OPERATING MANUAL

EN

STATYS

200 A to 1800 A Cabinet and Integrable Frame

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EN INDEX

1. WARRANTY CERTIFICATE

The warranty terms and conditions are stipulated in the offer, by default the following clauses apply.

The SOCOMEC warranty is strictly limited to the product(s) and does not extend to equipment which may be integrated with this/these product(s), nor the performance of such equipment.

The manufacturer guarantees its products to be free from manufacturing faults and defects in design, material or workmanship, subject to the limits set forth below.

The manufacturer reserves the right to modify the delivery with a view to fulfilling these guarantees or to replace defective parts. The manufacturer's warranty does not apply in the following cases:

- fault or defect in the design of parts added or supplied by the customer
- fault due to unforeseen circumstances or force majeure
- replacement or repair resulting from normal wear and tear of the modules or machinery
- damage caused by negligence, lack of proper maintenance or misuse of the products
- repair, modification, adjustment or replacement of parts undertaken by unqualified third parties or personnel without the express consent of SOCOMEC

The warranty period is twelve months commencing from the date of delivery of the product.

The repair, replacement or modification of the parts during the warranty period does not imply or justify any extension of the warranty beyond the original period.

In order to establish a valid warranty claim, the purchaser must notify the manufacturer in writing immediately after the discovery of any apparent material defects and provide any and all supporting evidence of the defects at the latest within eight days before the date of expiry of the warranty.

Defective parts which have been returned and replaced free of charge shall become the property of SOCOMEC.

The warranty is void if the purchaser has undertaken modifications or repairs on the devices on his or her own initiative and without the express consent of the manufacturer.

The manufacturer's responsibility is strictly limited to the obligations defined in this warranty (repair and replacement) excluding any other right to claim compensation or indemnity.

Any import tax, duty, fee or charge of any nature whatsoever imposed by European regulations or those of an importing country or of a transit country shall be paid by the purchaser.

2. SAFETY PROCEDURES

2. 1. Foreword

Thank you for choosing the STATYS Static Transfer System from SOCOMEC.

This equipment complies with the IEC 62310-2 product standard concerning Static Transfer Systems (STS).

This equipment conforms to the EC directives applicable to this type of product. This conformity is indicated by the CE mark: CE

2. 2. Precautions

For connection of STATYS, refer to the installation notice.

Carefully read this manual before operating STATYS.

CAUTION

For optimal use, it is recommended to maintain the ambient temperature and humidity at the values specified by the manufacturer.

DANGER

⚠ **When in shutdown mode, a STS remains powered by supplies at the input of each of the two sources.**

2. 3. Electrical risk

In normal operating conditions, there is no danger for personnel handling this equipment.

WARNING

All operations and maintenance must be performed by authorised personnel who have undertaken suitable training.

Scrupulously follow the operating or maintenance instructions described in this manual.

Take maximum precautions and determine which parts are live:

- by following the load diagrams,
- by checking the presence of potential with a voltmeter, for example.

2. 4. Risk of power cut

WARNING

Scrupulously follow the operating instructions described in this manual to prevent inadvertent power cuts which may pose a safety hazard to the user.

3. THE ROLE OF STATYS

The role of STATYS is to monitor the alternate source, to detect any failure of the preferred source and, if this should occur, to ensure that the load is automatically transferred to the alternate source.

4. OPERATING PRINCIPLE

STATYS is an autonomous electrical device which permits the seamless transfer of the load between a preferred electrical source and another alternate, synchronous or unsynchronous source (see “Functional diagram” § 6).
Under normal operation, STATYS supplies the load from the preferred source. S1 or S2 can be selected as the preferred source by the user, according to on-site restrictions.

Two transfer modes are possible:

- manual transfer mode, controlled by the operator locally or remotely by means of a BMS or other communicating system
- automatic transfer mode, which occurs when an out-of-tolerance voltage is detected on the preferred source
  The changeover is made without source overlap according to the Break-Before-Make principle.

NOTE: The preferred source (source 1 or source 2) is selected using the keyboard and this selection is displayed on-screen.

5. OPERATING MODES

5. 1. Manual transfer

The user is able to control the transfer of the load from one source to another, both via the keypad and via communication (see "Communication interface" § 8).
Manual transfer does not disturb the supply to the load.
If the synchronisation conditions are not met after 30 seconds (factory default setting), an asynchronous transfer occurs, if authorised, otherwise the request is cancelled.
If the transfer cannot take place (for example, 2nd source out of tolerance), the icon  appears.

Note: The alarm will shut off automatically when normal conditions are restored.

5. 2. Automatic transfer

Automatic transfer occurs in the event of a voltage drop, frequency drop or when the preferred source is unavailable. It does not interrupt the supply to the load. Automatic transfer switches the supply from the preferred source to the alternate source. Once the preferred source is re-established, the system automatically returns to this source after a time delay, which can be configured by the user.

The parameters that define the quality thresholds of the source and the automatic return can be adjusted in programming mode (see “STS settings” § 6.10).

To ensure totally secure transfer, STATYS continuously monitors the presence of the alternate source.
If the alternate source is unavailable (or if the voltage exceeds the preset tolerances), the transfer function is inhibited. STATYS raises an alarm to warn the operator that the transfer is no longer possible.

