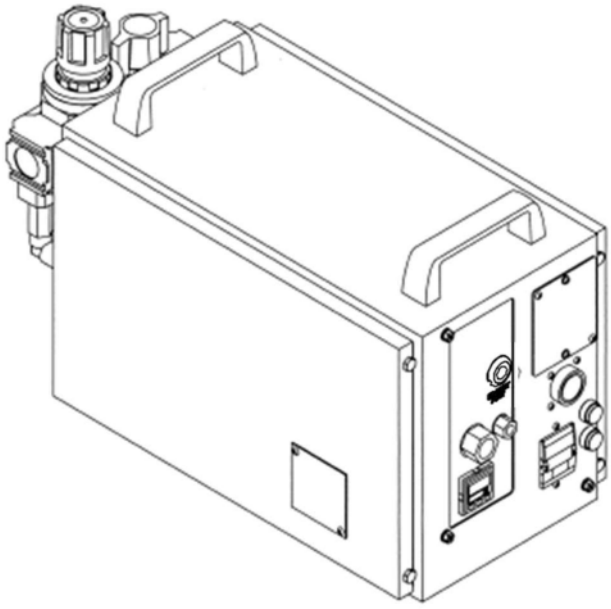
CKD

Power Arm Controller

PAW-B Series

Instruction Manual

SM-A21470-A/4



- Please read this instruction manual before using the product.
- Please carefully read the safety instructions.
- Keep this manual in an easily accessible location for future reference.

Introduction

Thank you for purchasing CKD's **Power Arm Controller "PAW-B Series"**. 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.

Power 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.
Power Arm Controller controls the pressure supplied to the body using electric signals.

And, keep the instruction manual in an easily accessible location for future reference. If you have any questions about this manual, please contact us.

Product specifications and appearances presented in this Instruction Manual are subject to change without notice.

The specifications for any special model may differ from those stated in this instruction manual. Check the specifications on the specification drawing, etc. of each product.

- 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:

JIS B 8370 (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:

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”.

Handle the product especially carefully when instructions are marked with DANGER.

⚠ **DANGER**	Indicates an imminently hazardous situation which will result in death or serious injury if the product is handled incorrectly.
⚠ **WARNING**	Indicates a potentially hazardous situation which could result in death or serious injury if the product is handled incorrectly.
⚠ **CAUTION**	Indicates a potentially hazardous situation which may result in personal injury or property damage if the product is handled incorrectly.

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 cautions and tips for use.
	Indicates electrical risks, such as electric shock, death, burn and fire.

Definition of persons for whom the manual is intended

This 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.

We define the following three categories of workers, and only the relevant workers are allowed to perform the described operation.

(1) Operators

These persons are allowed to operate Power Arm. The operators are required to acquire sufficient knowledge and operating skills to use this product. The operators shall carefully read this manual and sufficiently understand the operation procedures and safety precautions before operating this product.

(2) Maintenance personnel

These persons are allowed to perform the above operations of the operators and perform the periodic maintenance work, such as periodic inspection and replenishment and replacement of consumable parts. The maintenance personnel is required to acquire sufficient knowledge, operating skills and maintenance skills for this product. The maintenance personnel shall carefully read this manual and sufficiently understand the operation procedures, equipment characteristics, details of all operations and safety precautions before maintaining the product.

(3) Service persons (refer to the manufacturer that designs, manufactures and installs the equipment containing this product)

These persons are allowed to perform the operations, such as installation, assembly, adjustment and repair of this product, that require specific knowledge and skills. The service persons are 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 manual and sufficiently understand the safety precautions before installing, assembling, adjusting and repairing this product.

Wearing protective equipment

Operator	Safety shoes
Maintenance personnel ..	Electrical hard hat, insulating clothing, electrical boots, and electrical rubber gloves
Service persons	Electrical hard hat, insulating clothing, electrical boots, electrical rubber gloves, and other required protective equipment appropriate to their operations

Notes on using the product

⚠ DANGER

To connect the piping between the controller and the body, use screw fittings.

⚠ WARNING

This product is a controller designed to be connected to the body of Power Arm.

Before using the product, perform the risk assessment of the whole equipment to ensure the safety. The end user shall perform the risk assessment from the user's standpoint based on the information on residual risk of the whole equipment, and establish the safe operating procedures.

When any abnormality, such as vibration and noise, occurs, ensure your own safety first, and lock the arm in the vertical and rotation directions only when it is possible to do so safely.

Failure to do so may cause a fatal accident or serious damage to the product and equipment.

Do not modify the product or equipment without manufacturer's permission.

Never leave the product or equipment in the middle of operation or transfer.

Do not touch any live part.

When using, ground the ground terminal.

When connecting the air piping (electrical wiring) from the piping outlet of the body to the air circuit (electrical circuit), take care not to deform the air piping or electrical wiring or apply pulling stress.

The operators, maintenance personnel and service persons shall wear the specified protective equipment.

The arm may drop or rise due to failure of the device.

[Risk of falling]

Do not use the product as a ladder.

Do not climb on the product.

When the product is installed with the T bracket for wall mounting, do not push up the product from below.

[Risk of collision]

In the workplace, check that there are no obstacles or any other hazardous articles on the product or equipment.

When the product is installed on a wall, do not stand under the product.

[Risk of overturning]

When installing on a floor, select a rigid, finished and flat surface.

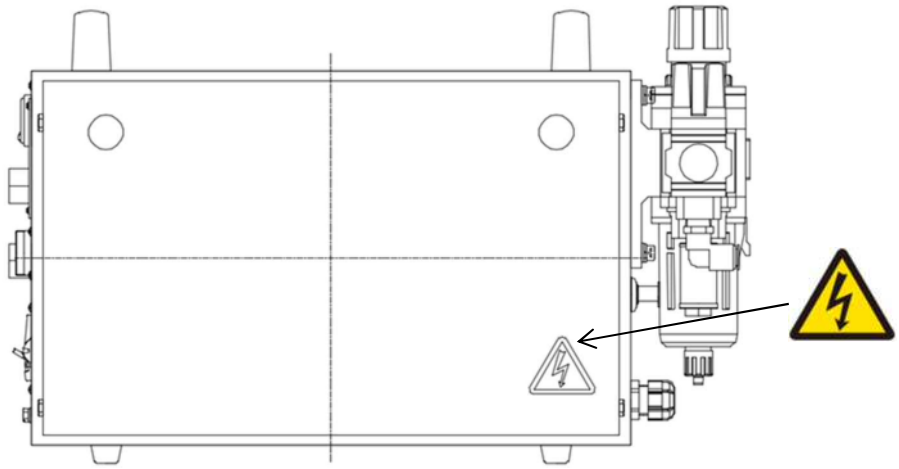
⚠ CAUTION

At the end of the day's work, if Power Arm is not used, turn off the power, close the residual pressure release valve, and discharge air.

When carrying the controller, hold the handles. It shall be carried by two persons.

Do not remove the hexagon bolts from the cover except when installing and maintaining.

Do not use the controller without the cover.



CAUTION: RISK OF ELECTRIC SHOCK
Do not remove the cover while power is applied.

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

Environmental precautions

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 part, follow the local laws and government ordinances.

Disposal precautions

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

Table of contents

1. Product Outline

1.1 Indication of model No.

1.1.1 Product model No.

Model numbering

PAW- B S 1 - DC - T

(a) Performance

(b) Number of axes

(c) Power supply

(d) Option

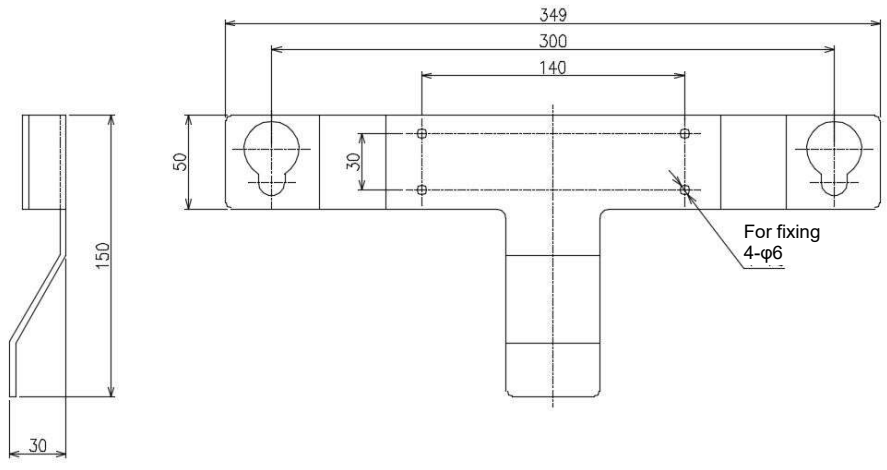
Symbol	Description
(a) Performance	
S	Standard
H	High-spec
(b) Number of axes	
1	1-axis
2	2-axes
(c) Power supply	
No symbol	Single phase, 100 to 220 VAC
DC	24 VDC
(d) Option	
T	T bracket
L	L bracket

* This is made to order, and the estimate will be made in each case.

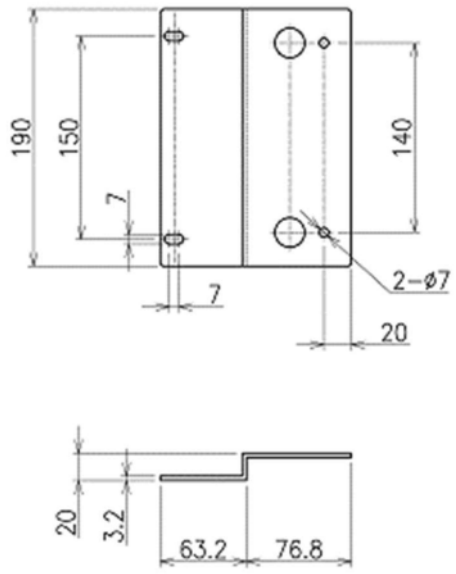
* Supplied with a 2.5 m long power cable (an AC cord with flat 2P plug + grounding pin for 100 VAC in Japan, or a 3-core (N, L, PE) cable with round crimp terminals for M5 for others).

1.1.2 Model No. of each optional part

PAW-B-T



PAW-B-L



1.2 Specifications

1.2.1 Product specifications

Item \ Model No.	PAW-BS□	PAW-BH□	PAW-BS□-DC	PAW-BH□-DC
Fluid used	Clean compressed air (JIS B8392-1: 2012 (ISO 8573-1:2010) [1:3:2])			
Max. working pressure	0.7 MPa			
Min. working pressure	0.35 MPa			
Withstanding pressure	1.05 MPa			
Supply voltage	Single phase, 100 to 220 VAC (50/60 Hz)		24 VDC +/- 10%	
Rated current	1 A		1.1 A	
Ambient temperature	5 to 50°C			
Ambient humidity	45 to 85%RH (no condensation)			
Ambient atmosphere	Indoors (no water or dust)			
Installation posture	Upright			
Lubrication	Not allowed			
Weight	14 kg	16 kg	14 kg	16 kg
Air supply port	Quick joint 10 in diam			

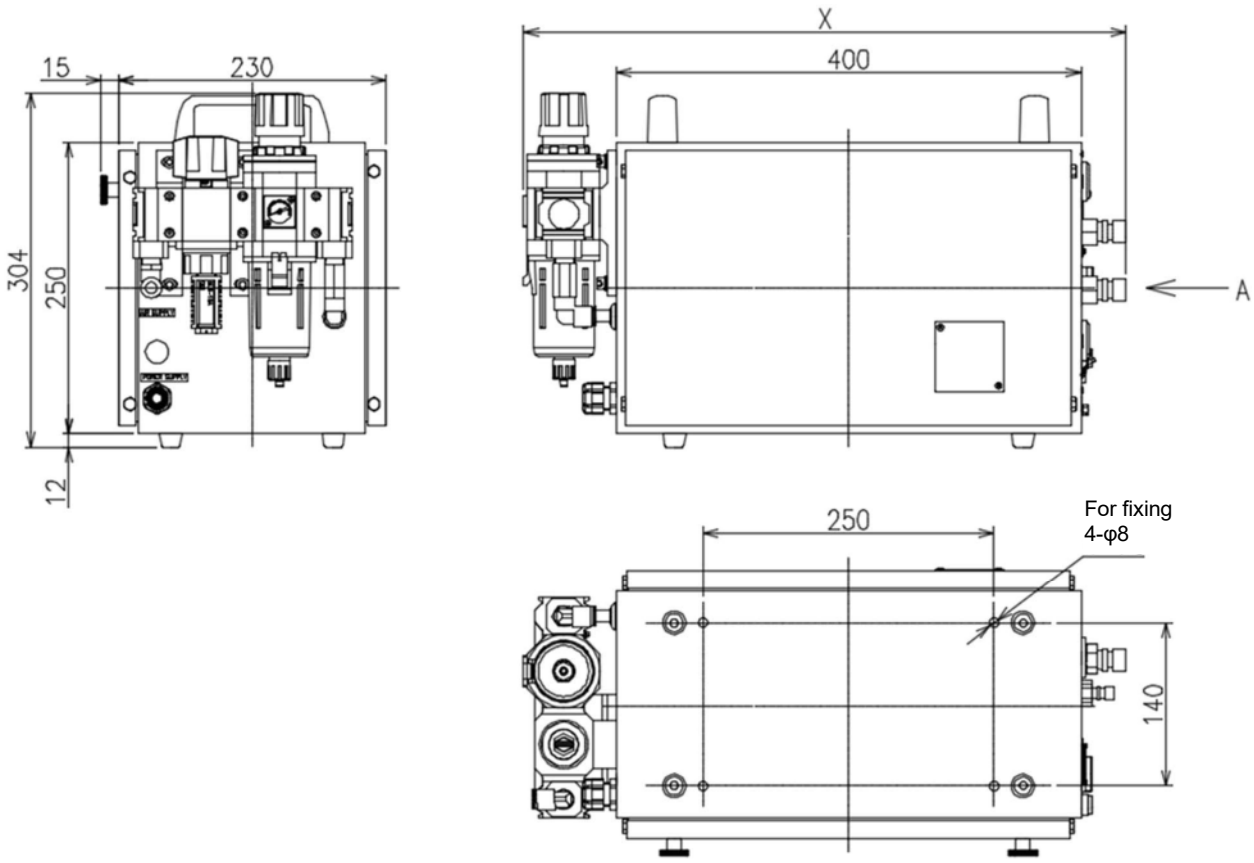
1.2.2 Performance specifications

Item \ Model No.	PAW-BS1□	PAW-BS2□	PAW-BH1□	PAW-BH2□
Input/output signals	Dedicated signals: input 3, output 2 General signals: input 1, output 2		Dedicated signals: input 3, output 2 General signals: input 9, output 7	
General-purpose single solenoid valve (4 in diam)	-		1 pc.	
General double solenoid valve (up to 8 in diam)	-		2 pcs.	
General port (4 in diam)	-		2 pcs.	
General port (up to 8 in diam)	-		3 pcs.	
Axis Note 1	1-axis	2-axes	1-axis	2-axes

