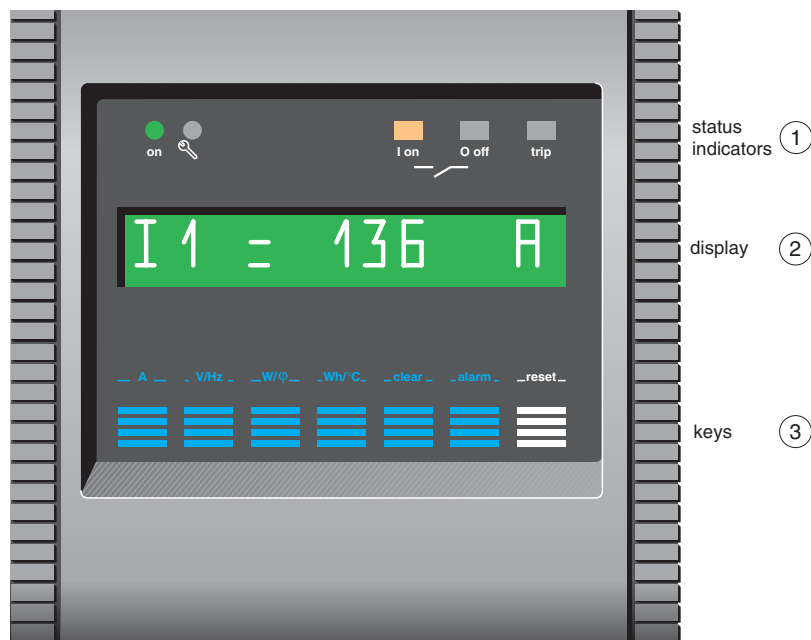
Display of: ----- indicates the end of the list of alarm messages.

#### □ reset key:

the protections trigger circuit breaker tripping and display of the related messages. The red trip indicator lights up.

After the fault has been cleared, the user presses the **reset** key to acknowledge.

The **trip** indicator is extinguished, the lists of alarms is erased and the device can be closed. The **reset** key is disabled until the fault has been cleared.



## Cartridge ④

The cartridge contains the information required for Sepam operation, such as:

- settings,
- stored data,
- control and monitoring logic...

## Pocket terminal socket ⑤

This socket is used to connect the TSM 2001 pocket terminal or the ACE 900 adapter to the SFT 2801 bit (PC link).

# Use - commissioning

## Description / use (cont'd)

### TSM 2001 pocket terminal

Your pocket terminal provides access to all the Sepam 2000 information, such as:

- current measurements,
- operating assistance messages,
- protection settings.



- ① 4-line display
- ② data entry keypad
- ③ brightness adjustment dial

The pocket terminal is supplied with power by Sepam and does not require any batteries; it can be connected with the power on.

The pocket terminal beeps when it is connected. The main menu appears (if nothing is displayed, adjust the brightness using the dial ③).

The user may access the various data from three menu levels. A menu may comprise several pages.

To access a menu, simply position the blinking cursor on the desired line and press the **enter** key.

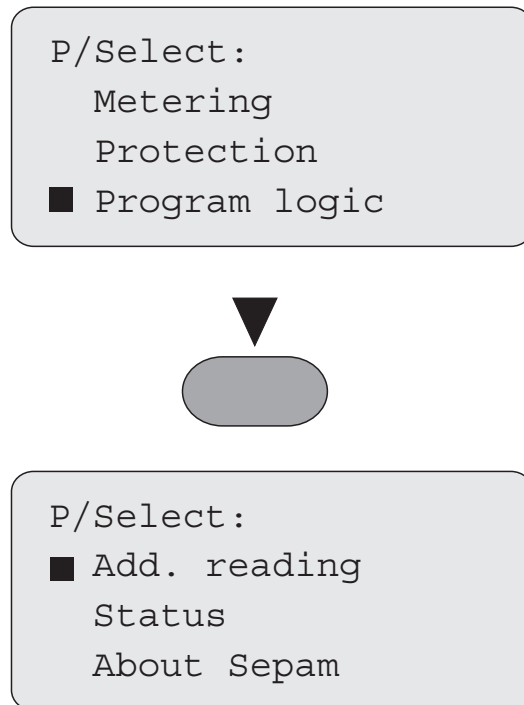
The first line of the menu contains the name of the current menu or function.

When **P/** appears at the top of the menu, it means that the user has entered the password.

#### Role of the keys:

- the pocket terminal beeps when the user presses a key that is disabled.
- the menu key is used to display the previous menu,
- the **▲** and **▼** keys are used to move the **■** cursor one line up or down in a menu.

To move to the next screen of a menu, the user simply positions the cursor on the last line and presses the **▼** key.



To move to the previous screen of a menu, the user simply positions the cursor on the second line and presses the **▲** key.

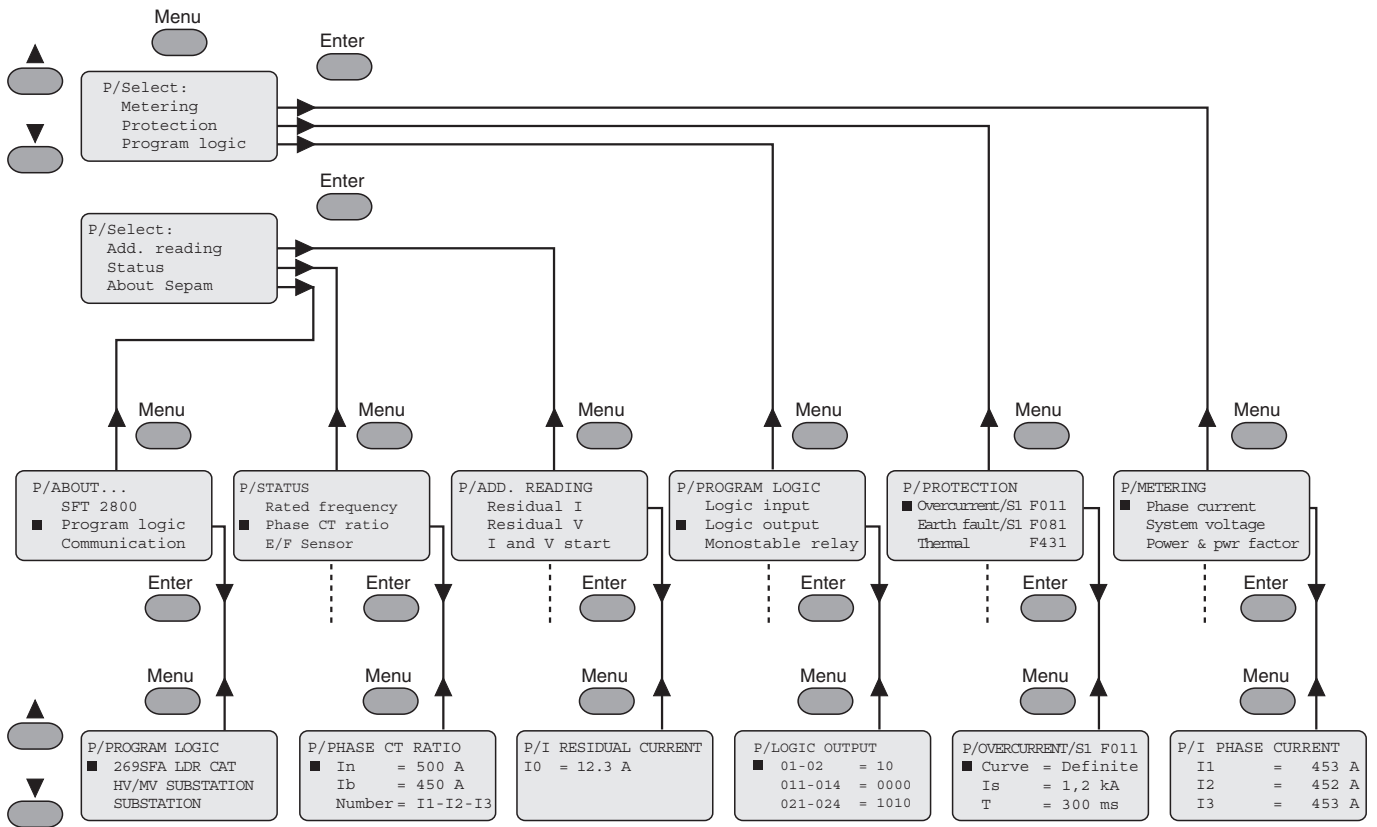
- the **code** key is used to enter and exit the parameter setting mode,
- the **numeric** and **.** keys are used to enter settings and the password,
- the **units** key is used to change setting unit multiplying factors (e.g. A, kA, ...),
- the **data+** and **data-** keys are used to select values from preset data lists. These lists are used when only a limited number of values may be used for a parameter, e.g. network frequency.

■ the **clear** key is used to:

- clear error messages,
- call back a previous setting value during data input,
- reset tripping currents and maximum demand readings,

■ the **enter** key is used to confirm a menu selection or to confirm all the settings for a function.

**N.B.** The first line always contains the name of the current menu or function.



# Use - commissioning

## Use (current operation)

### Energizing

Sepam is energized when operating normally. In the event of re-energizing after a break in the auxiliary power supply, Sepam 2000 automatically restarts according to the following sequence, which lasts about 5 s:

- green on and red indicators light up,
- beep (if the pocket terminal is connected),
- extinction of the red indicator,
- setting of the watchdog contact,
- testing of display:

0,0,0,0,0,0,0,0,0,0 then \*\*\*\*\* , then I1 = 0.0 A,

- breaker position indicator lights up,
  - display of the first message. Sepam is then in operation.
- If the pocket terminal is connected, it displays:

Press  
menu key  
to access  
opening menu

Sepam 2000 performs the functions of a precision measurement and alarm processing unit. The values are displayed directed with the related unit A, kA, etc. The messages clearly worded. There are two ways of operating the device:

- via the front face (**metering, annunciation** keys),
- via the TSM 2001 pocket terminals or PC (using menu).

Whenever a measurement is not available in the user's type of Sepam ----- is displayed.

### Operation via the front face or pocket terminal TSM 2001 or the PC

functions	key	TSM 2001 menu	name	description	range	accuracy	comments
phase current	A	metering	I1 I2 I3	measurement of each phase current	0 to 24 In	±0.5%	value depends on associated CT
max. demand current	A	metering	IM1 IM2 IM3	measurement of the average current in the 3 phases	0 to 24 In	±0.5%	the value is periodically recalculated. Value set in Status menu to 5, 10, 15, 30 or 60 mn RESET: clear key
tripping	A	metering	TRIP1 TRIP2 TRIP3 TRIP 0	measurement of phase and earth currents at the time of tripping	0 to 24 In  0 to 10 Ino	±5%	RESET: clear key
voltage	V/Hz	metering	U21 U32 U13	measurement of system voltages	0 to 375 kV	±0.5%	value depends on associated VT
frequency	V/Hz	metering	F	measurement of frequency	45 to 65 Hz	±0.02 Hz	measured on U21 input
real power	W/φ	metering	P	measurement of real power	0 to 999 MW	±1%	positive or negative
reactive power	W/φ	metering	Q	measurement of reactive power	0 to 999 MVAR	±1%	positive or negative
power factor	W/φ	metering	COS	measurement of power factor	-1 to +1	0.01	P sign inductive or capacitive
peak demand real and reactive power	W/φ	metering	PM	measurement of the greatest average power value	0 to 999 MW	±1%	same comment as for max. demand currents
	W/φ	metering	QM		0 to 999 MVAR	±1%	
real and reactive energy	Wh/°c	metering	+MWH	measurement of real energy consumed	0 to 99999.99	±1%	for display
	Wh/°C	metering	+MVRH	measurement of reactive energy consumed			
	Wh/°C	metering	-MWH	measurement of real energy supplied	0 to 280x10 <sup>6</sup>	±1%	for the pocket terminal
	Wh/°C	metering	-MVRH	measurement of reactive energy supplied			values are stored in the event of a power failure

**N.B.** No value is displayed when the measurement is less than 1.5% of the nominal value.

## Operation via the pocket terminal only



function	TSM 2001 menu	name	description	range	accuracy
earth fault	add. reading residual current	Io	measurement of residual current	0 to 10 Ino	±5%
residual voltage	add. reading residual voltage	Vo	measurement of residual voltage	0 to 1.5 Un	±5%
thermal overload	thermal protection	E	thermal capacity used	0 to 999%	±2%
directional overcurrent	directional O/C protection	Phi 1	phase shift between I1 and I32	0° to 360°	±3° at In, Un
		Phi 3	phase shift between I3 and U21	0° to 360°	±3° at In, Un
directional earth fault	directional E/F protection	Phi 0	phase shift between Io and Vo	0° to 360°	±3°
cumulative breaking current and nb. of breaks	add. reading nb of (kA) <sup>2</sup> breaks		cumulative (kA) <sup>2</sup> broken by breaking current range	5% In to 24 In	±10%
differential current and through current	add. reading		I diff and I through	0 to 24 In	±5%
true rms current	add. reading I rms		true rms current up to harmonic 21	0 to 4 In	±1%
messages	program logic	AL	list of last 16 automation messages	16 messages	

events counter	Sepam HV			Reset		
	line	busbar	transformer			
protection tripping	C2	C2	C2	KP49		
single-phase reclosing	C3			KP57		
3-phase reclosing	C4			KP57		
events counter	Sepam MV					Reset
	substation	overhead	underground	capacitor	busbar	
device switching	C1	C1	C1	C1	C1	KP53
overcurrent trip	C2	C2	C2	C2	C2	KP49
fault trip	C3	C3	C3	C3	C3	KP49
successful reclosing		C4				KP54
cycle 1		C5				KP54
cycle 2		C6				KP54
cycle 3		C7				KP54
cycle 4		C8				KP54
hours counter	capacitor Sepam				Reset	
capacitor 1	C4				KP62	
capacitor 2	C5				KP62	
capacitor 3	C6				KP62	



# Use - commissioning

## Use (current operation) (cont'd)

### Clearing measurements:

- maximum phase current demand.

To reset to zero:

□ press **clear** on the pocket terminal if the maximum current demand readings are displayed,

□ press **clear** on the display if at least one maximum demand is displayed,

- tripping current (phase or earth).

To reset to zero:

□ press **clear** on the pocket terminal if all the tripping currents are displayed,

□ press **clear** on the display if at least one tripping current is displayed,

- maximum real and reactive power demands.

To reset to zero:

□ press **clear** on the pocket terminal if all the maximum demands are displayed,

□ press **clear** on the display if at least one maximum power demand is displayed,

### N.B.

Zero resetting of the maximum demand readings allows calculations to be started for a new integration interval.

To reset to zero, press the **clear** key on the pocket terminal if the heat rise measurement is displayed and if the user is in parameter setting mode, the resetting of this setting alters the normal operation of the protections (changes their prior status).

## Annunciation

When an event is detected by Sepam, an operating message appears on the display.

The messages are stored in a list of alarms and may be reviewed in chronological order of appearance, starting with the most recent, by pressing the **alarm** key.

### Beware:

**pressing the reset key will erase the contents of any list of alarms.**

## List of messages (according to type of Sepam)

message <sup>(1)</sup>	type	meaning
ADJACENT	A	tripping of adjacent breakers
ABSENCE U	A	line voltage absent
BUCHHOLZ	P	Buccholz tripping
CONNECTOR	M	unplugged connector (DPC)
CYCLE 1	A	cycle 1 in progress
CYCLE 2	A	cycle 2 in progress
CYCLE 3	A	cycle 3 in progress
CYCLE 4	A	cycle 4 in progress
EXT. TRIP	A	tripping by external protection
DEFINITIVE	A	definitive tripping (fault not cleared)
DISCHARGE	A	time-delayed energizing
?CONTROL?	A	control monitoring
FAULT SSL	A	logic discrimination fault
SHUNT-TRIP	P&T	circuit breaker with shunt-trip coil
U/V RELEASE	P&T	circuit breaker with undervoltage release
VT FUSES	P	neutral voltage displacement
UNBAL. AL1	P	unbalance capacitor 1 alarm
UNBAL. TRIP1	P	unbalance capacitor 1 tripping
UNBAL. AL2	P	unbalance capacitor 2 alarm
UNBAL. TRIP2	P	unbalance capacitor 2 tripping
UNBAL. AL3	P	unbalance capacitor 3 alarm
UNBAL. TRIP3	P	unbalance capacitor 3 tripping
FRAME LEAK	P	tank earth leakage
OVERVOLT.	P	overvoltage
O/V BB1	P	overvoltage busbar 1
O/V BB2	P	overvoltage busbar 2
OVERVOLT. 1	P	overvoltage set point 1
OVERVOLT. 2	P	overvoltage set point 2
N VOLT DISP	P	neutral voltage displacement
OVERCURRENT	P	phase overcurrent
DIR. O/C	P	directional phase overcurrent
NEUTR. O/C1	P	neutral set point 1
NEUTR. O/C2	P	neutral set point 2
EARTH FAULT	P	earth fault
DIR. E/F	P	directional earth fault
MEM. OPG	A	disturbance recording off
U/V BB1	P	undervoltage busbar 1
U/V BB2	P	undervoltage busbar 2
UNDERFREQ.	P	underfrequency
UNDERVOLT.	P	undervoltage
PRESSURE	A	breaking pole pressure fault
RECEIVE BI	A	blocking input
RETRIP	A	retripping
DEAD ZONE		dead zone
RECLOSE 1PH OR 3PH	A	reclosing

---

<b>message <sup>(1)</sup></b>	<b>type</b>	<b>meaning</b>
<b>SUCCESSFUL</b>	A	reclosing successful
<b>SYNCHRO.</b>	P	synchronization
<b>OVERPRESSURE</b>	P	overpressure
<b>WINDING T</b>	P	tripping - winding temperature
<b>OIL T</b>	P	tripping - oil temperature
<b>THERMAL</b>	P	thermal overload alarm or tripping
<b>VT</b>	P	VT fault
<b>RECL.. LOCKED</b>	A	recloser locked out
<b>MAINTENANCE</b>	M	Sepam internal fault
<b>CARTRIDGE</b>	M	cartridge and Sepam not compatible
<b>M. CARTRIDGE</b>	M	faulty cartridge

type

A = automation (program logic)

P = protection

M = maintenance

P&T = control function parameter setting test

<sup>(1)</sup> If your Sepam has been customized, other messages may appear. Please refer to the information package provided by your installer.

