

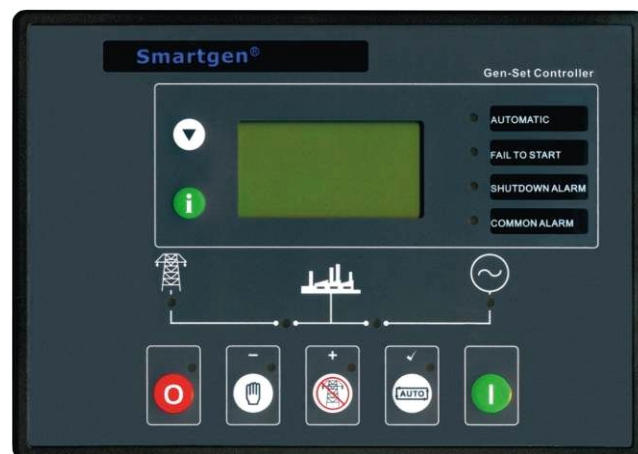
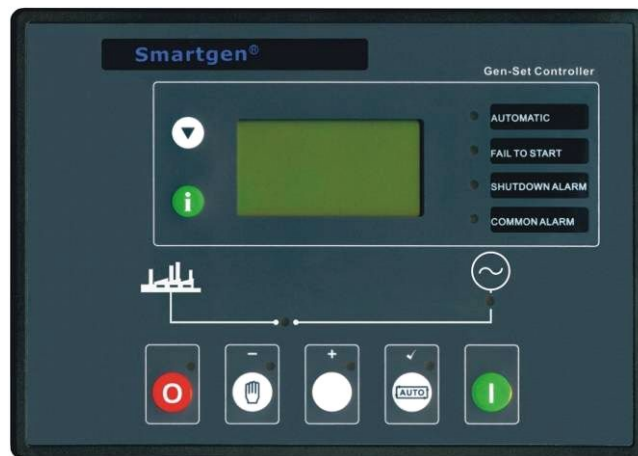
HGM6300G auto star module

Smartgen®

HGM6300G Series

Automatic Generator Module

User manual



SMARTGEN ELECTRIC

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Software Version

Version	Date	Note
1.0	2009-9-16	Original release.

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1. Summary

HGM6300G Series generator controller integrating digital, intelligent and network techniques is used for automatic control system of diesel generator. Also have GSM the message remote control and message warn the function of hinting .It can carry out functions including automatic start/stop, data measure and alarming. The controller uses LCD display, optional Chinese and English display interface with operation easy and reliable.

HGM6300G Series generator controller uses micro-processing technique which can carry out precision measure, constant value adjustment, timing and threshold setting and etc. of multi-parameters. It can be widely used in all types of generator automatic control system for compact structure, advanced circuits, simple connections and high reliability.

2. Performance and characteristics

- ◆ HGM6300 controller has two types:
 - HGM6310: ASM (Automatic Start Module)
 - HGM6320: AMF (Automatic Mains Failure Module)
- ◆ Using microprocessor as a core, graphics LCD with big screen and backlight, display between Chinese and English, key touch for operation.
- ◆ Precision measure and display of
 - mains voltage
 - mains frequency (Hz)
 - mains active power (kW)
 - mains apparent power (kVA)
 - mains power factor
 - generator voltage
 - generator current
 - generator frequency (Hz)
 - generator active power (kW)
 - generator apparent power (kVA)
 - generator power factor
 - generator hours count
 - generator cumulate electric energy (kWh)
 - generator temperature
 - generator pressure
 - generator fuel level
 - start battery voltage
- ◆ Configurable single phase 2 wires or three phase 3 wires or three phase 4 wires AC system input;
- ◆ Have message function; can setting 5 move correspond by letter terminal and controller correspondence. Can use to move correspondence terminal

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to send out an order to carry on a control to the controller, and when have the warning occurrence of constitution will return to move correspondence terminal;

- ◆ Control protection: Automatic start/stop, load transfer and alarming of generator;
- ◆ Parameters setting: Allow user to modify setting and store them inside internal FLASH memory, the parameters cannot be lost even with power down.
- ◆ Three channel analog inputs, may joint with Resistive-type temperature/ pressure/ fuel level sensors, Several temperature and pressure sensors can be used directly (ie. VDO, DATCON, CUMMINS), also may select “user defined” sensor via entering 16 point curves;
- ◆ Functions including RTC(real time clock) and hours count;
- ◆ Display of generator cumulated electric energy;
- ◆ Security password-protected programming levels.
- ◆ Several crank success conditions are optional;
- ◆ Built-in speed/frequency detecting units can accurately judge the states such as crank success and over speed;
- ◆ 99 historical records can be stored circularly and inquiring of the records can be made on site;
- ◆ Power supply range is wide, accommodating to different starting battery voltage environments;
- ◆ All parameters use digital modulation, abandoning analog modulation using conventional electronic potentiometer, reliability and stability are increased;
- ◆ Built-in watch dog can never be dead halt, ensuring smooth program execution;
- ◆ Modular configuration design, inserted type connection terminals, flush type installation, compact structure, easy installation.








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3. Specification

Operating Voltage	DC8. 0V to 35. 0V, Continuous Power Supply
Power Consumption	<3W
Alternator Input Range Single phase 2 wire 3-Phase 4 Wire 3-Phase 3 Wire 2-Phase 3 Wire	15V AC - 360 V AC (ph-N) 15V AC - 360 V AC (ph-N) 30V AC - 600 V AC (ph-ph) 30V AC - 600 V AC (ph-ph)
Alternator Input Frequency	50Hz - 60 Hz at rated engine speed
Magnetic Input Range	+/- 0. 5 V to 70 V Peak
Magnetic Input Frequency	10,000 Hz (max) at rated engine speed.
Start Relay Output	16 Amp DC at supply voltage.
Fuel Relay Output	16 Amp DC at supply voltage.
Auxiliary Relay Output (1-4)	(1-3) 16 Amp DC at supply voltage, (4) 6A 250VAC
Close Mains Relay	16A 250VAC free voltage contact
Close Generator Relay	16A 250VAC free voltage contact
Dimensions	240mm x 172mm x 57mm
Panel cutout	216mm x 160mm
Charge Fail / Excitation Range	0 V to 35 V
Operating Temperature Range	-25 to +70°C
Storage Condition	Temperature: (-40 to+ 70)°C
C. T. Burden	2. 5VA
C. T. Secondary	5A
Weight	0. 90kg


4. Operation

4.1. Key function

	Stop/ Reset key	This button places the module into its Stop/reset mode. When engine is running, pressing this key will stop the engine. When a shutdown alarm occur, pressing this key will reset alarm. In stop mode, pressing this key over 3 second will test LED mounted on the panel.
	Start key	In manual or manual test mode, pressing this key will start engine.
	Manual mode key/ Config '-' key	Pressing this key will set the module into manual mode. In setting parameter status, pressing this key will decrease setting value.
	Manual test mode/ Config '+' key	Pressing this key will set the module into manual test mode. In setting parameter status, pressing this key will increase setting value.
	Auto key / Config 'enter' key	Pressing this key will set the module into automatic mode. In setting parameter status, pressing this key will shift cursor or confirm setting value.
	View history record key	Pressing this key will view shutdown history records. Again pressing this key will quit.
	Scroll key	Pressing this key will scroll the screen.

4.2. Automatic operation

The following description details the sequences followed by a module containing the standard '*factory configuration*'. Always refer to your configuration source for the exact sequences and timers observed by any particular module in the field.

