U.S. Tsubaki Shock Relay
- the Electronic Shear Pin!

Protect your equipment and your investment with the U.S. Tsubaki Shock Relay.

Unexpected shock loads – overloads and underloads – can damage chains, drives, gears, turbines – the entire mechanical assembly. That means high maintenance, costly repairs and expensive downtime.

Mechanical devices like shear pins and torque limiters don’t provide enough protection. They are just not reliable.

Electronic Shock Relay from U.S. Tsubaki Acts before the Damage Occurs
These accurate, adjustable devices can determine if the equipment is operating properly. If the Shock Relay detects a problem, it shuts down the line – fast, safe and secure. That means big savings in time and money for you or your customers.

Reset at the Touch of a Button
After the problem is corrected, the Shock Relay can be reset at the touch of a button. No teardown is required. That means improved efficiency and reduced downtime.
- Accurate Protection
- Repeatable Performance
- Rapid, Easy Reset
- Quick Installation
- Wide Range of Applications
- Easy Selection

<table>
<thead>
<tr>
<th>Features</th>
<th>U.S. Tsubaki Shock Relay</th>
<th>Mechanical Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stability of operation</td>
<td>excellent</td>
<td>poor</td>
</tr>
<tr>
<td>Accuracy of operation</td>
<td>excellent</td>
<td>unsatisfactory</td>
</tr>
<tr>
<td>Adjustment of operational range</td>
<td>simple</td>
<td>difficult</td>
</tr>
<tr>
<td>Fine adjustment</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Reset</td>
<td>only push the “RESET” button</td>
<td>considerable time and labor is required</td>
</tr>
<tr>
<td>Selection</td>
<td>simple</td>
<td>new design for each application required</td>
</tr>
<tr>
<td>Life cycle</td>
<td>long</td>
<td>short</td>
</tr>
<tr>
<td>Threshold point</td>
<td>low</td>
<td>high</td>
</tr>
</tbody>
</table>
U.S. Tsubaki Shock Relay

Invented by U.S. Tsubaki, the Shock Relay is a precise electronic protector that adapts to virtually all types of equipment driven by an electric motor. The Shock Relay is installed on applications in the Material Handling Industry, Water Treatment Industry, Food Processing Industry, Agriculture Industry, Machine Tool Industry, Chemical Industry, and others.

**BUCKET ELEVATORS**

Protect chains from breaking.

**DRAG CONVEYORS**

Excessive buildup can damage conveyor flights and reducers.

**GEAR DRIVES**

Protect gears from damage.

**SCREW CONVEYORS**

Prevent damage to the screw.
Protects Your Application!

- Material Handling
  Conveyors, Turntables, Elevators
- Water Treatment Plants
  Pumps, Scrappers, Water Screens
- Food Machinery
  Pumps, Agitators, Mixers
- Agriculture
  Screw and Belt Conveyors, Bucket Elevators
- Machine Tool
  Tapping Machines, Drill Press
- Chemical Industry
  Pumps, Agitators, Packagers

WINDING APPLICATIONS

Sense excessive torque and shut off the equipment prior to damage occurring.

CONVEYOR APPLICATIONS

Detect damaging overloads that lead to downtime.

CHAIN FEEDERS

Protect attachments from damage.

PUMP APPLICATIONS

Protect pump from both overloads and underloads.
Note: Shock Relay is designed to accept all standard single-phase and 3-phase AC motors and all standard DC motors (above 600VAC, Contact U.S. Tsubaki).
### SHUNT SELECTION

<table>
<thead>
<tr>
<th>Motor Current</th>
<th>Shunt No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 amp</td>
<td>Shunt 1-50</td>
</tr>
<tr>
<td>1.5 amp</td>
<td>Shunt 1.5-50</td>
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<tr>
<td>2.0 amp</td>
<td>Shunt 2-50</td>
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<tr>
<td>5 amp</td>
<td>Shunt 5-50</td>
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<tr>
<td>10 amp</td>
<td>Shunt 10-50</td>
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<td>Shunt 400-50</td>
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<td>500 amp</td>
<td>Shunt 500-50</td>
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### AC MOTOR FULL-LOAD CURRENT LIST*

<table>
<thead>
<tr>
<th>HP</th>
<th>RPM</th>
<th>Amperages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>230 VAC</td>
<td>460 VAC</td>
</tr>
<tr>
<td>1/4</td>
<td>1800</td>
<td>.95</td>
</tr>
<tr>
<td></td>
<td>1200</td>
<td>1.18</td>
</tr>
<tr>
<td>1/2</td>
<td>1800</td>
<td>1.19</td>
</tr>
<tr>
<td></td>
<td>1200</td>
<td>1.59</td>
</tr>
<tr>
<td>3/4</td>
<td>1800</td>
<td>1.72</td>
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<td></td>
<td>1200</td>
<td>2.15</td>
</tr>
<tr>
<td>1</td>
<td>1800</td>
<td>2.92</td>
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<tr>
<td></td>
<td>1200</td>
<td>3.26</td>
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<tr>
<td>1 1/2</td>
<td>1800</td>
<td>4.36</td>
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<td>14.4</td>
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<td>7 1/2</td>
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<td></td>
<td>1200</td>
<td>21.5</td>
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<thead>
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<th>HP</th>
<th>RPM</th>
<th>Amperages</th>
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<td>460 VAC</td>
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<tr>
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<td>3600</td>
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<td></td>
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<td></td>
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<td></td>
<td>1800</td>
<td>293</td>
</tr>
<tr>
<td></td>
<td>1500</td>
<td>298</td>
</tr>
</tbody>
</table>

*Amperages shown are approximates only. Shock Relay can also be used on motors below 1/4 hp and above 125 hp.*
**TSB151, TSB152**

Shock Relay for Overload Protection

**ACTUAL LOAD METER**
Actual current of the motor is indicated in percentages, which makes it easy to set “LOAD CURRENT,” regardless of the value of the actual current load.