# Use - commissioning

## Commissioning (cont'd)

### Checking prior to commissioning

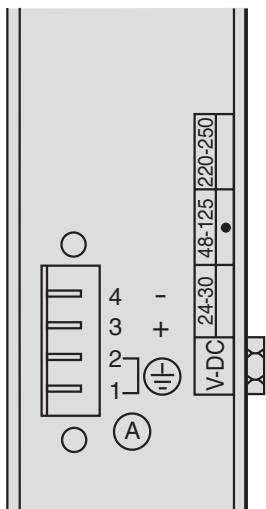
These operations must be carried out before Sepam 2000 is energized.

#### Checks:

##### ■ supply voltage

Ensure that the cubicle auxiliary supply voltage matches Sepam 2000's operating voltage.

It is indicated on the rear of the device, beside the power supply connector, by a dot in the voltage box,



##### ■ earthing

Check that the Sepam 2000 chassis is earthed by the ground nut situated on the Sepam side panel, on the power supply side.

##### ■ cartridge

□ Check that the cartridge is in its slot behind the front wicket door. To do so, open the wicket door by pulling on the notch situated on the left side panel. Sepam S36 and S35 have a shield on the right, which resembles the memory cartridge wicket door. This shield is not another wicket door. Do not try to open it. Check that the cartridge has been inserted correctly. Check the tightening of the 2 threaded screws by hand.

#### Above all do not insert or remove the cartridge when Sepam 2000 is energized,

□ the cartridge has an identification label on the front. The first 5 characters in the first line indicate the Sepam 2000 model. Ensure that this model matches the Sepam model indicated on the side of Sepam.

#### Example

S26LT on the cartridge label should match S26LT on the Sepam label.

■ connectors  
Check that all the connectors are correctly connected to the rear of the device and screw-locked.

#### Setting of microswitches on the rear of the device

Check that the microswitches which define operating modes and Sepam 2000 calibration operations were correctly set at the time of installation <sup>(1)</sup>.

#### The microswitches must be set with Sepam de-energized.

If the microswitches are incorrectly set, the measurements given by Sepam 2000 will be erroneous and the protections will fail to trip at the desired set points.

#### Default parameter setting

Factory-set parameter status:

##### ■ microswitches:

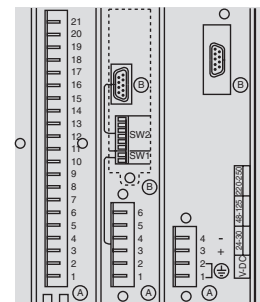
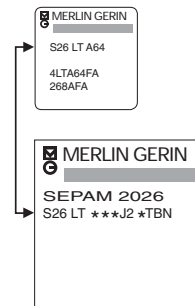
- they are set for a 5 A secondary current power supply,
- residual current measurement by core balance CT,
- residual voltage measurement by the sum of the 3 voltages,

##### ■ protection:

- set points: 999 kA or kV,
- time delays: 655 s,

##### ■ program logic time delay:

- t = 200 ms,



## Commissioning

#### Switch on the Sepam

After the Sepam has started up, check that no messages are present by pressing the "alarm" key.

#### Checking mode

All the data may be accessed for checking purposes without the risk of changing parameters or settings.

#### Parameter setting mode <sup>(2)</sup>

This mode is reserved for commissioning and maintenance. The entry of a password is required.

P\ appears at the top left of the screen <sup>(3)</sup>.

<sup>(1)</sup> Refer to chapter 3 «Installation».

<sup>(2)</sup> All parameters and settings must be based on a network discrimination study that is to be carried out prior to commissioning.

<sup>(3)</sup> This mode is automatically cancelled if no keys are pressed for about 1 minute. It may be cancelled manually by pressing the **Code** key.

## Parameter and setting errors

Changing a **status** parameter may put a protection setting outside the tolerance range. Sepam detects the problem and displays the following message:

```
P\CT ratio
protection setting
out of range
press clear key
```

The user should then check and, if necessary, change the protection settings. The PROTECTION line blinks until the settings have been corrected.

### Settings out of range.

A protection value may be out of range when it is set. Sepam detects this and indicates the permissible range of settings.

```
P\Earth fault/S1 F081
Iso out of range
0.05Ino < Iso < Ino
Press clear key
```

Example: 50N, 51N earth protection.

All the parameters and settings are accessible in 3 menus:

- general parameters: **status** menu,
- protection: **protection** menu,
- operating parameters: **program logic** menu,

### General parameters

The general parameters are accessible in the **status** menu; they are to be set at the time of commissioning and must not be modified during current operation.

## Status menu parameter chart

heading	name	function	command	selection
frequency	Fn	network frequency	data + and -	50 or 60 Hz
Phase CT ratio	In	CT rating	numeric keys	adjustable from 10 A to 6250 A
phase CT' ratio	lb	basis current of equip. being protected	numeric keys	0.4 to 1.3In in amps
	number	number of current sensors	data + and -	2 or 3 sensors
phase CT ratio for CSP	In	CT rating (standard values see table on the next page)	data + and -	30 values between 30 A and 2500 A
	lb	basic current of the equipment being protected	numeric keys	0.4In to 1.3In in amperes
	number	number of current sensors	data + and -	2 or 3 sensors
lo sensor l'o sensor	Ino	residual current measurement	data + and -	TC: ■ sum of 3I CPS: ■ sum1 3I or sum2 3I  ■ 2 A or 30 A core balance CT  S26, S36 numeric keys ■ CT + CSH30 Ino adjustable from 1 A to 6250 A  S25, S35 data + and - ■ 56 values from 1 A to 6250 A
max. interval	period	max. demand integration period	data + and -	adjustable from: 5, 10, 15, 30, 60 mn
phase VT phase VT'	number	number of VTs wired	data + and -	S26-S36 S25-S35 V U21 1U U21-U32 3U 3U
	Unp	rated VT primary voltage	numeric keys	adjustable from 220 V to 250 kV
	Uns	rated VT secondary voltage	data + and -	100, 110, 115, 120 V
	Vnso	type of residual tvoltage measurement	data + and -	■ sum of 3Vs ■ Uns / √3 ■ Uns / 3
direction of energy	incomer feeder	reverses the signs of power and energy measurements	data + and -	incomer: cable --> busbars <sup>(1)</sup> feeder: busbars --> cable <sup>(1)</sup>
communi- cation <sup>(2)</sup>	speed	transmission speed	data + and -	300, 600, 1200, 2400, 4800, 9600, 19200, 38400 bds
	station	number of Sepams in the network	numeric keys	1 to 255
	parity	transmission format	data + and -	even, odd, without parity
time tagging <sup>(2)</sup>	synchro	type of synchronization used	data + and -	via: - network - inputs I11 or I21
	events	I1 I2 I11 to I18 I21 to I28 I31 to I38 KTS1 to KTS32 KTS33 to KTS64	numeric keys  by network 8 bits for S26, S36 only	<sup>(3)</sup> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
password				see corresponding page

<sup>(1)</sup> incomer +↓↓, feeder +↑↑

<sup>(2)</sup> for commissioning, refer to "communication" document.

<sup>(3)</sup> 0 = not time-tagged  
1 = time-tagged.

All events are set to zero by default.

# Use - commissioning

## Commissioning (cont'd)

### Microswitch

#### SW1 and SW2 settings

The microswitch settings must be coherent with the choices made in the **status**, **phase CT ratio** and **VT ratio** menus:

- phase current input for 1 A / 5 A CT
  - 1 A secondary
  - 5 A secondary



- residual current measurement by sum of 3 currents



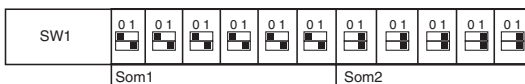
- residual current measurement by core balance CT



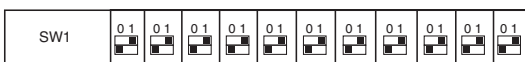
- current input for CSP sensor

current sensor range CSP	rated current of network										
	30	36	45	60	75	90	120	150	180	225	300
30-300 A	30	36	45	60	75	90	120	150	180	225	300
160-1600 A	160	192	240	320	400	480	640	800	960	1200	1600
500-2500 A	500	600	750	1000	1250	1500	2000	2500			
SW2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

- residual current measurement by sum of 3 currents



- residual current measurement by core balance CT



- connection voltage input
- residual voltage measurement by sum



- no residual voltage measurement



- residual voltage measurement by broken delta-star transformer.



### Protections

The following functions are available according to the type of Sepam :

#### Tank earth leakage (50/51)

Quick, selective detection of earth leakage current in transformer primary and secondary windings.

This is an additional overcurrent protection function.

For it to be used, the transformer tank must be insulated and a current sensor must be installed on the frame earthing connection.

#### Phase overcurrent (50/51)

Three-phase protection against phase-to-phase faults. The following types of time delay settings are available: definite, standard inverse, very inverse and extremely inverse.

#### Directional earth fault for compensated neutral systems (67NC)

Protection of feeder earth faults in networks in which the neutral is earthed by a compensation coil.

#### Directional overcurrent (67)

Incomer protection, which provides quick, selective detection of upstream faults when several transformer incoming feeders are used in parallel.

#### Earth fault (50N/51N)

Earth fault protection. The following types of time delay settings are available: definite, standard inverse, very inverse and extremely inverse.

Earth fault current may be detected by:

- three phase current transformers,
- a current transformer (1 A, 5 A) combined with a CSH30 interposing ring CT,
- a specific CSH120 or CSH200 sensor according to the required diameter; this is the most accurate method. The two available ratings (2 A and 30 A) provide a very wide setting range.

#### Directional earth fault (67N)

This function has several uses:

- highly sensitive earth fault protection for feeders supplied with power by a long cable (high capacitive current),
- quick, selective detection of upstream earth faults when there are several parallel substation feeders in the network.

#### Neutral (50/51N)

Overload protection of neutral earthing impedance and sensitive overall network protection against earth faults. This is an earth fault protection function.

#### Overvoltage (59)

Protection against abnormally high voltage and checking that there is sufficient voltage for power supply changeover. This protection monitors system voltage U21.

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**Neutral voltage displacement (59N)**

Detection of insulation faults in ungrounded systems by measurement of neutral voltage displacement. This protection is generally used for transformer incomers or busbars.

**Underfrequency (81)**

Detection of variances with respect to rated frequency, in order to maintain high quality power supply. This protection can be used for overall tripping or forload shedding.

**Undervoltage (27)**

Protection used by automated functions (changeover, load shedding).

The function checks for undervoltage in each of the system voltages measured.

**Remanent undervoltage (27R)**

Monitoring of the clearing of voltage sustained by self-powered protections after the opening of the circuit. This protection is used to prevent reclosing on live lines. It monitors system voltage U21.

**Thermal overload (49)**

Protection of equipment against thermal damage caused by overloads.

Thermal capacity used

is calculated according to a mathematical model, with 2 time constants, taking into account the effect of negative sequence current by means of an adjustable weighting factor. The function comprises:

- an adjustable alarm setting,
- an adjustable trip setting.

Recommendations:

- use the same setting for T1 and T2,
- set the negative sequence/unbalance coefficient to 0.

**Breaker failure (50BF-62)**

Back up protection in the event that the incoming breaker fails to operate when a retripping order is given by the same breaker or a tripping order is given by adjacent breakers. The function is ensured for single-phase and three-phase operations.

**Percentage-based overcurrent (50/51)**

Detection of an unbalance current between the two neutral points of capacitor bank mounted in a double-star arrangement. This current indicates that the components of one of the batteries are damaged.

**Synchro-check (25)**

Allows closing of the breaking device if the two circuits have voltage, frequency or phase variances within the planned limits.

# Use - commissioning

## Commissioning (cont'd)

### Protection function setting ranges

display messages	function	ANSI	TSM item	parameters		commands	setting limits
FRAME LEAK	frame leak	50/51	F021	curve	choice of tripping curve	<b>data+</b> and -	DT, SIT, VIT, EIT, UIT
				Is	setting	<b>numeric</b> keys and <b>units</b>	DT: 0.3 to 24 In SIT, VIT, EIT, UIT: 0.3 to 2.4 In
				T	time delay	<b>numeric</b> keys and <b>units</b>	DT: 0.05 to 655 s, 0.1 to 12.5 s at 10 Is
O/CURRENT	phase overcurrent	50/51	F011 to F014	curve	choice of tripping curve	<b>data+</b> and -	DT, SIT, VIT, EIT, UIT
				Is	setting	<b>numeric</b> keys and <b>units</b>	DT: 0.3 to 24 In SIT, VIT, EIT, UIT: 0.3 to 2.4 In
				T	time delay	<b>numeric</b> keys and <b>units</b>	DT: 0.05 to 655 s, 0.1 to 12.5 s at 10 Is
DIR. E/F	directional earth fault for compens. neutral system	67 NC	F481	Iso	setting	<b>numeric</b> keys- and <b>units</b>	S31: 0.05 In to 10 In CSH/2A: 0.1 to 20 A CSH/30 : 1.5 to 300 A
				Vso	setting	<b>numeric</b> keys and <b>units</b>	0.02 to 0.8 Un (VT: $Un/\sqrt{3}/100/\sqrt{3}$ ) 0.05 to 0.8 Un (VT: $Un/\sqrt{3}/100/3$ )
				T	time delay	<b>numeric</b> keys and <b>units</b>	0.05s to 655 s,
				Tmem	time delay	<b>numeric</b> keys and <b>units</b>	0.05s to 655 s
				Sect	setting of sector	<b>data+</b> and -	83° - 86°

DT : definite time, SIT, VIT, EIT: characteristic dependant time (inverse).

display messages	function	ANSI	TSM item	parameters		commands	setting limits
DIR. O/C	directional overcurrent	67	F521	curve	choice of tripping curve	data + and -	DT, SIT, VIT, EIT,UIT
				Is	setting	numeric keys and units	DT: 0.3 to 24In SIT, VIT, EIT, UIT: 0.3 to 2.4In
				T	time delay	numeric keys and units	DT: 0.05 to 655 s SIT, VIT, EIT, UIT: 0.1 to 12.5 s at 10 Is
				angle	characteristic angle	data + and -	30°, 45° or 60°
				$\varphi 1, \varphi 3$	phase shift	metering	between I1 and U32 and between I3 and U21
EARTH FAULT	earth fault	50N/51N (or 50G 51G)	F081 to F084	curve	choice of tripping curve	data + and -	DT, SIT, VIT, EIT, UIT
				Iso	setting	numeric keys and units	DT with: S3I: 0.05 to 10In CT 1/5A: 0.05 to 10Ino CSH/2A : 0.1 to 20 A CSH30A: 1.5 to 300 A SIT, VIT, EIT, UIT with: S3I: 0.05 to In CT 1/5A: 0.05 to Ino CSH/2A: 0.1 to 2 A CSH/30A: 1.5 to 30 A
				T	time delay	numeric keys and units	DT: 50 ms to 655 s SIT, VIT, EIT, UIT: 0.1 to 12.5 s at 10 Is
DIR. E/F	directional earth fault	67N	F501	Iso	setting	numeric keys and units	S3I: 0.05 to 10In CT 1/5A: 0.05 to 10Ino CSH/2A: 0.1 to 20 A CSH30A: 1.5 to 300 A
				T	time delay	numeric keys and units	0.05 to 655 s
				angle	characteristic angle	data + and -	0°, 15°, 30°, 45°, 60° 90°, -45°
				$\varphi 0$	phase shift	metering	between Io and Uo
NEUTR. O/C1 NEUTR. O/C2	neutral unbalance	50/51	F091 F092	curve	choice of tripping curve	data + and -	DT, SIT, VIT, EIT, UIT
				so	setting	numeric keys and units	DT with: S3I: 0.05 to 10In CT 1/5A: 0.05 to 10Ino CSH/2A : 0.1 to 20 A CSH30A: 1.5 to 300 A SIT, VIT, EIT, UIT, LTI with: S3I: 0.05 to In CT 1/5A: 0.05 to Ino CSH/2A: 0.1 to 2 A CSH/30A: 1.5 to 30 A
				T	time delay	numeric keys and units	DT: 50 ms to 655 s SIT, VIT, EIT, UIT: 0.1 to 12.5 s at 10 Is



# Use - commissioning

## Commissioning (cont'd)

display messages	function	ANSI	TSM item	parameters	commands	setting limits	
OVERVOLT.	overvoltage	59	F301 F302 F311 F312	Us	setting	numeric keys and units	0.5 to 1.5Un
				T	time delay	numeric keys and units	0.1 to 655 s
N VOLT DISP	neutral voltage displacement	59N	F391	Vso	setting	numeric keys and units	0,02 to 0.8Un (VT: $Un/\sqrt{3}/100/\sqrt{3}$ ) 0.05 to 0.8Un (VT: $Un/\sqrt{3}/100/3$ )
				T	time delay	numeric keys and units	0.05 to 655 s
UNDERFREQ.	underfrequency	81	F561 F562 F563 F564	Fs	setting	numeric keys and units	for 50 Hz: 45 to 50 Hz for 60 Hz: 55 to 60 Hz
				T	time delay	numeric keys and units	0.1 to 655 s
UNDERVOLT.	undervoltage	27	F241 F242 F321 F322 F331 F332 F341 F342 F361 F362 F371 F372	Us	setting	numeric keys and units	0.05 Unp to Unp
				T	time delay	numeric keys and units	0.05 to 655 s
	remanent undervoltage	27R	F351 F352	Us	setting	numeric keys and units	0.05 Un to Un
				T	time delay	numeric keys and units	0.05 to 655 s

display messages	function	ANSI	TSM item	parameters		commands	setting limits
<b>THERMAL</b>	thermal overload	49	F431	Es1	alarm setting	<b>numeric keys and units</b>	50% to 200%
				Es2	tripping setting	<b>numeric keys and units</b>	50% to 200%
				K	unbalance factor	<b>data + and -</b>	without = 0, low = 2.25 average = 4.5, high = 9
				T1	heat rise time constant	<b>numeric keys and units</b>	5 to 200 mn
				T2	cooling time constant	<b>numeric keys and units</b>	5 to 600 mn
				E	heat rise	metering	
<b>ADJACENT RETRIP</b>	protection fault	50FB/62	F981	dUs	setting	<b>numeric keys and units</b>	0.2 to 2 In
<b>DEAD ZONE</b>	circuit breaker			T1 and T2	time delay value	<b>numeric keys and units</b>	0.05 to 655 s
				I tri I ph 1 I ph 2 I ph 3	logic input	<b>data + and -</b>	I1, I2 I11 to I28 I21 to I28 I31 to I38
<b>SYN CHECK</b>	synchronism check	25	F171 F181	dUs	voltage variance setting	<b>numeric keys and units</b>	0.03 to 0.3 Un
				dFs	frequency variance setting	<b>numeric keys and units</b>	0.05 to 0.5 Hz
				dPhi	phase variance setting	<b>numeric keys and units</b>	5 to 45 degrees
				Us high	setting	<b>numeric keys and units</b>	0.8 to 1.1 Un
				Us low	setting	<b>numeric keys and units</b>	0.1 to 0.7 Un
				mode	operating mode	<b>data + and -</b>	mode 1 to 4
				dPhi	phase shift value	metering	
				U sync 1 U sync 2	voltage values	metering	
<b>UNBAL.ALx</b> <b>UNBAL.TRIPx</b>	percentage type	50/51	F111 F112	Is	setting	<b>numeric keys and units</b>	3 to 200 % In,
	overcurrent			F121 F122 F131 F132	T	time delay value	<b>and units and units</b>

Refer to the document entitled "testing", ref. 3140746, regarding protection testing.

