

## Grippers for collaborative robots RLSH/RHLF/RCKL Series



# UNIVERSAL ROBOTS Certified Grippers





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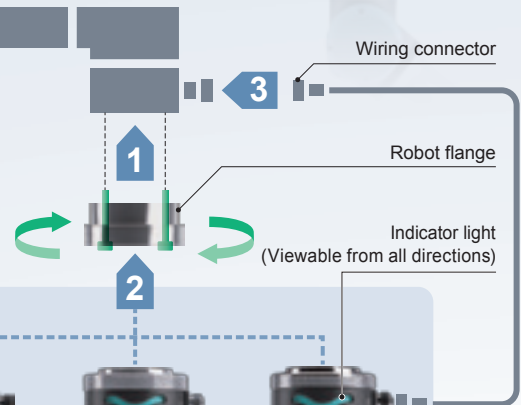
Compatible with UR3/UR5/UR10/UR16 e-series/CB-series



## Attaches to robots in just 5 minutes

- 1 Attach the dedicated flange to the robot
- 2 Attach the gripper by rotating the clamp ring
- 3 Wiring connector connection

Mounting complete!



### Gripper can be replaced without tools

- Because the same robot flange is used for all series, setup can be completed by simply replacing the gripper.
- The gripper can be replaced without tools, and the clamp ring can easily be turned by hand.



## Reduce teaching time to 1/10th

The exclusive "CKD-Pneumatic Gripper" software authorized by Universal Robots allows for simple setup and can greatly reduce teaching time through intuitive operation.

(A USB drive containing the software is included with the product.)

### Easy installation



USB drive  
(Included with product)

### Intuitive operation



The digital I/O can be configured while viewing a graphic display of the gripper's open/closed status.



The total mass (Payload) and the position of the center of gravity can be set for tools necessary for robot operation when configuring gripper settings.

The RLSH, RHLF and RCKL Series grippers for collaborative robots are air-driven, compact, and lightweight yet have a high gripping force. Easy setup makes it possible for anyone to implement collaborative robots.

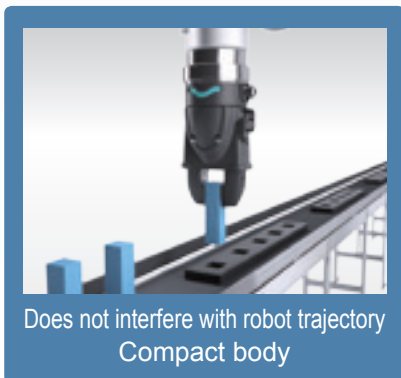
## Lineup includes three models that can be selected according to the purpose



### RLSH Series

#### Compact

Stroke: 18 mm  
Gripping force: 60 N\*  
Mass: 1.0 kg



### RHLF Series

#### Long stroke

Stroke: 32mm  
Gripping force: 85N\*  
Mass: 1.1kg



### RCKL Series

#### 3-way fingers

Stroke: 10mm  
Gripping force: 125N\*  
Mass: 1.1kg



\* Supply pressure 0.5 MPa, finger length (ℓ) = 20 mm, value at center of stroke

## Total support for air systems

Wide lineup of pneumatic equipment necessary for gripper operation, allowing you to create the optimal system.  
(For more details, visit our website at [https // www.ckd.co.jp /.](https://www.ckd.co.jp/))

### Valve

- Directional control valve
- Fitting
- Silencer
- Air tube



\* The above items are an optional four-piece set.

### Other Air Systems

- Compact compressor (Mobile air supply unit)
- Filter and regulator
- Fitting
- Various sensors
- Communication compatible equipment... And more



\* Purchase separately.



Gripper for collaborative robots Compact type

# RLSH Series

With speed controller and cylinder switch  
Port size:  $\phi 4$  push-in fitting



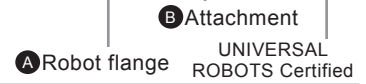
## Specifications

Descriptions		RLSH
Bore size	mm	$\phi 20$
Actuation		Double acting type
Working fluid		Compressed air
Max. working pressure	MPa	0.7
Min. working pressure	MPa	0.1
Port size		$\phi 4$ push-in fitting
Ambient temperature	$^{\circ}\text{C}$	0 - 50
Operating stroke length	mm	18
Repeatability	mm	$\pm 0.01$
Weight	kg	1
Indicator light		Blue/green
Cylinder switch		With F2H (Lights up when yellow LED is ON)

Note: See page 5 for manufacturing the attachment according to the workpiece.

## How to order

RLSH - A20D1N - L1 - **F** **Y2V** - UR



Code	Description
<b>A Robot Flange</b>	
Blank	Without robot flange
F	With robot flange (Note 1)
<b>B Attachments</b>	
Blank	Without attachments
Y2	Attachment for testing (Note 2)
V	Directional control valve / tube (Note 3)

Note 1: With robot flange mounting bolts

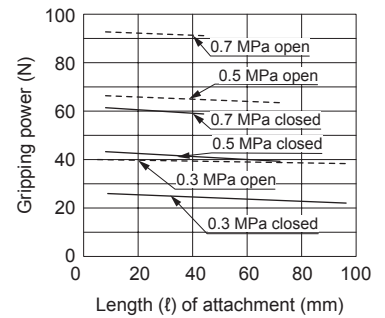
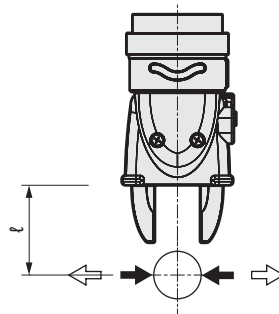
Note 2: Because it is made of resin, use it for gripping tests. (Mass is 25 g per piece)

Note 3: Directional control valve includes a  $\phi 4$  push-in fitting (air supply port and A/B port), silencer (R1/R2 port), and mounting plate. The tube has an outer diameter of  $\phi 4$  and a length of 2.5 m x 2 piece. For details about the directional control valve, see the last page.

