## 7MPa Work clamping system

CTU CTT
CLU CLT
CNA CMC CMD
CSU CST CSN CSY CSK
CEK CEA CVH
VCB VCP VHD VRG VEF WPB WPC
HCD HCS HCT X63 WRA WRB

Refer to separate catalog for details.

## Expansion clamp

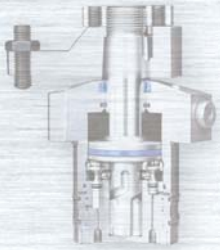
CGC
CGT
CGU
CGE
CGY

Refer to separate catalog for details.

## 7MPa Sensing clamp

CTM
CTN
CLM
CLN
CNB

Refer to separate catalog for details.



## Pal system

CPC
CPH
CPY
CPK
WVP

## air Work clamping system

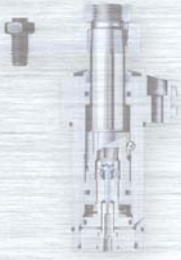
CTX
CTY
CLX
CLY
CSS
CSX

Refer to separate catalog for details.

## 35MPa Work clamping system

CTK CTW CTV
CLW CLV
CSW CSV
WVP
VCB VCP VHD VRG VEF WPC
HCD HCS HCT X63

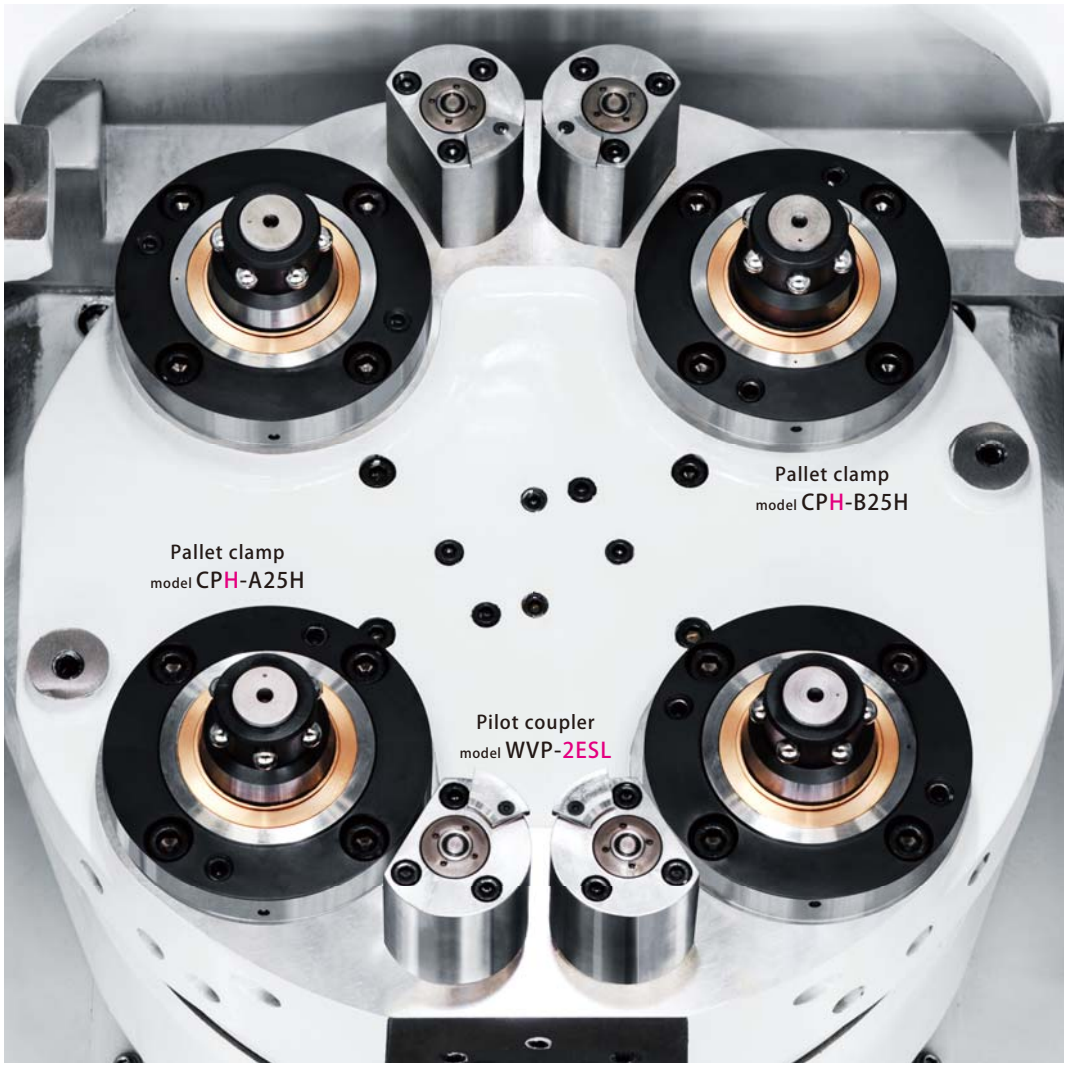
Refer to separate catalog for details.



# INDEX

## Pal system

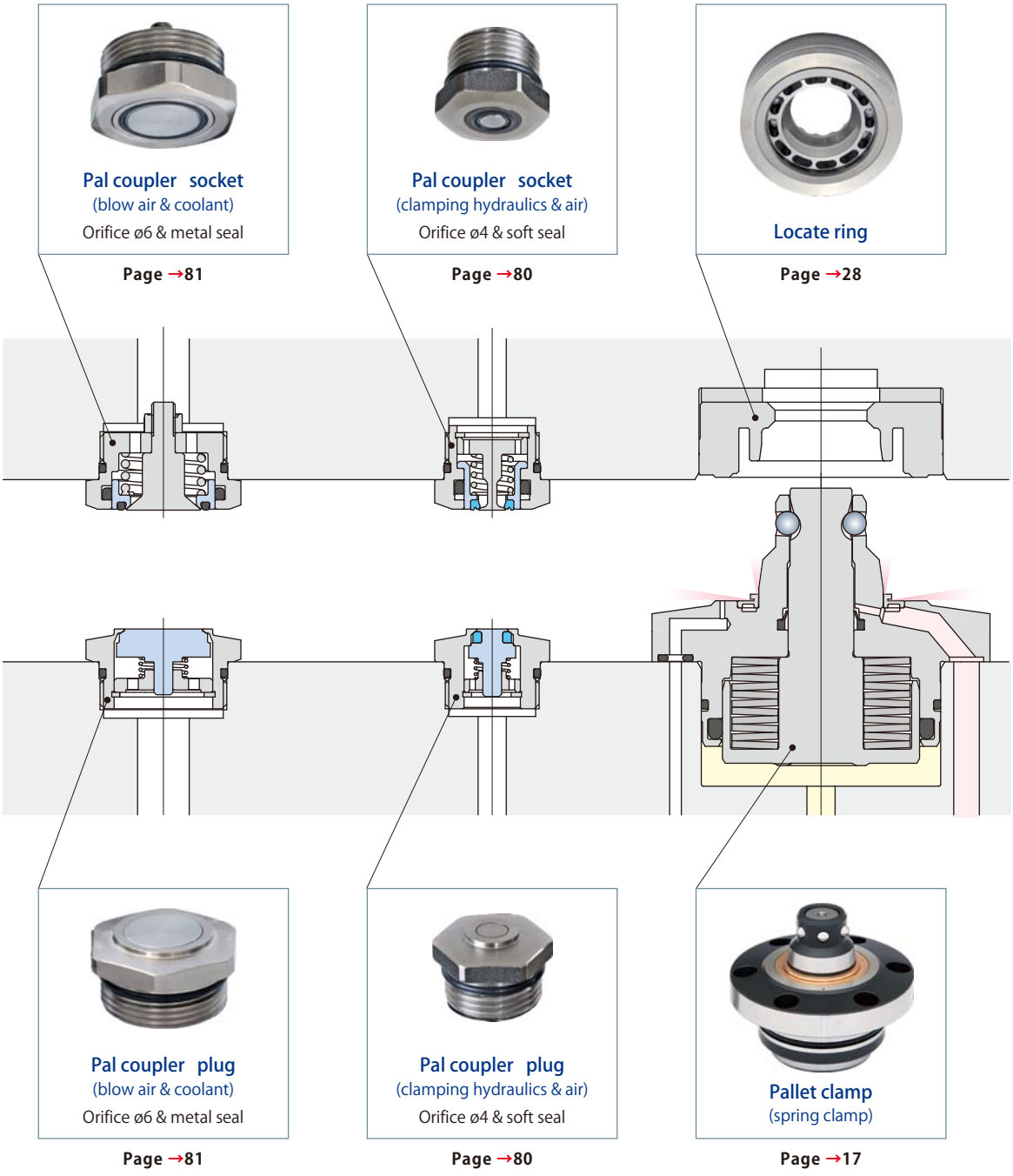
# Pal system


Pallet clamp
model CPH-B25H
Pallet clamp
model CPH-A25H
Pilot coupler
model WVP-2ESL

# Standard Pal system

Pal system that changes pallet by reducing hydraulic (air) clamp circuit pressure to zero

**Pal coupler fitting stroke 1 mm**



**Pal coupler socket**
(blow air & coolant)
Orifice ø6 & metal seal

**Page →81**

**Pal coupler socket**
(clamping hydraulics & air)
Orifice ø4 & soft seal

**Page →80**

**Locate ring**

**Page →28**

**Pal coupler plug**
(blow air & coolant)
Orifice ø6 & metal seal

**Page →81**

**Pal coupler plug**
(clamping hydraulics & air)
Orifice ø4 & soft seal

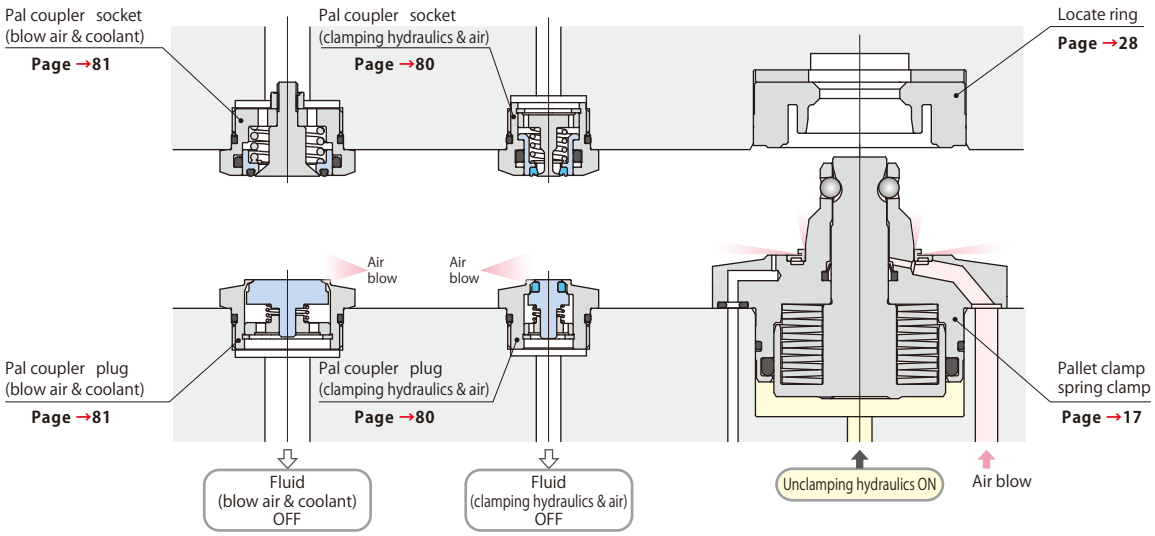
**Page →80**

**Pallet clamp**
(spring clamp)

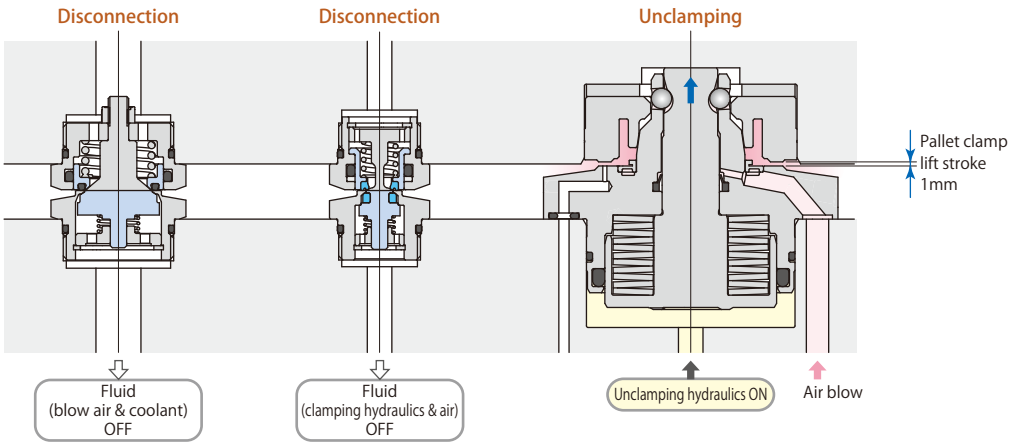
**Page →17**

Select one of either spring clamp (model CPC), hydraulic clamp (model CPH) or air clamp (model CPY) .

## Pallet change

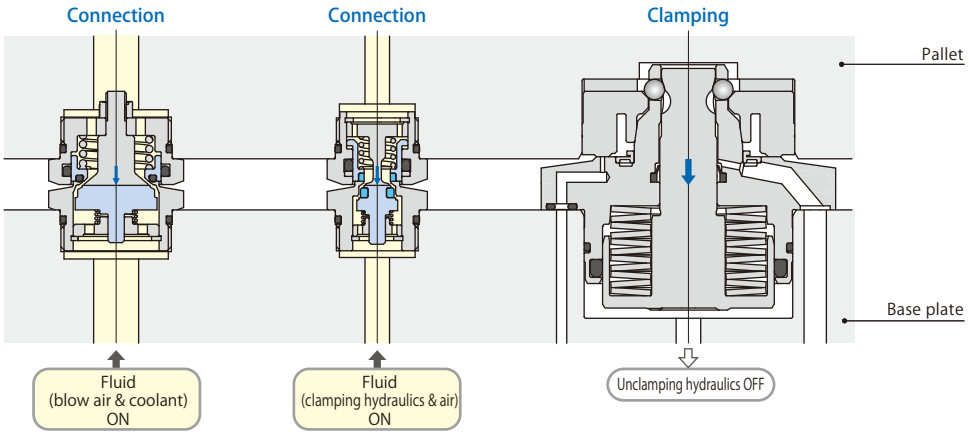



## Pallet unclamped and coupler disconnected




When unclamping pallet, coupler disconnects due to lift stroke of pallet clamp.

## Pallet clamped and coupler connected

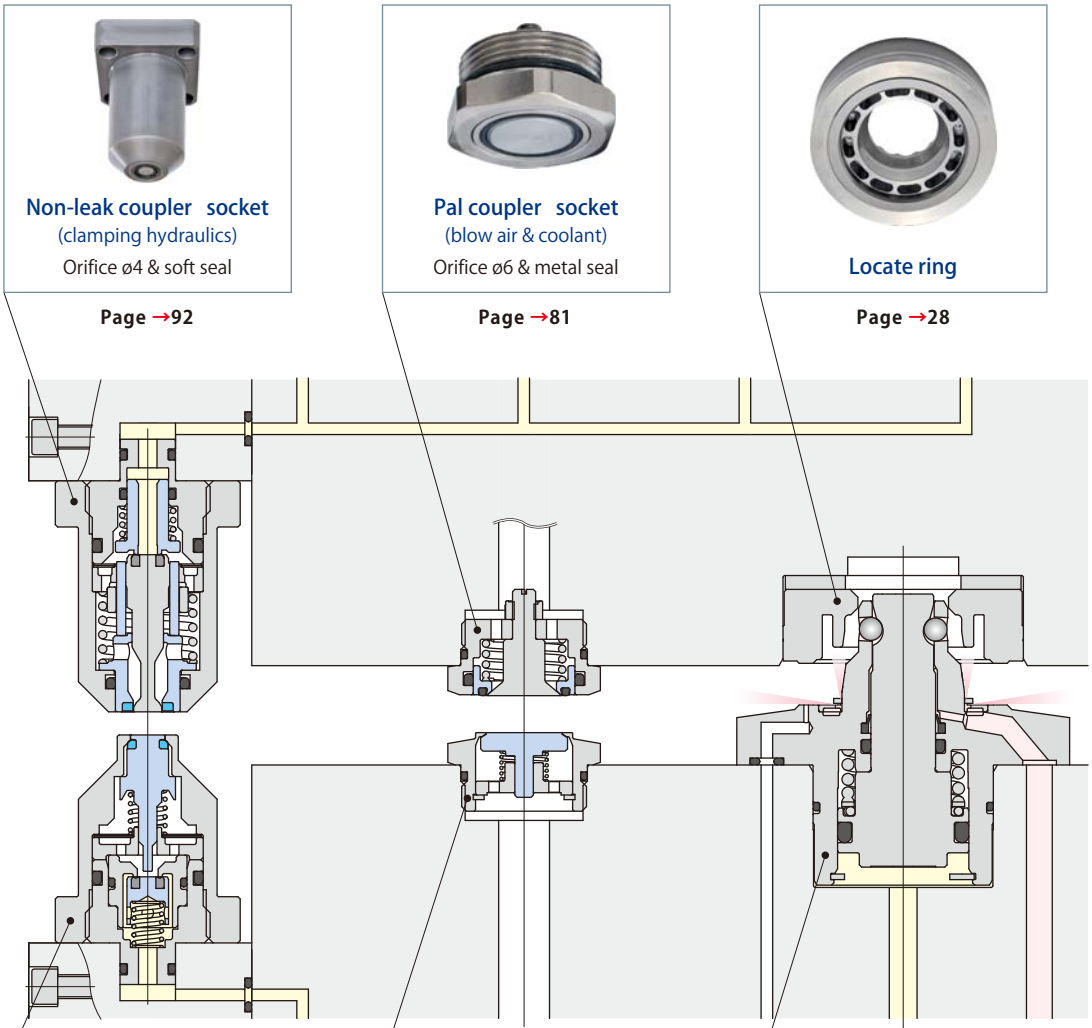



When clamping pallet, coupler connects due to clamp stroke of pallet clamp.

# Pallet changer Pal system

Pal system capable of changing pallets while maintaining hydraulic clamp in clamp condition

**Non-leak coupler fitting stroke 4 mm**



**Non-leak coupler socket**
(clamping hydraulics)
Orifice ø4 & soft seal

**Page →92**

**Pal coupler socket**
(blow air & coolant)
Orifice ø6 & metal seal

**Page →81**

**Locate ring**

**Page →28**

**Non-leak coupler plug**
(clamping hydraulics)
Orifice ø4 & soft seal

**Page →92**

**Pal coupler plug**
(blow air & coolant)
Orifice ø6 & metal seal

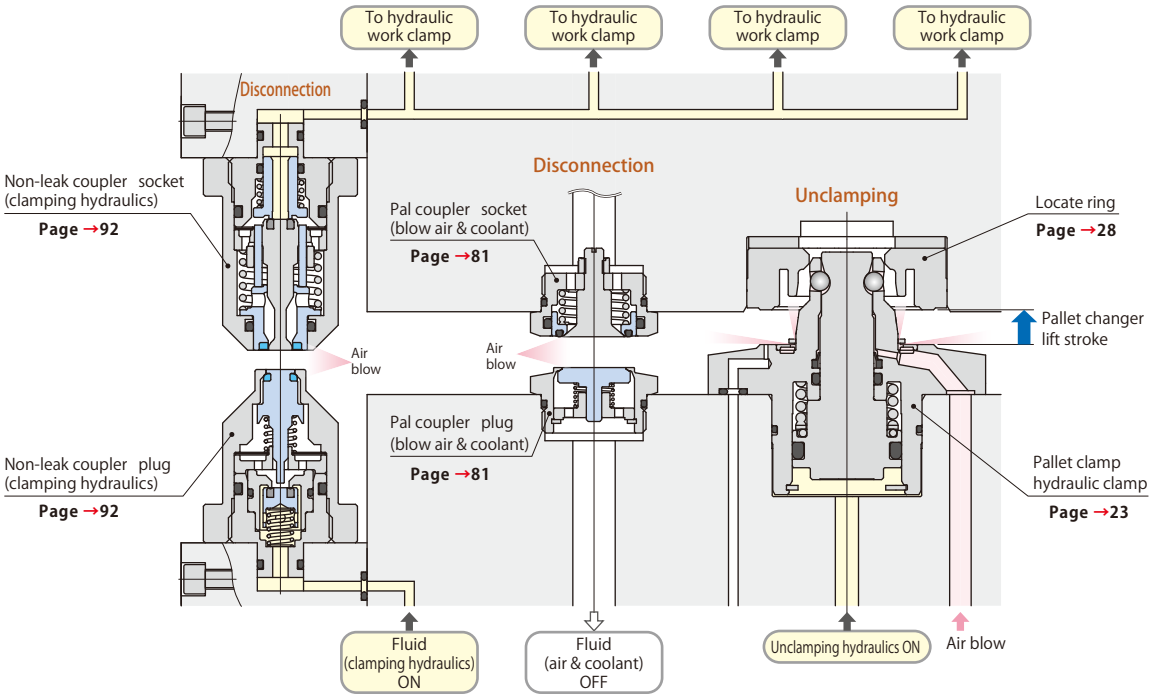
**Page →81**

**Pallet clamp**
(hydraulic clamp)

**Page →28**

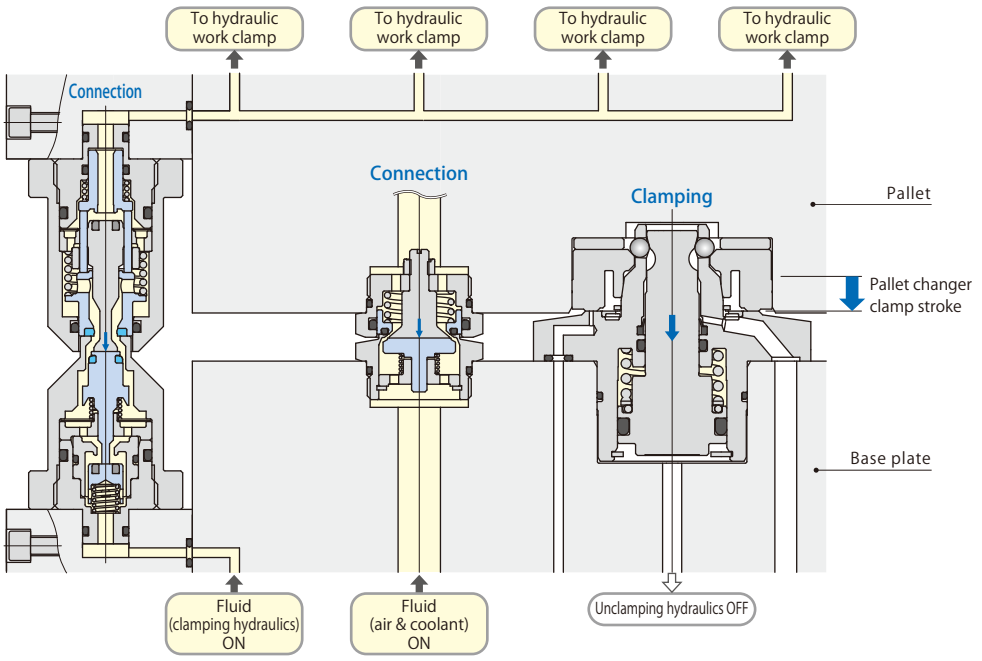
Select one of either spring clamp (model CPC), hydraulic clamp (model CPH) or air clamp (model CPY) .

## Pallet unclamped and coupler disconnected




When unclamping pallet, coupler disconnects due to lift stroke of pallet changer, with hydraulics sustained.

## Pallet clamped and coupler connected




When clamping pallet, coupler connects due to clamp stroke of pallet changer, with hydraulics sustained.

## Table of contents

# Pallet clamp

## 7 MPa

**Locate ring**
Pallet lower surface mounting
model CPS-ED

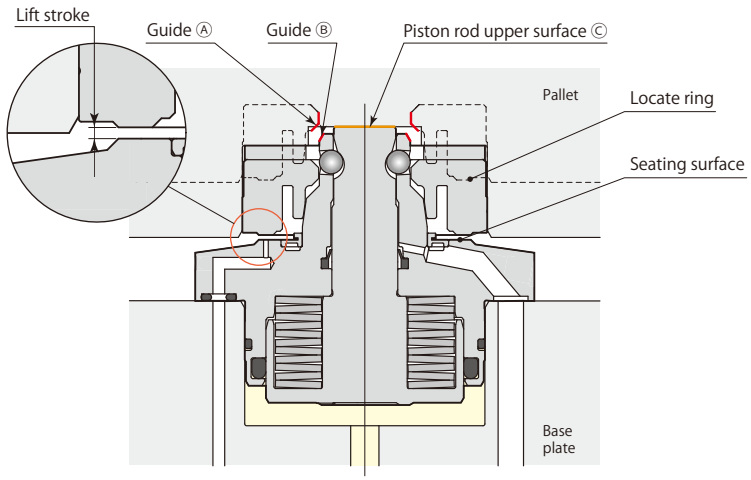
**Locate ring**
Pallet upper surface mounting
model CPS-ET

**Spring clamp**
model CPC-A

**Hydraulic clamp**
model CPH-A

## Pallet setting

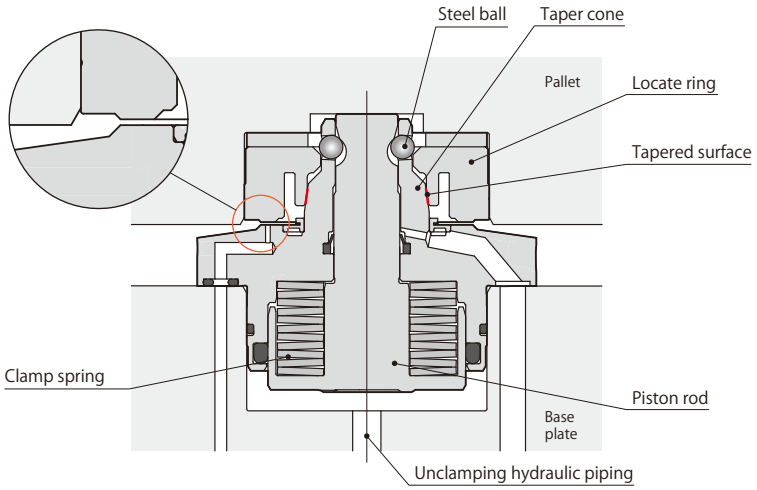
- Bring the pallet above the base plate. After positioning, lower the pallet. Pallet descends along guides Ⓐ & Ⓑ and stops after coming into contact with piston rod upper surface Ⓒ, making pallet setting easy. Furthermore, since locate ring does not come into contact with seating surface of pallet clamp, damages on seating surface can be prevented during pallet exchanges.




## XY axes positioning

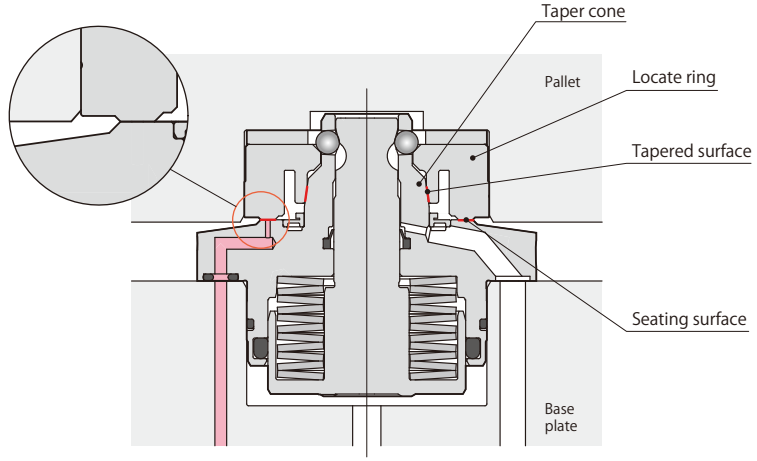
- When the unclamping hydraulic pressure is released, piston rod goes down by spring force* and radially extends the steel balls, pulling down the locate ring. The locate ring and taper cone at pallet clamp come into contact.

  ∗: For only model CPC. The piston rod in CPH goes down by the hydraulic force, the piston rod in CPY goes down by air force.



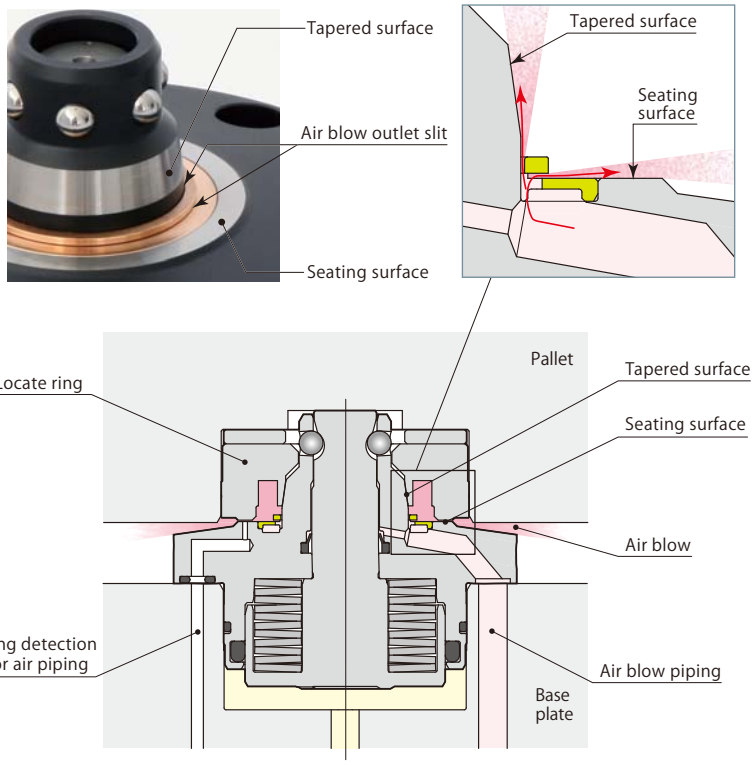

## XYZ axes positioning (clamping is completed)

- The locate ring that is attached to tapered surface of taper cone is expanded and deformed in radial direction to firmly position X axis and Y axis.
  Locate ring is attached to seating surface and positions Z axis. The positioning of X, Y and Z axes by tapered surface and seating surface completes the XYZ positioning (dual surface positioning).



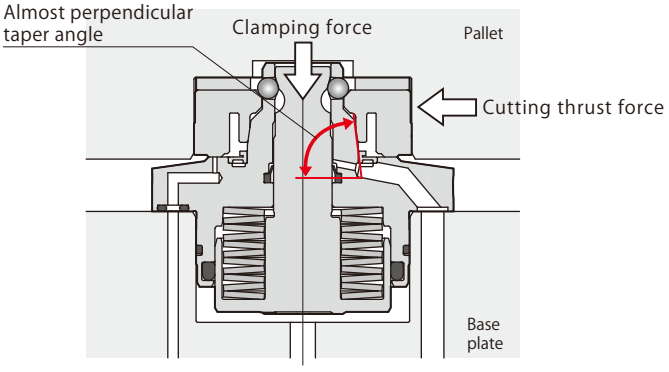
## High repeatability and retention of accuracy

- Air blows out of wide slits laid out over circumference to tapered surface and seating surface directly for ensuring prevention of foreign substances.
- Since seating detection function is provided, it is possible to prevent operation with incomplete clamping due to insertion of metal chips.
- Rust proofing has been implemented to locate ring in order to prevent rusting while pallet is in storage or on standby.
- All machined parts related to dual surface positioning are made using a high-precision grinding machine in a temperature control room to improve the accuracy of the parts.



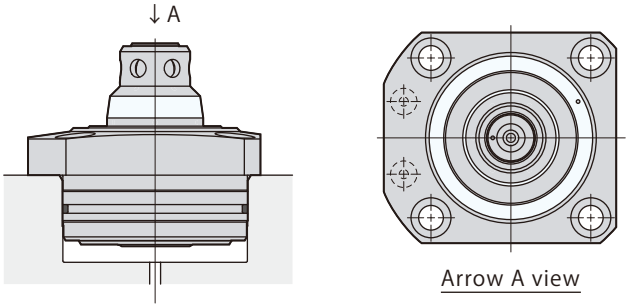

## Taper angle that withstands large cutting thrust force

- Pallet clamp has tapered surface angle that is close to perpendicular, which allows for stable clamping with minimal impact from thrust exerted during cutting process. This is particularly effective in inhibiting chatter when cutting process at higher locations on the pallet, which improves processing conditions for high-speed cutting and heavy duty cutting.




## Rectangular flange (made to order)

- A rectangular flange, created by cutting out mounting flange portion of pallet clamp body, is available (made to order). Inquire for details.

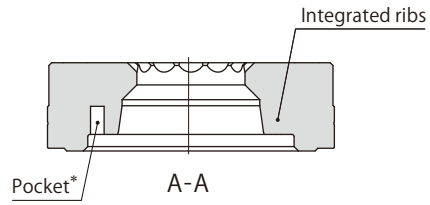


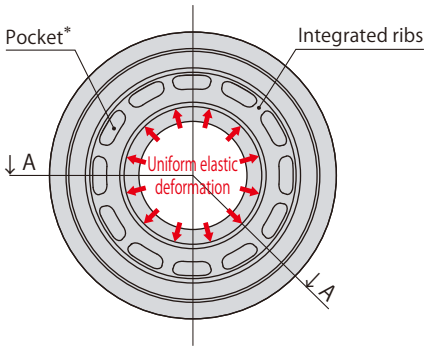
## Solid tapering method with superior durability and repeatability

- Solid tapering type locate ring has no sliding portion for its positioning structure. Advantageous in terms of durability as well as in keeping the initial repeatability for a long time.
- When positioning X & Y axes, the taper portion evenly and elastically deforms outwards to offer highly accurate positioning. Furthermore, the taper portion has no slits, eliminating accuracy issues relating to positioning due to intrusion of metal chips into slits.
- Elastic deformation of taper portion is conducted evenly due to the integrated ribs that are evenly distributed in the radial direction providing high clamping rigidity.

*: No pockets are provided with the model CPS-E25 and CPS-E40 because elastic deformation is easily obtainable at tapered part due to its body size.

Solid tapering type
model CPS-E



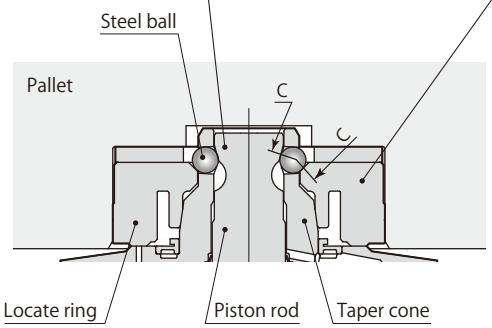




## Specialized design reduces surface contact pressure and prevents deterioration of clamping force

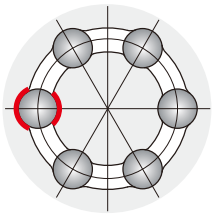
- Pallet clamp enhances output of clamp piston and firmly secures pallet. Steel ball contacting portions, where high surface pressure is exerted, have been designed in a special form that prevents indentation marking, which can deteriorate the clamping force, thereby making it possible to firmly fix pallets over long periods of time.

Special shape of piston rod
(steel ball contacting portions)


Special shape of locate ring
(steel ball contacting portions)

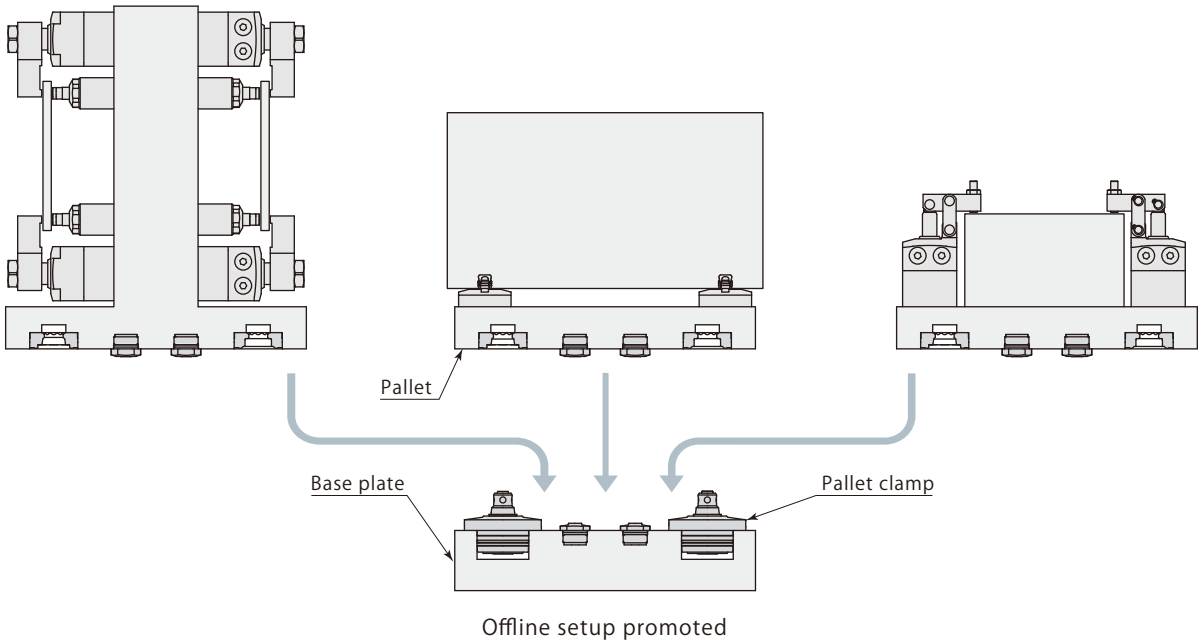




C-C



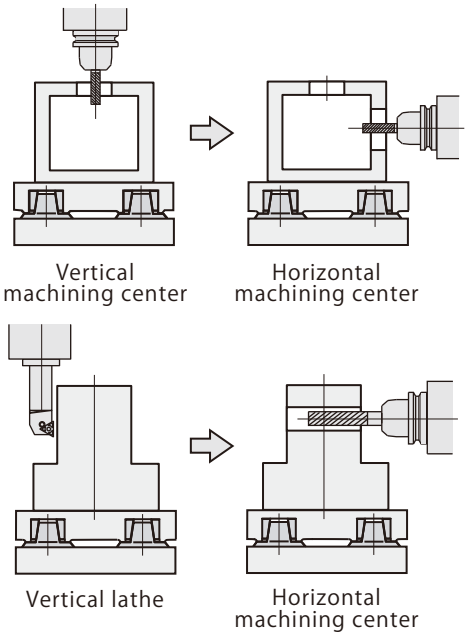
Contact portions to steel balls are line contacts, with lower surface pressure, thus initial clamping force is sustained for a long time.

## Exchanges of jigs and workpieces are easy with Pal system



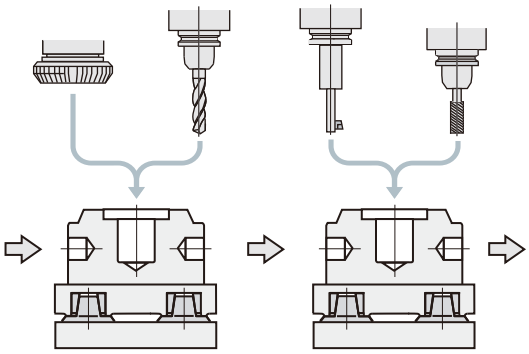

- Implementation of Pal system makes it possible to perform setting of workpiece on jigs of machine table accurately and significantly reduces setup time that was previously necessary for alignment.

## Multifaceted machining with high accuracy is easy



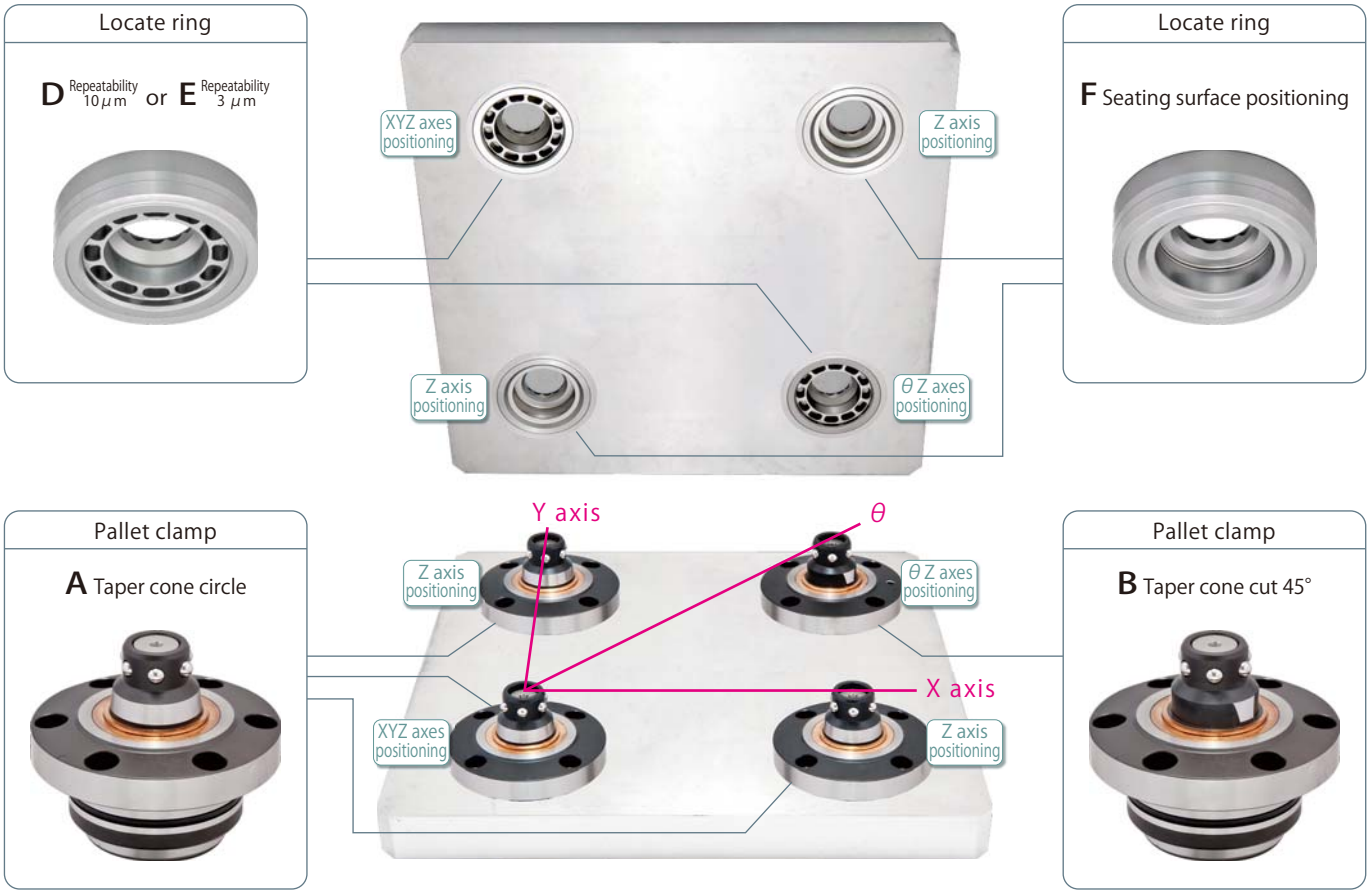

- Since workpieces do not have to be dismounted from pallets, continuous operations through multiple machines are possible. Highly accurate, multifaceted machining is possible with the Pal system.

## Process division is easy (pallet transfer method)

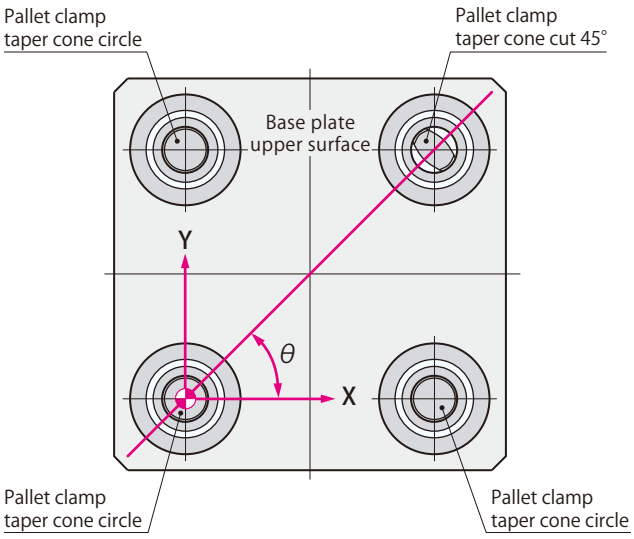


- Highly accurate positioning of Pal system makes it possible to distribute processes. This advantage allows a flexible allocation of machining process, which needs a very high accuracy. This flexibility makes it easier to unify tact time among all machines, leading to even distribution of load among machines to raise productivity.
- With pallet transfer method, mixed production of workpieces can be done easily.
- Workpieces are fixed onto the pallet before transferring, thus clamp time is short and problems relating to clamping can be mitigated at each machine.

