

# User guide

**SDMO**

**Changeover switch**

**VERSO 200**



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# 1 - Safety guidelines for installation and operation

Before connecting the unit to the power supply and before switching on the source changeover switch, please read this instruction manual carefully. This manual explains in detail all the stages for operating the changeover switch.


 <b>DANGER</b>	<p>A changeover switch works with <b>different sources of voltage supplied at potentially dangerous levels for the human body</b>. For this reason, only qualified electricians are permitted to commission changeover switches. SDMO Industries shall not be held responsible for failure to observe any of the instructions described below.</p>	
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	<p>The source changeover switch is designed to operate with an alternating supply voltage of <b>440 volts max. (*)</b>, for both the mains and the generating set. Any connection to a nominal voltage higher than this value will damage, or even destroy, the internal components of the unit.</p>
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(\*) However, the electrical components can bear variations in voltage to around the maximum voltage, within the operational limits set out in this document (section 8.6.1).

	<p>Our <b>Verso 200</b> range covers capacities from 200A to 3200A. Please ensure that your chosen changeover switch fully corresponds to its intended use. In this respect, it is necessary to check that the current flowing through the equipment does not exceed the nominal thermal capacity of the changeover unit switching components. Our equipment is designed to operate in the AC1 category, i.e. with no permissible overload (even short term), and at a maximum temperature of 40°C inside the equipment.</p>
<b>IMPORTANT</b>	

Where the unit is to be used at a temperature greater than 40°C, it is essential to adhere to the downgrade table contained in section 8.10. The capacity of the source changeover switch (nominal thermal rating in Amps), is marked on the inside of the equipment on the product information plate.

	<p>Our changeover switches are not equipped with a device to protect against overload and short-circuits which may occur downstream of the changeover switch. In this respect, it is necessary to check that suitable protection is fitted upstream of the source changeover switch; both for the mains and for the generating set. SDMO Industries shall not be held responsible for any damage to equipment as a result of a short-circuit downstream of the unit.</p>
<b>IMPORTANT</b>	

The wiring diagram provided on the inside of the unit should be consulted for any electrical connections (power and remote control).

	<p>The <b>Verso 200</b> changeover switch has been factory tested. When the unit is switched on for the first time, the electrical system:</p> <ul style="list-style-type: none"> <li>• automatically analyses the voltage, the frequency and the type of network (**),</li> <li>• display the three detected parameters on the screen and awaits user confirmation.</li> </ul> <p>If, during automatic configuration, the voltage is not stable <b>or</b> if the unit is not correctly connected (if a phase is not connected, for example), the automatic detection will not be correct. It will then be necessary to adjust the value of the detected parameter once the voltage has been stabilised and/or after the unit has been properly connected.</p>
<b>IMPORTANT</b>	

(\*\*) Please note that the electronics of the **Verso 200** work equally well with a three-phase network with a neutral point and a three-phase network without one.

## 2 - Installation of the source changeover switch

Changeover switches in the **Verso 200** range come in two types:

- Wall-mounted unit;
- Floor-mounted cabinet.

In order to best secure the unit, it must be attached to a wall or to a suitable floor surface. Select the location for the unit or cabinet depending on the routing of existing cables or, should this not be possible, check the possibility of the future installation of a cable routing system before the equipment is attached.

### 2.1 - Wall-mounted unit

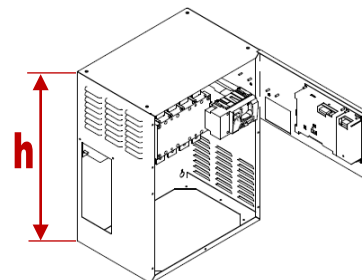
This unit can be securely fixed via four 7mm holes on its rear side (fastenings not provided).

A drilling template is marked on the cardboard packaging of the unit.

When fixing the unit to the wall, a suitable fixing system for the type of wall and the weight of the unit should be used (see table 1).

The unit must be fixed the right way up according to its height, marked "h" on the figure opposite.

Its protection index is IP2x.



**Figure 1 - wall-mounted unit**

### 2.2 - Floor-mounted cabinet

This unit can be securely fixed to the floor via four 10mm holes in the bottom of the cabinet (fastenings not provided).

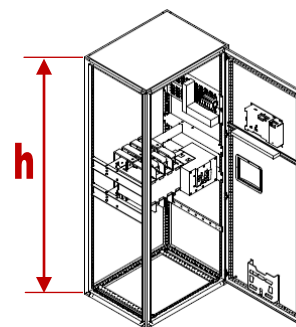
A drilling template is marked on the cardboard packaging of the cabinet.

When fixing the cabinet to the floor, use a fixing system that is suitable for the type of ground and the weight of the cabinet (see table 1).

The unit is designed to be fixed the right way up according to its height, marked "h" on the figure opposite.

The cabinet is equipped with four lifting rings for transportation and handling.

Its protection index is IP55.



**Figure 2 - floor-mounted cabinet**

### 2.3 - Unit dimensions and weights

Table 1 below gives the external dimensions and weights of the units by capacity.

<b>Size 1</b>	<b>• Wall-mounted cabinet</b>	<b>• h x l x d</b>	<b>• 800 x 600 x 400 (*)</b>	
<b>Capacity</b>	200A	250A	400A	630A
<b>Weight in kg</b>	<b>35</b>	<b>35</b>	<b>40</b>	<b>40</b>
<b>Size 2</b>	<b>• Floor-mounted cabinet</b>	<b>• h x l x d</b>	<b>• 2000 x 800 x 600 (**)</b>	
<b>Capacity</b>	800A	1000A	1250A	
<b>Weight in kg</b>	<b>200</b>	<b>200</b>	<b>215</b>	
<b>Size 3</b>	<b>• Floor-mounted cabinet</b>	<b>• h x l x d</b>	<b>• 2000 x 1000 x 600 (**)</b>	
<b>Capacity</b>	1600A			
<b>Weight in kg</b>	<b>250</b>			
<b>Size 4</b>	<b>• Floor-mounted cabinet</b>	<b>• h x l x p</b>	<b>• 2000 x 1000 x 800 (**)</b>	
<b>Capacity</b>	2000A	2500A	3200A	
<b>Weight in kg</b>	<b>415</b>	<b>420</b>	<b>450</b>	

**Table 1 - dimensions and weights**

(\*) An optional base, h=200mm, is available for floor mounting.

(\*\*) An optional base, h=200mm, is available.

### 3 - Electrical connections for the source changeover switch

#### 3.1 - Preliminary checks

In order to ensure personal safety and the longevity of the electrical appliance, the source changeover switch should be earthed. In order to do so, each changeover switch has three studs welded to the bottom of the unit allowing the earthing of the three main electrical connections:

- the "mains/source changeover switch" connection;
- the "generating set/source changeover switch" connection;
- the "source changeover switch/use" connection.



These studs are labelled with the symbol on the right.

The cables to be used (power supply and remote control unit) are industrial cables; H07RNF (flexible copper core) or U1000R2V (solid copper core).

Electrical cables must only be connected by a qualified electrician.

Table 2 below gives the maximum connection cross sections that it is possible to use depending on the equipment capacity. The capacity of the source changeover switch (thermal capacity in Amps) is marked on the inside of the equipment on:

- the right side for 200A to 630A wall-mounted units (size 1);
- the door for the 800A to 3200A cabinet units (sizes 2, 3 and 4).

Capacity	200A	250A	400A	630A	Size 1
Cross section	95mm <sup>2</sup> per phase	150mm <sup>2</sup> per phase	240mm <sup>2</sup> per phase	2x300mm <sup>2</sup> per phase	
Capacity	800A	1000A	1250A		Size 2
Cross section	2x300mm <sup>2</sup> per phase	2x300mm <sup>2</sup> per phase	4x185mm <sup>2</sup> per phase		
Capacity	1600				Size 3
Cross section	4x300mm <sup>2</sup> per phase				
Capacity	2000A	2500A	3200A		Size 4
Cross section	4x400mm <sup>2</sup> per phase	4x630mm <sup>2</sup> per phase	4x630mm <sup>2</sup> per phase		

**Table 2 - maximum connection cross sections**

*NB:* cable cross sections should be precisely defined by the installer, according to the installation conditions, temperature, and the nature and length of the cable.

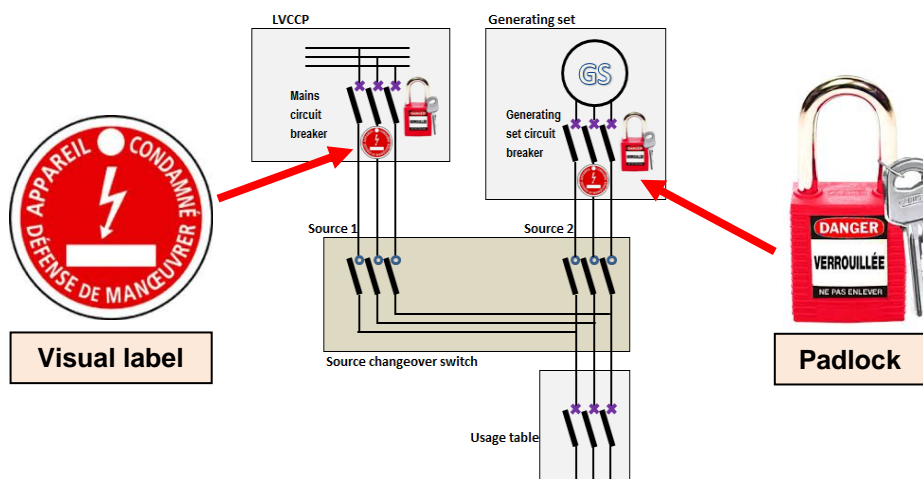
#### 3.2 - Securing voltage sources

Before making the electrical connection to source 1 (mains), it is necessary to secure the input protection circuit breaker (usually located in the general low voltage panel). This operation must be carried out by a person qualified to secure electrical equipment (\*).

Before connecting source 2 (generating set), it is necessary to ensure that the generating set cannot be started by an unauthorised person. It is therefore important to secure the generating set. This operation must be carried out by a person qualified to secure electrical equipment (\*).

(\* **Securing:** this equipment safety operation prevents any accidental electrical contact downstream of the equipment. This operation prevents any shut-off of power supply devices by fitting a padlock and visual labels (see figure 3).





**Figure 3 - Securing voltage sources**

- Check the installation wiring diagram in order to precisely identify all voltage sources.
- Check for the absence of voltage (CAV) at the terminals downstream of the circuit breakers, using appropriate equipment.
- Respect the procedures for securing electrical equipment.

### 3.3 - Power connections

Cables always pass through the bottom (\*) of both wall-mounted units and floor-mounted cabinets, whatever the capacity of the changeover switch. Take off the cable passage plate and drill as necessary to fit the cable glands.

Use connection accessories (end pieces, terminals, fixings, sleeves) as suited to the section of electrical cable in question. Cable glands should be attached manually to support the cables. Observe the correct order of the phases and the tightening torque (see table 5).

(\*) It is possible to connect cables through the top of the unit (option when ordering).

#### 3.3.1 - Upstream connections (mains and generating set)

Make upstream connections directly to the switch ports (up to 630A) or to the ends of the bars (800A and above), using table 3 below:

200A	250A	400A	630A	800A	1000A
Port 20 x 3.5 1x 9mm hole	Port 25 x 3.5 1x 11mm hole	Port 35 x 3.5 1x 11mm hole	Port 45 x 5 1x 13mm hole	Port 50 x 7 4x 9mm holes 1x 15mm hole	Port 50 x 7 4x 9mm holes 1x 15mm hole
1250A	1600A	2000A	2500A	3200A	
Port 60 x 7 4 oblongs 16 x 11	Port 90 x 8 1x 12.5mm hole 2 oblongs 17.5 x 12.5	1 port 160 x 10 2x 18mm holes	1 port 160 x 10 2x 18mm holes	2 ports 160 x 10 2x 18mm holes	

**Table 3 - upstream connection ports**

#### 3.3.2 - Downstream connections (use)

Make downstream connections to the ends of the bars toward the bottom of the unit or cabinet using table 4 below:

200A	250A	400A	630A	800A	1000A
Port 20 x 3 1x 9mm hole	Port 25 x 3 1x 11mm hole	Port 32 x 5 1x 11mm hole	Port 50 x 5 1x 13mm hole	Port 50 x 10 1x 13mm hole	Port 50 x 10 1x 13mm hole
1250A	1600A	2000A	2500A	3200A	
Port 60 x 12 2x 12mm holes	Port 100 x 8 2x 13mm holes	2 ports 120 x 10 2x 18mm holes	2 ports 120 x 10 2x 18mm holes	2 ports 120 x 10 2x 18mm holes	

**Table 4 - downstream connection ports**

### 3.3.3 - Tightening torque

The table 5 below sets out the tightening torques by the size of the connecting screw.

Screw	M6	M8	M10	M12
Torque (Nm) <b>advised/max</b>	<b>4.5 / 5.4</b>	<b>8.3 / 13</b>	<b>20 / 26</b>	<b>40 / 45</b>

**Table 5 - tightening torque**

### 3.3.4 - Auxiliary connections

The power supply cable for the generating set auxiliaries (water pre-heating, etc.) must be connected directly to the circuit breaker marked **4F17** (consult the wiring diagram).

