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Thank you very much for your selecting our products. In order to insure your correct operation, please read this Manual carefully before installation, connection, operation and maintenance.

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Notes for open the package and examination

When receiving the automatic transfer switch, please open the package and exam the following:

a. Check the shape whether there is something wrong in transportation, eg. frame destroyed.

b. Check whether the nameplate, type, model, and date is in good sound.

c. Please check whether the accessory mentioned in the Manual is included or not, besides the switch, Manual, and certificate.

The Shape and Each Parts of the Product

The Usual Tools for Mounting and Connection

- Cross screwdriver
- Open ended spanner
- Inner-hexagon screw
- Box spanner
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NOTICE

⚠️ Warning

- Please mount it on the antiflaming item, as metal.
- It is forbidden to mount in the medium which is explosive.
- Don’t mount it in the moist place.

⚠️ ATTENTION

- It should not be mounted in place which the outside magnetic field is more 5 times than the earth magnetic field, or else the switch will not work normally.
- It should not be mounted in the place which the vibration is higher than 5g.
- Working in the medium which no enough gas medium to corrode metal and damage insulation.
1. ambient air humidity: +40℃ ---- -5℃, average value in 24h not over +35℃.
2. Not over altitude 2000m.
3. Relative humidity is up to 50% at +40℃, it may have higher relative humidity under lower temperature; the max humid month of average lowest humidity not over +25℃, the average monthly max relative humidity not over 90%, and consider the temperature caused the fixation dew on the product face.
4. Pollution degree: class III.

Replacing notice for related parts

- If the customers need the internal or external accessories, they should follow the type, which is offered by our company, to insure the qualified safety. Otherwise, the customers choose them by themselves, and induce any problems, as quality or safety, our company have no responsibility.
Matter of concern before using

Fast Selection Table

<table>
<thead>
<tr>
<th>NQ2</th>
<th>M2</th>
<th>/</th>
<th>TH</th>
<th>AC220</th>
<th>63A</th>
<th>L</th>
<th>Switch mode</th>
<th>Control mode</th>
<th>Mounting mode</th>
<th>Other accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>125</td>
<td>M2</td>
<td>/</td>
<td>3</td>
<td>TH</td>
<td>63A</td>
<td>L</td>
<td>Switch mode</td>
<td>Control mode</td>
<td>Mounting mode</td>
<td>Other accessories</td>
</tr>
<tr>
<td>125</td>
<td>Frame degree current: 63,125,250,500,800,1000,1250,1600,2000,3150,4000,5000A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2</td>
<td>Type: M2 I (see notice 1), M2 II (see notice 2), M3 I (see notice 3), M3 II (see notice 4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Poles: 2p, 3p, 4p</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AC220</td>
<td>Rated control voltage: (notice: these three need custom-made)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>63A</td>
<td>Rated working current: 20, 32, 40, 63, 80, 100, 125, 60, 200, 225, 250, 350, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 3150, 4000, 5000A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>Series controller: no code if no controller; L: internal controller; E: LED economic controller, C: LCD dynamic display controller</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch mode</td>
<td>Control mode: NB (power network --- power network), NG (power network --- generator)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control mode</td>
<td>Control mode: R (self-propelled self-reset) O (self-propelled, no self-reset)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting mode</td>
<td>Mounting way: F (wiring of front panel) B (wiring of back panel)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other accessories</td>
<td>Accessories: protect cover up from 630A, using specification, product qualify, credit, manual control handhold.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks:

1. Type M2 I automatic transfer switch is instantaneous switch (no external or internal controller). You can use the manual handle to transfer the switch, when it is in the condition of examining or breakage, but needs to supply the power continuously. In this way you can look into the transfer motion, and get the main reason of malfunction.

2. Type M2 II automatic transfer switch which has the internal controller or LED external controller, has the relay test function of transfer, automatic or manual transfer, far distance start or stop generator, indicate two lines input voltage (in time). You can use the manual handle to transfer the switch, when it is in the condition of examining or breakage, but needs to supply the power continuously. In this way you can look into the transfer motion, and get the main reason of malfunction.

3. Type M3 I automatic transfer switch adopts three steps basic mechanism structure. It is made and followed the theory of two steps transfer. If it is automatic, the middle position will stop shortly. You can use manual operation to control OFF position, when the switch without power. You can also use manual handle to transfer the switch, when it is in the condition of examining or breakage, but needs to supply the power continuously. In this way you can look into the transfer motion, and get the main reason of malfunction.

