CR TYPE
— Standard Curved Roller Cage —

part number structure

<table>
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<tr>
<th>part number</th>
<th>roller diameter</th>
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<td>CR2-50-7Z</td>
<td>50</td>
<td>50</td>
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<td>0.4</td>
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<td>3.8°</td>
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<td>CR2-87-10Z</td>
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<td>RVF</td>
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<tr>
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<td>1.9°</td>
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<tr>
<td>CR3-85-10Z</td>
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<td>2.0°</td>
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<td>CR3-90-11Z</td>
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<td>RVF</td>
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<td>CR3-160-14Z</td>
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<td>1.0°</td>
<td>RVF,RV</td>
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</table>

ACTUATOR

ADVANTAGES H-3
PART NUMBER STRUCTURE H-4
SPECIFICATIONS H-6
ALLOWABLE SPEED AND STROKE LIMIT H-7
ACCURACY H-8
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G-70
NB’s BG type is a compact single axis actuator which integrates a slide guide and precision ball screw. BG type offers compact dimensions and outperforms conventional positioning tables. This is made possible by a unique “U” shaped guide rail and slide block which provides multiple functions of a guide block and a ball screw nut combined into a single unit. The “U” shaped guide rail offers high rigidity against bending moment. This structural feature allows for integrated framework of machinery or equipment and can be cantilevered. Additionally, the slide block contains 4 ball circuits which delivers high load capacity, high accuracy and high rigidity.

Figure H-1 Structure of BG type

**Adjustment Free**
The integration of the slide guide and precision ball screw eliminates complex precision adjustment and reduces installation time dramatically.

**High Rigidity**
Four-circuit and four-point contact structure and "U" shaped guide rail provide very high rigidity despite its compact configuration and can be used for cantilevered application.

**Space Saving**
In comparison to conventional positioning tables, the BG type allows for compact designs and dramatic space saving. The "U" shaped guide rail and integrated slide block and precision ball screw make this possible.

By utilizing four-circuit and four-point contact structure, the BG type provides extremely high rigidity. Figure H-3 shows displacement of each size of long block against radial load. Table H-3 shows the moment of inertia of area of guide rails.

**High Accuracy**
BG type contains four ball circuits and four-point contact ball grooves which contribute to its high rigidity. The combination of precision ground guide rail, slide block and precision ball screw provides high positioning accuracy.

Table H-1  Moment of Inertia of Area of Guide Rail

<table>
<thead>
<tr>
<th>part number</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>moment of inertia of area (mm²)</th>
<th>mass W (kg/100mm)</th>
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</thead>
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<td>BG15</td>
<td>30</td>
<td>15</td>
<td>9.5</td>
<td>25</td>
<td>32</td>
<td>44</td>
<td>1.22×10⁴</td>
<td>1.56×10⁵</td>
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<tr>
<td>BG20</td>
<td>40</td>
<td>20</td>
<td>12.5</td>
<td>32</td>
<td>37</td>
<td>52</td>
<td>6.50×10⁴</td>
<td>6.00×10⁵</td>
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<tr>
<td>BG26</td>
<td>50</td>
<td>25</td>
<td>16</td>
<td>40</td>
<td>47</td>
<td>62</td>
<td>1.69×10⁵</td>
<td>1.47×10⁶</td>
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<tr>
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<td>60</td>
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<td>5.11×10⁵</td>
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<td>112</td>
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<td>1.49×10⁸</td>
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<td>55</td>
<td>32</td>
<td>80</td>
<td>95</td>
<td>124</td>
<td>2.29×10⁷</td>
<td>2.28×10⁸</td>
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</table>

Figure H-3  Block Displacement against Radial Load

Figure H-4 Ball Contact Profile

---

ACTUATOR
**PART NUMBER STRUCTURE**

Part number for BG type is described as follows.

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<thead>
<tr>
<th>BG</th>
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<th>01</th>
<th>A</th>
<th>75</th>
<th>H</th>
<th>B</th>
<th>100</th>
<th>R</th>
<th>A</th>
<th>L</th>
<th>S</th>
<th>P</th>
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<tbody>
<tr>
<td>15</td>
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<td>100</td>
<td>P</td>
<td>A</td>
<td>L</td>
<td>K</td>
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<td>80</td>
<td>600</td>
<td>200</td>
<td>A</td>
<td>K</td>
<td>G</td>
<td>A</td>
<td>A</td>
<td>K</td>
<td>L</td>
<td>B</td>
<td>NPN</td>
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<tr>
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<td>600</td>
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<td>NPN</td>
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</table>

※ Short blocks are not available for BG3320.

<table>
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<tbody>
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<td>A</td>
<td>K</td>
<td>L</td>
<td>B</td>
<td>NPN</td>
</tr>
</tbody>
</table>

※ Drive block is located closest to motor bracket side.

There is limitation on the length of rails depending on block type and accuracy grade. Please refer to page H-7,8.

1. **BG type**
2. **size**
3. **ball screw lead**
4. **type of block**
5. **guide rail length**
6. **accuracy grade (P.H-8)**
7. **motor bracket** (refer to page H-30, H-31)
   The number in the square , □ after suffix RA , RB or RC indicates the mounting direction code. (refer to page H-46)
8. **cover, low housing and bellows**
   none: without top cover (P.H-14~)
9. **sensor** (P.H-59~)
   none: without sensor
   S: with slim-type / compact photomicro sensor
   H: with close contact capable photomicro sensor
   K: with proximity sensor
10. **option**
    none: without option
    P: with positioning pin hole (※1)
    G: with special grease option (※2)
    LB: with low temperature black chrome treatment (※3)
    PNP: with PNP sensor

In case of multiple options, add + between each option. Example: (PS+LB+PNP)

※1: △ is S, W or R (refer to page H-74)
   □ is R (refer to page H-74)
※2: ▲ is U, L or F (refer to page H-79)

Grease is applied to slide guide, ball screw, and angular bearings.

For BG15, LB is applied to steel parts except for the drive block, aluminum parts, and radial bearings.
Black chrome treatment is applied to the drive block.
### Specifications

BG Type is categorized as either high grade (H) or precision grade (P). Precision grade (P) has limitations on the length of rails. Please refer to page H-8.

Table H-2 Specifications

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</tbody>
</table>

### Allowable Speed and Stroke Limit

Allowable speed of BG type is subject to the type of motor and operating conditions. The speed may also be limited by the critical speed of the ball screw. Use caution when operating at high speeds or using long rails.

Table H-3 ALLOWABLE SPEED AND STROKE LIMIT

| Part number | rail length | long block | 2 long blocks | short block | 2 short blocks | stroke limit (mm) | speed (mm/sec) | lead1 | lead2 | lead3 | lead4 | lead5 | lead6 | lead7 | lead8 | lead9 | lead10 | lead11 | lead12 | lead13 | lead14 | lead15 | lead16 | lead17 | lead18 | lead19 | lead20 |
|-------------|-------------|-------------|---------------|-------------|---------------|-------------------|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| BG15        | 100         | 43          | 101           | 200         | 143           | 1,000            | 29.8           | 43.2  |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| BG20        | 150         | 93          | 200           | 250         | 223           | 255              | 610            | 1,086 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| BG26        | 250         | 123         | 300           | 250         | 223           | 255              | 610            | 1,086 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| BG33        | 400         | 210         | 600           | 400         | 310           | 233              | 610            | 1,086 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| BG46        | 800         | 400         | 1,200         | 800         | 400           | 233              | 610            | 1,086 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| BG55        | 1,600       | 800         | 2,400         | 1,600       | 800           | 233              | 610            | 1,086 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |

**Notes:**
- **H**: When using BG15, BG20 and BG26 series in the Precision grade with short and frequent stroke. (short stroke: BG1501 = 2mm or less, BG1502 = 4mm or less, BG2001 = 7mm or less, BG2005 = 25mm or less, BG2602 = 14mm or less and BG2605 = 25mm or less)
- Short block type is not available for lead 20.

Figure H-5 Direction of Moment

Figure H-6 Guide Rail Length and Allowable Speed
Table H-4 shows accuracy of BG type.

<table>
<thead>
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<th>part number</th>
<th>rail length mm</th>
<th>precision rail length mm</th>
<th>precision positioning repeatability</th>
<th>precision positioning accuracy</th>
<th>precision running parallelism B</th>
<th>precision backlash</th>
<th>precision starting torque N・m</th>
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<td>75</td>
<td>± 3</td>
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<td>20</td>
<td>10</td>
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<td>125</td>
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<td>5</td>
<td>2</td>
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<td>± 3</td>
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<td>± 3</td>
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<td>± 1</td>
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<td>50</td>
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<td>± 1</td>
<td>100</td>
<td>50</td>
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<td>BG55</td>
<td>980</td>
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<td>80</td>
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<td>1,180</td>
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<td>50</td>
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<tr>
<td></td>
<td>1,380</td>
<td>± 1</td>
<td>100</td>
<td>50</td>
<td>30</td>
<td>20</td>
<td>15</td>
</tr>
</tbody>
</table>

Above values are measured by using our selected motors.
※ Above specifications are based on using NB standard grease. Other grease may cause deviations.
The values in the parentheses are positioning repeatability when used with return pulley unit.

