GEC6510 GEC6520

✔SUPPORTING CLOUD SERVICE

✔SUPPORTING EURO-III SENSOR

✔SUPPORTING EFI ENGINE

✔SUPPORTING ENGINE MAINTENANCE

GENSET CONTROLLER

USER MANUAL

SHANGHAI FORTRUST POWER ELECTRIC CO., LTD

1. PERFORMANCE AND CHARACTERISTICS

GEC6500 series controller includes GEC6510 and GEC6520.

GEC6510：It is used for single machine automation, controlling the start and stop of genset by remote signal.

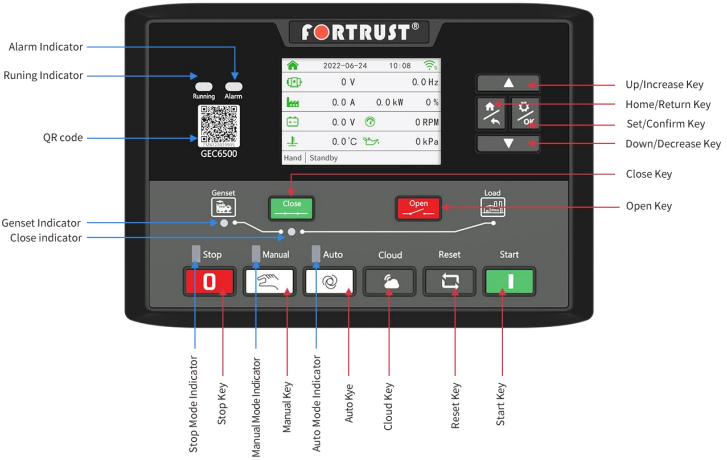
GEC6520： It adds the functions of mains monitoring and AMF on the basis of GEC6510, especially suitable for single machine automation system composed of one mains and one genset.

2. DIMENSION

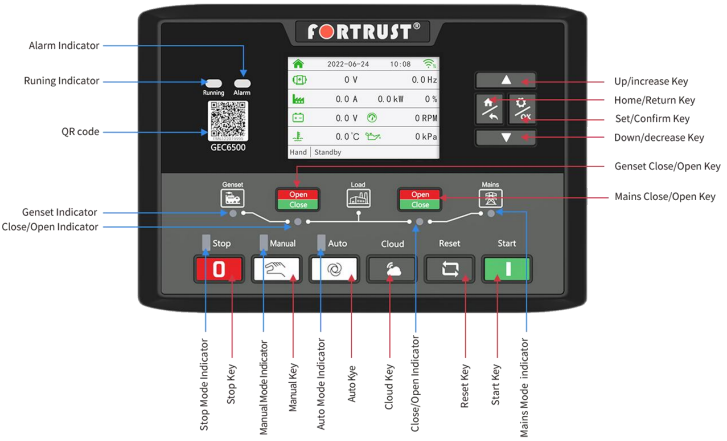
Overall Dimension	Panel Cutout
183mm x 137mm	184mm x 138mm

3. OPERATION

3.1 CONTROLLER PANEL



GEC6510



GEC6520

3.2 INDICATOR DESCRIPTION

Warning indicator: When warning alarm or alarm shutdown occurs, the warning indicator flashes; It does not light when there is no alarm.

Operation indicator: The indicator does not light up when the genset in standby state, but it is always on in normal operation.

4. KEY DESCRIPTIONS

KEY	FUNCTION	DESCRIPTION
	Stop	In manual/auto mode, it can stop the running genset. During stopping process, press this key again can stop generator immediately.
	Start	In manual mode, pressing this key can start the genset.
	Manual	Pressing this key will set the controller as Manual mode.
	Auto	Pressing this key will set the controller as Auto mode.
	Close/Open	Can control gens to switch on or off in Manual mode. NOTE: It is only fit for GEC6520.
	Close	Can control gens to switch on in Manual mode. NOTE: It is only fit for GEC6510.
	Open	Can control gens to switch off in Manual mode. NOTE: It is only fit for GEC6510.
	Set/Confirm	Pressing this key to enter menu interface; Shift cursor to confirm in parameters setting menu.
	Up/Increase	Screen scroll; Up cursor and increase value in setting menu.
	Down/Decrease	Screen scroll; Down cursor and decrease value in setting menu.
	Home/Return	Return to homepage when in main interface; Exit when in parameters setting interface.

