CKD

Compact Arm
CAW Series

INSTRUCTION MANUAL

SM-A86544-A/0

ORIGINAL INSTRUCTIONS

- 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.

CKD Corporation

CKD Corporation

PREFACE

Thank you for purchasing CKD's Compact Arm CAW Series.

The Compact Arm is an assist device for general industry using a pneumatic cylinder as part of its body to realize a compact and light-weight design and having improved bending and torsional stiffness. In addition, it can be folded for compact storage.

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.

Contact
CKD Corporation
2-250, Oji, Komaki-shi, Aichi, JAPAN 485-8551
Phone +81-568-77-1111 Fax +81-568-77-1123

CKD Europe B.V.
Beechavenue 125A, 1119 RB Schiphol-Rijk, The Netherlands
Phone: +31 23 554 1490 Mail: info@ckdeu.com

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:

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:

Thoroughly read and understand this Instruction Manual before using the product.

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

⚠ **DANGER**	Indicates an imminent hazard. Improper handling will cause death or serious injury to people.
⚠ **WARNING**	Indicates a potential hazard. Improper handling may cause death or serious injury to people.
⚠ **CAUTION**	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 prohibited actions that must not be performed in any case.
	Indicates mandatory actions that must be performed.
	Indicates general precautions and tips on using the product.

The following symbols are added to facilitate understanding of warning messages.

	Indicates that there are mechanical hazards such as fractures and injuries caused by pinching if your fingers or hands are inserted into any gaps on the product or equipment.

Definition of Workers who Handles the Product

This Instruction Manual is intended for all workers who handle this product. However, the workers are classified depending on their ability and experience in operation to ensure the safety.

CKD defines the following three categories of workers and only the relevant workers are allowed to perform the described operation.

- **Operator**
  This person is allowed to operate the product. The operator is required to acquire sufficient knowledge and operating skills to use this product. The operator shall carefully read this Instruction Manual and sufficiently understand the operation procedures and safety precautions before operating this product.

- **Maintenance person**
  In addition to the work permitted to the operator, this person is allowed to perform periodic maintenance work such as periodic inspection and replenishment and replacement of consumable parts. The maintenance person is required to acquire sufficient knowledge, operating skills and maintenance skills for this product. The maintenance person shall carefully read this Instruction Manual and sufficiently understand the operation procedures, equipment characteristics, details of all operations and safety precautions before maintaining this product.

- **Repair person** (refer to the manufacturer that designs, manufactures and installs the equipment containing this product)
  This person is the manufacturer that designs, manufactures and installs the piece of equipment incorporating this product and is allowed to perform work requiring special knowledge and skills such as installation, assembly, adjustment, and repair of this product. The repair person is required to have basic knowledge about pneumatic devices including materials, piping, electrotechnique and mechanics (level conforming to JIS B 8370 “General rule of design of pneumatic systems”), as well as knowledge of assembly of general machines. The persons shall carefully read this Instruction Manual and sufficiently understand the safety precautions before installing, assembling, adjusting and repairing this product.

Wearing protective equipment

Operator ..... Safety shoes

Maintenance person..... Hard hat, protective goggles and safety shoes

Repair person..... Hard hat, protective goggles, safety shoes and other required protective equipment appropriate to their operations

Precautions on Product Use

⚠ WARNING

[Design / selection]

- **When using the machine, please be sure to conduct a risk assessment of the entire machine and equipment to ensure safety before use. In addition, the end user should conduct a risk assessment of the user side based on the residual risk information of the entire machine and determine a safe operation method before use.**

  This product is a pneumatic assistive device, intended for use as a mechanical device with a tool or the like attached to the tip of the arm.

[Use / maintenance]

- **If abnormal noises are heard, personal safety should be the first priority, and joints should be locked only when it is safe to do so.**

  Failure to do so may result in fatal accidents or total damage to the product.

- **Do not modify the product or device without the manufacturer's approval.**

- **Do not put hands or fingers into product or device gaps.**

- **Do not leave the product or device during work operation.**

  When the operator's hand is removed from the tool, the horizontal position may not be maintained due to tilt during product installation or deflection of the arm due to the weight of a tool or the like..

  When not in use, the position can be held by tightening the lock lever at each joint.

  It is recommended to install a "home position" where the tool is stored in the specified location when not in use.

- **Do not use in excess of the maximum load capacity.**

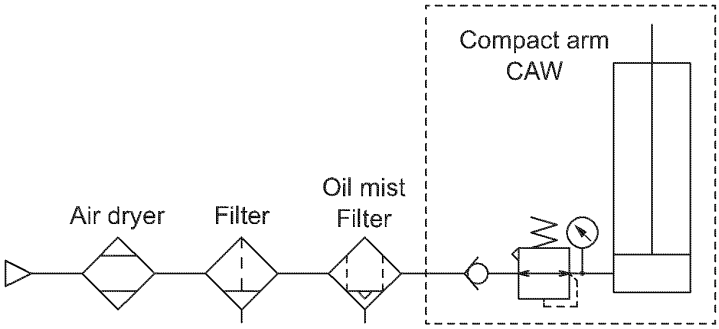
- **Do not use in excess of the maximum moment load.**

- **Do not put weight on the arm or hang the product from the arm.**

⚠ CAUTION

[Pneumatic source]

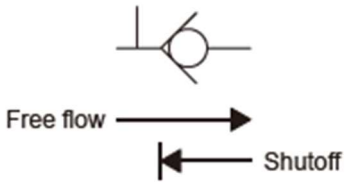
- **Working fluid must be clean air from which solids and water/oil have been sufficiently removed using a dryer, filter and oil mist filter.**
  Never supply lubricated air.



- **Keep the pressure difference between the primary and secondary sides of the precision regulator to 0.1MPa or more.**
  For the pressure required for load, refer to the graph of "Load capacity under pressure".

[Pneumatic piping]

- **Check IN.OUT display indicating the air inlet and outlet of the precision regulator before connecting.**
  A reverse connection could result in malfunction.
- **When handling the precision regulator, do not move or swing it by the adjustment knob.**
- **If the pneumatic piping on the secondary side of the precision regulator is dislocated during use, the arm may fall, creating a hazard.**
  Connect with reliable methods to prevent the pneumatic piping from dislocating.
- **Check symbols on the body before connecting the module check valve.**



- **Use sealing tape when piping.**
  Do not use liquid or solid sealant.
  In addition, ensure that the sealing tape does not enter the piping.

[Product installation]

- **When mounting the product, mount it on a vertical plane.**

[Use]

- **Do not use with the cover removed.**

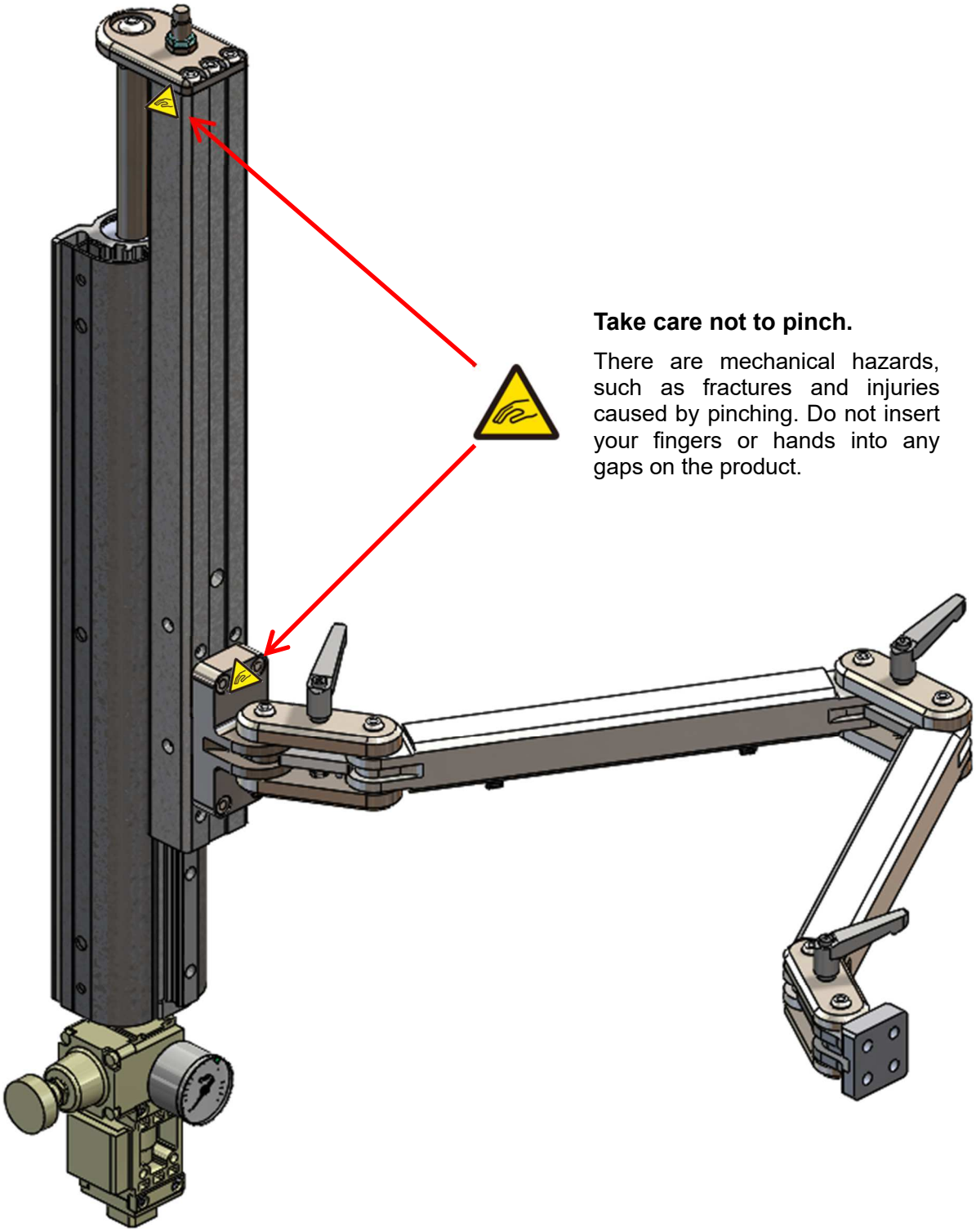
[Relocation / maintenance]

