CKD

New Products

Grippers for collaborative robots

RLSH/RHLF/RCKL-TM Series

OMRON

OMRON ROBOT

Official Certified Grippers

Green Power WATER

CKD Corporation

CC -1520A 1

OMRON

OMRON ROBOT Certified Grippers

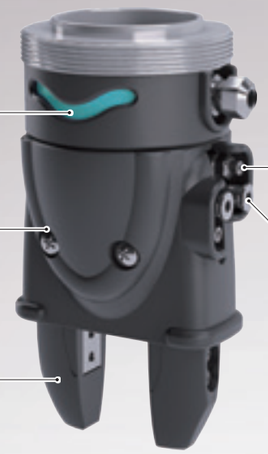
Compatible with TM5-700/TM5-900/TM12/TM14

Air gripper with high affinity for Collaborative Robots

The Grippers for collaborative robots RLSH/RHLF/RCKL-TM Series offers high gripping power while being compact and lightweight thanks to its air drive.
Easy setting enables introduction to any customer's collaborative robot.

Green Power
Collaborative Robot Grippers are manufactured with 100% RENEWABLE ENERGY (Certified by Green Power)

Winner of the 2020 Good Design Award



Mountable on robots in just 2 minutes

1. Mount dedicated flange on the robot
2. Turn the clamp ring to mount gripper
3. Connect the wiring connector

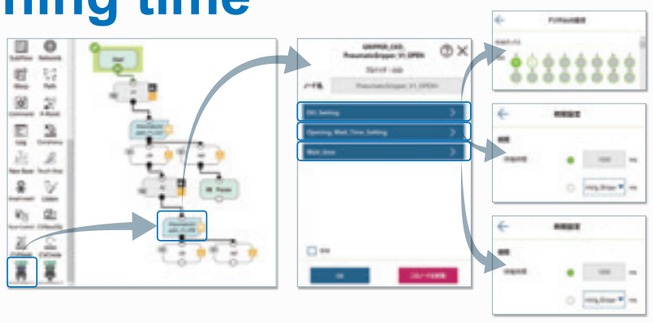
Mounting complete!

Enables gripper replacement without tools

- Through the adoption of a robot flange common to the entire series, changeover can be done simply by replacing the gripper.
- The simple gripper design enables replacement without tools: just turn the clamp ring by hand.

Reduced teaching time

With the dedicated software "Pneumatic Gripper", you can set the digital I/O settings, the timeout time for opening/closing the gripper, and the waiting time after opening/closing the gripper in one node.



3 models lined up to match your applications

RLSH Series
Compact

Stroke : 18 mm
Gripping power : 42 N*
Weight : 0.8 kg

RHLF Series
Long Stroke

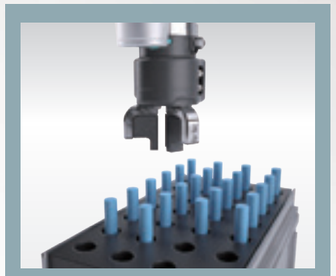
Stroke : 32 mm
Gripping power : 85 N*
Weight : 1.0 kg

RCKL Series
3-Way Finger

Stroke : 10 mm
Gripping power : 125 N*
Weight : 1.1 kg

Compact body avoids interference with robot trajectory

Thin long stroke keeps height low



3-way finger ideal for round and cylindrical workpieces

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

Total support for air systems

Various air components required for the gripper drive are available, enabling construction of the ideal system for each customer.
(For details, refer to the CKD website (https://www.ckd.co.jp/en/).)

Valve

- Directional control valve
- Fitting
- Silencer
- Air tube

*Optionally, the above 4 items can be ordered as a set.

Other air systems

- Compact compressor (Portable Air Supply Unit)
- Filter, regulator
- Fitting
- Sensors
- Communication supported devices, etc.

*Purchase separately.

Grippers for collaborative robots Compact

RLSH -TM Series

With speed controller, cylinder switch
Port size: ø4 push-in fitting

Specifications

Item		RLSH
Bore size	mm	ø20
Actuation		Double acting
Working fluid		Compressed air
Max. working pressure	MPa	0.7
Min. working pressure	MPa	0.1
Port size		ø4 push-in fitting
Ambient temperature	°C	0 to 50
Operating stroke length	mm	18
Repeatability	mm	±0.01
Weight	kg	0.8
Display lamp		Blue/green
Cylinder switch		With F2H (Lit when yellow LED ON)

Note: When manufacturing the attachment according to the workpiece, refer to page 5.

