# 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".

<b>ADANGER</b> 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**

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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**

### 

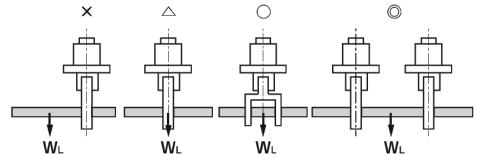
Install a protective cover as a safety measure if the moving workpiece can pose a risk to humans or if human fingers can get caught in the finger and/or the attachment. In the circuit pressure drops due to power failure or air source trouble, the gripping force will decrease and the work-piece may fall.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

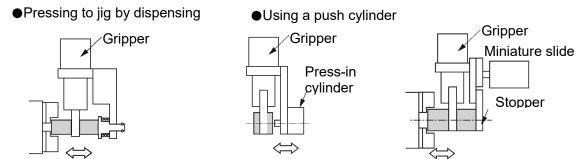
When gripping a long object or large work-piece, the center of gravity must be gripper to provide stable prehension. It is also necessary to stabilize prehension by increasing the size or using multiple jaws.



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**

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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

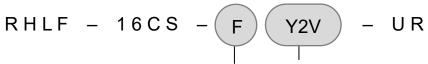
$$RLSH - A20D1N - L1 - F Y2V - UR$$

(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 $\varphi$ 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 $\varphi$ 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 $\varphi$ 4push-in fitting (air supply port and A/B port ),		control valve includes a $\varphi$ 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

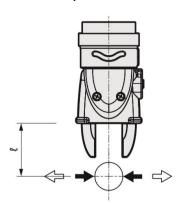
Descriptions		Proximity 2-wire	
		F2H	
Applications		Programable controller	
Load supply voltage		10 to 30VDC	
Load current		5 to 20mA	
Indicator light	Gripper	Yellow LED (ON lighting)	
indicator light	Flange	Blue,Green	
Leakage current		1 mA or less	
Shock resistance		980 m/s²	
Product weight	g	10	

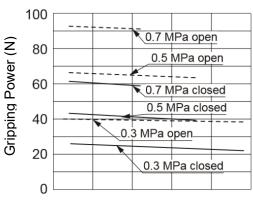
#### ■ Gripping power performance data

Gripping power that functions to opening and closing directions for the length ( $\ell$ ) 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 ( $\ell$ ) of attachment (mm)

# 1.2.2 RHLF Series

#### Product specification

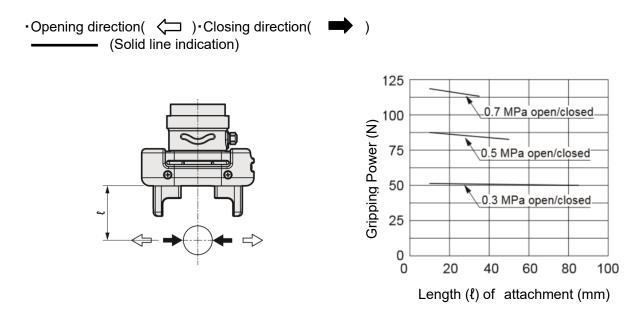
Descriptions		RHLF
Cylinder bore size	mm	φ16×2
Actuation		Double acting
Working fluid		Compressed air
Max.working pressure air	MPa	0.7
Min.working pressure air	MPa	0.2
Port size(Tube size)		Applicatable tube outer diameter φ4 (With speed control valve)
Ambient temperature	°C	5 to 50
Operational stroke 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 <sup>2</sup>		980 m/s²	
Product weight	g	18	

#### ■ Gripping power performance data

Gripping power that functions to opening and closing directions for the length ( $\ell$ ) 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

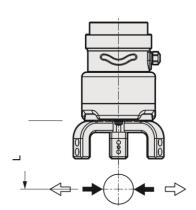
#### Sencor Specifications

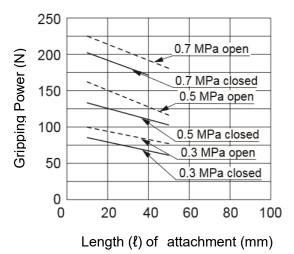
Descriptions		Proximity 2-wire	
		Т2Н	
Applications		Programable controller	
Load supply voltage		10 to 30VDC	
Load current		5 to 20mA	
Indicator light	Gripper	Red LED (ON lighting)	
maicator light	Flange	Blue,Green	
Leakage current		1 mA or less	
Shock resistance		980 m/s²	
Product weight g		18	

