CKD

Grippers For Collaborative Robot

UNIVERSAL ROBOTS Certified Grippers RLSH Series RHLF Series RCKL Series

INSTRUCTION MANUAL

SM-A28840-A/2



- Read this Instruction Manual before using the product.
- Read the safety notes carefully.
- Keep this Instruction Manual in a safe and convenient place for future reference.



PREFACE

Thank you for purchasing CKD's " RLSH Series / RHLF Series / RCKL Series " Grippers For Collaborative Robot.

This Instruction Manual contains basic matters such as installation and usage instructions in order to ensure optimal performance of the product. Please read this Instruction Manual thoroughly and use the product properly. Keep this Instruction Manual in a safe place and be careful not to lose it. Product specifications and appearances presented in this Instruction Manual are subject to change without notice.

- •The product is intended for users who have basic knowledge about materials, piping, electricity, and mechanisms of pneumatic components. CKD shall not be responsible for accidents caused by persons who selected or used the product without knowledge or sufficient training.
- Since there are a wide variety of customer applications, it is impossible for CKD to be aware of all of them. Depending on the application or usage, the product may not be able to exercise its full performance or an accident may occur due to fluid, piping, or other conditions. It is the responsibility of the customer to check the product specifications and decide how the product shall be used in accordance with the application and usage.

SAFETY INFORMATION

When designing and manufacturing any device incorporating the product, the manufacturer has an obligation to ensure that the device is safe. To that end, make sure that the safety of the machine mechanism of the device, the fluid control circuit, and the electric system that controls such mechanism is ensured.

To ensure the safety of device design and control, observe organization standards, relevant laws and regulations, which include the following:

ISO 10218, ISO 12100, JIS B 8433 ISO/TS 15066 ISO 4414, JIS B 8370, JFPS 2008(the latest edition)

In order to use our products safely, it is important to select, use, handle, and maintain the products properly.

Observe the warnings and precautions described in this Instruction Manual to ensure device safety.

Although various safety measures have been adopted in the product, customer's improper handling may lead to an accident. To avoid this:

<u>Thoroughly read and understand this Instruction Manual</u> <u>before using the product.</u>

To explicitly indicate the severity and likelihood of a potential harm or damage, precautions are classified into three categories: "DANGER", "WARNING", and "CAUTION".

ADANGER Indicates an imminent hazard. Improper handling will cause death or serious injury to people.			
	Indicates a potential hazard. Improper handling may cause death or serious injury to people.		
	Indicates a potential hazard. Improper handling may cause injury to people or damage to property.		

Precautions classified as "CAUTION" may still lead to serious results depending on the situation. All precautions are equally important and must be observed.

Other general precautions and tips on using the product are indicated by the following icon.



Indicates general precautions and tips on using the product.

Precautions on Product Use

The product must be handled by a qualified person who has extensive knowledge and experience.

The product is designed and manufactured as a device or part for general industrial machinery. Use the product within the specifications.

The product must not be used beyond its specifications. Also, the product must not be modified and additional work on the product must not be performed.

The product is intended for use in devices or parts for general industrial machinery. It is not intended for use outdoors or in the conditions or environment listed below.

- In applications for nuclear power, railroad system, aviation, ship, vehicle, medical equipment, and equipment that directly touches beverage or food.
- For special applications that require safety including amusement equipment, emergency shut-off circuit, press machine, brake circuit, and safety measures.
- For applications where life or properties may be adversely affected and special safety measures are required.

(Exception is made if the customer consults with CKD prior to use and understands the specifications of the product. However, even in that case, safety measures must be taken to avoid danger in case of a possible failure.)

Do not handle the product or remove pipes and devices until confirming safety.

- Inspect and service the machine and devices after confirming the safety of the entire system. also, turn off the energy source (air supply or water supply) and power to the relevant facility. Release compressed air from the system and use extreme care to avoid water or electric leakage.
- Since there may be hot or live parts even after operation has stopped, use extreme care when handling the product or removing pipes and devices.
- When starting or restarting a machine or device that incorporates pneumatic components, make sure that a safety measure (such as a pop-out prevention mechanism) is in place and system safety is secured.

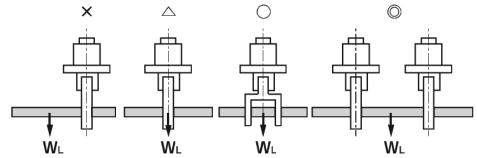
Precautions on Design and Selection

Install a protective cover as a safety measure if the moving workpiece can pose a risk to humans or if human fingers can get caught in the finger and/or the attachment. In the circuit pressure drops due to power failure or air source trouble, the gripping force will decrease and the work-piece may fall. Take measures such as drop prevention to prevent injury or damage to the human body or mechanical equipment.

When using the product in a cutting, casting, or welding plant, install a cover to prevent foreign matters such as cutting fluid, chips, powder, and dust from entering. Do not use the equipment in the following environments.

- Where cutting oil can splash onto the product (abrasives and polishing powder in the oil can abrade the sliding section)
- Where organic solvents, chemicals, acids, alkalis, and kerosene are present
- Where water can splash onto the product

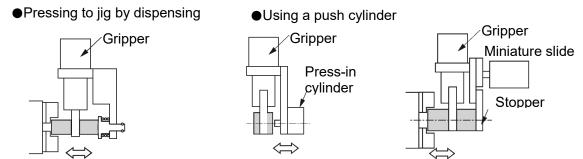
When gripping a long object or large work-piece, the center of gravity must be gripper to provide stable prehension. It is also necessary to stabilize prehension by increasing the size or using multiple jaws.



Select a modle that has sufficient power to grip the work-piece weight.

Select a model that has sufficient opening/closing width for the work-piece size.

If directry inserting the work-piece into the jig with the hand, consider clearance during design to avoid damaging the hand.



