

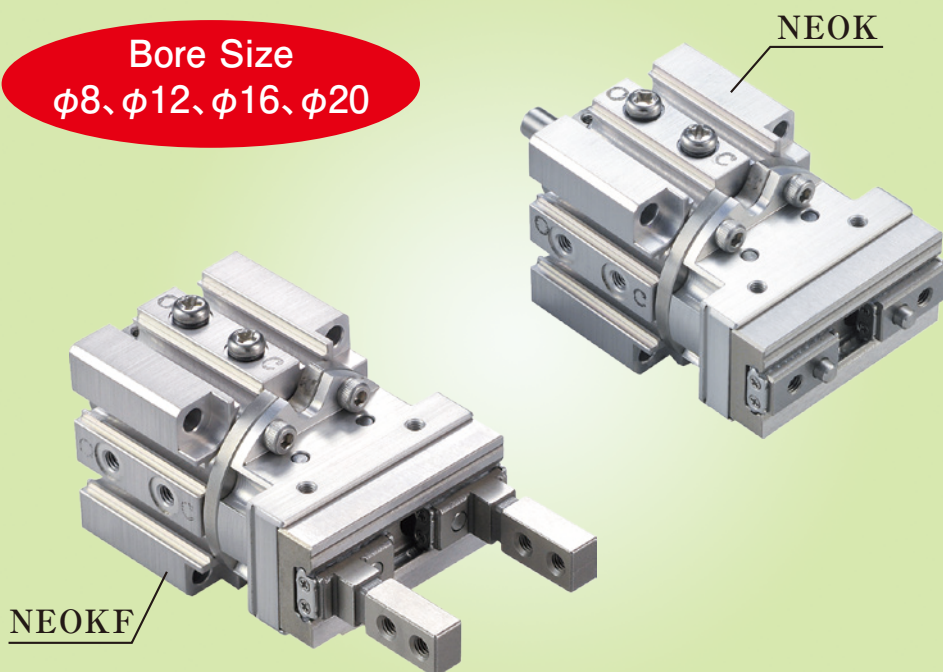


Registered Design

NEO Series

New-Era Original series

Bore Size
 $\phi 8$ 、 $\phi 12$ 、 $\phi 16$ 、 $\phi 20$



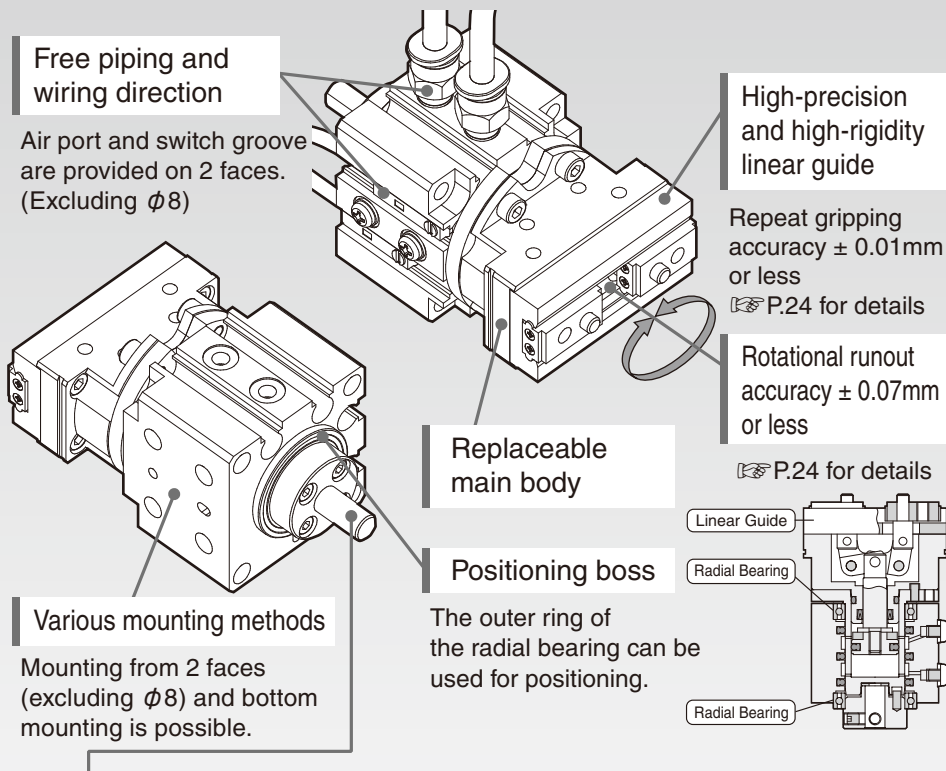
New-Era®

Swivel Gripper

NEOK Series

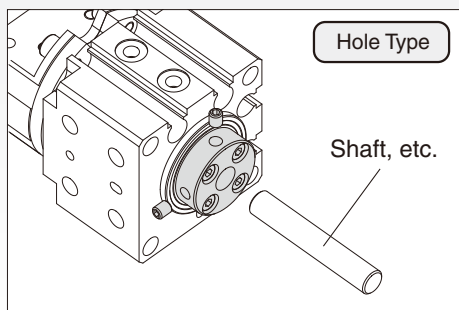
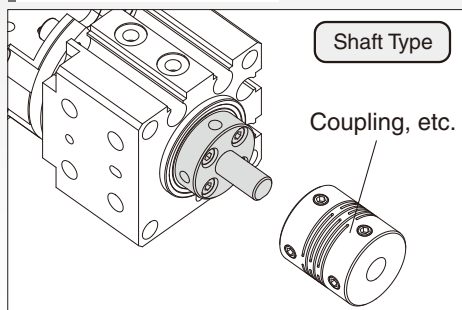
[Bore Size: $\phi 8$ 、 $\phi 12$ 、 $\phi 16$ 、 $\phi 20$]

Free continuous rotation of high-precision gripper by external drive!



Connection Part

Two types of connection parts are available.

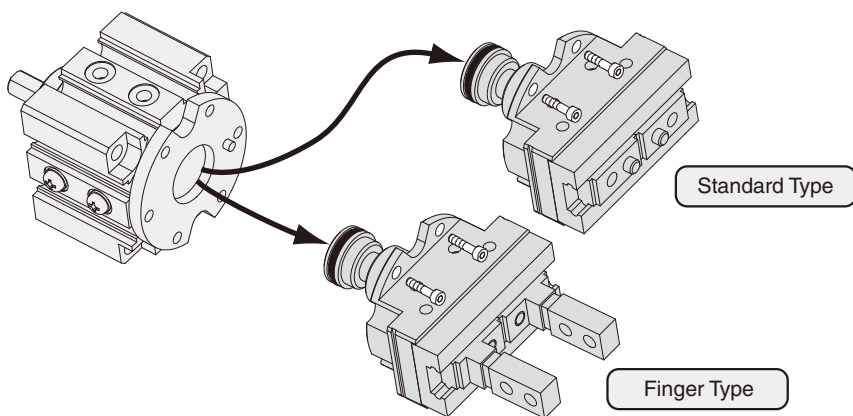


Product Features

Swivel joint structure is installed on the air gripper, and NEOK series achieved its high compactness by integration. The gripper is moved by external drive. Since only the gripper part can be moved with the fixed main body, air pipe and switch wire are not twisted.

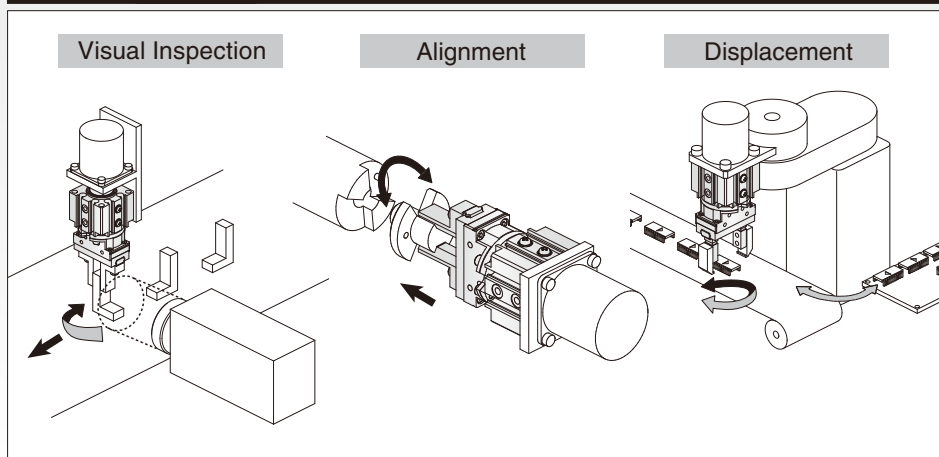
Main Body

Gripper part or cylinder part can be purchased separately
Easy setup change and maintenance



Application Example

For constant direction, angle control, inversion movement, etc.



Model Code No.

Main Body Assy + Case Assy

NEOK F - 12 C - 1 * JN - ZE235 A 2

Series Name

Bore Size

8 : 8mm
12 : 12mm
16 : 16mm
20 : 20mm

Action Type

C : Double Acting

Drive Shaft Connection Part

1: Shaft Type ※ P.2
2: Hole Type

Dust-proof Cover Type
(Can be mounted for
finger type only)

No Code: No Cover
JN: With NBR Rubber Cover
JS: With Silicon Rubber Cover
JF: With Fluorine Rubber Cover

Number of Switches

1: 1 Switch ※ Can be mounted
2: 2 Switches up to 4 switches.
For orders with 3
or more switches,
2 switches are
assembled, and
the rest is delivered
as attachment.

Switch Lead Wire Length

A: 1000mm
B: 3000mm

● Switch Type No Code: No Switch

ZE135

2 Wire Solid State Switch, Straight Type

ZE155

3 Wire Solid State Switch, Straight Type



ZE235

2 Wire Solid State Switch, L-shaped

ZE255

3 Wire Solid State Switch, L-shaped



● φ8 Switch Type No Code: No Switch

RB6

2 Wire Solid State Switch, Straight Type

RB7

3 Wire Solid State Switch NPN Output, Straight Type



RC6

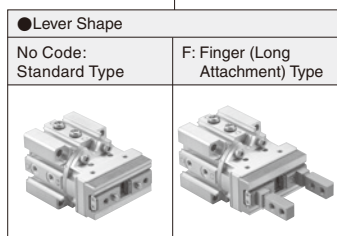
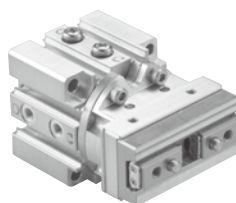
2 Wire Solid State Switch, L-shaped

RC7

3 Wire Solid State Switch NPN Output, L-shaped



● Switch details: P.25-29



Case Assy

DB - NEOK - 12 C - 1

Series Name

Bore Size

8 : 8mm
12 : 12mm
16 : 16mm
20 : 20mm

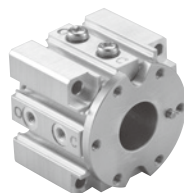
Case Assy

Action Type

C : Double Acting

Drive Shaft Connection Part

1: Shaft Type
2: Hole Type



Main Body Assy

DG - NEOK F - 12 C

Main Body Assy

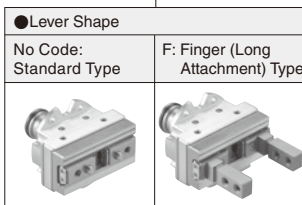
Series Name

Bore Size

8 : 8mm
12 : 12mm
16 : 16mm
20 : 20mm

Action Type

C : Double Acting



Dust-proof Cover (Can be mounted for NEOKF only)

JN - NEOKF 12

Dust-proof Cover

Series Name

Nominal Diameter

JN: With NBR Rubber Cover
JS: With Silicon Rubber Cover
JF: With Fluorine Rubber Cover