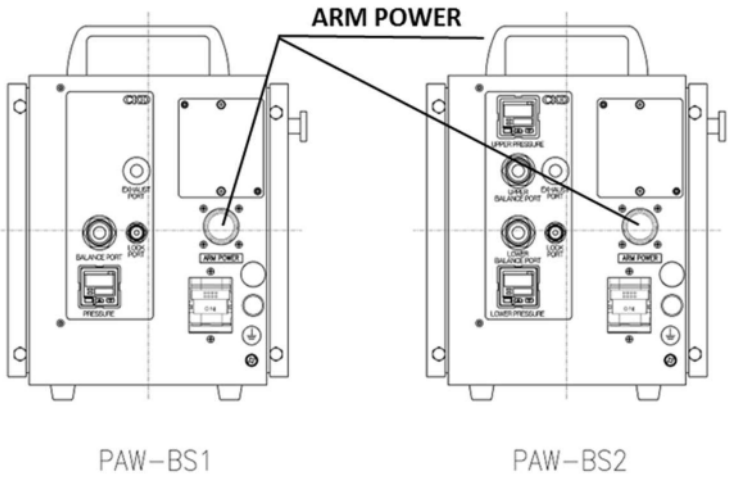
Note 1: The axes of the scalar arm and extension arm are excluded.

1.3 External dimensions

1.3.1 PAW-BS

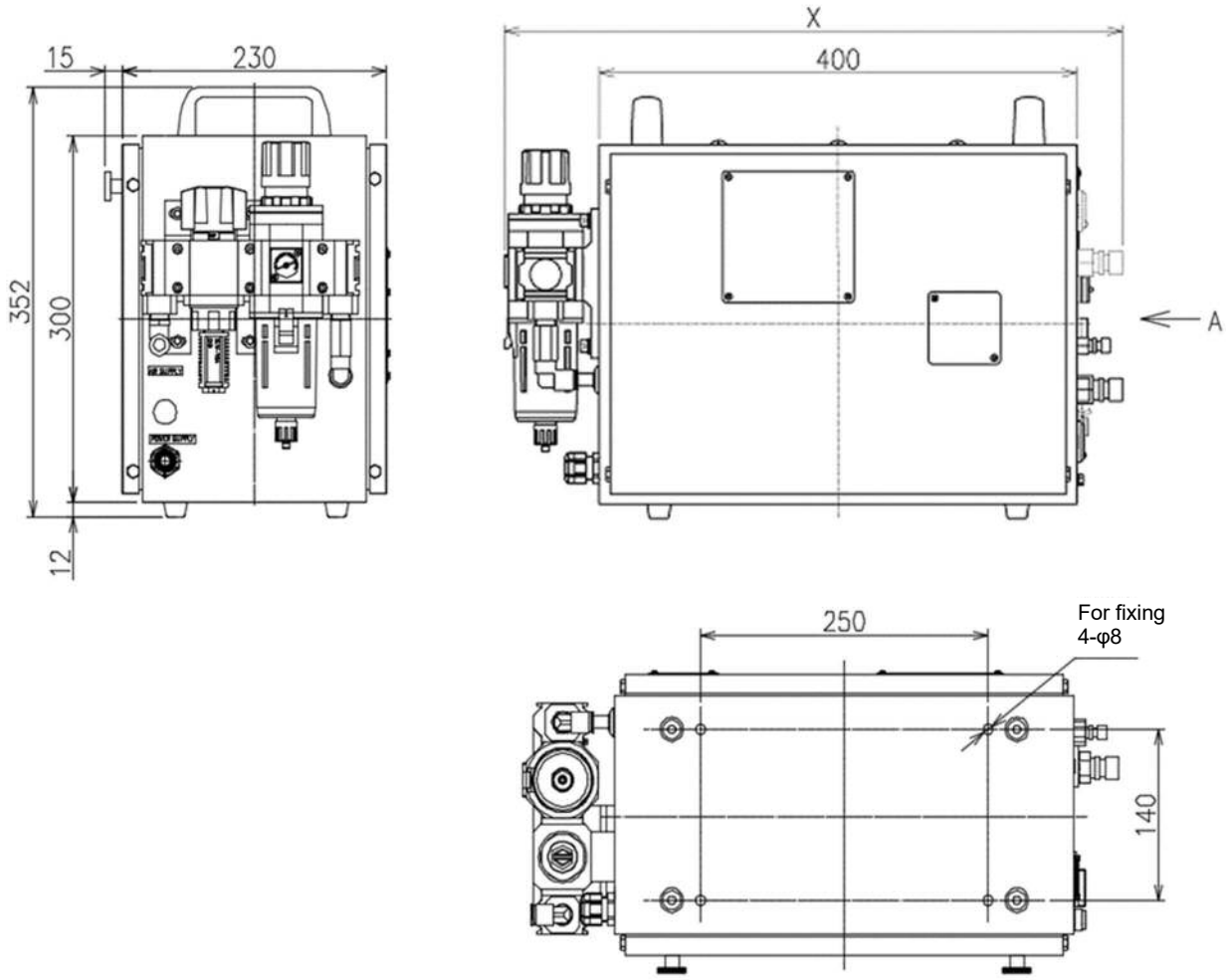


Combination	Number of axes	X
8, 8X	1	516
X, XS, Z, ZS		518
8X, XZ, 8XS, XZS	2	

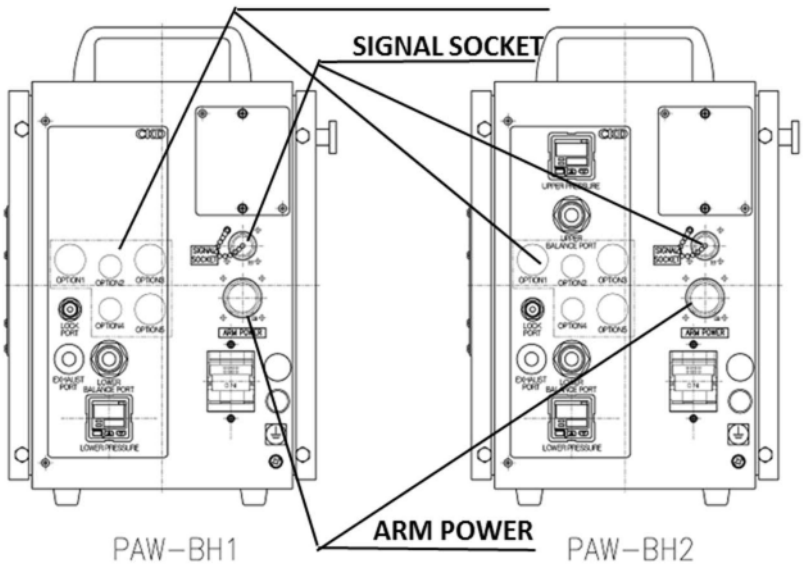


View A

1.3.2 PAW-BH



General port mounting positions



View A

2. Installation

2.1 Transportation

The product is packaged in any of the following two styles.

- Product: Packaged in cardboard box
- With cart: Basically crated. Packaged according to the shape and transport form in each case.

The total weight of the packaged product exceeds 15 kg.

Any cardboard box exceeding 15 kg shall be lifted by two or more persons and carried on a cart or the like.

The crated product shall be carried by the following two methods.

- Hoisting with a crane
- Lifting with a forklift or hand lift

Cranes, forklifts and hand lifts shall be operated by experts wearing protective equipment, such as a hard hat and safety shoes, (cranes and forklifts shall be operated by qualified experts), and the lifting height shall be limited to the minimum necessary.

The hoist and fork points shall be at the lowest level. Hoist and lift the product in a well-balanced state (at first, hoist slightly, lift, and make sure that it is well-balanced before carrying).

Any transporting method other than the above two methods is inapplicable. Never use any other method. It is prohibited to transport by humans.

It is prohibited to stack crates.

2.2 Unpacking

- The product shall be unpacked by service persons.
- Before unpacking, check the top and bottom.

Nails and staples are used on crates. When handling crates, wear a hard hat, safety shoes, long-sleeved work shirt, protective gloves and other protective equipment.

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

2.3 Storage

- The storage ambient temperature shall be -10 to 60°C (no freezing).
- The storage ambient humidity shall be 45 to 85%RH (no condensation).

Avoid storing under the following environmental conditions.

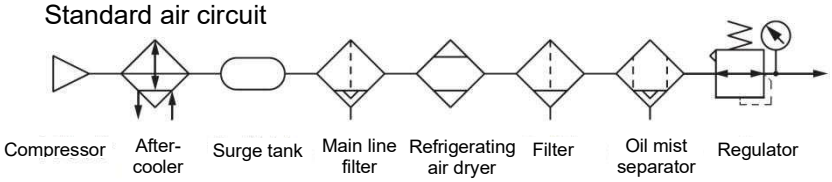
- Place under direct sunlight or radiation heat
- Place close to a burner or the like
- Place where the product may be splashed with water or oil
- Place with chips, trash or dust
- Place where corrosive or combustible gas may be generated
- Place where the product may be exposed to vibration or shock
- Place where X rays are used
- Place with much salt or organic solvents

2.4 Piping method

2.4.1 Air pressure source

- Supply air pressure within a range from [required pressure (see the table of weight capacity at pressure on page 4 of SM-A13989) + 0.1 MPa] to 0.7 MPa.
- Supply clean air (conforming to JIS B8392-1: 2012 (ISO 8573-1: 2010) [1:3:2]).

Standard air circuit

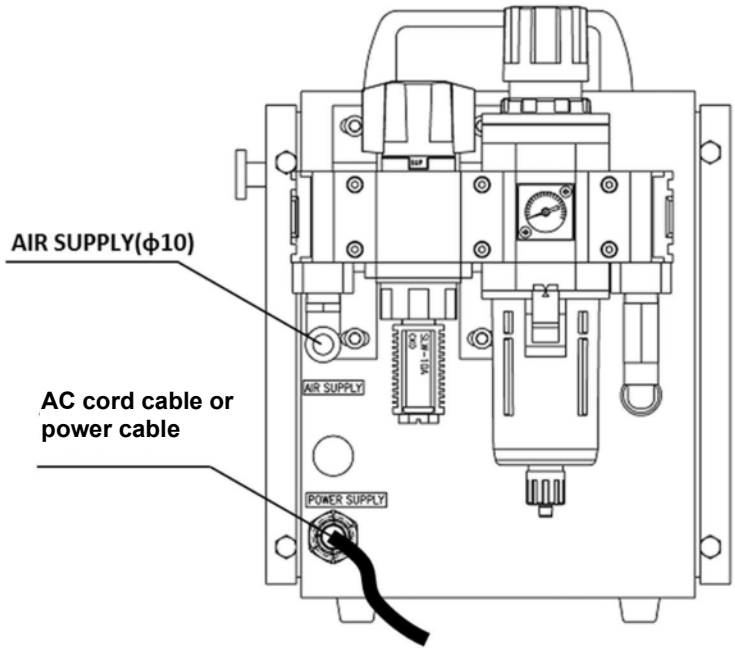


- This product is lubrication-free. Lubrication may cause trouble. Do not lubricate it.
- If carbonized compressor oil (carbon or tarry substances) enters the circuit, the electromagnetic valve and cylinder may malfunction. Maintain and inspect the compressor with sufficient care.

	Connect the air pressure piping securely so that it will not be disconnected during use. Take care not to deform the piping or apply pulling stress to it.

2.4.2 Piping connection

Connect the 10-diam tube to the AIR SUPPLY quick joint, and supply clean compressed air.



Connect the air piping of the body of Power Arm to the joint of the port appropriate to the body model number referring to the following table.

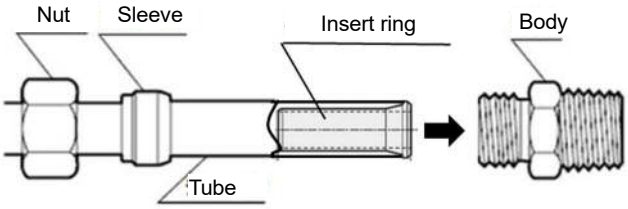
PORT \ Body	8, 8S	X, XS Z, ZS	8X 8XS	XZ XZS
LOCK	LOCK (φ4)			
UPPER BALANCE	-	-	UBP (φ8)	UBP (φ10)
(LOWER) BALANCE	BP (φ8)	BP (φ10)	LBP (φ10)	LBP (φ10)

Connect the piping in accordance with the following procedure.

1 Fit the nut and sleeve to the tube in that order, and fit the insert ring to the inside of the tube (it has been mounted in the air tube of the body of Power Arm).

