

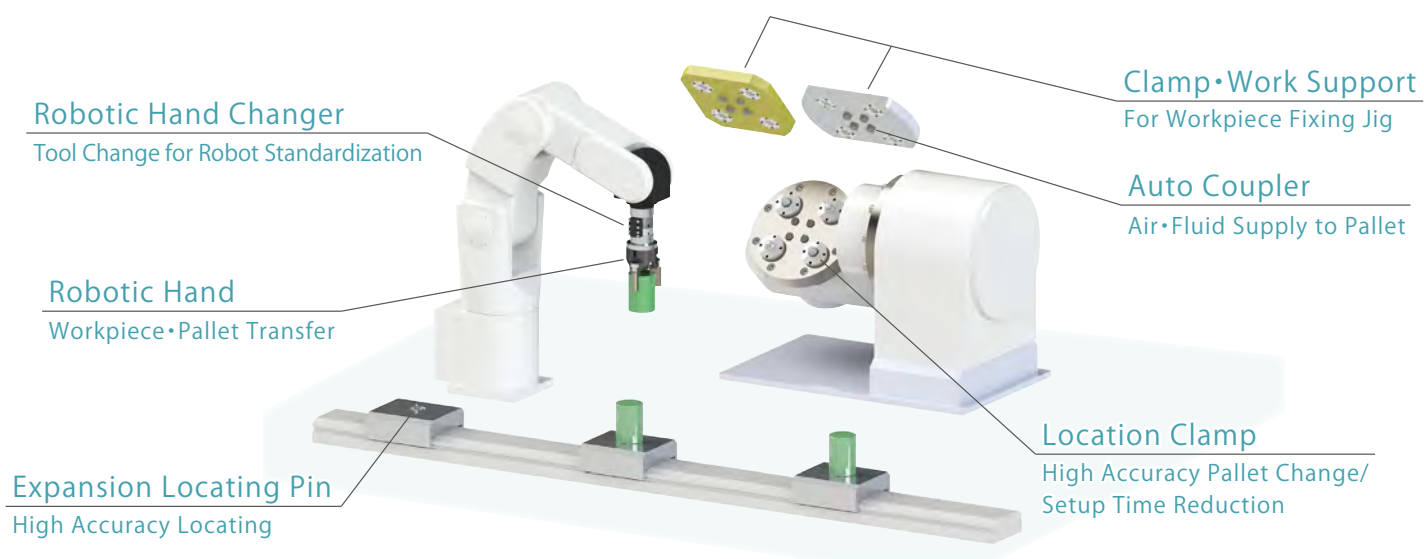
FA • Robotic Automation Products

# Application Examples

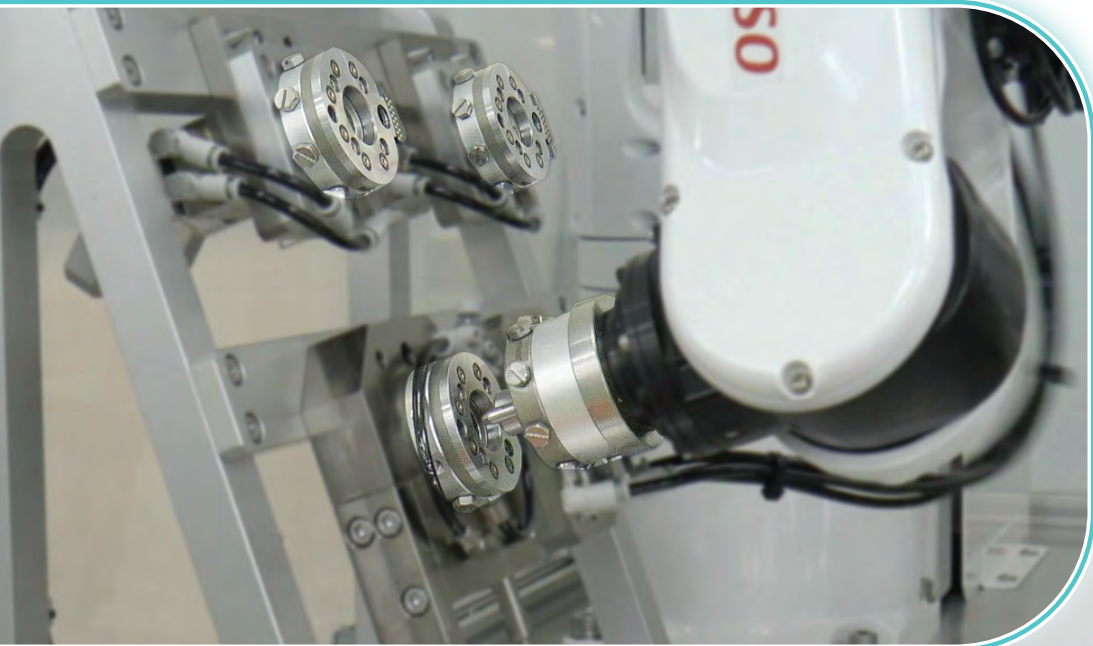
Ver.2

## For More Automation Solutions

Kosmek Products for Automation and Setup Improvement in Every Process

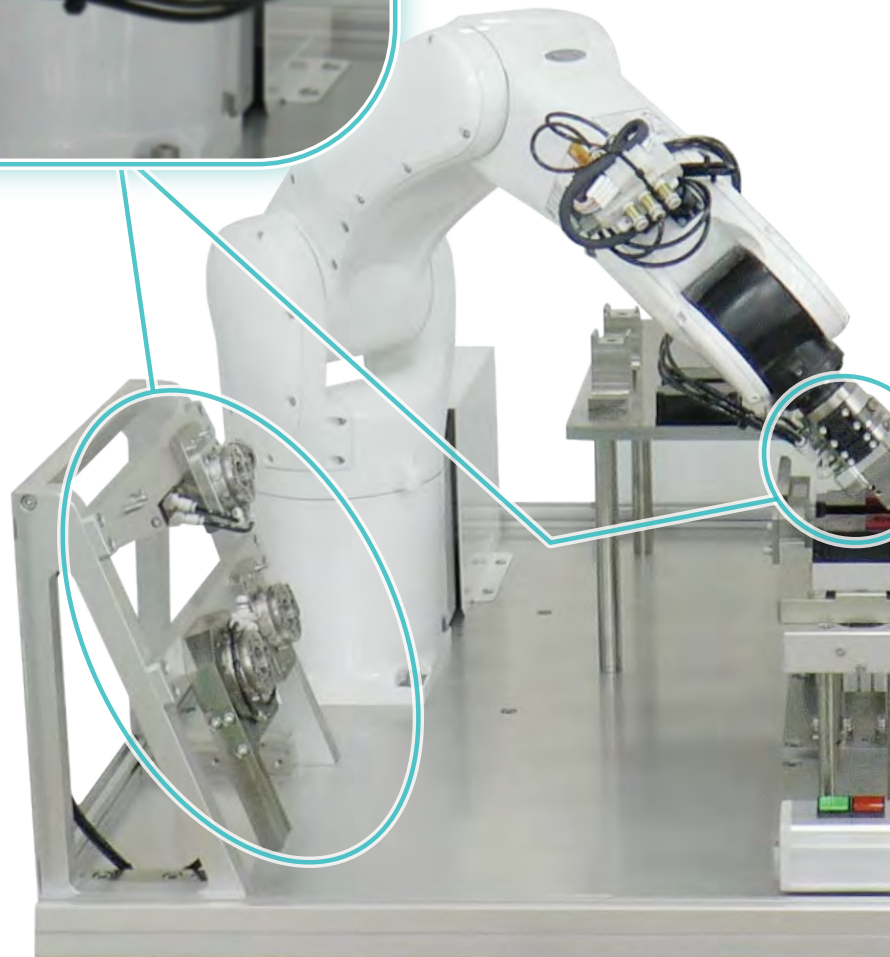


## Tool Change



### Robotic Hand Changer

P.3



### Automation Products (High Accuracy Locating/Compact Clamp, etc.)

P.19

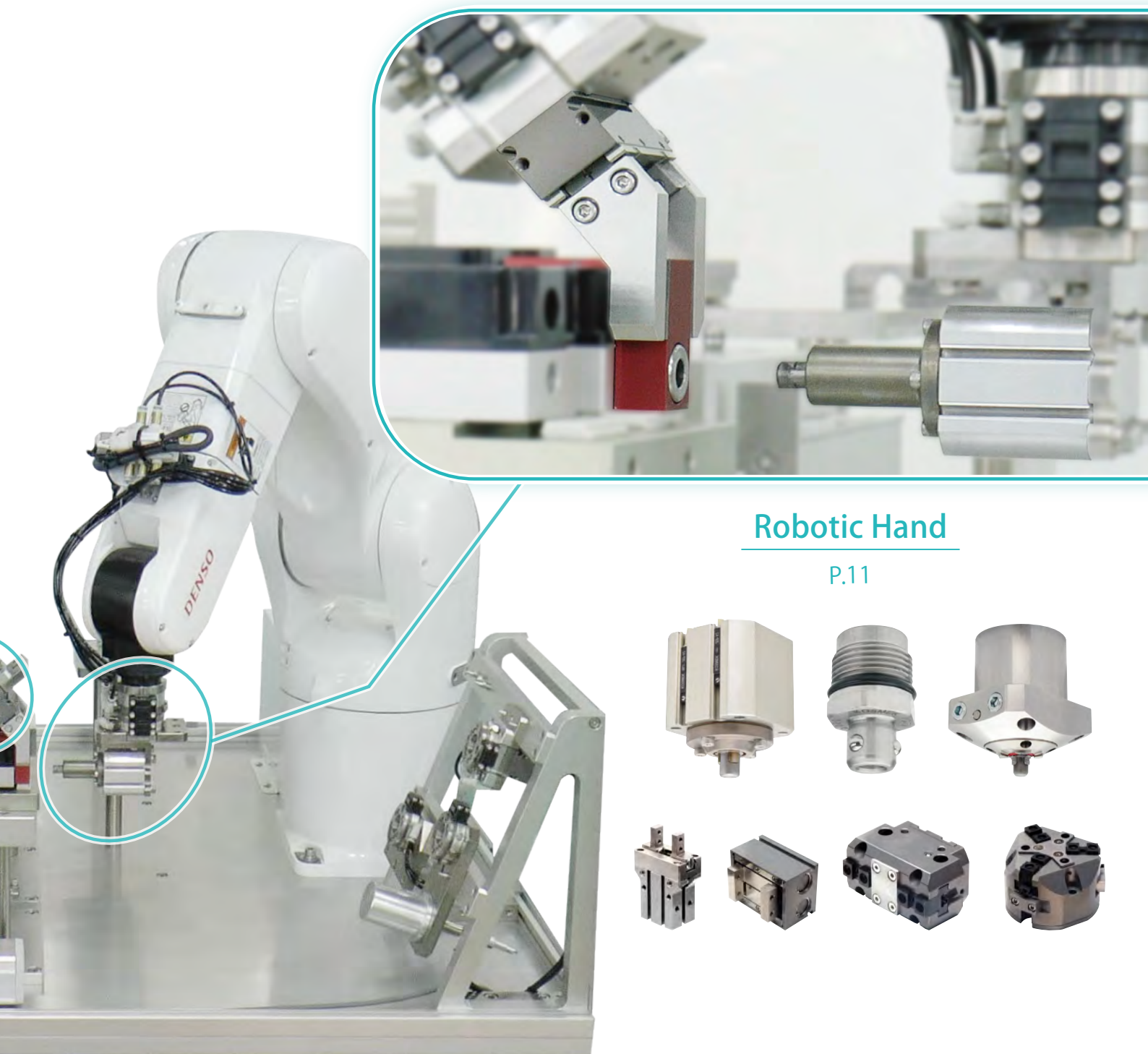
## Locating





# duction Map

## Transfer



### Robotic Hand

P.11



### Coupler

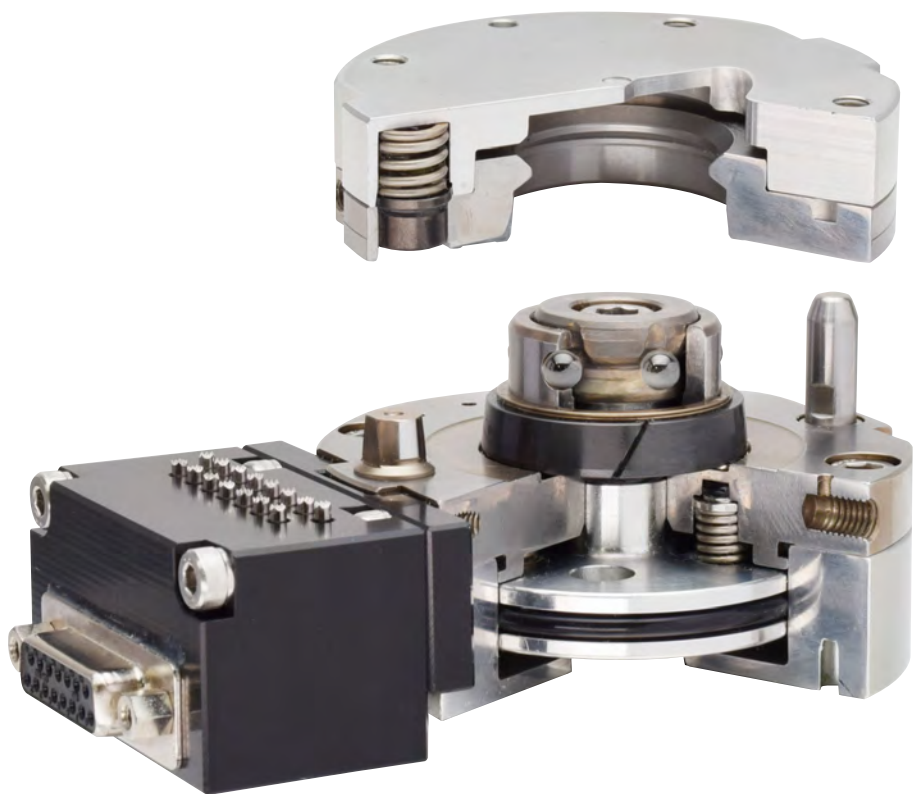
### Support / Back Up

### Clamp

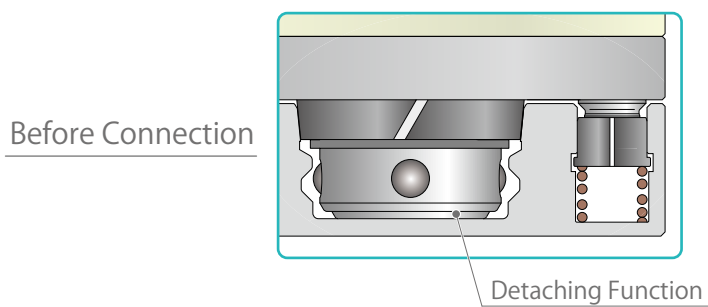


# The World's Only Robotic Hand Changer with Zero Backlash

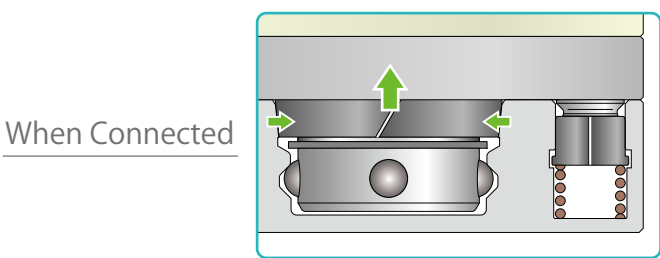
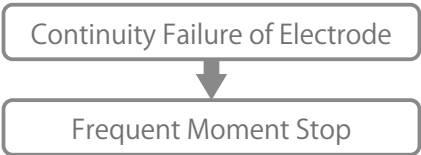
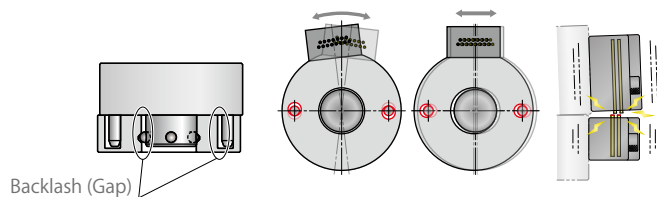
model SWR



## KOSMEK Exclusive Non-Backlash Mechanism

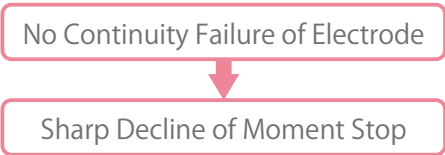
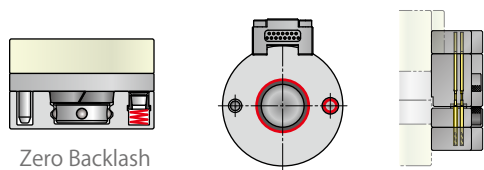


Backlash of Changer Causes Electrode Error  
Noise and Continuity Failure due to Friction of Contact Probe



### Zero-Backlash Connection with Dual Contact

Kosmek Hand Changer with No Backlash  
Prevents Electrode Error  
No Noise

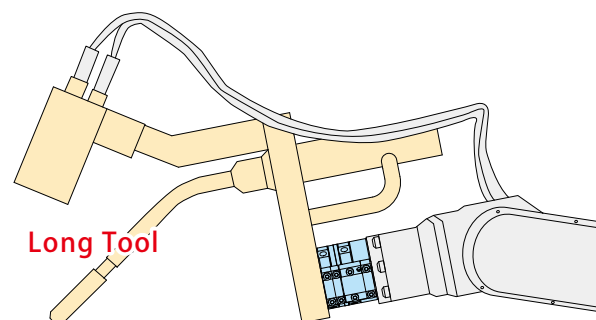




# Secures the Aimed Position

When Connected, Locating Repeatability is **3  $\mu$  m**

Even with long tools or hands, fluctuation of the edge is extremely small. It secures high accuracy processing even after tool change.

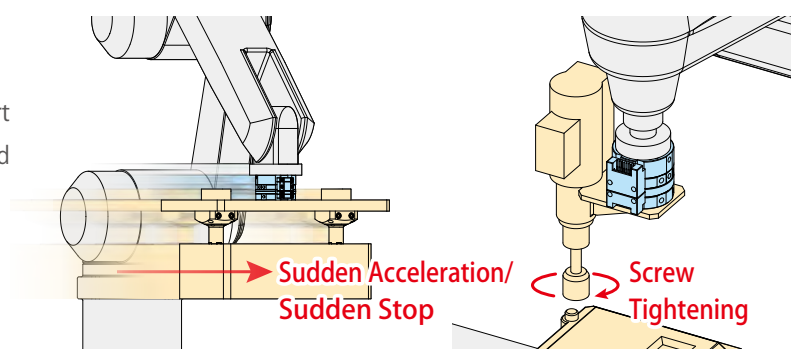


# 24-Hour Continuous Operation is Possible

Uncomparably High **Rigidity** and **Durability**

