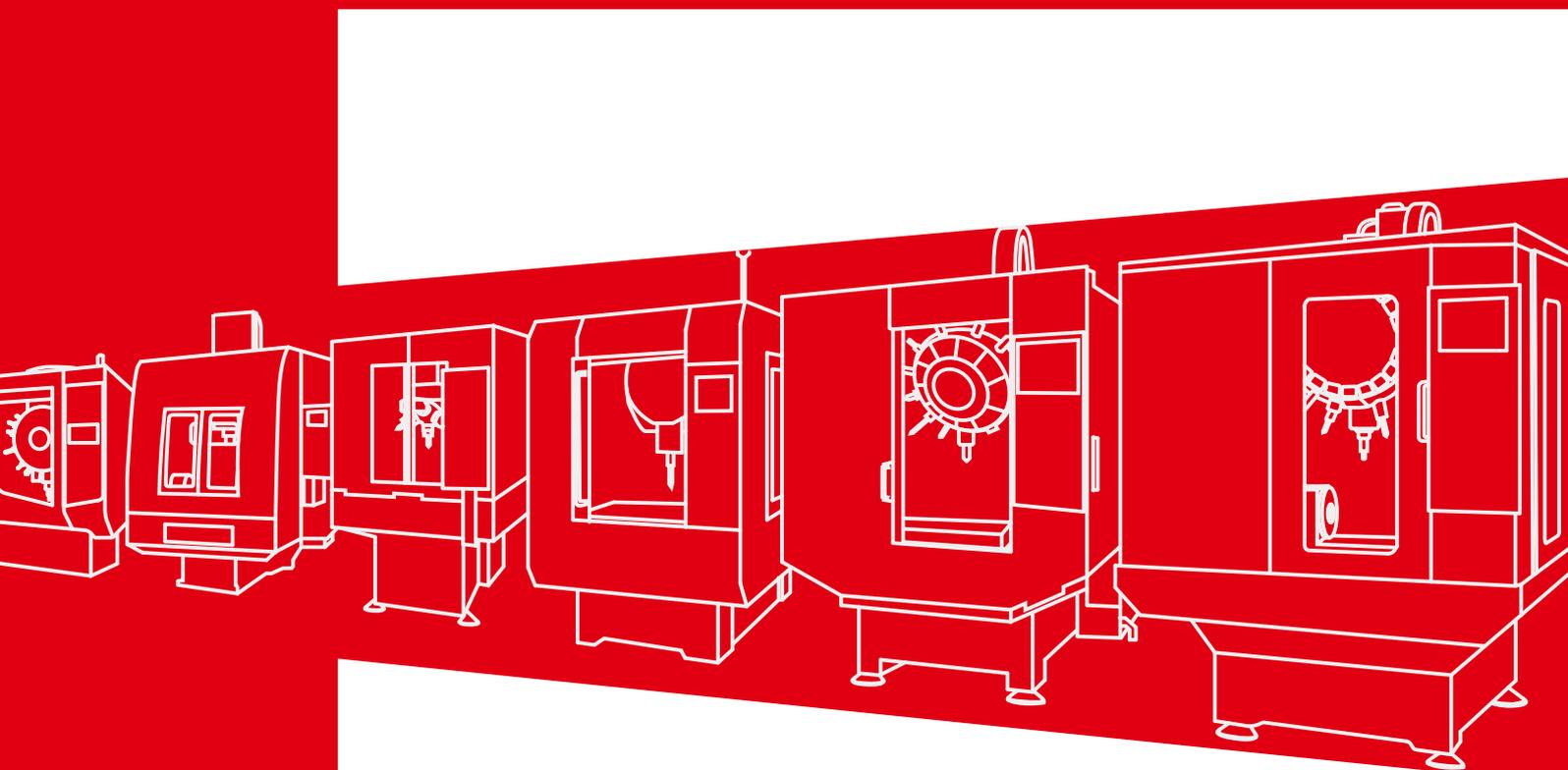


**HIGH-POWER**  
**Pneumatic**  
Series

# *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

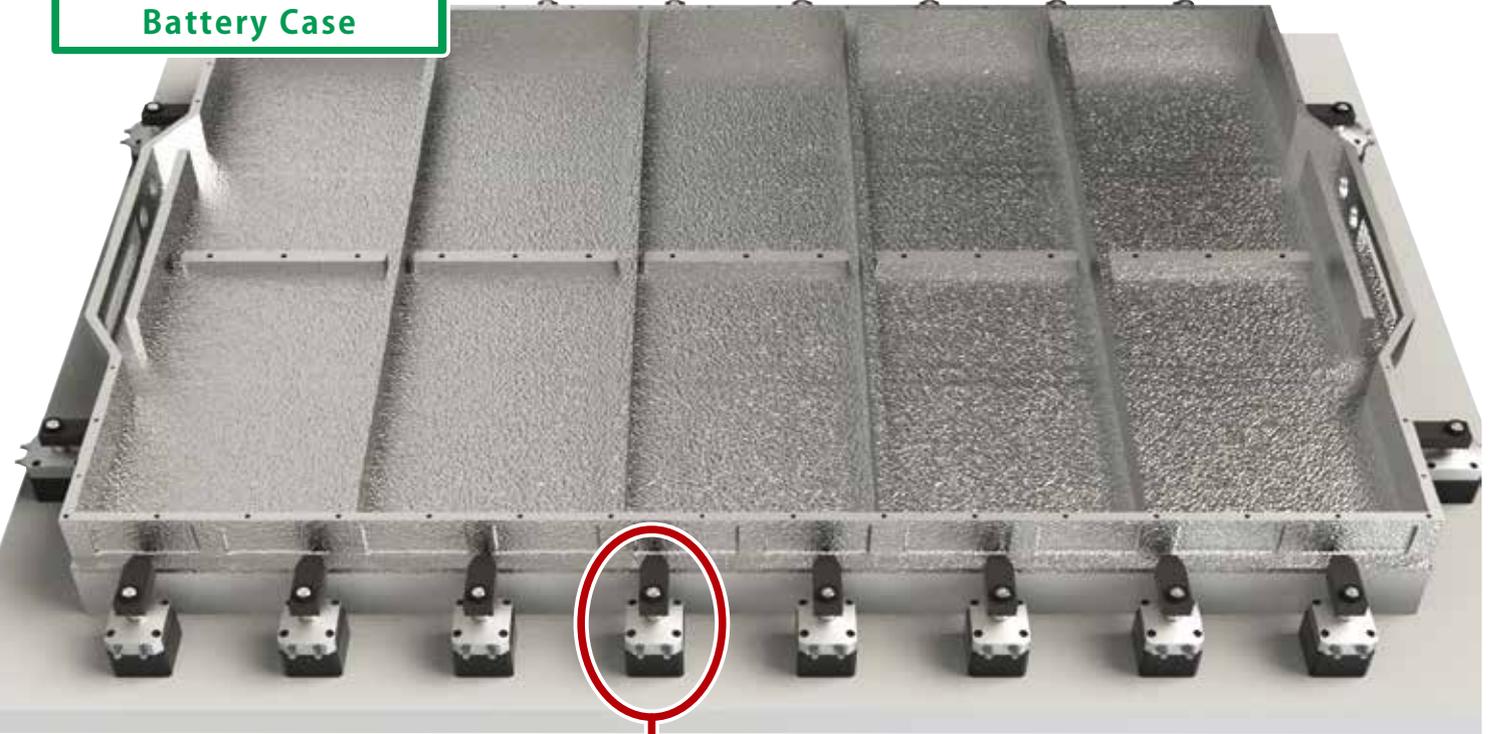
Examples of replacement of hydraulic clamps with high-power pneumatic clamps.

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.