8 : φ8
12 : φ12
16 : φ16
20 : φ20

NBR Rubber



Silicon Rubber



Fluorine Rubber



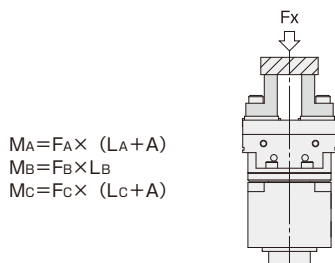
Specifications

Model Item	NEOK-8 (Standard)	NEOKF-8 (Finger)	NEOK-12 (Standard)	NEOKF-12 (Finger)	NEOK-16 (Standard)	NEOKF-16 (Finger)	NEOK-20 (Standard)	NEOKF-20 (Finger)
	Gripper Part							
Action Type	Double Acting							
Bore Size [mm]	φ 8		φ 12		φ 16		φ 20	
Opening/Closing Stroke [mm]	4		6.5		10		14	
Fluid	Air							
Working Pressure Range [MPa] In (), dust-proof cover attached	0.22~0.7	0.22~0.7 (0.3~0.7)	0.15~0.7	0.15~0.7 (0.2~0.7)	0.12~0.7	0.12~0.7 (0.15~0.7)	0.1~0.7	0.1~0.7 (0.15~0.7)
Proof Pressure [MPa]	1.05							
Maximum Operating Cycle [cycle/min]	120							
Operating Temperature [°C]	0~60 (No Freezing)							
Lubrication	Not Required							
Pipe Bore	M3×0.5				M5×0.8			
Effective Gripping Force ^{Note 1)} [N]	Opening Force : 10.8 Closing Force : 6.6		Opening Force : 23 Closing Force : 17		Opening Force : 39 Closing Force : 29		Opening Force : 74 Closing Force : 50	
Inertia moment [kg·m ²]	1.7×10 ⁻⁶	2.0×10 ⁻⁶	10×10 ⁻⁶	12×10 ⁻⁶	40×10 ⁻⁶	47×10 ⁻⁶	15×10 ⁻⁵	17×10 ⁻⁵
Repeat Gripping Accuracy [mm]	±0.01 ^{Note 2)}							
	Swivel Part							
Minimum Starting Torque [N·m]	0.15		0.2		0.25		0.4	
Allowable Rotational Speed [rpm]	120							
Lubrication	Required ^{Note 2)}							
	Common							
Rotational Runout Accuracy [mm]	±0.07 ^{Note 2)}							
Product Mass [g]	80	85 JN : +1.5 JS : +1.5 JF : +2	142	152 JN : +4.5 JS : +4 JF : +6.5	350	370 JN : +6.5 JS : +6 JF : +9	810	840 JN : +12.5 JS : +10 JF : +18.5

Note 1) It is an effective value when the gripping point L is 30 mm and the pressure is 0.5 MPa. For φ8, effective value when the gripping point L is 20mm and the pressure is 0.5 MPa.

Note 2) For details about repeat gripping accuracy, rotational runout accuracy and lubrication method refer P.24

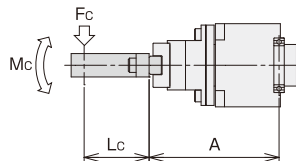
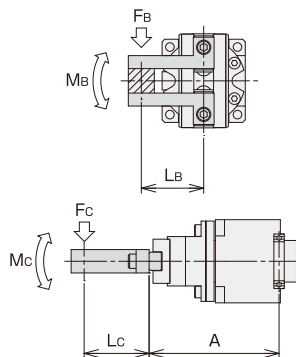
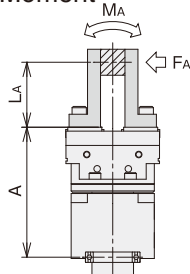
Allowable Load and Allowable Moment



$$M_A = F_A \times (L_A + A)$$

$$M_B = F_B \times L_B$$

$$M_C = F_C \times (L_C + A)$$

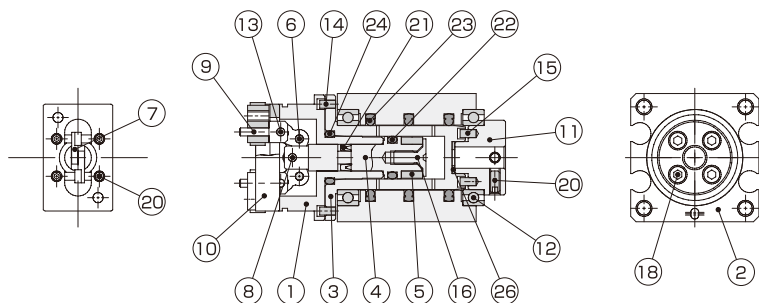


Model	Load and Moment	FX [N]	MA [N·m]	MB [N·m]	MC [N·m]	A [mm]
NEOK-8		12	0.06	0.04	0.06	42.5
NEOK-12		50	0.6	0.4	0.6	50
NEOK-16		120	1.5	1	1.5	67.5
NEOK-20		200	2.2	1.5	2.2	90

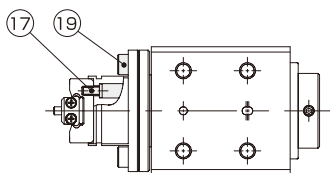
※For example of attachment design
P.13

Internal Structure Drawing

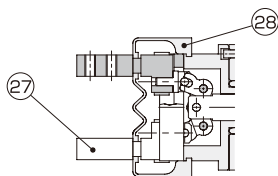
φ8



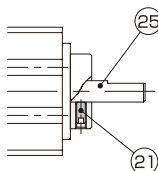
Drive Shaft Connection Type: Hole Type



Lever Shape: Finger Type



Drive Shaft Connection Part: Shaft Type

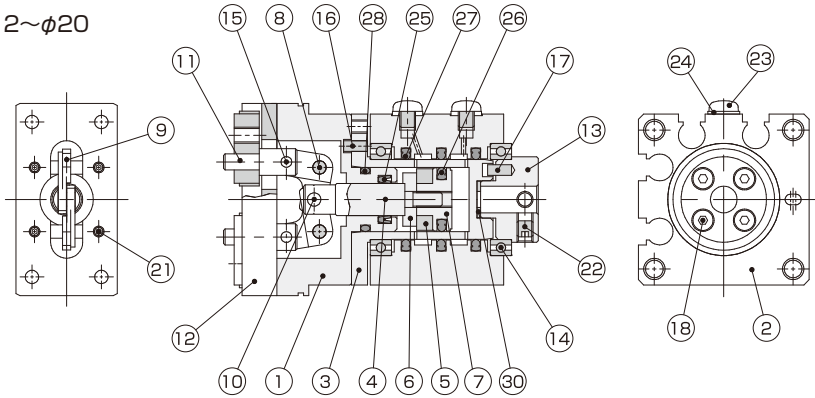


Parts List

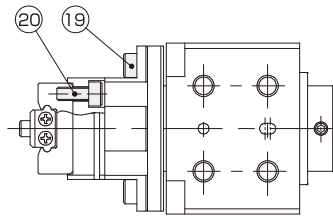
No	Name	Material	No	Name	Material	No	Name	Material
1	Body	Aluminium Alloy	12	Radial Bearing	Steel	23	Rotating Seal	NBR
2	Case	Aluminium Alloy	13	Press Fit Pin	Carbon Tool Steel	24	O Ring	NBR
3	Cylinder Tube	Stainless Steel	14	Press Fit Pin	Carbon Tool Steel	25	Shaft Adapter	Stainless Steel
4	Piston Rod	Stainless Steel	15	Press Fit Pin	Carbon Tool Steel	26	Shim	Stainless Steel
5	Magnet	Rare-earth Magnet	16	Cross-recessed Head Screw	Steel	27	Linear Guide	Steel
6	Fulcrum Pin	Carbon Tool Steel	17	Cross-recessed Head Screw	Soft Steel	28	Dust-proof Cover	NBR
7	Action Lever	Carbon Steel	18	Hexagon Socket Head Bolt	Stainless Steel			Silicon
8	Press Fit Pin	Carbon Tool Steel	19	Hexagon Socket Head Bolt	Stainless Steel			Fluorine
9	Knuckle	Stainless Steel	20	Hexagon Socket Head Setscrew	Steel			
10	Bearing	Bearing Steel	21	Rod Packing	NBR			
11	Stopper	Stainless Steel	22	Piston Packing	NBR			

Internal Structure Drawing

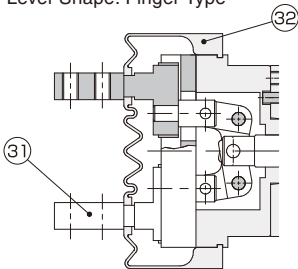
φ12~φ20



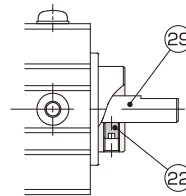
Drive Shaft Connection Type: Hole Type



Lever Shape: Finger Type



Drive Shaft Connection Part: Shaft Type

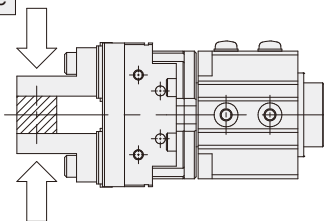


Parts List

No	Name	Material	No	Name	Material	No	Name	Material
1	Body	Aluminium Alloy	12	Bearing	Bearing Steel	23	Plug	Stainless Steel
2	Case	Aluminium Alloy	13	Stopper	Stainless Steel	24	Gasket	Steel, NBR
3	Cylinder Tube	Stainless Steel	14	Radial Bearing	Steel	25	Rod Packing	NBR
4	Piston Rod	Stainless Steel	15	Press Fit Pin	Carbon Tool Steel	26	Piston Packing	NBR
5	Magnet	Rare-earth Magnet	16	Press Fit Pin	Carbon Tool Steel	27	Rotating Seal	NBR
6	Pressure Cover	Aluminium Alloy	17	Press Fit Pin	Carbon Tool Steel	28	O Ring	NBR
7	Piston	Aluminium Alloy	18	Hexagon Socket Head Bolt	Stainless Steel	29	Shaft Adapter	Stainless Steel
8	Fulcrum Pin	Carbon Tool Steel	19	Hexagon Socket Head Bolt	Stainless Steel	30	Shim	Stainless Steel
9	Action Lever	Carbon Steel	20	Hexagon Socket Head Bolt	Stainless Steel	31	Linear Guide	Steel
10	Press Fit Pin	Carbon Tool Steel	21	Hexagon Socket Head Setscrew	Steel	32	Dust-proof Cover	NBR
11	Knuckle	Stainless Steel	22	Hexagon Socket Head Setscrew	Steel			Silicon Fluorine

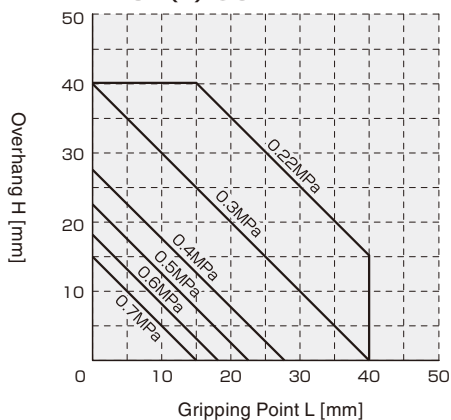
Gripping Point Limit Range (External Gripping)

External Gripping State

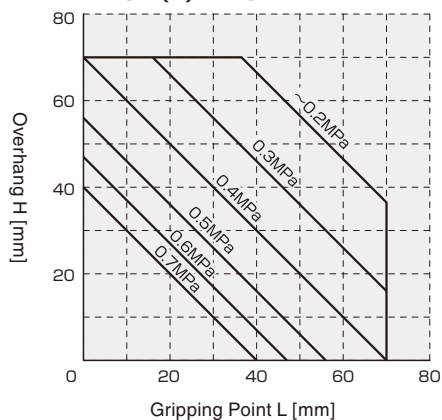


※For details about gripping point limit range and attachment mounting method P.12