Strong to "bending" and "torsion" with high rigidity obtained by non-backlash function.

Also, high strength material is used in all the contact part of the master and tool so that it ensures high durability and 3  $\mu$  m locating repeatability even after 1 million cycles.



Allowable Weight : 3kg ~ 120kg

# A Variety of Electrode/Air Joint Options

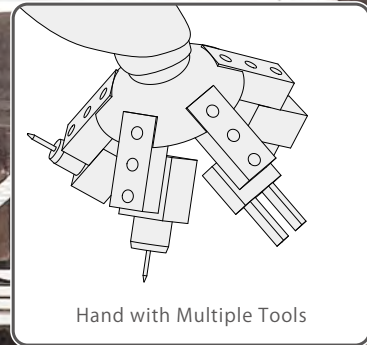
- Solder Terminal
- Solder Terminal with Cable
- Waterproof Electrode (Simple Waterproof)  
Only when connected : Equivalent to IP54
- D-sub Connector
- Circular Connector (Connector Based on JIS C 5432)
- Power Transmission Option (Connector Based on MIL-DTL-5015)
- High Current Transmission Option  
(Connector Based on MIL-DTL-5015)
- Waterproof Electrode (Noncontact Waterproof) IP67
- Air Joint (2 Port Option)
- Air Joint (4 Port • Solder Terminal Extensible Option)



# Advantages of Robotic Hand Changer in Assembly

## When Installing Multiple Tools on One Hand

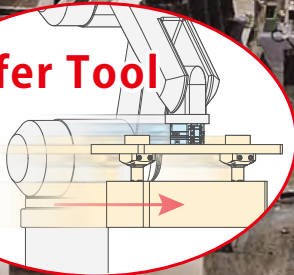
Interference	Frequent
Teaching	Complicated
Robot Size	Large



## When Installing Robotic Hand Changer

Interference	Occasional
Teaching	Simple
Robot Size	Small

### Transfer Tool



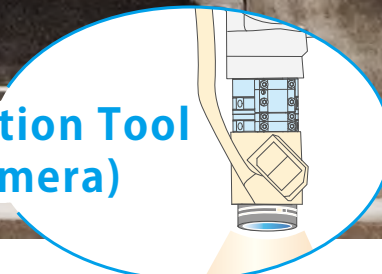
### Screw Tightening Tool



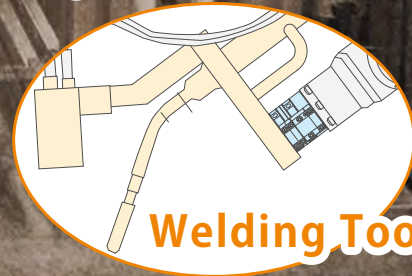
### Deburring Tool



### Inspection Tool (Camera)

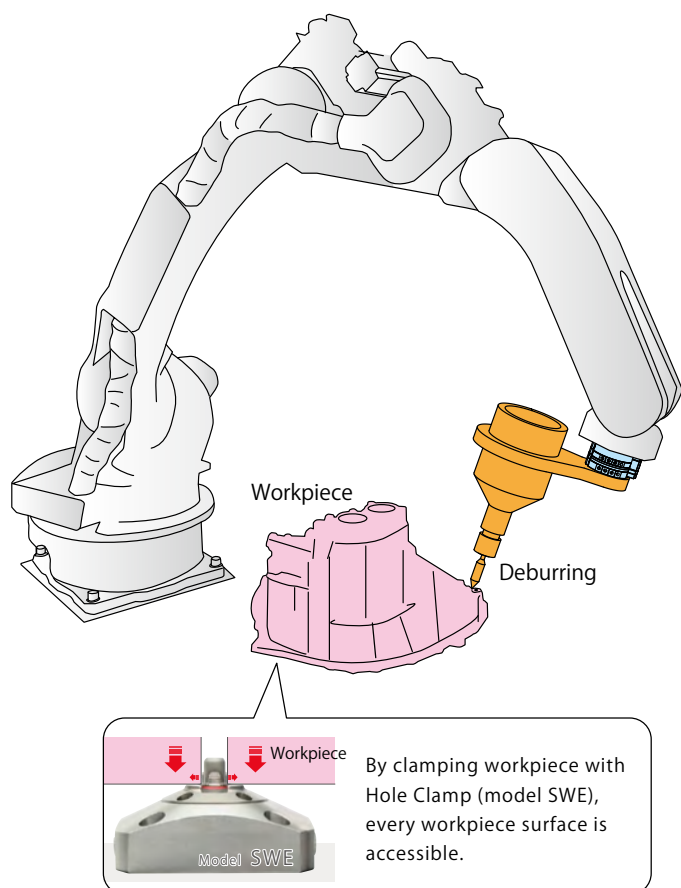


### Welding Tool





# Change the Transfer Hand and Deburring Tool with High Rigidity

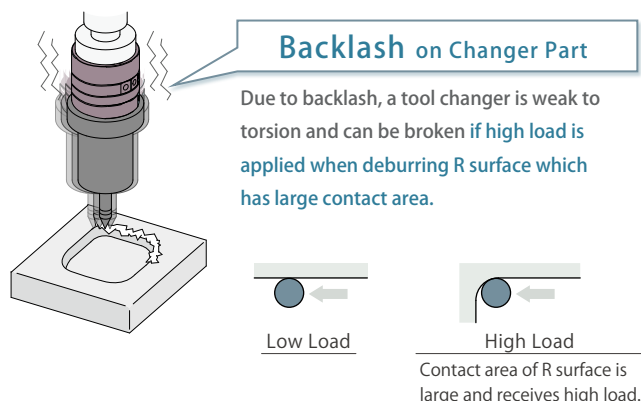


## Withstands Heavy Load with Non-Backlash Function

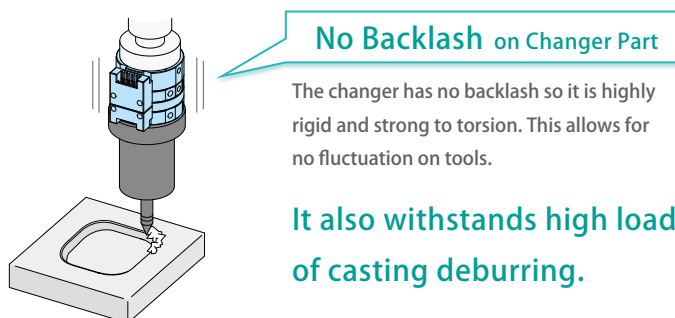
Strong to "bending" and "torsion" with high rigidity.

