

MGC310/MGC320 GENSET CONTROLLER USER MANUAL



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Table 1 Software Version

Date	Version	Content
2019-10-15	1.0	Original release.
2020-01-04	1.1	Fixed application diagram.
2020-08-18	1.2	1. Fixed typical application diagram terminal 17-20 to R,S, T, N1; 2. Added note 1 of remote start.
2020-12-12	1.3	1. Added description of remote start input port/power port; 2. Modified generator poles description.
2023-05-31	1.4	1. Updated the Logo of SmartGen; 2. Added the parameters of P50, P51, P52 and P53.
2023-07-03	1.5	Modified the typical application diagram of MGC310.

CONTENT

1 OVERVIEW	4
2 PERFORMANCE AND CHARACTERISTICS	5
3 SPECIFICATION	6
4 OPERATION	7
4.1 FRONT PANEL DESCRIPTION	7
4.2 KEYS FUNCTION DESCRIPTION	8
4.3 LCD ICONS DESCRIPTION	9
4.4 DISPLAY DESCRIPTION	10
4.4.1 LOW POWER CONSUMPTION OPERATION	11
4.4.2 INSTRUCTION	11
4.4.3 AUTO START SEQUENCE	11
4.4.4 AUTO STOP SEQUENCE	12
4.4.5 MANUAL START/STOP OPERATION	12
5 PROTECTION	13
6 CONNECTION	14
7 DEFINITION AND RANGE OF PARAMETERS	16
7.1 PARAMETER SETTING CONTENTS AND RANGE	16
7.2 DEFINABLE CONTENTS OF OUTPUT PORTS	20
7.3 DEFINABLE CONTENTS OF INPUT PORTS	20
7.4 SENSOR SELECTION	21
8 CONTROLLER PARAMETER SETTINGS	22
9 SENSOR SETTING	23
10 COMMISSIONING	24
11 TYPICAL APPLICATION	25
12 INSTALLATION	26
12.1 FIXING CLIPS	26
12.2 OVERALL AND CUTOUT DIMENSIONS	26
13 FAULT FINDING	27

1 OVERVIEW

MGC300 Series Genset Controller is applicable for single unit automation control to realize auto start of single unit and AMF. The controller integrates digitalization with intelligence and applies LCD graphic display, which is simple for operation and reliable for running.

MGC300 Series Genset Controller applies 32-bit micro-processor technology, realizing precise measuring for various parameters, set-value adjustment, timing, and threshold setting functions etc. A majority of parameters can be adjusted from the front panel, and all parameters can be configured by RS485 port via PC. It has compact structure, simple wiring, high reliability, which can be used for all types of genset automation system.

MGC300 Series Genset Controller includes true low power consumption (power off) and feign low power consumption (awakened, but screen light not on, only stop indicator flashing, not do any action).

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2 PERFORMANCE AND CHARACTERISTICS

- Graphic LCD display (backlight), LED indicators, push-button operation;
- Acrylic material for hard screen protection;
- Wide power supply range DC (8~35)V, which can suits different environments of starting battery voltages;
- Collect and display mains/gen 3-phase voltage, 3-phase current, frequency, and power parameters;

Mains

Line voltage (L12, L23, L31)
 Phase voltage (L1, L2, L3)
 Frequency (Hz)

Gen

Line voltage (L12, L23, L31)
 Phase voltage (L1, L2, L3)
 Frequency (Hz)

Load

Current (Ia, Ib, Ic) Unit: A
 Total active power P Unit: kW

- Mains has over volt, under volt, over frequency, under frequency, and loss of phase functions; Gen has over volt, under volt, over frequency, under frequency, over current, over power, and loss of phase functions;
- Precisely collect all parameter values of engines:
 Temperature °C Fuel level %
 Battery voltage V Accumulated running time H (max. 9999 hours)
 Speed RPM Accumulated start times (max. 90000000 times, display only on PC software)
- Genset fault protection and display function;
- Controller has 4 working modes: manual, auto, stop, and test mode, and MGC310 has stop, manual, auto modes, and MGC320 has manual, auto, stop, and test mode;
- Parameter setting function: allows users to change and set the parameters, which won't be lost in case of system power off; a majority of parameters can be adjusted from front panel, and all parameters can be configured by RS485 via PC;
- 1 digital input port, 2 fixed input ports;
- 2 fixed relay output ports (fuel output, starting output);
- 2 digital relay output ports;
- All parameters are adjusted digitally, improving the whole reliability and stability;
- Sealing gasket is designed between the enclosure and the control panel, whose dustproof and waterproof performance can be reached to IP65;
- Metal fixing clips are used to stable the controller;
- Modular structure design, pluggable wiring terminal, and built-in installation, make it compact in structure and easy to install.

3 SPECIFICATION

Table 2 Technical Parameters

Items	Contents
Working Voltage	DC (8.0~35.0)V continuous power supply
Overall Consumption	≤1.4W (Standby mode: ≤0.35W, 0W=low power consumption)
AC Volt Input:	
3 phase 4 wire	30V AC ~ 360V AC (ph-N)
3 phase 3 wire	30V AC ~ 620V AC (ph-ph)
Single phase 2 wire	15V AC ~ 360V AC (ph-N)
2 phase 3 wire	15V AC ~ 360V AC (ph-N)
Alternator Frequency	50Hz/60Hz
Crank Relay Output	7A 24V DC power supply
Fuel Relay Output	7A 24V DC power supply
Digital Relay Output Port 1	7A 250V AC volt free output
Digital Relay Output Port 2	7A 250V AC volt free output
Overall Dimensions	126mm x 106mm x 46.5mm
Panel Cutout	111mm x 91mm
CT Secondary Current	Rated: 62.5mA
Working Condition	Temperature:(-25~+70)°C Humidity:(20~93)% RH
Storage Condition	Temperature: (-30~+80)°C
Protection Level	Front panel IP65
Insulation Intensity	Apply AC2.2kV voltage between high voltage terminal and low voltage terminal and the leakage current is not more than 3mA within 1min.
Weight	0.27kg

