CKD

New Products

Grippers for collaborative robots
RLSH/RHLF/RCKL-UR Series

CKD Corporation

CC-1488A 3

UNIVERSAL ROBOTS
Certified Grippers

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

Pneumatic grippers with high compatibility with collaborative robots
Collaborative robots gripper RLSH/RHLF/RCKL-UR Series is air driven, so it is compact and lightweight with high gripping power. Easy setup supports the introduction of collaborative robots for all customers.

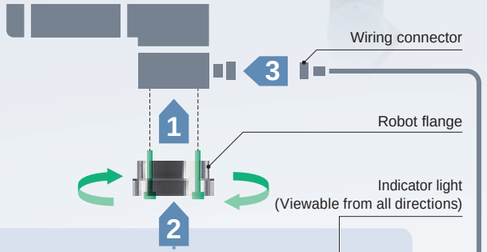
Green Power
Collaborative Robot Grippers are manufactured with 100% RENEWABLE ENERGY. (Certified by Green Power)

Winner of the 2020 Good Design Award

Attaches to 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!



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.

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

RLSH Series
Compact

Stroke	:18 mm
Gripping force	:42 N*
Mass	:0.8 kg

Does not interfere with robot trajectory
Compact body

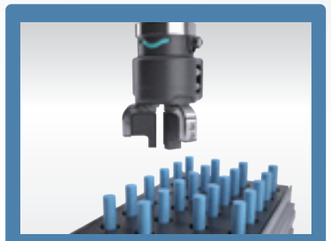
RHLF Series
Long stroke

Stroke	:32 mm
Gripping force	:85 N*
Mass	:1.0 kg

Low profile
Thin long stroke

RCKL Series
3-Way Finger

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



Optimal 3-way fingers
for cylindrical and spherical workpieces

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

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)

*Select option “F”

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.

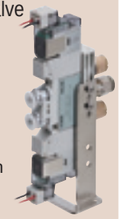
Total support for air systems

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/en/)

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.

Grippers for collaborative robots Compact

RLSH -UR 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		ø4Push-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 (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

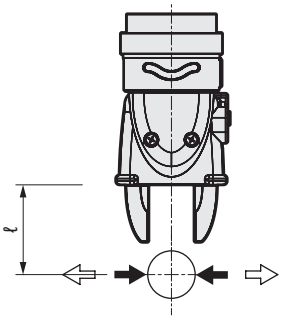
- F: Ⓐ Robot flange
- Y2V: Ⓑ Accessories
- UR: UNIVERSAL ROBOTScertification

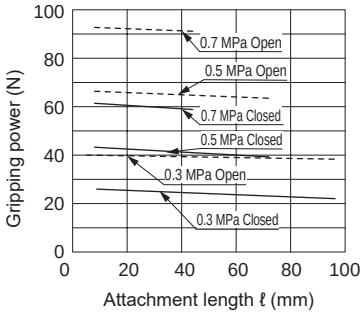
Code	Description
Ⓐ Robot flange	
Blank	Without robot flange
F	With robot flange (*1)
Ⓑ Accessories	
Blank	No accessories
Y2	Test attachment (*2)
V	Directional control valve/tube (*3)

*1: Robot flange mounting bolt,USBWith memory
*2: Use it for grip tests as it is made of resin. (Weight is1per book25g)
*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.

