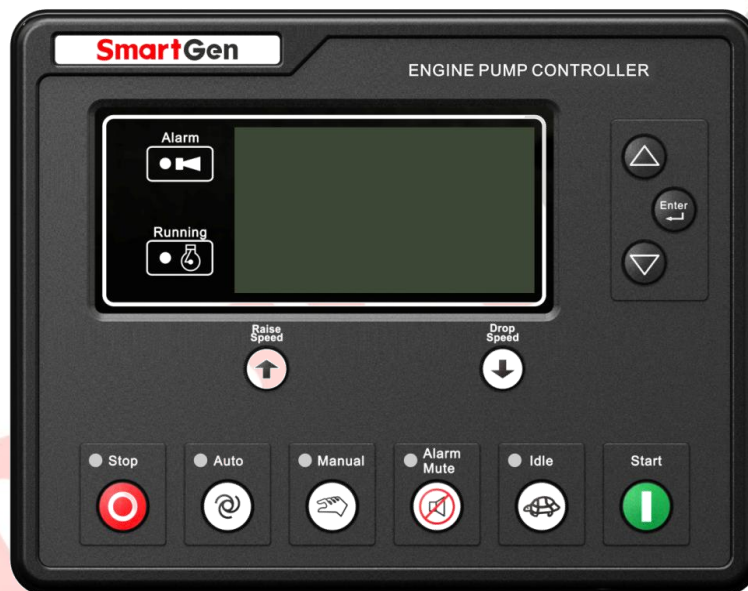# APC615

PUMP UNIT CONTROLLER

USER MANUAL

SMARTGEN (ZHENGZHOU) TECHNOLOGY CO.,LTD.

— All output ports are relay-out;

— Parameter setting: parameters can be modified and stored in internal FLASH memory and cannot be lost even in case of power outage;

— Multiple crank disconnect conditions (speed sensor, oil pressure) are optional;

— Widely power supply range DC(8~35)V, suitable to different starting battery voltage environment;

— Event log, real-time clock, scheduled start & stop pump unit (can be set as start pump unit once a day/week/month);

— Can control engine heater, cooler and fuel pump.

— With maintenance function. Actions can be set when maintenance time due;

— All parameters used digital adjustment, instead of conventional analog modulation with normal potentiometer, more reliability and stability;

— Waterproof security level IP65 due to rubber seal installed between the controller enclosure and panel fascia;

— Metal fixing clips enable perfect performance in high temperature environment;

— Modular design, anti-flaming ABS plastic enclosure, pluggable connection terminals and embedded installation way; compact structure with easy mounting.

3   SPECIFICATION

Table 3 – Technical Parameters

Items	Content
Working Voltage	DC8.0V to 35.0V, Continuous Power Supply.
Overall Consumption	<3W(Standby mode: ≤2W)
Speed Sensor Voltage	1.0 to 24V(effective value)
Speed Sensor Frequency	10000Hz (max)
Starter Relay Output	16A Connect to common port output
Fuel Relay Output	16A Connect to common port output
Programmable Relay Output 1	16A Connect to common port output
Programmable Relay Output 2	7A Connect to common port output
Programmable Relay Output 3	7A Connect to common port output
Programmable Relay Output 4	7A AC250V Volt free output
Programmable Relay Output 5	7A AC250V Volt free output
Programmable Relay Output 6	7A AC250V Volt free output
Analog Sensor	4 fixed sensors, 2 configurable sensors
Overall Dimensions	197 mm x 152 mm x 47 mm
Panel Cutout	186mm x 141mm
Working Condition	Temperature: (-25~+70)°C Humidity: (20~93)%RH
Storage Condition	Temperature: (-25~+70)°C
Protection Level	IP65 Gasket
Insulating Intensity	Apply AC2.2kV voltage between high voltage terminal and low

Items	Content
	voltage terminal; The leakage current is not more than 3mA within 1min.
Weight	0.70kg