#### Gripping power performance data

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

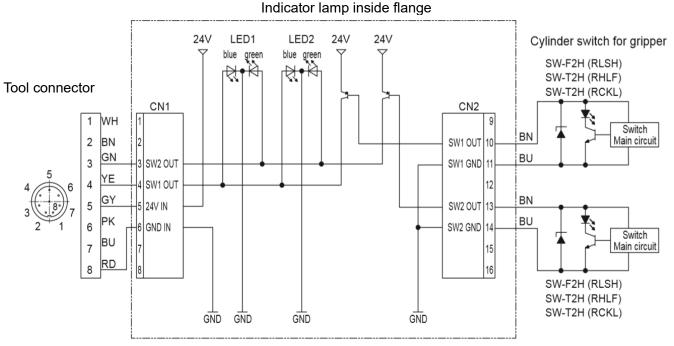
•Opening direction( <>> ) - - - - (Dashed line indication)





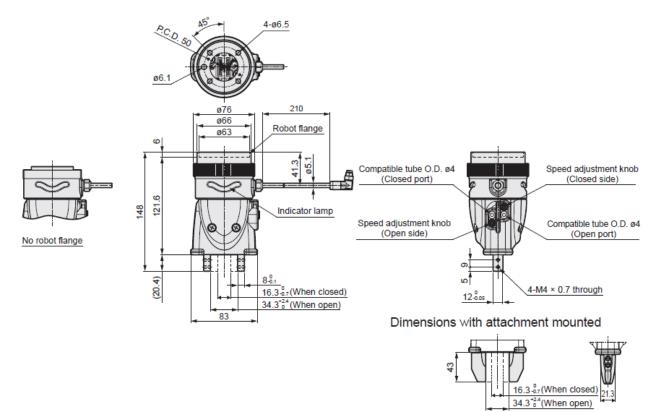
# 1.3 Electrical Circuit

#### Electrical circuit diagram

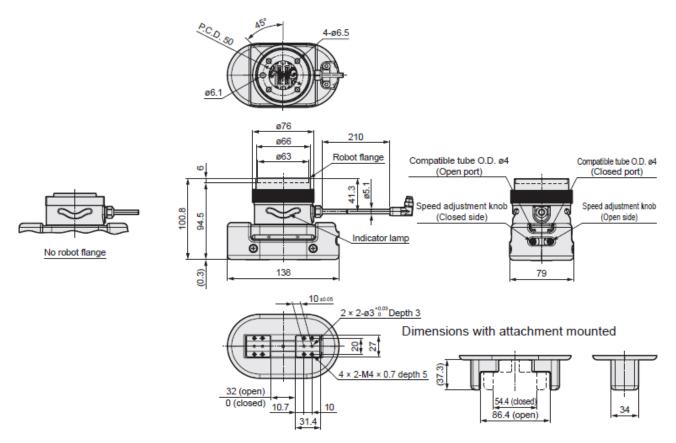


# 1.4 Dimensions

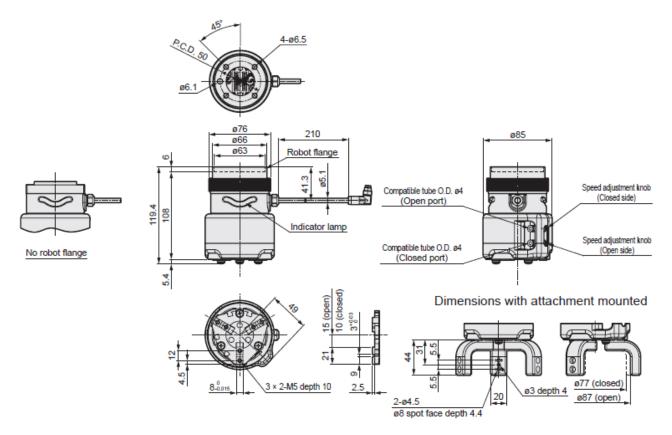
### 1.4.1 RLSH Series



### 1.4.2 RHLF Series



### 1.4.3 RCKL Series



# 2. INSTALLATION

# 2.1 Environment

# 

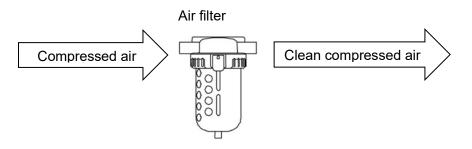
When using the product in a cutting, casting, or welding plant, install a cover to prevent foreign matters such as cutting fluid, chips, powder, and dust from entering. Do not use the equipment in the following environments.