- **During relocation and maintenance, the cylinder and arm are removed before work is performed.**

Precautions on Specific Hazard Sources

There are structural and operational hazards specific to the product and equipment. The workers see the figure below and thoroughly understand the hazards and methods of avoiding them before operating and maintaining the product.

- Warning labels are applied to the following positions before shipment. To use the product safely, do not remove, stain or damage the labels.



Take care not to pinch.

There are mechanical hazards, such as fractures and injuries caused by pinching. Do not insert your fingers or hands into any gaps on the product.

Precautions on Environment

Improper handling of the product may cause an impact on the environment. Install and use the product paying attention to the followings.

- When receiving and unpacking the product, dispose of unnecessary packaging materials in accordance with local laws and government ordinances.
- Failure to maintain the product and equipment may cause not only personal injuries and product or equipment troubles, but also environmental pollution. Implement the periodic maintenance of the product and equipment systematically and efficiently operate them.

  When disposing of any consumable or periodic replacement parts, follow the local laws and government ordinances.

Precautions on Product Disposal

⚠ CAUTION

- **When disposing of the product, follow the local laws and government ordinances.**

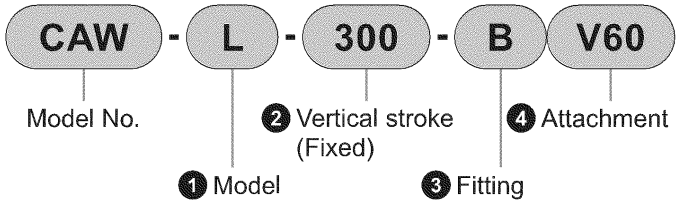
CONTENTS

1. PRODUCT OVERVIEW

1.1 Part Name

1.1.1 Product model number

Model Number Indication Method



1 Model

Code	Descriptions
L	Low load model
H	High load model

2 Vertical stroke (fixed)

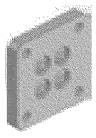
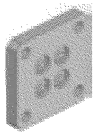
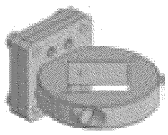
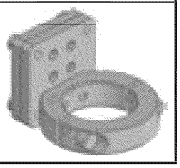
Code	Descriptions
300	300 mm (low load model)
450	450 mm (high load model)

3 Fitting

Code	Descriptions	
Blank	Without fitting	
U	Bottom mounting	
B	Ball fitting	

Note: Multiple selection is not possible.

4 Attachment

Code	Descriptions		
Blank	Without attachment		
F	Flange - thread		
F1	Flange - hole		
V40	ø30 to ø40	V-clamp	
V50	ø40 to ø50		
V60	ø50 to ø60		
V70	ø60 to ø70		
V80	ø70 to ø80		
D40	ø40	Round clamp	
D50	ø50		
D60	ø60		
D70	ø70		
D80	ø80		

Note: Multiple selection is not possible.

Discrete fitting and attachment model No.

CAW-U	Bottom mounting
CAW-L-B	Ball fitting for CAW-L
CAW-H-B	Ball fitting for CAW-H
CAW-F	Flange - thread
CAW-F1	Flange - hole
CAW-V☐	V-clamp (V40, V50, V60, V70, V80)
CAW-D☐	Round clamp (D40, D50, D60, D70, D80)

1.2 Specifications

1.2.1 Product specifications

Item \ Model number			CAW-L-300	CAW-H-450
Bore size		mm	ϕ32	
Usage environment			Indoor use (Excluding adverse environment with water or dust)	
Working fluid			Clean air ([Standard air circuit] Compressed air quality grade: equivalent to 1.5.1 to 1.6.1)	
Max. working pressure		MPa	0.25	0.45
Min. working pressure		MPa	0.18	0.26
Proof pressure		MPa	1.05	
Ambient temperature		℃	5～60	
Movable range	Vertical	mm	300	450
	Horizontal (*1)	mm	R750	R755
Port size			Rc1/4	
Cushion			Top end: Rubber cushion / Lowering end: Shock absorber	
Lubrication			Not available	
Load capacity (0.45MPa pressurized) (*2)		kg	5	15
Max. working speed (*3)		mm/s	300	
Air consumption (*4)		L/min (ANR)	4.3	5.4
Weight		kg	8.2	14.2

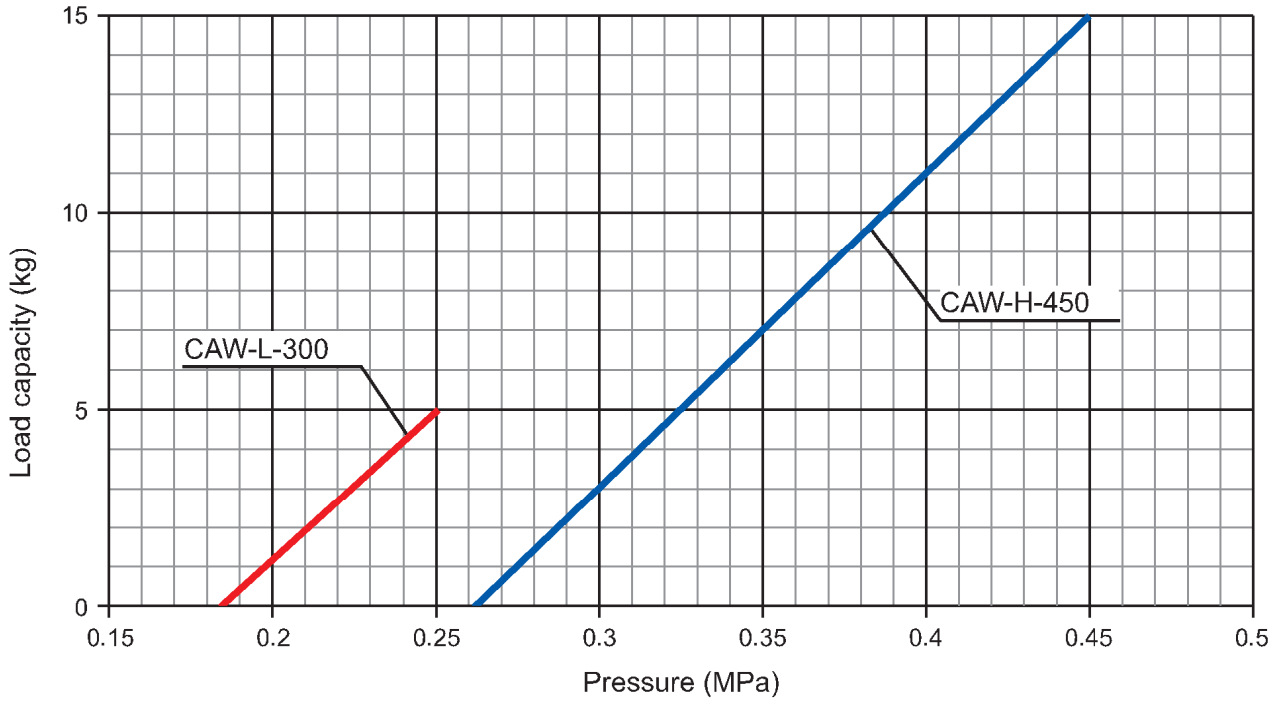
*1: Max. rotation radius of arm tip part. Refer to the dimensions for details on the movable range.
*2: Includes weights of fittings and attachments. Load capacity varies with the supplied pressure. Refer to “Load capacity under pressure” below.
*3: 40L/min (ANR) air is required when using continuously at the max. working speed. Supply compressed air with sufficient flow rate.
*4: Values are at air consumption 1 cycle/min., max. working pressure. The precision regulator RP1000 constantly releases air to the atmosphere.

