AUTOMATIC TRANSFER SWITCHES

Instructions
(MCCB TYPE)

BREAKER & SWITCHGEAR SYSTEM
Index

A. General description P2
B. MCCB TYPE Specification P2
C. The main structure analysis diagram P3
D. The main structure description P3
E. Control panel - Electronic P4
F. Control circuit diagram P4
G. Control Panel configuration diagram P5
H. Overall dimensions (mm) P6
I. Working Chart P7
J. Automatic Transfer Switch Component description P7
K. Frequently asked questions and easy maintenance of Description P9
A. General description

The company’s product is under the control by the strict-quality production, in full compliance with IEC standard, the control panel through the EMC certification (anti-surge, anti-noise), quality guaranteed products with high performance, high trust, and provide you with the most satisfactory service.

1. Apparatus there is access control to be installed in the electrical room, to avoid the non-electrical maintenance staff or children close, resulting in erroneous action or a sense of power accident.

2. Placement:
Install the ATS unit in any protected environment that provides adequate airflow around unit and is free from excessive dust, corrosive fumes inflammable material and conductive contaminants. Do not operate your ATS in an environment where the ambient temperature or humidity is high.

3. Transmission before the Note:
1. First of all, ATS switch to the OFF position
2. Check power line wiring is correct
3. Remove all unnecessary ATS wiring beside Normal power, back-up power, and load
4. Inspection commonly used power supply, Emergency power, load power whether there are short-circuited or grounded
5. Inspection commonly used power supply, standby power, load power of the terminals have locking
6. Control panel prohibited to use Pak 10000 Ohmmeter high voltage insulation apparatus measurements, for electric components safety.

4. Transmission in use Note:
1. During repair or operation is strictly prohibited contact with any terminal.
2. Do not rotation manual operation (except in special circumstances).
3. In addition to a specific need, please do not arbitrarily change any switch.

5. Manual Operation
When the main switch for some reason, after escape, purports to switch reversion to use, or because of some accident can not be automatically converted when the operation of the following ways:
Please motor connector before the operation quickly detached and manually switch to the anti-clockwise direction to your desired location, switches have ON, OFF position indicative of the power supply.

B. MCCB TYPE Specification

<table>
<thead>
<tr>
<th>Type</th>
<th>Pole</th>
<th>Rated current In (A)</th>
<th>AC Rated Breaking Capacity Sym r.m.s(KA)</th>
<th>IEC 60947-2 Icu</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>220V</td>
<td>380V</td>
</tr>
<tr>
<td>BS100CN</td>
<td>2P, 3P, 4P</td>
<td></td>
<td>10, 15, 20, 30, 40, 50, 60, 75, 100.</td>
<td>10</td>
</tr>
<tr>
<td>BS100SN</td>
<td>2P, 3P, 4P</td>
<td></td>
<td></td>
<td>7.5</td>
</tr>
<tr>
<td>BS100HN</td>
<td>2P, 3P, 4P</td>
<td>125, 150, 175, 200, 225.</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>BS225CN</td>
<td>2P, 3P, 4P</td>
<td></td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>BS225SN</td>
<td>2P, 3P, 4P</td>
<td></td>
<td></td>
<td>50</td>
</tr>
<tr>
<td>BS400CN</td>
<td>2P, 3P, 4P</td>
<td>250, 300, 350, 400.</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>BS400SN</td>
<td>2P, 3P, 4P</td>
<td></td>
<td></td>
<td>35</td>
</tr>
<tr>
<td>BS400HN</td>
<td>2P, 3P, 4P</td>
<td></td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>BS600CN</td>
<td>3P, 4P</td>
<td></td>
<td>500, 600.</td>
<td>50</td>
</tr>
<tr>
<td>BS600SN</td>
<td>3P, 4P</td>
<td></td>
<td></td>
<td>35</td>
</tr>
<tr>
<td>BS600HN</td>
<td>3P, 4P</td>
<td></td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>BS800CN</td>
<td>3P, 4P</td>
<td></td>
<td>700, 800.</td>
<td>85</td>
</tr>
<tr>
<td>BS800SN</td>
<td>3P, 4P</td>
<td></td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>BS800HN</td>
<td>3P, 4P</td>
<td></td>
<td></td>
<td>50</td>
</tr>
<tr>
<td>BS1000HS</td>
<td>3P</td>
<td></td>
<td>1000.</td>
<td>100</td>
</tr>
<tr>
<td>BS1200HS</td>
<td>3P</td>
<td></td>
<td>1200.</td>
<td>100</td>
</tr>
<tr>
<td>BS1600HS</td>
<td>3P</td>
<td>1400, 1600.</td>
<td>130</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