It ensures stable production even with offset transfer hand or heavy load deburring.

### General Changer

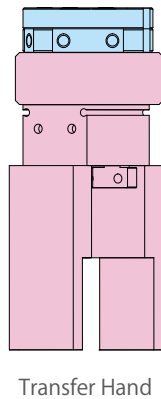
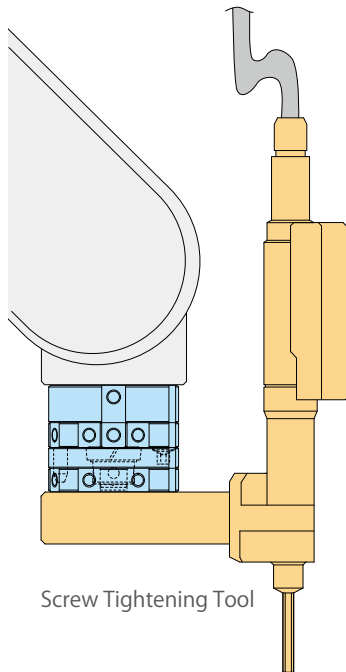


### Kosmek Robotic Hand Changer



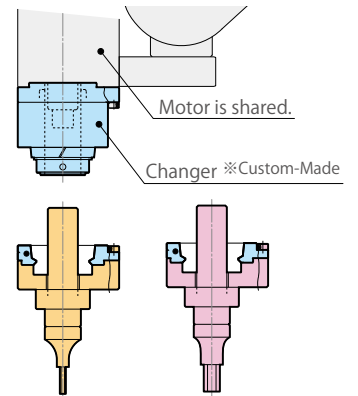


# Change the Transfer Hand and Screw Tightening Tool with High Rigidity

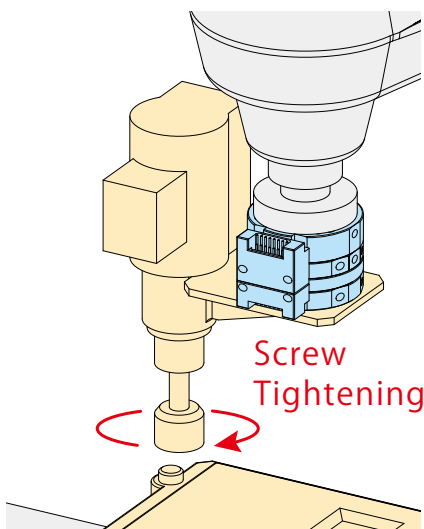


## Strong to Torque and Not Damaged by Impact Load

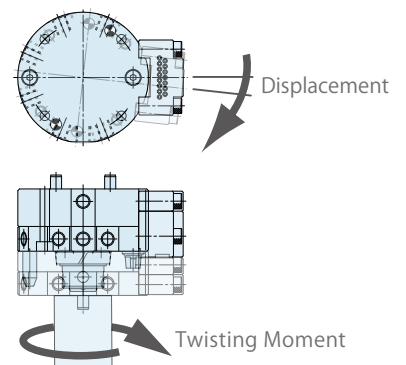
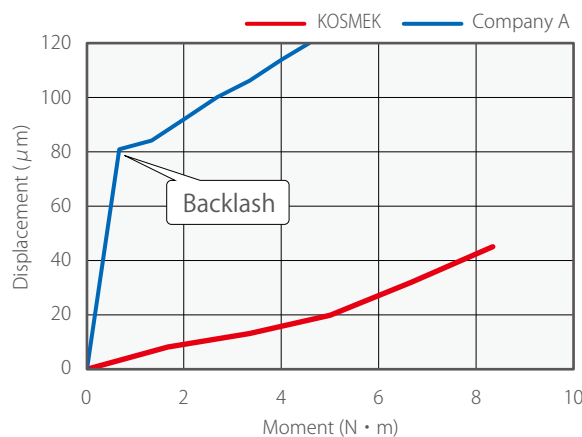
Exclusive non-backlash function is strong to torque and overcomes disadvantages of tool changers.  $3\mu\text{m}$  locating repeatability allows for highly reliable operation without fluctuation of the bit edge.



Changing only the bit part enables sharing the motor part.  
※Custom-Made Rodless Hollow Option

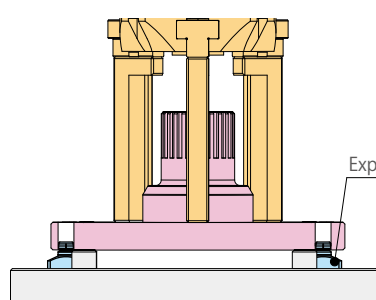
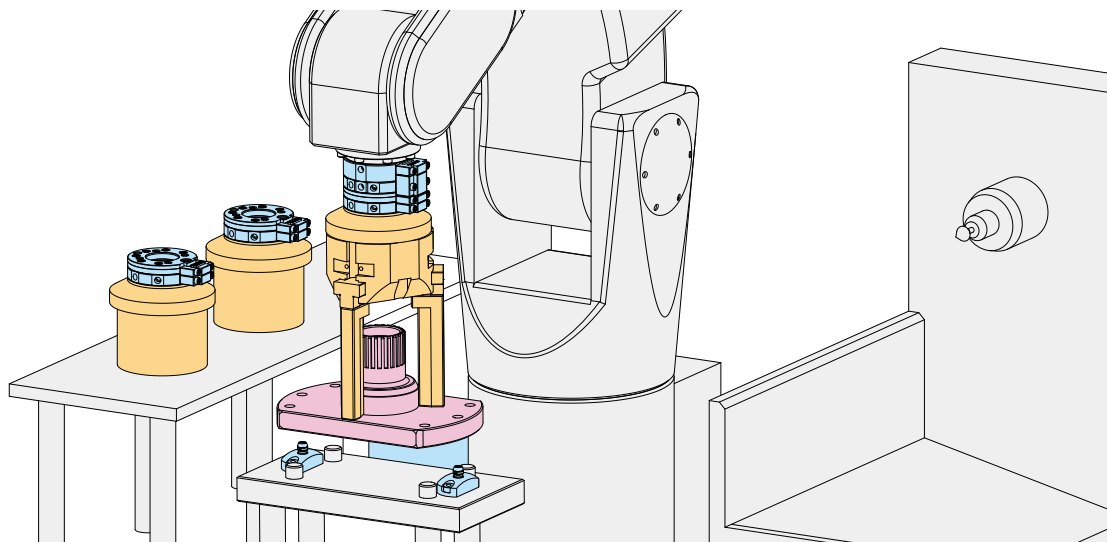


Moment and Displacement (Equivalent to 5kg Payload)

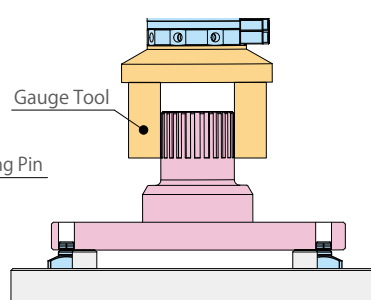


# Transfer → Inspection → Deburring

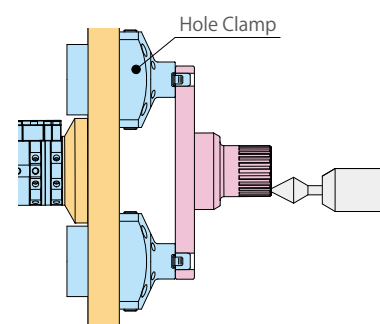
## One robot performs multiple operations.



Transfer to Inspection Process  
High Accuracy Locating with  
Expansion Locating Pin



Hand Change to the Gauge Tool  
for Dimension Inspection  
of the Spline Part



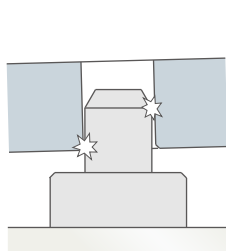
Hand Change to the Hand with  
Hole Clamp (※ Refer to P.17)  
for Deburring Process

## 3 $\mu$ m Locating Repeatability to Integrate Various Processes

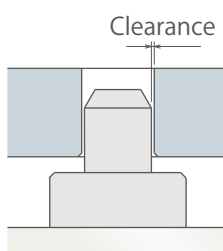
Locating workpiece side and tool side with high accuracy locating repeatability minimizes errors among processes.  
This allows for process integration.



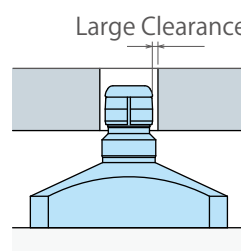
Model VWM  
Expansion Locating Pin



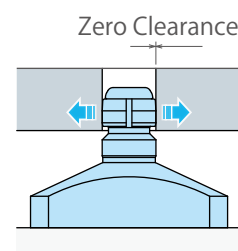
Loading/Unloading



Locating



Loading/Unloading (Released)



Locating (Locked)

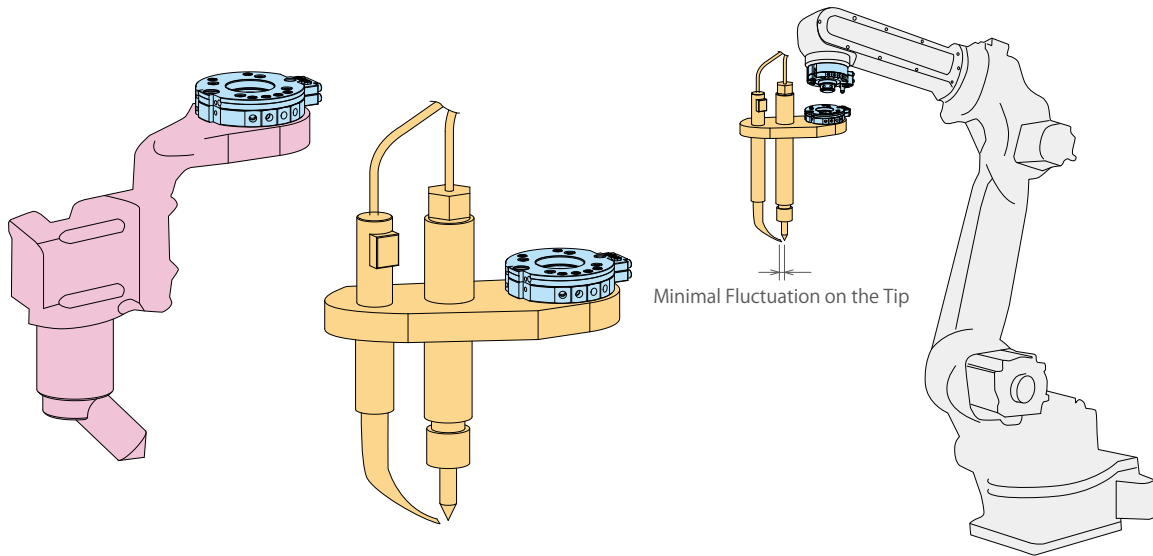
### Fixed Pin

Difficult to Load/Unload  
Some Clearance

### Expansion Locating Pin

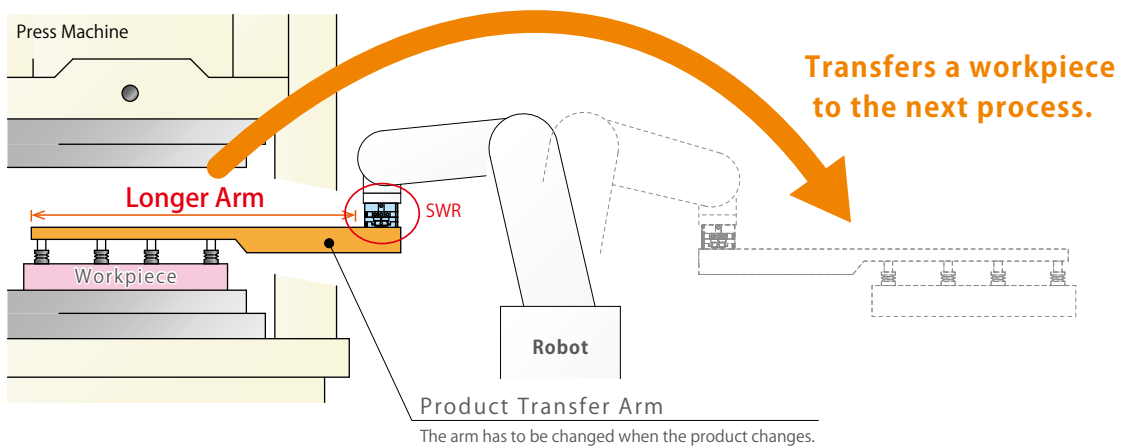
Easy to Load/Unload  
Zero Clearance and High Accuracy