For further information on the protection function characteristics, refer to the document entitled "metering and protection", ref. 3140747.

# Use - commissioning

## Commissioning (cont'd)

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### Program logic and annunciation

Sepam has standard program logic for operation suited to the most current installations, it can be adapted for each application scheme by parameter setting at the time of commissioning.

If your Sepam is customized, the role of the parameters may be different.

Please refer to the information package provided by your installer.

### Resource and program logic chart

function	item for S26, S36	item for S26, S36	remarks
logic input status	I1, I2 I11 to I38	I1, I2 I11 to I38	1 = input supplied 0 = input not supplied
output relay status	O1, O2 O11 to O34	O1, O2 O11 to O34	1 = contact closed 0 = 0 = contact open
internal relay status	K1 to K512	K1 to K256	1 = contact closed; 0 = contact open
stored bistable relay status	B1 to B128	B1 to B32	1 = contact closed; 0 = contact open
counter contents	C1 to C24	C1 to C16	reading
time delay output status	T1 to T60	T1 to T60	set between 50 ms and 655 s via <b>numeric</b> and <b>units</b> keys
parameters: latched contacts	KP1 to KP16 KP33 to KP48	KP1 to KP16	set to 1 or 0 via <b>data+ and -</b> keys or <b>numeric keys</b> 0 and 1
impulse contacts	KP17 to KP32 KP49 to KP64	KP17 to KP32	
remote control contacts	KTC1 to KTC32 KTC33 to KTC96	KTC1 to KTC32 KTC33 to KTC64	latched contacts set to 1 or 0 via a remote monitoring system cannot be read on pocket terminal
remote indication contacts	KTS1 to KTS64	KTS1 to KTS32	contacts set to 1 or 0 for reading by a remote monitoring system
alarm messages	BL1 to BL16	not available	reading of the last 16 automation activated messages (even if erased from display)

For further information on control and annunciation functions, refer to the "Control and monitoring functions" Ref PCRED398004.

## Connection of logic inputs: ESB and ESTOR1 boards

ESB		HV Sepam				MV Sepam		
		line	busbars	transformer	substation	capacitor	overhead underground	
I1	breaker closed position (contact closed CB closed, 3 contacts in series for 3 single-phase breakers)	■	■	■	■	■	■	
I2	breaker open position (contact open CB open, 3 contacts in parallel for 3 single-phase breakers)	■			■	■	■	
ESTOR1		HV Sepam				MV Sepam		
		line	busbars	transformer	substation	capacitor	overhead underground	busbar
I11	manual closing information	■						
	downgraded operation (contact closed)		■	■				
	earthing switch (contact open switch open)					■		
	receive blocking input busbar 1							■
	receive blocking input come to bus, coupling adjacent				■			
I12	manual closing information	■						
	receive blocking input			■			■	
	receive blocking input busbar 2							■
	receive blocking input come to bus, incomer adjacent				■			
	inhibit recloser						■	
	VT circuit (contact closed for VT circuit closed)						■	
I13	single-phase reclosing on	■						
	tripping by MV (contact closed)			■				
	opening order, normally open contact for shunt-trip coil normally closed contact for undervoltage release coil				■	■	■	■
I14	3-phase reclosing	■						
	synchronism selector switch in automatic mode tripping		■					
	oil temperature tripping			■				
	opening order, normally open contact				■	■	■	■
I15	recloser locked	■						
	choice of underfrequency set point 1		■					
	overpressure			■				
	tripping by external protection: contact according to parameter setting				■	■	■	■
I16	single-phase recloser	■						
	choice of underfrequency set point 2		■					
	winding temperature tripping			■				
	pole pressure: normally open contact				■	■	■	■
I17	3-phase recloser	■						
	choice of underfrequency set point 3		■					
	tap changer fault tripping			■				
	drawn out position: normally open contact				■	■	■	■
I18	recloser inhibited	■						
	choice of underfrequency set point 4		■					
	buccholz tripping			■				
	enable remote control: normally open contact for enable				■	■	■	■

# Use - commissioning

## Commissioning (cont'd)

### Connection of logic inputs, ESTOR2 and ESTOR 3 boards

ESTOR2		HV Sepam		
		line	busbars	transformer
I21	reserved for synchronization of external communication	■	■	■
I22	fault acknowledgment	■	■	■
I23	external order validation	■	■	■
I24	“Line VT” circuit closed (contact closed for VT circuit closed) “Busbar 1 VT” circuit closed (contact closed for VT circuit closed)	■	■	■
I25	“Busbar VT” circuit closed (contact closed for VT circuit closed) “Busbar 2 VT” circuit closed (contact closed for VT circuit closed)	■	■	■
I26	3-phase tripping by external protection information for activation of “breaker failure” for “breaker failure” activation	■	■	■
I27	inhibit tripping (contact closed)	■	■	■
I28	external protection tripping (contact closed)	■	■	■

ESTOR3		HV Sepam
		line
I31	downgraded operation (contact closed)	■
I32	receive teleprotection	■
I33	reserved	
I34	external “breaker failure” protection for recloser lockout	■
I35	phase 1 tripping by external protection information for «breaker failure» activation	■
I36	phase 2 tripping by external protection information for «breaker failure» activation	■
I37	phase 3 tripping by external protection information for «breaker failure» activation	■
I38	conditions OK for breaker closing (contact closed)	■

ESTOR2		Sepam MT			
		substation	capacitor	overhead underground	busbars
I21	reserved for synchronization of external communication	■	■	■	■
I22	fault acknowledgment	■	■	■	■
I23	HV tripping	■			
	capacitor 1 switch open		■		
	earthing switch	■		■	
I24	capacitor 1 switch closed		■		
	busbar 1 VT circuit closed				■
	line voltage present			■	
I25	circuit breaker position contact closed for closed and put on		■		
	HV tripping	■			
	capacitor 2 switch open		■		
	busbar 2 VT circuit closed				■
	"line VT" circuit closed			■	
I26	3-phase tripping by external protection information	■			
	capacitor 2 switch closed		■		
	incomer 1 circuit breaker closed and racked in				■
I27	incomer 2 circuit breaker closed and racked in				■
	capacitor 3 switch open		■		
I28	capacitor 3 switch closed		■		

ESTOR3		MV Sepam
		capacitor
I31	external lockout of capacitor control	■
I32	reserved	
I33	reserved	
I34	manual capacitor control	■
I35	automatic capacitor control	■
I36	varmeter control of capacitor 1 switch	■
I37	varmeter control of capacitor 2 switch	■
I38	varmeter control of capacitor 3 switch	■

# Use - commissioning

## Commissioning (cont'd)

### Connection of logic outputs: ESB and ESTOR1 boards

ESB		HV Sepam			MV Sepam		
		line	busbars	transformer	substation	capacitor	overhead underground
O1	Tripping	■	■	■	■	■	■
O2	Closing	■	■	■	■	■	■

ESTOR1		HV Sepam		
		line	busbars	transformer
O11	retripping of faulty circuit breaker undervoltage busbar 1	■	■	■
O12	adjacent breaker tripping undervoltage busbar 2	■	■	■
O13	fault tripping overvoltage busbar 1	■	■	■
O14	external disturbance recorder triggering overvoltage busbar 2	■	■	■

ESTOR1		MV Sepam				
		substation	capacitor	overhead feeder	underground feeder	busbars
O11	HV tripping	■				
	neutral voltage displacement	■				
	thermal overload		■		■	
	neutral unbalance					
	cycle in progress (recloser)			■		
	transmit blocking input to incomer 1					■
O12	fault tripping	■	■	■	■	■
O13	device fault	■	■	■	■	■
O14	send blocking input	■	■	■	■	
	transmit blocking input to incomer 2					■

## Connection of logic outputs: ESTOR2 and ESTOR3 boards

ESTOR2		HV Sepam		
		line	busbars	transformer
O21	line voltage absent	■		
	undervoltage load shedding		■	
	adjacent breaker tripping		■	
	transformer fault tripping			■
O22	cycle in progress	■		
	underfrequency load shedding		■	
	thermal overload alarm			■
O23	recloser in service	■		
	overvoltage		■	
	synchronism OK		■	
	MV tripping			■
O24	recloser inhibited if recloser in service	■		
	closing locked out if recloser inhibited	■		
	closing locked out		■	■

ESTOR3		HV Sepam
		line
O31	choice of single-phase reclosing	■
O32	choice of 3-phase reclosing	■
O33	recloser ready	■
O34	transmit teleprotection	■

ESTOR2		MV Sepam			
		substation	capacitor	overhead underground	busbars
O21	undervoltage	■		■	
	undervoltage busbar 1				■
	capacitor 1 switch closing order		■		
O22	undervoltage busbar 2				■
	coupling breaker tripping	■			
	underfrequency			■	
	capacitor 1 switch opening order		■		
O23	external disturbance recorder triggering	■	■	■	■
O24	capacitor switch fault (discrepancy or control)		■		
	overvoltage busbar 1				■
	overvoltage	■		■	

ESTOR3		MV Sepam	
		capacitor	busbars
O31	overvoltage busbar 2		■
	capacitor 2 switch closing order	■	
O32	synchronism OK		■
	capacitor 2 switch opening order	■	
O33	remanent undervoltage busbar 1		■
	capacitor 3 switch closing order	■	
O34	remanent undervoltage busbar 2		■
	capacitor 3 switch opening order	■	



# Use - commissioning

## Commissioning (cont'd)

### Parameter setting: line

function	pocket terminal contacts
<b>breaker failures</b>	
reclosing in service	KP1 = 1 and KP3 = 0
reclosing inhibited	KP1 = 0 and KP3 = 0
adjacent breaker tripping in service	KP2 = 0
adjacent breaker tripping inhibited	KP2 = 1
dead zone in service	KP1 = 0 and KP3 = 1
dead zone inhibited	KP1 = 0 and KP3 = 0
current monitoring bypass in service	KP33 = 0
current monitoring bypass inhibited	KP33 = 1
adjacent breaker tripping in service si verrouillage déclenchement	KP34 = 0
mise hors service du déclenchement disjoncteurs adjacents if circuit breaker is unavailable	KP34 = 1
<b>teleprotection</b>	
inhibited	KP7 = 0
in service	KP7 = 1
<b>directional earth fault</b>	
definite time	KP8 = 0
IDMT	KP8 = 1
<b>external protection tripping</b>	
protection without through current	KP11 = 0
protection with through current	KP11 = 1
<b>recloser</b>	
single operation	KP4 = 0
two operations	KP4 = 1
first 3-phase reclosing without synchronization	KP5 = 0
first 3-phase reclosing with synchronization	KP5 = 1
recloser locked out if developing fault during idle time of single/3-ph recloser	KP6 = 0
3-phase reclosing if developing fault during idle time of single/3-ph recloser	KP6 = 1
recloser activation by protections 50/51 or 50N/51N	KP9 = 1
recloser activation by protections 67 or 67N	KP10 = 1
reading of cycle choice	KP15 = 1
single-phase recloser	KP53 = 1
3-phase recloser	KP54 = 1
single/3-phase recloser	KP55 = 1
recloser disabled	KP56 = 1
<b>remote setting</b>	
remote setting active	KP38 = 0
remote setting inactive	KP38 = 1
<b>downgraded operation</b>	
fermeture disjoncteur	KP60 = 1
circuit breaker opening	KP61 = 1
<b>event counter</b>	
fault counter reset C2	KP49 = 1
cycle counter reset of reclosing C3 and C4	KP57 = 1
<b>synchro-check</b>	
acknowledgment of operating mode with voltage absent	KP58 = 1
no acknowledgment of operating mode with voltage absent	KP59 = 1
<b>disturbance recording</b>	
storage	KP50 = 1
automatic triggering	KP51 = 1
manual triggering	KP52 = 1

Parameters KP49 to KP61 are of the impulse type.

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## Time delay settings

The time delays are factory-set by default to 0.2 s.

time delays	
circuit breaker tripping impulse calibration	T1 = 0,2 s
circuit breaker closing impulse calibration	T2 = 0,2 s
synchro-check enable time delay (downgraded operation)	T3
synchro-check enable time delay for recloser	T4
lockout time delay	T5
single-phase idle time time delay	T6
3-phase idle time time delay	T7
slow idle time time delay	T8
discrimination time delay	T9
recovery time delay	T10
energizing initialization time delay	T11 = 0,2 s
discrepancy	T12 = 0,2 s

# Use - commissioning

## Commissioning (cont'd)

### Parameter setting: transformer

functions	parameters
<b>breaker failure</b>	
retripping in service	KP1 = 1 and KP3 = 0
retripping out of service	KP1 = 0 and KP3 = 0
adjacent breaker tripping in service	KP2 = 0
adjacent breaker tripping out of service	KP2 = 1
dead zone in service	KP1 = 0 and KP3 = 1
dead zone out of service	KP1 = 0 and KP3 = 0
enable current monitoring by pass	KP33 = 0
disable current monitoring by pass	KP33 = 1
enable adjacent breaker tripping if tripping inhibited	KP34 = 0
disable adjacent breaker tripping if tripping inhibited	KP34 = 1
<b>external protection tripping</b>	
protection without through current	KP4 = 0
protection with through current	KP4 = 1
<b>tank earth leakage protection</b>	
protection with through current less than 0.2 In	KP5 = 0
protection with through current greater than 0.2 In	KP5 = 1
<b>neutral protection set point 1</b>	
protection with through current less than 0.2 In	KP6 = 0
protection with through current greater than 0.2 In	KP6 = 1
<b>neutral protection set point 2</b>	
protection with through current less than 0.2 In	KP7 = 0
protection with through current greater than 0.2 In	KP7 = 1
<b>MV tripping</b>	
protection with through current	KP8 = 0
protection with through current	KP8 = 1
<b>receive blocking input</b>	
normal	KP9 = 0
fail-safe	KP9 = 1
<b>MV breaker tripping</b>	
MV breaker with shunt-trip coil	KP10 = 0
MV breaker with undervoltage release coil	KP10 = 1
<b>remote setting</b>	
remote setting active	KP38 = 0
remote setting inactive	KP38 = 1
<b>event counters</b>	
resetting of fault counter	KP49 = 1
<b>synchro-check</b>	
acknowledgment of operating mode with voltage off	KP58 = 1
no acknowledgment of operating mode with voltage off	KP59 = 1
<b>downgraded operation</b>	
circuit breaker closing	KP60 = 1
circuit breaker opening	KP61 = 1
<b>disturbance recording</b>	
storage	KP50 = 1
automatic triggering	KP51 = 1
manual triggering	KP52 = 1

### Time delay settings

The time delays are factory-set by default to 0.2 s.

time delays	
circuit breaker tripping pulse calibration	T1 = 0.2 s
circuit breaker closing pulse calibration	T2 = 0.2 s
synchro-check enable time delay (downgraded operation)	T3
time delay for blocking input before "SSL FAULT" message	T4 = 2 s

## Parameter setting: HV busbar

functions	parameters
<b>breaker failure</b>	
retripping in service	KP1 = 1 and KP3 = 0
retripping inhibited	KP1 = 0 and KP3 = 0
adjacent breaker tripping in service	KP2 = 0
adjacent breaker tripping inhibited	KP2 = 1
dead zone in service	KP1 = 0 and KP3 = 1
dead zone inhibited	KP1 = 0 and KP3 = 0
current check bypass put into service	KP33 = 0
current check bypass inhibited	KP33 = 1
adjacent breaker tripping put into service if tripping locked out	KP34 = 0
adjacent breaker tripping inhibited if tripping locked out	KP34 = 1
<b>external protection tripping</b>	
protection without through current	KP4 = 0
protection with through current	KP4 = 1
<b>remote setting</b>	
remote setting active	KP38 = 0
remote setting inactive	KP38 = 1
<b>event counter</b>	
resetting of fault counter C2	KP49 = 1
<b>underfrequency load shedding</b>	
choice of set point 1	KP54 = 1
choice of set point 2	KP55 = 1
choice of set point 3	KP56 = 1
choice of set point 4	KP57 = 1
<b>synchro-check</b>	
synchro-check or dead zone check	KP58 = 1
synchro-check only	KP59 = 1
Sepam used for several circuit breakers	KP5 = 1
Sepam used for one circuit breaker	KP5 = 0
<b>downgraded operation</b>	
circuit breaker closing	KP60 = 1
circuit breaker opening	KP61 = 1
<b>disturbance recording</b>	
storage	KP50 = 1
automatic triggering	KP51 = 1
manual triggering	KP52 = 1

## Time delay settings

The time delays are factory-set by default to 0.2 s.

time delays	
tripping pulse calibration	T1 = 0.2 s
closing pulse calibration	T2 = 0.2 s
synchro-check enable time delay (downgraded operation)	T3
minimum synchronism pulse OK	T4 = 0.2 s

# Use - commissioning

## Commissioning (cont'd)

### Parameter setting: MV busbar

functions	parameters
<b>open / close control</b>	
circuit breaker with shunt-trip coil	KP1 = 0
circuit breaker with undervoltage release coil	KP1 = 1
display of parameterized control	KP17 = 1
<b>external protection tripping</b>	
by normally open contact	KP4 = 0
by normally closed contact	KP4 = 1
<b>logic discrimination</b>	
normal blocking input receipt	KP9 = 0
fail-safe blocking input receipt	KP9 = 1
normal blocking input transmission	KP10 = 0
fail-safe blocking input transmission	KP10 = 1
pilot wire test	KP18 = 1
<b>event counter</b>	
resetting of fault counter C2 and C3	KP49 = 1
resetting of operation counter C1	KP53 = 1
<b>remote setting</b>	
remote setting active	KP38 = 0
remote setting inactive	KP38 = 1
<b>synchro-check</b>	
acknowledgment of operating mode with voltage off	KP58 = 1
no acknowledgment of operating mode with voltage off	KP59 = 1
enable circuit breaker closing	KP5 = 1
enable automatic transfert	KP5 = 0
<b>disturbance recording</b>	
storage	KP50 = 1
automatic triggering	KP51 = 1
manual triggering	KP52 = 1

Parameters KP49 to KP61 are of the impulse type.