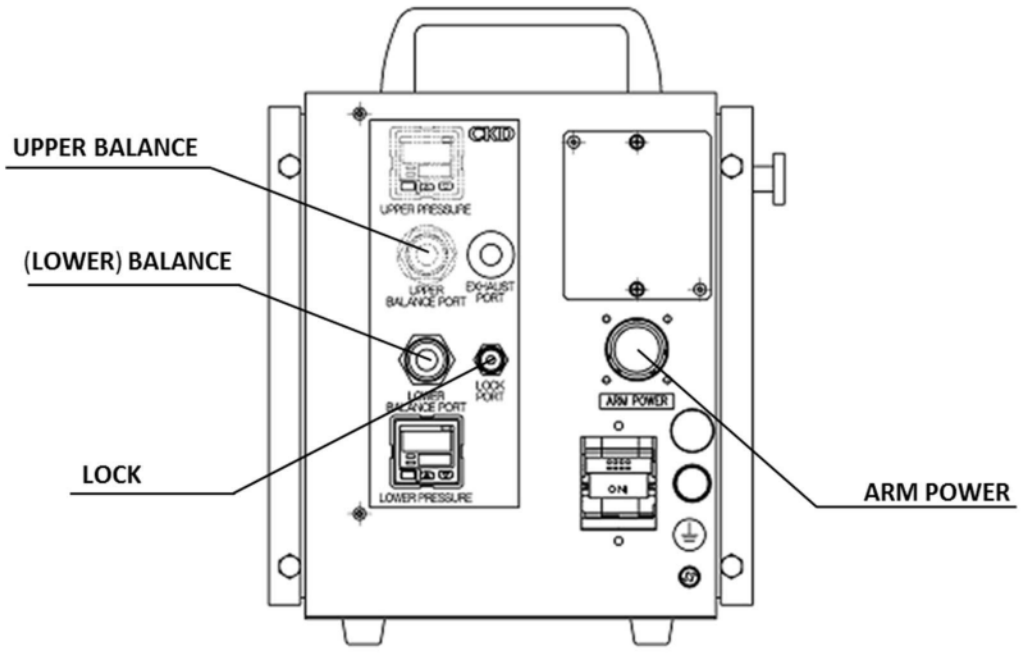
2 Insert the tube until it touches the joint body, and tighten the nut by hand.

3 Tighten with a spanner. The proper tightening turn is twice.

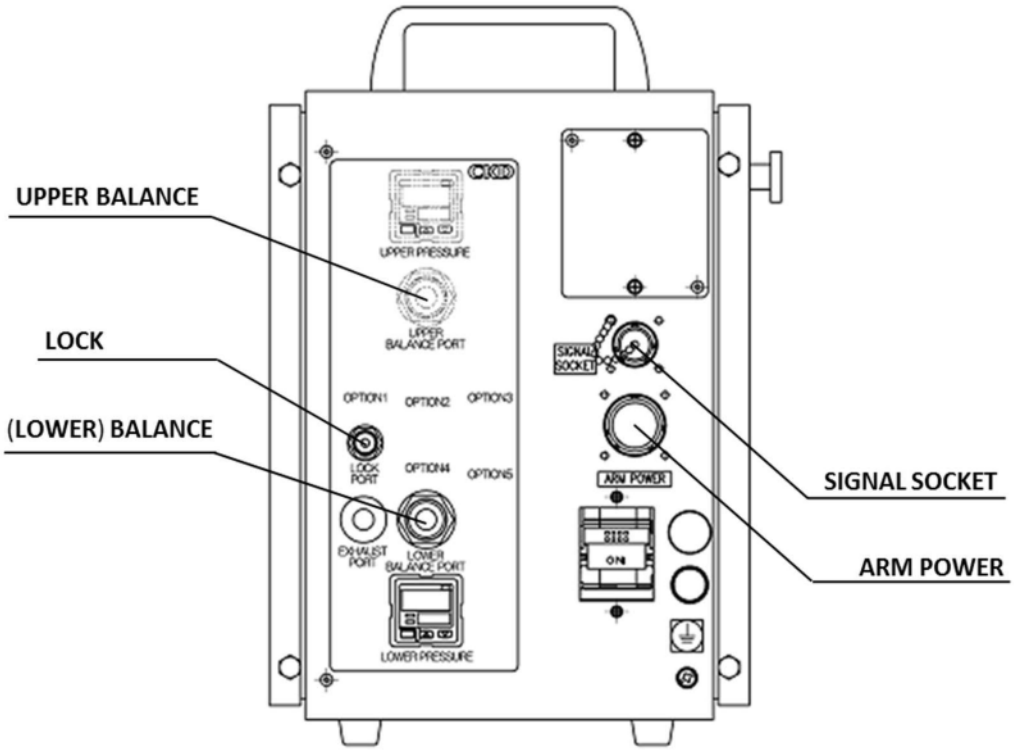


Make sure to confirm that the port name and the piping label are same before connecting.

Make sure to confirm that the connected piping don't come out by pulling lightly after the connecting work.



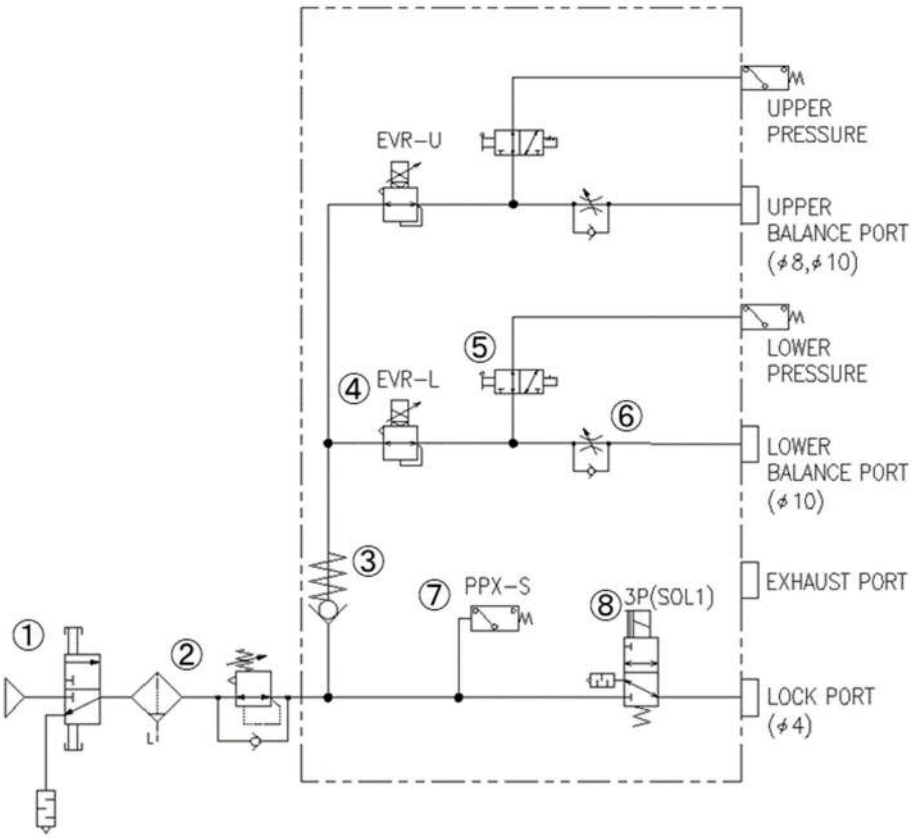
PAW-BS


UPPER BALANCE
LOCK
(LOWER) BALANCE
SIGNAL SOCKET
ARM POWER
UPPER PRESSURE
UPPER BALANCE PORT
OPTION1
OPTION2
OPTION3
LOCK PORT
OPTION4
OPTION5
EXHAUST PORT
LOWER BALANCE PORT
LOWER PRESSURE
SIGNAL SOCKET
ARM POWER
ON

PAW-BH

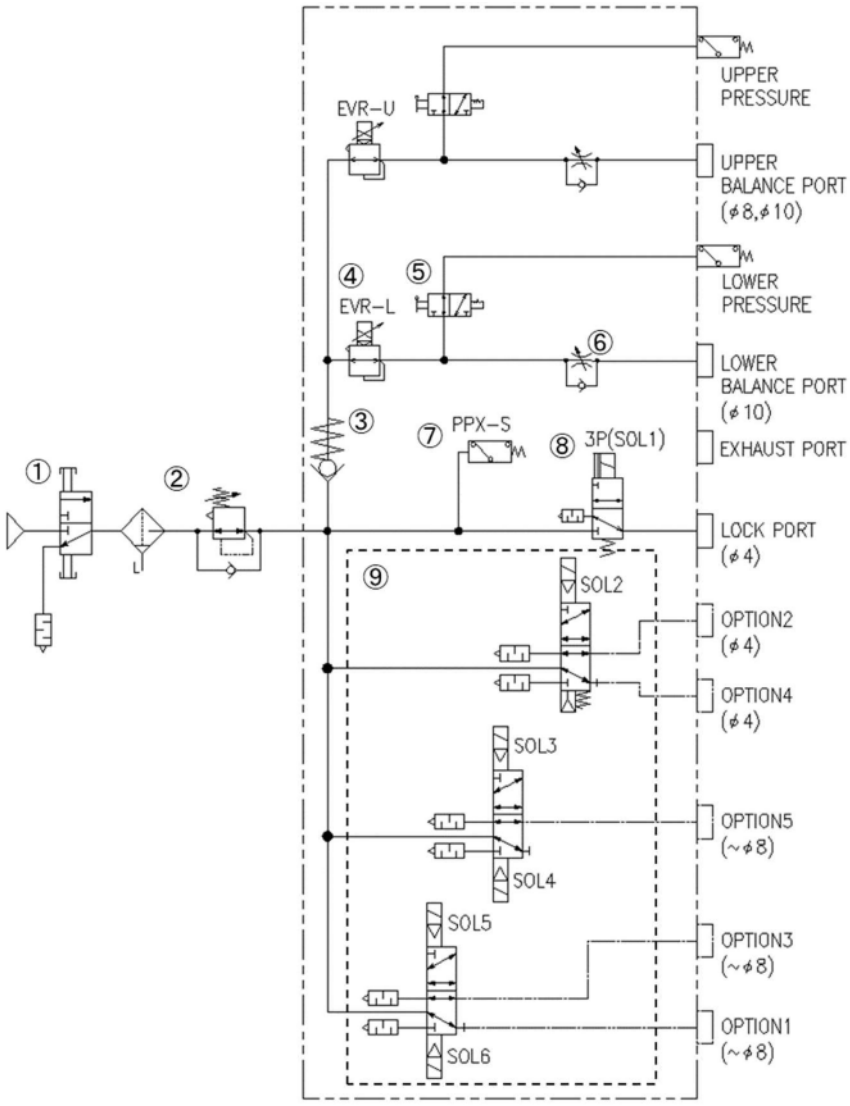
2.4.3 Air circuit

■ PAW-BS



No.	Product name	Model No.
①	Residual pressure release valve	V3000-10-W-S
②	Reverse filter regulator	W3100-10-W
③	Check valve	CHV2-10
④	Electropneumatic regulator	EVR-2909-18
⑤	Quick valve	3QV-06-06
⑥	Speed controller	SCL2-10-H1010
⑦	Digital pressure sensor	PPX-R10P-6M-J
⑧	Electromagnetic valve	3PB210-06-C1-3

■ PAW-BH



No.	Product name	Model No.
①	Residual pressure release valve	V3000-10-W-S
②	Reverse filter regulator	W3100-10-W
③	Check valve	CHV2-10
④	Electropneumatic regulator	EVR-2909-18
⑤	Quick valve	3QV-06-06
⑥	Speed controller	SCL2-10-H1010
No.	**Product name**	**Model No.**
⑦	Digital pressure sensor	PPX-R10P-6M-J
⑧	Electromagnetic valve	3PB210-06-C1-3
⑨	Manifold valve	M4GB280R-CX-E0N-3-FLA18041-3

2.5 Wiring method

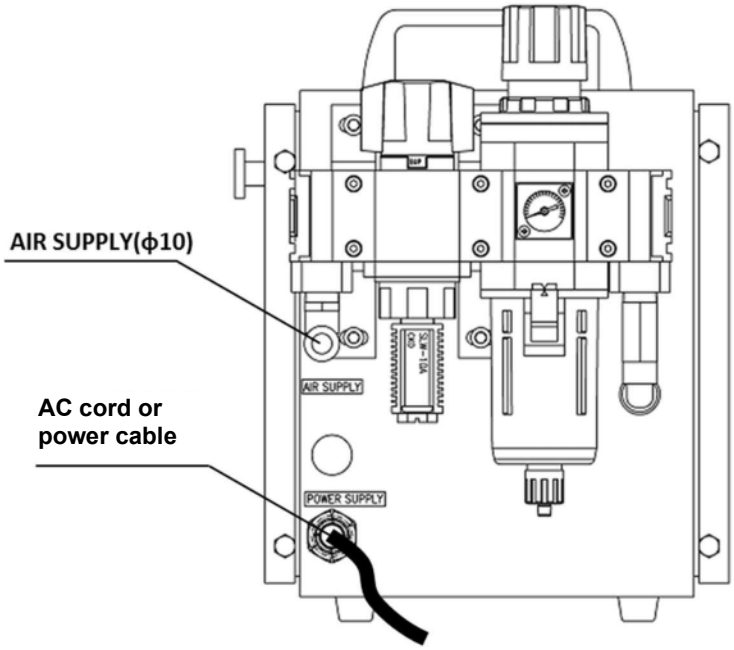
2.5.1 Connecting to a power supply

Connect the controller to a power supply suitable for the specifications.

- In the case of 100 VAC power supply in Japan
  Insert the plug of the AC cord coming from POWER SUPPLY into a 100 VAC outlet.

- In other case
  Connect the three round crimp terminals (M5) of the supplied power cable to the power supply and ground.

