GTR-220

User manual

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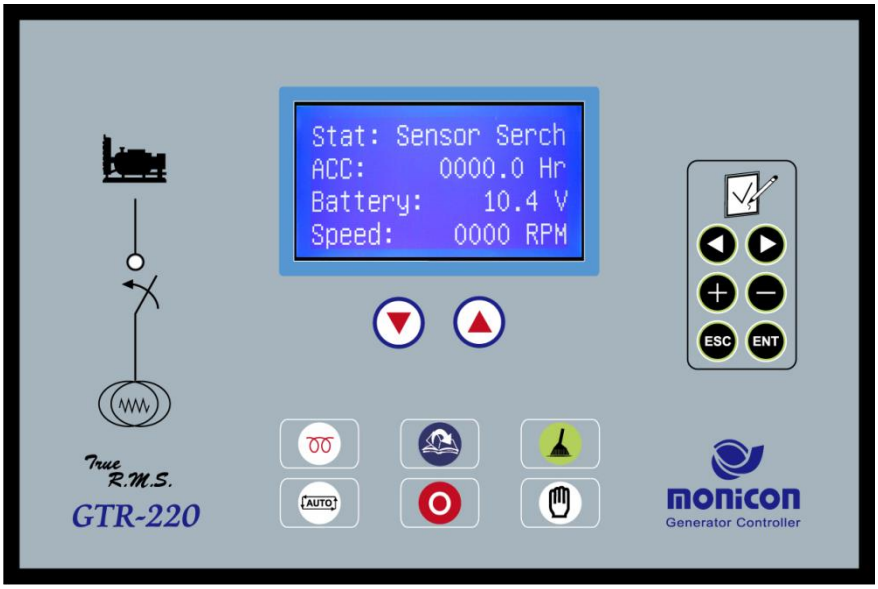
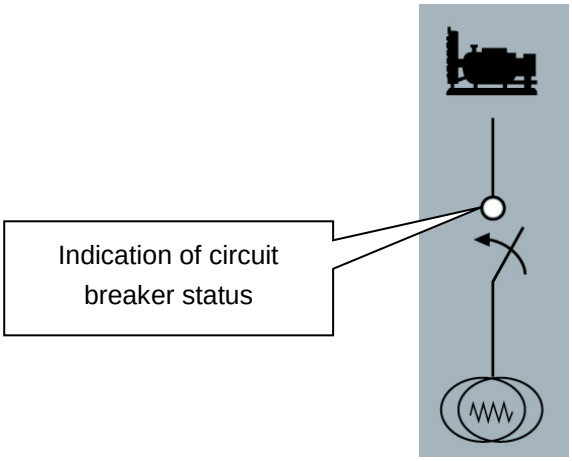
1. Panel descriptions



A. Circuit Breaker status LED



Genset Indicators：When ATS transfers load from Mains to the Genset, the LED turns ON if connector 26 detects signal from ATS switch.

B. Setup Keypad

1. In password entry mode, this keypad represents the first-digit.
2. Under PARAMETER setting, this keypad switches to the next parameter.

1. In password entry mode, this keypad represents the second-digit.
2. Under PARAMETER setting, this keypad switches to previous parameter.

1. In CODE entry mode, this keypad represents the third-digit.
2. Under PARAMETER setting, this keypad increases the setting value.

1. In CODE entry mode, this keypad represents the fourth-digit.
2. Under the PARAMETER setting mode, this keypad reduces the setting value.

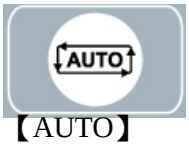
Enter or exit the parameter setting mode

Confirm and save the settings

These keypads alternately change the display of Genset information, evenlog, and error code.

2. Operation keypads


【Manual】



【AUTO】


【OFF】


【RESET】


【Preheat】


【Event Log】

1. **Manual**：Press manual keypad for 2 seconds to start the engine. Then LCD shows pre-heat function; after pre-heat, engine starts immediately. If engine fails to start, the GTR-220 returns to the OFF mode. The pre-heat state may not perform, if parameter setting is 0 second. If Pre-fuel is activated, the fuel outputs before crank procedure.

