TSUBAKI SHOCK RELAY SB Series

Electrical Overload Protectors
Improved ease of use

Even better usability thanks to the combination of a self-holding type and an automatic reset type. Also, the built-in CPU allows for stable current detection.

Electrical Overload Protector
SHOCK RELAY

Introduction of the new SB Series!

Features

- Select between a self-holding output relay or an automatic reset output relay
- Compact thanks to an integrated CT
- Compatible with a wide range of power sources
  Standard products are compatible with AC/DC24 to 240V power sources.
- Stable current detection
  Using the digital circuitry of the built-in CPU allows for even more stable current detection.
- CE marking
- RoHS compliant
- CCC certification, UL/cUL certification
**Application**

- **Jamming detection in packaging machines**
  (To prevent damage to cutters)

- **Overload protection for washers**
  (Usable in machines that use water because it is installed in the control panel)

- **Shredders**
  (To enable a temporary stop when the load becomes excessive)

- **Various other applications**
  - Lifting equipment
  - Chip conveyors
  - Screw conveyors
  - Mixers
  - Water treatment facilities
  - Garbage disposal facilities
  - Feeder
  - Food processing machines, etc.
What is the SHOCK RELAY?

Quick overcurrent detection

The SHOCK RELAY outputs a signal if the current from a motor exceeds the set value for longer than the set amount of time. For example, when foreign material causes a conveyor to jam, the signal from the SHOCK RELAY can help minimize damage to the equipment.

Easy to install on existing equipment

Because the SHOCK RELAY is an electric protection device, it can be mounted on existing equipment without making intensive mechanical modifications similar to mechanical protection devices.

Operates only when an overcurrent occurs

The shock time setting makes it possible to prevent a motor from shutting down due to device-specific pulsations or short overcurrent occurrences.

Operation modes

Overload operation mode

The SHOCK RELAY will not operate if the motor starting current is detected within the time set for the start time.

The SHOCK RELAY will not operate if a short overcurrent does not exceed the time set for the shock time.

The SHOCK RELAY will operate if an overcurrent lasts longer than the time set for the shock time.

Model No.

TSB S B 05

SHOCK RELAY
SB Series
Frame No.
### Various part names and functions

- **MON lamp**: The MON lamp is on during normal monitoring and turns off when the shock time is exceeded.
- **OC lamp**: The OC lamp flashes when the current setting is exceeded and is illuminated when the shock time is exceeded.
- **CT (current transformer)**: Indicates the current transformation.
- **DIP switch**: Relay operation output selection.
- **Test button**: Used for testing the relay.
- **Reset button**: Used to reset the relay.
- **Load current setting knob**: 0.2 to 10s.
- **Start time setting knob**: 0.2 to 5s.

*Picture shows the SHOCK RELAY with the DIP switch cover removed.*

### Standard specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>TSESB05</th>
<th>TSESB10</th>
<th>TSESB30</th>
<th>TSESB60</th>
<th>TSESB100</th>
<th>TSESB200</th>
<th>TSESB300</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model No.</strong></td>
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<tr>
<td><strong>Current setting range</strong></td>
<td>0.5 to 6 A</td>
<td>1 to 12 A</td>
<td>3 to 30 A</td>
<td>5 to 60 A</td>
<td>10 to 100 A</td>
<td>20 to 209 A</td>
<td>30 to 300 A</td>
</tr>
<tr>
<td><strong>Time setting range</strong></td>
<td>Start time</td>
<td>Shock time</td>
<td></td>
<td></td>
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<tr>
<td><strong>Current accuracy setting</strong></td>
<td>±10% (Full scale)</td>
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<tr>
<td><strong>Operation power</strong></td>
<td>24 to 240 V AC/DC ±10%, 50/60 Hz</td>
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<tr>
<td><strong>Maximum motor circuit voltage</strong></td>
<td>600 V AC, 50/60 Hz</td>
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<tr>
<td><strong>Current detection</strong></td>
<td>Two-phase CT system</td>
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<tr>
<td><strong>Display</strong></td>
<td>Normal monitoring state: MON lamp is on.</td>
<td>Overcurrent monitoring state: OC lamp is on.</td>
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<tr>
<td><strong>Output relay</strong></td>
<td>Contact arrangement</td>
<td></td>
<td></td>
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<tr>
<td><strong>Contact rating</strong></td>
<td>1a1b</td>
<td></td>
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<tr>
<td><strong>Transformer rating</strong></td>
<td>3 A, 250 V AC, cosφ = 1</td>
<td></td>
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<tr>
<td><strong>Minimum applicable load</strong></td>
<td>0.2 A or less, 250 V AC, cosφ = 0.4</td>
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<tr>
<td><strong>Operation selection</strong></td>
<td>DIP switch selection set to S6: Excitation when normal, self-hold after trip; Selection set to SA: Excitation upon error, automatic reset after trip</td>
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<tr>
<td><strong>Life</strong></td>
<td>80,000 times at contact rating load</td>
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<tr>
<td><strong>Operating temperature</strong></td>
<td>-20 to 60°C</td>
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<tr>
<td><strong>Storage temperature</strong></td>
<td>-30 to 70°C</td>
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<tr>
<td><strong>Humidity</strong></td>
<td>No dust or corrosive gas</td>
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<tr>
<td><strong>Altitude</strong></td>
<td>2,000 m or less</td>
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<tr>
<td><strong>Atmosphere</strong></td>
<td>Pollution degree 3 or below when installed in control box</td>
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<tr>
<td><strong>Vibration</strong></td>
<td>5.9 m/s² or less</td>
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<tr>
<td><strong>Insulation resistance</strong></td>
<td>10 MΩ or more (500 V DC Megger)</td>
<td></td>
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</tr>
<tr>
<td><strong>Dielectric voltage</strong></td>
<td>2000 V AC, 60 Hz; for 1 minute</td>
<td></td>
<td></td>
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<tr>
<td><strong>Protection construction</strong></td>
<td>IP20</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Material</strong></td>
<td>Housing</td>
<td></td>
<td></td>
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<tr>
<td><strong>Terminal cover</strong></td>
<td>Upper housing: PA6; Lower housing: PA68</td>
<td></td>
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<tr>
<td><strong>Power consumption</strong></td>
<td>2 W or less</td>
<td></td>
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<tr>
<td><strong>Mounting</strong></td>
<td>35-mm DIN rail or mounting plate</td>
<td></td>
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<tr>
<td><strong>Estimated mass</strong></td>
<td>0.2 kg (0.5 kg)</td>
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</tr>
</tbody>
</table>
External dimensions

