



SmartGen
ideas for power

HPS/FPC915-S01

DIESEL ENGINE FIRE PUMP CONTROL Box

USER MANUAL



ZHENGZHOU SMARTGEN TECHNOLOGY CO.,LTD.



Chinese trademark

SmartGen English trademark

SmartGen — make your generator *smart*

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Table 1 - Software Version

Date	Version	Content
2018-06-30	1.0	Original release.
2018-07-27	1.1	

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1 OVERVIEW

HPS/FPC915-S01 fire pump controller (Hereinafter referred to as fire control box) is mainly composed by box, FPC915 diesel engine fire pump controller, DOUT16 digital output module and BACM2406 battery charger.

HPS/FPC915-S01 fire pump controller is designed for controlling engine fire pump unit to realize unit automatic start/stop, data measurement, alarm protection functions. CANBUS (SAE J1939) interface enables the controller to communicate with various engines which fitted or not fitted with J1939 interface. Meanwhile, it also has battery automatic float charging function.

2 PERFORMANCE AND CHARACTERISTICS

FPC915 Diesel Driven Fire Pump Controller fits with LCD display, optional languages interface (including English, Chinese or other languages); simultaneously the exact parameters of pump unit and engine are indicated by the LCD display on the front panel and the controller is reliable and easy to use. It is adopt powerful 32-bit ARM microprocessor technology with precision parameters measuring, fixed value adjustment, time setting and set value adjusting and etc. The majority of parameters can be configured from front panel and all the parameters can be set using PC (via USB port). It can be widely used in a number of pump control systems with compact structure, simple connections and high reliability.

BACM2406 series battery charger, adopts the latest switch power components, is specially designed for charging lead-acid starting battery according to its property. This charger is suitable for lead-acid battery long-term supplementary charge (float charge). Maximum output current for 12V and 24V is 6A.

3 SPECIFICATION

Table 2 – Performance Parameters

Items	Contents
Working Voltage	DC12V/24V
Speed Sensor Voltage	1.0 to 24V(effective value)
Speed Sensor Frequency	10000Hz (max)
Overall Dimensions	730mmx540mmx226mm
Panel Cutout	480mmx160mm
Working Condition	Temperature: (-25~+70)°C Humidity: (20~93)%
Protection Level	IP43
Weight	30kg

4 MAIN FUNCTIONS AND PARAMETER SETTINGS

4.1 OPERATION FUNCTION

HPS/FPC915-S01 fire pump control box with working modes selection function, which can manual start/stop, emergency mode start/stop and etc. functions.

4.2 DISPLAY

a) Engine parameters display

Engine temperature, engine oil pressure, fuel level, battery 1 voltage, battery 2 voltage, charger voltage, total running time and total start times.

b) Pump unit parameters display

Outlet pressure, pipe network pressure, pump flow, pump head, accumulated flow, programmable sensor 1~ 2 (temperature, pressure, liquid level can be set).

c) Alarm status indication

Over(under) speed warning/shutdown, high water temperature warning/shutdown, low outlet pressure shutdown, and high outlet pressure warning/shutdown.

4.3 PARAMETER SETTINGS

Table 3 – Main Parameter Settings

Name	Alarm Limits	Function	Alarm Limits	Function
High water temp.	>95℃	Alarm	>98℃	Shutdown
Low oil pressure	<124Kpa	Alarm	<103Kpa	Shutdown
Overspeed	>1650rpm	Alarm	>1710rpm	Shutdown
Underspeed	<1290rpm	Alarm	<1200rpm	Shutdown
Battery voltage	>28.8V	Alarm		
Battery voltage	<20.4v	Alarm		

