HMC4100

MARINE ENGINE CONTROLLER

USER MANUAL

SMARTGEN (ZHENGZHOU) TECHNOLOGY CO.,LTD.

and, therefore, higher reliability and stability;

- Modular design, self extinguishing50% ABS+50%PC plastic enclosure and embedded installation way; small size and compact structure with easy mounting.

3 TECHNICAL PARAMETERS

Table 2 – Technical Parameters

Parameter	Details
Working Voltage	DC8.0V to DC35.0V, uninterrupted power supply.
Power Consumption	<3W (Standby mode: ≤2W)
Speed Sensor Voltage	1.0V to 24V (RMS)
Speed Sensor Frequency	Max 10,000 Hz
Start Relay Output	5A DC28V
Programmable Relay Output 1	5A DC28V
Programmable Relay Output 2~6	1A DC28V
Analog Sensor	3 Fixed resistor type sensors(temperature, oil temperature, and flexible sensor 1) 3 sensors can be configured as resistor/current/voltage type (oil pressure, flexible sensor 2, and flexible sensor 3).
Case Dimension	135 mm x 110 mm x 44 mm
Panel Cutout	116mm x 90mm
Working Conditions	Temperature: (-25~+70)ºC; Ralative Humidity: (20~93)%RH
Storage Conditions	Temperature: (-25~+70)ºC
Protection Level	IP65: when water-proof gasket ring inserted between panel and enclosure
Weight	0.35kg

4 INFORMATION INTERFACE

Display Screen	Display Content	Description
After pressing Enter for 1s, the controller will enter into parameter setting and information selection interface.	Return Parameter Setting Controller Information Event Log USB Enabled	After selected controller information, press Enter to enter into controller information interface.
First Panel	Controller Information Software Version: 1.1 Release Date: 2018-09-20 2018.10.15(5)09:30:10	This panel will display software version, hardware version and controller time. Press or to scroll screen.
Second Panel	O:C 1 2 3 4 5 6 Standby	This panel will display output port status, and genset status. Press or to scroll screen.
Third Panel	I: 1 2 3 4 5 6 Standby	This panel will display input port status, and engine status. Press or to scroll screen.

5 OPERATOR INTERFACE

5.1 PUSHBUTTONS DESCRIPTION

Table 4 – Keys Function Description

Icon	Button	Description
	Stop	Stop running generator in local mode; During stopping process, press this button again to stop generator immediately.
	Start	Start standby genset in local mode.
	Alarm Mute	Alarm sound off.
	Self-Check	In standby mode, pressing this button can test alarm without rotate speed.
	Alarm Reset	If alarm occurs, pressing this button will reset it.
	Up	1. Screen scroll. 2. Up cursor and increase value in setting menu.
	Down	1. Screen scroll. 2. Down cursor and decrease value in setting menu.
	Set	1. Pressing and holding for more than 1 second entry the parameter configuration menu; 2. In settings menu confirms the set value

5.2 CONTROLLER PANEL

Fig.1 - HMC4100 Front Panel Drawing

5.3 START/STOP OPERATION OF REMOTE CONTROL

5.3.1 ILLUSTRATION

Deploy any aux. input port of HMC4100 to remote start input. After the “remote mode” is active, remote start/stop operation can be achieved via remote monitoring module..

5.3.2 REMOTE START SEQUENCE

— When “Remote Start” is active, “Start Delay” timer is initiated(if remote start command is active, unit enters “Preheat” directly);
— “Start Delay” countdown will be displayed on status page of LCD;
— 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. Genset is cranked for a pre-set time. If genset 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 waits for the next crank attempt;
— Should this start sequence continue beyond the set number of attempts, the controller will initiate “Fail to Start” alarm, and alarm information will be displayed on the alarm page of LCD;
— In case of successful crank attempt, the “Safety On” timer is activated. As soon as this delay is over, “start idle” is started (if configured);
— After the start idle delay expired, controller will enter into “Warming Up” (if configured);
— When “Warming Up” delay is over, the generator will enter into “Normal Running” status.

