



PowerArm

# PAW Series

● Bore size: ø80/ø100/ø125

RoHS

## Specifications

| Item                                | mm          | PAW  |      |      |
|-------------------------------------|-------------|--|------|------|
|                                     |             | ø80  | ø100 | ø125 |
| Bore size                           | mm          | ø80  | ø100 | ø125 |
| Working fluid                       |             | Compressed air   |      |      |
| Max. working pressure               | MPa         | 0.7  |      |      |
| Min. working pressure               | MPa         | 0.25(When option L (with a rotation lock) is selected: 0.35) |      |      |
| Proof pressure                      | MPa         | 1.05   |      |      |
| Ambient temperature                 | °C          | 5 to 60  |      |      |
| Cushion                             |             | Rubber cushion   |      |      |
| Lubrication                         |             | Not available  |      |      |
| Load capacity (0.5 MPa pressurized) | kg          | 30   | 50   | 80   |
| Air consumption                     | ℓ/min (ANR) | 8  | 14   | 25   |

Note: Values are at air consumption 1 cycle/min. and working pressure 0.7 MPa.

## Movable range

· With single-axis

| Model No.      | Movable range<br>Vertical (mm) |
|----------------|--------------------------------|
| PAW-S-8 (ø80)  | 520                            |
| PAW-S-X (ø100) | 580                            |
| PAW-S-Z (ø125) | 650                            |

· With multi-axis

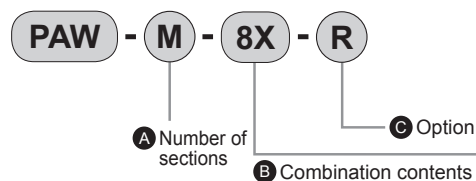
| Model No. | Movable range |                 |
|-----------|---------------|-----------------|
|           | Vertical (mm) | Horizontal (mm) |
| PAW-M-8S  | 520           | 1200            |
| PAW-M-XS  | 580           | 1400            |
| PAW-M-ZS  | 650           | 1600            |
| PAW-M-8X  | 1100          | 1300            |
| PAW-M-XZ  | 1230          | 1500            |
| PAW-M-8XS | 1100          | 2000            |
| PAW-M-XZS | 1230          | 2300            |
| PAW-M-8XZ | 1750          | 2100            |

Note: Horizontal movable range is the maximum value at the descending edge of the vertical movable range. See the external dimensions for more information on the movable range.

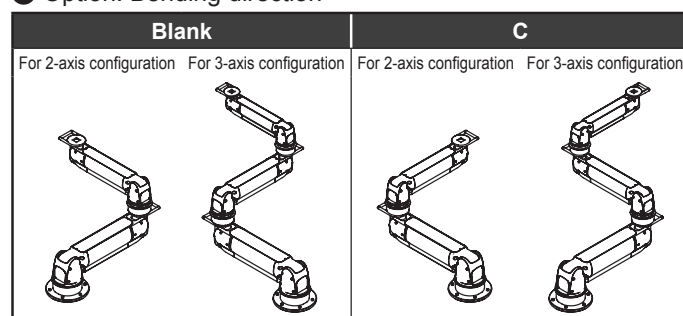
## Weight

| Model No. | Weight (kg) | Optional additional weight (kg) |                            |     |
|-----------|-------------|---------------------------------|----------------------------|-----|
|           |             | L (rotation lock mechanism)     | R (tip rotation mechanism) | LR  |
| PAW-M-8   | 27          | 0.5                             | 4                          | 5   |
| PAW-M-X   | 38          | 0.5                             | 5.5                        | 6.5 |
| PAW-M-Z   | 71          | 0.5                             | 7.5                        | 8.5 |
| PAW-M-8S  | 46          | 1.0                             | 4                          | 5.5 |
| PAW-M-XS  | 77          | 1.0                             | 5.5                        | 7   |
| PAW-M-ZS  | 123         | 1.0                             | 7.5                        | 9   |
| PAW-M-8X  | 58          | 1.0                             | 4                          | 5.5 |
| PAW-M-XZ  | 102         | 1.0                             | 5.5                        | 7   |
| PAW-M-8XS | 96          | 1.5                             | 4                          | 6   |
| PAW-M-XZS | 154         | 1.5                             | 5.5                        | 7.5 |
| PAW-M-8XZ | 121         | 1.5                             | 4                          | 6   |

### How to order

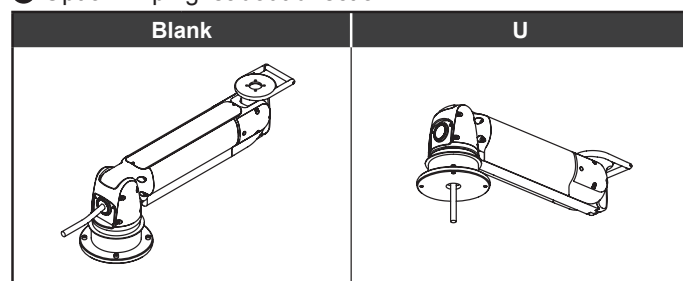


### C Option: Bending direction



\* C is not available for single axis (PAW-S).

### C Option: Piping leadout direction

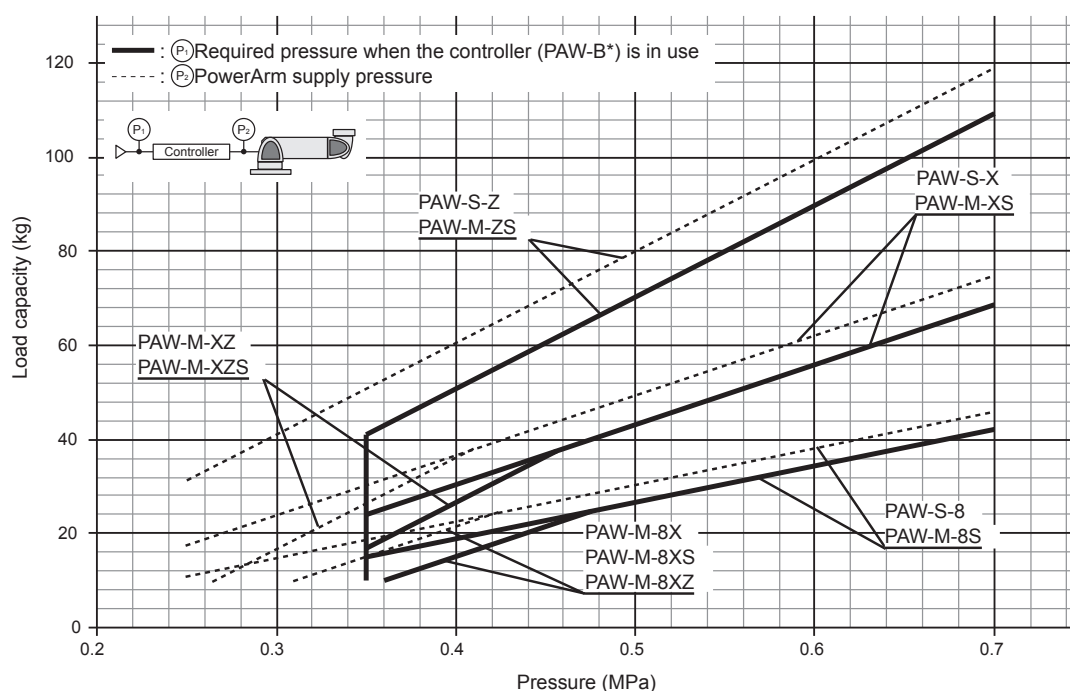


\* Piping holes at the mounting surface center are required for U.

|                        |  | A Number of sections |            |
|------------------------|--|----------------------|------------|
|                        |  | Single-axis          | Multi-axis |
|                        |  | S                    | M          |
| B Combination contents |  |                      |            |
| 8                      | ø80 single-axis  | ●                    |            |
| X                      | ø100 single-axis                                       | ●                    |            |
| Z                      | ø125 single-axis                                       | ●                    |            |
| 8S                     | ø80 + SCARA arm  |                      | ●          |
| XS                     | ø100 + SCARA arm                                       |                      | ●          |
| ZS                     | ø125 + SCARA arm                                       |                      | ●          |
| 8X                     | ø80 + ø100   |                      | ●          |
| XZ                     | ø100 + ø125  |                      | ●          |
| 8XS                    | ø80 + ø100 + SCARA arm                                 |                      | ●          |
| XZS                    | ø100 + ø125 + SCARA arm                                |                      | ●          |
| 8XZ                    | ø80 + ø100 + ø125                                      |                      | ●          |
| C Option               |  |                      |            |
| L                      | Rotation lock mechanism *                              | ●                    | ●          |
| R                      | Tip rotation mechanism                                 | ●                    | ●          |
| C                      | Bending direction (Refer to the figure at left)        |                      | ●          |
| U                      | Piping leadout direction (Refer to the figure at left) | ●                    | ●          |

\* A mechanism designed to hold the force applied in rotational directions.  
It is not designed to stop dynamic rotational force.

### Load capacity under pressure



\*1: Indicates the load capacity with the optional tip rotation mechanism mounted.