How to order

RLSH - A20D1N - L1 - F Y2V - TM

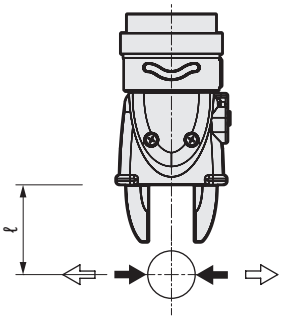
- F: Ⓐ Robot flange
- Y2V: Ⓑ Accessories
- TM: OMRON Robot authentication

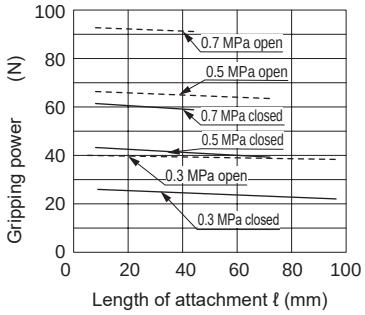
Code	Description
Ⓐ Robot flange	
Blank	Without robot flange
F	With robot flange (*1)
Ⓑ Accessories	
Blank	No accessories
Y2	Test attachment (*2)
V	Directional control valve/tube (*3)

*1: Robot flange mounting bolts included
*2: Use it for grip tests as it is made of resin. (Weight: 25 g per piece)
*3: Directional control valve has ø4 push-in fitting (air supply port, A/B port), silencer (R1/R2 port) and mounting plate. Tube outer diameter ø4, length 2.5m×2. For more information on gripping force performance data directional control valve, refer to the Ending pages.

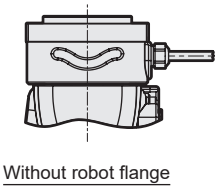
Gripping power performance data

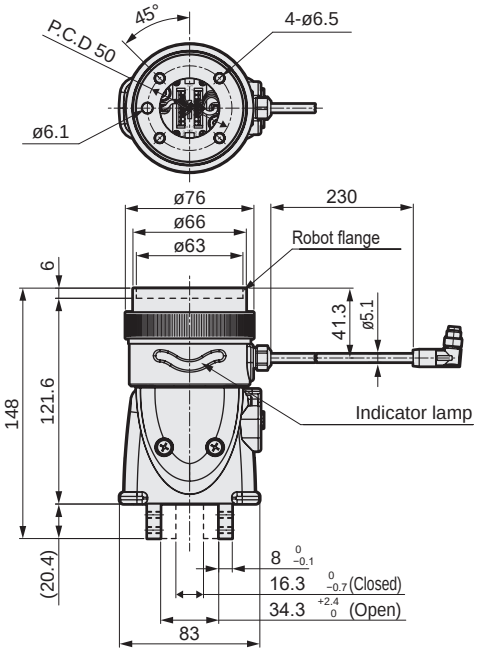
- The gripping force represents the thrust in the direction of the arrow shown in the figure (for one finger).
- The gripping force acting in the opening and closing directions of the gripper's attachment length ℓ when the supply pressure is 0.3, 0.5 and 0.7 MPa.
  - Open direction(⇦) ---------- (Broken line)
  - Close direction(➡) ———— (shown with continuous line)

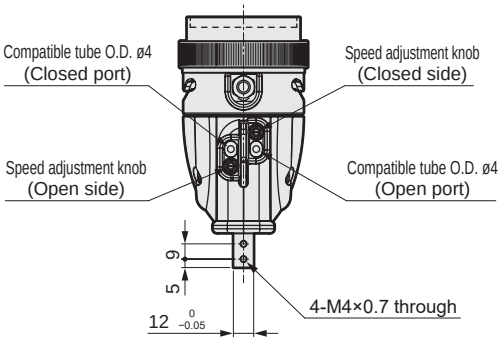




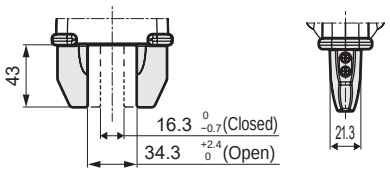
Dimensions







Dimensions when attachment is installed



Grippers for collaborative robots Long stroke

RHLF -TM Series

With speed controller, cylinder switch
Port size: ø4 push-in fitting

Specifications

Item		RHLF
Bore size	mm	ø16 x 2
Actuation		Double acting
Working fluid		Compressed air
Max. working pressure	MPa	0.7
Min. working pressure	MPa	0.2
Port size		ø4 push-in fitting
Ambient temperature	°C	5 to 50
Operating stroke length	mm	32
Repeatability	mm	±0.03
Weight	kg	1.0
Display lamp		Blue/green
Cylinder switch		With T2H (Lit when red LED is ON)

Note: When manufacturing the attachment according to the workpiece, refer to page 5.

How to order

RHLF - 16CS - F Y2V - TM

Ⓐ Robot flange — Ⓑ Accessories — OMRON Robot authentication

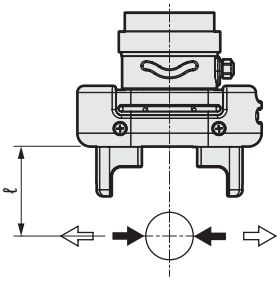
Code	Description
Ⓐ Robot flange	
Blank	Without robot flange
F	With robot flange (*1)
Ⓑ Accessories	
Blank	No accessories
Y2	Test attachment (*2)
V	Directional control valve/tube (*3)

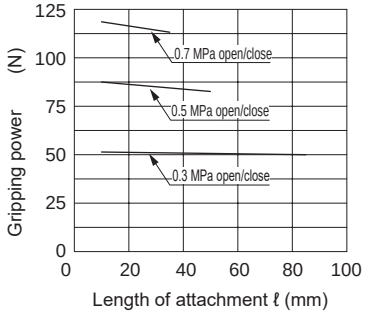
*1: Robot flange mounting bolts included
*2: Use it for grip tests as it is made of resin. (Weight: 30 g per piece)
*3: Directional control valve has ø4 push-in fitting (air supply port, A/B port), silencer (R1/R2 port) and mounting plate. Tube outer diameter ø4, length 2.5m×2. For more information on gripping force performance data directional control valve, refer to the Ending pages.