**LOAD CURRENT**
This presets the load current at the optimum setting in the range from 30% to 130% of the motor’s current. When the actual load current exceeds the preset current for the preset SHOCK TIME, the SHOCK RELAY trips to break the motor circuit. Audible alarm devices or warning lamps may be installed if desired.

The LOAD CURRENT should be preset by observing the ACTUAL LOAD METER condition because the motor generally runs under its rated current value.

**FINE ADJUSTMENT**
Adjustment is preset at the factory. When fine adjustment of actual load current is required, this may be used to adjust from -5% to +30% of the indicated meter value.

**START TIME**
When starting a motor, the starting current value is greater than the running current. This starting current value continues until the motor reaches normal speed. During this starting period, the time of which mainly depends on the type of load, the function of detecting the overload current is disabled. Adjustable range is from 0.2 to 20 seconds.

U.S. Tsubaki SHOCK RELAY monitors the change in motor current that closely approximates the torque output of the motor. Should the motor current exceed the preset LOAD CURRENT point for a preset length of SHOCK TIME (continuous overload time), the SHOCK RELAY will shut down the motor power supply.

**DIAGRAM OF OPERATION**

**TERMINALS FOR CONNECTION**
All terminals are located on the upper surface to provide easy access.

**POWER INDICATOR**
Indicates that the power supply is on.

**TRIP INDICATOR**
Lamp comes on when SHOCK RELAY trips.

**TEST BUTTON**
This switch is used to verify SHOCK RELAY operation.

**RESET BUTTON (manual)**
Reset can be done quickly whenever a cycle restart is desired.

**SHOCK TIME**
This presets the overload period. Range is variable from 0.2 to 3 seconds. Every momentary load over the preset current with a shorter period than the preset period is ignored. When the overload equals the preset period, the SHOCK RELAY will trip immediately to break the power supply to the motor.

**TYPICAL CONNECTING DIAGRAM**

- CB: Circuit Breaker
- MC: Magnetic Contactor
- TH: Thermal Overload Relay
- T: Timer
- L: Relay
- V: Voltmeter
- M: Motor

*Note: Refer to Specifications on page D-15.*
The TSB151 and TSB152 series SHOCK RELAY allows easy connection into new or existing applications. For single or three phase motors, simply wire the current transformer that we supply into one line of the motor and the SHOCK RELAY into the control circuit (stop-start circuit).

The SHOCK RELAY is powered by the same voltage as the control circuit to the motor starter, usually 115V or 230V single phase. If a different control voltage is used, a step down transformer may be required.

The supplied current transformer is then connected in one line of the motor that is being monitored. Motor voltages above 600 volts require special considerations. Contact U.S. Tsubaki.

**TSB151 is shown**

**TSB152 Current Transformer**

For use with TSB152, TSB152A, TSB152M, TSB152W

When ordering the TSB152, please select the correct size current transformer from the chart below. The transformer selected should closely match the motor amperage. U.S. Tsubaki will include the transformer you select with the TSB152 Shock Relay.

<table>
<thead>
<tr>
<th>Current Transformer for TSB152</th>
<th>Full-Load (amps)</th>
<th>Selected</th>
<th>Full-Load (amps)</th>
<th>Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>100AT</td>
<td>83</td>
<td>250AT</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>100AT</td>
<td>100</td>
<td>100AT</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>120AT</td>
<td>120</td>
<td>120AT</td>
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</tr>
<tr>
<td>33</td>
<td>100AT</td>
<td>125</td>
<td>250AT</td>
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</tr>
<tr>
<td>37</td>
<td>150AT</td>
<td>150</td>
<td>150AT</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>120AT</td>
<td>200</td>
<td>200AT</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>100AT</td>
<td>250</td>
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<td>60</td>
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<tr>
<td></td>
<td></td>
<td>400</td>
<td>400AT</td>
<td></td>
</tr>
</tbody>
</table>

When selecting a Shock Relay and compatible Current Transformer, locate the closest rating to the actual motor current in the list.

**Selection Example**
1. For 4 pole, 230V, 7½HP motor: rated current 21.5 amps, choose TSB152, 100AT current transformer.
2. For 4 pole 230V, 50HP motor: rated current 124 amps, choose TSB152, 250AT current transformer.
OVERLOAD PROTECTION — OEM MODEL
For use with single and three-phase motors up to 300 amps

START TIME
During startup, the current draw of a motor is greater than the running current. In order to prevent the Shock Relay from engaging during startup, the start time is adjustable from 0.2 seconds to 30 seconds.

TEST
The test button simulates a current overload.

CURRENT (A)
The trip current level is user adjustable and varies according to the Shock Relay model selected. The Shock Relay will only trip when the current draw of the motor exceeds both the current setting and the shock time setting.