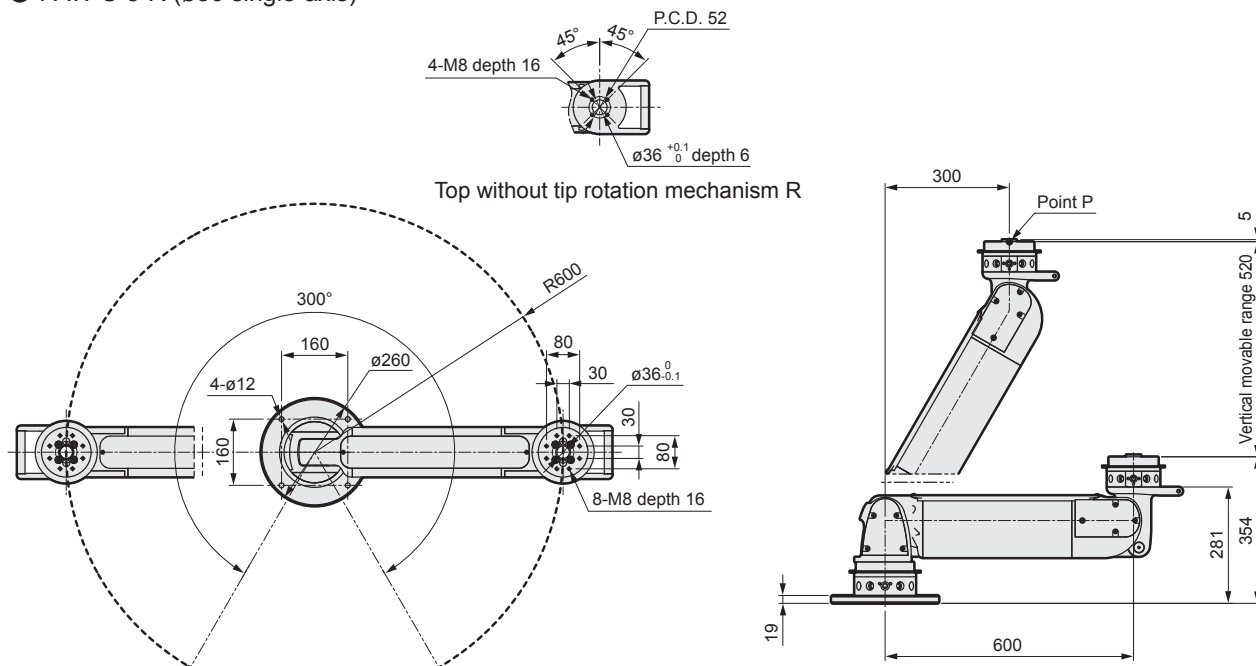
\*2: Pressure supplied to the controller should be increased, depending on the operating frequency and speed.

\*3: Attachment weight is not included.

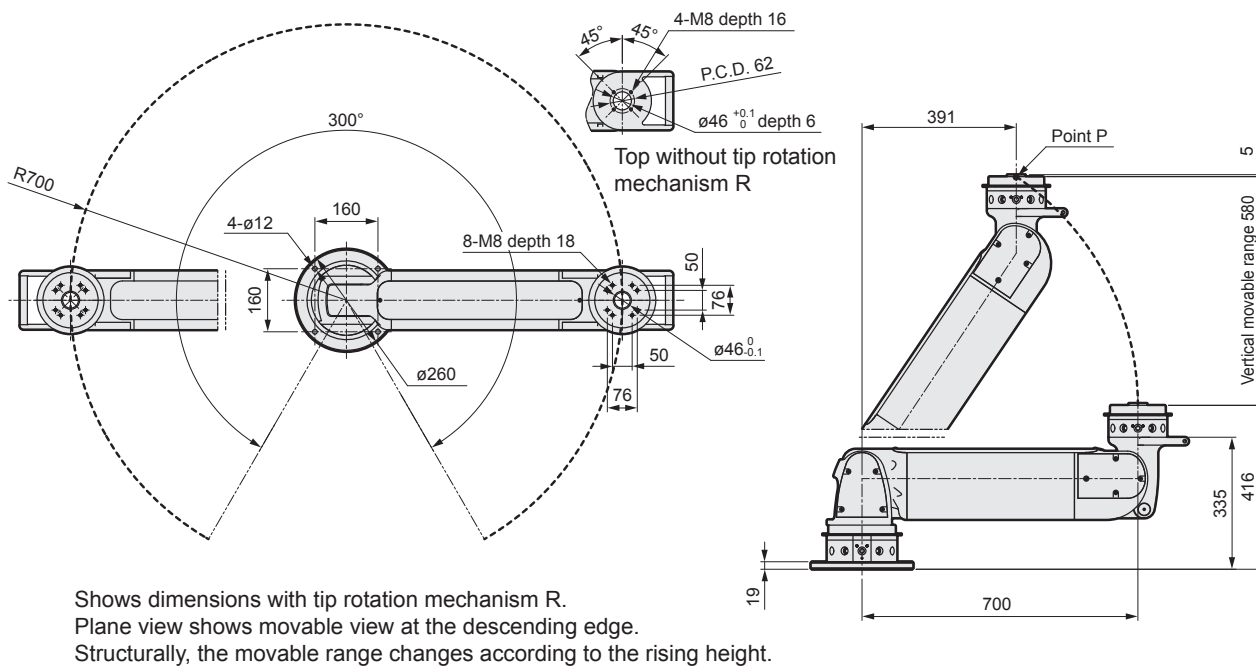
\*4: While the load capacity has properties such that it alters slightly according to the arm rise angle, this graph shows the lower limit values.

## Dimensions (single-axis)

### ● PAW-S-8-R (ø80 single-axis)



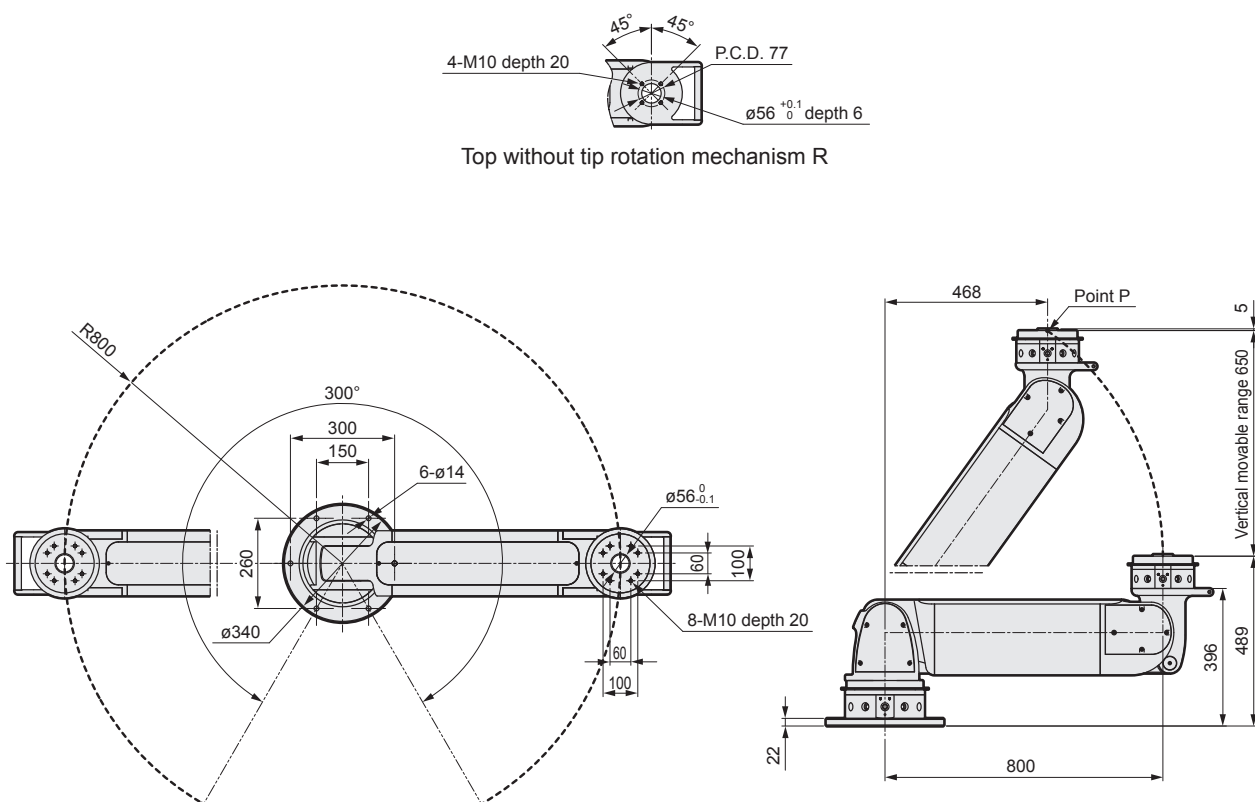
### ● PAW-S-X-R (ø100 single axis)



\* Refer to page 13 for the optional dimensions of the tip rotation mechanism (R) option.

## Dimensions (single-axis)

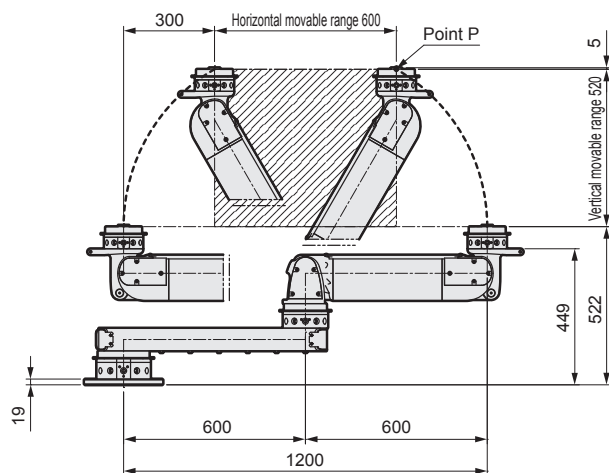
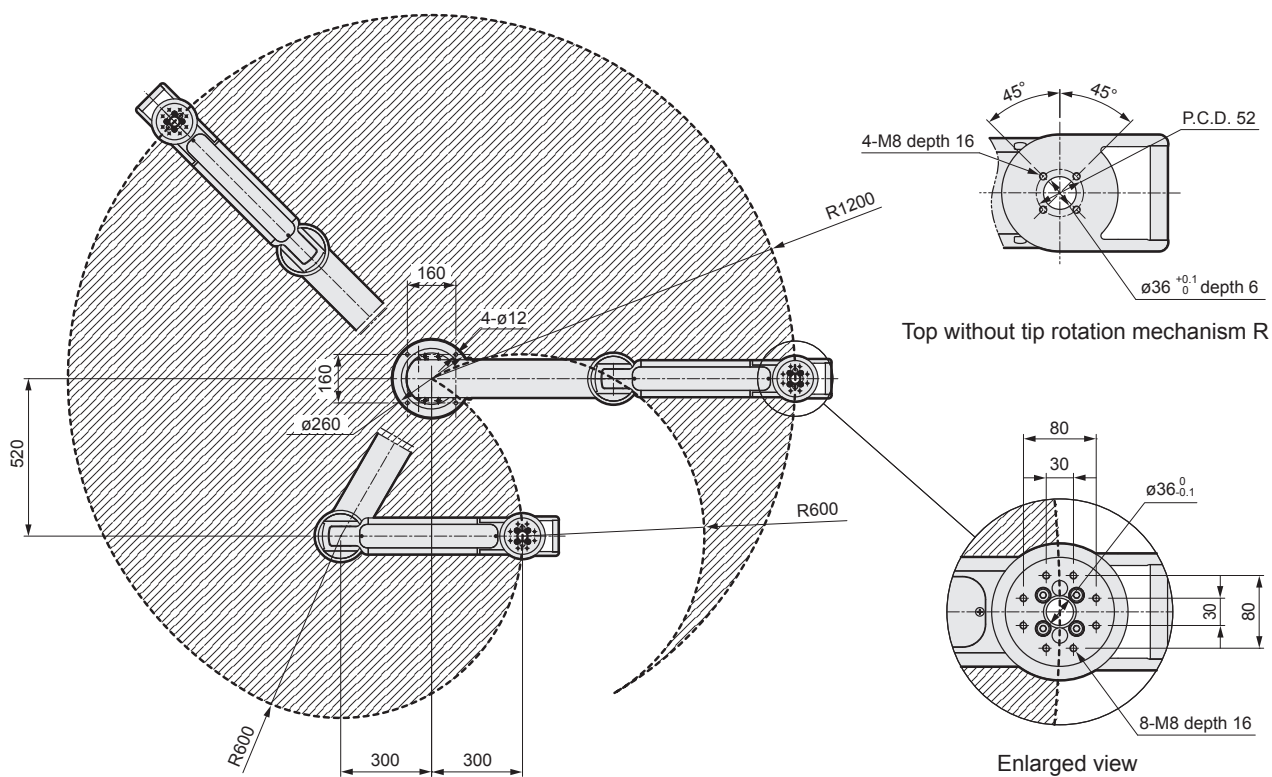
### ● PAW-S-Z-R (ø125 single axis)



