



### DESCRIPTION

The Model **SFS01-V2** is a Multi-attempt Automatic Engine Smart Switch designed to automatically [remotely] or manually start and stop the engine. It will indicate the operational status and fault conditions, automatically shut down the engine and indicate the start engine failure by a flashing "ST. FAIL" LED as well as informing operator via SMS. Other functions and possible engine fault conditions are also visually shown via a set of LEDs located on the module.

The **SFS01-V2** is designed to receive start/stop commands from a specially coded SMS or via direct call from a control server (**CS**) phone number(s). It is capable of storing up to 10 CS numbers (index 0-9) giving you and your colleagues an equal opportunity to control your engine from any place on earth where mobile network is available. You won't be charged for a call from CS phone number because the module will hang up incoming call immediately after recognizing you as a valid operator.

The **SFS01-V2** is fitted inside a polycarbonate IP67 rated enclosure. Wired remote control of the **SFS01-V2** is available through terminals 5 & 13 [using momentary N/O switch]. Wireless local control via a key fob is available as an option. Programming and operation of **SFS01-V2** is via specially coded SMS described in this manual.

### START and RUN Sequence

0.5 Second after the fuel relay is energized [wire 5], the 5 attempt start will begin its start sequence: the start relay will energize, feeding battery +ve [on wire 6 to wire 2 and then on to the start circuit]. If the engine has not fired by the end of 1st attempt, the starter is turned off for a resting period. The sequence will then repeat up to a maximum number of start attempts. Following a successful start, sensed when the oil pressure switch changes its state, the start relay is de-energized and latched out to prevent reengagement of the starter with the engine running.

#### Relay outputs are provided for:

- Fuel Solenoid Output
- Starter Motor Output

**The relays supply positive plant supply out.**

#### Inputs are available for:

- Low Oil Pressure [wire 3]
- Wired Remote Start [wire 1]
- Battery -Ve [wire GR/Y]
- Battery +Ve [wire 6]
- W. Pressure switch [wire 4]

#### *Lower PCB (green): engine controller*

#### Warning lights [LEDs] provided to indicate the following:

- **ST. FAIL** LED [Unsuccessful start after multiple attempts and S/D]
- **E. STOP** LED [Active state of emergency stop switch and S/D]
- **LOW OIL** LED [Low oil pressure alarm and S/D]
- **HET / GL** LED [High engine temperature and S/D] / [Glow plug energized]
- **SPEED** LED [Over/under engine speed failure and S/D]
- **ON LOAD** LED [Generator is on load]

#### *Upper PCB (blue): 3G/GSM controller*

- Green LED (SRV): lit during handling commands / messaging.
- Red LED (ACT): flashing every second during network initialization and flashing 2 times every 5<sup>th</sup> second after successful network initialization.

### Engine controller specification

DC Supply: 12Vdc  
Max. standby current: ~10mA @ 12 V  
Number of attempts: 5  
Crank durations: 2-3-3-4-5 sec  
Pause between each attempt: 20 sec  
Hold-off timer\* set for: 7 sec  
Starter relay output: 10A max  
Fuel solenoid output 10A max  
Operating Temperature Range: -20 to +55°C.  
Humidity: Less Than 80% RH

### 3G/GSM controller specification

DC Supply: 12Vdc  
Max. standby current: ~150mA / Average 50mA  
Receiver/transmitter: Integrated into SFS01-3G module.  
Working Frequencies: Dual-Band UMTS/HSDPA  
850/1900MHz  
Quad-Band GSM/GPRS/EDGE  
850/900/1800/1900MHz  
SIM Card: Standard size SIM (3V & 1.8V)  
*SIM card must be activated and inserted by a user into de-energised module before powering up the unit.*