SHOCK TIME
The shock time feature allows the current overload time to be set. The shock time is adjustable from 0.2 seconds to 10 seconds. The Shock Relay will only trip when the current draw of the motor exceeds the trip current and when the shock time is exceeded.

RESET BUTTON (SS model)
SA is auto reset.

CONNECTION TERMINALS (CONTACTS)
L1 & L2: Used to provide power to the Shock Relay. 95, 96 & 98: Provide output from the Shock Relay. The application — such as a motor — can be wired into these terminals. When the Shock Relay trips, the circuit opens and the application stops.

DIMENSIONS (mm)

TYPICAL CONNECTING DIAGRAM

Note: Refer to Specifications on page D-15.
# TSBSS/SA Shock Relay with External Current Transformer

**SS/SA SERIES**
Shock Relay

**EXTERNAL CURRENT TRANSFORMER**
The external current transformer is wired together with the SS/SA Series Shock Relay to provide overload protection for applications using larger motors, typically more than 60A.

## SPECIFICATIONS

<table>
<thead>
<tr>
<th>Shock Relay Model</th>
<th>TSBSS/SA05</th>
<th>TSBSA10</th>
<th>TSBSS/SA30</th>
<th>TSBSS/SA60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor HP 230 VAC</td>
<td>0.125 hp  – 1.5 hp</td>
<td>0.75 hp  – 3 hp</td>
<td>2 hp  – 7.5 hp</td>
<td>10 hp  – 15 hp</td>
</tr>
<tr>
<td>Motor HP 460 VAC</td>
<td>0.25 hp  – 3 hp</td>
<td>1.5 hp  – 7.5 hp</td>
<td>5 hp  – 15 hp</td>
<td>20 hp  – 30 hp</td>
</tr>
<tr>
<td>Load Current Setting Range</td>
<td>0.5A  – 5A</td>
<td>1A  – 10A</td>
<td>3A  – 30A</td>
<td>5A  – 60A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shock Relay with External Current Transformer Model</th>
<th>TSBSS/SA100</th>
<th>N/A</th>
<th>TSBSS/SA200</th>
<th>TSBSS/SA300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transformer</td>
<td>TSB2CT100</td>
<td>N/A</td>
<td>TSB2CT200</td>
<td>TSB2CT300</td>
</tr>
<tr>
<td>Motor HP 230 VAC</td>
<td>20 hp  – 25 hp</td>
<td>N/A</td>
<td>30 hp  – 50 hp</td>
<td>60 hp  – 100 hp</td>
</tr>
<tr>
<td>Motor HP 460 VAC</td>
<td>40 hp  – 60 hp</td>
<td>N/A</td>
<td>75 hp  – 125 hp</td>
<td>150 hp  – 200 hp</td>
</tr>
<tr>
<td>Load Current Setting Range</td>
<td>60A  – 100A</td>
<td>N/A</td>
<td>100A  – 200A</td>
<td>200A  – 300A</td>
</tr>
</tbody>
</table>

| Common to all TSBSS/SA units                         | TSBSS/SA05 | TSBSS/SA100 | TSBSS/SA10 | TSBSS/SA30 | TSBSS/SA300 |
|------------------------------------------------------|------------|-------------|------------|------------|
| Trip Output Relay Status                             | SS only    | N/A         | SS only    | SS only    | SS only    |
| Energized/Fail Safe to Open                          |            |             |            |            |            |
| Not Energized                                       | SA only    | SA only     | SA only    | SA only    |            |
| Trip Output Relay Contact rating                     |            |             | 3A load    |            |            |
| Start Time Setting Range                             |            |             | 0.2  – 30 sec |            |            |
| Shock Time Setting Range                              |            |             | 0.2  – 10 sec |            |            |
| Shock Relay Power Supply                              |            |             | 90  – 240 VAC |            |            |
| Test Function                                        |            |             | Built In  |            |            |
| Mounting                                              |            |             |            | 35mm DIN Rail or Panel |            |
| Operating Temperature Range                           |            |             |            | -41°F  – 158°F |            |
Overload Protection Plus Pre-Alarm Setting

**ACTUAL LOAD METER**
Actual current of the motor is indicated in percentages, which makes it easy to set “LOAD CURRENT,” regardless of the value of the actual current load.

**LOAD CURRENT**
This presets the load current at the optimum setting in the range from 30% to 130% of the motor’s current. When the actual load current exceeds the preset current for the preset SHOCK TIME, the SHOCK RELAY trips to break the motor circuit.

**ALARM SET POINT**
This presets the level at which an Alarm will sound. The Alarm can provide prior warning of an impending problem that may be correctable prior to the need to shut down the equipment.

**START TIME**
When starting a motor, the starting current value is greater than the running current. This starting current value continues until the motor reaches normal speed. During this starting period, the time of which mainly depends on the type of load, the function of detecting the overload current is disabled. Adjustable range is from 0.2 to 20 seconds.

**POWER INDICATOR**
Indicates that the power supply is on.

**TRIP INDICATOR**
Lamp comes on when SHOCK RELAY trips.

**TEST BUTTON**
This switch is used to verify SHOCK RELAY operation. The TSB151A and TSB152A have a test switch for both the alarm set point and the overload set point.

