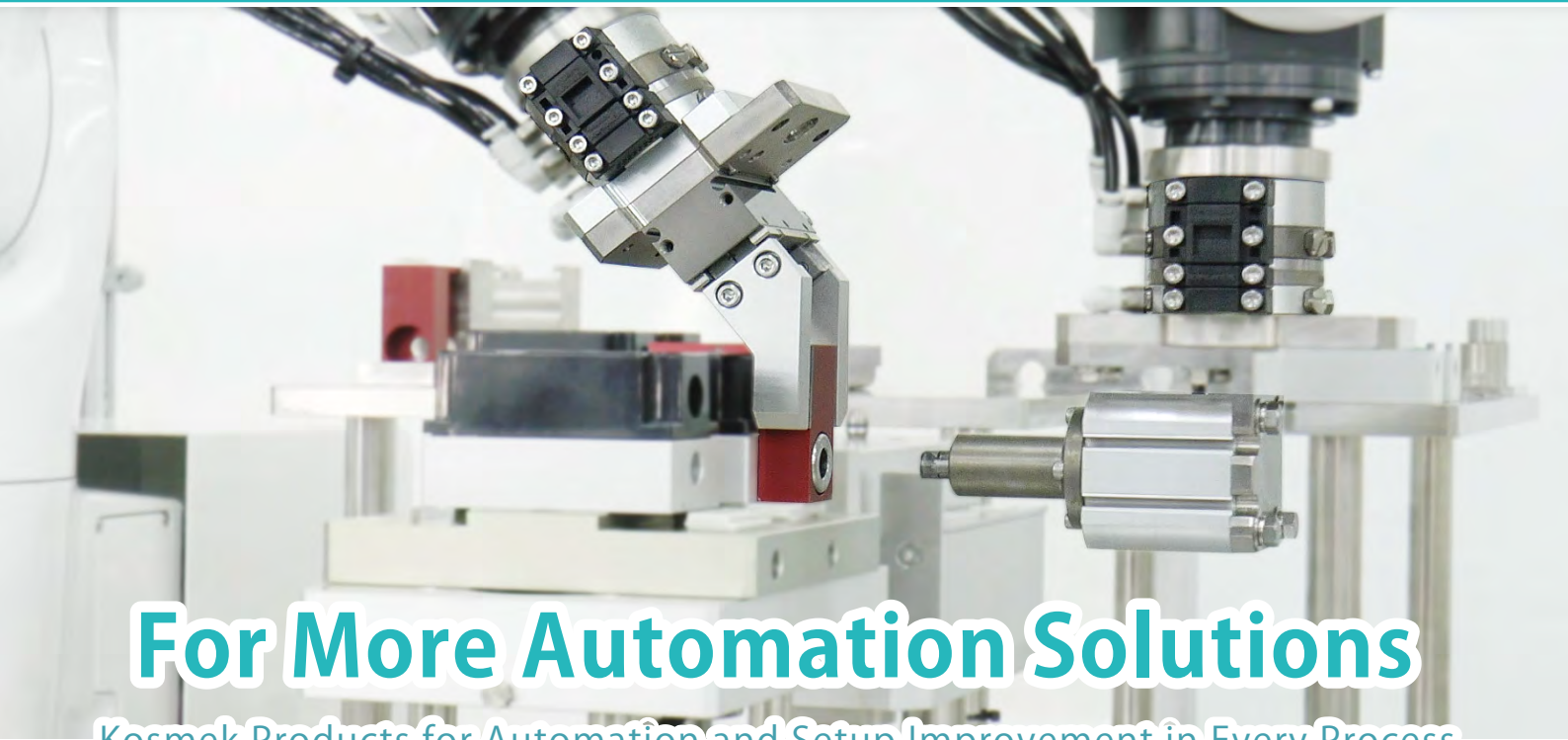


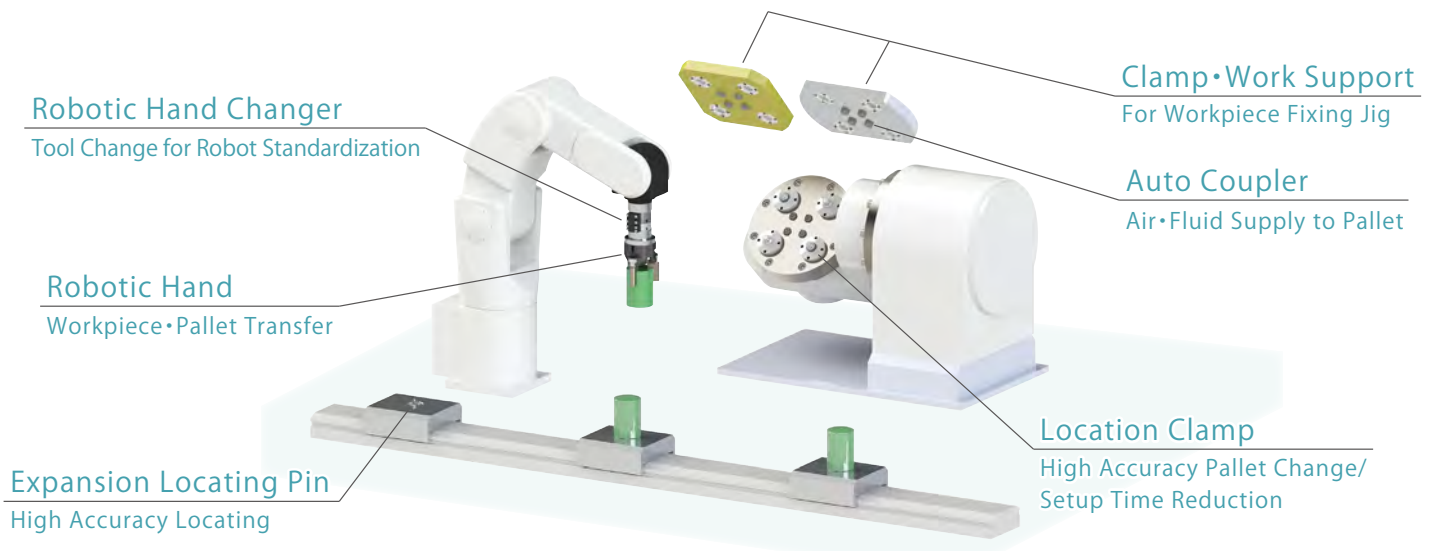
FA • Robotic Automation Products

Application Examples

Ver.2



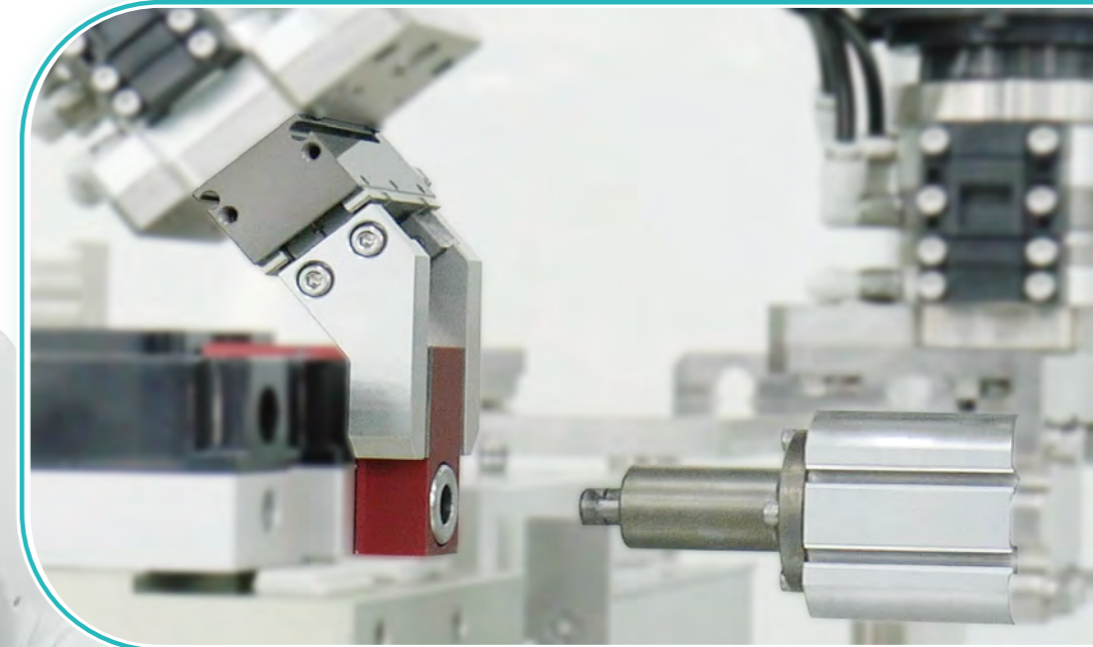
Kosmek Products for Automation and Setup Improvement in Every Process