- 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

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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

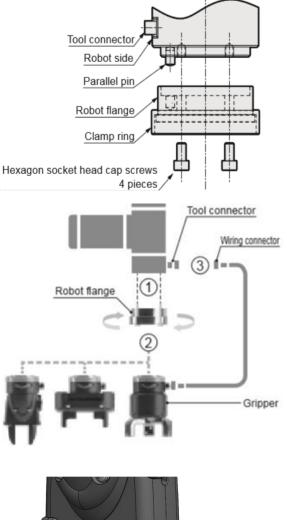
If the attachment is not rigid enough, sagging can result and cause the finger to twist or adversely affect operation.

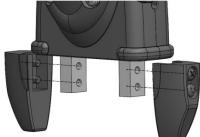
#### Mounting the attachment

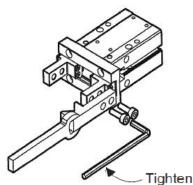
The effect on the hand body must be taken into consideration when mounting the attachment to the finger. Support the attachment with a wrench when tightening it so as not to twist the finger.

Do not apply load to the body

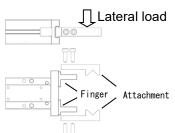
Descriptions	Bolt used	Tightening torque(N∙m)	
RLSH Series	M4×0.7	1.4	
RHLF Series	M4 × 0.7	1.4	
RCKL Series	M5×0.8	2.8	







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

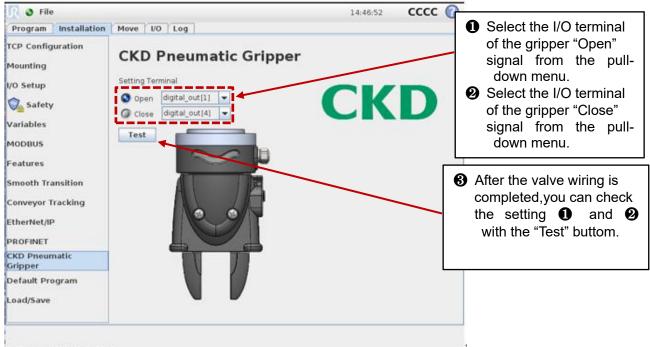
The sensor has a special wiring treatment. Please contact us. Replacement procedure manual is attached to replacement sensor.

# 2.4 Wiring

### 2.4.1 Wiring of Valve and Robot

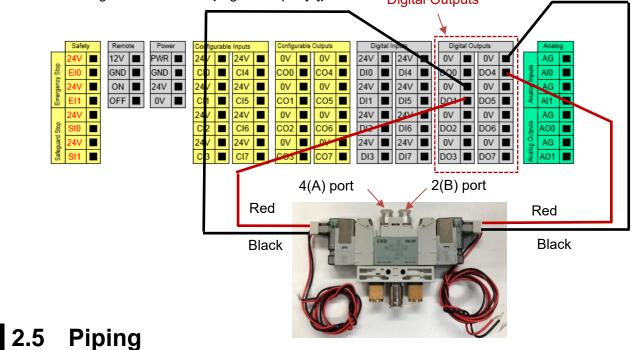
Setting method of I/O terminal for valve wiring

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.