Integrated CT type
TSBSB05 / TSBSB10 / TSBSB30 / TSBSB60

Externally mounted CT type
TSBSB100 / TSBSB200 / TSBSB300

The main unit and the CT are pre-wired when shipped from the factory.

Basic connection diagram

DIP switch selection set to SS

DIP switch selection set to SA

Notes:
1. Transformers (T) should be attached as necessary according to the operating power of the SHOCK RELAY.
2. The use of inverters or other harmonic noise generators may cause a malfunction. In such cases, make sure to install an isolation transformer.
3. Make sure that two of the three-phase wires are not wired to the motor pass through the two SHOCK RELAY CTS in the same orientation.
4. The coil capacity of the electromagnetic contactor (NC) be connected to the output relay of the SHOCK RELAY should be less than 200 VA when DR and less than 20 VA during retention.
5. Be cautious of the DIP switch selection of the SHOCK RELAY when connecting.

CT wiring

Depending on the motor capacity, refer to the table on the right to decide the applicable SHOCK RELAY model No. and the number of wires passing through the CT.

To improve CURRENT volume setting accuracy, at least two wires are used in combination with smaller motor currents. In such instances as when the lead length of the motor is low, increase the number of wires as necessary. It is recommended that, with two wires passing through, it’s necessary to convert the current scale of the CURRENT volume.

Example: With two wires passing through the CT, the CURRENT scale values should be halved before configuring the settings.

### 200 V AC motor

<table>
<thead>
<tr>
<th>Capacity (kW)</th>
<th>Applicable SHOCK RELAY model No.</th>
<th>Rated input through 100Ω</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1</td>
<td>TSBSB05</td>
<td>4</td>
</tr>
<tr>
<td>0.2</td>
<td>TSBSB05</td>
<td>3</td>
</tr>
<tr>
<td>0.4</td>
<td>TSBSB05</td>
<td>2</td>
</tr>
<tr>
<td>0.75</td>
<td>TSBSB05</td>
<td>1</td>
</tr>
<tr>
<td>1.0</td>
<td>TSBSB10</td>
<td>1</td>
</tr>
<tr>
<td>2.2</td>
<td>TSBSB10</td>
<td>1</td>
</tr>
<tr>
<td>3.7</td>
<td>TSBSB30</td>
<td>1</td>
</tr>
<tr>
<td>5.5</td>
<td>TSBSB30</td>
<td>1</td>
</tr>
<tr>
<td>7.5</td>
<td>TSBSB60</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>TSBSB60</td>
<td>1</td>
</tr>
<tr>
<td>–</td>
<td>–</td>
<td>–</td>
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<td>–</td>
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<td>–</td>
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</tr>
</tbody>
</table>