Automatic return from the alternate source back to the preferred source may also occur following a manual transfer.

In the event of a short circuit at the output of the supplied equipment, the transfer function is inhibited. This stops the short circuit from being transmitted along the other track and thus prevents the other source from being interrupted.

Two types of transfer may occur, synchronous or asynchronous, according to the source synchronisation status and the hardware configuration.

Synchronous transfer

Synchronous transfer occurs automatically when the two sources S1 and S2 are deemed to be synchronised, e.g. when their phase deviation is within the tolerance window (standard +/- 15°). In this case, switching the source does not alter the phase.

If the phase deviation exceeds this tolerance window, synchronous transfer is inhibited and automatic changeover to the other source will not be possible. However, the transfer may in any event be executed in these conditions if the system is configured for synchronous/asynchronous transfer.

NOTE: STATYS is configured for synchronous/asynchronous transfer by default.

It may be configured to “synchronous only” transfer for applications which are sensitive to phase shifts (see “Advanced parameters” § 9).

Most information processing equipment, servers, computer... are impervious to significant phase variations.

However if a significant part of the load is composed by magnetic elements (typicaly when there is a transformer between STATYS and the loads) there is a risk of inrush in case of transfer. In this case ATSM fonction must be activated (see “ATSM fonction” § 5.3).

Asynchronous transfer

Automatic asynchronous transfer occurs only if it is authorised by the software configuration (standard factory configuration, see “Advanced parameters” § 9) and if the sources S1 and S2 are not synchronised, e.g. their phase deviation exceeds the tolerance window. In this case, switching the source may produce a significant phase variation during the changeover.

This type of transfer allows for automatic load changeover between sources which are not permanently controlled, or which are unusually out of phase, thereby maximising the security of the power supply.

5. 3. Advance Transfer Switching Management (ATSM)

This function is dedicated to manage the startup and the transfer on downstream magnetic loads; typically when a transformer is placed between the STS and a critical load. In this case, there is a risk of high of transient current in case of transfer due to the magnetic load behavior. Here ATSM must be activated to avoid this high current to creat the risk to trip the upstream protection.

ATSM function works by limiting the transient output current (not activated by default). It measures the transformer magnetic flux and transfer each phase individually. Each phase is closed at the moment where the source voltage is matching the transformer flux. By doing so, the output current is not going higher than the nominal current of the load .

5. 4. Automatic restart function

Following the total unavailability of both sources and if STATYS is in conduction state on one of the two sources, an automatic restart and conduction occurs on the return to one of the 2 sources.

The supply is re transferred automatically onto the preferred source as soon as this source becomes available.

The automatic restart function is configurable and is set to OFF by default.

5. 5. Overload operation

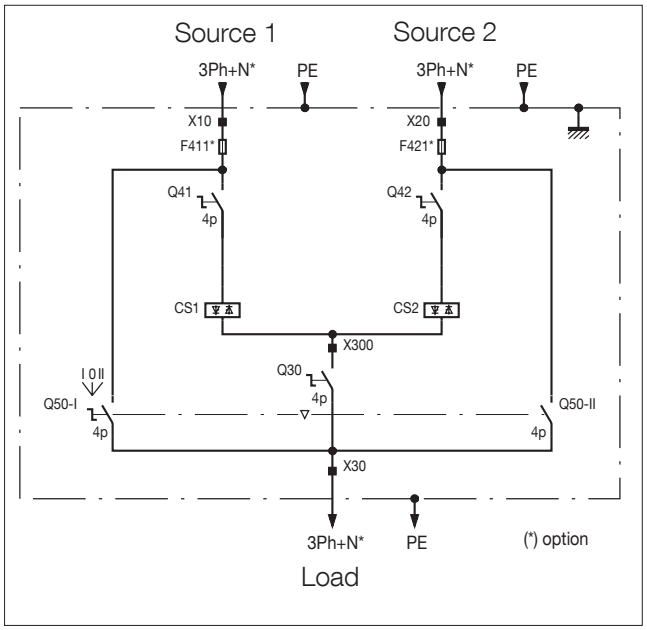
The STATYS overload control is based on the principle of filling a reservoir more or less rapidly, depending on the measured load rate.

Each STATYS string has its own reservoir.

