SmartGen

MAKING CONTROL SMARTER

HMC4300RM

REMOTE MONITORING CONTROLLER

USER MANUAL

郑州众智科技股份有限公司

SMARTGEN(ZHENGZHOU)TECHNOLOGY CO.,LTD.

SmartGen Registered trademark
No. 28 Xuemei Street, Zhengzhou, Henan, China
Tel: +86-371-67988888/67981888/67992951
+86-371-67981000(overseas)
Fax: +86-371-67992952
Web: www.smartgen.com.cn/
www.smartgen.cn/
Email: sales@smartgen.cn

Table 1 Version History

Date	Version	Content
2024-04-11	1.0	Original release.

CONTENT

1 OVERVIEW

HMC4300RM Remote Monitoring Controller integrates digitization, intelligentization and network technology, which is used for engine automation and remote monitoring system of single unit to achieve remote start/stop and other functions. It fits with LCD display, optional languages interface (Chinese and English), and it is reliable and easy to use.

2 PERFORMANCE AND CHARACTERISTICS

- 4.3-inch colour LCD, with 480x272 resolution, adjustable backlight brightness, optional Chinese/English, easy for debugging and commissioning;
- CAN BUS interface is able to connect with master control module to start/stop engine in remote control mode;
- Silicone panel and push buttons can be used in extreme temperature environment
- Hard-screen acrylic material been used to protect screen with great wear-resisting and scratch-resisting functions
- Sealing is designed for enclosure and IP65 of whole protection class;
- Modular design, anti-flaming plastic shell, pluggable waterproof terminals, embeded mounting with compact structure and easy installation.

3 SPECIFICATION

Table 2 Performance Parameters

Item	Contents
Working Voltage	DC8V to DC35V, DC reverse connection protection Resolution: 0.1V Accuracy: 1%
Overall Consumption	<4W (Standby mode: ≤2W)
CAN Interface	Isolated, maximum communication distance 250m, using Belden 9841cale or equivalent.
CE-EMC	EN 55032, EN 55024
Vibration	5Hz~8Hz: displacement±7.5 mm 8Hz~500Hz: a±2g IEC 60068-2-6
Shock	50g, 11ms, half-sine, complete shock test from three mutually perpendicular directions, totally 18 times IEC 60068-2-27
Bump	25g, 16ms, half-sine IEC 60255-21-2
Production Compliance	According to EN 61010-1 installation category (over voltage category) III, 300V, pollution class 2, altitude 3000m
Case Dimension	127 mm x 115 mm x 86mm
Panel Cutout	115mm x 103mm
Working Temperature	(-25~+70)°C
Working Humidity	(20~93)%RH
Storage Temperature	(-30~+80)°C
Protection Level	IP65
Weight	0.45kg

4 OPERATION

4.1 PANEL DESCRIPTION

Fig.1 HMC4300RM Front Panel Indication

4.2 KEY FUNCTION DESCRIPTION

Table 3 Key Function Description

Keys	Function	Description
	Stop	1. Press it to stop the running engine in remote mode. This key only be available in main screen. 2. Hold and press it for 5s, lamp test will be initiated. At this time, LCD shows white background. If the output port is configured as " Lamp Test Output", the corresponding output will be activated.
	Reset	1. Press it in main screen, the alarm reset will be enabled if there is an alarm. 2. Press it in parameter setting page to return to the previous menu.
	Knob	1. Turn the knob to switch the contents of each screen on main screen, including the sensor, parameters, input /output port status, etc. The progress bar above is highlighted during screen switching. 2. Press it to pop up brightness adjustment screen in the first page, turn the knob to adjust the brightness of screen and key backlight, and the screen will disappear automatically after no operation for 3s. 3. Hold and press for 1s to enter the parameter setting page in the first screen of main screen. 4. In other screens of main page, the vertical progress bar on the right side of the screen is highlighted after pressing this key. Turn the knob to page up/down to view more contents on the screen; Exit the function when pressing the knob again.

Keys	Function	Description
		5. Press it to move cursor and confirm the settings in the parameter setting page. 6. Turn the knob to set the number of the cursor or select a configuration in the list. Note: The No.2 &No.3 functions only be activated in the first screen of main page.
	Mute	Press it to stop the audible alarm and mute the sound of the controller
	Start	Press it to start the engine in the remote mode. Note: this key is only available in the main screen.