**Positioning Repeatability**
After setting an arbitrary position, from one end, move the drive block to this position and measure the stop position. Repeat the positioning and measurement process 7 times with respect to the setting position at the midpoint and near both ends of travel. Take the maximum difference and divide it by 2, then indicate it with a positive and negative sign as the test result.

\[
\text{Positioning Repeatability} = \pm \frac{1}{2} (\text{maximum value of } l_n - \text{minimum value of } l_n)
\]

**Positioning Accuracy**
Positioning is performed in one direction and the resulting position is set as the datum point. Take the difference between the actual travel distance and the commanded travel distance from the datum point. Continuing in the same direction (without returning to the start point) repeat this process randomly several times until nearing to the stroke limit. Express the accuracy by the absolute maximum difference.

\[
\text{Positioning Accuracy} = (\Delta l_n)_{\text{max}}
\]

**Running Parallelism B**
After fixing the guide rail onto the surface plate, placing the dial test indicator on the center of the slide block and connecting the indicator probe onto the mounting surface, run the block over the entire travel distance. Take the maximum deviation in readings as the test result.

**Backlash**
Using the feed screw to move the slide block a little, take the dial test indicator reading and make it the datum point. While in this position, thrust the block by a certain force in the same direction without using the feed screw. Release the thrust and read the return, then take the difference from the datum point. Repeat the same process at the midpoint and near both ends of travel. Take the maximum difference as the test result.

\[
\text{Backlash} = \Delta l
\]
To obtain the rated life of the BG type, calculate the rated life of the guide portion, ball screw portion and support bearing portion. Use the minimum value as the rated life of the BG type.

### A. Life of Guide Portion

Use the following equation for calculating the rated life of the guide portion.

\[ \text{La} = \left( \frac{L_f}{T_f} \right)^3 \times 50 \]  

\[ L_f: \text{rated life (km)} \]  
\[ T_f: \text{contact coefficient (refer to Table H-5)} \]  
\[ C: \text{basic dynamic loading rating (N)} \]  
\[ P: \text{calculated load applied to one block (N)} \]

**A.1. Calculation of \( P_T \)**

Before calculating the rated life using the equation (1), the calculated load applied to one block \( P_T \) needs to be obtained in consideration of the moment load, etc. that will be actually applied. For rapidly-accelerating or short stroke motion, \( P_T \) needs to be calculated with acceleration taken into consideration. The calculation of this acceleration will be carried out for the mass applied to BG. Obtain the calculated load during uniform motion, acceleration, and deceleration, and use the average value of the three as \( P_T \).

For the calculation of \( P_T \), select an appropriate equation depending on the installation conditions of the guide. It is also possible to calculate \( P_T \) without including the effect of acceleration by using the equation \( P_T = P_{TC} \) (see the equations (2), (5), and (8)). In this case, however, the obtained value is a rough approximation, so a selection with sufficient margin is recommended.

#### Table H-5 Contact Coefficient (f_c)

<table>
<thead>
<tr>
<th>number of blocks in close contact on one axis</th>
<th>contact coefficient (f_c)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.0</td>
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<tr>
<td>2</td>
<td>0.81</td>
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</table>

#### Table H-6 Applied Load Coefficient (f_W)

<table>
<thead>
<tr>
<th>operating conditions</th>
<th>velocity</th>
<th>applied load coefficient (f_W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>vibration, impact</td>
<td>none</td>
<td>0.0</td>
</tr>
<tr>
<td>low</td>
<td>0.25m/s or less</td>
<td>1.0</td>
</tr>
<tr>
<td>high</td>
<td>1m/s or more</td>
<td>2.0 - 3.5</td>
</tr>
</tbody>
</table>

#### Table H-7 Moment Equivalent Coefficient

<table>
<thead>
<tr>
<th>Ep (E2p)</th>
<th>Ey (E2y)</th>
<th>Er (E2r)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

**A.1.a. \( P_T \) for Horizontal Move (Horizontal Mounting)**

- **i) during uniform motion (\( P_{TC} \))**
  \[ P_{TC} = \frac{1}{n} \left( W + E_p \cdot m \cdot Y + E_y \cdot M_p + E_r \cdot M_r \right) \]  
  \[ \text{Figure H-11} \]

- **ii) during acceleration (\( P_{Ta} \))**
  \[ P_{Ta} = \frac{1}{n} \left( W + E_p \cdot m \cdot \alpha d \cdot Z + E_y \cdot (M_p + m \cdot \alpha d \cdot X) + E_r \cdot M_r \right) \]  
  Note that the values of \( (M_p + m \cdot \alpha d \cdot X) \) and \( (M_r + m \cdot \alpha d \cdot X) \) will be treated as 0 (zero) when the calculated value is negative.

- **iii) during deceleration (\( P_{Td} \))**
  \[ P_{Td} = \frac{1}{n} \left( W + E_p \cdot m \cdot \alpha d \cdot Z + E_y \cdot (M_p + m \cdot \alpha d \cdot X) + E_r \cdot M_r \right) \]  
  Note that the values of \( (M_p + m \cdot \alpha d \cdot X) \) and \( (M_r + m \cdot \alpha d \cdot X) \) will be treated as 0 (zero) when the calculated value is negative.

**A.1.b. \( P_T \) for Horizontal Move (Wall Mounting)**

- **i) during uniform motion (\( P_{TC} \))**
  \[ P_{TC} = \frac{1}{n} \left( W + E_p \cdot m \cdot Y + E_y \cdot M_p + E_r \cdot M_r \right) \]  
  \[ \text{Figure H-12} \]

- **ii) during acceleration (\( P_{Ta} \))**
  \[ P_{Ta} = \frac{1}{n} \left( W + E_p \cdot m \cdot \alpha a \cdot Z + E_y \cdot (M_p + m \cdot \alpha a \cdot X) + E_r \cdot M_r \right) \]  
  Note that the values of \( (M_p + m \cdot \alpha a \cdot X) \) and \( (M_r + m \cdot \alpha a \cdot X) \) will be treated as 0 (zero) when the calculated value is negative.

- **iii) during deceleration (\( P_{Td} \))**
  \[ P_{Td} = \frac{1}{n} \left( W + E_p \cdot m \cdot \alpha d \cdot Z + E_y \cdot (M_p + m \cdot \alpha d \cdot X) + E_r \cdot M_r \right) \]  
  Note that the values of \( (M_p + m \cdot \alpha d \cdot X) \) and \( (M_r + m \cdot \alpha d \cdot X) \) will be treated as 0 (zero) when the calculated value is negative.
### A.1. Calculation of Pa

#### A.1.a. For Horizontal Move

**i) during uniform motion** ($P_{ac}$)

$$P_{ac} = \mu \cdot W + F + f_b \cdot n$$  \hspace{1cm} (13)

**ii) during acceleration** ($P_{aa}$)

$$P_{aa} = (m + m_b \cdot n) \cdot (g + \alpha_a) + F + f_b \cdot n$$  \hspace{1cm} (14)

**iii) during deceleration** ($P_{ad}$)

$$P_{ad} = (m + m_b \cdot n) \cdot (g + \alpha_d) + F + f_b \cdot n$$  \hspace{1cm} (15)

#### A.1.b. For Vertical Move

**i) during uniform motion** ($P_{ac}$)

$$P_{ac} = (m + m_b \cdot n) \cdot g + F + f_b \cdot n$$  \hspace{1cm} (16)

**ii) during acceleration** ($P_{aa}$)

$$P_{aa} = (m + m_b \cdot n) \cdot (g + \alpha_a) + F + f_b \cdot n$$  \hspace{1cm} (17)

**iii) during deceleration** ($P_{ad}$)

$$P_{ad} = (m + m_b \cdot n) \cdot (g + \alpha_d) + F + f_b \cdot n$$  \hspace{1cm} (18)

#### A.1.c. PT for Vertical Move

**i) during uniform motion** ($PT_{ac}$)

$$PT_{ac} = \epsilon_{pl} \cdot m \cdot g + \epsilon_{pl} \cdot m_b \cdot n \cdot g + F + f_b \cdot n$$  \hspace{1cm} (19)

**ii) during acceleration** ($PT_{aa}$)

$$PT_{aa} = \epsilon_{pl} \cdot m \cdot (g + \alpha_a) + \epsilon_{pl} \cdot m_b \cdot n \cdot (g + \alpha_a) + F + f_b \cdot n$$  \hspace{1cm} (20)

**iii) during deceleration** ($PT_{ad}$)

$$PT_{ad} = \epsilon_{pl} \cdot m \cdot (g + \alpha_d) + \epsilon_{pl} \cdot m_b \cdot n \cdot (g + \alpha_d) + F + f_b \cdot n$$  \hspace{1cm} (21)

#### B. Calculation of Pa

Before calculating the life using the equation (12), calculate $Pa$ with acceleration taken into consideration. Calculate the load in each axial direction during uniform motion, acceleration, and deceleration and the obtained value is used as $Pa$.
BG15  

- Without Top Cover -

A (1 long block)  
B (2 long blocks in close contact)

<table>
<thead>
<tr>
<th>part number</th>
<th>stroke limit</th>
<th>dimensions</th>
<th>block mass</th>
<th>total mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>BG15A-75</td>
<td>30</td>
<td>75</td>
<td>0.03</td>
<td>0.31</td>
</tr>
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<td>BG15B-100</td>
<td>55</td>
<td>100</td>
<td>0.03</td>
<td>0.31</td>
</tr>
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<td>BG15A-125</td>
<td>80</td>
<td>125</td>
<td>0.03</td>
<td>0.31</td>
</tr>
<tr>
<td>BG15B-150</td>
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<td>150</td>
<td>0.03</td>
<td>0.31</td>
</tr>
<tr>
<td>BG15A-175</td>
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<td>175</td>
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<td>0.31</td>
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<td>BG15B-200</td>
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<td>200</td>
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<td>0.31</td>
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inertia (reference values)  
unit: kg・m²

