TSUBAKI
Smart Series Replaceable Tooth Insert
Large Size Conveyor Chain Sprockets
Sprocket replacement takes a lot of time and labor, and sometimes requires the shaft to be cut. And work in high places is especially dangerous, and takes even more time. Tsubaki’s Smart Series Replaceable Tooth Insert Series of sprockets is the solution to these problems. Tsubaki offers three types (split type, ring insert tooth type, and block insert tooth type) to reduce your replacement and labor time.

**Three smart features**

1. **Just the teeth can be replaced**
   - without having to remove the sprocket from the shaft

2. **Indicator pins**
   - let you know when to replace your sprockets

3. **All three types**
   - can be used in a wide range of operating environments

Sample graph showing running costs of new sprockets

*The Smart Series can be replaced without attaching or removing bearings or other parts, which reduces your running costs.*
Indicator pins

Lets you know when to replace your sprockets with just a glance.

Features

- Enables users to greatly reduce inspection time and labor.
- Users can confirm replacement periods with just a glance, making inspections smooth and easy.
- Lets you know when it's replacement time without needing to use tooth profile gauges or other specialty tools.

Specifications

- Embedded brass pin specifications
- Embedded in both sides of two sprocket teeth at 0° and 180°.
  When shaft holes are finished, indicator pins will be embedded in the tooth above the keyway.
- Sprockets are coated blue to make indicator pin confirmation easy.
### Smart Series Replaceable Tooth Insert
### Large Size Conveyor Chain Sprockets

<table>
<thead>
<tr>
<th>Type</th>
<th>Features</th>
<th>Available for</th>
<th>Roller type*</th>
<th>No. of teeth</th>
<th>Tooth material</th>
<th>Hub (mounting base) material</th>
<th>Coating</th>
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</thead>
<tbody>
<tr>
<td><strong>Split Type</strong></td>
<td>Sprockets divided into halves without any gaps around the shaft bore.</td>
<td>RF03075 ~ RF10150</td>
<td>S, R, F</td>
<td>6, 8, 10, 12</td>
<td>Carbon steel for machine structural use</td>
<td>Roller steel for general structural use</td>
<td>Lacquer coating (blue)</td>
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<tr>
<td><strong>Ring Replaceable Tooth Type</strong></td>
<td>Lock ring type replaceable teeth with bolts/nuts onto the mounting base.</td>
<td>RF10150 ~ RF36300</td>
<td>S, R, F</td>
<td>8, 10, 12</td>
<td>Alloy steel for machine structural use</td>
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<td><strong>Block Replaceable Tooth Type</strong></td>
<td>Lock block type replaceable teeth with bolts/nuts onto the mounting base.</td>
<td>RF10150 ~ RF26300</td>
<td>S</td>
<td>10, 12</td>
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</table>

*Items not in bold may not be available.
*M and N rollers are also available.

Other specifications available, contact a Tsubaki representative for more information.

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**Selection guide**

- **Less than RF10150**
  - Tooth wear: low
  - **Split type** Teeth not hardened
  - Tooth wear: high
  - **Split type** Teeth hardened

- **Greater than RF10150**
  - Tooth wear: low
  - **Replaceable ring tooth insert type** Teeth not hardened
  - Tooth wear: high
  - **Replaceable ring tooth insert type** Teeth hardened
  - Tooth wear: especially high
  - **Replaceable block tooth insert type**
Applications

- When wear causes high replacement frequency
- When sprockets are difficult to remove from their shaft due to attachment of conveyed material, corrosion, etc.
- When there is little space for replacement
- When the sprocket is located in a high place
- When using several sprockets on a long shaft

Smart Series Replaceable Tooth Insert Sprockets demonstrate their usefulness when used on these types of equipment

- Bucket elevator
  Used in high places
- Slag conveyor
  Little space for replacement
- Steel girder conveyor
  Sectional replacement on long shafts

Shaft assembly service

- Tsubaki manufactures the shafts and delivers them assembled together with the sprocket.
- No need to mount the sprocket to the shaft, which can reduce equipment mounting labor.
- For Smart Series Replaceable Tooth Insert Sprockets especially, with your next replacement you can generally replace just the split sprocket or teeth.
Split type

Sprockets are split in two (teeth and hub) for easy replacement

Construction

- Sprockets are split in two through the tooth roots. (Halves can also be joined together with nuts and bolts.)