4.3 REMOTE START/STOP OPERATION

4.3.1 ILLUSTRATION

Firstly, make HMC4300 controller enter the “Mode Selection” in “Parameter Setting”, then set controller in remote mode. When remote control mode is active, LCD screen displays  , and then start/stop operation will be activated via HMC4300RM.

4.3.2 REMOTE START SEQUENCE

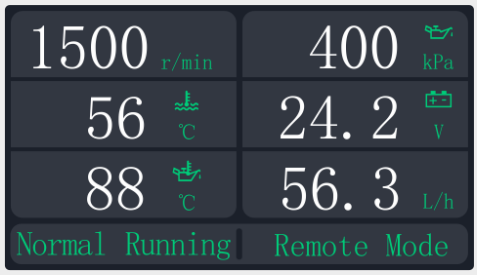
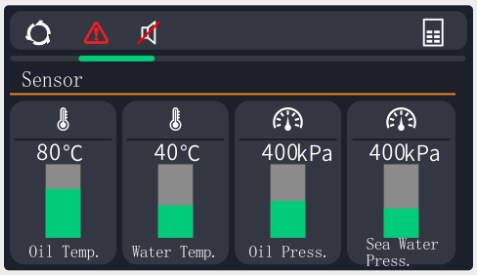
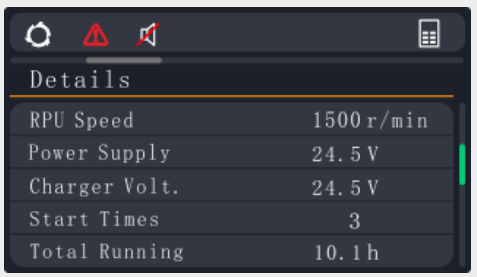
1) When it starts via remote monitoring module, it will enter “Preheat” period;
2) When start delay is over, preheat relay energizes (if configured), “Preheat Delay XX s” will be displayed on LCD;
3) After the preheating, the fuel relay is energized (if configured), and then the start relay (if configured) is energized;
4) If the engine 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;
5) Within the cranking attemts, if the engine fails to start, an alarm of start failure will be issued by controller and displayed on LCD;
6) During any cranking, if engine starts successfully, it enters “Safety on Delay”;
7) After safety on delay, it enters into “Start Idle” directly (if configured);
8) After the start idle, it will enter “High-speed Warming Up” (if configured);
9) When the delay is over, engine will run normally.

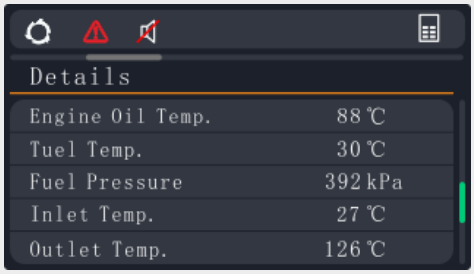
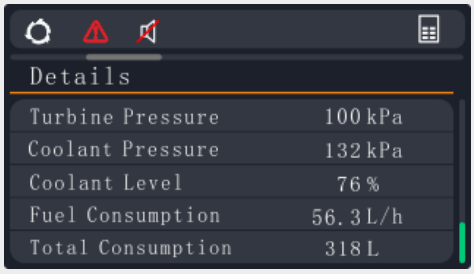
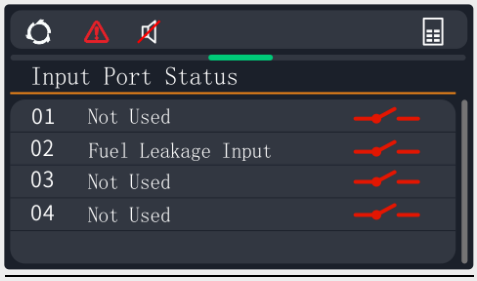
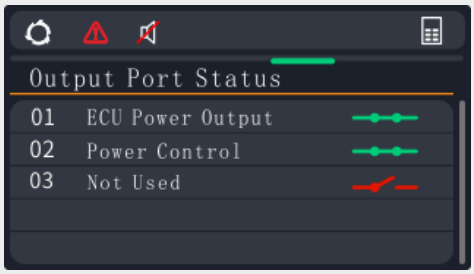
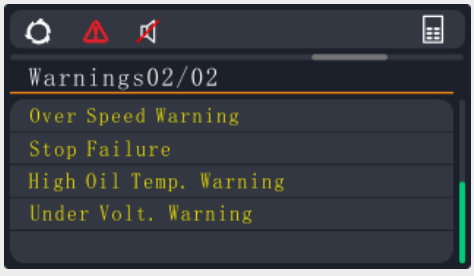
4.3.3 REMOTE STOP SEQUENCE