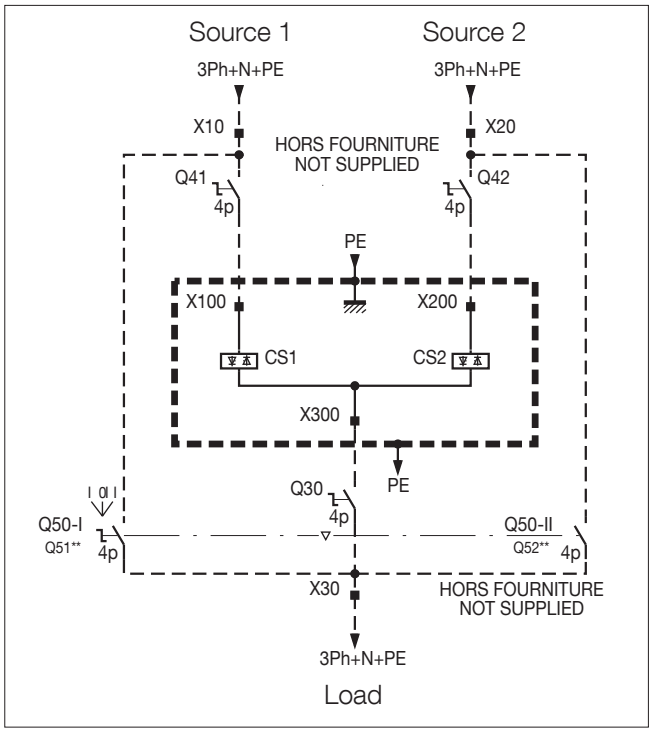
When STATYS is in overload, an “OVERLOAD ALARM” message appears and the “GENERAL ALARM” is triggered.

6. FUNCTIONAL DIAGRAMS

Cabinet Integrated



Integrable chassis



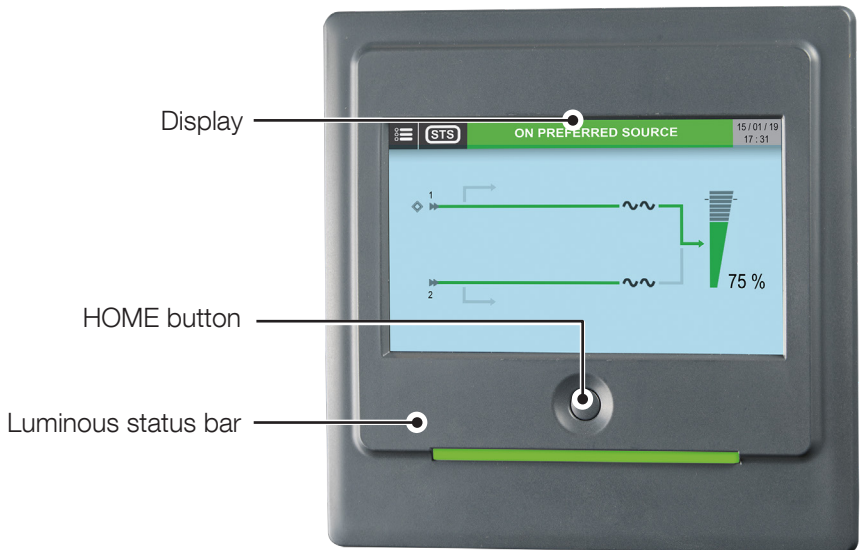
** = Q51 and Q52 for STATYS 800/1000A

LEGENDS:

Q41 = Source 1 input switch*,
Q42 = Source 2 input switch*,
Q30 = Output switch*,
Q50** = Inverter, for source 1 or 2 maintenance bypasses*,
CS1 = Static Switch 1,
CS2 = Static Switch 2,
F = Protection by Fuse (optional),
- -- - and * = Supplied by customer in Integrable version.

** = Q51 and Q52 for STATYS 800/1000A

7. TOUCHSCREEN



Control panel with LED status bar indicator	
Colour	Description
Flashing red-yellow-green-red	No communication. The data is no longer updated or not present. Load status cannot be given.
Flashing red	Load supplied, but the output will stop in few minutes.
Red	Load not supplied: Output switched OFF due to an alarm.
Flashing yellow-red	Load supplied, but no longer protected. A critical alarm occurs.
Flashing yellow	Maintenance requested / or service mode in progress.
Yellow	Load supplied with warning or load on alternate Source.
Green	Load on preferred Source.
Grey (OFF)	Load not supplied.

Only two elements are necessary to interact with the unit:

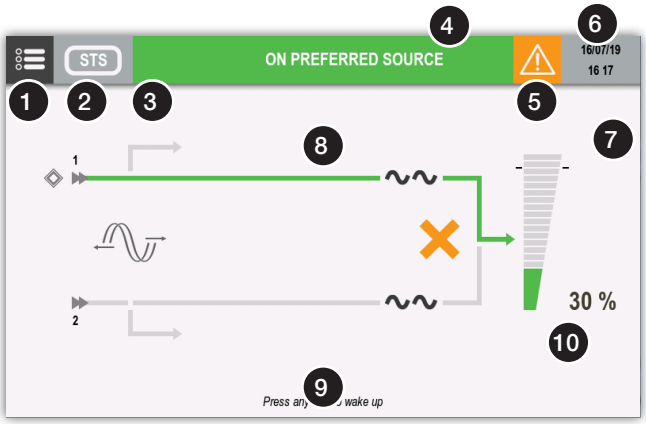
- HOME button: is a mono-stable button used to interact manually with the display especially in emergency situations. Logic behind the interaction is:
  - Single pressing (below 3 sec): HOME page return of graphic display
  - 3 sec < time < 6 sec: change the language to the default (English)
  - 6 sec < time < 8/9 sec: go to the calibration screen automatically
  - Above 8/9 sec: implement the hw reset of the micro controller and restart of the graphic
- Display: is the main active matrix of the display sensitive to touch pressure. The display is designed for rugged industrial applications. The display is single-touch only (no double touch effects). Depending on pressure, the navigation tree and various functions will be executed.

