Hydraulic Pallet Clamp

Model VS
Model VT
Model VSB
Model VSJ

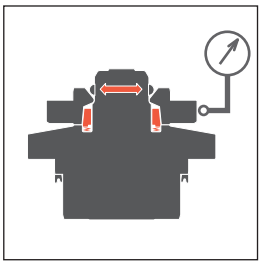
Instant Clamping and Locating

Locating Repeatability : 3 μm

PAT.

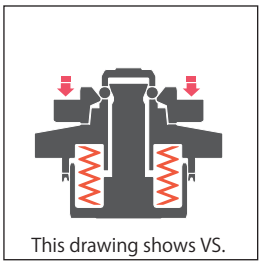
● High Accuracy Locating

Locating Repeatability : 3 μm
No need to inspect the fixture alignment inside the machine.



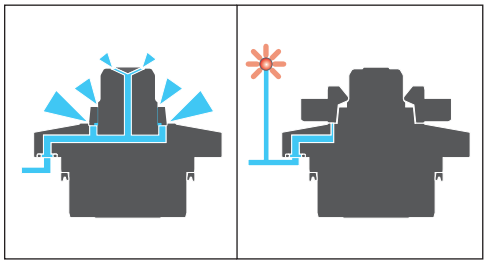
● Clamping Function

Clamping force is ranged from 2.5kN to 40kN.
Possible to select clamping force depending on purpose.

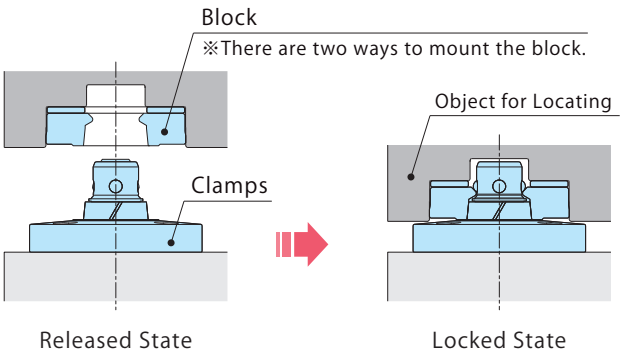


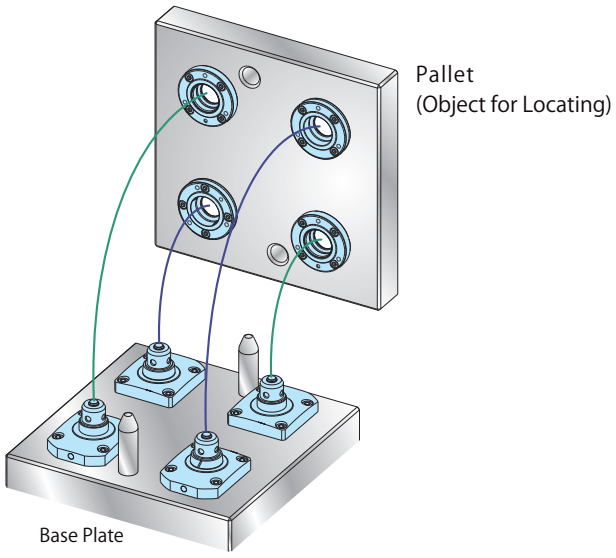
● Air-Blow and Seat Check

Contaminants are removed by air blow.
Seating surface is provided with the air hole, seat check is possible by using a gap sensor.



Action Description

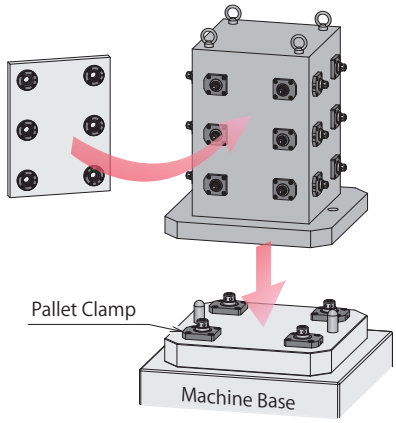




Advantages

● Higher Productivity by Setup Improvement

Pallet Clamp locates with high accuracy and clamps simultaneously.
(Fixture alignment and inspection are eliminated.)
Fixture change over is faster and easier, thus by eliminating alignment inspection for accuracy which is done in many different ways.



Pallet and Fixture Change Over on Machining Center

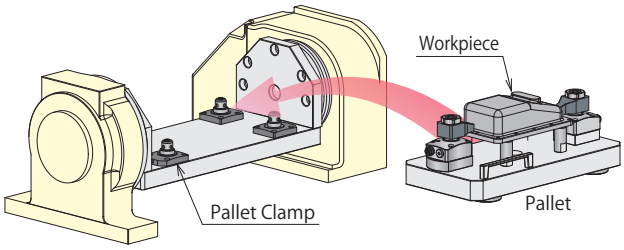
Preparation Time

Substantial Reduction

● Efficient use of machine by eliminating non-productive time like fixture setting etc is done outside.

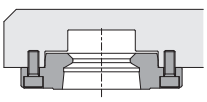
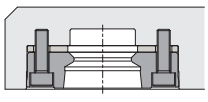
Since the fixture setting is outside, the machine idle time is reduced.

Pallet sharing system is very efficient for many variants with small batch production requirements.



Manual Pallet Change

Pallet alignment is **Instant**

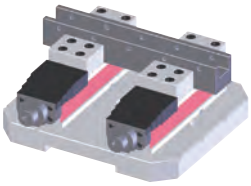
	 Model VS → P.981	 Model VT → P.985	 Model VSJ → P.991	 Model VSB → P.989
Classification	Single Action Spring Lock / Hydraulic Release	Double Action	Flange Shaped Block	Embedded Block
Operating Pressure Range	3.5 ~ 7MPa	1.5 ~ 7MPa	–	–
Features	• Able to detach from hydraulic source with spring lock. • Clamping force is stable regardless of hydraulic pressure.	• Clamping force varies depending on hydraulic pressure.	 Simple Mounting	 Straight Mounting
Accessories	Level Adjustment Collar (VS only) VZ-VS1 → P.983	–	–	Level Adjustment Collar (VSB Only) VZ-VSC → P.989

Installation Sample on the Machining Center

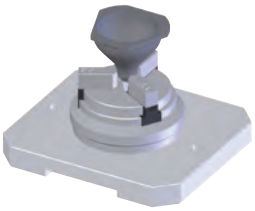
- With combination of machining center and pallet clamp, multiple fixtures and works become easily interchangeable.
- Internal setup time can be reduced with high accuracy repetitive locating of pallet clamp + one touch clamping.
- If common layouts are used, fixture count and required machines can be minimized saving cost and space.

Angle Plate Fixture

Clamp Fixture

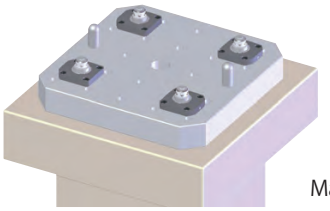


Vise Fixture



Chuck Fixture

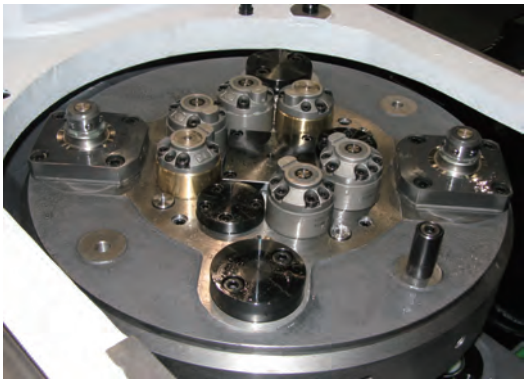
Base Plate



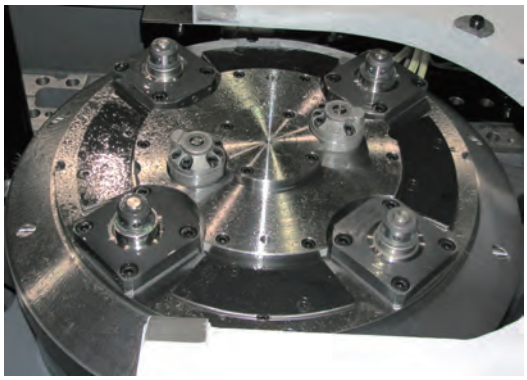
Machine Table

Shared

The pallet clamp is used at the machine table of the operating machine.



Preparation Side



Machine Side

- With non-leak auto couplers (model：BGC/BGD), there is no need of additional hydraulic circuits during machining.
- Using datum clamps in combination with non-leak auto couplers simplifies setup and reduces changeover time.

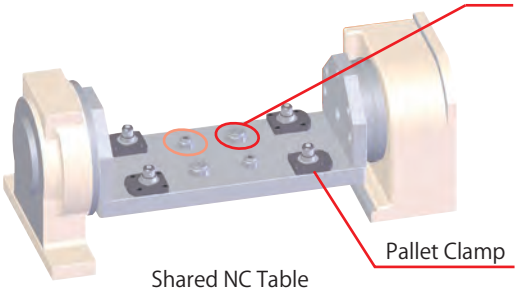
Installation Sample on NC table

- With combination of NC table and pallet clamp, multiple fixtures and works become easily interchangeable.
- Hydraulic pressure, air pressure and coolant can be supplied to the fixture with the use of zero setting force type auto couplers (Refer to JVC/JVD and JVE/JVF).

Hydraulic Clamp Fixture

Pneumatic Clamp Fixture

Air Chuck Fixture

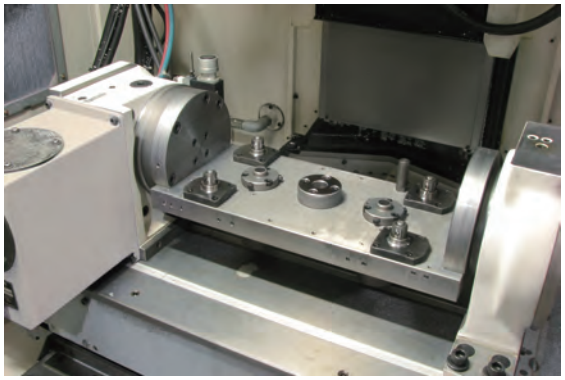


Shared NC Table

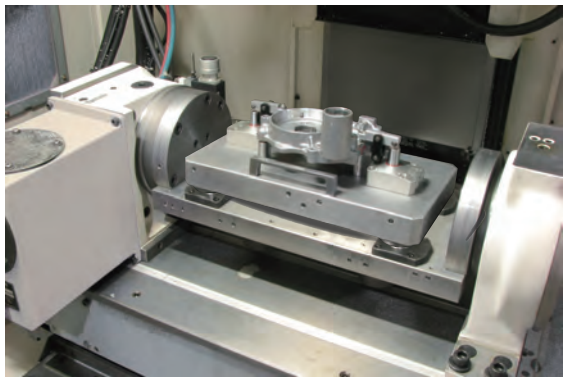
■ **Auto-Coupler**

model JVC/JVD JVE/JVF

Coupler with the minimum connection stroke enhances automation.
Compact and able to install in limited spaces.



Before Pallet Mounting

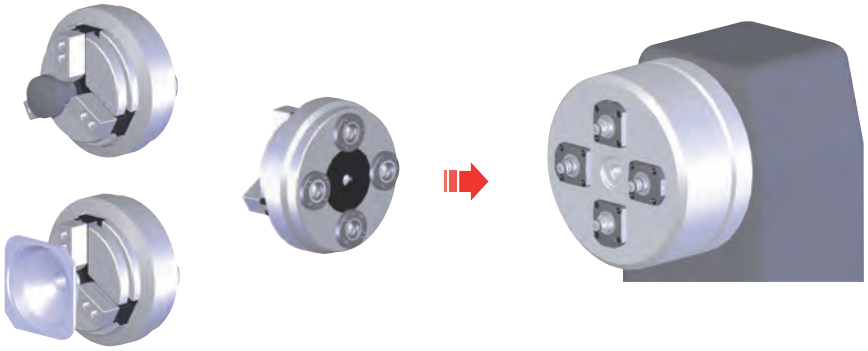


After Mounting Pneumatic Clamp Fixture

- The setup time during fixture changeover is greatly reduced.
- Thanks to high precision repetitive positioning (3 μm) of the pallet clamp, there is no need to check the fixture position precision within the machine.

Installation Sample to the Chuck used for Lathe

・With combination of the lathe unit and chuck, the workpiece setting time and chuck replacement time is substantially!



General Application Sample of Fixture

Optimization with Parent and Child Fixture

・The fixtures used for small size / large size work are divided into child fixture / large work used fixture, so that:

→ The setup operation is simplified and productivity is enhanced.

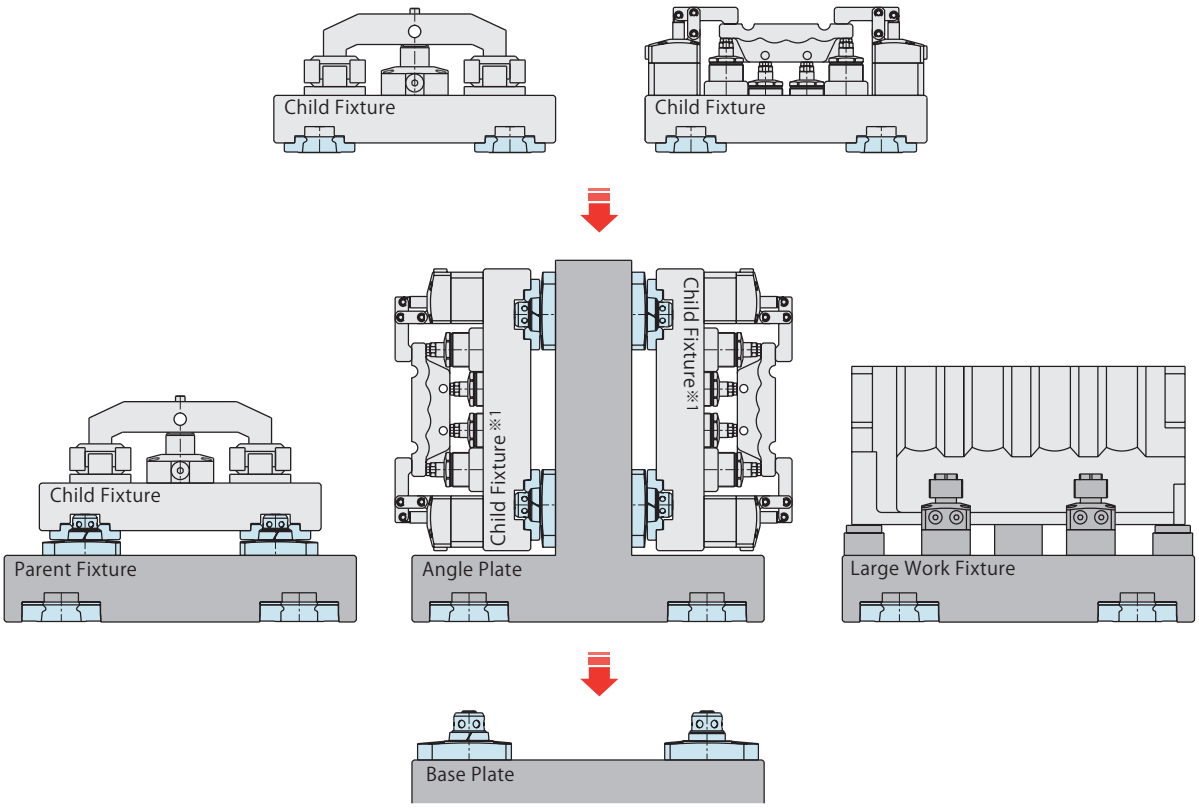
→ The fixture preparation cost is reduced as only the child.

Fixture needs to be prepared

・As the parent fixture / angle plate / child fixture can share one base plate

→ The fixture preparation cost is reduced.

→ The fixture stocking space is reduced.



Notes :

※1. In case the pallet (fixture) is in vertical position, the fixture may fall during releasing.
It is recommended to set up the latching mechanism to prevent the fixture from falling.

1. Even for fixtures with different pallet size, VS/VT clamp and VSB/VSJ block can be combined for use.
Installation samples when multiple pallet sizes are used.

Please choose WVS or VS (VT) according to the application.

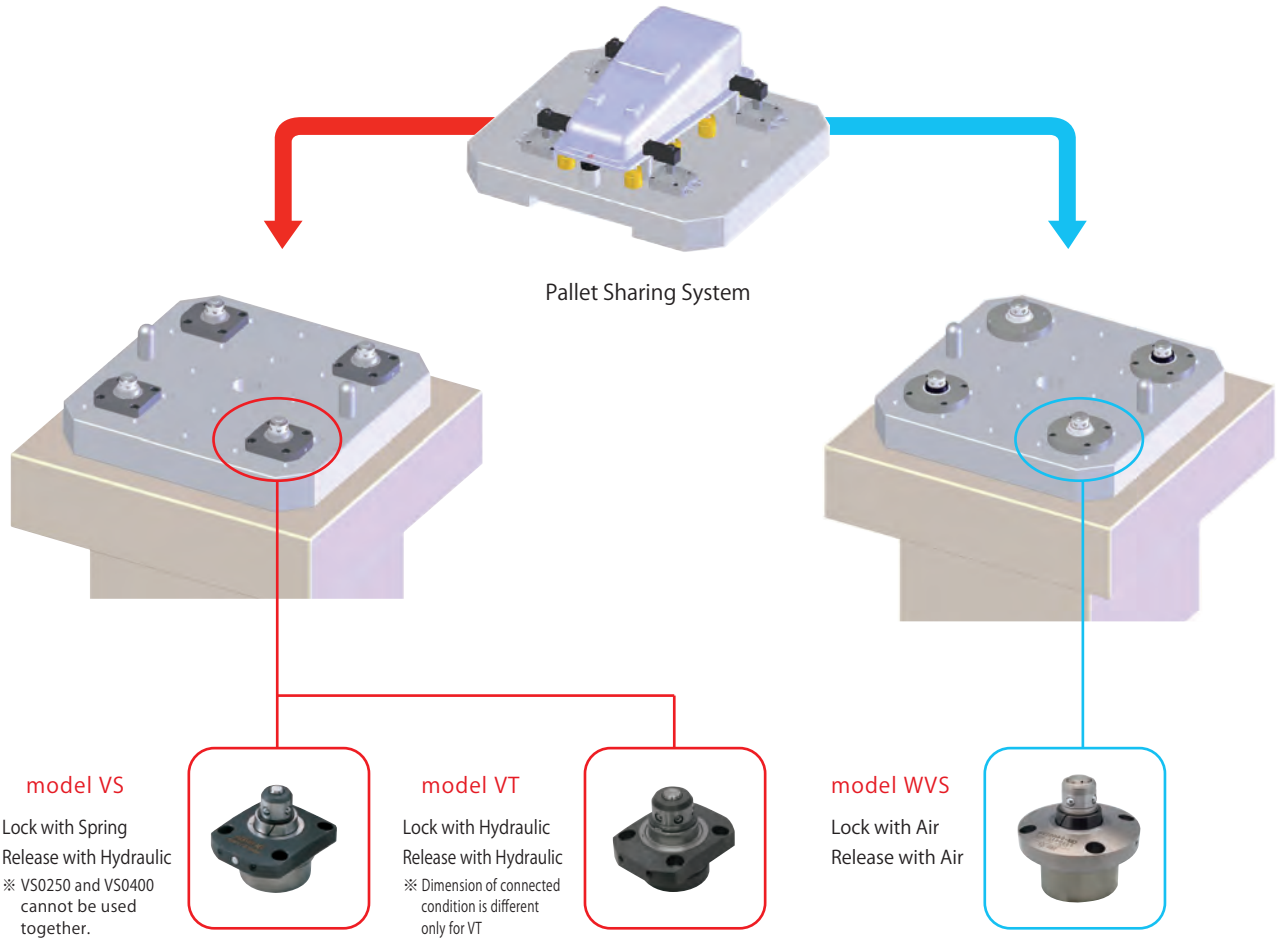
- Since the blocks (VSB/VSJ) attached to pallet side can be used for both VS/VT clamp and WVS high-power pneumatic pallet clamp, it is selectable from 3 type pallet clamps (VS / VT / WVS) according to application.

