MINCO 400

GENSET CONTROLLER MANUAL INSTRUCTION

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Ⅰ、**Summarization**

Minco 400 genset controller adopts high performance microprocessor and industry components.It has measuring，controlling, protection, four remote control,flexible software setting functions and user-defined to the input and output port, it can display all the measuring parameter, control parameters and the genset running state.The anti-jamming ability is strong,actually meets different types of genset auto control requirements.When the mains supply is failure, the control system will automaticaly give a start signal to start the genset and resume the power supply in short time.After the mains supply is normal, the control system will unload and shut down automaticly.

Ⅱ、**Charateristics**

1. Real virtual value measuring for voltage and current,powerful function，action smartly；
2. Wide-screen LCD display with 128×64 lattice and black-light；
3. Chinese and English double language menu,mutual operation, can be set and operated beyond the computer；
4. Auto start, auto protection, auto switch on control；
5. Perfect auto protection,warning details and working statement character display directly,fault record more than 50 items；
6. Connected parameters of coolant temp.,oil pressure, fuel level etc,is abundant；
7. All relay contact capability of strat and fuel is above 10A/250VAC/30VDC，the other is 5A；
8. User-defined to the input and output port,timing start or stop function；
9. RS232 communication，attached "four remote control"monitor software.

Ⅲ、**Fixup dimension drawing**

Operate panel	W 96 x H 96mm
Install hole	W 85 x H 85mm
Deepth	D 57mm

Veiw Map   Left Veiw Map

2MM iron panel
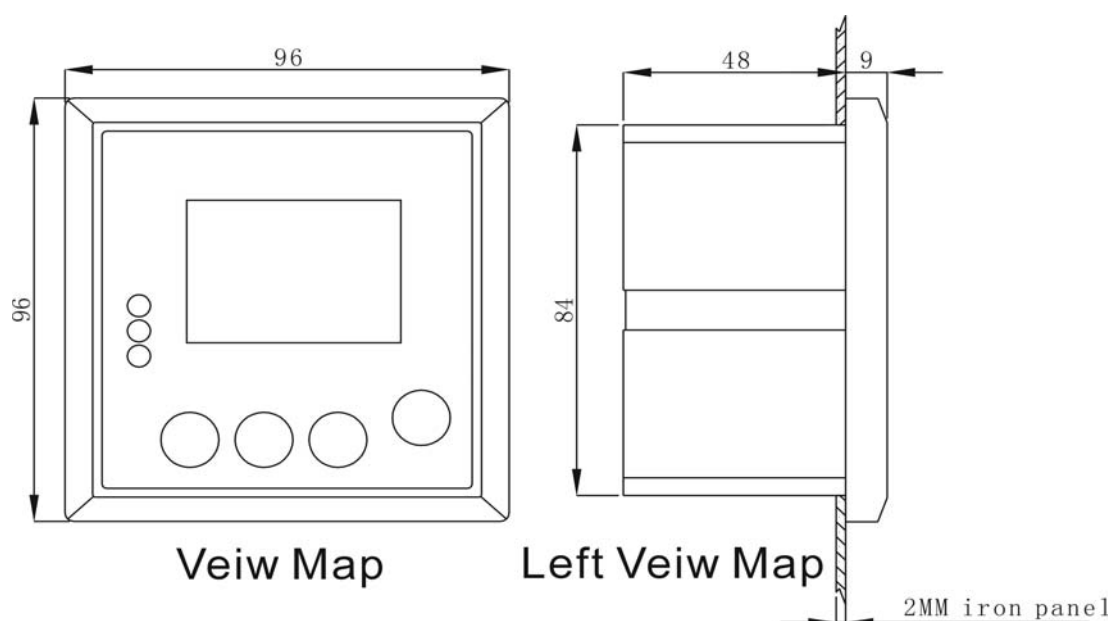
Ⅳ、**Function define and operate instruction**

1. **Operate panel function instruction**

Operate panel is composed of 128x64 LCD display,operation keys and state indicator light and system menu operate press keys.