<table>
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<th>with top cover</th>
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</thead>
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</tr>
<tr>
<td></td>
<td>125</td>
<td>1.56×10⁻⁷</td>
<td>1.58×10⁻⁷</td>
</tr>
<tr>
<td></td>
<td>175</td>
<td>2.05×10⁻⁷</td>
<td>2.07×10⁻⁷</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>2.30×10⁻⁷</td>
<td>2.32×10⁻⁷</td>
</tr>
<tr>
<td>BG1502</td>
<td>75</td>
<td>1.33×10⁻⁷</td>
<td>1.35×10⁻⁷</td>
</tr>
<tr>
<td></td>
<td>125</td>
<td>1.82×10⁻⁷</td>
<td>1.84×10⁻⁷</td>
</tr>
<tr>
<td></td>
<td>175</td>
<td>2.09×10⁻⁷</td>
<td>2.11×10⁻⁷</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>2.33×10⁻⁷</td>
<td>2.35×10⁻⁷</td>
</tr>
</tbody>
</table>

※1: Stroke limit is a drive distance between both ends of the dampers.  
※2: Mass stated “with top cover” includes mass of sub tables.  
※3: For B type (2 long blocks), drive block is located closest to motor bracket side.  
※4: □ is ball screw lead.
BG20 — Without Top Cover —
A (1 long block)
B (2 long blocks in close contact)

BG20 — With Top Cover —
A (1 long block)
B (2 long blocks in close contact)

---

part number stroke limit mm | stroke limit mm | dimensions mm | block mass kg | total mass kg
--- | --- | --- | --- | ---
BG20 A-150 | 93 | 150 | 207 | 15 | 2×60 | 15 | 2×60 | 0.07 | 0.11 | 0.58 | 0.03
BG20 A-200 | 143 | 200 | 257 | 40 | 2×60 | 0.07 | 0.11 | 0.71 | 0.07

---

inertia (reference values) unit: kg・m²

part number rail length without top cover with top cover
--- | --- | --- | --- | --- | --- | ---
BG2001 | 100 | 1.34×10⁻² | 1.35×10⁻² | 1.34×10⁻² | 1.35×10⁻² | 1.85×10⁻² | 2.34×10⁻² | 1.87×10⁻² | 2.37×10⁻²
200 | 2.33×10⁻² | 2.35×10⁻² | 2.34×10⁻² | 2.37×10⁻² | 2.60×10⁻² | 3.18×10⁻² | 2.60×10⁻² | 3.18×10⁻²

BG2005 | 150 | 2.66×10⁻² | 3.20×10⁻² | 3.00×10⁻² | 3.68×10⁻² | 2.70×10⁻² | 3.18×10⁻² | 2.70×10⁻² | 3.18×10⁻²
200 | 2.76×10⁻² | 3.20×10⁻² | 3.00×10⁻² | 3.68×10⁻² | 2.70×10⁻² | 3.18×10⁻² | 2.70×10⁻² | 3.18×10⁻²

---

※1 : Stroke limit is a drive distance between both ends of the dampers.
※2 : Mass stated “with top cover” includes mass of sub tables.
※3 : For B type (2 long blocks), drive block is located closest to motor bracket side.
※4 : □ is ball screw lead.
**BG26 —Without Top Cover—**
A (1 long block)  
B (2 long blocks in close contact)

---

**BG26 —With Top Cover—**
A (1 long block)  
B (2 long blocks in close contact)

---

**part number**

<table>
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<tr>
<th>part number</th>
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<th>stroke limit min</th>
<th>L1</th>
<th>L2</th>
<th>N1</th>
<th>M×P1</th>
<th>N2</th>
<th>M×P2</th>
<th>block mass kg</th>
<th>total mass kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>BG26 A 150</td>
<td>73</td>
<td>150</td>
<td></td>
<td></td>
<td></td>
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<td>0.34</td>
</tr>
<tr>
<td>B 200</td>
<td>72</td>
<td>200</td>
<td></td>
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<td></td>
<td>2×80</td>
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<td></td>
<td>0.17</td>
<td>0.71</td>
</tr>
<tr>
<td>B 250</td>
<td>73</td>
<td>250</td>
<td></td>
<td></td>
<td></td>
<td>2×80</td>
<td></td>
<td></td>
<td>0.17</td>
<td>0.71</td>
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<tr>
<td>B 300</td>
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<td>300</td>
<td></td>
<td></td>
<td></td>
<td>3×80</td>
<td></td>
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<td>0.71</td>
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</table>

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**inertia (reference values)**

<table>
<thead>
<tr>
<th>part number</th>
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<th>without top cover</th>
<th>long block</th>
<th>with top cover</th>
</tr>
</thead>
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<td>1.11×10^-6</td>
</tr>
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</tr>
<tr>
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<td>250</td>
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<td>300</td>
<td>1.12×10^-6</td>
<td>1.08×10^-6</td>
<td>1.11×10^-6</td>
</tr>
</tbody>
</table>

---

1: Stroke limit is a drive distance between both ends of the dampers.  
2: Mass stated "with top cover" includes mass of sub tables.  
3: For B type (2 long blocks), drive block is located closest to motor bracket side.  
4: □ is ball screw lead.
### BG33 —Without Top Cover—

- **Part number**: BG33
- **A (1 long block)**
- **B (2 long blocks in close contact)**

#### Dimensions

<table>
<thead>
<tr>
<th>Part number</th>
<th>Stroke limit</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
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<tr>
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<td></td>
<td>600</td>
<td>510</td>
<td>600</td>
<td>667</td>
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</tr>
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</table>

#### Mass

<table>
<thead>
<tr>
<th>Part number</th>
<th>Block mass</th>
<th>Total mass</th>
</tr>
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<tbody>
<tr>
<td>BG33</td>
<td>1.64 x 10^-6</td>
<td>1.64 x 10^-6</td>
</tr>
<tr>
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<td>2.09 x 10^-6</td>
<td>2.09 x 10^-6</td>
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<tr>
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<td>2.69 x 10^-6</td>
<td>2.69 x 10^-6</td>
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<td></td>
<td>3.35 x 10^-6</td>
<td>3.35 x 10^-6</td>
</tr>
<tr>
<td></td>
<td>4.02 x 10^-6</td>
<td>4.02 x 10^-6</td>
</tr>
<tr>
<td></td>
<td>4.99 x 10^-6</td>
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<td>1.64 x 10^-5</td>
<td>1.64 x 10^-5</td>
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<td>2.09 x 10^-5</td>
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<td>3.35 x 10^-5</td>
<td>3.35 x 10^-5</td>
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<tr>
<td></td>
<td>4.02 x 10^-5</td>
<td>4.02 x 10^-5</td>
</tr>
<tr>
<td></td>
<td>4.99 x 10^-5</td>
<td>4.99 x 10^-5</td>
</tr>
</tbody>
</table>

#### Notes

1. Stroke limit is a drive distance between both ends of the dampers.
2. Mass stated "with top cover" includes mass of sub tables.
3. For B type (2 long blocks), drive block is located closest to motor bracket side.
4. □ is ball screw lead.

### BG33 —With Top Cover—

- **Part number**: BG33
- **A (1 long block)**
- **B (2 long blocks in close contact)**

#### Dimensions

<table>
<thead>
<tr>
<th>Part number</th>
<th>Stroke limit</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
</tr>
</thead>
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<tr>
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<td>60</td>
<td>150</td>
<td>217</td>
<td>25</td>
</tr>
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<td></td>
<td>600</td>
<td>510</td>
<td>600</td>
<td>667</td>
<td>5</td>
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#### Mass

<table>
<thead>
<tr>
<th>Part number</th>
<th>Block mass</th>
<th>Total mass</th>
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</thead>
<tbody>
<tr>
<td>BG33</td>
<td>1.64 x 10^-6</td>
<td>1.64 x 10^-6</td>
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<td>2.09 x 10^-6</td>
<td>2.09 x 10^-6</td>
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<tr>
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<td>2.69 x 10^-6</td>
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<tr>
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<td>3.35 x 10^-6</td>
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<td>1.64 x 10^-5</td>
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<td></td>
<td>4.99 x 10^-5</td>
<td>4.99 x 10^-5</td>
</tr>
</tbody>
</table>

#### Notes

1. Stroke limit is a drive distance between both ends of the dampers.
2. Mass stated "with top cover" includes mass of sub tables.
3. For B type (2 long blocks), drive block is located closest to motor bracket side.
4. □ is ball screw lead.
**BG33**  
-Without Top Cover-  
C (1 short block)  
D (2 short blocks in close contact)