4 OPERATION

4.1 FRONT PANEL DESCRIPTION

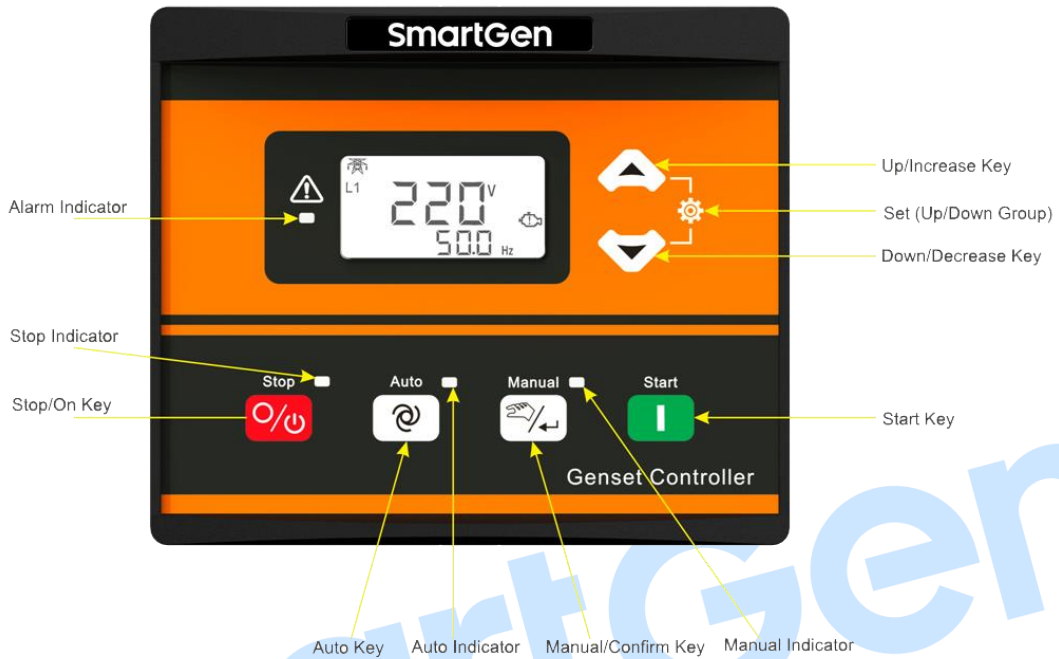


Fig. 1 MGC310 Panel Indication

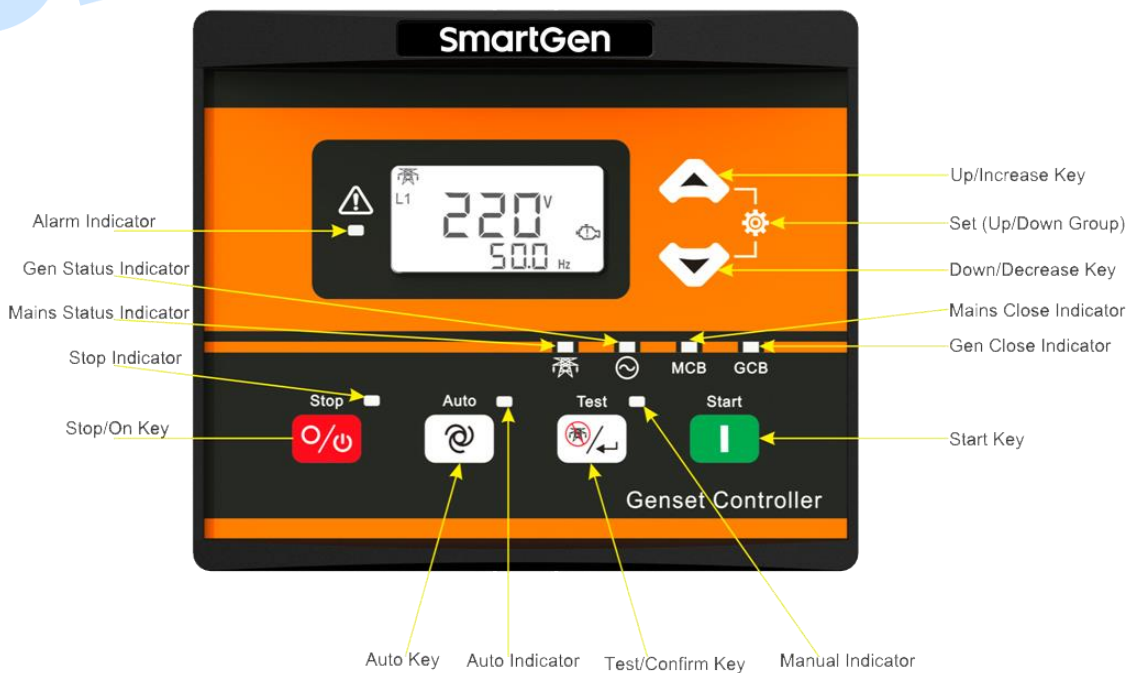









Fig. 2 MGC320 Panel Indication


















4.2 KEYS FUNCTION DESCRIPTION

Table 3 Keys Description

Icons	Function	Description	
	Stop/On	Stop the running genset both in manual mode and in auto mode; In alarm status, press this button to reset any shutdown alarms; In stop mode, press this button and Up to test if LCD icons and LED indicators are OK; In stop mode, press this button and Down to set backlight always on; In stop process, re-press this button to stop generator immediately; In parameter setting process, press this button to exit the setting quickly; In stop status, press this button to start; In start status, press longer for 3s and release to stop;	
	Auto	Press this key and controller enters to Auto mode; under this mode, genset can be controlled by remote start input signals;	
	Start	Press this key and genset will start;	
	Down/Decrease	LCD page scroll; In parameter settings, decrease the value where the cursor is;	Press the two keys simultaneously to enter parameter settings page;
	Up/Increase	LCD page scroll; In parameter settings, increase the value where the cursor is;	
	Manual/Confirm	Confirm key for parameter settings page; Manual key for other pages and press it to make controller in Manual mode; This key is especially for MGC310;	
	Test/Confirm	Confirm key for parameter settings page; Test key for other pages and press it to make controller commissioning; This key is especially for MGC320.	