## High Accuracy Exchange of Multiple Welding Torch

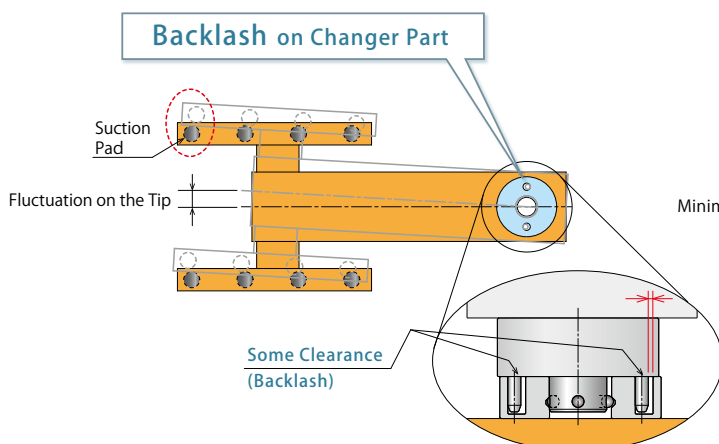


Even when changing longer torch, fluctuation on the tip is extremely small due to  $3\text{ }\mu\text{m}$  locating repeatability. This enables stable quality and appearance of products.

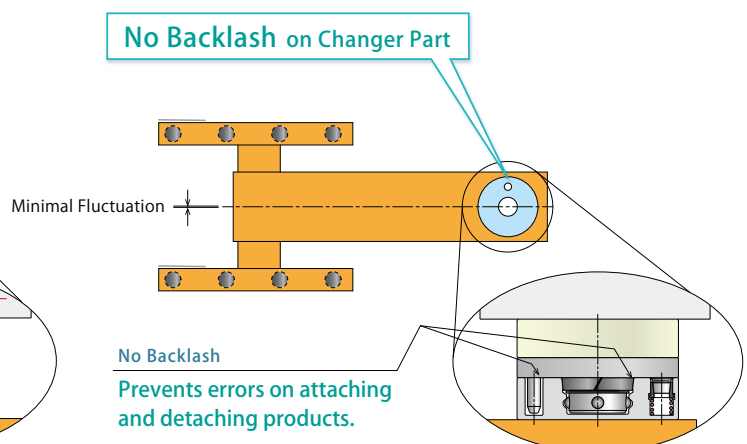
## High Accuracy Exchange of Transfer Arm



### General Changer

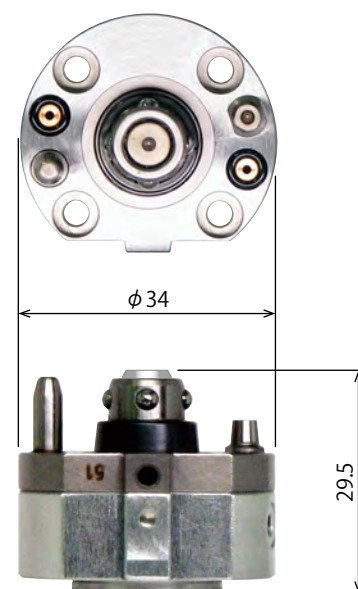
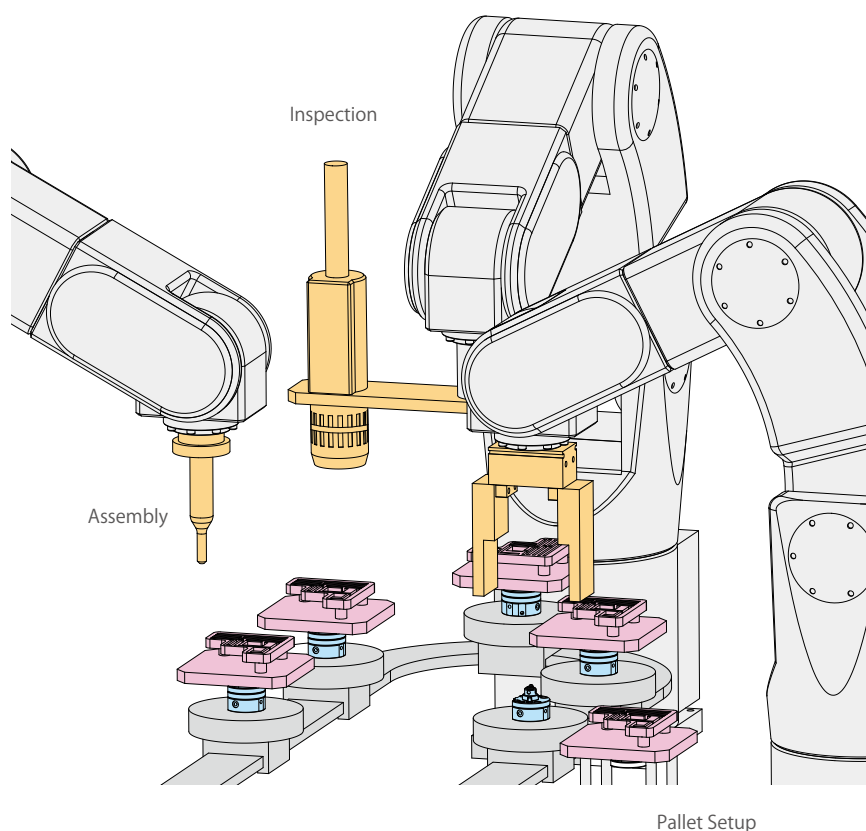


### Kosmek Robotic Hand Changer





# High Accuracy and Compact Pallet Change



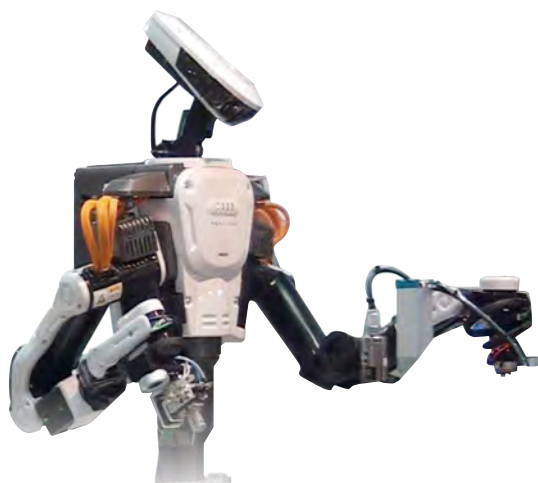
3kg Allowable Weight  
Robotic Hand Changer (Full Scale)  
Holding Force : 500N (At 0.5MPa)



## Locates and Clamps Simultaneously with One Unit

Locates and clamps a small pallet such as electronic component within a more compact space. Locating error between processes can be minimized with  $3\mu\text{m}$  locating repeatability.

# For Highly Versatile Humanoid Robot



Highly versatile humanoid robot requires multiple hands, and tool change is essential. Kosmek robotic hand changer ensures its lightness, high accuracy, high rigidity, and longer operation life.

## Suitable for Tool Changer with Camera Corrector

When adjusting position with camera corrector installed not on the tool side but on the robot side, accuracy of the changer affects the displacement amount of the tool end. Kosmek tool changer has high locating accuracy and this allows minimal error of camera corrector.

# Light•Compact Robotic Hand Series

For More Automation Solutions

**External Chuck**

**Internal Chuck : FA Pneumatic Hole Clamp**

## Kosmek Exclusive Internal Chuck Series

### FA Pneumatic Hole Clamp

Model WKH

Gripper expands and pulls workpiece in.

Light Body with Selectable Functions : Locating and Floating

Workpiece Diameter  $\phi 6 \sim \phi 14$  in 0.5mm increments.



Air Lock / Air Release

Self-Lock Function with Spring

### High-Power Pneumatic Hole Clamp

Model SWE

Can be used in machine tools. Gripper expands and pulls workpiece in.

High Power with Foreign Substance Prevention for Machine Tools, etc.

Workpiece Diameter  $\phi 6 \sim \phi 13$  in 0.5mm increments.



Air Lock / Air Release

Self-Lock Function with Spring

### Ball Lock Cylinder

Model WKA

Secures/Transfers a pallet and prevents falling off with steel balls.

Powerful, Light and Compact

Pull-Out Load Capacity (Holding Force) : 50N / 70N / 100N



Spring Lock / Air Release

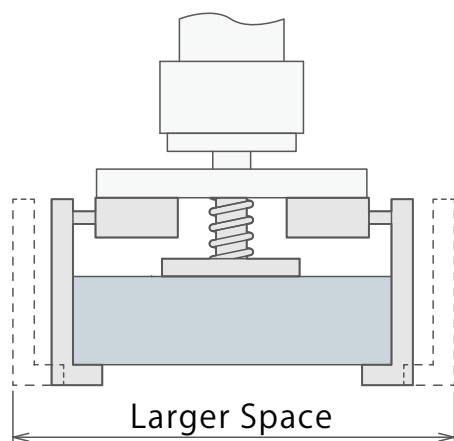


# Advantages of FA Pneumatic Hole Clamp

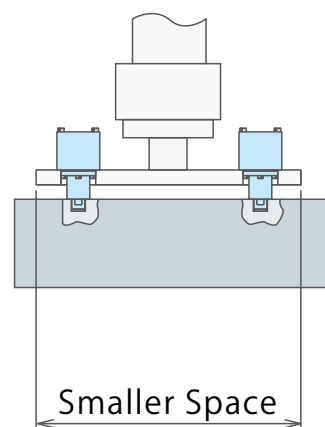
Model WKH FA Pneumatic Hole Clamp

Chuckling Inside of Workpiece Holes Allows for

**Compact** and **Light** Applications



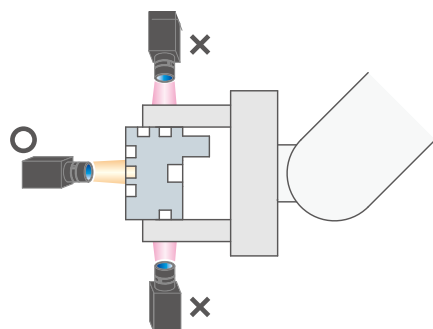
Loading/Lifting Hand with Parallel Hand/Linear Cylinder



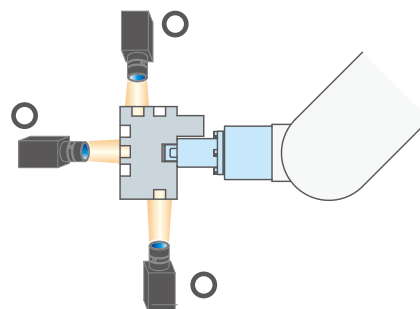
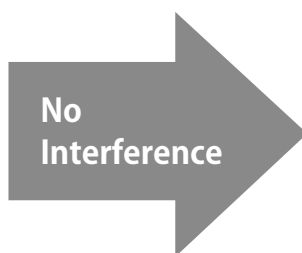
Hole Clamp is Compact and Light with Powerful Gripping Force

Chuckling Inside of Workpiece Holes Allows for

**Zero Interference** and **Minimum Setup**



Interferes with the hand when holding a workpiece.