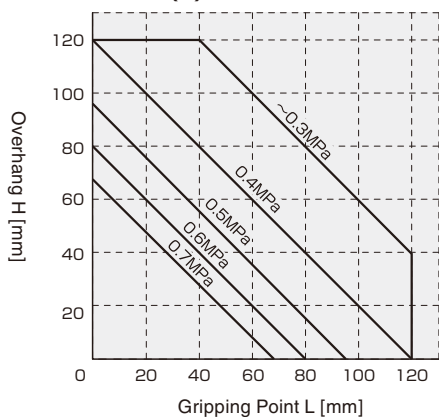
NEOK(F)-8C



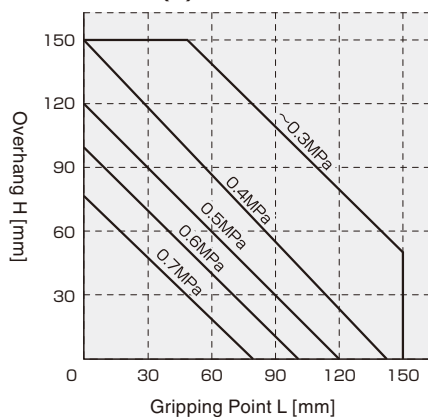
NEOK(F)-12C



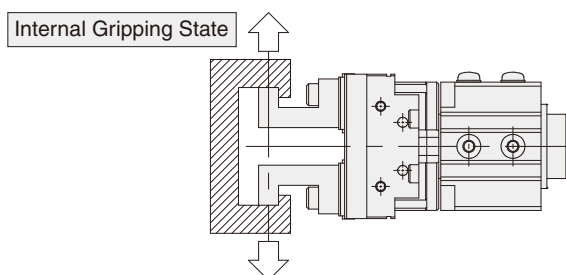
NEOK(F)-16C



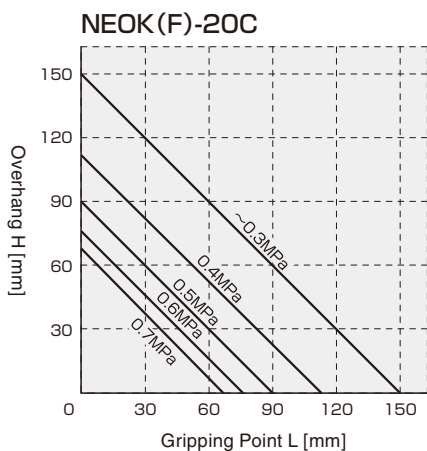
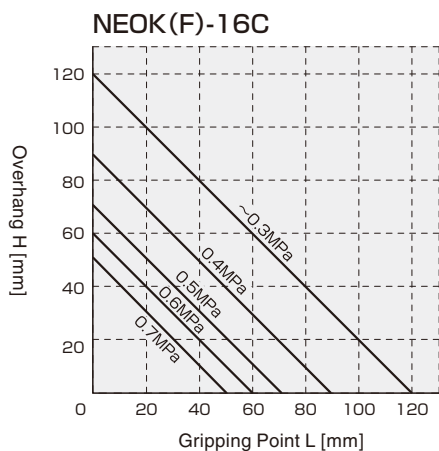
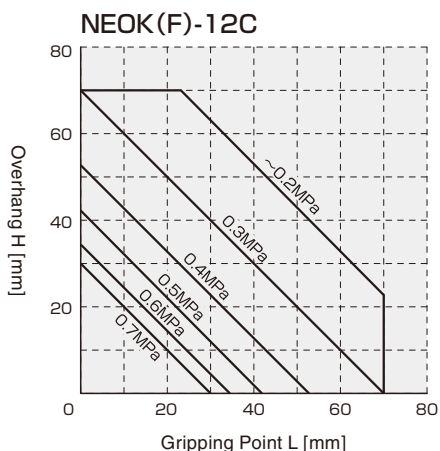
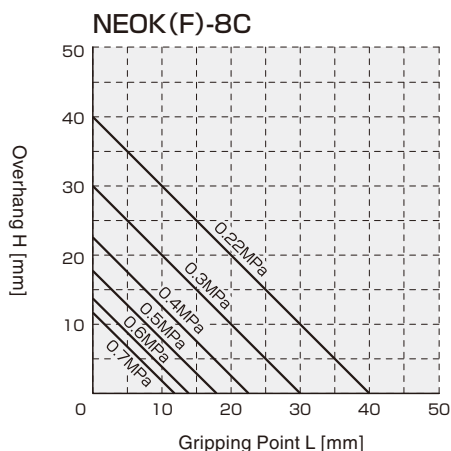
NEOK(F)-20C



Gripping Point Limit Range (Internal Gripping)

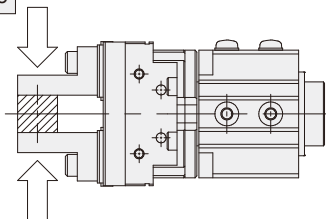


※For details about gripping point limit range and attachment mounting method ④ P.12



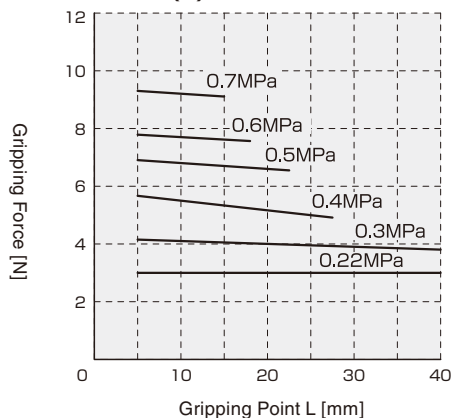
Effective Gripping Force (Closing Force/External Gripping)

External Gripping State

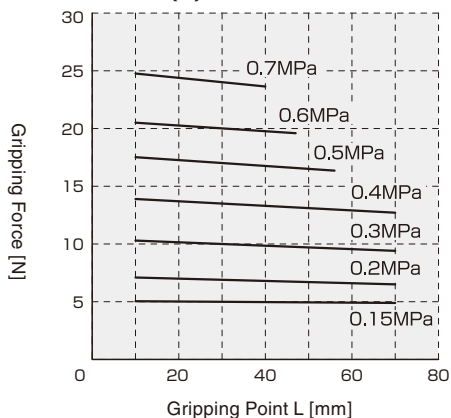


※For details about attachment mounting method refer P.12

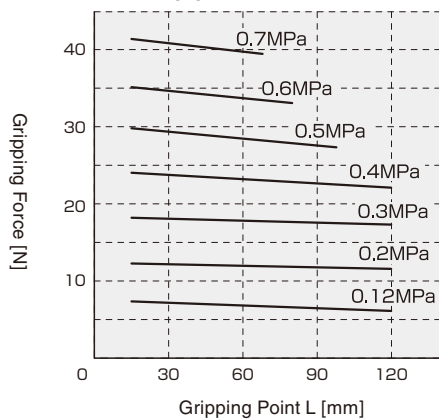
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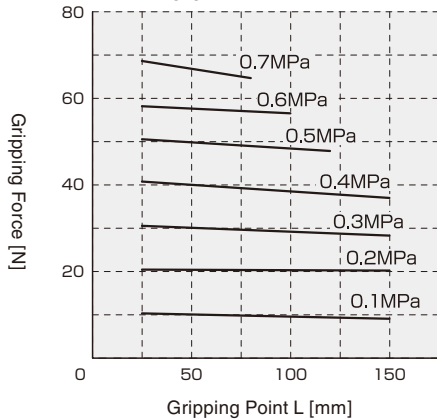
NEOK(F)-12C



NEOK(F)-16C

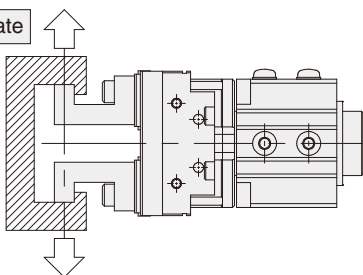



NEOK(F)-20C



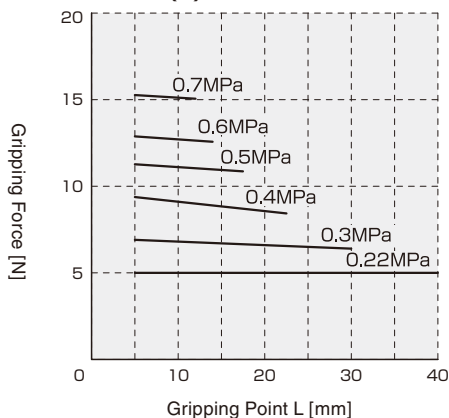
Effective Gripping Force (Opening Force/Internal Gripping)

Internal Gripping State

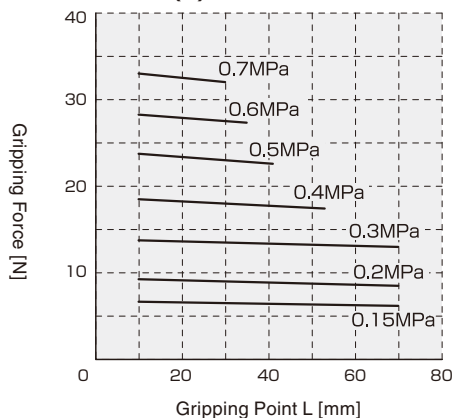


※For details about attachment mounting method  P.12

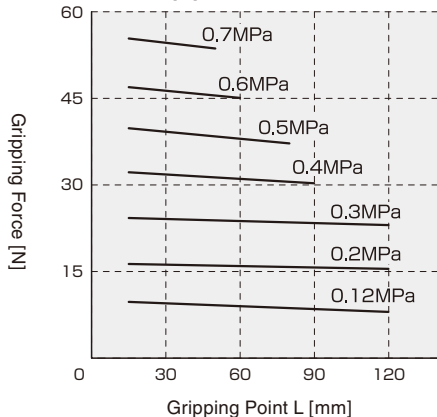
NEOK(F)-8C



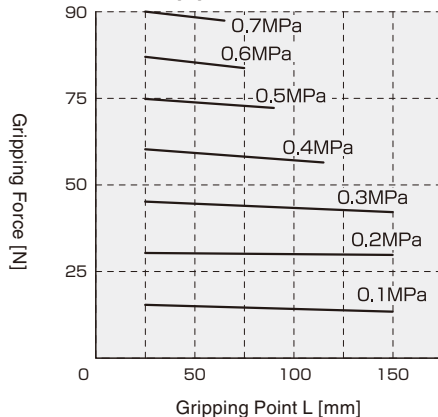
NEOK(F)-12C



NEOK(F)-16C



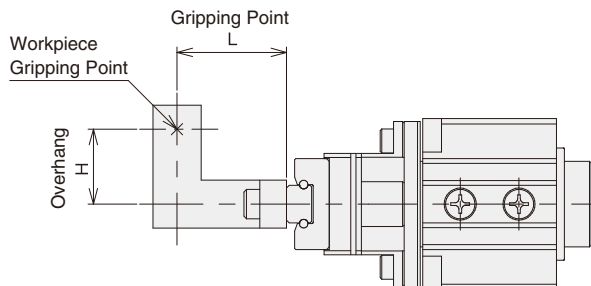
NEOK(F)-20C



Gripping Point Limit Range

Ensure that the gripping point (the position where the workpiece is gripped) L and overhang H are within the "Gripping Point Limit Range". If they exceed the limit range, an excessive moment will be applied to the guide part, causing increased backlash and a bad influence on the life and accuracy.

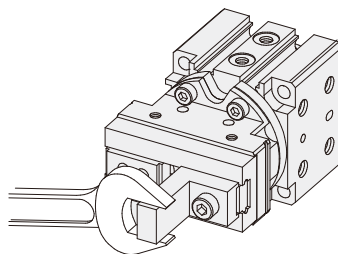
※ P.30 (3) for details



Attachment Mounting Method

When you mount the attachment, hold the attachment with a spanner or the like to remove load to the lever.

