Absorbing impact and noise

Dampening to meet the high speed requirements of the modern world.

**Shock absorber: Series RB**

**Coolant resistant type: Series RBL**

**Usable without a stopper nut**

The strong body can be positioned directly.

**Short type: Series RBQ**

A compact style that has been shortened lengthwise

**Allowable eccentric angle is 5°**

Suitable for absorption of rotation energy.

**Usable without a stopper nut**

The strong body can be positioned directly.

**Series Variations**

<table>
<thead>
<tr>
<th>Series</th>
<th>Basic type</th>
<th>With cap or bumper (Option)</th>
<th>Hexagon nut (Option)</th>
<th>Stopper nut (Option)</th>
<th>Foot bracket</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series RB</td>
<td>Series RB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>18-10-2</td>
</tr>
<tr>
<td>Series RB</td>
<td>Coolant resistant Series RBL (Except 08 type)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>18-10-8</td>
</tr>
<tr>
<td>Series RBQ</td>
<td>Series RBQ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>18-10-10</td>
</tr>
</tbody>
</table>

\* 2 Hexagon nuts are attached for Series RB and standard models RBQ.

**Shock absorber**

Automatic adjustment to the most appropriate absorption performance

Specially designed orifice can absorb energy comprehensively and most appropriately in many different applications. This ranges from high speed low loads, to load speed high loads; without requiring additional adjustment of the shock absorber.

![Example of comparison for drag characteristics](image)

Drag waveform will vary depending on the operating conditions.
Shock Absorber
Series RB

Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>RB0805</th>
<th>RB0806</th>
<th>RB1006</th>
<th>RB1007</th>
<th>RB1411</th>
<th>RB1412</th>
<th>RB2015</th>
<th>RB2725</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spec.</td>
<td>Basic type</td>
<td>With cap</td>
<td>Basic type</td>
<td>With cap</td>
<td>Basic type</td>
<td>With cap</td>
<td>Basic type</td>
<td>With cap</td>
</tr>
<tr>
<td>Max. energy absorption (J)</td>
<td>0.98</td>
<td>2.94</td>
<td>3.92</td>
<td>5.88</td>
<td>14.7</td>
<td>19.6</td>
<td>58.8</td>
<td>147</td>
</tr>
<tr>
<td>Stroke absorption (mm)</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>11</td>
<td>12</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>Collision speed (m/s)</td>
<td>0.05 to 5.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. allowable thrust (N)</td>
<td>245</td>
<td>245</td>
<td>422</td>
<td>422</td>
<td>814</td>
<td>814</td>
<td>1961</td>
<td>2942</td>
</tr>
<tr>
<td>Ambient temperature range (°C)</td>
<td>-10 to 80 (No freezing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring force (N)</td>
<td>Extended: 1.96</td>
<td>1.96</td>
<td>4.22</td>
<td>4.22</td>
<td>6.86</td>
<td>6.86</td>
<td>8.34</td>
<td>8.83</td>
</tr>
<tr>
<td>Retracted: 3.83</td>
<td>4.22</td>
<td>6.18</td>
<td>6.86</td>
<td>15.30</td>
<td>15.98</td>
<td>20.50</td>
<td>20.01</td>
<td></td>
</tr>
<tr>
<td>Weight (g)</td>
<td>Basic type: 15</td>
<td>15</td>
<td>23</td>
<td>23</td>
<td>65</td>
<td>65</td>
<td>150</td>
<td>350</td>
</tr>
<tr>
<td>With cap: 16</td>
<td>16</td>
<td>25</td>
<td>25</td>
<td>70</td>
<td>70</td>
<td>165</td>
<td>400</td>
<td></td>
</tr>
</tbody>
</table>

- It denotes the values at the maximum energy absorption per one cycle. Max. operation cycle/min can increase in proportion to energy absorption.

How to Order

RB [C] 14 12

Option
- Nil
- S (With stopper nut)
- J (Add 1 hex. nut (total: 3 pcs.))

Cushion
- Nil
- Basic type
- C (With cap)

- O.D thread—Stroke absorption

Replacement part no./Cap (Resin part only)

<table>
<thead>
<tr>
<th>RB</th>
<th>C</th>
<th>08</th>
<th>10</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>RBC</td>
<td>08</td>
<td>06</td>
<td>1006</td>
<td>1007</td>
</tr>
<tr>
<td>Cap</td>
<td></td>
<td></td>
<td>1411</td>
<td>1412</td>
</tr>
</tbody>
</table>

Cap cannot be mounted for basic type. Please place an order with cap type from the beginning.

Construction

Extended

Compressed

Component Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Outer tube</td>
<td>Rolled steel</td>
<td>Gray coated</td>
</tr>
<tr>
<td>2</td>
<td>Inner tube</td>
<td>Special steel</td>
<td>Heat treated</td>
</tr>
<tr>
<td>3</td>
<td>Piston rod</td>
<td>Special steel</td>
<td>Electroless nickel plated</td>
</tr>
<tr>
<td>4</td>
<td>Piston</td>
<td>Special steel</td>
<td>Heat treated</td>
</tr>
<tr>
<td>5</td>
<td>Bearing</td>
<td>Special bearing material</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Spring guide</td>
<td>Carbon steel</td>
<td>Zinc chromated</td>
</tr>
<tr>
<td>7</td>
<td>Lock ring</td>
<td>Copper</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Return spring</td>
<td>Piano wire</td>
<td>Zinc chromated</td>
</tr>
<tr>
<td>9</td>
<td>Seal holder</td>
<td>Copper alloy</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Stopper</td>
<td>Carbon steel</td>
<td>Zinc chromated</td>
</tr>
<tr>
<td>11</td>
<td>Steel ball</td>
<td>Bearing steel</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Set screw</td>
<td>Special steel</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Accumulator</td>
<td>NBR</td>
<td>Foam rubber</td>
</tr>
<tr>
<td>14</td>
<td>Rod seal</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Scraper</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Gasket</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Gasket</td>
<td>NBR</td>
<td>Only RB(C)2015, 2725</td>
</tr>
</tbody>
</table>
## Shock Absorber Series RB