4.3 LCD ICONS DESCRIPTION

Table 4 LCD Icons

Icon	Definition	Icon	Definition
	Gen power indication	FL	Fuel level sensor indication
	Mains power indication	L1	AC phase voltage indication
	Start countdown (crank disconnect is satisfied)	L12	AC line voltage indication
	Over frequency alarm	DC	Battery voltage indication
	Under frequency alarm	A	Load current unit
	Temp high alarm	H	Accumulated running time unit
	Fuel level low	Hz	Frequency unit
	Outside input alarm	°C	Temperature unit
	Engine oil pressure low alarm	rpm	Speed unit (r/min)
	Crank failure	kW	Active power unit
	Stop failure	V	Voltage unit
	Battery voltage abnormal	%	Percentage
	Gen voltage high		I# Mains Close
	Gen voltage low		II# Gen Close
	Load over current		

4.4 DISPLAY DESCRIPTION

Mains: Phase Voltage L1, Frequency F



Mains: Phase Voltage L2, Frequency F



Mains: Phase Voltage L3, Frequency F



Gen: Phase Voltage L1, Current IA



Gen: Phase Voltage L2, Current IB



Gen: Phase Voltage L3, Current IC



Mains: Line Voltage L12, Frequency F



Mains: Line Voltage L23, Frequency F



Mains: Line Voltage L31, Frequency F



Gen: Line Voltage L12, Frequency F



Gen: Line Voltage L23, Frequency F



Gen: Line Voltage L31, Frequency F



Battery Voltage, Speed



Fuel Level, Temp.



Active Power, Accumulated Running Time






NOTE1: When temp. and fuel level sensor are not displayed, it means they are not used; when OFF is displayed, it means that sensor is open.

4.4.1 LOW POWER CONSUMPTION OPERATION

Controller applies low power consumption method at hardware aspect, which reduces the power consumption greatly in the period of stop. With this battery cost is largely decreased, because it reduces the battery change times.


Controller has true low consumption (power off) and feign low consumption (awakened, LCD light not on, only stop indicator flashing, not do any action).

- a) Power on the controller, and controller is running as normal;
- b) After power on, press  and controller enters normal running, if  is not pressed, controller will judge the status according to the last stop situation; If controller is stopped manually, it will enter true low consumption as remote start signal is inactive; if it is active, controller enters feign low consumption; Otherwise, controller will run normally;
- c) In standby status, Press  for 3s and controller will be powered off.


▲NOTE 1: When low consumption time is set to 0, controller will not enter it automatically (base pin of control power is always energized).

▲NOTE 2: When low consumption time is not set to 0, if genset is in the standby mode and doesn't have data communication, controller will enter low consumption based on the set low consumption time.

4.4.2 INSTRUCTION


Press  and the indicator beside will be on, which means genset is in the auto mode.

4.4.3 AUTO START SEQUENCE

- a) When remote start signal is active (Terminal No. 6 connects B-), "Start Delay" time is initiated;
- b) When start delay is over, preheat relay outputs (if configured), "Preheat Delay" is initiated;
- c) After the above delay, the fuel relay outputs, and one second later, the crank relay outputs; During the crank time if the genset fails to start, fuel relay and crank relay stop outputting, enter "Crank Rest Time" and wait for next crank;
- d) If the genset fails to start during the set crank attempts, LCD displays  and it means crank failure alarm and meanwhile alarm indicator flashes;
- e) If the genset starts successfully during the crank attempts, it enters "Safety On" time, during which low oil pressure, high water temperature alarms are inactive; After "Safety On" delay, it enters "Start Idle Delay" (if configured);
- f) During "Start Idle Delay", under speed, under frequency and under voltage alarms are all inactive; When this delay is over, "High-speed Warming Up Delay" is initiated (if configured);
- g) After the above delay, genset will enter into normal running status. If genset voltage or frequency is abnormal, controller will issue shutdown alarm and stop the genset.

▲NOTE 1: MGC310 does not have this function.


4.4.4 AUTO STOP SEQUENCE

- a) When remote start input is invalid, "Stop Delay" time is initiated;
- b) Once this "Stop Delay" has expired, the "High-speed Cooling Delay" is initiated;
- c) When "Stop Idle Delay" (if configured) starts, idle speed relay is energized and outputs;
- d) When "ETS Solenoid Hold" begins, ETS relay is energized and fuel relay is de-energized;
- e) When controller enters "Wait for Stop" time, it will judge whether genset has stopped completely;
- f) After complete stop, controller will enter standby status; if genset cannot stop controller, it will issue alarm (LCD displays ).

▲NOTE 1: Press stop key in auto start status, genset will stop and enter into stop mode simultaneously.

▲NOTE 2: In the process of crank rest time, when fuel output is disconnected and crank rest countdown is less than 7s, preheat and ETS stop output; after crank rest time, ETS stop output is disconnected and fuel outputs; preheat output is stopped before crank.













4.4.5 MANUAL START/STOP OPERATION

Manual Start: press  to start genset (Please refer to start procedure b~g of AUTO START SEQUENCE). If water temperature high and abnormal voltage occur during the running process, controller shall protect it to stop quickly.

Manual Stop: press  to stop the running genset (Please refer to stop procedure b~f of AUTO STOP SEQUENCE).

5 PROTECTION

Table 5 Alarm Types

Icons	Alarm Contents	Type	Trigger Condition
	Over Frequency	Shutdown	Gen frequency is above over frequency limit for 2s, it alarms;
	Under Frequency	Shutdown	Detected when genset is running normally; gen freq. is less than under frequency limit for 10s, and it alarms;
	Temp. High	Shutdown	Detected after safety on delay; when temp. high is above high temp. limit for 3s, it alarms;
	Temp. High Input	Shutdown	Detected after safety on delay; when temp. high input is active, it alarms;
	Oil Pressure Low Input	Shutdown	Detected after safety on delay; when oil pressure low input is active, it alarms;
	Gen Over Current	Warning	Action is set as Warning; gen current is over pre-set value, and lasting time is over delay time, it alarms;
	Gen Over Current	Shutdown	Action is set as Shutdown; gen current is over pre-set value, and lasting time is over delay time, it alarms;
	Gen Over Current Cooling	Shutdown	Action is set as Cooling Shutdown; gen current is over pre-set value and lasting time is over delay time, it alarms;
	Gen Voltage High	Shutdown	Detected after safety on delay; gen voltage is over the threshold, and lasting time is over delay, and it alarms;
	Gen Voltage Low	Shutdown	Detected after genset normal running; gen voltage is lower than threshold, and lasting time is over delay time, and it alarms;
	Crank Failure	Shutdown	It alarms when crank failure during the pre-set crank attempts;
	Outside Shutdown Alarm Input	Shutdown	When the input port is configured as "Outside Shutdown Alarm Input", and it is active, it alarms;
	Fuel Level Low	Warning	When fuel level is lower than the threshold for 10s, it alarms;
	Fuel Level Low Input	Warning	When fuel level low input is active, it alarms;
	Stop Failure	Warning	Complete stop time is over but genset still not stops completely and it alarms;
	Battery Voltage Low	Warning	Battery voltage is lower than the threshold for 20s, it alarms;
	Battery Voltage High	Warning	Battery voltage is higher than the threshold for 20s, it alarms.

