



SmartGen
ideas for power

MGCP100B DIESEL ENGINE CONTROL BOX USER MANUAL



SMARTGEN (ZHENGZHOU) TECHNOLOGY CO., LTD.



Chinese trademark

SmartGen English trademark

SmartGen — make your generator *smart*

SmartGen Technology Co., Ltd.

No.28 Jinsuo Road, Zhengzhou, Henan Province, P. R. China

Tel: +86-371-67988888/67981888/67992951

+86-371-67981000(overseas)

Fax: +86-371-67992952

Email: sales@smartgen.cn

Web: www.smartgen.com.cn

www.smartgen.cn

All rights reserved. No part of this publication may be reproduced in any material form (including photocopying or storing in any medium by electronic means or other) without the written permission of the copyright holder.

Applications for the copyright holder's written permission to reproduce any part of this publication should be addressed to SmartGen Technology at the address above.

Any reference to trademarked product names used within this publication is owned by their respective companies.

SmartGen Technology reserves the right to change the contents of this document without prior notice.

Table 1 - Software Version

Date	Version	Note
2020-05-18	1.0	Original release.
2020-09-17	1.1	1. Modified product model: Diesel Engine Control Box MECB60 was changed to Diesel Engine Control Box MGCP100B. 2. Modified the temperature unit “°” to “°C” of parameter performance in Table 2. 3. Modified the remote control operation steps “3、4” to “1、2”. 4. Modified the fig.6 “control box back panel” to transparent picture. 5. Modified the “connector terminal 770520-3” in the packing list to “connector terminal core 770520-1”.



CONTENTS

1. OVERVIEW	4
2. PERFORMANCE PARAMETERS.....	4
3. FUNCTIONS AND OPERATIONS	4
3.1 DISPLAY FUNCTION.....	4
3.2 CONTROL FUNCTION	6
3.3 START AND STOP OPERATION IN REMOTE CONTROL MODE	8
3.4 START AND STOP OPERATION IN LOCAL CONTROL MODE	8
4. OPERATION AND USE.....	9
5. CONTROL BOX WIRING DIAGRAM.....	11
6. CASE DIMENSION	14
7. NOTES	14
8. MAINTENANCE	14
9. TROUBLESHOOTING	14
10. PACKING LIST	15

SmartGen

1. OVERVIEW

MGCP100B Diesel Engine Control Box (hereinafter “control box”) is mainly composed of HMC6000A 2 diesel engine controller, with security interface. The control box integrates digitization, intelligentization and network technology, which can be used in the automatic control system of a single diesel engine. It can realize the functions of local start, stop, remote start, shutdown, data measurement, display, alarm protection and other functions of the diesel engine, and the operation is safe and reliable. The control box is equipped with a remote monitoring interface to realize the remote start-up and shutdown functions of the engine by receiving the remote start-up and automatic start-up instructions.

2. PERFORMANCE PARAMETERS

Table 2- Performance Parameters

Items	Contents
Working Voltage	DC18.0V~35.0V, uninterrupted power supply.
Power Consumption	<8W
Speed Sensor Voltage	1.0V to 24V(RMS)
Speed Sensor Frequency	Max. 10000Hz
Temperature Measure Range	0~150°C
Pressure Measure Range	0~1MPa
Fuel Output	16A Connected to common output
Start Output	16A Connected to common output
Case Dimension	353mm×240mm×200mm(shock absorber height is exclusive)
Installation Dimensions	160mm×65mm, 4*φ6.5 panel cutout
Working Conditions	Temperature: (-25~+70)°C Humidity: (20~93)%
Storage Conditions	Temperature: (-30~+80)°C
Protection Level	IP65
Weight	4.5kg

3. FUNCTIONS AND OPERATIONS

3.1 DISPLAY FUNCTION

The HMC6000A 2 controller (hereinafter “controller”) in control box can display data and operation status. It mainly includes main interface display and measured data display on controller LCD.

