SmartGen

MAKING CONTROL SMARTER

MGC100

GENSET CONTROLLER

USER MANUAL

4.3.3 MANUAL START/STOP

a) Press  to start genset. It will detect complete start and accelerate to high-speed running automatically. With high temperature, low oil pressure, over speed and volt abnormal during genset running, controller can protect it to stop quickly (Please refer to Start Sequence b-g).

b) Press  to stop the running genset (Please refer to Stop Sequence b-f).

NOTE:

a) The genset can be stopped manually in remote start status; at this time, remote input is inhibited and it will be active when remote input is closed again.

b) After start conditions are satisfied, accumulative running timer will be initiated; at the same time, the last blinking decimal of nixie tube indicates that genset works normally.

5 PROTECTION

1) Low Oil Pressure: detect after Safety On, Alarm Stop when Low Oil Pressure input is active and lasts for 2s.
2) High Temperature: detect when start, Alarm Stop when High Temperature is active and lasts for 2s.
3) Over Speed: detect when start, Alarm Stop after duration exceeds Over Speed Stop Delay.
4) Gen Over Volt: Alarm Stop when the controller detects genset voltage exceeds overvoltage value and delay exceeds abnormal delay.
5) Gen Under Volt: Alarm Stop when the controller detects genset voltage less than under voltage value and delay less than abnormal delay.
6) Emergency Stop: ETS output immediately when Emergency Stop is active, in the meanwhile fuel, preheat and start signal are cut off and Emergency Shutdown Alarm Signal is sent.
7) Fail to Start: Alarm Stop when start failed in preset start times.
8) Gen Under Frequency: When genset is normal running, controller detects gen frequency falls below under frequency value and the “under frequency” delay has expired, under frequency shutdown alarm will be sent.
9) Gen Over Frequency: Detection when start genset, if gen frequency exceeds over frequency value and the “over frequency” delay has expired, over frequency shutdown alarm will be sent.

6 CONNECTION

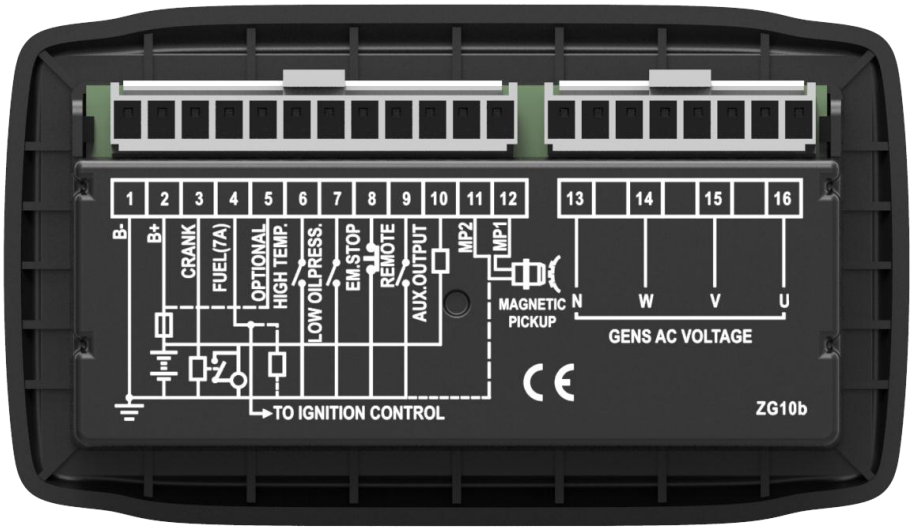

Fig.2 Rear Panel

Table 6 Terminal Connection Description

No.	Function	Cable Size	Note
1	B-	1.0mm²	Connected with negative of starter battery.
2	B+	1.0mm²	Connected with negative of starter battery. If wire length is over 30m, better to double wires in parallel. Max. 10A fuse is recommended.
3	Start Relay Output	1.0mm²	B+ power is supplied by terminal 2, rated 7A. Connected with start coil of starter.
4	Fuel Relay Output	1.0mm²	B+ power is supplied by terminal 2, rated 7A.
5	Controller Types	1.0mm²	When this terminal short connected with (B+), it used as diesel genset controller. When this terminal connected with nothing, it used as petrol genset controller.
6	High Temperature	1.0mm²	Ground connected is active (B-).
7	Low Oil Pressure	1.0mm²	Ground connected is active (B-).
8	Emergency Stop	1.0mm²	Ground connected is active (B-).
9	Remote Start	1.0mm²	Ground connected is active (B-).
10	Aux. Transistor	1.0mm²	B- power is supplied by terminal 1, rated 1A.
11	Magnetic Pickup 2 (B-) has already connected with controller innerly.	0.5mm²	Connected with Rotate Speed Sensor, shielding line is recommended.
12	Magnetic Pickup 1	0.5mm²	
13	N	1.0mm²	Connected with N wire.
14	W phase voltage monitor	1.0mm²	Connected with W phase (2A fuse is recommended).
15	V phase voltage monitor	1.0mm²	Connected with V phase (2A fuse is recommended).
16	U phase voltage monitor	1.0mm²	Connected with U phase (2A fuse is recommended).