Hydraulic Systems

- For the condition that is allowed to use oil
- For the machining process with high cutting load

All Pneumatic Systems

- For the condition that is not allowed to use oil
- For the machining process with high cutting load
- For inspection and assembly line



Pallet Sharing System

model VS

Lock with Spring
Release with Hydraulic

※ VS0250 and VS0400 cannot be used together.

model VT

Lock with Hydraulic
Release with Hydraulic

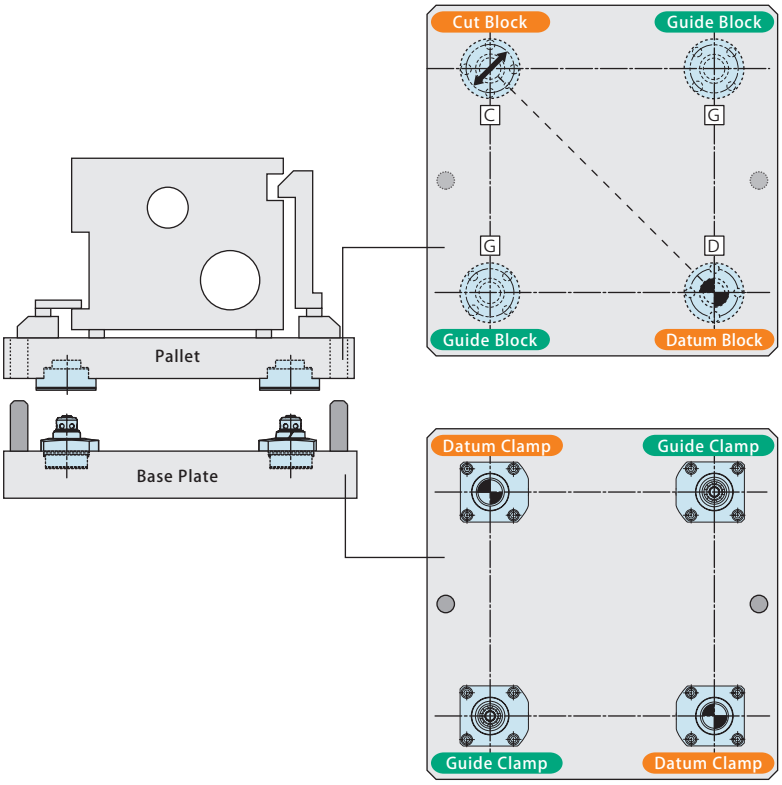
※ Dimension of connected condition is different only for VT

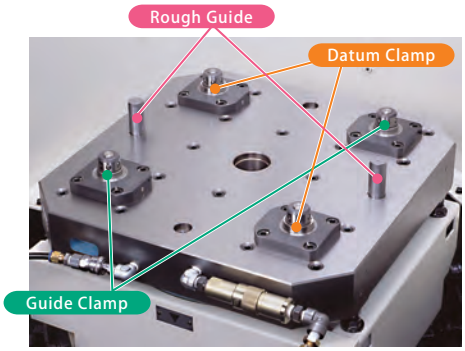
model WVS

Lock with Air
Release with Air

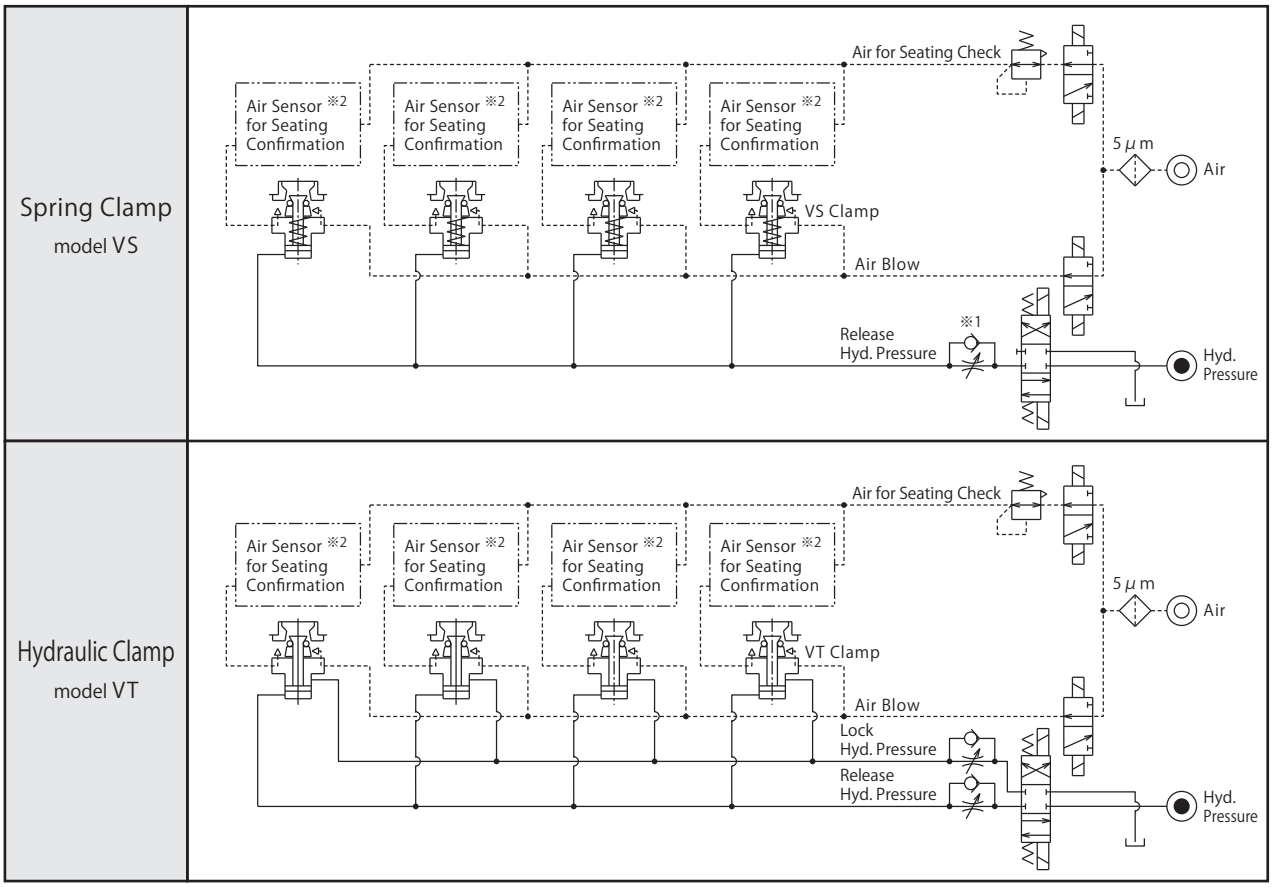
※ Refer to WVS(VS/VT)-VSB/VSJ block compatible list (P.215) for the detail form of combination.

Pallet Clamp System References





Circuit Reference



Notes :

1. Air blow passage should be ϕ6 or more for an effective air blow. Please supply filtered clean dry air.
2. It is recommended to use our non-leak valve (model BK and BSP) in order to maintain long releasing time when hydraulic supply is stopped.

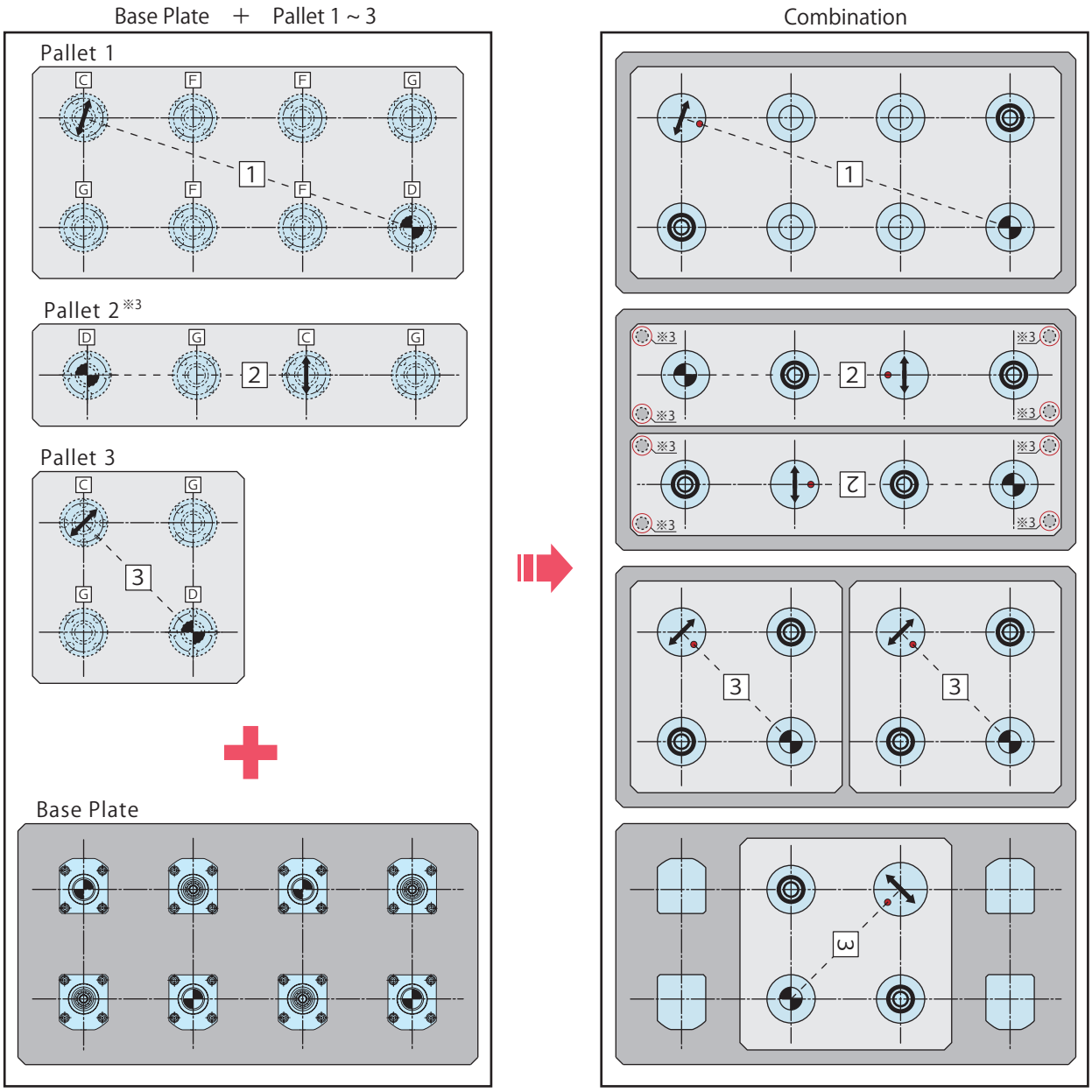
※1. When clamping is not simultaneous and a pallet is tilted, adjust the speed with meter-out controll for simultaneous clamping.

※2. Please refer to the list on the right for recommended air sensors for seating confirmation.

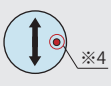
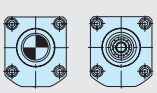
Maker	SMC	CKD
Name	Air Catch Sensor	Gap Switch
Model No.	ISA3-G	GPS3-E

Configuration sample when multiple pallet sizes are used together

In case there are a variety of pallets with different sizes for the base plate, the clamp and block can be combined for use.



Combination of Clamp and Block

Equipment Installed on the Base Plate		Equipment Installed on the Pallet		Functions when they are combined
 Datum Clamp	＋	 Datum Block	⇒	 Clamping Function ＋ Locating Function (Reference Point)
 Datum Clamp	＋	 ※4 Cut Block	⇒	 ※4 Clamping Function ＋ Locating Function (One Direction)
 Guide Clamp	＋	 Guide Block	⇒	 Clamping Function ＋ Guide Function
 Datum Clamp or Guide Clamp	＋	 Free Block	⇒	 Clamping Function

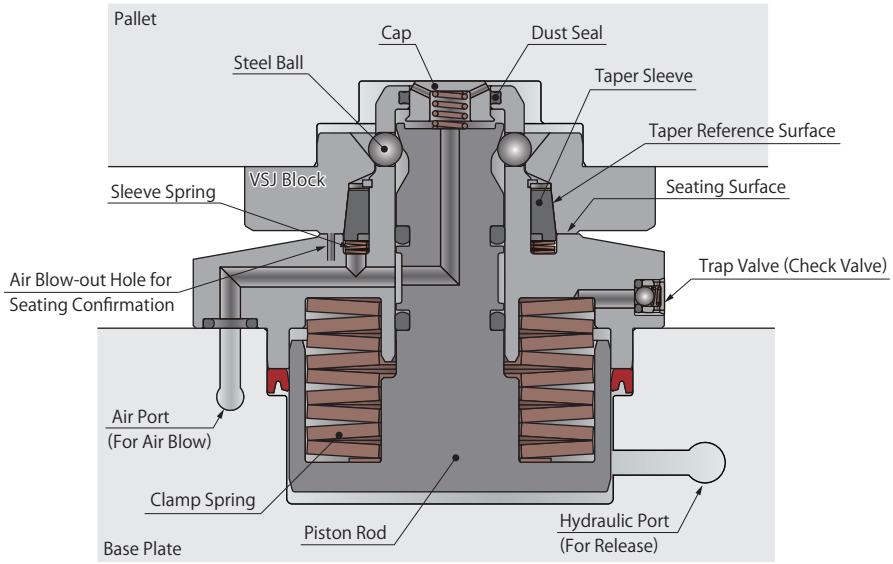
Notes :

※3. In case the clamp/block configuration is linear, it is recommended to provide additional supports for stability.

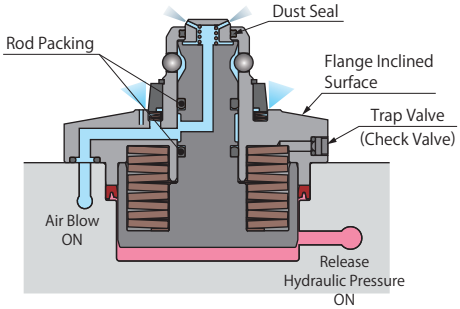
※4. The spring pin position is indicated. With the datum block as reference, unidirectional positioning is done via the cut block.
The cut block positioning plane must be tangent to the datum block.
(The spring pin is positioned on the line connecting the centers of the datum block and cut block.)

Cross Section

※The drawing shows the locked state of VS.



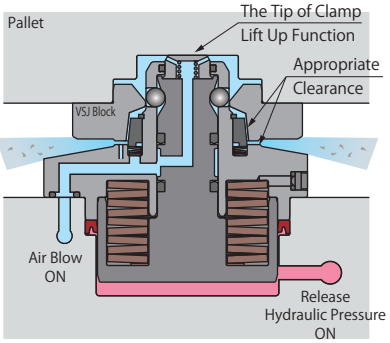
Action Description



Before Loading the Pallet

- Air blow prevents debris contamination.
- Dust seal prevents contaminants from above and keeps the steel ball area clean.
- The flange top is designed as inclined surface so that cutting chips or fluid can flow easily.
- The clamp spring chamber is totally shut from the external atmosphere with the rod packing and trap valve to ensure the clean environment.
- The slitting part of taper sleeve (one place) is protected with rubber plate to prevent invasion of cutting chips.

After Unloading the Pallet



When Loading the Pallet

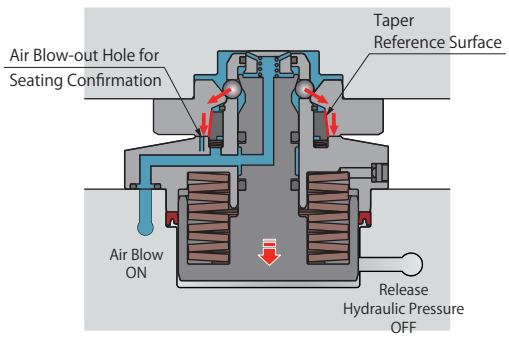
When loading the pallet

- The pallet is set on the raised piston rod cap.
  At this time there is clearance between the datum surfaces allowing air blow to remove contaminants effectively. Also, when loading the pallet, the clamp prevents damages caused by hitting/scratching and secures high accuracy.

When unloading the pallet

- The close contacting of taper seating surface is released with lift-up force.

When Unloading the Pallet



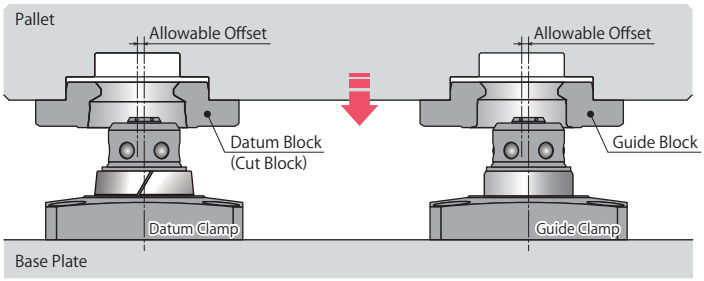
When Clamped

- When hydraulic pressured is OFF, the spring force lowers the piston rod and the steel balls engage the block bringing it to the seating surface.
- The pallet is positioned with high accuracy via the taper sleeve as it contacts the taper surface of the block.
- The seating surface includes an air vent for seating confirmation (via air catch sensor).

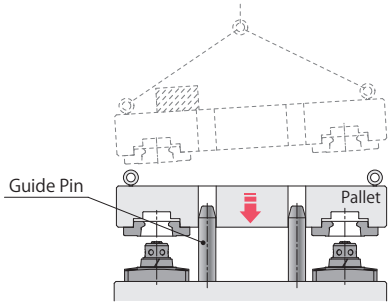
When Clamped

Action Description during Loading/Unloading

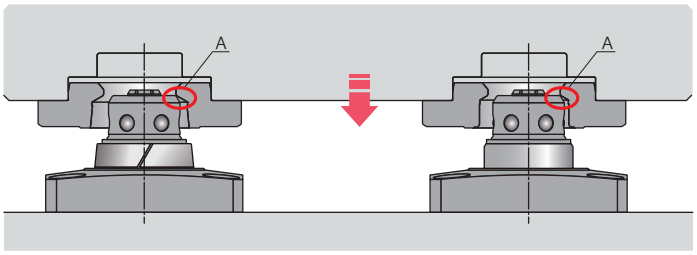
1. With hydraulic pressure released, load the pallet within the allowable offset.
   Air pressure must be continuously supplied to the air blow port.



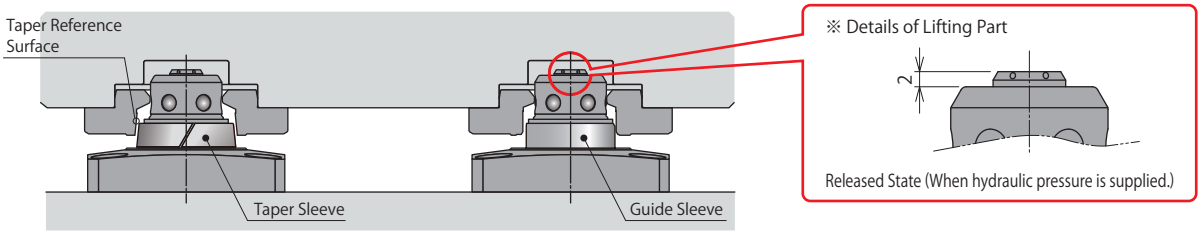
The pallet must be level with the base plate during loading and unloading, otherwise the clamps and blocks will be damaged. Provide guide pins to keep the pallet level during loading and unloading.



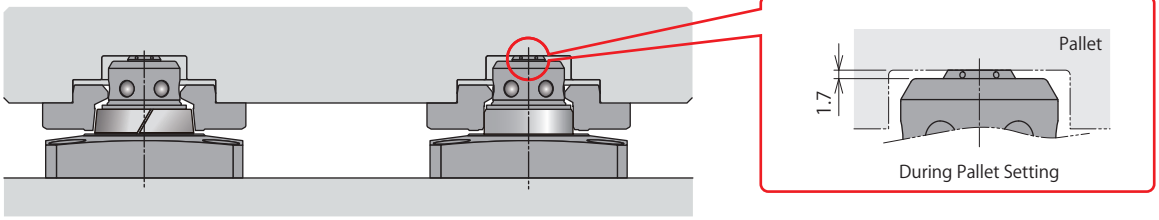
2. When lowering the pallet, it should be positioned so the blocks contact the rod as shown on A.



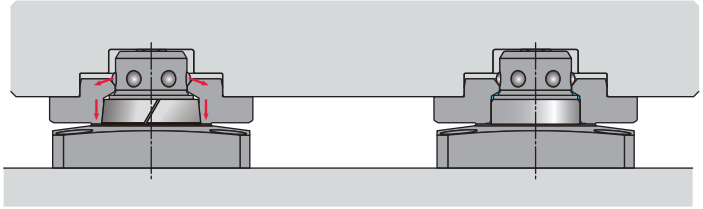
3. As the pallet is further lowered, it is positioned within 0.2mm of the reference axis via the guide sleeve and guide block.
   This provides clearance between datum clamp and taper surface.



4. Loading is finished when pallet is resting on piston rod. At this time, the appropriate clearance between seating surface and taper reference is created by lift up function, which makes it thus more effective that the cutting chips is removed by air blow.

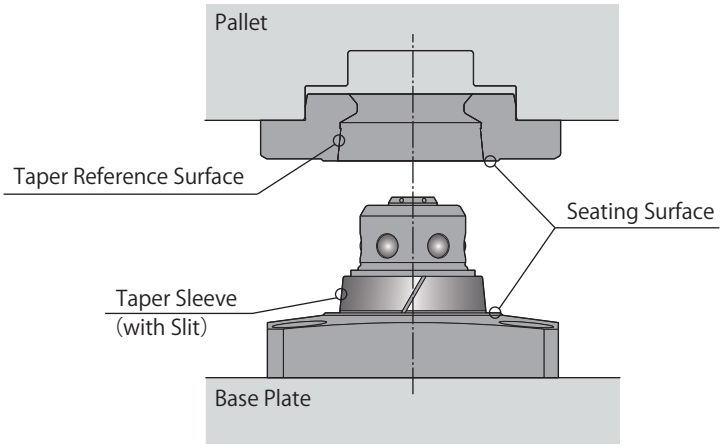


5. When release hydraulic pressure is OFF, the block is pressed on the seating surface with clamp spring.
   When the block is pressed, the taper reference surface is contacted for positioning.



Description of Movable Taper Sleeve

Locating Method：Dual Surface with Movable Taper Sleeve



The Benefits of Movable Taper Sleeve

With marginal error absorbed by the moveable taper sleeve, the clearance between the clamp unit, taper sleeve and block is eliminated enabling the repetitive location accuracy and stabilized clamping force.

