GCKW

3-Finger Gripper

Electric actuator
Motor specifications

CONTENTS

GCKW Series variation

Actuator model No.	Motor Size	Screw lead (mm)	Stroke and Max. speed (mm/s)		Max. Gripping force (N)
			4	6	
GCKW-16	□20	1.5	50		7
GCKW-20	□25	1.5	50		16
GCKW-25	□25L	1.5		50	29

Electric Actuator 3-Finger Gripper

GCKW-16

□20 Stepping motor

How to order

GCKW - 16 G H1 04 N C N - F R01

❶Size

16	16

❷Applicable controller * 1

G	ECG-B/ECMG

❸Screw lead

H1	1.5 mm

❹Stroke

04	4 mm (2 mm on one side)

❺Rubber cover

N	None

❻Encoder

C	Incremental encoder

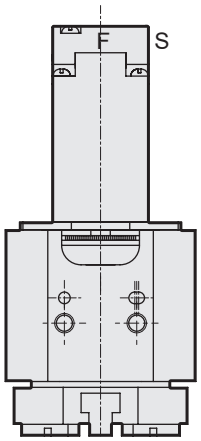
❼Connector leadout direction * 2

F	Front
S	Side

❽Relay cable *3

N00	None
R01	Movable 1 m
R03	Movable 3 m
R05	Movable 5 m
R10	Movable 10 m
S01	Fixed 1 m
S03	Fixed 3 m
S05	Fixed 5 m
S10	Fixed 10 m

[Fig. 1]



Connector leadout direction diagram

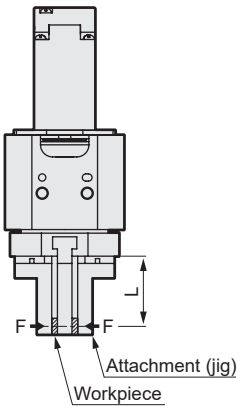
*1 For controller, refer to page 203.
*2 Refer to Figure 1.
*3 Refer to page 214 for relay cable dimensions.

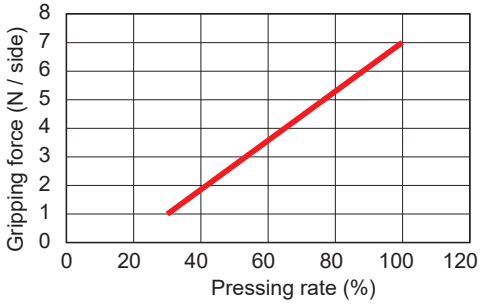
Specifications

Motor		□20 Stepping motor
Drive method		Sliding screw
Stroke	mm	4 (2 per side)
Screw lead	mm	1.5
Max. gripping force *1	N	7
Open/Close speed range	mm/s	5 to 50 (per side)
Gripping speed range *1	mm/s	5 to 15 (per side)
Repeatability * 2	mm	±0.02
Positioning repeatability *3	mm	±0.05 (per side)
Lost motion	mm	0.3 or less (per side)
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	250

*1 Gripping is done with pressing operation. If a pressing operation is performed in the positioning mode, parts inside the actuator may be damaged.
*2 Repeat accuracy indicates the variation when the same workpiece is repeated gripped at the same power, under the same operation conditions.
*3 This will result in variations in the stop position when repeated positioning to the same point is performed.