5.3.3 REMOTE STOP SEQUENCE

— When the “Remote Stop”, the “Stop Delay” is initiated (if remote stop command is active, unit enters “Cooling” directly).
— Once this “stop delay” has expired, “Cooling” starts;

10 BACK PANEL

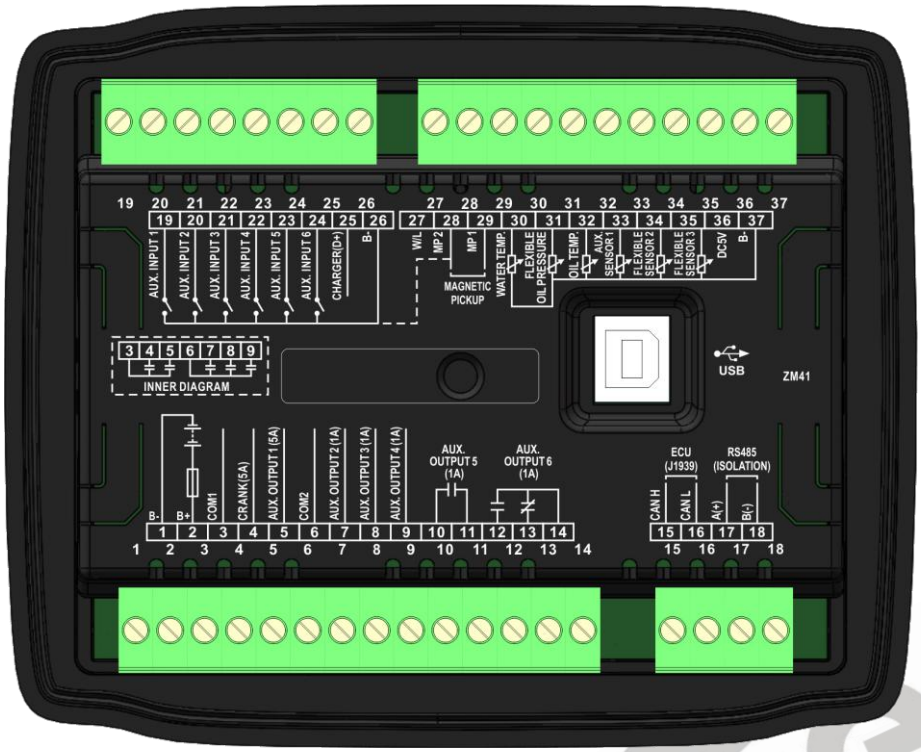

Fig.3 – HMC4100 Controller Panel

Table 18 - Description of Terminal Connection

No.	Function	Cable Size	Description	
1.	B-	1.5mm^2	Connected with negative of starter battery.	
2.	B+	1.5mm^2	Connected with positive of starter battery.	
3.	COM1	1.5mm^2	Connect to COM1 relay output, rated 5A DC28V	
4.	CRANK	1.5mm^2		
5.	Aux. Output 1(5A)	1.5mm^2		
6.	COM 2	1.0mm^2	Connect to COM2 relay output, rated 1A DC28V	Items see table 12
7.	Aux. Output 2(1A)	1.0mm^2		
8.	Aux. Output 3(1A)	1.0mm^2		
9.	Aux. Output 4(1A)	1.0mm^2		
10.	Aux. Output 5(1A)	1.0mm^2	Relay normally open volt free contact, rated 1A DC28V	
11.		1.0mm^2		
12.	Aux. Output 6(1A)	1.0mm^2	Normally open output, rated 1A	
13.		1.0mm^2	Normally close output, rated 1 A	
14.		1.0mm^2	Relay common point	
15.	ECU CAN H	0.5mm^2	120Ω impedance shielding wire is recommended with one end grounded.	
16.	ECU CAN L	0.5mm^2		
17.	RS485 A(+)	0.5mm^2	Parameters can be configured vai PC software.	
18.	RS485 B(-)	0.5mm^2		
19.	Aux. Input 1	0.5mm^2	Ground is active (B-)	Items see table 10
20.	Aux. Input 2	0.5 mm^2	Ground is active (B-)	
21.	Aux. Input 3	0.5 mm^2	Ground is active (B-)	

