




# ATS220 ATS CONTROLLER USER MANUAL



## Software Version

No.	Version	Date	Note
1	V1.0	2018-9-1	Original release.
2	V1.1	2019-10-8	The function of phase number selection for generator and mains input is added.

## Symbol Description

Symbol	Description
 Note	Remind operators to operate correctly, otherwise it may cause the equipment not to work correctly.
 Be care	It is indicated that potential hazards can damage equipment without proper precautions.
 Warning	It is indicated if appropriate preventive measures are not taken, potentially dangerous situations may result in death, serious personal injury or significant property losses.



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**Warning**

1. The installation of this equipment must be carried out by professionals.
2. When installing and operating the controller, please read the entire instruction manual first.
3. Any maintenance and commissioning of the equipment must be familiar with all the equipment, safety standards and precautions in advance, otherwise it may cause personal injury or damage to related equipment.
4. The engine must have an overspeed protection device independent of the controller system to avoid casualties or other damage caused by engine out of control.
5. After the installation of the controller is completed, please verify that all protection functions are valid.


**Be Care**

1. Please keep the good connection of the power supply of the controller. Do not share the connection lines of the positive and negative electrodes of the battery with the floating charger.
2. During the operation of the engine, do not disconnect the battery, otherwise it may cause damage to the controller.

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### Notes:

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## Summary

ATS220 is one controller with ATS system of Mains and genset power, which can control the ATS switch by auto or manual mode to apply for mains and gens power. It is with 4 digits LED tube which can display the single-phase gens voltage, gens frequency, mains voltage, mains frequency. ATS switch working status can be also shown by LED.

All the parameters can be set through the front face buttons or PC port.

## Main Features

- ◆ 32 units Micro-procession technology is used.
- ◆ Wide voltage range: 8-36V.
- ◆ 4 digits LED tube which can display mains, voltage, frequency.
- ◆ Totally 7 relay's output, max current is 5A(250VAC).
- ◆ 1 group programmable switch input.
- ◆ Parameters can be set by front face buttons.
- ◆ Standard water-proof rubber, the protection level can reach at IP54;
- ◆ All the connection are installed by European style terminals.
- ◆ Simulated mains function, crank conditions can be chosen.

## Parameters Display

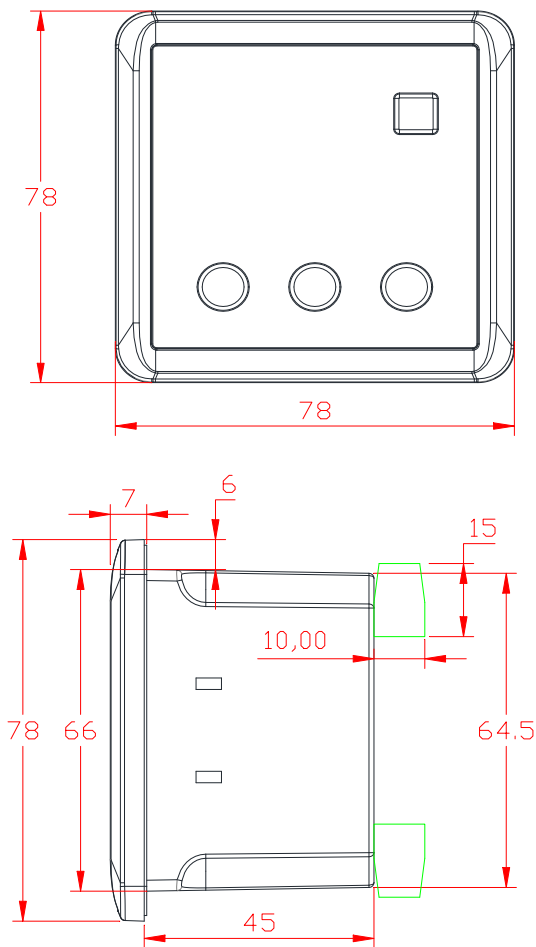
- ◆ Mains phase voltage
- ◆ Mains Frequency
- ◆ Gens phase voltage
- ◆ Gens Frequency

