



GTR-700 series
(GTR-720/GTR-760)
Generator controller
User manual

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GTR 7 20 & GTR76 0 User manual

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Revisions since the last release

version	remark
1.0	Initial version

1. Product overview

GTR-720/GTR-760 is a full-featured diesel engine generator controller, using liquid crystal (LCD) screen, can display Chinese, English and other Chinese, used in diesel generator set automation system, providing automatic start/stop, data measurement/display, abnormal alarm protection and other functions of generator set. Easy to operate, no special training required.

Most of the parameters of the controller can be adjusted from the panel, or through the USB or RS485 port to adjust the parameters and monitor the values, and the user can change the settings according to the system requirements to achieve programmable control. The GTR 720/GTR760 is your best choice in terms of functionality, protection of the device and ease of operation.

2. Specifications & Features

The controller contains a powerful ARM microprocessor that provides a complex range of functions

GTR-720: Automatic start-stop, condition monitoring, fault protection for diesel generators

GTR-760: Added to the GTR-760 SAE J1939 communication function for electronic control engines

The information collected and displayed by the controller is:

Battery voltage (V).

Cooling water temperature (°C, °F).

Oil pressure (PSI, BAR).

Fuel level (%)

Speed (RPM).

Cumulative Operating Hours (HR)

Generator line voltage (V).

Phase voltage (V).

Frequency (HZ).

Current (A).

Power factor

Real power (KW).

Virtual power (KVAR).

Apparent power (KVA).

Cumulative power (KWH, KVAH).

2.1 specification

Working DC voltage: 8~36 V (DC).

Power consumption: Max. 5.5 W

Alternator voltage: 10~500 V (AC).

Alternator frequency: 3~75 Hz

CT Secondary Current: 5A

Speed sensor voltage: 5 V~70 V (peak-to-peak).