7 DEFINITION AND RANGE OF PARAMETERS

Table 7 Parameter Content and Range

No.	Content	Parameter Range	Default	Description
P00	AC	(0-3)	0	0: Single phase 2-wire 1: 2-phase 3-wire 2: 3-phase 3-wire 3: 3-phase 4-wire
P01	Over Volt Threshold	(30-620)V	264	When generate voltage exceed this value and last for "Abnormal Delay", then it is regarded as over voltage and at the same time "Gen Abnormal" signal will be sent. When set value is 620V, it won't detect over voltage signal.
P02	Under Volt Threshold	(30-620)V	196	When generate voltage is under this value and last for "Abnormal Delay", then it is regarded as under voltage and at the same time "Gen Abnormal" signal will be sent. When set value is 30V, it won't detect under voltage signal.
P03	Gen Abnormal Delay	(0-20)s	10	Alarm delay value of generate over or under voltage.
P04	Start Delay	(0-3600)s	1	Time from remote start signal is active to start the genset.
P05	Stop Delay	(0-3600)s	1	Time from remote stop signal is deactivated to stop the genset.
P06	Start Attempts	(1-10)times	3	It is maximum of start attempts when starter failed to start. When reach set attempts the fail to start alarm will be initiated.
P07	Preheat Delay	(0-300)s	0	Time of pre-powering heat plug before starter is powered up.
P08	Crank Time	(3-60)s	8	Time of starter power up.
P09	Crank Rest Time	(3-60)s	10	The waiting time before second power up when engine start fail.
P10	Safety On Time	(1-60)s	5	Alarms for low oil pressure and under voltage are inactive.
P11	Start Idle Time	(0-3600)s	0	Idle running time of genset when starting.
P12	Warming Up Time	(3-3600)s	10	Warming time between genset close and high speed running.
P13	Cooling Time	(3-3600)s	10	Radiating time before stop genset, after it unloads.
P14	Stop Idle Time	(0-3600)s	0	dle running time when pump unit stop.
P15	ETS Hold Time	(0-120)s	20	Stop electromagnet's power on time when pump unit is stopping.
P16	Stop Time	(0-120)s	0	Time between ending of pump unit idle delay and stopped when "ETS Time" is set as 0; Time between ending of ETS hold delay and

No.	Content	Parameter Range	Default	Description
				stopped when “ETS Time” is not 0.
P17	Flywheel Teeth	(10-300)	118	Teeth number of the engine, for judging of starter separation conditions and inspecting of engine speed. See the following Installation Instruction.
P18	Over Speed Threshold	(0-6000)r/min	3500	When rotate speed exceed this threshold and last over the delay value, over speed shutdown alarm signal will be sent. (No detection for over speed signals if it is set as 0).
P19	Over Speed Delay	(0-20)s	2	When rotate speed exceed over speed threshold and last over the delay value, over speed alarm signal will be sent.
P20	Poles	(2-16)	2	Set genset poles.
P21	Disc. Condition	(0-2)	1	Disconnected condition. Separate condition of starter and engine are gen sensor and magnetic sensor, in order that separate stater motor and engine as soon as possible.
P22	Disc. Speed	(0-6000)r/min	840	In starting process, if genset rotate speed exceed this value, it is regarded as genset start success, starter will separate.
P23	Disc. Freq	(10-30)Hz	14	In starting process, if genset frequency exceed this value, that is genset start success, starter will separate.
P24	Fuel Output Select	(0-1)	0	0: Fuel output; 1: Stop output (ETS Output).
P25	Aux. Output 1	(0-9)	5	Configuration see form “Aux. Output Defination”
P26	Gen Under Freq Threshold	(0-75.0)Hz	45.0	When gen frequency falls below this threshold and last over the delay value, under frequency shutdown alarm signal will be sent. (No detection for under frequency signals if it is set as 0).
P27	Under Freq Shutdown Delay	(0-60)s	10	Gen under frequency delay value.
P28	Gen Over Freq Threshold	(0-75.0)Hz	57.0	When gen frequency exceeds this threshold and last over the delay value, over frequency shutdown alarm signal will be sent. (No detection for over frequency signals if it is set as 0)
P29	Over Freq Shutdown Delay	(0-60)s	2	Gen over frequency delay value.
CLb1	Ua			Correct A phase voltage value.
CLb2	Ub			Correct B phase voltage value.
CLb3	Uc			Correct C phase voltage value.