Model	Bolt to be Used	Maximum Tightening Torque [N·m]
NEOK-8	M2×0.4	0.315
NEOK-12	M3×0.5	1.14
NEOK-16	M4×0.7	2.7
NEOK-20	M5×0.8	5.4



Example of Attachment Design

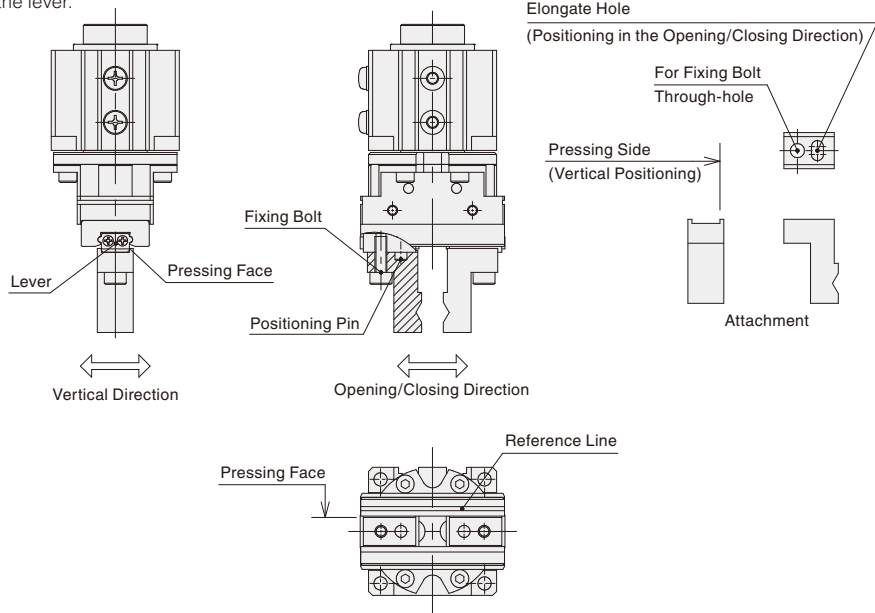
When you want to precisely position the attachment or when you need mounting repeatability, the following mounting methods are effective.

Positioning in the Opening/Closing Direction

The position in the opening/closing direction is determined by processing an elongate hole for the positioning pin on the attachment in the vertical direction, and fitting it to the positioning pin of the lever. (NEOKF has no positioning pin.)

Vertical Positioning

By making a projection on one side of the attachment and pressing it against the side of the lever on the reference line side, the position in the vertical direction can be determined. If there is concern about position misalignment during operation, make projections on both sides of the attachment and fit them to the lever.



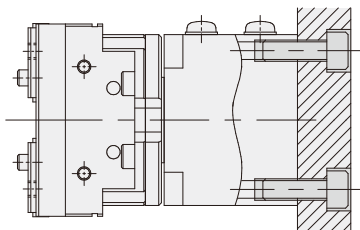
Attachment Mass

Please make the attachment mounted to the lever as light as possible. Be careful not to exceed the masses shown below. It shall be lighter when great acceleration or impact is applied during workpiece conveyance. Noted that applying large inertial load to the lever may cause breakage of internal parts.

Model	Mass [g]
NEOK(F)-8	10
NEOK(F)-12	50
NEOK(F)-16	100
NEOK(F)-20	150

Main Body Mounting Method**Main Body Mounting Method 1**

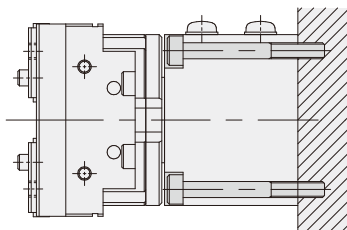
When the screw on the bottom face of the main body is used



Model	Bolt to be Used	Maximum Tightening Torque [N·m]
NEOK-8	M3×0.5	0.59
NEOK-12	M4×0.7	1.37
NEOK-16	M5×0.8	2.84
NEOK-20	M6×1.0	4.92

Main Body Mounting Method 2

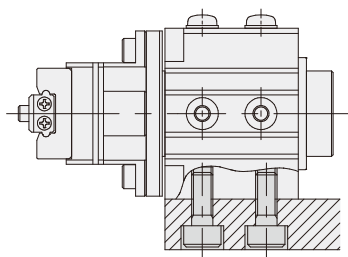
When the through-hole of the main body is used



Model	Bolt to be Used	Maximum Tightening Torque [N·m]
NEOK-8	Not Applicable	—
NEOK-12	M3×0.5	0.59
NEOK-16	M4×0.7	1.37
NEOK-20	M5×0.8	2.84

Main Body Mounting Method 3

When the screw on the side of the main body is used



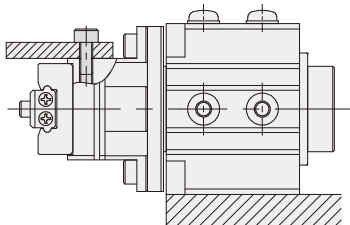
Model	Bolt to be Used	Maximum Tightening Torque [N·m]
NEOK-8	M3×0.5	0.59
NEOK-12	M4×0.7	1.37
NEOK-16	M5×0.8	2.84
NEOK-20	M6×1.0	4.92

Attachment Mounting Method

Attachment Mounting Method

When the screw on the top face of the main body is used

(Excluding NEOK-8)

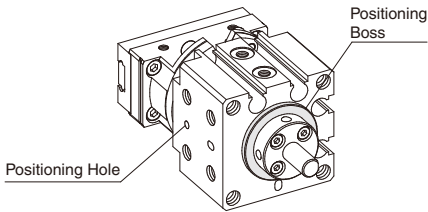


Model	Bolt to be Used	Maximum Tightening Torque [N·m]
NEOK-12	M2.5×0.45	0.34
NEOK-16		
NEOK-20		

Positioning When Mounting the Main Body

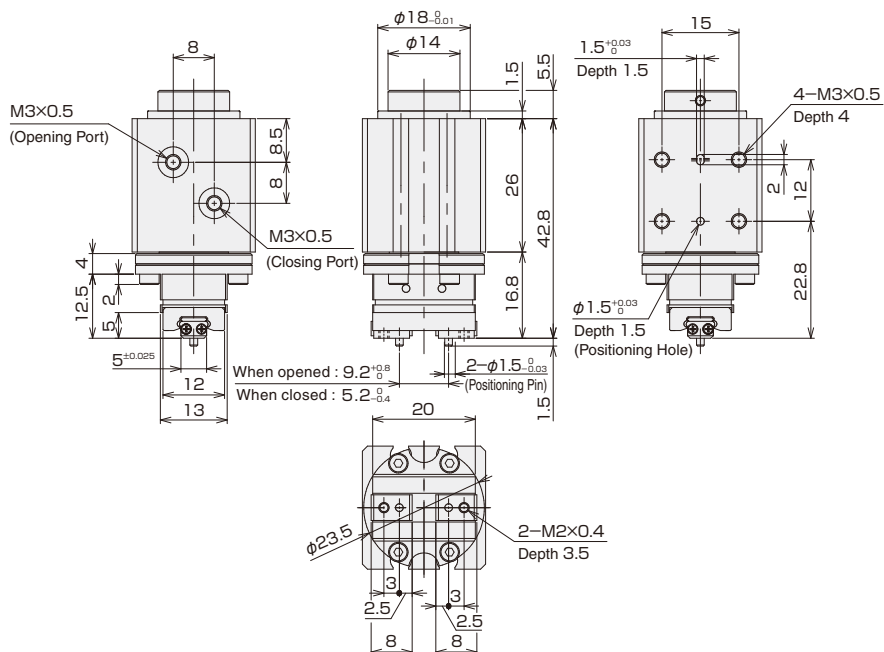
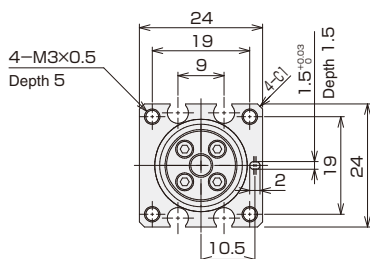
If positioning and reproducibility is required when mounting the main body, use positioning hole or boss according to mounting method.

Model	Bolt to be Used	Positioning Boss
NEOK-8	$\phi 1.5^{+0.03}_0$ Depth 1.5	$\phi 18^{0}_{-0.01}$ Height 1.5
NEOK-12	$\phi 2^{+0.03}_0$ Depth 2	$\phi 21^{0}_{-0.01}$ Height 1.5
NEOK-16	$\phi 2.5^{+0.03}_0$ Depth 2.5	$\phi 27^{0}_{-0.01}$ Height 1.5
NEOK-20	$\phi 4^{+0.03}_0$ Depth 4	$\phi 37^{0}_{-0.01}$ Height 3

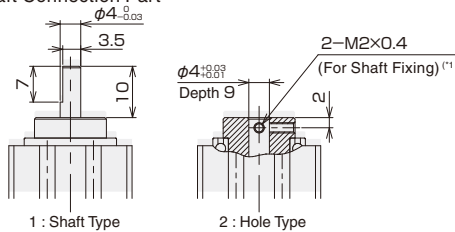


NEOK-8C-

1: Shaft Type
2: Hole Type



Drive Shaft Connection Part

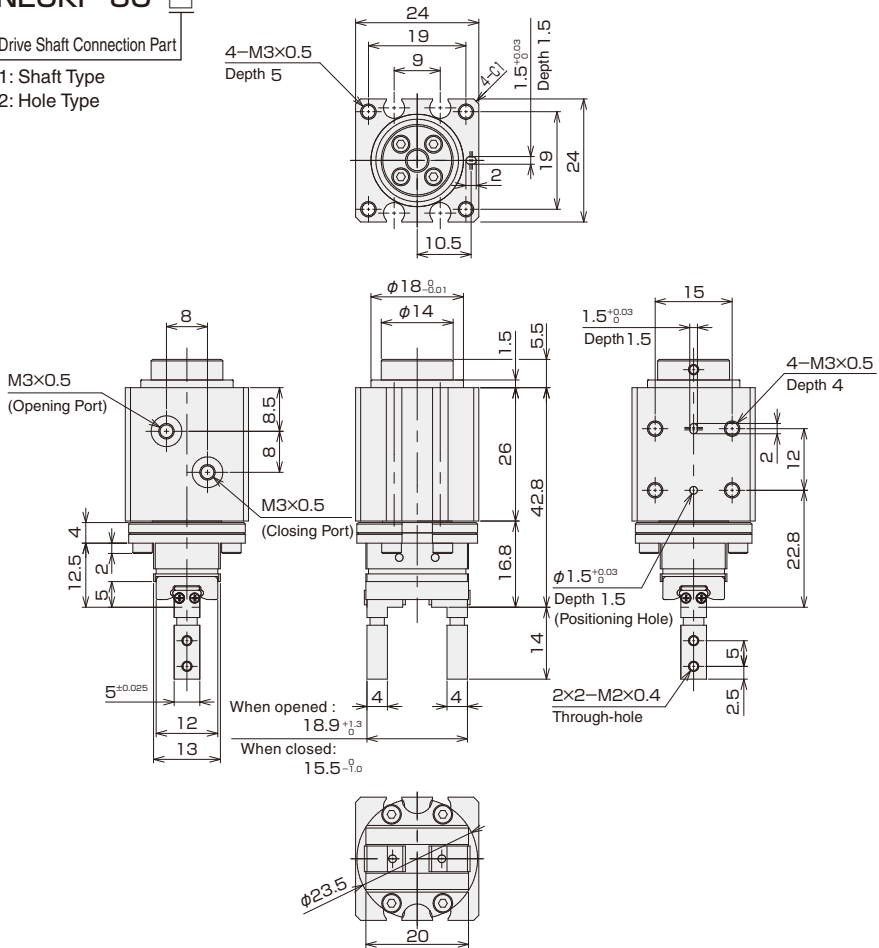


NEOKF-8C-□

Drive Shaft Connection Part

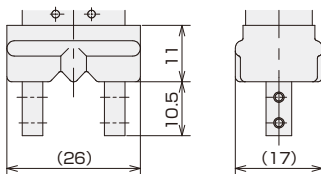
1: Shaft Type

2: Hole Type

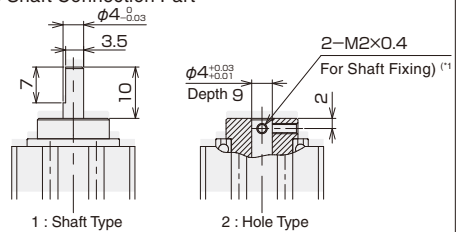


*1) For the hole type, 2 shaft fixing screws (M2 × 4L) with recessed end are attached.
Note) Select the shaft fixing screw according to the usage conditions.