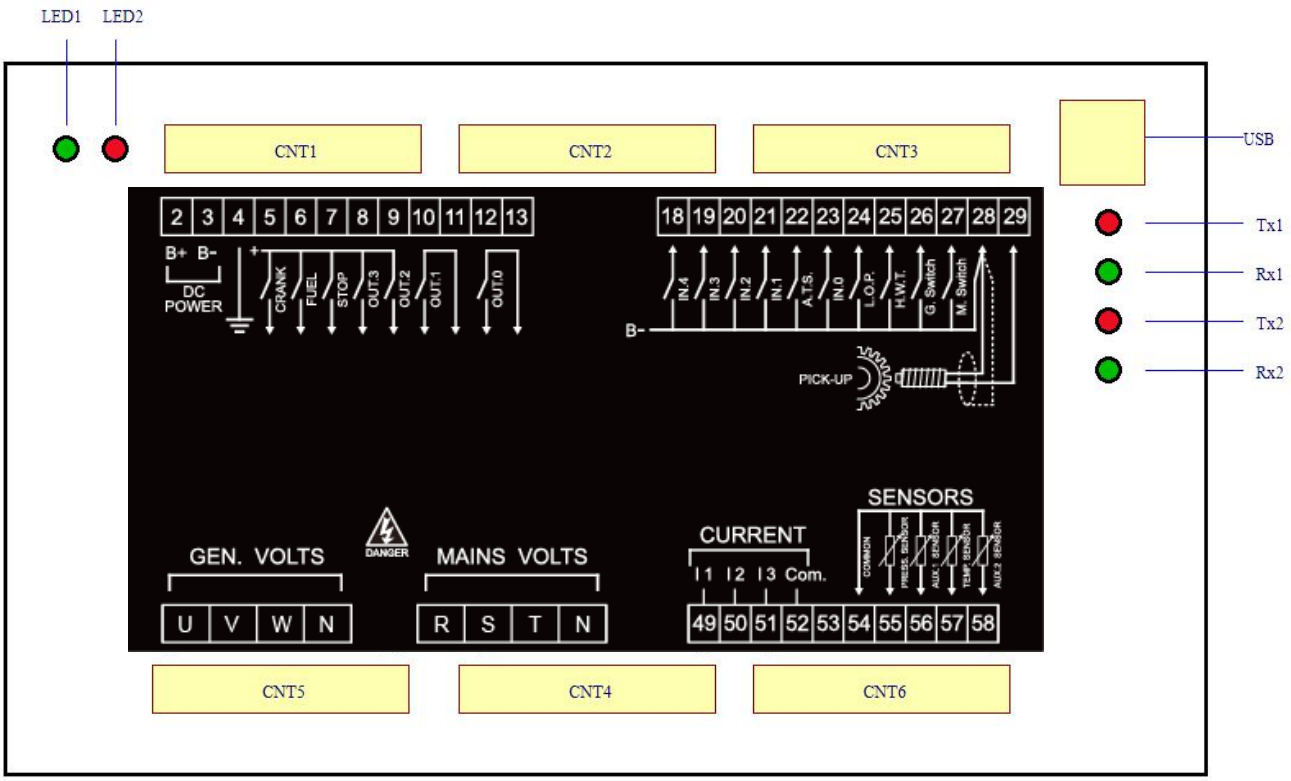
2. **AUTO**：In the Auto mode, the GTR-600 starts the engine by ATS signal and then the LCD shows preheat, if pre-heat function is enabled. After pre-heat, the engine starts to crank. If engine fails to start, the system returns to the pre-heat state and then start to crank the engine again. For example, if the conditions and parameter settings are given as follows: 1.stop duration is 10 seconds, crank attempt is 3 times. The engine cranks for 10 seconds and then rest for 10 seconds, after 3 attempts, the LCD shows the over crank and triggers the alarm.

3. **OFF**：Switch to OFF stops the engine and then “stop” appears on the LCD. The idle also appears on the LCD, if the idle function is enabled. After 10 seconds of delay (depends on the setting), the engine stops completely and idle icon disappears.

4. **Reset**：Press reset to clear error and deactivates alarm. The LCD turns red when errors are detected and then stops the engine and shows the error messages on the LCD. Press and hold  clears error and switches into OFF mode.

5. **Preheat**：Press the keypad  to manually activate the pre-heat output under OFF or AUTO mode. If the generator is running, the pre-heat function is prohibited.
6. **Event Log**：Press to display 1024 event records.

