# Pneumatic Expansion Locating Pin

Model VWM



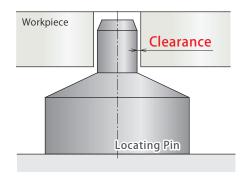
VWK2000-060/070 have been newly added

### Locating Repeatability VWM: $3 \mu \text{ m}$ , VWK: $10 \mu \text{ m}$

Zero Clearance between Reference Hole and Large Expansion Locating Pin

## It is an Air Control High-Accuracy Locating Pin that locates a workpiece by expanding the pin diameter.

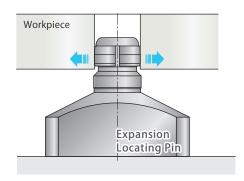
## The general locating pin has some clearance between the pin and workpiece hole.



General Locating Pin

#### Expansion locating pin: zero clearance!!

High Accuracy Setup Time Reduction Cost Reduction



#### The World's First Locating Mechanism

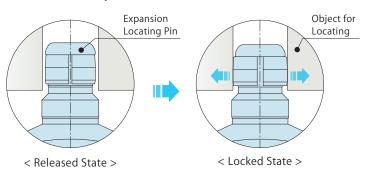
When expanded: Clearance between the pin and reference hole becomes

zero to locate with high accuracy.

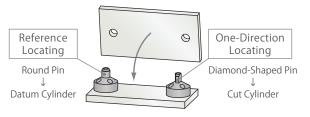
When released : Easy to load/unload workpieces with enough clearance.

#### **Action Description**

\*This drawing shows VWM.



Two types of locating pins (Cylindrical and Diamond shaped pins). Expansion Locating Pin consisting of Datum-D and Cut-C cylinder.

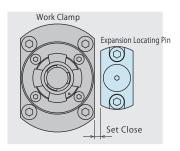




#### **Features**

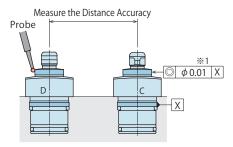
#### Simple Arrangement

The compact body can be installed close to the clamp, so fixture design is more simple.



#### Easy to Check the Accuracy

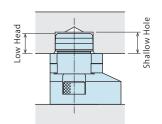
The same core part with X on the flange top allows to determine the origin and measure the distance accuracy.



%1. It is  $\phi$  0.02 for VWK.

#### For Shallow Workpiece Hole

The low head pin can be used for shallow workpiece hole.

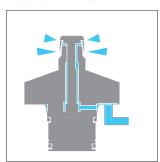


#### Function

#### Air Blow Function

Equipped to All Options

Prevent contamination.

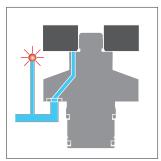


\*\*This drawing shows VWM.

#### With Seating Surface (Seat Check) Release Confirmation

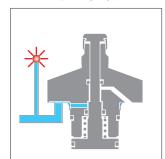
Only for -B: with Seating Surface

Available by using a gap sensor.



Only for -M: Release Confirmation

Available by using a gap sensor.



Locating Clamp

Locating

Hand • Clamp

Support

Valve • Coupler

Cautions • Others

Pneumatic Expansion

Locating Pin (Smaller)

VRA/VRC

Pneumatic Expansion Locating Pin (Large Expansion Model)

cating Pin

Manual Expansion Locating Pin

VX

Screw

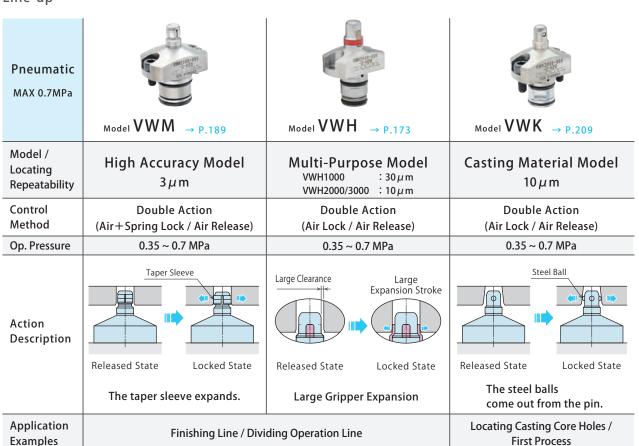
VXF

VXF

Compliance

WRC

#### Line-up



PAT.

### **Expansion Locating Pin**

#### Model VWM

Pneumatic • Double Action Locating Repeatability : 3  $\mu$  m



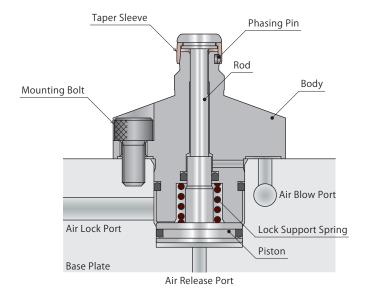
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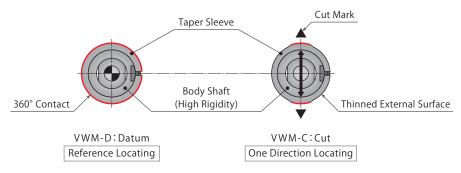
• Notes on Handling • Maintenance/Inspection • Warranty

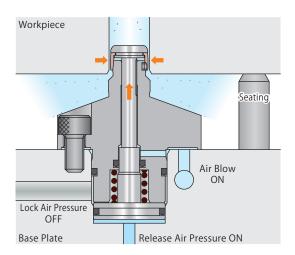
#### Action Description

This is a simplified drawing of VWM (Standard).



#### About Reference Locating and Orientation





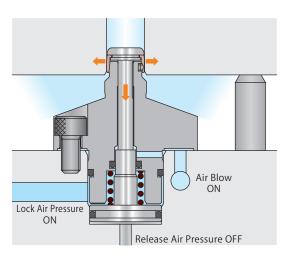
When loading workpiece

When unloading workpiece



 When lock air pressure is OFF and release air pressure is ON, the taper sleeve ascends with piston/rod and shrinks with its own elasticity.

- · Air blow prevents debris contamination.
- Rod head and taper sleeve are designed to load workpiece smoothly and prevent scratches.



When locating

When release air pressure is OFF and lock air pressure is ON, the piston/rod descend and the taper sleeve is expanded to locate the workpiece with high accuracy. (Seating is required for standard and release confirmation model.)

 When release pressure is OFF, it moves to the lock direction only with internal spring force so locating is not stable.

Locating + Clamp

Locatin

Hand • Clamp

Support

Valve • Coupler

Cautions • Others

Pneumatic Expansion Locating Pin (Smaller)

VRA/VRC

Pneumatic Expansion Locating Pin (Large Expansion Model)

VWH

neumatic Expansion ocating Pin

VWK

Manual Expansion Locating Pin

VX

Screw Locato

VXF

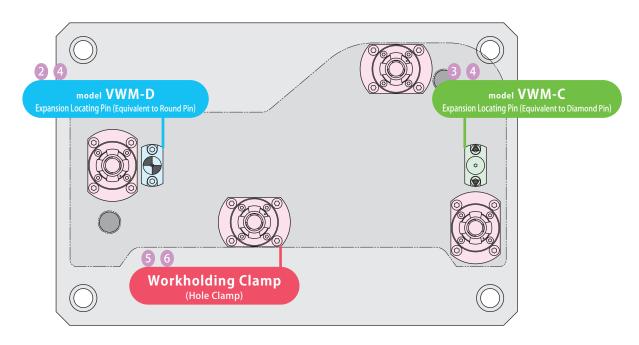
Compliance Module

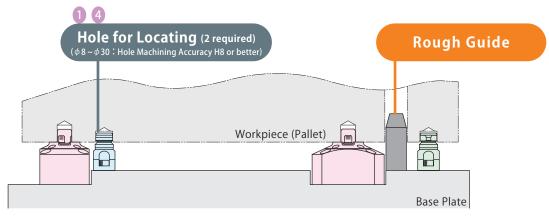
- System References
  - High Accuracy (3  $\mu$  m) + One-Touch Expansion Locating Pin Reduces Setup Time!
  - When dividing operations into different fixtures, High Accuracy Locating Pin (3  $\mu$  m)

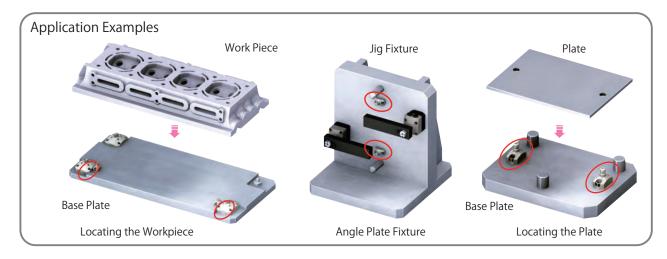
#### **Prevents Deterioration of Workpiece Accuracy!**

Using with Hole Clamps enables 5-face machining,

#### **Integrated Operation and More Compact Fixture!**







#### **Essential Points**

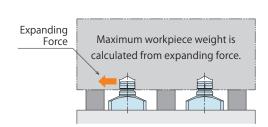
#### Workpiece Hole for Locating

- Workpiece hole diameter is  $\phi$  8 ~  $\phi$  30 (in 1mm increments).
- Hole machining accuracy for locating hole (two holes) is H8 or better.

# Workpiece Hole Diameter φ8 ~ φ30H8

#### Workpiece Weight

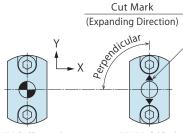
- Workpiece weight that expansion locating pin is able to locate with is calculated from expanding force.
- Expanding force is the force with which the expansion locating pin pushes out (expands) against the workpiece.
- Refer to the specification page for each model's calculation method of expansion force and allowable workpiece weight for locating.



#### Mounting Phase of VWM-C (Cut: For One Direction Locating)

- Reference position (origin) is determined by VWM-D (Datum: for reference locating).
- VWM-C (Cut: for one direction locating) locates in one direction (Y-axis), so phasing is necessary. When mounting, ensure the VWM-C (cut) cut mark is perpendicular to VWM-D (datum).

(There is a cut mark (▲) on top of the flange on the VWM-C unit that shows the locating direction.)



VWM-D (Datum)
For Reference (X-axis / Y-axis)
(Equivalent to Round Pin)

VWM-C (Cut) For One Direction (Y-axis) (Equivalent to Diamond Pin)

Support

Valve • Coupler

Hand • Clamp

Locating

Locating

Clamp

Cautions • Others

Pneumatic Expansion Locating Pin (Smaller)

VRA/VRC

Pneumatic Expansion Locating Pin (Large Expansion Model)

VWH

eumatic Expansion ocating Pin

VWM

Manual Expansion Locating Pin

VX

Screw

Locator

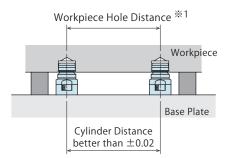
VXF

Compliance Module

WRC

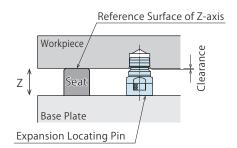
## 4 Distance Accuracy between Expansion Locating Pins and between Workpiece Holes

- The distance accuracy for the expansion locating pin should be within  $\pm 0.02$ mm.
- \*\*1. The distance accuracy of workpiece holes (pallet holes) should be within allowable difference. (Refer to "Notes for Design".)



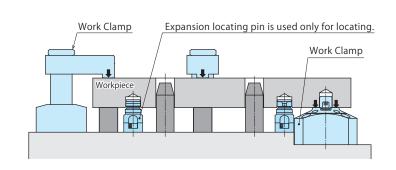
#### Setting an Additional Seat

 Standard model and -M: Release Confirmation model have no seating surface (reference surface towards Z-axis).
 Please prepare a seat separately.



#### Setting Additional Work Clamps

- Expansion locating pin has no clamping function.
- Additional clamps should be added to clamp workpiece.



#### Model No. Indication



#### Body Size

**2** : Select from Workpiece Hole Diameter  $\phi$ 8/ $\phi$ 9/ $\phi$ 10/ $\phi$ 11/ $\phi$ 12/ $\phi$ 13/ $\phi$ 14/ $\phi$ 15

**3** : Select from Workpiece Hole Diameter  $\phi$  16 /  $\phi$  17 /  $\phi$  18 /  $\phi$  19 /  $\phi$  20

**4** : Select from Workpiece Hole Diameter  $\phi 21 / \phi 22 / \phi 23 / \phi 24 / \phi 25$ 

**5** : Select from Workpiece Hole Diameter  $\phi$  26 /  $\phi$  27 /  $\phi$  28 /  $\phi$  29 /  $\phi$  30

#### 2 Design No.

0 : Revision Number

#### 3 Workpiece Hole Diameter

Contact us for unlisted workpiece hole diameters. (Workpiece hole machining accuracy should be H8 or better.)

Workpiece Hole Diam. Code	080	090	100	110	120	130	140	150	160	170	180	190	200
Workpiece Hole Diam. $\phi$ WA H8	8 + 0.022	9 + 0.022	10 + 0.022	11 + 0.027	12 + 0.027	13 + 0.027	14 + 0.027	15 + 0.027	16 <sup>+0.027</sup>	17 + 0.027	18 <sup>+0.027</sup>	19 <sup>+0.033</sup>	20 + 0.033
VWM2000				Selectio	n Range								
VWM3000										Sele	ction Ra	nge	
											14/	ata a a Hilada.	D: 414
Workpiece Hole Diam. Code	210	220	230	240	250	260	270	280	290	300	Work	oiece Hole	Diam. ∮ V 1
Workpiece Hole Diam. Code Workpiece Hole Diam. $\phi$ WA H8	210 21 <sup>+0.033</sup>	<b>220</b> 22 <sup>+0.033</sup>	230 23 <sup>+0.033</sup>	240 24 <sup>+0.033</sup>		<b>260</b> 26 + 0.033	270 27 <sup>+0.033</sup>	280 28 <sup>+0.033</sup>	<b>290</b> 29 <sup>+0.033</sup>	<b>300</b> 30 + 0.033	Work	oiece Hole	Diam. ∮ V
•		22 + 0.033		24 + 0.033							Work	piece Hole	Diam. $\phi$ V
Workpiece Hole Diam. $\phi$ WA H8		22 + 0.033	23 + 0.033	24 + 0.033			27 + 0.033		29+0.033		Work	piece Hole	Diam. φV

#### 4 Functions

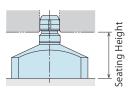
**D**: Datum (for Reference Locating)

**C**: Cut (for One Direction Locating)



#### 5 Seating Height

Model No.	9	Seating Hei	ght H (mm	)							
Model No.	15	20	25	30							
VWM2000	Selection Range										
VWM3000	Sel	ection Ran	ge								
VWM4000	Selection Range										
VWM5000	Selection Range										



Note:

Prepare a seat for **6** Option **Blank**: Standard and **M**: Release Confirmation Model.

KOSMEK
Harmony in Innovation

6 Options

**Blank**: None (Standard)

**B** : with Seating Surface

**M**: Release Confirmation Model

Note:

Contact us for combined use of  ${\bf B}$  : With Seating Surface and  ${\bf M}$  : Release Confirmation model.

7 Port Position This symbol is not required when selecting 6 Option: Blank (Standard) of VWM2000 / VWM3000.

R : Refer to External Dimensions

L : Refer to External Dimensions

Note:

Refer to **Port Position** on each External Dimension page for details.

Locating + Clamp

Location

Hand • Clamp

Support

Valve • Coupler

Cautions • Others

Pneumatic Expansion Locating Pin (Smaller)

VRA/VRC

Pneumatic Expansion Locating Pin (Large Expansion Model)

VWH

neumatic Expansion ocating Pin

VWM

VVVK

Manual Expansion Locating Pin

VX

Screw Locator

VXE

Compliance

#### Specifications: VWM2000 / VWM3000

Model No.					VWM	12000				VWM3000									
3 Workpiece Ho	le Diam. Code	080	090	100	110	120	130	140	150	160	170	180	190	200					
Workpiece Hole Diam. (Standa	rd Diam.) <b>mm</b>	φ8 <sub>H8</sub> <sup>+0.022</sup>	φ9 <sub>H8</sub> <sup>+0.022</sup>	φ10 <sub>H8</sub> <sup>+0.022</sup>	φ11 <sub>H8</sub> <sup>+0.027</sup>	φ12 <sub>H8</sub> <sup>+0.027</sup>	φ13 <sub>H8</sub> <sup>+0.027</sup>	φ14 <sub>H8</sub> <sup>+0.027</sup>	φ15 <sub>H8</sub> +0.027	φ16 <sub>H8</sub> +0.027	φ17 <sub>H8</sub> <sup>+0.027</sup>	φ18 <sub>H8</sub> <sup>+0.027</sup>	φ19 <sub>H8</sub> <sup>+0.033</sup>	φ20 <sub>H8</sub> <sup>+0.033</sup>					
Locating Repeatab	ility mm							0.003											
Allowable Offset (C:	Cut) mm	±0.05	±0.05	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.15	±0.15	±0.15	±0.15	±0.15					
F	at 0.35MPa	140	150	170	150	150	170	150	150	180	190	190	190	200					
Expanding *1	at 0.5MPa	220	230	250	230	220	250	230	220	280	290	290	290	300					
Force (F) N	at 0.7MPa	330	330	350	330	330	350	340	330	420	430	430	430	440					
Allowable Thrust Load	d **2 N	1500	1500	2000	2000	2500	2500	2500	2500	3500	3500	3500	3500	4000					
Cylinder Capacity	Release side		0.	18			0.2	21				0.38							
(Empty Action) cm <sup>3</sup>	Lock side		0.	17			0.2	20				0.34							
Operating Pressure Ran	nge MPa							0.35 ~ 0.7	,										
Withstanding Press	Withstanding Pressure MPa 1.0																		
Recommended Air Blow Pre	essure MPa							0.3 ~ 0.4											
Operating Temperature	Range °C							0 ~ 70											
Usable Fluid								Dry Air											

