Smartgen®

HAT500C

ATS CONTROL MODULE

OPERATING MANUAL

Smartgen Electronic

Smartgen Electronic Equipment Co., Ltd

No.28 JinSuo Road

Zhengzhou

Henan Province

P.R.China

Tel: 0086-371-67988888/67981888
0086-371-67991553/67992951/67992952
0086-371-67981000(overseas)

Fax: (0086)-371-67992952/67981000

Web: http://www.smartgen.com.cn
http://www.smartgen.cn

Email: sales@smartgen.com.cn

Software Version

Version	Date	Note
2008-03-15	1.1	Original release.
2011-06-16	1.4	Modify cycle start functions.

CONTENT

1 DESCRIPTION

The HAT500C is an Automatic Transfer System Control Module. It precisely measure/display two source 3-phase AC voltage and output free voltage controlling switch signal. The module is suitable for a variety of ATS system and can be widely used to electric devices in many fields such as electric power, communication, petroleum, coaling, metallurgy, rail, municipal business, smart mansion etc.

2 FEATURES

►Measure two source multi-parameters:

AC Line-Line voltage of #1
AC Line-Nature voltage of #1
AC Frequency of #1
AC Line-Line voltage of #2
AC Line-Nature voltage of #2
AC Frequency of #2
Load Line Current
Load Active power (kW) of #1, 2
Load apparent power (kVA) of #1, 2
Power Factor
Over Voltage
Under Voltage
Over Frequency
Under Frequency
Miss Phase
Over Current

►Compatible to multi-type of automatic transfer switches (ATS):

No OFF position (two segments kind), such as SOCOMEC VS switch;
One OFF position (three segments kind), such as SOCOMEC VE switch;
Two OFF position, such as the ATS composed of two circuit breakers or two contacts;

►Compatible to automatic switching of two utility source, two generating power or between one utility source and one generating power;

►Microprocessor based design, LCD display, and tactile key operation;

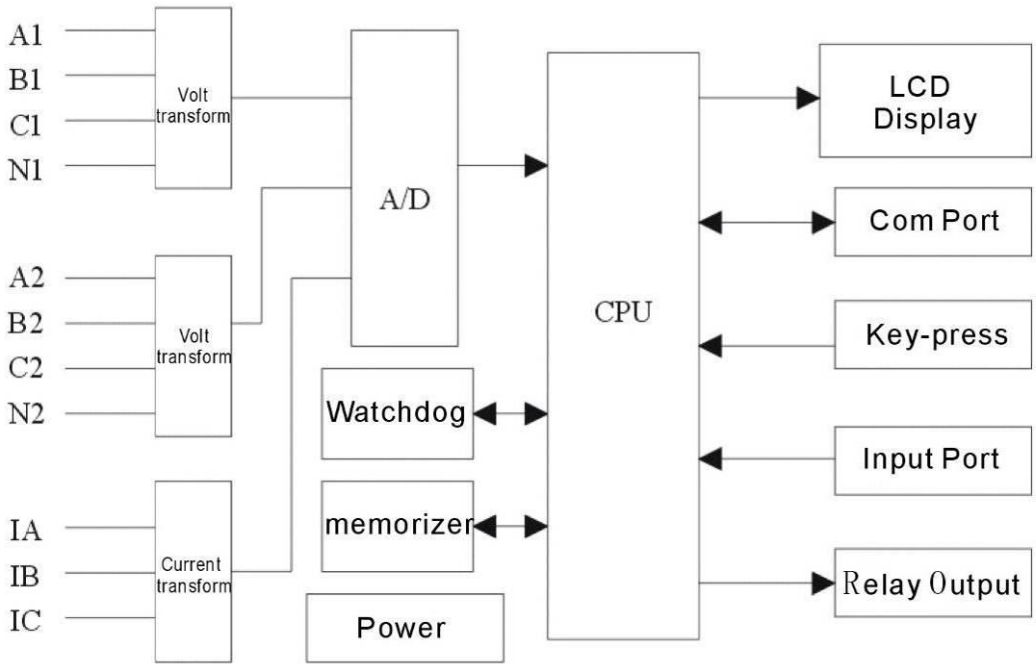
- ►Also may suit to two source single phase AC voltage system or two source 3-phase 3 wires AC voltage system by simply settings (note: 3-phase 3 wires system will be offered specially);
- ►Configurable priority of supply able to set I# supply priority or II# supply priority or NONE supply priority;
- ►Function of start generator;
- ►Function of auto transfer when one switch closing failures and another works well;
- ►Mandatory opening or closing switch in manual mode;
- ►Password to prevent the miss operation of non-professionals;
- ►Function of re-closing to prevent instantaneous power off aiming at switch which opening as voltage being low;
- ►Function of re-closing while power off to prevent the abnormal On/Off operation from the mismatching between the operation unit and switch position;
- ►Pulse output closing and Opening signal (up to 10 seconds), output auto shutoff after switching is done;
- ►Transfer rest delay time is programmable;
- ►Two N line separating design;
- ►Industrial standard RS485 communication interface to fulfill the “remote controlling, remote measuring, remote communication” function by the ModBus communication protocol;
- ►Parameters can be set in site or in monitor center and cannot lose even power off;
- ►20 historical records can be stored circularly and inquiring of the records can be made on site;
- ►RTC (real time clock);
- ►Start function including schedule exerciser at singly, weekly, and monthly;
- ►Module structure design, ABS plastic crust, embedded installation, plug connector, convenient maintenance.

3 SPECIFICATION

Power supply	1. DC 8.0V-35.0V; 2. Come from phase A and N of two source, voltage>160V(suited for 3-phase 4 wires); 3. Come from phase A and B of two source, voltage>160V (suited for 3-phase 3 wires).
Power consumption	<3W
Input voltage	220V±30% single-phase or 380V±30% 3-phase 4

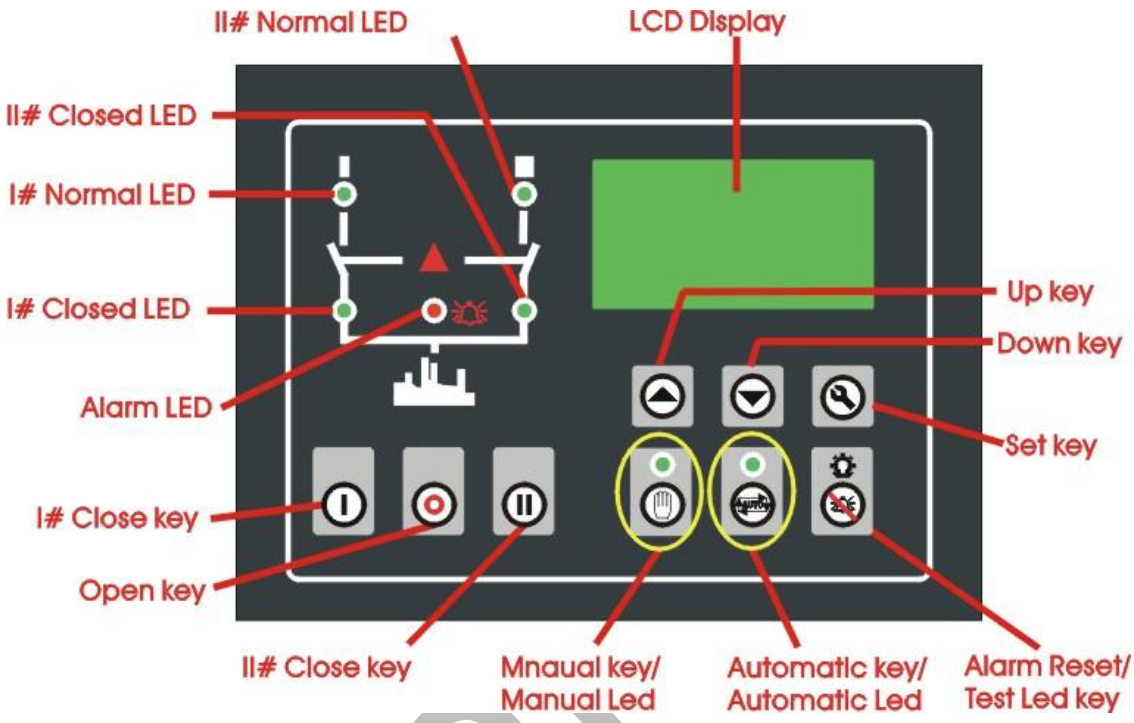
	wires
Rated frequency	50/60Hz
Relay output	10Amp 250VAC
Digit Input	Connecting with GND is active
Load secondly current of current transformer	Rating 5A
Communication	RS485Port, MODBUS Protocol
Dimensions	192mm x 144mm x 87.5mm
Panel cutout	186mm x 139mm
Operation condition	Temperature: (-30-+70)°C Humidity: (20-90)%
Storage condition	Temperature:(-40-+80)°C
Insulation strength	Object: Between the input/output/ power supply Quote from standard: EC688-1992 Test method: AC1.5kV /1min in current 5mA
Weight	1.18kg

4 OPERATE PRINCIPLE



5 OPERATION

5.1 Operation Panel



5.2 Key function description

	I# Close key	The key function is used to transfer #1 power to load in manual mode.
	Open key	The key function is used to transfer #1 or #2 powers to OFF load in manual mode.
	II# Close key	The key function is used to transfer #2 powers to load in manual mode.
	Manual key	The key function is used to initiate manual operation.
	Automatic key	The key function is used to initiate automatic operation.
	Alarm reset and Test Led key	If alarm has occurred, pressing this key will reset alarm. If no alarm, pressing down for 3 seconds will test Led mounted on the front panel.
	Set key	The key function is used to entering in setting menu, shifting cursor in setting and confirming the set information.

