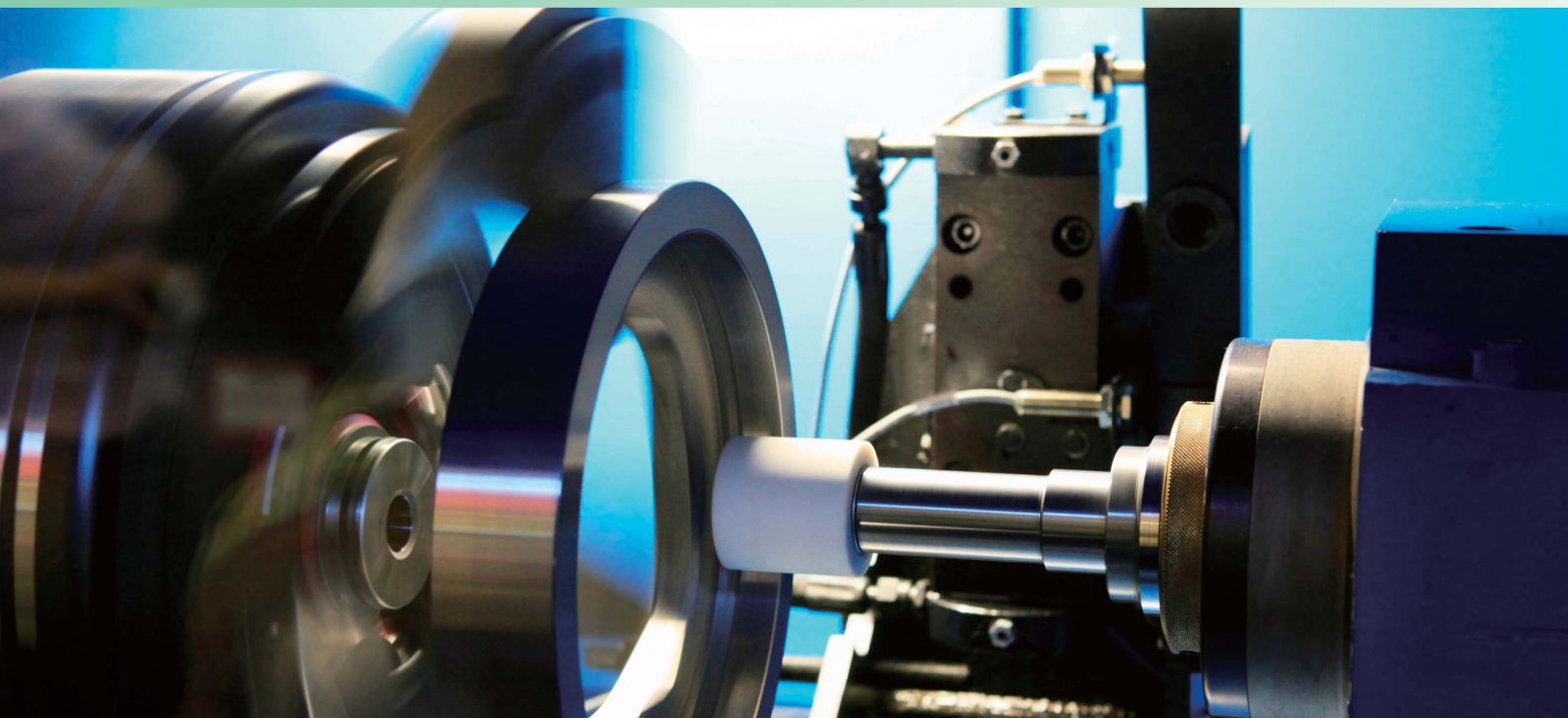




Power and Performance for Machine Tool Manufacturers



Tsubaki provides value and solutions evolution of machine tools.

Tsubaki offers a complete line-up of products, cultivated through our many successes and experience, for any machine tool application. Contact a Tsubaki representative to learn about the total solutions we can provide to customers developing new equipment or reviewing existing models.