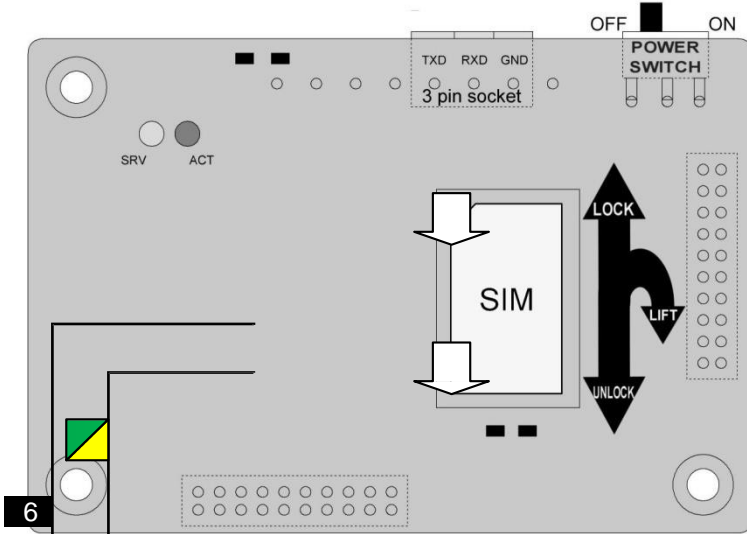
### IMPORTANT!

**The starter relay can only energize for 2nd and follow up crank cycle if "Low Oil Pressure" is sensed, to confirm that the engine is stationary.**

*\* During engine cranking and for a short time afterwards the protective hold-off timer is active and the relevant alarms inputs are inhibited. This enables the engine to start and achieve normal running conditions. Once the timer has expired, the inputs are enabled providing normal protection from the module.*

## Inserting a SIM card into 3G/GSM controller

**ATTENTION!**  
NEVER INSERT (OR REMOVE) A SIM CARD INTO POWERED UNIT!  
USE POWER SWITCH TO POWER OFF FIRST!



Insert a SIM card into a corresponding slot as it shown on the image.

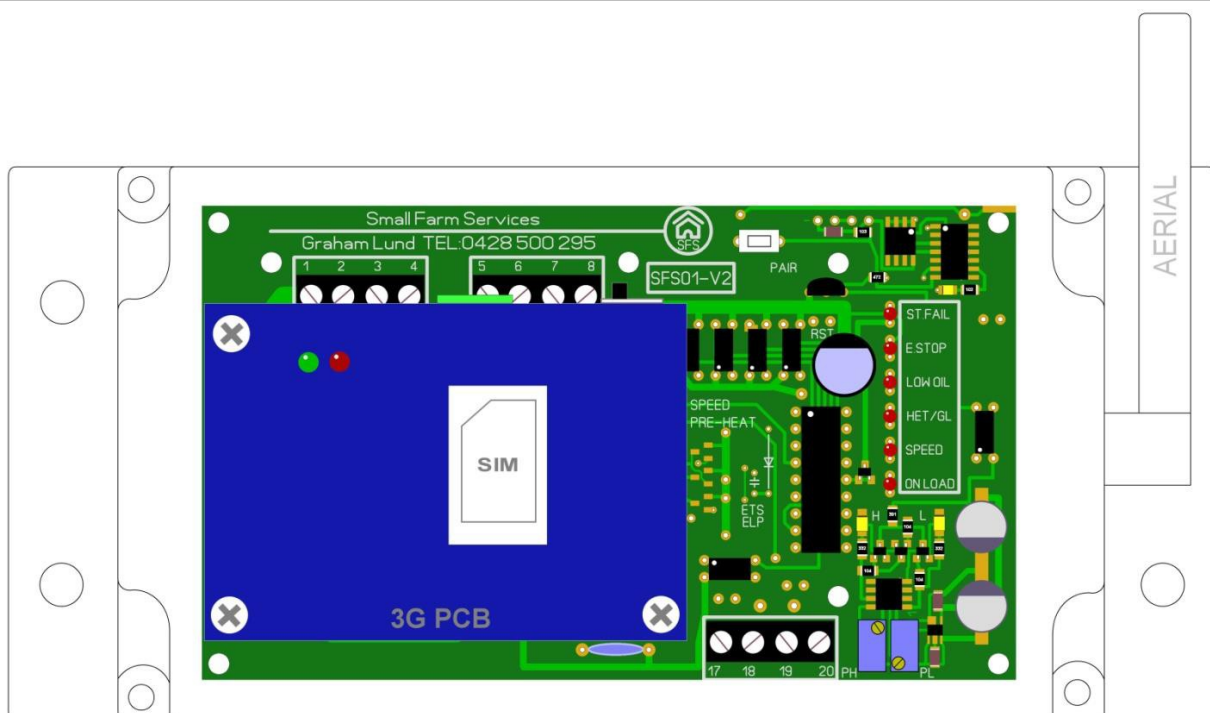
This image shows a correctly inserted SIM card.