4 OPERATION

4.1 PUSH BUTTONS DESCRIPTION

Table 4 – Keys Function

| Icons	Function	Description
	Stop	1.Stop running pump unit in Auto/Manual mode; 2. Reset alarm in stop mode; 3. Press at least 3 seconds to test lights are normal or not (Lamp test).
	Auto	Press it to set controller enters into Auto mode.
	Manual	Press it to set controller enters into Manual mode.
	Mute	Press it to mute controller alarms.
	Idle	Press it to set controller enters into Idle mode.
	Start	Press it to start generator in auto mode.
	Raise Speed	Press it to raise engine speed in manual speed control status.
	Drop Speed	Press it to drop engine speed in manual speed control status.
	Up/Increase	1. Screen scroll 2. Up cursor and increase value in setting menu.
	Down/Decrease	1. Screen scroll 2. Down cursor and decrease value in setting menu.
	Set/Confirm	1. Enter into Parameter Setting screen after holding and pressing over 3s;; 2. Confirm setting information.

4.2 INDICATOR LIGHT
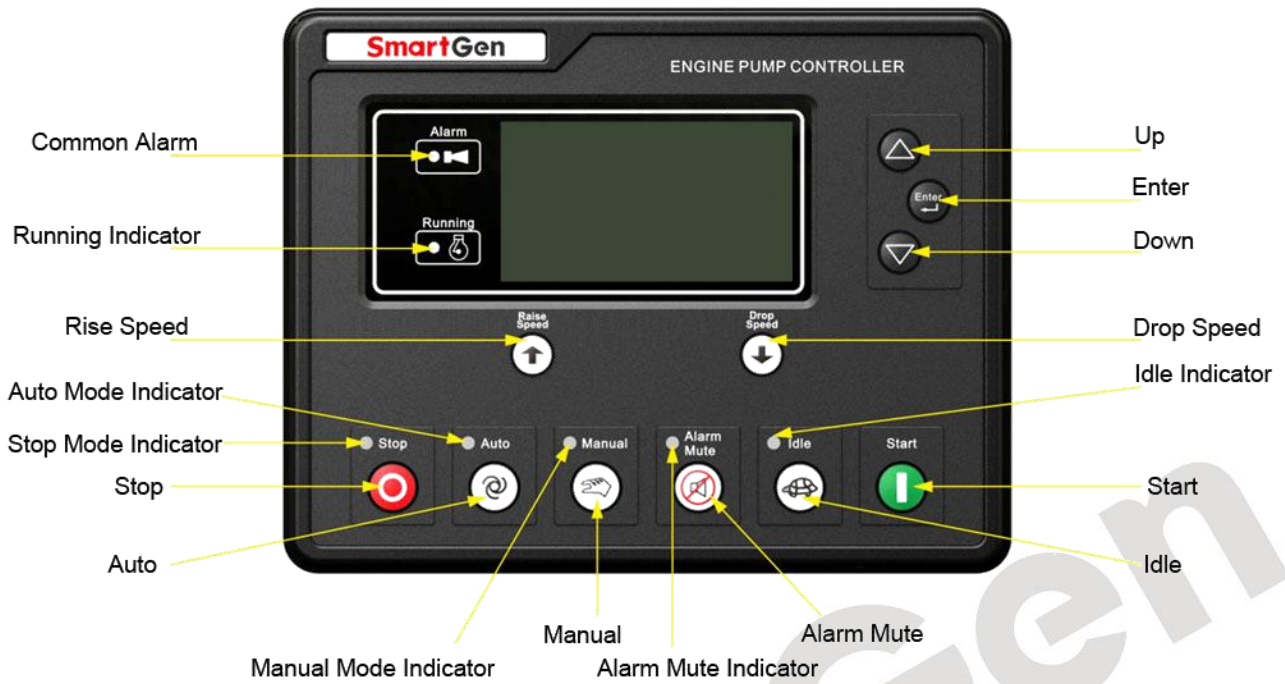
Fig.1 – APC615 Front Panel

⚠ **Note: Selected indicators description:**

Common warning indicator: flash slowly when warning alarms occur; flash quickly when shutdown alarms occur; light is off when there are no alarms.

Running indicator: always light when engine is normal running.