The main interface display includes a tachometer display range of 0 ~ 3000r/ min, a thermometer display range of 0~150°C, an oil pressure gauge display range of 0 ~ 1000 kpa, and power supply voltage display. The main interface display is shown in Figure 1.



Figure 1: Main Interface Display

- The measurement data display page includes start times, oil temperature, charger, power supply A, power supply B, and cumulative operation, as shown in Figure 2.
- The alarm page displays various warning alarms and shutdown alarms detected by the controller, as shown in Figure 3.

Interface	Display	Description
		relay output; A: Public alarm relay output.
The third screen		This screen can display the input port status and engine status of the controller. Press or can flip the screen.

3.2 CONTROL FUNCTION

The control box can control the engine start, shutdown, alarm protection and other functions in the local and remote control modes.

The control box is equipped with a remote monitoring interface, which can control the engine start, stop, noise reduction and other operations remotely. Various parameters and records of the engine can be displayed on the remote monitoring controller in real time.

The remote monitoring controller can control the engine only in the remote control mode, and other control keys do not work except for emergency stop in the local mode.

The control box panel layout is shown in Figure 5.



Figure 5: Control Box Panel

The functions of keys / knobs configured in the control box are shown in Table 4:

Table 4 - Function Description of Control Box Key

Key/Knob	Function	Description
Local / Remote Control	Mode conversion of local remote control	After turning this knob, the system switches to "local mode / remote control mode". Turning to "remote control", the diesel engine is in the remote control state, the "start" and "stop" functions of the remote instrument are effective, while the "start" and "stop" functions of the local instruments are not effective; if the diesel engine is turned to "remote control", the "start" and "stop" functions of the remote instruments are not effective, while the "start" and "stop" functions of the local instruments are effective.
Override Mode	Override mode	In override mode, only over speed and manual emergency shutdown can stop the engine.
Emergency Stop	Emergency stop	When an emergency occurs, press this key, the fuel output of the controller will be disconnected, the emergency stop output will be output, and the engine will stop immediately.
Normal Mode / Emergency Mode	Normal mode / emergency mode switching	When emergency start is required, turn the side "normal mode / emergency mode" knob to "emergency mode" position.
Emergency Start	Emergency start	In the emergency mode, press the "emergency start" key can switch on the motor and start the engine.

The functions of controller keys are shown in Table 5:

Table 5 - Key Function Description

Keys	Function	Description
	Stop	In the standby mode, the running engine can be stopped. In the process of shutdown, press this key again to stop the machine quickly.
	Start	In the standby mode, press this key to start the stationary engine.
	Mute	The sound alarm of the controller can be eliminated.
	Self-checking	Press this key to test the speed in standby mode.
	Reset	Press this key, if the controller has an alarm, it can reset the alarm.
	Lamp Test	Press this key to test the panel LED and screen.
	Home	Can quickly return to the first screen display interface.
	Event Log	Can quickly go to the alarm record page.

Keys	Function	Description
	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. Press this key for over 1 second to enter the parameter setting and controller information selection interface. 2. Confirm the setting information in the settings.

3.3 START AND STOP OPERATION IN REMOTE CONTROL MODE

3.3.1 DESCRIPTION

Turn the knob to "Remote control mode". After the remote control mode is effective, the start / stop operation can be carried out on the remote monitoring module.

3.3.2 REMOTE START SEQUENCE

- When the "remote start information" is valid, the preheating relay outputs (if configured), and the LCD status page displays the "preheat" countdown.
- After preheating, the fuel relay outputs for 1s, and then starts the relay output; if the engine fails to start successfully within the "start time", the fuel relay and start relay stop output and enter the "start interval" to wait for the next start.
- Within the set starting times, if the engine fails to start successfully, the controller will send out a start failure alarm, and the LCD Alarm page will display the start failure alarm.
- In any start, if the start is successful, the "safety delay" will be entered. After the safety delay, the "start idle" will be entered (if the start idle time delay is configured).
- When the start-up idle time delay is over, the controller enters "high-speed warm-up" (if the high-speed warm-up delay is configured).
- When the high-speed preheating delay ends, the engine runs normally.

