1. Application

HSQ1 Series Automatic Transfer Switching Equipment (hereinafter referred to as the ATSE) are suitably applied in AC 50Hz dual electric supply systems (normal power supply from electric grid and backup power supply from another grid or a generator) with rated insulation voltage 690V, rated working voltage 400V and rated current from 6A to 800A for automatic changeover when one supply is in failure so that to guarantee reliability and safety in electric supply.

The ATSE complies to Standards IEC 60947-6-1 Transfer Switching Equipment and GB/T 14048.11 Transfer Switching Equipment. It is suitable for emergent power supply. In the period of power supply transfer, it stops supplying electricity to load.

2. Feature

HSQ1 Series Automatic Transfer Switching Equipment is composed of a changeover controller, an executive switching body and a mechanical interlocking facility.

The microprocessor based and intelligence oriented controller makes detection in high accuracy and reliability. Many parameters such as transfer time delay and voltage threshold value may be setting adjusted by customers. Auto transfer-auto restore and auto transfer nonauto restore may be also site adjusted. The controller also has a remote controlled opening operation function for fire control. Based on above described functions, the grid - generator controllers of HSQ1 and HSQ1 (Z Type) have a signal output for start / stop generator. The HSQ1(Z Type) controller newly adds several functions such as main power supply selection, latest operation info memory, RS - 485 communication interface with built-in Modbus - RTU Communication Protocol and so on. For switching body, the improved motor-driven operating mechanism makes the body compact and less height. The mechanical interlocking is good at reliability among others.

Compared with the same kind of products by other manufacturers both abroad and at home, ours has the following features:

a) Intelligent controller has been employed. It detects three phases of both power supplies with high accuracy so that it will guarantee the load to use a power supply in compliance with application requirement.

b) The switching body has a zero position, i.e., the two circuit breakers in both power supplies may be in open position simultaneously for the convenience of reparation of downstream circuits.

c) Separate controller may receive a fire signal to open two circuit breakers in two power circuits simultaneously.

d) Grid - generator controller may generate a signal for automatic start and stop generator.

e) HSQ1(Z Type) controller possesses a communication function to realize remote control, remote measurement, remote communication and remote regulation.

f) Circuit breakers with overload and short circuit protection are controlled by the ATSE ranked in CB grade.

g) The ATSE has a reliable mechanical and electrical interlocking, making sure that the two circuit breakers will not be closed simultaneously.

h) Secondary circuit of ATSE has been wired fully before delivery. Customers may put it in use after wiring its primary circuit only.

3. Working conditions:

Ambient temperature not higher than + 40℃ nor lower than - 5℃ with average temperature in 24 hours not over + 35℃;

Altitude of installation location not over 2000 meters above sea level;

The relative humidity at max. ambient temperature of + 40℃ is not over 50%. Under lower temperature, higher humidity is acceptable, say, 90% at 20℃. Special measures should be taken for the occasional condensation due to temperature fluctuation;

Pollution Grade 3. Application category AC - 33iB.

4. Product specification

1. According to application location and users’ requirements on XHTQ1’s function, 7 types of controller may be selected as follows:

Table 1 shows types and control functions of the electronic controller.
Table 1 shows types and control functions of the electronic controller.

<table>
<thead>
<tr>
<th>Function</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HSO1 (grid - grid)</td>
</tr>
<tr>
<td>Phase lack transfer</td>
<td>Any phase or more than one phase</td>
</tr>
<tr>
<td>Undervoltage transfer</td>
<td>0.7, 0.75, 0.8Ue</td>
</tr>
<tr>
<td>Overvoltage transfer</td>
<td>1.1, 1.15, 1.2Ue</td>
</tr>
<tr>
<td>Time delay transfer</td>
<td>0 - 60s reset adjust, 0 - 30s adjust</td>
</tr>
<tr>
<td>Power normal indication</td>
<td>Yes</td>
</tr>
<tr>
<td>Indication of breaker C/O</td>
<td>Yes</td>
</tr>
<tr>
<td>3 - position (normal close, spare close and normal spare/manual motor operation)</td>
<td>Yes</td>
</tr>
<tr>
<td>Signal of start/stop generator</td>
<td>No</td>
</tr>
<tr>
<td>Set for auto transfer auto reset and auto transfer without reset</td>
<td>Set on the controller</td>
</tr>
<tr>
<td>Communication function</td>
<td>No</td>
</tr>
<tr>
<td>Other function</td>
<td>Spare power fault alarm (may be off), fire control</td>
</tr>
</tbody>
</table>

Note: The voltage of working power for HSO1j - 63 Controller is AC 187 - 263V

2. In terms of frame level of primary circuit breaker in ATSE switching body, there are 6 frame current levels for selection.

