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 W W W. S A S C O N T R O L L E R S . C O M



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# **1. GENERAL DESCRIPTION**

# 1.1 INTRODUCTION

This new genset controller series consists of two products: Surf-AMF and Surf-Auto. The Surf-AMF monitors the utility and controls the genset as well as the automatic transfer switch. The Surf-AUTO controls the genset only. However, the two controllers share many common features. Physically, the Surf has a very attractive and slim design. It features isolated measurement of the voltages and frequency on the two sources as well as the current on the load side. It has four user-selectable operating modes: Off,

Auto, Utility Only **1** or Manual. Front panel LEDs signal the installation status and operating mode. The user interface consists of an LCD display for the measurements and faults. The front panel push buttons are provided to select the operating mode and to access a menu of parameters. The menu gives access to all timers, set points and other parameters relevant to the control and protection of the installation. The Surf series has a myriad of communication ports: CAN bus, Serial RS232C, RS485 interface, USB, Ethernet and internet.

The SURF v1.2b features also a 4GB MicroSD card for data and event logging. Data and event retrieval is done by either USB port or Internet through a dedicated website.

The firmware could be easily upgraded on site via the USB interface using a desktop application or any smart phone with a free Android app.

### **1.2 FEATURES**

- Microcontroller based design
- Automatic mains failure or Auto Start controller
- Backlit liquid crystal display (LCD)
- Simultaneous display of AC voltage, currents, frequency, hour counter, oil pressure, engine temperature and battery voltage
- Display of power in KW and energy in KWh of both engine and Utility
- Display of fuel consumption rate (L/h), total fuel consumption, tank percentage and RPM
- Display of power factor of each line
- Display of Software version, the internet connection status, the date and time, the continuous hour counter and the utility hour counter.
- 4GB Micro SD card for event and data logging (optional)
- CAN bus J1939 enabled
- CAN bus with BAMVI\_CAN that can read DC voltage up to 275Vdc and DC current up to +-300Amps. More than
  one BAMVI-CAN can be connected to the bus (optional)
- Ethernet interface (optional)
- USB interface
- Serial RS232S interface (optional)
- Serial RS485.Modbus protocol (optional)
- Internet communication: no software installation required
- Galvanic isolation for utility and Genset AC inputs
- Parameters can be edited and updated from any remote interface at any time even when engine is running
- Menu accessible from front panel as well as USB, Ethernet and RS485
- Supports communication and SMS via GSM modem
- Supports 4-pole systems (Utility and Genset AC inputs are isolated)
- Accepts Genset frequencies of up to 500Hz
- Supports three current inputs for 50Hz current transformers or up to 500Hz using current transducers (optional and sold separately)
- Operation by push buttons
- Easy to fit DIN standard 196x144 panel mount housing
- Connection is via locking plug and socket connectors
- Solid-state short circuit protected outputs
- Front panel LEDs for inputs status
- LCD symbols to display different alarms
- Automatic engine starting and stopping
- Automatic shutdown on fault condition

Only Available for Surf-AMF. Becomes Standby mode is Surf-Auto.



- Low oil pressure alarm and shut down
- High engine temperature alarm and shut down
- Dynamo fail alarm and shut down
- Low fuel alarm and shut down
- Over / Under speed alarm and shut down
- Low coolant level alarm and shut down
- Over / Under voltage alarm and shut down
- Overcurrent alarm and shut down
- Tank Empty alarm and shut down
- Ten configurable outputs capable of driving up to 1.4Amps with improved short circuit and overload protection
- 6 configurable isolated digital inputs

# **1.3 TECHNICAL SPECIFICATION**

Supply voltage range	5 to 33Vdc
Maximum supply current	180mA
Standby supply current	56mA
Digital inputs activation logic	Low (ground)
Solid-State Output rating	1A 50V
AC inputs range (L-N)	0 to 256Vac
CT inputs range	0 to 5A
Operating temperature	-30 to 70°C
User access	Five push buttons
Data sampling rate	0.4samples/sec
Dimensions	196x144x33
Panel cut out	182x137

#### 2. OPERATION 2.1 FOUR MODES OF OPERATION

Four modes of operation are provided. Following is a description of each mode:

#### • Off Mode:

<u>For F/W "200r20" and later</u>, when the generator is not running or running with no load, pressing the OFF push button once will immediately turn off the Surf (load and genset as well). However if the generator was running on load, pushing the OFF push button once will immediately release the load. Genset and SURF will shut down after cooling. Pressing the OFF PB another time during cooling will immediately turn off the genset and the SURF. Moreover, pressing the OFF PB will reset any fault (keeping the SURF on).

For older versions and revisions, the engine and the module are shut down when the OFF push button is pressed for more than 3 seconds. Pressing once OFF PB will reset all faults and alarms.

- Manual Mode: This mode is entered when the Manual/Down push button is pressed. In this mode, the module will start the genset and engage the load. If, originally, Utility was feeding the load and the genset has no fault, Utility will continue feeding the load until the genset is done warming up<sup>1</sup>. The load is disengaged and a transfer dead time<sup>2</sup> is counted before the genset engages the load. If the genset has a fault, then Utility would disengage the load immediately.
- Utility Only/Standby Mode: This mode is entered when the Utility/Select push button is pressed. In this mode, if Surf type is Surf-AMF, the Utility would feed the load when it is present. If Utility is absent or Surf type is Surf-AUTO, the genset will not be requested. If the genset was feeding the load before switching to this mode, the load will be disengaged.
- Auto Mode: This mode is entered when the Auto/Up push button is pressed. In this mode, Utility will feed the load if present. If Utility is absent, the genset will feed the load if no faults exist on it and if it is in Ready mode<sup>3</sup>. If the genset was feeding the load and the remote control signal turns off, the genset would count the delay set by oFF (for Surf-AUTO) MRT (for Surf-AMF) before disengaging the load. If the Utility is restored while the genset is feeding the load, Genset disengages the load after Restoration delay. Utility will engage after transfer dead time.

Following is a description of the start sequence of the genset:

- 1. Once the remote control input receives a start signal, the response delay (set by RSP) is counted.
- 2. After the elapse of the response delay, the fuel pumping relay (if present) is engaged.
- 3. After the elapse of the fuel pump delay (set by FPP), the preheat relay (if present) is engaged for a time delay set by **PRH.**
- 4. A starting sequence of a preset number of attempts ATT will initiate.
- 5. The Electric Valve is engaged for 0.25 sec before the Starter.
- 6. If the start signal is removed before the engine starts, all timers are reset and the module is ready for a new sequence.
- 7. Cranking is disconnected when any of the following condition becomes valid:
- a. The measured frequency exceeds CrF.
- b.A voltage exceeding dcd (if not set to N) appears on the Dynamo input.
- c. The oil pressure switch opens (given that **boP** is not set to **Y**) and its preset delay has elapsed.
- d. The analog oil pressure measurement exceeded the value set by LoA (if not set to N).
- e. For Volvo engines, when a running indication is received through the CAN bus or the RPM exceeds 500.
- 8. If the engine fails to start after the preset number of attempts, the **Alarm** output is activated, the LCD alarm symbol (1) blinks and the Multifunction Display on the LCD would indicate a start fail error (**St Fail**). Otherwise, the engine enters the running state and the running symbol (ゲ) turns on.
- 9. After elapse of the warm-up delay, set by WuP, the load contactor is engaged via terminal Contactor-G and the green load led is activated. If one of the Outputs is set to Cont-G2, then Cont-G2 would be engaged 5 seconds after the first Contactor.
- 10. All protections are enabled when the engine is running and after the elapse of the fault bypass time set by **bYP**.
- 11. Once a fault occurs, the load is shut down. Some faults require the engine to cool before shutting (high engine temperature, overload). Other faults would directly shut the engine. **Alarm** output and the corresponding fault symbol on the LCD are activated. The Multifunction Display would explain the fault. If CAN bus is enabled, the Multifunction display will show the DTC (J1939 protocol error code) description of the fault received from the CAN bus.
- 12. When the start signal on the genset is removed, the load is shut down after the elapse of the delay set by **oFF** (for Surf-AUTO) **MRT** (for Surf-AMF). The engine is shut down after the elapse of the cooling time set by **CoL**.

U Warm Up delay is presettable in the menu

**2** Transfer dead time is presettable in the menu

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8 Refer to section 9.1
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2. OPERATIO



#### 2.2 TIME SWITCH OPERATION

The time switch manages the operating time of the genset, daily and weekly. Two parameters control the daily time switch: **T-Rdy** and **T-sdby**. **T-Rdy** sets the time at which the genset becomes ready. **T-sdby** sets the time at which the genset goes to standby mode. If genset is required to be in ready mode all day then set **T-Rdy** to **ALLTIM** (**T-Sdby** will no longer show). **Rdyday** controls the weekly operation. Under **Rdyday**, if **ALL** is set to **Y** then the genset will be ready all week long. Otherwise, the genset will be ready only in days set to **Y**. It will be in standby in days set to **N**. As a result, the genset will be ready during the hours set by **T-Rdy** and **T-Sdby** only on days set to **Y** under **Rdyday**.

#### 2.3 REMOTE CONTROL TERMINAL FUNCTION DESCRIPTION

In SURF-AMF with remote control set to **ROG**: when remote control is active, it overrides time switch setting and forces the genset into ready mode.

In SURF-AMF with remote control set to **SUP**: when remote control is active, it overrides time switch setting and forces the genset into standby mode.

In SURF-AUTO with remote control set to **ROG**: When remote control is active and genset in ready mode, the genset is started. Otherwise, the genset is stopped.

In SURF-AUTO with remote control set to **SUP**: when remote control is active and genset in ready mode, the genset is stopped.