\* Refer to page 13 for the optional dimensions of the tip rotation mechanism (R) option.

## Dimensions (multi-axis)

- PAW-M-8S-R (upper section  $\varnothing 80$  + lower section SCARA arm)



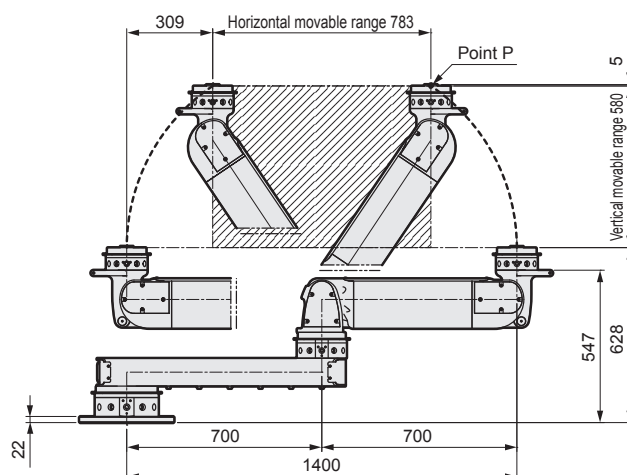
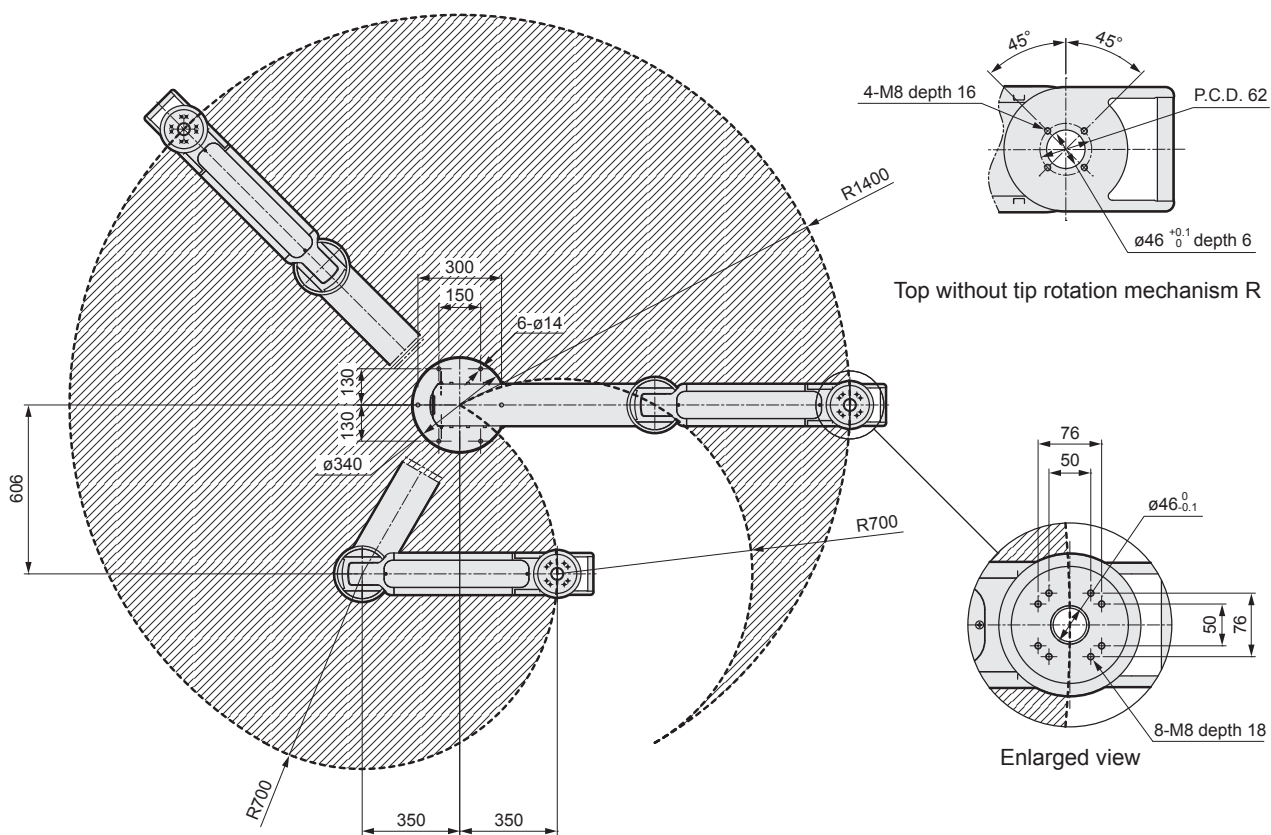
Shows dimensions with tip rotation mechanism R.  
Plane view shows movable view at the point P descending edge.  
Structurally, the movable range changes according to the point P rising height.

\* Refer to page 13 for the optional dimensions of the tip rotation mechanism (R) option.

\* With the bending direction (C) option, the operating range is left-right reversed.

Dimensions (multi-axis)

- PAW-M-XS-R (upper section  $\varnothing 100$  + lower section SCARA arm)

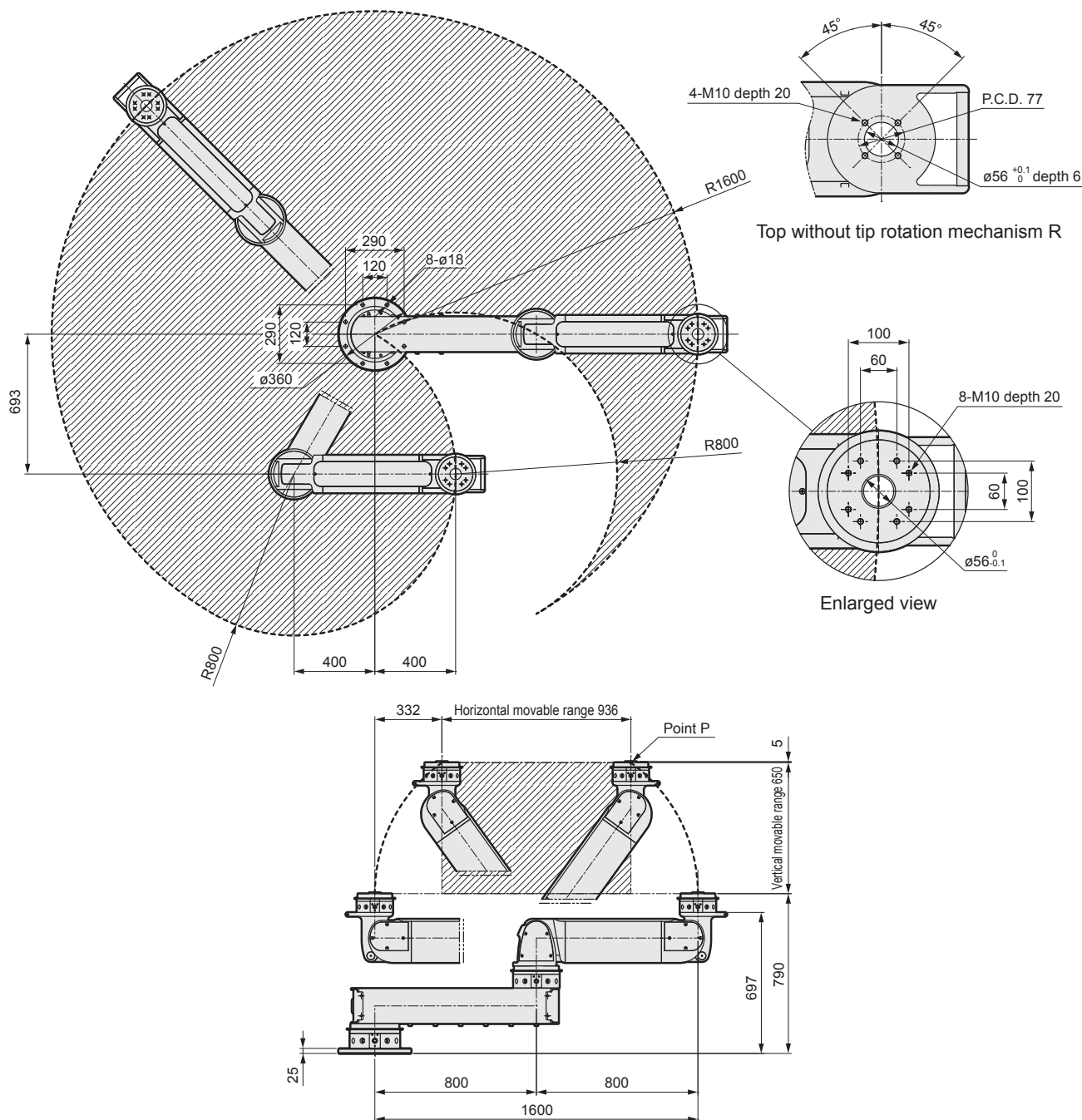


Shows dimensions with tip rotation mechanism R.  
Plane view shows movable view at the point P descending edge.  
Structurally, the movable range changes according to the point P rising height.