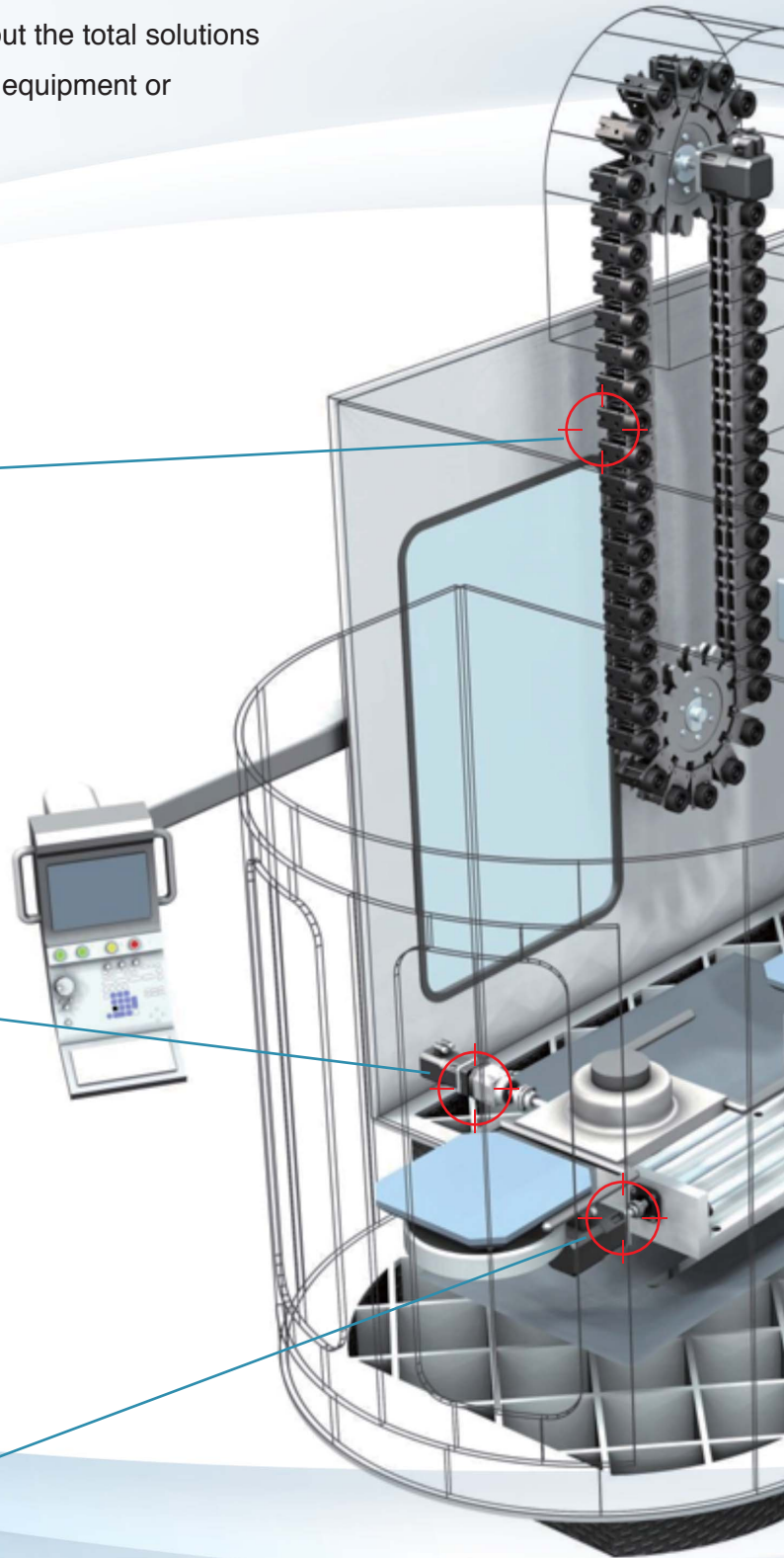
● Chains for tool magazines ●



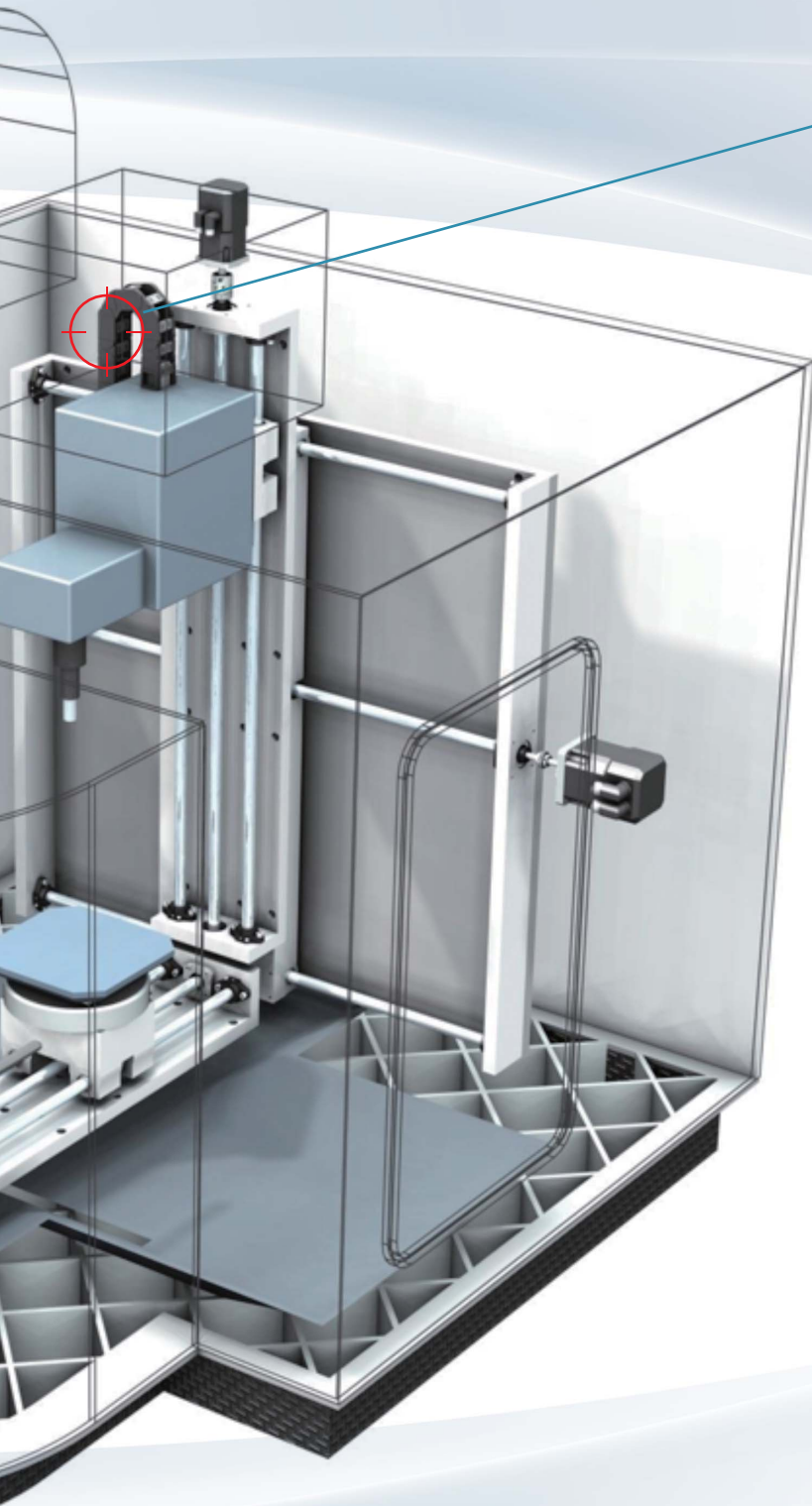
● Gearboxes for servomotors ●



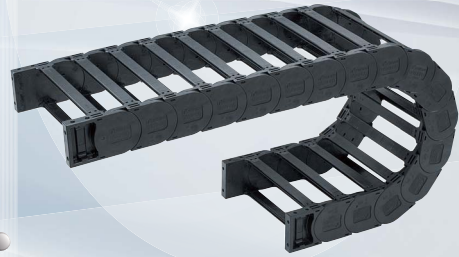
● Shaft couplings ●



to customers to match the constant



Hose and cable carrier systems



INDEX

Examples of Tsubaki solutions

Introduces examples of how Tsubaki products provide solutions to various needs and problems facing machine tools.

See [Pages 3-6](#)

Examples of use in CNC lathes, machining centers, combined machines, and peripheral equipment

Introduces examples of Tsubaki products being used in various machine tools and peripheral equipment.

See [Pages 7-12](#)

Main Tsubaki line-up and specifications

You will find our line-up and simple specifications for Tsubaki products used in machine tools.

See [Pages 13-22](#)

Case 1

Protection of hoses and cables from hot chips

Application Tailstock or vibration stopper in CNC lathes

Situation Hose and cable carrier system below work

Problem Hoses or cables are damaged by hot chips infiltrating the hose and cable carrier system.

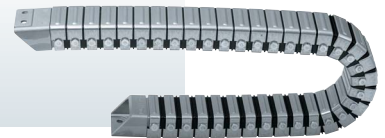


Tsubaki Solution

1

TKF Series Hot Chip Resistant Cableveyor

A steel cover on this series prevents hot chips from infiltrating the system.



2

TKA Series Cableveyor

The TKA Series has the highest sealability of any plastic series cable carrier system to prevent hot chips from infiltrating the system.



3

Aramid Covers

Damage and heat resistant aramid fiber covers wrap around hose and cable carrier systems to prevent hot chips from infiltrating. They can easily be attached to existing systems.



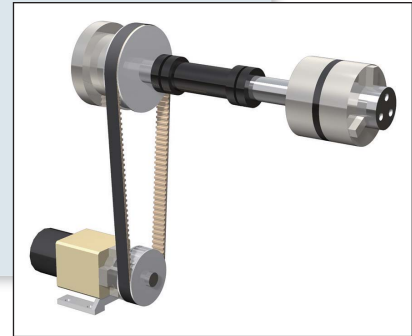
Benefits

- Reduced maintenance man-hours
- Avoiding machine trouble from cable damage

Case 2

Space saving and noise reduction for timing belt drives

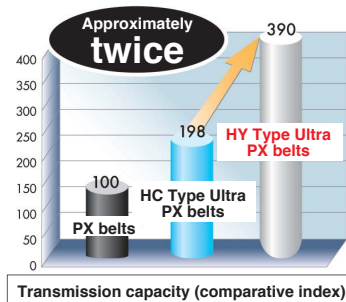
- Application** Milling spindle drive for CNC lathe
- Situation** Servo motor driven by timing belt and pulleys
- Problem** Large installation space required for timing belt and pulleys
Loud during high speed rotation



Tsubaki Solution

1 HY Type Ultra PX Belts

HY Type Ultra PX ultra-high strength timing belts have approximately twice the transmission performance of HC Type belts and allow users to reduce the size of their timing belt and pulleys.



2 Low Contact Pressure type KE Series Power Locks

When connecting shafts and pulleys with Power Locks (friction type locking device), pulley diameters can be downsized by using Low Contact Pressure type KE series Power Locks.



Benefits

- Making machines more compact

Tsubaki Advantage

Case 3

Shortening machining time and optimizing machining

Application Grinding machine

Problem Shortening air-cutting time until contacting between grindstone and workpiece

Tsubaki Solution

1

Contact detection type TSM4000M1 Shock Monitor

Shock Monitors can detect even minimal variations in load by monitoring input power. TSM4000M1 contact detection type can shorten air-cutting time because it can detect a minute load at the instant when the grindstone contacts with the workpiece. High frequency types are available for frequencies exceeding 120 Hz.



Benefit

- Optimized machining time

Tsubaki Advantage

Case 4

Reducing lost motion in feed shaft couplings

Application Couplings for feed shafts in CNC lathes and machining centers

Problem Need higher torsional stiffness for rigid couplings

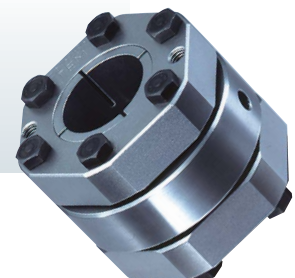
Tsubaki Solution

1

Power Rigid Couplings

Power Rigid Couplings have high torsional stiffness due to taper lock friction with the shafts (approximately four times the torsional stiffness in house testing).

This reduces lost motion from couplings during power transmission.



Benefit

- Realizing high precision feeding

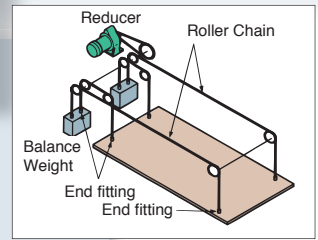
Tsubaki Advantage

Case 5

Adjusting work lifting device height using chain drive

Application Work lifting device

Problem It is difficult to adjust work height while lifting when using multiple chains.



Tsubaki Solution

1 Super-H Roller Chain

Maximum allowable load has been improved 20% over previous Super-H Chain with the December 2016 upgrade. Super-H Chain has a low elastic elongation, making it easy to adjust work height position on lifting devices.

We recommend Tough Tooth sprockets for Super-H chains.



Benefit

- Reducing man-hours

Tsubaki Advantage

Case 6

Hose and cable carrier system in high acceleration drive

Application High acceleration feeding

Problem Flapping of hose and cable carrier system, sometimes leading to breakage

Tsubaki Solution

1 TKQ Series Cableveyor

TKQ Series Cableveyors allow high acceleration, max. 4G, thanks to its continuous short pitch link design, unlike the other types of Cableveyor.

It is also quiet during high speed operation.



Benefit

- Realizing high acceleration feeding

Our products in CNC Lathes

Main Spindle

The main spindle is a unit that rotates the work piece attached to it. Tsubaki has a product line-up to match all three drive types (belt type, servo motor direct coupling type, and built-in motor type)

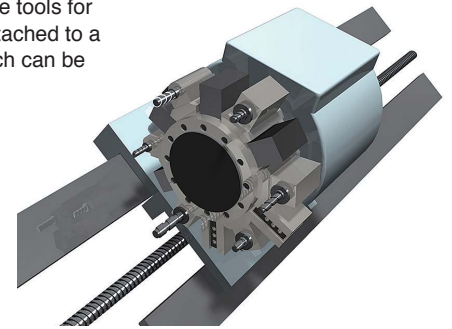


Power Lock

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Tool Post (Turret)

A turret consists of multiple tools for machining work pieces attached to a polygonal turret face, which can be indexed to any position. Tsubaki timing belts and Power Locks can be found in applications that need accurate precise indexing.