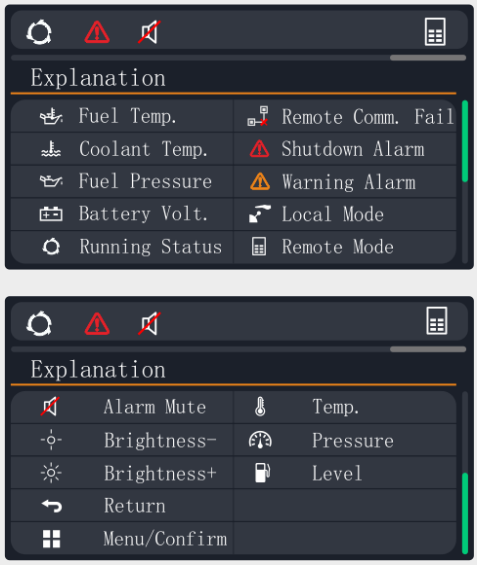
1) When using remote monitoring module to shut down, it will enter into “High-speed Cooling” period directly;
2) When “High-speed Cooling” delay is over, “Stop Idle” is initiated (if configured), idle relay is energized;
3) Once this “Stop Idle” has expired, the “ETS Solenoid Hold” begins. ETS relay is energized while ignition relay and fuel relay are de-energized;
4) Once this “ETS Solenoid Hold” has expired, “Fail to Stop Delay” begins. Complete stop is detected automatically;
5) Engine is placed into its standby mode after its complete stop. Otherwise, fail to stop alarm is initiated (If engine stops successfully after “fail to stop” alarm is initiated, it will enter standby mode).

4.4 CONTROLLER INFORMATION DISPLAY

Table 4 Main Screen Display

Screen	Display	Description
1st Screen	  	1. It displays engine speed, oil/water temperature, oil pressure, average fuel consumption and power voltage. 2. Two types of display screen: regular font and large font, which can be set in “Parameter Setting” ->” Display Configuration”. 3. Hold and press the knob for 1s to enter into parameter setting screen. 4. Short press the knob to pop up a brightness setting screen, turn on the knob to set the screen brightness and key backlight. * The top of status bar displays the current engine running status icon and current mode icon of controller. * The information bar below displays the running status and alarm information.
2nd Screen		It displays data of 4 Flex.senors according to the sensor types, sensor data and self-defined name. * The top of status bar displays the current engine running status icon and current mode icon of controller.
3rd Screen	 	1.It dynamically displays the following running data of engine. The paramtermeters that have not been collected will not be displayed; 2. The displayed contents include: engine speed, ECU water temperature, ECU oil pressure, RPU speed, RPU oil pressure, power supply voltage, charger voltage, crank attempts, total running time, fuel temperature, fuel pressure, inlet temperature, fuel pressure, inlet temperature, outlet temperature, turbine pressure, coolant pressure, coolant level, fuel consumption, total fuel consumption. * The top of status bar displays the current engine

Screen	Display	Description
	 	running status icon and current mode icon of controller. * Press the knob in this screen, i.e. turning the knob to up/down scroll the screen; Press the knob again to exit the screen scroll.
4th Screen		1.It displays controller intput status. Input name can automatically update according to the definition. * The top of status bar displays the current engine running status icon and current mode icon of controller.
5th Screen		1.It displays controller output status. Output name can automatically update according to the definition. * The top of status bar displays the current engine running status icon and current mode icon of controller.
6th Screen	 	It displays controller real-time alarm information. When the alarms display is full, page up/down to scroll the screen. * The top of status bar displays the current engine running status icon and current mode icon of controller. * Press the knob in this screen, i.e. turning the knob to up/down scroll the screen; Press the knob again to exit the screen scroll.