With Dust-proof Cover

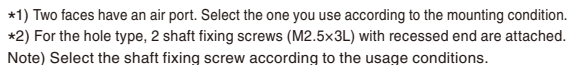


Drive Shaft Connection Part



NEOK-12C-

2: Hole Type



1 : Shaft Type

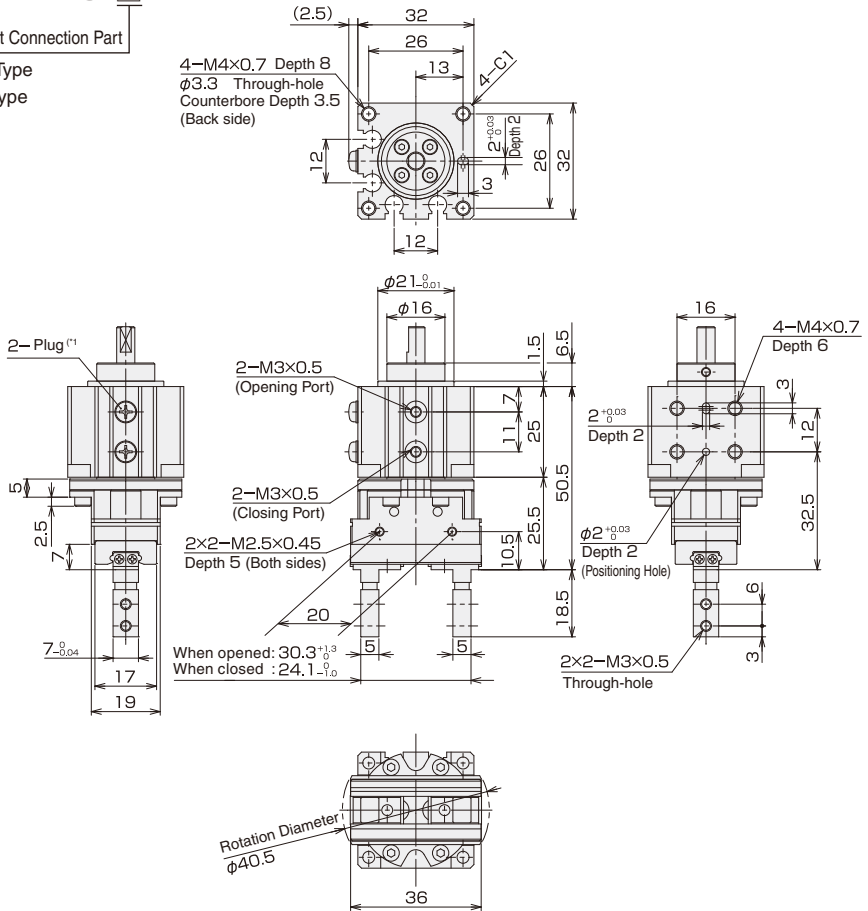
2 : Hole Type

NEOKF-12C-

Drive Shaft Connection Part

1: Shaft Type

2: Hole Type

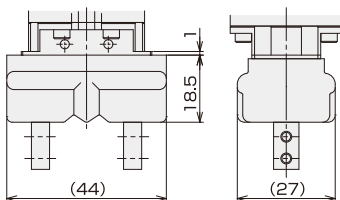


*1) Two faces have an air port. Select the one you use according to the mounting condition.

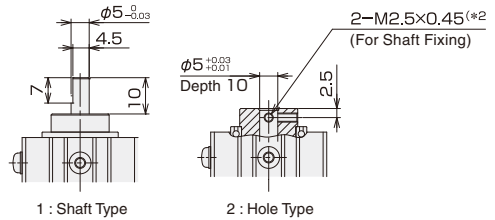
*2) For the hole type, 2 shaft fixing screws (M2.5×3L) with recessed end are attached.

Note) Select the shaft fixing screw according to the usage conditions.

With Dust-proof Cover



Drive Shaft Connection Part

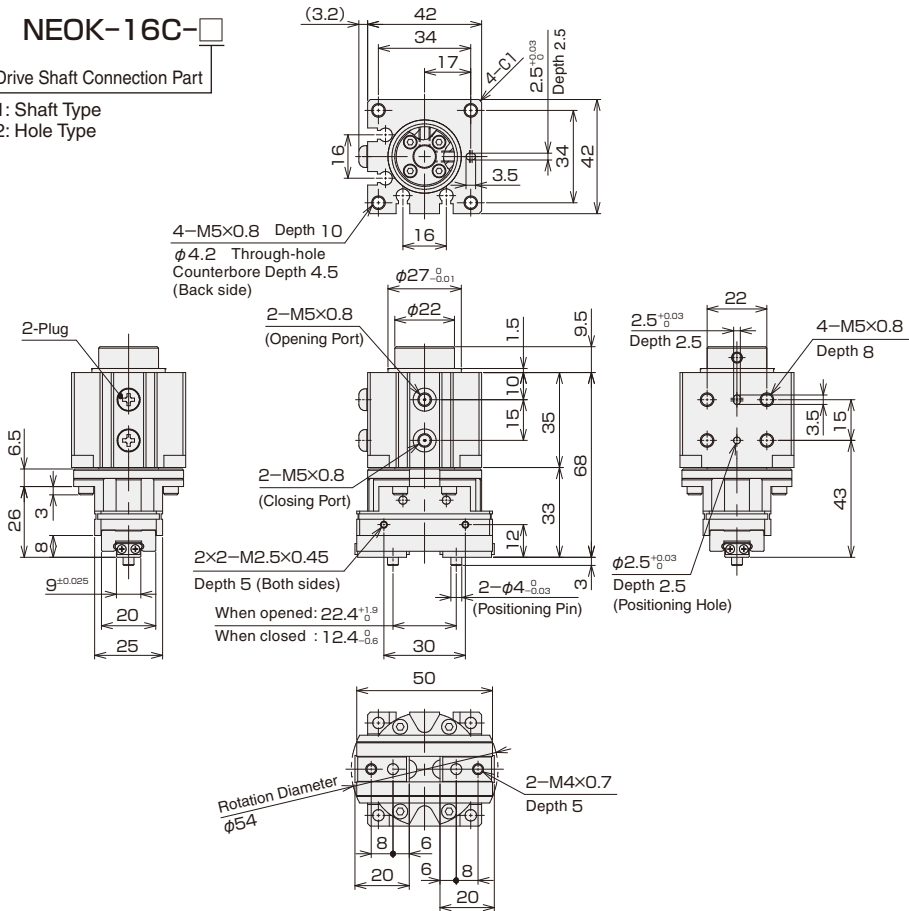


■ Dimensions

NEOK-16C

Drive Shaft Connection Part

1: Shaft Type
2: Hole Type



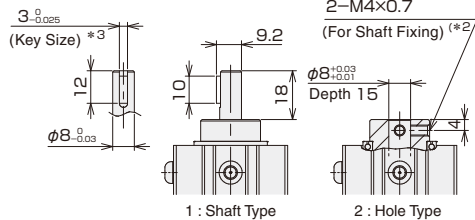
*1) Two faces have an air port. Select the one you use according to the mounting condition.

*2) For the hole type, 2 shaft fixing screws (M4×6L) with recessed end are attached.

*3) The key is delivered as attachment.

Note) Select the shaft fixing screw according to the usage conditions.

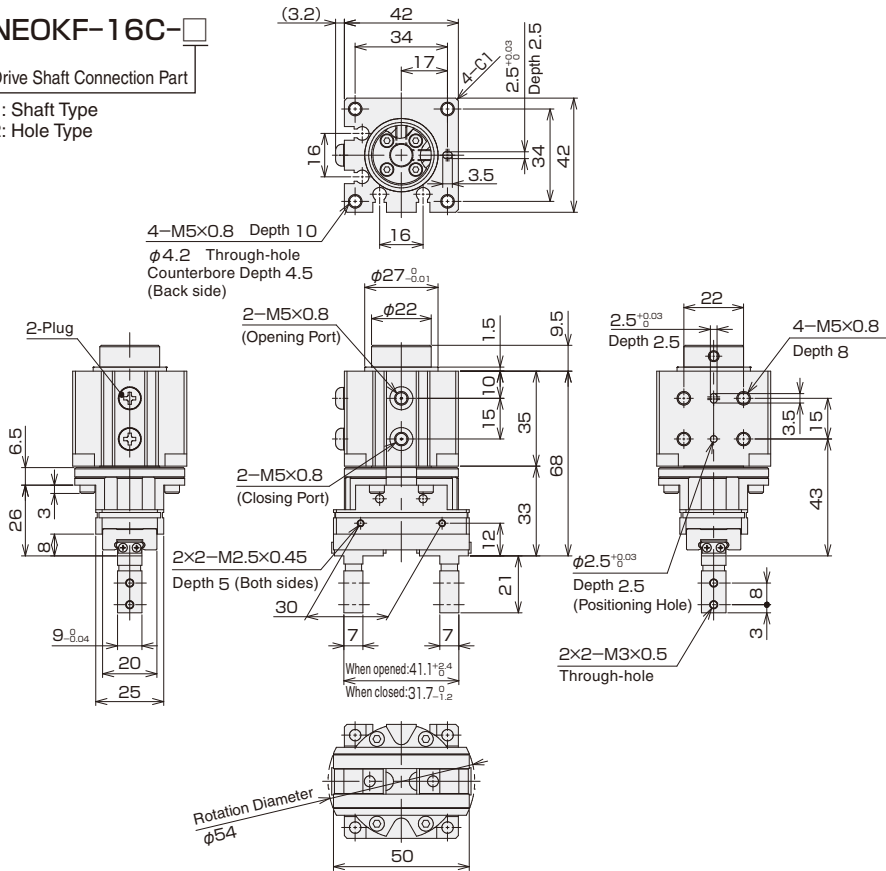
Drive Shaft Connection Part



NEOKF-16C-

Drive Shaft Connection Part

- 1: Shaft Type
2: Hole Type



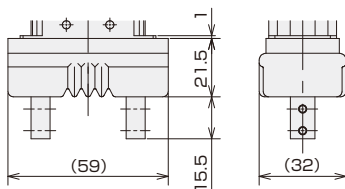
*1) Two faces have an air port. Select the one you use according to the mounting condition.

*2) For the hole type, 2 shaft fixing screws (M4× 6L) with recessed end are attached.

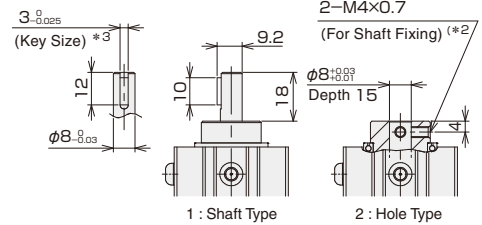
*3) The key is delivered as attachment.

Note) Select the shaft fixing screw according to the usage conditions.

