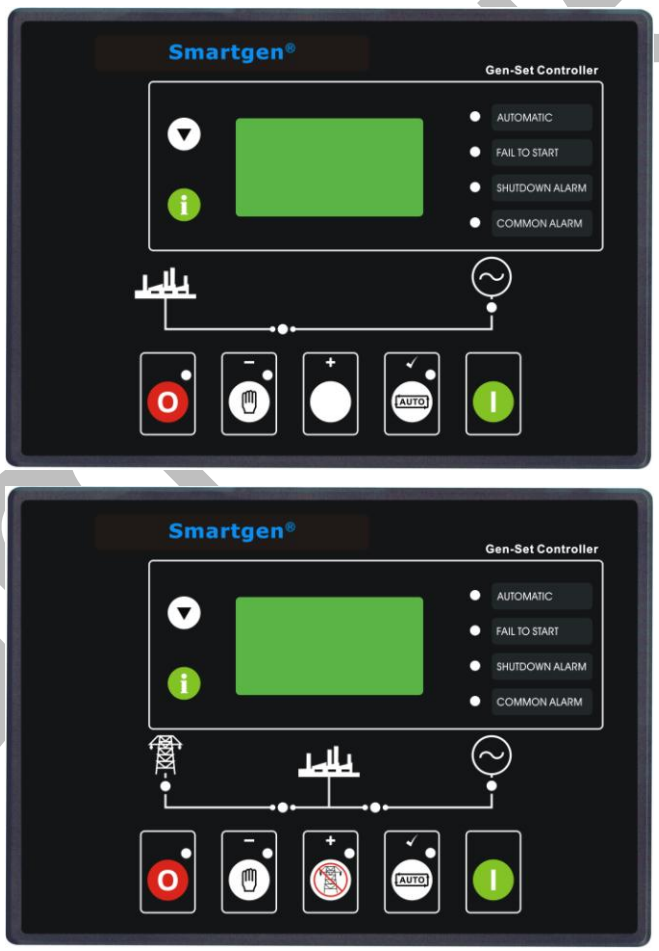
Smartgen®

# HGM6310D/6320D

## AUTOMATIC GENERATOR MODULE

# USER MANUAL




## SMARTGEN ELECTRONIC

# CONTENT

# 1 SUMMARY

HGM6310D/6320D is an automatic genset controller, which assembles digitization, intelligentization and networked techniques. It is used in automatic and monitor control system of unit set diesel genset to achieve automatic start/stop, data measure, alarm protection and 'three remote' functions (remote control, remote monitoring, remote communication). The controller adopts large liquid crystal display (LCD) and selectable Chinese and English interface with easy and reliable operation.

HGM6310D/6320D genset automatic controllers adopt microprocessor technique with precision measurement of multi-parameters, fixed value adjustment, time setting and threshold adjusting and etc.. It can be widely used in all types of automatic genset control system with compact structure, advanced circuits, simple connections and high reliability.

# 2 PERFORMANCE AND CHARACTERISTICS

- **HGM6300D** series controller has two types:
  **HGM6310D**: ASM (Automatic Start Module)
  **HGM6320D**: Based on HGM6310D, it adds mains AC monitoring, Mains/Genset automatic switching control functions (AMF), especially suitable for the automatic system composed by Mains and Genset.
- Microprocessor control, big screen LCD with back-lit display, selectable Chinese and English interface, touch button operation.
- Power supply range: (8~35) VDC, can adapt to12/24V start battery voltage environment.
- With dual water temperature, dual oil pressure sensor input.
- Precise testing function: almost can realize all the related electricity parameter and nonparametric detection.

  Mains electric quantity items:
  3 phase voltage Ua, Ub, Uc V
  3 phase current Ia, Ib, Ic A
  Frequency F1 Hz
  Active power PA kW
  Apparent power PR kVA
  Power factor PF

  Generator electric quantity items:
  3 phase voltage Ua, Ub, Uc V
  3 phase current Ia, Ib, Ic A
  Frequency F1 Hz
  Active power PA kW
  Apparent power PR kVA
  Power factor PF

Accumulate electric energy kWh

Engine parameter items:

Coolant temperature WT ºC/ºF display sync

Oil pressure OP kPa/Psi/Bar display sync

Speed RPM

Plant battery voltage V

Hour count (HC) can accumulate 999999 hours.

Starting up can accumulate Max.999999 times.

The abnormal condition of mains and generating electricity:

Over voltage

Under voltage

Over frequency

Under frequency

Loss of phase

Loss of electricity

Fault display and protection function items:

High temperature pre-alarm

High temperature shutdown alarm

Low oil pressure pre-alarm

Low oil pressure shutdown alarm

Over speed shutdown alarm

High cabinet temperature warn

Low fuel level warn

High voltage warn

Low voltage warn

Over current shutdown alarm

Fail to start alarm

Shutdown failure

Emergency stop alarm

Oil pressure sensor open circuit shutdown alarm

- Integrity of protection function can realize diesel genset Auto start/stop, load transfer and alarm protection.
- With real calendar, clock and accumulation of running time, can save 99 sets of history records to make facilities faults diagnosis possible. This history record can detect in locale, or via PC to detect and print.
- Can set a regular time in each month or each week to startup or shutdown.
- Display electric energy of genset cumulated output, can manage oil consumption of genset.
- The controller can be set for engine controller via software, that is, no monitor/display generator electricity parameter; it is fit for controlling pump unit.
- Multiple temperature, pressure and oil level sensor can be used, and parameter can be defined by users.
- With international standard MODBUS communication protocol, better fault

checking capability, and with RS232/RS485 communication interface, can realized functions of remote control, remote measure, remote message of genset, to achieve remote centralization monitoring.

- Modular design, anti-flaming ABS plastic shell, inserted-type connection terminals and built-in mounting. Structure compact with easy mounting.

# 3 SPECIFICATION

| ITEM | CONTENT |
|---|---|
| Operating voltage | DC8. 0V to 35. 0V, Continuous Power Supply |
| Power consumption | <3W(Standby mode: ≤2W) |
| Alternator Input Range<br>3-Phase 4 Wire<br>3-Phase 3 Wire<br>Single-Phase 2 Wire<br>2-Phase 3 Wire | <br>20V AC - 360 VAC (ph-N)<br>30V AC - 600 VAC (ph- ph)<br>20V AC - 360 VAC (ph-N)<br>20V AC - 360 VAC (ph-N) |
| Alternator Input Frequency | 50Hz - 60Hz |
| Magnetic Volt Input Range | 1.0V to 24.0V (RMS) |
| Magnetic Input Frequency | 10,000 Hz (max) |
| Start Relay Output | 16 Amp DC28V at DC supply output. |
| Fuel Relay Output | 16 Amp DC28V at DC supply output. |
| Auxiliary Relay Output (1-4) | (1-3)16Amp DC28V at DC supply output, (4)16Amp 250VAC passive output. |
| Close Generator Relay<br>Programmable Relay Output 5 | 16Amp 250VAC passive |
| Close Mains Relay<br>Programmable Relay Output 6 | 16Amp 250VAC passive |
| Overall Dimensions | 240mm x 172mm x 57mm |
| Panel Cutout | 214mm x 160mm |
| C. T. Secondary | 5A (rated) |
| Operating Temp. Range | Temperature: (-25~70)°C<br>Humidity: (20~90)% |
| Storage Condition | Temperature: (-40~+70)°C |
| Protective Level | IP55: when with waterproof rubber ring added between controller and its panel.<br>IP42: when without waterproof rubber ring between controller and its panel. |
| Insulation Intensity | Object: between input/output/power<br>Quote standard: IEC688-1992<br>Test way: AC1.5 kV/1min 3mA leakage current |
| Weight | 0.85kg |

# 4 OPERATION

## 4.1 KEY FUNCTION

| | | |
|---|---|---|
|  | Stop/ Reset key | Can stop generator under mode of **Manual/Auto**;<br>Can reset alarming under Stop;<br>To test if panel indicators are OK or not,( pressing this key at least 3 seconds );<br>During stopping process, pressing this again can stop generator immediately. |
|  | Start key | To start genset under **Manual** or **Auto** mode. |
|  | 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 when the mains are on load will open the mains load switch.<br>Pressing this key when the generator is on load and the mains are healed will open the generator load switch. Wait for the duration of the transfer delay, then close the mains load switch. |
|  | **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 event log | Pressing this key will view shutdown history records. Again pressing this key will quit. |
|  | Page down /decrease | Page down, or in setting parameter status, pressing this key will decrease setting value. |

## 4.2 AUTOMATIC OPERATION

**Starting Sequence**

1) **HGM6320D**, When Mains are abnormal (over and under voltage, over and under frequency), enter into mains "abnormal delay" and LCD display begins count down time. When mains abnormal delay is over, enter into "start delay".
2) **HGM6310D**, when remote start input is effective, enter into "start delay".
3) "Count-down" of start delay is displayed in LCD.
4) When start delay is over, preheat relay is output (if configured), "pre-heat start delay XX s" is displayed in LCD.
5) When pre-heat relay is over, fuel relay is output 1s and then start relay-output; if genset starting fails during "cranking time", the fuel and start relays stop output and enters into "crank interval time" to wait for next attempt.
6) If genset fails in starting within setting times, the first line of LED will turn black and start failure alarm will be displayed.
7) If it starts successfully, it will enter into "safe runtime". During this period, alarms of low oil pressure, high temperature, under speed, charge failure and etc. are inactive. Enter into "start idle delay" after safety run delay (if start idle delay is

configured).