**HYBRID** System using

Wedge

**Mechanical Lock** and

Air

Oil

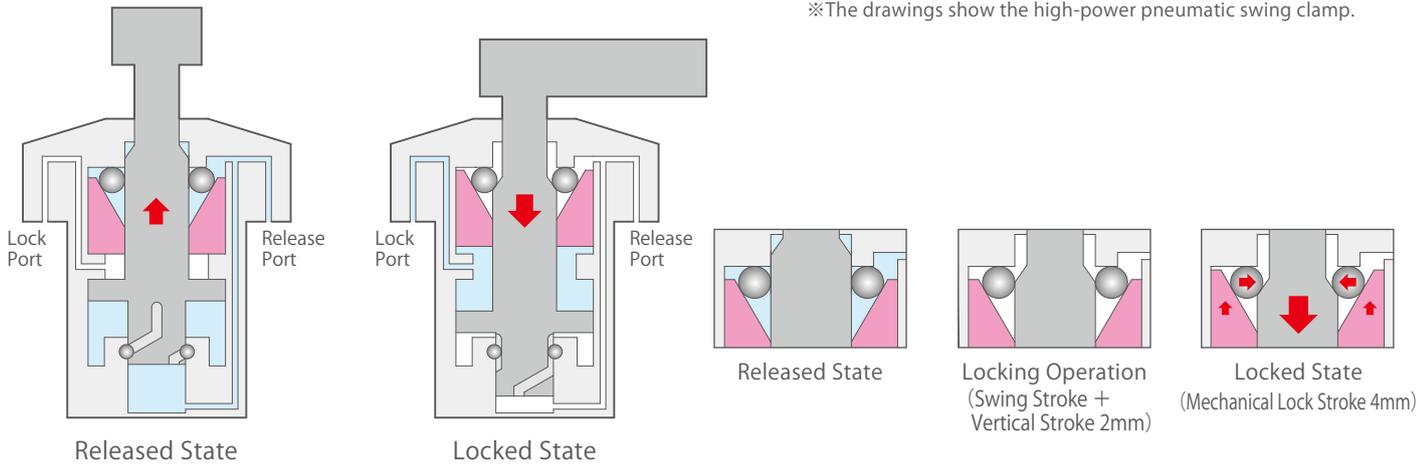
**Pneumatic / Hydraulic**



High-Power  
Pneumatic Swing Clamp  
model WHE

## 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.

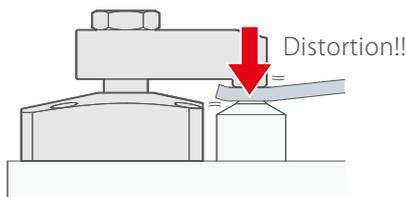


## High-Power Clamp

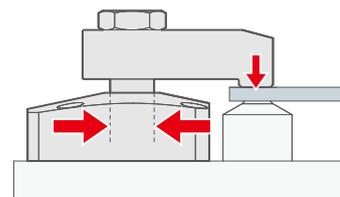
The downsized clamp exerts the equivalent force to the general clamp.

## 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

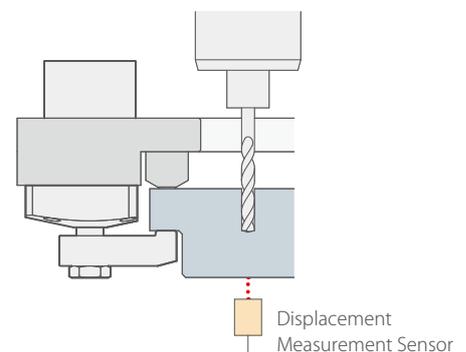
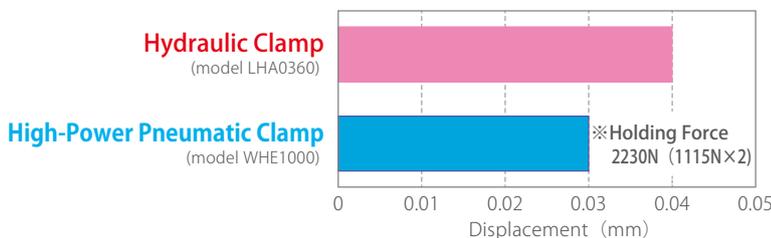
Holding force, more powerful than clamping force, enables backside machining with high speed.

### Displacement

※ Machining results by our own.

### 【 Machining Condition 】

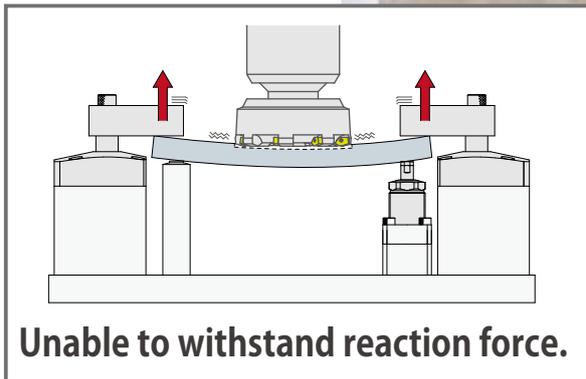
Drill Diameter	8.5 mm	Cutting Speed	25 m/min
Main Axis Revolution	936 rpm	Feed Speed	0.100mm/rev
Workpiece Material	S45C	Clamping Force	860N (430N×2)



# No Chattering on Aluminum

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

**Unable to Machine  
due to Chattering**



**Unable to Machine with  
General Swing Clamp**



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

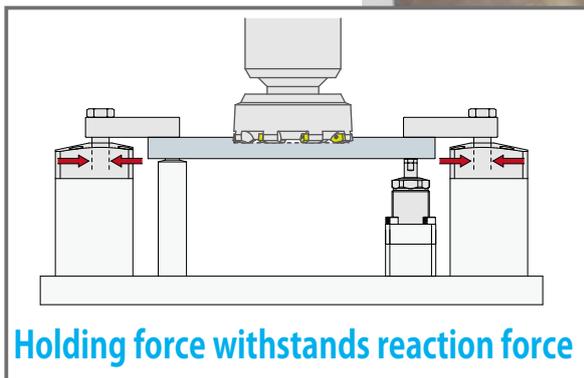
[http://www.kosmek.co.jp/php\\_file/video\\_products.php?id=060&lang=2](http://www.kosmek.co.jp/php_file/video_products.php?id=060&lang=2)



# Workpiece with High-Power Clamp



**Properly Machined with No Chattering**



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

## Clamping Conditions

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

## Machining Conditions

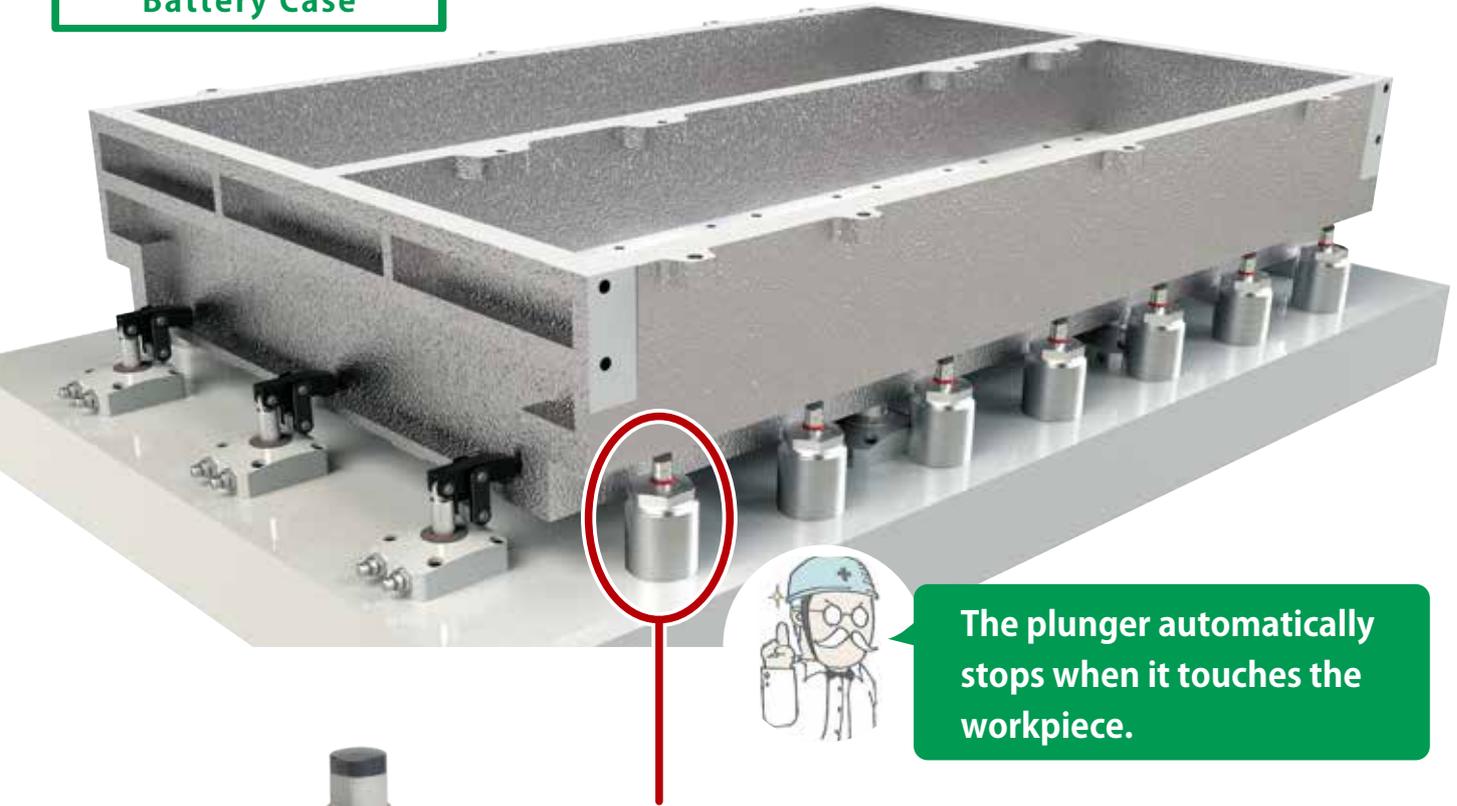
Tool Diameter	Workpiece Material	Infeed (Depth)	Coolant	Feed Speed
80mm	Aluminum (A5052)	3mm	Yes (Water Soluble)	896mm/rev