Screen	Display	Description
7th Screen	 	1.It displays the explanations of all icons of controller. * The top of status bar displays the current engine running status icon and current mode icon of controller. * Press the knob in this screen, i.e. turning the knob to up/down scroll the screen; Press the knob again to exit the screen scroll.

5 WIRING CONNECTION

HMC4300RM back panel is showed as below:

Fig.1 HMC4300RM Back Panel

Table 5 Terminal Connection Description

No.	Function	Cable	Remark
1	Flex. Sensor 1	/	Not used temporarily.
2	Flex. Sensor 2	/	Not used temporarily.
3	MP1	/	Not used temporarily.
4	MP2	/	Not used temporarily.
5	Charger D+	/	Not used temporarily.
6	NC	/	Not used temporarily.
7	ECU CAN H	0.5mm^2	Impedance-120Ω shielding wire is recommended, its single-end earthed. If CAN TR output is enabled, CANBUS will be automatically connected with a 120Ω resistor. Otherwise, a 120Ω resistor will be connected manually.
8	ECU CAN L	0.5mm^2	
9	Flex. Sensor 3	/	Not used temporarily.
10	VOUT (+5V)	/	Not used temporarily.
11	Aux. Input 4	/	Not used temporarily.
12	Flex. Sensor 4	/	Not used temporarily.
13	GND	/	Not used temporarily.
14	NC	/	Not used temporarily.
15	NC	/	Not used temporarily.
16	Aux. Input 1	/	Not used temporarily.
17	Aux. Input 2	/	Not used temporarily.
18	Aux. Input 3	/	Not used temporarily.
19	Aux. Output 1	/	Not used temporarily.
20	Aux. Output 2	/	Not used temporarily.

No.	Function	Cable	Remark
21	Aux. Output 3	/	Not used temporarily.
22	B+	1.5mm^2	Connected with positive of power supply. If wire length is over 30m, better to double wires in parallel. Max. 20A fuse is recommended.
23	GND	1.5mm^2	Connected with negative of power supply.

NOTE 1: USB interfaces in back panel can supply power for controller in short-time.

NOTE 2: The sensors, input ports and output ports on back panel are not used

NOTE 3: CAN interfaces on back panel can communicate with master controller.

NOTE 4: RS485 interfaces on back panel are not used temporarily.

Cable size requirements: CAN Communication Wire: 0.5mm^2

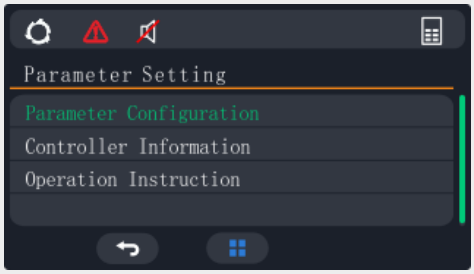
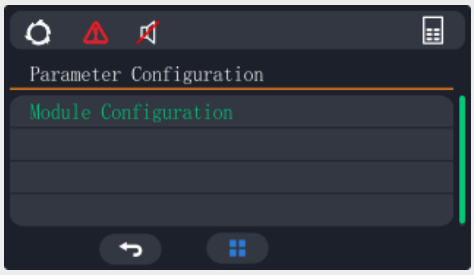
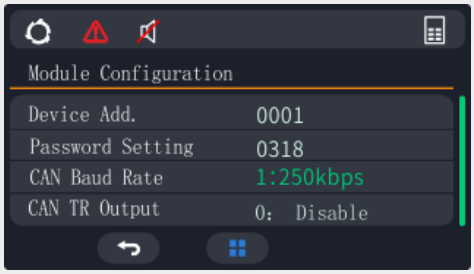
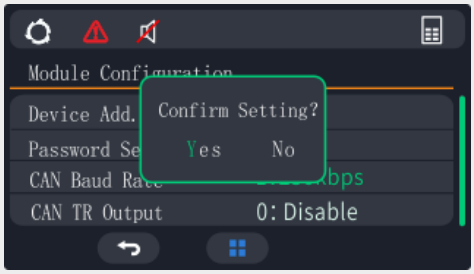
6 PARAMETER SETTING

6.1 MENUS

After the controller is turned on, press the knob to enter the parameter setting menu in the first screen, the menu includes: parameter configuration, mode selection, controller information, event log, self-check control and display information.