Two special functions are present on the control panel:

- Standby screen: for safety reasons, after a programmable amount of time, the display goes on standby. Display goes to the main screen and touch screen sensitivity is disabled. A label on the bottom of the main screen displays this status. To exit this status press the screen for the HOME button.
- OFF status: for power consumption and life enhancement, after a programmable amount of time display goes in “off”. Display goes black and no interaction is possible. Touching the HOME button or screen resumes normal operations.

Handle the control panel with care. It is made of metal, glass and plastic and contains delicate electronic components. The control panel may be damaged if dropped, pierced or broken or comes into contact with liquids. Do not use the control panel with a cracked screen, as it may cause injury.

7. 1. Display description



1	Menu access
2	Device reference
3	Functioning mode (see “Functioning mode” § 6.3)
4	Status displaying / Status page access
5	Alarm present – access to alarm page “Alarms” icon appears in case of preventive/critical alarm. A dedicated pop-up appears and can be cleared.
6	Clock
7	Maintenance alert
8	Synoptic area
9	Help message area “Press Key to wake up” appears when the display goes on standby. Touch the display to wake it up.
10	Measures report

7. 2. Menu architecture

- **MONITORING**
  - ▶ ALARMS
  - ▶ STATUS
  - ▶ SYNOPTIC
- **EVENTS LOG**
- **MEASUREMENTS**
  - ▶ OUTPUT MEASUREMENTS
  - ▶ SOURCE 1 MEASUREMENTS
  - ▶ SOURCE 2 MEASUREMENTS
- **CONTROLS**
  - ▶ TRANSFER
    - ▶ SWITCH ON PREFERRED SOURCE
    - ▶ SWITCH ON ALTERNATE SOURCE
    - ▶ FORCE ASYNCHRONOUS TRANSFER
    - ▶ ABORD ONFLY TRANSFER
  - ▶ SOURCE
    - ▶ SET S1 AS PREFERRED SOURCE
    - ▶ SET S2 AS PREFERRED SOURCE
  - ▶ SUBSET
    - ▶ SWITCH ON S1
    - ▶ SWITCH ON S2
    - ▶ SWITCH LOAD OFF
  - ▶ MAINTENANCE
    - ▶ ALARMS RESET
    - ▶ LED TEST
- **CONFIGURATIONS**
  - ▶ CLOCK
  - ▶ COM-SLOTS
    - ▶ COM-SLOT 1
  - ▶ REFERENCE
    - ▶ SOCOMEC REFERENCE
    - ▶ SERIAL NUMBER
  - ▶ REMOTE
    - ▶ REMOTE ON
    - ▶ REMOTE OFF

USER PARAMETERS

- ▶ LANGUAGE
- ▶ PASSWORD
- ▶ BUZZER
- ▶ DISPLAY
- ▶ PREFERENCES
- ▶ TOUCHSCREEN

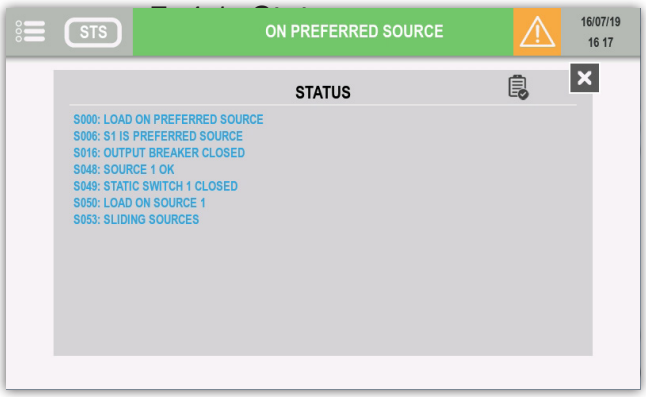
SERVICE

- ▶ SERVICE REPORT
- ▶ FIRMWARE VERSIONS
- ▶ SETTINGS
- ▶ NETWORK PARAMETERS (Only for service)
- ▶ MAINTENANCE CODE

7. 3. Functioning mode

Service

7. 4. Status



	Filtering
	List all active status
	List all status
	List all status not active

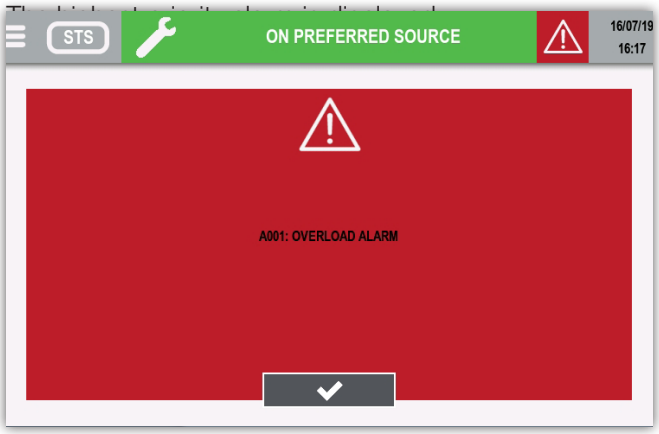
7. 5. Alarms management

7. 5.1. Alarm report

The alarm icon is present if at least one alarm is present.
Tap on the icon to open the alarm list.