Note 1: Rated Breaking Capacity (kA) IEC 60947-2
Note 2: Special breaking capacity please contact sales representative.
C. The main structure analysis diagram

D. The main structure description

(1). Shihlin Brand Molded Case Circuit Breaker (Shihlin Electric circuit breakers quality guaranteed).
(2). The Input Display: Display change the red ON / Green OFF conditions, when ATS switch escape from the status quo.
(3). Manual operating handle:
   a. Mode of operation, depending on the direction of rotation against the clock to make switch to change the ON and OFF.
   b. Optional handles with locks, to prevent equipment by non-management staff of arbitrary action, while the damage.
(4). BTS Terminal Blocks
(5). Gear Motor: The composition of induction motor and reduction gear, according to torque required switch configuration.
(6). Transmission gear switch structure.
(7). Mechanical Interlock devices:
   The use of seesaw principle of chain device, in any side of the MCCB inputs on the other side of the bakelite MCCB will bulge to withstand the primary contact, to avoid both sides of the Switch inputs at the same time.
(8). Load-side bus (400A and above):
   Copper forging, jumper two of the secondary side switches, copper-handling devices on the base below the copper connections with copper pillars connected with each other, after locking, and to Silver welding, strengthening the conductive area, resin covered conductive adhesive as a whole at any thickness up to 1.5mm, insulation withstand voltage of over 1000V or more.
E. Control panel - Electronic

1. Features
   a. Following EMC standard (IEC 60947-6), with anti-surge and anti-noise capability.
   b. Reading Status Easily: LED lights show status of power supply and load.
   c. Self-testing function:
      (1). Generator testing switch (AUTO-ON-OFF)
      (2). Normal power failure simulation test (TEST-AUTO)
   d. Flexibility: Option function for “Over and under voltage protector” and “Input phase fault detector”

2. Delay timer instructions
   a. TDEN: Time delay of transfer from Emergency to Normal when the normal power returned to normal.
   b. TDNE: Time delay of transfer from Normal to Emergency when the normal power supply is abnormal.
   c. TDES: Time delay on engine starting when the normal power supply is abnormal. (Fixed 4 seconds).
   d. TDEC: Time delay for engine cool-off after the power supply from the emergency power to the utility power.

F. Control circuit diagram

Supply voltage: AC 220V 50/60Hz
Disk hole size: 194.5mm Width (W) x 164mm high (H)

Notes:
1. S1 Generator Remote Control Auto / Test function
2. S2 Common side power simulation test
3. Dashed line for the additional equipment
4. Controlling voltage is 220V, if no please install the transformer voltage

Code Description:
- TNR, TER, ER: Power Relay
- M: Motor
- TDEN: from emergency to normal power supply switching time required
- TDNE: from normal to emergency power supply switching time required
- TDEC: generator shutdown delay time
- TDES: generator start time delay
**G. Control panel configuration diagram**

---

### Control panel (back) Description

![Diagram](image)

---

### 3P-ATS access line 3Ø3W 220V

![Diagram](image)

---

### 3P-ATS access line 3Ø4W 220V/380V

![Diagram](image)

---

### 4P-ATS access line 3Ø4W 220V/380V

![Diagram](image)

---

### ATS for the 3P Connection:

**System voltage:**
- **3Ø3W 220V:** Normal power supply connect to R, T, Emergency power connect to U, W.
- **3Ø4W 220/380V:** Normal power supply connect to R, Emergency power connect to U, neutral (N) connect to T, W.
- **3Ø3W 380 ~ 480V above:** Normal power supply through the transformer into a 220V connect to R, T, Emergency power through the transformer into a 220V connect to U, NE.

---

### ATS for the 4P connection mode:

**System voltage:**
- **3Ø4W 220/380V:** Normal power supply connect to R, NN, Emergency power connect to U, NE.
- **3Ø4W 120/208V:** Normal power supply connect to R, T, Emergency power connect to U, W.

