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**AUTOMATIC MAINS FAILURE**  
**SURF-LT - Lite Version**

**USER'S MANUAL**  
FOR H/W VERSION 1.00  
FOR S/W VERSION 1.00 1931




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### 1. GENERAL DESCRIPTION

#### 1.1 INTRODUCTION

This genset controller Lite series consists of two products: SurfLT-AMF and SurfLT-Auto. The SurfLT-AMF monitors the utility and controls the genset as well as the automatic transfer switch. The SurfLT-AUTO controls the genset only. However, the two controllers share many common features. Physically, the SurfLT has a very attractive and slim design. It has four user-selectable operating modes: Off, Auto, Utility Only  or Manual. Front panel LEDs signal the installation status, the presence of an alarm and the 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 SurfLT has two communication ports: CAN bus or RS485 interface, and USB. 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
- Graphical 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 date and time, the continuous hour counter and the utility hour counter.
- CAN bus J1939 (optional)
- 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)
- USB interface
- Serial RS485.Modbus protocol (optional)
- 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 and RS485
- Supports 4-pole systems
- 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 184x139 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 shut down on fault condition
- 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 Freq 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
- Six configurable outputs capable of driving up to 1Amps with improved short circuit and overload protection
- 6 configurable isolated digital input

**1.2 TECHNICAL DATA**

Supply voltage range	5 to 33Vdc
Maximum supply current	180mA
Standby supply current	32mA
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	Eight push buttons
Data sampling rate	0.4samples/sec
Dimensions	208x160x32
Panel cut out	184x139

### 2. OPERATION

#### 2.1 FOUR MODES OF OPERATION

Following is a description of each mode:

- **Off Mode:** when the generator is not running or running with no load, pressing the OFF push button once will immediately turn off the SurfLT (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 SURFLT will shut down after cooling. Pressing the OFF PB another time during cooling will immediately turn off the genset and the SURFLT. Moreover, pressing the OFF PB will reset any fault (keeping the SURFLT on).
- **Manual Mode:** This mode is entered when the Manual 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>2</sup>. The load is disengaged and a transfer dead time<sup>3</sup> is counted before the genset engages the load.
- **Utility Only/Standby Mode:** This mode is entered when the Utility push button is pressed. In this mode, if Surf type is SurfLT-AMF, the Utility would feed the load when it is present. If Utility is absent or SurfLT type is SurfLT-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 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>4</sup>. If the genset was feeding the load and the remote control signal turns off, the genset would count the delay set by **"Off del."**(for SurfLT-AUTO) – **"Mains Rest."**(for SurfLT-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 is counted.
2. After the elapse of the response delay, the preheat relay (if present) is engaged for a time delay set by **"Preheat"**.
3. A starting sequence of a preset number of **"Attempts"** will initiate.
4. The Electric Valve is engaged for 0.25 sec before the Starter.
5. If the start signal is removed before the engine starts, all timers are reset and the module is ready for a new sequence.
6. Cranking is disconnected when any of the following conditions becomes valid:
  - a. The measured frequency exceeds **"Crank disc"**.
  - b. A voltage exceeding **"dynCrankDisc"** (if not set to N) appears on the Dynamo input.
  - c. The oil pressure switch opens (given that **"Bypass OPS"** is not set to Y) and its preset delay has elapsed.
  - d. The analog oil pressure measurement exceeded the value set by **"LOP Alarm"**(if not set to N).
  - e. For Volvo engines, when a running indication is received through the CAN bus or the RPM exceeds 500.
7. If the engine fails to start after the preset number of attempts, the Alarm output and LED are activated, the graphicalDisplay indicates a start fail error(Start Fail), and the alarm symbol (!) blinks. Otherwise, the engine enters the running state.
8. After elapse of the **"Warm Up"** delay, the load contactor is engaged via terminal Contactor-Gand the green load led is activated. If one of the Outputs is set to G-Contactor 2, then this output would be engaged 5 seconds after the first Contactor.
9. All protections are enabled when the engine is running and after the elapse of the fault bypass time set by **"Flt Bypass"**.
10. 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 LED are activated. The corresponding fault symbol along with its description is shown on the graphical Display. If CAN bus is enabled, the graphical display will show the DTC (J1939 protocol error code description of the fault received from the CAN bus).
11. When the start signal on the genset is removed, the load is shut down after the elapse of the delay set by **"Off del."**(for SurfLT-AUTO) – **"Mains Rest."**(for SurfLT-AMF). The engine shuts down after the elapse of the cooling time set by **"Cooling"**.

<sup>2</sup> "Warm Up" is presentable in the menu

<sup>3</sup> "Transfer" is presentable in the menu

<sup>4</sup> Refer to section 2.2 & 2.3

## 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: "RdyTime" and "SbyTime". "RdyTime" sets the time at which the genset becomes ready. "SbyTime" sets the time at which the genset goes to standby mode. If genset is required to be in ready mode all day then set "RdyTime" to ALLTime ("SbyTime" will be no longer showed). "RdyDay" controls the weekly operation. If "RdyDay" is set to All then the genset will be ready all week long. If it is set to SEL, the genset will be ready only in days set to Y. It will be standby in days set to N. As a result, the genset will be ready during the hours set by "RdyTime" and "SbyTime" only on days set to Y under "RdyDay".

## 2.3 REMOTE CONTROL TERMINAL FUNCTION DESCRIPTION

In SURFLT-AMF with "Remote Ctrl" set to RQG: when remote control is active, it overrides time switch setting and forces the genset into ready mode.

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

In SURFLT-AUTO with "Remote Ctrl" set to RQG: When remote control is active and genset in ready mode, the genset is started. Otherwise, the genset is stopped.

In SURFLT-AUTO with "Remote Ctrl" set to SUP: when remote control is active and genset in ready mode, the genset is stopped.

## 3. TERMINAL LAYOUT

### 3. TERMINAL LAYOUT

#### 3.1 TERMINAL DESCRIPTION

CONNECTOR						
TERMINAL	P1			P2		
	1	-VBAT SUP	-ve battery supply	7	OUTPUT 4	Output 4 (Genset Contactor)
	2	+VBAT SUP	+ve battery supply	8	OUTPUT 5	Output 5 (Alarm Output)
	3	VBAT POW	After emergency stop and fuse	9	OUTPUT 6	Output 6 (Genset Contactor 2)
	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						
TERMINAL	P3			P4		
	13	REF SENS	Reference sensor input	19	RMTE CNTRL	Remote control input
	14	AN INPUT 1	Analog Input 1 (Oil pressure sensor input)	20	INPUT 1	Input 1 (Oil pressure switch)
	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						
TERMINAL	P5			P6		
	25	LINE RG	Line R – G supply	31	LINE RU	Line R – U supply
	26	NOT USE	Not used	32	NOT USE	Not used
	27	LINE SG	Line S – G supply	33	LINE SU	Line S – U supply
	28	NOT USED	Not used	34	NOT USED	Not used
	29	LINE TG	Line T – G supply	35	LINE TU	Line T – U supply
30	N G	Neutral – G supply	36	N U	Neutral – U supply	

CONNECTOR						
TERMINAL	P7					
	37	CT R p1	Current transformer on line R – p1			
	38	CT R p2	Current transformer on line R – p2			
	39	CT S p1	Current transformer on line S – p1			
	40	CT S p2	Current transformer on line S – p2			
	41	CT T p1	Current transformer on line T – p1			
42	CT T p2	Current transformer on line T – p2				



## 3.2 PROGRAMMABLE INPUTS/OUTPUTS

### 3.2.1 PROGRAMMABLE INPUTS

SURFLT has a total of five digital inputs (Input 1 to 5) that could be programmed to any of these functions: Oil Pressure Switch ("Oil Press. SW"), Engine Temperature Switch ("Eng. Temp. SW"), Oil Temperature Switch ("Oil Temp. SW"), Low Fuel Level Normally Open ("Lo Fuel SW-NO"), Low Fuel Level Normally Closed ("Lo Fuel SWNC") and Lamp Test ("Lamp Test"). Users can easily change the function of these inputs from the menu, parameters I1 to I5. The user can also disable the input by setting the corresponding parameter to "Not Assigned".