	Reset	In the state of alarm, the alarm light is on, the sixth line of the screen shows the alarm. Press this key to reset, and the screen alarm display bar disappears; If the fault still exists, the screen alarm is still displayed, and the alarm light is still on.
	Cloud Service	Press this key to enter the cloud service mode. Press this key to enter the Interface of WIFI connection with TWO-DIMENSIONAL code. Press it again to exit and enter the main interface. This key only takes effect on the home page of the controller. You can item 11 of Mobile cloud Service Functions For more details.

Note: The factory initial password is 1921. The operator can change the password to prevent others from changing the advanced configuration of the controller at will. Please remember after changing the password. If you forget the password, please contact the company's service personnel and feed back all the information on the "About" page of the controller to the service personnel.

5. PARAMETER SETTING

The steps for setting parameters of the controller are as follows：

a. After the controller starts up, press the OK button to enter the menu, as follows.

b. Press the cursor ▲ (up/increase) or ▼ （down/decrease）to select the controller’s information.

c. Press the OK button transferring setting the parameter to imputing the password, as follows.

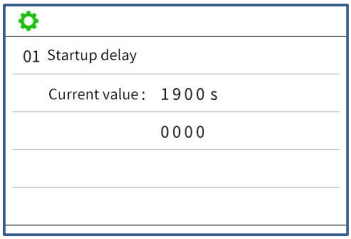
d. Press the button to enter the interface for parameter setting and password input, and then enter the password”1921” to set all the parameters. The setting method is as step e. and f..

e. Press the ▲ button (up/increase) or ▼ (down/decrease) to move the item up and down or modify the

value. Press the  button（set/confirm）to confirm the current value and move the cursor to the right.

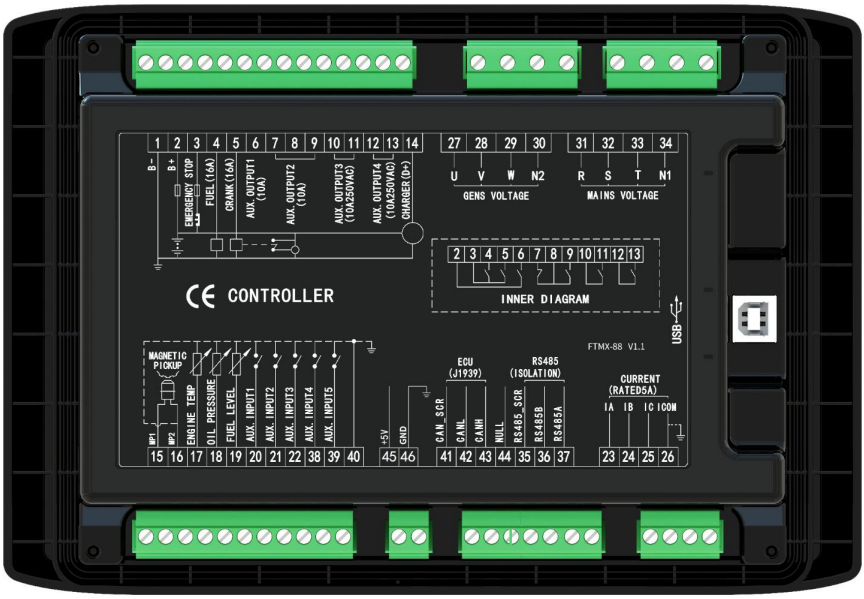
f. Press the  button (home/return) to return to the previous menu.

g. If the input configuration password is correct, then we enter the parameter setting interface (the first line is setting page flag line, the second is setting parameter item, the third is the current value, the fourth is setting parameter value). Press the  button (up/increase) or  (down/decrease) to select the parameter configuration items. Click the button to enter the correct parameter configuration mode as follows.



h. Set the parameter according to the step e. and f. If the value is within the range, it will be saved. If it is out of the range, it cannot be saved.