KOSMEK Production Map

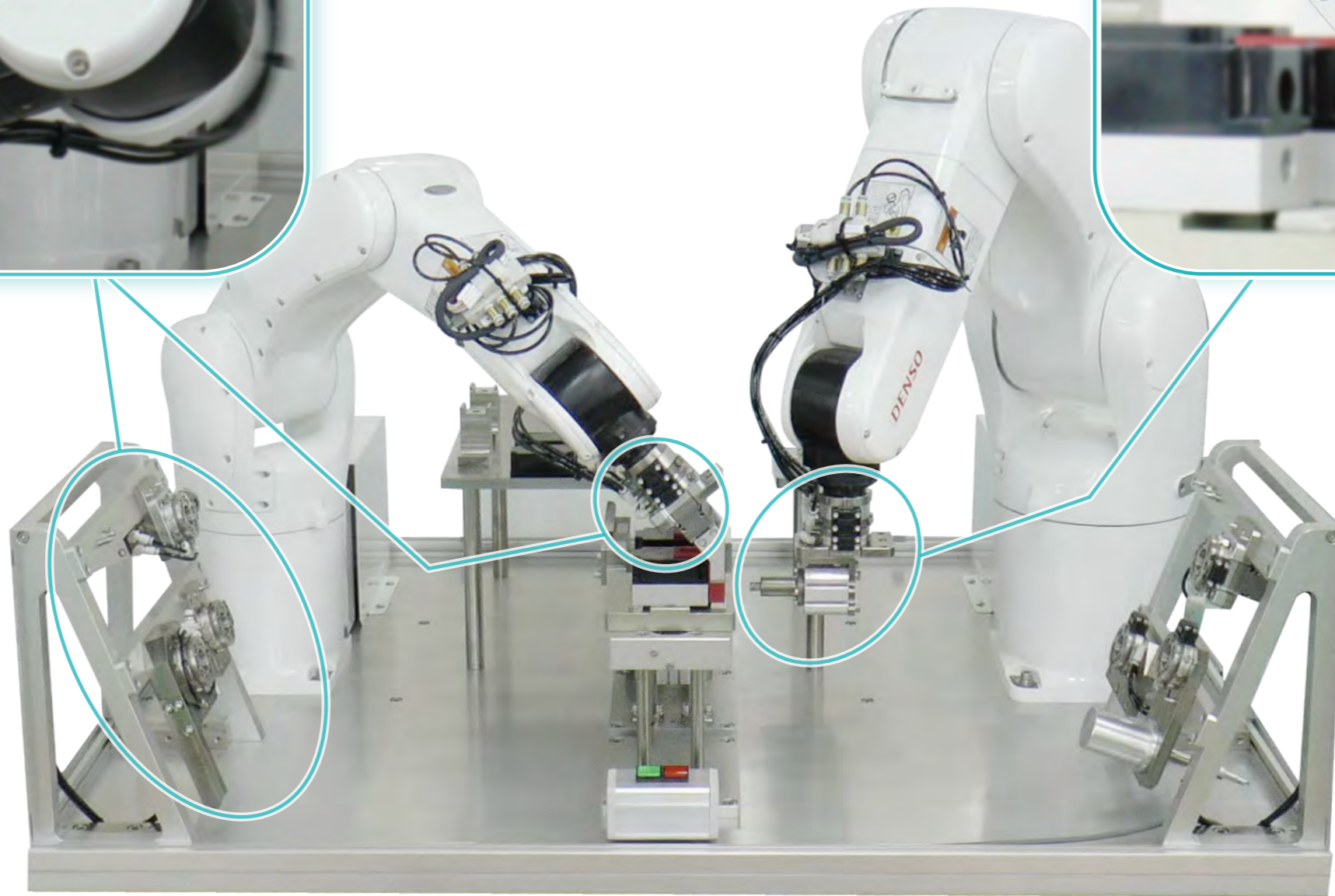
Tool Change

Transfer



Robotic Hand Changer

P.3



Robotic Hand

P.11



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

P.19

Locating



Coupler



Support / Back Up

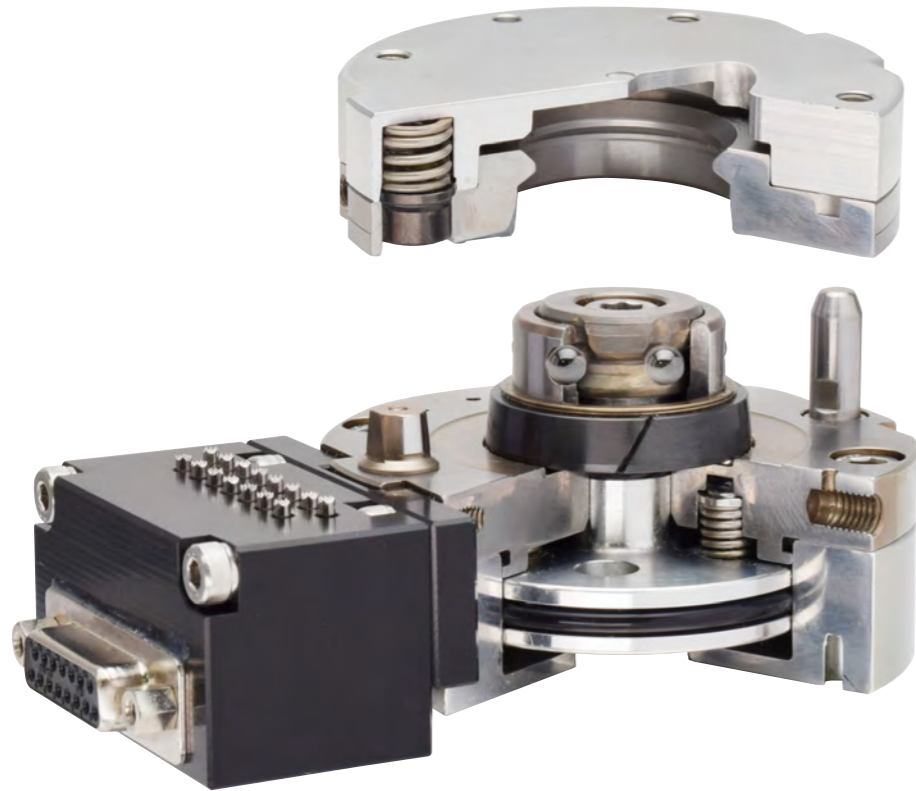


Clamp

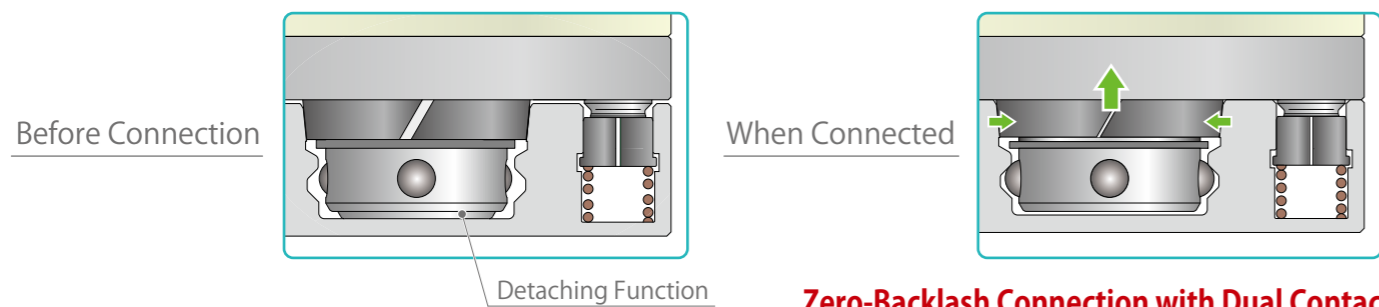


The World's Only Robotic Hand Changer with Zero Backlash

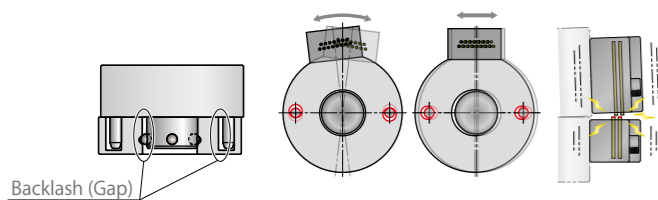
model SWR



KOSMEK Exclusive Non-Backlash Mechanism



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

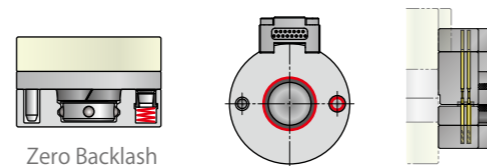


Continuity Failure of Electrode
↓
Frequent Moment Stop

Zero-Backlash Connection with Dual Contact

Kosmek Hand Changer with No Backlash
Prevents Electrode Error

No Noise

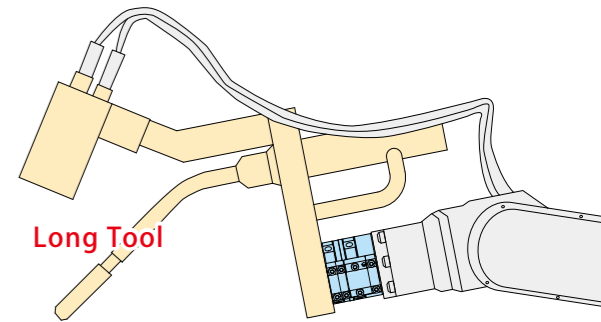


No Continuity Failure of Electrode
↓
Sharp Decline of Moment Stop

Secures the Aimed Position

When Connected, Locating Repeatability is **3 μm**

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

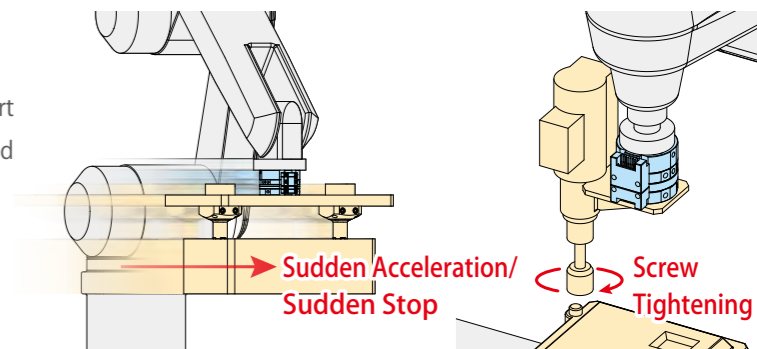


24-Hour Continuous Operation is Possible

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 μm 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)
- Waterproof Electrode (Noncontact Waterproof) IP67
- 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)
- 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



Hand with Multiple Tools

When Installing Robotic Hand Changer

- Interference: Occasional
- Teaching: Simple
- Robot Size: Small

Transfer Tool

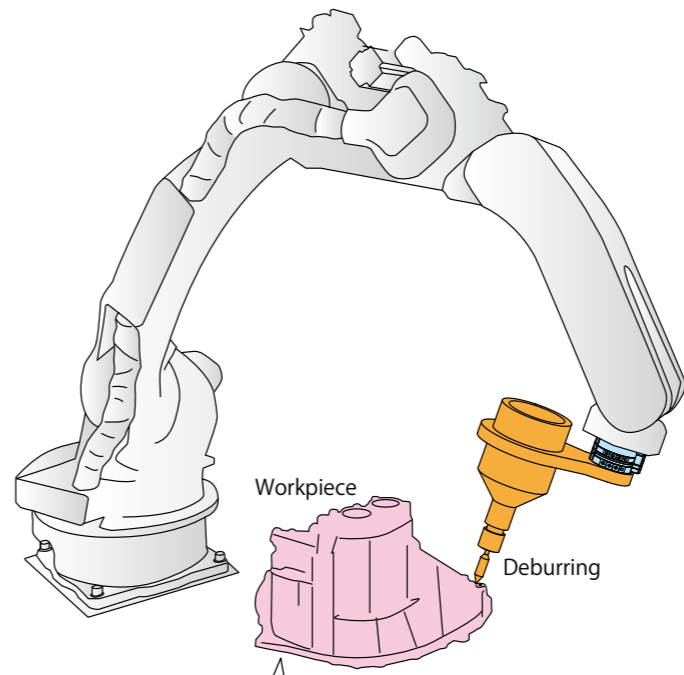
Screw Tightening Tool

Deburring Tool

Inspection Tool (Camera)

Welding Tool


Change the Transfer Hand and Deburring Tool with High Rigidity



Workpiece


Deburring

Hand Change



Deburring Tool

Workpiece



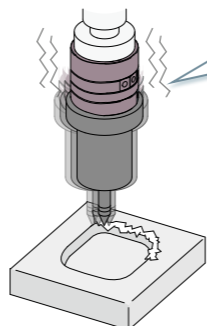
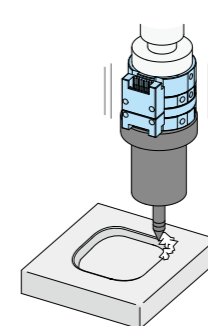
Workpiece

Workpiece Transfer Tool

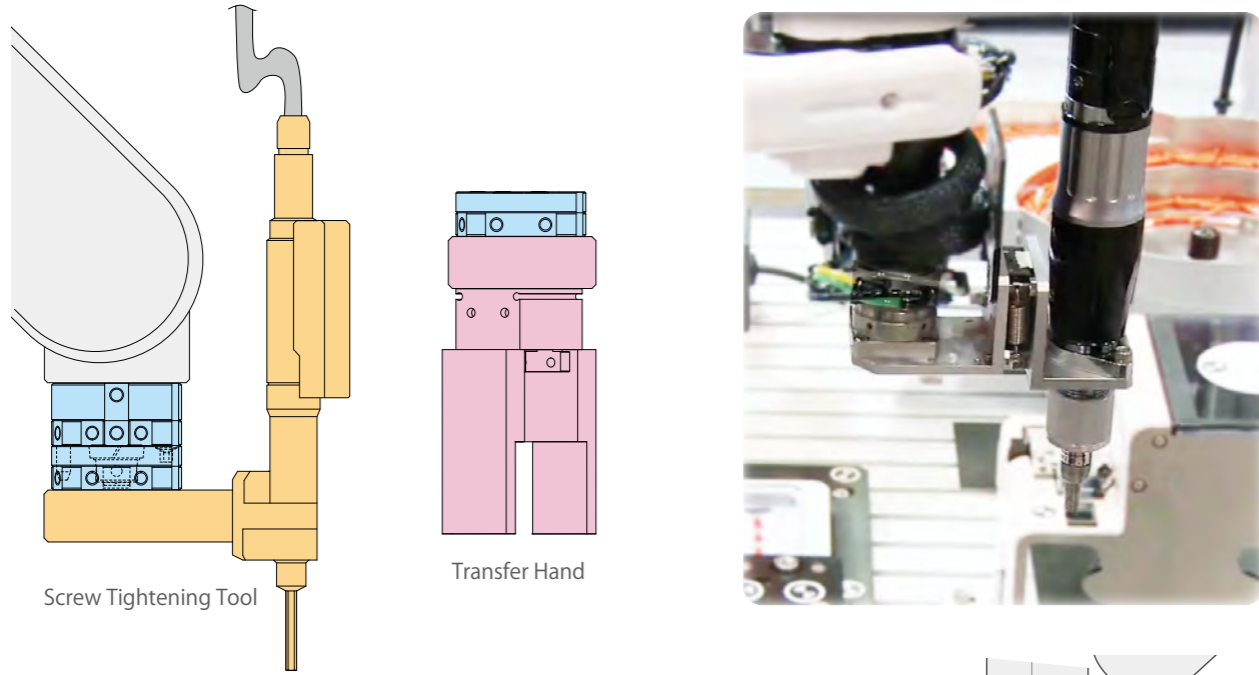
By clamping workpiece with Hole Clamp (model SWE), every workpiece surface is accessible.

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.

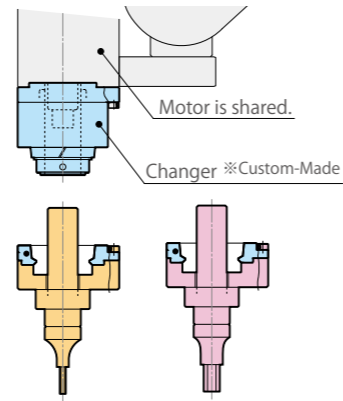
General Changer	Kosmek Robotic Hand Changer
<p>Backlash on Changer Part</p> <p>Due to backlash, a tool changer is weak to torsion and can be broken if high load is applied when deburring R surface which has large contact area.</p>  <p>Low Load</p> <p>High Load</p> <p>Contact area of R surface is large and receives high load.</p>	<p>No Backlash on Changer Part</p> <p>The changer has no backlash so it is highly rigid and strong to torsion. This allows for no fluctuation on tools.</p> <p>It also withstands high load of casting deburring.</p> 

Change the Transfer Hand and Screw Tightening Tool with High Rigidity

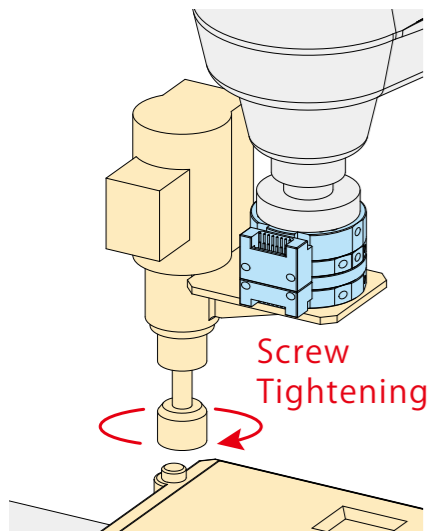


Strong to Torque and Not Damaged by Impact Load

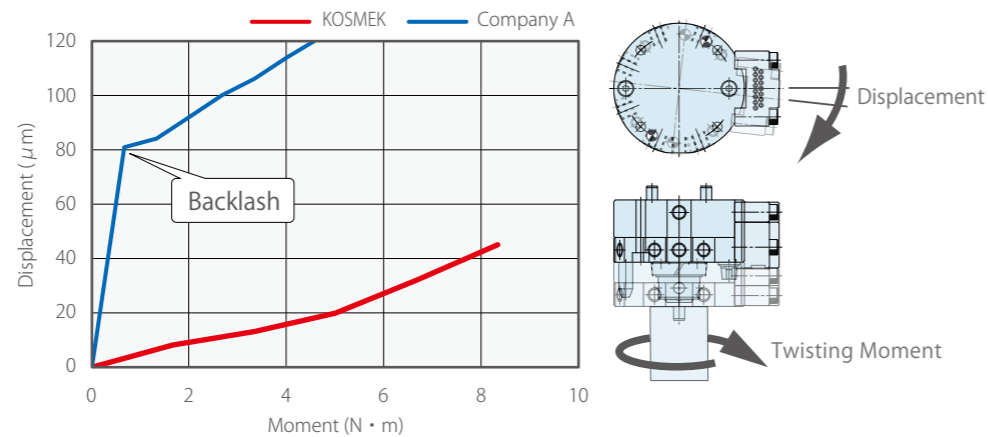
Exclusive non-backlash function is strong to torque and overcomes disadvantages of tool changers. $3\mu\text{m}$ locating repeatability allows for highly reliable operation without fluctuation of the bit edge.