3. Rear connectors：

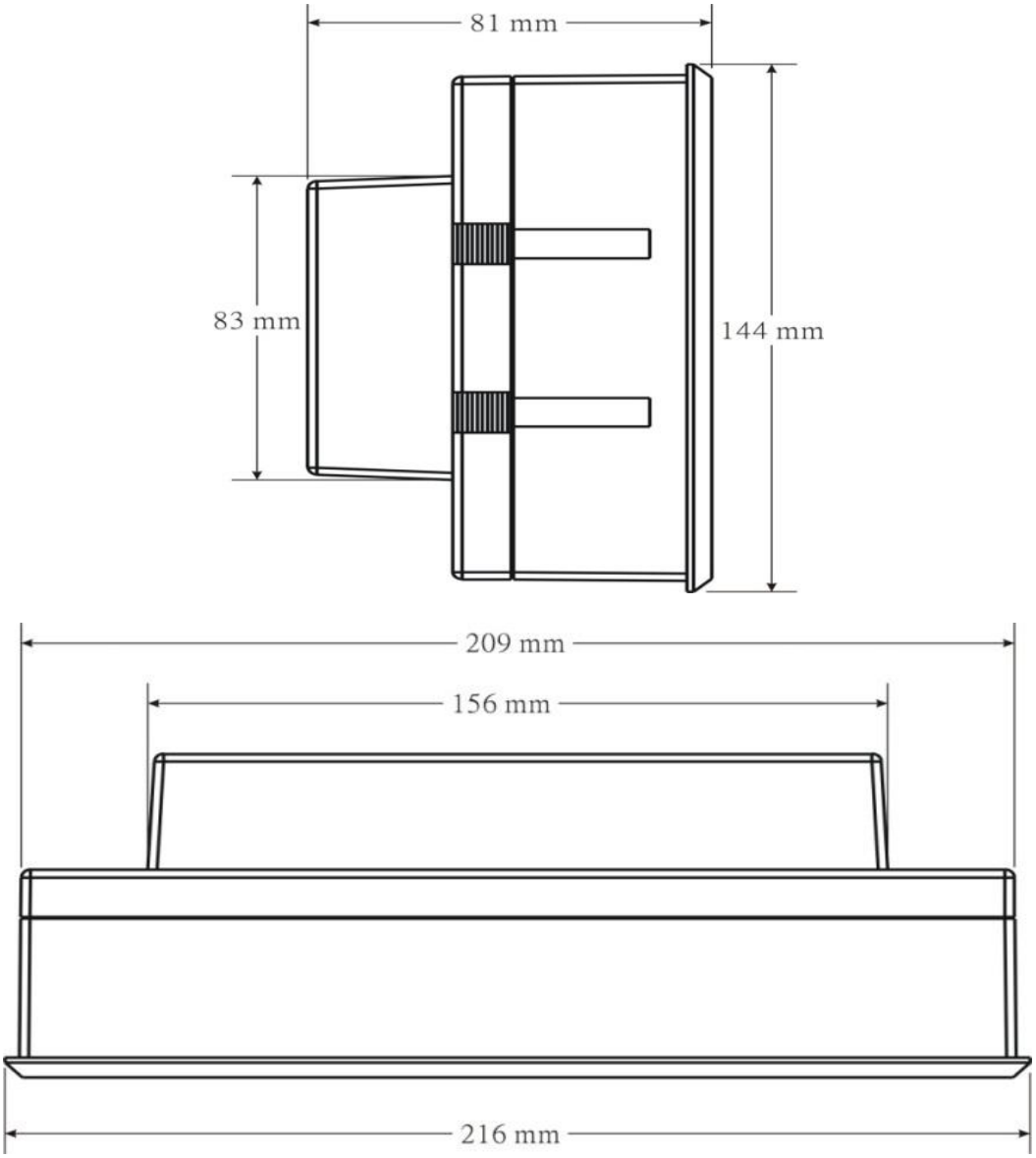


Pin	Description	英文代碼
2	Battery +	B+
3	Battery -	B+
4	Ground	GND
5	Starter output	Crank
6	Fuel output	Fuel
7	Stop output	STOP
8	User define Output 3	Out.3
9	User define Output 2	Out.2
10	User define Output 1	Out.1
11	User define Output 1	Out.1
12	User define Output 0	Out.0
13	User define Output 0	Out.0
18	User define input 4	In.4
19	User define input 3	In.3
20	User define input 2	In.2
21	User define input 1	In.1
22	ATS input	ATS
23	User define input 0	In.0

24	Low oil pressure switch	L.O.P.
25	High water temperature switch	H.W.T.
28	Pickup	Pickup
29	Pickup	Pickup
49	Genset CT1 (U)	I1
50	Genset CT2 (V)	I2
51	Genset CT3 (W)	I3
52	Genset CT N	COM
53	Sensor V+	Sensor V+
54	Sensor GND	Common
55	Oil Pressure sensor	Oil press
56	Oil temperature sensor	Oil Temp
57	Water temperature sensor	Coolant Temp.
58	AUX temperature sensor	Auxiliary
U	Genset voltage U	R
V	Genset voltage V	S
W	Genset voltage W	T
N	Genset voltage N	N
J5-1	CANBUS HI	CAN H
J5-2	CANBUS LOW	CAN L
J5-3	CANBUS GND	CAN GND
J5-4	RS-485 D+	485 A
J5-5	RS-485 D-	485 B

4. **Wiring Diagram**

5. **Dimension**



6. Specification

A. Function

1. Parameter settings
2. Mains OFF warning
3. Fuel level sensing
4. Frequency display
5. Genset voltage/current display
6. KW、KVAR、KWH、KVARH、P.F.
7. RPM
8. Running hours
9. Battery voltage display
10. Exerciser
11. Water temperature/Oil pressure display
12. 1024 Event log and
13. 64 Error record

B. Remote access:

1. Start, stop, and reset
2. Parameter settings
3. Genset monitoring
4. Error code access

C. Front panel:

1. Manual start / Stop
2. Auto (ATS)
3. Mains OFF simulation
4. Reset

D. Protections

Engine	Generator	Battery
1.High water temperature	1.Over load	1.Low voltage
2.Low oil pressure	2.Short	2.High voltage
3.Low coolant	3.High voltage	3.Charge fail
4.Over crank	4.Low voltage	4.Under voltage
5.Over speed	5.High frequency	
6.Low fuel	6.Low frequency	

E. Specification

DC input： 8～36 VDC
Power consumption： Max. 24 W
Voltage measurement： 0～500VAC(±0.2 ％)
Current measurement： 0～5 A * CT ratio (±0.2 ％)
Frequency measurement： 0～80 Hz(±0.02 ％)
Charger or pickup voltage： 5 V ～ 70 V(peak to peak)
Charger or pickup frequency：62 Hz ～ 5KHz
Relay output： 10 A/30 VDC (Output 3 Max. 1 A).
Communication protocol：A. Power environment Communication protocol
B. Modbus master Communication protocol
Working temperature： -10 ℃ ～ 60 ℃
Dimension(W * H * D)： 216 mm * 144 mm * 89 mm
Opening(W * H)： 210 mm * 138 mm
Weight： 1 Kg