6. TERMINAL CONNECTION DESCRIPTION



GEC6500 BACK PANEL

Terminal Connection Description

No.	Function	Cable Size(mm2)	Description
1	DC input B-	2.5	Connected to negative of starter battery.
2	DC input B+	2.5	Connected to positive of starter battery. If wire length is over 30m, better to double wires in parallel. Max. 20A fuse is

No.	Function	Cable Size(mm2)	Description
			recommended.
3	Emergency Stop	2.5	Connected to B+ via emergency stop button.
4	Fuel Relay Output	1.5	B+ is supplied by 3 points, rated 16A.
5	Start Relay Output	1.5	B+ is supplied by 3 points, rated 16A Connect to starter coil.
6	Aux. Relay Output 1	1.5	B+ is supplied by 2 points, rated 10A.
7	Aux. Relay Output 2	1.5	Normal close output, 10A rated.
8			Relay common port.
9			Normal open output, 10A rated.
10	Aux. Relay Output 3	2.5	Relay normal open volt-free contact output. 10A rated.
11			
12	Aux. Relay Output 4	2.5	
13			
14	Charger D+ Input	1.0	Connect to D+ (WL) terminal. If without, the terminal is hung up.
15	Speed Sensor Input	0.5	Connected to speed sensor, shielding line is recommended.
16	Speed Sensor Input (B-connected inside)		

No.	Function	Cable Size(mm2)	Description
17	Temp. Sensor Input	1.0	Connect to water/cylinder temp. resistance type sensor.
18	Oil Pressure Sensor Input	1.0	Connect to oil pressure resistance type sensor.
19	Fuel Level Sensor Input	1.0	Connect to fuel level resistance type sensor.
20	Aux. Input 1	1.0	Ground connected is active (B-).
21	Aux. Input 2	1.0	Ground connected is active (B-).
22	Aux. Input 3	1.0	Ground connected is active (B-).
23	CT A Phase Sensing Input	1.5	Connect secondary coil (rated 5A).
24	CT B Phase Sensing Input	1.5	Connect secondary coil (rated 5A).
25	CT C Phase Sensing Input	1.5	Connect secondary coil (rated 5A).
26	CT Common Port	1.5	CT Common Port
27	Gens U phase Voltage Sensing Input	1.0	Connect to U phase output (2A fuse is recommended).
28	Gens V phase Voltage sensing Input	1.0	Connect to V phase output (2A fuse is recommended).
29	Gens W phase Voltage	1.0	Connect to W phase output (2A fuse is recommended).

No.	Function	Cable Size(mm2)	Description
	Sensing Input		
30	Gens N Input	1.0	Connect to generator N-wire.
31	Mains R phase Voltage Sensing Input	1.0	Connect to mains R phase (2A fuse is recommended)
32	Mains S phase Voltage Sensing Input	1.0	Connect to mains S phase (2A fuse is recommended)
33	Mains T phase Voltage Sensing Input	1.0	Connect to mains T phase, (2A fuse is recommended)
34	Gens N Input	1.0	Connect to generator N-wire.
35	RS485 Common Ground	/	Impedance-120 Ω shielding wire is recommended, its single-end connect with ground.
36	RS485B	0.5	
37	RS485A	0.5	
38	Aux. Input 4	1.0	Ground connected is active (B-).
39	Aux. Input 5	1.0	Ground connected is active (B-).
40	Sensor Common port	1.0	Sensor Common port.
41	CAN Common Ground	0.5	Impedance-120 Ω shielding wire is recommended, its single-end connect with ground (the controller without CANBUS function doesn ’ t
42	CAN-H	0.5	
43	CAN-L	0.5	

No.	Function	Cable Size(mm2)	Description
			have this terminal).
44	NULL	1.0	
45	+5V output	1.0	+5V output
46	Sensor Common port	1.0	Sensor Common port.

NOTE: USB ports in controller rear panel are programmable parameter ports; user can directly program via PC.

7. PARAMETER CONTENTS AND RANGE

No.	Items	Range	Default	Description
1	Mains Normal Delay	(0-3600) S	10	The delay from abnormal to normal or from normal to abnormal. It is used for ATS (automatic transfer switch) control.
2	Mains Abnormal Delay	(0-3600) S	5	
3	Mains Under Voltage	(30-60000)V	184	When mains voltage is under the point, mains under voltage active. When the value is 30, mains under voltage disabled.
4	Mains Over Voltage	(30-60000)V	276	When mains voltage is higher than the point, mains over voltage active. When the point is 60000V, mains over voltage disabled.
5	Transfer Delay	(0-99.9)S	1.0	It’s the delay from mains open to generator closed or from generator open to mains closed.
6(1)	Start Delay	(0-3600) s	1	Time from mains abnormal or remote start signal is active to start genset.
7(2)	Stop Delay	(0-3600) s	1	Time from mains normal or remote start signal is inactive to stop genset.
8(3)	Start Times	(1-10)	3	When engine start failure, it’s the maximum cranking times. When setting crank times out, controller sends start fail signal.