(1).LCD display

Genset runs in normal（not setting state or not fault state）, display all the measure parameters and present state of genset. Each time when press "confirm"key,auto change to next display screen.

Operation	Description
Main screen 1 Press＋or－can switch the display interface	**Voltage** 000 **V** **Current** 000 **A** **Frequency** 00.0 **HZ** **Power** 000.0 **A**
Main screen 2 Press＋or－can switch the display interface	**Coolant temp:** --- ℃ **Oil pressure:** --- **MPa** **Oil level:** --- % **Run Time:** 00000.0 **H**
Main screen 3 Press＋or－can switch the display interfac	**Battery:** 12.0 **V** **Charger:** 00.0 **V**
Main screen 4 Press＋or－can switch the display interfac	**Stop/Reset status** **08-06-03/09:12:15**

Attention: If "display change mode"set in "auto"switch state，the LCD display screen will switch to next page after each 10 seconds,correspond to press once **SET** key；if "background light control"set in auto state,the LCD screen background light will be quto turn off after three minutes without any operate.Till to the fault appear or press any key the background light turns on.During the period of turning off the background light,the LCD display can not be seen, but not mistake for controller failure.If "Background light"control setting as "constant light"state，the LCD background light will keep lighting.

(2).Operation keys

Content	Function
○ START ↓	Press the key, when the above green LED keep bright, the controller is in "start"state, start the genset in manunal and keep running.
○ AUTO ↑	Press the key, when the above yellow LED keep bright, the controller is work in "auto"state，the controller receive the on-off signal of "remote start"，if this switch close, the genset will be delay started；otherwise will be delay stopped.If the time start is effective,the genset will be started also,when the time start is over, the genset will be delay stopped.
○ RESET ←	Press the key, when the above red LED keep bright,the controller works in **"stop／reset"state**，it will unload,and through decelerate and idle stop to cut off the fuel.During the decelerate and idle, the indicator keeps flash,keep light after stop.

(3).System menu operate keys

Press "set"key，holding 10 seconds，then to parameter setting menu，here the "reset"key is redefined to exit" ←",,"auto"key is redefined to add "↑"，   "start"keys redefined to reduce "↓",,"set"ky redefined to "→"

Content	Function
→	Parameter setting /enter to next menu/confirm to revise
←	Exit/back to the superior menu

	↑	Page up the menu/add value
	↓	Page down the menu/ degrade value

(4).State indicator light

Content	Function
○ FAILURE	Indicate the genset failure,protected stop,fault content display in the LCD screen，if start failure,over speed，oil pressure lower etc.，the fault reason will be locked，must press"reset"key to put right date display and restart the genset.
○ ALARM	Indicate the genset warning information,which has no influence on genset normal working，alarm detail see screen,such as low battery,low oil level etc..If appear many alarm informations,which will be displayed on the LCD display alternately.
○ REMOTE	Indicate "remote start" imput port stae.Normally is used to monitor mains supply.

2．Connection port definition

Port No.	Function
Power supply 8～36VDC,normal working current <300mA	
1	"-" battery cathode input
2	"+" battery anode input
Analog input（input voltage range 0～5.0VDC）	
6	Coolant temp.sensor
7	Oil pressure sensor
8	Fuel level sensor
18	Excitation/charge failure input（charge generatorD＋port input，forbid to connect ground ）
Genset current input（0～5A AC,whithout inside isolation,must input after transformation ratio）	
9	Load current in
10	Load current out
Genset voltage input（0～300V AC,with inside insolation）	
11	Genset voltage
12	Genset zero line
Switch output port（Relay insulated，start、fuel contact capability is 10A/250VAC/30VDC，others are 5A）	
3	User-defined output 1
4	User-defined output 2
5	User-defined output 3
16、17	User-defined output 4（passive contact）
21	User-defined input 1
22	User-defined input 2
23	User-defined input 3
13	Start
14	Fuel
15	Common port（common port for fuel and start contact）
19	Remote start
20	Emergency stop

V、Parameter setting

All parameter can be read and write through communication port,details see communication protocol.Except coolant temp.,oil press,fuel level sensor input curve date,all the parameters can be set on the spot by the controller operation panel key.