4. Type M3 II automatic transfer switch is composed by three-position basic body (LED controller, LCD controller). It has the function of transfer between automatic and manual, test transfer of power A and power B, solving the malfunction automatically and far distance start or stop generator. It has external protective interface, which can contact over-current relay, and have over-current protection. It also has communication interface, which can far distance watch the working condition of the controller. It can indicate each voltage in every step. It is a high capability intelligent controller. You can use manual operation to control OFF position, when the switch without power. You can also use manual handle to transfer the switch, when it is in the condition of examining or breakage, but needs to supply the power continuously. In this way you can look into the transfer motion, and get the main reason of malfunction.
# Matter of concern before using

## Main technical characteristics

<table>
<thead>
<tr>
<th>Type</th>
<th>M3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>AC400V/690V</td>
</tr>
<tr>
<td>Rated current</td>
<td>20A - 63A</td>
</tr>
<tr>
<td>Put in NO.</td>
<td>dual put in</td>
</tr>
<tr>
<td>Wiring way</td>
<td>front panel wiring</td>
</tr>
<tr>
<td>Poles</td>
<td>2P</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>4.5</td>
</tr>
<tr>
<td>Operating current</td>
<td>DC100V</td>
</tr>
<tr>
<td>AC100V/110V</td>
<td>3</td>
</tr>
<tr>
<td>AC200V/220V</td>
<td>1.5</td>
</tr>
<tr>
<td>Tripping current</td>
<td>DC100V</td>
</tr>
<tr>
<td>AC100V/110V</td>
<td>1A</td>
</tr>
<tr>
<td>AC200V/220V</td>
<td>0.5A</td>
</tr>
<tr>
<td>Short circuit endurable current</td>
<td>5kA</td>
</tr>
<tr>
<td>Rated limit short circuit current</td>
<td>12.5kA</td>
</tr>
<tr>
<td>Connection disconnection ability</td>
<td>AC-33B (10le connection · 8le disconnection) cosφ=0.35 DC-33B l.1leconnection · l.1le disconnectionL/R=1ms</td>
</tr>
<tr>
<td>Switchover time</td>
<td>A power side</td>
</tr>
<tr>
<td>Disconnection</td>
<td>20ms</td>
</tr>
<tr>
<td>Power B side</td>
<td>Put in</td>
</tr>
<tr>
<td>Disconnection</td>
<td>20ms</td>
</tr>
<tr>
<td>Life service</td>
<td>Electric life 2500times, Mechanical life 10000times</td>
</tr>
<tr>
<td>Operation cycle times</td>
<td>120times/M</td>
</tr>
<tr>
<td>Auxiliary switch</td>
<td>A power side IC, B power side IC</td>
</tr>
<tr>
<td>Switch capacity</td>
<td>AC 100V 5A AL 200V 2.5A DC100V 0.5A</td>
</tr>
<tr>
<td>Accessories</td>
<td>Protect cover, Break through absorber, Manual control handhold</td>
</tr>
</tbody>
</table>

**NOTES:** DC current operation situation, the structure of loop is same, only a little part is different. Please operate following DC current operation indication.
### Main technical characteristics

<table>
<thead>
<tr>
<th>Model</th>
<th>AC400V/690V</th>
<th>DC125V/250V</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1000A</td>
<td>1250A</td>
</tr>
<tr>
<td></td>
<td>dual put in</td>
<td></td>
</tr>
<tr>
<td></td>
<td>back panel wiring</td>
<td></td>
</tr>
<tr>
<td>2P</td>
<td>3P</td>
<td>4P</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2A</td>
<td>4A</td>
<td></td>
</tr>
<tr>
<td>2A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22kA</td>
<td>25kA</td>
<td>35kA</td>
</tr>
<tr>
<td>115ms</td>
<td>115ms</td>
<td>180ms</td>
</tr>
<tr>
<td>145ms</td>
<td>150ms</td>
<td>220ms</td>
</tr>
<tr>
<td>25ms</td>
<td>25ms</td>
<td>25ms</td>
</tr>
<tr>
<td>Electric life 2000times, Mechanical life 8000times</td>
<td>Electric life 2000times, Mechanical life 8000times</td>
<td></td>
</tr>
<tr>
<td>(120times/M)</td>
<td>(30times/M)</td>
<td></td>
</tr>
<tr>
<td>A power side IC, B power side IC</td>
<td>Switch capacity AC 100V 5A AL 200V 2.5A DC100V 0.5A</td>
<td></td>
</tr>
<tr>
<td>Protect cover</td>
<td>Break through absorber</td>
<td>Manual control handhold.</td>
</tr>
</tbody>
</table>
## Matter of concern before using

