

**SGQ\_ATS**  
**AUTOMATIC TRANSFER SWITCH**  
**USER MANUAL**



All rights reserved. No part of this publication may be reproduced in any material form (including photocopying or storing in any medium by electronic means or other) without the written permission of the copyright holder.

SmartGen reserves the right to change the contents of this document without prior notice.

**Table 1 Software Version**

| Date       | Version | Note                                                    |
|------------|---------|---------------------------------------------------------|
| 2006-03-18 | 1.0     | Original release.                                       |
| 2010-10-19 | 2.0     | Revision.                                               |
| 2011-06-08 | 2.1     | Modify the wiring diagram of N type, T type and M type. |
| 2011-11-22 | 2.2     | Modify the technical data of N type, T type and M type. |
| 2012-06-29 | 2.3     | Lines of wiring diagram are bold.                       |
| 2012-11-08 | 2.4     | Format Modification.                                    |
| 2014-05-30 | 2.5     | Add terminal number in wiring connection diagram.       |
| 2015-03-30 | 2.6     | Modify some details.                                    |
| 2019-06-26 | 2.7     | Modify M type wiring diagram, and add Q type switch.    |
| 2019-09-11 | 2.8     | Modify wiring diagram of M type and Q type.             |
| 2020-01-07 | 2.9     | Delete Q type switch and related parameters.            |
| 2022-01-04 | 3.0     | Modify M type wiring diagram.                           |
| 2022-07-29 | 3.1     | Update the Logo of SmartGen.                            |
| 2023-02-15 | 3.2     | Modify partial switch models and ordering models.       |

## CONTENTS

|     |                                                |    |
|-----|------------------------------------------------|----|
| 1   | SUMMARY .....                                  | 4  |
| 2   | STRUCTURE AND CHARACTERISTICS.....             | 4  |
| 3   | APPEARANCE AND CLASSIFICATION .....            | 5  |
| 3.1 | ILLUSTRATION .....                             | 5  |
| 3.2 | N TYPE CASE DIMENSIONS AND TECHNICAL DATA..... | 6  |
| 3.3 | T TYPE CASE DIMENSIONS AND TECHNICAL DATA..... | 7  |
| 3.4 | M TYPE CASE DIMENSIONS AND TECHNICAL DATA..... | 8  |
| 4   | WORKING REQUIREMENTS.....                      | 9  |
| 5   | ATS WIRING CONNECTION DIAGRAM.....             | 9  |
| 5.1 | N AND T TYPE WIRING CONNECTION DIAGRAM.....    | 9  |
| 5.2 | M TYPE WIRING CONNECTION DIAGRAM.....          | 10 |
| 6   | INSTALLATION AND DEBUGGING.....                | 11 |
| 7   | ORDER MODELS.....                              | 11 |

## **1 SUMMARY**

SGQ Automatic Transfer Switch (ATS) is used under conditions of AC660V 50/60Hz or DC250V. It is two-stage PC class type with electromagnetism drive structure, which can make fast load transfer (transfer time  $\leq 80\text{ms}$ ) of two power circuits. It can be widely used for national one-class load, for example: high buildings, post, telecommunications, coal mines, ships, industrial assembly lines, health care, military facilities etc. The two power circuits can be grid, auto start genset, storage battery etc.

## **2 STRUCTURE AND CHARACTERISTICS**

SGQ Automatic Transfer Switch (ATS) adopts electromagnetic coil drive, electrical and mechanical interlocking structure, main loop structure of two static contacts and one dynamic contact. Dynamic contact applies V type, which ensures two power circuits shall not be short circuit. N type and T type apply double coils; M type applies single coil. Coils are only energized at the time of transfer and this extends the usage life of switch to a great degree. Coil control power can be supplied by master/slave AC or DC power and it is not needed to add another control power. Switch itself has mechanical or electrical close indication, and at the same time it provides volts free auxiliary contact.

