DLSH

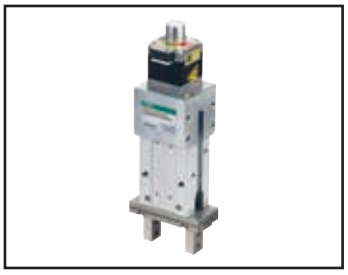
2-Finger Gripper

Electric actuator
Motor specifications

CONTENTS

DLSH Series variation

Actuator model No.	Motor Size	Spring lead (mm)	Stroke and Max. speed (mm/s)		Max. Gripping force (N)
			10	22	
DLSH-20	□28	4.2	63		10
DLSH-32	□42	6		60	40



Electric Actuator 2-Finger Gripper

DLSH-20

□28 Stepping motor

RoHS

How to order

DLSH - 20 ❶ S ❷ H4 ❸ 10 ❹ N ❺ N ❻ F3PH ❼ - F ❽ R1 ❾ A ❿ 1 ⓫

❶Size

20	20

❷Applicable controller * 1

S	ESC4

❸Spring lead

H4	4.2 mm

❹Stroke

10	10 mm (5 mm on one side)

❺Rubber cover

N	None

❻Finger

N	Basic

❼Switch

NNNN	None
F3PH	F-type straight
F3PV	F-type L-shaped

❽Connector leadout direction

F	Front

❾Relay cable * 2

N0	None
R1	Movable 1 m
R3	Movable 3 m
R5	Movable 5 m
RX	Movable 10 m

❿Controller included

N	None
A	DIN rail mounting specifications
B	Panel mounting specifications

⓫IO cable length

N	None
1	1 m
3	3 m
5	5 m
X	10 m

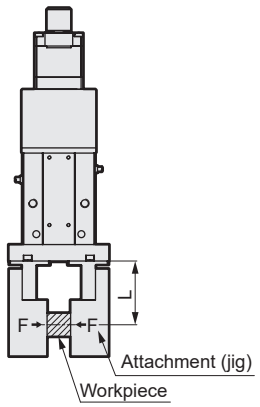
*1 For controller, refer to CC-1635A.
*2 Refer to page 104 for relay cable dimensions.

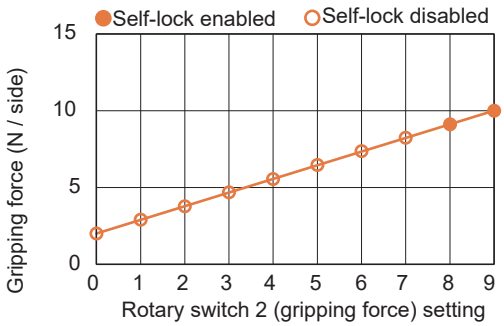
Specifications

Motor	□28 Stepping motor
Drive method	Coil spring
Stroke mm	10 (5 per side)
Pressing effective range mm	5 (2.5 per side)
Max. Gripping force * 1 N	10
Static allowable moment N·m	MP=2.1, MY=2.1, MR=2.1
Operation speed range mm/s	11 to 60
Max. acceleration/deceleration mm/s^2	1371 (Setting 9)
Gripping speed range mm/s	11 to 60
Repeatability * 2 mm	±0.02
Insulation resistance	10MΩ, 500 VDC
Withstand voltage	500 VAC for 1 minute
Operating ambient temperature, humidity	0 to 40 °C (no freezing) 35 to 80% RH (no condensation)
Storage ambient temperature, humidity	-10 to 50°C (no freezing) 35 to 80% RH (no condensation)
Atmosphere	No corrosive gas, explosive gas, or dust
Degree of protection	IP40
Weight g	600

* 1 Gripping is possible only in the closed direction. Operating the grip in the open direction may lead to damage of the actuator internal parts.
*2 Repeat accuracy indicates the variation when the same workpiece is repeated gripped at the same power, under the same operation conditions.