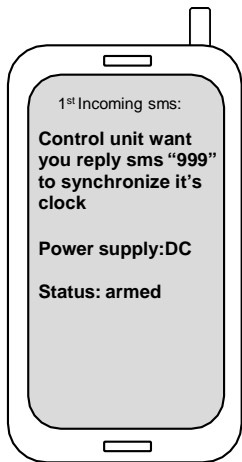
Attach the aerial.

## Powering up the unit and establishing a mobile network connection

Connect 12Vdc power supply to wires **6 (+)** and **GR/Y (-)**.

A short initialization time is required (approx. 60 sec) to get the 3G/GSM controller into mobile network. Don't try to press any buttons or perform other tasks during this time. During initialization time the red LED (ACT) is flashing every second until the controller is successfully connected to network. Once the connection is established the red LED starts flashing 2 times every 5th sec.





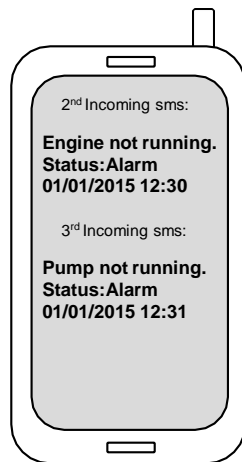
This image represents your mobile phone with a valid working CS phone number. Shortly after moving power switch to ON position you should receive a text message from SFS01-V2 module with following information (shown). You can reply "999" to synchronize your SFS01-V2 module's clocks. You should not expect any sms confirmations related to synchronization of your clocks. In some rare cases, when engine battery fails or not charged properly the SFS01-V2 module should notify you about this problem by sending following sms:

**Attention! Engine battery voltage below 11.5V! Immediate charging required!**

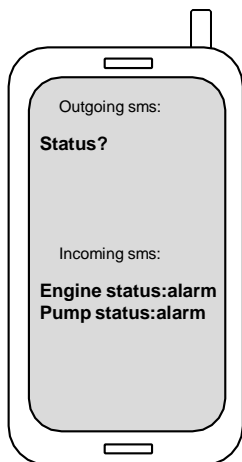
If that happens please charge your engine battery as soon as possible.

When engine battery voltage becomes normal the SFS01-V2 module will send the following sms confirmation:

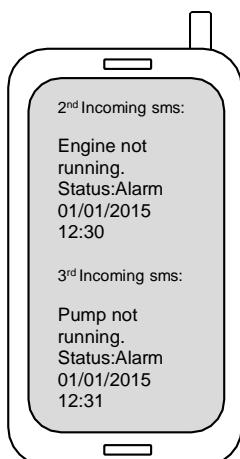
**Success! Engine battery voltage is normal.**

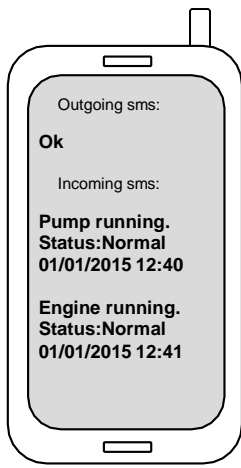


You will also receive some information about current status of your engine and pump ("**running**" or "**not running**", "**normal**" or "**alarm**") including current date and time stamp. Please note that sometimes sms messages come with delay and in unexpected order affected by network problems and peak times. Always check date/time stamp of sms before committing further actions.



