



Operation Manual

PRODUCT NAME

POWER CLAMP CYLINDER

MODEL / Series / Product Number

CKZ5N Series (ϕ 50, 63)

CKZ5T Series (ϕ 50, 63)

SMC Corporation

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Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “Caution,” “Warning” or “Danger.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

*1) ISO 4414: Pneumatic fluid power -- General rules relating to systems.

ISO 4413: Hydraulic fluid power -- General rules relating to systems.

IEC 60204-1: Safety of machinery -- Electrical equipment of machines .(Part 1: General requirements)

ISO 10218: Manipulating industrial robots -Safety.

etc.



Caution

Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.



Warning

Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.



Danger

Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results.

The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product.

This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly.

The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.

2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.

3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.

2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.

3. An application which could have negative effects on people, property, or animals requiring special safety analysis.

4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.



Safety Instructions

Caution

The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries.

If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.

If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”.

Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)

Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.

This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

*2) Vacuum pads are excluded from this 1 year warranty.

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.

Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction(WMD) or any other weapon is strictly prohibited.

2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulation of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

Caution

SMC products are not intended for use as instruments for legal metrology.

Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country.

Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

1. Installation

Precautions

⚠ Caution

- (1) There is a mechanical difference of -0.25 to $+0.25^\circ$ at the clamping end as shown in Figure 1. Be sure to make adjustments externally using a shim.
- (2) Adjust the angle of the clamp end so that the clamp arm contacts the workpiece at $+3^\circ$ or less. (Figure 1)

If the clamp arm contacts the workpiece at an angle of more than $+3^\circ$, the clamp cylinder may be damaged.

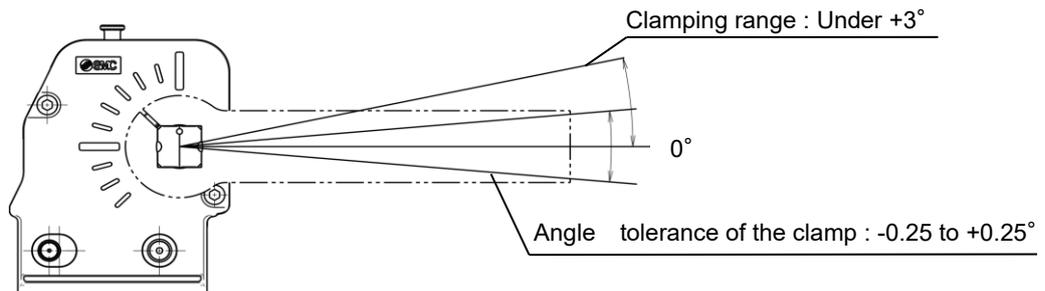


Figure 1

- (3) Be sure to use a speed controller, and make adjustments according to the following conditions.
 - Unclamping to clamping: 1 second or more.
 - Clamping to unclamping: 1 second or more.
 If excessive kinetic energy is applied, there is a possibility of damage.
- (4) This product can be mounted on the side or front. Install with the following tightening torque. Also, keep the engagement length.

Screw tightening torque and engagement length

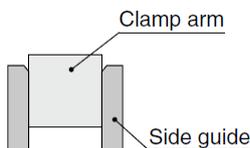
| Thread size | Tightening torque [Nm] | Min. engagement length [mm] |
|-------------|------------------------|-----------------------------|
| M8x1.25 | 12.5~15 | 10 |
| M10x1.5 | 24.5~29.4 | 11 |

Positioning pin engagement length

| Positioning pin size | Min. engagement length [mm] |
|----------------------|-----------------------------|
| Φ8H7 | 9 |
| Φ10H7 | 11 |

- (5) When using a side guide:

Attach the side guide so that lateral loads, such as galling, etc., are not applied to the clamp arm.



(6) Refer to the table below for the angle tolerance of the arm during unclamping.

| Bore size [mm] | Arm angle [°] | | | | | | | | |
|-------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|------------------------|------------------------|
| | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 |
| 50 | 15 ⁰ -3 | 30 ⁰ -4 | 45 ⁰ -5 | 60 ⁰ -5 | 75 ⁰ -5 | 90 ⁰ -5 | 105 ⁰ -5 | 120 ⁰ -6 | 135 ⁰ -9 |
| 63 | 15 ¹ -3 | 30 ⁰ -4 | 45 ⁰ -5 | 60 ⁰ -5 | 75 ⁰ -5 | 90 ⁰ -5 | 105 ⁰ -5 | 120 ⁰ -6 | 135 ⁰ -9 |

(7) Do not disassemble the power clamp cylinder.

The power clamp cylinder consists of a completely sealed structure in order to protect it from welding spatter. Do not disassemble, except for when replacing any of the replaceable parts, as this may cause the performance to deteriorate.

(8) Proximity switch output

The switch output signal is output near the clamping end and the unclamping end respectively. The switch output signal on the clamping side does not output the status where the power clamp cylinder is locked by the toggle mechanism.

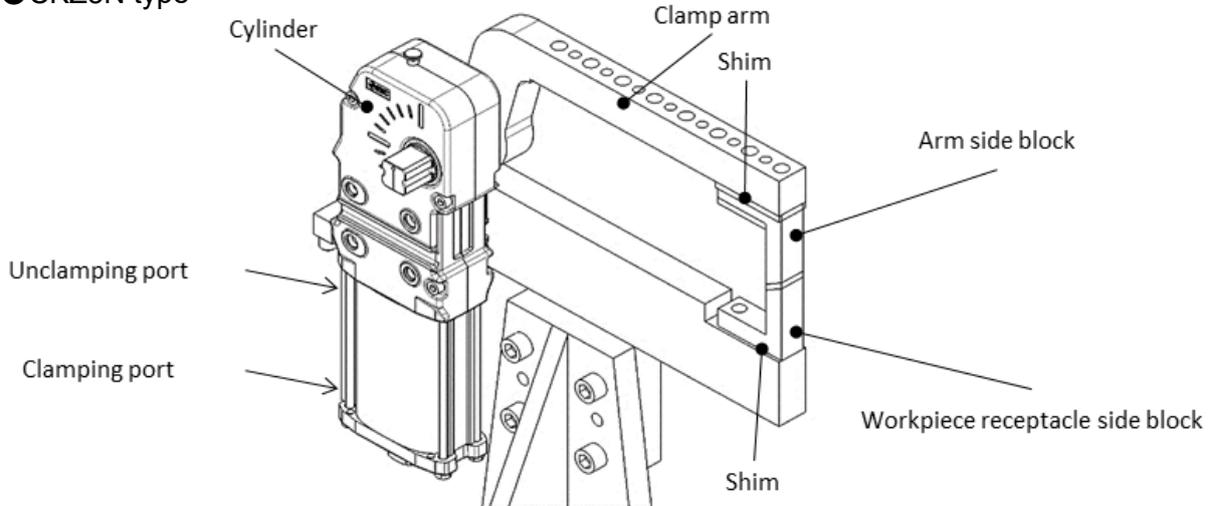
(9) Lubricating the toggle mechanism

The toggle mechanism has been lubricated for life at the factory and can be used without any further lubrication. Do not lubricate.

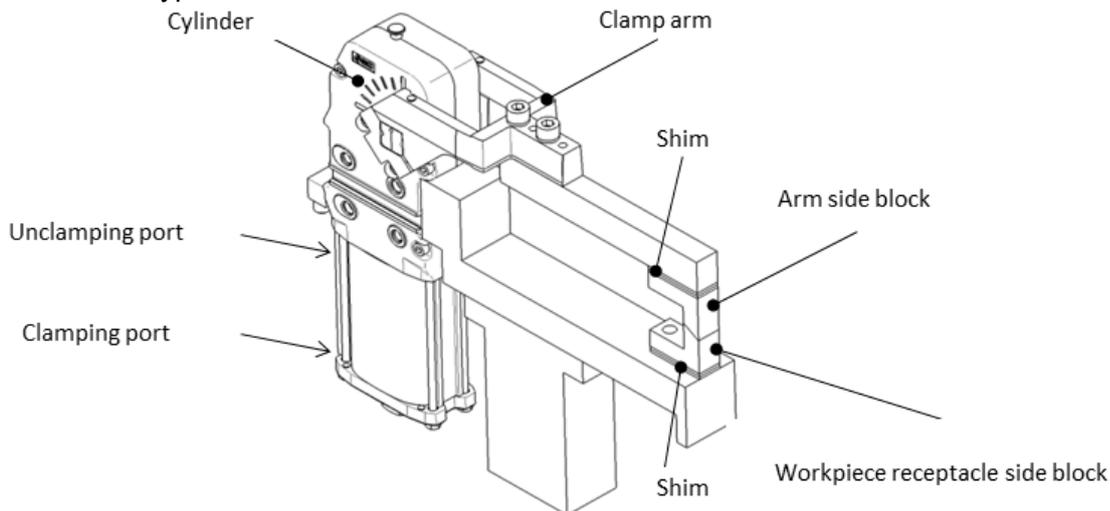
Power clamp cylinder mounting and setup procedure

<Ex. 1 When using clamping force only : When equipped with a workpiece receptacle>

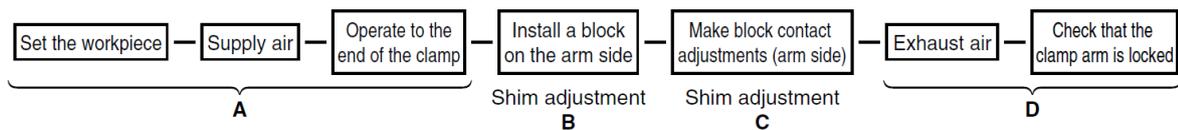
●CKZ5N type



●CKZ5T type



■ Procedure



A) Place the workpiece, supply air to the clamping port without attaching the block on the arm side, and operate the clamp arm to the end of the clamp.

B) In the state of A), attach the workpiece and the arm side block, and adjust the shim so that there is a space of about 0 mm.

During this step, theoretically, there is no clamping force pressing down on the workpiece.

C) In order to generate a clamping force from the state described in step B), insert an additional shim.