This mode is activated by pressing the  pushbutton. An LED indicator beside the button confirms this action.

When a **Remote Start** signal is applied to the remote start input (Hgm6310G) or when mains voltage occur over-voltage, under-voltage, over-frequency, under- frequency (Hgm6320G), the following sequence is initiated:

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To allow for false signals the **mains abnormal timer** is initiated (only Hgm6320G), Then the **Start Delay timer** is initiated. After this delay, if the pre-heat output option is selected then the pre-heat timer is initiated, and the corresponding auxiliary output (if configured) will energize.

NOTE: If the Remote Start signal is removed(Hgm6310G) during the Start Delay timer, or if mains voltage is normal (Hgm6320G) during the mains abnormal timer, the unit will return to a stand-by state.

After the above delays the Fuel Solenoid is energized, then one second later, the Starter Motor is engaged. The engine is cranked for a pre-set time period. If the engine fails to fire during this cranking attempt then the starter motor is disengaged for the pre-set rest period. Should this sequence continue beyond the set number of attempts, the start sequence will be terminated and **Fail to Start** fault will be displayed on the LCD screen.

When the engine fires, the starter motor is disengaged and locked out at a pre-set frequency from the Alternator output. Alternatively a Magnetic Pickup mounted on the flywheel housing can be used for speed detection (This is selected by PC using the 6300 series configuration software). Rising oil pressure can also be used to disconnect the starter motor, however it cannot be used for under speed or over speed detection.

After the starter motor has disengaged, the **Safety On timer** is activated, allowing **Oil Pressure, High Engine Temperature, Under-speed, Charge Fail** and any delayed Auxiliary fault inputs to stabilize without triggering the fault.




Once the engine is running, the **Warm Up timer**, if selected is initiated, allowing the engine to stabilize before accepting the load.

If an auxiliary output has been selected to give a **load transfer** signal, this would then activate.

NOTE: A load transfer will not be initiated until the Oil Pressure has risen. Thus preventing excessive wear on the engine.

On removal of the Remote Start signal, the **Stop delay** timer is initiated, once it has timed out, the **load Transfer** signal is de-energized, removing the load. The **Cooling timer** is then initiated, allowing the engine a cooling down period off load before shutting down. Once the **Cooling timer** expires the **Fuel Solenoid** is de-energized, bringing the generator to a stop.

4.3. Manual operation

● **HGM6320G**: This manual mode is activated by pressing the  pushbutton. This manual test mode is activated by pressing the  pushbutton. An LED indicator beside the button confirms this action. In any of the two mode, pressing the  pushbutton will initiate the start sequence.

If the **pre-heat** output option is selected this timer is then initiated, and the auxiliary output selected is energized.

After the above delay the **Fuel Solenoid** is energized, then the **Starter Motor** is engaged.

The engine is cranked for a pre-set time period. If the engine fails to fire during this cranking attempt then the starter motor is disengaged for the pre-set rest period. Should this sequence continue beyond the set number of attempts, the start sequence will be terminated and **Fail to Start** fault will be displayed on the LCD screen

When the engine fires, the starter motor is disengaged and locked out at a pre-set frequency from the Alternator output. Alternatively a Magnetic Pickup mounted on the flywheel housing can be used for speed detection (This is selected by PC using the 6300 series configuration software). Rising oil pressure can also be used to disconnect the starter motor, however it cannot be used for under speed or over speed detection.



After the starter motor has disengaged, the Safety On timer is activated, allowing Oil Pressure, High Engine Temperature, Under-speed, Charge Fail and any delayed Auxiliary fault inputs to stabilize without triggering the fault.

Once the engine is running, the Warm Up timer, if selected is initiated, allowing the engine to stabilize before it can be loaded.

In **manual** mode, generator take load or no load depend on mains supply, if mains is normal, it will not take load, otherwise it will take load.

In **manual test** mode, generator will take load regardless of mains supply normal or abnormal.

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● **Hgm6310**: This manual mode is activated by pressing the  pushbutton. An LED indicator beside the button confirms this action. In any of the two modes, pressing the  pushbutton will initiate the start sequence.

The start sequence is similar as the above.

In above process, when the Warm Up timer has expired, if the remote start signal is active, generator will take load, if inactive, generator will not take load.

In above process, pressing  key will bring the generator to a stop.

4.4. GSM SMS controls from a distance a function description

This function can let customer usage GSM move correspondence terminal equipments such as the cellular phone carry on remote control to the controller. Be circulating such as the now generator set, establish the generator set shut down, then can send out a message code **SMS STOP MODE**, be controller to return to code **SMS STOP MODE OK**, the machine set then stop circulating.

The message code is described as follows

Number	Message code	Explain
1	SMS STOP MODE	Shut down mode code, setting the controller is in shutting down mode Return: SMS STOP MODE OK
2	SMS MANUAL MODE	Manual mode code, setting the controller is in hand to manual mode Return: SMS MANUAL MODE OK
3	SMS TEST MODE	Manual test mode code, setting the controller is in manual test mode Return: SMS TEST MODE OK
4	SMS AUTO MODE	Auto mode code, setting controller is in auto mode Return: SMS AUTO MODE OK
5	SMS START	Start code, control the generator set to work(When controller was in manual mode or manual test mode this code effective) Return: SMS START MODE OK
6	SMS GENSET	Inspect code, inspect the controller current appearance Return:

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		Item	Content
		Generator description	Zhengzhou1234567890abcd
		Working mode	MANUAL MODE
		Working state	GENSET AT REST
		Mains	MAINS=230V
		Generate electricity	GENS=230V
		Generate frequency	F=50.0Hz
		Oil press	OPS=4.35Bar
		Temperature	WTP=55C
		Fuel	FLE=85%
		Battery electricity	BAT=27.5V

Note: Write the message code to all use English capital letter of alphabet, and have to strictly write according to the format in the manual. All code just meant while must wait until to return to correspond a code that operation was effective.

5. Protection

5.1. *Warning alarm /Pre-alarm*

Warnings or pre-alarms are non-critical alarm conditions and do not affect the operation of the generator system, they serve to draw the operators attention to an undesirable condition.

In the event of a warning alarm or pre-alarm, the module will display on the LCD screen.

Warning alarms is shown as the below:

HIGH ENGINE TEMPERATURE, if the module detects that the engine coolant temperature has exceeded the high engine temperature pre-alarm setting level after the Safety On timer has expired, a warning will occur.

LOW OIL PRESSURE, if the module detects that the engine oil pressure has fallen below the low oil pressure pre- alarm setting level after the **Safety On** timer has expired, a warning will occur.

OVERSPEED, if the engine speed exceeds the pre-alarm trip a warning is initiated.

UNDERSPEED, if the engine speed falls below the pre-set pre-alarm after the Safety On timer has expired, a warning is initiated.

LOSS OF SPEED SIGNAL, if the speed sensing signal is lost during cranking, a warning will occur.

GENERATOR HIGH FREQUENCY, if the module detects a generator output frequency in excess of the pre-set pre-alarm, a warning is initiated.

GENERATOR LOW FREQUENCY, if the module detects a generator output frequency below the pre-set pre-alarm after the Safety On timer has expired, a warning is initiated.

GENERATOR HIGH VOLTAGE, if the module detects a generator output voltage in excess of the pre-set trip a shutdown is initiated.

GENERATOR LOW VOLTAGE, if the module detects a generator output voltage below the below the pre-set pre- alarm after the Safety On timer has expired, a warning is initiated.