1.2.2 Fitting / attachment weight table

(unit: kg)

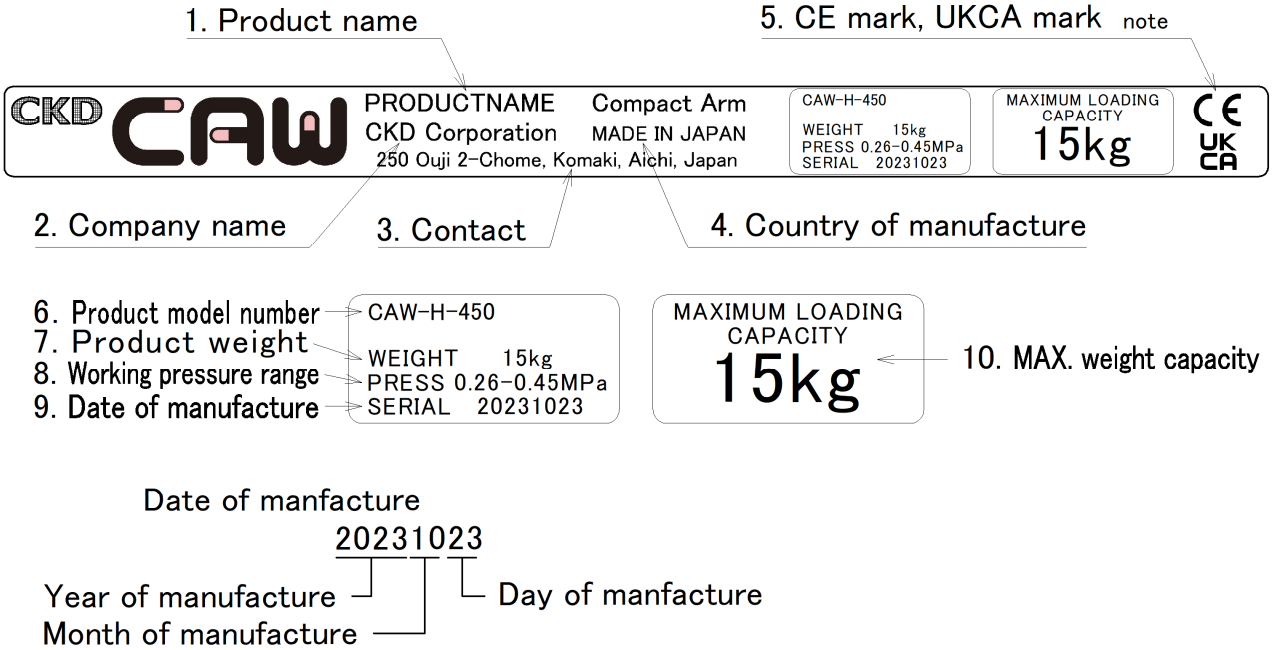
Option name	Discrete model No.	Weight	Option name	Discrete model No.	Weight	Option name	Discrete model No.	Weight
Bottom mounting	CAW-U	0.4	V-clamp	CAW-V40	1.5	Round clamp	CAW-D40	1.4
Ball fitting	CAW-L-B	0.6		CAW-V50	1.6		CAW-D50	1.6
	CAW-H-B	0.9		CAW-V60	2.0		CAW-D60	1.8
Flange - thread	CAW-F	0.5		CAW-V70	2.5		CAW-D70	1.9
Flange - hole	CAW-F1	0.5		CAW-V80	2.9		CAW-D80	2.3

1.2.3 Load capacity under pressure



Note: Pressure shows the pressure supplied to the "IN" side of the precision regulator.

1.2.4 Description of product name plate



note: CE mark, UKCA mark may not be affixed to some custom models.

2. System design

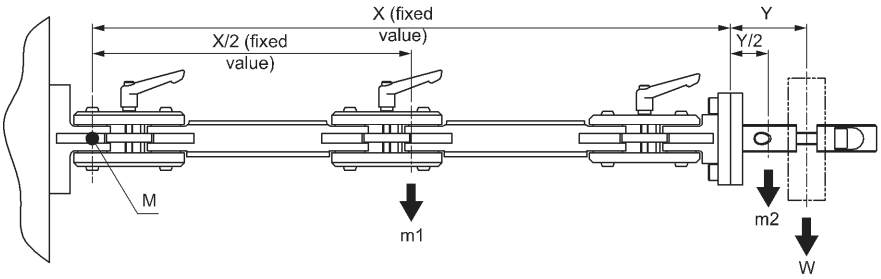
2.1 Moment load

Calculate the moment load below from the weight of the workpiece used, and select and design the fitting and attachment so that the maximum moment load is not exceeded.

Max. moment load

Model No.	M (N·m)
CAW-L-300	52
CAW-H-450	147

How to calculate moment load



$$M=\{(X+Y)\times W\}+\{(X+Y/2)\times m2\}+(X/2\times m1)$$

M : Moment load (N·m)
X : Arm length (fixed value, [CAW-L-300] 0.75m
[CAW-H-450] 0.755m)
Y : Distance from arm tip to center of gravity of workpiece (attachment center of gravity)
W : Weight of workpiece (N = kg × 9.8)
m1 : Arm weight (fixed value, [CAW-L-300] 33.3N (3.4 kg)
[CAW-H-450] 65.7N (6.7 kg)
m2 : Fitting, attachment weight (N = kg × 9.8)

Notes on using ball fitting

This product cannot be used in a lateral orientation.

Example of calculation:
CAW-H-450-BD70 (ball fitting + round clamp ø70) suspends the 10kg workpiece
X : Arm length [CAW-H-450] 0.755 m
Y : Distance from the arm tip to the center of gravity of the workpiece (center of gravity of attachment)
[From B (ball joint) dimensions] 0.041 m (41 mm)
W : Weight of workpiece: 98 N (10 kg)
m1 : Arm weight [CAW-H-450] 65.7N (6.7 kg)
m2 :Fitting, attachment weight (N = kg × 9.8)
[From B (ball fitting) weight] 8.82N (0.9 kg)
[From D70 (round clamp øweight] 18.62N (1.9 kg)

{(0.755 + 0.041)×98}+{(0.755 + [0.041/2])×
[8.82 + 18.62]}+([0.755/2]×65.7)
= 124.1N·m ...OK, since the max. moment load is not exceeding 147N·m

2.2 Position locking mechanism

The module check valve prevents sudden drops even if the air supply is shut off.

When the air supply is shut off, the cylinder internal pressure gradually decreases with bleed from the precision regulator and the arm slowly drops within several seconds to several tens of seconds (which varies with the weight of the workpiece and attachment mounted on the end).

To prepare for the interruption of air supply when not in use, lower the workpiece to the bottom end or return it to the home position after use.

If cut off during use, similarly lower the workpiece or return it to the home position while ensuring safety.

2.3 Fittings and attachments

2.3.1 How to assemble

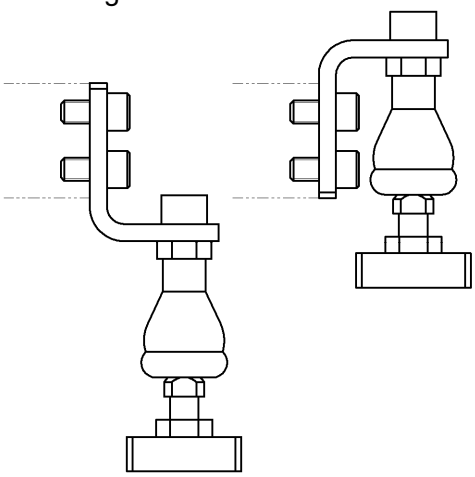
Fittings and attachments will be delivered in the disassembled state. Assemble at the tip of the arm at the specified torque by the customer.