# 3. TERMINAL LAYOUT 3.1 TERMINAL DESCRIPTION

			Conn	ECTOR		
			P1	P2		
	1 -VBAT -ve battery supply		7	OUTPUT 4	Output 4 (Genset Contactor)	
	2	+Vbat sup	+ve battery supply	8	OUTPUT 5	Output 5 (Alarm Output)
<b>MINAL</b>	3	VBAT POW	After emergency stop and fuse	9	OUTPUT 6	Output 6 (Genset Contactor 2)
Ter	4	OUTPUT 1	Output 1 (Starter)	10	DYN EXC	Dynamo excitation
	5	OUTPUT2	Output 2 (Fuel Electric Valve)	11	CAN H	CAN High line
	6	OUTPUT3	Output 3 (Utility Contactor)	12	CAN L	CAN Low Line

	CONNECTOR						
			Р3		P4		
	13	REF SENS	Reference sensor input	19	RMTE CNTRL	Remote control input	
IINAL	14	AN INPUT 1	Analog Input 1 (Oil pressure sensor input)	20	input 1	Input 1 (Oil pressure switch)	
Tern	15	AN INPUT 2	Analog Input 2 (Engine temperature sensor input)	21	INPUT 2	Input 2 (Engine temperature switch)	
	16	AN INPUT 3	Analog Input 3 (Fuel Sensor)	22	INPUT 3	Input 3 (Oil temperature switch)	
	17	AN INPUT 4	Analog Input 4 (Not Assigned)	23	INPUT 4	Input 4 (Low Fuel level Normally Open)	
	18	LCL	Low Coolant Probe	24	INPUT 5	Input 5 (Lamp Test)	

	CONNECTOR					
			P5	P6		
	25	LINE RU	Line R – U supply	31	LINE RG	Line R – G supply
	26	NOT USE	Not used	32	NOT USE	Not used
TERMINAL	27	LINE SU	Line S – u supply	33	LINE SG	Line S – G supply
	28	NOT USED	Not used	34	NOT USED	Not used
	29	LINE TU	Line T – U supply	35	LINE TG	Line T – G supply
	30	N U	Neutral – U supply	36	N G	Neutral – G supply

	Connector						
			P7		P8		
	37	CT R P <b>1</b>	Current transformer on line R – p1	43	Data	DATA+	
	38	СТ R Р <b>2</b>	Current transformer on line R – p2	44	Data	DATA-	
RMINA	39	ст s р <b>1</b>	Current transformer on line S – p1	45	output 10	Output 10 (N/A)	
TEI	40	ст s Р <b>2</b>	Current transformer on line S – p2	46	OUTPUT 9	Output 9 (N/A)	
	41	ст т Р <b>1</b>	Current transformer on line T – p1	47	OUTPUT 8	Output 8 (N/A)	
	42	ст т Р <b>2</b>	Current transformer on line T – p2	48	OUTPUT 7	Output 7 (N/A)	

#### 3.2 PROGRAMMABLE INPUTS/OUTPUTS 3.2.1 PROGRAMMABLE INPUTS

SURF has a total of five digital inputs (Input  $1 \rightarrow 5$ ) that could be programmed to any of these functions: Oil Pressure Switch (**oPS**), Engine Temperature Switch (**ETS**), Oil Temperature Switch (**oTS**), Low Fuel Level Normally Open (**LFo**), Low Fuel Level Normally Closed (**LFc**) and Lamp Test (**LMP**). Users can easily change the function of these inputs from the menu, parameters  $11 \rightarrow 15$ . The user can also disable the input by setting the corresponding parameter to Not Assigned (**N/A**).

# 3.2.2 PROGRAMMABLE OUTPUTS

SURF has a total of ten outputs (4 outputs are optional) that could be programmed to any of these functions: Preheat, Starter, Electric Valve, Utility Contactor, Genset Contactor, Alarm, Cut-off, Pre-alarm, Genset Contactor 2, Dummy Load, Overload, Start Fail, Manual/Off Mode, Auto Mode and Fuel pump. Users can easily change the function of these outputs from the menu, parameters  $O1 \rightarrow O10$ . The user can also disable the output by setting the corresponding parameter to Not Assigned (N/A). Following is a description of each function:

• Fuel pump (FPu) Function when one of the outputs is set to Fuel pump, the FPP parameter in the menu becomes visible and takes the default value 0. The fuel pump output is activated when the genset finishes counting the response delay and remains on as long as the engine is running.

• **Preheat** (**PRE**) **Function** when one of the outputs is set to Preheat, the **PRH** parameter in the menu becomes visible and takes the default value 0. The preheat output is activated when the genset finishes counting the fuel pump delay and remains on for a delay set by **PRH**.

• Starter (STA) Function is activated while cranking the genset and remains on for a delay set by STA. The minimum value of STA is 1 sec if the oil pressure is bypassed otherwise the minimum value is the oil pressure bypass delay plus one second (boP+1).

• Electric Valve (EVA) Function if present should be defined at Output 2 since the dynamo excitation is physically connected to this output. To configure the Electric Valve at another output, the dynamo input should be connected to VBAT or the dynamo shutdown must be disabled (**dSd** set to **N**) if dynamo excitation is not required. Otherwise, the dynamo input should be externally excited.

• **Utility Contactor (C-U) Function** if present should be defined at Output 3. This output is activated when Utility engages the load and turns off when the load is released.

• Genset Contactor (C-G) Function if present should be defined at Output 4. This output is activated when the genset engages the load and turns off when the load is released.

• Alarm (ALA) Function is activated when a genset fault occurs. This output is not activated on emergency stop since it disables all outputs.

• **Cut-Off** (**Cut**) **Function** is activated when the genset should be shut down and it has finished cooling, when a fault that does not require cooling has occurred and the load was released or when the SURF module is turned off while the genset was on. When the cut-off output is activated, it will remain on until the delay set by **Cut** has elapsed. If the SURF module was turned off, the module cannot be turned on until the cut-off delay has elapsed. The parameter **Cut** is not visible in the menu unless this output is activated.

• **Pre-alarm** (**PRA**) **Function** is activated on a pre-alarm condition caused by the analog measurements oil pressure/engine temperature dropping below/exceeding the pre-alarm level set in the parameters' menu **LoP/HTP**.

• **Genset Contactor 2** (**CG2**) **Function** is activated five seconds after the first genset contactor is engaged if the voltage and frequency readings are correct and there is no overload condition. If an overload occurs, this contactor is disengaged first and the load is measured again, if the overload condition persists then the contactor G is disengaged. Otherwise, Contactor G remains engaged. Contactor G2 re-engages when the load decreases.

• Dummy Load (dLd) Function is activated when the load remains below the level specified by doN for a delay set by dod. This output is disengaged when the load current exceeds the level specified by doF. Parameters doN, dod and doF are not visible unless this output is activated.

• **Overload** (oLd) Function is activated when the load exceeds the value set by oLd and the module is counting the overload delay set by oLdd or if an overload fault occurs. The output will be turned off if the load falls below oLd before the delay elapses.

• **Start Fail** (**STF**) **Function** is activated when the genset fails to start. This output is turned off when the start fail error is no longer present. The fault is removed when the Remote Control input is recycled or when Utility is restored.

• Manual/Off Mode (MSt) Function is activated when the mode of operation is Manual or Off. This output is turned off when the mode of operation is changed from Manual and Off.

• Auto Mode (AUT) Function is activated when the mode of operation is Auto. This output is turned off when the mode of operation is changed from Auto.

## **3.3 FRONT PANEL DESCRIPTION**

#### **3.3.1 MEASURED AND DISPLAYED PARAMETERS**

- Voltage, current and frequency measurements correspond to the source feeding the load.
- The currents on the three phases are measured and displayed simultaneously using the following format.

Current range	Format	
0 to 99.9A	##.# in A	
100 to 999A	### in A	
1000 to 1999A	1### in A	
2000 to 9999A	#.## in KA	

- The line-neutral and line-line voltages are all measured. The voltage displayed is either fixed on one voltage or allowed to scroll automatically between all six voltages (RN, SN, TN, RS, ST, and TR). The Menu push button is used to switch between the two display modes.
- The frequency is measured and permanently displayed.
- The hour meter is measured (or taken from the CAN bus if it is enabled) and permanently displayed.
- The engine temperature and oil pressure are measured (or taken from the CAN bus if it is enabled) and permanently displayed
- The battery voltage is measured and permanently displayed
- The Multifunction portion of the LCD displays the number of hours since the last oil change (oilh), the active power in KW for the source feeding the load, the energy in KWh for the genset and Utility, Utility and Genset status, RPM, L/H, L, TP (Tank percentage), Software version (###FW# or ###F##), Ethernet Software version (E###r#), the internet connection status, the date and time, power factor of each line, the continuous hour counter (CHR.) and the utility hour counter (uh).To start or stop scrolling between these messages, press the push button of the current operating mode.

### 3.3.2 FRONT PANEL LEDS

- Four Leds are used to indicate the operating mode.
- Six input Leds used to indicate the status of the inputs.
- Utility supply has one red led. Led ON indicates that the Utility supply is within the acceptable limits, the phases are all present and in the right sequence. Led OFF indicates absence of Utility. Led blinking indicates an anomaly on the Utility.
- Utility contactor has one green led to show its status.
- Genset has one red led. Led OFF means that the genset is not requested to start. Led blinking means that the genset has been requested to start or the genset is running with an anomaly. Led ON indicates that genset is running and ready to supply the load.
- Genset contactor has one green led to show its status.

Led No.	Color	Input configuration	Correspondent factory configuration
1	Green	Remote Control signal	Remote Control signal
2	Red	IP1 signal	Oil pressure signal
3	Red	IP2 signal	Engine temperature signal
4	Red	IP3 signal	Oil temperature signal
5	Red	IP4 signal	Low Fuel level Normally Open signal
6	Red	IP5 signal	Lamp Test signal

#### **3.3.3 LEDS DESCRIPTION**



#### 4. COMMUNICATION PROTOCOLS

SURF supports communication with the electronic control unit (ECU) on the genset using the J1939 CAN Bus protocol. Three different ECU types are supported: Standard Engine (**SE**), Volvo Engine (**VE**) and Perkins Engine (**PE**). Parameter **ECU** in the menu is used to select the ECU type. If the genset does not contain an ECU, set this parameter to **No**. The SURF module reads the following parameters from the CAN bus: oil pressure (PSI), engine coolant temperature (°C), fuel consumption (Liters/hour), engine speed (RPM), engine total hours of operation (Hr) and the engine total fuel consumption (L).