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GENERATOR HIGH CURRENT, if the module detects a generator output current in excess of the pre-set trip a warning is initiated.

FAIL TO STOP, If the module detects the engine is still running when the 'Fail to stop timer' expires, a warning is initiated.

BATTERY HIGH VOLTAGE, if the module detects that the plant DC supply has risen above the high volts setting level, a warning is initiated.

BATTERY LOW VOLTAGE, if the module detects that the plant DC supply has fallen below the low volts setting level, a warning is initiated.

AUXILIARY INPUTS, if an auxiliary input has been configured as a warning the appropriate information will be displayed.

5.2. Shutdowns

Shutdowns are latching and stop the Generator. The alarm must be cleared, and the fault removed to reset the module.

NOTE: The alarm condition must be rectified before a reset will take place. If the alarm condition remains it will not be possible to reset the unit (The exception to this is the Low Oil Pressure alarm, as the oil pressure will be low with the engine at rest). Any subsequent warnings or shutdowns that occur will be displayed steady, therefore only the first-up shutdown will appear displaying.

EMERGENCY STOP, removal of the +ve DC Supply from the Emergency Stop input initiates the following sequence, firstly it will initiate a controlled shutdown of the Generator and prevent any attempt to restart the Generator until the Emergency Stop push-button has been reset. Secondly it removes the +ve DC supply from both the Fuel Solenoid and Starter Solenoid.

HIGH ENGINE TEMPERATURE, if the module detects that the engine coolant temperature has exceeded the high engine temperature trip setting level after the Safety On timer has expired, a shutdown will occur.

LOW OIL PRESSURE, if the module detects that the engine oil pressure has fallen below the low oil pressure trip setting level after the Safety On timer has expired, a shutdown will occur.

OVERSPEED, if the engine speed exceeds the pre-set trip a shutdown is initiated.

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UNDERSPEED, if the engine speed falls below the pre-set trip after the Safety On timer has expired, a shutdown is initiated.

LOSS OF SPEED SIGNAL, if the speed sensing signal is lost during cranking, a shutdown is initiated.

GENERATOR HIGH FREQUENCY, if the module detects a generator output frequency in excess of the pre-set trip a shutdown is initiated.

GENERATOR LOW FREQUENCY, if the module detects a generator output frequency below the pre-set trip after the Safety On timer has expired, a shutdown is initiated.

GENERATOR HIGH VOLTAGE, if the module detects a generator output voltage in excess of the pre-set trip a shutdown is initiated.

GENERATOR LOW VOLTAGE, if the module detects a generator output voltage below the pre-set trip after the Safety On timer has expired, a shutdown is initiated.

GENERATOR HIGH CURRENT, if the module detects a generator output current in excess of the pre-set trip a warning is initiated. This warning will continue for a period of time depending upon the level of overload that the generator is subjected to, and the configuration setting for Generator Over Current in the 6300 series configuration software.

For instance the factory default settings for Generator High Current allow for a loading of the generator to 110% for one hour. That is to say if the generator load level exceeds the trip point by 10%, a warning alarm will occur while the overload condition exists. If the load level does not drop to normal levels within one hour, the engine is stopped, the 6300 module displaying either shutdown alarm or electrical trip alarm depend upon module configuration.

NOTE: Higher overload levels will result in a faster acting shutdown condition. For instance with the factory default configuration, an overload level twice that of the trip level (typically 200%) will result in a Generator High Current shutdown condition after 36 seconds. For details of the relationship between the overload and the shutdown time, please see the Appendix section of this manual.

FAIL TO START, if the engine does not fire after the pre-set number of attempts has been made a shutdown will be initiated.

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OIL PRESSURE SENDER OPEN CIRCUIT, if the module detects a loss of signal from the oil pressure sender (open circuit) a shutdown is initiated.

AUXILIARY INPUTS, if an auxiliary input has been configured as a shutdown the appropriate information will be displayed.

5.3. Electrical trips

Electrical trips are latching and stop the Generator but in a controlled manner. On initiation of the electrical trip condition the module will de-energize the **Load Transfer** Output to remove the load from the generator. Once this has occurred the module will start the Cooling timer and allow the engine to cool, off-load before shutting down the engine. The alarm must be accepted and cleared, and the fault removed to reset the module.

GENERATOR HIGH CURRENT, if the module detects a generator output current in excess of the pre-set trip a warning is initiated.

If this over current condition continues for an excess period of time, then the alarm is escalated to either a shutdown or electrical trip condition (depending upon module configuration). For further details of the over current alarm, please see Over Current Shutdown Alarm.

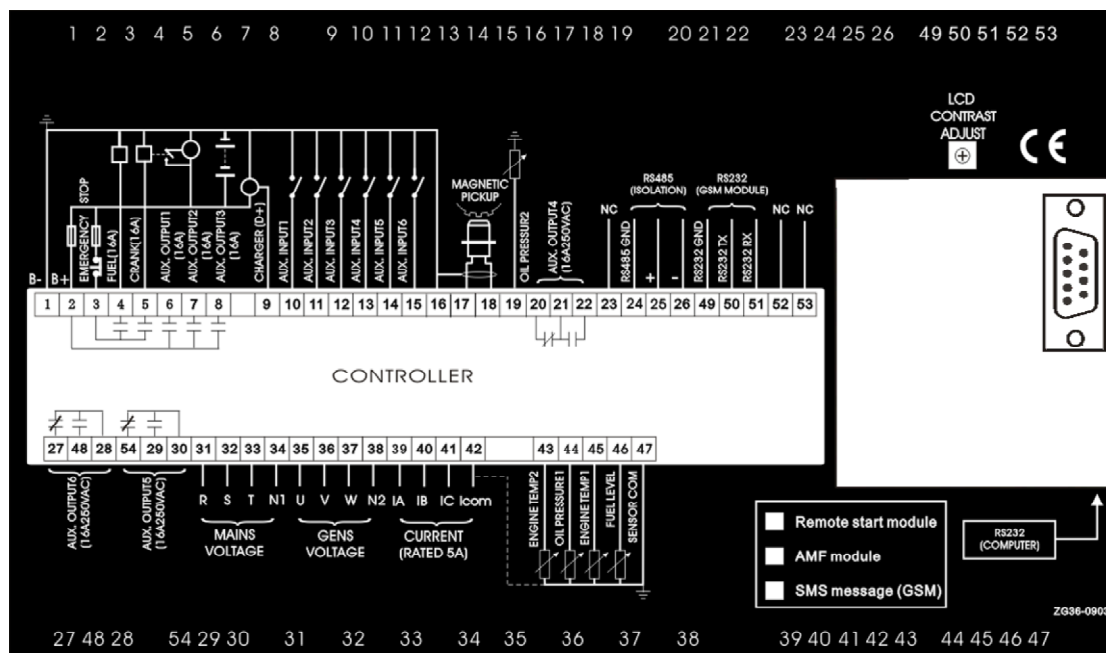
AUXILIARY INPUTS, if an auxiliary input has been configured as an electrical trip the appropriate information will be displayed.