### Main technical characteristics

<table>
<thead>
<tr>
<th>Type</th>
<th>M2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>AC400V/690V DC125V/250V</td>
</tr>
<tr>
<td>Rated current</td>
<td>20A-63A 100A-125A 160-250A</td>
</tr>
<tr>
<td>Put in NO.</td>
<td>dual put in</td>
</tr>
<tr>
<td>Wiring way</td>
<td>back panel wiring</td>
</tr>
<tr>
<td>Poles</td>
<td>2P 3P 4P 2P 3P 4P 2P 3P 4P</td>
</tr>
<tr>
<td>Weight(kg)</td>
<td>4.5kg 5kg 5.5kg 5kg 5.5kg 6kg 6kg 8kg 10kg</td>
</tr>
<tr>
<td>Operating current</td>
<td>DC100V AC100V/110V AC200V/220V</td>
</tr>
<tr>
<td></td>
<td>3A 3A 4A 3A 4A 3A 4A 5A</td>
</tr>
<tr>
<td></td>
<td>3A 3A 4A 3A 4A 3A 4A 5A</td>
</tr>
<tr>
<td></td>
<td>1.5A 1.5A 2A 1.5 1.5A 2A 1.5 2A 2.5A</td>
</tr>
<tr>
<td>Short circuit endurable current</td>
<td>5kA 10kA</td>
</tr>
<tr>
<td>Rated limit short circuit current</td>
<td>12.5kA 25kA</td>
</tr>
<tr>
<td>Connection disconnection ability</td>
<td>AC-33B(10le connection · 8le disconnection) cosø=0.35 DC-33B l.lleconnection · l.lle disconnectionL/R=1ms</td>
</tr>
<tr>
<td>Switchover time</td>
<td>A power side Power B side</td>
</tr>
<tr>
<td></td>
<td>Put in Disconnection Put in Disconnection</td>
</tr>
<tr>
<td></td>
<td>55ms 20ms 80ms 20ms</td>
</tr>
<tr>
<td></td>
<td>55ms 20ms 80ms 20ms</td>
</tr>
<tr>
<td>Life service</td>
<td>Electric life 2500times, Mechanical life 10000times</td>
</tr>
<tr>
<td>Operation cycle times</td>
<td>120times/M</td>
</tr>
<tr>
<td>Auxiliary switch</td>
<td>A power side IC, B power side IC Switch capacity AC 100V 5A AL 200V 2.5A DC100V 0.5A</td>
</tr>
<tr>
<td>Accessories</td>
<td>Protect cover, Break through absorber, Manual control handhold.</td>
</tr>
</tbody>
</table>

Notice: DC operation situation, the structure of loop is same, only a little part is different, please operate following the DC operation instruction. Two-position type is economic type, and it is general used type.

1. 80-125A current grade overall dimension is the same as M3
2. 160-250A current grade overall dimension is the same as M3
3. 350-500A current grade overall dimension is the same as M3.
Safety Consideration in Working

To avoid high temperature, high moist or mephitis (combustion gas).

The motion of put in and trip should finish in 0.3 seconds. To insure the safety and the motion finish exactly, the control injunction should be keeping up from 0.5 seconds.

If the injunction of put in and trip are sent to the same side power, the loop will have excitation, so please avoid that.

To avoid manual operation, use motor operation. Please refer to the method of P8 for the manual operation.

In the DC operation, if the power has not stop down circuit(DROPER), please don’t connect the power with the output side of step down circuit, but should in the input side.

Please keep propriety abundant for operation power, operation lead and so on. Please pay attention to the capacity of the accumulator in the DC operation.

In the M3100-M3400 DC operation, connect the operated terminal A1 B1 with +(P)pole; A2 B2 with —(N) pole.

Please contact with us, if it has special standard or condition.
Safety Consideration in Working

Manual Operation Methods and Attentions

MAC-DT can guarantee the switch performance of electric-drive operation, but the difference between strength, speed of the switch. When the hand-operated switches do the load switching, the contacts may be consumed and dissolved etc. If need artificial manual operation and please implement under the following condition, please avoid hand operating in other occasions.

1. When there is no operation power at all.
2. When inspect the operating mechanism and contact part, there is no load.
3. Damages happened and cannot action.

Notes: when artificial hand operating, the operating power has to cut off the power.

- **M2 artificial trip methods**  Put in method of A B power sides

  - Insert the front nick of manual handhold into the left operating axis.
  - Pull down the handhold and that can throw in.
  - Visual inspect ON/OFF indicator to confirm throw-in.

  Please take down the operating handhold after operating.

- **M3 hand-operated methods**  Artificial trip methods

  - Taking off the hand-operated handhold, insert the screwdriver into the left side TRIP hole and press inside, and then the switch will trip. (Please confirmed by the ON/OFF indicator if the switch is trip.)

- **M3 hand-operated methods**  A power side thrower-in methods

  - Insert the front nick of manual handhold into the left operating axis.
  - Pull up the handhold and that can throw in.
  - Visual inspect ON/OFF indicator to confirm throw-in.

  Please take down the operating handhold after operating.

- **M3 hand-operated methods**  B power side thrower-in methods

  - Insert the front nick of manual handhold into the left operating axis.
  - Insert the screwdriver into the right SELECT hole and press inside.
  - Keep the screwdriver in the position that press on and pull up the hand-operated handhold at the same time. That can throw in B-side switch.