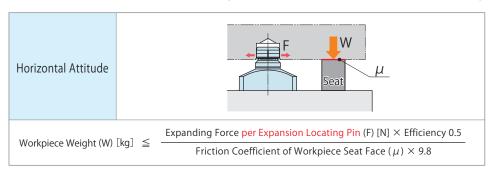
#### Specifications: VWM4000 / VWM5000

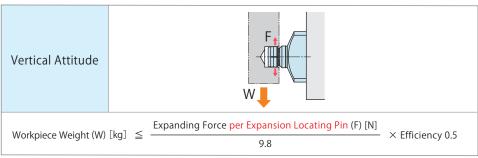
Model No.				VWM4000					VWM5000		
3 Workpiece Hol	le Diam. Code	210	220	230	240	250	260	270	280	290	300
Workpiece Hole Diam. (Standar	rd Diam.) <b>mm</b>	φ21 <sub>H8</sub> <sup>+0.033</sup>	φ 22 <sub>H8</sub> <sup>+0.033</sup>	$\phi$ 23 <sub>H8</sub> $^{+0.033}_{0}$	φ 24 <sub>H8</sub> <sup>+0.033</sup>	φ 25 <sub>H8</sub> <sup>+0.033</sup>	φ 26 <sub>H8</sub> <sup>+0.033</sup>	φ27 <sub>H8</sub> <sup>+0.033</sup>	$\phi$ 28 <sub>H8</sub> $^{+0.033}_{0}$	$\phi$ 29 <sub>H8</sub> $^{+0.033}_{0}$	$\phi$ 30 <sub>H8</sub> $^{+0.033}_{0}$
Locating Repeatabi	ility mm					0.0	003				
Allowable Offset (C:	Cut) mm	±0.15	±0.15	±0.15	±0.15	±0.15	±0.15	±0.15	±0.15	±0.15	±0.15
Francisco di se se %1	at 0.35MPa	420	420	420	420	420	700	710	710	710	710
Expanding **1	at 0.5MPa	580	580	580	580	580	920	930	930	930	930
Force (F) N	at 0.7MPa	790	790	790	790	790	1210	1220	1220	1220	1220
Allowable Thrust Load	d*2 N	5500	5500	5500	5500	6500	7500	7500	7500	9000	9000
Cylinder Capacity	Release side			0.62					0.86		
(Empty Action) cm <sup>3</sup>	Lock side			0.54					0.74		
Operating Pressure Ran	nge MPa					0.35	~ 0.7				
Withstanding Press	ure MPa					1	.0				
Recommended Air Blow Pressure MPa 0.3 ~ 0.4											
Operating Temperature	Range °C					0 ~	70				
Usable Fluid						Dry	Air				-

#### Notes:

- %1. Expanding force shows the calculated value when coefficient friction is  $\mu$ 0.2. Refer to the following for the relative equation of expanding force and allowable workpiece weight for locating.
- $\ensuremath{\%2}. \ensuremath{\text{ Exceeding allowable thrust load leads to accuracy failure and/or damages on the product.}$ 
  - 1. This product locates with air pressure + spring and releases with air pressure. (Air Pressure Double Action)
  - 2. This cylinder is used only for locating and does not have a clamping function.

#### Relative Equation of Expanding Force and Allowable Workpiece Weight for Locating







#### Thrust Load/Displacement Curve

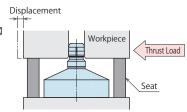
This graph shows the relationship between thrust load and displacement.

Thrust load is the static load applied perpendicular to the center axis of the VWM (Pneumatic Expansion Locating Pin).

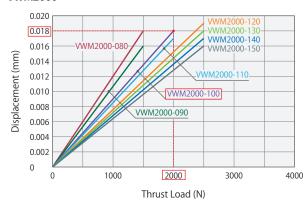
#### Note:

This graph shows the thrust load (static load) applied to a single datum (VWM-D) cylinder that is not used with any other cylinders, etc.

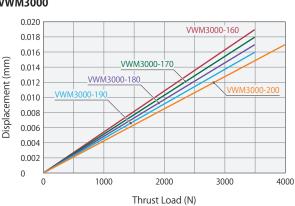
[How to Read the Thrust Load/Displacement Curve] ex.) In case of VWM2000-100 Requirement: When a 2000N thrust load is applied to an expanded VWM2000-100, the displacement will be about 0.018mm.



#### VWM2000



#### VWM3000



#### Locating Clamp

Locating

Support

Valve • Coupler

Hand • Clamp

Cautions · Others

Pneumatic Expansion Locating Pin (Smaller)

VRA/VRC

Pneumatic Expansion Locating Pin (Large Expansion Model)

## neumatic Expa ocating Pin

Manual Expansion

Locating Pin

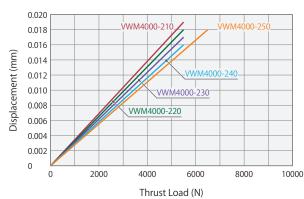
Screw VXF

VXF

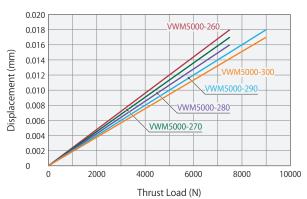
Compliance

WRC

VWM4000



#### VWM5000



When Locking (At Full Stroke)

Datum Diameter

(At Full Stroke)

Full Stroke

 $\odot$ 

Datum Diameter

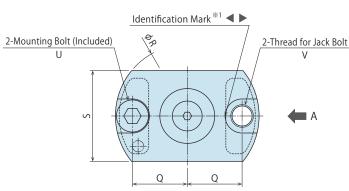
(When Releasing)

#### External Dimensions

\* The drawing shows the released state of VWM2000 and VWM3000.

#### Expanding Area Detail

When Releasing



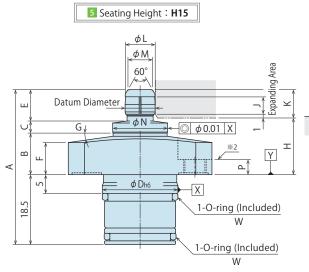
VWM-D

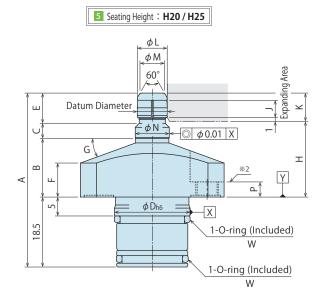
Workpiece Hole Dimensions

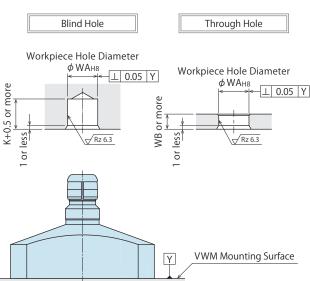


(Datum: Reference Locating)





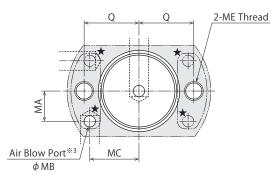


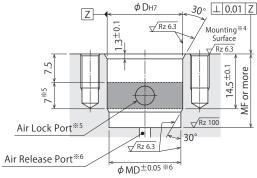


#### Notes:

- ※1. Identification mark is only marked on -C: Cut (for one direction locating). ◀ ▶ indicates the locating direction.
- ※2. Do not use spring washer or toothed lock washer.
- 1. When mounting the product, use two mounting bolts (Strength Grade 12.9) and tighten them evenly. Use two jack bolts to remove the product, keeping it parallel to the mounting surface.
- 2. This product has no seat. Choose option -B: with Seating Surface or prepare a seat separately.

#### Machining Dimensions for Mounting





Weight

#### Notes:

- ※3. Install the air blow port choosing one port from four ★ parts.
- There might be foam near the flange bottom depending on roughness of mounting surface, but this is not a malfunction.
- %6. Prepare the air release port on the bottom within the range of  $\phi$  MD.
  - accuracy, workpiece hole distance accuracy and mounting phase before installation. (Refer to P.229.)

Make sure to check the cautions for cylinder mounting distance

External Dimensions and Machining Dimensions for Mounting

(mm) VWM2000-□-□-□ VWM3000-□-□-□ Model No. 3 Workpiece Hole Diam. Code 170 190 080 090 100 110 120 130 140 150 160 180 200 5 Seating Height Workpiece Hole Diam. (Standard Diam.)  $\phi 8_{H8} + \frac{0.022}{0} \phi 9_{H8} + \frac{0.022}{0} \phi 10_{H8} + \frac{0.022}{0} \phi 10_{H8} + \frac{0.027}{0} \phi 11_{H8} + \frac{0.027}{0} \phi 11_{H8} + \frac{0.027}{0} \phi 13_{H8} + \frac{0.027}{0} \phi 13_{H8} + \frac{0.027}{0} \phi 15_{H8} + \frac{0.027}{0} \phi 15_{H8} + \frac{0.027}{0} \phi 16_{H8} + \frac{0.0$ At Releasing Datum φ7.94 or less φ8.94 or less φ9.94 or less φ10.94 or less φ11.92 or less φ12.92 or less φ13.92 or less φ14.92 or less φ15.89 or less φ16.89 or less φ17.89 or less φ18.89 or less Diameter At Full Stroke \$\phi 8.05 or more \quad \text{9.05 or more} \quad \text{91.0.05 or more} \quad \text{91.0.07 or more} \quad \quad \text{91.0.07 or more} \quad \text{91.0.07 or more} \quad \quad \quad \text{91.0.07 or more} \quad Full Stroke 0.65 0.75 41 46 51 41 46 51 41 46 51 41 46 51 41 46 51 41 46 51 41 46 51 41 46 51 41 545 51.5 41.5 46.5 51. В 11 | 155 | 205 | 11 | 15 | 20 | 11 | 15 | 20 | 11 | 15 | 20 | 11 | 15 | 20 | 11 | 15 | 20 | 11 | 15 | 20 | 11 | 14.5 | 19.5 | 11 | 14.5 | 19.5 | 11 | 14.5 | 19.5 | 11 | 14.5 | 19.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 15.5 | 20.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10 C D h6 (Body Side)  $23_{-0.013}^{0}$  $20_{-0.013}^{0}$  $20_{-0.013}^{0}$ D H7 (Machining Hole) 20 +0.021 20 +0.021 23 +0.021 Ε 9 85 9 9 85 9 9 85 9 9 85 9 9 | 8.5 | 9 | 9 | 8.5 | 9 | 9 | 8 | 11 | 11 | 8 | 11 | 11 | 8 | 11 | 11 | 8 | 11 | 11 | 8 | 11 | 11 F 8° 20° 35° 8° 20° 35° 8° 20° 35° 8° 20° 35° 8° 20° 35° 8° 20° 35° 8° 20° 35° 8° 20° 35° 8° 20° 35° 8° 20° 35° 8° 20° 35° 8° 20° 35° 8° 20° 35° 8° 15° 30° 15° 30° 8° 1 G 15 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 25 1 Н J 4.6 5.1 6 7.5 9.5 Κ 7.9 8.9 9.8 10.8 12.8 14.8 17.7 19.7 11.8 13.8 15.7 16.7 18.7 L 9.5 12.5 M 6.5 7.5 8.5 10.5 11.5 13.5 14 15 16 17 18 14.5 9 9 14.5 10 10 14.5 11 11 14.5 12 12 18.5 13 18.5 14 14 14.5 15 15 15 15 16 16 22.5 17 17 22.5 18 18 22.5 19 19 22.5 20 20 22.5 21 21 Ν 5 Р 4 Q 14.5 14.5 17.5 R 47 38 38 S 27 24 24 U  $M5 \times 0.8 \times 12$  $M5 \times 0.8 \times 12$  $M6 \times 1 \times 16$ ٧  $M6 \times 1$  $M6 \times 1$  $M8 \times 1.25$ AS568-016 (90) AS568-016 (90) AS568-018 (90) W 2.5 CA 2.5 3 3.5 3.5 4 4 4.5 4.5 5 5 CB 7.8 8.8 9.7 10.7 11.7 12.7 13.7 14.7 15.5 16.5 17.5 18.5 19.5 MΑ 8 8 9.5 ΜB 3 MC 13 13 15 19 19 MD M5×0.8 Thread Depth 9 or more ME M5×0.8 Thread Depth 9 or more M6×1 Thread Depth 12 or more MF 19.5 19.5 20 18 +0.027 19 +0.033 20 +0.033 WA 10 WB 4.5

110 | 120 | 140 | 110 | 120 | 140 | 110 | 120 | 140 | 110 | 120 | 140 | 110 | 120 | 140 | 110 | 120 | 140 | 110 | 130 | 140 | 110 | 130 | 140 | 110 | 130 | 140 | 110 | 130 | 140 | 110 | 130 | 150 | 110 | 130 | 150 | 110 | 130 | 150 | 160 | 180 | 210 | 160 | 180 | 210 | 160 | 180 | 210 | 160 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 190 | 210 | 170 | 170 | 190 | 210 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 1

Locating Clamp

Locating

Hand • Clamp

Support

Valve • Coupler

Cautions • Others

Pneumatic Expansion Locating Pin (Smaller)

VRA/VRC

Pneumatic Expansion Locating Pin (Large Expansion Model)

Manual Expansion Locating Pin

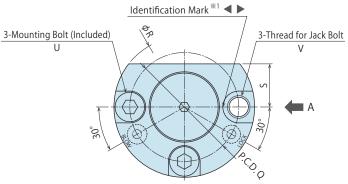
Screw

VXF

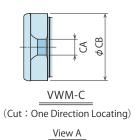
VXF

Compliance

\*\* The drawing shows the released state of VWM4000-R / VWM5000-R.
The ports of VWM4000-L / VWM5000-L are placed to the symmetrical positions.

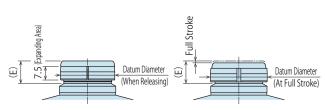


VWM-D (Datum: Reference Locating)

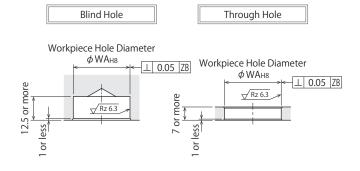


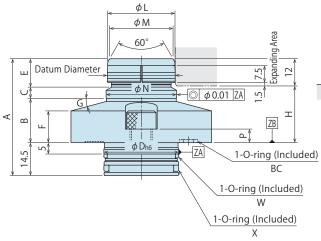
#### Expanding Area Detail

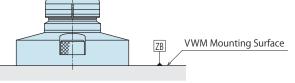




#### Workpiece Hole Dimensions



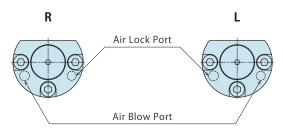




#### Notes:

- When mounting the product, use three mounting bolts (Strength Grade 12.9) and tighten them evenly.
   Use three jack bolts to remove the product, keeping it parallel to the mounting surface.
- 2. This product has no seat. Choose option **-B**: with Seating Surface or prepare a seat separately.
- The port names are marked on the product surface.
   (BLOW: Air Blow Port, LOCK: Air Lock Port)
   Continuously supply air pressure to the air blow port.

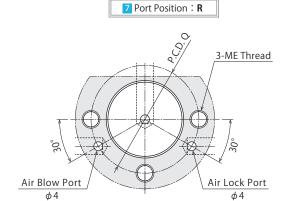
#### Port Position

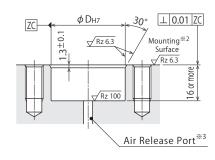


#### Note:

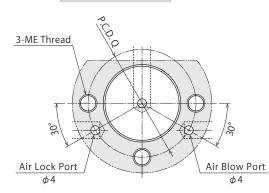
4. Please make sure that the port positions are correct.

#### Machining Dimensions for Mounting





7 Port Position: L



#### Notes:

- $\ensuremath{\%2}.$  There might be foam near the flange bottom depending on roughness of mounting surface, but this is not a malfunction.
- %3. Prepare the air release port on the bottom within the range of  $\phi$  D.
- 1. Make sure to check the cautions for cylinder mounting distance accuracy, workpiece hole distance accuracy and mounting phase before installation. (Refer to P.229.)