## Pallet clamp configuration pattern 1

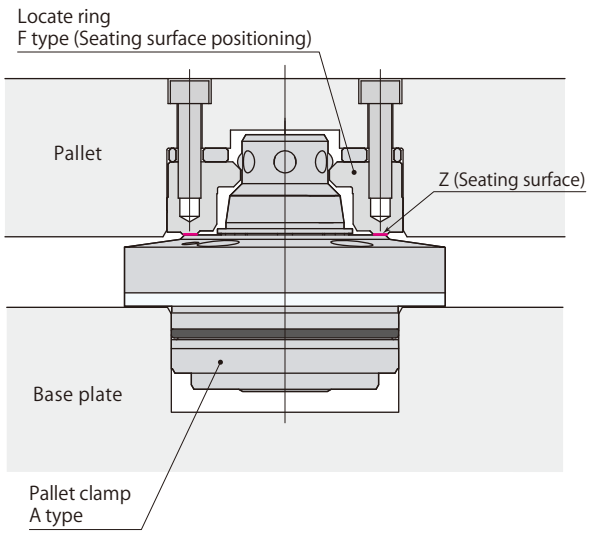



## θ X Y axes positioning by tapered surface



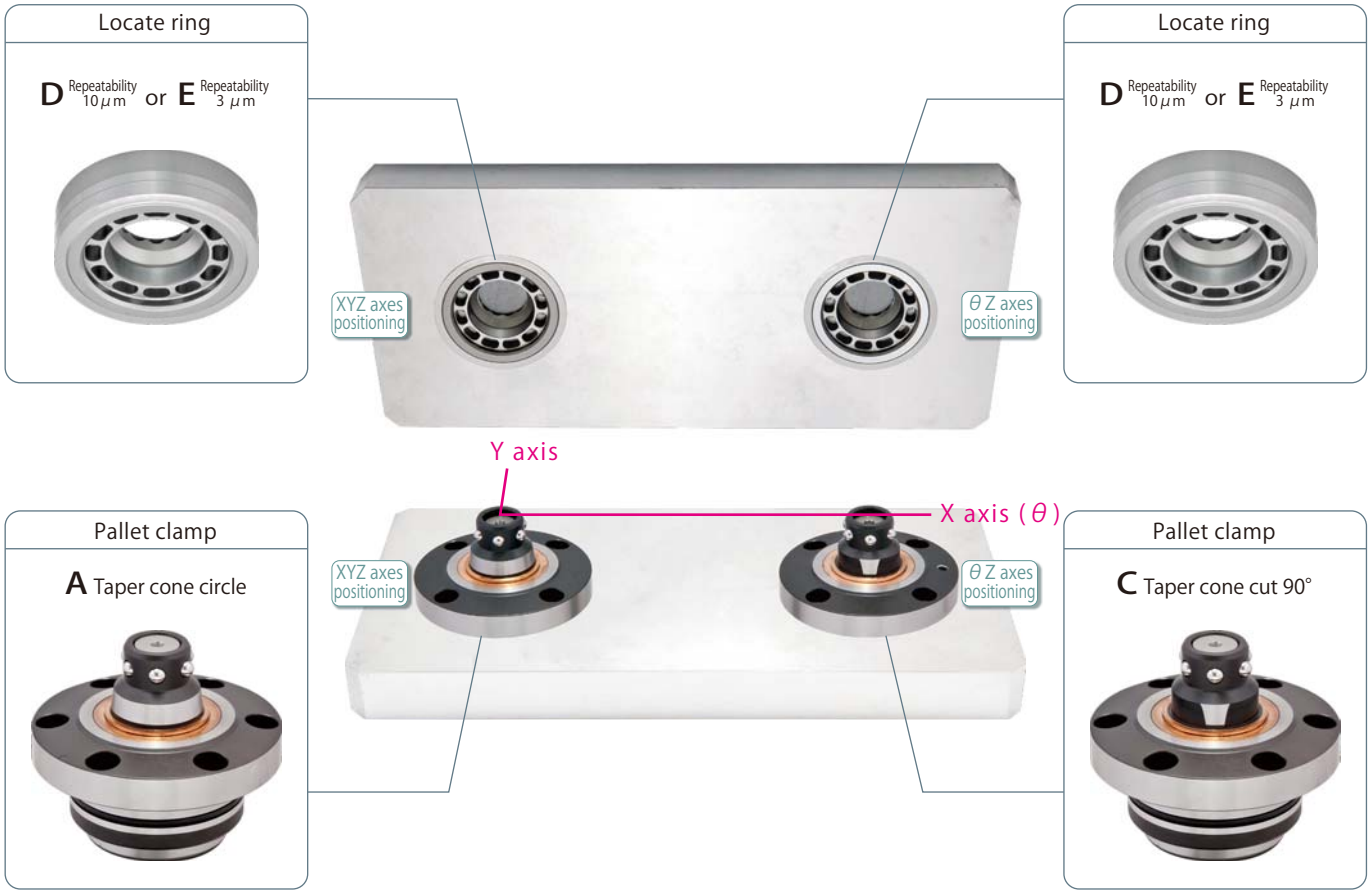

The pitch error between XYZ axes positioning pallet clamp and θ Z axes positioning pallet clamp is tolerated by cut type taper cone even under thermal change conditions.

## Z axis positioning by seating surface

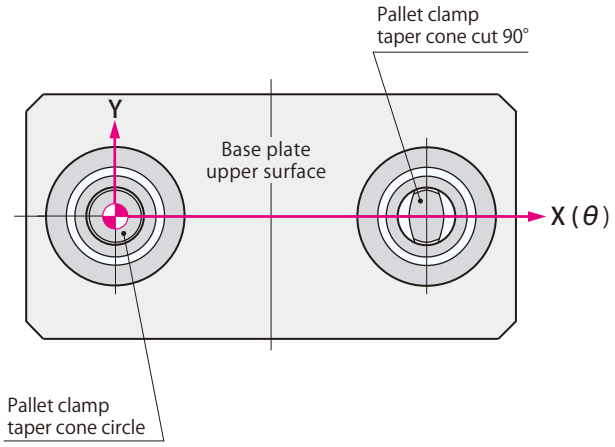



Since Z axis is positioned by 4 points of seating surface with no effect from pitch error, surface accuracy of pallet is sustained at high levels.

## Pallet clamp configuration pattern 2

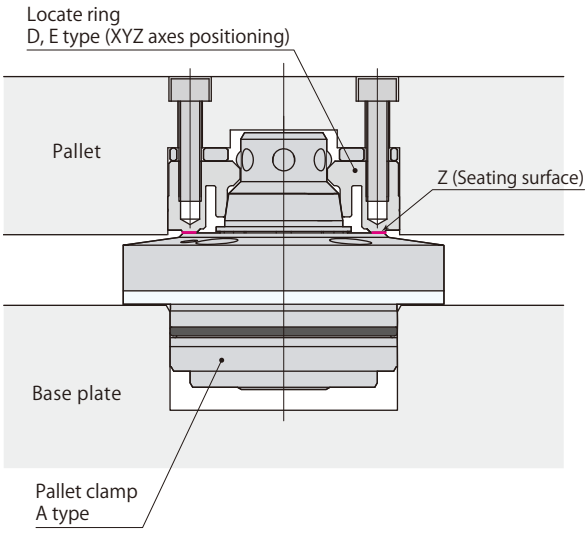



## θ X Y axes positioning by tapered surface




The pitch error between XYZ axes positioning pallet clamp and θ Z axes positioning pallet clamp is tolerated by cut type taper cone even under thermal change conditions.

## Z axis positioning by seating surface

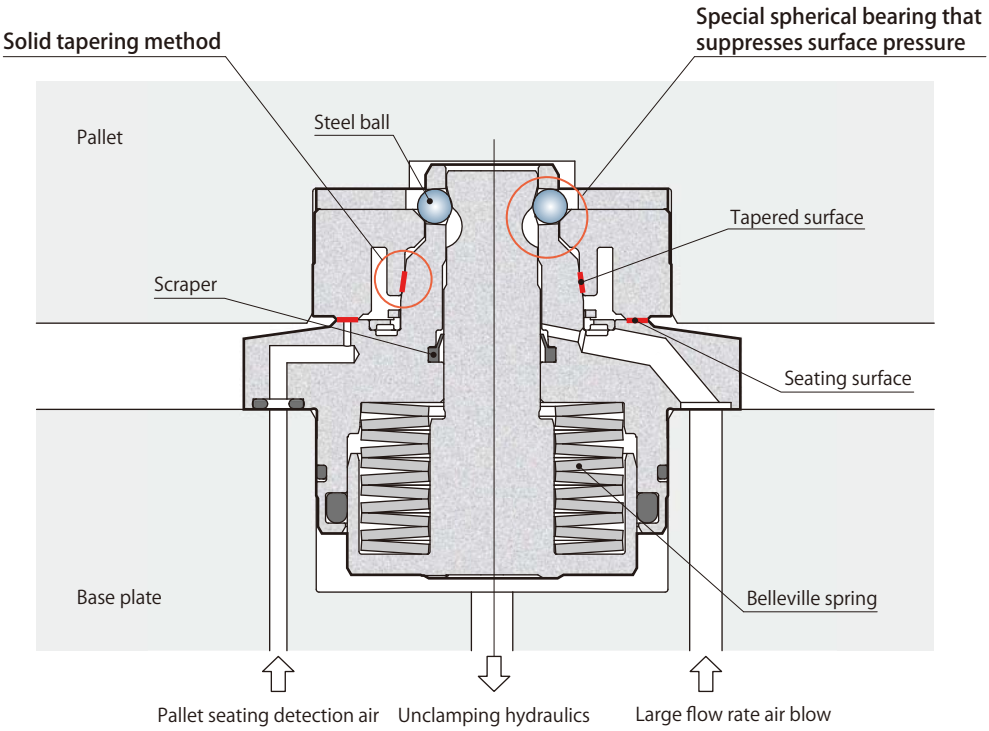



Since Z axis is positioned by 2 points of seating surface with no effect from pitch error, surface accuracy of pallet is sustained at high levels.

## Spring clamp

model **CPC-□□H** US PAT.


**Highly rigid pallet clamp and repeatability of 3 μm with dual surface contact**
**The mechanical clamp with high output, long-life belleville spring**



## Specifications

CPC – [Type] [Size] H

Type
- **A** : Taper cone circle
- **B** : Taper cone cut 45°
- **C** : Taper cone cut 90°
- **S** : Shim

Size
- 03
- 06
- 10
- 16
- 25
- 40

● Be sure to specify models and serial numbers when placing repeat orders. (Models and serial numbers are laser marked on clamps; For shim, same models and serial numbers as clamps may be specified.)

■ indicates made to order.

| Model | | | CPC-□03H | CPC-□06H | CPC-□10H | CPC-□16H | CPC-□25H | CPC-□40H |
|---|---|---|---|---|---|---|---|---|
| Clamping force*1 | | kN | 4.0 | 6.0 | 10.0 | 16.0 | 25.0 | 40.0 |
| Cylinder capacity (unclamp)*1 | | $cm^3$ | 4.0 | 6.1 | 14.1 | 28.7 | 49.6 | 77.9 |
| Full stroke | | mm | 4.4 | 4.4 | 5.0 | 6.5 | 7.0 | 7.5 |
| Clamp stroke | | mm | 2.4 | 2.4 | 3.0 | 4.0 | 4.5 | 5.0 |
| Safety stroke | | mm | 2.0 | 2.0 | 2.0 | 2.5 | 2.5 | 2.5 |
| Lift stroke*2 | | mm | 1 | | | | | |
| Max. allowable eccentricity for pallet setting | | mm | ±1.0 | ±1.5 | ±2.0 | ±2.5 | ±3.5 | ±4.0 |
| Lift force*1*3 | Hydraulic pressure 3.5MPa | kN | 0.4 | 0.4 | 1.5 | 3.2 | 4.6 | 4.6 |
| | Hydraulic pressure 5MPa | kN | 1.8 | 2.5 | 5.7 | 9.8 | 15.3 | 20.1 |
| | Hydraulic pressure 7MPa | kN | 3.6 | 5.2 | 11.4 | 18.7 | 29.4 | 40.9 |
| Lift force calculation (P:Unclamping hydraulic pressure MPa)*1*3 | | | 0.91×P-2.73 | 1.39×P-4.46 | 2.83×P-8.42 | 4.42×P-12.25 | 7.09×P-20.18 | 10.39×P-31.80 |
| Max. allowable load (including a pallet)*4 | Horizontal mounting | kN | 3.0 | 8.0 | 15.0 | 25.0 | 35.0 | 50.0 |
| | Vertical mounting | kN | 0.5 | 1.5 | 2.5 | 4.0 | 5.0 | 7.5 |
| Mass*1 | | kg | 0.5 | 0.7 | 1.6 | 3.0 | 5.6 | 9.6 |
| Recommended tightening torque of mounting screws*5 | | N·m | 7 | 7 | 12 | 29 | 57 | 100 |

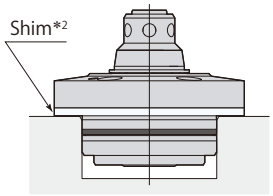
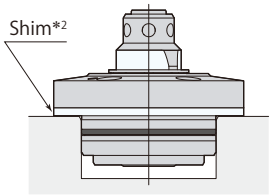
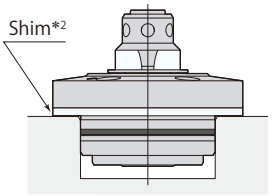
● Pressure range:3.5–7 MPa ● Proof pressure:10.5 MPa ● Operating temperature:0–70 ℃

● Fluid used:General mineral based hydraulic oil (ISO-VG32 equivalent) ● Recommended air blow pressure:0.3–0.5 MPa

∗1:The figure indicates one piece of clamp. ∗2:This is the amount for lifting pallet when unclamping.

∗3:Set the hydraulic pressure so that the lift force is equal to or greater than the max. allowable load.

∗4:This is maximum allowable load of pallet, regardless of how many clamps are used. ∗5:ISO R898 class 12.9

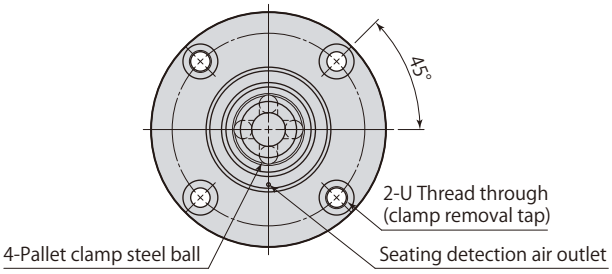
| Pallet clamp type | A Taper cone circle | B*3 Taper cone cut 45° | C*3 Taper cone cut 90° |
|---|---|---|---|
| Spring clamp model **CPC***1 |  model CPC-A□H |  model CPC-B□H |  model CPC-C□H |

∗1:Spring clamp model CPC and hydraulic clamp model CPH (**page →22**) cannot be used together.

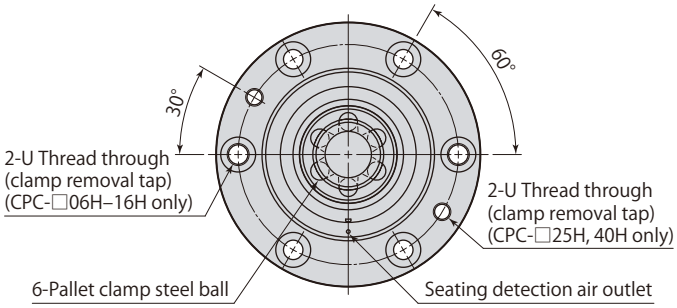
∗2:Shim of pallet clamp can be used when heights of mounted clamps vary. (option)

∗3:Taper cone cut can be selected from B type or C type.

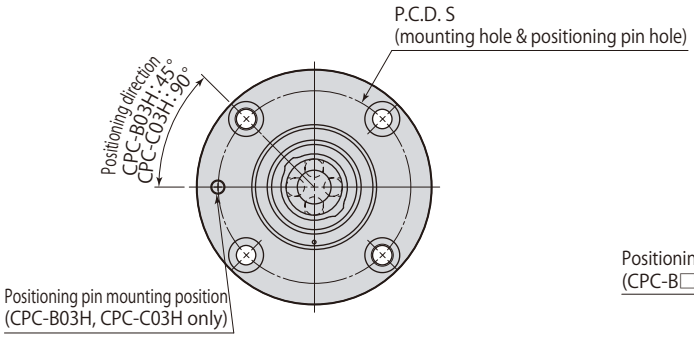
## Dimensions



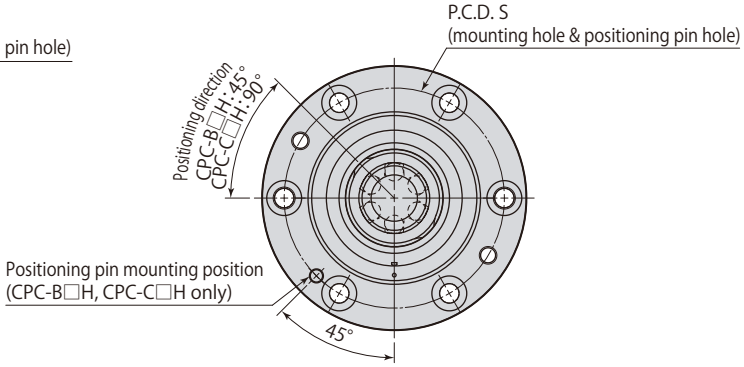

CPC-A03H



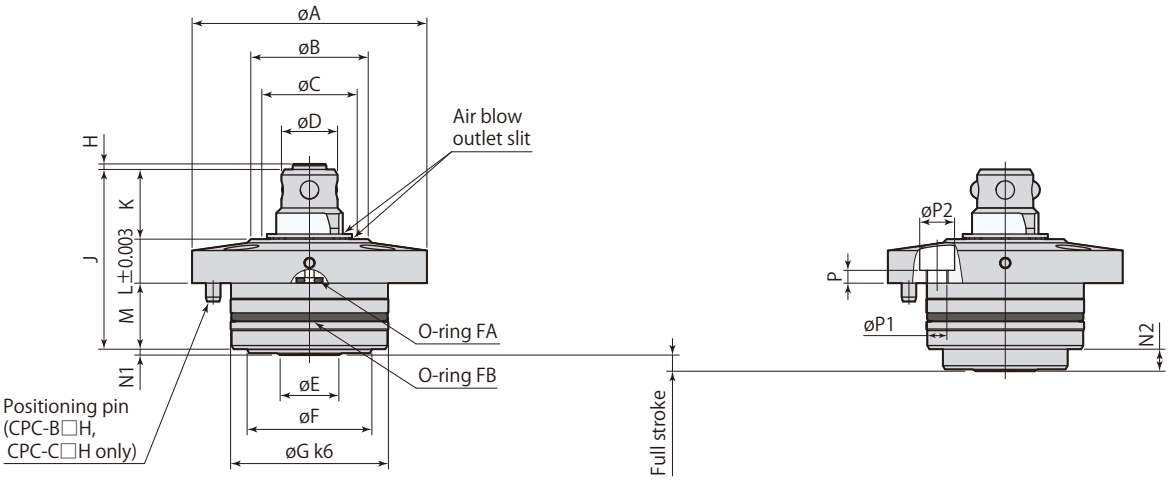

CPC-A06–40H



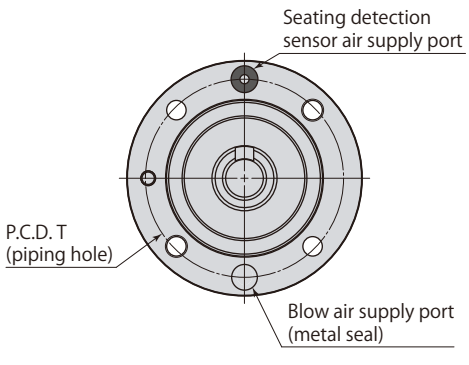

CPC-$\frac{B}{C}$03H



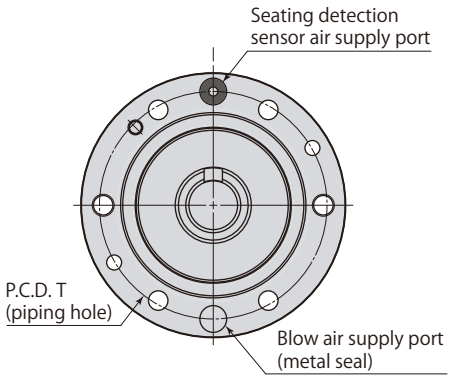

CPC-$\frac{B}{C}$06–40H




**Unclamp** **Stroke end**




CPC-□03H



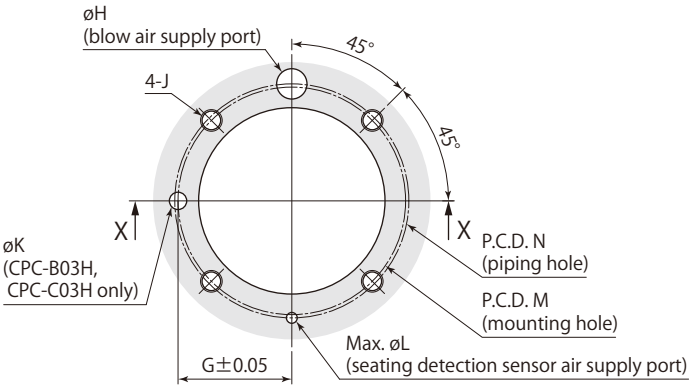

CPC-□06–40H

mm

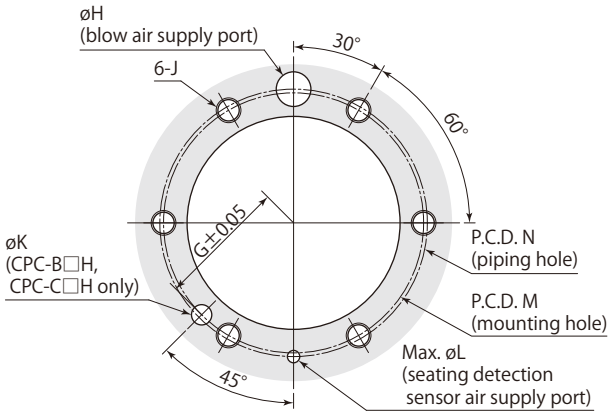
| Model | CPC-□03H | CPC-□06H | CPC-□10H | CPC-□16H | CPC-□25H | CPC-□40H |
|---|---|---|---|---|---|---|
| øA | 64 | 72 | 100 | 120 | 150 | 175 |
| øB | 32 | 45 | 48 | 66 | 78 | 94 |
| øC | 26 | 37 | 40 | 56 | 66 | 78 |
| øD | 15.3 | 19.3 | 23 | 29.4 | 37.3 | 46 |
| øE | 16 | 19 | 29 | 35 | 45 | 56 |
| øF | 34 | 42 | 60 | 75 | 95 | 115 |
| øG | 43 $^{+0.018}_{+0.002}$ | 51 $^{+0.021}_{+0.002}$ | 74 $^{+0.021}_{+0.002}$ | 89 $^{+0.025}_{+0.003}$ | 110 $^{+0.025}_{+0.003}$ | 130 $^{+0.028}_{+0.003}$ |
| H | 1.5 | 1.5 | 1.3 | 1.3 | 1.3 | 1.3 |
| J | 50.6 | 57.6 | 68 | 85.5 | 107 | 129.5 |
| K | 19 | 22.5 | 26 | 34 | 41 | 48 |
| L | 12 | 13 | 15 | 18 | 22 | 28 |
| M | 18 | 18 | 24 | 27 | 32 | 35 |
| N1 | 1.6 | 4.1 | 3 | 6.5 | 12 | 18.5 |
| N2 | 6 | 8.5 | 8 | 13 | 19 | 26 |
| P | 3.5 | 5 | 4 | 5 | 5 | 7 |
| P1 | 5.3 | 5.3 | 6.8 | 9 | 11 | 14 |
| P2 | 9.5 | 9.5 | 11 | 14 | 17.5 | 20 |
| S | 52.5 | 60 | 86 | 104 | 130 | 152 |
| T | 54 | 62 | 86 | 104 | 130 | 152 |
| U | M6×1 | M6×1 | M8×1.25 | M10×1.5 | M10×1.5 | M12×1.75 |
| Positioning pin (dowel pin) | ø4(h8)×10 | ø4(h8)×10 | ø4(h8)×10 | ø6(h8)×12 | ø6(h8)×12 | ø6(h8)×12 |
| O-ring FA (FKM-90) | P4 | P4 | P4 | P6 | P8 | P10 |
| O-ring FB (FKM-90) | AS568-029 | AS568-032 | AS568-147 | AS568-152 | AS568-155 | AS568-158 |

- Be sure to match up phase of pallet clamp steel balls and locate ring steel ball grooves.
- Positioning direction is the direction in which tapered surface has not been cut.
- Use øA, which has been ground at the same time as tapered surface, for positioning measurement after mounting.
- When mounting the pallet clamp, use positioning pin. The positioning pin is packed with a pallet clamp.
- Mounting screws are not included.
- Pal coupler (**pages →80–85**) recommended when using couplers in a set.
- □ dimensions are different from former pallet clamp (model CPC-□□F).

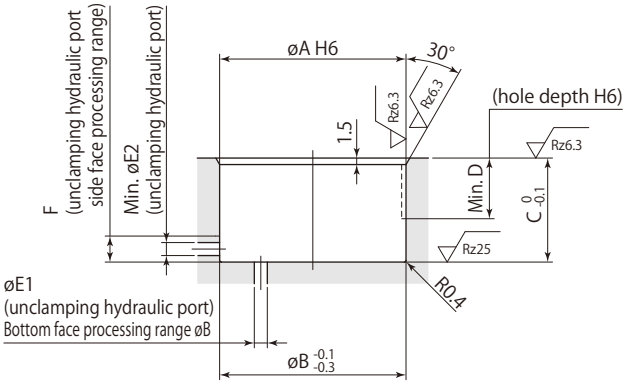
## Mounting details




CPC-□03H



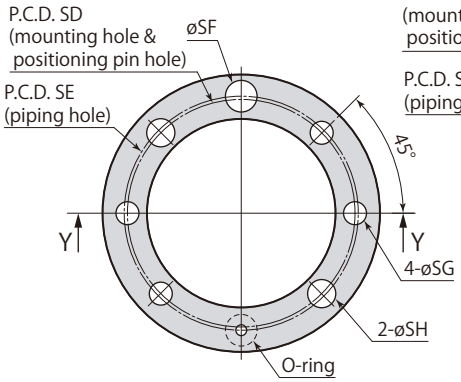

CPC-□06–40H



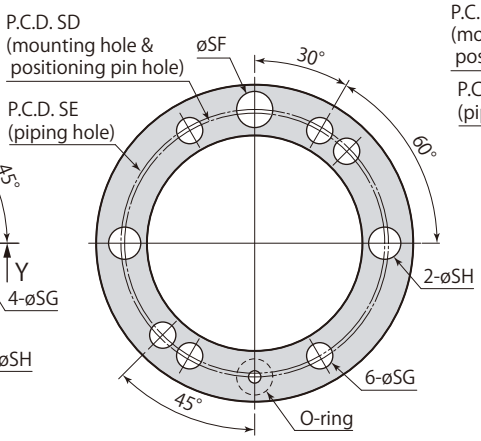

X-X

Rz: ISO4287(1997)

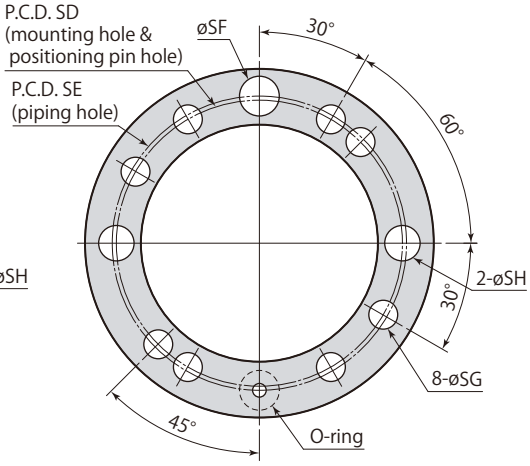
## Shim (option)



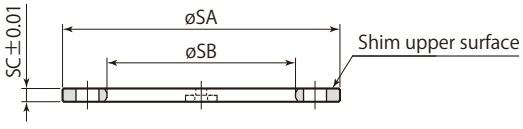

CPC-S03H




CPC-S06–16H




CPC-S25/40H




Y-Y

mm

| Model | CPC-□03H | CPC-□06H | CPC-□10H | CPC-□16H | CPC-□25H | CPC-□40H |
|---|---|---|---|---|---|---|
| øA | 43 $^{+0.016}_{0}$ | 51 $^{+0.019}_{0}$ | 74 $^{+0.019}_{0}$ | 89 $^{+0.022}_{0}$ | 110 $^{+0.022}_{0}$ | 130 $^{+0.025}_{0}$ |
| øB | 43 | 51 | 74 | 89 | 110 | 130 |
| øE1 | 3–12 | 3–15 | 3–25 | 3–31 | 4–39 | 4–50 |
| øE2 | 3 | 3 | 3 | 3 | 4 | 4 |
| F | 6 | 8.5 | 8 | 13 | 19 | 26 |
| G | 26.25 | 30 | 43 | 52 | 65 | 76 |
| øH | 4.5–7 | 4.5–7 | 5.5–8 | 6–9 | 7–11 | 7–13 |
| J | M5 | M5 | M6 | M8 | M10 | M12 |
| øL | 2.5 | 2.5 | 2.5 | 4 | 6 | 8 |
| M | 52.5 | 60 | 86 | 104 | 130 | 152 |
| N | 54 | 62 | 86 | 104 | 130 | 152 |
| **Not using shim (standard specifications)** | | | | | | |
| C | 24 | 26.5 | 32 | 40 | 51 | 61 |
| D | 14 | 14 | 15 | 15 | 16 | 16 |
| øK | 4.1 $^{+0.1}_{0}$ depth 6 | 4.1 $^{+0.1}_{0}$ depth 6 | 4.1 $^{+0.1}_{0}$ depth 6 | 6.1 $^{+0.1}_{0}$ depth 6 | 6.1 $^{+0.1}_{0}$ depth 6 | 6.1 $^{+0.1}_{0}$ depth 6 |
| **Using shim (shim specifications)** | | | | | | |
| C | 21 | 23.5 | 29 | 37 | 47 | 57 |
| D | 11 | 11 | 12 | 12 | 12 | 12 |
| øK | 4.1 $^{+0.1}_{0}$ depth 4 | 4.1 $^{+0.1}_{0}$ depth 4 | 4.1 $^{+0.1}_{0}$ depth 4 | 6.1 $^{+0.1}_{0}$ depth 4 | 6.1 $^{+0.1}_{0}$ depth 4 | 6.1 $^{+0.1}_{0}$ depth 4 |

- Process with shim specification dimensions when shim is attached. Processing with standard specification dimensions will result in clamp damage during full stroke.
- Process either bottom or side surface of unclamping hydraulic port.
- Be sure to match up phase of pallet clamp steel balls and locate ring steel ball grooves.
- ▭ dimensions are different from former pallet clamp (model CPC-□□F).

mm

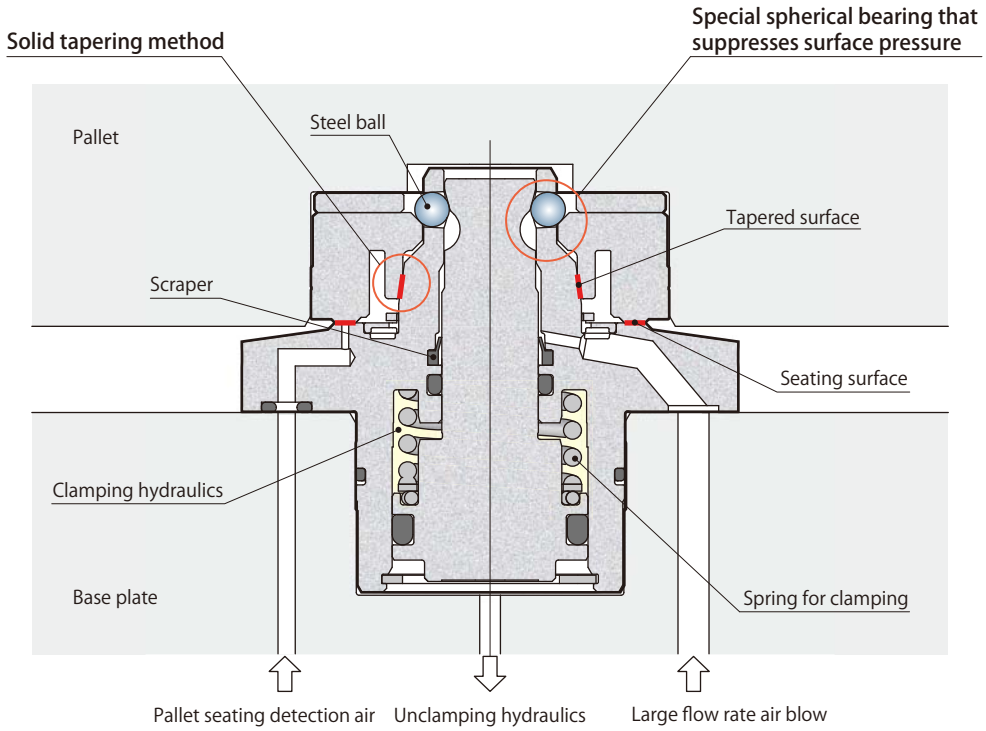
| Shim | CPC-S03H | CPC-S06H | CPC-S10H | CPC-S16H | CPC-S25H | CPC-S40H |
|---|---|---|---|---|---|---|
| øSA | 64 | 72 | 100 | 120 | 150 | 175 |
| øSB | 43.5 | 51.5 | 75 | 90 | 111 | 131 |
| SC | 3.05 | 3.05 | 3.05 | 3.05 | 4.05 | 4.05 |
| SD | 52.5 | 60 | 86 | 104 | 130 | 152 |
| SE | 54 | 62 | 86 | 104 | 130 | 152 |
| øSF | 7.3 | 7.3 | 8.2 | 9.2 | 11.2 | 13.2 |
| øSG | 5.3 | 5.3 | 6.3 | 9 | 11 | 14 |
| øSH | 6.5 | 6.5 | 9 | 11 | 11 | 14 |
| O-ring (FKM-90) | P4 | P4 | P4 | P6 | P8 | P10 |
| Mass | 0.04 kg | 0.04 kg | 0.07 kg | 0.10 kg | 0.22 kg | 0.28 kg |

- This diagram indicates dimensions at shipping.
- Adjust thickness of shim by grinding to ensure flatness of pallet.
- Grind shim upper surface (surface without O-ring) to adjust shim.
- ▭ dimensions are different from former pallet clamp (model CPC-□□F).

## Hydraulic clamp

model **CPH-□□H** US PAT.


**Highly rigid pallet clamp and repeatability of 3 μm with dual surface contact**
**Compact and reliable hydraulic clamp**



## Specifications

CPH – (Type) (Size) H

Type
- **A** : Taper cone circle
- **B** : Taper cone cut 45°
- **C** : Taper cone cut 90°
- **S** : Shim

Size
- 03
- 06
- 10
- 16
- 25
- 40

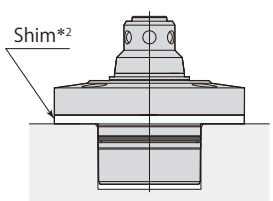
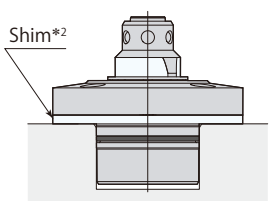
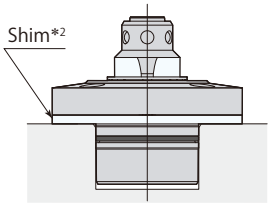
● Be sure to specify models and serial numbers when placing repeat orders. (Models and serial numbers are laser marked on clamps; For shim, same models and serial numbers as clamps may be specified.)

■ indicates made to order.

| Model | | | CPH-□03H | CPH-□06H | CPH-□10H | CPH-□16H | CPH-□25H | CPH-□40H |
|---|---|---|---|---|---|---|---|---|
| Clamping force*1 | Hydraulic pressure 0MPa*2 | kN | 0.3 | 0.3 | 0.4 | 0.5 | 0.6 | 0.8 |
| | Hydraulic pressure 5MPa | kN | 2.9 | 4.4 | 7.3 | 11.6 | 18.0 | 28.8 |
| | Hydraulic pressure 7MPa | kN | 4.0 | 6.0 | 10.0 | 16.0 | 25.0 | 40.0 |
| Clamping force calculation (P:Hydraulic pressure MPa)*1 | | | 0.52×P+0.3 | 0.81×P+0.3 | 1.37×P+0.4 | 2.21×P+0.5 | 3.48×P+0.6 | 5.60×P+0.8 |
| Cylinder capacity*1 | Unclamp | $cm^3$ | 1.7 | 2.8 | 4.8 | 9.9 | 16.0 | 27.2 |
| | Clamp | $cm^3$ | 1.3 | 2.1 | 3.8 | 7.8 | 12.6 | 21.4 |
| Full stroke | | mm | 4.4 | 4.4 | 5.0 | 6.5 | 7.0 | 7.5 |
| Clamp stroke | | mm | 2.4 | 2.4 | 3.0 | 4.0 | 4.5 | 5.0 |
| Safety stroke | | mm | 2.0 | 2.0 | 2.0 | 2.5 | 2.5 | 2.5 |
| Lift stroke*3 | | mm | 1 | | | | | |
| Max. allowable eccentricity for pallet setting | | mm | ±1.0 | ±1.5 | ±2.0 | ±2.5 | ±3.5 | ±4.0 |
| Lift force*1*4 | Hydraulic pressure 3.5MPa | kN | 1.1 | 1.9 | 3.0 | 4.9 | 7.5 | 12.0 |
| | Hydraulic pressure 5MPa | kN | 1.7 | 2.9 | 4.4 | 7.2 | 11.0 | 17.5 |
| | Hydraulic pressure 7MPa | kN | 2.4 | 4.2 | 6.4 | 10.2 | 15.5 | 24.8 |
| Lift force calculation (P:Unclamping hydraulic pressure MPa)*1*4 | | | 0.38×P-0.24 | 0.63×P-0.28 | 0.96×P-0.37 | 1.52×P-0.41 | 2.29×P-0.50 | 3.63×P-0.67 |
| Max. allowable load (including a pallet)*5 | Horizontal mounting | kN | 3.0 | 8.0 | 15.0 | 25.0 | 35.0 | 50.0 |
| | Vertical mounting | kN | 0.5 | 1.5 | 2.5 | 4.0 | 5.0 | 7.5 |
| Mass*1 | | kg | 0.3 | 0.6 | 0.8 | 1.6 | 2.7 | 4.9 |
| Recommended tightening torque of mounting screws*6 | | N·m | 7 | 7 | 12 | 29 | 57 | 100 |

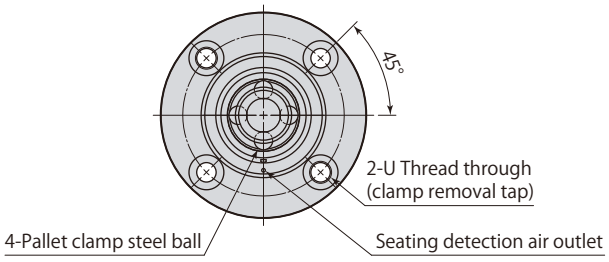
● Pressure range:5–7 MPa (model CPS-E), 2–7 MPa (model CPS-D, CPS-F) ● Proof pressure:10.5 MPa
● Operating temperature:0–70℃ ● Fluid used:General mineral based hydraulic oil (ISO-VG32 equivalent)
● Recommended air blow pressure:0.3–0.5 MPa

*1:The figure indicates one piece of clamp. *2:The value indicates the force generated by the spring.
*3:This is the amount for lifting pallet when unclamping.
*4:Set the hydraulic pressure so that the lift force is equal to or greater than the max allowable load.
*5:This is maximum allowable load of pallet, regardless of how many clamps are used. *6:ISO R898 class 12.9

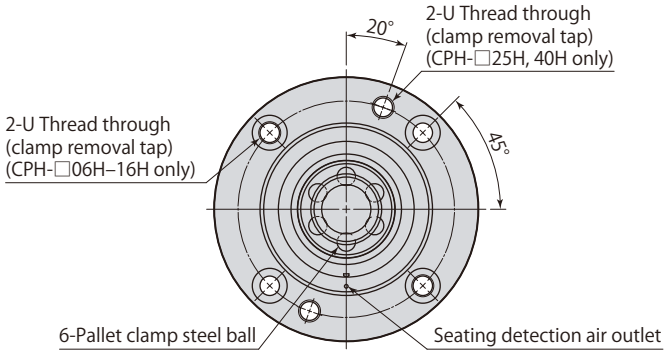
| Pallet clamp type | A Taper cone circle | B*3 Taper cone cut 45° | C*3 Taper cone cut 90° |
|---|---|---|---|
| Hydraulic clamp model **CPH***1 |   model CPH-A□H |   model CPH-B□H |   model CPH-C□H |

*1:Hydraulic clamp model CPH and spring clamp model CPC (**page →16**) cannot be used together.
*2:Shim of pallet clamp can be used when heights of mounted clamps vary. (option)
*3:Taper cone cut can be selected from B type or C type.

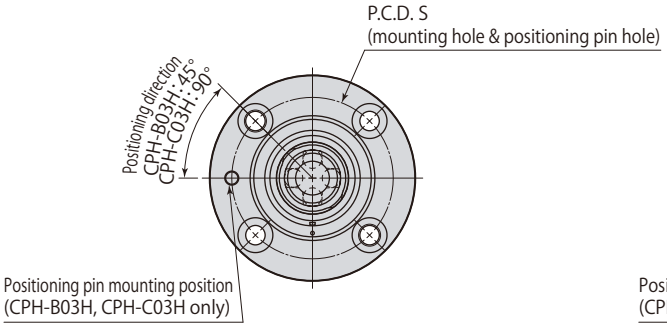
## Dimensions



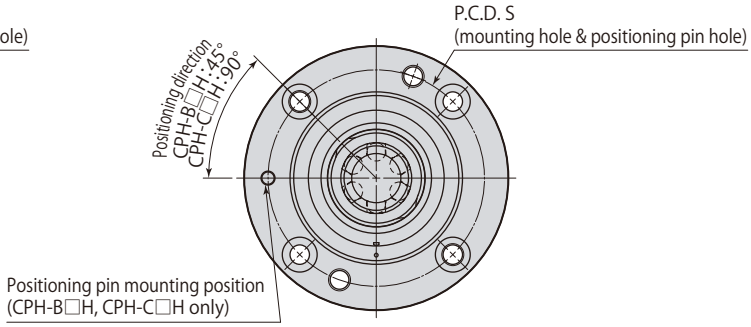

CPH-A03H



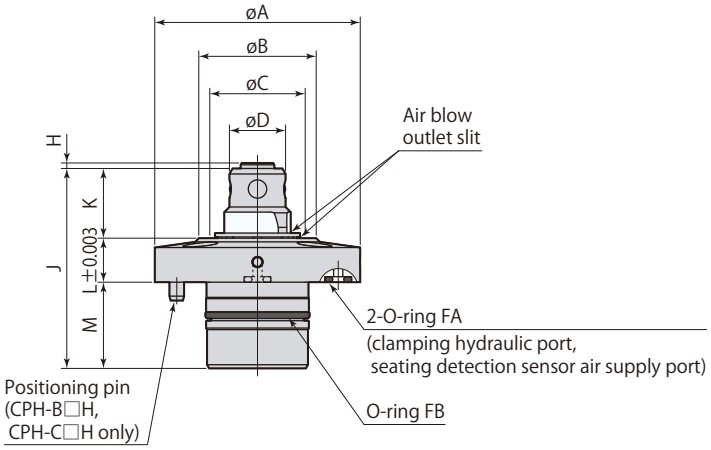

CPH-A06–40H



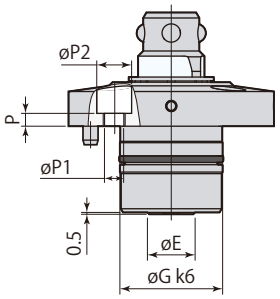

CPH-$^{B}_{C}$03H



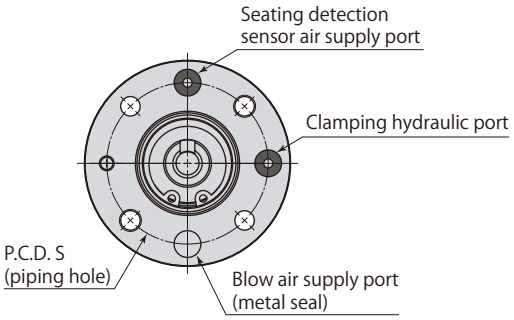

CPH-$^{B}_{C}$06–40H



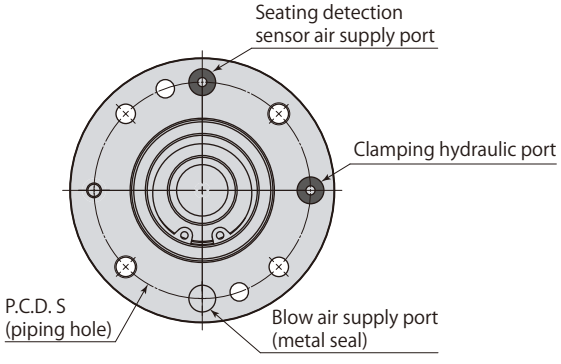

### Unclamp




### Stroke end




CPH-□03H



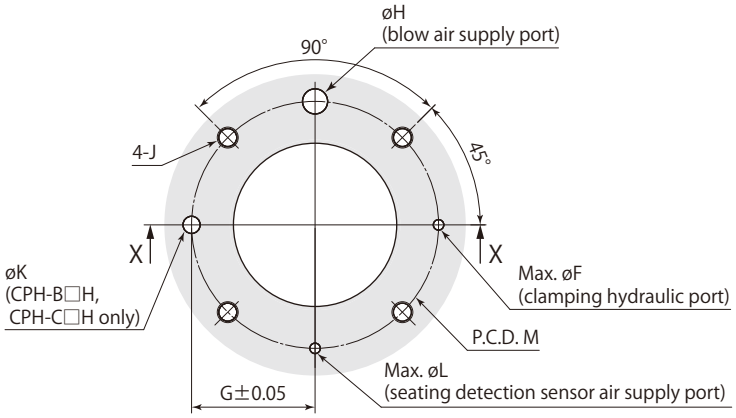

CPH-□06–40H

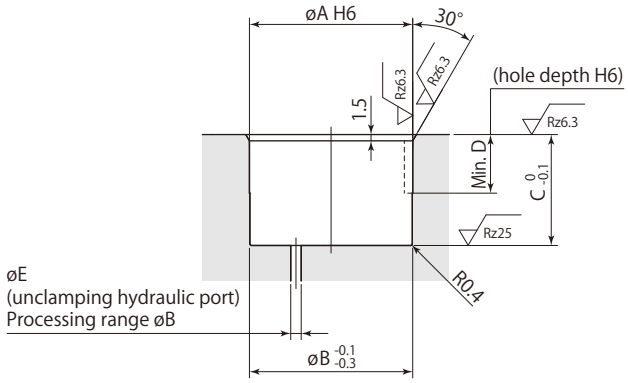
mm

| Model | CPH-□03H | CPH-□06H | CPH-□10H | CPH-□16H | CPH-□25H | CPH-□40H |
|---|---|---|---|---|---|---|
| øA | 56 | 72 | 76 | 100 | 120 | 145 |
| øB | 32 | 45 | 48 | 66 | 78 | 94 |
| øC | 26 | 37 | 40 | 56 | 66 | 78 |
| øD | 15.3 | 19.3 | 23 | 29.4 | 37.3 | 46 |
| øE | 13 | 19 | 21 | 28 | 38 | 48 |
| øG | 28 $^{+0.015}_{+0.002}$ | 39 $^{+0.018}_{+0.002}$ | 45 $^{+0.018}_{+0.002}$ | 54 $^{+0.021}_{+0.002}$ | 65 $^{+0.021}_{+0.002}$ | 80 $^{+0.021}_{+0.002}$ |
| H | 1.5 | 1.5 | 1.3 | 1.3 | 1.3 | 1.3 |
| J | 54.5 | 61.5 | 67.5 | 79.5 | 93.5 | 109.5 |
| K | 19 | 22.5 | 26 | 34 | 41 | 48 |
| L | 12 | 13 | 15 | 18 | 22 | 28 |
| M | 23.5 | 26 | 26.5 | 27.5 | 30.5 | 33.5 |
| P | 3.5 | 5 | 6 | 6 | 7 | 9 |
| øP1 | 5.3 | 5.3 | 6.8 | 9 | 11 | 14 |
| øP2 | 9.5 | 9.5 | 11 | 14 | 17.5 | 20 |
| S | 44 | 59 | 62 | 84 | 100 | 122 |
| U | M6×1 | M6×1 | M8×1.25 | M10×1.5 | M10×1.5 | M12×1.75 |
| Positioning pin (dowel pin) | ø4(h8)×10 | ø4(h8)×10 | ø4(h8)×10 | ø6(h8)×12 | ø6(h8)×12 | ø6(h8)×12 |
| O-ring FA (FKM-90) | P4 | P4 | P4 | P6 | P8 | P10 |
| O-ring FB (FKM-90) | AS568-022 | AS568-028 | AS568-030 | AS568-135 | AS568-141 | AS568-150 |

- Be sure to match up phase of pallet clamp steel balls and locate ring steel ball grooves.
- Positioning direction is the direction in which tapered surface has not been cut.
- Use øA, which has been ground at the same time as tapered surface, for positioning measurement after mounting.
- When mounting the pallet clamp, use positioning pin. The positioning pin is packed with a pallet clamp.
- Mounting screws are not included.
- Pal coupler (**pages →80–85**) recommended when using couplers in a set.
- 1.5 dimensions are different from former pallet clamp (model CPH-□□F).