① Absorbs tolerance variations in each location clamp and block.

② Absorbs wear of locating part due to long time use.

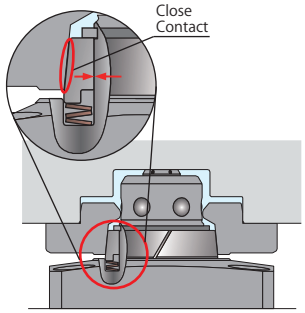
③ Absorbs space variations of mounting holes.

④ Absorbs space variations due to temperature change.

Movement and Error Absorbed by the Movable Taper Sleeve (①/②)

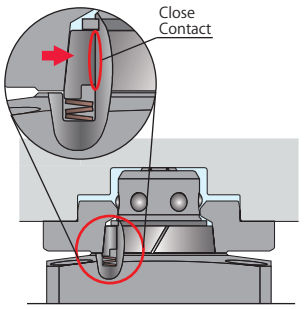
Starting of Action for Locating

There is almost zero clearance as the moving parts come in contact with the taper reference surface.



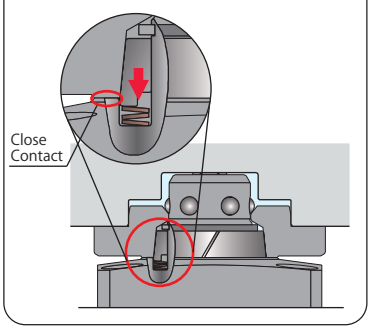
XY Locating

Clearance between the taper sleeve and the moving parts of the unit is completely zero.



XYZ Locating

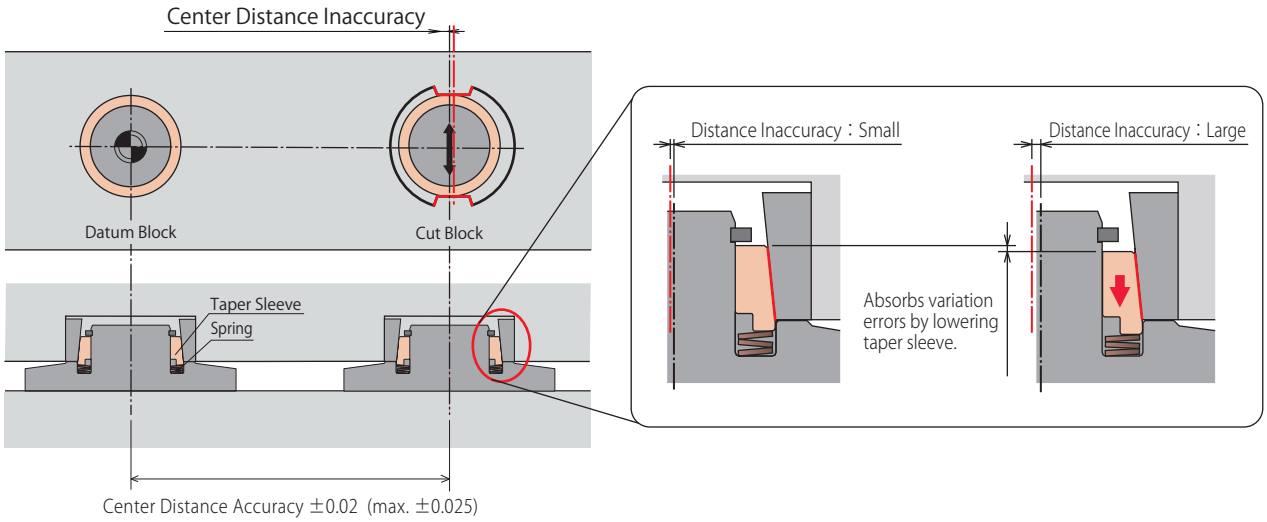
Absorbs errors by lowering the taper sleeve. Seating surface touches and locates on 2 surfaces.



Movable taper sleeve absorbs distance error. (③/④)

Absorbs distance variations minimizing the wear of locating parts and prevents deformation of clamp/block.

※The precision assurance function is absolutely necessary especially when plates are transported or multiple fixture changeovers are needed.



Model No. Indication (Clamp)

VS : Spring Clamps

VS 0 06 0 - M D

1 2 3

1 Clamping Force

- **02** : Clamping Force 2.5kN
- **04** : Clamping Force 4.0kN
- **06** : Clamping Force 6.0kN
- **10** : Clamping Force 10.0kN
- **16** : Clamping Force 16.0kN
- **25** : Clamping Force 25.0kN
- **40** : Clamping Force 40.0kN

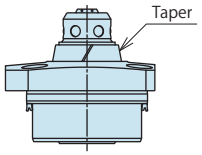
2 Design No.

- **0** : Revision Number

3 Functions

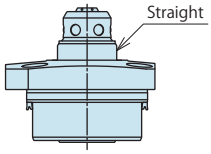
- **D** : Datum Clamp (Especially Used for Locating)
- **G** : Guide Clamp (Especially Used for Guide)

D



Datum Clamp

G



Guide Clamp

VT : Hydraulic Clamps

VT 0 06 0 - M D - A

1 2 3 4

1 Clamping Force

- **04** : Clamping Force (at 7MPa) 4.0kN
- **06** : Clamping Force (at 7MPa) 6.2kN
- **10** : Clamping Force (at 7MPa) 9.9kN
- **16** : Clamping Force (at 7MPa) 16.0kN

※ For detailed specifications, please refer to "Clamping Force/Lift-Up Force (Hydraulic Clamp model VT)".

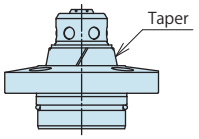
2 Design No.

- **0** : Revision Number

3 Functions

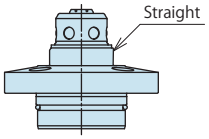
- **D** : Datum Clamp (Especially Used for Locating)
- **G** : Guide Clamp (Especially Used for Guide)

D



Datum Clamp

G

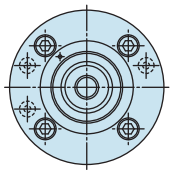


Guide Clamp

4 Flange Shape

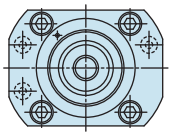
- **A** : Cylindrical
- **B** : Prismatic

A



Cylindrical

B



Prismatic

Model No. Indication (Level Adjustment Collar for VS)

※This product is only for VS Clamp.

VZ 0 06 0 - VS1

1 2

1 Accommodate VS Clamp Model

- **02** : VS0020
- **04** : VS0040
- **06** : VS0060
- **10** : VS0100
- **16** : VS0160
- **25** : VS0250
- **40** : VS0400

2 Design No.

- **0** : Revision Number

Model No. Indication (Block)

VSB：Embedded Block

VSB 06 0 - D
1 2 3 4

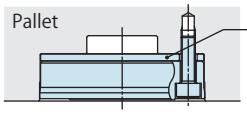
VSJ：Flange Shaped Block

VSJ 06 0 - D
1 2 3 4

1 Shape of Block

VSB：Embedded Block
VSJ：Flange Shaped Block

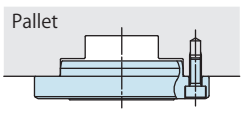
VSB



(Level Adjustment Collar for VSB)
This is not attached to VSB as accessory.
Please prepare VZ□-VSC described below.

Embedded Block

VSJ



Flange Shaped Block

2 Accommodate WVT/VS/VT Clamp Model

02：VS0020 / VS0040 / VT0040 /WVS0040
06：VS0060 / VT0060 /WVS0060
10：VS0100 / VT0100 /WVS0100
16：VS0160 / VT0160 /WVS0160
25：VS0250
40：VS0400

Note：1. WVS is the pallet clamps operated by air.

3 Design No.

0：Revision Number

4 Functions

D：Datum Block (Especially Used for Reference Locating)
C：Cut Block (Especially Used for One Direction Locating)
G：Guide Block (Especially Used for Guide)
F：Free Block (Shared by Multiple Pallets with Different Sizes)

Combination of Clamp and Block

Clamp Model	Block Model	Function
VS/VT-MD (Datum Clamp)	VSB□-D / VSJ□-D (Datum Block)	Clamping + Locating at a Reference Point
VS/VT-MD (Datum Clamp)	VSB□-C / VSJ□-C (Cut Block)	Clamping + One Direction Locating
VS/VT-MG (Guide Clamp)	VSB□-G / VSJ□-G (Guide Block)	Clamping + Guide
VS/VT-M□ (Datum / Guide Clamp)	VSB□-F / VSJ□-F (Free Block)	Clamping

Model No. Indication (Level Adjustment Collar for VSB)

※This product is only for VSB's embedded block.

VZ 0 06 0 - VSC
1 2

1 Accommodate VSB Block Model

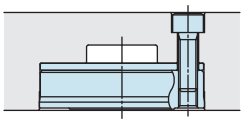
02：VSB020-□
06：VSB060-□
10：VSB100-□
16：VSB160-□
25：VSB250-□
40：VSB400-□

2 Design No.

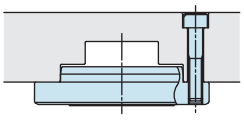
0：Revision Number

Other Mounting Examples (Reference)

※Please contact us for mounting methods as shown in the drawings below.



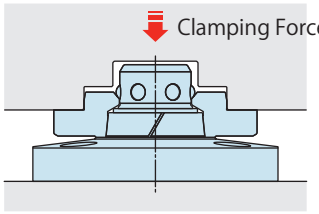
VSB Block：Bolt Mounting from the Upper Side



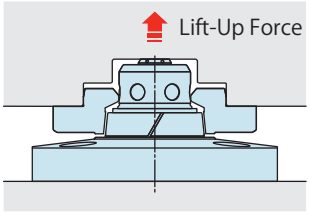
VSJ Block：Bolt Mounting from the Upper Side

Clamping Force / Lift-up Force (Spring Clamp Model VS)

Model No.		VS0020	VS0040	VS0060	VS0100	VS0160	VS0250	VS0400
Clamping Force kN		2.5	4.0	6.0	10.0	16.0	25.0	40.0
Lift-Up Force kN	At 7 MPa	4.0	4.4	5.0	9.1	13.3	20.0	33.5
	At 5 MPa	2.2	2.3	2.3	4.7	6.7	10.0	15.5
	At 3.5 MPa	0.9	0.7	0.4	1.3	1.8	0.5	2.0



Clamping force is stable because VS clamps with spring.

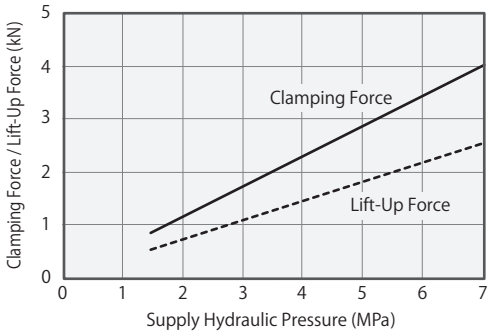


Lift up force varies according to the supply hydraulic pressure.

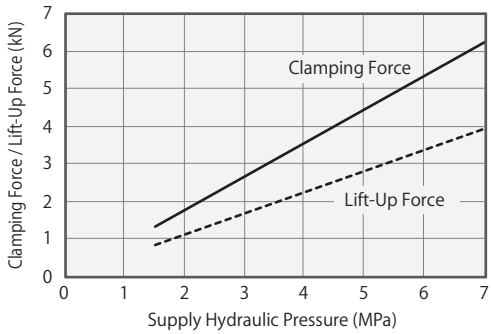
Clamping Force / Lift-Up Force (Hydraulic Clamp Model VT)

Model No.		VT0040	VT0060	VT0100	VT0160
Clamping Force kN	At 7 MPa	4.0	6.2	9.9	16.0
	At 5 MPa	2.9	4.5	7.1	11.4
	At 3.5 MPa	1.7	2.7	4.3	6.8
Lift-Up Force kN	At 7 MPa	2.5	4.0	6.5	10.2
	At 5 MPa	1.8	2.9	4.7	7.3
	At 3.5 MPa	1.1	1.7	2.8	4.4

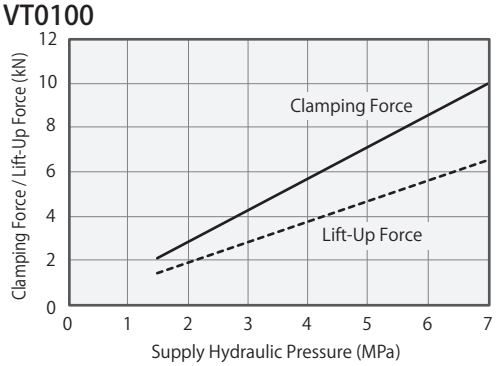
VT0040



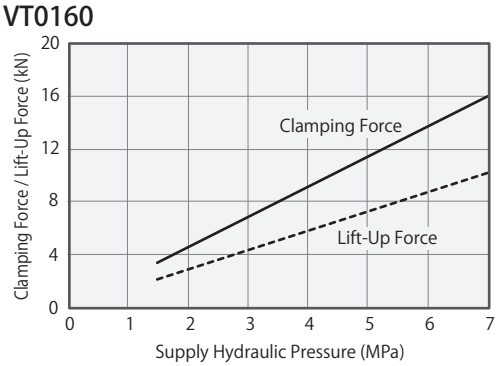
VT0060



VT0100

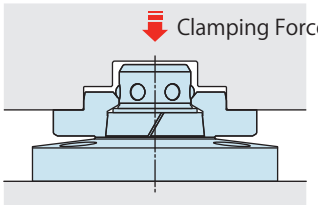


VT0160

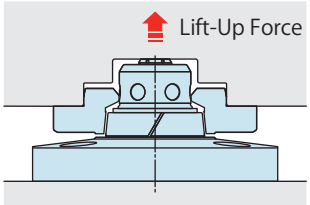


Notes :

1. This graph shows the value of one clamp.
2. This graph shows the relationship between the supply hydraulic pressure and the clamping force (solid line)/Lift-up force (dotted line).



Clamping force of VT depends on supply hydraulic pressure because VT is designed to be operated by hydraulic double action.

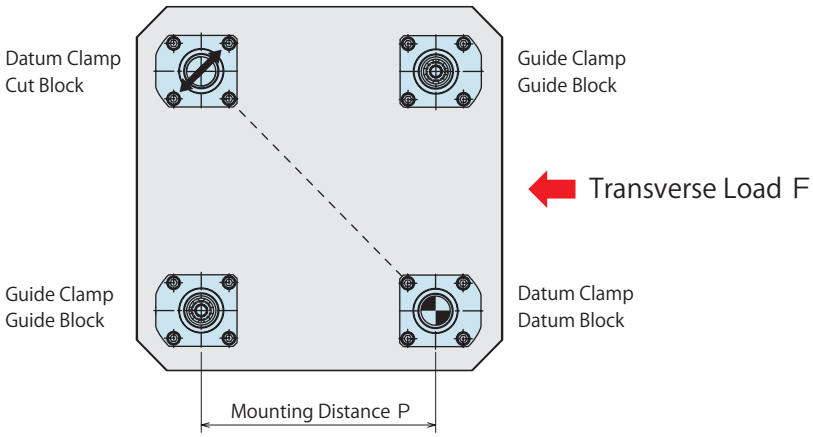


Lift-up force varies according to the supply hydraulic pressure.

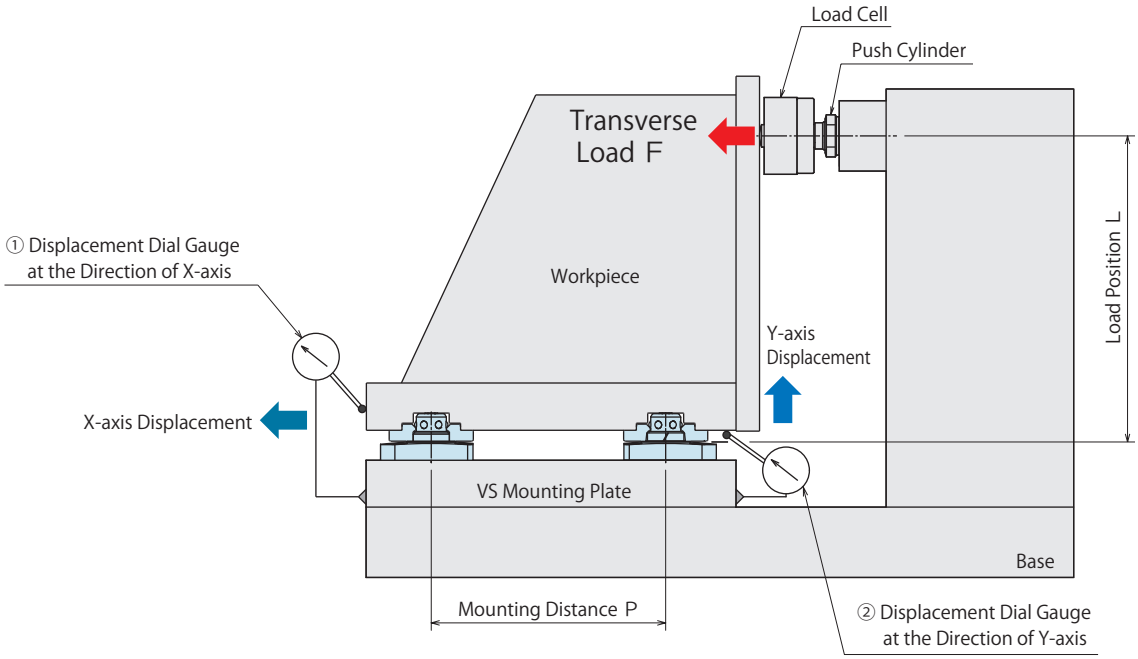
Displacement against Transverse Load

※The displacement is the predicted reference value on the basis of test data under the conditions shown below.

■ Clamp / Block Layout



■ Testing Device



How to Read the Displacement

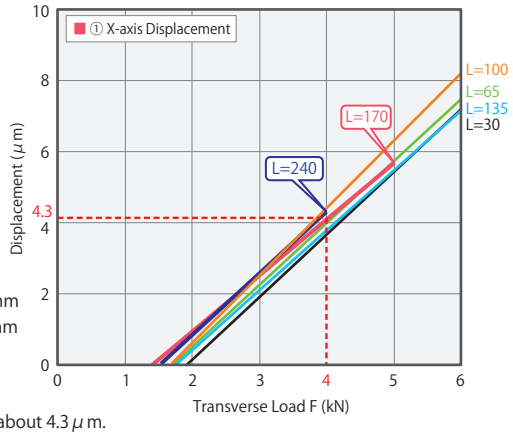
(Example) When using VS0020

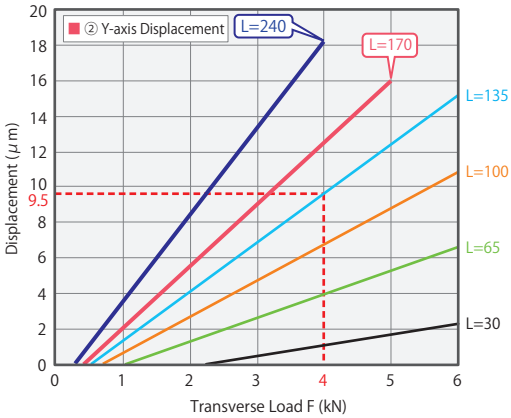
■ Components

【Clamp】
VS0020-MD×2 Units
VS0020-MG×2 Units
【Block】
VSJ020-D×1 Unit
VSJ020-C×1 Unit
VSJ020-G×2 Units

■ Requirements

Mounting Distance P=200mm
Load Position L=135mm
Transverse Load F=4kN





■ Displacement

① X-axis displacement is about 4.3 μm.
② Y-axis displacement is about 9.5 μm.

Note :

1. Please contact us in case the conditions are different.

Displacement against Transverse Load

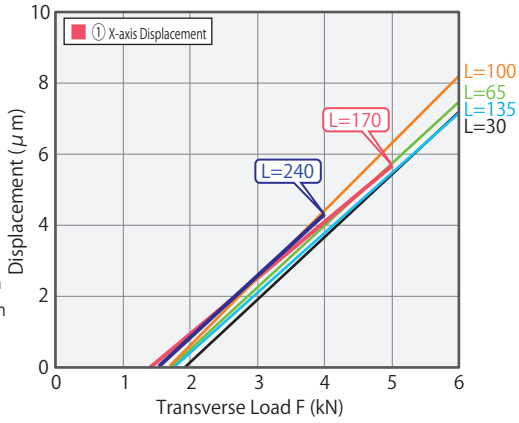
※ The displacement is the predicted reference value on the basis of test data under the conditions as shown on P.978.