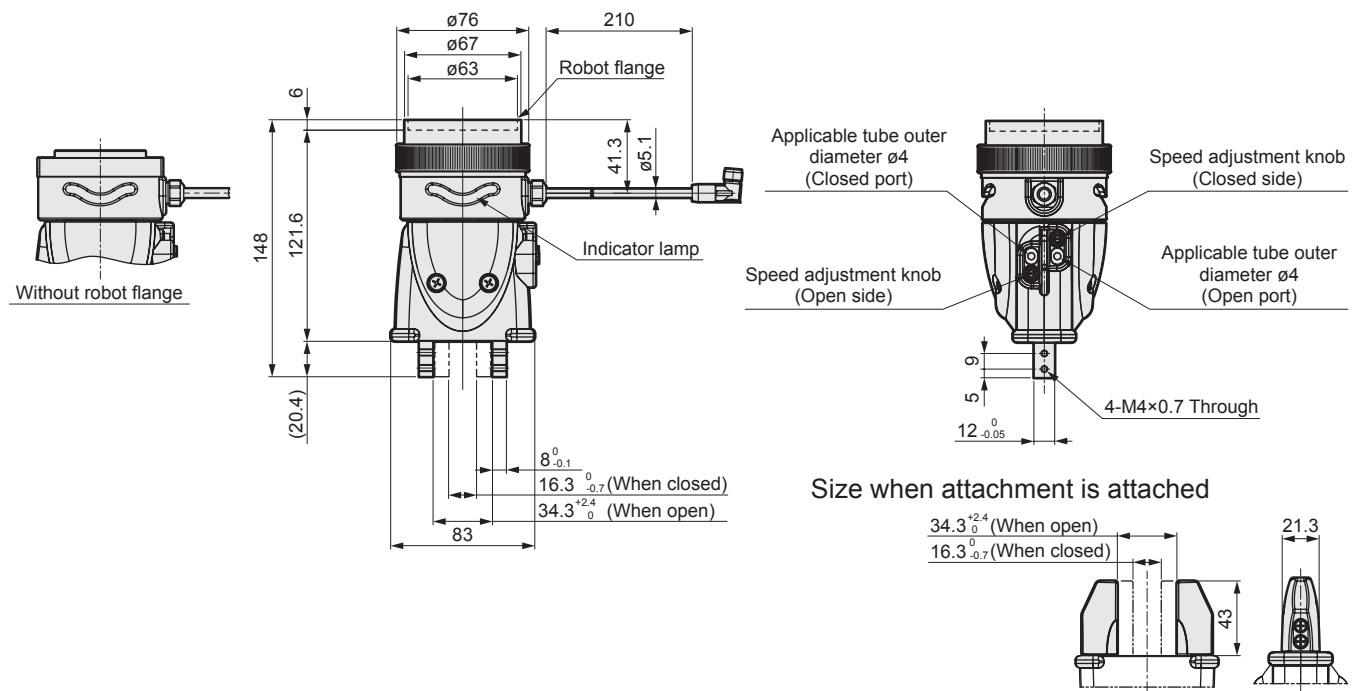
## Gripping power performance data

- The gripping force indicates the thrust (for one finger) in the direction of the arrow shown in the figure.
- Indicates the gripping force operating in the opening and closing directions for the length ( $l$ ) of the attachment of the gripper when the supply pressure is 0.3, 0.5, and 0.7 MPa.

- Opening direction (←) ----- (Dashed line indication)
- Closing direction (→) ----- (Solid line indication)



## Dimensions





Gripper for collaborative robots Long stroke type

# RHLF Series

With speed controller and cylinder switch  
Port size:  $\varnothing 4$  push-in fitting



## Specifications

Descriptions		RHLF
Bore size	mm	$\varnothing 16 \times 2$
Actuation		Double acting type
Working fluid		Compressed air
Max. working pressure	MPa	0.7
Min. working pressure	MPa	0.2
Port size		$\varnothing 4$ push-in fitting
Ambient temperature	$^{\circ}\text{C}$	5 - 50
Operating stroke length	mm	32
Repeatability	mm	$\pm 0.03$
Weight	kg	1.1
Indicator light		Blue/green
Cylinder switch		With T2H (Lights up when red LED is ON)

Note: See page 5 for manufacturing the attachment according to the workpiece.

## How to order

RHLF - 16CS - F Y2V - UR



Code	Description
<b>A Robot Flange</b>	
Blank	Without robot flange
F	With robot flange (Note 1)
<b>B Attachments</b>	
Blank	Without attachments
Y2	Attachment for testing (Note 2)
V	Directional control valve / tube (Note 3)

Note 1: With robot flange mounting bolts

Note 2: Because it is made of resin, use it for gripping tests. (Mass is 30g per piece)

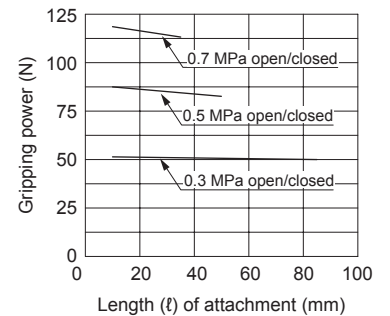
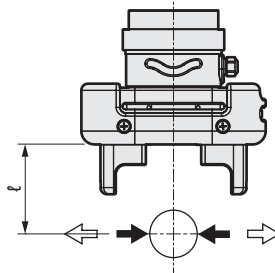
Note 3: Directional control valve includes a  $\varnothing 4$  push-in fitting (air supply port and A/B port), silencer (R1/R2 port), and mounting plate. The tube has an outer diameter of  $\varnothing 4$  and a length of 2.5 m x 2 piece.

