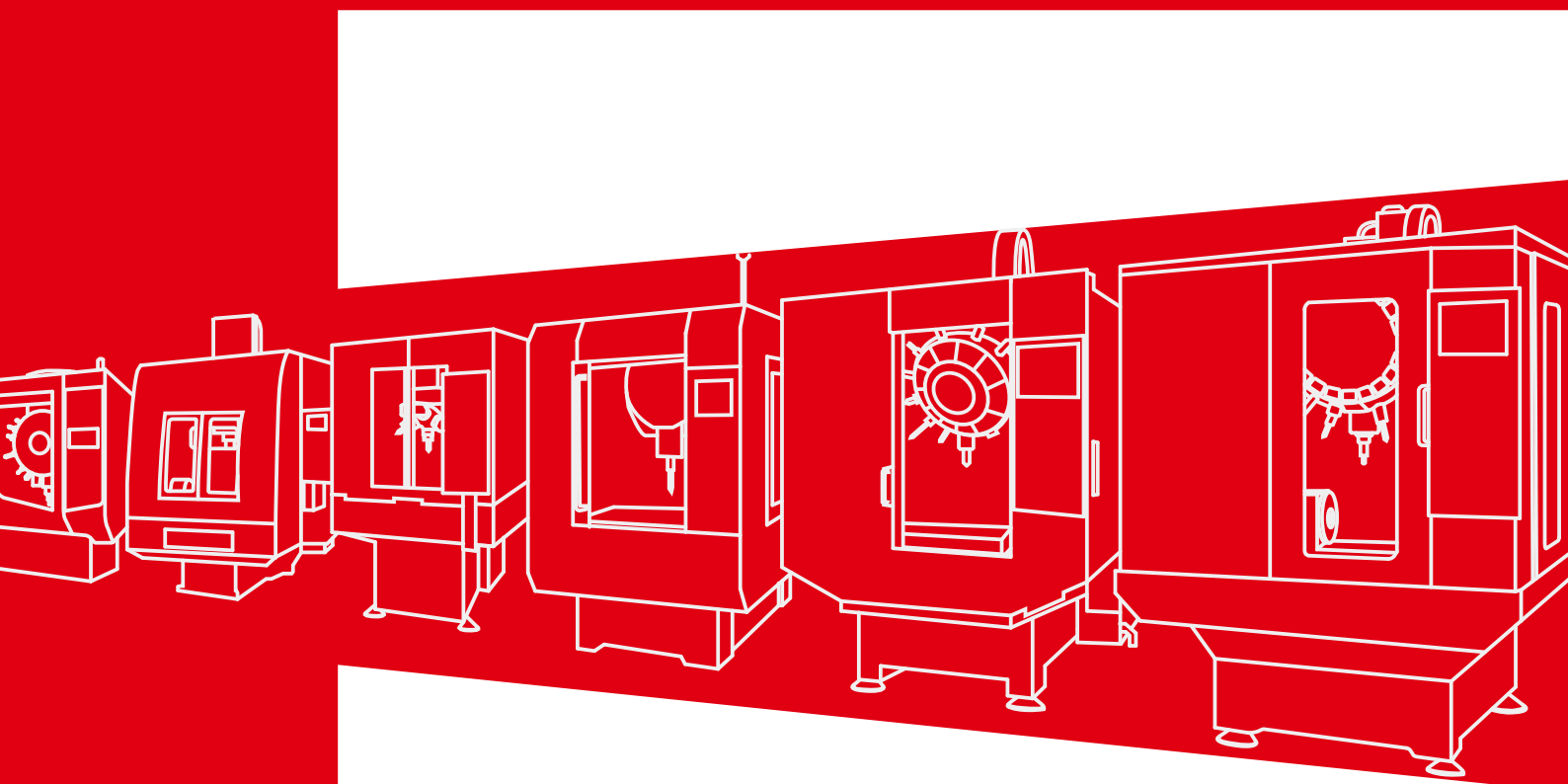


# *High-Power Clamp BEV parts Machining Examples*



Suitable for BT30 Machining Centers

*Energy-saving Machining*  
**Over 200,000 units sold !**

# Wedge HYBRID System using Mechanical Lock and **KOSMEK Exclusive High-**

**High-Power Pneumatic Clamp, Suitable for**

**High-Power Pneumatic Clamp is the solution**



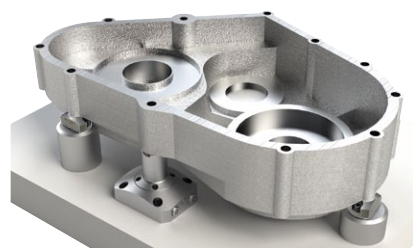
## High quality machining with pneumatic clamp

Clamping force equivalent to hydraulics.  
Powerful holding force prevents deformation.  
P.3



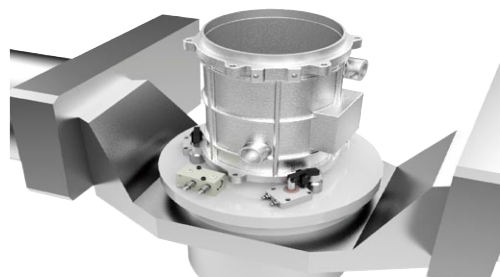
## Prevents deformation of light /thin workpiece

Prevents chattering and deformation.  
Enables machining of thin workpieces with high accuracy.  
P.7



## High-accuracy locating prevents locating errors

Expansion locating pin enables high-accuracy locating  
of workpieces and smooth loading/unloading.  
P.9



## 5-axis machining by pressure holding

KOSMEK Air Non-Leak system can maintain air pressure  
improves machine utilization by reducing the number  
of ports and outside setup.  
P.11

# Air Pneumatic Pressure **Power Pneumatic Clamp !**

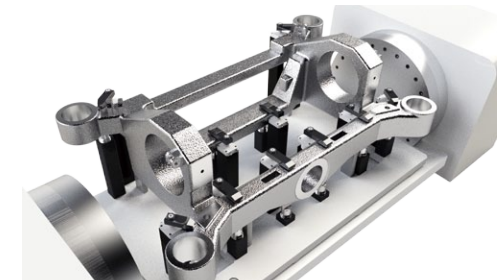


**EV / BEV Machining • Carbon Neutrality**



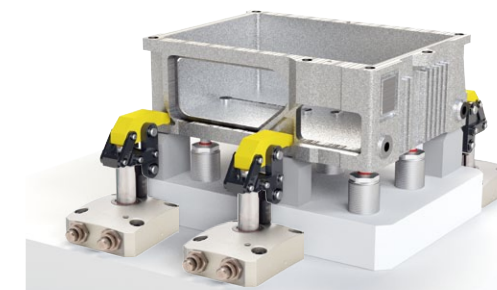
## Process integration / Minimum setup

Achieves 5-face machining by clamping the hole at the  
bottom of the workpiece. Tool's projecting length can  
be minimized.  
P.13



## Enables multiple workpieces

Enables multiple workpiece production by quick  
change pallet clamps.  
P.15



## Clamps difficult shape part

Approaching a workpiece from large amount of  
retraction.  
P.17



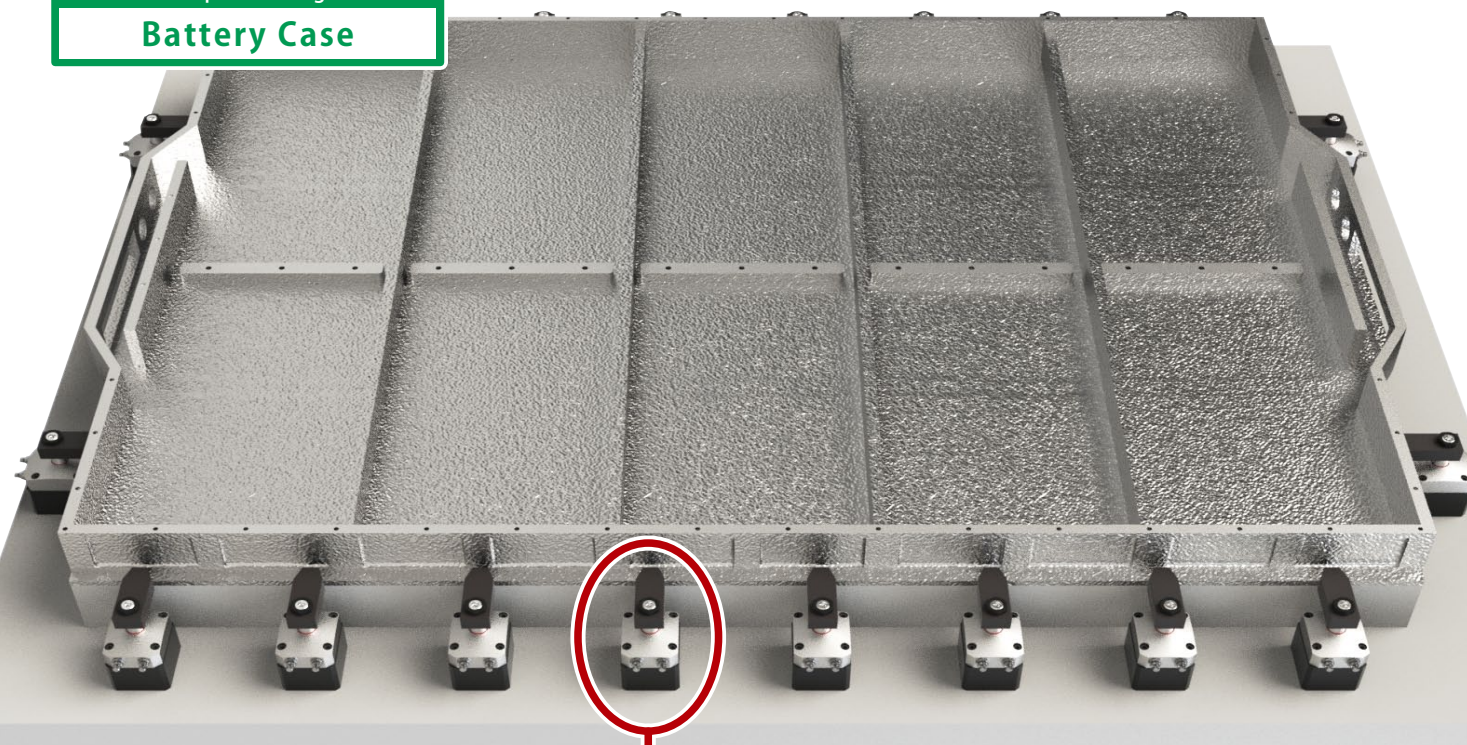
## Advantages of High-Power Pneumatic Series

Examples of replacement of hydraulic clamps with  
high-power pneumatic clamps.  
P.19



**Enables machining with Air**  
**Powerful holding force with Mechanical Locking**

Workpiece Image  
**Battery Case**

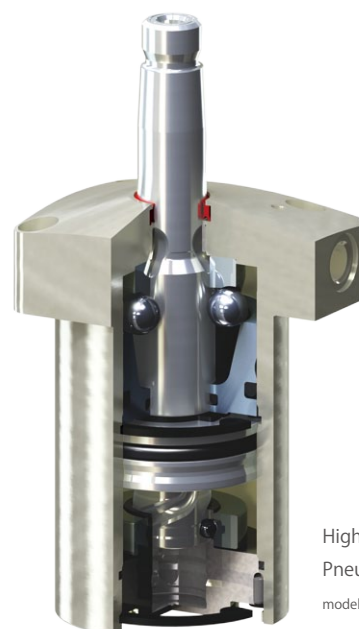


High-Power Pneumatic Swing Clamp/Link Clamp

model **WHE / WCE**

High clamping force with pneumatic and mechanical lock system.

Stronger holding force with mechanical lock clamping force.