**BG33**  
-With Top Cover-  
C (1 short block)  
D (2 short blocks in close contact)

---

**part number**  
**stroke limit**  
**dimensions mm**  
**block mass kg**  
**total mass kg**

<table>
<thead>
<tr>
<th>part number</th>
<th>stroke limit mm</th>
<th>L₁</th>
<th>L₂</th>
<th>N₁</th>
<th>M₁×P₁</th>
<th>N₂</th>
<th>M₂×P₂</th>
<th>M₁×P₁×N₁</th>
<th>M₂×P₂×N₂</th>
<th>M₁×P₁×N₁×M₂×P₂×N₂</th>
<th>block mass kg</th>
<th>total mass kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>BG33 C-150</td>
<td>85</td>
<td>150</td>
<td>217</td>
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<td>0.03</td>
<td>0.15</td>
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<td>BG33 D-34</td>
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<td>0.4</td>
<td>0.3</td>
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<td>350</td>
<td>400</td>
<td>467</td>
<td>4×100</td>
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<td>0.4</td>
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<td>467</td>
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<td>0.4</td>
<td>0.3</td>
<td>0.4</td>
<td>0.4</td>
</tr>
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<td>BG33 C-500</td>
<td>340</td>
<td>500</td>
<td>567</td>
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<td>6×100</td>
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<td>0.4</td>
<td>0.3</td>
<td>0.4</td>
<td>0.4</td>
</tr>
</tbody>
</table>

*1: Stroke limit is a drive distance between both ends of the dampers.*  
*2: Mass stated "with top cover" includes mass of sub tables.*  
*3: For D type (2 short blocks), drive block is located closest to motor bracket side.*  
*4: □ is ball screw lead.*  
*5: Ball screw lead of 20mm is not available for BG33 short block type.*
**BG46 –Without Top Cover–**

A (1 long block)
B (2 long blocks in close contact)

---

**BG46 –With Top Cover–**

A (1 long block)
B (2 long blocks in close contact)

---

### Part Number and Dimensions

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Stroke Limit</th>
<th>Length mm</th>
<th>Section A-A</th>
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</thead>
<tbody>
<tr>
<td>BG46_A-340</td>
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<tr>
<td>BG46_A-440</td>
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<td>110</td>
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<tr>
<td>BG46_B-340</td>
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<td>110</td>
</tr>
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<td>BG46_B-440</td>
<td>800</td>
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<td>110</td>
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### Inertia (Reference Values)

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<th>Rail Length mm</th>
<th>Without Top Cover Long Block</th>
<th>With Top Cover Long Block</th>
</tr>
</thead>
<tbody>
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<td>940</td>
<td>4.90×10^-5</td>
<td>4.81×10^-5</td>
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</tbody>
</table>

---

1. Stroke limit is the drive distance between both ends of the dampers.
2. Mass stated "with top cover" includes mass of sub tables.
3. For B type (2 long blocks), drive block is located closest to motor bracket side.
4. □ is ball screw lead.

---

**H-24**

---

**H-25**
### BG46 Without Top Cover

- **C** (1 short block)
- **D** (2 short blocks in close contact)

### BG46 With Top Cover

- **C** (1 short block)
- **D** (2 short blocks in close contact)

#### Part Number and Dimensions

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Stroke Limit (mm)</th>
<th>L₁</th>
<th>L₂</th>
<th>Block Mass (kg)</th>
<th>Total Mass (kg)</th>
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</thead>
<tbody>
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</tr>
<tr>
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<td>BG46 E-440</td>
<td>4 x 100</td>
<td>2.46 x 10⁻⁵</td>
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</tr>
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<td>3.24 x 10⁻⁵</td>
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</tr>
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<td>7 x 100</td>
<td>3.63 x 10⁻⁵</td>
<td>3.67 x 10⁻⁵</td>
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<tr>
<td>BG46 I-440</td>
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<td>4.02 x 10⁻⁵</td>
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</table>

#### Inertia (Reference Values)

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<thead>
<tr>
<th>Part Number</th>
<th>Rail Length (mm)</th>
<th>Without Top Cover</th>
<th>With Top Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>BG4610</td>
<td>1 block</td>
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</tr>
<tr>
<td>BG4620</td>
<td>4 block</td>
<td>5 block</td>
<td>6 block</td>
</tr>
</tbody>
</table>

---

1: Stroke limit is a drive distance between both ends of the dampers.
2: Mass stated "with top cover" includes mass of sub tables.
3: For D type (2 short blocks), drive block is located closest to motor bracket side.
4: □ is ball screw lead.
**BG55 — Without Top Cover —**

A (1 long block)  
B (2 long blocks in close contact)

**BG55 — With Top Cover —**

A (1 long block)  
B (2 long blocks in close contact)

---

### Specifications

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<th>Rail Length</th>
<th>Rail Length</th>
<th>Rail Length</th>
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<td>2.7</td>
<td>3.3</td>
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</tbody>
</table>

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### Notes

1. Stroke limit is a drive distance between both ends of the dampers.
2. Mass stated "with top cover" includes mass of sub tables.
3. For B type (2 long blocks), drive block is located closest to motor bracket side.
4. □ is ball screw lead.
### MOTOR BRACKET CONFIGURATIONS & APPLICABLE MOTORS

NB provides optional motor brackets to easily install most popular motors.

#### Table H-9 (1) Applicable Motors

<table>
<thead>
<tr>
<th>Applicable motors</th>
<th>Output flange</th>
<th>BG15</th>
<th>BG20</th>
<th>BG26</th>
<th>BG33</th>
<th>BG46</th>
<th>BG55</th>
</tr>
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<td>B</td>
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<td>MUMA01</td>
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<td>-</td>
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<tr>
<td>YASKAWA ELECTRIC</td>
<td>100W</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>A6</td>
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<td>A1</td>
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<tr>
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#### Table H-9 (2) Applicable Motors

<table>
<thead>
<tr>
<th>Applicable motors</th>
<th>Output flange</th>
<th>BG15</th>
<th>BG20</th>
<th>BG26</th>
<th>BG33</th>
<th>BG46</th>
<th>BG55</th>
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</thead>
<tbody>
<tr>
<td>Q</td>
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<td>A1</td>
<td>A1</td>
<td>50W</td>
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<td>100W</td>
</tr>
<tr>
<td>Q</td>
<td>400W</td>
<td>A1</td>
<td>A1</td>
<td>A1</td>
<td>50W</td>
<td>A1</td>
<td>100W</td>
</tr>
<tr>
<td>R</td>
<td>750W</td>
<td>A1</td>
<td>A1</td>
<td>A1</td>
<td>50W</td>
<td>A1</td>
<td>100W</td>
</tr>
<tr>
<td>H-30</td>
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<td>-</td>
<td>-</td>
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<td>-</td>
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</tbody>
</table>

NB can provide other types of motor brackets. Please contact NB for details.
BG15

Figures inside ( ) indicates mass of the motor mount adapter plate.

A0

A1 (Mass: 9g)
Recommended Coupling: XW-15C2(Nabeya Bi-tech Kashiha)
SFC-05DA2(Miki Puffy Co., Ltd.)

A2 (Mass: 8g)
Recommended Coupling: LA-15C2(Sekal Manufacturing Co., Ltd.)
XW-15C2(Nabeya Bi-tech Kashiha)
SFC-05DA2(Miki Puffy Co., Ltd.)

A3 (Mass: 9g)
Recommended Coupling: LA-15C2(Sekal Manufacturing Co., Ltd.)
XW-15C2(Nabeya Bi-tech Kashiha)
SFC-05DA2(Miki Puffy Co., Ltd.)

A4 (Mass: 8g)
Recommended Coupling: LA-15C2(Sekal Manufacturing Co., Ltd.)
XW-15C2(Nabeya Bi-tech Kashiha)
SFC-05DA2(Miki Puffy Co., Ltd.)

A5 (Mass: 4g)
Recommended Coupling: XW-15C2(Nabeya Bi-tech Kashiha)

A6 (Mass: 4g)
Recommended Coupling: XW-15C2(Nabeya Bi-tech Kashiha)

A7 (Mass: 11g)
Recommended Coupling: LA-15C2(Sekal Manufacturing Co., Ltd.)
XW-15C2(Nabeya Bi-tech Kashiha)
SFC-05DA2(Miki Puffy Co., Ltd.)

Attach the motor to the motor mount adapter plate first.
BG20

Figures inside ( ) indicates mass of the motor mount adapter plate.

For configurations A5, A6, A9, and AA, attach the motor to the motor mount adapter plate first.
For configurations A5, A6 and A9, attach the motor to the motor mount adapter plate first.
BG33

Figures inside( ) indicates mass of the motor mount adapter plate.

For configurations B1 and B2, attach the motor to the motor mount adapter plate first.
BG46

Figures inside ( ) indicates mass of the motor mount adapter plate.