For details about the directional control valve, see the last page.

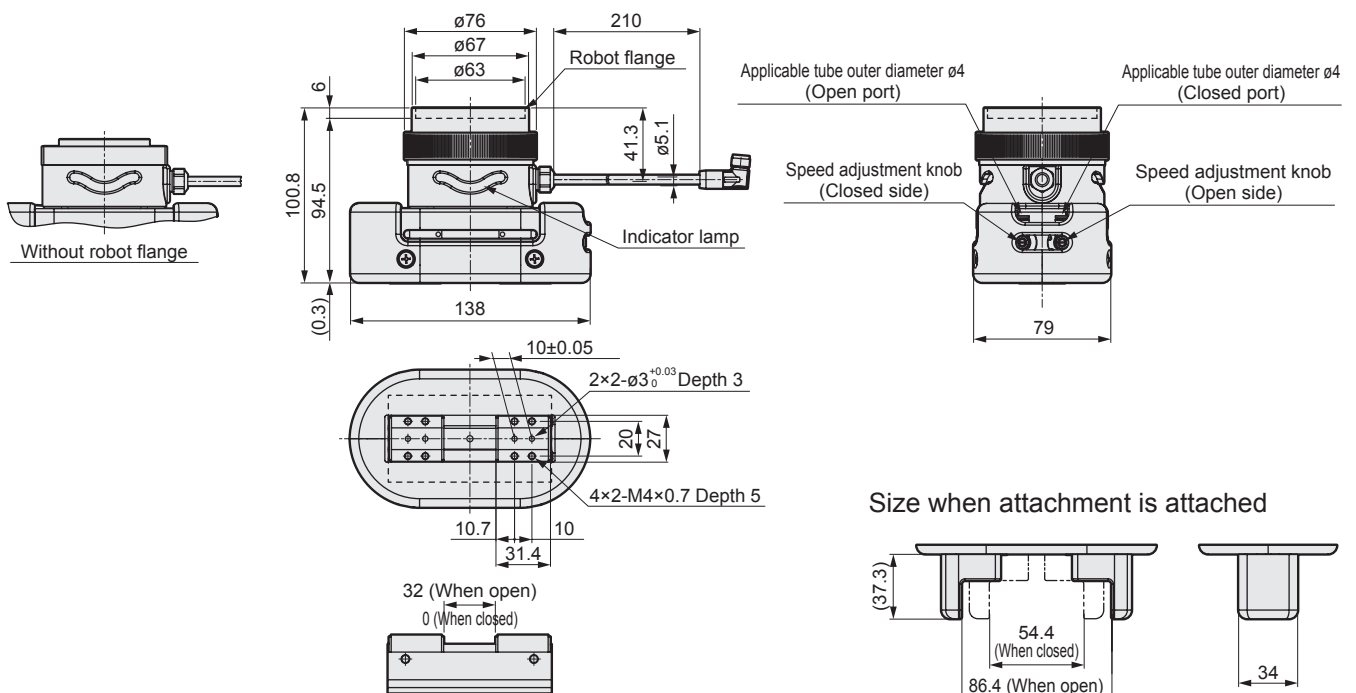
## Gripping power performance data

- The gripping force indicates the thrust (for one finger) in the direction of the arrow shown in the figure.
- Indicates the gripping force operating in the opening and closing directions for the length ( $l$ ) of the attachment of the gripper when the supply pressure is 0.3, 0.5, and 0.7 MPa.

- Opening direction ( $\leftarrow$ ),
- Closing direction ( $\rightarrow$ ) (Solid line indication)



## Dimensions





Gripper for collaborative robots 3-way fingers type

# RCKL Series

With speed controller and cylinder switch  
Port size:  $\varnothing 4$  push-in fitting

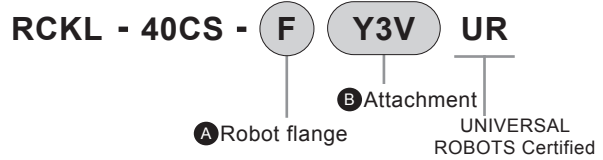


## Specifications

Descriptions		RCKL
Bore size	mm	$\varnothing 40$
Actuation		Double acting type
Working fluid		Compressed air
Max. working pressure	MPa	0.7
Min. working pressure	MPa	0.3
Port size		$\varnothing 4$ push-in fitting
Ambient temperature	$^{\circ}\text{C}$	5 - 50
Operating stroke length	mm	10
Repeatability	mm	$\pm 0.01$
Weight	kg	1.1
Indicator light		Blue/green
Cylinder switch		With T2H (Lights up when red LED is ON)

Note: See page 5 for manufacturing the attachment according to the workpiece.