### 3.2.2 PROGRAMMABLE OUTPUTS

SURFLT has a total of six outputs 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 and Auto Mode. Users can easily change the function of these outputs from the menu, parameters O1 to O6. The user can also disable the output by setting the corresponding parameter to "Not Assigned". Following is a description of each function:

- Preheat ("Preheat") Function when one of the outputs is set to Preheat, the "Preheat" parameter in the menu becomes visible and takes the default value 0. The preheat output is activated when the genset finishes counting the response delay and remains on for a delay set by "Preheat".
- Starter ("Starter") Function is activated while cranking the genset and remains on for a delay set by "Starter". The minimum value of "Starter" is 1 sec if the oil pressure is bypassed otherwise the minimum value is the oil pressure bypass delay plus one second ("Bypass OPS"+1).
- Electric Valve ("Elec. Valve") Function is activated 250msec before the activation of the starter output and remains on until the genset should be shut down and it has finished cooling.
- Utility Contactor ("U-Contactor") Function This output is activated when Utility engages the load and turns off when the load is released.
- Genset Contactor ("G-Contactor") Function This output is activated when the genset engages the load and turns off when the load is released.
- Alarm ("Alarm") Function is activated when a genset fault occurs. This output is not activated on emergency stop since it disables all outputs.
- Cut-Off ("Cut-OFF") 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 SURFLT 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 "CutOff" has elapsed. If the SURFLT module was turned off, the module cannot be turned on until the cut-off delay has elapsed. The parameter "CutOff" is not visible in the menu unless this output is activated.
- Pre-alarm ("Prealarm") 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 Preal."/"HET Preal".
- Genset Contactor 2 ("G-Contactor 2") 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 ("Dummy Load") Function is activated when the load remains below the level specified by "Dummyldeng." for a delay set by "Dummyld del.". This output is disengaged when the load current exceeds the level specified by "Dummyld dis.". Parameters "Dummyldeng.", "Dummylddel." and "Dummylddis." are not visible unless this output is activated.
- Overload ("Overload") Function is activated when the load exceeds the value set by Overload and the module is counting the overload delay set by Overld del. or if an overload fault occurs. The output will be turned off if the load falls below Overload before the delay elapses.
- Start Fail ("Start Fail") 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.
- Auto Mode ("Auto Mode") 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. TERMINAL LAYOUT

### 3.3 FRONT PANEL LEDES

- Four LEDs are used to indicate the operating mode.
- Six input LEDs used to indicate the status of the inputs.
- One Led is used to indicate the presence of an alarm.
- 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 the 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.

#### 3.3.1 INPUT LEDES DESCRIPTION

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

#### 4. COMMUNICATION PROTOCOLS

SURFLT 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 Type” in the menu is used to select the ECU type. If the genset does not contain an ECU, set this parameter to No. The SURFLT module reads the following parameters from the CAN bus: oil pressure (PSI), engine coolant temperature (oC), 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 SURFLT module by connecting it to a PC through USB Port, RS485 Serial Port (Modbus).

Note that the Modbus RS485 and the CAN communication features are both optional and cannot be used simultaneously.

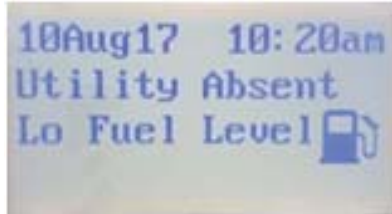
## 5. GRAPHICAL DISPLAY

### 5. GRAPHICAL DISPLAY

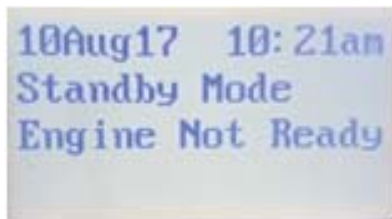
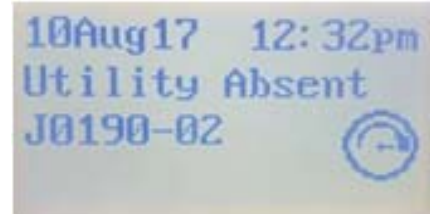
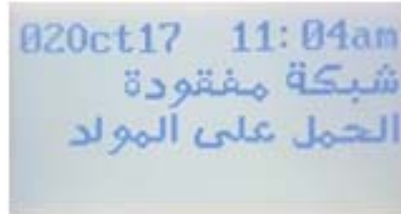
#### 5.1 MEASURED AND DISPLAYED MEASUREMENTS

##### 5.1.1 DISPLAYED PAGES

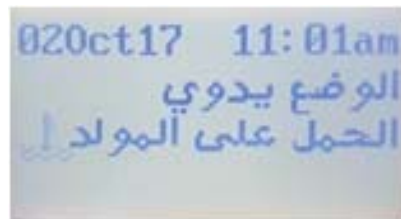
- Home page showing simultaneously the date and the time, the utility status (for SURFLT-AMF), the operating mode (for SURFLT-AUTO), the genset Status and the current fault with its symbol if existing.



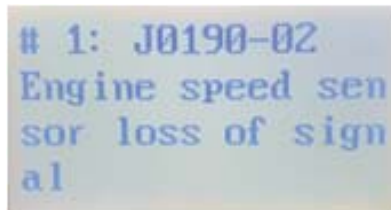
**SURFLT-AMF**



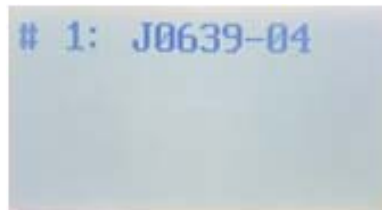
**SURFLT-AUTO**



- DTC Fault description page showing the description of the DTC fault code sent by the ECU (for AMF-CAN or AST-CAN)



**DTC with Description**



**DTC w/o Description**

- Genset page showing the genset status, voltages, currents, frequency and RPM. The line-neutral and line-line voltages are all measured and displayed by an automatic scrolling system. The ESC push button is used to start/stop the voltages scrolling.



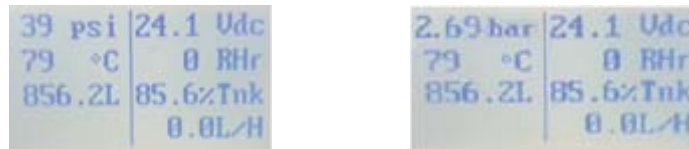
- Utility page showing the utility status, voltages, currents, and frequency (for SurFLT-AMF). The line-neutral and line-line voltages are all measured and displayed by an automatic scrolling system. The ESC push button is used to start/stop the voltages scrolling.



The currents on the three phases are measured and displayed simultaneously using the following format.

Current range	Format
0 to 9999A	#### in A
10000 to 999999A	### in KA

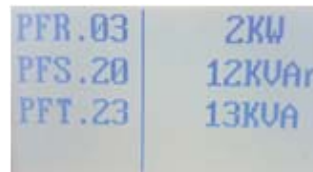
- Genset readings page showing oil pressure (in psi or bar), engine temperature (in °C), fuel Level (in Liters), battery voltage, the number of hours since the last oil change (RHr), the tank percentage and the fuel consumption (in Liters/hour).



- ECU Readings page showing OilTemp(in °C), InletTemp(in °C), FuelTemp(in °C), TurboPr (in bar), FuelPr (in bar)



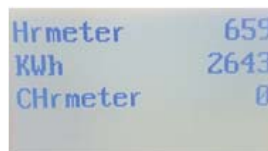
- Power page showing the power factor on each line (R, S, T), the active power in KW, the reactive power in KVAR and the apparent power in KVA.



- Counters Page showing the engine running hours (Hrmeter), the engine energy in kwh (KWh), the engine continuous Hourmeter (CHrmeter), the mains hour meter (MHrmeter) and the Mains energy in kwh (MKWh).

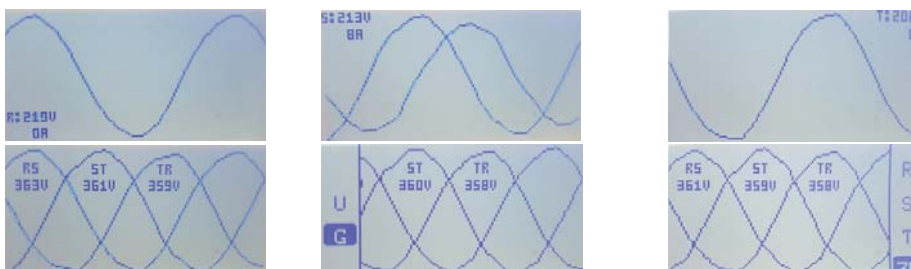


**SURFLT-AMF**



**SURFLT-AUTO**

- Graph page plotting the LN Voltages and currents for the Utility (AMF) and the Genset sources.

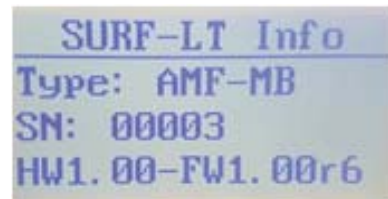


The Escape push button is used to change the source to plot (U: utility, G: genset).

The Select push button is used to change the Line to plot (R(S, T): to plot Line R(S, T) voltage with the corresponding current, 3P: to plot 3 LN voltages together).

## 5. GRAPHICAL DISPLAY

- Product page showing the SurfLTType (AMF, AST, AMF-CAN (with CAN bus), AST-CAN (with CAN bus), AMF-MB (with RS485 Modbus), AST-MB (with RS485 Modbus)), the device serial number, the hardware version (HW) and the firmware version along with the revision number (FW).



The UP and Down push buttons are used to scroll through the above pages. To access the parameters menu, Press and release the Select push button. The parameters menu cannot be accessed from the Graph page. In this page:

### 5.2 MENU DESCRIPTION

#### 5.2.1 ACCESSING THE MENU

A password is required for accessing the menu. The password consists of 3 digits. Two passwords can access the menu. The first is provided by S. & A.S. Co. Ltd. and is referred to as client password. This password can only be changed by S. & A.S. Co. Ltd. The second password is referred to as the user password. The user password can be modified in the menu. The client password accesses all the items in the menu whereas the user password is denied access to some of the menu items.

Follow the steps described below to access the menu:

- Press the Select push button once. You will be prompted to enter a three-digit code. The default password is 000.
- Use the UP and DOWN push buttons to scroll to the desired number.
- Press the Select push button. "\*" replaces the first digit.
- 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 for 10 minutes without the need to re-enter the password for every menu access.