---

**A0**
Recommended Coupling: SFC-030DA2(Miki Pulley Co., Ltd.)
LAD-25C(Sakai Manufacturing Co., Ltd.)
XBW-25C2(Nabeya Bi-tech Kaine)

**A1** (Mass: 103g)
Recommended Coupling: SFC-030DA2(Miki Pulley Co., Ltd.)
LAD-30C(Sakai Manufacturing Co., Ltd.)
XBW-34C3(Nabeya Bi-tech Kaine)

**A2** (Mass: 106g)
Recommended Coupling: SFC-030DA2(Miki Pulley Co., Ltd.)
LAD-30C(Sakai Manufacturing Co., Ltd.)
XBW-34C3(Nabeya Bi-tech Kaine)

**A3** (Mass: 448g)
Recommended Coupling
(200W-400W): SFC-030DA2(Miki Pulley Co., Ltd)
XBW-34C3(Nabeya Bi-tech Kaine)
(750W): SFC-040DA2(Miki Pulley Co., Ltd)
XBW-39C3(Nabeya Bi-tech Kaine)

**A4** (Mass: 628g)
Recommended Coupling: SFC-040DA2(Miki Pulley Co., Ltd.)
XBW-39C3(Nabeya Bi-tech Kaine)

---

**B0**
Recommended Coupling: SFC-020DA2(Miki Pulley Co., Ltd.)
LAD-25C(Sakai Manufacturing Co., Ltd.)
XBW-25C2(Nabeya Bi-tech Kaine)

---

**C0**
Recommended Coupling: SFC-020DA2(Miki Pulley Co., Ltd.)
LAD-25C(Sakai Manufacturing Co., Ltd.)
XBW-25C2(Nabeya Bi-tech Kaine)

---

**D0**
Recommended Coupling: SFC-020DA2(Miki Pulley Co., Ltd.)
LAD-25C(Sakai Manufacturing Co., Ltd.)
XBW-27C2(Nabeya Bi-tech Kaine)
*Please contact NB when you use oSTEP motor (Oriental Motor Co., Ltd.)*

---

**D1** (Mass:435g)
Recommended Coupling: SFC-030DA2(Miki Pulley Co., Ltd.)
LAD-25C(Sakai Manufacturing Co., Ltd.)
XBW-34C3(Nabeya Bi-tech Kaine)
*Please contact NB when you use oSTEP motor (Oriental Motor Co., Ltd.)*

---
BG55
Figures inside( ) indicates mass of the motor mount adapter plate.

A0
Recommended Coupling: SFC-035DA2/Mik Pulley Co., Ltd.
LAO-35C/Sakai Manufacturing Co., Ltd.
X0W-34C3/Nabeya Bi-tech Kashira

A1 (Mass: 329g)
Recommended Coupling: SFC-040DA2/Mik Pulley Co., Ltd.
LAO-40C/Sakai Manufacturing Co., Ltd.
X0W-35C3/Nabeya Bi-tech Kashira

A2 (Mass: 333g)
Recommended Coupling: SFC-040DA2/Mik Pulley Co., Ltd.
LAO-40C/Sakai Manufacturing Co., Ltd.
X0W-35C3/Nabeya Bi-tech Kashira

A3 (Mass: 399g)
Recommended Coupling: SFC-040DA2/Mik Pulley Co., Ltd.
LAO-40C/Sakai Manufacturing Co., Ltd.
X0W-35C3/Nabeya Bi-tech Kashira

A4 (Mass: 449g)
Recommended Coupling: SFC-035DA2/Mik Pulley Co., Ltd.
LAO-40C/Sakai Manufacturing Co., Ltd.
X0W-35C3/Nabeya Bi-tech Kashira
*Please contact NB when you use aSTEP motor (Oriental Motor Co., Ltd.).

A5 (Mass: 449g)
Recommended Coupling: SFC-035DA2/Mik Pulley Co., Ltd.
LAO-40C/Sakai Manufacturing Co., Ltd.
X0W-35C3/Nabeya Bi-tech Kashira
*Please note that the motor’s maximum torque should be set within the coupling’s allowable torque.
The ball screw shaft end is exposed with the exposed bracket R0 type.
Please fabricate an original bracket in case the standard brackets are not applicable.

**BG15**

1. Applicable with cover and with sensors.
2. Mass is 0.04kg less than the mass in the table on page H-14.

**BG20**

1. Applicable with cover and with sensors.
2. Mass is 0.04kg less than the mass in the table on page H-16.

**BG26**

1. Applicable with cover and with sensors.
2. Mass is 0.08kg less than the mass in the table on page H-18.

**BG33**

1. Applicable with cover and with sensors.
2. Mass is 0.1kg less than the mass in the table on page H-20,H-22.

**BG46**

1. Applicable with cover and with sensors.
2. Mass is 0.3kg less than the mass in the table on page H-24,H-26.

**BG55**

1. Applicable with cover and with sensors.
2. Mass is 0.3kg less than the mass in the table on page H-28.
Return pulley units in which a motor is connected with a timing belt are available for BG type. Its return structure allows the reduction of total length (available for BG33 and BG46).

**BG33**

1. This drawing shows RA for MSMA01 (Panasonic).
2. Installation position of Pulley Unit can be selected at 90° intervals (mounting direction code).
3. Applicable with cover and with sensors.

**Precaution for applying H type sensors**
- When the motor is positioned at direction 3 or 9, H type sensors interfere if mounted on the side of motor. H type sensors must be mounted opposite to the motor.

4. Tension plate can be built in and is not exposed. (not applicable to RC)
5. Mass is added 0.2kg to the mass on page H-20～23.
6. Inertia is added 2.22×10⁻⁶kg・m² to the value of Table on page H-24～27. (motor inertia not included)
7. Part number structure BG33***〜****/☆☆□
   - ☆☆: Symbol of applicable motor bracket (refer to Table H-10)
   - □: Mounting direction code (refer to cross section A-A)

Please contact NB for other stepper motors.

**BG46**

1. This drawing shows RA for MSMA01 (Panasonic).
2. Installation position of Pulley Unit can be selected at 90° intervals (mounting direction code).
3. Applicable with cover and with sensors.

**Precaution for applying H type sensors**
- When the motor is positioned at direction 3 or 9, H type sensors interfere if mounted on the side of motor. H type sensors must be mounted opposite to the motor.

4. Tension plate can be built in and is not exposed.
5. Mass is added 0.7kg to the mass on page H-24～27.
6. Inertia is added 1.24×10⁻⁵kg・m² to the value of Table on page H-24～27. (motor inertia not included)
7. Parts number structure BG46***〜****/☆☆□
   - ☆☆: Symbol of applicable motor bracket (refer to Table H-11)
   - □: Mounting direction code (refer to cross section A-A)

Please contact NB for other stepper motors.

Table H-10 Applicable Motor

<table>
<thead>
<tr>
<th>motor bracket</th>
<th>applicable motors</th>
<th>output</th>
<th>flange</th>
<th>motor diameter</th>
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<tr>
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<td>Panasonic</td>
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<td>38</td>
<td>8</td>
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<td>YASKAWA ELECTRIC</td>
<td>50〜100W</td>
<td>40</td>
<td>8</td>
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<tr>
<td>RC</td>
<td>MITSUBISHI ELECTRIC</td>
<td>50〜100W</td>
<td>40</td>
<td>5</td>
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<td></td>
<td>MELSERVO SERIES</td>
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<tr>
<td></td>
<td>SANYO DENKI</td>
<td>50〜100W</td>
<td>40</td>
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<td></td>
<td>SANMOTIONQ1 SERIES</td>
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</tr>
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</table>

Please contact NB for other stepper motors.

Table H-11 Applicable Motor

<table>
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<th>motor bracket</th>
<th>applicable motors</th>
<th>output</th>
<th>flange</th>
<th>motor diameter</th>
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<tr>
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<td>200W</td>
<td>60</td>
<td>11</td>
</tr>
<tr>
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<td>60</td>
<td>14</td>
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<td></td>
<td>MITSUBISHI ELECTRIC</td>
<td>200W</td>
<td>60</td>
<td></td>
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<tr>
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<td>MELSERVO SERIES</td>
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<td></td>
<td>SANYO DENKI</td>
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<td></td>
<td>SANMOTIONQ1 SERIES</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Please contact NB for other stepper motors.
NB provides low housing with actuators. The height of housing is lower than the block. When the length of work is longer than the block, mounted with standard housing, the housing contact works. It is recommended to take low housing when long work is mounted.

Please note that the height of motor bracket cannot be lower any more.

**BG15**
- Mass is 0.005Kg less than the mass on page H-14.

**BG20**
- Mass is 0.01Kg less than the mass on page H-16.

**BG26**
- Mass is 0.02Kg less than the mass on page H-18.

**BG33**
- Mass is 0.02Kg less than the mass on page H-20, 22.

**BG46**
- Mass is 0.05Kg less than the mass on page H-24, 26.

**BG55**
- Mass is 0.1Kg less than the mass on page H-28.
**BELLOWS**

BG type can be specified with a cover or bellows for dust prevention. Bellows are securely fixed for various installation methods in positioning and directions. Sensor for bellows is limited to K (proximity sensor) type only, which is pre-installed at proper positions. Please pay attention to the stroke limit of BG with bellows that is shorter than the standard stroke limit.

- **Position of Sensor Cable Outlet**

  - The positions of the outlet for sensor cables can be selected as Figure H-15 shows.

- **Sensor Timing Chart**

  - The following chart shows the standard sensor arrangement.

<table>
<thead>
<tr>
<th>part number</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>BG15</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>BG20</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>BG26</td>
<td>5</td>
<td>13</td>
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<tr>
<td>BG33</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>BG46</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>BG55</td>
<td>10</td>
<td>13</td>
</tr>
</tbody>
</table>

- **Sensor number structure for bellows**

  1. J (for the first symbol)
  2. Specification of the position of the sensor cable outlet
      - Please select the motor side or the housing side.
      - M: motor side
      - E: housing side (end plate side)
  3. Specification of the position of the sensor rail
      - Please select the right hand or the left hand.
      - R: on the right from the motor side
      - L: on the left from the motor side
  4. JNN for without sensors
  5. Sensor type is K (proximity sensor) type only (APM-D3 series: YAMATAKE CORPORATION).