Note :The work-piece is side along the top of the small jaw, so gripper life could drop markedly. Sufficient consideration should be made for the shape of the small jaw.

Ajust the gripper opening/closing speed with a speed control valve. When using at high speed, play may be faster, the work-piece vibrates due to the shock at opening and closing, causing a gripper error, work-piece insertion error, poor repeatability. Condensation (water drops) may occur in the piping under certain conditions if an actuator

with small bore size or short stroke is operated at high frequency. Use a quick exhaust valve to prevent condensation.

Precautions on Product Disposal

When disposing of the product, comply with laws pertaining to disposal and cleaning of wastes and have an industrial waste disposal company dispose of the product.

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1. PRODUCT OVERVIEW

1.1 Model Number Indication

1.1.1 RLSH Series

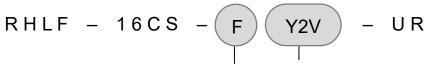
$$RLSH - A20D1N - L1 - F Y2V - UR$$

(A)Robot flange

Co	de	Content
(A) Robot	Flange	
Bla	ank	Without robot flange
F	-	With Robot flange (Note 1)

Symbol		Content		
(B) Attachn	nents			
Blar	۱k	Without attachments		
Y2	2	Small jaw for testing (Note 2)		
V		Directional control valve/tube (Note 3)		
Note 1 :	With rob	ot flange mounting bolts		
Note 2 :	Because	it is made of resin, use it for gripping tests (Mass is 25g per piece)		
Note 3 :	(R1/R2 p	Directional control valve includes a φ 4 push-in fitting (air supply port and A/B port), silencer (R1/R2 port), and mounting plate. The tube has an outer daiameter of φ 4 and a length of 2.5m × 2 pieces.		
Note 4 :	Standard with cylinder switch(F2H).			

1.1.2 RHLF Series



(A)Robot flange (B)Attachments

Code	Content
(A) Robot Flange	
Blank	Without robot flange
F	With Robot flange (Note 1)

Symbol		Content
(B) Attach	ments	
Bla	ank	Without attachments
Y	/2	Small jaw for testing (Note 2)
V		Directional control valve/tube (Note 3)
Note 1 : With robot flange mounting bolts		flange mounting bolts
Note 2 : Because it is made of resin, use it for gripping tests (Mass is 30g per piece)		is made of resin, use it for gripping tests (Mass is 30g per piece)
Note 3 : Directional control valve includes a φ 4push-in fitting (air supply port and A/B port),		control valve includes a φ 4push-in fitting (air supply port and A/B port),

silencer (R1/R2 port), and mounting plate. The tube has an outer daiameter of $\phi 4$ and a length of 2.5m × 2 pieces.

Note 4 : Standard with cylinder switch(T2H).

1.1.3 RCKL Series RCKL - 40CS - F Y3V - UR (B)Attachments

(A) Robot flange

Code	Content
(A) Robot Flange	
Blank	Without Robot flange
F	With Robot flange (Note 1)

	Symbol	Content	
(B)	Attachments		
	Blank	Without attchments	
	Y3	Small jaw for testing (Note 2)	
	V	Directional control valve/tube (Note 3)	

 Note 1
 :
 With robot flange mounting bolts

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

 Note 3
 :
 Directional control valve includes a φ4push-in fitting (air supply port and A/B port), silencer (R1/R2 port), and mounting plate. The tube has an outer daiameter of φ4 and a length of 2.5m × 2 pieces

 Note 4
 :
 Standard with cylinder switch(T2H).

1.1.4 Option (Please contact us for single item model number)

■ Attachment <Y2,Y3>

Attachment for testing <Y2>(RLSH,RHLF), <Y3>(RCKL)

Note: The figure on the right is for RLSH. For other models, refer to the dimensional drawings.

< Accessory >

- Attachments 2pieces (RLSH,RHLF), 3pieces (RCKL)
- Mounting Bolts

■ Valve,tube <V>

- < Accessory >
- Double solenoid valve 1pc
- Mounting plate 1pc
- φ4push-in fitting 1pc
- Silencerφ4 tube
- 2pc 2.5m×2pc





1.2 Speciffications

1.2.1 RLSH Series

Product specifications

Descriptions		RLSH
Cylinder bore size	mm	φ20
Actuation		Double acting
Working fluid		Compressed air
Max.working pressure air	MPa	0.7
Min.working pressure air	MPa	0.1
Port size (Tube size)		Applicatable tube outer diameter φ4 (With speed control valve)
Ambient temperature	°C	0 to 50
Operational stroke length	mm	18
Repeatability	mm	±0.01
Product weight	kg	1

Sencor Specifications

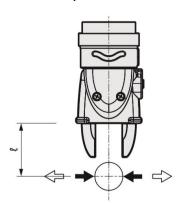
Descriptions		Proximity 2-wire	
		F2H	
Applications		Programable controller	
Load supply voltage		10 to 30VDC	
Load current		5 to 20mA	
Indicator light	Gripper	Yellow LED (ON lighting)	
indicator light	Flange	Blue,Green	
Leakage current		1 mA or less	
Shock resistance		980 m/s²	
Product weight	g	10	

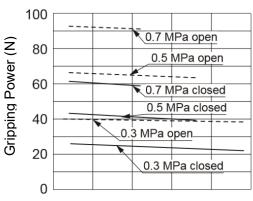
■ Gripping power performance data

Gripping power that functions to opening and closing directions for the length (ℓ) of attachment of gripper at supply pressure 0.3,0.5,0.7MPa is shown. (Represent one finger)

• Opening direction ($\langle \square \rangle$) – – – (Dashed line indication)

Closing direction (
) _____ (Solid line indication)





Length (ℓ) of attachment (mm)