NOTE 1: Shutdown alarms are latched signals and alarms can be removed by using Stop key (in stop status); warning alarms are not latched.

6 CONNECTION

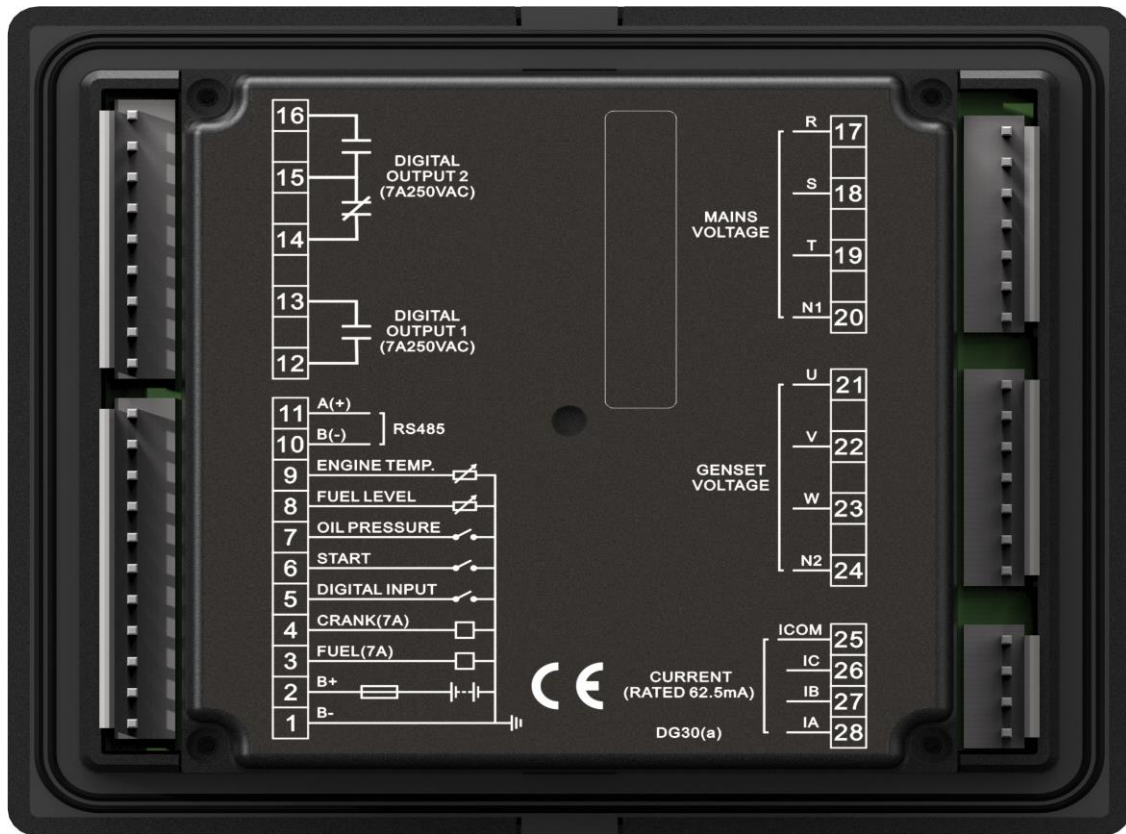


Fig. 3 Controller Back Panel

Table 6 Terminal Connection Description

No.	Function	Cable Size	Note
1	B-	1.5mm ²	Connected with negative of starting battery
2	B+	1.5mm ²	Connected with positive of starting battery
3	Fuel Relay Output	1.0mm ²	B+ power is supplied by terminal 2, rated 7A
4	Crank Relay Output	1.0mm ²	B+ power is supplied by terminal 2, rated 7A
5	Digital Input	1.0mm ²	Digital input, grounded active (B-); Fuel level sensor; connected with level low digital signal or level resistance sensor.
6	Remote Start Input Port/Power Port	1.0mm ²	Grounded active (B-) 1. For MGC320, when mains failure and mains detection is active, this port is active; MGC310 is always active; 2. This port is power port, when it is disconnected, controller will power off.
7	Oil Pressure Input	1.0mm ²	Connected with digital signals of oil pressure low
8	Fuel Level Sensor Input	1.0mm ²	Fuel level sensor input
9	Temp. Sensor Input	1.0mm ²	Connected with water/cylinder digital signals or temp. resistance sensor
10	RS485-	1.0mm ²	
11	RS485+	1.0mm ²	
12	Digital Output 1	1.0mm ²	Relay N/O connector, volt free output, rated 7A
13			N/C output, rated 7A
14	Digital Output 2	1.0mm ²	Relay COM
15			N/O output, rated 7A
16			
17	Mains R Voltage	1.0mm ²	Connected to Mains R Phase
18	Mains S Voltage	1.0mm ²	Connected to Mains S Phase
19	Mains T Voltage	1.0mm ²	Connected to Mains T Phase
20	Mains N1 Input	1.0mm ²	Connected to Mains N1 wire
21	Gens U Voltage	1.0mm ²	Connected to genset output U Phase
22	Gens V Voltage	1.0mm ²	Connected to genset output V Phase
23	Gens W Voltage	1.0mm ²	Connected to genset output W Phase
24	Gens N2 Input	1.0mm ²	Connected to genset output N2 wire
25	CT COM	1.0mm ²	
26	CT IC	1.0mm ²	Outside connected with CT secondary coil (rated 62.5mA)
27	AT IB	1.0mm ²	Outside connected with CT secondary coil (rated 62.5mA)
28	CT IA	1.0mm ²	Outside connected with CT secondary coil (rated 62.5mA)