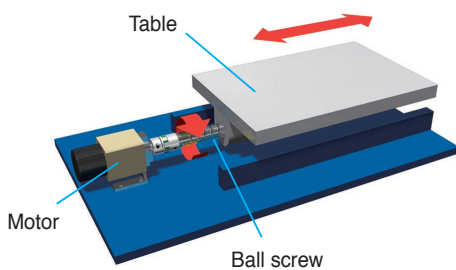
Coupling

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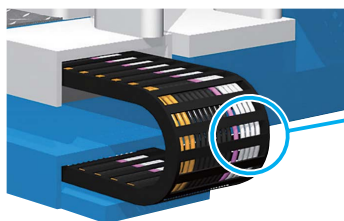
**Oil Proof Type
Ultra PX Belt**

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Table Feeding Mechanism (X- and Y-axes)

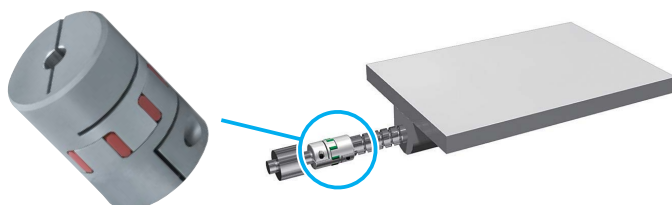


The feed spindle (X- and Y-axes) that provides feed movement to the blade tools that will machine the work piece. Tsubaki can provide the right coupling to meet your ball screw and servo motor coupling needs, as well as Cableveyor to securely support and guide the cables and hoses during machine movement.



Cableveyor

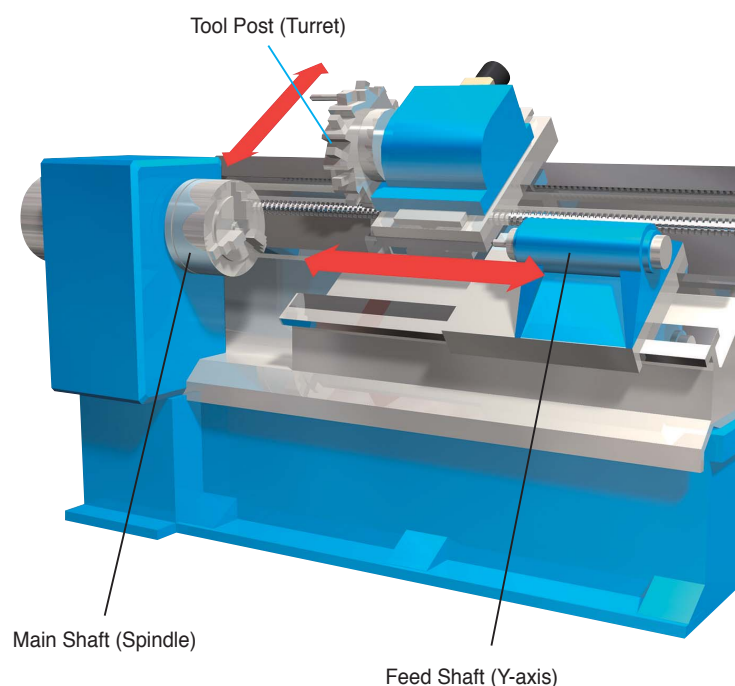
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Coupling

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Structure of CNC Lathe



Overload and Wear Detectors

Installing an overload protection device can help you avoid defects resulting from broken tools and worsening yield rates in a CNC lathe.

Tsubaki Shock Monitors quickly detect changes in power values and reliably detect overloads.



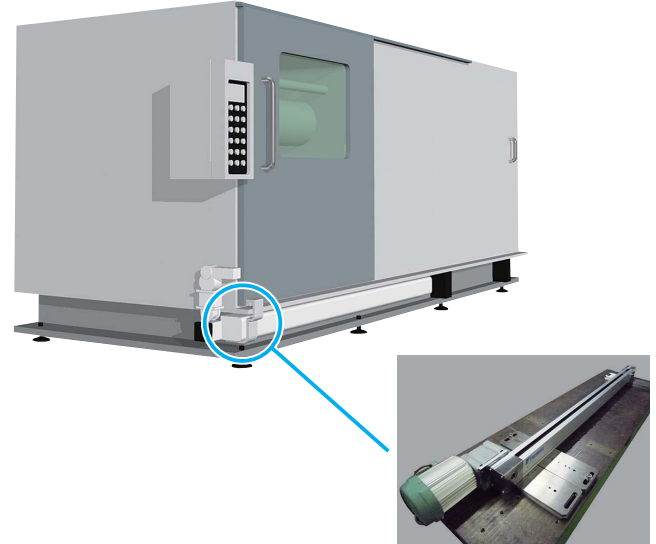
Shock Monitor

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Automatic Door Operation Mechanism

With machine tools becoming all electric, Tsubaki developed a belt-type door operation unit that uses a DC brushless motor for automatic door operation.

*Contact a Tsubaki representative for more information regarding this product.



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Chip and Coolant Handling System

Chip conveyor is the best to carry metal chips that be generated when machining in a CNC lathe.

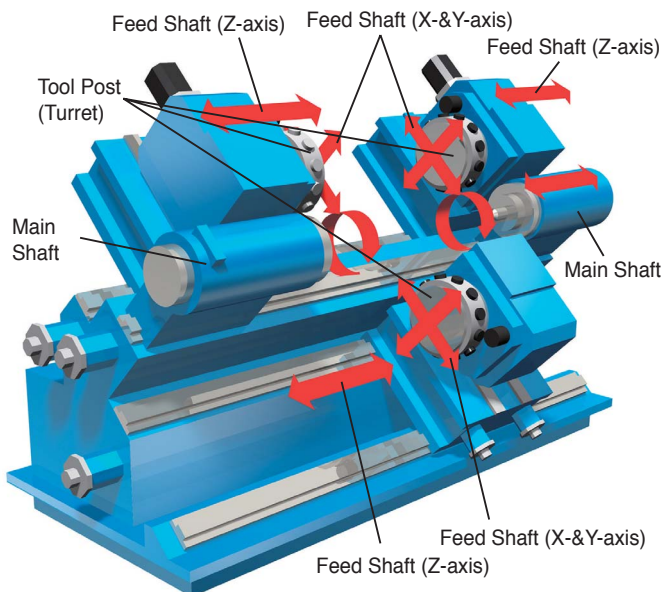
Tsubaki offers a wide line-up of chip conveyors, including hinge, scraper and push-bar types. Their drives use motors with a reducer integrated with an overload protection device. We also offer coolant separators, slug recovery equipment, and other items needed in coolant processing.

*Manufactured and sold by Tsubaki Mayfran



▶ More Information
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Structure of Multitasking machine



Our products in Machining Centers

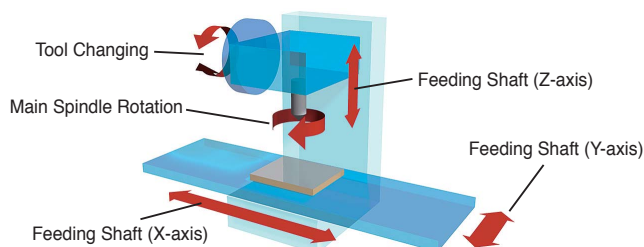
Main Spindle



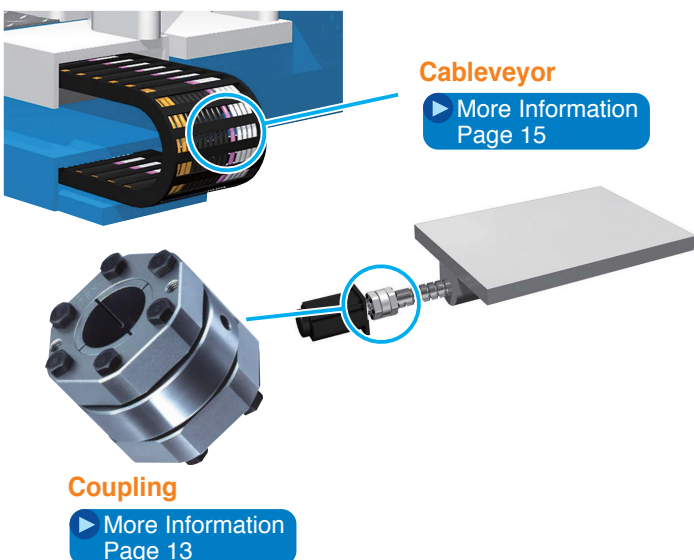
The main spindle is the heart of a machining center. It rotates attached tools to machine the work piece. On the spindle drive, you'll find a complete line-up of Tsubaki products for belt drives, servo motor direct coupling drives, and built-in motor drives.