⚠**NOTE**：**ECU warning and ECU shutdown illustration: if detailed alarm content displayed on the LCD of controller, please check engien condition according to the displayed content; otherwise, please look up engine user manual based on the SPN code to receive information.**

6   CONNECTIONS
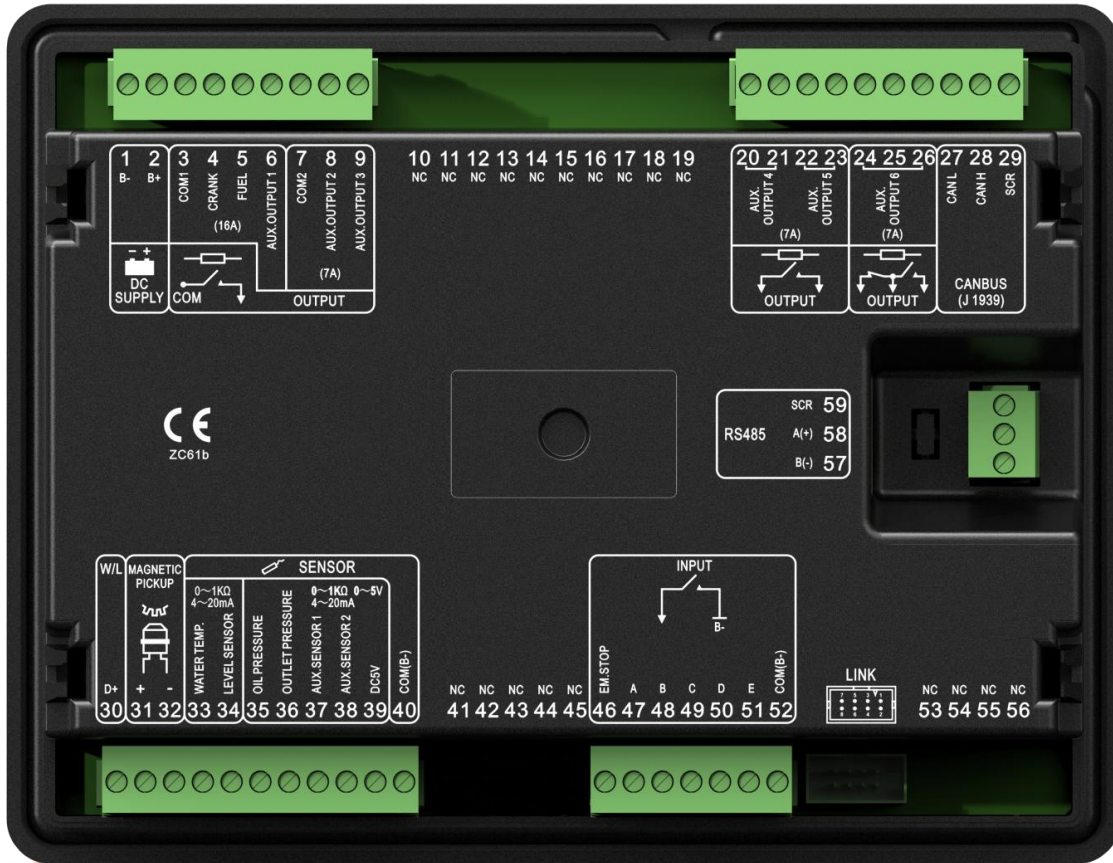
Fig. 2 – APC615 Back Panel

Description of terminal connections:

No.	Function	Cable Size	Description	
1	B-	2.5mm^2	Connected with negative of starter battery.	
2	B+	2.5mm^2	Connected with positive of starter battery. If wire length is over 30m, better to double wires in parallel. Max. 20A fuse is recommended.	
3	COM1 Relay Common Port	1.5mm^2	Connect to COM1 output with rated 16A.	
4	Crank	1.5mm^2		
5	Fuel	1.5mm^2		
6	Aux. Output 1	1.5mm^2		
7	COM2	1.5mm^2	Connect to COM2 output with rated 7A.	Detailed setting items please to
8	Aux. Output 2	1.5mm^2		