**RESET BUTTON (manual)**
Reset can be done quickly whenever a restart is desired.

**SHOCK TIME**
This presets the overload period. Range is variable from 0.2 to 3 seconds. Every momentary load over the preset current with a shorter period than the preset period is ignored. When the overload equals the preset period, the SHOCK RELAY will trip immediately to break the power supply to the motor.

**DIAGRAM OF OPERATION**

**TYPICAL CONNECTING DIAGRAM**

Dimensions and current transformer selection are the same as for the TSB151 and TSB152. Refer to page D-8.
TSB151M, TSB152M
Overload Protection Plus Impact Detection

ACTUAL LOAD METER
Actual current of the motor is indicated in percentages, which makes it easy to set "LOAD CURRENT," regardless of the value of the actual current load.

LOAD CURRENT
This presets the load current at the optimum setting in the range from 30% to 130% of the motor’s current. When the actual load current exceeds the preset current for the preset SHOCK TIME, the SHOCK RELAY trips to break the motor circuit.

IMPACT SET POINT
This presets the point at which an Impact Shock Load is deemed dangerous. When the actual load current exceeds this level for more than 5/100 of a second, the SHOCK RELAY trips to break the motor circuit.

POWER INDICATOR
Indicates that the power supply is on.

TRIP INDICATOR
Lamp comes on when SHOCK RELAY trips.

TEST BUTTON
This switch is used to verify SHOCK RELAY operation.

RESET BUTTON (manual)
Reset can be done quickly whenever a cycle restart is desired.

SHOCK TIME
This presets the overload period. Range is variable from 0.2 to 3 seconds. Every momentary load over the preset current with a shorter period than the preset period is ignored. When the overload equals the preset period, the SHOCK RELAY will trip immediately to break the power supply to the motor.

START TIME
When starting a motor, the starting current value is greater than the running current. This starting current value continues until the motor reaches normal speed. During this starting period, the time of which mainly depends on the type of load, the function of detecting the overload current is disabled. Adjustable range is from 0.2 to 20 seconds.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Load Current Setting</th>
<th>For Impact Load</th>
<th>30% ; 300%</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>For Continuous Load</td>
<td>30% ; 130%</td>
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<table>
<thead>
<tr>
<th>Shock Time Setting</th>
<th>For Impact Load</th>
<th>.05 sec. (fixed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>For Continuous Load</td>
<td>.2 sec. ; 3 sec.</td>
</tr>
</tbody>
</table>

DIAGRAM OF OPERATION

TYPICAL CONNECTING DIAGRAM

Dimensions and current transformer selection are the same as for the TSB151 and TSB152. Refer to page D-8.
U.S. TSUBAKI SHOCK RELAY

TSB151W, TSB152W
Overload and Underload Protection

ACTUAL LOAD METER
Actual current of the motor is indicated in percentages, which makes it easy to set "LOAD CURRENT," regardless of the value of the actual current load.

OVERLOAD CURRENT
This presets the load current at the optimum setting in the range from 30% to 130% of the motor’s current. When the actual current exceeds the preset current for the preset SHOCK TIME, the SHOCK RELAY trips to break the motor circuit.

UNDERLOAD CURRENT
This presets the lower acceptable load current limit. When the actual load current falls below this level for the preset SHOCK TIME, the SHOCK RELAY trips to break the motor circuit.

START TIME
When starting a motor, the starting current value is greater than the running current. This starting current value continues until the motor reaches normal speed. During this starting period, the time of which mainly depends on the type of load, the function of detecting the overload is disabled. Adjustable range is from 0.2 to 20 seconds.

TERMINALS FOR CONNECTION
All terminals are located on the upper surface to provide easy access.

POWER INDICATOR
Indicates that the power supply is on.

TRIP INDICATOR
Lamp comes on when SHOCK RELAY trips.

TEST BUTTON
This switch is used to verify SHOCK RELAY operation.

RESET BUTTON (manual)
Reset can be done quickly whenever a restart is desired.

SHOCK TIME
This presets the overload period. Range is variable from 0.2 to 3 seconds. Every momentary load over the preset current with a shorter period than the preset is ignored. When the overload equals the preset period, the SHOCK RELAY will trip immediately to break the power supply to the motor.

DIAGRAM OF OPERATION

OVERLOAD
- Current<br>- Motor rpm<br>- Current<br>- Shock Relay (Trip)
- Time
- Preset "START TIME"
- Preset "SHOCK TIME"

UNDERLOAD
- Current<br>- Motor speed
- Current
- Shock Relay (Trip)
- Time
- Preset "START TIME"
- Preset "SHOCK TIME"

STANDARD CONNECTING DIAGRAM

TSB151W, TSB152W
- SOURCE<br>- MC Electromagnetic Contactor<br>- TH Thermal Overload Relay<br>- CB Circuit Breaker
- M Motor

Dimensions and current transformer selection is the same as for TSB151 and TSB152. Refer to page D-8.

Note: Refer to Specifications on page D-16.
TSB50D, TSB152D

Overload Protection for D.C. Motors

**ACTUAL LOAD METER**
Actual current of the motor is indicated in percentages, which makes it easy to set “LOAD CURRENT,” regardless of the value of the actual current load.

**LOAD CURRENT**
This presets the load current at the optimum setting in the range from 30% to 130% of the motor’s current. When the actual load current exceeds the preset current for the preset SHOCK TIME, the SHOCK RELAY trips to break the motor circuit.