## Mounting details

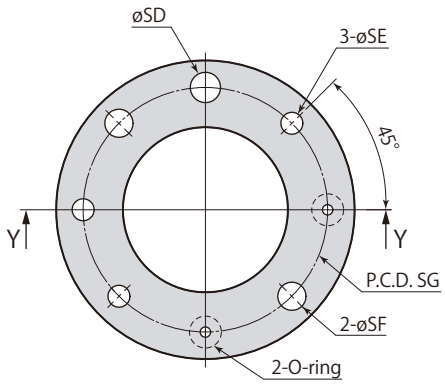


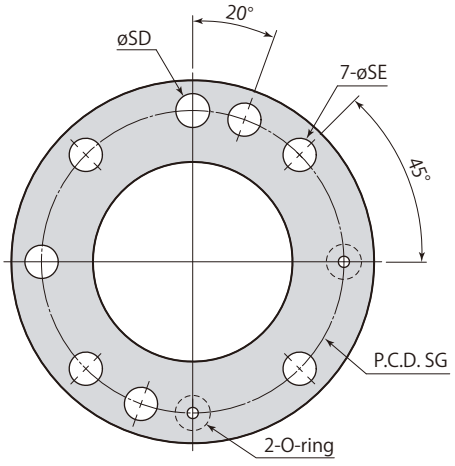

X-X

Rz: ISO4287(1997)

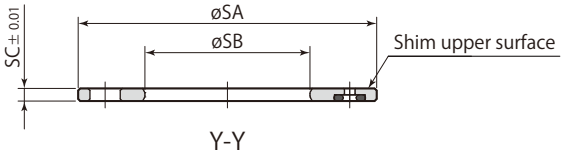
## Shim (option)




CPH-S03–16H




CPH-S25/40H




Y-Y

mm

| Model | CPH-□03H | CPH-□06H | CPH-□10H | CPH-□16H | CPH-□25H | CPH-□40H |
|---|---|---|---|---|---|---|
| øA | 28 $^{+0.013}_{0}$ | 39 $^{+0.016}_{0}$ | 45 $^{+0.016}_{0}$ | 54 $^{+0.019}_{0}$ | 65 $^{+0.019}_{0}$ | 80 $^{+0.019}_{0}$ |
| øB | 28 | 39 | 45 | 54 | 65 | 80 |
| øE | 3–8 | 3–14 | 3–16 | 3–23 | 4–31 | 4–41 |
| øF | 2.5 | 2.5 | 2.5 | 4 | 6 | 8 |
| G | 22 | 29.5 | 31 | 42 | 50 | 61 |
| øH | 4.5–7 | 4.5–7 | 5.5–8 | 6–9 | 7–11 | 7–13 |
| J | M5 | M5 | M6 | M8 | M10 | M12 |
| øL | 2.5 | 2.5 | 2.5 | 4 | 6 | 8 |
| M | 44 | 59 | 62 | 84 | 100 | 122 |
| **Not using shim (standard specifications)** | | | | | | |
| C | 24 | 26.5 | 27 | 28 | 31 | 34 |
| D | 14 | 14 | 14 | 15 | 16 | 16 |
| øK | 4.1 $^{+0.1}_{0}$ depth 6 | 4.1 $^{+0.1}_{0}$ depth 6 | 4.1 $^{+0.1}_{0}$ depth 6 | 6.1 $^{+0.1}_{0}$ depth 6 | 6.1 $^{+0.1}_{0}$ depth 6 | 6.1 $^{+0.1}_{0}$ depth 6 |
| **Using shim (shim specifications)** | | | | | | |
| C | 21 | 23.5 | 24 | 25 | 27 | 30 |
| D | 11 | 11 | 11 | 12 | 12 | 12 |
| øK | 4.1 $^{+0.1}_{0}$ depth 4 | 4.1 $^{+0.1}_{0}$ depth 4 | 4.1 $^{+0.1}_{0}$ depth 4 | 6.1 $^{+0.1}_{0}$ depth 4 | 6.1 $^{+0.1}_{0}$ depth 4 | 6.1 $^{+0.1}_{0}$ depth 4 |

- Process with shim specification dimensions when shim is attached. Processing with standard specification dimensions will result in clamp damage during full stroke.
- Be sure to match up phase of pallet clamp steel balls and locate ring steel ball grooves.
- ☐ dimensions are different from former pallet clamp (model CPH-□□F).

mm

| Shim | CPH-S03H | CPH-S06H | CPH-S10H | CPH-S16H | CPH-S25H | CPH-S40H |
|---|---|---|---|---|---|---|
| øSA | 56 | 72 | 76 | 100 | 120 | 145 |
| øSB | 28.8 | 39.8 | 46 | 55 | 66 | 81 |
| SC | 3.05 | 3.05 | 3.05 | 3.05 | 4.05 | 4.05 |
| øSD | 7.3 | 7.3 | 8.2 | 9.2 | 11.2 | 13.2 |
| øSE | 5.3 | 5.3 | 6.3 | 9 | 11 | 14 |
| øSF | 6.8 | 6.8 | 9 | 11 | – | – |
| SG | 44 | 59 | 62 | 84 | 100 | 122 |
| O-ring (FKM-90) | P4 | P4 | P4 | P6 | P8 | P10 |
| Mass | 0.04 kg | 0.06 kg | 0.06 kg | 0.12 kg | 0.22 kg | 0.32 kg |

- This diagram indicates dimensions at shipping.
- Adjust thickness of shim by grinding to ensure flatness of pallet.
- Grind shim upper surface (surface without O-ring) to adjust shim.
- ☐ dimensions are different from former pallet clamp (model CPH-□□F).

## Specifications

CPS – [Type] [Size] [Mounting method]

Type
- **D** : Repeatability 10 μm*1
- **E** : Repeatability 3 μm
- **F** : Seating surface positioning (Z axis positioning)
- **S** : Shim
- **P** : Protective plate*2

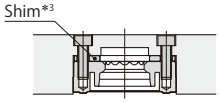
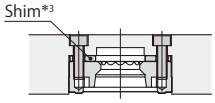
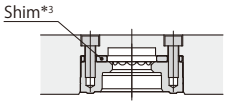
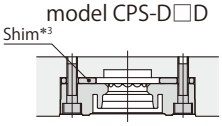
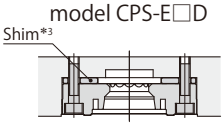
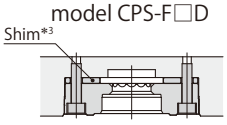
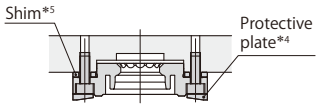
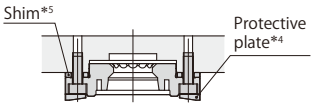
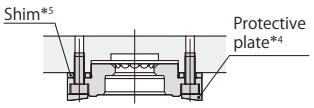
Size
**03** **06** **10** **16** **25** **40**

Mounting method
- **T** : Pallet upper surface mounting
- **D** : Pallet lower surface mounting
- **F** : Flange mounting

● Be sure to specify models and serial numbers when placing repeat orders.
(Models and serial numbers are laser marked on clamps; For shim, same models and serial numbers as clamps may be specified.)

■ indicates made to order.

*1 : model CPS-D (repeatability 10 μm) is limited to sizes of 03, 06, 10, and 16.
*2 : The protective plate is only flange mounting type.

| Locate ring | D*1 Repeatability 10 μm | E*1 Repeatability 3 μm | F*2 Seating surface positioning (Z axis positioning) |
|---|---|---|---|
| **T** Pallet upper surface mounting | model CPS-D□T   | model CPS-E□T   | model CPS-F□T   |
| **D** Pallet lower surface mounting | model CPS-D□D   | model CPS-E□D   | model CPS-F□D   |
| **F** Flange mounting | model CPS-D□F   | model CPS-E□F   | model CPS-F□F   |

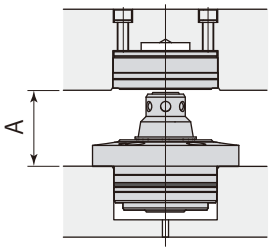
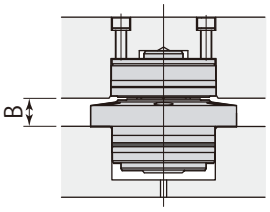
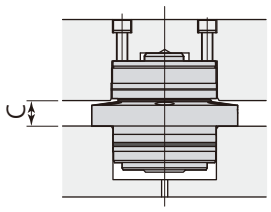
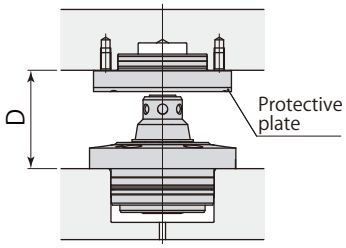
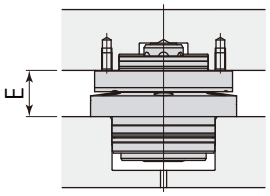
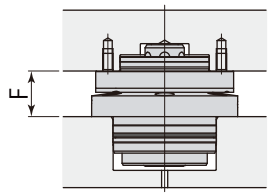
*1 : model CPS-D (repeatability 10 μm) and model CPS-E (repeatability 3 μm) of locate ring cannot be used together.
*2 : model CPS-F (seating surface positioning) needs the positioning of XY axes.
*3 : It is recommended to use a shim (option) to adjust mounting hole depth for the locate rings for pallet upper surface mounting and lower surface mounting. Grind shim to adjust thickness.
*4 : Protective plate (flange mounting only) can be used to prevent damage of seating surface, when pallet must be placed on the floor, etc. (option)
*5 : Shim of locate ring of flange mounting can be used when heights of mounted locate rings vary. (option)

## Mass

kg

| Locate ring | | D Repeatability 10 μm | | | | E Repeatability 3 μm | | | | | | F Seating surface positioning (Z axis positioning) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **T** Pallet upper surface mounting | Model | CPS-D03T | CPS-D06T | CPS-D10T | CPS-D16T | CPS-E03T | CPS-E06T | CPS-E10T | CPS-E16T | CPS-E25T | CPS-E40T | CPS-F03T | CPS-F06T | CPS-F10T | CPS-F16T | CPS-F25T | CPS-F40T |
| | Mass | 0.1 | 0.2 | 0.3 | 0.7 | 0.1 | 0.2 | 0.3 | 0.7 | 1.2 | 2 | 0.1 | 0.2 | 0.3 | 0.7 | 1.1 | 1.8 |
| **D** Pallet lower surface mounting | Model | CPS-D03D | CPS-D06D | CPS-D10D | CPS-D16D | CPS-E03D | CPS-E06D | CPS-E10D | CPS-E16D | CPS-E25D | CPS-E40D | CPS-F03D | CPS-F06D | CPS-F10D | CPS-F16D | CPS-F25D | CPS- F40D |
| | Mass | 0.2 | 0.3 | 0.5 | 1.2 | 0.2 | 0.3 | 0.5 | 1.2 | 2 | 3.1 | 0.2 | 0.3 | 0.5 | 1.1 | 1.9 | 3 |
| **F** Flange mounting | Model | CPS-D03F | CPS-D06F | CPS-D10F | CPS-D16F | CPS-E03F | CPS-E06F | CPS-E10F | CPS-E16F | CPS-E25F | CPS-E40F | CPS-F03F | CPS-F06F | CPS-F10F | CPS-F16F | CPS-F25F | CPS- F40F |
| | Mass | 0.1 | 0.2 | 0.3 | 0.8 | 0.1 | 0.2 | 0.3 | 0.8 | 1.5 | 2.5 | 0.1 | 0.2 | 0.4 | 0.8 | 1.5 | 2.4 |

## Height of pallet from base plate

| Locate ring mounting method | Pallet changing | Pallet setting (Unclamp) | Clamp |
|---|---|---|---|
| **T** Pallet upper surface mounting<br>**D** Pallet lower surface mounting |  |  |  |
| **F** Flange mounting |  |  |  |

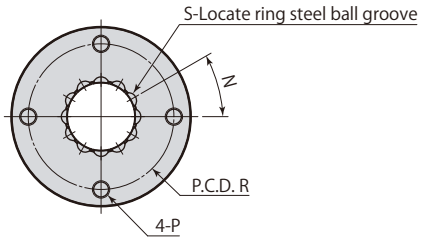
mm

| Spring clamp Hydraulic clamp | | CPC CPH-□03H | CPC CPH-□06H | CPC CPH-□10H | CPC CPH-□16H | CPC CPH-□25H | CPC CPH-□40H |
|---|---|---|---|---|---|---|---|
| **T** Pallet upper surface mounting<br>**D** Pallet lower surface mounting | A | Min. 33 | Min. 38 | Min. 44 | Min. 55 | Min. 66 | Min. 79 |
| | B | 12.5 | 13.5 | 15.5 | 18.5 | 22.5 | 28.5 |
| | C | 11.5 | 12.5 | 14.5 | 17.5 | 21.5 | 27.5 |
| **F** Flange mounting | D | Min. 43 | Min. 48 | Min. 56 | Min. 71 | Min. 86 | Min. 104 |
| | E | 22 | 23.5 | 27.5 | 33.5 | 41 | 52 |
| | F | 21 | 22.5 | 26.5 | 32.5 | 40 | 51 |

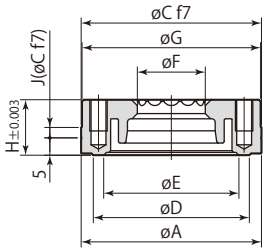
- Pallet lift capacity for dimension A or D or more is needed to change pallet.
- The height from base plate to pallet varies when using shim for pallet clamp or locate ring (flange mounting).

**Former type pallet clamps (model CPC-□□F, CPH-□□F) have different lift stroke, air blow (air outlet, sealing method, connecting pipe diameter), locate ring mounting dimensions. Please bear this in mind when placing repeat orders.**
**Inquire separately regarding former type pallet clamps.**

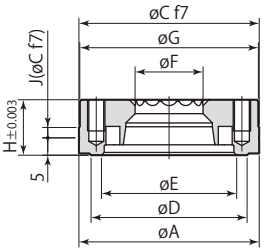
## Dimensions



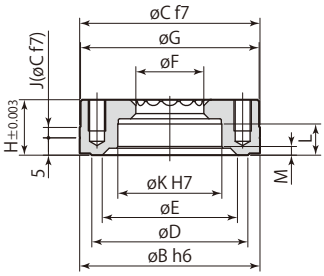

CPS-D03–16T Locate ring (D type)




CPS-E03–40T Locate ring (E type)




CPS-F03–40T Locate ring (F type)



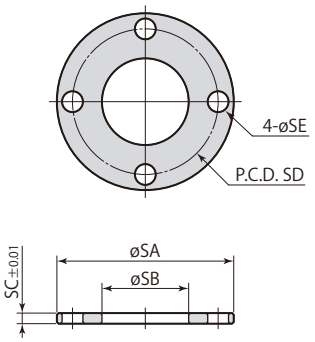

mm

| Model | CPS-□03T | CPS-□06T | CPS-□10T | CPS-□16T | CPS-□25T | CPS-□40T |
|---|---|---|---|---|---|---|
| øA | 40 $^{+0.005}_{-0.011}$ | 52 $^{+0.006}_{-0.013}$ | 60 $^{+0.006}_{-0.013}$ | 80 $^{+0.006}_{-0.013}$ | 95 $^{+0.007}_{-0.015}$ | 115 $^{+0.007}_{-0.015}$ |
| øB | 40 $^{0}_{-0.016}$ | 52 $^{0}_{-0.019}$ | 60 $^{0}_{-0.019}$ | 80 $^{0}_{-0.019}$ | 95 $^{0}_{-0.022}$ | 115 $^{0}_{-0.022}$ |
| øC | 40 $^{-0.025}_{-0.050}$ | 52 $^{-0.030}_{-0.060}$ | 60 $^{-0.030}_{-0.060}$ | 80 $^{-0.030}_{-0.060}$ | 95 $^{-0.036}_{-0.071}$ | 115 $^{-0.036}_{-0.071}$ |
| øD | 32 | 45 | 48 | 66 | 78 | 94 |
| øE | 28 | 39 | 42 | 58 | 68 | 80 |
| øF | 15.6 | 19.6 | 23.3 | 29.7 | 37.6 | 46.3 |
| øG | 39.5 | 51.5 | 59.5 | 79.5 | 94.5 | 114.5 |
| H | 13 | 16 | 20 | 25 | 30 | 35 |
| J | 3 | 3 | 3 | 3 | 3 | 4 |
| øK | 22 $^{+0.021}_{0}$ | 30 $^{+0.021}_{0}$ | 32 $^{+0.025}_{0}$ | 45 $^{+0.025}_{0}$ | 55 $^{+0.030}_{0}$ | 65 $^{+0.030}_{0}$ |
| L | 7 | 9 | 11 | 14 | 16 | 19 |
| M | 2 | 2.5 | 2.5 | 3 | 4 | 5 |
| N* | 45° | 30° | 30° | 30° | 30° | 30° |
| P | M5×0.8 depth 6 | M5×0.8 depth 9 | M6×1 depth 11 | M8×1.25 depth 15 | M10×1.5 depth 18 | M12×1.75 depth 21 |
| R | 31 | 42 | 48 | 64 | 75 | 90 |
| S | 8 | 12 | 12 | 12 | 12 | 12 |

∗: Be sure to match up phase of locate ring steel ball grooves and pallet clamp steel balls.

● Mounting screws are not included.

## Shim (option)



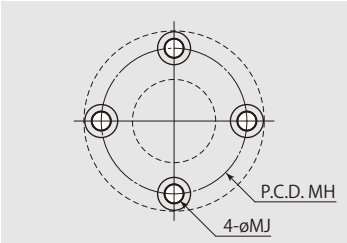

mm

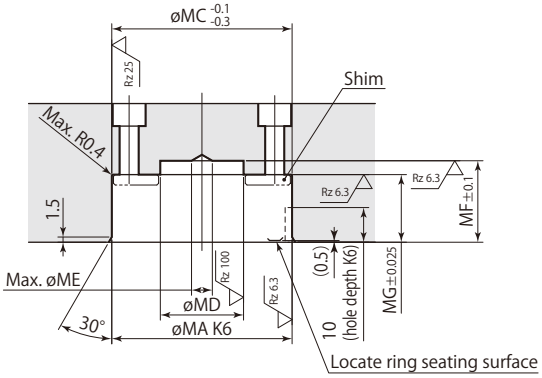
| Shim | CPS-S03T | CPS-S06T | CPS-S10T | CPS-S16T | CPS-S25T | CPS-S40T |
|---|---|---|---|---|---|---|
| øSA | 39 | 51 | 59 | 79 | 94 | 114 |
| øSB | 21 | 25 | 33 | 46 | 56 | 67 |
| SC | 2.05 | 3.05 | 3.05 | 3.05 | 4.05 | 4.05 |
| SD | 31 | 42 | 48 | 64 | 75 | 90 |
| øSE | 6 | 6 | 7 | 9 | 11 | 14 |
| Mass | 0.01 kg | 0.03 kg | 0.04 kg | 0.07 kg | 0.13 kg | 0.14 kg |

● This diagram indicates dimensions at shipping.

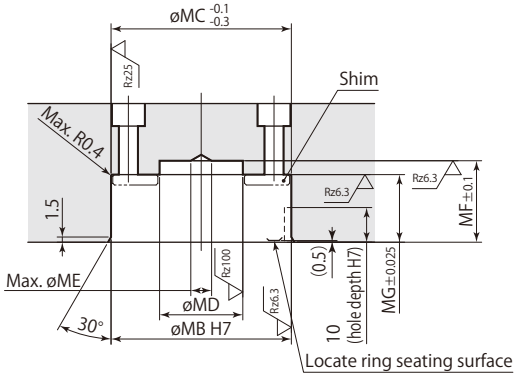
● Adjust thickness of shim by grinding to ensure flatness of pallet.

## Mounting details




CPS-D03–16T, CPS-E03–40T




CPS-F03–40T

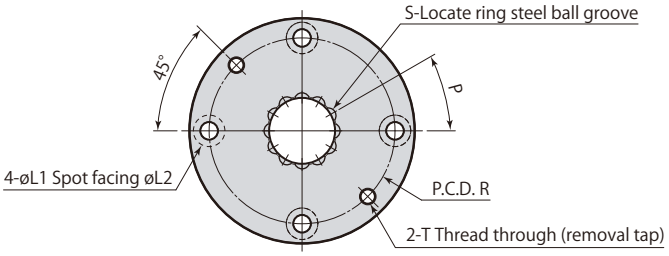
Rz: ISO4287(1997)

mm

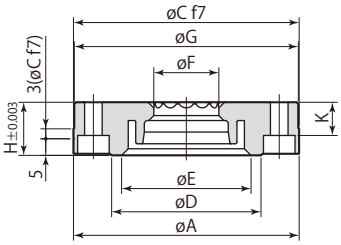
| Model | CPS-□03T | CPS-□06T | CPS-□10T | CPS-□16T | CPS-□25T | CPS-□40T |
|---|---|---|---|---|---|---|
| øMA | 40 $^{+0.003}_{-0.013}$ | 52 $^{+0.004}_{-0.015}$ | 60 $^{+0.004}_{-0.015}$ | 80 $^{+0.004}_{-0.015}$ | 95 $^{+0.004}_{-0.018}$ | 115 $^{+0.004}_{-0.018}$ |
| øMB | 40 $^{+0.025}_{0}$ | 52 $^{+0.030}_{0}$ | 60 $^{+0.030}_{0}$ | 80 $^{+0.030}_{0}$ | 95 $^{+0.035}_{0}$ | 115 $^{+0.035}_{0}$ |
| øMC | 40 | 52 | 60 | 80 | 95 | 115 |
| øMD | 20 | 24 | 28 | 36 | 50 | 60 |
| øME | 6 | 6 | 8 | 10 | 12 | 15 |
| MF | 20 | 23.5 | 26.8 | 34.8 | 41.8 | 48.8 |
| MG | 15.5 | 19.5 | 23.5 | 28.5 | 34.5 | 39.5 |
| MH | 31 | 42 | 48 | 64 | 75 | 90 |
| øMJ | 5.5 | 5.5 | 6.6 | 9 | 11 | 13.5 |

- Be sure to match up phase of locate ring steel ball grooves and pallet clamp steel balls.
- dimensions are different from former pallet clamp (model CPC-□□F, CPH-□□F).

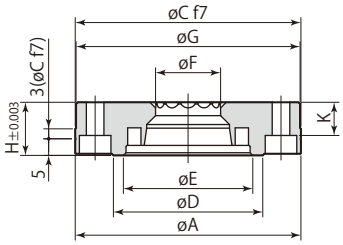
## Dimensions



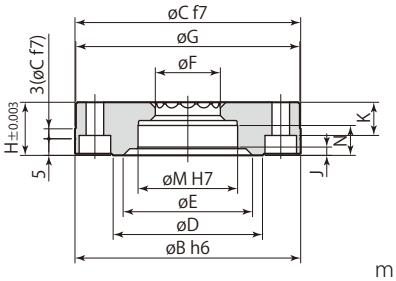

### CPS-D03–16D Locate ring (D type)




### CPS-E03–40D Locate ring (E type)




### CPS-F03–40D Locate ring (F type)

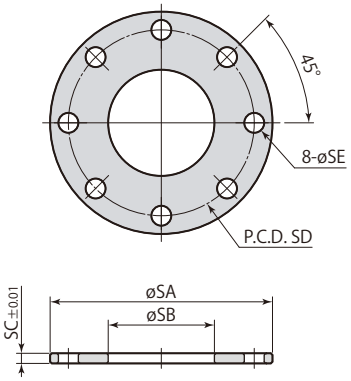



mm

| Model | CPS-□03D | CPS-□06D | CPS-□10D | CPS-□16D | CPS-□25D | CPS-□40D |
|---|---|---|---|---|---|---|
| øA | 55 $^{+0.006}_{-0.013}$ | 68 $^{+0.006}_{-0.013}$ | 75 $^{+0.006}_{-0.013}$ | 100 $^{+0.007}_{-0.015}$ | 120 $^{+0.007}_{-0.015}$ | 140 $^{+0.007}_{-0.018}$ |
| øB | 55 $^{0}_{-0.019}$ | 68 $^{0}_{-0.019}$ | 75 $^{0}_{-0.019}$ | 100 $^{0}_{-0.022}$ | 120 $^{0}_{-0.022}$ | 140 $^{0}_{-0.025}$ |
| øC | 55 $^{-0.030}_{-0.060}$ | 68 $^{-0.030}_{-0.060}$ | 75 $^{-0.030}_{-0.060}$ | 100 $^{-0.036}_{-0.071}$ | 120 $^{-0.036}_{-0.071}$ | 140 $^{-0.043}_{-0.083}$ |
| øD | 32 | 45 | 48 | 66 | 78 | 94 |
| øE | 28 | 39 | 42 | 58 | 68 | 80 |
| øF | 15.6 | 19.6 | 23.3 | 29.7 | 37.6 | 46.3 |
| øG | 54.5 | 67.5 | 74.5 | 99.5 | 119.5 | 139.5 |
| H | 13 | 16 | 20 | 25 | 30 | 35 |
| J | 2 | 2.5 | 2.5 | 3 | 4 | 5 |
| K | 7 | 10 | 13 | 16 | 19 | 22 |
| øL1 | 5.3 | 5.3 | 6.8 | 9 | 11 | 14 |
| øL2 | 9.5 | 9.5 | 11 | 14 | 17.5 | 20 |
| øM | 22 $^{+0.021}_{0}$ | 30 $^{+0.021}_{0}$ | 32 $^{+0.025}_{0}$ | 45 $^{+0.025}_{0}$ | 55 $^{+0.030}_{0}$ | 65 $^{+0.030}_{0}$ |
| N | 7 | 9 | 11 | 14 | 16 | 19 |
| P* | 45° | 30° | 30° | 30° | 30° | 30° |
| R | 43 | 56 | 61 | 82 | 98 | 116 |
| S | 8 | 12 | 12 | 12 | 12 | 12 |
| T | M5×0.8 | M5×0.8 | M6×1 | M8×1.25 | M10×1.5 | M12×1.75 |

∗: Be sure to match up phase of locate ring steel ball grooves and pallet clamp steel balls.

● Mounting screws are not included.




## Shim (option)

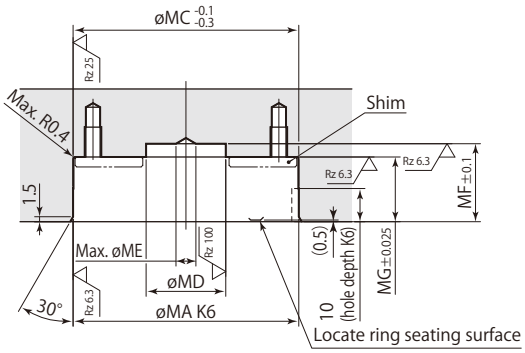
mm

| Shim | CPS-S03D | CPS-S06D | CPS-S10D | CPS-S16D | CPS-S25D | CPS-S40D |
|---|---|---|---|---|---|---|
| øSA | 54 | 67 | 74 | 99 | 119 | 139 |
| øSB | 24 | 32 | 39 | 55 | 65 | 77 |
| SC | 2.05 | 3.05 | 3.05 | 3.05 | 4.05 | 4.05 |
| SD | 43 | 56 | 61 | 82 | 98 | 116 |
| øSE | 6 | 6 | 7 | 9 | 11 | 14 |
| Mass | 0.06 kg | 0.06 kg | 0.07 kg | 0.11 kg | 0.22 kg | 0.31 kg |

● This diagram indicates dimensions at shipping.

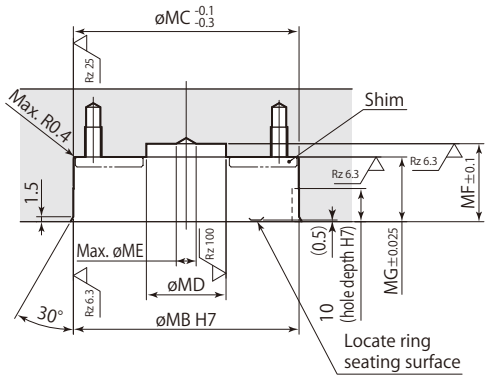
● Adjust thickness of shim by grinding to ensure flatness of pallet.

## Mounting details

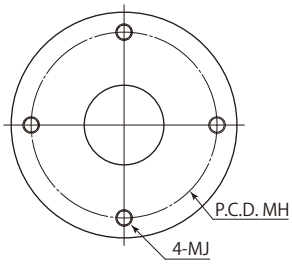



CPS-D03–16D, CPS-E03–40D

Rz: ISO4287(1997)




CPS-F03–40D

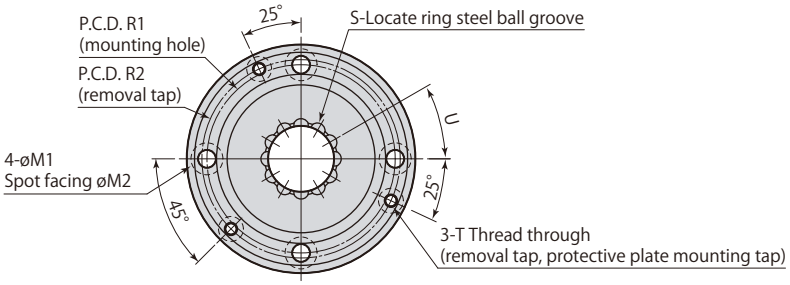



mm

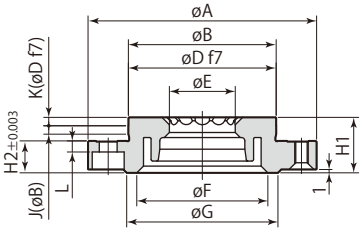
| Model | CPS-□03D | CPS-□06D | CPS-□10D | CPS-□16D | CPS-□25D | CPS-□40D |
|---|---|---|---|---|---|---|
| øMA | 55 $^{+0.004}_{-0.015}$ | 68 $^{+0.004}_{-0.015}$ | 75 $^{+0.004}_{-0.015}$ | 100 $^{+0.004}_{-0.018}$ | 120 $^{+0.004}_{-0.018}$ | 140 $^{+0.004}_{-0.021}$ |
| øMB | 55 $^{+0.030}_{0}$ | 68 $^{+0.030}_{0}$ | 75 $^{+0.030}_{0}$ | 100 $^{+0.035}_{0}$ | 120 $^{+0.035}_{0}$ | 140 $^{+0.035}_{0}$ |
| øMC | 55 | 68 | 75 | 100 | 120 | 140 |
| øMD | 20 | 24 | 28 | 36 | 50 | 60 |
| øME | 6 | 6 | 8 | 10 | 12 | 15 |
| MF | 20 | 23.5 | 26.8 | 34.8 | 41.8 | 48.8 |
| MG | 15.5 | 19.5 | 23.5 | 28.5 | 34.5 | 39.5 |
| MH | 43 | 56 | 61 | 82 | 98 | 116 |
| MJ | M5 | M5 | M6 | M8 | M10 | M12 |

- Be sure to match up phase of locate ring steel ball grooves and pallet clamp steel balls.
- dimensions are different from former pallet clamp (model CPC-□□F, CPH-□□F).

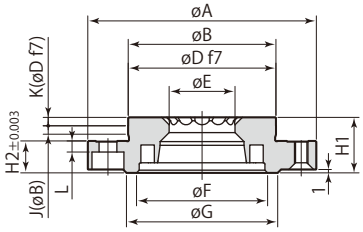
## Dimensions



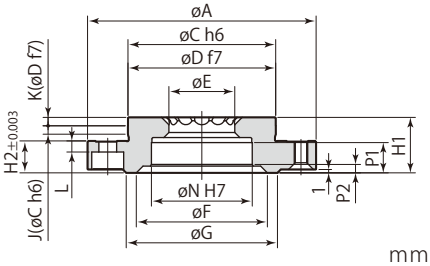

### CPS-D03–16F Locate ring (D type)




### CPS-E03–40F Locate ring (E type)




### CPS-F03–40F Locate ring (F type)



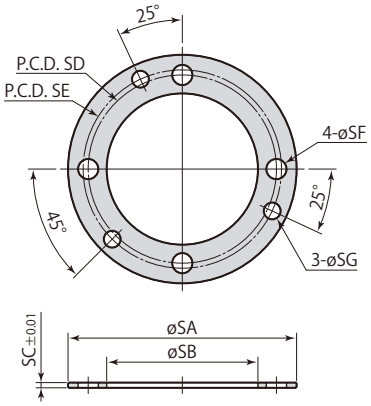

mm

| Model | CPS-□03F | CPS-□06F | CPS-□10F | CPS-□16F | CPS-□25F | CPS-□40F |
|---|---|---|---|---|---|---|
| øA | 55 | 68 | 75 | 100 | 120 | 140 |
| øB | 31 $^{+0.005}_{-0.011}$ | 44 $^{+0.005}_{-0.011}$ | 47 $^{+0.005}_{-0.011}$ | 66 $^{+0.006}_{-0.013}$ | 80 $^{+0.006}_{-0.013}$ | 95 $^{+0.007}_{-0.015}$ |
| øC | 31 $^{0}_{-0.016}$ | 44 $^{0}_{-0.016}$ | 47 $^{0}_{-0.016}$ | 66 $^{0}_{-0.019}$ | 80 $^{0}_{-0.019}$ | 95 $^{0}_{-0.022}$ |
| øD | 31 $^{-0.025}_{-0.050}$ | 44 $^{-0.025}_{-0.050}$ | 47 $^{-0.025}_{-0.050}$ | 66 $^{-0.030}_{-0.060}$ | 80 $^{-0.030}_{-0.060}$ | 95 $^{-0.036}_{-0.071}$ |
| øE | 15.6 | 19.6 | 23.3 | 29.7 | 37.6 | 46.3 |
| øF | 28 | 39 | 42 | 58 | 68 | 80 |
| øG | 32 | 45 | 48 | 66 | 78 | 94 |
| H1 | 15.5 | 16.5 | 20 | 25 | 30 | 35 |
| H2 | 9 | 9.5 | 11.5 | 14.5 | 18 | 23 |
| J | 2.4 | 2.5 | 3.2 | 4.7 | 4.2 | 4.2 |
| K | 2.1 | 2.5 | 2.8 | 3.3 | 3.8 | 3.8 |
| L | 2.8 | 3.3 | 4.2 | 5.2 | 6.5 | 9.5 |
| øM1 | 5.3 | 5.3 | 6.8 | 9 | 11 | 14 |
| øM2 | 9.5 | 9.5 | 11 | 14 | 17.5 | 20 |
| øN | 22 $^{+0.021}_{0}$ | 30 $^{+0.021}_{0}$ | 32 $^{+0.025}_{0}$ | 45 $^{+0.025}_{0}$ | 55 $^{+0.030}_{0}$ | 65 $^{+0.030}_{0}$ |
| P1 | 7 | 9 | 11 | 14 | 16 | 19 |
| P2 | 2 | 2.5 | 2.5 | 3 | 4 | 5 |
| R1 | 43 | 56 | 61 | 82 | 98 | 116 |
| R2 | 46 | 59 | 64 | 88 | 106 | 124 |
| S | 8 | 12 | 12 | 12 | 12 | 12 |
| T | M4×0.7 | M4×0.7 | M5×0.8 | M5×0.8 | M6×1 | M6×1 |
| U* | 45° | 30° | 30° | 30° | 30° | 30° |

∗: Be sure to match up phase of locate ring steel ball grooves and pallet clamp steel balls.

● Mounting screws are not included.

## Shim (option)



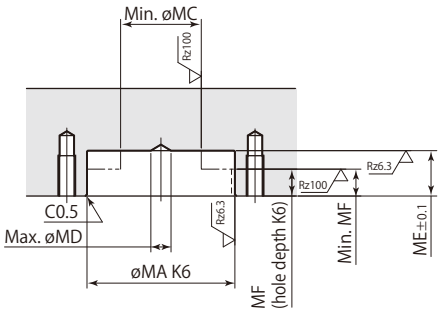

mm

| Shim | CPS-S03F | CPS-S06F | CPS-S10F | CPS-S16F | CPS-S25F | CPS-S40F |
|---|---|---|---|---|---|---|
| øSA | 55 | 68 | 75 | 100 | 120 | 140 |
| øSB | 32 | 45 | 48 | 67 | 81 | 96 |
| SC | 1.55 | 1.55 | 2.05 | 3.05 | 3.05 | 3.05 |
| SD | 43 | 56 | 61 | 82 | 98 | 116 |
| SE | 46 | 59 | 64 | 88 | 106 | 124 |
| øSF | 6 | 6 | 7 | 9 | 11 | 14 |
| øSG | 5 | 5 | 6 | 6 | 7 | 7 |
| Mass | 0.02 kg | 0.02 kg | 0.04 kg | 0.09 kg | 0.13 kg | 0.17 kg |

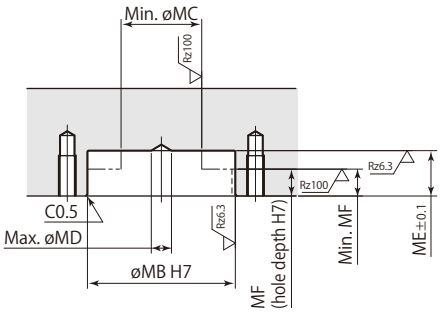
● This diagram indicates dimensions at shipping.

● Adjust thickness of shim by grinding to ensure flatness of pallet.

## Mounting details

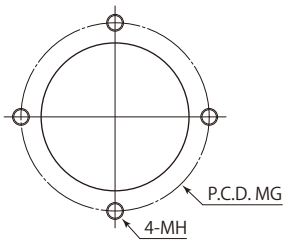



CPS-D03–16F, CPS-E03–40F




CPS-F03–40F

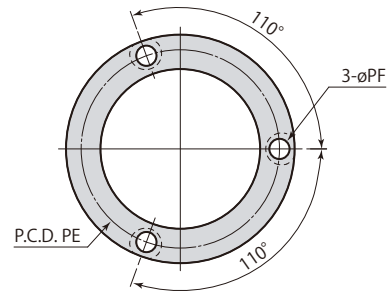
Rz: ISO4287(1997)

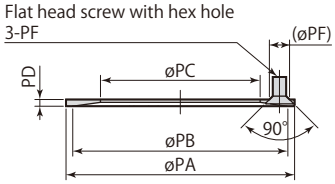



mm

| Model | CPS-□03F | CPS-□06F | CPS-□10F | CPS-□16F | CPS-□25F | CPS-□40F |
|---|---|---|---|---|---|---|
| øMA | 31 $^{+0.003}_{-0.013}$ | 44 $^{+0.003}_{-0.013}$ | 47 $^{+0.003}_{-0.013}$ | 66 $^{+0.004}_{-0.015}$ | 80 $^{+0.004}_{-0.015}$ | 95 $^{+0.004}_{-0.018}$ |
| øMB | 31 $^{+0.025}_{0}$ | 44 $^{+0.025}_{0}$ | 47 $^{+0.025}_{0}$ | 66 $^{+0.030}_{0}$ | 80 $^{+0.030}_{0}$ | 95 $^{+0.035}_{0}$ |
| øMC | 20 | 24 | 28 | 36 | 50 | 60 |
| øMD | 6 | 6 | 8 | 10 | 12 | 15 |
| MG | 43 | 56 | 61 | 82 | 98 | 116 |
| MH | M5 | M5 | M6 | M8 | M10 | M12 |
| **Not using shim (standard specifications)** | | | | | | |
| ME | 10.5 | 13.5 | 14.8 | 19.8 | 23.3 | 25.3 |
| MF | 7.5 | 8 | 9.5 | 11.5 | 13 | 13 |
| **Using shim (shim specifications)** | | | | | | |
| ME | 9 | 12 | 12.8 | 16.8 | 20.3 | 22.3 |
| MF | 6.5 | 6.5 | 7.5 | 8.5 | 10 | 10 |

- Be sure to match up phase of locate ring steel ball grooves and pallet clamp steel balls.
- ▭ dimensions are different from former pallet clamp (model CPC-□□F, CPH-□□F).



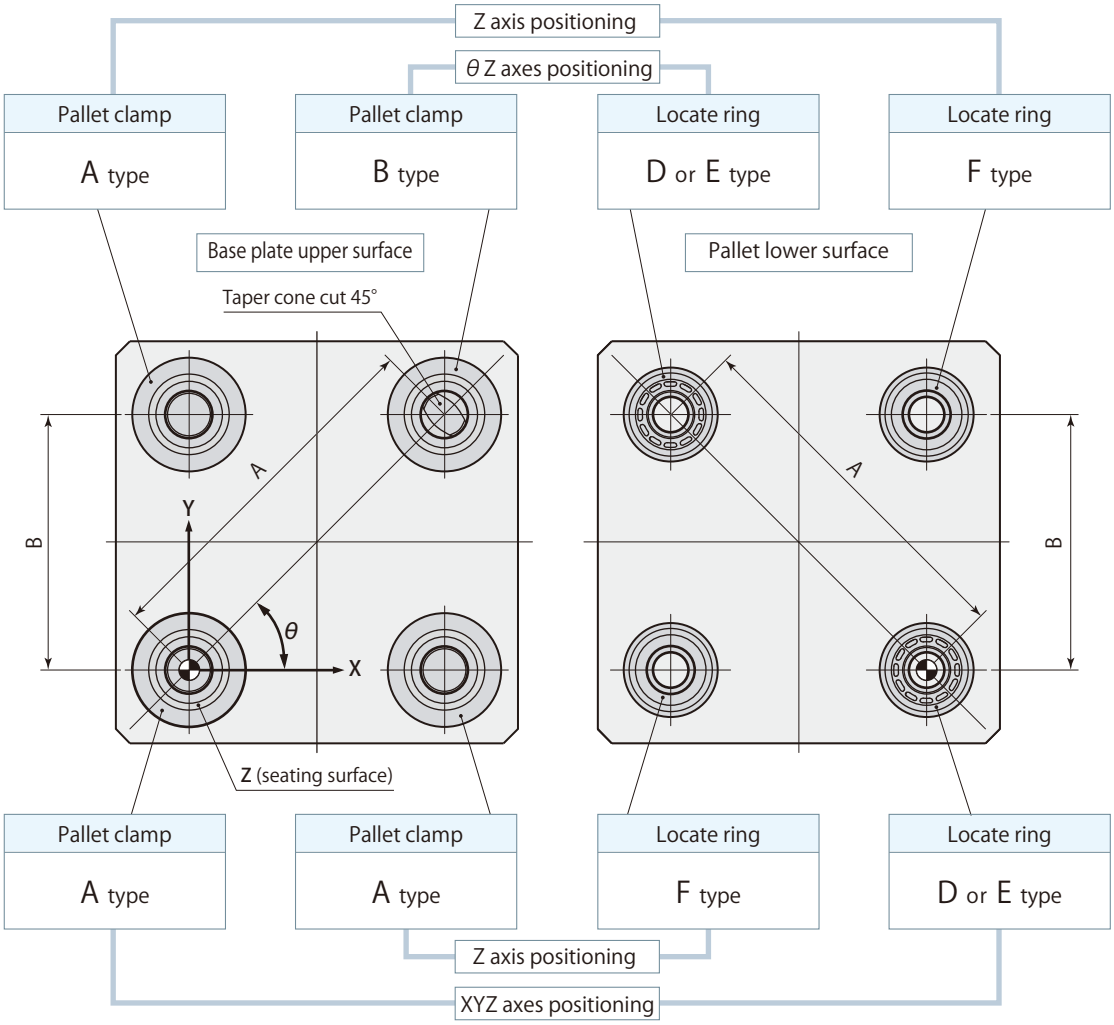




## Protective plate (option)

mm

| Protective plate | CPS-P03F | CPS-P06F | CPS-P10F | CPS-P16F | CPS-P25F | CPS-P40F |
|---|---|---|---|---|---|---|
| øPA | 55 | 68 | 75 | 100 | 120 | 140 |
| øPB | 51 | 64 | 68 | 94 | 114 | 132 |
| øPC | 34.5 | 47.5 | 50.5 | 68.5 | 80.5 | 96.5 |
| PD | 2 | 2 | 2 | 2.5 | 3 | 3 |
| PE | 46 | 59 | 64 | 88 | 106 | 124 |
| øPF | 6 | 6 | 8 | 8 | 9 | 9 |
| Mass | 0.02 kg | 0.02 kg | 0.03 kg | 0.06 kg | 0.1 kg | 0.13 kg |

## Pitch tolerance of Pal system

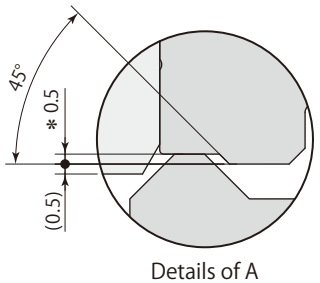



mm

| Model (Size) | 03 | 06 | 10 | 16 | 25 | 40 |
|---|---|---|---|---|---|---|
| Pitch tolerance of A dimensions | ±0.01 | | | ±0.02 | ±0.03 | |
| Pitch tolerance of B dimensions | ±0.03 | | | ±0.04 | ±0.05 | |

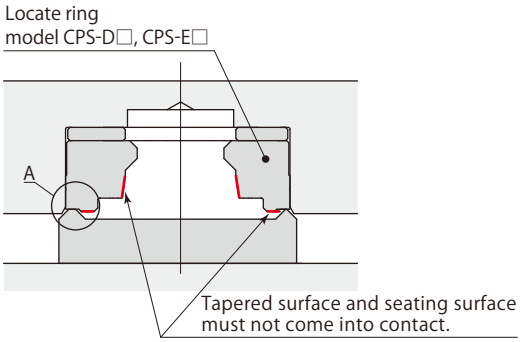
## Method for positioning pallet changer setup table

Internal hole of model CPS-F (Seating surface positioning) can be used for positioning of setup table for pallet change with pallet changer. In order to sustain accuracy, do not allow surfaces other than those of pallet clamp model CPC or model CPH to come into contact with tapered surface or seating surface.