9(4)	Preheat Delay	(0-300)s	0	Time of pre-powering heat plug before starter is powered up.
10(5)	Cranking Time	(3-60)s	8	Time of starter power up each time.
11(6)	Crank Rest Time	(3-60)s	10	The second waiting time before power up when engine start fail.
12(7)	Safety On Time	(1-60)s	10	Alarm for low oil pressure, high temp, under speed, under frequency/voltage, failed to charge are all inactive.
13(8)	Start Idle Time	(0-3600)s	0	Idle running time of genset when starting.
14(9)	Warming Up Time	(0-3600)s	10	Warming time between genset switch on and high speed running.
15(10)	Cooling Time	(3-3600)s	10	Time for cooling before stopping.
16(11)	Stop Idle Time	(0-3600)s	0	Idle running time when genset stop.
17(12)	ETS Solenoid Hold	(0-120)s	20	Stop electromagnet’s power-on time when genset is stopping.
18(13)	Wait for Stop Time	(0-120)s	0	If “ETS Solenoid Hold” set as 0, it is the time from end of idle delay to genset at rest; if not 0, it is from end of ETS solenoid delay to genset at rest.
19(14)	Switch Close Delay	(0.0-10.0)s	5.0	Mains’ or generator’s switch closing pulse width, when it is 0, output is continuous.

20(15)	Flywheel Teeth	（10-300）	118	Number of flywheel teeth, it can detect disconnection conditions and engine speed.
21(16)	Gen Abnormal Delay	(0-20.0)s	10.0	Over or under voltage alarm delay.
22(17)	Gen Over Voltage Shutdown	(30-60000)V	264	When genset voltage is over the point, generator over voltage is active. When the point is 60000V, generator over voltage is disabled.
23(18)	Gen Under Voltage Shutdown	(30-60000)V	196	When generator voltage is under the point, generator under voltage is active. When the point is 30V, generator under voltage is disabled.
24(19)	Under Speed Shutdown	(0-6000)r/min	1200	When the engine speed is under the point for 10s, shutdown alarm signal is sent.
25(20)	Over Speed Shutdown	(0-6000)r/min	1710	When the engine speed is over the point, genset will shutdown directly and shutdown alarm signal is sent.
26(21)	Rated Idle	(0-6000)r/min	750	The engine started successfully and reached the required rated idle.
27(22)	Rated Speed	(0-6000)r/min	1500	Rated speed required by high speed engine operation.

28(23)	Gen Under Frequency Shutdown	(0-75.0)Hz	40	When generator frequency is lower than the point (not equal to 0) for 10s, shutdown alarm signal is sent.
29(24)	Gen Over Frequency Shutdown	(0-75.0)Hz	57	When generator’s frequency is over the point and continues for 2s, generator over frequency is active.
30(25)	High Temperature Shutdown	(80-300)°C	98	When the temperature sensor value is over this point, it sends out high temp. alarm. When the value is 300, warning alarm won’t be sent. (only suited for temperature sensor, except for high temp. pressure alarm signal inputted by programmable input port.)
31(26)	Low Oil Pressure Shutdown	(0-400)kPa	103	When the oil pressure sensor value is under this point, Low Oil Pressure alarm is sending out. When the value is 0, warning alarm won’t be sent. (only suited for oil pressure sensor, except for low oil pressure alarm signal inputted by programmable input port.)