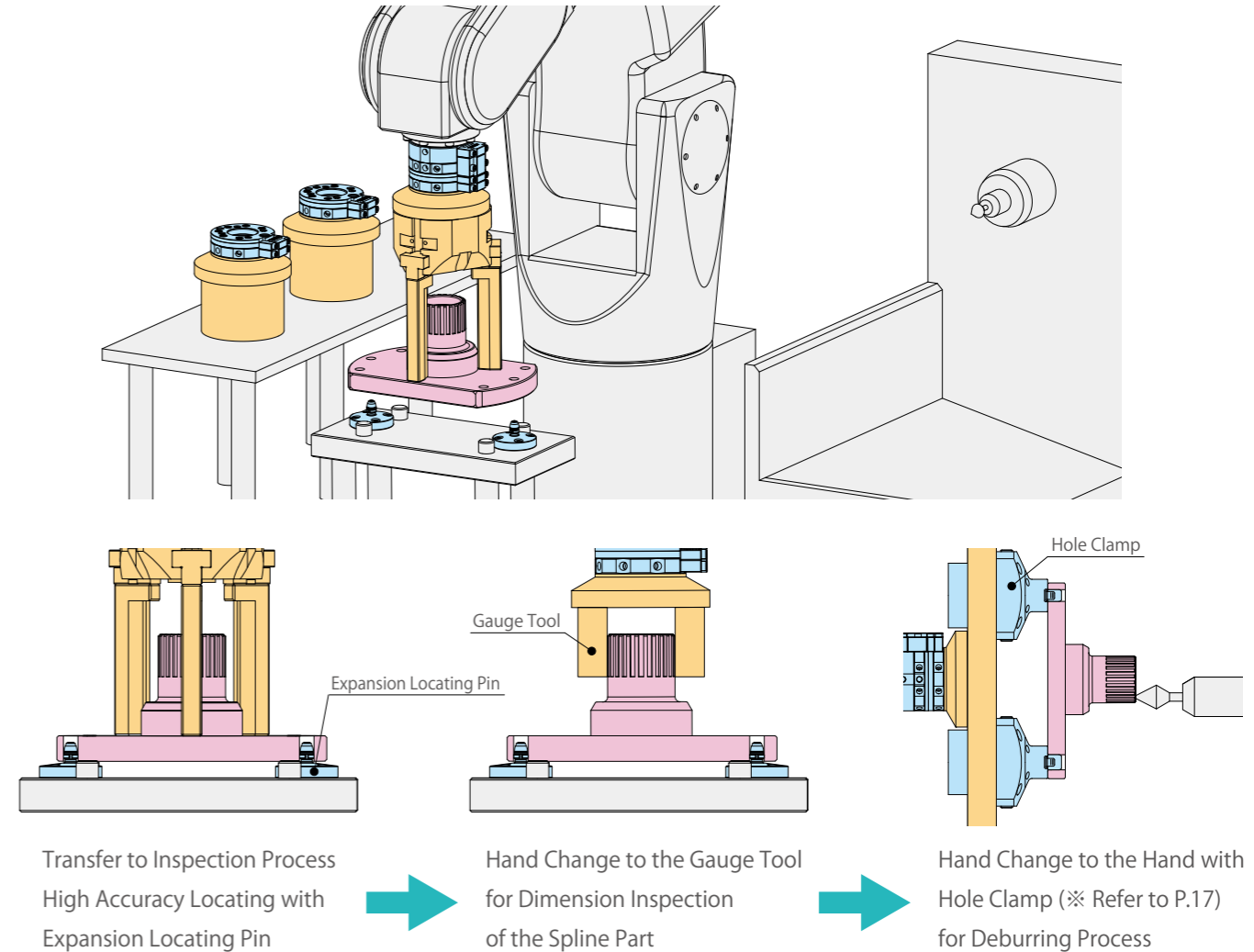
Changing only the bit part enables sharing the motor part.
※Custom-Made Rodless Hollow Option



Moment and Displacement (Equivalent to 5kg Payload)

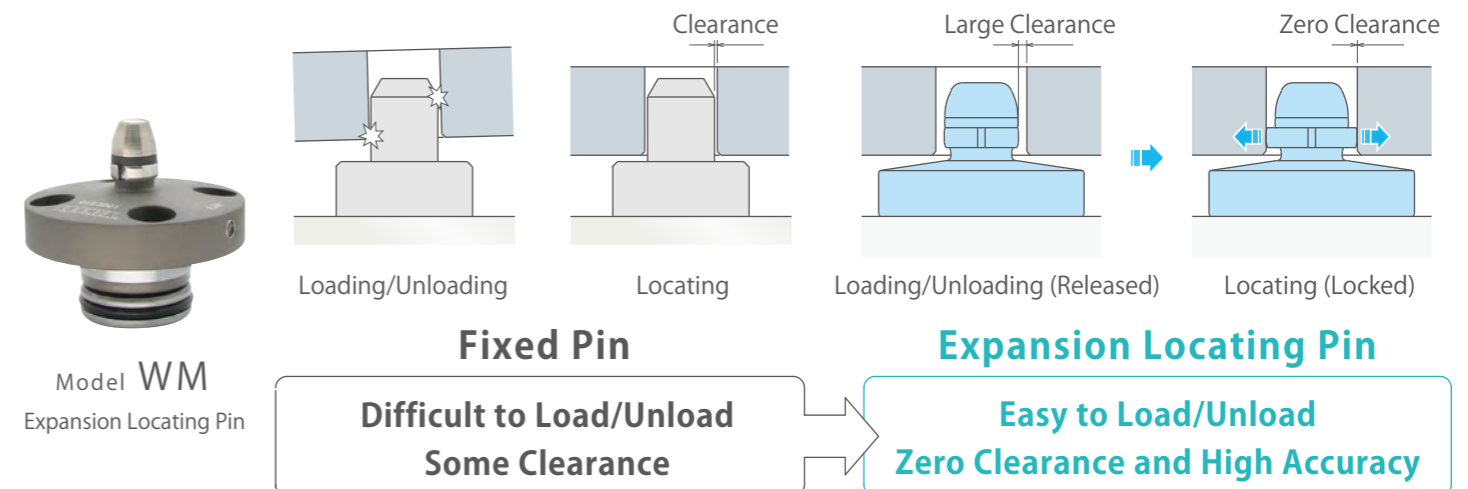


Transfer → Inspection → Deburring One robot performs multiple operations.