7. Engine Crank Settings

1. Detect Frequency
   Setting：Disable/ Enable
   Default：Enable
   Description：Detect presence of frequency before cranking the engine.
2. Detect oil press
   Setting：Disable/ Enable
   Default：Enable
   Description：Detect presence of oil pressure before cranking the engine.
3. Crank Inteval
   Setting：5~40(seconds)
   Default：10
   Description：Set the duration of each crank period.
4. Crank attempts
   Setting：1~10
   Default：3
   Description：Set total number of crank attempts.
5. Escape Up Limit
   Setting：15~30(Hz)
   Default：20
   Description：Frequency above setting disconnects starter motor.
6. Engage Low Limit
   Setting：15~30(Hz)
   Description：Frequency below setting activates crank procedure
7. OP Build up Time
   Setting：0.2~2.0(Seconds)
   Default：0.6
   Description：Time delay after activation of oil pressure switch before disconnecting starter motor. (“Check oil pressure before crank” must be enabled.)
8. Idle Inteval
   Setting：0~600(Seconds)
   Default：300
   Description：Duration of engine idle

8. Engine Settings

1. PreAdd Fuel Time
   Setting：0.0~5.0(seconds)

Default：3

Description：Activates fuel pump before initiating crank procedure.

2. Pre-heat Time

   Setting：1~20(Seconds)

   Default：0

   Description：Duration of Preheat before engine crank.

3. Energied To Stop

   Setting：1~30(seconds)

   Default：10

   Description：Output duration for stop solenoid to shut down the engine.

4. Failed to Stop

   Setting：1~10(Seconds)

   Default：4

   Description：Time delay before crank procedure after user press reset button.

5. Trip then shut

   Setting： Disable/ Enable

   Default：Enable

   Description：When error occurred, timer starts before shutdown the engine

6. Trip Duration

   Setting：30~900(Seconds)

   Default：780

   Description：When error occurred, RUN LED flashes and controller outputs error signal, if error is not cleared within setting, system initiates Genset shutdown.

7. Cooling Time

   Setting：0~1250(Seconds)

   Default：310

   Description：Set engine cooling time for normal Genset shutdown. Engine cooling time is disabled during malfunction shutdown

8. Freq versus RPM

   Setting：0~200

   Description: To conver RPM from frequency, divide RPM by frequency (1800rpm/60HZ=30), 30 is the ratio for this setting.

9. Man. Inst. Stop

   Setting：Disable/ Enable

   Default：Enable

   Description：Manual shutdown the Genset without cooling down the engine

9. Hour Meter

1. ACC. Seconds/
   Setting：0~59(Seconds)
   Default：0
   Description：Set the hour meter in seconds.
2. ACC. Minutes
   Setting：0~59(Minutes)
   Default：0
   Description：Set the hour meter in minutes
3. ACC. Hour
   Setting：0~99(Hour)
   Default：0
   Description：Set the hour meter in hours.
4. ACC. 100Hour
   Setting：0~99(*100)
   Default：0
   Description：Set the hour meter in 100 hours scale.

10. Sensors Switche

1. H.W.T. Detection
   Setting：Disable/ Enable
   Default：Enable
   Description：Activates high water temperature protection
2. W.T. Sw. Type
   Setting： NC/NO
   Default：NO
   Description：Setup the switch type to normally close or normally open.
3. H.W.T. Sw. Delay
   Setting：1~9.5(Seconds)
   Default：5
   Description：When high water temperature occurres, timer starts before activating protection
4. L.O.P. Detection
   Setting：Disable/ Enable
   Default：Enable
   Description：Activates low oil pressure protection
5. O.P. switch type
   Setting：NC/NO

Default：NO

Description：Setup the switch type to normally close or normally open.

6. L.O.P Sw. Delay

Setting：0.2~6.0(Seconds)

Default：3

Description：When low oil pressure occurres, timer starts before activating protection

11. Auxilary Input

1. Auto Input Delay

Setting：0.2~5(Seconds)

Default：1

Description：Time delay for AUTO start.

2. Input0 Detect

Setting：Disable/ Enable

Default：Enable

Description：Activates Aux 0 function

3. Input0 Name

Setting：1~13

(1.Emergency Stop 2.Over Frequency 3.Low battery Voltage 4. System Fault 5.High fuel level 6. System trip 7.Insulation fail 8.Heat Fan out 9.Pre-Alarm 10.Charge fail 11.Over Load 12.Low water temperature 13.Preheat)

Default：7.

Description：Define the function for AUX 0 input

4. In 0 Protection

Setting：1.Warning 2.Alarm 3.Trip 4.Stop

Default：3.