5 FPC915 CONTROLLER KEYS OPERATION

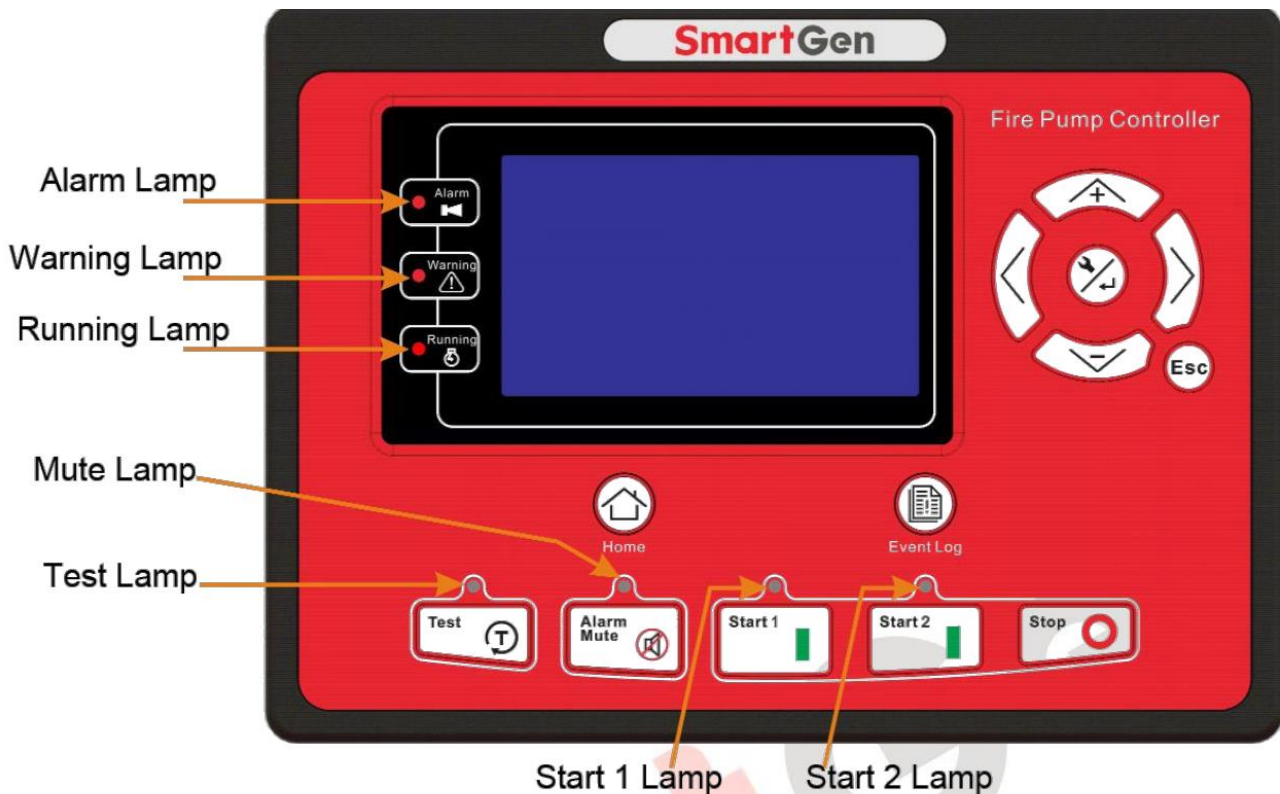
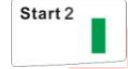


Fig.1 – FPC915 Front Panel Drawing

Table 4 – Keys Function Description

Icon	Name	Description
	Stop/Reset	Stop running pump unit in Auto/Manual mode; Reset alarms in stop mode; Lamp test (press at least 3 seconds); During stopping process, press this button again to stop pump unit immediately.
	Start 1	Press this button to start gensets via start battery in Manual mode; after start, starting motor divorced whiles loose this button.
	Start 2	Press this button to start gensets via control battery in Manual mode; after start, starting motor divorced whiles loose this button.
	Mute	Alarming sound off.
	Test	Control magnetic valve to open in Auto mode.
	Home	Shortcut to return to the main screen.
	Event Log	Look over pipeline pressure logs.
	Up/Increase	Screen scroll Up cursor and increase value in setting menu.
	Down/Decrease	Screen scroll Down cursor and increase value in setting menu.

Icon	Name	Description
	Left	Screen scroll; Left move cursor in setting menu.
	Right	Screen scroll; Right move cursor in setting menu.
	Set/Confirm	Confirm information in setting screen; Pressing and holding for more than 3 seconds enters parameter setting menu.
	Exit	Returns to the main menu; In settings menu returns to the previous menu.