### 3 APPEARANCE AND CLASSIFICATION

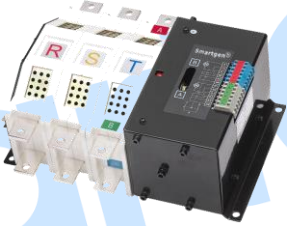
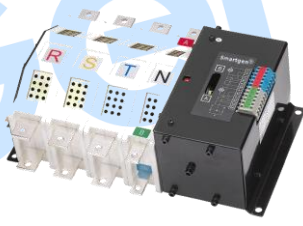
#### 3.1 ILLUSTRATION

SGQ ATS can be classified into 3 types by appearance: N type, T type, M type. Each type has 3P and 4P, and N type still has 2P.

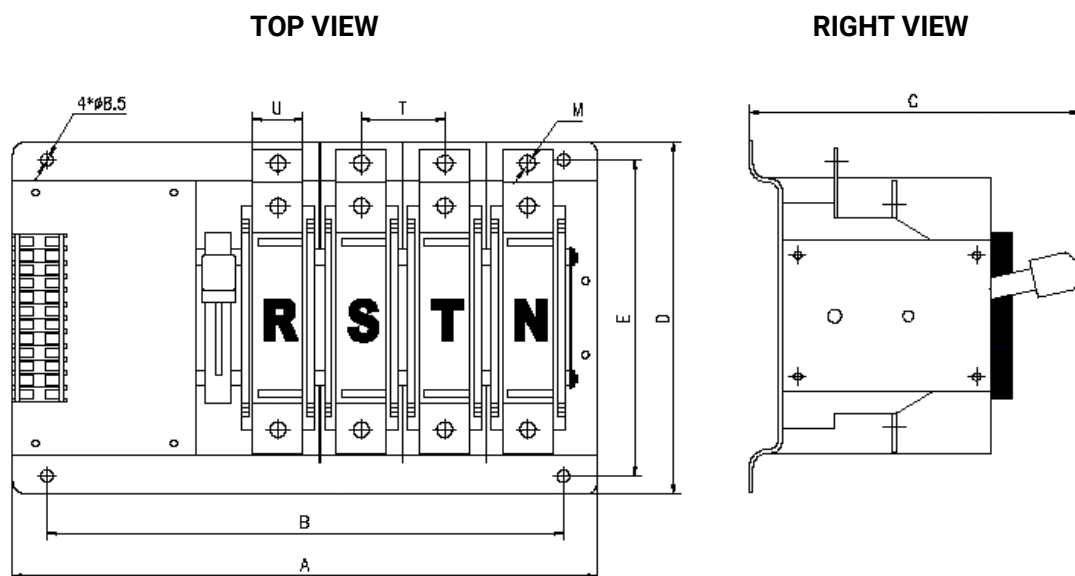
The rated current series are: 63A, 125A, 160A, 200A, 250A, 400A, 630A, 800A, 1000A and 1250A.

Switch appearances are as below.

**Table 2 Switch Appearance**

| Type   | 2P                                                                                | 3P                                                                                  | 4P                                                                                    |
|--------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| N Type |  |    |    |
|        |                                                                                   |                                                                                     |                                                                                       |
| T Type | Nil                                                                               |   |   |
|        |                                                                                   |                                                                                     |                                                                                       |
| M Type | Nil                                                                               |  |  |
|        |                                                                                   |                                                                                     |                                                                                       |