No.	Function	Cable Size	Description	
9	Aux. Output 3	1.5mm^2		see Table 10.
10~19	NC			
20	Aux. Output 4	1.5mm^2	Relay normally open volt free contactor with rated 7A, volt free output.	
21		1.5mm^2		
22	Aux. Output 5	1.5mm^2	Relay normally open volt free contactor with rated 7A, volt free output.	
23		1.5mm^2		
24	Aux. Output 6	1.5mm^2	Normally close output with rated 7A	
25		1.5mm^2	Relay common point	
26		1.5mm^2	Normally open output with rated 7A	
27	ECU CAN L	0.5mm^2	120Ω impedance shielded wire is recommended to use, and single-end earthed.	
28	ECU CAN H	0.5mm^2		
29	ECU SCR	/		
30	Charging Generator D+ Input	1.0mm^2	Connect to D+ (WL) terminal of charging generator, if there is no this terminal in the charger, this terminal is suspended.	
31	Speed Sensor Input	0.5mm^2	Connect to speed sensor of engine, shield line is recommended to use.	
32	Speed sensor input, internal of controller has connected with B-	0.5mm^2		
33	Temperature sensor	1.0mm^2	Connected to temp. sensor (Resistor/current type)	Detailed setting items please to see Table 12.
34	Fuel level sensor	1.0mm^2	Connected to fuel level sensor (Resistor/current type)	
35	Oil pressure sensor	1.0mm^2	Connected to oil pressure sensor (Resistor/current/voltage type)	
36	Outlet Pressure Sensor Input	1.0mm^2	Connected to outlet pressure sensor of pump unit (Resistor/current/voltage type)	
37	Flexible Sensor 1	1.0mm^2	User-defined (Resistor/current/voltage type)	
38	Flexible Sensor 2	1.0mm^2	User-defined (Resistor/current/voltage type)	
39	DC5V	1.0mm^2	Supply power for voltage type sensor.	
40	Sensor COM	1.0mm^2	Sensor common port, internal of controller has connected with B-.	
41~45	NC	/	/	
46	Emergency Stop	0.5 mm^2	Controller emergency stop the genset if input port is active.	
47	Aux. Input 1(A)	0.5 mm^2	Ground connected is active (B-)	Detailed setting

No.	Function	Cable Size	Description	
48	Aux. Input 2(B)	0.5 mm^2	Ground connected is active (B-)	items please to see Table 11.
49	Aux. Input 3(C)	0.5 mm^2	Ground connected is active (B-)	
50	Aux. Input 4(D)	0.5 mm^2	Ground connected is active (B-)	
51	Aux. Input 5(E)	0.5 mm^2	Ground connected is active (B-)	
52	Aux. Input COM	0.5 mm^2	Internal of controller has connected with B-.	
53~56	NC	/	/	
57	RS485-(B)	0.5mm^2	120Ω impedance shielded wire is recommended to use, and single-end earthed.	
58	RS485+(A)	0.5mm^2		
59	RS485 Shield	/		
	Link	/	Can realize communicate with PC monitoring software.	

7 DEFINITION AND RANGE OF PARAMETERS

7.1 PARAMETER CONTENTS AND RANGE

| No.	Items	Parameter	Default	Description
Language				
1	Language	(0-2)	0	0: Simplified Chinese; 1:English; 2:Other
Timers				
1	Start Delay	(0-3600)s	1	Time from remote start signal is active to start the pump unit.
2	Return Delay	(0-3600)s	1	Time from remote stop signal is deactivated to stop the pump unit.
3	Preheat Delay	(0-3600)s	0	Time of pre-powering heat plug before starter is powered up.
4	Pre-start Fuel Time	(0-3600)s	1	Fuel relay output time before starter power on.
5	Cranking Time	(3-60)s	8	Time of starter powers up. (If diesel driven pump unit is enabled, this time also can be cranking time of diesel driven pump unit).
6	Crank Rest Time	(3-60)s	10	The waiting time before second power up when engine starts fail. (If diesel driven pump unit is enabled, this time also can be crank rest time of diesel driven pump unit).
7	Safety On Delay	(0-3600)s	10	Alarms for low oil pressure, high temperature, under speed, under frequency/voltage, charge fail are deactivated during "Safety On Delay".
8	Start Idle Time	(0-3600)s	0	Idle running time of the pump unit when starting.
9	Warming Up Time	(0-3600)s	10	Warming time between the pump unit take load and high speed running.
10	Cooling Time	(0-3600)s	10	Radiating time before stop the pump unit, after it unloads.
11	Stop Idle Time	(0-3600)s	0	Idle running time when pump unit stop.
12	ETS Solenoid Hold	(0-3600)s	20	Stop electromagnet's power on time when pump unit is stopping. (If diesel driven pump unit is enabled, this time also can be stop output time of diesel driven pump unit).
13	Wait for Stop Time	(0-3600)s	0	Time between ending of pump unit idle delay and stopped when "ETS Solenoid Hold" is set as 0; Time between ending of ETS delay and stopped completely when "ETS Hold output time" is not 0.
14	After Stop Time	(0-3600)s	0	Time between pump unit stopped and standby.
15	Fuel Pre-supply	(0-12)h	2	When unit is in standby status and the output