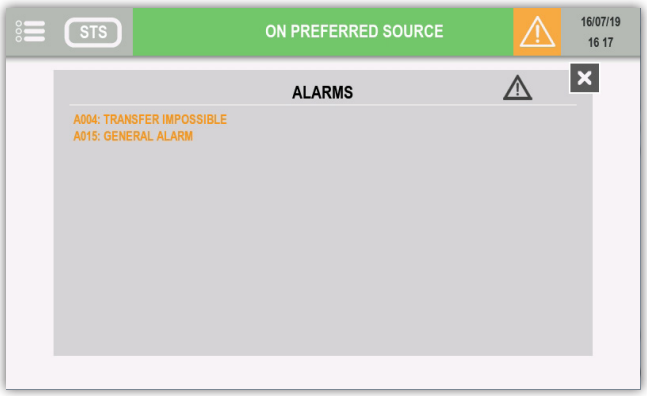
7. 5.2. Alarm popup

In case of critical alarm a popup message appears and the buzzer is running according its settings.



Tap on valid button to stop the buzzer and to close the popup message. The alarm page is automatically display after this action.

7. 5.3. Alarm page



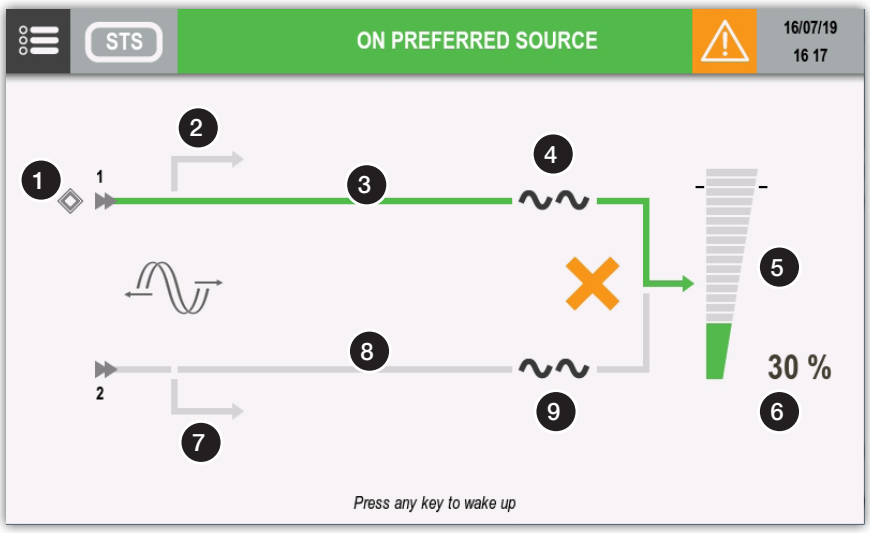
	Filtering
	List all active alarms
	List all active preventive alarms
	List all active critical alarms

Popup alarm for preventive alarm

In USER PARAMETERS menu, USER PREFERENCES item gives the possibility to enable popup alarm also with preventive alarms.

7. 6. SYNOPTIC ANIMATION

Item	Description	Rules of animation				Touch actions
		Grey	Green	Yellow	Red	
1	Preferred source	-	-	-	-	-
2	Maintenance bypass 1	Present	-	Load on maintenance bypass	-	-
3	Input source 1	voltage absent	voltage presence	Out of tolerance	-	-
4	Static Switch 1	Normal status	-	Preventive alarm	Critical alarm	Access to Static Switch page
						
5	Load rate symbol	No load	Fill-up to 95%	Fill-up to 110%	Fill-up over 110%	Access to output measurements pages
						
6	Load rate value	Instantaneous value. displayed if value > 0				-
7	Maintenance bypass 2	Present	-	Load on maintenance bypass	-	-
8	Input source 2	voltage absent	voltage presence	Out of tolerance	-	-
9	Static Switch 2	Normal status	-	Preventive alarm	Critical alarm	Access to Static Switch page
						



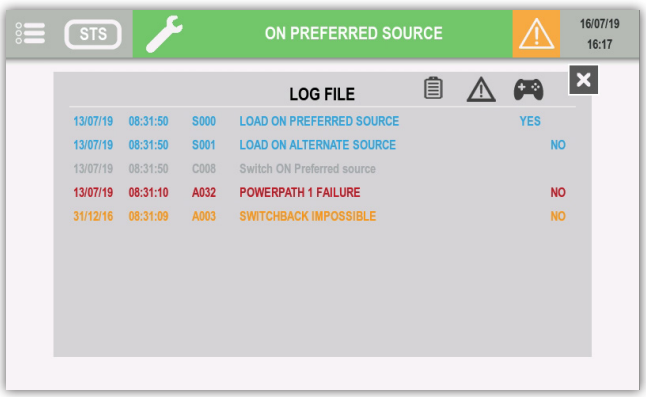
7. 6.1. Additional icons

Transfer impossible

Transfer locked

Maintenance alarm.
Preventive maintenance is requested.