## Parameters

Options	Parameters
Operation Voltage	DC8-36V Continuous
Power Consumption	Standby: 24V: MAX 1W
	Working: 24V: MAX 3W
Mains AC Voltage Input	30VAC-300VAC(ph-N)
Gens AC Voltage Input	30VAC-300VAC(ph-N)
Gens Close Output	5Amp(AC250V) free output
Mains Close Output	5Amp(AC250V) free output
Gen Start Relay	5Amp(AC250V) free output
Switch Value Input	Available if connecting with Battery -
Working Condition	-30-70°C
Storage Condition	-40-85°C
Protection Level	IP54: when waterproof rubber gasket is added between controller and its panel
Overall Dimension	78mm*78mm*55mm
Panel Cutout	67mm*67mm
Weight	0.3Kg

**Overall Dimension and Wiring Diagram**

◆ Overall Dimension:

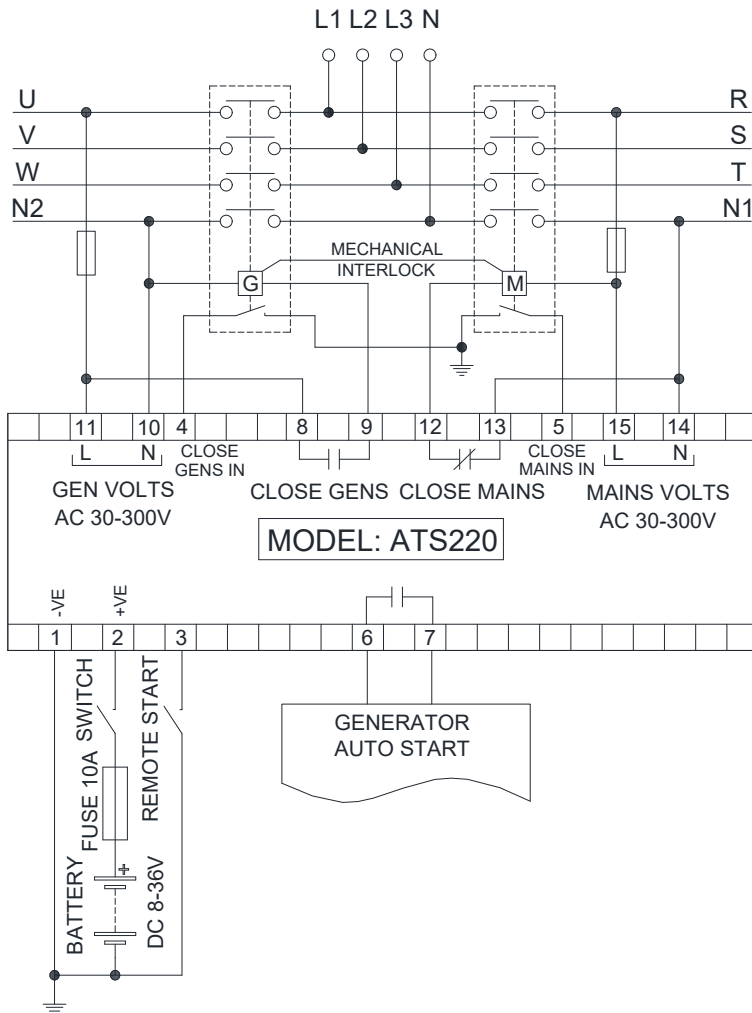


◆ Descriptions of terminal connection

No.	Function	Description	Cable cross sectional area
1	Power Input B-	DC8-36V Continuous.	2.5mm <sup>2</sup>
2	Power Input B+		2.5mm <sup>2</sup>
3	Remote Start Input	Ground connection is active.	1.0mm <sup>2</sup>
4	Close Gens input	Ground connection is active.	1.0mm <sup>2</sup>
5	Close Mains input	Ground connection is active.	1.0mm <sup>2</sup>
6	Gens Start Output	Volts free, Relay contact, Normally	1.0mm <sup>2</sup>
7		Open output, Max5A(250VAC)	1.0mm <sup>2</sup>