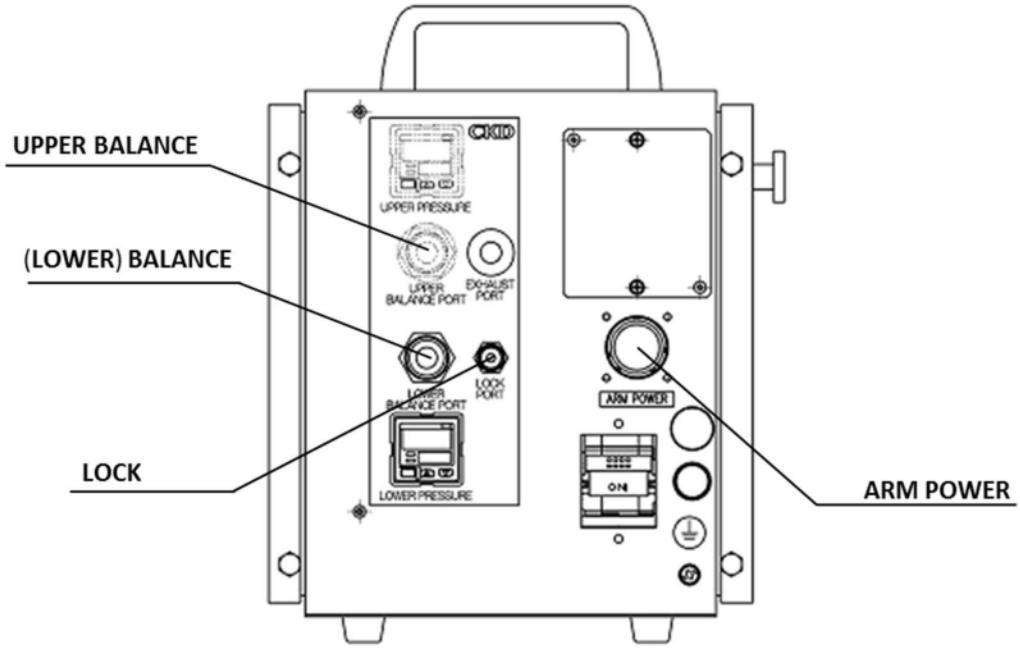
When connecting the power cable, make sure that the power supply on the primary side is disconnected.



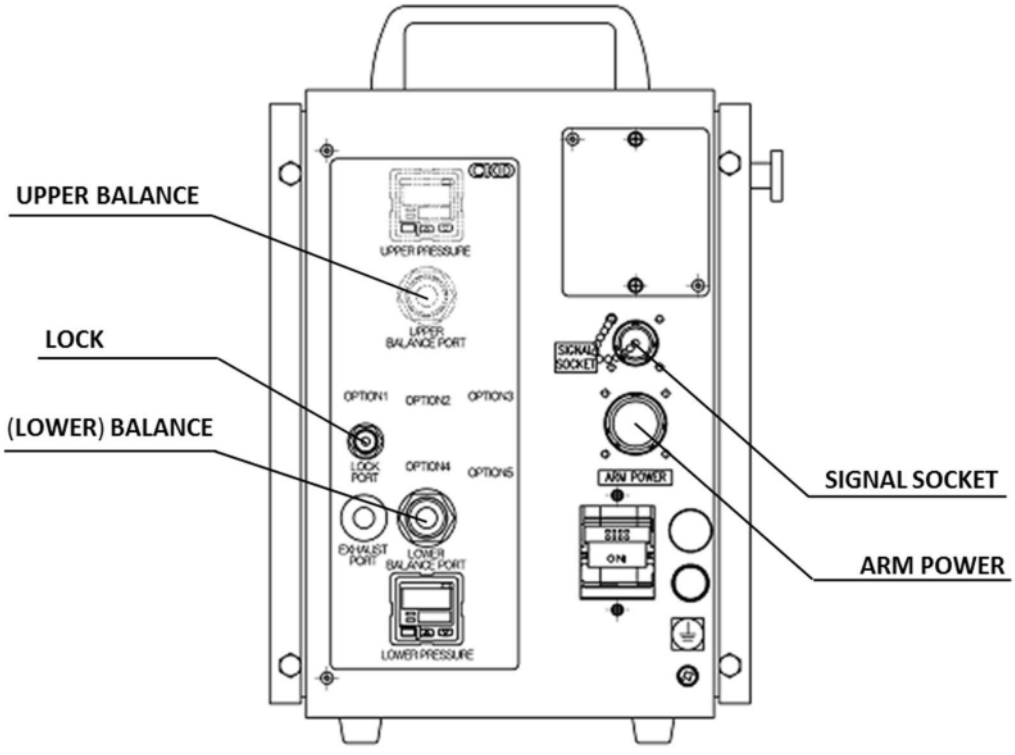
2.5.2 Connecting the body of Power Arm

Connect the connector of the cable coming from the body to the ARM POWER connector on the controller side.
Align the connector, push it all the way in, and tighten the screw completely.

For a high-spec model with two cables coming from the body, connect the large connector to ARM POWER, and connect the small connector to SIGNAL SOCKET after removing the cap.


UPPER BALANCE
(LOWER) BALANCE
LOCK
ARM POWER
UPPER PRESSURE
UPPER BALANCE PORT
EXHAUST PORT
LOWER BALANCE PORT
LOCK PORT
LOWER PRESSURE
ARM POWER
ON

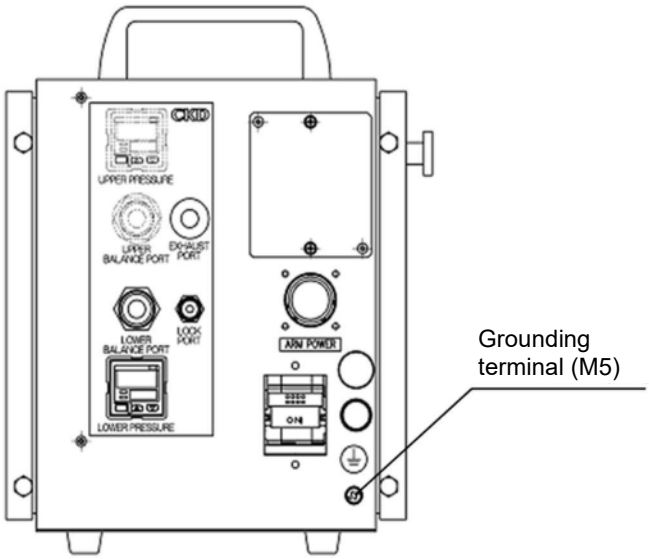
PAW-BS


UPPER BALANCE
LOCK
(LOWER) BALANCE
SIGNAL SOCKET
ARM POWER
UPPER PRESSURE
UPPER BALANCE PORT
OPTION1
OPTION2
OPTION3
LOCK PORT
OPTION4
OPTION5
EXHAUST PORT
LOWER BALANCE PORT
LOWER PRESSURE
ON

PAW-BH

2.5.3 Connecting the grounding terminal

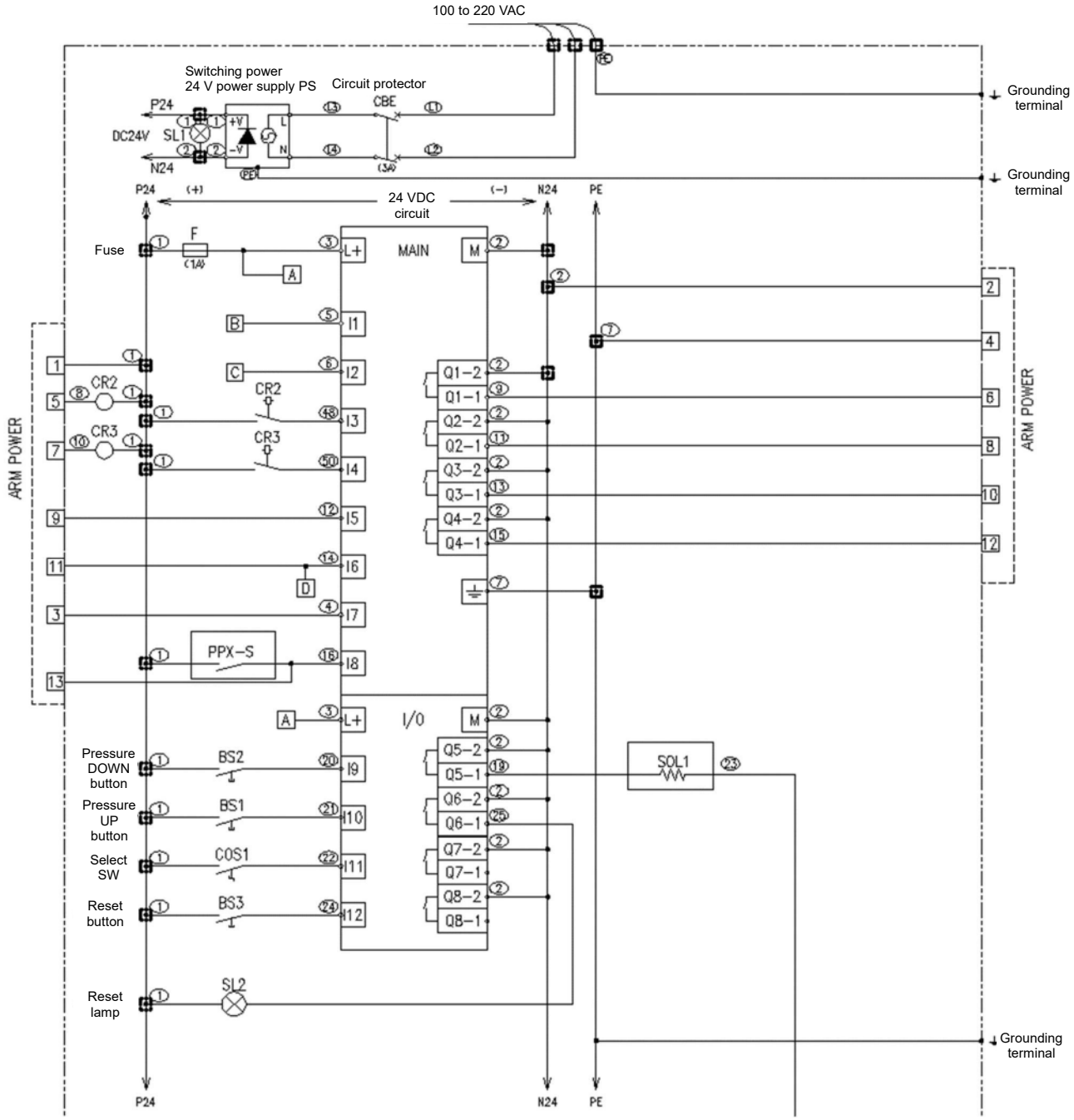
Connect a grounding wire to the grounding terminal (M5) on the product side.
The grounding wire must be prepared by the customer. Use a grounding wire of AWG18 or more.

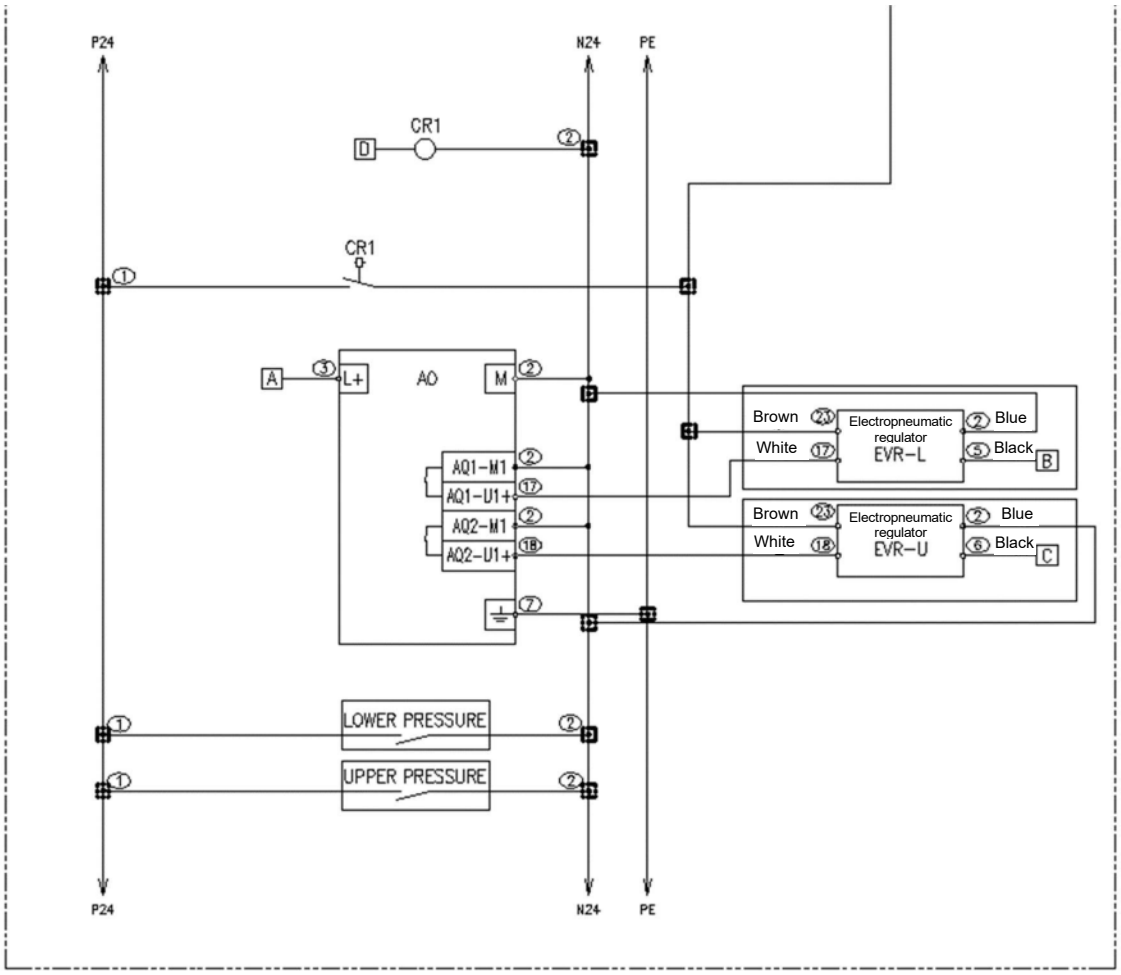


If the controller is used without grounding, malfunction due to noise or electric shock may occur.