Gripping force and rotary switch setting

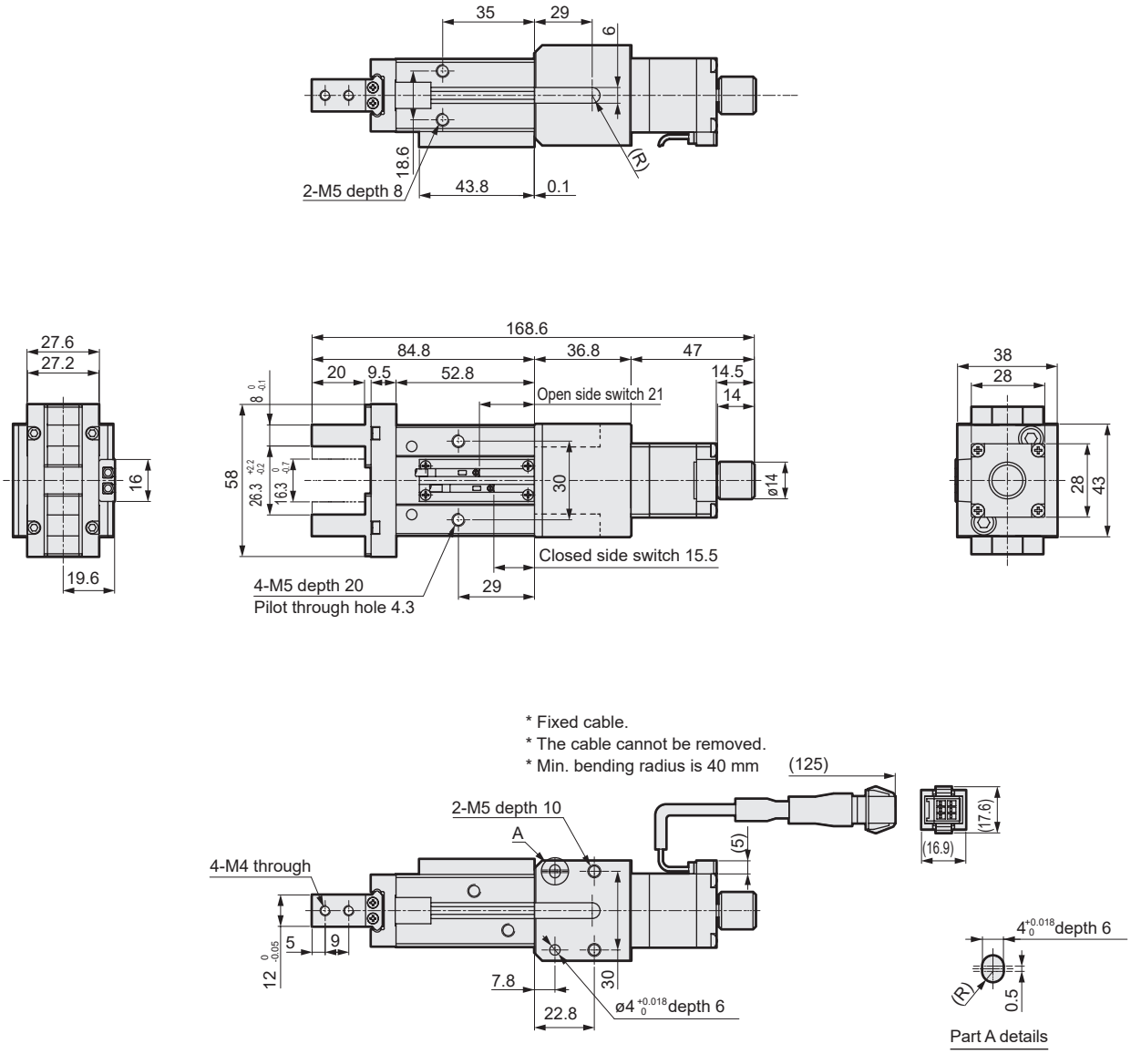




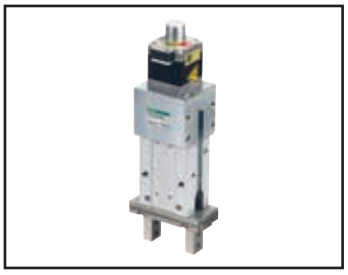
*1 Gripping force is a guideline. Errors may occur due to pressing position or cylinder switch adjustment.
*2 speed setting is 9 (60 mm/s). (L=20)
*3 Pressing position = stroke × 0.5
*4 The self-lock range is a reference value. Depending on conditions, the self-lock may not be effective.