### 400 V AC motor

<table>
<thead>
<tr>
<th>Capacity (kW)</th>
<th>Applicable SHOCK RELAY model No.</th>
<th>Rated input through 100Ω</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2</td>
<td>TSBSB05</td>
<td>4</td>
</tr>
<tr>
<td>0.4</td>
<td>TSBSB05</td>
<td>3</td>
</tr>
<tr>
<td>0.75</td>
<td>TSBSB05</td>
<td>2</td>
</tr>
<tr>
<td>1.5</td>
<td>TSBSB05</td>
<td>1</td>
</tr>
<tr>
<td>2.2</td>
<td>TSBSB10</td>
<td>1</td>
</tr>
<tr>
<td>3.7</td>
<td>TSBSB10</td>
<td>1</td>
</tr>
<tr>
<td>5.5</td>
<td>TSBSB30</td>
<td>1</td>
</tr>
<tr>
<td>7.5</td>
<td>TSBSB60</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>TSBSB60</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>TSBSB90</td>
<td>1</td>
</tr>
<tr>
<td>18.5</td>
<td>TSBSB90</td>
<td>1</td>
</tr>
<tr>
<td>22</td>
<td>TSBSB90</td>
<td>1</td>
</tr>
</tbody>
</table>
Safety and Control Devices

From equipment protection devices like torque limiters, shock guards, and shock relays to control devices like torque keepers and shock monitors, Tsubaki’s “SAFCON” safety and control devices provide your vital machinery with top-notch safety and improvements.

Safety Guide and Warranty

**WARNING**

- When using any of the products described in this catalog, be sure to follow any applicable labor laws and regulations (such as the Labor Safety and Health Regulations).
- Follow the instructions below when installing, maintaining, or inspecting a product:
  1. Turn the power switch off.
  2. Do not store the device under equipment that may fall.
  3. Secure the movable parts of the equipment so as not to move.
  4. Wear clothing and protective gear suitable for the work.
- When performing a test operation or during periodic inspections, verify that the protective equipment is functioning properly.
- Because the SHOCK RELAY has certain requirements for Megger testing, follow the instruction manual when carrying out testing.
- Never perform work while the product is powered. Make sure the power is off before performing the work.
- Failure to do so can result in electric shock.
- SHOCK RELAY wiring, electrical operation, and maintenance and inspection should be performed only by qualified personnel with specialized knowledge.
- Otherwise, fire, electric shock, and injury may occur.
- Operate the SHOCK RELAY according to the manufacturer’s instructions.
- Failure to do so can result in electric shock or fire.

**CAUTION**

- Ensure that the end user of the device receives the appropriate instruction manual.
- Be sure to check that the contents of the manual are carefully read before use.
- In the event that an instruction manual is not available, use the device name and model number to request one from the distributor where you purchased the devices or from our sales office.
- Do not rearrange the device’s components or perform additional work in order to modify the device in any way.
- This device includes consumable parts (tantalum electrolytic capacitors, relays, etc.).
- Periodically check the product’s functions and operations according to the instruction manual.
- If the function or operation is found to be inadequate, contact the distributor for repair.
- Do not use the device in a corrosive gas environment. Superswitching gases (SO₂, SF₆) can especially corrode the copper and copper alloy used on PCBs and parts, resulting in a malfunction.
- Periodically clear the device to prevent overheating due to dust or other substances as this may cause a fire.
- When disposing of the device, treat it as industrial waste.
- The device details described in this catalog are intended primarily for model selection. Before using the device, read the instruction manual thoroughly, and ensure the device is used correctly.

Warranty:

Tsubaki S&M Co., hereinafter referred to as “Seller” and customers, hereinafter referred to as “Buyer”. Goods sold or supplied by Seller to Buyer, hereinafter referred to as “Goods”.

1. Warranty period without charge
   Effective 18 months from the date of shipment or 12 months from the first use of Goods, including the installation of the Goods to the Buyer’s equipment or machine - whichever comes first.

2. Warranty coverage
   Should any damage or problem with the Goods arise within the warranty period, given that the Goods were operated and maintained according to the instructions provided in the manual, the Seller will repair and replace at no charge once the Goods are returned to the Seller.
   This warranty does not include the following:
   1) Any costs related to removal of Goods from the Buyer’s equipment or machine to repair or replace parts.
   2) Cost to transport Buyer’s equipment or machines to the Buyer’s repair shop.
   3) Costs to reimburse any profit loss due to any repair or damage and consequential losses caused by the Buyer.

3. Warranty with charge
   Seller will charge for any investigation and repair of Goods caused by:
   1) Improper installation by failing to follow the instruction manual.
   2) Insufficient maintenance or improper operation by the Buyer.
   3) Incorrect installation of the Goods to other equipment or machines.
   4) Any modifications or additions of Goods by the Buyer.
   5) Any repair by engineers other than the Seller or those designated by the Seller.
   6) Operation in an environment not specified in the manual.
   7) Force Majeure or forces beyond the Seller’s control such as natural disasters and injuries inflicted by a third party.
   8) Secondary damage or problems incurred by the Buyer’s equipment or machines.
   9) Defective parts supplied or specified by the Buyer.
   10) Incorrect wiring or parameter settings by the Buyer.
   12) Losses or damages not caused by the Seller.

4. Dispatch service
   The service to dispatch a Seller’s engineer to investigate, adjust or test the Seller’s Goods is at the Buyer’s expense.

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