Model selection

STEP 1 Calculating the required gripping power

Calculate the required gripping power when transporting a workpiece (weight W_L) with the following as the reference.

$$F_W > \frac{W_L \times g \times K}{n}$$

F_W : Required gripping power (N)
n : Number of Attachments = 2
W_L : Weight of workpiece (kg)
g : Gravity acceleration 9.8 (m/s^2)
K : Transport coefficient
5 [holding only]
10 [normal transport]
20 [suddenly accelerated transport]

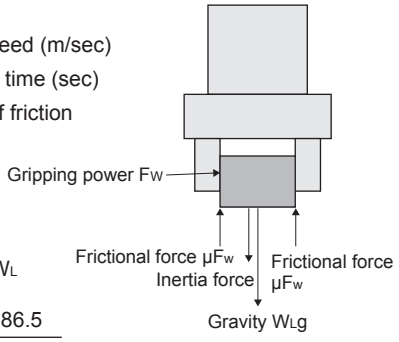
Transport coefficient K

Calculation example: When decelerating and stopping in 0.1 second from transport speed of V = 0.75 m/s with friction coefficient μ of workpiece and attachment as 0.1, see below.

Obtain the transport coefficient K from the force applied to the workpiece

- Inertial force = $W_L \times (V/t)$
- Gravity = $W_L g$
- Required gripping power $F_W > \frac{W_L \times (V/t) + W_L g}{n\mu} = \frac{W_L \times (V/t+g)}{n\mu} = \frac{17.3 W_L}{2 \times 0.1} = 86.5 W_L$

V: Transport speed (m/sec)
t: Deceleration time (sec)
μ: Coefficient of friction



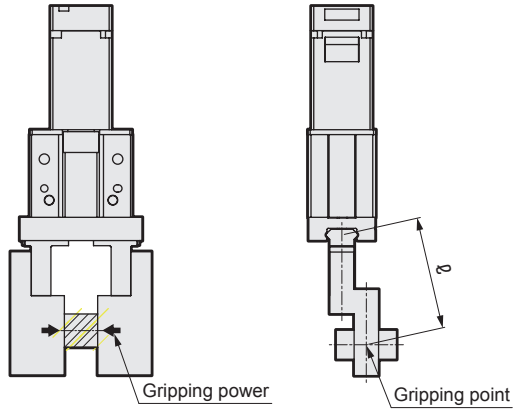
∴Here, the transport coefficient K is calculated from the above equation: $\frac{W_L \times g \times K}{n} = 86.5 W_L$

$$K = \frac{n \times 86.5}{g} = \frac{2 \times 86.5}{9.8} \approx 20$$

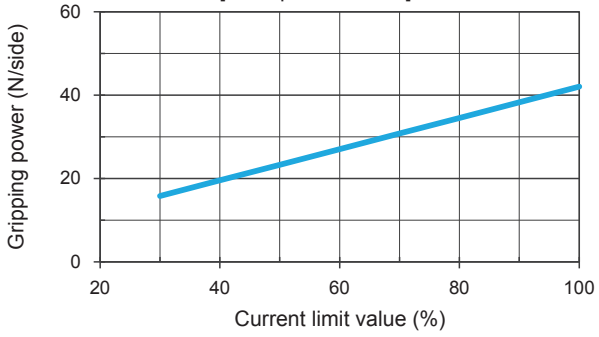
Note) Allowance is required for transport coefficient K due to impacts during transportation, etc. Even when the coefficient of friction μ is higher than μ = 0.1, set transport coefficient K from 10 to 20 or more for safety.

STEP 2 Temporarily select a model from the gripping power graph

Check the following conditions and temporarily select a model from the gripping power graph.
The gripping power varies according to length L of the attachment (gripping point distance ℓ) and the current limit value.
Confirm on the graph that sufficient force can be obtained under the working conditions.

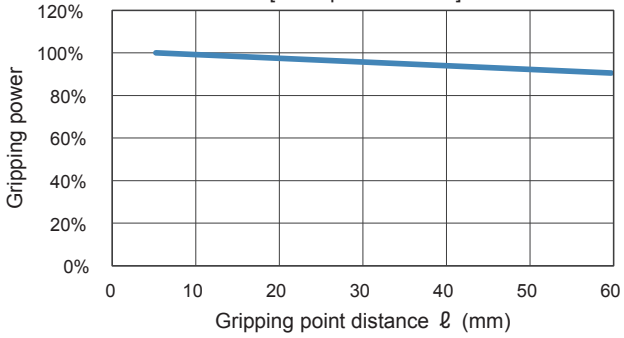


Gripping power and current limit value
[Example: FLSH-20]



*Refer to pages 2, 4 and 6.