3.3.3 REMOTE STOP SEQUENCE

- When the "stop signal" is effective, start "high-speed heat dissipation".
- After the high-speed heat dissipation is finished, the idle speed relay is powered on and output when entering the "stop idle" (if configured).
- After the stop idle is over, then enter "ETS solenoid ", the ETS solenoid relay is powered on and the fuel relay output is disconnected.
- After the ETS solenoid hold then enter "waiting for stable stop" to automatically judge whether it is stopped stably.
- If the engine stops stably, it will enter into "engine standby"; otherwise, the controller will enter the shutdown failure state and issue a shutdown failure warning (after the shutdown failure alarm, if the engine stops stably, it will enter "engine standby")

3.4 START AND STOP OPERATION IN LOCAL CONTROL MODE

3.4.1 DESCRIPTION

Turn the knob to "Local mode". After the local mode is effective, you can start / stop the machine by pressing the key on the controller.



3.4.2 LOCAL START SEQUENCE

- After pressing  , the preheating relay outputs (if configured), and the LCD status page displays "preheating" countdown;
- After the preheating delay is over, the fuel relay outputs 1s, and then starts the relay output; if the engine fails to start successfully within the "start time", the fuel relay and start relay stop output and enter "power on shutdown".
- In any start, if the start is successful, it will enter the "safety delay".
- When the safety delay is over, if the speed, water temperature and oil pressure of the controller are normal, the controller will directly enter into "normal operation".

3.4.3 LOCAL STOP SEQUENCE

- When press  , you can enter "shutdown delay". The shutdown relay is powered on and the fuel relay output is disconnected.
- After shutdown delay is over, enter "waiting for stable stop" to automatically judge whether it is stopped stably.
- If the engine stops stably, it will enter the "engine standby" mode; otherwise, the controller will enter the shutdown failure state and issue a shutdown failure warning (after the shutdown failure alarm, if the engine stops stably, it will enter "engine standby").

4. OPERATION AND USE

4.1.1 CHECK BEFORE USE

- a. Before the control box is used for the first time or after maintenance, after checking the external wiring of the control box, turn on the power switch, and the display screen of the controller is on.
- b. Before starting, make sure the engine has no shortage of oil and water and meets the starting conditions.

4.1.2 LOCAL CONTROL OPERATION STEPS

1) STRAT



- (1) Turn on "Power Supply" and the display screen of the controller will light up and display the parameters.
- (2) Press the green start key, the engine will start according to the set program, and display the parameters.

2) STOP

- (1) Remove the load.
- (2) Press the red "stop" key to stop the engine until it stops stably.
- (3) Turn off the power switch.

4.1.3 REMOTE CONTROL OPERATION STEPS

1) START

- (1) Turn on the "Power Supply" of the local control box, the display will be on, turn the "local / remote control" knob to the remote control position, and the controller will display "remote control mode".
- (2) In the remote control mode, after receiving the "remote start signal" command, the engine starts

according to the set program, the display screen shows the parameters, and automatically turns to normal operation.

2) STOP

- (1) Remove the load, the engine starts to stop until it stops stably.
- (2) Turn off “Power Supply”.