5.4. *The message warns item*

Number	Item
1	EMERGENCY STOP
2	HIGH TEMP OF 1#
3	LOW OIL PRESS OF 1#
4	OVER SPEED SHUTDOWN
5	UNDER SPEED SHUTDOWN
6	LOSS OF SPEED
7	HIGH FREQ SHUTDOWN
8	LOW FREQ SHUTDOWN
9	HIGH VOLTAGE SHUTDOWN
10	LOW VOLTAGE SHUTDOWN
11	OVER CURRENT SHUTDOWN
12	FAILED TO START
13	PRESSURE1 SENSOR OPEN
14	INPUT1 SHUTDOWN
15	INPUT2 SHUTDOWN
16	INPUT3 SHUTDOWN
17	INPUT4 SHUTDOWN
18	INPUT5 SHUTDOWN
19	INPUT6 SHUTDOWN
20	OVER CURRENT TRIP
21	INPUT1 TRIP
22	INPUT2 TRIP
23	INPUT3 TRIP
24	INPUT4 TRIP
25	INPUT5 TRIP
26	INPUT6 TRIP
27	HIGH TEMP OF 2#
28	LOW OIL PRESS OF 2#

6. Connecting Terminal

The back board of HGM6310G and hgm6320G Controller is shown as follows:



Pin	Function	Dim	Description
1	DC Plant Supply Input (-ve)	2.5mm	System DC negative input. (Battery Negative).
2	DC Plant Supply Input (+ve)	2.5mm	System DC positive input. (Battery Positive).(Recommended Maximum Fuse 20A)
3	Emergency Stop Input	2.5mm	Plant Supply +ve. Also supplies fuel & start outputs. (Recommended Maximum Fuse 32A)
4	Fuel relay Output	2.5mm	Plant Supply +ve from pin 3. 16 Amp rated.
5	Start relay Output	2.5mm	Plant Supply +ve from pin 3. 16 Amp rated.
6	Auxiliary Output relay 1	2.5mm	Plant Supply +ve. 16 Amp rated.
7	Auxiliary Output relay 2	2.5mm	Plant Supply +ve. 16 Amp rated.
8	Auxiliary Output relay 3	2.5mm	Plant Supply +ve. 16 Amp rated.
9	Charge fail / excite	1.0mm	Do not connect to ground (battery -ve)
10	Auxiliary input 1	1.0mm	Switch to -ve
11	Auxiliary input 2	1.0mm	Switch to -ve

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Pin	Function	Dim	Description
12	Auxiliary input 3	1.0mm	Switch to -ve
13	Auxiliary input 4	1.0mm	Switch to -ve
14	Auxiliary input 5	1.0mm	Switch to -ve
15	Auxiliary input 6	1.0mm	Switch to -ve
16	Functional Earth	1.0mm	Connect to a good clean earth point
17	Magnetic pickup +ve	1.0mm	Connect to Magnetic Pickup device
18	Magnetic pickup -ve	1.0mm	
19	Oil Pressure ² Input	1.0mm	Connect to Oil pressure ² sender
20	Auxiliary Output relay 4	2.5mm	Free voltage contacts. 16 Amp rated.
21			
22			
23	NC		
24	RS485 port Common	0.5mm	Use only 120Ω RS485 approved cable
25	RS485 port A(+)	0.5mm	
26	RS485 port B(-)	0.5mm	
27	Auxiliary Output relay 6 (close mains output)	2.5mm	Free voltage contacts, N/C, 16 Amp rated.
28			
48			
29	Auxiliary Output relay 5 (Close generator output)	2.5mm	Free voltage contacts, N/O, 16 Amp rated.
30			
54			
31	Mains L1 voltage Monitoring	1.0mm	Connect to mains L1 output (Recommend 2A fuse)
32	Mains L2 voltage monitoring	1.0mm	Connect to mains L2 output (Recommend 2A fuse)
33	Mains L3 voltage monitoring	1.0mm	Connect to mains L3 output (Recommend 2A fuse)
34	Mains Neutral input	1.0mm	Connect to mains Neutral terminal
35	Generator L1 voltage monitoring	1.0mm	Connect to Generator L1 output (Recommend 2A fuse)
36	Generator L2 voltage monitoring	1.0mm	Connect to Generator L2 output (Recommend 2A fuse)
37	Generator L3 voltage monitoring	1.0mm	Connect to Generator L3 output (Recommend 2A fuse)
38	Generator Neutral input	1.0mm	Connect to Generator Neutral terminal (AC)
39	CT Secondary for L1	2.5mm	Connect to secondary of L1 monitoring CT
40	CT Secondary for L2	2.5mm	Connect to secondary of L2 monitoring CT

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Pin	Function	Dim	Description
41	CT Secondary for L3	2.5mm	Connect to secondary of L3 monitoring CT
42	CT secondary common	2.5mm	Connect to secondary of all monitoring CT's
43	Coolant Temperature2 Input	-	
44	Oil Pressure1 Input	1.0mm	Connect to Oil pressure sender
45	Coolant Temperature1 Input	1.0mm	Connect to Coolant Temperature sender
46	Fuel Level input	1.0mm	Connect to Fuel Level sender
47	Sender Common Return	1.0mm	Return feed for senders
49	RS232GND	0.5mm	Connect the GSM module
50	RS232TXD		
51	RS232RXD		
52	NC		
53	NC		
	RS232 COMPUTER		Supervise and control and install the parameter

PART CONNECTOR FUNCTION DETAILS

1. Emergency Stop input. Internally linked to Starter and Fuel outputs. If this input is not connected to positive the module will be locked out, and if the engine is running it will shutdown immediately. The Positive Supply is also removed from Starter and Fuel outputs, therefore only a single pole Emergency Shutdown button is required.
2. Charge Fail input / Excitation output. Supplies excitation to the Plant Battery Charging Alternator, also an input for the Charge Fail detection circuitry.
3. Auxiliary input. This is a negative switched configurable input. It is possible to configure the input to be a normally closed signal or a normally open signal.
4. RS485 port. Use only screened 120Ω cable approved specifically for use in RS485 applications.
5. Sensor sensing input. Connect to resistive type sender.



7. Configuration


Although full configuration of the module is possible using the 6300 series configuration software, selected parameters that may require adjustment in the field are able to be adjusted via the module's fascia.

NOTE: Care should be taken to ensure that changes made via the front panel editor are carefully recorded and fed back to the generator supplier if applicable. This is to safeguard against using the 6300 series configuration software to configure the module at a later date, possibly overwriting the changes made using the front panel editor. When using the 6300 series configuration software to make configuration changes, the first operation should be to "read configuration from controller" to ensure that any changes made to the controller's configuration by the front panel editor are 'loaded' into the PC before any changes are made.

Full details of this procedure can be found in the 6300 series configuration software manual.

7.1. Parameter Setting

Pressing down both  and  keys will show the interface to enter password. The default password is "1234" when it leaves factory. When setting each item, after selecting this item, press the key 'enter' to enter the setting interface, then press the key '-' or '+' to adjust the numerical value, press the key 'enter' to move the cursor, finally press the key 'enter' to confirm the set parameter, here if the inner buzzer hoot for 3 times quickly, it indicate the setting t value in excess of the limited, if the inner buzzer hoot for one long period time, it indicate that the value has be saved.

In setting process, pressing  key will quit and return main LCD screen.

Configurable parameters is shown in the below table.