- **Sensor Timing Chart**

  - The following chart shows the standard sensor arrangement.”

  **Figure H-15 Position of Sensor Cable Outlet**

  ![](image)

  1. The drawings show the "JMN" configuration.
  2. The numbers in the parentheses are the dimensions when sensors are not selected.
  3. Please refer to page H-14 for dimensions that are not shown on the drawings.
  4. Material of bellows: composite resin sheet (black)

- **Material of Bellows**

  - The material of bellows is composite resin sheet (black).

<table>
<thead>
<tr>
<th>rail length</th>
<th>L</th>
<th>1 stroke limit (mm)</th>
<th>2 long blocks stroke limit (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>100</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>125</td>
<td>113</td>
<td>43</td>
<td>29.5</td>
</tr>
<tr>
<td>150</td>
<td>138</td>
<td>60</td>
<td>33.5</td>
</tr>
<tr>
<td>175</td>
<td>163</td>
<td>85</td>
<td>33.5</td>
</tr>
<tr>
<td>200</td>
<td>188</td>
<td>100</td>
<td>33.5</td>
</tr>
<tr>
<td>225</td>
<td>210</td>
<td>120</td>
<td>33.5</td>
</tr>
<tr>
<td>250</td>
<td>235</td>
<td>140</td>
<td>33.5</td>
</tr>
<tr>
<td>275</td>
<td>260</td>
<td>160</td>
<td>33.5</td>
</tr>
<tr>
<td>300</td>
<td>285</td>
<td>180</td>
<td>33.5</td>
</tr>
</tbody>
</table>

  * The rail mounting holes at the center cannot be used for the rail length 150 with two long blocks.
1. The drawings show the "JMN" configuration.
2. The numbers in the parentheses are the dimensions when sensors are not selected.
3. Please refer to page H-16 for dimensions that are not shown on the drawings.
4. Material of bellows: composite resin sheet (black)

<table>
<thead>
<tr>
<th>Rail Length</th>
<th>L (stroke limit)</th>
<th>1 Long Block Effective Stroke</th>
<th>MIN</th>
<th>2 Long Blocks Effective Stroke</th>
<th>MIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>138</td>
<td>58</td>
<td>48</td>
<td>29.5</td>
<td>32</td>
</tr>
<tr>
<td>200</td>
<td>188</td>
<td>100</td>
<td>90</td>
<td>33.5</td>
<td>70</td>
</tr>
</tbody>
</table>

※The rail mounting holes at the center cannot be used for the rail length 150 with two long blocks.
1. The drawings show the "JML" configuration. The cross sections become reversed when "J*R" is selected.
2. The numbers in the parentheses are the dimensions when sensors are not selected.
3. Please refer to page H-20 for dimensions that are not shown on the drawings.
4. Material of bellows: composite resin sheet (black)

- **Material of Bellows:** Composite resin sheet (black)
- **B(2 long blocks in close contact)**
- **B(2 long blocks in close contact)**
- **D(2 short blocks in close contact)**
- **D(2 short blocks in close contact)**

### Table of Dimensions

<table>
<thead>
<tr>
<th>Material</th>
<th>Rail Length (mm)</th>
<th>1 Short Block</th>
<th>2 Short Blocks</th>
<th>MIN</th>
<th>1 Long Block</th>
<th>2 Long Blocks</th>
<th>MIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>150</td>
<td>138</td>
<td>68.5</td>
<td>48.5</td>
<td>26.5</td>
<td>48.5</td>
<td>26.5</td>
</tr>
<tr>
<td>Material</td>
<td>200</td>
<td>188</td>
<td>104.5</td>
<td>84.5</td>
<td>33.5</td>
<td>67</td>
<td>47</td>
</tr>
<tr>
<td>Material</td>
<td>300</td>
<td>288</td>
<td>184.5</td>
<td>164.5</td>
<td>43.5</td>
<td>143</td>
<td>123</td>
</tr>
<tr>
<td>Material</td>
<td>400</td>
<td>388</td>
<td>262.5</td>
<td>242.5</td>
<td>54.5</td>
<td>211</td>
<td>191</td>
</tr>
<tr>
<td>Material</td>
<td>500</td>
<td>488</td>
<td>342.5</td>
<td>322.5</td>
<td>64.5</td>
<td>291</td>
<td>271</td>
</tr>
<tr>
<td>Material</td>
<td>600</td>
<td>588</td>
<td>422.5</td>
<td>402.5</td>
<td>75.5</td>
<td>369</td>
<td>349</td>
</tr>
</tbody>
</table>
1. The drawings show the "JML" configuration. The cross sections become reversed when "J*R" is selected.

2. The numbers in the parentheses are the dimensions when sensors are not selected.

3. Please refer to page H-26 for dimensions that are not shown on the drawings.

4. Material of bellows: composite resin sheet (black)

---

**Table:**

<table>
<thead>
<tr>
<th>Rail Length</th>
<th>L (mm)</th>
<th>1 Long Block</th>
<th>2 Long Blocks</th>
<th>MIN</th>
<th>1/2 Stroke Limit</th>
<th>MIN</th>
<th>1/2 Stroke Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>340°</td>
<td>328</td>
<td>192</td>
<td>172</td>
<td>33.5</td>
<td>97</td>
<td>77</td>
<td>26.5</td>
</tr>
<tr>
<td>440°</td>
<td>428</td>
<td>272</td>
<td>252</td>
<td>43.5</td>
<td>183</td>
<td>163</td>
<td>33.5</td>
</tr>
<tr>
<td>540°</td>
<td>528</td>
<td>364</td>
<td>344</td>
<td>47.5</td>
<td>253</td>
<td>243</td>
<td>43.5</td>
</tr>
<tr>
<td>640°</td>
<td>628</td>
<td>450</td>
<td>430</td>
<td>54.5</td>
<td>355</td>
<td>335</td>
<td>47.5</td>
</tr>
<tr>
<td>740°</td>
<td>728</td>
<td>530</td>
<td>510</td>
<td>64.5</td>
<td>441</td>
<td>421</td>
<td>54.5</td>
</tr>
<tr>
<td>840°</td>
<td>828</td>
<td>608</td>
<td>588</td>
<td>76.5</td>
<td>521</td>
<td>501</td>
<td>64.5</td>
</tr>
<tr>
<td>940°</td>
<td>928</td>
<td>686</td>
<td>666</td>
<td>86.5</td>
<td>599</td>
<td>579</td>
<td>75.5</td>
</tr>
<tr>
<td>1040°</td>
<td>1,028</td>
<td>774</td>
<td>754</td>
<td>92.5</td>
<td>677</td>
<td>657</td>
<td>86.5</td>
</tr>
<tr>
<td>1140°</td>
<td>1,128</td>
<td>866</td>
<td>846</td>
<td>96.5</td>
<td>765</td>
<td>745</td>
<td>92.5</td>
</tr>
</tbody>
</table>

---

**Notes:**

- The rail mounting holes at the center cannot be used for the rail length 340° with two short or long blocks.

---

**Table:**

<table>
<thead>
<tr>
<th>Rail Length</th>
<th>L (mm)</th>
<th>1 Short Block</th>
<th>2 Short Blocks</th>
<th>MIN</th>
<th>1/2 Stroke Limit</th>
<th>MIN</th>
<th>1/2 Stroke Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>340°</td>
<td>328</td>
<td>219.5</td>
<td>199.5</td>
<td>38.5</td>
<td>165</td>
<td>145</td>
<td>29.5</td>
</tr>
<tr>
<td>440°</td>
<td>428</td>
<td>306.5</td>
<td>286.5</td>
<td>43.5</td>
<td>247</td>
<td>227</td>
<td>38.5</td>
</tr>
<tr>
<td>540°</td>
<td>528</td>
<td>393.5</td>
<td>373.5</td>
<td>54.5</td>
<td>337</td>
<td>317</td>
<td>43.5</td>
</tr>
<tr>
<td>640°</td>
<td>628</td>
<td>480.5</td>
<td>460.5</td>
<td>54.5</td>
<td>415</td>
<td>395</td>
<td>54.5</td>
</tr>
<tr>
<td>740°</td>
<td>728</td>
<td>567.5</td>
<td>547.5</td>
<td>55.5</td>
<td>495</td>
<td>475</td>
<td>64.5</td>
</tr>
<tr>
<td>840°</td>
<td>828</td>
<td>654.5</td>
<td>634.5</td>
<td>57.5</td>
<td>573</td>
<td>553</td>
<td>75.5</td>
</tr>
<tr>
<td>940°</td>
<td>928</td>
<td>741.5</td>
<td>721.5</td>
<td>65.5</td>
<td>651</td>
<td>631</td>
<td>86.5</td>
</tr>
<tr>
<td>1040°</td>
<td>1,028</td>
<td>828.5</td>
<td>808.5</td>
<td>96.5</td>
<td>721</td>
<td>701</td>
<td>96.5</td>
</tr>
<tr>
<td>1140°</td>
<td>1,128</td>
<td>915.5</td>
<td>895.5</td>
<td>107.5</td>
<td>801</td>
<td>781</td>
<td>107.5</td>
</tr>
</tbody>
</table>