### Basic type: RB0805, RB0806, RB1006, RB1007

<table>
<thead>
<tr>
<th>Model</th>
<th>Basic type dimensions</th>
<th>With cap*</th>
<th>Hexagon nut</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>D</td>
<td>E₁</td>
<td>E₂</td>
</tr>
<tr>
<td>RB0805</td>
<td>2.8</td>
<td>6.8</td>
<td>6.8</td>
</tr>
<tr>
<td>RB0806</td>
<td>2.8</td>
<td>6.8</td>
<td>6.8</td>
</tr>
<tr>
<td>RB1006</td>
<td>3</td>
<td>8.8</td>
<td>8.6</td>
</tr>
<tr>
<td>RB1007</td>
<td>3</td>
<td>8.8</td>
<td>8.6</td>
</tr>
</tbody>
</table>

* Other dimensions are the same as the basic type.

### With cap: RBC0805, RBC0806

<table>
<thead>
<tr>
<th>Model</th>
<th>Basic type dimensions</th>
<th>With cap*</th>
<th>Hexagon nut</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>D</td>
<td>E₁</td>
<td>E₂</td>
</tr>
<tr>
<td>RBC0805</td>
<td>2.8</td>
<td>6.8</td>
<td>6.8</td>
</tr>
<tr>
<td>RBC0806</td>
<td>2.8</td>
<td>6.8</td>
<td>6.8</td>
</tr>
<tr>
<td>RBC1006</td>
<td>3</td>
<td>8.8</td>
<td>8.6</td>
</tr>
<tr>
<td>RBC1007</td>
<td>3</td>
<td>8.8</td>
<td>8.6</td>
</tr>
</tbody>
</table>

* Other dimensions are the same as the basic type.

### Basic type: RB1411, RB1412, RB2015, RB2725

<table>
<thead>
<tr>
<th>Model</th>
<th>Basic type dimensions</th>
<th>With cap*</th>
<th>Hexagon nut</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>D</td>
<td>E₁</td>
<td>E₂</td>
</tr>
<tr>
<td>RB1411</td>
<td>5</td>
<td>12.2</td>
<td>12</td>
</tr>
<tr>
<td>RB1412</td>
<td>5</td>
<td>12.2</td>
<td>12</td>
</tr>
<tr>
<td>RB2015</td>
<td>6</td>
<td>18.2</td>
<td>18</td>
</tr>
<tr>
<td>RB2725</td>
<td>8</td>
<td>25.2</td>
<td>25</td>
</tr>
</tbody>
</table>

* Other dimensions are the same as the basic type.

### Hexagon Nut

(2 pcs. standard equipment)

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>RB08J</td>
<td>M8 x 1.0</td>
</tr>
<tr>
<td>RB10J</td>
<td>M10 x 1.0</td>
</tr>
<tr>
<td>RB14J</td>
<td>M14 x 1.5</td>
</tr>
<tr>
<td>RB20J</td>
<td>M20 x 1.5</td>
</tr>
<tr>
<td>RB27J</td>
<td>M27 x 1.5</td>
</tr>
</tbody>
</table>

### Option

**Stopper nut**

For basic type

**For cap type**

### Replacement Parts

**Cap**

These are the replacement part for the cap type. Not available for the basic type.

**Material:** Polyurethane

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>RBC08C</td>
<td>6.5</td>
</tr>
<tr>
<td>RBC10C</td>
<td>9</td>
</tr>
<tr>
<td>RBC14C</td>
<td>12.5</td>
</tr>
<tr>
<td>RBC20C</td>
<td>16</td>
</tr>
<tr>
<td>RBC27C</td>
<td>21</td>
</tr>
</tbody>
</table>

---

**Shock Absorber Series RB**

[Image]
1. Type of impact

- Cylinder stroke at load (Horizontal)
- Cylinder stroke at load (Downward)
- Cylinder stroke at load (Upward)
- Free impact
- Free dropping impact
- Rotating impact (with torque)

2. Specification and operational instructions

- Selection of shock absorber based on cylinder conditions and/or impact point
- Specifications of relevant objects
- Selection of shock absorbers with a good fit

3. Calculation of corresponding weight of impacting object \( M_e \)

\[
M_e = \frac{E_1}{m \cdot g \cdot h}
\]

4. Calculation of kinetic energy \( E_1 \)

\[
E_1 = \frac{1}{2} m \cdot v^2
\]

5. Calculation of thrust energy \( E_2 \)

\[
E_2 = F \cdot S
\]

6. Calculation of corresponding weight of impacting object \( M_e \)

\[
M_e = \frac{E_1}{m \cdot g \cdot h}
\]

7. Selection of applicable model

- Selection of applicable model based on calculated \( M_e \)

Note 1) Collision speed is the speed at which an object is impacting against the shock absorber.

Note 2) An impact body equivalent weight is the weight of an impact object without involving thrust, into which an object's total energy has been converted, refer to the catalog of a shock absorber. Hence, \( E = M_e \cdot \mu \).

Note 3) For the formula of moment of inertia \( I \), refer to the catalog of a shock absorber.
**Precautions**

**Danger**

1. **Energy absorption**
   Select a model so that the aggregated energy of impact object should not exceed the maximum absorption energy. Otherwise, it could cause changes in properties or result in damaging the shock absorber.

2. **Corresponding weight of impacting object**
   Make a model selection, so that the corresponding weight of impacting object does not exceed the allowable range. Pulsation will occur in buffer due to spring force, thus making it difficult to absorb shock smoothly.

3. **Collision speed**
   Use it in the conditions that collision speed is within the specified range. It could cause the changes in buffer characteristics or lead to damage a shock absorber.