# 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

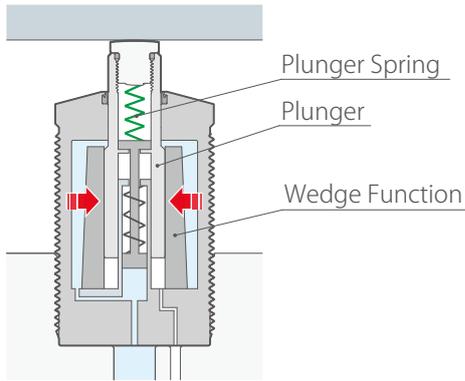
Video Title : Chattering Prevention Effect by Work Support

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

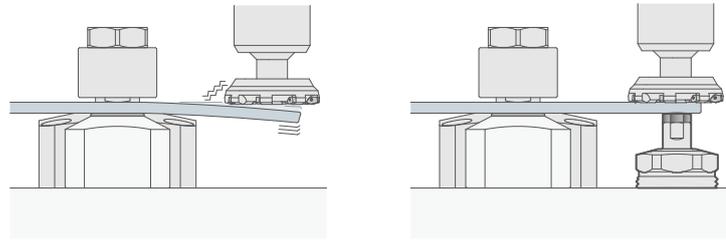


## Chattering Prevention

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.



< Internal Action Image >

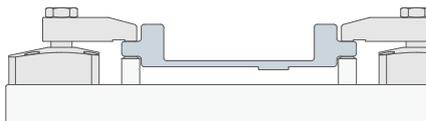


**Chattering**

**No Chattering!!**

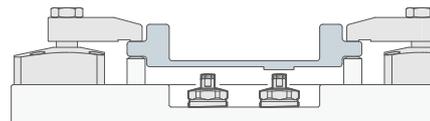
## Deformation Prevention

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



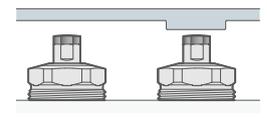
Without Work Support

**Bending**

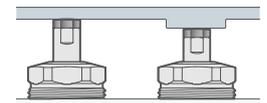


With Work Support

**No Bending!!**



Before plunger is lifted up



Locked after touching workpiece

## Action Confirmation

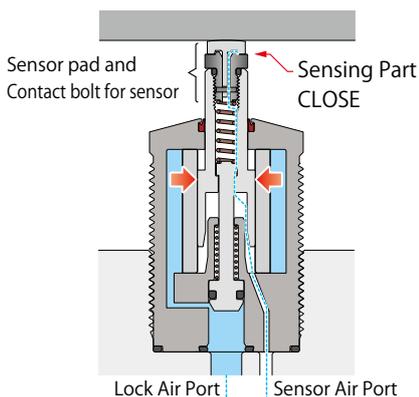
### Options

### Air Sensing Option

※An air sensor is required.

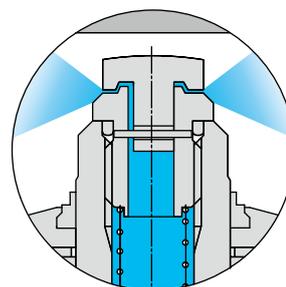
The sensing part opens and closes when the plunger touches the workpiece, allowing for plunger advance action confirmation.

Highly reliable action confirmation function suitable for automation.

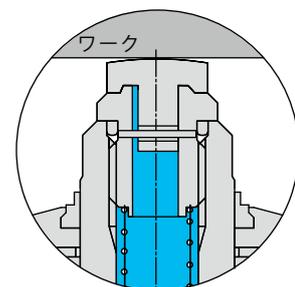


Pressure Sensor **ON**

Air Sensor **ON**



Sensing OPEN (OFF)



Sensing CLOSE (ON)

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

Workpiece Image  
**Reduction Gearbox**



Equivalent to Round pin



Equivalent to Diamond pin

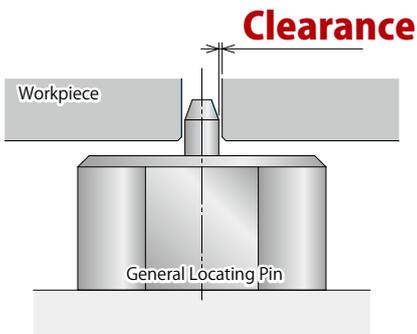


## Expansion Locating Pin

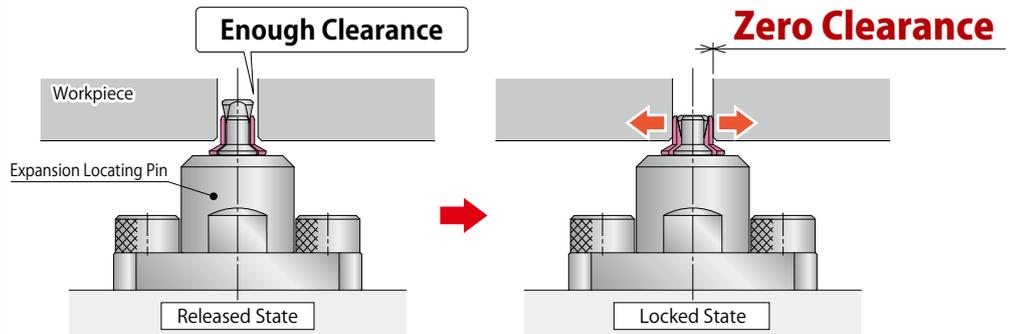
model **VWH / VWM / VWK**

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.



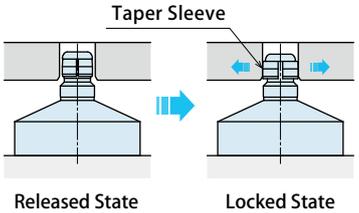
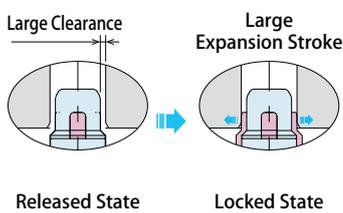
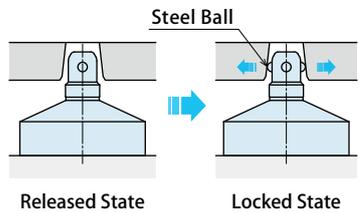
Expansion locating pin has **zero clearance!!**

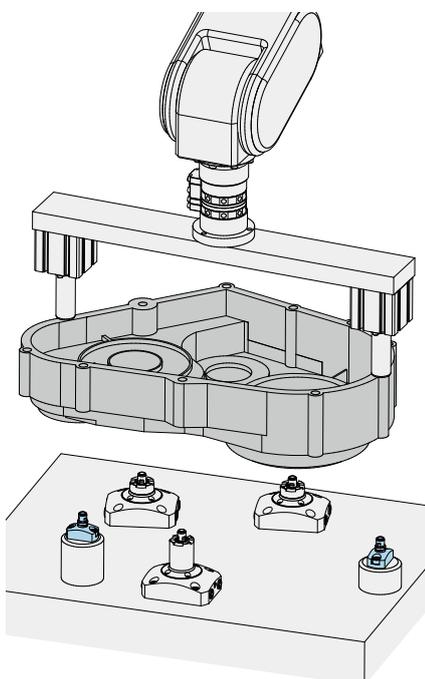
When expanded : Clearance between the pin and reference hole becomes zero to locate with high accuracy.