Parameter	Range	Default	Remark
01 Oil pressure1 warn	(1-399)kPa	124kPa/ 18. 0PSI	Return: 138kPa/ 20. 0PSI
02 Oil pressure1 stop*3	(0-398)kPa	103kPa/ 14. 9PSI	
03 Engine temp1 warn	(81-139)°C	90°C/ 194°F	Return: 88°C/190°F
04 Engine temp1 stop*4	(82-140)°C	95°C/ 203°F	

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Parameter	Range	Default	Remark
05 Fuel level (warning)	(0-100)%	10%	
06 Start delay	(0-9999s)	5s	
07 Pre-heat delay	(0-300s)	0s	
08 Cranking time	(3-60s)	5s	
09 Crank rest time	(3-60s)	10s	
10 Safety on time	(5-60s)	10s	
11 Over speed delay	(0-10s)	2s	
12 Start idle time	(0-3600s)	10s	
13 Warm up time	(0-3600s)	30s	
14 Transfer time	(0-600s)	2s	
15 Return time	(0-9999s)	30s	
16 Cooling time	(0-3600s)	60s	
17 Stop idle time	(0-3600s)	10s	
18 ETS Solenoid hold	(0-120s)	20s	
19 Fail to stop delay	(10-120)s	30s	
20 Gen. transient	(0-30s)	5s	
21 Mains transient *1	(0-30s)	2s	
22 Mains under volt *1	(50-360V /624) *2	184V	Return: 207V
23 Mains over volt*1	(50-360V /624) *2	276V	Return: 253V
24 Mains under freq *1	(0-75Hz)	45. 0Hz	Return: 48. 0Hz
25 Mains over freq*1	(0-75Hz)	55. 0Hz	Return: 52. 0Hz
26 Generator UV (shutdown)	(50-360V /624) *2	184V	
27 Generator UV (warning)	(50-360V /624) *2	196V	Return: 207V
28 Generator OV (warning)	(50-360V /624) *2	265V	Return: 253V
29 Generator OV (shutdown)	(50-360V /624) *2	273V	
30 Generator UF (shutdown)	(0-74. 8 Hz)	40. 0Hz	
31 Generator UF (warning)	(0. 1-74. 9 Hz)	42. 0Hz	
32 Generator OF (warning)	(0. 1-74. 9 Hz)	55. 0Hz	Return: 52. 0Hz
33 Generator OF (shutdown)	(0. 2-75 Hz)	57. 0Hz	

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Parameter	Range	Default	Remark
34 Over current	(50-120%)	100%	
35 Flywheel teeth	(10-500)	118	
36 Under speed (shutdown)	(0-5998 RPM)	1270	
37 Under speed (warning)	(1-5999 RPM)	1350	Return: 1380RPM
38 Over speed (warning)	(1-5999 RPM)	1650	Return: 1620RPM
39 Over speed (shutdown)	(2-6000 RPM)	1710	
40 Over speed shoot	(0-10%)	0	
41 Battery under volt (warning)	(0-39.9 V)	8.0V	
42 Battery over volt (warning)	(0.1-40V)	33.0V	
43 Charge fail volt (warning)	(0-39V)	6.0V	
44 Language select	(0-1)	0	0: 简体中文 1: English
45 Change password	(0-9999)	1234	
46 Oil pressuer2 warn	(1-399)kPa	124kPa/ 18.0PSI	Return: 138kPa/ 20.0PSI
47 Oil pressuer2 stop	(0-398)kPa	103kPa/ 14.9PSI	
48 Engine temp2 warn	(81-139)°C	90°C/ 194°F	Return: 88°C/190°F
49 Engine temp2 stop	(82-140)°C	95°C/ 203°F	
50 Generator CT	(5-6000:5A)	500	
51 Oil press1 sensor	1-14	VDO10 bar	
52 Temp1 sensor	1-13	VDO 120 °C	
53 Fuel level sensor	1-11	VDO ohm (10-180)	
54 Oil press2 sensor	1-13	Not used	
55 Temp2 sensor	1-12	Not	

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Parameter	Range	Default	Remark
		used	
56 Module address	1-254	1	
57 Temperature unit	0-1	°C	
58 Pressure unit	0-2	Kpa	
59 Phone number 1	At most 16 bit		
60 Phone number 2			
61 Phone number 3			
Note:			
*1: Only HGM6320G is used			
*2: 360V is Line-Nature voltage, 624V is Line-Line voltage (3-phase 3 wires).			
*3: If Low pressure (shutdown) set to 0, a stop signal is inhabitable.			
*4: If high temperature (shutdown) set to 140, a stop signal is inhabitable.			

Other parameters configuration, (only adjust via 6300 configurable software)



Parameter	Default
Address	1
Generator	Yes
Generator pole number	4
Magnetic Pickup Unit	Yes
AC system	3-phase 4 wires
Fast loading feature	No
Start number	3
Immediate mains dropout	Not used
Voltage transformer	No
Oil pressure sensor	VDO 10Bar
Engine temperature sensor	VDO 120 degrees C
Fuel level sensor	VDO Ohm Range (10-180)
Fuel pump control	No
Digit input1	Remote start on load, close to active
Digit input2	Indication, close to active, always active
Digit input3	Warning, close to active, always active
Digit input4	Shutdown, close to active, always active
Digit input5	Shutdown, close to active, active from safety on
Digit input6	Electrical trip, close to active, always active
Digit output1	Preheat output (during preheat timer)
Digit output2	Common alarm
Digit output3	ETS output
Digit output4	Idle / run control
Digit output5	Close generator
Digit output6	Close mains (HGM6320) Not used (HGM6310)

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Parameter	Default
LED1	System in stop mode
LED2	Fail to start
LED3	Common shutdown alarm
LED4	Common alarm
Current transformer first side current	500A
Generator full current	500A
Delayed over current percent	100% (500A)
Time multiplier (over current)	36
Action (over current)	Electrical trip
Generator frequency (starter disconnect)	15Hz
Engine speed (starter disconnect)	450RPM
Oil pressure (starter disconnect)	Not used
Detect oil pressure during cranking	Yes
Schedule start	No

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7.2. Editing the current data/time

Pressing down both the  key and  key will show the setting data/time interface. The setting sequence is year -month -date (week) hour :minute :second.


Note: Setting must be in stop mode.

7.3. Digit input 1-6

The below parameters only can be set by HGM6300G configurable software.

Content	Description
User configured	<p>The input is configured to perform an auxiliary function, this may be any of the following:</p> <p>Indication (annunciation only, no alarm or shutdown) Warning (Alarm only, no shutdown) Shutdown (Alarm and shutdown) Electrical Trip (Alarm/off-load generator followed by shutdown after cooling)</p> <p>The function also has an activation time associated with it chosen from the following list:</p> <p>Never active -This switches off the input if not in use. Always active -The input selected to be an indication or alarm even when the module is in the STOP/RESET MODE. Active from starting -The Auxiliary input is only active once an attempt to start the generator is made. It will remain active until the generator is at rest again. Active from safety on - Auxiliary inputs are only active once the Safety On timer has timed out. This allows a delay on start up for faults, such as Oil Pressure and High Engine Temperature Warnings, or other shutdown conditions which require a delay during start-up, such as Under-voltage.</p>
Alarm mute	When active, this will disable an output configured to 'audible alarm', without resetting the module's alarm condition.
Reset alarm	When an alarm is active, it will be cleared.
Control at gate input	When the control at gate switch input, sending out to report to the police the signal
Auxiliary Mains Fail	The 6320T module will monitor the incoming single or three phase supply for Over Voltage, Under Voltage, Over Frequency or Under Frequency. It may be required to monitor a different mains supply or some aspect of the incoming mains not monitored by the module. If the devices providing this additional monitoring are connected to operate this input, the 6320T will operate as if the incoming mains supply has fallen outside of limits, the generator will be instructed to start and take the load. Removal of the input signal will cause the module to act if the mains has returned to within limits.
Reversed	This input is used to provide feedback to allow the 6320T to give