## How to order



Code	Description
<b>A Robot Flange</b>	
Blank	Without robot flange
F	With robot flange (Note 1)

<b>B Attachments</b>	
Blank	Without attachments
Y3	Attachment (Note 2)
V	Directional control valve / tube (Note 3)

Note 1: With robot flange mounting bolts

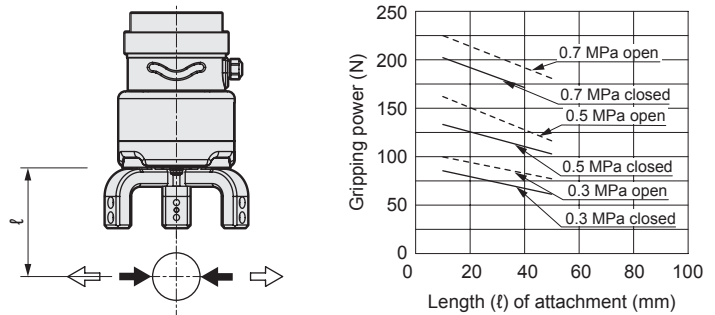
Note 2: Built-to-order product, made of aluminum. (Mass is 50g per piece)

Note 3: Directional control valve includes a  $\varnothing 4$  push-in fitting (air supply port and A/B port), silencer (R1/R2 port), and mounting plate. The tube has an outer diameter of  $\varnothing 4$  and a length of 2.5 m x 2 piece. For details about the directional control valve, see the last page.

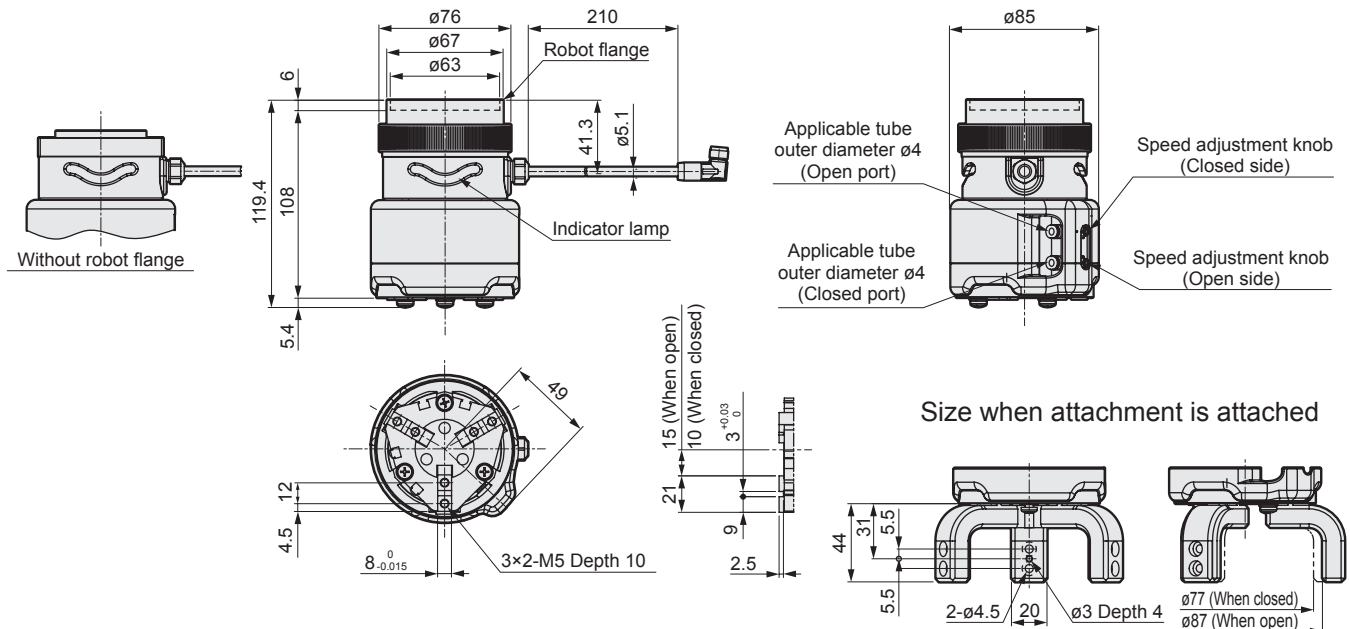
## Gripping power performance data

- The gripping force indicates the thrust (for one finger) in the direction of the arrow shown in the figure.
- Indicates the gripping force operating in the opening and closing directions for the length ( $l$ ) of the attachment of the gripper when the supply pressure is 0.3, 0.5, and 0.7 MPa.

- Opening direction (←) ----- (Dashed line indication)
- Closing direction (→) ————— (Solid line indication)



## Dimensions



## How to use the included "CKD Pneumatic Gripper" software

The following explains how to use the dedicated "CKD Pneumatic Gripper" software included with this product. For more details, refer to the UR Robot Manual and the instruction manual for this product.

### Software Installation

After inserting the included USB drive into the robot controller, go to the "Setup Robot" screen of the robot controller, select "URCaps," then select "CKD Pneumatic Gripper" and press the "Restart" button to begin installation.

### Installation Settings Screen

Configure the digital I/O settings of the directional control valve that opens and closes the gripper. Settings can be configured while confirming the actual open/close status on the graphic display, so it is easy to confirm whether the signal is reversed. For the directional control valve, use a 2-position double solenoid valve to prevent workpieces from falling when the signal is cut off.

**Directional control valve digital I/O settings**  
Configures directional control valve digital I/O settings for OPEN/CLOSE.

**Test button**  
Confirms the OPEN/CLOSE operation to make sure the I/O settings are correct.

**Graphic display**  
The OPEN/CLOSE status of the gripper and the operating status of the built-in cylinder switch are indicated by a change in color.