Table Feeding Mechanism (X-, Y- and Z axes)

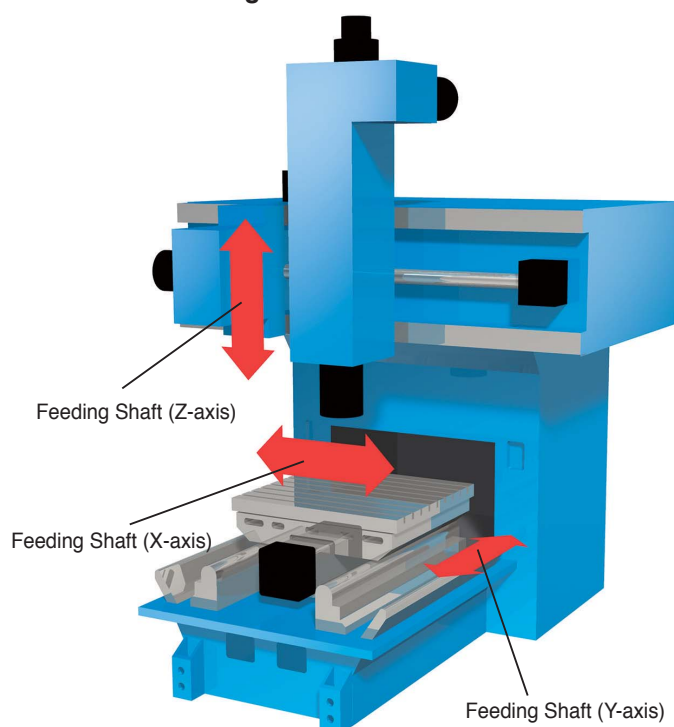


Machining centers use a variety of methods to turn the motor that feeds the ball screw and move the table. Tsubaki offers a selection of couplings to match your needs in connecting the feed spindles (X-, Y-, and Z-axes) of the ball screw and servo motor, and Cableveyors to securely support and guide the cables and hoses as the equipment moves.



Structure of Machining Center

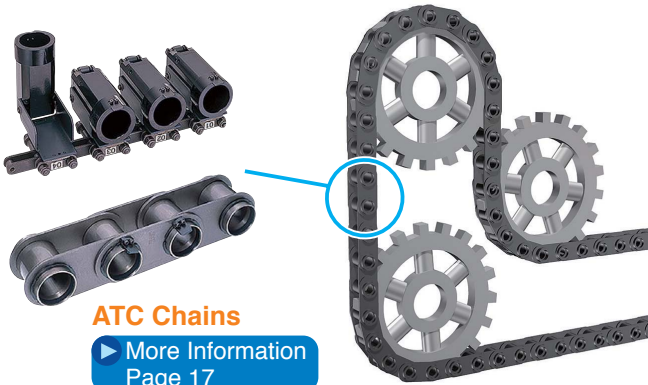
<Vertical Machining Center>



Automatic Tool Changer (ATC) Systems

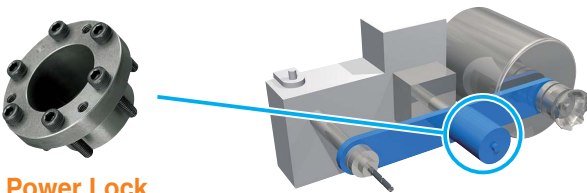
An ATC system automatically changes tools in a machining center as needed.

Tsubaki has long years of experience and success with chain-type ATC systems. Choose from our complete line-up of Power Locks to find the ideal one for your tool changer arm connection.



ATC Chains

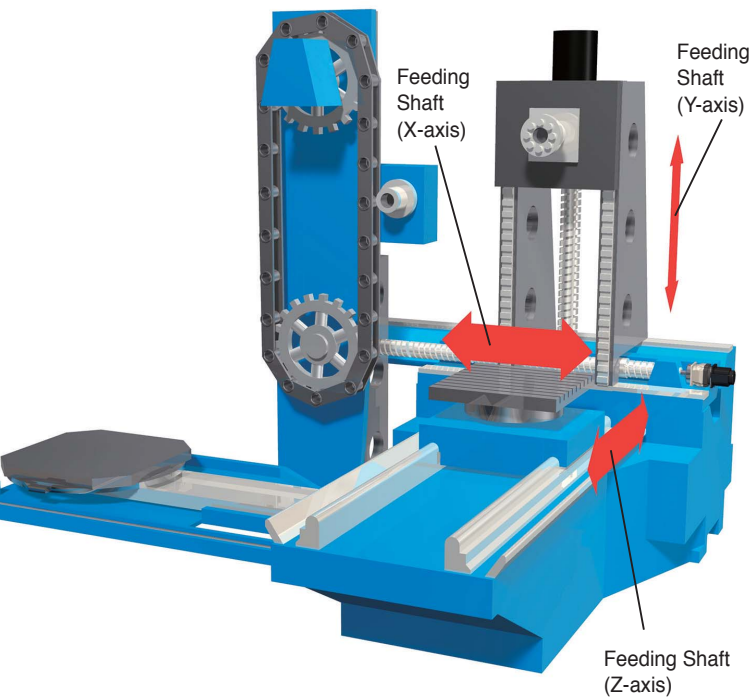
▶ More Information
Page 17



Power Lock

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Page 14

<Horizontal Machining Center>



Overload and Wear Detectors

Installing an overload protection device can help you avoid defects resulting from broken tools and worsening yield rates in a CNC lathe. Tsubaki Shock Monitors quickly detect changes in power values and reliably detect overloads.



Shock Monitor

▶ More Information
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Automatic Door Operation Mechanism

With machine tools becoming all electric, Tsubaki developed a belt-type door operation unit that uses a DC brushless motor for automatic door operation.

* Contact a Tsubaki representative for more information regarding this product.

▶ More Information
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Chip and Coolant Handling System

Chip conveyor is the best to carry metal chips that be generated when machining in a machining center. Tsubaki offers a wide line-up of chip conveyors, including hinge, scraper and push-bar types. Their drives use motors with a reducer integrated with an overload protection device. We also offer coolant separators, slug recovery equipment, and other items needed in coolant processing.

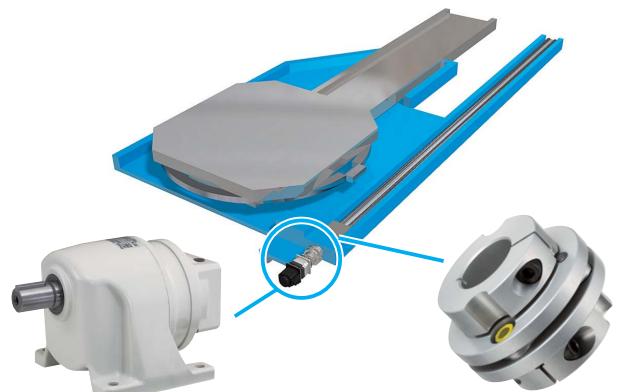
* Manufactured and sold by Tsubaki Mayfran



Chip Conveyor

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Automatic Pallet Changer (APC) Systems



Reducer

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Coupling

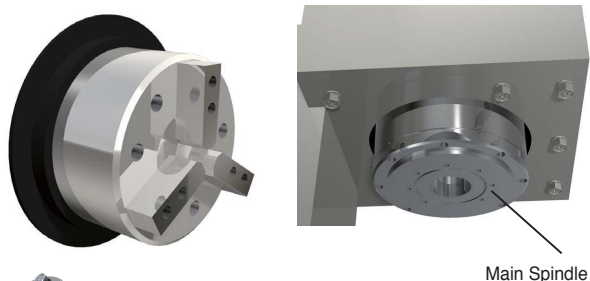
▶ More Information
Page 13

An APC system automatically replaces pallets onto which work pieces have been attached between the machining center and work table. We offer a wide-array of couplings for connecting the ball screw and servo motor that move the pallets, and high precision reducers for the servo motors.

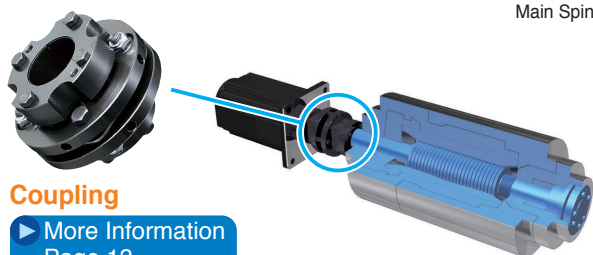
Our products in Combined Machines

Main Spindle

Even if derivative NC lathe or machining center have several main spindle drives, you'll find a complete line-up of products for belt drive, servo motor direct coupling, and built-in motor types at Tsubaki.



Main Spindle



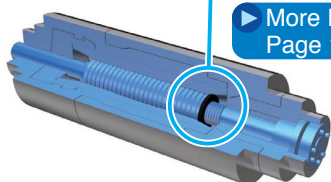
Coupling

▶ More Information Page 13



Power Lock

▶ More Information Page 14



Chip and Coolant Handling System

Chip conveyor is the best to carry metal chips that be generated when machining in a combined machine. Tsubaki offers a wide line-up of chip conveyors, including hinge, scraper and push-bar types. Their drives use motors with a reducer integrated with an overload protection device. We also offer coolant separators, slug recovery equipment, and other items needed in coolant processing.

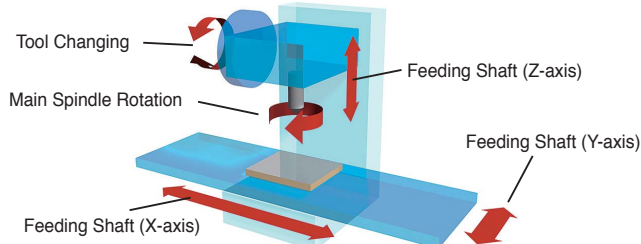
*Manufactured and sold by Tsubaki Mayfran



Chip Conveyor

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Table Feeding Mechanism (X-, Y- and Z-axes)



Combined machines use a variety of methods to turn the motor that feeds the ball screw and move the table. Tsubaki offers a selection of couplings to match your needs in connecting the feed spindles (X-, Y-, and Z-axes) of the ball screw and servo motor, and Cableveyors to securely support and guide the cables and hoses as the equipment moves.