Bolt size	Tightening torque N·m
M8	18.8
M10	37
M14	63

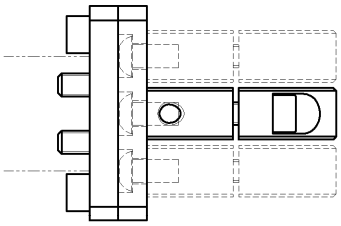
M10 and M14 are for ball fitting tightening

Select assembly orientation and mounting position for ball fitting, V-clamp and round clamp.

Ball fitting

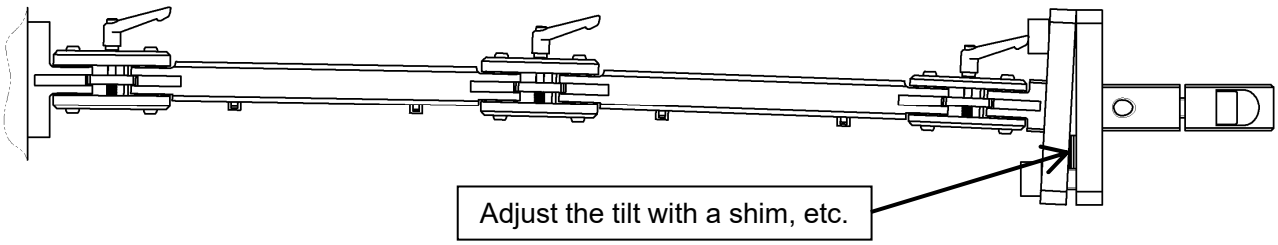


V-clamp, Round clamp



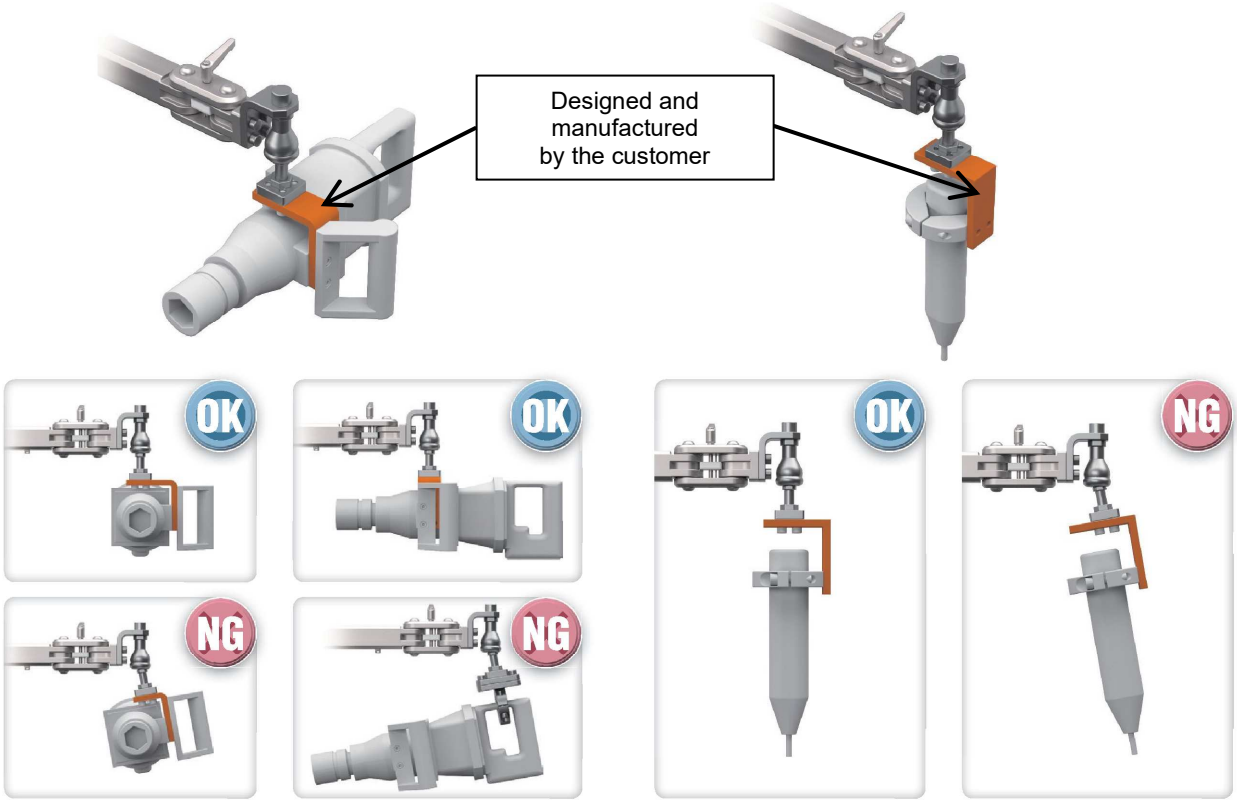
Rubber plates for dimension adjustment and scratch prevention are included with V-clamps and round clamps. Use as necessary.

Depending on the weight of the workpiece, the end may tilt. Adjust the tilt with a shim, etc., as necessary.



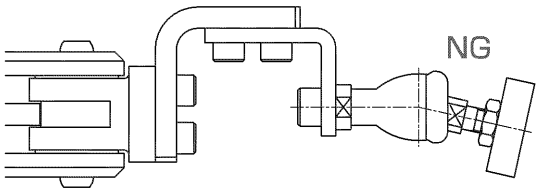
2.3.2 Notes on using ball fitting

When suspending the workpiece using the ball fitting, the customer must design and manufacture the attachment and bracket so that the workpiece can be suspended at the center of gravity where it is in the work orientation.



⚠ CAUTION

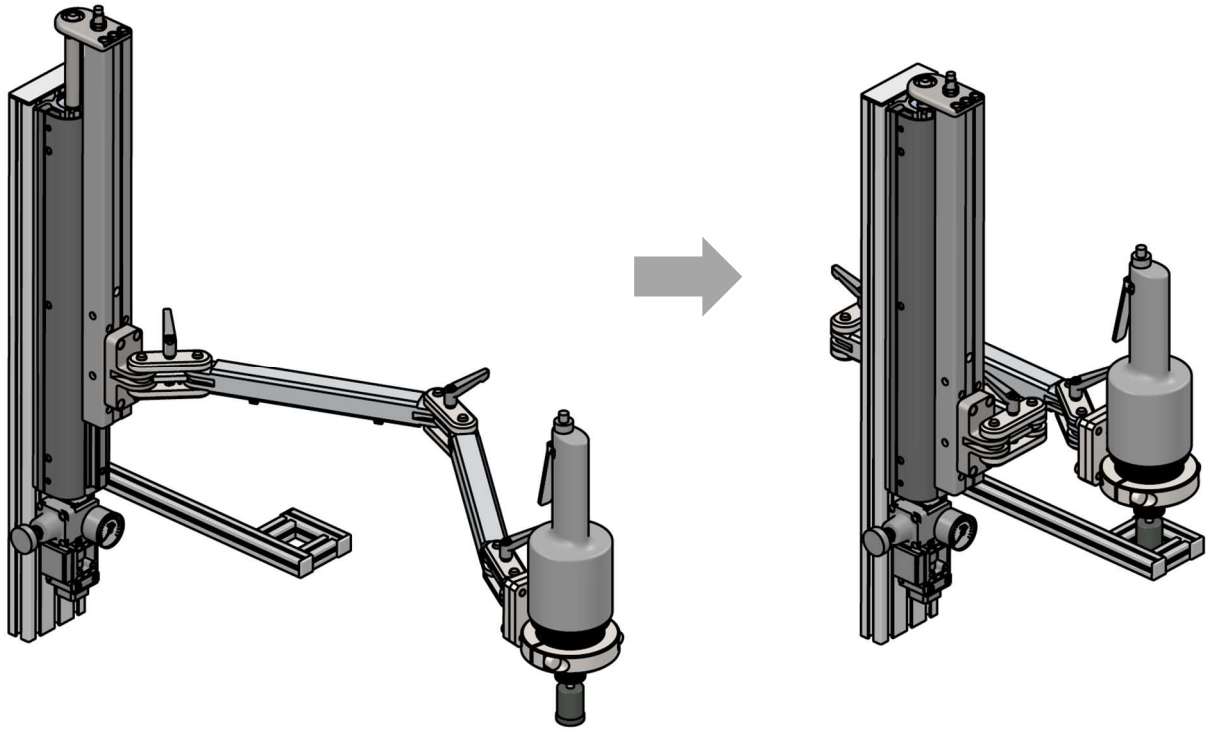
- **Ball fitting cannot be used in a lateral orientation.**