### Program Registration Screen

This screen is for registering operation instructions to the gripper in the robot program. Enter the gripper operation direction, Payload (total mass of the gripper, attachment, and workpiece), barycentric coordinates (payload center of gravity), and the conditions for moving to the next operation.

**Operating direction selection button**  
Selects the operating direction using the OPEN/CLOSE check buttons. Operation can be confirmed using the Test button.

**Total mass and center of gravity setting**  
For "Payload," enter the total mass of the gripper, attachment, and workpiece, and for "Center of gravity," enter the center of gravity for the total mass using the XYZ coordinates.

**Operating condition settings**  
Sets the conditions for moving to the next operation after gripper operation. Select the signal number for input signal waiting, and enter the waiting time for the timer setting.

# Grippers for collaborative robots

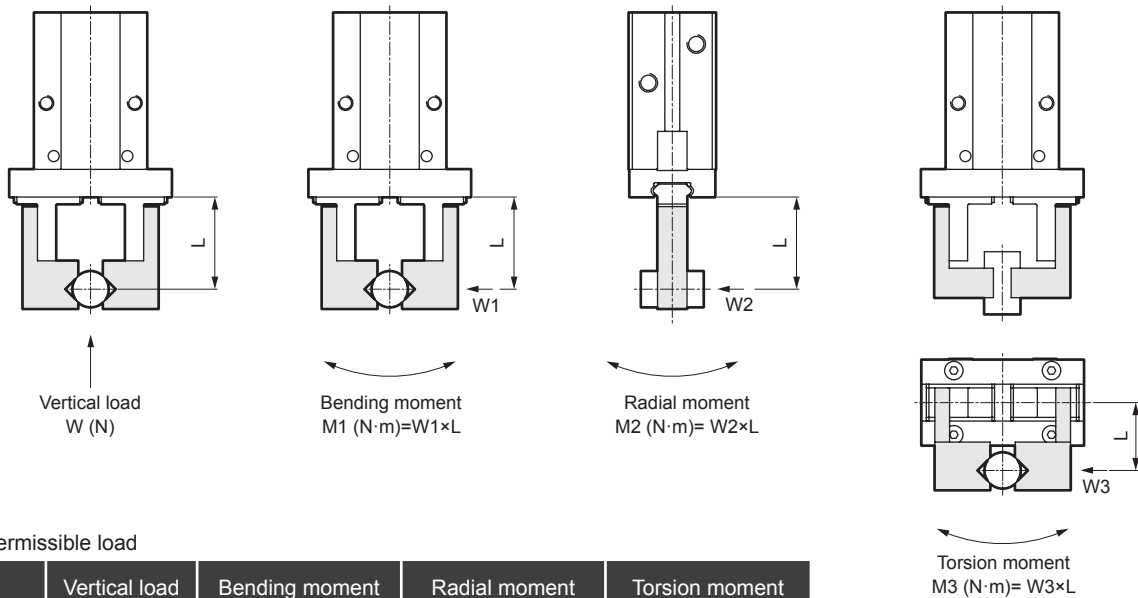
## About the attachment

- Use the lightest and shortest attachment possible. If it is long or heavy, the inertial force during opening and closing will be large, which may cause the fingers to become loose or accelerate the wear of the finger sliding portion, which can have a negative impact on the lifespan.
- Select the length for when an L-shaped attachment is attached as shown below.  
Example: For an L-shape, when the finger direction is 30 mm and 30 mm after bending 90 degrees, the length of the attachment should be 60 mm
- Make sure that the length of the attachment is according to the value in the gripping force performance data.
- Be sure to follow the table below because the mass of the attachment affects the lifespan.

Model	Mass (W) per attachment
RLSH	W < 80 g
RHLF	W < 100g
RCKL	W < 95g

## About external forces applied to the fingers

When an external force is applied to a finger such as when conveying and inserting workpieces, use it within [Table 1] parameters.  
(\* To use it while conveying, consider the impact to the terminal.)



[Table 1] Permissible load

Model	Vertical load Wmax (N)	Bending moment M1max (N·m)	Radial moment M2max (N·m)	Torsion moment M3max (N·m)
RLSH	198	1.8	3.6	1.8
RHLF	164	0.94	2	1.1

L: Distance up to the point where load is applied

- Sample calculation for external forces applied to the fingers

Sample calculation ①: When conveying a workpiece

When a workpiece (mass  $m = 0.7$  kg, center of gravity distance  $L=40$  mm) is gripped and conveyed with Model number: RLSH-A20DIN attachment (mass  $m_k: 0.4$  kg, center of gravity distance  $L_k=30$  mm)

( $g$ : Gravity acceleration =  $9.8$  m/s<sup>2</sup>,  $\alpha$ : Impact coefficient generated at the terminal = 3)

$$M_1 = \alpha \times W_1 \times L = \alpha \times (m_k \times g \times L_k \times 2 + m \times g \times L)$$

$$= 3 \times (0.4 \times 9.8 \times 30 \times 10^{-3} \times 2 + 0.7 \times 9.8 \times 40 \times 10^{-3}) \doteq 1.5 \text{ N}\cdot\text{m}, \text{ and } M_{1\text{max}} = 1.8 \text{ N}\cdot\text{m} \text{ or less, so it can be used}$$

Sample calculation ②: When inserting a workpiece

When a load of  $W_1: 30$  N is applied to Model number: RLSH-A20DIN,  $L=40$  mm

$$M_1 = W_1 \times L = 30 \times 40 \times 10^{-3} = 1.2 \text{ N}\cdot\text{m}, \text{ and } M_{1\text{max}} = 1.8 \text{ N}\cdot\text{m} \text{ or less, so it can be used}$$





# Safety Precautions

Be sure to read this section before use.