No.	Content	Parameter Range	Default	Description
CLb4	Uab			Correct AB wire voltage.
CLb5	Ubc			Correct BC wire voltage.
CLb6	Uca			Correct CA wire voltage.

Table 8 Defined Contents of Aux. Output Ports

No.	Content	Description
0	Not Used	When this is chosen, output port won't output.
1	Preheat Output	Close before start, open before energize.
2	Common Alarm	When stop alarm is initiated, this alarm will self-lock untill alarm reset.
3	Idle Output	Used for engine which has idles. Close before starting and open in warming up delay; Close during stopping idle process and open when stop is completed.
4	ETS Output	Used for some genset which has stop electromagnet. Close before stoping idle ended. Open when "ETS Delay" ended.
5	Air Flap Choke	Used for genset with choke valve electromagnet. Close when gen start and open when safety running delay is over.
6	Reserved	
7	Reserved	
8	Reserved	
9	Reserved	

Table 9 Crank Disconnect Conditions Selection

No.	Content
0	Magnetic Sensor
1	Generator
2	Magnetic Sensor + Generator

NOTE:

1) Magnetic sensor is magnetic device which detects numbers of flywheel teeth installed in generator.
2) If magnetic sensor is selected, please insure numbers of flywheel teeth is same with set value, otherwise, "Over Speed Shutdown" may be caused.
3) If genset without magnetic sensor, please don't select corresponding items, otherwise, "Start Failure" may be caused.
4) If generate isn't selected, the controller won't detect over/under voltage; if magnetic sensor isn't selected, speed of genset is converted via generate signal.

8 PARAMETERS SETTING

8.1 PARAMETERS REGULATION

When the controller is running, press for 3s, it will enter into **parameter number menu** and LED will display P00:

1) Press and to downturn/upturn parameter number;
2) After parameter number is selected, press to enter into parameter setting menu; press and to increase/decrease parameter value (it can be double-clicked);
3) Press to confirm modification and save value;
4) For multiple parameters, step (1-3) can be repeat done for setting;
5) After parameter setting, press for 3s to exit parameter setting status.

8.2 RESTORE FACTORY SETTINGS

In emergency stop input status, press and for 5s at the same time, it can restore to default and "reset" will be displayed on LED.

8.3 ELIMINATE ACCUMULATED TIME

Press and for 5s at the same time, accumulated running time will be reset an "hclr" will be displayed on LED.

NOTE:

——Over voltage threshold must be greater than under voltage threshold.

——When start successfully, generator frequency need to be set lower as soon as possible in order to starter separate sooner.

——Number of setting contents refers to "Parameter Content and Range (Table 7)".

——Only in parameter number menu can exit from parameter setting status. If there is no press operation in parameter number menu, it will exit in 30s automatically.

9 CASE DIMENSIONS

Controller is panel built-in design; it is fixed by clips when installed.