Table 2 shows the primary frame level and rated working current.

<table>
<thead>
<tr>
<th>Type</th>
<th>Circuit breaker applied</th>
<th>Frame current Inm A</th>
<th>Rated working current In A</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSO1y – 63</td>
<td>HSM8 – 63</td>
<td>63</td>
<td>6, 10, 16, 20, 25, 32, 40, 50, 63</td>
</tr>
<tr>
<td>HSO1y – 125</td>
<td>HSM1 – 125</td>
<td>125</td>
<td>12.5, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125</td>
</tr>
<tr>
<td>HSO1y – 125</td>
<td>HSM1 – 125</td>
<td>125</td>
<td>12.5, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125</td>
</tr>
<tr>
<td>HSO1y – 160</td>
<td>HSM1 – 160</td>
<td>160</td>
<td>16, 20, 32, 40, 50, 63, 80, 100, 125, 160</td>
</tr>
<tr>
<td>HSO1y – 160</td>
<td>HSM1 – 160</td>
<td>160</td>
<td>16, 20, 32, 40, 50, 63, 80, 100, 125, 160</td>
</tr>
<tr>
<td>HSO1y – 250</td>
<td>HSM1 – 250</td>
<td>250</td>
<td>100, 125, 160, 180, 200, 225, 250</td>
</tr>
<tr>
<td>HSO1y – 400</td>
<td>HSM1 – 400</td>
<td>400</td>
<td>200, 225, 250, 315, 350, 400</td>
</tr>
<tr>
<td>HSO1y – 800</td>
<td>HSM1 – 800</td>
<td>800</td>
<td>500, 630, 700, 800</td>
</tr>
</tbody>
</table>

Note: For those with rated current more than 800A, the ATSE system containing HSW Series ACB may be selected. For more detail, please refer to catalogue of HSW Series ACB.
5. Type and its designation

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z</td>
<td>Communication, Blank for standard type</td>
</tr>
<tr>
<td>5</td>
<td>for grid - grid and 6 for grid - generator</td>
</tr>
<tr>
<td>CB's pole number, 2 for 2-pole, 3 for 3-pole and 4 for 4-pole</td>
<td></td>
</tr>
<tr>
<td>Rated current (In) of executive CB</td>
<td></td>
</tr>
<tr>
<td>No code for single motor-driven operating mechanism and s for dual motor-drive operating mechanisms</td>
<td></td>
</tr>
<tr>
<td>Rated frame level current (Inm) of executive CB</td>
<td></td>
</tr>
<tr>
<td>Derived code (no such code for standard type, y for electromechanical type and j for easy type). Residual current circuit breaker</td>
<td></td>
</tr>
<tr>
<td>Design serial No.</td>
<td></td>
</tr>
<tr>
<td>Automatic Transfer Switching Equipment</td>
<td></td>
</tr>
<tr>
<td>Hangshen Group, manufacturer</td>
<td></td>
</tr>
</tbody>
</table>

Note:
1) Z Type is suitable for HSQ1 Standard only
2) For ATSE with HSQ1y Controller, the code 5 or 6 invalid, only power grid-grid.
3) For HSM1 four-pole circuit breaker on switching body, the ON/OFF mode of N pole is that N pole not equipped with current trip and N pole's ON/OFF operation done together with other 3 poles.
4) 63A frame can work with HSQ1y and HSQ1j Controllers only and the controllers are directly mounted on switching body. 125A and 160A frames may work with HSQ1 and HSQ1y Controllers. However, 250A and above frames can only work with HSQ1 Controller.
5) As a single motor-driven operating structure, a motor in the middle is used to make open and closed operations for two circuit breakers. Dual motor-driven operating structure has two sets of motor-driven operating mechanisms to operate two sets of circuit breakers respectively. The remaining functions are same for these two operating structures.