6 PANEL BUTTONS OPERATION

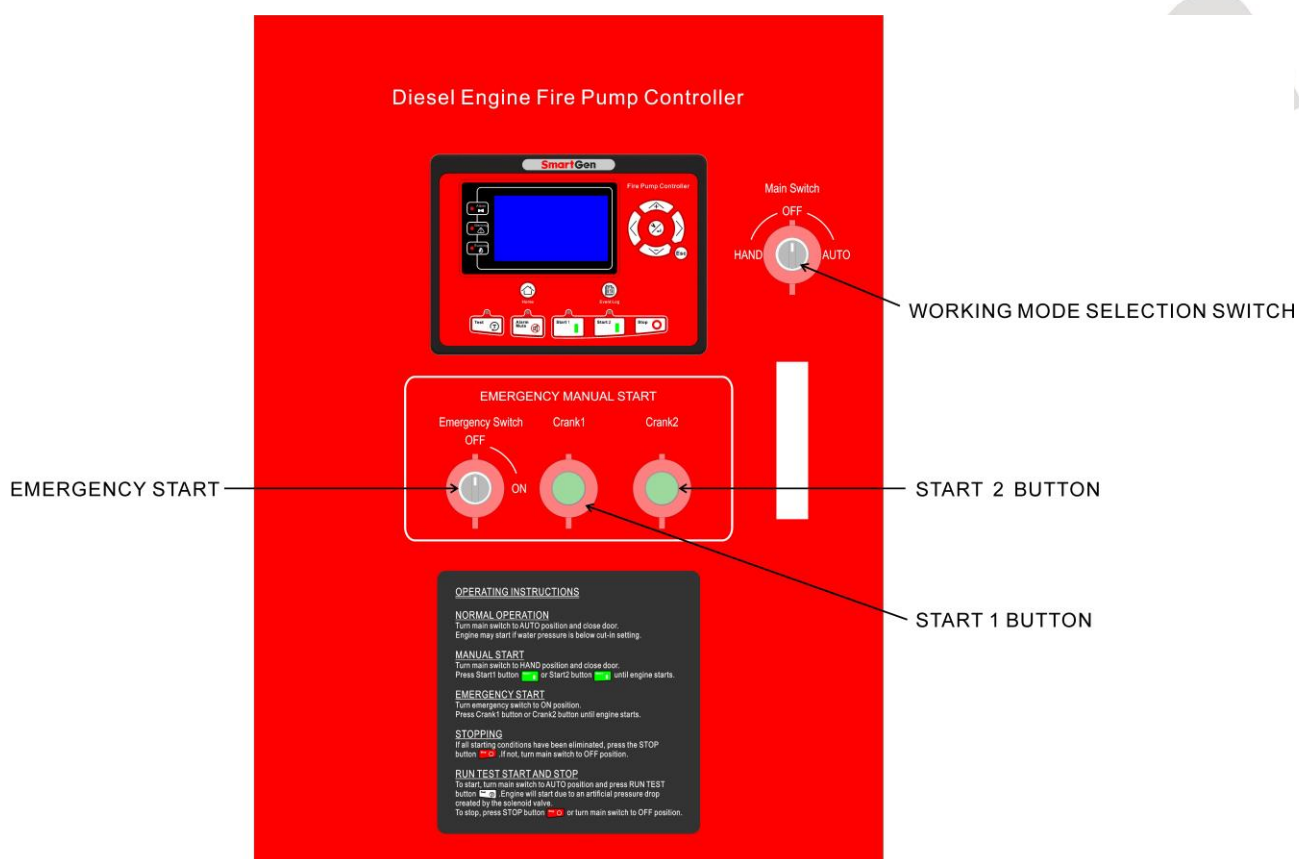


Fig.2 – HPS/FPC915-S01 Fire Pump Control Box Panel Drawing

7 GENSET START/STOP OPERATION

7.1 WIRE CONNECTION

After connecting genset to the fire pump control box according to the electrical schematic diagram, and then check and confirm the wire connection is correct. Close the miniature circuit breakers QF1, QF2, QF3, QF4 in the fire cabinet.

7.2 PARAMETER SETTINGS

Setting engine and pump related parameters in FPC915 controller, including number of flywheel teeth, crank disconnect conditions, outlet pressure, pipe network pressure, inputs and outputs, and etc.