4.1.4 BACK PANEL



Figure 6: Control Box Back Panel



5. CONTROL BOX WIRING DIAGRAM

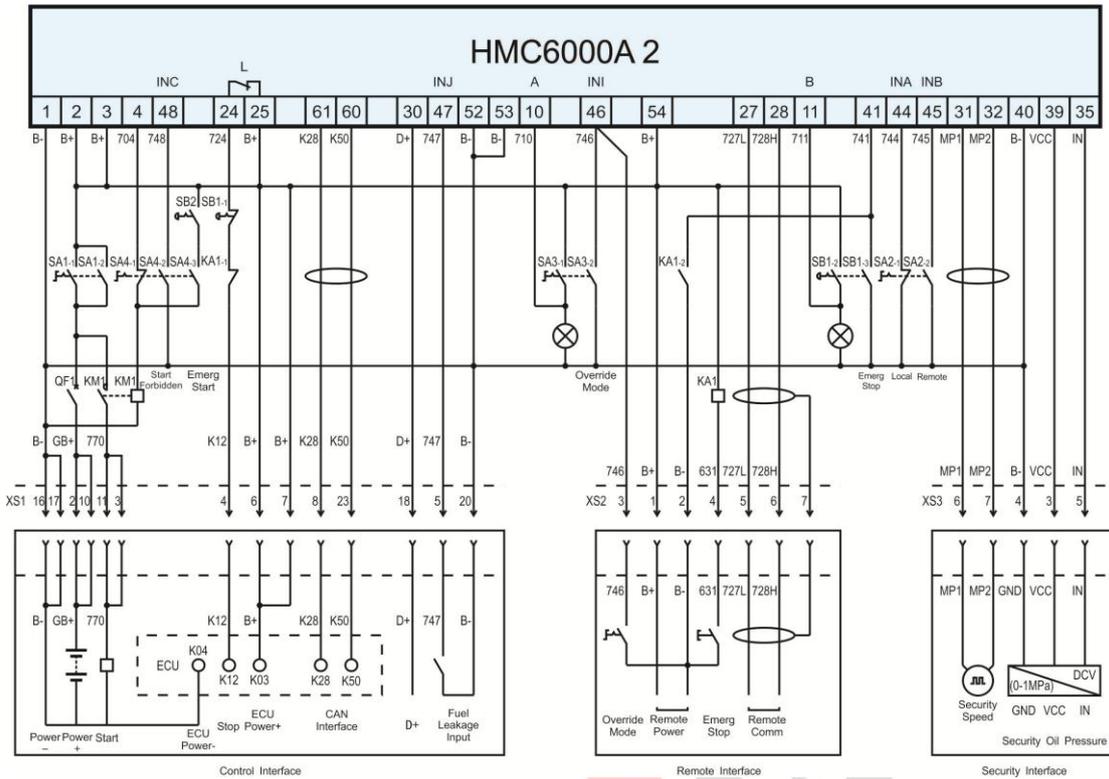


Figure 7: Control Box Wiring Diagram

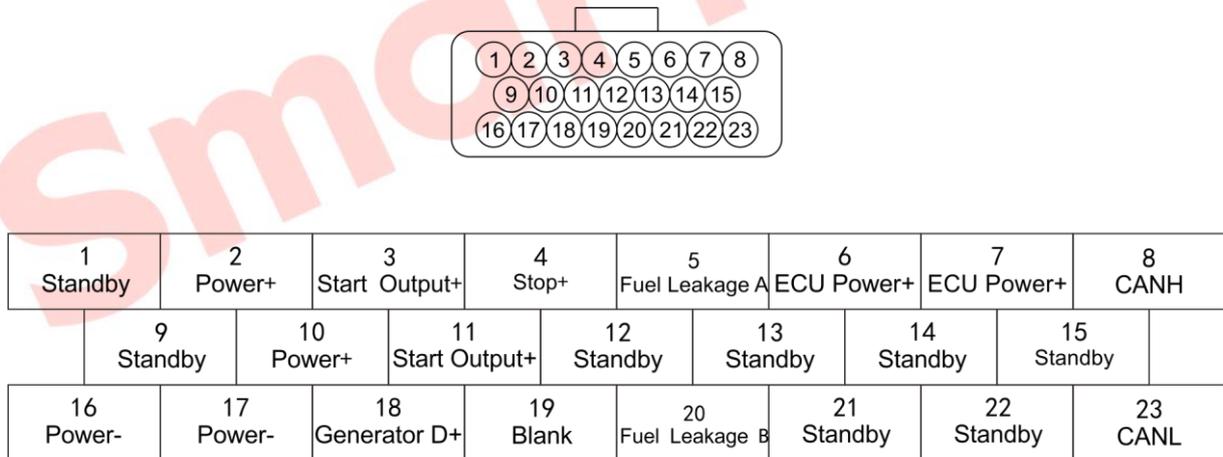


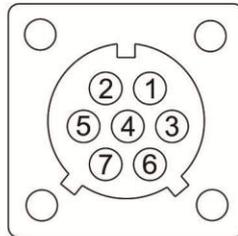
Figure 8: Security Module

Table 6 - Wiring Description of Safety Module Terminal

Pin	Definition	Cable Size	Description
1	Spare	/	
2	Spare	/	
3	Security oil pressure VCC	1.0mm ²	Power supply for security oil pressure sensor
4	Safety oil	1.0mm ²	Common terminal of security oil pressure sensor



Pin	Definition	Cable Size	Description
	pressure GND		
5	Security oil pressure OUT	1.0mm ²	Security oil pressure sensor input
6	Security speed A	1.0mm ²	Connect the speed sensor
7	Security speed B	1.0mm ²	Connect the speed sensor

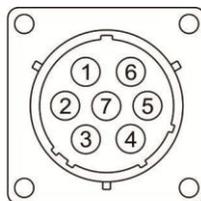


Pin	1	2	3	4	5	6	7
Definition	Power+	Power-	Override Mode	Emerg Stop	CANL	CANH	Shielding

Figure 9: Remote Monitor

Table 7 - Wiring Description of Remote Monitor Terminal

Pins	Definition	Specification	Description
1	Power supply+	2.5mm ²	Remote power supply B+
2	Power supply-	2.5mm ²	Remote power supply B-
3	Override mode	1.0mm ²	Override mode input(I)
4	Emergency stop	1.0mm ²	Emergency stop input
5	CANL	0.5mm ²	Used to access the remote monitoring module
6	CANH	0.5mm ²	
7	Shielded ground	0.5mm ²	



Pin	1	2	3	4	5	6	7
Definition	Standby	Standby	Security Oil Pressure VCC	Security Oil Pressure GND	Security Oil Pressure OUT	Security Speed A	Security Speed B