	Up key	The key function is used to scroll screen or change a programming value while in the programming mode. When this push-button is pressed down, the displayed value will be incremented to a higher value as desired.
	Down key	The key function is used to scroll screen or change a programming value while in the programming mode. When this push-button is pressed down, the displayed value will be decremented to a lower value as desired.

Note:

1) At the same time Pressing down  and  will display the transfer priority in main display screen.
2) At the same time Pressing down  and  will display the number of OFF position in main display screen.

5.3 LCD Display

5.3.1 Main screen

U1(L-L) 380 380 380V **AMP 500 500 500A** **F1 50.0Hz PWR 329kW** Present Status：MANU	This screen will show: line-line voltage, frequency of #1, current and active power of load, and present status is in manual mode.
U2(L-L) 380 380 380V **F2 50.0Hz** **PF 1.00 PS 329kVA** Present Status：MANU	This screen will show: line-line voltage, frequency of #2, power factor and Apparent power of load, and present status is in manual mode.
U1(L-N) 219 219 219V **U2(L-N) 219 219 219V** **2006-02-08（3）18:25:30** Present Status：MANU	This screen will show: line-nature voltage of #1, 2, current date and time, and present status is in manual mode. Note: It is week in the bracket.

Note: pressing  or  key may scroll the screen.

5.3.2 Parameters setting screen

Pressing down  on main screen will show as:

1 Current State **2 History record** **3 Test generator** **4 Parameters Set** **5 Date & Time Set** **6 Information**	Pressing ▲ or ▼ key will select, and press 🔧 key to confirm.

6 CURRENT STATE DISPLAY

On the main screen press 🔧 key and select 1 Current State, and then pressing 🔧 key, the screen will show as follow:

Current State
1# Volt normal
2# Volt normal
Over current

→ LCD Display Current State
→ LCD Display I# operating state of power supply
→ LCD Display II# operating state of power

Display priority of the #1 source (upper to lower)

No	Item	Type	Description
1	1# switch Alarm	Alarm	When the terminal 2 (1# alarm input) is active, this will display.
2	1# Fail to Shut	Alarm	When 1# breaker occur closing failure, this will display.
3	1# Fail to Break off	Alarm	When 1# breaker occur opening failure, this will display.
4	1# Over Volt	Indication	When 1# source occur over voltage, this will display.
5	1# Miss Phase	Indication	When any of 1# three phases is miss, this will display.
6	1# Over Freq	Indication	When 1# source occur over frequency, this will display.
7	1# Below Freq	Indication	When 1# source occur under frequency, this will display.
8	1# Below Volt	Indication	When 1# source occur under voltage, this will display.
9	1# Reverse phase	Warning	When 1# phase sequence is error, this will display.
10	1# Volt normal	Indication	When 1# source voltage is normal, this will display.

Display priority of the #2 sources (upper to lower)

No	Item	Type	Description
1	2# Switch Alarm	Alarm	When the terminal 4 (2# alarm input) is active, this will display.
2	2# Fail to Shut	Alarm	When 2# breaker occur closing failure, this will display.
3	2# Fail to Break off	Alarm	When 2# breaker occur opening failure, this will display.
4	2# Over Volt	Indication	When 2# source occur over voltage, this will display.
5	2# Miss Phase	Indication	When any of 2# three phases is miss, this will display.
6	2# Over Freq	Indication	When 2# source occur over frequency, this will display.
7	2# Below Freq	Indication	When 2# source occur under frequency, this will display.
8	2# Below Volt	Indication	When 2# source occur under voltage, this will display.
9	2# Reverse phase	Warning	When 2# phase sequence is error, this will display.
10	2# Volt normal	Indication	When 2# source voltage is normal, this will display.

Display priority of the other states (upper to lower)

No	Item	Type	Description
1	Overload	Warning	When the load occurs over current, this will display.
2	Gens Starting	Indication	When the start generator is active, this will display.
3	Breaking Compulsorily	Warning	When the terminal 19 (configurable input is set to “Breaking Compulsorily”) is active, this will display.

Note:

Alarm: when an alarm occurs, lamp will flash and this alarm signal will latch until pressing key to reset.

Warning: when a warning occurs, lamp will flash and will not latch. When a warning is inactive, lamp will extinguish.

Indication: this is an indication only.

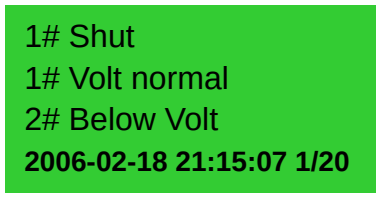
7 HISTORY RECORD DISPLAY

On the main screen press key and select **2 History record**, and then pressing

key, the screen will show as follow:

Figure1: Pressing or key will scroll a record, and pressing key will display items of current record.

Fig1



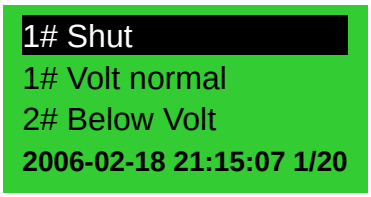
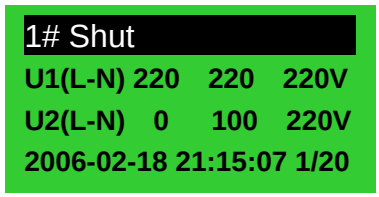


Fig2-1

Figure2: pressing or key will show as figue2-1, 2-2, 2-3. Pressing key will quit current record, pressing key will exit and return to main screen.

Fig2-2



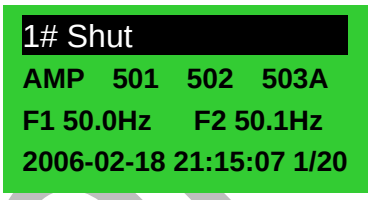


Fig2-3

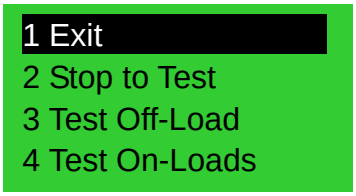
The history record contents include: Record type; 1# power state; 2# power state; 1# Three phase phase voltage; 1# Three phase phase voltage; Three phase current;1# frequency; 2# frequency and the date time of the record.

Record type:

No.	TYPE	Description
1	1# Shut	When 1# Shut signals output, this will display.
2	2# Shut	When 2# Shut signal output, this will display.
3	1# Fail to Shut	When 1# breaker occur closing failure, this will display.
4	2# Fail to Shut	When 2# breaker occur closing failure, this will display.
5	1# Fail to break off	When 1# breaker occur opening failure, this will display.
6	2# Fail to break off	When 2# breaker occur opening failure, this will display.
7	1# Switch Alarm	When the terminal 2 (1# alarm input) is active, this will display.
8	2# Switch Alarm	When the terminal 4 (2# alarm input) is active, this will display.
9	Breaking Compulsorily	When the terminal 19 (configurable input is set to “Breaking Compulsorily”) is active, this will display.

8 TEST GENERATOR OPERATION

On the main screen press key and select **3 Test generator**, and then pressing key, the screen will show as follow:

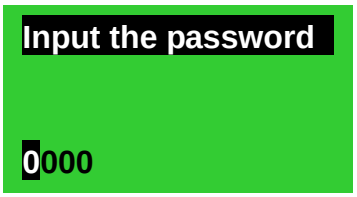


Press or key select, and press key to

confirm.