With Dust-proof Cover

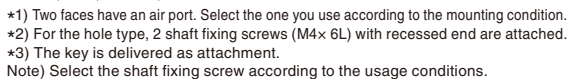


Drive Shaft Connection Part



NEOK-20C-

2: Hole Type



Note) Select the shaft fixing screw according to the usage conditions.

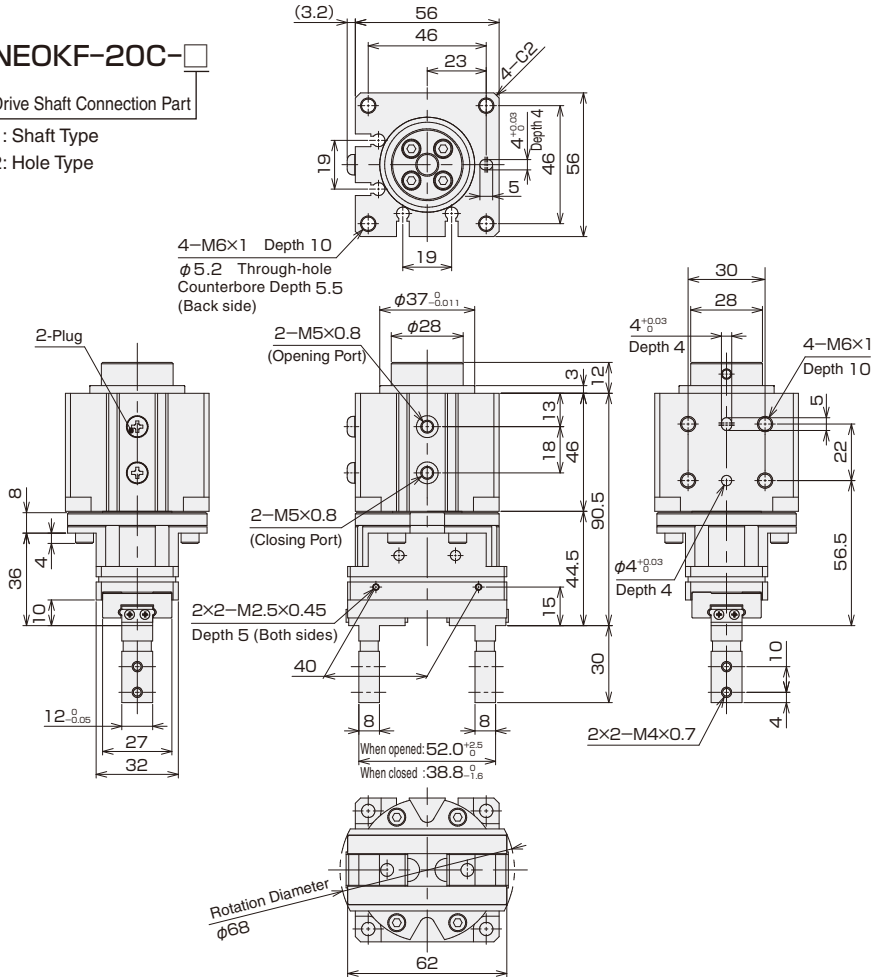
2 : Hole Type

NEOKF-20C-

Drive Shaft Connection Part

1: Shaft Type

2: Hole Type

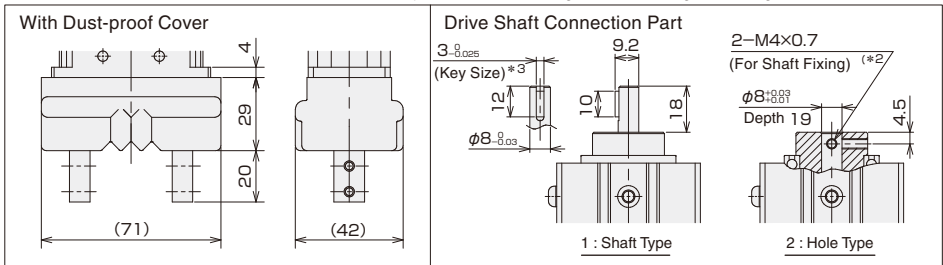


*1) Two faces have an air port. Select the one you use according to the mounting condition.

*2) For the hole type, 2 shaft fixing screws (M4× 6L) with recessed end are attached.

*3) The key is delivered as attachment

Note) Select the shaft fixing screw according to the usage conditions.

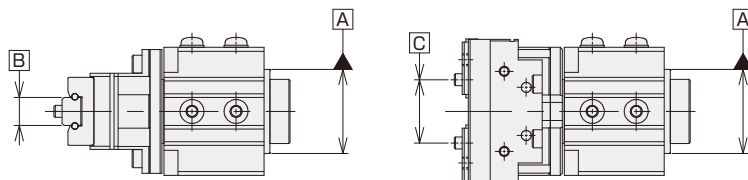


Terminology

Rotational Runout Accuracy

Rotation misalignment of bearing width center [B] relative to positioning boss center [A] : ± 0.07 mm

Rotation misalignment of lever pin pitch center [C] relative to positioning boss center [A] : ± 0.07 mm

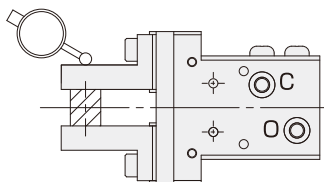


Rotational runout accuracy: ± 0.07 mm or less

Repeat Gripping Accuracy

Indicates runout of the workpiece (lever) position after the same workpiece is gripped 10 times repeatedly.

(Deflection of the attachment is not included.)

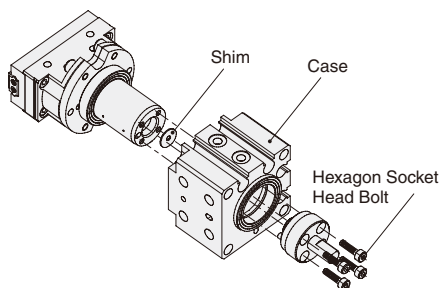


NEOK Series: ± 0.01 mm or less

Lubrication Method

Disassembly

The swivel joint can be disassembled after removing the hexagon socket head bolt. During disassembly, be careful to avoid loss of internal part (shim). Reassembly without the shim may cause operation failures. During reassembly, apply anaerobic adhesive to the hexagon socket head bolt.



Lubrication

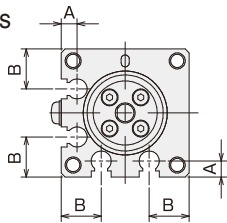
Although the swivel joint is coated with lubricant, operation may become less smooth depending on the rotational speed, usage conditions and ambient environment, so it is recommended to fill lubricant regularly.

The grease supplying period varies depending on usage conditions and ambient environment, but the total number of rotations 2 million is generally used as a guide.

Apply lithium soap base grease after wiping off old grease of the rotating seal inside the case.

In case of difficult disassembly, it is also possible to fill from the air port. In addition, turbine oil (ISO, VG32) can also be used.

Switch Groove Dimensions

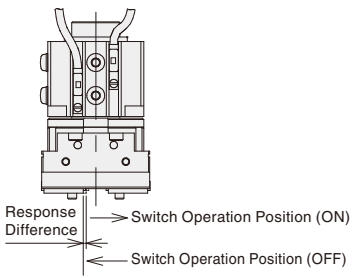


[mm]				
Size	φ8	φ12	φ16	φ20
A	1.8	4	6.6	9
B	7.5	10	13	18.5

Note) For φ8 only, the switch grooves are located on the symmetrical planes.

Switch Response Difference

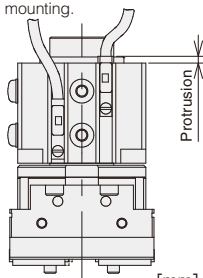
Refers to the distance from the position where the levers move and the switch turns on to the position where the levers move in the reverse direction and the switch turns off.



Cylinder Bore	φ8	φ12	φ16	φ20
Maximum Response Difference	0.3	0.3	0.4	0.4
Maximum Protrusion	1	0	0	0

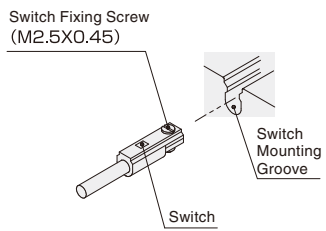
Switch Protrusion Distance

The maximum protrusion (when the lever is fully closed) of switch from the end face of the case is as follows. Please use it as a guide for mounting.



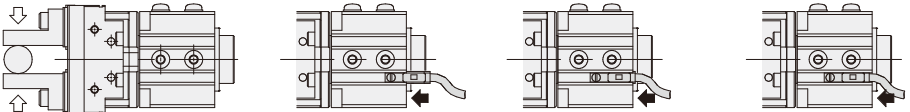
Switch Mounting

Insert the switch into the switch mounting groove. After setting the mounting position, tighten the switch fixing screw with a precision screwdriver. The tightening torque shall be 0.1 N · m or less.



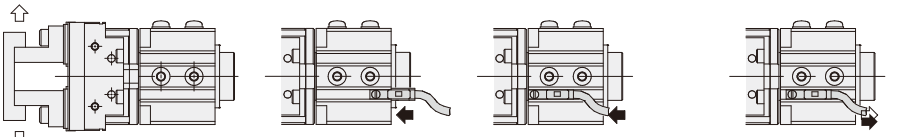
Switch Mounting Position Adjustment

For external gripping



- ①Check the workpiece external gripping and fully-closed state.
- ②Insert the switch into the switch mounting groove of the main body in the arrow direction.
- ③The LED lamp lights up by inserting the switch further in the arrow direction.
- ④Fix the switch at the position where the switch is moved 0.6 mm in the arrow direction from the position where the lamp lights up in ③

For internal gripping



- ①Check the workpiece internal gripping and fully-opened state.
- ②Insert the switch into the switch mounting groove of the main body in the arrow direction.
- ③The LED lamp lights up by inserting the switch further in the arrow direction. It turns off by moving it further.
- ④Fix the switch at the position where the switch is moved 0.6 mm further from the position where the LED lamp lights up when the switch is returned in the arrow direction at the position in③.

Note) ① indicates the position where you need to check if the switch is ON. Adjust and mount the switch in the order from ① to ④.