**Warning**

1. **Static load**
   Design the system, so that any other forces than the buffer capacity or impacts should not be applied to the piston rod which is stopped at the retracted state.

**Caution**

1. **Maximum operating frequency**
   Design the system in the conditions under which it is not used at the frequency exceeding the specified maximum operating frequency. (But, the maximum operating frequency will vary depending on the absorbed energy.)

2. **Stroke**
   The maximum absorption energy in the specifications cannot be exerted unless the full stroke is used for both Series RB and RBL.

3. **Work surface of an impact object**
   The contact surface of the impact object with which the piston rod comes into contact must be highly rigid. In the case without a cap, a high surface compression load is applied to the contact surface of the impact body with which the piston rod comes into contact. Therefore, the contact surface must be highly rigid (hardness of HRC35 or more).

4. **Be aware of the return force of the impact object**
   If used in a conveyor drive, after the shock absorber has absorbed energy, it could be pushed back by the spring that is built-in. For the spring force in the specifications, refer to the column (page 10-18-2).

5. **Selection of size**
   As the number of operations proceeds, the maximum absorption energy of shock absorbers will be decreased by the following reasons such as abrasion, or deterioration, etc. of the internal working fluid. Taking this into consideration, selecting a size which is 20 to 40% affordable against the amount of absorption energy is recommended.

6. **Drag characteristics**
   In general, the values of drag (reactive force generated during operation) generated by the operating speed will vary in hydraulic shock absorber. And then, by adopting “Porous orifice construction”, the RB series can adapt to such fast/slow speed and can absorb shock smoothly in a wide range of speed.

   But, the speed reduction (speed reduction G) would be larger around the stroke terminal, depending upon the operating conditions. Please note that it might be encountered that stroke time is long, motion is not smooth, etc. If this would be a problem, we recommend that stroke amount should be restricted by using our optional component like “Stopper nut”, etc.

   Including this case, if the data on operational status (stroke time, reactive force, deceleration, etc.) are required, please consult with SMC.

**Operating Environment**

**Danger**

1. **Operation in an environment which requires explosion-proof**
   - When mounting in places where static electricity is accumulated, implement a distribution of electrical energy by grounding.
   - Do not use the materials for buffer face which might cause to spark by collision.

**Warning**

1. **Pressure**
   Do not use it in the vacuum state, which is substantially different from the atmospheric pressure (above sea level) and in the atmosphere under being pressurized.

**Selection**

2. **Using inside a clean room**
   Do not use the shock absorber in a clean room, as it could contaminate the clean room.

**Mounting**

**Warning**

1. **Before performing installation, removal, or stroke adjustment, make sure to cut the power supply to the equipment and verify that the equipment has stopped.**

2. **Installation of protective cover**
   We recommend the protective cover should be installed in the case equipment has stopped.

3. **The rigidity of the mounting frame must be taken into consideration**
   If the mounting frame lacks strength, the shock absorber will vibrate after an impact, causing bearing wear and damage.

   Load on mounting plate can be calculated as follows.

   \[
   \text{Load on mounting plate} = \frac{E (\text{Absorbed energy J})}{S (\text{Stroke m})}
   \]

**Warning**

1. **tightening torque of mounting nut should be as follows.**
   When threading on a mounting frame in order to mount a shock absorber directly, prepared hole dimensions are referred to the table below.

<table>
<thead>
<tr>
<th>Model</th>
<th>RB(C)0805</th>
<th>RB(C)1006</th>
<th>RB(C)1411</th>
<th>RB(C)2015</th>
<th>RB(C)2725</th>
</tr>
</thead>
<tbody>
<tr>
<td>O.D. thread (mm)</td>
<td>M8 x 1.0</td>
<td>M10 x 1.0</td>
<td>M14 x 1.5</td>
<td>M20 x 1.5</td>
<td>M27 x 1.5</td>
</tr>
<tr>
<td>Thread prepared bore (mm)</td>
<td>ø7.1 ± 0.1</td>
<td>ø9.1 ± 0.1</td>
<td>ø12.7 ± 0.1</td>
<td>ø18.7 ± 0.1</td>
<td>ø25.7 ± 0.1</td>
</tr>
<tr>
<td>Tightening torque (N·m)</td>
<td>1.67</td>
<td>3.14</td>
<td>10.8</td>
<td>23.5</td>
<td>62.8</td>
</tr>
</tbody>
</table>

2. **Deviation of impact**
   The installation must be designed so that the impact body is perpendicular to the shock absorber’s axial center. An angle of deviation that exceeds 3° will place an excessive load on the bearings, leading to oil leaks within a short period of operation.

   Allowable eccentric angle \( \theta_1 < 3° \)
Be sure to read before handling. Refer to pages 10-24-3 to 10-24-6 for Safety Instructions and Actuator Precautions.

**Precautions**

### Mounting

3. **Rotating angle**
   
   If rotating impacts are involved, the installation must be designed so that the direction in which the load is applied is perpendicular to the shock absorber’s axial center. The allowable rotating angle until the stroke end must be $\theta_2 < 3^\circ$.