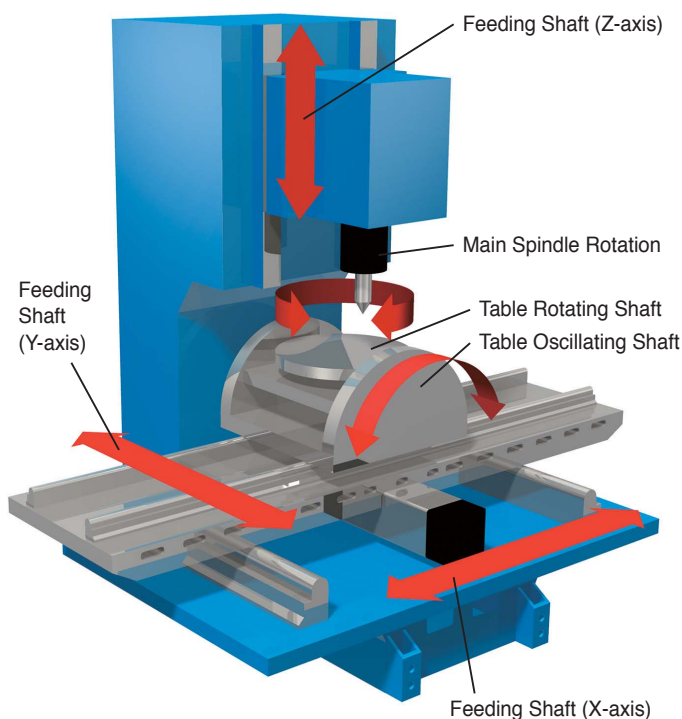
Cableveyor

▶ More Information Page 15

Coupling

▶ More Information Page 13

Structure of Combined Machine



Our products in Peripheral Equipment

Work and Pallet Lifting Devices

Tsubaki offers the Zip Chain Actuator and Lift Master as unique products for lift devices on peripheral devices for machine tools. The Zip Chain Actuator is a unique linear actuator using Tsubaki Zip Chain. It is more compact than other linear actuators, allowing users to save space.

The Lift Master is an electrical lifter that can handle overhanging or lateral loads. The screws and guides are housed in the frame to help make the unit more compact.

Tsubaki can offer other gear motors, gear boxes, couplings, and jacks to use in combination with lifting equipment.

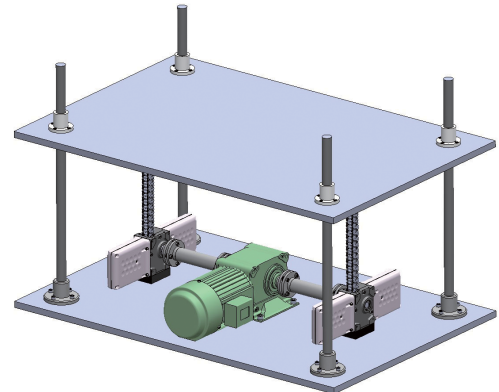
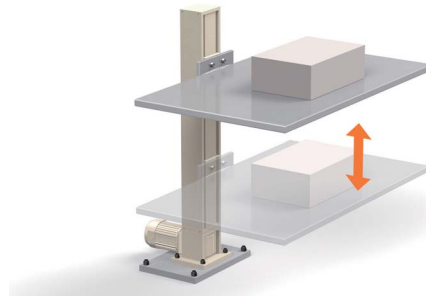
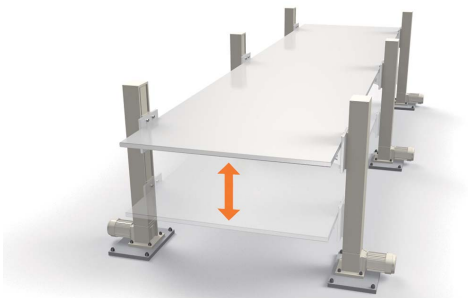
Contact a Tsubaki representative for more information regarding these products.

Lift Master

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Zip Chain Actuator

[▶ More Information Page 20](#)

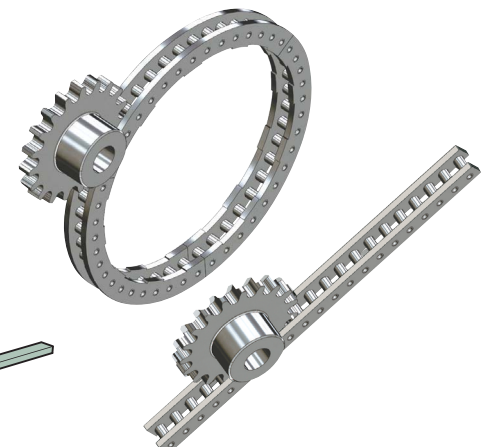
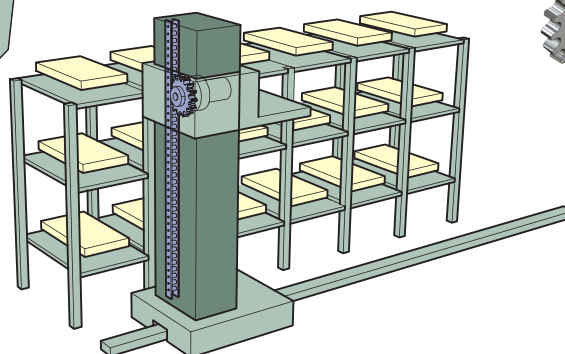
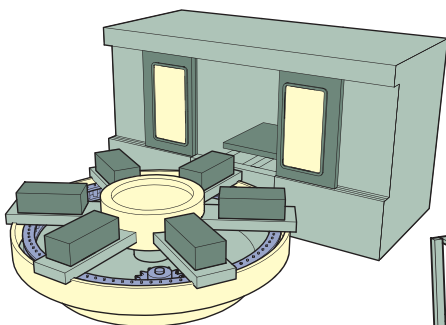


Work and Pallets Travel Units

Tsubaki Pin Gear Drive Units are useful in pallet feed and drive units. This new drive unit replacement for gears and racks can be used in rotating and linear drives. It uses a segmental structure to allow for easy installation.

Pin Gear Drive Unit

[▶ More Information Page 18](#)



Couplings

Tsubaki couplings are the best choice for coupling main spindles and servo motors, and servo motors for the X-/Y-/Z-axes feed shafts and ball screw.

NEF Taper Lock Series Echt-Flex Coupling (for main spindle and feed shaft applications)

- Demonstrates high performance for high speed drives thanks to its balanced design and precision assembly balance.
- For main spindle applications, we precisely assemble the unit and adjust the balance before shipping.
- The optimally shaped disc, based on FEM, features high torsional rigidity and superb flexibility. There is no backlash either.



- Applicable torque range: 39.2 - 245 N·m
- Applicable bore diameter range: 10 - 50 mm



NES Series Echt-Flex Coupling (for main spindle and feed shaft applications)

- The hub uses lightweight, high strength extra super Duralumin, and the unique hub shape realizes a low moment of inertia. There is no backlash either.
- It fastens to the spindle using a clamping method – just tighten the clamp bolts on either side of the coupling for easy attachment.
- We can also provide balance adjusted couplings with taper lock mechanisms for main spindle applications.

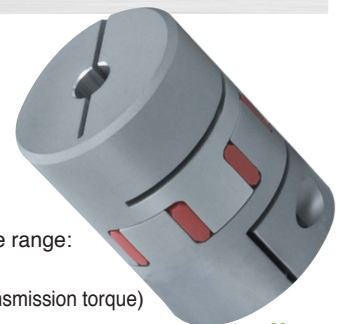


- Applicable torque range: 0.7 - 300 N·m
- Applicable bore diameter range: 4 - 50 mm



LN Series Jaw-Flex Coupling (for feed shaft applications)

- The spider uses a new material with unsurpassed vibration damping properties. It absorbs vibration during table feed so as to not damage work piece machining quality.
- Users can select from two spider types: 98A with excellent vibration damping properties and 64D with high torsional rigidity and superb wear resistance. These jaw-type couplings still provide torque transmission with no backlash.
- It fastens to the spindle using a clamping method – just tighten the clamp bolts on either side of the coupling for easy attachment.

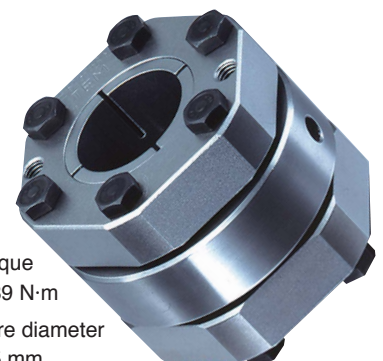


- Applicable torque range: 60 - 405 N·m (normal spider transmission torque)
- Applicable bore diameter range: 12 - 42 mm



Power Rigid Coupling (for feed shaft application)

- Its design uses no flexible elements to give it high torsional rigidity.
 - Uses a taper lock method to realize a large spindle fastening strength.
 - The outer race has a polygonal shape for a lower moment of inertia and no backlash.
 - Its simple design and common parts can greatly lower your costs.
- * Does not absorb misalignment.



- Applicable torque range: 78 - 489 N·m
- Applicable bore diameter range: 16 - 35 mm

Locking Devices

Power Locks are used in fastening the tool changers, turrets, and pulleys for main spindle drive in ATC systems, and to fasten rotors for built-in spindle motors.