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

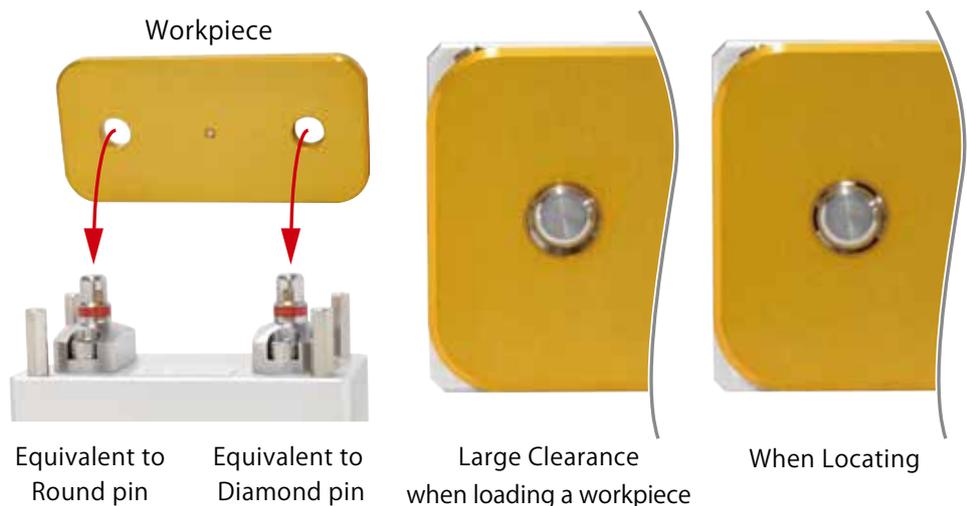
# Expansion Locating Pin

## with The World's Smallest Diameter

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

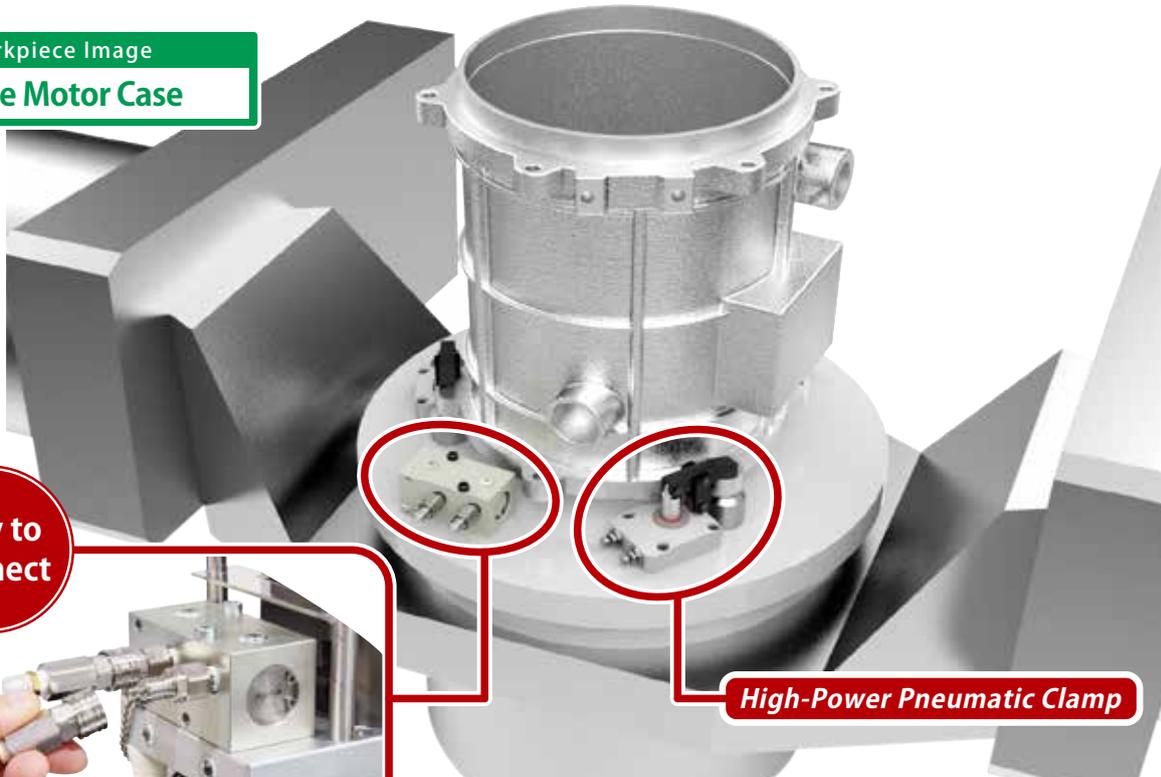


**model VWH is suitable for automatic loading and unloading with large clearance.**



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

Workpiece Image  
**eAxle Motor Case**



## Air Non-Leak Valve

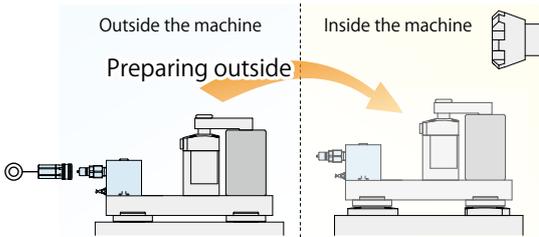
**Air Double-Acting**

model **BWQ**

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

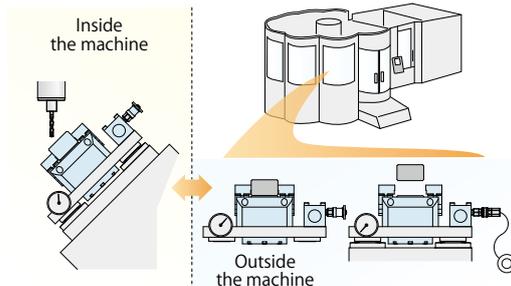
A2 port (outgoing lock air) maintains air pressure even after disconnected from the air source unless air is provided to B1 port (release port).

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

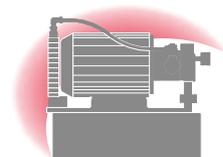


Setup Outside the Machine  
Improves Machine Up Time

Reduce the Number of  
Circuits in the Machine



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



No Hydraulic Use  
Energy-Saving

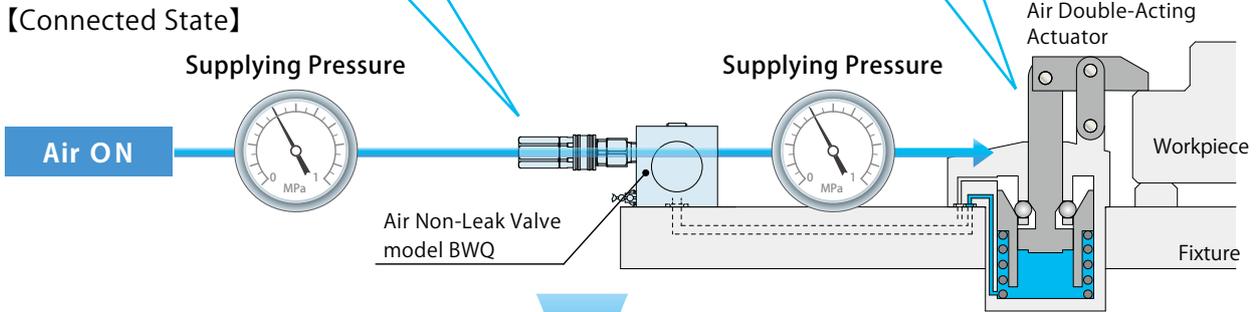


**Easy to Connect**

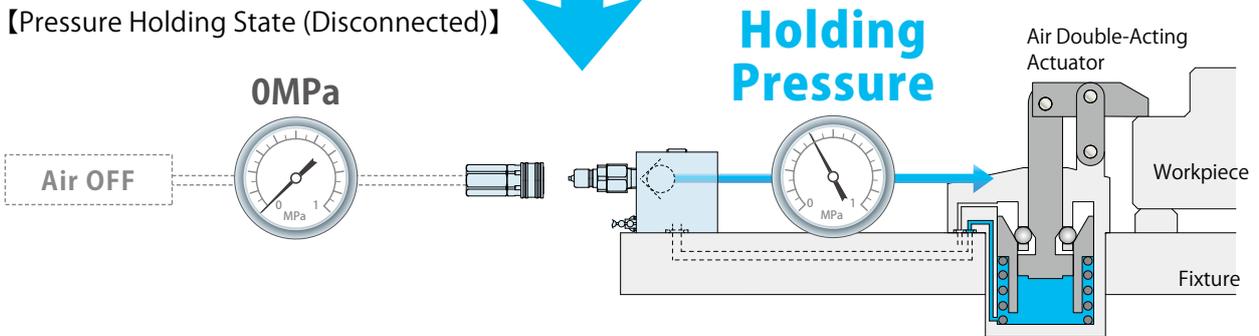


**Best for the Use with High-Power Pneumatic Clamp !**

**Equal machining force as hydraulic fixture.**



**Holds the pressure even after the coupler is 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)

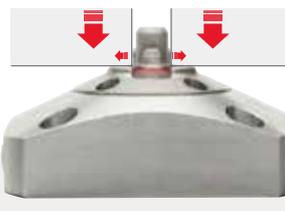
# Zero interference and minimum setup Strong clamping force replaces hydraulics

Workpiece Image

Inverter / Converter Case



Grips and clamps a workpiece hole.