Single-phase water preheating	<b>3G1.5mm<sup>2</sup> minimum</b>	U1000R2V or H07RNF
Three-phase water preheating	<b>5G1.5mm<sup>2</sup> minimum</b>	U1000R2V or H07RNF

## 3.4 - Remote control connections

### 3.4.1 - External starting command

Connect a 2-conductor cable (H07RNF or U1000R2V) with min. 2.5mm<sup>2</sup> diameter, between the source changeover switch (**terminal block X13**, terminals 3 & 4) and the generating set (see wiring diagram).



**Never connect alternating voltage to the external command terminals. SDMO Industries shall not be held responsible for the consequences of any failure to respect this instruction.**

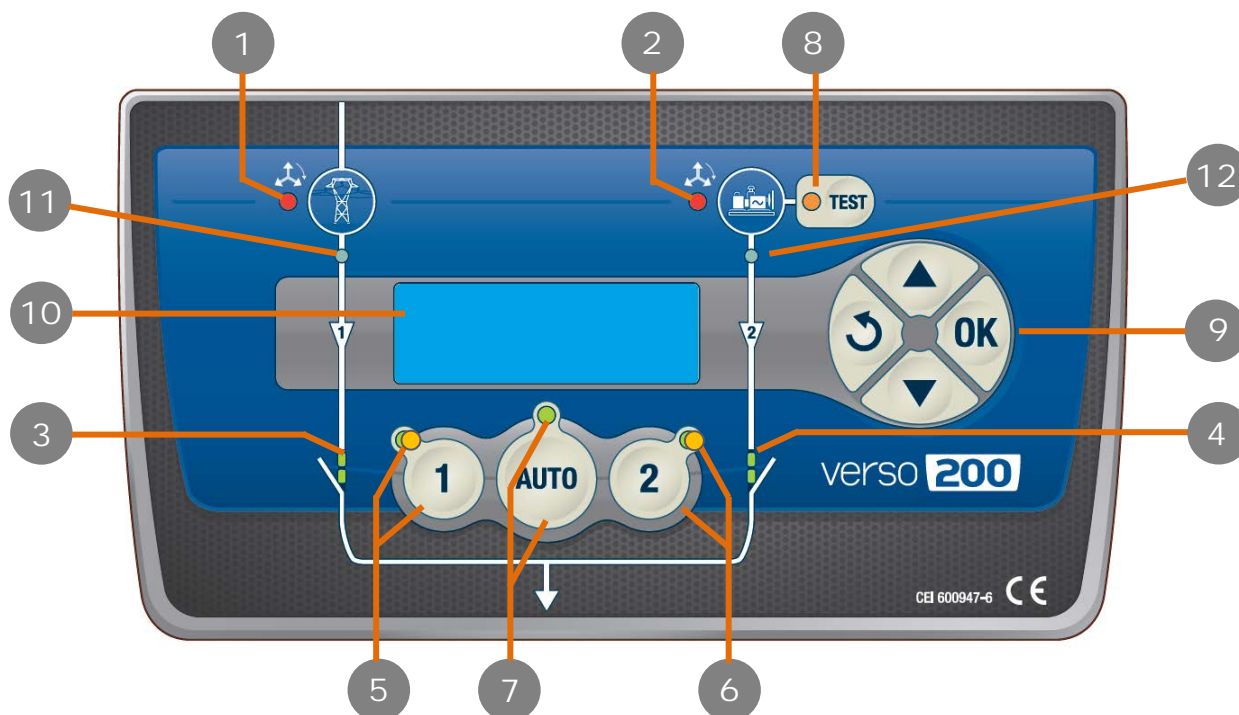
### 3.4.2 - Options

Connect the options as per the wiring diagram supplied with the source changeover switch. See section 9 for details of the options available for the unit.

## 4 - Description of the electronic module

The **Verso 200** electronic module is fitted to the front of the control box or unit. It consists of a polycarbonate casing with 2 electronic cards fitted to the back.

The module controls all operations of the source changeover switch.



**Figure 4 - front panel of the electronic module**

### Description of the front panel

1	Red LED, phase sequence upon voltage source 1 (mains) supply
2	Red LED, phase sequence upon voltage source 2 (generating set) supply
3	Green switch-position LED, source 1
4	Green switch-position LED, source 2
5	Source 1 preset button, with orange LED
6	Source 2 forcing button, with orange LED
7	<b>AUTO</b> mode button, with green LED
8	<b>TEST</b> mode button, with orange LED
9	Four-button keypad for navigation, accessing menus and configuration
10	Deep-blue screen, white characters, 4 lines, 20 characters
11	Traffic-light LED (red, green, orange) condition of voltage source 1 (OK, alarm, default)
12	Traffic-light LED (red, green, orange) condition of voltage source 2 (OK, alarm, default)

The synoptic on the front panel represents the source changeover switch comprising two switches which are electronically connected at the bottom of the unit. The arrow at the bottom represents customer installation.

At the top left, an electricity pylon symbolises the mains (source 1) and on the right a generating set symbolises the back-up source (source 2).

LEDs ① and ② bear a pictogram symbolising the phase sequence function (see section 8.2 for more details on this function).

The table below lists the LEDs and their colour by situation.

No. LED	Off	Lit fixed green	Lit flashing green	Lit fixed orange	Lit fixed red
1	phase sequence source 1 OK				phase sequence fault with source 1
2	phase sequence source 2 OK				phase sequence fault with source 2
11	no source 1	source 1 OK		alarm U or F source 1	fault U or F with source 1
12	no source 2	source 2 OK		alarm U or F with source 2	fault U or F with source 2
3	switch source 1 open	switch source 1 closed	fault with position control source 1		
4	switch source 2 open	switch source 2 closed	fault with position control source 2		
5	no forcing for source 1			source 1 forcing selected	
6	no forcing for source 2			source 2 forcing selected	
7	<b>AUTO</b> mode not operational	<b>AUTO</b> mode operational			
8	<b>TEST</b> mode not selected			<b>TEST</b> mode selected	

**Table 6 - functions of the front-panel LEDs**

## 5 - Switching on the source changeover switch

### 5.1 - Preliminary checks

Before switching on the source changeover switch:

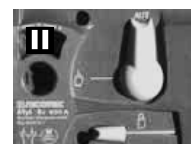
- 1** - Check to make sure that no tool or connection accessory has been left inside the equipment.
- 2** - Check that the switch is in the "O" position (see the 3 figures below).



Switch in I position



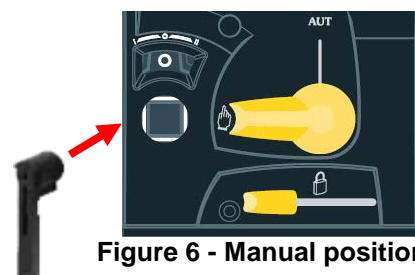
Switch in O position



Switch in II position


**Figure 5 - switch positions**

- If the switch is not in the "O" position, turn the yellow lever to the "manual" (M) position (see figure to the right), insert the switch handle into its square housing and turn the switch to the "O" position.
- Remove the switch handle.
- Return the yellow lever to the automatic (AUT) position.



**Figure 6 - Manual position**

*Please note:*

In position <b>AUT</b>	⇒ the electrical controls are active
	⇒ it is impossible to insert the control handle
	⇒ it is impossible to pull the flap to fit a padlock
In position 	⇒ the electrical controls are overridden
	⇒ it is possible to insert and to use the control handle
	⇒ it is possible to padlock the switch if the handle has been removed

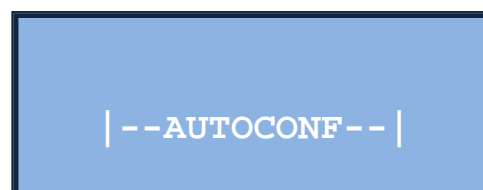
- 3** - Close the upper door of the removable panel of the unit or cabinet.

### 5.2 - Switching to the mains

#### Step 1

- ⇒ Release and close the mains-protection circuit breaker; alternating current will now be present in the source changeover switch.
- ⇒ The phase sequence check will run automatically. The fixed-green LED 7 (AUTO mode operational) will be lit.

⇒ The unit will auto-configure and the screen to the right will appear for a few seconds.  
During its auto-configuration, the system will analyse source 1 and display the results on the screen, as in step 3 below.



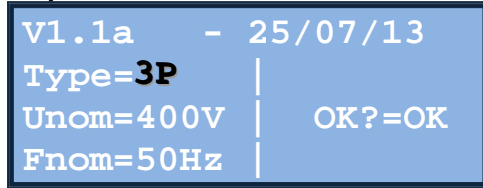
#### Step 2

- If the phase sequence is **correct (\*)** (LED 1 remains lit), the fixed-green LED 11 will be lit and the switch automatically turned to the "I" position.  
(\* ) The phase sequence function is only available for a three-phase network.
- ⇒ The switch will automatically turn to the I position and the fixed-green LED 3 will be lit. Voltage will now be present downstream of the source changeover switch ready for use.
- ⇒ The changeover switch is now operational for source 1. The behaviour of source 2 still has to be checked.
- ⇒ Proceed to step 3.

- If the phase sequence is **incorrect** (the fixed-red LED 1 is lit), the switch will remain in the "O" position.

- ⇒ Open and release the mains circuit breaker, check the absence of voltage (CAV) upstream of the source changeover switch, then adjust the wiring of the phases.
- ⇒ Then return to step 1.

**Step 3**



The system will display the 3 parameters detected:

- type of network (e.g.: **3P**);
- nominal voltage (e.g.: **415V**);
- nominal frequency (e.g.: **50Hz**).

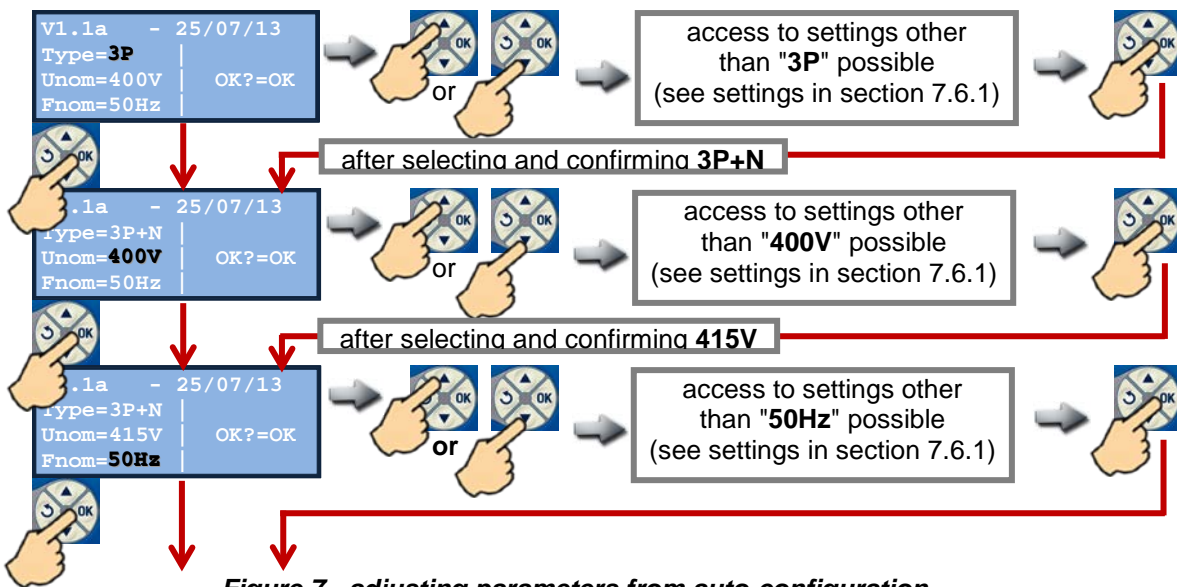
A prompt to the right will request user confirmation of these 3 parameters. The first parameter, "3P," will flash.

The electronic system can detect three-phase networks, two-phase networks and single-phase networks, but it cannot detect the presence of a neutral point (**3P+N** or **2P+N** network).

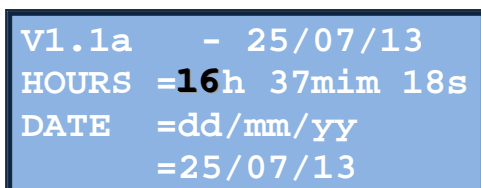
- If source 1 is a **3P+N** network, the user must then modify this information (as explained below).
- If, at the time of auto-configuration, voltage source 1 presents a level of voltage lesser or greater than its **actual nominal voltage**, the user must modify the displayed **Unom** voltage value (see the table of voltage detection ranges in section 8.1).

**Example:**

- The nominal voltage is **415 Volts** and the detection range for 415 Volts is between **408** and **427 Volts** (see section 8.1).
- At the time of auto-configuration the voltage measured at the changeover switch terminals is **407 Volts**, therefore the system will detect a nominal voltage of **400 Volts**.
- ⇒ The user will therefore have to modify the nominal voltage as explained below.