5 Faces Accessible with No Interference

## External Chuck Series

### Robotic Hands

Model WPA / WPH / WPP / WPQ

Compact Body with High Gripping Force  
Highly Versatile Robotic Hands for Various Usage



Parallel Gripper  
Model WPA



Parallel Gripper  
Model WPH



Three-Jaw Chuck  
Model WPP



Two-Jaw Chuck  
Model WPQ

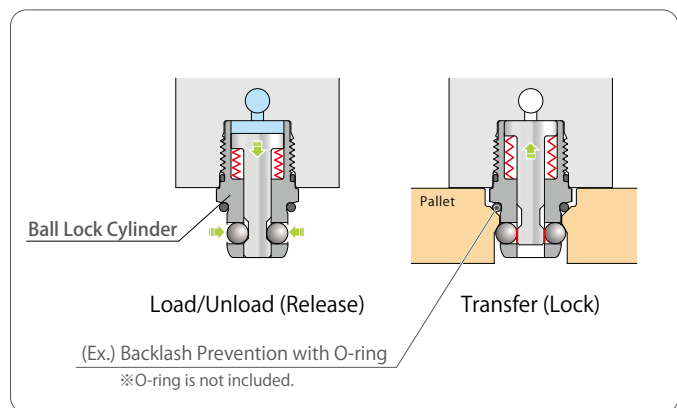
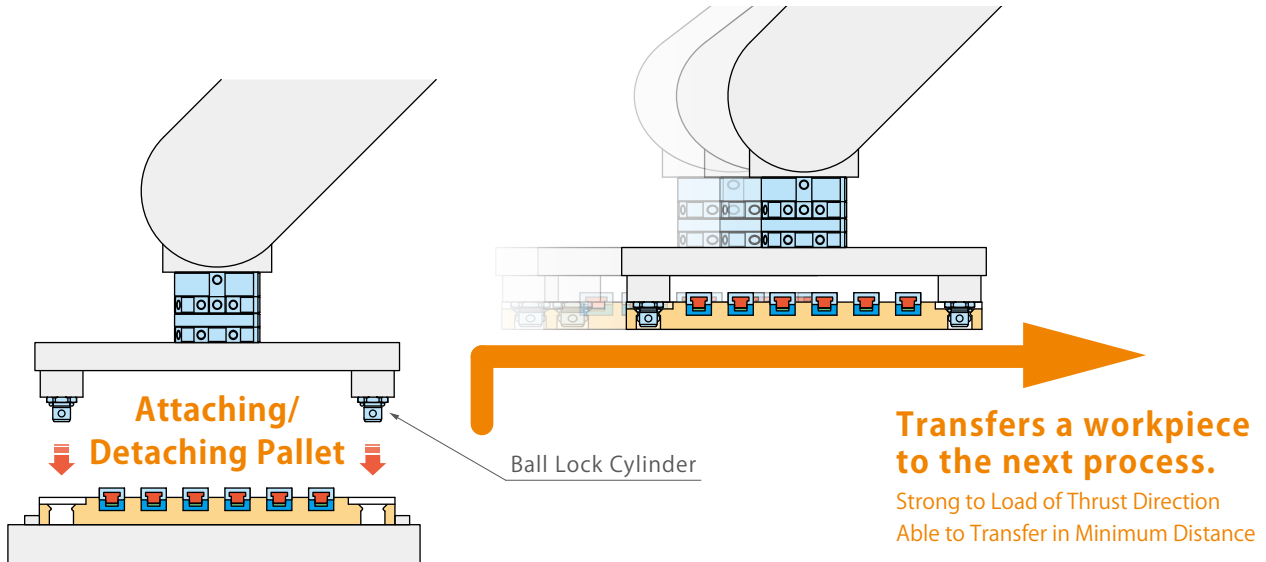
Air Lock / Air Release





# For Faster and More Accurate Pallet Transfer

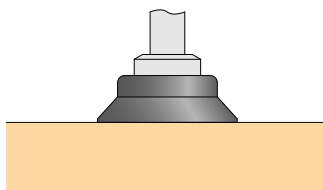
Model WKA Ball Lock Cylinder



Current Method

Suction Pad

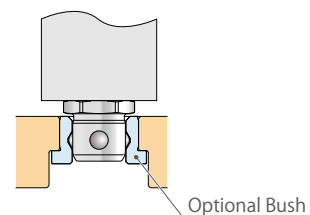
Limited Speed  
Low Suction Force



Suction Pad has critical weight limits and speed limits due to low suction force. Also, the suction force is affected by the roughness of surface and is decreased due to deterioration and friction.

Ball Lock Cylinder

Powerful • Light • Compact with Mechanical Lock  
Single Circuit for Positive Pressure Only



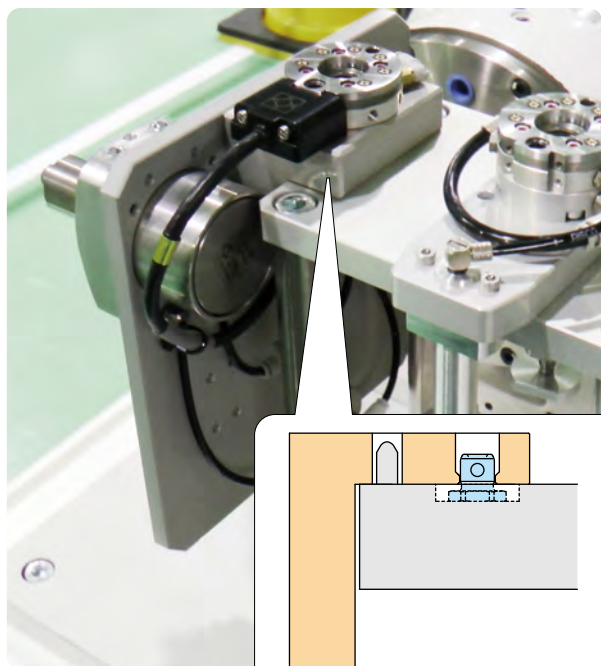
Requires Hole Machining

Optional bush simplifies hole machining.

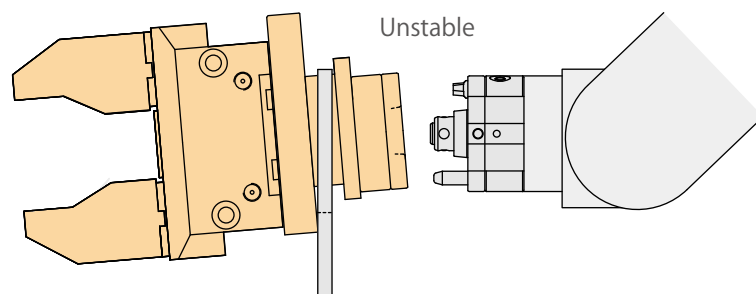


# For More Compact Tool Stocker and More Reliable Hand Change

Model WKA Ball Lock Cylinder

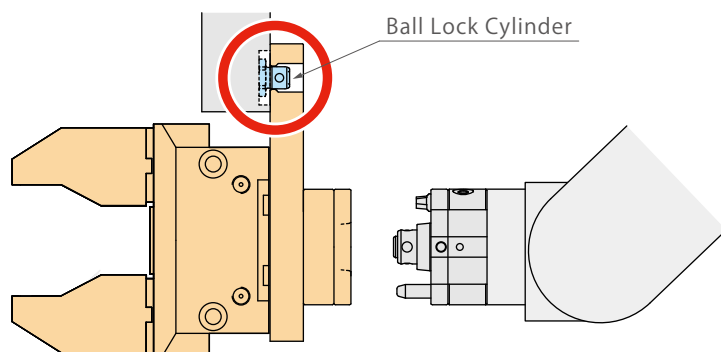


Offset Hand



Hook-Type Stand

The hand placed on the hook is inclined and causes frequent errors when attaching/detaching.



Ball Lock Cylinder

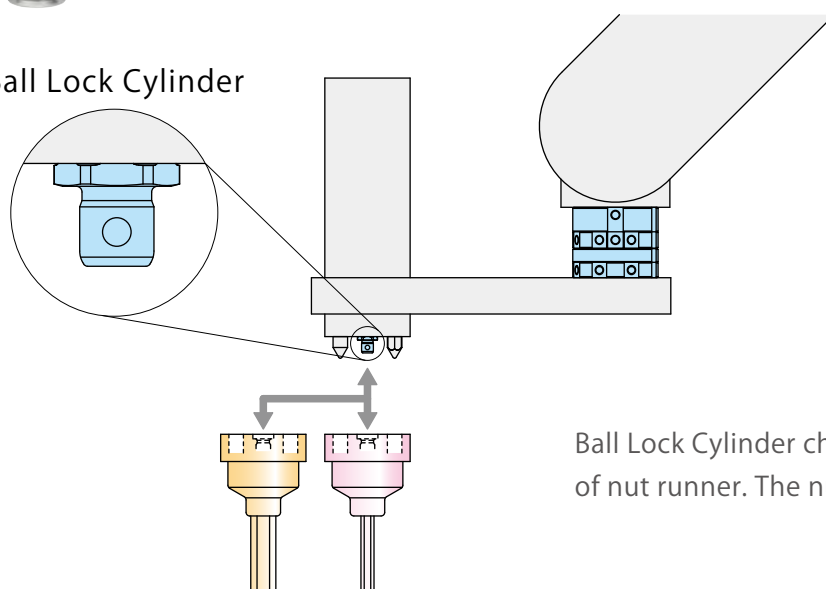
Keeps it horizontal even with offset hand.  
Prevents error at changer attaching/detaching.



# Bit Change of Nut Runner

Model WKA Ball Lock Cylinder

Ball Lock Cylinder

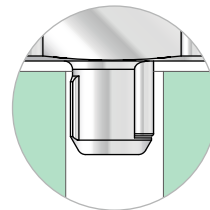
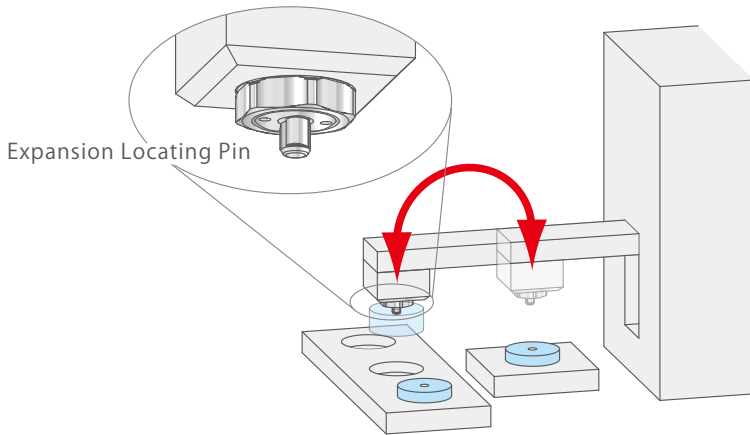


Ball Lock Cylinder changes only the bit part of nut runner. The nut runner part is shared.

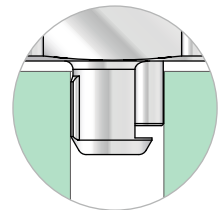


## For Internal Chuck of Smaller Diameter

Model VRA/VRC Expansion Locating Pin



Release



Lock

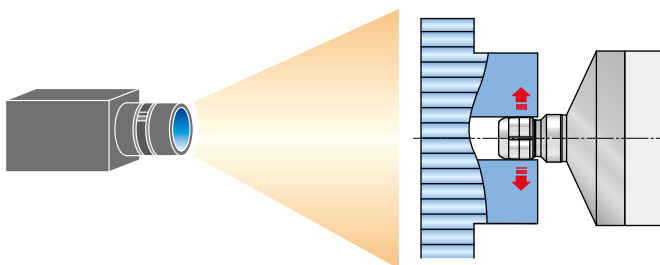
## High Accuracy Locating Prevents Assembly Errors of Small Components

Expansion Locating Pin has high accuracy locating (repeatability:  $3\text{ }\mu\text{m}$ ) suitable for assembly of small electronic components (motor parts, camera module, etc.) which are about the size of the tip of the finger. This allows for more compact applications.

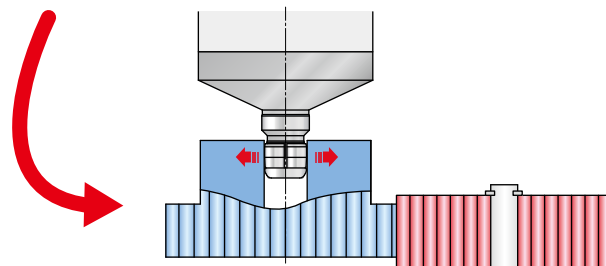


## For Internal Chuck with Locating

Model VWM Expansion Locating Pin



After checking the position by camera, keeps the proper position to install it.