While in the menu, if no push buttons are pressed for 25 seconds or if the ESC button is pressed, the system will automatically exit the menu.

While editing a parameter in the menu, if no push buttons are pressed for 10 seconds or if the ESC button is pressed, the system will automatically exit the edit mode.

While in the menu, the UP/DOWN push buttons are used to scroll up/down the sub menus or the parameters list. The Select push button accesses the sub menu or edits the parameter.

While editing a parameter in the menu, the UP/DOWN push buttons are used to increment/decrement the parameter value. The Select push button saves the changes done on the parameter edited.

Displayed Parameter	Description	Arabic	Visibility Condition	Range	Default Value
Utility	Utility Submenu	شبكة عامة	AMF AMF-CAN AMF-MB	N/A	N/A
Genset	Genset Submenu	مولد	N/A	N/A	N/A
Load	Load Submenu	حمل	N/A	N/A	N/A
ECU	ECU Submenu	ECU	AMF-CAN Auto-CAN	N/A	N/A
OPS	Oil Pressure Sensor Submenu	حس ضغط زيت	N/A	N/A	N/A
ETS	Engine Temperature Sensor Submenu	حس حرارة	N/A	N/A	N/A
Dynamo/Battery	Dynamo and Battery Submenu	شاحن بطارية	N/A	N/A	N/A
Fuel	Fuel Submenu	مستوى مازوت	N/A	N/A	N/A
Inputs	Inputs Function Submenu	مداخل	N/A	N/A	N/A
Outputs	Outputs Function Submenu	مخارج	N/A	N/A	N/A
Date/Time	Date/Time Submenu	وقت - تاريخ	N/A	N/A	N/A
Modbus	Modbus Submenu	Modbus	AMF-MB Auto-MB	N/A	N/A
Counters	Counters Submenu	عدادات	N/A		N/A
Configurations	Configurations Submenu	ضبط	N/A	N/A	N/A
View Faults	View Existing Faults	اعطال	N/A	N/A	N/A
Erase Faults	Erase Existing Faults	الغاء اعطال	N/A	N/A	N/A

## 5.2.2 SUBMENUS DESCRIPTION

### 5.2.2.1 UTILITY SUBMENU

Displayed Parameter	Description	Arabic	Visibility Condition	Range	Default Value
Over Freq	Over Frequency	+ تردد	N/A	N(0), 1 to 999Hz	55Hz
OFreq del.	Over Frequency Delay	+ مهلة تردد	N/A	0 to 99"	2"
Under Freq	Under Frequency	- تردد	N/A	N(0), 1 to 999Hz	45Hz
UFreq del.	Under Frequency Delay	- مهلة تردد	N/A	0 to 99"	5"
OVolt(L-N)	Over Voltage	+ جهد	N/A	N(0), 1 to 999V	240V
OVolt del.	Over Voltage Delay	+ مهلة جهد	N/A	0 to 99"	3"
UVolt(L-N)	Under Voltage	- جهد	N/A	N(0), 1 to 999V	180V
UVolt del.	Under Voltage Delay	- مهلة جهد	N/A	0 to 99"	5"
Mains Rest.	Mains Restoration Delay	اعادة الشبكة	N/A	0 to 999"	10"
U-Phases	Utility Connection	عدد الفازات	N/A	3ph(0): 3 phases 1ph(2): 1 phase	3ph
U-Seq Test	Utility Phase Sequence Test	قلب الفازات	N/A	N(0), Y(1)	Y

### 5.2.2.2 GENSET SUBMENU

Displayed Parameter	Description	Arabic	Visibility Condition	Range	Default Value
Over Freq	Over Frequency	+ تردد	N/A	N(0), 1 to 999Hz	55Hz
OFreq del.	Over Frequency Delay	+ مهلة تردد	N/A	0 to 99"	2"
Under Freq	Under Frequency	- تردد	N/A	N(0), 1 to 999Hz	45Hz
UFreq del.	Under Frequency Delay	- مهلة تردد	N/A	0 to 99"	5"
OVolt(L-N)	Over Voltage	+ جهد	N/A	N(0), 1 to 999V	240V
OVolt del.	Over Voltage Delay	+ مهلة جهد	N/A	0 to 99"	3"
UVolt(L-N)	Under Voltage	- جهد	N/A	N(0), 1 to 999Hz	180V
UVolt del.	Under Voltage Delay	- مهلة جهد	N/A	0 to 99"	5"
Response	Response Delay	استجابة	N/A	0 to 999"	5"
Preheat	Preheat Delay	تسخين مسبق	An Output is configured as Preheat	0 to 999"	0"
Starter	Starter Delay	اقلاع	N/A	1 to 999"	5"
Bet Trials	Time Between Trials	انتظار	N/A	1 to 999"	12"
Maintain EV	Maintain Electric Valve	ابقاء صباب م.	N/A	1 to 999"	5"
Attempts	Number Of Attempts	عدد محاولات	N/A	1 to 999"	3"
Flt Bypass	Fault Bypass Delay	فترة سماح	N/A	1 to 999"	15"
Warm Up	Warm-Up Delay	تحمية	N/A	0 to 999"	10"
Off del	Off Delay	مهلة ايقاف	SURF Auto SURF Auto-CAN SURF Auto-MB	0 to 999"	10"
Transfer	Transfer Dead Time	تحويل	N/A	0 to 999"	0"
Cooling	Cooling Delay	تبريد	N/A	0 to 999"	30"
Cut Off	Cut Off Time	طفاية	An Output is configured as Cut-Off	N(0), 1 to 999"	10"
Crank disc	Crank Disconnect Freq	تردد دوران	N/A	0 to 999Hz	15"
HT/OLD Cooling	Cooling After High Temperature	تبريد حرارة/حمل	N/A	N(0), Y(1)	Y
G-phases	Genset Phases Number	عدد الفازات	N/A	3ph(0), 1ph(2)	3ph

## 5. GRAPHICAL DISPLAY

### 5.2.2.3 LOAD SUBMENU

Displayed Parameter	Description	Arabic	Visibility Condition	Range	Default Value
CT ratio	Current Transformer Ratio	نسبة محول	N/A	5/5 to 9999/5	100/5
Overload	Overload %	حمل زائد	N/A	N(0), 10 to 999%	90%
Overld del.	Overload Delay	مهلة حمل زائد	N/A	0 to 99"	10"
Dummy ldeng.	Dummy Load Engage Set point	+ حمل ادنى	An Output is configured as Dummy Load	N(0), 1 to 999%	10%
Dummy ld del.	Dummy Load Engage Delay	مهلة حـ ادنى	An Output is configured as Dummy Load	0 to 999"	30"
Dummy ld dis.	Dummy Load Disengage Set Point	- حمل ادنى	An Output is configured as Dummy Load	N(0), 1 to 999%	17%

### 5.2.2.4 ECU SUBMENU

Displayed Parameter	Description	Arabic	Visibility Condition	Range	Default Value
ECU Type <sup>5</sup>	Electronic Control Unit Type (cannot be modified when engine is running)	ECU Type	N/A	NO ECU(0) STD ECU(1) VOLVO(2) PERKINS(3) SCANIA(4)	NO
AccPedalPos <sup>6</sup>	Accelerator Pedal Position	AccPedalPos	ECU Type = VE (Volvo)	0 to 100%	50%
IdlSpeed del <sup>6</sup>	Idle Speed Delay	IdlSpeed del	ECU Type = VE (Volvo)	N(0), 1 to 99	3"
Speed sel <sup>6</sup>	Speed Select	Speed sel	ECU Type = VE (Volvo)	PRI(0), SEC(1)	PRI
Water InFuel <sup>7</sup>	Water In Fuel	Water InFuel	N/A	Dis(0) PAIm(1) Alm(2)	DIS
HrmeterSrc <sup>8</sup>	Hourmeter Source	HrmeterSrc	N/A	ECU(0) SURF(1)	ECU

### 5.2.2.5 OPS SUBMENU

Displayed Parameter	Description	Arabic	Visibility Condition	Range	Default Value
OPS Type	Oil Pressure Sensor Type	نوع حـ ضغط	ECU = No ECU	VDO-1(0) VDO-2(1) MURPHY(2) TNE(3)	VDO-1
Bypass OPS	Bypass Oil Pressure Sensor	فترة سماح	N/A	Y(0), 1 to 5"	1"
LOP Preal.	Low Oil Pressure Prealarm	انذار مسبق	N/A	N(0), 1 to 999PSI	N
LOP Alarm	Low Oil Pressure Alarm	انذار	N/A	N(0), 1 to 999PSI	N
OP Unit	Sets Oil Pressure Unit	وحدة قياس	N/A	PSI, bar	PSI

### 5.2.2.6 ETS SUBMENU

Displayed Parameter	Description	Arabic	Visibility Condition	Range	Default Value
ETS Type	Engine Temperature Sensor Type	نوع حـ حرارة	ECU = No ECU	VDO-1(0) VDO-2(1) MURPHY(2) PT100(3) TNE(4)	VDO-1
HET Preal.	High Engine Temperature Pre-alarm	انذار مسبق	N/A	N(0), 1 to 999°C	N
HET Alarm	High Engine Temperature Alarm	انذار	N/A	N(0), 1 to 999°C	N
HiTemp del.	High Temperature Sensor delay	مهلة حـ حرارة	N/A	0 to 999 "	2 "