Users can communicate with the SURF module by connecting it to a PC through USB Port, RS485 Serial Port (Modbus), Ethernet Port or a GSM Modem. When connecting from a PC, the program **SURF Control** allows the users to view and control the engine and to access the SURF parameters. When the parameter **Mod** is set to **GSM**, the user can also communicate with the SURF via SMS messages. To set up this feature, the following parameters must be set:

- 1. <u>The identification of the SURF module (**SITEId**)</u>: This ID will be included as a header of all sent or received SMS messages. It must contain 6 digits which can be numbers (from 0 to 9) or letters (A to Z). Any message with a wrong ID will be ignored.
- 2. <u>The phone number (**PHONE**</u>): When a fault occurs, The SURF will send an SMS containing as a header the SURF ID followed by the fault description and all the readings at the time the fault occurred. This SMS is sent to the phone number specified by the user. The phone number must be between 3 and 18 digits long.

Command Description	SMS Format 0
Reset	SURF ###### reset
Delete Fault Log	SURF ###### dltfault
Switch to manual mode	SURF ##### manual
Switch to Auto mode	SURF ###### auto
Switch to Utility mode (AMF only)	SURF ##### utility
Switch to Standby mode (Auto only)	SURF ###### standby
View utility readings (AMF only)	SURF ###### umeasure
View generator readings	SURF ###### gmeasure
Modify the parameters 3	SURF ###### update parameter1=value1,parameter2=value2
	Example: SURF SURF00 update A01=5,A03=32,A12=145,A31=0
View the parameters <b>5</b>	SURF ###### request parameter1,parameter2,parameter3
	Example: SURF SURF00 request A01,A03,A12,A31,A10

Following is a description of the functions supported via SMS:

When modifying or viewing parameters through SMS, the SMS alias (refer to section 7) is used to identify the parameter being updated/requested. Thus, if the user wants to request the parameters **RSP**, **Mod** and **ECU** from the SURF having **SiteID** SURF00, the SMS would then be: "*SURF SURF00 request* a01,a66,a64". Note that the **parameters A64 to A76**, **A81 and A82 can be requested but cannot be modified through SMS**.

To set up the Ethernet module, the following parameters must be set:

- 1. <u>The DHCP Module (dHC)</u>: If the network to which the SURF is being connected distributes IP addresses automatically, then the DHCP Module on the SURF must be enabled (dHC set to Y). If a fixed IP should be assigned to the SURF, then dHC should be set to N.
- <u>Network Configuration (IP Adr, SubNET, GATEWY)</u>: If dHC is set to N, the user must specify to the SURF: the IP Address (IP Adr), the Subnet Mask (SubNET) and the Default Gateway (GATEWY).
- 3. <u>The identification of the SURF module (SITEId</u>): the SITEId is used by the Ethernet module as a Net BIOS Name (NBNS).

SMS letters are not case sensitive.

**<sup>2</sup>**###### being the SITEId.

<sup>&</sup>lt;sup>3</sup>Only 5 parameters can be modified in one SMS.

Parameter1, Parameter2 can take any value between A01 and A64 excluding A30. Value1, Value2 can take any value within the parameter's value range.

<sup>•</sup> Only 5 parameters can be viewed in one SMS.



## 5. GRAPHICAL DISPLAY

## 5.1 MENU DESCRIPTION

Follow the steps described below to access the menu:

1. Press the Menu Push button for three seconds: The alphanumeric characters on the LCD would display "PSW – ". You will be prompted to enter a three-digit code. The default password is 000.

- 2. Use the UP and DOWN push buttons to scroll to the desired number.
- 3. Press the SELECT push button. "\*" replaces the first digit.
- 4. Repeat steps 2. and 3. until all three digits are entered.

If the entered password is valid, the user will have access to the menu below. If no push buttons are pressed for 5 minutes while in the menu, the system will automatically exit the menu.

The SMS Alias column in the table represents the SMS code to use when modifying the parameter through SMS. In the Range column below, the number between brackets is the one to use when the parameter is being modified through SMS.

Displayed Parameter	Description	Range	Factory Settings
RSP	Response delay	0 to 255 sec	5 sec
FPP	Fuel Pump delay	0 to 255 sec	0 sec
PRH	Preheat delay	0 to 255 sec	0 sec
STA	Starter time	0 to 255 sec	5 sec
bET	Time between trials	0 to 255 sec	12 sec
ATT	Number of Attempts	0 to 255	3 Att
bYP	Fault bypass delay	0 to 255 sec	15 sec
WuP	Warm-up delay	0 to 255 sec	10 sec
MRT oFF	Mains Restoration delay (AMF only) Off delay (AUTO only)	0 to 255 sec	10 sec
XFR	Transfer dead time (AMF only)	0 to 255 sec	0 sec
CoL	Cooling delay	0 to 255 sec	30 sec
Cut	Cut-Off time	N /0/, 1 to 255 sec	10 sec
CrF	Crank Disconnect Freq.	0 to 255 Hz	15 Hz
UoF	Utility Over Frequency (AMF only)	N <i>(0)</i> , 1 to 255 Hz	55 Hz
UoFd	Utility Over Freq. delay (AMF only)	0 to 99 sec	2 sec
UuF	Utility Under Frequency (AMF only)	N <i>(0),</i> 1 to 255 Hz	45 Hz
UuFd	Utility Under Freq. delay (AMF only)	0 to 99 sec	5 sec
UoV	Utility Over Voltage (AMF only)	N <i>(0),</i> 1 to 999 V	416 V <sup>14</sup>
UoVd	Utility Over Volt. delay (AMF only)	0 to 99 sec	3 sec
UuV	Utility Under Voltage (AMF only)	N <i>(0),</i> 1 to 999 V	346 V <sup>14</sup>
UuVd	Utility Under Volt. delay (AMF only)	0 to 99 sec	5 sec
GoS	Genset Over Speed	0 to 9999	1650
GoSd	Genset Over Speed delay	0 to 99	2
GuS	Genset Under Speed	0 to 9999	1350
GuSd	Genset Under Speed delay	0 to 99	5
GoV	Genset Over Voltage	N <i>(0),</i> 1 to 999 V	416 V 🔁
GoVd	Genset Over Volt. delay	0 to 99 sec	3 sec
GuV	Genset Under Voltage	N <i>(0)</i> , 1 to 999 V	346 V <sup>14</sup>
GuVd	Genset Under Volt. delay	0 to 99 sec	5 sec
ст	Current Transformer ratio	0/5 to 9999/5	100/5
oLd	Overload %	N <i>(0)</i> , 1 to 255%	90%
oLdd	Overload delay	0 to 99 sec	10 sec
doN	Dummy load engage set point	N <i>(0),</i> 1 to 255 %	10%
dod	Dummy load engage delay	0 to 255 sec	30
doF	Dummy load disengage set point	N (0), 1 to 255 %	17%
boP	Bypass OPS	Y (0),1 to 5 sec	1 sec
oPS	Oil Pressure Sensor type	V1=VDO type 1 <i>(0)</i> V5=VDO type 2 <i>(1)</i> MU=Murphy <i>(2)</i> <i>TNE(3)</i>	V1
LoP	Low Oil Pressure Pre-alarm	N <i>(0),</i> 1 to 255 PSI	
LoA	Low Oil Pressure Alarm	N /0/, 1 to 255 PSI	5 sec

This Threshold is set for phase-phase connection usage

Displayed Parameter	Description	Range	Factory Settings
ETS	Engine Temperature Sensor type	V1=VD0-1 <i>(0)</i> V2=VD0-2 <i>(1)</i> MU=Murphy <i>(2)</i> <i>PT=PT100 (3)</i> <i>TNE(4)</i>	0 sec
НТР	High Engine Temp Pre-alarm	N <i>(0),</i> 1 to 255 °C	N
HTA	High Engine Temp Alarm	N <i>(0),</i> 1 to 255 °C	N
СНТ	Cooling After High Temperature	N <i>(0)</i> ,Y <i>(1)</i>	Y
dcd	Dynamo Crank Disconnect	N <i>(0)</i> , 10 to 26 V	N
dSd	Dynamo Shut Down	N <i>(0),</i> 5 to 10 V	10 V
Hib	High Battery	N <i>(0)</i> , 1 to 255 V	30 V
Hbd	High Battery Delay	0 to 255 sec	3 sec
Lob	Low Battery	N <i>(0)</i> , 1 to 255 V	8 V
Lbd	Low Battery Delay	0 to 255 sec	2 sec
LcL	Low Coolant Level	Nc <i>(0),</i> No <i>(1)</i>	No
01	Output 1	N/A=Not Assigned (0) PRE=Preheat (1) STA=Starter (2) EVA= Electric valve (3) C-U=Cont-Utility (4) C-G=Cont-Genset (5) ALA=Alarm (6) Cut=Cut Off (7) PRA=Pre Alarm (8) CG2=Cont-Genset2 (9) dLd=Dummy Load (10) oLd=Overload (11) STF=Start Fail (12) AUT=Auto Mode (13) MSt=Manual stop Mode(14) FPu=Fuel Pump(15)	STA
02	Output 2	(same as above)	EVA
03	Output 3	(same as above)	C-U
04	Output 4	(same as above)	C-G
05	Output 5	(same as above)	ALA
06	Output 6	(same as above)	CG2
07	Output 7	(same as above)	N/A
08'3	Output 8	(same as above)	N/A
09'5	Output 9	(same as above)	N/A
01013	Output 10	(same as above)	N/A
RC	Remote Control	RQG= Request Generator <i>(0)</i> SUP= Simulate Utility Present <i>(1)</i>	RQG
11	Input 1	N/A=Not Assigned (0) oPS=Oil Pressure (1) ETS=Engine Temp. (2) oTS=Oil Temp. (3) LFo=Low Fuel No (4) LFc=Low Fuel Nc (5) LMP=Lamp Test (6)	oPS
12	Input 2	(same as above)	ETS
13	Input 3	(same as above)	oTS
14	Input 4	(same as above)	LFo
15	Input 5	(same as above)	LMP
RHR	Run Hour	N (0), 1 to 9999 hr.	150 hr.