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Content	Description
	true indication of the contactor or circuit breaker switching status. It should be connected to the generator load switching device auxiliary contact.
Reversed	
Lamp Test	This input is used to provide a test facility for the front panel indicators fitted to the 6320T module. When the input is activated all LED and LCD indicators will illuminate.
Reversed	
Reversed	
Panel Lock	This input is used to provide security to the installation. If the Panel lock input is active, the module will not respond to operation of the Mode select or start buttons. This allows the module to be placed into a specific mode (such as Auto) and then secured. The operation of the module is not affected and the operator will still be able to view the various instrumentation pages etc. (<i>Front panel configuration access is barred while system lock is active</i>). When active, the  icon will display on line 1 of the LCD display.
Remote Start on load	If this input is active, the 6320G will operate thus: To use this function the 6320G should be placed in the AUTO mode. The module will perform the start sequence as described earlier in this manual.
Remote Start off load	If this input is active operation will be similar to the 'Remote Start on load' function except that the generator will not be instructed to take the load. This function can be used where an engine only run is required e. g. for exercise.
Scheduled run inhibit	In automatic mode, this will inhibit the engine to scheduled run.
Reversed	

7.4. Digit output 1-6

The below parameters can only be set by 6320T configurable software.

Content	Description
Output Not Used	The output is not used.
Air flap Relay	The output controls the closing of the air-flaps in an Emergency Stop or Over-speed situation.
Audible alarm	This output is intended to drive an external Klaxon or alarm indicator and will be active upon the module triggering a warning, shutdown or electrical trip alarm. This external alarm can be 'muted', without resetting the module's alarm condition by activating an auxiliary input that has been configured to "Alarm Mute".
Battery High Voltage	This output indicates that a Battery High Voltage alarm has occurred.
Battery Low Voltage	This output indicates that a Battery Low Voltage alarm has occurred.
Wind machine control	When the temperature exceeds the scope of the enactment, opening the Wind machine. When the temperature is low in set the scope, the close Wind machine
GSM communication failure	When GSM mold piece can't normally communication act
GSM Power	Control a power supply, be GSM mold piece can't normally communication, control the GSM mold piece to re- start
Start relay energized	The output mimics the operation of the start relay. Can be used to control external logic circuitry.
Fuel relay energized	The output mimics the operation of the fuel relay. Can be used to control external logic circuitry.
Calling for Scheduled run	This output indicates that a scheduled run is in progress.
Charge alternator failure	This output indicates that a failure of the auxiliary charging alternator on the generator has occurred.
ATS2 control	Control the ATS2 switch
Reversed	
ATS1 control	Control the ATS1 switch
Reversed	
Combined under & over Frequency warning	The output indicates that either an under frequency or over frequency warning has been activated.

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Content	Description
Combined under & over Frequency shutdown	The output indicates that either an under frequency or over frequency shutdown has been activated.
Combined under & over voltage shutdown	The output indicates that either an under voltage or over voltage shutdown has been activated.
Combined under & over voltage warning	The output indicates that either an under voltage or over voltage warning has been activated.
Common alarm	The output indicates that a warning, electrical trip or shutdown alarm has been activated. Reset rules as above, depending on whether it is a Warning or a Shutdown fault.
Common Electrical Trip alarm	The output indicates that an electrical trip alarm has been activated. This output can only be reset by removal of the fault and by then pressing the Stop Reset button.
Common Shutdown alarm	The output indicates that a shutdown alarm has been activated. This output can only be reset by removal of the fault and by then pressing the Stop Reset button or by using an external 'Alarm Reset' Input.
Common Warning alarm	The output indicates that a warning alarm has been activated. This output is normally self-resetting on removal of the fault. However, it is possible to configure the module such that the warning alarms are
Coolant temperature high pre-alarm	This output indicates that a high engine coolant temperature warning (pre-alarm) has occurred.
Coolant temperature high shutdown	This output indicates that a high engine coolant temperature shutdown has occurred.
Cooling down timer in progress	This output source will be active when the cooling off-load timer is running.
Reserved	
Digital Input 1 active	This output indicates that Digital input 1 is active.
Digital Input 2 active	This output indicates that Digital input 2 is active.
Digital Input 3 active	This output indicates that Digital input 3 is active.
Digital Input 4 active	This output indicates that Digital input 4 is active.
Digital Input 5 active	This output indicates that Digital input 5 is active.
Digital Input 6 active	This output indicates that Digital input 6 is active.
Emergency Stop	This output indicates that an Emergency stop alarm has occurred.
Energize to stop	The output controls the fuel solenoid on an ETS type generator, energizing for the time period selected in the Edit Timer Menu. The normal fuel output (pin 4)

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Content	Description
	should not be connected to the fuel solenoid, however it can be used for controlling panel instruments and other functions required whilst the engine is running.
Fail to start alarm	The output indicates that the engine has not started after the specified number of attempts, selected in the Edit Miscellaneous Menu.
Fuel Pump Control	The output is used to control a fuel transfer pump. Once the 'fuel pump on' level has been reached the module will activate the fuel pump control output. This output will remain active until the 'fuel pump off' level is reached.
Generator Available	This output indicates when the generator is ready to accept load, i. e. after safety on and warm up timers have timed out. It could be used to connect to an Automatic Transfer System or PLC to give a signal that the set is available.
Generator High Frequency Pre-alarm	This output indicates that a Generator High Frequency Warning (pre- alarm) has occurred.
Generator High Frequency Shutdown	This output indicates that a Generator High Frequency Shutdown has occurred.
Generator High Voltage Pre-alarm	This output indicates that a Generator High Voltage Warning (pre- alarm) has occurred.
Generator High Voltage Shutdown	This output indicates that a Generator High Voltage Shutdown has occurred.
Generator Low Frequency Pre-alarm	This output indicates that a Generator Low Frequency Warning (pre- alarm) has occurred.
Generator Low Frequency Shutdown	This output indicates that a Generator Low Frequency Shutdown has occurred.
Generator Low Voltage Pre-alarm	This output indicates that a Generator Low Voltage Warning (pre- alarm) has occurred.
Generator Low Voltage Shutdown	This output indicates that a Generator Low Voltage Shutdown has occurred.
Louver control	The output controls the opening of the louvers on engine starting and closure when engine has stopped.
Low Fuel Level	This output indicates that the level of fuel has fallen below the low fuel alarm trip point.
Loss of speed	This output indicates that a loss of speed alarm has occurred.
Mains Failure	This output indicates that the module has sensed that a failure of the incoming AC mains supply. This output will become active whenever the mains