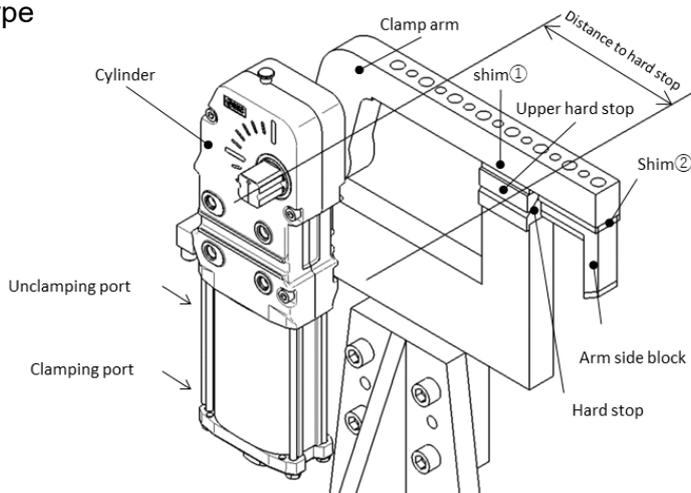
The thickness of the shim changes depending on the arm length and the operating pressure. Refer to page 8 to 10.

Please note that the graph should only be used as a guide as there is a tolerance of about 10% in the clamp cylinder body.

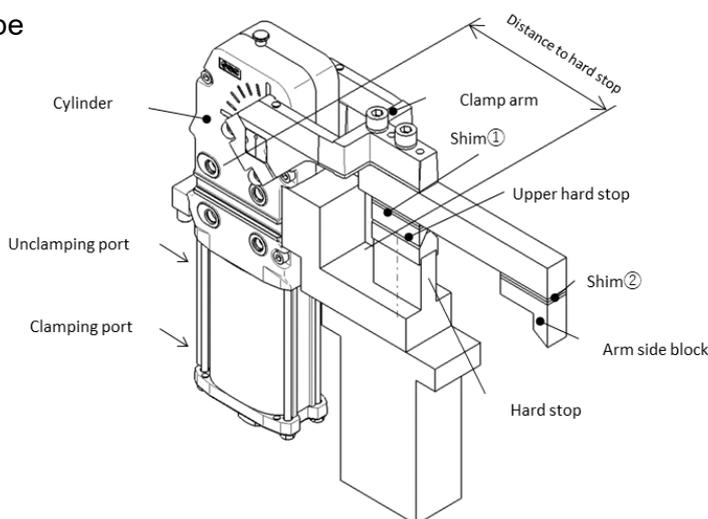
D) Exhaust the air while in the clamped state, and confirm that the clamp arm does not open.

<Ex. 2 When using a hard stop: When not equipped with a workpiece receptacle>

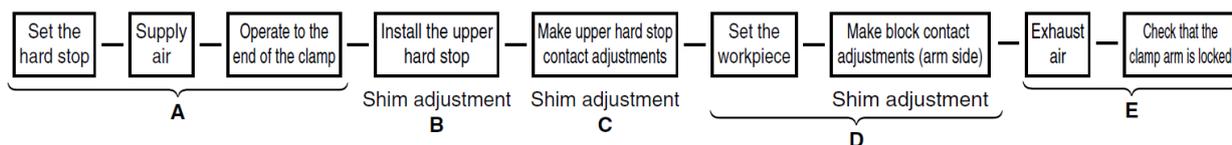
●CKZ5N type



●CKZ5T type



■ Procedure



A) Supply air to the clamping port without installing the upper hard stop, and operate the clamp arm to the end of the clamp.

B) In the state of A), attach the upper hard stop and adjust shim ① so that there is a space of about 0 mm between the upper hard stop and the hard stop.

During this step, theoretically, there is no clamping force applied to the hard stop.

C) In order to generate a clamping force from the state described in step B), insert an additional shim.

The thickness of the shim changes depending on the distance to the hard stop and the operating pressure.

Refer to page 8 to 10, and consider the distance to the hard stop as the arm length.

Please note that the graph should only be used as a guide as there is a tolerance of about 10% in the clamp cylinder body.

D) In the state of C), adjust shim ② so that the arm side block contacts the workpiece.

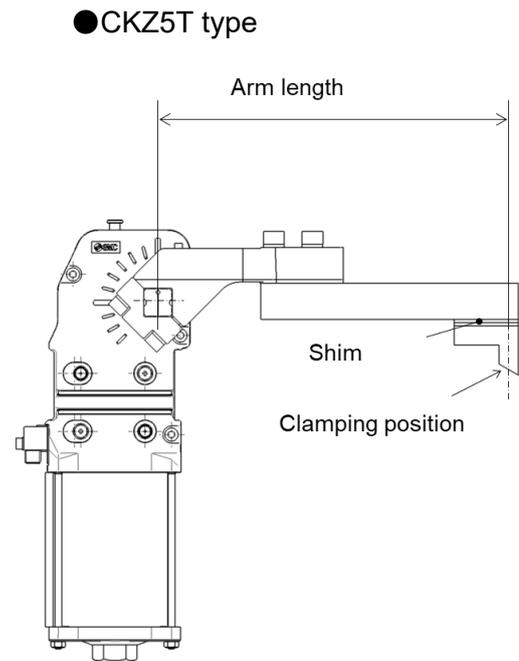
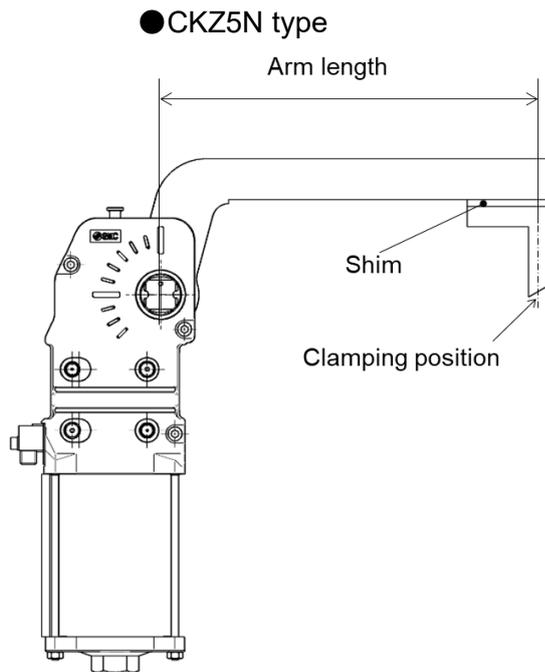
E) Exhaust the air while in the clamped state, and confirm that the clamp arm does not open.

Relation between shim thickness and clamping force

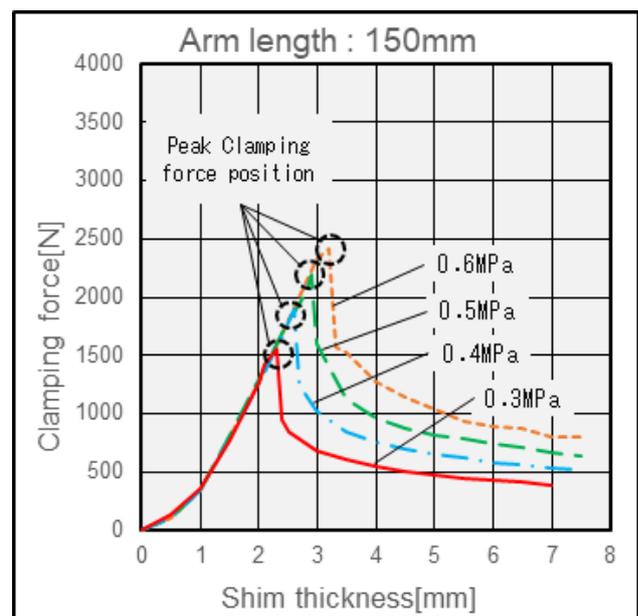
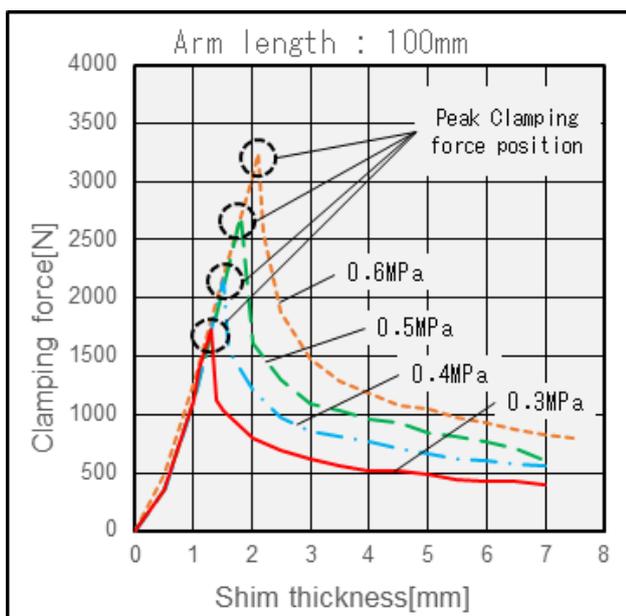
- * Use this figure as a guide as there is a tolerance of about 10% in the clamp cylinder body.
- * When a shim exceeding the peak clamping force position on the graph is inserted, the lock will not be activated when clamped.