**START TIME**
When starting a motor, the starting current value is greater than the running current. This starting current value continues until the motor reaches normal speed. During this starting period, the time of which mainly depends on the type of load, the function of detecting the overload current is disabled. Adjustable range is from 0.2 to 20 seconds.

**CURRENT FLOW INDICATOR**
This lamp lights when the load current flows into the SHOCK RELAY. This is after the fixed 3-second start time.

**SHUNT SELECTION**
The D.C. Motor Shock Relay has basically the same functions and dimensions as the standard TSB152 and TSB50. Differences exist in that a shunt is required to monitor direct current of the D.C. motor in place of using a current transformer.

<table>
<thead>
<tr>
<th>CATALOG NUMBER</th>
<th>AMP</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shunt 1-50</td>
<td>1</td>
<td>1.38</td>
<td>.500</td>
</tr>
<tr>
<td>Shunt 2-50</td>
<td>2</td>
<td>1.38</td>
<td>.500</td>
</tr>
<tr>
<td>Shunt 5-50</td>
<td>5</td>
<td>1.38</td>
<td>.500</td>
</tr>
<tr>
<td>Shunt 10-50</td>
<td>10</td>
<td>1.38</td>
<td>.500</td>
</tr>
<tr>
<td>Shunt 20-50</td>
<td>20</td>
<td>1.38</td>
<td>.500</td>
</tr>
<tr>
<td>Shunt 50-50</td>
<td>50</td>
<td>1.38</td>
<td>.500</td>
</tr>
<tr>
<td>Shunt 100-50</td>
<td>100</td>
<td>1.38</td>
<td>.500</td>
</tr>
<tr>
<td>Shunt 150-50</td>
<td>150</td>
<td>1.38</td>
<td>.500</td>
</tr>
<tr>
<td>Shunt 200-50</td>
<td>200</td>
<td>1.38</td>
<td>.500</td>
</tr>
<tr>
<td>Shunt 250-50</td>
<td>250</td>
<td>1.63</td>
<td>.750</td>
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<tr>
<td>Shunt 300-50</td>
<td>300</td>
<td>1.63</td>
<td>.750</td>
</tr>
<tr>
<td>Shunt 400-50</td>
<td>400</td>
<td>1.63</td>
<td>.750</td>
</tr>
<tr>
<td>Shunt 500-50</td>
<td>500</td>
<td>1.63</td>
<td>.750</td>
</tr>
</tbody>
</table>

**POWER INDICATOR**
Indicates that the power supply is on.

**TRIP INDICATOR**
Lamp comes on when SHOCK RELAY trips.

**TEST BUTTON**
This switch is used to verify SHOCK RELAY operation.

**RESET BUTTON (manual)**
Reset can be done quickly whenever a cycle restart is desired.

**SHOCK TIME**
This presets the overload period. Range is variable from 0.2 to 3 seconds. Every momentary load over the preset current with a shorter period than the preset is ignored. When the overload equals the preset period, the SHOCK RELAY will trip immediately to break the power supply to the motor.

**LOAD CURRENT ADJUSTMENT**
Adjustable range is from 50% to 130%.

**SHOCK TIME**
Adjustable range is from 0.3 to 3 seconds.

Note: TSB50D automatically resets when the motor power is disconnected. If manual reset is required, it is possible by installing a separate reset button.

**TYPICAL CONNECTING DIAGRAM**

**D - PT COMPONENTS**

M Motor
MC Electromagnetic Contactor
TH Thermal Overload Relay
CB Circuit Breaker

Note: Refer to Specifications on page D-16.
## SPECIFICATIONS

### FEATURES

<table>
<thead>
<tr>
<th></th>
<th>TS81151</th>
<th>TS81152</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motor Amps</strong></td>
<td>0.25 - 16 amps</td>
<td>17 - 400 amps</td>
</tr>
<tr>
<td><strong>Lead Current Range</strong></td>
<td>30 - 130%</td>
<td>30 - 130%</td>
</tr>
<tr>
<td><strong>Start Time Setting Range</strong></td>
<td>0.2 - 20 sec.</td>
<td>0.2 - 20 sec.</td>
</tr>
<tr>
<td><strong>Shock Time Setting Range</strong></td>
<td>0.2 - 3 sec.</td>
<td>0.2 - 3 sec.</td>
</tr>
<tr>
<td><strong>Input Voltage for Operation</strong></td>
<td>115/230 Volt 50/60 Hz</td>
<td>115/230 Volt 50/60 Hz</td>
</tr>
<tr>
<td><strong>Allow, Input Voltage Fluctuation</strong></td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td><strong>Input Current from C.T. Secondary</strong></td>
<td>5mA</td>
<td>5A</td>
</tr>
<tr>
<td><strong>Meter Fine Tuning Adjustment</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Output Contact</strong></td>
<td>Transfer Contact 250VAC 0.7A at inductive load*</td>
<td>Transfer Contact 250VAC 0.7A at inductive load*</td>
</tr>
<tr>
<td><strong>Test Button</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Withstanding Voltage</strong></td>
<td>1500VAC @ 60Hz for 1 min. between terminal and enclosure</td>
<td>1500VAC @ 60Hz for 1 min. between terminal and enclosure</td>
</tr>
<tr>
<td><strong>Surface Color</strong></td>
<td>Munsell 7.5BG/4.5</td>
<td>Munsell 2.5Y/2</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>2.2 lbs.</td>
<td>2.6 lbs.</td>
</tr>
<tr>
<td><strong>Power Consumption</strong></td>
<td>1.2VA</td>
<td>1.2VA</td>
</tr>
<tr>
<td><strong>Operating Temperature Range</strong></td>
<td>14°F - 122°F</td>
<td>14°F - 122°F</td>
</tr>
<tr>
<td><strong>Operating Humidity</strong></td>
<td>85% R.H. or less</td>
<td>85% R.H. or less</td>
</tr>
<tr>
<td><strong>Max. Elevation</strong></td>
<td>1,000m</td>
<td>1,000m</td>
</tr>
<tr>
<td><strong>Atmosphere</strong></td>
<td>Free of corrosive gas and dust</td>
<td>Free of corrosive gas and dust</td>
</tr>
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</table>