Gripping force and pressing rate

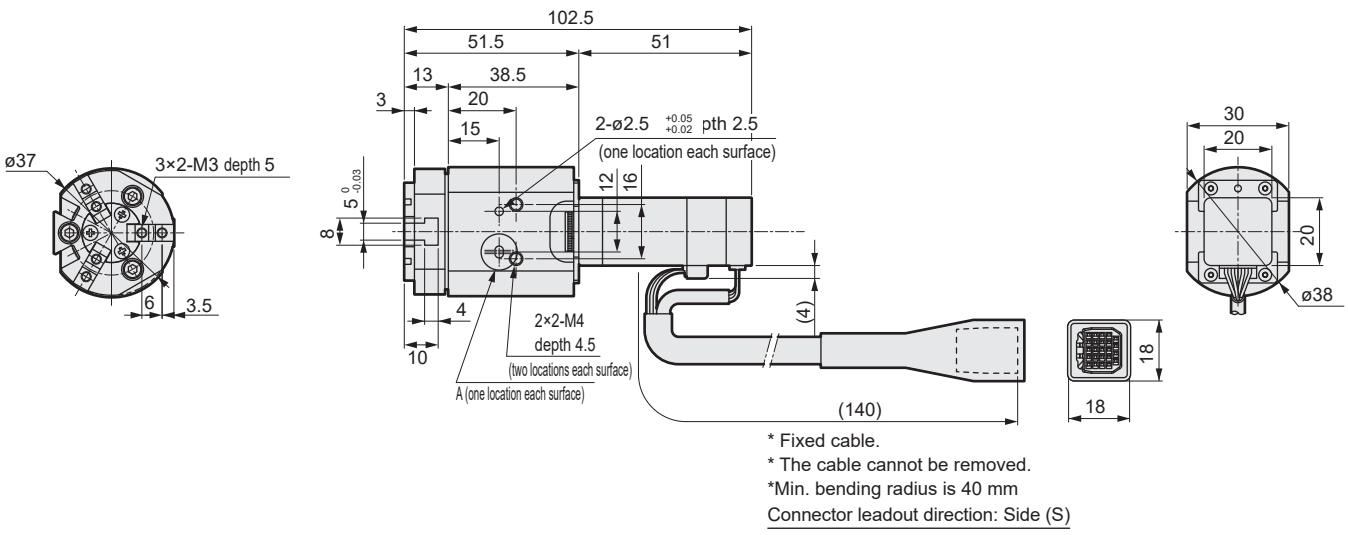




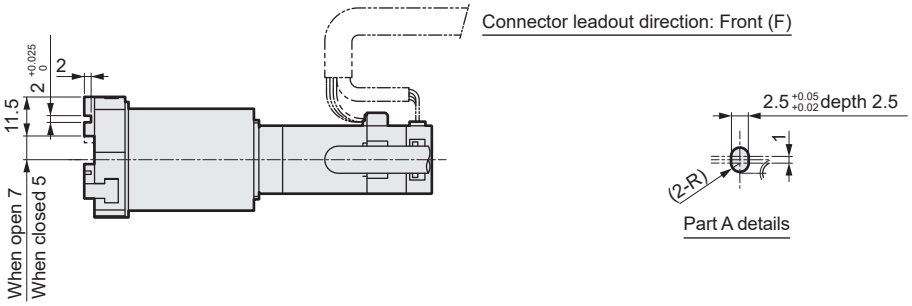
*1 Gripping force and pressing rate indicate a guideline. Power supply voltages, individual motor differences and variations in mechanical efficiency may result in differing actual values, even at the same pressing rate.
*2 Speed when gripping is 15 mm/s. (L=20)

Dimensions

● GCKW-16



* Fixed cable.
* The cable cannot be removed.
*Min. bending radius is 40 mm
Connector leadout direction: Side (S)



Electric Actuator 3-Finger Gripper

GCKW-20

□25 Stepping motor

How to order

GCKW - 20 G H1 04 N C N - F R01

❶Size

20	20

❷Applicable controller * 1

G	ECG-B/ECMG

❸Screw lead

H1	1.5 mm

❹Stroke

04	4 mm (2 mm on one side)

❺Rubber cover

N	None

❻Encoder

C	Incremental encoder

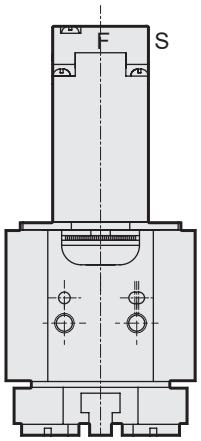
❼Connector leadout direction * 2

F	Front
S	Side

❽Relay cable *3

N00	None
R01	Movable 1 m
R03	Movable 3 m
R05	Movable 5 m
R10	Movable 10 m
S01	Fixed 1 m
S03	Fixed 3 m
S05	Fixed 5 m
S10	Fixed 10 m

[Fig. 1]



Connector leadout direction diagram

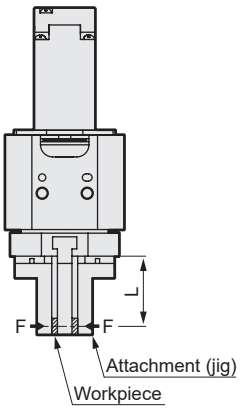
*1 For controller, refer to page 203.
*2 Refer to Figure 1.
*3 Refer to page 214 for relay cable dimensions.