<sup>5</sup> To enable ECU, Bypass OPS parameter must be set to Y (ECU cannot be modified when SURF is showing Not Ready)

<sup>6</sup> These parameters are only available when ECU type is Volvo and cannot be modified when engine is running

<sup>7</sup> These parameters cannot be modified when engine is running

<sup>8</sup> Applicable in revision number 9 and later



### 5.2.2.7 DYNAMO/BATTERY SUBMENU

Displayed Parameter	Description	Arabic	Visibility Condition	Range	Default Value
DynCrankDisc	Dynamo Crank Disconnect	نسبة محول	N/A	N(0), 10 to 26V	N
DynShutDown	Dynamo Shutdown	حمل زائد	N/A	N(0), 5 to 10V	10V
Hi bat Alarm	High Battery Alarm	مهلة حمل زائد	N/A	N(0), 1 to 50V	30V
Hi bat del.	High Battery Delay	+ حمل ادنى	N/A	0 to 999"	3"
Lo bat Alarm	Low Battery Alarm	مهلة جـ ادنى	N/A	N(0), 1 to 50V	8V
Lo bat del.	Low Battery Delay	- حمل ادنى	N/A	0 to 999"	2"

### 5.2.2.8 FUEL SUBMENU

Displayed Parameter	Description	Arabic	Visibility Condition	Range	Default Value
Section	Tank Section	مساحة	N/A	0 to 9999cm <sup>2</sup>	1333cm <sup>2</sup>
Height	Tank Height	ارتفاع	N/A	0 to 9999cm	75cm
Offset	Tank Offset	تعديل	N/A	0 to 9999L	0L
LFL Preal.	Tank Pre-alarm	انذار مسبق	N/A	0 to 9999L	0L
Tank Empty	Tank Alarm	فارغ	N/A	0 to 999L	0L

### 5.2.2.9 INPUTS SUBMENU

Displayed Parameter	Description	Arabic	Visibility Condition	Range	Default Value
Lo cool lvl	Low Coolant Level	Lo cool lvl	N/A	NC(0), NO(1)	NO
Remote Ctrl	Remote Control	Remote Ctrl	N/A	RQG(0), SUP(1)	RQG
I1	Input 1	I1	N/A	Not Assigned(0) Oil Press. SW(1) Eng. Temp. SW(2) Oil Temp. SW(3) Lo Fuel SW-NO(4) Lo Fuel SW-NC(5) Lamp Test(6)	Oil Press. SW
I2	Input 2	I2	N/A	(Same as above)	Eng. Temp. SW
I3	Input 3	I3	N/A	(Same as above)	Oil Temp. SW
I4	Input 4	I4	N/A	(Same as above)	Lo Fuel SW-NO
I5	Input 5	I5	N/A	(Same as above)	Lamp Test

### 5.2.2.10 OUTPUTS SUBMENU

Displayed Parameter	Description	Arabic	Visibility Condition	Range	Default Value
O1	Output 1	O1	N/A	Not Assigned(0) Preheat(1) Starter(2) Elec. Valve(3) U-Contactor(4) G-Contactor(5) Alarm(6) Cut-OFF(7) Prealarm(8) G-Contactor 2(9) Dummy Load(10) Overload(11) Start Fail(12) Auto Mode(13)	Starter
O2	Output 2	O2	N/A	(same as above)	Elec. Valve
O3	Output 3	O3	N/A	(same as above)	U-Contactor
O4	Output 4	O4	N/A	(Same as above)	G-Contactor
O5	Output 5	O5	N/A	(Same as above)	Alarm
O6	Output 6	O6	N/A	(Same as above)	G-Contactor 2

## 5. GRAPHICAL DISPLAY

### 5.2.2.11 DATE/TIME SUBMENU

Displayed Parameter	Description	Arabic	Visibility Condition	Range	Default Value
Weekly Ex	Weekly Exercise	تمرس اسبوعي	N/A	N(0), Y(1)	N
RdyTime	Set Genset Ready Time	جاهز	N/A	##:## #m or AllTime	AllTime
SbyTime	Set Genset Standby Time	غير جاهز	RdyTime = AllTime	##:## #m	-
RdyDay	Set Genset Ready Day	جاهز نهار	N/A	SEL(0), ALL(1)	ALL
Sunday		احد	RdyDay = SEL	N(0), Y(1)	Y
Monday		اثنين	RdyDay = SEL	N(0), Y(1)	Y
Tuesday		ثلاثاء	RdyDay = SEL	N(0), Y(1)	Y
Wednesday		اربعاء	RdyDay = SEL	N(0), Y(1)	Y
Thursday		خميس	RdyDay = SEL	N(0), Y(1)	Y
Friday		جمعة	RdyDay = SEL	N(0), Y(1)	Y
Saturday		سبت	RdyDay = SEL	N(0), Y(1)	Y

### 5.2.2.12 MODBUS SUBMENU

Displayed Parameter	Description	Arabic	Visibility Condition	Range	Default Value
Modbus Ena	Modbus RS485 Enabled	ModbusEna	N/A	N(0), Y(1)	N
ID	Modbus ID	ID	N/A	1 to 247	20
Baudrate	Modbus Baudrate	Baudrate	N/A	9600(0) 14400(1) 19200(2) 28800(3) 38400(4) 56000(5) 57600(6) 115200(7)	9600
Parity	Parity bit	Parity	N/A	Non(0) Odd(1) Evn(2)	Non
Stop bits	Number Of Stopbits	Stop bits	N/A	1(0) 1.5(1) 2(2)	1
Mode	Transmission Mode	Mode	N/A	RTU(0) ASC(1)	RTU

### 5.2.2.13 COUNTERS SUBMENU

Displayed Parameter	Description	Arabic	Visibility Condition	Range	Default Value
Run hours	Modify Run Hours	Run Hours	N/A	N(0), 1 to 9999	500
GHrmeter	Modify Genset Hourmeter	GHrmeter	ECU = No ECU or HrmeterSrc = SURF	0 to 99999	-
Reset GContHr ?	Reset Genset Continuous Hourmeter	Reset GContHr ?	ECU = No ECU	N/A	-
GKWh	Modify Genset KWh	GKWh	N/A	0 to 999999	-
MHrmeter	Modify Mains Hourmeter	MHrmeter	N/A	0 to 99999	-
MKWh	Modify Mains KWh	MKWh	N/A	0 to 999999	-

### 5.2.2.14 CONFIGURATIONS SUBMENU

Displayed Parameter	Description	Arabic	Visibility Condition	Range	Default Value
Init Mode	Initial Operating Mode	وضع أولي	N/A	OFF, LAST	OFF
Date	Modify Date	تاريخ	N/A	dd mmm yy	-
Time	Modify Time	وقت	N/A	##:## #m	-
User p/w	User Password	سر مستخدم	N/A	000 to 999	000
BacklightLevel	Modify Backlight Level	إضاءة	N/A	N(0), 1 to 4	4
Contrast	Modify LCD Contrast	تباين	N/A	0 to 30	10
Language	Modify Language	لغة	N/A	English(0) Arabic(1)	English

## 5.3 DESCRIPTION OF STATUS MESSAGES SHOWN ON LCD DISPLAY

### 5.3.1 FOR UTILITY <sup>7</sup>

Status Message	Arabic	Description
Utility Absent	شبكة مفقودة	Utility is Absent
Utility Ready	شبكة جاهزة	Utility is Ready
UVoltAnomaly	شبكة خطأ جهد	Utility Voltage error (Over/under voltage, phase failure)
UFreqAnomaly	شبكة خطأ تردد	Utility Frequency error (Over/under frequency)
USeqAnomaly	شبكة فاز معكوس	Utility Sequence error
URestoring 10	اعادة شبكة 10	Utility is being restored with count down
UTransfer 10	تحويل شبكة 10	Utility is counting Transfer Dead Time with count down
UFeedingLoad	الحمل على الشبكة	Utility is Feeding Load

### 5.3.2 FOR GENSET

Status Message	Arabic	Description
Standby	غير جاهز	Genset ready but Remote Control is absent
Engine Ready	مستعد	Genset ready
Engine Not Ready	غير مستعد	Genset not ready
Response 10	استجابة مولد 10	Engine Counting Response delay with count down
Preheat 10 <sup>8</sup>	تسخين مسبق 10	Engine Preheating with count down
Cranking	اقلاع مولد	Engine Cranking
Running	دوران	Engine running
WarmingUP 10	تحمية مولد 10	Engine Warming Up with count down
Transfer 10	تحويل مولد 10	Engine counting Transfer Dead Time with count down
RunningOnLoad	الحمل على المولد	Engine running on load
Shut Load 10	اطفاء حمل 10	Engine Shutting Load with count down
Cooling 10	تبريد مولد 10	Engine Cooling with count down
ShutEngine 10 <sup>9</sup>	اطفاء مولد 10	Shutting Engine with count down
Fault	خطأ	A fault has occurred on the Genset
Hi Oil Temp	خطأ حرارة زيت	High oil temperature Fault
Eng Temp Sensor	خطأ ح. حرارة	Engine Temperature Sensor Fault
Emergency Stop	خطأ توقف طوارئ	Emergency stop
Start Fail	فشل اقلاع مولد	Fail to start Fault
Phase Failure	خطأ فاز مقطوع	Genset Phase failure Fault
SequenceFail	خطأ فاز معكوس	Genset Sequence failure Fault
Battery Hi	+ خطأ جهد بطارية	High battery Fault
Battery Lo	- خطأ جهد بطارية	Low battery Fault
Over Freq	+ خطأ تردد	Genset Over Frequency Fault
Under Freq	- خطأ تردد	Genset Under Frequency Fault
Over Voltage	+ خطأ جهد	Genset Over voltage Fault
Under Voltage	- خطأ جهد	Genset Under voltage Fault
OverLoad	خطأ زيادة حمل	Overload Fault
UncontrolShtdn	خطأ توقف مفاجئ	Uncontrolled shut down
Lo Oil Press	خطأ ضغط زيت	Low Oil Pressure Fault
Hi Eng Temp	خطأ حرارة مولد	High Engine Temperature Fault
Lo Fuel Level	- مستوى مازوت	Low Fuel Level Fault
Lo Cool Level	- مستوى مبرد	Low Coolant Level Fault
Lo Dynamo V	خطأ جهد شاحن	Low Dynamo Voltage Fault