Press→ key	**Enter to parameter setting interface** Inputs status Alarm limit set Time start set Outputs status Measure regulate Fault Record Delay time set Date and time set System set
Press↑or↓key	Select the examine/setting parameter content(reversed display when selected)
Press→key	Enter to the next menu of selected item
Press←key	Exit the parameter setting state

Attention: If didn't press any keys over three minutes,it will auto exit the parameter setting state,to avoid illegimate operation the controller.

1．Parameter setting instruction

Switch inputs status	**Real time display controller input port state** Remote run: 0 Emergency stop: 0 Auxiliary input 1: 0 Auxiliary input 2: 0 Auxiliary input 3: 0 Auxiliary input 4: 0 **Attention: Press any menu key will be exit**
Outputs status	**Real time display controller output port state** Crank: 0 Fuel: 0 Auxiliary output 1: 0 Auxiliary output 2: 0 Auxiliary output 3: 0 Auxiliary output 4: 0 **Attention: Press any menu key will be exit**
Fault Record	**Fault record** 01/04 **(Fault serial number/total number)** Genset start failure!! **(Fault record)** 08-06-03/11:26:38 **(Fault time)** **Attention:**press＋、－key,display up and down fault record；press **set** or **exit** will be exit.
Date and time set	Date：year－month－day/week Time：hour：minute：second Press ＋、－key to change the reverse display data；Press **Exit** reverse display move to the left，move to the first position then press **Exit** then back to the superior menu，date and time will not changed；press **set** reverse display move to the right，move to the last position press **set** then back to the superior menu，date and time display according to the new setting.
Alarm limit set	Voltage upper limit:0250 Frequency upper limit:0530 overcurrent stop:0500 Oil level down limit:020 Voltage low limit:0200 Frequency low limit:0470 Coolant temp.upper limit:096 Battery low limit:0105 Overcurrent alarm:0400 Acceleration upper limit:0550 Fuel level upper limit:080 Charge low limit:080 Fule level low limit:020 Press＋or－,choose content and content reversed display;press **Exit** back to the superior menu；Press **set**，enter choosing parameter setting state,the selected parameter is underline,it means the parameter is being operated.The first bit of this parameter reversed display,shows the data of bit can be changed.Enter the parameter setting state,press＋、－key to change the reversed displayd data;press **Exit** move reversed bit to the end of left,press **Exit** and back to the

	superior menu，parameter will be not changed;press set reversed display move to the end of right，press set and back to the superior menu，parameter changed and saved. **Attention**：the unit of frequency is 0.01HZ,the unit of charge and battery is 0.01V、the unit of oil level is 0.01MPa

Measurements Calibration	**Input password: 8421(default)**
	
	    Current high point: 0000 Power low point: 0000
	    Current low point: 0000 Battery voltage: 0000
	    Voltage high point: 0000 Charge voltage: 0000
	    Voltage low point: 0000 Coolant Adjustment: 0000
	    Power high point: 0000 Oil pressure Adjustment: 0000
	    Oil level Adjustment: 0000
	