12 HMC4100 APPLICATION DIAGRAM

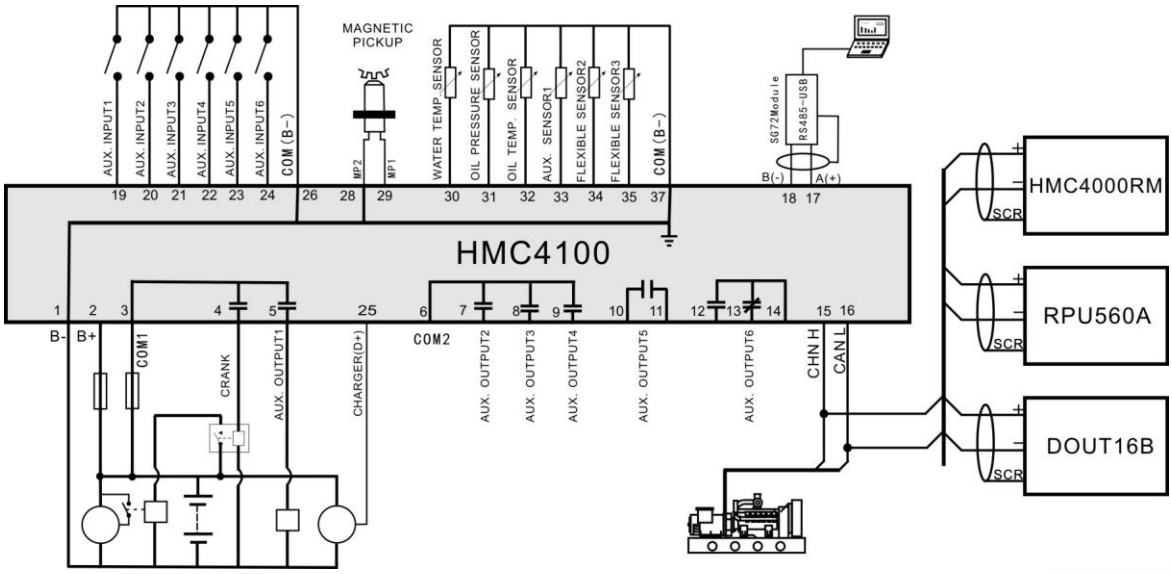

Fig.4 – HMC4100 Application Diagram

13 COMMISSIONING

Doing the following check before the system starting to run formally is recommended:

— Ensure all the connections are correct and wires diameter is suitable;

— Ensure that the controller DC power has fuse, controller's positive and negative connected to start battery are correct;

— Take proper action to prevent engine to crank success (e. g. Remove the connection wire of fuel valve). If checking is OK, make the start battery power on;

— Make the local mode active and then the controller enter into local mode. Press the Start button and the engine will start. If engine failed to fire, the genset will enter into ETS status automatically;

— Recover the action to prevent engine to crank success e. g. Connect wire of fuel valve), press start button again, and the engine will start. The engine will run from safety on delay to normal running if all works regularly. During this time, please watch the running status. If abnormal, stop engine and check all wires connection according to this manual.

— If there is any other question, please contact Smartgen's service.

14 INSTALLATION

14.1 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.