<sup>7</sup> Available only for SurfLT-AMF


<sup>8</sup> Available only if one of the outputs is set to Preheat

<sup>9</sup> Available only if one of the outputs is set to Cut-Off

## 5.4 DETECTED AND SIGNALLED FAULTS AND WARNINGS

### 5.4.1 WARNINGS

**High Engine Temperature Warning** occurs when the analog engine temperature sensor reading goes above the **High Engine Temperature Pre-alarm** value set by **HET Preal** in the menu or when the engine temperature switch is active and the 4 seconds delay is still counting.

**The Engine Temperature** symbol () blinks to indicate this warning.

**Low Coolant Level Warning** occurs when the coolant switch is detected active and the 4 seconds delay is counting.

**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 Preal** in the menu or when the oil pressure switch is detected and the fault delay (2 sec) is counting.

**The Oil Pressure** symbol () blinks to indicate this warning.



**Low Fuel Level Warning** occurs when the fuel switch is detected active and the 4 seconds delay is counting.


**The Fuel Level** symbol () on the **LCD** blinks to indicate this warning.

**Low Dynamo Voltage Warning** occurs when the dynamo voltage decreases below the dynamo shut down voltage set by **DynShutDown** and the 5 seconds delay is counting.

**The Dynamo Voltage** symbol () on the **LCD** blinks to indicate this warning.

**Over/Under Frequency Warning** occurs when the frequency goes above/below the values set in **Over Freq/Under Freq** and the delay set by **OFreq del/UFreqdelis** counting.

The frequency symbol ( or ) blinks to indicate this warning.

**Oil Change Warning** occurs when the hours count since last oil change has exceeded the value set by Run hours. 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 fuel analog reading goes below the **Tank Empty Pre-alarm** value set by **LFL Preal** in the menu.

## 5.4.2 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	!
Emergency stop	Shuts load, engine and all outputs immediately	!
High Battery	Shuts load and engine after the elapse of the High Battery delay (Hi bat del)	!
Low Battery	Shuts load and engine after the elapse of the Low Battery delay (Lo bat del)	!
High Engine Temp.	Shuts load and engine due to high engine temperature	
High Temperature Sensor	Shuts load and engine due to sensor connection failure or/and LoTemp for MURPHY	
High Oil Temp.	Shuts load and engine due to high oil temperature	!
Low Coolant Level	Shuts load and engine due low coolant level	
Low Oil Pressure	Shuts load and engine due to low oil pressure	
Low Fuel Level	Shuts load and engine due to low fuel level	
Low Dynamo Volt	Shuts load and engine due to low dynamo voltage	
Genset Over Voltage	Shuts the load and engine after the elapse of the over voltage delay (OVolt del)	!
Genset Under Voltage	Shuts the load and engine after the elapse of the under voltage delay (UVolt del)	!
Genset Phase Failure	Shuts load and engine due to a phase failure	!
Genset Sequence Failure	Shuts engine due to a sequence failure	!
Genset Over Frequency	Shuts the load and engine after the elapse of the over frequency delay (OFreq del)	
Genset Under Frequency	Shuts the load and engine after the elapse of the under frequency delay (UFreq del)	
Over Load	Shuts the load and engine after the elapse of the over load delay (Overld del)	--
Utility Over Voltage	Shuts the load after the elapse of the over voltage delay (OVolt del)	--
Utility Under Voltage	Shuts the load after the elapse of the under voltage delay (UVolt del)	--
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 (OFreq del)	--
Utility Under Frequency	Shuts the load after the elapse of the under frequency delay (UFreq del)	--
Tank Empty	Shuts load and engine due to tank empty	
UcShut	Uncontrolled shut down of the genset has occurred.	!
Water In Fuel	Shuts load and engine due to water in fuel (received from ECU)	


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

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

**High Battery Fault** occurs when the battery voltage exceeds **Hi bat Alarm** for a delay set by **Hi bat del**. The fault symbol (!) turns on and the **LCD** display indicates a high battery fault by displaying **Battery Hi** in the **Genset Status**.

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


**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 **HET Alarm** in the menu. The Engine Temperature symbol () turns on and the **LCD** display shows **Hi EngTempin** the **Genset Status**. **Genset** goes into cooling if **HT/OLD Cooling** is set to Y.


**High Temperature Sensor Fault** occurs when the analog engine temperature sensor connection is failed or/and the engine temperature goes below the minimum readable value for **MURPHY** sensor type. The **Engine Temperature** symbol () turns on and the **LCD** display shows **HiTemp Sensor** in the **Genset Status**.


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

**Low Coolant Level Fault** occurs when the coolant switch is detected active for 4 seconds. **The Coolant Level** symbol () on the **LCD** turns on and the **LCD** display shows **Lo Cool Levelin** the **Genset Status**.

## 5. AUXILIARY FUNCTIONS MENU

**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 LOP Alarm in the menu. The **Oil Pressure** symbol (  ) turns on and the LCD display shows **Lo Oil Press** in the Genset Status.



**Low Fuel Level Fault** occurs when the fuel switch is detected active for 4 seconds. The Fuel Level symbol (  ) on the LCD would turn on and the LCD display shows Lo Fuel Level in the Genset Status.

**Low Dynamo Voltage Fault** occurs when the dynamo voltage decreases below the dynamo shut down voltage set by **DynShut-Down** for 5 seconds. The **Dynamo Voltage** (  ) symbol on the LCD turns on and the LCD display shows Lo **Dynamo Vin** the Genset Status.


**Over/under Voltage Fault** occurs when one of the three-phase voltages goes above/below the over/under voltage limits set by **OVolt(L-N)/UVolt(L-N)** for a delay of **OVolt del/UVolt del**. The LCD display indicates an over/under voltage fault by displaying **Over Voltage/Under Voltage** in the Genset Status or UVolt Anomaly in the **Utility Status**. If the fault occurs on the genset, the fault symbol (!) turns on.

**Phase Failure Fault** occurs when one of the phases fails. The LCD display indicates the fault by displaying Phase Failure in the Genset Status or UVoltAnomaly in the Utility Status. If the fault occurs on the genset, the fault symbol (!) turns on.

**Sequence Failure Fault** occurs when the phases are reversed. The LCD display indicates the fault by displaying SequenceFail in the Genset Status or USeqAnomaly in the Utility Status. If the fault occurs on the genset, the fault symbol (!) turns on.

**Over/Under Frequency Fault** occurs when the frequency goes above/below the values set in Over Freq/Under Freq for a delay of OFreq del/UFreqdel. The LCD display indicates an over/under frequency fault by displaying Over Voltage/Under Frequency in the Genset Status or UFreqAnomaly in the Utility Status. If the fault occurs on the genset, the Frequency symbol (  or  ) turns on for an over/under frequency fault.

**Overload Fault** occurs when the load on the genset exceeds the value set by Overload for a delay set by Overld del. The fault symbol (!) turns on and the LCD display indicates an overload fault by displaying OverLoad in the Genset Status. Genset goes into cooling if HT/OLD Cooling is set to Y.

**Tank Empty Fault** occurs when the analog fuel level sensor reading goes below the Tank Empty value set by Tank Empty in the menu. **The Tank Empty** symbol (  ) turns on and the LCD display shows Lo Fuel Level in the Genset Status. 0

**UcShut** occurs when the **Genset** does an uncontrolled shut down (SurfLT did not give shut down order). The fault symbol (!) turns on and the LCD display indicates an uncontrolled shut down fault by displaying **Uncontrolled F** in the Genset Status.

### 5.4.3 DTC FAULTS

When an ECU is installed and it is in a faulty status, the DTC fault code is shown in the Genset Status. The correspondent description will be displayed on Page 2 if its code is mentioned in the below table.

DTC Fault Code	DTC Fault Description
J0091-08	PWM throttle position sensor abnormal
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	Atmospheric pressure sensor shorted Hi
J0108-04	Atmospheric 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 coolanttemp. action alert
J0168-02	Battery voltage intermittent plus
J0172-03	Intake manifold air temp. sensor shorted
J0172-04	Intake manifold air temp. sensor shorted

<b>DTC Fault Code</b>	<b>DTC Fault Description</b>
J0172-15	Hi intelair 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 temp. warning
J0174-16	Hi fuel temp. 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 oVdc supply above normal or shorted
J0678-04	ECM oVdc supply below normal or shorted
J1108-31	Critical override enabled
J1111-02	Check configurable parameters

## **5.5. FAULT LOG**

SURFLT has a Fault Log that can save the last 15 faults 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, ContHourmeter, MainsHourmeter, L/H, L, KW and KWHr, MainsKWHr. The Fault Log can be accessed and erased through the SURFLT menu.