When designing and manufacturing a device using CKD products, the manufacturer is obligated to check that device safety mechanism, pneumatic control circuit, or water control circuit and the system operated by electrical control that controls the devices is secured.

It is important to select, use, handle and maintain the product appropriately to ensure that the CKD product is used safely. Observe warnings and precautions to ensure device safety.

Check that device safety is ensured, and manufacture a safe device.

## WARNING

**1** This product is designed and manufactured as a general industrial machine part. It must be handled by an operator having sufficient knowledge and experience.

**2** Use this product in accordance with specifications.

This product must be used within its stated specifications. In addition, never modify or additionally machine this product. This product is intended for use in general industrial machinery equipment or parts. It is not intended for use outdoors (except for products with outdoor specifications) or for use under the following conditions or environments. (Note that this product can be used when CKD is consulted prior to its usage and the customer consents to CKD product specifications. The customer should provide safety measures to avoid danger in the event of problems.)

**①** Use for applications requiring safety, including nuclear energy, railways, aircraft, marine vessels, vehicles, medical devices, devices or applications in contact with beverages or foodstuffs, amusement devices, emergency cutoff circuits, press machines, brake circuits, or safety devices or applications.

**②** Use for applications where life or assets could be significantly affected, and special safety measures are required.

**3** Observe organization standards and regulations, etc. related to the safety of device design and control, etc.  
ISO4414, JIS B 8370 (Pneumatics fluid power - General rules and safety requirements for systems and their components)  
JFPS2008 (Principles for pneumatic cylinder selection and use)  
Including the High Pressure Gas Safety Act, Industrial Safety and Health Act, other safety rules, organization standards and regulations, etc.

**4** Do not handle, pipe, or remove devices before confirming safety.

**①** Inspect and service the machine and devices after confirming safety of all systems related to this product.


**②** Note that there may be hot or charged sections even after operation is stopped.


**③** When inspecting or servicing the device, turn OFF the energy source (air supply or water supply), and turn OFF power to the facility. Discharge any compressed air from the system, and pay attention to possible water leakage and leakage of electricity.


**④** When starting or restarting a machine or device that incorporates pneumatic components, make sure that the system safety, such as pop-out prevention measures, is secured.

**5** Observe warnings and cautions in the following pages to prevent accidents.

■ The precautions are ranked as "DANGER", "WARNING" and "CAUTION" in this section.

 **Danger:** When a dangerous situation may occur if handling is mistaken leading to fatal or serious (DANGER) injuries, and when there is a high degree of emergency to a warning.

 **Warning:** If handled incorrectly, a dangerous situation may occur, resulting in death or serious injury. (WARNING)

 **Caution:** When a dangerous situation may occur if handling is mistaken leading to minor injuries or (CAUTION) physical damage.

Note that some items described as "CAUTION" may lead to serious results depending on the situation. Every item provides important information and must be observed.

Please read below notes before ordering.

**1** Warranty period

This warranty shall be valid for one year after delivery to the customer's designated site.

**2** Scope of warranty

If any faults, found to be the responsibility of CKD, occur during the above warranty term, the product shall be replaced, the required replacement parts provided free of charge, or shall be repaired at the CKD factory free of charge. This Limited Warranty will not apply to:

(1) Failures due to use outside the conditions and environments set forth in the catalog or these specifications.

(2) Failures resulting from factors other than this product.

(3) Failures caused by improper use of the product.

(4) Failures resulting from modifications or repairs made without CKD consent.

(5) Failures caused by matters that could not be predicted with the technologies in practice when the product was delivered.

(6) Failures resulting from natural disasters or accidents for which CKD is not liable.

The warranty covers the actually delivered product, and does not cover any damage resulting from losses induced by faults in the delivered product.

**3** Compatibility check

The customer is responsible for confirming the compatibility of CKD products with the customer's systems, machines and equipment.



# Safety Precautions

Be sure to read this section before use.

For details on general cylinders and cylinder switches, refer to Pneumatic Cylinders (CB-030S).

## Laws and regulations on robot safety

Please read the following standards carefully before use.

ISO10218 and JIS B 8433 (Robots and robotic devices)  
ISO/TS 15066 (Robots and robotic devices)

Product-specific cautions: Grippers for collaborative robots

## Design/selection

### ⚠ WARNING

- If a moving workpiece poses a danger to the human body, or if there is a possibility of human fingers being pinched by the fingers of the gripper or attachment, take safety precautions such as by installing a protective cover.
- If the circuit pressure drops due to a power outage or there is a problem with the air source, gripping force may decrease causing the workpiece to fall. Provide position locking measures, etc., so that personnel are not injured or machines damaged.

### ⚠ CAUTION

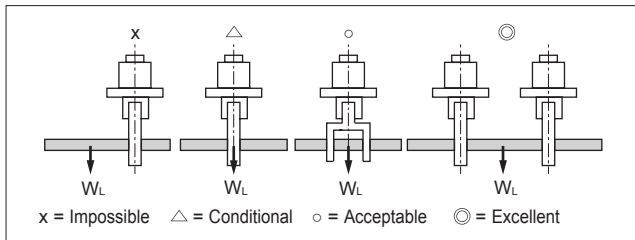
#### ■ Usage environment

At cutting, casting, or welding plants, there is a risk of foreign matter, such as cutting fluid, chips, powder and dust, entering the equipment. Use covers and such to prevent this as much as possible.

Do not use the equipment under the following environments.