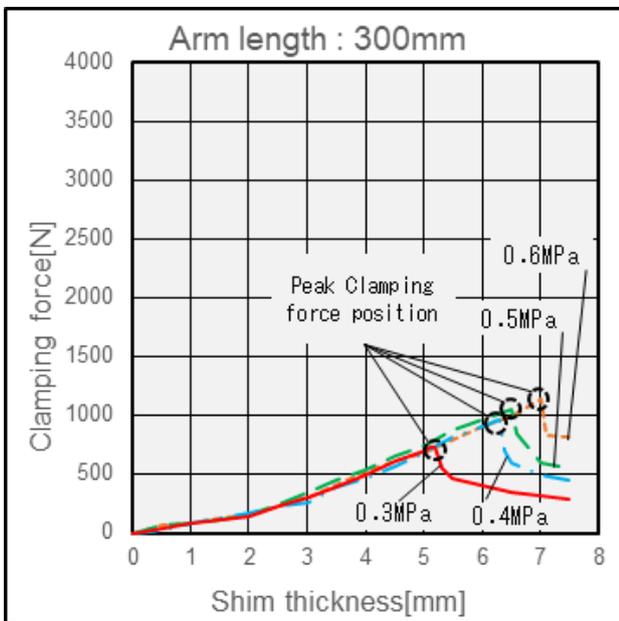
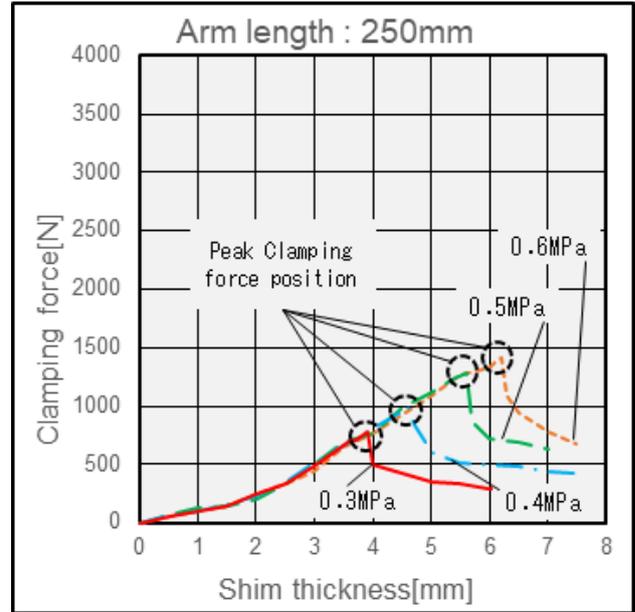
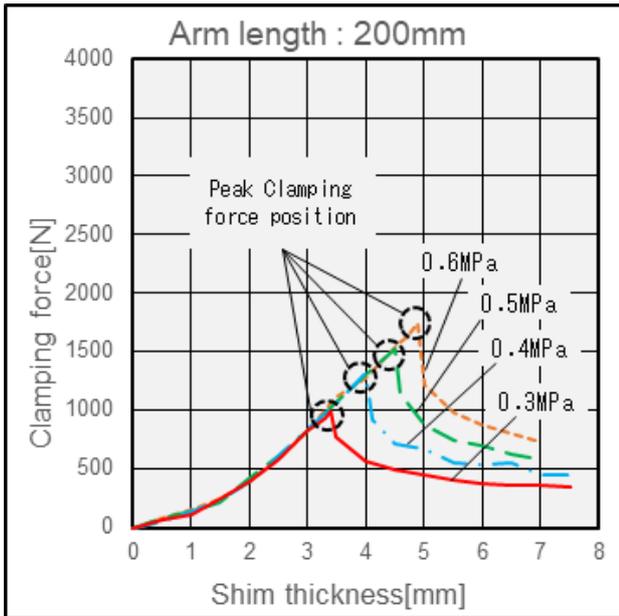
Insert a shim of the appropriate thickness.

- * The arm length indicates the distance between the clamp arm shaft and the clamping position.

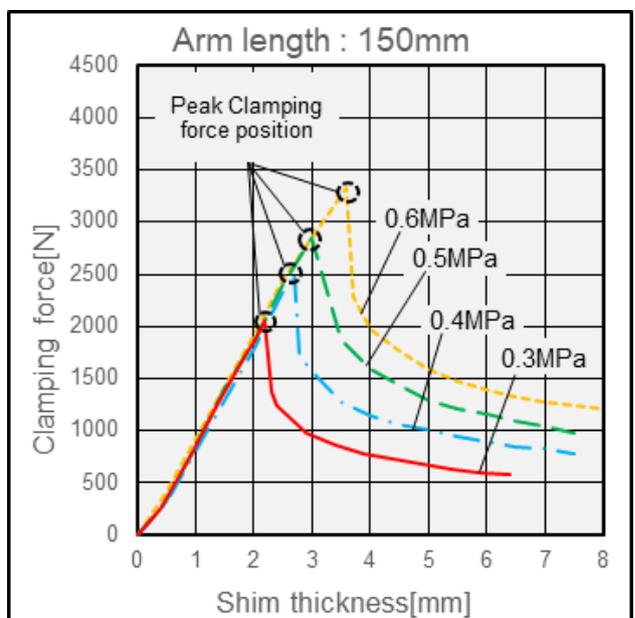
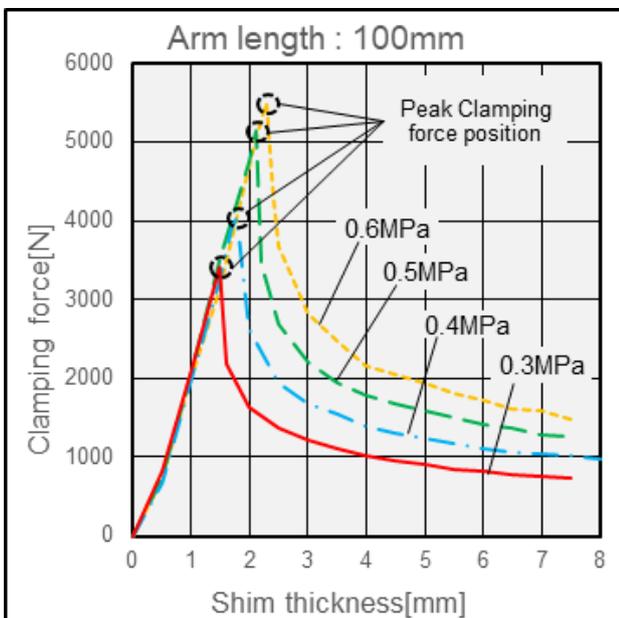


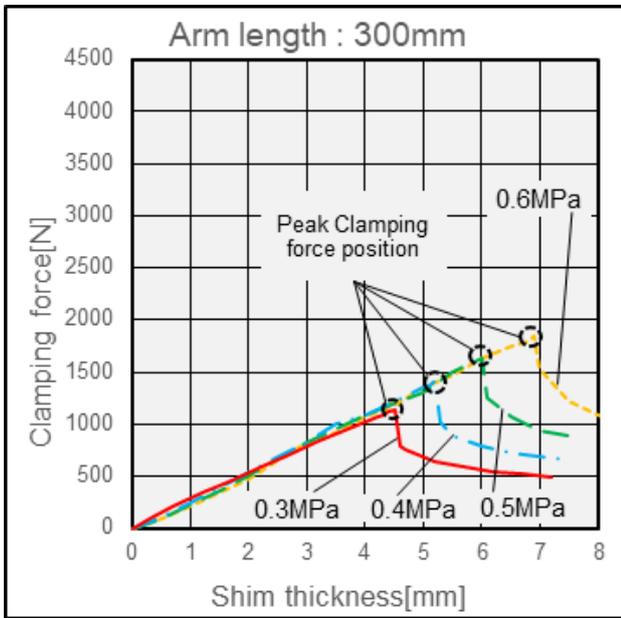
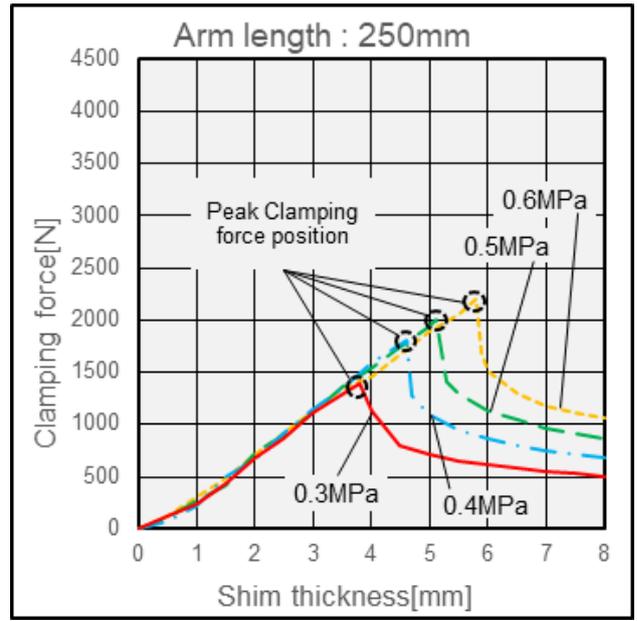
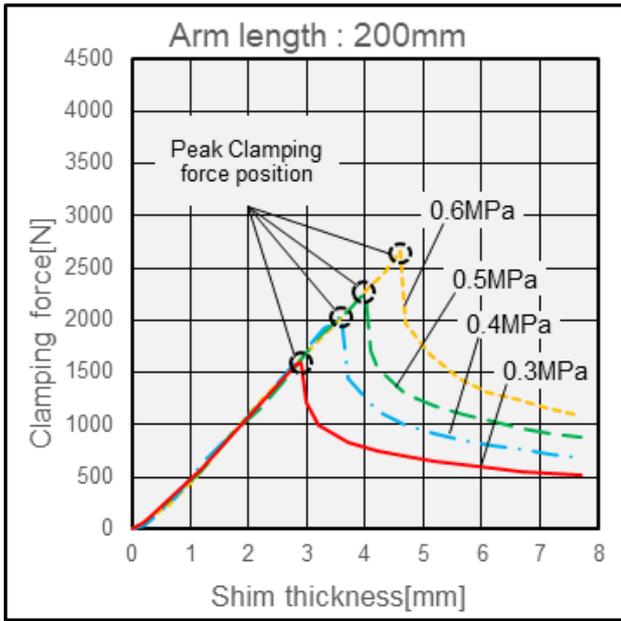
φ 50