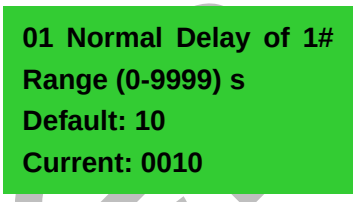
Test Off-Load: This will send out a start generator signal immediately. After 2# source is normal, if 1# source is normal, the breaker will not act. The breaker will transfer the load to 2# only when 1# source is abnormal. After 1# source restore normal, the breaker will transfer the load to 1#. Here the start generator signal output will keep.

Fig1



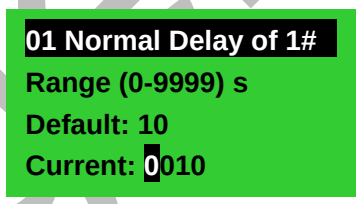
Test On-Load: This will send out a start generator signal immediately. After 2# source is normal, the breaker will transfer the load to 2# immediately regardless of 1# source normal whether or not.

Fig2



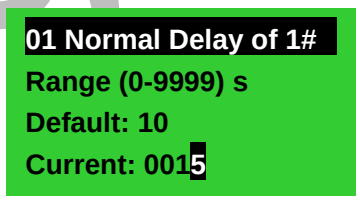
Stop to Test: This will stop a start generator signal immediately.

Fig3



Note: the test generator operation is active only in automatic mode.

Fig4



9 PARAMETERS SETTING

On the main screen press key and select **4 Parameters set**, and then pressing key, the screen will show the entering password interface.

Press or key to adjust the numerical value, press key to move the cursor, finally press key to confirm the password. If the password is OK, will enter the setting parameters interface (figure2). **Default password is "1234".**

Press or key to lookup current configure of each parameter, and press key enter the setting interface. The content of line 1 and current setting numerical value will display in reverse (figure3).

Press or key to adjust the numerical value, press key to move the cursor, finally press key to confirm the setting value(figure4). If the setting value is in range, this will save into inner FLASH. If the setting value is over range, this will not save. At any time pressing key will quit to the setting interface and return to main screen.

9.1 Parameters Table

Item	Range	Default	Description
01 Normal delay of 1#	(0-9999)s	10	It is the delay of #1 power from voltage abnormal to voltage normal.
02 Abnormal Delay of 1#	(0-9999)s	5	It is the delay of #1 power from voltage normal to voltage abnormal.
03 Normal Delay of 2#	(0-9999)s	10	It is the delay of #2 powers from voltage abnormal to voltage normal.
04 Abnormal Delay of 2#	(0-9999)s	5	It is the delay of #2 powers from voltage normal to voltage abnormal.
05 Shut time	(0-20)s	5	Breaker close pulse. If it is set to zero, the output will hold.
06 Break off time	(1-20)s	5	Breaker open pulse.
07 Transfer rest time	(0-20)s	1	It is the delay from #1 power breaker opened to #2 powers breaker start to close or from #2 power breaker opened to #1 power breaker start to close.
08Exceed Convert Time	(0-20.0)s	0.0	After the module has received a close state input, the breaker close output continues to hold until the delay is expended.
09 Again Shut time	(0-20.0)s	1.0	When the breaker fail to close for the first time, the module will open breaker, and then attempt to close for the second time, if the second time closing breaker is still failure, the module will send out closing breaker failure signal.
10 Again Break time	(0-20.0)s	1.0	When the breaker fail to open for the first time, the module will close breaker, and then attempt to open for the second time, if the second time opening breaker is still failure, the module will send out opening breaker failure signal.
11 Start GENS Delay	(0-9999)s	1	It is the delay from #1 power is abnormal to send out start

Item	Range	Default	Description
			generator signal.
12 Stop GENS Delay	(0-9999)s	5	It is the delay from #1 power is normal to send out stop generator signal.
13 Over voltage	(30-360)V	276	The setting are used to configure the #1 and #2 powers over voltage point in the event of the #1 or #2 voltage rising above the setting value. This value can be adjusted to suit user requirements.
14 Under voltage	(30-360)V	184	The setting are used to configure the #1 and #2 powers under voltage point in the event of the #1 or #2 voltage falling below the setting value.
15 1# Over Frequency	(0.0-75.0)Hz	55.0	When the frequency of #1 power is over than the point, over frequency is active.
16 1# Below Freq	(0.0-75.0)Hz	45.0	When the frequency of #1 power is low than the point, low frequency is active.
17 2# Over Frequency	(0.0-75.0)Hz	57.0	When the frequency of #2 powers is over than the point, over frequency is active.
18 2# Below Freq	(0.0-75.0)Hz	40.0	When the frequency of #2 power is low than the point, low frequency is active.
19 CT rate	(5-6000)/5	500	Current transformer rate
20 Full load current	(5-5000)A	500	Load maximum rated current.
21 Over current PCT	(50-150) %	120	When the load current is over than the point, the over current delay is initiated.
22 Over current delay	(0-9999)s	1296	When load current is over than the point and hold great than the timer, send out over current signal. When the delay is zero, over current is disabled.
23 Address of Com	(1-254)	1	Setting the Modbus™ Slave ID of the controller you wish to communicate with.
24 Password		1234	It applies to modify these parameters.

Item	Range	Default	Description
25 Start GENS select	(1-2)	1	1 when #1 source abnormal, only sends out start generator signal. 2 when #1 and #2 voltages are abnormal at the same time send out start generator signal.
26OFF Position Select	(1-3)	1	1 Two Breaking, two OFF position, such as the ATS composed of two circuit breakers or two contacts. 2 One Breaking, one OFF position (three segments kind), such as SOCOMEC VE switch. 3 NO Breaking, no OFF position (two segments kind), such as SOCOMEC VS switch.
27 AC System	(1-3)	1	1 3-phase 4 wire 2 3-phase 3 wire (special order) 3 Single phase 2 wire
28 Language	(1-2)	1	1 Chinese 2 English
29 Set Priority	(1-3)	1	1.1# Priority, setting #1 power transfer is prior. If #1 and #2 is normal at the same time, the switch will transfer load to #1 power source. 2. 2# Priority, setting #2 power transfers is prior. If #1 and #2 is normal at the same time, the switch will transfer load to #2 power source. 3. NO Priority, the transfer is no. If #1, 2 sources is normal at the same time and #1, 2 take no load, the switch will first transfer load to #1 power source. Only when #1 power is abnormal, the #2 power will supply for load; if the switch have been taken load, it will not switched to another power

Item	Range	Default	Description
			until abnormality occurs in the power.
30 Set Digit Output 1	(1-24)	19	01.Not used 02.Critical failure output 03. Failed of transfer 04. Warning alarm output 05. Alarm output(delay) 06. 1#Volts normal 07. 1#Volts Abnormal 08. 2#Volts normal 09. 2#Volts Abnormal 10. Over current output 11. Auto state output 12. Manual state output 13. Gens start output(N/O) 14. Gens start output(N/C) 15.1# switch shut output 16.1# switch break off output 17.2# switch shut output 18.2# switch break off output 19. Common Alarm output 20. Timing test Gen set 21. 1# shut state 22. 2# shut state 23. 1#Gens start output 24. 2# Gens start output
31 Set Digit Output 2	(1-24)	13	
32 Set Digit Input 1	(1-9)	2	01.Not used 02.Breaking Compulsorily 03.Test off load 04. Test on load 05.Test LED 06. 1#Gens Alarm 07. 2# Gens Alarm 08. 1#switch Alarm 09. 2# switch Alarm
33 Set Digit Input 2	(1-9)	8	
34 Set Digit Input 3	(1-9)	9	
35Cycle start time interval	(1-250)H	12	Set up two unit's cycle start time intervals.