8) During “start idle delay”, alarms of under speed, under frequency, under voltage alarm are inactive. As soon as this start idle delay is over, genset will enter into “warming up delay” (if high speed warming delay is configured).
9) When “warming up delay” is over, if generator normal, then indicator lamp illuminates. If generator voltage and frequency reach load requirement, genset close relay is output, genset is on load, generator supply power indicator lamp illuminates, then genset will enter into normal running status; if genset voltage or frequency is abnormal, the controller will alarm to shutdown (gens alarm is displayed in LCD).

**Stopping Sequence**

**HGM6320D**, if mains turns normal during genset is running, enter into mains voltage “normal delay” and its indicator illuminates after mains is confirmed normally, “Start delay” is beginning.

1) **HGM6310D**, genset enters into “stop delay” as soon as “Remote Start” input is inactive.
2) After stop delay ends, enter “high speed coolant delay”, and generator close relay is disconnected, after “switch transfer delay”, mains close relay output, mains is on-load, generator power supply indicator lamp isn’t illuminating, and mains power supply indicator lamp illuminates.
3) Idle relay is power-on output when the controller enters “idle stop delay”.
4) Enter into “ETS relay”, ETS shutdown relay is power-on output. Fuel relay output is disconnected.
5) Genset can automatically judge if it is steady when the controller enters “Genset stop steady time”.
6) After genset stops steadily, enter generator standby status; if genset does not stop, then controller will alarm (LCD screen display shutdown failure warn).

## 4.3 MANUAL OPERATION

1) **HGM6320D Auto start mode** is active when press key and its indicator illuminates. Press key, then controller enters “**Manual Test Mode**” and indicator illuminates. Under the both modes, press key to start genset, and it automatically detects if it starts successfully and accelerate high speed running. With high temperature, low oil pressure, over speed and voltage during diesel genset running, controller can protect genset to stop effectively and quickly (please refer to No.4~9 of auto start operation for more details). Under **“Manual Test Mode** ”, genset on-load is decided by whether mains are normal or not. If mains are normal, loading switch isn’t transferred; while mains

are abnormal, loading switch is transferred into gens side. Under “Manual Test Mode  “, after genset runs well in high speed, no matter mains is normal or not, loading switch must be transferred into Gens.

2) **HGM6310D Auto start mode** is active when press  key, and its indicator is illuminates. Then press  key to start generator, it automatically detects if it is started successfully and genset automatically accelerates high speed running. With high temperature, low oil pressure, over speed and voltage abnormal during diesel genset running, controller can protect genset to stop effectively and quickly (please refer to No.4~9 of **Auto** start operation for more details). After genset runs well in high speed, controller will send signal of Gens close.

3) Manual stop, press  key can shutdown the running genset (please refer to No.3~7 of **AUTO** stop operation for more details).

## 4.4 VIEWING THE EVENT LOG

In the control panel, press  key to view previous abnormal shutdown records of the controller, including shutdown warning and corresponding time. Press  key to view back records. Again press  key to return real time display status of the controller. **HGM6310D/6320D** controller can save recent 99 pieces of abnormal shutdown records.

# 5 PROTECTION

## 5.1 WARNINGS

Warnings 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.

| DISPLAY | REASON |
|---|---|
| ENGINE HIGH TEMPERATURE | 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. |
| LOW OIL PRESSURE | 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. |
| OVERSPEED | The engine speed has risen above the over speed pre-alarm setting |

| DISPLAY | REASON |
|---|---|
| UNDERSPEED | The engine speed has fallen below the under speed pre alarm setting. |
| LOSS OF SPEED SIGNAL | If the speed sensing signal is lost during cranking, a warning will occur. |
| GENERATOR OVER FREQUENCY | The generator output frequency has risen above the pre-set pre-alarm setting. |
| GENERATOR UNDER FREQUENCY | The generator output frequency has fallen below the pre-set pre-alarm setting after the Safety On timer has expired. |
| GENERATOR OVER VOLTAGE | The generator output voltage has risen above the pre-set pre-alarm setting. |
| GENERATOR UNDER VOLTAGE | The generator output voltage has fallen below the pre-set pre-alarm setting after the Safety On timer has expired. |
| GENERATOR OVER CURRENT | If the module detects a generator output current in excess of the pre-set trip a warning alarm initiates. |
| FAIL TO STOP | The module has detected a condition that indicates that the engine is running when it has been instructed to stop. |
| LOW FUEL LEVEL | The level detected by the fuel level sensor is below the low fuel level setting. |
| CHARGE FAILURE | The auxiliary charge alternator voltage is low as measured from the W/L terminal. “Charging failure warning” will display in LCD screen. |
| BATTERY UNDER VOLTAGE | The DC supply has fallen below the low volts setting level for the duration of the low battery volts timer. |
| BATTERY OVER VOLTAGE | The DC supply has risen above the high volts setting level for the duration of the high battery volts timer. |
| AUXILIARY INPUT | Auxiliary inputs can be user configured and will display the message as written by the user. |

## 5.2 SHUTDOWN ALARM

When controller detects shutdown alarms, it will shut down immediately and disconnect Gens close relay signals to disengage load. The alarms are displayed in LCD.

| DISPLAY | REASON |
|---|---|
| EMERGENCY STOP | The emergency stop button has been depressed. This is a failsafe input and will immediately stop the genset. It will be displayed in LCD. |

| DISPLAY | REASON |
|---|---|
| ENGINE HIGH TEMPERATURE | The engine coolant temperature has exceeded the high engine temperature trip setting level after the Safety On timer has expired, and it will be displayed in LCD. |
| LOW OIL PRESSURE | The engine oil pressure has fallen below the low oil pressure trip setting level after the Safety On timer has expired, and it will be displayed in LCD. |
| OVERSPEED | The engine speed has exceeded the pre-set trip, and it will be displayed in LCD. |
| UNDERSPEED | The engine speed has fallen below the pre-set trip after the Safety On timer has expired, and it will be displayed in LCD. |
| LOSS OF SPEED SIGNAL | The speed signal from the magnetic pickup is not being received by the DSE controller. |
| GENERATOR OVER FREQUENCY | The generator output frequency has risen above the preset level, and it will be displayed in LCD. |
| GENERATOR UNDER FREQUENCY | The generator output frequency has fallen below the preset level. |
| GENERATOR OVER VOLTAGE | The generator output voltage has risen above the preset level. |
| GENERATOR UNDER VOLTAGE | The generator output voltage has fallen below the preset level. |
| GENS OVER CURRENT | When controller detects that genset current is over pre-set alarm or delay is not 0, it will send stop alarm signal and it will be displayed in LCD. |
| FAIL TO START | The engine has not fired after the preset number of start attempts. |
| OIL PRESSURE SENSOR OPEN CIRCUIT | The oil pressure sensor is detected as not being present (open circuit). |
| AUXILIARY INPUTS | An active auxiliary input configured as a shutdown will cause the engine to shut down. The display shows the text as configured by the user. |