Description：Setup the action when AUX 0 activates

5. In0 Switch Type

Setting：NC/NO

Default：NO

Description：Setup AUX 0 to normally close or normally open

6. Input 0 delay

Setting：0.2~5.0(Seconds)

Default：0.6

Description：When AUX 0 input activates, timer starts before activating protection

7. Input 1 Detect

Setting：Disable/ Enable

Default：Enable

Description：Activates Aux 1 function

8. Input1 Name
   Setting：1~13
   (1.Battle Switch 2. Over Frequency 3.Low battery Voltage 4. System Fault 5.High fuel level 6. System trip 7.Insulation fail 8.Heat Fan out 9.Pre-Alarm 10.Charge fail 11.Over Load 12.Low water temperature 13.Preheat)
   Default：5.
   Description：Define function for AUX 1
9. In1 Protection
   Setting：1.Warning 2.Alarm 3.Trip 4.Stop
   Default：3.
   Description：Setup the action when AUX 0 activates
10. In 1 Switch type
    Setting：NC/NO
    Default：NO
    Description：Define AUX1 type to normally close or normally open
11. Input 1 delay
    Setting：0.2~5.0(Seconds)
    Default：1.0
    Description：When AUX 1 input activates, timer starts before activating protection
12. Input 2 Detect
    Setting：Disable/ Enable
    Default：Enable
    Description：Activates Aux 2 function
13. Input 2 Name
    Setting：1~13
    (1.Low coolant level 2. Over Frequency 3.Low battery Voltage 4. System Fault 5.High fuel level 6. System trip 7.Insulation fail 8.Heat Fan out 9.Pre-Alarm 10.Charge fail 11.Over Load 12.Low water temperature 13.Preheat)
    Default：3.
    Description：Define function for AUX 2
14. In 2 Protection
    Setting：1.Warning 2.Alarm 3.Trip 4.Stop
    Default：2
    Description：Setup the action when AUX 2 activates
15. In 2 Switch type
    Setting： NC/NO
    Default：NO

Description：Setup AUX2 to normally close or normally open

16. Input 2 delay

    Setting：0.2~5.0(Seconds)

    Default：0.4

    Description：When AUX 2 input activates, timer starts before activating protection

17. Input 3 Detect

    Setting：Disable/ Enable

    Default：Enable

    Description：Activates Aux 3 function

18. Input 3 Name

    Setting：1~13

    (1.Low fuel 2. Over Frequency 3.Low battery Voltage 4. System Fault 5.High fuel level 6. System trip 7.Insulation fail 8.Heat Fan out 9.Pre-Alarm 10.Charge fail 11.Over Load 12.Low water temperature 13.Preheat)

    Default：8.

    Description：Define function for AUX 3

19. In 3 Protection

    Setting：1.Warning 2.Alarm 3.Trip 4.Stop

    Default：2.

    Description：Setup the action when AUX 3 activates

20. In 3 Switch type

    Setting：NC/NO

    Default：NO

    Description：Setup AUX 3 to normally close or normally open

21. Input 3 delay

    Setting：0.2~5.0(Seconds)

    Default：0.4

    Description：When AUX 3 input activates, timer starts before activating protection

12. **Auxilary Output**

1. Output 0 function

   Setting：1~45

1.All errors	2.System trip	3.Preheat	4.Idle
5.Reset	6.Main breaker ON	7.Main breaker hold	8. Genset normal
9.Engine running	10.Over crank	11.Over speed	12.Over frequency
13.Low frequency	14.Low oil pressure(switch)	15. High water temperature(switch)	16.High AC voltage
17.Low AC voltage	18.Overload	19.Short circuit	20.Low battery

21.High DC volt	22.Aux IN0 Activat	23. Aux IN1 Activat	24. Aux IN2 Activat
25. Aux IN3Activat	26.Sen. Fault Alarm	27.HWT Value Alarm	28. LOP Value Alarm
29. LFL Value Alarm	30.HFL Value Alarm	31.System not in AUTO	32.System in AUTO
33.Manual Start	34.AUTO Start	35.Standby	36.Pre-heat
37.Pre add fuel	38.Cranking	39.Crank rest	40.System in normal
41.System Alarm	42.System Trip	43.Stop inteval	44. Cooling interval
45.Reverse power			

Default：3.

Description：Setup the function for AUX output 0

2. Output 1 function

Setting：1~45

Default：3.

Description：Setup the function for AUX output 1

3. Output 2 function

Setting：1~45

Default：4.

Description：Setup the function for AUX output 2

4. Output 3 function

Setting：1~45

Default：5.

Description：Setup the function for AUX output 3

13. CAN BUS J1939

1. J1939

Setting：Disable/ Enable

Default：Enable

Description：Enables Canbus

2. Brand Selection

Range：

Caterpillar	Cummins	Chrysler	Detroit Diesel	Deutz	GM
Isuzu	Iveco	JCB	John Deere	Logger	MAN
MTU	Perkins	Scania	SISU	Standard	Steyer
VM	Volvo				

14. Frequency

1. System Frequency

Setting：50/60(Hz)

Description：Setup Genset frequency in 50Hz or 60Hz

2. Hi freq. Detect

   Setting：Disable/ Enable

   Default：Enable

   Description：Activates high frequency protection

3. H. F. set point

   Setting：50~60/60~72(Hz)

   Default：55/66Hz

   Description：When AC frequency is higher than setting, controller shuts down the engine and display high frequency error, if high frequency is enable.

4. Hi Freq. Delay

   Setting：1~9(Seconds)

   Default：2

   Description：When high frequency occurres, timer starts before activating protection

5. Low freq. Detect

   Setting：Disable/ Enable

   Default：Enable

   Description：Activates low frequency protection

6. L.F. protection

   Setting：1.Warning 2.Alarm 3.Trip 4.shutdown

   Default：3

   Description：Setup the action when low frequency occurs

7. .L.F. set point

   Setting：40~50/48~60(Hz)

   Default：45/56Hz

   Description：When AC frequency is lower than setting, controller outputs trip signal.