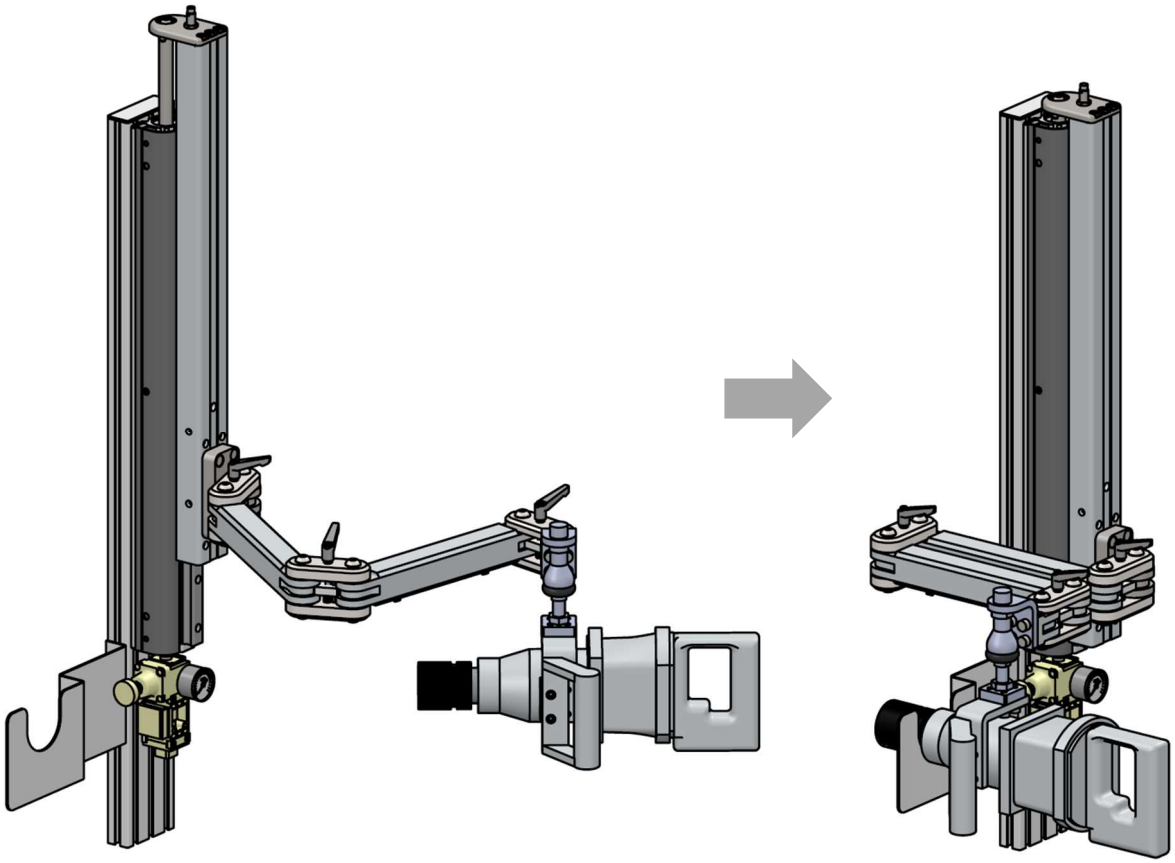


2.4 [Recommended] Home Position

When the operator's hand is removed from the tool, the horizontal position may not be maintained due to tilt during product installation or deflection of the arm due to the weight of the tool or other parts.

It is recommended to install a "home position" where the tool is stored in the specified location when not in use.





3. INSTALLATION

3.1 Transportation

Packing The product is packed in cardboard.

Product CAW-H-450 weigh over 15 kg after packing.

- Any item packed in a cardboard box exceeding 15 kg shall be lifted up by two or more persons and transported on a dolly or the like.

3.2 Unpacking

- Each crate or box must be unpacked by a repair person after checking that the top side is up.

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.

- After unpacking, dispose of unnecessary packing materials in accordance with the local laws and government ordinances.

3.3 Working and storage environments

The ambient temperature when used is 5 to 60°C.

The ambient temperature when stored is -10 to 60°C (no freezing).

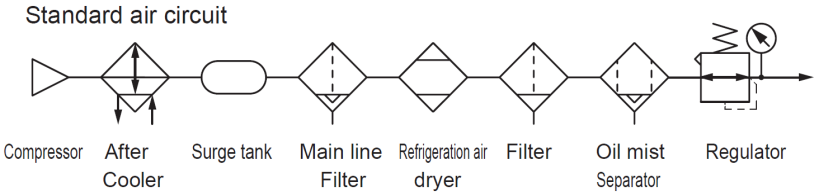
Do not use or store the product under the following environmental conditions.

- It is exposed to direct sunlight or radiant heat
- Firearms are nearby
- Water or oil can splash onto the product
- Atmosphere contains cutting chips, foreign matters or duct
- Corrosive or combustible gas are generated
- It is subject to vibrations or shocks
- X-ray is used
- Atmosphere contains a lot of salt or organic solvents

3.4 Piping

Refer to "1.2.3 Load capacity under pressure" for the supplied air pressure, and use within the appropriate working pressure range.

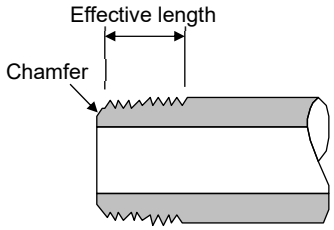
Supply clean air ([standard air circuit] compressed air quality grade: equivalent to 1.5.1 to 1.6.1).



It is unnecessary to lubricate the product. Lubrication may cause troubles. Do not lubricate it.

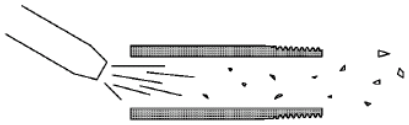
If carbides (carbon or tarry substances) in the compressor oil enter the circuit, the precision regulator and cylinders may cause malfunction. Make sure to maintain and inspect the compressor carefully.

- Use pipes that are made of corrosion-resistant materials after the filter such as zinc-plated pipes, nylon tubes, and rubber tubes.
- Use pipes with an effective cross-sectional area that allows the cylinder to achieve the predetermined piston speed.
- Install the filter for removing rust, foreign matters, and drainage from the piping as close as possible to the solenoid valve.
- Observe the effective thread length for the gas pipes.
- In addition, chamfer the threaded end of the pipes by about a 1/2 pitch.



- **Pipe cleaning**

Before piping, blow air into the pipes to clean the interior and to remove cutting chips and foreign matters.

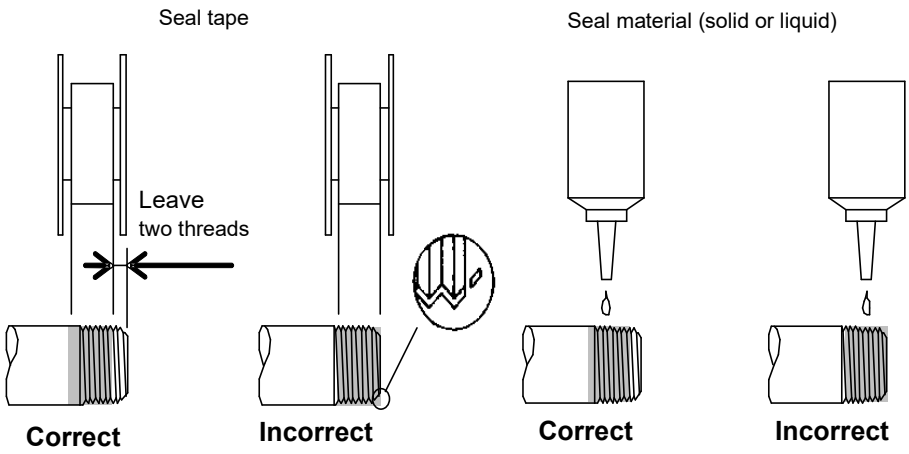


- **Seal material**

Use a seal tape or a seal material to stop leakage from piping.
Apply a seal tape or seal material to the screw threads leaving two or more threads at the pipe end uncovered or uncoated. If the pipe end is fully covered or coated, a shred of seal tape or residue of seal material may enter inside of the pipes or device and cause a failure.