## 5.3 ELECTRICAL TRIPS

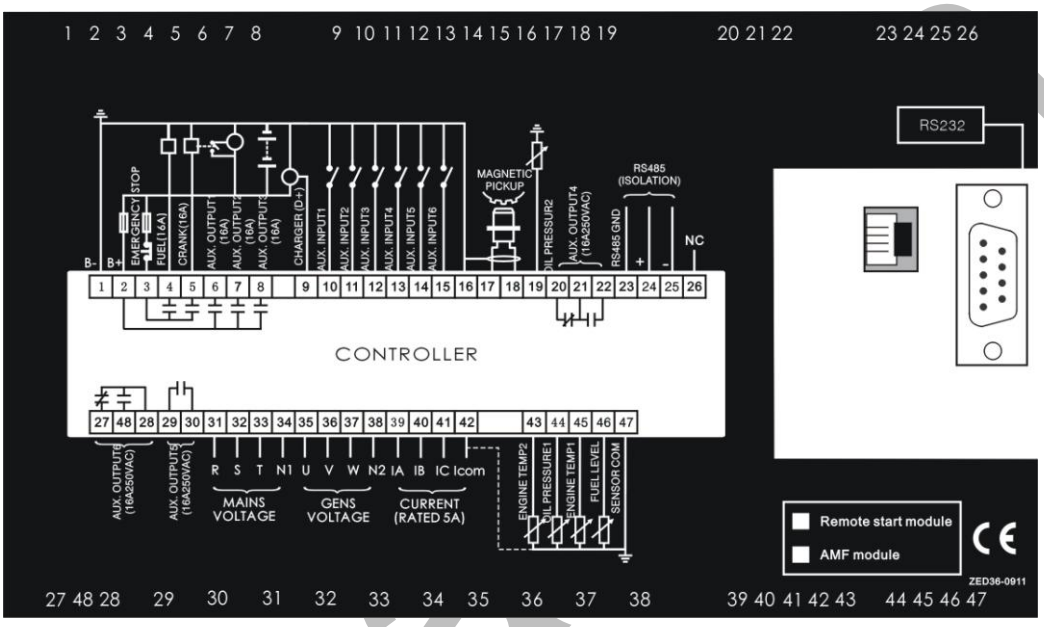
Electrical trips are latching and stop the Generator but in a controlled manner. On initiation of the electrical trip condition the module will de-energies the **‘Close Generator’** Output to remove the load from the generator.

| DISPLAY | RANGE | REASON |
|---|---|---|
| GENERATOR OVER CURRENT | Always active | If a generator output in excess of the high current alarm point, a warning alarm occurs. If this high current condition continues for an excess period, then the alarm escalates to either a shutdown or electrical trip condition. |

| | | |
|---|---|---|
| AUXILIARY INPUTS | User settings | If an auxiliary input configured as an electrical trip is active, the appropriate message will be displayed as configured by the user. |
| **Note:**-Types of input trip alarm quantity must be configured by users, and then input port is active. | | |

# 6 CONNECTING

The back panel of HGM6310D and HGM6320D controller is shown as follows:




| PIN | DESCRIPTION | CABLE SIZE | NOTES |
|---|---|---|---|
| 1 | DC Plant Supply Input (B-) | 2.5mm | System DC negative input. (Battery negative). |
| 2 | DC Plant Supply Input (B+) | 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 output relay | 2.5mm | Plant supply +ve from pin 3. 16 Amp rated. |
| 5 | Start output relay | 2.5mm | Plant supply +ve from pin 3. 16 Amp rated. |
| 6 | Aux. output 1 | 2.5mm | Plant supply +ve. 16 Amp rated. |
| 7 | Aux. output 2 | 2.5mm | Plant supply +ve. 16 Amp rated. |
| 8 | Aux. output 3 | 2.5mm | Plant supply +ve. 16 Amp rated. |

| PIN | DESCRIPTION | CABLE SIZE | NOTES |
|---|---|---|---|
| 9 | Charging fail / excite | 1.0mm | Do not connect to ground (battery –ve) |
| 10 | Aux. input 1 | 1.0mm | Switch to -ve |
| 11 | Aux. input 2 | 1.0mm | Switch to -ve |
| 12 | Aux. input 3 | 1.0mm | Switch to -ve |
| 13 | Aux. input 4 | 1.0mm | Switch to -ve |
| 14 | Aux. input 5 | 1.0mm | Switch to -ve |
| 15 | Aux. input 6 | 1.0mm | Switch to -ve |
| 16 | Magnetic common GND | 1.0mm | Connect to a good clean GND point. |
| 17 | Magnetic pickup B + | 1.0mm | Connect to magnetic pickup device. |
| 18 | Magnetic pickup B- | 1.0mm | |
| 19 | Oil Pressure sensor 2 input | 1.0mm | Connect to oil pressure sensor 2. |
| 20 | Aux. output 4 | 2.5mm | Free voltage contacts. 16Amp rated. |
| 21 | | | |
| 22 | | | |
| 23 | RS485 common GND | 0.5mm | Use only 120Ω RS485 approved cable. |
| 24 | RS485 + | 0.5mm | |
| 25 | RS485 - | 0.5mm | |
| 26 | Not connected | - | |
| 27 | Aux. output 6 (Close mains relay output) | 2.5mm | Free voltage contacts, N/C, 16 Amp rated. |
| 28 | | | |
| 48 | | | |
| 29 | Aux. output 5 (Close generator output) | 2.5mm | Free voltage contacts, N/O, 16 Amp rated. |
| 30 | | | |
| 31 | Mains A voltage monitoring | 1.0mm | Connect to mains A output (Recommend 2A fuse) |
| 32 | Mains B voltage monitoring | 1.0mm | Connect to mains B output (Recommend 2A fuse) |
| 33 | Mains C voltage monitoring | 1.0mm | Connect to mains C output (Recommend 2A fuse) |
| 34 | Mains Neutral input | 1.0mm | Connect to mains neutral terminal |
| 35 | Generator A voltage monitoring | 1.0mm | Connect to generator A output (Recommend 2A fuse) |
| 36 | Generator B voltage monitoring | 1.0mm | Connect to generator B output (Recommend 2A fuse) |
| 37 | Generator C voltage monitoring | 1.0mm | Connect to generator C output (Recommend 2A fuse) |
| 38 | Generator Neutral input | 1.0mm | Connect to generator N line terminal. |
| 39 | CT Secondary for A | 2.5mm | Connect to secondary of A monitoring CT. |

| PIN | DESCRIPTION | CABLE SIZE | NOTES |
|---|---|---|---|
| 40 | CT Secondary for B | 2.5mm | Connect to secondary of B monitoring CT. |
| 41 | CT Secondary for C | 2.5mm | Connect to secondary of C monitoring CT. |
| 42 | CT Secondary common | 2.5mm | Connect to secondary of all monitoring CT's. |
| 43 | Temperature sensor 2 input | 1.0mm | The temperature sensor input, can be connected to an external resistance sensor. |
| 44 | Oil Pressure sensor1 input | 1.0mm | Oil pressure sensor input, can be connected to an external resistance sensor. |
| 45 | Temperature sensor 1 input | 1.0mm | Temperature sensor 1 input can be connected to an external resistance sensor. |
| 46 | Liquid Level sensor input | 1.0mm | Liquid level sensor input, can be connected to an external resistance sensor. |
| 47 | Sensor common | 1.0mm | Sensors common GND can connect to casing or starting battery cathode. |
| | RS232 connectors | 0.5mm | Communication with the computer (2-RXD, 3-TXD, 5-GND) |
| | RJ45 network | | Software upgrades port (Manufacturers use) |

**Note:** Prohibit removing starting battery when the engine is running, or it will damage the control system because of over DC input voltage.

# 7 PROGRAMMING PARAMETERS AND DEFINITION

**HGM6310D / 6320D** generator controllers set parameters as follows:

## 7.1 CONFIGURABLE PARAMETERS AND SCOPE TABLE

| Parameter | Range | Default | Remark |
|---|---|---|---|
| 01Low oil pressure 1 threshold(warning) | (1-399)kPa | 124kPa | Return: 138kPa |
| 02Low oil pressure 1 threshold (shutdown) *3 | (0-398)kPa | 103kPa | Low oil pressure 1 threshold setting range: Shutdown value < Warn value<Return value |
| 03High temperature 1 threshold(warning) | (81-139)ºC | 90ºC | Return: 88ºC |
| 04 High temperature 1 threshold (shutdown)*4 | (82-140)ºC | 95ºC | High temperature 1 threshold setting range: |

| Parameter | Range | Default | Remark |
|---|---|---|---|
| | | | Shutdown value > Warn value>Return value |
| 05Fuel level threshold (warning) | (0-100)% | 10% | Analog quantity |
| 06 Start delay | (0-9999s) | 5s | timer |
| 07 Pre-heat delay | (0-300s) | 0s | timer |
| 08 Crank time | (3-60s) | 8s | timer |
| 09 Crank rest time | (3-60s) | 10s | timer |
| 10 Safety run time | (5-60s) | 10s | timer |
| 11Over speed/ over shoot delay | (0-10s) | 2s | timer |
| 12 Start idle time | (0-3600s) | 10s | timer |
| 13 Warming up time | (0-3600s) | 30s | timer |
| 14 Transfer switch time | (0-600s) | 2s | timer |
| 15 Return time | (0-9999s) | 30s | timer |
| 16 Coolant time | (0-3600s) | 60s | timer |
| 17 Stop idle time | (0-3600s) | 10s | timer |
| 18ETS Solenoid hold time | (0-120s) | 20s | timer |
| 19Waiting for steady stop time | (10-120s) | 30s | timer |
| 20Generator transient delay | (0-30s) | 5s | timer |
| 21Mains transient delay *1 | (0-30s) | 2s | |
| 22Mains under voltage (trip) *1 | (50-360V/624) *2 | 184V | Return: 207V<br>Return value>Under volts trip value |
| 23Mains over voltage (trip) *1 | (50-360V/624) *2 | 276V | Return: 253V<br>Return value<High volts trip value |
| 24Mains low frequency (trip) *1 | (0-75Hz ) | 45.0Hz | Return: 48.0Hz<br>Return value>Low freq. trip value |
| 25Mains high frequency (trip) *1 | (0-75Hz) | 55.0Hz | Return: 52.0Hz<br>Return value<High freq. trip value |
| 26Generator under voltage (shutdown) | (50-360V/624) *2 | 184V | |
| 27Generator under voltage(warning) | (50-360V/624) *2 | 196V | Return: 207V<br>Generator under volts threshold setting range:<br>Shutdown value<Warn value<On-load value |
| 28Generator over | (50-360V/624) | 265V | Return: 253V |