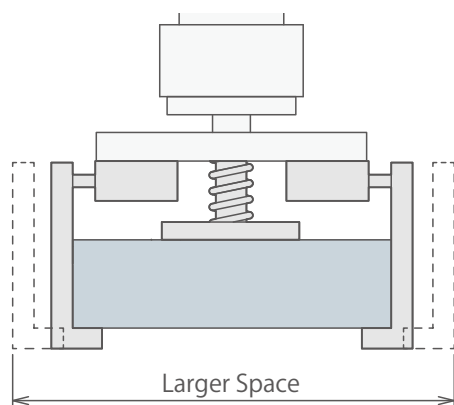
## Suitable for Workpiece Image Inspection

Clamps the inner diameter of workpiece hole and locates with high accuracy (locating repeatability  $3\text{ }\mu\text{m}$ ). Allows for compact applications and improves accuracy of inspection and assembly.



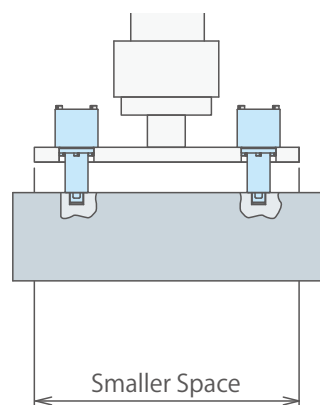
## From Light to Heavy Workpiece

### Current Method



Loading/Lifting Hand with Parallel Hand/Linear Cylinder

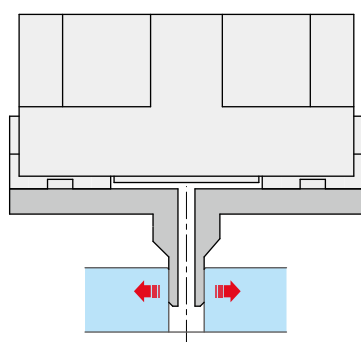
### FA Pneumatic Hole Clamp



Compact and Light with Powerful Gripping Force  
Small Stroke with High Operation Speed

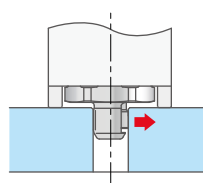
## For Light Workpiece with Small Diameter

### Current Method



Heavy • Large • Low Accuracy  
Thin lever tip is not suitable for smaller diameter hole.  
Low rigidity of the gripper tip has low durability.

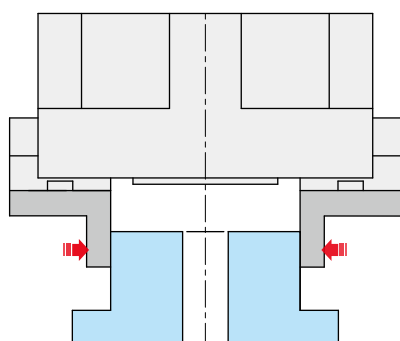
### Expansion Locating Pin



Light • Compact • High Accuracy  
Easy to Control with Spring Lock • Air Release

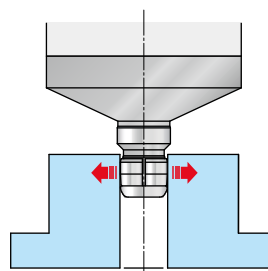
## For Workpiece which Requires Locating Accuracy

### Current Method



Heavy • Large • Low Accuracy  
Clamping part interferes with outer inspection or approach.

### Expansion Locating Pin

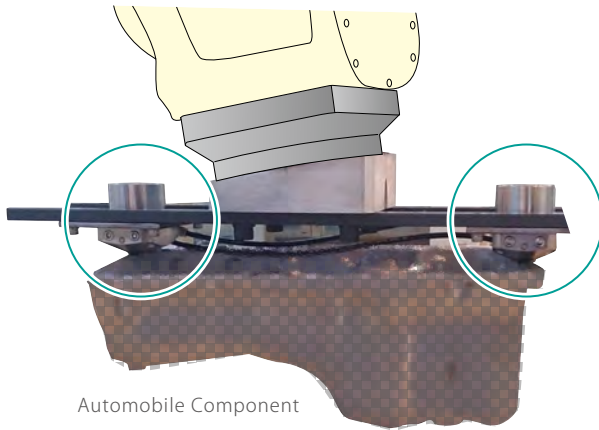


Light • Compact • High Accuracy  
No interference on outer surface and suitable for inspection, etc.  
Small Stroke with High Operation Speed



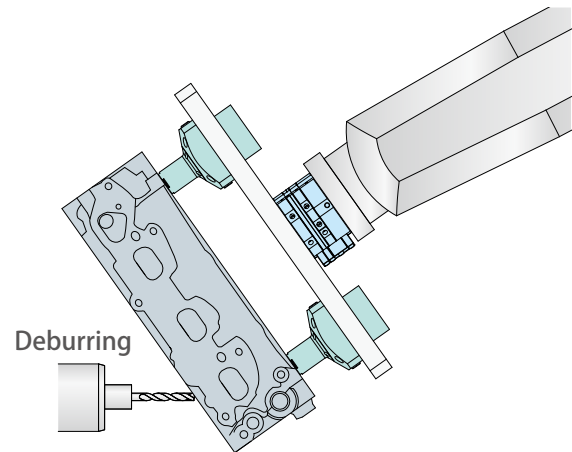
# For Minimizing Weight and Space of Heavy Workpiece Transfer Hand

Model SWE High-Power Pneumatic Hole Clamp



Automobile Component

Transfer Heavy Workpiece with Light Hand



Deburring

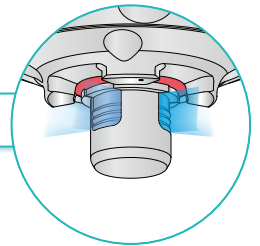
5 Faces Accessible with No Interference

## Energy Saving with Light Hand

Reducing the weight of the hand increases the robot speed and maximizes utilization of the robot payload leading to downsizing of the robot size.

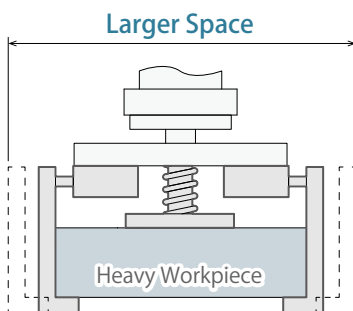
### Air Blow

Hole clamp and workpiece hole can be cleaned by air blow.



### Current Method

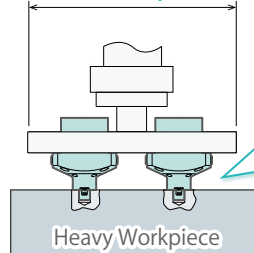
Linear Cylinder



Heavy•Large

### Transfer Hand with High-Power Pneumatic Hole Clamp

Smaller Space



Reduce the Hand Weight

Gripper expands and pulls workpiece in.



Clamping Force **2 kN** (Air Pressure : 0.45 MPa)

Even at zero pressure, it will stay locked with internal spring and prevent falling of workpieces.

Clamping Force at 0MPa **0.25 kN**

Light•Compact•High Accuracy  
Self-lock function ensures safety.

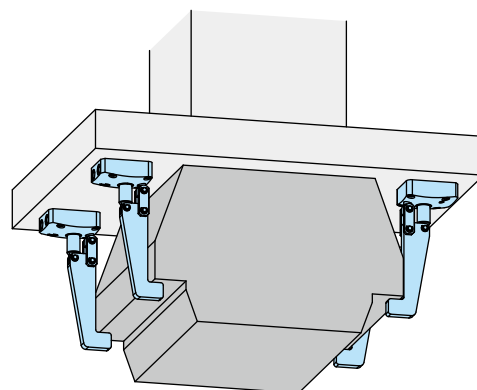


# For Minimizing Weight and Space of Irregular Shaped Workpiece Transfer Hand

Model WCE High-Power Pneumatic Link Clamp



Automobile Component



## Compact and High-Power Clamp Cylinder with Self-Locking

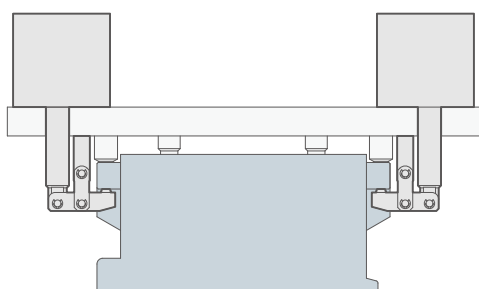
Compact and high-power clamp cylinder with exclusive mechanical locking structure.

Internal self-locking holds workpiece even when air supply is stopped.

Introduced for Irregular Shaped Workpiece Transfer Hand

Current Method

General  
Air Cylinder



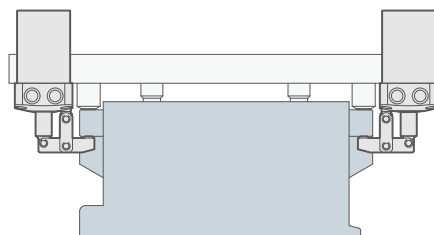
Heavy • Large

High-Power Pneumatic Clamp

Exerts Equivalent Clamping Force  
with Mechanical Lock

Fixture Weight  
About 10% Reduced

※ Reference when  
workpiece size is 300×260.



Light • Compact • Powerful  
Reduce the Loads to Transfer Equipment

# Automation Products

For More Automation Solutions

## Instant Change of Workpiece • Pallet



Model SWT

### Pallet Clamp / Screw Locator

Model SWT / VXF

Clamps and Locates a Pallet and Plate

Locating Repeatability : 3  $\mu$ m



Model SWT  
Location Clamp

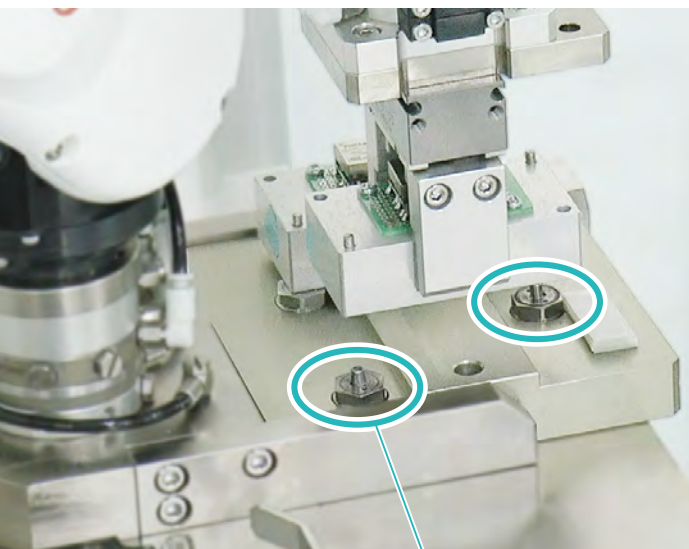
Air + Spring Lock / Air Release  
Self-Lock Function with Spring



Model VXF  
Screw Locator

Manual Lock / Manual Release

## High Accuracy Locating of Workpiece • Pallet



Model VRA

### Expansion Locating Pin

Model VRA / VRC / VWM / VX

Zero Clearance with High Accuracy Locating Pin

Workpiece Hole Diameter :  $\phi 3 \sim \phi 20$



Model VRA/VRC  
Locating Repeatability 3  $\mu$ m

Spring Lock / Air Release



Model VWM  
Locating Repeatability 3  $\mu$ m

Air + Spring Lock / Air Release



Model VX  
Locating Repeatability 5  $\mu$ m

Manual Lock / Manual Release



## Powerful Support for Unstable Parts

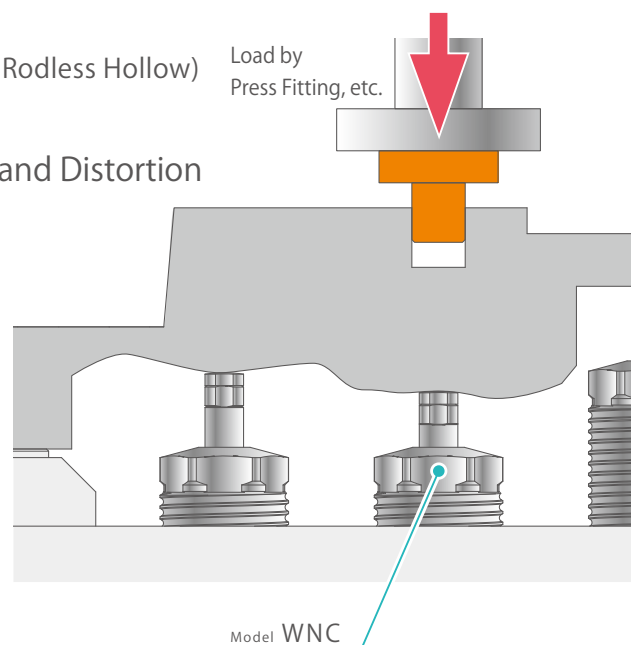
### High-Power Pneumatic Work Support (Standard / Rodless Hollow)

Model WNC / WNA

#### Firmly Supports the Workpiece and Prevents Chattering and Distortion

Locks when the tip of work support contacts a workpiece.