Gripping power performance data

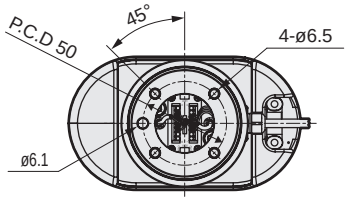
- The gripping force represents the thrust in the direction of the arrow shown in the figure (for one finger).
- The gripping force acting in the opening and closing directions of the gripper's attachment length ℓ when the supply pressure is 0.3, 0.5 and 0.7 MPa.

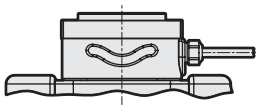
• Open direction(⇦), closed direction (➡) ——— (shown with continuous line)

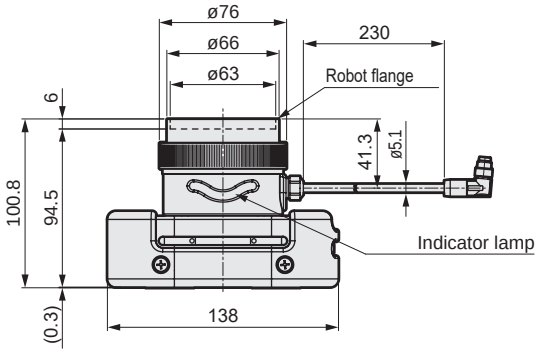


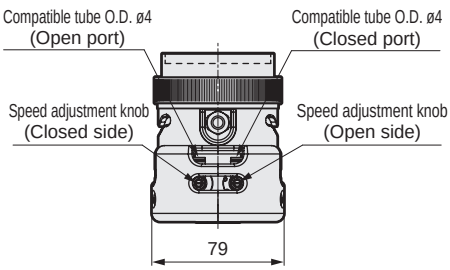


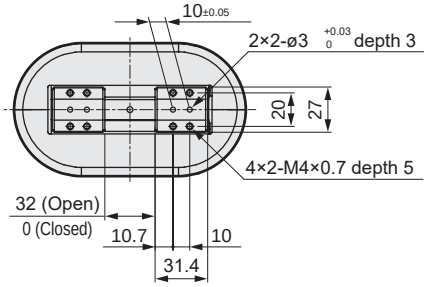
Dimensions



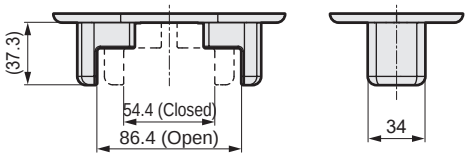

Without robot flange







Dimensions when attachment is installed



Grippers for collaborative robots 3-way finger type

RCKL -TM Series

With speed controller, cylinder switch
Port size: ø4 push-in fitting

Specifications

Item		RCKL
Bore size	mm	ø40
Actuation		Double acting
Working fluid		Compressed air
Max. working pressure	MPa	0.7
Min. working pressure	MPa	0.3
Port size		ø4 push-in fitting
Ambient temperature	°C	5 to 50
Operating stroke length	mm	10
Repeatability	mm	±0.01
Weight	kg	1.1
Display lamp		Blue/green
Cylinder switch		With T2H (Lit when red LED is ON)

Note: When manufacturing the attachment according to the workpiece, refer to page 5.

How to order

RCKL - 40CS - F Y3V - TM

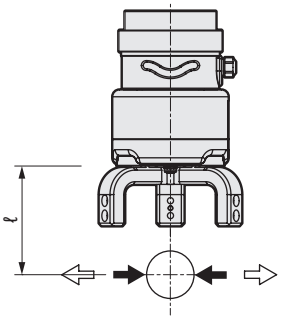
A Robot flange — B Accessories — OMRON Robot authentication

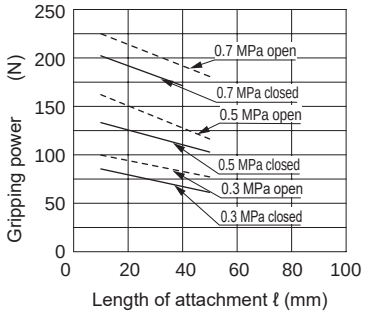
Code	Description
A Robot flange	
Blank	Without robot flange
F	With robot flange (*1)
B Accessories	
Blank	No accessories
Y3	Attachment (*2)
V	Directional control valve/tube (*3)

*1: Robot flange mounting bolts included
*2: Made-to-order product, aluminum. (Weight 50 g per pc)
*3: Directional control valve has ø4 push-in fitting (air supply port, A/B port), silencer (R1/R2 port) and mounting plate. Tube outer diameter ø4, length 2.5m×2. For more information on gripping force performance data directional control valve, refer to the Ending pages.