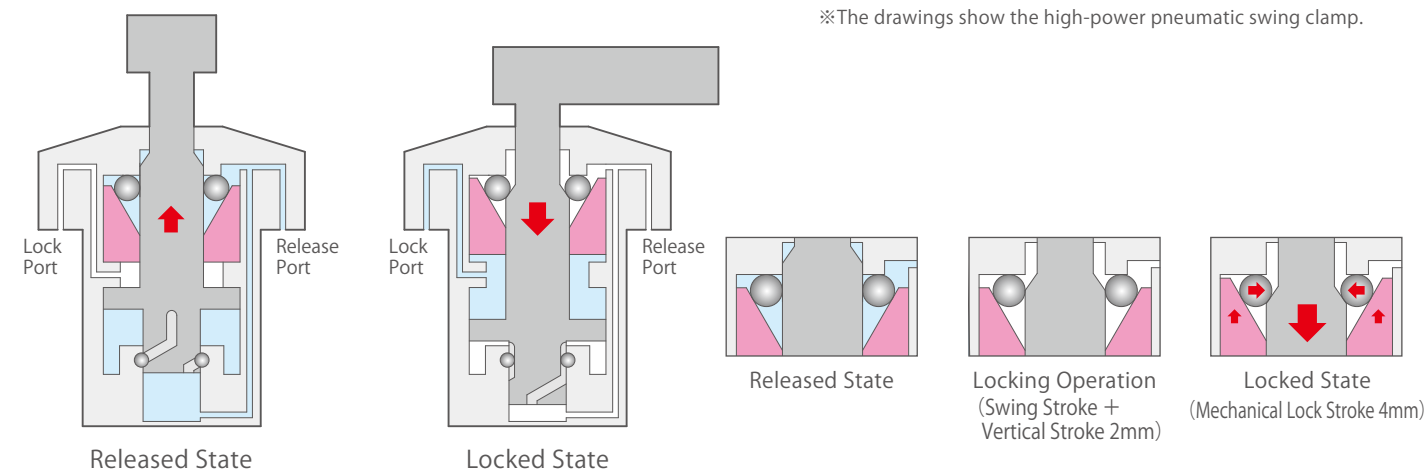


High-Power  
Pneumatic Swing Clamp  
model WHE

**HYBRID** System using  
Wedge  
**Mechanical Lock** and  
Air Oil  
**Pneumatic / Hydraulic**

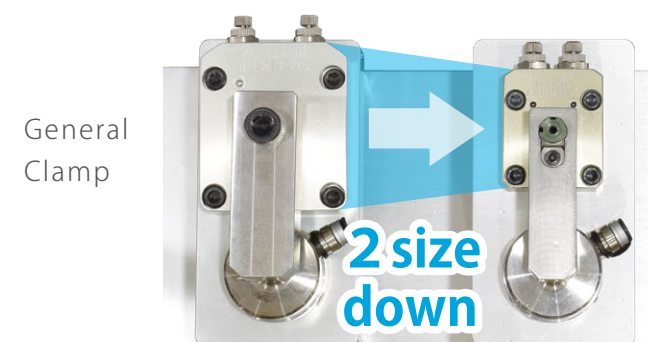
**High-Power Clamp with Mechanical Locking System** PAT.

※The drawings show the high-power pneumatic swing clamp.



**Smaller Footprint**

Smaller cylinders allow for more compact fixtures.  
Exerts approximately 3 times higher clamping force  
than the same size comparison cylinder.

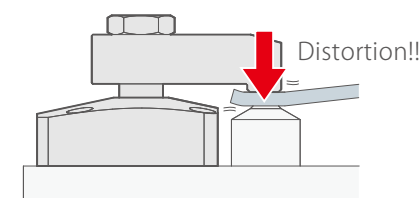


**High-Power Clamp**

The downsized clamp exerts  
the equivalent force to the general clamp.

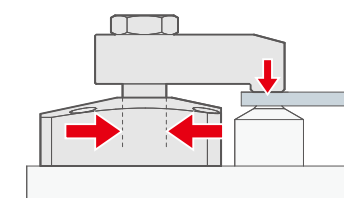
**High Quality**

Optimum clamping force does not distort workpiece  
and holding force is strong enough to withstand  
machining loads, allowing for high quality machining.



**General Clamp :**

The workpiece is distorted  
due to strong clamping force.



**High-Power Clamp :**

Clamping force is lowered, yet  
the workpiece is supported by holding force.

**Backside Machining**

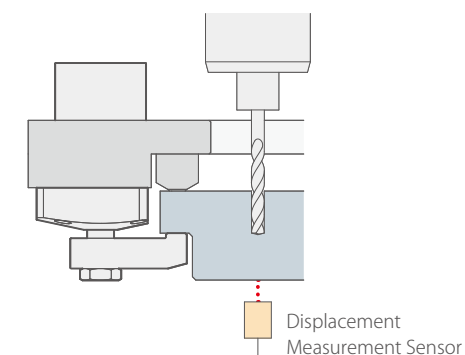
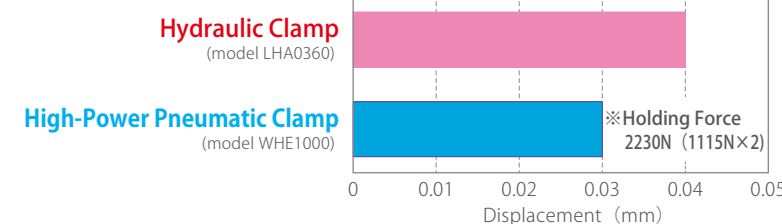
Holding force, more powerful than clamping force,  
enables backside machining with high speed.

Displacement

※ Machining results  
by our own.

【 Machining Condition 】

|                      |         |                |               |
|----------------------|---------|----------------|---------------|
| Drill Diameter       | 8.5 mm  | Cutting Speed  | 25 m/min      |
| Main Axis Revolution | 936 rpm | Feed Speed     | 0.100mm/rev   |
| Workpiece Material   | S45C    | Clamping Force | 860N (430N×2) |

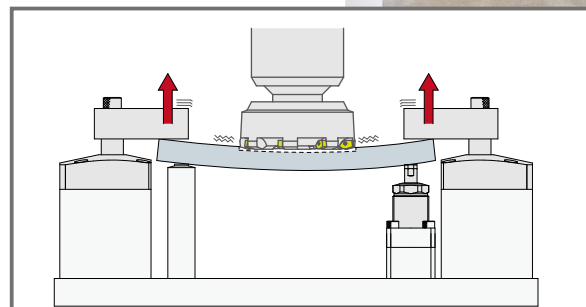


Displacement  
Measurement Sensor

# No Chattering on Aluminum

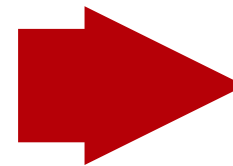
**Great Difference Shown by  
the Actual Machining Tests**

**Unable to Machine  
due to Chattering**

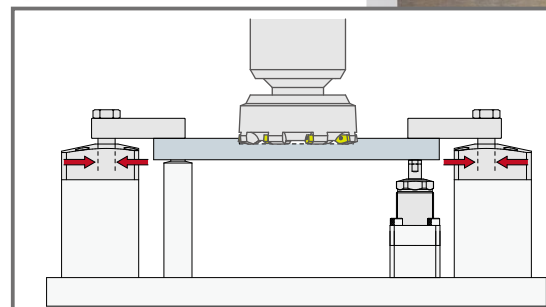


Unable to withstand reaction force.

Unable to Machine with  
General Swing Clamp



**Properly Machined  
with No Chattering**

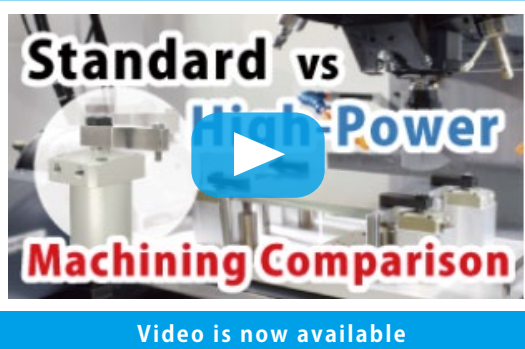


Holding force withstands reaction force

Able to Machine with  
**High-Power Swing Clamp**



Results of testing by our own.



Machining example video is available on our website.

High-Power Pneumatic Swing

Search

Video Title

【Machining Comparison】 High-Power Pneumatic Swing Clamp vs Standard Pneumatic Clamp

[https://www.kosmek.co.jp/php\\_file/video\\_products.php?id=060&lang=2](https://www.kosmek.co.jp/php_file/video_products.php?id=060&lang=2)



## Clamping Conditions

| Model No. / Product Name                               | Clamping Force | Holding Force  | Supply Pressure |
|--|----------------|----------------|-----------------|
| <b>WHE0600 × 4</b><br>High-Power Pneumatic Swing Clamp | 1,190 N        | <b>3,670 N</b> | 0.29MPa         |
| <b>WHA0400 × 4</b><br>Pneumatic Swing Clamp            |                | -              | 0.32 MPa        |

## Machining Conditions

| Tool Diameter | Workpiece Material  | Infeed (Depth) | Coolant                | Feed Speed |
|---------------|---------------------|----------------|------------------------|------------|
| 80mm          | Aluminum<br>(A5052) | 3mm            | Yes<br>(Water Soluble) | 896mm/rev  |

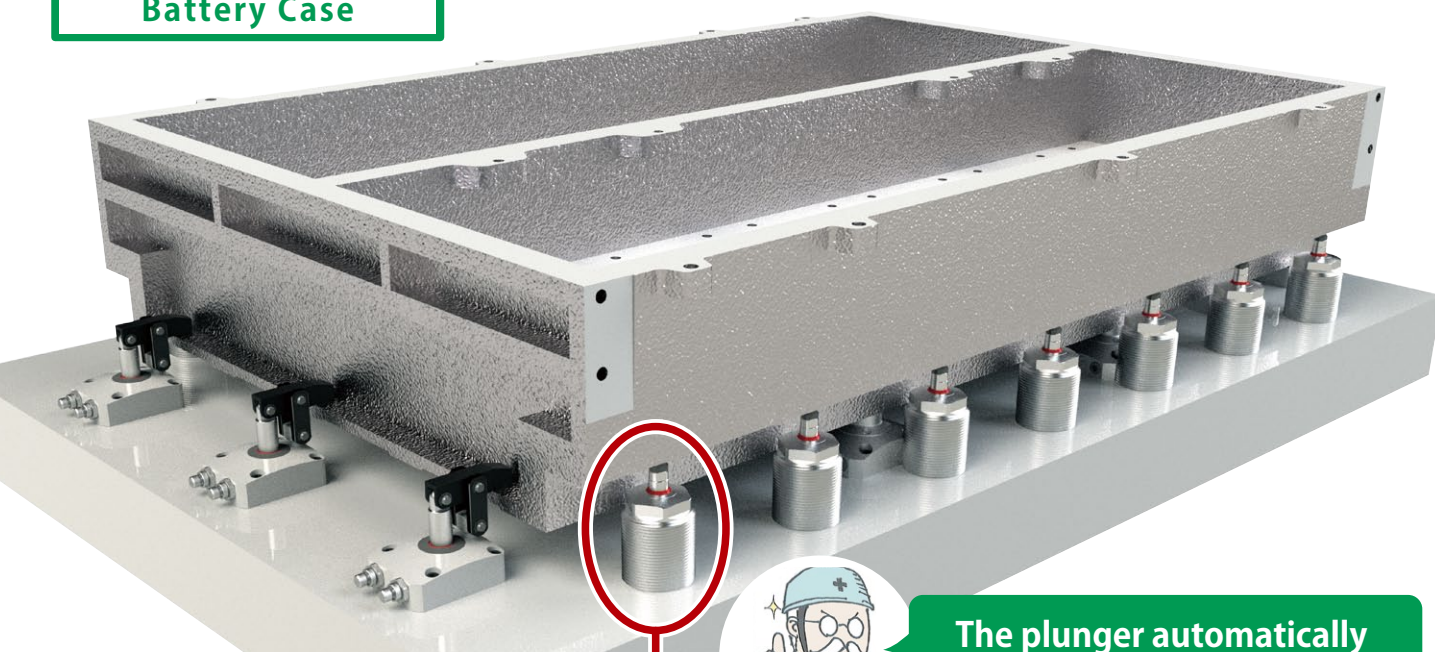


# High-Power Pneumatic Work Support

The prevention of chattering and deformation improves accuracy.