Gripping power and gripping point distance
[Example: FLSH-20]

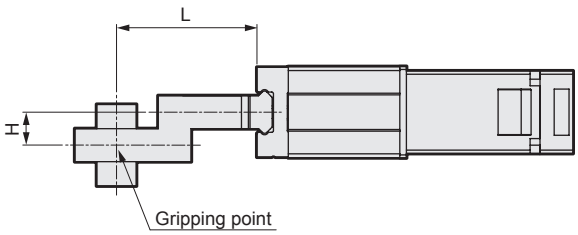


*Refer to page 10.

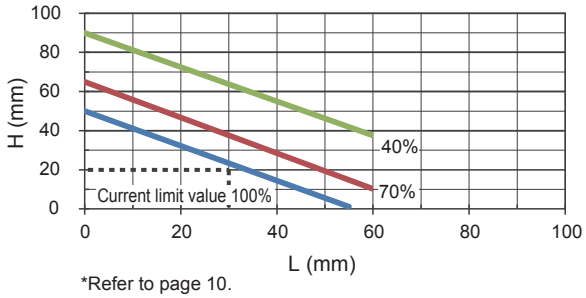
STEP 3 Confirmation of attachment shape

Use gripping point distance within the range of the graph at right.

Example) L: 30 mm, H: 20 mm



Gripping point distance and current limit value
[Example: FLSH-20]



*Refer to page 10.

When FLSH-20 is selected, the intersection of L: 30 mm and H: 20 mm will be inside the 100% pressing line, so it can be used.

●Use attachments as short and lightweight as possible.

If the attachment is long and heavy, inertia increases when opening and closing.
This may cause play in the finger, and adversely affect durability.

●Minimizing the attachment shape as much as possible within the performance data enables the product to be used for a longer time.

●The weight of the attachment affects durability, so check that the weight is less than the following value.

W < 1/4h (1 pc.) W : Weight of attachment
h : Product weight of gripper

STEP 4 Confirmation of external forces applied to finger

When external force is applied to the finger, use it within the range in [Table 1].