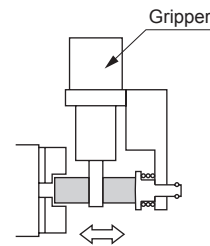
- Cutting fluid is applied (because the sliding portion will be scraped by the abrasive or abrasive powder in the fluid)
- When the atmosphere contains organic solvents, chemicals, acids, alkalis, kerosene, etc.
- Water is applied

- When grasping long or large workpieces, it is a necessary to grasp the center of gravity to ensure a stable grip, but it is also necessary to stabilize it by increasing the size and using multiple pieces.

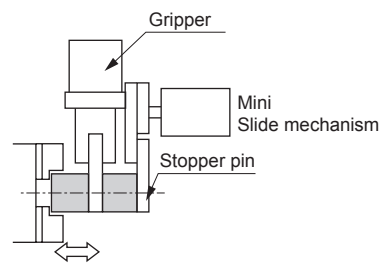
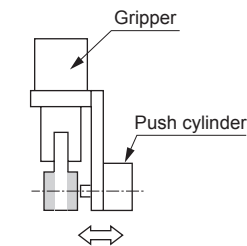


- Select a model with a sufficient gripping force according to the mass of the workpiece.
- Select a model with a sufficient opening and closing width according to the size of the workpiece.
- When inserting the workpiece directly to the jig using a gripper, take the clearance into consideration during design. The gripper may be damaged.

- Press the jig by ejecting



- When using a push cylinder



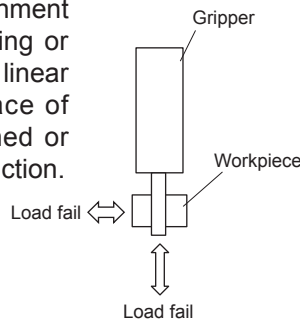
Note) Since the workpiece slides on the attachment, the lifespan of the gripper may be greatly reduced. The shape of the attachment should be sufficiently considered.

- If the attachment is not rigid enough, the fingers may twist due to deflection, which may have a negative impact on operation.
- Adjust the gripper opening/closing speed using the speed controller. When used at high speed, backlash may occur sooner. Also, the workpiece may vibrate due to the impact of opening and closing, which may result in gripper errors, workpiece insertion failures, or poor repeatability.
- If a small-diameter or short-stroke actuator operates at a high frequency, condensation (water droplets) may form inside the piping in certain conditions. Take steps to prevent condensation such as by using a quick exhaust valve.

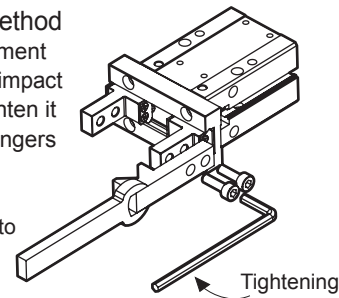
## Mounting, installation and adjustment

### CAUTION

Be sure not to apply an excessive load to the fingers and attachment when attaching and detaching or conveying workpieces. The linear guide rolling contact surface of the fingers may be scratched or dented, resulting in a malfunction.



**Attachment mounting method**  
When mounting the attachment to the fingers, consider the impact to the gripper body and tighten it with a wrench so that the fingers are not twisted.



Descriptions	Bolt used	Tightening torque (N·m)
RLSH-A20D1N	M4×0.7	1.4
RHLF-16CS	M4×0.7	1.4
RCKL-40CS	M5×0.8	2.8

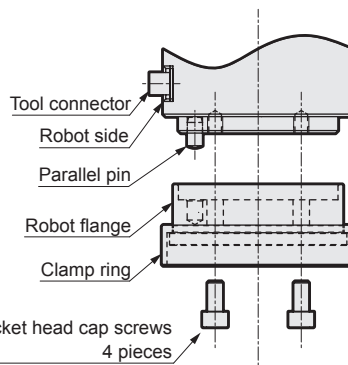
### [Mounting method]

#### ① Mounting the robot flange

Loosen the clamp ring and remove the robot flange from the gripper.

After inserting the parallel pin (included) to the robot flange surface, mount the robot flange to the robot using the four hexagon socket head cap screws (included).

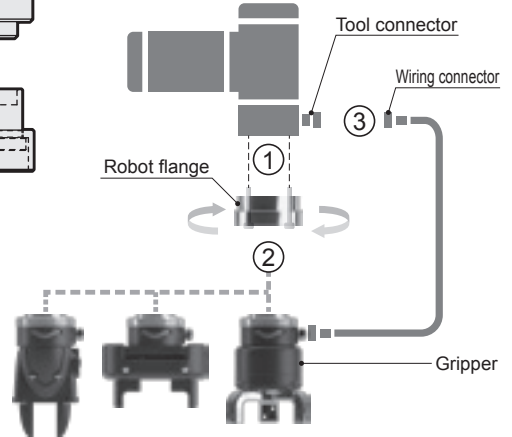
Note: Tightening torque = 7 Nm



#### ② Mounting the gripper

Mount the gripper to the robot flange and tighten the clamp ring.