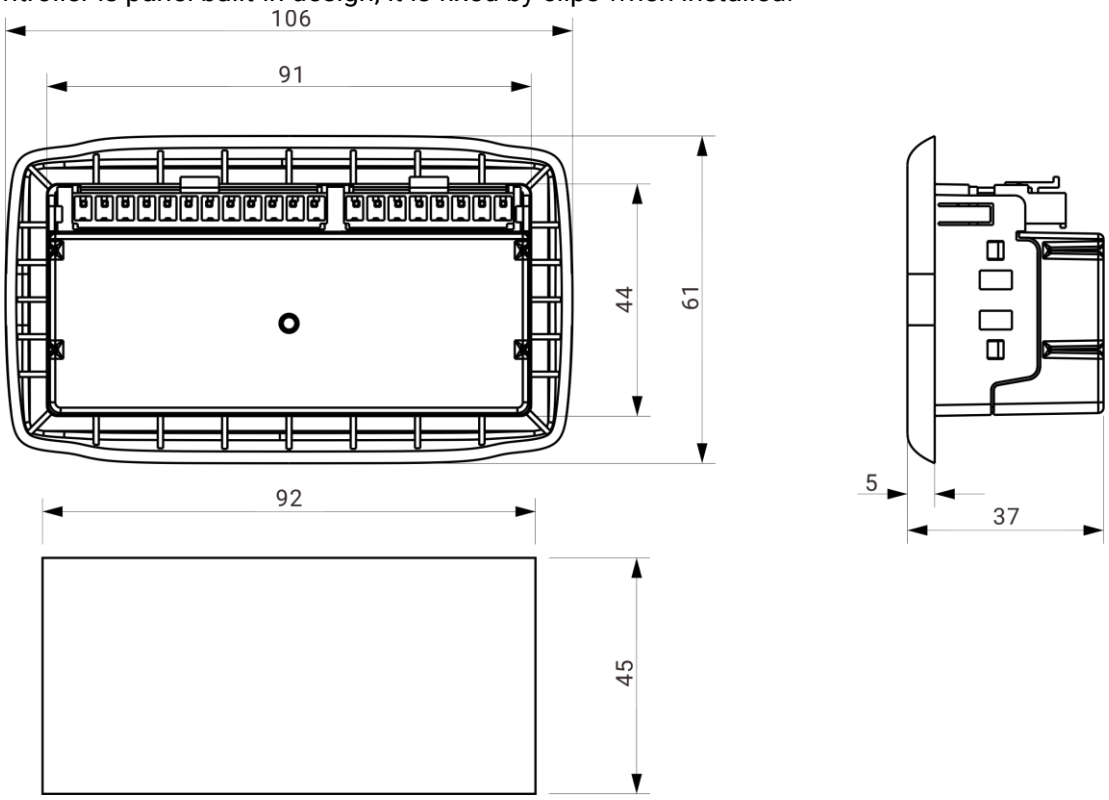

Fig.3 Case Dimensions

1) Battery Voltage Input

NOTE: MGC100 controller can suit for widely range of battery voltage DC(9~18)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 1.0mm^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.

WARN: In running process, removing start battery is strictly prohibit.

2) Speed Sensor Input

NOTE: 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 11 terminal of controller with one end and the other end hanging in the air. The other two signal lines connect separately to 11, 12 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.

3) Withstand Voltage Test

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

10 TYPICAL APPLICATION

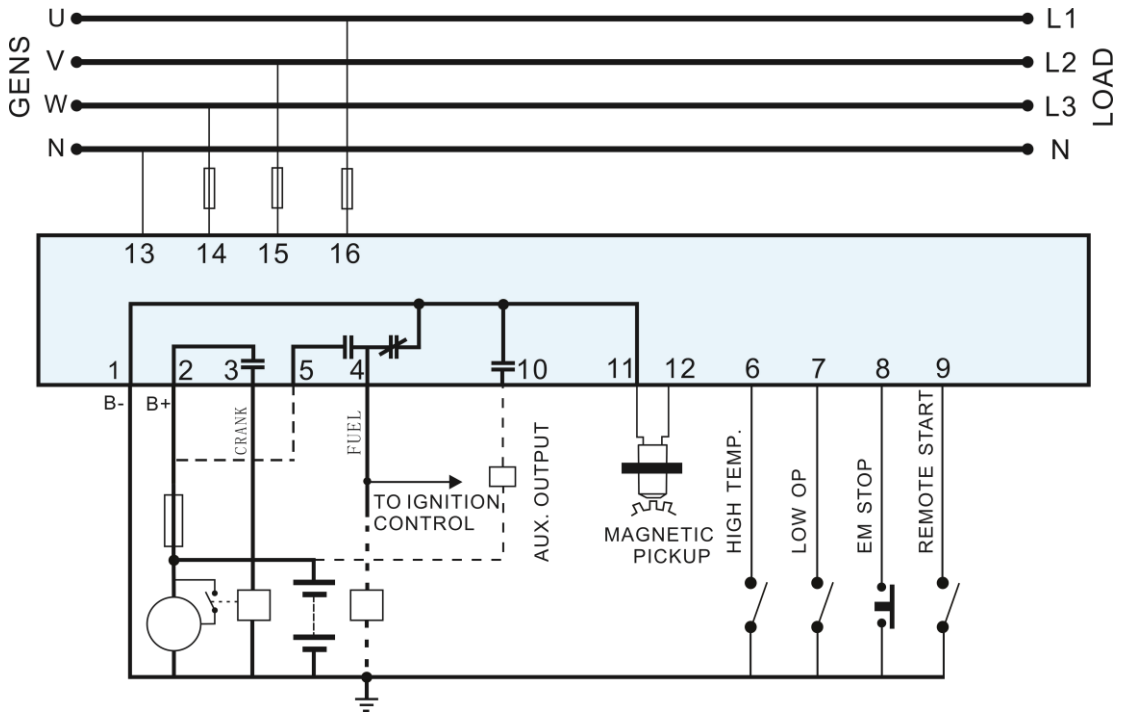

Fig.4 Typical Application

NOTE: When it controls petrol genset, terminal 4 connects with ignition control; when it controls diesel genset, terminal 5 needs to short connect with B+, terminal 4 needs to connect with fuel output.

11 FAULT FINDING

Table 10 Fault Finding

Symptoms	Possible Solutions
Controller no response with power	Check starting batteries; Check controller connection wirings; Check DC fuse.
Crank not disconnect	Check fuel oil circuit and its connections; Check starting batteries; Check speed sensor and its connections; Refer to engine manual.
Shutdown alarm in running	Check related switch and its connections according to the information on LED.
Starter no response	Check starter connections; Check starting batteries.