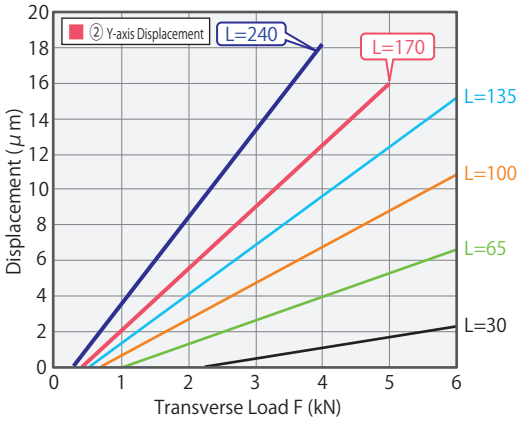
VS0020

■ Components
【Clamp】
VS0020-MD×2 Units
VS0020-MG×2 Units
【Block】
VSJ020-D×1 Unit
VSJ020-C×1 Unit
VSJ020-G×2 Units

■ Requirements
Mounting Distance P=200mm
Load Position L=30～240mm

■ Clamping Force
Total 10kN (2.5kN×4)



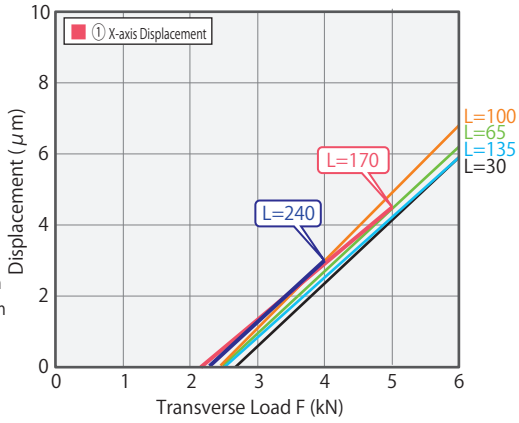


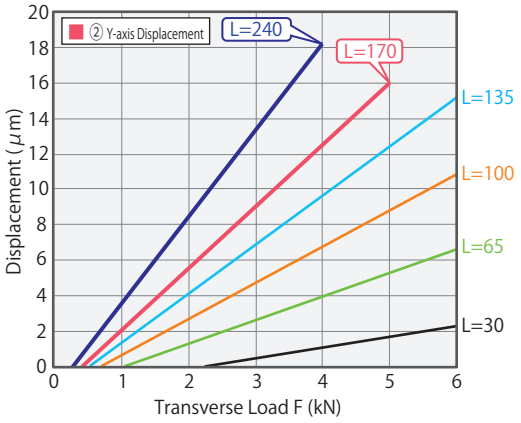
VS0040

■ Components
【Clamp】
VS0040-MD×2 Units
VS0040-MG×2 Units
【Block】
VSJ020-D×1 Unit
VSJ020-C×1 Unit
VSJ020-G×2 Units

■ Requirements
Mounting Distance P=200mm
Load Position L=30～240mm

■ Clamping Force
Total 16kN (4kN×4)



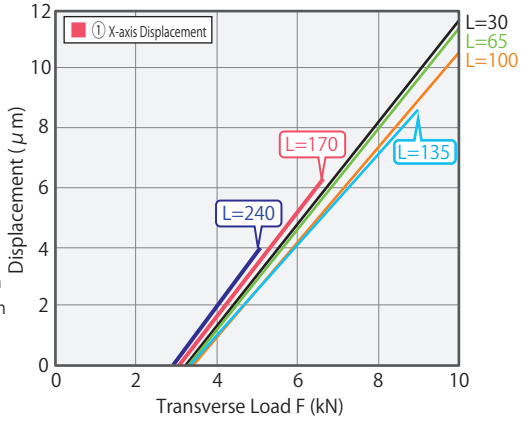


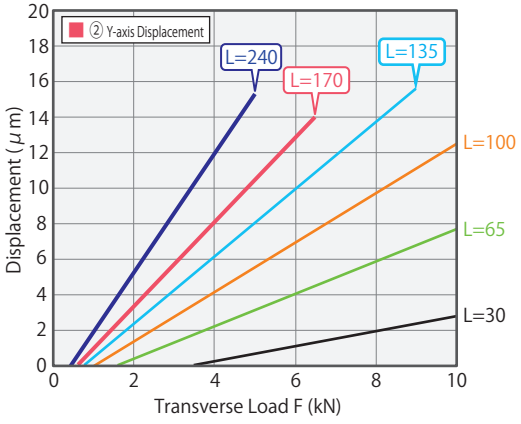
VS0060

■ Components
【Clamp】
VS0060-MD×2 Units
VS0060-MG×2 Units
【Block】
VSJ060-D×1 Unit
VSJ060-C×1 Unit
VSJ060-G×2 Units

■ Requirements
Mounting Distance P=200mm
Load Position L=30～240mm

■ Clamping Force
Total 24kN (6kN×4)



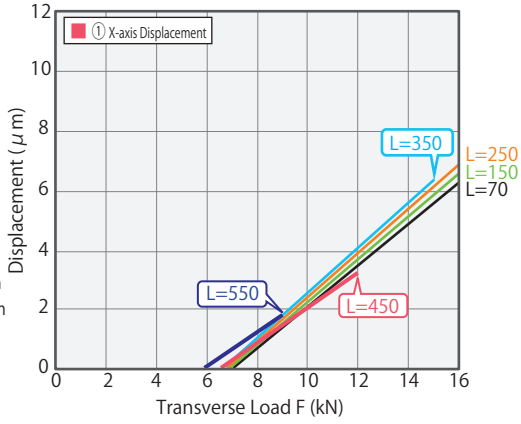


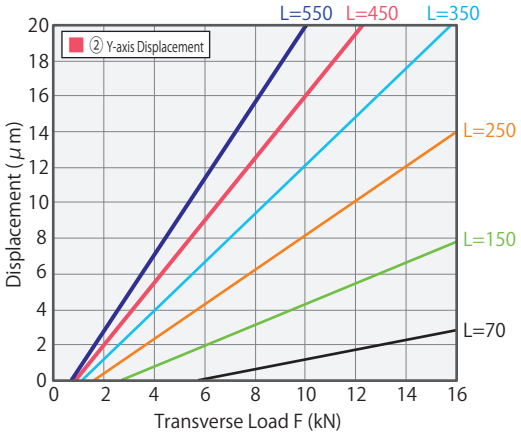
VS0100

■ Components
【Clamp】
VS0100-MD×2 Units
VS0100-MG×2 Units
【Block】
VSJ100-D×1 Unit
VSJ100-C×1 Unit
VSJ100-G×2 Units

■ Requirements
Mounting Distance P=300mm
Load Position L=70～550mm

■ Clamping Force
Total 40kN (10kN×4)



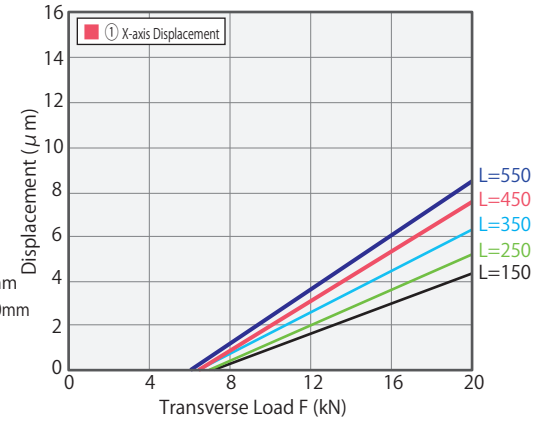


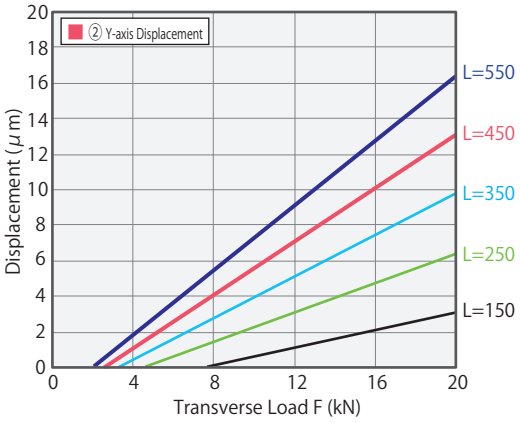
VS0160

■ Components
【Clamp】
VS0160-MD×2 Units
VS0160-MG×2 Units
【Block】
VSJ160-D×1 Unit
VSJ160-C×1 Unit
VSJ160-G×2 Units

■ Requirements
Mounting Distance P=300mm
Load Position L=150～550mm

■ Clamping Force
Total 64kN (16kN×4)



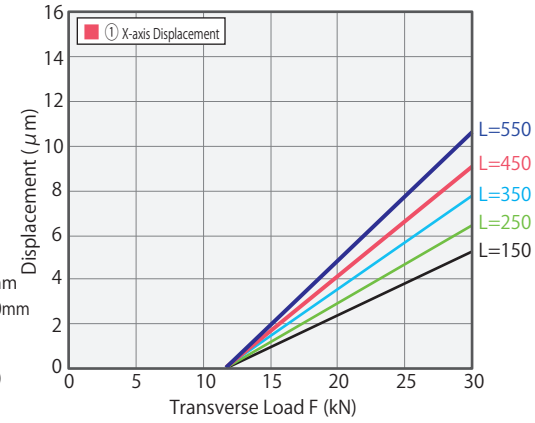


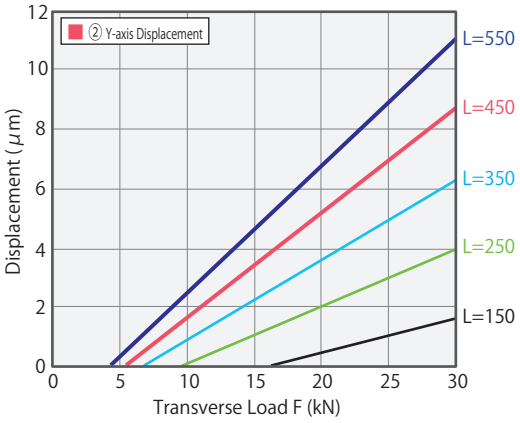
VS0250

■ Components
【Clamp】
VS0250-MD×2 Units
VS0250-MG×2 Units
【Block】
VSJ250-D×1 Unit
VSJ250-C×1 Unit
VSJ250-G×2 Units

■ Requirements
Mounting Distance P=375mm
Load Position L=150～550mm

■ Clamping Force
Total 100kN (25kN×4)



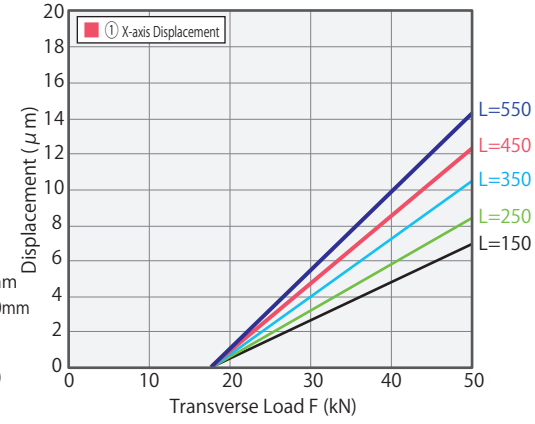


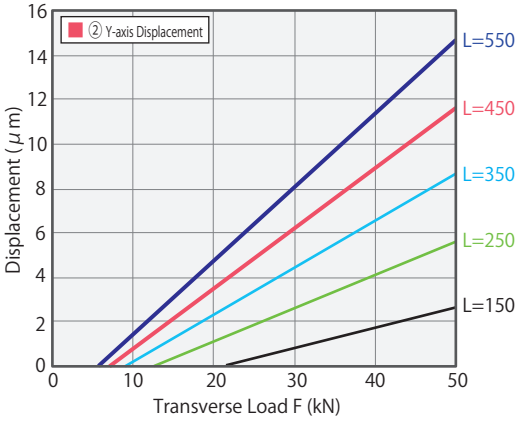
VS0400

■ Components
【Clamp】
VS0400-MD×2 Units
VS0400-MG×2 Units
【Block】
VSJ400-D×1 Unit
VSJ400-C×1 Unit
VSJ400-G×2 Units

■ Requirements
Mounting Distance P=375mm
Load Position L=150～550mm

■ Clamping Force
Total 160kN (40kN×4)



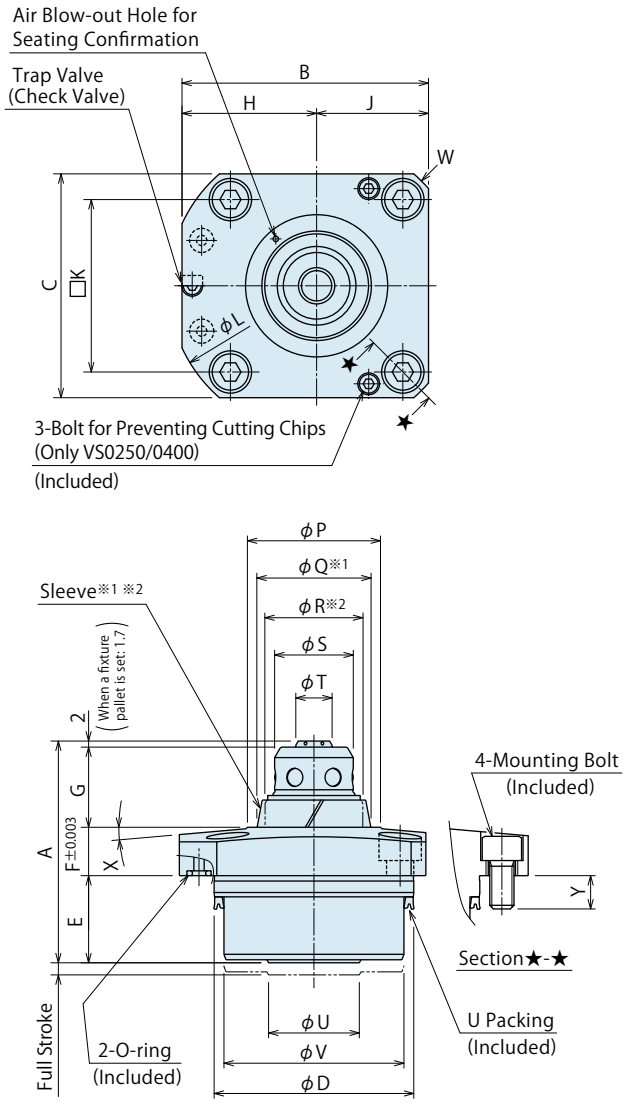


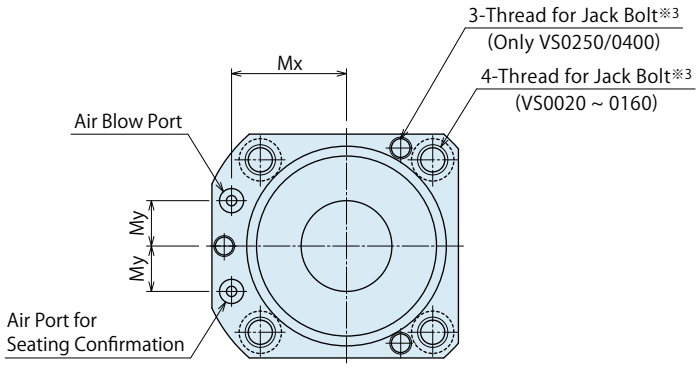
Note :

1. The displacement may vary as per the fixture condition. The displayed values are just for reference based on the test data.

External Dimensions

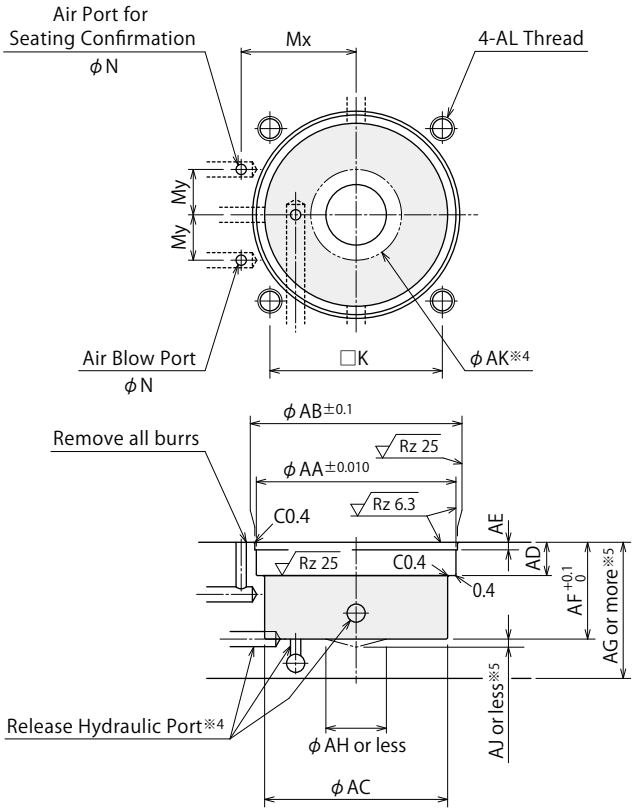
※This drawing shows the released state of VS.
(When supplying release hydraulic pressure)





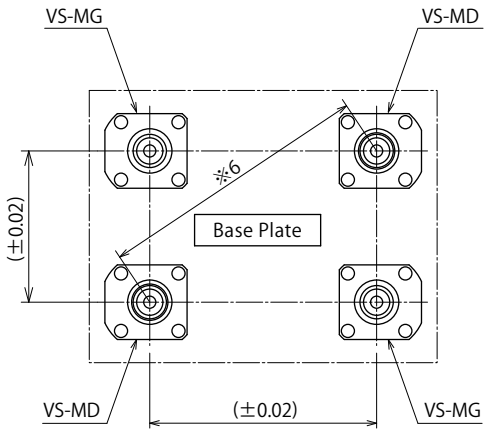
Notes :
※1. φQ shows the dimensions of sleeve (taper) of datum clamp (VS-MD).
※2. φR shows the dimensions of sleeve (straight) of guide clamp (VS-MG).
※3. The thread for jack bolt is used when removing the clamp.
(See P.996 for operation method.)

Machining Dimensions of Mounting Area



Notes :
1. Make sure no burrs are on or around the hole intersection.
※4. Release hydraulic port should be machined within ▭ range.
※5. The base thickness (AG) and remaining depth after boring (AJ) are reference values when the base material is S50C.

Distance Accuracy of Each Clamp



Note :
※6. Please make sure the distance accuracy of each datum clamp is below ±0.025mm between the clamps with the longest distance.

Specifications

Model No.		VS0020-M□	VS0040-M□	VS0060-M□	VS0100-M□	VS0160-M□	VS0250-M□	VS0400-M□
Clamping Force ※7 kN		2.5	4.0	6.0	10.0	16.0	25.0	40.0
Locating Repeatability mm		0.003						
Full Stroke mm		3.4	3.4	3.4	4.0	4.5	5.8	6.5
Lift Up Stroke mm		1.0						
Allowable Offset when fixture pallet is set mm		1.5	1.5	1.5	2.0	2.0	2.5	2.5
Lift Up Force ※7 kN	at 7.0MPa	4.0	4.4	5.0	9.1	13.3	20.0	33.5
	at 5.0MPa	2.2	2.3	2.3	4.7	6.7	10.0	15.5
	at 3.5MPa	0.9	0.7	0.4	1.3	1.8	0.5	2.0
Max. Loading Weight ※8 kg		500	500	800	1200	1600	2500	4000
Releasing Cylinder Capacity ※7 cm^3		3.7	4.6	5.5	11.1	18.5	37.7	66.9
Releasing Hyd. Pressure MPa	Max. Operating Pressure	7.0						
	Min. Operating Pressure	3.5						
	Withstanding Pressure	10.5						
Operating Air Pressure (For Air Blow) MPa		0.4 ~ 0.5						
Operating Temperature ℃		0 ~ 70						
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32						
Weight ※7 kg		0.4	0.5	0.7	1.3	2.2	4.8	9.7

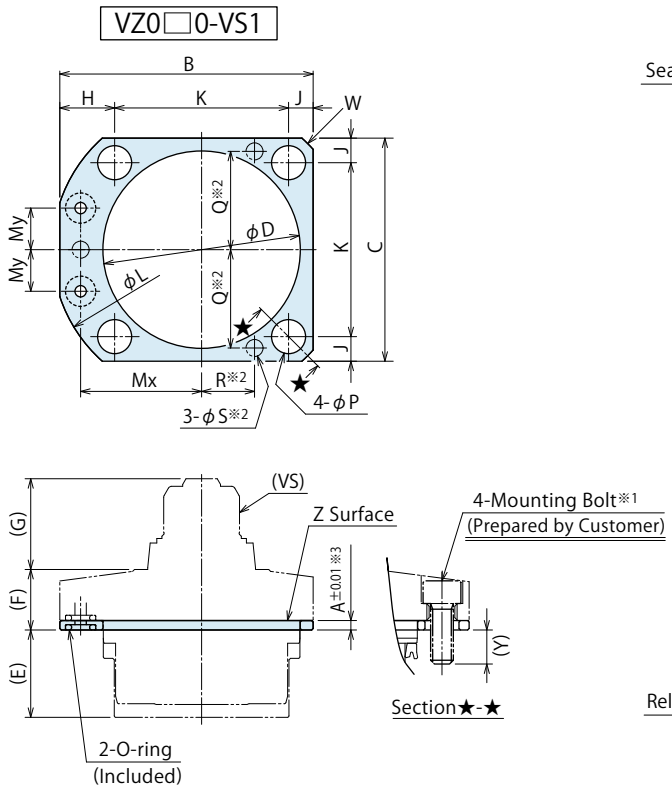
Notes : ※7. The specification indicates the value of one device.
※8. It indicates the weight of pallet in horizontal position (placed flat) that VS can locate regardless of number of clamps.
Release hydraulic pressure is determined with the loading weight (fixture).
(Loading weight should be less than 80% of the lift-up force (Number of Clamps×Lift-Up Force)).
When using pallet in vertical direction, please refer to P.995.