6. Working principle

Auto transfer and auto restore

When the controller is set at "Auto transfer-auto restore" controlling program, the controller supervises the normal power and spare power at any time. If there is abnormal in one phase or more in voltage (such as overvoltage, undervoltage or no voltage) of the normal power, and spare power being OK in an appropriate delay time t1 called transfer time delay (this time delay for judging reversible or irreversible fault in the normal power) and the fault cannot be recovered surely, the controller will give off a signal to turn off the circuit breaker in the normal power and make closing operation of the circuit breaker in spare power. In this way, the load is energized from spare power. If the normal power is detected to be OK later on, through a certain time delay t2 called reset time delay to inspect whether the normal power is really recovered, the controller will give off a signal to turn off the circuit breaker in spare power and turn on the circuit breaker in normal power. Then the load is energized from normal power still. This kind of controlling program is called auto transfer auto reset.

Auto transfer and nonauto restore

When the controller is set at "Auto transfer nonauto restore" controlling program, the controller supervises two powers (Power I and Power II) at any time. If there is abnormal in one phase or more in voltage such as overvoltage, undervoltage or no voltage in current power supply say Power I, and power II detected to be OK in an appropriate delay time t1 called transfer time delay (this time delay for judging reversible or irreversible fault in power 1) and the fault cannot be recovered surely, the controller will give off a signal to turn off the circuit breaker in power 1 and make closing operation of the circuit breaker in power II. In this way, the load is energized from power II. If power II is detected to be OK later on, the controller will not give off transfer signal and Power II supplies electricity power still. As a matter of fact, there is no priority in Power I and Power II and they are back up for each other.

Note: Regarding to the fixed transfer time in HSQ1 Series ATSEs, the minimum time is 0.5s ~ 1s for dual motor-driven structure and 1.5s ~ 3s for single motor-driven structure.

7. Installation and regulation

1. Installation of switching body

   Fix the switching body on the enclosure firmly, wire the incoming and outgoing terminals of the two circuit breakers as per primary scheme drawing Fig. 1 and earth the device reliably. For a 4-pole circuit breaker, the working power for whole HSQ1 is ready. Yet for a 3-pole circuit breaker, an additional N line should be connected to N terminal of the device before HSQ1 works normally.

2. Installation of controller

   Fix the HSQ1 Controller on an opening panel of a case or a board with two supports that go with the equipment, and then put the special plug from switching body to the socket of the controller in place. If the customer wants remote closing operation, the corresponding control cable should be connected well as required. If HSQ1 grid - generator controller is used, start/stop generator signal should be connected in place.
Because the electronic controller is directly fixed on switching body, there is no need to pierce holes for the controller on panel of case or board for HSQ1y or HSQ1j Automatic Transfer Switching Equipment. However, according to actual need, several holes for indicating lamps may be pierced for power indication or breaker status indication and so forth (see Figs. 2a and 2b). The rated working voltage of indicating lamp is AC 230V. The HSQ1j Controller is shown in Figs. 3a and 3b.

**Feature:**

- Working mode and parameter transfer may be set through controlling buttons.
- Fire extinguishing interacting control function: There are one group of passive fire signal input terminals in the intelligent controller. The signal input is isolated by optic coupling resulting in high disturbance proof. And furthermore, a group of passive feedback signal output terminals will feed the destination signal for the circuit breaker to the fire extinguishing equipment.
- Start/stop control function for generator: One group of relay stem nodes are remained for start and stop of a generator.
Terminal and wire

1. 101, 102: Terminals for normal power zero line to a 3-pole circuit breaker (anyone of 3 poles wired only);
2. 201, 202: Terminals for spare power zero line to a 3-pole circuit breaker (anyone of 3 poles wired only);
3. 301 ~ 303: Output of external status indicating lamps for normal power (AC220V 0.5A);
   - 301: Common zero line for indicating lamps
   - 302: Output of normal power signal
   - 303: Output of normal power closing signal
4. 401 ~ 403: Output of external status indicating lamps for spare power (AC 220V 0.5A);
   - 401: Common zero line for indicating lamps
   - 402: Output of spare power signal
   - 403: Output of spare power closing signal
5. 501 ~ 503: Output terminals for generator start control signals.
   - If a spare power comes from an auto-start generator-set, the customer may connect between 501 ~ 503 terminals and a generator controller to realize auto-start function for the generator set.
   - Internally, 501 ~ 503 is a group of 3A passive stem nodes on a relay. 503 is a common terminal of the relay, and 501 is the normally closed contact whereas 502 is a normally open contact of the relay.
6. 601 ~ 604: Fire extinguishing interacting control terminals used for turning off power by remote control after alarm given from fire equipment.
   - 601 and 602: Input terminals for fire extinguishing interacting control signal. Only one group of passive normally open contacts can be connected externally.
   - 603 and 604: A group of normally open stem node internally for fire action back signal. The terminals are normally open if everything is OK. If a fire signal goes to the controller and ATSE transfers to open position, 603 and 604 terminals are closed. The ATSE will stop working after the fire interacting function begins. Only when the fire signal is cancelled and auto/manual switch on control panel transferred once can the ATSE function normally.