Securely supports a workpiece with various heights.



## Clean and Powerful Clamping with Air Pressure • Mechanical Lock

### High-Power Pneumatic Clamp

Model WHE / WCE / SWE

#### Powerful Clamping Force with Air Pressure and Holding Force with Mechanical Lock

Clamping force which withstands the load with holding force does not distort the workpiece.



Model WHE  
Swing Clamp



Model WCE  
Link Clamp



Model SWE  
Hole Clamp

## Auto Coupler to Supply Positive • Negative Pressure

### Auto Coupler

Model JVA/JVB JVC/JVD JVE/JVF



#### Compact Coupler to Connect Hydraulic/Pneumatic Circuits

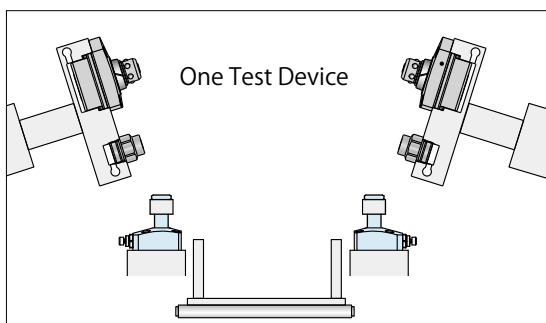
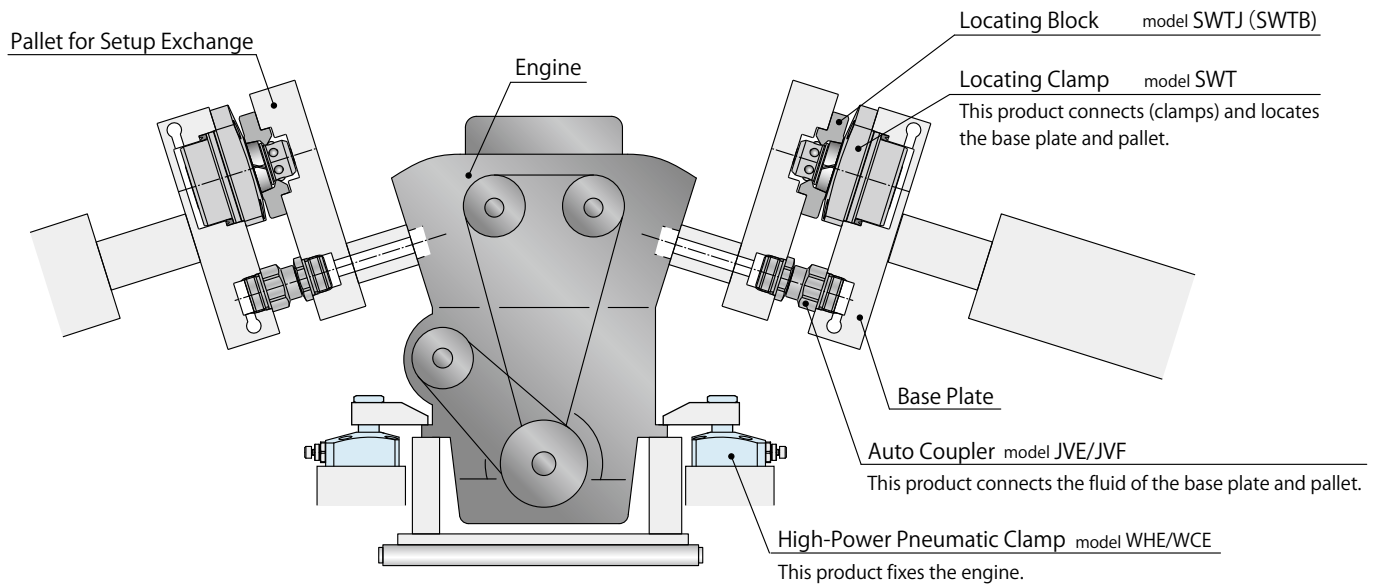
Connection Stroke : 1mm Commonly Used with Screw Locator and Pneumatic Location Clamp



# Automatic Setup of Cold Oil Test Bench

Model SWT / JV□ / WHE

Location Clamp / Auto Coupler / High-Power Pneumatic Swing Clamp

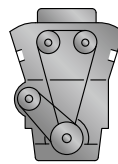


Standardize the Workpieces

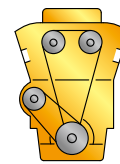


Change the Pallets

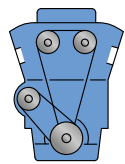
Engine A



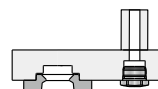
Engine B



Engine C



Pallet for Engine A



Pallet for Engine B

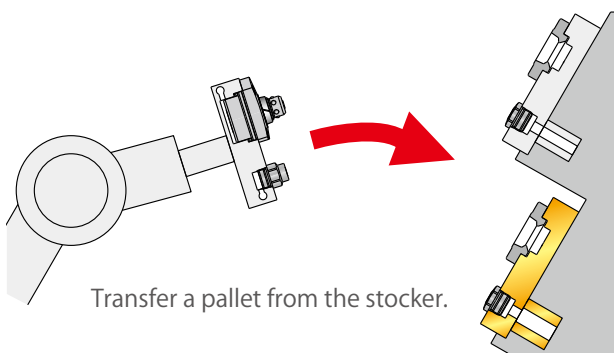


Pallet for Engine C



## Productivity Improvement and Application Standardization with Automatic Setup

In an engine cold test (engine function test in non-fired state), every time an engine model changes, testing device had to be exchanged due to the design of the testing device. Applying pneumatic location clamp to a part (the joint part of an engine and testing device.) of testing device enables the automatic setup exchange (time reduction in setup) by the robot.



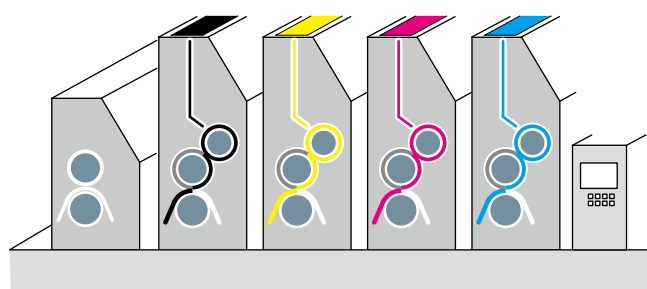
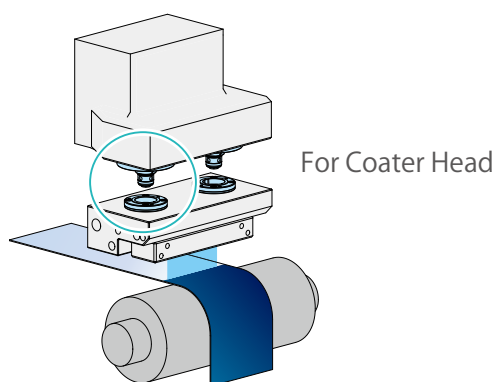
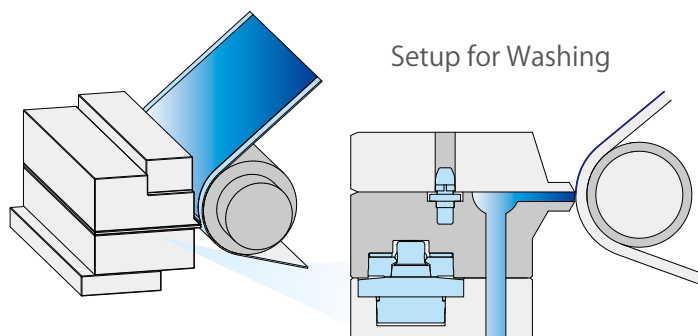
### Automatic Pallet Change with Robot

With high accuracy (locating repeatability:  $3 \mu\text{m}$ ) of Location Clamp, dislocation of the pallet is minimum during setup, and this allows for almost the same operation. Also, it ensures safety with self-locking to hold a pallet without air supply.



# Automatic Setup of Coating • Printing Device

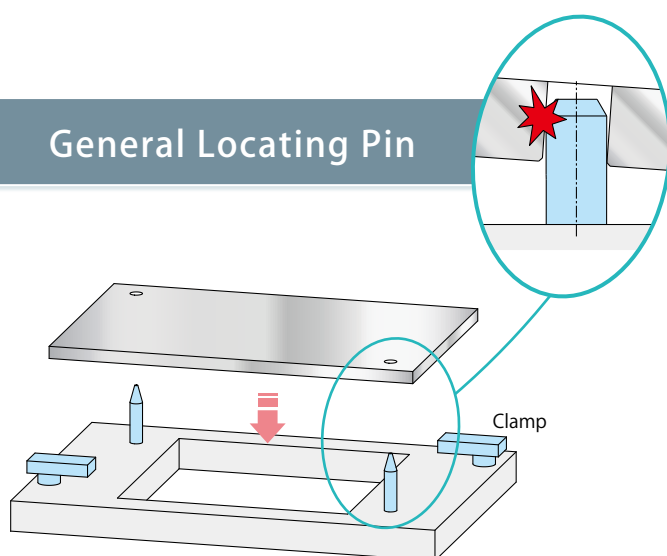
Model SWT Location Clamp



## Reduces Setup Time and Ensures High Coating/Printing Quality

With  $3\mu\text{m}$  locating repeatability it minimizes dislocation during coating unit/roller unit setup and keeps high quality of coating and printing.  
Suitable for automation with simultaneous locating and clamping.

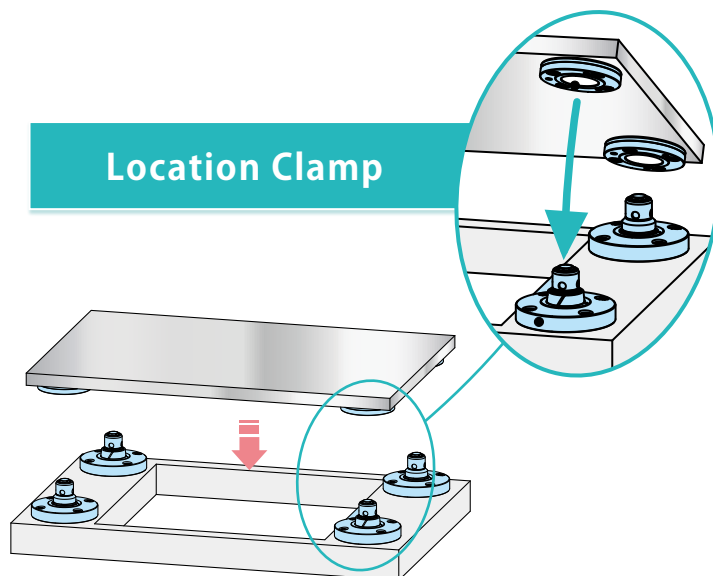
### General Locating Pin



### Locating Pin + Clamp

Unstable Locating Accuracy (It depends on clearance.)  
Requires high accuracy transfer due to interference.  
Requires space for clamps.