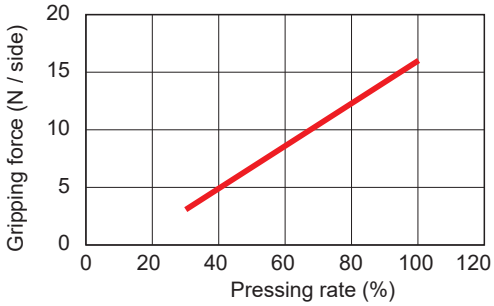
Specifications

Motor		□25 Stepping motor
Drive method		Sliding screw
Stroke	mm	4 (2 per side)
Screw lead	mm	1.5
Max. gripping force *1	N	16
Open/Close speed range	mm/s	5 to 50 (per side)
Gripping speed range *1	mm/s	5 to 15 (per side)
Repeatability * 2	mm	±0.02
Positioning repeatability *3	mm	±0.05 (per side)
Lost motion	mm	0.3 or less (per side)
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	390

*1 Gripping is done with pressing operation. If a pressing operation is performed in the positioning mode, parts inside the actuator may be damaged.
*2 Repeat accuracy indicates the variation when the same workpiece is repeated gripped at the same power, under the same operation conditions.
*3 This will result in variations in the stop position when repeated positioning to the same point is performed.

Gripping force and pressing rate

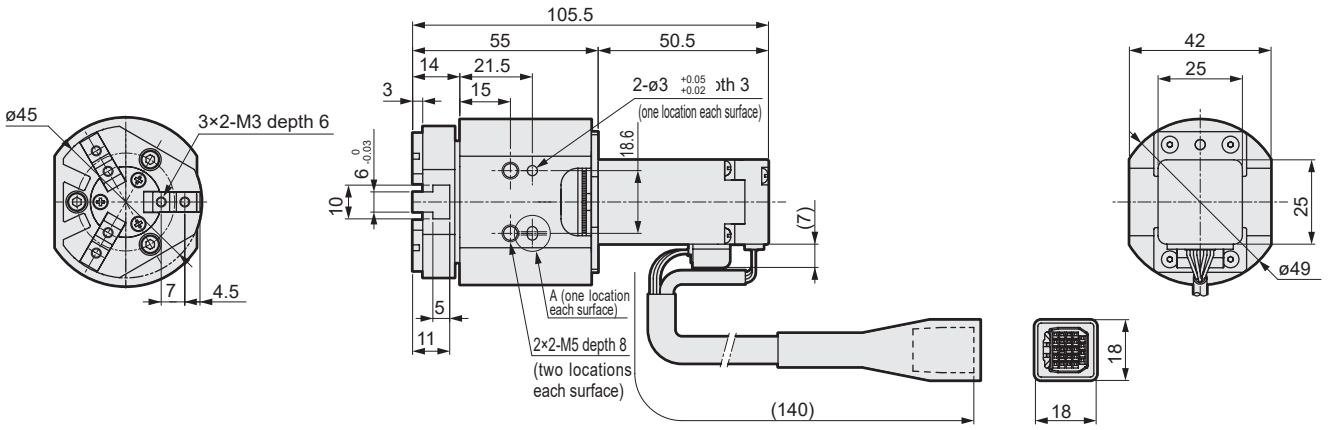




*1 Gripping force and pressing rate indicate a guideline. Power supply voltages, individual motor differences and variations in mechanical efficiency may result in differing actual values, even at the same pressing rate.
*2 Speed when gripping is 15 mm/s. (L=20)

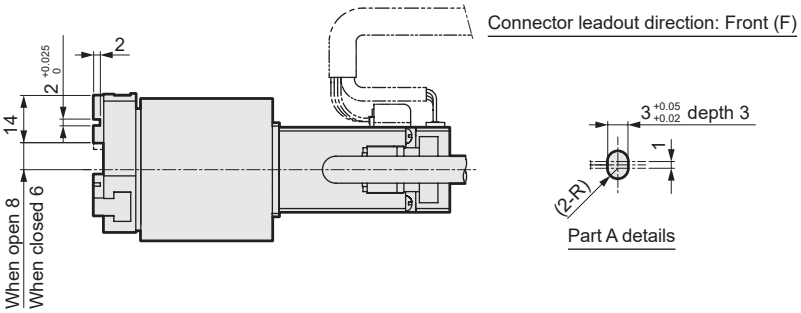
Dimensions

● GCKW-20



* Fixed cable.
* The cable cannot be removed.
*Min. bending radius is 40 mm

Connector leadout direction: Side (S)