### Time delay settings

The time delays are factory-set by default to 0.2 s.

time delays	
time delay for recovery of open/closed information upon change in device position	T1 = 0.2 s
time delay for blocking input before "SSL FAULT" message	T2 = 2 s
inhibit blocking input transmission after tripping	T3 = 0.2 s
tripping pulse via remote control order	T5 = 0.2 s
closing pulse via remote control order	T6 = 0.2 s
synchro-check enable time delay	T7
minimum synchronism pulse OK	T8 = 0.2 s

## Parameter setting: substation

functions	parameters
<b>open / close control</b>	
circuit breaker with shunt-trip coil	KP1 = 0
circuit breaker with undervoltage release coil	KP1 = 1
display of parameterized control	KP17 = 1
<b>breaker failure</b>	
protection breaker fault in service	KP2 = 0
protection breaker fault out of service	KP2 = 1
enable current monitoring by-pass	KP3 = 0
disable current monitoring by-pass	KP3 = 1
<b>HV tripping</b>	
by normally open contact	KP5 = 0
by normally closed contact	KP5 = 1
<b>HV breaker tripping</b>	
by normally open contact	KP6 = 0
by normally closed contact	KP6 = 1
<b>MV coupling breaker tripping</b>	
by normally open contact	KP7 = 0
by normally closed contact	KP7 = 1
<b>directional phase overcurrent</b>	
tripping if at least one of the three phases is above the set point	KP33 = 0
tripping if at least two of the three phases are above the set point	KP33 = 1
<b>receive blocking input</b>	
normal	KP9 = 0
fail-safe	KP9 = 1
<b>transmit of blocking input</b>	
normal	KP10 = 0
fail-safe	KP10 = 1
pilot wire test	KP18 = 1
<b>external protection tripping</b>	
by normally open contact	KP4 = 0
by normally closed contact	KP4 = 1
<b>remote setting</b>	
remote setting active	KP38 = 0
remote setting inactive	KP38 = 1
<b>event counter</b>	
resetting of fault counter C2 and C3	KP49 = 1
resetting of operation counter C1	KP53 = 1
<b>disturbance recording</b>	
storage	KP50 = 1
automatic triggering	KP51 = 1
manual triggering	KP52 = 1

## Time delay settings

The time delays are factory-set by default to 0.2 s.

time delays	
time delay for recovery of open/closed information upon change in device position	T1 = 0.2 s
time delay for blocking input before «SSL FAULT» message	T2 = 2 s
inhibit blocking input transmission after tripping	T3 = 0.2 s
tripping pulse via remote control order	T5 = 0.2 s
closing pulse via remote control order	T6 = 0.2 s

# Use - commissioning

## Commissioning (cont'd)

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### Parameter setting: capacitor

functions	parameters
<b>open / close control</b>	
circuit breaker with shunt-trip coil	KP1 = 0
circuit breaker with undervoltage release coil	KP1 = 1
display of parameterized control scheme	KP17 = 1
<b>logic discrimination</b>	
send blocking input BI with shunt-trip	KP10 = 0
send blocking input BI with undervoltage release (fail-safe)	KP10 = 1
BI (blocking input) pilot wire test	KP18 = 1
<b>external protection tripping</b>	
N/O contact	KP4 = 0
N/C contact	KP4 = 1
<b>counters</b>	
resetting of operation counter C1	KP53 = 1
resetting of phase fault trip counter C2 and C3	KP49 = 1
resetting of running hours counter C4, C5 and C6	KP62 = 1
<b>choice of number of capacitors</b>	
3 capacitors	KP36 = 0 and KP37 = 0
2 capacitors	KP36 = 0 and KP37 = 1
1 capacitor	KP36 = 1 and KP37 = 1
<b>remote setting</b>	
remote setting active	KP38 = 0
remote setting inactive	KP38 = 1
<b>switch open/close control</b>	
capacitor 1 switch closing	KP54 = 1
capacitor 1 switch opening	KP55 = 1
capacitor 2 switch closing	KP56 = 1
capacitor 2 switch opening	KP57 = 1
capacitor 3 switch closing	KP58 = 1
capacitor 3 switch opening	KP59 = 1
<b>capacitor control</b>	
manual control	KP60 = 1
automatic control	KP61 = 1
<b>disturbance recording</b>	
storage	KP50 = 1
automatic triggering	KP51 = 1
manual triggering	KP52 = 1

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## Time delay settings

The time delays are factory-set by default to 0.2 s.

time delays	
time delay for recovery of open/closed information upon change in device position	T1 = 0.2 s
inhibit blocking input transmission after tripping	T3 = 0.2 s
circuit breaker tripping pulse via remote control order	T5 = 0.2 s
circuit breaker closing pulse via remote control order	T6 = 0.2 s
capacitor discharge time delay	T7
capacitor 1 switch manual opening order time delay	T21 = 0.05 s
capacitor 2 switch manual opening order time delay	T22 = 0.5 s
capacitor 3 switch manual opening order time delay	T23 = 1 s
circuit breaker manual opening order time delay	T24 = 4 s
capacitor 1 switch opening pulse	T25 = 0.2 s
capacitor 2 switch opening pulse	T26 = 0.2 s
capacitor 3 switch opening pulse	T27 = 0.2 s
capacitor 1 switch closing pulse	T28 = 0.2 s
capacitor 2 switch closing pulse	T29 = 0.2 s
capacitor 3 switch closing pulse	T30 = 0.2 s
capacitor 1 discharge time delay	T31
capacitor 2 discharge time delay	T32
capacitor 3 discharge time delay	T33
time delay for recovery of open/closed information upon change in switch 1 position	T34 = 1 s
time delay for recovery of open/closed information upon change in switch 2 position	T35 = 1 s
time delay for recovery of open/closed information upon change in switch 3 position	T36 = 1 s



# Use - commissioning

## Commissioning (cont'd)

### Parameter setting: overhead

functions	parameters
<b>open / close control</b>	
circuit breaker with shunt-trip coil	KP1 = 0
circuit breaker with undervoltage release coil	KP1 = 1
display of parameterized control scheme	KP17 = 1
<b>external protection tripping</b>	
by normally open contact	KP4 = 0
by normally closed contact	KP4 = 1
<b>logic discrimination</b>	
receive shunt-trip blocking input BI	KP9 = 0
receive undervoltage release blocking input BI (fail-safe)	KP9 = 1
transmit shunt-trip blocking input BI	KP10 = 0
transmit undervoltage release blocking input BI (fail-safe)	KP10 = 1
pilot wire test	KP18 = 1
<b>recloser</b>	
no activation of recloser by directional earth fault for compensated neutral 67N	KP6 = 0
activation recloser by directional earth fault for compensated neutral	KP6 = 1
checking line voltage absent by input I23	KP7 = 0
checking line voltage absent by undervoltage remanent	KP7 = 1
activation cycle 1 by time-delayed protection	KP11 = 0
activation cycle 1 by instantaneous protection	KP11 = 1
activation cycle 2 by time-delayed protection	KP12 = 0
activation cycle 2 by instantaneous protection	KP12 = 1
activation cycle 3 by time-delayed protection	KP13 = 0
activation cycle 3 by instantaneous protection	KP13 = 1
activation cycle 4 by time-delayed protection	KP14 = 0
activation cycle 4 by instantaneous protection	KP14 = 1
final tripping by time-delayed protection	KP15 = 0
final tripping by instantaneous protection	KP15 = 1
inhibition recloser by input I12	KP16 = 1
recloser on	KP19 = 1
recloser off	KP20 = 1
cycle 1 on	KP21 = 1
cycle 1 off	KP22 = 1
cycle 2 on	KP23 = 1
cycle 2 off	KP24 = 1
cycle 3 on	KP25 = 1
cycle 3 off	KP26 = 1
cycle 4 on	KP27 = 1
cycle 4 off	KP28 = 1
<b>remote setting</b>	
remote setting enable	KP38 = 0
remote setting disable	KP38 = 1
<b>counters</b>	
resetting of fault counters C2 and C3	KP49 = 1
resetting of operation counter C1	KP53 = 1
resetting of reclosing cycle counters C4, C5, C6, C7 and C8	KP54 = 1
<b>disturbance recording</b>	
storage	KP50 = 1
automatic triggering	KP51 = 1
manual triggering	KP52 = 1
<b>load shedding</b>	
load shedding by underfrequency setting 1	KP55 = 1
load shedding by underfrequency setting 2	KP56 = 1
load shedding by underfrequency setting 3	KP57 = 1
load shedding by underfrequency setting 4	KP58 = 1
no load shedding (priority)	KP59 = 1

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## Time delay settings

The time delays are factory-set by default to 0.2 s.

time delays	
time delay for recovery of open/closed information upon change in device position	T1 = 0.2 s
time delay for blocking input before «SSL FAULT» message	T2 = 2 s
inhibit blocking input transmission after tripping	T3 = 0.2 s
command not executed fault time delay	T4 = 0.2 s
circuit breaker tripping pulse via remote control order	T5 = 0.2 s
circuit breaker closing pulse via remote control order	T6 = 0.2 s
disengaging time delay	T10
cycle 1 isolation time delay	T11
cycle 2 isolation time delay	T12
cycle 3 isolation time delay	T13
cycle 4 isolation time delay	T14
lockout time delay	T15
time delay for voltage present check by self-powered protection	T17 = 20 s

# Use - commissioning

## Commissioning (cont'd)

### Parameter setting: underground

functions	parameters
<b>open / close control</b>	
circuit breaker with shunt-trip coil	KP1 = 0
circuit breaker with undervoltage release coil	KP1 = 1
display of parameterized control scheme	KP17 = 1
<b>external protection tripping</b>	
by normally open contact	KP4 = 0
by normally closed contact	KP4 = 1
<b>logic discrimination</b>	
receive shunt-trip blocking input BI	KP9 = 0
receive undervoltage release blocking input BI (fail-safe)	KP9 = 1
transmit shunt-trip blocking input BI	KP10 = 0
transmit undervoltage release blocking input BI (fail-safe)	KP10 = 1
pilot wire test	KP18 = 1
<b>remote setting</b>	
remote setting enable	KP38 = 0
remote setting disable	KP38 = 1
<b>counters</b>	
resetting of fault counters C2 and C3	KP49 = 1
resetting of operation counter C1	KP53 = 1
<b>disturbance recording</b>	
storage	KP50 = 1
automatic triggering	KP51 = 1
manual triggering	KP52 = 1
<b>load shedding</b>	
load shedding by underfrequency setting 1	KP55 = 1
load shedding by underfrequency setting 2	KP56 = 1
load shedding by underfrequency setting 3	KP57 = 1
load shedding by underfrequency setting 4	KP58 = 1
no load shedding (priority)	KP59 = 1

### Time delay settings

The time delays are factory-set by default to 0.2 s.

time delays	
time delay for recovery of open/closed information upon change in device position	T1 = 0.2 s
time delay for blocking input before «SSL FAULT» message	T2 = 2 s
inhibit blocking input transmission after tripping	T3 = 0.2 s
circuit breaker tripping pulse via remote control order	T5 = 0.2 s
circuit breaker closing pulse via remote control order	T6 = 0.2 s

## Operation: line

functions	trip	lock out			protection function	ext. dist. rec. trig.			messages <sup>(2)</sup>
	O1		O11	O12	O13	O14	O24 <sup>(1)</sup>		
retripping or dead zone		■	■						RETRIP DEAD ZONE
tripping adjacent breakers		■		■					ADJACENT
phase overcurrent	■	■			■	■		■	OVERCURRENT
earth fault	■	■			■	■		■	EARTH FAULT
directional overcurrent	■	■			■	■		■	DIR. O/C
directional earth fault	■	■			■	■		■	DIR. E/F
overvoltage	■	■			■			■	OVERVOLT.
residual overvoltage		■							VT FUSES
external protection tripping	■	■			■			■	EXT. TRIP
synchro-check									SYNCHRO

functions	O21	O22	O23	O24 <sup>(1)</sup>	O31	O32	O33	O34	messages <sup>(2)</sup>
line voltage off	■								VOLTAGE OFF
cycle in progress		■							RECLOSE 1PH or 3PH
recloser in service			■						
recloser locked out				■					LOCKED
single-phase reclosing choice					■				
three-phase reclosing choice						■			
ready for single-phase reclosing							■		
teleprotection								■	
detection of plugged connectors (DPC)									CONNECTOR
external order validation									M. ESTOR
VT supervision									VT/VT LINE/ VT BUSBAR

<sup>(1)</sup> status of output O24.

	no faults		faults present	
	contact	message	contact	message
recloser inhibited	closed	—	open	according to faults
recloser in service	closed	—	open	LOCKED

<sup>(2)</sup> on Sepam 2000 display unit (according to language version).

# Use - commissioning

## Commissioning (cont'd)

### HV busbar operation

functions	trip	lock out			fault trip	ext. dist. rec. trig.		inhibit closing	messages <sup>(1)</sup>
	O1		O11	O12	O13	O14	O21	O24	
retripping or dead zone		■	■						RETRIP CB DEAD ZONE
tripping adjacent breakers		■		■			■		ADJACENT
phase overcurrent	■	■			■	■		■	OVERCURRENT
earth fault	■	■			■	■		■	EARTH FAULT
external tripping	■	■			■			■	EXT. TRIP

functions	lockout	O11	O12	O13	O14	O21	O22	O23	messages <sup>(1)</sup>
	undervoltage busbar 1	■	■						
undervoltage busbar 2	■		■						U/VOLT BUS2
overvoltage busbar 1	■			■					O/VOLT BUS1
overvoltage busbar 2	■				■				O/VOLT BUS2
undervoltage	■					■			UNDERVOLT.
underfrequency	■						■		UNDERFREQ.
overvoltage	■							■	OVERVOLT.
synchro-check								■	SYNCHRO
detection of plugged connectors (DPC)									CONNECTOR
external order validation									M. ESTOR
VT supervision									VT/BUS1 VT/BUS2 VT

<sup>(1)</sup> on Sepam 2000 display unit (according to language versions).

### MV busbar operation

functions	trip	lock out	inhibit closing	trans. BI	fault trip	device fault	trans. BI	ext. dist. rec. trig.	messages <sup>(1)</sup>
	O1			O11	O12	O13	O14	O23	
phase overcurrent	■	■	■	■	■		■	■	OVERCURRENT
earth fault	■	■	■	■	■		■	■	EARTH FAULT
external tripping	■	■	■		■				EXT. TRIP
pole pressure		■	■			■			PRESSURE
CB control		■	■			■			?CONTROL?

functions	O21	O22	O24	O31	O32	O33	O34	messages <sup>(1)</sup>
	undervoltage set point 1 busbar 1	■						
undervoltage set point 2 busbar 1	■							U/VOLT.2 B1
undervoltage set point 1 busbar 2		■						U/VOLT.1 B2
undervoltage set point 2 busbar 2		■						U/VOLT.2 B2
overvoltage set point 1 busbar 1			■					O/VOLT.1 B1
overvoltage set point 2 busbar 1			■					O/VOLT.2 B1
overvoltage set point 1 busbar 2				■				O/VOLT.1 B2
overvoltage set point 2 busbar 2				■				O/VOLT.2 B2
remanent undervoltage busbar 1						■		
remanent undervoltage busbar 2							■	
synchro-check					■			SYNCHRO
detection of plugged connectors (DPC)								CONNECTOR
VT supervisor								VT/BUS1 VT/BUS2 VT

<sup>(1)</sup> on Sepam 2000 display unit (according to language versions).

## Operation: transformer

functions	trip	lock out			fault trip	ext. dist. rec. trig	MV trip	inhibit closing	messages <sup>(1)</sup>
	O1		O11	O12	O13	O14	O23	O24	
retripping or dead zone		■	■						RETRIP DEAD ZONE
tripping adjacent breakers		■		■					ADJACENT
phase overcurrent	■	■			■	■	■	■	OVERCURRENT
earth fault	■	■			■	■	■	■	EARTH FAULT
neutral setting 1	■	■			■	■	■	■	NEUTR. O/C1
neutral setting 2	■	■			■	■	■	■	NEUTR. O/C2
tank earth leakage	■	■			■	■	■	■	FRAME LEAK
external tripping	■	■			■		■	■	EXT. TRIP
MV tripping	■	■			■			■	TRIP BY MV
synchro-check									SYNCHRO

functions	trip	lock out	fault trip			MV trip	inhibit closing	messages <sup>(1)</sup>
	O1		O13	O21	O22	O23	O24	
thermal overload alarm	■	■	■	■	■	■	■	THERMAL THERMAL
thermal overload tripping	■	■		■		■	■	OIL TEMP.
thermal overload tripping oil temperature	■	■		■		■	■	WIND. TEMP
thermal overload tripping winding temperature	■	■		■		■	■	OL TC FAULT
thermal overload tripping Buchholz	■	■		■		■	■	BUCHHOLZ
thermal overload tripping overpressure detection of plugged connectors (DPC)	■	■		■		■	■	TR. PRESSURE CONNECTOR
external order validation								M. ESTOR
VT supervision								LINE VT/BUS VT

<sup>(1)</sup> on Sepam 2000 display unit (according to language versions).

# Use - commissioning

## Commissioning (cont'd)

### Operation: substation

functions	trip O1	inhibit closing	lock out	O11	fault trip O12	O13	trans. BI O14	ext. dist. rec. trig. O23	messages <sup>(1)</sup>
phase overcurrent	■	■	■		■		■	■	OVERCURRENT
earth fault	■	■	■		■		■	■	EARTH FAULT
directional overcurrent	■	■	■	■ <sup>(2)</sup>	■		■	■	DIR. O/C
directional earth fault	■	■	■	■ <sup>(2)</sup>	■		■	■	DIR. E/F
neutral voltage displacement			■	■ <sup>(3)</sup>					N VOLT DISP
external tripping	■	■	■						EXT. TRIP
pole pressure		■	■			■			PRESSURE
CB control		■	■			■			?CONTROL?

functions	inhibit closing	lock out	O11	O21	O22	O24	messages
undervoltage				■			UNDERVOLT.
tripping of upstream (HV) and coupling breakers	■	■	■		■		CB FAILURE
overvoltage						■	OVERVOLT.