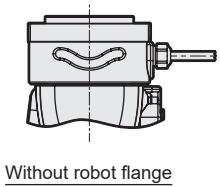
Gripping power performance data

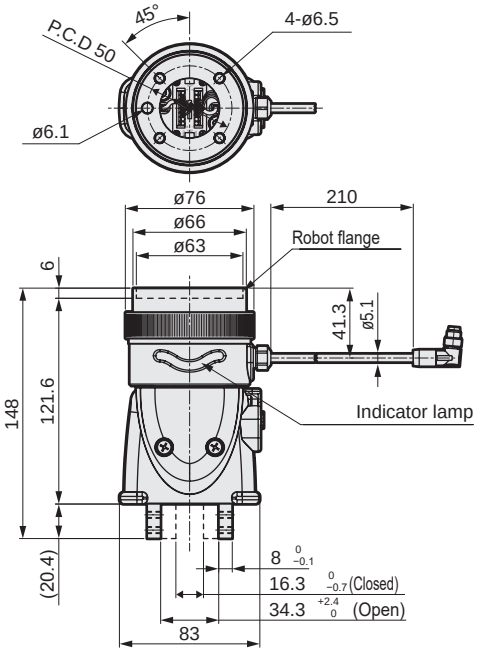
- The gripping force represents the thrust in the direction of the arrow shown in the figure (for one finger).
- Indicates the gripping force operating in the opening and closing directions for the length (ℓ) of the attachment of the gripper when the supply pressure is 0.3, 0.5, and 0.7 MPa.
  - Open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

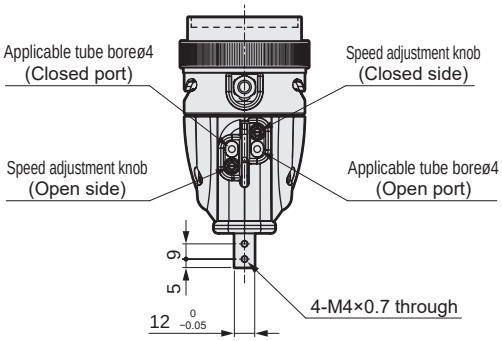




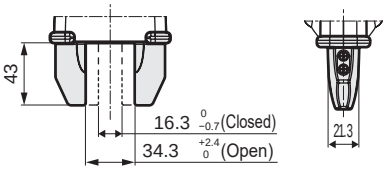
Dimensions







Dimensions when attachment is installed



Grippers for collaborative robots Long stroke

RHLF -UR 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		T2HWith (redLED ONlit when in use)

Note: For attachments manufactured to match workpieces,5Refer to page.

How to order

RHLF - 16CS - F Y2V - UR

- F: Ⓐ Robot flange
- Y2V: Ⓑ Accessories
- UR: UNIVERSAL ROBOTScertification

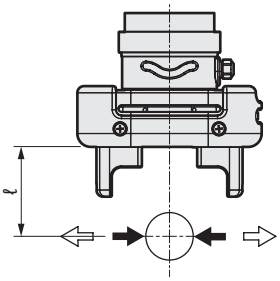
Code	Description
Ⓐ Robot flange	
Blank	Without robot flange
F	With robot flange (*1)
Ⓑ Accessories	
Blank	No accessories
Y2	Test attachment (*2)
V	Directional control valve/tube (*3)

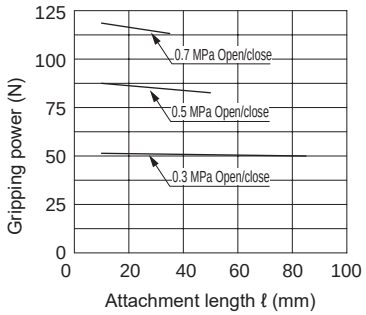
*1: With robot flange mounting bolts
*2: Because it is made of resin, use it for gripping tests. (Mass is 30g per piece)
*3: Directional control valve has ø4 push-in fitting (air supply port, A/B port), silencer (R1/R2 port) and mounting plate. Tube outer diameter ø4, length 2.5m×2. For more information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

Gripping power performance data

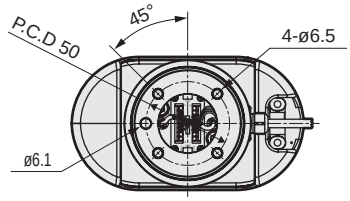
- The gripping force represents the thrust in the direction of the arrow shown in the figure (for one finger).
- Indicates the gripping force operating in the opening and closing directions for the length (ℓ) of the attachment of the gripper when the supply pressure is 0.3, 0.5, and 0.7 MPa.

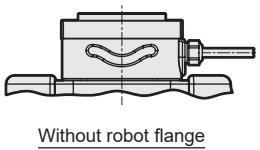
• Open direction(⇦), closed direction (➡) ——— (shown with continuous line)

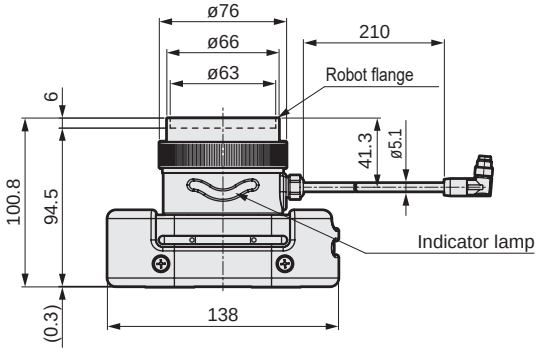


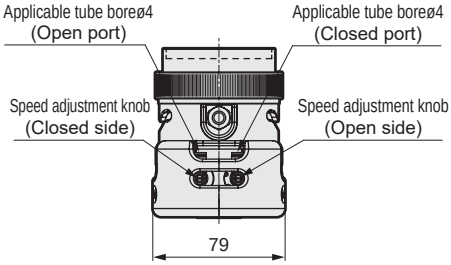


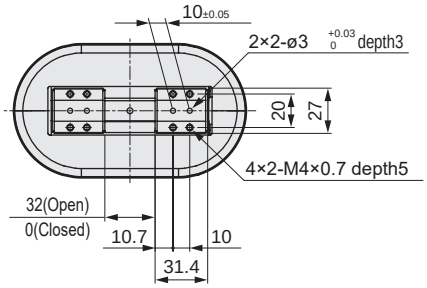
Dimensions



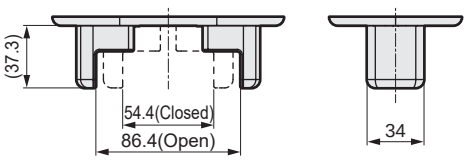

Without robot flange







Dimensions when attachment is installed



Grippers for collaborative robots 3-way finger type

RCKL -UR 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		ø4Push-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 (Lights up when red LED is ON)

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

How to order

RCKL - 40CS - F Y3V - UR

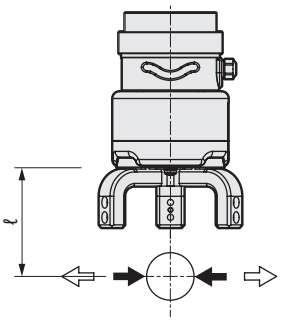
- F: Ⓐ Robot flange
- Y3V: Ⓑ Accessories
- UR: UNIVERSAL ROBOTScertification

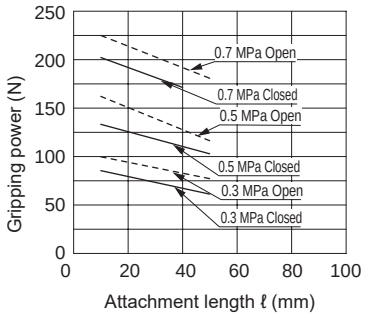
Code	Description
Ⓐ Robot flange	
Blank	Without robot flange
F	With robot flange (*1)
Ⓑ Accessories	
Blank	No accessories
Y3	Attachment (*2)
V	Directional control valve/tube (*3)

*1: Robot flange mounting bolt,USBWith memory
*2: Made-to-order product, aluminum. (Weight is1per book50g)
*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.

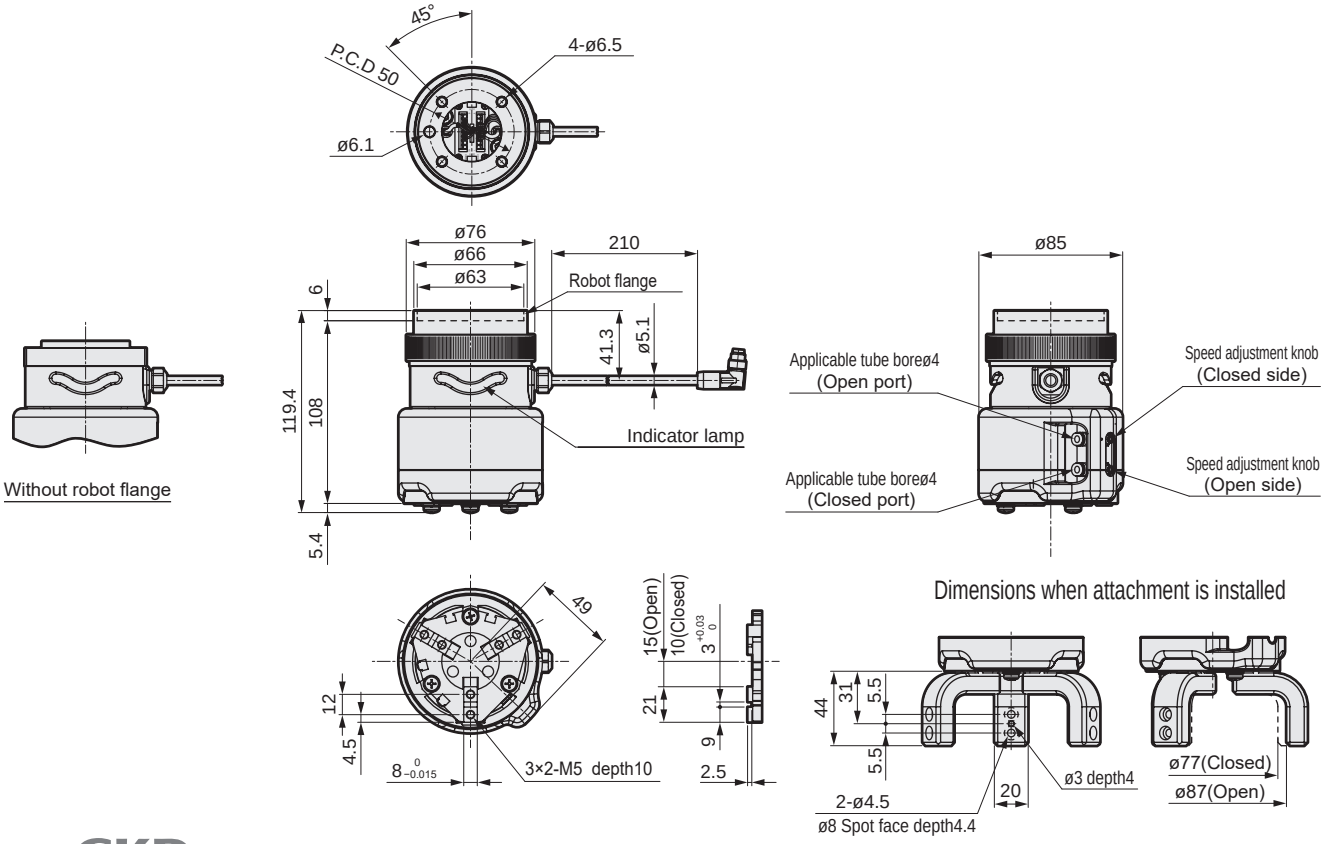
Gripping power performance data

- The gripping force represents the thrust in the direction of the arrow shown in the figure (for one finger).
- 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.
  - Open direction(⇦) ---------- (Broken line)
  - Close direction(➡) ———— (shown with continuous line)





Dimensions



Included CKD Pneumatic Gripper Software Operation Method

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. *When option “F” is selected

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

Set the digital I/O for the directional control valve opening and closing the gripper. Setting is possible while checking the actual open/close status via the graphic display, enabling easy confirmation that the signals are not reversed. To prevent workpieces from falling when the directional control valve signal is shut OFF, use a two-position double solenoid.

Directional control valve digital I/O settings
Set the digital I/O for open/close and the activating directional control valve.

Test button
Open/close action and I/O setting accuracy can be confirmed.

Graphic display
The gripper open/close status and built-in cylinder switch operational status are displayed with color changes.

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.

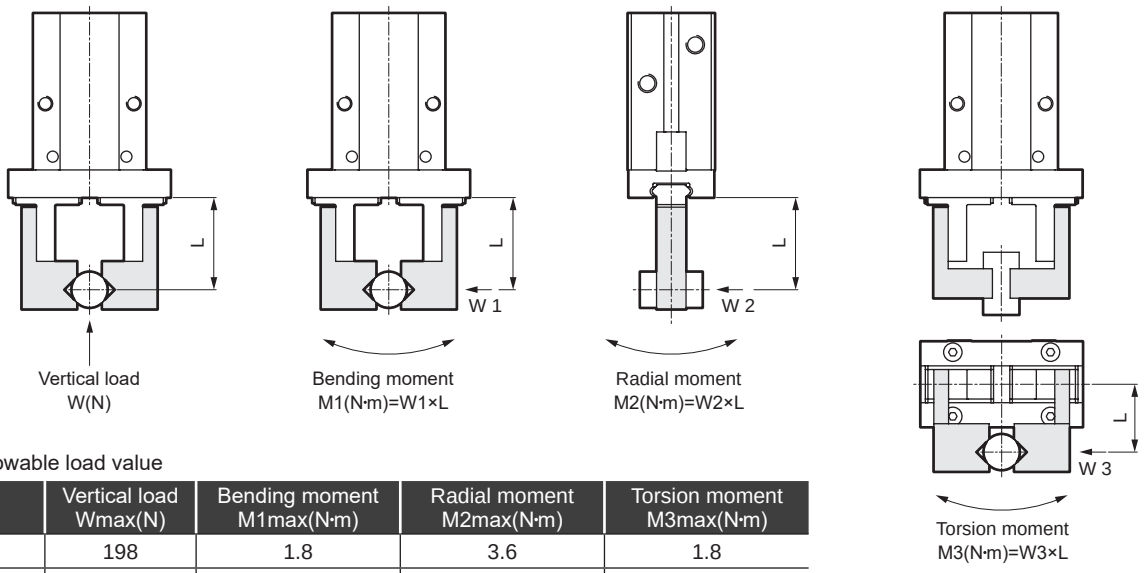
Attachments

- Use the attachments that are as short and lightweight as 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 the length as shown below.
  Example: For an L-shape, when the finger direction is 30 mm and 90 mm after bending 30 degrees, the length of the attachment should be 60 mm
- The length of the attachment should be within the value of the gripping force performance data.
- The weight of the attachment affects durability, so follow the table below.

Model	Attachment1Weight per unitW
RLSH	W < 80g
RHLF	W < 100g
RCKL	W < 95g

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.
(* When using it for conveying, consider the impact to the terminal.)



[Table1]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

• Sample calculation for external forces applied to the fingers

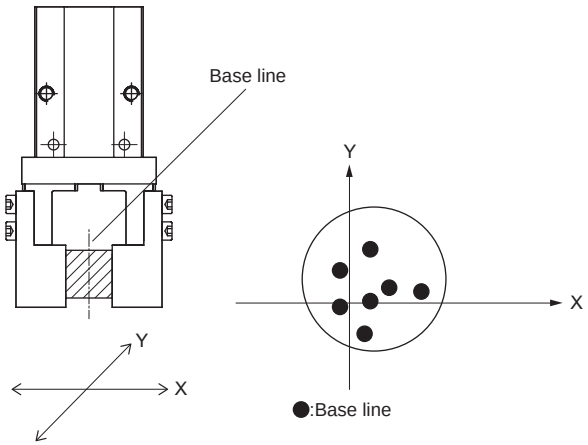
Sample calculation (1): When conveying a workpiece
Model No.: RLSH-A20D1N, attachment (weight m_k: 0.07kg, center of gravity distance L_kWhen a workpiece (weight m=0.7kg, center of gravity distance L=40mm) is gripped and transported at = 30mm)
(g: Gravity acceleration 9.8m/s^2, α: Coefficient of impact generated at end = 3)
M_1= α × W_1×L = α× (m_k×g×L_k×2+m×g×L)
= 3 × (0.07 × 9.8 × 30 × 10^{-3}×2 + 0.7 ×9.8 ×40 ×10^{-3}≈ 0.95N·m, M1Can be used since it is max=1.8N·m or less

Sample calculation (2): When inserting a workpiece
Model No.: RLSH-A20D1N, L=40mm for load W_1: When 30 N is added
M_1=W_1×L=30×40×10^{-3}= 1.2N·m and M1max= 1.8N·m or less, so 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: 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: If handled incorrectly, a dangerous situation may occur, resulting in death or serious injury.

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

Laws and regulations on robot safety

Thoroughly read the regulations below 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

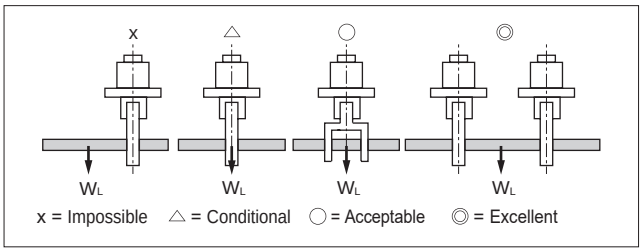
■ Usage environment

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.

- Exposed to cutting oil (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

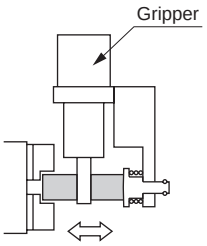


■ Select a model with a sufficient gripping force according to the mass of the workpiece.

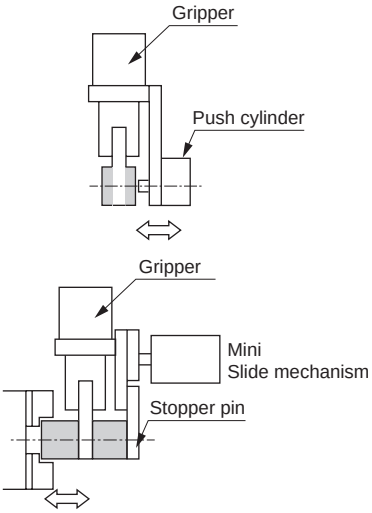
■ Select a model with sufficient opening/closing width for the workpiece size.

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

● Press the jig by ejecting



● When using a 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 fingers may twist due to deflection, which may have a negative impact on operation.

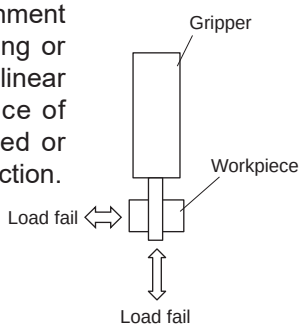
■ Adjust the gripper opening/closing speed using the speed controller.
When used at high speed, backlash may occur sooner. Also, the workpiece may vibrate due to the impact of opening and closing, which may result in gripper errors, workpiece insertion failures, or poor repeatability.

■ 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

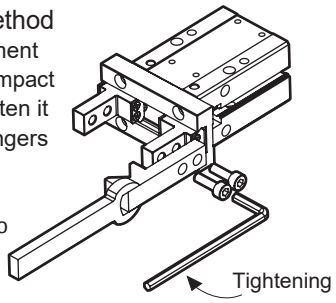
⚠CAUTION

■ 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.

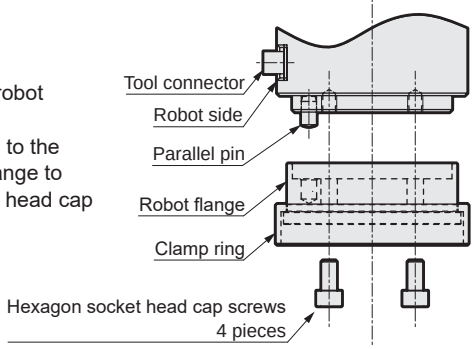


Item	Bolt used	Tightening torque (N·m)
RLSH-A20D1N	M4×0.7	1.4
RHLF-16CS	M4×0.7	1.4
RCKL-40CS	M5×0.8	2.8

[Mounting method]

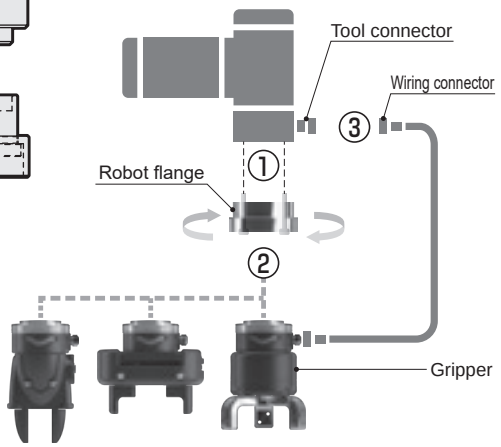
① Mounting the robot flange

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 N•m



② Mounting the gripper

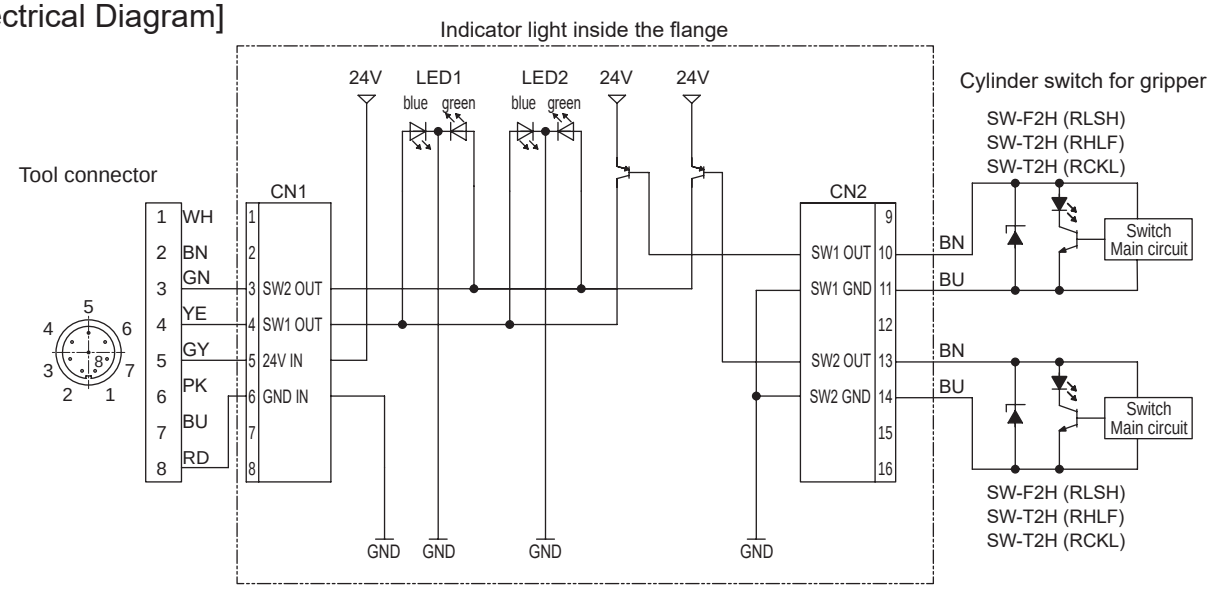
Mount the gripper on the robot flange and tighten the clamp ring to install.
Note: Turn the clamp ring forcefully by hand to tighten it, and check that it is not loose.