  Visual inspect ON/OFF indicator to confirm: throw-in. please take down the operating handhold after operating.
Safety Consideration in Working

M3-type inside circuit diagram and switching application wiring diagram.

Notice:
1. Type M2/M3 LED external controller, has aero-pin.
   a. SET: has code 1,2,3D, they can set A low-voltage (high voltage), B low voltage/high voltage, OFF-A, OFF-B, B-OFF, generator stop, the delay of A error, B error and generator starting clock for parameter.
   b. DOWN/UP: it has the function of plus or minus in setting. AUTO/MAN: transfer between automatic and manual; in the manual state, press the button for 3 seconds and in reference voltage of power A and power B R,T,S phase (indicate by the each code).
   c. STOP: cut off the power A and power B, transfer to OFF position, and it is in the wait state.
   d. AON: Under the manual state, push “AON” button and Power A input. Under the automatic and stop mode, push “AON” button, then it will indicate the phase R S T voltage of Power A.
   e. BON: Under the manual state, push “BON” button and Power B input. Under the automatic and stop mode, push “BON” button, then it will indicate the phase R S T voltage of Power B.
2. A B auxiliary contact can be used in connecting the signal of indicate, alarm or feedback, and that depends on the customer. The exactly using specification is in the ATS M3 external LCD controller.
3. When there is something not coincident between the test voltage and factual voltage, please carry on the setting operating for the reference voltage under the manual state.
Safety Consideration in Working

M2 (two-position) type inside diagram and switching application wiring diagram

- XB1, XB2 = internal control switch
- XA1, XA2 = internal control switch
- C = Throw in coil
- S1 = rectifier
- AUX = Auxiliary switch
- AT1–AT2 = A power side tripping terminal
- BT1–BT2 = B power side tripping terminal

Notice: A1, B1 (put in signal import by power A, AC220V)
A2, B2 (put in signal import by power B, AC220V)

Notice: A B auxiliary contact can be used in connecting the signal of indicate, alarm or feedback, and that depends on the customer.
Notice:

1. (introduction for each function button)
   - **SET**: it can set the delay of A-B, B-A, and stopping generator
   - **DOWN**: you can set minus, and it can indicate B voltage when it is automatic, and it can transfer into B power by manual.
   - **UP**: you can set plus, and it can indicate A voltage when it is automatic, and it can transfer into A power by manual.
   - **B-A**: auto/man transfer (LED indicate twinkle that means it is in the manual state)
     At the same time, press the SET and B-A, reference voltage of A B power can be set. (LED indicate U-A U-B)

2. **A1 A2** (put in signal import by power A, AC220V)
   **B1 B2** (put in signal import by power B, AC220V)
   **G1 G2** (generator contact)
   Auxiliary contacts A B can be used in connecting the signal of indicate, alarm or feedback, and that depends on the customer.
Safety Consideration in Working

Introduction of M3 LCD external controller function

- Function introduction:
  1. This panel is NQ2-M3 type (three steps) controller.
  2. This controller can test the input voltage for two sets of three phases and four lines, and also can test the over-voltage, under-voltage and phase failure. It can deal with the malfunction automatically. The controller has the function of alarm and starting the generator automatically.
  3. Manage the transfer between Set A and Set B for power supply.
  4. It can automatically control the system distant ATS controller, because of the communication port.
  5. It is a high quality intelligent controller, which can set different kinds of parameter, and come down to large area.

- Button Layout (From left to right):
  SET  DOWN  UP  AUTO/MAN  STOP  A-ON  B-ON

- The specification of the parameter and setting
  Button “SET” parameter specification: (push button “SET” for 3 seconds and enter the setting state.)
  1. CODE 1: A low voltage range 160-210V, initial-value: 180V
  2. CODE 2: A high voltage range 230-400V, initial-value: 250V
  3. CODE 3: B low voltage range 160-210V, initial-value: 180V
  4. CODE 4: B high voltage range 230-400V, initial-value: 250V
  5. CODE 5: OFF-A, delay range: 0-999s, initial value: 10s
  6. CODE 6: OFF-B, delay range: 0-999s, initial value: 10s
  7. CODE 7: B-OFF, delay range: 0-999s, initial value: 10s
  8. CODE 8: Generator stop delay range: 0-999s, initial value: 10s
  9. CODE 9: Unnatural delay range: 0-999s, initial value: 0s
  10. CODE C: Unnatural delay range: 0-999s, initial value: 0s
  11. CODE D: Start generator clock range: 0-999s, initial value: 20s

When Set A voltage isn’t natural, and start Set B and put it into working. If the Set B in the setting range, but it can not put in, as the generator can’t start, then there will be four alarm hints (the generator has malfunction)

Start process:

  The first time: CODE D in the inverse clock, and start Power B. But if it is failure, then it will be enter the second start in 10s.
  The second time: CODE D in the inverse clock, and start Power B. But if it is failure, then it will be enter the third start in 10s.
  The third time: CODE D in the inverse clock, and start Power B. But if it is failure, then it will be enter the forth start in 10s.
  The forth time: CODE D in the inverse clock, and start Power B. But if it is failure, and start alarm indicate wrong code E-G, which indicate the generator malfunction.