- \* Refer to page 13 for the optional dimensions of the tip rotation mechanism (R) option.
- \* With the bending direction (C) option, the operating range is left-right reversed.

## Dimensions (multi-axis)

- PAW-M-ZS-R (upper section  $\varnothing 125$  + lower section SCARA arm)



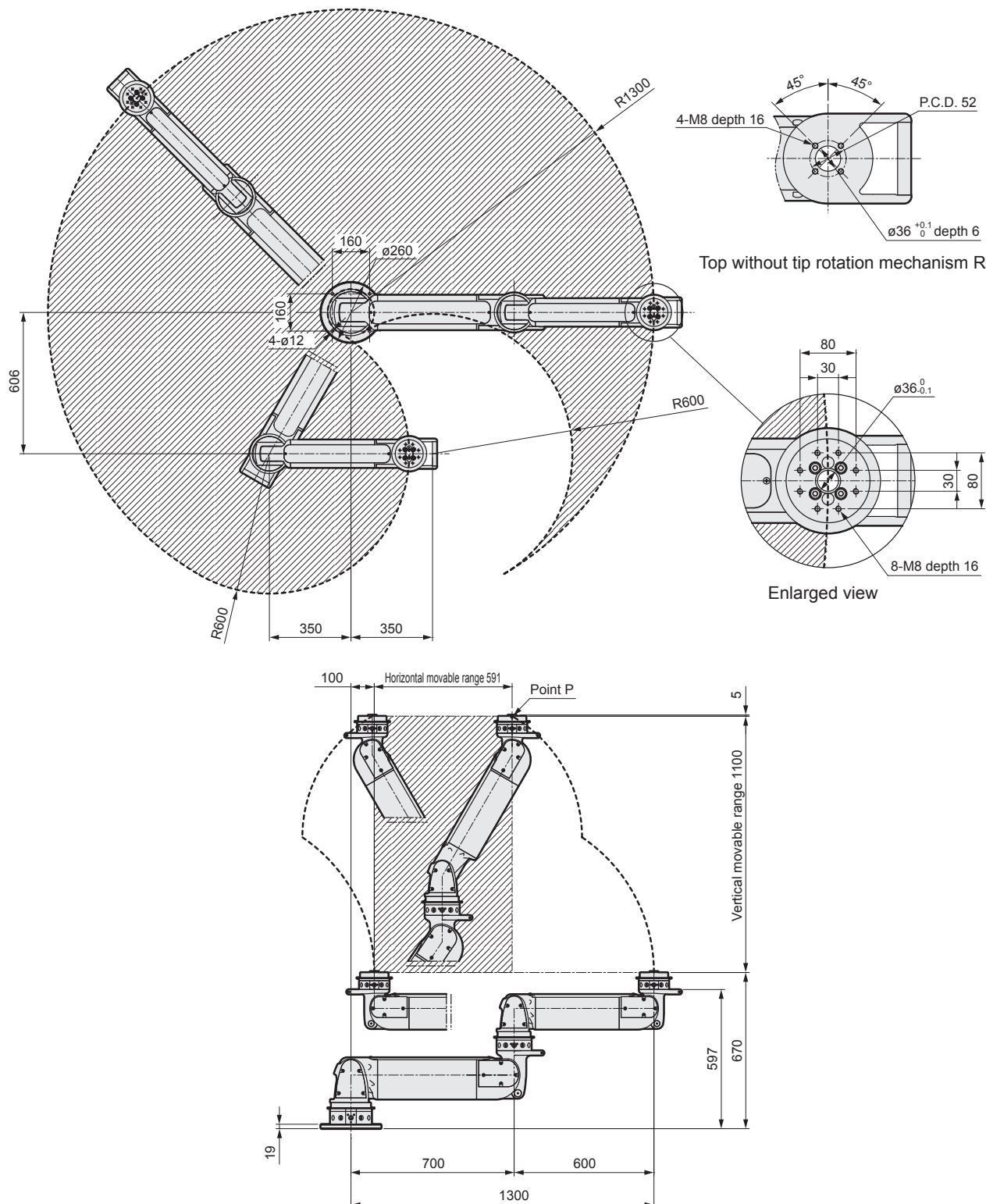
Shows dimensions with tip rotation mechanism R.  
 Plane view shows movable view at the point P descending edge.  
 Structurally, the movable range changes according to the point P rising height.

\* Refer to page 13 for the optional dimensions of the tip rotation mechanism (R) option.

\* With the bending direction (C) option, the operating range is left-right reversed.

Dimensions (multi-axis)

- PAW-M-8X-R (upper section  $\varnothing 80$  + lower section  $\varnothing 100$ )



Shows dimensions with tip rotation mechanism R.

Plane view shows movable view at the point P descending edge.

Structurally, the movable range changes according to the point P rising height.

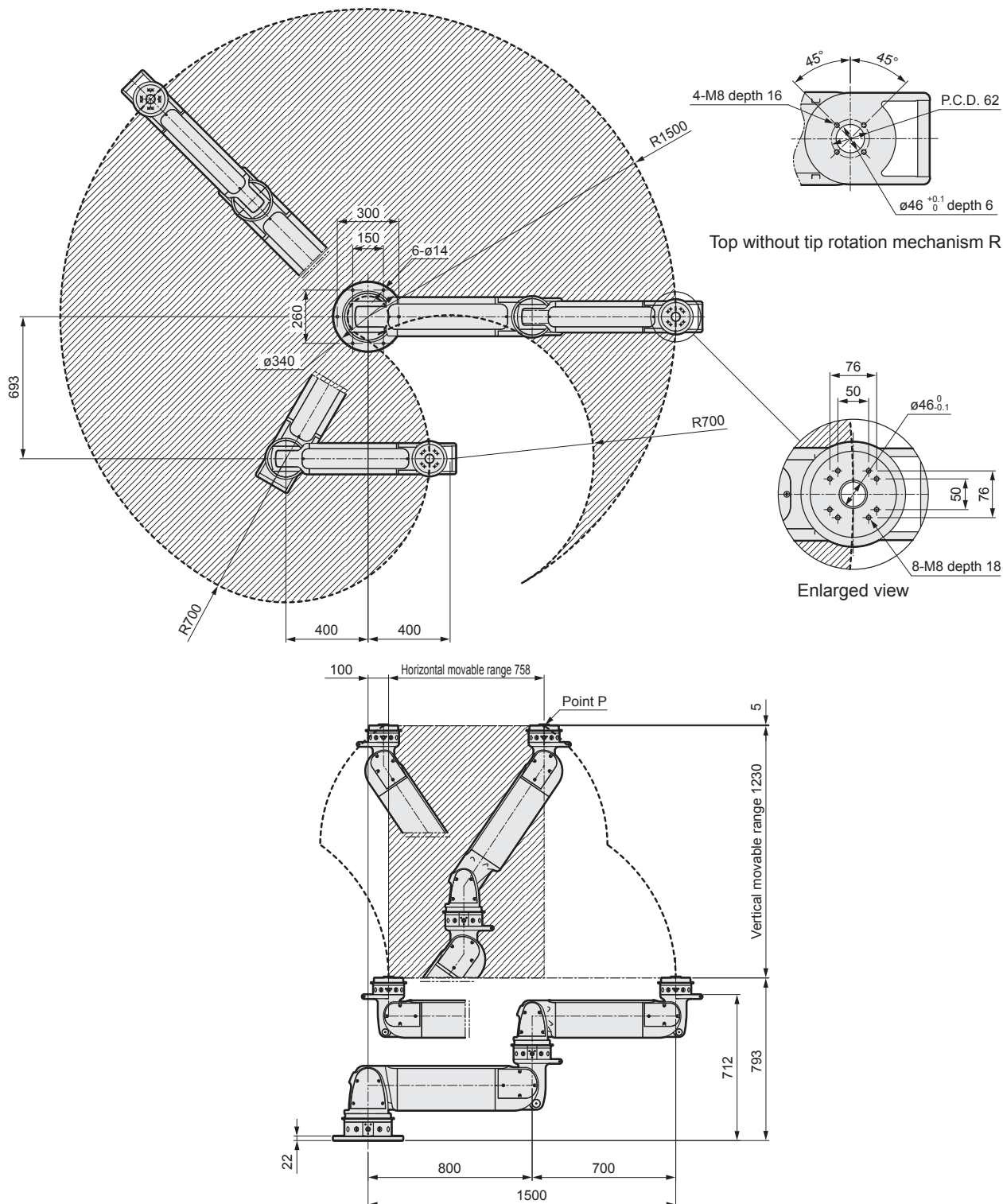
\* Refer to page 13 for the optional dimensions of the tip rotation mechanism (R) option.

\* With the bending direction (C) option, the operating range is left-right reversed.