1.2.2 RHLF Series

Product specification

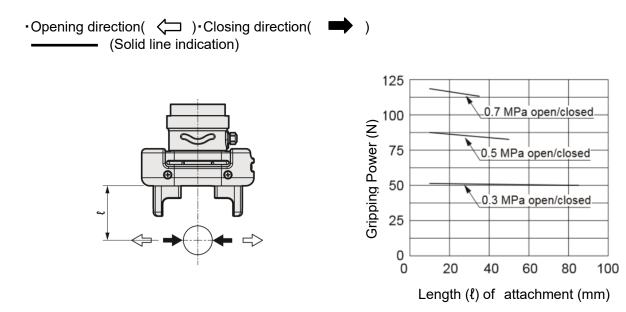
Descriptions		RHLF
Cylinder bore size	mm	φ16×2
Actuation		Double acting
Working fluid		Compressed air
Max.working pressure air	MPa	0.7
Min.working pressure air	MPa	0.2
Port size(Tube size)		Applicatable tube outer diameter φ4 (With speed control valve)
Ambient temperature	°C	5 to 50
Operational stroke length	mm	32
Repeatability	mm	±0.03
Product weight	kg	1.1

Sencor Specifications

Descriptions		Proximity 2-wire	
		Т2Н	
Applications		Programable controller	
Load supply voltage		10 to 30VDC	
Load current		5 to 20mA	
Indicator light	Gripper	Red LED (ON lighting)	
	Flange	Blue,Green	
Leakage current		1 mA or less	
Shock resistance 980 m/s ²		980 m/s²	
Product weight	g	18	

■ Gripping power performance data

Gripping power that functions to opening and closing directions for the length (ℓ) of attachment of gripper at supply pressure 0.3,0.5,0.7MPa is shown. (Represent one finger)



1.2.3 RCKL Series

Product specification

Descriptions		RCKL
Cylinder bore size	mm	φ40
Actuation		Double acting
Working fluid		Compressed air
Max.working pressure air	MPa	0.7
Min.working pressure air	MPa	0.3
Port size(Tube size)		Applicatable tube outer diameterφ4 (With speed control valve)
Ambient temperature	°C	5 to 50
Operational stroke length	mm	10
Repeatability	mm	±0.01
Product weight	kg	1.1

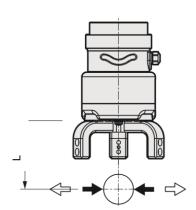
Sencor Specifications

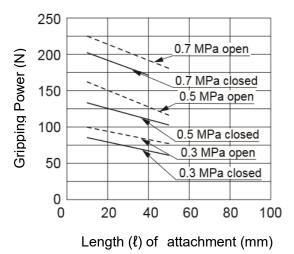
Descriptions		Proximity 2-wire	
		Т2Н	
Applications		Programable controller	
Load supply voltage		10 to 30VDC	
Load current		5 to 20mA	
Indicator light	Gripper	Red LED (ON lighting)	
maicator light	Flange	Blue,Green	
Leakage current		1 mA or less	
Shock resistance		980 m/s²	
Product weight g		18	

Gripping power performance data

Gripping power that functions to opening and closing directions for the length (ℓ) of attachment of gripper at supply pressure 0.3,0.5,0.7MPa is shown. (Represent one finger)

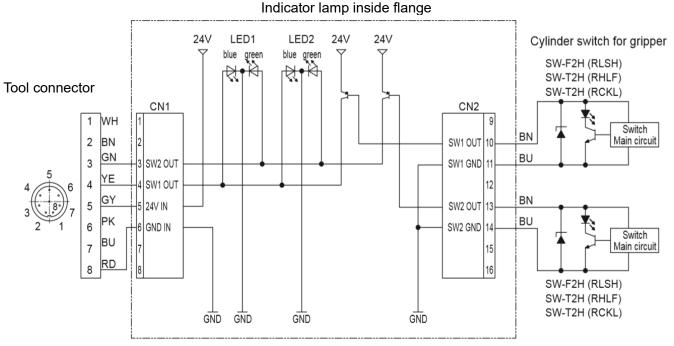
•Opening direction(<>>) - - - - (Dashed line indication)