Workpiece Image

Battery Case



The plunger automatically stops when it touches the workpiece.



## High-Power Pneumatic Work Support

model **WNC**

Strong support force that is equivalent to hydraulic pressure prevents chattering and deformation during workpiece machining.

The work support has been improved for environmental resistance:

Exclusive Scraper for excellent draining of cutting chips.

Knockout Function to release adherence that ensures highly reliable operation.



Machining example video is available on our website.

Chattering Prevention Effect

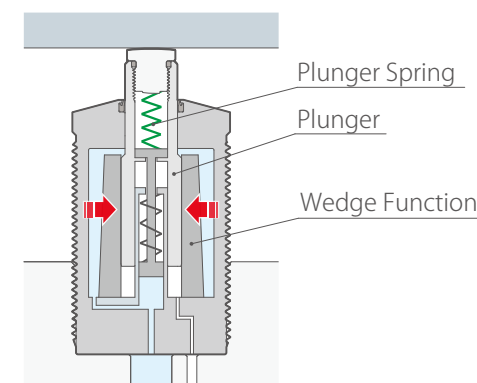
Search

Video Title : Chattering Prevention Effect by Work Support

[https://www.kosmek.co.jp/php\\_file/video\\_products.php?id=057&lang=2](https://www.kosmek.co.jp/php_file/video_products.php?id=057&lang=2)

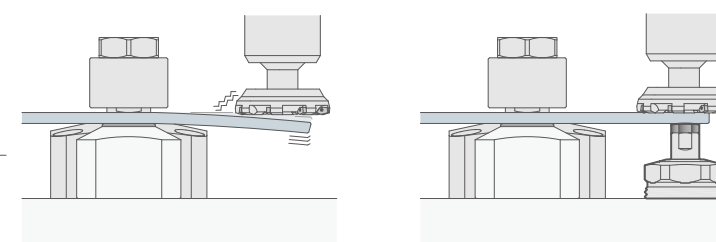


## Chattering Prevention



< Internal Action Image >

After the plunger touches the workpiece with slight spring force, it is locked tightly with the wedge function, preventing chattering and deformation of the workpiece.

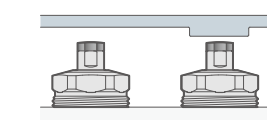
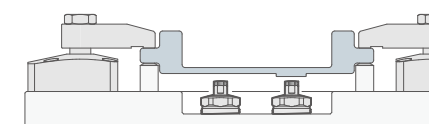
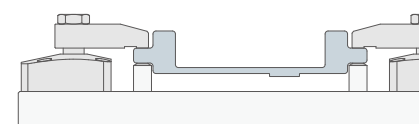


Chattering

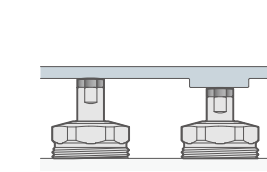
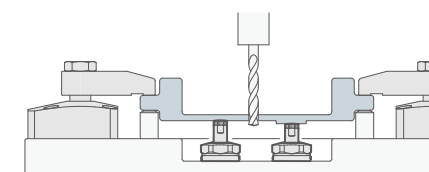
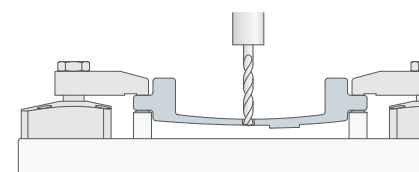
No Chattering!!

## Deformation Prevention

Plunger is locked where it touches the workpiece within the stroke range.



Before plunger is lifted up



Locked after touching workpiece

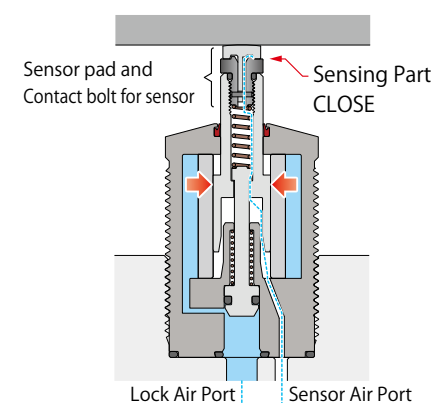
Without Work Support

With Work Support

Bending

No Bending!!

## Action Confirmation



Pressure Sensor ON

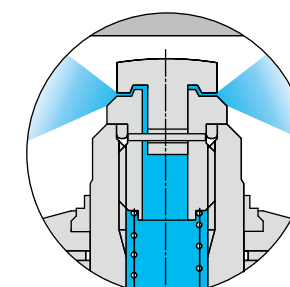
Air Sensor ON

Options

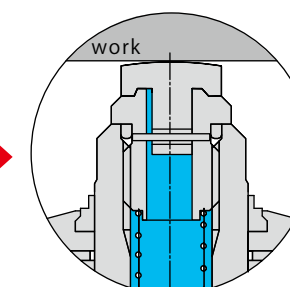
**Air Sensing Option** ※An air sensor is required.

The sensing part opens and closes when the plunger touches the workpiece, allowing for plunger advance action confirmation.

Highly reliable action confirmation function suitable for automation.



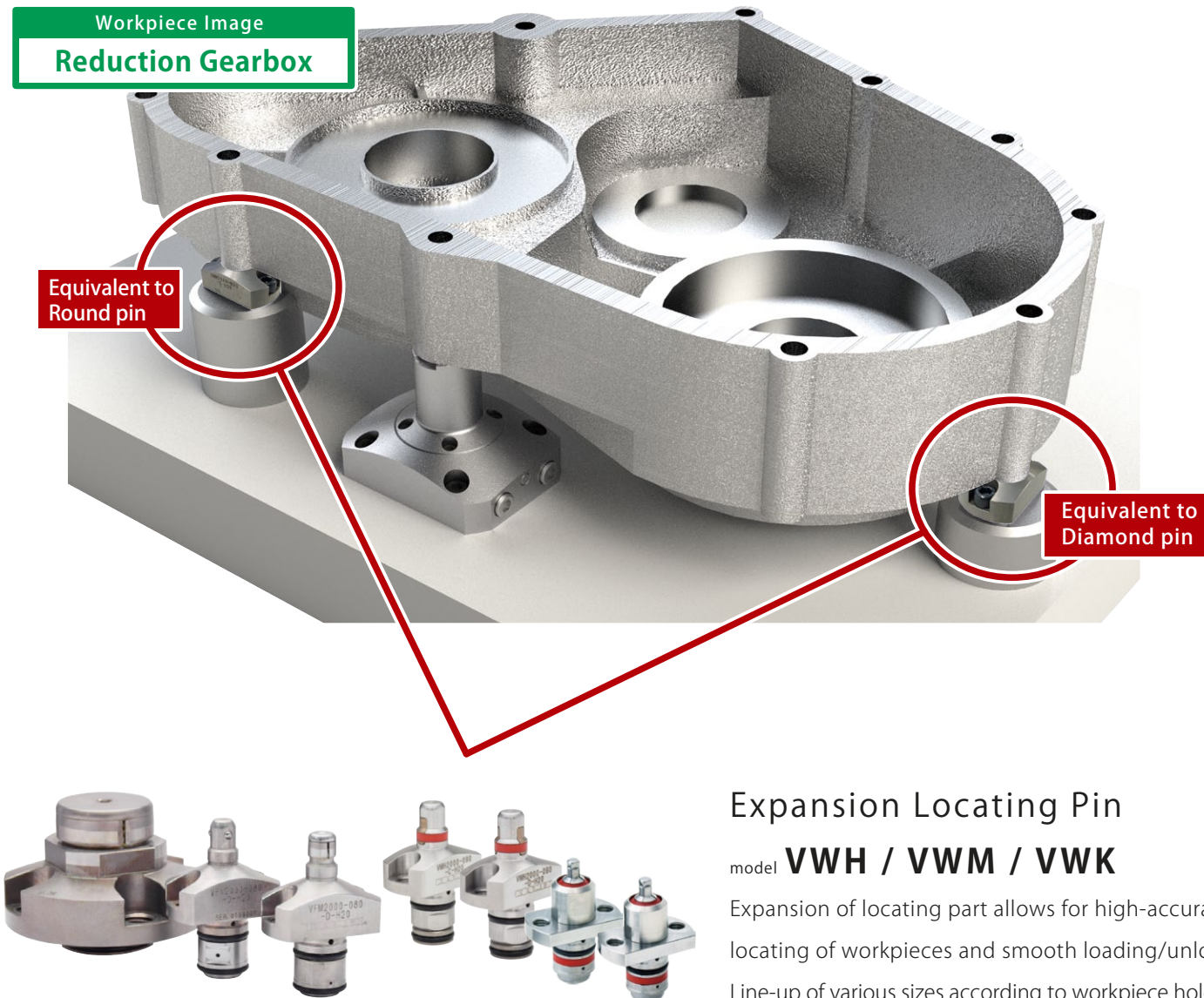
Sensing OPEN (OFF)



Sensing CLOSE (ON)



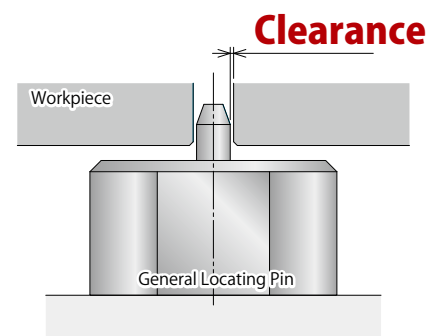
**High-Accuracy expansion locating pin  
Improves workpiece machine quality.**



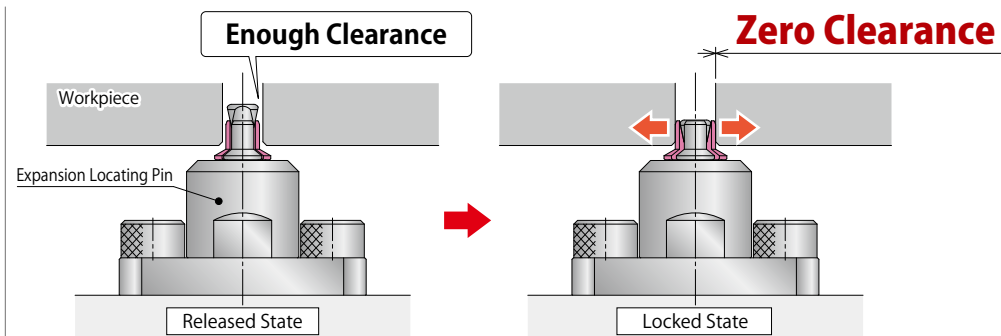
### Expansion Locating Pin

model **VWH / VWM / VWK**

Expansion of locating part allows for high-accuracy locating of workpieces and smooth loading/unloading.  
Line-up of various sizes according to workpiece hole diameters.



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



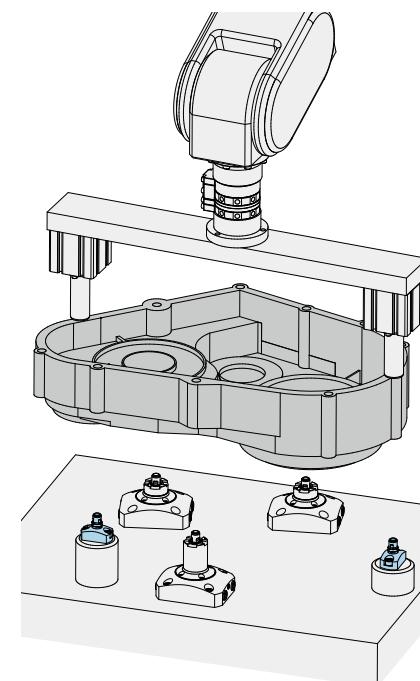
**Expansion locating pin has zero clearance!!**

When expanded : Clearance between the pin and reference hole becomes zero to locate with high accuracy.