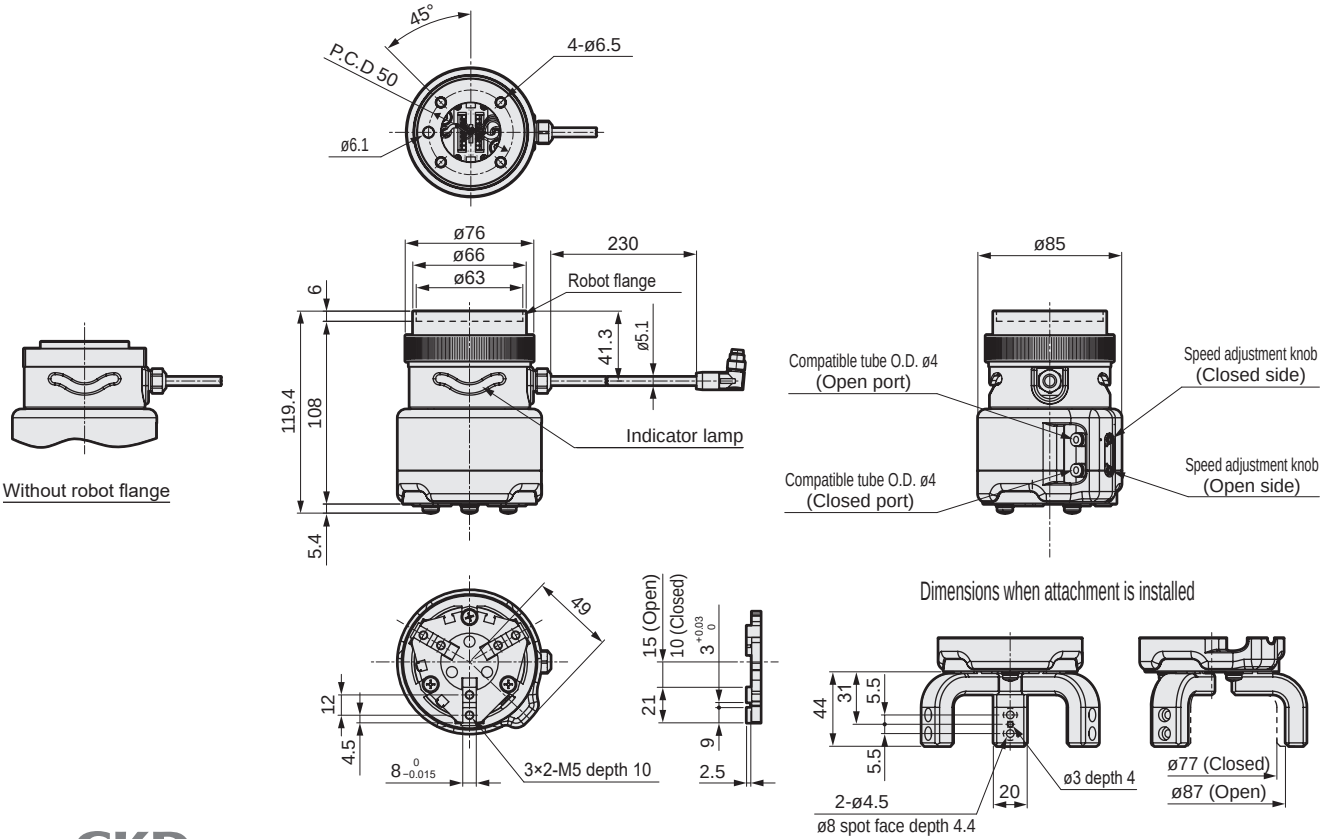
Gripping power performance data

- The gripping force represents the thrust in the direction of the arrow shown in the figure (for one finger).
- The gripping force acting in the opening and closing directions of the gripper's attachment length ℓ when the supply pressure is 0.3, 0.5 and 0.7 MPa.
  - Open direction(⇦) ---------- (Broken line)
  - Close direction(➡) ———— (shown with continuous line)





Dimensions



CKD Pneumatic Gripper Software Operation Method

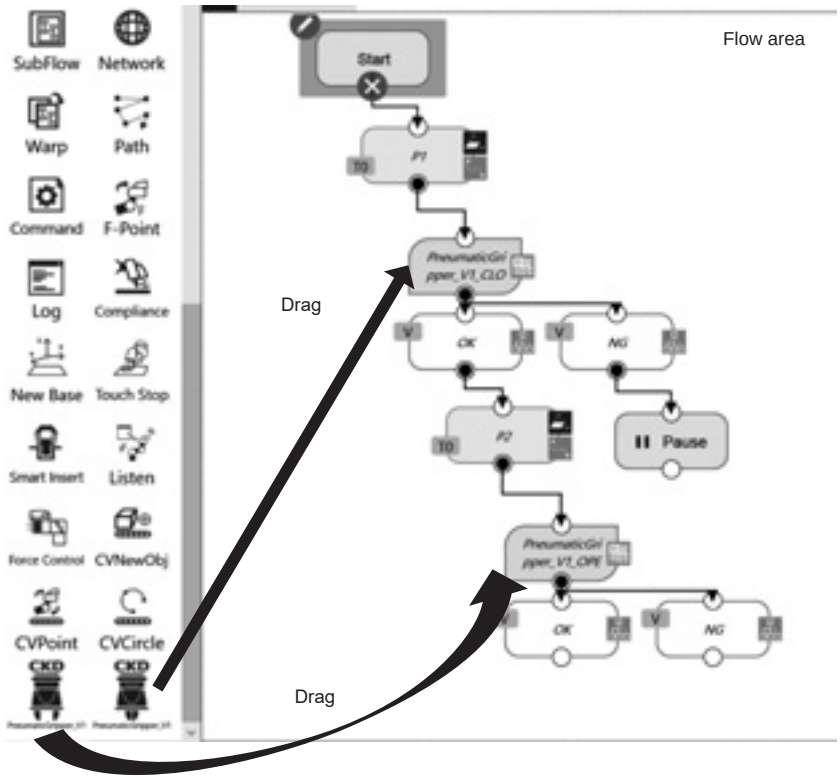
This is an overview of the operation method for the CKD Pneumatic Gripper dedicated software. Refer to the Robot Manual and this product's Instruction Manual for details.