   ![Allowable rotating eccentric angle $\theta_2 < 3^\circ$](image)

**Installation Conditions for Rotating Impact** (mm)

<table>
<thead>
<tr>
<th>Model</th>
<th>$S$ (Stroke)</th>
<th>$\theta_2$ (Allowable rotating angle)</th>
<th>$R$ (Min. installation radius)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RB...0805</td>
<td>5</td>
<td>3$^\circ$</td>
<td>96</td>
</tr>
<tr>
<td>RB...0806</td>
<td>6</td>
<td>115</td>
<td></td>
</tr>
<tr>
<td>RB...1006</td>
<td>6</td>
<td>115</td>
<td></td>
</tr>
<tr>
<td>RB...1007</td>
<td>7</td>
<td>134</td>
<td></td>
</tr>
<tr>
<td>RB...1411</td>
<td>11</td>
<td>210</td>
<td></td>
</tr>
<tr>
<td>RB...1412</td>
<td>12</td>
<td>229</td>
<td></td>
</tr>
<tr>
<td>RB...2015</td>
<td>15</td>
<td>287</td>
<td></td>
</tr>
<tr>
<td>RB...2725</td>
<td>25</td>
<td>478</td>
<td></td>
</tr>
</tbody>
</table>

4. Do not scratch the sliding portion of the piston rod or the outside threads of the outer tube.
   Failure to observe this precaution could scratch or gouge the sliding portion of the piston rod, or damage the seals, which could lead to oil leakage and malfunction. Furthermore, damage to outside threaded portion of the outer tube could prevent the shock absorber from being mounted onto the frame, or its internal components could deform, leading to a malfunction.

5. **Never turn the screw on the bottom of the body.**
   This is not an adjusting screw. Turning it could result in oil leakage.

   ![Piston rod Bottom set screw (Do not rotate)](image)

   Damage is not allowed.

6. Adjust the stopping time through the use of the stopper nut, as follows:
   Control the stopping time of the impact object by turning the stopper nut in or out (thus changing length “a”). After establishing the stopper nut position, use a hexagon nut to secure the stopper nut in place.

   ![Stopper nut](image)

**Caution**

1. **Check the mounting nut is not loosen.**
   The shock absorber could become damaged if it is used in a loose state.

2. **Pay attention to any abnormal impact sounds or vibrations.**
   If the impact sounds or vibrations have become abnormally high, the shock absorber may have reached the end of its service life. If this is the case, replace the shock absorber. If use is continued in this state, it could lead to equipment damage.

3. **Confirm that abnormality, oil leakage, etc. in the outward surface.**
   When a large amount of oil is leaking, replace the product, because it is believed to be happening something wrong with it. If it keeps on using, it may cause to break the equipment which is mounted by this product.

4. **Inspect the cap for any cracks or wear.**
   If the shock absorber comes with a cap, the cap could wear first. To prevent damage to the impact object, replace the cap often.

**Maintenance**

**Caution**

1. Check the mounting nut is not loosen.
   The shock absorber could become damaged if it is used in a loose state.

2. Pay attention to any abnormal impact sounds or vibrations.
   If the impact sounds or vibrations have become abnormally high, the shock absorber may have reached the end of its service life. If this is the case, replace the shock absorber. If use is continued in this state, it could lead to equipment damage.

3. Confirm that abnormality, oil leakage, etc. in the outward surface.
   When a large amount of oil is leaking, replace the product, because it is believed to be happening something wrong with it. If it keeps on using, it may cause to break the equipment which is mounted by this product.

4. Inspect the cap for any cracks or wear.
   If the shock absorber comes with a cap, the cap could wear first. To prevent damage to the impact object, replace the cap often.
Shock Absorber: Coolant Resistant Type

Series **RBL**

Can be operated in an environments exposed to non-water soluble cutting oil. (Mainly JIS Class 1 equivalent)

**Specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>Basic type</th>
<th>With cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>RBL1006</td>
<td>RBL1007</td>
<td>RBL1411</td>
</tr>
<tr>
<td>Exp. energy absorption (J)</td>
<td>3.92</td>
<td>5.88</td>
</tr>
<tr>
<td>Stroke absorption (mm)</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Max. operation cycle/min</td>
<td>0.05 to 5</td>
<td></td>
</tr>
<tr>
<td>Max. allowable thrust (N)</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>Allowable temperature range (°C)</td>
<td>–10 to 80</td>
<td></td>
</tr>
</tbody>
</table>

**Effective atmosphere**

- Non-water soluble cutting oil

**Spring force (N)**

<table>
<thead>
<tr>
<th>Model</th>
<th>Extended</th>
<th>Retracted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic type</td>
<td>4.22</td>
<td>6.18</td>
</tr>
<tr>
<td>With cap</td>
<td>4.22</td>
<td>6.86</td>
</tr>
<tr>
<td>RBLC1006, 1007</td>
<td>8.73</td>
<td>14.12</td>
</tr>
<tr>
<td>RBLC1411, 1412</td>
<td>8.73</td>
<td>14.61</td>
</tr>
<tr>
<td>RBLC2015</td>
<td>11.57</td>
<td>17.65</td>
</tr>
<tr>
<td>RBLC2725</td>
<td>22.16</td>
<td>38.05</td>
</tr>
</tbody>
</table>

**Weight (g)**

<table>
<thead>
<tr>
<th>Model</th>
<th>Basic type</th>
<th>With cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>RBL1006</td>
<td>RBL1007</td>
<td>RBL1411</td>
</tr>
<tr>
<td>Exp. energy absorption (J)</td>
<td>3.92</td>
<td>5.88</td>
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<tr>
<td>Stroke absorption (mm)</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Max. operation cycle/min</td>
<td>0.05 to 5</td>
<td></td>
</tr>
<tr>
<td>Max. allowable thrust (N)</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>Allowable temperature range (°C)</td>
<td>–10 to 80</td>
<td></td>
</tr>
</tbody>
</table>

- It denotes the values at the maximum energy absorption per one cycle.
- Max. operation cycle/min can increase in proportion to energy absorption.

**How to Order**

**Coolant resistant type**

- Basic type
- With cap

**Cushion**

- Nil
- Basic type
- With cap

**O.D. thread—Stroke absorption**

- 2 mounting hexagon nuts are attached as standard.

**Replacement part no./Cap (Resin part only)**

- RBL1006, 1007: RBLC1006
- RBL1411, 1412: RBLC1411
- RBL2015: RBLC2015
- RBL2725: RBLC2725

**Cap**

Cap cannot be mounted for basic type. Please place an order with cap type from the beginning.