AS Series Power Lock (Most popular multipurpose type)

- A popular standard type that is our simplest to attach and remove.
 - Imperial sizes, electroless nickel plating, and stainless steel types are also available.
 - Perfect for fastening ATC arms and the rotors of built-in spindle motors to main spindles.
 - Uses high strength fastening bolts, and has fewer bolts than competitor products to help you cut down on attachment time.
- * This series has no centering functions. A centering guide on the boss (hub) is required.

- Applicable shaft diameter: 19 - 300 mm
- Applicable torque range: 245 - 151000 N·m
- Applicable shaft tolerance: h8
- Applicable hub bore tolerance: H8



KE Series Power Lock (economic type for a wide range of shaft tolerances)

- This easy to use series has centering functions and a small ratio of inner and outer diameters.
- Has a simple, economical structure with just an inner ring, outer ring, and fastening bolts.
- Perfect for fastening ATC arms, turrets, and pulleys for spindle motor drives.
- m6, k6, js6-7 and h6-10 shaft tolerances are available. (excluding electroless nickel plating type)
- Electroless nickel plating and stainless steel types also available.

- Applicable shaft diameter: 5 - 100 mm
- Applicable torque range: 7.5 - 9900 N·m
- Applicable shaft tolerance: h8 (m6, k6, js6-7, h6-10)
- Applicable hub bore tolerance: H8



EL Series Power Lock (element type)

- This excellent space saving design is lightweight and compact.
 - Users can select the number to be included, the number of fastening bolts, and the size to match their application. Allows for flexible designing.
 - Completely ring shaped for excellent dynamic balance.
 - Perfect for fastening ATC arms, turrets, and pulleys for spindle motor drives.
- * This series has no centering functions. A centering guide on the boss (hub) is required.

- Applicable shaft diameter: 10 - 150 mm
- Applicable torque range: 6.9 - 10500 N·m
- Applicable shaft tolerance: ø10 - 38: h6 ø40 - 150: h8
- Applicable hub bore tolerance: ø10 - 38: H7 ø40 - 150: H8



Low Contact Pressure Type KE Series Power Lock

- Same size as KE series, but can be used on small diameter hubs.
- Wide range of shaft tolerances just like KE series
- Can be used on hub with low yield point stress

- Applicable shaft diameter: 5 - 100 mm
- Applicable torque range: 6.3 - 8290 N·m
- Applicable shaft tolerance: h8 (m6, k6, js6-7, h6-10)
- Applicable hub bore tolerance: H8



AD-N Series Power Lock (large capacity type)

- Has the same inner diameter as the AS Series with 1.5 - 3 times or more the transmission torque capacity.
 - Has centering functions, so there is no need to machine a troublesome centering guide on the hub bore.
 - Regardless of the application, this series is ideal wherever large transmission torque capacity is needed.
 - Electroless nickel plating and stainless steel types also available.
- * This power lock should not be attached and removed more than twice. (Power Locks in other series can be attached and removed up to ten times.)

- Applicable shaft diameter: 19 - 300 mm
- Applicable torque range: 382 - 429000 N·m
- Applicable shaft tolerance: h8
- Applicable hub bore tolerance: H8



SL Series Power Lock (outer fastening type)

- Can be fastened from the outside of the hub, making it ideal for where design limitations force the use of thin-walled hubs or for fastening to hollow shafts.
- We can provide tap holes for balance adjustments for when fastening the rotors on built-in spindle motors to main spindles that are rotating at high speeds.
- Ideal for applications where design limitations force the use of thin-walled hubs when fastening to turret shafts or other additional shafts.

- Applicable shaft diameter: 24 - 300 mm
- Applicable torque range: 167 - 290000 N·m
- Applicable hub outer diameter tolerance: h7
- Applicable hub bore tolerance: H7
- Applicable shaft tolerance: h6



EF Series Reverse Taper Power Lock (made-to-order product)

- The direction of the taper is opposite that of the standard EF Series, eliminating hub movement during attachment.
- Ideal for fastening ATC arms and built-in spindle motor rotors to main spindles.
- We can provide tap holes for balance adjustments for when fastening the rotors on built-in spindle motors to main spindles that are rotating at high speeds.
- When using an element-type with ATC arms or the like, we can provide designs that eliminate the trouble of manufacturing a pressurizing flange while providing maximum consideration for the mounting dimensions of the current pressurizing flange and element-type.

* Contact a Tsubaki representative for more information.



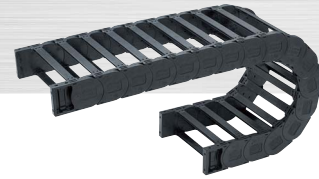
Hose and Cable Carrier System

TKP Series Cableveyor (open type)

Standard-type Plastic Series open model.

Wide selection of easy-to-handle products—from compact to large sizes.

- Dividers can be fixed for separating the cables.
- Long-span arrangements can be installed to accommodate long strokes.
- Various installations horizontally or vertically possible



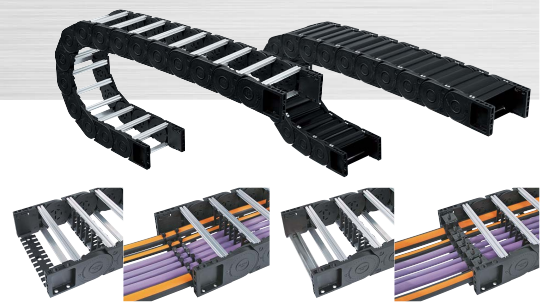
TKHC, TKLC Series Cableveyor (open type) / TKHT, TKLT Series Cableveyor (closed type)

Ideal for housing and guiding multiple cables and hoses.

Wide selection of easy-to-handle products – from compact to large sizes.

A wide line-up of closed types with aluminum covers effective for protecting cables and hoses from hot chips and spatter.

- Aluminum stays can protect cables and hoses, and plastic links made of oil-proof material.
- Extremely quiet, high torsional stiffness, and long life.
- Widths configurable to 1 mm increments (excluding some closed type).
- Open type is the same size as closed type (excluding some items).
- Attaching lock parts can lock in horizontal dividers (excluding TKHT).
- Supports installation of strain relief combs.



TKXC Series Cableveyor (open type) / TKXT Series Cableveyor (closed type)

Cable carrier with large inner height (cable and hose maximum diameter: 97 mm, open type)

Large choice of stay systems for effectively housing cables of all sizes.

- Aluminum stays can protect cables and hoses, and plastic links are made of oil-proof material.
- Widths configurable to 1 mm increments (inner width: maximum 1000 mm).
- To extend the life of cable carriers in gliding operations Tsubaki supplies detachable, replaceable glide shoes. Replaceable glide shoes are a very economical solution. When wear occurs only the glide shoes are replaced, and not the complete cable carrier.

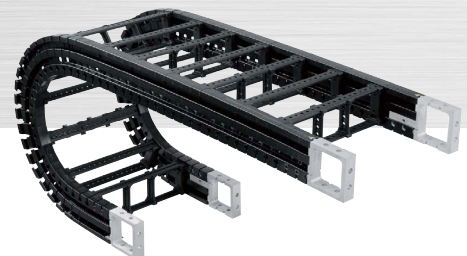


Glide Shoes

TKQ Series Cableveyor (open type)

The short pitch continuous link structure means no links slide against each other for quiet, low debris generation operation. Runs smoothly with minimal vibration, even at high speeds.

- Maximum travel speed: 600 m/min.
- Up to maximum 4G acceleration.
- Special inner widths also available.

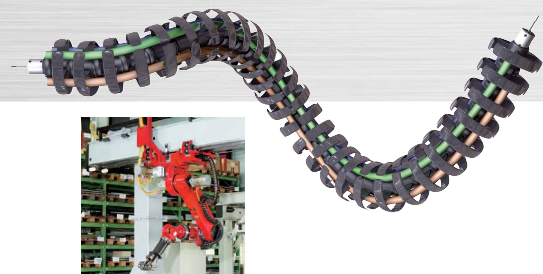


TKRB Series Cableveyor: ROBOTRAX system for 3D movement

The minimum bend radius can be maintained for three-dimensional movement.

The cables are cleanly isolated in three separate chambers.

- Fast cable laying by simple pressing in the cables – no threading through is necessary.
- Special plastic for long service life
- Uses a steel cable reinforced member to handle heavy loads.
- Wide variety of accessories for moving and installation environments available.



Tsubaki provides an extensive line of quality proven Cableveyors to suit for machine tools.

TKA Series Cableveyor (closed type)

Excellent cable protection in the connector area, and chip and dirt resistant due to smooth surfaces.

- Easy-open covers from any position offer secure fastening.
- Unique link structure for superior quietness during operation.
- Supports installation of comb-shaped strain reliefs.



FLATVEYOR

The FLATVEYOR is a free-standing flat cable system that makes full use of cable carrier technology.

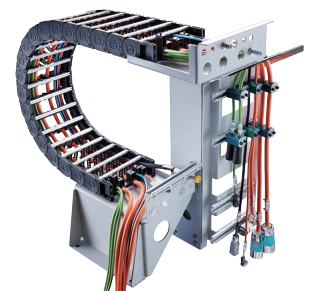
- The built-in support member allows for a maximum travel stroke of up to 3 m.
- The cable's minimum bending radius does not change, ensuring smooth operation and preventing the cable from bouncing upward.
- In addition to the recommended Tsubaki cables for motion, the FLATVEYOR supports installation of a wide variety of cables and tubes. (Varies according to cable/tube specifications and various conditions.)
- The simple structure is lighter. Adopting the same shape as a flat cable, the FLATVEYOR can be installed even when space is limited. Cables can also be retracted within the device without the need for relays.