Locating Clamp

Hand • Clamp

Support

Valve • Coupler

Cautions • Others

Pneumatic Expansion Locating Pin (Smaller)

VRA/VRC

Pneumatic Expansion Locating Pin (Large Expansion Model)

VWH

neumatic Expan

Manual Expansion

Locating Pin VX

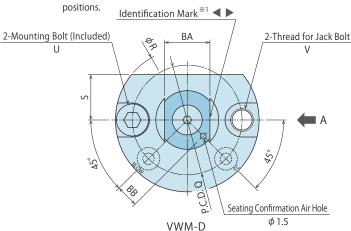
Screw

VXF VXF

Compliance

© External Dimensions and Machining Dimensions for Mounting (mm)																															
Model No.							vw	M40	00-[		]-[]											vw	M50	000-		]-[]					
3 Workp	iece Hole Diam. Code		210	)	Ī	220		[ ·	230		]	240			250			260			270			280			290			300	
5 Seat	ing Height	H15	H20	H25	H15	H20	H25	H15	H20	H25	H15	H20	H25	H15	H20	H25	H20	H25	H30	H20	H25	H30	H20	H25	H30	H20	H25	H30	H20	H25	H30
Workpiece Hole [	Diam. (Standard Diam.)	φ2	1 <sub>H8</sub> +	0.033 0	φ2	2 <sub>H8</sub> +(	0.033	φ23	3H8 <sup>+0</sup>	0.033	φ24	1 <sub>H8</sub> +	0.033 0	φ2	5н8+	0.033 0	φ26	5H8 +(	0.033	φ27	7 <sub>H8</sub> +0	0.033	φ2	8 <sub>H8</sub> +	0.033 0	φ29	Энв+	0.033 0	φ30	)+8	).033
Datum	At Releasing	φ20	).89 o	or less	φ21	1.89 o	rless	φ22	.89 o	r less	φ23	.89 o	rless	φ24	4.89 o	rless	φ25	.89 o					φ27	7.89 o	rless	φ28	3.89 o	r less	φ29	9.89 o	rless
Diameter	At Full Stroke	φ21	.07 or	r more	φ22	2.07 or	more	φ23	.07 or	more	φ24	.07 oı	r more	φ25	5.07 oı	r more	φ26	.07 or	more	φ27	.07 or	more	φ28	3.07 or	r more	φ29	0.07 or	r more	φ30	).07 or	more
Full Stroke																	1														
	A	41.5	46.5	51.5	41.5	46.5	51.5	41.5	46.5	51.5	41.5	46.5	51.5	41.5	46.5	51.5	46.5	51.5	56.5	46.5	51.5	56.5	46.5	51.5	56.5	46.5	51.5	56.5	46.5	51.5	56.5
	В	10.5	15.5	20.5	10.5	15.5	20.5	10.5	15.5	20.5	10.5	15.5	20.5	10.5	15.5	20.5	14.5	20	25	14.5	20	25	14.5	20	25	14.5	19.5	24.5	14.5	19.5	24.5
	С	3.7	4	4	3.7	4	4	3.7	4	4	3.7	4	4	3.7	4	4	4.7	4.5	4.5	4.7	4.5	4.5	4.7		4.5		5	5	4.7	5	5
D h6 (B	ody Side)								28	0 -0.01	3													33	0-0.01	6					
D H7 (Mach	nining Hole)	28 +0.021 12.8   12.5   12.8   12.5   12.8   12.5   12.5   12.8   12.5																													
	Е	12.8	12.5	12.5	12.8	12.5	12.5	12.8	12.5	12.5	12.8	12.5	12.5	12.8	12.5	12.5	12.8	12.5	12.5	12.8	12.5	12.5	12.8	12.5	12.5	12.8	12.5	12.5	12.8	12.5	12.5
	F	8	11	11	8	11	11	8	11	11	8	11	11	8	11	11	11	14	14	11	14	14	11	14	14	11	14	14	11	14	14
	G	8°	15°	30°	8°	15°	30°	8°	15°	30°	8°	15°	30°	8°	15°	30°	8°	15°	30°	8°	15°	30°	8°	15°	30°	8°	15°	30°	8°	15°	30°
	Н	15	20	25	15	20	25	15	20	25	15	20	25	15	20	25	20	25	30	20	25	30	20	25	30	20	25	30	20	25	30
	L		20.7	7		21.7			22.7			23.7	,		24.7	,		25.7			26.7			27.7	•		28.7	,		29.7	
	M		19			20			21			22			23			24			25			26			27			28	
	N	27.5	22	22	27.5	23	23	27.5	24	24	27.5	25	25	27.5	26	26	32.5	27	27	32.5	28	28	32.5	29	29	32.5	30	30	32.5	31	31
	P								5															6							
	Q								40															48							
	R								51															62							
	S								16.5															19							
	U							M6	×1>	<16												Ν	18×	(1.25	5×2	0					
	V							M	3×1	.25													M	10×	1.5						
	W	AS568-021 (90) AS568-024 (90)																													
	Χ	AS568-118 (90) AS568-122 (90)																													
	BC						Α	S568	3-00	7 (9	0)											OF	RNE	3R-90	) P5-	-N					
(	CA		5.5			5.5			6			6			6			6.5			6.5			7			7			7	
(	CB		20.5	5		21.5			22.5			23.5	;		24.5	;		25.5			26.5			27.5			28.5	)		29.5	
ı	ME		M6×1 Thread Depth 12 or more M8×1.25 Thread Depth 15 or r																												
\	WA	2	1 +0.	.033	2	2 +0.	033	2	3 +0.	033	2	4 +0	.033	2	25 +0	.033	2	6 +0	.033	2	7 +0.	.033	2	28 +0	.033	2	9 +0	0.033	3	0+0.0	033
We	eight g	220	260	290	230	260	300	230	270	300	230	270	300	240	270	310	390	440	490	390	440	500	400	450	500	400	450	500	410	460	510

\*\* The drawing shows the released state of VWM2000-BR / VWM3000-BR.
The ports of VWM2000-BL / VWM3000-BL are placed to the symmetrical positions



(Datum: Reference Locating)



(Cut: One Direction Locating)

5 Seating Height: **H15** 

View A

# Datum Diameter G Down Down

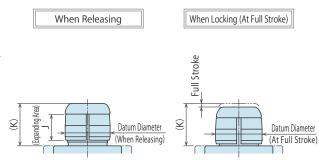
1-O-ring (Included)

1-O-ring (Included)

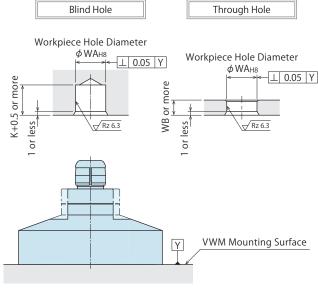
#### 5 Seating Height: H20 / H25

18.5

#### Expanding Area Detail

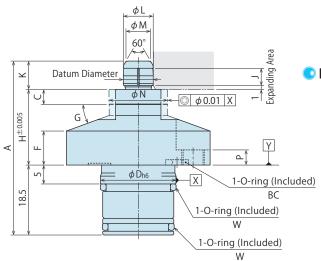


#### Workpiece Hole Dimensions

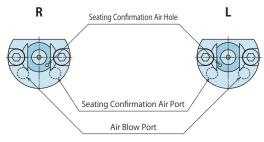


#### Notes:

- ※1. Identification mark is only marked on -C: Cut (for one direction locating). ◀ ▶ indicates the locating direction.
- When mounting the product, use two mounting bolts (Strength Grade 12.9) and tighten them evenly.
   Use two jack bolts to remove the product, keeping it parallel to the mounting surface.
- The port names are marked on the product surface.
   (BLOW: Air Blow Port, FC: Seating Confirmation Air Port)
   Continuously supply air pressure to the air blow port and seating confirmation air port.



#### Port Position



#### Note:

3. Please make sure that the port positions are correct.

Locating

Locating

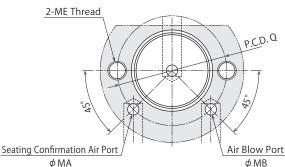
Hand • Clamp

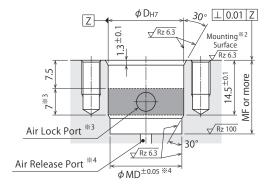
Clamp

#### Machining Dimensions for Mounting

2-ME Thread P.C.D. Q Air Blow Port Seating Confirmation Air Port φМВ  $\phi MA$ 

7 Port Position: **R** 





Weight

#### Notes:

- ※2. There might be foam near the flange bottom depending on roughness of mounting surface, but this is not a malfunction.
- %4. Prepare the air release port on the bottom within the range of  $\phi$  MD.
- 1. Make sure to check the cautions for cylinder mounting distance accuracy, workpiece hole distance accuracy and mounting phase before installation. (Refer to P.229.)

7 Port Position: L

Support Valve · Coupler Cautions • Others Pneumatic Expansion Locating Pin (Smaller) φMB

cating Pin

VRA/VRC

Pneumatic Expansion

Expansion Model)

Manual Expansion Locating Pin

٧X

Screw

VXF VXF

Compliance

WRC

#### External Dimensions and Machining Dimensions for Mounting

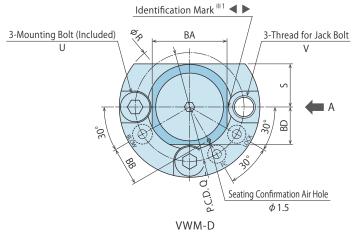
(mm) VWM2000-□-□-□-B□ VWM3000-□-□-□-B□ Model No 3 Workpiece Hole Diam. Code 140 170 080 090 100 110 120 130 150 160 180 200 **5** Seating Height Workpiece Hole Diam. (Standard Diam.)  $\phi 8 \text{HB}_0^{+0.022}$   $\phi 9 \text{HB}_0^{+0.022}$   $\phi 10 \text{HB}_0^{+0.022}$   $\phi 11 \text{HB}_0^{+0.027}$   $\phi 12 \text{HB}_0^{+0.027}$   $\phi 13 \text{HB}_0^{+0.027}$   $\phi 14 \text{HB}_0^{+0.027}$   $\phi 15 \text{HB}_0^{+0.027}$   $\phi 16 \text{HB}_0^{+0.027}$   $\phi 16 \text{HB}_0^{+0.027}$   $\phi 16 \text{HB}_0^{+0.027}$   $\phi 18 \text{HB}_0^{+0.027}$   $\phi 19 \text{HB}_0^{+0.027}$ At Releasing Datum \$\phi\$.94 or less \ \ \phi\$.89 \dot or less \ \ \phi\$.94 or less \ \ \phi\$.94 or less \ \ \phi\$.99 \dot or less \ \ \phi\$.10.84 or less \ \ \phi\$.10.84 or less \ \ \phi\$.10.85 or less \ \ \phi\$.10.85 or less \ \phi\$.10.86 or less \ \phi\$.10.8 Diameter At Full Stroke \$\phi 8.05 or more \quad \text{9.05 or more} \quad \text{9.05 or more} \quad \text{91.0.05 or more} \quid \text{91.0.05 or more} \quad \quad \quad \text{91.0.05 or more} \quad \qquad \qquad \quad \quad \qquad \quad \qquad \qquad \qquad \qquad \qquad \qqq \q Full Stroke 0.65 0.75 C D h6 (Body Side) 20 - 0.013 20 - 0.013 23 - 0.013 23 + 0.021 20 +0.021 D H7 (Machining Hole) 20 +0.021 F 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 35° | 8° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | 20° | G 15 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 25 15 20 20 20 20 20 20 20 2 Н J 4.6 5.1 6 Κ 7.5 9.5 7.9 8.9 9.8 10.8 11.8 12.8 13.8 14.8 15.7 16.7 17.7 18.7 19.7 L 9.5 12.5 Μ 6.5 7.5 8.5 10.5 11.5 13.5 14 15 16 17 18 16.5 20.5 Ν 15.5 17.5 18.5 19.5 21.5 22.5 23.5 24.5 25.5 26.5 27.5 5 4 4 0 29 29 35 R 38 47 38 S 12 12 13.5 U  $M5 \times 0.8 \times 12$  $M5 \times 0.8 \times 12$  $M6 \times 1 \times 16$ ٧  $M6 \times 1$  $M6 \times 1$  $M8 \times 1.25$ AS568-016 (90) AS568-016 (90) AS568-018 (90) W ВА 12 13 14 15 16 18 19 20 23 BB 6 7.5 8 8.5 9.5 10 10.5 11 11.5 12 BC AS568-006 (90) AS568-006 (90) AS568-007 (90) CA 2.5 2.5 3 3.5 3.5 4 4 4.5 4.5 5 3 CB 7.8 8.8 9.7 10.7 12.7 14.7 15.5 16.5 17.5 18.5 19.5 13.7 MΑ 3 3 3 3 4 MB MD 19 M5×0.8 Thread Depth 9 or more ME M5×0.8 Thread Depth 9 or more M6×1 Thread Depth 12 or more 19.5 19.5 MF 13 +0.027 14 + 0.027 17 +0.027 18 <sup>+0.027</sup> WA WB 4.5

110 | 130 | 150 | 120 | 140 | 150 | 120 | 140 | 150 | 120 | 140 | 160 | 120 | 140 | 160 | 120 | 140 | 160 | 120 | 140 | 160 | 120 | 140 | 160 | 120 | 140 | 160 | 120 | 140 | 160 | 120 | 140 | 160 | 120 | 140 | 160 | 180 | 200 | 230 | 180 | 210 | 230 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 180 | 210 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 2

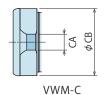
When Locking (At Full Stroke)

#### External Dimensions

\*\* The drawing shows the released state of VWM4000-BR / VWM5000-BR.
The ports of VWM4000-BL / VWM5000-BL are placed to the symmetrical positions.



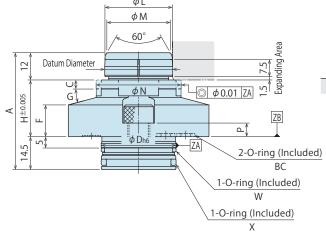
(Datum: Reference Locating)



(Cut: One Direction Locating)

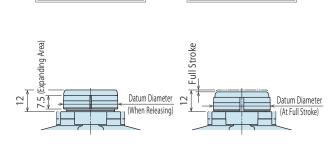
View A



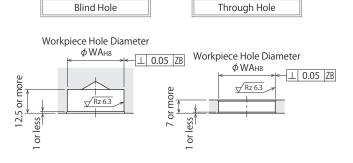


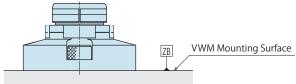
#### Expanding Area Detail

When Releasing



#### Workpiece Hole Dimensions

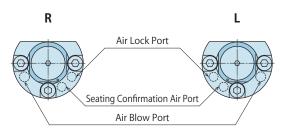




#### Notes:

- Identification mark is only marked on -C: Cut (for one direction locating). ◀ ▶ indicates the locating direction.
- When mounting the product, use three mounting bolts (Strength Grade 12.9) and tighten them evenly.
   Use three jack bolts to remove the product, keeping it parallel to the mounting surface.
- The port names are marked on the product surface.
   (BLOW: Air Blow Port, FC: Seating Confirmation Air Port, LOCK: Air Lock Port) Continuously supply air pressure to the air blow port and seating confirmation air port.

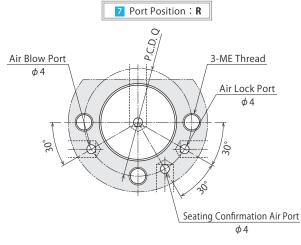
#### Port Position

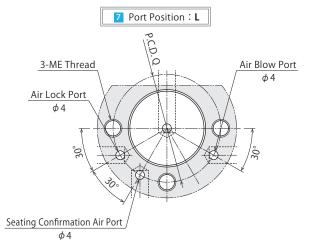


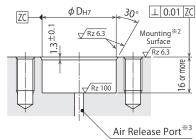
#### Note:

3. Please make sure that the port positions are correct.

#### Machining Dimensions for Mounting







#### Notes:

- \*\*2. There might be foam near the flange bottom depending on roughness of mounting surface, but this is not a malfunction.
- %3. Prepare the air release port on the bottom within the range of  $\phi$  D.
- Make sure to check the cautions for cylinder mounting distance accuracy, workpiece hole distance accuracy and mounting phase before installation. (Refer to P.229.)

Clamp

Locating

Hand • Clamp

Support

Locating

Valve • Coupler

Cautions • Others

Pneumatic Expansion Locating Pin (Smaller)

Pneumatic Expansion Locating Pin (Large Expansion Model)

VWH

#### neumatic Expansion ocating Pin

\/\\/\/

VVVIX

Manual Expansion Locating Pin

VX

Screw Locator

VXE

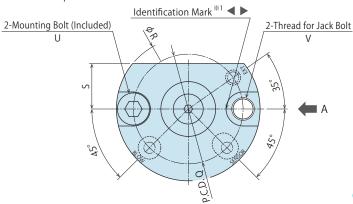
Compliance

WRC

#### © External Dimensions and Machining Dimensions for Mounting

	nal Dimen	310	113	aı	iu							11310	113	101	141	ount	iiig										(m	nm)
Model No.							/WI		00-🗆-	<b>□-B</b>										M50	00-[							
3 Worl	kpiece Hole Diam. Code		210		ļ	220			230	_		240	L	250		260		270			280			290			300	
5 Sea	ating Height															H20 H25												
Workpiece Hole	e Diam. (Standard Diam.)		1 <sub>H8</sub> <sup>+(</sup>			2н8 <sup>+0</sup>			Зн8 <sup>+0.03</sup>			H8 0.033				ф 26 <sub>H8</sub> +					8 <sub>H8</sub> +			9 <sub>H8</sub> +(			) <sub>H8</sub> +0	
Datum	At Releasing	φ20	0.89 o	r less	φ2	1.89 or	less	φ22	2.89 or le	ss $\phi$	23.	89 or less	φ2	4.89 o	r less	φ 25.89 (	or less	φ 26.89 α	or less	φ2	7.89 o	r less	φ28	3.89 o	r less	φ29	.89 01	rles
Diameter	At Full Stroke	φ21	1.07 or	r more	φ 22	2.07 or	more	φ23	.07 or mo	re φ	24.	07 or more	φ2	5.07 or	more	φ 26.07 α	r more	φ27.07 o	r more	φ28	3.07 oı	r more	φ29	0.07 or	more	φ30	.07 or	mor
Full Stroke																1												
	Α	41.5	46.5	51.5	41.5	46.5	51.5	41.5	46.5 51	.5 41	1.5	46.5 51.5	41.5	46.5	51.5	46.5 51.5	56.5	46.5 51.5	56.5	46.5	51.5	56.5	46.5	51.5	56.5	46.5	51.5	56.
	С	4	4	4	4	4	4	4	4 4		4	4 4	4	4	4	4 4	4	4 4	4	4	4	4	4	4	4	4	4	4
D h6 (E	Body Side)								28 _0.	013											33	0 -0.01	6					
D H7 (Mad	chining Hole)			28 +0.021 33 +0.025																								
	F	8	11	11	8	11	11	8	11 1	1 8	3	11 11	8	11	11	11 14	14	11 14	14	11	14	14	11	14	14	11	14	14
	G	8°	15°	30°	8°	15°	30°	8°	15° 30	)° 8	3°	15° 30°	8°	15°	30°	8° 15°	30°	8° 15°	30°	8°	15°	30°	8°	15°	30°	8°	15°	30
	Н	15	20	25	15	20	25	15	20 25	5 1	5	20 25	15	20	25	20 25	30	20 25	30	20	25	30	20	25	30	20	25	30
	L		20.7	7		21.7			22.7		2	23.7		24.7		25.	7	26.7	7		27.7	7		28.7			29.7	
	M		19			20			21			22		23		24		25			26			27			28	
	N		28.5	5		29.5			30.5		3	31.5		32.5		33.5	5	34.5	5		35.5	5		36.5			37.5	
	Р								5												6							
	Q								40												48							
	R								51												62							
	S								16.5												19							
	U							М6	$\times 1 \times 1$	6									Ν	√8×	< 1.25	5×2	0					
	V							M8	3×1.25	5										Μ	10×	1.5						
	W						Α	S56	8-021 (	90)									Α	S56	8-02	4 (90	))					
	X						Α	S56	8-118 (	90)									Α	S56	8-12	2 (90	O)					
	BA		24			25			26			27		28		29		30			31			32			33	
	BB		12.5	5		13			13.5			14		14.5		15		15.5	5		16			16.5			17	
	BC						Α	S56	8-007 (	90)									0	R NE	BR-90	0 P5-	-N					
	BD		12.5	5		13			13.5			14		14.3		15		15.5	5		16			16.5			16.5	
	CA		5.5			5.5			6			6		6		6.5		6.5			7			7			7	
	СВ		20.5	)		21.5			22.5		2	23.5		24.5		25.5	5	26.5	5		27.5	5		28.5			29.5	
	ME								Depth									M8×1										
	WA	2	21 +0	.033	2	22 +0.	033	2	3 +0.033	3	24	1 <sup>+0.033</sup>		25 <sup>+0.</sup>	.033	26 +0	0.033	27 +0	0.033	2	28 <sup>+0</sup>	0.033	2	9 +0.	.033	3	0 +0.	033
V	Veight g	220	260	290	230	260	300	230	270 30	0 23	30	270 300	240	270	310	390 440	490	390 440	500	400	450	500	400	450	500	410	460	510

\*\* The drawing shows the released state of VWM2000-MR / VWM3000-MR.
The ports of VWM2000-ML / VWM3000-ML are placed to the symmetrical positions.