Control panel

1. Normal power indicating lamp
   - When the voltage of normal power is OK, the lamp goes on.
2. Spare power indicating lamp
   - When the voltage of spare power is normal, the lamp goes on.
3. Normal power ON indicating lamp
   - When ATSE is at normal power position, the lamp goes on.
   - When Controller is at returning time delay, the lamp flashes.
4. Spare power ON indicating lamp
   - When ATSE is to spare power position, the lamp goes on.
   - When Controller is at returning time delay, the lamp flashes.
5. Auto/Manual transfer mode selecting switch
   - If the handle of the switch is at left position, the ATSE is in automatic transfer mode. If the handle is at right position, it is in manual mode.
3. Regulation

After correct installation as per above requirement, regulation may be performed.

Regulation of HSQ1y and HSQ1j ATSES

Put the Auto/Manual switch on the controller to auto position and the equipment begins to work. If a certain circuit breaker is at closed position before energized, its closed indicating lamp will go on now. Regulation may be performed as per Table 3 and Table 4 item by item. In Tables 3 and 4, N and R represents circuit breakers in normal power circuit and spare power circuit respectively.

Normal power time delay, spare power power time delay, auto transfer auto reset and auto transfer without reset are needed to be set by the customer (only auto transfer auto reset for HSQ1j) according to actual need. Attention: if the switch is at auto position but there is no response from equipment or a circuit breaker in a normal circuit cannot be closed, inspection should be made to see whether there is damage in two fuses on the switching body. As there is no fuse for HSQ1j, if it is the case in HSQ1j, the controller for HSQ1j should be replaced.

If a customer needs to perform a power frequency withstand voltage test, the electronic controller should be removed away from equipment for the time being. Otherwise, the electronic controller and a motor in motor-driven operating mechanism will possibly be damaged hereby.

Regulation of HSQ1 ATSE

Grid - grid controller:

The panel of grid - grid controller is shown in Fig. 4

1) Turn on "power" switch 4 to energize the controller and the "operation" indicating lamp 10 goes on. If both normal power and spare power are OK, the "normal power OK" 8 and "spare power OK" 14 indicating lamps go on.

2) Press down "normally closed" button 18 in the "manual operation" area, the controller gives off closing command to normal power circuit breaker and the "supply from normal power" indicating lamp 7 goes on to indicate that the circuit breaker is closed. Press down "spare closing" button 19 to open the normal power circuit breaker and close the spare power circuit breaker. At this, the "supply from normal power" indicating lamp 7 goes off and the "supply from spare power" indicating lamp 15 goes on. Press down "breakdown re-latch" button 20, any circuit breaker in closed position will be open immediately. If a certain circuit breaker is tripped from closed position due to overload or short circuit, "CB tripped" indicating lamp 6 or 16 goes on. After the fault is cleared away, press down the "breakdown re-latch" button 20 to re-latch the circuit breaker for ready to close.

3) Press down "auto reset" button 1 or "no auto reset" button 2 in "auto-operation" area, and the controller will enter auto control mode. Regulation will be performed as per Tables 3 and 4. The "test" button 3 is used to mimic normal power in fault although the normal power is OK actually. ATSE will transfer to spare power automatically after a time delay.

4) "Undervoltage threshold value" is 0.7, 0.75 or 0.8 rated working voltage Ue. If the power voltage is less than set value, the controller judges to be a power fault. "Overvoltage threshold value" is 1.1, 1.15 or 1.2 rated working voltage Ue. If the power voltage is higher than set value, the controller judges to be a power fault also. "Transfer time delay" is 0 ~ 60s adjustable and "reset time delay" is 0 ~ 30s adjustable. Their function is described in working principle in Chapter 6. The above 4 parameters may be set by customers according to actual need.

