

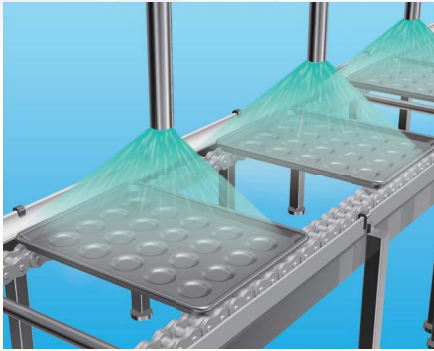


# Tsubaki Power and Performance for the Food Processing Machinery





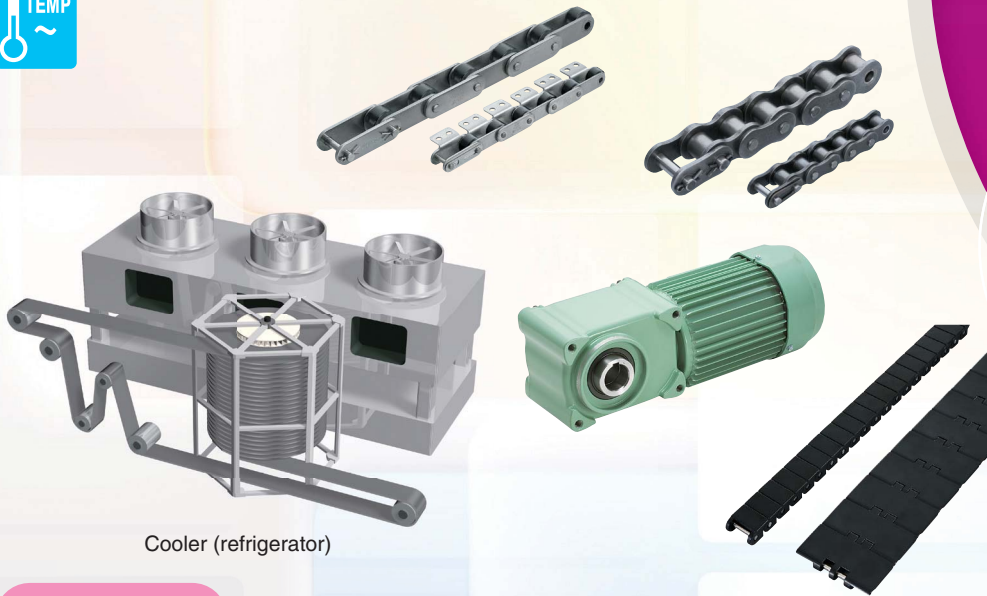
# Food factories have a variety of environments, and



Container cleaning process



To p. 3 & 4



Cooler (refrigerator)

To p. 7 & 8

## Product Introduction

- Lube-free Chain  
Lambda Chain /  
Long Life Lambda Chain
- Surface Treated Chain  
NP Series / NEP Series
- Stainless Steel Chain  
AS Series / SS Series  
NS Series / LSK Series
- Large Size Conveyor Chain
- Plastic Top Chain  
Antibacterial and mold resistant series /  
Chemical-resistant series /  
Low-temperature series /  
Heat-resistant series
- Plastic Modular Chain
- Plastic Rail
- Reducer

Corrosion

Product

Temperature

Key



**Sanitary**  
Can be used hygienically.



**Chemical resistance**  
Resistant to various chemicals.  
(See the chemical resistance chart.)



**Corrosion resistant**  
Can be exposed to water.

# Tsubaki products are used to meet the needs of these environments.

**Clean**

Seasoning spreader

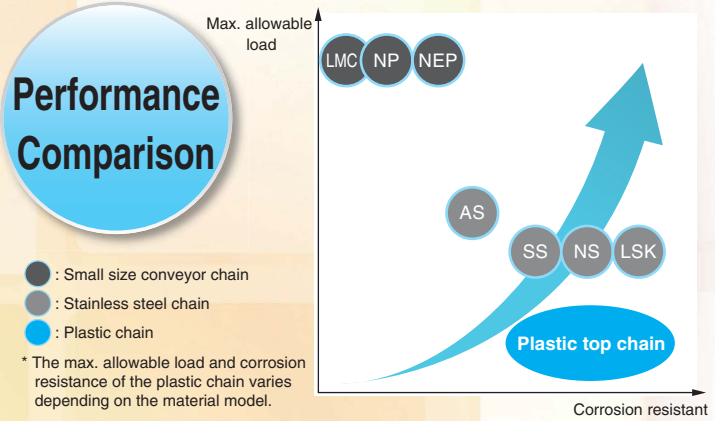
**To p. 5 & 6**

**Efficiency**

Lifter

**To p. 9 & 10**

- Shock Monitor
- Sprocket — Indicator Pins
- Pin Gear Drive Unit
- Roller Chain Couplings
- Zip Chain Actuator
- Mini System
- U-TOP Conveyor System