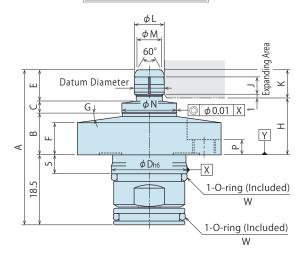
<u>VWM-D</u> (Datum: Reference Locating)



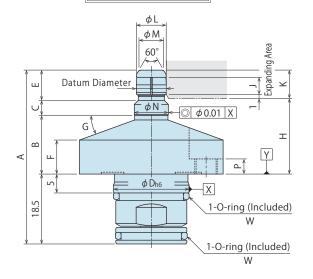
(Cut: One Direction Locating)

View A

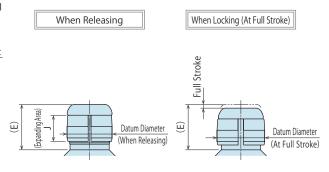
#### 5 Seating Height: **H15**



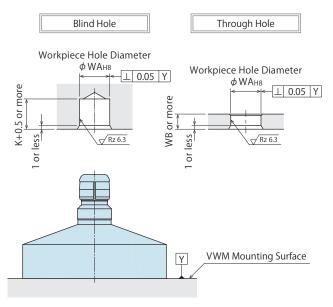
#### 5 Seating Height: H20 / H25



#### 💿 Expanding Area Detail



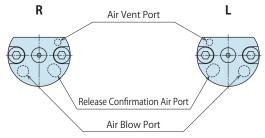
#### Workpiece Hole Dimensions



#### Notes:

- Identification mark is only marked on -C: Cut (for one direction locating). ◀ ▶ indicates the locating direction.
- When mounting the product, use two mounting bolts (Strength Grade 12.9) and tighten them evenly.
   Use two jack bolts to remove the product, keeping it parallel to the mounting surface.
- The port names are marked on the product surface.
   (EXT: Air Vent Port, BLOW: Air Blow Port,
   SENSOR: Release Confirmation Air Port)
   Continuously supply air pressure to the air blow port and release confirmation air port.
- This product has no seat. Choose option -B: with Seating Surface or prepare a seat separately.

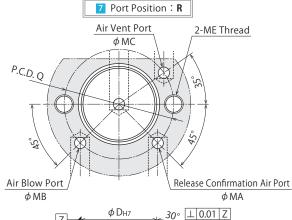
#### Port Position

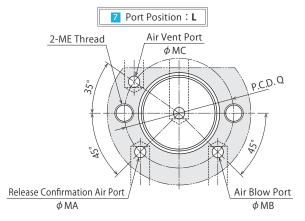


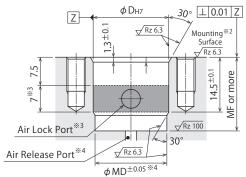
#### Note:

4. Please make sure that the port positions are correct.

#### Machining Dimensions for Mounting







#### Notes:

- $\fint 2$ . There might be foam near the flange bottom depending on roughness of mounting surface, but this is not a malfunction.
- %4. Prepare the air release port on the bottom within the range of  $\phi$  MD.
  - 1. Make sure to check the cautions for cylinder mounting distance accuracy, workpiece hole distance accuracy and mounting phase before installation. (Refer to P.229.)

Locating Clamp

Hand • Clamp

Support

Valve • Coupler

Cautions • Others

Pneumatic Expansion

Locating Pin (Smaller) VRA/VRC

Pneumatic Expansion Locating Pin (Large Expansion Model)

VWH

neumatic Expa ocating Pin

Manual Expansion Locating Pin

VX

Screw

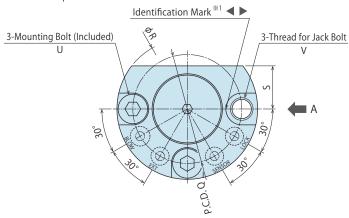
VXF

VXF

Compliance

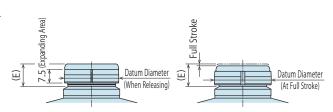
Exterr	nal Dimer	ısi	ons	5	and	۸k	Лac	hir	iir	ıg D	)ii	men	ısio	on	s fo	r M	ou	nt	ing											(m	ın
Model No.								٧	WN	12000	)-[	]-[]-	□-M									٧	WM	30	00-□			И□			
3 Workp	niece Hole Diam. Code	(	080	Ī	09	0	1	00	1	110		120	)	1	30	14	0	[ ]	150	16	0		170	Ī	180	)	1	90		200	)
5 Seat	ting Height											H15 H20																			
Workpiece Hole [	Diam. (Standard Diam.)	φ8	H8 <sup>+0.02</sup>	2	ф 9н8	+0.02 0	<sup>2</sup> φ10	H8 <sup>+0.02</sup>	<sup>2</sup> φ΄	11 <sub>H8</sub> <sup>+0.0</sup>	027	φ12 <sub>H8</sub> <sup>+</sup>	0.027	¢13⊦	+0.027 18 0	ф14н8	+0.027 0	φ15	5н8 <sup>+0.027</sup>	φ16н8	+0.027 0	φ17	7 <sub>H8</sub> +0.0	)27	φ18 <sub>H8</sub> †	-0.027 0	φ19	H8 <sup>+0.033</sup>	φ2	0 <sub>H8</sub> +	0.0
Datum	At Releasing	φ7	.94 or les	S	φ8.94	or les	φ9.	94 or less	φ	10.94 or	less	φ11.92	or less	φ12.	92 or less	φ13.92	2 or less	φ14	4.92 or less	φ15.8	9 or less	φ16	5.89 or l	ess	φ17.89	or less	φ18.	.89 or less	φ1	9.89	or le
Diameter	At Full Stroke	φ8.	.05 or mor	e	φ9.05	or mor	φ10	05 or mo	re <b>φ</b> 1	l 1.05 or n	nore	φ12.05 ο	r more	φ13.0	05 or more	φ14.05	or more	φ15	5.05 or more	φ16.07	or more	φ17	.07 or m	nore	φ18.07	or more	φ19.	07 or more	φ20	0.07 o	rm
Full Stroke						0	.65								0.										1.0	)					
	A	_	46 51	_	41 46		_					41.5 46.5											_	_	43 48	_	_	_		48	_
	В	11	15.5 20.	.5	11 15	5 20	11	15 20	11	15 2	20	11 14.5	19.5	11 1	4.5 19.5	11 14.	5 19.5	11	14.5 19.5	10.5 15	5 20.5	10.5	15.5 2	0.5	10.5 15.5	20.5	10.5	15.5 20.5	10.5	15.5	2
	С	3.2	4 4		3.2 4.				3.2	2 4.5 4	4.5	3.2 5	5	3.2	5 5	3.2 5	5	3.2	5 5	3.7 4	4	3.7	4	4	3.7 4		3.7	4 4	3.7	4	
D h6 (Bo	ody Side)						20 <sub>-</sub> 0									0 - 0.0										-0.0					
D H7 (Macl	hining Hole)			_			20 +0	.021							_	0 +0.02	_								_	+0.0					_
	E	8.3	8 8		8.3 8	8	8.3	8 8	8.3	8	8	8.8 8.5	8.5	8.8	8.5 8.5	8.8 8.5	8.5	8.8	8.5 8.5	10.3 1	10	10.3	10 1	10	10.3 10	10	10.3	10 10	10.3	10	
	F	8.5	9 9		8.5 9	9	8.5	9 9	_			8.5 9	_	_	9 9	8.5 9	_	8.5		8 1	_	8		-	8 11	11	8	11 11	8	11	
	G	8°	20° 35	0	8° 20	° 35	° 8°	20° 35	° 8°	20° 3	35°	8° 20°	35°	8° 2	20° 35°	8° 20	° 35°	8°	20° 35°	8° 15	° 30°	8°	15° 3	0°	8° 15°	30°	8°	15° 30°	8°	15°	1
	Н	15	20 25	5	15 20	) 25	15	20 25	15	20 2	25	15 20	25	15	20   25	15 20	25	15	20 25	15 2	) 25	15	20 2	25	15 20	25	15	20   25	15	20	Ĺ
	J					4	4.6								5	.1									6						
	K						7.5									3									9.5	;					
	L		7.9		8.	9		9.8		10.8		11.8	3		2.8	13	.8		14.8	15	.7	1	6.7		17.	7	1	8.7		19.7	7
	M		6.5		7.			3.5		9.5		10.5	_		1.5	12		_	13.5	1.		_	15		16			17	L	18	_
	N	14.5	9 9	1	14.5 10	) 10	14.5	11 11	14.	5 12	12	18.5 13	13	18.5	14 14	18.5 15	15	18.5	16 16	22.5 1	7 17	22.5	18 1	18 2	22.5 19	19	22.5	20 20	22.5	21	
	Р						4									4									5						
	Q						29								2	9									35						
	R						38									8									47						
	S						12								1	2									13.	5					
	U				М	5×	0.8×	12						Λ	15×C	.8×1	2							N	16×1	$\times 1$	6				
	V					M	5×1								M6	×1								١	M8×	1.25	,				
	W			_	AS:	568	-016	(90)								016 (9	90)						F	۱S5	68-0	18 (	90)				
(	CA		2.5		2.	5		3		3		3.5		3	3.5	4			4	4.	5		4.5		5			5		5	
(	CB		7.8		8.	8		9.7		10.7		11.7	7	1.	2.7	13	.7		14.7	15	.5	1	6.5		17.	5	1	8.5	L	19.5	í
٨	ИΑ						3									3									4						
<u> </u>	ИB						3									3									4						_
MC 3												3									4										
٨	ИD						19									9									22						_
	ME	1	ν15×1	3.0	3 Thr			th 9	or r	more		M5	$\times$ 0.8	3 Th		Dept	n 9 c	or m	nore		N	l6×	1 Th	rea		•	12	or mo	re		
	MF		. 0.022				9.5	. 0.000		, 0.0	27	. ^	027			9.5	0.037		. 0 027		0.027		. 0.0	17	20			. 0 033	_		-
	VA	8	+0.022	_	9 +	0.022 0	10	) +0.022 0	1	11+0.0	2/	12+0	.02/	13	+0.027	14+	0.027	1:	5 <sup>+0.027</sup>	16+	0.027 0	17	7+0.02	2/	18 <sup>+0</sup>	).02/	19	+0.033	2	0+0	.0
V	VB			_			4									.5									5.5						
We	eight g	110	130   15	0	120   14	0 15	120	140 16	120	0   140   1	160	120 140	160	120   1	140 160	120 14	0 160	120	140 160	180 20	0   230	180	210 2	30	180 210	240	180	210   240	180	210	2

\* The drawing shows the released state of VWM4000-MR / VWM5000-MR. The ports of VWM4000-ML / VWM5000-ML are placed to the symmetrical positions.



Expanding Area Detail

When Locking (At Full Stroke) When Releasing



Through Hole

Workpiece Hole Diameter

 $\phi$  WAH8

√Rz 6.3

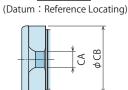
⊥ 0.05 ZB

#### Workpiece Hole Dimensions

Blind Hole

Workpiece Hole Diameter  $\phi$  WAH8

√Rz 6.3



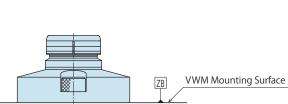
VWM-D

(Cut: One Direction Locating)









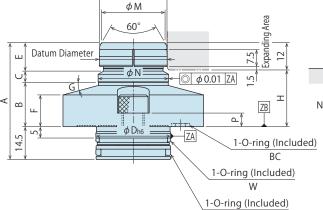
⊥ 0.05 ZB

7 or more

l or less

#### View A

φI



#### Notes:

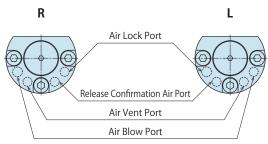
Χ

12.5 or more

l or less

- ※1. Identification mark is only marked on -C: Cut (for one direction locating). ◀ ▶ indicates the locating direction.
  - When mounting the product, use three mounting bolts (Strength Grade 12.9) and tighten them evenly. Use three jack bolts to remove the product, keeping it parallel to the mounting surface.
  - 2. The port names are marked on the product surface. (EXT: Air Vent Port, BLOW: Air Blow Port, SENSOR: Release Confirmation Air Port, LOCK: Air Lock Port) Continuously supply air pressure to the air blow port and release confirmation air port.
  - 3. This product has no seat. Choose option -B: with Seating Surface or prepare a seat separately.

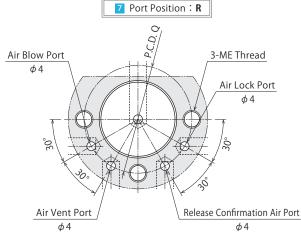
#### Port Position

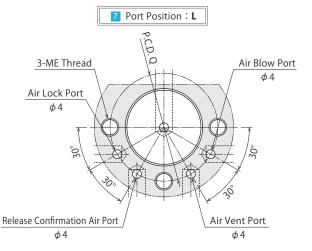


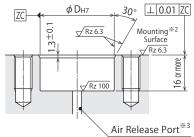
Note:

4. Please make sure that the port positions are correct.

#### Machining Dimensions for Mounting







#### Notes:

- ※2. There might be foam near the flange bottom depending on roughness of mounting surface, but this is not a malfunction.
- %3. Prepare the air release port on the bottom within the range of  $\phi$  D.
- 1. Make sure to check the cautions for cylinder mounting distance accuracy, workpiece hole distance accuracy and mounting phase before installation. (Refer to P.229.)

Locating + Clamp

Hand • Clamp

Support

Valve • Coupler

Cautions • Others

Pneumatic Expansion

Locating Pin (Smaller)

....

Pneumatic Expansion Locating Pin (Large Expansion Model)

VWH

#### neumatic Expansion ocating Pin

VANA

VWK

Manual Expansion Locating Pin

VX

Screw Locator

VXF

VXF Compliance

dule

WRC

#### External Dimensions and Machining Dimensions for Mounting

<u> </u>	nal Dimen	sio	ns	an	d I	Иa	ch	iniı	ng	Di	me	ns	ioi	ns i	tor	M	ou	nti	ng											(r	mm)
Model No.						١	/WN	/40C	0-[	]-[	-M□										١	/WN	1500	00-□	]-[]	-M					
3 Work	piece Hole Diam. Code		210			220			230	)		240			250			260			270			280			290			300	
5 Seat	ting Height	H15	H20	H25					H20	H25	H15	H20	H25	H15	H20	H25			H30	H20	H25	H30	H20	H25	H30	H20	H25	H30			
Workpiece Hole	Diam. (Standard Diam.)	φ2	1 <sub>H8</sub> +	0.033 0	φ2	2H8 <sup>+(</sup>	0.033	φ23	Вн8 <sup>+</sup>	0.033 0	φ24	lнв <sup>+(</sup>	0.033	φ2!	H8 (	0.033	φ26	5н8 <sup>+(</sup>	0.033	φ27	7 <sub>H8</sub> +0	).033	φ28	8н8 <sup>+</sup>	0.033 0	φ2	9 <sub>H8</sub> +	0.033	φ30	0нв <sup>+(</sup>	0.033
Datum	At Releasing	φ20	0.89 o	r less	φ2	1.89 o	r less	φ22	.89 o	or less	φ23	.89 o	rless	φ24	1.89 o	r less	φ25	5.89 o	rless	φ26	.89 01	less	φ27	7.89 o	rless	φ28	3.89 o	r less			
Diameter	At Full Stroke	φ21	1.07 o	r more	φ22	2.07 or	more	φ23	.07 o	r more	φ24	.07 or	more	φ25	.07 or	more	φ26	.07 or	more	φ27	.07 or	more	φ28	3.07 oi	r more	φ29	9.07 or	more	φ30	1.07 or	r more
Full Stroke																1	1														
	Α	41.5	46.5	51.5	41.5	46.5	51.5	41.5	46.5	51.5	41.5	46.5	51.5	41.5	46.5	51.5	46.5	51.5	56.5	46.5	51.5	56.5	46.5	51.5	56.5	46.5	51.5	56.5	46.5	51.5	56.5
	В	10.5	15.5	20.5	10.5	15.5	20.5	10.5	15.5	20.5	10.5	15.5	20.5	10.5	15.5	20.5	14.5	20	25	14.5	20	25	14.5	20	25	14.5	19.5	24.5	14.5	19.5	24.5
	С	3.7	4	4	3.7	4	4	3.7	4	4	3.7	4	4	3.7	4	4	4.7	4.5	4.5	4.7	4.5	4.5	4.7			_	5	5	4.7	5	5
D h6 (B	lody Side)		28 - <sub>0.013</sub>																		0 -0.01										
D H7 (Mac	chining Hole)	28 + 0.021 128   125   125   125   125   125   125   125   125   125   126   125   125   128   125   1																													
	E	12.8	12.5	12.5	12.8	12.5	12.5	12.8	12.5	12.5	12.8	12.5	12.5	12.8	12.5	12.5	12.8	12.5	12.5	12.8	12.5	12.5	12.8	12.5	12.5	12.8	12.5	12.5	12.8	12.5	12.5
	F	8	11	11	8	11	11	8	11	11	8	11	11	8	11	11	11	14	14	11	14	14	11	14	14	11	14	14	11	14	14
	G	8°	15°	30°	8°	15°	30°	8°	15°	30°	8°	15°	30°	8°	15°	30°	8°	15°	30°	8°	15°	30°	8°	15°	30°	8°	15°	30°	8°	15°	30°
	Н	15	20	25	15	20	25	15	20	25	15	20	25	15	20	25	20	25	30	20	25	30	20	25	30	20	25	30	20	25	30
	L		20.7	'		21.7			22.7	7		23.7			24.7			25.7			26.7			27.7	,		28.7			29.7	,
	M		19			20			21			22			23			24			25			26			27			28	
	N	27.5	22	22	27.5	23	23	27.5	24	24	27.5	25	25	27.5	26	26	32.5	27	27	32.5	28	28	32.5	29	29	32.5	30	30	32.5	31	31
	Р								5															6							
	Q								40															48							
	R								51															62							
	S								16.5	5														19							
	U							M6	×1>	×16												٨	/8×	1.25	5×2	0					
	V							M8	3×1	.25													M 1	10×	1.5						
	W						Α	S568	3-02	21 (9	0)											Α	S568	8-02	4 (90	O)					
	X	AS568-118 (90) AS568-122 (90)																													
	BC	AS568-007 (90)									Ol	R NB	BR-90	0 P5	-N																
	CA		5.5			5.5			6			6			6			6.5			6.5			7			7			7	
	СВ		20.5	;		21.5			22.5	5		23.5			24.5			25.5			26.5			27.5	,		28.5			29.5	
	ME										12 or														epth						
,	WA	2	21 +0	.033	2	2 +0.	033	2	3 +0	.033	2	4 <sup>+0.</sup>	033	2	5 +0.	033	2	6 +0.	033	2	7 +0.1	033	2	8+0	.033	2	9 +0.	033	3	0 +0.	.033
W	/eight g	220	260	290	230	260	300	230	270	300	230	270	300	240	270	310	390	440	490	390	440	500	400	450	500	400	450	500	410	460	510