Electric Actuator 3-Finger Gripper

GCKW-25

□25L Stepping motor

How to order

GCKW - 25 G H1 06 N C N - F R01

❶Size

25	25

❷Applicable controller * 1

G	ECG-B/ECMG

❸Screw lead

H1	1.5 mm

❹Stroke

06	6 mm (3 mm per side)

❺Rubber cover

N	None

❻Encoder

C	Incremental encoder

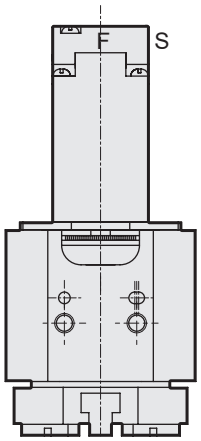
❼Connector leadout direction * 2

F	Front
S	Side

❽Relay cable *3

N00	None
R01	Movable 1 m
R03	Movable 3 m
R05	Movable 5 m
R10	Movable 10 m
S01	Fixed 1 m
S03	Fixed 3 m
S05	Fixed 5 m
S10	Fixed 10 m

[Fig. 1]



Connector leadout direction diagram

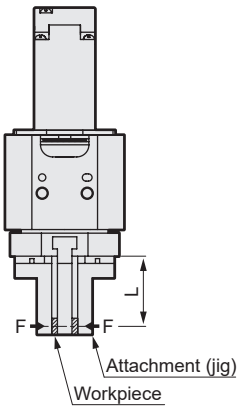
*1 For controller, refer to page 203.
*2 Refer to Figure 1.
*3 Refer to page 214 for relay cable dimensions.

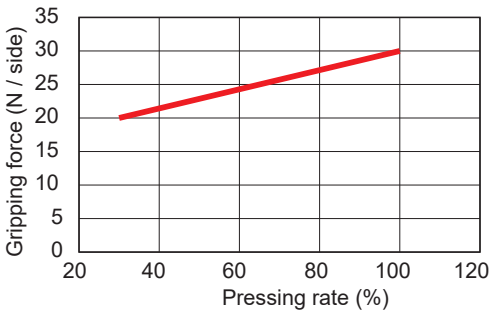
Specifications

Motor		□25L Stepping motor
Drive method		Sliding screw
Stroke	mm	6 (3 per side)
Screw lead	mm	1.5
Max. gripping force * 1	N	29
Open/Close speed range	mm/s	5 to 50 (per side)
Gripping speed range *1	mm/s	5 to 15 (per side)
Repeatability *2	mm	±0.02
Positioning repeatability *3	mm	±0.05 (per side)
Lost motion	mm	0.3 or less (per side)
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	580

*1 Gripping is done with pressing operation. If a pressing operation is performed in the positioning mode, parts inside the actuator may be damaged.
*2 Repeat accuracy indicates the variation when the same workpiece is repeated gripped at the same power, under the same operation conditions.
*3 This will result in variations in the stop position when repeated positioning to the same point is performed.