If Extra Output is installed

5. GRAPHICAL DISPLAY

Displayed Parameter	Description	Range	Factory Settings
ECU	Engine Electronic Control Unit Type (cannot be modified when engine is running)	No=No control unit <i>(0)</i> SE=Standard engine <i>(1)</i> VE=Volvo Engine <i>(2)</i> PE=Perkins Engine <i>(3)</i>	No
APP	Accelerator Pedal Position	0 to 100 %	50%
IDL	Idle Speed Delay <sup>17</sup>	N <i>(0)</i> ,1 to 99	N
SPd	Speed Select <sup>16</sup>	PRI=Primary speed <i>(0)</i> SEC=Secondary speed <i>(1)</i>	PRI
UPW	User Password	000 to 999	000
EMd	Ethernet mode	dMd=Dedicated Mode Mod=Modbus Mode UdP=UDP Mode (PC Application)	dMd
ITd <sup>23</sup>	Internet timeout delay in hours	0 to 99 hours	2 hours
Mod	Modem Type	No=no modem <i>(0)</i> GSM=GSM modem <i>(1)</i>	No
PHONE	Phone Number	(3 to 18 digits)	0
SITEId	Identification Code	(6 digits or letters)	XXXXXX
dHC	DHCP Enabled	N (0),Y (1)	N
IP Adr	IP Address	,,	192.168.0.21
SubNET	Subnet Mask		255.255.255.0
GATEWY	Default Gateway		192.168.0.1
UPH	Utility Connection (AMF only)	3PH=3 phase <i>(0)</i> 2PH=2 phase <i>(1)</i> 1PH=1 phase <i>(2</i>	3PH
GPH	Genset Connection	3PH=3 phase <i>(0)</i> 1PH=1 phase <i>(1)</i>	ЗРН
dATE	Set the date	DD.MM.YY	-
TIME	Set the time	##h##P or ##h##A	-
T-RdY	Set the genset ready time	ALLTIM, ##h##P or ##h##A	ALLTIM
T-SdbY®	Set the genset standby time	##h##P or ##h##A	-
RdYdAY	Set the genset ready days	1	-
ALL		N (0),Y (1)	Y
SUN <sup>(4)</sup>		N (0),Y (1)	Y
MON <sup>19</sup>		N (0),Y (1)	Y
TUE <sup>19</sup>		N <i>(0)</i> ,Y <i>(1)</i>	Y
WED <sup>19</sup>		N <i>(0)</i> ,Y <i>(1)</i>	Y
THU <sup>19</sup>		N (0),Y (1)	Y
FRI <sup>19</sup>		N (0),Y (1)	Y
SAT <sup>19</sup>		N (0),Y (1)	Y
WEX6	Weekly exercise	N (0),Y (1)	N
P.SNAME	Primary Server name (AST/ES & AMF/ES only)		www.sascontroll ers.com
S.SNAME	Secondary Server name (AST/ES & AMF/ES only)		www.sascontroll ers.com
HR.Mod	Modify Hour meter (only if ECU=No)	0 to 65530	000000
RSTCHR	Reset Continuous Hourmeter		
UHR.Mod	Modify Utility Hour meter(AMF only)	0 to 65530	000000
KWh.Mod	Modify Genset KWhour	0 to 999999	000000
UWh.Mod	Modify Utility KWhour (AMF only)	0 to 999999	000000
TS	Tank Section in cm2/10	0 to 9999	1333
TH	Tank Height in cm	0 to 255	75
То	Tank Offset in L	0 to 9999	0

5. GRAPHICAL DISPLAY

<sup>To enable ECU, boP parameter must be set to Y (ECU cannot be modified when SURF is showing "NotRdy")
These parameters are only available when ECU type is Volvo and cannot be modified when engine is running
Appears only if T—Rdy is set to time
Appears only if ALL is set to N
When enabled, if generator did not operate between Sunday and Friday, it would be started on Saturday at 8:00 am for half an baux</sup> hour



Displayed Parameter	Description	Range	Factory Settings
TP	Tank Pre-alarm in L	0 to 9999	0
TE	Tank Empty	0 to 255	0
MDS	Modbus RS485 Enabled	N (0),Y (1)	N
MID	Modbus ID	1 to 247	20
BAURAT	Modbus Baudrate	9600 (0) 14400(1) 19200(2) 28800(3) 38400(4) 56000(5) 57600(6) 115200(7)	9600
PAR	Modbus Parity	NoN(0) odd(1) EVN(2)	NoN
STP	Modbus Number of Stop Bits	1 1.5 2	1
МТМ	Modbus Transmission Mode	RTU(0) ASC(1)	RTU
UST	Utility Phase Sequence test enabled (AMF only)	N(0), Y(1)	Y
GST	Genset Phase Sequence test enabled	N(0), Y(1)	Y
ERSFLT	Erase Fault Log	-	
VIEWFT	View Fault Log		
dSR	Data Sampling Rate(If SD Card is installed)	N, 20sec to 24Hours	2 minutes
SdFoRM	SD Format Request (If SD Card is installed)	-	
EXIT	Exit Menu	-	

#### 5.2 DESCRIPTION OF STATUS MESSAGES SHOWN ON LCD DISPLAY 5.2.1 FOR UTILITY

Status Message	Description
U-AbSt	Utility is Absent
U-RdY	Utility is Ready
U- VX	Utility Voltage error (Over/under voltage, phase failure)
U- FX	Utility Frequency error (Over/under frequency)
U- SX	Utility Sequence error
U-W 10	Utility is being restored with count down
U-X 10	Utility is counting Transfer Dead Time with count down
U-OnLd	Utility is Feeding Load

# 5.2.2 FOR GENSET

Status Message	Description
StndbY	Genset ready but Remote Control is absent
REAdY	Genset ready
NotRdY	Genset not ready
RSP 10	Engine Counting Response delay with count down
PRH 10 2	Engine Preheating with count down
FPP 10 🕄	Fuel pump count down
CRANKG	Engine Cranking
RUNING	Engine running
WUP 10	Engine Warming Up with count down
XFR 10	Engine counting Transfer Dead Time with count down
OnLoad	Engine running on load

Available only for SurfLT-AMF
Available only if one of the outputs is set to Preheat
Available only if one of the outputs is set to Fuel Pump



Status Message	Description
SLd 10	Engine Shutting Load with count down
CoL 10	Engine Cooling with count down
SEG 10 🟅	Shutting Engine with count down
Fault	A fault has occurred on the Genset
Hi-Oil T	High oil temperature Fault
E-StoP	Emergency stop
St Fail	Fail to start Fault
Ph Fail	Genset Phase failure Fault
SQ Fail	Genset Sequence failure Fault
bat-Hi	High battery Fault
bat-Lo	Low battery Fault
oSPEED	Genset Over speed Fault
uSPEED	Genset Under speed Fault
oVolt	Genset Over voltage Fault
uVolt	Genset Under voltage Fault
oVLoad	Overload Fault
L	Fuel Level (Available only when CAN is enabled)
rPM	Rounds per minute (Available only when CAN is enabled)
—L/H	Fuel Consumption Rate (Available only when CAN is enabled)
-TP	Tank percentage
FW- orF	Software version with revision number
Er-	Ethernet Software version with revision number
CHR	Continuous genset hour counter
Uh	Utility hour counter
—PF-	Power factor
UWh	Utility KWh
–Add	CAN Address (Available only when CAN is enabled)

# 5.3 DETECTED AND SIGNALED FAULTS AND WARNINGS

# 5.3.1 WARNINGS

High Engine Temperature Warning occurs when the analog engine temperature sensor reading goes above the High Engine Temperature Pre-alarm value set by HTP in the menu or when the engine temperature switch is active and the 4 second fault delay is still being counted. The Engine Temperature symbol blinks indicating this warning.

Low Coolant Level Warning occurs when the coolant switch is detected active and the 4 second delay is being counted. The Coolant Level symbol ( , on the LCD blinks to indicate this warning.

Low Oil Pressure Warning occurs when the analog reading goes below the Low Oil Pressure Pre-alarm value set by LoP in the menu or when the oil pressure switch is detected and the fault delay (2 sec) is being counted. The Oil Pressure symbol blinks indicating this warning.

Low Fuel Level Warning occurs when the fuel switch is detected active and the 4 second delay is being counted. The Fuel Level symbol (<sup>(\*)</sup>) on the LCD blinks to indicate this warning.

Low Dynamo Voltage Warning occurs when the dynamo voltage decreases below the dynamo shutdown voltage set by **dSd** and the 5 second delay is being counted. The Dynamo Voltage (<sup>亡</sup>) symbol on the LCD blinks to indicate this warning.

Over/Under Speed Warning occurs when the speed goes above/below the values set in GoS/GuS for the Genset

and the delay set by **GoSd/GuSd** is being counted. The RPM symbol (<sup>(C)</sup>) turns on to indicate this warning.

Over/Under Frequency Warning occurs when the frequency goes above/below the values set in UoF/UuF (for Utility) and the delay set by **UoFd/UuFd** (for Utility) is being counted.

Oil Change Warning occurs when the hours since last oil change exceed the value set by RHR. This warning is indicated by the blinking of the Oil Pressure symbol on the LCD. To reset the oil change counter, press the push button corresponding to the current operating mode for 2 seconds.

Tank Empty Warning occurs when the analog reading goes below the Tank Empty Pre-alarm value set by TP in the menu. The Fuel Level symbol ( $\overset{{}_{\frown}}{\frown}$ ) on the LCD blinks to indicate this warning.



## 5.3.2 FAULTS

To delete the current fault, press and release the Off push button.