32(27)	Low Fuel Level Warning	(0-100)%	10	When fuel level sensor value is under this point and remains for 10s, genset sends out warning alarm, only warn but not shutdown.
33(28)	Low Fuel Level Shutdown	(0-100)%	5	When fuel level sensor value is under this point and remains for 5s, genset sends out shutdown alarm.
34(29)	Loss of Speed Signal Delay	(0-20.0)s	5.0	When the delay setting as 0s, it only warn but not shutdown.
35(30)	Charging Failure Volt. Difference	(0-30)V	0	During genset normal running, when B+ and charger D+ (WL) voltage difference is above this value for 5s, the controller issues “ Charging Failure ” warning.
36(31)	Battery Over Voltage	(12.0-40.0)V	33	When generator battery voltage is over the point and remains for 20s, battery over voltage signal is active. it only sends warn but not shutdown.
37(32)	Battery Under Voltage	(4.0-30.0)V	8	When generator battery voltage is under the point and remains for 20s, battery under voltage signal is active. it only sends warn but not shutdown.

38(33)	CT Ratio/5	(5-6000)/5	500	External current transformer ratio.
39(34)	Full Load Rating	(5-6000) A	500	Rated current of generator, used for calculating over load current.
40(35)	Over Current Protection	（0-2）	2	According to the selected action, for the power over current 0: no action, 1: open or 2: alarm shutdown.
41(36)	Over Current Percentage	(50-130) %	200	When load current is over the point, the over current delay is initiated.
42(37)	Over Current Delay	(0-3600) s	30	When load current is over the point, over current signal is sent. When the delay is 0, only warn but not shutdown.
43(38)	Fuel Pump On	(0-100)%	25	When the fuel level lower than the set value for 2s, it sends a signal to open fuel pump.
44(39)	Fuel Pump Off	(0-100)%	80	When the fuel level higher than the set value for 2s, it sends a signal to close fuel pump.
45(40)	Aux. Output 1 Function	(0-25)	2	Factory default: Energized to stop.
46(41)	Aux. Output 2 Function	(0-25)	3	Factory default: Idle control.
47(42)	Aux. Output 3 Function	(0-25)	5	Factory default: Gens closed/ opened.

48(43)	Aux. Output 4 Function	(0-25)	6	Factory default: Mains closed/ opened.
49(44)	Aux. Output 1 Function	(0-25)	1	Factory default: High temperature alarm.
50(45)	Aux. Output 1 Active	(0-1)	0	Factory default: closing.
51(46)	Aux. Output 1 Delay	(0-20.0)s	2	Input signal active delay
52(47)	Aux. Output 2 Function	(0-25)	2	Factory default: Low oil pressure alarm.
53(48)	Aux. Output 2 Active	(0-1)	0	Factory default: closing.
54(49)	Aux. Output 2 Delay	(0-20.0)s	2	Input signal active delay
55(50)	Aux. Output 3 Function	(0-25)	10	Factory default: Remote start input.
56(51)	Aux. Output 3 Active	(0-1)	0	Factory default: closing.
57(52)	Aux. Output 3 Delay	(0-20.0)s	2	Input signal active delay
58(53)	Aux. Output 4 Function	(0-25)	11	Factory default: Low fuel level warn.
59(54)	Aux. Output 4 Active	(0-1)	0	Factory default: close.
60(55)	Aux. Output 4 Delay	(0-20.0)s	2	Input signal active delay
61(56)	Aux. Output 5 Function	(0-25)	12	Factory default: Low coolant level warn.
62(57)	Aux. Output 5 Active	(0-1)	0	Factory default: close.

63(58)	Aux. Output 5 Delay	(0-20.0)s	2	Input signal active delay
64(59)	Power On Mode	(0-2)	0	0: Stop Mode; 1: Manual Mode; 2: Auto Mode
65(60)	Module Address	(1-254)	1	The communication address of controller.
66(61)	Password	(0-9999)	1921	All parameters can be set. See NOTE4.
67(62)	Engine Speed of Crank Disconnect	(0-3000)r/min	360	When engine speed is over this point, starter will disconnect.
68(63)	Frequency of Crank Disconnect	(0.0-30.0)Hz	14	When generator frequency is over this point, starter will disconnect.
69(64)	Oil Pressure of Crank Disconnect	(0-400)kPa	200	When engine oil pressure is over this point, starter will disconnect.
70(65)	High Temp. Stop Inhibit	(0-1)	0	Default: when temperature is overheat, the genset alarm and shutdown. Details see NOTE2
71(66)	Low OP Inhibit Stop Inhibit	(0-1)	0	Default: when oil pressure is too low, it sends alarm and shutdown.Details see NOTE3
72(67)	AC System	(0-2)	0	0 3P4W； 1 2P3W； 2 1P2W；
73(68)	Temp. Sensor Curve Type	(0-10)	8	SGX