Software installation

Download the Plug&Play software package (OMRON robot users: https://www.omron.com/global/en) or (https://www.ckd.co.jp/english), follow the directions in the Instruction Manual, and import the file.

Program screen

The gripper open/close directions are shown with icons, so drag the icons to the Flow Edit area and set the digital I/O.



Graphic display

The open/closed state of the gripper and the operating state of the built-in cylinder switch are represented by changes in color.

Node screen

Set the digital I/O settings for the directional control valve, the timeout time for opening and closing the gripper, and the waiting time after gripping the workpiece.

Close digital I/O setting

The digital I/O setting for the directional control valve close operation can be set at will.

Close timeout setting

Sets the time at which, if the gripper close time exceeds the arbitrarily set number of seconds, an error will be displayed.

Standby time setting after closing

Sets the arbitrary standby time to stabilize operation after closing the gripper.

*Open time is set likewise.

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.
- When mounting an L-shaped attachment, select length as shown below.

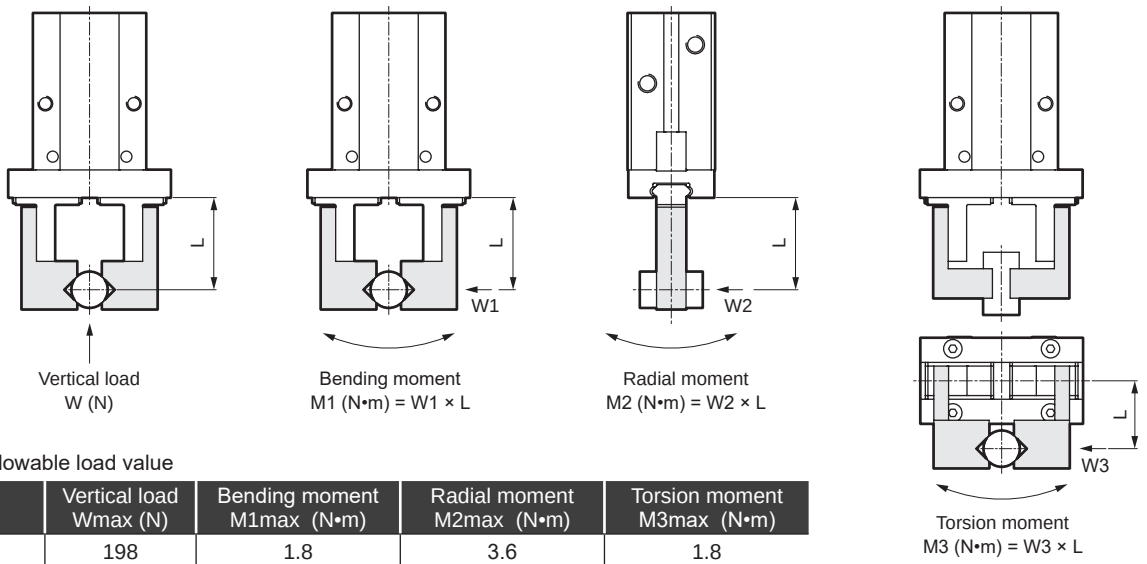
Ex.: If the L-shape is 30 mm in the finger direction and 90 mm at a 30° angle, assume the attachment length is 60 mm.

- Length of attachment should be within the numerical values of gripping power performance data.
- The weight of the attachment affects durability, so check that the weight is in accordance with the table below.

Model	Weight W per attachment
RLSH	W < 80 g
RHLF	W < 100 g
RCKL	W < 95 g

External forces applied to finger

When external force such as workpiece transport or insertion is applied to the finger, use it within the range in [Table 1].
(*For use during transport, be careful of impacts applied to the end.)