**Construction**

**Component Parts**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Outer tube</td>
<td>Rolled steel</td>
<td>Gray coated</td>
</tr>
<tr>
<td>2</td>
<td>Inner tube</td>
<td>Special steel</td>
<td>Heat treated</td>
</tr>
<tr>
<td>3</td>
<td>Piston rod</td>
<td>Special steel</td>
<td>Electroless nickel plated</td>
</tr>
<tr>
<td>4</td>
<td>Piston</td>
<td>Special steel</td>
<td>Heat treated</td>
</tr>
<tr>
<td>5</td>
<td>Bearing</td>
<td>Special bearing material</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Spring guide</td>
<td>Carbon steel</td>
<td>Zinc chromated</td>
</tr>
<tr>
<td>7</td>
<td>Lock ring</td>
<td>Copper</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Return spring</td>
<td>Piano wire</td>
<td>Zinc chromated</td>
</tr>
<tr>
<td>9</td>
<td>Seal holder</td>
<td>Copper alloy</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Stopper</td>
<td>Carbon steel</td>
<td>Zinc chromated</td>
</tr>
<tr>
<td>11</td>
<td>Steel ball</td>
<td>Bearing steel</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Set screw</td>
<td>Special steel</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Accumulator</td>
<td>NBR</td>
<td>Foam rubber</td>
</tr>
<tr>
<td>14</td>
<td>Rod seal</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Scraper</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Gasket</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Gasket</td>
<td>NBR</td>
<td>Only RBL(C)2015, 2725</td>
</tr>
</tbody>
</table>

**Effective atmosphere**

- Non-water soluble cutting oil

**Model**

- RBL
- RBLC

**Option**

- Nil
- Basic type
- With cap

**Component Parts**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
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</tr>
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<td></td>
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<tr>
<td>17</td>
<td>Gasket</td>
<td>NBR</td>
<td>Only RBL(C)2015, 2725</td>
</tr>
</tbody>
</table>

**Effective atmosphere**

- Non-water soluble cutting oil

**Model**

- RBL
- RBLC

**Option**

- Nil
- Basic type
- With cap

**Component Parts**

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<tr>
<td>5</td>
<td>Bearing</td>
<td>Special bearing material</td>
<td></td>
</tr>
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<td>Seal holder</td>
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<td>Foam rubber</td>
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<tr>
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<tr>
<td>17</td>
<td>Gasket</td>
<td>NBR</td>
<td>Only RBL(C)2015, 2725</td>
</tr>
</tbody>
</table>
**Shock Absorber: Coolant Resistant Type**  
**Series RBL**

### Dimensions

**Basic type: RBL1006, RBL1007**

- **With cap:** RBLC1006, RBLC1007  
- *Other dimensions are the same as the basic type.*

**Basic type: RBL1411, RBL1412, RBL2015, RBL2725**

- **With cap:** RBLC1411, RBLC1412, RBLC2015, RBLC2725  
- *Other dimensions are the same as the basic type.*

### Hexagon Nut

(2 pcs. standard equipment)

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Dimensions</th>
<th>(mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RB10J</td>
<td>M10 x 1.0</td>
<td>4</td>
</tr>
<tr>
<td>RB14J</td>
<td>M14 x 1.5</td>
<td>6</td>
</tr>
<tr>
<td>RB20J</td>
<td>M20 x 1.5</td>
<td>6</td>
</tr>
<tr>
<td>RB27J</td>
<td>M27 x 1.5</td>
<td>6</td>
</tr>
</tbody>
</table>

### Option

**Stopper nut**  
For basic type

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Dimensions</th>
<th>(mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RB10S</td>
<td>14</td>
<td>11</td>
</tr>
<tr>
<td>RB14S</td>
<td>19</td>
<td>11</td>
</tr>
<tr>
<td>RB20S</td>
<td>27</td>
<td>15</td>
</tr>
<tr>
<td>RB27S</td>
<td>36</td>
<td>25</td>
</tr>
</tbody>
</table>

**For cap type**

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Dimensions</th>
<th>(mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RB10S</td>
<td>8</td>
<td>31.2</td>
</tr>
<tr>
<td>RB14S</td>
<td>16</td>
<td>40</td>
</tr>
<tr>
<td>RB20S</td>
<td>22</td>
<td>51</td>
</tr>
<tr>
<td>RB27S</td>
<td>32</td>
<td>62</td>
</tr>
</tbody>
</table>

### Replacement Parts

**Cap**

These are the replacement parts for the cap type. Not available for the basic type.

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Dimensions</th>
<th>(mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RB10C</td>
<td>9</td>
<td>8.7</td>
</tr>
<tr>
<td>RB14C</td>
<td>12.5</td>
<td>10</td>
</tr>
<tr>
<td>RB20C</td>
<td>16</td>
<td>18</td>
</tr>
<tr>
<td>RB27C</td>
<td>21</td>
<td>25</td>
</tr>
</tbody>
</table>

### Note

L, LL and S dimensions of RBL(C)1007/1006 are different from those of RB(C)1007/1006.
**Shock Absorber: Short Type**