| Parameter | Range | Default | Remark |
|---|---|---|---|
| voltage(warning) | *2 | | |
| 29Generator over voltage(shutdown) | (50-360V/624) *2 | 273V | Generator over volts threshold setting range: Shutdown value>Warn value>Return value |
| 30Generator low frequency (shutdown) | (0-74.8Hz) | 40.0Hz | |
| 31Generator low frequency (warning) | (0.1-74.9Hz) | 42.0Hz | On-load value：45.0Hz Generator low freq threshold setting range: Shutdown value<Warn value<On-load value |
| 32Generator high frequency (warning) | (0.1-74.9Hz) | 55. 0Hz | Return: 52. 0Hz |
| 33Generator high frequency(shutdown) | (0.2-75Hz) | 57.0Hz | Generator high freq threshold setting range: Shutdown value>Warn value>Return value |
| 34Over current percentage | (50-120%) | 100% | Analog quantity |
| 35 Flywheel teeth | (10-500) | 118 teeth | |
| 36Under speed threshold (shutdown) | (0-5998 RPM) | 1270RPM | |
| 37Under speed threshold(warning) | (1-5999 RPM) | 1350 RPM | Return : 1380RPM Generator under speed threshold setting range: Shutdown value<Warn value<On-load value |
| 38 Over speed threshold (warning) | (1-5999 RPM) | 1650 RPM | Return: 1620RPM |
| 39 Over speed threshold (shutdown) | (2-6000RPM) | 1710RPM | Generator over speed threshold setting range: Shutdown value>Warn value>Return value |
| 40Over shoot percentage | (0-10%) | 0 | Analog quantity |
| 41Battery low voltage threshold(warning) | (0-39.9 V) | 8.0V | Analog quantity |
| 42Battery high voltage threshold (warning) | (0.1-40V) | 33.0V | Analog quantity |
| 43Charge failure threshold(warning) | (0-39V) | 6.0V | Analog quantity |
| 44 Language select | (0-1) | 0 | 0: Chinese 1: English |
| 45 Password | (0-9999) | 1234 | Numerical value |
| 46Low oil pressure 2 threshold(warning) | (1-399)kPa | Not used | |

| Parameter | Range | Default | Remark |
|---|---|---|---|
| 47Low oil pressure 2 threshold(shutdown) | (0-398)kPa | Not used | Low oil pressure 2 threshold setting standard: Shutdown value< Warn value< Return value. |
| 48High temperature 2 threshold (warning) | (81-139)ºC | Not used | |
| 49High temperature 2 threshold (shutdown) | (82-140)ºC | Not used | High temperature 2 threshold setting standard: Shutdown value> Warn value > Return value. |
| 50 Current transformer | 5-6000:5A | 500A | Load value：500A |
| 51Select oil pressure sensor 1 | 1-14 | VDO10 bar | |
| 52Select temperature sensor 1 | 1-13 | VDO120ºC | |
| 53Select fuel level sensor | 1-11 | VDO ohm (10-180) | |
| 54Select oil pressure sensor 2 | 1-14 | Not used | |
| 55Select temperature sensor 2 | 1-13 | Not used | |
| 56 Module address | 1-254 | 1 | |
| 57 Select temperature unit | 0-1 | ºC | The controller is active when temperature sensor 2 is configured. |
| 58 Select pressure unit | 0-1 | kPa | The controller is active when oil pressure sensor 2 is configured. |
| **Note:**<br>*1: **HGM6310D** controller doesn't possess the item.<br>*2: 360V for phase voltage, 624V for line voltage (3- phase 3 wire).<br>*3: Low oil pressure (shutdown) setting value is 0 without shutdown.<br>*4: High temperature (shutdown) setting value is 140 without shutdown. | | | |

Other parameters configuration: They can be only configured via PC software (as follows).

| Parameter | Default |
|---|---|
| Alternator AC voltage sensing | Yes |
| Generator pole number | 4 |
| Magnetic Pickup Select | Yes |
| AC system | 3-phase 4 wire |
| Fast on load mode | No |
| Crank times | 3 |
| Open mains breaker when Mains is short-time abnormal | Inactive(only HGM6320D use) |
| Voltage transformer | No |

| Parameter | Default |
|---|---|
| Fuel pump control | No |
| Digital input1 | Remote start on load, close to activate. |
| Digital input2 | High temperature input, shutdown, close to activate (activate from safety on). |
| Digital input3 | Low oil pressure input, shutdown, close to activate (activate from safety on). |
| Digital input4 | Low oil pressure inputs, warning, close to activate, (always activate). |
| Digital input5 | High oil temperature input, shutdown, close to activate (activate from safety on). |
| Digital input6 | Exterior alarm input, shutdown, close to activate (always activate). |
| Digital output1 | Pre-heat output (during pre-heat timer). |
| Digital output2 | Common alarm |
| Digital output3 | ETS solenoid output |
| Digital output4 | Idle /Run speed control |
| Digital output5 | Close generator |
| Digital output6 | Close mains (HGM6320D)<br>Not used (HGM6310D) |
| LED1 | System in Auto mode |
| LED2 | Fail to start |
| LED3 | Common shutdown alarm |
| LED4 | Common alarm |
| Over Current Delay multiplier | 36 |
| Action (over current) | Electrical trip |
| Generator frequency (crank disconnect) | 15Hz |
| Engine speed (crank disconnect) | 450RPM |
| Oil pressure (crank disconnect) | Not used |
| Detect oil pressure during cranking | Yes |
| Schedule start genset | No |

## 7.2 PROGRAMMABLE OUTPUT PORT 1-6 DEFINITION CONTENT TABLE

| NUM | CONTENT | DESCRIPTION |
|---|---|---|
| 1 | Not Used | |
| 2 | Air flap control | When over speed alarm shutdown and emergency stop is active, can turn off air flap. |
| 3 | Audible alarm | When warning, shutdown, electrical trip is active, can connect exterior alarm, can configure input port “Audible alarm”. |
| 4 | Battery high voltage | The DC supply has risen above the high volts |

| NUM | CONTENT | DESCRIPTION |
|---|---|---|
| | | setting level for the duration of the high battery volts timer |
| 5 | Battery low voltage | The DC supply has fallen below the low volts setting level for the duration of the low battery volts timer |
| 6 | Reserved | |
| 7 | Reserved | |
| 8 | Reserved | |
| 9 | Crank relay output | Operation of generator start, disconnect after start success. |
| 10 | Fuel relay output | When generator start is active, disconnect of waiting stop steady. |
| 11 | Calling for scheduled run | The controller operates when scheduler start is active, or inactive. |
| 12 | Charging alternator fails | The controller is active when generator charges failure alarm. |
| 13 | Close Generator output | This output source is intended to be used to control the load switching device. Whenever the 6300D module selects the generator to be on load this control source will be active. |
| 14 | Close Generator pulse output | This output source is intended to be used to control the load switching device. Whenever the 6300D module selects the mains to be on load, this control source will be active for the duration of the 'Breaker Close Pulse Timer'. Once this timer has expired, the output source will once again become in-active. |
| 15 | Close Mains output | This output source is intended to be used to control the load switching device. Whenever the 6320D module selects the mains to be on load this control source will be active. |
| 16 | Close Mains pulse output | Whenever the 6320D module selects the mains to be on load this control source will be active for the duration of the 'Breaker Close Pulse Timer'. Once this timer has expired, the output source will once again become in-active. |
| 17 | Common under & over Frequency shutdown | Either under frequency or over frequency shutdown has been activated. |
| 18 | Common under & over Frequency warning | Either under frequency or over frequency warning has been activated. |
| 19 | Common under & over voltage shutdown | Either under voltage or over voltage shutdown has been activated. |
| 20 | Common under & over voltage warning | Either under voltage or over voltage warning has been activated. |
| 21 | Common alarm | A warning, electrical trip or shutdown alarm |