### **5.5.1 VIEWING THE FAULT LOG**

To access the Fault Log, enter the menu (refer to section 5.2.1), scroll down until "View Faults" is displayed and press the SELECT push button. The message "View Faults" will not be displayed if no faults are saved. To scroll between the different saved faults, use the UP/DOWN push buttons. Each time the SELECT push button is pressed, the readings at the time of the fault are displayed. To exit the Fault Log, press the ESCAPE push button.

### **5.5.2 ERASING THE FAULT LOG**

To erase the Fault Log, enter the menu, scroll down until "Erase Faults" is displayed and press the SELECT push button. The SURFLT module prompts you to confirm your request by displaying the "Are You Sure ?" message. To cancel the request, press the ESCAPE push button. To confirm the request, press the SELECT push button.

## 6. FIRMWARE UPGRADE

### 6. FIRMWARE UPGRADE

#### 6.1 INSTALLING THE SAS DEVICE 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 "SAS\_PTool\SAS\_PTool" folder.
2. Setup the application located in "SAS\_PTool\SAS\_PTool\SAS\_PTool\_Setup" folder
3. SAS\_PTool will appear in the programs list. Send it to Desktop as shortcut.

#### 6.2 INSTALLING THE SAS DEVICE USB DRIVER

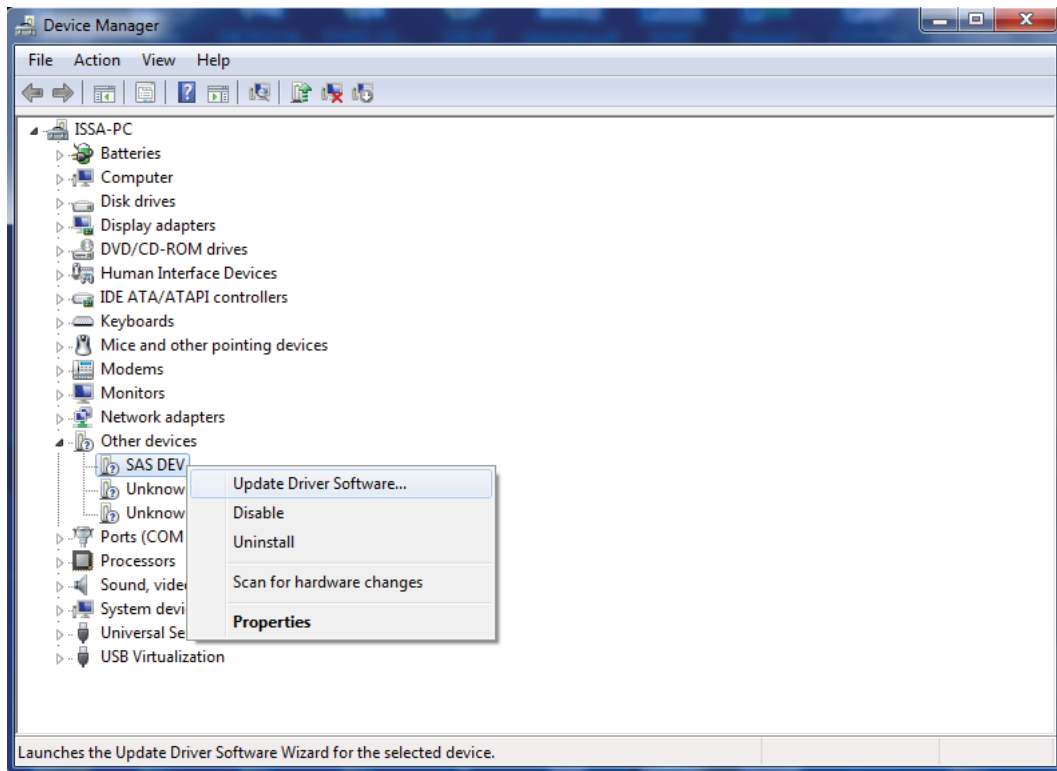
1. Plug in the USB cable to the SAS device before turning power on
2. Turn on power of the SAS device. All the leds on the front starts blinking.

##### 6.2.1 DRIVER SETUP FOR WINDOWS VISTA/WIN7

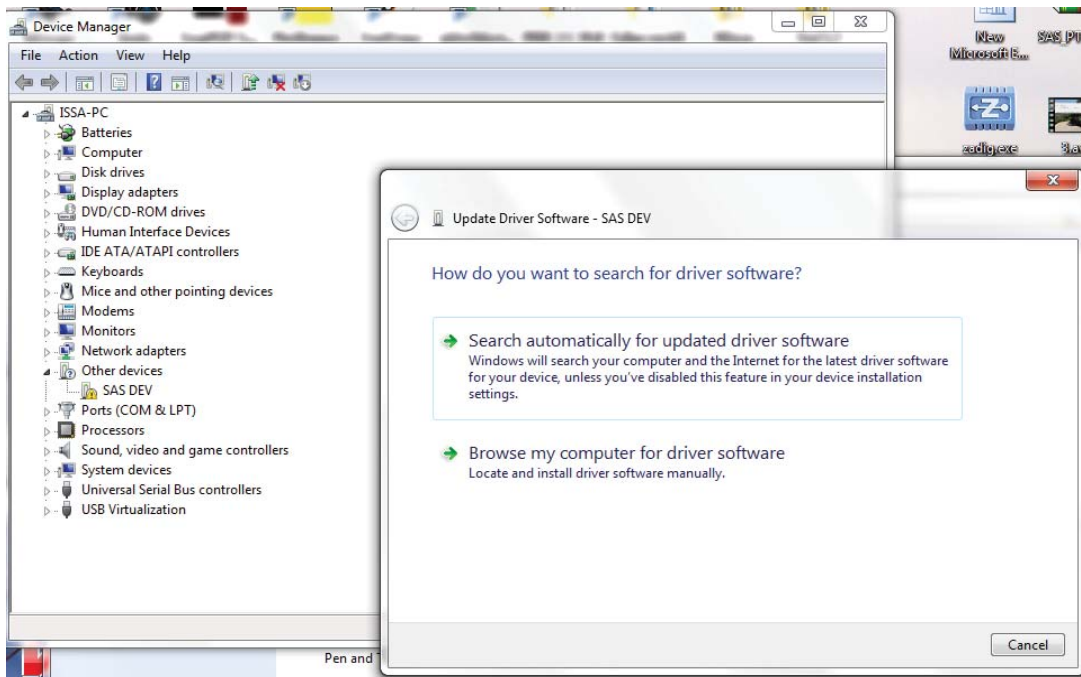
The first SAS device plugged into the PC USB port may not launch an automatic start. In this case, right-click my computer and choose properties. The following window appears. On the left side of the window, click on Device Manager.





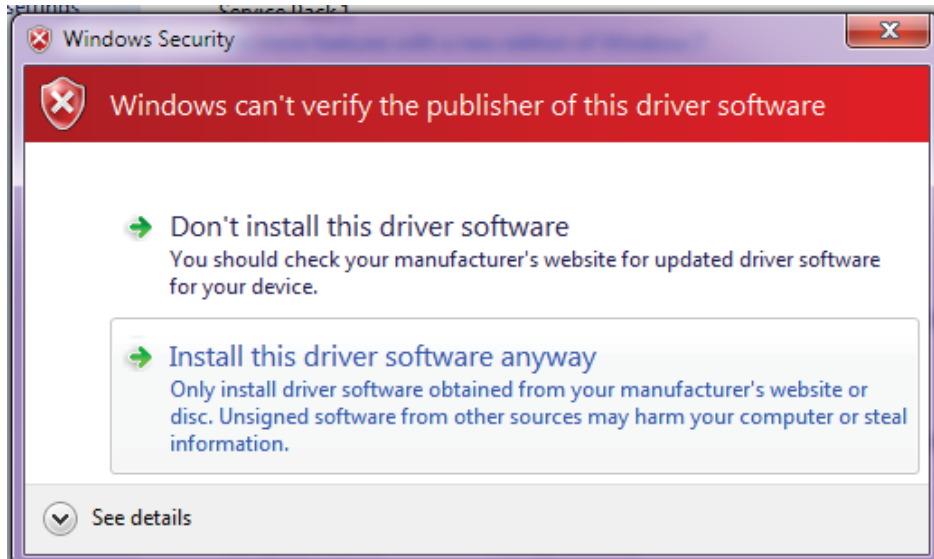


Select "Search automatically for updates driver software".



## 6. FIRMWARE UPGRADE

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 SAS Device connected to the PC USB port will be installed automatically.

### 6.2.2 DRIVER SETUP FOR WINDOWS XP

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

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



Select "Continue Anyway".