5) If terminals 12 and 13 at rear of the controller are short circuited, the "remote control" indicating lamp 11 goes on. At this, any circuit breaker in any circuit in closed position will be open immediately by a signal given off from the controller. If terminals 12 and 13 are parted, the "remote control" indicating lamp goes off and the controller is restored to original status.
6) If voltage of two powers is not in the set range, the "fault" button 12 on the controller goes on and ATSE remains intact. If voltage is OK through above regulation, press down "auto reset" or "no auto reset" button, the ATSE begins to enter automatic control mode.

7) The 10# and 11# terminals behind the controller have a fire fighting linkage signal feedback function, which is a set of normally open contacts. (This function is user optional, when the order is marked.)

Grid - generator controller:

The panel layout of grid - generator controller is shown in Fig. 5. The panel of grid-generator controller is basically the same as that of grid - grid controller. Their differences rest in "start time delay" 13 becoming "transfer time delay" for a motor, and "reset time delay" 17 becoming "transfer time delay". Compare to grid - grid controller, there is one more start/stop generator signal output for grid - generator controller.

Concrete procedure: Say there is a fault (overvoltage or undervoltage) in normal power (grid). If the normal power cannot restore OK within a "start time delay" t1, the controller will close terminals 25 and 26 which are connected to passive normally open contacts. If there is no voltage output from normal power (grid), the controller will close terminals 25 and 26 directly without any time delay and give this signal to start the generator. When the generator voltage comes to a normal range set, the controller will give out a transfer signal to transfer load back to the normal power. After a time delay of 1 minute, the controller will give out a stop generator signal to disconnect contacts wired to terminals 25 and 26. If the normal power restores OK and the controller is set at auto transfer without reset position, the controller will not give out any transfer signal and stop generator signal at all.

Regulation of HSQ1 (Z Type) ATSE

The panel of HSQ1 (Z Type) Controller is shown in Fig. 6.

Grid - grid controller:

1) Turn on power switch 6 to energize the controller and "Welcome to using Hangshen Apparatus" will be shown in the controller liquid crystal display which represents that the controller begins working. As the controller executes control function according to system set parameter, the lettering picture will last 10 seconds and phase voltage display begins.

2) Manual operation: Press down closing button 4 of power I and the controller will give out a closing command to power I then closing indicating lamp 7 for power I goes on. Press down closing button 3 of power II and the controller will give out closing command to power II then closing indicating lamp 9 for power II goes on. Press down breakdown re-latch button 2, any circuit breaker in closed position will be open immediately. If a certain circuit breaker is tripped from closed position due to overload or short circuit, CB tripped indicating lamp 8 or 10 goes on. After the fault is cleared away, press down the breakdown re-latch button 2 to re-latch the circuit breaker for ready to close.

3) Auto operation: Press down auto button 5 and the controller will enter auto control mode. If power I is a main power, the controller will control ATSE to auto transfer auto reset for power I and vice versa if power II is a main power. If there is no main power and the two powers are backed up for each other, the controller will control ATSE at auto transfer without reset position. The actual parameter will be set through combined button 1 and liquid crystal picture 11.

4) Remote operation: If terminals 12 and 13 at rear of the controller are short circuited, any circuit breaker in any circuit in closed position will be open immediately. If terminals 12 and 13 are parted, the controller is restored to original status.

5) For regulation of communication function, please refer to description of communication protocol and wire should be made as per RS - 485. The regulation is realized through upstream computer. Only when the communication control of the controller is set to "remote" can the unit receives "write" operation from upstream computer.

6) If above regulation is made successfully, the equipment may come into use right away. Before operation, set all parameters according to needs to avoid other unexpected operation.
Grid - generator controller

In the control process from grid - generator controller, generator start time delay and idling time delay functions are added. Concrete procedure: If there is an abnormal event occurred in grid power (overvoltage and undervoltage) and fault cannot be cleared away within “start time delay” t1, the corresponding passive normally open contacts at terminals 25 and 26 at rear of the controller will be closed. If there is no voltage output from normal power (grid), the corresponding passive normally open contacts at terminals 25 and 26 will be directly closed without any time delay to start the generator immediately with this signal. When the generator voltage comes to the set normal range, the controller will transfer the load to the generator after a transfer time delay t2. If the normal power restores OK and the grid power is set as a main power, the controller will give out a command to transfer load back to the normal power. After an idling time delay, the controller will give out a stop generator signal to disconnect contacts wired to terminals 25 and 26. If the generator power is set as a main power, the controller will not give out any transfer signal and stop generator signal at all after the grid power restores OK.