| NUM | CONTENT | DESCRIPTION |
|---|---|---|
| | | has been activated. Reset rules as above, depending on whether it is a warning or a shutdown fault. |
| 22 | Common electrical trip alarm | 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. |
| 23 | Common shutdown alarm | 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. |
| 24 | Common warning alarm | 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. |
| 25 | Coolant temperature high 1 pre-alarm | A high engine coolant temperature warning (pre-alarm) has occurred. |
| 26 | Coolant temperature high 1 shutdown | a high engine coolant temperature shutdown has occurred. |
| 27 | Cooling delay timer active | This output source will be active when the cooling off-load timer is running. |
| 28 | Reserved | |
| 29 | Digital Input 1active | Digital input 1 is active. |
| 30 | Digital Input 2active | Digital input 2 is active. |
| 31 | Digital Input 3active | Digital input 3 is active. |
| 32 | Digital Input 4active | Digital input 4 is active. |
| 33 | Digital Input 5active | Digital input 5 is active. |
| 34 | Digital Input 6 active | Digital input 6 is active. |
| 35 | Emergency stop alarm | An emergency stop alarm has occurred. |
| 36 | ETS solenoid shutdown output | This output controls the fuel solenoid on an ETS solenoid type generator, energizing for the time period selected in the Edit Timer Menu. The normal fuel output (pin 4) 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. |
| 37 | Fail to start alarm | The engine has not started after the specified number of attempts, selected in the edit miscellaneous menu. |
| 38 | Fuel Pump Control | This 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 |

| NUM | CONTENT | DESCRIPTION |
|---|---|---|
| | | reached. |
| 39 | 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. |
| 40 | Generator high Frequency warn | This output indicates that a generator high frequency warning (pre- alarm) has occurred. |
| 41 | Generator high Frequency shutdown | This output indicates that a generator high frequency shutdown has occurred. |
| 42 | Generator high voltage warn | This output indicates that a generator high voltage warning (pre- alarm) has occurred. |
| 43 | Generator high voltage shutdown | This output indicates that a generator high voltage shutdown has occurred. |
| 44 | Generator low frequency warn | This output indicates that a generator low frequency warning (pre- alarm) has occurred. |
| 45 | Generator low frequency shutdown | This output indicates that a generator low frequency shutdown has occurred. |
| 46 | Generator low voltage warn | This output indicates that a generator low voltage warning (pre- alarm) has occurred. |
| 47 | Generator low voltage shutdown | This output indicates that a generator low voltage shutdown has occurred. |
| 48 | Louvre control | This output controls the opening of the louvers on engine starting and closure when engine has stopped. |
| 49 | Low fuel level | This output indicates that the level of fuel has fallen below the low fuel alarm trip point. |
| 50 | Loss of speed | This output indicates that a loss of speed alarm has occurred. |
| 51 | Mains abnormal | 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 voltage or frequency goes out of limits, or if the auxiliary mains failure input active (if used) and the mains transient timer has expired. |
| 52 | Mains high frequency | This output indicates that the module has sensed that the incoming AC mains supply has exceeded the frequency limit setting. |
| 53 | Mains high voltage | This output indicates that the module has sensed that the incoming AC mains supply voltage has exceeded the voltage limit setting. |
| 54 | Mains low frequency | This output indicates that the module has sensed that the incoming AC mains supply |

| NUM | CONTENT | DESCRIPTION |
|---|---|---|
| | | has fallen below the frequency setting. |
| 55 | 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. |
| 56 | Low oil pressure 1 warn | The controller is active when low oil pressure 1 warning. |
| 57 | Low oil pressure 1 shutdown | The controller is active when low oil pressure 1 shutdown. |
| 58 | Oil pressure sensor open circuit | This output indicates that the module has detects an open circuit failure in the Oil Pressure transducer circuit. |
| 59 | Breaker generator output | This output source is intended to be used to control the load switching device. Whenever the 6300D module selects the mains to be on load this control source will be active. |
| 60 | Breaker generator pulse output | This output source is intended to be used to control the load switching device. Whenever the 6300D module selects the mains to be on load, this control source will be active for the duration of the 'Breaker open pulse timer'. |
| 61 | Mains breaker output | This output source is intended to be used to control the load switching device. Whenever the 6320D module selects the generator to be on load this control source will be active. |
| 62 | Mains breaker pulse output | This output source is intended to be used to control the load switching device. Whenever the 6320D module selects the generator to be on load this control source will be active for the duration of the 'Breaker open pulse timer'. Once this timer has expired the output source will once again become in-active and the 6320D will issue commands to load the generator. |
| 63 | Over current warn | This output indicates that the over-current warning (pre-alarm) level has been reached. |
| 64 | Over current trip | This output indicates that the over-current trip level been reached. |
| 65 | Over speed warn | This output indicates that an over speed warning (pre-alarm) has occurred. |
| 66 | Over speed shutdown alarm | This output indicates that an over speed shutdown has occurred. |
| 67 | Pre-heat (during starting timer) | This output controls the pre-heater. Pre-heat output is available for the duration of the pre-heat timer, which terminates prior to cranking. |

| NUM | CONTENT | DESCRIPTION |
|---|---|---|
| 68 | Pre-heat (until end of cranking) | This output controls the pre-heater. As 'Pre-heat (during preheat timer)' mode but pre-heat is also available during cranking. |
| 69 | Pre-heat (until end of warming) | This output controls the pre-heater. As 'Pre-heat (until safety on)' but pre-heat continues to be available until the warm-up timer has elapsed |
| 70 | Pre-heat (until end of safety run) | This 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. |
| 71 | Breaker output | 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. |
| 72 | System in Manual Test Mode | This output indicates that the module is in the manual test mode. |
| 73 | System in Auto Mode | This output indicates that the module is in the automatic mode. |
| 74 | System in Manual Mode | This output indicates that the module is in the manual mode. |
| 75 | System in Stop Mode | This output indicates that the module is in the stop mode. |
| 76 | Under speed warning | This output indicates that an under speed warning (pre-alarm) has occurred. |
| 77 | Under speed shutdown | This output indicates that an under speed shutdown has occurred. |
| 78 | Automatic shutdown inhibit | This output indicates that an automatic restore inhibit has occurred. |
| 79 | Idle/ high speed control | This output is active from cranking, continues to be active until the start idle time has elapsed; Also this output is active during the period of the stop idle timer, and continues to be active until the engine has stopped. |
| 80 | Advance oil-supplied output | This output is active during start- safety running. |
| 81 | Raise speed output | This output is active during the warming up timer. |
| 82 | Charging excitation output | Starting in the safe operation of the output, in no power frequency is output during the 2 seconds. |
| 83 | Drop speed energized | This output is available during the period of the coolant down timer, and remain until the engine has stopped. |
| 84 | Pre-set to lubrication output | This output is active during pre-heat safety running. |

| NUM | CONTENT | DESCRIPTION |
|---|---|---|
| 85 | High temperature 2 warn | When high temperature 2 alarm is active. |
| 86 | High temperature 2 shutdown alarm | When high temperature 2 shutdown is active. |
| 87 | Low oil pressure 2 warn | This output is active when low oil pressure 2 warns. |
| 88 | Low oil pressure 2 shutdown | This output is active when low oil pressure 2 shutdown. |
| **Note:** Output port 1-6, only can use computer software configuration. | | |