External Dimensions and Machining Dimensions for Mounting

(mm)

Model No.	VS0020-M□	VS0040-M□	VS0060-M□	VS0100-M□	VS0160-M□	VS0250-M□	VS0400-M□
A	51.8	56.6	59.7	72.5	85.1	109.2	134.5
B	57	60.5	67	81.5	98.5	118	152
C	48	51	59	74	89	108	140
D	$42^{+0.027}_{+0.011}$	$46^{+0.027}_{+0.011}$	$52m6^{+0.030}_{+0.011}$	$66m6^{+0.030}_{+0.011}$	$79m6^{+0.030}_{+0.011}$	$98m6^{+0.035}_{+0.013}$	$124^{+0.035}_{+0.013}$
E	15.8	20.6	22.2	28	33.6	45.2	56
F	12	12	13.5	16	20	26	32
G	22	22	22	26.5	29.5	36	44.5
H	33	35	37.5	44.5	54	64	82
J	24	25.5	29.5	37	44.5	54	70
K	37	40	46	57	68.5	85	109
L	69	74	79	98	118	143	185
Mx	27.5	29.5	32	38	46.5	56	72
My	9	11	11	15	15	18.5	20
N	3	3	3	3.3	5	5	6
P	32	32	35.5	44	51	68	84
Q※1	25	25	28.5	36	42	55.5	67.5
R※2	22.5	22.5	26	32.3	38.3	48	60
S	18	18	20	26	32	40	50
T	8	8	10	12	15	20	24
U	20	20	24	30	40	50	55
V	37.3	41.3	45.5	59.5	72.5	91	114.5
W	C2	C2	ϕ79	ϕ98	ϕ118	ϕ143	ϕ185
X	7.5°	7.5°	7.5°	5°	5°	5°	5°
Y	8	8	9.5	11	13.5	20	24.2
AA	42	46	52	66	79	98	124
AB	42.2	46.2	52.2	66.2	79.2	98.2	124.2
AC	38	42	46.2	60.5	73.5	92	116
AD	8.5	8.5	10	11	11	12.5	16
AE	2	2	2	2.5	2.5	3	3
AF	19.2	24	25.6	32	38.1	51	62.5
AG※5	25	30	30	40	45	60	75
AH	15	15	20	25	35	45	50
AJ※5	2.5	2.5	1	2.5	1	1.5	2
AK	20	20	24	30	40	50	55
AL (Nominal×Pitch×Depth)	M5×0.8×9	M5×0.8×9	M6×1×11	M8×1.25×12	M10×1.5×5	M12×1.75×22	M16×2×25
Mounting Bolt	M5×0.8×12	M5×0.8×12	M6×1×14	M8×1.25×16	M10×1.5×20	M12×1.75×30	M16×2×35
Bolt for Preventing Cutting Chips	–	–	–	–	–	M6×1×10	M8×1.25×12
3-Thread for Jack Bolt	–	–	–	–	–	M6×1	M8×1.25
4-Thread for Jack Bolt	M6×1	M6×1	M8×1.25	M10×1.5	M12×1.75	–	–
O-ring	OR NBR-70-1 P5-N	OR NBR-70-1 P5-N	OR NBR-70-1 P5-N	OR NBR-70-1 P5-N	OR NBR-70-1 P7-N	OR NBR-70-1 P7-N	OR NBR-70-1 P8-N
Full Stroke	3.4	3.4	3.4	4.0	4.5	5.8	6.5

External Dimensions



Notes :

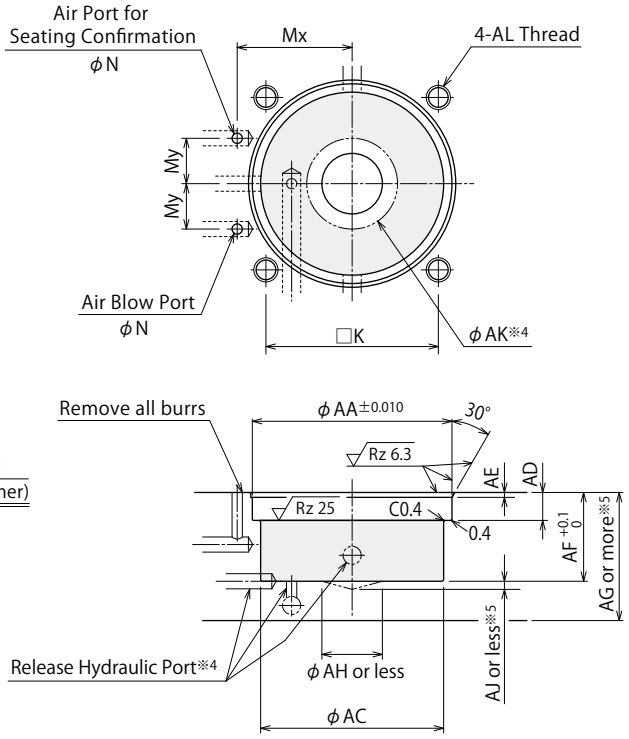
※1. When using VZ-VS1, the mounting bolts included in VS Clamp cannot be used due to insufficient strength.
Please use mounting bolts prepared by customer.

※2. These are only the dimensions for VZ0250-VS1 and VZ0400-VS1.

※3. Please grind Z surface when adjusting the thickness.

Machining Dimensions of Mounting Area

(When using VZ-VS1 Level Adjustment Collar.)



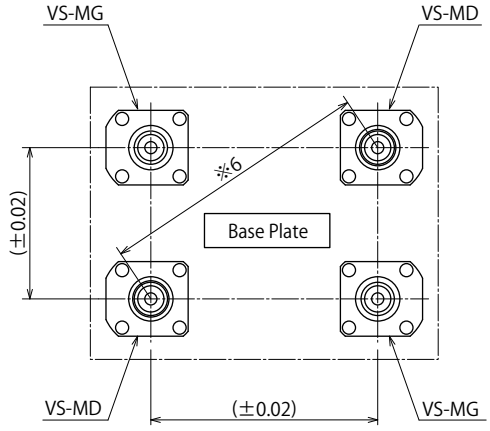
Notes :

1. When using VZ-VS1, please machine the mounting hole as shown in the drawing above.
2. Make sure no burrs are on or around the hole intersection.

※4. Release hydraulic port should be machined within ▭ range.

※5. The base thickness (AG) and remaining depth after boring (AJ) are reference values when the base material is S50C.

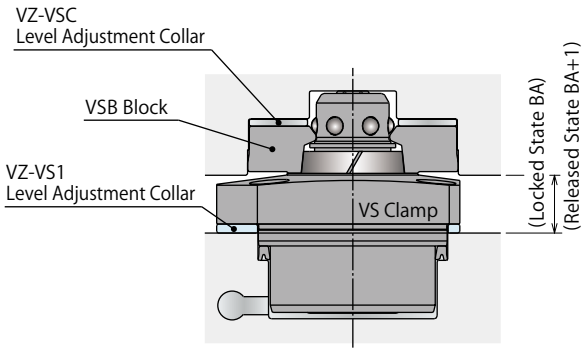
Distance Accuracy of Each Clamp

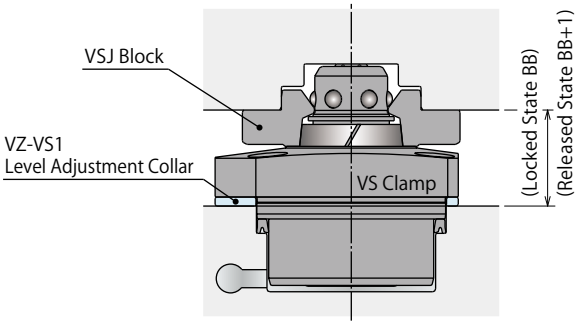


Note :

※6. Please make sure the distance accuracy of each datum clamp is below ±0.025mm between the clamps with the longest distance.

Connection Dimensions





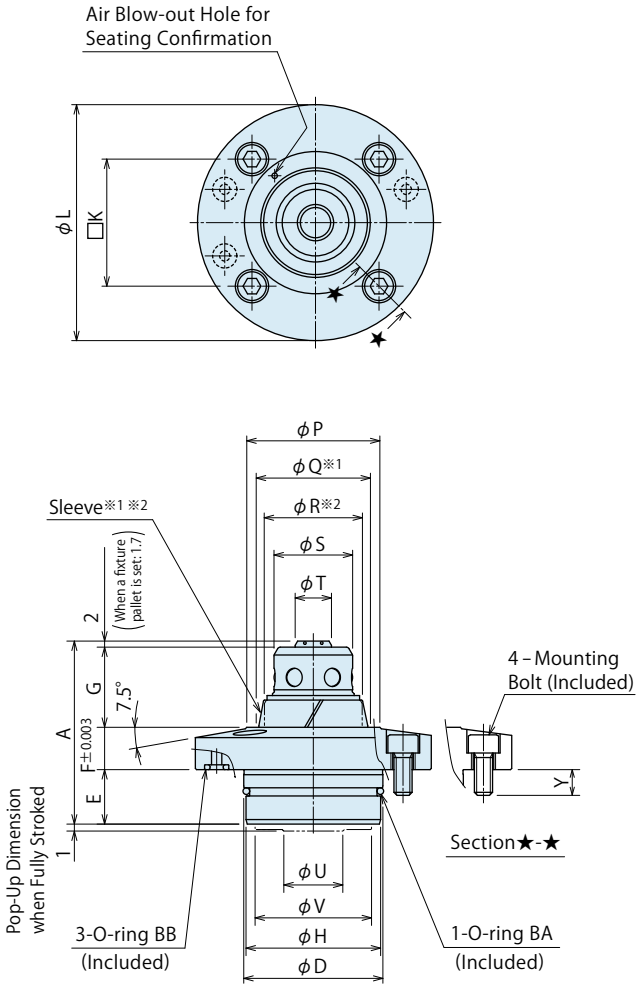
External Dimensions and Machining Dimensions for Mounting

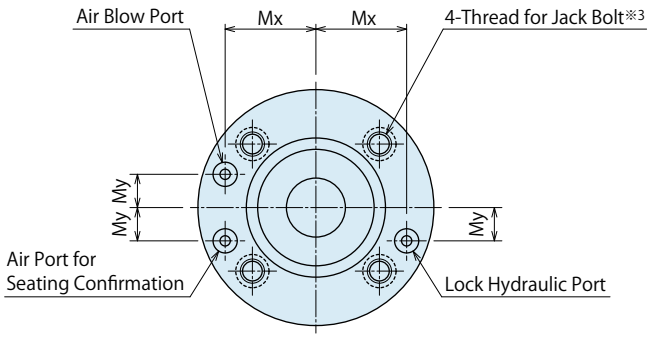
(mm)

Model No.	VZ0020-VS1	VZ0040-VS1	VZ0060-VS1	VZ0100-VS1	VZ0160-VS1	VZ0250-VS1	VZ0400-VS1
Accommodate Clamp Model	VS0020-MD VS0020-MG	VS0040-MD VS0040-MG	VS0060-MD VS0060-MG	VS0100-MD VS0100-MG	VS0160-MD VS0160-MG	VS0250-MD VS0250-MG	VS0400-MD VS0400-MG
A	2	2	2.5	3	3	3.5	4
B	57	60.5	67	81.5	98.4	118	152
C	48	51	59	74	88.9	108	140
D	42.2	46.2	52.2	66.2	79.2	98.2	124.2
E	17.2	22	23.1	29	35.1	47.2	58.5
F	14	14	16	19	23	29.5	36
G	24	24	24	28.5	31.5	38	46.5
H	14.5	15	14.5	16	19.7	21.5	27.5
J	5.5	5.5	6.5	8.5	10.2	11.5	15.5
K	37	40	46	57	68.5	85	109
L	69	74	79	98	118	143	185
Mx	27.5	29.5	32	38	46.5	56	72
My	9	11	11	15	15	18.5	20
N	3	3	3	3.3	5	5	6
P	6.8	6.8	9	11	13	16	18
Q※2	–	–	–	–	–	47.5	61.5
R※2	–	–	–	–	–	26.5	34
S※2	–	–	–	–	–	8	10
W	C2	C2	ϕ79	ϕ98	ϕ118	ϕ143	ϕ185
Y	8	8	9	12	15.5	21.5	25.2
AA	42	46	52	66	79	98	124
AC	38	42	46.2	60.5	73.5	92	116
AD	6.5	6.5	7.5	8	8	9	12
AE	0.6	0.6	0.6	0.6	0.6	0.6	0.8
AF	17.2	22	23.1	29	35.1	47.5	58.5
AG※4	23	28	28	37	42	57	71
AH	15	15	20	25	35	45	50
AJ※4	2.5	2.5	1	2.5	1	1.5	2
AK	20	20	24	30	40	50	55
AL(Nominal×Pitch×Depth)	M5×0.8×9	M5×0.8×9	M6×1×10	M8×1.25×13	M10×1.5×17	M12×1.75×24	M16×2×26
Mounting Bolt※1	M5×0.8×14	M5×0.8×14	M6×1×16	M8×1.25×20	M10×1.5×25	M12×1.75×35	M16×2×40
O-ring	OR NBR-70-1 P5-N	OR NBR-70-1 P5-N	OR NBR-70-1 P5-N	OR NBR-70-1 P5-N	OR NBR-70-1 P7-N	OR NBR-70-1 P7-N	OR NBR-70-1 P8-N
When using VSB, BA	13.5	13.5	15.5	18.5	22.5	29	35.5
When using VSJ, BB	22	22	26	29	35	44.5	54

External Dimensions

※This drawing shows the released state of VT-A.





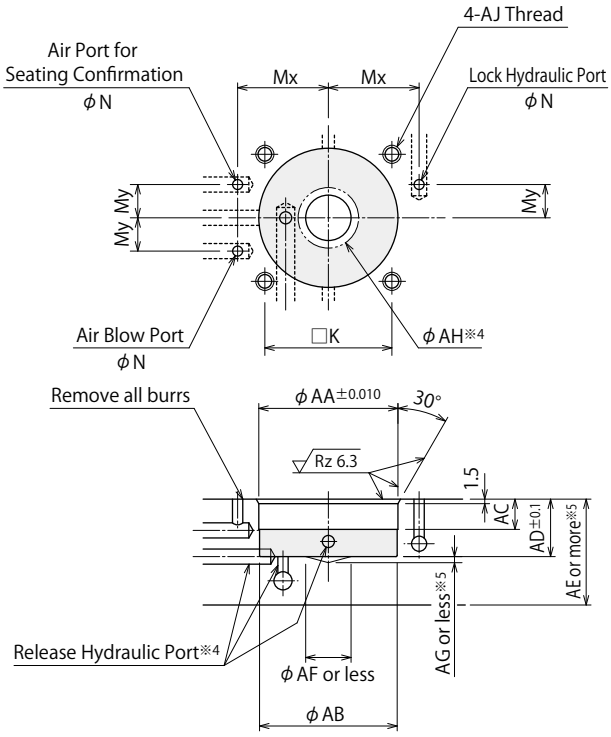
Notes :

※1. ϕQ shows the dimensions of sleeve (taper) of datum clamp (VT-MD).

※2. ϕR shows the dimensions of sleeve (straight) of guide clamp (VT-MG).

※3. The thread for jack bolt is used when removing the clamp.
(See P.996 for operation method.)

Machining Dimensions of Mounting Area



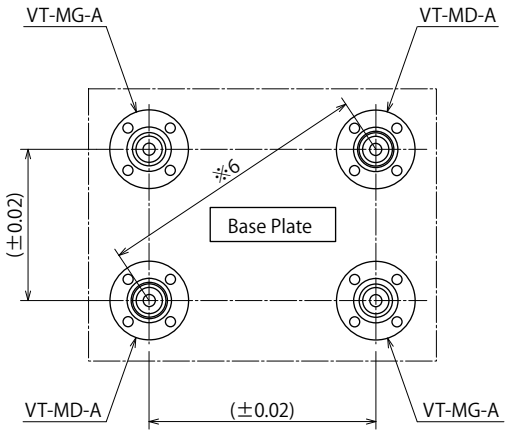
Notes :

1. Make sure no burrs are on or around the hole intersection.

※4. Release hydraulic port should be machined within ▭ range.

※5. The base thickness (AG) and remaining depth after boring (AJ) are reference values when the base material is S50C.

Distance Accuracy of Each Clamp



Note :

※6. Please make sure the distance accuracy of each datum clamp is below ±0.025mm between the clamps with the longest distance.

Specifications

Model No.		VT0040-M□-A	VT0060-M□-A	VT0100-M□-A	VT0160-M□-A
Locating Repeatability	mm	0.003			
Clamping Force (Calculation Formula)※7 ※8	kN	0.57×P	0.89×P	1.42×P	2.28×P
Lift Up Force (Calculation Formula)※7 ※8	kN	0.36×P	0.57×P	0.93×P	1.45×P
Full Stroke	mm	3.4	3.4	4.0	4.5
Lift Up Stroke	mm	1.0			
Allowable Offset when fixture pallet is set	mm	1.5	1.5	2.0	2.0
Max. Loading Weight※9	kg	500	800	1200	1600
Cylinder Capacity ※8 cm³	Lock	1.1	1.9	3.5	6.2
	Release	1.5	2.4	4.7	8.1
Max. Operating Pressure	MPa	7.0			
Min. Operating Pressure	MPa	1.5			
Withstanding Pressure	MPa	10.5			
Operating Air Pressure (For Air Blow)	MPa	0.4 ~ 0.5			
Operating Temperature	℃	0 ~ 70			
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32			
Weight※8	kg	0.3	0.4	0.8	1.3

Notes : ※7. P : Hydraulic Pressure (MPa).
※8. The specification indicates the value of one device.
※9. It indicates the weight of pallet in horizontal position (placed flat) that VS can locate regardless of number of clamps.
Release hydraulic pressure is determined with the loading weight (fixture).
(Loading weight should be less than 80% of the lift-up force (Number of Clamps×Lift-Up Force)).
When using pallet in vertical direction, please refer to P.995.

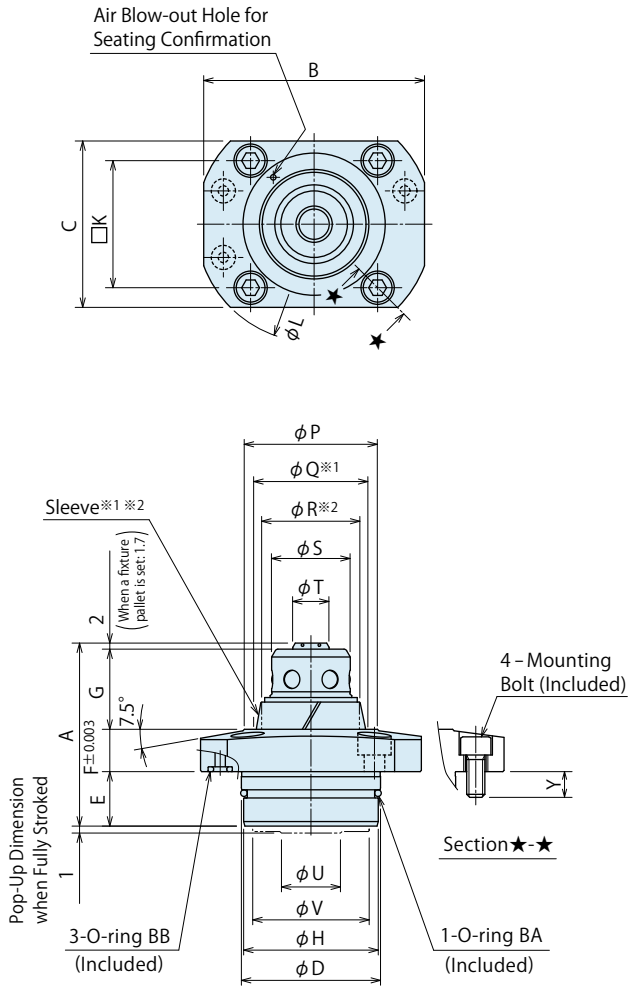
External Dimensions and Machining Dimensions for Mounting

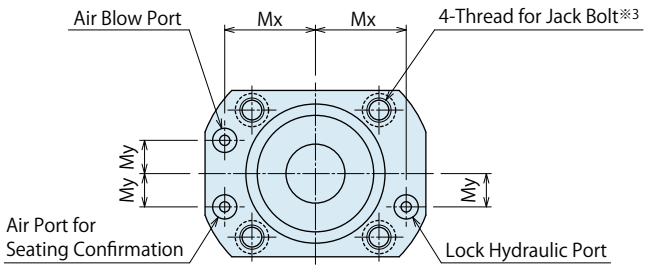
(mm)

Model No.	VT0040-M□-A	VT0060-M□-A	VT0100-M□-A	VT0160-M□-A
A	49	53.5	60.5	68.5
D	30 $^{+0.027}_{+0.011}$	36 $^{+0.027}_{+0.011}$	46 $^{+0.027}_{+0.011}$	56m6 $^{+0.030}_{+0.011}$
E	13	17	18	19
F	12	12.5	14	18
G	22	22	26.5	29.5
H	29	35	45	55
K	29	33	42	50
L	56.5	66	78	88
Mx	21.5	25.5	30	34.5
My	8	9	11	12
N	2.6	3	3 ~ 3.3	3 ~ 3.3
P	32	35.5	44	51
Q※1	25	28.5	36	42
R※2	22.5	26	32.3	38.3
S	18	20	26	32
T	8	10	12	15
U	10	15	20	25
V	24	30	38.5	48
Y	9	9	8.5	13.5
AA	30	36	46	56
AB	29.5	35.5	45.5	55.5
AC	8	8	10	10
AD	14	18	19	20
AE※5	20	25	25	30
AF	6	10	15	20
AG※5	3.5	3.5	2	5
AH	10	15	20	25
AJ (Nominal×Pitch×Depth)	M5×0.8×10	M5×0.8×10	M6×1×10	M8×1.25×15
O-ring BA	AS568-023(90)	AS568-027(90)	AS568-030(90)	AS568-033(90)
O-ring BB	AS568-007(90)	OR NBR-90 P5-N	OR NBR-90 P5-N	OR NBR-90 P5-N
Mounting Bolt	M5×0.8×14	M5×0.8×14	M6×1×14	M8×1.25×20
Thread for Jack Bolt	M6×1	M6×1	M8×1.25	M10×1.5

External Dimensions

※This drawing shows the released state of VT-B.