Attention: If the circuit breaker is tripped because of overcurrent, the ATSE will not make any transfer operations.

8. Overall and installation dimensions

1. The overall and installation dimensions for HSQ1j - 63 shown in Fig. 7

![Fig. 7](image)

2. The overall and installation dimensions for HSQ1y - 63 shown in Fig. 8

![Fig. 8](image)
3. The overall and installation dimensions for HSQ1y-125 and 160 shown in Fig. 9 (common for 3-pole and 4-pole ones)

![Fig. 9](image_url)

4. The overall and installation dimensions for HSQ1 Series Switching Body (with single operating mechanism) shown in Fig. 10 and Table 5

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions</th>
<th>3-pole</th>
<th>4-pole</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSQ1 - 125</td>
<td>A 405</td>
<td>156</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td>B 300</td>
<td>147</td>
<td>117</td>
</tr>
<tr>
<td>HSQ1 - 160</td>
<td>C 140</td>
<td>163</td>
<td>128</td>
</tr>
<tr>
<td></td>
<td>D 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HSQ1 - 250</td>
<td>L 170</td>
<td>162</td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>H 175</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HSQ1 - 400</td>
<td>K 314</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HSQ1 - 800</td>
<td>M 328</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>N 217</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>K 222</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>I</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5. The overall and installation dimensions for HSQ1 Series Switching Body (with double operating mechanisms) shown in Fig. 11 and Table 6

![Fig. 11](image)

![Fig. 12](image)

Table 6 The overall and installation dimensions for HSQ1 Series Switching Body (with double operating mechanisms)

<table>
<thead>
<tr>
<th>Type</th>
<th>Dim</th>
<th>A</th>
<th>W</th>
<th>L</th>
<th>B</th>
<th>C</th>
<th>d</th>
<th>H1</th>
<th>H2</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSQ1 – 125s</td>
<td></td>
<td>400</td>
<td>78</td>
<td>103</td>
<td>170</td>
<td>300</td>
<td>140</td>
<td>9</td>
<td>230</td>
</tr>
<tr>
<td>HSQ1 – 160s</td>
<td></td>
<td>400</td>
<td>90</td>
<td>120</td>
<td>170</td>
<td>300</td>
<td>140</td>
<td>9</td>
<td>225</td>
</tr>
</tbody>
</table>

6. The overall and installation dimensions for HSQ1 Controller

The overall and installation dimensions for HSQ1 Controller are shown in Fig. 12. It may be embedded in a door of a case or a cabinet. Its piercing oblong hole is 228×114 in mm.

![Fig. 12](image)
7. Electric schematic drawing of HSQ1 Series

7.1 Electric schematic drawing of HSQ1y-63

Note: In dotted lines, wire should be made by customers.

Q1, Q2 Circuit Breaker
K1, K2 Micro switch
C Capacitor
PG Connection item (connecting to the controller)
M Motor
JX Wiring terminal
KA1 Intermediate relay

Attention: Internal active output, prohibit access to power supply and prevent short circuit.

7.2 Electric schematic drawing of HSQ1y-125,160

Note: In dotted lines, wire should be made by customers.

Q1, Q2 Circuit Breaker
Q1B, Q2B Tripping alarm contacts in CB
Q1F, Q2F Auxiliary contacts in CB
PG Connection item (connecting to the controller)
C Capacitor
M Motor
K1, K2 Micro switch

Attention: Internal active output, prohibit access to power supply and prevent short circuit.
7.3 Electric schematic drawing of HSQ1-125~800 / with single operating mechanism

Communication interface definition for HSQ1(Z)

- 5 - GND
- 9
- 4
- 8
- 3 - A (+)
- 8 - B (-)

7.4 Electric schematic drawing of HSQ1-125s~160s / with dual operating mechanism

Note: In dotted lines, wire should be made by customers.
Q1, Q2 Circuit breaker
Q3, Q4 MCB
Q1B, Q2B Tripping alarm contacts in CB
Q1F, Q2F Auxiliary contacts in CB
K3, K4 Micro switch
M Motor
C Capacitor

Note: In dotted lines, wire should be made by customers.
Q1, Q2 Circuit breaker
Q3, Q4 MCB
Q1B, Q2B Tripping alarm contacts in CB
Q1F, Q2F Auxiliary contacts in CB
DC1, DC2 Motor-driven operating mechanism