Fault	Comments	Symbol
Fail to start	Genset fails to start after the maximum number of attempts was reached	I
Emergency stop	Shuts load, engine and all outputs immediately	l
High Battery	`Shuts load and engine after the elapse of the High Battery delay (Hbd)	!
Low Battery	Shuts load and engine after the elapse of the Low Battery delay (Lbd)	!
High Engine Temp.	Shuts load and engine due to high engine temperature	E CE

Fault	Comments	Symbol
High Oil Temp.	Shuts load and engine due to high oil temperature	!
Low Coolant Level	Shuts load and engine due low coolant level	-Ŧ,
Low Oil Pressure	Shuts load and engine due to low oil pressure	₽₽7.
Low Fuel Level	Shuts load and engine due to low fuel level	₹.
Low Dynamo Volt	Shuts load and engine due to low dynamo voltage	- <u>+</u>
Genset Over Voltage	Shuts the load and engine after the elapse of the over voltage delay (GoVd)	I
Genset Under Voltage	Shuts the load and engine after the elapse of the under voltage delay (GuVd)	!
Genset Phase Failure	Shuts load and engine due to a phase failure	I
Genset Sequence Failure	Shuts engine due to a sequence failure	!
Genset Over Speed	Shuts the load and engine after the elapse of the over speed delay (GoSd)	
Genset Under Speed	Shuts the load and engine after the elapse of the under speed delay (GuSd)	0
Over Load	Shuts the load and engine after the elapse of the over load delay (oLdd)	-
Utility Over Voltage	Shuts the load after the elapse of the over voltage delay (UoVd)	-
Utility Under Voltage	Shuts the load after the elapse of the under voltage delay (UuVd)	-
Utility Phase Failure	Shuts load due to a phase failure	-
Utility Sequence Failure	Utility anomaly due to sequence failure	-
Utility Over Frequency	Shuts the load after the elapse of the over frequency delay (UoFd)	-
Utility Under Frequency	Shuts the load after the elapse of the over frequency delay (UuFd)	-
Tank Empty	Shuts load and engine due to tank empty	2
UcShut	Genset shut down abnormally (SURF did not give shutdown order)	1

**Fail to Start Fault** occurs when the engine does not turn on after **ATT** cranking attempts. **ATT** is set in the menu. The fault is removed when the Remote Control input is recycled or when Utility is restored. The fault symbol (1) blinks and the Multifunction display indicates a start fail fault by displaying **St Fail** in the Genset Status page.

**Emergency Stop** occurs when the emergency switch is turned off. All the outputs from the SURF will be disabled, the fault symbol (!) turns on and the Multifunction display indicates the fault by displaying **E-StoP** in the Genset Status page.

**High Battery Fault** occurs when the battery voltage exceeds **Hib** for a delay set by **Hbd**. The fault symbol (I) turns on and the Multifunction display indicates a high battery fault by displaying **bat-Hi** in the Genset Status page.

Low Battery Fault occurs when the battery voltage drops below Lob for a delay set by Lbd. This fault is tested when the engine is not cranking and independent of the fault bypass delay. The fault symbol (I) turns on and the Multifunction display indicates a low battery fault by displaying **bat-Lo** in the Genset Status page.

High Engine Temperature Fault occurs when the engine temperature switch is detected on for 4 seconds or when the analog engine temperature sensor reading goes above the High Engine Temperature Alarm value set by HTA in

the menu. The Engine Temperature symbol ( defined a) turns on and the Multifunction display shows **Fault** in the Genset Status page. Genset goes into cooling if **CHT** is set to **Y**.



**High Oil Temperature Fault** occurs when the oil temperature switch is detected on for 4 seconds. The fault symbol (**I**) turns on and the Multifunction display indicates a high oil temperature fault by displaying **Hi-Oil T** in the Genset Status page.

Low Coolant Level Fault occurs when the coolant switch is detected active for 4 seconds. The Coolant Level symbol (

Low Oil Pressure Fault occurs when the oil pressure switch is detected on for 2 seconds or when the analog oil pressure sensor reading goes below the Low Oil Pressure Alarm value set by LoA in the menu. The Oil Pressure symbol (<sup>127</sup>) turns on and the Multifunction display shows **Fault** in the Genset Status page.

Low Fuel Level Fault occurs when the fuel switch is detected active for 4 seconds. The Fuel Level symbol (<sup>(\*)</sup>) on the LCD would turn on and the Multifunction display shows **Fault** in the Genset Status page.

Low Dynamo Voltage Fault occurs when the dynamo voltage decreases below the dynamo shutdown voltage set by dSd for 5 seconds. The Dynamo Voltage (<sup>世</sup>) symbol on the LCD turns on and the Multifunction display shows Fault in the Genset Status page.

**Over/under Voltage Fault** occurs when one of the three-phase voltages goes above/below the over/under voltage limits set by **GoV/GuV** (for Genset), **UoV/UuV** (for Utility) for a delay of **GoVd/GuVd**(for Genset), UoVd/UuVd (for Utility). The Multifunction display indicates an over/under voltage fault by displaying **oVolt/uVolt** in the Genset Status page or **U-VX** in the Utility Status page. If the fault occurs on the genset, the fault symbol (1) turns on.

**Phase Failure Fault** occurs when the voltage on one of the lines falls below 100V or the voltage difference between any two phases exceeds 120V or the frequency goes below 15Hz. The Multifunction display indicates the fault by displaying **Ph Fail** in the Genset Status page or **U-VX** in the Utility Status page. If the fault occurs on the genset, the fault symbol (!) turns on.

**Sequence Failure Fault** occurs when the phases are reversed. The Multifunction display indicates the fault by displaying **SQ Fail** in the Genset Status page or **U- SX** in the Utility Status page. If the fault occurs on the genset, the fault symbol (!) turns on.

Over/Under Speed Fault occurs when the engine speed goes above/below the values set in GoS/GuS for a delay of GoSd/GuSd. The Multifunction display indicates an over/under speed fault by displaying oSPEED/uSPEED in the

Genset Status page. The RPM symbol ( $^{\textcircled{O}}$ ) turns on for an under speed fault and blink for an over speed fault.

**Over/Under Frequency Fault** occurs when the frequency goes above/below the values set in **UoF/UuF** (for Utility) for a delay of **UoFd/UuFd** (for Utility). The Multifunction display indicates an over/under frequency fault by displaying **U-FX** in the Utility Status page.

**Overload Fault** occurs when the load on the genset exceeds the value set by **oLd** for a delay set by **oLdd**. The fault symbol (1) turns on and the Multifunction display indicates an overload fault by displaying **oVLoad** in the Genset Status page. Genset goes into cooling if **CHT** is set to **Y**.

Tank Empty Fault occurs when the analog fuel level sensor reading goes below the Tank Empty value set by TE in

the menu. The Tank Empty symbol (<sup>\*)</sup>) turns on and the Multifunction display shows **Fault** in the Genset Status page.

**UcShut** occurs when the Genset shut down abnormally (SURF did not give shutdown order). The fault symbol (1) turns on and the Multifunction display indicates an uncontrolled shut down fault by displaying **UcShut** in the Genset Status page.

**Fail to Start Fault** occurs when the engine does not turn on after **ATT** cranking attempts. **ATT** is set in the menu. The fault is removed when the Remote Control input is recycled or when Utility is restored. The fault symbol (!) blinks and the Multifunction display indicates a start fail fault by displaying **St Fail** in the Genset Status page.

**Emergency Stop** occurs when the emergency switch is turned off. All the outputs from the SURF will be disabled, the fault symbol (**!**) turns on and the Multifunction display indicates the fault by displaying **E-StoP** in the Genset Status page.

**High Battery Fault** occurs when the battery voltage exceeds **Hib** for a delay set by **Hbd**. The fault symbol (I) turns on and the Multifunction display indicates a high battery fault by displaying **bat-Hi** in the Genset Status page.



Low Battery Fault occurs when the battery voltage drops below Lob for a delay set by Lbd. This fault is tested when the engine is not cranking and independent of the fault bypass delay. The fault symbol (!) turns on and the Multifunction display indicates a low battery fault by displaying **bat-Lo** in the Genset Status page.

High Engine Temperature Fault occurs when the engine temperature switch is detected on for 4 seconds or when the analog engine temperature sensor reading goes above the High Engine Temperature Alarm value set by HTA in

the menu. The Engine Temperature symbol ( ) turns on and the Multifunction display shows **Fault** in the Genset Status page. Genset goes into cooling if **CHT** is set to **Y**.

**High Oil Temperature Fault** occurs when the oil temperature switch is detected on for 4 seconds. The fault symbol ( I ) turns on and the Multifunction display indicates a high oil temperature fault by displaying **Hi-Oil T** in the Genset Status page.

Low Coolant Level Fault occurs when the coolant switch is detected active for 4 seconds. The Coolant Level symbol (

Low Oil Pressure Fault occurs when the oil pressure switch is detected on for 2 seconds or when the analog oil pressure sensor reading goes below the Low Oil Pressure Alarm value set by LoA in the menu. The Oil Pressure symbol (<sup>1277</sup>) turns on and the Multifunction display shows Fault in the Genset Status page.

Low Fuel Level Fault occurs when the fuel switch is detected active for 4 seconds. The Fuel Level symbol (<sup>(\*)</sup>) on the LCD would turn on and the Multifunction display shows **Fault** in the Genset Status page.

Low Dynamo Voltage Fault occurs when the dynamo voltage decreases below the dynamo shutdown voltage set by dSd for 5 seconds. The Dynamo Voltage (<sup>亡</sup>) symbol on the LCD turns on and the Multifunction display shows Fault in the Genset Status page.

**Over/under Voltage Fault** occurs when one of the three-phase voltages goes above/below the over/under voltage limits set by **GoV/GuV** (for Genset), **UoV/UuV** (for Utility) for a delay of **GoVd/GuVd**(for Genset), **UoVd/UuVd** (for Utility). The Multifunction display indicates an over/under voltage fault by displaying **oVolt/uVolt** in the Genset Status page or **U-VX** in the Utility Status page. If the fault occurs on the genset, the fault symbol (1) turns on.