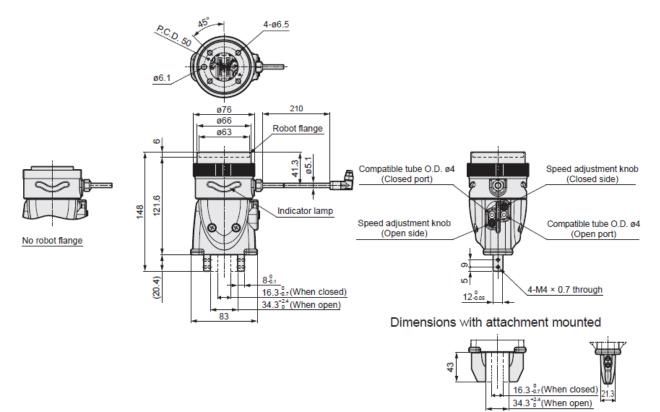
1.3 Electrical Circuit

Electrical circuit diagram

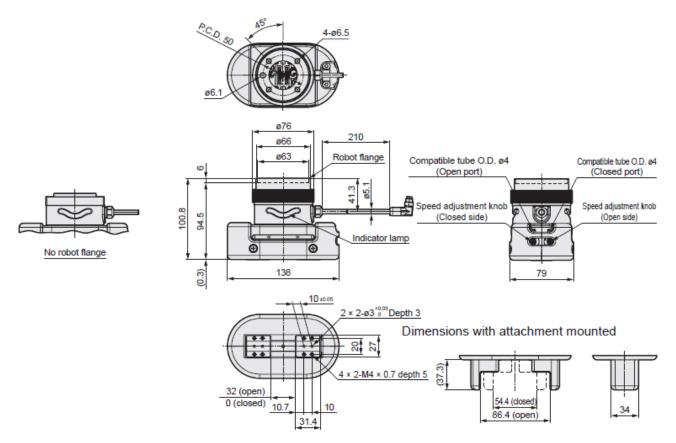


1.4 Dimensions

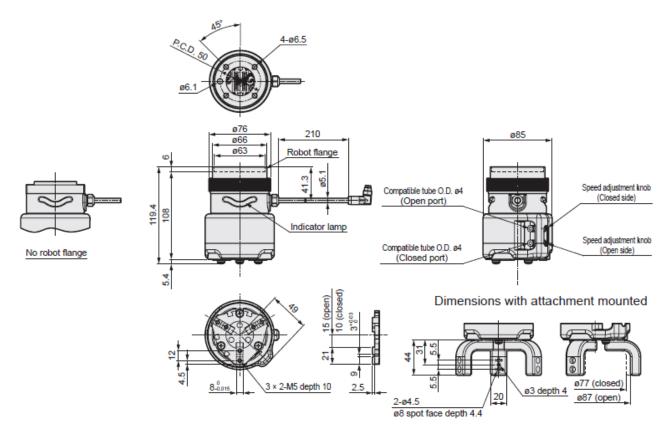
1.4.1 RLSH Series



1.4.2 RHLF Series



1.4.3 RCKL Series



2. INSTALLATION

2.1 Environment

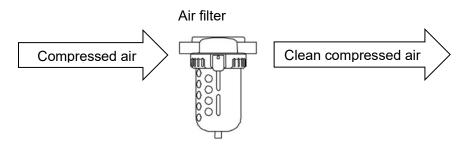
When using the product in a cutting, casting, or welding plant, install a cover to prevent foreign matters such as cutting fluid, chips, powder, and dust from entering. Do not use the equipment in the following environments.

- Where cutting oil can splash onto the product (abrasives and polishing powder in the oil can abrade the sliding section)
- Where organic solvents, chemicals, acids, alkalis, and kerosene are present
- Where water can splash onto the product

 $\boldsymbol{\cdot}$ Use the product within the following ambient temperature range.

0°C to 50°C, RH 85% or less (no freezing)

 For compressed air, use clean and dry air that has been passed through an air filter. Use an air filter in the circuit and be careful with the filtration rate (a filter that removes particles exceeding 5 μm is desirable), flow rate, and mounting position (install the filter near the directional control valve).



2.2 Unpacking

- Check that the model number ordered and the model number indicated on the product are the same.
- Check the exterior of the product for any damage.
- When storing the product, take proper measures to prevent foreign matters from entering the cylinder.

2.3 Mounting

Install a protective cover as a safety measure if the moving workpiece can pose a risk to humans or if human fingers can get caught in the finger and/or the attachment. Take proper measures to prevent the workpiece from falling so that people are not injured andmachines and devices are not damaged.

If the circuit pressure drops due to a power failure or a problem with the air source, the gripping power may decrease and the workpiece may fall.

2.3.1 Body

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=7N · m

2 Mounting the gripper

Mount the gripper to the robot flange and tighten the Clamp ring

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

3 Connector connection

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

4 Attachment of accessory jaws

Attach the jaws to the fingers or table with the attached screw or bolt.

- Note 1: Accessory jaws for RLSH and RHLF is made of resin. Use for gripping test.
- Note 2: Accessory jaws for RCKL is made of aluminum. Use for gripping test.
- Note 3: Use the following for the tightening torque of the accessory fingers.

Model	Tightening torque (N∙m)
RLSH,RHLF	1.4
RCKL	2.8

Rigidity of the attachment

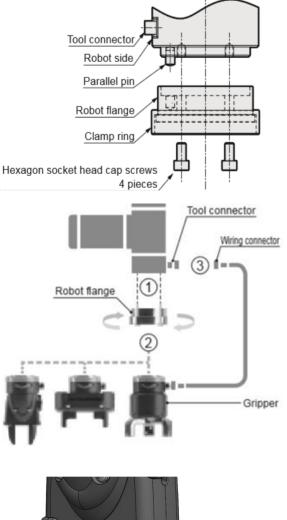
If the attachment is not rigid enough, sagging can result and cause the finger to twist or adversely affect operation.

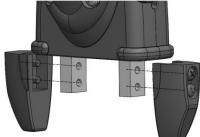
Mounting the attachment

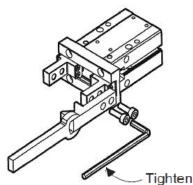
The effect on the hand body must be taken into consideration when mounting the attachment to the finger. Support the attachment with a wrench when tightening it so as not to twist the finger.

Do not apply load to the body

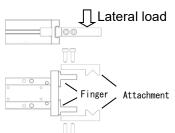
Descriptions	Bolt used	Tightening torque(N∙m)	
RLSH Series	M4×0.7	1.4	
RHLF Series	M4 × 0.7	1.4	
RCKL Series	M5×0.8	2.8	







Be careful not to apply a lateral load to the finger when mounting the attachment. \Box



Backlash or damage may occur when an excessive lateral load or an impact load is applied. Use the product so that the external force applied to the finger does not exceed the allowable load described in the catalog.

2.3.2 Sensor

How to move the sensor

- 1 Loosen the fixing screw.
- 2 Move the sensor slong the groove and tighten the screw.

Model	Tightening torque(N·m)	
RLSH(F2H)	0.03 to 0.08	
RHLF,RCKL(T2H)	0.1 to 0.2	

How to replace the sensor

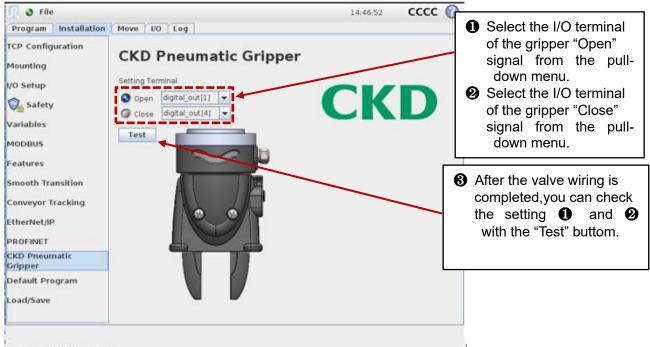
The sensor has a special wiring treatment. Please contact us. Replacement procedure manual is attached to replacement sensor.