8	Gens Close Output	Volts free, Relay contact, Normally Open output, Max5A(250VAC)	1.0mm <sup>2</sup>
9			1.0mm <sup>2</sup>
10	Gens Voltage Input L	Gens voltage Input, AC30-300V	1.0mm <sup>2</sup>
11	Gens Voltage Input N		1.0mm <sup>2</sup>
12	Mains Close Output	Volts free, Relay contact, Normally Open output, Max5A(250VAC)	1.0mm <sup>2</sup>
13			1.0mm <sup>2</sup>
14	Mains Voltage Input L	Mains voltage Input, AC30-300V	1.0mm <sup>2</sup>
15	Mains Voltage Input N		1.0mm <sup>2</sup>

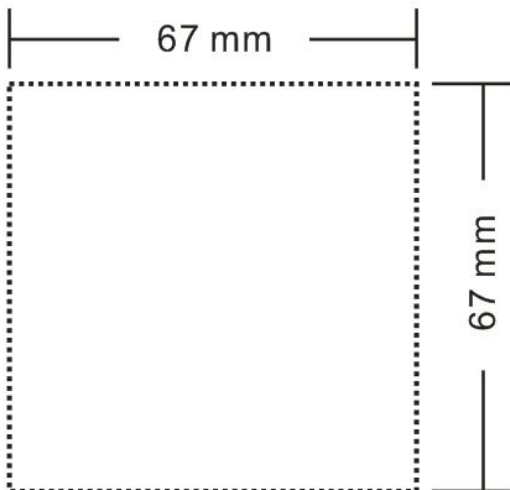
◆ **Typical Wiring Diagram**



**Note:** Please don't move battery during running status or it may cause the controller broken!

**Installation instruction**

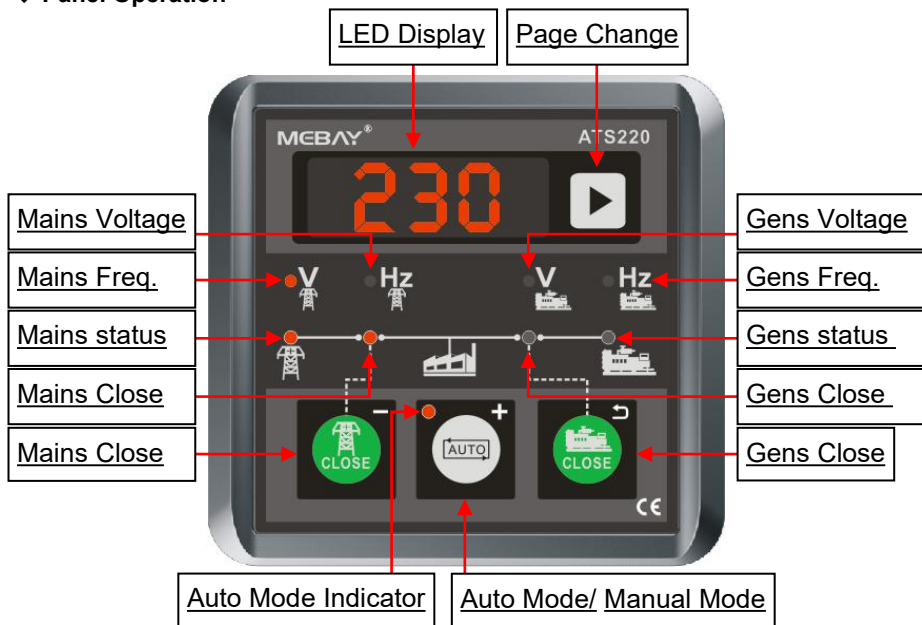
- ◆ The controller should be installed by two accessories and screw.
- ◆ Panel Cutout: W67mm\*H67mm.



**Note:** If the controller is installed directly in the genset shell or other fluctuated equipment, the rubber pad must be installed.

**Panel and display**

◆ **Panel Operation**





### ◆ Panel instruction


Indicator name	Main function
Mains Voltage Indicator	Mains voltage. When the load is switched to the mains supply, the display will display the mains voltage
Mains Frequency Indicator	Mains frequency
Gens Voltage Indicator	Gens voltage. When the load is switched to the gens supply, the display will display the gens voltage
Gens Frequency Indicator	Gens Frequency
Mains status Indicator	LED will be on if the Mains normal and off if Mains off, flash if there is low voltage or high voltage alarm.
Mains Close Indicator	LED will be on if the Mains loading is available.
Gens status Indicator	LED will be on if the Gens normal and off if Gens off, flash if there is low voltage or high voltage alarm.
Gens Close Indicator	LED will be on if the Gens loading is available.
Auto Mode Indicator	LED will be on under auto mode and off under manual mode.