8. Low freq. Delay

   Setting：1~9(seconds)

   Default：3

   Description：When low frequency occurres, timer starts before activating protection

9. Mini. Freq. Det.

   Setting：Disable/ Enable

   Default：1

   Description：Activates Extreme low frequency protection.

10. M.F. Set Point

    Setting：15~30(Hz)

Default：20

Description：When sudden drop of frequency belows setting; low frequency protection automatically disables and engine operates at idle speed.

15. Battery

1. System DC volt
   Setting：12/24(V)
   Default：24
   Description：Setup DC voltage in 12V or 24V
2. Batt. Fault Alarm
   Setting：Disable/ Enable
   Default：1
   Description：Activates battery error protections
3. L. Batt set point
   Setting：8.4~12/16.8~24(V)
   Default：10.8/20
   Description：When battery voltage is below setting, controller displays low DC volt warning.
4. H. Batt. Set point
   Setting：12~16.8/24~33.6(V)
   Default：14.4/28.4
   Description：When battery voltage is above setting, controller displays high DC volt warning.
5. Weak Batt. Detect
   Setting：Disable/ Enable
   Default：1
   Description：Activates weak battery protection
6. W. Batt. Set point
   Setting：4.8~8.4/9.6~16.8(V)
   Default：6/9.6
   Description：When battery voltage is below setting, controller displays battery warning.
7. Charge failed
   Setting：9.6~14.4/19.2~28.8(V)
   Default：12.6/22.6V
   Description：When voltage is out of range, controller displays charge fail.

16. AC Voltage

1. System AC volt
   Setting：110/120/190/208/220/380V/440/480/660/3300/4160/6600/7620/11400
   Default：380V

Description：Setup Genset AC voltage

2. Hi ACV Detect
   Setting：Disable/ Enable
   Default：1
   Description：Activates high voltage protection.
3. Hi ACV protect
   Setting：1.Warning 2.Alarm 3.Trip 4.Stop
   Default：3
   Description：Setup the action when high voltage occurs.
4. Hi ACV set point
   Setting：110~132/120~144/190~228/208~250/220~264/380~456(V)
   Default：122/122/210/242/242/418
   Description：When AC voltage is above the setting, the controller outputs trip signal.
5. Hi ACV Delay
   Setting：0.5~5(Seconds)
   Default：1.5
   Description：When high voltage occurred, timer starts before activating protection
6. Low ACV Detect
   Setting：Disable/ Enable
   Default：1
   Description：Activates low voltage protection
7. Low ACV protect
   Setting：1.Warning 2.Alarm 3.Trip 4.Stop
   Default：3
   Description：Setup the action when low voltage occurs
8. Low ACV setpoint
   Setting：78~110/84~120/134~190/146~208/154~220/266~380(V)
   Default：108/108/172/198/198/342
   Description：When AC voltage is below setting, controller outputs trip signal

9. Low ACV Delay
   Setting：0.5~5(Seconds)
   Default：2.5
   Description：When low voltage occurred, timer starts before activating protection
10. Mini. ACV Detect
    Setting：Disable/ Enable
    Default：1
    Description：Activates extreme low voltage protection.

11. Mini. ACV Setpoint
    Setting：34~88/36~96/58~152/62~166/66~176/114~304(V)
    Default：56/60/96/110/110/190
    Description：When sudden drop of AC voltage blows setting, low voltage protection is disabled.
12. ACV Escape Motor
    Setting：Disable/ Enable
    Description：Disconnect starter motor by Genset voltage
13. Esc.ACV Setpoint
    Setting：44~100/48~108/76~172/84~188/88~198/152~342(V)
    Default：72/72/124/124/132/228
    Description：Disconnect starter motor when AC Voltage reaches disconnection setting

17. AC Current

1. Current Ratio：
   Range：1~31

20:5	30:5	40:5	50:5	60:5
75:5	80:5	100:5	150:5	200:5
250:5	300:5	400:5	500:5	600:5
700:5	750:5	800:5	900:5	1000:5
1200:5	1500:5	1600:5	2000:5	2500:5
3000:5	3200:5	4000:5	5000:5	6000:5

   Default：500:5
   Description：Setup the current transformer ratio
2. Over load Detect：
   Setting：Disable/ Enable
   Default：0
   Description：Activates overload protection

3. Overload Protection：
   Setting：1.Warning 2.Alarm 3.Trip 4.Stop
   Default：2
   Description：Setup the action when overload occurs
4. O.L. set point：
   Range：1~31

0.4~5.0(A)	0.8~10.0(A)	1.2~15.0(A)	1.6~20.0(A)	2.4~30.0(A)
3.2~40.0(A)	4.0~50.0(A)	4.8~60.0(A)	5.0~75.0(A)	6.4~80.0(A)
8.0~100.0(A)	12.0~150.0(A)	16.0~200.0(A)	20.0~250.0(A)	24.0~300.0(A)

32.0~400.0(A)	40.0~500.0(A)	48.0~600.0(A)	50.0~750.0(A)	64.0~800.0(A)
72.0~900.0(A)20	80.0~1000.0(A)	96.0~1200.0(A)	120.0~1500.0(A)	128.0~1600.0(A)
160.0~2000.0(A)	200.0~2500.0(A)	240.0~3000.0(A)	252.0~3200.0(A)	320.0~4000.0(A)
400.0~5000.0(A)				