7.3 MANUAL START/STOP OPERATION

Turn knob SA1 to HAND position, controller enters into manual mode.

7.3.1 MANUAL START

After powered for fire pump control box, LCD of FPC915 illuminated, press start 1  or start 2 , then pump unit starts up. While starting successfully, release  or , engine will speed up to the rated speed automatically. Pressing  can start pump unit according to battery 1 and Pressing  can start pump unit according to battery 2.

7.3.2 RUNNING

After pump unit started successfully, "Running" indicator on the controller lights up. Meanwhile, please check whether the parameters of the diesel engine on the FPC915 controller are normal.

7.3.3 MANUAL STOP

Press  to stop the running pump unit.

7.4 AUTO START/STOP OPERATION

Turn the knob SA1 on the panel to the AUTO position and the controller enters the automatic mode.

7.4.1 AUTO START

- When satisfied the auto start conditions, "Start Delay" timer is initiated.
- When start delay is over, preheat relay energizes (if configured), "preheat delay XX s" information will be displayed on LCD;
- After the above delay, the Fuel Relay is energized, and then one second later, the Start Relay is engaged. The engine is cranked for a pre-set time. If the pump unit fails to fire during this cranking attempt then the fuel relay and start relay are disengaged for the pre-set rest period; "crank rest time" begins and wait for the next crank attempt.
- Should this start sequence continue beyond the set number of attempts, the start sequence will be terminated, the Fail to Start fault will be displayed on LCD.
- In case of successful crank attempt, the "Safety On" timer is activated, allowing Low Oil Pressure, High Temperature, under speed and Charge Alternator Failure inputs to stabilize without triggering the fault. As soon as this delay is over, "start idle" delay is initiated (if configured).
- During "start idle" delay, under speed alarm is inhibited. When this delay is over, "warming up" delay is initiated (if configured).
- After the "warming up" delay, pump unit will enter into Normal Running status.

7.4.2 AUTO STOP

- a) When satisfied the stop conditions, "Stop Delay" timer is initiated (if alarm stop, please go to step d).
- b) Once this "stop delay" has expired, the "Cooling Delay" is then initiated. Then the "Stop Idle" delay is initiated.
- c) During "Stop Idle" Delay (if configured), idle relay is energized.
- d) "ETS Solenoid Hold" begins, ETS relay is energized while fuel relay is de-energized.
- e) "Fail to Stop Delay" begins, complete stop is detected automatically.
- f) Pump unit is placed into its "After stop time" after its complete stop. Otherwise, fail to stop alarm is initiated and the corresponding alarm information is displayed on LCD (If pump unit stopped successfully after "Failed to Stop" alarm, it will enter "After stop time" and remove alarm).
- g) Pump unit is placed into its standby mode after its "After stop time".

7.5 EMERGENCY START

Emergency mode: When the controller fails to operate, turn the emergency knob switch SA2 to the AUTO position. At this time, the pump unit can be started by pressing the start1 button or the start 2 button. When need to stop the engine, turn the emergency knob switch SA2 to the OFF position.

7.6 ALARM

Alarms display: when fault alarms occur, "Alarm" and "Warning" indicators are illuminated. At this time, alarm information can be viewed through the LCD of the FPC915 controller.

▲Note: if controller shuts down because of the fault alarms, only alarms have been removed and press "Stop/Reset" button, can pump unit be re-started again.

8 ATTENTION

- a) Fire pump control box should be protected from violent vibration and collision during handling and installation. Store in a dry, clean, non-corrosive atmosphere. The installation method of the control box is the base installation type, and the installation should be firm.
- b) The controller manual, accessories and electrical schematics provided by the manufacturer should be kept safely for use during commissioning and maintenance.
- c) The repair and routine maintenance of the fire pump control box should be carried out by a trained and skilled electrician. When faults occur, it should be checked according to the electrical schematic. Firstly, please check whether the connection of the line is correct, whether the wiring is loose or disconnect, and then replace the relevant device.
- d) When the fire pump control box fails or needs to purchase spare parts, please contact our sales or service personnel, and inform them of the corresponding control panel model and factory number so that the problem can be solved in time and accurately.