### 3.2 N TYPE CASE DIMENSIONS AND TECHNICAL DATA



**Fig. 1 N Type Diagram**

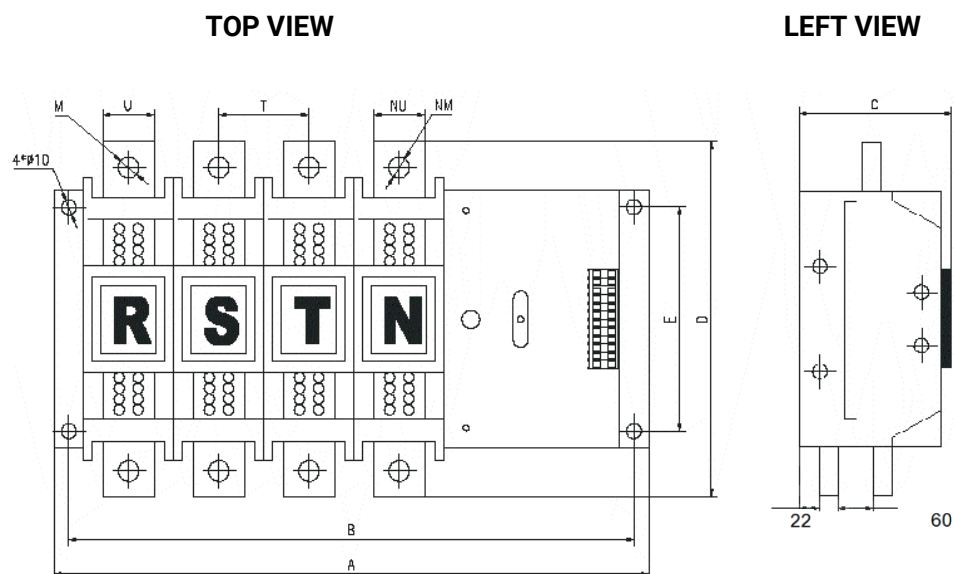
**Table 3 N Type Case Dimensions**

| Model  | Overall size (mm) |     |     |     |     | Installation size (mm) |     |     |     | Copper bar and location hole (mm) |    |    |
|--------|-------------------|-----|-----|-----|-----|------------------------|-----|-----|-----|-----------------------------------|----|----|
|        | A                 |     |     | D   | C   | B                      |     |     | E   | M                                 | U  | T  |
|        | 2P                | 3P  | 4P  |     |     | 2P                     | 3P  | 4P  |     |                                   |    |    |
| SGQN63 | 172               | 200 | 228 | 186 | 155 | 139                    | 167 | 195 | 165 | 5                                 | 12 | 27 |
| SGQ125 | 192               | 228 | 265 | 186 | 155 | 159                    | 195 | 232 | 165 | 7                                 | 20 | 37 |

**Table 4 N Type Technical Data**

| Type                                |            | SGQN63                                         |    |     |    | SGQ125 |      |  |
|-------------------------------------|------------|------------------------------------------------|----|-----|----|--------|------|--|
| Rated current                       |            | 63A                                            |    |     |    | 125A   |      |  |
| Rated limited short-circuit current |            | 35kA                                           |    |     |    |        |      |  |
| Coil operating voltage              |            | AC220V (176~265)V                              |    |     |    |        |      |  |
| Coil operating current              |            | 3.5A                                           |    |     |    |        |      |  |
| Auxiliary contact                   |            | 1A 250VAC, N/O, Free Voltage, Each side has 2. |    |     |    |        |      |  |
| Operation time                      | Mechanical | 10000 times                                    |    |     |    |        |      |  |
|                                     | Electrical | 4000 times                                     |    |     |    |        |      |  |
| Number of poles                     |            | 2P                                             | 3P | 4P  | 2P | 3P     | 4P   |  |
| Net weight (kg)                     |            | 3.5                                            | 4  | 4.5 | 4  | 4.5    | 5. 5 |  |
| Operation cycle                     |            | 15 seconds /time                               |    |     |    |        |      |  |