### Location Clamp



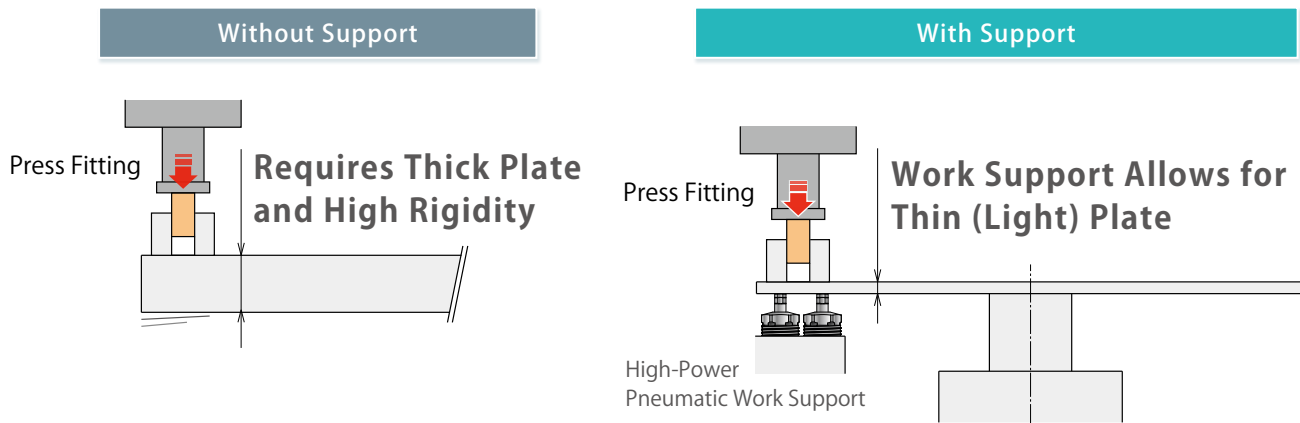
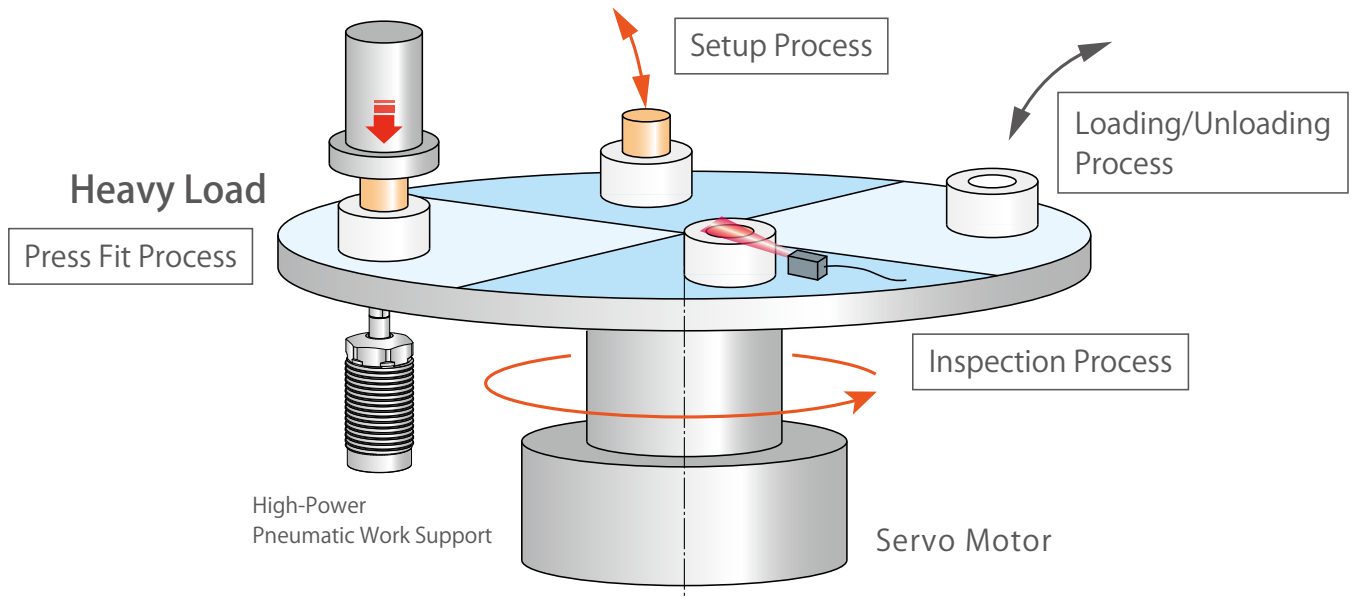
### Pneumatic Location Clamp

High Accuracy (Locating Repeatability :  $3\mu\text{m}$ )  
Lift-up function enables to set workpiece without obstruction.  
Locates and clamps at the same time.



# For Minimizing Application with Partial Improvement of Rigidity

Model WNC High-Power Pneumatic Work Support



## Supports Load to Reduce the Size of Application and Cost

When load is applied on only one process of rotary table, another application with rigidity is required to withstand the load. Also, since the rotating torque increases, a larger servo motor is required and application has to be larger and more expensive.

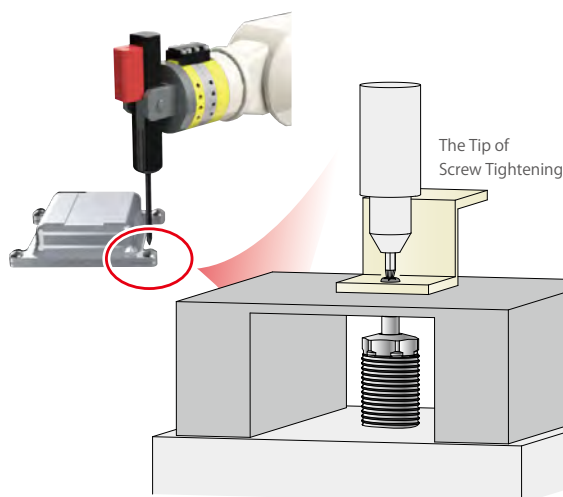
Supporting the load with high-power pneumatic support enables a thinner rotary table and compact servo motor. This allows for more compact application, cost reduction and quality improvement.



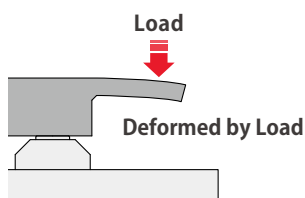


# Backup of Screw Tightening

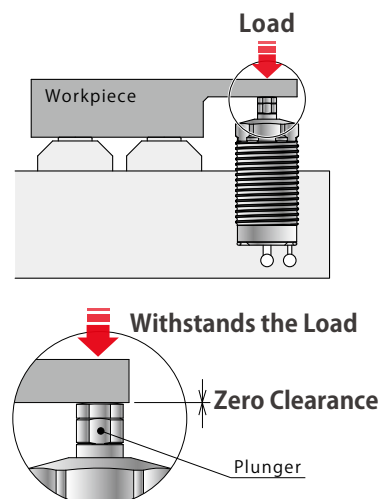
Model WNC High-Power Pneumatic Work Support



## Without Support



## With Support



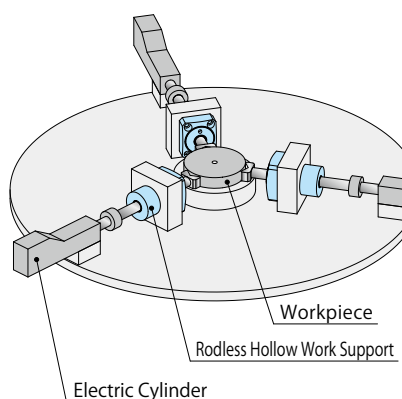
## Prevents Deformation Caused by Pressing and Improves Quality

Work support prevents dislocation and deformation caused by load during assembly and/or press fitting. Contact force (force with internal low spring) applied to a workpiece is only slight. It supports a workpiece without applying much load.

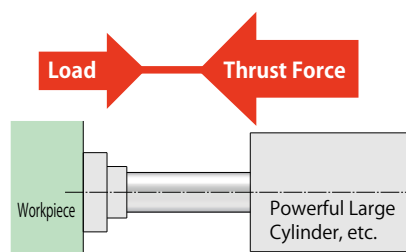


# Backup of Automatic Setup with Electric Cylinder

Model WNA Rodless Hollow Work Support



## Without Support

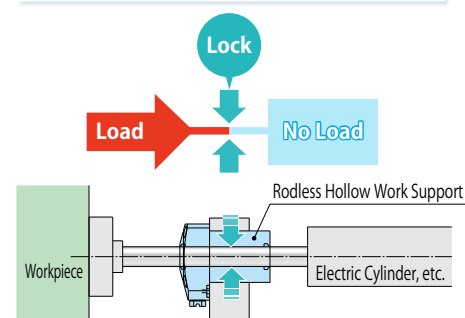


Requires powerful cylinder to withstand the load.

Excessive thrust is applied to the workpiece.

Overload can be applied to the cylinder.

## With Support



Work support grips and holds the rod so that the cylinder does not receive the load. Compact and low power cylinder can be selected.

Able to use the cylinder with minimal thrust.

Does not transmit the load to the cylinder and prevents the overload.



# Single Setup of Table Press Machine (High Accuracy Locating + Clamping)

Model SWT / VXF Air Location Clamp / Screw Locator

General Fixed Pin Manual Tightening Accuracy Correction Required	Screw Locator No Accuracy Correction Required (Manual Tightening)	Air Location Clamp Locking in Mere Seconds No Accuracy Correction Required
Table Press Machine Upper Die (No Setup Change)	Table Press Machine Upper Die (No Setup Change)	Table Press Machine Upper Die (No Setup Change)
<p>Round Pin      Diamond Pin</p>	<p>No Backlash!</p>	<p>No Backlash!</p>
<p>Clearance</p>	<p>Elastic Ring Close Contact</p> <p>&lt;Locating Completed&gt;</p>	<p>When Loading Pallet (Lift Up)      When Locking</p>
<p>Unreliable Accuracy and Repeatability due to Clearance</p> <p>Hard to Load • Easy to Get Stuck</p> <p>Manual Tightening</p>	<p>3 <math>\mu</math>m Locating Repeatability</p> <p>Easy Loading/Unloading with Taper Pin</p> <p>Manual Tightening</p>	<p>3 <math>\mu</math>m Locating Repeatability</p> <p>Drastic Reduction of Setup Time</p> <p>Suitable for Automation</p>

## Productivity and Quality Improvement with High Accuracy Setup

Setup time can be drastically reduced with pallet clamp that locates with high accuracy (locating repeatability) and clamps simultaneously for high accuracy locating of lower die. When clamping by manual tightening, screw locator can be used for high accuracy locating (locating repeatability: 3  $\mu$ m).

# Company Profile



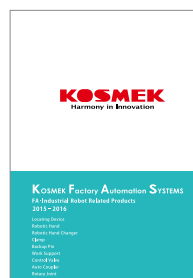
KOSMEK LTD. Head Office

Company Name	KOSMEK LTD.
Established	May 1986
Capital	¥99,000,000
Chairman	Keitaro Yonezawa
President	Tsutomu Shirakawa
Employee Count	250
Group Company	KOSMEK LTD. KOSMEK ENGINEERING LTD. KOSMEK (USA) LTD. KOSMEK EUROPE GmbH KOSMEK (CHINA) LTD. KOSMEK LTD. - INDIA
Business Fields	Design, production and sales of precision products, and hydraulic and pneumatic equipment
Customers	Manufacturers of automobiles, industrial machinery, semiconductors and electric appliances
Banks	Resona bank, Tokyo-Mitsubishi bank, Ikeda bank

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	EUROPE	<b>TEL. +43-463-287587</b>	<b>FAX. +43-463-287587-20</b>
	KOSMEK EUROPE GmbH	Schleppeplatz 2 9020 Klagenfurt am Wörthersee Austria	
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	Thailand Representative Office	67 Soi 58, RAMA 9 Rd., Suanluang, Suanluang, Bangkok 10250, Thailand	
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"FA • Robotic Automation Products Complete Catalog".  
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Complete Catalog  
Catalog No.FA0020□-□-GB

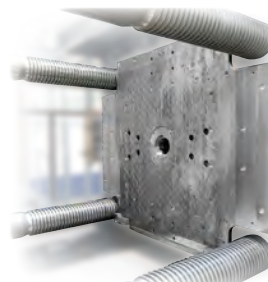
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We have various types of hydraulic and pneumatic products. Please let us know your requirements, and we will make it happen.



### KOSMEK WORK CLAMPING SYSTEMS

MACHINE TOOL RELATED PRODUCTS



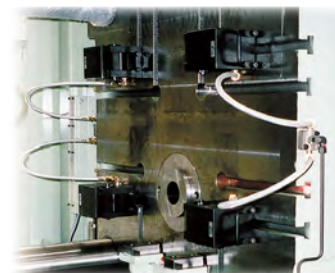
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FOR INJECTION MOLDING MACHINES



### QUICK DIE CHANGE SYSTEMS

FOR PRESS MACHINES



### DIECAST CLAMPING SYSTEMS

FOR DIECAST MACHINES

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