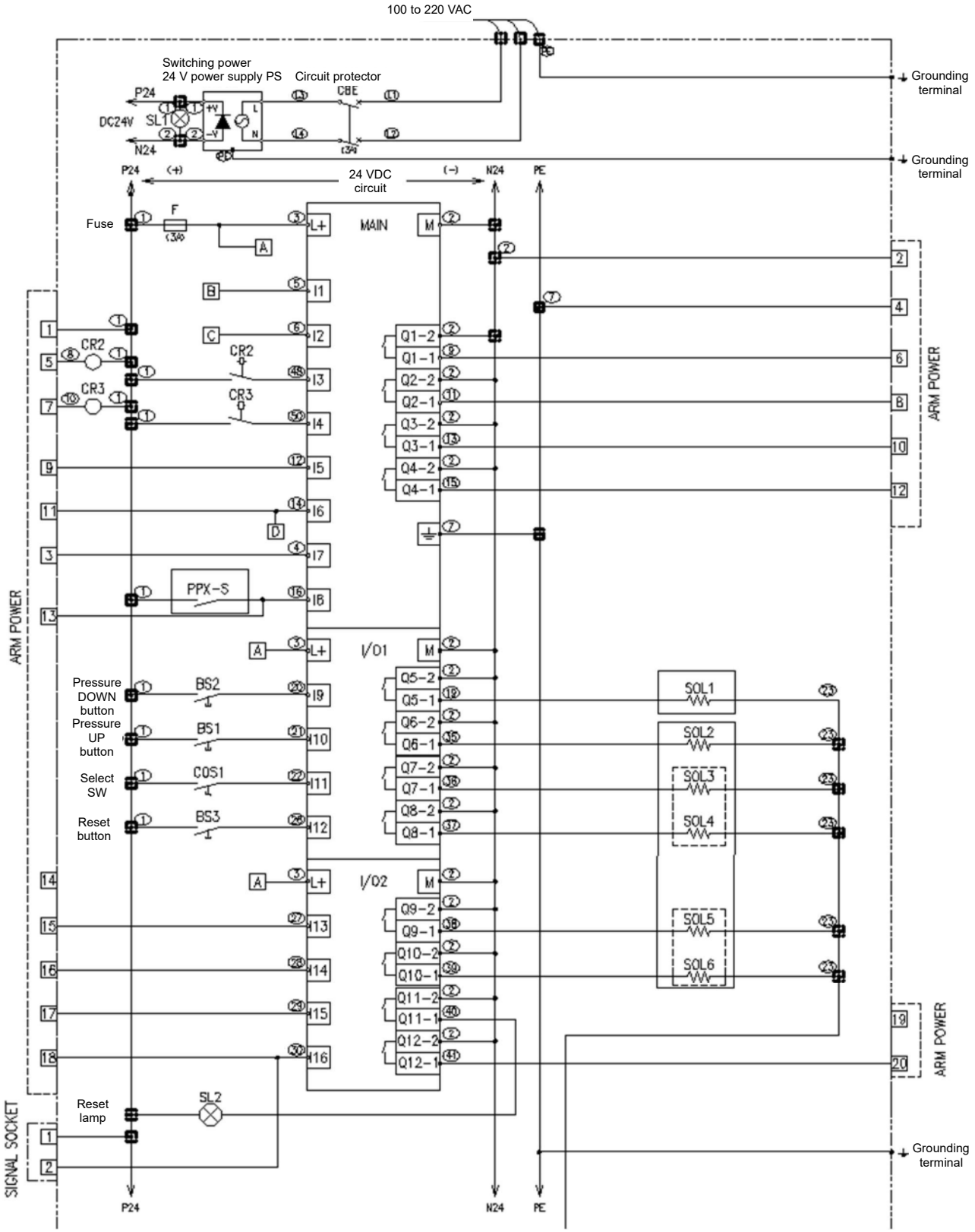
2.5.4 Electric circuit diagram

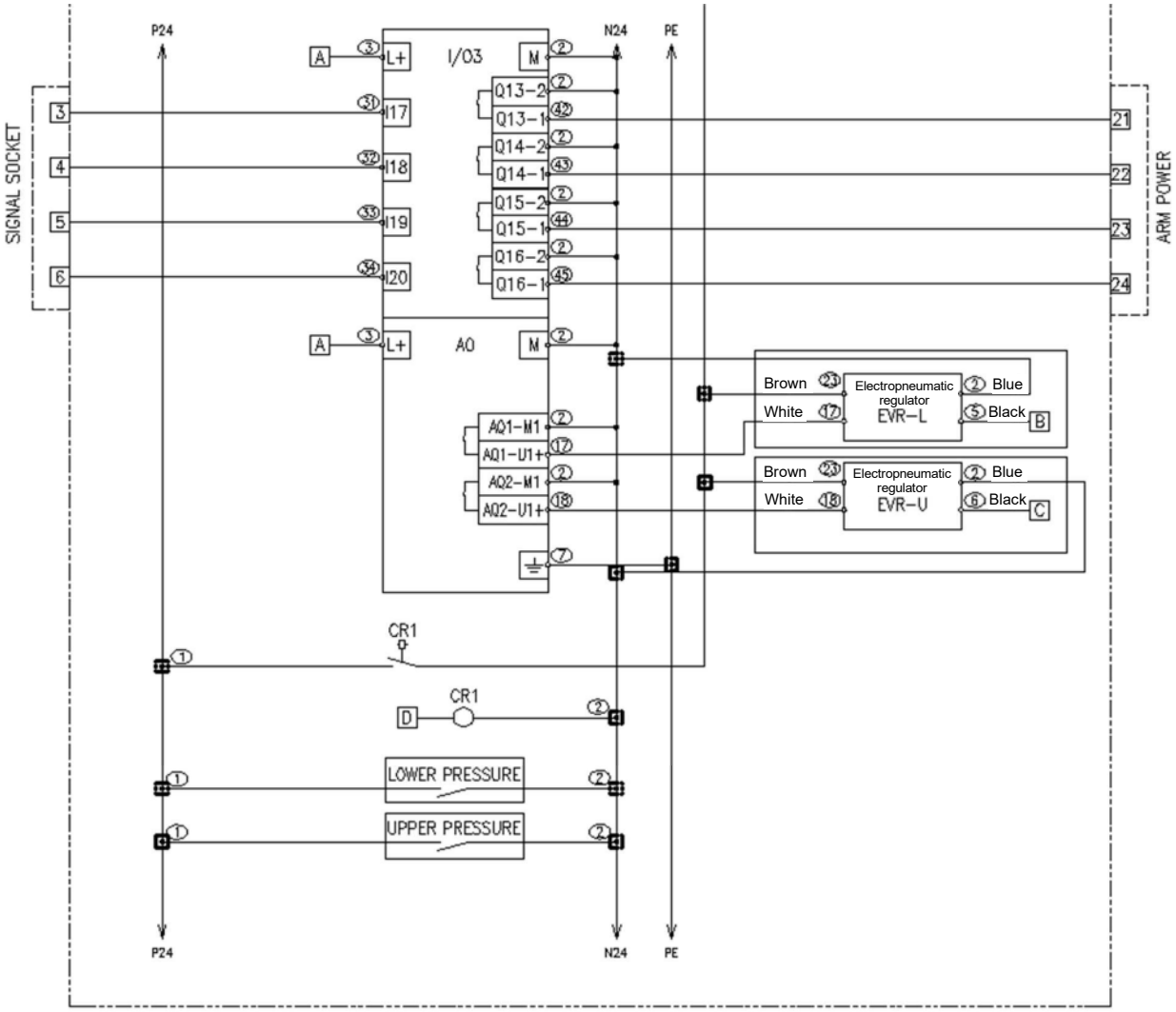
■ PAW-BS




P24
N24
PE
CR1
D
CR1
A
L+
AO
M
AQ1-M1
AQ1-U1+
AQ2-M1
AQ2-U1+
Brown
White
Electropneumatic regulator
EVR-L
Blue
Black
B
Brown
White
Electropneumatic regulator
EVR-U
Blue
Black
C
LOWER PRESSURE
UPPER PRESSURE
P24
N24
PE

■ PAW-BH


100 to 220 VAC
Switching power
24 V power supply PS
Circuit protector
CBE
P24
DC24V
SL1
N24
Grounding terminal
Grounding terminal
24 VDC circuit
Fuse
F
MAIN
I1
I2
I3
I4
I5
I6
I7
I8
CR2
CR3
PPX-S
I/O1
I/O2
Q1-2
Q1-1
Q2-2
Q2-1
Q3-2
Q3-1
Q4-2
Q4-1
Q5-2
Q5-1
Q6-2
Q6-1
Q7-2
Q7-1
Q8-2
Q8-1
Q9-2
Q9-1
Q10-2
Q10-1
Q11-2
Q11-1
Q12-2
Q12-1
ARM POWER
ARM POWER
ARM POWER
Pressure DOWN button
BS2
Pressure UP button
BS1
Select SW
COS1
Reset button
BS3
Reset lamp
SL2
SIGNAL SOCKET
SOL1
SOL2
SOL3
SOL4
SOL5
SOL6
Grounding terminal
P24
N24
PE


SIGNAL SOCKET
P24
N24
PE
I/O3
AO
L+
M
I17
I18
I19
I20
Q13-2
Q13-1
Q14-2
Q14-1
Q15-2
Q15-1
Q16-2
Q16-1
AQ1-M1
AQ1-U1+
AQ2-M1
AQ2-U1+
Brown
White
Blue
Black
Electropneumatic regulator
EVR-L
EVR-U
ARM POWER
CR1
LOWER PRESSURE
UPPER PRESSURE

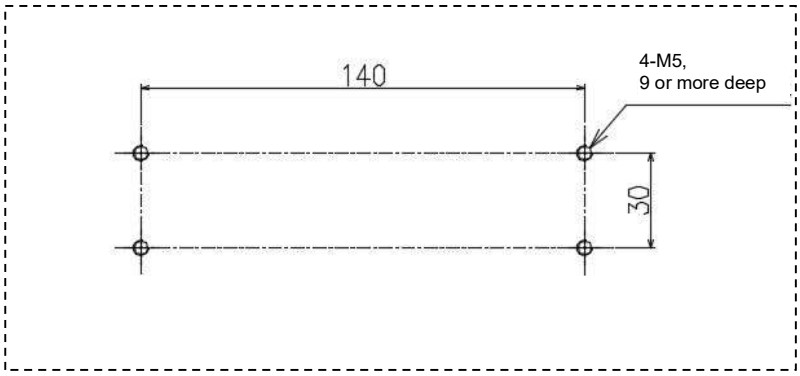
2.6 Installation method

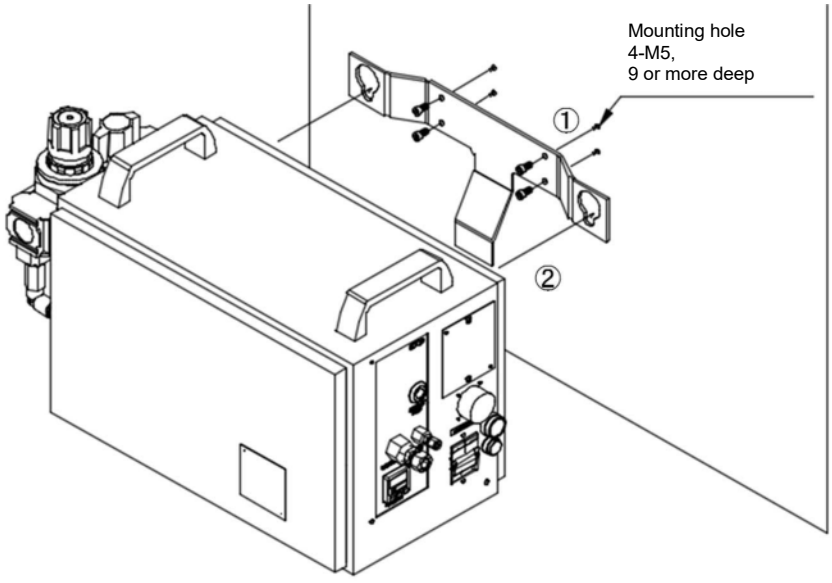
- When installing the controller on a floor, place it on a flat, hard surface.
- When using the T bracket for wall mounting, install the controller as shown below.

1 Secure the T bracket for wall mounting on the vertical surface for installation using the supplied hex socket screws.

2 Insert the knurled knobs of the controller into the holes in the T bracket, and hang the controller.

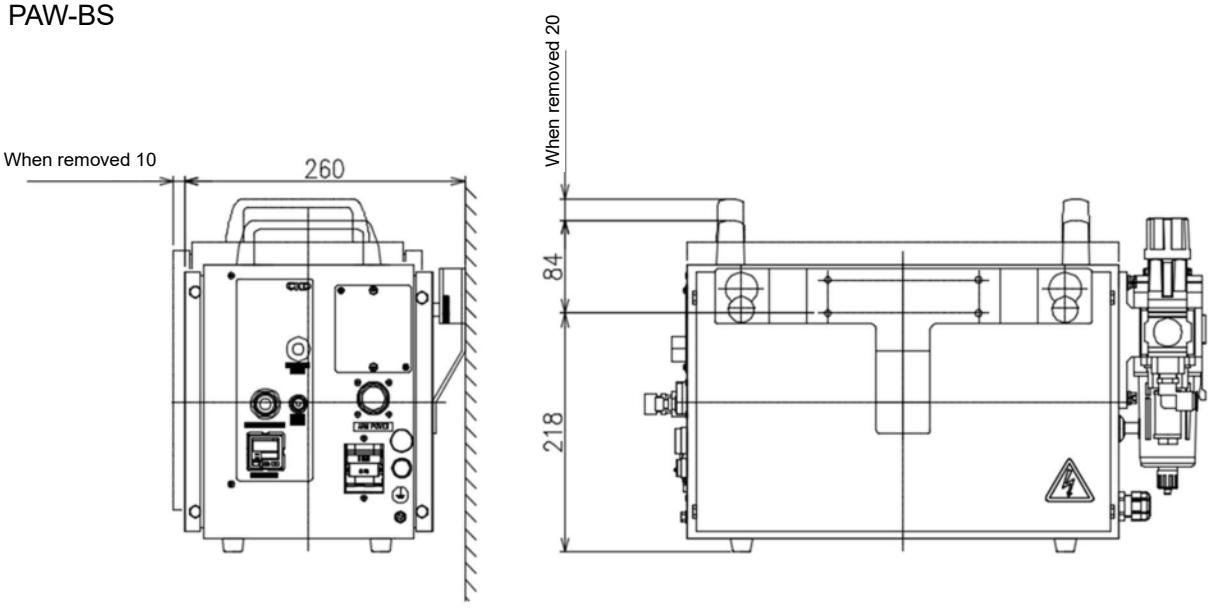
Drilling dimensions for fitting the T bracket