Speed sensor frequency: 10~10000 Hz

Electric appliance export: 5 A / 30V

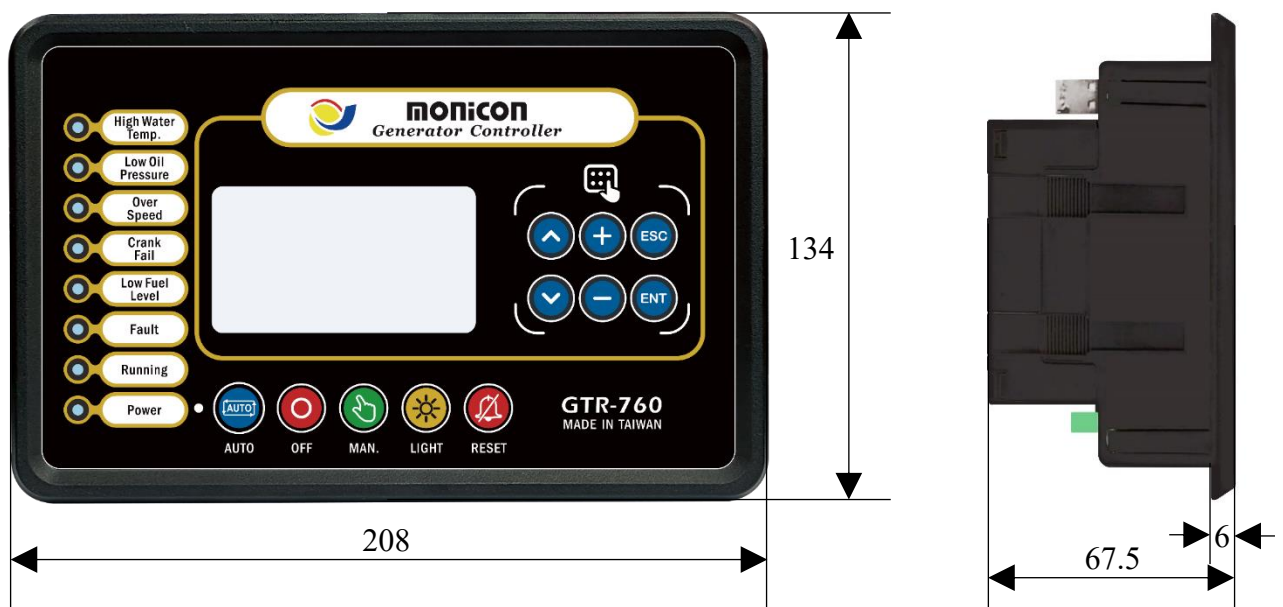
Working temperature: -30 °C~70 °C

Measurement :W 208 mm × H 134 mm × D 67.5 mm

Hole Size :H 185 mm × H 114 mm

Weight: 565 g

2.2 Exterior dimensions









3. Controller Instructions

3.1 panel illustrate




3.2 Button function description

icon	Key name	Feature description
	Automatic mode	Press this key to switch the controller to automatic mode
	Parking key	Press this button to stop the running generator
	Manual startup	Press this button to start the generator manually
	Light number test	Press this key to test whether the panel indicator is normal
	Mute/Revert	When pressed once, the alarm output can be turned off, and when pressed again, the fault light can be cleared; If it is held continuously, the controller will turn off the alarm output and the fault light in turn

icon	Key name	Feature description
	Previous	The display page turns to the previous page and moves the cursor up in the parameter settings
	Next	The display page turns to the next page and moves the cursor down in the parameter settings
	The value increases	Add the parameter value to the parameter settings
	The value decreases	Reduce the parameter value in the parameter settings
	Return key	Enter the settings menu interface In the parameter settings, return to the previous menu
	Configuration key	Confirm the settings in the parameter settings


3.3 Operating instructions

3.3.1. Auto Start/Stop:


-  A. Press the key to switch to automatic (AUTO) mode, the indicator next to the button lights up and the screen status bar shows 'Standby'. In this mode, the controller decides to start or stop the generator based on the external autostart signal
- B. First of all, the controller will start timing according to the set preheating delay time, and the action corresponds to the preheating output, the LCD panel displays "preheating", when the preheating delay counts to, the fuel relay outputs, the controller will start timing according to the set pre-refueling time, and the LCD panel displays "pre-refueling".
- C. When the front refueling count is reached, the engine starting relay will output and drive the starting motor to run. If the engine cannot be ignited normally, the starting relay and fuel relay will stop output and enter the rest area of the disc workshop; After the rest time, return to the front refueling cycle to perform the second starting procedure. If the engine cannot be ignited smoothly within the preset number of starts, it is judged that the engine has failed, and the LCD panel will display "Start Failure", and the corresponding indicator light will be operated at the same time.
- D. When the engine is successfully started, the generator continues to run until the external starting signal fails

E. When the external starting signal fails, the generator enters the cold engine delay time zone, the controller will start the timer according to the set cold engine time, and the power transmission and parking zone will start at the end of the cold machine, at this time the fuel relay will be disconnected, and the power transmission stop relay output until the end of the stop time.

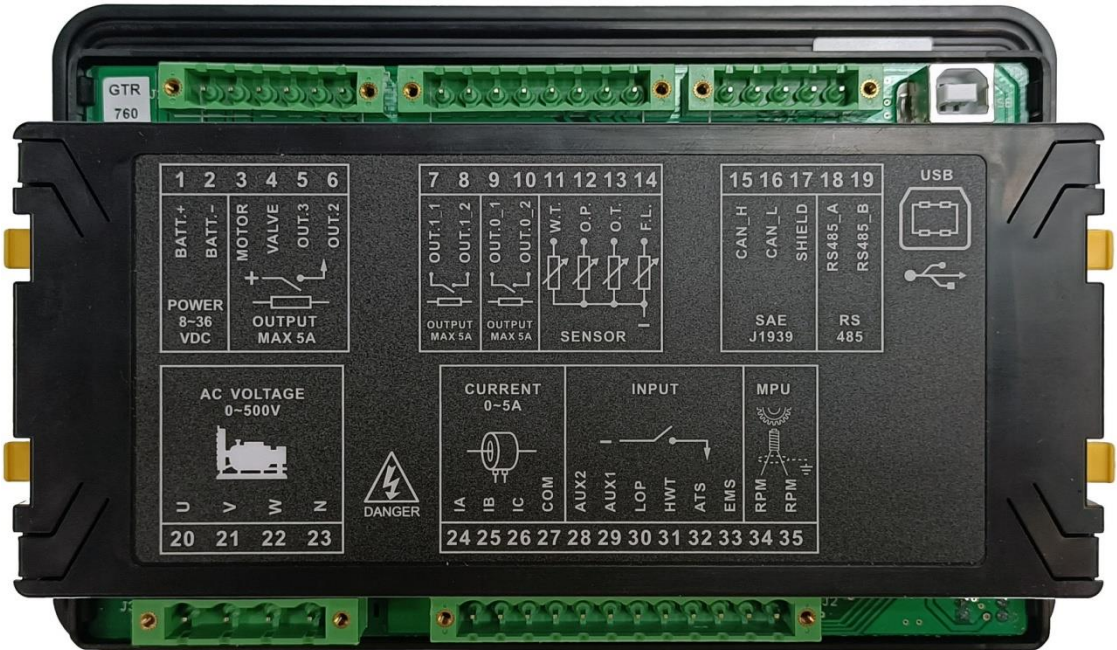
3.3.2. To start manually:

Press  the button to enter the manual start mode, the controller starts the starting program, and the operation process is the same as the B~C step 3.3.1

3.3.3. Shutdown:


When the engine is  running, press the button to stop the engine running, at this time the fuel relay will be disconnected, and the power stop relay output will be sent until the end of the shutdown time.

4. Instructions for backplane pins

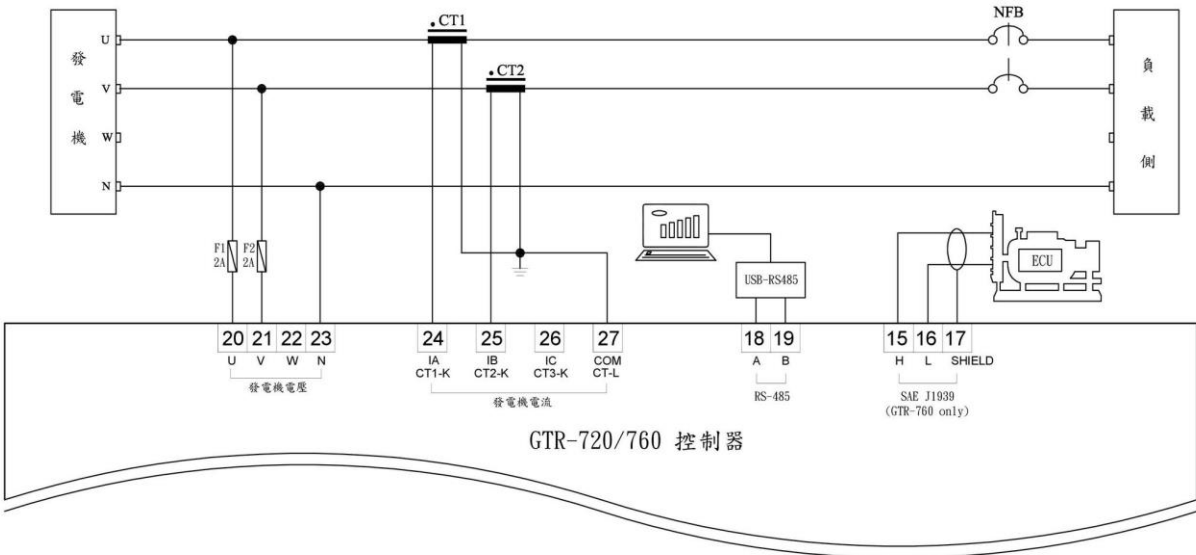
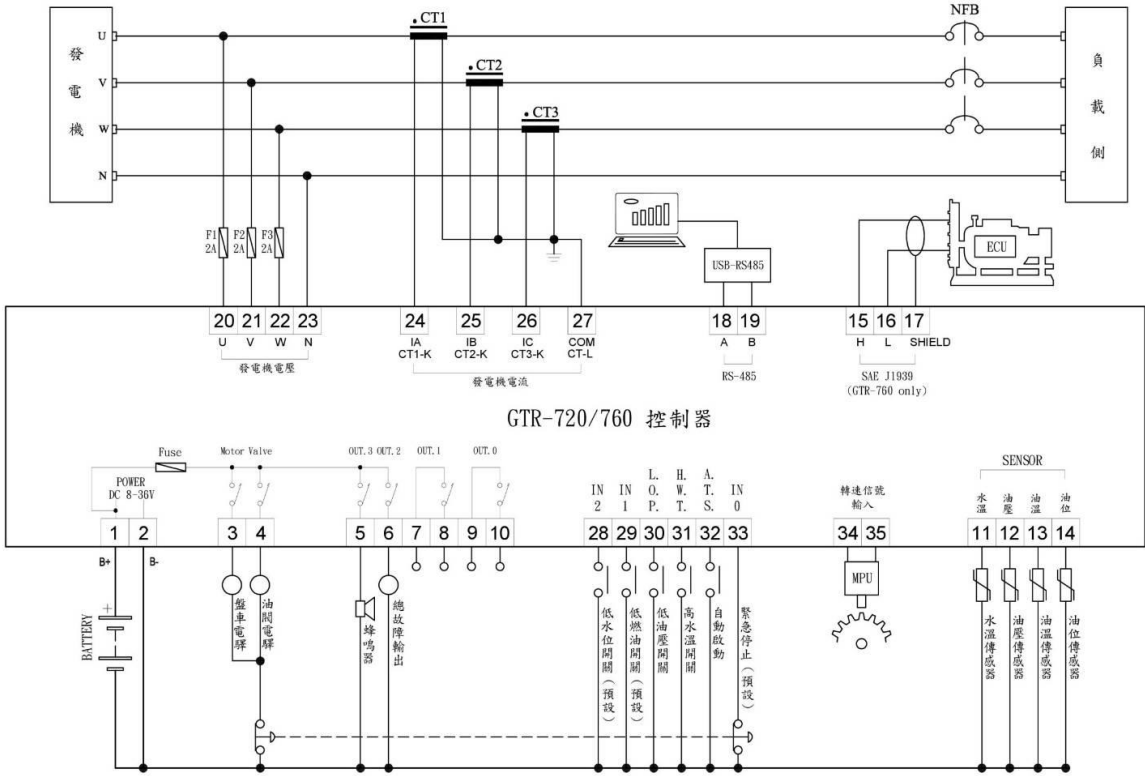