2.4 Wiring

2.4.1 Wiring of Valve and Robot

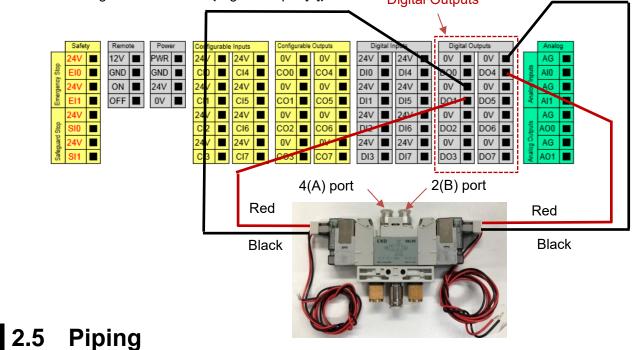
Setting method of I/O terminal for valve wiring

After installing the the decicated software from the USB memory stick attached to the product (see 3.1.3). Set the valve wiring I/O terminal from the setting screen.



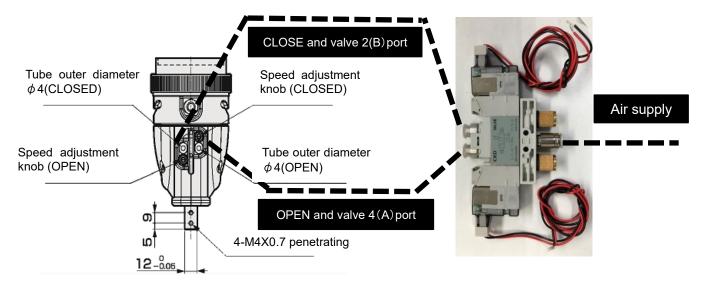
Wiring of valve and controller

Connect the valve wiring to the I/O terminal set on the previous page. In the case of the figure below, the "Open" signal is connect to {Digital Output [1]}, and the "Close" signal is connect to {Digital Output [4]}.



2.5.1 Piping for gripper

Refer to the figure below for piping between the valve and gripper and piping to the valve.



USAGE

Using the gripper 3.1

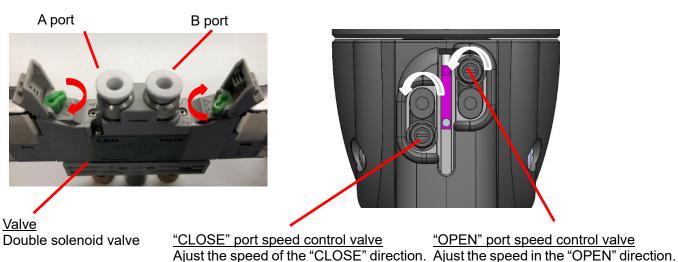
Make sure that no excessive load is applied to the fingers and claws during work removal and transfer. The linear rolling surface of the finger may be damaged or dented, resulting in malfunction.

3.1.1 Usage

- 1 Supply air to the valve. It is recommended to check the operation from about 0.3MPa.
- 2 Open the cover of the A port of the valve and the lever will appear. When the lever is pressed, air flows to A port
- **3** Turn the speed control valve knob of the gripper "OPEN" port slowly counterclockwise with a flathead screwdriver to confirm that the gripper opens.

Note : Please do not turn it too quickly as it is dangerous.

- 4 Open the cover of the B port of the valve and lever will appear. When the lever is pressed, air flow to the B port.
- 5 Turn the speed control valve knob of the gripper "CLOSE" port slowly counterclockwise with a flathead screwdriver to confirm that the gripper close. Note : Please do not turn it too quickly as it is dangerous.
- 6 After confirming that the lever is not locked, close the cover.



Speed increases counterclockwise.

Speed increases counterclockwise.

3.1.2 Starting the robot

Turn on the robot. (For details, see the robot manual.)

3.1.3 Software installation

Insert the included USB into the teachpendant and install the software.

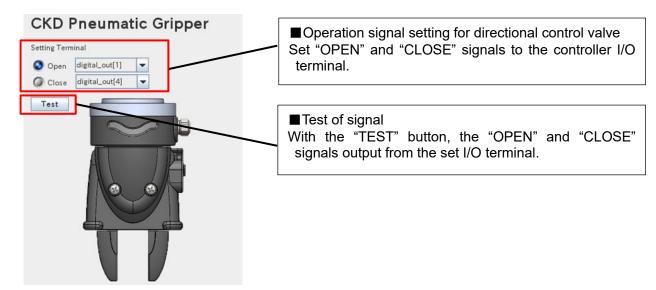
Software : CKD Pneumatic Gripper

For details , see the "Installation of \lceil 3.2.1Software installation \rfloor .

3.1.4 Setting "CKD Pneumatic Gripper"

On the screen, select the location where you wired the valve $\lceil 2.4.1 \text{ Setting method of I/O terminal for valve wiring}$. After wiring, check the open/close of the gripper with the "Test" button.

If there is no air supply, use the energization indicator on the solenoid valve. When "OPEN" is selected, check that the energization indicator lamp on the 4(A) port is lit, when "CLOSE" is selected, check that the energization indicator lamp on the 2(B) port is lit.



3.1.5 Adjustment of sencor

Adjust the sensor according to the work piece referring to [2.3.3 Sensor].

It is roommended to unify the display color of the gripper and the display color of the teachpendant. For details, see $\lceil 3.2.2 \rceil$ Sensor status and indicator display \rfloor .