**Series RBQ**

### Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>RBQ1604</th>
<th>RBQ2007</th>
<th>RBQ2508</th>
<th>RBQ3009</th>
<th>RBQ3213</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic type</td>
<td>RBQC1604</td>
<td>RBQC2007</td>
<td>RBQC2508</td>
<td>RBQC3009</td>
<td>RBQC3213</td>
</tr>
<tr>
<td>Max. energy absorption (J)</td>
<td>1.96</td>
<td>11.8</td>
<td>19.6</td>
<td>33.3</td>
<td>49.0</td>
</tr>
<tr>
<td>Stroke absorption (mm)</td>
<td>4</td>
<td>7</td>
<td>8</td>
<td>8.5</td>
<td>13</td>
</tr>
<tr>
<td>Collision speed (m/s)</td>
<td>0.05 to 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. operating frequency * (cycle/min)</td>
<td>60</td>
<td>60</td>
<td>45</td>
<td>45</td>
<td>30</td>
</tr>
<tr>
<td>Max. allowable thrust (N)</td>
<td>294</td>
<td>490</td>
<td>686</td>
<td>981</td>
<td>1177</td>
</tr>
<tr>
<td>Ambient temperature (°C)</td>
<td>−10 to 80</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring force (N)</td>
<td></td>
<td></td>
<td>Extended</td>
<td>6.08</td>
<td>12.75</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Retracted</td>
<td>13.45</td>
<td>27.75</td>
</tr>
<tr>
<td>Weight (g)</td>
<td>28</td>
<td>60</td>
<td>110</td>
<td>182</td>
<td>240</td>
</tr>
<tr>
<td>Option/Stopper nut</td>
<td>RBQ16S</td>
<td>RBQ20S</td>
<td>RBQ25S</td>
<td>RBQ30S</td>
<td>RBQ32S</td>
</tr>
</tbody>
</table>

* It denotes the values at the maximum energy absorption per one cycle. Therefore, the operating frequency can be increased according to the energy absorption.

---

**How to Order**

- **Cushion**
  - Nil: Basic type
  - C: With bumper

- **O.D. thread—Stroke absorption**
  - Nil: Basic type
  - Add'l 1 of hex. nut (Total: 3 pcs. *)

**Construction**

**At impact**

An impact object that strikes against the piston rod end pressurizes oil inside the piston. Thus, pressurized oil jets out through the orifice inside the piston, thereby generating hydraulic resistance to absorb the energy of the impacting object.

The oil jetted out through the orifice is collected inside the outer tube by means of the stretching action of the accumulator.

**At returning**

When the impact object is removed, the return spring pushes out the piston rod, and negative pressure, generated at the same time, opens the check ball to permit oil to return to the shock absorber ready for the next impact.

---

**Component Parts**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Outer tube</td>
<td>Rolled steel</td>
<td>Black nickel plated</td>
</tr>
<tr>
<td>2</td>
<td>Piston rod</td>
<td>Special steel</td>
<td>Heat treated, Hard chrome plated</td>
</tr>
<tr>
<td>3</td>
<td>Piston</td>
<td>Special steel</td>
<td>Heat treated</td>
</tr>
<tr>
<td>4</td>
<td>Bearing</td>
<td>Special bearing material</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Return spring</td>
<td>Piano wire</td>
<td>Zinc chromated</td>
</tr>
<tr>
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<td>Carbon steel</td>
<td>Zinc chromated</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Check ball</td>
<td>Bearing steel</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Accumulator</td>
<td>Fluoro rubber</td>
<td>Foam rubber</td>
</tr>
<tr>
<td>9</td>
<td>Rod seal</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Scraper</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Bumper</td>
<td>Polyurethane</td>
<td>Only with bumper</td>
</tr>
</tbody>
</table>

---

**Allowable eccentric angle is 5°**

Ideal for absorption of rotating energy

With bumper Series RBQC

Basic type Series RBQ
Series RBQ
Basic type

Series RBQC
With bumper

<table>
<thead>
<tr>
<th>Model</th>
<th>Shock absorber</th>
<th>Hexagon nut</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic type</td>
<td>With bumper</td>
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</tr>
<tr>
<td>RBQ1604</td>
<td>6</td>
<td>27</td>
</tr>
<tr>
<td>RBQ2007</td>
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<td>27</td>
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<td>RBQ3009</td>
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<td>27</td>
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<td>RBQ3213</td>
<td>18</td>
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<td>27</td>
</tr>
<tr>
<td>RBQC2007</td>
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<tr>
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<td>18</td>
<td>27</td>
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</table>

Hexagon Nut
(2 pcs. standard equipment)

<table>
<thead>
<tr>
<th>Option</th>
<th>Replacement Parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stopper nut</td>
<td>Bumper</td>
</tr>
</tbody>
</table>

Material: Carbon steel

<table>
<thead>
<tr>
<th>Part no.</th>
<th>MM</th>
<th>h</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>RBQ16J</td>
<td>M16 x 1.5</td>
<td>6</td>
<td>22</td>
<td>25.4</td>
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<tr>
<td>RBQ20J</td>
<td>M20 x 1.5</td>
<td>6</td>
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<td>31.2</td>
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<tr>
<td>RBQ25J</td>
<td>M25 x 1.5</td>
<td>6</td>
<td>32</td>
<td>37</td>
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<tr>
<td>RBQ30J</td>
<td>M30 x 1.5</td>
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<td>RBQ32J</td>
<td>M32 x 1.5</td>
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<td>41</td>
<td>47.3</td>
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Material: Polyurethane

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<th>B</th>
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<tbody>
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<td>RBQC16C</td>
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<td>4.7</td>
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<tr>
<td>RBQC20C</td>
<td>4.5</td>
<td>8</td>
<td>8.3</td>
</tr>
<tr>
<td>RBQC25C</td>
<td>5</td>
<td>8.3</td>
<td>9.3</td>
</tr>
<tr>
<td>RBQC30C</td>
<td>6</td>
<td>11.3</td>
<td>12.4</td>
</tr>
<tr>
<td>RBQC32C</td>
<td>6.6</td>
<td>13.1</td>
<td>14.4</td>
</tr>
</tbody>
</table>

Note 1) In the case of RB20J, RB and RBQ are common.

Note 2) In the case of RB20S, RB and RBQ are common.
Model Selection

Model Selection Step

1. Type of impact
   - Cylinder stroke at load (Horizontal)
   - Cylinder stroke at load (Downward)
   - Cylinder stroke at load (Upward)
   - Conveyor stroke at load (Horizontal)
   - Free dropping impact
   - Rotating impact (With torque)

2. Enumeration of operating conditions

   Symbol
   - Operating conditions: F
   - Impacting object weight: m
   - Dropping height: h
   - Impact location: d
   - Cylinder operation pressure: p
   - Torque: T
   - Ambient temperature: °C
   - Friction coefficient: µ

Specifications and operational instructions

3. Selection of applicable model

   Taking into consideration the corresponding weight of the impacting object Me, calculated using Equation and collision speed v, check the provisional model compatibility with the condition of application. If this is satisfactory, then the said provisional model will be the applicable one.