74(69)	Pressure Sensor Curve Type	(0-9)	8	SGX
75(70)	Liquid Level Sensor Curve Type	(0-3)	0	SGD
76(71)	Generator Poles	(2-64)	4	Number of magnetic poles, used for calculating rotating speed of generator without speed sensor.
77(72)	Temp. Sensor Open Circuit Action	(0-2)	1	0: Not used; 1: Warning; 2: Shutdown
78(73)	Oil Pressure Sensor Open Circuit Action	(0-2)	1	0: Not used; 1: Warning; 2: Shutdown
79(74)	Liquid Level Sensor Open Circuit Action	(0-2)	1	0: Not used; 1: Warning; 2: Shutdown
80(75)	Disconnect Oil Pressure Delay	(0-20.0)s	0	When disconnect conditions include oil pressure and engine oil pressure is higher than disconnect oil pressure delay, the genset is regarded as start successfully and starter will disconnect.
81(76)	Overload Action	(0-2)	0	0 Not used; 1 Warn; 2 Shutdown When power is higher than preset value and duration exceeds than delay, over power warning is active. Return and delay value can be set.

82(77)	Start Interface	(0-1)	1	0: Disabled; 1: Enabled. Start interface delay can be set.
83(78)	Maintenance Password	(0-9999)	1234	Enter password interface of maintenance configuration.
84(78)	Date			Set the date/time of controller.
85(79)	Fuel Output Time	(1-60)s	1	It is the time of the genset fuel output during power on.
86(80)	Manual Mode ATS	(0-1)	0	0: Key Switch; 1: Auto Switch.
87(81)	Speed Raise Pulse	(0-20.0)s	2.0	It is the speed-up pulse output time, when the unit enters the high-speed warm-up.
88(83)	Speed Drop Pulse	(0-20.0)s	2.0	It is the speed-drop pulse output time, when the unit enters the stop idling.
89(84)	ATS Open Time	(1.0-60.0)s	3.0	ATS Open Time
90(85)	Sensor curves	（0-2）	0	0 Temp. sensor； 1 Pressure sensor； 2 Liquid level sensor. Select the sensor to be set, and then input the resistance value (or current or voltage) and the corresponding value of each point of the curve. It takes 8 points to input.
91(86)	Engine Type	(0-29)	00	00 Normal genser 01 Common J1939 genset See table 15 for more details.
92(87)	CAN Address	(0-255)	3	

93(88)	Rated Active Power	(0-6000) kW	100	Used to calculate active power/rated power percentage.
94(89)	Crank Disconnect Condition	(0-6)	04	Conditions of disconnecting starter (generator, magnetic pickup sensor, oil pressure), each condition can be used alone and simultaneously to separating the starter motor and genset as soon as possible.
95(90)	Under Speed Alarm	(0-6000)r/min	1300	When the engine speed is under the point for 10s, alarm signal is sent.
96(91)	Over Speed Alarm	(0-6000)r/min	1650	When the engine speed is over the point for 2s, alarm signal is sent.
97(92)	Gen Under Voltage Alarm	(30-60000)V	200	Power A/B/C phase under voltage alarm threshold
98(93)	Gen Over Voltage Alarm	(30-60000)V	260	Power A/B/C phase over voltage alarm threshold
99(94)	Gen Under Frequency Alarm	(0-75.0)Hz	43	When generator frequency is lower than the point (not equal to 0) for 5s, alarm signal is sent.

100(95)	Gen Over Frequency Alarm	(0-75.0)Hz	56	When generator’s frequency is over the point and continues for 1s, alarm signal is sent.
101(96)	D+Enable		Disable	

NOTE1: The value in first line of “Number” column is for GEC6520 and the value in brackets is for GEC6510.

NOTE2: If select high temperature inhibit, or set programmable input as High Temperature Inhibit (this input is active), when temperature is higher than pre-setting threshold, controller sends warning signal only and not shutdown.

NOTE3: If select low oil pressure inhibit, or set programmable input as Low Oil Pressure Inhibit (this input is active), when low oil pressure is lower than pre-setting threshold, controller sends warning signal only and not shutdown.