	Password authentication input method
	    Press ＋、 － to change the reversed display dtat；press[**Exit**]to move the selected content to the left，press **Exit** key and back to the superior menu when the selected content move to the fist bit,press set key,move the selected to the end of right,enter the password press set，if the password is correct then get through the next menu.
	    Users according the error value of the controller measuring data and the real data to decide whether you need to data adjust.The controller already adjusted before leave factory,but it may be some　warp in the use environment,if the warp is in the error range,we suggest not adjusting the data,especially the genset current and power.
	    Press ＋、－ choose content reversed display，press **Exit** back to superior menu；press set enter to choose data adjustment state，and the adjusting parameter underline.,it means the parameter is being operated.The first bit of parameter reversed display,shows the data of bit can be changed.
	    Enter to data adjusting state,press ＋、 － to change the data,press **Exit** key,the reversed display turn left，when move to the fist bit,press **Exit** then back to the superior menu，data adjustment is cancelled.Press set the reversed display turn right，move to the fourth position press set back to the superior menu，data adjustment achieved,parameter changed saved.
	    For three phase voltage,three phase current and battery voltage adjustment,enter data adjust state,change the data then press set to finish the data adjustment.(Current keep two decimal fraciotn）.Battery voltage、charge voltage、coolant temp.、oil pressure,fuel level adjustment is different，MINCO400 controller provide battery voltage adjustment,charge voltage adjustment,coolant temp.adjustment,oil pressur adjustment,fuel level adjustment to adjust the mearuring data,the scop of adjustment is ±10％。Special explain, for coolant temp.,oil pressure,fuel level sensors maybe positive modulus(it means the sensor output minish along with input added），it maybe negative modulus(it means the sensor output minish along with input added），add or minish adjust value lead to adjust dffect decide by the real situation.
	Attention: the unit of current is 0.01A,battery,power's unit is 0.1KW

Delay time set	**Password input: 8421**　（**default**） Cool stop:020 Assistant input 2 delay:005 Genset start:005 Assistant input 3 delay:002 Crank interval delay:015 Assistant input 4 delay:005

	Crank delay:008 Charge fail delay:030 Bapass time:020 Low battery delay:020 Energize to stop:000 Retransformation delay:002 Pre-fuel delay:005 Overload:003 Idle start delay:010 Over Voltage delay:003 Idle stop delay:015 Over Frequency delay:003 Acceleration delay:020 Warm up delay:010 Assistant input 1 delay:003 Deceleration delay:020 Press ＋、 － choose content reversed display，press **Exit** back to superior menu；press **set** enter to choose data adjustment state， and the adjusting parameter underline.it means the parameter is being operated.The first bit of parameter reversed display， shows the data of this bit can be changed.Enter to data adjusting state,press ＋、 － to change the data of reversed display；press **Exit** to move the right， reach to the first bit then press **Exit** to back to the superior menu， data adjustment in valid；press **set** key, the reversed display turn right,when move to the end ,press **set** key to back to superior menu，the change of parameter is saved。Delay time up limit can't be over255 seconds， if setting over 255 seconds sysytem will change to 255 seconds automatically.
System parameters set	**Input password: 8421 (default)** Trip frequency:0135 Measurement 1:000 Output 4:004 Current ratio:0500 Output 1:000 Input 1:002 Passport:8421 Output 2:006 Input 2:001 Address:120 Output 3:002 Input 3:006 Input 4:008 Language C/E:0 Switch Method:0 Start Method: 0 Backlight :1 Press ＋、 － choose content reversed display，press **Exit** back to superior menu；press **set** key， enter the setting state， the adjusting parameter is underline，it means the parameter is being operated.The first bit of parameter reversed display， show the data of this bit can be changed.After enter into the setting state，press ＋、 － key to change the data,press **Exit** key to turn left， move to the first bit then press **Exit** to back to the superior menu， the parameter will not be changed；press **set** key to turn right， move to the end then press **set** key to back to the superior menu， parameter changes are saved.
Timing Start setting	Date：month－day/week Time：begin time：minute－end time：minute Press ＋、 － key to change the data of reversed display；press **Exit** to turn left,when the reversed display move to the first bit of the left,press **Exit** key to back to the superior menu，the date and time will not be changed；press **set** to turn right，when the reversed display move the end of the right,press **set** key to back to the superior menu， the date and time setting will be saved.