## 7.3 PROGRAMMABLE INPUT PORT 1-6 DEFINITION CONTENT TABLE

| NUM | TYPE | DESCRIPTION |
|---|---|---|
| 1 | User configured | User can define the following functions<br>Indication: only state display, no alarm or shutdown.<br>Warning: only warning, no shutdown.<br>Shutdown: alarm, even immediately shutdown.<br>Electrical Trip: alarm/generator off-load, after high speed cooling heat shutdown.<br>Inactive: This input is no effect.<br>Always active: This input is always detected.<br>Active after start: The controller begins detection in start operation.<br>Active safety on: The controller begins detection after safety on delay. |
| 2 | Alarm mute | When the input is active, can prohibit output configurable within “Alarm mute” output. |
| 3 | Prohibit alarm shutdown | When input is active, no shutdown when shutdown alarm quantity happened. |
| 4 | Auto shutdown Inhibit | In automatic mode, generators normal operate, when input is active, are not allowed generate electricity automatic stop. (This function only limits toHGM6320D). |
| 5 | Automatic startup Inhibit | In automatic mode, when the input is active, prohibit generate electricity automatic startup. |
| 6 | Mains abnormal auxiliary input | When the input is active, display mains abnormal. (This function only limits to HGM6320D). |
| 7 | Generator close status input | This function must be connected to generator on-load switch auxiliary point. |
| 8 | Generator on-load Inhibit | This input is used to prevent the 6300D from loading the generator. If the generator is already on load, activating this input will cause the 6300D to unload the generator. Removing the input will allow the generator to be loaded again. |
| 9 | Lamp Test | This input is used to provide a test facility for the front panel indicators fitted to the 6300D module. When the input is activated all LED and LCD indicators will illuminate. |

| | | |
|---|---|---|
| 10 | Mains closed status input | This input is used to provide feedback to allow the 6320D to give true indication of the contactor or circuit breaker switching status. It should be connected to the mains load switching device auxiliary contact. |
| 11 | Mains Load Inhibit | This input is used to prevent the 6320D from loading the mains supply. If the mains supply is already on load activating this input will cause the module to unload the mains supply. Removing the input will allow the mains to be loaded again. |
| 12 | Panel Lock | When the input effective, not all keys on its function, on the first screen LCD panel display on the line. |
| 13 | Remote Start off load | In automatic mode, when the input effective, can automatically open generator, after the normal operation of generator without load. When the input is invalid, can automatically stop generator. |
| 14 | Remote Start on load | In automatic mode, when the input effective, can automatically open generator, after the normal operation of generator with load. When the input is invalid, can automatically stop generator. |
| 15 | Schedule run Inhibit | In automatic mode, this will inhibit the engine to scheduled run. |
| 16 | Analog Mains available | This function is provided to over-ride the **6320D** module's internal monitoring function. If this input is active the module will not respond to the state of incoming AC mains supply unless the monitored AC mains supply is out of limits AND this input is inactive. This can be used to control the operation of the generator during a mains failure by allowing generator operation only if equipment operation requires the generator to run. |

## 7.4 USER-DEFINED ITEMS

| NUM | TYPE | DESCRIPTION |
|---|---|---|
| 1 | High temperature input | When this input is active, panel displays high water temperature input alarm. |
| 2 | Low oil pressure input | When this input is active, panel displays alarm. |
| 3 | High oil temperature input | When this input is active, panel displays high oil temperature input alarm. |
| 4 | High cabinet temperature input | When this input is active, panel displays high cabinet temperature input alarm. |
| 5 | Low water level input | When this input is active, panel displays low water level input alarm. |
| 6 | Low oil level input | When this input is active, panel displays low oil level input alarm. |
| 7 | Over speed input | When this input is active, panel displays over speed input alarm. |
| 8 | External alarm | When this input is active, panel displays external alarm |

| | | |
|---|---|---|
| | input | input alarm. |
| 9 | Over current input | When this input is active, panel displays over current input alarm. |
| 10 | Half oil level input | When this input is active, panel displays half oil level input alarm. |
| 11 | Monitor mode input | Effective, panel displays system monitor mode, only detect genset electricity parameter and alarm signal (under speed, under voltage no detection). |
| 12 | Raise speed limit bit switch | During raise speed process, if raise speed limit bit switch input is active, or then output stop. |
| 13 | Drop speed limit bit switch | During drop speed process, if drop speed limit bit switch input is active, or then output stop. |
| **Note:** Input port 1-6, only can use computer software configuration. | | |

## 7.5 SENSORS SELECT

| Num | Input | Content | Remark |
|---|---|---|---|
| 1 | Temperature sensor | 1 Not used<br>2 Digital input low active<br>3 Digital input high active<br>4 VDO 120 degrees C<br>5 Datcon high<br>6 Datcon low<br>7 Murphy<br>8 Cummins<br>9 SGH 120 degrees C<br>10 Curtis<br>11 SGD 120 degrees C<br>12 Pt100<br>13 User defined | The range of user-defined resistance-type resistance input is 0-999 ohm; the factory default value is VDO 120 degrees C curve. User-defined temperature curve is set by PC software. |
| 2 | Pressure sensor | 1 Not used<br>2 Digital input low active<br>3 Digital input high active<br>4 VDO 5 bar<br>5 VDO 10 bar<br>6 Datcon 5 bar<br>7 Datcon 10 bar<br>8 Datcon 7 bar<br>9 Murphy 7 bar<br>10 CMB812<br>11 SGH 10 bar<br>12 Curtis<br>13 SGD 10 bar<br>14 User defined | The range of user-defined resistance-type resistance input is 0-999 ohm; the factory default value is VDO 10 bar curve. User-defined pressure curve is set by PC software. |
| 3 | Fuel level sensor | 1 Not used<br>2 Digital input low active<br>3 Digital input high active<br>4 VDO Ohm range (10-180)<br>5 VDO Tube type (90-0)<br>6 US Ohm range (240-33)<br>7 GM Ohm range (0-90) | The range of user-defined resistance-type resistance input is 0-999 ohm; the factory default value is VDO 0hm range (10-180). When the user defines, oil level sensor curve is set by PC |

| Num | Input | Content | Remark |
|---|---|---|---|
| | | 8 GM Ohm range Ohm range (0-30)<br>9 Ford (73-10)<br>10 NKZR12/24-1-04 Ohm range (100-0)<br>11 User defined | software. |

## 7.6 START-UP SUCCESS

| Num | Content |
|---|---|
| 0 | Magnetic pickup sensor |
| 1 | Generator |
| 2 | Magnetic pickup sensor + Generator |
| 3 | Magnetic pickup sensor + oil pressure 1 sensor |
| 4 | Generator + oil pressure 1 sensor |
| 5 | Generator + Magnetic pickup sensor + oil pressure 1 sensor |

1) The crank disconnection has three types. The magnetic pickup sensor and the generator voltage can be used alone, the oil pressure must be used with the magnetic pickup sensor and the generator voltage, in order to make the starter and the engine disconnect as soon as possible.
2) Magnetic pickup sensor is the magnetic device that is installed in the engine to test flywheel teeth.
3) When choosing magnetic pickup sensor, make sure flywheel teeth of the engine is same with setting values, or over-speed shutdown or under-speed shutdown may appear.
4) If the generator does not have magnetic pickup sensors, please don't choose corresponding items, otherwise start failure or loss of speed alarm and shutdown will occur.
5) If the generator has no oil pressure sensor, please don't choose corresponding items.
6) If the generator starting conditions has not be selected, the controller will not measure and display the relative parameters (This can be applied to the pump set), if magnetic pickup sensor has not be selected, the speed displayed in the controller is accounted by Gens signal.

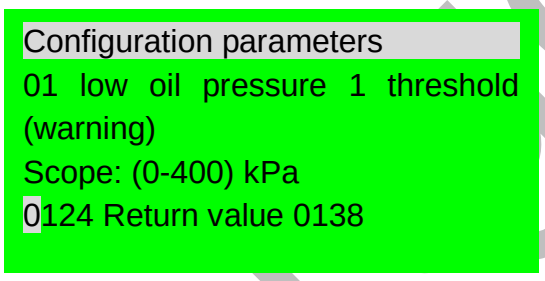
**Note:** Only can be configured via computer software.

# 8 PARAMETER EDITING

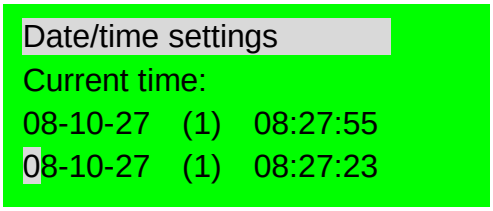
■ **Operating parameters settings:** after controller start, press key and

key simultaneously, then enter parameters configuration password confirm interface, press “+” or “-” key to change the parameter to the required value, press “√” key to the right move of bit, in fourth bit press“√” key to check password, enter into parameter mains interface when password is correct, to exit and back to the mains interface when password isn’t correct. (Factory default password is1234).

Press “+” key and “-” key to select the parameter you wish to view/change within the currently selected section. In current parameter configuration screen, press“√ ”key to enter the current parameter configuration mode, with the first digital turning black, press“+” key or “-” key to change parameter value, press “√ ”key to the right move of bit, in fourth bit press“√” key to check password. The parameter value will be saved in internal **FLASH** of the controller.




■ **Date and time setting:** after starting up, press key and key to enter the time setting. Two lines of date and time will display in the interface, which the first line is the current date and time, while the second line is modification status for the user. The black digital display is adaptable for user. The user can modify current digital by pressing “+”key and “-” key to increase and decrease the value. Press “√” key to confirm value and shift to the right. Number “1” in the parenthesis is the display of one week. It is set by the microprocessor based on current date, so the user does not need to modify.




* **Note:** At any time in editing parameter, pressing key can stop current parameter setting and immediately return to the operation standby mode.