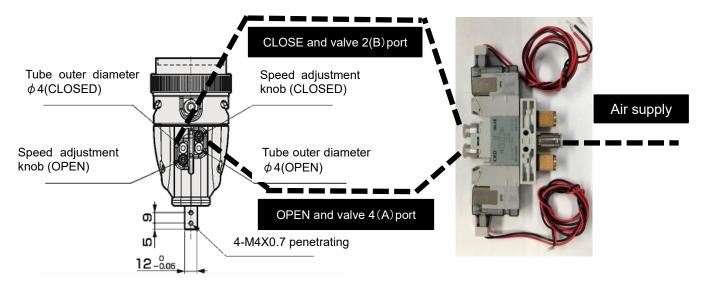
#### Wiring of valve and controller

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

# 

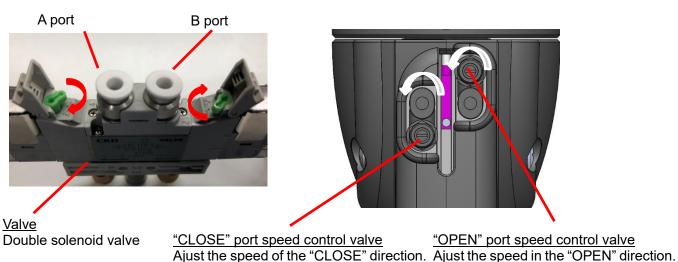
Make sure that no excessive load is applied to the fingers and claws during work removal and transfer. The linear rolling surface of the finger may be damaged or dented, resulting in malfunction.

# 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.

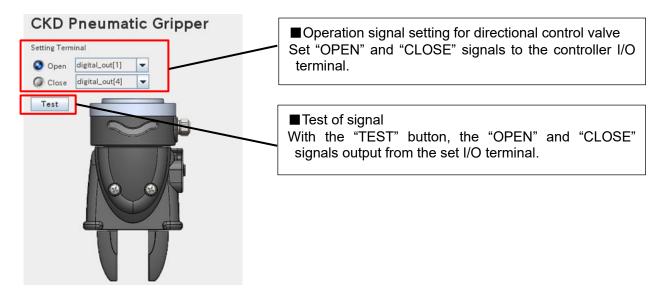
Software : CKD Pneumatic Gripper

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

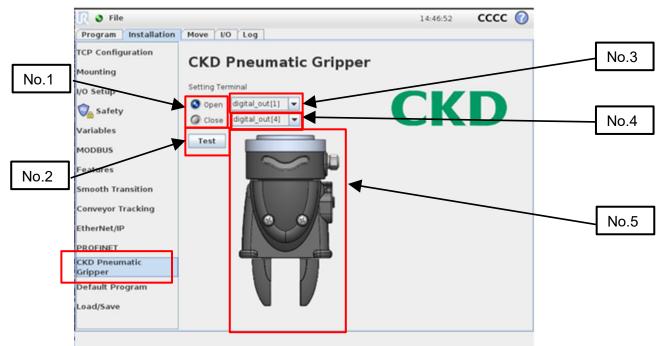
Press [Restart] to restart the robot. The installation is completed. Note : For details on how to use [URCaps], refer to the UR robot manual.

	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 ].



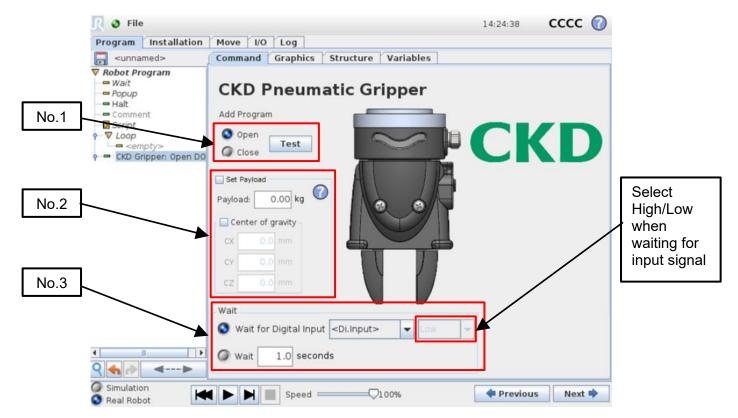
No.	Name	Discription	
1	Check button of Open/Close	Open and Close selection button of gripper.	
2	"Test" button	By pressing the button, the operation test selected in No.1 is performed.	
3	Drop-down list of Open button	Set each signal of Open and Close. Select and set the digital I/O terminal of the 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	<ul> <li>Operating direction selection buton</li> <li>"Test" button</li> </ul>	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

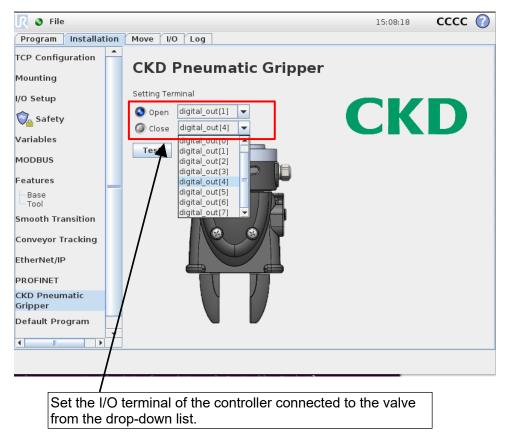
After setting up the UR robot and connecting this product, set up the software.