Model	Tightening torque(N·m)	
RLSH(F2H)	0.03 to 0.08	
RHLF, RCKL(T2H)	0.1 to 0.2	



Setting the sensor position in the "CLOSE" direction





Setting the sensor position in the "OPEN" direction

3.2 Program functions and operations

3.2.1 Software installation

Install the dedicated software for product on the robot.

1 The USB memory stick provided with product contains the dedicated software URCaps. Insert this USB port of the teachpendant.

On the teachpendant of the UR robot, go to the [Setup Robot] screen and select [URCaps].

PolyScope Rol	bot User Interface 🛛 🖉	S	Setup Robot	0
	Please select	Initialize Robot		
	Run Program	Calibrate Screen		
UNIVERSAL ROBOTS		URCaps		
nobors	Program Robot	Network		
	Setup Robot	Language Set Password		
About	Shutdown Robot	Time	URSoftware 3.11.0.82155 (Aug 20 2019)	
	Shidown Robot	Update		
		Back		
		Direk		

2 Select the [+] button on the screen, select [CKD Pneumatic Gripper] from data in USB, and press [OPEN] .

	Setup Robot	Setup Robot		
Initialize Robot	URCaps Active URCaps	Initialize Robot	Select URCa	p to install
Calibrate Screen	GripperOpenClose	Calibrate Screen	Current Directory: /home/ur/ursim/ursim-3.1	1.0.82155/programs 👻 👔 🏠 🕸
URCaps		URCaps		
Network	URCap Information	Network		
Language		Language		
Set Password		Set Password		
Time		Time		
Update		Update		
Back		Back	Filename: CKD-Pneuma Filter: URCap Files	
Back	🕀 — 🕑 Restart	Back	oreap mes	Open Cancel

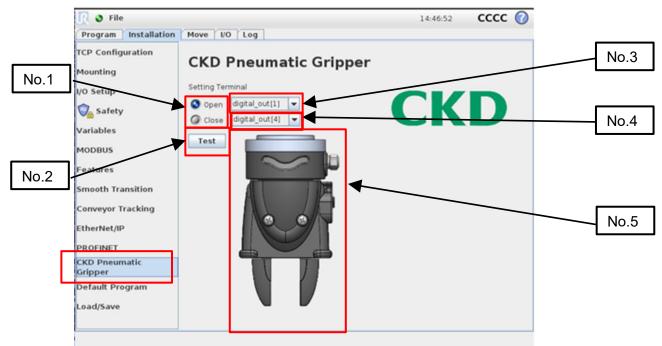
Press [Restart] to restart the robot. The installation is completed. Note : For details on how to use [URCaps], refer to the UR robot manual.

	Setup Robot 🕜
Initialize Robot	URCaps Active URCaps
Calibrate Screen	CKD-PneumaticGripper
URCaps	
Network	URCap Information
Language	URCap name: CKD-PneumaticGripper Version: 1.0.0 Developer: CKD Corporation
Set Password	Contact Info: 250, Ouji 2-chome, Komaki, Alchi, 485-8551, Japan Description: This software includes functions for controling "CKD Pneumatic Gripper".
Time	Copyright: Copyright © 2019 CKD Corporation License Type: Single Copy License License:
Update	ッフトウェア使用非確契約条件 CKD Pneumatic Gripper考用ッフトウェア(製品るCKD Pneumatic Gripper for UR Software 以下「フノトウェブ」といいます)をインストールする時に、このソフトウェア使用」
Back	det in a carrier of the first of the f

3.2.2 Explanation of operation screen

Setting screen

The setting screen is displayed by pressing [CKD Pneumatic Gripper] under the [installation].



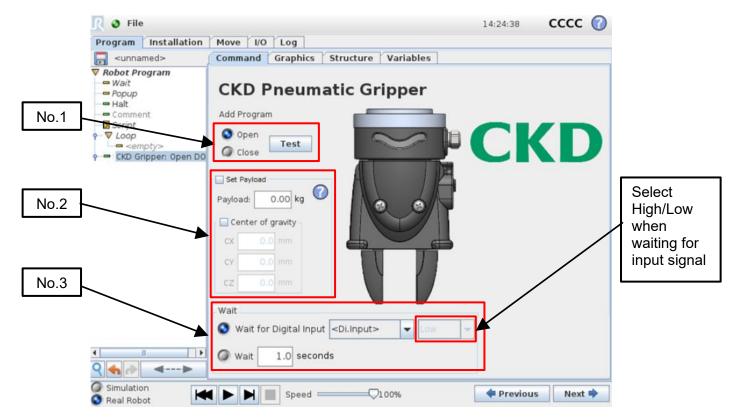
No.	Name	Discription	
1	Check button of Open/Close	Open and Close selection button of gripper.	
2	"Test" button	By pressing the button, the operation test selected in No.1 is performed.	
3	Drop-down list of Open button	Set each signal of Open and Close. Select and set the digital I/O terminal of the controller from the drop-down A reboot is required to apply the settings to the system.	
4	Drop-down list of Close button		
5	Indicator	An indicator that indicates the state of the gripper. The Open/Close state of the gripper and the operation status of the sensor are displayed by color change.	

Open sensor	Close sensor	Color of flange	Gripper display	message
ON	OFF	Blue		None
OFF	ON	Green		None
OFF	OFF	Gray	Intermediate posiion	None
ON	ON	Light blue	Intermediate position	Display check the "Cylinder Position Sensors"

Sensor status and indicator display

Proguram registratio

Display when select [Program], and select [Structure], and select [URCaps], press [CKD Pneumatic Gripper], and press " CKD Gripper" on the program list.



No.	Name	Discription
1	 Operating direction selection buton "Test" button 	Select the operation direction with the "Open" or "Close" check button and register it in the program list. Operation can be checked with the "Test" button.
2	Total mass and center of gravity setting	In Payload, enter the toal weight of the gripper and the load, and enter the coordinates of the center of the total weight of the gripper and the load. (Note .1)
3	Operating condition setting	Set the conditions unil the next operaion. Select a signal from the pull-down menu when waiing for an inputsignal, and set a waiting time when setting a waiting time.