## Dimensions (multi-axis)

- PAW-M-XZ-R (upper section  $\varnothing 100$  + lower section  $\varnothing 125$ )



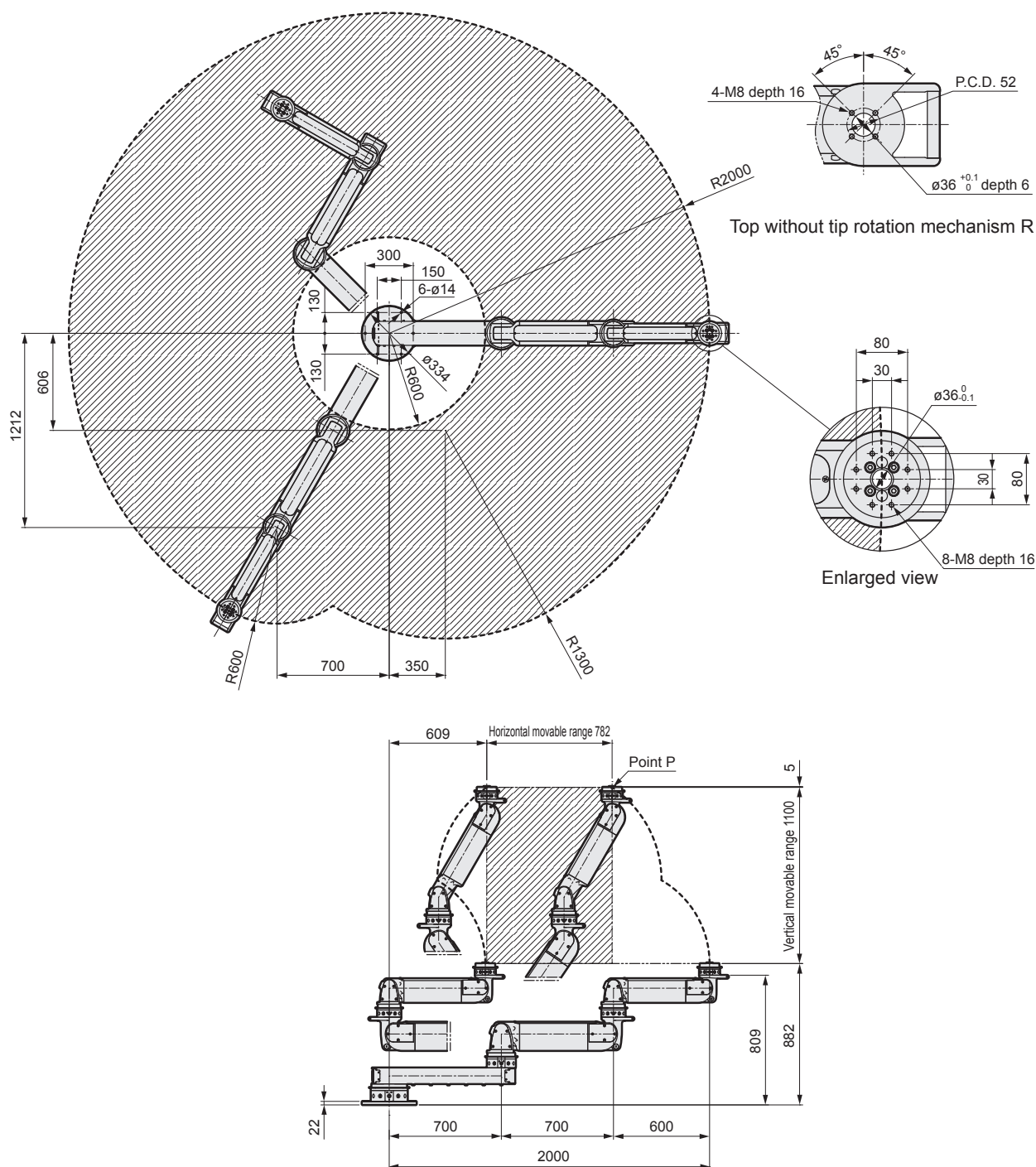
Shows dimensions with tip rotation mechanism R.  
Plane view shows movable view at the point P descending edge.  
Structurally, the movable range changes according to the point P rising height.

\* Refer to page 13 for the optional dimensions of the tip rotation mechanism (R) option.

\* With the bending direction (C) option, the operating range is left-right reversed.

## Dimensions (multi-axis)

- PAW-M-8XS-R (upper section  $\varnothing 80$  + middle section  $\varnothing 100$  + lower section SCARA arm)

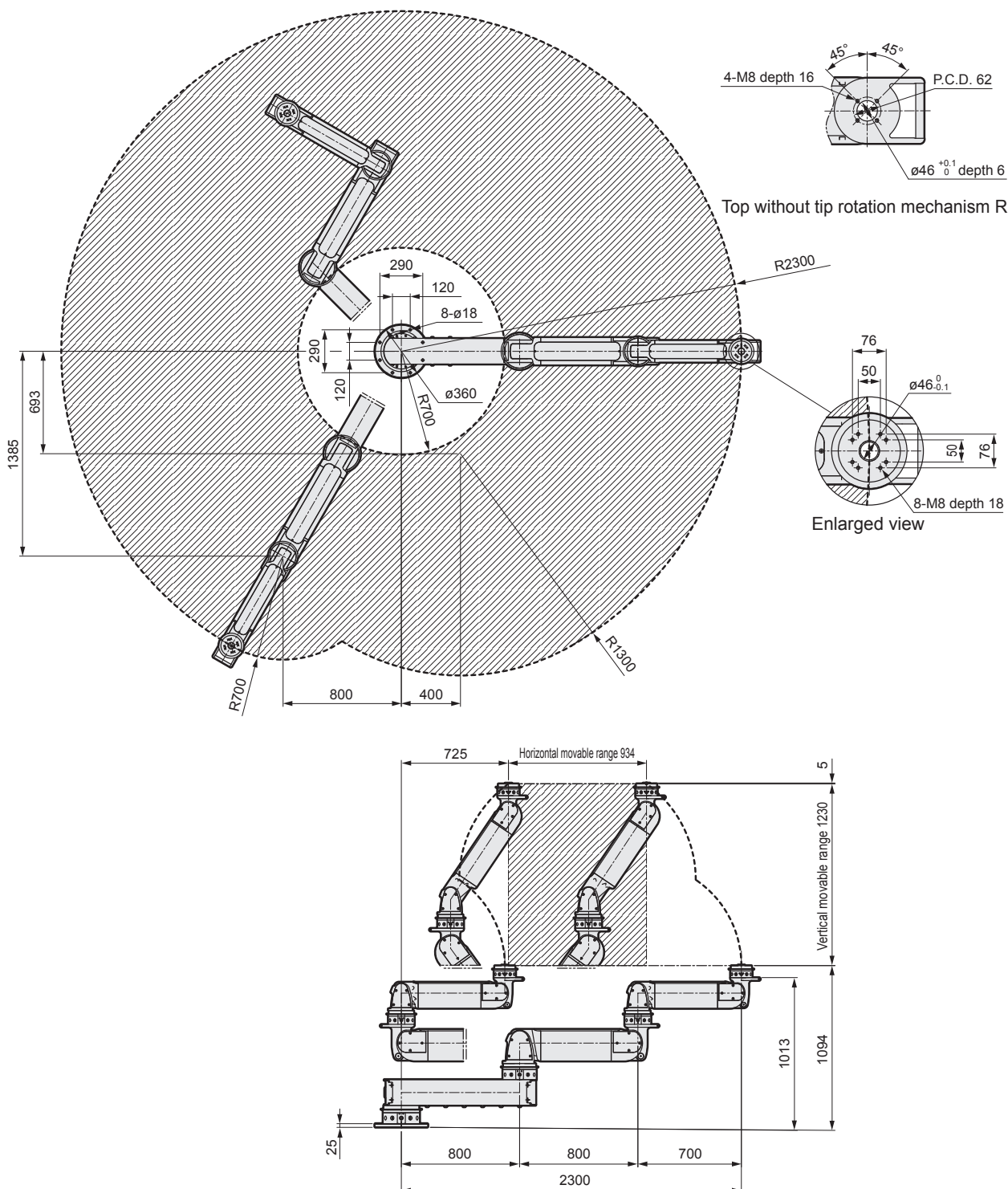


Shows dimensions with tip rotation mechanism R.  
Plane view shows movable view at the point P descending edge.  
Structurally, the movable range changes according to the point P rising height.

- \* Refer to page 13 for the optional dimensions of the tip rotation mechanism (R) option.
- \* With the bending direction (C) option, the operating range is left-right reversed.

## Dimensions (multi-axis)

- PAW-M-XZS-R (upper section  $\varnothing 100$  + middle section  $\varnothing 125$  + lower section SCARA arm)