### FEATURES

<table>
<thead>
<tr>
<th></th>
<th>TS8153</th>
<th>TS8154</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motor Amps</strong></td>
<td>Refer to page D-10</td>
<td>Refer to page D-10</td>
</tr>
<tr>
<td><strong>Lead Current Range</strong></td>
<td>10 - 130%</td>
<td>10 - 130%</td>
</tr>
<tr>
<td><strong>Start Time Setting Range</strong></td>
<td>0.2 - 30 sec.</td>
<td>0.2 - 30 sec.</td>
</tr>
<tr>
<td><strong>Shock Time Setting Range</strong></td>
<td>0.2 - 10 sec.</td>
<td>0.2 - 10 sec.</td>
</tr>
<tr>
<td><strong>Input Voltage for Operation</strong></td>
<td>90 - 250 VAC</td>
<td>90 - 250 VAC</td>
</tr>
<tr>
<td><strong>Allow, Input Voltage Fluctuation</strong></td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Input Current from C.T. Secondary</strong></td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Meter Fine Tuning Adjustment</strong></td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Output Contact</strong></td>
<td>3A/250 VAC, Resistive</td>
<td>3A/250 VAC, Resistive</td>
</tr>
<tr>
<td><strong>Test Button</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Withstanding Voltage</strong></td>
<td>2000VAC, 5mA @ 60Hz for 1 min. between terminal and enclosure</td>
<td>2000VAC, 5mA @ 60Hz for 1 min. between terminal and enclosure</td>
</tr>
<tr>
<td><strong>Surface Color</strong></td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>0.35 lbs.</td>
<td>0.35 lbs.</td>
</tr>
<tr>
<td><strong>Power Consumption</strong></td>
<td>2.7VA</td>
<td>2.7VA</td>
</tr>
<tr>
<td><strong>Operating Temperature Range</strong></td>
<td>-4°F - 158°F</td>
<td>-4°F - 158°F</td>
</tr>
<tr>
<td><strong>Operating Humidity</strong></td>
<td>45 - 85% R.H.</td>
<td>45 - 85% R.H.</td>
</tr>
<tr>
<td><strong>Max. Elevation</strong></td>
<td>2,000m</td>
<td>2,000m</td>
</tr>
<tr>
<td><strong>Atmosphere</strong></td>
<td>Free of corrosive gas and dust</td>
<td>Free of corrosive gas and dust</td>
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</table>

### FEATURES

<table>
<thead>
<tr>
<th></th>
<th>TS8181A</th>
<th>TS8182A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motor Amps</strong></td>
<td>0.25 - 16 amps</td>
<td>17 - 400 amps</td>
</tr>
<tr>
<td><strong>Alarm Load Current Range</strong></td>
<td>30 - 130%</td>
<td>30 - 130%</td>
</tr>
<tr>
<td><strong>Start Time Setting Range</strong></td>
<td>0.2 - 20 sec.</td>
<td>0.2 - 20 sec.</td>
</tr>
<tr>
<td><strong>Shock Time Setting Range</strong></td>
<td>0.2 - 3 sec.</td>
<td>0.2 - 3 sec.</td>
</tr>
<tr>
<td><strong>Input Voltage for Operation</strong></td>
<td>115 Volt 50/60 Hz</td>
<td>115 Volt 50/60 Hz</td>
</tr>
<tr>
<td><strong>Allow, Input Voltage Fluctuation</strong></td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td><strong>Input Current from C.T. Secondary</strong></td>
<td>5mA</td>
<td>5A</td>
</tr>
<tr>
<td><strong>Meter Fine Tuning Adjustment</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Output Contact</strong></td>
<td>Transfer Contact 250VAC 0.7A at inductive load*</td>
<td>Transfer Contact 250VAC 0.7A at inductive load*</td>
</tr>
<tr>
<td><strong>Test Button</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Withstanding Voltage</strong></td>
<td>1500VAC @ 60Hz for 1 min. between terminal and enclosure</td>
<td>1500VAC @ 60Hz for 1 min. between terminal and enclosure</td>
</tr>
<tr>
<td><strong>Surface Color</strong></td>
<td>Munsell 7.5BG/4.5</td>
<td>Munsell 2.5Y/2</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>2.2 lbs.</td>
<td>2.6 lbs.</td>
</tr>
<tr>
<td><strong>Power Consumption</strong></td>
<td>1.2VA</td>
<td>1.2VA</td>
</tr>
<tr>
<td><strong>Operating Temperature Range</strong></td>
<td>14°F - 122°F</td>
<td>14°F - 122°F</td>
</tr>
<tr>
<td><strong>Operating Humidity</strong></td>
<td>85% R.H. or less</td>
<td>85% R.H. or less</td>
</tr>
<tr>
<td><strong>Max. Elevation</strong></td>
<td>1,000m</td>
<td>1,000m</td>
</tr>
<tr>
<td><strong>Atmosphere</strong></td>
<td>Free of corrosive gas and dust</td>
<td>Free of corrosive gas and dust</td>
</tr>
</tbody>
</table>