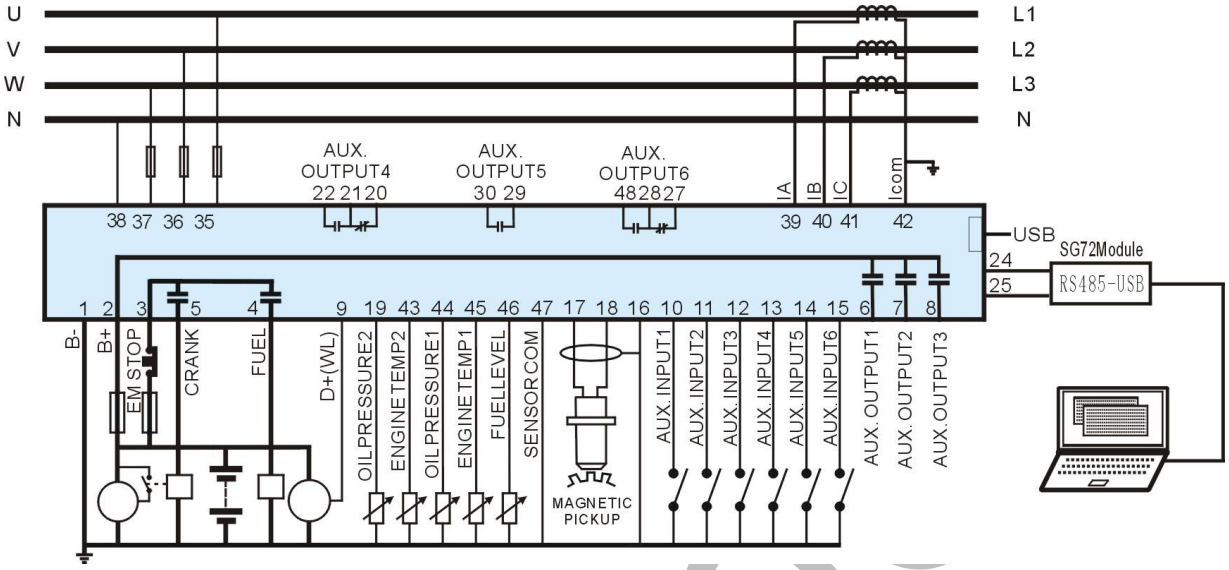
# 9 COMMISSIONING

Before the system is started, it is recommended that the following checks are made:

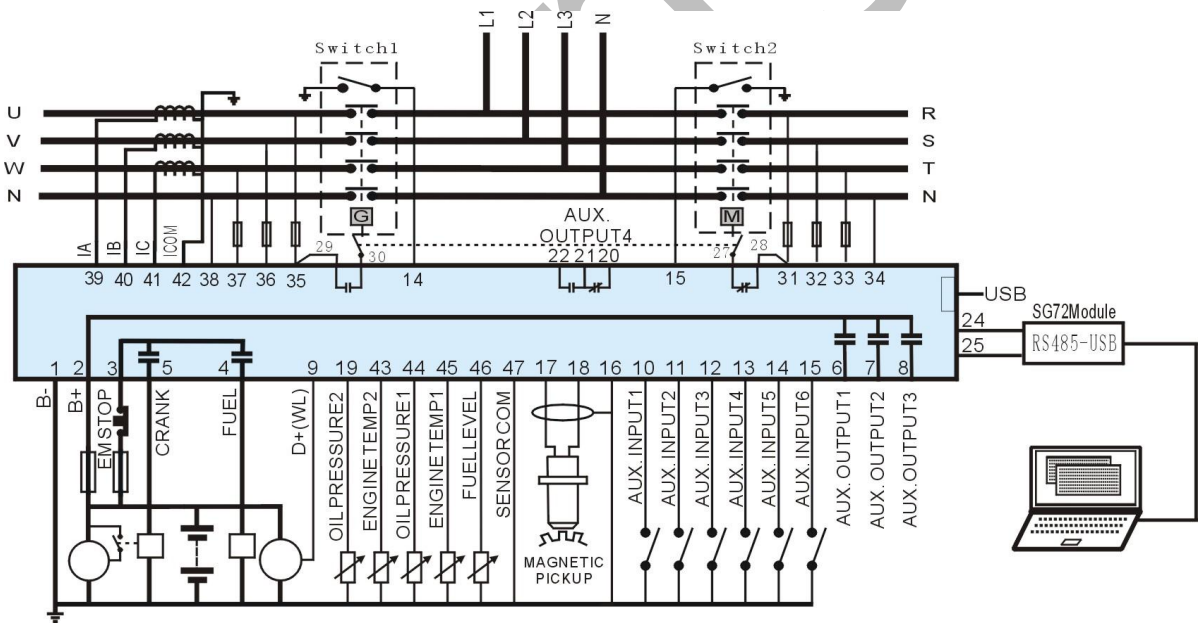
1) All the wiring to the module is of a standard and rating compatible with the system. Check all mechanical parts are fitted correctly and that all electrical connections.
2) The unit DC supply is fused and connected to the battery and that it is of the correct polarity.
3) The Emergency Stop input is wired to an external normally closed switch connected to DC positive.
4) To check the start cycle operation, take appropriate measures to prevent the engine from starting (disable the operation of the fuel solenoid). After a visual inspection to ensure it is safe to proceed, connect the battery supply. Select "**MANUAL**" and then press "**START**" the unit start sequence will commence.
5) The starter will engage and operate for the pre-set crank period. After the starter motor has attempted to start the engine for the pre-set number of attempts, the LCD will display 'Failed to start. Select the **STOP/RESET** position to reset the unit.
6) Restore the engine to operational status (reconnect the fuel solenoid). Press the "**START**". This time the engine should start. It will be possible at this time to view the engine. If it is fine, the engine should continue to run for an indefinite period (if configured), and run up to operating speed. If not, then check that the engine is fully operational (alternator voltage, frequency, etc.). Stop the generator set running, check connections of each part refer to this manual.
7) Select automatic mode on the front panel, then connect to mains signal; switch the **ATS** (if be configured) to the mains load after the normal delay of the controller. After the cooling, stop the controller to standby mode until the mains are abnormal again;
8) Once the mains appear abnormal condition again, the genset will automatically start to normal running mode, initiate generator closing instruction, and switch the **ATS** to genset load. If not, refer to **ATS control** section connection in the manual;
9) If you have any other questions, please contact witch company technical personnel.

# 10 TYPICAL WIRING DIAGRAMS

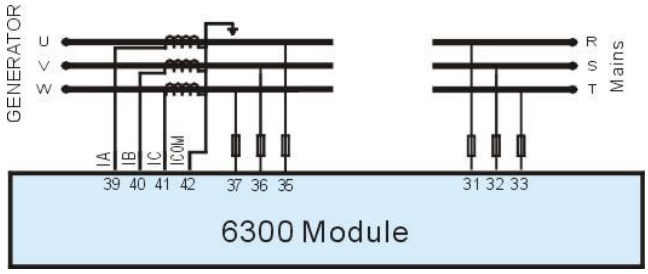
HGM6310D Typical wiring diagram



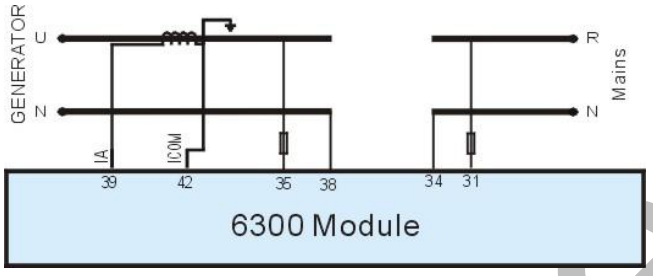

HGM6320D Typical wiring diagram



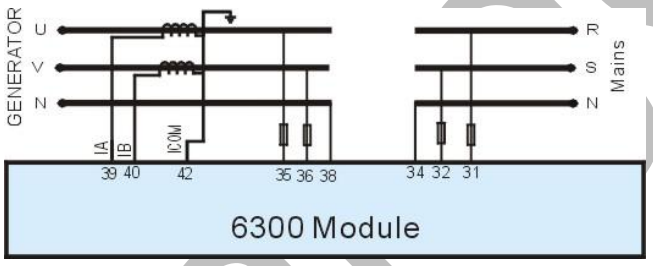

**Note:** If the engine starting battery voltage is 24V, starting output, fuel output and stop output (according to user's configuration) should not be less than 2 ohms for battery cathode resistance, if less than 2 ohms, please expand relays with more than 30A current in corresponding output. if the engine starting battery voltage is12V, starting output, fuel output and stop output (according to user's configuration) should not be less than 1 ohms for battery cathode resistance; if less than 1 ohm， please expand relays with more than 30A current in corresponding output.