### **Expansion Locating Pin**

#### Model VWK

Pneumatic • Double Action Locating Repeatability :  $10 \, \mu \, \mathrm{m}$ 



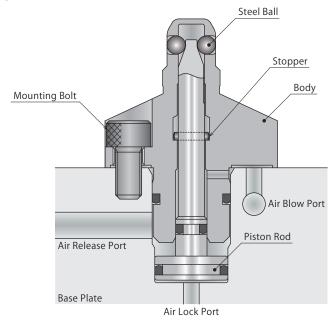
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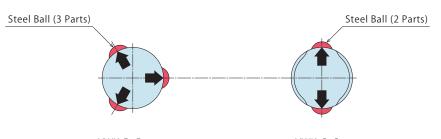


#### Action Description

This is a simplified drawing of VWK (Standard).

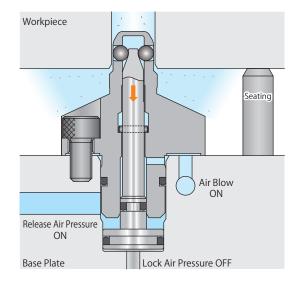


#### About Reference Locating and Orientation



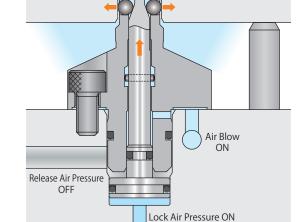
VWK-D: Datum
Reference Locating





When loading workpiece

When unloading workpiece



41

• When lock air pressure is OFF and release air pressure is ON, the piston rod descends and steel balls are free to move.

• Air blow prevents debris contamination.

It is not a malfunction when the steel balls are expanded with air blow pressure.  When release air pressure is OFF and lock air pressure is ON, the piston rod ascends and the steel balls are expanded to locate the workpiece (Seating is required for standard and release confirmation models.)

When locating

Locating + Clamp

Locatin

Hand • Clamp

Support

Valve • Coupler

Cautions • Others

Pneumatic Expansion Locating Pin (Smaller)

VRA/VRC

Pneumatic Expansion Locating Pin (Large Expansion Model)

\/\\/ LI

neumatic Expansion

VWM

Manual Expansion Locating Pin

VX

Screw

Locato

VXF

Compliance Module

#### Model No. Indication



#### Body Size

**2** : Select from Workpiece Hole Diameter  $\phi$  5.7 ~  $\phi$  10.8

**3** : Select from Workpiece Hole Diameter  $\phi$  10.4 ~  $\phi$  16.2

#### 2 Design No.

0 : Revision Number

#### 3 Workpiece Hole Diameter

Workpiece Hol	e Diameter Code	060	070	080	090	100	110	120	130	140	150
Workpiece Hole	Straight Hole	φ5.7 ~ φ6.6	φ6.7 ~ φ7.6	φ7.6 ∼ φ8.5	φ8.5 ~ φ9.5	φ9.5 ~ φ10.8	φ10.4∼φ12	φ11.4∼φ13	φ 12.2 ~ φ 14.1	φ 13.2 ~ φ 15.1	φ14~φ16.2
Diameter (mm)	Taper Hole	Ø6.1 ~ Ø6.6	φ7.1 ~ φ7.6	φ8∼φ8.5	φ9~φ9.5	φ10~φ10.8	φ11 ~ φ12	φ12 ~ φ13	φ13 ~ φ14.1	φ14∼φ15.1	φ15 ~ φ16.2
VWK2000			Sel	ection Rar	nge						
VWK3000								Sel	ection Rar	nge	

#### Straight Hole

# Workpiece Hole Diameter

#### Taper Hole



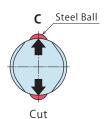
#### 4 Functions

**D**: Datum (for Reference Locating)

**C** : Cut (for One Direction Locating)

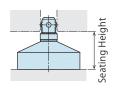


Datum



#### 5 Seating Height Dimension

**H15**: 15mm **H20**: 20mm **H25**\*\*: 25mm



Note:

Prepare a seat for **6** Option **Blank**: Standard and **M**: Release Confirmation Model.

% Only **H15/ H20** can be selected for VWK2000-060/ 070.



#### 6 Options

**Blank**: None (Standard)

**B**: with Seating Surface

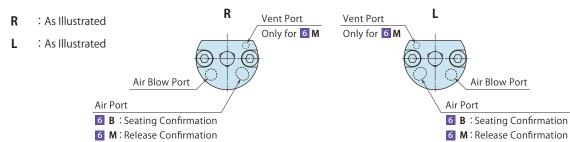
M: Release Confirmation Model

	Workpiece ( ■ =Ava	ilable Option)
6 Option Symbol	060 / 070	080~150
Blank	•	•
В		•
М		•

Note:

Contact us for combined use of **B**: With Seating Surface and **M**: Release Confirmation model.





Locating + Clamp

Location

Hand • Clamp

Support

Valve • Coupler

Cautions • Others

Pneumatic Expansion Locating Pin (Smaller)

VRA/VRC

Pneumatic Expansion Locating Pin (Large Expansion Model)

VWH

neumatic Expansion

VWM

VWK

Manual Expansion Locating Pin VX

. . . . . .

Screw Locator

VX

VXF

Compliance Module

#### Specifications: VWK2000

Model No.		VWK2000-060	VWK2000-070	VWK2000-080	VWK2000-090	VWK2000-100					
Workpiece Hole Diameter	Straight Hole	$\phi$ 5.7 $\sim$ $\phi$ 6.6	φ 6.7 ~ φ 7.6	$\phi$ 7.6 $\sim$ $\phi$ 8.5	$\phi 8.5 \sim \phi 9.5$	$\phi$ 9.5 $\sim$ $\phi$ 10.8					
mm	Taper Hole	$\phi 6.1 \sim \phi 6.6$ $\phi 7.1 \sim \phi 7.6$ $\phi 8 \sim \phi 8.5$		$\phi$ 9 $\sim$ $\phi$ 9.5	$\phi$ 10 $\sim$ $\phi$ 10.8						
Locating Repeatability *1	mm	0.01									
Allowable Offset (C: Cut)	mm	±0.25	0.25 ±0.3		±0.4	±0.5					
Expanding Force (F) *2 N	at 0.35MPa	70									
	at 0.5MPa	110									
	at 0.7MPa	150									
Allowable Thrust Load **3	N	250	450	450 450		800					
Cylinder Capacity	Release side	0.23	0.23	0.23	0.28	0.33					
(Empty Action) cm <sup>3</sup>	Lock side	0.28	0.28	0.28	0.34	0.40					
Operating Pressure Range	Poperating Pressure Range MPa $0.35 \sim 0.7$										
Withstanding Pressure	MPa	1.0									
Recommended Air Blow P	ressure MPa	0.3 ~ 0.4									
Operating Temperature Ra	ange °C	0~70									
Usable Fluid		Dry Air									

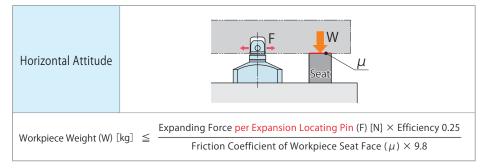
#### Specifications: VWK3000

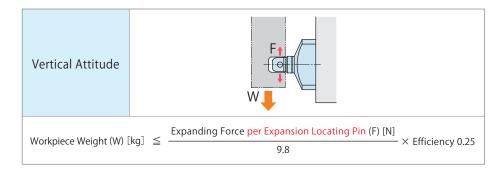
Model No.		VWK3000-110	VWK3000-120	VWK3000-130	VWK3000-140	VWK3000-150					
Workpiece Hole Diameter	Straight Hole	φ 10.4 ~ φ 12	φ 11.4 ~ φ 13	φ 12.2 ~ φ 14.1	φ 13.2 ~ φ 15.1	φ 14 ~ φ 16.2					
mm	Taper Hole	φ11 ~ φ12	φ12~φ13	φ 13 ~ φ 14.1	φ 14 ~ φ 15.1	φ 15 ~ φ 16.2					
Locating Repeatability *1	mm	0.01									
Allowable Offset (C:Cut)		±0.6	$\pm 0.6$ $\pm 0.6$ $\pm 0.7$ $\pm 0.$		±0.7	±0.8					
Expanding Force (F) **2 N	at 0.35MPa	120									
	at 0.5MPa	170									
	at 0.7MPa	240									
Allowable Thrust Load **3	N	1000	1000	1300	1300	1800					
Cylinder Capacity	Release side	0.59	0.59	0.67	0.67	0.75					
(Empty Action) cm <sup>3</sup>	Lock side	0.76	0.76	0.87	0.87	0.97					
Operating Pressure Range	MPa	0.35 ~ 0.7									
Withstanding Pressure	MPa	1.0									
Recommended Air Blow P	ressure MPa	0.3 ~ 0.4									
Operating Temperature Ra	ange ℃	0~70									
Usable Fluid		Dry Air									

#### Notes:

- \*1. It shows locating repeatability under the specific condition (no load).
- **%3.** Exceeding allowable thrust load leads to accuracy failure and/or damages on the product.
  - 1. This product locates and releases with air pressure. (Air Pressure Double Action)
  - 2. This cylinder is used only for locating and does not have a clamping function.

#### Relative Equation of Expanding Force and Allowable Workpiece Weight for Locating





Locating Clamp

Hand • Clamp

Support

Valve • Coupler

Cautions • Others

Pneumatic Expansion Locating Pin (Smaller)

VRA/VRC

Pneumatic Expansion Locating Pin (Large Expansion Model)

VWM

Manual Expansion Locating Pin

Screw Locator

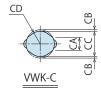
VXF

Compliance

\*\* This drawing shows VWK2000 clamping action without workpiece.

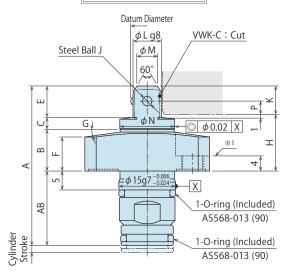
# 2-Mox1 Thread for Jack Bolt M5×0.8×12

 $\underbrace{\frac{VWK-D}{}}_{\text{(Datum: Reference Locating)}}$ 

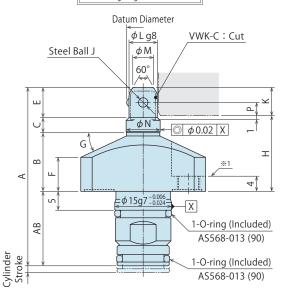


(Cut: One Direction Locating)

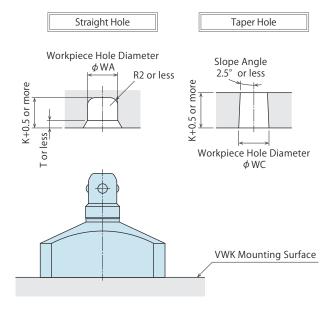
#### 5 Seating Height: **H15**



#### 5 Seating Height: H20 / H25



#### Workpiece Hole Dimensions



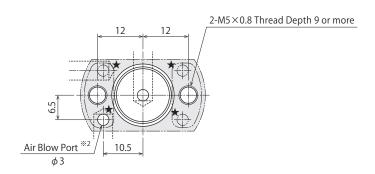
#### Notes:

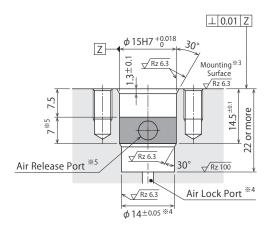
- ※1. Do not use spring washer or toothed lock washer.
  - When mounting the product, use two mounting bolts (Strength Grade 12.9) and tighten them evenly.
     Use two jack bolts to remove the product, keeping it parallel to the mounting surface.
  - 2. This product has no seat. Choose option **-B**: with Seating Surface or prepare a seat separately.

VWM / VWK Features P.187

Action Description

#### Machining Dimensions for Mounting





#### Notes:

- \*3. There might be foam near the flange bottom depending on roughness of mounting surface, but this is not a malfunction.
- %4. Prepare the air lock port on the bottom within the range of  $\phi$  14.
- 1. Make sure to check the cautions for cylinder mounting distance before installation. (Refer to P.229.)

- ※2. Install the air blow port choosing one port from four ★ parts.
- - accuracy, workpiece hole distance accuracy and mounting phase

Locating Clamp

Hand • Clamp

Support

Valve • Coupler

Cautions • Others

Pneumatic Expansion Locating Pin (Smaller)

VRA/VRC

Pneumatic Expansion Locating Pin (Large Expansion Model)

VWH

VWM

Manual Expansion Locating Pin

VX

Screw

VXF

VXF Compliance

WRC

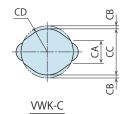
#### External Dimensions and Machining Dimensions for Mounting

External Dimensions and Machining Dimensions for Mounting (mm										(mm)				
Model No.  3 Workpiece Hole Diam. Code		+		VWK2000-070-□-□ <b>070</b>		VWK2000-080-□-□ 080		VWK2000-090-□-□ 090			VWK2000-100-□-□ 100			
Workpiece Hole Diameter	WA (Straight Hole)	5.7 ^	~ 6.6	6.7 ~ 7.6		7.6 ~ 8.5		8.5 ~ 9.5			9.5 ~ 10.8			
	WC (Taper Hole)	6.1 ~ 6.6		7.1 ~ 7.6		8 ~ 8.5		9 ∼ 9.5		10 ~ 10.8				
Datum Diameter	At Releasing	$\phi$ 5.6 or less		$\phi$ 6.6 or less		$\phi$ 7.5 or less		φ8.3 or less		φ9.3 or less				
	At Full Stroke	φ6.6 o	r more	$\phi$ 7.6 or more		\$\phi 8.5 or more		φ9.5 or more		φ 10.8 or more				
Cylinder Stroke		1.8 1.8		1.8		2.2		2.6						
A		41.7	46.7	41.7	46.7	42.2	47.2	52.2	42.3	47.3	52.3	42.4	47.4	52.4
В		11	15.5	11	15.5	11	15.5	20.5	11	15.5	20.5	11	15.5	20.5
С		3.2	4	3.2	4	3.2	4	4	3.2	4	4	3.2	4	4
Е		7.8	7.5	7.8	7.5	8.3	8	8	8.8	8.5	8.5	9.3	9	9
F		9	9	9	9	9	9	9.5	9	9	9.5	9	9	9.5
G		8°	25°	8°	25°	8°	25°	40°	8°	25°	40°	8°	25°	40°
Н		15	20	15	20	15	20	25	15	20	25	15	20	25
	J	2.	38	2.5		2.5		3		3.5				
K			7	7		7.5		8		8.5				
L		5.0	6 - 0.004 - 0.022	6.6 - 0.005		7.5 - 0.005 - 0.027		8.3 <sup>- 0.005</sup> - 0.027		9.3 - 0.005				
M		4	.6	4.6			5.5		6		6.5			
	N	14.5	9	14.5	9	14.5	9	9	14.5	10	10	14.5	11	11
Р			3	3		3.5		3.5			3.5			
Т		1	.5	1.5		2		2		2				
AB		19	19.7 19.7		9.7	19.7		19.3		18.9				
CA		3		3.5		3.5		4		4.5				
СВ		0.25 0.3		.3	0.4		0.4			0.5				
CC		5.1		6		6.7		7.5			8.3			
CD		R2	.55	R3		R3.35		R3.75		R4.15				
1	Weight g	70	80	70	80	70	80	100	70	80	100	70	90	100

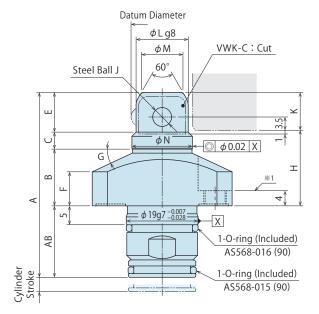
% This drawing shows VWK3000 clamping action without workpiece.