### 3.3 T TYPE CASE DIMENSIONS AND TECHNICAL DATA



**Fig. 2 T Type Diagram**

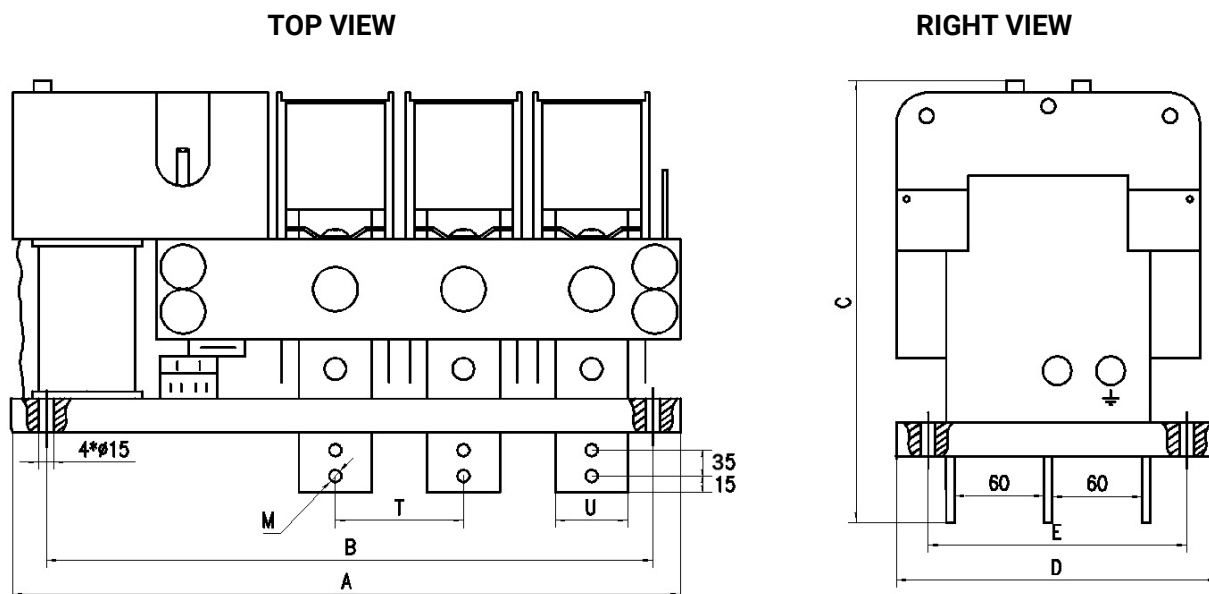
**Table 5 T Type Case Dimensions**

| Model  | Overall size(mm) |     |     |     | Installation size (mm) |     |     | Copper bar and location hole (mm) |    |    |    |    |
|--------|------------------|-----|-----|-----|------------------------|-----|-----|-----------------------------------|----|----|----|----|
|        | A                |     | D   | C   | B                      |     | E   | M                                 | NM | U  | NU | T  |
|        | 3P               | 4P  |     |     | 3P                     | 4P  |     |                                   |    |    |    |    |
| SGQ160 | 326              | 375 | 292 | 146 | 307                    | 356 | 200 | 9                                 | 9  | 20 | 20 | 49 |
| SGQ200 | 326              | 375 | 292 | 146 | 307                    | 356 | 200 | 9                                 | 9  | 20 | 20 | 49 |
| SGQ250 | 326              | 375 | 292 | 146 | 307                    | 356 | 200 | 9                                 | 9  | 20 | 20 | 49 |
| SGQ400 | 356              | 405 | 292 | 146 | 337                    | 386 | 200 | 11                                | 9  | 30 | 20 | 59 |
| SGQ630 | 368              | 427 | 310 | 146 | 349                    | 408 | 200 | 14                                | 14 | 40 | 30 | 63 |

**Table 6 T Type Technical Data**

| Type                                |            | SGQ160                                         |    | SGQ200 |    | SGQ250 |    | SGQ400 |    | SGQ630 |    |
|-------------------------------------|------------|------------------------------------------------|----|--------|----|--------|----|--------|----|--------|----|
| Rated current                       |            | 160A                                           |    | 200A   |    | 250A   |    | 400A   |    | 630A   |    |
| Rated limited short-circuit current |            | 35kA                                           |    |        |    |        |    |        |    |        |    |
| Coil operating voltage              |            | AC220V (176~265)V                              |    |        |    |        |    |        |    |        |    |
| Coil operating current              |            | 7A                                             |    |        |    |        |    |        |    |        |    |
| Auxiliary contact                   |            | 1A 250VAC, N/O, Free Voltage, Each side has 2. |    |        |    |        |    |        |    |        |    |
| Operation time                      | Mechanical | 8000 times                                     |    |        |    |        |    |        |    |        |    |
|                                     | Electrical | 3000 times                                     |    |        |    |        |    |        |    |        |    |
| Number of poles                     |            | 3P                                             | 4P | 3P     | 4P | 3P     | 4P | 3P     | 4P | 3P     | 4P |
| Net weight (kg)                     |            | 18                                             | 20 | 18     | 20 | 18     | 20 | 19     | 21 | 20     | 22 |
| Operation cycle                     |            | 10 seconds/time                                |    |        |    |        |    |        |    |        |    |