**Lube free**  
 Lube-free chain requires no lubrication.

**Resistant to stress corrosion cracking**  
 (brittle fracture resistance)  
 Strong against stress corrosion cracking.

**Operating temperature range**  
 This is the chain usage temperature range.



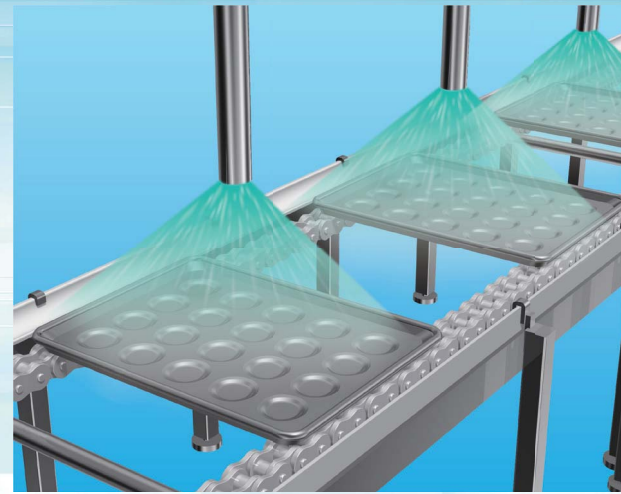
# Corrosive Environment

## Stainless Steel Chain (SS Series)



- Standard SUS304-equivalent corrosion-resistant chain.

Application example: Cleaning process, areas where lubrication cannot be used



Container cleaning process

## Stainless Steel Chain (AS Series)



- The pins and rollers are made of precipitation-hardened stainless steel and max. allowable load is 1.5 times than SS series.  
\* Corrosion resistance is slightly less than SS Series.

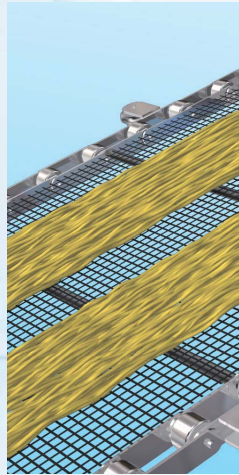
Application example: Areas where the allowable load of SS Series is insufficient

## Stainless Steel Chain (NS Series)



- Uses SUS316-equivalent material, and for use in areas where corrosion resistance is required.

Application example: Processes that use salt, vinegar, or chemicals



## Stainless Steel Chain (LSK Series)



- Uses a special engineering plastic inserted bush with highly wear resistance for a longer wear life.
- Less initial elongation for easy adjustment.

Application example: For net conveyors in corrosive environments and processes that require accuracy such as filling machines and packagers



## Large-size Conveyor Chains Advanced Model GSA Series / SSA Series



- Large size conveyor chain made of stainless steel for transporting heavy objects. Advanced models have greater wear resistance than conventional GS and SS Series.

Application example: Transport of heavy objects in corrosive environment



## Corrosion resistant

	Environmental-resistant roller chain						Top chain		
	SS	AS	NS	LSK	NP	NEP	Normal specifications HG Series	Y Series	Plastic rail
Acetone	○	○	○	○	×	—	○	○	×
Oil (vegetable, mineral)	○	○	○	○	○	○	○	○	○
Sodium hydroxide (25% caustic soda)	○	○	○	○	×	△	○	×	○
Citric acid	○	○	○	○	×	—	×	×	○
Acetic acid (10%)	○	○	○	○	×	—	×	×	○
Sodium hypochlorite	×	×	○	×	×	△	×	×	○
Nitric acid (5%)	○	△	○	—	×	—	×	×	△
Vinegar	△	×	○	△	×	—	△	△	○
Potassium hydroxide	○	○	○	△	—	—	○	○	○
Lactic acid	○	△	○	—	×	—	○	○	○
Water	○	○	○	○	△	○	○	○	○

- : Sufficient corrosion resistance
- △ : Corrosion-resistant under some operating conditions
- ×
- : Unknown

\* Since corrosion resistance changes somewhat according to the operating conditions, the information in this table is not guaranteed. Determine your specification requirements after first checking the corrosion resistance of the chain under the actual operating conditions using this table as a reference.

# (Water, Salt, Chemicals)

## Surface Treated Chain (NP Series)

- RS Roller Chain with nickel plating. The nickel plating not only improves the appearance, but also adds a small degree of corrosion resistance.