12. After CODE D, push the “SET” button, and store the parameter into the EEPROM.

- DOWN/UP button:
  These two buttons only use in the setting state, and have the function of adding and reducing.

- AUTO/MAN button:
Safety Consideration in Working

This is the button of transfer between automatic and manual, and it is shown in the LCD. Under the manual state:

Push the “MAN” button for 3 seconds, and enter the set reference voltage, they are:
1. Power A, R phase reference voltage, CODE A, show R, range is 160-250V, initial voltage: 220V.
2. Power A, S phase reference voltage, CODE A, show S, range is 160-250V, initial voltage: 220V.
3. Power A, T phase reference voltage, CODE A, show T, range is 160-250V, initial voltage: 220V.
4. Power B, R phase reference voltage, CODE B, show R, range is 160-250V, initial voltage: 220V.
5. Power B, S phase reference voltage, CODE B, show S, range is 160-250V, initial voltage: 220V.
6. Power B, T phase reference voltage, CODE B, show T, range is 160-250V, initial voltage: 220V.
7. Exit.

STOP button:
Automatic and manual modes cut off the Power A and Power B, and transfer into OFF position as the system in the waiting state. Only one state, automatic or manual one, the system can work.

AON button:
Under the manual state, push “AON” button and Power A input. Under the automatic and stop mode, push “AON” button, then it will indicate the phase R S T voltage of Power A.

BON button:
Under the manual state, push “BON” button and Power A input. Under the automatic and stop mode, push “BON” button, then it will indicate the phase R S T voltage of Power B.

Wrong code indicate:
Wrong code E-A: Power A input fails.
Wrong code E-AS: Power A trip fails.
Wrong code E-B: Power B input fails.
Wrong code E-BS: Power B trip fails.
Wrong code E-G: Generator input fails. (start 4 times but fails continuously)
All alarms will stop the sound in 20s, but the state will keep.

Function proceeding
Control state: only Power A, or only Power B or both power input. Following are the description of the three states:

1. Only Power A, function buttons are AUTO/MAN STOP AON SET.
   Under automatic state: If the voltage of the phase R.S.T are natural, and Power A will input.
   a). Under voltage: As long as the Phase R, Phase S, or Phase T is under voltage, and it should set by CODE 9, the Power A will be cut off and transfer into OFF position. The alarm and generator Set B will work. In the set time of CODE D, the Power B will go right, and let Set B to supply the power. When Set B is working, the alarm will stop. If in the set time of CODE D, the Power B is still can not work in the natural voltage, it will indicate E-G, that means the generator is malfunction and is keeping alarm state. When Power A gets right, the alarm will stop. That is the operation proceeding:

   B-OFF(CODE 7) –– OFF –– OFF-A(CODE 5, Power input) –– generator stop (CODE 8) –– turn of the generator –– Power set supply the electricity naturally.
   Notice: If the voltage is under 160VAC, we deal with it as phase failure.
   b). Over-voltage: As long as the Phase R, Phase S, or Phase T is under voltage, and it should set by CODE 9, the Power A will be cut off and transfer into OFF position. The alarm and generator Set B will work. In the set time of CODE D, the Power B will go right, and let Set B to supply the power. When Set B is working, the alarm will stop. If in the set time of CODE D, the Power B is still can not work in the natural voltage, it will indicate E-G, that means the generator is malfunction and is keeping alarm state. When Power A gets right, the alarm will stop. That is the operation proceeding:

   B-OFF(CODE 7) –– OFF –– OFF-A(CODE 5, Power input) –– generator stop (CODE 8) –– turn of the generator –– Power set supply the electricity naturally.
Safety Consideration in Working

c). Phase failure: As long as the Phase R, Phase S, or Phase T is under voltage, and the Power A will be cut off and transfer into OFF position immediately. The alarm and generator Set B will work. In the set time of CODE D, the Power B will go right, and let Set B to supply the power. When Set B is working, the alarm will stop. If in the set time of CODE D, the Power B is still can not work in the natural voltage, it will indicate E-G, that means the generator is malfunction and is keeping alarm state. When Power A gets right, the alarm will stop. That is the operation proceeding: B-OFF(CODE 7)–OFF–OFF-A(CODE 5, Power input)–generator stop (CODE 8)–turn the generator supply the electricity naturally.

When it is under voltage, over voltage or phase failure, it will not act, but the test function will work naturally, and the malfunction will not alarm. The generator port is closed.

e). Under the STOP state:
Cut off all action to OFF position.
The generator port is closed.