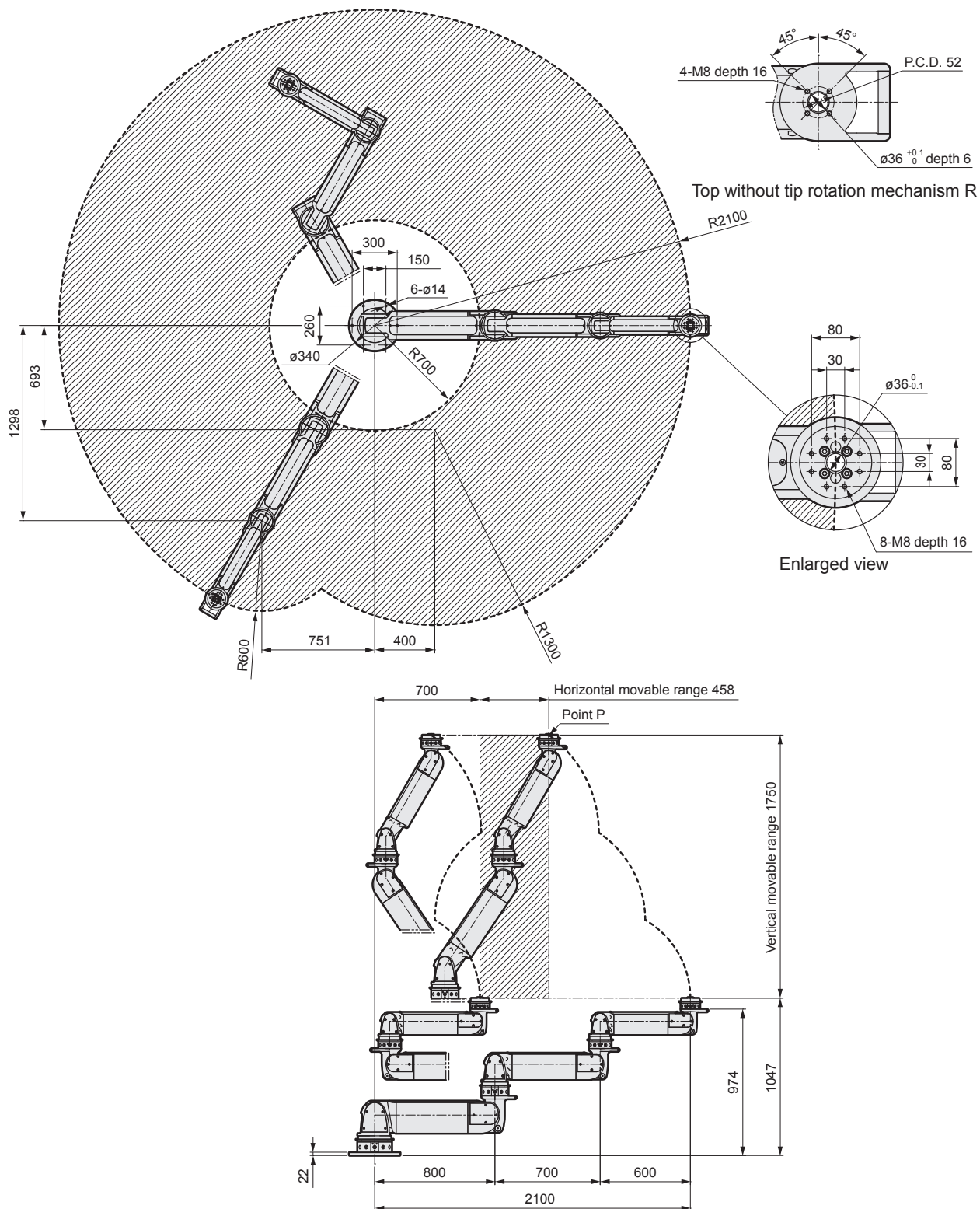
Shows dimensions with tip rotation mechanism R.  
 Plane view shows movable view at the point P descending edge.  
 Structurally, the movable range changes according to the point P rising height.

\* Refer to page 13 for the optional dimensions of the tip rotation mechanism (R) option.

\* With the bending direction (C) option, the operating range is left-right reversed.

Dimensions (multi-axis)

- PAW-M-8XZ-R (upper section  $\varnothing 80$  + middle section  $\varnothing 100$  + lower section  $\varnothing 125$ )



Shows dimensions with tip rotation mechanism R.

Plane view shows movable view at the point P descending edge.

Structurally, the movable range changes according to the point P rising height.

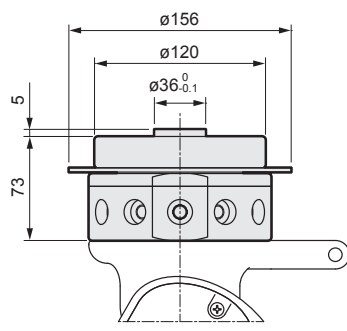
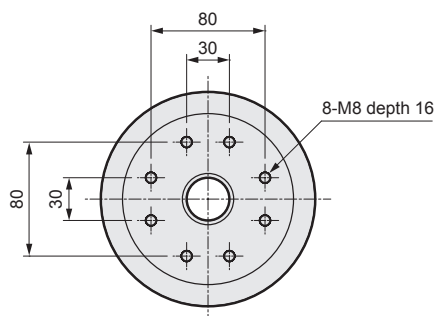
\* Refer to page 13 for the optional dimensions of the tip rotation mechanism (R) option.

\* With the bending direction (C) option, the operating range is left-right reversed.

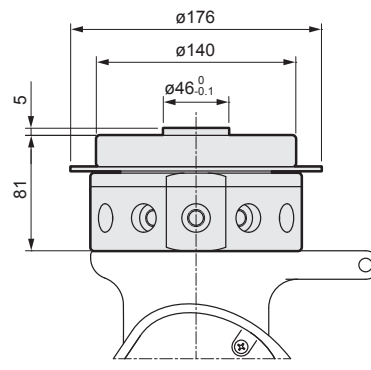
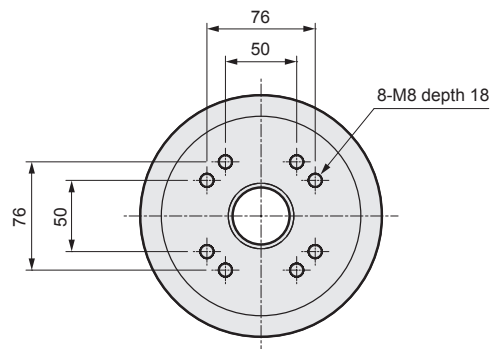
## Optional dimensions

### ● Tip rotation mechanism (R)

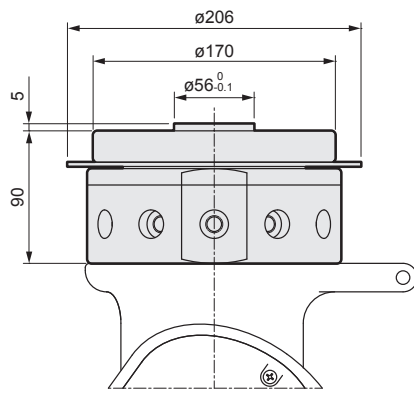
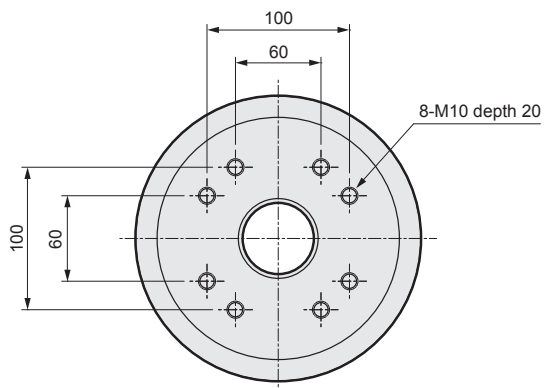
· For PAW-S-8-R  
PAW-M-8S-R  
PAW-M-8X-R  
PAW-M-8XS-R  
PAW-M-8XZ-R



· For PAW-S-X-R  
PAW-M-XS-R  
PAW-M-XZ-R  
PAW-M-XZS-R



· For PAW-S-Z-R  
PAW-M-ZS-R



## Discrete unit model No.

### PowerArm unit

| PAW-AU-( ) |      |
|------------|------|
| 8          | ø80  |
| X          | ø100 |
| Z          | ø125 |

### Rotation unit

| PAW-RU-( ) |                                |
|------------|--------------------------------|
| T          | AU-8 tip part                  |
| 8          | AU-8 base part / AU-X tip part |
| X          | AU-X base part / AU-Z tip part |
| Z          | AU-Z base part                 |
| ZS         | SU-Z base part                 |

### SCARA arm unit

| PAW-SU-( ) |                            |
|------------|----------------------------|
| 8S         | For AU-8 (AU-8 lower part) |
| XS         | For AU-X (AU-X lower part) |
| ZS         | For AU-Z (AU-Z lower part) |

### Base plate

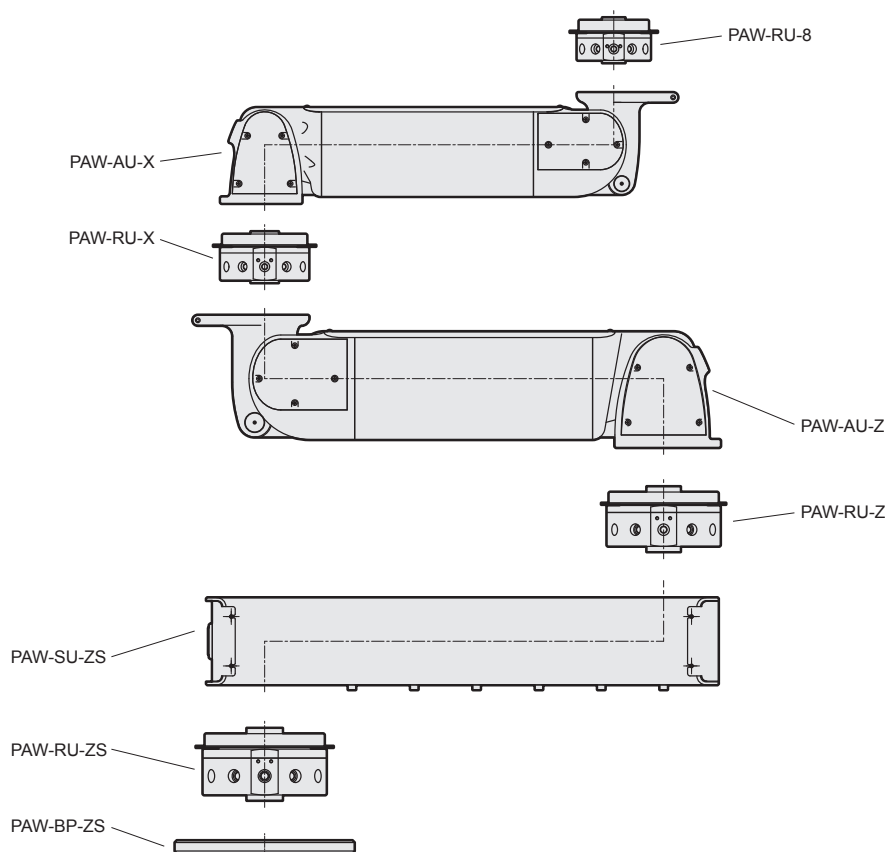
| PAW-BP-( ) |                                     |
|------------|-------------------------------------|
| 8          | AU-8 base part (assembled to RU-8)  |
| X          | AU-X base part (assembled to RU-X)  |
| Z          | AU-Z base part (assembled to RU-Z)  |
| ZS         | SU-Z base part (assembled to RU-ZS) |