**Figure 7 - adjusting parameters from auto-configuration**



- The system will display the time and date. The unit is equipped with an internal electronic clock. The clock continues to function when the changeover switch is powered off. Should there be a discrepancy in the time, the clock must be updated.

**Figure 8- adjusting the date and time**

The hour (in the format 00h-23h) will flash.

- Press ▲ or ▼ to make any adjustments to the hour.
- Press **OK** to confirm. The minutes will flash.
- Press ▲ or ▼ to make any adjustments to the minutes and confirm by pressing **OK**.
- Repeat the same process for the seconds, day, month and year.

**NB:** updating the date and time has no effect on the functioning of the changeover switch. In the case that incorrect data is input, only the dates and times of the events saved in the **EVENTS** menu will be incorrect (see paragraph 7.4).

Once the information has been updated, the screen will display an overview of the electrical details (frequency and voltage).

The example on the right displays a three-phase + neutral network, with a frequency of 50Hz and a 410V voltage.

(1) OK	Hz=50.3
U12=410V	V1=238V
U23=411V	V2=238V
U31=414V	V3=240V

### 5.3 - Switching on the generating set

#### Step 1

With the mains present and the switch in the "I" position (voltage present downstream of the source changeover switch), release and close the back-up circuit breaker and set the generating set to **AUTO** mode (see user documents on the generating set control module).

#### Step 2

⇒ Press the **TEST** button on the **Verso 200** module. The fixed-red LED **8** will be lit and the screen on the right will appear.

⇒ Press the **U** button. The generating set will start up without any further notice.

```

-----TEST-----
---30sec---
TEST>0KW=OK
TEST 0KW=EXIT
    
```

The voltage of the generating set will be established upstream of the changeover switch on the source 2 side.

#### Step 3

■ If the phase sequence is correct (\*) (LED **2** remains off), the fixed-green LED **12** will be lit, the switch will automatically turn to the "II" position, and the fixed-green LED **4** will be lit. Voltage will be present downstream of the source changeover switch ready for use.

(\*) function only available for three-phase networks.

■ If the phase sequence is incorrect (the fixed-red LED **2** is lit), the switch will remain in the "I" position.

⇒ Open and release the mains circuit breaker, check the absence of voltage (CAV) upstream of the source changeover switch, then adjust the wiring of the phases.

⇒ Then return to step 1.

#### Step 4

⇒ Press the **TEST** button to stop the generating set. The switch will automatically turn to the "I" position and the set will stop following a cool-down timer.

The **Verso 200** changeover switch will be operational.

## 6 - Using the Verso 200 module

In addition to its main function of automatic source changeover, the **Verso 200** module allows an overview of the main electrical information (voltage and frequency), as well as any events (conditions, alarms, faults), to be viewed in real time. It also allows you to change the change-over switch operation mode and to adjust parameters where necessary, ensuring optimum performance for the environment in which it is installed.

### 6.1 - Reading the electrical ratings

Following the voltage source present over the changeover switch, you will observe:

- "**source 1**" screen, if source **1** is present (screen text "**(1) OK**");
- "**source 2**" screen, if source **2** is present (screen text "**(2) OK**").

If the two voltage sources are present at the same time, they will be displayed in a cycle.

The display will vary according to the nature of the voltage source (three-phase, single-phase, etc.). The time for which each source is displayed can be adjusted in the **TIMER** menu (timer **T26**) (see section 7.7.1).

#### 6.1.1 - Three-phase source with a neutral point

For a three-phase voltage source with a neutral point, the three phase-to-phase voltage values (**U12**, **U23**, **U31**), the three phase-to-neutral voltage values (**V1**, **V2**, **V3**), and frequency (**Hz**) will be displayed.

Source 1 present screen		Source 2 present screen	
(1) OK	Hz=50.3	(2) OK	Hz=50.1
U12=410V	V1=238V	U12=405V	V1=235V
U23=411V	V2=238V	U23=407V	V2=232V
U31=414V	V3=240V	U31=411V	V3=231V

*Figure 9 - overview display for three-phase + N source*

#### 6.1.2 - Three-phase source without a neutral point

For a three-phase voltage source without a neutral point, the three phase-to-phase voltage values (**U12**, **U23**, **U31**) and the frequency (**Hz**) will be displayed.

Source 1 present screen		Source 2 present screen	
(1) OK	Hz=50.3	(2) OK	Hz=50.1
U12=410V		U12=405V	
U23=411V		U23=407V	
U31=414V		U31=411V	

*Figure 10 - overview display for three-phase source*

#### 6.1.3 - Two-phase source with a neutral point

For a two-phase voltage source with a neutral point, the phase-to-phase voltage value (**U12**), the two phase-to-neutral voltage values (**V1**, **V2**), and the frequency (**Hz**) are displayed.

Source 1 present screen		Source 2 present screen	
(1) OK	Hz=50.3	(2) OK	Hz=50.1
U12=230V	V1=127V	U12=230V	V1=127V
	V2=127V		V2=127V

*Figure 11 - overview display for two-phase + N source*



### 6.1.4 - Single-phase source

For a single-phase voltage source, the phase-to-neutral voltage value (V) and the frequency (Hz) will be displayed.

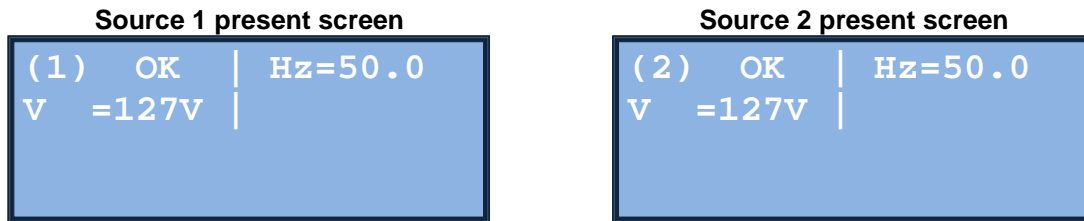


Figure 12 - overview display for single-phase source

### 6.2 - Operating modes

There are four different operating modes:

- "AUTO" mode;
- "forcing source 1" mode;
- "forcing source 2" mode;
- "TEST" mode.



#### 6.2.1 - "AUTO" Mode

This is the normal operating mode for the source changeover switch.

The **AUTO** key LED (no. 7) lights up green to signal that **AUTO** mode is selected. When voltage is supplied from source 1 and once the checks have been carried out by the electronic module, the changeover switch is automatically placed in **AUTO** mode.

In **AUTO** mode, the changeover switch can be found in one of three positions: **O**, **I** or **II**.

#### 6.2.2 - "Forcing source 1" mode

Button 1 is used to force the changeover switch to close over source 1 (mains).

Pressing button 1 initiates the following actions:

- the **AUTO** mode LED goes out;
- the button 1 LED is lit;
- the generating set (source 2) switch is opened, if it was closed;
- the mains switch (source 1) is closed, if it was open.

#### 6.2.3 - "Forcing source 2" mode

Button 2 is used to force the changeover switch to close over source 2 (generating set).

Pressing button 2 initiates the following actions:

- the **AUTO** mode LED goes out;
- the button 2 LED is lit;
- the mains switch (source 1) is opened, if it was closed;
- the generating set switch (source 2) is closed, if it was open.

#### 6.2.4 - "TEST" Mode

**TEST** mode is used to check the functioning of the generating set from the changeover switch.

This check is done with source 1 present.

Pressing the **TEST** button will bring up the **TEST** screen on the right.

The user has the choice of two operating modes:

- "test off load";
- "test on load".

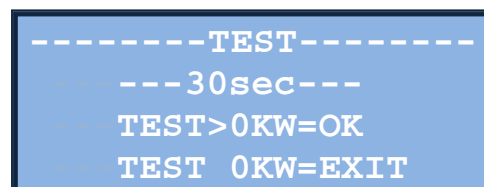


Figure 13 - test mode screen

The generating set will be started up automatically when the **TEST** button is pressed. LED no. 8 will be lit fixed orange. The user then has thirty seconds (as indicated on the screen), to select the desired operating mode.



Selecting the operating mode is simple:

- press the **OK** button for a "test on load" (>0kW);
- press the **U** button for a "test off load" (0kW);

The duration of the test (on or off load) corresponds to timer **T19** (see section 7.7.1). This timer begins when the **TEST** button is pressed.

If the user does not select either of the two modes during the allotted 30 second time period, the "**test off load**" mode is automatically selected by default.

Test mode (on or off load) can be interrupted by the user at any time by touching the **TEST** button.

In " <b>test off load</b> " mode	Generating set immediately shut down without cooling, source <b>1</b> remains closed.
In " <b>test on load</b> " mode	Gradual shut-down (*) of the generating set once the source changeover switch turns to <b>I</b> position.

(\*) The gradual shut-down depends on timer **T18** (see section 7.7.1).

## 6.3 - Alarms and faults display

### 6.3.1 - Alarms

When an alarm is triggered the following are lit fixed-orange:

- LED **11** for source **1**;
- LED **12** for source **2**.

<b>Min. voltage source 1</b>	<b>Min. voltage source 2</b>
<b>Max. voltage source 1</b>	<b>Max. voltage source 2</b>
<b>Min. frequency source 1</b>	<b>Min. frequency source 2</b>
<b>Max. frequency source 1</b>	<b>Max. frequency source 2</b>

**Table 7 - list of alarms**

When an alarm is triggered (alarm table above), no message is displayed on the screen. See section 8.5 on alarm management.

### 6.3.2 - Faults

When a fault is detected, the following are lit fixed-red:

- LED **1** for source **1** (phase sequence fault);
- LED **2** for source **2** (phase sequence fault);
- LED **11** for source **1** (min/max voltage or min/max frequency fault);
- LED **12** for source **2** (min/max voltage or min/max frequency fault).

The LEDs will be lit red and the fault displayed on the first line of the screen.

The example shows a "max voltage fault" over source **1**.

(1) U>%	Hz=50.3
U12=400V	V1=230V
U23=412V	V2=236V
U31=400V	V3=229V

**Figure 14 - fault display**

In the case of the fault above, the generating set will start up. If the generating set does not start up for any reason, the additional message to the right will be displayed (see also section 6.4).

(1) U>%	Hz=50.3
(2)=SOS GEN START	
RESET=OK	

**Figure 15 - no GS start-up**

### 6.3.3 - Resetting a fault

⇒ Eliminate the cause of the fault.

⇒ Press the **OK** button; the fault will be automatically removed from the screen. The fault will be recorded in the event stack (see section 7.4).

## 6.4 - Display of actions in progress

During normal operation (e.g.: loss of voltage over source 1) or abnormal operation (e.g.: source 1 closing fault), the messages below will be displayed on lines 3 and 4 of the screen.

```
(1) U<% | Hz=50.1
T00=52sec
(1)->(0)
```

Loss of voltage over source 1

```
(1) OK | Hz=50.1
T13=005s/10
(2)->(1)
```

Power returned to source 1 OK  
Source 2 switched to source 1

```
(1) OK | Hz=50.1
T19=458sec
MODE TEST
```

Test mode in progress

```
(1) OK | Hz=50.1
T18=060sec
(2)<°C
```

Cooling source 2

```
(1) OK | Hz=50.1
T20=020mn
Préavis EJP
```

EJP notice (for France only) timer

```
(1) OK | Hz=50.1
T19=526mn
Perte EJP
```

EJP loss (for France only) timer

```
(1) OK | Hz=50.1
MODE EJP
```

EJP mode (for France only) in progress

```
(1) OK | Hz=50.1
PROGRAM
```

Programme in progress

```
(2) U<% | Hz=50.1
ATS=0
```

ATS = 0 activation of a programmed entry (function F07)

```
(1) U>% | Hz=50.1
(2)=SOS GEN START
RESET=OK
```

GS non-starting fault

```
(1) U>% | Hz=50.1
(1)=OK CONFIRM ?
CONFIRM=OK
```

Manual confirmation of power return by programmed entry (function F06)

```
(1) U>% | Hz=50.1
(1)->4F01=SOS
RESET=OK
```

Surge arrester activated signal

```
(1) OK | Hz=50.1
(0)->(1)=SOS
RESET=OK
```

Source 1 closing fault

```
(2) OK | Hz=50.1
(0)->(2)=SOS
RESET=OK
```

Source 2 closing fault

```
(2) OK | Hz=50.1
(1)->(0)=SOS
RESET=OK
```

Source 1 opening fault

```
(1) OK | Hz=50.1
(2)->(0)=SOS
RESET=OK
```

Source 2 opening fault

```
(1) ACB | Hz=50.1
(1)=SOS ACB
RESET=OK
```

Source 1 phase sequence fault

```
(2) ACB | Hz=50.1
(2)=SOS ACB
RESET=OK
```

Source 2 phase sequence fault

Some messages request confirmation that the user has viewed or ignores them.

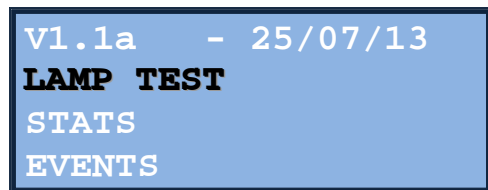
## 7 - Description of menus available on the screen

### 7.1 - List of menus, features and navigation

The table below sets out the list of menus that the user can access. The following paragraphs then describe each menu separately.