Features

- Sprockets can be mounted and removed to the shafts without needing to remove bearings first.
- Useful in situations where mounting or removing the sprocket from long shafts is difficult.

Model numbering

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<th>Q - S</th>
<th>TS - E</th>
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<td>4: Hardened teeth</td>
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<td>7: Indicator pins</td>
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(Note) Split type sprockets come with finished bores. Indicate bore finishing instructions separately.

Price/delivery

Made-to-order item
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<th>Bore Dia.</th>
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<th>Hub Dia.</th>
<th>Total Length</th>
<th>Center Distance</th>
<th>Sprocket Diameter</th>
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</table>

Note: 1. Numbers of teeth, hub diameters, and so on not shown in the table above also available. Contact a Tsubaki representative for more information.
2. Check that there is no interference between the tooth outer diameters and buckets, aprons, etc.
3. The number of teeth is a gap on the tooth mating surface.
4. For model numbers, insert roller type (R/F/S), hub type (BW,CW), and tooth hardening (Q/N) in the boxes.
5. Items with an * are not available.
6. Boxes are finished. Minimum bore diameter is the pilot bore shown in the table + 1 mm.
7. Approximate masses shown are when used with 8 rollers. Contact a Tsubaki representative regarding approximate masses when using other rollers.
8. Refer to the handling instructions regarding steps for sprocket mounting and removal.
Ring Type Replaceable Tooth Insert Sprockets

Ring type replaceable tooth inserts for easy replacement

**Construction**

- Composed of replaceable piece-like tooth inserts, a mounting base (sprocket hub), and bolts, spring washers, and nuts.

**Features**

- Just the tooth inserts can be replaced without removing the mounting base from the shaft.
- Useful when replacing sprockets in high places.

**Model numbering**

<table>
<thead>
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<th>RF26300S 10T - BW1</th>
<th>Q - S</th>
<th>RK - E</th>
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<td>CW1: Welded both sides</td>
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<td>Hardened teeth</td>
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<td>N: Teeth not hardened</td>
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<td>Q: Teeth hardened</td>
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<td>Ring type</td>
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<td>Indicator pins</td>
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</table>

*Tooth insert model numbers (for when replacing tooth inserts only)*

**RF26300S 10T - RE Q - S RK - E**

(One tooth insert, bolts, spring washers, and nuts for one sprocket come as a set.)

Note: A drawing number is required when initially providing special specifications. Indicate the drawing number on your order form.

**Price/Delivery**

Made-to-order item
# List of models/dimensions

<table>
<thead>
<tr>
<th>Model no.</th>
<th>No. of teeth</th>
<th>Pitch circle Dia.</th>
<th>Outer Dia.</th>
<th>Bore Dia.</th>
<th>Tooth Dia.</th>
<th>Total Length</th>
<th>Center Distance</th>
<th>Mounting Base OD</th>
<th>Mounting Bolt Size</th>
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</table>

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**Note:**
1. Numbers of teeth, hub diameters, and so on not shown in the table above also available. Contact a Tsubaki representative for more information.
2. There is no interference between the tooth outer diameters and buckets, aprons, etc. Consult for interference between the bolt protrusion and equipment.
3. There is a gap on the mating area of each type of replaceable tooth.
4. For model numbers, insert roller type (R/F/S), hub type (BW1/CW1, or RE for tooth inserts only), and tooth hardening (Q/N) in the boxes.
5. There are two taps for hanging on each tooth insert (each piece). Use for attaching wire ropes or eye bolts.
6. Approximate masses shown are when used with S rollers. Contact a Tsubaki representative regarding approximate masses when using other rollers.
7. Items with a “-” are not available.
8. Refer to the handling instructions regarding steps for sprocket mounting and removal.
Wear resistant block teeth for easy replacement

**Construction**

- Composed of individual tooth inserts, a mounting base (sprocket hub), and nuts and bolts.

**Features**

- Just the tooth inserts can be replaced without removing the mounting base from the shaft.
- Tooth inserts use alloy steel standard for high wear resistance.
- Each tooth insert is light.

**Model numbering**

**RF12200S 12T - BW1 Q - S BK - E**

- **RF12200S**: Chain no.
- **12T**: No. of teeth
- **BW1**: Hub type
- **Q**: Hardened teeth
- **S**: Smart Series
- **BK**: Block type
- **E**: Indicator pins

*Tooth insert model numbers (for when replacing tooth inserts only)*

**RF12200S 12T - RE Q - S BK - E**

(One tooth insert, bolts, nuts, and special adhesive for one sprocket come as a set.)