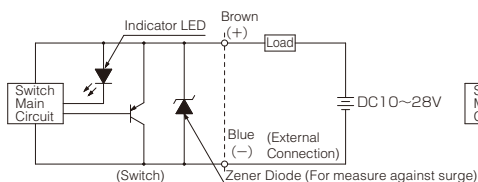
Specifications

Item	Type	ZE135	ZE155	ZE235	ZE255
Wiring Method		2 Wire System	3 Wire System	2 Wire System	3 Wire System
Lead Wire Leading Direction		Straight Type		L-shaped	
Power-supply Voltage		—	DC4.5~28V	—	DC4.5~28V
Load Voltage		DC10~28V	DC4.5~28V	DC10~28V	DC4.5~28V
Load Current		4~20mA (At 25°C, 10mA at 60°C)	50mA MAX.	4~20mA (At 25°C, 10mA at 60°C)	50mA MAX.
Consumption Current at ON		—	10mA MAX. (DC24V)	—	10mA MAX. (DC24V)
Internal Drop Voltage ^{Note 1)}		4.5V MAX.	0.5V MAX. (However, 20 mA at the voltage of 10V or less)	4.5V MAX.	0.5V MAX. (However, 20 mA at the voltage of 10V or less)
Leak Current		1mA MAX. (DC24V, 25°C)	50μA MAX. (DC24V)	1mA MAX. (DC24V, 25°C)	50μA MAX. (DC24V)
Delay Time		1ms MAX.			
Insulation Resistance ^{Note 2)}		100MΩ MIN. (Between case and lead wire terminal at DC 500V Mega)			
Withstand Voltage ^{Note 2)}		AC500V(50/60Hz) 1 minute (Between case and lead wire terminal)			
Shock Resistance		294m/s ² [30.0G] (Non-repetitive)			
Vibration Resistance		Double amplitude 1.5mm · 10~55Hz [88.3m/s ² (9.0G) }			
Protection Structure		IEC IP67, JIS C0920 (Watertight type)			
Operation Indicator		Red LED indicator illuminates at ON			
Lead Wire ^{Note 3)}		PCCVD.15SQ×2 cores (brown, blue)× \varnothing ^{Note 3)}	PCCVD.15SQ×3 cores (brown, blue, black)× \varnothing ^{Note 3)}	PCCVD.15SQ×2 cores (brown, blue)× \varnothing ^{Note 3)}	PCCVD.15SQ×3 cores (brown, blue, black)× \varnothing ^{Note 3)}
Operating Temperature Range		0~60°C			
Storage Temperature Range		-10~70°C			
Mass		15 g (When the lead wire length A is 1 m), 35 g (When the lead wire length B is 3 m)			

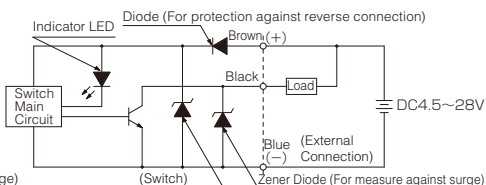
Note 1): The internal drop voltage changes depending on the load current. Note 2): As per our test standards. Note 3): Lead wire length L: A: 1 m, B: 3 m

Internal Circuit

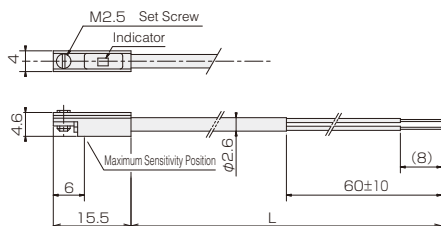
ZE135 · ZE235



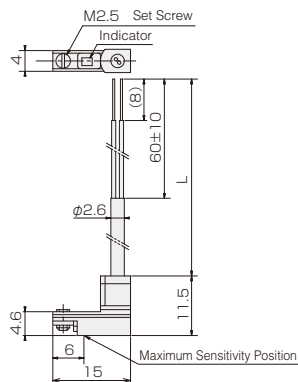
ZE155 · ZE255

**Outside Dimensions [mm]**

ZE135 · ZE155



ZE235 · ZE255

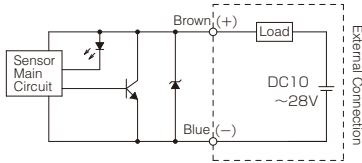


RB6、RC6 Type (Solid State)

Specifications

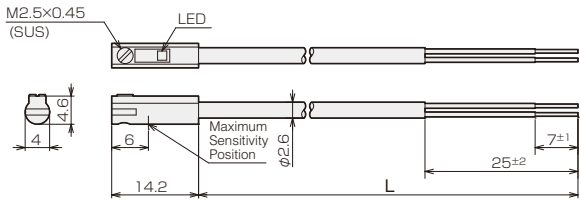
Item	Type	RB6	RC6
Wiring Method		2 Wire System	
Lead Wire Leading Direction		Straight Type	L-shaped
Load Voltage		DC10~28V	
Load Current		4~20mA	
Consumption Current at ON		—	
Internal Drop Voltage		3.5V max	
Leak Current		0.8mA max	
Delay Time		1ms max	
Insulation Resistance		100MΩ min (DC500V)	
Withstand Voltage		AC1000V (50/60Hz) 1 minute	
Shock Resistance		50G	
Vibration Resistance		9G Double amplitude 1.5mm	
Protection Structure		IEC529 IP67	
Operation Indicator		Red LED indicator illuminates at ON	
Lead Wire		φ2.6 2 cores PVC	
Operating Temperature Range		-10~70℃	
Storage Temperature Range		-20~80℃	
Mass		12 g (When the lead wire length is 1 m), 31g (When the lead wire length is 3 m)	

Internal Circuit



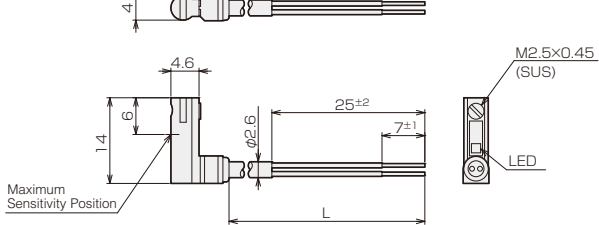
Outside Dimensions [mm]

RB6



Type	Size L	Tolerance of L
RB6	1000	±10
RB6LA	3000	±30

RC6

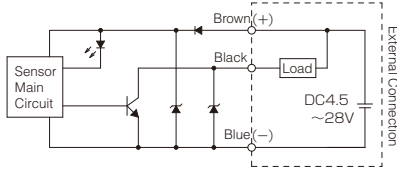


Type	Size L	Tolerance of L
RC6	1000	±10
RC6LA	3000	±30

Specifications

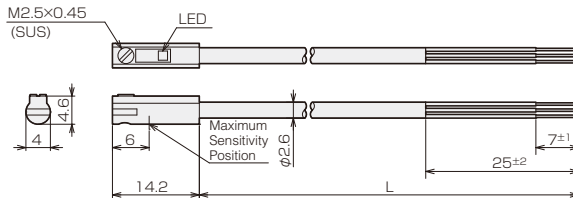
Item	Type	RB7	RC7
Wiring Method		3 Wire System	
Lead Wire Leading Direction		Straight Type	L-shaped
Load Voltage		DC4.5~28V	
Load Current		50mA max	
Consumption Current at ON		10mA max(DC24V)	
Internal Drop Voltage		0.5V max	
Leak Current		0.01mA max	
Delay Time		1ms max	
Insulation Resistance		100M Ω min(DC500V)	
Withstand Voltage		AC1000V(50/60Hz) 1 minute	
Shock Resistance		50G	
Vibration Resistance		9G Double amplitude 1.5mm	
Protection Structure		IEC529 IP67	
Operation Indicator		Red LED indicator illuminates at ON	
Lead Wire		ϕ 2.6 3 cores PVC	
Operating Temperature Range		-10~70℃	
Storage Temperature Range		-20~80℃	
Mass		12 g (When the lead wire length is 1 m), 31g (When the lead wire length is 3 m)	

Internal Circuit



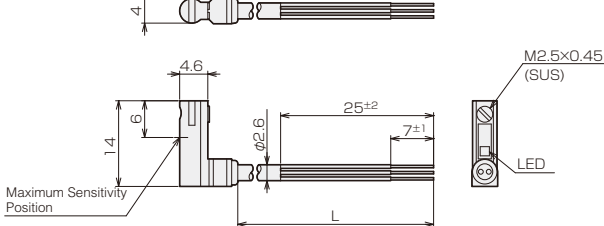
Outside Dimensions [mm]

RB7



Type	Size L	Tolerance of L
RB7	1000	±10
RB7LA	3000	±30

RC7



Type	Size L	Tolerance of L
RC7	1000	±10
RC7LA	3000	±30

■ Precautions in Switch Handling

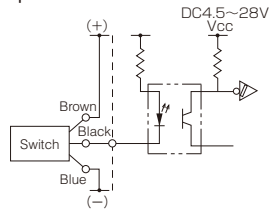
1. Pay attention to the lead wire color when connecting them. Wrong connection may result in malfunction or breakage.
2. Do not connect 2 wire system solid state sensor switches to TTL and C-MOS.
3. Use of a protection diode for surge is recommended for inductive load such as an electromagnetic relay.
4. Do not connect the sensor switches in series (no AND connection) because the circuit voltage is dropped in direct proportion to the number of sensor switches.
5. When the sensor switches are connected in parallel (OR connection), sensor outputs (e.g. black wires) can be directly connected. In this case, however, be careful not to cause a load restoration failure because leak current increases in direct proportion to the number of sensors.
6. The sensor switches are magnetic induction type switches. Therefore, do not use them in places with a strong external magnetic field and do not get them closer to the great current such as a power line. Do not use a magnetic body for the mounting member. Doing so may result in malfunction.
7. Do not put a force to the lead wires such as by pulling the lead wire or bending it extremely.
8. Do not use the switches in an environment that is exposed to chemicals or gases.
9. The switch tightening torque shall be $0.1 \text{ N} \cdot \text{m}$ or less when the switch is fixed.

■ Solid State

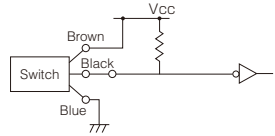
Switch Connection	2 Wire System Solid State	3 Wire System Solid State
Basic Connection		
Connection with Relay		
Serial (AND) Connection Parallel (OR) Connection		
Connection with Solenoid Valve		
Connection with Sequencer		

The next connection examples show only for the 3 wire system solid state.

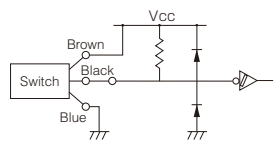
★ Connection with TTL Separated Connection



Direct Connection



★ Connection with C-MOS



Gripper Selection Guide

Precautions for Selection

(1) Safety Measures

If the movable parts of the workpiece and gripper may cause damage to the human body or mechanical equipment during operation, take safety measures such as installing a protective cover.

In addition, if using a pneumatic gripper, see also the common precautions of pneumatic equipment.

(2) Gripping Force and Workpiece Mass

The gripping force varies depending on action type (single acting type or double acting type) and working pressure. It also relates to the material, shape, surface roughness and movement speed, etc. of the workpiece to be gripped. As a general guide, select a gripper that has a gripping force of 10 to 20 times or more the workpiece weight.

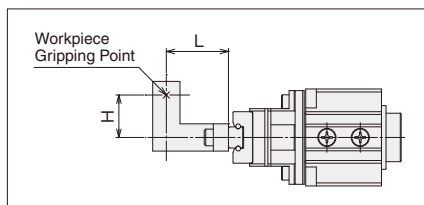
In addition, it shall be greater than that when great acceleration or impact is applied during workpiece conveyance.

Selection of an unsuitable model may cause workpiece falling, etc.

(3) Gripping Point Limit Range

When gripping a workpiece, mount the attachment to the finger part according to the workpiece while keeping the distances from the gripper body (gripping point L and overhang H) within the limit range.

If they exceed the limit range, the bending moment applied to the finger part will become large, causing backlash and a bad influence on the life and accuracy.



(4) Attachment Design

The attachment shall be designed to be as light and short as possible. If the attachment is long and heavy, the bending moment applied to the finger part and the inertial force at the time of gripping will become too large, causing increased backlash or damage.

(5) Opening/Closing Stroke

Select a model that has a margin in gripper opening/closing and stroke relative to workpiece. If there is no margin, gripping may become unstable due to the variation of gripper opening/closing width and workpiece diameter.

When a detection switch is used, it may cause detection failures.

(6) Mounting

When mounting the attachment to the finger part, do not twist the finger part. Twisting may cause backlash or reduced accuracy.

Also, adjust and check so that no external force is applied when opening/closing the finger part. When moving the gripper or opening/closing the finger part, collision of the workpiece or attachment with other objects may cause backlash or damage. When mounting the gripper body, prevent scratches or dents due to the gripper falling or collision.

(7) Opening/Closing Speed

If the opening/closing speed of the finger part is too high, the inertia of the finger part and attachment may cause backlash or damage.

Install a speed control valve to prevent impact.



Actuator Precaution ①

Please read the following instructions before use.

Design



WARNING

◆ Abnormal action

Actuators may cause a kind of impact when force change occurs due to rattle in the sliding part of a machine. In this case, actuators may result in bodily damage (e.g. hands or legs being caught) or machine damage. Therefore, adjust actuators for smooth mechanical movement and design them to prevent bodily damage.

◆ Protective cover

When there is a risk that a system or a product is harmful to human body during operation, install a protective cover.