<sup>(1)</sup> on Sepam 2000 display unit (according to language versions).

<sup>(2)</sup> HV tripping by directional phase overcurrent and earth fault protections or indication for neutral voltage displacement protection operation. S62, S63, S66 applications.

<sup>(3)</sup> S64 application.

## Operation: capacitor

functions	trip O1	inhibit closing	lockout	transmit BI O14	alarm O11	fault trip O12	device fault O13	messages <sup>(1)</sup>
thermal capacity used alarm						■		THERMAL
thermal capacity used tripping	■	■	■			■		THERMAL
phase overcurrent	■	■	■	■		■		OVERCURRENT
earth fault	■	■	■	■		■		EARTH FAULT
undervoltage	■	■	■			■		UNDERVOLT
overvoltage setting 1	■	■	■			■		OVERVOLT.1
overvoltage setting 2	■	■	■			■		OVERVOLT.2
delayed re-energizing capacitor 1		■						DISCHARGE 1
delayed re-energizing capacitor 2		■						DISCHARGE 2
delayed re-energizing capacitor 3		■						DISCHARGE 3
delayed re-energizing external protection trip	■	■	■			■		DISCHARGE EXT. TRIP
pole pressure		■	■				■	PRESSURE
trip circuit supervision		■	■				■	?CONTROL?
cap 1 switch control supervision								?CONTROL 1?
cap 2 switch control supervision								?CONTROL 2?
cap 3 switch control supervision								?CONTROL 3?
detection of plugged connectors (DPC)								CONNECTOR
VT monitoring								VT

functions	close switch 1 O21	trip switch 1 O22	close switch 2 O31	trip switch 2 O32	close switch 3 O33	trip switch 3 O34	alarm O11	messages <sup>(1)</sup>
unbalance (3 cap.) capacitor 1 alarm							■	UNBAL.AL1
unbalance (3 cap.) capacitor 2 alarm							■	UNBAL.AL2
unbalance (3 cap.) capacitor 3 alarm							■	UNBAL.AL3
unbalance (3 cap.) capacitor 1 trip		■						UNBAL.TRIP1
unbalance (3 cap.) capacitor 2 trip				■				UNBAL.TRIP2
unbalance (3 cap.) capacitor 3 trip						■		UNBAL.TRIP3
varmeter control	■	■	■	■	■	■		

<sup>(1)</sup> on Sepam 2000 display unit (according to language versions).



# Use - commissioning

## Commissioning (cont'd)

### Operation: overhead feeder, underground feeder

functions	trip	inhibit	lock					fault		device	trans.	ext. dist		messages <sup>(1)</sup>
	O1	closing	out	O11	O12	O13	O14	O21	O22	O23	O24			
thermal overload (tripping)	■	■	■		■									THERMAL
thermal overload (alarm)				■										THERMAL
phase overcurrent OVERCURRENT	■	■ <sup>(2)</sup>	■ <sup>(2)</sup>		■		■					■		
earth fault	■	■ <sup>(2)</sup>	■ <sup>(2)</sup>		■		■					■		EARTH FAULT
directional earth fault	■	■ <sup>(2)</sup>	■ <sup>(2)</sup>		■		■					■		DIR. E/F
directional earth fault for compensated neutral	■	■ <sup>(2)</sup>	■ <sup>(2)</sup>		■		■					■		DIR. E/F
underfrequency setting 1	■	■	■		■							■		UNDERFREQ.1
underfrequency setting 2	■	■	■		■							■		UNDERFREQ.2
underfrequency setting 3	■	■	■		■							■		UNDERFREQ.3
underfrequency setting 4	■	■	■		■							■		UNDERFREQ.4
external protection tripping	■	■	■		■									EXT. TRIP
pole pressure		■	■											PRESSURE
trip circuit supervision		■	■											?CONTROL?
detection of plugged connectors (DPC)														CONNECTOR
undervoltage UNDERVOLTAGE												■		
overvoltage														■ OVERVOLT. 1 OVERVOLT. 2

<sup>(1)</sup> on Sepam 2000 display unit (according to language version).

<sup>(2)</sup> if recloser off or if trip definitive.

## Disturbance recording: HV Sepam

### Activation of disturbance recording

application	line	busbars	transformer
KP52	■	■	■
KTC52	■	■	■
instantaneous O/C	■	■	■
directional inst. O/C	■		
instantaneous earth fault	■	■	■
directional inst. earth fault	■		
O13 output	■	■	■

### Logical states recorded

function	KFR1	KFR2	KFR3	KFR4	KFR5	KFR6	KFR7	KFR8
output O1	■							
output O2		■						
output O11							■	
output O12								■
output O13			■					
output O34				■				
instantaneous O/C					■			
directional inst. O/C								
instantaneous earth fault						■		
directional inst. earth fault								

## Disturbance recording: MV Sepam

### Activation of disturbance recording

application	substations	overhead / underground	capacitors	busbars
KP52	■	■	■	■
KTC52	■	■	■	■
instantaneous O/C	■	■	■	■
directional inst. O/C	■			
instantaneous earth fault	■	■	■	■
directional inst. earth fault	■	■		
O13 output	■	■	■	

### Logical states recorded

function	KFR1	KFR2	KFR3	KFR4	KFR5	KFR6	KFR8
output O1	■						
output O2		■					
output O12			■				
output O14				■			
instantaneous O/C					■		
directional inst. O/C							
instantaneous earth fault						■	
directional inst. earth fault							
circuit breaker failure							■

## Remote setting: HV and MV Sepam

protection function curves, settings, time delays, angles...

program logic time delays

# Use - commissioning

## Maintenance

Sepam comprises self-testing and self-diagnosis to facilitate installation maintenance.

### Indicator lamps and display messages

■ Green indicator lamp lit up:

Sepam is energized.

■ No indicator lamp lit up:

There is probably an auxiliary power supply fault.

Check the auxiliary power supply and CE40 boards and perform the lamp test.

■ Red  lamp indicates internal Sepam faults.

Sepam continuously performs on-line internal tests. When the test results are negative, Sepam automatically runs a series of sequences which result in either:

□ automatic reinitialization (minor fault, e.g. transient auxiliary power supply break)

Sepam carries out a complete restart sequence.

If restart is successful, Sepam operates again normally. All the output relays are de-energized <sup>(1)</sup>,

□ switching to the fail-safe position (major fault)

Sepam goes into the fail-safe position.

All the output relays drop out <sup>(1)</sup>

in order to avoid inadvertent commands,

and the watchdog drops out as well.

The following may cause internal faults:

■ missing cartridge:

□ red  indicator lamp lit up,

□ display OFF,

□ no dialogue with pocket terminal,

□ no dialogue with communication link,

□ watchdog dropped out,

□ switching to fail-safe position.

Sepam 2000 will not start, lacking a program:

this is a major fault.

■ set-up fault:

□ red  indicator lamp lit up,

□ display indicates **CARTRIDGE**,

□ no dialogue with pocket terminal,

□ no dialogue with communication link,

□ watchdog dropped out,

□ switching to fail-safe position.

Sepam 2000 is shut down: this is a major fault.

□ the type of cartridge is not compatible

with the Sepam model.

Caution: do not insert or remove the cartridge

while Sepam is energized.

□ disconnect the auxiliary power supply and wait

2 seconds before handling the cartridge.

Check the references on the Sepam and on the cartridge (refer to chapter on Sepam identification).

□ Sepam is automatically disabled until the appropriate cartridge is inserted.

■ hardware fault on cartridge:

□ red  indicator lamp lit up,

□ display indicates **M CARTRIDGE**,

□ no dialogue with pocket terminal,

□ no dialogue with communication link,

□ watchdog dropped out,

□ switching to fail-safe position.

Sepam 2000 is shut down: this is a major fault.

□ the cartridge is faulty,

□ disconnect the auxiliary power supply,

□ Sepam is automatically inhibited until a new cartridge is installed.

Consult your maintenance department.

■ other major faults:

□ red indicator lamp lit up,

□ display indicates **MAINTENANCE**,

□ no dialogue with pocket terminal,

□ no dialogue with communication link (if the CPU is faulty),

□ watchdog dropped out,

□ switching to fail-safe position.

Sepam 2000 is shut down: this is a major fault.

Consult your maintenance department.

■ minor or partial fault:

□ red indicator lamp extinguished,

□ display indicates **MAINTENANCE**,

□ dialogue with pocket terminal is maintained,

□ dialogue with communication link is maintained,

□ watchdog does not drop out,

Sepam 2000 is operating, however it has detected a transient fault or a component has failed to pass self-testing.

Consult your maintenance department.

■ other minor or partial faults:

□ red indicator lamp extinguished,

□ display indicates **M CARTRIDGE**,

□ dialogue with pocket terminal is maintained,

□ dialogue with communication link is maintained,

□ watchdog does not drop out,

Sepam 2000 is operating, however it has detected a fault in the status parameters or an overrun of the number of entries written in the cartridge memory.

Set the status parameters that are blinking or consult your maintenance department.

### Communication indicator lamps

These lamps are located at the rear of the device on the CE40 module when the module is equipped with the communication option.

■ Green indicator lamp blinking: indicates traffic on the line.


This is the normal operating mode.

■ Indicator lamps extinguished: there is no communication.

Check the cabling and inquiries at the level above.

■ Red indicator lamp lit up: indicates initialization of the coupler, which lasts about 2 seconds, or a coupler fault.

Consult your maintenance department.

■ Red  indicator lamp lit up and the recommendations given in the maintenance chapter do not allow Sepam to be restarted.

Call the maintenance department.

<sup>(1)</sup>this may cause tripping with undervoltage program logic (so-called fail-safe logic).

#### The display indicates:

##### ■ \*\*\*\*\*

- No measurements have been requested.
- The requested measurement is not available.
- The measurement is out of range.

##### ■ CONNECTOR

- Indication that one or more connectors are unplugged.

Check that the connectors are plugged in and tightened by screws on the rear of the device. Check that the DPC has been strapped to all the connectors.

##### ■ ?CONTROL?

- The circuit breaker shunt-trip mechanism is faulty. Possible causes:
  - loss of auxiliary power supply,
  - broken coil,
  - disconnected or damaged wiring,
  - device position contacts stuck.

Check the cabling and the state of the different contacts.

Sepam prevents the device from closing.

- When the ?CONTROL messages appears the first time that Sepam is energized.

Appuyer sur la touche reset pour acquitter ce message. Régler la temporisation T1 à 2 s.

##### ■ PRESSURE

The breaking pole pressure switch indicates a drop in gas pressure.

Sepam inhibits breaking device closing.

Please refer to the breaking device maintenance manual.

## Unwanted tripping, no tripping

Incorrect parameter setting may cause unwanted tripping or no tripping <sup>(1)</sup>.

Check the settings.

## Tests

##### ■ Lamp test:

when the user presses the **A** and **V/Hz** measurement keys at the same time, all the indicators on the front of the device light up as well as the display, which indicates alternately \*\*\*\*\* and 000000000.

##### ■ Logic discrimination pilot wire link test.

**Program logic** menu parameters

---

KP18 = 1

forcing of "blocking input" output

check processing by upstream Sepam input I12 (**RECEIVE BI** message)

---

## Sepam replacement

When Sepam is replaced:

- switch off Sepam,
- dismantle th Sepam to be replaced,
- remove the cartridge,
- mount the Sepam replacement (hardware configuration),
- install the cartridge,
- verify the compatibility of the cartridge and Sepam (see chapter on identification),
- set microswitches SW1 and SW2 on the rear of the device in the same positions as they were in on the Sepam that was replaced,
- install the connectors, checking their markings,
- energize Sepam.

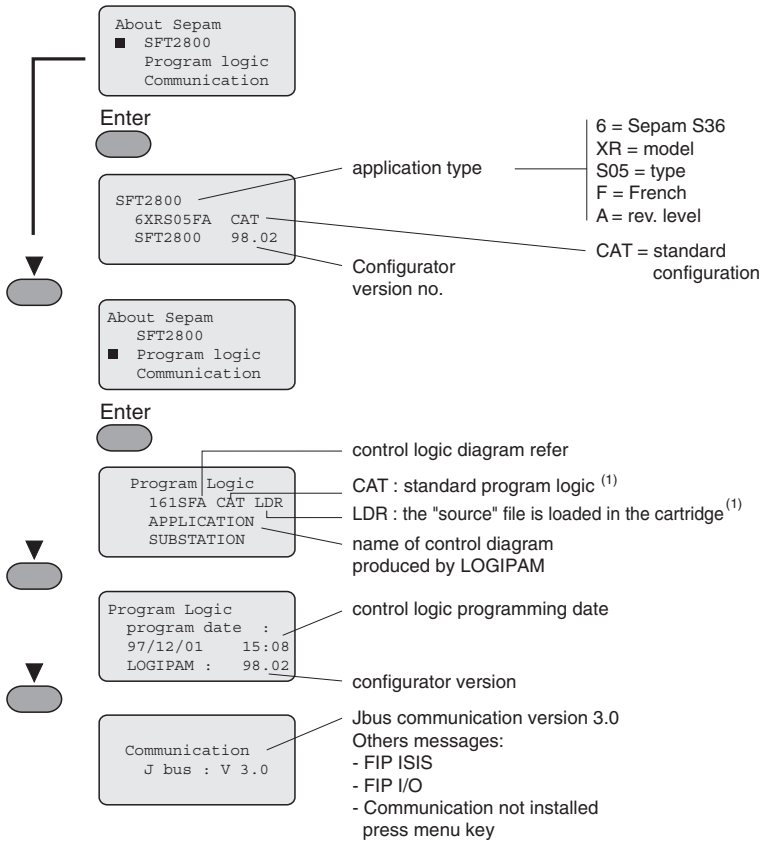
<sup>(1)</sup> All the settings should be based on a network discrimination study that is to be carried out prior to commissioning.



# Use - commissioning Maintenance (cont'd)

## Sepam identification using the pocket terminal

Menu: About Sepam



### Reminder

In the event of a cartridge error or incompatibility with Sepam, the message **CARTRIDGE** appears on the front of the device.

Check the coherence between the cartridge and Sepam using the compatibility list given on the following page.

## Compatibility of types and models

type	model S36 / S26	nb. of ESTOR boards
<b>line</b>		
L60	YR	3
L61	XR	3
L62	XR	3
L63	YR	3
L64	XR	3
L65	TR	3
L66	XR	3
L67	XR	3
L00	TR	3
<b>busbars</b>		
B61	YR	2
B62	XR	2
B63	XR	2
B00	TR	2
B68	YR	2
B69	TR	3
<b>transformer</b>		
T60	YR	2
T61	KR	2
T62	XR	2
T63	YR	2
T64	XR	2
T66	LR	2
T67	XR	2
<b>substation</b>		
S61	YR	2
S62	XR	2
S63	XR	2
S64	XR	2
S65	YR	2
S62	XR	2
<b>overhead feeder</b>		
A61	XR	2
A62	XR	2
A63	XR	2
A64	LT	2
<b>underground feeder</b>		
U61	YR	2
U62	XR	2
U63	XR	2
U64	LT	2
<b>capacitor</b>		
C61	YR	2
C62	XR	2
C63	KR	3
C64	LR	3

# Sepam 2000 documentation

<b>documentation</b> <sup>(1)</sup>	<b>reference</b> <sup>(2)</sup>	<b>content</b>	<b>use</b>
Sepam range	PCRED397071EN	summarized description of the Sepam range	selecting the type of Sepam: 100, 1000, 2000
line	PCRED397080EN	characteristics, selection table, connections	installation studies
substation	PCRED397087EN	characteristics, selection table, connections	installation studies
transformer	PCRED397086EN	characteristics, selection table, connections	installation studies
busbars	PCRED397088EN	characteristics, selection table, connections	installation studies
capacitor	PCRED398005EN	characteristics, selection table, connections	installation studies
metering and control	PCRED398025EN	cubicle mounting, description of display setting, commissioning, use	installation, parameter
for customized applications	PCRED398027EN	description of programming resources	making customized programs
overhead/underground	PCRED397090EN	characteristics, selection table, connections	installation studies
testing	3140746A	testing methods	testing methods
metering and protections functions	3140747A	operating principle, characteristics	installation studies, choice of protections, settings
control and monitoring functions	PCRED398004EN	operating principle, characteristics	installation studies, choice
installation, use, commissioning	PCRED398003EN	cubicle mounting instructions	
use and commissioning S25, S35, S36	PCRED398060EN	description of display and TSM 2001 pocket terminal	commissioning, use
Jbus/Modbus communication	3140751A	implementation of communication	programming of the remote control and monitoring system
general characteristics	3140752A	details on characteristics and accessories	installation studies
diagnostic guide	3140758A	diagnosis of Sepam 1000, 2000 faults	use, commissioning

<sup>(1)</sup> This documentation may be procured from your Merlin Gerin correspondent.

<sup>(2)</sup> References:

followed by the letter EN documentation in English, followed by the letter FR for documentation in French, followed by the letter A documentation in English, followed by the letter F for documentation in French.

# Password

---

## Use of the password

The user enters a password via the pocket terminal in order to be able to change parameters and settings.

### Code key

When the user pressed the **code** key, the following menu appears:

```
Enter your
password then
press enter key
```

Type the following on the keypad  
**6543210** (1) and press **enter**.

This is the password for standard Sepams.  
If your Sepam has been customized,  
refer to the documentation provided by your installer.  
To exit this mode, simply:

- press the **code** key
  - wait 2 minutes after activating any key.
- When the pocket terminal is in parameter setting mode, **P1** appears on the top left of the screen.

## Modification of the password

- go to parameter setting mode
- in the **Status** menu, choose the **password** heading using the arrow and press **enter**.

The following window is displayed:

```
PASSWORD
old =
new =
verif. =
```

- enter, one after the other
- the password to be modified in the «old» line <sup>(2)</sup>
- the new password in the «new» and «verif» lines <sup>(3)</sup>
- after each password, press **enter** to go to the next line.

- at the end of the sequence, the following window is displayed:

```
Validate settings
Yes = Enter
No = Clear
```

- press **enter**: the new password is validated.