Note: A drawing number is required when initially providing special specifications. Indicate the drawing number on your order form.

We cannot provide a number of tooth inserts that differs from the number of teeth on the mounting base.

**Price/Delivery**

Made-to-order item
List of models/dimensions

<table>
<thead>
<tr>
<th>Model no.</th>
<th>No. of teeth</th>
<th>Pitch Circle Dia.</th>
<th>Outer Dia.</th>
<th>Bore Dia.</th>
<th>Pilot Bore d</th>
<th>Max. dim.</th>
<th>Tooth Width</th>
<th>Hub Dia.</th>
<th>Total Length</th>
<th>Center Distance</th>
<th>Mounting Bolt Size</th>
<th>Bolt Protrusion</th>
<th>Approx. Mass per Tooth Insert</th>
<th>Total Approx. Mass Kg</th>
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<td>14</td>
<td>28</td>
<td>2.4</td>
<td>379</td>
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</tbody>
</table>

Note 1. Numbers of teeth, hub diameters, and so on not shown in the table above also available. Contact a Tsubaki representative for more information.
2. Contact a Tsubaki representative when your chain uses M or N rollers.
3. Check that there is no interference between the tooth outer diameters and buckets, aprons, etc.
4. Check for interference between the bolt protrusion and equipment.
5. Enter the hub type (BW1, CW1, or RE for tooth inserts only) in the boxes in the model number.
6. All teeth are hardened.
7. Refer to the handling instructions regarding steps for sprocket mounting and removal.
1. Common elements of Smart Series Tooth Insert Sprockets

(1) Indicator pins

① Inspection steps

- Remove any material attached to the sprocket profile so that you can check the indicator pins.
- There are two indicator pins (at roughly 0° and 180°) embedded into the teeth of each sprocket. With two indicator pins on one side of one tooth, there are a total of four teeth with embedded pins on both sides so they can be used regardless of direction of rotation.
- The position of the indicator pins will vary by model (available chain size, sprocket no. of teeth, type).
- With finished bores, there will be one indicator pin located on the tooth nearest to the top of the keyway.

② The sprocket has reached its usage limit when wear reaches the indicator pins.

Points of caution

- Wear will rapidly accelerate if the sprocket continues to be used after wear has reached the indicator pins. This will also adversely impact the chain. We recommend immediate replacement.
- Replace your sprocket if wear exceeds 20% of tooth width before reaching the indicator pins.
- Review your sprocket’s alignment before wear exceeds 20%.

(2) Before mounting and removing

① Points of caution when mounting and removing

- There is a risk of extreme danger if, while replacing the sprocket or tooth inserts, gravitational balance is lost and leads to the shaft rotating or the sprocket/teeth falling off. Always securely support or anchor the sprocket and teeth before starting work. Also, ensure the work location is safe and that there are a sufficient number of people to assist.
- When removing ring and block type tooth insert sprockets, when using a torch to cut or otherwise remove stubborn bolts that will not budge due to the presence of conveyed material or sprocket corrosion, use a file or grinder to remove scratches, conveyed material, etc. from the mounting base seat. The seat of bolts and nuts is an important element of tooth insert sprocket functionality. Place a patch (rod) with a diameter smaller than the bolt against the bolt and strike with a hammer to loosen the bolt.
- For especially heavy sprockets and tooth inserts, use the hanging hole and eyebolt taps provided. Firmly secure any slings or wires used.
- Thoroughly clean where the sprocket will be mounted on the shaft and the split pieces/mounting base of the sprocket. Use a file or grinder to remove any scratches, corrosion, conveyed material, etc. and give it a smooth finish. If these defects are not removed then sprocket or tooth misalignment or play may develop, which will prevent the chain from properly engaging the sprocket, lead to premature chain/sprocket wear and damage, and lead to the sprocket falling off.

② Mounting bolts

- When finally tightening the bolts and nuts, tighten little by little over several turns to ensure a uniform tightening. Finally, securely tighten the bolts and use a torque wrench to confirm tightness. The following table shows torque values.