Gripping force and pressing rate

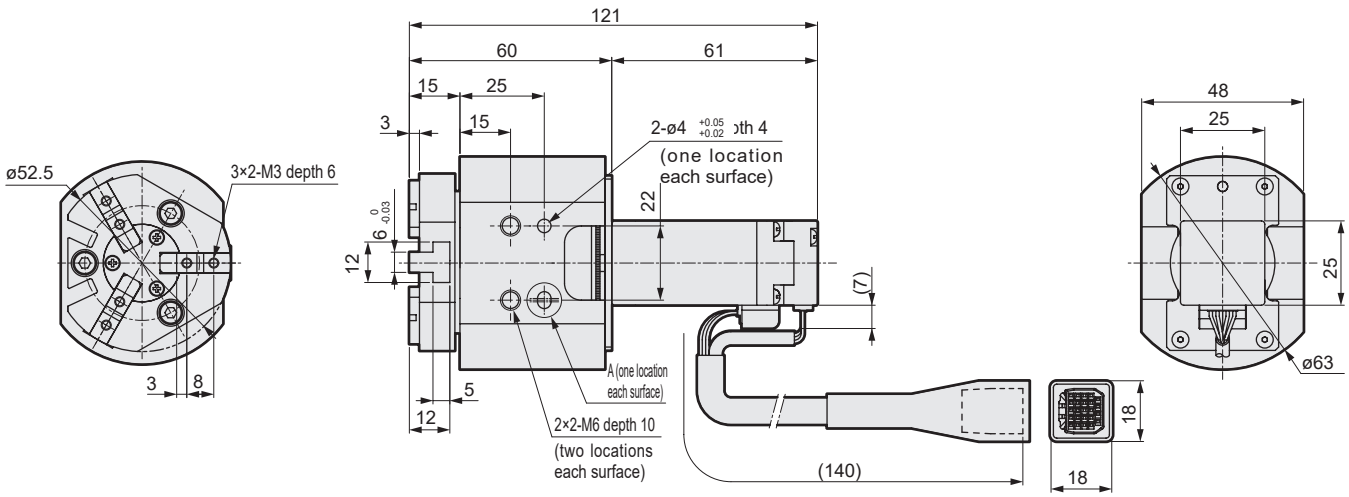




*1 Gripping force and pressing rate indicate a guideline. Power supply voltages, individual motor differences and variations in mechanical efficiency may result in differing actual values, even at the same pressing rate.
*2 Speed when gripping is 15 mm/s. (L=20)

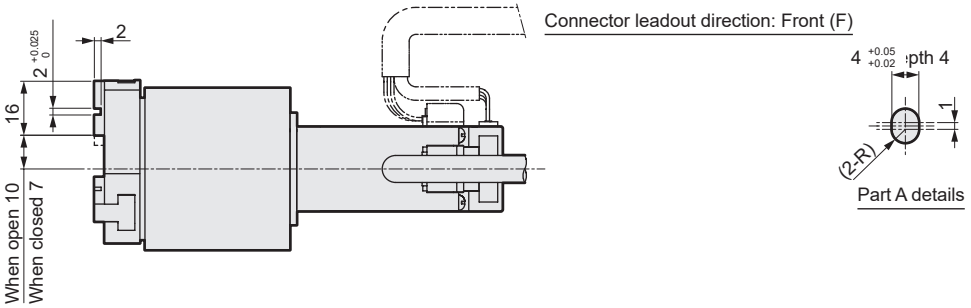
Dimensions

● GCKW-25



* Fixed cable.
* The cable cannot be removed.
*Min. bending radius is 40 mm

Connector leadout direction: Side (S)



Model selection

STEP 1 Calculating the required gripping force

Gripping force F_W satisfying the following equation is required to transport the workpiece (weight W_L).

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

F_W : Required gripping force [N]
n : Number of attachments = 3
W_L : Weight of workpiece [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

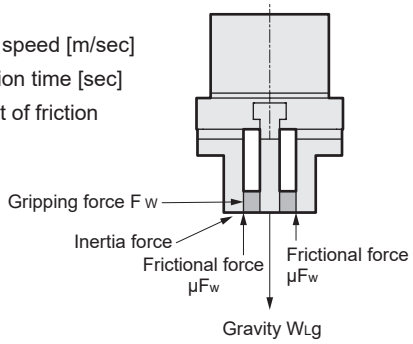
Calculation example) Transport speed V = If the friction coefficient μ between the workpiece and the finger is 0.1 for the purpose of decelerating and stopping at 0.75 m / s in 0.1 seconds, the result is as follows.