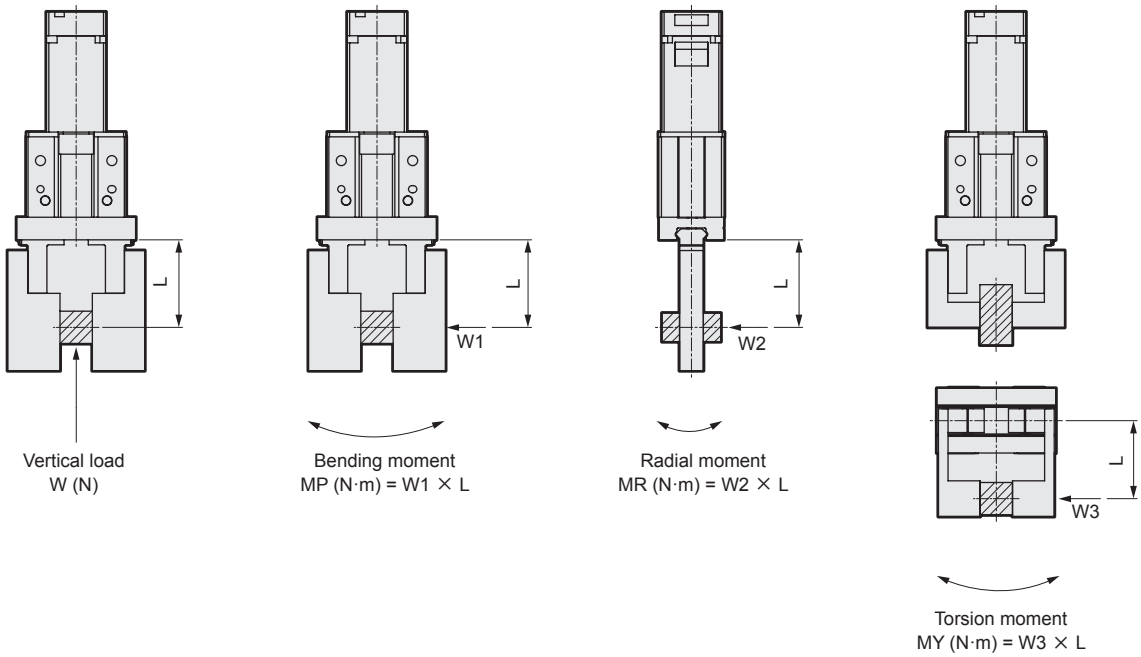


Table 1 Static allowable moment

Size	Vertical load Wmax (N)	Bending moment MPmax (N·m)	Radial moment MRmax (N·m)	Torsion moment MYmax (N·m)
FLSH-16	98	0.68	1.36	0.68
FLSH-20	147	1.32	2.65	1.32
FLSH-25	255	1.94	3.88	1.94

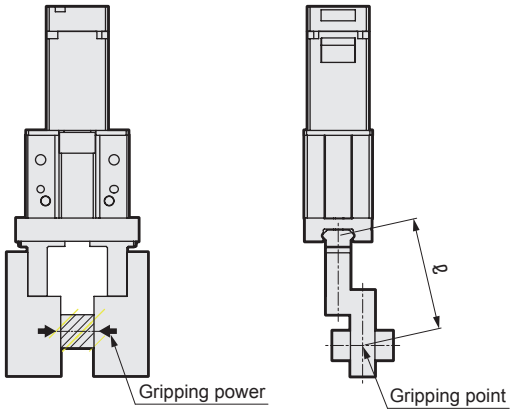
Example of calculation:

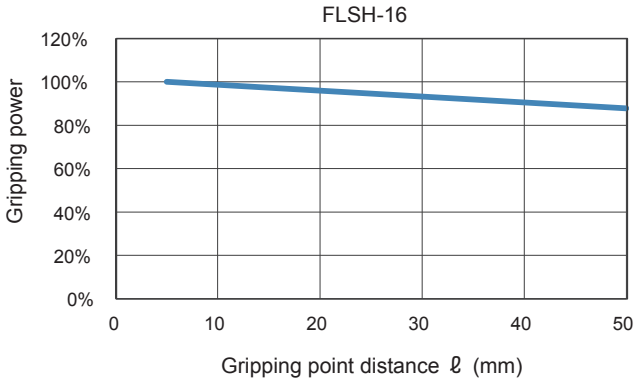
Model No.: FLSH-20, L: where load W1 of 30 N is applied to 40 mm

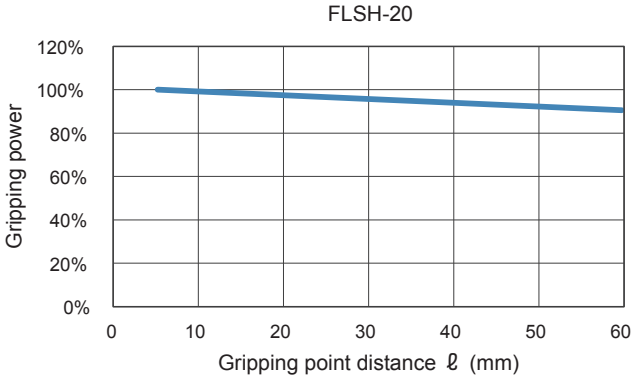
$MP = 30 \times 40 \times 10^{-3} = 1.2\ N \cdot m < MPmax = 1.32\ N \cdot m$

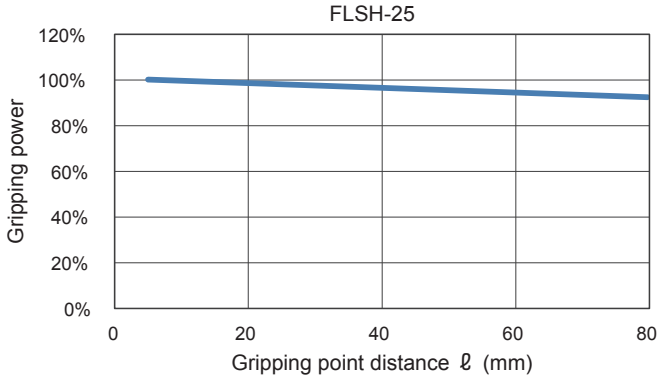
Gripping power and gripping point guidelines

This indicates the gripping power at gripping point distance ℓ.









Gripping point distance and current limit value