### 3.4 M TYPE CASE DIMENSIONS AND TECHNICAL DATA



**Fig. 3 M Type Diagram**

**Table 7 M Type Case Dimensions**

| Models  | Overall size(mm) |     |     |     | Installation size(mm) |     |     | Copper bar and location hole (mm) |    |    |
|---------|------------------|-----|-----|-----|-----------------------|-----|-----|-----------------------------------|----|----|
|         | A                |     | D   | C   | B                     |     | E   | M                                 | U  | T  |
|         | 3P               | 4P  |     |     | 3P                    | 4P  |     |                                   |    |    |
| SGQ630  | 530              | 600 | 280 | 345 | 490                   | 560 | 210 | 12                                | 30 | 90 |
| SGQ800  | 530              | 600 | 280 | 345 | 490                   | 560 | 210 | 12                                | 40 | 90 |
| SGQ1000 | 530              | 600 | 280 | 345 | 490                   | 560 | 210 | 12                                | 45 | 90 |
| SGQ1250 | 530              | 600 | 280 | 345 | 490                   | 560 | 210 | 12                                | 55 | 90 |

**Table 8 M Type Technical Data**

| Type                                |            | SGQ630                                         |      | SGQ800   |    | SGQ1000  |    | SGQ1250  |    |
|-------------------------------------|------------|------------------------------------------------|------|----------|----|----------|----|----------|----|
| Rated current                       |            | 630A                                           |      | 800A     |    | 1000A    |    | 1250A    |    |
| Rated limited short-circuit current |            | 32 kA                                          |      |          |    |          |    |          |    |
| Coil operating voltage              |            | AC220V (176~265)V                              |      |          |    |          |    |          |    |
| Coil operating current              |            | 16A                                            |      |          |    |          |    |          |    |
| Secondary contact                   |            | 1A 250VAC, N/O, Free Voltage, Each side has 1. |      |          |    |          |    |          |    |
| Operation time                      | Mechanical | 6000 times                                     |      |          |    |          |    |          |    |
|                                     | Electrical | 3000 times                                     |      |          |    |          |    |          |    |
| Number of poles                     |            | 3P                                             | 4P   | 3P       | 4P | 3P       | 4P | 3P       | 4P |
| Net weight (kg)                     |            | 37                                             | 43.5 | 39       | 46 | 41       | 48 | 48       | 57 |
| Operation cycle                     |            | 15s/time                                       |      | 20s/time |    | 25s/time |    | 25s/time |    |