## Surface Treated Chain (NEP Series)

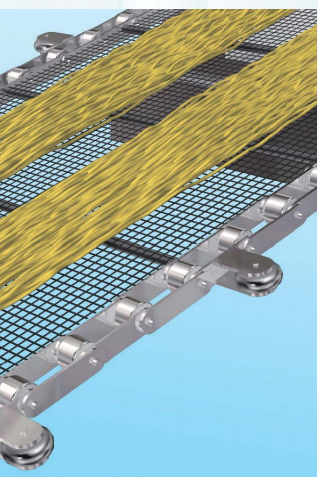
- Surface-treated chains that use a base RS Roller Chain with a special Tsubaki coating.
- They have the strength of RS Roller Chain and offer superb salt water, weather, and chemical resistance.
- The tension is similar to that of steel chain, thereby preventing any change in size.

\* Avoid using in areas where food may come in direct contact and peeling may occur.

Application example: Drive chain used in cleaning process with water



Corrosion resistant



Steaming machine process

## Plastic Top Chain Chemical-resistant Series (Y)

- Contains special plastic, and has corrosion resistance to organic solvents, alkalis, oxidizing agents, and other chemicals.
- Complies with the Food Sanitation Act.

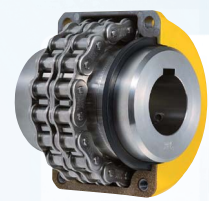
Application example: Conveyor that needs to be washed using chemical solvent



## Roller Chain Couplings Stainless Steel Specifications

- Roller chains and sprockets are made of austenitic stainless steel, enabling use in corrosive environments such as those with acids and alkalis. Can be used in wide temperature range of  $-20$  to  $200^{\circ}\text{C}$ . (With case:  $-10$  to  $80^{\circ}\text{C}$ )

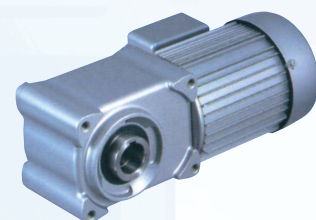
Application example: Environments subject to water and extreme temperatures



## Small Size Gear Motor Waterproof Specifications

- Motor with special coating and protection rating equivalent to IP65. Available options include a special chemical-resistant coating and stainless steel output shaft.

Application example: Machinery exposed to water and equipment directly washed with water

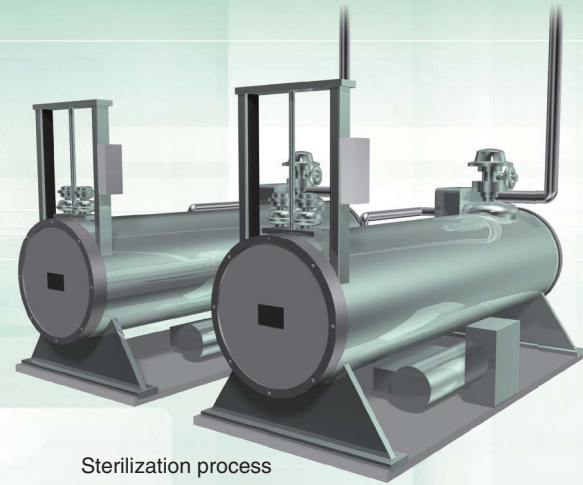




# Clean Environment

## Drive Chain / Small Size Conveyor Chain

- General-purpose chain for drive and transport.



Sterilization process

## LAMBDA Chain

- In cases where the system is used in the proximity of food and lubrication would be difficult, the Lambda Chain, with its special oil-impregnated bush, offers a lube-free solution. In addition, the oil impregnation process uses NSF-H1-compliant parts for food processing machinery as standard to ensure food safety.



Application example: Areas near food and where lubrication cannot be used



Lube free

## Long Life LAMBDA Chain (X-A)

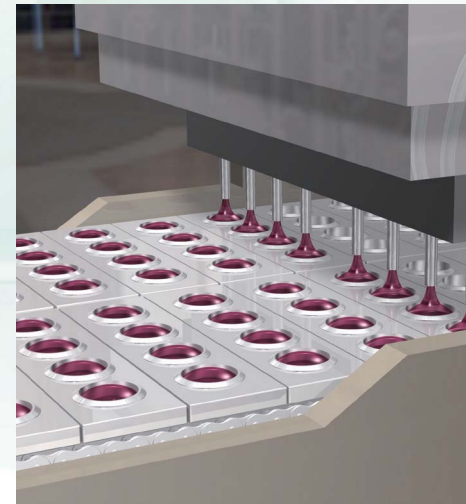
- The special oil-impregnated felt seal helps drastically improve the wear resistance of the Lambda Chain, control misalignment due to chain elongation, and lengthen the service life.



Application example: For processes that require accuracy such as filling machines and packagers



Long life



Filling process

## Small Size Gear Motor Food (Transport) Specifications



### For both food specifications and food transport specifications

- Uses antimicrobial coating to protect against germs.
- Uses NSF-certified H1 grease to ensure food safety.