NOTE: Please modify the controller parametes in standby mode, otherwise, abnormal occurrences will take place.

Table 6 Parameter Setting Screen

Screen	Display	Description
Parameter Setting		1. It displays parameter setting menu, the details see chapter6.2~6.7. * The top of status bar displays the current engine running status icon and current mode icon of controller. * The icons below indicate that press the reset key to return and press the knob to confirm.
Secondary Screen of Parameter Setting		1. It displays the secondary menu of parameter configuration; different modules of the controller can be configured. * The top of status bar displays the current engine running status icon and current mode icon of controller. * The icons below indicate that press the reset key to return and press the knob to confirm.
Setting and Conformation	 	1. It displays a configuration page of parameter, the green number indicates the current cursor, press the knob to move cursor backward; turn the knob to change the value of current cursor; after the modification, the controller will prompt you to confirm the change. * The top of status bar displays the current engine running status icon and current mode icon of controller. * The icons below indicate that press the reset key to return and press the knob to confirm.

6.2 CONTENTS AND RANGES OF PARAMETER CONFIGURATION

Table 7 Contents and Ranges of Parameter Configuration

Item	Range	Defaults	Remark
Parameter Configuration			
1 Device Address	0~9999	0001	
2 Password Setting	0~9999	0318	
3 CAN Comm Baud Rate	(0-2) 0: 500kbps 1: 250kbps 2: 125kbps	1: 250kbps	
4 CAN TR Output	(0-1)	0: Disable	0: Disable; 1: Enable (After it is enabled, CANBUS will automatically connect with a 120Ω matching resistance).

a) CONTROLLER INFORMATION

This screen displays the development information of local controller and remote monitoring controller, such as software version, hardware version and release date. If the local controller is not connected, the information line of HMC4300 displays "####", if yes, the corresponding software version, hardware version and release date of local controller will be displayed.

4 COMMISSIONING

The following checks are recommended before running the system:

——Check all the wirings are correct and the wire diameter is appropriate;

——The connection between controller and the positive/negative of power supply is correct, and the switch of power supply is closed;

——Check the wirings of remote monitoing module, press the start key of the module in remote mode, the engine will start;