Dimensions

● DLSH-20



* The lead wire direction for switch and F3PH (F-type straight) is on the finger side. If problems occur when processing the lead wire, use F3PV (F-type L-shaped).



Electric Actuator 2-Finger Gripper

DLSH-32

□42 Stepping motor

RoHS

How to order

DLSH - 32 S H6 22 N N F3PH - F R1 A 1

❶Size

32	32

❷Applicable controller * 1

S	ESC4

❸Spring lead

H6	6 mm

❹Stroke

22	22 mm (single side 11 mm)

❺Rubber cover

N	None

❻Finger

N	Basic

❼Switch

NNNN	None
F3PH	F-type straight
F3PV	F-type L-shaped

❽Connector leadout direction

F	Front

❾Relay cable * 2

N0	None
R1	Movable 1 m
R3	Movable 3 m
R5	Movable 5 m
RX	Movable 10 m

❿Controller included

N	None
A	DIN rail mounting specifications
B	Panel mounting specifications

⓫IO cable length

N	None
1	1 m
3	3 m
5	5 m
X	10 m

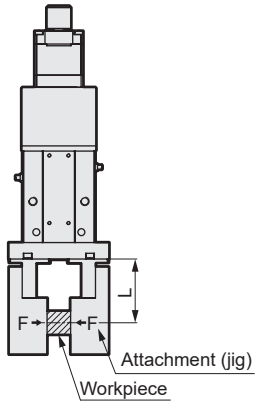
*1 For controller, refer to CC-1635A.
*2 Refer to page 104 for relay cable dimensions.

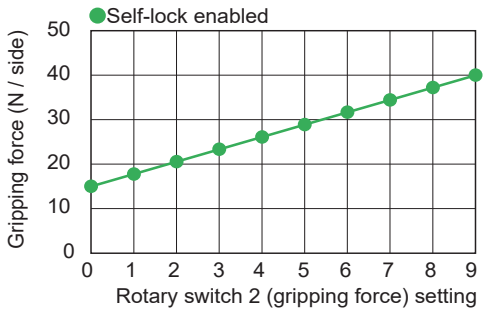
Specifications

Motor	□42 Stepping motor
Drive method	Coil spring
Stroke mm	22 (11 per side)
Pressing effective range mm	11 (5.5 per side)
Max. Gripping force * 1 N	40
Static allowable moment N·m	MP=4.5, MY=4.5, MR=4.5
Operation speed range mm/s	15 to 63
Max. acceleration/deceleration mm/s^2	840 (Setting 9)
Gripping speed range mm/s	15 to 63
Repeatability * 2 mm	±0.02
Insulation resistance	10MΩ, 500 VDC
Withstand voltage	500 VAC for 1 minute
Operating ambient temperature, humidity	0 to 40 °C (no freezing) 35 to 80% RH (no condensation)
Storage ambient temperature, humidity	-10 to 50°C (no freezing) 35 to 80% RH (no condensation)
Atmosphere	No corrosive gas, explosive gas, or dust
Degree of protection	IP40
Weight g	1950

*1 Gripping is possible only in the closed direction. Operating the grip in the open direction may lead to damage of the actuator internal parts.
*2 Repeat accuracy indicates the variation when the same workpiece is repeated gripped at the same power, under the same operation conditions.