11 TYPICAL APPLICATION
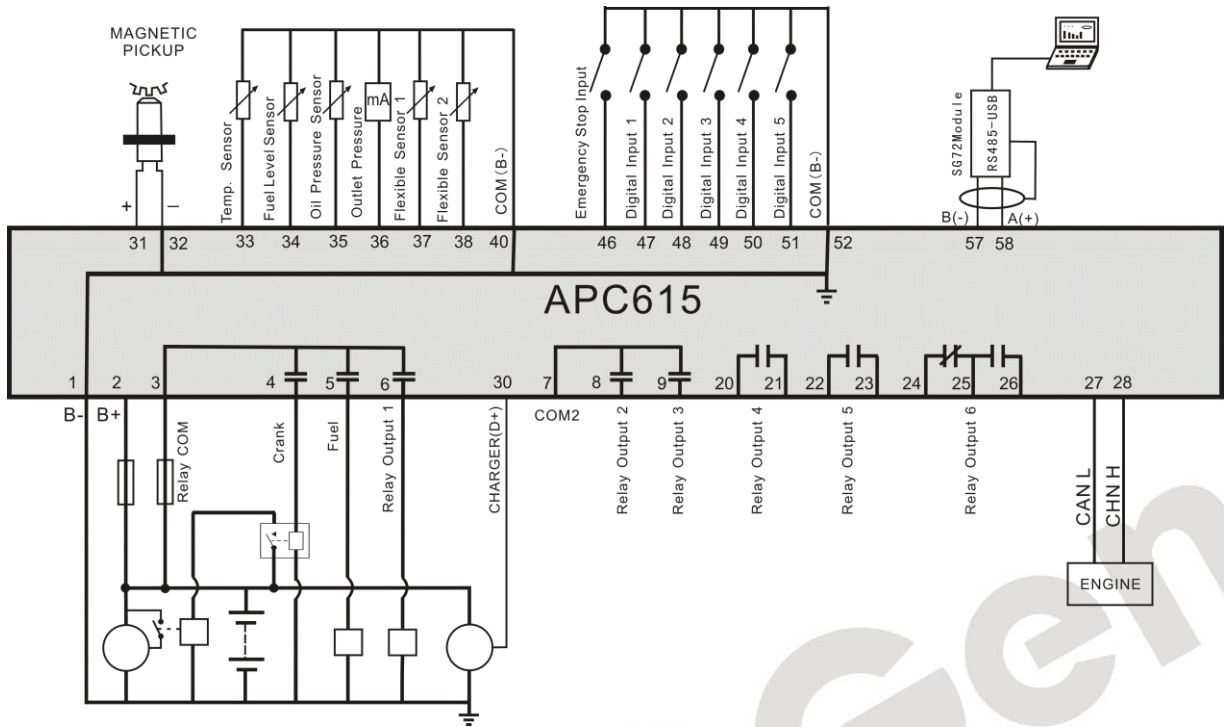
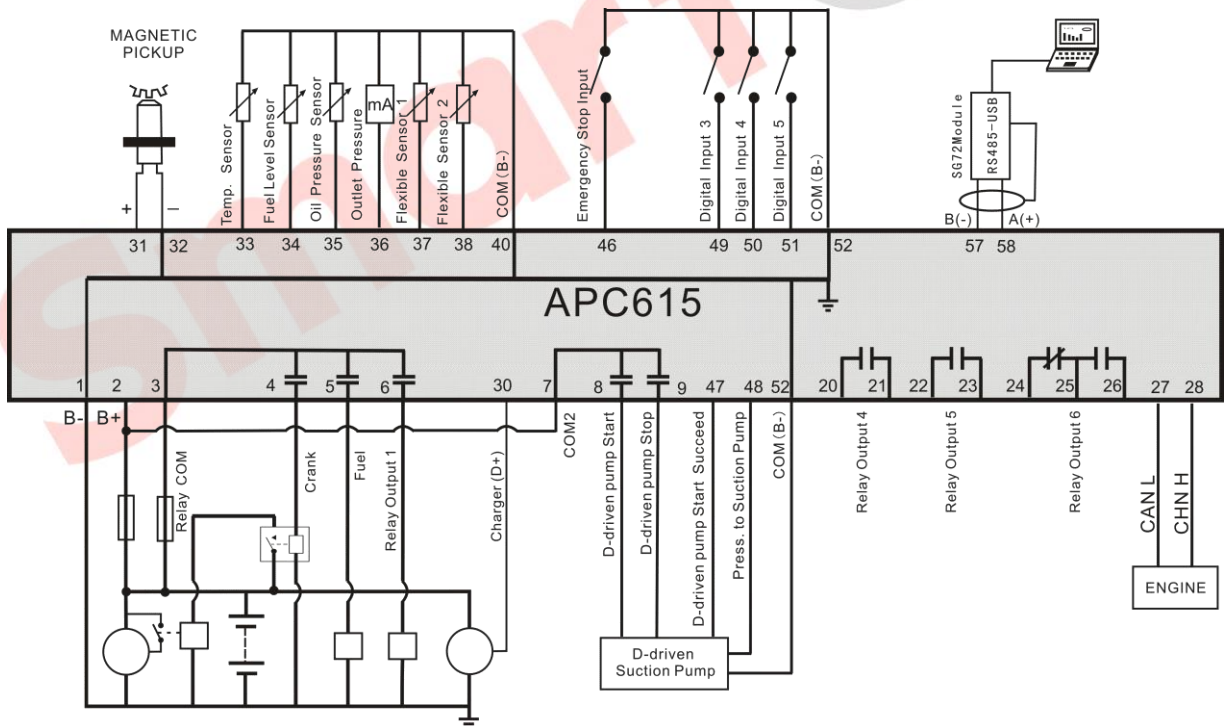Fig. 5 - APC615 Typical Application Diagram