NOTE4: If default password (1921) isn’t changed, it doesn’t need to input when configuring parameters via PC software; if the password is changed for the first time via PC software, it need to input password in password window.

NOTE5: After correctly entering the password, you can enter again within one minute without entering the password (if you exit, recycle). You can directly enter the parameter setting interface by entering the parameter serial number.

8. CRANK DISCONNECT CONDITIONS SELECTION

Crank Disconnect Conditions Selection

No.	Setting Description
00	Speed
01	Gen frequency
02	Speed + Gen frequency
03	Speed + Oil pressure
04	Gen frequency + Oil pressure
05	Speed + Gen frequency+ Oil pressure
06	Oil pressure

NOTE:

1) There are 3 conditions to make starter disconnected with engine, that is, speed sensor, generator frequency and engine oil pressure. They all can be used separately or combined.

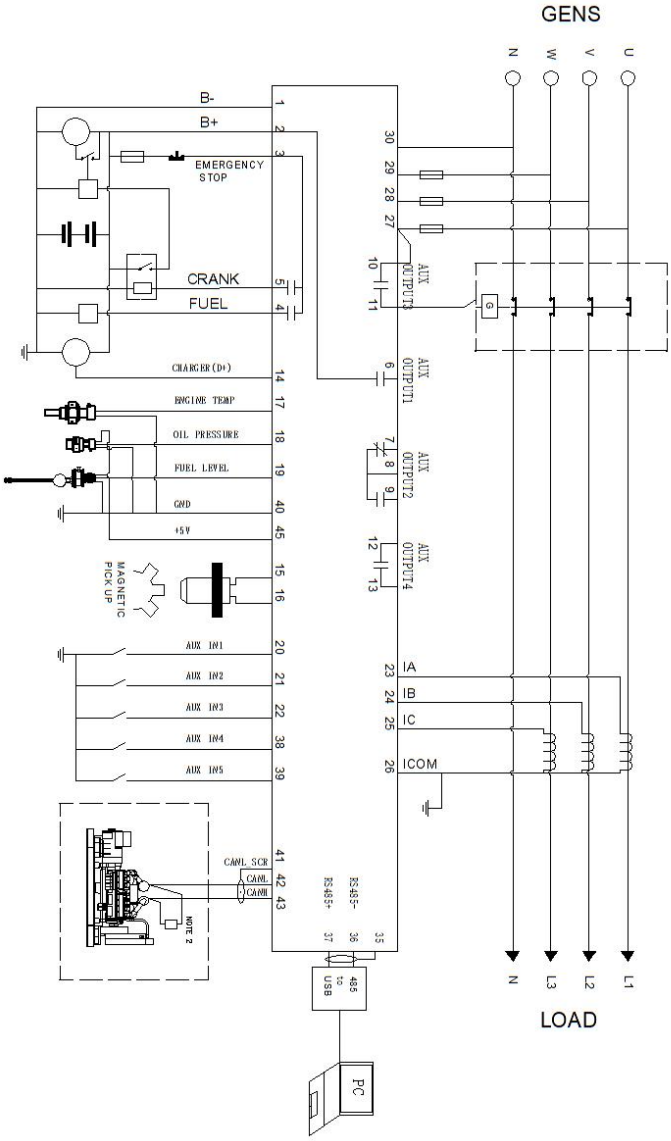
2) The starting condition cannot be set beyond the range in the table by other means, otherwise the starting failure will alarm and stop, and the starting motor will be damaged after a long time of starting output.

3) When set as speed sensor, must ensure that the number of flywheel teeth is as same as setting, otherwise, "over speed stop" or "under speed stop" may be caused.

4) The calculation method of speed should be set correctly (sensor, ECU communication, frequency conversion), otherwise the starting failure will alarm and stop, and the starting motor will be damaged after a long time of starting output.

5) If genset without oil pressure sensor, please don ' t select corresponding items, otherwise the starting failure will alarm and stop, and the starting motor will be damaged after a long time of starting output.