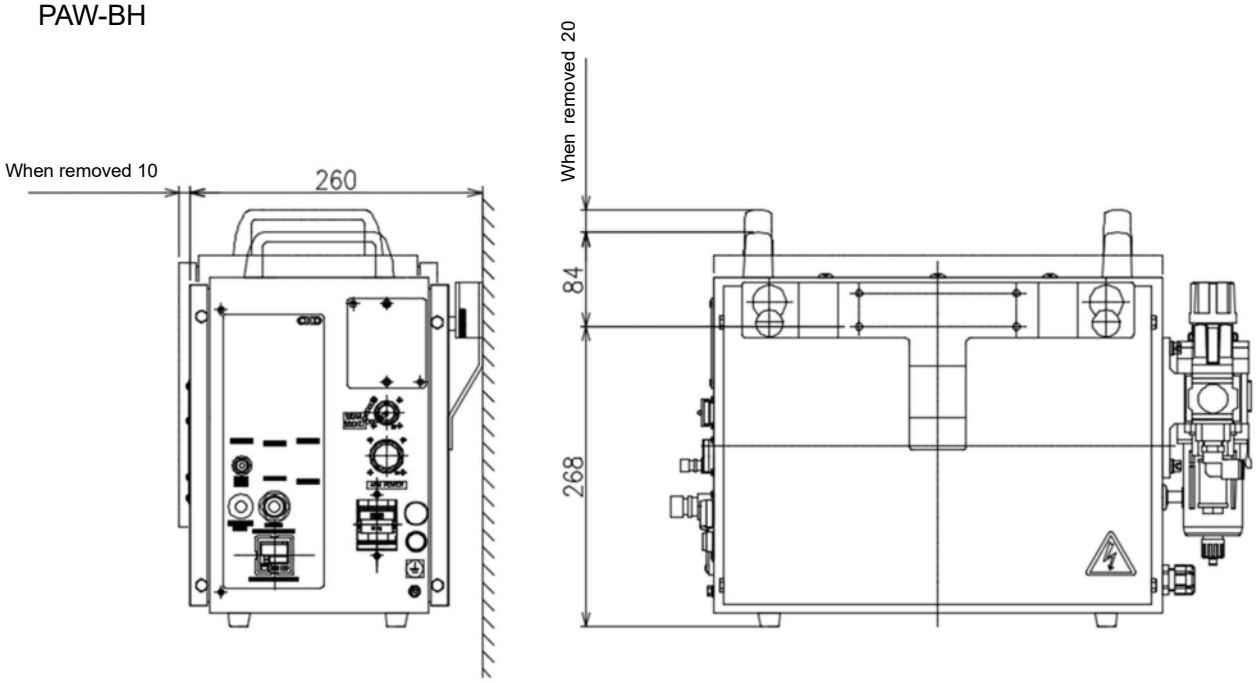


Installation dimensions

PAW-BS

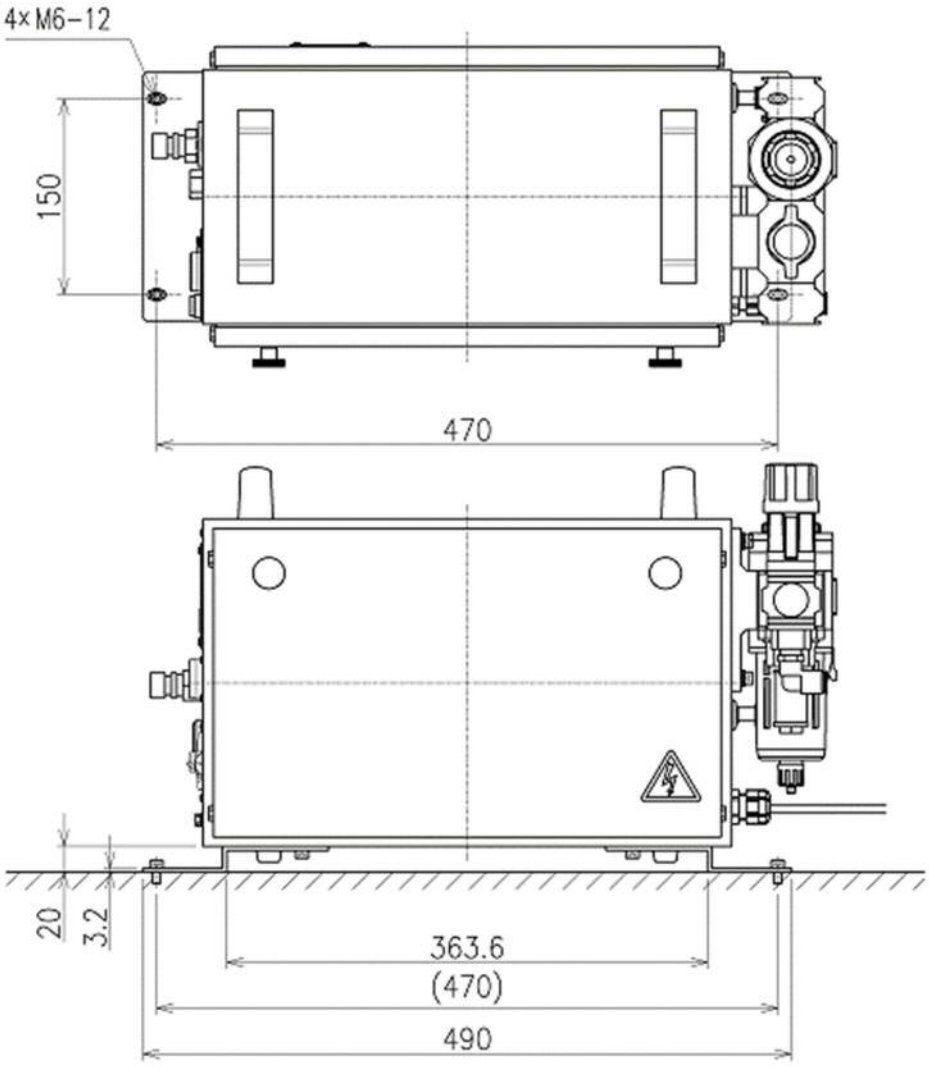


PAW-BH



- When using the L brackets, tap the flat surface according to the dimensions shown below, and secure the brackets with the supplied hex socket screws.

Installation dimensions



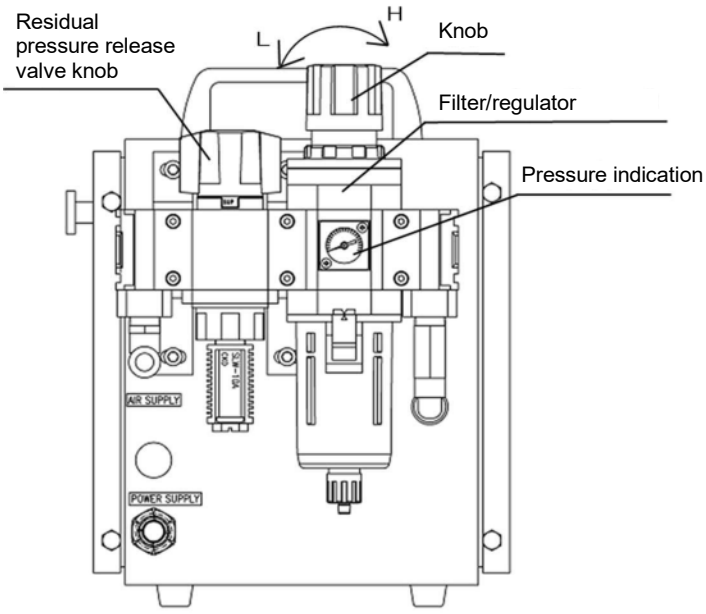
3. Operation procedure

3.1 Supplying air

Turn the residual pressure release valve knob to supply air.
Air is supplied when the knob is in parallel with the flow direction.

Check that the pressure indicated on the filter regulator is within the specified pressure range.
The pressure necessary for the controller is the pressure required to lift a workpiece (see page 4 of the instruction manual for the body, SM-A13989) + 0.1 MPa.

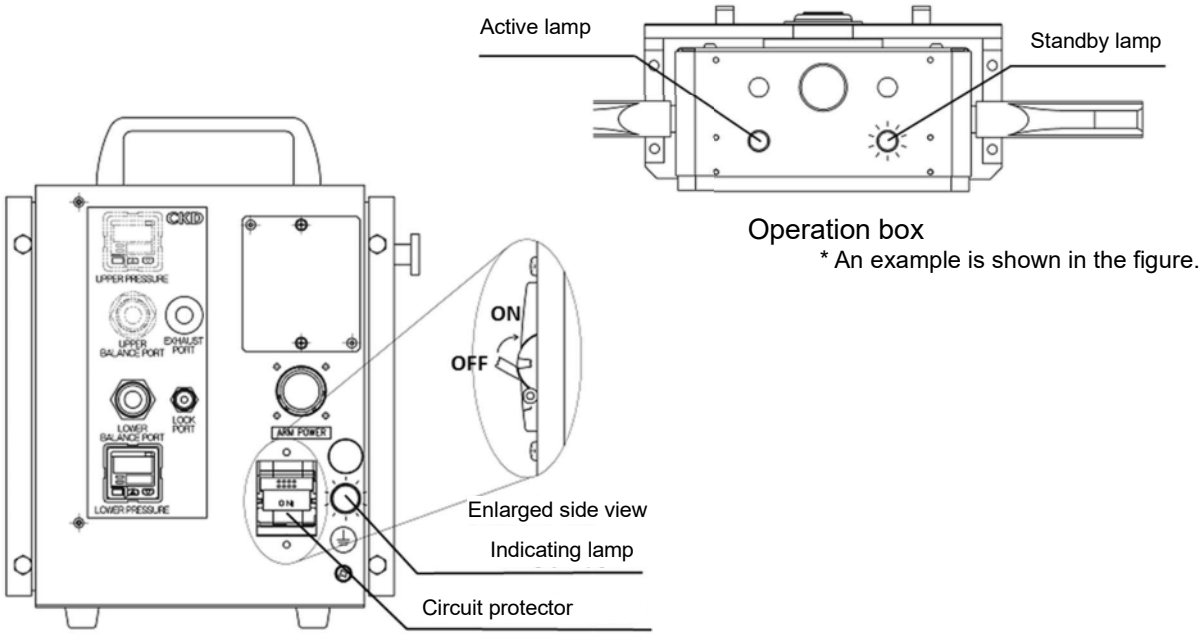
If the pressure is not within the specified pressure range, check that the primary pressure is higher than the specified range, and turn the filter regulator knob to set the pressure within the range.



3.2 Turning on the power

Turn on the circuit protector on the controller side. The power will be turned on, and the indicating lamp (umber) will light up.

The standby lamp on the operation box will flash for 5 seconds and light up.



The interval of 5 seconds after the power is turned on is the preparation time required for the devices to start up. Also, checks are made during the 5 seconds to confirm that the load cell is not disconnected or no overload is applied.

If any abnormality is detected, the standby lamp will rapidly and repeatedly flash. For the resetting method, see “4. Troubleshooting”

When the controller is mounted on a cart and the outrigger sensors for interlock are provided on the cart, the standby lamp will continue to flash unless all outriggers are opened.

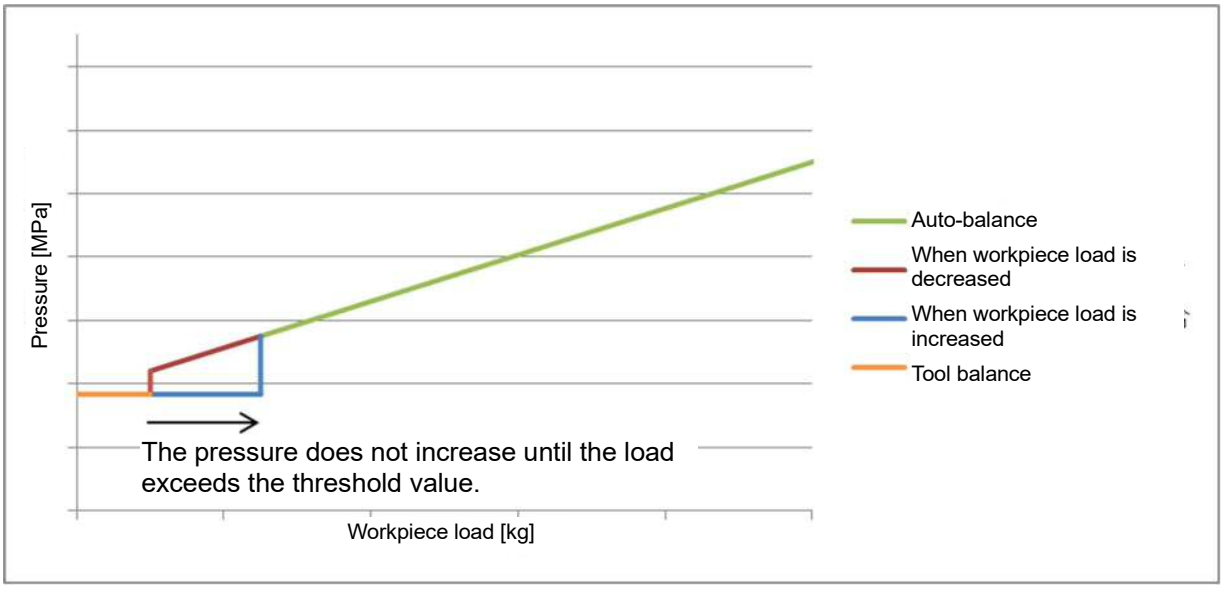
Open all outriggers, and the standby lamp will flash for 5 seconds and light up.