**Phase Failure Fault** occurs when the voltage on one of the lines falls below 100V or the voltage difference between any two phases exceeds 120V or the frequency goes below 15Hz. The Multifunction display indicates the fault by displaying **Ph Fail** in the Genset Status page or **U-VX** in the Utility Status page. If the fault occurs on the genset, the fault symbol (!) turns on.

**Sequence Failure Fault** occurs when the phases are reversed. The Multifunction display indicates the fault by displaying **SO Fail** in the Genset Status page or **U- SX** in the Utility Status page. If the fault occurs on the genset, the fault symbol (!) turns on.

Over/Under Speed Fault occurs when the engine speed goes above/below the values set in GoS/GuS for a delay of GoSd/GuSd. The Multifunction display indicates an over/under speed fault by displaying oSPEED/uSPEED in the

Genset Status page. The RPM symbol (<sup>(()</sup>) turns on for an under speed fault and blink for an over speed fault.

**Over/Under Frequency Fault** occurs when the frequency goes above/below the values set in **UoF/UuF** (for Utility) for a delay of **UoFd/UuFd** (for Utility). The Multifunction display indicates an over/under frequency fault by displaying **U-FX** in the Utility Status page.

**Overload Fault** occurs when the load on the genset exceeds the value set by **oLd** for a delay set by **oLdd**. The fault symbol (!) turns on and the Multifunction display indicates an overload fault by displaying **oVLoad** in the Genset Status page. Genset goes into cooling if **CHT** is set to **Y**.

Tank Empty Fault occurs when the analog fuel level sensor reading goes below the Tank Empty value set by TE in

the menu. The Tank Empty symbol (<sup>\*</sup>) turns on and the Multifunction display shows **Fault** in the Genset Status page.

**UcShut** occurs when the Genset shut down abnormally (SURF did not give shutdown order). The fault symbol (I) turns on and the Multifunction display indicates an uncontrolled shut down fault by displaying **UcShut** in the Genset Status page.



## 5.3.3 DTC FAULTS

When an ECU is installed and it is in a faulty status, the DTC fault code is shown on the multifunction display. The correspondent description will be displayed if its code is mentioned in the below table.

DTC Fault Code	DTC Fault Description
J0091-08	PWM THROTTLE POSITION SENSOR ADNORMAL
J0100-01	Low oil pressure shutdown
J0100-03	ENGINE OIL PRESSURE SENSOR SHORTED HI
J0100-04	ENGINE OIL PRESSURE SENSOR SHORTED LO
J0100-17	Low oil pressure warning
J0100-18	LoW oIL PRESSURE ACTION ALERT
J0102-03	TURboCHARGER OUTLET PRESSURE SENSOR SHOR
J0102-04	TURboCHARGER OUTLET PRESSURE SENSOR SHOR
J0102-15	HI boost PRESSURE WARNING
J0102-16	HI boost PRESSURE ACTION ALERT
J0108-03	ATMoS PHERIC PRESSURE SENSOR SHORTED HI
J0108-04	ATMoS PHERIC PRESSURE SENSOR SHORTED LO
J0110-00	HI CoolANT TEMP. SHUTdoWN
J0110-03	ENGINE COOLANT TEMP. SENSOR SHORTED HI
J0110-04	ENGINE COOLANT TEMP. SENSOR SHORTED LO
J0110-15	HI Coolant TEMP. Warning
J0110-16	HI Coolant TEMP. Action Alert
J0168-02	bATTERY VoLTAGE INTERMITTENTplus
J0172-03	INTAKE MANIFOLD AIR TEMP. SENSOR SHORTED
J0172-04	INTAKE MANIFOLD AIR TEMP. SENSOR SHORTED
J0172-15	HI INTEL AIR TEMP. WARNING
J0172-16	HI INTEL AIR TEMP. ACTION ALERT
J0174-03	FUEL TEMP. SENSOR SHORTED HI
J0174-04	FUEL TEMP. SENSOR SHORTED LO
J0174-15	HI FUEL TEM P. WARNING
J0174-16	HI FUEL TEM P. ACTION ALERT
J0190-00	over speed shutdown
J0190-02	ENGINE SPEEd SENSOR LOSS OF SIGNAL
J0190-11	ENGINE SPEEd SENSOR MECHANICAL FAULT
J0190-15	over speed warning
J0190-16	over speed action alert
J0228-13	ENGINE TIMING CALIBRATION REQUIREd
J0234-02	INCORRECT ECM SOFTWARE
J0620-03	5V SENSOR SUPPLY AboVE NORMAL OR SHORTEd
J0620-04	5V SENSOR SUPPLY bELOW NORMAL OR SHORTED
J0651-11	INJECTOR CYLINDER 1 FAULT
J0652-11	INJECTOR CYLINDER 2 FAULT
J0653-11	INJECTOR CYLINDER 3 FAULT
J0654-11	INJECTOR CYLINDER 4 FAULT
J0655-11	INJECTOR CYLINDER 5 FAULT
J0656-11	INJECTOR CYLINDER 6 FAULT
J0678-03	ECM 8VdC SUPPLY AboVE NoRMAL oR SHoRTEd

DTC Fault Code	DTC Fault Description
J0678-04	ECM 8VdC SUPPLY bELoW NoRMAL oR SHoRTEd
J1108-31	CRITICAL oVERRIdE ENAbLEd
J1111-02	CHECK CoNFIGURABLE PARAMETERS

#### 5.4. LOGS

SURF has a Fault Log that can save the last 15 faults (last 100 faults are saved if optional SD card is installed) that occurred on the genset. The Fault Log saves the type of error that occurred along with the voltages, frequency, currents, oil pressure, engine temperature, battery voltage, hour meter, L/H, L, KW and KWHr. The Fault Log can be accessed and erased through the SURF menu or remotely through the different communication protocols supported.



#### 5.4.1 VIEWING THE FAULT LOG

To access the Fault Log, enter the menu (refer to section 7), scroll down until "**VIEWFT**" is displayed and press the SELECT push button. If no faults are saved, a "**NO FLT**" message is displayed. Otherwise, "**FLT 1**" is displayed. To scroll between the different saved faults, use the UP/DOWN push buttons. When the Fault Log is entered, the readings at the time of the fault are displayed instead of the current readings. The fault number, type, L/H, L, KW, KWHr, occurrence date and time are displayed on the Multifunction display. To scroll between these readings, press the Menu push button. To exit the Fault Log, press the SELECT push button.

#### 5.4.2 ERASING THE FAULT LOG

To erase the Fault Log, enter the menu, scroll down until "**ERSFLT**" is displayed and press the SELECT push button. The SURF module prompts you to confirm your request by displaying the "**RUSURE**" message. To cancel the request, press the UP push button. To confirm the request, press the DOWN push button.

#### 5.4.3 SD CARD FOR FAULTS, EVENTS AND DATA LOGGING

If optional SD card is installed, the surf will have the following features:

### 5.4.3.1 FAULTS

SURF can save on the SD card the last 100 faults that occurred on the genset

### 5.4.3.2 EVENTS AND DATA LOGGING

All events are saved on the SD card. Events cover user parameter manipulation, mode changes and operational events. For data logging user should set the parameter **dSR** to specify the data logging frequency.



# 6. FIRMWARE UPGRADE

#### 6.1 INSTALLING THE SURF USB DRIVER

- 1. Plug in the USB cable to the SURF device before turning power on
  - 2. Turn on power of the SURF device. All the LEDs on the front start blinking.

### 6.1.1 DRIVER SETUP FOR WINDOWS VISTA/WIN7<sup>10</sup>

The first SURF plugged into the PC USB port may not launch an automatic start. In this case, right-click my computer and choose properties. The following window appears. On the left side of the window, click on Device Manager.

💮 💬 - 🕎 - Control Panel 🕨	System and Security   System		Search Control Panel	x Q
Control Panel Home Control Panel Home Control Panel Home Remote settings System protection Advanced system settings	View basic information Windows edition Windows 7 Professional Copyright © 2009 Microso Get more features with a n	about your computer ft Corporation. All rights reserved. ew edition of Windows 7		E
	System Rating: Processor: Installed memory (RAM): System type:	Windows Experience Indee Intel(R) Core(TM)2 Duo CPU P 3.00 GB 32-bit Operating System	× 8800 @ 2.66GHz 2.67 GHz	

The "SAS DEV" device will appear in Other Devices, right-click it and choose Update Driver Software.

🚔 Device Manager	
File Action View He	2
(= -) 🗔 🔄 👔	1 💀 🔛 🔫 🕫
⊿ 🚔 ISSA-PC	
Batteries	
Computer	
Disk drives	
👂 🖳 Display adapters	
DVD/CD-ROM d	ves
👂 🖏 Human Interfac	Devices
IDE ATA/ATAPI	ontrollers
Keyboards	
Mice and other	binting devices
Network adapte	
A D Other devices	
SAS DEV	
Unknow	Update Driver Software
🔚 🐻 Unknow	Disable
Ports (COM)	Uninstall
Processors	
Sound, vide	Scan for hardware changes
b 👰 System devi	Properties
👂 🏺 Universal Se	rioperates
D - USB Virtualizatio	
Launches the Undate Driver	oftware Wizard for the selected device.
and and opuate birrer	

<sup>10</sup> This will be implemented only one time when the first SurfLT is connected to PC through USB



\_\_\_\_\_

Select "Search automatically for updates driver software".

1

6	🕞 📱 Update Driver Software - SURF AMF / AUTO Ver 1.0	
	How do you want to search for driver software?	
	Search automatically for updated driver software Windows will search your computer and the Internet for the latest driver software for your device, unless you've disabled this feature in your device installation settings.	
	Browse my computer for driver software Locate and install driver software manually.	
		Cancel

Select Install this driver software anyway.



The Driver SETUP procedure will be done only once For Windows vista/Win7.

So, the driver of any new SURF connected to the PC USB port will be installed automatically.



#### 6.1.2 DRIVER SETUP FOR WINDOWS XP

Each time new SURF is plugged into the PC USB port, a "Found New Hardware Wizard" window appears.

Select "Install the software automatically (Recommended)" and click next.