◆ Impact relaxation

When the driven object moves at a high speed or its mass is large, it is difficult to absorb impact using the cushion of the cylinder only. Therefore, install a circuit to reduce the speed before going to the cushion to release impact. In this case, consider the rigidity of the mechanical system fully.

◆ Power source failures and supply pressure drop

If the power source (e.g. electric, pneumatic pressure, hydraulic source) has a failure or the air pressure drops due to troubles, cylinder power will drop, thus leading to load decrease. Take measures to prevent damage to human bodies and equipment.

◆ Jumping prevention circuit

When the cylinder is driven by the exhaust center type directional control valve or one side of the piston is pressed under the condition that air has been exhausted from the cylinder (such as when starting after the residual pressure has been exhausted from the circuit), driven objects will jump out at a high speed. Such situation may be harmful to the human body (e.g. hands or legs getting caught) or machine damage. Therefore, select equipment and design circuits to prevent driven objects from jumping.

◆ Emergency stop, abnormal stop

Design actuators so that their motions do not damage human bodies or equipment even in case of emergency/abnormal stop of the system or when the system is re-started after stop.

Selection



WARNING

◆ Working pressure range

If the system is used with the maximum working pressure or above, each part will be worn or damaged, thus resulting in breakage or operation failures. If the system is used with the minimum working pressure or less, the specified thrust force cannot be generated, thus causing malfunctions such as failure to move smoothly. Therefore,

use products within the specified working pressure range. (See the specifications.)

◆ Intermediate stop

When the 3-position closed center type directional control valve is used to stop the cylinder piston in the intermediate position, it cannot stop it correctly and accurately because it uses not hydraulic pressure but compressed air. Also, it is not assured that valves and cylinders leak no air. Therefore, pistons may not be able to stop for a long time. Consult us if you need to realize long time stop position retention.

Mounting



WARNING

◆ Locking in mounting

Product fixing bolts and attachment/jig mounting bolts must have a locking. Mount bases must have a structure to prevent deformation and breakage due to thrust force or inertia force at stopping.



CAUTION

◆ Precautions in operating

Do not use the product until it is confirmed that equipment operate properly.

After mounting, repair or modification, connect compressed air and power and conduct appropriate functional tests and leak inspection to check if the mounting is appropriate.

◆ Equipment operation check

After mounting the product to the system, do not start the system immediately but check if the product has been properly mounted for safety.

◆ Product handling

Dropping or hitting the product or pinching the product with a tool will result in product deformation, thus causing accuracy deterioration and operational failure.

◆ Speed adjustment

Adjust the cylinder drive speed gradually to the specified speed with a speed controller from the low speed side.

◆ Precautions in magnetic products

Bringing magnetic products such as a magnetic disk, a magnetic guard and a magnetic tape close to the built-in switch sensing magnet type may result in data erase. Also, do not bring them close to any equipment that may cause malfunction due to magnetism.



Actuator Precaution ②

Please read the following instructions before use.

Piping



CAUTION

◆ Seal tape winding

When you screw in pipes and joints, be careful not to make piping screw chips and sealing materials enter into the inside of the pipes. When you use a seal tape, wind a screw with the tape so that 1.5 to 2 turns of the screw head is not winded.

Lubricating



CAUTION

◆ Use in the lubrication circuit

If the system needs lubricating, use additive-free turbine oil class 1 ISO VG32 or ISO VG46. Do not use machine oil and spindle oil because they will damage packings, thus causing operation failures. Do not stop lubricating in the middle of lubricating because doing so will cause flowout of lubrication grease, thus accelerating damage of packings and other parts, resulting in operation failures.

Air source



CAUTION

◆ Quality of compressed air

Compressed air containing drain (e.g. dust, water, salt, degraded compressor oil, oil carbon particles) and corrosive gas will damage packings and other parts, thus causing operation failures and damages. Therefore, use clean compressed air.

◆ Drain removal measure

Compressed air containing a large amount of drain not only causes operation failures of the air compressor but also causes environmental contamination. Install equipment such as an after-cooler, an air dryer and an air filter (nominal filtration rating: 50 μm or less).

The air cleaning system to drive actuators is recommended in JPAS005 "Guidelines for Use and Selection of Pneumatic Cylinders".

◆ Temperature of compressed air

Hot compressed air will accelerate damage of packings and other parts. Even when the environmental temperature is within the specified range, heat may transmit through jigs connected to the actuator and driven objects. When the environmental temperature is low, drain and moisture will become solidified or frozen, thus resulting in damaged packings and parts and operation failures. Therefore, measures to prevent freezing must be taken.

Usage environment



WARNING

◆ Outdoor use

Do not use the product in places where the product is directly or indirectly exposed to wind and rain, is exposed to direct sunlight, or any outdoor place where the product is influenced by temperature or any other factors because this product is not resistant to weather.

◆ Use in the corrosive environment

Do not use the product in water or places where the product is exposed to salt water, acid, alkaline fluid splash, iron powder or in their gases or moisture vapors.

◆ Cover installation

Attachment of dust, water, oil, chips, iron powder, or spatter to the rod and the sliding parts will result in damaged shafts and packings, thus causing air leak and operation failures. Install a cover to prevent them from attaching.

◆ Operating temperature range

Use with a temperature exceeding the maximum operating temperature will result in deterioration acceleration such as hardening of packings, thus causing operation failures. Even when the environmental temperature is within the specified range, heat may transmit through jigs and driven objects. When the product is working at a high speed, its sliding surfaces will locally overheat, thus causing similar problems, freezing due to adiabatic expansion or surface dew condensation.

When the temperature is lower than the minimum operating temperature, drain and moisture will become solidified or frozen, thus resulting in damaged packings and operation failures. Therefore, measures to prevent freezing must be taken.

Maintenance and check



WARNING

◆ Removing equipment, and supplying and exhausting compressed air

Before removing equipment, make sure that driven object fall prevention measures and runaway prevention measures have been taken, cut off supply air, turn off the power of the equipment and exhaust compressed air from the system. Before re-starting the equipment, make sure that the jumping prevention measures have been taken and do it carefully.



CAUTION

◆ Draining air filter

Operating the equipment without maintaining or draining the air dryer and the air filter will result in life shortening or equipment failures. Drain tends to increase in summer in particular, so drain them frequently in summer. Use of a type with an auto drain function is recommended.



Switch Precaution ①

Please read the following instructions before use.

Design and selection



WARNING

◆ Specification check

Please read the specifications carefully because use of a load current, voltage, temperature or impact outside of the specified range will result in equipment breakage or operation failures.

◆ Contact protection circuit (measure against surge voltage)

When an induction load such as a relay or a solenoid is connected, surge voltage is generated. In this case, therefore, install a contact protection circuit. See "Switch Connection Method" for details.

◆ Actuator installation interval

Switches are operated by a magnet built in the actuator. Therefore, if two products get close to each other, their magnets may interfere with each other, thus causing malfunction.

◆ Leak Current

<Solid State>

For the 2 wire system solid state auto switch, currents (leak currents) flow to the load to activate the internal circuit even when they are OFF.

When the leak current is lower than the load operation current (input off current of the controller), restoration failure occurs (ON state remains). If such switch cannot meet the specification, use a 3 wire system switch. When switches (n switches) are connected in parallel, the magnitude of the current flown to the load will be n times.

◆ Serial connection

When switches with an indicator are connected in series, voltage drop occurs due to the internal resistance of light-emitting diodes, etc. (When n switches are connected, the voltage drop is n times.)

In this case, the load may not operate even when the switches are normally operated.

◆ Switch wiring length

When the switch wiring is long, excessive current flows into the contact due to the incoming current when the switch is turned ON. Thus, the switch may remain ON. When the wire length is longer than 10 m, install a cable surge absorbing circuit. See "Switch Connection Method" for details.

◆ Detection in the middle of a stroke

Note that when a switch is provided in the middle of a stroke, the switch operates when the piston speed is too high but the load may not be operated. In this case, decrease the speed or install an electric hold circuit.

◆ Interlock

When a switch is used for systems such as an interlock, design it in consideration of failures and malfunctions.

◆ Securing the maintenance space

Secure the space for operations such as switch adjustment and indicator check.

Mounting and adjustment



WARNING

◆ Switch handling

Impact to a switch such as by falling may result in breakage of the inside of the switch.

◆ Lead wire handling

Excess tensile force on a lead wire may result in lead wire breakage in the cable or breakage of the inside of a switch.

◆ Switch fixing tightening torque

Tightening the switch fixing screw or mounting bracket with a torque larger than the specified torque may result in switch breakage. Insufficient torque may result in out of mounting position in use. Follow the specified tightening torque for each switch.

◆ Switch setting position

Adjust the switch mounting position so that the piston stops in the center of the operation range (ON range). (The mounting position specified in the catalogue shows the optimal position in the stroke end.) When it is set in the end of the operation range (around the ON/OFF border line), operation may be unstable.

Wiring



WARNING

◆ Lead wire wiring

To install a switch in the movable area, take some wiring measures such as allowing extra cable length and replaceable cables. When wire is bundled with air pipes by a spiral tube, unreasonable force may be applied to the wires. Therefore, allow extra length of wires in this case.

◆ Load connection

Operating a 2 wire system switch while connecting it directly to the power without connecting any load such as a relay and a sequence controller may result in instant overcurrent, thus resulting in switch breakage.

◆ Short-circuit of load

Operating a switch with a short-circuited load will cause the flow of overcurrent, thus resulting in switch breakage.

◆ Polarity

In case of DC, wires have polarity. Brown lead wires are (+) and blue lead wires are (-). When wires are connected reversely in the contact switch, the switch operates but the light-emitting diode does not illuminate. When wires are connected reversely in the solid state switch, the switch does not operate and the internal circuit may be broken.

When the power wire (brown) and the output wire (black) are connected reversely in the 3 wire system switch, the switch will be broken.



Switch Precaution ②

Please read the following instructions before use.

Usage environment



DANGER

◆ Use in the hazardous atmosphere

Do not use switches in the explosive gas atmosphere. Switches do not have an explosion-proof structure. Do not use them in the explosive gas atmosphere because doing so may result in explosion.



WARNING

◆ Use in a powerful magnetic field

Use of a switch in a powerful magnetic field will result in switch operation failure and malfunctions because the internal magnetic force and the magnetic field distribution change.

◆ Adjacent of magnetic body

Note that when there is a large amount of iron power (e.g. chips, welding spatters) accumulated around the switch cylinder or magnetic bodies (attracted to the magnet) are adjacent to the switch cylinder, the magnetic force inside the cylinder is deprived so the switch may not operate.

◆ Usage environment

The water proof property of the switch is applicable to the IEC Standard IP66 (JIS C0920 Water Proof Type). However, if they are constantly exposed to water, insulation failure may occur. When they are exposed to oil (e.g. cutting oil) or chemical or in such atmosphere, lead wire hardening or insulation failure may occur.

◆ Impact

If excessive impact is applied to a contact switch in use, the contact may cause malfunction. Such failures will be reduced by using no-contact switches, but you must check the impact-resistant values in the specifications before doing so.

◆ Surge generating places <Solid State>

When there is a large surge generating system (e.g. electromagnetic lifter, high-frequency induction furnace, motor) in the periphery of the cylinder with a no-contact switch, circuit elements inside the switch may deteriorate or break. Therefore, take measures against the surge (source of generation) and pay attention to confusion with other lines.

◆ Temperature change

Even when switches are used within the specified use temperature, extreme environmental temperature changes may have a bad influence on the parts inside the switch.

Maintenance and check



WARNING

◆ Screw and hardware looseness check

Looseness of a switch mounting screw and hardware will result in switch displacement, thus causing unstable operation and malfunction. After setting the position again, tighten them with a specified torque.

◆ Lead wire breakage check

Damaged lead wire coating may result in insulation failure or breakage. Replace the switch or repair the lead wire immediately.

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