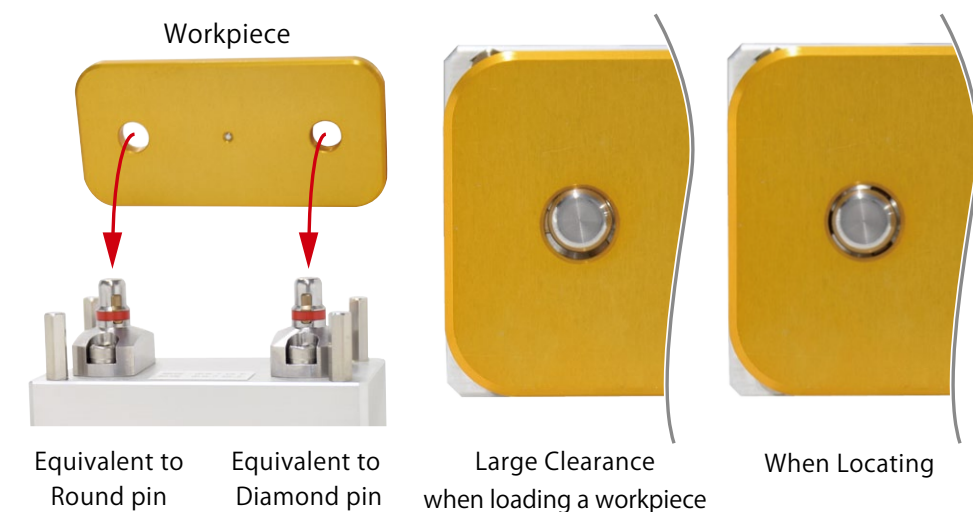
When released : Easy to load/unload workpieces with enough clearance.

# Expansion Locating Pin with The World's Smallest Diameter

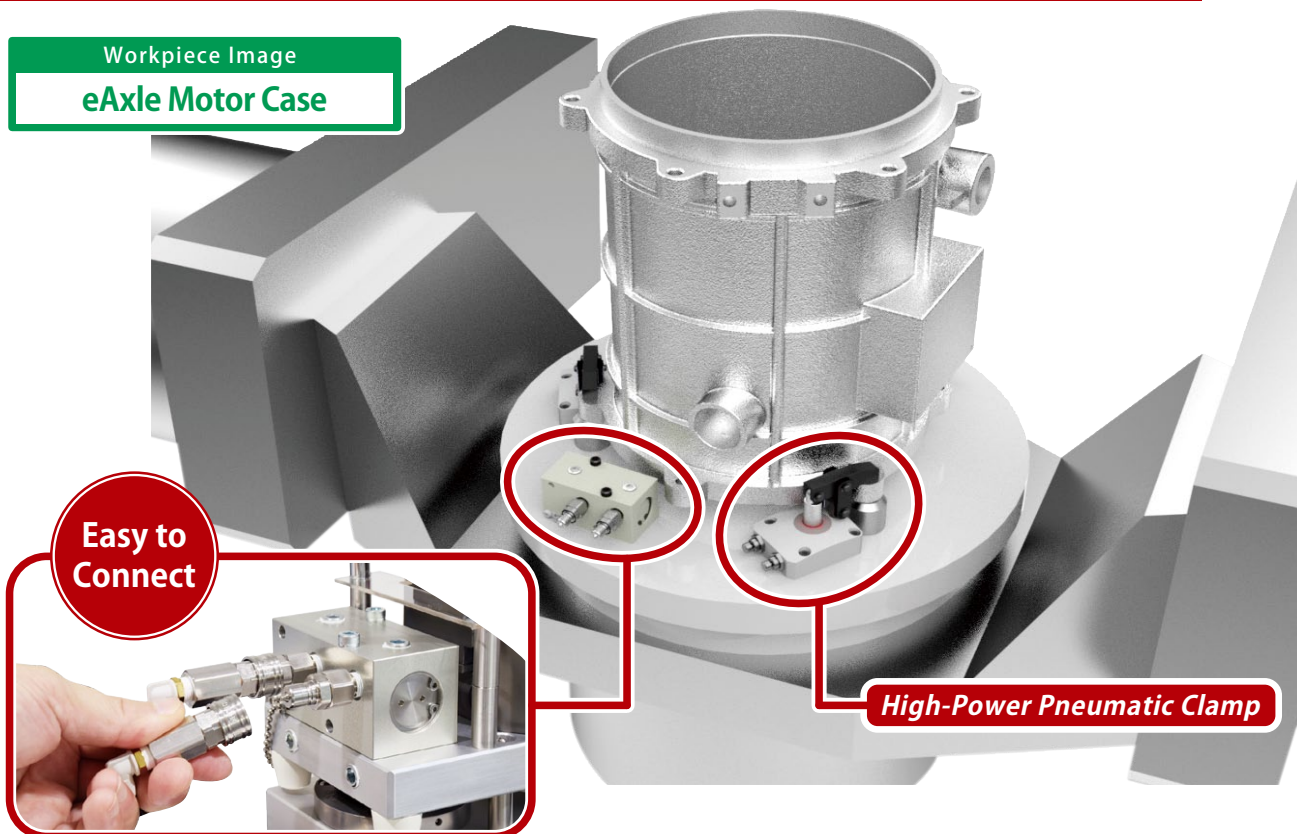
|                          | High Accuracy Model<br>model <b>VWM</b>                           | Large Expansion Model<br>model <b>VWH</b>                                     | Casting Material Model<br>model <b>VWK</b>  |
|--------------------------|---|---|---|
| Locating Repeatability   | 3 $\mu$ m   | VWH1000 : 30 $\mu$ m<br>VWH2000/3000 : 10 $\mu$ m                             | 10 $\mu$ m  |
| Control Method           | Double Action<br>(Air+Spring Lock / Air Release)                  | Double Action<br>(Air Lock / Air Release)                                     | Double Action<br>(Air Lock / Air Release)   |
| Workpiece Hole Diam.(mm) | $\phi 8 \sim \phi 30$   | <b>NEW</b> $\phi 5$ 、 $\phi 6$ 、 $\phi 7$ 、 $\phi 8$<br>$\phi 9 \sim \phi 15$ | <b>NEW</b> $\phi 5.7 \sim 6.6$ , $\phi 6.7 \sim 7.6$<br>$\phi 7.6 \sim \phi 16.2$ |
| Action Description       | The taper sleeve expands.<br><br>Released State      Locked State | Large Gripper Expansion<br><br>Released State      Locked State               | The steel balls come out from the pin.<br><br>Released State      Locked State    |



**model VWH is suitable for automatic loading and unloading with large clearance.**



## Maintain pressure with Air Non-Leak Valve. Solution for limited ports.



### Air Non-Leak Valve

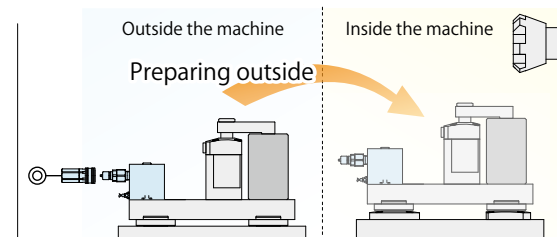
### Air Double-Acting

#### model **BWQ**

Pilot Check Valve with Air Non-Leak\* Function.

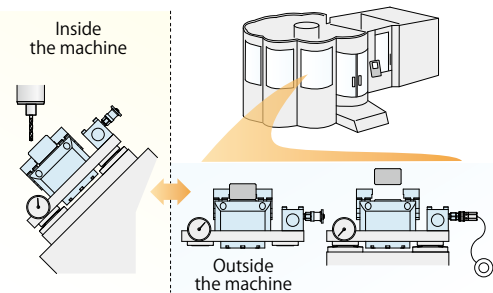
A2 port (outgoing lock air) maintains air pressure even after disconnected from the air source unless air is provided to B1 port (release port).

※ "Air Non-Leak" means that the outgoing A2 port has pressure maintaining ability for more than 24 hours (under constant temperature).

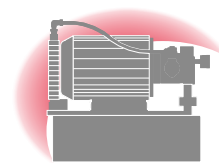


Setup Outside the Machine  
Improves Machine Up Time

Reduce the Number of  
Circuits in the Machine



Outside Setup by Disconnecting  
Air of APC, Pallet Pooling, etc.



No Hydraulic Use  
Energy-Saving



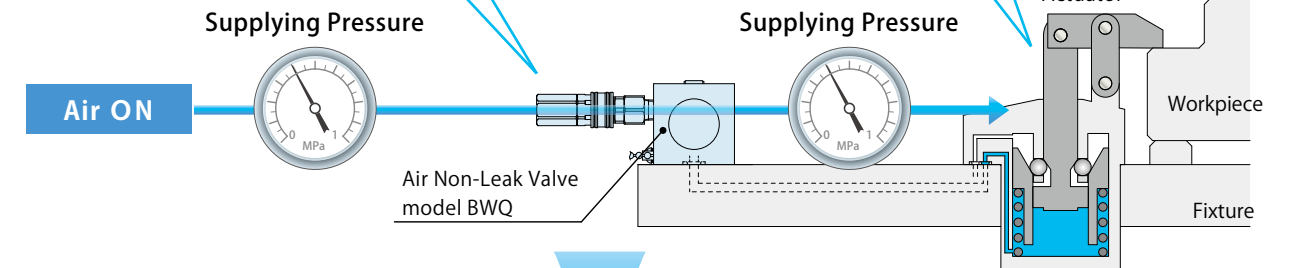
Easy to  
Connect



Best for the Use with  
High-Power Pneumatic Clamp !

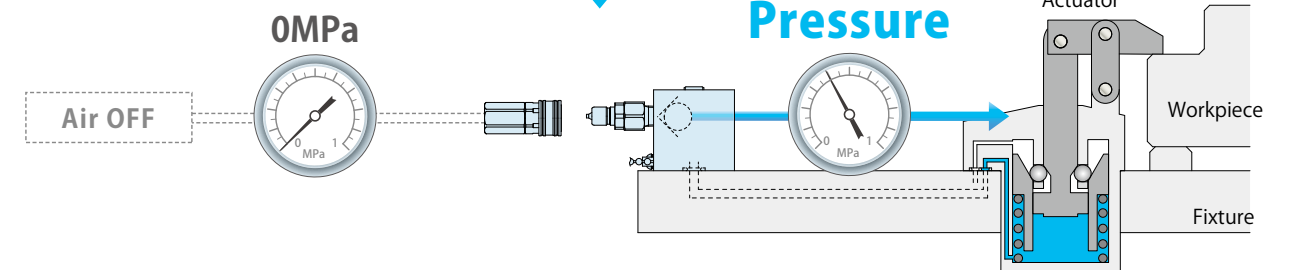
Equal machining force as hydraulic fixture.

【Connected State】



Holds the pressure even after the coupler is disconnected.

【Pressure Holding State (Disconnected)】



### Notes for Usage (BWQ)

1. "Air Non-Leak" means that a single BWQ unit (A2 port) has pressure maintaining ability for more than 24 hours (under constant temperature). This cannot be used in equipment that requires the leakage amount level that is confirmed by tracer gas leak testing using helium and hydrogen.
2. After installing parts of pressure maintaining circuit, confirm pressure maintaining by testing leakage at each connecting part using leak checker, etc. (Please install a pressure gauge in the circuit.)
3. When disconnecting the socket of the coupler, make the socket on the both circuits to pressure zero and in an opened state in order to maintain pressure with the check valve built in the body. (Control Valve Example: 5-port 3-position exhaust center)
4. Before disconnecting/connecting the coupler, remove cutting chips and coolant with air blow, etc. Also, install the coupler cover except during disconnecting/connecting operation.
5. Even though this product is equipped with filter, please note that inadequate flushing may result in poor flow performance or malfunction due to clogging of the built-in filter.