Please note:

If the passwords entered for «new» and «verif» are different, the following message is displayed:

```
new password
not valid
press "clear"
```

\* If the password is lost, the program logic must be reloaded with the control schemes and settings in order to find the original password.

**N.B.** If you do not want your operating personnel to know the password that gives access to the parameter setting mode, remove this page from the user's documentation.

<sup>(1)</sup> Code by default in standard program logic; with customization, the password is given by the installer.

<sup>(2)</sup> 7 digits are mandatory.

<sup>(3)</sup> 3 digits minimum, 7 digits maximum.



# Commissioning tests

## Testing a Sepam

---

### **Sepam commissioning does not call for individual testing of the metering and protection functions.**

Sepam has been designed and developed to ensure all of the functions:

- protection,
- metering,
- program logic.

Each of the functions has been factory-tested in its entirety. In addition, Sepam has a high performing self-testing system which continually checks function integrity

(e.g. no settings outside the tolerance range, etc.).

The product is ready to use and commissioning has been simplified accordingly.

### **Simple testing of one function ensures the correct operation of the whole group of functions, provided that the product is installed correctly.**

It is therefore sufficient to check the Sepam installation.

Checking relates to:

- parameter setting,
- connection to current and voltage sensors,
- connection of switchgear control and annunciation.

The **commissioning tests** chapter describes the simple, thorough method to be applied for testing.

Individual testing of each protection and control function is no longer essential. However, if the testing of a function proves to be necessary, please refer to the **function tests** section.

This test procedure is used to commission Sepam and check the accuracy of the connections, parameter settings and adjustments. It does not require individual testing of protection functions which have been factory-tested. The use of this test method considerably reduces commissioning time.

## Procedure

### **Set the parameters**

(use the corresponding setting record sheets attached to record parameter and setting values).

- status,
- program logic,
- protection settings.

### **Carry out testing**

Use the test sheet attached which indicates:

- the tests to be performed,
- the test facility connection scheme,
- the expected results (if the test results are not in compliance, look for the cause),
  - parameter setting (status, microswitch setting ...),
  - cabling,
  - etc...
- when a box is checked off , it means that the test has been performed and the results are in compliance.

### **To perform the tests, the following are required:**

- test equipment, see test equipment chapter,
- Sepam 2000 documentation:
  - installation, use and commissioning HV/MV substation,
  - metering and protection functions,
  - control and monitoring functions.

# Test sheets - Setting record sheets

## Contents

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setting record sheets	<b>3/6</b>

# Test sheets - Setting record sheets

## Testing a Sepam

---

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Checking relates to:

- parameter setting,
- connection to current and voltage sensors,
- connection of switchgear control and annunciation.

TEST SHEET		Sepam 2000			
Project : .....		Type of Sepam 2000 <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>  serial number <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>			
Switchboard: .....					
Panel: .....					
<b>Commissioning tests</b>					
Check current and voltage sensor wiring and phase rotation order beforehand.					
Set the status parameters and set the protections according to the <b>setting record sheet</b> .					
type of test		scheme	result	display	
<b>Sepam connected to current sensors only <sup>(1)</sup></b>					
secondary injection of rated current	I1 = 1 or 5 A I2 = 1 or 5 A I3 = 1 or 5 A	<b>B6</b>	primary rated current	I1 = ..... I2 = ..... I3 = .....	<input type="checkbox"/>
<b>Sepam connected to current and voltage sensors</b>					
3-phase secondary injection	rated current (1 or 5 A)	<b>B6</b>	$P = + \frac{3U_n \cdot I_n}{2}$	P = + .....	feeder <input type="checkbox"/>
	rated voltage (Uns)		$Q = + \frac{\sqrt{3}U_n \cdot I_n}{2}$	Q = + .....	
	phase shift $\varphi = -30^\circ$ inductive		$P = - \frac{3U_n \cdot I_n}{2}$	P = - .....	incomer <input type="checkbox"/>
			$Q = - \frac{\sqrt{3}U_n \cdot I_n}{2}$	Q = - .....	
<b>residual current according to assembly</b>					
Σ3CT 3-phase secondary injection in 1 phase	rated current (1 or 5 A)	<b>B6</b>	residual I = 0	Ir = .....	<input type="checkbox"/>
	rated current (1 or 5 A)		residual I = rated I	Ir = .....	<input type="checkbox"/>
CSH primary injection	30 A	<b>B7</b>	28.5 ≤ residual I ≤ 31.5 A	Ir = .....	<input type="checkbox"/>
	0.2 A		0.18 ≤ residual I ≤ 0.22 A	Ir = .....	<input type="checkbox"/>
CT secondary injection	rated current (1 or 5 A)	<b>B7</b>	residual I = rated I	Ir = .....	<input type="checkbox"/>
<b>residual voltage according to assembly</b>					
VT in broken delta single-phase secondary injection	$\frac{U_{ns}}{\sqrt{3}}$	<b>B7</b>	residual voltage = phase voltage	Vo = .....	<input type="checkbox"/>
VT in star 3-phase secondary injection	$\frac{U_{ns}}{\sqrt{3}}$	<b>B6</b>	residual voltage = phase voltage	Vo = .....	<input type="checkbox"/>
<b>logic input / output wiring</b>					
check the conformity of logic input and output connection					<input type="checkbox"/>
<b>circuit breaker/contactator program logic</b>					
closing control	by closing button		closing of device		<input type="checkbox"/>
tripping control	by tripping button		opening of device		<input type="checkbox"/>
<b>pilot wire test (standard Sepam)</b>					
test the link (KP18)			(message) RECEIVE.BI (on upstream Sepam)		<input type="checkbox"/>
<b>Tests carried out on:</b> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>			<b>Signature</b>		<b>Signature</b>
<b>by:</b> _____					
<b>Comments:</b> _____					

<sup>(1)</sup> see "Testing" documentation

**Program logic parameters**

KP	(0 or 1)	comments		KP	(0 or 1)	comments	
KP1	<input type="checkbox"/>		<input type="checkbox"/>	KP33	<input type="checkbox"/>		<input type="checkbox"/>
KP2	<input type="checkbox"/>		<input type="checkbox"/>	KP34	<input type="checkbox"/>		<input type="checkbox"/>
KP3	<input type="checkbox"/>		<input type="checkbox"/>	KP35	<input type="checkbox"/>		<input type="checkbox"/>
KP4	<input type="checkbox"/>		<input type="checkbox"/>	KP36	<input type="checkbox"/>		<input type="checkbox"/>
KP5	<input type="checkbox"/>		<input type="checkbox"/>	KP37	<input type="checkbox"/>		<input type="checkbox"/>
KP6	<input type="checkbox"/>		<input type="checkbox"/>	KP38	<input type="checkbox"/>		<input type="checkbox"/>
KP7	<input type="checkbox"/>		<input type="checkbox"/>	KP39	<input type="checkbox"/>		<input type="checkbox"/>
KP8	<input type="checkbox"/>		<input type="checkbox"/>	KP40	<input type="checkbox"/>		<input type="checkbox"/>
KP9	<input type="checkbox"/>		<input type="checkbox"/>	KP41	<input type="checkbox"/>		<input type="checkbox"/>
KP10	<input type="checkbox"/>		<input type="checkbox"/>	KP42	<input type="checkbox"/>		<input type="checkbox"/>
KP11	<input type="checkbox"/>		<input type="checkbox"/>	KP43	<input type="checkbox"/>		<input type="checkbox"/>
KP12	<input type="checkbox"/>		<input type="checkbox"/>	KP44	<input type="checkbox"/>		<input type="checkbox"/>
KP13	<input type="checkbox"/>		<input type="checkbox"/>	KP45	<input type="checkbox"/>		<input type="checkbox"/>
KP14	<input type="checkbox"/>		<input type="checkbox"/>	KP46	<input type="checkbox"/>		<input type="checkbox"/>
KP15	<input type="checkbox"/>		<input type="checkbox"/>	KP47	<input type="checkbox"/>		<input type="checkbox"/>
KP16	<input type="checkbox"/>		<input type="checkbox"/>	KP48	<input type="checkbox"/>		<input type="checkbox"/>
KP17	<input type="checkbox"/>		<input type="checkbox"/>	KP49	<input type="checkbox"/>		<input type="checkbox"/>
KP18	<input type="checkbox"/>		<input type="checkbox"/>	KP50	<input type="checkbox"/>		<input type="checkbox"/>
KP19	<input type="checkbox"/>		<input type="checkbox"/>	KP51	<input type="checkbox"/>		<input type="checkbox"/>
KP20	<input type="checkbox"/>		<input type="checkbox"/>	KP52	<input type="checkbox"/>		<input type="checkbox"/>
KP21	<input type="checkbox"/>		<input type="checkbox"/>	KP53	<input type="checkbox"/>		<input type="checkbox"/>
KP22	<input type="checkbox"/>		<input type="checkbox"/>	KP54	<input type="checkbox"/>		<input type="checkbox"/>
KP23	<input type="checkbox"/>		<input type="checkbox"/>	KP55	<input type="checkbox"/>		<input type="checkbox"/>
KP24	<input type="checkbox"/>		<input type="checkbox"/>	KP56	<input type="checkbox"/>		<input type="checkbox"/>
KP25	<input type="checkbox"/>		<input type="checkbox"/>	KP57	<input type="checkbox"/>		<input type="checkbox"/>
KP26	<input type="checkbox"/>		<input type="checkbox"/>	KP58	<input type="checkbox"/>		<input type="checkbox"/>
KP27	<input type="checkbox"/>		<input type="checkbox"/>	KP59	<input type="checkbox"/>		<input type="checkbox"/>
KP28	<input type="checkbox"/>		<input type="checkbox"/>	KP60	<input type="checkbox"/>		<input type="checkbox"/>
KP29	<input type="checkbox"/>		<input type="checkbox"/>	KP61	<input type="checkbox"/>		<input type="checkbox"/>
KP30	<input type="checkbox"/>		<input type="checkbox"/>	KP62	<input type="checkbox"/>		<input type="checkbox"/>
KP31	<input type="checkbox"/>		<input type="checkbox"/>	KP63	<input type="checkbox"/>		<input type="checkbox"/>
KP32	<input type="checkbox"/>		<input type="checkbox"/>	KP64	<input type="checkbox"/>		<input type="checkbox"/>

**Program logic parameters (cont'd)**

time delay (value)	comments		time delay (value)	comments	
T1	_____ s _____	<input type="checkbox"/>	T31	_____ s _____	<input type="checkbox"/>
T2	_____ s _____	<input type="checkbox"/>	T32	_____ s _____	<input type="checkbox"/>
T3	_____ s _____	<input type="checkbox"/>	T33	_____ s _____	<input type="checkbox"/>
T4	_____ s _____	<input type="checkbox"/>	T34	_____ s _____	<input type="checkbox"/>
T5	_____ s _____	<input type="checkbox"/>	T35	_____ s _____	<input type="checkbox"/>
T6	_____ s _____	<input type="checkbox"/>	T36	_____ s _____	<input type="checkbox"/>
T7	_____ s _____	<input type="checkbox"/>	T37	_____ s _____	<input type="checkbox"/>
T8	_____ s _____	<input type="checkbox"/>	T38	_____ s _____	<input type="checkbox"/>
T9	_____ s _____	<input type="checkbox"/>	T39	_____ s _____	<input type="checkbox"/>
T10	_____ s _____	<input type="checkbox"/>	T40	_____ s _____	<input type="checkbox"/>
T11	_____ s _____	<input type="checkbox"/>	T41	_____ s _____	<input type="checkbox"/>
T12	_____ s _____	<input type="checkbox"/>	T42	_____ s _____	<input type="checkbox"/>
T13	_____ s _____	<input type="checkbox"/>	T43	_____ s _____	<input type="checkbox"/>
T14	_____ s _____	<input type="checkbox"/>	T44	_____ s _____	<input type="checkbox"/>
T15	_____ s _____	<input type="checkbox"/>	T45	_____ s _____	<input type="checkbox"/>
T16	_____ s _____	<input type="checkbox"/>	T46	_____ s _____	<input type="checkbox"/>
T17	_____ s _____	<input type="checkbox"/>	T47	_____ s _____	<input type="checkbox"/>
T18	_____ s _____	<input type="checkbox"/>	T48	_____ s _____	<input type="checkbox"/>
T19	_____ s _____	<input type="checkbox"/>	T49	_____ s _____	<input type="checkbox"/>
T20	_____ s _____	<input type="checkbox"/>	T50	_____ s _____	<input type="checkbox"/>
T21	_____ s _____	<input type="checkbox"/>	T51	_____ s _____	<input type="checkbox"/>
T22	_____ s _____	<input type="checkbox"/>	T52	_____ s _____	<input type="checkbox"/>
T23	_____ s _____	<input type="checkbox"/>	T53	_____ s _____	<input type="checkbox"/>
T24	_____ s _____	<input type="checkbox"/>	T54	_____ s _____	<input type="checkbox"/>
T25	_____ s _____	<input type="checkbox"/>	T55	_____ s _____	<input type="checkbox"/>
T26	_____ s _____	<input type="checkbox"/>	T56	_____ s _____	<input type="checkbox"/>
T27	_____ s _____	<input type="checkbox"/>	T57	_____ s _____	<input type="checkbox"/>
T28	_____ s _____	<input type="checkbox"/>	T58	_____ s _____	<input type="checkbox"/>
T29	_____ s _____	<input type="checkbox"/>	T59	_____ s _____	<input type="checkbox"/>
T30	_____ s _____	<input type="checkbox"/>	T60	_____ s _____	<input type="checkbox"/>

tick off the box when the setting is done

SETTING RECORD SHEET			Sepam 2000 Line			
Project: .....			Type of Sepam 2000 <b>L</b> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			
Switchboard: .....			serial number <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			
Panel: .....						
<b>Status menu parameters</b>						
menu	name	function				
frequency	Fn	network frequency	<input type="checkbox"/> 50 Hz	<input type="checkbox"/> 60 Hz		
phase CT ratio			board 2 (ECM)			
	In	CT rating (in Amps)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> A	<input type="checkbox"/> kA		
	Ib	basis current (in Amps)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> A	<input type="checkbox"/> kA		
	number	number of current sensors	<input type="checkbox"/> 1-I3	<input type="checkbox"/> I1-I2-I3		
Io sensor			board 2 (ECM)			
	I <sub>no</sub>	residual current measurement	<input type="checkbox"/> Sum 3I ph for CT			
			<input type="checkbox"/> 2 A core bal. CT	<input type="checkbox"/> 30 A core bal. CT		
			<input type="checkbox"/> CT + CSH 30 for S36	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> A	<input type="checkbox"/> kA	
max. demand interval	interval	max. demand integration time	<input type="checkbox"/> 5 mn	<input type="checkbox"/> 10 mn	<input type="checkbox"/> 15 mn	<input type="checkbox"/> 30 mn
			<input type="checkbox"/> 60 mn			
VT ratio			board 3 (3U + Vo)		board 4 (3U + Vo)	
	number	number of wired VTs	<input type="checkbox"/> V <input type="checkbox"/> 1U <input type="checkbox"/> 3U S36	<input type="checkbox"/> V <input type="checkbox"/> 1U <input type="checkbox"/> 3U S36	<input type="checkbox"/> U21 <input type="checkbox"/> U21-U32 <input type="checkbox"/> 3U S35	<input type="checkbox"/> U21 <input type="checkbox"/> U21-U32 <input type="checkbox"/> 3U S35
	Unp	rated VT primary voltage	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> volts	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> volts	<input type="checkbox"/> kilovolts	
	Uns	rated VT secondary voltage	<input type="checkbox"/> 100 V <input type="checkbox"/> 110 V	<input type="checkbox"/> 100 V <input type="checkbox"/> 110 V	<input type="checkbox"/> 115 V <input type="checkbox"/> 120 V	<input type="checkbox"/> 115 V <input type="checkbox"/> 120 V
	V <sub>nso</sub>	type of residual voltage measurement	<input type="checkbox"/> Sum 3V	<input type="checkbox"/> Sum 3V	<input type="checkbox"/> Uns/√3	<input type="checkbox"/> Uns/3
power flow sense	incomer feeder	reverses the signs of power and energy measurements	<input type="checkbox"/> Incomer = cables to busbars			
			<input type="checkbox"/> Feeder = busbars to cables			
communication	bauds	transmission speed	<input type="checkbox"/> 300	<input type="checkbox"/> 600	<input type="checkbox"/> 1200	<input type="checkbox"/> 2400
			<input type="checkbox"/> 4800	<input type="checkbox"/> 9600	<input type="checkbox"/> 19200	<input type="checkbox"/> 38400
	address	Sepam station number in network	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			
	parity	transmission format	<input type="checkbox"/> even	<input type="checkbox"/> odd	<input type="checkbox"/> no parity	
time tagging	synchro	type of synchronization used	<input type="checkbox"/> via network		<input type="checkbox"/> via input I11	
					<input type="checkbox"/> via input I21	
		events	KTS1 to 8	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
			KTS9 to 16	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
		N.B.:	KTS17 to 24	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
		For each event,	KTS25 to 32	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
		choose 0 or 1	KTS33 to 40	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
		0 = not time-tagged	KTS41 to 48	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
		1 = time-tagged	KTS49 to 56	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
		all events are set to 0 by default	KTS57 to 64	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
			I1 I2	<input type="checkbox"/> <input type="checkbox"/>		
			I11 to I18	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
		KTS33 to 64 for S36 only	I21 to I28	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
			I31 to I38	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		