[Table 1] Allowable load value

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 to the point where load is applied

• Calculation example of external forces applied to finger

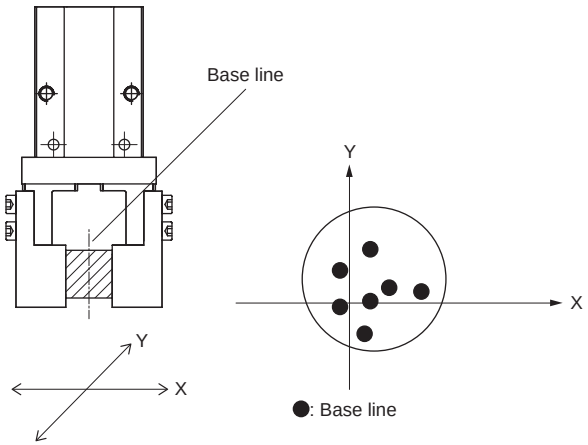
Calculation example (1): Workpiece transport
When gripping a workpiece (weight m = 0.07 kg, center of gravity distance L = 40 mm) with model No. RLSH-A20D1N, attachment (weight m_k = 0.4 kg, center of gravity distance L_k = 30 mm) for transport
(When g: gravity acceleration = 9.8 m/s^2 and α: coefficient of impact on end = 3)
$M_1 = \alpha \times W_1 \times L = \alpha \times (m_k \times g \times L_k \times 2 + m \times g \times L)$
$= 3 \times (0.07 \times 9.8 \times 30 \times 10^{-3} \times 2 + 0.7 \times 9.8 \times 40 \times 10^{-3}) \approx 0.95$ N•m, M1max = 1.8 N•m or less, use is possible

Calculation example (2): Workpiece insertion
Model No.: RLSH-A20D1N, where load W_1 of 30 N is applied to L: 40 mm
$M_1 = W_1 \times L = 30 \times 40 \times 10^{-3} = 1.2$ N•m, M1max=1.8 N•m or less, use is possible

Repeatability

The repeatability here indicates the displacement of the workpiece position deviation in the case of repeated clamping and unclamping under the same conditions (gripper fixed, same workpiece used, etc. Refer to right).

Conditions
- Workpiece dimensions, shape, weight
- Workpiece transfer position
- Clamp method, length
- Workpiece and workpiece receiving surface resistance
- Fluctuation of gripping power (air pressure), etc.



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.)

❶ 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.
❷ 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.

❶ Inspect and service the machine and devices after confirming safety of all systems related to this product.
❷ Note that there may be hot or charged sections even after operation is stopped.
❸ 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.
❹ 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: (DANGER) When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries, and when there is a high degree of emergency to a warning.

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

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

Warranty

1 Warranty period

The product specified herein is warranted for one (1) year from the date of delivery to the location specified by the customer.

2 Warranty coverage

If the product specified herein fails for reasons attributable to CKD within the warranty period specified above, CKD will promptly provide a replacement for the faulty product or a part thereof or repair the faulty product at one of CKD's facilities free of charge.
However, following failures are excluded from this warranty:

1) Failure caused by handling or use of the product under conditions and in environments not conforming to those stated in the catalog, the Specifications, or the Instruction Manual.
2) Failure caused by use of the product exceeding its durability (cycles, distance, time, etc.) or caused by consumable parts.
3) Failure not caused by the product.
4) Failure caused by use not intended for the product.
5) Failure caused by modifications/alterations or repairs not carried out by CKD.
6) Failure caused by reasons unforeseen at the level of technology available at the time of delivery.
7) Failure caused by acts of nature and disasters beyond control of CKD.

The warranty stated herein covers only the delivered product itself. Any loss or damage induced by failure of the delivered product is excluded from this warranty.
Note: For details on the durability and consumable parts, contact your nearest CKD sales office.

3 Compatibility check

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

Pneumatic components

Safety Precautions

Be sure to read this section before use.
Refer to Pneumatic Cylinders (CB-030SA) for general information of the cylinder and cylinder switches.

Regulations on robot safety

Laws and regulations on robot safety. Please read the following standards carefully before use.

ISO 10218, JIS B 8433 (Robots and robotic devices)
ISO/TS 15066 (Robots and robotic devices)

Product-specific cautions: Grippers for collaborative robots

Design/selection

⚠WARNING

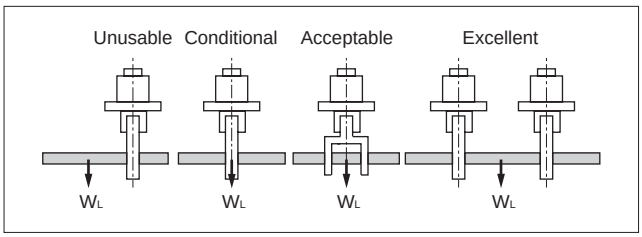
■ If a moving workpiece poses a danger to the human body, or if there is a possibility of human fingers being pinched by the fingers of the gripper or attachment, take safety precautions such as by installing a protective cover.

■ If the circuit pressure drops due to power failure or air source trouble, the gripping power may decrease and the workpiece may fall. Provide position locking measures, etc., so that personnel are not injured or machines damaged.

⚠CAUTION

■ Working 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.
- Exposed to coolant (because the sliding section is abraded by abrasive or polishing debris in the liquid)
- When the atmosphere contains organic solvents, chemicals, acids, alkalis, kerosene, etc.
- Exposed to water

■ When gripping long or large workpieces, stable gripping requires a grip on the center of gravity. Stability is a must when using larger or multiple workpieces as well.

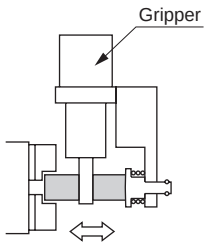


■ Select a model with sufficient power to grip the workpiece weight.

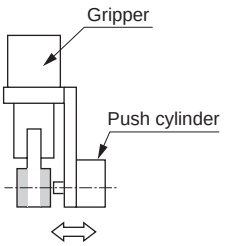
■ Select a model with sufficient opening/closing width for the workpiece size.