# 2-M6×1 Thread for Jack Bolt M5×0.8×12

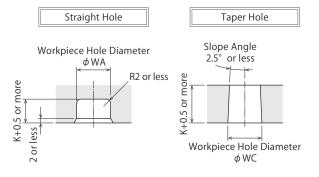
(Datum: Reference Locating)

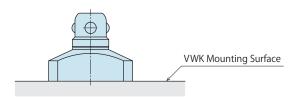


(Cut: One Direction Locating)



#### Workpiece Hole Dimensions





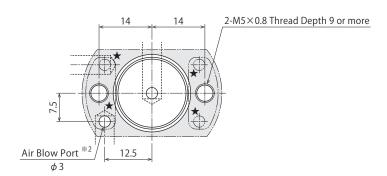
#### Notes:

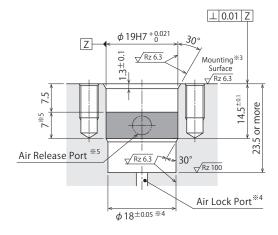
- $\frak{\%}1$ . Do not use spring washer or toothed lock washer.
- When mounting the product, use two mounting bolts (Strength Grade 12.9) and tighten them evenly.
   Use two jack bolts to remove the product, keeping it parallel to the mounting surface.
- 2. This product has no seat. Choose option **-B**: with Seating Surface or prepare a seat separately.

VWM / VWK Features P.187

Action Description

#### Machining Dimensions for Mounting





Model No.

СВ

CC

CD

Weight

#### Notes:

- ※2. Install the air blow port choosing one port from four ★ parts.
- ※3. There might be foam near the flange bottom depending on roughness of mounting surface, but this is not a malfunction.
- 34. Prepare the air lock port on the bottom within the range of  $\phi$  18.

VWK3000-130-□-□

0.7

10.6

R5.3

120

140

110

 Make sure to check the cautions for cylinder mounting distance accuracy, workpiece hole distance accuracy and mounting phase before installation. (Refer to P.229.)

VWK3000-140-□-□

0.7

11.6

R5.8

120

140

110

Locating + Clamp

Locating

Hand • Clamp

Support

Valve • Coupler

Cautions • Others

Pneumatic Expansion Locating Pin (Smaller)

VRA/VRC

Pneumatic Expansion Locating Pin (Large Expansion Model)

V/W/H

VWM

Manual Expansion Locating Pin

VX

Screw

Locato

(mm)

VWK3000-150-□-□

0.8

12.2

R6.1

120

140

VXE

VXF Compliance

Module

WRC

#### External Dimensions and Machining Dimensions for Mounting

VWK3000-110-□-□

0.6

9

R4.5

120

140

110

100

g

3 Workpiece Hole Diam. Code 120 130 110 140 150 5 Seating Height H15 H20 H25 H20 H25 H15 H20 H25 H15 H20 H25 H20 H25 Workpiece WA (Straight Hole) 10.4 ~ 12 11.4~13 12.2 ~ 14.1 13.2 ~ 15.1 14~16.2 Hole Diameter 14 ~ 15.1 WC (Taper Hole) 11~12 12~13 13 ~ 14.1 15~16.2 At Releasing  $\phi$  10.2 or less  $\phi$  11.2 or less  $\phi$  12.0 or less  $\phi$  13.0 or less φ 13.8 or less Datum Diameter At Full Stroke  $\phi$  12.0 or more  $\phi$  13.0 or more  $\phi$  14.1 or more  $\phi$  16.2 or more  $\phi$  15.1 or more Cylinder Stroke 3.8 3.4 3.4 3 3 43.9 48.9 43.7 48.7 48.7 48.8 48.8 Α 53.7 43.7 53.7 43.8 53.8 43.8 53.8 53.9 В 11 15.5 20.5 20.5 20.5 20 11 15.5 11 15.5 11 15 20 11 15 C 3.2 4 4.5 4 4 3.2 4 3.2 4 4 3.2 4.5 4.5 3.2 4.5 9.8 10.5 10.3 10 Ε 9.8 9.5 9.5 9.5 9.5 10.3 10 10 10 10.8 10.5 F 9 9 9.5 9 9 9.5 9 9 9.5 9 9 9.5 9 9 9.5 G 8° 25° 40° 8° 25° 40° 8° 25° 40° 8° 25 40 8° 25° 40° Н 15 20 25 15 20 25 15 20 25 15 20 25 15 20 25 J 4 4 4.5 4.5 5 Κ 9 9 9.5 9.5 10  $10.2 \, {}^{-0.006}_{-0.033}$  $11.2 \, {}^{-0.006}_{-0.033}$  $12.0 \, {}^{-0.006}_{-0.033}$  $13.0^{\,-0.006}_{\,-0.033}$  $13.8^{\,-0.006}_{\,-0.033}$ Μ 7.4 8.4 9.2 10.2 11.0 Ν 18.5 12 18.5 13 13 18.5 14 14 18.5 15 15 18.5 16 16 ΑB 19.7 19.7 19.3 19.3 18.9 CA 5 5 5.5 5.5 6

0.6

10

R5

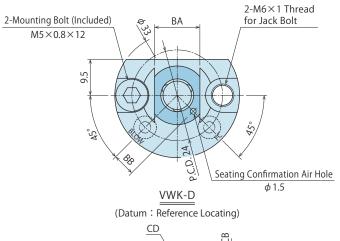
120

140

110

VWK3000-120-□-□

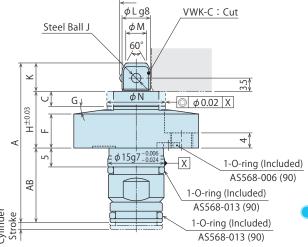
\*\* This drawing shows VWK2000-BR clamping action without workpiece. The ports of VWK2000-BL are placed to the symmetrical positions of this drawing.



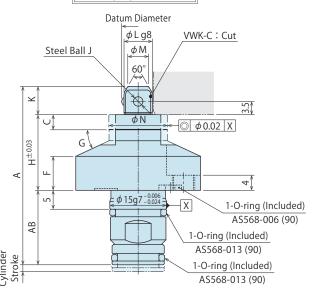
VWK-C

(Cut: One Direction Locating)

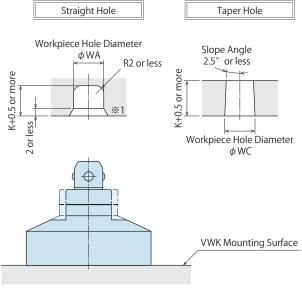




#### 5 Seating Height: H20 / H25



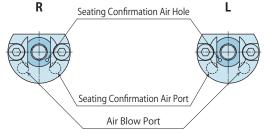
#### Workpiece Hole Dimensions



#### Notes:

- \*\*1. Please note that if the chamfer of the workpiece hole end is large, the seating confirmation air may not be increased.
  - When mounting the product, use two mounting bolts (Strength Grade 12.9) and tighten them evenly.
     Use two jack bolts to remove the product, keeping it parallel to the mounting surface.
- 2. The port names are marked on the product surface.
  (BLOW: Air Blow Port, FC: Seating Confirmation Air Port)
  Continuously supply air pressure to the air blow port and seating confirmation air port.

#### Port Position

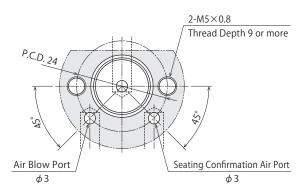


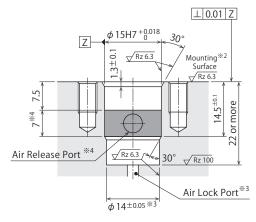
#### Note:

3. Please make sure that the port positions are correct.

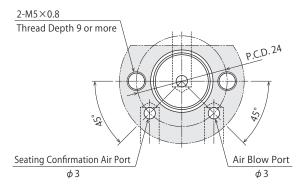
#### Machining Dimensions for Mounting

7 Port Position: **R** 





7 Port Position: L



#### Notes:

- \*2. There might be foam near the flange bottom depending on roughness of mounting surface, but this is not a malfunction.
- 3. Prepare the air lock port on the bottom within the range of  $\phi$  14.
- - 1. Make sure to check the cautions for cylinder mounting distance accuracy, workpiece hole distance accuracy and mounting phase before installation. (Refer to P.229.)

Locating Clamp

Locating

Hand • Clamp

Support

Valve • Coupler

Cautions · Others

Pneumatic Expansion Locating Pin (Smaller)

VRA/VRC

Pneumatic Expansion Locating Pin (Large Expansion Model)

VWH

VWM

Manual Expansion Locating Pin

VX

Screw

VXF

VXF

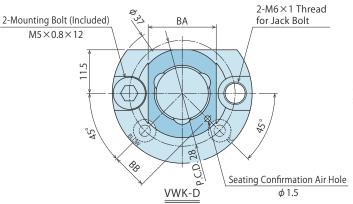
Compliance

WRC

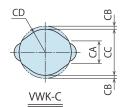
#### External Dimensions and Machining Dimensions for Mounting

(mm) VWK2000-090-□-□-B□ Model No. VWK2000-080-□-□-B□ VWK2000-100-□-□-B□ 3 Workpiece Hole Diam. Code 080 090 100 5 Seating Height H15 H20 H25 H20 H25 H20 H25 WA (Straight Hole) 7.6 ~ 8.5 8.5 ~ 9.5 9.5 ~ 10.8 Workpiece Hole Diameter WC (Taper Hole) 8 ~ 8.5 9~9.5 10 ~ 10.8 At Releasing  $\phi$  7.5 or less  $\phi$  8.3 or less  $\phi$  9.3 or less Datum Diameter At Full Stroke  $\phi$  8.5 or more  $\phi$  9.5 or more  $\phi$  10.8 or more Cylinder Stroke 2.2 1.8 2.6 47.2 47.3 42.2 52.2 42.3 52.3 42.4 47.4 52.4 Α C 4 4 4 4 4 4 4 4 4 9 9 9 9 9.5 9 9 F 9.5 9.5 8° 25° 8° 259 G 8° 25 40° 40° 40° Н 15 20 25 15 20 25 15 20 25 J 2.5 3 3.5 Κ 7.5 8 8.5  $7.5^{\,-0.005}_{\,-0.027}$  $8.3^{\,-0.005}_{\,\,-0.027}$  $9.3^{\,-0.005}_{\,-0.027}$ ı Μ 5.5 6 6.5 Ν 15.5 15.5 15.5 16.5 16.5 16.5 17.5 17.5 17.5 ΑB 19.7 19.3 18.9 ВА 12 13 14 ВВ 6 6.5 CA 3.5 4 4.5 СВ 0.4 0.4 0.5 CC 6.7 7.5 8.3 CD R3.35 R3.75 R4.15 Weight 80 90 110 80 90 110 80 100 110 g

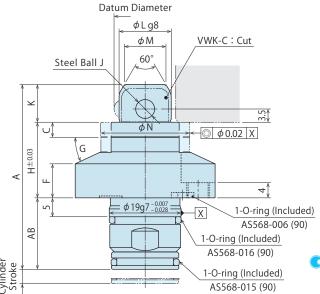
\*\* This drawing shows VWK3000-BR clamping action without workpiece.
The ports of VWK3000-BL are placed to the symmetrical positions of this drawing.



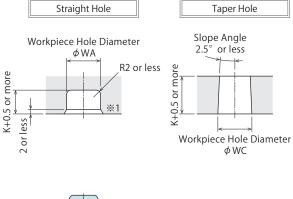
(Datum: Reference Locating)

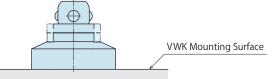


(Cut: One Direction Locating)



#### Workpiece Hole Dimensions

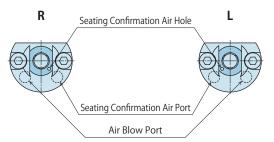




#### Notes:

- \*\*1. Please note that if the chamfer of the workpiece hole end is large, the seating confirmation air may not be increased.
  - When mounting the product, use two mounting bolts (Strength Grade 12.9) and tighten them evenly.
     Use two jack bolts to remove the product, keeping it parallel to the mounting surface.
  - The port names are marked on the product surface.
     (BLOW: Air Blow Port, FC: Seating Confirmation Air Port)
     Continuously supply air pressure to the air blow port and seating confirmation air port.

#### Port Position

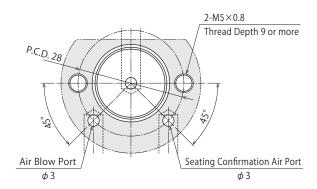


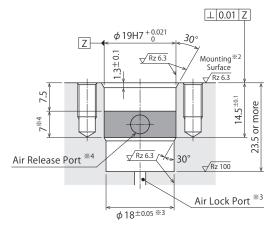
#### Note:

3. Please make sure that the port positions are correct.

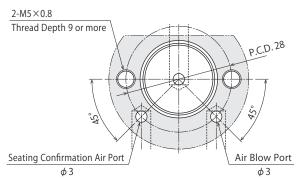
#### Machining Dimensions for Mounting

7 Port Position: **R** 





Port Position: L



#### Notes:

- ※2. There might be foam near the flange bottom depending on roughness of mounting surface, but this is not a malfunction.
- 3. Prepare the air lock port on the bottom within the range of  $\phi$  18.
- 1. Make sure to check the cautions for cylinder mounting distance accuracy, workpiece hole distance accuracy and mounting phase before installation. (Refer to P.229.)

Locating Clamp

Locating

Hand • Clamp

Support

Valve • Coupler

Cautions · Others

Pneumatic Expansion Locating Pin (Smaller)

VRA/VRC

Pneumatic Expansion Locating Pin (Large Expansion Model)

VWH

VWM

Manual Expansion Locating Pin

VX

Screw

VXF

VXF Compliance

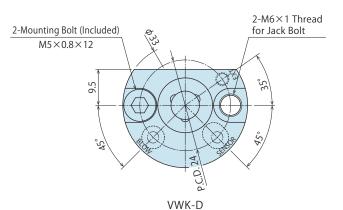
WRC

#### External Dimensions and Machining Dimensions for Mounting

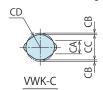
Model No. VWK3000-140-□-□-B□ VWK3000-150-□-□-B□ 3 Workpiece Hole Diam. Code 120 130 110 140 150 5 Seating Height H15 H20 H25 H20 H25 H15 H20 H25 H15 H20 H25 H15 H20 H25 WA (Straight Hole) 10.4 ~ 12 11.4~13 12.2 ~ 14.1 13.2 ~ 15.1 14~16.2 Workpiece Hole Diameter WC (Taper Hole) 11~12 12~13 13 ~ 14.1 14~15.1 15 ~ 16.2 At Releasing  $\phi$  10.2 or less  $\phi$  11.2 or less  $\phi$  12.0 or less  $\phi$  13.0 or less φ 13.8 or less Datum Diameter At Full Stroke  $\phi$  12.0 or more  $\phi$  13.0 or more  $\phi$  14.1 or more  $\phi$  16.2 or more  $\phi$  15.1 or more Cylinder Stroke 3.8 3.4 3.4 3 3 43.8 48.9 43.7 48.7 43.7 48.7 48.8 48.8 43.9 Α 53.7 53.7 43.8 53.8 53.8 53.9 C 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 F 9 9 9 9 9 9 9.5 9 9.5 9 9.5 9 9 9.5 9.5 8° G 8 25 40° 8° 25 40° 8° 25 40° 8 25° 40° 25° 40° 20 25 Н 15 20 25 15 20 25 15 20 25 15 25 15 20 J 4 4 4.5 4.5 5 Κ 9 9 9.5 9.5 10  $10.2^{\,-0.006}_{\,-0.033}$  $12.0 \, {}^{-0.006}_{-0.033}$ 13.0 -0.006  $11.2^{\,-0.006}_{\,-0.033}$  $13.8^{\,-0.006}_{\,-0.033}$ L Μ 7.4 8.4 9.2 10.2 11.0 Ν 19.5 19.5 19.5 20.5 20.5 20.5 21.5 21.5 21.5 22.5 22.5 22.5 23.5 23.5 23.5 ΑB 19.7 19.7 19.3 19.3 18.9 ВА 15 16 17 17 18 ВВ 8 8.5 9 9.5 10 CA 5 5 5.5 5.5 6 СВ 0.6 0.6 0.7 0.7 0.8 CC 9 10 10.6 11.6 12.2 CD R4.5 R5 R5.3 R5.8 R6.1 Weight 110 130 150 110 130 150 110 130 150 120 130 150 120 140 150 g

#### External Dimensions

\*\* This drawing shows VWK2000-MR clamping action without workpiece. The ports of VWK2000-ML are placed to the symmetrical positions of this drawing.

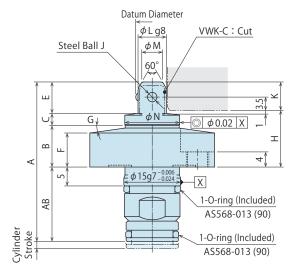


(Datum: Reference Locating)

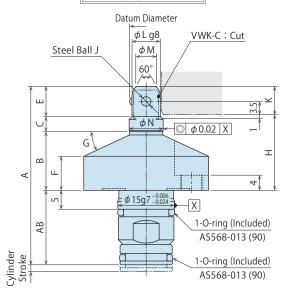


(Cut: One Direction Locating)

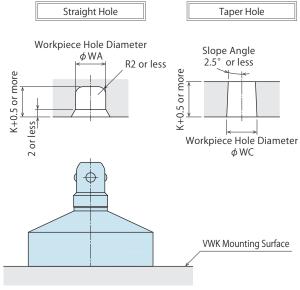
## 5 Seating Height: **H15**



### 5 Seating Height: H20 / H25



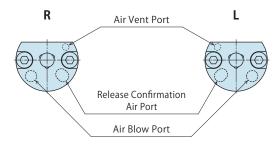
# Workpiece Hole Dimensions



#### Notes:

- When mounting the product, use two mounting bolts (Strength Grade 12.9) and tighten them evenly.
   Use two jack bolts to remove the product, keeping it parallel to the mounting surface.
- The port names are marked on the product surface.
   (EXT: Air Vent Port, BLOW: Air Blow Port,
   SENSOR: Release Confirmation Air Port)
   Continuously supply air pressure to the air blow port and release confirmation air port.
- 3. This product has no seat. Choose option **-B**: with Seating Surface or prepare a seat separately.