Gripping force and rotary switch setting

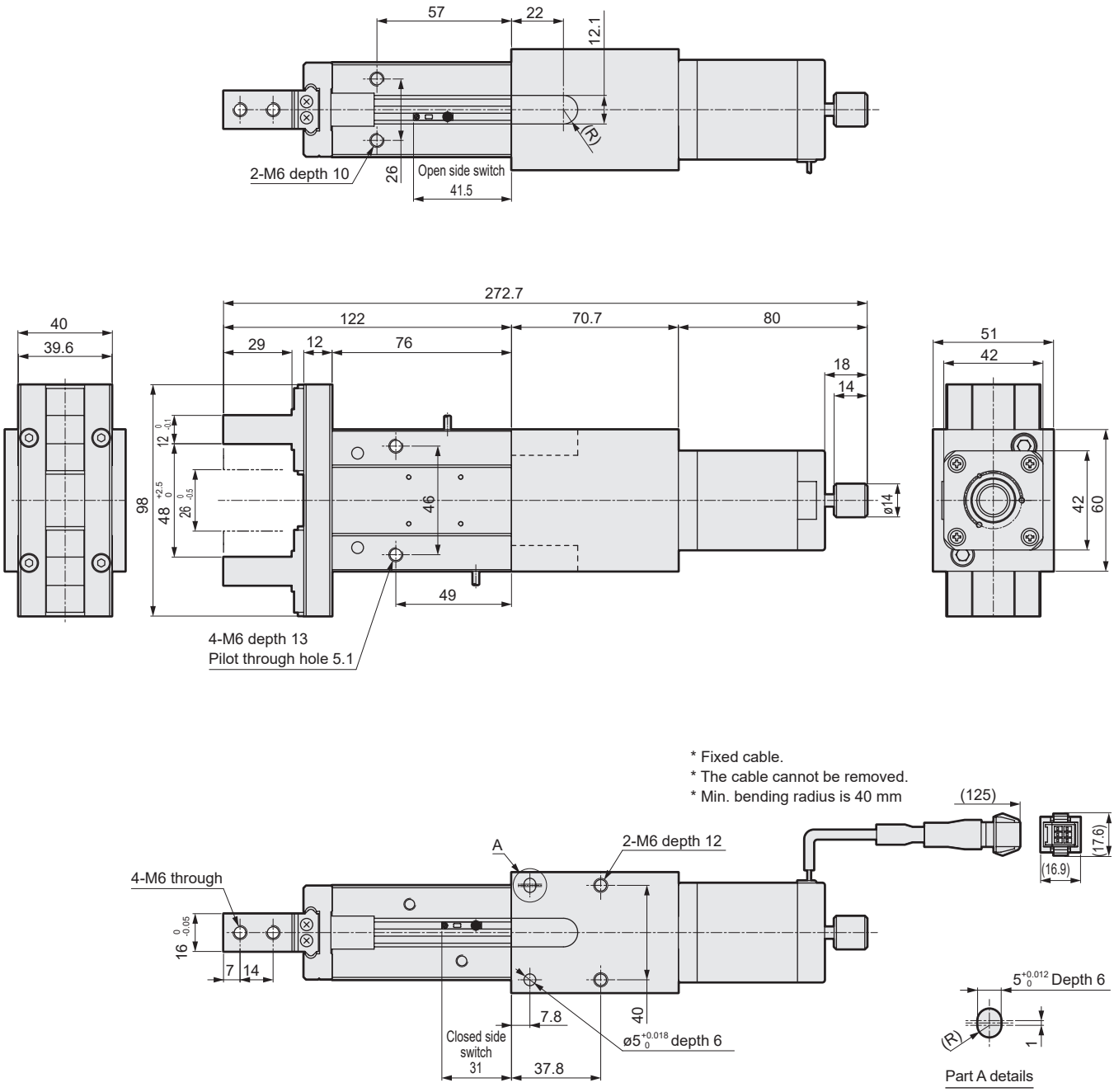




*1 Gripping force is a guideline. Errors may occur due to pressing position or cylinder switch adjustment.
*2 speed setting is 9 (63 mm/s). (L=20)
*3 Pressing position = stroke × 0.5
*4 The self-lock range is a reference value.
Depending on conditions, the self-lock may not be effective.

Dimensions

● DLSH-32



Model selection

STEP 1 Calculating the required gripping force

Calculate the required Gripping force 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 force (N)
n : Number of attachments = 2
W_L : Workpiece weight (kg)
g : Gravity acceleration 9.8 (m/s^2)
K : Transport coefficient
5 [holding only]
10 [normal transport]
20 [sudden accelerated transport]

Transport coefficient K

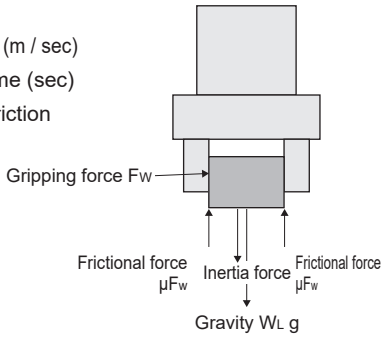
Calculation example: When decelerating and stopping in 0.1 second from transport speed of V = 0.75 m/s with friction coefficient μ of workpiece and attachment as 0.1, see below.