---

### Notes:

The control power supply for 220V input, such as input supply must be installed without 220V transformer (PT).
- Transformer (PT) selected:
  - a. 225AT: The following selection of 100VA.
  - b. 250 ~ 400AT: selection 150VA.
  - c. 500AT: selection above 300VA.
H. Overall dimensions (mm)

3P BS100 & BS225 type

4P BS100 & BS225 type

3P BS100 & BS225 high capacity(kA) type

4P BS100 & BS225 high capacity(kA) type

3P BS400 type(including high capacity(kA))

4P BS400 type(including high capacity(kA))

3P BS600 & BS800 type

4P BS600 & BS800 type

3P BS1000 above high capacity(kA) type

Description:
1. This table using the units of millimeters (mm) mark.
2. This form is only marked (for industrial use - Standard type) size.
3. This table is for standard specification, if requir the special specification, please contact representative.
I. Working Chart of the ATS

<table>
<thead>
<tr>
<th></th>
<th>TDES</th>
<th>TDNE</th>
<th>TDEN</th>
<th>TDEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORMAL SOURCE (N1,N2,N3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMERGENCY SOURCE (E1,E2,E3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GENERATOR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOAD (L1,L2,L3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REMOTE GENERATOR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE:
1. Generator is Start by Manual operation or Signal from F-G Terminal (TDES)
2. Time for Mechanical Transfer position
3. TDES = is fixed time 4 sec

J. Automatic Transfer Switch Component description

Note. **"Number table is non-standard goods, For purchase information, please contact the company, and in order that stated in**

* 1. TIME DELAY ON ENGINE STARING (TDES)
   When the normal(common) power supply is irregular or disappear, the engine will start after 4 seconds (standard)
   A. Fixed 4 second (standard)
   B. Adjustable 1 ~ 3 minutes (custom)

2. TIME DELAY NORMAL TO EMERGENCY (TDNE)
   When the normal(common) power loss, while the engine starting voltage is established, the relay (TDEN), begin to set the value of time, so that normal(common) power switch to emergency(standby) power supply.
   A. Adjustable 1 ~ 30 seconds (standard)
   B. Adjustable 1 ~ 60 seconds (custom)
   C. Adjustable 1 ~ 30 minutes (custom)

3. TIME DELAY EMERGENCY TO NORMAL (TDEN)
   When the normal(common) power supply is back to normal, the relay (TDEN), that is set to embark on the value of time, so that emergency(standby) power switch to the normal(common) power.
   A. Adjustable 1 ~ 30 seconds (standard)
   B. Adjustable 1 ~ 60 seconds (custom)
   C. Adjustable 1 ~ 3 minutes (custom)

4. TIME DELAY FOR ENGINE COOL OFF (TDEC)
   When the normal(common) to restore power supply, and switch is completed, the relay (TDEC), namely, the value set to embark on the start time so that the engine generator under no-load shutdown.
   A. Adjustable 1 ~ 60 seconds (custom)
   B. Adjustable 1 ~ 3 minutes (standard)
   C. Adjustable 1 ~ 30 minutes (custom)

5. TEST SWITCH
   This switch can be used assuming power outage, so that generator operation and load testing functionality of ATS.
6. **Two / three-stage selector switch**
   A. TEST: Available on the assumption that power outage, so that generators start, and switch to standby (emergency) power supply.
   B. OFF: to make the engine shut down.
   C. AUTO: in this location.

7. **PILOT LIGHTS**
   Emergency(standby) power load indicator (red)
   Normal(common) power load indicator (green), made

8. **ENGINE START CONTACTS**
   Is used to control the engine starter generator

9. **RELAY AUXILIARY CONTACTS**
   Normal(common) power auxiliary relay (NR) 2a2b contact
   Emergency(standby) power auxiliary relay (ER) 2a2b contact

* 10. **High Breaking Capacity Molded Case Circuit Breaker**
   If you need this high capacity (kA) non-melting line circuit breaker can refer to the company’s MCCB catalog choice.

* 11. **REV. PREVENING RELAY**
   Could confirm that the phase sequence and the lack of three-phase phase, to prevent the reverse-phase motor running. The protector system has nothing to do with voltage detection and the load.