### Automatic Connection



### Air Non-Leak Coupler

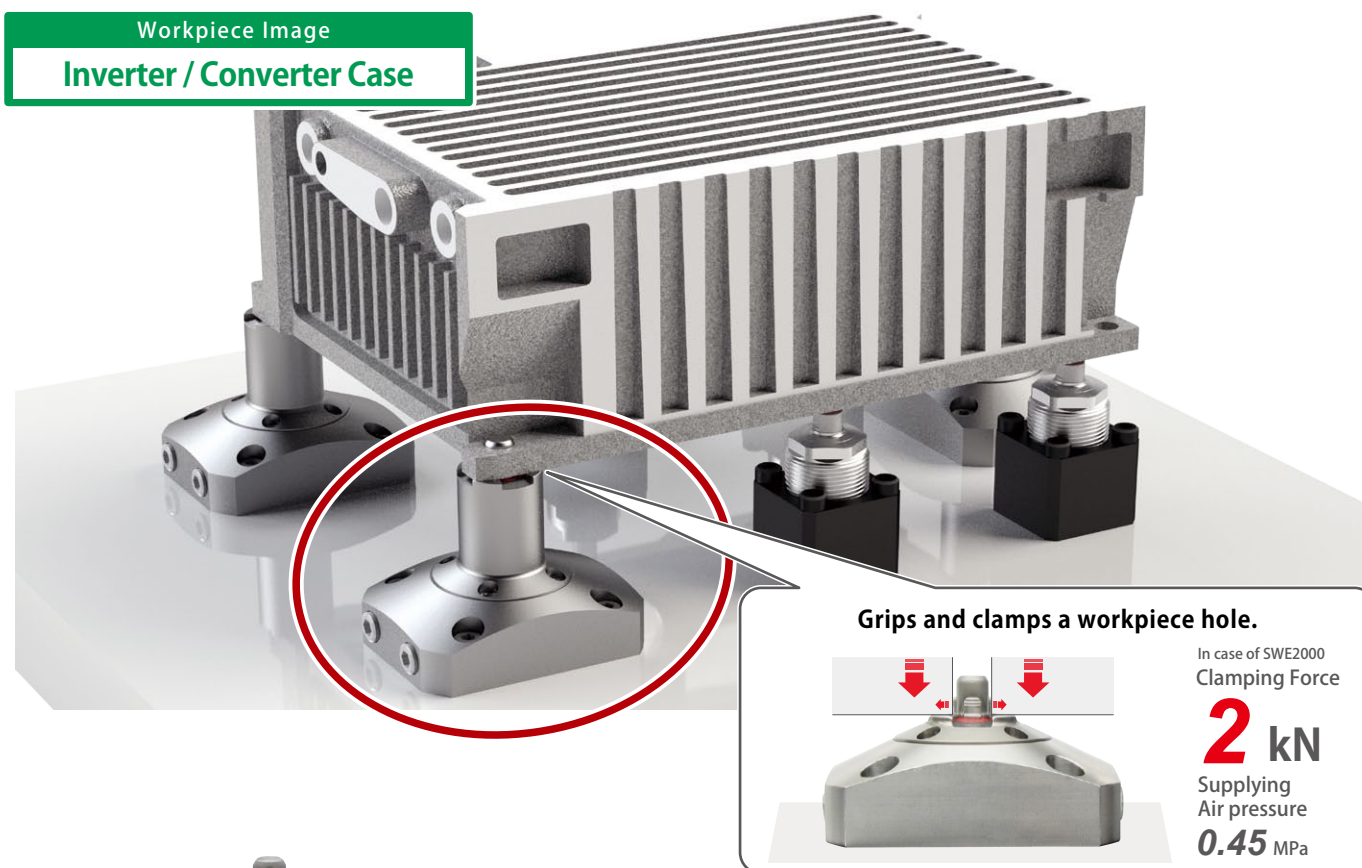
#### model **BWA/BWB**

By connecting and disconnecting under pressure, the BWA port (outgoing lock air) maintains air pressure after disconnected (Air Non-Leak\* Function).

※ "Air Non-Leak" means that the BWA outgoing side has pressure maintaining ability for more than 24 hours (under constant temperature)



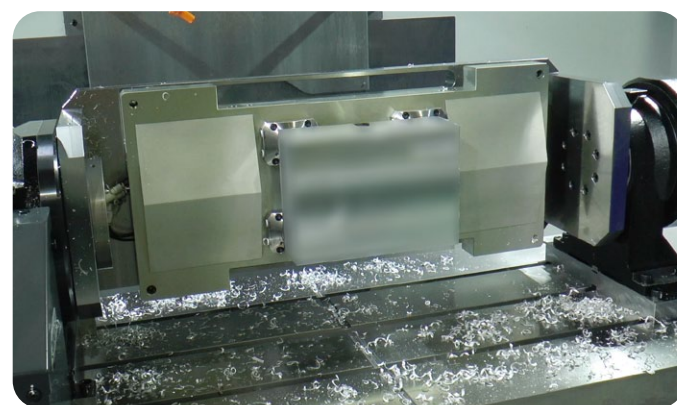
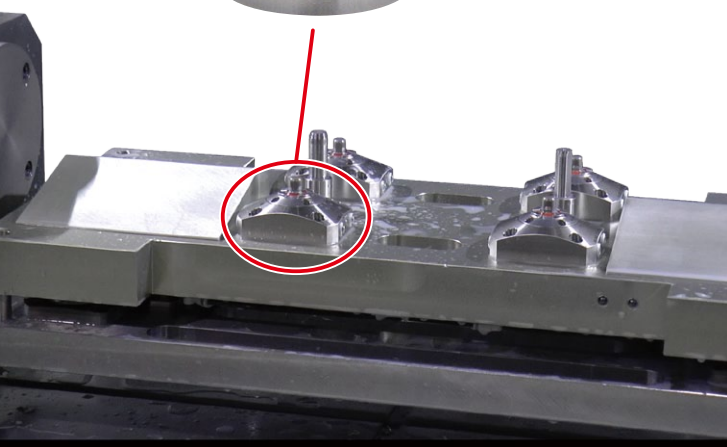
## Zero interference and minimum setup Strong clamping force replaces hydraulics



### High-Power Pneumatic Hole Clamp

model **SWE**

Mechanical lock function allows for powerful clamping force equivalent to hydraulic clamp. By expansion of gripper, pulls and clamps in a workpiece hole. Even when air pressure is at zero, internal spring ensures clamping force.

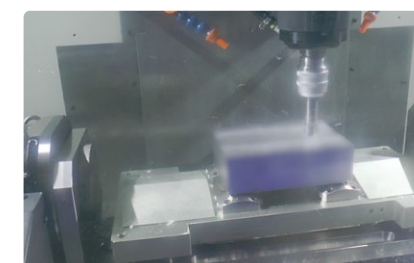


#### Simplifies a Fixture

Less interference allows for workpiece loading with a robot.  
Inclined surface on the flange enables easy flow of cutting chips,  
resulting in less malfunctions caused by piled-up cutting chips.

#### Side-Surface Machining Possible with a Powerful Clamping Force

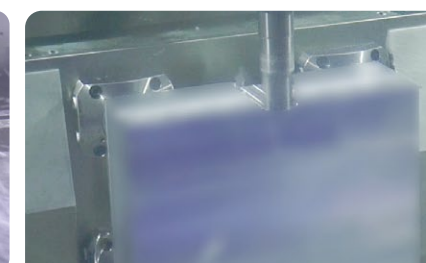
|                      | External Clamp  | Hole Clamp     |
|----------------------|---|----------------|
| <b>Integration</b>   | The number of machinable faces without interference<br><b>3 Faces</b> | <b>5 Faces</b> |
| <b>Automation</b>    | Teaching and designing of transfer equipment<br><b>Difficult</b>      | <b>Easy</b>    |
| <b>Accessibility</b> | Accessibility of machining tool<br><b>Distant</b>                     | <b>Close</b>   |
| <b>Fixture Size</b>  | Table size<br>Equipment size<br><b>Large</b>                          | <b>Compact</b> |