Appendix


GENS
N
W
V
U
B-
B+
EMERGENCY STOP
CRANK
FUEL
CHARGER(D+)
ENGINE TEMP
OIL PRESSURE
FUEL LEVEL
GND
+5V
MAGNETIC PICK UP
AUX IN1
AUX IN2
AUX IN3
AUX IN4
AUX IN5
AUX OUTPUT3
AUX OUTPUT1
AUX OUTPUT2
AUX OUTPUT4
IA
IB
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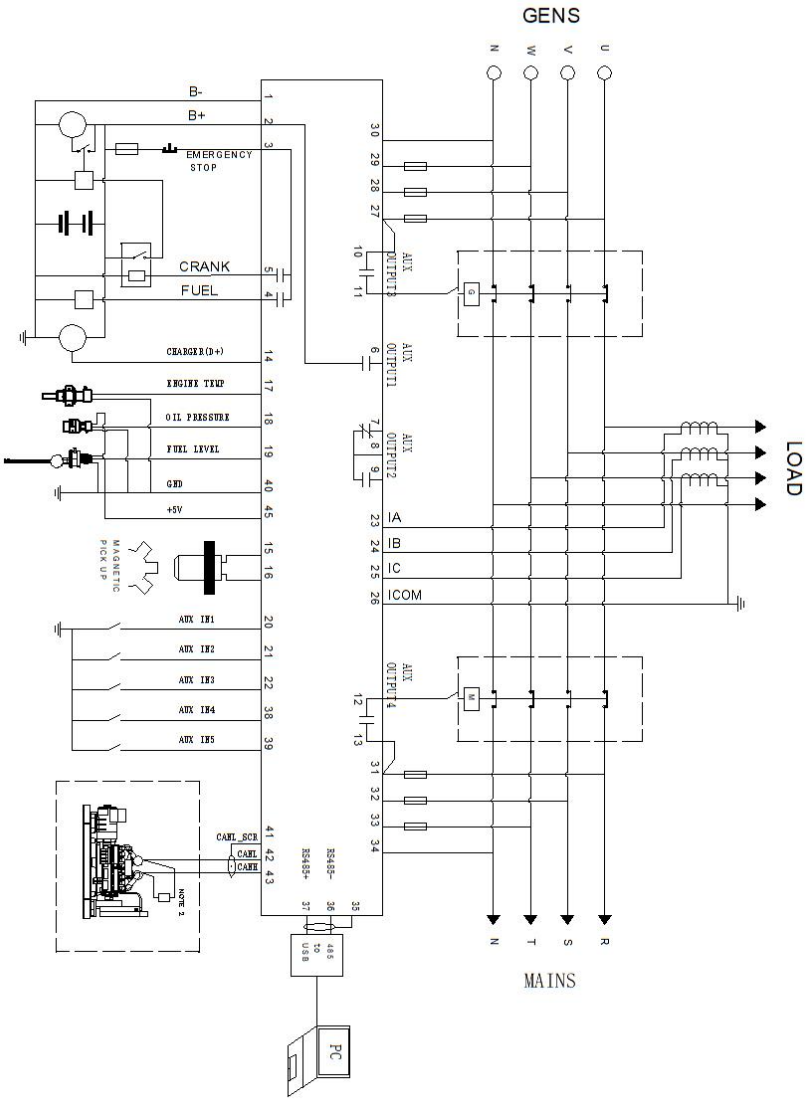
485 to USB
PC
N
L3
L2
L1
LOAD


GENS
N
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B+
EMERGENCY STOP
CRANK
FUEL
CHARGER(D+)
ENGINE TEMP
OIL PRESSURE
FUEL LEVEL
GND
+5V
MAGNETIC PICK UP
AUX IN1
AUX IN2
AUX IN3
AUX IN4
AUX IN5
AUX OUTPUT3
AUX OUTPUT1
AUX OUTPUT2
AUX OUTPUT4
IA
IB
IC
ICOM
LOAD
CANL_SCR
CANL
CANH
NOTE 2
RS485-
RS485+
485 to USB
PC
N
T
S
R
MAINS

FORTRUST®

Address: Room 803, Building A, Senlan Meilun Building, 555 Lansong Road, Pudong New District, Shanghai

Tel: 19851351321

Postcode: 200137

Factory Address: No.49 Mingzhu Road, Qidong Coastal Area, Jiangsu Province, China.

Postcode：226236

Tel:19851351386

Service Hotline：13917597386

Web：www.fortrustpowerele.com

Email: info @fortrust.cn