TOTALTRAX: Ready-to-assemble cable carrier system

Cables and hoses with end connectors attached are delivered installed in the cable carrier as a set.

- Installation on machines or equipment following delivery is quick and simple.
- Reduced procurement costs because of concentrating on one supplier – one purchase order and one item number.



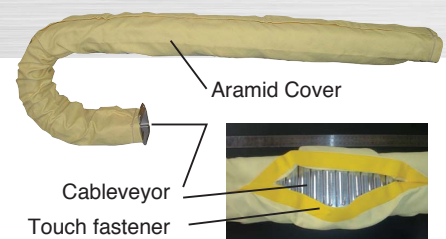
Aramid Covers: unique covers against chips

Aramid Covers protect cables, hoses, and cable carriers from hot chips.

- Excellent heat resistance
- Excellent cut resistance
- Excellent chemical resistance (Please contact a Tsubaki representative for more information.)
- High strength
- Easy installation

Specifications

- Operating temperature range: up to 200 degrees Celsius (Cover main body: to 400 degrees Celsius, Touch fastener: to 200 degrees Celsius)
- Color: Yellow (Aluminum deposition is also available)
- End parts of fabric: Aramid stitching
- Cover closing parts: Touch fastener (Zip fastener is available)



ATC Chain and Tool Pot

Combine chain especially designed for ATC systems with a high performance Tool Pot to enable high quality and cost savings in a superb compact design. We offer individual pots for drums and gripper types.

HP Series

A simple type consisting of link plates and hollow pins.

The chain can freely articulate, which gives users a high degree of layout freedom, and even a large number of tools can be housed in a tight space.

- Mainly for horizontal type and double column machining centers.
- Generally for 60 - 240 tools.
- Can accommodate a variety of tool specifications and pitches.



Split Series

The pots that house the tools can be removed from the chain and used.

The chain can only articulate one way, which limits layout freedom, but the pots can be removed. This eliminates the need for waiting (intermediate) pots and allows tools to be housed in fixed locations.

- Mainly for vertical and horizontal type machining centers.
- Generally for 40 - 60 tools.
- Can accommodate a variety of tool specifications and pitches.



Rotating Series

Rotates the pot attached to the chain 90° at where the tool will be changed by the ATC arm. This prevents the ATC arm from interfering with other tools, and enables direct changing of the tool on the main spindle with a double arm.

- Mainly for vertical type machining centers.
- Generally for 40 - 60 tools.
- Can accommodate a variety of tool specifications and pitches.



SK Series

The pitch between adjacent tools increases when the chain articulates around the sprocket, making it easy to switch tools with double arms.

The chain can only articulate one way, which limits layout freedom.

- Mainly for vertical and horizontal type machining centers.
- Generally for 40 - 60 tools.
- Can accommodate a variety of tool specifications.



Standing Series

Tools can be housed vertically from the chain, allowing for a thinner magazine. (However, it will be taller.)

The pitch between adjacent tools increases when the chain articulates around the sprocket, making it easy to switch tools with double arms.

- Mainly for horizontal type machining centers.
- Generally for 20 - 40 tools.
- Can accommodate a variety of tool specifications and pitches.



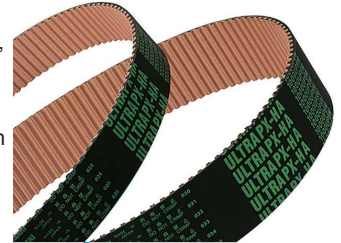
Rubber Timing Belts

The Oil Proof Type Ultra PX Belt can be used in environments in contact with oil. (For example, main spindle drive)

Oil Proof Type Ultra PX Belts

- The rubber for the belt uses an oil resistant material for use in contact with oil.
- Transmission capacity is equivalent to the HC Type Ultra PX Belt. Space saving design. (Transmission capacity is double that of the previous PX Belt.)
- High precision transmission is possible thanks to minimal elongation from operation. Reducing maintenance cost and maintenance man-hour.
- Easy to determine the time for replacement.

- UP5M-HA (Pitch 5 mm)**
Belt Length (475 - 3930 mm)
Belt Width (10 mm, 15 mm, 25 mm)
- UP8M-HA (Pitch 8 mm)**
Belt Length (480 - 4400 mm)
Belt Width (15 mm, 25 mm, 40 mm, 60 mm)
- * Can also product UP14M-HA (Pitch 14 mm). Contact a Tsubaki representative for more information



HY Type Ultra PX Belts (Ultra high tension belt)

- HY Type Ultra PX Belts use a hybrid core of carbon and glass for dramatically increased strength and durability.
- These belts have 1.3-2.0 times the transmission performance of Oil Proof Type Ultra PX Belts, allowing for more compact and lightweight equipment.
- Less load elongation and high damping characteristics lead to higher equipment precision.

- UP3M-HY (Pitch 3mm)**
Belt Length (312 - 1947 mm)
Belt Width (6, 10, 15 mm)
- UP5M-HY (Pitch 5 mm)**
Belt Length (600 - 3930 mm)
Belt Width (10, 15, 25 mm)
- UP8M-HY (Pitch 8 mm)**
Belt Length (760 - 4400 mm)
Belt Width (15, 25, 40, 60 mm)
- UP14M-HY (Pitch 14 mm)**
Belt Length (1120 - 4508 mm)
Belt Width (40, 60, 80, 100, 120 mm)



Pin Gear Drive Unit

The most suitable unit for rotating and linear drives

- Pin Gear Drive Units are drive units that come with pin gears and pin wheels (or pin racks) for engagement.
- The pin gear tooth profile is an approximation of an involute curve to provide smooth engagement and power transmission between pin wheel and rack. Teeth have been hardened to increase their strength and wear resistance.
- Uses a segmented system for easy installation. Rough mounting precision is allowed.
- Made-to-order product. (for example, stainless steel type)

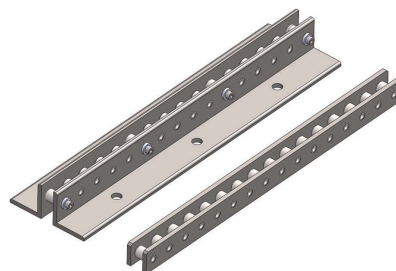
- Pitch**
20 - 120 mm
(Stainless Steel type: 20 - 90 mm)
- Allowable tangential loads**
Steel type: 4.7 - 122.5 kN
Stainless Steel type: 0.8 - 16.8 kN
- Maximum Speed**
Tangential speed: 50 m/min.

Pin Wheel

Pin Gear

Pin Rack

Pin Gear



Gear Reducers

Tsubaki offers a complete line-up of precision reducers for servo motors that drive pallet changers, small gear motors installed in overload protection equipment for chip conveyors, and other reducers for machine tool applications.

TERVO Series for Servo Motors (for pallet changers)

- Standard gear heads for servos achieve high cost savings.

In addition to an expansive line-up of helical, hypoid, and worm gears, we also offer right-angle shaft, parallel shaft, solid shaft, and hollow shaft types.

■ HMTK Hypoid Gear Head

Right-angle shaft type
Output shaft: Hollow, solid
Servo motor range:
0.1 kW - 2 kW
Reduction ratio: 1/5 - 1/200



■ SWJMK/SWMK Worm Gear Head

Right-angle shaft type
Output shaft: Hollow
Servo motor range:
0.1 kW - 7 kW
Reduction ratio: 1/10 - 1/60



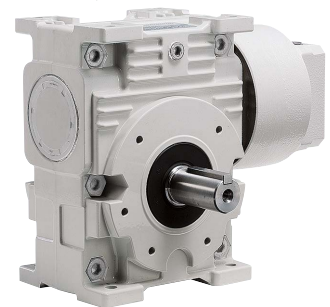
■ GMTK Helical Gear Head

Parallel shaft type
Output shaft: Solid
Servo motor range:
0.1 kW - 2 kW
Reduction ratio: 1/5 - 1/200



■ EWJMK/EWMK Worm Gear Head

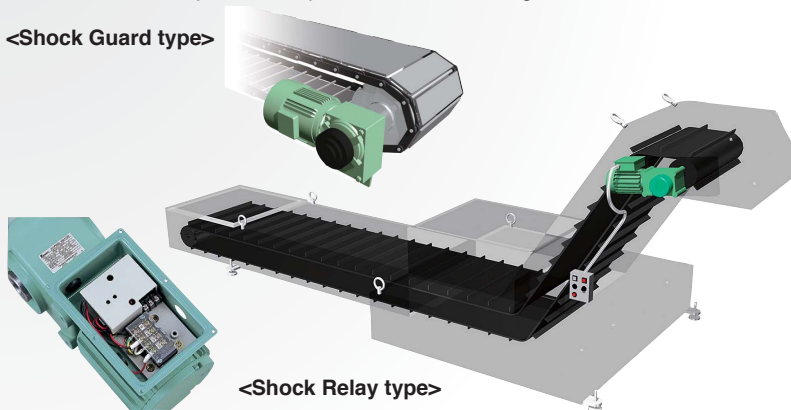
Right-angle shaft type
Output shaft: Solid
Servo motor range:
0.1 kW - 7 kW
Reduction ratio: 1/10 - 1/60



Croise Motor with Overload Protection Device (for chip conveyors)

- This gear motor uses a high strength, heavy shock resistant worm gear and is ideal for chip conveyors.
- Users can select from electrical type Shock Relays (right photo) and mechanical overload protector (left photo) for the overload protection device.
- Available in a variety of motor options in different voltages and with CE/UL/CCC standards.