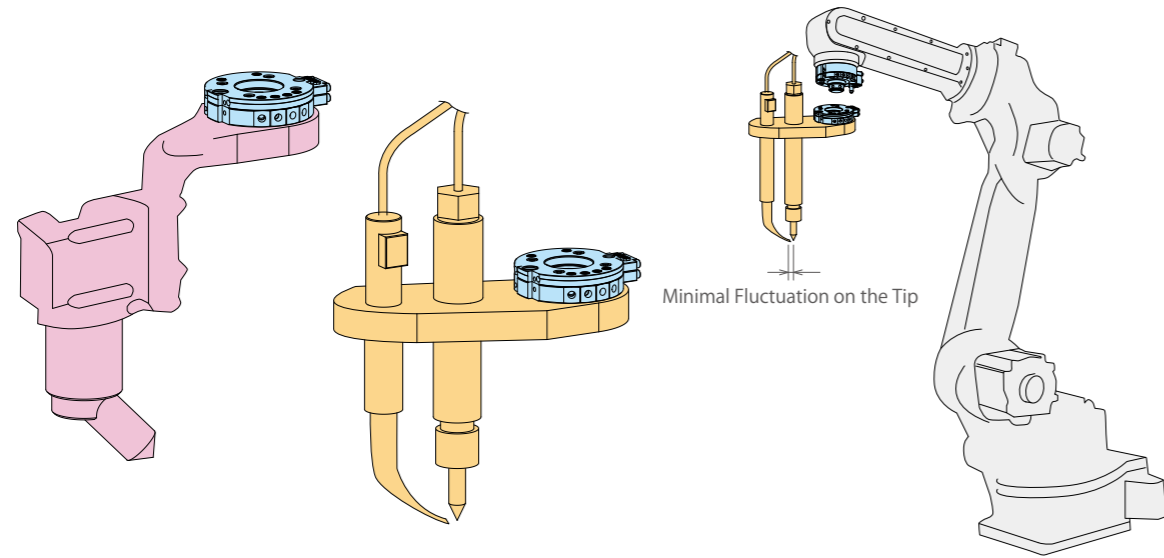


$3\mu\text{m}$ Locating Repeatability to Integrate Various Processes

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

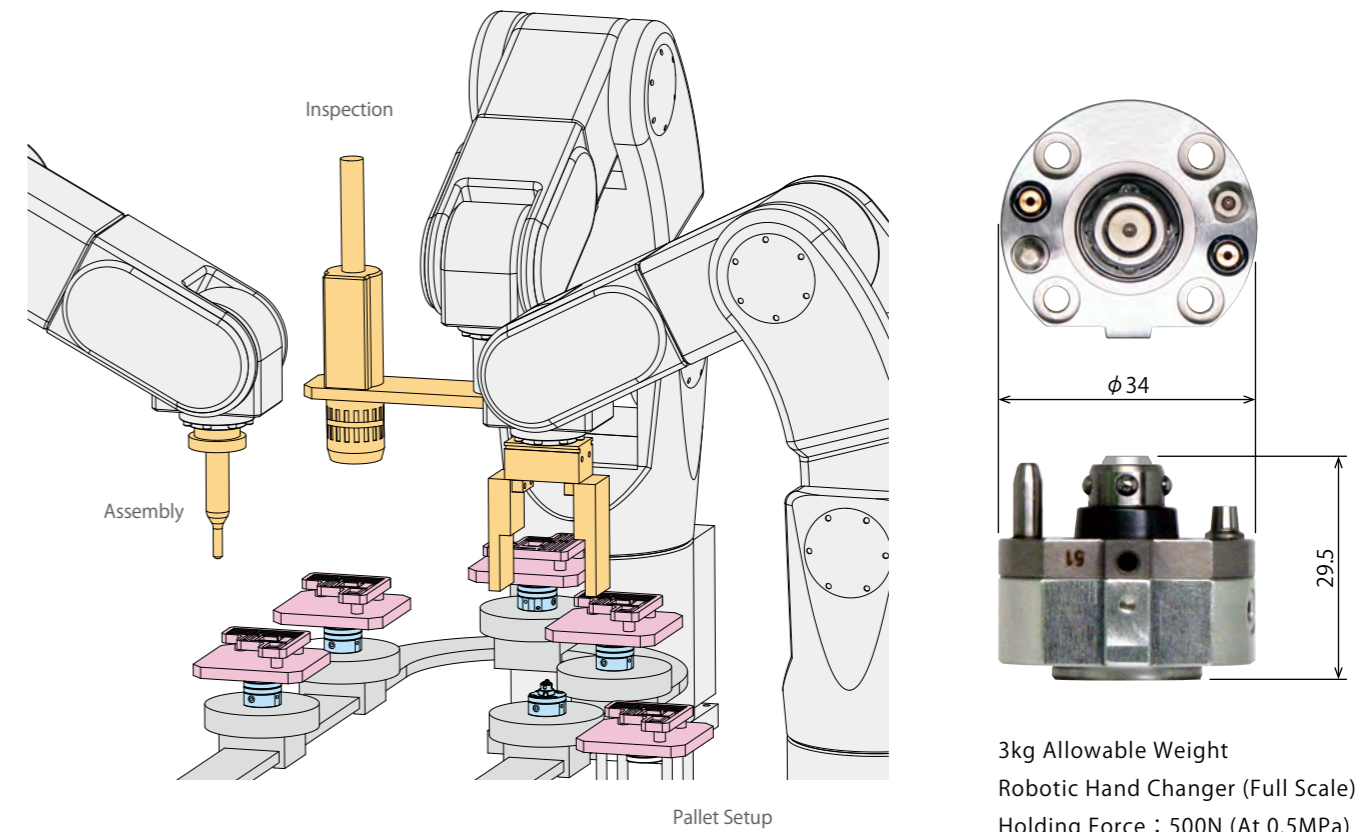


High Accuracy Exchange of Multiple Welding Torch



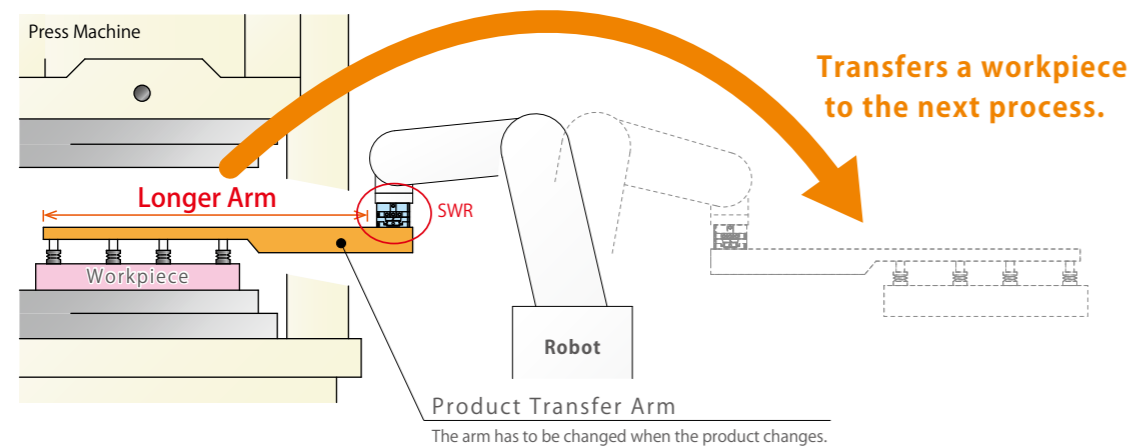
Even when changing longer torch, fluctuation on the tip is extremely small due to $3\mu\text{m}$ locating repeatability. This enables stable quality and appearance of products.

High Accuracy and Compact Pallet Change

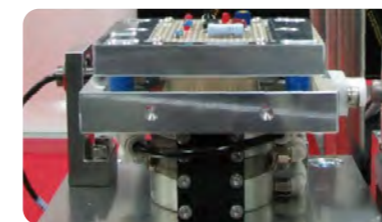


3kg Allowable Weight
Robotic Hand Changer (Full Scale)
Holding Force : 500N (At 0.5MPa)

High Accuracy Exchange of Transfer Arm



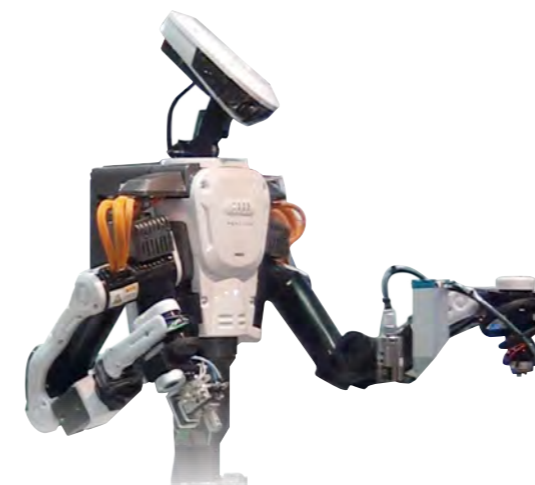
Transfers a workpiece to the next process.



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

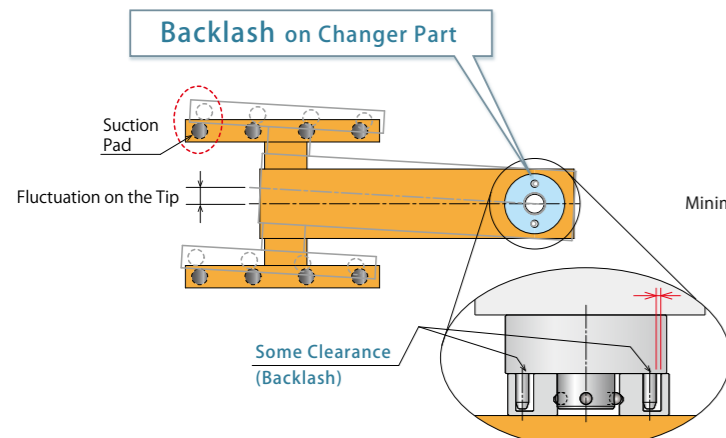


Highly versatile humanoid robot requires multiple hands, and tool change is essential. Kosmek robotic hand changer ensures its lightness, high accuracy, high rigidity, and longer operation life.

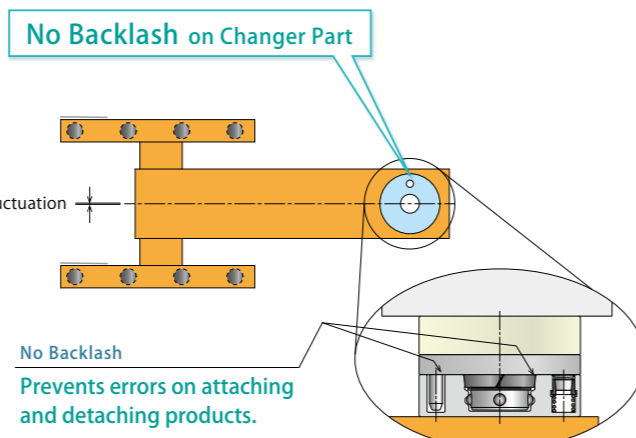
Suitable for Tool Changer with Camera Corrector

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.

General Changer

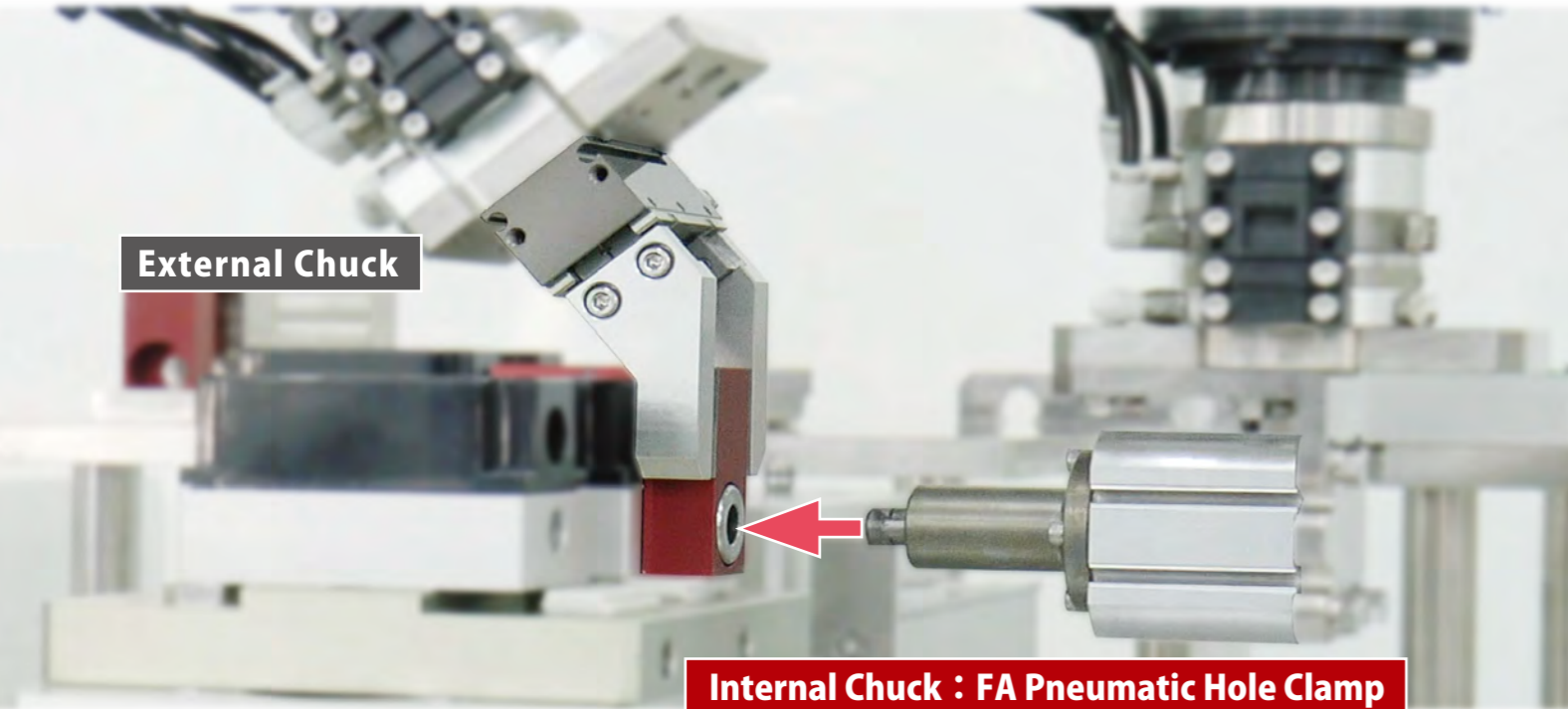


Kosmek Robotic Hand Changer



Light • Compact Robotic Hand Series

For More Automation Solutions

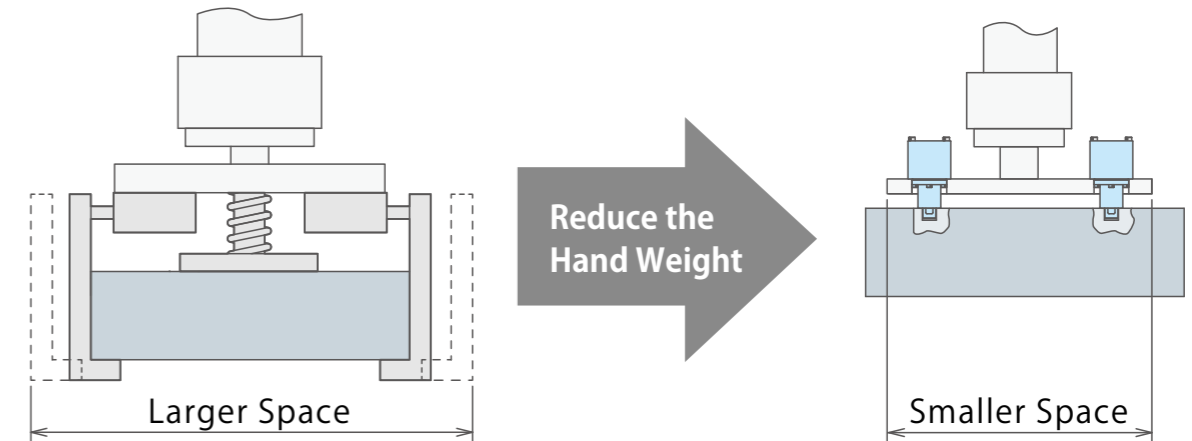


Advantages of FA Pneumatic Hole Clamp

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

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

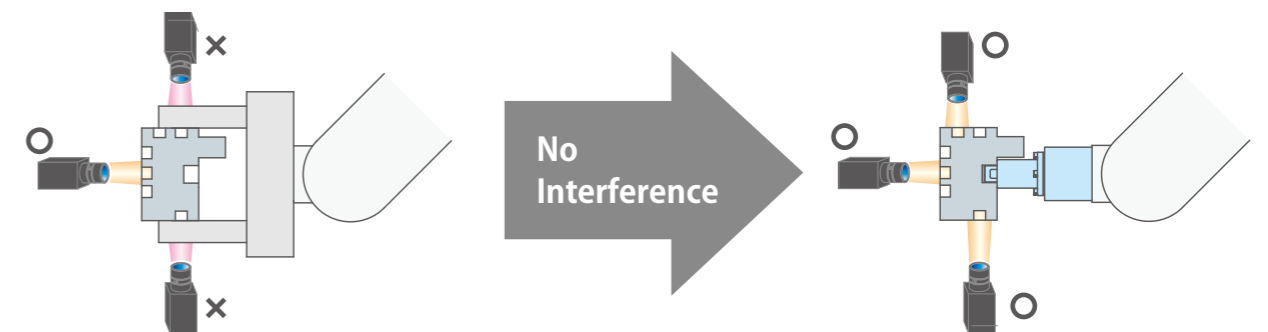
Secures/Transfers a pallet and prevents falling off with steel balls.
Powerful, Light and Compact
Pull-Out Load Capacity (Holding Force) : 50N / 70N / 100N