---

**Notes:**

- The rail mounting holes at the center cannot be used for the rail length 340° with two short or long blocks.
1. The drawings show the "JML" configuration. The cross sections become reversed when "JR" is selected. 
2. The numbers in the parentheses are the dimensions when sensors are not selected. 
3. Please refer to page H-28 for dimensions that are not shown on the drawings. 
4. Material of bellows: composite resin sheet (black)

<table>
<thead>
<tr>
<th>sensor code</th>
<th>sensor type</th>
<th>sensor rail1</th>
<th>sensor rail2</th>
<th>sensor rail3</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>slim/compact type photomicro sensor</td>
<td>BG15 ○ ○ ○</td>
<td>BG20 ● ● ●</td>
<td>BG26 ● ● ●</td>
</tr>
<tr>
<td></td>
<td>PM-L24 (SUNX)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>close contact capable photomicro sensor</td>
<td>BG33 ○ ○ ○</td>
<td>BG46 ○ ○ ○</td>
<td>BG55 ○ ○ ○</td>
</tr>
<tr>
<td></td>
<td>EE-SX671 (OMRON)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>proximity sensor (N.C. contact)</td>
<td>BG15 ○ ○ ○</td>
<td>BG20 ● ● ●</td>
<td>BG26 ● ● ●</td>
</tr>
<tr>
<td></td>
<td>APM-D3B1 (Azbil)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

※1: length of cable: 1m
※2: 3 pcs of sensor connector will be attached
※3: normal close contact
※4: different frequency type

Table H-12 NPN Sensor

Figure H-17 Sensor rail

Photomicro sensor or proximity sensor can be attached to the BG actuator with our optional sensor-mounting rail (the same length as the guide rail length). Tapped holes are machined on both sides of the guide rail, allowing attachment of sensor to either side. Standard positioning (without special instruction from customer) would be to the left of the motor mount end. Sensor option includes the items that are listed below. Three types of sensor rail are available. (see Figure H-17) For details, please refer to page H-59 〜 H-69. Depending on sizes, some sensor rail are not available.
BG15

K Specification (Proximity Sensor)

—Without Top Cover—

proximity sensor
APM-D38B1

sensor dog
APM-D38B1

sensor rail

min 8
(combination with the different frequency type)

10

—for guide rail length 75
(both sides of the guide rail)

—With Top Cover—

sensor dog

sensor rail

min 8
(combination with the different frequency type)

10

—for guide rail length 75
(both sides of the guide rail)

Accessories
proximity sensor (APM-D38B1, A/b) 2 pcs
proximity sensor (different frequency type) (APM-D38B1, A/b) 1 pc
sensor rail 1 pc
sensor dog 1 pc
2 pcs of sensor dogs for BG15A-75
(refer to the figure on the right.)

BG20

S Specification (Compact Photomicro Sensor)

—Without Top Cover—

photomicro sensor

10

—With Top Cover—

photomicro sensor

10

Accessories
photomicro sensor (PM-L24, SUNX) 3 pcs
sensor mounting plate 3 pcs
sensor rail 1 pc
sensor dog 1 pc

K Specification (Proximity Sensor)

—Without Top Cover—

proximity sensor
APM-D38B1

proximity sensor
APM-D38B1F

sensor rail

min 8
(combination with the different frequency type)

10

—With Top Cover—

proximity sensor
APM-D38B1

proximity sensor
APM-D38B1F

sensor rail

min 8
(combination with the different frequency type)

10

Accessories
proximity sensor (APM-D38B1, A/b) 2 pcs
proximity sensor (different frequency type) (APM-D38B1F, A/b) 1 pc
sensor rail 1 pc
sensor dog 1 pc
BG26
S Specification (Compact Photomicro Sensor)

---Without Top Cover---

---With Top Cover---

Accessories
photomicro sensor (PM-L24, SUNX) 3 pcs
sensor rail 1 pc
sensor dog 1 pc

K Specification (Proximity Sensor)

---Without Top Cover---

---With Top Cover---

Accessories
proximity sensor (APM-D3B1, Azbil) 2 pcs
proximity sensor (different frequency type) (APM-D3B1F, Azbil) 1 pc
sensor rail 1 pc
sensor dog 1 pc

BG33
S Specification (Slim-Type Photomicro Sensor)

---Without Top Cover---

---With Top Cover---

Accessories
photomicro sensor (EE-SX674, OMRON) 3 pcs
connector (EE-1001, OMRON) 3 pcs
sensor rail 1 pc
sensor dog 1 pc
* 2 pcs for BG33ID-150.
**BG33**

**H Specification (Close Contact Capable Photomicro Sensor)**

*Without Top Cover*

- Long block
  - Photomicro sensor connector
  - Sensor dog
  - Sensor rail

- Short block
  - 4.25 mm
  - 10 mm

*With Top Cover*

- Long block
  - 4.25 mm
  - 10 mm
  - Sensor rail

- Short block
  - 4.25 mm
  - 10 mm

Accessories:
- Photomicro sensor (EE-SX671, OMRON) 3 pcs
- Connector (EE-1001, OMRON) 3 pcs
- Sensor mounting plate (only for the without cover type) 3 pcs
- Sensor rail 1 pc
- Sensor dog 1 pc

* 2 pcs for BG33D-150.

**BG33**

**K Specification (Proximity Sensor)**

*Without Top Cover*

- Long block
  - Proximity sensor (APM-D381)
  - Proximity sensor (different frequency type) APM-D381F

- Short block
  - 4.25 mm
  - 10 mm

*With Top Cover*

- Long block

- Short block
  - 4.25 mm
  - 10 mm

Accessories:
- Proximity sensor (APM-D381, Azbil) 2 pcs
- Proximity sensor (different frequency type) APM-D381F, Azbil) 1 pc
- Sensor rail 1 pc
- Sensor dog 1 pc

* 2 pcs for BG33D-150.
BG46
S Specification (Slim-Type Photomicro Sensor)

—Without Top Cover—

—With Top Cover—

accessories
photomicro sensor (EE-SX674, OMRON) 3 pcs
connector (EE-1001, OMRON) 3 pcs
sensor rail 1 pc
sensor dog 1 pc

BG46
H Specification (Close Contact Capable Photomicro Sensor)

—Without Top Cover—

—With Top Cover—

accessories
photomicro sensor (EE-SX671, OMRON) 3 pcs
connector (EE-1001, OMRON) 3 pcs
sensor rail 1 pc
sensor dog 1 pc
**BG46**

**K Specification (Proximity Sensor)**

- Without Top Cover
- With Top Cover

**BG55**

**S Specification (Compact Photomicro Sensor)**

- Without Top Cover
- With Top Cover

**H Specification (Close Contact Capable Photomicro Sensor)**

- Without Top Cover
- With Top Cover

Accessories:
- Photomicro sensor (EE-SX674, 0MRON): 3 pcs
- Connector (EE-1001, 0MRON): 3 pcs
- Sensor rail 1 pc
- Sensor dog 1 pc
### BG55

**K Specification (Proximity Sensor)**

---Without Top Cover---

![Diagram of BG55 without top cover]

---With Top Cover---

![Diagram of BG55 with top cover]

Accessories
- Proximity sensor (APM-D3B1, Azbil) 2 pcs
- Proximity sensor (different frequency type) (APM-D3B1F, Azbil) 1 pc
- Sensor rail 1 pc
- Sensor dog 1 pc

---Type NPN, PNP---

**Type NPN**
- Sensing object: opaque: 2 x 0.8mm min.
- Differential travel: 0.025mm
- Power supply voltage: 5 to 24 VDC ±10%, ripple (P-P): 10% max.
- Current consumption: 12mA max. (NPN), 12mA max. (PNP)
- Control output: NPN open collector output models: At 5 to 24 VDC, 100mA load current (Io) with a residual voltage of 0.8V max, 40mA load current (Io) with a residual voltage of 0.4V max.
- PNP open collector output models: At 5 to 24 VDC, 50mA load current (Io) with a residual voltage of 1.3V max.
- Output operation: Dark-On (+, L terminal open-circuit), Light-On (+, L terminal short-circuit)
- Response frequency: 1kHz max. (3kHz average)
- Operation indicator: operation indicator (red) lit with incident fluorescent light: 1000 ℓx max.
- Ambient illumination (on receiver lens): 5mm (slot width) opaque: 2 x 0.8mm min.
- Ambient temperature: -25 to 55℃ storage: -30 to 80℃
- Ambient humidity: operating: 5 to 85%RH storage: 5 to 95%RH
- Vibration resistance: destruction: 20 to 2000Hz, (with a peak acceleration of 100m/s²)
- Shock resistance: destruction: 500m/s² for 3 times each in X, Y, and Z directions
- Degree of protection: IEC60529 IP50
- Connection method: connector type (direct soldering possible)
- Weight: approx. 3g
- Material: case: Polybutylene terephthalate (PBT)
- Cover: Polycarbonate (PC)

---Type PNP---
- Sensing object: opaque: 2 x 0.8mm min.
- Differential travel: 0.025mm
- Power supply voltage: 5 to 24 VDC ±10%, ripple (P-P): 10% max.
- Current consumption: 12mA max. (NPN), 12mA max. (PNP)
- Control output: NPN open collector output models: At 5 to 24 VDC, 100mA load current (Io) with a residual voltage of 0.8V max, 40mA load current (Io) with a residual voltage of 0.4V max.
- PNP open collector output models: At 5 to 24 VDC, 50mA load current (Io) with a residual voltage of 1.3V max.
- Output operation: Dark-On (+, L terminal open-circuit), Light-On (+, L terminal short-circuit)
- Response frequency: 1kHz max. (3kHz average)
- Operation indicator: operation indicator (red) lit with incident fluorescent light: 1000 ℓx max.
- Ambient illumination (on receiver lens): 5mm (slot width) opaque: 2 x 0.8mm min.
- Ambient temperature: -25 to 55℃ storage: -30 to 80℃
- Ambient humidity: operating: 5 to 85%RH storage: 5 to 95%RH
- Vibration resistance: destruction: 20 to 2000Hz, (with a peak acceleration of 100m/s²)
- Shock resistance: destruction: 500m/s² for 3 times each in X, Y, and Z directions
- Degree of protection: IEC60529 IP50
- Connection method: connector type (direct soldering possible)
- Weight: approx. 3g
- Material: case: Polybutylene terephthalate (PBT)
- Cover: Polycarbonate (PC)

---Please read the specifications and precautions of the manufacturer's catalog.---

### PNP SENSOR

For the BG type sensors can be changed to the PNP type by adding a sensor option code "PNP" at the end of the part number.