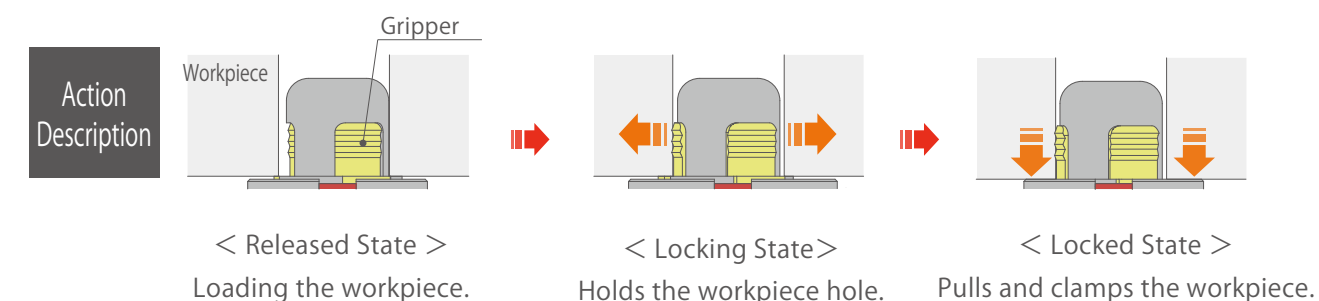
Top Surface Milling



Side Surface Drilling



Side Surface Milling

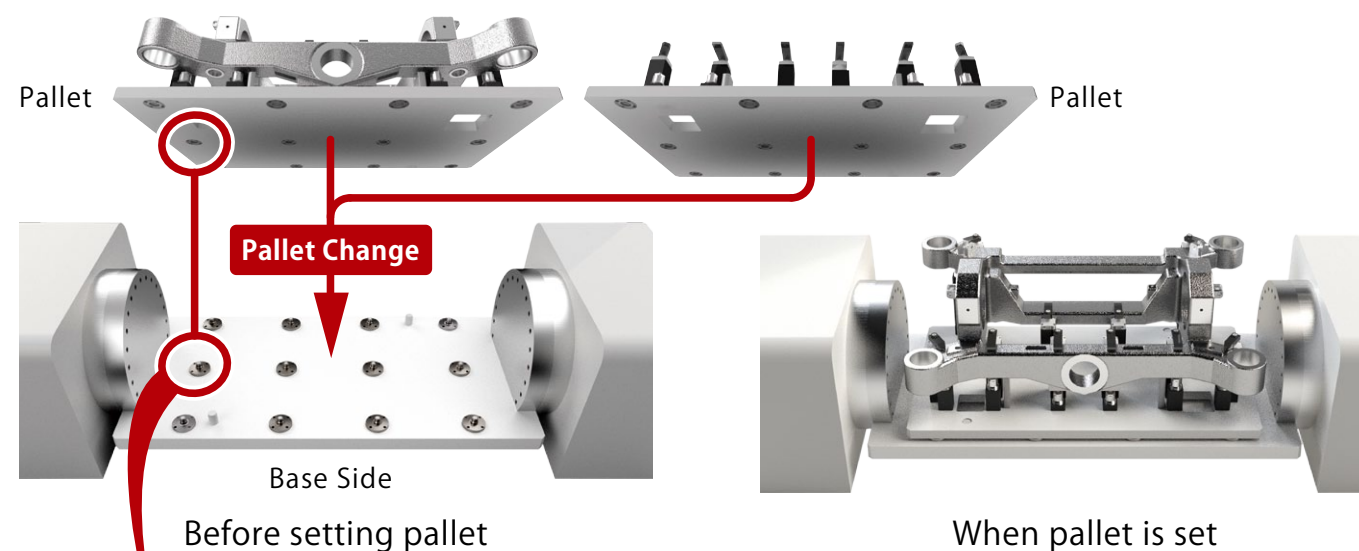
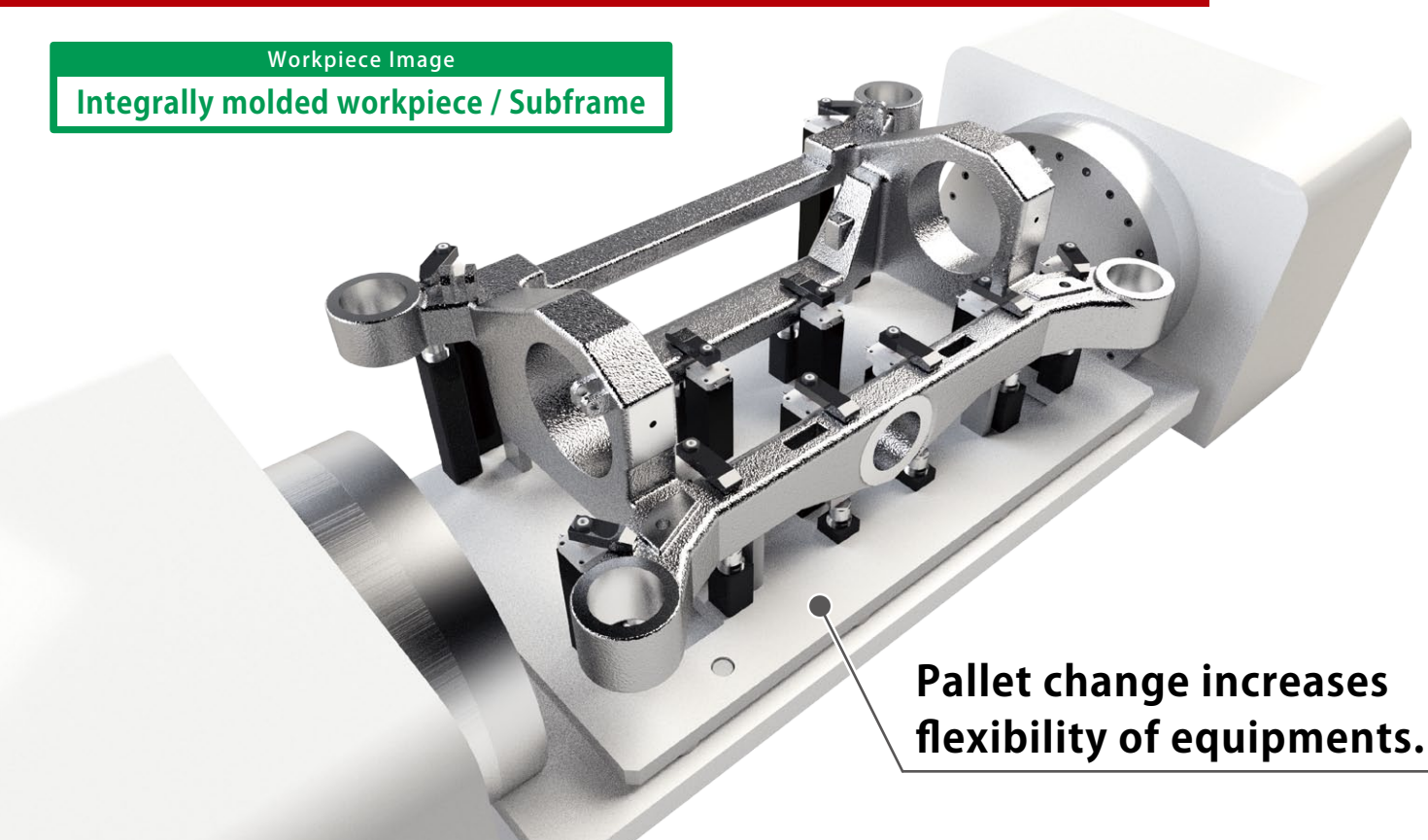




## No additional machines, More workpieces by Changing Pallets.

Workpiece Image

Integrally molded workpiece / Subframe



### High-Power Pneumatic Pallet Clamp

model **WVS**

Locates and clamps simultaneously.

Powerfully locks the fixtures. Locating Repeatability : 3  $\mu$  m.

Drastic setup time reduction for fixture change, pallet transfer, and outside setup.



## Light-Pallet Change Enables Multi-kind Workpieces

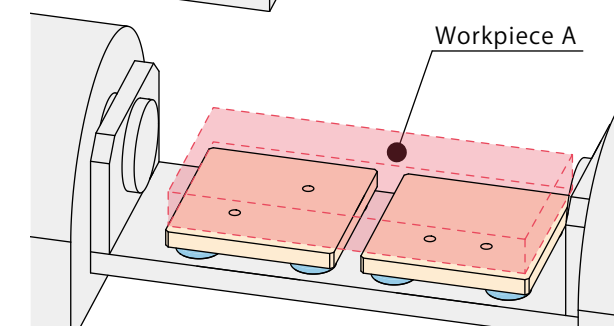
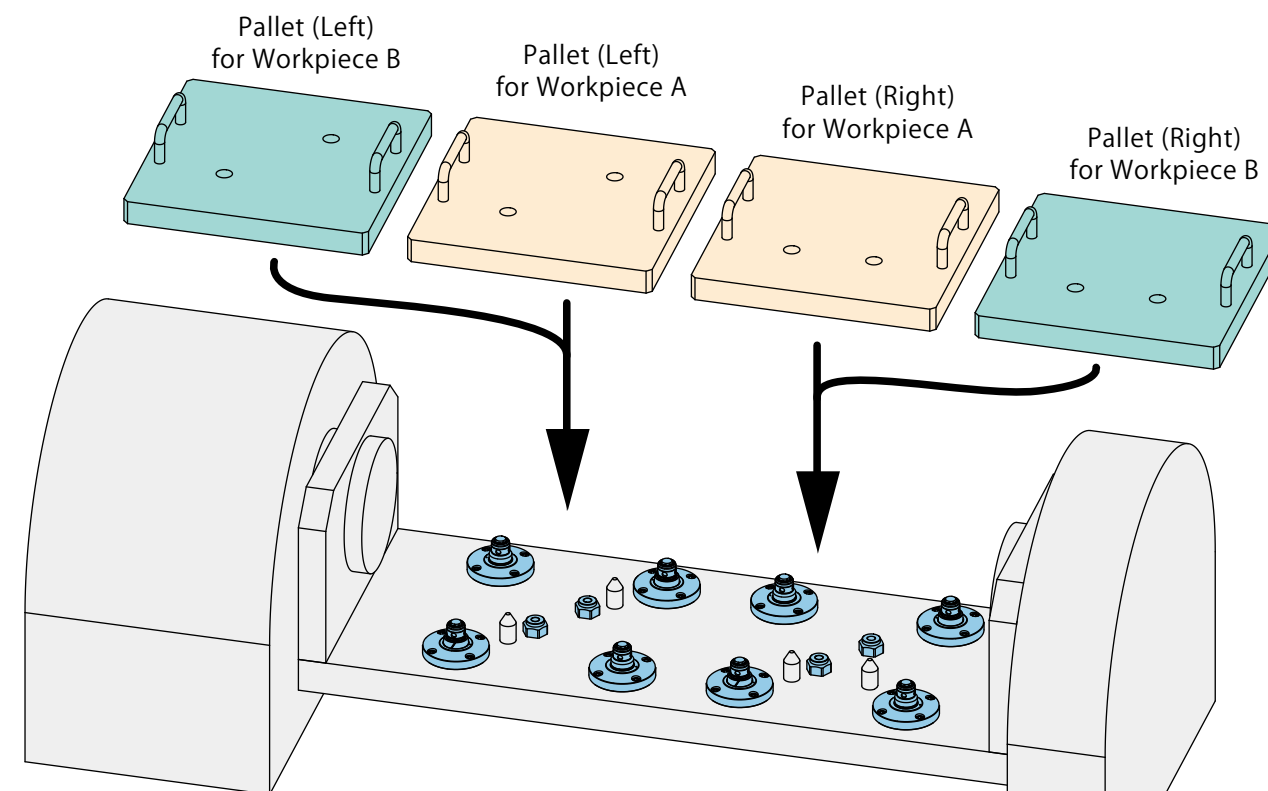
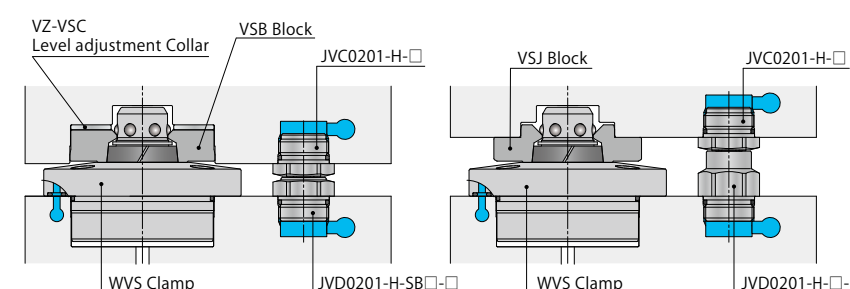
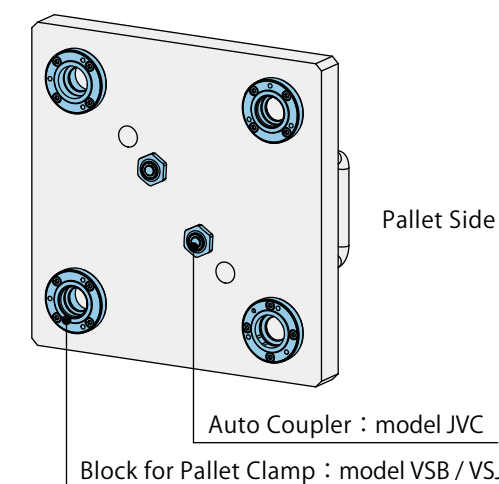
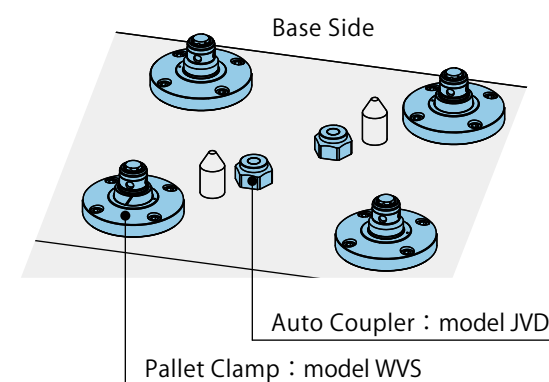