Spring Lock / Air Release

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 WPH / WPP / WPQ

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



Parallel Gripper
Model WPH



Three-Jaw Chuck
Model WPP



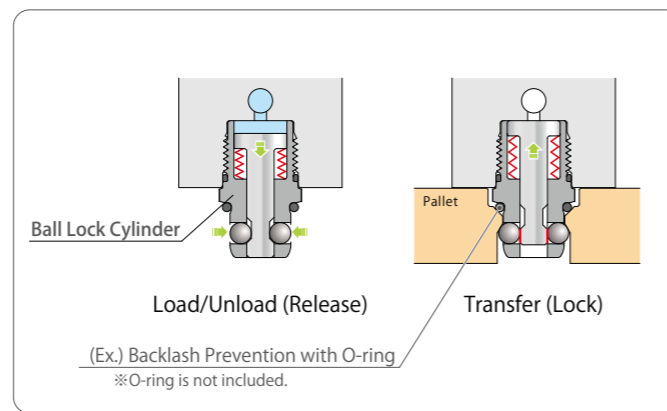
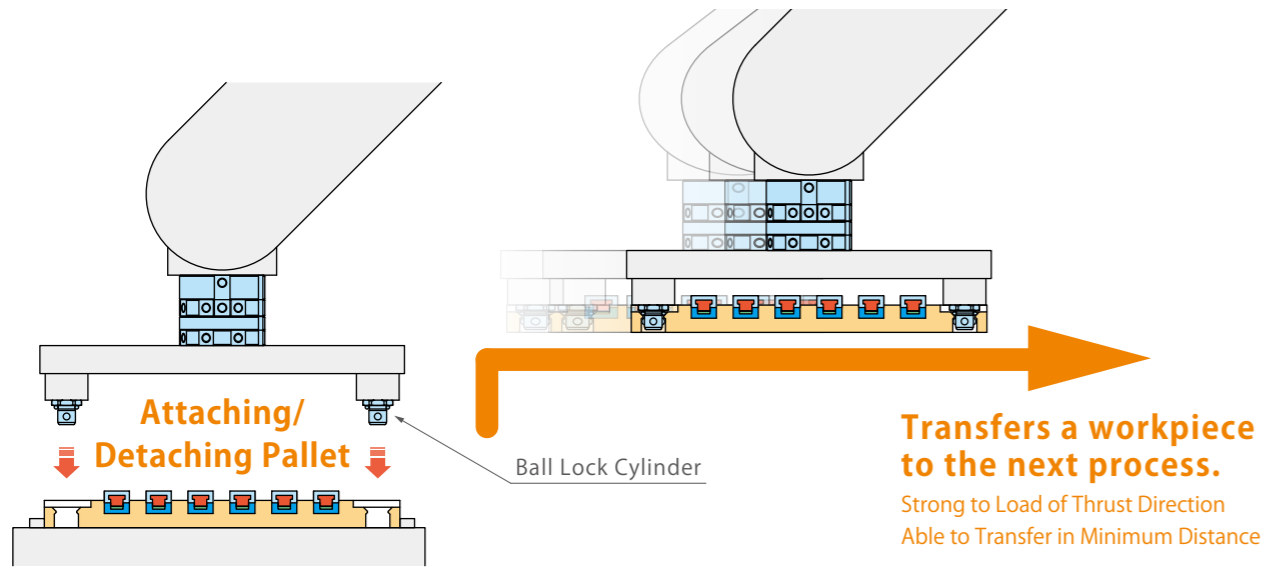
Two-Jaw Chuck
Model WPQ

Air Lock / Air Release



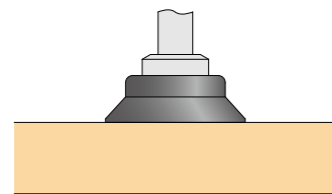
For Faster and More Accurate Pallet Transfer

Model WKA Ball Lock Cylinder



Current Method **Suction Pad**

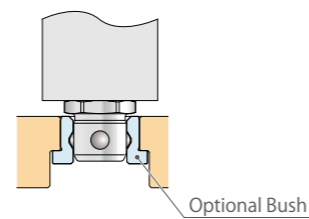
Limited Speed
Low Suction Force



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

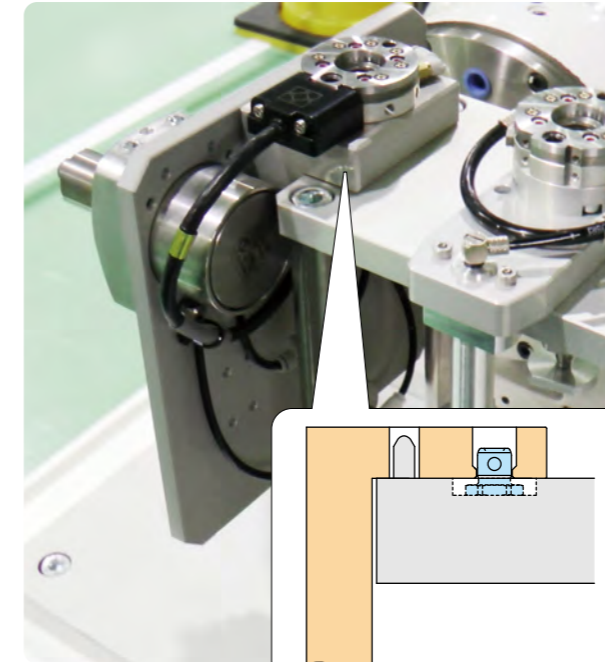


Requires Hole Machining
Optional bush simplifies hole machining.

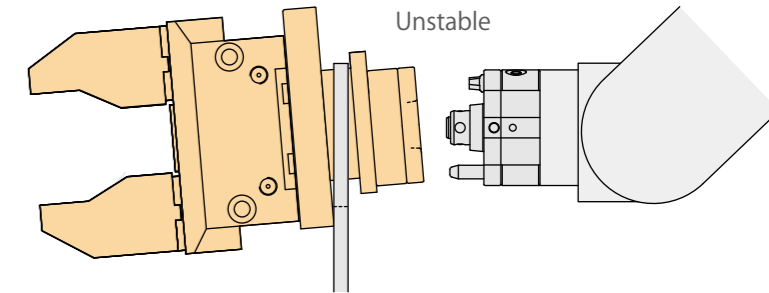


For More Compact Tool Stocker and More Reliable Hand Change

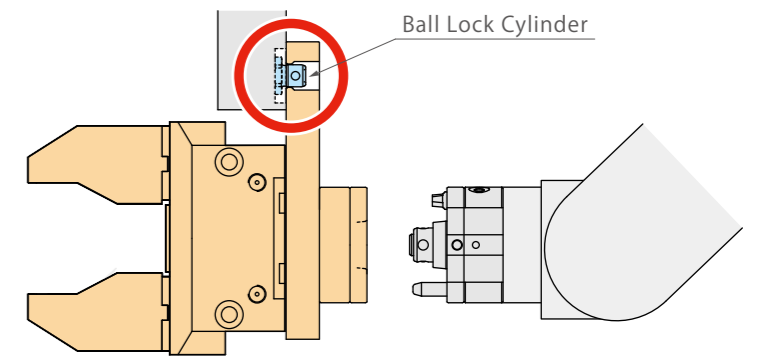
Model WKA Ball Lock Cylinder



Offset Hand



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



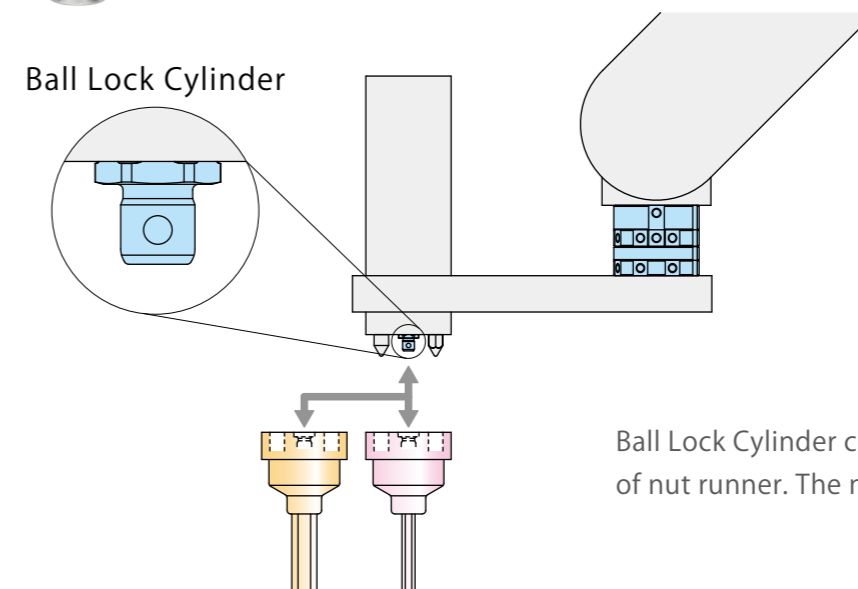
Ball Lock Cylinder

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



Bit Change of Nut Runner

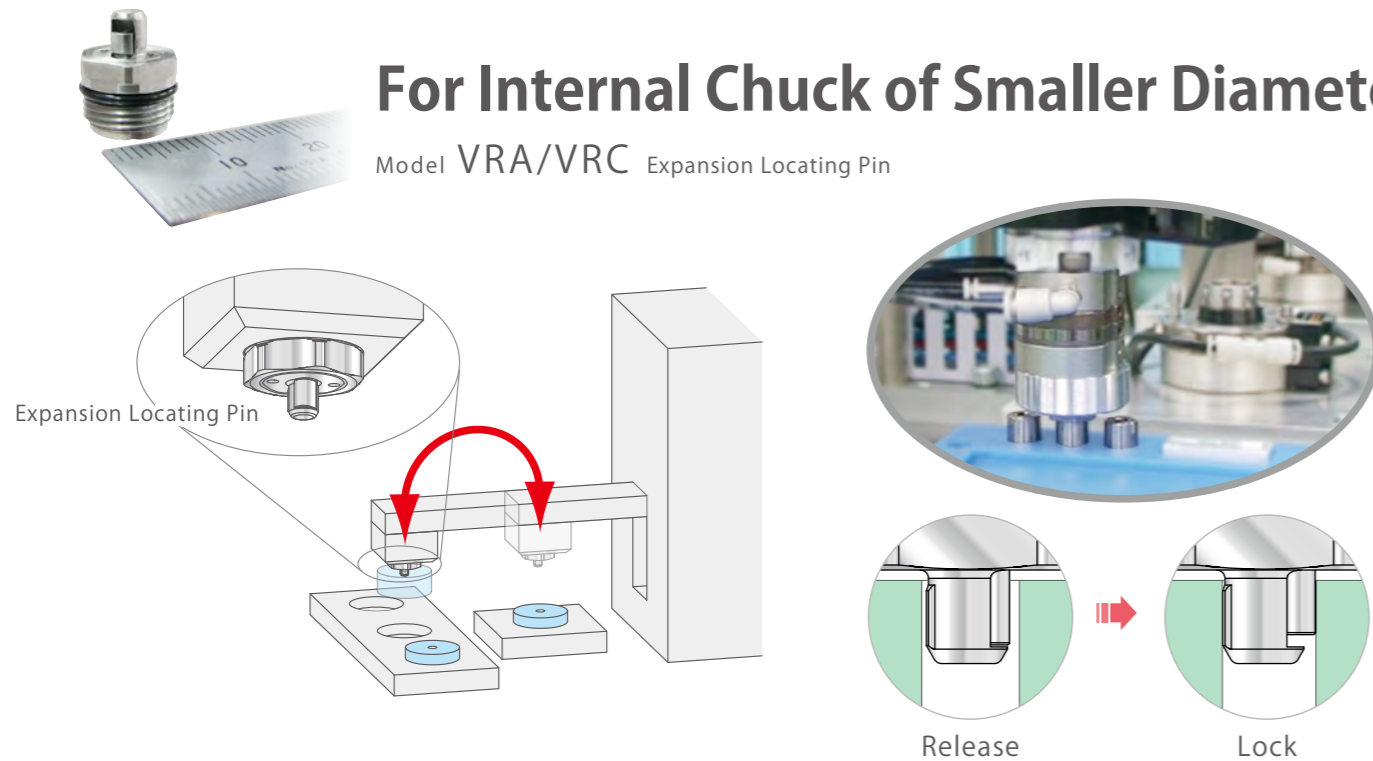
Model WKA Ball Lock Cylinder



Ball Lock Cylinder 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



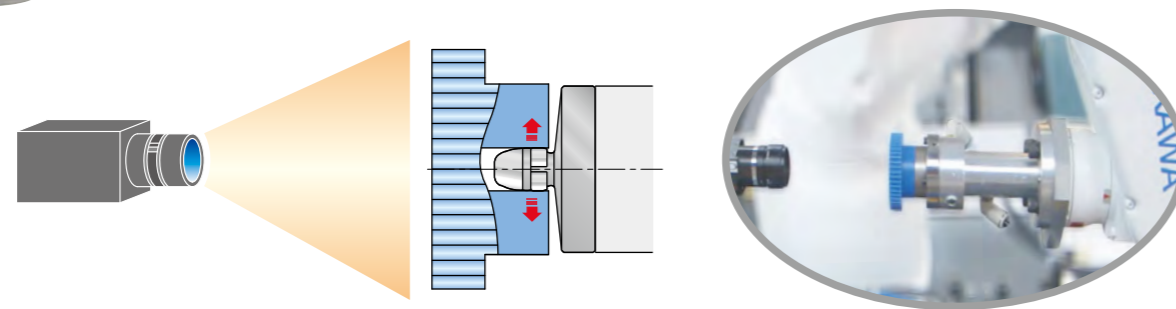
High Accuracy Locating Prevents Assembly Errors of Small Components

Expansion Locating Pin has high accuracy locating (repeatability: $3 \mu\text{m}$) 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 WM Expansion Locating Pin



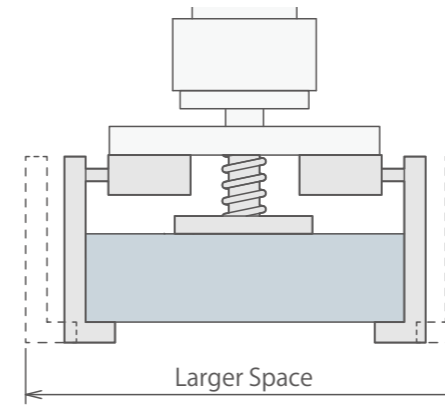
After checking the position by camera, keeps the proper position to install it.