9.2 Input/output function description

The detail information of configurable input

Item	Description
01 Not used	

02Breaking Compulsory	When active, this will force the breaker to transfer the ATS to OFF position. It isn't suit for one OFF position ATS.
03 Test Off-load	When active, this will send out a start generator signal immediately. After 2# source is normal, if 1# source is normal, the breaker will not act. The breaker will transfer the load to 2# Only when 1# source is abnormal. After 1# source restore normal, the breaker will transfer the load to 1#. Here the start generator signal output will keep.
04 Test On-Load	When active, this will send out a start generator signal immediately. After 2# source is normal, the breaker will transfer the load to 2# immediately regardless of 1# source normal whether or not.
05 Test LED	When active, all Led lamps mounted on the front panel will illuminate, LCD will fill black block.
06. 1#Gens Alarm	Cycle start, if the input activate, 1# unit will no longer starting.
07. 2#Gens Alarm	Cycle start, if the input activate, 2# unit will no longer starting.
08. 1#switch Alarm	1#switch Alarm input
09. 2#switch Alarm	2#switch Alarm input

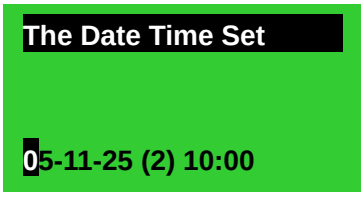
The detail information of configurable output

Item	Description
01 Not used	
02 Critical failure	It includes closing failure, opening failure and breaker fault of #1, 2 sources.
03 Fail To Transfer	It includes #1 closing failure, opening failure and #2 closing failure, opening failure.
04 Warning output	It include miss phase of #1, 2 sources, over current, breaking compulsory.
05 Alarm output(delay)	This output is intended to drive an external Klaxon or alarm indicator and will be active upon the module triggering an alarm fault. The output delay is upon the "Delay of alarm" in the above parameters table.
06 1# Normal volt	It will output when #1 voltage is normal.
07 1# Abnormal volt	It will output when #1 voltage is abnormal.
08 2# Normal volt	It will output when #2 voltages is normal.
09 2# Abnormal volt	It will output when #2 voltages is abnormal.
10 Over current output	It will output when load over current is occurred.
11 Auto state output	It is active in manual mode.
12 Man state output	It is active in manual mode.

Item	Description
13 Generator Start(N/O)	When the start generator signal is active, the output relay energized. When the start generator signal is inactive, the output relay de-energized. Here the DC supply is necessary.
14 Generator Start(N/C)	When the start generator signal is inactive, the output relay energized. When the start generator signal is active, the output relay de-energized.
15 1# Shut output	#1 closing breaker output.
16 1# Break Off output	#1 opening breaker output.
17 2# Shut output	#2 closing breaker output.
18 2# Break Off output	#2 opening breaker output.
19Common Alarm output	It is include critical failure and Warning alarm.
20 Time Test Gen Start	When scheduler start generator is on-line, the output is active.
21 1# Shut State	#1 breaker close state output
22 2# Shut State	#2 breaker open state output
23. 1#Gens start output	Gens start signal output when cycle start.
24. 2#Gens start output	

10 DATE AND TIME SETUP

On the main screen press key and select **5 Date & Time set**, and then pressing key, the screen will show the date and time interface.



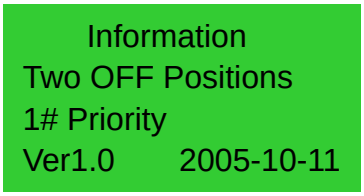
Press or key to adjust the numerical value, press key to move the cursor, finally press key to confirm the setting value.

Format: yy – mm - dd (w) hh: mm

11 MOUULE INFORMATION

On the main screen press key and select **6 Information**, and then pressing key, the screen will show the information interface.

Pressing key will exit and return to main screen.



12 ATS OPERATION

12.1 Manual operation

Press key and manual operation indicator light, the controller in manual mode.

- Press key, 1# close relay outputs, begin to monitor 1# closing input, if active, the 1# supply power LED light, the 1# supply power connect to load.
- Press key, 2# close relay outputs, begin to monitor 2# closing input, if active, the 2# supply power LED light, the 2# supply power connect to load.
- Press key, 1#/2# breaker relay output, if 1# and 2# close status input monitor no active, 1# and 2# supply power on load LED blackout, load break 1# and 2# supply power. *1

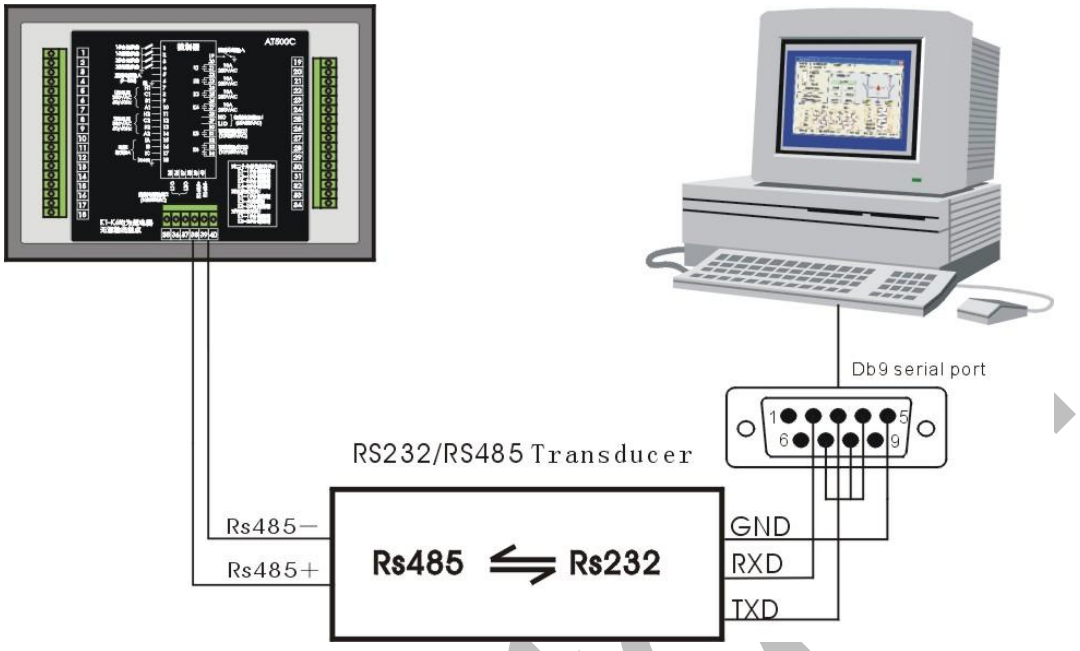
*1: For the ATS of no OFF position, press key is invalid.

12.2 Automatic operation

Press the key and the automatic LED light, enter AUTO mode and controller can automatically switch load to 1# or 2#.

- 1# priority: so as the 1# supply power normal, controller switch 1# supply power connect to load, when 1# priority supply power.
- 2# priority: so as the 2# supply power normal, controller switch 2# supply power connect to load, when 2# priority supply power.
- No priority: The normal 1# supply powers in advance, as far as abnormal occur; just automatically switch to on the side of 1#.

13 LINK TO PC



The module has a RS485 communication port on the rear. The HAT500C configuration software allows the modules to be connected to a PC via a RS485-RS232 transducer. Once connected the various operating parameters within the module can be viewed or edited as required by the engineer. This software allows easy controlled access to these values and also has diagnostic monitoring facilities.

The Configuration interface should only be used by competent, qualified personnel, as changes to the operation of the module may have safety implications on the panel / ATS to which it is fitted.

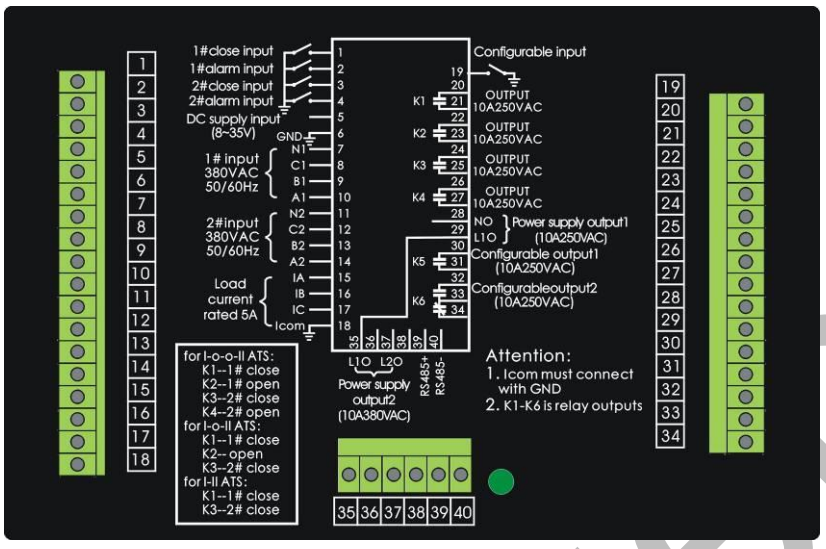
Communication parameters:

Item	Default
Module address	1 (range: 1-254)
Baud rate	9600bps
Data bits	8bit
Parity bit	None
Stop bit	1bit

Please download the HAT500C configuration software from the below web site.

http://www.smartgen.com.cn/

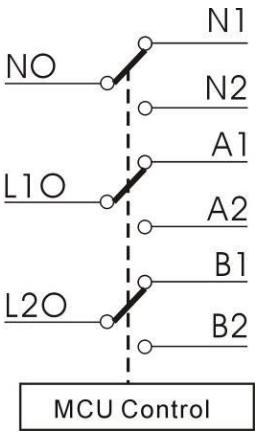
14 DESCRIPTION OF CONNECTING TERMINAL



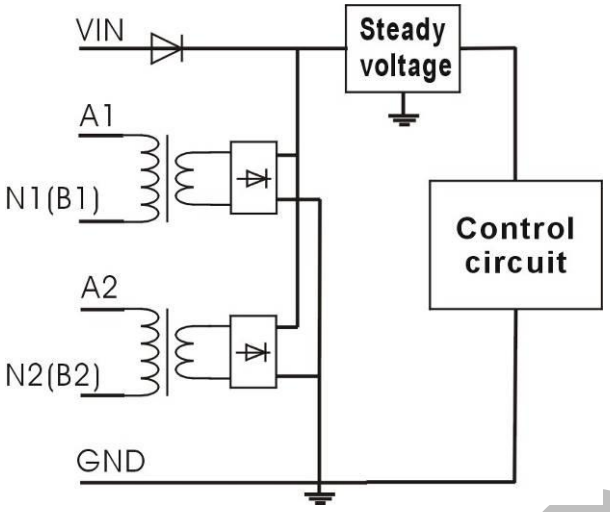
No	Terminal	Description
1	1# close input	It is the input of #1 breaker closing auxiliary contact. It is active to be connect to GND.
2	1# alarm input	It is the input of #1 breaker fault contact. It is active to be connect to GND.
3	2# close input	It is the input of #2 breaker closing auxiliary contact. It is active to be connect to GND.
4	2# alarm input	It is the input of #2 breaker fault contact. It is active to be connect to GND.
5	Vin (8-35)VDC	Engine-generator battery positive input. It is not necessary. Fuse of Max. 1A is Recommended.
6	GND	Engine-generator battery negative input. It is common earth terminal of all switch inputs.
7	N1	Connect to 1# source L1, L2, L3 output. Fuse of 10A is Recommended.
8	C1	
9	B1	
10	A1	
11	N2	Connect to 2# source L1, L2, L3 output. Fuse of 10A is Recommended.
12	C2	
13	B2	
14	A2	
15	IA	Externally Connecting with Secondary Coil of Current Transformer. Current rating 5A
16	IB	
17	IC	
18	Icom	
19	Configurable Digit Input	See above

No	Terminal	Description
20	#1 breaker closed output	#1 breaker closed output. Capacity 250V10A
21		
22	#1 breaker opened output.	#2 breaker opened output. Capacity 250V10A
23		
24	#2 breaker closed output	#1 breaker closed output. Capacity 250V10A
25		
26	#2 breaker opened output	#2 breaker opened output. Capacity 250V10A
27		
28	NO	It is used to supply for ATS. It comes from #1 and #2 power phase N. Any of #1 and #2 phases A voltage is normal it will output.
29	L1O	It is used to supply for ATS. It comes from #1 and #2 power phase A. Any of #1 and #2 phases A voltage is normal it will output. Capacity 250V10A
30	Configurable Digit Output 1	Relay free voltage contacts output. Rated at 10A 250V AC.
31		
32	Configurable Digit Output 2	N/O — Relay free voltage contacts output. Rated at 10A 250V AC.
33		COM
34		N/C
35	L1O	It is used to supply for ATS. It comes from #1 and #2 power phase B. Any of #1 and #2 phase B voltage is normal it will output. Capacity 380V10A
37	L2O	
36	NC	Not connected
38	RS485(GND)	Interconnecting wiring to/ from the HAT500C engine /generator controller communication port shall utilize #22 AWG (min.) 2 conductors, twisted, shielded cable. The drain (shield) wire must be connected at the HAT500C controller end.
39	RS485+	
40	RS485-	

L1O, L2O, NO output logic figure:

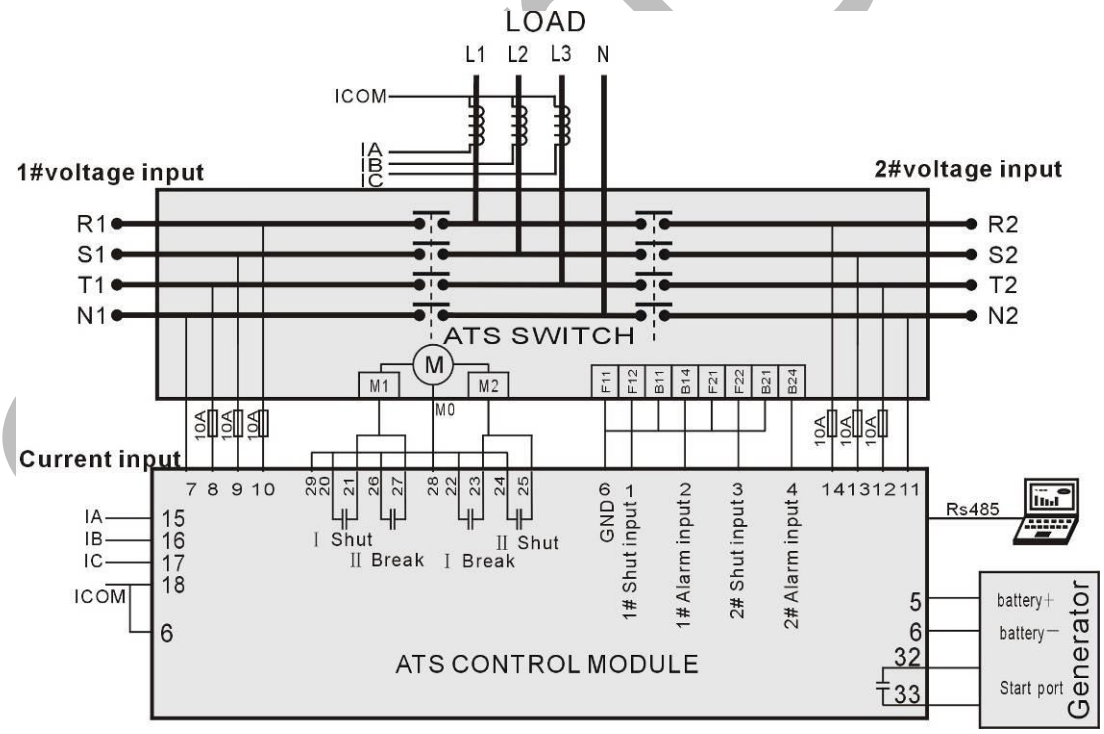


Unit inner supply figure:

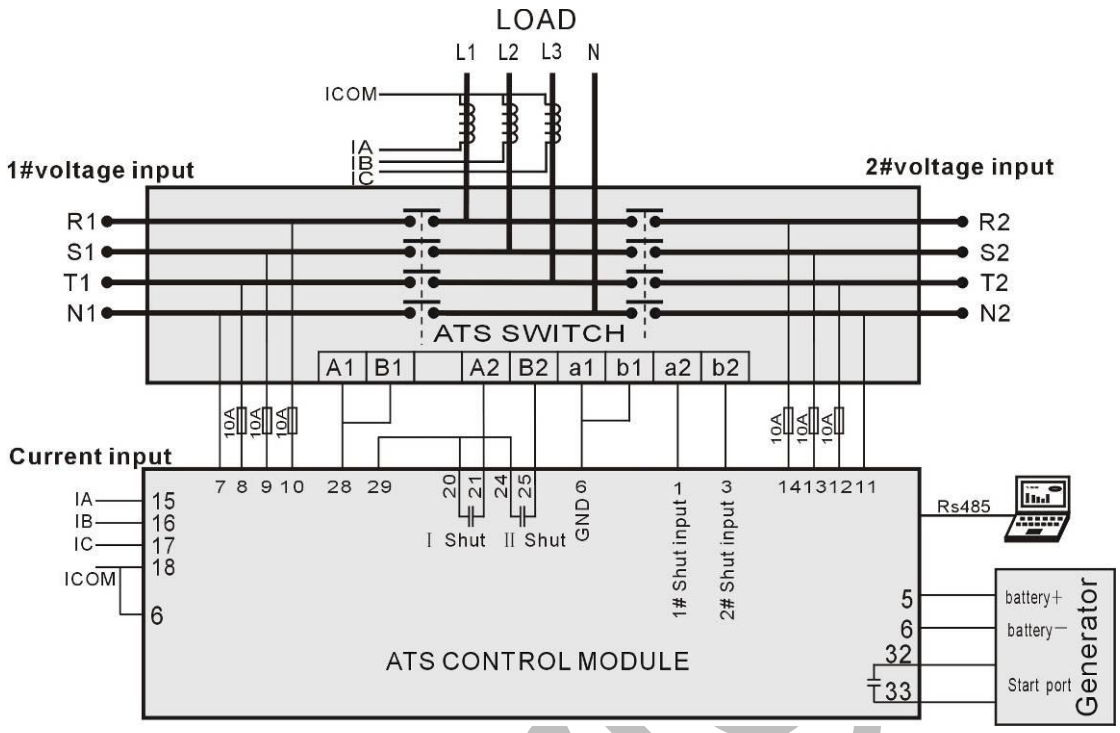


15 TYPICAL WIRING DIAGRAM

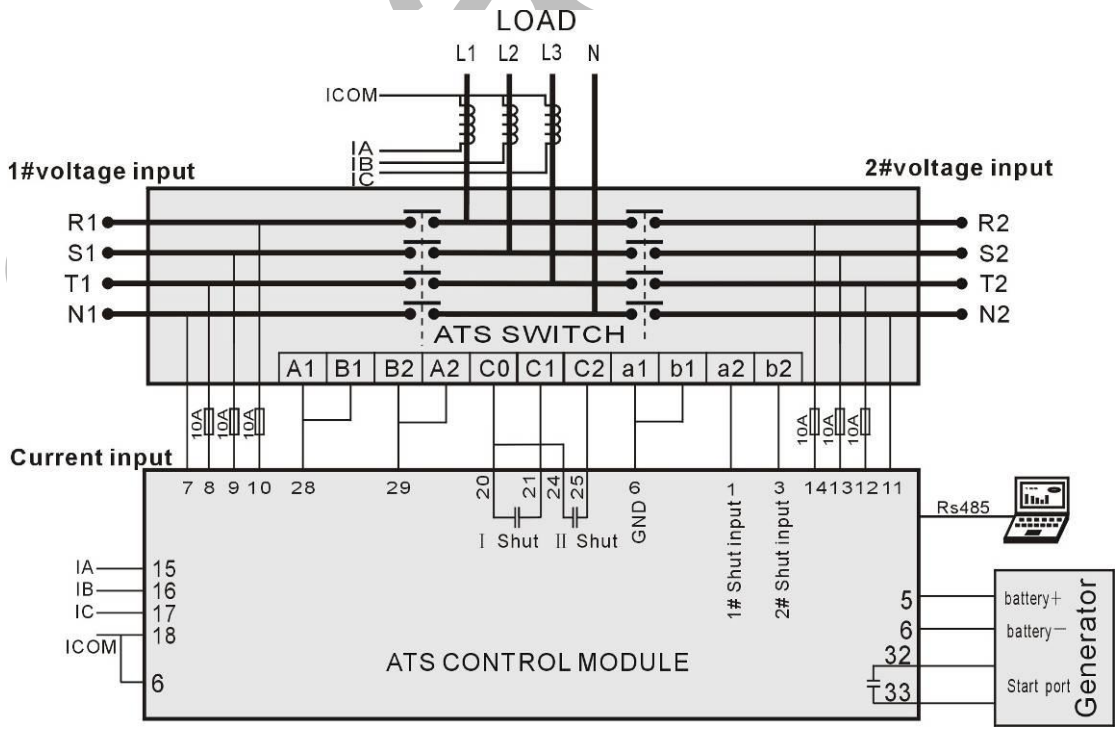
15.1 One motor and two circuit breakers ATS