*CAUTION: If the starter coil in the magnetic contactor (MC) of the monitored motor exceeds the Shock Relay output contact's capacity, an auxiliary relay must be installed to prevent damage to the Shock Relay. The Instruction manual included with each Shock Relay details how to add this auxiliary relay if required.
### SPECIFICATIONS

#### FEATURES

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<th>TSB152M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Amps</td>
<td>0.25 - 16 amps</td>
<td>17 - 400 amps</td>
</tr>
<tr>
<td>Load Current Range</td>
<td>30 - 130%</td>
<td>30 - 130%</td>
</tr>
<tr>
<td>Impact Load Current Range</td>
<td>30 - 300%</td>
<td>30 - 300%</td>
</tr>
<tr>
<td>Start Time Setting Range</td>
<td>0.2 - 20 sec.</td>
<td>0.2 - 20 sec.</td>
</tr>
<tr>
<td>Shock Time Setting Range</td>
<td>0.2 - 3 sec.</td>
<td>0.2 - 3 sec.</td>
</tr>
<tr>
<td>Impact Shock Time Setting</td>
<td>0.05 sec. (fixed)</td>
<td>0.05 sec. (fixed)</td>
</tr>
<tr>
<td>Input Voltage for Operation</td>
<td>115/230 Volt 50/60 Hz</td>
<td>115/230 Volt 50/60 Hz</td>
</tr>
<tr>
<td>Allow. Input Voltage Fluctuation</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Input Current from C.T. Secondary</td>
<td>5mA</td>
<td>SA</td>
</tr>
<tr>
<td>Meter Fine Tuning Adjustment</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Output Contact</td>
<td>Transfer Contact 250VAC 0.2A at inductive load*</td>
<td>Transfer Contact 250VAC 0.2A at inductive load*</td>
</tr>
<tr>
<td>Test Button</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Withstanding Voltage</td>
<td>1500VAC @ 60Hz for 1 min. between terminal and enclosure</td>
<td>1500VAC @ 60Hz for 1 min. between terminal and enclosure</td>
</tr>
<tr>
<td>Surface Color</td>
<td>Munsell 7.5BG4/1.5</td>
<td>Munsell 2.5Y7/2</td>
</tr>
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<td>Weight</td>
<td>2.2 lbs.</td>
<td>2.6 lbs.</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>1.2VA</td>
<td>1.2VA</td>
</tr>
<tr>
<td>Operating Temperature Range</td>
<td>14°F - 122°F</td>
<td>14°F - 122°F</td>
</tr>
<tr>
<td>Operating Humidity</td>
<td>85% R.H. or less</td>
<td>85% R.H. or less</td>
</tr>
<tr>
<td>Max. Elevation</td>
<td>1,000m</td>
<td>1,000m</td>
</tr>
<tr>
<td>Atmosphere</td>
<td>Free of corrosive gas and dust</td>
<td>Free of corrosive gas and dust</td>
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#### SPECIFICATIONS

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<th>FEATURES</th>
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<th>TSB152W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Amps</td>
<td>0.25 - 16 amps</td>
<td>17 - 400 amps</td>
</tr>
<tr>
<td>Overload Current Range</td>
<td>30 - 130%</td>
<td>30 - 130%</td>
</tr>
<tr>
<td>Underload Current Range</td>
<td>30 - 130%</td>
<td>30 - 130%</td>
</tr>
<tr>
<td>Start Time Setting Range</td>
<td>0.2 - 20 sec.</td>
<td>0.2 - 20 sec.</td>
</tr>
<tr>
<td>Shock Time Setting Range</td>
<td>0.2 - 3 sec.</td>
<td>0.2 - 3 sec.</td>
</tr>
<tr>
<td>Input Voltage for Operation</td>
<td>115/230 Volt 50/60 Hz</td>
<td>115/230 Volt 50/60 Hz</td>
</tr>
<tr>
<td>Allow. Input Voltage Fluctuation</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Input Current from C.T. Secondary</td>
<td>5mA</td>
<td>SA</td>
</tr>
<tr>
<td>Meter Fine Tuning Adjustment</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Output Contact</td>
<td>Transfer Contact 250VAC 0.2A at inductive load*</td>
<td>Transfer Contact 250VAC 0.2A at inductive load*</td>
</tr>
<tr>
<td>Test Button</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Withstanding Voltage</td>
<td>1500VAC @ 60Hz for 1 min. between terminal and enclosure</td>
<td>1500VAC @ 60Hz for 1 min. between terminal and enclosure</td>
</tr>
<tr>
<td>Surface Color</td>
<td>Munsell 7.5BG4/1.5</td>
<td>Munsell 2.5Y7/2</td>
</tr>
<tr>
<td>Weight</td>
<td>2.2 lbs.</td>
<td>2.6 lbs.</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>1.2VA</td>
<td>1.2VA</td>
</tr>
<tr>
<td>Operating Temperature Range</td>
<td>14°F - 122°F</td>
<td>14°F - 122°F</td>
</tr>
<tr>
<td>Operating Humidity</td>
<td>85% R.H. or less</td>
<td>85% R.H. or less</td>
</tr>
<tr>
<td>Max. Elevation</td>
<td>1,000m</td>
<td>1,000m</td>
</tr>
<tr>
<td>Atmosphere</td>
<td>Free of corrosive gas and dust</td>
<td>Free of corrosive gas and dust</td>
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#### SPECIFICATIONS