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Content	Description
	voltage or frequency goes out of limits, or if the auxiliary mains failure input active (if used) and the mains transient timer has expired.
Mains High frequency	This output indicates that the module has sensed that the incoming AC mains supply has exceeded the frequency limit setting.
Mains High voltage	This output indicates that the module has sensed that the incoming AC mains supply voltage has exceeded the voltage limit setting.
Mains Low frequency	This output indicates that the module has sensed that the incoming AC mains supply has fallen below the frequency setting.
Mains Low voltage	This output indicates that the module has sensed that the incoming AC mains supply voltage has fallen below the voltage limit setting.
Oil pressure low Pre-alarm 1#	This output indicates that a low oil pressure warning (pre-alarm) has occurred.
Oil pressure low Shutdown 1#	This output indicates that a low oil pressure shutdown has occurred.
Oil Press sender Open circuit	This output indicates that the module has detected an open circuit failure in the Oil Pressure transducer circuit.
ATS to Mains	Mains on load
ATS to Gens	Gens on load
Reserve	
Reserve	
Over current Pre-alarm	This output indicates that the over-current warning (pre-alarm) level has been reached.
Over current trip	This output indicates that the over-current trip level has been reached.
Over speed Pre-alarm	This output indicates that an over speed warning (pre-alarm) has occurred.
Over speed Shutdown	This output indicates that an over speed shutdown has occurred.
Pre-heat (during preheat timer)	The output controls the pre-heater. Pre-heat output is available for the duration of the pre-heat timer, which terminates prior to cranking.
Pre-heat (until end of cranking)	The output controls the pre-heater. As 'Pre-heat (during preheat timer)' mode but pre-heat is also available during cranking.
Pre-heat (until end of warming)	The output controls the pre-heater. As 'Pre-heat (until safety on)' but pre-heat continues to be

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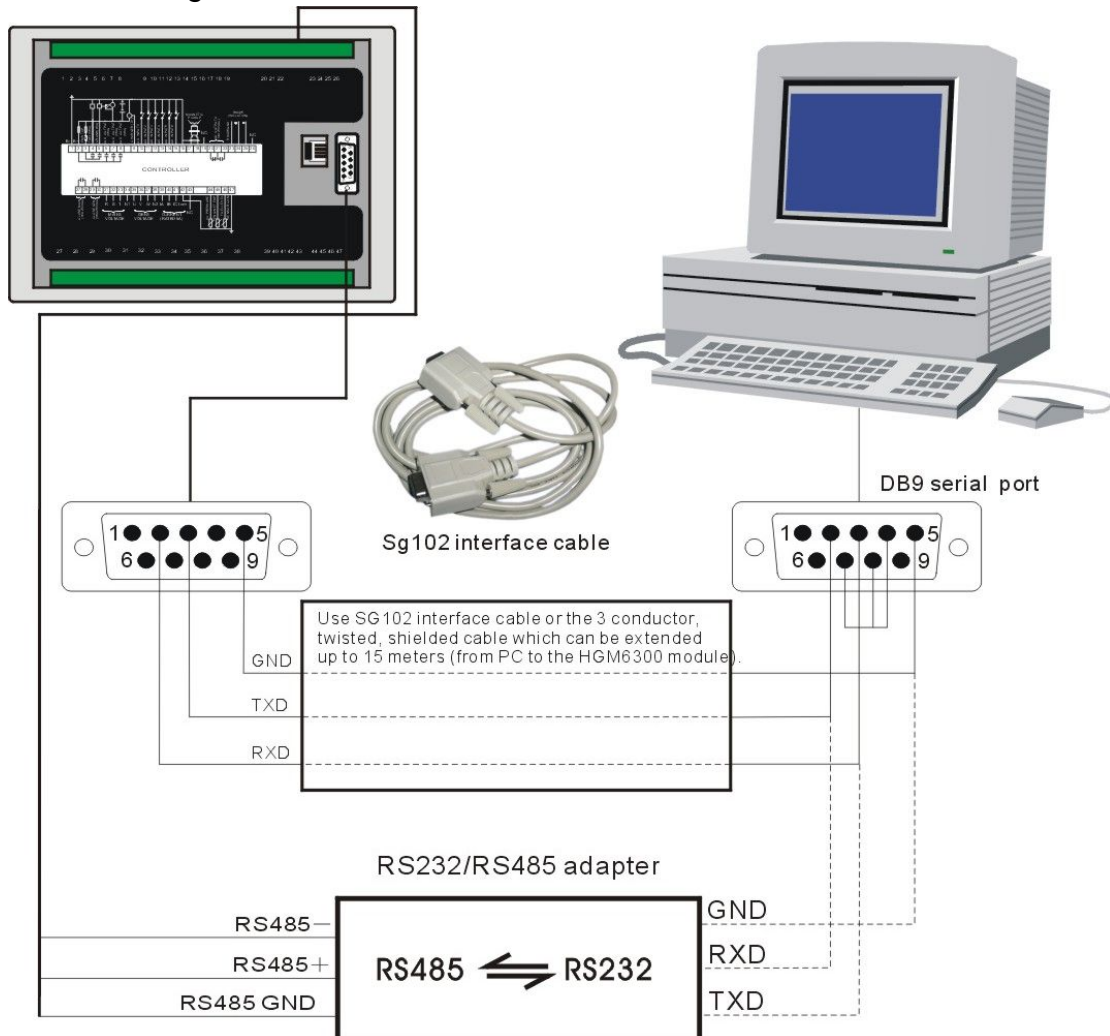
Content	Description
	available until the warm-up timer has elapsed
Pre-heat (until safety on)	The output controls the pre-heater. As 'Pre-heat (until end of cranking)' but pre-heat is also available while waiting for the delayed alarms to become active.
Open breaker	This output source is intended to be used to control the load switching device. Whenever the 6320 module has taken load this control source will be active.
System in Manual Test Mode	This output indicates that the module is in the test mode.
System in Auto Mode	The output indicates that the module is in the Auto mode.
System in Manual Mode	This output indicates that the module is in the manual mode.
System in Stop Mode	The output indicates that the module is in the Stop mode.
Under speed Warning	This output indicates that an under speed warning (pre-alarm) has occurred.
Under speed Shutdown	This output indicates that an under speed shutdown has occurred.
Waiting for manual restore	This output indicates that an auto restore inhibit has occurred.
Idle/ run control	This output is active from cranking, continues to be active until the start idle timer has elapsed; Also this output is active during the period of the stop idle timer, continues to be active until the engine has stopped.
Reversed	-
Raise speed	This output is active during the warming up timer.
Excite generator	This output is available for the period of the crank timer. This output will energize for 2 second during the period of the safety on timer if generator has no voltage.
Drop speed	This output is available during the period of the coolant down timer, and remain until the engine has stopped.
Preset to Lubricate	This output is active from cranking, continues to be active until the safety timer has elapsed.
Ambient temperature Very high	The temperature lead high, and exceeded the warning the temperature value give alarm
Reserve	
Oil pressure low pre-alarm	This output indicates that a low oil pressure warning

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Content	Description
for 2#"	(pre-alarm) has occurred.
Oil pressure low shutdown for 2#	This output indicates that a low oil pressure shutdown has occurred.

8. Link to PC

This below figure shows the link from PC to HGM6300G module.