If you would like to check the current status of your engine and pump, type and send "**Status?**" message to SFS01-V2 control module. You should receive a reply as shown on this image or another combination of texts: **Engine status: alarm (or normal), Pump status: alarm (or normal)**. Status "**normal**" means that engine is running or/and pump is running and producing water pressure. Status "**alarm**" means engine is stationary and/or water pressure is low.

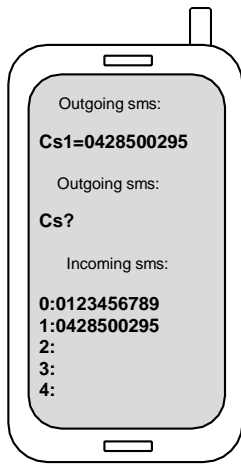




If you would like to start (or stop) your engine via sms - type and send the following command: **"Ok"**  
 You should receive following sms confirmations:  
**Pump running. Status: Normal** with date/time stamp.  
 And another confirmation:  
**Engine running. Status: Normal** with date/time stamp.  
 Please note, if one or both confirmations didn't arrive after 2-3 min please check the engine/pump status by sending **"Status?"** command. There could be a chance when engine couldn't start up successfully due to unforeseen circumstances. If so, check your engine and pump condition asap. Also send another **"Ok"** to reset the fault indicating LED "ST. FAIL" if lit.

You can also start and stop your engine by calling it from your valid CS number.  
 A successful call will be hung up and hence not charged.  
 All standard sms confirmations will be issued automatically after that as usual.

Setting up control server phone numbers (CS) using sms commands



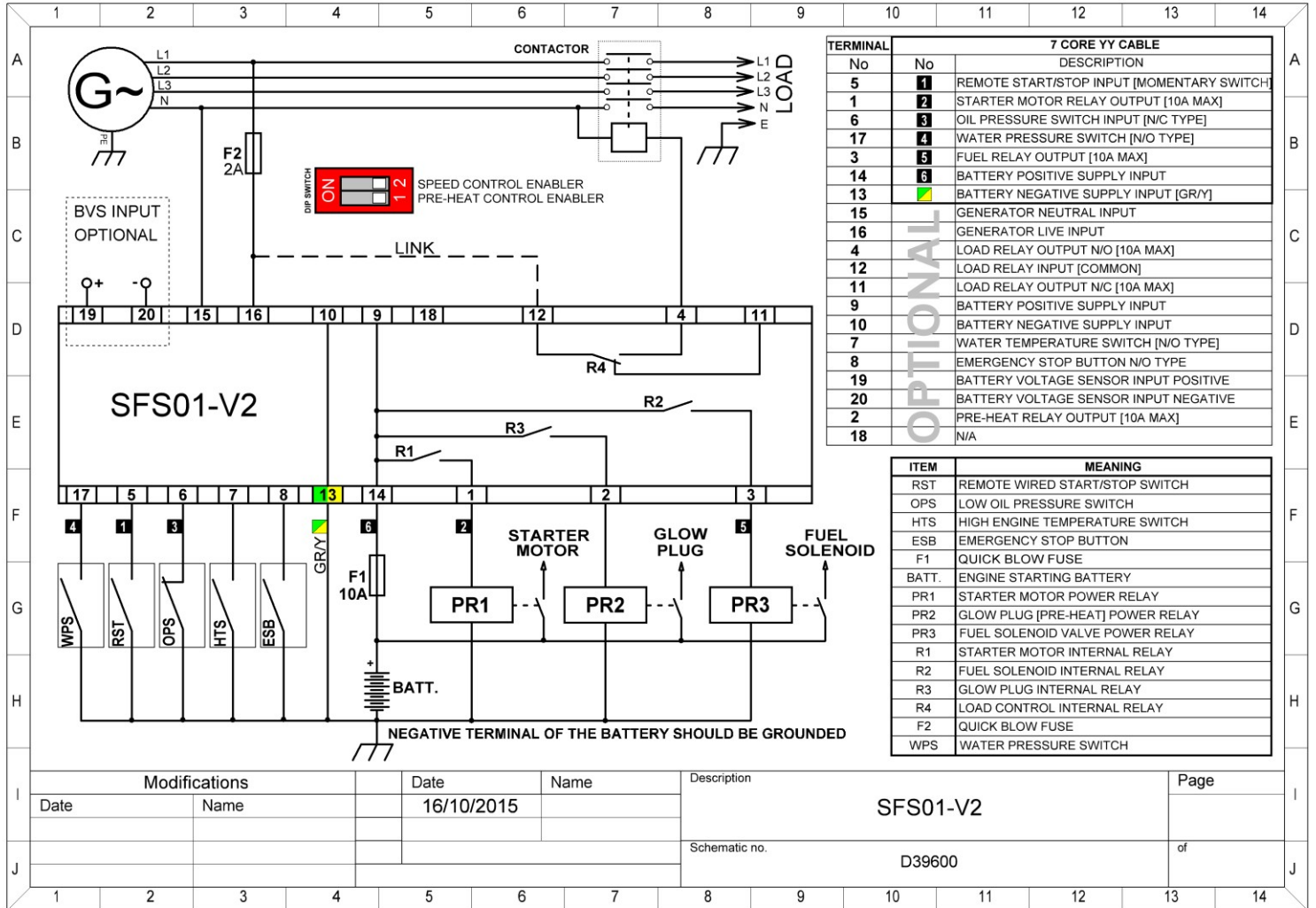
If you would like to add another CS number via sms-type and send the following command:  
**"CSn=0413740953"** where "n" is a CS phone index (0~9) and "0413740953" is your next CS phone number.  
 Please note, that your 1<sup>st</sup> CS phone number (for example: 0123456789) would have been entered via PC prior to supply.