### Rotation lock unit

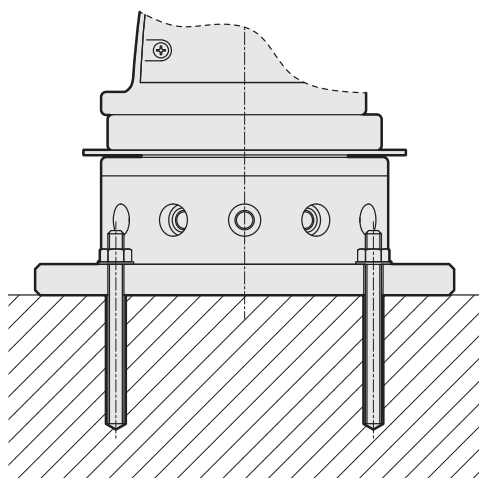
#### PAW-LU

---Common to each rotation unit (1 unit is required for each rotation unit location)

Example: When configuring PAW-M-XZS-R



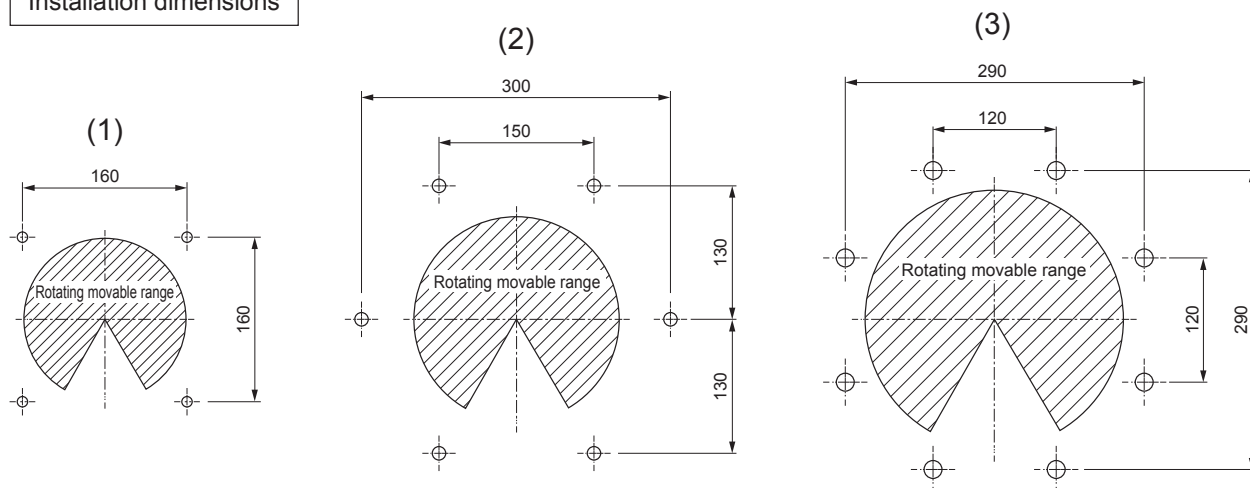
- Refer to the Instruction Manual for details about assembly and piping. An air tube must be prepared separately.
- A bolt and washer for fastening is attached with each unit.



- When installing on an existing concrete floor (which must include reinforcing bars [ø6 or more]), use a chemical anchor (made by Nihon Decoluxe Co., Ltd.).
- For chemical anchor types, anchor bar dimensions, No. of units, and installation dimensions, refer to the table and figures below. Perform installation (drilling) as shown in the chemical anchor Instruction Manual.

|     | Product model No.                                     | Chemical anchor types | Anchor bar dimensions | No. of units |
|-----|---|-----------------------|-----------------------|--------------|
| (1) | PAW-S-8, PAW-S-X<br>PAW-M-8X, PAW-M-8S                | R-10N<br>or R-10LN    | W3/8"<br>or M10       | 4            |
| (2) | PAW-S-Z, PAW-M-XZ<br>PAW-M-8XZ, PAW-M-XS<br>PAW-M-8XS | R-12N<br>or R-12LN    | W1/2"<br>or M12       | 6            |
| (3) | PAW-M-ZS<br>PAW-M-XZS                                 | R-16N<br>or R-16LN    | W5/8"<br>or M16       | 8            |

### Installation dimensions



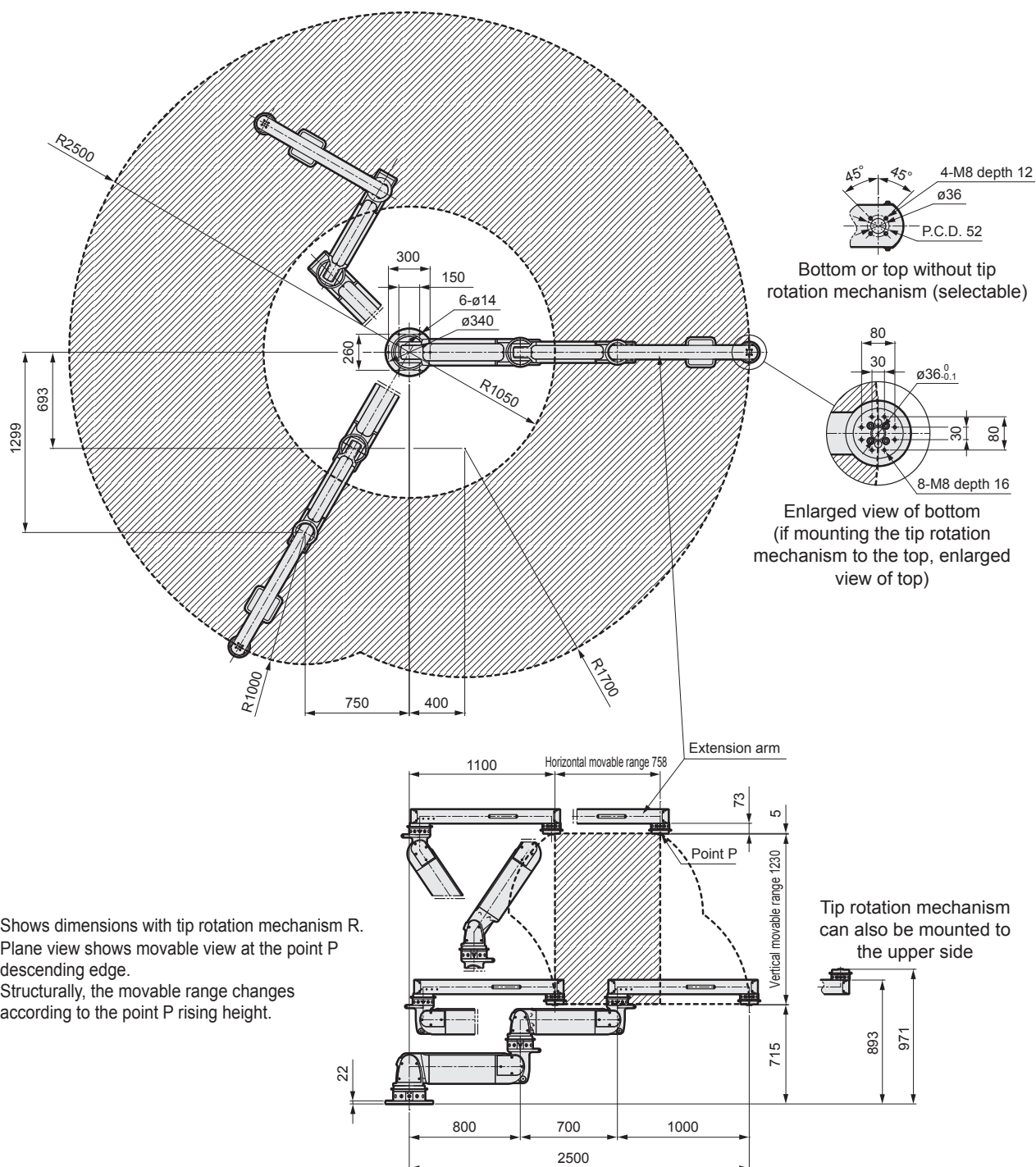
- If mounting to a frame or dolly, etc., use 10.8 or 12.9 category bolt strength, and check that the screw insertion depth is 1.5D or more.
- When installing the product, make sure that the installation surface is accurately leveled. If not level, position holding may become impossible due to arm tip tilting or arm imbalance.
- Installation must be performed by a professional.

## Extension arm

When a wider movable range must be secured, or when the workpiece is suspended for transport, an extension arm can be installed on the arm upper part.

When designing the attachment, refer to page 17, and be careful to maintain the allowable moment or below.

Example: Movable range when the arm extension is installed on PAW-M-XZ (upper section  $\varnothing 100$  + lower section  $\varnothing 125$ )

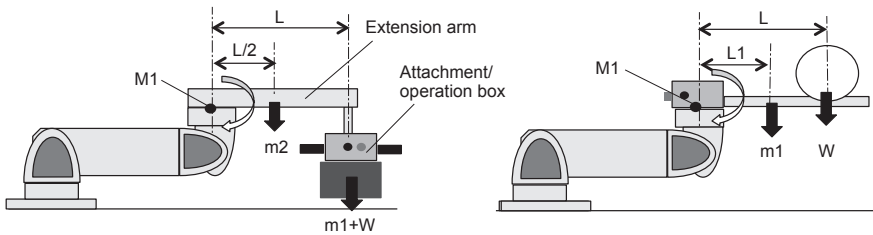


Contact CKD for details.