<Shock Guard type>



<Shock Relay type>



- Motor capacity:
0.1 kW - 0.4 kW
- Reduction ratio:
1/10 - 1/400
- Gear combination
 - CSMA: Worm gear
 - HCMA: Helical gear + worm gear
 - CMMA: Worm gear + helical gear



Door Operation Unit

Tsubaki offers automatic door operation units for machine tools.

Belt-type Door Operation Unit

- With machine tools becoming all electric, Tsubaki developed a belt-type door operation unit that uses a DC brushless motor for automatic door operation. Provides high speeds and safe door operation.
- Provides better responsiveness, controllability, and safety than air cylinder devices.
- Energy saving
- Low cost, space saving, wire saving, and easy operation.



* Contact a Tsubaki representative for more information regarding this product.

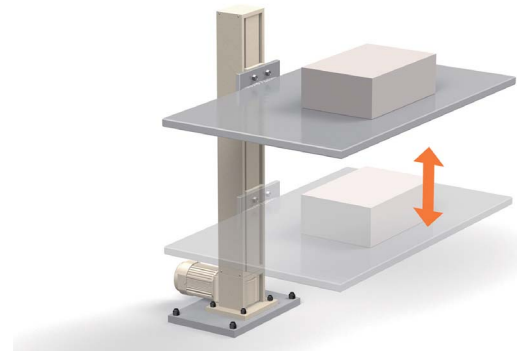
Linear Actuator

Tsubaki offers two types of linear actuator products: “Screw and Nut” and “Meshing chain.”

Lift Master

- Lift Master is a self-standing type electrical lifter that allows for overhanging and lateral loads.
- Screw and guide mechanism are housed in the frame for a compact design.
- Allows for overhanging loads thanks to its built-in sliding guide
- Uses a brake motor. No power is required to prevent free fall or hold loads.
- Clean, with no oil leakage. Easy maintenance.

* Contact a Tsubaki representative for more information regarding this product.



Zip Chain Actuator

- Meshing chain (Zip Chain) is a chain uniquely developed by Tsubaki. Tsubaki Zip Chain Actuators are linear actuator products using this chain.
- 1/4 to 1/5 the size of conventional linear actuators, as this product can compactly house the Zip Chain.
- Free mounting direction (vertical, horizontal, and hanging installation)
- Capable of higher-speed operation compared to screw type, hydraulic, and pneumatic cylinders.
ZCA025, ZCA135: Maximum speed = 1000 mm/sec
ZCA145: Maximum speed = 500 mm/sec
- Various options available (with gear motor, with guide, and so on)

* Contact a Tsubaki representative for more information regarding this product.



Overload and Wear Detectors

Tsubaki Shock Monitors quickly detect changes in power values and reliably detect overloads.

Shock Monitor TSM4000M1 (For machine tools. Contact detection type)

- Load ratio at no-load operation can be automatically, or by external input, offset to 0%. Quickly and reliably detects minimal load changes.
- Capable of high-precision detection of minute power changes when the tool and workpiece contact as the power is automatically offset to 0% during no-load operation. (There are two types of output: OUT1 and OUT2)
- OUT3 is a non-offset value and the absolute value can be monitored.
- As for detection level, as a set, OUT1, OUT2, and OUT3 can be switched from the external for a maximum of 8 types. Compatible with the change of grinding stone and workpieces.

- Applied Motor
 - Capacity : 0.1-110 kW
 - Power source voltage : AC200 V/220 V, AC400 V/440 V
 - Frequency : 5-120 Hz



Shock Monitor TSM4000M2 (For machine tools. Integral power type)

- Detects overload and tool wear by integrating one cycle of power from the manufacturing process.
- With the constant pressure of a finishing machine, even if the tool wears, the load ratio does not rise while the machining time increases. This is monitored in the power consumption (area).
- After machining is completed, the wear is detected by the upper limit of power integration (OUT2), while the drill breakage can be detected by the lower limit (OUT1). With the instantaneous value of OUT3, overload due to jams is monitored with the absolute value.
- As a set, there are a maximum of 8 types that OUT1, OUT2 and OUT3 can be switched between externally. It accommodates the change of tools and workpieces. The integral time setting can be changed easily.

- Applied Motor
 - Capacity : 0.1-110 kW
 - Power source voltage : AC200 V/220 V, AC400 V/440 V
 - Frequency : 5-120 Hz



Chip Conveyors and Coolant Filtration Systems

ConSep 2000 II : Chip Conveyor System for Chips with Coolant Cleaning

The ultimate in chip handling and coolant processing.
Ideal for processing chips from multiple process machines.

- Able to convey long and short chips, etc., regardless of shapes and materials.
- Compatible with all coolants, both water-soluble and water-insoluble.
- The built-in filtration drum saves the time and effort of cleaning the inside of the tank.
- Service and maintenance available worldwide.
- Energy-efficient, environmentally friendly design.



ConSep 2000: Chip Conveyor System for Chips with Coolant Cleaning

Able to convey long and short chips, etc., regardless of shapes and materials.
The built-in filtration drum saves the time and effort of cleaning the inside of the tank.

- Ideal for handling mixed long and short chips and high coolant volumes.
- Flexible system realized by two types of conveyors.
- Unique design protects the filter drum.
- Permanent self-cleaning filter media with backwash spray cleans coolant to 50 micron nominal.



SC12RMG: Magnetic Chip-Coolant Separator

Ideal for separating coolant from ferromagnetic chips, especially castings and short steel chips.

- Ferrite magnets mounted underneath the bottom pan of the conveyor attract ferrous chips and fine chips, which are removed by cleats on the conveyor belt.
- Economical solid/liquid separation with a compact footprint on the factory floor.
- Magnetic material underneath the bottom pan can be doubled in thickness for more powerful separation and even greater reduction in sediment/sludge outflow.



MT10: Hinged Steel Belt Conveyor

Reliable Handling of Long Chips from Small Machine Tools.
Bestselling small-profile model featuring economical operation in a compact format.

- Precision-processed hinged steel belt is ideal for processing long chips.
- An MT10AR heavy-duty model is also available to withstand wear on key components from hardened chips.
- Ideal for handling chips from small-scale machine tools or with limited installation areas.



CT20: Hinged Steel Belt Conveyor

Reliable Handling of Long Chips from Small- to Medium-Size Machine Tools
Versatile medium-sized model is an upgraded version of the MT10 offering superb efficiency.

- Precision-processed hinged steel belt is ideal for processing long chips.
- A CT20AR heavy-duty model is also available to withstand wear on key components from hardened chips.



Sludge Barrier: Peripherals

Compact, portable sludge recovery unit with built-in magnets.

- Simplifies in-tank sludge recovery and disposal without troublesome manual operations.
- Easy retrofitting for existing coolant tanks by merely cutting a mounting slot in the cover or lid.



Absorbed Sludge



Gear Motors Protected by Shock Relays: Standard Equipment

Shaft-mounted gear motors with Shock Relays.

- Tsubakimoto Shock Relay® is a safety device designed to constantly monitor current flow to protect electric motors and other devices from damage resulting from unexpected overloads or electrical surges.
- Shock Relays are built into the terminal boxes of shaft-mounted gear motors on the ConSep series, MT10, CT20, CT1, SC12R series, and SC25 models, and can also signal an overload condition via a single-wire line.



*Manufactured and sold by **Tsubaki Mayfran**
<http://www.mayfran.co.jp/>

Tsubaki group website Tsubaki Power Transmission Products Technical Information Website TT-net now online



TT-net, Tsubaki Power Transmission Products*1 Technical Information Website, has been online since April 8, 2013.

*1 Power transmission products are machine parts for general industrial use such as chains, gearboxes, and liner actuators.



TT-net <https://tt-net.tsubakimoto.co.jp/tecs/top/index.asp?lang=en>

Tsubaki website <http://tsubakimoto.com>

Tsubaki Group Network Global Network

The Tsubakimoto Chain Group's worldwide sales and manufacturing network bolsters the global business of our customers in real time. (as of April 1, 2016)



● Manufacturing sites in Japan ● Sales and manufacturing sites around the world ● Sales sites around the world

JAPAN (11 manufacturing sites)	Kyotanabe plant	Saitama plant
	Kyoto plant	Hyogo plant
	Okayama plant	Tsubakimoto Mayfran Inc.
AMERICAS (10 companies)	U.S.Tsubaki, Holdings, Inc.	Tsubaki of Canada Limited
	Tsubakimoto Europe B.V.	Tsubaki Kabelschlepp GmbH
EUROPE (19 companies)	Tsubakimoto U.K. Ltd.	Mayfran Limbug B.V.
	Taiwan Tsubakimoto Co.	Tsubakimoto Korea Co., Ltd.
EAST ASIA & INDIAN OCEAN RIM (31 companies)	Tsubakimoto Chain (Shanghai) Co., Ltd.	Tsubakimoto Singapore Pte. Ltd.
	Tsubaki Australia Pty. Ltd.	



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