2. Only Power B, function buttons are AUTO/MAN STOP BON SET.

Notice:
Only in the state B, the generator port is open.
Under automatic state: If the voltage of the phase R.S.T are natural, and Power B will input.

a). Under voltage: As long as the Phase R, Phase S, or Phase T is under voltage, and it should set by CODE C, the Power B will be cut off and transfer into OFF position. The alarm and generator Set B will work. When Set B is working, the alarm will stop. That is the operation proceeding: OFF-B(CODE 6 Set)—Set B input.

Notice: If the voltage is under 160VAC, we deal with it as phase failure.

b). Over voltage: As long as the Phase R, Phase S, or Phase T is under voltage, and it should set by CODE C, the Power B will be cut off and transfer into OFF position. The alarm and generator Set B will work. When Set B is working, the alarm will stop. That is the operation proceeding: OFF-B(CODE 6 Set)—Set B input.

c). Phase failure: As long as the Phase R, Phase S, or Phase T is under voltage, and it should set by CODE C, the Power B will be cut off and transfer into OFF position. The alarm and generator Set B will work. When Set B is working, the alarm will stop. That is the operation proceeding: OFF-B(CODE 6 Set)—Set B input.

When it is under voltage, over voltage or phase failure, it will not act, but the test function will work naturally, and the malfunction will not alarm. The generator port is open.

e). Under the STOP state:
Cut off all action to OFF position.
The generator port is open.

3. Both are being, function buttons are AUTO/MAN AON BON SET STOP

Under automatic state: If the voltage of the phase R.S.T are natural, and Power A will input firstly.

a). If the Set A has something wrong as over voltage, under voltage or phase failure, we will deal with it according to the Only Power A. When Set B is working, the alarm will stop. You can use the A-ON button to check the state of Set A.

b). When Set B has the problems, it will in the OFF position and keep alarm state. If Set B goes right firstly, that is OFF-B(CODE 6)–Power B input–Power B supply the power naturally and the alarm stops. If Set A goes right firstly, that is OFF-A(CODE 5)–Power input–the generator stop(CODE 8)–turn the generator supply the power naturally, and the alarm stops.

When it is under voltage, over voltage or phase failure, it will not act, but the test function will work naturally, and the malfunction will not alarm. The generator port is open.

d). Under the STOP state:
Cut off all action to OFF position.
The generator port is open.
Safety Consideration in Working

Brief introduction of M2 II internal controller function

- Function brief introduction
  1. This panel is ATS two-steps facility controller, and it has voltage test function.
  2. It can test the two sets of input voltage, and start the generator automatically.
  3. Manage the transfer between Set A and Set B for power supply.

- Button distribution (from left to right)
  B-A   UP   DOWN   SET

- Button “set” parameter specification: push button for 3 seconds and enter the setting state.
  1. A-B delay: indicate A-B, range: 0-225s, initial value: 10s
  2. B-A delay: indicate B-A, range:0-225s, initial value:10s
     Generator stop delay: indicate G-S, range:0-225s, initial value: 10s. If you use the UP/DOWN button to plus or minus, and don’t operate in 20s, it will exit.

- DOWN button
  1. In the setting, it has the function of minus.
  2. It indicates power B at ordinary time.
  3. Under the manual setting, it transfers to power B.

- UP button
  1. In the setting, it has the function of plus.
  2. It indicates A power at ordinary time.
  3. Under the manual setting, it transfers into A power.

- B-A button
  1. Push the SET and B-A button at the same time for 5s, and enter the set reference voltage, they are:
     A power reference voltage, indicate U-A, initial value 220V
     B power reference voltage, indicate U-B, initial value 220V
     DOWN/UP button is used to plus and minus operating, and don’t operate in 20s, it will exit.
  2. Push the B-A button at ordinary time, and it transfers between automatic and manual.
     Push the B-A button for 5s until it winkles, and that means you have entered the manual state.
     Push UP button is stay in power A and indicate A voltage.
     Push DOWN button is stay in power B and indicate B voltage.
     Push B-A button for 4s until it winkles, it will exit manual state.

- Function proceeding:
  It can divided into A state only, B state only and both A and B state.
  1. A state only, switch over into A power, show A voltage.
     Please set the voltage norm-value which is according to the standard value of the input voltage, and insure the precision of the indicate voltage.
  2. B state only, switch over into B power, show B voltage.
     Please set the voltage norm-value which is according to the standard value of the input voltage, and insure the precision of the indicate voltage.
  3. both A and B state: let A power throw in firstly. If there is something wrong in A power, the switch will start the generator and enter B power, and show the B voltage. When A power get right, it delay switch over to A power and in the clock time to cut off the generator.
M2, M3 LED external economic controller

Function brief introduction
1. This panel is NQ2-M3 type (three steps) controller.
2. This controller can test the input voltage for two sets of three phases and four lines, and also can test the over-voltage, under-voltage and phase failure. It can deal with the malfunction automatically. The controller has the function of alarm and starting the generator automatically.
3. Manage the transfer between Set A and Set B for power supply.
4. It is a high quality intelligent controller, which can set different kinds of parameter, and come down to large area.