Found New Hardware Wize	ard
	Welcome to the Found New Hardware Wizard
	This wizard helps you install software for:
	Communications Port MS
	If your hardware came with an installation CD or floppy disk, insert it now.
	What do you want the wizard to do?
	<ul> <li>Install the software automatically (Recommended)</li> <li>Install from a list or specific location (Advanced)</li> </ul>
	Click Next to continue.
	< Back Next > Cancel

Select "Continue Anyway".

Hardwa	re Installation
<u>.</u>	The software you are installing for this hardware: Communications Port MS has not passed Windows Logo testing to verify its compatibility with Windows XP. ( <u>Tell me why this testing is important.</u> ) <b>Continuing your installation of this software may impair</b> or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
	Continue Anyway STOP Installation

The driver of the new SURF connected to the PC USB port will be installed automatically.



# 6.2 FIRMWARE UPGRADE USING PC

#### 6.2.1 INSTALLING THE SURFLT FIRMWARE UPGRADE SOFTWARE

In order to upgrade firmware on site, a CD will be provided by S. & A. S. Ltd & the below steps shall be followed:

- 1. Run file "SAS\_Patch.exe" located in "Surf120\_PTool\SAS\_PTool" folder.
- 2. Setup the application located in "Surf120\_PTool\SAS\_PTool\SAS\_PTool\_Setup" folder
- 3. SAS\_PTool will appear in the programs list. Send it to Desktop as shortcut.

#### 6.2.2 FIRMWARE UPGRADE PROCESS

Run "SAS\_PTool" application.

The following window will appear prompting the user that the SURF board is detected on the USB port:

💝 SAS Firmware Up	grade V1.1.0		
De∨ice found	SAS DEV Open File	Upgrade	
	Open	File to download	

Click Open to choose the \*.sas file that will be used to upgrade the firmware.

A Footnote will appear showing the file name, the software version and its date:

🔅 SAS Firmware Up	grade V1.1.0	
Device found	SAS DEV	
	Open File	Upgrade
SAS file named:	SURF_AMF12c200 dated 21/08/17 SW v200F1	9 for SURF HW v1.2c Standard to be downloaded
	via USB' is opene	ed !!

Click upgrade. The upgrade progress is shown as below:

🔅 SAS Firmware Up	ograde V1.1.0	k
Device found	SAS DEV	
	Open File Upgrade	
SAS file named:	'SURF_AMF12c200 dated 21/08/17 SW v200F19 for SURF HW v1.2c Standard to be downloaded via USB' is opened !!	
		ĺ
	Firmware is upgrading	



Once the upgrade is complete, the footnote "Firmware upgraded successfully" will appear:

💝 SAS Firmware Up	grade V1.1.0	
Device found	No SAS device found	
	Open File	Upgrade
SAS file named:	SURF_AMF12c200 dated 21/08/17 via US	SW v200F19 for SURF HW v1.2c Standard to be downloaded B' is opened !!
	Firmware upgraded su	ccessfully !

Then the SURF Firmware upgraded successfully and the SURF will automatically restart.

#### 6.3 FIRMWARE UPGRADE USING GOOGLE STORE ON SMART PHONE 6.3.1 INSTALLING THE SASPTOOL FIRMWARE APPLICATION ON THE MOBILE

In order to upgrade firmware from a mobile, follow the below steps:

1. Search for the application "SASPTool" on google store and install it, or follow the link below: https://play.google.com/store/search?q=SASPTool.

## 6.3.2 FIRMWARE UPGRADE PROCESS

2. Run "SAS\_PTool" application from the mobile.

The below window appears showing all \*.sas files already saved.



- 3. Power off the SURF board
- 4. Use a USB cable to connect board to the mobile.
- 5. Turn SURF on.



The following window will appear:

🛃 SAS_PTool
A S. & A.S. LTD
Plugin your device and make sure the connection is established then choose a program file from the list below :
SURF_LT100100r6_oldDynamo.sas
SURF_LT100100r6_oldDynamoVar.sas
W14a100.sas
SURF_AMF12c200_USB_r19.sas
Refresh
SAS Device Disconnected ¥
Connect
www.sascontrollers.com

6. Click on the Connect button. The following window will appear showing that a SAS Device is now connected:

SAS_PTOOL	
Plugin your device and make sure the connection is established then choose a program file from the list below :	
SURF_LT100100r6_oldDynamoVar.sas	
SURF_AMF12c200_USB_r19.sas Refresh	
SAS Device Connected 🛩 Connect	
www.sascontrollers.com	SUCCESS

7. Click on the sas file that you need to download.



A Popup window will appear showing the file name, its description and its date:



8. Click Yes. The download will start:.







Once the download is complete, the message "Firmware Downloaded successfully" will appear:





9. Disconnect the USB cable.

The user can now process with normal operation of the lift.

If you desire to delete any sas file from the mobile list, press on the filename until a Popup window appears showing you multiple choices and then click on Remove from list:

SAS_PTool
Plugin your device and make sure the
SURF_AMF12c200 dated 21/08/17 SW v200F19 for SURF
Download
Remove from list
Back
SAS Device Disconnected & Connect

### 6.3 ONLINE FIRMWARE UPGRADE

This feature is available only in SURF v1.2b SURF v1.2c. In order to upgrade firmware remotely, SURF must be connected to the internet and its status must be online & the below steps shall be followed:

- 1. Run the SURF Web application on our website <u>www.sascontrollers.com</u>.
- 2. Enter the username and the correspondent password to access your already registered account.
- 3. A list of your surf controllers appears (see the figure below).

Surf ID Location	Description Last seen	H/W Ver.	Туре Со	ntroller Eth. Ver. Ver.		Control			
IPCS01 africa	4 weeks ago	1.2a					í 🏹	(	2
PETITE 🔤	online	1.2b	AMF	204.3	100.1		<i></i> 📈	<del>V</del> (	2
SACCAL 🔤	online	1.2b	AUTO	100.0	0.0		<i></i> 📈	<del>v</del> (	
NIDALW 🔤	online	1.1					í 🏹	<del>V</del> (	
ELIE01 saccal s	1 month ago	1.2b	AMF	200.4	100.0		í 🏹	(	2
IPT637 🔛 nigeria	online	1.2b	Delta	200.5	100.1		<i></i> 📈	<del>V</del> (	
DEBIYE 🔤	online	1.2b	Delta	200.6	100.1		<i></i> 📈	<del>V</del> (	2
ZYXXXX 🔤	6 hours ago	1.26 DC	+SOLAR(17+9K	(w) <b>500.13</b>	100.1		í 🏹	(	2
0013ZZ	online	1.2b	Delta	200.6	100.0		<i></i> 📈	<ul> <li>✓ (</li> </ul>	2

- 4. Check Controller Ver. and Eth. Ver. of the SURF to see if any upgrade is needed.
- 5. To upgrade the SURF, make sure the engine is turned off, and then click on the button "Firmware Upgrade" as shown in the image below.



CONTACTS			SO	RT BY :	Date Of Creat	ïon			•			
Surf ID	Location	Description	Last seen	H/W Ver.	Туре	Controller Ver.	Eth. Ver.	Co	ontrol			
IPCS01	africa		4 weeks ago	1.2a					ا ً∢∕	× 🗉		^ 🔬
PETITE 🔤			online	1.2b	AMF	204.3	100.1		∳⊗	× "	<b>0</b> (	
SACCAL 🔤			online	1.2b	AUTO	100.0	0.0		∳⊗	×	<b>0</b> (	
NIDALW 🔤			online	1.1					<i>چ</i>	×	<b>0</b>	
ELIE01	saccal	s	1 month ago	1.2b	AMF	200.4	100.0		∳⊗	× 🗉		2
IPT637 🖂	nigeria		online	1.2b	Delta	200.5	100.1		ا 衫	× י	<b>A</b> (	2
DEBIYE 🔤			online	1.2b	Delta	200.6	100.1	Firm	ware Upgra		<b>0</b> (	2
0011ZZ 🔛			1 hour ago	1.2b	Delta	200.6	100.1		ا 🎸	×		2
0013ZZ 🔛			online	1.2b	Delta	200.6	100.0		<i></i>	× "	<del>v</del> (	<u></u>

- 6. The user is prompted to enter a password. This password is provided by S. & A. S. Ltd.
- 7. The below window appears if the valid password is entered.



- 8. Under Update Controller Firmware, select "Choose Files" button to choose the online controller software to be upgraded. Double check the filename and its extension (\*\_online.sas).
- 9. The Ethernet firmware upgrade is optional. In case it's needed, select the "Update Ethernet Firmware" check box and select "Choose files" to choose the Ethernet software to be upgraded Double check the filename and its extension (ICSP\_SURF\*\_online.sas).
- 10. Click "Start Firmware upgrade" Button. A pop-up window shows the description of both Firmwares. Double check the description before confirming the start of the upgrade process.
- The Ethernet firmware and Controller firmware download will be started consecutively, once finished a green symbol (✓) is displayed indicating that the upgrade process on the SURF itself has started. During Upgrade, the SURF will go Offline.





12. When the Ethernet/Controller firmware upgrade is done successfully, the SURF will go Online showing the newest Controller Ver. And Eth. Ver. on the control screen.

# 7. SD CARD RETRIEVAL

# 7.1 INSTALLING THE DRIVER

- 1. Plug in the USB cable to the SURF device before turning power on.
- 2. Turn on power of the SURF device.
- 3. Go to device manager, search for "SURF120 Virtual COM Port" in "Other devices" category.