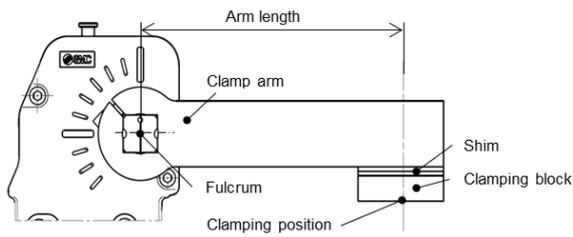
Φ63



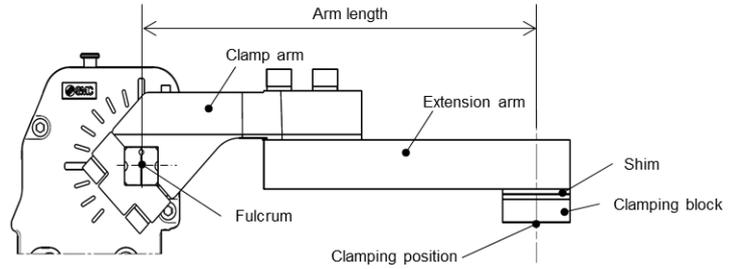


Relation between arm length and clamping force

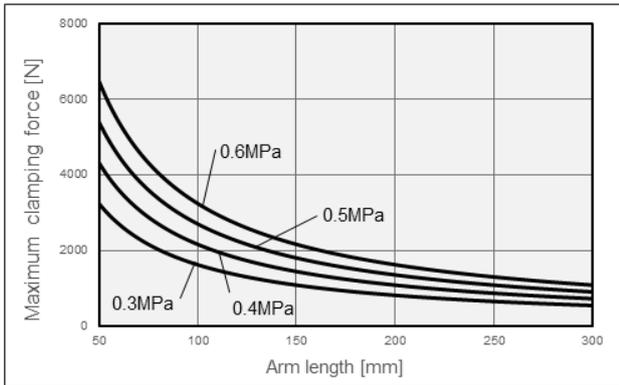
●CKZ5N type



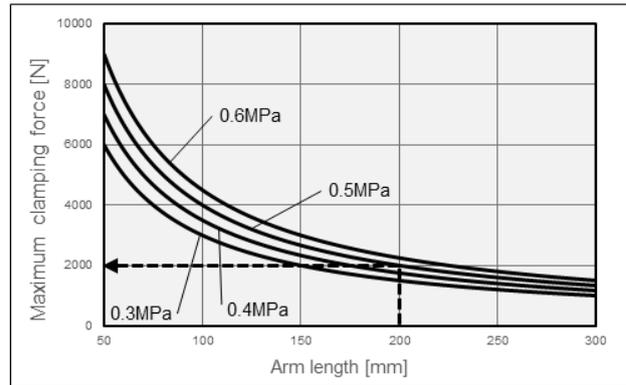
●CKZ5T type



Bore size : 50



Bore size : 63



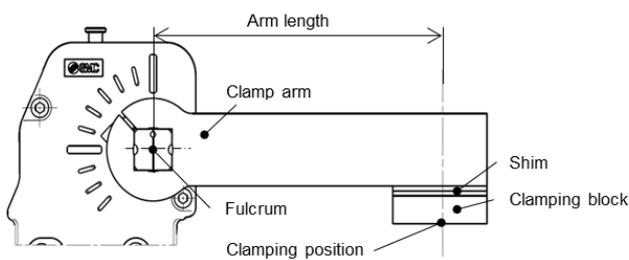
Calculation example

Bore size: 63, Arm length: 200 mm, Operating pressure: 0.5 MPa

With an arm length of 200 mm and an operating pressure of 0.5 MPa, according to the graph, the maximum clamping force is 2000 N.

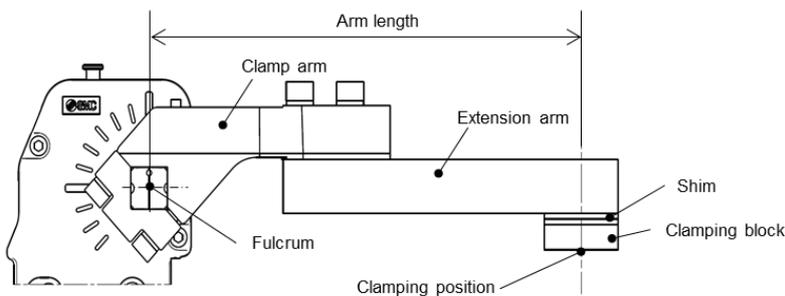
Allowable arm length

●CKZ5N type



| Bore size | Allowable arm length [mm] |
|-----------|---------------------------|
| 50 | 300 |
| 63 | 300 |

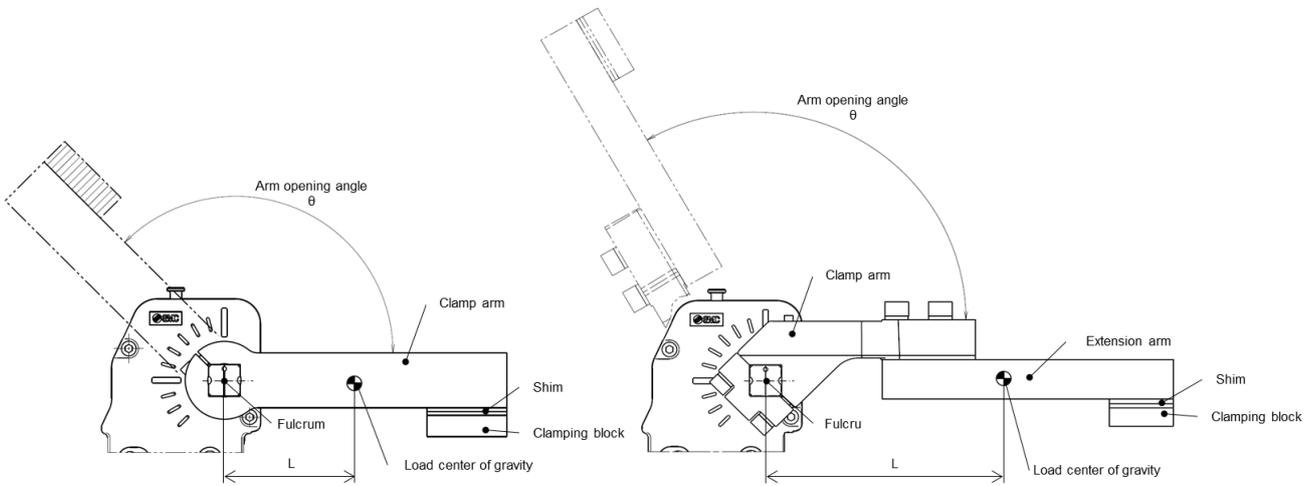
●CKZ5T type



Allowable load mass

●CKZ5N type

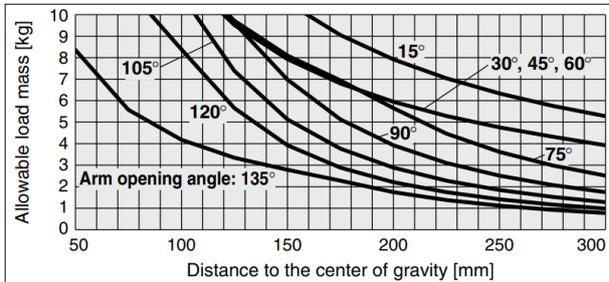
●CKZ5T type



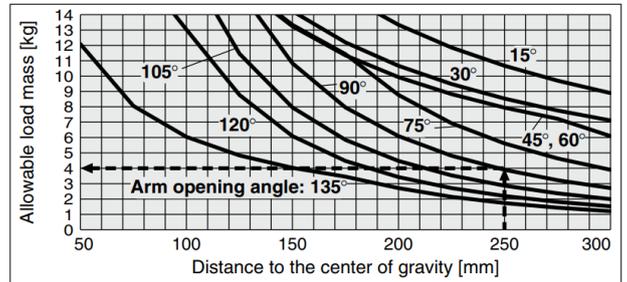
The allowable load mass changes depending on the arm opening angle.
 Be sure to use the product within the allowable values shown in the graphs below.
 * The load indicates the total weight of the clamp arm and clamping block.
 * When the operating time is 1 second

- Calculation procedure for allowable load mass**
1. Calculate the distance L from the fulcrum to the load center of gravity.
 2. Check the arm opening angle of the product.
 3. Read the allowable load mass from the graph.

Bore Size: 50



Bore Size: 63

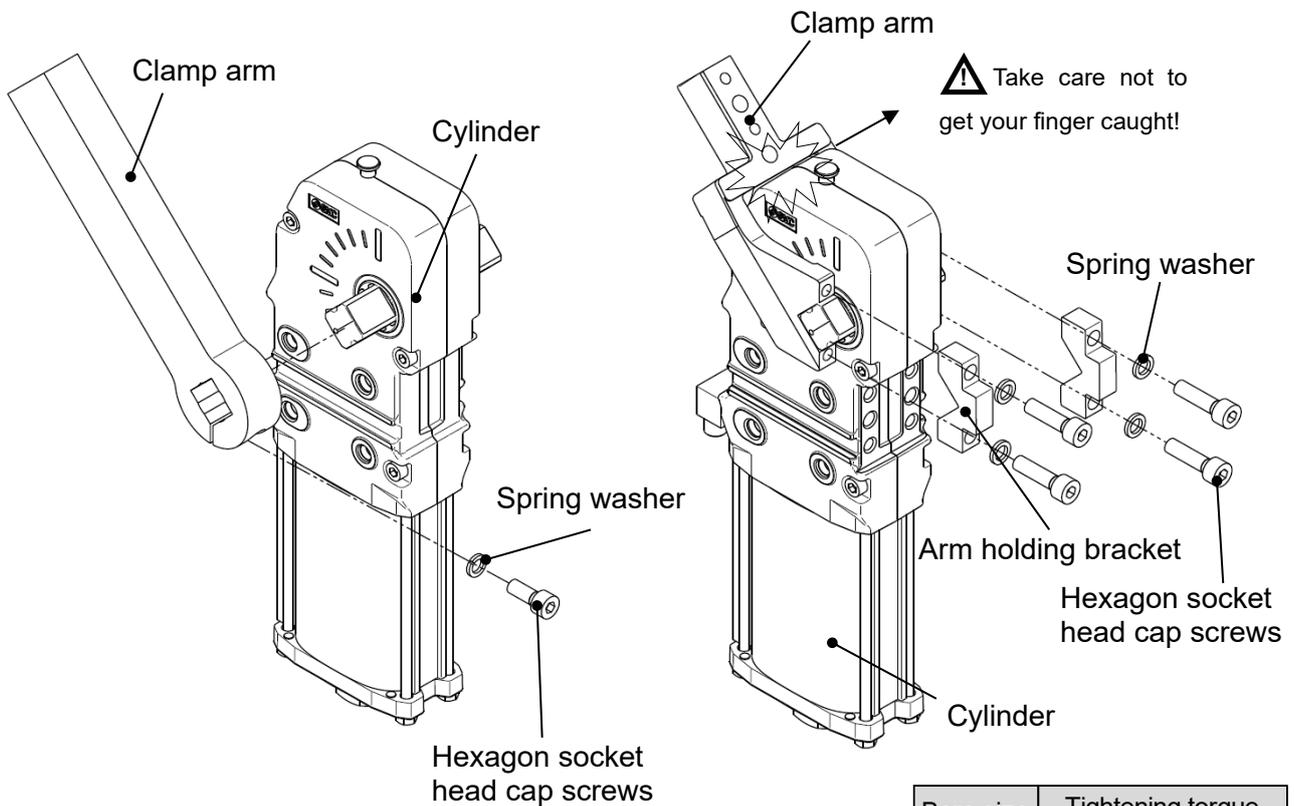


Calculation example Bore size: 63, Arm opening angle: 90°, Distance to the center of gravity L : 250 mm
 With an arm opening angle of 90° and a 250 mm distance to the center of gravity, according to the graph, the maximum allowable load mass is 4.0 kg.