**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		
Mounting No Setup     anslog_in[2]     Votage       Variables     Startup     Communication interface       Smooth Transition     The Tool Communication interface allows communication with the tool withing     Stating the tool votage to 24V may damage attached equipment if it is only configured to 12V       Baud Rate     11200     Image       Baud Rate     11200     Image       Parky     Image     Image       Stop Bits     Image     Image       Startery     RX Ide Chars     1.5       Tx Ide Chars     1.5     Image       Features     Tx Ide Chars     1.5	Mounting     anslog_in[2]     Votage       W0 Setup     anslog_in[3]     Votage       Variables     O Communication interface       Startup     O Communication interface allows communication with the tool without external wining       Home     Baud Rate       Home     Baud Rate       Parky     Intra       Stor IVO     Parky       Stor Bits     Dis       RX Isle Chars     1.5       Stafety     TX Isle Chars       Features     TX Isle Chars	Mounting No Setup     ansing_ni21 ansing_ni31     Votage       Variables     Communication interface Startup     Communication interface allows communication with the tool without external wining       Smooth Transition     The Tool Communication interface allows communication with the tool without external wining       Home     Baud Rate       Baud Rate     11200       Parky     Interface       Stop Bis     Interface       Skide Chars     1.5       Tx ide Chars     1.5       Tx ide Chars     3.3	Mounting     anslog_in[2]     Votage       W0 Setup     anslog_in[3]     Votage       Variables     O Communication interface       Startup     O Communication interface allows communication with the tool without external wining       Home     Baud Rate       Tool I/O     Parky       Parky     Intra       Storp Bits     Dis       Startup     Standard Output       Baud Rate     Intra       Parky     Intra       Storp Bits     Dis       RX kile Chars     I.5       Startup     Sourcing (PMP)       Parky     Intra       Baud Rate     I.5       Digital Output 0     Sourcing (PMP)       Startery     TX life Ohars       TX life Ohars     3.3	Mounting No Setup     analog_[n]2] analog_[n]3]     Motage       Variables     O communication interface Startup     O communication interface allows communication with the tool without external wiring       Same Tool VO     Date Pin Power       Baud Rafe Parky     1200       Parky     None       Stop Bits Startup     No tage       Kk Ide Chars     1.3 3.3       TX Ide Chars     1.4 3.3	TCP	Aceter Incuts			Tool Digital Output mod	e is defined based on the too	attached
I/O Setup     analog_n[3]     Votage     I/O       Variables     O Communication interface allows communication with the fool without external wining     Setting the tool votage to 24V may damage attached equipment if it is only configured to 12V       Simooth Transition     The Tool Communication interface allows communication with the tool without external wining     I/O       Home     Baud Rate     11200     I/O       Baud Rate     11200     I/O       Parky     I/O     Standard Output       Stop Bits     D/O     Standard Output       Stafety     TX ide Chars     1.5       TX ide Chars     3.3     Digital Output 1       Sourcing (PMP)     Sourcing (PMP)	IVO Setup     analog_in[3]     Votage     ITool Output Votage     24.       Variables     Communication interface     Satisfy the tool votage to 2.4V may damage attached equerment if it is only configured to 12V       Smooth Transition     The Tool Opmunication interface allows communication with the tool without esternal withing     O Duel Pin Power       Baud Rate     11000     Itop     Standard Output       Baud Rate     1.3     Dis       Stop Bits     Dis     Sourcing (PMP)       Starledy     Tx ide Chars     1.3       Features     Tx ide Chars     1.3	I/O Setup     analog_in[3]     Votage     Table Output Votage     124       Variables     Communication Interface     Sating the tool votage to 24V may damage attached equipment if it is only configured to 12V       Startup     The Tool Communication Interface allows communication with the tool without external wing     Sating the tool votage to 24V may damage attached equipment if it is only configured to 12V       Home     Baud Rate     Intra     Sating the tool votage       Baud Rate     Intra     Intra       Porty     Sate of the tool votage     Sate of the tool votage       Stop Bits     Intra     Sate of the tool votage       Rx Ide Chars     I.3     Sate of the tool votage       Tx Ide Chars     I.3     Sate of the tool votage       Features     Fleidous     Sate of the tool votage	IVO Setup     analog_in[3]     Votage     IVO setup     IVO s	IVO Setup     analog_in[3]     Motage     Tot Output Voitage     [24]       Variables     Communication Interface     Sating the tool voitage to 24V may damage attached equipment if it is only configured to 32V       Smooth Transition     The Tool Communication Interface allows communication with the tool without external wing     Sating the tool voitage to 24V may damage attached equipment if it is only configured to 32V       Home     Baud Rate     11000     Image       Baud Rate     11000     Image     Image       Parky     Image     Image     Image       Stop Bits     Image     Image     Image       RX Idle Chars     Image     Image     Image       TX Idle Chars     Image     Image     Image       Fieldows     Image     Image     Image	Mounting		Votage	•	100000000000000000000000000000000000000	a eesa soo horse nahasah	