Indication Layout
Four positions LED indicate, from left to right:
The first position: code position
The second, third, forth position: value position

Button Layout:
From left to right
Down Up
Set Stop Auto/Man

The specification of the parameter and setting
Under the automatic and stop state, press the SET button for 3s and enter the setting state.
1. Code 1: A low voltage range 160-230V, initial value: 160V.
2. Code 2: A high voltage range 230-400V, initial value: 250V.
3. Code 3: B low voltage range 160-230V, initial value: 160V.
4. Code 4: B high voltage range 230-400V, initial value: 250V.
5. Code 5: A-OFF delay, range 0-999s, initial value: 10s
   Notice: this code is B3 parameter, when B2 is A-B delay setting.
6. Code 6: OFF-A delay, range 0-999s, initial value: 10s
   Notice: this code is B3 parameter, when B2 is B-A delay setting.
7. Code 7: B-OFF delay, range 0-999s, initial value: 10s
   Notice: this code is B3 parameter, when B2 doesn’t have.
8. Code 8: OFF-B delay, range 0-999s, initial value: 10s
   Notice: this code is B3 parameter, when B2 doesn’t have.
9. Code 9: start the generator clock, range 0-999s initial value: 10s.
   When Set A voltage isn’t natural, and start Set B and put it into working. If the Set B in the setting range, but it can not put in, as the generator can’t start, then there will be four alarm hints (the generator has malfunction).

Start process:
The first time: CODE 9 in the inverse clock, and start Power B. But if it is failure, then it will be enter the second start in 10s.
The second time: CODE 9 in the inverse clock, and start Power B. But if it is failure, then it will be enter the third start in 10s.
The third time: CODE 9 in the inverse clock, and start Power B. But if it is failure, then it will be enter the forth start in 10s.
The forth time: CODE 9 in the inverse clock, and start Power
Safety Consideration in Working

M2, M3 LED external economic controller

- If it is failure, and start alarm indicate wrong code E-G, which indicate the generator malfunction.
- Code A: Generator stop delay range: 0-999s, initial value: 10s
- If you don’t want to set code C D, and you can set button STOP and exit.
- Code C: A voltage norm, range 160-250V, initial value: 220V.
- Code D: B voltage norm, range 160-250V, initial value: 220V.
- After CODE D, push the “SET” button, and store the parameter into the EEPROM.

- STOP button
  a). Automatic and manual modes cut off the Power A and Power B, and transfer into OFF position as the system in the waiting state. Only one state, automatic or manual one, the system can work.
  b). When it show LED alternately, the system enters stop position.

- AUTO/MAN button
  a). This button can switch over from automatic to hand-operation, and it will be shown on the LED.
  b). In the automatic state, it will enter the manual state. (LED will be shown “------”)
  c). Press this button, it will enter the automatic state.

- DOWN button
  a). In the setting, it has the function of minus.
  b). It indicates B power of the R T S phases under the automatic and stop states.
  c). Under the manual setting, it transfers to B power.

- UP button
  a). In the setting, it has the function of plus.
  b). It indicates A power of the R T S phases under the automatic and stop states.
  c). Under the manual setting, it transfers in the A power.

- Wrong code indicate:
  - Wrong code E-A: Power A input fails.
  - Wrong code E-AS: Power A trip fails.
  - Wrong code E-B: Power B input fails.
  - Wrong code E-BS: Power B trip fails.
  - Wrong code E-G: Generator input fails. (start 4 times but fails continuously)
  - All alarms will stop the sound in 20s, but the state will keep.

Notice:
1. Insure the operation correctly and all buttons should press up 0.5s.
2. If there is something discord, please use code C and code D, to make sure the voltage test precision.
Mounting Proceedings

M2, M3 Ⅱ type LED external economic controller

Installation and dimension

M3 Ⅱ type LCD external dynamic display controller

Installation and dimension
Mounting Proceedings

Panel safe distance

- **M2, M3  32A-63A**

  Panel safe distance S1 dimension: 30mm(400V).60mm(690V)

  - Panel dimensions (in mm):
    - A: 2P 188, 3P 210, 4P 232
    - B: 2P 88, 3P 110, 4P 132

- **M2, M3  80A-125A**

  Panel safe distance S1 dimension: 30mm(400V).60mm(690V)

  - Panel dimensions (in mm):
    - A: 2P 209, 3P 239, 4P 269
    - B: 2P 103, 3P 133, 4P 163