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

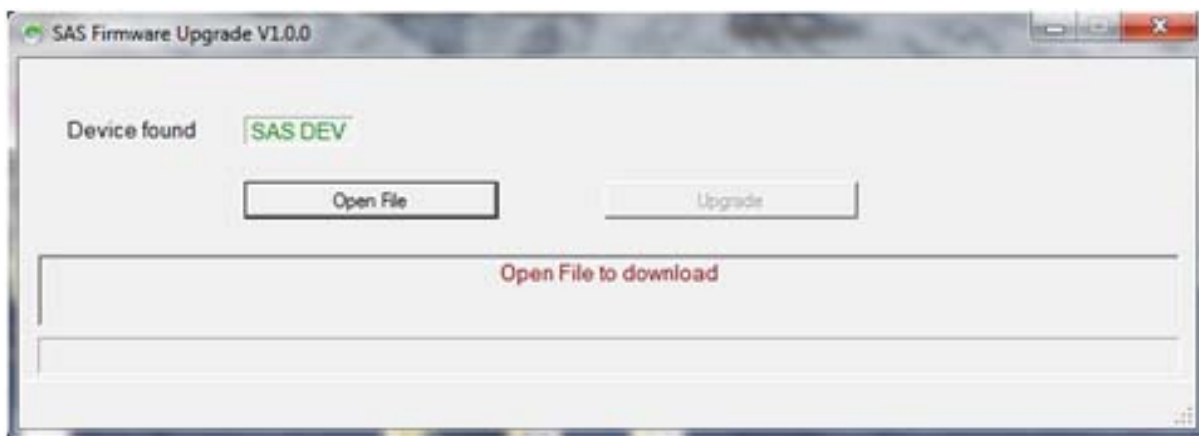
### 6.3 FIRMWARE UPGRADE PROCESS

Run "SAS\_PTool" application.

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

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

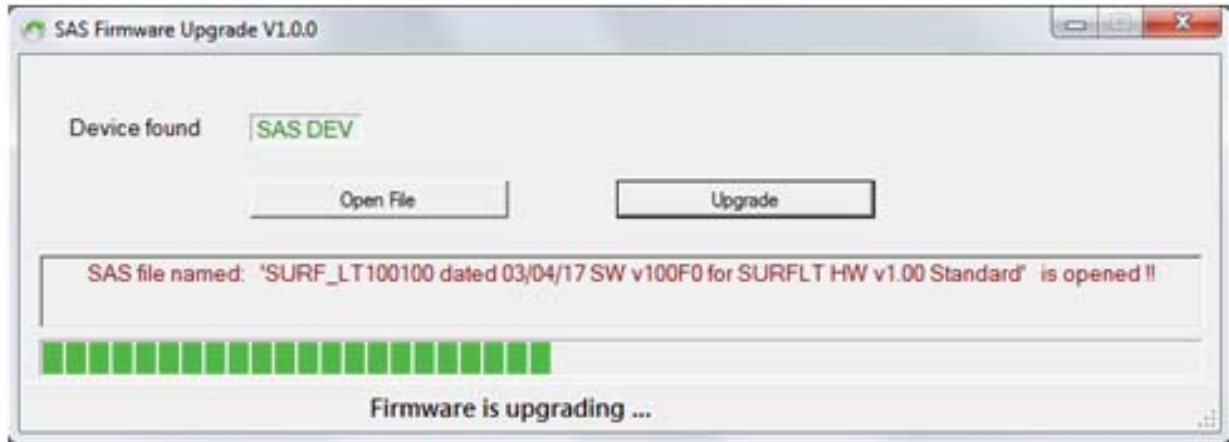
A Footnote will appear showing the file name, the software version and its date:



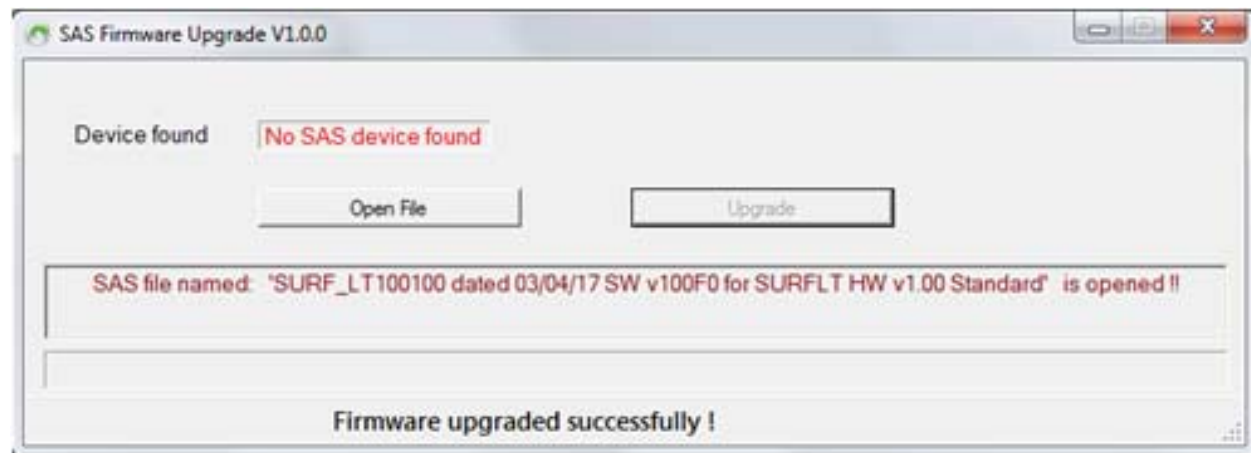
Click upgrade.

## 6. FIRMWARE UPGRADE

The upgrade progress is shown as below:



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



Then the SAS device firmware upgraded successfully, and the SAS device will automatically run the new firmware.

## 6.4. FIRMWARE UPGRADE USING GOOGLE PLAY STORE ON SMART PHONE

### 6.4.1 INSTALLING THE SASPTOOL FIRMWARE APPLICATION ON THE MOBILE

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

1. Search for the application "SASPTool" on Google play store and install it, or follow the link below:

[https://play.google.com/store/search?q=SASPTool.](https://play.google.com/store/search?q=SASPTool)

### FIRMWARE UPGRADE PROCESS

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



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



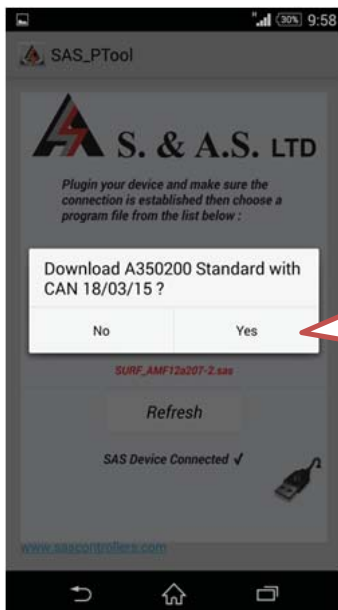
## 6. FIRMWARE UPGRADE

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

The following window will appear showing that a SAS Device is now connected:



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

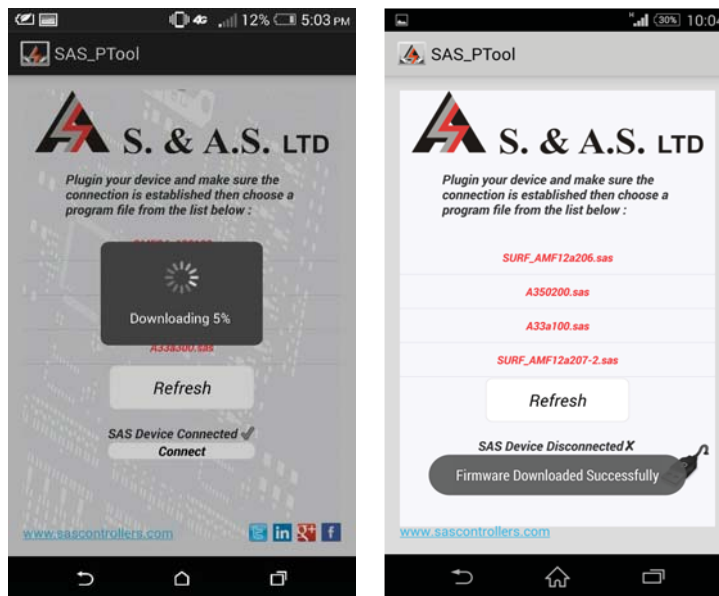


A **POPUP** window will appear showing the file name, its description and its date:



7. Click Yes

The Download Will Start:



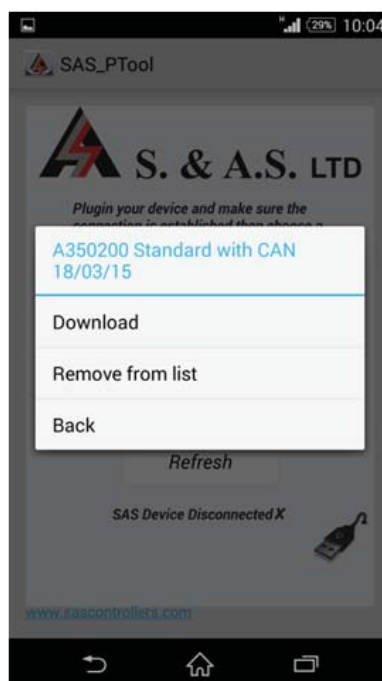
Once the download is completed, the message “Firmware downloaded successfully” will appear:

8. Disconnect the USB cable.



The user can now process with normal operation.