Mounting of the clamp arm

⚠ Caution Make sure that the air inside the cylinder is exhausted.

Mount the clamp arm to the cylinder, then tighten it with the hexagon socket head cap screws to the tightening torque below.



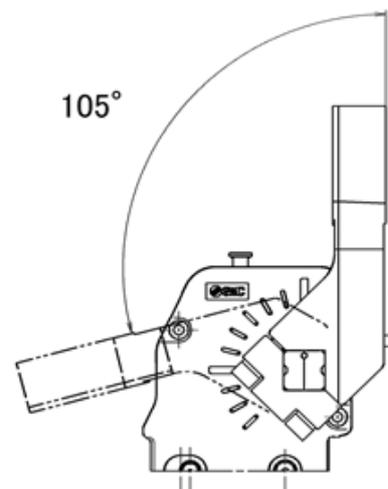
| Bore size [mm] | Tightening torque [N · m] |
|----------------|---------------------------|
| 50 | 12 to 15 |
| 63 | 15 to 20 |

The clamp arm may interfere with the cylinder body depending on the mounting method. Be sure to check for interference.

■ Vertical clamping (CKZ5T type only)

When mounting the clamp arm in a vertical clamping position, mount as shown in the figure below.

The maximum arm opening angle is 105°.

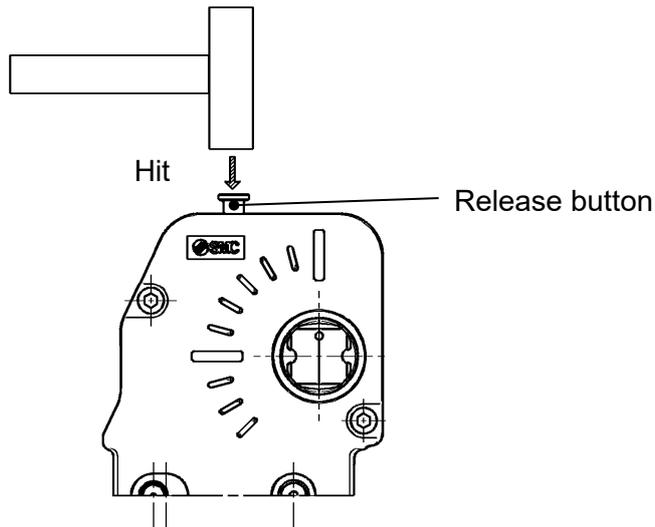


Manual lock release

⚠ Cation Be sure to confirm safety before manually releasing the lock, and only perform work while the air is exhausted.

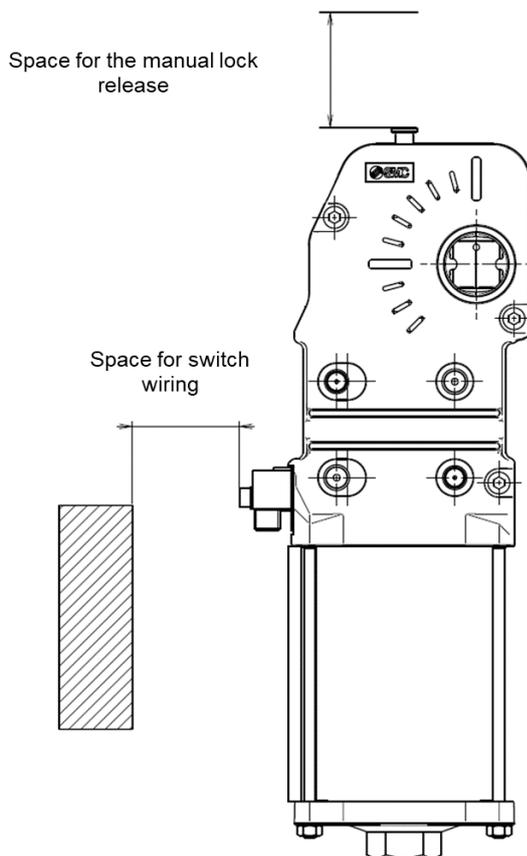
Otherwise, the clamp arm may operate unexpectedly.

The lock can be released easily by hitting the Release button of the cylinder top with a plastic hammer.



Space in design

Leave sufficient space in the below position.



To change the arm opening angle

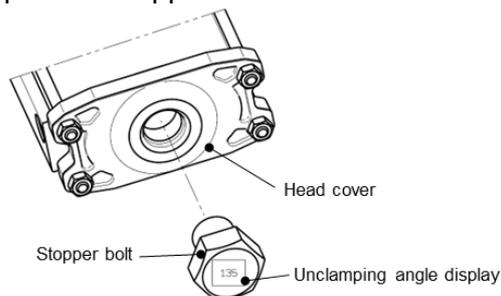
⚠ Caution Be sure to confirm safety, and perform the work while the air is exhausted.

1. Procedure for changing the stopper bolt position

Remove the stopper bolt of the head cover, and replace the stopper bolt for the angle to be changed with the following tightening torque.

When tightening the stopper bolt, hold the head cover.

Refer to Replacement Parts (CKZ5N : P.19. , CKZ5T : P.22) for the part numbers of the applicable stopper bolts.



Stopper Bolt Tightening Torque

| Bore size | Tightening Torque(N · m) |
|-----------|--------------------------|
| 50、63 | 45 to 65 |

2. Procedure for changing the switch position

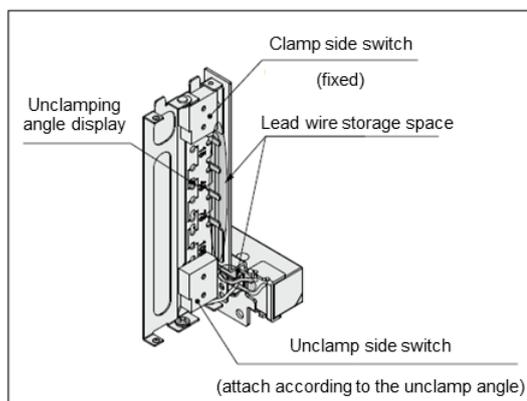
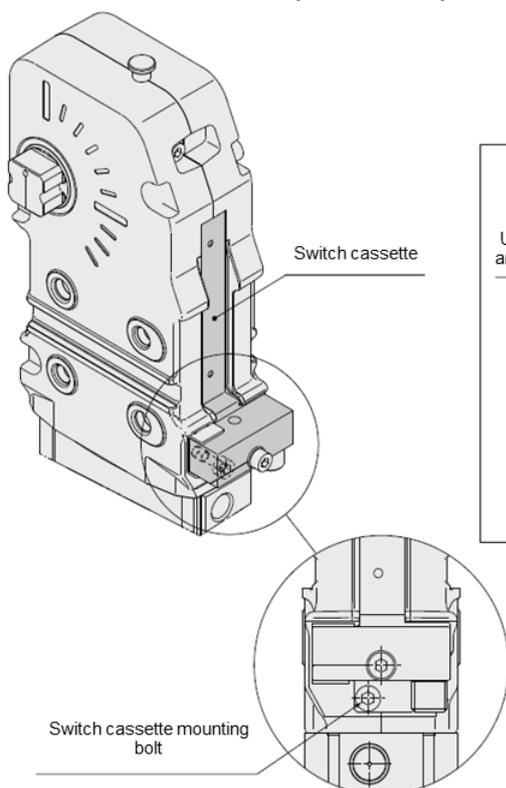
1) Unclamp the cylinder and set the arm angle to 15 ° or more.

2) Loosen the switch cassette mounting bolt, and remove the switch cassette.

3) Remove the switch on the unclamping side, and attach it in the position of the desired angle. Refer to P.16 to P.18.

4) Mount the switch cassette to the body, and tighten the switch cassette mounting bolt to the tightening torque shown below.

Refer to Replacement Parts (CKZ5N : P.19, CKZ5T : P.22) for the part numbers of the switch cassette replacement parts.



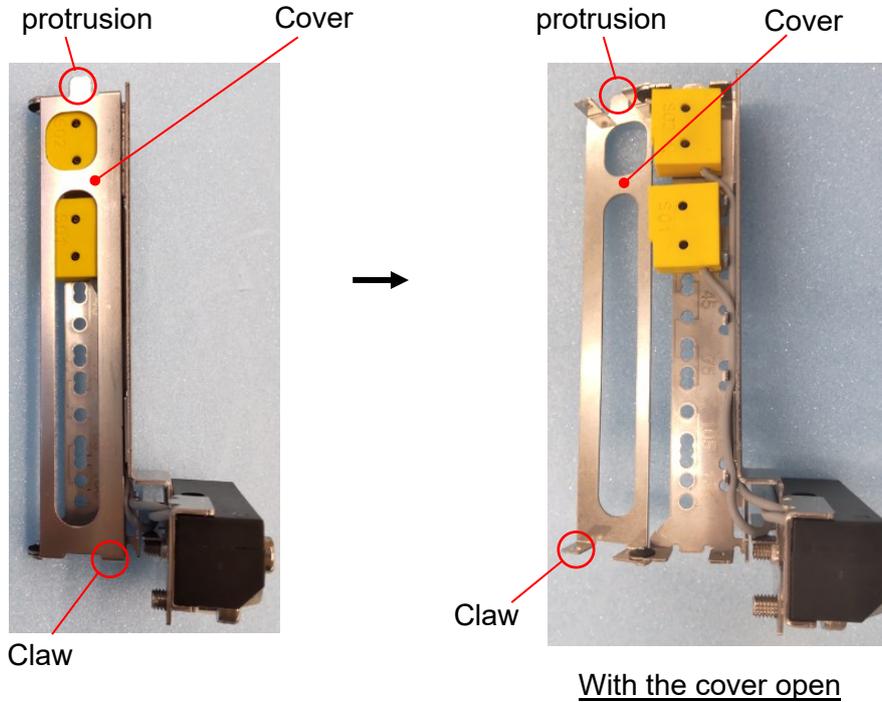
Switch Cassette Mounting Bolt Tightening Torque

| Bore size | Tightening Torque(N · m) |
|-----------|--------------------------|
| 50、63 | 3.0 to 4.0 |

■ Proximity switch installation example

⚠ Caution Be careful not to cut your hands at the edge of the switch cassette.