Suitable for Workpiece Image Inspection

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

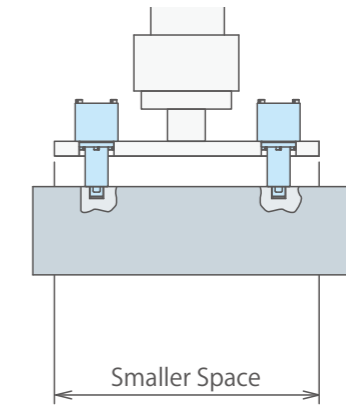
From Light to Heavy Workpiece

Current Method



Loading/Lifting Hand with Parallel Hand/Linear Cylinder

FA Pneumatic Hole Clamp



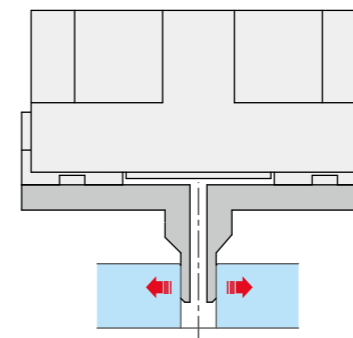
Compact and Light with Powerful Gripping Force
Small Stroke with High Operation Speed



Model WKH
Workpiece Hole Diameter:
 $\phi 6 \sim \phi 14$

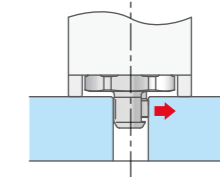
For Light Workpiece with Small Diameter

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



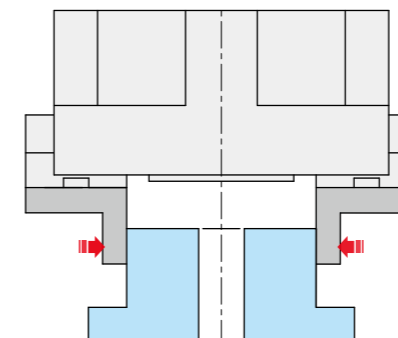
Light • Compact • High Accuracy
Easy to Control with Spring Lock • Air Release



Model VRA/VRC
Workpiece Hole Diameter:
 $\phi 3 \sim \phi 6$

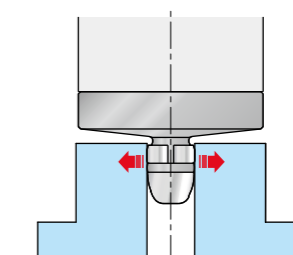
For Workpiece which Requires Locating Accuracy

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

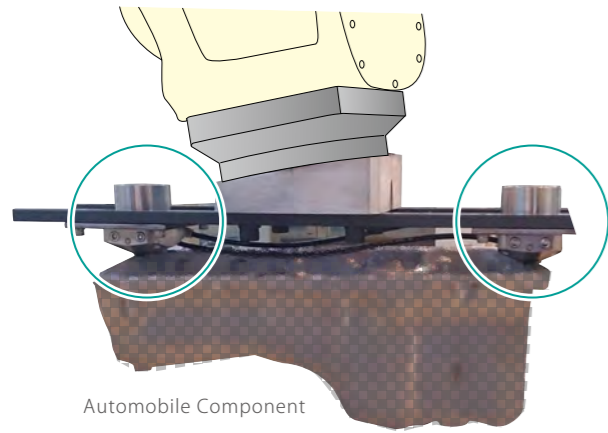


Model WM
Workpiece Hole Diameter:
 $\phi 8 \sim \phi 20$



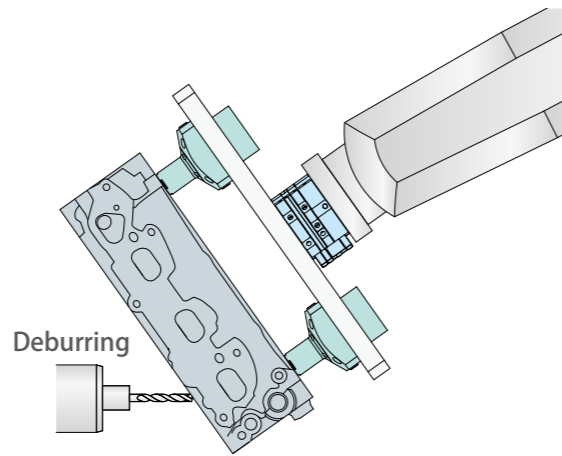
For Minimizing Weight and Space of Heavy Workpiece Transfer Hand

Model SWE High-Power Pneumatic Hole Clamp



Automobile Component

Transfer Heavy Workpiece with Light Hand



Deburring

5 Faces Accessible with No Interference

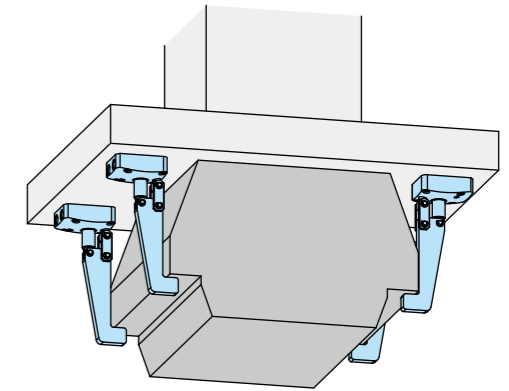


For Minimizing Weight and Space of Irregular Shaped Workpiece Transfer Hand

Model WCE High-Power Pneumatic Link Clamp



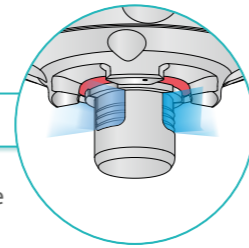
Automobile Component



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



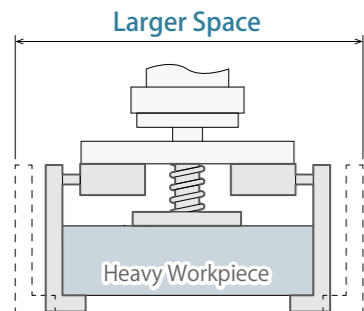
Hole clamp and workpiece hole can be cleaned by air blow.

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

Linear Cylinder



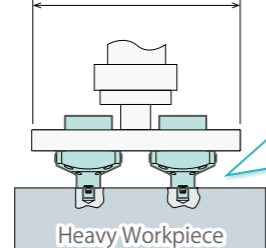
Larger Space

Heavy Workpiece

Heavy • Large

Transfer Hand with High-Power Pneumatic Hole Clamp

Smaller Space



Heavy Workpiece

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

Gripper expands and pulls workpiece in.



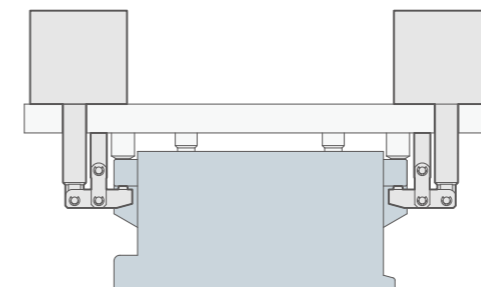
Clamping Force **2 kN** (Air Pressure : 0.45 MPa)

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

Clamping Force at 0MPa **0.25 kN**

Current Method

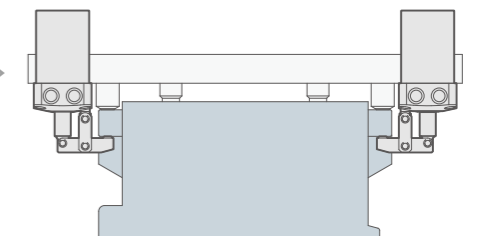
General Air Cylinder



Heavy • Large

High-Power Pneumatic Clamp

Exerts Equivalent Clamping Force with Mechanical Lock



Light • Compact • Powerful
Reduce the Loads to Transfer Equipment

Fixture Weight About 10% Reduced

※ Reference when workpiece size is 300×260.

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 μm



Model SWT
Location Clamp

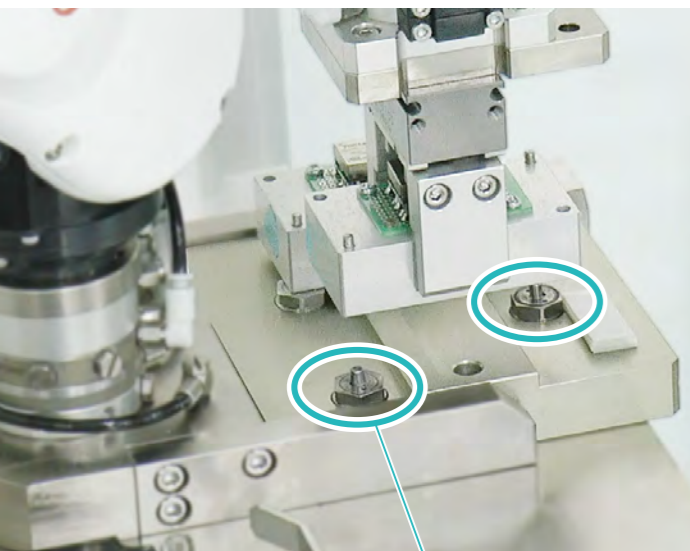
Air + Spring Lock / Air Release
Self-Lock Function with Spring



Model VXF
Screw Locator

Manual Lock / Manual Release

High Accuracy Locating of Workpiece • Pallet



Model VRA

Expansion Locating Pin

Model VRA / VRC / WM / VX

Zero Clearance with High Accuracy Locating Pin

Workpiece Hole Diameter : φ3 ~ φ20



Model VRA/VRC
Locating Repeatability 3 μm

Spring Lock / Air Release



Model WM
Locating Repeatability 3 μm

Air + Spring Lock / Air Release



Model VX
Locating Repeatability 5 μm

Manual Lock / Manual Release

Powerful Support for Unstable Parts

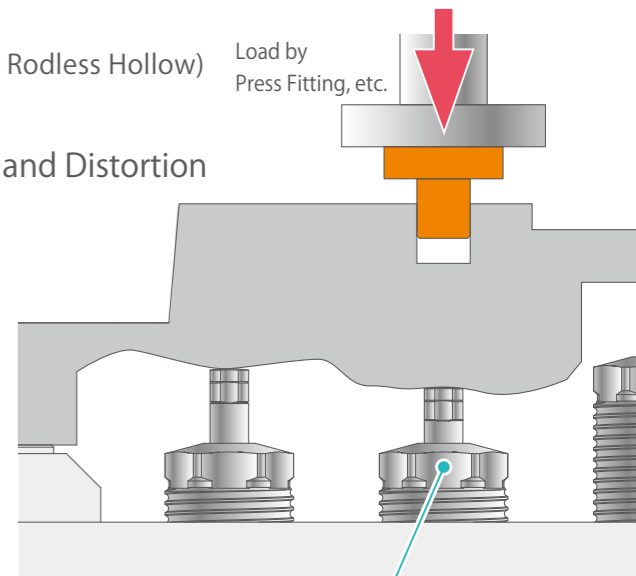
High-Power Pneumatic Work Support (Standard / Rodless Hollow)

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.