*Note: avoid changing CS number with index "0" via sms because your current CS phone number will be replaced with new CS number and you would not be able to operate your SFS01-V2 module.*

If you would like to check all CS valid numbers- text **"CS?"** and you receive a reply with all CS numbers available. To delete a specific CS number text **"CSn"** where "n" is an index of CS phone number to be deleted. Example: to delete CS1 phone number text **"CS1"**. Now you can check if CS1 number has been deleted by requesting a new CS phone number list by texting: **"CS?"**

# Wiring diagram

**CAUTION!**  
**ENGINE FITTED WITH REMOTE START MODULE.**  
**ENGINE MAY START WITHOUT WARNING.**  
**ISOLATE STARTER CIRCUIT PRIOR TO ANY MAINTENANCE.**  
**CONTACT ALDGATE PUMPS FOR MORE INFORMATION IF REQUIRED.**



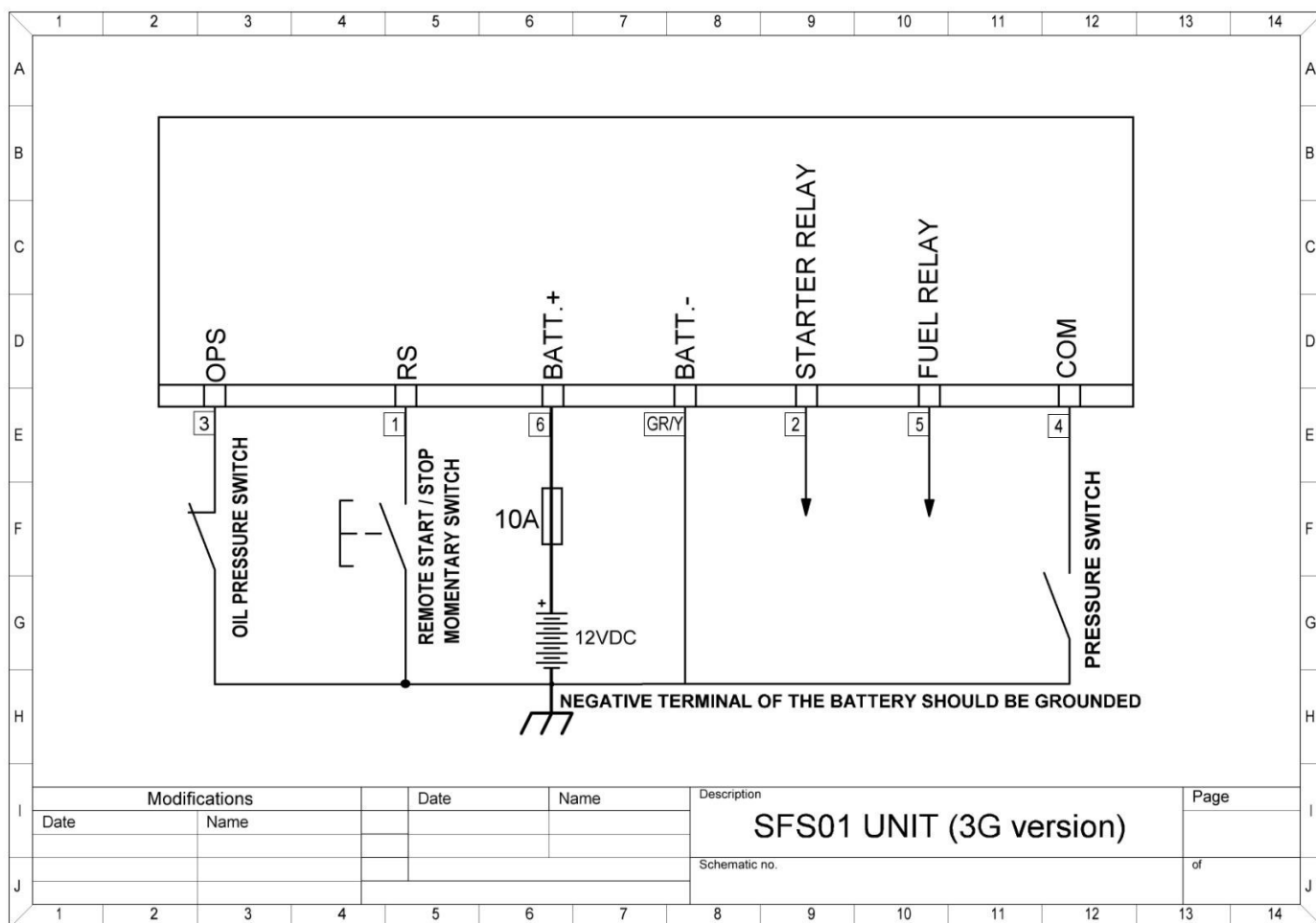