2．System parameter description

Trip frequency	When start the genset, if examine the genset frequency>trip frequency，it considers the genset start successfully and stop the crank output(trip speed generally setting to 1／3 of genset rated frequency).
Current ratio	Current ratio setting value is corresponding to 5，for example the current ratio setting in 500，it's correspond with 500：5。

Change password	Leave factory password 8421，please change the password on your own.
Address	Only use for multi equipment networking control，to differentiate the equipmen.
Measurement 1 setting	Unused.
Output 1 setting	Assistant output 1 defination：
Output 2 setting	0－Public failure；1－Auxiliary shutdown；2－Genset supply；3－Automation；4－Idle closed；5－Idle cutoff；6－Pre-fuel；7－Warm up；
Output 3 setting	8－Acceleration；9－Deceleration；10－damper；11－overcurrent；
Output 4 setting	12－high speed；13－battery low；14－pumping；15－alarm；
Input 1 setting	Assistant input 1 defination：
Input 2 setting	0－monitor；1－low oil pressure；2－high coolant temp.；3－acceleration limit；4－deceleration limit；5－high oil temp.；
Input 3 setting	6－low fuel level（alarm non-stop）；7－high fuel level；8－Float failure alarm；
Input 4 setting	9－alarm；10－alarm non-stop（running period）；11－alarm stop。
Starting Method	0：Measuring fuel level 1：Not measuring fuel level
Voltage measuring method	0：measure phase voltage 1：measure line voltage
Display mode	0：Switch in manual 1：Auto switch
Language selection	0：Chinese 1：English
Backlight select	0：Auto shut down 1：Constant light

Assistant output 1 defination instruction：

Public failure： Any of failure for genset protection stop can bring public failure output；

Auxiliary shutdown： genset stop to output,when energize to stop is over,the output is over；

Genset supply： After the genset working normally，if the remote starts switch closed，genset supply will bring output；

Automation： if controller in auto state，auto relay has output；

Idle closed、idle cutoff： output will be brought during the period of idle start and idle stop，but the state of which are opposite；

Pre-fuel： Output will be brought during the period of pre fuel；

Warm-up： Output will be brought before the pre-fuel delay and genset start succesfully；

Acceleration、deceleration： Output will be brought during the acceleration delay and deceleration dely，which coordinate to finish the mechanical speed governing；

Damper： Output will be brought when the genset is over speed；

Overcurrent： Output will be brought when the genset is overcurrent；

High speed： Output will be brought when genset running at rated speed；

Battery low： Output will be brought when the battery voltage is low；

Pumping： Output will be brought when low fuel level is measured to alarm，Output will be vanished when high fuel level is measured，auto fuel can be realized；

Alarm： Output will be brought when genset alarm.

Assistant input 1 defination instruction：

Monitor： nonparticipate control，only monitor the state，needless input can set up to monitor；

Low fuel level： genset will shutdown when the low fuel level is measured；

High coolant temp.： genset will shutdown when the high coolant temp. is measured；

Acceleration limit、 deceleration limit： in coordination with acceleration and deceleration to realize the mechanical speed governing；

High oil temp.： genset will shutdown when the high oil temperature is measured；

Low fuel level： genset will not shutdown but will alarm when the low fuel level is measured；

High fuel level： in coordination with low fuel level to realize the pumping function；

Float failure alarm： genset will not shutdown but float failure alarm occur during the genset is working if this port is closed；

Alarm： user-defined alarm， instruct to assistant input 1－4 alarm；

Alarm non-stop： user-defined alarm， but only during the period of genset working， instruct to assistant input 1－4 alarm；

Alarm stop： user-defined alarm， cause to shutdown when genset is running， instruct to assistant input 1－4 stop.

Attention：

display, alarm and protection of coolant temp.、 oil pressure and fuel level can be realized by measuring the analog volum，and also can be realized by definating the high coolant temp.,low oil pressure,fuel level to the auxiliary input portion. If the auxiliary volum and alarm input are exist together in the system,then any of alarm can come into being protection..If the switch alarm protection is no need,please define the auxiliary input to another function;if the analog volum alarm protection is no need,please set the alarm up-low limit to the measurment limit so as to not alarm.

Sine the input and output can be user-defined,Minco400 controller's input and output function actualized is bigger far than the real amount of input and output.Although some function of controller has been appointed, which can't execute wherever there is no defination to input and output accordin corresponding. For example,when the genset normally running, if the remote start input closed,the genset will work on load,but if no supply output defination, there is no supply action, it would means the genset has being runned to load..