Figure 10: Control



Table 8 - Wiring Description of Control Terminal

Pins	Definition	Specification	Description
1	Spare	/	
2	Power supply+	2.5mm ²	DC working power supply positive input.
3	Start output+	2.5mm ²	Start relay output
4	Parking+	1.5 mm ²	In the local status, press the stop key to disconnect the ECU ignition switch power supply to realize the shutdown. When the speed is too high, the water temperature is too high, and the oil pressure is too low, the ECU ignition switch power supply is disconnected to realize the shutdown.
5	Fuel leak A	1.0mm ²	Fuel leakage input
6	ECU power supply+	2.5mm ²	DC working power supply positive output
7	ECU power supply+	2.5mm ²	DC working power supply positive output.
8	CANH	0.5mm ²	used to access the engine ECU with J1939 interface.
9	Spare	/	
10	Power supply+	2.5mm ²	DC working power supply positive input.
11	Start output+	2.5mm ²	Start relay output
12	Spare	/	
13	Spare	/	
14	Spare	/	
15	Spare	/	
16	Power supply-	2.5mm ²	DC working power supply negative input.
17	Power supply-	2.5mm ²	DC working power supply negative input.
18	Generator D+	1.0mm ²	The D + terminal input of charging generator is not allowed to be grounded.
19	Blank	/	
20	Fuel leak B	1.0mm ²	Fuel leakage input common terminal, internal connection (B -)
21	Spare	/	
22	Spare	/	
23	CANL	0.5mm ²	It is used to access the engine ECU with J1939 interface.