Foot position	function	Illustrate the narrative
1	DC power cathode import	Connect to the positive terminal of the battery
2	DC power supply	Connect to the negative terminal of the battery

Foot position	function	Illustrate the narrative
	negative electrode import	
3	Start-up electric appliance export	Positive export, 1 terminal power supply, maximum 5A
4	Export of fuel and electrical appliances	Positive export, 1 terminal power supply, maximum 5A
5	Configurable relay output 3	Positive export, 1 terminal power supply, maximum 5A
6	Configurable relay output 2	Positive export, 1 terminal power supply, maximum 5A
7	Configurable relay output 1	Uncharged output, 5A max
8		
9	Configurable relay output 0	Uncharged output, 5A max
10		
11	Water temperature sensor input	Connect a water temperature sensor
12	Oil pressure sensor input	Connect the oil pressure sensor
13	Oil temperature sensor input	Connect the oil temperature sensor
14	Fuel level sensor input	Connect the fuel level sensor
15	CAN H terminal	To connect the CAN H end of the ECU, it is recommended to use a shielded wire of 120 ohms
16	CAN L terminal	To connect the CAN H end of the ECU, it is recommended to use a shielded wire of 120 ohms
17	ECU shield terminals	It is recommended to use a shielded wire of 120 ohms
18	RS485 A terminal (D+)	It is recommended to use a shielded wire of 120 ohms
19	RS485 B terminal (D-)	
20	Generator U-phase voltage input	Connect to the generator set U-phase output
21	Generator V-phase voltage input	Connect to the generator set V-phase output

Foot position	function	Illustrate the narrative
22	Generator W phase voltage input	Connect to the generator set W phase output
23	Generator N phase input	Connect to the generator set N phase
24	U-phase current import	Connect to the U-phase CT secondary side
25	V-phase current import	Connect to the V-phase CT secondary side
26	W-phase current import	Connect to the W phase CT secondary side
27	Current joint end import	Common end attached to the secondary side of CT
28	Switch input 2 can be set	Grounding is valid
29	Switch input 1 can be set	Grounding is valid
30	Low oil pressure switch input	Grounding is valid
31	High water temperature switch input	Grounding is valid
32	Externally Activated Import (ATS)	Grounding is valid
33	The switch input 0 can be set	Grounding is effective (factory default: emergency stop, open road action)
34	Speed sensor input	Connect to the speed sensor
35		
	A socket for connecting to a PC	Use a USB Type A to Type B cable