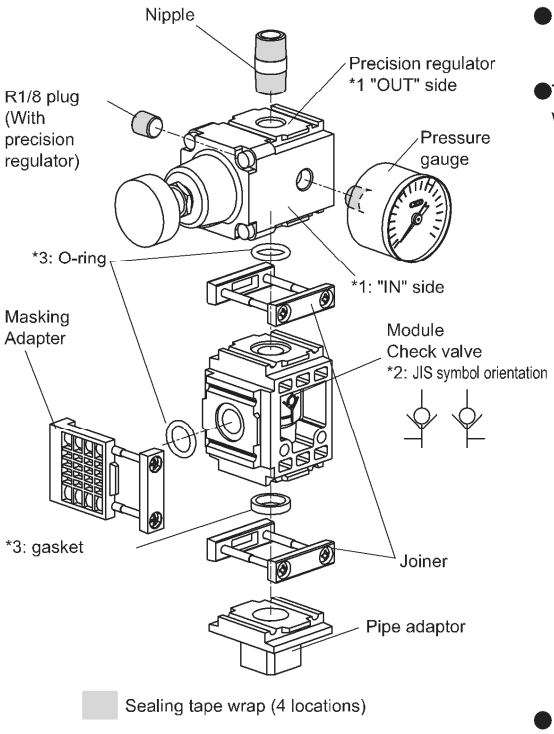
When using a seal tape, wind it around the screw threads in the direction opposite from the screw threads and press it down with your fingers to attach it firmly.

When using a liquid seal material, be careful not to apply it to resin parts. The resin parts can become damaged and this may lead to a failure or malfunction.
Also, do not apply seal material to the internal threads.



3.5 How to assemble

①Assemble the included air components.



● Wrap sealing tape around pressure gauge and R1/8 plug, and assemble them to the precision regulator. By changing the assembly position of the R1/8 plug and pressure gauge, the pressure adjustment knob position of the precision regulator can be reversed.

● The pipe adaptor, precision regulator and module check valve are connected with a joiner or masking adaptor.

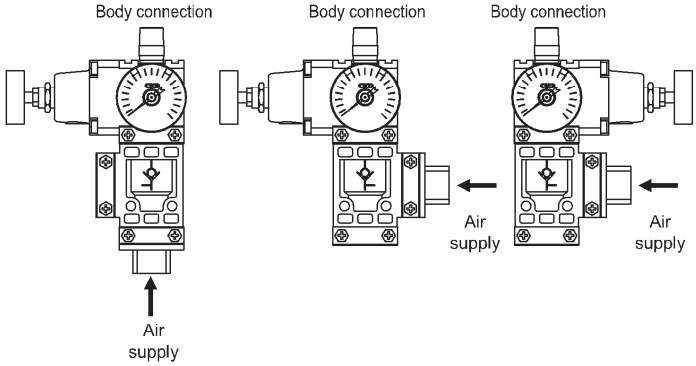
*1: Please note the orientation of the "IN" and "OUT" sides of the precision regulator.

*2: Check the symbol on the module check valve before connecting.

*3: Check the shape and position of the O-rings (2 pcs.) and gasket (1 pc.) before connecting.

*3: The pipe leadout direction can be selected by changing the pipe adaptor assembly position and masking adaptor assembly position.

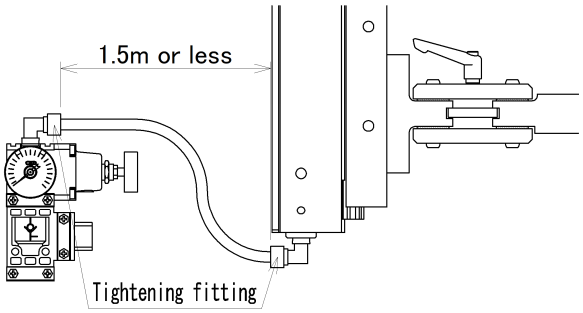
[Connection example]



● Assemble the fitting.
Recommended fittings: Single straight GWS8-8, single elbow GWL8-8

* The main unit and air equipment can be installed at a distance from each other by using a piping tube and a fastening fitting.

Make sure that the tube length is 1.5m or less.



Recommended Component: Tightening fitting Single straight MJS8-8, Single elbow MJL8-8
Tube Soft nylon tube F-1508

Recommended mounting bracket: L type bracket for Precision regulator RP1000 B131
T-bracket for Air unit B110-W (Used in place of Joiner)

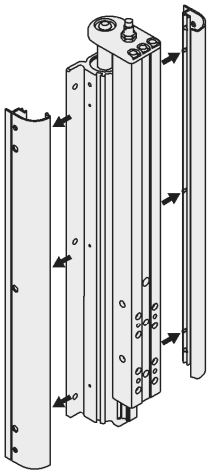
⚠ WARNING

▪ **When installing the product away from the air Component, use a Tightening fitting.**

If a push-in fitting (fitting GW Series, etc.) is used, unintended tube dislocation could cause the workpiece to dive, creating a dangerous situation.

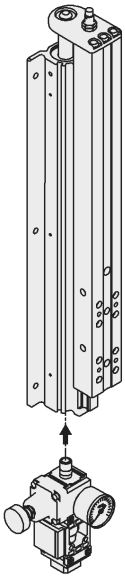
②Remove the right and left covers.
Since it uses a position locking screw, remove the cover while pulling it lightly.

Required tool: Phillips screwdriver Ph1



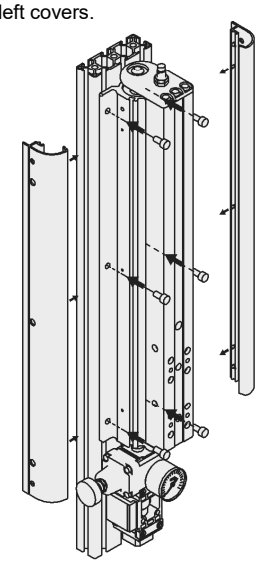
③[When directly installing air component]
Wrap sealing tape around the nipple and attach the air component to the cylinder.

Tightening torque: 6 to 8 N·m

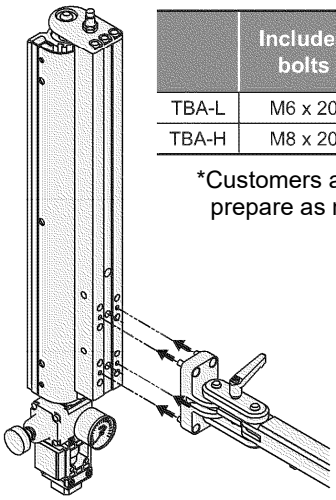


④Mount the cylinder section.
Mounting bolt: Hexagon socket head cap screw: M6×12
CAW-L : 6 units
CAW-H : 8 units
*Customers are asked to prepare as necessary.

Use a level gauge on the cylinder section Install vertically.
After installation, attach the right and left covers.



⑤Attach the arm section with the specified tightening torque with the included bolts.

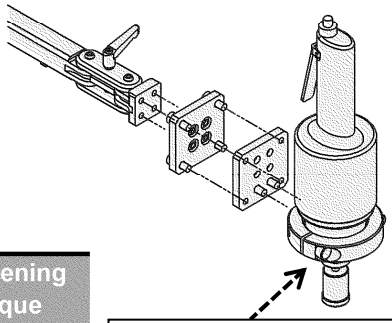


	Included bolts	Tightening torque N·m
TBA-L	M6 x 20	7.8
TBA-H	M8 x 20	18.8

*Customers are asked to prepare as necessary.

⑥Use any fitting, attachment, etc., to fix the tool to the arm tip.

Rubber plates for dimension adjustment and scratch prevention are included with V-clamps and round clamps. Use as necessary.



Bolt size	Tightening torque N·m
M8	18.8
M10	37
M14	63

M10 and M14 are for ball joint tightening

Rubber plates for dimension adjustment and scratch prevention are included with V-clamps and round clamps. Use as necessary.
Adjust the tightening torque of the tool fixing bolt according to the rigidity of the tool.

⑦Turn the pressure adjustment knob of the precision regulator counterclockwise to set the secondary side flow rate to 0 L/min and supply air. Gradually turn the pressure adjustment knob clockwise to adjust the pressure that is balanced. After adjusting the pressure, tighten the lock nut, and then set the pressure adjustment knob.

⚠ WARNING

- **Be sure to turn the pressure adjustment knob of the precision regulator "fully closed" (with the secondary side flow rate at 0L/min) to supply air.**

  If pressure is applied to the secondary side of the precision regulator when air is supplied, the arm may leap up.

4. Usage methods

4.1 Usage methods

▪ Range of load capacity

Use the product within the following load capacity.