Note 1: The setting on the [CKD Pneumatic Gripper] screen is available only for "Close". At the time of "Open" makes setting on the UR robot default setting screen shwn below.

Default setting for total mass and center of gravity

	🕜 Ø File	09:01:49 CCCC 🕜	
	Program Linstallation	Available TCPs:	
Select the check button and enter the coordinates of the center of gravity. See the table below.	VOILING VOILING Voilables MODBUS client Features Conveyor Tracking EtherNet/IP PROFINET Default Program	Image: result Image: result Image: result I	Enter the total weight of the gripper. See the table below.
		CV // mm CZ min	

Madal		Center of gravity (mm)		Total weight (kg)
Model	сх	CY	cz	(Note.2)
RLSH	0.0	1.1	56.7	0.8
RHLF	0.0	1.8	58.5	1.0
RCKL	0.0	1.4	63.6	1.0

Note 2 : If the jig is made according to the work piece, enter the total center of gravity and the total weight of the gripper and the jig.

3.2.3 Program setting procedure

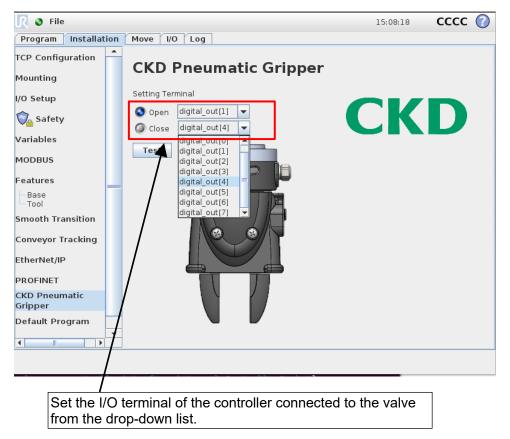
After setting up the UR robot and connecting this product, set up the software.

1 Go to the [Installation] tab, Set the [Tool output voltage] to 24V.

TCP Image: Constraint of the constra	Mounting Aralog Trous anslog_h[2] Votage Votage 1 Variables O communication interface Startup O communication interface Transition The Tool Communication interface allows communication with the tool without external wring Home Baud Refe Parky Interface Starlup Standard Output Votage to 24V may damage attached experiment if it is only configured to 12V Home Baud Refe Parky Interface Stratup Standard Output Starlup Standard Output Baud Refe Interface Parky Interface Stratup Standard Output Baud Refe Interface Parky Interface Starlup Standard Output Starlup Standard Output Starlup Standard Output Starlup Standard Output Digital Output Sourcing (PMP) Digital Output Sourcing (PMP)	Mounting Anang inputs Mounting anslog_in[2] Votage NO Setup anslog_in[3] Votage Variables O communication interface Ito software to interface votes and with the tool watched of tool watched of tool of the tool watched of tool of the tool watched of tool of the tool watched of tool of t	Mounting Aralog Thous Mounting anslog_h[2] WO Setup anslog_h[3] Variables O communication interface Startup Communication interface Startup The Tool Communication interface allows communication with the tool without external wring Home Baud Refe Parky Interface Starlup Standard Output Voltage to 24V may damage attached experiment if it is only configured to 12V Home Baud Refe Parky Interface Strated Parky Starley Standard Output Voltage Starley Tx Ide Chars Tx Ide Chars 1.3 Tx Ide Chars 3.3	Mounting Motage Mounting analog_h[2] Motage Motage analog_h[3] Motage Variables Communication interface Startup Communication interface allows communication with the tool without external wring Mome Baud Refe Parky Startup Stop Bits Startup Startup Stop Bits Startup Startup Startup Startup Baud Refe Items Parky Startup Startup Startup RX Idle Chars 1.3 TX Idle Chars 3.3	General	Tool Analog Inputs			Digital Output Mode		
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	Fleidous				Features						
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	CARCADA				Fieldoun						

2 Set the "Open" signal and "Close" signal on the setting screen.

The figure below shows the case where the {digital output [1]} is set to "Open (valve A port output)" and the {digital output [0]} is set to "Close (valve B port output)}.



3.2.4 Procedure for registering commands in the program

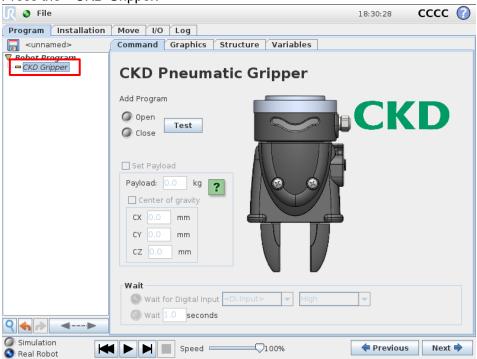
After completing the software setting, register the command in the UR robot program.

1 If you select [Structure] tab, [URCaps] tab, and press [CKD Pneumatic Gripper] on the program screen, "CKD Grip:" will be added to the UR robot program list displayed on the left side of the screen.

Press the [CKD Pneumatic Gripper] button displayed on the [URCaps] tab.

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<pre> <unnamed></unnamed></pre>	Command Graphics Structure Variables		
Robot Program <i>cempty></i>	Program Structure Editor		
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	Basic Advanced Wizards URCaps		
	CKD Pneumatic Gripper		
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<►	Move Cut Delet	e	
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2 Press the "CKD Gripper:" and the screen changes to the [CKD Pneumatic Gripper] screen. Press the "CKD Gripper:

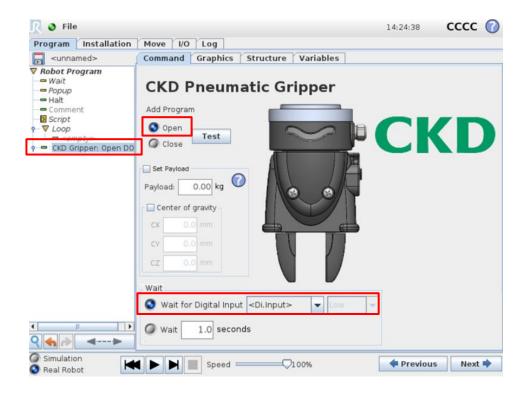


3 Press the button of "Open" or "Close" on the [CKD Pneumatic Gripper] screen, and the name of program is changed, and the command is registered in the UR robot program.