Startup     Communication Interface       Smooth Transition     The Tool Communication Interface allows communication with the tool without external wining       Home     Baud Rafe       Taol I/O     Parky       Stop Bits     Interface       RX Isle Chars     I.5       Startup     Startup       Features     TX Isle Chars       Fieldous     Startup	Startup     O Communication Interface       Smooth Transition     The Tool Communication Interface allows communication with the tool without external wring       Home     Baud Rate       Baud Rate     11000       Parity     Tani       Stop Bits     Dial       RX Idle Chars     1.5       Startures     3.3	Startup     Communication Interface       Smooth Transition     The Tool Communication Interface allows communication with the tool without external wiring       Home     Baud Rate       Taol VO     Parky       Stop Bits     Dim       RX Idle Chars     1.5       TX Idle Chars     3.3	Startup     O Communication Interface       Smooth Transition     The Tool Communication Interface allows communication with the tool without external wring       Home     Baud Rate       Baud Rate     11000       Parity     Tanel       Stop Bits     Date       RX Ide Chars     1.5       TX Ide Chars     3.3	Startup     Communication Interface       Smooth Transition     The Tool Communication Interface allows communication with the tool without external wiring       Home     Baud Rate       Baud Rate     10000       Parky     Starte       Stop Bits     Dia       RX Idle Chars     1.3       TX Idle Chars     3.3	I/O Setup	analog_in(3)	Votage		Tool Output Voltage	24	
Startup     Outer Startup       Smooth Transition     The Tool Communication interface allows communication with the tool without external wiring       Home     Baud Rate     Itera       Baud Rate     Itera     Itera       Tool V/O     Parky     Itera       Stop Bits     One       Rx kide Chars     1.3       Safety     TX ide Chars     3.3	Startup     Outer Startup       Smooth Transition     The Tool Communication Interface allows communication with the tool without external wring       Home     Baud Rete       Taol VO     Parity       Conveyor Tracking     Stop Bits       Ki kile Chars     1.5 3.3       Features	Startup     Communication interface allows communication with the tool without external withing       Home     Baud Refe     Conveyor       Taol I/O     Parky     Conveyor       Stop Bits     Conv     Conveyor       Tracking     RX kide Chars     1.3       Safety     TX lide Chars     3.3	Startup     Out       Smooth Transition     The Tool Communication interface allows communication with the tool without external wring       Home     Baud Rate     Itoto       Home     Baud Rate     Itoto       Taol I/O     Party     Itoto       Conveyor Tracking     Stop Bits     One       Xi Ide Chars     I.5       Features       Fieldous	Startup     Communication interface allows communication with the tool without external wiring       Home     Baud Refe     Conveyor       Taol V/O     Parky     Conveyor       Stop Bits     Conveyor       Tracking     RX kde Chars     1.3       Safety     TX ide Chars     3.3	Variables				. Setting the tool volta	ige to 24V may damage atta	thed
Instruction     with the tool without external wiring     Image: Conveyor Tracking     Dual Ph Power       Conveyor Tracking     Stop Bts     Image: Conveyor Tracking     Stop Bts       RX Idle Chars     1.5       Safety     TX Idle Chars     3.3	Second Standard Output B     Open Proven       Home     Baud Rate     11000     Image: Conveyor Tracking       Conveyor Tracking     Stop Bits     Open       RX Ide Chars     1.5       Safety     TX Ide Chars     3.3	Subscription     with the tool without external wiring       Home     Baud Rate     I Up tool       Table I/O     Parky     I Image       Conveyor     Stop Bits     One       Tracking     Ki Idle Chars     I.5       Salfedy     TX Idle Chars     3.3	Selection     with the tool without external wiring     O Duel Pin Power       Home     Baud Refe     11000     with the tool without external wiring       Tool V/O     Parity     Innii     with the tool without external wiring       Conveyor     Stop Bits     Innii     with the tool without external wiring       Conveyor     Stop Bits     Innii     with the tool without external wiring       Saled V/O     Parity     Innii     with the tool without external wiring       Stop Bits     Die     Digtal Output 0     Sourcing (PMP)       Saled V/O     TX Ide Chars     1.5     Sourcing (PMP)       Features     Feedows     3.3     Feedows	Simulation     with the tool without external wiring       Home     Baud Rate     I (1) (2)       Table I/O     Parky     I (2)       Conveyor     Stop Bits     Oral       Tracking     RX Idle Chars     I.5       Safety     TX Idle Chars     3.3	Startup	O Communication Inter	face		equipment if it is ont	y configured to 12V	