Description：When current is above setting, the controller outputs trip signal

5. Overload Delay：

   Setting：10~300(Second)

   Default：260

   Description：When overload occurres, timer starts before activating protection

6. Short Detect：

   Setting：Disable/ Enable

   Default：0

   Description：Activates AC short protection

7. Short protect：

   Setting：1.Warning 2.Alarm 3.Trip 4.Stop

   Default：1

   Description：Setup the action when AC short occurs

8. Short set point：

   Setting：1~31

0.1~20.0(A)	0.1~30.0(A)	0.1~40.0(A)	0.1~50.0(A)	0.1~60.0(A)
0.1~75.0(A)	0.1~80.0(A)	0.2~100.0(A)	0.3~150.0(A)	0.4~200.0(A)
5.0~250.0(A)	6.0~300.0(A)	8.0~400.0(A)	10.0~500.0(A)	12.0~600.0(A)
14~700.0(A)	15.0~750.0(A)	16.0~800.0(A)	18.0~900.0(A)	20.0~1000.0(A)
24.0~1200.0(A)	30.0~1500.0(A)	32.0~1600.0(A)	40.0~2000.0(A)	50.0~2500.0(A)
60.0~3000.0(A)	64.0~3200.0(A)	80.0~4000.0(A)	100.0~5000.0(A)	120~6000(A)

   Description：When current is above the setting, controller outputs trip signal

9. Short Delay：

   Setting：0.1~1.0(Second)

   Default：0.4

   Description：When AC short occurres, timer starts before activating protection

18. **RPM**

1. RPM Mul. Factor

   Setting：1~200

   Default：60

   Description：Please use value calculated in next parameter setting

2. RPM Div. Factor

Setting：1~200

Default：40

Description：The R.P.M. numerator and denominator are the ratio of engine revolution versus total number of fly wheel teeth; or the RPM of fly wheel versus the RPM of alternator charger. For example: Set up the RPM numerator and the denominator to 1 to find input pulse from the LCD.

(A) If the engine revolution is 1800 and alternator revolution is 460 (input pulse), the R.P.M. numerator could be set to 90→（1800÷20）and R.P.M. denominator could be set to 23→(460÷20).

Solution: 1800 / 460 = 3.913

The R.P.M. calculation formula is as below

R.P.M. = Input pulse * (RPM numerator / RPM denominator)

1800 = 460 * (90/23)

(B) If the engine revolution is 1500 and total count of fly wheel teeth in one second is 4437 (input pulse), the R.P.M. numerator should be set to 45 and R.P.M. denominator should be set to 133.

Solution: 1500 / 4437 = 0.338

The R.P.M. calculation formula is as below

R.P.M. = Input pulse * (revolution numerator / revolution denominator)

1500 = 4437 * (45/133)

(C) If the teeth count of engine flywheel is 118. Assume the rated rpm of Gen-set is 1500 rpm. Then the 1500 rpm/50hz => 30 rpms/per second also generate 30 x 118 =3540 electronic signals. Then 1500 / 3540 = 0.423 (75/177=0.423), set the R.P.M. numerator to 75 and R.P.M. denominator to 177.

3. RPM Escape Motor

   Setting：Disable/ Enable

   Description：Disconnect starter motor by RPM setting

4. RPM Esc. Setpoint

   Setting：300~900(RPM)

   Default：480

   Description：Disconnect starter motor when RPM reaches setting

5. RPM Disp. Source

   Setting：1.Alternator, 2.Frequency)

   Default：Alternator

   Description：Converts the RPM from frequency or alternator speed.

6. O.S. Detection

   Setting：Disable/ Enable

   Default：Enable

   Description：Activates over speed protection.

7. O.S. Set Point

   Setting：1350~2100(RPM)

Default：1920

Description：If engine speed is higher than setting, controller shuts down the engine only if over speed is enabled

8. Over Speed Delay

   Setting：1~10(Second)

   Default：4

   Description：When over speed occurres, timer starts before activating protection

19. Sensors Options

1. LFL value Alarm

   Setting：Disable/ Enable

   Default：Enable

   Description：Activates low fuel warning

2. L.F.L. Set point

   Setting：6~55(%)

   Default：45

   Default：When fuel level is below setting, controller displays warning message.

3. H.F.L. Set Point

   Setting：35~99(%)

   Default：95

   Description：When fuel level is above setting, controller displays warning message

4. LOP Value Fun.

   Setting：Disable/ Enable

   Default：Enable

   Description：Activates low oil pressure warning

5. LOP Set Point

   Setting：15~60(PSI)

   Default：26

   Description：When oil pressure is below setting, controller displays warning message

6. HWT Value Fun.

   Setting：Disable/ Enable

   Default：Enable

   Description：Activates high water temperature protection.

7. HWT Set Point

   Setting：85~110(℃)

   Default：104

   Description：When water temperature is above setting, controller displays warning message

8. OP Escape Motor

Setting：Disable/ Enable

Default：Enable

Description：Disconnect starter motor when oil pressure reaches setting.