Model No.	Load capacity (kg)
CAW-L-300	5
CAW-H-450	15

▪ Range of working pressure

Use the product within the following working pressure.

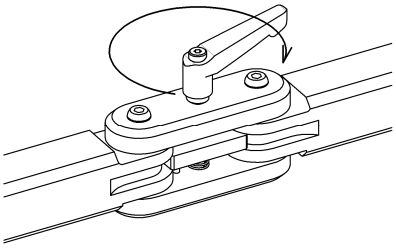
Model No.	working pressure (MPa)
CAW-L-300	0.18~0.25
CAW-H-450	0.26~0.45

4.2 Joint locking mechanism

A simple locking mechanism is provided at the joint.

Turning the lever can tighten it to lock the joint.

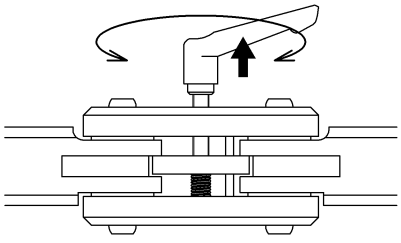
When finished, lock all joints or return to their home position (see page 6) to suppress unintended arm movement.



- This locking mechanism is a simple mechanism that suppresses the arm's flow (the arm moves freely when the hand is released). It is not designed to securely hold arm movement.

- Do not tighten further, starting from the point where the joint locks.The locking mechanism will be damaged.

- When the lever is pulled up, the engagement is released and the lever position can be moved freely, enabling orientation to be adjusted even if the lever interferes with the workpiece, etc.



5. MAINTENANCE AND INSPECTION

5.1 Periodic Inspection

In order to use the product safely under optimum conditions, an operator or a maintenance person must perform a periodic inspection every day.

5.1.1 Inspection item

Inspect the following items to make sure that there is no abnormality with the product.

Inspection item	Action
Check that the mounting bolts for fixing the cylinder and arm are not loose.	Tighten the bolts with appropriate tightening torque.
Check that the bolt holding the tool, attachment, etc., at the arm tip is not loose.	Tighten the bolts with appropriate tightening torque.
Check that there is no contamination or peeling of the warning labels.	Clean and re-apply the warning labels.
Check for air leakage.	Replace the packing.
Check if impact is absorbed at the bottom end.	Replace the shock absorber.
Check if vertical operation is smooth (no error resistance or abnormal noise).	Adjust the pressure for balancing the precision regulator.
	Lubricate the grease to the built-in guide.
	Since the parts are damaged or deformed, replace the product.
Check if the swivel operation is smooth (no error resistance or abnormal noise).	Loosen the lock lever.
	Since the parts are damaged or deformed, replace the product.
Check that there are no air leakage from piping parts and deterioration of piping materials or tubes.	Replace the piping materials and tubes.

If there is an abnormality, stop using the product, have a repair person check the situation, and take measures.

5.1.2 Maintenance of the product

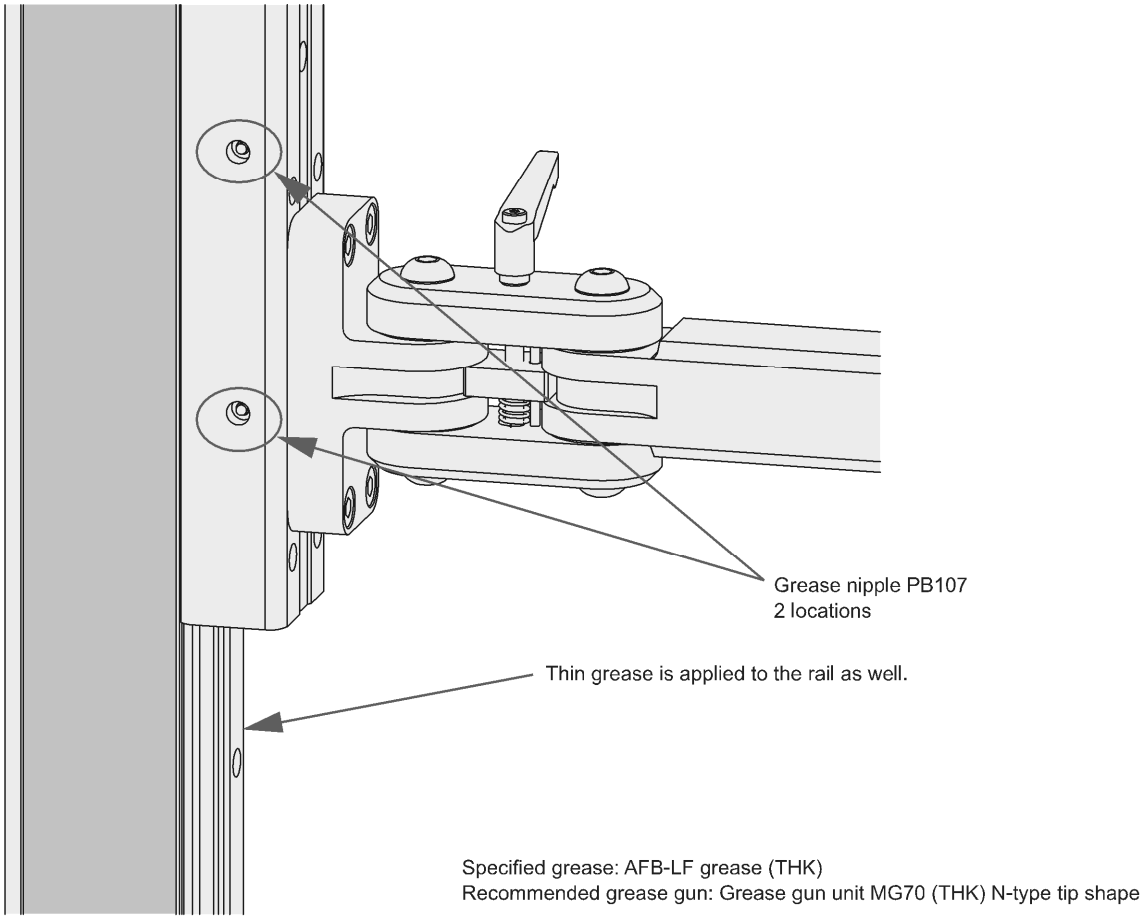
Maintenance person and Repair person should perform the maintenance work.

This product can be used without lubrication.

In normal use, lubrication to the built-in guide is not required. However, if the guide section is in poor movement, inject a small amount of designated grease into the two grease nipples.

Lightly apply grease to the rail ball raceway surface as well.

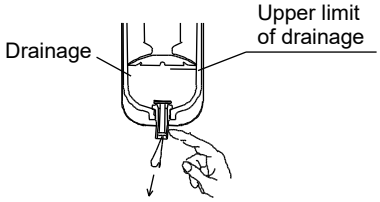
Since excessive injection or application of grease may increase the operating resistance, inject and apply grease little by little while observing the conditions.



5.1.3 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 precision regulator or the cylinder, be careful when performing maintenance or inspection of the compressor.



5.2 Disassembly

Repair person is responsible for disassembly and replacement.

- Before replacing parts, shut off the air supply and switch the residual pressure exhaust valve to discharge residual pressure.
  While replacing the valve, lock the residual pressure exhaust valve at the "exhaust position".

The cylinder part of this product can be disassembled.

If problems such as air leakage or impact absorption failure due to the shock absorber occur, disassemble referring to the 5.3 "Internal structure" and replace the parts in the consumable parts list.

5.2.1 How to replace Packing kit

- Remove the product from the device.

  Turn the pressure adjustment knob of [(10) Precision regulator] counterclockwise to set the supply pressure to 0MPa.

  Remove the tools at the arm end, remove [(8) Hexagon socket head cap screw], and remove the arm.

  Remove [(6) Cover] and remove the cylinder part from the device.

- Disassembly is performed at PUSH (with the piston rod protruding).

  In the PUSH state, use adhesive tape for [(4) Table] [(5) Body] fix with. (The linear guide does not have a stopper, so it may fall off if used as is.)

  Hold the width across flats of [(18) Floating joint] with a 14mm wrench, remove [(19) Hexagon socket button head bolt], and then [(24)C type snap ring] remove and pull out [(3) Piston rod] together with [(23) Rod metal].

  Replace [(22) Cushion rubber], [(25) Wear ring], and [(27) Piston packing]. Piston packing is mounted with grease up dedicated for cylinder interior (milky white) (has an orientation, refer to the 5.3 internal structure).

  [(28) C type snap ring] and remove [(29) Head cover].