🗄 Device Manager	-	×
File Action View Help		
(≠ ⇒) 🗊 🛛 🗊 💭		
		_
> Disk drives		^
> Image Display adapters		
> WD/CD-ROM drives		
> Win Human Interface Devices		
> The ATA/ATAPI controllers		
> Keyboards		
> U Mice and other pointing devices		
> Monitors		
V V IVetwork adapters		
Kaspersky Security Data Escort Adapter		
Deskul DCI COPDack Adapter		
WAN Miniport (IKEV2)		
WAN Miniport (IP)		
WAN Miniport (1976)		
WAN Miniport (L2TP)		
WAN Miniport (Network Monitor)		
WAN Miniport (PPPOE)		
WAN Miniport (PPTP)		
(SSIP)		
SUPE120 Vietual COM Port		
> = Policible Devices		
Communications Port (COM1)		
Gommunications Port (COWI)		¥

4. Right-click on "SURF120 Virtual COM Port" and choose "Update Driver Software...", a new window appears.

	22
🕞 🛽 Update Driver Software - SURF120 Virtual COM Port	
How do you want to search for driver software?	
Search automatically for updated driver software Windows will search your computer and the Internet for the latest driver software for your device, unless you've disabled this feature in your device installation settings.	
Browse my computer for driver software Locate and install driver software manually.	
	Cancel

5. Choose "Browse my computer for driver software", the window shown in the picture below appears:

	X
Update Driver Software - SURF120 Virtual COM Port	
Browse for driver software on your computer	
Search for driver software in this location:	
C:\Users\sas\Desktop\New folder   Browse	
☑ Include subfolders	
Let me pick from a list of device drivers on my computer This list will show installed driver software compatible with the device, and all driver software in the same category as the device.	
Next	Cancel

7. SD CARD RETRIEVAL

6. Browse for the S. & A.S Virtual Com Port Driver then click the Next button.

	23
🕞 🛽 Update Driver Software - SURF120 Virtual COM Port	
Installing driver software	

7. A pop-up message appears. Click on "Install this driver software anyway".



8. Once the windows has finished installing the driver software, the message shown in the following picture appears:

i	Update Driver Software - SURF AMF/AUTO Ver 1.2 (COM3)
	Windows has successfully updated your driver software
	Windows has finished installing the driver software for this device:
	SURF AMF/AUTO Ver 1.2
l	Close

9. Click "Close". "SURF AMF/AUTO Ver 1.2 " appears in "Ports" category.

File /	Action View Help		
<b>(= =</b> )			
>	🔤 Keyboards		
>	Mice and other pointing devices		
>	💻 Monitors		
~	🖵 Network adapters		
	🚍 Kaspersky Security Data Escort Adapter		
	😨 Npcap Loopback Adapter		
	🚍 Realtek PCIe GBE Family Controller		
	🚽 WAN Miniport (IKEv2)		
	🚽 WAN Miniport (IP)		
	🚽 WAN Miniport (IPv6)		
	wAN Miniport (L2TP)		
	🚽 WAN Miniport (Network Monitor)		
	wan Miniport (PPPOE)		
	wan Miniport (PPTP)		
	wAN Miniport (SSTP)		
>	Portable Devices		
~	Ports (COM & LPT)		
	Communications Port (COM1)		
	SURF AMF/AUTO Ver 1.2 (COM3)		
>	Print queues		
>	Processors		
5	Security devices		
Ś	Sensors		
Ś	Software devices		
Ś	Sound, video and game controllers		

### 7.2 SD CARD RETRIEVAL

In order to retrieve Event or Time logs from SURF v1.2b, a desktop application will be provided by S. & A. S. Ltd & the below steps shall be followed:

- 1. Run file "Log\_Retrieve\_Utility\_windows.exe".
- 2. Setup the application "Log\_Retrieve\_Utility\_windows.exe".
- 3. "S. &A. S Log Retrieve Utility" will appear in the programs list. Send it to Desktop as shortcut.

### 7.3 DATA SAMPLING AND RETRIEVE

- With the Surf powered on and set to one of the three operating modes (Manual, Auto or Standby/Mains-Only mode), establish a USB Connection between the SURF and your PC.
   Open the Desktop Application
- Open the Desktop Application.
   A Virtual COM port should appear as shown in the figure below (Surf 1.2B at: COM#).
  - Otherwise, press the "**Refresh**" button or try to re-plugin the USB cable.

If the problem persists, consider using another PC USB port or replacing the USB Cable). Make sure the SD-CARD is considered "**Mounted**" before proceeding with the next step.

V3.1 5/27/16 B+2 S.&A.S Controllers	- 0
Plugin your SAS device ,then select one of the active pol	rts if av
	Surf 1.2B at :COM84
Connection status Mounted	Refresh
Total Space : 3720 MB Free Space : 3719 MB Device Identi	fication Name : XXXXXX
Time Log   Event Log	·
Select time interval :	Time L
Time Starts : Mon 05/30/2016 9 Time Ends : Mon 05/30/2016 9	
Excel Sheer Draw Table	Plot Graph

4. Select the port and enter the SURF password.

V3.1 5/27/16 B+2 Plugin your SAS device ,then select one of the activity	ers ve ports if av
	Surf 1.2B at :COM84
Connection status UnMounted	Refresh
Total Space : 0       Free         Time Log       Enter your device password         Select time interval :       OK         Time Starts :       Imme Ends         Excel Sheet       Draw Table	Time L

5. If the entered password is valid, you can select the type required (Time Log or Event Log), then choose the Start/End dates and press the "Excel Sheet" Button.



6. Select the path and name for the Excel file to be exported.

/3.1 5/27/16 B+2 Plugin your SAS	S.&A.S Co	ontrollers f the active ports	if av	_ (
			Surf 1.2B at :CO	M84
Connection status Mo	unted		Refr	esh
Total Space : 3720 MB Free S	pace: 3719 MB	Device Identific	ation Name : )	<i>aaaaa</i>
Select time interval :				Time L
Time Starts : Mon 05/30/2016 Excel Sheet	Y     Time Ends :     Mon       Draw Table	05/30/2016 <b>?</b>	Plot Graph	
	Excel File In Progress 7%			

V3.1 5/27/16 B+2 S.&A.S Controllers Plugin your SAS device , then select one of the active port	= 🕑
	Surf 1.2B at :COM84
Connection status Mounted	Refresh
Total Space : 3720 MB Free Space : 3719 MB Device Identifi	cation Name : XXXXXX
. Time Log . Event Log	· ·
Select time interval :	Time L
Time Starts : Mon 05/30/2016 ? Time Ends : Mon 05/30/2016 ?	Plot Graph

7. The retrieve process should start and the progress will be indicated by an animated loader with the completed percentage.

8. Wait until the loader disappears, at this stage the progress is finished and you can find the exported file at the path specified in step #5.

V3.1 5/27/16 B	3+2     S.&A.S Controllers       Plugin your SAS device ,then select one of the active ports if av	Ċ
Connection s	Surf 1.2B at :COM84	
Total Spac		
Select time	File Name:     Time Logs       Files of Type:     All Files	
	Open Cancel	
Retrieving	data from your device "please wait and don't disconnect your USB Cable untill end of data	



8. CASE DIMENSIONS





# 9. WIRING DIAGRAM

This section contains the wiring diagram of the SURF-AMF and SURF-AUTO.





# WHICH GENERATOR CONTROLLER IS RIGHT FOR YOU?

	Smart Turbo v1.2	Smart GT v1.O	Surf LT v1.0	Surf 1.2c
	Antonio I Antonio I Antonio			
Automatic engine starting and stopping	✓	✓	1	✓
Automatic mains failure	_	_	$\checkmark$	$\checkmark$
User Access	3 Push Buttons	3 Push Buttons	8 Push Buttons	5 Push Buttons
Dimensions (WidthxHeightxDepth)	72x72x32 mm	72x72x32 mm	208x160x32 mm	196x144x33 mm
Panel cut out	68.5x68.5 mm	68.5x68.5 mm	184x139 mm	182x137 mm
Number of Phases	1 Phase	1 Phase	1phase/ <b>3</b> Phases	1phase/3Phases
Digital Outputs	4	4	6	6(Optional 10)
Digital Inputs	5	5	5	5
Analog Inputs	—	2	4	4
Voltage Measurement	1 L-N	1 L-N	3 L-N, 3L-L	3 L-N, 3L-L
Frequency Measurement	✓	✓	✓	✓
Current Measurement	—	$\checkmark$	✓	✓
Power Measurement	—	$\checkmark$	✓	✓
Energy Measurement	—	$\checkmark$	✓	$\checkmark$
Run hours counter	$\checkmark$	$\checkmark$	✓	✓
Oil run hours counter	$\checkmark$	$\checkmark$	✓	✓
Over / Under voltage alarm and shut down	✓	✓	✓	✓
Over / Under frequency alarm and shut down	✓	✓	~	~

	Smart Turbo v1.2	Smart GT v1.0	Surf LT v1.0	Surf 1.2c
Overload alarm and shut down	—	$\checkmark$	✓	✓
Low oil pressure alarm and shut down	✓	$\checkmark$	✓	✓
High engine temperature alarm and shut down	✓	✓	✓	✓
Battery alarm	$\checkmark$	$\checkmark$	✓	✓
Dynamo fail alarm and shut down	✓	✓	✓	✓
Low coolant level alarm and shut down	✓	✓	✓	✓
Low fuel alarm and shut down	✓	$\checkmark$	✓	✓
Tank Empty alarm and shut down	—	_	✓	✓
Automatic shutdown on fault condition	✓	$\checkmark$	✓	✓
Solid-state short circuit protected outputs	✓	✓	✓	✓
Galvanic isolation for utility and Genset AC inputs	_	_	_	✓
Oscilloscope	—		✓	_
Faults Logging	_	Up to 10 faults	Up to 15 faults	if SD Card is present, Up to 100 faults Else, Up to 15 faults

	Smart Turbo v1.2	Smart GT v1.O	Surf LT v1.0	Surf 1.2c
EVENTS AND DATA LOGGING	_	_	_	Available if SD Card is present
USB interface	✓	✓	✓	✓
CAN Module (J1939 Protocol)	—	—	Optional	✓
Ethernet Module	—	—	—	Optional
RS485 (Modbus)	—		Optional	Optional
MicroSD Card	—		—	Optional
SMS via GSM Module (RS232 Interface)	_	_	_	✓
On-site Firmware Upgrade	✓	✓	✓	✓
Remote Online Firmware Upgrade	_	_	_	$\checkmark$