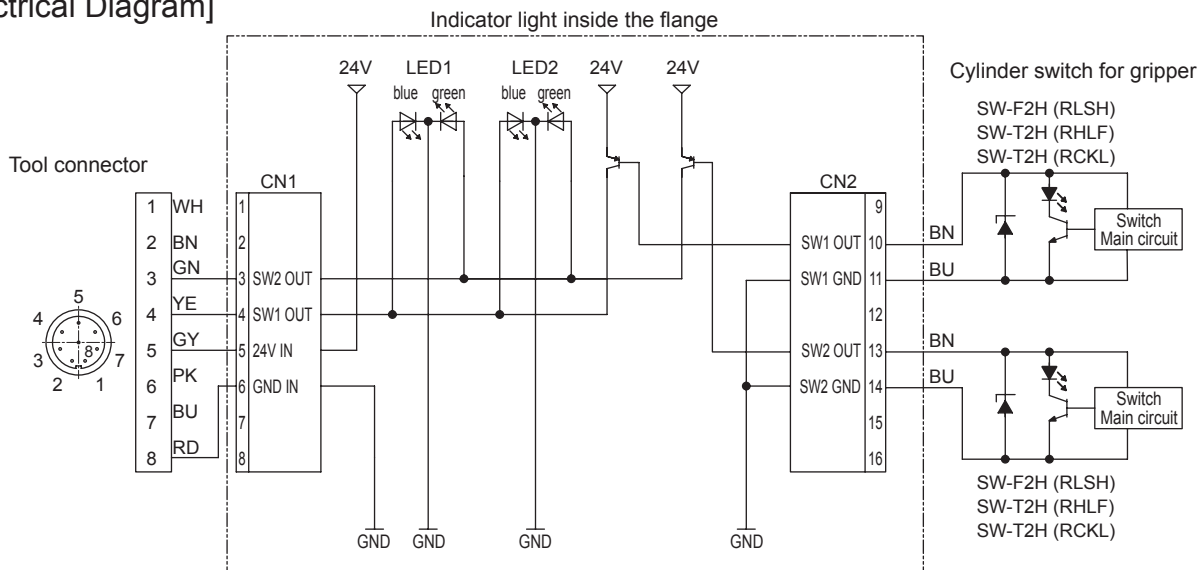
Note: Tighten the clamp ring by hand to make sure it is not loose.



#### ③ Connector connection

Connect the gripper connector to the tool connector of the robot.

### [Electrical Diagram]



### [Switch specifications]

Descriptions	Proximity 2-wire	
	F2H	T2H
Applications	Dedicated for programmable controller	
Load voltage/current	DC10 to 30V 5 to 20mA	
Leakage current	1mA or less	
Shock resistance	980m/s <sup>2</sup>	
Weight	g 10	18

# Grippers for collaborative robots

## Directional control valve (Option)

Symbol  when attachment V (directional control valve / tube) is selected

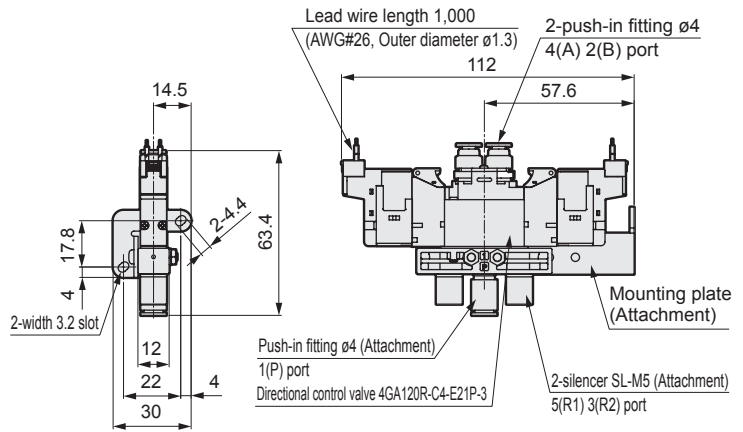
Directional control valve model No.  
4GA120R-C4-E21P-FLA28482-3

Refer to "Pneumatic Valves (No.CB-023S)" for other specification products.

### Specifications

Item	Description
Valve type and operation method	Pilot operated soft spool valve
Solenoid position	2-position double solenoid
Max. working pressure MPa	0.7
Min. working pressure MPa	0.2
Ambient temperature °C	-5 to 55 (no freezing)
Fluid temperature °C	5 - 55
Manual override	Non-locking/locking common
Response time ms	9
Flow characteristics	P → A/B: C = 1.2, b = 0.47
C [dm <sup>3</sup> /(s·bar)], b	A/B → R1/R2: C = 0.72, b = 0.37
Rated voltage V	24V DC
Voltage fluctuation range	±10%
Holding current A	0.017
Power consumption W	0.40
Surge suppressor	Built-in
Indicator	Built-in lamp

### Dimensions

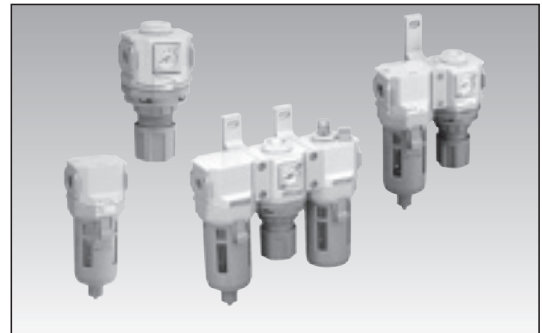


## Related products

### Modular type selex FRL

- Compact/modular type with unified principal dimensions for filters, regulators, and lubricators
- Wide variety of combinations are possible according to the application
- Long-life element is used
- Simple design with no wasted space on the front

Catalog No. CB-024SA



### Portable air supply unit ASU-S

- Portable compact compressor
- Supplies clean air with built-in filter
- Continuous operation possible

Catalog No. CC-1363A



If the goods and/or their replicas, the technology and/or software found in this catalog are to be exported from Japan, Japanese laws require that the exporter makes sure that they will never be used for the development or manufacture of weapons for mass destruction.

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