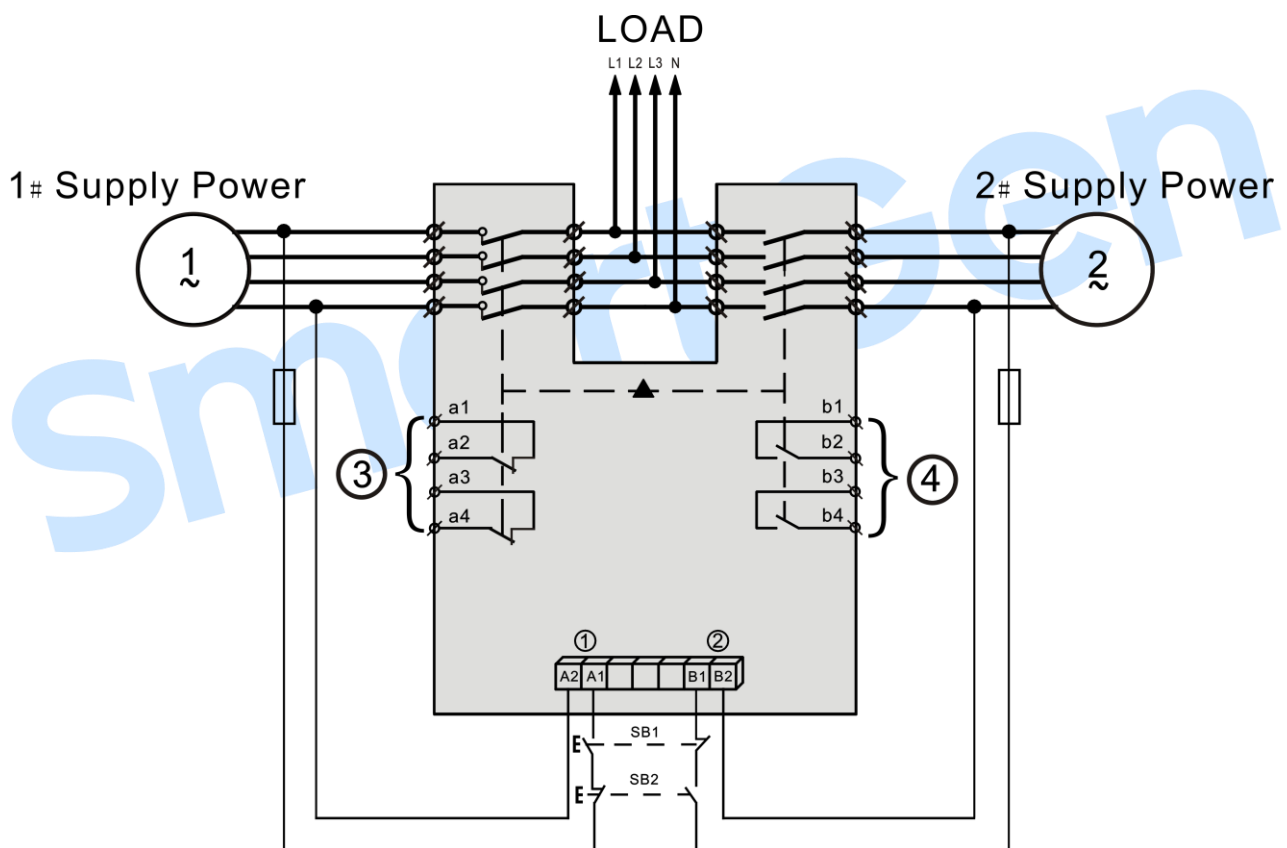
## 4 WORKING REQUIREMENTS

**Table 9 Working Requirements**

| Item                   | Requirements |
|------------------------|--------------|
| Working temperature    | (-40~+70)°C  |
| Working Humidity       | (20~90)%RH   |
| Installation elevation | ≤5000m       |
| Pollution class        | III          |
| Installation type      | IV           |