### ◆ Key Function Description

ICON	Button Name	Function Description
	Mains Close Decrease	<ul style="list-style-type: none"> <li>◆ Mains loading shall be output under manual mode if press it.</li> <li>◆ Under display mode, parts of the page can move down.</li> <li>◆ Under edition mode, to move the digit or decrease the numbers, press the button continuously to reduce the number continuously.</li> </ul>
	Auto/manual switching Increase	<ul style="list-style-type: none"> <li>◆ Press it, working under auto mode if LED is on.</li> <li>◆ Press it, working under manual mode if LED is off</li> <li>◆ Under display mode, parts of the page can move up.</li> <li>◆ Under edition mode, to move the digit or increase the numbers, press the button continuously to increase the number continuously..</li> </ul>
	Gens Close Revert	<ul style="list-style-type: none"> <li>◆ Gens loading shall be output under manual mode if press it.</li> <li>◆ Under edition mode, pressing this key can cancel the setting and back to upper class under edition.</li> <li>◆ Under display mode, pressing this key ,Parameters to be saved under value checking page.</li> </ul>
	Page Change Confirm	<ul style="list-style-type: none"> <li>◆ Change the display page.</li> <li>◆ Under display mode, Confirm entering parameter edition mode.</li> <li>◆ Under edition mode, Confirm the change.</li> </ul>


### Control and operation instruction



#### ◆ Mode change

Manual and Auto modes are available for this controller, press  to switch; when the LED is lighted like this , it means working under auto mode.


When the LED is lighted like this , it means working under Manual mode,

◆ **Manual Mode**

When press  and indicator is off, then it means working under Manual mode.

Under manual mode, Mains loading shall be output under manual mode if press . Gens loading shall be output under manual mode if press . There is no output for genset crank relay.

◆ **Auto crank mode**


When press  and indicator is on, then it means working under Auto mode. Under Auto Mode:

When the Mains becomes abnormal (power shortage, over voltage, under voltage), then “Mains abnormal delay” starts, “Gens Start Delay” shall also start if the Mains is still abnormal after the delay, then Gens relay output shall be closed and start to crank. When the gens voltage becomes normal, “Gens normal delay” starts. The ATS switch will transfer to Gens when the Gens loading output closed after “Transfer interval delay”.

When the Mains becomes normal, then “Mains normal delay” starts, Gens loading relay is off, the ATS switch transfer to Mains when the Mains loading is closed after “Transfer interval delay” .

When the Mains is normal, then “Gens Stop Delay” starts, the genset shall be stop after gens crank relay is off after delay.



 **Note: the default mode is Manual mode, Auto indicator is off.**










 **Warning: please make sure that the controller is under manual mode if you are going to maintain the equipment in order to avoid any accidents.**

**Parameters setting**



◆ **Edition Page**

Please operate as below steps:

1. Press  and  simultaneously, then loose, Then system comes into menu setting.

2. Under display mode, Press to  shift down the parameters, press  to shift up the parameters, press to get into parameter changing page.
3. Under display mode, press  to get into parameter changing page. this option's last digit become flashed, then it means entering the edition page.
4. Under edition mode, Press  to add number, press  to reduce number, press  to cancel. The value can be increased or decreased continuously when pressing the button continuously.
5. After correction, Press  to confirm the value modification, this option's last digit become flashed, then it comes into display mode.
6. Under edition mode, press  to cancel correction and revert back to display mode.
7. Under display mode, press  to exit and save data.