* 12. **UNDER VOLTAGE RELAY**
   A. Mining-phase protection design standards, with a view to operating voltage voltage display from 85 ~ 264V, detection voltage range of 1V ~ 499V, can be set to escape and restore the value.
   B. Normal(common) side and Emergency side 3 the installation of a three-phase protection.

* 13. **OVER VOLTAGE RELAY**
   Over-voltage sensing relays, the detection voltage range of 1V ~ 499V, can be set to escape and restore the value.

14. **CONTROL FUSE**
   Control circuit with fuse, just installed in the main control line.

* 15. **Remote-line non-single-contact**
   If the generator itself, the remote control circuit is not a single contact, that is, remote control line in three or more, please specified.
K. Frequently asked questions and easy maintenance of Description

1. Why normal power outages, generators will not start?

   Solutions:
   a. Control panel to selectively switch (AUTO-OFF-TEST) change to the “TEST” position. (This feature is to launch a remote control signal generator)
   b. Generator does not start factors:
      i. Generator Remote Cord not linked: Please connect.
      ii. Generator itself isn’t on automatic position: Please change to the automatic position.
      iii. Signal diameter is too small (or too far away), change more than 3.5mm².
   c. After following A and B action, change switch back to “AUTO” position.

2. Why Normal power outages, generators started, but there is no switching power supply?

   Solutions:
   a. To determine the control panel, whether the standby power LED lights be switched on or micro-light.
   b. No lighting condition Description:
      i. Not yet reached the ATS generator voltage output of a measurement (the amount of UW whether there is 220V)
      ii. N-phase generator Missed.
      iii. Control panel fuse burned: Please take control back of the spare fuses for replacement.
   c. There are lighting conditions: Measuring (8), (10) whether there is 220V.
      A. No, to confirm the motor capacitor line then good.
      B. Yes, please contact the technical staff. (Possibly motor immersion)

3. Why is the normal power is restored, but did not switch power supply?

   Solutions:
   a. To determine the control panel, LED lights were used on incoming calls whether the switch-or micro-light.
   b. No lighting condition Description:
      i. Normal power voltage output not yet reached the ATS time measurements (the amount of (R), (T) whether there is 220V)
      ii. Missed normal power N-phase
      iii. Control panel fuse burned down: (if (R), (T) with 220V) Please take control back of the spare fuses for replacement
      iv. Control panel, change switch back to “auto” position.
      v. (11), (21) contact is short-circuit chip is loose.
   c. There are lighting conditions: Please contact the technical staff.
4. Why is the normal power is restored, generators can not be shut down after the time?

   Solutions:
   a. To confirm whether the COOL OFF lights switched on
   b. Lighting conditions Note: (generator operation)
      i. Generating its own built-in delay shutdown feature.
      ii. Check “TDEC” timer in the other sets ATS.
      iii. Generator is switched to automatic.
   c. No lighting: Please contact the technical staff.

5. Normal power supply and power LED lights are available but no output?
   Status: AUX circuit breaker may malfunction.
   Solution: Please contact the technical staff.

6. Generator power and LED lights are available but no output?
   Status: AUX circuit breaker may malfunction.
   Solution: Please contact the technical staff

7. Why ATS has been rotating motor will not stop?
   Status:
   a. Breaker failure.
   b. Mechanical chain of failures.
   Solution:
   a. Please remove control panel (8) line (motor power line)
   b. Please contact the technical staff.
Based in Taiwan

Breaker & Switchgear System

Towards the Development of Globalization

VCB
Vacuum Circuit Breaker

MCB / ELCB
Miniature Circuit Breaker

BHA
Miniature Circuit Breaker

ACB
Air Circuit Breaker

SW1 100-P
Pre-Payment Electricity Meter

BHP
Surge Protective Device

MCCB / ELCB
Molded Case Circuit Breaker / Earth-Leakage Circuit Breaker

MS
Magnetic Contactor / Switch

SW3005
Multi-function Electricity Meter

BBIT
Sleeve

SLPR
3-phase Sequence Protection Relay

ATS
Automatic Transfer Switches

SPM8
Digital Multi-Meter

BW
Wall Switch & Socket
BREAKER & SWITCHGEAR SYSTEM