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

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

- Inertial force = $W_L \times (V / t)$
- Gravity = $W_L g$
- Required gripping force $F_W >$

$$\frac{W_L \times (V / t) + W_L g}{n\mu} = \frac{W_L \times (V / t + g)}{n\mu} = \frac{17.3 W_L}{2 \times 0.1} = 86.5 W_L$$



∴ Here, the transport coefficient K is calculated from the above equation:

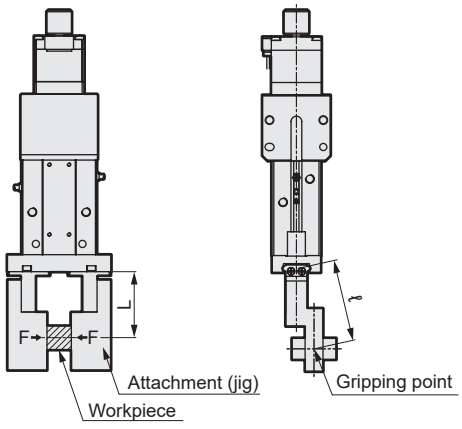
$$\frac{W_L \times g \times K}{n} = 86.5 W_L$$

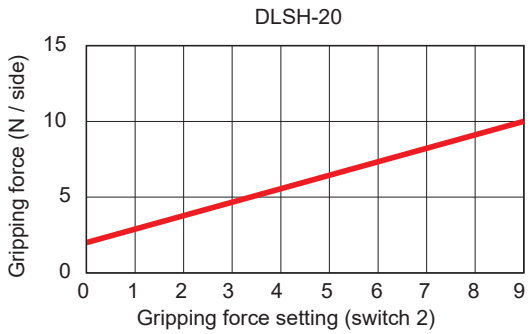
$$K = \frac{n \times 86.5}{g} = \frac{2 \times 86.5}{9.8} \approx 20$$

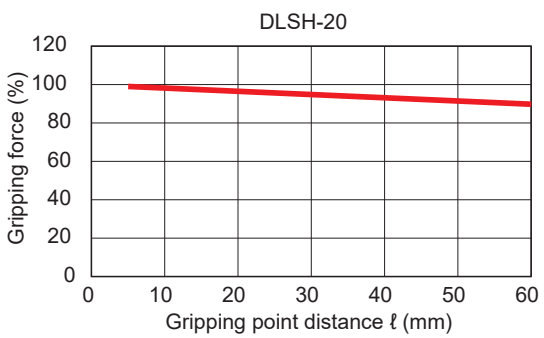
Note) Allowance is required for transport coefficient K due to impacts during transportation, etc. Even when the coefficient of friction μ is higher than μ=0.1, set transport coefficient K from 10 to 20 or more for safety.

STEP 2 Temporarily select a model from the gripping force graph

Check the conditions at right and temporarily select a model from the gripping force graph. The Gripping force varies according to gripping point distance ℓ and gripping force setting. Confirm on the graph that sufficient force can be obtained under the working conditions.



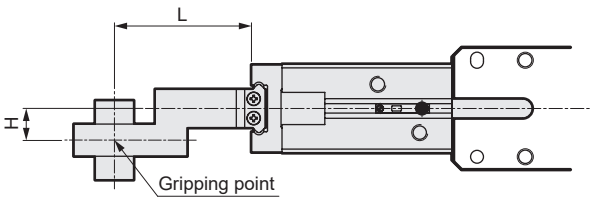




STEP 3 Confirmation of attachment shape

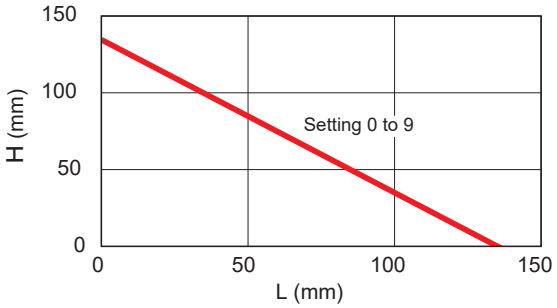
Use gripping point distance within the range of the graph at right.