4.1 Wiring example



5. Parameter definition and description

Parameter name	Parameter range	Default value	illustrate
Turning parameters			
Detection frequency at start-up	Energy-free/energetic	Enablement	Set whether to detect the generator frequency when starting
Detects oil pressure at start-up	Energy-free/energetic	Exceptive	Set whether the oil pressure switch is detected when starting
Turning time	5~40(sec)	10	Set the time of each turn
Number of turns	1~10	3	Set the number of retries for failed turnovers
The motor jumps off the upper limit	15~30(Hz)	20	If the frequency is higher than the set value, cut off the power of the starting motor
Lower motor input limit	15~30(Hz)	20	If the frequency is lower than the set value, put in the power to start the motor
Oil pressure settling delay	0.2~6.0(sec)	1.2	After the oil pressure is established during the car, the time to get rid of the starting motor is delayed. It must be used with the parameter of "detecting oil pressure at start-up"
Idle time	0~240(sec)	0	Set the number of idle time seconds
Engine parameter setting			
Front refueling time	0~50(sec)	0	Sets the time when the fuel relay is output earlier when the engine starts
Pre-heat deposit time	0~90(sec)	0	Set the time required to warm up before the engine starts
Transmission stop time	1~30(sec)	10	When the engine parking method is power delivery stop, this parameter can be used for the length of time the engine parking valve tie rod is sent power
Parking failed	Energy-free/energetic	Enablement	Set the parking failure detection function to be turned on or off
Fault overdue stop detection	Energy-free/energetic	Enablement	When there is an error trip action, the running light will start flashing, and the control system will send a fault trip contact signal, if the fault signal is not cleared within the set time, the engine will automatically stop

Parameter name	Parameter range	Default value	illustrate
Fault overdue stop delay	30~900(sec)	30	Set the fault overdue delay time
Cold machine delay	0~1250(sec)	0	Set the cold engine operation time when the engine is stopped. (No chiller operation delay during fault shutdown)
Frequency-to-speed ratio	0~100	30	Set the coefficient of operation for engine speed and frequency
Manual parking does not chill the machine	Energy-free/energetic	Enablement	When this parameter is enabled, the manual stop will stop directly without performing the chiller operation delay
Sensor switch parameter setting			
High water temperature switch detection	Energy-free/energetic	Enablement	Set whether to detect high water temperature
High water temperature switching form	Normally closed/normally open	Normally open	Set the high water temperature switch pattern
High water temperature switching delay	1~9.5(sec)	1.5	Set the delay time when the controller detects a high water temperature
Low oil pressure switch detection	Energy-free/energetic	Enablement	Set whether to detect low oil pressure
Low oil pressure switching form	Normally closed/normally open	Normally closed	Set the low oil pressure switch form
Low oil pressure switch delay	0.2~6.0(sec)	1.0	Set the delay time when the controller detects low oil pressure
Auxiliary input switch setting			
Auto-start delay	0.2~5(sec)	1.0	When an ATS remote start signal is detected; The controller delays the time to start the generator.
Enter 0 switch detection	As indicated	Overall lethality	Options can be set: energy removal, global enablement, before starting, after starting, after