  Replace [(30) Cylinder gasket]. Cylinder gasket is mounted with grease up dedicated for cylinder interior (milky white)

- Assemble in the reverse order. [(21) Slide plate] has front and back sides (refer to the internal structure 5.3).

  Tightening torque (19)Hexagon socket button head bolt[M8] : 18.8N･m ±10%

  (8)Hexagon socket head cap screw CAW-L-300[M6] : 7.8N･m ±10%
  CAW-H-450[M8] : 18.8N･m ±10%

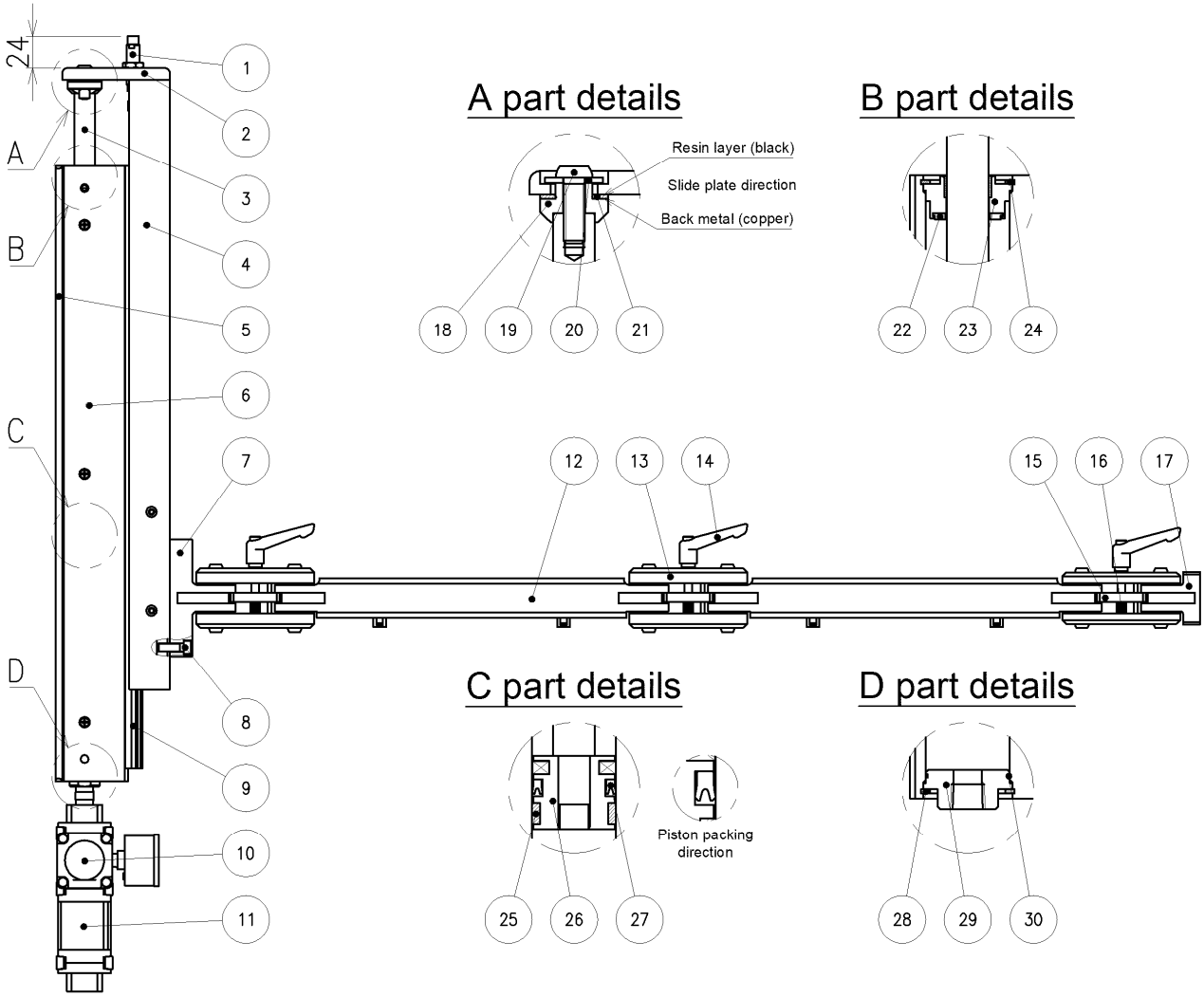
5.2.2 How to replace shock absorber

- Remove [(1) Shock absorber] from the product and replace with a new Shock absorber. (Two hexagon nuts are assembled to Shock absorber, but one is not used.)

  Tighten the hexagon nut with the end surface of a shock absorber positioned 24mm from [(2)End cover] (refer to the 5.3 internal structure).

  Tightening torque : 3.5N･m ±10%

5.3 Internal structure



Parts list

Part number	Part name	Material	Remarks
1	Shock absorber	Steel, etc	NCK-00-0.7-C
2	End plate	Steel	Zinc plated chromate treatment
3	Piston rod	Steel	Industrial chrome plating
4	Table	Aluminum alloy	Alumite treatment
5	Body	Aluminum alloy	Alumite treatment
6	Cover	ABS resin	
7	Base clevis	Steel	Zinc plated chromate treatment
8	Hexagon socket head cap screw	Steel	For arm tightening
9	Linear guide	Steel, resin	
10	Precision regulator	Aluminum alloy, etc.	Paint
11	Module check valve	Resin, stainless steel, etc.	Paint
12	Arm	Aluminum alloy	Chromate treatment
13	Link plate	Steel	Zinc plated chromate treatment
14	Lock lever	Steel, etc	Paint
15	Lock plate	Resin	
16	Lock plate spring	Stainless steel	
17	Clevis	Aluminum alloy	Chromate treatment
18	Floating joint	Steel	Zinc plated chromate treatment
19	Hexagon socket button head bolt	Steel	
20	Washer	Steel	Chromate treatment
21	Slide plate	Dry bearing	
22	Cushion rubber	Urethane rubber	
23	Rod metal	Aluminum alloy	Chromate treatment
24	C type snap ring	Stainless steel	
25	Wear ring	Polyacetal resin	
26	Piston	Aluminum alloy	Chromate treatment
27	Piston packing	Nitrile rubber	
28	C type snap ring	Stainless steel	
29	Head cover	Aluminum alloy	Chromate treatment
30	Cylinder gasket	Nitrile rubber	

Consumable parts list

Part name	Part model No.	Part content
Packing kit	CAW-32K	(22) Cushion rubber (25) Wear ring (27) Piston packing (30) Cylinder gasket Grease dedicated for cylinder interior
Shock absorber	NCK-00-0.7-C	

6. TROUBLESHOOTING

Problems, Causes, and Solutions

When any problem occurs during use of the product, stop using the product, have a maintenance person (or a repair person depending on the item) to check the situation, and take measures.

Problem	Cause	Solution
Product does not operate.	No pressure or insufficient pressures are applied to product.	Connect pressure sources.
	Incorrect assembly direction of precision regulator.	Check the direction of "IN" and "OUT" of the precision regulator, and assemble in the correct direction.
	Incorrect assembly direction of module check valve.	Check the direction of the code on the module check valve and assemble in the correct direction.
	The piston packing is damaged.	Replace the piston packing.
Upward and downward operating forces are uneven.	Pressures adjusted by precision regulator are high or low.	Re-adjust the pressures with the precision regulator.

7. Others

7.1 Dismantling

- The product shall be dismantled by a service person who has sufficient knowledge of machine assembly and pneumatic equipment assembly.

To dismantle the product, first remove all the tools and attachments on the arm tip, and follow the procedure for assembling in reverse to "3.5 How to assemble".

7.2 Disposal

When disposing of the product, follow the local laws and government ordinances.

7.3 EU / UK Declaration of Conformity

EU/UK Declaration of Conformity (CE/UKCA) is available on our website.

https://www.ckd.co.jp/productinfo/eu/

8. WARRANTY PROVISIONS

8.1 Warranty Conditions

- **Warranty coverage**

If the product specified herein fails for reasons attributable to CKD within the warranty period specified below, CKD will promptly 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 use or management that violates the "DANGER", "WARNING", and "CAUTION" precautions and other instructions stated in the catalog, the Specifications, or this Instruction Manual.
- 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 machinery or device of another manufacturer, which is attached to the product when in use, had been subjected to risk assessments that are defined and required in the product safety standards such the basic safety standards, the group safety standards, and the individual machinery safety standards classified according to ISO/IEC Guide 51and had functions and structures for securing safety.
- 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.

8.2 Warranty Period

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