7 DEFINITION AND RANGE OF PARAMETERS

7.1 PARAMETER SETTING CONTENTS AND RANGE

Table 7 Parameter Setting Contents and Range

No.	Items	Range	Default	Description
P00	Mains Normal Delay	(0~3600)s	10	Confirm time duration for Mains voltage from abnormal to normal or from normal to abnormal to be used for ATS transfer.
P01	Mains Abnormal Delay	(0~3600)s	5	
P02	Mains Under Volt Threshold	(30~6000)V	184	If the voltage sample is lower than it, mains under voltage is considered; When it is set 30V, under voltage signal shall not be detected; return difference is 10V.
P03	Mains Over Volt Threshold	(30~6000)V	276	If the voltage sample is higher than it, mains over voltage is considered; When it is set 6000V, over voltage signal shall not be detected; return difference is 10V.
P04	Mains Options	(0~1)	0	0: AMF 1: Display Only
P05	Start Delay	(0~3600)s	1	Time duration from mains abnormal or remote start signal is active to genset startup.
P06	Stop Delay	(0~3600)s	1	Time duration from mains normal or remote start signal is deactivated to genset stop.
P07	Crank Attempts	(1~10) times	3	It is maximum crank attempts when engine fails to start. When it is reached, controller shall send out crank failure signal.
P08	Preheat Time	(0~300)s	0	Preheating plug pre-energization time before starter is powered on.
P09	Cranking Time	(3~60)s	8	Time for starter to be energized every time.
P10	Crank Rest Time	(3~60)s	10	The waiting time before second power up when engine start fails.
P11	Safety On Delay	(1~60)s	10	Alarms for low oil pressure, temp. high, under speed, under frequency and under voltage, charging failure are deactivated.
P12	Start Idle Delay	(0~3600)s	0	Time for genset idle running at starting.
P13	Warming Up Time	(0~3600)s	10	Warming-up time before breaker close after high speed running for genset.
P14	Cooling Time	(0~3600)s	10	Radiating time before genset stop after genset is unloaded.
P15	Stop Idle Delay	(0~3600)s	0	Time for genset idle running at stopping;
P16	ETS Solenoid Hold	(0~120)s	20	The time for stop electromagnet to be energized before genset stop.
P17	Wait for Stop	(0~120)s	0	Time from idle delay to complete stop when ETS stop output is set to 0s; when

No.	Items	Range	Default	Description
				the output time is not 0s; it's time from ETS delay over to complete stop.
P18	Generator Poles	(2~64)	2	Number of generator poles. It can be used for speed calculation of engine without speed sensor.
P19	Gen Abnormal Delay	(0~20.0)s	10.0	Alarm delay for gen under/over voltage.
P20	Gen Over Volt Shut Threshold	(30~6000)V	264	When generator voltage is higher than this threshold and lasts for the set gen abnormal delay, then over voltage is considered and shutdown alarm will be initiated. (No detection for over volt signals if it is set as 6000V)
P21	Gen Under Volt Shut Threshold	(30~6000)V	196	When sample voltage falls below this threshold and lasts for the set delay, under voltage is considered and shutdown alarm shall be initiated. (No detection for under volt signals if it is set as 30V)
P22	Level High to disable Fuel Pump	(0~100)%	80	When fuel level is over the pre-set value for 2s, fuel pump is off.
P23	Level Low to enable Fuel Pump	(0~100)%	25	When fuel level is under the pre-set value for 2s, fuel pump is on.
P24	Gen Under Freq Shut Threshold	(0~75.0)Hz	45.0	When generator frequency falls below this threshold (not 0) and lasts for the delay time, then it is considered under frequency and shutdown alarm signal will be initiated.
P25	Gen Over Freq Shut Threshold	(0~75.0)Hz	57.0	When generator frequency is over than this threshold and lasts for the delay time, then it is considered over frequency and shutdown alarm signal will be initiated.
P26	Under Frequency Shutdown Delay	(0~60)s	10	When generator frequency falls below this threshold (not 0) and lasts for the delay time, then it is considered under frequency and shutdown alarm signal will be initiated.
P27	Over Frequency Shutdown Delay	(0~60)s	2	When generator frequency is over than this threshold and lasts for the delay time, then it is considered over frequency and shutdown alarm signal will be initiated.
P28	Temp. High Shut Threshold	(80~140)°C	98	When outside temp. sensor is above this value, and temp. high signal is issued; it is detected only after safety on delay and only for externally connected temp. sensor; when set value is 140, temp. high signal is not issued (only for temp. sensor, excluded

No.	Items	Range	Default	Description
				the temp. high alarm signal of input port).
P29	Level Low Warning Value	(0~200)%	50	When level is under this value for 10s, level low warning is issued (only warning, not stop).
P30	Battery Over Volt Warn Threshold	(12~40)V	33.0	When battery voltage is higher than this value for 20s, battery voltage abnormal signal is issued. (only warning, not stop)
P31	Battery Under Volt Warn Threshold	(4~30)V	8.0	When battery voltage is lower than this value for 20s, battery voltage abnormal signal is issued. (only warning, not stop)
P32	CT Ratio	500A/62.5mA	500	CT ratio for externally connected CT.
P33	Full Load Current	(5~1900)A	500	Rated current of genset; used for full load current calculation.
P34	Over Current Percentage	(50~130)%	120	When load current is higher than this, over current delay started.
P35	Over Current Delay	(0~3600)s	60	DMT over current delay; when load current is over the pre-set value for pre-set time, over current is considered; when delay is 0s; it only gives warning, not stop.
P36	Over Current Action	(0~2)	0	0: Warning 1: Shutdown 2: Cooling Shutdown
P37	Digital Output 1 Set	(0~9)	5	See Table 8 for detailed output contents.
P38	Digital Output 2 Set	(0~9)	6	See Table 8 for detailed output contents.
P39	Fuel Output Time	(1~60)s	1	Fuel output time for genset start.
P40	Module Power On Mode	(0~2)	0	0: Stop Mode 1: Manual Mode 2: Auto Mode
P41	Module Address	(1~254)	1	Communication address
P42	Password Set	(0~9999)	0318	Controller password.
P43	Disconnection Frequency	(0.0~30.0)Hz	14.0	In the starting process when gen frequency exceeds this value, it is considered that start is successful and starter will be disconnected.
P44	AC System	(0~3)	0	0: 3P4W 1: 2P3W 2: 1P2W 3: 3P3W
P45	Temp Sensor Types	(0~12)	8	See Table 10 for Temp. sensor type.
P46	Level Sensor Selection	(0~5)	3	See Table 10 for level sensor type.
P47	Input 1 Set	(0~8)	4	See Table 9 for input contents.
P48	Digital Input 1 Delay	(0~20.0)s	2.0	Digital input acts when input is delaying.
P49	Low Consumption	(0~180)s	0	Low power consumption time setting.
P50	Each Phase Overcurrent Enable	(0~1)	0	0: Disable; 1: Enable; When it enables, it will alarm according to the alarm threshold value of each