3．Delay time instruction

Delay of "cool down"	When the controller is "Auto"state,once the "Remote start"switch turn off and auto start finish,then to delay,the genset will be stopped after delay.
Delay of "genset start"	When the controller is in "Auto" state,once the "Remote start"switch turn off ,then to delay，the genset will be stopped after delay.
Delay of "Crank Interval"	When the cranking time delay ended,if the start succeed condition is not satisfied and not reach the crank times limit,the delay will be repeated and crank times add 1.
Delay of "start running"	When the genset start and begin to delay,if the start succeed condition is satisfied(genset frequency>trip frequency ）， it's consider to be genset strart successful and stop delay.
Delay of "bypass time"	After the genset start successfully,begin to start delay of the bypass，"low oil pressure","high coolant temp."etc.will not be monitored during the delay to avoid mistake alarm when genset in start early.
Delay of "energize to stop"	Auxiliary stop relay have output when genset stop，"energize to stop"delay begin,when delay ended,auxiliary stop relay don't work.
Delay of "pre-fuel"	Before the genset start,the delay of pre-fuel has begun.At the same time,the relay of pre-fuel closed,after the delay be over , the relay of pre-fuel cutoff,the genset start to crank.
Delay of "idle	After the genset start successfully, the delay of idle start is begin,the relay of "idle

start"	start" begin to work at same time.
Delay of "idle stop"	When genset stop,the delay of "idle stop"is begin after deceleration is over,the idle relay begin to work.
Delay of "ACC."	Genset start successfully and idle start over,it's beginning ACC delay,ACC. Relay closed,if the delay ended but not yet get the ACC in the right position signal,it will be a "ACC failure "alarm".
Delay of "Auxiliary input 1"	Delay begin at time of the auxiliary input 1 closed,delay will interrupt when the state is normal，if the input still closed after delay is over,it will be alarm.
Delay of "Auxiliary input 2"	Delay begin at time of the auxiliary input 2 closed,delay will interrupt when the state is normal，if the input still closed after delay is over,it will be alarm.
Delay of "Auxiliary input 3"	Delay begin at time of the auxiliary input 3 closed,delay will interrupt when the state is normal，if the input still closed after delay over,it will be alarm.
Delay of "Auxiliary input 4"	Delay begin at time of the auxiliary input 4 closed,delay will interrupt when the state is normal，if the input still closed after delay over,it will be alarm.
Delay of "Charge failure"	After the genset start succesfully，if the charge voltage not exceed the charge lower limit,it will be alarm.
Delay of "low battery"	When battery voltage is lower than limit,delay is begin,which will interrupt when the state is normal,if the input still closed after delay over,it will be low battery alarm.
Delay of "retransformation"	When the normal supply comeback normal state after genset onload.The normal supply must be stable for a period, until the delay retransformation is over than switch to mains supply on load.
Delay of overload	Delay begins when current is exceed the alarm up limit,if the current in normal,delay will interrupt，if still overcurrent after delay,it will be overload stop.If the current exceed the stop upper limit,then protect stop without delay.
Delay of "over voltage"	Delay begins when voltage exceed the limit,if the voltage in normalduring the period of delay,delay will be interrupted，if over voltage exist after delay is finished，then will be over voltage protection stop.
Delay of "over frequency"	Delay begins when the frequency exceed the upper limit,if the voltage in normal during the period of delay,delay will be interrupted,if over frequency exist after delay finished,then will be over frequency protection stop.if the frequency is upper than limit,then stop protected without delay.
Delay of "warm up"	Happened during the time when the genset starting successfully.To extend the time of power supply switching to genset on load.Power supply untill the genset reach to optimum state if not emergency,and availably reduce the abrasion.
Delay of "deceleration"	Delay begins when the genset stop,deceleration relay closed,if not yet detect the speed signal, when the delay is over,that will appear the alarm of "deceleration fail".