<table>
<thead>
<tr>
<th>Bolt size</th>
<th>M10</th>
<th>M12</th>
<th>M16</th>
<th>M20</th>
<th>M24</th>
<th>M30</th>
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<tbody>
<tr>
<td>Tightening torque [N·m]</td>
<td>68</td>
<td>118</td>
<td>289</td>
<td>568</td>
<td>980</td>
<td>1960</td>
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</table>
2. Steps for mounting and removing sprockets by type and points of caution

(1) Split types

- Take special care to ensure the sprocket does not fall when mounting or removing. (See pg. 11 before starting.)
- When mounting or removing, ensure there are enough people to support the sprocket, tighten the bolts, and perform other work.
- Thoroughly clean the shaft where the sprocket will be mounted and the split sections of the sprocket itself.
- Match the split sprocket to where it is to be mounted on the shaft. When doing so, ensure the alignment marks on the teeth are aligned.
- When matching the split sprocket, there is no gap in the hub assembly surface but there is a gap in the tooth assembly surface. These parts have been designed this way. There will be no problems due to this when the chain engages the sprocket.
- Use the accompanying spring washers and alternate tightening the bolts with a torque wrench to ensure a secure, uniform tightening. (See pg. 11 before starting.)
- Ensure there is no misalignment of the split sprocket faces when mounting to the shaft.
- The split sprocket will not loosen in normal environments as long as the appropriate torque has been used. In situations where heavy vibrations may cause the sprocket to fall and cause injury, use a thread locking fluid or take other measures to prevent loosening.
- When removing the sprocket, alternate loosening the bolts uniformly. Before loosening the bolts, reconfirm the sprocket is securely supported or anchored so that no piece can fall. (See pg. 11 before starting.)

(2) Ring type split sprockets

- Take special care to ensure the sprocket or tooth inserts do not fall when mounting or removing. (See pg. 11 before starting.)
- When replacing tooth inserts, ensure there are enough people to support the tooth inserts, tighten the bolts and nuts, and perform other work.
- Thoroughly clean the shaft where the sprocket will be mounted and the mounting base.
- Ensure the alignment marks on the tooth inserts are aligned and temporarily tighten the bolts, spring washers, and nuts.
- Adjust the inserts so that the mounting gap is uniform. The gap should be between 1 - 3 mm. There will be no problems due to this when the chain engages the sprocket.
- Adjust so that the heights of the tooth insert bottoms are uniform with the heights of adjacent tooth inserts.
Usage

- Spot weld all nuts in two places to prevent loosening. The sprocket is designed for use in harsh environments with vibration, impact, and corrosion. These factors are envisioned to make it easy for nuts and bolts to loosen. Securely prevent this loosening by spot welding all nuts.

- When removing tooth inserts, use a grinder to remove the spot welds.
- Each tooth insert comes with nuts and bolts attached. Loosen the nuts first. Before loosening the nuts, reconfirm the tooth insert is securely supported or anchored so that no tooth insert can fall. (See pg. 11 before starting.)
- Remove the bolts to remove the tooth inserts. When using a torch to cut or otherwise remove stubborn nuts that will not budge due to the presence of conveyed material or sprocket corrosion, use a file or grinder to remove scratches, conveyed material, etc. from the mounting base seat. (See pg. 11 before starting.)
- Do the same with the remaining tooth inserts to remove them.

(3) Block type tooth insert sprockets

- Take special care to ensure the sprocket or tooth inserts do not fall when mounting or removing. (See pg. 11 before starting.)
- When replacing tooth inserts, ensure there are enough people to support the tooth inserts, tighten the bolts and nuts, and perform other work.
- Thoroughly clean the shaft where the sprocket will be mounted and the mounting base, and degrease the mountain base and where the new tooth insert will be mounted.
- Use a spatula to apply a coat of special adhesive to the entire surface where the tooth insert will be mounted.
- When attaching the tooth insert to the mounting base, ensure that the bottom of the mounting base and the tooth insert touch.
- Tighten the accompanying nuts and bolts once you are sure they are touching.
- When using block type tooth insert sprockets with bucket elevators, attach bolts from the inner side of the conveyor to the outer side.
- Use spot welding on all nuts to prevent loosening.
- Leave for 24 hours to allow the adhesive to dry.