Model WNC

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

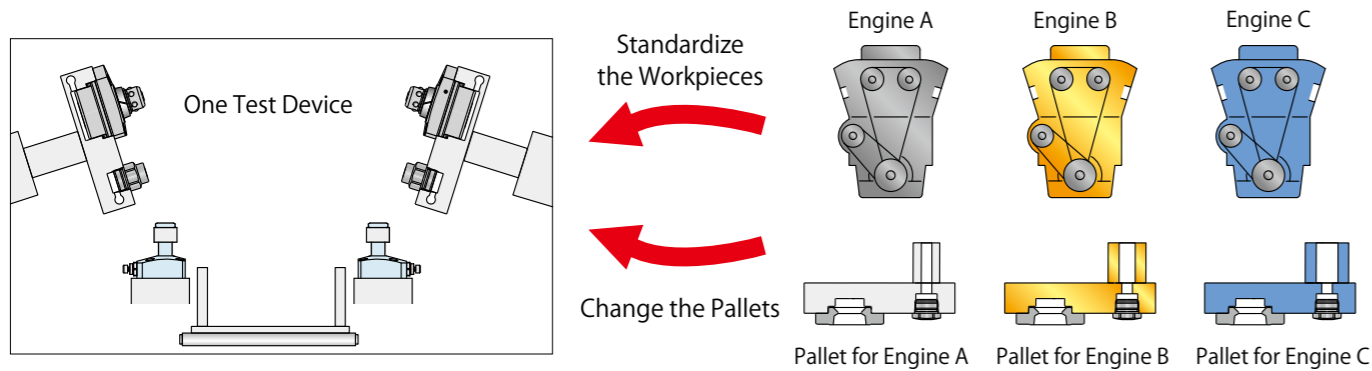
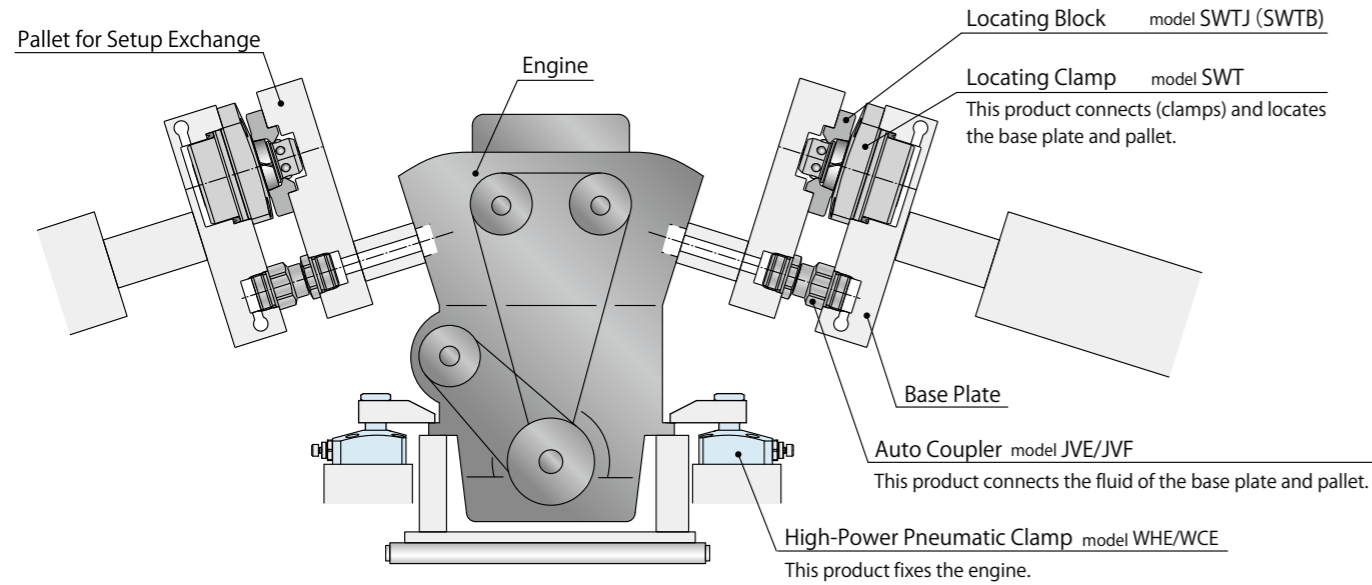


Compact Coupler to Connect Hydraulic/Pneumatic Circuits

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

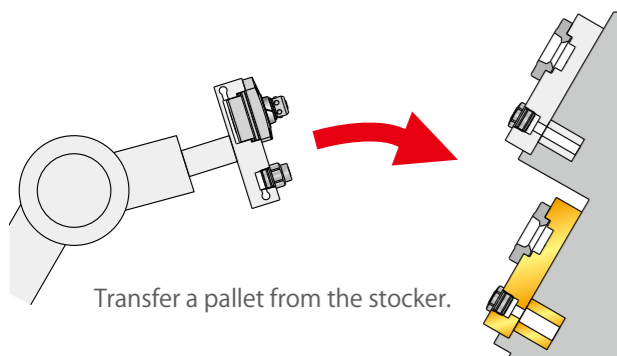
Automatic Setup of Cold Oil Test Bench

Model SWT / JV□ / WHE
Location Clamp / Auto Coupler / High-Power Pneumatic Swing Clamp



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.



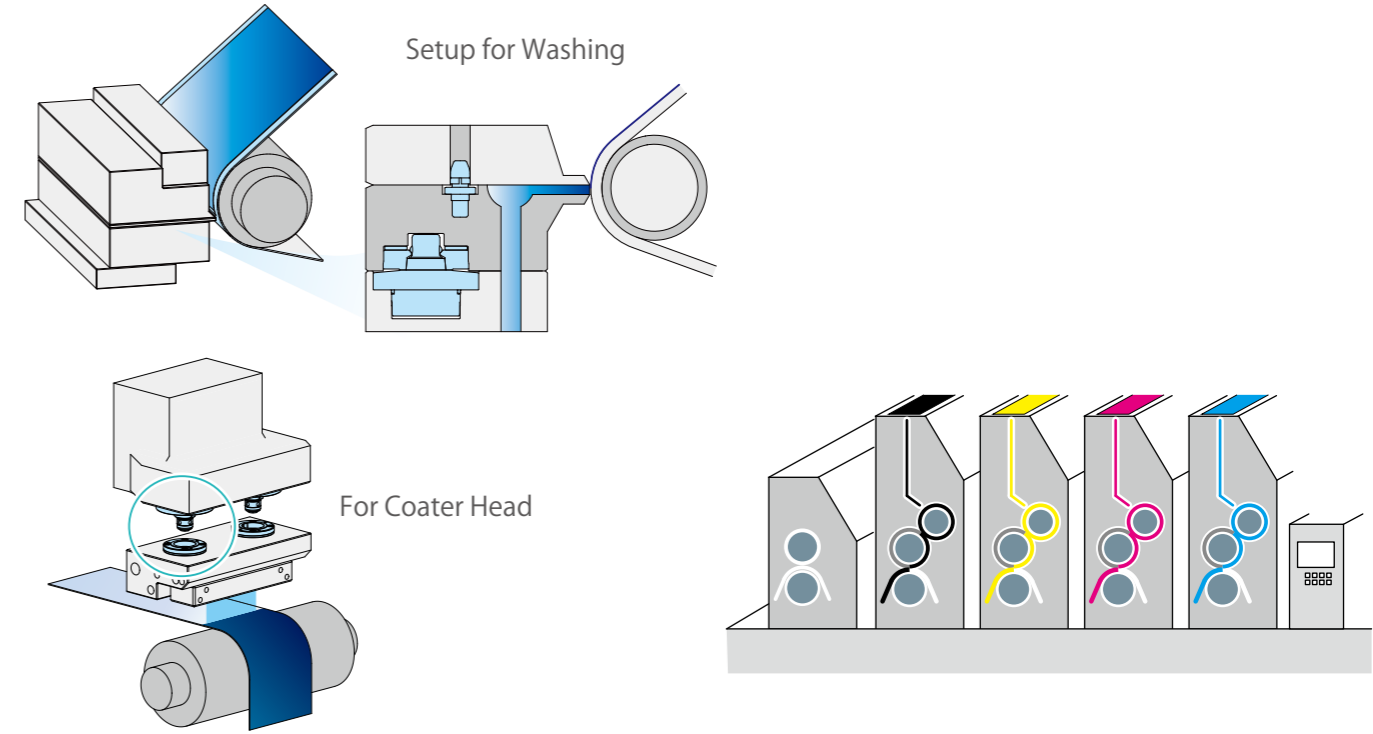
Automatic Pallet Change with Robot

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.



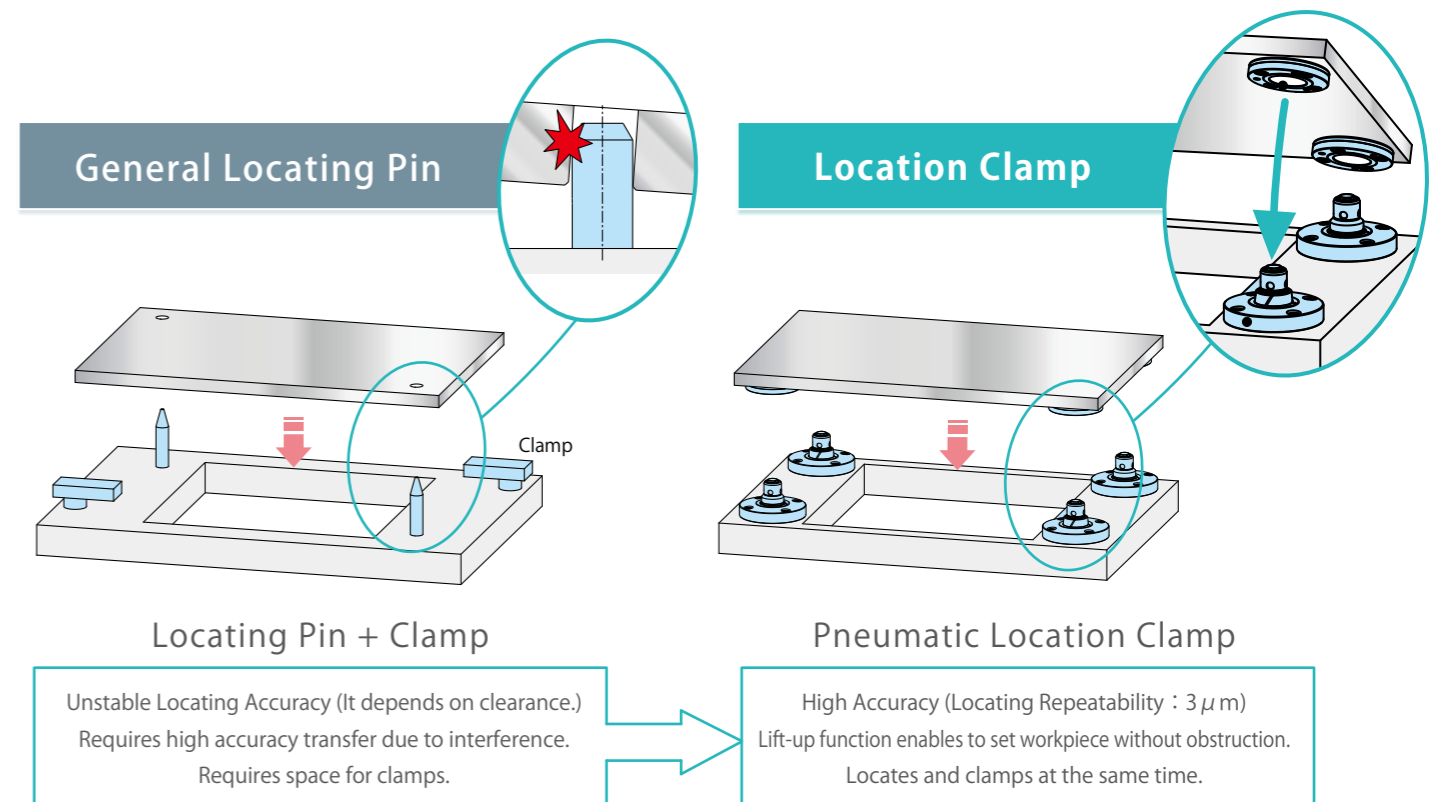
Automatic Setup of Coating · Printing Device

Model SWT Location Clamp



Reduces Setup Time and Ensures High Coating/Printing Quality

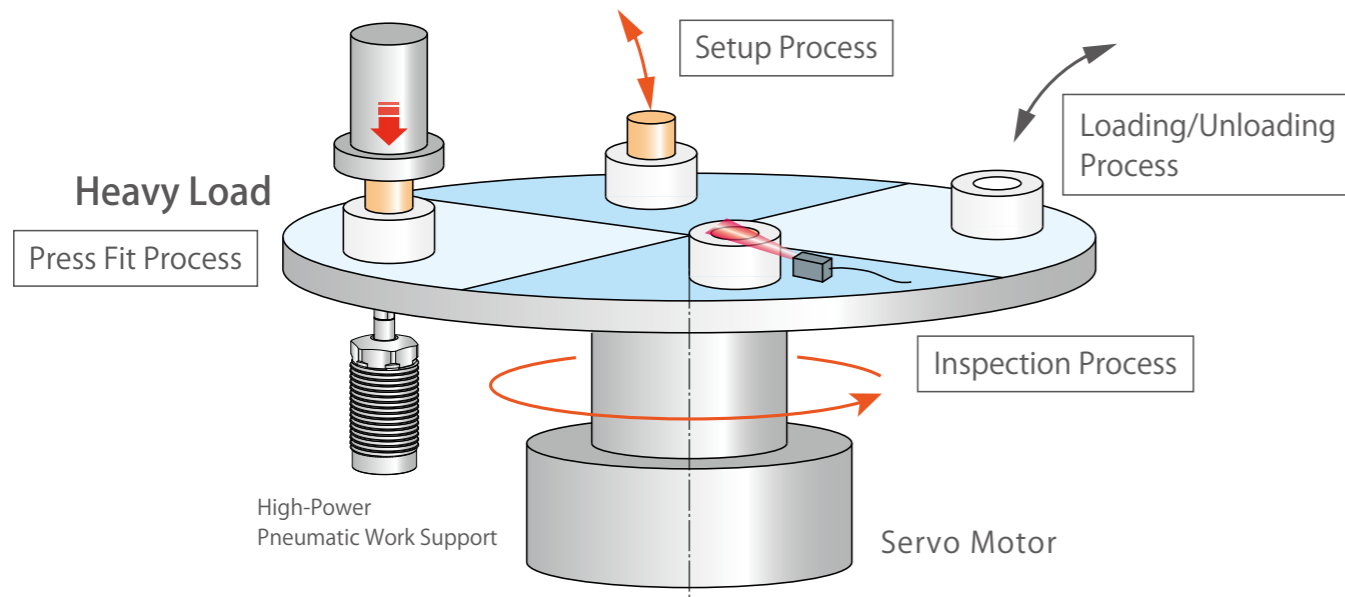
With $3 \mu\text{m}$ locating repeatability it minimizes dislocation during coating unit/roller unit setup and keeps high quality of coating and printing. Suitable for automation with simultaneous locating and clamping.