No.	Items	Range	Default	Description
				phase.(Phase-A, Phase-B, Phase-C)
P51	Full Load B-phase Current	(5~1900)A	500	The rated current of Phase-B.
P52	Full Load C-phase Current	(5~1900)A	500	The rated current of Phase-C.
P53	Rated Active Power	(0~6000.0kW)	276.0	When the real power is greater than the rated power*the percentage of overcurrent, after the set delay, it will send a overcurrent alarm.

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7.2 DEFINABLE CONTENTS OF OUTPUT PORTS

Table 8 Definable Contents of Output Ports

No.	Items	Function Description
0	Not Used	When this is chosen, output port won't output.
1	Common Alarm	Includes all shutdown alarms and warnings; when there is only warning alarm input, alarms are not latched; when shutdown alarms occur, alarms are latched until they are reset.
2	ETS Control	It is used for some gensets with stop electromagnet. Pull-in occurs when stop idle ends. Open occurs when "ETS Delay" ends.
3	Idle Speed Control	It is used for genset with idling speed. Pull-in occurs when it starts. Open occurs when it enters high-speed warming up. Pull-in occurs in the process of stop idle and open occurs when the genset stops completely.
4	Preheat Control	Close before start, open before starter energized.
5	Gen Close Output	Generator close outputs when generator is normally running.
6	Mains Close Output	Mains close outputs when generator is normally running.
7	High Speed Output	Outputs when enters high-speed warming up; disconnects after cooling.
8	Fuel Pump Output	Outputs when fuel pump works.
9	Reserved	

7.3 DEFINABLE CONTENTS OF INPUT PORTS

Table 9 Definable Contents of Input Ports (All Grounded (B-) Active)



No.	Items	Remark
0	Not Used	
1	Temp. High Alarm Input	After safety on delay is finished, genset shutdown immediately if this signal is active.
2	Oil Pressure Low Input	
3	Reserved	
4	Outside Shutdown Alarm Input	If this signal is active, genset will immediately shutdown.
5	Cooling Shutdown for Temp. High	When this signal is active and genset is running normally, if temp. high occurs, controller will stop after cooling delay; when this signal is inactive, if temp. high occurs, controller will stop immediately.
6	Reserved	
7	Reserved	
8	Reserved	

7.4 SENSOR SELECTION

Table 10 Sensor Selection

No.	Items	Contents	Remark
1	Temp. Sensor	0: Not Used 1: Customized Resistance Curve 2: VDO 3: SGH 4: SGD 5: CURTIS 6: DATCON 7: VOLVO-EC 8: SGX 9: Digital Low Input Active 10: Digital High Input Active 11: Reserved 12: Reserved	Customized resistance input range: 0Ω~6000Ω; Default: SGX Sensor.
2	Fuel Level Sensor	0: Not Used 1: Customized Resistance Curve 2: SGH 3: SGD 4: Digital Low Input Active 5: Digital High Input Active	Customized resistance input range: 0Ω~6000Ω; Default: SGD Sensor.

8 CONTROLLER PARAMETER SETTINGS

- a. Under standby status, press   at the same time, it will enter password entry screen (Fig. 4). At this moment the first digital flashes.

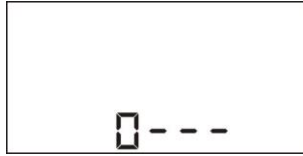






Fig. 4 Password Entry Screen

- b. Press  and the flashing number adds 1; Press  and it decreases 1. After correct setting, press  /  to move.





- c. After the password is passed it will enter parameter setting screen (Fig. 5). At this moment it displays the serial number of the setting item and the set value. Press  and the setting item goes down; Press  and the setting item goes up.



Fig. 5 Parameter Setting Screen

- d. Press  /  and it enters the setting status of the current parameter value. At this time the first digital number is flashing and the setting method is same as Step a.

9 SENSOR SETTING

- a) Sensor types that can be connected inside controller are all resistance sensors; Parts of standard curves (Table 10) have been put inside the controller for users. If customized sensor curves are planned to use, users must set by PC software;
- b) When customized sensor curve is set, X value (resistance) must be inputted from small to big, otherwise mistake may occur;
- c) When "Not Used" is selected for sensor, sensor curve won't work, and at the same time LCD won't display sensor data;
- d) Y value of the foremost points and the last few points can be set the same as below:

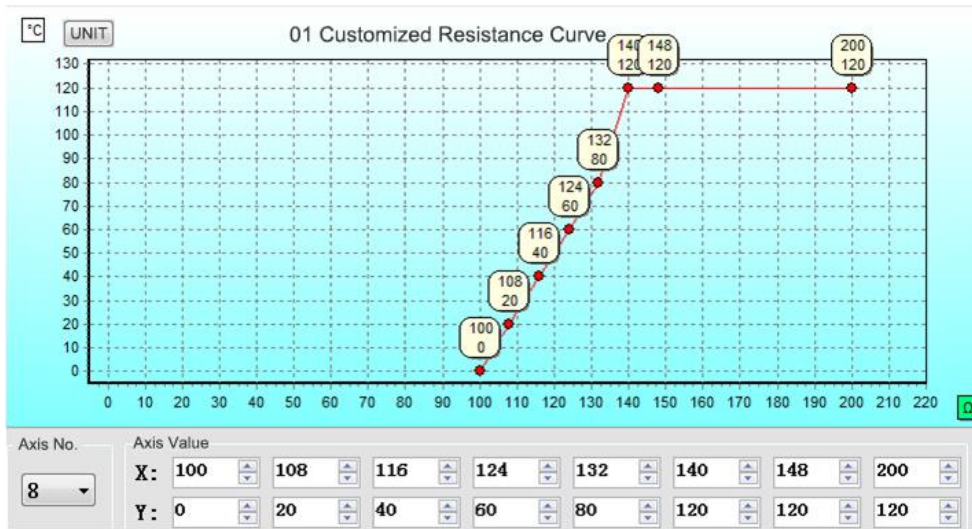


Fig. 6 Sensor Curve

10 COMMISSIONING

Before official operation, the following checks are suggested to do:

- a) Check all the connections are correct and wire diameter is proper;
- b) Make sure that the controller DC power has fuse, and it is correctly connected to the positive and negative of starting battery;
- c) Take proper action to prevent engine from cranking successfully (e. g. remove the connection wire of fuel valve). Make sure everything is correct. Connect starting battery power, and the controller shall conduct the procedure;
- d) Press "Start" button, and genset will start. After the set cranking times, controller will send signal of Crank Failure; and then press "Stop" to reset controller;
- e) Recover the action of preventing engine from cranking successfully (e. g. recover the wire of fuel valve). Press "Start" button again, and genset will start. If everything goes well, genset will go normally running after idle running (if configured), and Mains and Gen will close. During this period, please observe engine's running status, alternator voltage and frequency carefully. If there is something unusual, stop the running genset and check all wire connections according to this manual;
- f) For any other questions please contact with SmartGen service personnel.

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11 TYPICAL APPLICATION

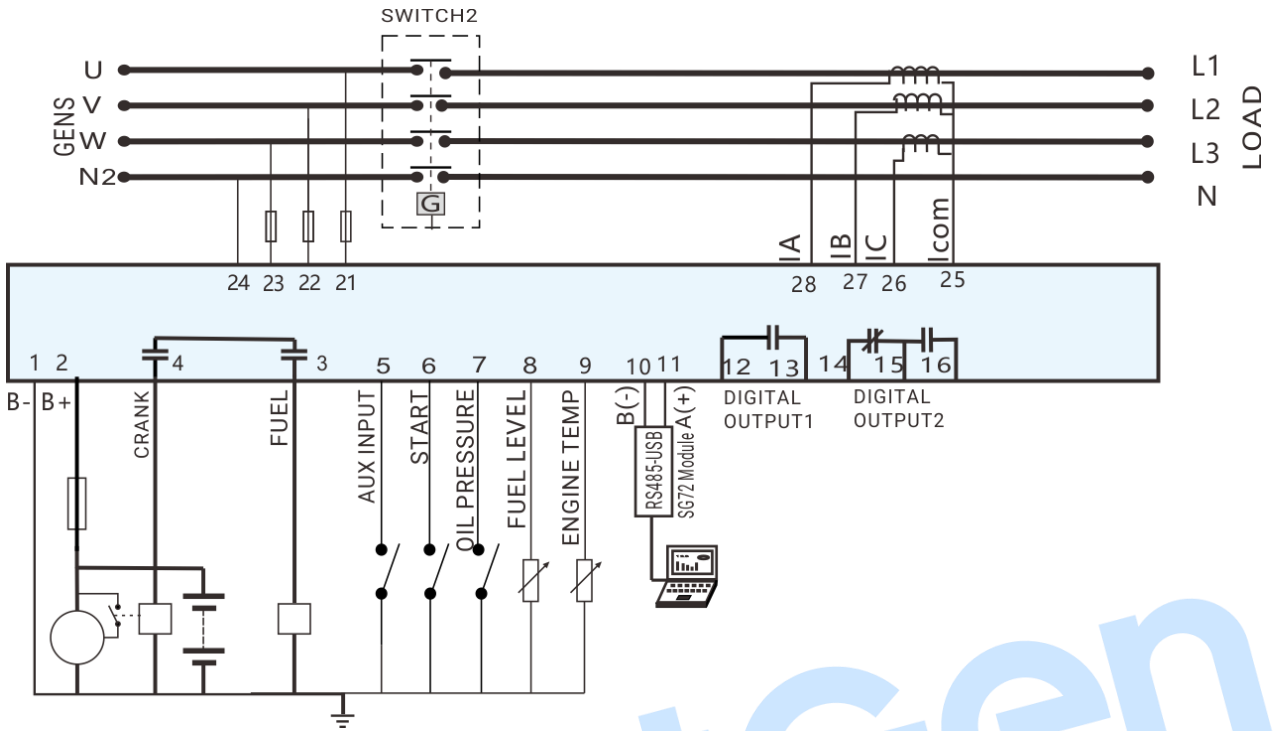


Fig. 7 MGC310 Typical Application Diagram

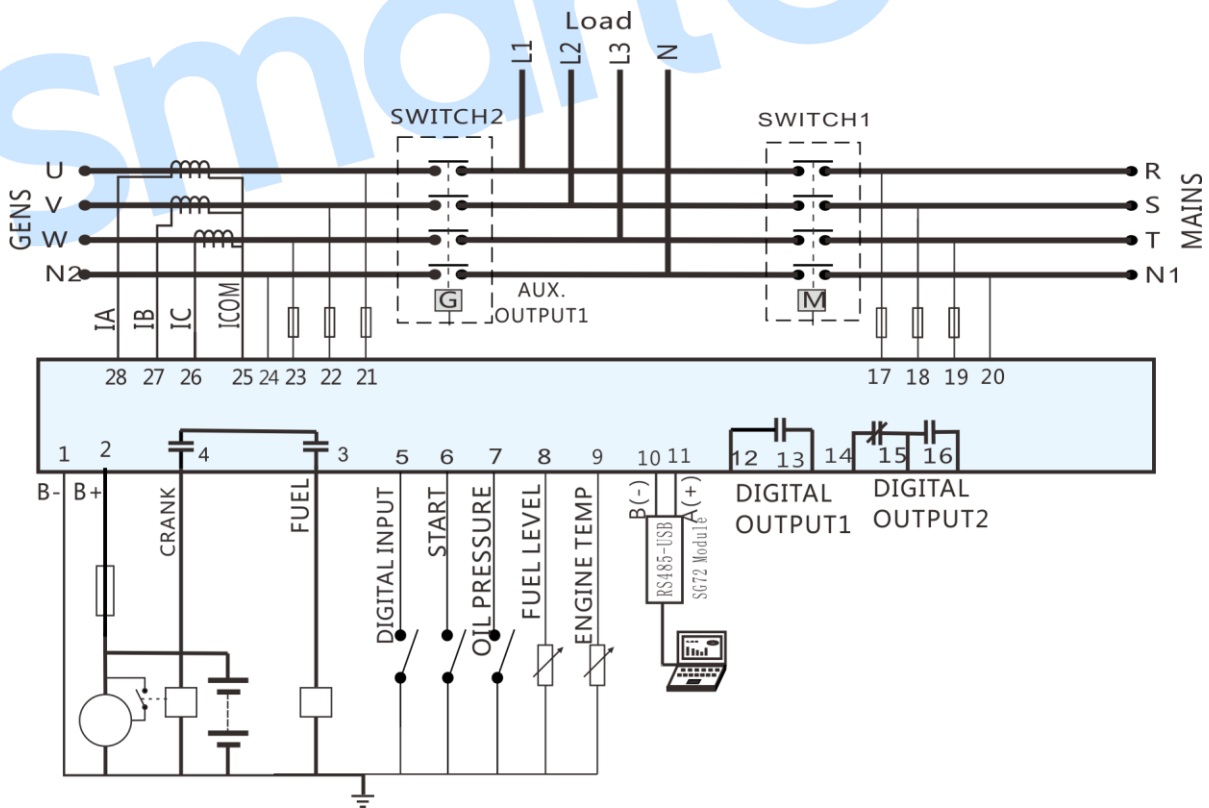


Fig. 8 MGC320 Typical Application Diagram

▲ CAUTION! Crank, fuel output ports shall expand big capacity relays.

▲ CAUTION! When sensor port is configured to "Digital High Input Active", hung up means high electrical level, and power positive connected is prohibited.

12 INSTALLATION

12.1 FIXING CLIPS

- The controller is panel-embedded design and it is fixed by clips in installation.
- Twist the fixing clip screw anticlockwise until it reaches proper position.
- Pull the fixing clip backwards (towards the back of the module), ensuring two clips are right inside their allotted slots.
- Turn the fixing clip screws firmly clockwise until they are fixed on the panel.

▲NOTE: Pay attention not to over tighten the clip screws.

12.2 OVERALL AND CUTOUT DIMENSIONS

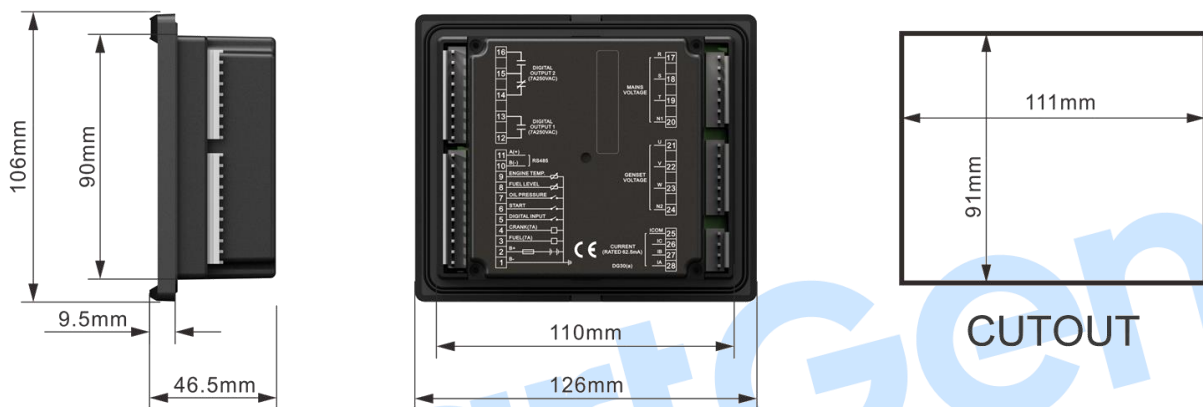


Fig. 9 Overall and Cutout Dimensions

— Battery Voltage Input