Code number of controller socket:
1 - Normal phase N
2 - Normal phase B
3 - Normal phase A
4 - Normal phase C
5 - Spare phase N
6 - Spare phase A
7 - Spare phase B
8 - Spare phase C
9 - Earthing

Fire control feedback signal, passive NO contact
Contact capacity: 1A/AC 250V
Fire fighting signal, internal active, please connect the passive contact. Switch dual-disconnect when the contact is closed.
Rated power supply is used for generator delay start, without delay can not be connected

10 - Common phase N
11 - Spare closing indication
12 - Normal closing indication
13 - Spare tripping indication
14 - Normal tripping indication
15 - Spare closing command
16 - Normal opening command
17 - Normal closing command
18 - Spare opening command
19 - Generator start signal, passive normally open contact, contact capacity: 5A/AC250V

User connection schematic

The dotted line frame is the connection part of the user and the other parts have been completed by the factory connection and debugging.
## 9. Ordering information

**HSQ1y (CB class) ordering information**

<table>
<thead>
<tr>
<th>Customer</th>
<th>Quantity</th>
<th>Order date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poles number</td>
<td>□ 3P □ 4P</td>
<td></td>
</tr>
<tr>
<td>Model</td>
<td>Rated current</td>
<td>Note</td>
</tr>
<tr>
<td>HSQ1y - 63</td>
<td>□ 6A □ 10A □ 16A □ 20A □ 25A □ 32A □ 40A □ 63A</td>
<td>Only by manual operation to dual-disconnect circuit breakers</td>
</tr>
<tr>
<td>HSQ1y - 125</td>
<td>□ 12.5A □ 16A □ 20A □ 25A □ 32A □ 40A □ 50A □ 63A □ 80A □ 100A □ 125A</td>
<td>Using remote control contact to dual-disconnect breakers. (Non feedback signal)</td>
</tr>
<tr>
<td>HSQ1y - 160</td>
<td>□ 16A □ 20A □ 32A □ 40A □ 50A □ 63A □ 80A □ 100A □ 125A □ 160A</td>
<td>Using remote control contact to dual-disconnect breakers. (Non feedback signal)</td>
</tr>
</tbody>
</table>

**HSQ1j (CB class) ordering information**

<table>
<thead>
<tr>
<th>Customer</th>
<th>Quantity</th>
<th>Order date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poles number</td>
<td>□ 2P □ 3P □ 4P</td>
<td></td>
</tr>
<tr>
<td>Model</td>
<td>Rated current</td>
<td>Note</td>
</tr>
<tr>
<td>HSQ1j - 63</td>
<td>□ 6A □ 10A □ 16A □ 20A □ 25A □ 32A □ 40A □ 63A</td>
<td></td>
</tr>
</tbody>
</table>
## HSQ1 (CB class) ordering information

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<th>Customer</th>
<th>Quantity</th>
<th>Order date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poles number</td>
<td>□ 3P □ 4P</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Rated current</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSQ1-125</td>
<td>□ 12.5A □ 16A □ 20A □ 25A □ 32A □ 40A □ 50A □ 63A □ 80A □ 100A □ 125A</td>
<td></td>
</tr>
<tr>
<td>HSQ1-160</td>
<td>□ 16A □ 20A □ 32A □ 40A □ 50A □ 63A □ 80A □ 100A □ 125A □ 160A</td>
<td></td>
</tr>
<tr>
<td>HSQ1-250</td>
<td>□ 100A □ 125A □ 160A □ 180A □ 200A □ 225A □ 250A</td>
<td></td>
</tr>
<tr>
<td>HSQ1-400</td>
<td>□ 200A □ 225A □ 250A □ 315A □ 350A □ 400A</td>
<td></td>
</tr>
<tr>
<td>HSQ1-800</td>
<td>□ 500A □ 500A □ 630A □ 800A</td>
<td></td>
</tr>
</tbody>
</table>

| Operation type | □ Single motor-driven operating mechanism | Dual-motor-driven operating mechanism only for HSQ1-125 and HSQ1-160 |

<table>
<thead>
<tr>
<th>Controller</th>
<th>Type</th>
<th>Optional functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Grid - Grid</td>
<td>□ Grid - Generator</td>
<td>□ Grid - Grid (Z type)</td>
</tr>
</tbody>
</table>

The controller is installed in a split type, and the length of the cable is 1.8m.