Sensor status and gripper display

Operation	Screen display	Content
No operation	CKD Gripper:	Operation direction not set
Press the "Open" button	🗕 CKD Gripper: Open	"Open" set
Press the "Close"button	🗕 CKD Gripper: Close	"Close" set

Example of registering a command of the "Open" in a program.



4. MAINTENANCE AND INSPECION

Do not touch electrical wiring connections (bare live parts) of actuators equipped with solenoid valves, actuators equipped with switches, and other such actuators. Do not touch live parts with bare hands.

An electric shock may occur.

Plan and perform daily and periodic inspections so that maintenance can be managed properly.

If maintenance is not properly managed, the product's functions may deteriorate significantly and this may lead to faults (such as short service life, damage, and malfunction) or accidents.

4.1 Periodic Inspection

In order to use the product under optimum conditions, perform a periodic inspection every six months or when the operation count reaches 5 hundred thousand times

<Inspection item>

- Actuation state
- Air leakage
- Looseness of screws and bolts
- Backlash in the finger
- Stroke abnormality

4.2 Maintenance of the product

Regularly grease the sliding section of the finger with lithium grease. Regular greasing can extend

service life further.

Manufacturer	Model
ТНК	AFF grease

4.3 Maintenance of the circuit

- Discharge the drainage accumulated in the air filter periodically before it exceeds the specified line.
- Since foreign matters such as carbide (carbon or tar substance) from the compressor oil may contaminate the circuit and cause an operation fault of the solenoid valve or the cylinder, be careful when performing maintenance or inspection of the compressor.

5. TROUBLESHOOTING

5.1 Problems, Causes, and Solutions

If the product does not operate properly, check the table below for a possible solution.

5.1.1 Finger (cylinder)

Failure phenomenon	Cause	Treatment method
	No pressure or insufficient pressure is applied.	Secure sufficient pressure.
Finger does not	No signal is input to directional control valve.	Repair the control circuit.
operate.	Centers were not aligned when mounted.	Correct the way the cylinder is mounted.
operate.		Change the mounting style
	Piston packing is damaged.	Replace the cylinder.
	Speed is lower than minimum working piston	Mitigate load fluctuation.
	speed.	
	Centers were not aligned when mounted.	Correct the way the cylinder is mounted.
		Change the mounting style.
Finger does not	Lateral load is applied.	Install a guide.
operate smoothly.		Correct the way the cylinder is mounted.
,		Change the mounting style
	Load is too large.	Increase the pressure.
		Enlarge the bore size.
	Speed control valve has meter-in circuit.	Change the mounting direction of the speed control
		valve.
	Force of shock due to high-speed actuation is	Decrease the speed.
	excessive.	Lighten the load.
Finger is damaged		Install a more effective cushion mechanism
or deformed.		(external cushion mechanism).
or derormed.	Lateral load is applied.	Install a guide.
		Correct the way the cylinder is mounted.
		Change the mounting style.

5.1.2 Sensor

Failure phenomenon	Cause	Treatment method
	Contact is welded.	Replace the switch.
Switch turns on but indicator does not	Rating of load is exceeded.	Replace the relay with one recommended by CKD or replace the switch.
blink.	Indicator is damaged.	Replace the switch.
	External signal is faulty.	Check the external circuit.
	Cables are disconnected.	Replace the switch.
	External signal is faulty.	Check the external circuit.
	Voltage is wrong.	Use specified voltage.
0 10 1 1	Switch is not mounted in right place.	Mount the switch in right place.
Switch does not	Switch is not positioned correctly.	Position and tighten the switch correctly.
turn on.	Switch is facing opposite direction. Load (relay) cannot respond for intermediate position detection.	Mount the switch so that it faces the correct direction. Lower the speed. Replace the relay with one recommended by CKD.
	Rating of load is exceeded.	Replace the relay with one recommended by CKD or replace the switch.
	Piston is not moving.	Move the piston.
	Contact is welded.	Replace the switch.
Switch does not	Rating of relay is exceeded.	Replace the relay with one recommended by CKD or replace the switch.
turn off.	Ambient temperature is too high or too low.	Use the switch at an ambient temperature of 0°C to 60°
	Magnetic field is nearby.	Install a magnetic shield.
	External signal is faulty.	Check the external circuit.

If you have any other questions or concerns, contact your nearest CKD sales office or distributor.

6. WARRANTY PROVISIONS

6.1 Warranty Conditions

Warranty coverage

If the product specified herein fails for reasons attributable to CKD within the warranty period specified below, 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:

• 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 this Instruction Manual.

- Failure caused by incorrect use such as careless handling or improper management.
- Failure not caused by the product.
- Failure caused by use not intended for the product.
- Failure caused by modifications/alterations or repairs not carried out by CKD.

• Failure that could have been avoided if the customer's machinery or device, into which the product is incorporated, had functions and structures generally provided in the industry.

- Failure caused by reasons unforeseen at the level of technology available at the time of delivery.
- 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.

■ Confirmation of product compatibility

It is the responsibility of the customer to confirm compatibility of the product with any system, machinery, or device used by the customer.

Others

The terms and conditions of this warranty stipulate basic matters.

When the terms and conditions of the warranty described in individual specification drawings or the Specifications are different from those of this warranty, the specification drawings or the Specifications shall have a higher priority.

6.2 Warranty Period

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