In case of SWE2000  
Clamping Force

**2** kN

Supplying  
Air pressure

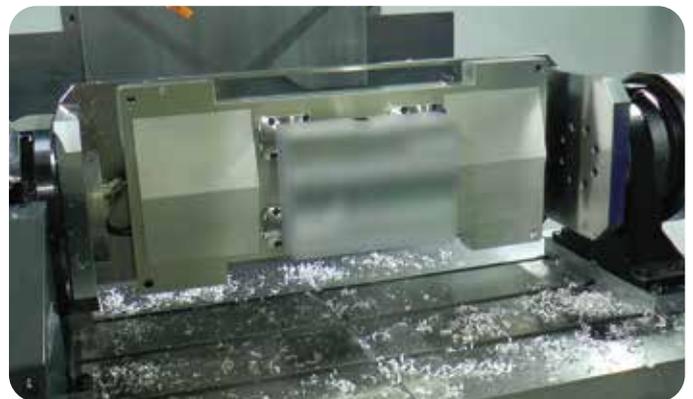
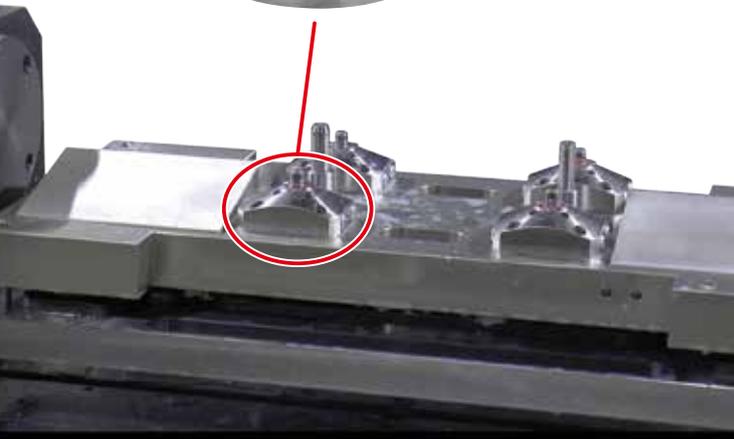
**0.45** MPa



## 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.

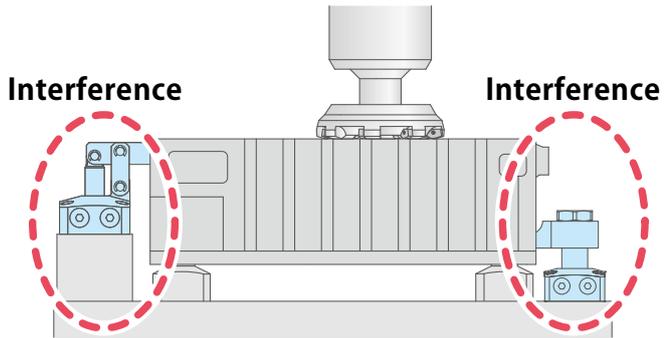


### Simplifies a Fixture

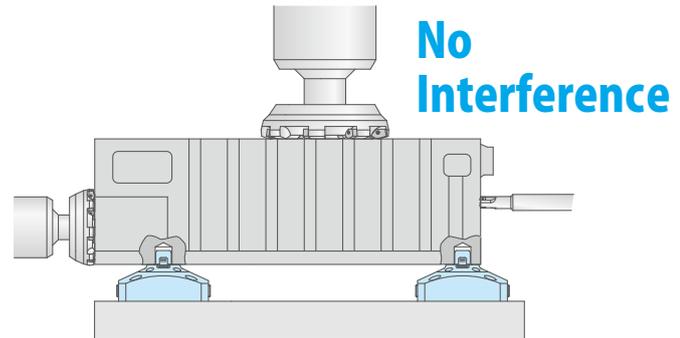
Less interference allows for workpiece loading with a robot.  
Inclined surface on the flange enables easy flow of cutting chips,  
resulting in less malfunctions caused by piled-up cutting chips.