7. 7. Event log page



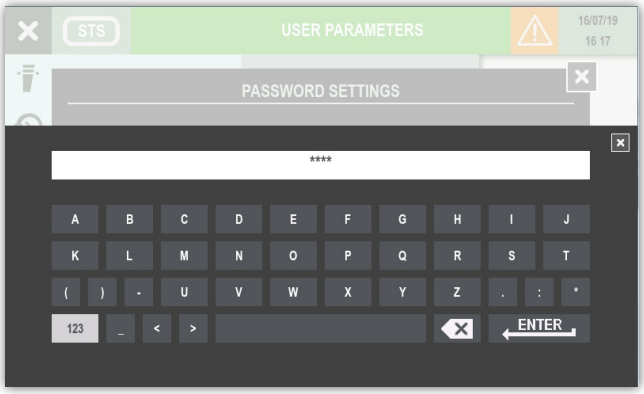
	Show STATUS events
	Show ALARMS events
	Show CONTROLS

7. 8. Menu function descriptions

7. 8.1. Entering passwords

Some operations and settings require a password in order to be performed.

Press ENTER to confirm the selection or HOME BUTTON to abort.



Press “123” to cycle to number view page.

Press ENTER to confirm.

7. 8.2. MONITORING menu

Submenu Alarm opens the alarm pages.

Submenu Status opens the status pages.

7. 8.3. EVENTS LOG menu

This menu accesses the event log (Status and Alarms).

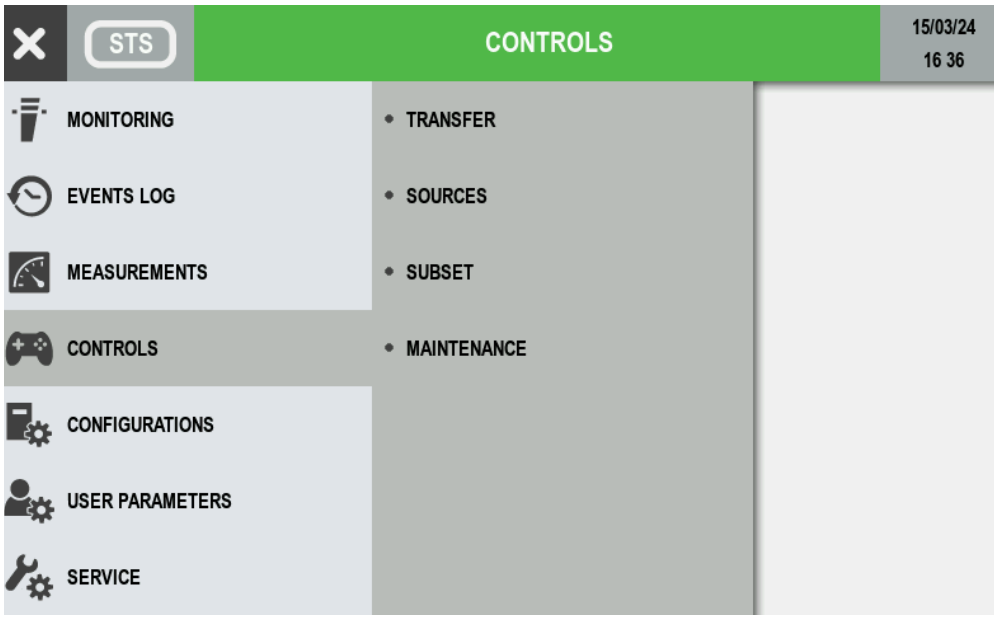
7. 8.4. MEASUREMENTS menu

This menu displays all STS measurements relating to the input stages, output stage.

The pins on the bottom of the screen indicate whether or not there are more pages. Sliding to the right or left changes measurements page.

7. 8.5. CONTROLS menu

This menu contains the commands that can be sent to the STS. Some of them are password protected.



Transfer:

- Switch ON preferred or alternate source
- Force or Abort asynchronous Transfer

SOURCES:

- Set source 1 or source 2 as preferred source

SUBSET:

- Load ON source 1 or 2
- Switch load OFF

Maintenance:

- reset alarm

7. 8.6. STS CONFIGURATION MENU

- CLOCK: this function sets the date and time.
- COM-SLOTS: this function configures the RS485 modbus serial link.
- REFERENCE: STATYS identification and serial number.
- REMOTE: this function enables controls from remote devices through MODBUS protocol.

7. 8.7. USER PARAMETERS menu

This menu contains the different functions for users such as language, password, buzzer, display, preferences, touch-screen calibration.

7. 8.8. SERVICE menu

This menu is reserved for support service personnel and holds STS identification data and utilities for software upgrades.