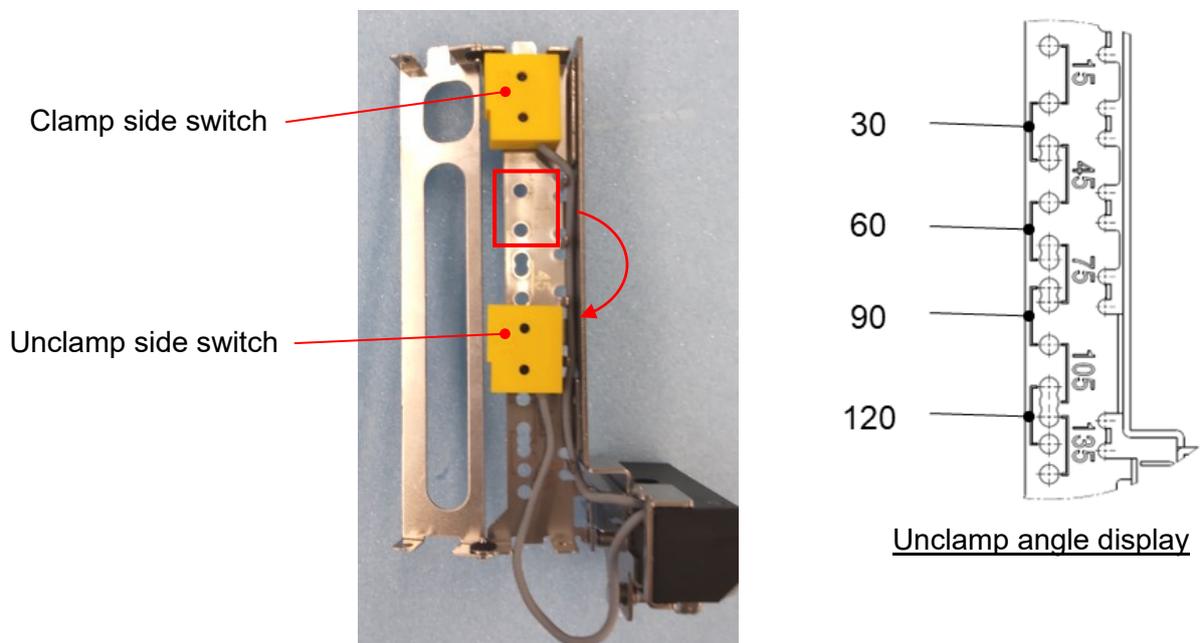
- ① Push the protrusion at the top of the switch cassette cover and the claw at the bottom in the direction of rotation to open the cover.



- ② Change the mounting position of the switch on the unclamp side according to the unclamp angle display of the switch cassette.

Note1) Arrange the switch so that the lead wire is on the lower side.

Note2) Do not move the clamp side switch.

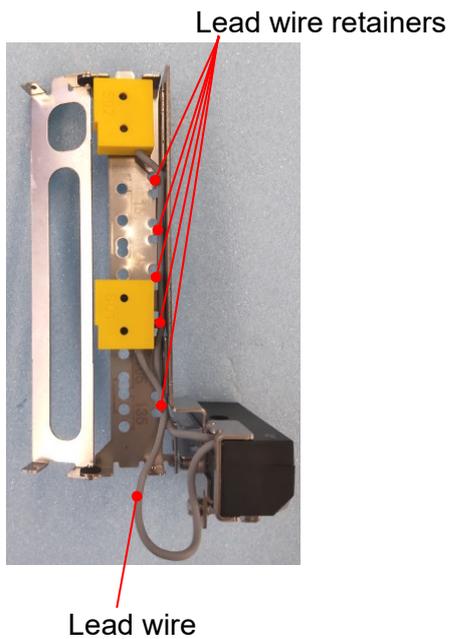


③ Fix the lead wire of the unclamp side switch with the lead wire retainer.

Note3) Fix the lead wire without slack to prevent interference with the internal parts of the cylinder.

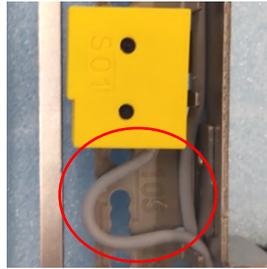
Note4) Use the lead wire retainers provided below the bottom of the switch.

Do not use lead wire retainers for unclamp angles of 105 °, 120 ° and 135 °.



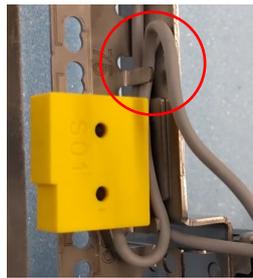
<Failure example 1>

There should be no slack in the lead wire.

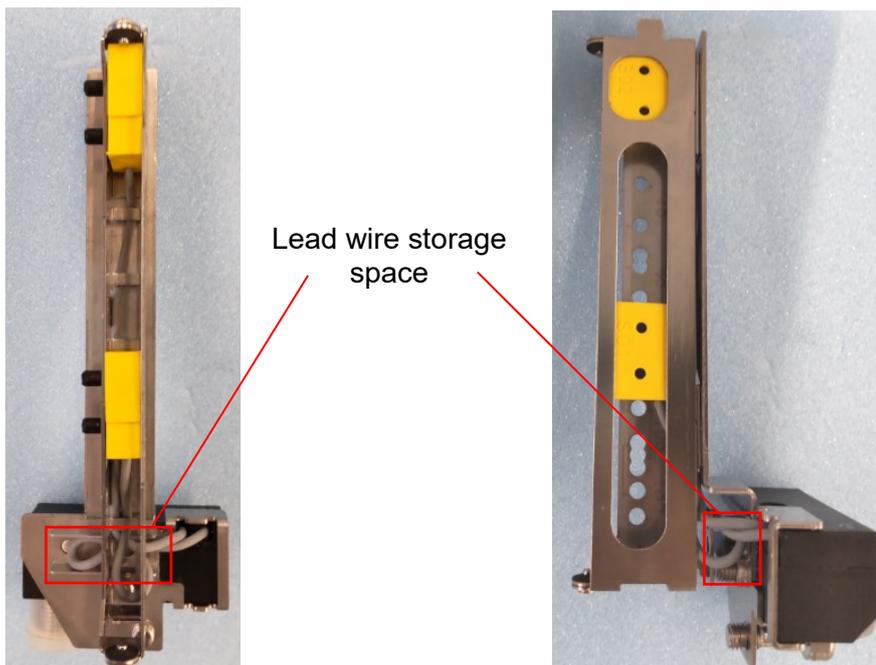


<Failure example 2>

Do not use the lead wire retainer above the switch.

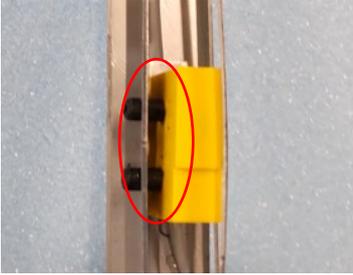


④ Close the cover until you hear a click, and put the excess lead wire in the lead wire storage space.



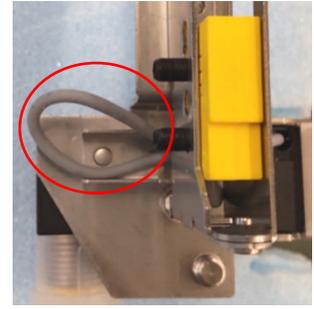
<Failure example 3>

There should be no gap between the switch cassette and the switch.



<Failure example 4>

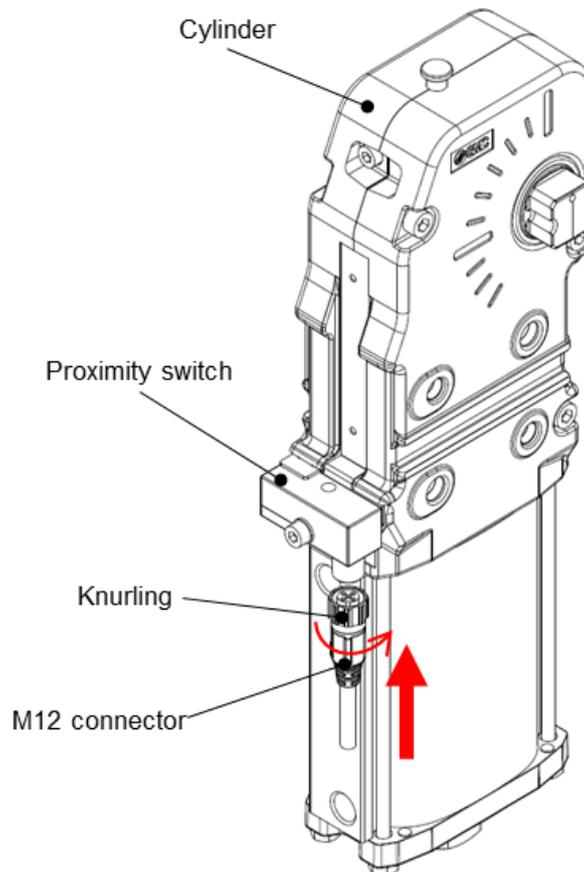
Don't let the lead wire stick out.



Wiring

When attaching the M12 connector cable to the proximity switch, turn the knurling to tighten it, and then turn it another 1/8 turn from the point where you feel resistance to rotation.

Also, the M12 connector cable may loosen due to vibration during cylinder operation, so retighten it regularly.