9 COMMON FAULT ANALYSIS

When the fire pump control box fails, firstly, please check the external wire connection according to the electrical schematic provided by the supplier. Then check according to the fault phenomenon and troubleshooting methods of the control box listed in the table below. If the problem still not resolved, please contact the relevant personnel of the manufacturer for consultation.

Table 5 – Troubleshooting

Symptoms	Possible Solutions
Controller no response with power.	Check starting batteries; Check controller connection wirings; Check power wiring of controller.
Genset shutdown	Check controller alarms information; Check the water/cylinder temperature is too high or not.
Low oil pressure alarm after crank disconnect	Check the oil pressure sensor and its connections (OPL, OPS).
High water temp. alarm after crank disconnect	Check the temperature sensor and its connections (WTH, WTS). Check if the negative and ground wires of the battery are in good contact.
Shutdown Alarm in running	Check related switch and its connections according to the information on LCD; Check programmable inputs.
Crank not disconnect	Check fuel oil circuit and its connections; Check starting batteries; Check speed sensor and its connections; Refer to engine manual.
Starter no response	Check starter connections(CRANK); Check starting batteries.

For detailed controller parameters and function settings, please refer to the controller manual in the fire pump control box. If you have any questions, please consult the relevant personnel of the company.



10 OVERALL AND INSTALLATION DIMENSIONS

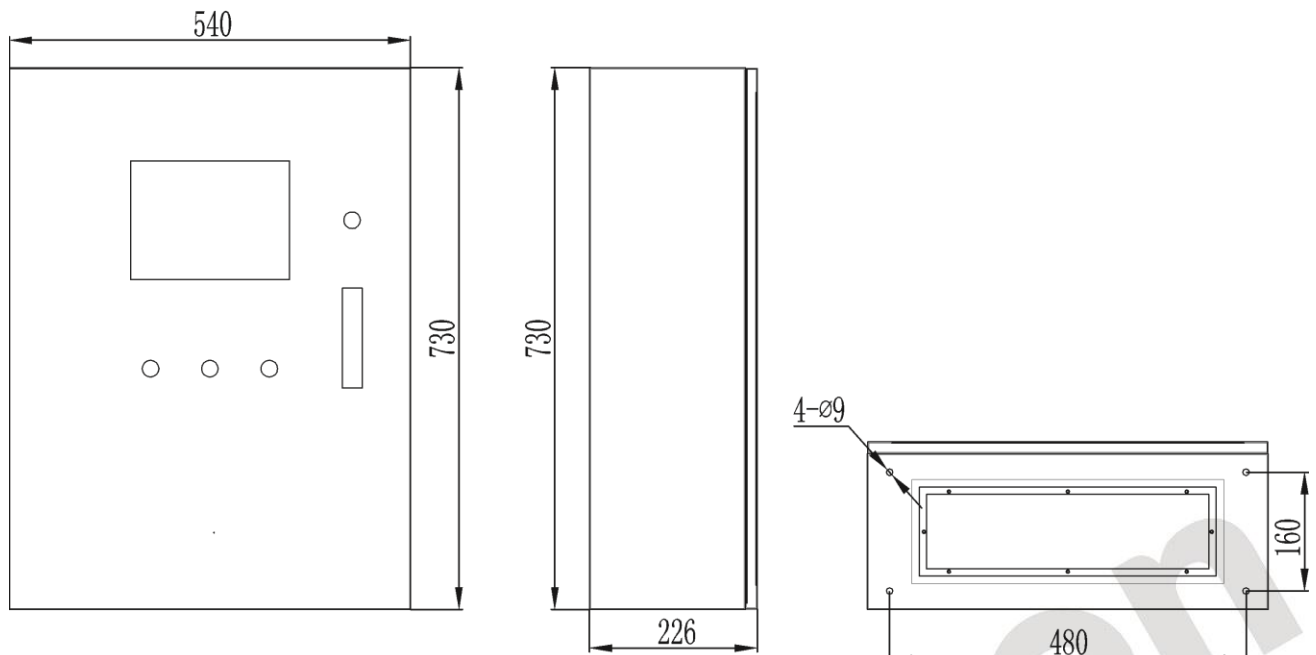


Fig.3 – Overall and Installation Dimensions