   Caution on Selection

   In order for the shock absorber to operate accurately for long hours, it is necessary to select a model that is well-suited to your operating conditions. If the impact energy is smaller than 5% of the maximum energy absorption, select a model that is one class smaller.

Equation

Corresponding weight of impacting object Me = \( \frac{m \cdot v^2}{2} \cdot \frac{1}{E_1} \)

Calculation of kinetic energy E

Using the equation suitable for the classification of impact.

\[ E = \frac{1}{2} m v^2 \]

Calculation of thrust energy E

\[ E = E_1 + E_2 \]

3. Specifications and operational instructions

   - Confirmation of specifications
   - Type of impact
   - Cylinder stroke at load (Horizontal)
   - Cylinder stroke at load (Downward)
   - Cylinder stroke at load (Upward)
   - Conveyor stroke at load (Horizontal)
   - Free dropping impact
   - Rotating impact (With torque)

   Operating conditions

   - Cylinder operation pressure
   - Torque: T
   - Ambient temperature: °C
   - Friction coefficient: µ

4. Calculation of kinetic energy E

   Using the equation suitable for the classification of impact.

   \[ E = \frac{1}{2} m v^2 \]

Calculation of thrust energy E

\[ E = E_1 + E_2 \]

Calculation of corresponding weight of impacting object Me

\[ Me = \frac{2 \cdot m \cdot v^2}{E_1} \]

5. Calculation of operating conditions

   Specifications and operational instructions

   - Cylinder operation pressure
   - Torque: T
   - Ambient temperature: °C
   - Friction coefficient: µ

6. Selection of applicable model

   Taking into consideration the corresponding weight of the impacting object Me, calculated using Equation and collision speed v, check the provisional model compatibility with the condition of application. If this is satisfactory, then the said provisional model will be the applicable one.

   Caution on Selection

   In order for the shock absorber to operate accurately for long hours, it is necessary to select a model that is well-suited to your operating conditions. If the impact energy is smaller than 5% of the maximum energy absorption, select a model that is one class smaller.
Selection

1. Energy absorption
   Select a model so that the aggregated energy of impact object should not exceed the maximum absorption energy. Otherwise, it could cause changes in properties or result in damaging the shock absorber.

2. Corresponding weight of impacting object
   Make a model selection so that the corresponding weight of impacting object does not exceed the allowable range. Pulsation will occur in buffer and deceleration force, thus making it difficult to absorb shock smoothly.

3. Collision speed
   Use it in the conditions that collision speed is within the specified range. It could cause the changes in buffer characteristics or lead to damage a shock absorber.

Warning

1. Static load
   Design the system, so that any other forces than the buffer capacity or impacts should not be applied to the piston rod which is stopped at the retracted state.

Caution

1. Maximum operating frequency
   Design the system in the conditions under which it is not used at the frequency exceeding the specified maximum operating frequency. (But, the maximum operating frequency will vary depending on the absorbed energy.)

2. Stroke
   The maximum absorption energy in the specifications cannot be exerted unless the full stroke is used.

3. Work surface of an impact object
   The contact surface of the impact object with which the piston rod comes into contact must be highly rigid.

4. BE aware of the return force of the impact object.
   If used in a conveyor drive, after the shock absorber has absorbed energy, it could be pushed back by the spring that is built-in. For the spring force in the retracted state,

5. Selection of size
   The maximum absorption energy in the specifications cannot be exerted unless the full stroke is used.

6. Drag characteristics
   In general, the values of drag (reactive force generated during operation) generated by the operating speed will vary in hydraulic shock absorber. And then, by adopting "Porous orifice construction", the RB series can adapt to such this fast/slow speed and can absorb shock smoothly in a wide range of speed.

7. Load on mounting plate
   
   \[
   N = \frac{E}{S} \text{ (Absorbed energy J)}
   \]

Mounting

1. Before performing installation, removal, or stroke adjustment, make sure to cut the power supply to the equipment and verify that the equipment has stopped.

2. Installation of protective cover
   We recommend the protective cover should be installed in the case workers might be getting close during the operation.

3. The rigidity of the mounting frame must be taken into consideration
   If the mounting frame lacks strength, the shock absorber will vibrate after an impact, causing bearing wear and damage.

Warning

1. Tightening torque of mounting nut should be as follows.
   When threading on a mounting frame in order to mount a shock absorber directly, prepared hole dimensions are referred to the table below.

<table>
<thead>
<tr>
<th>Model</th>
<th>RBQ(C)160</th>
<th>RBQ(C)2007</th>
<th>RBQ(C)2508</th>
<th>RBQ(C)3009</th>
<th>RBQ(C)3213</th>
</tr>
</thead>
<tbody>
<tr>
<td>O.D. thread (mm)</td>
<td>M16 x 1.5</td>
<td>M20 x 1.5</td>
<td>M25 x 1.5</td>
<td>M30 x 1.5</td>
<td>M32 x 1.5</td>
</tr>
<tr>
<td>Tread prepared bore (mm)</td>
<td>ø14.7 + 0.1</td>
<td>ø18.7 + 0.1</td>
<td>ø23.7 + 0.1</td>
<td>ø28.7 + 0.1</td>
<td>ø30.7 + 0.1</td>
</tr>
<tr>
<td>Tightening torque (N·m)</td>
<td>14.7</td>
<td>23.5</td>
<td>34.3</td>
<td>78.5</td>
<td>88.3</td>
</tr>
</tbody>
</table>

2. Deviation of impact
   The installation must be designed so that the impact body is perpendicular to the shock absorber's axial center. An angle of deviation that exceeds 5° will place an excessive load on the bearings, leading to oil leaks within a short period of operation.