Single phase, 2 wire (take HGM6320D for example)

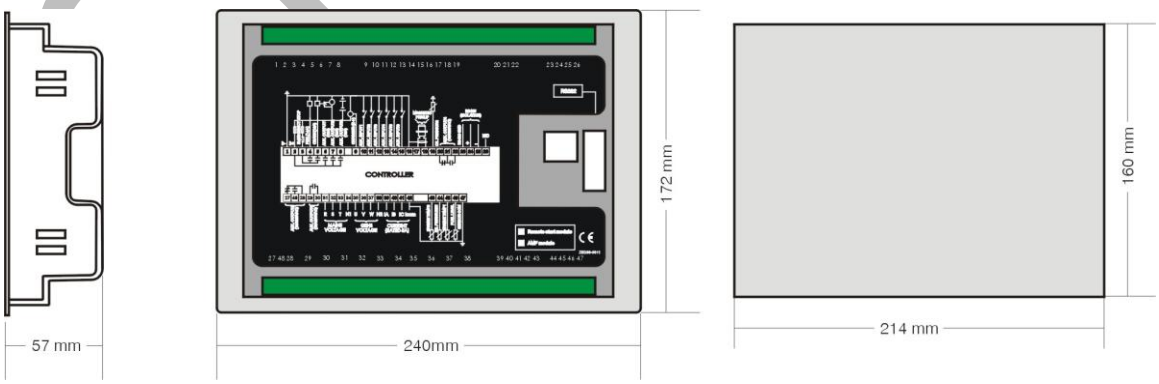



2-phase, 3 wire (take HGM6320D for example)




# 11 INSTALLATION

The installation dimension of **HGM6310D** is just the same with **HGM6320D.**
The controller is designed as panel installation mode, which is fixed by fixing clips when installed. The overall dimension and panel size are given as follows:




**1. Battery Voltage Input**

HGM6310D/6320D controller can be applicable to (8-35) VDC battery voltage environment; battery negative must be reliability connected to engine shell. The connection of controller power supply B + and B- to battery poles should not be less than2.5mm$^2$, if there is the float charger, please directly connect the charger output wire to battery poles, and then separately connect the

wirings from the battery poles to the power supply output of the controller in case that the charger will interfere with the normal operation of the controller.

2. **Speed Sensor Input**

   Speed sensor is installed in the engine for testing magnetic device of flywheel teeth. Its wiring with controller should adapt 2 core shielding wire, shielding layer is connected to the terminal 16 in the controller, and the other two signal wires should be separately connected to the terminal 17 and terminal 18. Speed sensor output voltage range should be in 1-24VAC (RMS), normal voltage is 12VAC (in rated speed). When installing the speed sensor, spin the sensor to touch the flywheel first, draw back 1/3 laps, and finally lock nut on the sensor.

3. **Output and Expand Relays**

   All output of the controller is relay contacts output, if there is need to expand output relays, please expand follow current diode in both ends of the relay coil (when extended relay coil links DC) or increase resistance and capacitance loop (when extended relay coil links AC) in order to prevent interference with the controller or other equipments.

4. **AC Input**

   HGM6310D/6320D controller current input must connect to external current transformer, and the current transformer must be 5A, while the phase of current transformers and the phase of input voltage must be correct, otherwise the sampling current and the active power may be incorrect.

   **Note:** a. **ICOM** pin must be connected to cathode of the power supply in the controller;

   b. When there is load current, open circuit is strictly prohibited in transformer.

5. **Withstand voltage Test**

   When the controller has been installed in the control panel, if you want to have Withstand voltage test, please disconnect all terminals in the controller lest high-voltage damages the controller.

# 12 FACTORY DEFAULT VALUES

Open the PC software of the controller, the system will automatically download factory default configuration. If users need to recover the factory default values, restart the PC testing software of the controller, and rewrite into the controller.

| Parameter | Remark |
|---|---|
| 01 Low oil pressure 1 threshold (warning) | 124kPa/18.0PSI |
| 02 Low oil pressure 1 threshold (shutdown) | 103kPa/14.9PSI |
| 03 High temperature 1 threshold (warning) | 90ºC/194ºF |
| 04High temperature 1 threshold (shutdown) | 95ºC /203ºF |
| 05Fuel level threshold (warning) | 10% |
| 06 Start delay | 5s |
| 07 Pre-heat delay | 0s |
| 08 Start time | 8s |
| 09 Start hold time | 10s |
| 10 Safety run timer | 10s |

| Parameter | Remark |
|---|---|
| 11 Speeding/overshoot delay | 2s |
| 12 Start idle time | 10s |
| 13 Warming-up time | 30s |
| 14 Transform switch time | 2s |
| 15 Return time | 30s |
| 16 Cooling time | 60s |
| 17 Stop idle time | 10s |
| 18 ETS Solenoid hold time | 20s |
| 19 Await steady stop delay | 30s |
| 20 Generator transient delay | 5s |
| 21 Mains transient delay | 2s |
| 22Mains under voltage threshold (trip) | 184V |
| 23 Mains over voltage threshold (trip) | 276V |
| 24Mains under frequency threshold(trip) | 45.0Hz |
| 25Mains over frequency threshold(trip) | 55.0Hz |
| 26Generator under voltage threshold (shutdown) | 184V |
| 27Generator under pressure threshold(warning) | 196V |
| 28Generator over pressure threshold(warning) | 265V |
| 29Generator over pressure threshold(shutdown) | 273V |
| 30Generator under frequency threshold(shutdown) | 40.0Hz |
| 31Generator under frequency threshold(warning) | 42.0Hz |
| 32Generator over frequency threshold(warning) | 55.0Hz |
| 33Generator over frequency threshold (shutdown) | 57.0Hz |
| 34 Over current percentage | 100% |
| 35 Flywheel teeth | 118teeth |
| 36Under-speed threshold(shutdown) | 1270RPM |
| 37Under-speed threshold(warning) | 1350RPM |
| 38Over-speed threshold(warning) | 1650RPM |
| 39Over-speed threshold(shutdown) | 1710RPM |
| 40Over-speed overshoot percentage | 0 |
| 41Battery low voltage threshold(warning) | 8.0V |
| 42Battery over voltage threshold(warning) | 33.0V |
| 43Charging failure threshold(warning) | 6.0V |
| 44 Language selection | 0 |
| 45 Password setup | 1234 |
| 46Low oil pressure 2 threshold(warning) | Not used |
| 47Low oil pressure 2 threshold (shutdown) | Not used |
| 48High temperature 2 threshold(warning) | Not used |
| 49High temperature 2 threshold(shutdown) | Not used |
| 50 Current transformer | 500A |
| 51Oil pressure sensor 1 selection | VDO10 bar |
| 52Temperature sensor 1 selection | VDO 120ºC |
| 53 Fuel level sensor selection | VDO Ohm |
| 54Oil pressure sensor 2 selection | Not used |
| 55Temperature sensor 2 selection | Not used |

| Parameter | Remark |
|---|---|
| 56 Module address | 1 |
| 57 Temperature units selection | ºC |
| 58 Pressure units selection | kPa |

# 13 FAULT FINDING

The following are regular failures and failure eliminations in the process of using the controller. If there is any other fault, please contact with our company.

| SYMPTOM | POSSIBLE REMEDY |
|---|---|
| Controller is inoperative | Check the start battery and wiring to the unit. Check the DC supply. Check the DC fuse. |
| Genset shutdown | Check the water/cylinder temperature is not above normal values ;<br>Check the AC supply voltage;<br>Check the DC fuse. |
| Controller emergency stop | If no Emergency Stop Switch is fitted, ensure that a DC positive signal is connected to the Emergency Stop input. Check emergency stop switch is functioning correctly. Check Wiring is not open circuit. |
| Low oil Pressure alarm stop after engine has fired | Check engine oil pressure. Check oil pressure switch/sensor and wiring. |
| High engine temperature alarm stop after engine has fired. | Check engine temperature. Check switch/sensor and wiring. |
| Shutdown during running | Check relevant switch and wiring of fault indicated on LCD display. Check configuration of input. |
| Fail to start | Check wiring of fuel solenoid. Check battery supply is present on the Fuel output of the module. Check the speed-sensing signal is present on the module's inputs. Refer to engine manual |
| Starter motor is inoperative | Check wiring to starter solenoid. Check battery supply is present on the Starter output of module. |
| Engine runs but generator will not take load | Check the switching device. Check connections to the switching device. |

# 14 PRODUCT PACKAGE

This product should be set according to the following items:

| ITEM | PACKET |
|---|---|
| HGM6310D or HGM6320D controller | 1 |
| Fixing clips | 4 |
| Product certification | 1 |
| Product instruction | 1 |