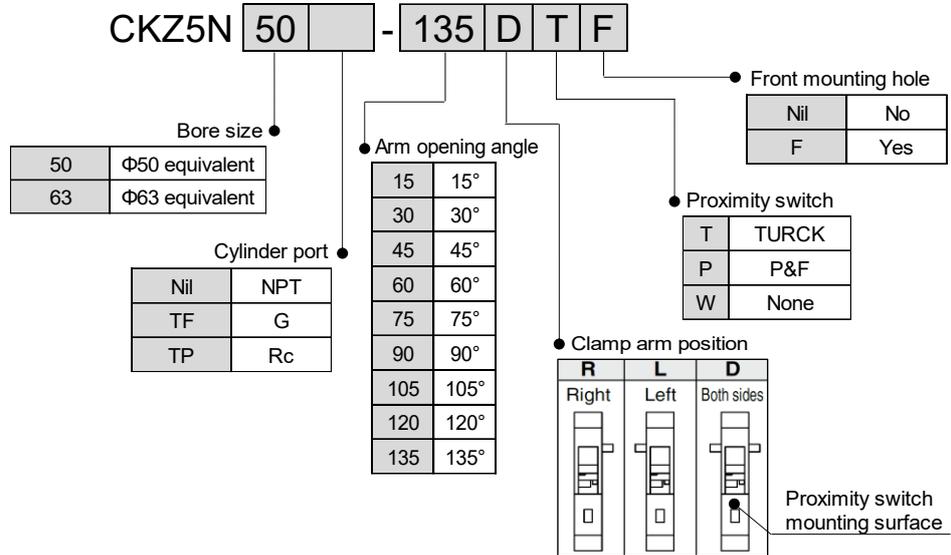


2. Product Specifications

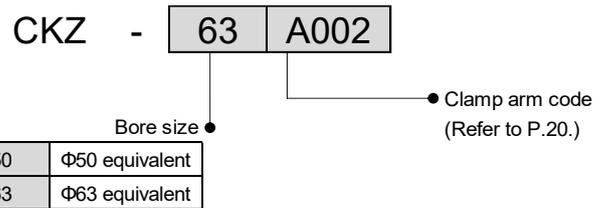
CKZ5N series

How to Order

Base type



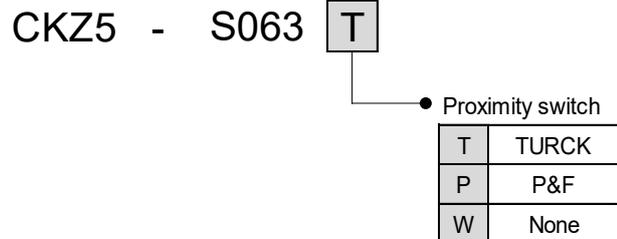
Clamp arm



Replacement Parts

Switch Kit

- * The switch kit includes a switch cassette assembly and mounting brackets.



Stopper Bolt Kit

- * The stopper bolt kit includes a stopper bolt and O-ring seal.



■ Clamp Arm code List

| Bore size | SMC part no. | Clamp arm code | NAAMS code |
|-----------|-------------------|----------------|------------|
| 50 | CKZ-50A001 | A001 | ACA201M |
| | CKZ-50A002 | A002 | ACA202M |
| | CKZ-50A003 | A003 | ACA203M |
| | CKZ-50A004 | A004 | ACA206M |
| | CKZ-50A005 | A005 | ACA207M |
| | CKZ-50A006 | A006 | ACA208M |
| | CKZ-50A007 | A007 | ACA211M |
| | CKZ-50A008 | A008 | ACA212M |
| | CKZ-50A009 | A009 | ACA213M |
| | CKZ-50A010 | A010 | ACA216M |
| | CKZ-50A011 | A011 | ACA217M |
| | CKZ-50A012 | A012 | ACA218M |
| | CKZ-50A013 | A013 | ACA221M |
| | CKZ-50A014 | A014 | ACA222M |
| | CKZ-50A015 | A015 | ACA223M |
| | CKZ-50A016 | A016 | ACA226M |
| | CKZ-50A017 | A017 | ACA227M |
| | CKZ-50A018 | A018 | ACA228M |
| | CKZ-50A019 | A019 | ACA236M |
| | CKZ-50A020 | A020 | ACA237M |
| | CKZ-50A021 | A021 | ACA238M |
| | CKZ-50A022 | A022 | ACA246M |
| | CKZ-50A023 | A023 | ACA247M |
| | CKZ-50A024 | A024 | ACA248M |
| | CKZ-50A025 | A025 | ACA256M |
| | CKZ-50A026 | A026 | ACA257M |
| | CKZ-50A027 | A027 | ACA258M |
| 63 | CKZ-63A001 | A001 | ACA001M |
| | CKZ-63A002 | A002 | ACA002M |
| | CKZ-63A003 | A003 | ACA003M |
| | CKZ-63A004 | A004 | ACA004M |
| | CKZ-63A005 | A005 | ACA005M |
| | CKZ-63A006 | A006 | ACA006M |
| | CKZ-63A007 | A007 | ACA007M |
| | CKZ-63A008 | A008 | ACA008M |
| | CKZ-63A009 | A009 | ACA009M |
| | CKZ-63A010 | A010 | ACA010M |
| | CKZ-63A011 | A011 | ACA011M |
| | CKZ-63A012 | A012 | ACA012M |
| | CKZ-63A013 | A013 | ACA013M |
| | CKZ-63A014 | A014 | ACA014M |
| | CKZ-63A015 | A015 | ACA015M |
| | CKZ-63A016 | A016 | ACA016M |
| | CKZ-63A017 | A017 | ACA017M |
| | CKZ-63A018 | A018 | ACA018M |
| | CKZ-63A019 | A019 | ACA019M |
| | CKZ-63A020 | A020 | ACA020M |
| | CKZ-63A021 | A021 | ACA021M |
| | CKZ-63A022 | A022 | ACA022M |
| | CKZ-63A023 | A023 | ACA023M |
| | CKZ-63A024 | A024 | ACA024M |
| | CKZ-63A025 | A025 | ACA025M |
| | CKZ-63A026 | A026 | ACA026M |
| | CKZ-63A027 | A027 | ACA027M |
| | CKZ-63A028 | A028 | ACA028M |
| | CKZ-63A029 | A029 | ACA029M |
| | CKZ-63A030 | A030 | ACA030M |
| | CKZ-63A031 | A031 | ACA031M |
| | CKZ-63A032 | A032 | ACA032M |
| | CKZ-63A033 | A033 | ACA033M |
| | CKZ-63A034 | A034 | ACA034M |
| | CKZ-63A035 | A035 | ACA035M |
| | CKZ-63A036 | A036 | ACA036M |
| | CKZ-63A037 | A037 | ACA037M |
| | CKZ-63A038 | A038 | ACA038M |
| | CKZ-63A039 | A039 | ACA039M |
| | CKZ-63A040 | A040 | ACA040M |
| | CKZ-63A041 | A041 | ACA041M |
| | CKZ-63A042 | A042 | ACA042M |
| | CKZ-63A043 | A043 | ACA043M |
| | CKZ-63A044 | A044 | ACA044M |
| | CKZ-63A045 | A045 | ACA045M |
| | CKZ-63A046 | A046 | ACA046M |
| | CKZ-63A047 | A047 | ACA047M |
| | CKZ-63A048 | A048 | ACA048M |

Cylinder Specifications

| Bore size | 50 | 60 |
|--------------------------------|---|---------|
| Action | Double acting | |
| Fluid | Air | |
| Proof pressure | 0.9MPa | |
| Max. operating pressure | 0.6MPa | |
| Min. operating pressure | 0.3MPa | |
| Ambient and fluid temperatures | -10 to 60°C(No freezing) | |
| Cushion | Clamping side: None Unclamping side: Rubber bumper | |
| Operating time | Clamping: 1sec or more, Unclamping: 1sec or more | |
| Max. allowable holding moment* | 800N·m | 1500N·m |

* Refers to the maximum holding force (torque) while clamped with the operating air exhausted This is not the possible holding force (torque) for normal use.

Weight (Cylinder Without Clamp Arm)

| Bore size | Arm opening angle | | | | | | | | |
|-----------|-------------------|-----|-----|-----|-----|-----|------|------|------|
| | 15° | 30° | 45° | 60° | 75° | 90° | 105° | 120° | 135° |
| 50(D)* | 2.9 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.7 | 2.7 | 2.7 |
| 50(R/L)* | 2.8 | 2.8 | 2.8 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |
| 63(D) | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.3 | 3.3 | 3.3 | 3.3 |
| 63(R/L) | 3.4 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.2 | 3.2 | 3.2 |

* Clamp arm position D : Both sides R : Right L : left

Cylinder Stroke

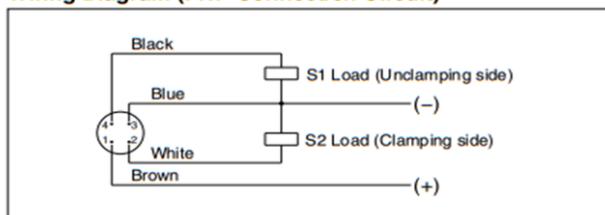
| Bore size | Arm opening angle | | | | | | | | |
|-----------|-------------------|------|------|------|------|------|------|------|------|
| | 15° | 30° | 45° | 60° | 75° | 90° | 105° | 120° | 135° |
| 50 | 22.9 | 32.5 | 40.6 | 48.4 | 56.4 | 64.5 | 72.4 | 79.4 | 84.4 |
| 63 | 22.9 | 32.5 | 40.6 | 48.4 | 56.4 | 64.5 | 72.4 | 79.4 | 84.4 |

Proximity Switch Specifications

| Manufacturer | TURCK | P&F |
|-------------------------|---|---|
| Power supply voltage | 10 to 30 VDC | 10 to 30 VDC |
| Output | N.O., PNP | N.O., PNP |
| Continuous load current | 150 mA | 100 mA |
| Response frequency | 30 Hz | 25 Hz |
| Housing material | PBT | PA6, PBT |
| Output indication | Clamping side: Red Unclamping side: Yellow | Clamping side: Red Unclamping side: Yellow |
| Power supply indication | Green | Green |
| Connector | M12 connector | M12 connector |

* Switch specifications correspond to the manufacturers' technical information.

Wiring Diagram (PNP Connection Circuit)



Connection (Female side) Connector Cable

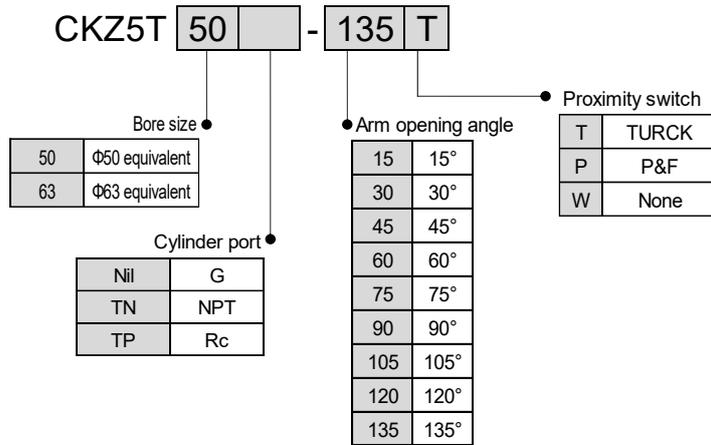
Use M12-4 pin socket (female) A cord.