Refer to Table H-12 for the model number of PNP type sensors.

**Table H-13 PNP Sensor Type**

<table>
<thead>
<tr>
<th>Sensor code</th>
<th>Sensor type</th>
<th>BG15</th>
<th>BG20</th>
<th>BG26</th>
<th>BG33</th>
<th>BG46</th>
<th>BG55</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>Slim/compact type photomicro sensor</td>
<td>PM-L24 P (3pcs) (SUNX)</td>
<td>EE-SX674P (3pcs)</td>
<td>EE-SX671P (3pcs)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>Close contact type photomicro sensor</td>
<td>EE-SX671P (3pcs)</td>
<td>EE-SX671P (3pcs)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>Proximity sensor (N.C. contact)</td>
<td>APM-D3E1 (2pcs)</td>
<td>APM-D3E1F (1pc)</td>
<td>APM-D3E1F (1pc)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

※1: length of cable: 1m  
※2: 3 pcs of sensor connector will be attached  
※3: normal close contact  
※4: different frequency type
### Proximity Sensor Specifications

#### NPN Type
- **PM-L24**
  - Sensing Range: 5mm
  - Minimum Sensing Object: 0.8 x 1.8mm
  - Repeatability: 0.03mm or less
  - Supply Voltage: 5 to 24 VDC ±10%, ripple (P-P) 10% or less
  - Current Consumption: 15mA or less

#### PNP Type
- **PM-L24P**
  - Sensing Range: 5mm
  - Minimum Sensing Object: 0.8 x 1.8mm
  - Repeatability: 0.03mm or less
  - Supply Voltage: 5 to 24 VDC ±10%, ripple (P-P) 10% or less
  - Current Consumption: 15mA or less

#### Output
- **NPN Type**
  - Maximum Sink Current: 50mA, Applied Voltage: 30VDC or less (between output and 0V)
  - Residual Voltage: 0.7V or less (at 50mA sink current) 0.4V or less (at 16mA sink current)

- **PNP Type**
  - Maximum Source Current: 50mA, Applied Voltage: 30VDC or less (between output and +V)
  - Residual Voltage: 0.7V or less (at 50mA sink current) 0.4V or less (at 16mA sink current)

#### Control Output
- **NPN Type**
  - NPN Open-Collector Transistor
  - Switching Current: 30mA max. (resistive load)
  - Voltage Drop: 1V max. (switching current 30mA)
  - Output Dielectric Strength: 26.4V

- **PNP Type**
  - PNP Open-Collector Transistor
  - Switching Current: 30mA max. (resistive load)
  - Voltage Drop: 1V max. (switching current 30mA)
  - Output Dielectric Strength: 26.4V

#### Material
- Case: Polybutylene terephthalate (PBT)
- Cover: Polycarbonate

### Compact Photomicro Sensor
- **PM-L24**
  - Sensing Range: 5mm (fixed)
  - Minimum Sensing Object: 0.05mm or less
  - Repeatability: 0.03mm or less
  - Supply Voltage: 5 to 24 VDC ±10%, ripple (P-P) 10% or less
  - Current Consumption: 15mA or less

### Additional Information
- Please read the specifications and precautions of the manufacturer's catalog.
**POSITIONING PIN HOLE**

For the BG type, positioning pin holes can be provided on the slide block and sub table by adding the option code "PS" or "PW" in the end of the part number.

The option code "PR" is used to provide the guide rail with positioning pin holes.

When positioning pin holes are necessary on both the slide block/sub table and guide rail, please add the option code "PSR" or "PWR"

Table H-14 Chart For Positioning

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**Positioning Pin Hole for Slide Block and Sub Table**

It is useful when exacting reassembly positioning is required. In case of two blocks used, both blocks are processed.

When the code "PS" is added, the drilling is processed only on the mounting surface(slide block or sub table). When the code "PW" is specified for a BG with a top cover (except for BG15), the slide block and sub table are connected by the straight pins at the location where the "PS" option specifies on the slide block.

Note that NB does not supply straight pins for the "PS" option.

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**BG15A,B (long block)**

(PS Option)

- With Top Cover

![BG15A,B Diagram](../images/bg15a_b_with_top_cover.png)

- Without Top Cover

![BG15A,B Diagram](../images/bg15a_b_without_top_cover.png)

- With Top Cover

![BG15A,B Diagram](../images/bg15a_b_with_top_cover_with_cover.png)

- Without Top Cover

![BG15A,B Diagram](../images/bg15a_b_without_top_cover_without_cover.png)

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**BG20A,B (long block)**

(PS Option)

- With Top Cover

![BG20A,B Diagram](../images/bg20a_b_with_top_cover.png)

- Without Top Cover

![BG20A,B Diagram](../images/bg20a_b_without_top_cover.png)

- With Top Cover

![BG20A,B Diagram](../images/bg20a_b_with_top_cover_with_cover.png)

- Without Top Cover

![BG20A,B Diagram](../images/bg20a_b_without_top_cover_without_cover.png)

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**BG26A,B (long block)**

(PS Option)

- With Top Cover

![BG26A,B Diagram](../images/bg26a_b_with_top_cover.png)

- Without Top Cover

![BG26A,B Diagram](../images/bg26a_b_without_top_cover.png)

- With Top Cover

![BG26A,B Diagram](../images/bg26a_b_with_top_cover_with_cover.png)

- Without Top Cover

![BG26A,B Diagram](../images/bg26a_b_without_top_cover_without_cover.png)

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*Please contact NB for the without-top-cover option or the "PW" option.*

*For some cases, a shallow counterbore of φ4 will be machined at the hole area with * " to remove a hardened layer.*
**BG33A,B** (long block)

- **Without Top Cover**
  - 77.2
  - 74.4
  - 53.8

- **With Top Cover**
  - 74.6
  - 54

- **Motor end**

For some cases, a shallow count bore of Ø4 will be machined at the hole area with "※" to remove a hardened layer.

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**BG33C,D** (short block)

- **Without Top Cover**
  - 51.9
  - 49.1
  - 28.5

- **With Top Cover**
  - 74
  - 54

- **Motor end**

For some cases, a shallow count bore of Ø4 will be machined at the hole area with "※" to remove a hardened layer.

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**BG46A,B** (long block)

- **Without Top Cover**
  - 109.2
  - 106.6
  - 80

- **With Top Cover**
  - 81

- **Motor end**

For some cases, a shallow count bore of Ø5 will be machined at the hole area with "※" to remove a hardened layer.

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**BG46C,D** (short block)

- **Without Top Cover**
  - 73.2
  - 70.6
  - 44

- **With Top Cover**
  - 12

- **Motor end**

For some cases, a shallow count bore of Ø5 will be machined at the hole area with "※" to remove a hardened layer.

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**BG55A,B** (long block)

- **Without Top Cover**
  - 123
  - 121
  - 96

- **With Top Cover**
  - 37.5

- **Motor end**

For some cases, a shallow count bore of Ø5 will be machined at the hole area with "※" to remove a hardened layer.
LUBRICATION

- BG type contains a lithium soap based grease. (Multemp PS No.2, KYODO YUSHI) Apply similar type of grease for the lubrication as required depending on the operating conditions.
- Use the grease fitting to lubricate the slide block.
- For ball screw portion apply grease directly to the surface of screw shaft.
- BG15 slide block has φ2mm oil holes instead of grease fitting.
- Unless otherwise instructed, a grease fitting is located as shown in Figure H-19.
- The grease can be changed to a high function type by adding a special grease option at the end of the part number. Please refer to Table H-16 for the grease option.

USE AND HANDLING PRECAUTIONS

- Please handle as a precision component and avoid excessive vibration or shock.
- Rough handling will affect the smooth motion and reduce the precision performance and life time.
- DO NOT DISASSEMBLE. The accuracy of BG type is preadjusted when assembled.
- Please allow for extra stroke length. If the guide block repeatedly collides with damper, it may cause damage.
- Please never touch the area at both stroke ends during operation. There is a danger for the fingers to be caught at the stroke end. Please pay enough attention to the guide rail area even when not in operation, there is a danger for the fingers to be injured by the dust cover.
- Depending upon the operating environment, dust and foreign particles may contaminate BG type and disrupt the ball circulation and precision performance.