Tool VO         Parky         Nime         w           Conveyor Tracking         Stop Bts         Dim         Digtal Output 0         Bourcing (PMP)           Safety         TX Ide Chars         1.5         Digtal Output 1         Sourcing (PMP)           Features         Features         Features         Digtal Output 1         Sourcing (PMP)	Teel VO     Parky     Inne     w       Conveyor Tracking     Stop Bits     Inne     Inne     Digital Output 0       Stop Bits     Inne     W     Digital Output 0     Sourcing (PhP)       Safety     TX lide Chars     3.5     Sourcing (PhP)       Features     Sourcing (PhP)     Sourcing (PhP)	Tool I/O     Parky     Inne     W       Conveyor Tracking     Stop Bits     One     Digital Dutput 0     Bourcing (PMP)       Safety     TX Ide Chars     1.3     3.3     Digital Dutput 1     Sourcing (PMP)       Features     Fieldbus     1.3     3.3     Digital Dutput 1     Sourcing (PMP)	Tool VO     Party     Nme     w       Conveyor Tracking     Stop Bits     One     w       K ide Chars     1.5       Safety     TX ide Chars     3.5	Tool VO     Parky     Nime     W       Conveyor Tracking     Stop Bits     One     Digital Dutput 0       Safety     TX Ide Chars     1.5       Features     Fieldbus				ommunication	O Duel Pin Power		
Conveyor Tracking         Stop Bits         Digital Output 0         Bourcing (PNP)           Safety         TX Ide Chars         1.5         Digital Output 1         Sourcing (PNP)           Features         Fieldbus         3.5         Digital Output 1         Sourcing (PNP)	Conveyor Tracking         Stop Bits         Digital Output B         Bouncing (PhP)           Ki idle Charis         1.5         Digital Output 1         Sourcing (PhP)           Safety         TX idle Charis         3.5         Digital Output 1         Sourcing (PhP)           Features         TX idle Charis         3.5         Digital Output 1         Sourcing (PhP)	Conveyor Tracking         Stop Bits         Digital Dutput B         Bouncing (PMP)           Safety         TX Ide Chars         1.5         Digital Dutput I         Sourcing (PMP)           Features         Features         3.3         Features         Features	Conveyor Tracking         Stop Bits         Dia         Digital Output B         Bouncing (PhP)           Safety         RX ide Chars         1.5         Digital Output 1         Sourcing (PhP)           Safety         TX ide Chars         3.3         Digital Output 1         Sourcing (PhP)           Features         Fieldows         3.3         Digital Output 1         Sourcing (PhP)	Conveyor Tracking         Stop Bits         Digital Dutput 0         Sourcing (PNP)           Safety         TX Ide Chars         1.5         Digital Dutput 1         Sourcing (PNP)           Features         Fieldbus         3.3         Digital Dutput 1         Sourcing (PNP)	Home	Baud Rate		Ψ.			
Conveyor Tracking         Stop Ers         Dia           Rx idle Chars         1.5         Digital Output 1         Spurcing (P)(P)           Safety         TX idle Chars         3.5         Eastures           Fieldbus         Fieldbus         Fieldbus         Fieldbus	Conveyor Tracking         Stop bits         Digital Dutput 1         Sourcing (PNP)           Safety         TX lide Chars         3.3         Digital Dutput 1         Sourcing (PNP)	Conveyor Tracking         Stop Eris         Digital Dutput 1         Sourcing (PMP)           Safety         TX Idle Chans         3.3         Equation 1         Sourcing (PMP)           Features         Fieldows         3.3         Environment of the chans         Sourcing (PMP)	Conveyor Tracking         Stop bits         Digital Dutput 1         Sourcing (PNP)           Safety         TX Ide Chars         3.5         Digital Dutput 1         Sourcing (PNP)           Features         Fieldows         3.5         Digital Dutput 1         Sourcing (PNP)	Conveyor Tracking         Stop Eris         Digital Dutput 1         Sourcing (PMP)           Safety         TX Idle Chans         3.3         Equation 1.5         Sourcing (PMP)           Features         Fieldows         3.3         Environmental Sourcing (PMP)         Sourcing (PMP)	Tool I/O	Parity		Ψ.	-		
Safety TX Ide Chars 1.3 Features Fieldous	Safety TX lde Chars 3.5 Features	Safety TX Ide Chars. 1.3 Features Fieldous	Safety TX lide Chars 1.3 Features Fieldous	Safety TX Ide Chars 3.3 Features Fieldous		Stop Bits		Ψ.		And a strategy descent of the strategy of the	
Features Fieldbus	Features 313	Features Fieldbus	Features Fieldbus	Features Fieldbus	and Artistan a	RX Idle Chars		1.5	Digital Output 1	Sourcing (PMP)	
Fieldbas		Fieldbas	Fieldbus	Fieldbas				3,5			
	Fleidous				Features						
URCaps		URCaps	URCaps	URCape -	Fieldoun						
	URCape				URCape						
	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