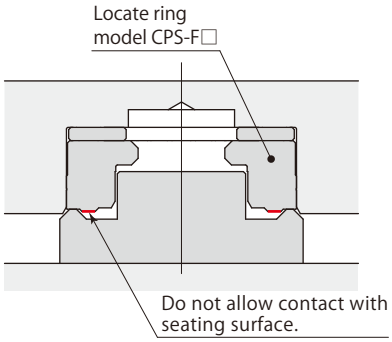



Details of A

Locate ring XYZ axes and θ Z axes positioning



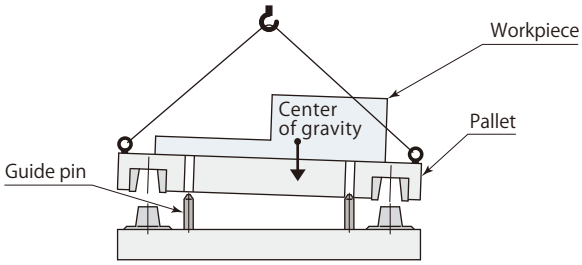

Locate ring Z axis positioning

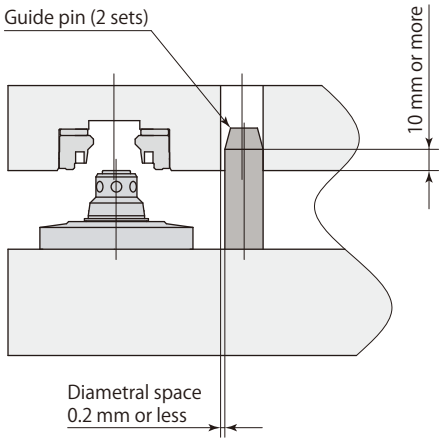



∗: 1mm for CPS-□□F (Locate ring for flange mounting)

## Pallet change

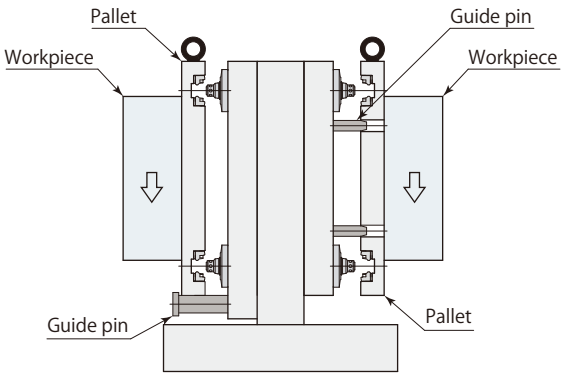
- When pallet changing, the pallet should be mounted or dismounted observing the figures shown in "Max. allowable eccentricity for pallet setting". (Refer to **page →17** (model CPC), **page →23** (model CPH) for max. allowable eccentricity for pallet setting.)
- Ensure that pallet does not lean to the side when pallet mounting or dismounting. When dismounting pallet in particular, pulling while in a tilted condition can damage pallet clamp and locate ring. A guide pin is recommended to prevent the pallet from leaning.

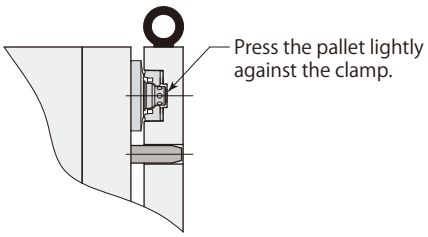



## For vertical mounting of pallet

- A guide pin must be installed when mounting pallet vertically.
- Ensure spacing is set in order to ensure that mounted guide pin does not affect positioning.
- Ensure the pallet is closely contact with the base when it is clamped. Clamping with a space may cause the damage of both of clamp and locate ring.
  (Refer to **page →29** for the height of pallet from base plate when pallet setting.)



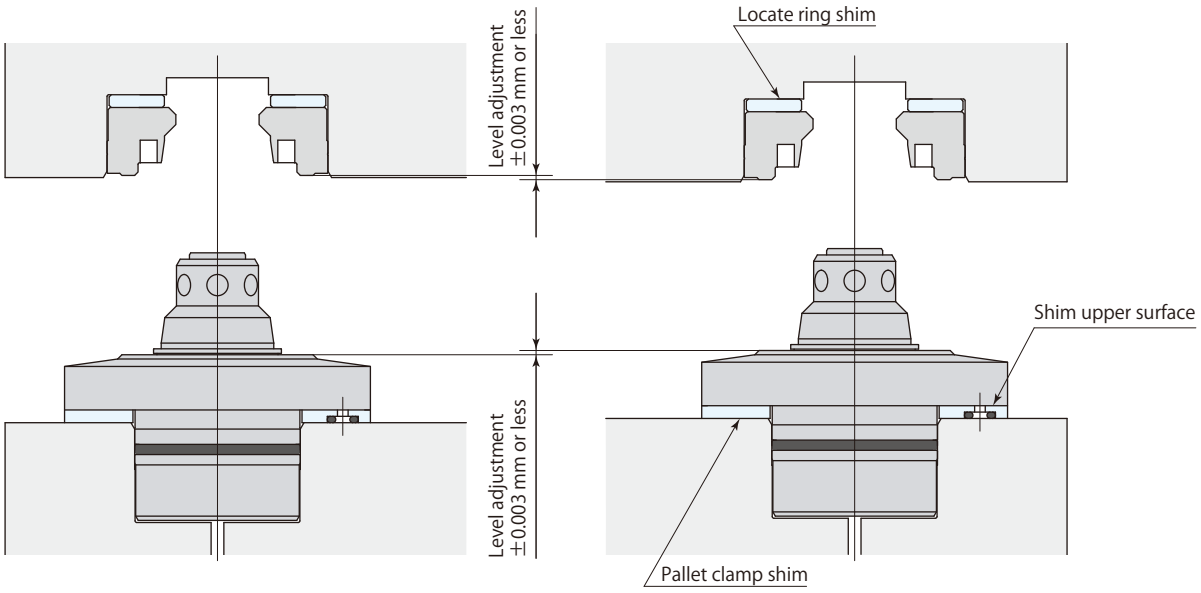
## Level adjustment

### Level adjustment of pallet clamp seating surface

- If level adjustment of pallet clamp seating surface is required, use pallet clamp shim (option). The level can be adjusted by grinding the shim.
- Grind shim upper surface (surface without O-ring).
- The measurement on the seating surface should be performed under the pallet clamped condition without locate rings. (Recommended adjustment figure : ±0.003mm)

### Level adjustment of locate ring seating surface

- If level adjustment of locate ring seating surface is required, use locate ring shim (option). The level can be adjusted by grinding the shim. (Recommended adjustment figure : ±0.003mm)




## Mounting & dismounting of clamp

### Mounting of clamp

①The ring has been mounted on the clamp to avoid taking it apart during the shipment. Remove it after mounting the clamp on the base plate, supplying the hydraulic pressure for unclamping.

②The ring is an important part for dismounting the clamp. Store if for future maintenance.

### Dismounting of clamp

①Mount the ring before dismounting the clamp from the base plate. Supply hydraulic pressure for unclamping to mount it.

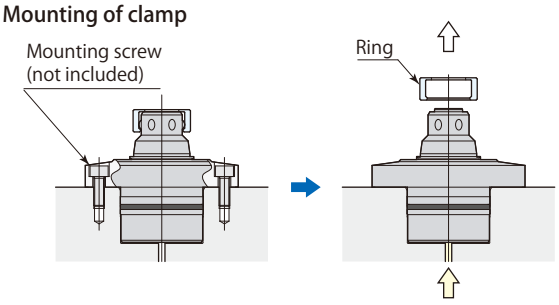
②Drain oil in the circuit and remove the mounting screws.

③Mount the set-screws on the mounting tap to protect the threads and clamp mounting surface.

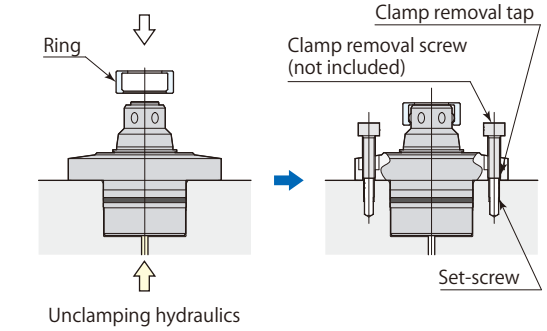
④Mount the clamp removal screw on the clamp removal tap and dismount the clamp.

⑤Retain the clamp upright condition when dismounting it.

**Mounting of clamp**




**Dismounting of clamp**



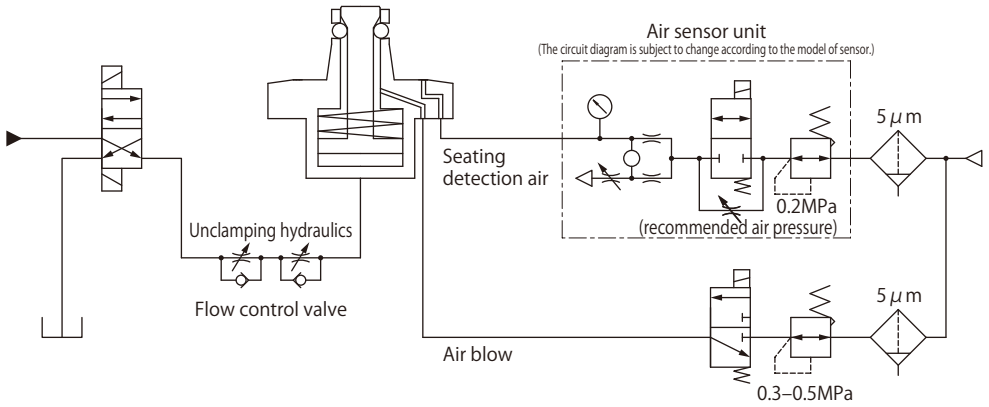
## Air sensor unit recommended condition of use

| | |
|---|---|
| Supplier and model | ISA3-F/G series manufactured by SMC |
| | GPS2-05, GPS3-E series manufactured by CKD |
| Air supply pressure | 0.2 MPa |
| Inner diameter of piping | ø4 mm |
| Overall piping length | 5 m or less |

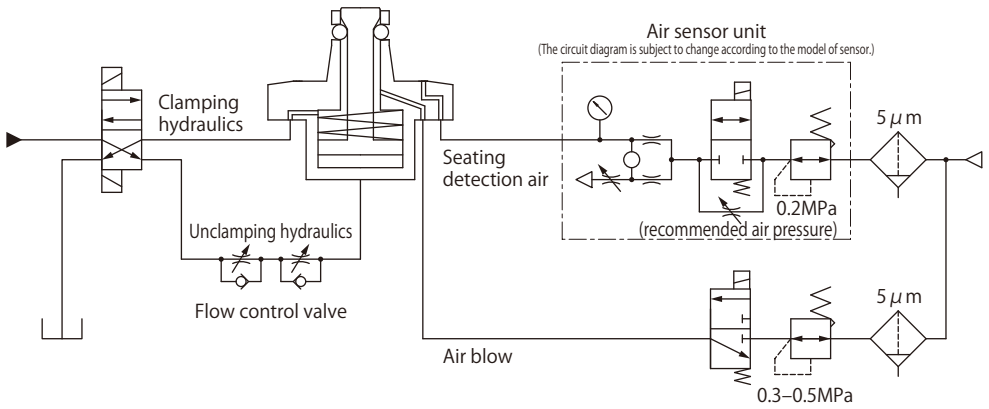
- Supply the dry and filtered air. Particulate size 5 μm or less is recommended.
- Use a solenoid valve with needle for air sensor unit and control it supplying air all the time in order to eliminate intrusion of chips or coolant.
- There is a case that air sensing cannot be made successfully as designed when it is used out of the usage shown on the left. Contact Technical service center for more details.
- Refer to the sensor supplier's instruction manual for the details of setting.
- Sensing performance such as detectable time and pressure differs depending on the supplier and model number of the sensor. Select the right model referring to sensor's application and characteristics.
- Clamp state observation or operating check by the air sensor should be made while air blow is OFF.

## Hydraulic and pneumatic circuit diagram

### Spring clamp model CPC




### Hydraulic clamp model CPH




- Be sure to make inner diameter of air blow circuit 8 mm or more except for clamp mounting surface.
- Adjust full stroking time to be more than 1 second by a flow control valve to avoid impact at the time of clamp or unclamp action.

## Table of contents

# air Pallet clamp

## Dual cylinder model Double acting 0.5 MPa

## model CPY

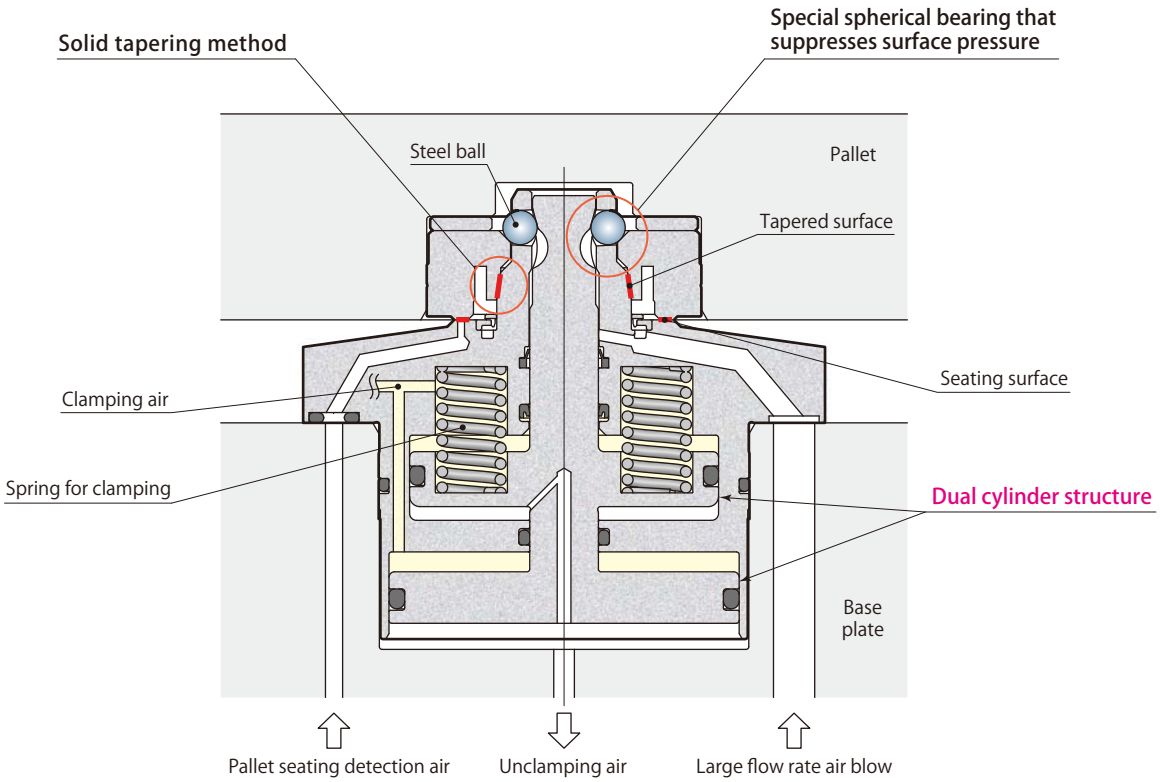
Locate ring
Flange mounting
model CPS-EF

Air pallet clamp Dual cylinder model
model CPY-A

## Dual cylinder model

model **CPY-□□H.**


**Highly rigid pallet clamp and repeatability of 3 μm with dual surface contact**
**Compact downsized compared with the conventional model thanks to dual cylinder structure**



## Specifications

CPY – [Type] [Size] H

Type
- **A** : Taper cone circle
- **B** : Taper cone cut 45°
- **C** : Taper cone cut 90°
- **S** : Shim

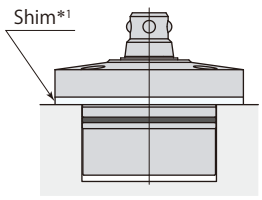
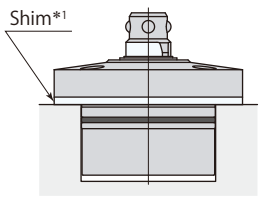
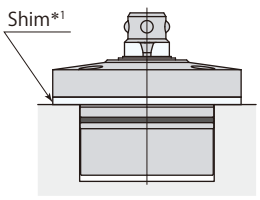
Size: **02** **03** **04** **06** **10**

indicates made to order.

| Model | | | CPY-□02H | CPY-□03H | CPY-□04H | CPY-□06H | CPY-□10H |
|---|---|---|---|---|---|---|---|
| Air pressure range | | MPa | 0.4–0.5 (model CPS-L) | | 0.4–0.5 (model CPS-E) | | |
| | | | 0.25–0.5 (model CPS-D, CPS-F) | | | | |
| Clamping force*1 | Air pressure 0MPa*2 | kN | 0.1 | 0.3 | 0.8 | 1.2 | 1.8 |
| | Air pressure 0.25MPa | kN | 0.9 | 1.5 | 2.4 | 3.7 | 5.8 |
| | Air pressure 0.3MPa | kN | 1.0 | 1.8 | 2.7 | 4.2 | 6.6 |
| | Air pressure 0.4MPa | kN | 1.3 | 2.3 | 3.4 | 5.2 | 8.2 |
| | Air pressure 0.5MPa | kN | 1.7 | 2.7 | 4.0 | 6.1 | 9.8 |
| Clamping force calculation (P: Air pressure MPa)*1 | | | 3.10×P+0.1 | 4.88×P+0.3 | 6.38×P+0.8 | 9.88×P+1.2 | 16.0×P+1.8 |
| Cylinder capacity*1 | Clamp | $cm^3$ | 7.3 | 11.6 | 15.3 | 23.8 | 43.7 |
| | Unclamp | $cm^3$ | 7.7 | 11.9 | 15.6 | 24.4 | 44.7 |
| Full stroke | | mm | 4.4 | 4.4 | 4.4 | 4.4 | 5.0 |
| Max. allowable eccentricity for pallet setting | | mm | ±1.0 | ±1.0 | ±1.0 | ±1.5 | ±2.0 |
| Lift stroke*3 | | mm | 1 | | | | |
| Lift force*1*4 | Air pressure 0.25MPa | kN | 0.3 | 0.4 | 0.2 | 0.5 | 0.8 |
| | Air pressure 0.3MPa | kN | 0.4 | 0.6 | 0.4 | 0.7 | 1.3 |
| | Air pressure 0.4MPa | kN | 0.6 | 0.8 | 0.7 | 1.3 | 2.2 |
| | Air pressure 0.5MPa | kN | 0.8 | 1.1 | 1.1 | 1.9 | 3.1 |
| Lift force calculation (P: Unclamping air pressure MPa)*1*4 | | | 1.74×P-0.10 | 2.71×P-0.25 | 3.55×P-0.68 | 5.56×P-0.92 | 8.94×P-1.39 |
| Max. allowable load (including a pallet)*5 | Horizontal mounting | kN | 2.0 | 2.5 | 3.0 | 8.0 | 15.0 |
| | Vertical mounting | kN | 0.3 | 0.4 | 0.5 | 1.5 | 2.5 |
| Mass*1 | | kg | 0.4 | 0.6 | 0.8 | 1.3 | 2.3 |
| Recommended tightening torque of mounting screws*6 | | N·m | 3.5 | 3.5 | 7 | 7 | 7 |

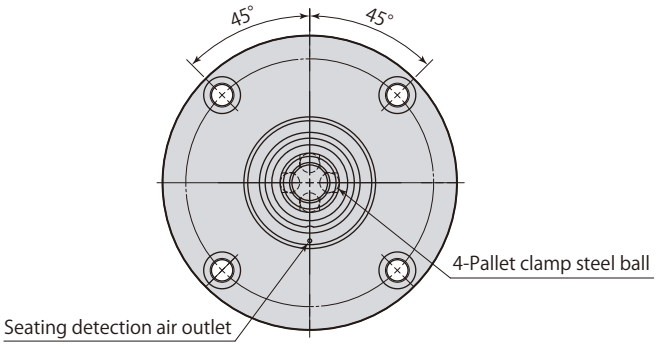
- Proof pressure: 0.75 MPa
- Operating temperature: 0–70 ℃
- Fluid used: Air*7
- Oil supply: Not required
- Recommended air blow pressure: 0.3–0.5 MPa

*1: The figure indicates one piece of clamp. *2: The value indicates the force generated by the spring.
*3: This is the amount for lifting pallet when unclamping.
*4: Set the air pressure for unclamping so that the lift force is equal to or greater than the max. allowable load.
The max. allowable load can be calculated by the formula of lift force×quantity of CPY×0.8.
*5: This is maximum allowable load of pallet, regardless of how many clamps are used.
*6: ISO R898 class 12.9 *7: Supply the dry and filtered air. Particulate size 5 μm or less is recommended.

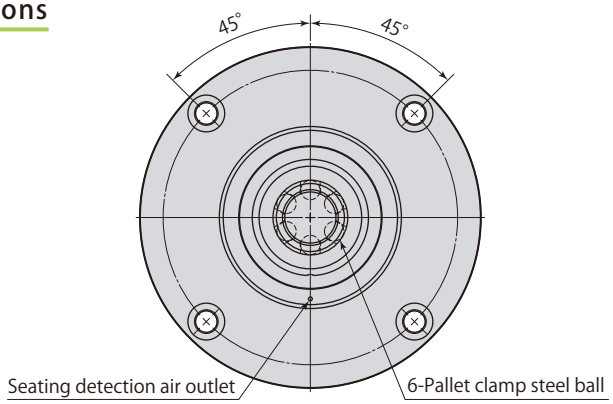
| Pallet clamp type | A Taper cone circle | B*2 Taper cone cut 45° | C*2 Taper cone cut 90° |
|---|---|---|---|
| Air clamp model **CPY** |   model CPY-A□H |   model CPY-B□H |   model CPY-C□H |

*1: Shim of pallet clamp can be used when heights of mounted clamps vary. (option)
*2: Taper cone cut can be selected from B type or C type.

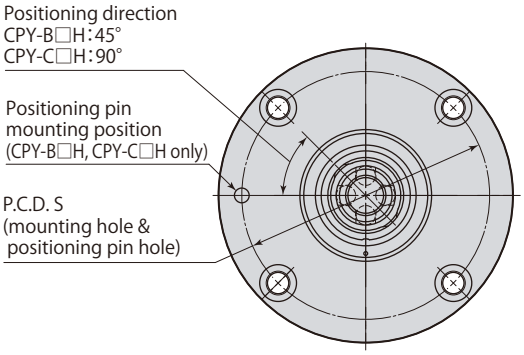
## Dimensions



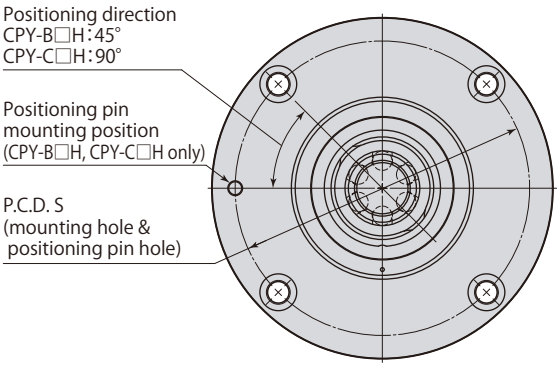

CPY-A02–04H



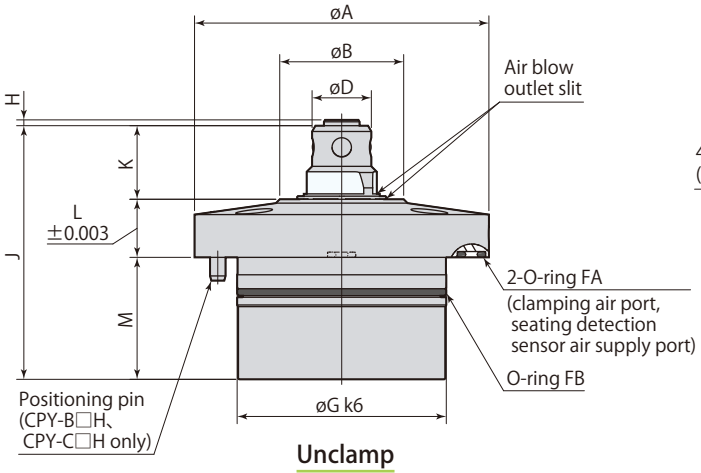

CPY-A06/10H



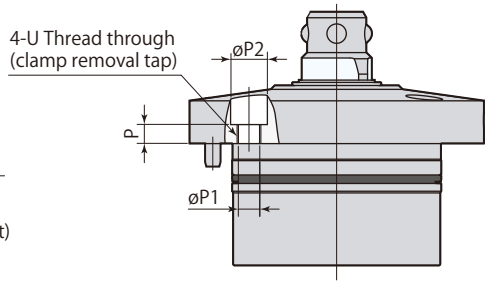

CPY-$^{B}_{C}$02–04H



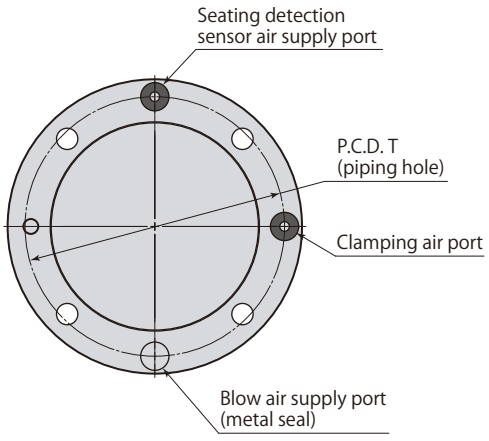

CPY-$^{B}_{C}$06/10H



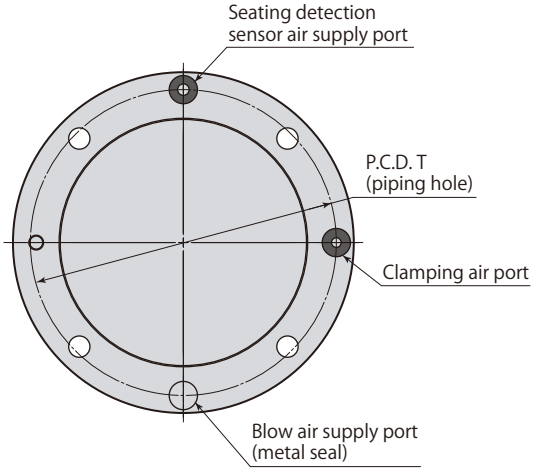

**Unclamp**




**Stroke end**




CPY-□02–04H



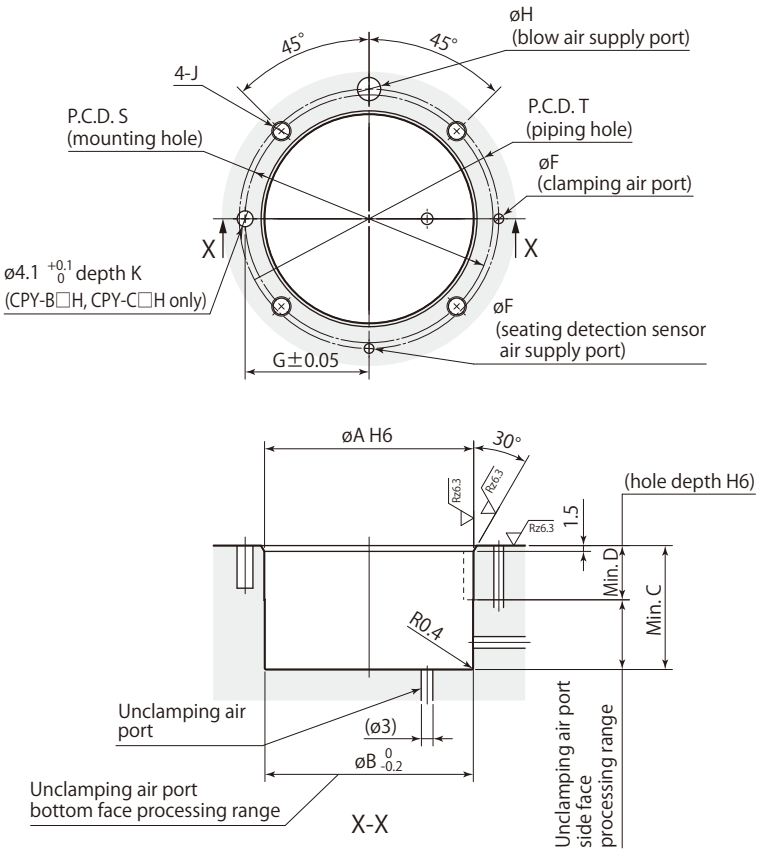

CPY-□06/10H

mm

| Model | CPY-□02H | CPY-□03H | CPY-□04H | CPY-□06H | CPY-□10H |
|---|---|---|---|---|---|
| øA | 59 | 68 | 76 | 88 | 106 |
| øB | 32 | 32 | 32 | 45 | 48 |
| øD | 15.3 | 15.3 | 15.3 | 19.3 | 23 |
| øG | 39 $^{+0.018}_{+0.002}$ | 48 $^{+0.018}_{+0.002}$ | 54 $^{+0.021}_{+0.002}$ | 66 $^{+0.021}_{+0.002}$ | 84 $^{+0.025}_{+0.003}$ |
| H | 1.5 | 1.5 | 1.5 | 1.5 | 1.3 |
| J | 61.5 | 61.5 | 65.5 | 72 | 83.5 |
| K | 19 | 19 | 19 | 22.5 | 26 |
| L | 12 | 12 | 15 | 18 | 22 |
| M | 30.5 | 30.5 | 31.5 | 31.5 | 35.5 |
| P | 4 | 3.5 | 5 | 8 | 11 |
| øP1 | 4.3 | 4.3 | 5.5 | 5.5 | 5.5 |
| øP2 | 8 | 8 | 9.5 | 9.5 | 9.5 |
| S | 49 | 58 | 64 | 76 | 94 |
| T | 50 | 59 | 67 | 79 | 96 |
| U | M5×0.8 | M5×0.8 | M6×1 | M6×1 | M6×1 |
| Positioning pin (dowel pin) | ø4(h8)×10 | ø4(h8)×10 | ø4(h8)×10 | ø4(h8)×10 | ø4(h8)×10 |
| O-ring FA (FKM-90) | P4 | P4 | P4 | P4 | P5 |
| O-ring FB (FKM-90) | AS568-028 | AS568-031 | AS568-033 | AS568-036 | AS568-151 |

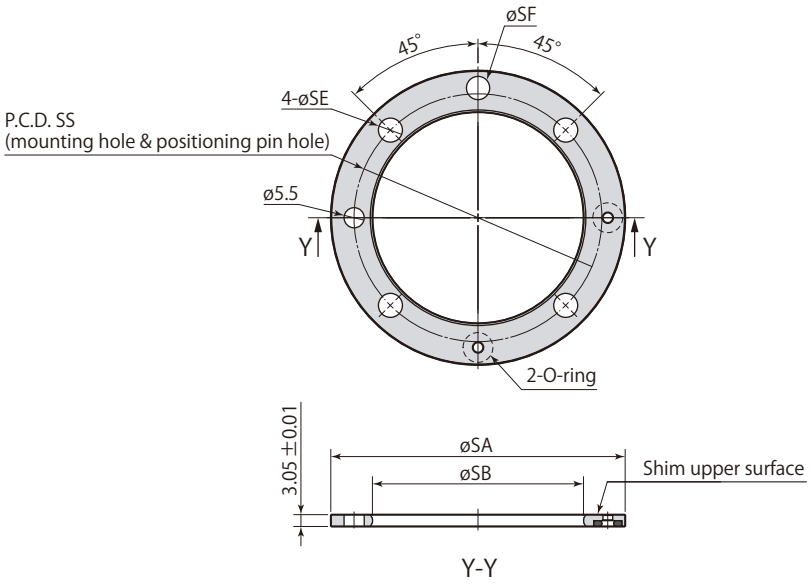
- Be sure to match up phase of pallet clamp steel balls and locate ring steel ball grooves.
- Positioning direction is the direction in which tapered surface has not been cut.
- Use øA, which has been ground at the same time as tapered surface, for positioning measurement after mounting.
- When mounting the pallet clamp, use positioning pin. The positioning pin is packed with a pallet clamp.
- Mounting screws are not included.
- Pal coupler (**pages →80–85**) recommended when using couplers in a set.
- Blow air supply port is metal seal. Air bubbles may come out from the mounting surface due to the air blow, however it is not abnormal.

## Mounting details




Rz: ISO4287(1997)

## Shim (option)



mm

| Model | CPY-□02H | CPY-□03H | CPY-□04H | CPY-□06H | CPY-□10H |
|---|---|---|---|---|---|
| øA | 39 $^{+0.016}_{0}$ | 48 $^{+0.016}_{0}$ | 54 $^{+0.019}_{0}$ | 66 $^{+0.019}_{0}$ | 84 $^{+0.022}_{0}$ |
| øB | 39 | 48 | 54 | 66 | 84 |
| øF | 2.5 | 2.5 | 2.5 | 2.5 | 3 |
| G | 24.5 | 29 | 32 | 38 | 47 |
| øH | 4.5–6 | 4.5–6 | 4.5–6 | 4.5–6 | 5.5–7 |
| J | M4 | M4 | M5 | M5 | M5 |
| S | 49 | 58 | 64 | 76 | 94 |
| T | 50 | 59 | 67 | 79 | 96 |
| **Not using shim (standard specifications)** | | | | | |
| C | 31 | 31 | 32 | 32 | 36 |
| D | 14 | 14 | 14 | 14 | 15 |
| K | 7 | 7 | 7 | 7 | 7 |
| **Using shim (shim specifications)** | | | | | |
| C | 28 | 28 | 29 | 29 | 33 |
| D | 11 | 11 | 11 | 11 | 12 |
| K | 4 | 4 | 4 | 4 | 4 |

- Process with shim specification dimensions when shim is attached.
- Process either bottom or side surface of unclamping air port.
- Be sure to match up phase of pallet clamp steel balls and locate ring steel ball grooves.

mm

| Shim | CPY-S02H | CPY-S03H | CPY-S04H | CPY-S06H | CPY-S10H |
|---|---|---|---|---|---|
| øSA | 59 | 68 | 76 | 88 | 106 |
| øSB | 39.5 | 48.5 | 54.5 | 66.5 | 84.5 |
| øSE | 5.5 | 5.5 | 6.5 | 6.5 | 6.5 |
| øSF | 6 | 6 | 6 | 6 | 7 |
| SS | 49 | 58 | 64 | 76 | 94 |
| O-ring (FKM-90) | P4 | P4 | P4 | P4 | P5 |
| Mass | 0.03kg | 0.04kg | 0.05kg | 0.06kg | 0.07kg |

- This diagram indicates dimensions at shipping.
- Adjust thickness of shim by grinding to ensure flatness of pallet.
- Grind shim upper surface (surface without O-ring) to adjust shim.

## Specifications

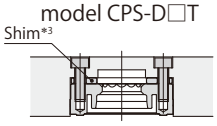
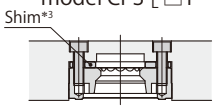
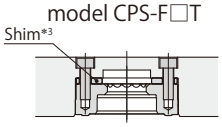
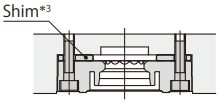
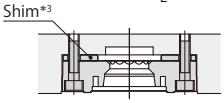
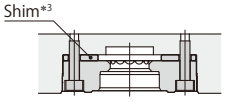
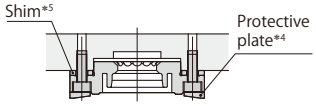
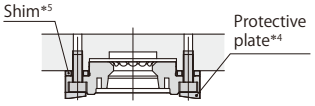
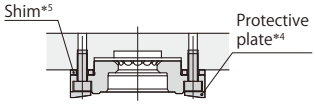
CPS –

| Type | Size | Mounting method |
|---|---|---|
| **D** : Repeatability 10 μm | **03** | **T** : Pallet upper surface mounting |
| **E** : Repeatability 3 μm | **06** | **D** : Pallet lower surface mounting |
| **L** : Repeatability 3 μm*1 | **10** | **F** : Flange mounting |
| **F** : Seating surface positioning (Z axis positioning) | | |
| **S** : Shim | | |
| **P** : Protective plate*2 | | |

indicates made to order.

*1 : model CPS-L (repeatability 3 μm) is available for size 03 only. (Exclusive use for CPY-□02H, CPY-□03H)

*2 : The protective plate is only flange mounting type.

| Locate ring | D*1 Repeatability 10 μm | E or L*1 Repeatability 3 μm | F*2 Seating surface positioning (Z axis positioning) |
|---|---|---|---|
| **T** Pallet upper surface mounting | model CPS-D□T   | model CPS-$^{E}_{L}$□T   | model CPS-F□T   |
| **D** Pallet lower surface mounting | model CPS-D□D   | model CPS-$^{E}_{L}$□D   | model CPS-F□D   |
| **F** Flange mounting | model CPS-D□F   | model CPS-$^{E}_{L}$□F   | model CPS-F□F   |

*1 : model CPS-D (repeatability 10 μm) cannot be used together with model CPS-E or CPS-L (repeatability 3 μm).

*2 : model CPS-F (seating surface positioning) needs the positioning of XY axes.

*3 : It is recommended to use a shim (option) to adjust mounting hole depth for the locate rings for pallet upper surface mounting and lower surface mounting. Grind shim to adjust thickness.

*4 : Protective plate (flange mounting only) can be used to prevent damage of seating surface, when pallet must be placed on the floor, etc. (option)

*5 : Shim of locate ring of flange mounting can be used when heights of mounted locate rings vary. (option)

## Locate ring model correspondence

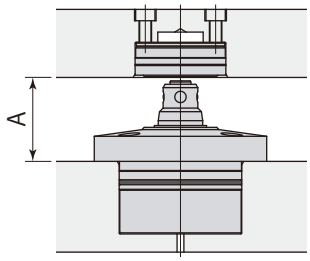
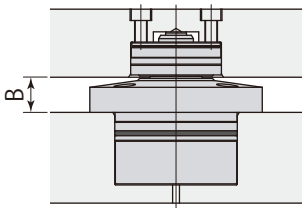
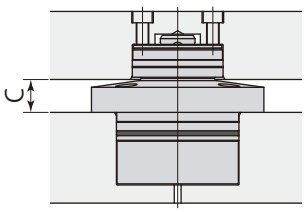
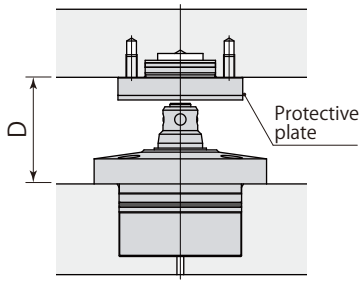
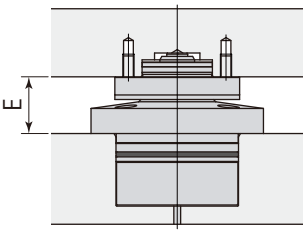
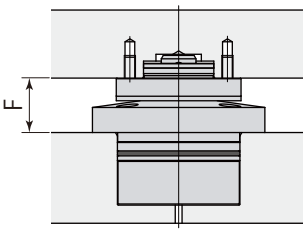
| Pallet clamp | | CPY-□02H | CPY-□03H | CPY-□04H | CPY-□06H | CPY-□10H |
|---|---|---|---|---|---|---|
| Repeatability | 3 μm | CPS-L03□ | | CPS-E03□ | CPS-E06□ | CPS-E10□ |
| | 10 μm | CPS-D03□ | | | CPS-D06□ | CPS-D10□ |
| Seating surface positioning (Z axis positioning) | | CPS-F03□ | | | CPS-F06□ | CPS-F10□ |

## Mass

kg

| Locate ring | | D Repeatability 10 μm | | | E or L Repeatability 3 μm | | | | F Seating surface positioning (Z axis positioning) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| T Pallet upper surface mounting | Model | CPS-D03T | CPS-D06T | CPS-D10T | CPS-L03T | CPS-E03T | CPS-E06T | CPS-E10T | CPS-F03T | CPS-F06T | CPS-F10T |
| | Mass | 0.1 | 0.2 | 0.3 | 0.1 | 0.1 | 0.2 | 0.3 | 0.1 | 0.2 | 0.3 |
| D Pallet lower surface mounting | Model | CPS-D03D | CPS-D06D | CPS-D10D | CPS-L03D | CPS-E03D | CPS-E06D | CPS-E10D | CPS-F03D | CPS-F06D | CPS-F10D |
| | Mass | 0.2 | 0.3 | 0.5 | 0.2 | 0.2 | 0.3 | 0.5 | 0.2 | 0.3 | 0.5 |
| F Flange mounting | Model | CPS-D03F | CPS-D06F | CPS-D10F | CPS-L03F | CPS-E03F | CPS-E06F | CPS-E10F | CPS-F03F | CPS-F06F | CPS-F10F |
| | Mass | 0.1 | 0.2 | 0.3 | 0.1 | 0.1 | 0.2 | 0.3 | 0.1 | 0.2 | 0.4 |

## Height of pallet from base plate

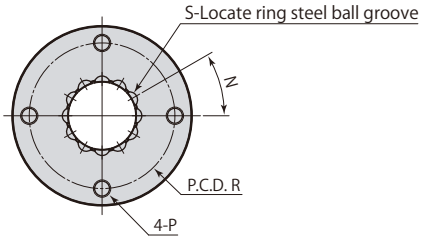
| Locate ring mounting method | Pallet changing | Pallet setting (Unclamp) | Clamp |
|---|---|---|---|
| T Pallet upper surface mounting<br>D Pallet lower surface mounting |  |  |  |
| F Flange mounting |  |  |  |

mm

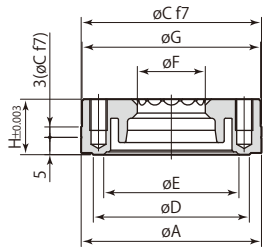
| Pallet clamp | | CPY-□02H | CPY-□03H | CPY-□04H | CPY-□06H | CPY-□10H |
|---|---|---|---|---|---|---|
| T Pallet upper surface mounting<br>D Pallet lower surface mounting | A | Min. 33 | Min. 33 | Min. 36 | Min. 43 | Min. 51 |
| | B | 12.5 | 12.5 | 15.5 | 18.5 | 22.5 |
| | C | 11.5 | 11.5 | 14.5 | 17.5 | 21.5 |
| F Flange mounting | D | Min. 43 | Min. 43 | Min. 46 | Min. 53 | Min. 63 |
| | E | 22 | 22 | 25 | 28.5 | 34.5 |
| | F | 21 | 21 | 24 | 27.5 | 33.5 |

- Pallet lift capacity for dimension A or D or more is needed to change pallet.
- The height from base plate to pallet varies when using shim for pallet clamp or locate ring (flange mounting).

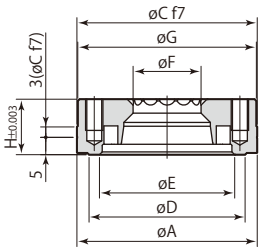
## Dimensions



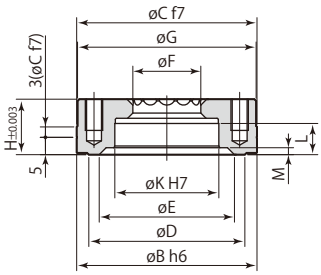

CPS-D03–10T Locate ring (D type)




CPS-E03–10T Locate ring (E type)
CPS-L03T Locate ring (L type)




CPS-F03–10T Locate ring (F type)



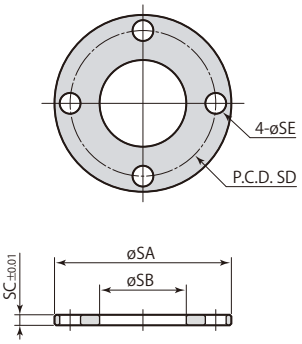

mm

| Model | CPS-□03T | CPS-□06T | CPS-□10T |
|---|---|---|---|
| øA | 40 $^{+0.005}_{-0.011}$ | 52 $^{+0.006}_{-0.013}$ | 60 $^{+0.006}_{-0.013}$ |
| øB | 40 $^{0}_{-0.016}$ | 52 $^{0}_{-0.019}$ | 60 $^{0}_{-0.019}$ |
| øC | 40 $^{-0.025}_{-0.050}$ | 52 $^{-0.030}_{-0.060}$ | 60 $^{-0.030}_{-0.060}$ |
| øD | 32 | 45 | 48 |
| øE | 28 | 39 | 42 |
| øF | 15.6 | 19.6 | 23.3 |
| øG | 39.5 | 51.5 | 59.5 |
| H | 13 | 16 | 20 |
| øK | 22 $^{+0.021}_{0}$ | 30 $^{+0.021}_{0}$ | 32 $^{+0.025}_{0}$ |
| L | 7 | 9 | 11 |
| M | 2 | 2.5 | 2.5 |
| N* | 45° | 30° | 30° |
| P | M5×0.8 depth 6 | M5×0.8 depth 9 | M6×1 depth 11 |
| R | 31 | 42 | 48 |
| S | 8 | 12 | 12 |

∗: Be sure to match up phase of locate ring steel ball grooves and pallet clamp steel balls.

● Mounting screws are not included.

## Shim (option)



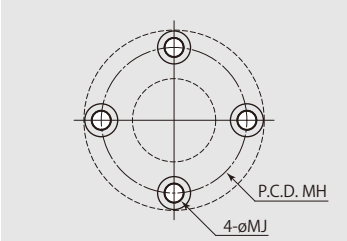

mm

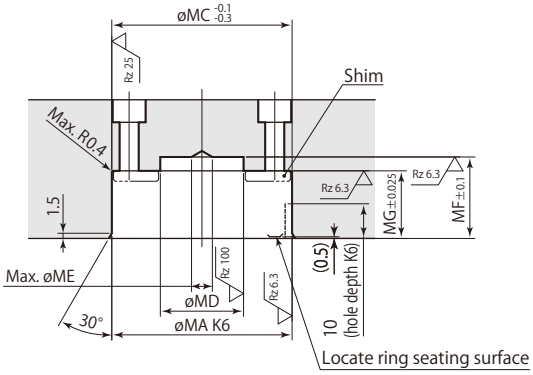
| Shim | CPS-S03T | CPS-S06T | CPS-S10T |
|---|---|---|---|
| øSA | 39 | 51 | 59 |
| øSB | 21 | 25 | 33 |
| SC | 2.05 | 3.05 | 3.05 |
| SD | 31 | 42 | 48 |
| øSE | 6 | 6 | 7 |
| Mass | 0.01 kg | 0.03 kg | 0.04 kg |

● This diagram indicates dimensions at shipping.

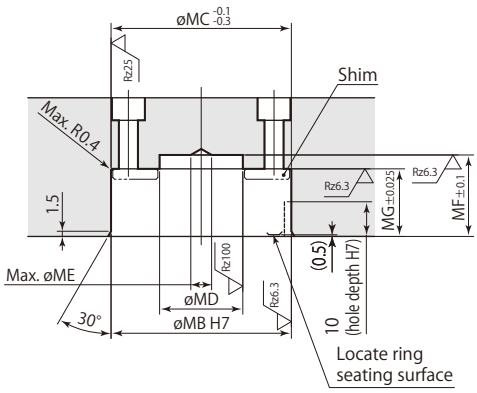
● Adjust thickness of shim by grinding to ensure flatness of pallet.