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

## External Clamp



## Hole Clamp



### External Clamp

### Hole Clamp

**Integration**

The number of machinable faces without interference

**3 Faces**

**5 Faces**

**Automation**

Teaching and designing of transfer equipment

**Difficult**

**Easy**

**Accessibility**

Accessibility of machining tool

**Distant**

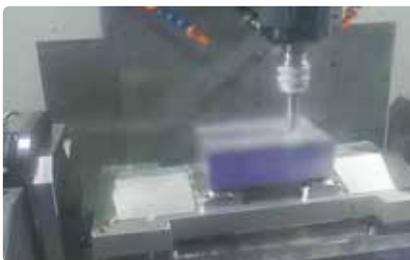
**Close**

**Fixture Size**

Table size  
Equipment size

**Large**

**Compact**



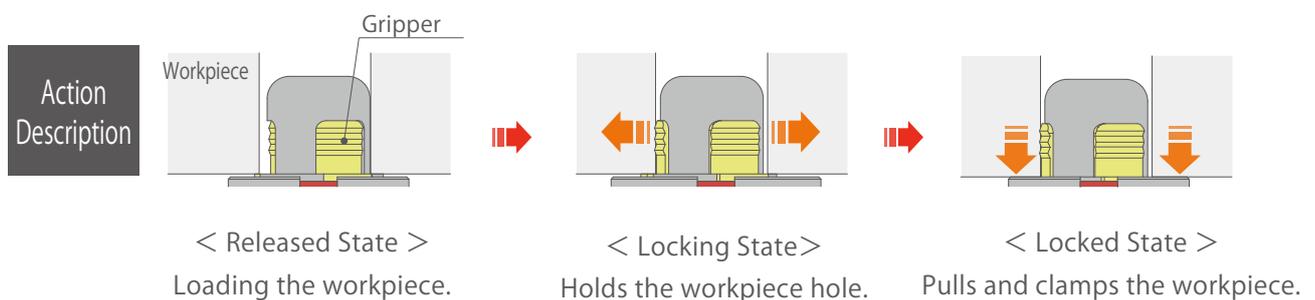
Top Surface Milling



Side Surface Drilling



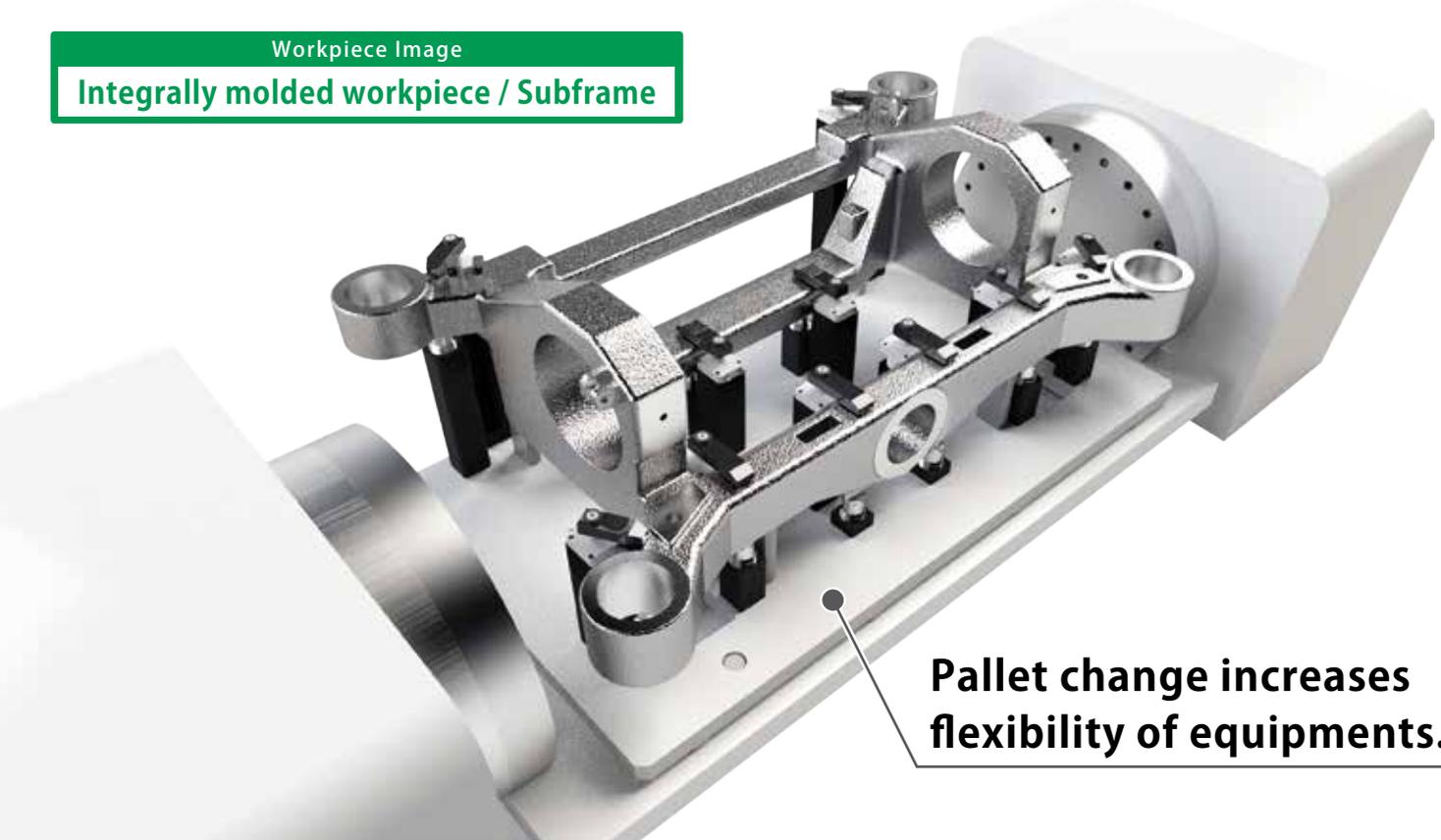
Side Surface Milling



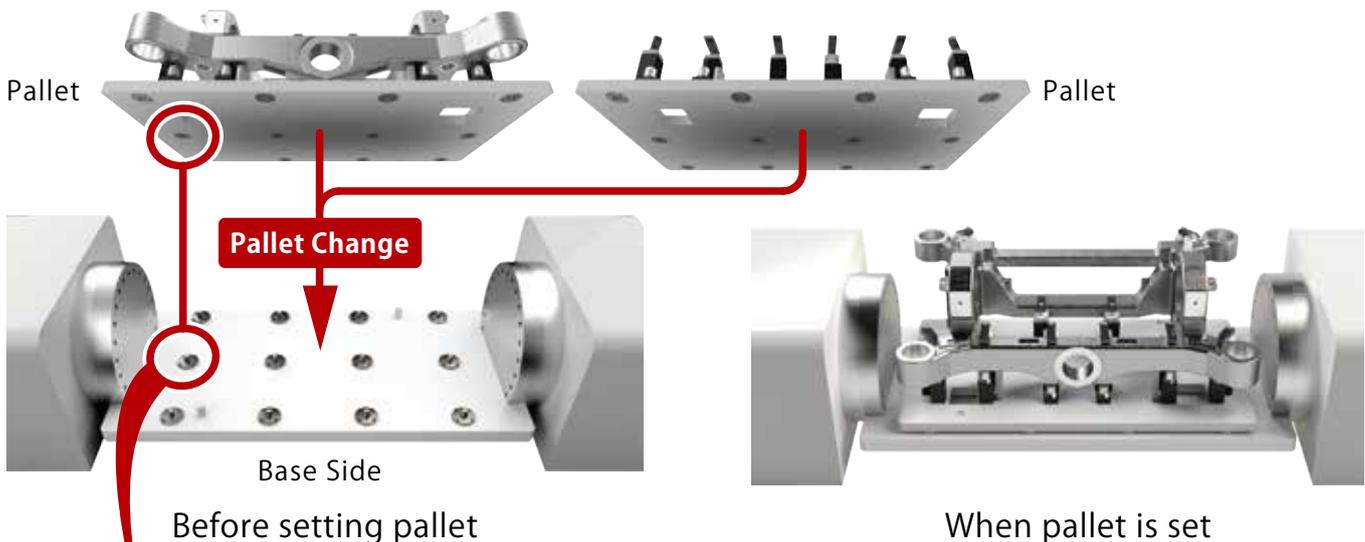
# No additional machines, More workpieces by Changing Pallets.

Workpiece Image

Integrally molded workpiece / Subframe



Pallet change increases flexibility of equipments.



## 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

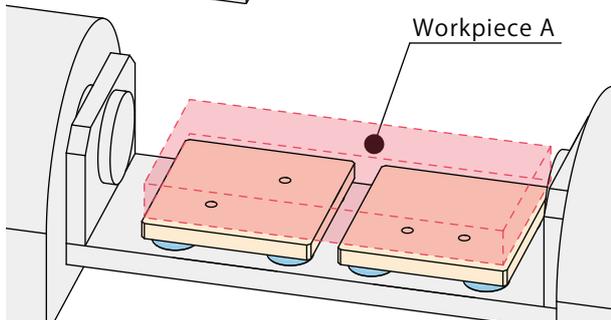
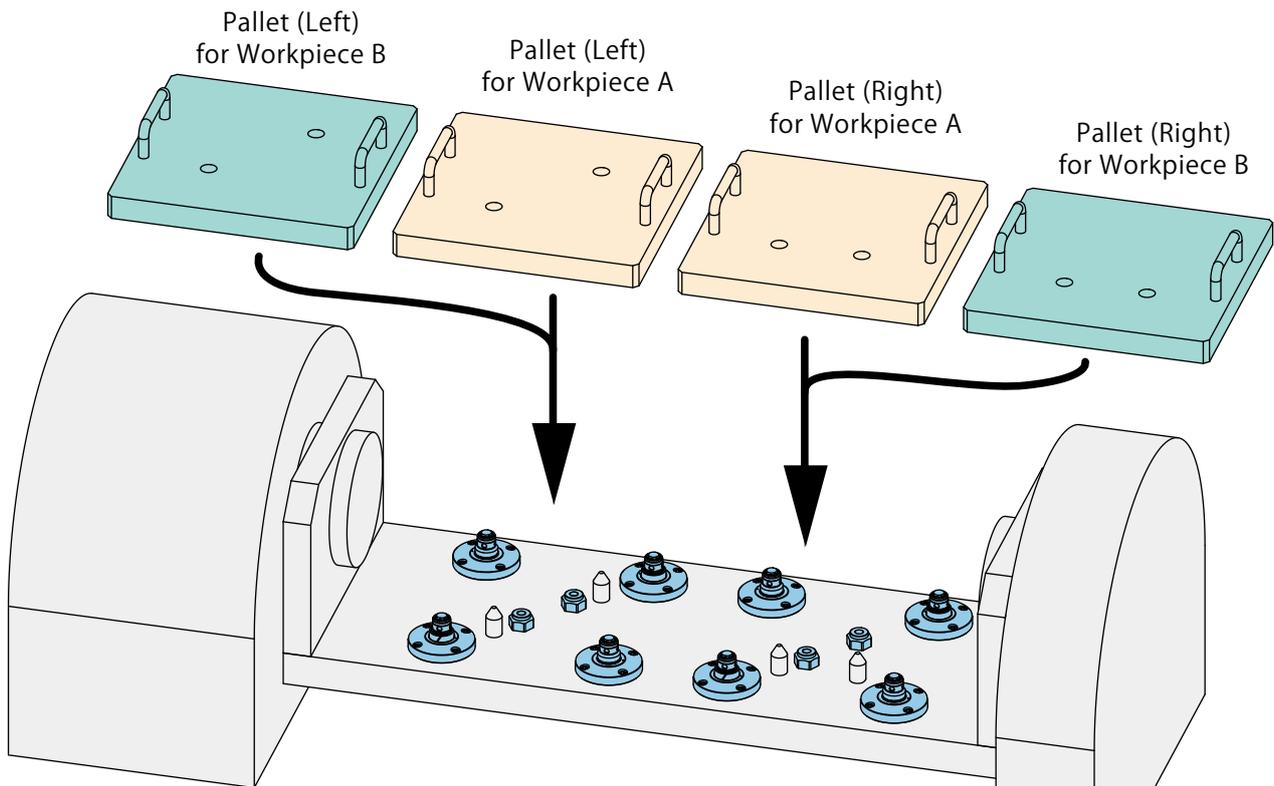
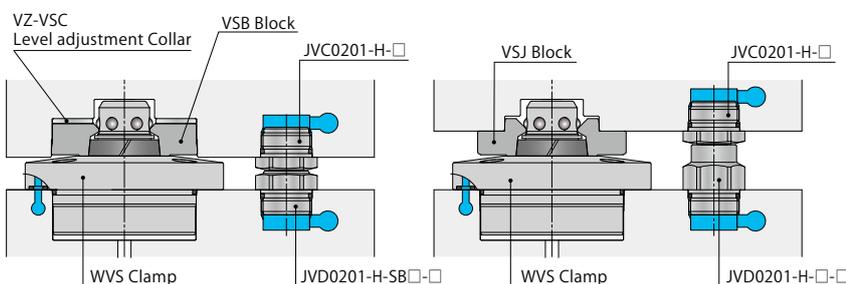
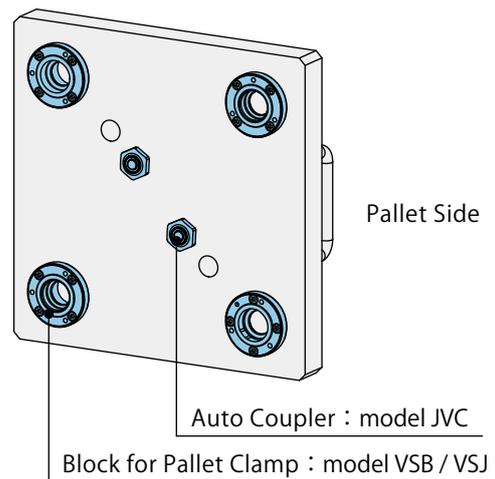
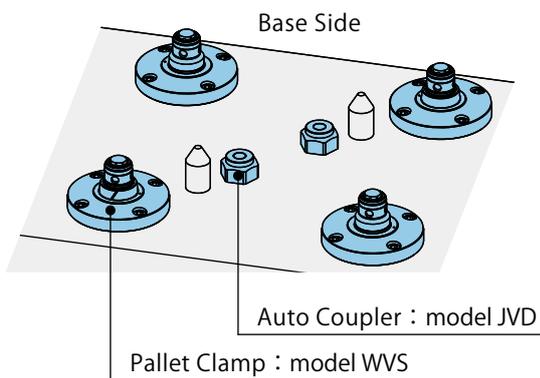