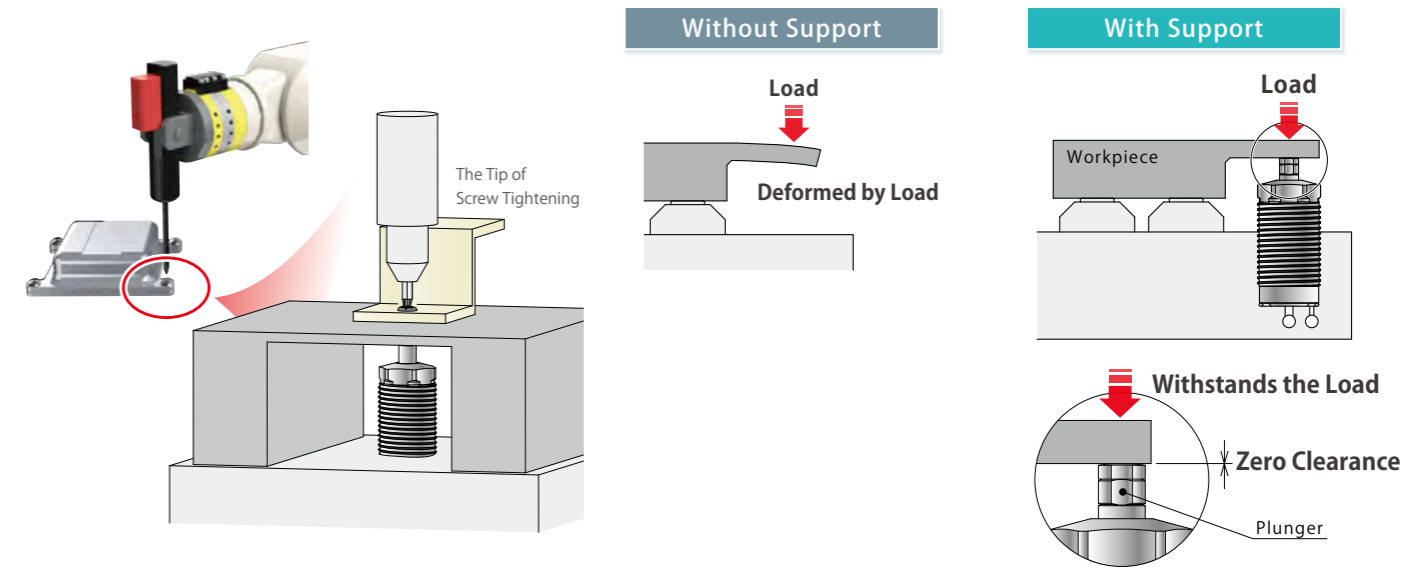
For Minimizing Application with Partial Improvement of Rigidity

Model WNC High-Power Pneumatic Work Support



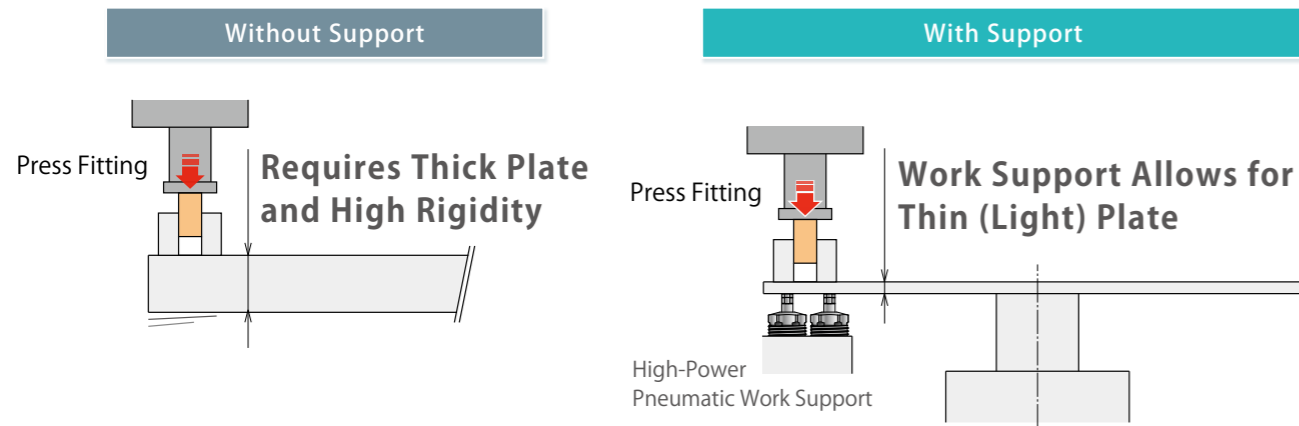
Backup of Screw Tightening

Model WNC High-Power Pneumatic Work 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.



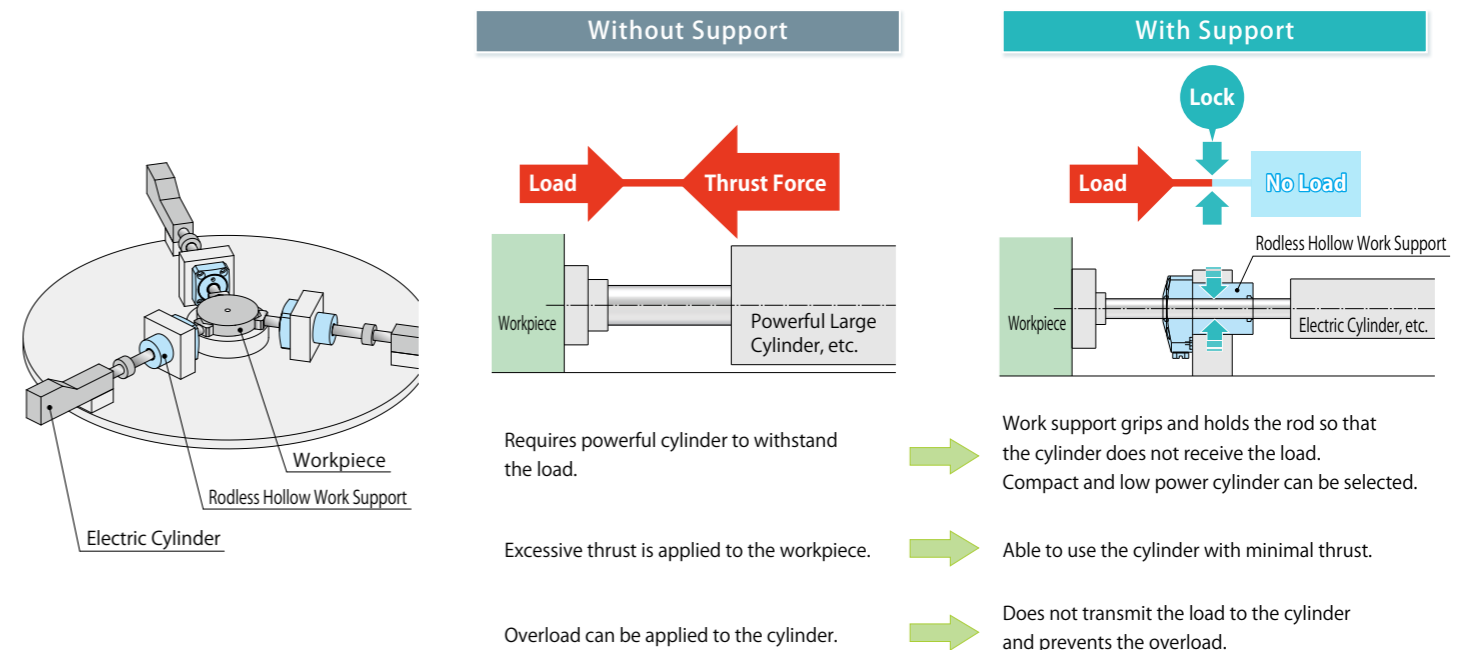
Supports Load to Reduce the Size of Application and Cost

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 Automatic Setup with Electric Cylinder

Model WNA Rodless Hollow Work Support

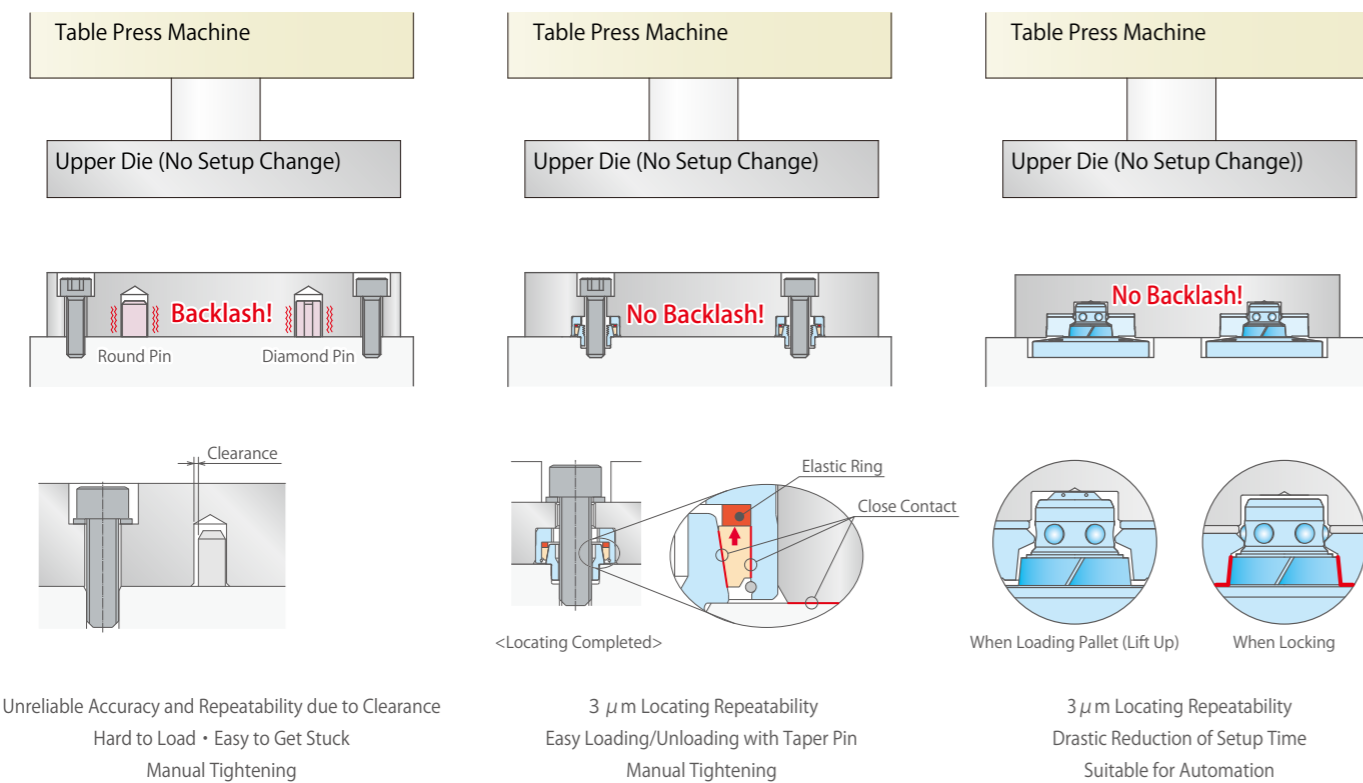




Single Setup of Table Press Machine (High Accuracy Locating + Clamping)

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
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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 μm).

Company Profile



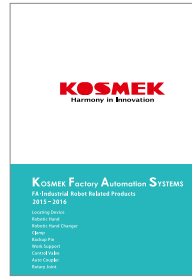
KOSMEK LTD. Head Office

Company Name	KOSMEK LTD.
Established	May 1986
Capital	¥99,000,000
Sales	60 billion yen (period ended March 2015)
Chairman	Keitaro Yonezawa
President	Tsutomu Shirakawa
Employee Count	230
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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For further information of each product, please refer to "FA • Robotic Automation Products Complete Catalog". Please contact us or request it from our website.



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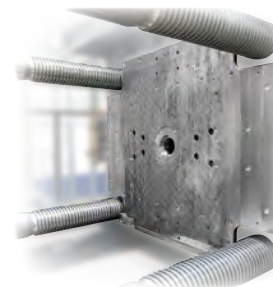
Product Line-up

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



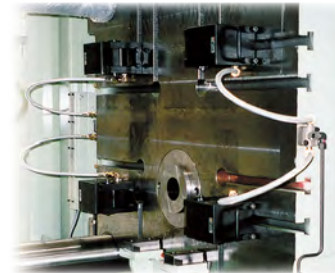
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FOR INJECTION MOLDING MACHINES



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DIECAST CLAMPING SYSTEMS

FOR DIECAST MACHINES

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<http://www.kosmek.co.jp>

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