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 = $W_L (V/t)$
- Gravity = $W_L g$
- Required gripping force $F_W >$ $\frac{W_L (V/t) + W_L g}{n\mu} = \frac{W_L (V/t+g)}{n\mu} = \frac{17.3\, W_L}{3 \times 0.1} = 57.7\, W_L$

∴ Here, the transport coefficient K is calculated from the above equation: $\frac{V/t + g}{\mu g} = \frac{0.75/0.1 + 9.8}{0.1 \times 9.8} \approx 20$

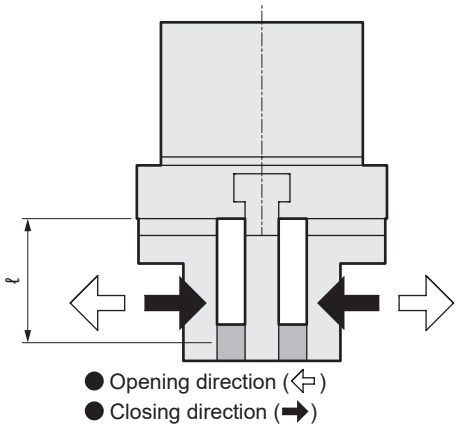


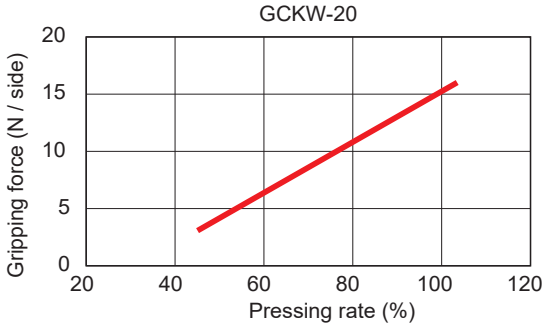
Note) Allowance is required for transport coefficient K due to impacts during transportation, etc. Even when the coefficient of friction μ is higher than μ=0.1, set transport coefficient K from 10 to 20 or more for safety.

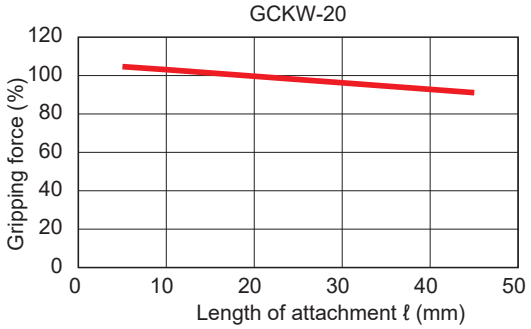
STEP 2 Temporarily select a model from the gripping force graph

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 the current limit value. Confirm on the graph that sufficient force can be obtained under the working conditions.

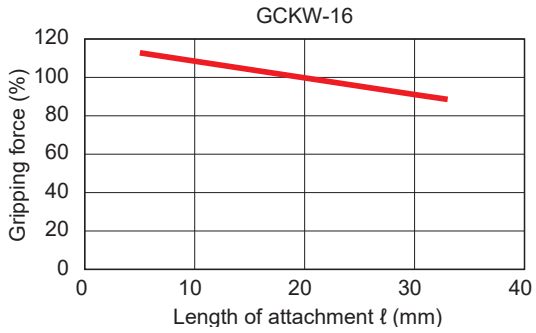
Grip direction

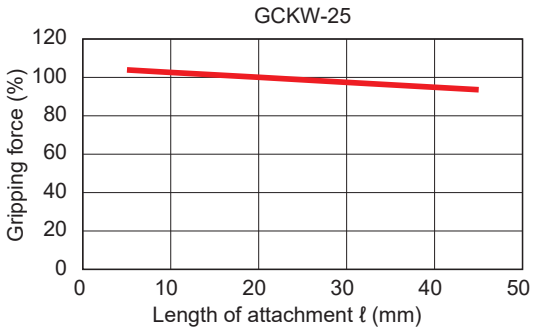




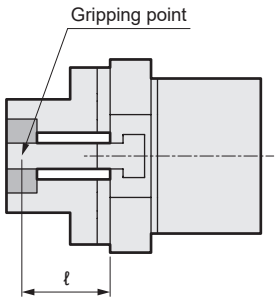


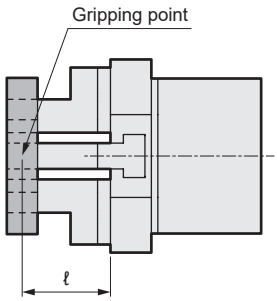
Gripping force and gripping point distance





STEP 3 Confirmation of attachment shape





- **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.
  - Even if the attachment shape is within the performance data, by making it as small as possible enables the product to have a longer service life. Also, if ℓ is long, unexpected vibration, etc., could cause erroneous gripping and falling during transport.
  - 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