6. CASE DIMENSION

Unit: mm

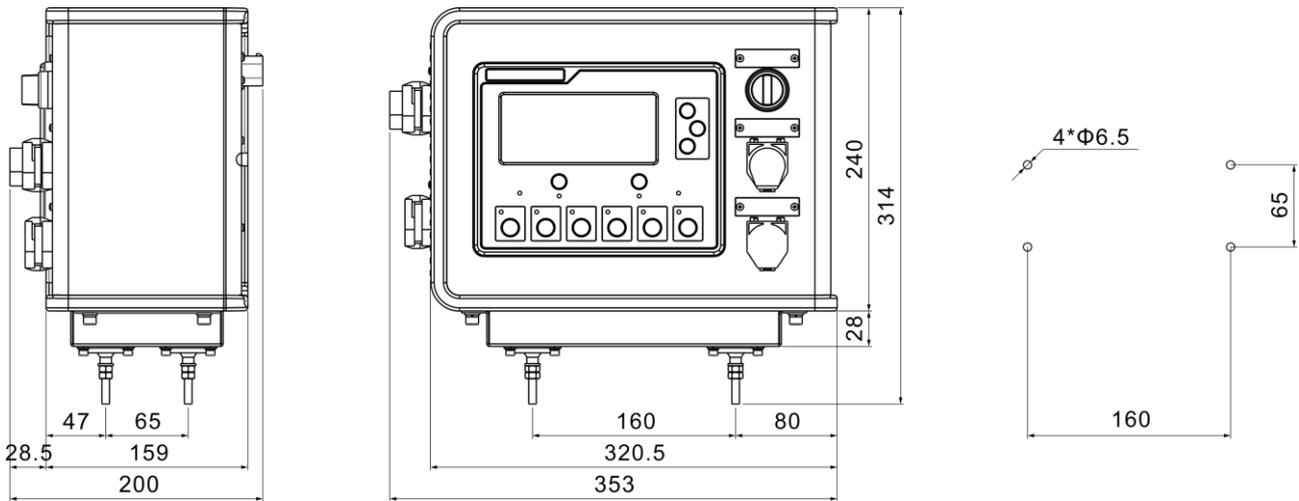


Figure 11: Overall Case Dimensions

7. NOTE

- a. Before starting the engine, make sure the engine has the starting conditions!
- b. Do not repair the components inside the control box during operation!
- c. Do not disconnect the battery during operation!
- d. Do not press the stop and reset buttons at will during operation!

8. MAINTENANCE

- a. When the control box is stored separately, it must be placed in a dry place, and there is no corrosive medium in the air.
- b. Check the fasteners and terminal blocks regularly to prevent looseness. If the wiring is loose, the wiring should be aligned.
- c. Regularly remove the dust and dirt at each conductive contact to ensure good electrical contact.

9. TROUBLESHOOTING

Table 9 - Troubleshooting

Problem	Possible Solution
Control box is no response with power	Check power-line connection. Check control box power switch connection wiring.
Starter is no response	Check starting batteries. Check starting connections and power lines. Check starter.
Fail to start	Check fuel circuit and connections, start power supply. Check speed sensor and connections. Refer to engine user manual for more details.
Loss of speed signal	Check whether the wire of speed sensor is

	loosening.
High oil temperature alarm after engine has fired.	Check oil temperature and the curve of sensor. Check cooling device.
High water temperature alarm after engine has fired.	Check water temperature sensor and the curve of sensor.
Diesel engine shutdown alarm	Check fuel system and cooling system according to the alarm information. Refer to diesel engine user manual for more details.
Emergency shutdown	Check emergency button is loose or not. Check emergency shutdown input is configured correctly or not.

10. PACKING LIST

Table 10 - Packing list

No.	Name/Type	Quantity
1	MGCP100B Product-3(C018)	1
2	23 Pin Connector 770680-1	1
3	Connector Terminal Core 770520-1	20
4	Connector Sealing Plug 770678-1	16
5	Aviation Plug WY16K7TI	1
6	Aviation PlugYP21TK11UQNI	1
7	Product Certificate	1
8	MGCP100B User Manual-3(C018)	1
9	HMC6000A 2 User Manual	1
10	ZZ-TY-GYLC018 Electrical Schematic Diagram	1