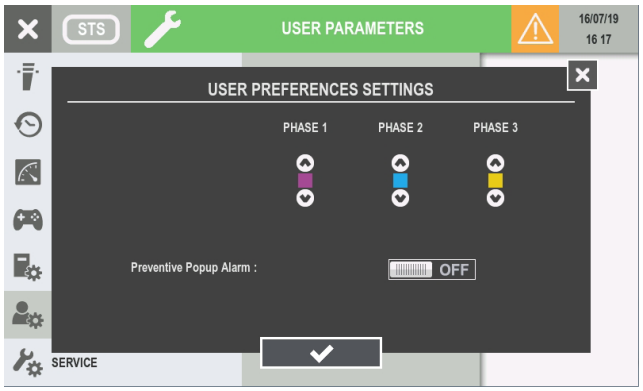
7. 9. Additional user functions

7. 9.1. Phase color modification

- Enter MAIN MENU > USER PARAMETERS > PREFERENCES

For each phase is possible to select a specific colour in a set of colour range. Those colours are applying in the measurements pages.

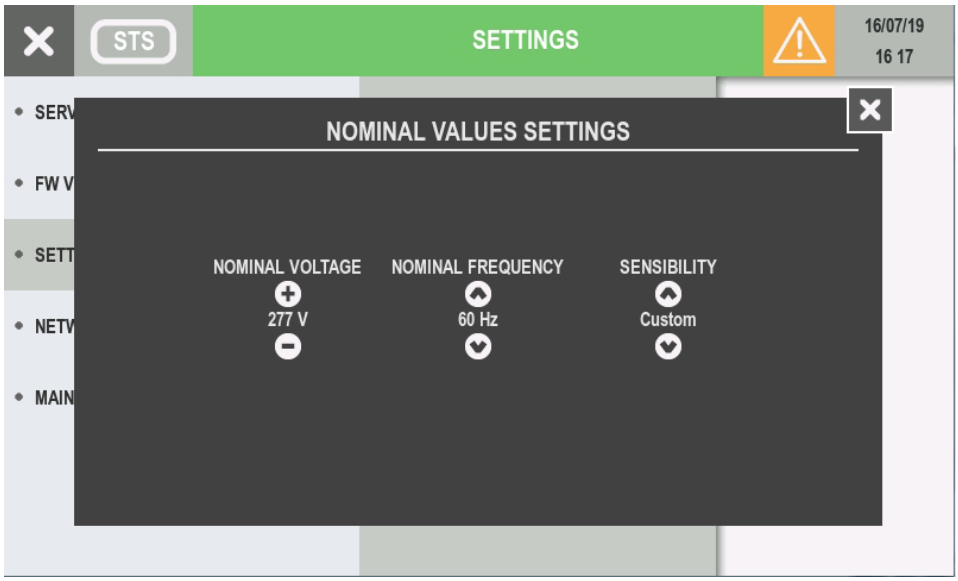
Colour		Default colour
	Yellow	Phase 3
	Orange	
	Red	
	Green	
	Light blue	Phase 2
	Dark blue	
	Purple	Phase 1
	Brown	
	Light grey	
	Dark grey	
	Black	