# Sepam 2000 Line

function	identification	setting							
overcurrent		curve		Is		T			
	F011		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	F012		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	F013		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	F014		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
earth fault		curve		Iso		T			
	F081		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	F082		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	F083		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	F084		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
undervoltage		Us		T					
	F321-341-361		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
directional overcurrent		curve		$\theta$	Is		T		
	F521		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
directional earth fault		$\theta_0$		Iso		T			
	F501		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
overvoltage		Us		T					
	F301		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
neutral voltage displacement		Vso		T					
	F391		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
breaker failure	F981	Is	T1	T2	I tri		I 1-ph		
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		I 2-ph	I 3-ph						
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					
synchro-check	F171 or F181	dUs	dFs	d $\phi$ s	Us high		Us low		
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		mode	Ta						
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					

tick off the box when the setting is done

Settings made on:

by: \_\_\_\_\_



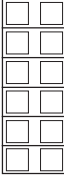


Signature

Signature

Comments: \_\_\_\_\_



**Status menu parameters** (cont'd)

menu	name	function		
Microswitch settings	voltage board		 SW1	<input type="checkbox"/>
	current board	board 2		
		board 3		
		CT (ECM 1)	CT (ECM 2)	
		 SW2	 SW2	<input type="checkbox"/>
		 SW1	 SW1	<input type="checkbox"/>

put an X in the box to indicate switch setting  
e.g. switch set to right

**Sepam 2000 Transformer program logic parameters**

\_\_\_\_\_

KP	0 or 1	KP	0 or 1
KP1	<input type="checkbox"/> reclosing / dead zone enabled / disabled	KP10	<input type="checkbox"/> shunt-trip/undervoltage MV tripping
KP2	<input type="checkbox"/> adjacent breaker tripping enabled/disabled	KP33	<input type="checkbox"/> current check bypass enabled/disabled
KP3	<input type="checkbox"/> reclosing / dead zone enabled/disabled	KP34	<input type="checkbox"/> inst. adjacent breaker tripping enabled/disabled
KP4	<input type="checkbox"/> external protection tripping with / without through current	KP38	<input type="checkbox"/> remote setting active / inactive
KP5	<input type="checkbox"/> tank earth leakage with current flow less than / greater than 0.2 In	KP49	<input type="checkbox"/> fault counter reset
KP6	<input type="checkbox"/> neutral set point 1 with current flow less than / greater than 0.2 In	KP50	<input type="checkbox"/> disturbance recorder record storage
KP7	<input type="checkbox"/> neutral set point 2 with current flow less than / greater than 0.2 In	KP51	<input type="checkbox"/> automatic disturbance recorder triggering
KP8	<input type="checkbox"/> MV tripping with/without through current	KP52	<input type="checkbox"/> manual disturbance recorder triggering
KP9	<input type="checkbox"/> normal/fail-safe blocking input receipt	KP58	<input type="checkbox"/> synchro-check with acknowledgment of voltage absent
		KP59	<input type="checkbox"/> synchro-check without acknowledgment of voltage absent
		KP60	<input type="checkbox"/> breaker closing downgraded operation
		KP61	<input type="checkbox"/> breaker opening downgraded operation
time delay (value)		time delay (value)	
T1	<input type="checkbox"/> _____ s tripping pulse	T3	<input type="checkbox"/> _____ s synchro-check enabled with downgraded operation
T2	<input type="checkbox"/> _____ s closing pulse	T4	<input type="checkbox"/> _____ s SSL fault time delay



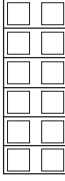

### Sepam 2000 Transformer

function	identification	setting									
thermal overload		coeff	T1 and T2		Es1 alarm		Es2 trip				
	F431	0		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			
overcurrent		curve		Is		T					
	F011		<input type="checkbox"/>		<input type="checkbox"/>			<input type="checkbox"/>			
	F012		<input type="checkbox"/>		<input type="checkbox"/>			<input type="checkbox"/>			
	F013		<input type="checkbox"/>		<input type="checkbox"/>			<input type="checkbox"/>			
	F014		<input type="checkbox"/>		<input type="checkbox"/>			<input type="checkbox"/>			
earth fault		curve		Iso		T					
	F081		<input type="checkbox"/>		<input type="checkbox"/>			<input type="checkbox"/>			
	F082		<input type="checkbox"/>		<input type="checkbox"/>			<input type="checkbox"/>			
	F083		<input type="checkbox"/>		<input type="checkbox"/>			<input type="checkbox"/>			
	F084		<input type="checkbox"/>		<input type="checkbox"/>			<input type="checkbox"/>			
tank frame leakage		curve		Is		T					
	F021		<input type="checkbox"/>		<input type="checkbox"/>			<input type="checkbox"/>			
neutral		curve		Iso		T					
	F091		<input type="checkbox"/>		<input type="checkbox"/>			<input type="checkbox"/>			
	F092		<input type="checkbox"/>		<input type="checkbox"/>			<input type="checkbox"/>			
breaker failure	F981	Is		T1		T2		I tri		I 1-ph	
		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
		I 2-ph		I 3-ph							
		<input type="checkbox"/>		<input type="checkbox"/>							
synchro-check	F171	dUs		dFs		dφs		Us high		Us low	
		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
		mode		Ta							
		<input type="checkbox"/>		<input type="checkbox"/>							

tick off the box when the setting is done

<b>Settings made on:</b> <input style="width: 100%; height: 15px;" type="text"/> <b>by:</b> _____ _____	<b>Signature</b>	<b>Signature</b>
<b>Comments:</b> _____ _____		

SETTING RECORD SHEET			Sepam 2000 HV Busbars					
Project: .....			Type of Sepam 2000 <b>B</b> [ ] [ ] [ ]					
Switchboard: .....			serial number                    [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]					
Panel: .....								
<b>Status menu parameters</b>								
menu	name	function						
frequency	Fn	network frequency	<input type="checkbox"/> 50 Hz	<input type="checkbox"/> 60 Hz				
phase CT ratio			board 2 (ECM)					
	In	CT rating (in Amps)	[ ] [ ] [ ] [ ]	<input type="checkbox"/> A	<input type="checkbox"/> kA	<input type="checkbox"/>		
	Ib	basis current (in Amps)	[ ] [ ] [ ] [ ]	<input type="checkbox"/> A	<input type="checkbox"/> kA	<input type="checkbox"/>		
	number	number of current sensors		<input type="checkbox"/> I1-I3	<input type="checkbox"/> I1-I2-I3	<input type="checkbox"/>		
Io sensor			board 2 (ECM)					
	Ino	residual current measurement	<input type="checkbox"/> Sum 3I ph for CT					
			<input type="checkbox"/> 2 A core bal. CT	<input type="checkbox"/> 30 A core bal. CT				
			<input type="checkbox"/> CT + CSH 30 for S36	[ ] [ ] [ ] [ ]	<input type="checkbox"/> A	<input type="checkbox"/> kA		
			<input type="checkbox"/> [ ] [ ] [ ] [ ]	<input type="checkbox"/> A	<input type="checkbox"/> kA for S35			
max. demand interval	interval	max. demand integration time	<input type="checkbox"/> 5 mn	<input type="checkbox"/> 10 mn	<input type="checkbox"/> 15 mn	<input type="checkbox"/> 30 mn		
			<input type="checkbox"/> 60 mn					
VT ratio			board 3 (3U + Vo)		board 4 (3U + Vo)			
	number	number of wired VTs	<input type="checkbox"/> V	<input type="checkbox"/> 1U	<input type="checkbox"/> 3U S36	<input type="checkbox"/> V	<input type="checkbox"/> 1U	<input type="checkbox"/> 3U S36
			<input type="checkbox"/> U21	<input type="checkbox"/> U21-U32	<input type="checkbox"/> 3U S35	<input type="checkbox"/> U21	<input type="checkbox"/> U21-U32	<input type="checkbox"/> 3U S35
	Unp	rated VT primary voltage	[ ] [ ] [ ] [ ]	<input type="checkbox"/> volts				
				<input type="checkbox"/> kilovolts				
Uns	rated VT secondary voltage	<input type="checkbox"/> 100 V	<input type="checkbox"/> 110 V					
		<input type="checkbox"/> 115 V	<input type="checkbox"/> 120 V					
Vnso	type of residual voltage measurement	<input type="checkbox"/> Sum 3V				<input type="checkbox"/> Sum 3V		
		<input type="checkbox"/> Uns/√3	<input type="checkbox"/> Uns/3				<input type="checkbox"/> Uns/√3	<input type="checkbox"/> Uns/3
power flow sense	incomer feeder	reverses the signs of power and energy measurements	<input type="checkbox"/> Incomer = cables to busbars					
			<input type="checkbox"/> Feeder = busbars to cables					
communication	bauds	transmission speed	<input type="checkbox"/> 300	<input type="checkbox"/> 600	<input type="checkbox"/> 1200	<input type="checkbox"/> 2400		
			<input type="checkbox"/> 4800	<input type="checkbox"/> 9600	<input type="checkbox"/> 19200	<input type="checkbox"/> 38400		
	address	Sepam station number in network	[ ] [ ] [ ] [ ]					
	parity	transmission format	<input type="checkbox"/> even	<input type="checkbox"/> odd	<input type="checkbox"/> no parity			
time tagging	synchro	type of synchronization used	<input type="checkbox"/> via network		<input type="checkbox"/> via input I11			
					<input type="checkbox"/> via input I21			
		events	KTS1 to 8	[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]				
			KTS9 to 16	[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]				
	N.B.	KTS17 to 24	[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]					
	For each event, choose 0 or 1	KTS25 to 32	[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]					
	0 = not time-tagged	KTS33 to 40	[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]					
	1 = time-tagged	KTS41 to 48	[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]					
	all events are set to 0 by default	KTS49 to 56	[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]					
		KTS57 to 64	[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]					
		I1 I2	[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]					
		I11 to I18	[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]					
		I21 to I28	[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]					
		I31 to I38	[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]					

Status menu parameters (cont'd)				
menu	name	function	board 3 (3U + Vo)	board 4 (3U + Vo)
Microswitch settings	voltage board		 SW1	 SW1 <input type="checkbox"/>
	current board		board 2	
			CT (ECM 1)	 SW2 <input type="checkbox"/>
<div style="border: 1px solid black; padding: 5px; width: fit-content;">           put an X in the box to indicate switch setting            e.g. switch set to right    <input type="checkbox"/> <input checked="" type="checkbox"/> </div>			 SW1	<input type="checkbox"/>

Sepam 2000 HV Busbars program logic parameters <span style="float: right;"> _ _ _ _ _ _ _ </span>				
KP 0 or 1		KP 0 or 1		
KP1 <input type="checkbox"/> reclosing / dead zone enabled/disabled	<input type="checkbox"/>	KP49 <input type="checkbox"/> fault counter reset	<input type="checkbox"/>	
KP2 <input type="checkbox"/> adjacent breaker tripping enabled/disabled	<input type="checkbox"/>	KP50 <input type="checkbox"/> disturbance recorder record storage	<input type="checkbox"/>	
KP3 <input type="checkbox"/> reclosing / dead zone enabled / disabled	<input type="checkbox"/>	KP51 <input type="checkbox"/> automatic disturbance recorder triggering	<input type="checkbox"/>	
KP4 <input type="checkbox"/> external protection tripping with/without through current	<input type="checkbox"/>	KP52 <input type="checkbox"/> manual disturbance recorder triggering	<input type="checkbox"/>	
KP5 <input type="checkbox"/> synchronization for one circuit breaker / for several circuit breakers	<input type="checkbox"/>	KP54 <input type="checkbox"/> choice of U/F load shedding set point 1	<input type="checkbox"/>	
KP33 <input type="checkbox"/> current check bypass enabled/disabled	<input type="checkbox"/>	KP55 <input type="checkbox"/> choice of U/F load shedding set point 2	<input type="checkbox"/>	
KP34 <input type="checkbox"/> inst. adjacent breaker tripping enabled/disabled	<input type="checkbox"/>	KP56 <input type="checkbox"/> choice of U/F load shedding set point 3	<input type="checkbox"/>	
KP38 <input type="checkbox"/> remote setting active / inactive	<input type="checkbox"/>	KP57 <input type="checkbox"/> choice of U/F load shedding set point 4	<input type="checkbox"/>	
		KP60 <input type="checkbox"/> breaker closing downgraded operation	<input type="checkbox"/>	
		KP61 <input type="checkbox"/> breaker opening downgraded operation	<input type="checkbox"/>	
time delay (value)		time delay (value)		
T1 <input type="text"/> s tripping pulse	<input type="checkbox"/>	T3 <input type="text"/> s enable synchro-check in downgraded operation	<input type="checkbox"/>	
T2 <input type="text"/> s closing pulse	<input type="checkbox"/>	T4 <input type="text"/> s synchronism measurement OK pulse	<input type="checkbox"/>	

# Sepam 2000 HV Busbars



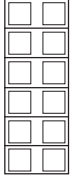
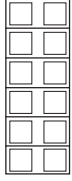



function	identification	setting					
overcurrent		curve		Is		T	
	F011	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	F012	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	F013	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	F014	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
earth fault		curve		Iso		T	
	F081	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	F082	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	F083	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	F084	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
undervoltage		Us			T		
	F321-341-361	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	F241-331-371	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
breaker failure	F981	Is	T1	T2	I tri	I 1-ph	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		I 2-ph	I 3-ph				
		<input type="checkbox"/>	<input type="checkbox"/>				
overvoltage		Us			T		
	F301	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	F311	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
underfrequency		Fs			T		
	F561	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	F562	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	F563	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	F564	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
synchro-check	F171 or F181	dUs	dFs	dφs	Us high	Us low	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		mode	Ta				
<input type="checkbox"/>	<input type="checkbox"/>						

tick off the box when the setting is done

<b>Settings made on:</b> <input type="text"/>	<b>Signature</b>	<b>Signature</b>
<b>by:</b> <input type="text"/>		
<b>Comments:</b> <input type="text"/>		

SETTING RECORD SHEET			Sepam 2000 MV Busbars		
Project: .....			Type of Sepam 2000 <b>B</b> [ ] [ ] [ ]		
Switchboard: .....			serial number                    [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]		
Panel: .....					
<b>Status menu parameters</b>					
menu	name	function			
frequency	Fn	network frequency	<input type="checkbox"/> 50 Hz <input type="checkbox"/> 60 Hz		<input type="checkbox"/>
phase CT ratio			board 2 (ECM)		
	In	CT rating or CSP (in Amps)	[ ] [ ] [ ] [ ] <input type="checkbox"/> A <input type="checkbox"/> kA		<input type="checkbox"/>
	Ib	basis current (in Amps)	[ ] [ ] [ ] [ ] <input type="checkbox"/> A <input type="checkbox"/> kA		<input type="checkbox"/>
	number	number of current sensors	<input type="checkbox"/> I1-I3 <input type="checkbox"/> I1-I2-I3		<input type="checkbox"/>
Io sensor			board 2 (ECM ou ECA)		
	Ino	residual current measurement	<input type="checkbox"/> Sum 3I ph for CT <input type="checkbox"/> Sum1 3I or Sum2 3I for CT <input type="checkbox"/> 2 A core bal. CT <input type="checkbox"/> 30 A core bal. CT <input type="checkbox"/> CT + CSH 30 for S36 [ ] [ ] [ ] [ ] <input type="checkbox"/> A <input type="checkbox"/> kA		<input type="checkbox"/>
max. demand interval	interval	max. demand integration time	<input type="checkbox"/> 5 mn <input type="checkbox"/> 10 mn <input type="checkbox"/> 15 mn <input type="checkbox"/> 30 mn <input type="checkbox"/> 60 mn		<input type="checkbox"/>
VT ratio			board 3 (3U + Vo)		board 4 (3U + Vo)
	number	number of wired VTs	<input type="checkbox"/> V <input type="checkbox"/> 1U <input type="checkbox"/> 3U    S36 <input type="checkbox"/> U21 <input type="checkbox"/> U21-U32 <input type="checkbox"/> 3U    S35		<input type="checkbox"/> V <input type="checkbox"/> 1U <input type="checkbox"/> 3U    S36 <input type="checkbox"/> U21 <input type="checkbox"/> U21-U32 <input type="checkbox"/> 3U    S35
	Unp	rated VT primary voltage	[ ] [ ] [ ] [ ] <input type="checkbox"/> volts <input type="checkbox"/> kilovolts		[ ] [ ] [ ] [ ] <input type="checkbox"/> volts <input type="checkbox"/> kilovolts
	Uns	rated VT secondary voltage	<input type="checkbox"/> 100 V <input type="checkbox"/> 110 V <input type="checkbox"/> 115 V <input type="checkbox"/> 120 V		<input type="checkbox"/> 100 V <input type="checkbox"/> 110 V <input type="checkbox"/> 115 V <input type="checkbox"/> 120 V
	Vnso	type of residual voltage measurement	<input type="checkbox"/> Sum 3V <input type="checkbox"/> Uns/√3 <input type="checkbox"/> Uns/3		<input type="checkbox"/> Sum 3V <input type="checkbox"/> Uns/√3 <input type="checkbox"/> Uns/3
power flow sense	incomer feeder	reverses the signs of power and energy measurements	<input type="checkbox"/> Incomer = cables to busbars <input type="checkbox"/> Feeder = busbars to cables		<input type="checkbox"/>
communication	bauds	transmission speed	<input type="checkbox"/> 300 <input type="checkbox"/> 600 <input type="checkbox"/> 1200 <input type="checkbox"/> 2400 <input type="checkbox"/> 4800 <input type="checkbox"/> 9600 <input type="checkbox"/> 19200 <input type="checkbox"/> 38400		<input type="checkbox"/>
	address	Sepam station number in network	[ ] [ ] [ ] [ ]		<input type="checkbox"/>
	parity	transmission format	<input type="checkbox"/> even <input type="checkbox"/> odd <input type="checkbox"/> no parity		<input type="checkbox"/>
time tagging	synchro	type of synchronization used	<input type="checkbox"/> via network <input type="checkbox"/> via input I11 <input type="checkbox"/> via input I21		<input type="checkbox"/>
		events	KTS1 to 8                    [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] KTS9 to 16                [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] N.B.                        KTS17 to 24                [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] For each event,        KTS25 to 32                [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] choose 0 or 1            KTS33 to 40                [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] 0 = not time-tagged    KTS41 to 48                [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] 1 = time-tagged        KTS49 to 56                [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] all events are set      KTS57 to 64                [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] to 0 by default        I1 I2                            [ ] [ ] [ ] [ ] I11 to I18                [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] KTS33 to 64 for S36    I21 to I28                [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] only                        I31 to I38                [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]		



Status menu parameters (cont'd)				
menu	name	function	board 3 (3U + Vo)	board 4 (3U + Vo)
Microswitch settings	voltage board		 SW1	 SW1 <input type="checkbox"/>
	current board		board 2 CT (ECM 1)  SW2 CSP (ECA)  SW2   SW1  SW1	<input type="checkbox"/>
<div style="border: 1px solid black; padding: 5px; width: fit-content;">           put an X in the box to indicate switch setting            e.g. switch set to right   </div>				