4．Timing start instruction

Timing start is only valid on the auto state of MINCO400.

MINCO400 estimate the nowaday date(month-day/week) to be correspond or not,if is correspond,then start the machine to work or stop the machinte to halt at the setting time(hour:minute).All the parameter are set to 0，then forbid timing start function.

Any of each date about month、day、week is set to 0，shows the date is to be correspond with nowaday,if the month,day,week are all set to 0，means timing start every day,day and month are set to 0，means timing start every week；month and week are set to 0，means timing start every month.

For example: The date of timing start is set to:08-00/01   Time is:10:00-12:20

Means at Monday of every week on the August,the genset will start at 10:00,stop at 12:20.
The date of timing start is set to :00-03/00   Time is :10:00-12:20
Means on the 3th of every month,the genset will start at 10:00,stop at 12:20

Ⅵ、Normal failure and handling method

Failure	Describtion	Solution
Manual start failure	Press the **start** key，the green light isn't bright on the aboved and motor doesn't work.	Check whether the greenlight is broken,if the LED light isn't broken,please contact with the factory；if the LED light is broken,please see below solution.
	Press **start** key，the green light is bright on the aboved and the motor doesn't work.	Check the menu of "low oil pressure"in the "input port state",if display "0",please check whether the oil pressure sensor is ok;if display "1",the oil pressure sensor is ok,now please pree **start** key,measuring the module port 34"start"whether there's 24Vwith a multimeter,if the voltage is 24V,check whether the outside middle relay,start moter is broken,and whether the battery voltage is enough;If port 34 no output,the module might be damaged.
Auto start failure	Module in **Auto** state ，inspection"remote start"have input,the "remote start"state light is bright on and the motor doesn't work.	Check the menu of "remote start"in the "input state", if the "remote start"display "0"means that the outside timer etc module relay is broken cause didn't receive the input signal;If display "1",the module might be broken.
	Module in **Auto** state ，inspection"remote start"have input,the "remote start"state light is brightonand the motor doesn't work；	Check the oil pressure sensor;switch to the manual start,check whether there are output fignal of the port 34-"start",the outside components and the battery voltage.
Wheel tooth is fighting when start	Start successful and motor keep running,the whell tooth is fighting.	Lower down the trip speed;
On load current display incorrect	Current ratio in system parameter setting is wrong.	Reset the current ratio.