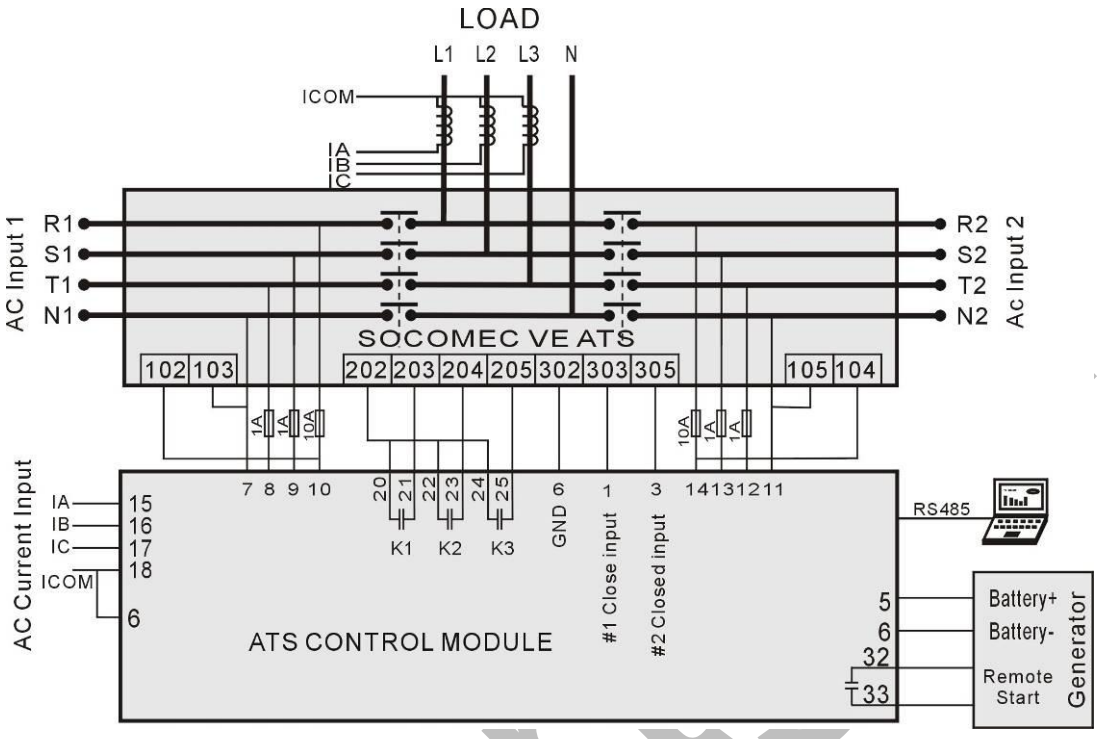
15.2 SGQ-N, T TYPE SWITCH



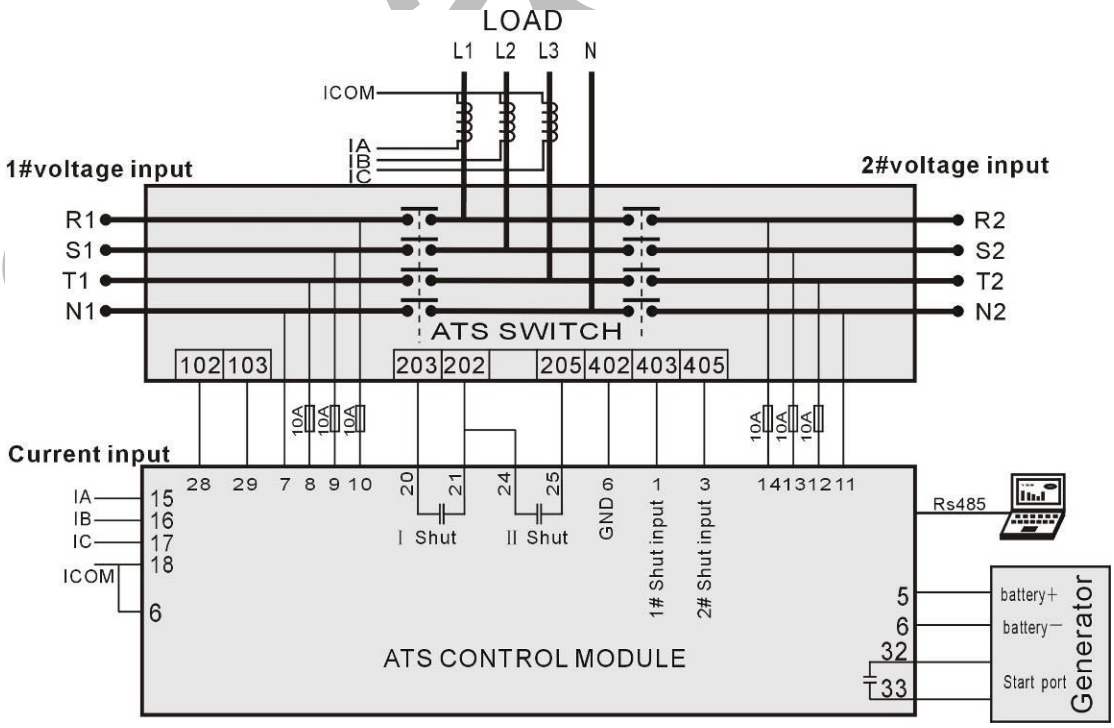
15.3 SGQ-M TYPE SWITCH



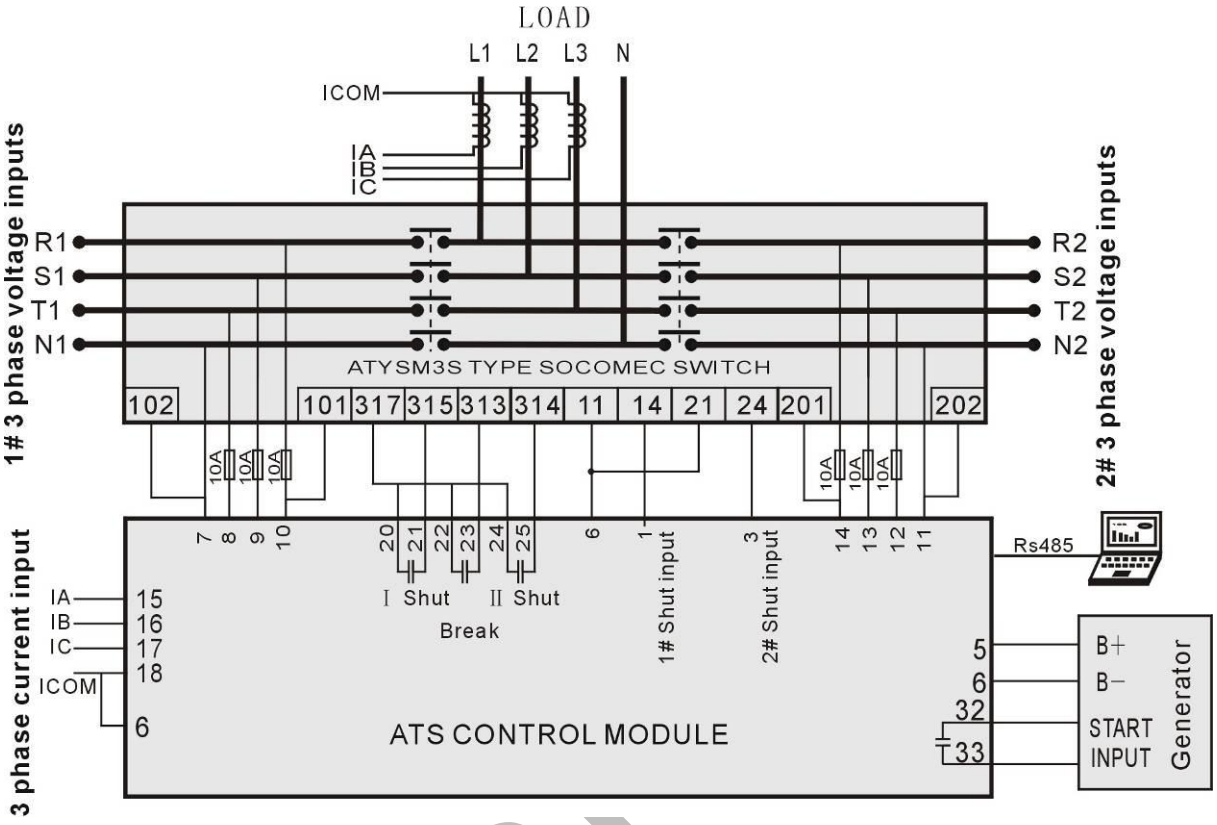
15.4 SOCOMEC-VE SWITCH



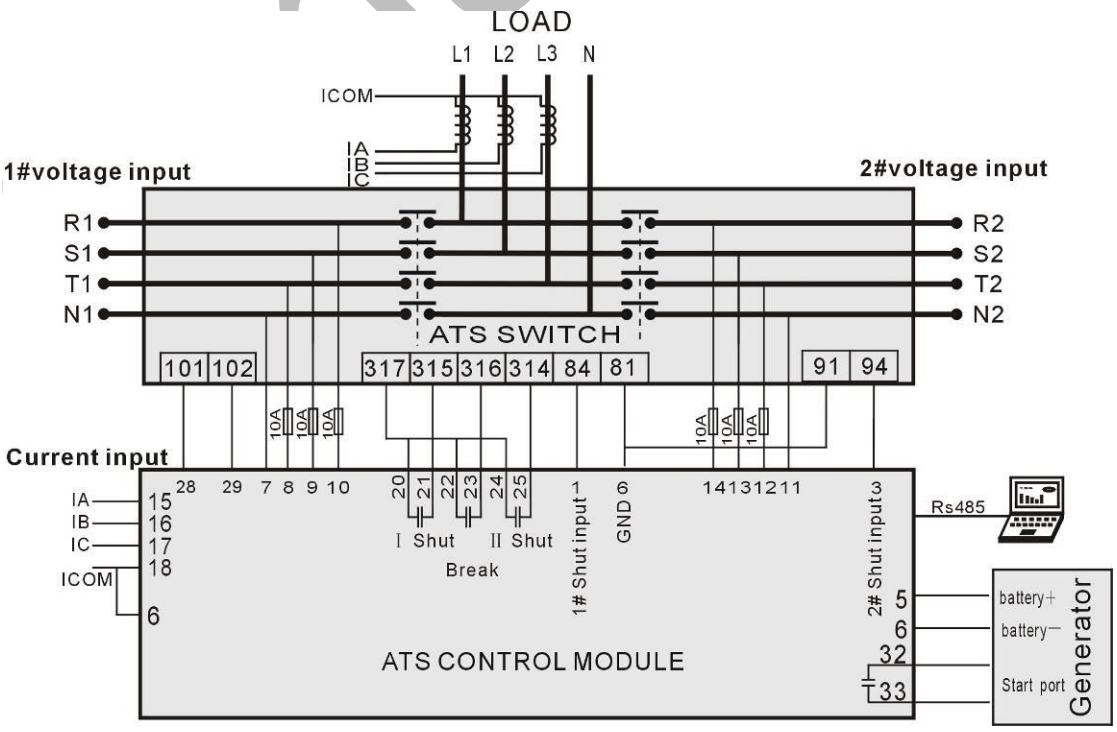
15.5 SOCOMEC-VS SWITCH



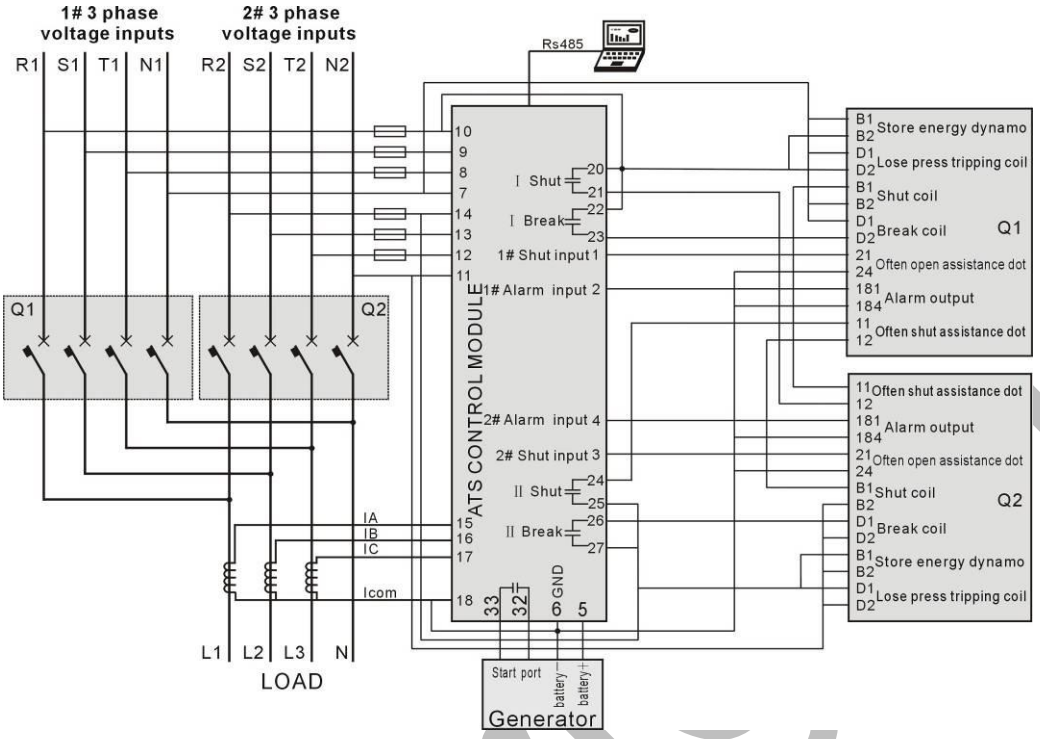
15.6 SOCOMEC-ATYSM3S SOCOMEC SWITCH



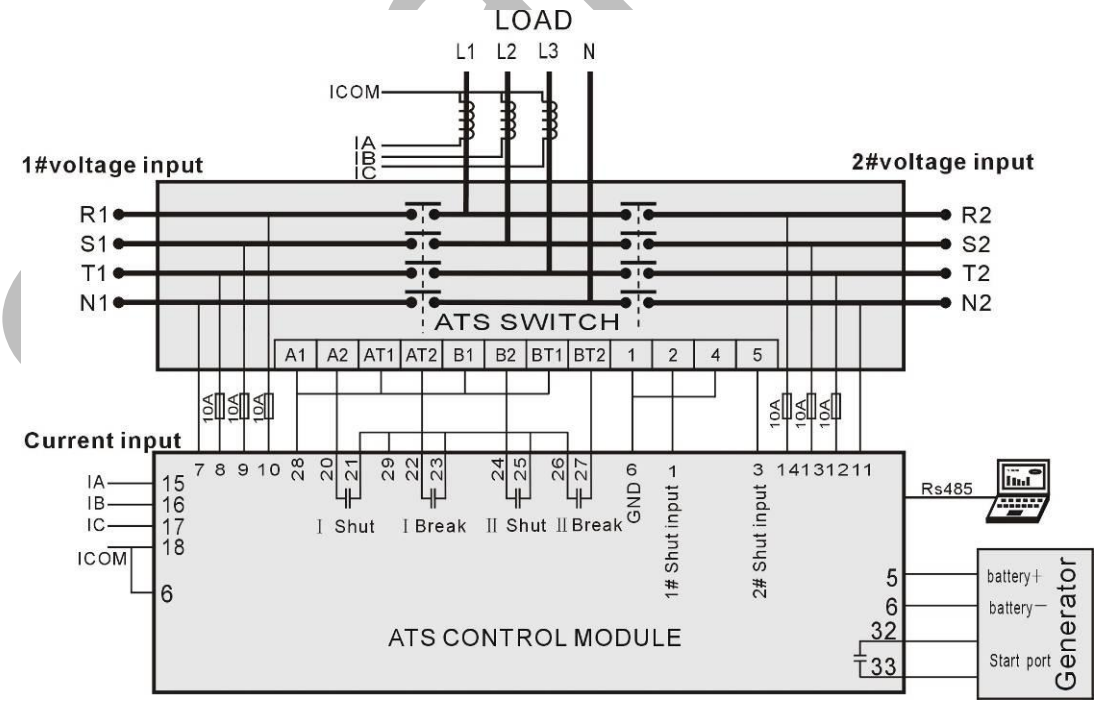
15.7 SOCOMEC-ATYS3 SOCOMEC SWITCH



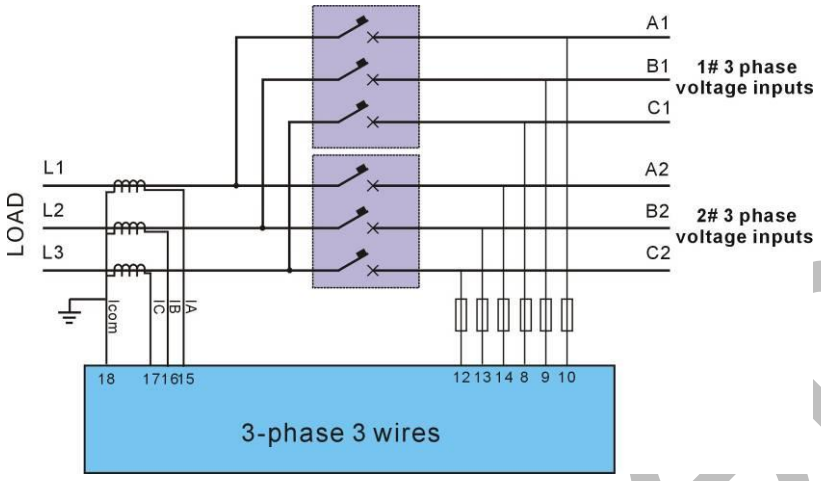
15.8 Frame formula switch



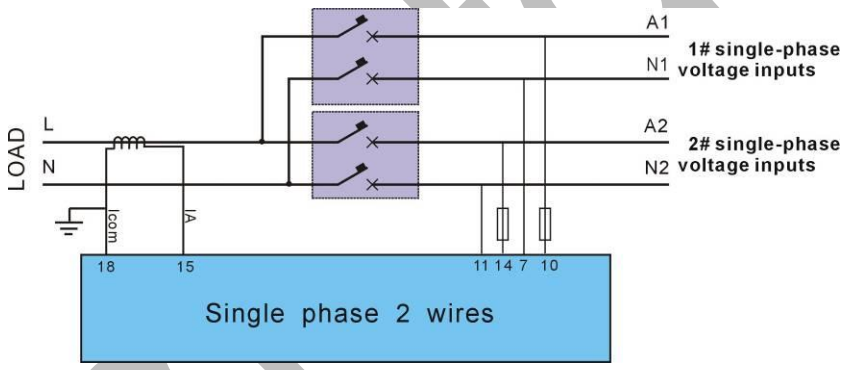
15.9 VITZRO SWITCH



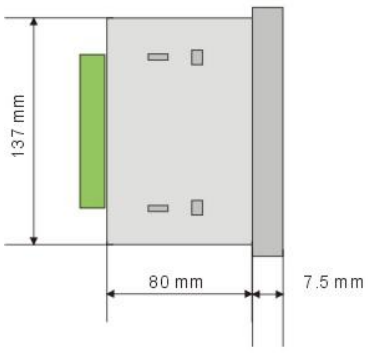
15.10 3-phase 3 wires

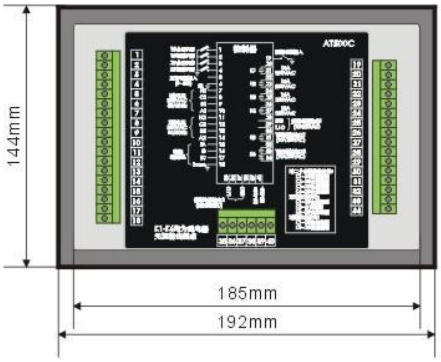


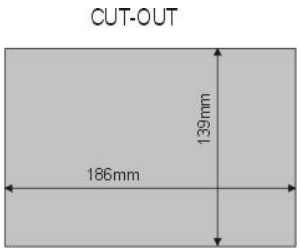
15.11 Single-phase 2 wires



16 INSTALLATION AND DIMENSIONS







17 FAULT FINDING

Fault Symptom	Measures May Be Taken
The controller is not work	Check the Phase A1, N1 or Phase A1, N1 voltage Check connections of the controller Check AC fuse
The module work well but the breaker is not work.	Check connections form the breaker to the module. Transfer the breaker in manual mode. Check the numbers of the OFF position is match between the module setting and the breaker.
Closing failure	Check #1 closed state input Check #2 closed state input
1# or 2# normal lamp is flashing	Check if miss phase Check the setting point of over voltage and under voltage Check the setting point of over frequency and under frequency
Load current is abnormal	Confirm the Icom terminal has been connected with GND terminal.
Generator is not start	Check the condition of start generator. Check the module should work in automatic mode. Check the delay of start generator. Check the input of DC power.
Communication failure	Check the module address.