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

5 TYPICAL APPLICATION

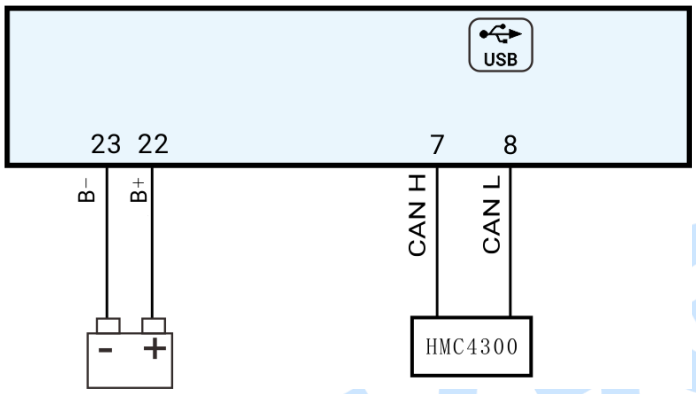


Fig.3 HMC4300RM Typical Application Diagram

6 INSTALLATION

a) FIXING CLIPS

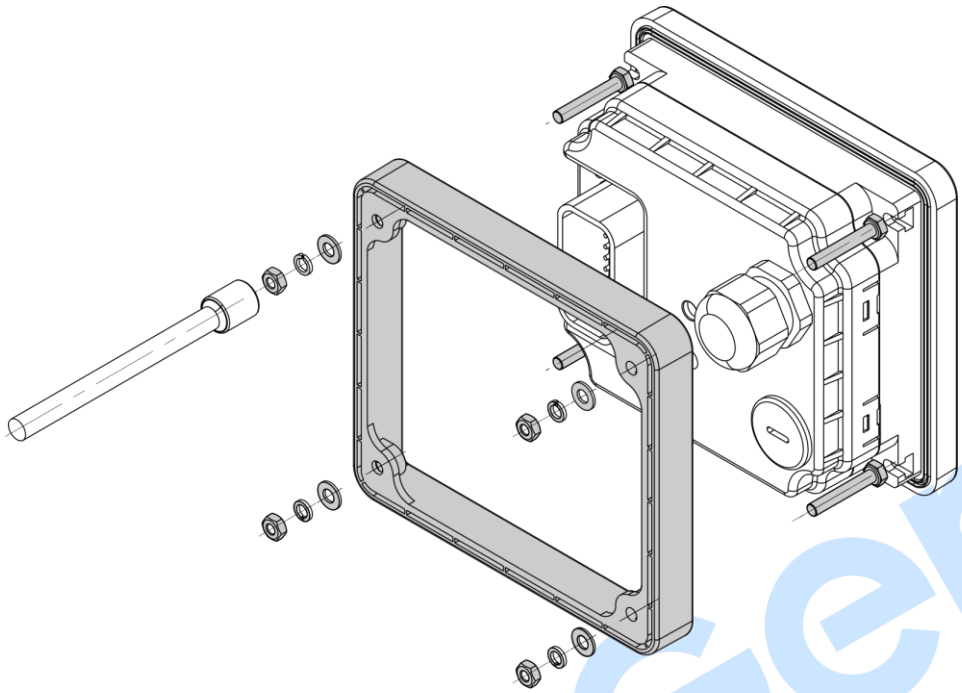


Fig.4 HMC4300RM Exploded View

——The controller is designed for panel mounting and is fixed by a press frame during installation;
——Remove the press frame from the controller;
——Take out the 4 M4 bolts and place them in the corresponding slots on the front shell;
——Put the controller in the opening position of the control cabinet and place the press frame in line with the 4 bolts from behind the controller;
——Tighten the flat washers, spring washers and hexagon nuts for installation.

b) CASE DIMENSIONS AND PANEL CUTOUT

Unit:mm

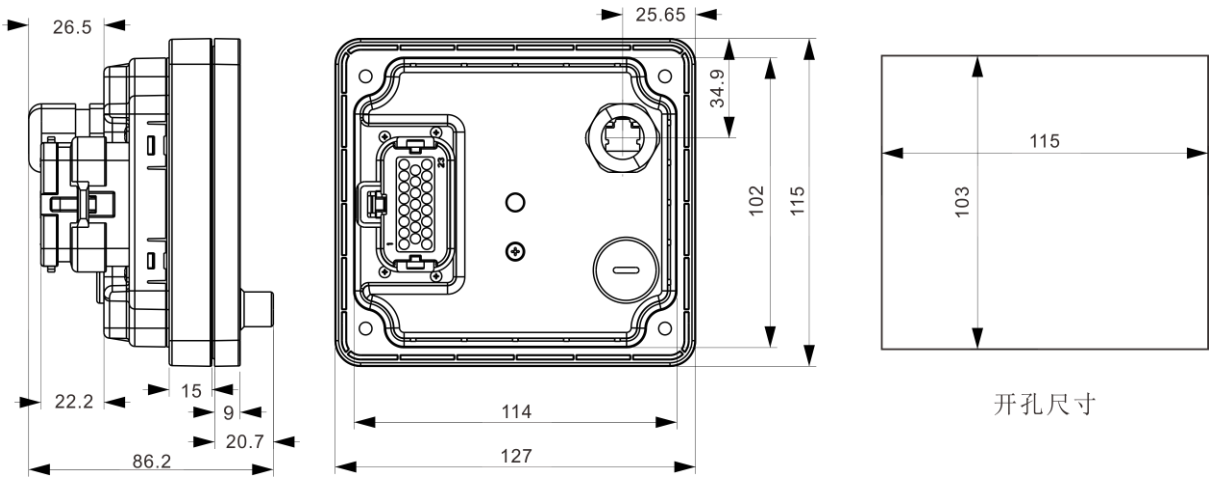


Fig.6 Case Dimensions and Panel Cutout

7 TROUBLESHOOTING

Table 8 Troubleshooting

Problem	Possible Solution
Controller no response with power	Check starting batteries; Check controller wirings; Check DC fuse.
CAN Communication failure	Check if CAN wires are plugged tightly and not damaged; Check if CAN communication baud rate is set correctly; Check if a 120Ω matching resistor needed to be connected, set controller via "RS485 TR Output" to connect the resistor automatically;