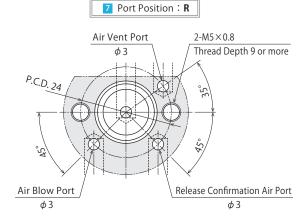
#### Port Position

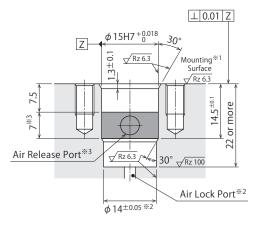


#### Note:

4. Please make sure that the port positions are correct.

# Machining Dimensions for Mounting





# $2-M5 \times 0.8$ Air Vent Port Thread Depth 9 or more φ3 P.C.D. 24

7 Port Position: L

#### Notes:

- ※1. There might be foam near the flange bottom depending on roughness of mounting surface, but this is not a malfunction.
- %2. Prepare the air lock port on the bottom within the range of  $\phi$  14.

Release Confirmation Air Port

φ3

1. Make sure to check the cautions for cylinder mounting distance accuracy, workpiece hole distance accuracy and mounting phase before installation. (Refer to P.229.)

Clamp

Locating

Valve • Coupler

Cautions • Others

VRA/VRC

Pneumatic Expansion Locating Pin (Large Expansion Model)

Manual Expansion

VX

Screw

VXF

VXF Compliance

WRC

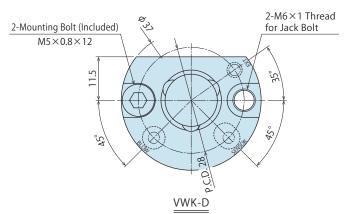
Model No.		VWK2	000-080-🗆-	-M□	VWK2	000-090-🗆-	-M□	VWK2	000-100-🗆-	-M□
	3 Workpiece Hole Diam. Code		080			090			100	
	5 Seating Height	H15	H20	H25	H15	H20	H25	H15	H20	H25
Workpiece	WA (Straight Hole)		7.6 ~ 8.5			8.5 ~ 9.5			9.5 ~ 10.8	
Hole Diameter	WC (Taper Hole)		8 ~ 8.5			9 ~ 9.5			10 ~ 10.8	
Datum Diamatan	At Releasing	$\phi$ 7.5 or less		$\phi$ 8.3 or less		$\phi$ 9.3 or less				
Datum Diameter At Full Stroke		$\phi$ 8.5 or more		$\phi$ 9.5 or more		φ 10.8 or more				
Cylinder Stroke		1.8		2.2		2.6				
	A	42.2	47.2	52.2	42.3	47.3	52.3	42.4	47.4	52.4
	В	11	15.5	20.5	11	15.5	20.5	11	15.5	20.5
С		3.2	4	4	3.2	4	4	3.2	4	4
	E	8.3	8	8	8.8	8.5	8.5	9.3	9	9
	F	9	9	9.5	9	9	9.5	9	9	9.5
	G	8°	25°	40°	8°	25°	40°	8°	25°	40°
	Н	15	20	25	15	20	25	15	20	25
	J		2.5			3			3.5	
	K		7.5			8			8.5	
L		7.5 <sup>-0.005</sup> -0.027			8.3 -0.005			9.3 -0.005		
	M		5.5			6			6.5	
	N	14.5	9	9	14.5	10	10	14.5	11	11
	AB	19.7		19.3		18.9				
CA		3.5			4		4.5			
	СВ	0.4			0.4			0.5		
CC		6.7			7.5			8.3		
CD		R3.35			R3.75			R4.15		
	Weight g	80	90	110	80	90	110	80	100	110

Air Blow Port

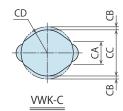
 $\phi$ 3

#### External Dimensions

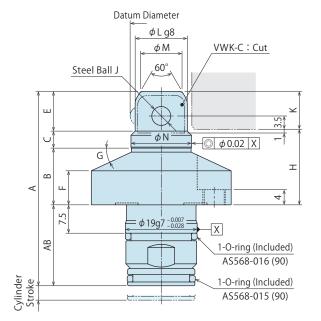
\*\* This drawing shows VWK3000-MR clamping action without workpiece.
The ports of VWK3000-ML are placed to the symmetrical positions of this drawing.



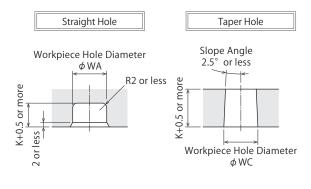
(Datum: Reference Locating)

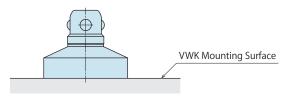


(Cut: One Direction Locating)



# Workpiece Hole Dimensions

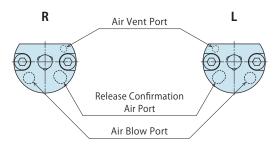




#### Notes:

- When mounting the product, use two mounting bolts (Strength Grade 12.9) and tighten them evenly.
   Use two jack bolts to remove the product, keeping it parallel to the mounting surface.
- The port names are marked on the product surface.
   (EXT: Air Vent Port, BLOW: Air Blow Port, SENSOR: Release Confirmation Air Port)
   Continuously supply air pressure to the air blow port and release confirmation air port.
- 3. This product has no seat. Choose option **-B**: with Seating Surface or prepare a seat separately.

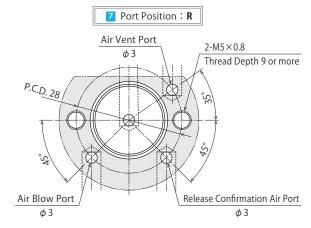
## Port Position

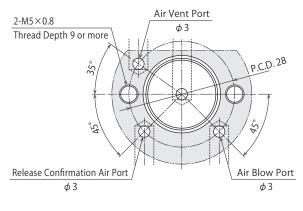


#### Note:

4. Please make sure that the port positions are correct.

# Machining Dimensions for Mounting





7 Port Position: L

## ⊥ 0.01 Z $\phi$ 19H7 $^{+0.021}_{0}$ Z Mounting<sup>\*\*1</sup> Surface √Rz 6.3 Rz 6.3 more ŏ √Rz 6.3 Air Release Port \*\*3 30° √Rz 100 √Rz 6.3 Air Lock Port \*\*2 $\phi$ 18 $\pm$ 0.05%2

#### Notes:

- ※1. There might be foam near the flange bottom depending on roughness of mounting surface, but this is not a malfunction.
- $\times$ 2. Prepare the air lock port on the bottom within the range of  $\phi$  18.
- - 1. Make sure to check the cautions for cylinder mounting distance accuracy, workpiece hole distance accuracy and mounting phase before installation. (Refer to P.229.)

Locating Clamp

Locating

VXF

VXF Compliance

WRC

# External Dimensions and Machining Dimensions for Mounting

VWK3000-110-||--||-M||| VWK3000-120-||--||-M|| VWK3000-130-||--||-M|| VWK3000-140-||--||-M|| Model No. VWK3000-150-□-□-M□ 3 Workpiece Hole Diam. Code 120 130 110 140 150 5 Seating Height H15 H20 H25 H20 H25 H15 H20 H25 H15 H20 H25 H15 H20 H25 WA (Straight Hole) 10.4 ~ 12 11.4~13 12.2 ~ 14.1 13.2 ~ 15.1 14~16.2 Workpiece Hole Diameter WC (Taper Hole) 11~12 12~13 13 ~ 14.1 14~15.1 15~16.2 At Releasing  $\phi$  10.2 or less  $\phi$  11.2 or less  $\phi$  12.0 or less  $\phi$  13.0 or less φ 13.8 or less Datum Diameter At Full Stroke  $\phi$  12.0 or more  $\phi$  13.0 or more  $\phi$  14.1 or more  $\phi$  16.2 or more  $\phi$  15.1 or more Cylinder Stroke 3.8 3 3.4 3.4 3 46.2 51.2 51.2 51.3 46.3 51.3 51.4 Α 56.2 46.2 56.2 46.3 56.3 56.3 46.4 56.4 В 11 15.5 20.5 15.5 20.5 20.5 11 15.5 11 11 15 20 11 15 20 C 4 4.5 3.2 4 4 3.2 4 3.2 4 4 3.2 4.5 4.5 3.2 4.5 10.3 Ε 9.8 9.5 9.5 9.8 9.5 9.5 10.3 10 10 10 10 10.8 10.5 10.5 F 9 9 9.5 9 9 9.5 9 9 9.5 9 9 9.5 9 9 9.5 G 8° 25° 40° 8° 25° 40° 8° 25° 40° 8° 25° 40 8° 25° 40° Н 15 20 25 15 20 25 15 20 25 15 20 25 15 20 25 J 4 4 4.5 4.5 5 Κ 9 9 9.5 9.5 10 10.2 -0.006  $11.2^{\,-0.006}_{\,-0.033}$  $12.0 \, ^{-0.006}_{-0.033}$ 13.0 -0.006 13.8 -0.006 Μ 7.4 8.4 9.2 10.2 11.0 Ν 18.5 12 18.5 13 13 18.5 14 18.5 15 15 18.5 16 16 AB 22.2 22.2 21.8 21.8 21.4 CA 5 5 5.5 5.5 6 СВ 0.6 0.6 0.7 0.7 0.8 CC 9 10 10.6 11.6 12.2 CD R4.5 R5 R5.3 R5.8 R6.1 Weight 120 140 160 120 140 160 120 140 160 120 140 160 120 140 160 g

### Cautions

Notes for Design

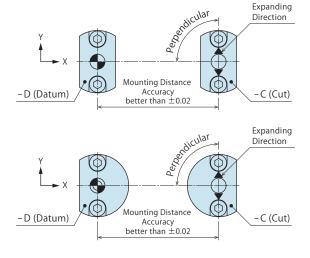
VWM / VWK common

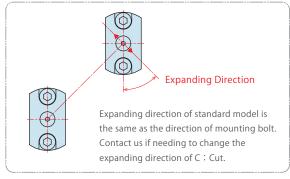
- 1) Check Specifications
- Please use each product according to the specifications.
   VWM locates with air pressure + spring and releases with air pressure.
   VWK locates and releases with air pressure.
- 2) Notes for Circuit Design
- Please read "Circuit Reference" to assist with proper air circuit design.

Improper circuit design may lead to malfunctions and damages.

- 3) Air Supply
- Continuously supply air pressure to the air blow port.
   If air supply is shut off during operation, contaminants enter into the cylinder leading to malfunctions.
- Continuously supply air pressure to the seating confirmation air port for -B: with Seating Surface, and to the release confirmation air port for -M: Release Confirmation model.
- 4) Setting Up the Clamps
- The expansion locating pin is a positioning cylinder and has no clamping mechanism. A clamp must be provided separately.
- 5) Expansion Locating Pin Mounting Direction (Phase)
- The Cut (VWM / VWK-C) locates a workpiece in the direction of rotation based on the datum (VWM / VWK-D). Therefore, it is required to determine the phase of C: Cut when mounting.

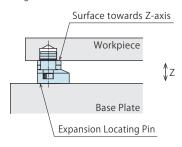
When mounting the product, make sure that expanding direction of -C (Cut) is perpendicular to -D (Datum).



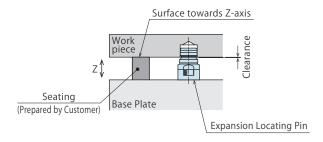


- 6) Reference Surface towards Z-axis
- -B: with Seating Surface has seating on the flange surface, but the Standard model and -M: Release Confirmation model have no seating (reference surface towards Z-axis).
   Please prepare a seat separately.

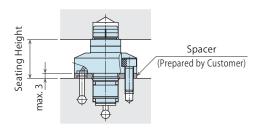
#### -B: with Seating Surface



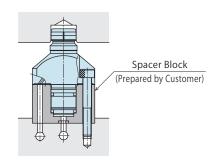
Standard / -M: Release Confirmation Model



- 7) Adjusting Height of Expansion Locating Pin
- Seating height can be selected from 15mm / 20mm / 25mm.
- For slight adjustment of seating height and expanding part height, install a spacer (3mm or less) under the flange.

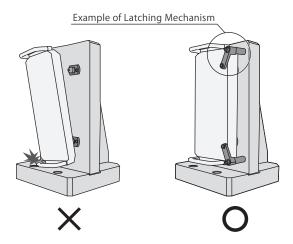


 Install a spacer block under the flange if the height of expansion locating pin is not enough.

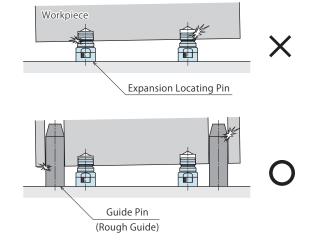




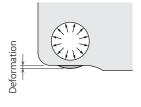
- 8) When the workpiece is in vertical position.
- When setting a workpiece, make sure it is in proper proximity and square to the expansion locating pins.
   If it is locked out of position, the products may be damaged.
- As the workpiece may fall down when released, it is recommended to set up the latching mechanism to prevent it from falling down.
- When the workpiece is used in vertical position (hanging on the wall), the internal moving parts tend to wear out.
   Check the locating accuracy regularly, and if exceeding the allowable range, replace the product.



- 9) Inclination in the Z-axis direction.
- If a workpiece is tilted when loading/unloading, expanded part of expansion locating pin and workpiece hole will get stuck and the cylinder and workpiece will be damaged. Workpiece should be loaded and unloaded with less than  $4/100 \sim 5/100$  (approx.  $2 \sim 3^{\circ}$ ) of tilt between workpiece and expansion locating pin plane.
- The product will be damaged when a workpiece is tilted during loading/unloading (especially when unloaded). Prepare guide pins (rough guides) to keep the workpiece level during loading/ unloading.



- 10) Thickness around the Workpiece Hole
- Thin wall around the workpiece hole could be deformed by expanding force, and locating accuracy would not fill the specification. Please conduct trial testing before use.



Locating + Clamp

Locating

Hand • Clamp

Support

Valve • Coupler

Cautions • Others

Pneumatic Expansion Locating Pin (Smaller)

VRA/VRC

Pneumatic Expansion Locating Pin (Large Expansion Model)

VWH

eumatic Expansion cating Pin

V W M

vwĸ

Manual Expansion Locating Pin

VX

Screw Locator

VXE

Compliance

ule WRC

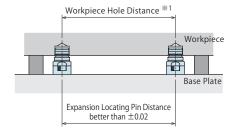
- Cautions
- Notes for DesignRegarding VWM
- 1) Distance Accuracy of VWM
- $\bullet$  Distance accuracy of the VWM's mounting hole should be better than  $\pm 0.02 \text{mm}.$

\*\*1. The distance accuracy of each workpiece hole should be within the center distance accuracy on the following list "JIS B 0613 Class 2" considering the allowable offset (VWM-C: Cut) and the datum cylinder distance accuracy (VWM-D: Datum).

Allowable Offset (C : Cut)  $\geq$  Datum Cylinder Distance Accuracy +Workpiece Hole Distance Accuracy (Listed in JIS B 0613)

The following shows the center distance accuracy [Class 2] (JIS B 0613).

[JIS B 0613 Ex	kcerpt]	unit:mm		
Center Distanc	e Classification	Center Distance Accuracy		
Greater than	or less	Class 2		
50	80	±0.023		
80	120	±0.027		
120	180	±0.032		
180	250	±0.036		
250	315	±0.041		
315	400	±0.045		
400	500	±0.049		
500	630	±0.055		
630	800	±0.063		
800	1000	±0.070		



- Notes for Design Regarding VWK
- 1) Distance Accuracy of VWK
- Distance accuracy between VWK mounting holes (D:Datum and C:Cut) and between workpiece holes has to be determined according to the allowable offset (VWK-C:Cut).



#### Installation Notes

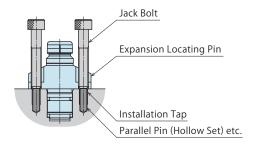
- 1) Check the fluid to use
- Please supply filtered clean dry air.
- Oil supply with a lubricator etc. is unnecessary.
- 2) Preparation for Piping
- The pipeline, piping connector and fixture circuits should be cleaned and flushed thoroughly.

The dust and cutting chips in the circuit may lead to fluid leakage and malfunction.

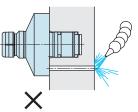
- 3) Applying Sealing Tape
- Wrap with tape 1 to 2 times following the screwing direction.
   Wrapping in the wrong direction will cause leaks and malfunction.
- Pieces of the sealing tape can lead to air leaks and malfunction.
- When piping, be careful that contaminant such as sealing tape does not enter in products.
- 4) Installation / Removal of the Expansion Locating Pin
- Use all the attached hexagonal socket bolts (Strength Grade 12.9) and tighten them with torque shown in the table below.
   Tighten them evenly to prevent tilting of the product.

Model No.	Mounting Bolt Thread Size	Tightening Torque (N·m)
VWM2000	M5×0.8	6.3
VWM3000	M6×1	10
VWM4000	M6×1	10
VWM5000	M8×1.25	25
VWK2000	M5×0.8	6.3
VWK3000	M5×0.8	6.3

- Do not use spring washer or toothed lock washer.
- There might be foam near the flange bottom depending on roughness of mounting surface, but this is not a malfunction.
- When removing the product, use two jack bolts (two mounting bolt holes) in order not to damage the installation tap. The following shows the case in which the parallel pin (hollow set) is set in the tapped hole so that the installation tap will not be damaged.



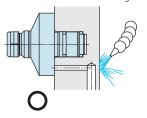
- 5) Appropriate Measures for the Air Vent Port
- For the air vent port of -M: Release Confirmation model, consider the environment and avoid coolant or any contaminants.
   If coolant or contaminants enter in the product, it will not function properly.