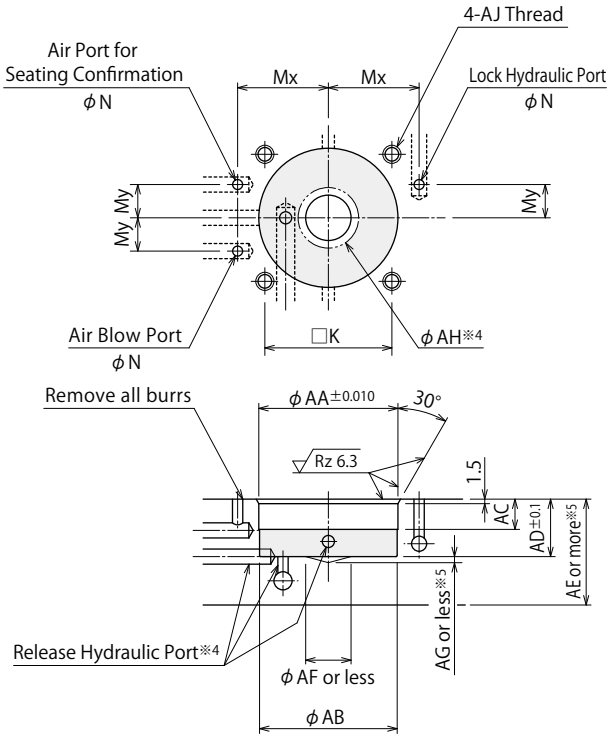
Notes :

※1. ϕQ shows the dimensions of sleeve (taper) of datum clamp (VT-MD).

※2. ϕR shows the dimensions of sleeve (straight) of guide clamp (VT-MG).

※3. The thread for jack bolt is used when removing the clamp.
(See P.996 for operation method.)

Machining Dimensions of Mounting Area



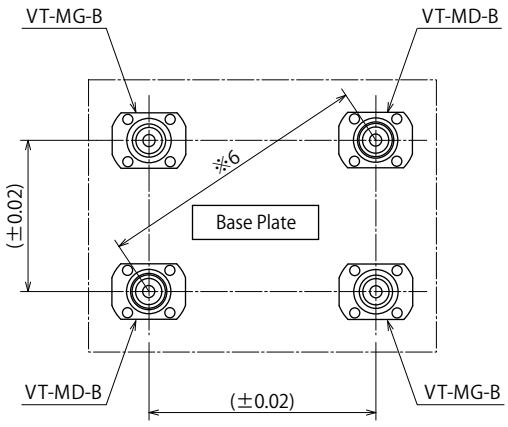
Notes :

1. Make sure no burrs are on or around the hole intersection.

※4. Release hydraulic port should be machined within ▭ range.

※5. The base thickness (AE) and remaining depth after boring (AG) are reference values when the base material is S50C.

Distance Accuracy of Each Clamp



Note :

※6. Please make sure the distance accuracy of each datum clamp is below ±0.025mm between the clamps with the longest distance.

Specifications

Model No.		VT0040-M□-B	VT0060-M□-B	VT0100-M□-B	VT0160-M□-B
Locating Repeatability	mm	0.003			
Clamping Force (Calculation Formula)※7 ※8	kN	0.57×P	0.89×P	1.42×P	2.28×P
Lift Up Force (Calculation Formula)※7 ※8	kN	0.36×P	0.57×P	0.93×P	1.45×P
Full Stroke	mm	3.4	3.4	4.0	4.5
Lift Up Stroke	mm	1.0			
Allowable Offset when fixture pallet is set	mm	1.5	1.5	2.0	2.0
Max. Loading Weight※9	kg	500	800	1200	1600
Cylinder Capacity ※8	cm³ Lock	1.1	1.9	3.5	6.2
	cm³ Release	1.5	2.4	4.7	8.1
Max. Operating Pressure	MPa	7.0			
Min. Operating Pressure	MPa	1.5			
Withstanding Pressure	MPa	10.5			
Operating Air Pressure (For Air Blow)	MPa	0.4 ~ 0.5			
Operating Temperature	℃	0 ~ 70			
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32			
Weight※8	kg	0.3	0.4	0.8	1.3

Notes : ※7. P : Hydraulic Pressure (MPa).
※8. The specification indicates the value of one device.
※9. It indicates the weight of pallet in horizontal position (placed flat) that VS can locate regardless of number of clamps.
Release hydraulic pressure is determined with the loading weight (fixture).
(Loading weight should be less than 80% of the lift-up force (Number of Clamps×Lift-Up Force)).
When using pallet in vertical direction, please refer to P.995.

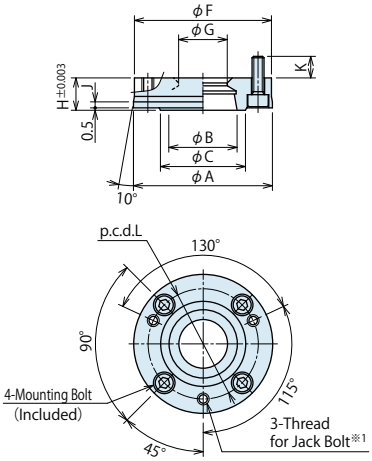
External Dimensions and Machining Dimensions for Mounting

(mm)

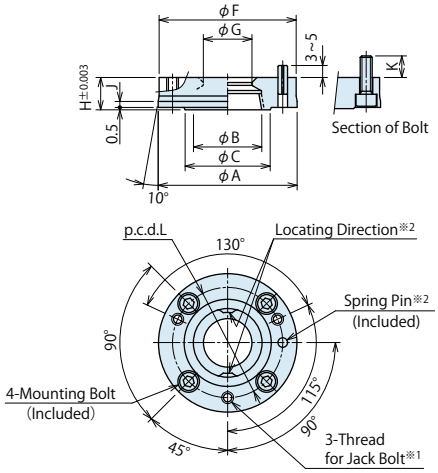
Model No.	VT0040-M□-B	VT0060-M□-B	VT0100-M□-B	VT0160-M□-B
A	49	53.5	60.5	68.5
B	53	62	73	82
C	40	44	55	67
D	30 $^{+0.027}_{+0.011}$	36 $^{+0.027}_{+0.011}$	46 $^{+0.027}_{+0.011}$	56m6 $^{+0.030}_{+0.011}$
E	13	17	18	19
F	12	12.5	14	18
G	22	22	26.5	29.5
H	29	35	45	55
K	29	33	42	50
L	56.5	66	78	88
Mx	21.5	25.5	30	34.5
My	8	9	11	12
N	2.6	3	3 ~ 3.3	3 ~ 3.3
P	32	35.5	44	51
Q※1	25	28.5	36	42
R※2	22.5	26	32.3	38.3
S	18	20	26	32
T	8	10	12	15
U	10	15	20	25
V	24	30	38.5	48
Y	9	9	8.5	13.5
AA	30	36	46	56
AB	29.5	35.5	45.5	55.5
AC	8	8	10	10
AD	14	18	19	20
AE※5	20	25	25	30
AF	6	10	15	20
AG※5	3.5	3.5	2	5
AH	10	15	20	25
AJ (Nominal×Pitch×Depth)	M5×0.8×10	M5×0.8×10	M6×1×10	M8×1.25×15
O-ring BA	AS568-023(90)	AS568-027(90)	AS568-030(90)	AS568-033(90)
O-ring BB	AS568-007(90)	OR NBR-90 P5-N	OR NBR-90 P5-N	OR NBR-90 P5-N
Mounting Bolt	M5×0.8×14	M5×0.8×14	M6×1×14	M8×1.25×20
Thread for Jack Bolt	M6×1	M6×1	M8×1.25	M10×1.5

External Dimensions

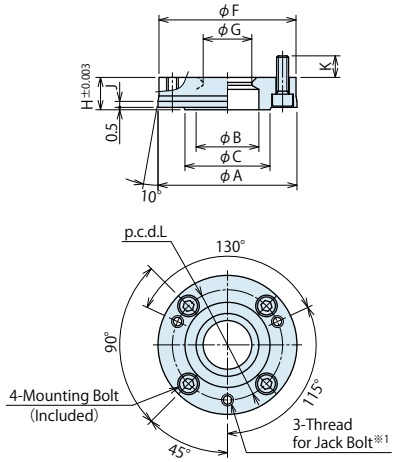
VSB020/060/100/160/250-D



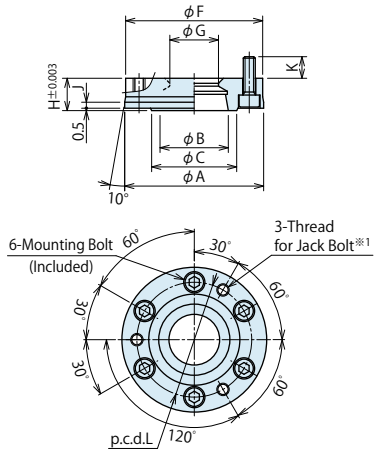
VSB020/060/100/160/250-C



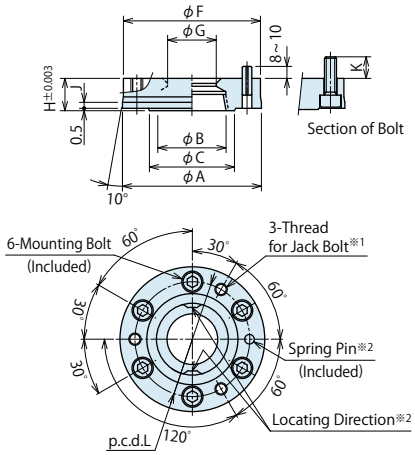
VSB020/060/100/160/250-G/F



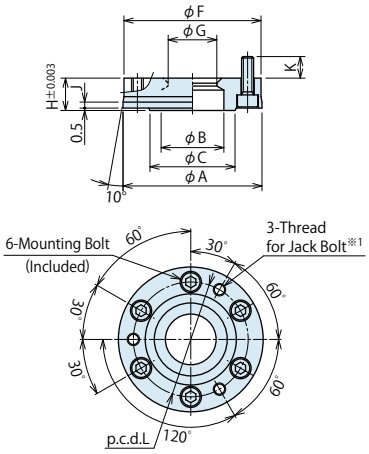
VSB400-D



VSB400-C



VSB400-G/F



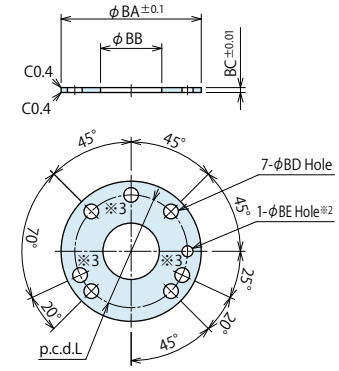
Notes :

※1. The thread for jack bolt is used when removing a VSB block.

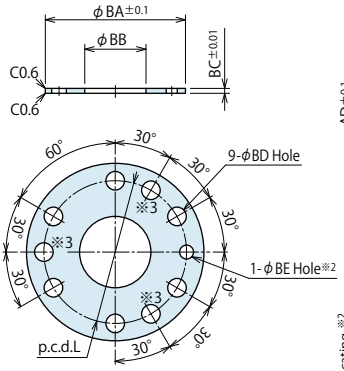
※2. The spring pin is used for phasing of VSB-C locating direction.

Dimensions of Level Adjustment Collar

VZ0020/0060/0100/0160/0250-VSC



VZ0400-VSC

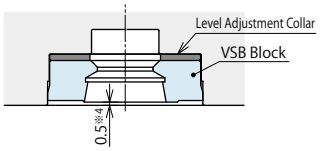


Notes :

1. Please refer to the drawings above when preparing a level adjustment collar by yourself.

※3. (3 parts) are for jack screw.
Align them with the phase of jack screw of VSB block.

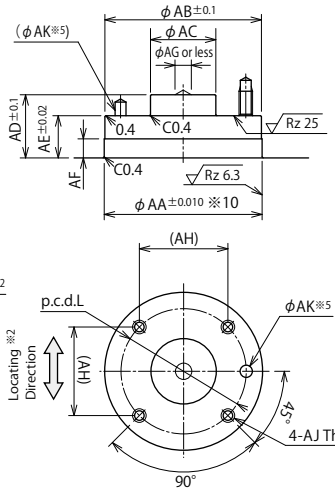
※Mounting of Level Adjustment Collar



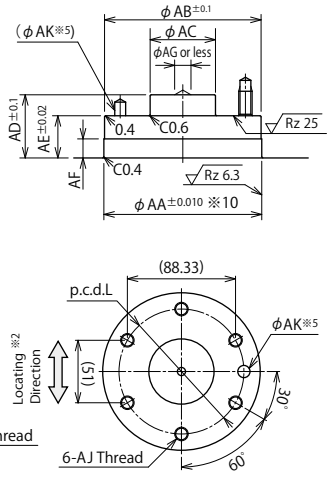
※4. It shows the gap between the seating surface of VSB Block and the bottom surface of the pallet.

Machining Dimensions of Mounting Area

VSB020/060/100/160/250



VSB400

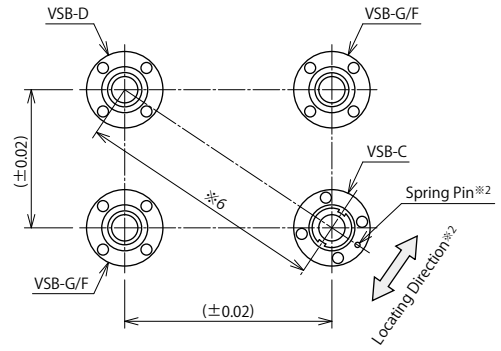


Notes :

1. This drawing shows when the gap between the seating surface of VSB block and the bottom surface of the pallet is 0.5mm by using the level adjustment collar.

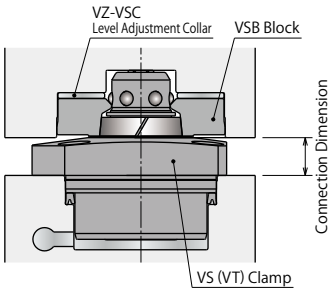
※5. ϕAK hole is used for phasing of VSB-C locating direction.
Please make sure ϕAK hole is at the line connecting the centers of VSB-D and VSB-C.
This machining is only necessary for VSB-C.

Mounting Distance Accuracy and VSB-C Phase



Note :
※6. Distance accuracy of the block should be within ±0.025mm between the blocks with the longest distance.

Connection Dimensions



When using VS (mm)

Clamp Model No.		VS0020	VS0040	VS0060	VS0100	VS0160	VS0250	VS0400
Connection Dimensions	Lock	11.5	11.5	13	15.5	19.5	25.5	31.5
	Release	12.5	12.5	14	16.5	20.5	26.5	32.5

When using VT (mm)

Clamp Model No.		VT0040	VT0060	VT0100	VT0160
Connection Dimensions	Lock	11.5	12	13.5	17.5
	Release	12.5	13	14.5	18.5

Note :
2. If using VZ-VS1, please refer to P.983 .

External Dimensions and Machining Dimensions for Mounting

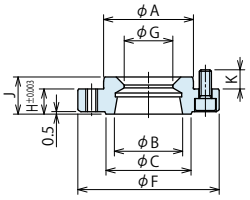
(mm)

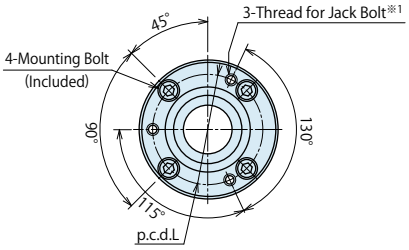
Model No.	VSB020-D VSB020-C	VSB020-G VSB020-F	VSB060-D VSB060-C	VSB060-G VSB060-F	VSB100-D VSB100-C	VSB100-G VSB100-F	VSB160-D VSB160-C	VSB160-G VSB160-F	VSB250-D VSB250-C	VSB250-G VSB250-F	VSB400-D VSB400-C	VSB400-G VSB400-F
A	50 +0.027 +0.011	50g7 −0.009 −0.034	58m6 +0.030 +0.011	58g7 −0.010 −0.040	70m6 +0.030 +0.011	70g7 −0.010 −0.040	83m6 +0.035 +0.013	83g7 −0.012 −0.047	107 +0.030 +0.011	107g7 −0.012 −0.047	123 +0.030 +0.011	123g7 −0.014 −0.054
B	25	22.7(25.5)※7	28.5	26.2(29)※7	36	32.5(36.5)※7	42	38.5(42.5)※7	55.5	48.3(56)※7	67.6	60.3(68)※7
C	32		35.5		44		51		68		84	
F	49.2		57.2		69.2		82.2		106.2		122.2	
G	18.3		20.3		26.3		32.3		40.4		50.5	
H	13		13		16.5		17.5		22.5		26.5	
J	2.5		2.5		2.5		3		4		4	
K	8		9		10.5		16.5		18.3		19.5	
L	40		46		56		66		86		102	
AA※10	50		58		70		83		107		123	
AB	49.5		57.5		69.5		82.5		106.5		122.5	
AC	22		24		30		36		46		58	
AD	23.2		23.2		27.7		30.7		37.2		45.7	
AE	15.5		15.5		20		21		27		32	
AF	7		7		8		8		8		8	
AG	3		3		5		5		6		8	
(AH)	28.28		32.53		39.6		46.67		60.81		-	
AJ (Nominal×Pitch×Depth)	M4×0.7×7		M5×0.8×8		M6×1×10		M8×1.25×14.5		M10×1.5×15.5		M10×1.5×15.5	
AK	ϕ3.4 Depth 5	-	ϕ4.5 Depth 5	-	ϕ4.5 Depth 5	-	ϕ4.5 Depth 5	-	ϕ5.5 Depth 5	-	ϕ5.5 Depth 10	-
Mounting Bolt	M4×0.7×16		M5×0.8×16		M6×1×20		M8×1.25×25		M10×1.5×30		M10×1.5×35	
Thread for Jack Bolt	M4×0.7		M5×0.8		M6×1		M8×1.25		M8×1.25		M8×1.25	
Spring Pin※8	ϕ3×10	-	ϕ4×10	-	ϕ4×10	-	ϕ4×10	-	ϕ5×10	-	ϕ5×14	-
Weight	0.15 kg		0.2 kg		0.35 kg		0.5 kg		1.3 kg		1.8 kg	
Applicable Clamp	VS0020-MD VS0040-MD VT0040-MD	VS0020-MG VS0040-MG VT0040-MG ※9 VS0020-MD VS0040-MD VT0040-MD	VS0060-MD VT0060-MD	VS0060-MG VT0060-MG ※9 VS0060-MD VT0060-MD	VS0100-MD VT0100-MD	VS0100-MG VT0100-MG ※9 VS0100-MD VT0100-MD	VS0160-MD VT0160-MD	VS0160-MG VT0160-MG ※9 VS0160-MD VT0160-MD	VS0250-MD	VS0250-MG ※9 VS0250-MD	VS0400-MD	VS0400-MG ※9 VS0400-MD
Model No.	VZ0020-VSC		VZ0060-VSC		VZ0100-VSC		VZ0160-VSC		VZ0250-VSC		VZ0400-VSC	
BA	49.2		57.2		69.2		82.2		106		122.2	
BB	23		25		32		38		50		62	
BC	2		2		3		3		4		5	
BD	5		6		7.5		10		12		12	
BE	3.4		4.5		4.5		4.5		5.5		5.5	

Notes : ※7. The dimensions in ( ) display that of VSB-F.
※8. The spring pin is included only in VSB-C.
※9. The guide block (VSB-G) is used only for guide clamp (VS/VT-G) and the free block (VSB-F) can be used for both datum clamp (VS/VT-D) and guide clamp (VS/VT-G).
※10. Pallet with low rigidity (thin pallet or pallet made of aluminum etc.) may be deformed when mounting VSB block.
In this case, tolerance of mounting hole machining dimension AA±0.010 should be close to +0.010 (the upper limit of the tolerance).