## Mounting details




CPS-D03–10T, CPS-E03–10T, CPS-L03T




CPS-F03–10T

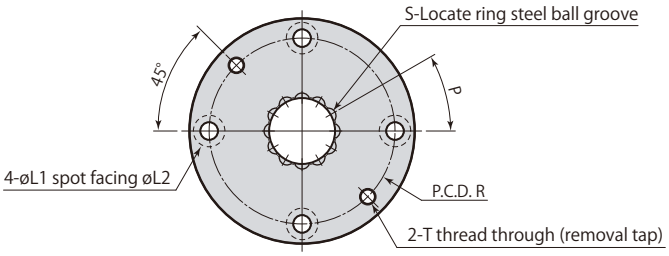
Rz: ISO4287(1997)

mm

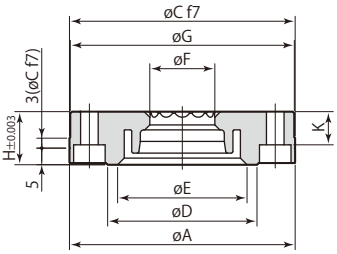
| Model | CPS-□03T | CPS-□06T | CPS-□10T |
|---|---|---|---|
| øMA | 40 $^{+0.003}_{-0.013}$ | 52 $^{+0.004}_{-0.015}$ | 60 $^{+0.004}_{-0.015}$ |
| øMB | 40 $^{+0.025}_{0}$ | 52 $^{+0.030}_{0}$ | 60 $^{+0.030}_{0}$ |
| øMC | 40 | 52 | 60 |
| øMD | 20 | 24 | 28 |
| øME | 6 | 6 | 8 |
| MF | 20 | 23.5 | 26.8 |
| MG | 15.5 | 19.5 | 23.5 |
| MH | 31 | 42 | 48 |
| øMJ | 5.5 | 5.5 | 6.6 |

● Be sure to match up phase of locate ring steel ball grooves and pallet clamp steel balls.

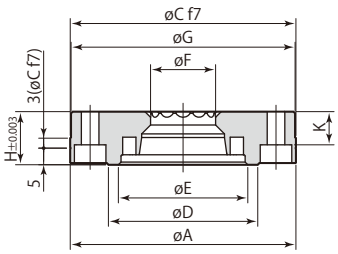
## Dimensions



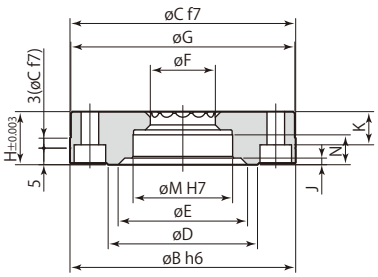

**CPS-D03–10D Locate ring (D type)**




**CPS-E03–10D Locate ring (E type)**
**CPS-L03D Locate ring (L type)**




**CPS-F03–10D Locate ring (F type)**



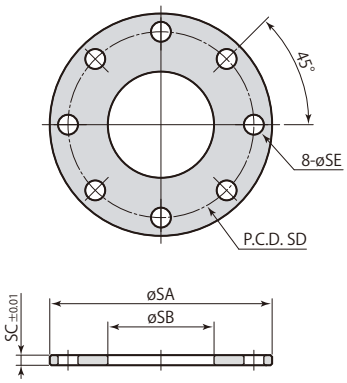

mm

| Model | CPS-□03D | CPS-□06D | CPS-□10D |
|---|---|---|---|
| øA | 55 $^{+0.006}_{-0.013}$ | 68 $^{+0.006}_{-0.013}$ | 75 $^{+0.006}_{-0.013}$ |
| øB | 55 $^{0}_{-0.019}$ | 68 $^{0}_{-0.019}$ | 75 $^{0}_{-0.019}$ |
| øC | 55 $^{-0.030}_{-0.060}$ | 68 $^{-0.030}_{-0.060}$ | 75 $^{-0.030}_{-0.060}$ |
| øD | 32 | 45 | 48 |
| øE | 28 | 39 | 42 |
| øF | 15.6 | 19.6 | 23.3 |
| øG | 54.5 | 67.5 | 74.5 |
| H | 13 | 16 | 20 |
| J | 2 | 2.5 | 2.5 |
| K | 7 | 10 | 13 |
| øL1 | 5.3 | 5.3 | 6.8 |
| øL2 | 9.5 | 9.5 | 11 |
| øM | 22 $^{+0.021}_{0}$ | 30 $^{+0.021}_{0}$ | 32 $^{+0.025}_{0}$ |
| N | 7 | 9 | 11 |
| P* | 45° | 30° | 30° |
| R | 43 | 56 | 61 |
| S | 8 | 12 | 12 |
| T | M5×0.8 | M5×0.8 | M6×1 |

∗: Be sure to match up phase of locate ring steel ball grooves and pallet clamp steel balls.

● Mounting screws are not included.

## Shim (option)



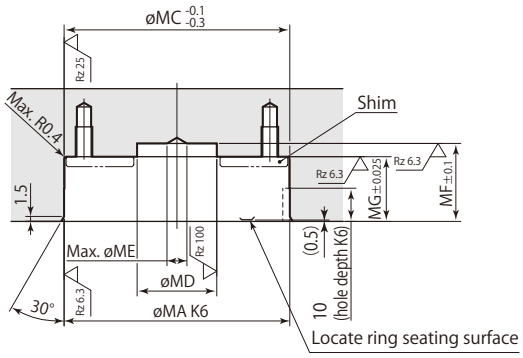

mm

| Shim | CPS-S03D | CPS-S06D | CPS-S10D |
|---|---|---|---|
| øSA | 54 | 67 | 74 |
| øSB | 24 | 32 | 39 |
| SC | 2.05 | 3.05 | 3.05 |
| SD | 43 | 56 | 61 |
| øSE | 6 | 6 | 7 |
| Mass | 0.06 kg | 0.06 kg | 0.07 kg |

● This diagram indicates dimensions at shipping.

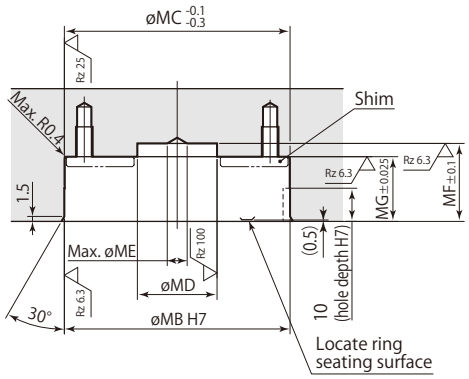
● Adjust thickness of shim by grinding to ensure flatness of pallet.

## Mounting details

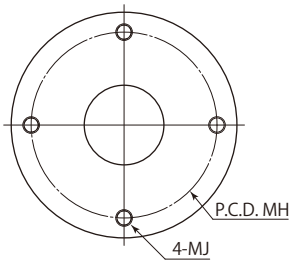



CPS-D03–10D, CPS-E03–10D, CPS-L03D

Rz: ISO4287(1997)




CPS-F03–10D

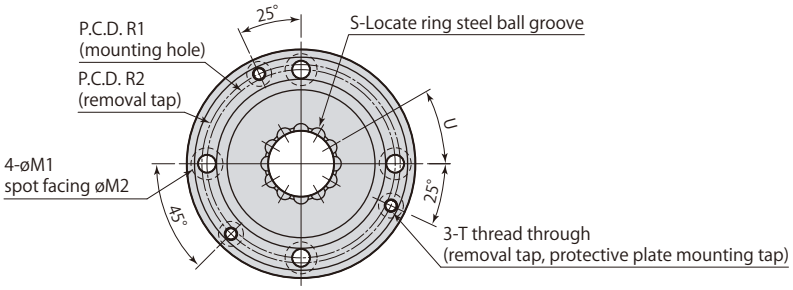



mm

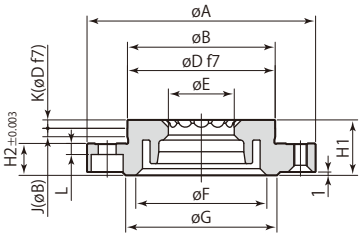
| Model | CPS-□03D | CPS-□06D | CPS-□10D |
|---|---|---|---|
| øMA | 55 $^{+0.004}_{-0.015}$ | 68 $^{+0.004}_{-0.015}$ | 75 $^{+0.004}_{-0.015}$ |
| øMB | 55 $^{+0.025}_{0}$ | 68 $^{+0.030}_{0}$ | 75 $^{+0.030}_{0}$ |
| øMC | 55 | 68 | 75 |
| øMD | 20 | 24 | 28 |
| øME | 6 | 6 | 8 |
| MF | 20 | 23.5 | 26.8 |
| MG | 15.5 | 19.5 | 23.5 |
| MH | 43 | 56 | 61 |
| MJ | M5 | M5 | M6 |

● Be sure to match up phase of locate ring steel ball grooves and pallet clamp steel balls.

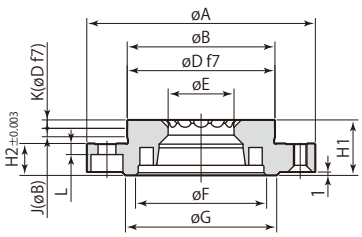
## Dimensions



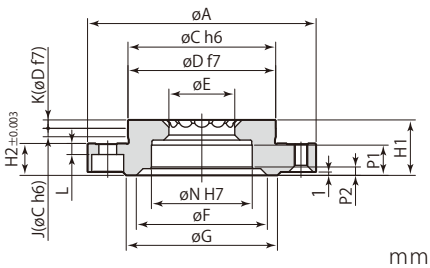

### CPS-D03–10F Locate ring (D type)




### CPS-E03–10F Locate ring (E type)
### CPS-L03F Locate ring (L type)




### CPS-F03–10F Locate ring (F type)



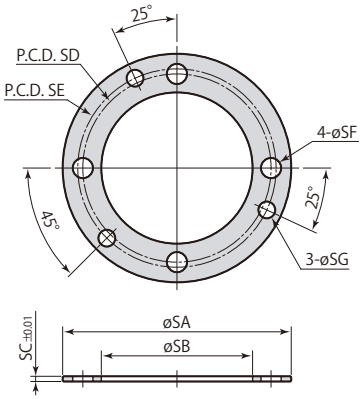

mm

| Model | CPS-□03F | CPS-□06F | CPS-□10F |
|---|---|---|---|
| øA | 55 | 68 | 75 |
| øB | 31 $^{+0.005}_{-0.011}$ | 44 $^{+0.005}_{-0.011}$ | 47 $^{+0.005}_{-0.011}$ |
| øC | 31 $^{0}_{-0.016}$ | 44 $^{0}_{-0.016}$ | 47 $^{0}_{-0.016}$ |
| øD | 31 $^{-0.025}_{-0.050}$ | 44 $^{-0.025}_{-0.050}$ | 47 $^{-0.025}_{-0.050}$ |
| øE | 15.6 | 19.6 | 23.3 |
| øF | 28 | 39 | 42 |
| øG | 32 | 45 | 48 |
| H1 | 15.5 | 16.5 | 20 |
| H2 | 9 | 9.5 | 11.5 |
| J | 2.4 | 2.5 | 3.2 |
| K | 2.1 | 2.5 | 2.8 |
| L | 2.8 | 3.3 | 4.2 |
| øM1 | 5.3 | 5.3 | 6.8 |
| øM2 | 9.5 | 9.5 | 11 |
| øN | 22 $^{+0.021}_{0}$ | 30 $^{+0.021}_{0}$ | 32 $^{+0.025}_{0}$ |
| P1 | 7 | 9 | 11 |
| P2 | 2 | 2.5 | 2.5 |
| R1 | 43 | 56 | 61 |
| R2 | 46 | 59 | 64 |
| S | 8 | 12 | 12 |
| T | M4×0.7 | M4×0.7 | M5×0.8 |
| U* | 45° | 30° | 30° |

∗:Be sure to match up phase of locate ring steel ball grooves and pallet clamp steel balls.

● Mounting screws are not included.

## Shim (option)



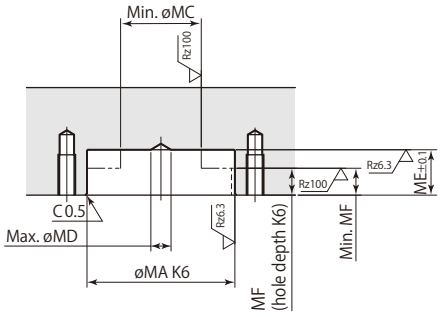

mm

| Shim | CPS-S03F | CPS-S06F | CPS-S10F |
|---|---|---|---|
| øSA | 55 | 68 | 75 |
| øSB | 32 | 45 | 48 |
| SC | 1.55 | 1.55 | 2.05 |
| SD | 43 | 56 | 61 |
| SE | 46 | 59 | 64 |
| øSF | 6 | 6 | 7 |
| øSG | 5 | 5 | 6 |
| Mass | 0.02 kg | 0.02 kg | 0.04 kg |

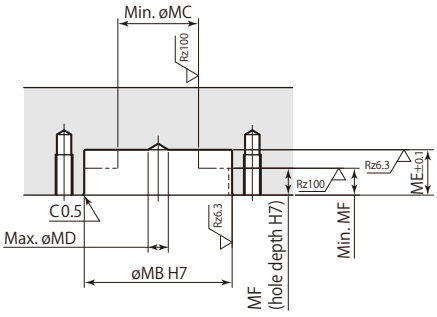
● This diagram indicates dimensions at shipping.

● Adjust thickness of shim by grinding to ensure flatness of pallet.

## Mounting details

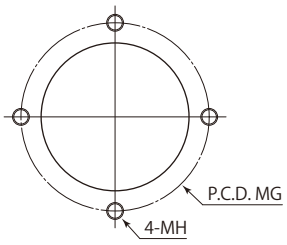



CPS-D03–10F, CPS-E03–10F, CPS-L03F




CPS-F03–10F

Rz: ISO4287(1997)

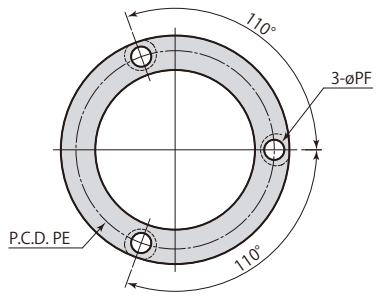


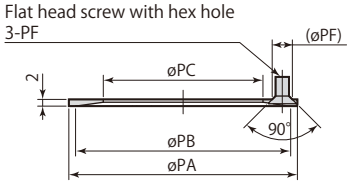

mm

| Model | CPS-□03F | CPS-□06F | CPS-□10F |
|---|---|---|---|
| øMA | 31 $^{+0.003}_{-0.013}$ | 44 $^{+0.003}_{-0.013}$ | 47 $^{+0.003}_{-0.013}$ |
| øMB | 31 $^{+0.025}_{0}$ | 44 $^{+0.025}_{0}$ | 47 $^{+0.025}_{0}$ |
| øMC | 20 | 24 | 28 |
| øMD | 6 | 6 | 8 |
| MG | 43 | 56 | 61 |
| MH | M5 | M5 | M6 |
| **Not using shim (standard specifications)** | | | |
| ME | 10.5 | 13.5 | 14.8 |
| MF | 7.5 | 8 | 9.5 |
| **Using shim (shim specifications)** | | | |
| ME | 9 | 12 | 12.8 |
| MF | 6.5 | 6.5 | 7.5 |

● Be sure to match up phase of locate ring steel ball grooves and pallet clamp steel balls.

## Protective plate (option)

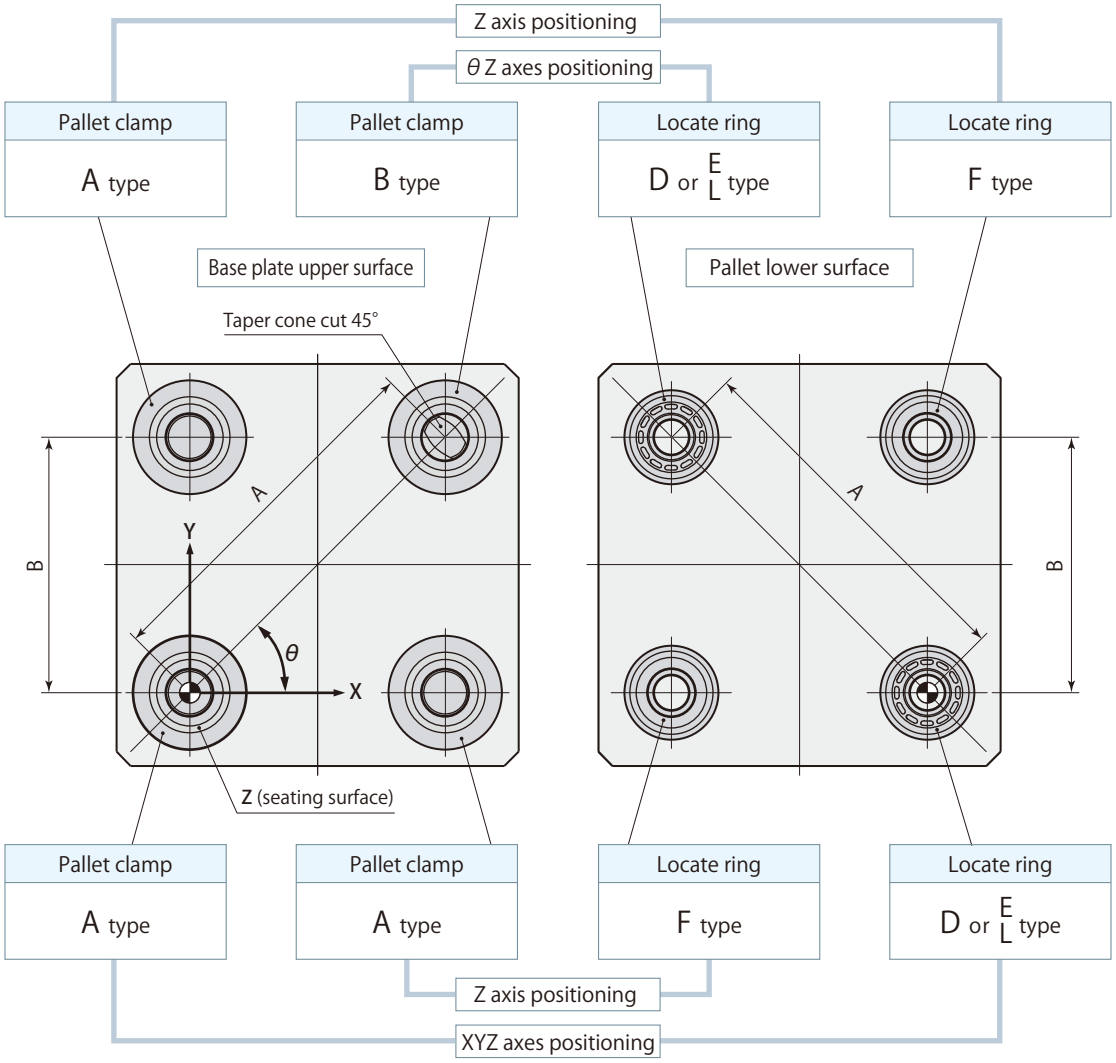



mm

| Protective plate | CPS-P03F | CPS-P06F | CPS-P10F |
|---|---|---|---|
| øPA | 55 | 68 | 75 |
| øPB | 51 | 64 | 68 |
| øPC | 34.5 | 47.5 | 50.5 |
| PE | 46 | 59 | 64 |
| øPF | 6 | 6 | 8 |
| Mass | 0.02 kg | 0.02 kg | 0.03 kg |

## Pitch tolerance of Pal system

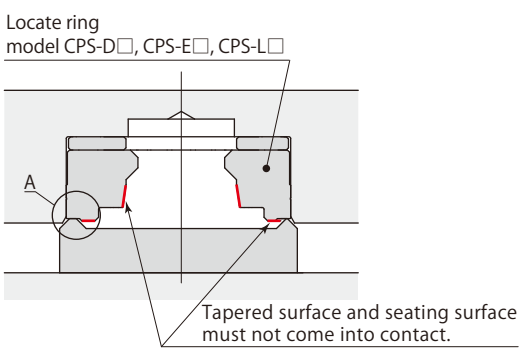



| | |
|---|---|
| Pitch tolerance of A dimensions | ±0.01 mm |
| Pitch tolerance of B dimensions | ±0.03 mm |

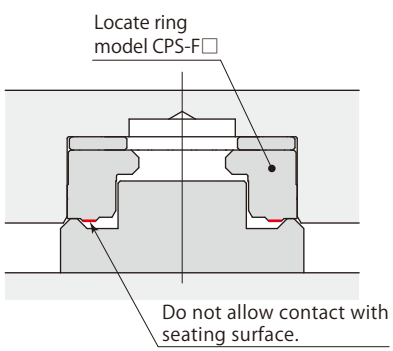
## Method for positioning pallet changer setup table

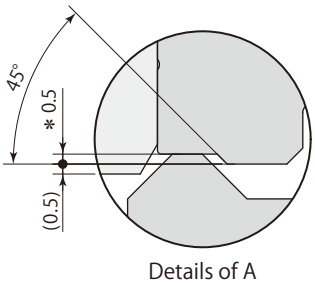
Internal hole of model CPS-F (Seating surface positioning) can be used for positioning of setup table for pallet change with pallet changer. In order to sustain accuracy, do not allow surfaces other than those of pallet clamp model CPY to come into contact with tapered surface or seating surface.

Locate ring XYZ axes and θ Z axes positioning




Locate ring Z axis positioning



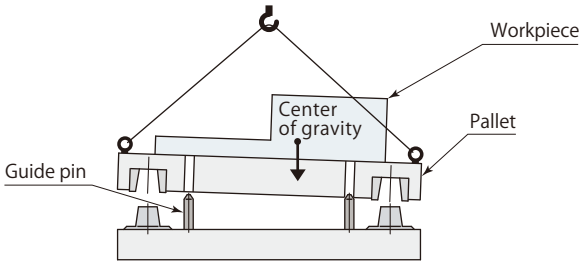



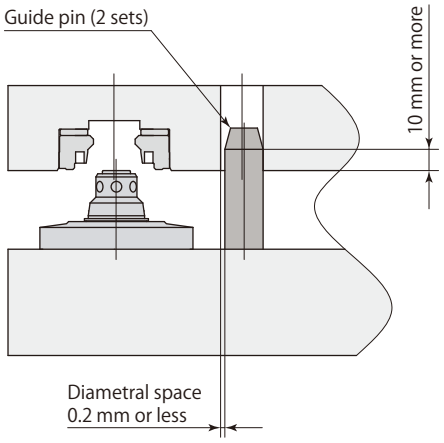

Details of A

∗: 1mm for CPS-□□F (Locate ring for flange mounting)

## Pallet change

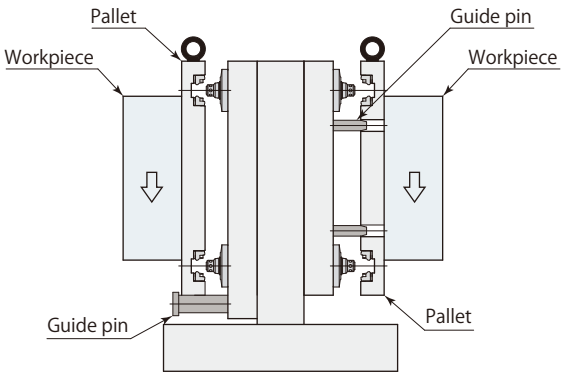
- When pallet changing, the pallet should be mounted or dismounted observing the figures shown in "Max. allowable eccentricity for pallet setting". (Refer to **page →43** for max. allowable eccentricity for pallet setting.)
- Ensure that pallet does not lean to the side when pallet mounting or dismounting. When dismounting pallet in particular, pulling while in a tilted condition can damage pallet clamp and locate ring. A guide pin is recommended to prevent the pallet from leaning.

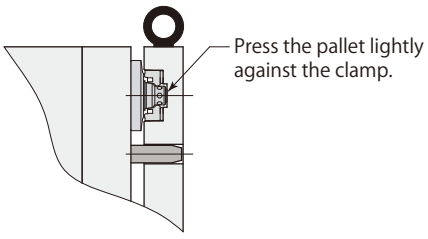



## For vertical mounting of pallet

- A guide pin must be installed when mounting pallet vertically.
- Ensure spacing is set in order to ensure that mounted guide pin does not affect positioning.
- Ensure the pallet is closely contact with the base when it is clamped. Clamping with a space may cause the damage of both of clamp and locate ring.
  (Refer to **page →49** for the height of pallet from base plate when pallet setting.)



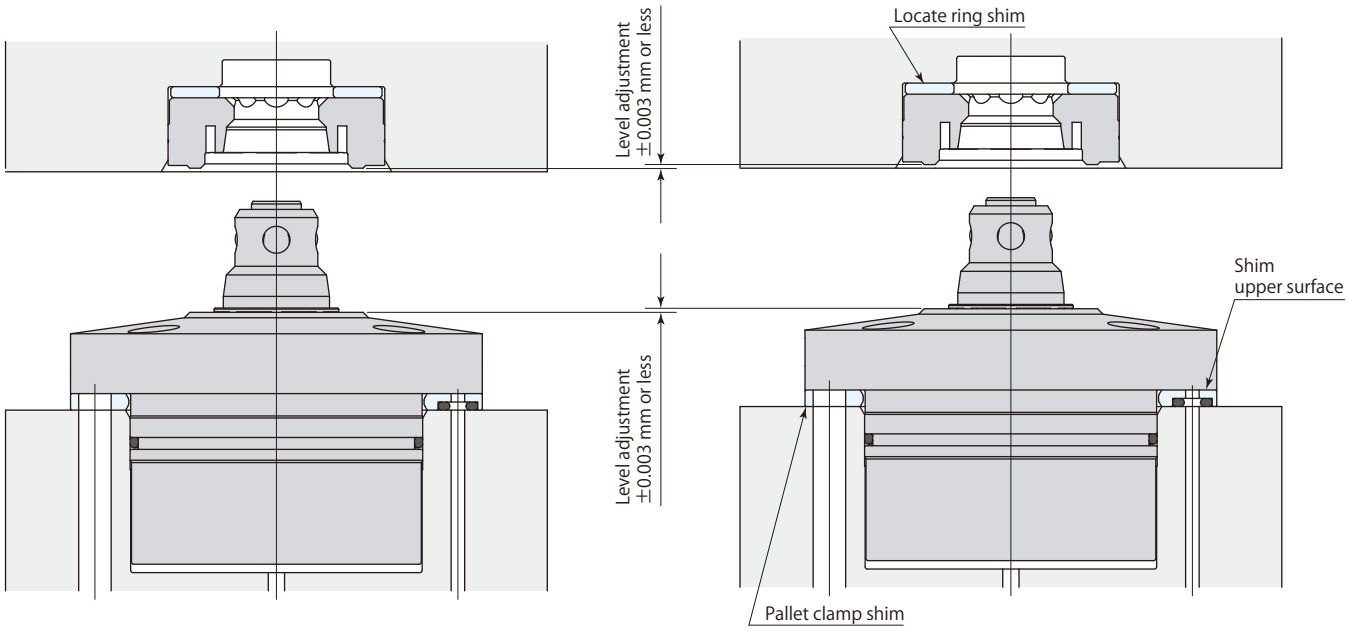
## Level adjustment

### Level adjustment of pallet clamp seating surface

- If level adjustment of pallet clamp seating surface is required, use pallet clamp shim (option). The level can be adjusted by grinding the shim.
- Grind shim upper surface (surface without O-ring).
- The measurement on the seating surface should be performed under the pallet clamped condition without locate rings. (Recommended adjustment figure : ±0.003mm)

### Level adjustment of locate ring seating surface

- If level adjustment of locate ring seating surface is required, use locate ring shim (option). The level can be adjusted by grinding the shim. (Recommended adjustment figure : ±0.003mm)



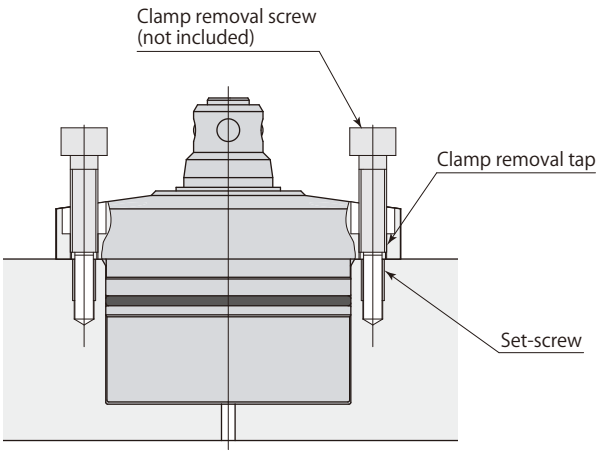

## Dismounting of clamp

### Dismounting of clamp

①Mount the set-screws on the mounting tap to protect the threads and clamp mounting surface.

②Mount the clamp removal screw on the clamp removal tap and dismount the clamp.

③Retain the clamp upright condition when dismounting it.

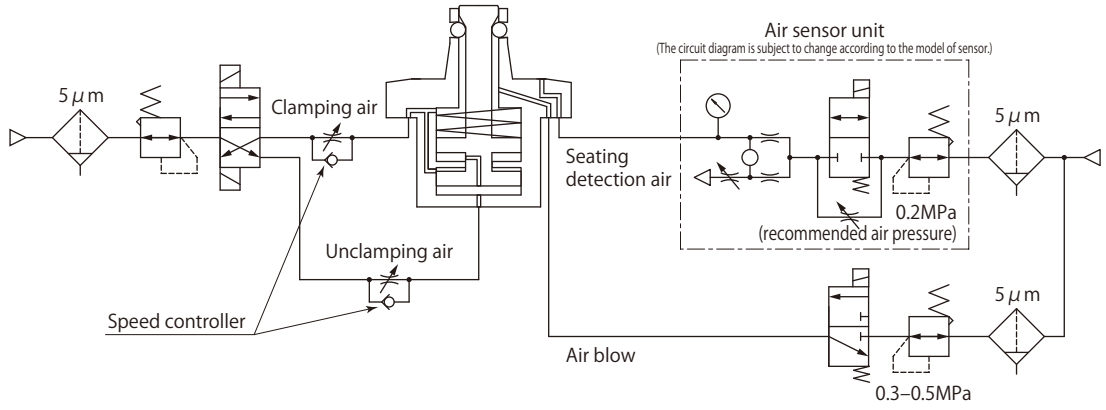


## Air sensor unit recommended condition of use

| | |
|---|---|
| Supplier and model | ISA3-F/G series manufactured by SMC |
| | GPS2-05, GPS3-E series manufactured by CKD |
| Air supply pressure | 0.2 MPa |
| Inner diameter of piping | ø4 mm |
| Overall piping length | 5 m or less |

- Supply the dry and filtered air. Particulate size 5 μm or less is recommended.
- Use a solenoid valve with needle for air sensor unit and control it supplying air all the time in order to eliminate intrusion of chips or coolant.
- There is a case that air sensing cannot be made successfully as designed when it is used out of the usage shown on the left. Contact Technical service center for more details.
- Refer to the sensor supplier's instruction manual for the details of setting.
- Sensing performance such as detectable time and pressure differs depending on the supplier and model number of the sensor. Select the right model referring to sensor's application and characteristics.
- Clamp state observation or operating check by the air sensor should be made while air blow is OFF.

## Pneumatic circuit diagram




- Be sure to make inner diameter of air blow circuit 8 mm or more except for clamp mounting surface.
- Adjust full stroking time to be more than 1 second by a speed controller to avoid impact at the time of clamp or unclamp action.

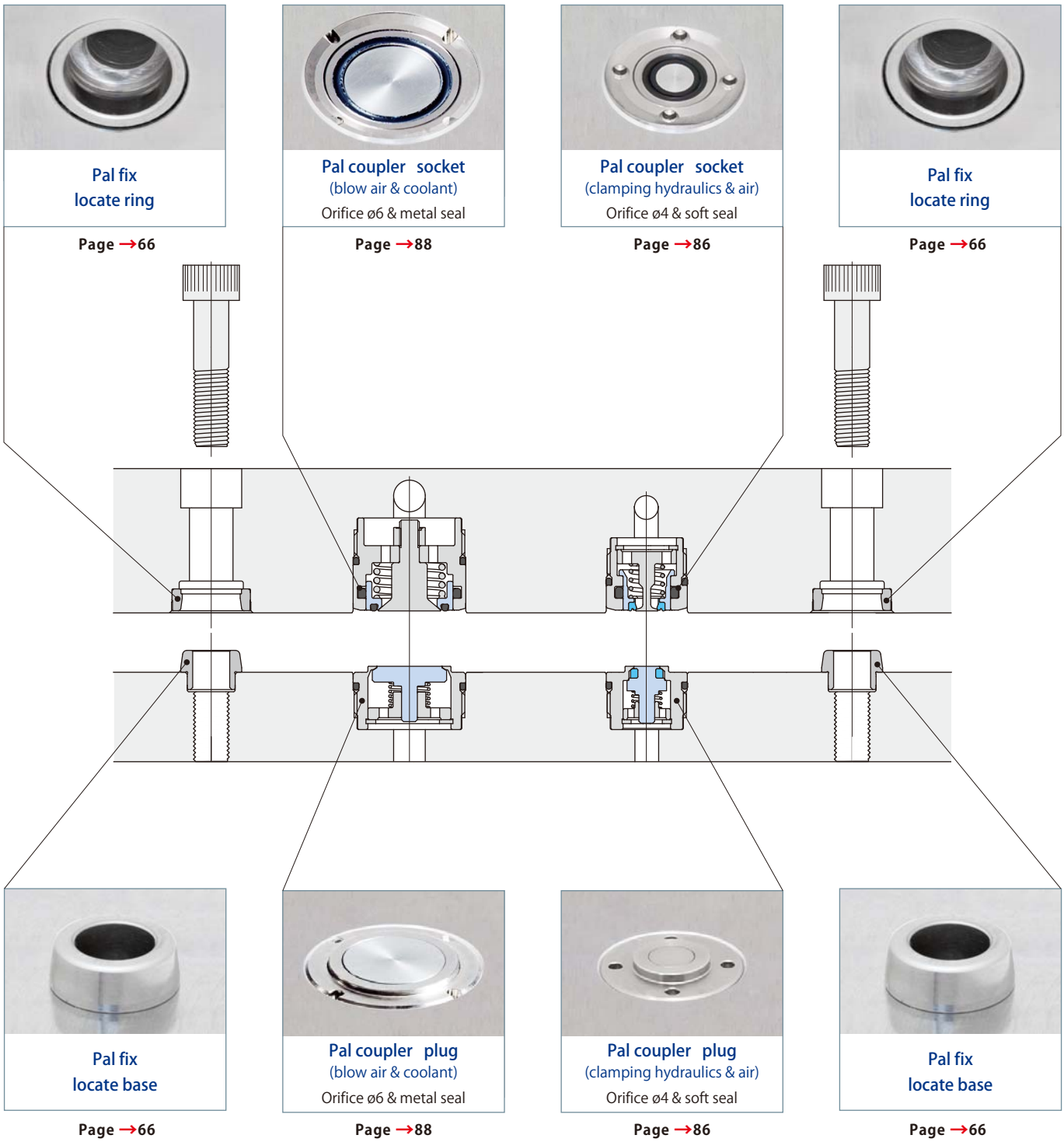
## Table of contents

# Pal fix

## Manual clamp

## model CPK

## Super-compact locating device makes you utilize a working space to the full.



Pal fix
locate ring

Page →66

Pal coupler socket
(blow air & coolant)
Orifice ø6 & metal seal

Page →88

Pal coupler socket
(clamping hydraulics & air)
Orifice ø4 & soft seal

Page →86

Pal fix
locate ring

Page →66

Pal fix
locate base

Page →66

Pal coupler plug
(blow air & coolant)
Orifice ø6 & metal seal

Page →88

Pal coupler plug
(clamping hydraulics & air)
Orifice ø4 & soft seal

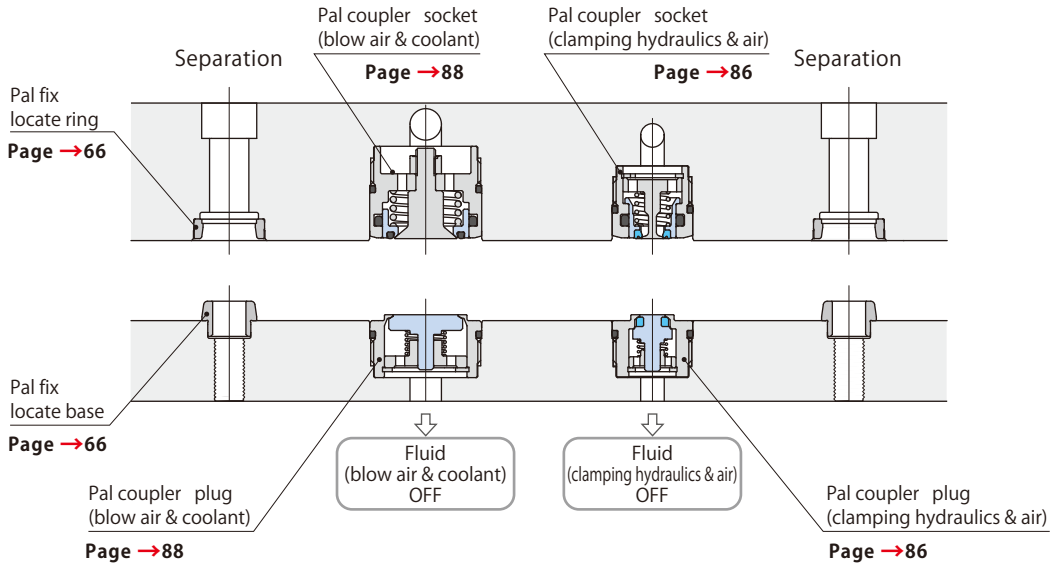
Page →86

Pal fix
locate base

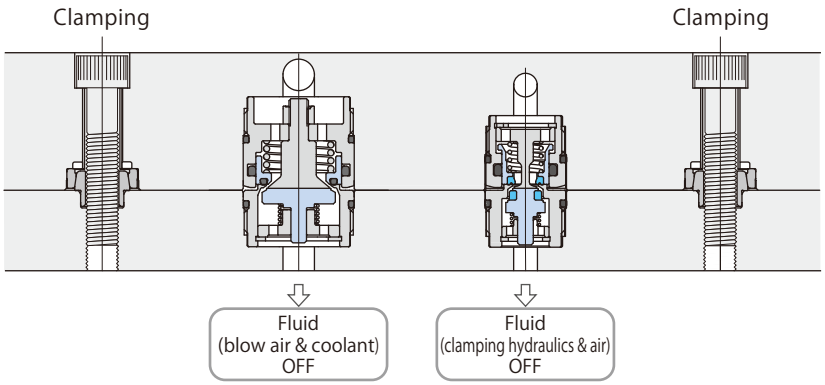
Page →66

## It is a taper cone model with dual surface contact to position high-accuracy.

## Pallet change and coupler disconnected

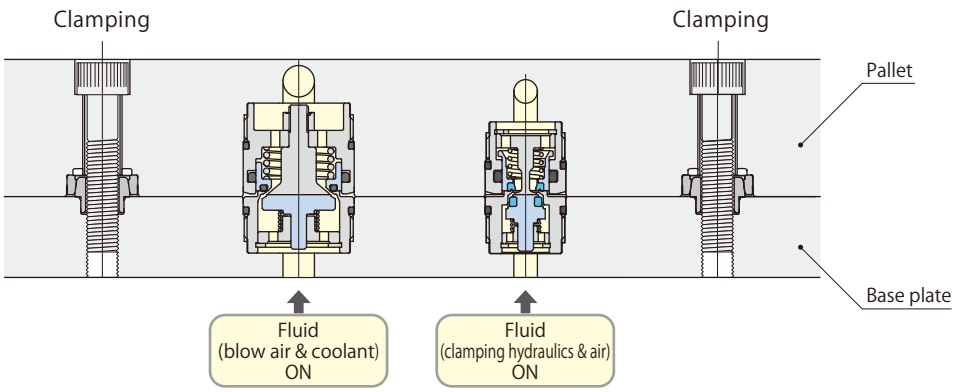



## Pallet clamped and coupler connected



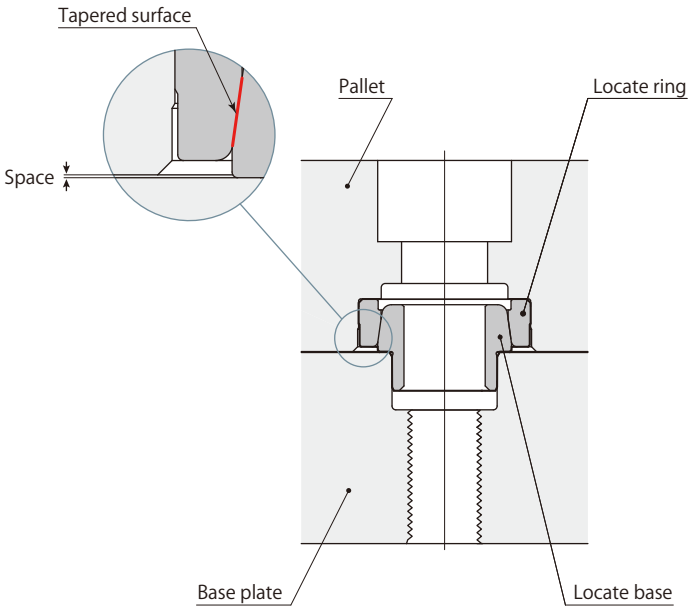

Precise positioning can be made by simply tightening the screws, and couplers can be connected at the same time.

## Pallet clamped and circuit pressurized



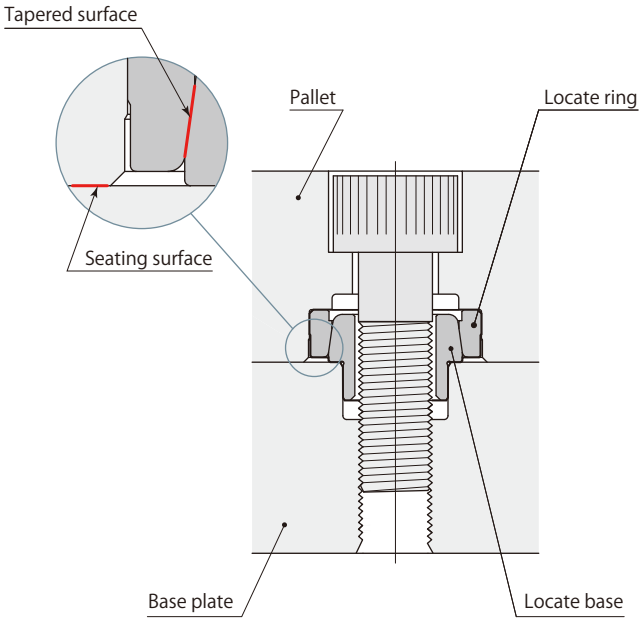
## Pallet setting

● Bring pallet above the base plate. Lower it slowly after positioning.
Pallet is centered along the tapered surface of the locate base.




## XYZ positioning (dual surface positioning)

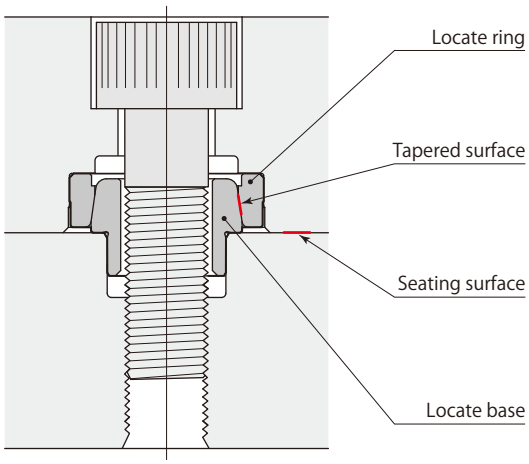
● Tapered surface of locate ring is expanded and deformed in radial direction by the locate base to firmly position X axis and Y axis.
Pallet is attached to seating surface of base plate and positions Z axis. The positioning of X, Y and Z axes by tapered surface and seating surface completes the XYZ positioning (dual surface positioning).



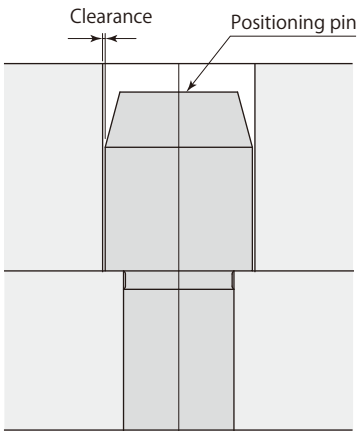
## Realizing high-accuracy positioning

In the case of ordinary positioning pin, it is common knowledge that the clearance is provided between the pin and the hole to allow the dimensional tolerance between the two pins, and to facilitate the positioning operation, however there is a risk of impairing the positioning repeatability depending on the volume of clearance so that the positioning re-adjustment must be done when re-setting the objects.
Pal fix can exert 3 $\mu$m of repeatability and requires no re-adjustment after setting the objects.

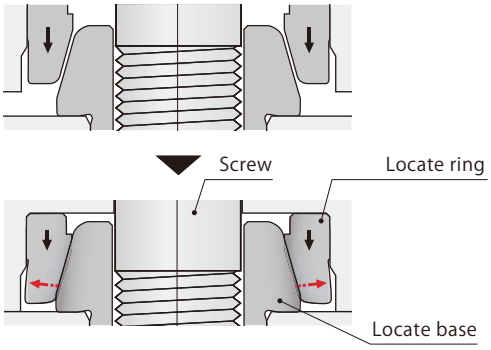
Pal fix




Positioning pin



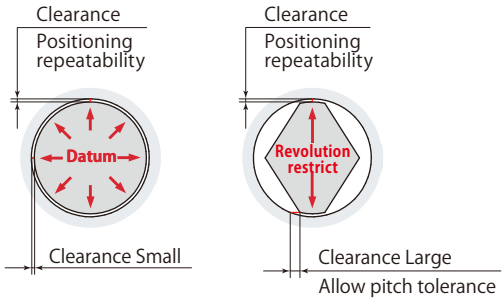

**Taper cone makes attaching / detaching easy**




**By means of elastic deformation**

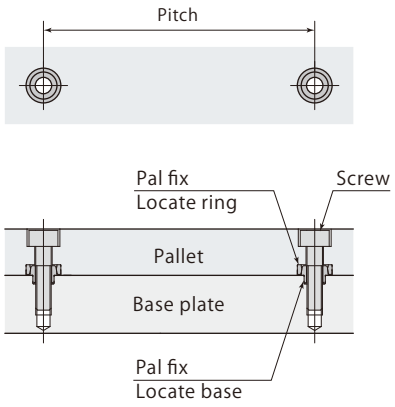
**Positioning repeatability : Within 3$\mu$m**
**Pitch tolerance allowance : ±0.02mm**

**Round** **Diamond**

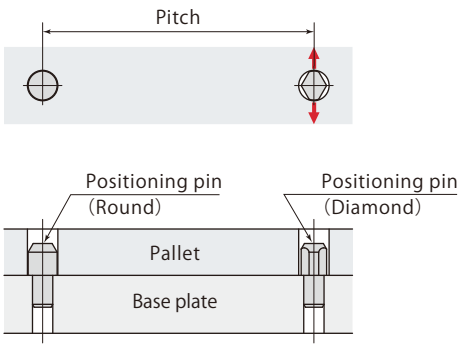



The positioning repeatability spoils when providing a large clearance.
A small clearance impairs the operability.