1	<b>LAMP TEST</b>	Lamp (or LED) test	} page 1
2	<b>STATS</b>	Statistics	
3	<b>EVENTS</b>	Events	
4	<b>MAINT</b>	Maintenance	} page 2
5	<b>PARAM</b>	Adjustment of parameters	
6	<b>TIMER</b>	Timing settings	
7	<b>PROGRAMS</b>	Programming of the generating set test	} page 3
8	<b>I/O</b>	Programming the inputs and outputs of the electronic module	
9	<b>AUTOSET</b>	Automatic settings of the electronic module	
10	<b>RS485</b>	Programming the serial link	} page 4
11	<b>INIT</b>	Initialisation of the parameters, timings, I/O, auto-configuration	
12	<b>FACTORY</b>	Miscellaneous; hardware, software, recovering programs via USB key	

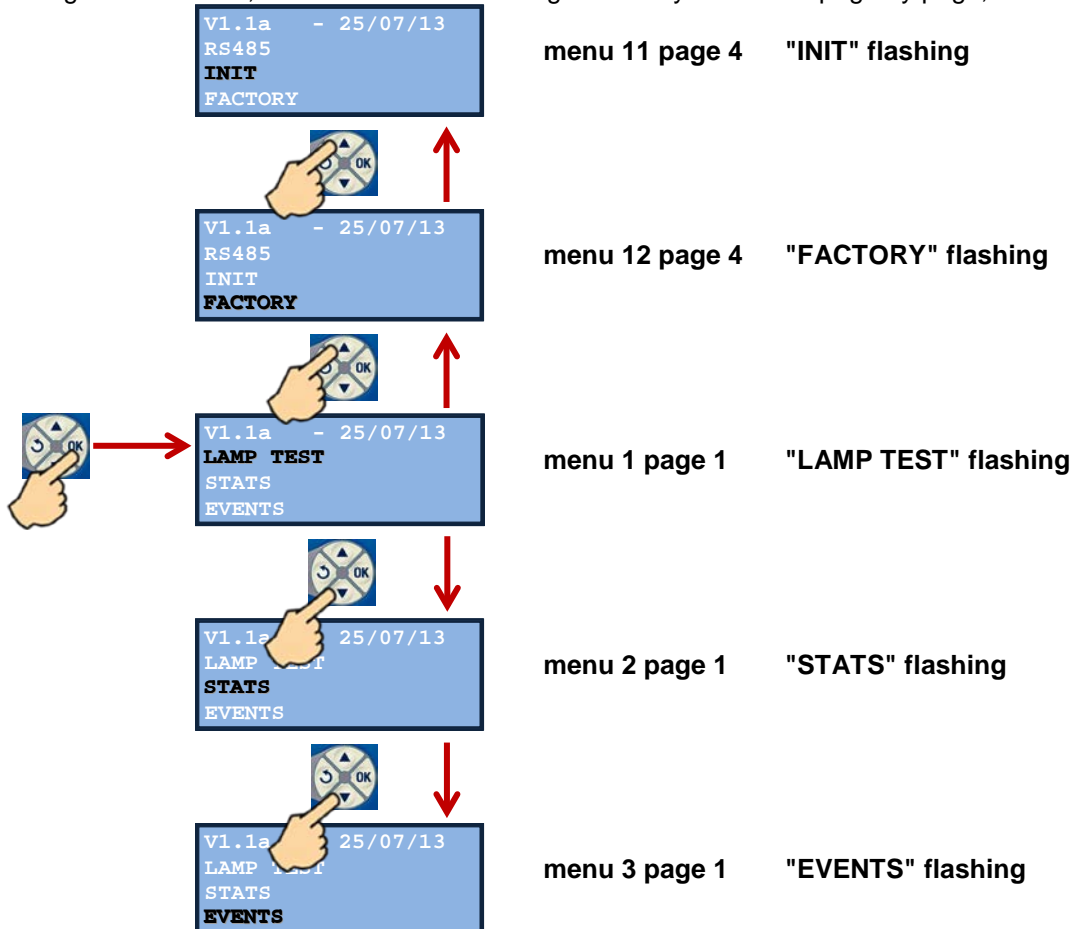
The different menus can be accessed by pressing the **OK** button. The screen on the right will then appear. The first line displays the reference of the software version and the date, in the format **day/month/year**.



*Figure 16 - menu list screen*

The first menu, **LAMP TEST**, will be flashing on the screen.

To navigate the menus, the user can scroll through menu by menu and page by page, as below:



*Figure 17 - accessing menus*

Pressing the **OK** button will allow the user to access whichever menu is flashing (see the following paragraphs). Pressing the **↵** button will allow the user to exit the menus, returning to the general display.

### 7.2 - "LAMPS TEST" menu

The **LAMPS TEST** menu consists of only one screen. This screen allows the user to control the correct functioning of the electronic components (pixels) and the LEDs. Pressing the **OK** button initiates a lamp test for 3 seconds.

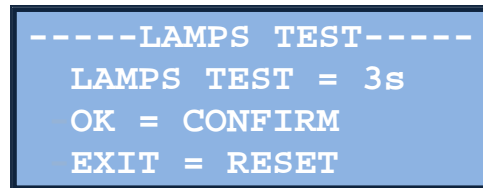
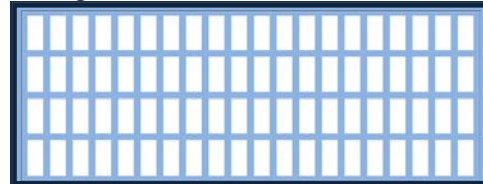


Figure 18 - LAMPS TEST screen

All LEDs on the front panel are lit, as is every full motif on the screen (as on the figure on the right).

At the end of the test, the screen automatically goes back to the list of menus.

If the **OK** button is not pressed, the **LAMPS TEST** screen will remain. Pressing the **↵** button allows the user to return to the list of menus.

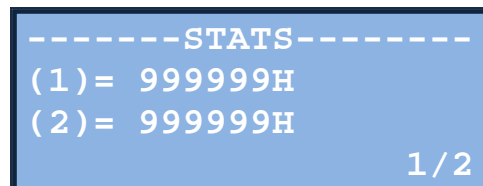


### 7.3 - "STATS" menu

The **STATS** menu consists of two screens that are accessible in a loop, via the **▲** and **▼** buttons.

Screen **1/2** displays:

- the number of hours during which source **1** has been closed (**source 1** = mains);
- the number of hours during which source **2** has been closed (**source 2** = generating set).



Screen **2/2** displays:

- the number of switches from source **1** to source **2**;
- the number of switches from source **2** to source **1**.

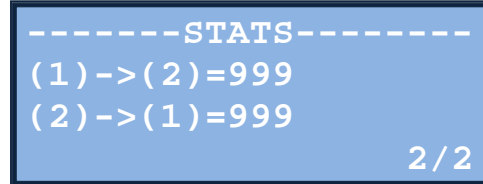


Figure 19 - STATS screens 1/2 and 2/2

Pressing the **↵** button allows the user to navigate away from the **STATS** menu, returning to the list of menus.

### 7.4 - "EVENTS" menu

The **EVENTS** menu consists of one or more screens depending on the number of events recorded to the memory (1 event = 1 screen page).

An event constitutes a normal (operation) or abnormal (fault displayed on the general screen) state. The electronic module can record up to 100 events. If a 101st event appears, event number 1 is deleted from the event stack.

Each screen records one event as displayed to the right:

- identification of the voltage source, **1** or **2**;
- the event in the form of a code;
- the time at which it occurred in the format hour/minute/second;
- the date on which it occurred in the format day/month/year;
- the number of the event in stack, from 001 to 100.

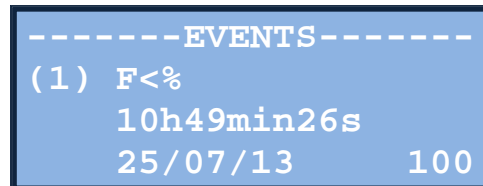


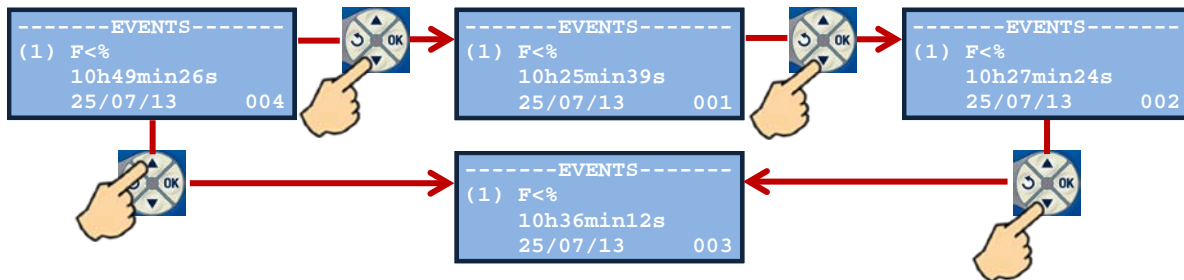
Figure 20 - EVENTS screen page

When this menu is selected, the screen which appears displays the event most recently recorded to the memory (=100 if the stack is full).

⇒ Pressing the **▲** button allows the user to access the **previous event** (older time and date), if one exists. Pressing the **▲** button again brings up the event prior to that event, and so on up until the oldest event.

⇒ Pressing the ▼ button allows the user to access the **oldest event** (oldest time and date), if one exists. Pressing the ▼ button again brings up the next most recent event, and so on. Pressing the ↻ button allows the user to return to the list of menus.

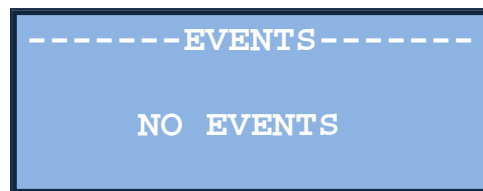
E.g.: in the case of an event stack containing 4 identical events (source 1 min frequency fault) recorded at different times:



**Figure 21 - consulting the event stack**

If there are no events recorded in the stack when the **EVENTS** menu is selected, the screen to the right will appear.

The ▲ and ▼ buttons will have no effect. Pressing the ↻ button exits the menu.

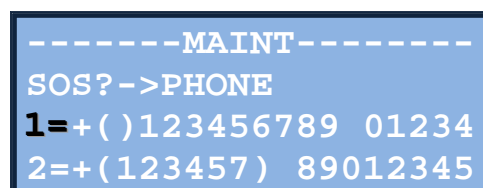


List of events which can be recorded to the memory (code and meaning)	
(1) U<%	Source 1 min voltage fault
(1) U>%	Source 1 max voltage fault
(1) F<%	Source 1 min frequency fault
(1) F>%	Source 1 max frequency fault
(1) U<<%	Source 1 min voltage fault (final or critical)
(1) U>>%	Source 1 max voltage fault (final or critical)
(1) F<<%	Source 1 min frequency fault (final or critical)
(1) F>>%	Source 1 max frequency fault (final or critical)
(1) ACB	Source 1 phase sequence fault
(2) U<%	Source 2 max voltage fault
(2) U>%	Source 2 max voltage fault
(2) F<%	Source 2 min frequency fault
(2) F>%	Source 2 max frequency fault
(2) U<<%	Source 2 min voltage fault (final or critical)
(2) U>>%	Source 2 max voltage fault (final or critical)
(2) F<<%	Source 2 min frequency fault (final or critical)
(2) F>>%	Source 2 max frequency fault (final or critical)
(2) ACB	Source 2 phase sequence fault
(2) =0kW	Test off load mode activated by user on source 2
(2) >0kW	Test on load mode activated by user on source 2
(2) START	Start-up of the generating set (source 2)
(2) TOP EJP	TOP EJP present (for France only)
(2) Préavis EJP	EJP notice (for France only)
(2) 4F01	Source 2 surge arrester activated

Reminder: source 1 = mains source 2 = generating set

### 7.5 - "MAINT" menu

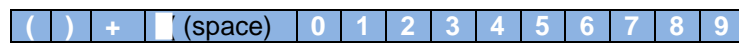
The **MAINT** menu consists of only one screen. This screen displays two telephone numbers previously entered into the memory by the user. These two numbers are named 1 and 2.



**Figure 22 - MAINT screen**

The format for entering the data (the numbers comprising the telephone number) is completely free. No number is entered into the memory by default.

When the **MAINT** screen is displayed, the number "1=" will flash. Press **OK** to enter telephone number 1, the cursor **█** will then flash to the right of the "=" sign. The characters available for entering the telephone number are:



To select the characters, simply use the **▲** and **▼** buttons. Once the desired character is on the screen, press **OK** to move on to select the next character, and so on for all of the characters comprising the telephone number. It is possible to enter up to eighteen characters.

When the number has been entered, press **OK** and enter blank characters ( **█** ) up to the end of the line. The number "1=" will then flash again.

Press **▼** to access telephone no. 2 and follow the same process.



Pressing the **↺** button allows the user to navigate away from the **MAINT** menu, returning to the list of menus.