Ⅶ、Outside wire connection drawing

MINCO 400 Genset Controller
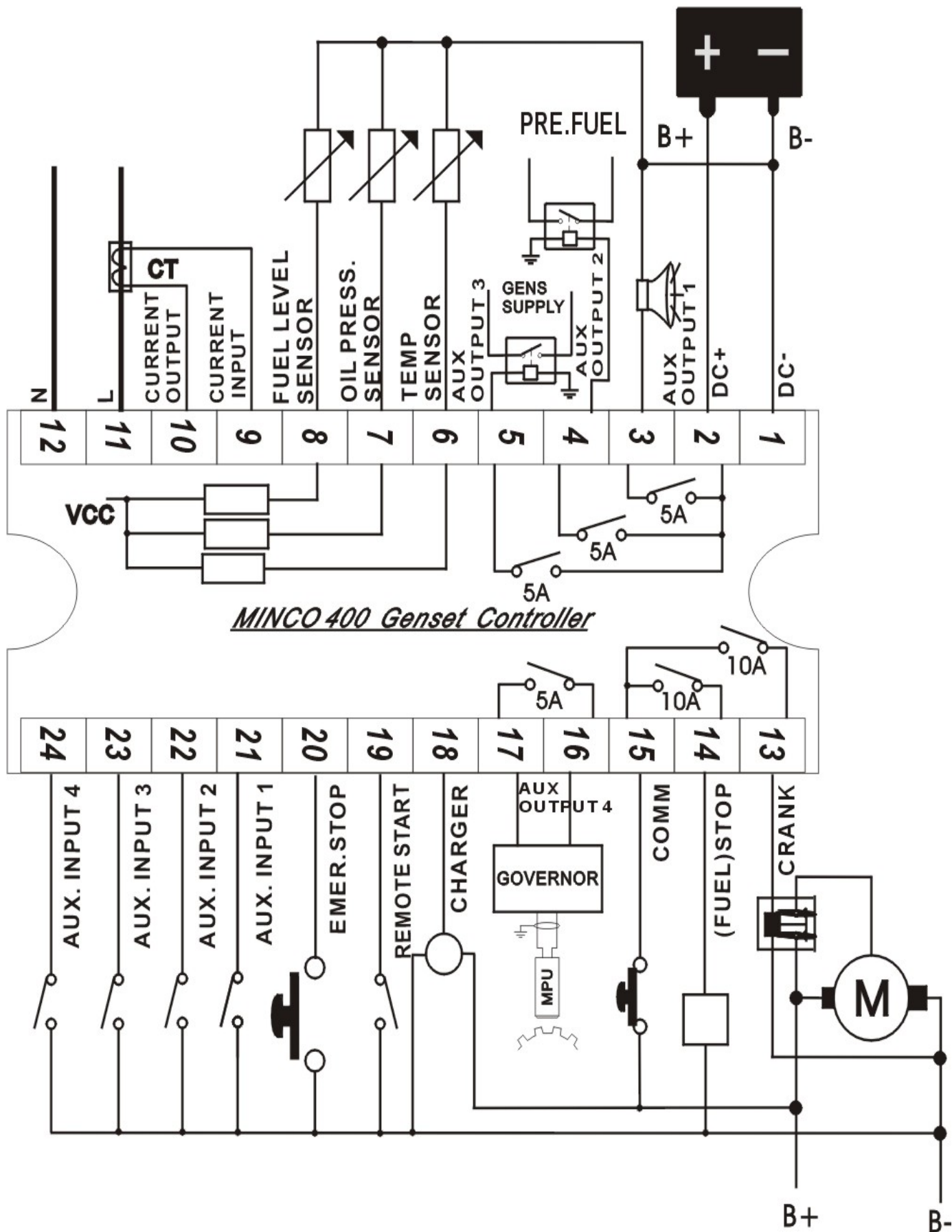
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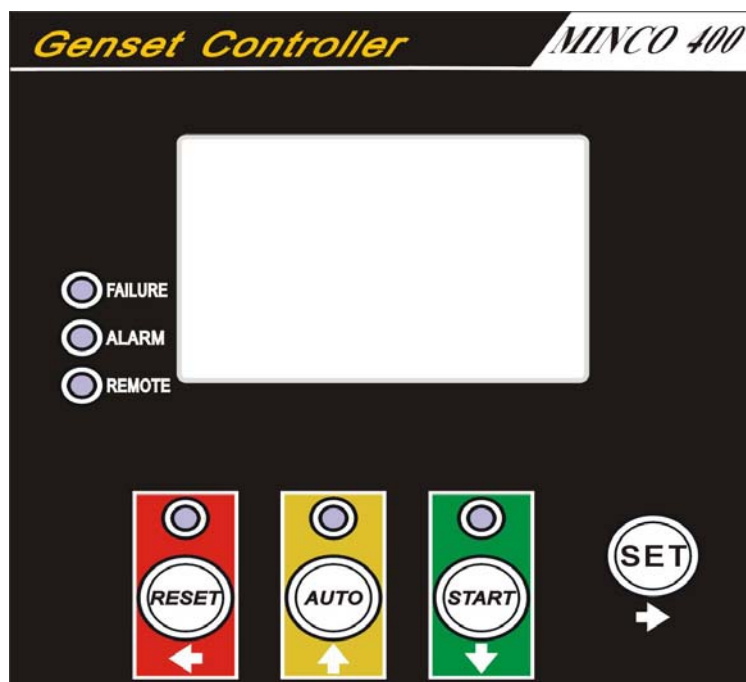
Ⅸ、Controller back panel diagram