Pal fix only keeps pitch accuracy.




The diamond pin must be mounted perpendicularly toward round pin in addition to keeping the pitch accuracy between the two.



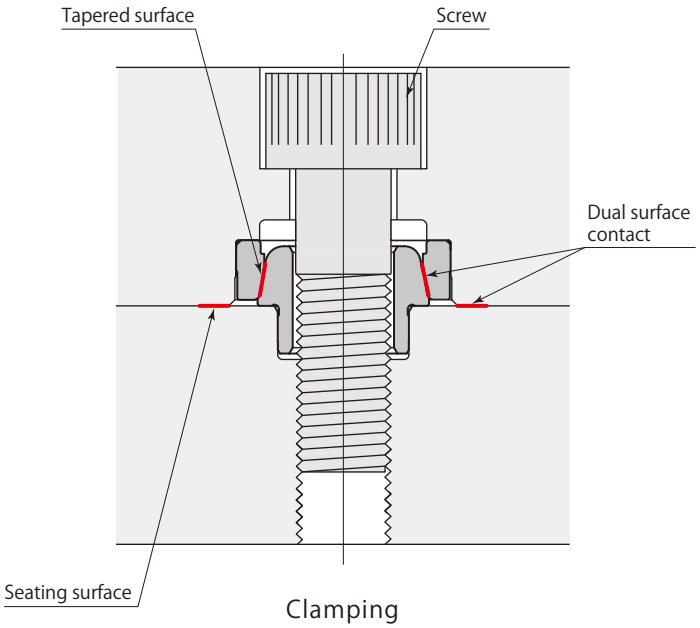

Combination of round and diamond pin

## Pal fix

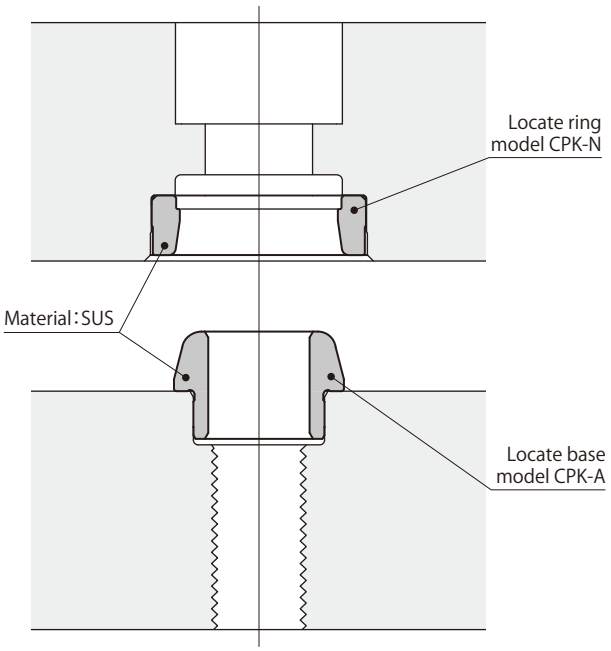
model **CPK** PAT.


**The dual surface contact taper cone combines high precision machining (repeatability: 3 μm*) and makes attaching or detaching easy.**

*: Repeatability dependent on mounting orientation and mass (weight)

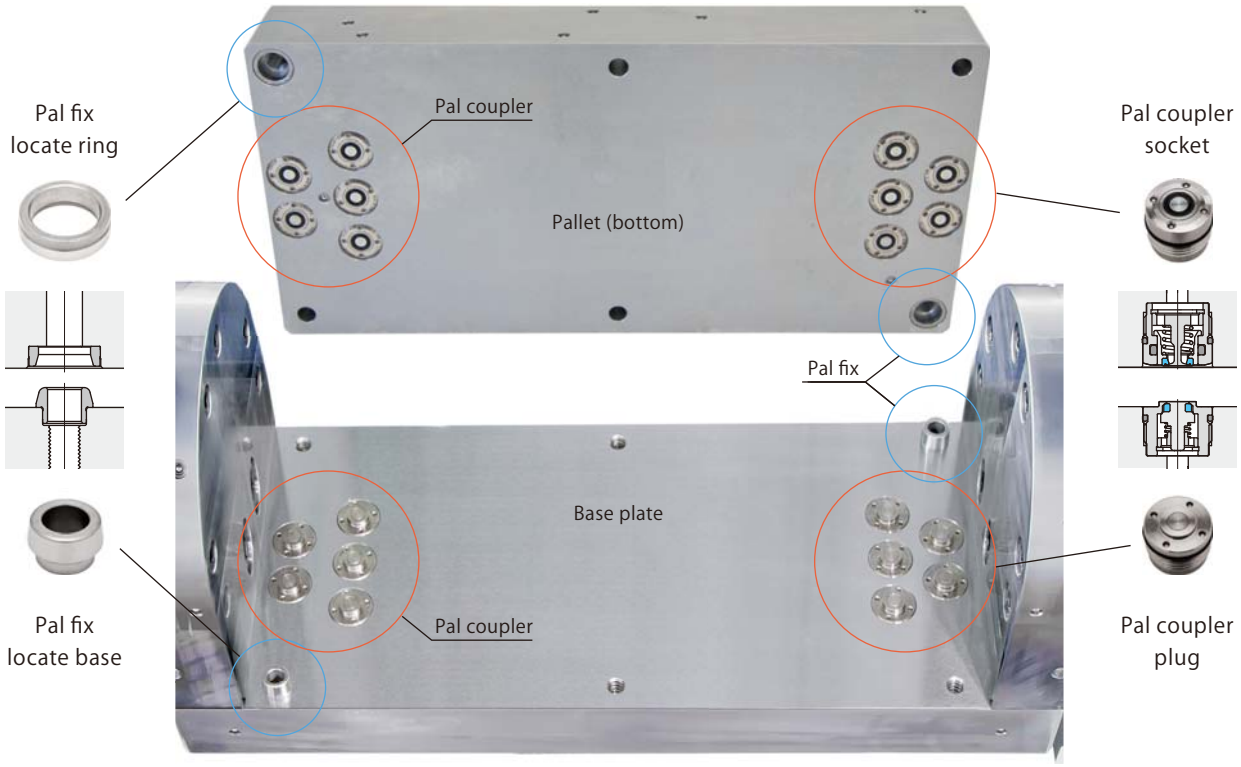



Clamping

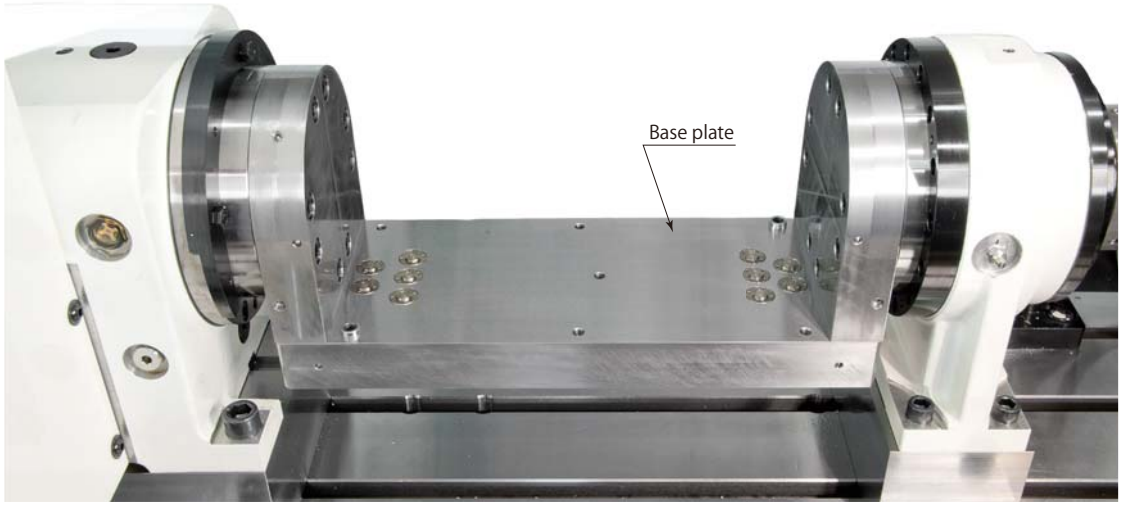



Separation

## Usage example



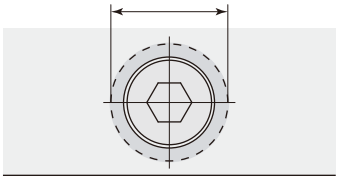




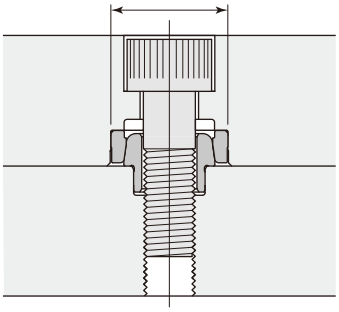
## Compacting

Pal fix

Space (small)

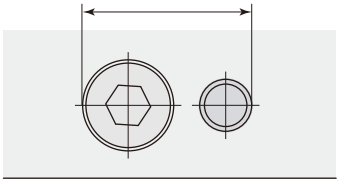


Space (small)

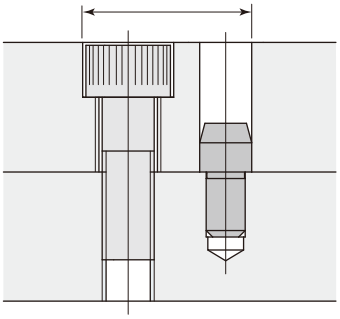


Positioning pin

Space (big)

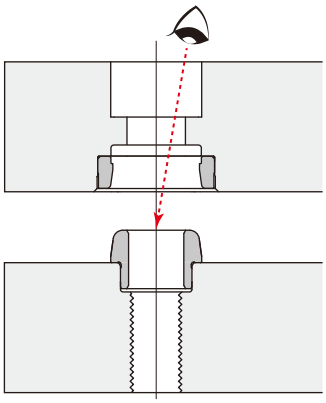


Space (big)

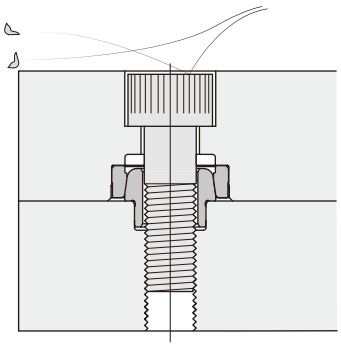


## Easy attaching and detaching

Pal fix

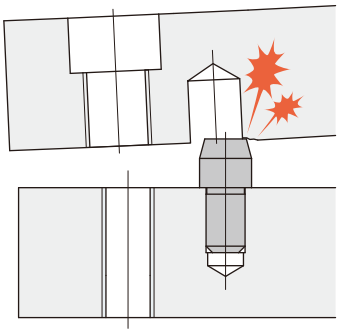


● Visual attaching and detaching.

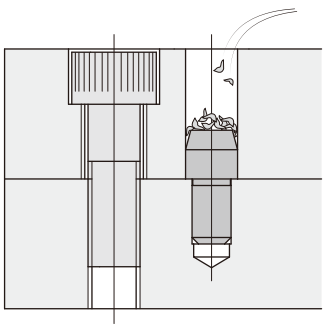


● Prevents intrusion of chips and foreign substances.

Positioning pin



● With no visual, it is difficult to detach and attach. Seating surface will also be damaged.



● Chips accumulate and are trapped, becoming difficult to remove.

## Specifications

CPK — **A** : Locate base / **N** : Locate ring

Size: **06** / **08** / **10** / **12** / **16**

| Model | | | | CPK-□06 | CPK-□08 | CPK-□10 | CPK-□12 | CPK-□16 |
|---|---|---|---|---|---|---|---|---|
| Max. allowable load*1 | Repeatability 3 μm | Horizontal mounting | kN | 0.85 | 1.0 | 1.2 | 1.5 | 2.0 |
| | | Vertical mounting | kN | 0.17 | 0.2 | 0.25 | 0.3 | 0.4 |
| | Repeatability 5 μm | Horizontal mounting | kN | 2.5 | 3.0 | 3.7 | 4.5 | 6.0 |
| | | Vertical mounting | kN | 0.5 | 0.6 | 0.75 | 0.9 | 1.2 |
| Min. clamping force*2 | | | kN | 7.5 | 9.0 | 12.5 | 15.5 | 21.5 |
| Max. allowable eccentricity for pallet changing | | | mm | ±0.5 | ±0.5 | ±0.5 | ±0.5 | ±1.0 |
| Mass | Locate base | | g | 3.0 | 5.0 | 7.0 | 10.0 | 21.0 |
| | Locate ring | | g | 3.0 | 4.0 | 7.0 | 11.0 | 22.0 |

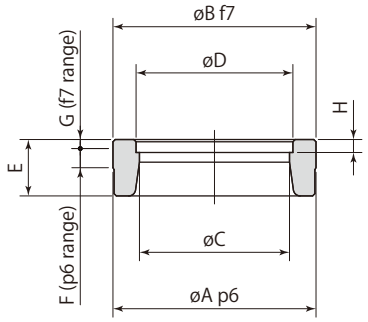
∗1 : This is maximum allowable load of pallet, regardless of how many Pal fix are used.

∗2 : Indicates necessary force to position one pair of locate base and locate ring.


Scale 1:1

## Dimensions

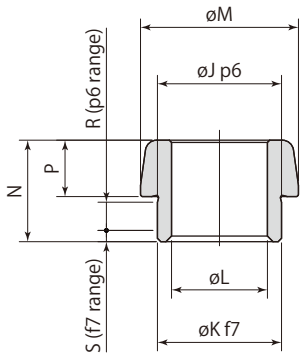
### Locate ring




mm

| Model | CPK-N06 | CPK-N08 | CPK-N10 | CPK-N12 | CPK-N16 |
|---|---|---|---|---|---|
| øA | 15 +0.029 +0.018 | 18 +0.029 +0.018 | 22 +0.035 +0.022 | 25 +0.035 +0.022 | 32 +0.042 +0.026 |
| øB | 15 -0.016 -0.034 | 18 -0.016 -0.034 | 22 −0.020 −0.041 | 25 −0.020 −0.041 | 32 −0.025 −0.050 |
| øC | 10.9 | 13.3 | 16.1 | 18.4 | 24 |
| øD | 11.4 | 13.9 | 16.9 | 19.4 | 25.2 |
| E | 4.5 | 5 | 6 | 7 | 9 |
| F | 1.7 | 1.7 | 1.7 | 1.7 | 2 |
| G | 0.8 | 0.8 | 1 | 1.3 | 2 |
| H | 1.15 | 1.15 | 1.15 | 1.15 | 1.35 |

### Locate base

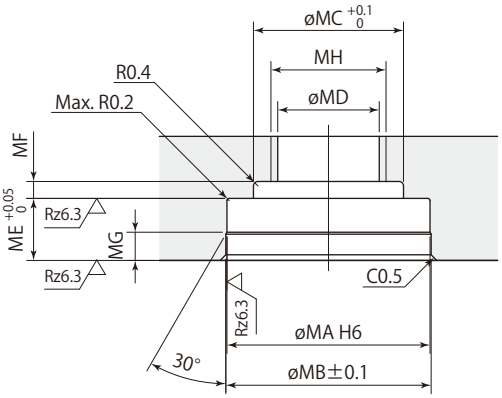



mm

| Model | CPK-A06 | CPK-A08 | CPK-A10 | CPK-A12 | CPK-A16 |
|---|---|---|---|---|---|
| øJ | 9 +0.024 +0.015 | 11 +0.029 +0.018 | 14 +0.029 +0.018 | 16 +0.029 +0.018 | 21 +0.035 +0.022 |
| øK | 9 −0.013 −0.028 | 11 −0.016 −0.034 | 14 −0.016 −0.034 | 16 −0.016 −0.034 | 21 −0.020 −0.041 |
| øL | 6.5 | 8.5 | 11 | 13 | 17 |
| øM | 11.5 | 14 | 17 | 19.5 | 25.5 |
| N | 8.5 | 9 | 10 | 11.5 | 13.5 |
| P | 4.5 | 5 | 6 | 7 | 9 |
| R | 2.5 | 2.5 | 2.5 | 3 | 3 |
| S | 1 | 1 | 1 | 1 | 1 |

## Mounting details

### Locate ring mounting details




Rz: ISO4287(1997)

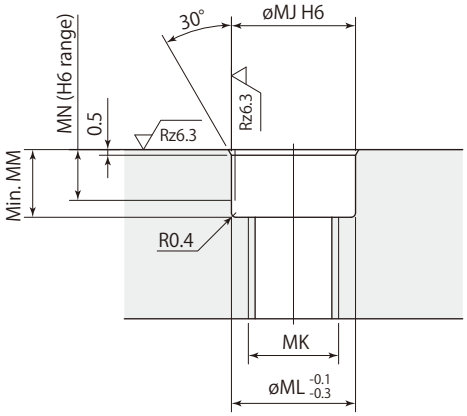
mm

| Model | CPK-N06 | CPK-N08 | CPK-N10 | CPK-N12 | CPK-N16 |
|---|---|---|---|---|---|
| øMA | 15 +0.011 0 | 18 +0.011 0 | 22 +0.013 0 | 25 +0.013 0 | 32 +0.016 0 |
| øMB | 15.2 | 18.2 | 22.2 | 25.2 | 32.2 |
| øMC | 11.6 | 14.2 | 17.5 | 20.0 | 25.8 |
| øMD | 6.8 | 9 | 11 | 14 | 18 |
| ME | 5 | 5.5 | 6.5 | 7.5 | 9.5 |
| MF | 1.5 | 1.5 | 2 | 2 | 2 |
| MG | 2 | 2.5 | 3.5 | 4 | 5 |
| MH* | M8 | M10 | M12 | M16 | M20 |

∗: Thread MH is provided to mount model CPK-N.
Refer to **page →73** for mounting method.

● Refer to **page →72** for mounting pitch tolerance.

### Locate base mounting details



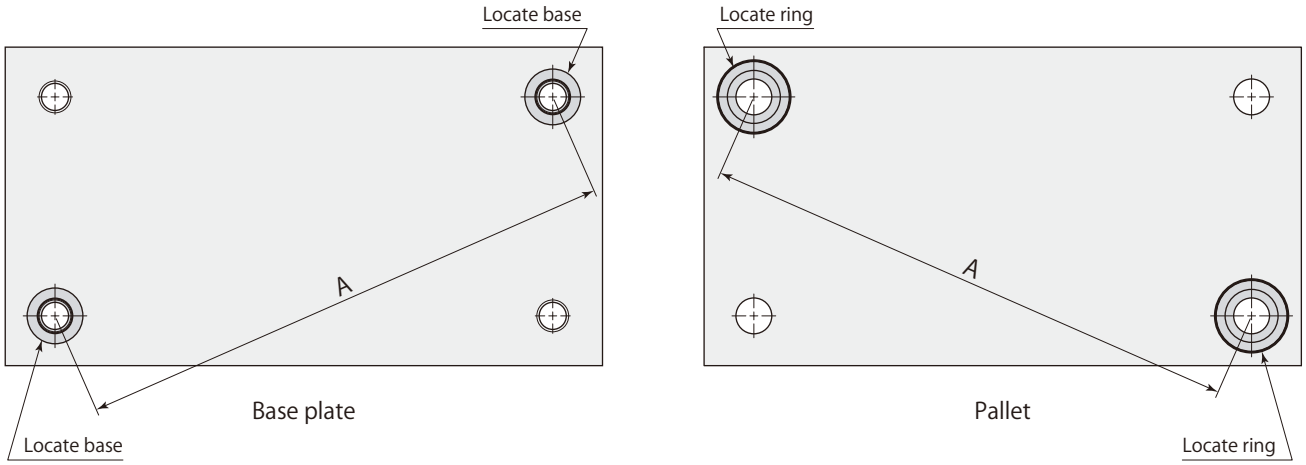

Rz: ISO4287(1997)

mm

| Model | CPK-A06 | CPK-A08 | CPK-A10 | CPK-A12 | CPK-A16 |
|---|---|---|---|---|---|
| øMJ | 9 +0.009 0 | 11 +0.011 0 | 14 +0.011 0 | 16 +0.011 0 | 21 +0.013 0 |
| MK | M6 | M8 | M10 | M12 | M16 |
| øML | 9 | 11 | 14 | 16 | 21 |
| MM | 5.5 | 6 | 6 | 7 | 7 |
| MN | 4.5 | 4.5 | 4.5 | 5 | 5 |

● Refer to **page →72** for mounting pitch tolerance.

## Mounting pitch tolerance




| | |
|---|---|
| Pitch tolerance of A dimension | ±0.02 mm |

## Tightening turn for screws

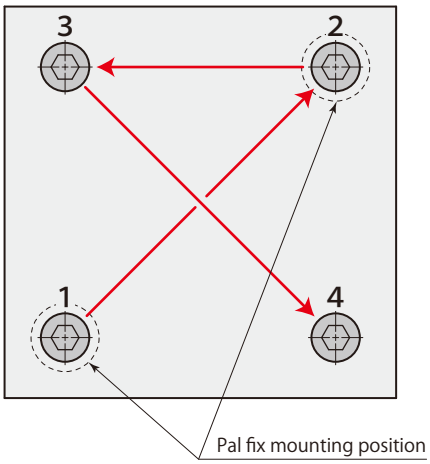
① Tighten the screw up by hand until the seating surface of screw holding to other.

② Tighten the screws tentatively in order as shown in the diagram on the right with a minimum force. (**page →69**)

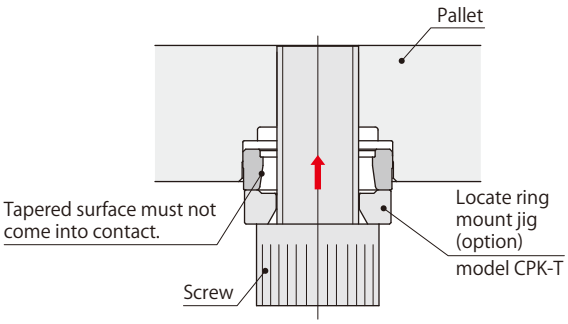
③ Tighten all of the screws again in order shown in the diagram.

● Make sure to tighten all screws evenly. Make sure not to give extra force only one or two screws on the same side. (e.c. : 1 and 3 on the right drawing.)

Tightening turn for screws

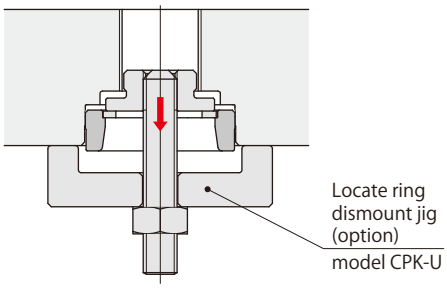


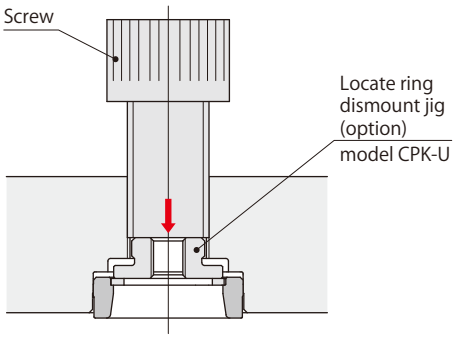
## Mounting of locate ring




● Press a locate ring in the hole keeping it upright.

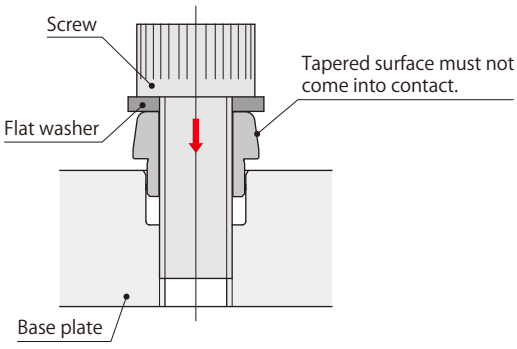
## Dismounting of locate ring



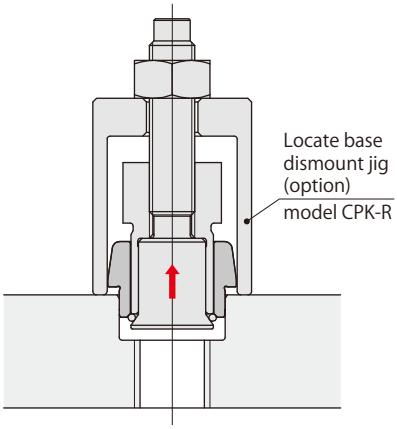

● The ring can be removed by a screw.

## Mounting of locate base




● Press a locate base in the hole keeping it upright. Be sure to use a flat washer to protect the locate base from damage.

## Dismounting of locate base

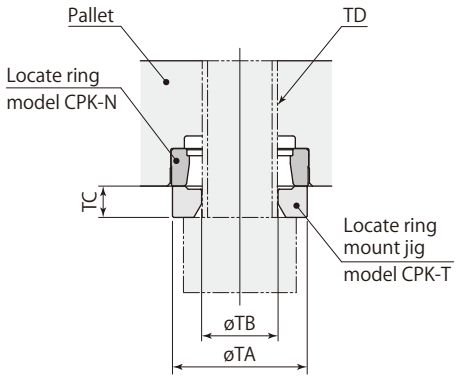



● Ask Pascal in the use of dismount jig of locate ring and locate base.

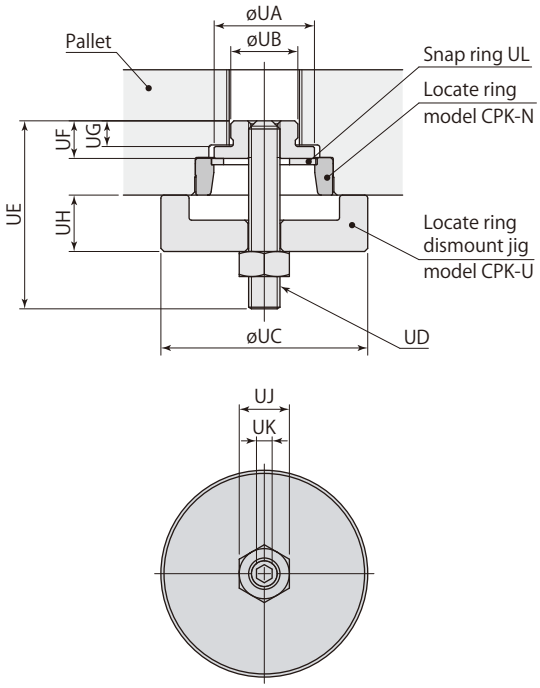
CPK — **T** : Locate ring mount jig
**U** : Locate ring dismount jig

Size
06
08
10
12
16

## Locate ring mount jig




## Locate ring dismount jig




mm

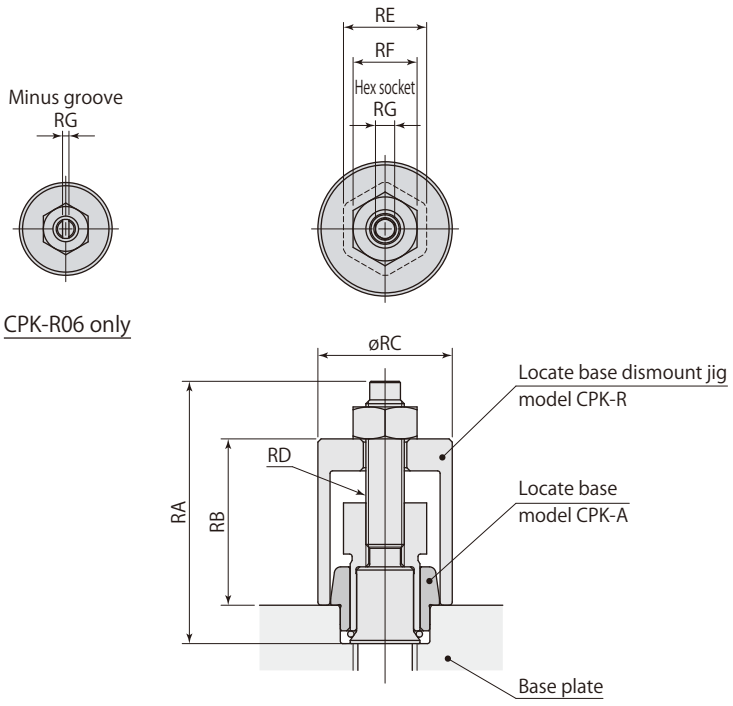
| Locate ring mount jig | CPK-T06 | CPK-T08 | CPK-T10 | CPK-T12 | CPK-T16 |
|---|---|---|---|---|---|
| Locate ring dismount jig | CPK-U06 | CPK-U08 | CPK-U10 | CPK-U12 | CPK-U16 |
| øTA | 14.5 | 17.5 | 21.5 | 24.5 | 31.5 |
| øTB | 8.2 | 10.2 | 12.2 | 16.2 | 20.2 |
| TC | 4 | 4 | 5 | 5 | 6 |
| TD | M8 | M10 | M12 | M16 | M20 |
| øUA | 10.8 | 13.2 | 16 | 18.3 | 23.9 |
| øUB | 6.5 | 8.7 | 10.7 | 13.7 | 17.7 |
| øUC | 25 | 27 | 33 | 35 | 43 |
| UD | M4×0.7 | M4×0.7 | M5×0.8 | M5×0.8 | M6×1.0 |
| UE | 25 | 25 | 30 | 30 | 40 |
| UF | 5.5 | 5.5 | 6 | 6.5 | 9 |
| UG | 4.1 | 4.1 | 4.1 | 4.6 | 7.1 |
| UH | 8 | 8 | 9 | 9.5 | 11.5 |
| UJ (nut width across flats) | 7 | 7 | 8 | 8 | 10 |
| UK (hex socket) | 2 | 2 | 2.5 | 2.5 | 3 |
| UL* | RTW-11 | RTW-13 | RTW-16 | RTW-18 | RTW-24 |
| Locate ring | CPK-N06 | CPK-N08 | CPK-N10 | CPK-N12 | CPK-N16 |

*: Snap ring is made by Ochiai Corporation.

CPK — R : Locate base dismount jig

Size
06
08
10
12
16

## Locate base dismount jig

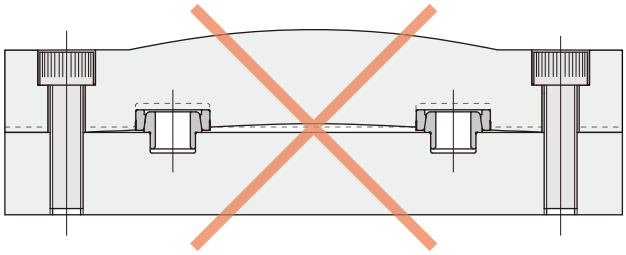



mm

| Locate base dismount jig | CPK-R06 | CPK-R08 | CPK-R10 | CPK-R12 | CPK-R16 |
|---|---|---|---|---|---|
| RA | 33 | 36.5 | 41 | 43.5 | 55.5 |
| RB | 20.5 | 22.5 | 26 | 27.5 | 37 |
| øRC | 14.5 | 17 | 21 | 24 | 31 |
| RD | M4×0.7 | M5×0.8 | M6×1.0 | M6×1.0 | M8×1.25 |
| RE (hex width across flats) | 10 | 10 | 13 | 17 | 22 |
| RF (nut width across flats) | 7 | 8 | 10 | 10 | 13 |
| RG | 1 | 2.5 | 3 | 3 | 4 |
| Locate base | CPK-A06 | CPK-A08 | CPK-A10 | CPK-A12 | CPK-A16 |

## Clamping

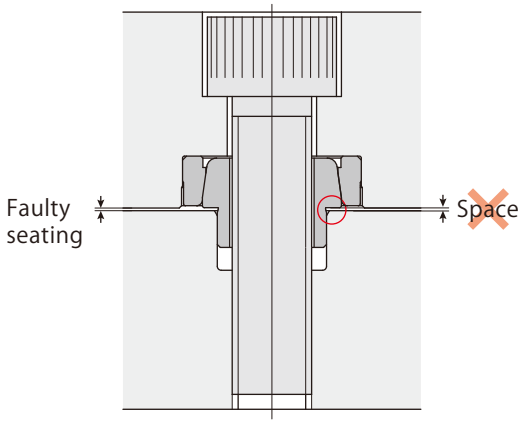
● Put the screws through Pal fix and tighten it.
Failure of the instruction may cause impair the repeatability.



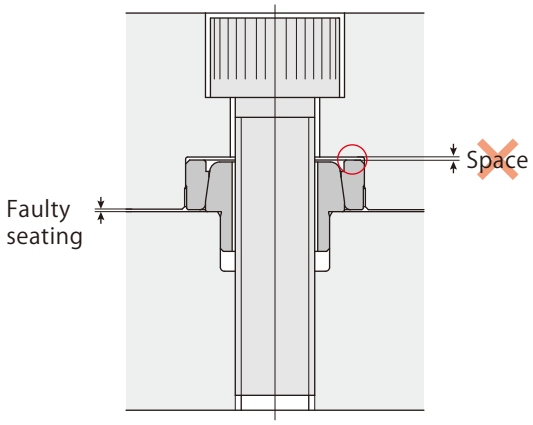
## Mounting

● Make sure if locate base, locate ring are securely pressed into the end of the mounting hole.
Insufficient press-fit may cause mis-seating and excessive deformation, which results in breakage.

Insufficient press-fit of locate base

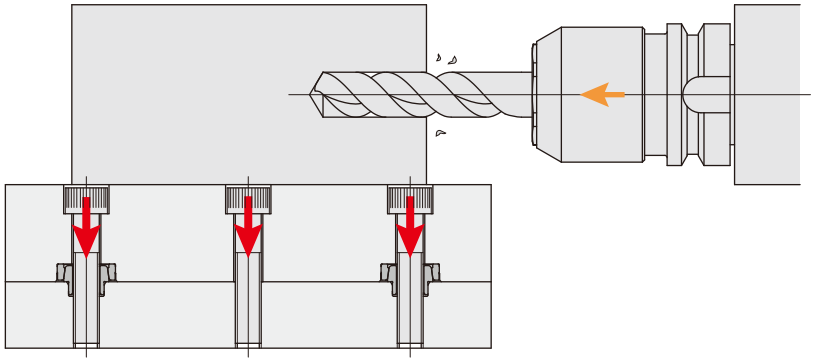



Insufficient press-fit of locate ring



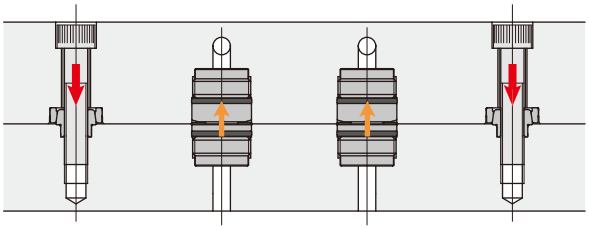

## Defining fastening power

● Define the fastening power based on the load from the side.
There is a risk of damage when the load is applied to Pal fix.



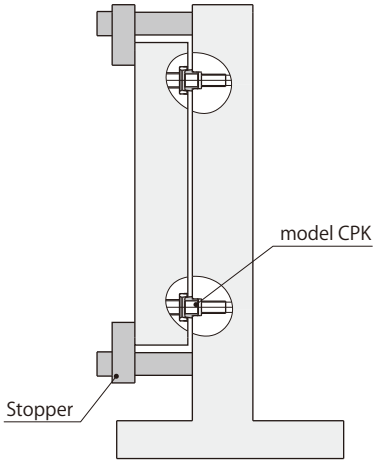
## Reactive force of coupler

- Reactive force is generated when Pal couplers are used. The fastening power should be determined considering the reactive force of the coupler.



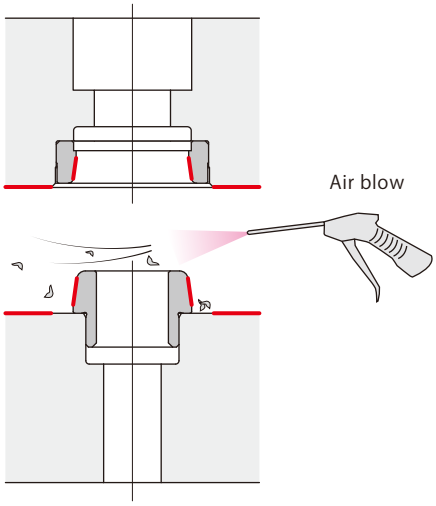
## Fall protection

- The mechanical stopper must be provided to avoid pallet falling when changing the pallet.



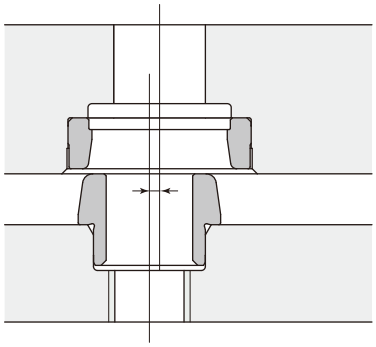

## Cleaning

- Keep the seating and tapered surface clean.




## Max. allowable eccentricity

- Keep allowable eccentricity when loading or unloading the pallet.
  (Refer to **page →69** for max. allowable eccentricity.)



## Table of contents



Refer to **page →103** for the details of the couplers that are not described in the catalog.

# Coupler

## model WVP

Pal coupler Hydraulic pressure 25MPa & air
model WVP-2BSH model WVP-2BPH

Pal coupler Blow air & coolant
model WVP-3DSN model WVP-3DPN

Pal coupler Hydraulic pressure 7MPa & air
model WVP-2FSL model WVP-2FPL

Pal coupler Blow air & coolant
model WVP-3GSN model WVP-3GPN

Pal coupler Air
model WVP-1FSN model WVP-1FPN

Pilot coupler Hydraulic pressure 7MPa
model WVP-2ESL model WVP-2EPL

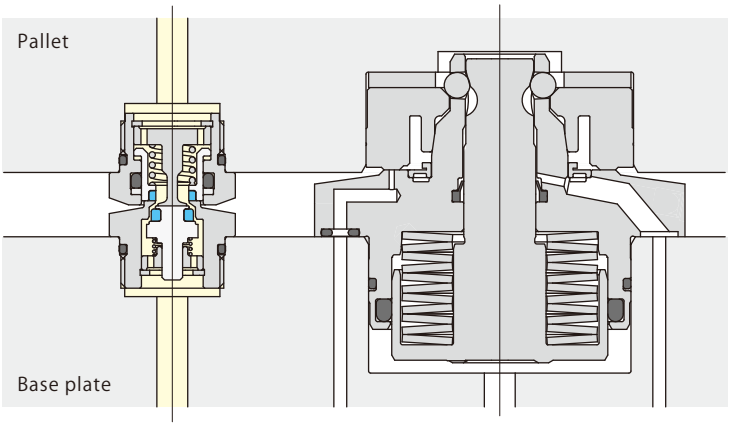
Non-leak coupler Hydraulic pressure 7MPa
(Plug hydraulic pressure source)
model WVP-2HSL model WVP-2HPL

Non-leak coupler Hydraulic pressure 7MPa
(Socket hydraulic pressure source)
model WVP-2SSL model WVP-2SPL

## Hydraulic and air coupler with zero hydraulic oil leak with special seal at tip section

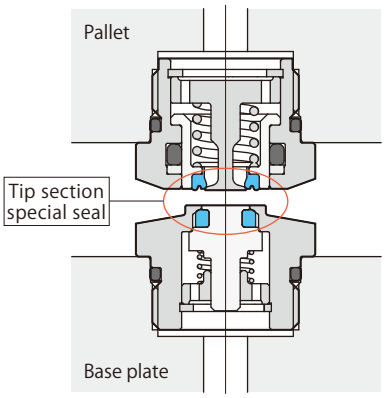
### Pal coupler socket
Hydraulic pressure 25 MPa & air
model **WVP-2BSH**

### Pal coupler plug
Hydraulic pressure 25 MPa & air
model **WVP-2BPH-□□**

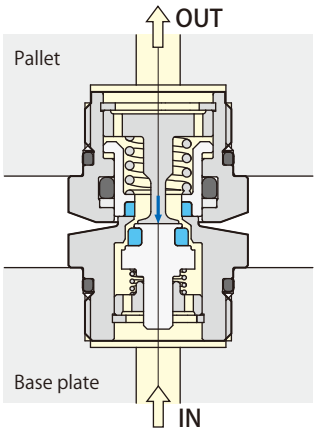



Coupling at same time with pallet clamp

Disconnected




Connected




- Special soft seal at tip section enables plug (WVP-2BPH) to be pressurized under disconnected state. Socket (WVP-2BSH) can retain residual pressure of up to 0.3 MPa.
- Special seal installed on the tip of coupler socket and coupler plug can minimize the intrusion of air and spill of working fluid during connection and disconnection, furthermore, it prevents corruption of coolant by being miscible with spilled working fluid and air contamination of clamp circuit.
- Disconnection and connection of coupler is performed by lift stroke of pallet clamp and there is no need for connecting mechanism or stopper. No reactive force is generated when pallet is set, since coupler is not connected. (Refer to **page →5**)
- The couplers are selectable according to the size of pallet clamp and no spacer block is required.
- Height of coupler is maintained low in order to reduce thickness of pallet.
- The parts in the coupler are corrosion prevented (plating or stainless) and oil and air can be applied as a fluid.

### Specifications

| | | |
|---|---|---|
| Pressure range | 0–25 MPa | Circuit symbol |
| Proof pressure | 37.5 MPa | 0.3MPa; Hydraulic pressure 25 MPa & air; Connect/disconnect under pressure : Incapable |
| Orifice area | 10.2 mm² | |
| Fluid used | General mineral based hydraulic oil (ISO-VG32 equivalent) & air | |
| Allowable eccentricity | ±0.5 mm | |
| Allowable inclination | 0.3° or less | |
| Reactive force* | 113 N per 1 MPa fluid pressure | |
| | Max. spring force for no pressure 40 N | |
| Operating temperature | 0–70 ℃ | |

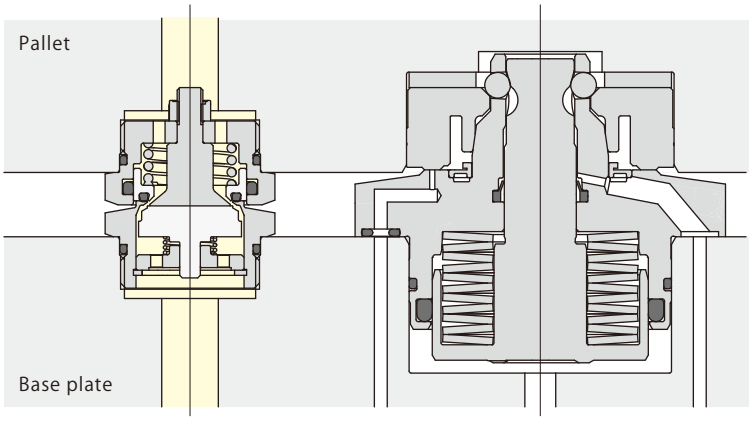
∗ : Reactive force (N) = Fluid pressure (MPa) ×113+40

Refer to **pages →82**, **83** for details.

## Air & coolant coupler with large orifice area and capability to accommodate large flow rates.

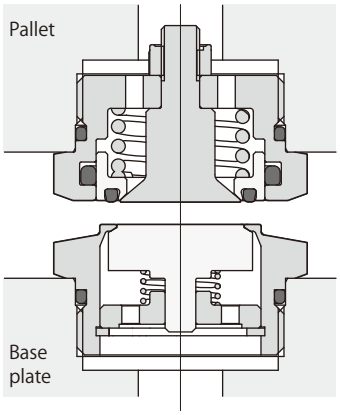
Pal coupler socket
Blow air & coolant
model **WVP-3DSN**

Pal coupler plug
Blow air & coolant
model **WVP-3DPN-□□**

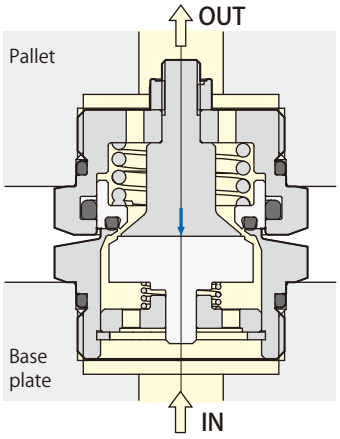



Coupling at same time with pallet clamp

Disconnected




Connected




- Height of coupler is maintained low in order to reduce thickness of pallet.
- Disconnection and connection of coupler is performed by lift stroke of pallet clamp and there is no need for connecting mechanism or stopper. No reactive force is generated when pallet is set, since coupler is not connected. (Refer to **page →5**)
- The couplers are selectable according to the size of pallet clamp and no spacer block is required.
- Large orifice area allows to supply large volume of coolant or blow air.

### Specifications

| | | |
|---|---|---|
| Pressure range | 0–1 MPa | Circuit symbol |
| Proof pressure | 1.5 MPa | |
| Orifice area | 29.0 mm² | |
| Fluid used | Air & coolant | Air & coolant |
| Allowable eccentricity | ±0.5 mm | Connect/disconnect under pressure : Incapable |
| Allowable inclination | 0.3° or less | |
| Reactive force* | 380 N per 1 MPa fluid pressure | |
| | Max. spring force for no pressure 60 N | |
| Operating temperature | 0–70 ℃ | |

∗ : Reactive force (N) = Fluid pressure (MPa) ×380+60

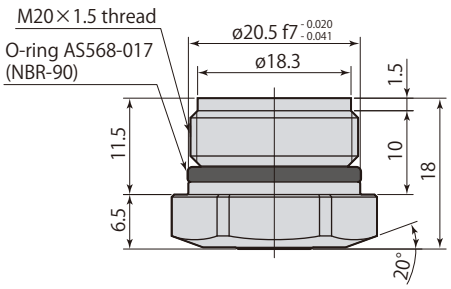
- Refer to **pages →84**, **85** for details.