Image : Pallet Setting and Workpiece



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



model **JVC/JVD**

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

Workpiece Image

**Inverter / Converter Case**



## High-Power Pneumatic Frog Clamp

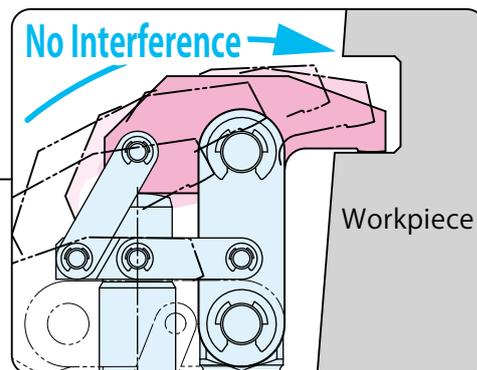
model **WFE**

Largely retracted lever avoids interference during workpiece loading/unloading.

High clamping force with pneumatic and mechanical lock system.

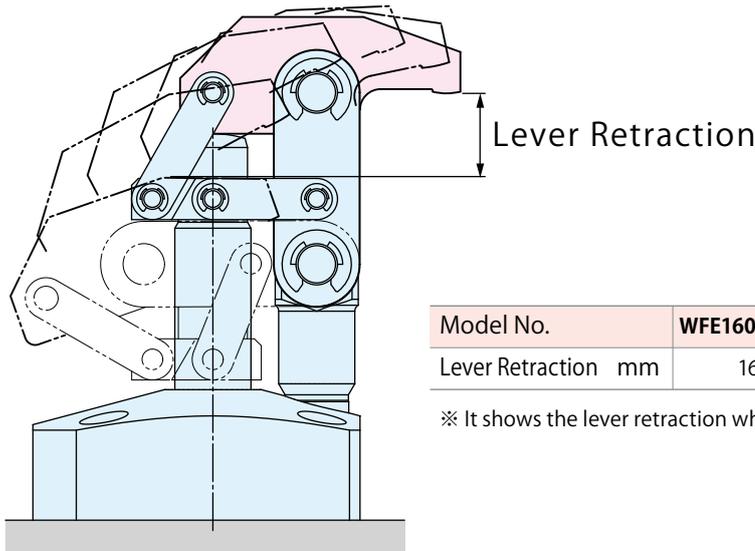
Stronger holding force with mechanical lock clamping force.

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



● **Lever Retracted Lower than the Clamping Point**

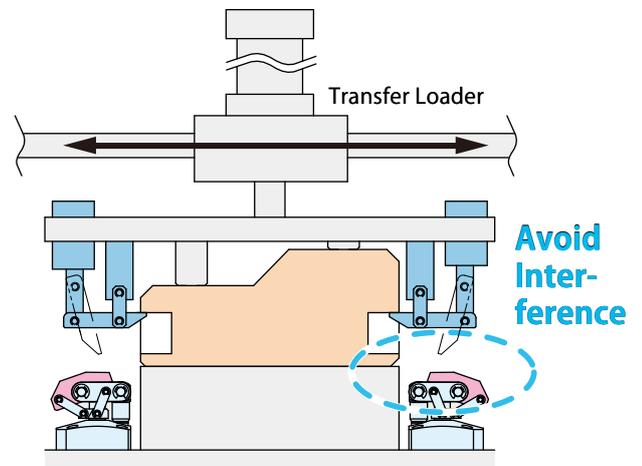
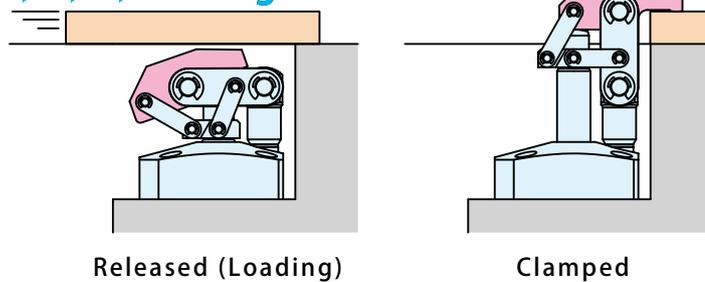
Large lever retraction allows for wide angle of loading and unloading workpieces between operations.



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**

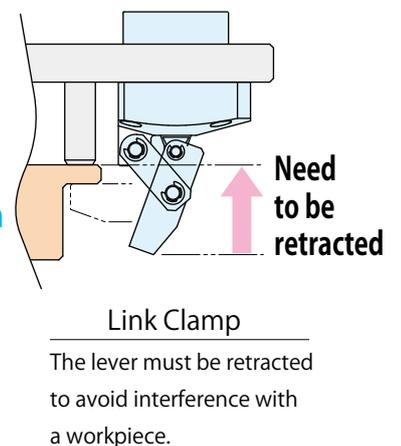
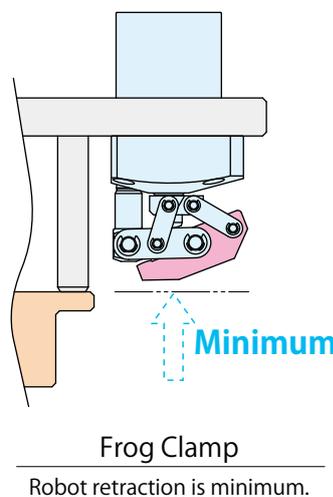
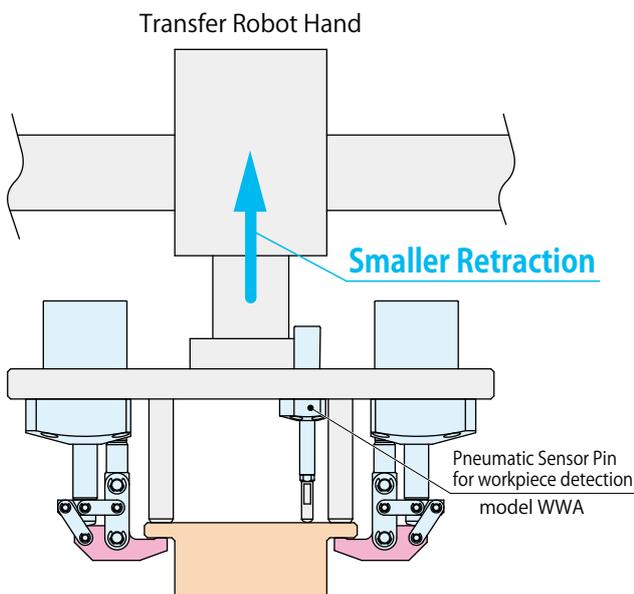


**Avoid interference with a workpiece when loading and unloading**

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

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

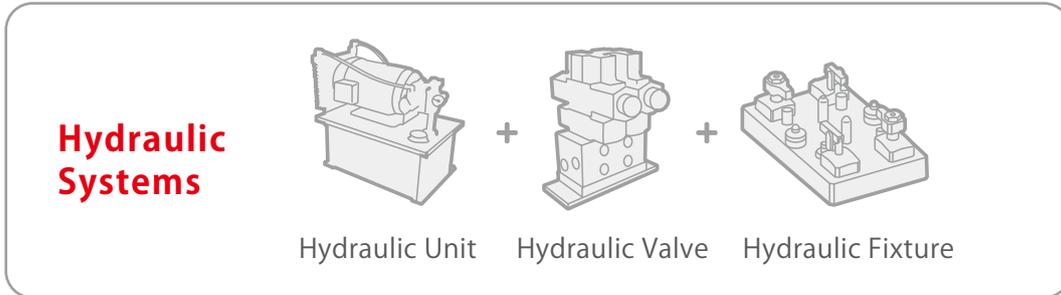
The largely retracted lever avoids interference with the work clamping lever on the transfer robot hand.



**For Robot Hands**

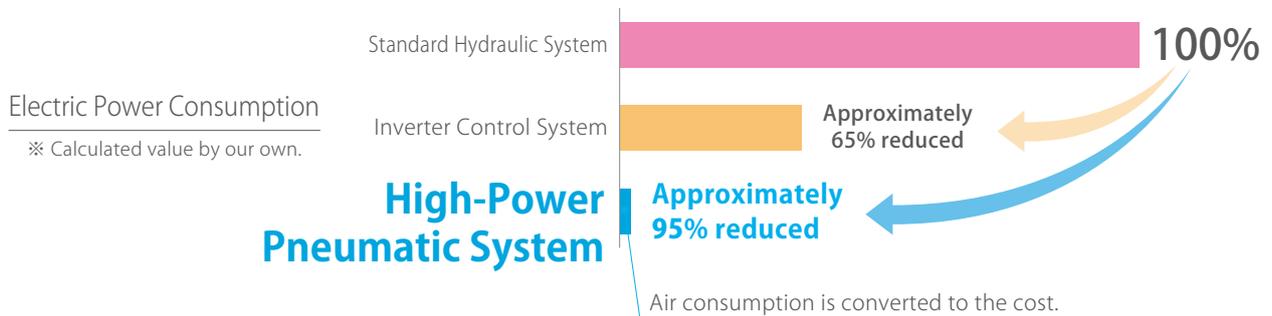
The largely retracted lever minimises robot retraction.

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



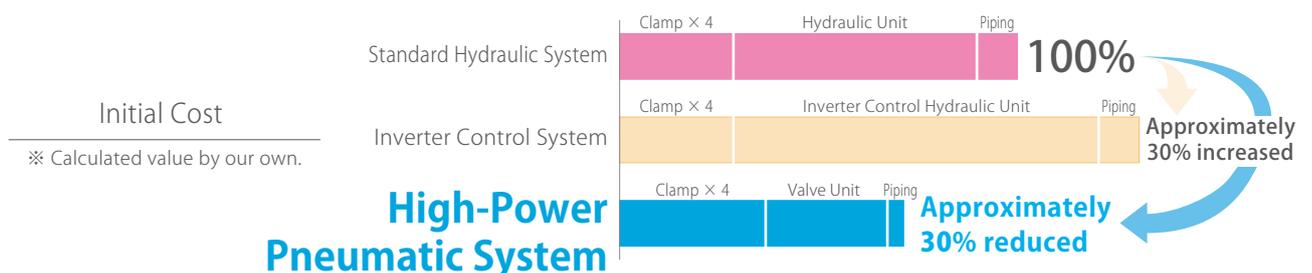
## Energy-Saving

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



## Cost-Reduction

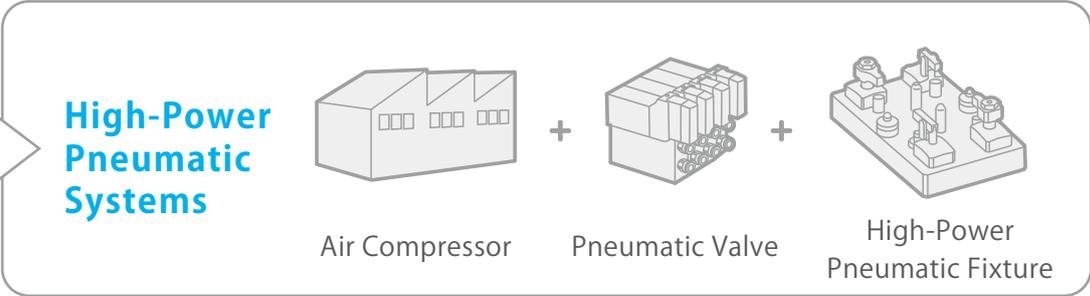
The initial cost of high-power pneumatic system is much less than that of hydraulic system.  
The running cost is also reduced with less maintenance.



# Systems

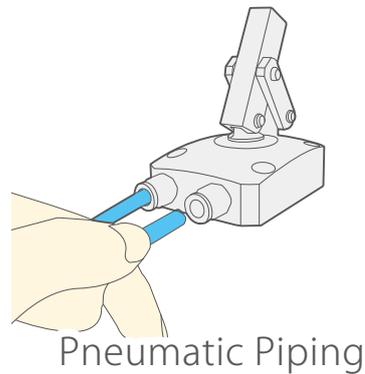
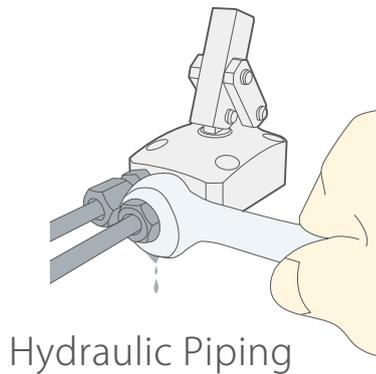


A blue rectangular graphic with a white border. On the left, there is a red circle with a diagonal slash over the word "Hydraulics". To the right of this is a cartoon illustration of a worker wearing a yellow hard hat and safety glasses. To the right of the worker, the text "Hydraulic-less machining" is written in white on a blue background.



## Less Workload

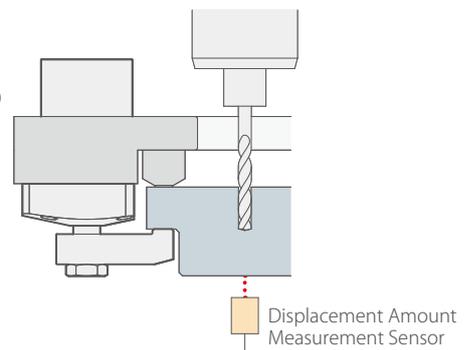
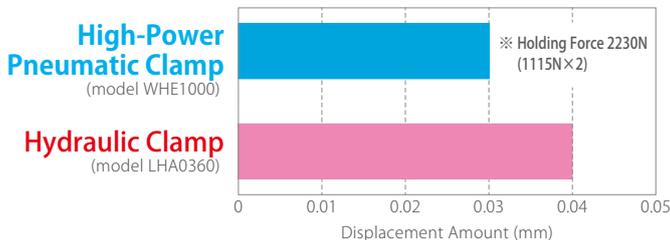
Installation is easily done with air piping, since there is no need of hydraulic piping. It is the solution to problems such as fluid leakage and temperature effects.



## 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.

Displacement Amount			
※ Results of machining 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)





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- Specifications in this Leaflet are Subject to Change without Notice.



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