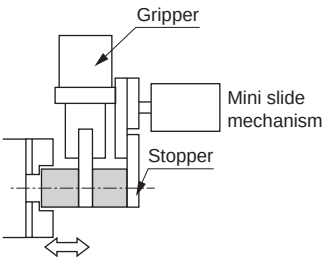
■ When inserting the workpiece directly to the jig using a gripper, take the clearance into consideration during design. Otherwise the gripper may be damaged.

● Push-in jig with ejector



● When using push cylinder





Note) Since the workpiece slides over the top of the attachment, it may significantly shorten the service life of the gripper. The shape of the attachment should be sufficiently considered.

■ If the attachment is not rigid enough, the resulting sag could cause the finger to twist or adversely affect operation.

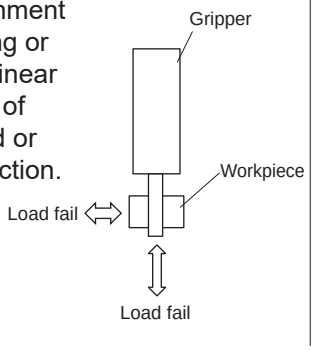
■ Adjust the gripper open/close speed with the speed controller.
When used at high speed, backlash may occur sooner. Also, the workpiece may vibrate due to the impact of opening and closing, which may result in gripper errors, workpiece insertion failures, or poor repeatability.

■ 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

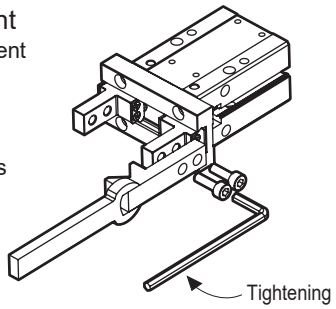
■ Be sure not to apply an excessive load to the fingers and attachment when attaching and detaching or conveying workpieces. The linear guide rolling contact surface of the fingers may be scratched or dented, resulting in a malfunction.



■ Mounting the attachment

When mounting the attachment to the finger, to prevent any effect on the gripper, support with a wrench, etc., when tightening so that the finger is not twisted.

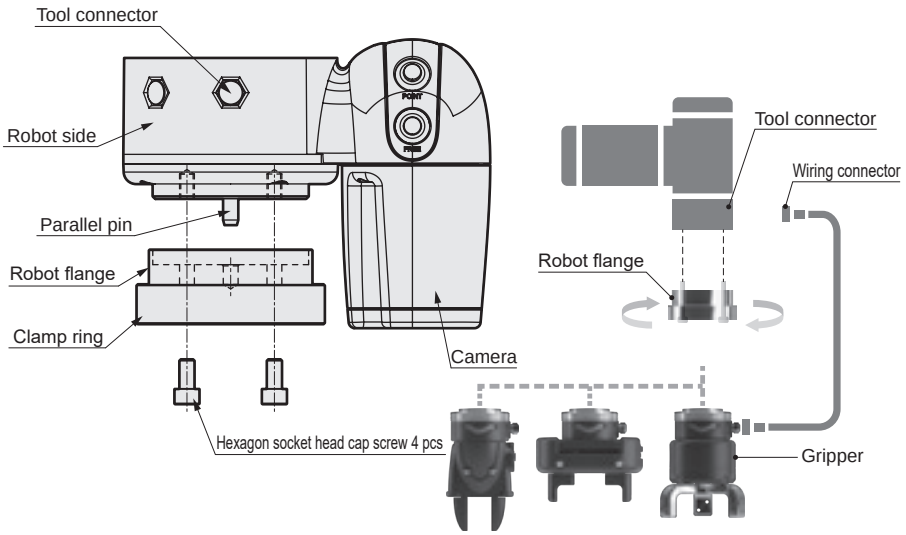
Do not apply load to the body.