3.3 Activation

When the standby lamp is on, hold the handle on the operation box to turn on the photoelectric sensor, or press the active button depending on the specifications to switch the arm to the Active state. The standby lamp will go out, and the active lamp will light up.

Power Arm will be unlocked and ready for operation.

In the Active state, the pressure balance will be automatically adjusted according to the workpiece weight (auto-balance). However, the balance pressure (tool balance) in the no-load state is maintained until the threshold value is exceeded.



3.4 Standby

Release your hand from the handle on the operation box in the Active state (the active lamp is on) to turn off the photoelectric sensor, or press the standby button depending on the specifications to switch the arm to the standby state. The active lamp will go out, and the standby lamp will light up.

The arm will be locked and held on the spot.

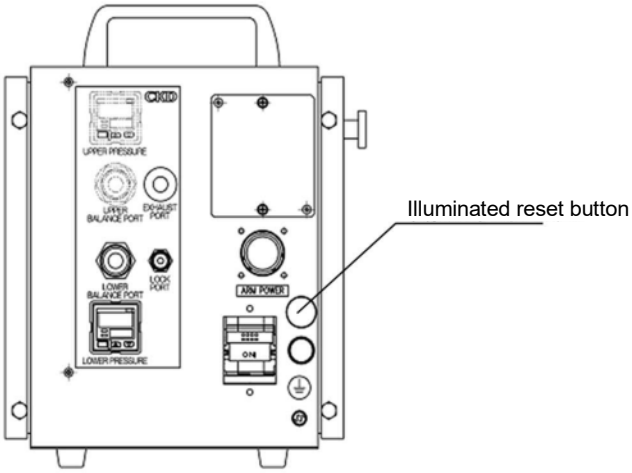
The arm is held in the vertical direction by the contained air. Therefore, when a force in the vertical direction is applied to the arm, it will slightly move due to compression or expansion of the air.

3.5 Emergency stop and abnormal stop

If the emergency stop button is pressed or an abnormality occurs, the standby lamp will flash repeatedly the specified number of times, and the arm will be set to the standby state. The number of flashes varies depending on the type of abnormality.

When the emergency stop button is released or the abnormality is removed, the reset lamp (yellow) on the controller will light up. Press the reset button. The arm will be set to the ready state, and the reset lamp will go out.

(For the number of flashes and the measures to be taken, see “4. Troubleshooting”)



3.6 Balance lock (selection)

The balance lock function is designed to hold the secondary pressure of the electropneumatic regulator when the balance lock button is pressed.

When the arm is moved up or down during transfer of a workpiece, the load cell may detect inertia force depending on the shape or stiffness of the attachment, and automatic pressure balancing may be unstable. However, in the balance lock state, the workpiece can be transferred stably. When you touch the workpiece during transfer, it is recommended to operate the arm in the balance lock state.

Press the balance lock button to set the arm to the balance lock state, and the balance lock lamp will light up.

When the balance lock button is pressed again, the arm will be released from the balance lock state.

Also, when the arm is standby or the load is less than the threshold value, it will be released from the balance lock state.

	If the workpiece is removed or dropped from the attachment in the balance lock state, the arm will enter the tool balance state but will rise due to delay in response.
	Before removing the workpiece from the attachment, release the arm from the balance lock state.

3.7 UP assist (selection)

The UP assist function is designed to forcibly increase the secondary pressure of the electropneumatic regulator to assist to raise the arm when the UP button is pressed.

While the UP button is held down, the pressure supplied to the cylinder is increased from the preset balance pressure, and the arm is balanced to tend to rise. However, the degree of rise varies depending on the balance setting condition and the angle of rise.

Release the UP button, and the arm will return to the original balanced state.

3.8 Clamp (selection)

When the clamp button is pressed, the attachment cylinder will drive to start the clamp.

After the completion of clamping, the clamp lamp will light up.

To release the clamp, move the workpiece load completely to a table or the like to remove the load from the arm end.

When the load become less than the threshold value, the clamp lamp will flash.

Hold down the flashing clamp button. The clamp will be released, and the clamp lamp will go out.

3.9 Vacuum (selection)

Press the Vacuum button, and the ejector will operate to start vacuuming.

The Vacuum lamp is on during vacuuming.

To release the vacuum, move the workpiece load completely to a table or the like to remove the load from the arm end.

When the load become less than the threshold value, the vacuum lamp will flash.

Hold down the flashing vacuum button. The vacuum will be released, and the vacuum lamp will go out.

3.10 Balance setting

3.10.1 Default setting

The pressure balance has been adjusted before shipment so that the downward operating force of the arm rising at an angle of 10° and the upward operating force of the arm rising at an angle of 35° are less than the specified values. Also, the balance has been adjusted so that there is no significant difference in feeling between upward and downward operations.

3.10.2 Balance adjustment procedure

If the arm is not well-balanced, adjust the balance in accordance with the following procedure before use.

If the arm is well-balanced according to the operation range mainly used and the workpiece weight, it may be more easily operable.

1 Remove the hexagon socket button head screws (2 places) on the controller side, and remove the cover.

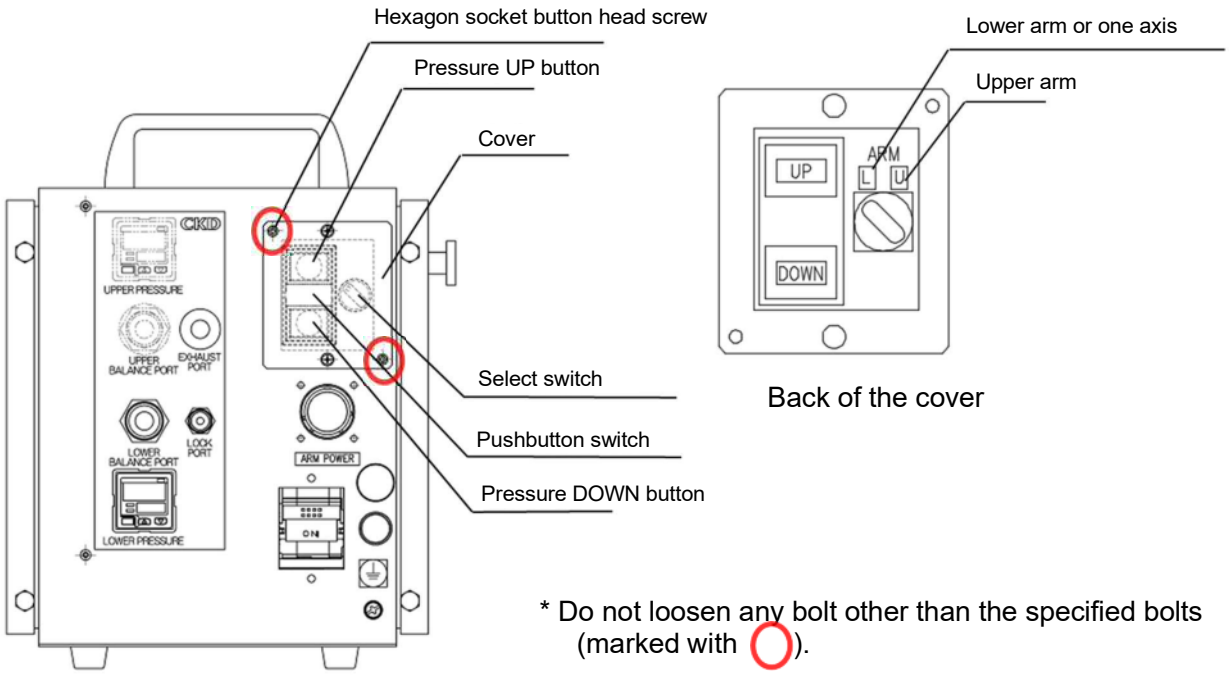
2 Turn the select switch to select the arm to be balanced (see the back of the cover).

3 Set Power Arm to the Actived state.

4 Press the pushbutton switch while observing the change in balance.

- Each press of the button will change the pressure by 1.8 kPa.
- Press the pressure UP button, and the pressure supplied to the cylinder will increase to easily raise the arm.
  However, you may feel heavy when moving it downward.
- Press the pressure DOWN button, and the pressure supplied to the cylinder will decrease to easily lower the arm.
  However, you may feel heavy when moving it upward.

5 After the completion of adjustment, fit the cover with the hexagon socket button head screws.



* Do not loosen any bolt other than the specified bolts (marked with ◯).

After the power is restarted, the changed balance setting will be maintained.

4. Troubleshooting

4.1 Troubles and measures

4.1.1 Troubles

If any abnormality occurs during use of the product, discontinue the use, and take measures after checking with maintenance personnel (or service persons depending on the item). If any abnormality occurs in the arm with a workpiece at its end, remove the workpiece using a lifting cart or the like to ensure the safety. Then, take measures.

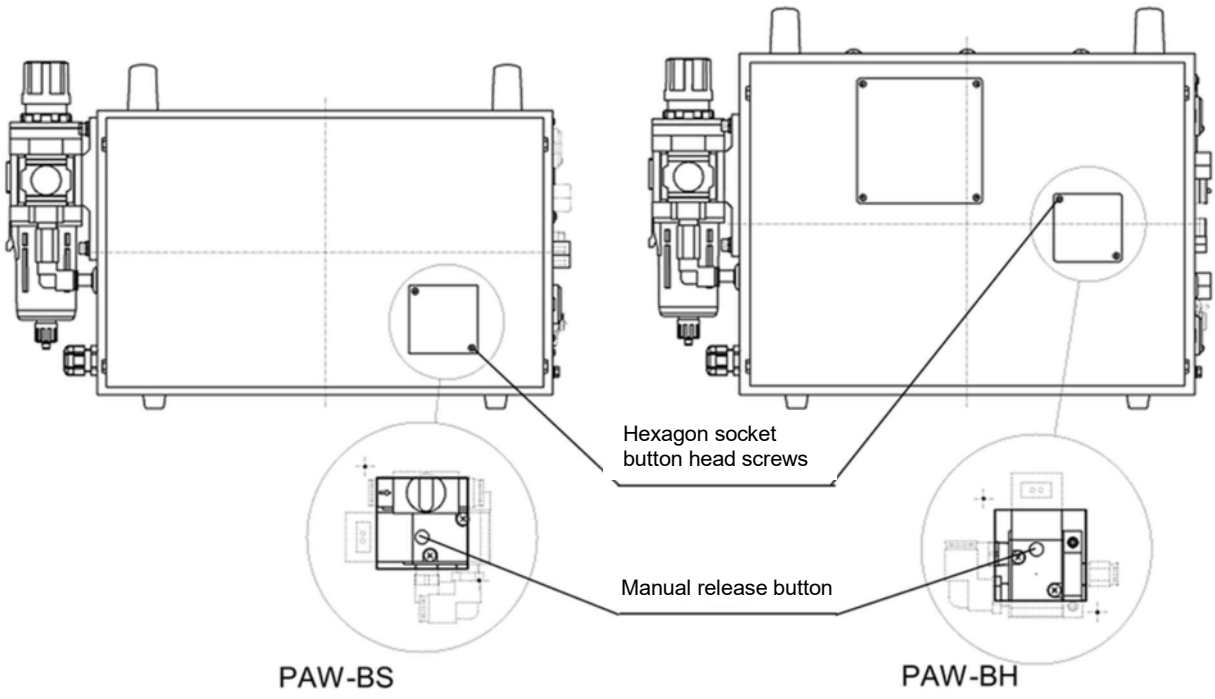
Trouble		Cause	Remedy
The arm does not operate.	The standby lamp flashes six times repeatedly.	Abnormal condition of PLC module in Controller.	Contact your nearest CKD office or distributor.PAW would have some issue (devices failure, wire interruption, etc.)
	The standby lamp flashes five times repeatedly.	The emergency stop button has been pressed.	Release the emergency stop button, and press the reset button on the controller side.
	The standby lamp flashes four times repeatedly.	Primary pressure out of the specified range	Set the primary pressure within the specified range, and press the reset button on the controller side.
	The standby lamp flashes three times repeatedly.	Application of overload in the negative direction to the arm end, or disconnection of the load cell wiring	Remove the overload from the arm end, and press the reset button on the controller side. When overload in the negative direction is applied, reapply the power.
	The standby lamp flashes twice repeatedly. The electropneumatic regulator generates a beat note.	Insufficient primary pressure	Supply the pressure required to lift the workpiece + 0.1 MPa to the primary side, and press the reset button on the controller side.
		Weight higher than the weight capacity	Reduce the weight of the workpiece, and press the reset button.
The arm does not rise.		Weight higher than the weight capacity	Reduce the weight of the workpiece.
			Increase the primary pressure.
Poor balance between upward and downward operating forces		High or low pressure setting	Readjust the pressure with the adjustment button on the controller side (see “3.10.2”).

If the trouble cannot be remedied after taking the above measures, the equipment failure or wire disconnection may have occurred.
If you have any questions, contact your nearest CKD office or distributor.

4.1.2 Manual operation of valve

If a load in the negative direction (in the opposite direction to the force applied when the workpiece is transferred) is on the arm end in the case where the standby lamp flashes three times repeatedly and the arm does not operate, manually operate the valve in accordance with the following procedure to forcibly release the lock on Power Arm. When the lock is released, the arm can be moved up.

1. Remove the hexagon socket button head screws (2 places) on the controller front panel, and remove the cover.
2. Push the valve manual release button in the controller all the way in with a thin screwdriver. While the release button is pushed, the lock on Power Arm is released.
3. Lift the arm, and remove the load in the negative direction from the arm end.
4. Release the valve manual release button in the controller.
5. Press the reset button whose lamp is on.
6. Check the operation, and fit the cover with the hexagon socket button head screws.



	Do not manually operate the valve except when a load in the negative direction is on the arm end.
	If the standby lamp flashes three times repeatedly not because a load in the negative direction is on the arm end, the manual valve operation may cause the arm to jump up, resulting in a hazardous situation. For manual operation of other valves, refer to the instruction manual for each product.
	This operation must be performed by two or more personnel. Before approaching the arm, push the manual release button, and make sure that the arm does not jump up.