- **M2, M3  160A-250A**

  Panel safe distance S1 dimension: 30mm(400V).60mm(690V)

  - Panel dimensions (in mm):
    - A: 2P 219, 3P 254, 4P 289
    - B: 2P 113, 3P 148, 4P 183

- **M2, M3  350A-500A**

  Panel safe distance S1 dimension: 30mm(400V).60mm(690V)

  - Panel dimensions (in mm):
    - A: 2P 280, 3P 340, 4P 400
    - B: 2P 164, 3P 224, 4P 284

1. operating circuit terminal  
2. hand-operated handhold entrance  
3. auxiliary switch  
4. A power side main circuit terminal  
5. main circuit terminal load side  
6. B power side main circuit  
7. ON/OFF selector  
8. hand-operated handhold (movable type)
Panel safe distance

### M3 630A-1600A

**Panel safe distance**
- S1 dimension: 45mm(400V), 90mm(690V)
- S2 dimension: 430mm(400V), 450mm(690V)

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<td>H</td>
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**Panel safe distance**
- S1 dimension: 50mm(400V), 100mm(690V)
- S2 dimension: 560mm(400V), 600mm(690V)

### 2000A-4000A

**Panel safe distance**
- S1 dimension: 50mm(400V), 100mm(690V)
- S2 dimension: 560mm(400V), 600mm(690V)

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</table>
Panel safe distance

Installation and wiring

- the construct of MAC-DT has a definite installation direction. If it changes the direction, the performance will change, so please use correct installation methods. If wiring, machine configuration etc. cannot be installed according to the provision, please contact with our company. Correct installation methods: you can see the body maneplate from the face side and install it on the direction, which parallel with vertical plane of the huge rock.

- Protect cover
  To protect the clashing and breaking while carrying when the products leave factory, the cover plate of operating circuit terminal should be fixed as picture A shows. When completed wiring, the cover plate of negative main circuit terminal should be fixed as picture B shows. The installation screw (M4) of main circuit terminal cover should be installed on the body.
Panel safe distance

**NOTICE:**

1. When the main circuit terminal wiring, please avoid directly adding the bend pressure of wire to the terminal.
2. About the arc extinguish distance of the outside of arc extinguish chamber, please refer to S1, S2 of Outline Dimension Figure.
3. Please make sure that have connected the earth wire to the mark.

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**Fig. I** fixing bolt hole (front panel wiring)  **Fig. II** fixing bolt hole and panel surface hole (back panel wiring)
Operating proceeding

Examining and preparing before operating

Check the wiring:
1. We should specialized in the auxiliary control parts, which should follow our offering.
2. Test the insulation between phase and phase, between phase and the frame by megawatt electric meter.
3. Check the terminals and bolts have been fixed tightly.
   Notice: Examining it according to the specification firstly, then let it work.

Pre-operational test

Follow the rules of “examining and preparing before operating”, and make sure there is no unusual, and you can have a test operating.
1. Pull the operated-handle, and the operation should be flexible.

Operating

If the test operating is OK, then we can operate it.
Maintenance and inspection

⚠️ Attention

- The testing and maintenance should be done by the technician.
- Finish the following thing before examining.
  1. Cut off the load side and power side.
  2. Cut off the control part connected with electric.
  3. Unlade the switch from the installation place.
- The maintenance and inspection should be done after installing one-year time, and twice a year at unusual condition. The content of the maintenance and inspection are:

  600A-3000A accord to the point in the above diagram, please lubricate it with 1-2 drops ISO NO.8 machine oil.

  To protect the dust, dirt and rust damages, please clear away the dirt etc.

  Please visual inspect if the contact parts have any distortion, damage, discoloration etc.

  The reasons of bad contact are rust, acidification, and dust of contact face, so when it maintains, please try action of switch.

  When DC operates, please notice the battery capacity and elasticized states.
Trouble and solution

The reason of trouble and the key to the solution:

Q: 1. The switch cannot transfer automatically or has the lock phenomena?
   A: a). wrong connection;  b). devote loop is burn; c). devote spring broke;  d). the lubricate of the drive machine is not effect.

Q: 2. The power has input, but the load side has not output?

Q: 3. Prepare power can not input?
   A: a). the interlock abrasion; b). the voltage of the prepare power is lower than the normal, and it should be in the range of 180V-250V.

Q: 4. The common power can not input.
   A: a). the singlechip can not work, or photocoupler broke; b). the voltage of the common power is lower than the normal, and it should be in the range of 180V-250V.

Q: 5. The voltage value of the controller is different from the practice.
   A: There is something interfere the controller, so make sure the voltage is 220V is the point.

Q: 6. The generator is start to work, but the controller indicate that the generator has malfunction, and turn off it.
   A: The set for the test time of generator is mistake. Let the generator time match with the start/stop time. The general time is 4*t. T is the start time of generator, which set by the controller.