MGC300 controller is only suitable for DC(8~35)V battery voltage environment. Battery negative must be connected with the engine shell soundly. The diameter of the wire which connects controller power B+/B- and battery positive/negative must be over (or equal to) 1.5mm². If floating charger is configured, please firstly connect charger output wires to battery's positive and negative directly, and then connect battery's positive and negative and controller power's positive and negative individually with separated wires in order to prevent charger disturbing the controller's normal working.

— Output and Expand Relays

All outputs are relay contactor outputs. If relay expansion is needed, please add flyback diode (expansion relay coil has DC) to the two ends of expansion relay coils, or add resistance-capacity circuit (expansion relay coil has AC), in order to prevent disturbing controller or other devices.

— AC Current Input

MGC300 controller current input must connect outside CT. CT secondary side rated current must be 62.5mA, and at the same time CT phase and input voltage phase must be correct, otherwise the current sampling and active power may be incorrect.


⚠WARNING: When there is load current, CT secondary side open circuit is strictly prohibited.

— Withstand Voltage Test

When the controller has been installed in the control panel, if the high voltage test is conducted, please disconnect controller's all terminals in order to prevent high voltage entering controller and damaging it.

13 FAULT FINDING

Table 11 Fault Finding

Symptoms	Possible Solutions
Controller no response with power	Check starting batteries; Check controller wirings; Check DC fuse; Check whether  is pressed for 3s.
Genset shutdown	Check water/cylinder temp. is too high or not; Check Alternator voltage; Check DC fuse.
Low oil pressure alarm after crank disconnect	Check pressure digital input port and its wirings.
High water temp. alarm after crank disconnect	Check water temp. sensor and wire connections.
Shutdown alarm in running	Check related switches and the wirings according LED display information; Check digital input port.
Crank Failure	Check fuel circuit and its connections; Check starting batteries; Refer to engine manual.
Starter no response	Check starter connections; Check starting batteries.
Cannot connect PC software	Check whether 485 wires are connected reversely; Check whether PC software is right or not.