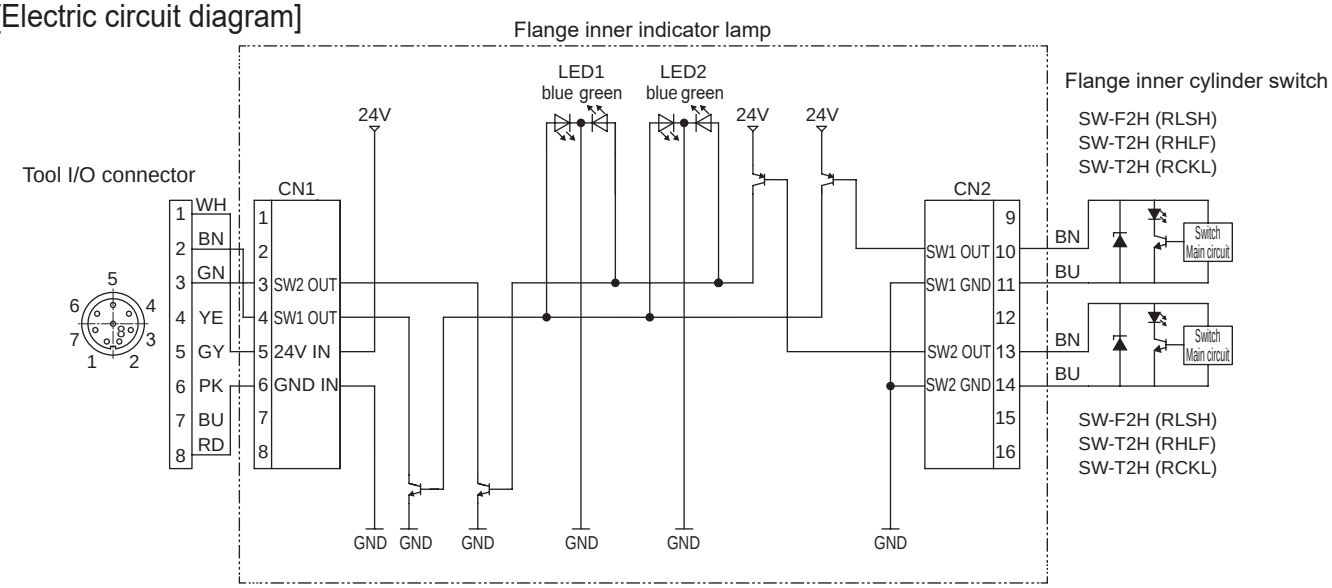
Item	Bolt used	Tightening torque (N•m)
RLSH-A20D1N	M4 × 0.7	1.4
RHLF-16CS	M4 × 0.7	1.4
RCKL-40CS	M5 × 0.8	2.8

[Mounting method]

(1) When mounting the gripper, make sure that the LED lamp is parallel to the camera. Install the parallel pin on the connector side.
(2) Loosen the clamp ring and remove the robot flange from the gripper. After inserting the parallel pin (included) on the robot flange side, mount the robot flange to the robot with 4 hexagon socket head cap screws (included). Note: Tightening torque = 7 N•m
(3) Install the gripper on the robot flange and tighten the clamp ring to install. Note: Strongly tighten the clamp ring by turning with your hand and check that it is not loose.
(4) Connect the gripper connector to the robot tool connector.



[Electric circuit diagram]



[Switch specifications]

Item	Proximity 2-wire	
	F2H	T2H
Applications	Dedicated for programmable controller	
Load voltage/current	10 to 30 VDC 5 to 20 mA	
Leakage current	1 mA or less	
Impact resistance	980 m/s^2	
Weight g	10	18

Grippers for collaborative robots

Directional control valve (option)

Attachment V (directional control valve/tube) when Item Ⓑ is selected

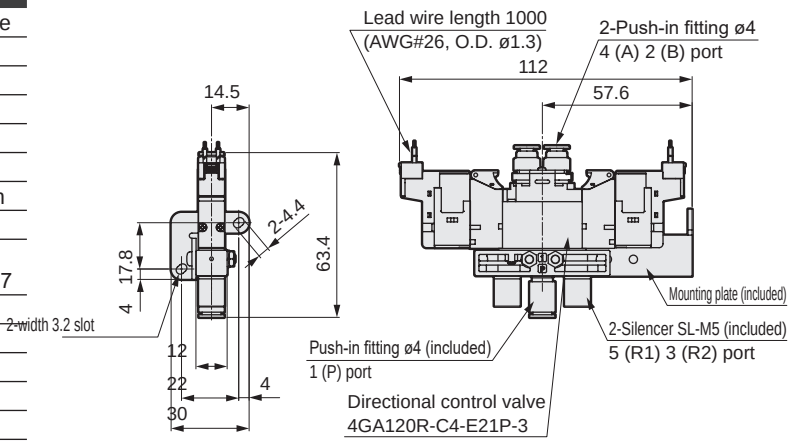
Directional control valve model No.
4GA120R-C4-E21P-FLA28482-3-ST

Refer to "Pneumatic Valves (No. CB-023SA)" for products with other specifications.

Specifications

Item	Description
Valve and operation	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 to 55
Manual override	Non-locking/locking common
Response time ms	9
Flow characteristics C[dm^3/(s·bar)], b	P → A/B: C=1.2, b=0.47 A/B → R1/R2: C=0.72, b=0.37
Rated voltage V	24 VDC
Voltage fluctuation range	±10%
Holding current A	0.017
Power consumption W	0.40
Surge suppressor	Integrated
Indicator	Lamp built in

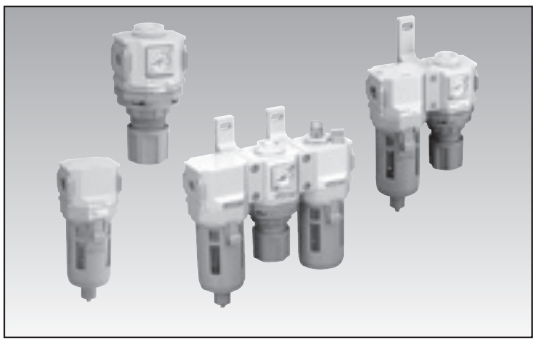
Dimensions



Related products

Modular F.R.L.

Catalog No. CB-024SA



- Compact modular design with unified boundary dimensions of filters, regulators, lubricators, etc.
- Various combinations are possible to suit a variety of applications
- Long service life element
- Simple front surface design

Portable Air Supply Unit ASU-S

Catalog No. CC-1363A

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

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