Parameter name	Parameter range	Default value	illustrate
			protection function
Enter a 0 switch name		Emergency stop	Set Enter the name of the 0 switch
Enter the 0 switch function	As indicated	Stop the car	Options can be set: alarm, alarm, trip, stop
Enter 0 switch pattern	Normally closed/normally open	Normally closed	Set input 0 switch normally open or normally closed
Enter 0 switch delay	0.2~5(sec)	0.2	Set the time for which the input 0 switching delay
Input 1 switch detection	As indicated	Overall lethality	Options can be set: energy removal, global enablement, before starting, after starting, after protection function
Enter a 1 switch name		Low fuel level	Set Enter 1 to the name of the switch
Input 1 switch function	As indicated	Stop the car	Options can be set: alarm, alarm, trip, stop
Enter 1 switch form	Normally closed/normally open	Normally open	Set input 1 switch normally open or normally closed
Input 1 switch delay	0.2~5(sec)	5	Set the time for input 1 to switch delay
Input 2 switch detection	As indicated	Overall lethality	Options can be set: energy removal, global enablement, before starting, after starting, after protection function
Enter a 2 switch name		low water	Sets the name of the input 2 switch
Input 2 switch function	As indicated	Stop the car	Options can be set: alarm, alarm, trip, stop
Enter 2 switch form	Normally closed/normally open	Normally open	Set input 2 switch normally open or normally closed
Input 2 switch delay	0.2~5(sec)	2	Set the time for the switch delay of input 2
Auxiliary output parameter setting			

Parameter name	Parameter range	Default value	illustrate
Output 0 function			Sets the function of the output 0 switch
Output 1 function			Set the function of the output 1 switch
Output 2 function			Set the function of the output 2 switch
Output 3 function			Set the function of the output 3 switch
LED output parameters			
LED 0 function	As indicated	High water temperature failure	Configurable options: high water temperature fault, low oil pressure fault, engine overspeed, starting failure, low fuel level fault, system total alarm, system jump, total fault output, idle control, reset key press, closing normal output, generator voltage normal, generator loading medium, overspeed action, high frequency action, low frequency action, low oil pressure switching action, high water temperature switching action, high voltage action, low voltage action, overcurrent action, short circuit action, low battery action, high battery action, input 0 Action, input 1 action, input 2 action, high water temperature value, low oil pressure value, low fuel value, high fuel value, system non-automatic position, system automatic position, system manual start, system automatic start, Sensor inspection, starting command interval, warm-up zone, front refueling zone, turning zone, rearing rest zone, operating zone, system alarm, system jumping, parking zone, engine cooling zone, sensor failure, charging failure, reverse power failure, overload.
LED 1 function	As indicated	High water temperature failure	
LED 2 function	As indicated	Engine overdrive	
LED 3 function	As indicated	Boot failure	
LED 4 function	As indicated	Import 1 operation	
LED 5 function	As indicated	Total system alerts	
CAN Bus J1939 (limited to GTR-760 valid).			
J1939 features	Energy-free/energetic	Exceptive	Set whether to enable J1939 communication
Electric controller			Set the ECU model

Parameter name	Parameter range	Default value	illustrate
brand			
Transfer speed command	Energy-free/energetic	Exceptive	Set whether to output the control speed command
Speed command delay	0~30(sec)	0	The delay time of the output speed command
Idle speed	550~1300(RPM)	950	Speed during idle
Rated speed	1200~2000(RPM)	1800	The speed at normal operation
Read the elapsed time	Energy-free/energetic	Exceptive	The running time is read from the ECU
Plus deceleration control	Energy-free/energetic	Exceptive	
Ramp of the ramp	1~20(RPM)	1	
Ramp down	1~20(RPM)	1	
Frequency parameters			
System frequency	50/60(Hz)	60	Set the rated frequency of the system
High frequency detection	Energy-free/energetic	Enablement	Set whether high frequencies can be detected
High frequency setting	50~60/58~72(Hz)	55/66Hz	Set the action point of the high-frequency protection function
High frequency delay	0.5~5(sec)	1	Set the delay time for high-frequency protection actions
Low frequency detection	Energy-free/energetic	Enablement	Set whether to detect low frequencies
Low frequency capability		alert	
Low frequency setting	40~53/48~63(Hz)	45/54Hz	Set the action point of the low-frequency protection function
Low frequency delay	0.5~10 (seconds).	5	Set the delay time for low-frequency protection actions
Lowest frequency	Energy-free/energetic	Enablement	Set whether the lower limit of low-frequency