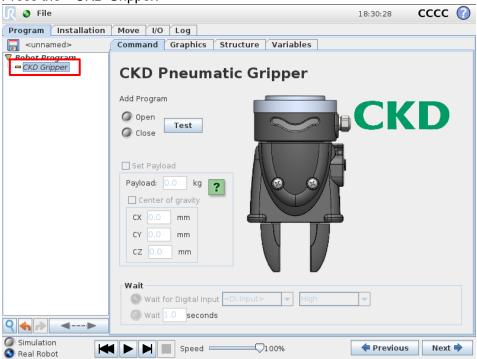
After completing the software setting, register the command in the UR robot program.

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.

🕘 File		09:44:19	cccc 🕜
Program Installation	Move I/O Log		
<pre> <unnamed></unnamed></pre>	Command Graphics Structure Variables		
<b>Robot Program</b> <i>cempty&gt;</i>	Program Structure Editor		
	Set placement of node After selected		
	Basic Advanced Wizards URCaps		
	CKD Pneumatic Gripper		
	Edit		
	Move Copy Past	e	Suppress
<►	Move Cut Delet	e	
Simulation Real Robot	Speed100%	💠 Prev	ious Next 🔷

**2** Press the "CKD Gripper:" and the screen changes to the [CKD Pneumatic Gripper] screen. Press the "CKD Gripper:

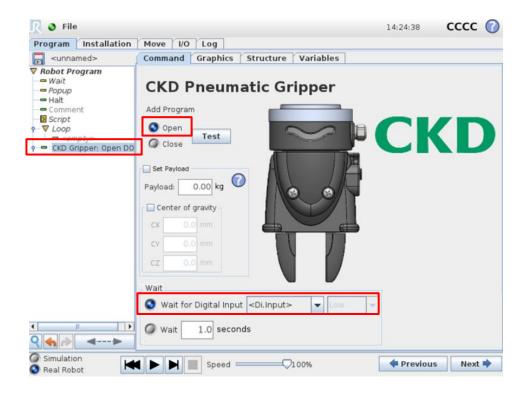


**3** Press the button of "Open" or "Close" on the [ CKD Pneumatic Gripper ] screen, and the name of program is changed, and the command is registered in the UR robot program.

#### 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.
<b>0</b> 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.