## 5 ATS WIRING CONNECTION DIAGRAM

### 5.1 N AND T TYPE WIRING CONNECTION DIAGRAM



**Fig. 4 N Type and T Type**

1. Position control I

2. Position control II

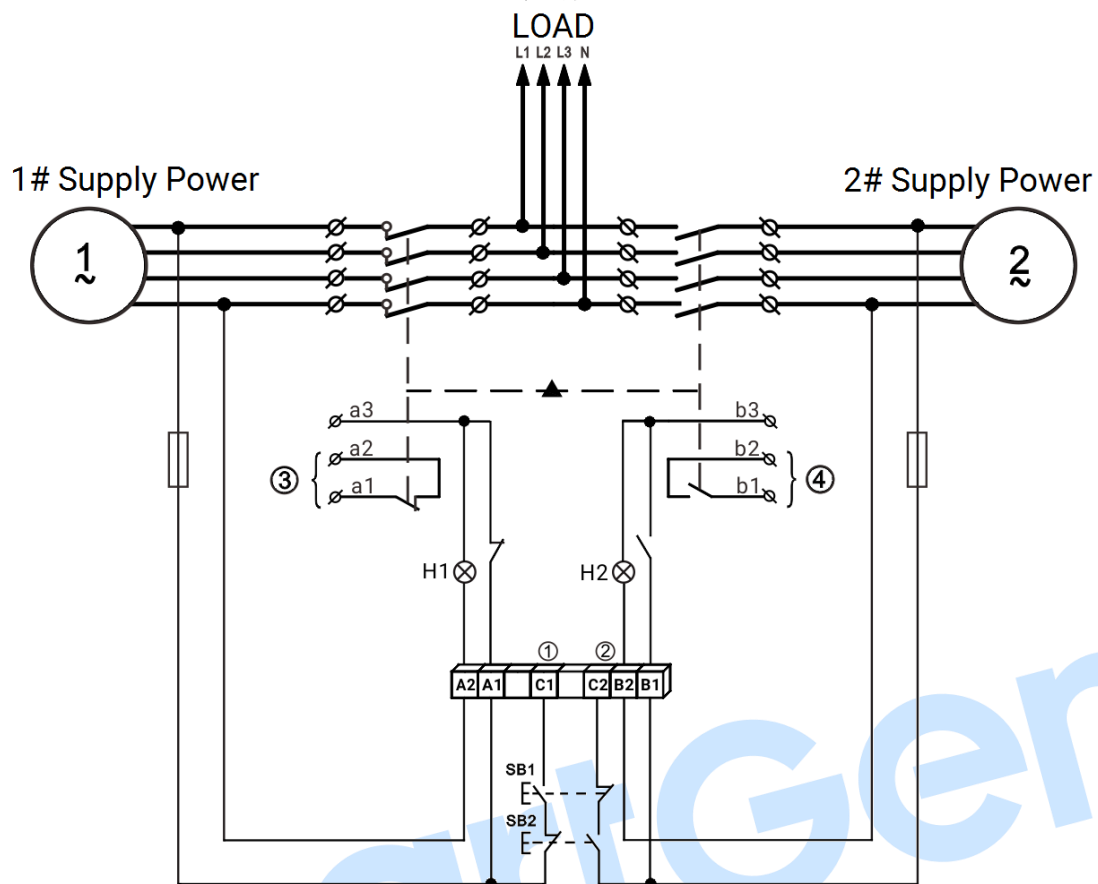
3. Aux. contact of position I

4. Aux. contact of position II

SB1 is #1 power close button

SB2 is #2 power close button

## 5.2 M TYPE WIRING CONNECTION DIAGRAM



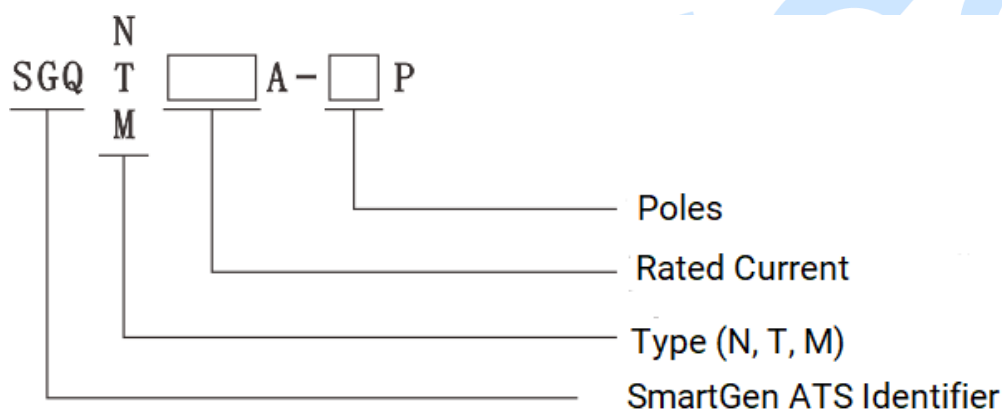
**Fig. 5 M Type**

- |                               |                                |
|-------------------------------|--------------------------------|
| 1. Position control I         | 2. Position control II         |
| 3. Aux. contact of position I | 4. Aux. contact of position II |
| SB1 is #1 power close button  | SB2 is #2 power close button   |
| H1 is #1 close indication     | H2 is #2 close indication      |

## 6 INSTALLATION AND DEBUGGING

All operations about ATS installation and debugging shall be conducted by professionals or persons knowing the switch device and protection and precaution measures must be considered during the operation. Wiring connection of main loop must make sure leading wire is not taking any pressure or force. Before installation and debugging please check firstly whether switch is damaged or whether there is harmful environment effect on it. At the same time please check whether there is loose wire resulting from transportation; clear the smudge, especially the smudge on the surface of insulating parts. The smudge probably is caused by the packing materials in the transportation process or in the storage process. Please make sure the phase sequences are in accordance at connecting the first circuit; please observe the wiring connection diagram of user manual strictly at connecting the second circuit and pay attention to control power voltage class at the same time. Ground must be well connected on switch installation. Considering personal safety and switch changeover rapidity, debugging handle can only be used for debugging and users are prohibited to operate on-load with debugging handle. First use the handle to operate switch, and if nothing unusual occurs, then operate button manually. If nothing unusual happens, then normal running can start.

## 7 ORDER MODELS



**Fig. 6 Model Illustration**