## Moment load

[When upper and lower movable arms are single-axis]



When mounting the extension arm  
 $M1 = (m1 + W) \times L + m2 \times L/2$

m1: Attachment/operation box weight  
 m2: Extension arm weight  
 W: Weight of workpiece  
 L: Distance from the PowerArm mounting part to the center of gravity of the attachment/workpiece

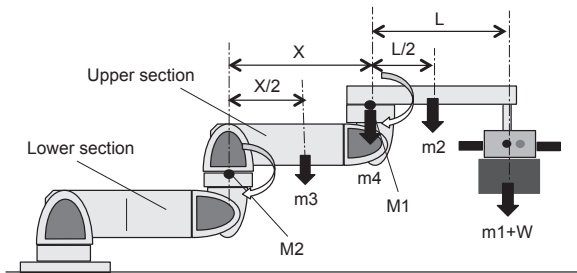
When the attachment is offset  
 $M1 = m1 \times L1 + W \times L$

m1: Attachment/operation box weight  
 W: Weight of workpiece  
 L1: Distance from the PowerArm mounting part to the center of gravity of the attachment/operation box  
 L: Distance from the PowerArm mounting part to the center of gravity of the workpiece

| Model No. | M1 (N · m) |
|-----------|------------|
| PAW-S-8   | 350        |
| PAW-S-X   | 550        |
| PAW-S-Z   | 900        |
| PAW-M-8S  | 350        |
| PAW-M-XS  | 550        |
| PAW-M-ZS  | 900        |

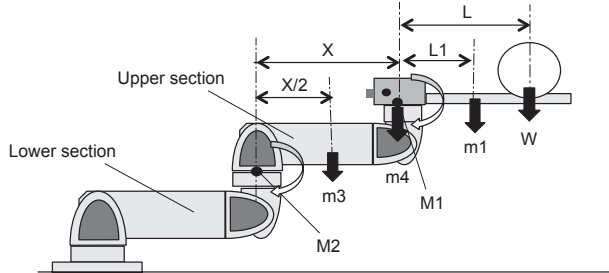
\* Design the workpiece, attachment, and extension arm so that the moment load is at or below the value in the table.  
 \* Calculate the movable arm part only.

[When upper and lower movable arms are 2-axis]



When mounting the extension arm  
 (1) Moment applied to the upper section  
 $M1 = (m1 + W) \times L + m2 \times L/2$   
 (2) Moment applied to the lower section  
 $M2 = (m1 + W) \times (L + X) + m2 \times (L/2 + X) + m3 \times X/2 + m4 \times X$

m1: Attachment/operation box weight  
 m2: Extension arm weight  
 m3: PowerArm weight  
     PAW-AU-8: 14kg    PAW-AU-X: 23kg  
     PAW-AU-Z: 42kg  
 m4: Rotation unit weight  
     PAW-RU-T: 4kg    PAW-RU8: 5kg  
     PAW-RU-X: 8kg  
 W: Weight of workpiece  
 L: Distance from the PowerArm mounting part to the center of gravity of the attachment/workpiece  
 X: PowerArm length  
     PAW-AU-8: 600mm, PAW-AU-X: 700mm



When the attachment is offset  
 (1) Moment applied to the upper section  
 $M1 = m1 \times L1 + W \times L$   
 (2) Moment applied to the lower section  
 $M2 = W \times (L + X) + m1 \times (L1 + X) + m3 \times X/2 + m4 \times X$

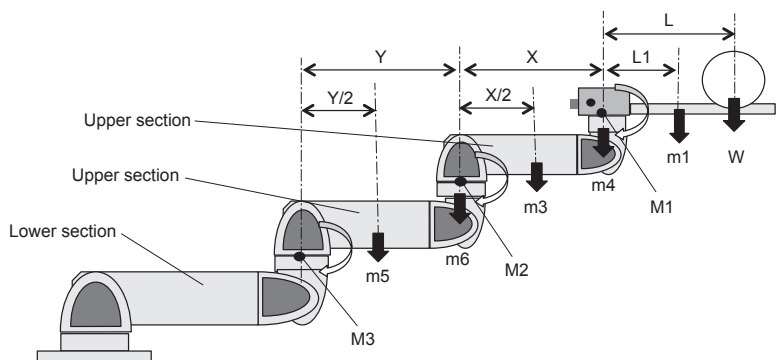
m1: Attachment/operation box weight  
 m3: PowerArm weight  
     PAW-AU-8: 14kg    PAW-AU-X: 23kg  
     PAW-AU-Z: 42kg  
 m4: Rotation unit weight  
     PAW-RU-T: 4kg    PAW-RU-8: 5kg  
     PAW-RU-X: 8kg  
 W: Weight of workpiece  
 L1: Distance from the PowerArm mounting part to the center of gravity of the attachment/operation box  
 L: Distance from the PowerArm mounting part to the center of gravity of the workpiece  
 X: PowerArm length  
     PAW-AU-8: 600mm, PAW-AU-X: 700mm

| Model No. | Upper section<br>M1 (N · m) | Lower section<br>M2 (N · m) |
|-----------|-----------------------------|-----------------------------|
| PAW-M-8X  | 350                         | 550                         |
| PAW-M-XZ  | 550                         | 900                         |
| PAW-M-8XS | 350                         | 550                         |
| PAW-M-XZS | 550                         | 900                         |

\* Design the workpiece, attachment, and extension arm so that the moment load is at or below the value in the table.  
 \* Calculate the movable arm part only.

## Moment load

[When upper and lower movable arms are 3-axis]



When the attachment is offset

(1) Moment applied to the upper section

$$M1 = m1 \times L1 + W \times L$$

(2) Moment applied to the middle section

$$M2 = W \times (L + X) + m1 \times (L1 + X) + m3 \times X/2 + m4 \times X$$

(3) Moment applied to the lower section

$$M3 = W \times (L + X + Y) + m1 \times (L1 + X + Y) + m3 \times (X/2 + Y) + m4 \times (X + Y) + m5 \times Y/2 + m6 \times Y$$

m1: Attachment/operation box weight

m3: PowerArm weight; PAW-AU-8: 14 kg

m4: Rotation unit weight; PAW-RU-T: 4 kg

m5: PowerArm weight; PAW-AU-X: 23 kg

m6: Rotation unit weight; PAW-RU-8: 5 kg

W: Weight of workpiece

L1: Distance from the PowerArm mounting part to the center of gravity of the attachment/operation box

L: Distance from the PowerArm mounting part to the center of gravity of the workpiece

X: PowerArm length; PAW-AU-8: 600 mm

Y: PowerArm length; PAW-AU-X: 700 mm

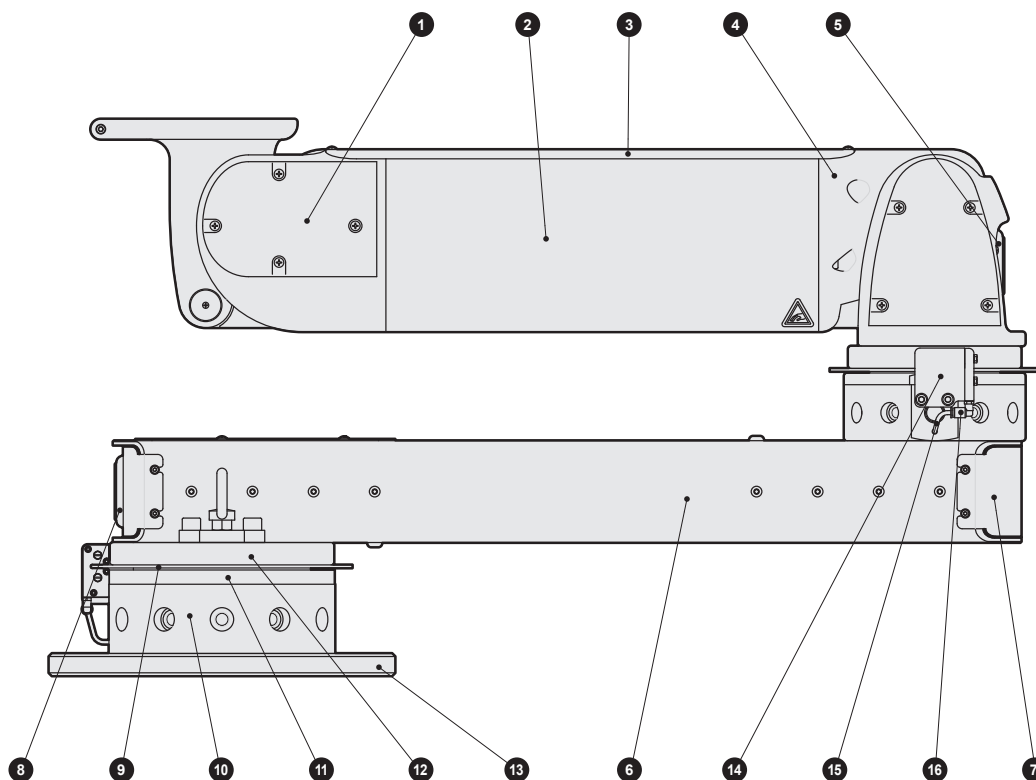
| Model No. | Upper section<br>M1(N · m) | Middle section<br>M2(N · m) | Lower section<br>M3(N · m) |
|-----------|----------------------------|-----------------------------|----------------------------|
| PAW-M-8XZ | 350                        | 550                         | 900                        |

\* Design the workpiece, attachment, and extension arm so that the moment load is at or below the value in the table.

\* Calculate the movable arm part only.

## Material/Treatment

### • PowerArm PAW



| No. | Product name            | Part name                    | Material                         | Surface-treated  |
|-----|-------------------------|------------------------------|----------------------------------|--|
| 1   | PowerArm unit (*1)      | Crevice cover, bracket cover | Flame retardant ABS resin        |  |
| 2   |                         | Body                         | Aluminum alloy                   | Alumite treatment                                      |
| 3   |                         | Top cover                    | Aluminum alloy                   | Alumite treatment                                      |
| 4   |                         | Crevice, bracket, link arm   | Aluminum alloy                   | Baking finish  |
| 5   |                         | Grommet                      | EPDM                             |  |
| 6   | SCARA arm unit (*2)     | Body                         | Steel                            | Baking finish  |
| 7   |                         | Cover                        | Aluminum alloy                   | Alumite treatment                                      |
| 8   |                         | Grommet                      | EPDM                             |  |
| 9   | Rotation unit (*3)      | Lock disk                    | Stainless steel alloy            | Industrial chrome plating                              |
| 10  |                         | Body                         | Aluminum alloy                   | Alumite treatment                                      |
| 11  |                         | Washer                       | Steel                            | Zinc plating chromate treatment                        |
| 12  |                         | Mounting plate               | Aluminum alloy                   | Alumite treatment                                      |
| 13  | Base plate (*4)         | Base plate                   | Steel                            | Zinc plating chromate treatment                        |
| 14  | Rotation lock unit (*5) | Rotation lock unit           | Steel                            | Zinc plating chromate treatment                        |
| 15  |                         | Tube                         | Nylon                            |  |
| 16  |                         | Fitting                      | Flame retardant PBT Copper alloy | Electroless nickel plating of the copper alloy section |