9. Fault find

Symptom	Possible Remedy
Unit is inoperative	Check the battery and wiring to the unit. Check the DC supply. Check the DC fuse.
Unit shuts down	Check DC supply voltage is not above 35 Volts or below 8 Volts. Check the operating temperature is not above 70 °C. Check the DC fuse.
Unit locks out on Emergency Stop	If an Emergency Stop Switch is not fitted, ensure that a positive is connected to the Emergency Stop input. Check emergency stop switch is functioning correctly. Check Wiring is not open circuit.
Intermittent Magnetic Pick- up sensor fault	Ensure that Magnetic pick-up screen is only connected at one end, if connected at both ends, this enables the screen to act as an aerial and will pick up random voltages.
Low oil Pressure fault operates after engine has fired	Check engine oil pressure. Check oil pressure switch/ sender and wiring. Check configured polarity (if applicable) is correct (i.e. Normally Open or Normally Closed) or that sender is compatible with the 6300 Module and is correctly configured.
High engine temperature fault operates after engine has fired.	Check engine temperature. Check switch/sender and wiring. Check configured polarity (if applicable) is correct (i.e. Normally Open or Normally Closed) or that sender is compatible with the 6300 Module.
Shutdown fault operates	Check relevant switch and wiring of fault indicated on LCD display. Check configuration of input.
Warning fault operates	Check relevant switch and wiring of fault indicated on LCD display. Check configuration of input.
Fail to Start is activated after pre-set number of attempts to start	Check wiring of fuel solenoid. Check fuel. Check battery supply. Check battery supply is present on the Fuel output of the module. Check the speed sensing signal is present on the 6300 inputs. Refer to engine manual.
Continuous starting of generator when in AUTO	Check that there is no signal present on the "Remote Start" input. Check configured polarity is correct.
Generator fails to start on receipt of Remote Start signal.	Check Start Delay timer has timed out. If remote start fault, check signal is on "Remote Start" input. Confirm input is configured to be used as "Remote Start".
Pre-heat inoperative	Check wiring to engine heater plugs. Check battery supply. Check battery supply is present on the Pre-heat output of module. Check pre-heat has been selected in your configuration.
Starter motor inoperative	Check wiring to starter solenoid. Check battery supply.

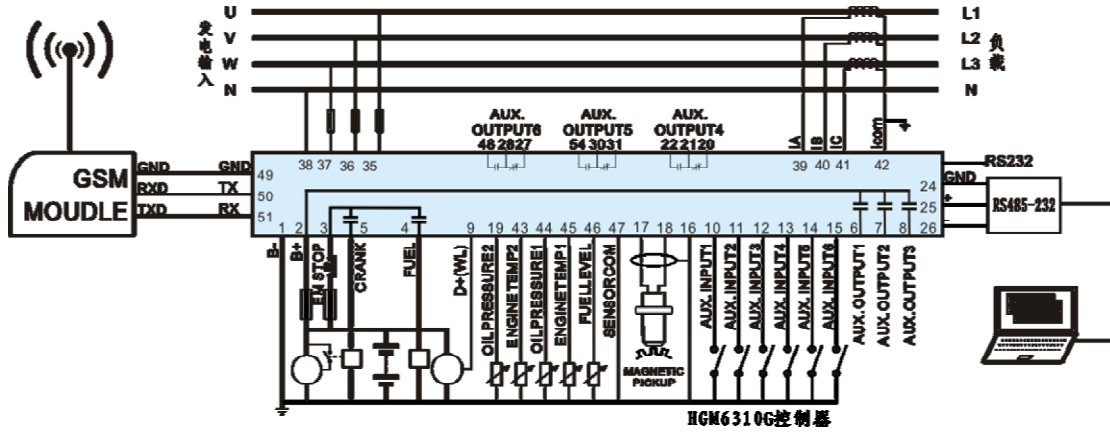
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Symptom	Possible Remedy
	Check battery supply is present on the Starter output of module. Ensure that the Emergency Stop input is at +Ve.
Engine runs but generator will not take load	Check Warm up timer has timed out. Ensure generator load inhibit signal is not present on the module inputs.
Incorrect reading on Engine gauges	Check engine is operating correctly. Check sender and wiring paying particular attention to the wiring to terminal 47. Check that sender is compatible with the 6300 Module and is correctly configured.

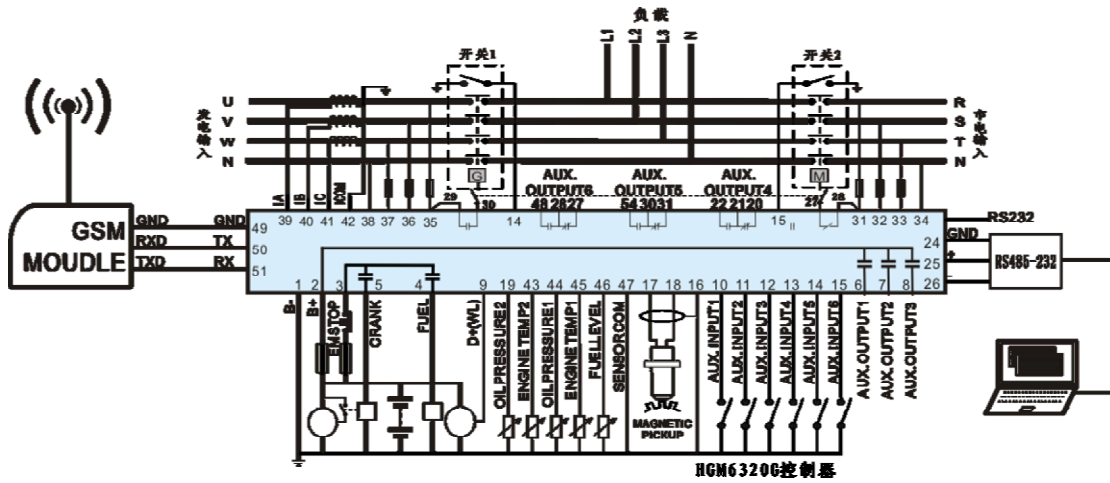
10. Typical wiring diagram

10.1. 3-phase 4 wires

HGM6310G general wiring diagram

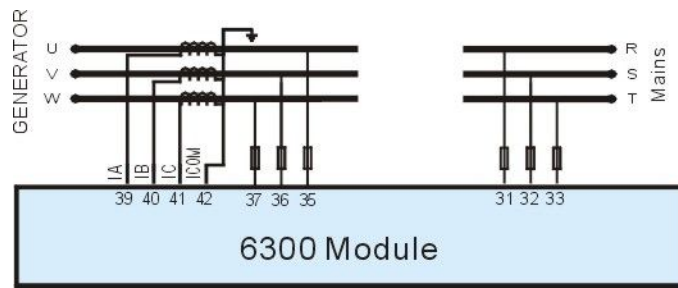


HGM6320G general wiring diagram



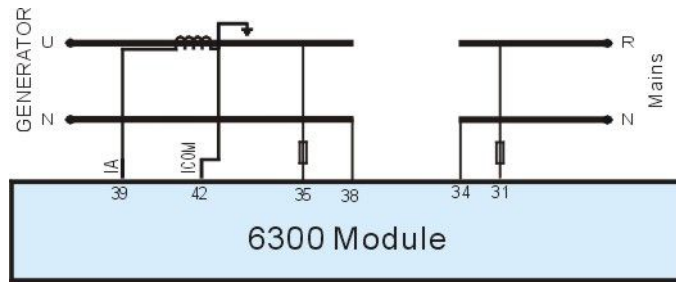
HGM6300G auto star module

10.2. 3-phase 3 wires

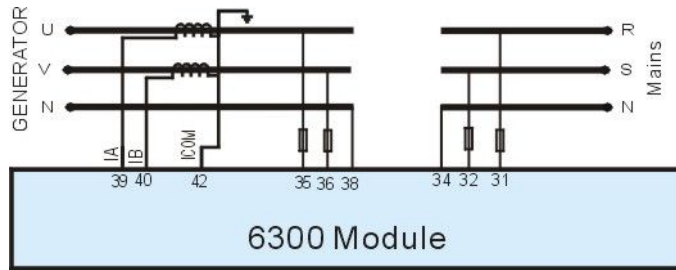


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10.3. Single phase 2 wires



10.4. 2-phase 3 wires



11. Installation

The controller is designed to panel installation mode, and it is fixed by clamps when it is installed. The overall dimension and panel tapping dimension are given as follows:

