CKD

New Products

Grippers for Collaborative Robots

RLSH/RHLF/RCKL-FN Series

FANUC Robot

CRX Series Compatible Gripper

Green Power

CKD Corporation

CC-1525A 1

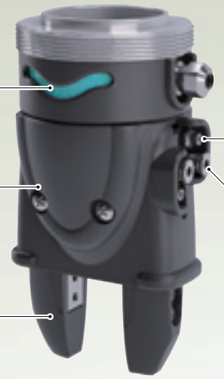
FANUC Robot
CRX Series Compatible Gripper
CRX-10iA, CRX-10iA/L compatible

Air Grippers: High affinity for Collaborative Robots

RLSH/RHLF/RCKL-FN Series Pneumatic Gripper's air drive offers high gripping power while being light and compact. Easy setting enables use with any customer's collaborative robot.

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

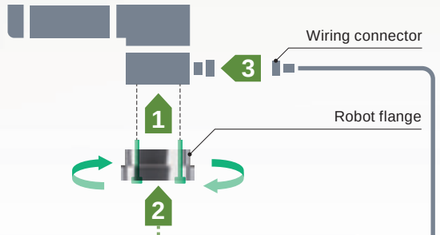
Winner of the 2020 Good Design Award



Mountable on robots in just 2 minutes

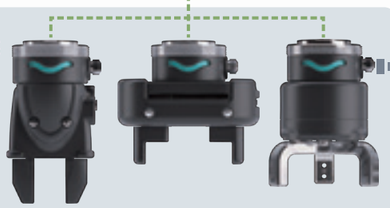
1. Mount dedicated flange on the robot
2. Turn the clamp ring to mount gripper
3. Connect the wiring connector

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.



3 models in the lineup to match your applications

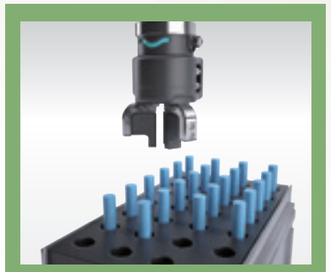
RLSH Series
Compact
Stroke : 18 mm
Gripping power : 42 N*
Weight : 0.8 kg

Compact body avoids interference with robot trajectory

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

Low profile long stroke keeps height low

RCKL Series
3-Way Finger
Stroke : 10 mm
Gripping power : 125 N*
Weight : 1.1 kg

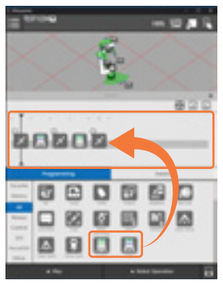


3-way finger ideal for round and cylindrical workpieces

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

Teaching time reduced to 1/10

The CKD Pneumatic Gripper plug-in software compatible with the FANUC Robot CRX Series enables dramatic reductions in teaching time with simple setting procedures and intuitive operation.



Drag and drop the command icons to create programs for the robot.

Set the digital I/O while viewing the gripper open/close status via graphic display.

Confirm the load setting information required for robot operation and designate load setting numbers while teaching the gripper to open/close.

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 -FN 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 - FN

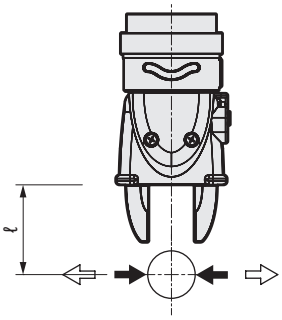
- F: Ⓐ Robot flange
- Y2V: Ⓑ Accessories
- FN: FANUC Robot CRX Series compatible

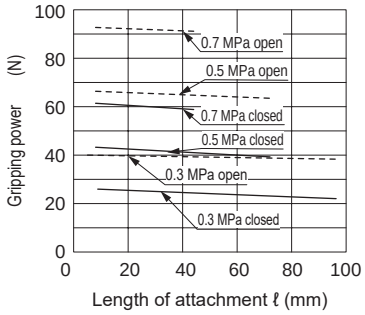
Code	Description
Ⓐ Robot flange	
Blank	Without robot flange
F	With robot flange (*1)
Ⓑ Accessories	
Blank	No accessories
Y2	Test attachment (*2)
V	Directional control valve/tube (*3)

*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.

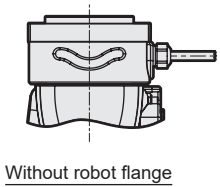
Gripping power performance data

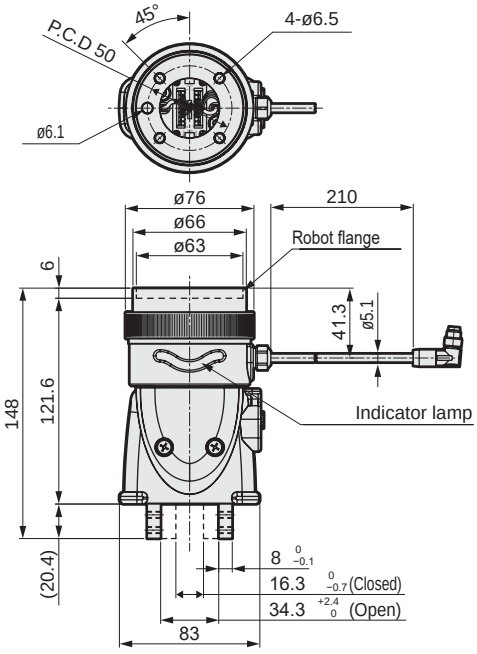
- The gripping force represents the thrust in the direction of the arrow shown in the figure (for one finger).
- The gripping force acting in the opening and closing directions of the gripper's attachment length ℓ when the supply pressure is 0.3, 0.5 and 0.7 MPa.
  - Open direction(⇦) ---------- (Broken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

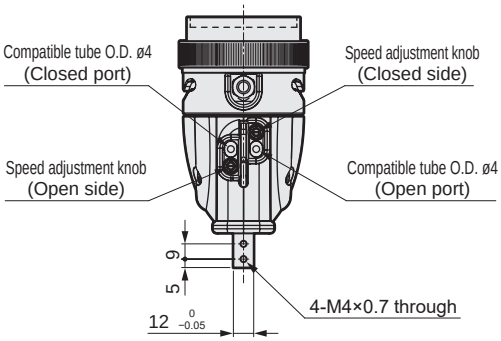




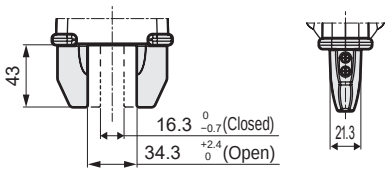
Dimensions







Dimensions when attachment is installed



Grippers for collaborative robots Long stroke

RHLF -FN 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 - FN

- F: Ⓐ Robot flange
- Y2V: Ⓑ Accessories
- FN: FANUC Robot CRX Series compatible

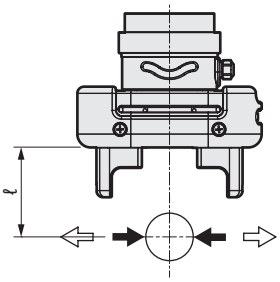
Code	Description
Ⓐ Robot flange	
Blank	Without robot flange
F	With robot flange (*1)
Ⓑ Accessories	
Blank	No accessories
Y2	Test attachment (*2)
V	Directional control valve/tube (*3)

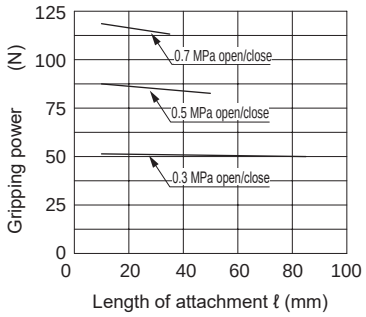
*1: Robot flange mounting bolts included
*2: Use it for grip tests as it is made of resin. (Weight: 30 g per piece)
*3: Directional control valve has ø4 push-in fitting (air supply port, A/B port), silencer (R1/R2 port) and mounting plate. Tube outer diameter ø4, length 2.5m×2. For more information on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

Gripping power performance data

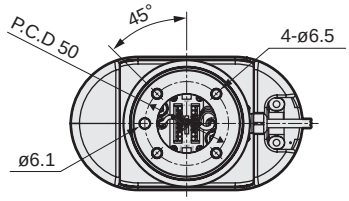
- The gripping force represents the thrust in the direction of the arrow shown in the figure (for one finger).
- The gripping force acting in the opening and closing directions of the gripper's attachment length ℓ when the supply pressure is 0.3, 0.5 and 0.7 MPa.

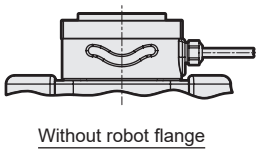
• Open direction(⇦), closed direction (➡)——————(shown with continuous line)

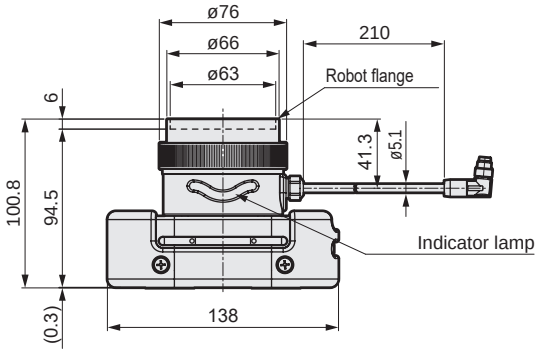


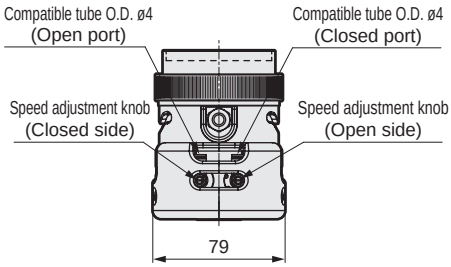


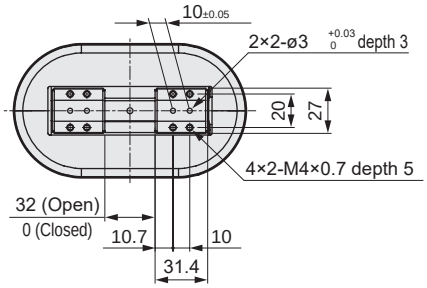
Dimensions



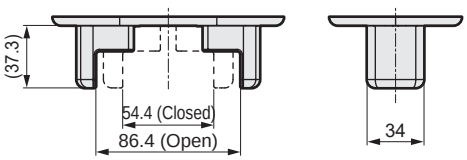








Dimensions when attachment is installed



Grippers for collaborative robots 3-way finger type

RCKL -FN 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 - FN

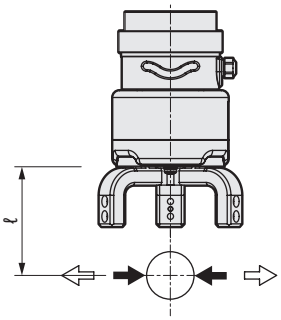
- F: Ⓐ Robot flange
- Y3V: Ⓑ Accessories
- FN: FANUC Robot CRX Series compatible

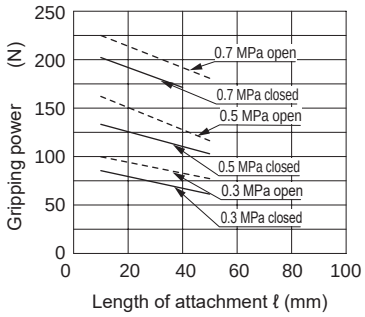
Code	Description
Ⓐ Robot flange	
Blank	Without robot flange
F	With robot flange (*1)
Ⓑ Accessories	
Blank	No accessories
Y3	Attachment (*2)
V	Directional control valve/tube (*3)

*1: Robot flange mounting 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.

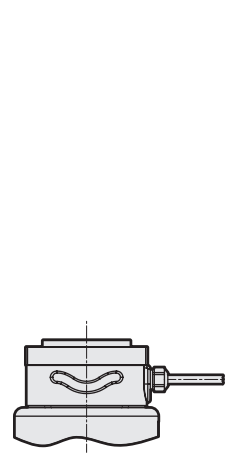
Gripping power performance data

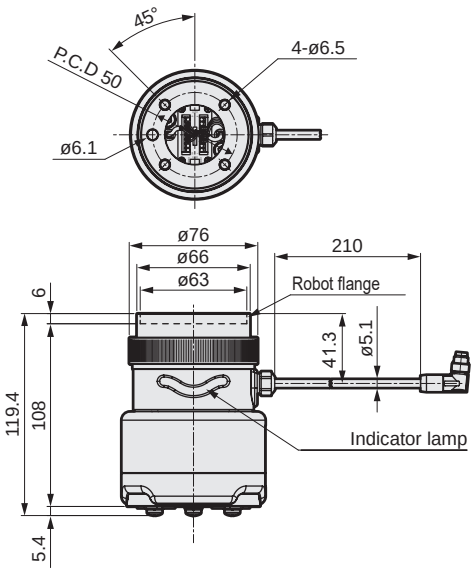
- The gripping force represents the thrust in the direction of the arrow shown in the figure (for one finger).
- The gripping force acting in the opening and closing directions of the gripper's attachment length ℓ when the supply pressure is 0.3, 0.5 and 0.7 MPa.
  - Open direction(⇦) ---------- (Broken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

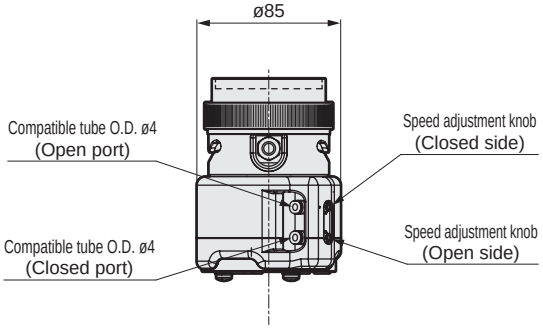


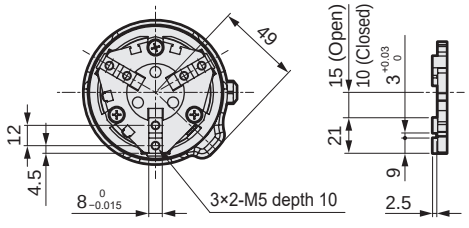


Dimensions

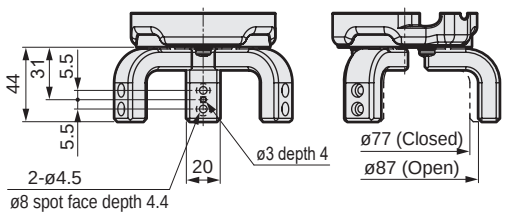








Dimensions when attachment is installed



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

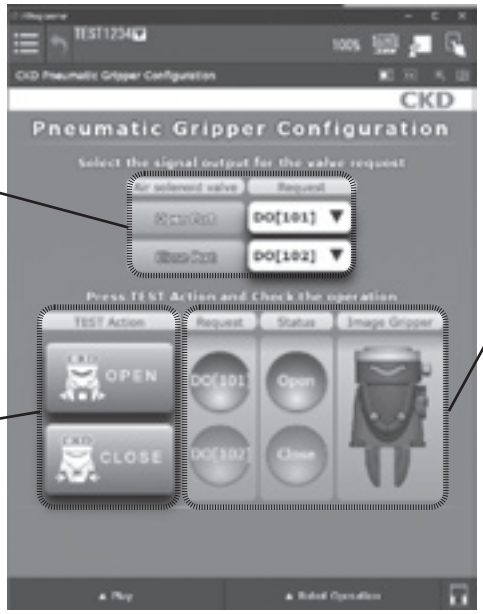
Download the FANUC Robot CRX Series-dedicated Plug & Play software package from the CKD website (https://www.ckd.co.jp/en/) and install the file according to the directions in the Instruction Manual.

Installation setting 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 setting
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.

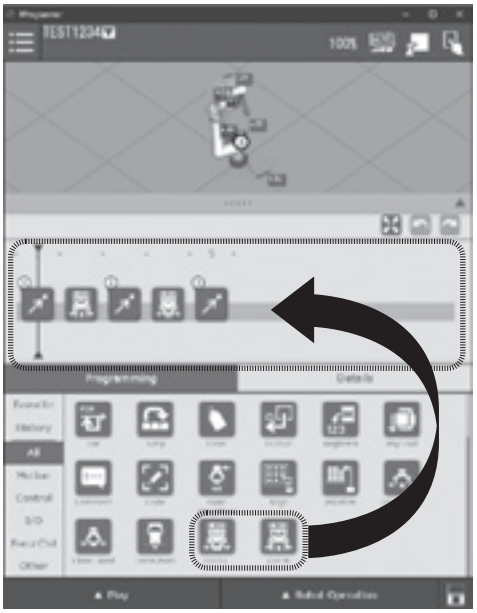


Graphic display
The gripper open/close status and built-in cylinder switch operational status are displayed with color changes.

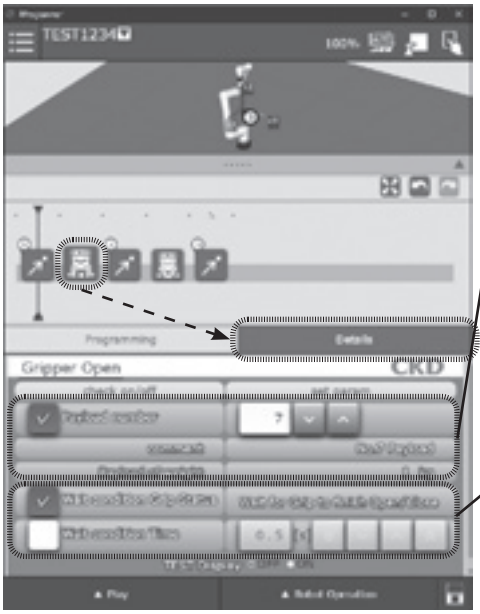
Program screen

Drag and drop the command icons to create programs for the robot. Detailed program setting is possible with each icon.

· Program creation



· Detailed parameter setting



Load setting
Load setting after gripper operation is possible. Designate the load number registered in the robot body to set a combination of total weight, center of gravity position, and inertia.

Standby conditions
The conditions for moving to the next operation after gripper operation can be set. As the standby condition, "Gripper operation finished" can be set.

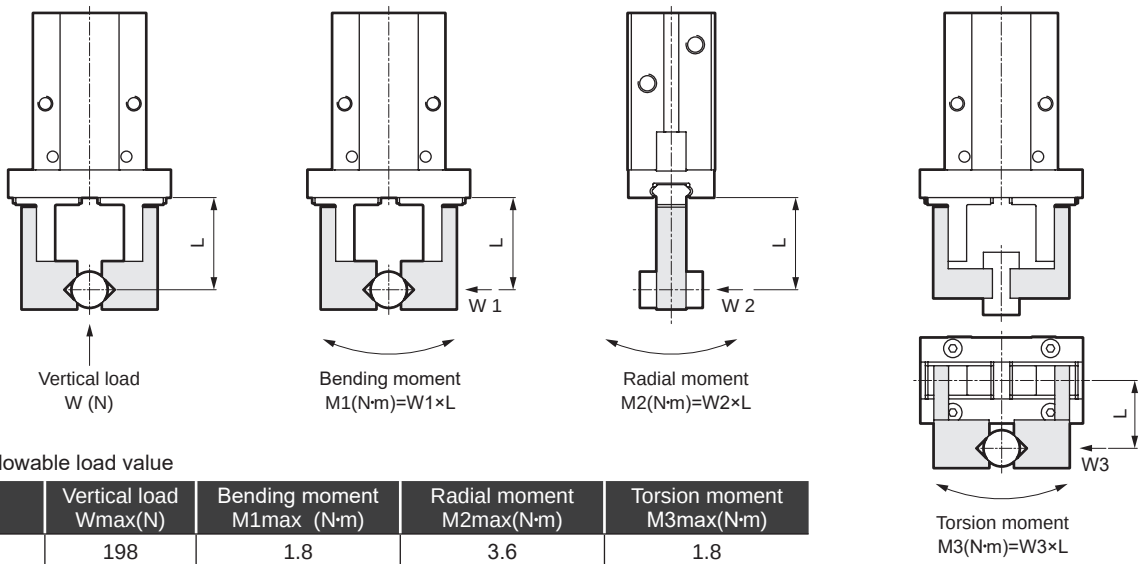
Attachments

●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	Weight per attachment (W)
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.)



[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

• Sample calculation for external forces applied to the fingers

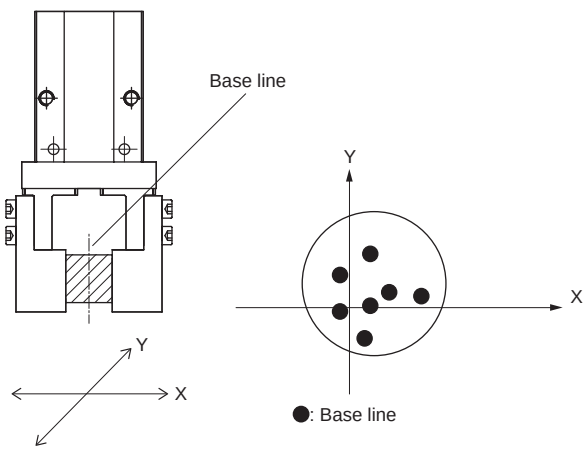
Sample calculation (1): When conveying a workpiece
Model No.: RLSH-A20D1N, attachment (weight m_k: 0.07kg, center of gravity distance L_kWhen a workpiece (weight m=0.7kg, center of gravity distance L=40mm) is gripped and transported at = 30mm)
(g: Gravity acceleration 9.8m/s^2, α: Coefficient of impact 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 same conditions (gripper fixed, same workpiece used)Indicates the displacement of the workpiece when clamping and unclamping are repeated in [S: 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.
Refer to Pneumatic Cylinders (CB-030SA) for general information of the cylinder and cylinder switches.

Regulations on robot safety

Thoroughly read the regulations below 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

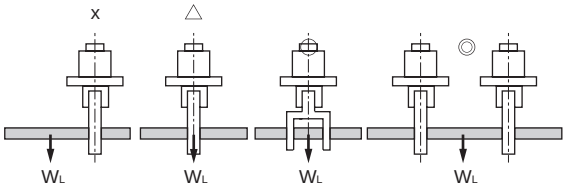
■ Working environment

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 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.



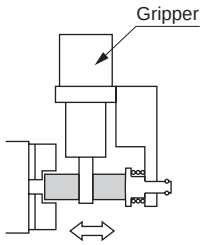
◎: Excellent, ○: Acceptable, △: Conditional, x: NG

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

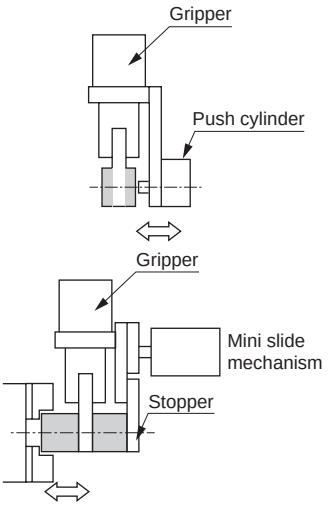
■ Select a model with sufficient opening/closing width for the workpiece size.

■ 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 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.

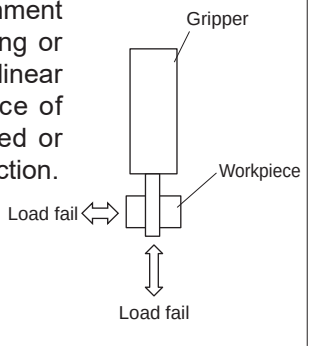
■ If a small-diameter or short-stroke actuator operates at a high frequency, condensation (water droplets) may form inside the piping in certain conditions. Take steps to prevent condensation such as by using a quick exhaust valve.

■ To prevent workpieces from falling when the signal is shut off, use a 2-position double solenoid for the directional control valve.

Mounting, installation and adjustment

⚠ CAUTION

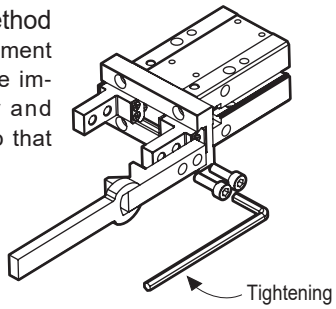
■ Be sure not to apply an excessive load to the fingers and attachment when attaching and detaching or conveying workpieces. The linear guide rolling contact surface of the fingers may be scratched or dented, resulting in a malfunction.



■ 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.

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) Robot flange mounting

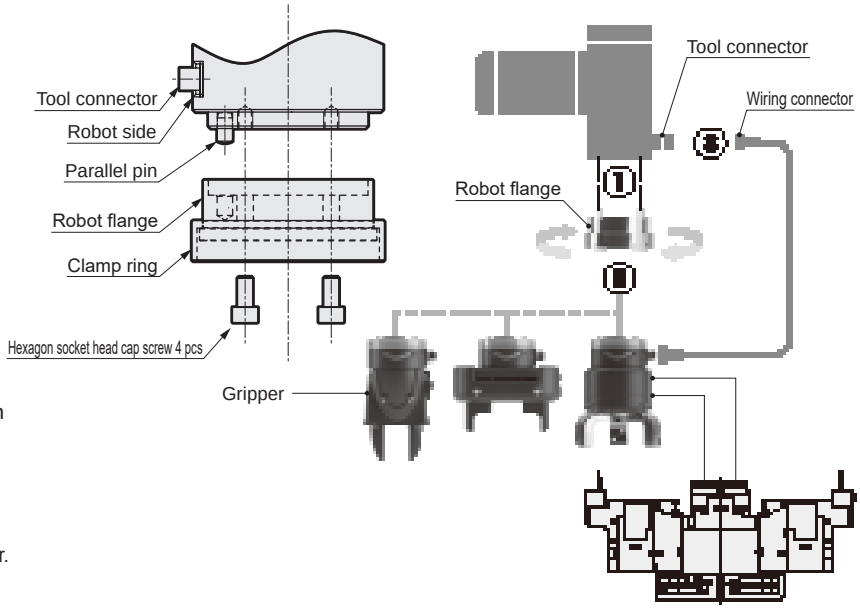
Loosen the clamp ring and remove the robot flange from the gripper.
After inserting the parallel pin (included) into the robot flange surface, install the robot flange to the robot with the 4 hexagon socket head cap screws (included).
Note: Tightening torque = 7N·m