TERMINAL		7 CORE YY CABLE	
No	No	DESCRIPTION	
5	1	REMOTE START/STOP INPUT [MOMENTARY SWITCH]	
1	2	STARTER MOTOR RELAY OUTPUT [10A MAX]	
6	3	OIL PRESSURE SWITCH INPUT [N/C TYPE]	
17	4	WATER PRESSURE SWITCH [N/O TYPE]	
3	5	FUEL RELAY OUTPUT [10A MAX]	
14	6	BATTERY POSITIVE SUPPLY INPUT	
13	7	BATTERY NEGATIVE SUPPLY INPUT [GR/Y]	
15	8	GENERATOR NEUTRAL INPUT	
16	9	GENERATOR LIVE INPUT	
4	10	LOAD RELAY OUTPUT N/O [10A MAX]	
12	11	LOAD RELAY INPUT [COMMON]	
11	12	LOAD RELAY OUTPUT N/C [10A MAX]	
9	13	BATTERY POSITIVE SUPPLY INPUT	
10	14	BATTERY NEGATIVE SUPPLY INPUT	
7	15	WATER TEMPERATURE SWITCH [N/O TYPE]	
8	16	EMERGENCY STOP BUTTON N/O TYPE	
19	17	BATTERY VOLTAGE SENSOR INPUT POSITIVE	
20	18	BATTERY VOLTAGE SENSOR INPUT NEGATIVE	
2	19	PRE-HEAT RELAY OUTPUT [10A MAX]	
18	20	N/A	