Example) L: 30 mm, H: 20 mm



If DLSH-20 is selected, L:30mm, H:20mm
intersection point is inside the line with gripping force setting 0 to 9, can be used.

Gripping point distance and gripping force setting



Refer to page 88.

●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.

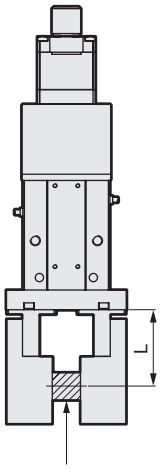
●Minimizing the attachment shape as much as possible within the performance data enables the product to be used for a longer time.

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

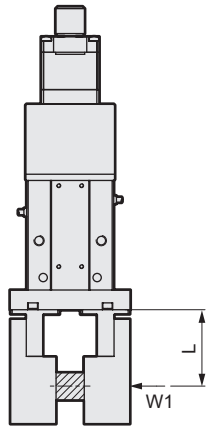
W < 1/4 H (1 pc.) W : Weight of attachment
h : Gripper product weight

STEP 4 Confirmation of external forces applied to finger

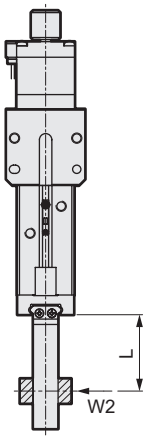
When external force is applied to the finger, use it within the range in [Table 1].



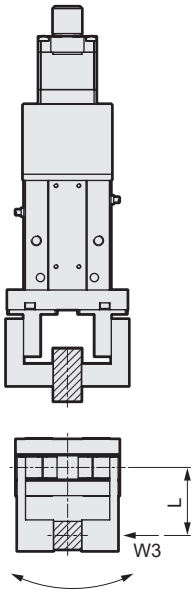
Vertical load
W (N)



Bending moment
MP (N·m) = W1 × L



Radial moment
MR (N·m) = W2 × L



Torsion moment
MY (N·m) = W3 × L

Table 1 Static allowable moment

Size	Vertical load Wmax (N)	Bending moment MP max (N·m)	Radial moment MR max (N·m)	Torsion moment MY max (N·m)
DLSH20	265	2.1	2.1 (40)	2.1
DLSH32	490	4.5	4.5 (90)	4.5

If multiple external forces are applied, the resultant external forces (formula below) must be less than 1.

WT = W / Wmax + MP / MPmax + MR / MRmax + MY / MYmax < 1

Radial moment can be used with less than ( ). In this case, use L and H dimensions with less than 2/3 of the length specified on page 88.

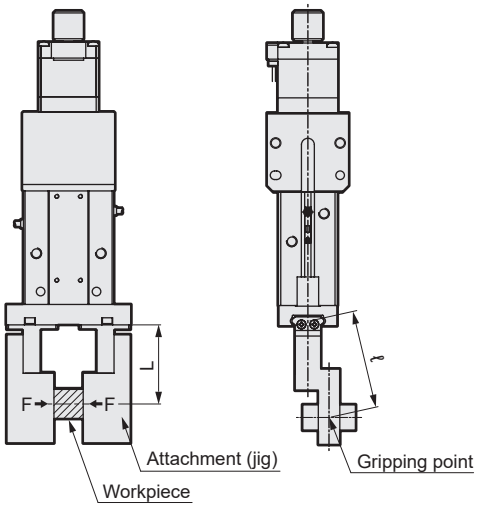
Example of calculation:

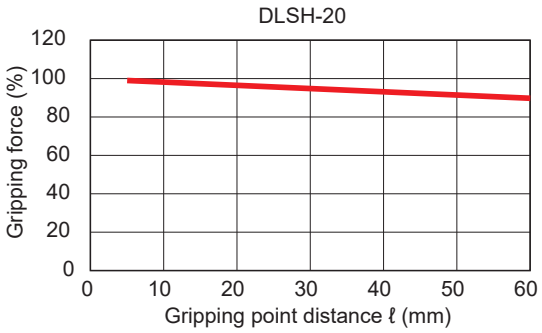
Model No.: DLSH-20, When load W1 : 30 N is applied to L : 40 mm

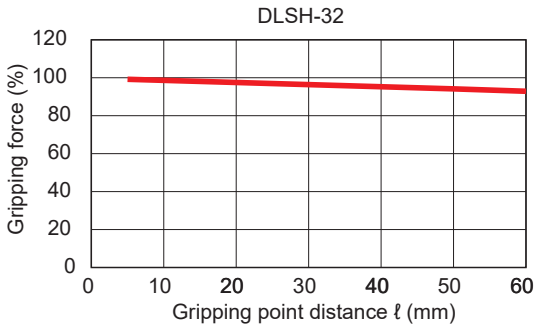
$MP = 30 \times 40 \times 10^{-3} = 1.2\ N{\cdot}m < MPmax = 2.1\ N{\cdot}m$

Gripping force and gripping point distance

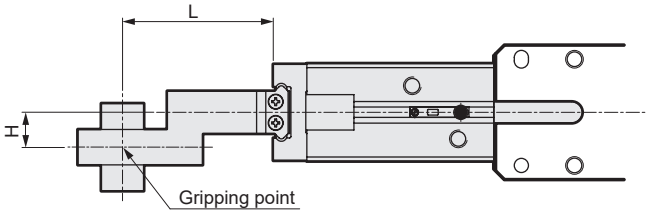
This indicates the gripping force at gripping point distance ℓ.

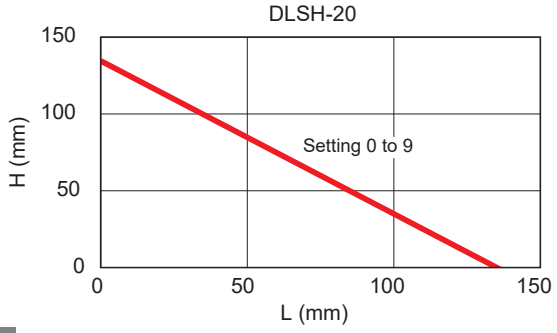


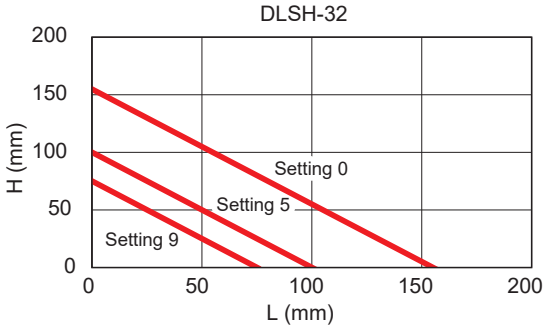




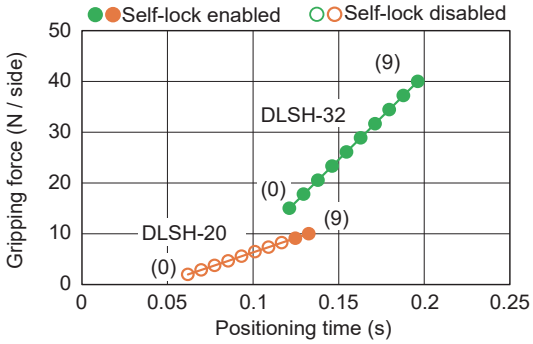
Gripping point distance and gripping force setting







Positioning time for pressing operation



*1 ( ): Rotary switch 2 (gripping force) setting.
*2 The self-lock range is a reference value. Depending on conditions, the self-lock may not be effective.
*3 Gripping force is a guideline.
Errors may occur due to pressing position or cylinder switch adjustment.
*4 Pressing position = center of stroke, rotary switch 1 (speed) setting = 9.
*5 The Positioning time is the time from the start of motor rotation to the stop.