Parameter name	Parameter range	Default value	illustrate
detection		nt	protection detection is enabled
Minimum frequency setting	25~40/30~48 (Hz)		When the system frequency is lower than the setting, the low-frequency protection function will be automatically removed
Battery related parameters			
Battery voltage selection	12/24(V)	24	Set the battery voltage, you can choose 12V or 24V
Battery failure alarm	Energy-free/energetic	Enablement	Whether the battery fault gives an alarm, or only an alarm
Low battery voltage setting	8.4~14/16.8	21.6~30(V)	Set the action point of the low battery alarm function
High battery voltage setting	10~16.8/22~36(V)	30	Set the action point of the high battery alarm function
Weak power detection	Energy-free/energetic	Enablement	Set whether to detect weak battery power
Low power setting	7~9.6/9.6~19.2(V)	16.8	Set the weak power voltage action point
Charging failure setting	12~14.2/24~28.6(V)	25.2	Set the voltage at which charging fails
When charging failure is extended	0~60(sec)	5	Set the delay time for charging failure actions
AC voltage parameters			
System AC phase	As indicated	3 phases 4 wires	Configurable options: 3-phase 4-wire, 3-phase 3-wire, single-phase 3-wire
Generator output voltage	110~11400(V)	380	Set the rated voltage of the generator
Controller input voltage	110~440(V)	380	Set the voltage of the input controller (transformer secondary side)
High voltage detection	Energy-free/energetic	Enablement	Set whether to detect high voltage
High voltage capability		Stop the car	The action when setting the high voltage

Parameter name	Parameter range	Default value	illustrate
High voltage setting		418	Set the operating point of high voltage protection (the setting range is determined by the rated voltage of the generator)
High voltage delay	0.5~5(sec)	2	Set the delay time for high-voltage action
Low voltage detection	Energy-free/energetic	Enablement	Set whether to detect low voltage
Low voltage capability		Stop the car	The action when the voltage is set at a low voltage
Low voltage setting		418	Set the operating point of low voltage protection (the setting range is determined by the rated voltage of the generator)
Low voltage delay	0.5~5(sec)	2	Set the delay time for low-voltage operation
Lowest voltage detection			Set whether the lower detection limit of low voltage protection is enabled
Minimum voltage setting			When the system voltage is lower than the setting, the protection function of low voltage will be automatically removed
AC current parameters			
Current ratio setting	20:5~5000:5	500:5	Setting the Specific Flow Device (CT)
Current ratio fine-tuning	0~20%	0	Set the specific flow offset value
Overcurrent detection	Energy-free/energetic	Enablement	Set whether to detect overcurrent
Overcurrent function		Stop the car	Set the action during overcurrent
Overcurrent setting		400	Set the current value for overcurrent protection
Overcurrent delay	10~300(sec)	10	Set the delay time for overcurrent action
Short circuit detection	Energy-free/energetic	Enablement	Set whether to detect short circuits
Short circuit function		Stop the car	Set the action when short-circuited
Short circuit setting		800	Sets the current value for short-circuit action
Short-circuit delay		0.2	Set the delay time for short-circuit action

Parameter name	Parameter range	Default value	illustrate
Speed-related parameters			
The speed factor multiplier	1~200	60	Sets the multiplier for rotational speed calculation
The speed factor divisor	1~200	2	Sets the divisor for rotational speed calculation
Speed retreat motor detection	Energy-free/energetic	Enablement	Set the speed value, retreat the starting motor function, turn on or off
Speed retract motor setting	150~900(RPM)	480	The speed value of the starting motor when turning
The rotational speed shows the source	As indicated	Convert from frequency	Configurable options: conversion from frequency, conversion from pulse, J1939 available
Speed detection	Energy-free/energetic	Enablement	Set whether to detect speeding
Super speed setting	1350~2100(RPM)	1980	Setting of speeding action
Overspeed delay	0.5~9.5(sec)	1	Set the delay time for the speeding action
Low speed detection	Energy-free/energetic	Exceptive	Set whether to detect low speeds
Low rpm capability		alert	Set the action at low speed
Low speed setting	1200~1810(RPM)	1650	The setpoint for low rpm operation
Low speed delay	0.5~10(sec)	2	Set the delay time for low-rpm action
Sensor-related parameters			
Oil level value alert	Energy-free/energetic	Exceptive	Set whether to warn if the oil level value is too low
Low oil level value setting	6~55(%)	20	When the fuel level value falls below the set value, the controller generates an alarm
High oil level value setting	35~99(%)	90	When the fuel level value is higher than the set value, the controller generates an alarm
Low oil pressure numerical function		Exceptive	Sets the action when the oil pressure value is too low
Low oil pressure	15~140(PSI)	30	The oil pressure value is too low and the