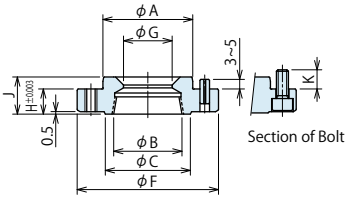
External Dimensions

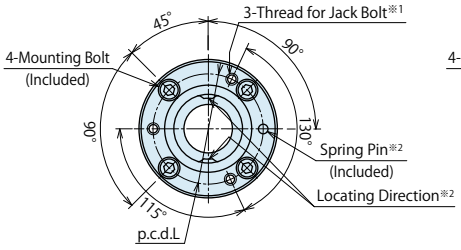
VSJ020/060-D



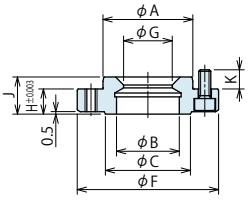


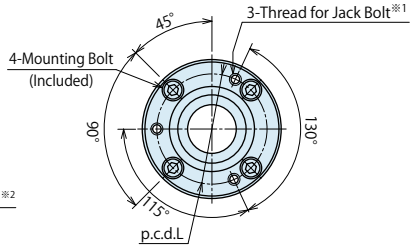
VSJ020/060-C



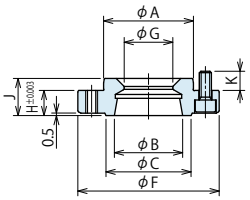


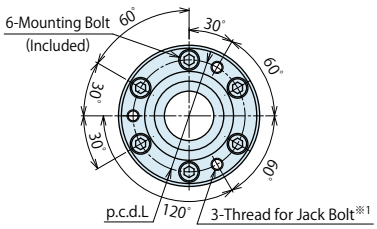
VSJ020/060-G
VSJ020/060-F



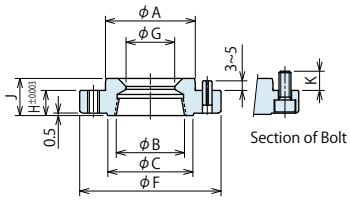


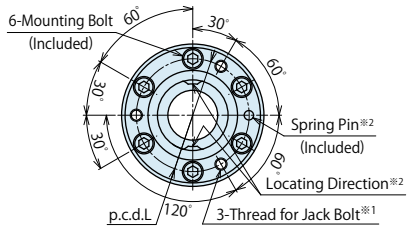
VSJ100/160/250/400-D



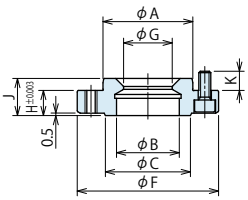


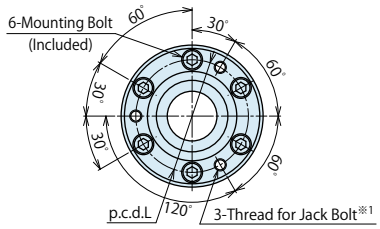
VSJ100/160/250/400-C





VSJ100/160/250/400-G
VSJ100/160/250/400-F

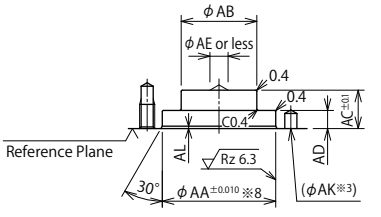


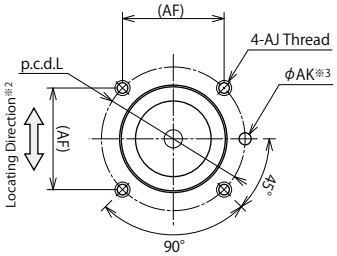


Notes :
※1. The thread for jack bolt is used when removing VSJ block.
※2. The spring pin is used for phasing of VSJ-C locating direction.

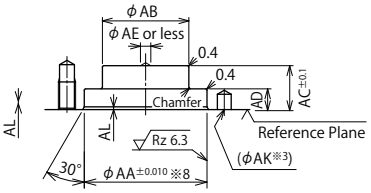
Machining Dimensions of Mounting Area

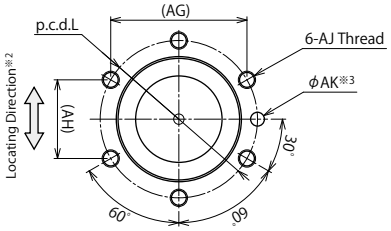
VSJ020/060





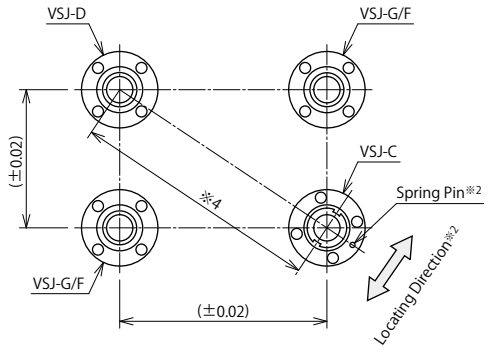
VSJ100/160/250/400





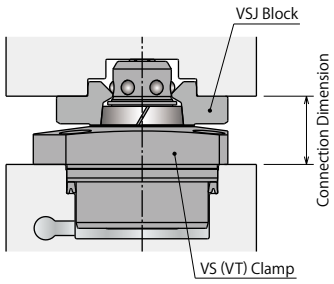
Notes :
※3. ϕAK hole is used for phasing of VSJ-C locating direction.
Please make sure ϕAK hole is at the line connecting the centers of VSJ-D and VSJ-C.
This machining is only necessary for VSJ-C.

Mounting Distance Accuracy and VSJ-C Phase



Note :
※4. Distance accuracy of the block should be within ±0.025mm between the blocks with the longest distance.

Connection Dimensions



When using VS (mm)

Clamp Model No.		VS0020	VS0040	VS0060	VS0100	VS0160	VS0250	VS0400
Connection Dimensions	Lock	20	20	23.5	26	32	41	50
	Release	21	21	24.5	27	33	42	51

When using VT (mm)

Clamp Model No.		VT0040	VT0060	VT0100	VT0160
Connection Dimensions	Lock	20	22.5	24	30
	Release	21	23.5	25	31

Not :
1. If using VZ-VS1, please refer to P.983 .

External Dimensions and Machining Dimensions for Mounting

(mm)

Model No.	VSJ020-D VSJ020-C	VSJ020-G VSJ020-F	VSJ060-D VSJ060-C	VSJ060-G VSJ060-F	VSJ100-D VSJ100-C	VSJ100-G VSJ100-F	VSJ160-D VSJ160-C	VSJ160-G VSJ160-F	VSJ250-D VSJ250-C	VSJ250-G VSJ250-F	VSJ400-D VSJ400-C	VSJ400-G VSJ400-F
A	31.5 +0.027 +0.011	31.5g7 −0.009 −0.034	37.5 +0.027 +0.011	37.5g7 −0.009 −0.034	52m6 +0.030 +0.011	52g7 −0.010 −0.040	62m6 +0.030 +0.011	62g7 −0.010 −0.040	74m6 +0.030 +0.011	74g7 −0.010 −0.040	85 +0.030 +0.011	85g7 −0.012 −0.047
B	25	22.7(25.5)※5	28.5	26.2(29)※5	36	32.5(36.5)※5	42	38.5(42.5)※5	55.5	48.3(56)※5	67.6	60.3(68)※5
C	32		35.5		44		51		68		84	
F	49		59		74		89		108		123	
G	18.3		20.3		26.3		32.3		40.4		50.5	
H	8		10		10		12		15		18	
J	13		15		16.5		18.5		23		26.5	
K	6.7		7.8		7.8		8.8		13.8		13	
L	40		47.5		62.5		75		90		102	
AA※8	31.5		37.5		52		62		74		85	
AB	22		25		31		38		46		58	
AC	14.7		12.7		17.2		18.2		21.7		27.2	
AD	6		6		7.5		7.5		9		9.5	
AE	3		3		5		5		6		8	
(AF)	28.28		33.59		-		-		-		-	
(AG)	-		-		54.13		64.95		77.94		88.33	
(AH)	-		-		31.25		37.5		45		51	
AJ (Nominal×Pitch×Depth)	M4×0.7×8		M5×0.8×9		M5×0.8×9		M6×1×10		M8×1.25×15		M10×1.5×15	
AK	ϕ3.4 Depth 5	-	ϕ4.5 Depth 5	-	ϕ4.5 Depth 5	-	ϕ4.5 Depth 5	-	ϕ5.5 Depth 5	-	ϕ5.5 Depth 5	-
AL	0.8		0.8		0.8		0.8		1.5		1.5	
Chamfer	-		-		C0.4		C0.4		C0.4		C0.6	
Mounting Bolt	M4×0.7×10		M5×0.8×12		M5×0.8×12		M6×1×14		M8×1.25×20		M10×1.5×20	
Thread for Jack Bolt	M4×0.7		M5×0.8		M5×0.8		M6×1		M8×1.25		M8×1.25	
Spring Pin※6	ϕ3×10	-	ϕ4×10	-	ϕ4×10	-	ϕ4×10	-	ϕ5×10	-	ϕ5×10	-
Weight	0.1 kg		0.18 kg		0.3 kg		0.55 kg		1.0 kg		1.45 kg	
Applicable Clamp	VS0020-MD VS0040-MD VT0040-MD	VS0020-MG VS0040-MG VT0040-MG ※7 VS0020-MD VS0040-MD VT0040-MD	VS0060-MD VT0060-MD	VS0060-MG VT0060-MG ※7 VS0060-MD VT0060-MD	VS0100-MD VT0100-MD	VS0100-MG VT0100-MG ※7 VS0100-MD VT0100-MD	VS0160-MD VT0160-MD	VS0160-MG VT0160-MG ※7 VS0160-MD VT0160-MD	VS0250-MD	VS0250-MG ※7 VS0250-MD	VS0400-MD	VS0400-MG ※7 VS0400-MD

Notes : ※5. The dimensions in ( ) display that of VSJ-F.
※6. The spring pin is included only in VSJ-C.
※7. The guide block (VSJ-G) is used only for guide clamp (VS/VT-G) and the free block (VSJ-F) can be used for both datum clamp (VS/VT-D) and guide clamp (VS/VT-G).
※8. Pallet with low rigidity (thin pallet or pallet made of aluminum etc.) may be deformed when mounting VSJ block.
In this case, tolerance of mounting hole machining dimension AA±0.010 should be close to +0.010 (the upper limit of the tolerance).

Introduction of Related Products

Pump Unit

model CV

→ P.1281

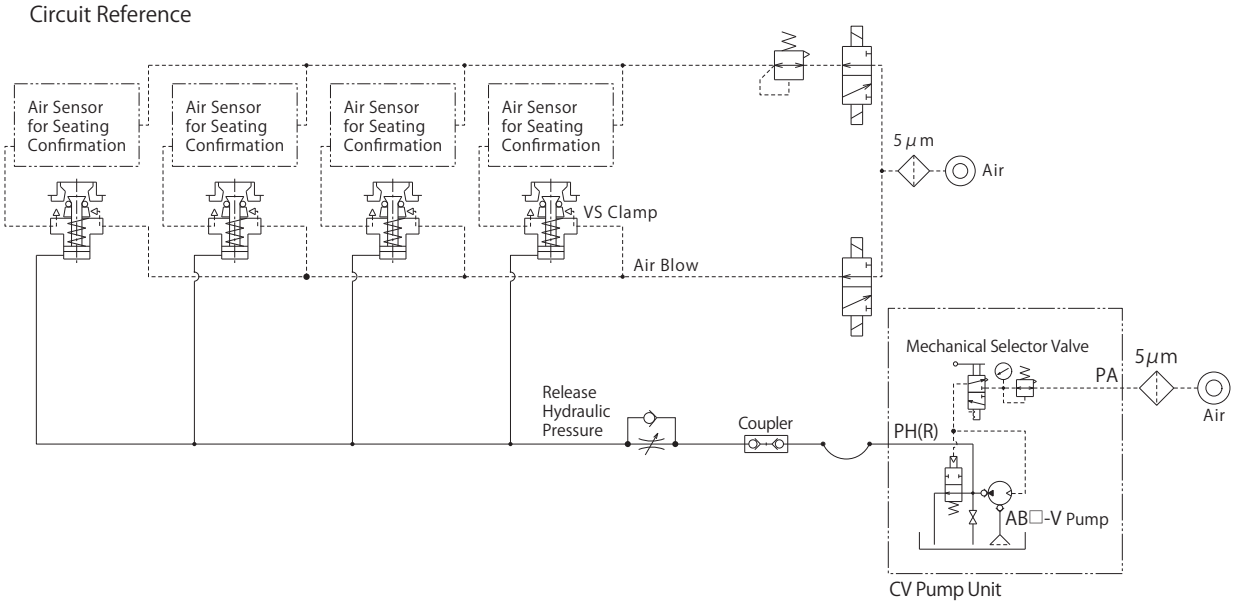
Hydraulic pressure is generated with factory air pressure.
Ability of single circuit control (hydraulic pressure ON/OFF) with air ON/OFF.
Easy to set up with compact size.

Please refer to P.1281 for detailed specifications.

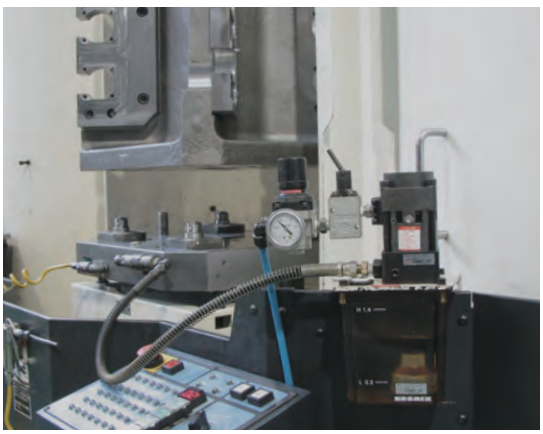
Model	CV2B30-0-□□	CV2B40-0-□□	CV2B50-0-□□
Pump Model No.	AB3000-V□	AB4000-V□	AB5000-V□
Discharge Hydraulic Pressure ※1 MPa	2.4～4.3	3.9～7.0	6.0～11.0
Air Consumption Nm³/min	0.4		
Tank Capacity ℓ	2ℓ(Actual Amount for Use 1.1ℓ)		
Operating Temperature ℃	0～70		
Usable Fluid	General Hydraulic Oil Equivalent to ISO-VG-32		

Notes : ※1. It shows discharge hydraulic pressure when set air pressure is 0.3～0.5MPa.
1. Please refer to AB/AC Pump Performance Curve (P.1305) for the calculation formula and the amount of discharge oil.

Circuit Reference



Installation Examples

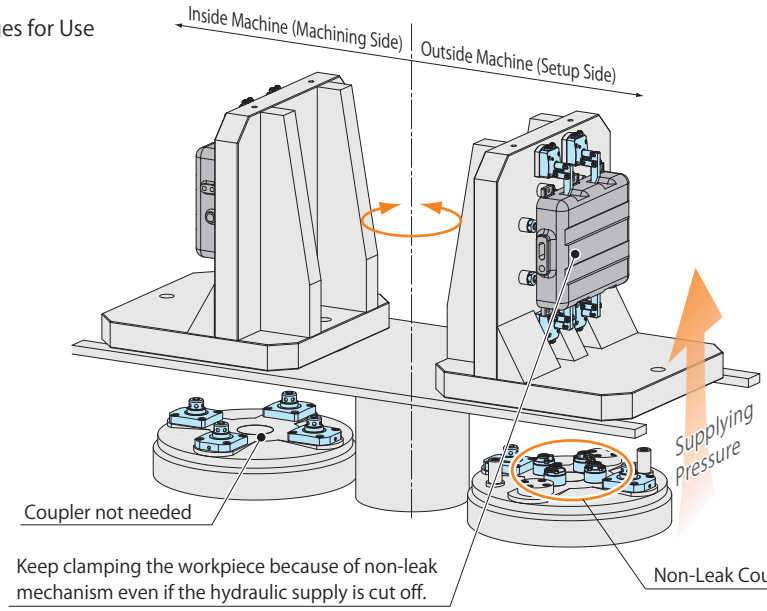


Non-Leak Coupler (Hydraulic Pressure) model BGC/BGD

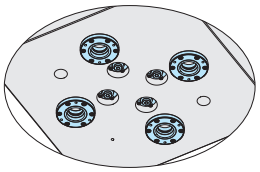
→ P.1111

Even if the coupler is separated after adding pressure and supplying fluid, it can hold the pressure of the coupler at the side that receive fluid supply from the other.
You can cut off unwanted circuit facilities and hydraulic pressure is allowed to be off even when the coupler is separated.

Images for Use



The Bottom Surface of Pallet

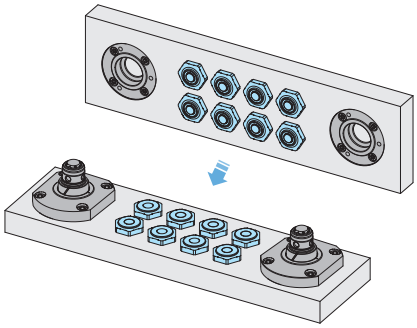


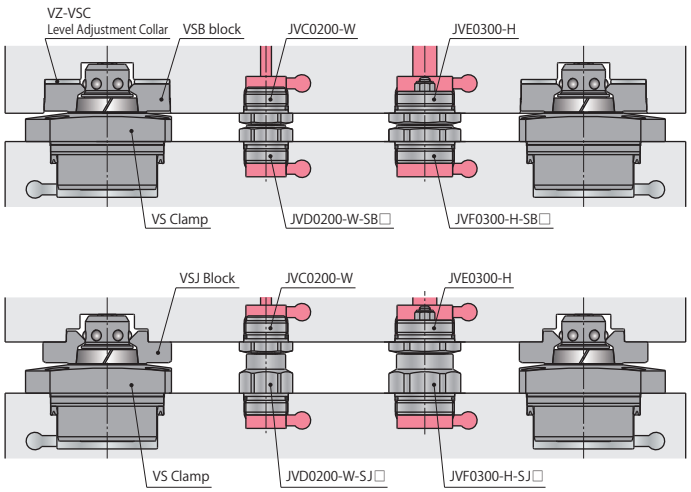
Auto Coupler (Hydraulic Pressure / Air / Coolant) model JVC/JVD, JVE/JVF

→ P.1153 ~ P.1160

Coupler with the minimum connection stroke enhances automation.
Compact and able to install in limited spaces.

Images for Use





Cautions

Notes for Design

1) Check Specifications

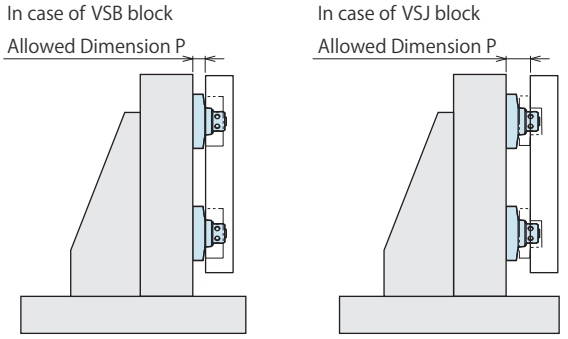
- Please use each product according to the specifications.

2) Notes for Circuit Design

- Please read "Notes on Hydraulic Cylinder Speed Control Unit" for proper hydraulic circuit design. Improper circuit design may lead to malfunctions and damages. (Refer to P.1356)
- Air blow passage should be $\phi 6$ or more for an effective air blow.

3) When Using a Pallet in Vertical Position

- When setting a workpiece or a fixture plate, make sure it is in proper proximity and square to the clamps.
  If it is locked out of position, the clamps may be damaged.



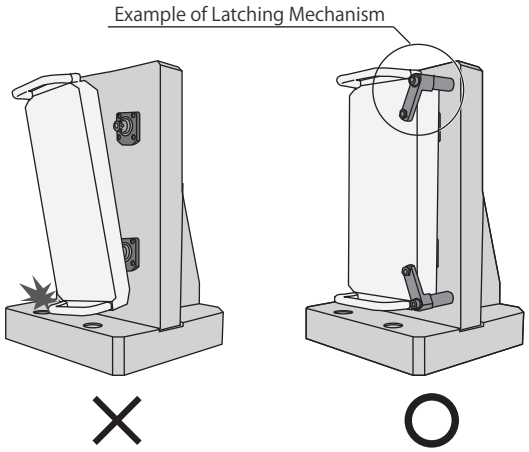
Allowed Dimension P (VS Spring Clamp) (mm)

Model No.	VS0020	VS0040	VS0060	VS0100	VS0160	VS0250	VS0400
VSB block	13	13	14.5	17	21	27	33
VSJ block	21.5	21.5	25	27.5	33.5	42.5	51.5

Allowed Dimension P (VT Hydraulic Clamp) (mm)

Model No.	VT0040	VT0060	VT0100	VT0160
VSB Block	13	13.5	15	19
VSJ Block	21.5	24	25.5	31.5

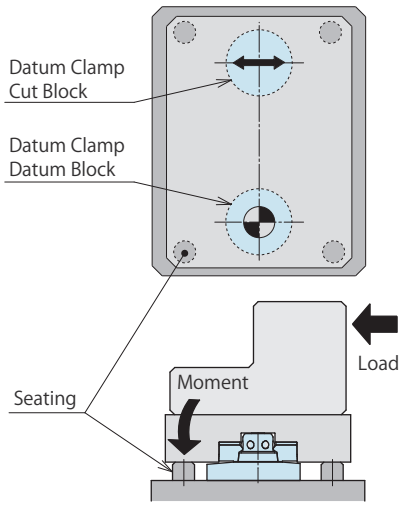
- As the workpiece fixture plate may fall down when releasing, it is recommended to set up the latching mechanism to prevent a fall.
- When the pallet is used in vertical position (hanging on the wall), the internal moving parts tend to wear out. Please Check the locating accuracy on a regular basis, and replace the product in case the locating accuracy exceeds the allowable range.



- When the pallet is in horizontal position, make sure the weight of the workpiece fixture is less than the lifting force of the clamps and maximum load of the machine.
- When the pallet is in vertical position, make sure the weight of the workpiece fixture pallet is 10% of the clamping force.
- Please contact us in case the pallet is in other position.