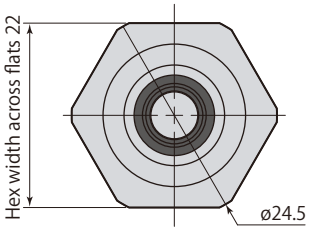
## Dimensions

### WVP-2BSH

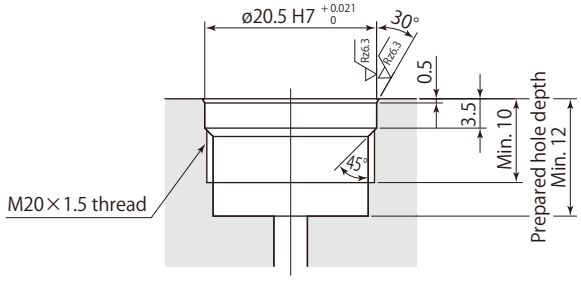
Hydraulic pressure 25 MPa & air socket

Recommended tightening torque: 25 N·m



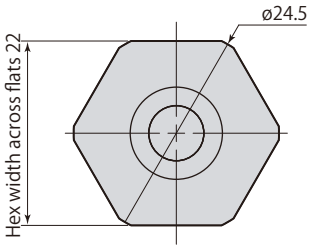

**Mounting details**

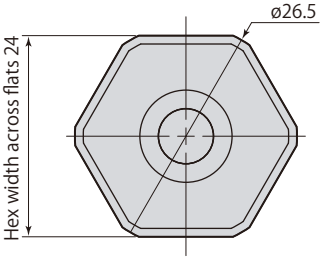


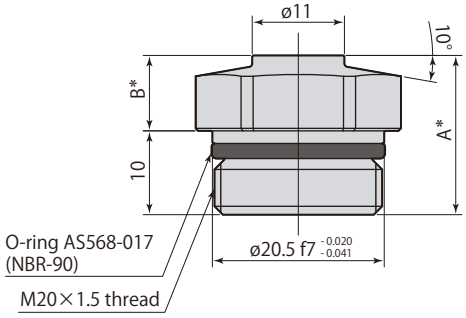

Rz: ISO4287(1997)

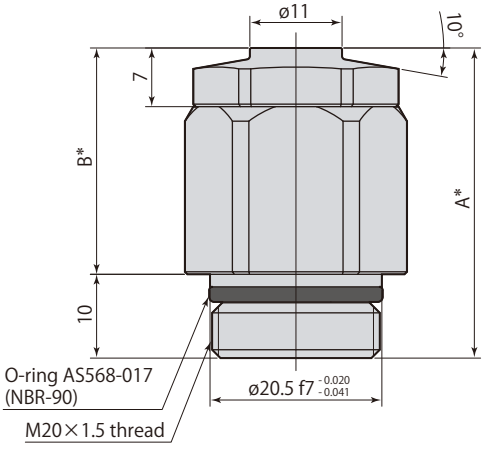
- Stop supplying fluid during disconnection and connection operations. Disconnecting or connecting coupler while fluid is flowing results in the leakage.
- Coupler has no built in filter. Ensure that foreign substances on connecting surfaces are removed by blowing air before connecting to prevent intrusion of foreign substances into piping.
- Make sure air bleeding in the hydraulic circuit is perfectly done when installation.

WVP-2BPH-10A, 16F, 25F, 40F
WVP-2BPH-16S, 25S, 40S only




∗ : Dimension varies according to the size and model no of the coupler.

**WVP-2BPH-□□** Hydraulic pressure 25 MPa & air plug Recommended tightening torque: 25 N·m

mm

| Coupler | | WVP-2BSH | | | | | |
|---|---|---|---|---|---|---|---|
| Socket / Plug | | WVP-2BPH-03T | WVP-2BPH-06T | WVP-2BPH-10T | WVP-2BPH-16T | WVP-2BPH-25T | WVP-2BPH-40T |
| A | | 16 | 17 | 19 | 22 | 26 | 32 |
| B | | 6 | 7 | 9 | 12 | 16 | 22 |
| H (distance to pallets) | | 11.5 | 12.5 | 14.5 | 17.5 | 21.5 | 27.5 |
| Coupler mass | Socket | 38 g | | | | | |
| | Plug | 34 g | 37 g | 42 g | 49 g | 58 g | 73 g |

**Applicable pallet clamp / locate ring**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pallet clamp | CPC-, CPH- | □03H | □06H | □10H | – | □16H | – | □25H | – | □40H | – |
| Air pallet clamp | CPY- | □02H, □03H | – | – | □04H | – | □06H | – | □10H | – | □06H |
| Locate ring | CPS- | □03T, D | □06T, D | □10T, D | □03T, D | □16T, D | □06T, D | □25T, D | □10T, D | □40T, D | □06F |
| Locate ring shim | | S03T, D | S06T, D | S10T, D | S03T, D | S16T, D | S06T, D | S25T, D | S10T, D | S40T, D | – |

mm

| Coupler | | WVP-2BSH | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Socket / Plug | | WVP-2BPH-03F | WVP-2BPH-06F | WVP-2BPH-10F | WVP-2BPH-10A | WVP-2BPH-16F | WVP-2BPH-25F | WVP-2BPH-40F |
| A | | 25.5 | 27 | 31 | 38 | 37 | 44.5 | 55.5 |
| B | | 15.5 | 17 | 21 | 28 | 27 | 34.5 | 45.5 |
| H (distance to pallets) | | 21 | 22.5 | 26.5 | 33.5 | 32.5 | 40 | 51 |
| Coupler mass | Socket | 38 g | | | | | | |
| | Plug | 57 g | 61 g | 71 g | 95 g | 92 g | 114 g | 147 g |

**Applicable pallet clamp / locate ring**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Pallet clamp | CPC-, CPH- | □03H | □06H | □03H | □10H | – | □16H | □25H | □40H |
| Air pallet clamp | CPY- | □02H, □03H | – | □02H, □03H | – | □10H | – | – | – |
| Locate ring | CPS- | □03F | □06F | □03F | □10F | □10F | □16F | □25F | □40F |
| Locate ring shim | | – | – | S03F | – | – | – | – | – |

mm

| Coupler | | WVP-2BSH | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Socket / Plug | | WVP-2BPH-03B | WVP-2BPH-06S | WVP-2BPH-06B | WVP-2BPH-10S | WVP-2BPH-16S | | WVP-2BPH-25S | WVP-2BPH-40S |
| A | | 30 | 28.5 | 33.5 | 33 | 40 | | 47.5 | 58.5 |
| B | | 20 | 18.5 | 23.5 | 23 | 30 | | 37.5 | 48.5 |
| H (distance to pallets) | | 25.5 | 24 | 29 | 28.5 | 35.5 | | 43 | 54 |
| Coupler mass | Socket | 38 g | | | | | | | |
| | Plug | 68 g | 65 g | 77 g | 75 g | 101 g | | 123 g | 156 g |

**Applicable pallet clamp / locate ring**

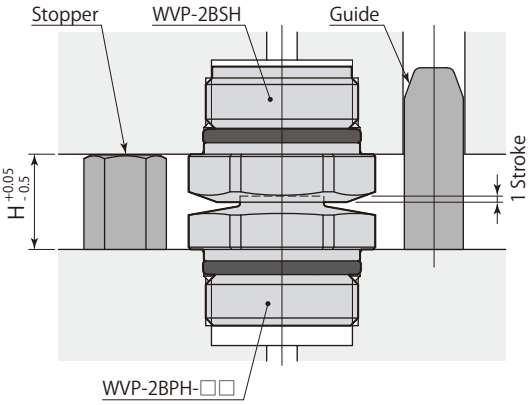
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pallet clamp | CPC-, CPH- | – | □06H | – | – | □10H | □16H | – | □25H | □40H |
| Air pallet clamp | CPY- | □04H | – | □04H | □06H | – | – | □10H | – | – |
| Locate ring | CPS- | □03F | □06F | □03F | □06F | □10F | □16F | □10F | □25F | □40F |
| Locate ring shim | | S03F | S06F | – | S06F | S10F | S16F | S10F | S25F | S40F |

indicates made to order.

## Caution in use

- The distance between the base and the pallet varies when the pallet clamp is mounted with the shim (model CPC-S, CPH-S, CPY-S). Install the Pal coupler to have the dimension $H^{+0.05}_{-0.5}$ set as shown in the above table when it is connected.
- Former pallet clamp (model CPC-□□F, CPH-□□F) cannot be used in combination with the couplers, as lift stroke is different.
- Ask Pascal in case it is used in combination with Pal coupling model CPM.
- Provide the stopper and the guide as shown in the diagram to protect coupler from damage unless it is used in combination with pallet clamp. Do not use a coupler as a guide or stopper when connecting. It may cause the damage. Install the stopper to have the dimension $H^{+0.05}_{-0.5}$ set as shown in the above table (See diagram on the right). Observe allowable eccentricity and inclination value when installing the guide. (Refer to **page →80** for details on allowable eccentricity and inclination value.)

Mounting sample without pallet clamp

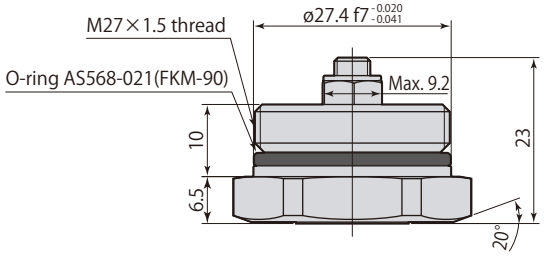


## Dimensions

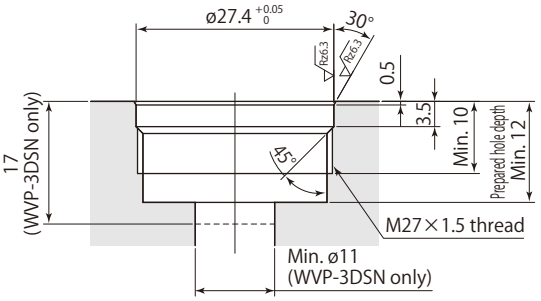
### WVP-3DSN

Blow air & coolant socket

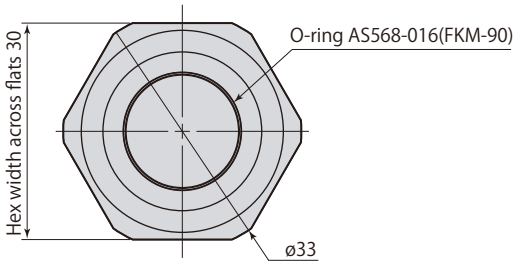
Recommended tightening torque：30 N·m




**Mounting details**

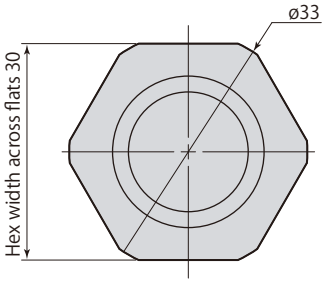


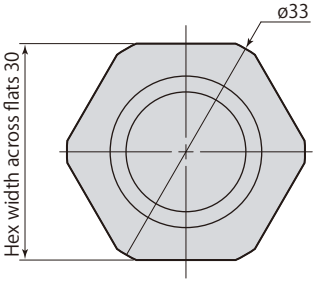

Rz: ISO4287(1997)

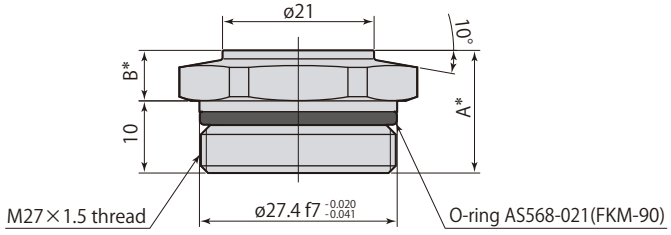


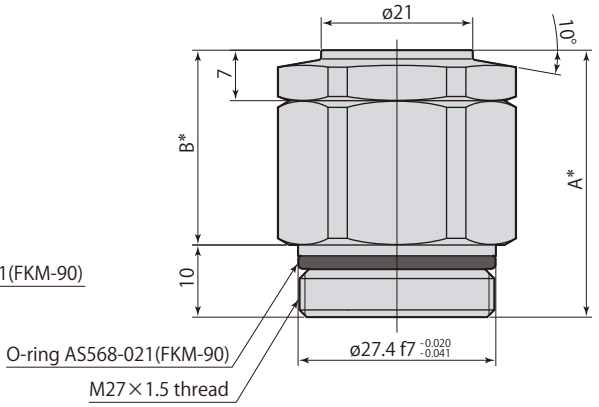

- Fluid leaks from the tip of coupler when supplying it under disconnected state.
- Stop supplying fluid during disconnection and connection operations. Disconnecting or connecting coupler while fluid is flowing results in the leakage.
- Coupler has no built in filter. Ensure that foreign substances on connecting surfaces are removed by blowing air before connecting to prevent intrusion of foreign substances into piping.

WVP-3DPN-10A, 16F, 25F, 40F
WVP-3DPN-16S, 25S, 40S only




＊：Dimension varies according to the size and model no of the coupler.

**WVP-3DPN-□□** Blow air & coolant plug Recommended tightening torque：30 N·m

mm

| Coupler | | WVP-3DSN | | | | | |
|---|---|---|---|---|---|---|---|
| Socket / Plug | | WVP-3DPN-03T | WVP-3DPN-06T | WVP-3DPN-10T | WVP-3DPN-16T | WVP-3DPN-25T | WVP-3DPN-40T |
| A | | 16 | 17 | 19 | 22 | 26 | 32 |
| B | | 6 | 7 | 9 | 12 | 16 | 22 |
| H (distance to pallets) | | 11.5 | 12.5 | 14.5 | 17.5 | 21.5 | 27.5 |
| Coupler mass | Socket | 70 g | | | | | |
| | Plug | 57 g | 60 g | 67 g | 77 g | 90 g | 111 g |

**Applicable pallet clamp / locate ring**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pallet clamp | CPC-, CPH- | □03H | □06H | □10H | – | □16H | – | □25H | – | □40H | – |
| Air pallet clamp | CPY- | □02H, □03H | – | – | □04H | – | □06H | – | □10H | – | □06H |
| Locate ring | CPS- | □03T, D | □06T, D | □10T, D | □03T, D | □16T, D | □06T, D | □25T, D | □10T, D | □40T, D | □06F |
| Locate ring shim | | S03T, D | S06T, D | S10T, D | S03T, D | S16T, D | S06T, D | S25T, D | S10T, D | S40T, D | – |

mm

| Coupler | | WVP-3DSN | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Socket / Plug | | WVP-3DPN-03F | WVP-3DPN-06F | WVP-3DPN-10F | WVP-3DPN-10A | WVP-3DPN-16F | WVP-3DPN-25F | WVP-3DPN-40F |
| A | | 25.5 | 27 | 31 | 38 | 37 | 44.5 | 55.5 |
| B | | 15.5 | 17 | 21 | 28 | 27 | 34.5 | 45.5 |
| H (distance to pallets) | | 21 | 22.5 | 26.5 | 33.5 | 32.5 | 40 | 51 |
| Coupler mass | Socket | 70 g | | | | | | |
| | Plug | 89 g | 94 g | 108 g | 132 g | 128 g | 157 g | 197 g |

**Applicable pallet clamp / locate ring**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Pallet clamp | CPC-, CPH- | □03H | □06H | □03H | □10H | – | □16H | □25H | □40H |
| Air pallet clamp | CPY- | □02H, □03H | – | □02H, □03H | – | □10H | – | – | – |
| Locate ring | CPS- | □03F | □06F | □03F | □10F | □10F | □16F | □25F | □40F |
| Locate ring shim | | – | – | S03F | – | – | – | – | – |

mm

| Coupler | | WVP-3DSN | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Socket / Plug | | WVP-3DPN-03B | WVP-3DPN-06S | WVP-3DPN-06B | WVP-3DPN-10S | WVP-3DPN-16S | WVP-3DPN-25S | WVP-3DPN-40S |
| A | | 30 | 28.5 | 33.5 | 33 | 40 | 47.5 | 58.5 |
| B | | 20 | 18.5 | 23.5 | 23 | 30 | 37.5 | 48.5 |
| H (distance to pallets) | | 25.5 | 24 | 29 | 28.5 | 35.5 | 43 | 54 |
| Coupler mass | Socket | 70 g | | | | | | |
| | Plug | 104 g | 99 g | 116 g | 114 g | 139 g | 168 g | 208 g |

**Applicable pallet clamp / locate ring**

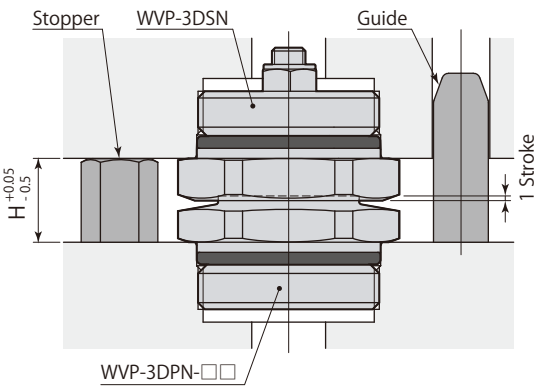
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pallet clamp | CPC-, CPH- | – | □06H | – | – | □10H | □16H | – | □25H | □40H |
| Air pallet clamp | CPY- | □04H | – | □04H | □06H | – | – | □10H | – | – |
| Locate ring | CPS- | □03F | □06F | □03F | □06F | □10F | □16F | □10F | □25F | □40F |
| Locate ring shim | | S03F | S06F | – | S06F | S10F | S16F | S10F | S25F | S40F |

indicates made to order.

## Caution in use

- The distance between the base and the pallet varies when the pallet clamp is mounted with the shim (model CPC-S, CPH-S, CPY-S). Install the Pal coupler to have the dimension $H^{+0.05}_{-0.5}$ set as shown in the above table when it is connected.
- Former pallet clamp (model CPC-□□F, CPH-□□F) cannot be used in combination with the couplers, as lift stroke is different.
- Ask Pascal in case it is used in combination with Pal coupling model CPM.
- Provide the stopper and the guide as shown in the diagram to protect coupler from damage unless it is used in combination with pallet clamp. Do not use a coupler as a guide or stopper when connecting. It may cause the damage. Install the stopper to have the dimension $H^{+0.05}_{-0.5}$ set as shown in the above table (See diagram on the right). Observe allowable eccentricity and inclination value when installing the guide. (Refer to **page →81** for details on allowable eccentricity and inclination value.)

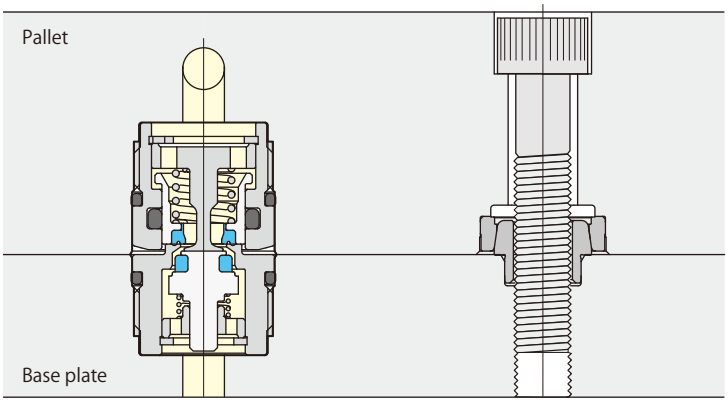
Mounting sample without pallet clamp



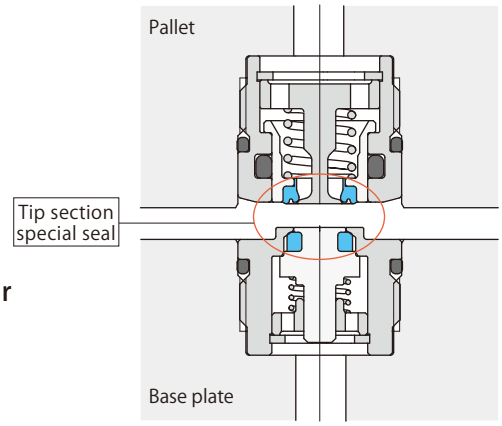
## Hydraulic and air coupler with zero hydraulic oil leak with special seal at tip section

Pal coupler socket
Hydraulic pressure 7 MPa & air
model **WVP-2FSL**

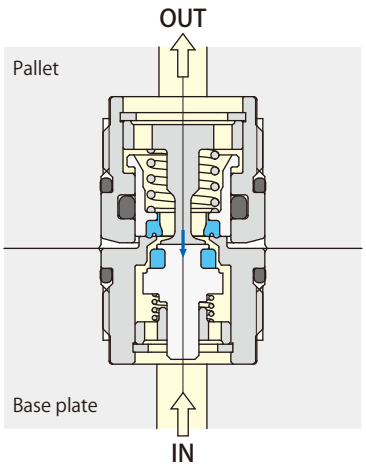
Pal coupler plug
Hydraulic pressure 7 MPa & air
model **WVP-2FPL**




Disconnected




Connected




- Special soft seal at tip section enables plug (WVP-2FPL) to be pressurized under disconnected state. Socket (WVP-2FSL) can retain residual pressure of up to 0.3 MPa.
- Special seal installed on the tip of coupler socket and coupler plug can minimize the intrusion of air and spill of working fluid during connection and disconnection, furthermore, it prevents corruption of coolant by being miscible with spilled working fluid and air contamination of clamp circuit.
- Height of coupler is maintained low in order to reduce thickness of pallet.
- This model is designed to use on flat mating faces with no protrusion from mount face.
- The parts in the coupler are corrosion prevented (plating or stainless) and oil and air can be applied as a fluid.

### Specifications

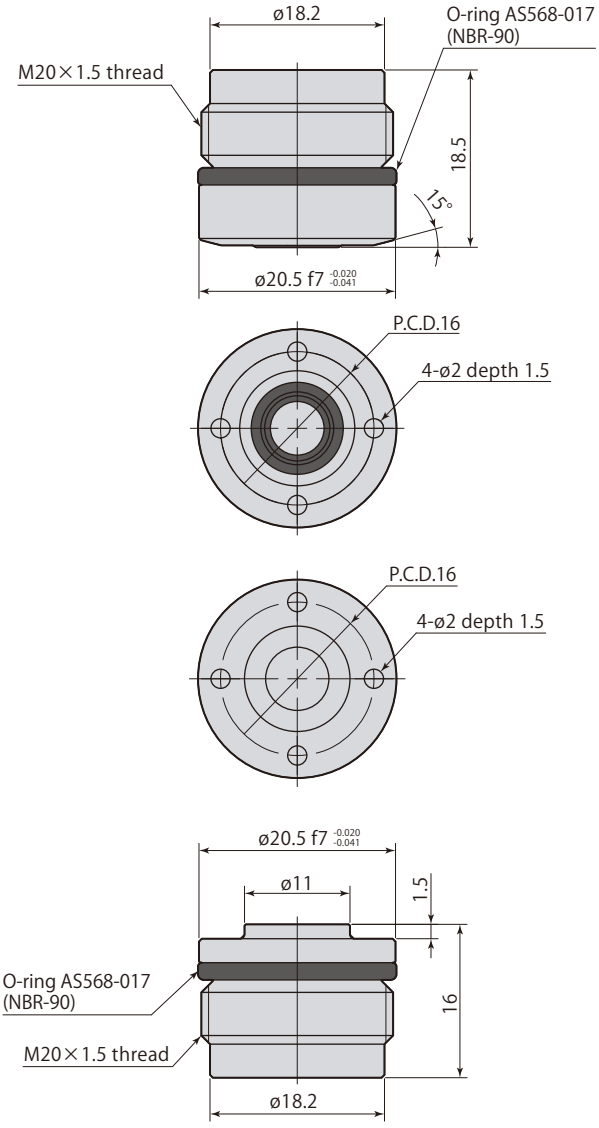
| | | |
|---|---|---|
| Pressure range | 0–7 MPa | Circuit symbol |
| Proof pressure | 10.5 MPa | 0.3MPa |
| Orifice area | 10.2 mm² | |
| Fluid used | General mineral based hydraulic oil (ISO-VG32 equivalent) & air | Hydraulic pressure 7 MPa & air |
| Allowable eccentricity | ±0.5 mm | Connect/disconnect under pressure : Incapable |
| Allowable inclination | 0.3° or less | |
| Reactive force* | 113 N per 1 MPa fluid pressure | |
| | Max. spring force for no pressure 40 N | |
| Operating temperature | 0–70 ℃ | |
| Mass | WVP-2FSL : 31 g WVP-2FPL : 29 g | |

*: Reactive force (N) = Fluid pressure (MPa) ×113+40

## Dimensions

### WVP-2FSL

Hydraulic pressure 7 MPa & air socket
Recommended tightening torque：15 N·m

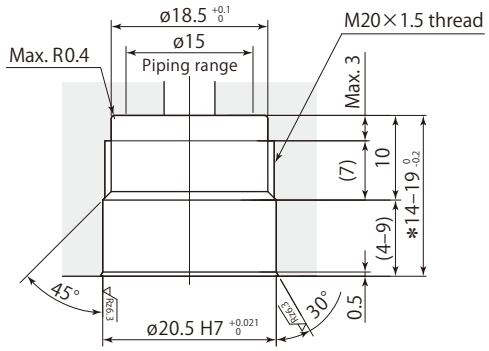



### WVP-2FPL

Hydraulic pressure 7 MPa & air plug
Recommended tightening torque：15 N·m

### Mounting details

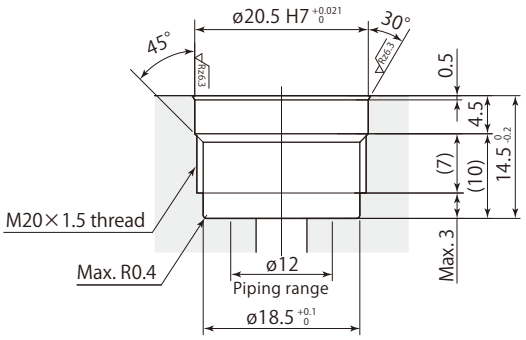
WVP-2FSL




∗：When using Pal fix as a set, be sure to set depth to $19^{\ 0}_{-0.2}$.
Refer to **pages →66–77** for details on Pal fix.

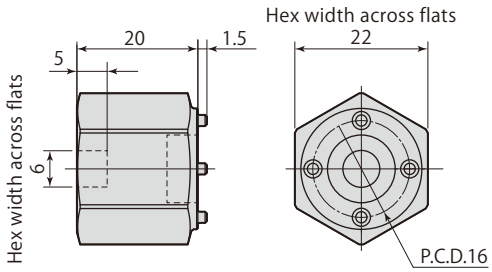
### Mounting details

WVP-2FPL




Rz: ISO4287(1997)

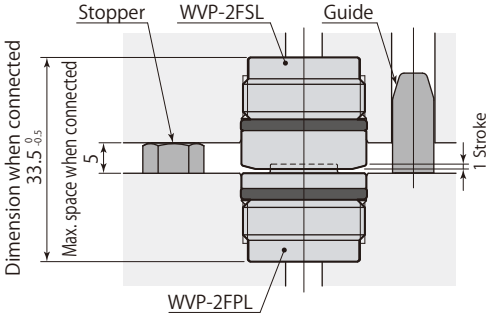
### Mounting tool (option) model **WVP-2FJ**




## Caution in use

- Stop supplying fluid during disconnection and connection operations. Disconnecting or connecting coupler while fluid is flowing results in the leakage.
- Coupler has no built in filter. Ensure that foreign substances on connecting surfaces are removed by blowing air before connecting to prevent intrusion of foreign substances into piping.
- Make sure air bleeding in the hydraulic circuit is perfectly done when installation.
- Provide the stopper and the guide as shown in the diagram to protect coupler from damage unless it is used in combination with Pal fix. Do not use a coupler as a guide or stopper when connecting. It may cause the damage. Install the stopper to have the dimension $33.5^{\ 0}_{-0.5}$ (See diagram on the right). Observe allowable eccentricity and inclination value when installing the guide. (Refer to **page →86** for details on allowable eccentricity and inclination value.)

Mounting sample without Pal fix

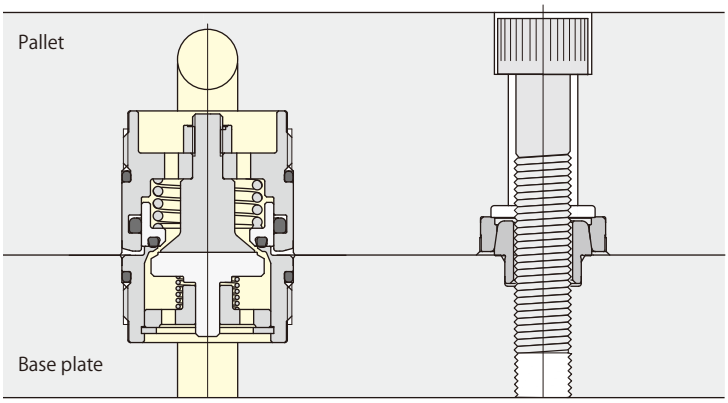


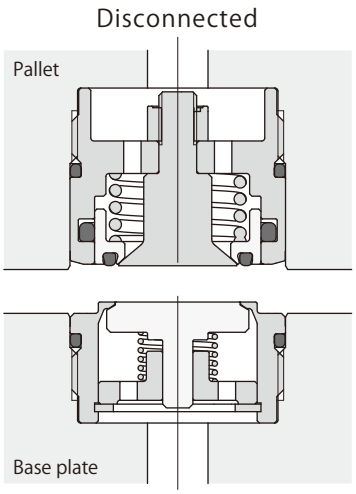
## Air & coolant coupler with large orifice area and capability to accommodate large flow rates.

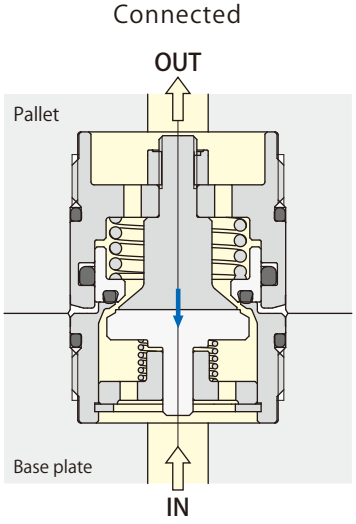
Pal coupler socket
Blow air & coolant
model **WVP-3GSN**

Pal coupler plug
Blow air & coolant
model **WVP-3GPN**






- Large orifice area allows to supply large volume of coolant or blow air.
- Height of coupler is maintained low in order to reduce thickness of pallet.
- This model is designed to use on flat mating faces with no protrusion from mount face.

### Specifications

| | | |
|---|---|---|
| Pressure range | 0–1 MPa | Circuit symbol |
| Proof pressure | 1.5 MPa | |
| Orifice area | 29.0 mm² | |
| Fluid used | Air & coolant | Air & coolant |
| Allowable eccentricity | ±0.5 mm | Connect/disconnect under pressure : Incapable |
| Allowable inclination | 0.3° or less | |
| Reactive force* | 380 N per 1 MPa fluid pressure | |
| | Max. spring force for no pressure 60 N | |
| Operating temperature | 0–70 ℃ | |
| Mass | WVP-3GSN : 77 g WVP-3GPN : 48 g | |

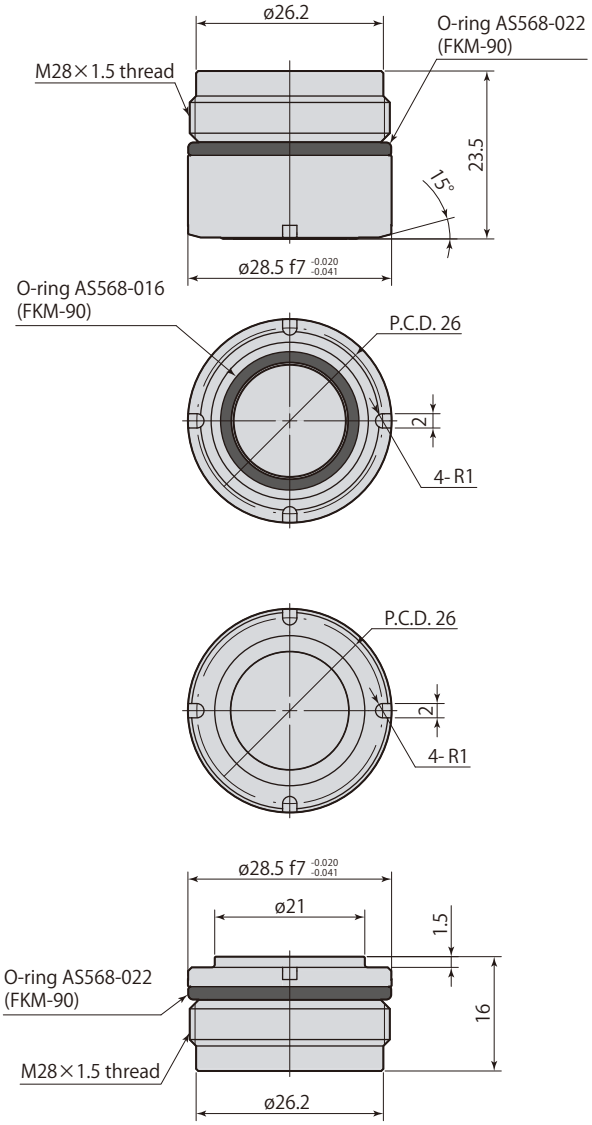
*: Reactive force (N) = Fluid pressure (MPa) ×380+60

## Dimensions

### WVP-3GSN

Blow air & coolant socket

Recommended tightening torque : 30 N·m



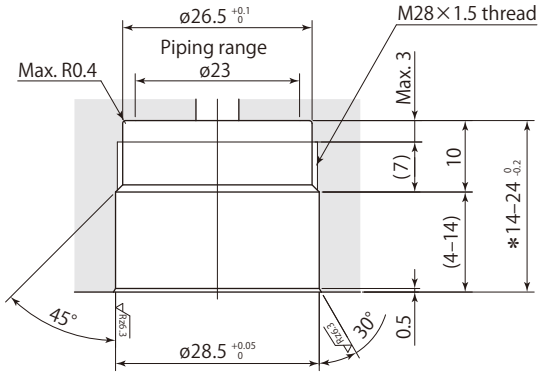

### WVP-3GPN

Blow air & coolant plug

Recommended tightening torque : 30 N·m

### Mounting details

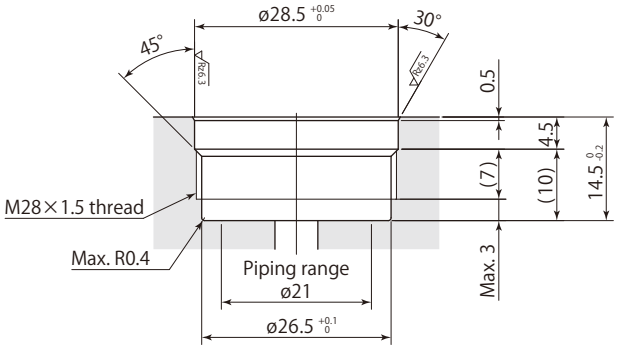
WVP-3GSN




*: When using Pal fix as a set, be sure to set depth to $24^{0}_{-0.2}$.
Refer to **pages →66–77** for details on Pal fix.

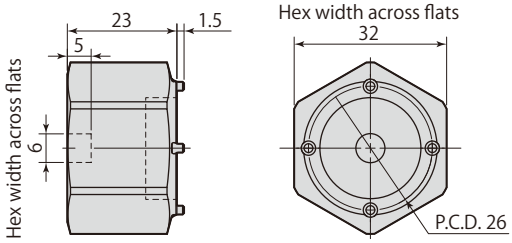
### Mounting details

WVP-3GPN




Rz: ISO4287(1997)

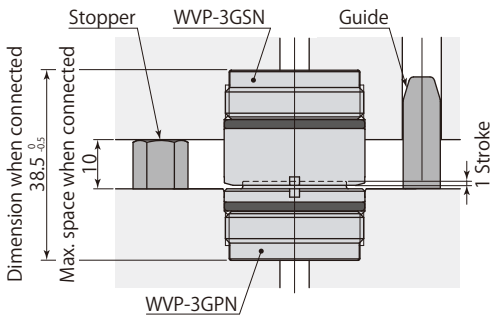
Mounting tool (option) model **WVP-3GJ**




## Caution in use

- Fluid leaks from the tip of coupler when supplying it under disconnected state.
- Stop supplying fluid during disconnection and connection operations. Disconnecting or connecting coupler while fluid is flowing results in the leakage.
- Coupler has no built in filter. Ensure that foreign substances on connecting surfaces are removed by blowing air before connecting to prevent intrusion of foreign substances into piping.
- Provide the stopper and the guide as shown in the diagram to protect coupler from damage unless it is used in combination with Pal fix. Do not use a coupler as a guide or stopper when connecting. It may cause the damage. Install the stopper to have the dimension $38.5^{0}_{-0.5}$ (See diagram on the right). Observe allowable eccentricity and inclination value when installing the guide. (Refer to **page →88** for details on allowable eccentricity and inclination value.)

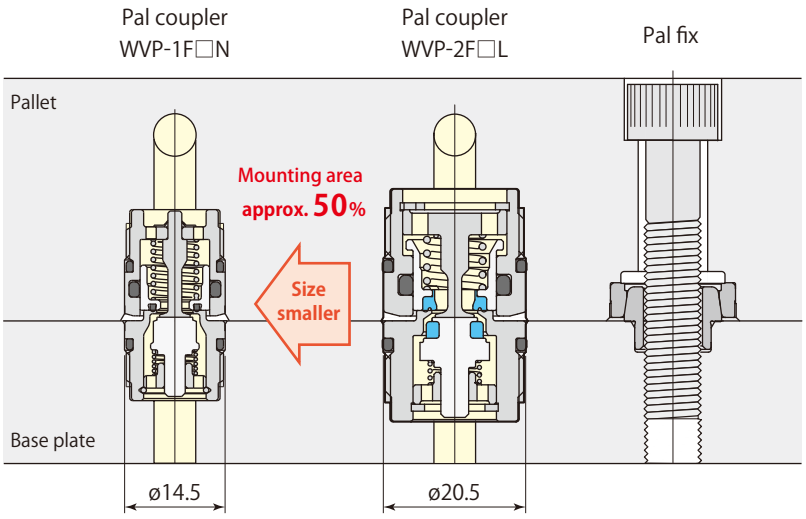
Mounting sample without Pal fix

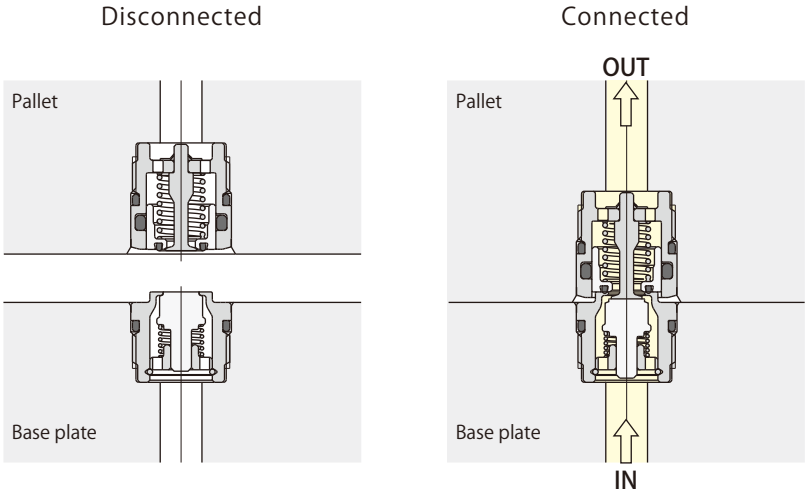


## Downsized air coupler but maintaining same flow rate with existing models.

### Pal coupler socket
Air
model **WVP-1FSN**

### Pal coupler plug
Air
model **WVP-1FPN**




- This model is designed to use on flat mating faces with no protrusion from mount face.
- The parts in the coupler are corrosion prevented (stainless).

## Specifications

| | | |
|---|---|---|
| Pressure range | 0–1 MPa | Circuit symbol |
| Proof pressure | 1.5 MPa | |
| Orifice area | 8 mm² | |
| Fluid used | Air | |
| Allowable eccentricity | ±0.4 mm | Air |
| Allowable inclination | 0.3° or less | Connect/disconnect under pressure : Incapable |
| Reactive force* | 79 N per 1 MPa fluid pressure | |
| | Max. spring force for no pressure 24 N | |
| Operating temperature | 0–70 ℃ | |
| Mass | WVP-1FSN : 12.5 g WVP-1FPN : 10.5 g | |

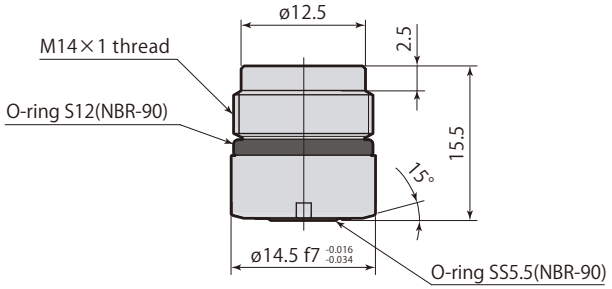
*: Reactive force (N) = Fluid pressure (MPa) ×79+24

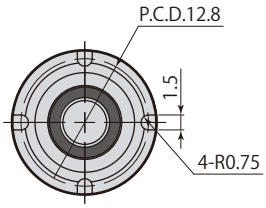
## Dimensions

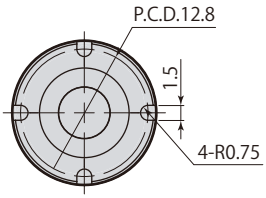
### WVP-1FSN

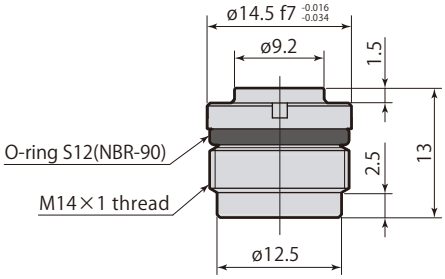
Air socket

Recommended tightening torque : 5 N·m



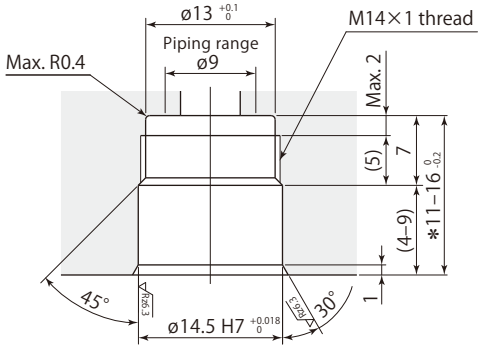

### WVP-1FPN

Air plug

Recommended tightening torque : 5 N·m

### Mounting details

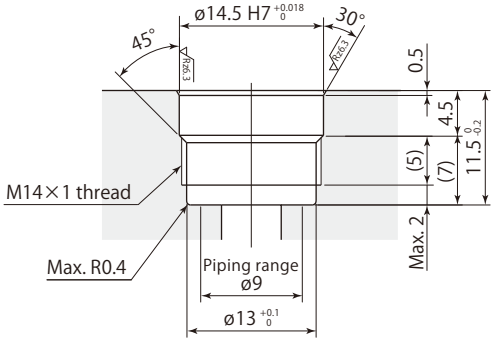
WVP-1FSN




*: When using Pal fix as a set, be sure to set depth to $16^{0}_{-0.2}$.
Refer to **pages →66–77** for details on Pal fix.

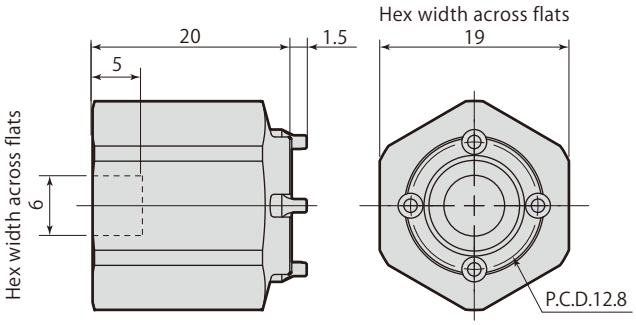
### Mounting details

WVP-1FPN




Rz: ISO4287(1997)

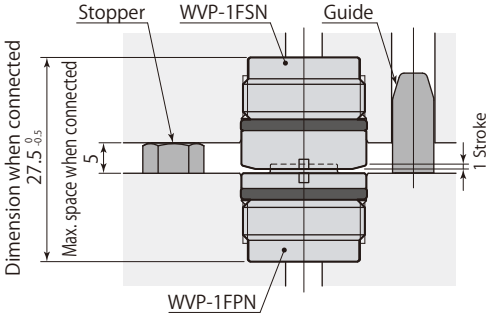
### Mounting tool (option) model **WVP-1FJ**




## Caution in use

- Stop supplying fluid during disconnection and connection operations. Disconnecting or connecting coupler while fluid is flowing results in the leakage.
- Coupler has no built in filter. Ensure that foreign substances on connecting surfaces are removed by blowing air before connecting to prevent intrusion of foreign substances into piping.
- Provide the stopper and the guide as shown in the diagram to protect coupler from damage unless it is used in combination with Pal fix. Do not use a coupler as a guide or stopper when connecting. It may cause the damage. Install the stopper to have the dimension $27.5^{0}_{-0.5}$ (See diagram on the right). Observe allowable eccentricity and inclination value when installing the guide. (Refer to **page →90** for details on allowable eccentricity and inclination value.)

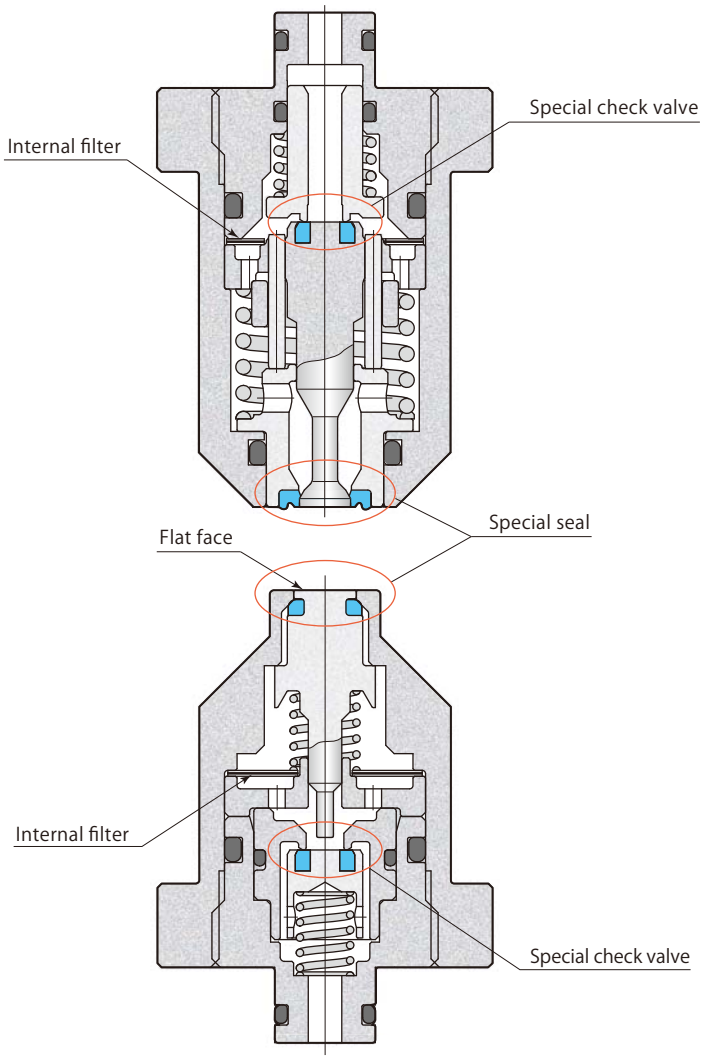
Mounting sample without Pal fix



## Special seal mechanism ensures leak of operating oil is zero for connecting and disconnecting

### 7 MPa Non-leak coupler socket
model **WVP-2HSL**

### 7 MPa Non-leak coupler plug
model **WVP-2HPL**




Spill amount (liquid drip amount per connection or disconnection) 0.01 mL or less

- Special seal installed on the tip of coupler socket and coupler plug can minimize the intrusion of air and spill of working fluid during connection and disconnection, furthermore, it prevents corruption of coolant by being miscible with spilled working fluid and air contamination of clamp circuit.
- Model WVP-2H incorporates filter and protects internal check valves and clamps from foreign substances.
- Connection and disconnection, which had been difficult to perform with conventional couplers while hydraulic pressure is applied, can be performed smoothly.
- Pressure in the circuit is retained for a long time after disconnection of coupler.