## 7.6 - "PARAM" menu

The **PARAM** menu consists of eight screens, with each screen including three parameters.

The twenty-four parameters allow for full adjustment, optimising the performance of the **Verso 200** source changeover switch.

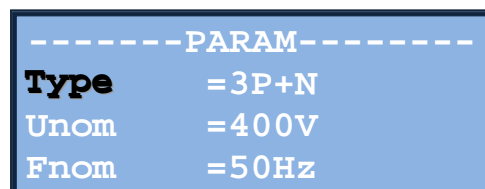


Figure 23 - PARAM screen, page 1

### 7.6.1 - List of parameters

The table below sets out the parameters available for viewing and adjustment via the **PARAM** menu.

Title	Meaning	Possible values	By default	
<b>Type</b>	Type of network	3P+N, 3P, 2P+N, 1P+N	3P+N	page 1
<b>Unom</b>	Operating voltage in Volts	208, 220, 230, 240, 380, 400, 415, 440	415	
<b>Fnom</b>	Operating frequency in Hz	50, 60	50	
<b>(1) U&lt;%</b>	Source 1, min voltage threshold in %	As per the Unom voltage	Dynamic	page 2
<b>(2) U&lt;%</b>	Source 2, min voltage threshold in %	As per the Unom voltage	Dynamic	
<b>(1) U&gt;%</b>	Source 1, max voltage threshold in %	As per the Unom voltage	Dynamic	page 3
<b>(2) U&gt;%</b>	Source 2, max voltage threshold in %	As per the Unom voltage	Dynamic	
<b>(1) Hz&lt;%</b>	Source 1, min frequency threshold in %	From 0 to 10% if 50Hz, from 0 to 25% if 60Hz	5%	page 4
<b>(2) Hz&lt;%</b>	Source 2, min frequency threshold in %	From 0 to 10% if 50Hz, from 0 to 25% if 60Hz	5%	
<b>(1) Hz&gt;%</b>	Source 1, max frequency threshold in %	From 0 to 30% if 50Hz, from 0 to 8% if 60Hz	5%	page 5
<b>(2) Hz&gt;%</b>	Source 2, max frequency threshold in %	From 0 to 30% if 50Hz, from 0 to 8% if 60Hz	8%	
<b>ABC</b>	Phase sequence	ABC, ACB, OFF (no check)	ABC	page 6
<b>(1) V/V</b>	Adjustment of voltage source 1	From 0 to 9999	1000	
<b>(2) V/V</b>	Adjustment of voltage source 2	From 0 to 9999	1000	page 7
<b>Position</b>	Changeover switch position control	YES, NO	YES	
<b>Bklight</b>	Screen back-light control	From 1 to 99, (1= black screen)	99	page 8
<b>Contrast</b>	Screen contrast adjustment	From 1 to 99, (1= max contrast)	10	
<b>Modbus</b>	Activation of the RS485 serial link	YES, NO (no activation)	NO	page 9
<b>Prio EJP</b>	Management of EJP priority (see § 7.9.1)	YES, NO (no management)	NO	
<b>(1) OK?</b>	Confirmation of return of voltage source 1	YES, NO (not confirmed)	NO	page 10
<b>NO %</b>	Confirmation of U and F thresholds	OFF (no confirmation), ON	OFF	
<b>Hist/U%</b>	U threshold hysteresis adjustment	From 0 to 3%	2%	page 11
<b>Hist/F%</b>	F threshold hysteresis adjustment	From 0 to 2%	0%	
<b>(1)+/-</b>	Source 1 voltage gain adjustment	From 0 to 999	100	

*NB:* the dynamic adjustment of voltage thresholds is explained in detail in section 8.6.1.

### 7.6.2 - Selection and modification of a parameter

The first parameter of the first page, **Type**, will flash. Parameters can be selected and modified via the following process:

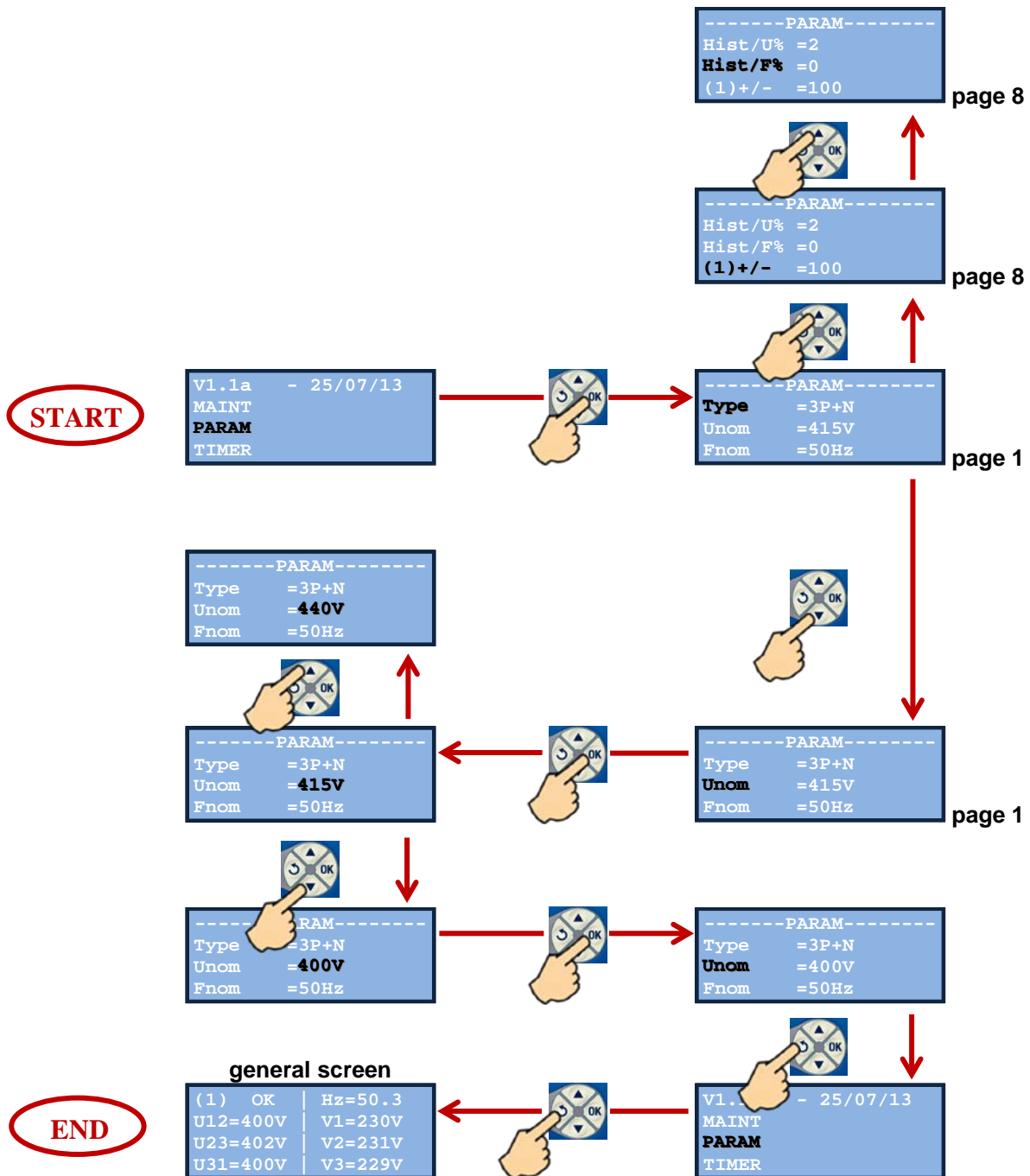


Figure 24 - process for modifying a parameter

### 7.7 - "TIMER" menu

The **TIMER** menu consists of 17 screens, each displaying 3 timers (except page 17).

The 50 timings (**T00** to **T49**), can be fully set by the user, optimising the performance of the **Verso 200** source changeover switch.

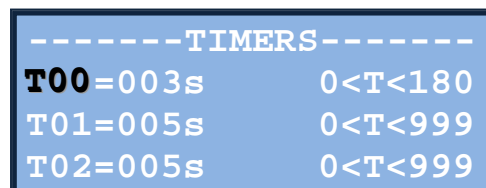


Figure 25 - TIMERS screen, page 1



### 7.7.1 - List of timers

The table below sets out the 50 timers available for viewing and adjustment via the **TIMER** menu.

No.	Meaning	Possible values	By default	
T00	Loss of voltage source 1	From 0 to 180 seconds	3 seconds	page 1
T01	Return of voltage source 1	From 0 to 999 seconds	5 seconds	
T02	Min. voltage fault source 1	From 0 to 999 seconds	5 seconds	
T03	Max. voltage fault source 1	From 0 to 999 seconds	5 seconds	page 2
T04	Min. voltage fault source 2	From 0 to 999 seconds	5 seconds	
T05	Max. voltage fault source 2	From 0 to 999 seconds	5 seconds	page 3
T06	Min. frequency fault source 1	From 0 to 999 seconds	5 seconds	
T07	Max. frequency fault source 1	From 0 to 999 seconds	5 seconds	
T08	Min. frequency fault source 2	From 0 to 999 seconds	5 seconds	page 4
T09	Max. frequency fault source 2	From 0 to 999 seconds	5 seconds	
T10	Source 1 control fault	From 2 to 999 seconds	5 seconds	
T11	Source 2 control fault	From 2 to 999 seconds	5 seconds	page 5
T12	Switch of source	From 0 to 999 seconds/10	10/10 seconds	
T13	Stabilisation of voltage source 1	From 0 to 999 seconds/10	10/10 seconds	
T14	Stabilisation of voltage source 2	From 0 to 999 seconds/10	30/10 seconds	page 6
T15	Establishment of voltage source 1	From 0 to 999 seconds/10	5/10 seconds	
T16	Establishment of voltage source 2	From 0 to 999 seconds/10	5/10 seconds	
T17	GS cooling source 1	From 0 to 999 seconds	60 seconds	page 7
T18	GS cooling source 2	From 0 to 999 seconds	60 seconds	
T19	Test mode in progress	From 0 to 999 seconds	600 seconds	
T20	EJP notice (for France only)	From 0 to 999 minutes	20 minutes	page 8
T21	EJP loss (For France only)	From 0 to 999 seconds	600 seconds	
T22	Power cut-off	From 0 to 999 seconds	10 seconds	
T23	Failure to start	From 0 to 999 seconds	30 seconds	page 9
T24	Reserved for future development	From 0 to 999 seconds	120 seconds	
T25	Reserved for future development	From 0 to 999 seconds	120 seconds	
T26	Scrolling down of measurement screens	From 1 to 10 seconds	5 seconds	page 10
T27	Reserved for future development	From 0 to 999 seconds	3 seconds	
T28	Critical min. voltage fault source 1	From 0 to 999 seconds	1 second	
T29	Critical max. voltage fault source 1	From 0 to 999 seconds	1 second	page 11
T30	Critical min. voltage fault source 2	From 0 to 999 seconds	5 seconds	
T31	Critical min. voltage fault source 2	From 0 to 999 seconds	5 seconds	
T32	Critical min. frequency fault source 1	From 0 to 999 seconds	1 second	page 12
T33	Critical max. frequency fault source 1	From 0 to 999 seconds	1 second	
T34	Critical min. frequency fault source 2	From 0 to 999 seconds	5 seconds	
T35	Critical max. frequency fault source 2	From 0 to 999 seconds	5 seconds	page 13
T36	Final fault source 1	From 0 to 999 seconds/10	5/10 seconds	
T37	Reserved for future development	From 0 to 999 seconds	1 second	
T38	Final fault source 2	From 0 to 999 seconds/10	5/10 seconds	page 14
T39	Reserved for future development	From 0 to 999 seconds	1 second	
T40	Production request	From 0 to 999 seconds	10 seconds	
T41	Switch in changeover switch power supply	From 0 to 999 seconds	3 seconds	page 15
T42	Back-light activation	From 0 to 999 seconds	15 seconds	
T43	Reserved for future development	From 0 to 999 seconds	5 seconds	
T44	Reserved for future development	From 0 to 999 seconds	5 seconds	page 16
T45	Reserved for future development	From 0 to 999 seconds	3 seconds	
T46	Reserved for future development	From 0 to 999 seconds	3 seconds	
T47	Reserved for future development	From 0 to 999 seconds	3 seconds	page 17
T48	Reserved for future development	From 0 to 999 seconds	3 seconds	
T49	Reserved for future development	From 0 to 999 seconds	3 seconds	



7.7.2 - Selection and adjustment of a timer

The first timer of page 1, **T00**, will flash. Timers can be selected and adjusted via the following process:

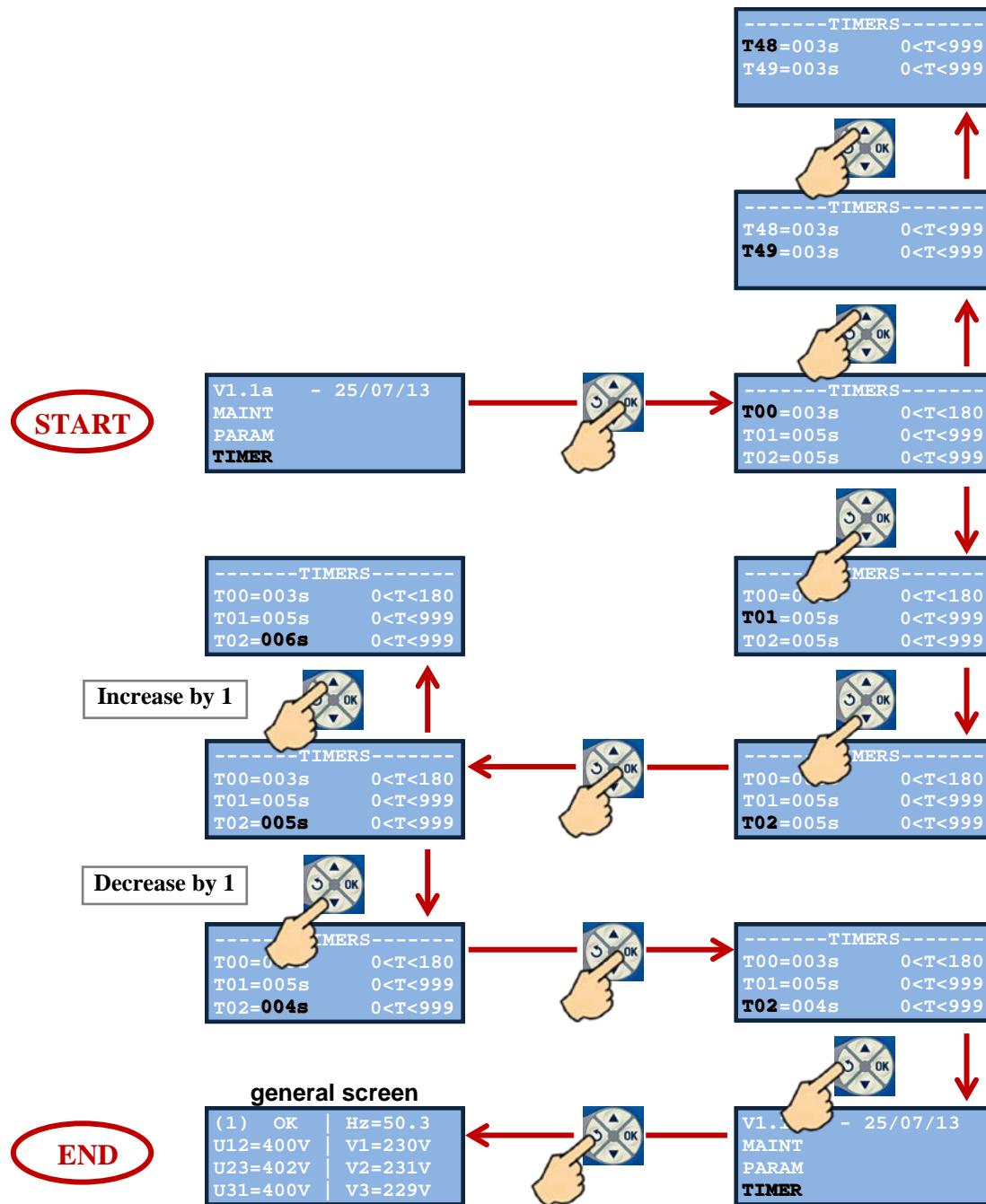


Figure 26 - process for adjusting a timer

## 7.8 - "PROGRAMS" menu

The **PROGRAMS** menu consists of several screens used to manage 3 **Verso 200** source changeover switch test programs.

These 3 programs use 4 different criteria to define the test.

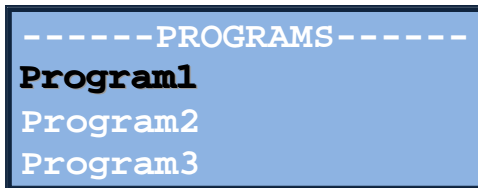


Figure 27 - PROGRAMS menu

### 7.8.1 - Description of criteria

The following criteria define the conditions in which the changeover switch operating program will run.

Criteria	Choice	Description	
Criterion 1	<b>Period</b>	<b>Off</b>	No programming
		<b>Week</b>	Generating set start-up on a very specific date. The corresponding date will be repeated every week of the year. Generating set shut-down is also possible. The date for this must be no more than 6 days after the start-up date.
		<b>Day</b>	Generating set start-up every day of the week, repeated every week of the year.
		<b>1Day</b>	Generating set start-up on a single date in the current year. There will be no start-up the following year.
Criterion 2	<b>Test</b>	<b>=0KW</b>	The generating set starts up, but the changeover switch remains in the <b>I</b> position (source 1). The test will stop according to the last 2 criteria.
		<b>&gt;0KW</b>	The generating set starts up, and the changeover switch shifts from the <b>I</b> position to the <b>II</b> position. The test will stop according to the last 2 criteria. The changeover switch will shift back from the <b>II</b> position to the <b>I</b> position.
Criterion 3	<b>StartDate</b>	<b>dd/mm (*)</b>	This allows the user to programme the start-up date for the generating set. This date will be systematically associated with a start-up time ( <b>Start Hour</b> ).
Criterion 4	<b>StopDate</b>	<b>dd/mm</b>	This allows the user to programme the stop date for the generating set. This date will be systematically associated with a stop time ( <b>Stop Hour</b> ).
	<b>StartHour</b>	<b>00h 00mn (**)</b>	This allows the user to programme the start-up time for the generating set.
	<b>StopHour</b>	<b>00h 00mn</b>	This allows the user to programme the stop time for the generating set.

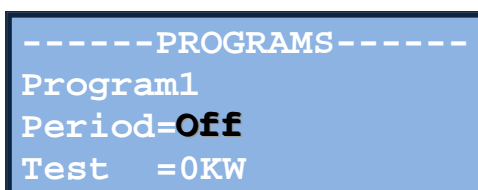
(\*) date format: day/month

(\*\*) time format: 00-23 hours and 00-59 minutes

### 7.8.2 - Selecting and modifying a program

When the **PROGRAMS** screen appears, "**Program1**" will be flashing. A program can be selected for configuration cyclically using the **▼** and **▲** buttons.

- Press **OK** to select one of the 3 programs to configure, for example program 1 "**Program1**".
- The 2 first criterion then appear: **Period** (criterion 1) and **Test** (criterion 2).



By default, the "**Period**" criterion will be set to "**Off**" (flashing).

- Press **▲** or **▼** to select an option for criterion 1 (**Week**, **Day** or **1Day**).

- Press **OK** to confirm.

The option **=0KW** or **>0KW** will then flash.

- Press **▲** or **▼** to select an option for criterion 2 (**=0KW** or **>0KW**).

- Press **OK** to confirm.



According to the option selected for criterion 1, one of the 3 screens below will appear:

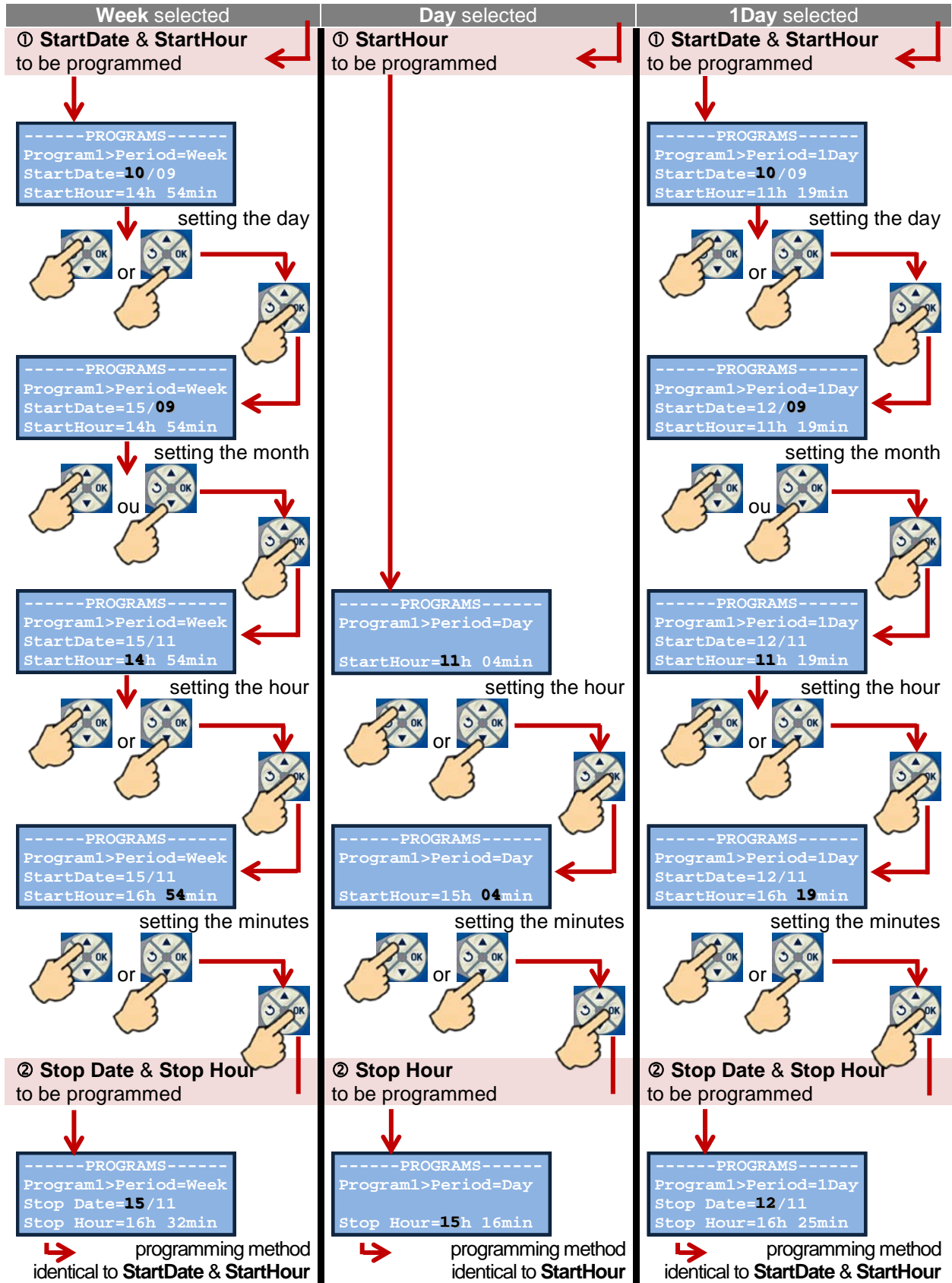


Figure 28 - method for programming in the PROGRAMS menu

## 7.9 - "I/O" menu

The I/O menu consists of 2 screens and 5 possible settings.

This menu is used to set the parameters for the 3 inputs and 2 outputs provided on the electronic card.

```

-----Input/Output-----
IN #1=F02 (2) >0KW
IN #2=F04 (1) OK?
IN #3=F08 Lamp test
    
```

Figure 29 - I/O menu, page 1

The inputs are labelled **IN#1**, **IN#2** and **IN#3**, and the outputs are labelled **OUT#1** and **OUT#2**.

### 7.9.1 - Functions linked to inputs and outputs

The inputs and outputs are linked to pre-determined functions (**F00** to **F09** for the inputs and **F00** to **F12** for the outputs). According to the user's needs, two inputs or the two outputs can be programmed for the same function (e.g.: **IN#1=F04**, **IN#2=F04**). All available functions are described in the table below.

The title of each function is displayed on the screen for each function number (see previous screenshot).

Functions available for inputs		
Number	Title	Description
<b>F00</b>		No associated function
<b>F01</b>	<b>PreavisEJP</b>	EJP notice (for France only) (*)
<b>F02</b>	<b>Top EJP</b>	Top EJP (for France only) (*)
<b>F03</b>	<b>Prior EJP</b>	EJP priority (for France only) (*)
<b>F04</b>	<b>(2) &gt;0KW</b>	Source 2 production request
<b>F05</b>	<b>(2) &gt;0KW+T</b>	Source 2 production request associated with a timer
<b>F06</b>	<b>(1) OK?</b>	Confirmation of return of voltage source 1
<b>F07</b>	<b>1-&gt;(0)&lt;-2</b>	Changeover switch forced into <b>O</b> position
<b>F08</b>	<b>Lamp test</b>	Lamp test over distance
<b>F09</b>	<b>SOS 4F01</b>	Surge arrester fault report (optional fitting to the changeover switch)

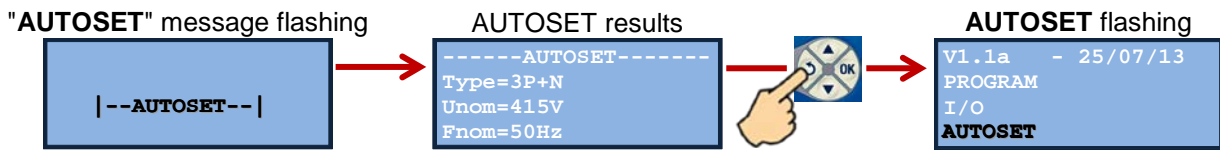
Functions available for outputs		
Number	Title	Description
<b>F00</b>		No associated function
<b>F01</b>	<b>-&gt;(1)</b>	Report changeover switch closed in <b>I</b> position
<b>F02</b>	<b>-&gt;(2)</b>	Report changeover switch closed in <b>II</b> position
<b>F03</b>	<b>(1)-&gt;</b>	Report changeover switch open over source 1
<b>F04</b>	<b>(2)-&gt;</b>	Report changeover switch open over source 2
<b>F05</b>	<b>(1) OK</b>	Source 1 OK in performance range
<b>F06</b>	<b>(2) OK</b>	Source 2 OK in performance range
<b>F07</b>	<b>AUTO NOK</b>	Verso 200 not in AUTO mode
<b>F08</b>	<b>(2) + T22</b>	Power interruption request
<b>F09</b>	<b>EJP</b>	EJP mode report (*)
<b>F10</b>	<b>IN#1</b>	Input 1 report
<b>F11</b>	<b>IN#2</b>	Input 2 report
<b>F12</b>	<b>IN#3</b>	Input 3 report

(\*) **EJP**: this is a concept specific to France and means: **E**ffacement **J**ours de **P**ointe (peak-day load reduction)

The default setting for the 3 inputs and 2 outputs is **F00** (no associated function).