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



## 7. CASE DIMENSION

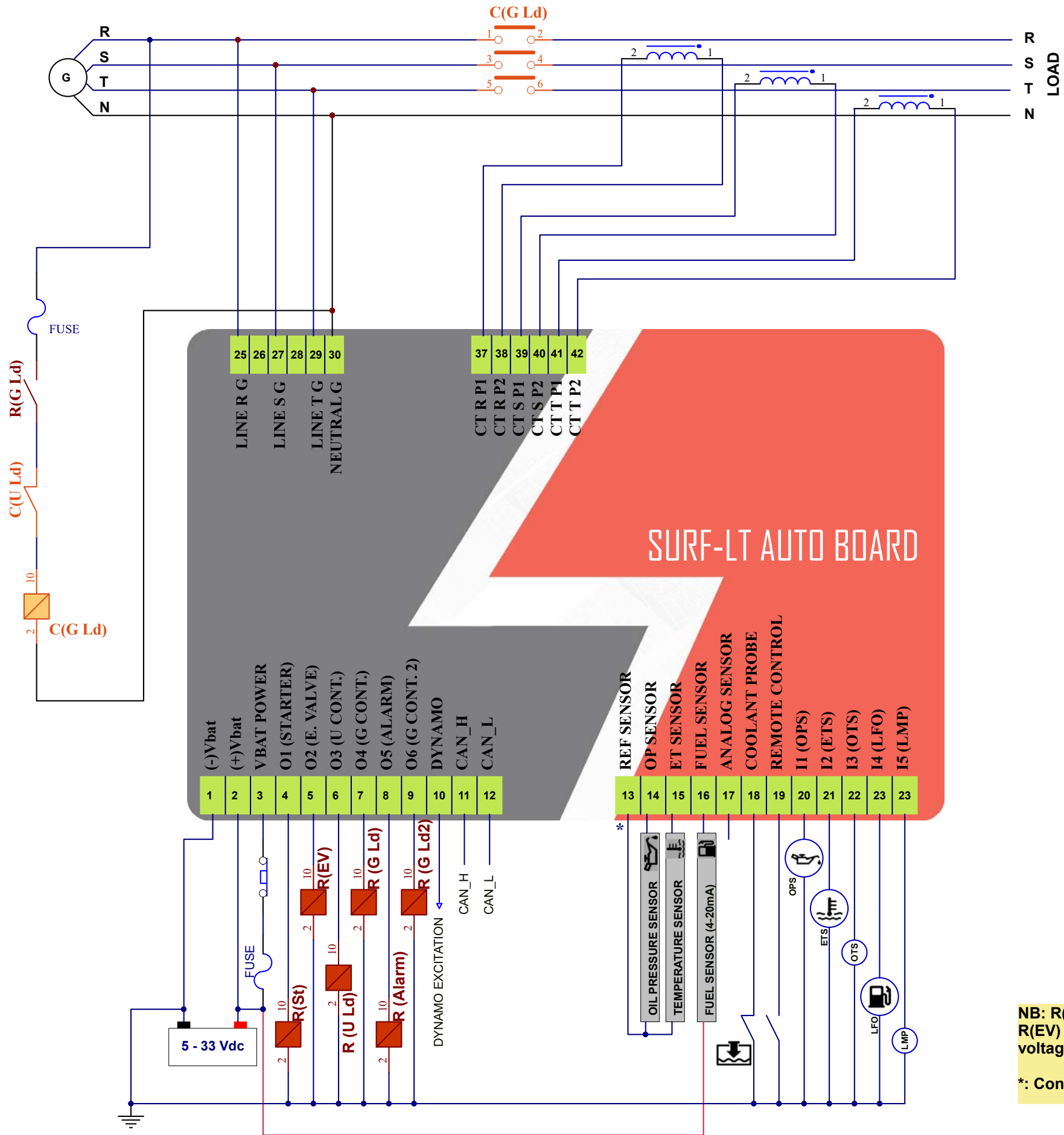
### 7. CASE DIMENSION





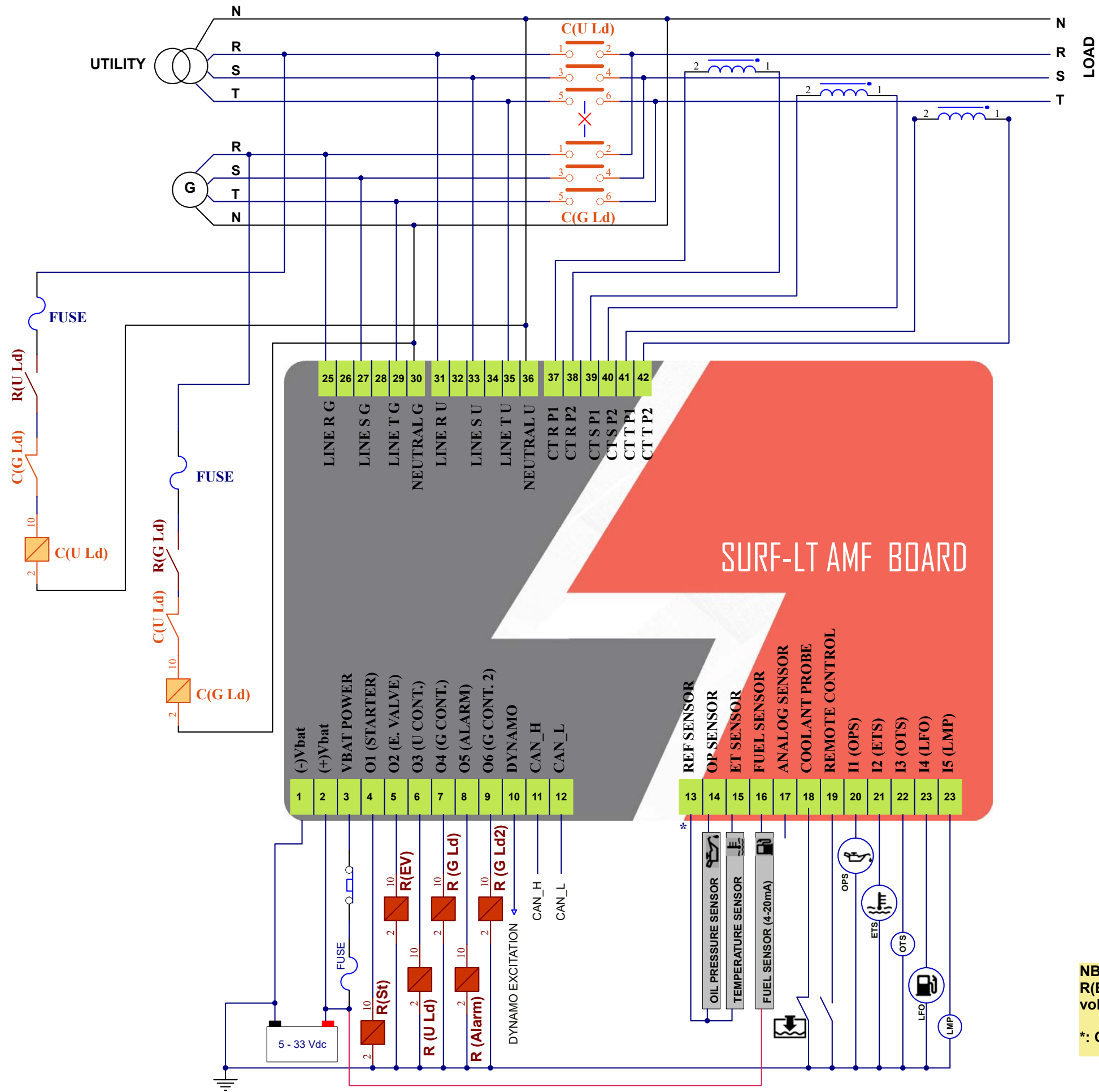
## 8. APPENDIX A

This appendix contains all wiring diagrams relevant to assembling the board in a panel.



NB: R(Alarm), R(G Ld2), R(U Ld), R(G Ld), R(St) and R(EV) relays should all be DC relays with their coil voltage equal to the battery voltage





\*: Connected to battery -ve on the engine body






NB: R(Alarm), R(G Ld2), R(U Ld), R(G Ld), R(St) and R(EV) relays should all be DC relays with their coil voltage equal to the battery voltage

\*: Connected to battery -ve on the engine body

## WHICH GENERATOR CONTROLLER IS RIGHT FOR YOU?

	Smart Turbo v1.2	Smart GT v1.0	Surf LT v1.0	Surf 1.2c
				
Automatic engine starting and stopping	✓	✓	✓	✓
Automatic mains failure	—	—	✓	✓
User Access	3 Push Buttons	3 Push Buttons	8 Push Buttons	5 Push Buttons
Dimensions (WidthxHeightxDPTH)	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/3Phases	1phase/3Phases
Digital Outputs	4	4	6	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	—	✓	✓	✓
Power Measurement	—	✓	✓	✓
Energy Measurement	—	✓	✓	✓
Run hours counter	✓	✓	✓	✓
Oil run hours counter	✓	✓	✓	✓
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	—	✓	✓	✓
Low oil pressure alarm and shut down	✓	✓	✓	✓
High engine temperature alarm and shut down	✓	✓	✓	✓
Battery alarm	✓	✓	✓	✓
Dynamo fail alarm and shut down	✓	✓	✓	✓
Low coolant level alarm and shut down	✓	✓	✓	✓
Low fuel alarm and shut down	✓	✓	✓	✓
Tank Empty alarm and shut down	—	—	✓	✓
Automatic shutdown on fault condition	✓	✓	✓	✓
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	Up to 100 faults

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



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