- Applicable to both TURCK and P&F
- Please contact SMC for NPN specifications.

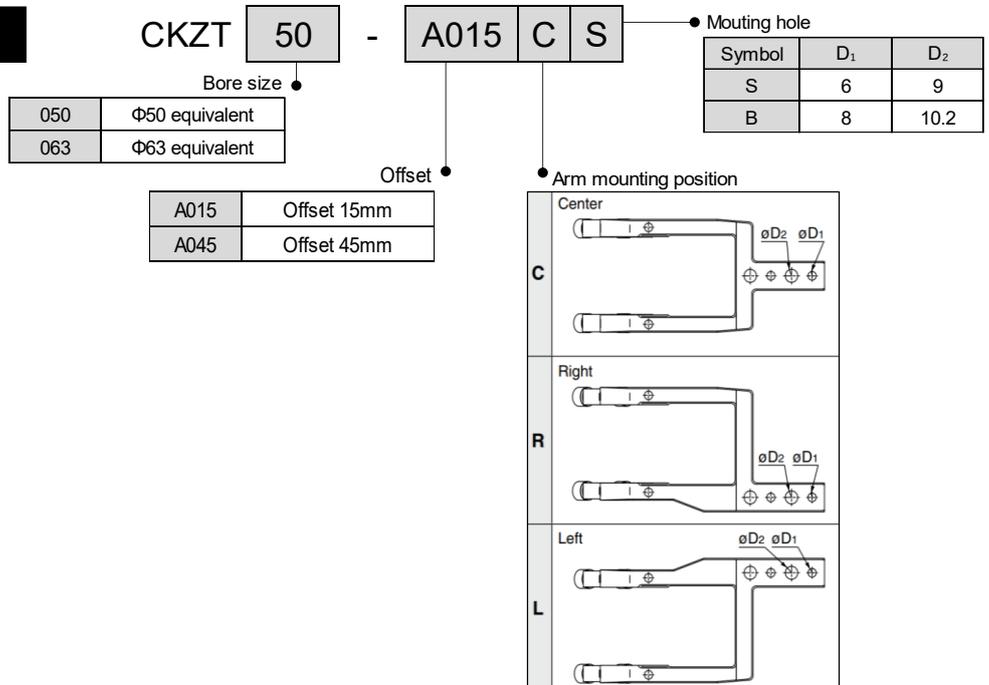
CKZ5T series

How to Order

Base type



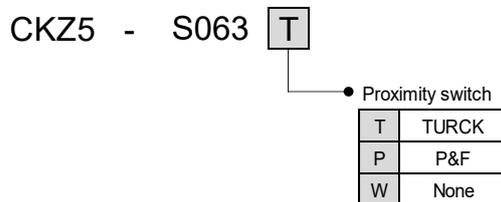
Clamp arm



Replacement Parts

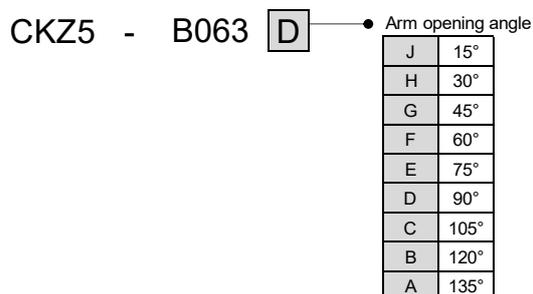
Switch Kit

- * The switch kit includes a switch cassette assembly and mounting brackets.



Stopper Bolt Kit

- * The stopper bolt kit includes a stopper bolt and O-ring seal.



Cylinder Specifications

| | | |
|--------------------------------|---|---------|
| Bore size | 50 | 60 |
| Action | Double acting | |
| Fluid | Air | |
| Proof pressure | 0.9MPa | |
| Max. operationg pressure | 0.6MPa | |
| Min. operationg pressure | 0.3MPa | |
| Ambient and fluid temperatures | -10 to 60°C(No freezing) | |
| Cushion | Clamping side: None Unclamping side: Rubber bumper | |
| Operating time | Clamping: 1 sec or more, Unclamping: 1 sec or more | |
| Max. allowable holding moment* | 800N·m | 1500N·m |

* Refers to the maximum holding force (torque) while clamped with the operating air exhausted This is not the possible holding force (torque) for normal use.

Weight (Cylinder Without Clamp Arm)

| Bore size | Arm opening angle | | | | | | | | |
|-----------|-------------------|-----|-----|-----|-----|-----|------|------|------|
| | 15° | 30° | 45° | 60° | 75° | 90° | 105° | 120° | 135° |
| 50 | 2.9 | 2.9 | 2.9 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 |
| 63 | 3.4 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.2 | 3.2 |

[kg]

Cylinder Stroke

| Bore size | Arm opening angle | | | | | | | | |
|-----------|-------------------|------|------|------|------|------|------|------|------|
| | 15° | 30° | 45° | 60° | 75° | 90° | 105° | 120° | 135° |
| 50 | 22.9 | 32.5 | 40.6 | 48.4 | 56.4 | 64.5 | 72.4 | 79.4 | 84.4 |
| 63 | 22.9 | 32.5 | 40.6 | 48.4 | 56.4 | 64.5 | 72.4 | 79.4 | 84.4 |

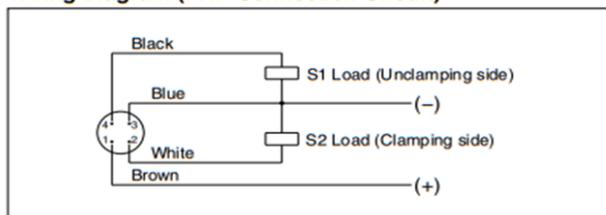
[mm]

Proximity Switch Specifications

| Manufacturer | TURCK | P&F |
|-------------------------|---|---|
| Power supply voltage | 10 to 30 VDC | 10 to 30 VDC |
| Output | N.O., PNP | N.O., PNP |
| Continuous load current | 150 mA | 100 mA |
| Response frequency | 30 Hz | 25 Hz |
| Housing material | PBT | PA6, PBT |
| Output indication | Clamping side: Red Unclamping side: Yellow | Clamping side: Red Unclamping side: Yellow |
| Power supply indication | Green | Green |
| Connector | M12 connector | M12 connector |

* Switch specifications correspond to the manufacturers' technical information.

Wiring Diagram (PNP Connection Circuit)



Connection (Female side) Connector Cable

Use M12-4 pin socket (female) A cord.

- Applicable to both TURCK and P&F
- Please contact SMC for NPN specifications.

Troubleshooting

| Trouble | Possible cause | Countermeasures |
|---|--|--|
| Operation has lost smoothness. | 1. Insufficient pressure. | · Supply appropriate pressure. |
| Force has decreased. | 1. Insufficient air pressure.. | · Supply appropriate pressure. |
| | 2. Insufficient flow rate. | · The resistance in the fluid path may have increased due to deformation or foreign matter entering the product. Perform repair or cleaning. |
| Clamp arm operation speed is too fast. | 1. Speed controller is not used. | · Use a speed controller suitable for the size of the product. Refer to the catalog and operation Manual of the speed controller for details. |
| | 2. Insufficient fine adjustment of the speed controller. | · Select a speed controller, which can be adjusted to the required speed. Refer to the catalog and operation manual of the speed controller for details. |
| Clamp arm operation speed is too slow. | 1. Directional control valve is too small. | · Select directional control valves with suitable size. Refer to the catalog and operation manual of the directional control valve for details. |
| | 2. Resistance of equipment in the piping route is too large. | · Use components and equipment of an appropriate size. It affects the piping diameter and length. Equipment at the exhaust side should also be of an appropriate size. Refer to the catalog and operation manual of the components and equipment for details. |
| | 3. Excessive load weight for clamp arm end. | · Maintain the load weight within allowable weight range. |
| The product sometimes does not operate. | 1. Problem of equipment other than this product. | · Check all items in the system one by one to find the cause. Refer to the catalog and operation manual of the components and equipment for details. |
| The product has become unable to operate. | 1. Problem of equipment other than this product. | · Check all items in the system one by one to find the cause. Refer to the catalog and operation manual of the components and equipment for details. |
| | 2. Insufficient pressure | · Supply appropriate pressure. |

| Trouble | Possible cause | Countermeasures |
|--|--|--|
| Piston speed cannot be adjusted with the speed controller. | 1. Incorrect speed controller selection. | <ul style="list-style-type: none"> Use a speed controller suitable for the size of the product. Refer to the catalog and operation manual of the speed controller for details. |
| | 2. Problem of the speed controller. | <ul style="list-style-type: none"> Replace the speed controller with a new one. Refer to the catalog and operation manual of the speed controller for details. |
| The product has stick and slip movement. | 1. Insufficient margin of output. | <ul style="list-style-type: none"> Supply appropriate pressure. |
| | 2. Use of a meter-in circuit. | <ul style="list-style-type: none"> The operation may become unstable if the product is used with meter-in. Use of a meter-out circuit. |
| The product shows sudden and fast Movement after being stopped for extended periods of time. | 1. Fluctuation of residual pressure in the product between continuous operation and operation after stoppage for extended periods of time. | <ul style="list-style-type: none"> Consider the use of a suitable pneumatic circuit to prevent sudden action of the product. |
| Switch does not turn on (Switch sometimes does not turn on) | 1. Power supply failure or connection failure. | <ul style="list-style-type: none"> Check the power supply. Connect the product properly. |
| | 2. Displacement of the switch position. | <ul style="list-style-type: none"> The switch position of the clamp side is different for $\Phi 50$ and $\Phi 63$. Check that the angle indication on the stopper bolt matches the mounting of the switch position on the unclamping side. |
| | 3. Lowered sensitivity of the switch. | <ul style="list-style-type: none"> Eliminate the problem of ambient temperature, vibration, or impact. Replace the switch with a new one if the problem is not solved. |
| The clamp arm is not locked automatically. | 1. The relation between the shim depth and the clamp force is not correct. | <ul style="list-style-type: none"> Adjust the shim properly. |
| Insufficient clamp force. | 1. The relation between the shim depth and the clamp force is not correct. | <ul style="list-style-type: none"> Adjust the shim properly. |

| Revision history |
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