Pressing **OK** will initiate a 7-second auto-configuration. The **AUTOSET** message will flash. At the end of the auto-configuration process, the three main parameters detected by the **Verso 200** module will appear: "**Type**", "**Unom**" and "**Fnom**" (see figure 32 below).



**Figure 32 - AUTOSET sequence**

No modifications can be made on this screen. However, if one or more parameters (network type, voltage, frequency) have been modified in the **PARAM** menu and the auto-configuration has then been run, the auto-configuration will have modified one or more of the three parameters preset in the **PARAM** menu.

If source 1 is not present when the auto-configuration is run, the **Verso 200** module will display: **type=3P+N, Unom=208V, Fnom=50Hz.**

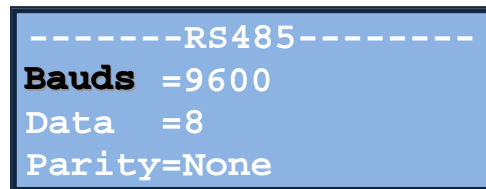
Pressing **U** allows the user to exit this screen and return to the list of menus.

### 7.11 - RS485 menu

The **RS485** menu consists of 2 pages and 5 possible settings.

This menu is can be used to fully customise the settings for the serial link of the electronic card.

Please note that an RS485 serial link is optional.



**Figure 33 - RS485 menu, page 1**

#### 7.11.1 - List of RS485 parameters

The table below sets out the 5 parameters available for viewing and adjustment via the **RS485** menu.

Title	Meaning	Possible values	By default
<b>Bauds</b>	Communication speed	9600	9600
<b>Data</b>	Number of data entries	7 or 8	8
<b>Parity</b>	Parity	None (without), Even, Odd	None
<b>StopBit</b>	Number of stop bytes	0 or 1	1
<b>IDSlave</b>	Slave number	From 1 to 255	1

} page 1  
} page 2

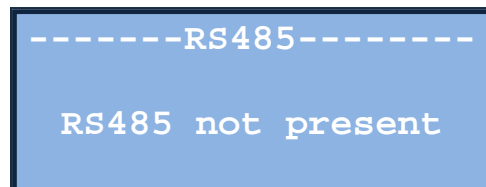
#### 7.11.2 - Selecting and modifying an RS485 parameter

The process for selecting and modifying a parameter via the **RS485** menu is identical to that for modifying a parameter via the **PARAM** menu.

#### 7.11.3 - No RS485

If there is no RS485 link on the electronic card, the screen to the right will appear when the user selects this menu.

Pressing **U** allows the user to exit this screen and return to the list of menus.



**Figure 34 - "no RS485" screen**

The RS485 link is not yet available. Calling up the RS485 menu will, therefore, bring up the screen in figure 34.

### 7.12 - "INIT" menu

The **INIT** menu consists of one screen.  
 This menu can be used to initiate the system.  
 The system must be initiated with voltage supply from source **1**.  
 The **OK** command will appear on the screen.

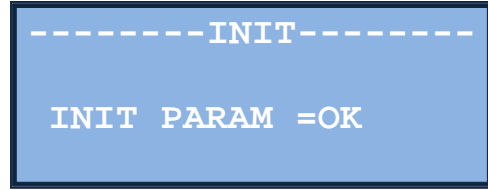


Figure 35 - INIT screen

After pressing **OK**, initialisation is launched and the following actions are run:

- 1- Return to the default values for the **PARAM** menu parameters;
- 2- Automatic network-, voltage- and frequency-type test;
- 3- Return to the default values for the **TIMER** menu timers;
- 4- The 3 inputs and 2 outputs are set to **F00**;
- 5- The events stack is reset in the **EVENTS** menu.

**IMPORTANT:** if there is no voltage supply from source **1** when initiating the system, there will be no automatic test (point 2 above) and the following default settings will be configured:

- source **1** configured as **3P+N** (default parameter);
- voltage configured as **208V** (lowest possible value) (default parameter = 415V);
- frequency configured as **50Hz** (default parameter).

The initialisation lasts around 10 seconds and proceeds as follows:

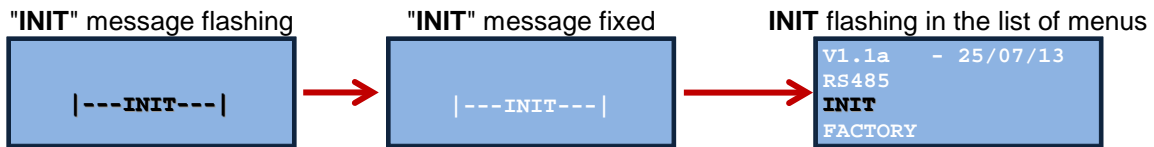


Figure 36 - initialisation sequence

### 7.13 - "FACTORY" menu

The **FACTORY** menu consists of 2 screens and 5 accessible data entries.  
 Each data entry appears on an additional screen for a specific function.  
 The five screens are described below.

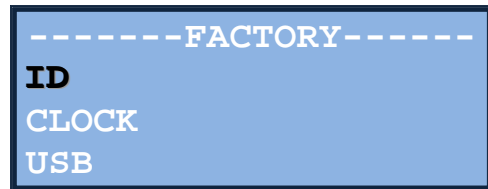


Figure 37 - FACTORY menu

#### 7.13.1 - List of screens under the FACTORY menu

The table below sets out the screens that can be accessed from the **FACTORY** menu.

Title	Meaning
<b>ID</b>	Provides information on the electronic card
<b>CLOCK</b>	Allows the date and time to be updated
<b>USB</b>	Allows data files to be recovered or transferred
<b>SPY</b>	Reserved for troubleshooting by SDMO Industries
<b>AUTOCONF</b>	Adjustment of parameters

page 1  
 page 2

#### 7.13.2 - ID screen

The **ID** screen provides information on the **Verso 200** electronic card:

- hardware identification (electronic card);
- software identification;
- the **Verso 200** module serial number.

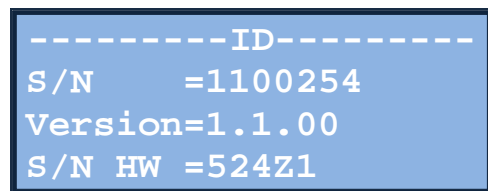


Figure 38 - ID menu



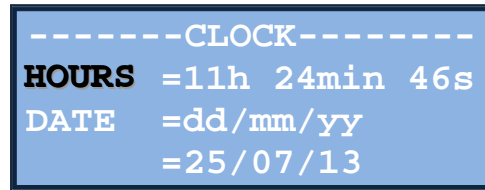
This information cannot be adjusted. It also appears in the "S/N.txt" file, which is created when a USB key is inserted (see section 7.13.4).

Pressing the **↵** button exits this screen.

### 7.13.3 - "CLOCK" screen

The "**CLOCK**" screen can be used to set the time and date which will then be used for recording the time and date of events (conditions, alarms and faults).

When the menu is brought up, **HOURS** will flash.



**Figure 39 - CLOCK menu**

Process for setting the time:

- Starting from the screen above, press **OK** to access the time.
- Press **▲** or **▼** to adjust the hour (format: 00-23), then press **OK** to confirm.
- Press **▲** or **▼** to adjust the minutes (format: 00-59), then press **OK** to confirm.
- Press **▲** or **▼** to adjust the seconds (format: 00-59), then press **OK** to confirm.

**HOURS** will flash again.

Process for setting the date:

- Starting from the previous screen, press **▼** to access the **DATE**.
- **DATE** will flash. Press **OK** to access the date.
- Press **▲** or **▼** to adjust the day (format: 01-31), then press **OK** to confirm.
- Press **▲** or **▼** to adjust the month (format: 01-12), then press **OK** to confirm.
- Press **▲** or **▼** to adjust the year (format: 12-99), then press **OK** to confirm.

**HOURS** will flash again.

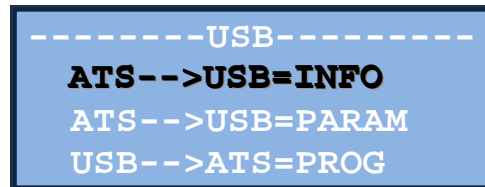
- Press **↵** to exit the screen.

**NB:** when a data category is flashing (hours, minutes, seconds, day, month, year), pressing **↵** has no effect.

### 7.13.4 - "USB" screen

Insert a USB key into the port in the electronic card. If the key is recognised by the system, the screen to the right can then be accessed through the **FACTORY** menu, by selecting **USB**.

The line displaying **ATS-->USB=INFO** will be flashing.



**Figure 40 - USB menu**

3 options are available on this screen:

<b>ATS--&gt;USB=INFO</b>	Automatic creation of a txt file ( <b>S/N.txt</b> ) and transfer of the following data from the electronic card to the USB key: ⇒ The full <b>PARAM</b> , <b>TIMER</b> , <b>ID</b> and <b>EVENTS</b> menus
<b>ATS--&gt;USB=PARAM</b>	Automatic creation of a txt file ( <b>PARAM.txt</b> ) and transfer of the following data from the electronic card to the USB key: ⇒ the full <b>PARAM</b> and <b>TIMER</b> menus
<b>USB--&gt;ATS=PROG</b>	This allows the transfer of data from the <b>PARAM.txt</b> file on the USB key to the electronic card: ⇒ The full <b>PARAM</b> menu

Select the desired option using the **▼** and **▲** buttons, then press **OK** to run the operation. Once the operation has been completed, the first line, **ATS-->USB=INFO**, will flash again regardless of the option that was selected. The USB key can then be removed.

Press the **↵** button to exit the **USB** menu.



If the USB key is not connected to the electronic card, the screen to the right will appear when the **USB** menu is brought up.



Figure 41 - USB not detected

#### 7.13.5 - "SPY" screen

The **SPY** screen is for the internal use of SDMO Industries.

It gives a full overview of the condition of the source changeover switch (LEDs, switch positions, inputs, outputs, etc.).

It allows the troubleshooting of the inputs and outputs of the electronic card.

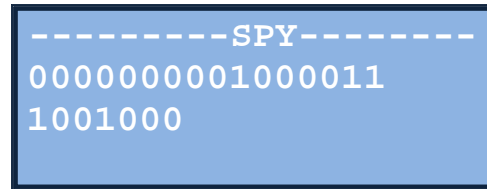


Figure 42 - SPY screen

Pressing the **U** button exits the **SPY** screen and returns to the list of accessible screens in **FACTORY**.

#### 7.13.6 - "AUTOCONF" screen

The **AUTOCONF** screen allows an auto-configuration to be run when the source changeover switch goes back to receiving voltage from source 1.

On the screen to the right, **AUTOCONF** will be flashing. Press **OK**, "0" will flash.

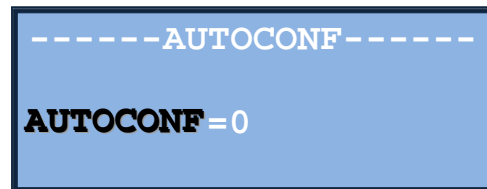


Figure 43 - AUTOCONF screen

Change the **AUTOCONF** value by pressing **▼** or **▲**. The **AUTOCONF** value will change to "1". Press **OK** to confirm this choice.

The next time the changeover switch has its power supply cut and then return, **or** when it is next initiated (**INIT** menu), an automatic configuration will be run.

The flowchart below details the automatic sequence that runs once **AUTOCONF=1** has been selected and an initialisation has been run (section 7.12):

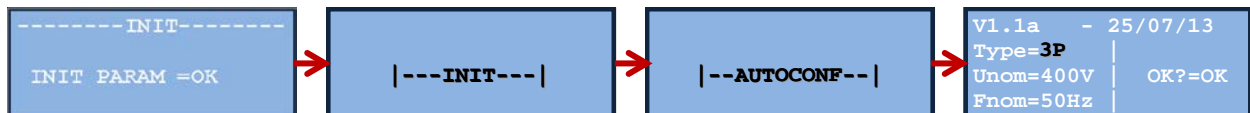


Figure 44 - INIT and AUTOCONF sequence

## 8 - Automatic responses and safety features

### 8.1 - Voltage detection

The table below sets out the voltage ranges that allow the system to detect the nominal voltage value **Unom** during auto-configuration.