#### Examples

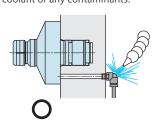
① Prepare the manifold piping.

Use the manifold piping and prepare the air vent port to the place without the influence of coolant or cutting chips.



② Prepare the external piping.

If it is impossible to prepare manifold piping like the case ①, move the air vent port by using external piping to the place without the influence of coolant or any contaminants.



Locating + Clamp

Locating

Hand • Clamp

Support

Valve • Coupler

Cautions • Others

Pneumatic Expansion

Locating Pin (Smaller)

Pneumatic Expansion Locating Pin (Large Expansion Model)

VWH

eumatic Expansion cating Pin

V VV IVI

VWK

Manual Expansion Locating Pin VX

Screw

Locator

VXE

Compliance Module

WRC

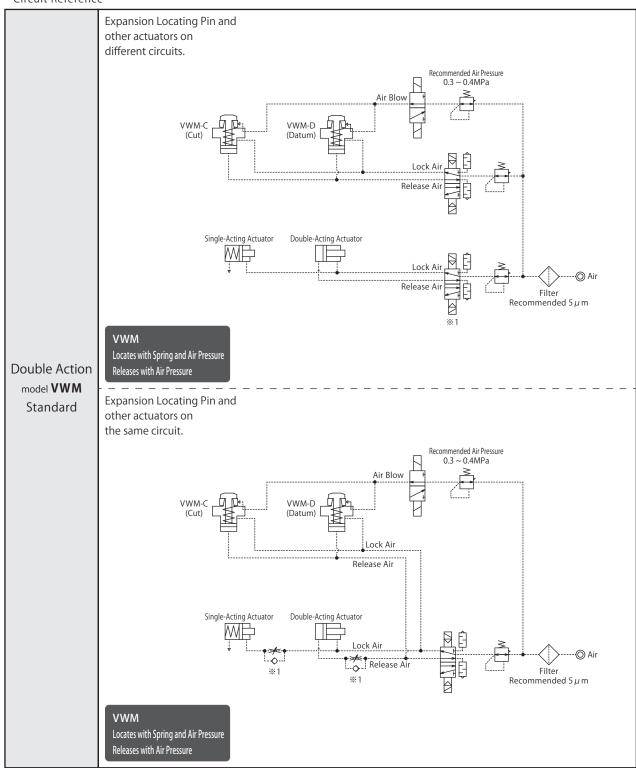
- Circuit Reference
- Notes on Pneumatic Cylinder Speed Control Unit VWM (Standard)



Please pay attention to the cautions below. Design the circuit for controlling the action speed of cylinder.

Improper circuit design may lead to malfunctions and damages. Please review the circuit design in advance.

#### Circuit Reference



#### Notes:

- ※1. The procedure for lock operation should be "VWM (Expansion Locating Pin)" → "other actuators". Otherwise there might be accuracy failure and/or damages on the product.
- 1. This circuit reference is one example. It should be prepared depending on the fixture structure.

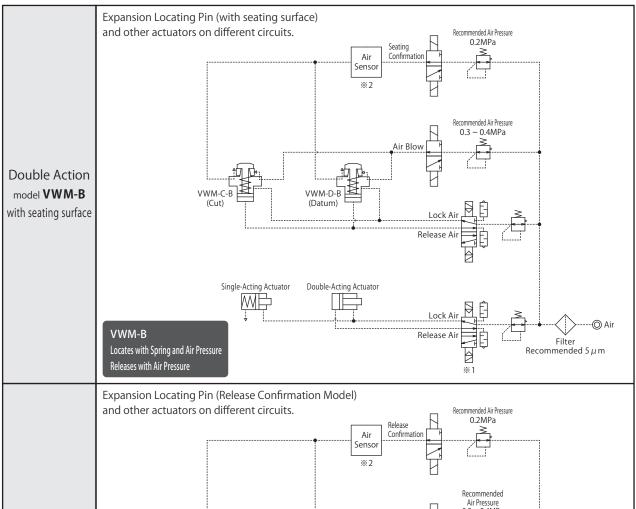
Notes on Pneumatic Cylinder Speed Control Unit VWM-B (with Seating Surface)

 $VWM\text{-}M \ \ (Release \ Confirmation)$ 

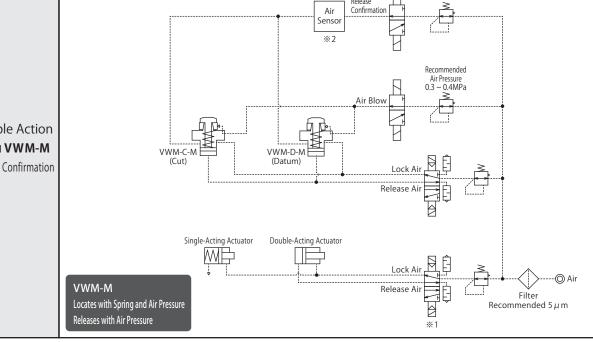


Please pay attention to the cautions below. Design the circuit for controlling the action speed of cylinder. Improper circuit design may lead to malfunctions and damages. Please review the circuit design in advance.

#### Circuit Reference



**Double Action** model **VWM-M** Release Confirmation



#### Notes:

- ※1. The procedure for lock operation should be "VWM (Expansion Locating Pin)" → "other actuators". Otherwise there might be accuracy failure and/or damages on the product.
- ※2. Recommended Air Sensor: ISA□-G (SMC), GPS3 (CKD)
- 1. This circuit reference is one example. It should be prepared depending on the fixture structure.

Locating Clamp

Locating

Hand • Clamp

Support

Valve • Coupler

Cautions • Others

Pneumatic Expansion Locating Pin (Smaller

VRA/VRC

Pneumatic Expansion Locating Pin (Large Expansion Model)

Manual Expansion Locating Pin

Screw

VXF

Compliance

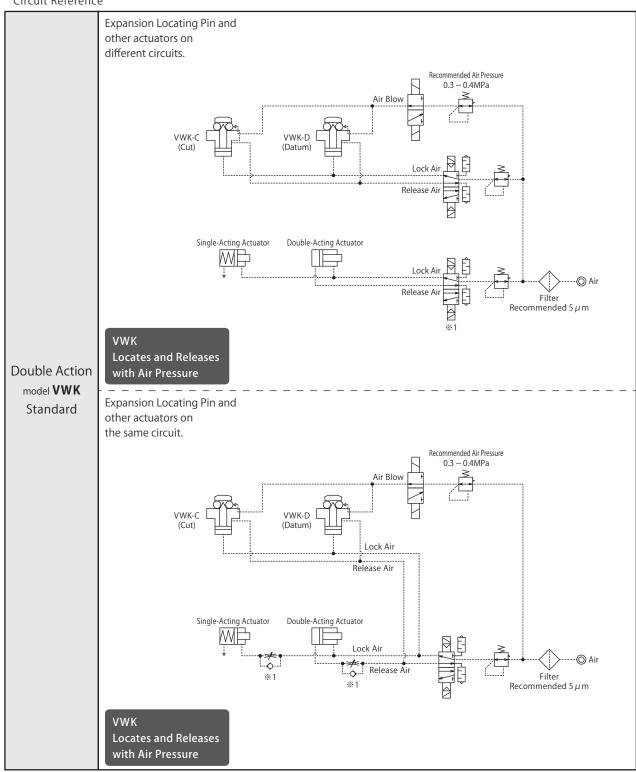
WRC

- Circuit Reference
- Notes on Pneumatic Cylinder Speed Control Unit VWK (Standard)



Please pay attention to the cautions below. Design the circuit for controlling the action speed of cylinder. Improper circuit design may lead to malfunctions and damages. Please review the circuit design in advance.

#### Circuit Reference



#### Notes:

- ※1. The procedure for lock operation should be "VWK (Expansion Locating Pin)" → "other actuators". Otherwise there might be accuracy failure and/or damages on the product.
- 1. This circuit reference is one example. It should be prepared depending on the fixture structure.



Notes on Pneumatic Cylinder Speed Control Unit

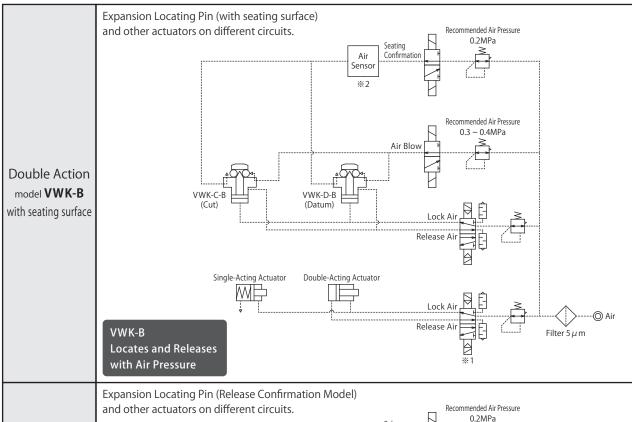
VWK-B (with Seating Surface)

VWK-M (Release Confirmation)



Please pay attention to the cautions below. Design the circuit for controlling the action speed of cylinder. Improper circuit design may lead to malfunctions and damages. Please review the circuit design in advance.

#### Circuit Reference



Release Air Sensor % 2 Recommended Air Pressure 0.3 ~ 0.4MPa Air Blow **Double Action** model **VWK-M** VWK-C-M VWK-D-M Release Confirmation (Cut) (Datum) Single-Acting Actuator Double-Acting Actuator - ( Air VWK-M Filter  $5 \mu$  m Locates and Releases with Air Pressure

#### Notes:

- ※1. The procedure for lock operation should be "VWK (Expansion Locating Pin)" → "other actuators". Otherwise there might be accuracy failure and/or damages on the product.
- ※2. Recommended Air Sensor : ISA□-G (SMC), GPS3 (CKD)
- 1. This circuit reference is one example. It should be prepared depending on the fixture structure.

Locating + Clamp

Locating

Hand • Clamp

Support

Valve • Coupler

Cautions • Others

Pneumatic Expansion Locating Pin (Smaller)

VRA/VRC

Pneumatic Expansion Locating Pin (Large Expansion Model)

VWH

cating Pin

VWM

Manual Expansion

Locating Pin

Screw

Locator

VXF

Compliance Module

WRC

#### Cautions

### Notes on Handling

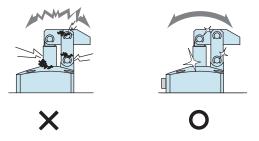
- 1) It should be operated by qualified personnel.
- The hydraulic machine and air compressor should be operated and maintained by qualified personnel.
- Do not operate or remove the product unless the safety protocols are ensured.
- ① The machine and equipment can only be inspected or prepared when it is confirmed that the safety devices are in place.
- ② Before the product is removed, make sure that the above-mentioned safety devices are in place. Shut off the pressure and power source, and make sure no pressure exists in the air and hydraulic circuits.
- ③ After stopping the product, do not remove until the temperature drops.
- 4 Make sure there is no trouble/issue in the bolts and respective parts before restarting the machine or equipment.
- Do not touch a clamp (cylinder) while it is working.
   Otherwise, your hands may be injured.



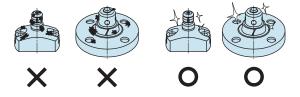
- 4) Do not disassemble or modify.
- If the equipment is taken apart or modified, the warranty will be voided even within the warranty period.

### Maintenance and Inspection

- 1) Removal of the Machine and Shut-off of Pressure Source
- Before removing the product, make sure that the safety devices are in place. Shut off the pressure and power source and make sure no pressure exists in the air and hydraulic circuits.
- Make sure there is no trouble/issue in the bolts and respective parts before restarting.
- 2) Regularly clean the area around the piston rod and plunger.
- If it is used when the surface is contaminated with dirt, it may lead to packing seal damage, malfunctioning, fluid leakage.



- Regularly clean the reference surfaces (taper reference surface and seating surface) of locating products (SWT/SWQ/SWP/VRA/ VRC/VX/VXE/VXF/WVS/WVG/VWH/VWM/VWK).
- Locating products (except VRA/VRC/VX/VXE/VXF and SWR without air blow port) can remove contaminants with the cleaning function.
   When installing a workpiece or a pallet, make sure there are no contaminants such as thick sludge.
- Continuous use with dirt on components will lead to locating failure, fluid leakage and malfunction.



- 4) Regularly tighten pipe, mounting bolt, nut, snap ring, cylinder and others to ensure proper use.
- 5) Make sure the hydraulic fluid has not deteriorated.
- 6) Make sure there is a smooth action without an irregular noise.
- Especially when it is restarted after left unused for a long period, make sure it can be operated correctly.
- 7) The products should be stored in the cool and dark place without direct sunshine or moisture.
- 8) Please contact us for overhaul and repair.



## Warranty

- 1) Warranty Period
- The product warranty period is 18 months from shipment from our factory or 12 months from initial use, whichever is earlier.
- 2) Warranty Scope
- If the product is damaged or malfunctions during the warranty period due to faulty design, materials or workmanship, we will replace or repair the defective part at our expense. Defects or failures caused by the following are not covered.
- ① If the stipulated maintenance and inspection are not carried out.
- ② Failure caused by the use of the non-confirming state at the user's discretion.
- ③ If it is used or operated in an inappropriate way by the operator. (Including damage caused by the misconduct of the third party.)
- ④ If the defect is caused by reasons other than our responsibility.
- ⑤ If repair or modifications are carried out by anyone other than Kosmek, or without our approval and confirmation, it will void warranty.
- ⑥ Other caused by natural disasters or calamities not attributable to our company.
- $\ensuremath{{\ensuremath{\bigcirc}}}$  Parts or replacement expenses due to parts consumption and deterioration.

(Such as rubber, plastic, seal material and some electric components.)

Damages excluding from direct result of a product defect shall be excluded from the warranty.

Clamp

Locating

Locating

Hand • Clamp

Support

Valve • Coupler

Electric Drive • Convevor

Cautions • Others

Cautions

Installation Notes

Maintenance/

表記改定のお知らせ

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Our Products

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Sales Offices



# **Sales Offices**

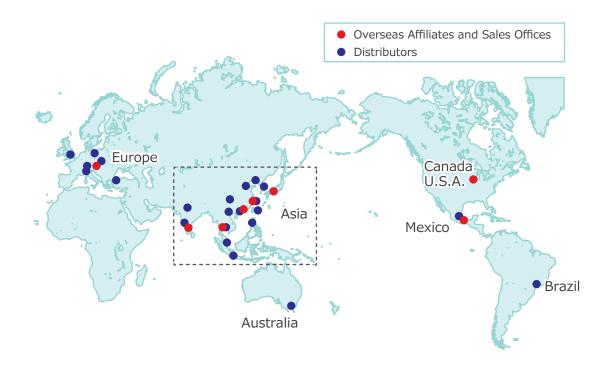
# Sales Offices across the World

JAPAN HEAD OFFICE Overseas Sales	<b>TEL.</b> +81-78-991-5162 KOSMEK LTD. 1-5, 2-chome, Murotani, Nis 〒651-2241 兵庫県神戸市西区室谷2丁目1番5	, , , , , , , ,
United States of America SUBSIDIARY	TEL. +1-630-620-7650	FAX. +1-630-620-9015
KOSMEK (USA) LTD.	650 Springer Drive, Lombard, IL 60148 US	SA .
MEXICO REPRESENTATIVE OFFICE	TEL. +52-442-161-2347	
KOSMEK USA Mexico Office	Av. Santa Fe #103 int 59 Col. Santa Fe Juri	quilla C.P. 76230 Queretaro, Qro Mexico
EUROPE SUBSIDIARY	TEL. +43-463-287587	FAX. +43-463-287587-20
KOSMEK EUROPE GmbH	Schleppeplatz 2 9020 Klagenfurt am Wör	thersee Austria
CHINA	TEL. +86-21-54253000	FAX. +86-21-54253709
KOSMEK (CHINA) LTD. 考世美(上海)貿易有限公司	Room601, RIVERSIDE PYRAMID No.55, Lar 中国上海市浦东新区浦三路21弄55号银亿滨江中	ne21, Pusan Rd, Pudong Shanghai 200125, China 中心601室 200125
INDIA BRANCH OFFICE	TEL. +91-9880561695	
KOSMEK LTD - INDIA	F 203, Level-2, First Floor, Prestige Center	Point, Cunningham Road, Bangalore -560052 India
THAILAND REPRESENTATIVE OFFICE	TEL. +66-2-300-5132	FAX. +66-2-300-5133
KOSMEK Thailand Representation Office	67 Soi 58, RAMA 9 Rd., Suanluang, Suanlu	ang, Bangkok 10250, Thailand
TAIWAN (Taiwan Exclusive Distributor) Full Life Trading Co., Ltd. 盈生貿易有限公司	<b>TEL.</b> +886-2-82261860 16F-4, No.2, Jian Ba Rd., Zhonghe District, New 台湾新北市中和區建八路2號 16F-4(遠東世紀月	•
PHILIPPINES (Philippines Exclusive Distributor)	TEL. +63-2-310-7286	FAX. +63-2-310-7286
G.E.T. Inc, Phil.	Victoria Wave Special Economic Zone Mt. Apo Buildin	g, Brgy. 186, North Caloocan City, Metro Manila, Philippines 1427
INDONESIA (Indonesia Exclusive Distributor)	TEL. +62-21-29628607	FAX. +62-21-29628608

# Sales Offices in Japan

Head Office Osaka Sales Office	TEL. 078-991-5162	FAX. 078-991-8787
Overseas Sales	〒651-2241 兵庫県神	申戸市西区室谷2丁目1番5号
Talva Calas Offica	TEL. 048-652-8839	FAX. 048-652-8828
Tokyo Sales Office	〒331-0815 埼玉県さ	いたま市北区大成町4丁目81番地
Nagova Salas Offica	TEL. 0566-74-8778	FAX. 0566-74-8808
Nagoya Sales Office		FAX. 0566-74-8808 R城市美園町2丁目10番地1
Nagoya Sales Office  Fukuoka Sales Office		

# **Global Network**



# Asia Detailed Map