Fig. 6 – Typical Application with Diesel Driven Suction Pump
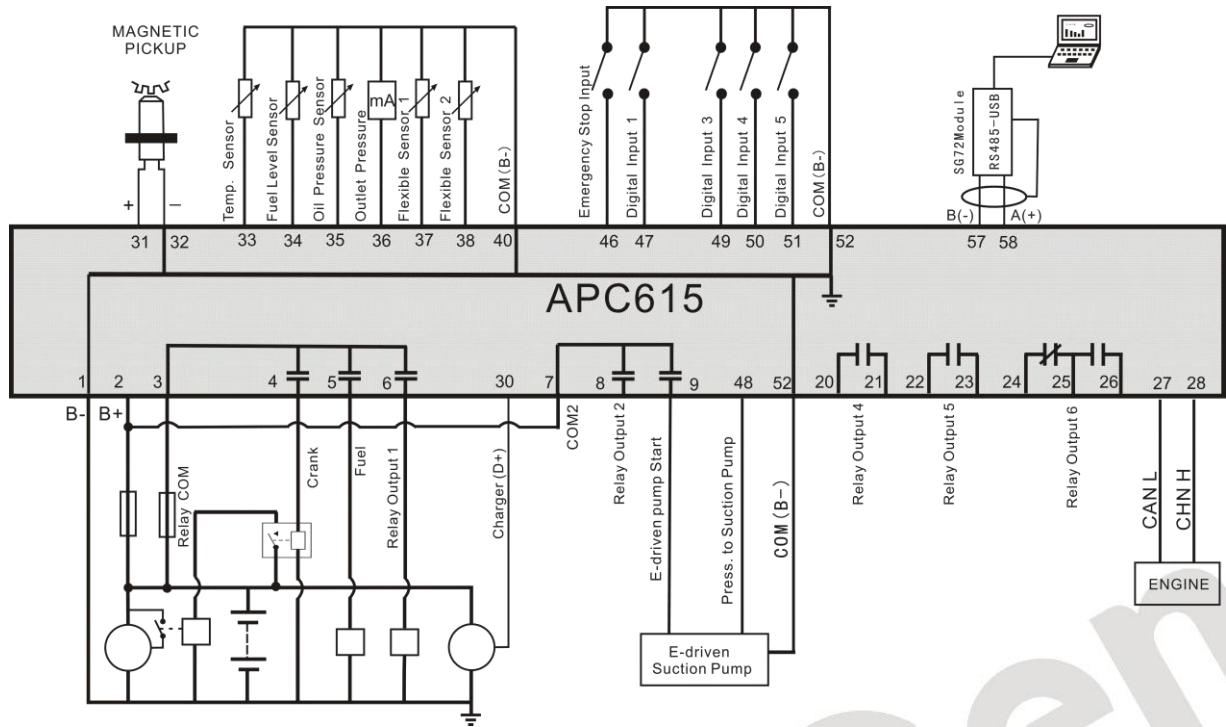
Fig. 7 – Typical Application with Electric Driven Suction Pump