14.2 OVERALL DIMENSIONS AND CUTOUT DIMENSIONS

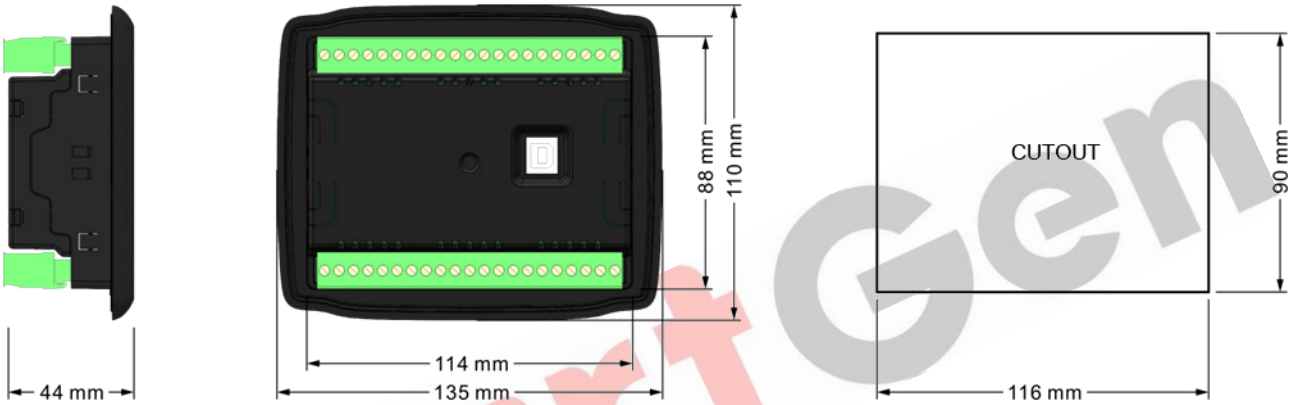

Fig.5 – Overall & Cutout Dimension

15 INSTALLATION ATTENTIONS

15.1 BATTERY VOLTAGE INPUT

HMC4100 controller can suit for widely range of battery voltage DC (8~35) V. Negative of battery must be connected with the engine shell. The diameter of wire which is 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 positive and negative input ports in order to prevent charge disturbing the controller's normal working.

15.2 SPEED SENSOR INPUT

Speed sensor is magnetic equipment which is installed on engine body for testing flywheel teeth number. 2 core shielding wire is used for the connection of the sensor and controller. The wire is supposed to be connected to 26 terminal of controller with one end and the other end hanging in the air. The other two signal lines connect separately to 28, 29 terminal. Speed sensor output voltage is supposed to be at AC (1-24) V (virtual value) when it is in full speed range, and AC12V (when in rated rotate speed) is recommened. When install the speed sensor, screw it to contact the flywheel firstly, inverse it with 1/3 circle, and then tighten the nut finally.

15.3 OUTPUT AND EXPANSION RELAY

All outputs of controller are relay contact output type. If expansion relays are needed, please add freewheel diode to both ends of expansion relay's coils (when coils of relay has DC current) or add resistance-capacitance return circuit (when coils of relay has AC current), in order to prevent charge disturbing the controller or others equipment.

15.4 WITHSTAND VOLTAGE TEST

When controller has been installed in control panel, if need the high voltage test, please disconnect controller's all terminals in order to prevent high voltage into controller and damage it.

16 TROBLESHOOTING

Table 38 – Trouble Shooting

Problem	Possible Solution
Controller no response with power.	Check starting batteries; Check controller connection wirings; Check DC fuse.
Genset shutdown	Check the water/cylinder temperature is too high or not.
Emergency shutdown	Check emergency shutdown button function;
Low oil pressure alarm after engine has fired.	Check oil pressure sensor and wiring.
High water temperature alarm after engine has fired.	Check water temperature sensor and its wiring.
Shutdown alarm when engine is running	Check relevant switch and its wiring according to the information on LCD. Check auxiliary digital input port.
Fail to start	Check fuel return circuit and its wiring. Check starting battery. Check speed sensor and its wiring. Consult engine manual.
Starter no respond	Check starter wiring; Check start battery
RS485 communication failure	Check wiring; Check if COM port setting is right; Check if RS485 A and B wires are connected in the opposite way; Check if PC communication port is damaged. Putting a 120Ω resistance between RS485 A and B is recommended.
CANBUS communication failure	Check wiring; Check if CANBUS CANH and CANL wires are connected in the opposite way; Check if CANBUS CANH and CANL wires at both ends are connected in the opposite way; Putting a 120Ω resistance between CANBUS CANH and CANL is recommended.