Image : Pallet Setting and Workpiece



Able to supply air pressure to the pallet side by using with Auto Coupler

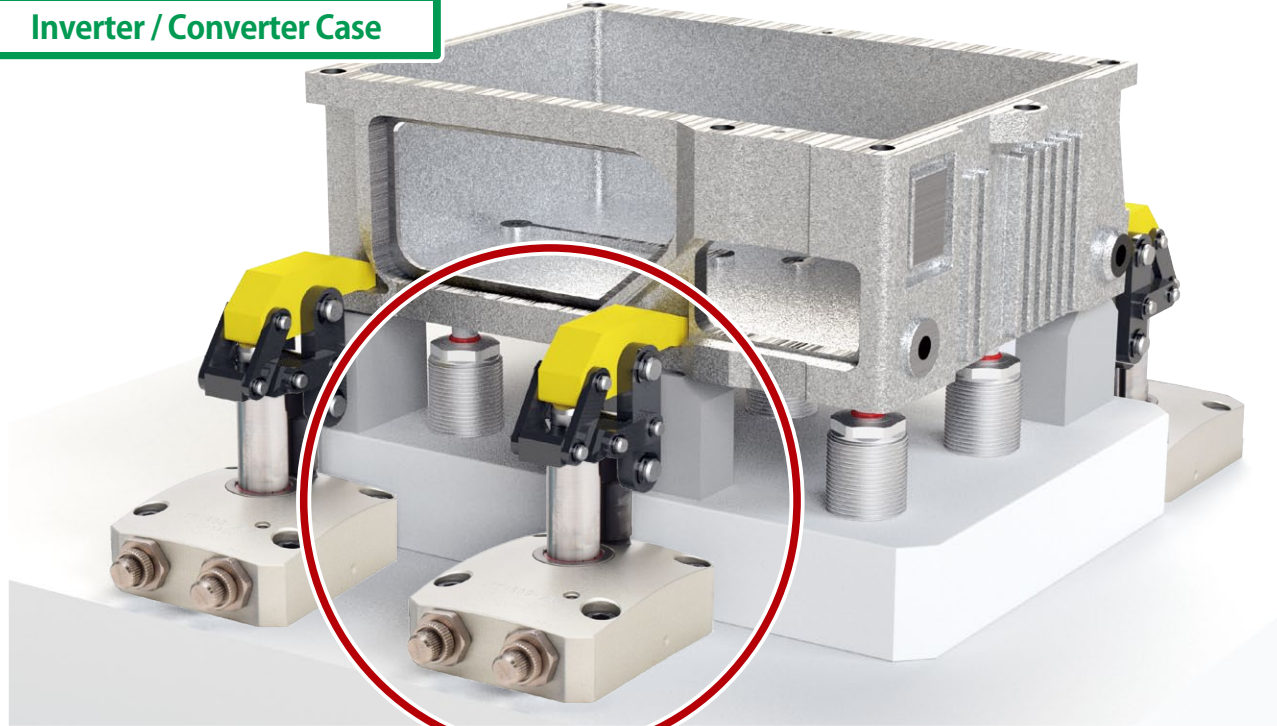


model **JVC/JVD**

**Enables to clamp difficult shape parts.  
Link clamp approaches from large amount of retraction.**

Workpiece Image

Inverter / Converter Case

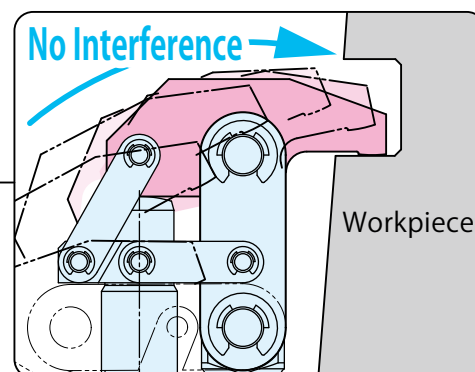
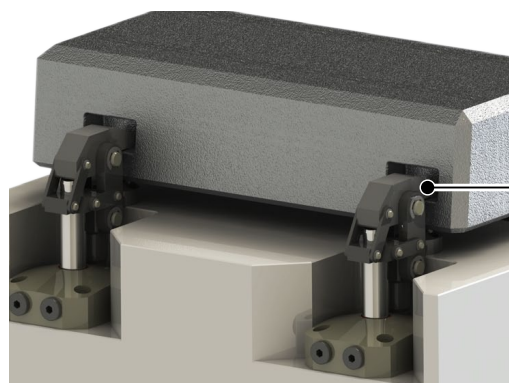


### High-Power Pneumatic Link Clamp -Retracting Model-

model **WFE**

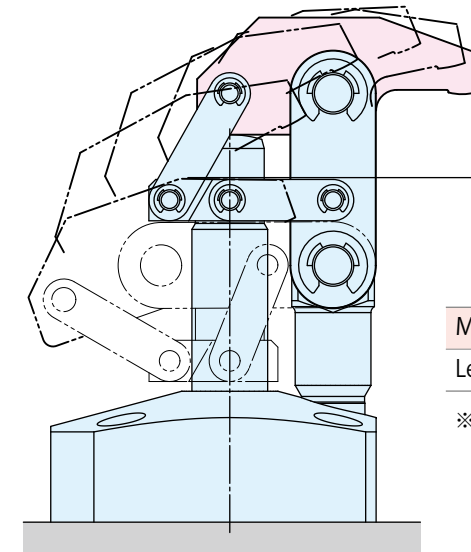
Largely retracted lever avoids interference during workpiece loading/unloading.  
High clamping force with pneumatic and mechanical lock system.  
Stronger holding force with mechanical lock clamping force.

The compact lever-operating range enables to clamp difficult clamping points.



### • Lever Retracted Lower than the Clamping Point

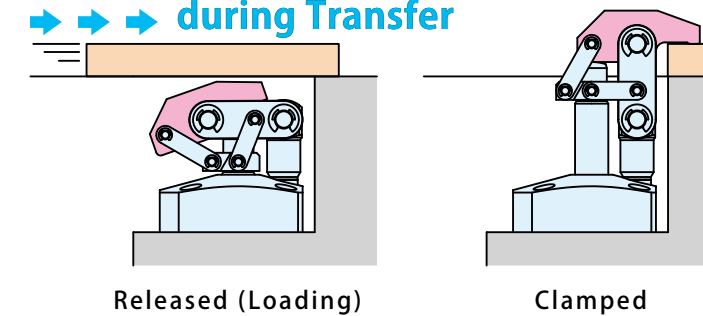
Large lever retraction allows for wide angle of loading and unloading workpieces between operations.



| Model No.           | WFE1600-2□□ | WFE2500-2□□ | WFE4000-2□□ |
|---------------------|-------------|-------------|-------------|
| Lever Retraction mm | 16          | 16          | 24          |

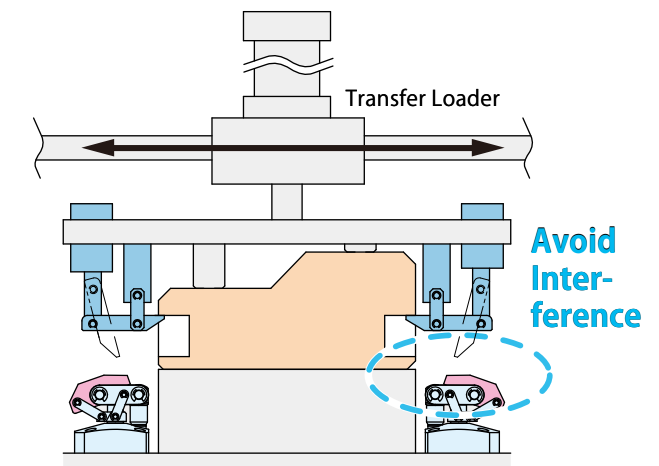
※ It shows the lever retraction when using KOSMEK option lever.

**Avoid Interference  
during Transfer**



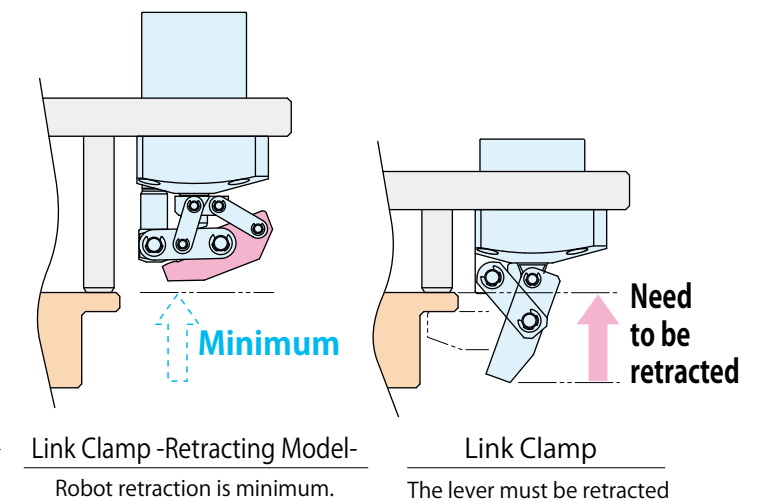
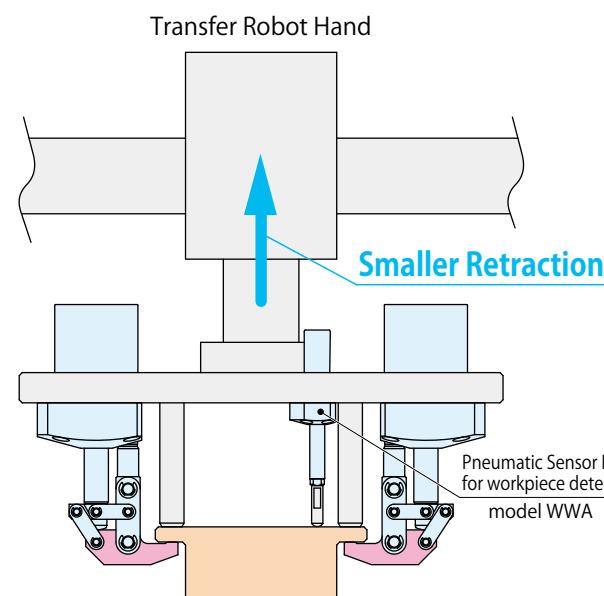
### Avoid interference with a workpiece when loading and unloading

Large lever retraction allows for wide angle of loading and unloading workpieces between operations.



### Avoid interference with clamps on the robot hand.

The largely retracted lever avoids interference with the work clamping lever on the transfer robot hand.



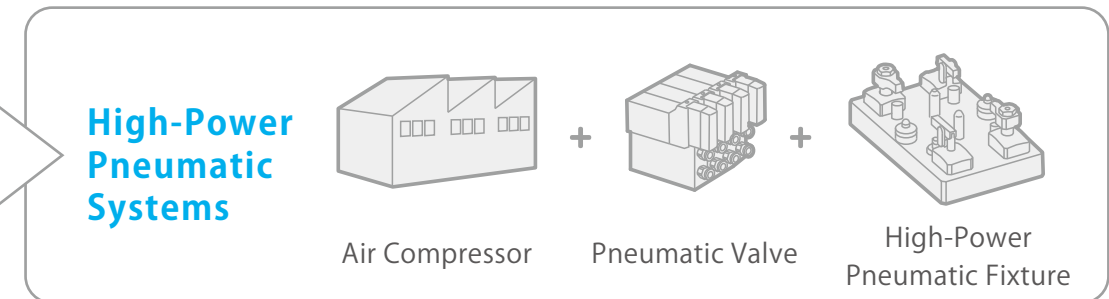
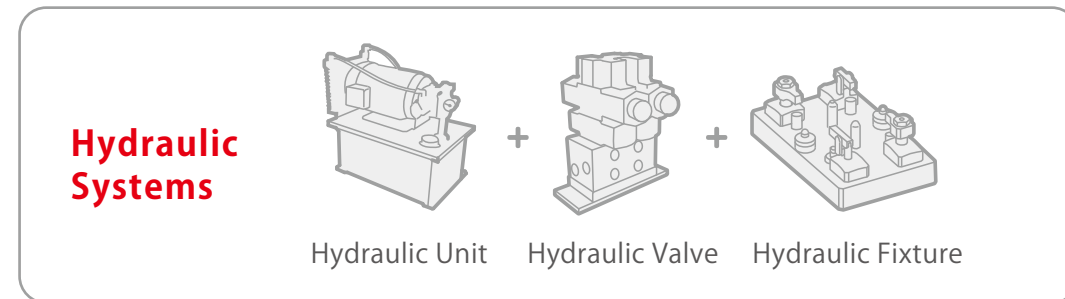
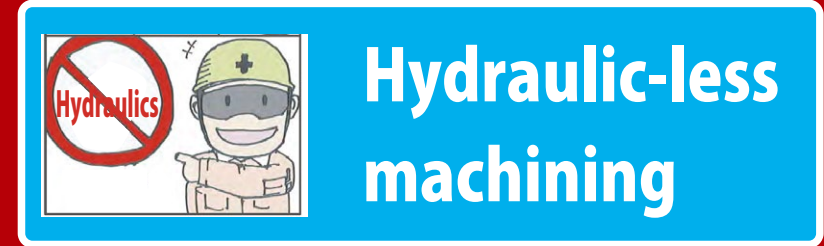
### For Robot Hands

The largely retracted lever minimises robot retraction.