9. Esc.OP Set Point

Setting：25~65(PSI)

Default：39

Description：Disconnect starter motor when oil pressure reaches setting.

10. OP Sensor Brand

Setting：

VDO 10 Bar	KD 10 Bar	YG 962	N 010 B2	KL 3967251
MHI 10 Bar	DATCON 10 Bar	SUSUKI 10 Bar	VDO 5 Bar	KP 6 Bar
User Define				

Description：Setup oil pressure sensor brand.

11. WT Sensor Brand

Setting：

VDO 120	KD 120	WGI 900131	KP130	YB 054
KL 3967250	MHI 98	SUSUKI	PRO	SCD
User Define				

Description：Setup water temperature sensor brand

12. FL sensor Brand

Setting：

FUEL_LEVEL 100	User Define

Description：Setup fuel sensor brand

13. Chk. Before Start

Setting：Disable/ Enable

Default：Enable

Description：Setup the system to check sensors during controller boot up.

14. Cel. Or Feh.

Setting：0~1(℉ / ℃)

Default：1

Description：Setup water temperature unit in Fahrenheit or Celsius.

15. P.S.I or Bar

Setting：0~1(BAR /PSI)

Default：PSI

Description：Setup oil pressure unit in Bar or PSI

20. **Exercise Funct.**

1. Exercise Funct.
   Setting：Disable/ Enable
   Default：Enable
   Description：Activates exerciser function.
2. Date / week Depend
   Setting：0~1(Date/Week)
   Default：0
   Description：Setup monthly exercise by date or week.
3. Date Set Point
   Setting：1~31(date)
   Default：1
   Description：Setup date of monthly exercise
4. Week Set Point
   Setting：0~6(week)
   Default：1
   Description：Setup week of monthly exercise
5. Hour Set Point
   Setting：0~23(hour)
   Default：12
   Description：Setup the starting hour of the exercise
6. Minute Set Point
   Setting：0~59(minute)
   Default：0
   Description：Setup the starting minute of the exercise
7. Running Inteval
   Setting：0~510(minute)
   Default：4
   Description：Setup the duration of each exercise

21. **Maintain**

1. Maintain Funct.
   Setting：Disable/ Enable
   Default：Enable
   Description：Activates service reminder function
2. Maintain Protect
   Setting：1.Warning 2.Alarm 3.Trip 4.Stop

Default：2

Description：Setup the action when service reminder reaches setting

3. Maintain Code0

   Setting：0~99

   Default：12

   Description：Setup Second digit of service password

4. Maintain Code 1

   Setting：0~99

   Default：15

   Description：Setup first digit of service password

5. Maintain Dncount

   Setting：0~1275(hour)

   Default：1200

   Description：Setup the duration between each service

22. Reverse Power

1. Reverse PowerDet

   Setting：Disable/ Enable

   Description：Activates Reverse power detection.

2. R.P. protect

   Setting：1~4(1.Warning 2.Alarm 3.Trip 4.Stop)

   Description：Setup the action when reverse power occured

3. R.P. Set Point

   Setting：0~1084.0(KW)

   Description：Setup the reverse power upper limit. (Uppder limit changes with AC voltage setting and CT ratio)

4. R.P. Delay

   Setting：1~20(Seconds)

   Description：When reverse power reaches setting, timer starts before activating protection

23. OverLoad Protect

1. Over Load Detect

   Setting：Disable/ Enable

   Description：Activates over load detection.

2. Overload protect

   Setting：1.Warning 2.Alarm 3.Trip 4.Stop

Description：Setup the action when over load occured

3. O. Load Setpoint

   Setting：

0.08~20.0(KW)	0.1~30.0(KW)	0.1~40.0(KW)	0.1~50.0(KW)	0.1~60.0(KW)
0.1~75.0(KW)	0.1~80.0(KW)	0.2~100.0(KW)	0.3~150.0(KW)	0.4~200.0(KW)
5.0~250.0(KW)	6.0~300.0(KW)	8.0~400.0(KW)	10.0~500.0(KW)	12.0~600.0(KW)
14~700.0(KW)	15.0~750.0(KW)	16.0~800.0(KW)	18.0~900.0(KW)	20.0~1000.0(KW)
24.0~1200.0(KW)	30.0~1500.0(KW)	32.0~1600.0(KW)	40.0~2000.0(KW)	50.0~2500.0(KW)
60.0~3000.0(KW)	64.0~3200.0(KW)	80.0~4000.0(KW)	100.0~5000.0(KW)	120~6000(KW)

   Description：Setup the Earth fault amperage limit

4. Over Load Delay

   Setting：1~20(Seconds)

   Description：When Earth fault reaches setting, timer starts before activating protection

24. **Other**

1. Protect Pending

   Setting：1～30 (seconds)

   Default：10.5

   Description：Time delay for displaying warning or error messages after engine starts.

2. Language

   Setting：0～1

   Default：1

   Description：Choose between English or Chinese language

3. Comm. address

   Setting：0～255(00H~FFH)

   Default：01H

   Description：Multiple Genset networking via RS-485 requires individual address for each controller.

4. Not in AUTO

   Setting：Disable/ Enable

   Description：When GTR-220 is in OFF mode, controller triggers alarm.

5. Contrast Adjust

   Setting：1 ～19

   Description：Set the contrast of LCD screen