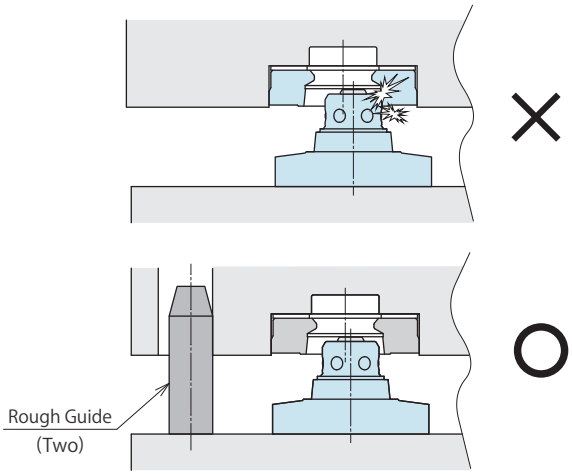
4) Seat Setting

- In case the clamp/block configuration is linear, it is recommended to provide additional supports for stability.

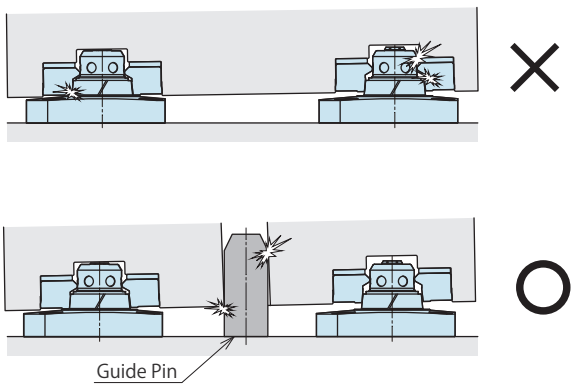


5) Setting of Rough Guide

- If the position of the pallet during loading is outside the clamp allowable offset, the clamp may contact the seating surface and the taper surface of the block (VSB/VSJ-D) causing damage to the product and decrease of the locating accuracy. It is recommended to use rough guides to load the pallet within the allowable offset.



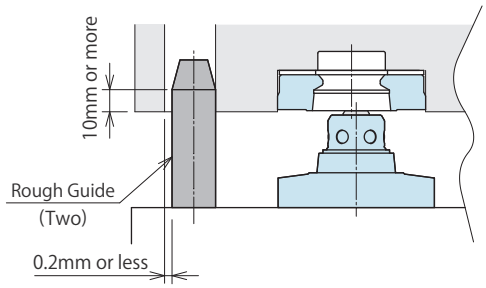
- The pallet must be level with the base plate during loading and unloading, otherwise the clamps and blocks will be damaged.
  Provide guide pins to keep the pallet level during loading and unloading.



6) Use a guide when not using the guide block (VSB/VSJ-G)

- The combination of the guide clamp (VS/VT-G) and the guide block (VSB/VSJ-G) ensures the protective function of the datum clamp. Please set a guide in the following cases of not using the guide block.

In case of using the combination of two datum clamps, a datum block (VSB/VSJ-D), and a cut block (VSB/VSJ-C) only.
In case of using the combination of a datum clamp and a free block (VSB/VSJ-F) only in order to rotate a fixture plate.



Installation Notes

1) Check the Usable Fluid

- Please use the appropriate fluid by referring to the Hydraulic Fluid List (P.1355).

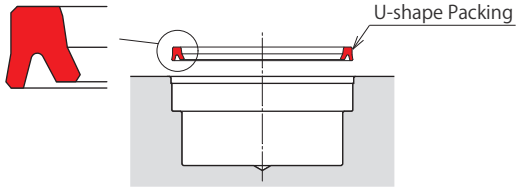
2) Installation of the Product

- Use four bolts with hex. hole (Strength Grade 12.9) and tighten the product with torque as shown in the table below. Tighten them evenly to prevent twisting or jamming.

Clamp Model		Block Model		Thread size	Tightening Torque (N·m)
VS	VT	VSB	VSJ		
–	–	VSB020	VSJ020	M4×0.7	3.2
VS0020 VS0040	VT0040 VT0060	VSB060	VSJ060 VSJ100	M5×0.8	6.3
VS0060	VT0100	VSB100	VSJ160	M6×1	10
VS0100	VT0160	VSB160	VSJ250	M8×1.25	25
VS0160	–	VSB250 VSB400	VSJ400	M10×1.5	50
VS0250	–	–	–	M12×1.75	80
VS0400	–	–	–	M16×2	200

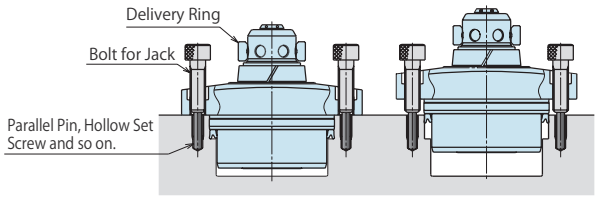
- Please set the U-shape packing to the mounting hole as shown in the drawing below before mounting the VS (Spring Lock Clamp).

Be careful with the mounting direction.



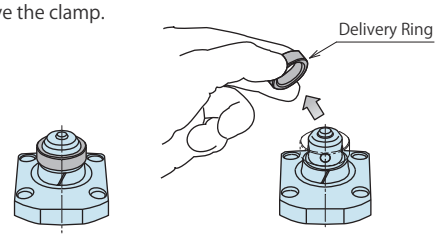
3) Removal of the Product (Only VS Clamp)

- Supply release hydraulic pressure and make sure the clamp is in the released state.
- Mount the delivery ring.
- Stop the pressure and make sure the clamp is in the locked state.
- Remove mounting bolts. Insert jack bolts and tighten them evenly to lift clamp.
- Protect the thread part with parallel pins, etc. as shown in the below drawing not to damage the surface of mounting bolts.

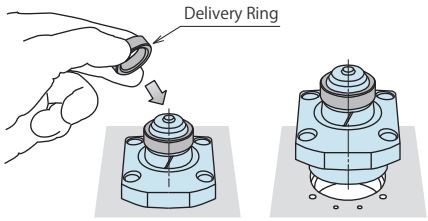


4) Delivery Ring 【Important】(Only VS Clamp)

- The delivery ring prevents detachment of parts of individual clamp.
- The clamp will be equipped with a delivery ring for shipment. After mounting the pallet clamp on the fixture, remove the delivery ring before use. (When removing the delivery ring, supply release hydraulic pressure.)
- Please keep the delivery ring with great care as it is necessary to remove the clamp.



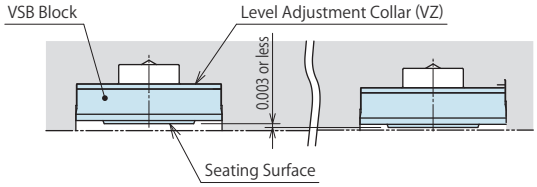
- When removing the pallet clamp from the fixture, mount the delivery ring in advance. Otherwise the internal parts may be detached from the spring, and they cannot be recovered.



5) Level Adjustment of VSB Block Seating Surface

- When installing each block in the fixture plate, adjust the level of block seating surface as described below. (Recommended Level Adjustment : within ±0.003mm)

① Install in order of the level adjustment collar and the block to the fixture and tighten them with the specified torque.
② Measure the level of the seating surface of each block.
③ In case the levels are not even, remove the blocks, and grind the level adjustment collar so that the level range is within ±0.003mm.
④ Once again, install the block and level adjustment collar into the fixture plate, and check the levels.



※ Please refer to P.1355 for common cautions. ・Installation Notes ・Hydraulic Fluid List ・Notes on Hydraulic Cylinder Speed Control Circuit ・Notes on Handling ・Maintenance/Inspection ・Warranty

Cautions

Installation Notes (For Hydraulic Series)

1) Check the Usable Fluid

- Please use the appropriate fluid by referring to the Hydraulic Fluid List.

2) Procedure before Piping

- The pipeline, piping connector and fixture circuits should be cleaned by thorough flushing.
- The dust and cutting chips in the circuit may lead to fluid leakage and malfunction.
- There is no filter provided with Kosmek's product except for a part of valves which prevents foreign materials and contaminants from getting into the circuit.

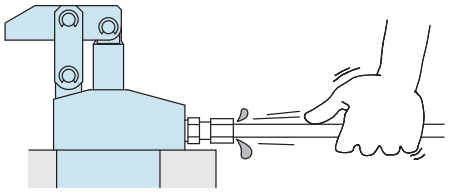
3) Applying Sealing Tape

- Wrap with tape 1 to 2 times following the screw direction.
- Pieces of the sealing tape can lead to oil leakage and malfunction.
- Please implement piping construction in a clear environment to prevent anything getting in products.

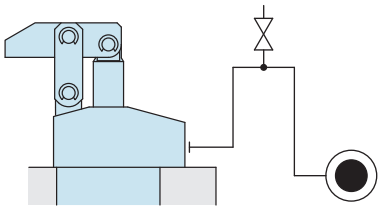
4) Air Bleeding of the Hydraulic Circuit

- If the hydraulic circuit has excessive air, the action time may become very long. If air enters the circuit after connecting the hydraulic port or under the condition of no air in the oil tank, please perform the following steps.

① Reduce hydraulic pressure to less than 2MPa.
② Loosen the cap nut of pipe fitting closest to the clamp by one full turn.
③ Shake the pipeline to loosen the outlet of pipe fitting.
Hydraulic fluid mixed with air comes out.



④ Tighten the cap nut after bleeding.
⑤ It is more effective to release air at the highest point inside the circuit or at the end of the circuit.
(Set an air bleeding valve at the highest point inside the circuit.)



5) Checking Looseness and Retightening

- At the beginning of the machine installation, the bolt and nut may be tightened lightly. Check the looseness and re-tighten as required.

Hydraulic Fluid List

ISO Viscosity Grade ISO-VG-32

Maker	Anti-Wear Hydraulic Oil	Multi-Purpose Hydraulic Oil
Showa Shell Sekiyu	Tellus S2 M 32	Morlina S2 B 32
Idemitsu Kosan	Daphne Hydraulic Fluid 32	Daphne Super Multi Oil 32
JX Nippon Oil & Energy	Super Hyrando 32	Super Mulpus DX 32
Cosmo Oil	Cosmo Hydro AW32	Cosmo New Mighty Super 32
ExxonMobil	Mobil DTE 24	Mobil DTE 24 Light
Matsumura Oil	Hydol AW-32	
Castrol	Hyspin AWS 32	

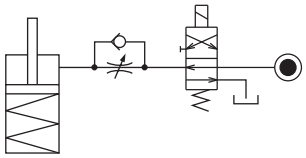
Note : Please contact manufacturers when customers require products in the list above.

Notes on Hydraulic Cylinder Speed Control Unit

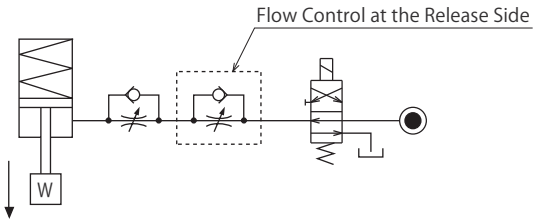
Please pay attention to the cautions below. Design the hydraulic circuit for controlling the action speed of hydraulic cylinder. Improper circuit design may lead to malfunctions and damages. Please review the circuit design in advance.

Flow Control Circuit for Single Acting Cylinder

For spring return single acting cylinders, restricting flow during release can extremely slow down or disrupt release action. The preferred method is to control the flow during the lock action using a valve that has free-flow in the release direction. It is also preferred to provide a flow control valve at each actuator.



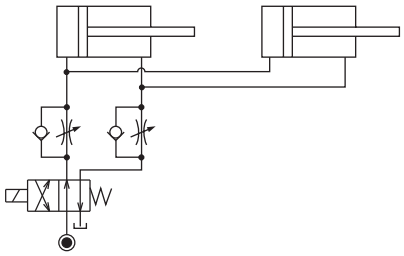
Accelerated clamping speed by excessive hydraulic flow to the cylinder may sustain damage. In this case add flow control to regulate flow. (Please add flow control to release flow if the lever weight is put on at the time of release action when using swing clamps.)



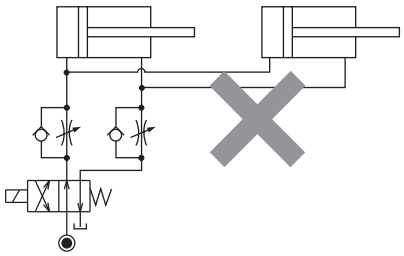
Flow Control Circuit for Double Acting Cylinder

Flow control circuit for double acting cylinder should have meter-out circuits for both the lock and release sides. Meter-in control can have adverse effect by presence of air in the system.
However, in the case of controlling LKE, TMA, TLA, both lock side and release side should be meter-in circuit.
Refer to P.75 for speed adjustment of LKE.
For TMA and TLA, if meter-out circuit is used, abnormal high pressure is created, which causes oil leakage and damage.

【Meter-out Circuit】(Except LKE/TMA/TLA)

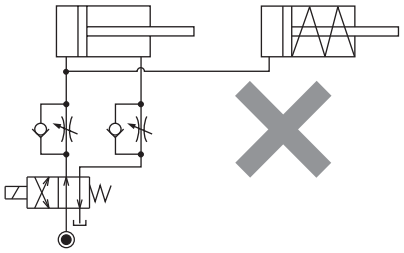


【Meter-in Circuit】(LKE/TMA/TLA must be controlled with meter-in.)



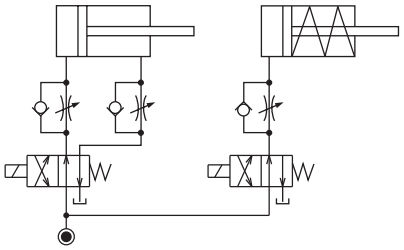
In the case of meter-out circuit, the hydraulic circuit should be designed with the following points.

① Single acting components should not be used in the same flow control circuit as the double acting components.
The release action of the single acting cylinders may become erratic or very slow.

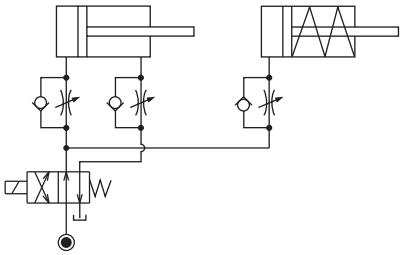


Refer to the following circuit when both the single acting cylinder and double acting cylinder are used together.

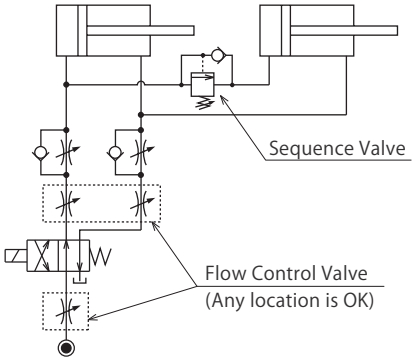
○ Separate the control circuit.



○ Reduce the influence of double acting cylinder control unit.
However, due to the back pressure in tank line, single action cylinder is activated after double action cylinder works.



② In the case of meter-out circuit, the inner circuit pressure may increase during the cylinder action because of the fluid supply. The increase of the inner circuit pressure can be prevented by reducing the supplied fluid beforehand via the flow control valve. Especially when using sequence valve or pressure switches for clamping detection. If the back pressure is more than the set pressure then the system will not work as it is designed to.



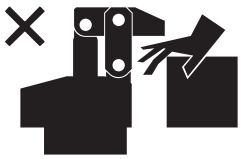
Cautions

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.

2) 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 abnormality in the bolts and respective parts before restarting the machine or equipment.

3) Do not touch a clamp (cylinder) while it is working.
Otherwise, your hands may be injured due to clinching.

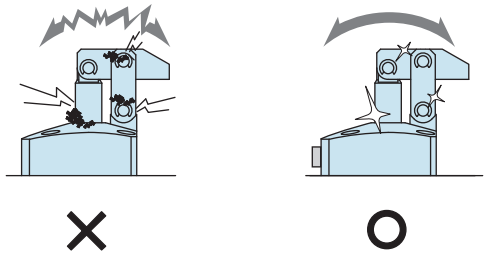


4) Do not disassemble or modify.
- If the equipment is taken apart or modified, the warranty will be voided even within the warranty period.

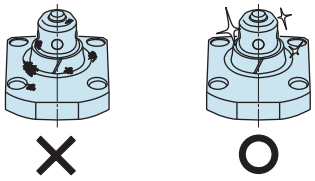
Maintenance and Inspection

1) Removal of the Machine and Shut-off of Pressure Source
- Before the machine is removed, make sure that safety devices and preventive 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 abnormality 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 and fluid leakage.



3) Please clean out the reference surfaces on a regular basis (taper reference surface and seating surface) of the locating products. (VS/VT/VFL/VFM/VFJ/VFK/WVS/VWM/VWK/VX/VXE/VXF)
- The locating products, except VX/VXE/VXF model, can remove contaminants with cleaning functions. However, hardened cutting chips, adhesive coolant and others may not be removed. Make sure there are no contaminants before installing a workpiece/pallet.
- Continuous use with contaminant on components will lead to locating accuracy failure, malfunction and fluid leakage.



4) If disconnecting by couplers, air bleeding should be carried out on a regular basis to avoid air mixed in the circuit.

5) Regularly tighten nut, bolt, pin, cylinder, pipe line and others to ensure proper use.

6) Make sure the hydraulic fluid has not deteriorated.

7) 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.

8) The products should be stored in the cool and dark place without direct sunshine or moisture.

9) 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 If the product is used while it is not suitable for use based on the operator's judgment, resulting in defect.
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.
⑦ 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.

Sales Offices

Sales Offices across the World

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United States of America SUBSIDIARY KOSMEK (USA) LTD.	**TEL. +1-630-620-7650**	FAX. +1-630-620-9015 650 Springer Drive, Lombard, IL 60148 USA
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EUROPE SUBSIDIARY KOSMEK EUROPE GmbH	**TEL. +43-463-287587**	FAX. +43-463-287587-20 Schleppeplatz 2 9020 Klagenfurt am Wörthersee Austria
CHINA KOSMEK (CHINA) LTD. 考世美(上海)貿易有限公司	**TEL. +86-21-54253000**	FAX. +86-21-54253709 Room601, RIVERSIDE PYRAMID No.55, Lane21, Pusan Rd, Pudong Shanghai 200125, China 中国上海市浦东新区浦三路21弄55号银亿滨江中心601室 200125
INDIA BRANCH OFFICE KOSMEK LTD - INDIA	**TEL. +91-9880561695**	F 203, Level-2, First Floor, Prestige Center Point, Cunningham Road, Bangalore -560052 India
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INDONESIA (Indonesia Exclusive Distributor) PT. Yamata Machinery	**TEL. +62-21-29628607**	FAX. +62-21-29628608 Delta Commercial Park I, Jl. Kenari Raya B-08, Desa Jayamukti, Kec. Cikarang Pusat Kab. Bekasi 17530 Indonesia

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Nagoya Sales Office	**TEL. 0566-74-8778**	FAX. 0566-74-8808 〒446-0076　愛知県安城市美園町2丁目10番地1
Fukuoka Sales Office	**TEL. 092-433-0424**	FAX. 092-433-0426 〒812-0006　福岡県福岡市博多区上牟田1丁目8-10-101

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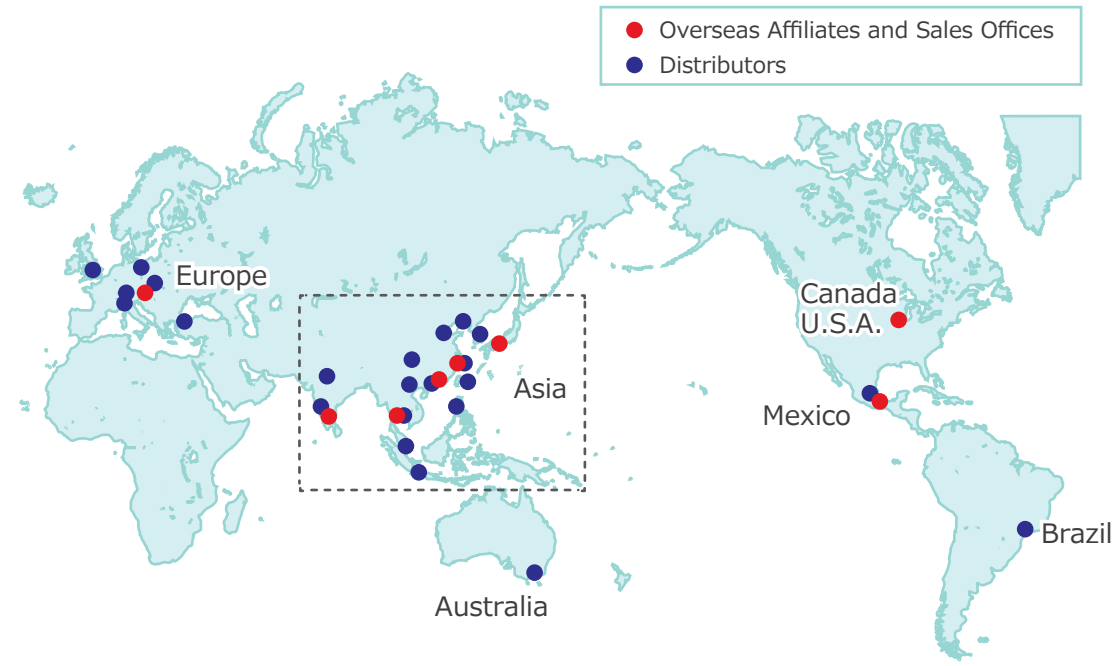

Asia Detailed Map

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