- When removing the nuts, grinder to remove the spot welds, and then loosen the nut to remove. Before loosening the nuts, reconfirm that the tooth insert is securely supported or anchored so that it will not fall when the nut is loosened. (See pg. 11 before starting.)
- When using a torch to cut or otherwise remove stubborn nuts that will not budge due to the presence of conveyed material or sprocket corrosion, use a file or grinder to remove scratches, conveyed material, etc. from the mounting base seat. (See pg. 11 before starting.)
- Remove the bolts to remove the tooth inserts. Be careful when doing so that the tooth insert does not suddenly come off and fall.
Safety Precautions

[WARNING]  Observe the items below to prevent danger.

- Be sure to read the operation manual before using or adding the product and always use the product correctly.
- When using the sprockets in a lifting device, set up a safety barrier and do not allow anyone to go under the equipment.
- Always install safety equipment (safety covers, etc.) on sprockets and chain.
- Implement safety measures for the equipment in advance and regularly perform maintenance and inspections.
- Follow all applicable local safety regulations as required.
- Observe the following when installing, removing, maintaining, or inspecting the product:
  - Read and follow the instructions in the operation manuals and catalogs before conducting the work.
  - Turn off the instructions in the operation manuals and catalogs before conducting the work and take preventive measures so that the switch will not be turned on unexpectedly.
  - Secure the sprocket and chain to prevent them from moving freely.
  - If a load is always imposed on the equipment (e.g., hoisting equipment), eliminate the load before performing maintenance and inspection work.
  - Wear suitable clothes and protective gear (e.g., safety glasses, gloves, and shoes) when working.
  - Only experienced personnel should perform sprocket replacement.

[CAUTION] Observe the items below to prevent accidents.

- Understand the specifications of the sprockets that you are handling.
- Before installing or replacing sprockets, inspect it to make sure no damage occurred during delivery.
- Inspect and maintain sprockets and chain at regular intervals.
- The product is provided with an operation manual. Be sure to read the operation manual before using the product and always use the product correctly.
  - If the operation manual is not on hand, request an operation manual from your dealer or Tsubaki dealer.

Warranty

1. Warranty period without charge
   Tsubakimoto Sprocket Co. (hereinafter referred to as “Company”) provides a warranty without charge valid for either 18 months after the shipment of the purchased product (hereinafter referred to as “Goods”) from the factory, or 12 months after the first use of Goods, whichever comes first. First use of Goods is considered to be the complete incorporation of Goods into the equipment of the purchasing party (hereinafter referred to as “Customer”). This warranty may be provided with charge in certain circumstances.

2. Warranty coverage
   Should any malfunction in Goods arise during the warranty period, given that Goods were properly installed, operated, and maintained as instructed in the catalog, instruction manual, or similar, Company shall promptly deliver or repair Goods or the failed part at no charge once Company has confirmed such failure. This warranty only covers delivered Goods and therefore does not include the following: (“Instruction manual or similar” includes documentation specially provided to Customer.)
   (1) Any costs required for the removal or mounting of Goods from or into Customer’s equipment for repair or replacement.
   (2) Costs required for transporting Customer’s equipment to repair shop, etc.
   (3) Profits lost due to a malfunction or repair, or any other consequential loss.

3. Warranty with charge
   Company will charge for any investigation and repair of a malfunction in Goods (even during the warranty period) if caused by:
   (1) Improper location, installation, lubrication, or maintenance by Customer’s failing to follow the catalog, instruction manual, or similar. (“Instruction manual or similar” includes documentation specially provided to Customer.)
   (2) Operation methods (including usage conditions, usage environment, and allowable values) resulting from Customer’s failure to follow operation described in the catalog, instruction manual, or similar. (“Instruction manual or similar” includes documentation specially provided to Customer.)
   (3) Inappropriate disassembly, modification, alteration, or processing by Customer.
   (4) Use of Goods by Customer in conjunction with damaged or worn parts not made by Company.
   (5) Failure of operational life under conditions of use as determined by Company to satisfy operational life covered by Warranty.
   (6) Use by Customer under conditions other than those discussed.
   (7) Consumption, wear, or deterioration of bearings, oil seals, oil, and other consumable parts incorporated into Goods.
   (8) Secondary failure or malfunction resulting from malfunctioning of Customer’s equipment.
   (9) Malfunction of Goods resulting from a Force Majeure such as an act of God.
   (10) Malfunction of Goods resulting from a wrongful act committed by a third party.
   (11) Any other reason that is not attributable to Company.

CAUTION

Product details described in this catalog are primarily intended to aid product selection. Always read the instruction manual before using any product to ensure correct use.

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