Warning

1. Pressure
   Do not use it in the vacuum state, which is substantially different from the atmospheric pressure (above sea level) and in the atmosphere under being pressurized.
## Precautions

Be sure to read before handling. Refer to pages 10-24-3 to 10-24-6 for Safety Instructions and Actuator Precautions.

### Mounting

3. **Rotating angle**
   
   If rotating impacts are involved, the installation must be designed so that the direction in which the load is applied is perpendicular to the shock absorber’s axial center.
   
   The allowable rotating eccentric angle until the stroke end must be $\theta_2 \leq 5^\circ$.

4. Do not scratch the sliding portion of the piston rod or the outside threads of the outer tube.
   
   Failure to observe this precaution could scratch or gouge the sliding portion of the piston rod, or damage the seals, which could lead to oil leakage and malfunction. Furthermore, damage to outside threaded portion of the outer tube could prevent the shock absorber from being mounted onto the frame, or its internal components could deform, leading to a malfunction.

5. **Never turn the screw on the bottom of the body.**
   
   This is not an adjusting screw. Turning it could result in oil leakage.

6. **Adjust the stopping time through the use of the stopper nut, as follows:**
   
   Control the stopping time of the impact object by turning the stopper nut in or out (thus changing length “a”). After establishing the stopper nut position, use a hexagon nut to secure the stopper nut in place.

### Maintenance

1. **Check the mounting nut is not loosen.**
   
   The shock absorber could become damaged if it is used in a loose state.

2. **Pay attention to any abnormal impact sounds or vibrations.**
   
   If the impact sounds or vibrations have become abnormally high, the shock absorber may have reached the end of its service life. If this is the case, replace the shock absorber. If use is continued in this state, it could lead to equipment damage.

3. **Confirm that abnormality, oil leakage, etc. in the outward surface.**
   
   When a large amount of oil is leaking, replace the product, because it is believed to be happening something wrong with it. If it keeps on using, it may cause to break the equipment which is mounted by this product.

4. **Inspect the bumper for any cracks or wear.**
   
   If the shock absorber comes with a bumper, the damper could wear first. To prevent bumper to the impact object, replace the bumper often.

5. **How to replace bumper**
   
   The bumper inserted into the piston rod can be removed easily by a small screwdriver. When reassembling, push the smaller end of the bumper inside the piston.

### Installation Conditions for Rotating Impact (mm)

<table>
<thead>
<tr>
<th>Model</th>
<th>$S$ (Stroke)</th>
<th>$\theta_2$ (Allowable rotating angle)</th>
<th>$R$ (Min. installation radius)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RBQ...1604</td>
<td>4</td>
<td>5°</td>
<td>46</td>
</tr>
<tr>
<td>RBQ...2007</td>
<td>7</td>
<td></td>
<td>80</td>
</tr>
<tr>
<td>RBQ...2508</td>
<td>8</td>
<td></td>
<td>92</td>
</tr>
<tr>
<td>RBQ...3009</td>
<td>8.5</td>
<td></td>
<td>98</td>
</tr>
<tr>
<td>RBQ...3213</td>
<td>13</td>
<td></td>
<td>149</td>
</tr>
</tbody>
</table>
Series RB, RBL
Made to Order Specifications:

Foot Bracket for Shock Absorber
Available for the foot mounting bracket of Series RB.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Applicable absorber</th>
</tr>
</thead>
<tbody>
<tr>
<td>RB08-X331</td>
<td>RB0805, 0806</td>
</tr>
<tr>
<td>RB10-X331</td>
<td>RB1006, 1007</td>
</tr>
<tr>
<td>RB14-X331</td>
<td>RB1411, 1412</td>
</tr>
<tr>
<td>RB20-X331</td>
<td>RB2015</td>
</tr>
<tr>
<td>RB27-X331</td>
<td>RB2725</td>
</tr>
</tbody>
</table>

*Order the foot bracket separately.

### Dimensions

<table>
<thead>
<tr>
<th>Part no.</th>
<th>B</th>
<th>D</th>
<th>H</th>
<th>L</th>
<th>MM</th>
<th>T</th>
<th>X</th>
<th>Mounting bolt</th>
</tr>
</thead>
<tbody>
<tr>
<td>RB08-X331</td>
<td>15</td>
<td>4.5 drill, 8 counterbore depth 4.4</td>
<td>7.5</td>
<td>32</td>
<td>M8 x 1.0</td>
<td>10</td>
<td>20</td>
<td>M4</td>
</tr>
<tr>
<td>RB10-X331</td>
<td>19</td>
<td>5.5 drill, 9.5 counterbore depth 5.4</td>
<td>9.5</td>
<td>40</td>
<td>M10 x 1.0</td>
<td>12</td>
<td>25</td>
<td>M5</td>
</tr>
<tr>
<td>RB14-X331</td>
<td>25</td>
<td>9 drill, 14 counterbore depth 8.6</td>
<td>12.5</td>
<td>54</td>
<td>M14 x 1.5</td>
<td>16</td>
<td>34</td>
<td>M8</td>
</tr>
<tr>
<td>RB20-X331</td>
<td>38</td>
<td>11 drill, 17.5 counterbore depth 10.8</td>
<td>19</td>
<td>70</td>
<td>M20 x 1.5</td>
<td>22</td>
<td>44</td>
<td>M10</td>
</tr>
<tr>
<td>RB27-X331</td>
<td>50</td>
<td>13.5 drill, 20 counterbore depth 13</td>
<td>25</td>
<td>80</td>
<td>M27 x 1.5</td>
<td>34</td>
<td>52</td>
<td>M12</td>
</tr>
</tbody>
</table>