 **Note:** Please press  and  on the mean time, then press  in order to make all the parameters to be default status.

 **Note:** the data can not be saved if the user didn't press  to confirm the setting.

 **Warning:** it will be valid once setting ok, please take care safety.

◆ **Parameter setting**

No.	Parameter	Range(default)	Notes
0	Mains Normal Delay	0-6500s(10s)	It is the delay of Mains from voltage abnormal to voltage normal.
1	Mains Abnormal Delay	0-6500s(5s)	It is the delay of Mains from voltage normal to voltage abnormal.
2	Gens Normal Delay	0-6500s(10s)	It is the delay of Gens from voltage abnormal to voltage normal.
3	Gens Start Delay	0-6500s(1s)	When Mains voltage is abnormal, start delay begins; start signal is initiated after the delay has expired.

4	Gens Stop Delay	0-6500s( <b>5s</b> )	When starting, if the Mains voltage is normal, stop delay begins; stop signal is initiated after the delay has expired.
5	Close Delay	1.0-10.0s( <b>10.0s</b> )	Closing relay output pulse. If set as 10S, it is continuous output.
6	Transfer interval delay	0-3600.0s( <b>1.0s</b> )	It is the interval time for Mains loading to Gens or Gens loading to Mains when the setting is loading continuously.
7	Exceed Transfer	0-20s( <b>20s</b> )	It is the extra output delay of the close relay after the closing signal has received. If the parameter is 20s, the relay will continue to output.
8	Mains under voltage	55-330V( <b>184V</b> )	if the Mains voltage is lower than “Mains under voltage”and during“Mains Abnormal Delay”still lower than “Mains under voltage”after delay, then it regards as Mains abnormal.if during “Mains Abnormal Delay”,the mains voltage up is higher than “Mains Revert under voltage”,then it is regards as Mains normal.
9	Mains Revert under voltage	55-330V( <b>207V</b> )	
10	Mains over voltage	55-330V( <b>276V</b> )	If the Mains voltage is higher than “Mains over voltage”and during“Mains Abnormal Delay”still higher than “Mains over voltage”after delay, then it regards as Mains abnormal.If during “Mains Abnormal Delay”,the Mains voltage down is lower than “Mains Revert over voltage”,then it is regards as Mains normal.
11	Mains Revert over voltage	55-330V( <b>253V</b> )	
12	Gens Over Frequency	40-80.0Hz ( <b>57.0Hz</b> )	Gens frequency upper limit, it is abnormal when the gens frequency has exceed the set value.
13	Gens Under Frequency	0-70.0Hz ( <b>40.0Hz</b> )	Gens frequency lower limit, it is normal when the gens frequency has exceed the set value.
14	Gens Over voltage	0-360V( <b>264V</b> )	Gens voltage upper limit,it is normal when the gens voltage has fallen below the set value.
15	Gens Under voltage	0-360V( <b>192V</b> )	Gens voltage lower limit,it is abnormal when the gens voltage has fallen below the set value.
16	Close Input Enable	<b>0- Disable</b> 1- Enable	When the loading input starts, the status will be shown by the indicator on the panel according to the input parameter,or it will be lighted by the Mains or Gens loading relay outputs.
17	Remote Start Input Type	<b>0-Remote Start Is On load</b> 1-Remote Start Is	Remote Start Is On load: The generator will start, and the load transferred to the generator when the remote start is active.

		Off load 2-Simulated mains	Remote Start Is Off load: The generator will start and run off load when the remote start input is active. Simulated mains: If the input is active the generator will not start in the event of a mains failure.
18	Gens Phase	<b>0-1 Phase 2 Wire</b> 1-2 Phase 3 Wire 2-3 Phase 3 Wire	Select the generation input to calculate the voltage display. 1 phase 2 line: display L-N; 2-phase 3-line: display L-L; 3-phase 4-line: display L-L.
19	Mains Phase	<b>0-1 Phase 2 Wire</b> 1-2 Phase 3 Wire 2-3 Phase 3 Wire	Select the mains input to calculate the voltage display. 1 phase 2 line: display L-N; 2-phase 3-line: display L-L; 3-phase 4-line: display L-L.

### Fault finding

Symptoms	Possible Solutions
Controller no response with power	Check DC voltage. Check DC fuse. check if the terminal 1 and 2 is with battery voltage.
Genset running while ATS not transfer	Check ATS. Check the connection wirings between the controller and the ATS. Check the control delay parameters
Genset Start Abnormal	Check the connection of auto start control port between controller and genset. Check if the remote control is normal. Check if the relative delay setting is normal.