### Sepam 2000 MV Busbars program logic parameters

\_\_\_\_\_

KP	0 or 1	KP	0 or 1
KP1	<input type="checkbox"/> shunt-trip / undervoltage release coil	KP38	<input type="checkbox"/> remote setting active / inactive
KP4	<input type="checkbox"/> external protection tripping by N/O or N/C contact	KP49	<input type="checkbox"/> fault counter reset
KP5	<input type="checkbox"/> enable circuit breaker closed or automatic transfert	KP50	<input type="checkbox"/> disturbance recorder record storage
KP9	<input type="checkbox"/> normal/fail-safe blocking input receipt	KP51	<input type="checkbox"/> automatic disturbance recorder triggering
KP10	<input type="checkbox"/> normal/fail-safe blocking input transmission	KP52	<input type="checkbox"/> manual disturbance recorder triggering
KP17	<input type="checkbox"/> command not executed display	KP53	<input type="checkbox"/> operation counter reset
KP18	<input type="checkbox"/> pilot wire test	KP58	<input type="checkbox"/> synchro-check with acknowledgment of voltage absent
		KP59	<input type="checkbox"/> synchro-check without acknowledgment of voltage absent
time delay (value)		time delay (value)	
T1	<input type="checkbox"/> _____ s recovery of open/closed information upon change in device position	T5	<input type="checkbox"/> _____ s tripping pulse via remote control
T2	<input type="checkbox"/> _____ s SSL fault	T6	<input type="checkbox"/> _____ s closing pulse via remote control
T3	<input type="checkbox"/> _____ s blocking input transmission inhibited	T7	<input type="checkbox"/> _____ s synchro-check enabled
		T8	<input type="checkbox"/> _____ s minimum synchronization pulse OK


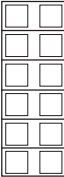
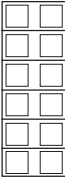



## Sepam 2000 MV Busbars

function	identification	setting									
overcurrent		curve		Is		T					
	F011		<input type="checkbox"/>		<input type="checkbox"/>				<input type="checkbox"/>		
	F012		<input type="checkbox"/>		<input type="checkbox"/>				<input type="checkbox"/>		
	F013		<input type="checkbox"/>		<input type="checkbox"/>				<input type="checkbox"/>		
	F014		<input type="checkbox"/>		<input type="checkbox"/>				<input type="checkbox"/>		
earth fault		earth fault		Iso		T					
	F081		<input type="checkbox"/>		<input type="checkbox"/>				<input type="checkbox"/>		
	F082		<input type="checkbox"/>		<input type="checkbox"/>				<input type="checkbox"/>		
	F083		<input type="checkbox"/>		<input type="checkbox"/>				<input type="checkbox"/>		
	F084		<input type="checkbox"/>		<input type="checkbox"/>				<input type="checkbox"/>		
undercurrent		Us			T						
	F321-341-361			<input type="checkbox"/>					<input type="checkbox"/>		
	F322-342-362			<input type="checkbox"/>					<input type="checkbox"/>		
	F241-331-371			<input type="checkbox"/>					<input type="checkbox"/>		
	F242-332-372			<input type="checkbox"/>					<input type="checkbox"/>		
remanent undervoltage		Us			T						
	F351			<input type="checkbox"/>					<input type="checkbox"/>		
	F251			<input type="checkbox"/>					<input type="checkbox"/>		
overvoltage		Us			T						
	F301			<input type="checkbox"/>					<input type="checkbox"/>		
	F302			<input type="checkbox"/>					<input type="checkbox"/>		
	F311			<input type="checkbox"/>					<input type="checkbox"/>		
	F312			<input type="checkbox"/>					<input type="checkbox"/>		
synchro-check	F181	dUs		dFs		dps		Us haut		Us bas	
			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		mode		Ta							
			<input type="checkbox"/>		<input type="checkbox"/>						

tick off the box when the setting is done

<b>Setting made on:</b> <span style="border-bottom: 1px solid black; display: inline-block; width: 150px; margin-left: 10px;"></span> <b>by:</b> <span style="border-bottom: 1px solid black; display: inline-block; width: 450px; margin-left: 10px;"></span>	<b>Signature</b>	<b>Signature</b>
<b>Comments:</b> <span style="border-bottom: 1px solid black; display: inline-block; width: 800px; margin-left: 10px;"></span>		



Status menu parameters (cont'd)			
menu	name	function	
Microswitch settings	voltage board	 SW1 <input type="checkbox"/>	
	current board	board 2	
		CT (ECM 1)	CSP (ECA)
		 SW2 <input type="checkbox"/>	 SW2 <input type="checkbox"/>
<div style="border: 1px solid black; padding: 5px; width: fit-content;">           put an X in the box to indicate switch setting            e.g. switch set to right     </div>		 SW1 <input type="checkbox"/>	 SW1 <input type="checkbox"/>

**Sepam 2000 Substation program logic parameters** |\_|\_|\_|\_|\_|\_|\_|\_|

KP 0 or 1		KP 0 or 1	
KP1 <input type="checkbox"/> shunt-trip / undervoltage release coil	<input type="checkbox"/>	KP11 <input type="checkbox"/> external protection with/without through current	<input type="checkbox"/>
KP2 <input type="checkbox"/> breaker failure protection enabled/disabled	<input type="checkbox"/>	KP17 <input type="checkbox"/> command not executed display	<input type="checkbox"/>
KP3 <input type="checkbox"/> current check bypass enabled/disabled	<input type="checkbox"/>	KP18 <input type="checkbox"/> pilot wire test	<input type="checkbox"/>
KP4 <input type="checkbox"/> external protection tripping by N/O or N/C contact	<input type="checkbox"/>	KP33 <input type="checkbox"/> directional phase 1/3 / 2/3	<input type="checkbox"/>
KP5 <input type="checkbox"/> HV tripping by N/O or N/C contact	<input type="checkbox"/>	KP38 <input type="checkbox"/> remote setting active / inactive	<input type="checkbox"/>
KP6 <input type="checkbox"/> HV breaker tripping by N/O or N/C contact	<input type="checkbox"/>	KP49 <input type="checkbox"/> fault counter reset	<input type="checkbox"/>
KP7 <input type="checkbox"/> coupling breaker tripping by N/O or N/C contact	<input type="checkbox"/>	KP50 <input type="checkbox"/> disturbance recorder record storage	<input type="checkbox"/>
KP9 <input type="checkbox"/> normal/fail-safe blocking input receipt	<input type="checkbox"/>	KP51 <input type="checkbox"/> automatic disturbance recorder triggering	<input type="checkbox"/>
KP10 <input type="checkbox"/> normal/fail-safe blocking input transmission	<input type="checkbox"/>	KP52 <input type="checkbox"/> manual disturbance recorder triggering	<input type="checkbox"/>
		KP53 <input type="checkbox"/> operation counter reset	<input type="checkbox"/>

time delay (value)		time delay (value)	
T1 <input type="checkbox"/> <input type="text" value=""/> s recovery of open/closed information upon change in device position	<input type="checkbox"/>		
T2 <input type="checkbox"/> <input type="text" value=""/> s SSL fault	<input type="checkbox"/>		
T3 <input type="checkbox"/> <input type="text" value=""/> s blocking input transmission inhibited	<input type="checkbox"/>		
T5 <input type="checkbox"/> <input type="text" value=""/> s tripping pulse via remote control	<input type="checkbox"/>		
T6 <input type="checkbox"/> <input type="text" value=""/> s closing pulse via remote control	<input type="checkbox"/>		

# Sepam 2000 Substation

function	identification	setting									
overcurrent		curve		Is		T					
	F011		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>				
	F012		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>				
	F013		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>				
	F014		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>				
earth fault		curve		Iso		T					
	F081		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>				
	F082		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>				
	F083		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>				
	F084		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>				
undervoltage		Us			T						
	F321-341-361		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>				
neutral voltage displacement		Vso			T						
	F391		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>				
overvoltage		Us			T						
	F301		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>				
directional overcurrent		curve		θ		Is		T			
	F521		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		
directional earth fault		θo			Iso			T			
	F501		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		
breaker failure	F981	Is		T1		T2		I tri		I 1-ph	
			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		I 2-ph		I 3-ph							
			<input type="checkbox"/>		<input type="checkbox"/>						

tick off the box when the setting is done

Setting made on:

by: \_\_\_\_\_




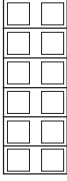






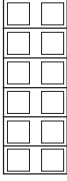






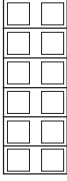





Signature

Signature

Comments: \_\_\_\_\_



### Status menu parameters (cont'd)

menu	name	function															
Microswitch settings	voltage board	 SW1	<input type="checkbox"/>														
	current board	<table border="0"> <tr> <td colspan="2">board 2</td> <td>board 3</td> </tr> <tr> <td>CT (ECM 1)</td> <td>CSP (ECA)</td> <td>CT (ECM 2)</td> </tr> <tr> <td> SW2</td> <td> SW2</td> <td> SW2</td> </tr> <tr> <td></td> <td> SW1</td> <td> SW1</td> </tr> <tr> <td></td> <td> SW1</td> <td> SW1</td> </tr> </table>	board 2		board 3	CT (ECM 1)	CSP (ECA)	CT (ECM 2)	 SW2	 SW2	 SW2		 SW1	 SW1		 SW1	 SW1
board 2		board 3															
CT (ECM 1)	CSP (ECA)	CT (ECM 2)															
 SW2	 SW2	 SW2															
	 SW1	 SW1															
	 SW1	 SW1															
<div style="border: 1px solid black; padding: 5px;">                     put an X in the box to indicate switch setting                      e.g. switch set to right   </div>			<input type="checkbox"/>														

### Sepam 2000 Capacitor program logic parameters

\_\_\_\_\_

KP	0 or 1	KP	0 or 1
KP1	<input type="checkbox"/> shunt-trip / undervoltage release coil	<input type="checkbox"/> KP51	<input type="checkbox"/> automatic disturbance recorder triggering
KP4	<input type="checkbox"/> external protection tripping by N/O or N/C contact	<input type="checkbox"/> KP52	<input type="checkbox"/> manual disturbance recorder triggering
KP10	<input type="checkbox"/> normal/fail-safe blocking input transmission	<input type="checkbox"/> KP53	<input type="checkbox"/> operation counter reset
KP17	<input type="checkbox"/> command not executed display	<input type="checkbox"/> KP54	<input type="checkbox"/> capacitor 1 switch closing
KP18	<input type="checkbox"/> pilot wire test	<input type="checkbox"/> KP55	<input type="checkbox"/> capacitor 1 switch opening
KP36	<input type="checkbox"/> choice of number of capacitors	<input type="checkbox"/> KP56	<input type="checkbox"/> capacitor 2 switch closing
KP37	<input type="checkbox"/> choice of number of capacitors	<input type="checkbox"/> KP57	<input type="checkbox"/> capacitor 2 switch opening
KP38	<input type="checkbox"/> remote setting active / inactive	<input type="checkbox"/> KP58	<input type="checkbox"/> capacitor 3 switch closing
KP49	<input type="checkbox"/> fault counter reset	<input type="checkbox"/> KP59	<input type="checkbox"/> capacitor 3 switch opening
KP50	<input type="checkbox"/> disturbance recorder record storage	<input type="checkbox"/> KP60	<input type="checkbox"/> breaker closing
		<input type="checkbox"/> KP61	<input type="checkbox"/> breaker opening
		<input type="checkbox"/> KP62	<input type="checkbox"/> running hours counter reset

time delay (value)		time delay (value)	
T1	_____ s	<input type="checkbox"/>	recovery of open/closed information upon change in device position
T3	_____ s	<input type="checkbox"/>	blocking input transmission inhibited
T5	_____ s	<input type="checkbox"/>	tripping pulse via remote control
T6	_____ s	<input type="checkbox"/>	closing pulse via remote control
T7	_____ s	<input type="checkbox"/>	capacitor discharge
T21	_____ s	<input type="checkbox"/>	manual switch 1 opening time delay
T22	_____ s	<input type="checkbox"/>	manual switch 2 opening time delay
T23	_____ s	<input type="checkbox"/>	manual switch 3 opening time delay
T24	_____ s	<input type="checkbox"/>	manual breaker opening time delay
T25	_____ s	<input type="checkbox"/>	switch 1 opening pulse
T26	_____ s	<input type="checkbox"/>	switch 2 opening pulse
T27	_____ s	<input type="checkbox"/>	switch 3 opening pulse
T28	_____ s	<input type="checkbox"/>	switch 1 closing pulse
T29	_____ s	<input type="checkbox"/>	switch 2 closing pulse
T30	_____ s	<input type="checkbox"/>	switch 3 closing pulse
T31	_____ s	<input type="checkbox"/>	capacitor 1 discharge
T32	_____ s	<input type="checkbox"/>	capacitor 2 discharge
T33	_____ s	<input type="checkbox"/>	capacitor 3 discharge
T34	_____ s	<input type="checkbox"/>	recovery of open/closed information upon change in switch 1 position
T35	_____ s	<input type="checkbox"/>	recovery of open/closed information upon change in switch 2 position
T36	_____ s	<input type="checkbox"/>	recovery of open/closed information upon change in switch 3 position



Sepam 2000 Capacitor										
function	identification	setting								
thermal overload		coeff		T1		T2		Es1 alarm		Es2 tripping
	F431	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
overcurrent		curve			Is			T		
	F011	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	F012	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
earth fault		curve			Iso			T		
	F081	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	F082	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
neutral unbalance 3 capacitor		Is						T		
	F111	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	F112	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	F121	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	F122	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	F131	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	F132	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
undervoltage		Us						T		
	F321-341-361	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
overvoltage		Us						T		
	F281	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	F282	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	F301	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	F302	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

tick off the box when the setting is done

Settings made on: \_\_\_\_\_

by: \_\_\_\_\_

Signature

Signature

Comments: \_\_\_\_\_





# Sepam 2000 Overhead feeder program logic parameters

\_\_\_\_\_

time delay (value)		time delay (value)	
T1	_____ s recovery of open/closed information upon change in device position	<input type="checkbox"/>	T10 _____ s disengaging time delay
T2	_____ s SSL fault	<input type="checkbox"/>	T11 _____ s cycle 1 isolation time delay
T3	_____ s blocking input transmission inhibited	<input type="checkbox"/>	T12 _____ s cycle 2 isolation time delay
T4	_____ s command not executed	<input type="checkbox"/>	T13 _____ s cycle 3 isolation time delay
T5	_____ s tripping pulse via remote control	<input type="checkbox"/>	T14 _____ s cycle 4 isolation time delay
T6	_____ s closing pulse via remote control	<input type="checkbox"/>	T15 _____ s lockout time delay
			T17 _____ s voltage presence check for self-powered protections

### Sepam 2000 Overhaed feeder

fonction	identification	setting					
overcurrent		curve		Is		T	
	F011		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	F012		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	F013		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	F014		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
earth fault		curve		Iso		T	
	F081		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	F082		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	F083		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	F084		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
directional earth fault		$\theta_0$		Iso		T	
	F501		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
directional earth fault for compensated neutral		Iso	Vso	T	T mem	mains	
	F481	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
undercurrent		Us		T			
	F321-341-361		<input type="checkbox"/>				<input type="checkbox"/>
remanent undervoltage		Us		T			
	F521		<input type="checkbox"/>				<input type="checkbox"/>
overcurrent		Us		T			
	F301		<input type="checkbox"/>				<input type="checkbox"/>
	F302		<input type="checkbox"/>				<input type="checkbox"/>
underfrequency		Fs		T			
	F561		<input type="checkbox"/>				<input type="checkbox"/>
	F562		<input type="checkbox"/>				<input type="checkbox"/>
	F563		<input type="checkbox"/>				<input type="checkbox"/>
	F564		<input type="checkbox"/>				<input type="checkbox"/>

tick off the box when the setting is done

Settings made on:

by: \_\_\_\_\_






Signature

Signature

Comments: \_\_\_\_\_



### Status menu parameters (cont'd)

menu	name	function		
Microswitch settings	voltage board		 SW1	<input type="checkbox"/>
	current board	board 2		
		CT (ECM 1)		
		CSP (ECA)		
		 SW2	 SW2	<input type="checkbox"/>
		 SW1	 SW1	<input type="checkbox"/>

put an X in the box to indicate switch setting  
e.g. switch set to right

### Sepam 2000 Underground feeder program logic parameters

\_\_\_\_\_

KP 0 or 1		KP 0 or 1	
KP1 <input type="checkbox"/>	shunt-trip / undervoltage release coil	KP49 <input type="checkbox"/>	fault counter reset
KP4 <input type="checkbox"/>	external protection tripping by N / O or N / C contact	KP50 <input type="checkbox"/>	disturbance recorder record storage
KP9 <input type="checkbox"/>	normal / fail-safe blocking input receipt	KP51 <input type="checkbox"/>	automatic disturbance recorder triggering
KP10 <input type="checkbox"/>	normal / fail-safe blocking input transmission	KP52 <input type="checkbox"/>	manual disturbance recorder triggering
KP17 <input type="checkbox"/>	display of parameterized control scheme	KP53 <input type="checkbox"/>	operation counter reset
KP18 <input type="checkbox"/>	pilot wire test	KP55 <input type="checkbox"/>	choice of U/F load shedding set point 1
KP38 <input type="checkbox"/>	remote setting active / inactive	KP56 <input type="checkbox"/>	choice of U/F load shedding set point 2
		KP57 <input type="checkbox"/>	choice of U/F load shedding set point 3
		KP58 <input type="checkbox"/>	choice of U/F load shedding set point 4
		KP59 <input type="checkbox"/>	priority choice
time delay (value)		time delay (value)	
T1 _____ s	recovery of open / closed information upon change in device position	T5 _____ s	tripping pulse via remote control
T2 _____ s	SSL fault	T6 _____ s	closing pulse via remote control
T3 _____ s	blocking input transmission inhibited		

Sepam 2000 Underground feeder									
function	identification	setting							
thermal overload		coeff	T1 et T2		Es1 alarm		Es2 trip.		
	F431	0		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
overcurrent		curve		Is		T			
	F011		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	F012		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	F013		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	F014		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
earth fault		curve		Iso		T			
	F081		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	F082		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	F083		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	F084		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
directional earth fault		$\theta_0$		Iso		T			
	F501		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
directional earth fault for compensated neutral		Iso	Vso	T		T mem		mains	
	F481	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
undercurrent		Us			T				
	F321-341-361		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
overvoltage		Us			T				
	F301		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	F302		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
underfrequency		Fs			T				
	F561		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	F562		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	F563		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	F564		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

tick off the box when the setting is done

Réglages effectués le :

par : \_\_\_\_\_

Visa

Visa

Remarques : \_\_\_\_\_



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