Nominal voltage	Nominal voltage detection ranges			
	Min voltage	Max voltage	Min deviation	Max deviation
208V		<b>214V</b>		<b>6V</b>
220V	<b>215V</b>	<b>227V</b>	<b>-5V</b>	<b>7V</b>
230V	<b>228V</b>	<b>237V</b>	<b>-2V</b>	<b>7V</b>
240V	<b>238V</b>		<b>-2V</b>	
380V		<b>390V</b>		<b>10V</b>
400V	<b>391V</b>	<b>407V</b>	<b>-9V</b>	<b>7V</b>
415V	<b>408V</b>	<b>427V</b>	<b>-7V</b>	<b>12V</b>
440V	<b>428V</b>		<b>-12V</b>	

**Table 8 - voltage detection ranges**

#### How to use the table:

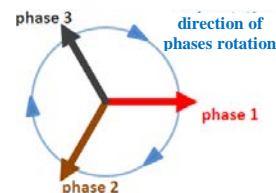
If the voltage at the terminals of the changeover switch, when supplied by source 1, is between **408 Volts** and **427 Volts**, the system will display a nominal voltage of **415 Volts** on the screen.

Nevertheless, it is the user's responsibility to check the value given by the system, as it may have been incorrect at the time of measurement.

### 8.2 - Phase sequence

The electronic module is equipped with a system to detect the order of source 1 (mains) and source 2 (generating set) phases. The three phases of a three-phase network create a rotating field following the sketch below.

- . The rotating field is "**direct**" when the three phases rotate clockwise.
  - . The rotating field is "**reverse**" when the three phases rotate anticlockwise.
- In the case of a reverse field, it is necessary to modify the wiring of the source changeover switch.



### 8.3 - Loss of voltage source 1

There is considered to be a "**loss of voltage**" over source 1 when the mains voltage **U** upstream of the source changeover switch is equal to or below **Unom/2**.

When voltage is detected to be at this level, the power outage timer (**T00**) is activated. If, at the end of this timer, the voltage has not returned to a correct level, the power cut will then be taken into account. The changeover switch will remain in the **I** position. A starting order will be sent to the generating set. Following the generating set start-up and when the voltage has stabilised (**T14**), supply is returned to the source switching mechanism and the changeover switch changes to the **O** position, and then to the **II** position. Supply is then returned.

### 8.4 - Return of voltage source 1

There is considered to be a "**return of voltage**" over source 1 when the mains voltage **U** upstream of the source changeover switch is greater than **Unom/2**.

When voltage is detected to be at this level, the mains return timer (**T01**) is activated. If, at the end of the timer, voltage has not fallen back below **Unom/2**, the return of voltage is confirmed, timer **T18** is started and there will be a switch from source 2 to source 1. At the end of the **T18** timer, the generating set automatically receives a stop order (remote deactivation order).

### 8.5 - Alarms and faults associated with frequency and voltage

This section explains how to acknowledge and manage the alarms and faults associated with variations in frequency and voltage over the two voltage sources.

The voltage (in Volts) and frequency (in Hertz) over both voltage sources **1** and **2** are constantly checked.

- An alarm is triggered as soon as the voltage or frequency **fall** to their **minimum threshold**.
- An alarm is triggered as soon as the voltage or frequency **rise** to their **maximum threshold**.
- When any of the 8 thresholds are reached, the LED associated with the voltage source, (**1** or **2**), will flash orange, and a timer will be activated.

Source	Event	Consequence 1	Consequence 2
<b>1</b>	Min voltage threshold reached	LED <b>11</b> flashing	Timer <b>T02</b> activated
<b>1</b>	Max voltage threshold reached	LED <b>11</b> flashing	Timer <b>T03</b> activated
<b>2</b>	Min voltage threshold reached	LED <b>12</b> flashing	Timer <b>T04</b> activated
<b>2</b>	Max voltage threshold reached	LED <b>12</b> flashing	Timer <b>T05</b> activated
<b>1</b>	Min frequency threshold reached	LED <b>11</b> flashing	Timer <b>T06</b> activated
<b>1</b>	Max frequency threshold reached	LED <b>11</b> flashing	Timer <b>T07</b> activated
<b>2</b>	Min frequency threshold reached	LED <b>12</b> flashing	Timer <b>T08</b> activated
<b>2</b>	Max frequency threshold reached	LED <b>12</b> flashing	Timer <b>T09</b> activated

⇒ If the voltage (or frequency) remains outside of the limits set by the max and min thresholds, **a fault is triggered** at the end of the timer associated with the corresponding threshold..

The LED for the associated source (**1** or **2**) will then become fixed-red. The switch will also be opened (for source **1** or source **2**).

⇒ If the voltage (or frequency) falls back inside the fixed limits before the end of the timer, a fault is not be triggered and the alarm will disappear.

## 8.6 - Setting voltage and frequency thresholds (dynamic)

### 8.6.1 - Setting voltage thresholds

Whatever its capacity in Amperes, the switch has operational limits in terms of voltage power supply. The table below summarises the adjustable threshold limits via the screen, in terms of the voltage supplied via source **1** and source **2**.

The changeover-switch electronics and motors function correctly between **184 Volts** and **276 Volts**.

Voltage power supply to the electronics		208V	220V	230V	240V	254V
Possible type of network (Volts - no. of phases with or without a neutral point)	1P+N		220V	230V	240V	
	2Ph+N		220V	230V	240V	
	3Ph	208V	220V	230V	240V	440V
	3Ph+N	208V	220V or 380V	230V or 400V	240V or 415V	440V
<b>Min possible threshold that can be set in %</b>		<b>12</b>	<b>16</b>	<b>20</b>	<b>22</b>	<b>28</b>
Min. possible voltage in <b>Volts</b>		184	184	184	184	184
<b>Max possible threshold that can be set in %</b>		<b>33</b>	<b>25</b>	<b>20</b>	<b>15</b>	<b>9</b>
Max. possible voltage in <b>Volts</b>		276	276	276	276	276

**Table 9 - adjustable threshold limits for voltage**

It should be noted that:

- the more the nominal voltage decreases, the lower the min programmable threshold;
- the more the nominal voltage increases, the lower the max programmable threshold.

In the example of a 3Ph+N network with a voltage of 415 Volts upstream of the changeover switch and an electronics voltage power supply of 240 Volts, then the electronic system will automatically adjust the range settings for the two voltage thresholds, which will be:

<b>Min. threshold</b>	<b>22%</b>	...	<b>12%</b>	...	<b>0%</b>	...	<b>8%</b>	...	<b>15%</b>	<b>Max. threshold</b>
<b>Min voltage</b>	<b>184V</b>	...	<b>211V</b>	...	<b>240V</b>	...	<b>221V</b>	...	<b>276V</b>	<b>Max voltage</b>
					<b>Nominal voltage</b>					

## 8.6.2 - Setting frequency thresholds

Whatever its capacity in Amperes, the source changeover switch has operational limits in terms of frequency. The table below summarises the adjustable threshold limits via the screen, in terms of the frequency of the voltage supplied via source 1 and source 2.

The changeover-switch electronics and motors function correctly between **45 Volts** and **65 Volts**.

Frequency of the voltage power supply to the electronics	50Hz	60Hz
<b>Possible type of network</b>	1P+N	1P+N
	2P+N	2P+N
	3P	3P
	3P+N	3P+N
<b>Min possible threshold in %</b>		
Min. possible frequency in Hertz	10	25
<b>Max possible threshold in %</b>		
Max. possible frequency in Hertz	30	8
	65	65

**Table 10 - adjustable threshold limits for frequency**

In the example of a frequency of 50Hz over the voltage power supply upstream of the source changeover switch, the electronic system will automatically adjust the range setting of the two frequency thresholds, which will be:

<b>Min. threshold</b>	<b>10%</b>	...	<b>6%</b>	...	<b>0%</b>	...	<b>12%</b>	...	<b>30%</b>	<b>Max. threshold</b>
<b>Min frequency</b>	<b>45Hz</b>	...	<b>47Hz</b>	...	<b>50Hz</b>	...	<b>56Hz</b>	...	<b>65Hz</b>	<b>Max frequency</b>
					<b>Nominal frequency</b>					

## 8.7 - Critical and final voltage thresholds

As well as the min. and max. thresholds that can be adjusted in relation to the voltage power supply, 4 additional thresholds are in place in order to ensure optimum protection of the electronics.

### 8.7.1 - Critical thresholds

The critical thresholds are the min. and max. operational voltages issued by the appliance manufacturer:

- Min. critical threshold = **184 Volts**;
- Max. critical threshold = **276 Volts**.

If the voltage reaches one of the 2 critical thresholds, a timer is activated (see table of timers in section 7.7.1). If, at the end of this timer, the voltage has not fallen back below the critical threshold, the electronic system automatically turns the switch to the opposite position.

### 8.7.2 - Final thresholds

The final thresholds are the voltages that must not be exceeded, beyond the critical thresholds:

- Min. final threshold = **150 Volts**;
- Max. final threshold = **300 Volts**.

If, while the critical threshold timer is active, the voltage reaches any of the 2 final thresholds, a new, very short timer (usually 0.5 seconds) will be activated. At the end of this timer, the electronic system automatically turns the switch to the opposite position.

## 8.8 - Critical frequency thresholds

As well as the min. and max. thresholds that can be adjusted in relation to the frequency of the voltage power supply, 2 additional thresholds are in place in order to ensure optimum protection of the electronics of the unit.

The critical thresholds are the min. and max. operational frequencies issued by the appliance manufacturer:

- Min. critical threshold = **45Hz**;
- Max. critical threshold = **65Hz**.

If the voltage reaches one of the 2 critical thresholds, a timer is activated (see table of timers in section 7.7.1). If, at the end of this timer, the frequency has not fallen back below the critical threshold, the electronic system automatically turns the switch to the opposite position.

### 8.9 - "EJP" function (for France only)

The "EJP" function can be used for the French market. "EJP," standing for peak-day load reduction, is a pricing system and a way of operating employed by electricity providers in France.

The user enjoys a low rate over a period of 343 days per year. In exchange, the price of a kWh is at a premium for the remaining 22 days. These days are called "EJP days" and are distributed between 1 November and 31 March.

The user is warned the day before each EJP-rate day ("EJP-12 hours" contact available). Another "EJP-30 minutes" contact (again called "EJP notice") closes automatically 30 minutes before the start of the EJP.

A **T20** timer (generally 20 minutes) is initiated, and at the end of this timer the generating set starts up automatically.

When the "top EJP" contact is closed 30 minutes after the EJP notice, the switch turns to the "I" position, to the "O" position and then to the "II" position.

The "top EJP" contact remains closed from 6am to 10pm. At 10pm, the contact opens, the switch returns to the I position, and the generating set begins a cool-down and then stops at the end of the **T18** timer.

The EJP function is included with the **Verso 200**, but it is not programmed (see paragraph 7.9.1).

### 8.10 - Effect of temperature

The changeover switch is designed to operate inside housing (unit or cabinet) at 40°C.

If the temperature surrounding the switch exceeds 40°C, the user should refer to the table below in order to determine the switch capacity applicable in relation to its intended use (load) and the temperature.

Temp.	Capacity in Amperes										
	200	250	400	630	800	1000	1250	1600	2000	2500	3200
Up to 40°C	<b>Currents with downgrade (in Amperes)</b>										
From 41°C to 50°C	180	225	360	567	720	900	1125	1440	1800	2250	2880
From 51°C to 60°C	144	180	288	454	576	720	900	1152	1440	1800	2304
From 61°C to 70°C	101	126	202	318	404	504	630	807	1008	1260	1613

**Table 11 - temperature downgrades**

**Temp.** is the surrounding air temperature of the appliance.

It should be noted that using the source changeover switch in a surrounding air temperature of over 60°C reduces the switch performance by half. Extreme care must, therefore, be taken, with regard to the ambient temperature inside the unit.

## 9 - Options

The table below sets out the options available for the **Verso 200** source changeover switch.

1	IT set-up with neutral point (ITAN)	Replacement of the 4F17 fuse with a 3P+N circuit breaker
2	IT set-up without neutral point (ITSN) For $U_{nom} \leq 240V$	Replacement of the 4F17 fuse with a 3P circuit breaker
3	IT set-up without neutral point (ITSN) For $U_{nom} \geq 240V$	Same as option no. 2, with the addition of a three-phase kit without neutral point (auto-transformer)
4	Three-phase network without neutral from 380V to 440V	Addition of a three-phase kit without neutral (auto-transformer)
5	70kA surge arrester	Addition of a surge arrester kit, only for size 1 equipment, delivered with installation notice
6	wiring through the top	Impossible after delivery, must be pre-ordered
7	IP55 protection rating	For size 1 unit only
8	Base	Height 200mm for all equipment sizes