12 INSTALLATION

12.1 FIXING CLIPS

Controller is panel built-in design; it is fixed by clips when installed.
— Withdraw the fixing clip screw (turn anticlockwise) until it reaches proper position.
— Pull the fixing clip backwards (towards the back of the module) ensuring two clips are inside their allotted slots.
— Turn the fixing clip screws clockwise until they are fixed on the panel.

⚠ Note: Care should be taken not to over tighten the screws of fixing clips.

12.2 OVERALL DIMENSION
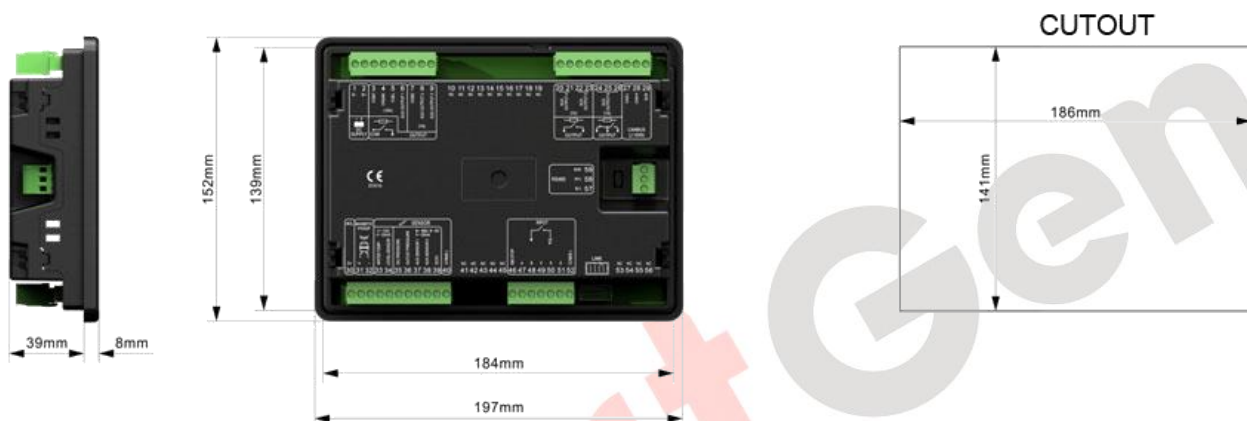

Fig. 8 – Overall & Cutout Dimensions

— **Battery Voltage Input**

APC615 controller can suit for widely range of battery voltage DC(8~35)V. Negative of battery must be connected with the engine shell soundly. The diameter of wire which from power supply to battery must be over 2.5mm^2. If floating charge configured, please firstly connect output wires of charger to battery's positive and negative directly, then, connect wires from battery's positive and negative to controller's corresponding input ports in order to prevent charge disturbing the controller's normal working.

— **Speed Sensor Input**

Speed sensor is the magnetic equipment which be installed in starter and for detecting flywheel teeth. Its connection wires to controller should apply for 2 cores shielding line. The shielding layer should connect to No. 32 terminal of controller while another side is hanging in air. The else two signal wires are connected to No. 31 and No. 32 terminals of controller. The output voltage of speed sensor should be within AC(1~24)V (effective value) during the full speed. AC12V is recommended (in rated speed). When install the speed sensor, let the sensor is spun to contacting flywheel first, then, port out 1/3 lap, and lock the nuts of sensor at last.

— **Output And Expansion Relay**