## Specifications

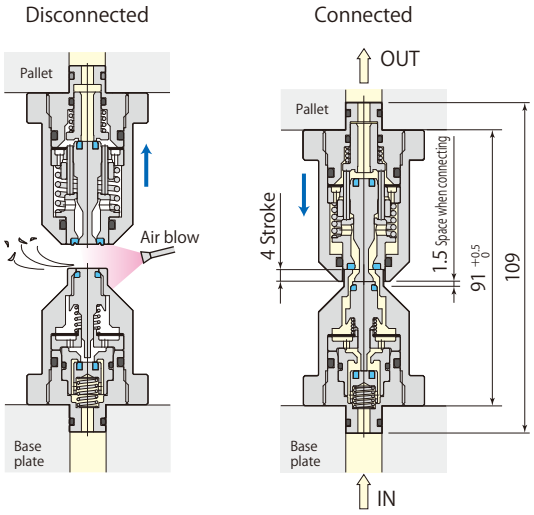
| | | |
|---|---|---|
| Pressure range | 1–7 MPa | Circuit symbol |
| Proof pressure | 10.5 MPa | |
| Orifice area | 12.5 mm² | |
| Fluid used | General mineral based hydraulic oil (ISO-VG32 equivalent) | |
| Allowable eccentricity | ±0.4 mm | Plug hydraulic pressure source 7MPa |
| Allowable inclination | 0.2° or less | Connect/disconnect under pressure : Capable |
| Reactive force* | 154 N per 1 MPa fluid pressure | |
| | Max. spring force for no pressure 157 N | |
| Operating temperature | 0–70 ℃ | |
| Mass | WVP-2HSL：270 g WVP-2HPL, 2HDL：230 g | |

∗：Reactive force (N) = Fluid pressure (MPa) ×154+157

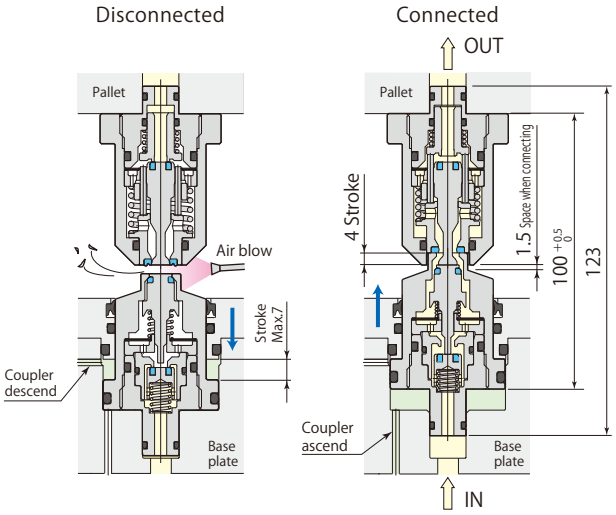
- Supply operating oil from plug.
- Mixed use with model WVP-2S□L is not possible.

## Non-leak coupler fixed

Coupler lower section hydraulic pressure supply

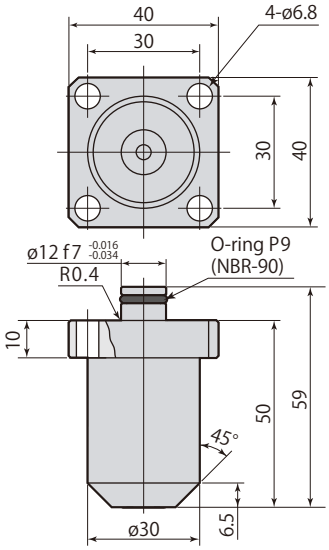


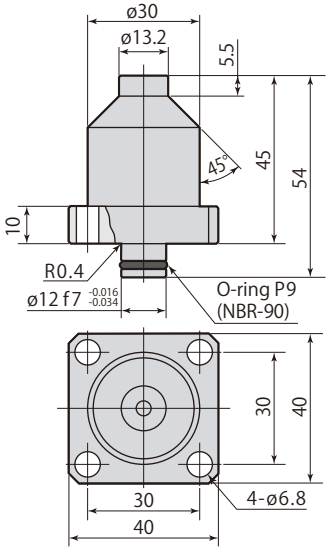

## Non-leak coupler float




## Dimensions

WVP-2HSL socket (fixed)

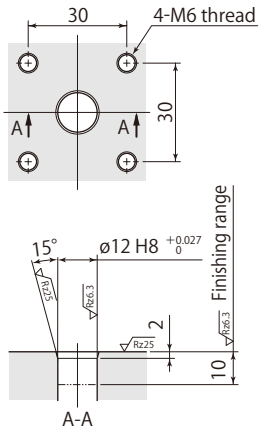


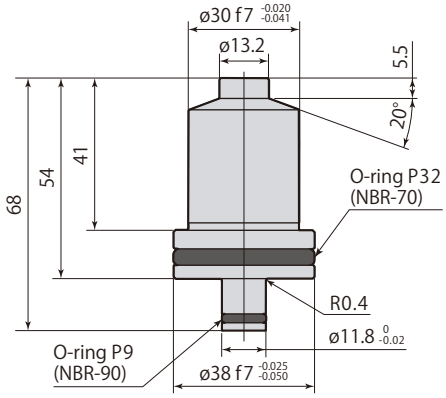

WVP-2HPL plug (fixed)

### Mounting details

WVP-2HSL
WVP-2HPL

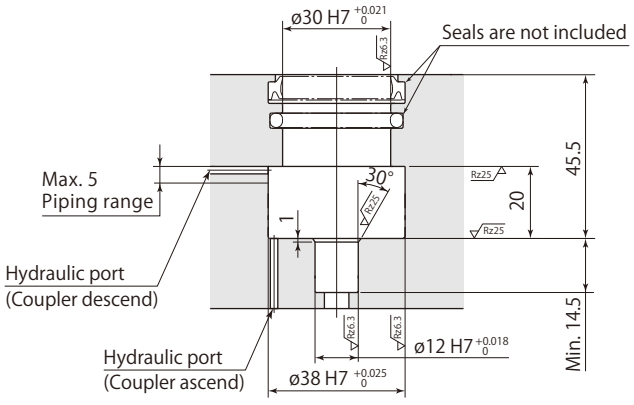



WVP-2HDL plug (floating)




### Mounting details

WVP-2HDL



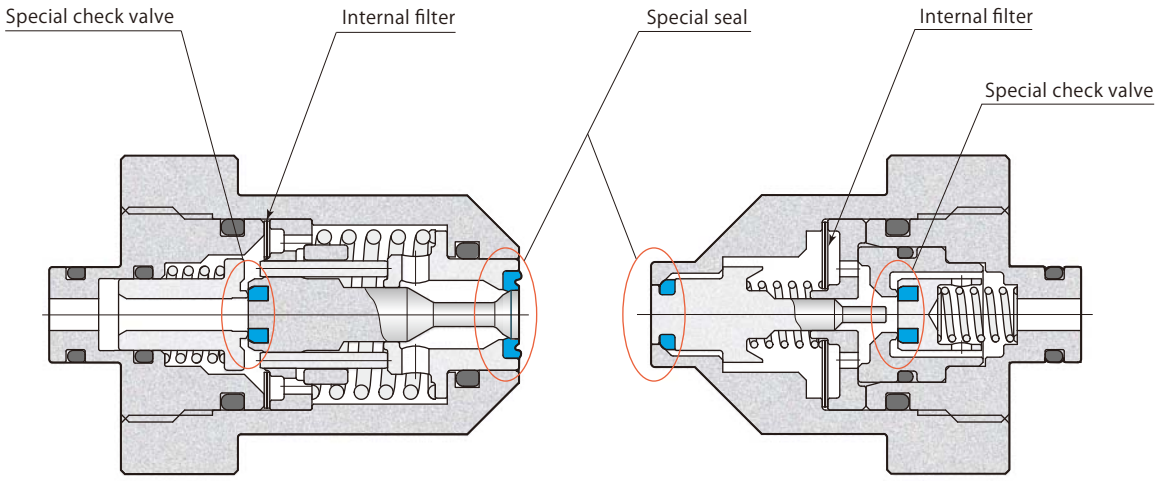

● Mounting screws are not included.

Rz: ISO4287(1997)

## Special seal mechanism ensures leak of operating oil is zero for connecting and disconnecting

7 MPa Non-leak coupler socket
model **WVP-2SSL**

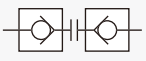
7 MPa Non-leak coupler plug
model **WVP-2SPL**




Spill amount (liquid drip amount per connection or disconnection) 0.01 mL or less

- Special seal installed on the tip of coupler socket and coupler plug can minimize the intrusion of air and spill of working fluid during connection and disconnection, furthermore, it prevents corruption of coolant by being miscible with spilled working fluid and air contamination of clamp circuit.
- Model WVP-2S incorporates filter and protects internal check valves and clamps from foreign substances.
- Connection and disconnection, which had been difficult to perform with conventional couplers while hydraulic pressure is applied, can be performed smoothly.
- Pressure in the circuit is retained for a long time after disconnection of coupler.
- Jig pallet fabrication cost is kept low by using an economically priced plug for coupler of pallet.

### Specifications

| | | |
|---|---|---|
| Pressure range | 1–7 MPa | Circuit symbol  Socket hydraulic pressure source 7MPa Connect/disconnect under pressure : Capable |
| Proof pressure | 10.5 MPa | |
| Orifice area | 12.5 mm² | |
| Fluid used | General mineral based hydraulic oil (ISO-VG32 equivalent) | |
| Allowable eccentricity | ±0.4 mm | |
| Allowable inclination | 0.2° or less | |
| Reactive force* | 154 N per 1 MPa fluid pressure | |
| | Max. spring force for no pressure 162 N | |
| Operating temperature | 0–70 ℃ | |
| Mass | WVP-2SSL：300 g WVP-2SPL：260 g | |

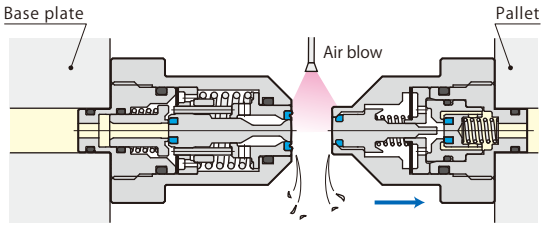
∗：Reactive force (N) = Fluid pressure (MPa) ×154+162

- Supply operating oil from socket.
- Mixed use with model WVP-2H□L is not possible.

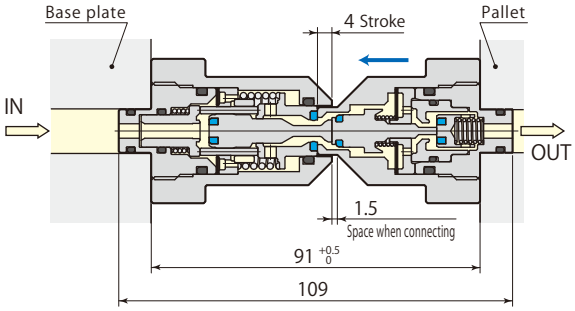
## Non-leak coupler fixed

Horizontal mounting of coupler

Disconnected



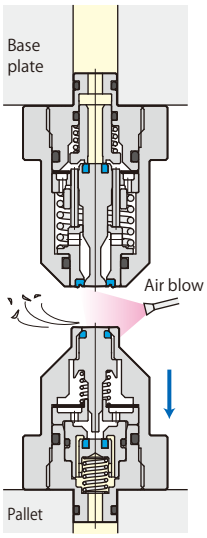

Connected



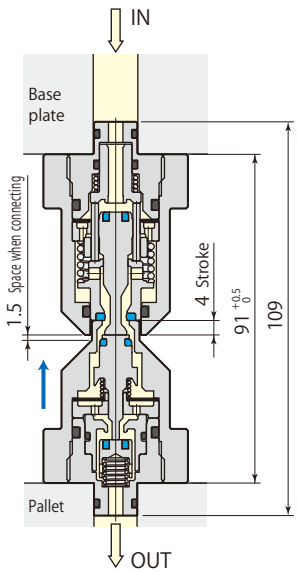

## Non-leak coupler fixed

Coupler upper section hydraulic pressure supply

Disconnected



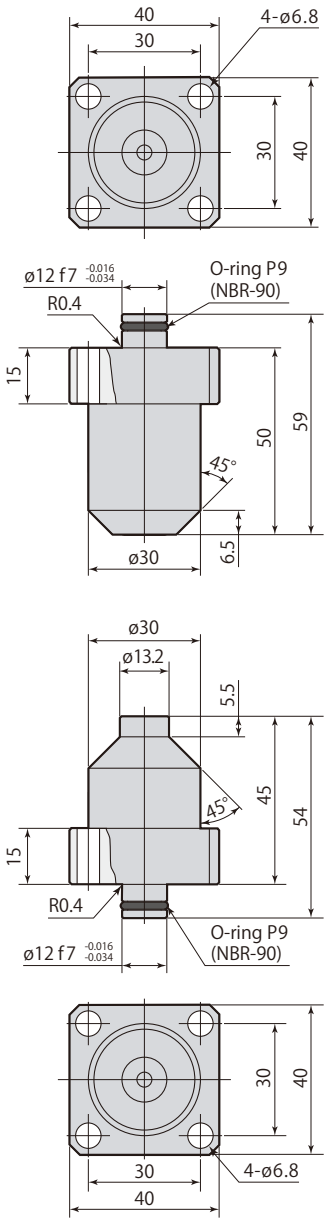

Connected




● Perform installation with plug below so metal chips are less likely to adhere and air blowing can be performed properly.

## Dimensions

WVP-2SSL socket (fixed)

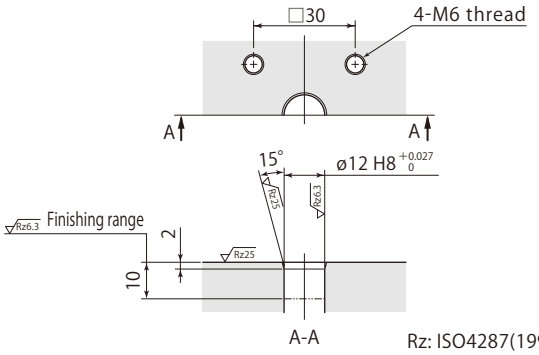



WVP-2SPL plug (fixed)

● Mounting screws are not included.

## Mounting details

WVP-2SSL, WVP-2SPL

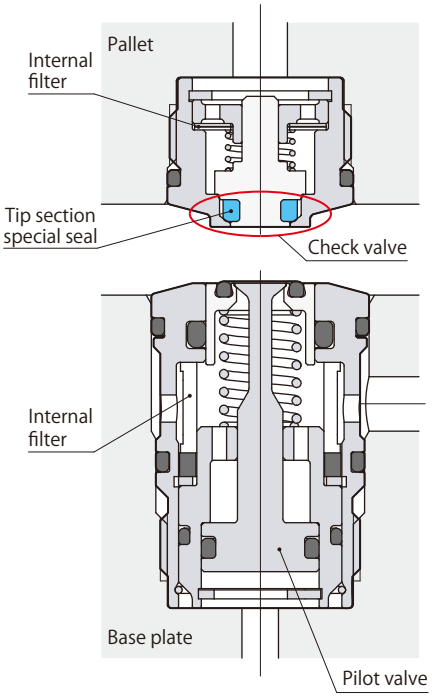



Rz: ISO4287(1997)

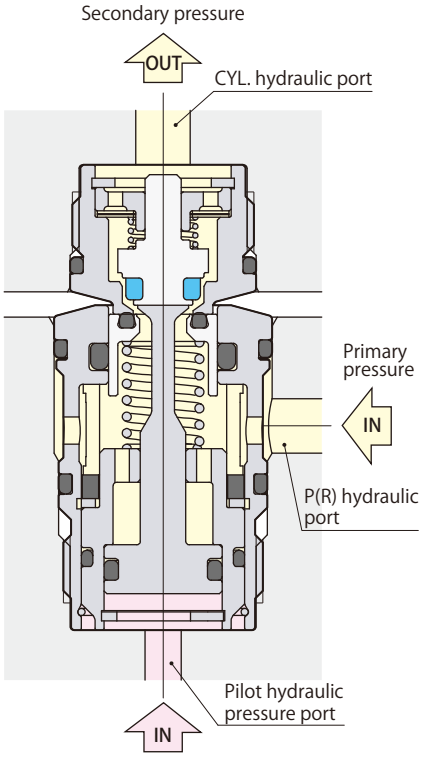
## Compact coupler that has less reactive force when connecting by means of a pilot check valve

### 7 MPa Pilot coupler plug
model **WVP-2EPL**

### 7 MPa Pilot coupler socket
model **WVP-2ESL**

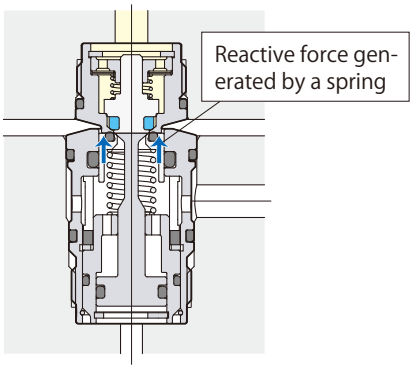



Disconnected




Connected (Pressure)

- A pilot check mechanism enables the reactive force when connecting to lower.

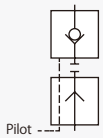



- Unique seal on the tip of coupler ensures a long-term retaining the circuit pressure even after disconnection.
- Filter is fitted inside coupler to prevent intrusion of metal chips and debris into hydraulic circuit.

## Specifications

| | |
|---|---|
| Pressure range | 1–7 MPa |
| Proof pressure | 10.5 MPa |
| Orifice area | 10.2 mm² |
| Fluid used | General mineral based hydraulic oil (ISO-VG32 equivalent) |
| Allowable eccentricity | ±0.5 mm |
| Allowable inclination | 0.3° or less |
| Reactive force | Spring force when connected 28 N |
| | Reactive force when pressurized 113 × P*1 + 36 N |
| Pilot pressure | 0.4 × P*2 + 0.1 MPa or more |
| Operating temperature | 0–70 ℃ |
| Mass | WVP-2EPL : 29 g WVP-2ESL : 82 g |

Circuit symbol



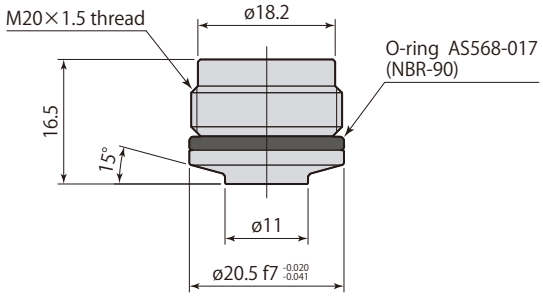

OIL | 7MPa | Secondary pressure retainable

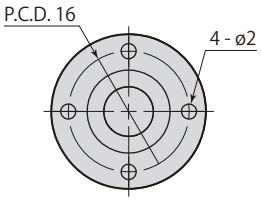
*1 : P = Primary side hydraulic pressure (MPa)
*2 : P = Secondary side hydraulic pressure (MPa)

## Dimensions

### WVP-2EPL

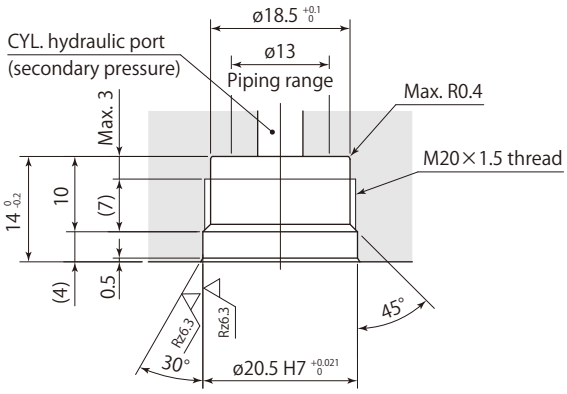
Hydraulic pressure 7MPa plug
Recommended tightening torque：15 N·m

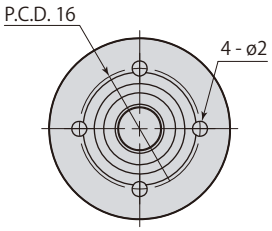


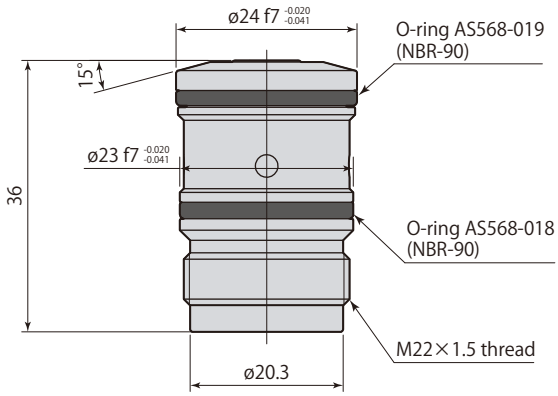




### Mounting details

WVP-2EPL

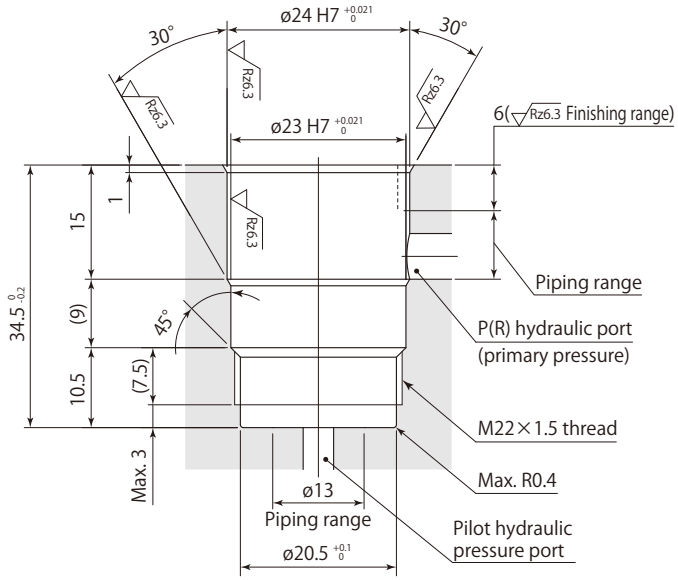



### Mounting details

WVP-2ESL



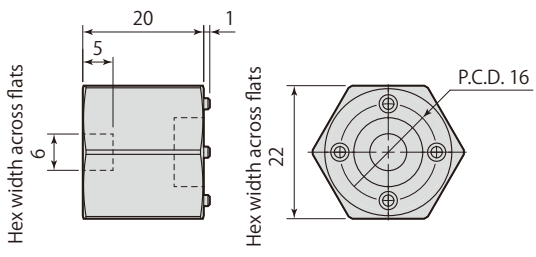

Rz: ISO4287(1997)

### WVP-2ESL

Hydraulic pressure 7MPa socket
Recommended tightening torque：15 N·m

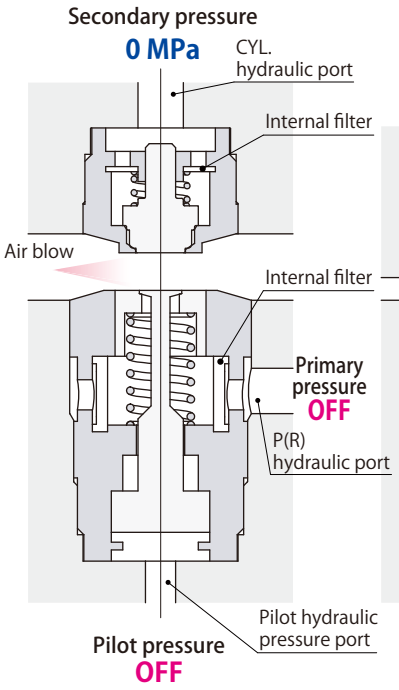
- Do not supply pressure to P port (primary) and pilot port under disconnected state or during connecting and disconnecting action.
- No check valve provided in a socket. Do not supply pressure when coupler disconnected state.
- Make sure air bleeding in the hydraulic circuit is perfectly done when installation.
- Reactive force generates when primary pressure is supplied. Locking device which exerts bigger force than reactive force should be mounted after couplers are connected.

Mounting tool (option) model **WVP-2EJ**



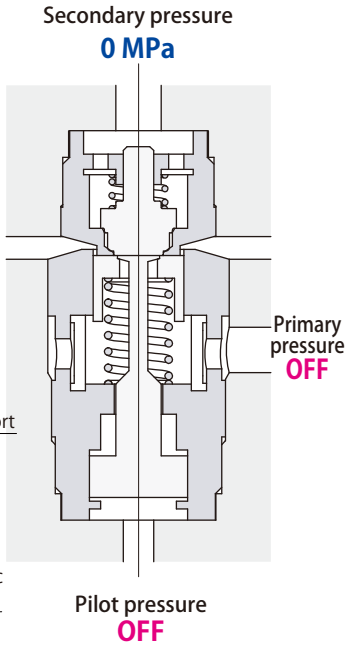
## Clamp pressure holding action

### ①Disconnected state



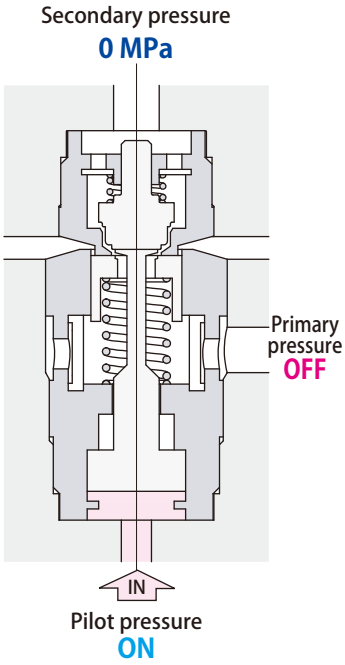

Do not supply primary and pilot pressure when coupler disconnected state.

### ②Connecting



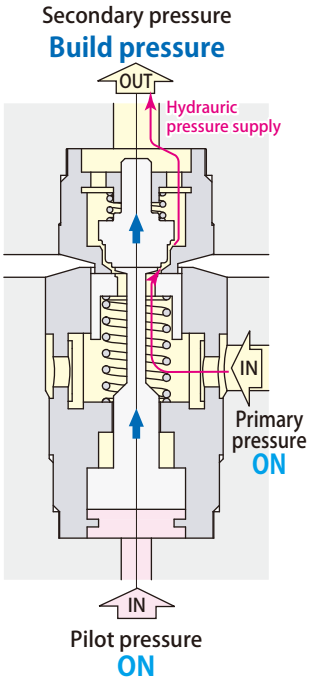

Connect the couplers.

### ③Build pressure-1




Supply pilot pressure to open the check valve.

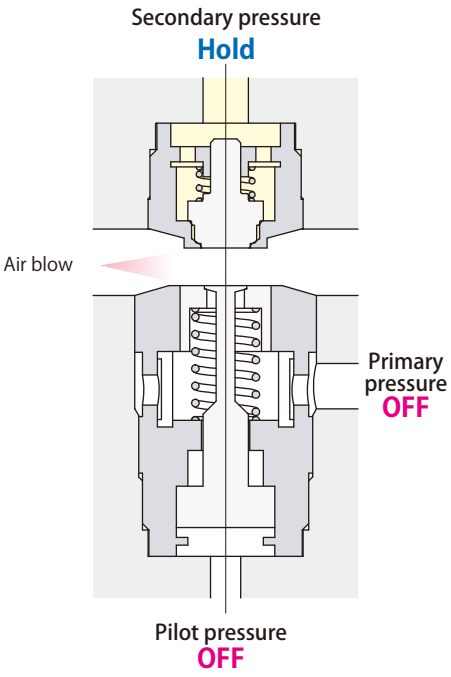
### ④Build pressure-2




Supply primary pressure after pilot pressure is supplied.

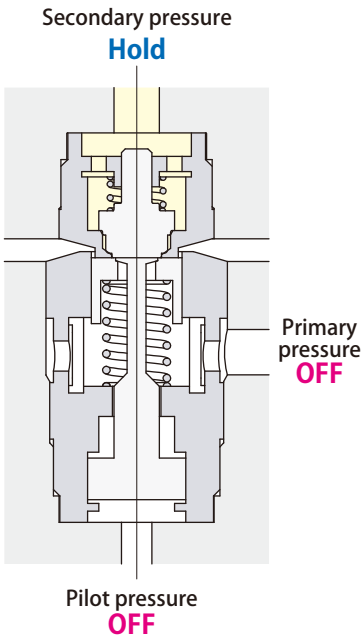
## Clamp pressure release action

### ①Disconnected state



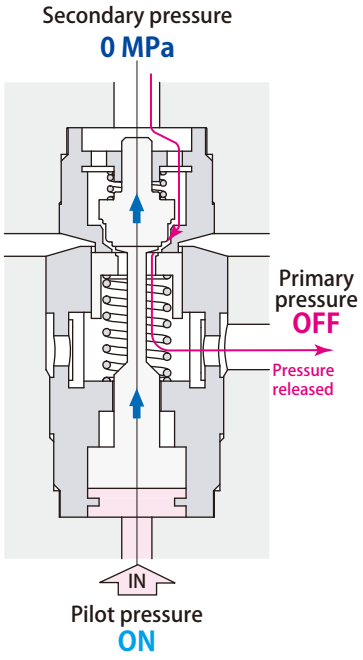

Do not supply primary and pilot pressure when coupler disconnected state.

### ②Connecting



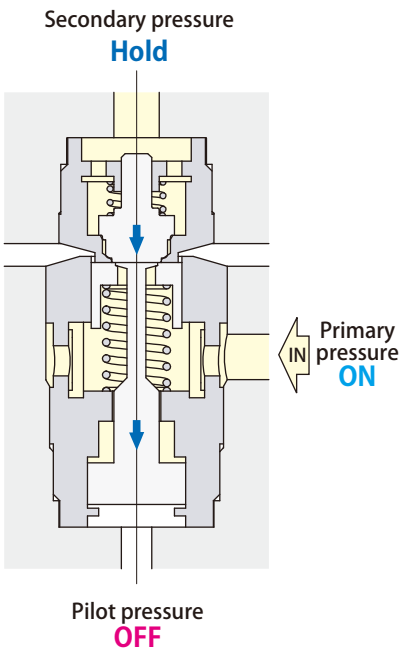

Connect the couplers.

### ③Clamp pressure release action-1



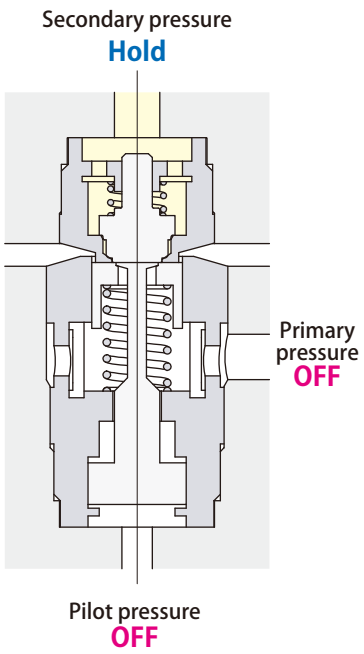

Supply pilot pressure after connection and release the clamp pressure.

### ⑤Pressure holding action-1



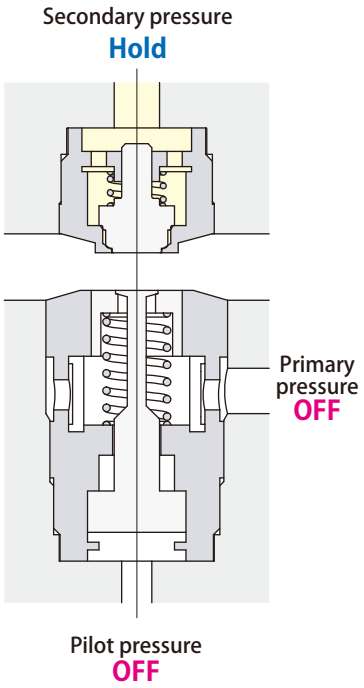

Stop supplying pilot pressure after secondary pressure is built up.

### ⑥Pressure holding action-2



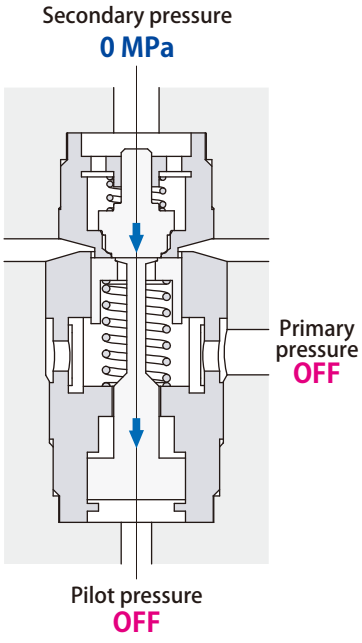

Stop supplying primary pressure after pilot pressure is supplied.

### ⑦Coupler disconnecting action



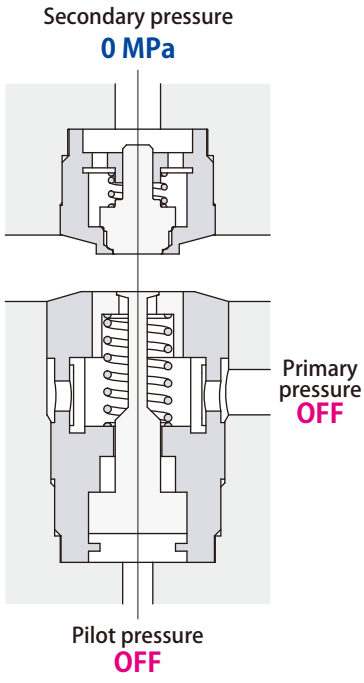

Clamp pressure is kept even after coupler is disconnected.

### ④Clamp pressure release action-2




Stop supplying pilot pressure after clamp pressure is released.

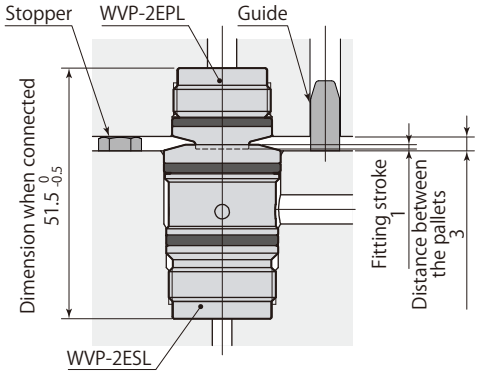
### ⑤Coupler disconnecting action



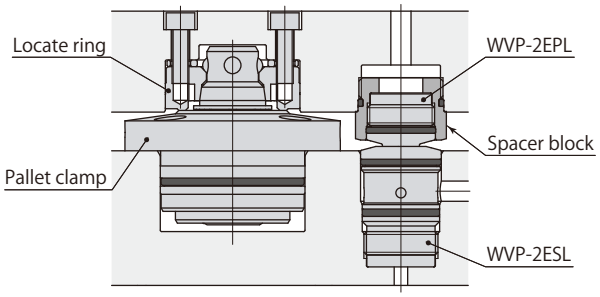

Disconnect couplers.

## Caution in use

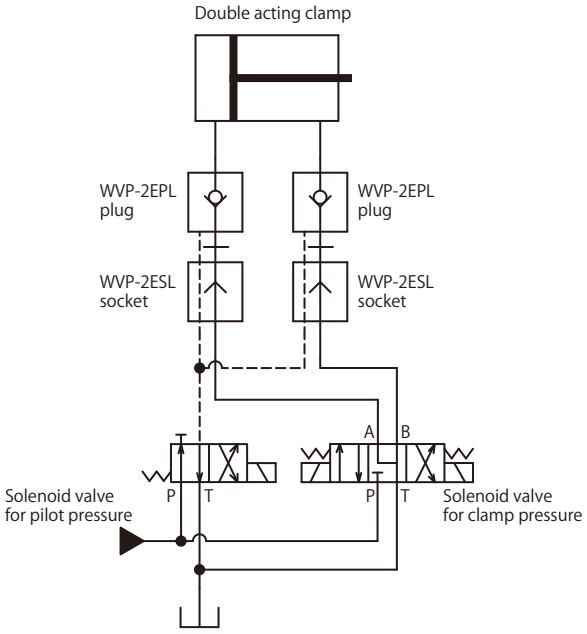
- Install the stopper to have the dimension $51.5^{0}_{-0.5}$(See diagram on the below).
  Observe allowable eccentricity and inclination value when installing the guide (Refer to **page →96**).




- Prepare a spacer block (by customer) separately when coupler is used with a pallet clamp.

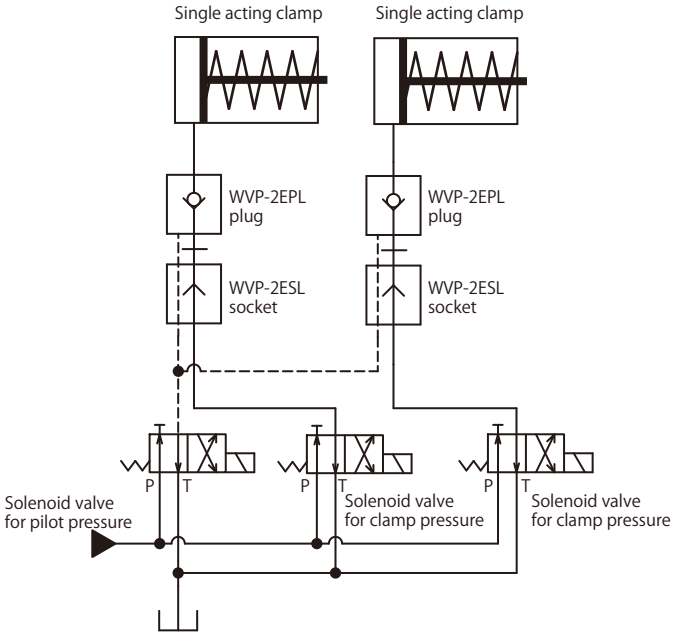



## Hydraulic circuit diagram for double acting clamp




- 3 position, center tank-port solenoid valve should be used for clamp pressure circuit to avoid back pressure. A solenoid valve which switches to Tank port connection except supplying pressure to the circuit should be used.

## Hydraulic circuit diagram for single acting clamp




- A solenoid valve which switches to Tank port connection except supplying pressure to the circuit should be used to avoid back pressure.

## Caution in use

- Perform complete air bleeding of the circuit when using couplers under pressure type. Insufficient air bleeding may cause the oil spill when connecting or circuit pressure drop.
- Do not connect the couplers with metal chips or coolant on the tip of it. Perform air blow to clean it off if there is a risk of adherence.
- Provide complete flushing to the oil pass of the manifold block to avoid contamination of the burrs or debris in the circuit. Failure of this instruction may cause damage of seals and result in the oil leakage because all models of coupler does not have preventive filters to protect contamination from oil supply side.
- Set coupling force to be same or more than reactive force of each model. Reactive force remains active until coupler has been totally disconnected.
- Provide the guide pin separately because coupler does not contain a guide or stopper block.
- Do not mount the couplers on the place where coolant oil builds up.

### Reactive force calculation example

Piping specification

| | |
|---|---|
| Hydraulic pressure | Two double acting clamp circuits (5 MPa each)<br>Coupler models : WVP-2BPH×2, WVP-2BSH×2 |
| Air | One seating detection circuit (0.3 MPa)<br>Coupler models : WVP-3DPN, WVP-3DSN |

### Reactive force against clamping

Clamping circuit

Spring force 40 (N) + Hydraulic pressure 5 (MPa) ×113 = 605 (N)

Unclamping circuit

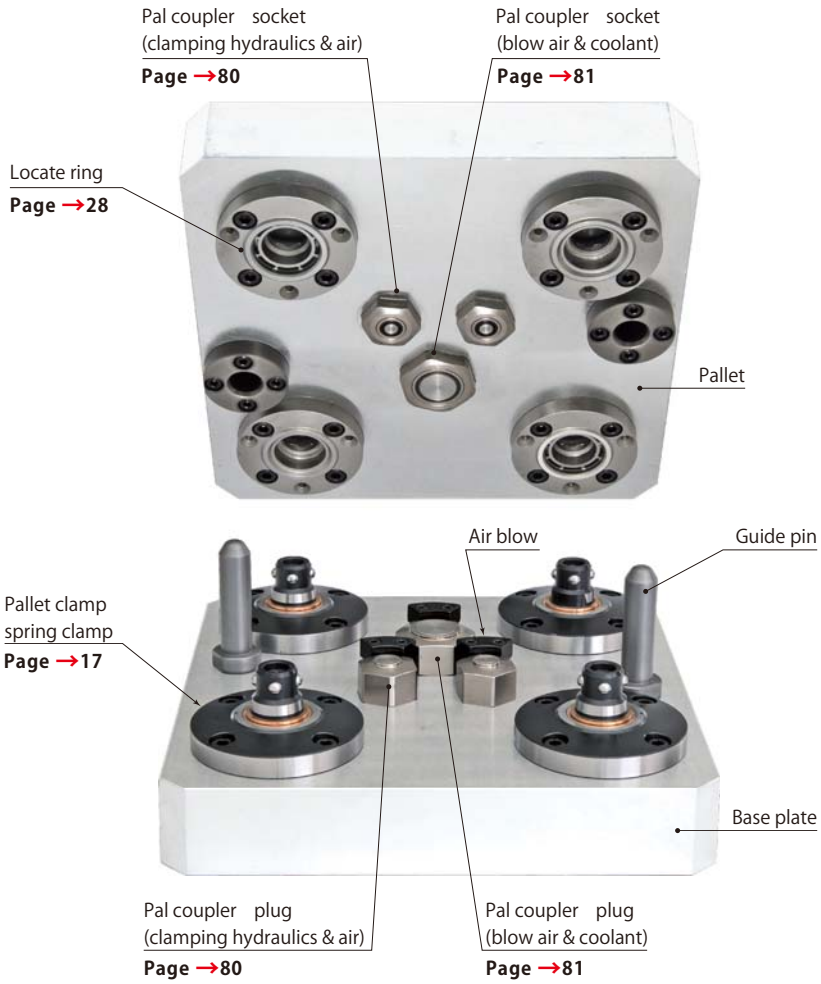
Spring force 40 (N)

Air circuit

Spring force 60 (N) + Air pressure 0.3 (MPa) ×380 = 174 (N)

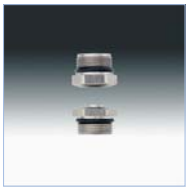
Total reactive force

Hydraulic coupler 605 (N) + 40 (N) + Air coupler 174 (N) = 819 (N)




Standard Pal system configuration example

## 25MPa Pal coupler

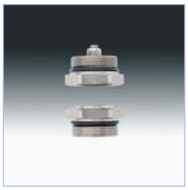


Fluid used: Oil, air
Orifice: 10.2 mm²
Built in filter: Not included
Connect/disconnect under pressure: Incapable

Socket model **WVP-2BSH**
Plug model **WVP-2BPH**

Page →80

## 1MPa Pal coupler



Fluid used: Air, coolant
Orifice: 29.0 mm²
Built in filter: Not included
Connect/disconnect under pressure: Incapable

Socket model **WVP-3DSN**
Plug model **WVP-3DPN**

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## 7MPa Pal coupler

Fluid used: Oil, air
Orifice: 10.2 mm²
Built in filter: Not included
Connect/disconnect under pressure: Incapable

Socket model **WVP-2FSL**
Plug model **WVP-2FPL**

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## 1MPa Pal coupler

Fluid used: Air, coolant
Orifice: 29.0 mm²
Built in filter: Not included
Connect/disconnect under pressure: Incapable

Socket model **WVP-3GSN**
Plug model **WVP-3GPN**

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## 1MPa Pal coupler

Fluid used: Air
Orifice: 8 mm²
Built in filter: Not included
Connect/disconnect under pressure: Incapable

Socket model **WVP-1FSN**
Plug model **WVP-1FPN**

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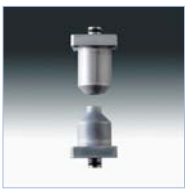
## 7MPa Non-leak coupler

Plug hydraulic pressure source



Fluid used: Oil
Orifice: 12.5 mm²
Built in filter: Included
Connect/disconnect under pressure: Capable

Socket (fixed) model **WVP-2HSL**
Plug (fixed) model **WVP-2HPL**
Plug (floating) model **WVP-2HDL**

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## 7MPa Non-leak coupler

Socket hydraulic pressure source

Fluid used: Oil
Orifice: 12.5 mm²
Built in filter: Included
Connect/disconnect under pressure: Capable

Socket model **WVP-2SSL**
Plug model **WVP-2SPL**

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## 7MPa Pilot coupler

Fluid used: Oil
Orifice: 10.2 mm²
Built in filter: Included
Connect/disconnect under pressure: Incapable*
*: Secondary pressure retainable

Socket model **WVP-2ESL**
Plug model **WVP-2EPL**

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## 35MPa Non-leak coupler

Plug hydraulic pressure source

Fluid used: Oil
Orifice: 12.5 mm²
Built in filter: Included
Connect/disconnect under pressure: Capable

Socket (fixed) model **WVP-2HSH**
Plug (fixed) model **WVP-2HPH**
Plug (floating) model **WVP-2HDH**

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## 35MPa Non-leak coupler

Socket hydraulic pressure source

Fluid used: Oil
Orifice: 12.5 mm²
Built in filter: Included
Connect/disconnect under pressure: Capable

Socket model **WVP-2SSH**
Plug model **WVP-2SPH**

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## 1MPa Air coupler

Fluid used: Air
Orifice: 16.7 mm²
Built in filter: Included
Connect/disconnect under pressure: Incapable

Socket model **WVP-2WSN**
Plug model **WVP-2WPN**

Request a catalog seperately.

## 1MPa Coolant coupler

Fluid used: Coolant
Orifice: 54.5 mm²
Built in filter: Not included
Connect/disconnect under pressure: Incapable

Socket model **WVP-4KSN**
Plug model **WVP-4KPN**

Request a catalog seperately.

## 7MPa Compact coupler

Fluid used: Oil, air
Orifice: 12.5 mm²
Built in filter: Included
Connect/disconnect under pressure: Incapable

Socket (fixed) model **WVP-2CSL**
Socket (embeded) model **WVP-2CFL**
Plug (fixed) model **WVP-2CPL**

Request a catalog seperately.

## 7MPa Pal coupler

Fluid used: Oil, air
Orifice: 12.6 mm²
Built in filter: Not included
Connect/disconnect under pressure: Incapable

Socket model **WVP-2MSH**
Plug model **WVP-2MDL**

Request a catalog seperately.

## 25MPa Mini coupler

Fluid used: Oil, air
Orifice: 12.6 mm²
Built in filter: Not included
Connect/disconnect under pressure: Incapable

Socket model **WVP-2MSH**
Plug model **WVP-2MPH**

Request a catalog seperately.