ITEM	MEANING
RST	REMOTE WIRED START/STOP SWITCH
OPS	LOW OIL PRESSURE SWITCH
HTS	HIGH ENGINE TEMPERATURE SWITCH
ESB	EMERGENCY STOP BUTTON
F1	QUICK BLOW FUSE
BATT.	ENGINE STARTING BATTERY
PR1	STARTER MOTOR POWER RELAY
PR2	GLOW PLUG [PRE-HEAT] POWER RELAY
PR3	FUEL SOLENOID VALVE POWER RELAY
R1	STARTER MOTOR INTERNAL RELAY
R2	FUEL SOLENOID INTERNAL RELAY
R3	GLOW PLUG INTERNAL RELAY
R4	LOAD CONTROL INTERNAL RELAY
F2	QUICK BLOW FUSE
WPS	WATER PRESSURE SWITCH

Modifications		Date	Name	Description	Page
Date	Name	16/10/2015		SFS01-V2	
				Schematic no.	of
				D39600	

**CAUTION!**  
**ENGINE FITTED WITH REMOTE START**  
**MODULE. ENGINE MAY START WITHOUT**  
**WARNING.**

**ISOLATE STARTER CIRCUIT PRIOR TO ANY MAINTENANCE.**  
**CONTACT ALDGATE PUMPS FOR MORE INFORMATION IF REQUIRED.**





This form is designed for your own personal information

It may be helpful if you list your preferred control server "CS" numbers here for future reference.

CS #	Number	Name
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		

Remember - the above numbers will have the capability to start and stop your diesel pump set.

If loading a land line telephone number please add the area code.

The listed CS numbers will all receive text messages informing them of the operation of the diesel pump set.

A good rule of thumb is to ask all other persons listed on the CS to contact "CS0" prior to starting or stopping the engine to avoid duplication of messages to the control module.

**The primary user (CS"0") will receive a txt message from the control module every Friday just to confirm all is well.**

# Quick Guide to SMS Commands

- Start and stop the engine send: **OK** via SMS
- To check the engine and pump status send:  
**STATUS?** via SMS.
- To get a list of authorised phone numbers [CS numbers] that can activate the module send: **CS?** via SMS.
- To check that the module is currently being powered by the engine starting battery send: **POW** via SMS.  
(Please note POW only confirms the modules battery supply. The SFS-3G V2 controller will send a SMS if the battery voltage drops below 11.5 volts.)
- **Remember** - if you start your engine manually via the key start, you must stop the engine manually via the key start.

When the engine is started manually, you will receive a "pump running status normal" text only  
No message is sent regarding the engine status.

If you text Status? with the engine running (started manually) the module would respond with  
"Engine status: alarm"  
"Pump status: normal"

This is because when the engine is started manually the module understands that no automatic re-start procedure is required so the module ignores the engine OPS that monitors oil pressure.

- **Likewise** - if you start your engine via SMS using the control module, you must stop the engine via SMS.

When the engine is started remotely via text using the control module, you will receive the following  
"Pump running. Status: Normal (Date & Time)"  
followed by

"Engine running. Status: Normal (Date & Time)"  
If you text Status? with the engine running (started via SMS) the module would respond with  
"Engine status: normal"  
"Pump status: normal"

The "Oil Pressure Switch" is activated by the engine running and is acting normally. If the engine failed to start the Oil Pressure Switch would send the required signals to begin the re-start procedure.