Parameter name	Parameter range	Default value	illustrate
value setting			operating pressure value
High water temperature numerical function		Exceptive	Set the action when the water temperature value is too high
High water temperature value setting	45~110(°C)	100	The water temperature value is too high and the temperature value of the action
Oil pressure value retreat motor	Energy-free/energetic	Exceptive	Set the oil pressure value, and the restarting motor function is turned on or off
Oil pressure withdrawal motor setting	25~65(PSI)	45	The pressure value of the starter motor when turning
Oil pressure sensor brand		Monicon	
Water temperature sensor brand		Monicon	
Oil level sensor brand		Susuki	
Power on the system to check the sensor	Energy-free/energetic	Exceptive	Check whether to check the sensor before starting
Temperature unit setting	°F /°C	°C	Sets the display temperature unit
Oil pressure unit setting	BAR /PSI	PSI	Set the display pressure unit
Timing start parameters (limited to GTR-760 validity).			
Timing total enable switch	Energy-free/energetic	Exceptive	Set whether the total timing is enabled
Daily/weekly timing period	Day/Week	day	Set scheduled startup cycle
Daily time	1~31(Sun)	28	Set a monthly start date
Weekly timing	Week 1 ~ Sunday	Sunday	Set a weekly schedule to start the week

Parameter name	Parameter range	Default value	illustrate
Time timing	0~23(hours)	12	Set scheduled startup time
Minute timing	0~59(min)	0	Set scheduled startup time
Duration of operation	0~510(min)	4	Set the running time after the timer starts
Warranty timing parameters (limited to GTR-760 validity).			
Warranty enabling switch	Energy-free/energetic	Exceptive	Set whether the warranty is enabled
Warranty expiration feature		alert	Set the warranty expiration action
Warranty password 0 change	0~99	12	When these two parameters are combined, the password for the warranty timer reset (default: 1215)
Warranty password 1 Change	0~99	15	
Warranty countdown	2~500(Hours)	250	Set the number of hours when the warranty expires
Inverse power failure parameters (limited to GTR-760 validity).			
Inverse power actuation switch	Energy-free/energetic	Exceptive	Set whether the reverse power protection is enabled
Inverse power function		Jump	Setting reverse power protection operation
Inverse power set point			Reverse power protection setting
Reverse power operation extension	0.5~10 (seconds).	2	Set the delay time for the counter-electric action
Overload Fault Parameters (Limited GTR-760 Valid)			
Overload fault detection	Energy-free/energetic	Exceptive	Set whether overload protection is enabled
Overload fault function		Stop the car	Configuration overload protection operation
Overload set point			Overload protection settings
Overload action delay	0.5~40 (seconds).	5	Set the delay time for overload actions

Parameter name	Parameter range	Default value	illustrate
other			
Protection is paused	1~30 (sec).	10	After the engine starts, the system temporarily stops detecting fault signals from external inputs for a set period of time
Machine address	01H~FEH	01	Modbus communication ID
The system is not auto-detected	Energy-free/energetic	Exceptive	When enabled by this parameter, it detects the position of the panel switch when the engine is in standby, and the controller will output an alarm if the switch is placed in the "off" position
Communication rate	9600/19200 (BPS)	9600	Modbus communication connection rate
Displays the relevant parameters			
Phrase setting	English/Chinese	Chinese	Select Chinese and English to display
Displays the oil temperature	Energy-free/energetic	Exceptive	Choose whether to display the oil temperature
Displays the oil level	Energy-free/energetic	Exceptive	Choose whether to display the oil level
Displays manufacturer information	Energy-free/energetic	Enablement	Select whether to display the manufacturer information page
Displays power information	Energy-free/energetic	Enablement	Choose whether to display the power message page
Scroll through the information page	Energy-free/energetic	Exceptive	Information page timed scrolling function
Page scroll time	1~10(sec)	5	Information page timed scroll time
The backlight is solid	Energy-free/energetic	Exceptive	LCD backlight constant light function
Backlight duration	5~99.5(sec)	60	LCD backlight duration