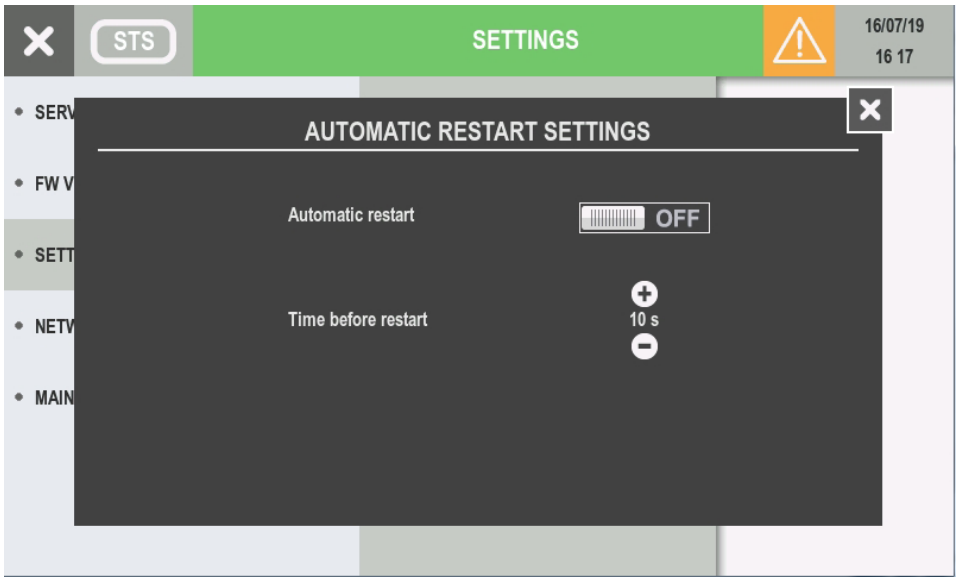


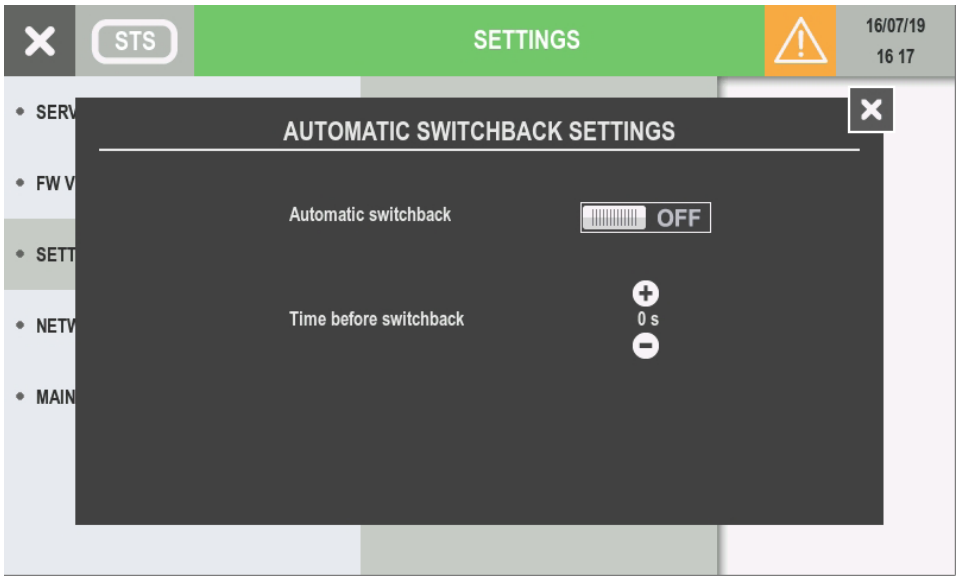
The popup alarm appears in case of critical alarms. This function can be extended to preventive alarms by switching “Preventive Popup Alarm” to ON.

7. 10. STS SETTINGS

please see “Programming mode” § 7.6.4







8. COMMISSIONING

8. 1. Start conditions

- Source 1 and Source 2 voltages are present.

In the case of a standard cabinet installation:

- switches Q41, Q42, Q30 are open,
- inverter Q50 is set to position "0" (or Q51 and Q52 on 0 for STATYS 800/1000A).

8. 2. Power-up of STATYS

- Close switches Q41 and Q42.

At this stage, the control electronics are powered ON. According to the automatic restart configuration (see “STS settings” § 6.10) conduction can then be activated on the output.

8. 3. Selecting the preferred source

Note: According to the factory default setting, the preferred source is source 1.

Under normal operation, the load is supplied by the preferred source.

REMINDER: automatic transfer switches the supply from the preferred source to the alternate source. It is therefore important that the user defines the preferred source.

8. 4. Load supply

If conduction is not activated, the user may force the conduction (see “Controls menu” § 6.8.5).

When STATYS is in conduction state, close switch Q30. Visually check the colour of the bar on the diagram animation (see “Touchscreen” § 6),

.

8. 5. Transfer onto “maintenance bypass”

STATYS is equipped with two bypasses (except the “Integrable” model) which enable it to directly supply the load from source 1 or 2 without interrupting your application’s power supply.

This function is entirely secure, the switches are equipped with mechanical and electronic locks to minimise the risk of human error.

Since each source has its own “maintenance bypass”, two cases may be considered:

a. The load is supplied by source 1:

- set inverter Q50 to position I (or Q51 on 1 for STATYS 800/1000A),
- open switches Q30, Q41 and Q42.

At this stage, the SCR and the electronics are powered OFF.

b. The load is supplied by source 2:

- Set inverter Q50 to position II (or Q52 on 1 for STATYS 800/1000A),
- open switches Q30, Q41 and Q42.

At this stage, the SCR and the electronics are powered OFF.

8. 6. "Maintenance bypass" return

Since each source has its own "maintenance bypass", two cases may be considered:

a. Inverter Q50 is set to position I (or Q51 on 1 for STATYS 800/1000A):

- close Q41,
- switch conduction onto source 1,
- visually check the colour of the bar on the diagram animation (see "Touchscreen" § 6),
- close Q30,
- set Q50 to position "0" (or Q51 on 0 for STATYS 800/1000A),
- also close Q42 to enable a further changeover.

b. Inverter Q50 is set to position II (or Q52 on 1 for STATYS 800/1000A):

- close Q42,
- switch conduction onto source 2,
- visually check the colour of the bar on the diagram animation (see "Touchscreen" § 6),
- close Q30,
- set Q50 to position "0" (or Q52 on 0 for STATYS 800/1000A),
- also close Q41 to enable a further changeover.

9. COMMUNICATION INTERFACE

STATYS is equipped as standard with:

- one terminal block giving access to:
  - 1 dry contact relay for the general alarm,
  - 1 dry contact relay for the preventive maintenance alarm,
  - 1 inputs for an emergency stop button (button not supplied),
  - 2 outputs for accidental tripping of upstream protection (source 1 and source 2) (see the Installation Manual, reference 552183).

STATYS is also equipped with 4 Com Slots which can each house one communication module:

- Com-Slot 1 dedicated to communication interface such as:
  - NET VISION for Ethernet connection, network services and IoT gateway,
  - MODBUS TCP card for remote monitoring system,
- 1 to 4 alarm relay modules (each module providing 3 inputs and 4 outputs).

10. ADVANCED DIAGNOSTICS AND PARAMETERS

STATYS is equipped with a diagnostic card for connection to a maintenance computer. This link can be used for adjusting the advanced parameters and other settings according to specific operational needs. Maintenance personnel can also use this link to download the event log, statistics and comprehensive information for rapid and complete diagnostics

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