5. Maintenance

5.1 Periodic inspection

This product shall be inspected every day by operators or maintenance personnel so that it can be used safely in the optimum condition.

5.1.1 Periodic inspection

Check the product for the following items.

If any abnormality is found, discontinue the use, and take measures or repair after checking with maintenance personnel.

Inspection item	Remedy
Loose piping or wiring	Tighten to proper torque.
Contamination or peeling of warning labels	Clean or re-apply the warning labels.
Dents or damage on the product	Overhaul. Note 1
Abnormal resistance or noise	Overhaul. Note 1
Accumulated drainage	Discharge the drainage. “5.1.2” Supply air conforming to the specifications.
Loose bolts	Tighten to proper torque.
Air leak from piping parts, or deteriorated piping materials or tubes	Replace the piping parts or tubes.

Note 1: If you want to overhaul the product, contact us.

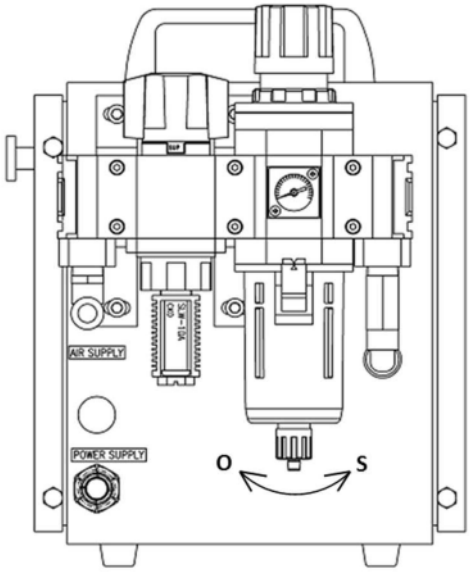
Before replacing any part, disconnect the power and air supply, and switch the residual pressure release valve to discharge the residual pressure.

5.1.2 Draining method

Turn the filter regulator cock in the O direction, and the drainage will be discharged. Turn it in the S direction, and the discharge will be stopped.

Place a container under the cock, and discharge the drainage in the filter regulator.

The maximum tightening torque of the drain cock is 0.5 N·m.



If drainage is generated, examine and improve the air quality.
Before discharging the drainage, disconnect the power and air supply, and switch the residual pressure release valve to discharge the residual pressure.

5.2 Periodic maintenance parts

5.2.1 Periodic maintenance parts

Replacement work shall be performed by service persons.

Part name	Part No.	Standard replacement time Note 1	Replacement method
Relay	G2RV-1-S-G DC21 × 3pc (Omron)	200,000 times Note 2	Overhaul
Smart relay	Contact us.	500,000 times or 26 years	Overhaul
Reverse filter/regulator	W3100-10-W(CKD)	5 years	Overhaul
Electropneumatic regulator	EVR-2909-18(CKD)	3 years	
Pressure switch	PPX-R10P-6M-J(CKD)		

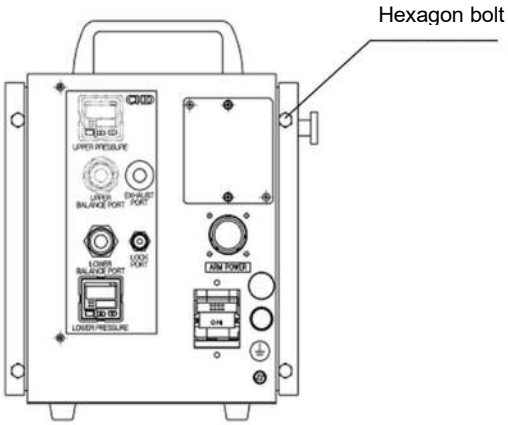
Note 1: The standard number of times calculated by the formula, 80 times/day (up-down movement) x 240 days/year. The number is not a guaranteed value because it varies depending on the frequency and conditions of use.

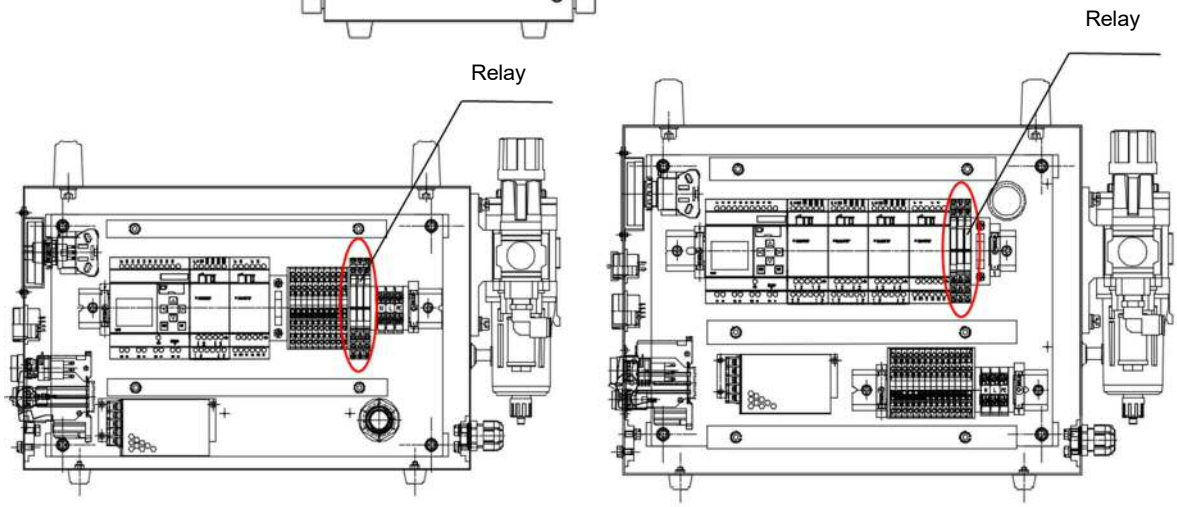
Note 2: When the number of operations of the relay used to switch between the actived and standby states exceeds a certain value, the active lamp will flash in the actived state.
However, the arm can be used while the active lamp is flashing.

5.2.2 Relay replacement procedure

When the active lamp to indicate the time for replacement of the relay flashes, replace the relay with a new one in accordance with the following procedure.

1 Remove the four hexagon bolts from the cover on the face with a knurled knob, and remove the cover.

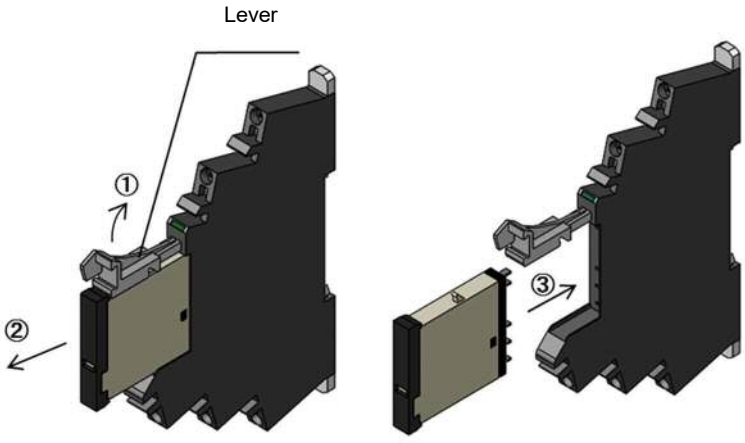




PAW-BS PAW-BH

2 Pull up the lever on the relay (①), and the relay can be removed (②).

3 Fit the new relay by pushing it straight (③).

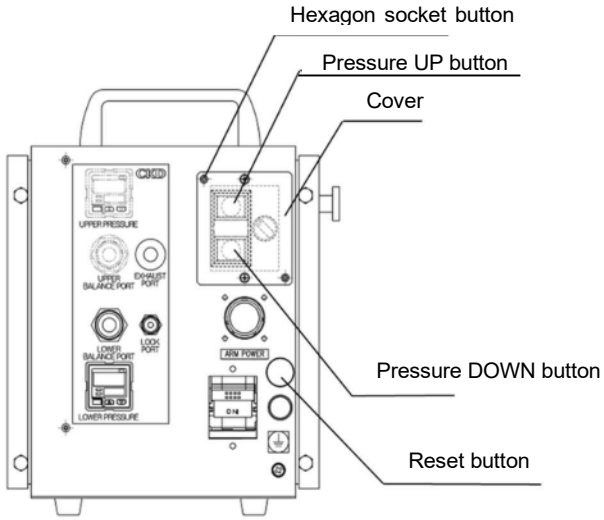


Relay

4 After fitting the relay, secure the removed cover with the hexagon bolts.

5 Apply air and power supplies, remove the hexagon socket button head screws (2 places) on the controller side, and remove the cover.

6 Press the pressure UP button, pressure DOWN button and reset button simultaneously for 5 seconds or more.



7 Set Power Arm to the actived state, and make sure that the active lamp is not flashing and Power Arm can be used in the same manner as before replacement of the relay.

Before replacing any part, shut off the air supply, and switch the residual pressure release valve to discharge the residual pressure.
Turn off the circuit protector, and disconnect the primary power supply.

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 repair the faulty product at one of CKD's facilities free of charge.

However, the warranty does not cover:

- Failures caused by handling or use in conditions or environment not described in the catalog, specification or this instruction manual
- Failures caused by careless use or improper management
- Failures caused not by the delivered product
- Failures caused by use not conforming to the specified method
- Failures caused by modifications/alterations or repairs not carried out by CKD
- Damage that could be avoided if any other manufacturer's machines or devices installed on this product had been subject to risk assessment defined and required by product safety standards, such as the (1) basic safety standard, (2) group safety standard and (3) specific machine safety standard classified in ISO/IEC Guide 51, and had functions or structures that could ensure the safety
- Failures caused by any reason that could not be foreseen by the technology available at the time of delivery
- Failures caused by fire, earthquake, flood, lightning or any other natural disaster, terrestrial disaster, pollution, salt damage, gas disaster, abnormal voltage or any other external factor

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 warranty period of this product is one year from the date of delivery to the place designated by your company. Or, the warranty is valid until the number of operations reaches 100,000 within one year.

6.3 Remarks

- If the product is exported outside Japan by the customer, it shall be repaired if returned to CKD's facility or a company or plant specified by CKD. Work and cost associated with the return shall not be covered by the warranty.
- The repaired product shall be delivered to a place in Japan specified by the customer in a package appropriate for delivery in Japan.

Ver4　24/12/2024

CKD

Website　https://www.ckd.co.jp/en/

Japan
CKD Corporation
2-250 Ouji, Komaki, Aichi 485-8551, Japan
Phone: +81-(0)568-74-1338　Fax: +81-(0)568-74-1165

China
CKD (Shanghai) Corporation
Room 612, 6th Floor, Yuanzhongkeyan Building, No. 1905
Hongmei Road, Xuhui District, Shanghai 200233, China
Phone: +86-(0)21-60906046/7/8　Fax: +86-(0)21-60906046

Taiwan
Taiwan CKD Corporation
16F-3, No. 7, Sec. 3, New Taipei Blvd., Xinzhuang Dist.,
New Taipei City 242, Taiwan
Phone: +886-(0)2-8522-8198　Fax: +886-(0)2-8522-8128

Korea
CKD Korea Corporation
(3rd Floor), 44, Sinsu-ro, Mapo-gu, Seoul 04088, Korea
Phone: +82-(0)2-783-5201/5202/5203　Fax: +82-(0)2-783-5204

Malaysia
M-CKD Precision Sdn. Bhd.
Lot No. 6, Jalan Modal 23/2, Seksyen 23, Kawasan, MIEL,
Fasa 8, 40300 Shah Alam, Selangor Darul Ehsan, Malaysia
Phone: +60-(0)3-5541-1468　Fax: +60-(0)3-5541-1533

Singapore
CKD Singapore Pte. Ltd.
33 Tannery Lane, #04-01 Hoesteel Industrial Building,
Singapore 347789, Singapore
Phone: +65-6744-2623　Fax: +65-67442486

CKD Corporation Branch Office
33 Tannery Lane, #04-01 Hoesteel Industrial Building,
Singapore 347789, Singapore
Phone: +65-6744-7260

Thailand
CKD Thai Corporation Ltd.
44, Smooth Life Tower, 19th Floor, Unit 1902,
North Sathorn Road, Silom, Bangrak, Bangkok 10500, Thailand
Phone: +66-(0)2-267-6300　Fax: +66-(0)2-267-6304/6305

Vietnam
CKD Vietnam Engineering Co., Ltd.
18th Floor, CMC Tower, Duy Tan Street, Cau Giay District,
Hanoi, Vietnam
Phone: +84-(0)24-3795-7631　Fax: +84-(0)24-3795-7637

Indonesia
PT CKD Trading Indonesia
Menara Bidakara 2, 18th Floor, Jl. Jend. Gatot Subroto
Kav. 71-73, Pancoran, Jakarta 12870, Indonesia
Phone: +62-(0)21-2938-6601　Fax: +62-(0)21-2906-9470

India
CKD India Private Limited
Unit No. 607, 6th Floor, Welldone Tech Park, Sector 48,
Sohna Road, Gurgaon-122018, Haryana, India
Phone: +91-(0)124-418-8212

U. S. A.
CKD USA Corporation
1605 Penny Lane, Schaumburg, IL 60173, USA
Phone: +1-847-648-4400　Fax: +1-847-565-4923

Mexico
CKD Mexico, S. de R.L. de C.V.
Cerrada la Noria No. 200 Int. A-01, Querétaro Park II,
Parque Industrial Querétaro, Santa Rosa Jáuregui,
Querétaro, C.P. 76220, México
Phone: +52-442-161-0624

Europe
CKD Europe B.V.
Beechavenue 125A, 1119 RB Schiphol-Rijk, The Netherlands
Phone: +31-(0)23-5541490

CKD Corporation Europe Branch
Beechavenue 125A, 1119 RB Schiphol-Rijk, The Netherlands
Phone: +31-(0)23-5541490

Italy
CKD Italia S.R.L.
Via di Fibbiana 15, 50041 Calenzano (FI), Italy
Phone: +39-(0)55-882-5359　Fax: +39-(0)55-882-7376