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<thead>
<tr>
<th>FEATURES</th>
<th>TSB152D</th>
<th>TSB850D</th>
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<tbody>
<tr>
<td>Motor Amps</td>
<td>Up to 500A</td>
<td>Up to 500A</td>
</tr>
<tr>
<td>Load Current Range</td>
<td>30 - 130%</td>
<td>50 - 130%</td>
</tr>
<tr>
<td>Start Time Setting Range</td>
<td>0.2 - 20 sec.</td>
<td>3 sec. (fixed)</td>
</tr>
<tr>
<td>Shock Time Setting Range</td>
<td>0.2 - 3 sec.</td>
<td>0.3 - 3 sec.</td>
</tr>
<tr>
<td>Input Voltage for Operation</td>
<td>115/230 Volt 50/60 Hz</td>
<td>115/230 Volt 50/60 Hz</td>
</tr>
<tr>
<td>Allow. Input Voltage Fluctuation</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Input Current from C.T. Secondary</td>
<td>50mV</td>
<td>50mV or 100mV</td>
</tr>
<tr>
<td>Meter Fine Tuning Adjustment</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Output Contact</td>
<td>Transfer Contact 250VAC 0.2A at inductive load*</td>
<td>Transfer Contact 250VAC 0.1A at inductive load*</td>
</tr>
<tr>
<td>Test Button</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Withstanding Voltage</td>
<td>1500VAC @ 60Hz for 1 min. between terminal and enclosure</td>
<td>1500VAC @ 60Hz for 1 min. between terminal and enclosure</td>
</tr>
<tr>
<td>Surface Color</td>
<td>Munsell 10GY8/4</td>
<td>Munsell N-2.0</td>
</tr>
<tr>
<td>Weight</td>
<td>2.2 lbs.</td>
<td>0.7 lbs.</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>1.2VA</td>
<td>0.6VA</td>
</tr>
<tr>
<td>Operating Temperature Range</td>
<td>14°F - 122°F</td>
<td>14°F - 122°F</td>
</tr>
<tr>
<td>Operating Humidity</td>
<td>85% R.H. or less</td>
<td>85% R.H. or less</td>
</tr>
<tr>
<td>Max. Elevation</td>
<td>1,000m</td>
<td>1,000m</td>
</tr>
<tr>
<td>Atmosphere</td>
<td>Free of corrosive gas and dust</td>
<td>Free of corrosive gas and dust</td>
</tr>
</tbody>
</table>

*CAUTION: If the starter coil in the magnetic contactor (MC) of the monitored motor exceeds the Shock Relay output contact’s capacity, an auxiliary relay must be installed to prevent damage to the Shock Relay. The instruction manual included with each Shock Relay details how to add this auxiliary relay if required.
Shock Relay Accessories

When purchasing Shock Relay, consider these convenient accessories, also available from U.S. Tsubaki.

■ Fitting Plate

When mounting Shock Relay in your electrical panel box, save yourself time and money with our fitting plate. Pre-drilled to fit the appropriate model, our fitting plate eliminates the need for you to fabricate and drill your own holes. Refer to the chart below for dimensions.

<table>
<thead>
<tr>
<th>Type</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>t</th>
<th>d</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSB50</td>
<td>7%2</td>
<td>4%3</td>
<td>6%</td>
<td>3%</td>
<td>1%2</td>
<td>1%</td>
<td>1%</td>
<td>0.8 lbs.</td>
</tr>
<tr>
<td>TSB151-152</td>
<td>9%4</td>
<td>5%3</td>
<td>8%3</td>
<td>4%1</td>
<td>1%2</td>
<td>1%</td>
<td>1%</td>
<td>1.4 lbs.</td>
</tr>
</tbody>
</table>

■ Shock Relay Enclosure

Protect your Shock Relay from casual contact, dust and intermittent exposure to splashes and spills of water and other chemicals. Includes a window for easy viewing of the meter and settings. Meets ISO IP44 standards.

Available for models TSB151 and TSB152 series units.
WARNING

USE CARE TO PREVENT INJURY
COMPLY WITH THE FOLLOWING
TO AVOID SERIOUS PERSONAL INJURY

1. Disconnect power. Always lock out power switch before installing, removing, or servicing unit. Comply with Occupational Safety and Health Standards 1910.147 “The Control of Hazardous Energy (Lock Out/Tag Out).”


3. Guards must be provided on all power transmission and conveyer applications in accordance with provisions of ANSI/ASME B 15.1-2000 “Safety Standards for Mechanical Power Transmission Apparatus” and ANSI/ASME B 20.1-2006 “Safety Standards for Conveyors and Related Equipment,” or other applicable standards. When revisions of these standards are published, the updated edition shall apply.