(2) Gripper mounting

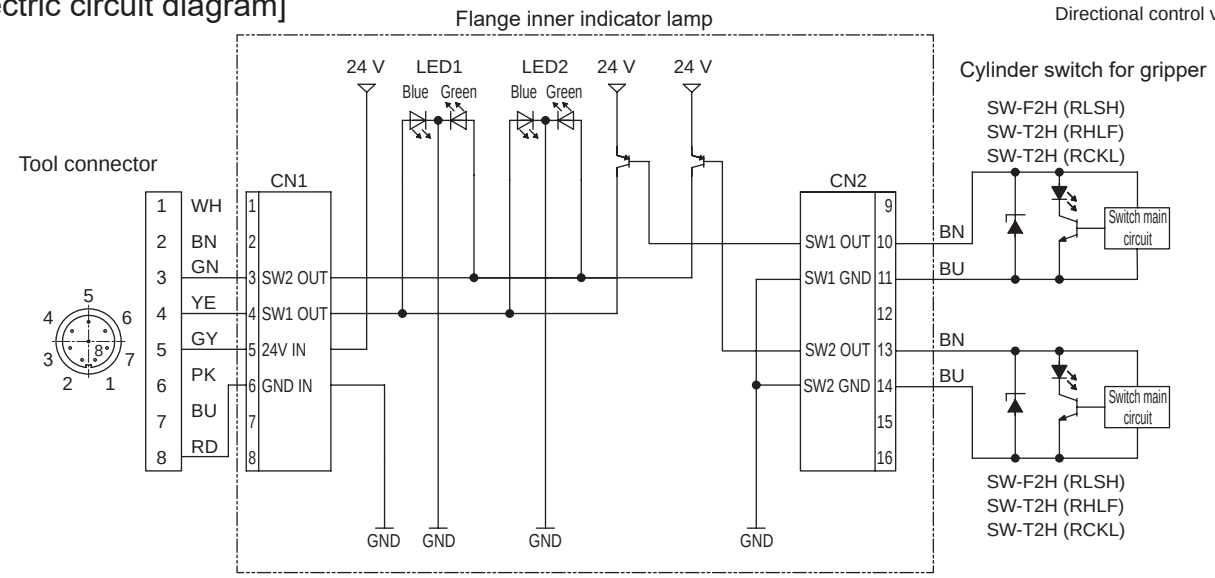
Install the gripper on the robot flange and tighten the clamp ring to install.
Note: Turn the clamp ring forcefully by hand to tighten it, and check that it is not loose.

(3) Connector connection

Connect the gripper connector to the 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)

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

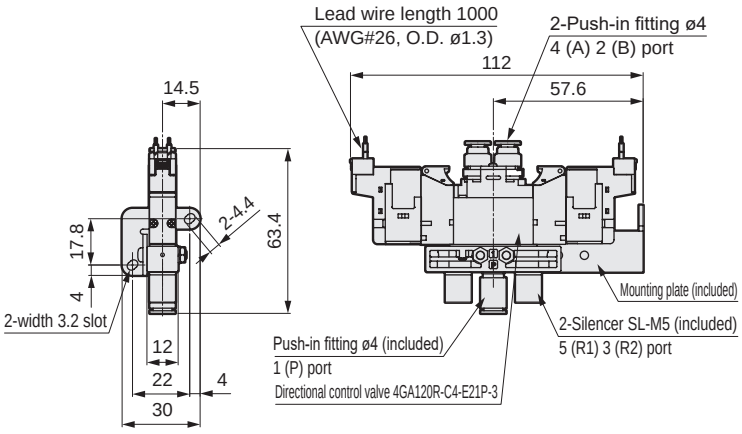
Directional control valve model No.
4GA120R-C4-E21P-FLA28482-3-ST

Refer to "Pneumatic Valves (No. CB-023SA)" for 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	DC24V
Voltage fluctuation range	±10%
Holding current A	0.017
Power consumption W	0.40
Surge suppressor	Integrated
Indicator	Lamp built in

Dimensions

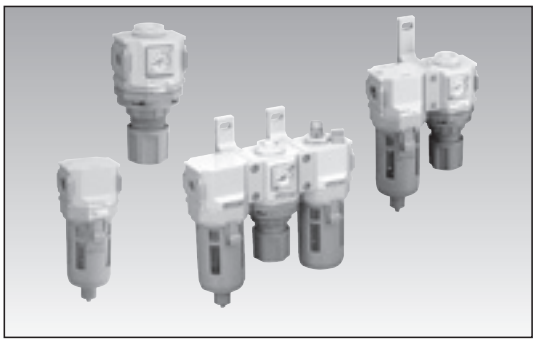


Related products

Modular F.R.L.

Catalog No. CB-024SA

- Compact/modular 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

- Easily 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

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