③ Connector connection

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

[Electrical Diagram]



[Switch specifications]

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

Grippers for collaborative robots

Directional control valve (Option)

When Code Ⓑ attachment V is selected (directional control valve / tube)

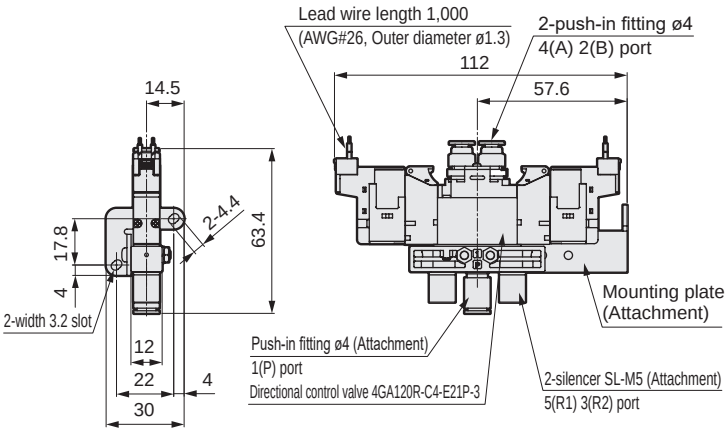
Directional control valve model No.
4GA120R-C4-E21P-FLA28482-3-ST

Refer to “Pneumatic Valves (No.CB-023SA)” 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 C [$dm^3/(s{\cdot}bar)$], 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	Built-in
Indicator	Built-in lamp

Dimensions

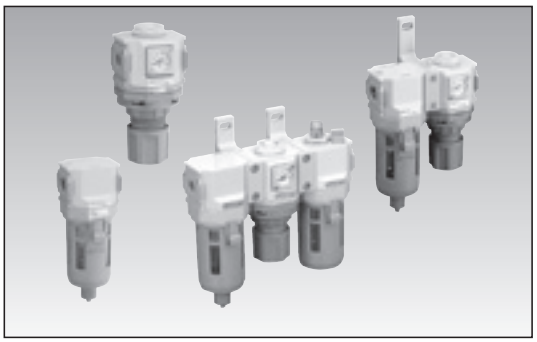


Related products

Modular type selex FRL

Catalog No. CB-024SA

- 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



Portable air supply unit ASU-S

Catalog No. CC-1363A

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

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 and/or manufacture of weapons for mass destruction.

CKD Corporation

[Website]
https://www.ckd.co.jp/en/

Head Office・Plant	2-250, Ouji, Komaki, Aichi 485-8551	TEL(0568)77-1111	FAX(0568)77-1123
Equipment Sales Div.	2-250, Ouji, Komaki, Aichi 485-8551	TEL(0568)74-1303	FAX(0568)77-3410
Overseas Sales Dept.	2-250, Ouji, Komaki, Aichi 485-8551	TEL(0568)77-1338	FAX(0568)77-3461
Tokyo Office	4F, Bunkahousou Media Plus, 1-31-1, Hamamatsu-cho, Minato-ku, Tokyo 105-0013	TEL(03)5402-3620	FAX(03)5402-0120
Osaka Office	6F, PMO EX Shin-Osaka, 4-2-10 Miyahara, Yodogawa-ku, Osaka 532-0003	TEL(06)6152-9415	FAX(06)4866-5391

2022.1