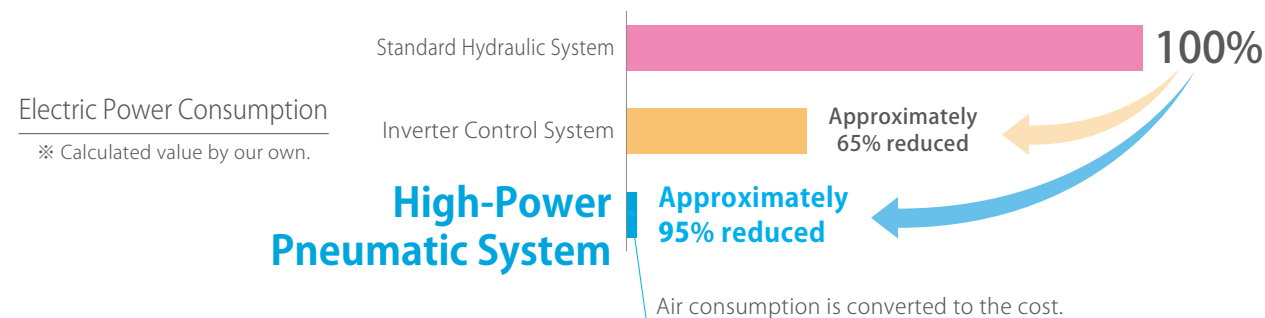
# Advantages of High-Power Pneumatic ( Hydraulic Clamp → High-Power Pneumatic Clamp )

## Systems



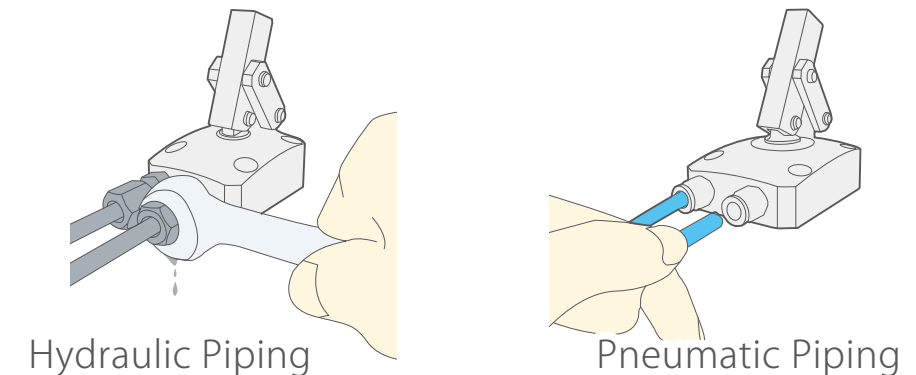
## Energy-Saving

High-power pneumatic system requires only air resulting in cost reduction.  
No hydraulic unit required. Reduction of electric power consumption/CO2.



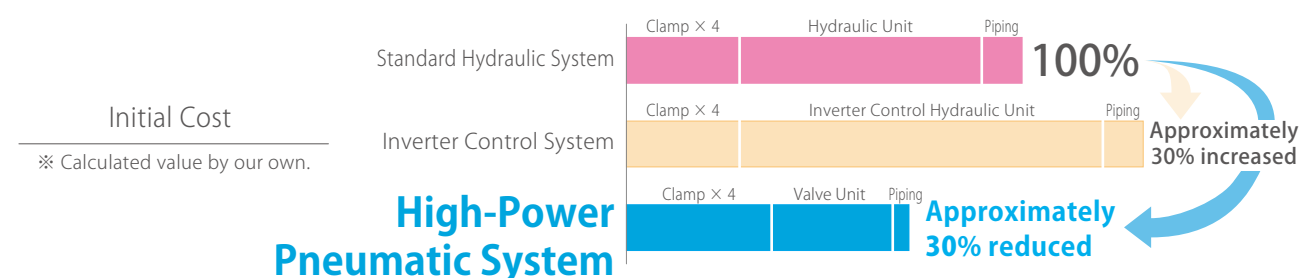
## Less Workload

Installation is easily done with air piping, since there is no need of hydraulic piping.  
It is the solution to problems such as fluid leakage and temperature effects.



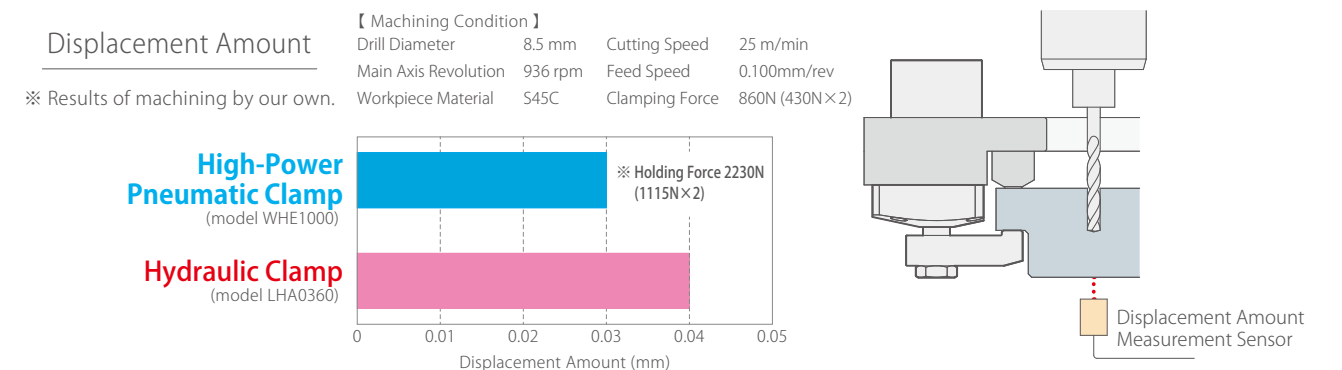
## Cost-Reduction

The initial cost of high-power pneumatic system is much less than that of hydraulic system.  
The running cost is also reduced with less maintenance.



## High Power

Holding force with mechanical locking (wedge) function withstands the reaction force similar to hydraulic clamps. Also, it enables high speed machining on both front and back faces.



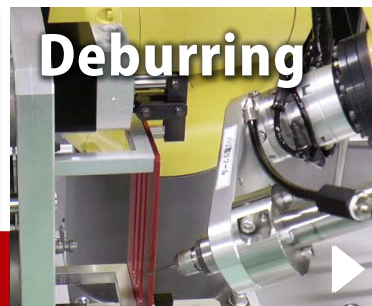
# KOSMEK Products to Enhance

# Productivity in Every Process

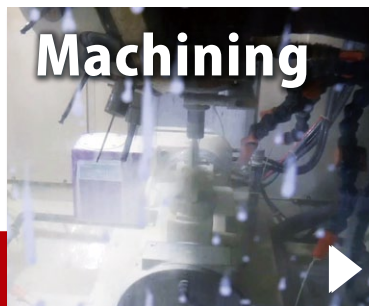
## Casting Components



- Die Clamping Cylinder
- High-Speed Core Pull Cylinder

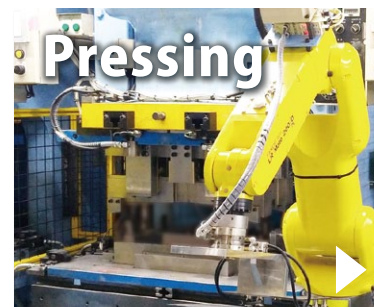


- Work Clamp
- Robotic Hand Changer

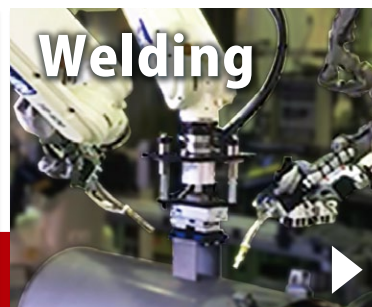


- Work Clamp
- Expansion Locating Pin
- Pallet Clamp
- Non-Leak Valve • Coupler
- Rotary Joint

## Sheet Metal Components

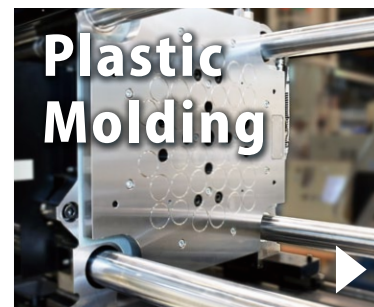


- Die Clamping Cylinder
- Robotic Hand Changer



- Work Clamp for Welding Equipment
- Robotic Hand
- Robotic Hand Changer

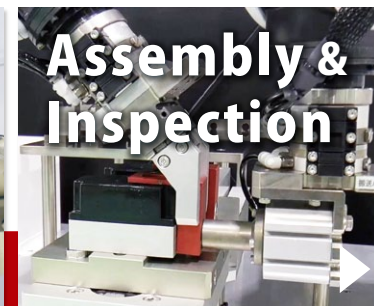
## Resin Components



- Mold Clamping Device
- Robotic Hand Changer

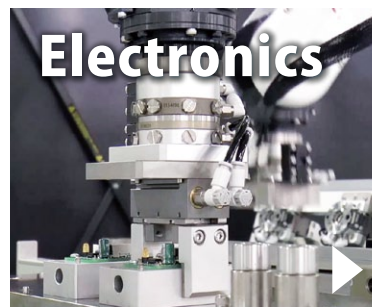


- Work Clamp for Washing Equipment
- Robotic Hand
- Robotic Hand Changer



- Pneumatic Clamp
- Expansion Locating Pin
- Robotic Hand Changer
- Auto Coupler
- Compliance Module
- Smart Series

## Electronic Components



- Robotic Hand
- Expansion Locating Pin
- Robotic Hand Changer





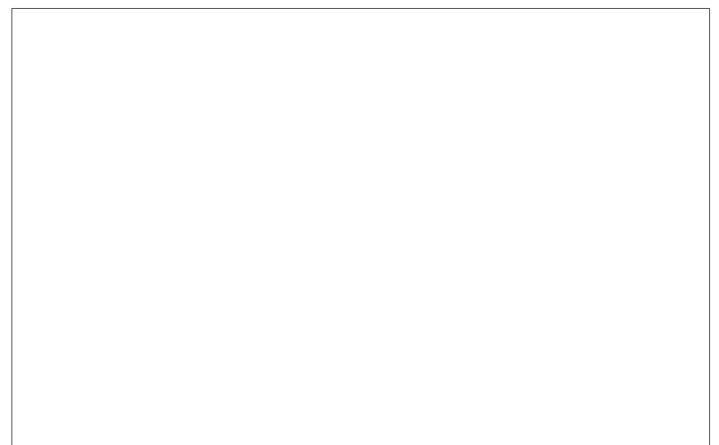


## KOSMEK LTD.

▶ <https://www.kosmek.com/>

HEAD OFFICE 1-5, 2-chome, Murotani, Nishi-ku, Kobe-city, Hyogo, Japan 651-2241  
TEL.+81-78-991-5162 FAX.+81-78-991-8787

|  |   |
|--|---|
| United States of America<br>SUBSIDIARY | KOSMEK (USA) LTD.<br>650 Springer Drive, Lombard, IL 60148 USA<br>TEL. +1-630-620-7650 FAX. +1-630-620-9015   |
| MEXICO<br>REPRESENTATIVE OFFICE        | KOSMEK USA Mexico Office<br>Av. Santa Fe 103, Int. 59, col. Santa Fe Juriquilla, Queretaro,<br>QRO, 76230, Mexico TEL. +52-1-55-3044-9983                   |
| EUROPE<br>SUBSIDIARY                   | KOSMEK EUROPE GmbH<br>Schleppeplatz 2 9020 Klagenfurt am Wörthersee Austria<br>TEL. +43-463-287587 FAX. +43-463-287587-20                                   |
| CHINA<br>SUBSIDIARY                    | KOSMEK (CHINA) LTD.<br>Room601, RIVERSIDE PYRAMID No.55, Lane21, Pusan Rd, Pudong<br>Shanghai 200125, China TEL. +86-21-54253000                            |
| INDIA<br>BRANCH OFFICE                 | KOSMEK LTD. - INDIA<br>4A/Old No:649, Ground Floor, 4th D cross, MM Layout, Kavalbyrasandra,<br>RT Nagar, Bangalore -560032 India TEL.+91-9880561695        |
| THAILAND<br>REPRESENTATIVE OFFICE      | KOSMEK Thailand Representation Office<br>67 Soi 58, RAMA 9 Rd., Phatthanakan, Suanluang, Bangkok 10250, Thailand<br>TEL. +66-2-300-5132 FAX. +66-2-300-5133 |



- For Further Information on Unlisted Specifications and Sizes, Please call us.
- Specifications in this Leaflet are Subject to Change without Notice.