### Food transport specifications (0.2 kW/0.4 kW only)

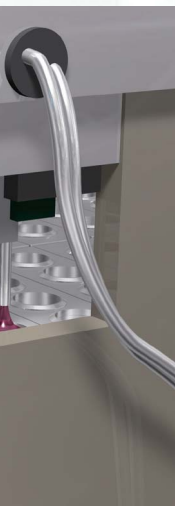
- Finless specifications for easy cleaning.

### Food specifications

- Handles capacities from 0.1 kW to 5.5 kW and can be configured with various options such as non-standard voltages, brake configuration, and Power Lock configuration.

Application example: Areas where food may scatter after filling and processes that use direct positioning and transport of food

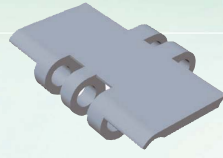




Seasoning coating machine

### Plastic Top Chain

- Made of plastic for self-lubrication without the need for separate lubrication.
- Complies with the Food Sanitation Act.



Icons: **FD LESS**, **Food**, **TSUBAKI ECO LINK**

### Plastic Top Chain Low-friction Wear-resistant Series (HG)

- Contains special plastic that complies with the Food Sanitation Act, features improved wear resistance, and reduces wear debris.
- Use the PLF plastic rail with low-friction specifications for greater effectiveness.

Application example: Processes that cannot use lubricant prior to packaging and must avoid wear debris




Icon: **TSUBAKI ECO LINK**

### PLF Plastic Rail Low-friction Wear-resistant Series

- Uses a special low-friction plastic to reduce the coefficient of dynamic friction by 30% to 50% compared to conventional plastic rails and reduce wear debris in dry environments.
- Complies with the Food Sanitation Act.

Application example: Processes that cannot use lubricant prior to packaging and must avoid wear debris




Icon: **FD LESS**, **TSUBAKI ECO LINK**

### Plastic Top Chain Antibacterial and Mold Resistant Series (MWS)

- Contains an original antibacterial agent with an antibacterial effect against various bacteria, and features moldproof properties to effectively control the growth of blue mold and other mold.
- Complies with the Food Sanitation Act.

Application example: Areas where food may scatter after filling and processes where food is transported directly on the chain



Icons: **FD LESS**, **Food**, **TSUBAKI ECO LINK**

### Reducers Compatible with Lubrication for Food Processing Machinery

- The lubricant for our reducers can be changed to NSF-certified H1 grease for greater safety and security of all food processing machinery.



Icon: **Food**, **TSUBAKI ECO LINK**

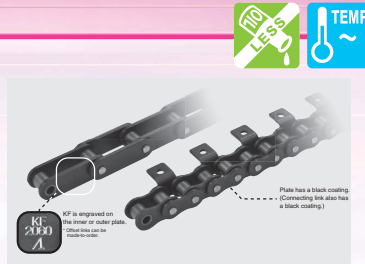


# Temperature Environment

## LAMBDA Chain (KF Series)

- Uses a special lubricant for operation in high-temperature environments to prevent volatilization and deterioration and provide wear resistance at high temperatures.

Application example: Drive and transport in an oven or other high-temperature environment



## Plastic Roller Double Pitch Chain (KV Series)

- The special plastic roller has excellent heat and chemical resistance to control wear of the roller and running rails in high-temperature environments.

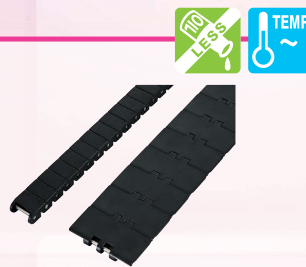
Application example: Transport in an oven or other high-temperature environment



## Plastic Top Chain Heat-resistant Series (KV)

- Can also be used for transport in high-temperature environments. It is also suitable for high speed conveyance and has chemical resistance for excellent flame retardance. There are three types depending on the temperature requirements: KV150, KV180, and KV250.
- KV180 and KV250 comply with the Food Sanitation Act.

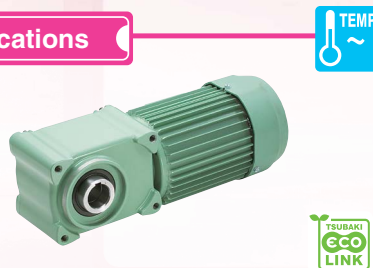
Application example: Transport at an oven exit or rice cooker



## Small Size Gear Motor Heat-resistant Specifications

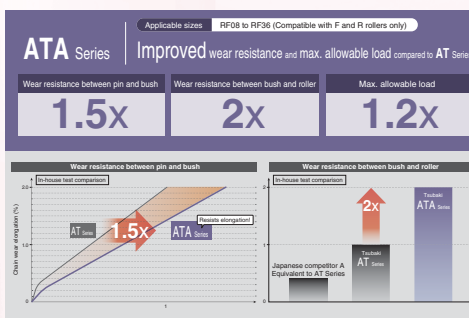
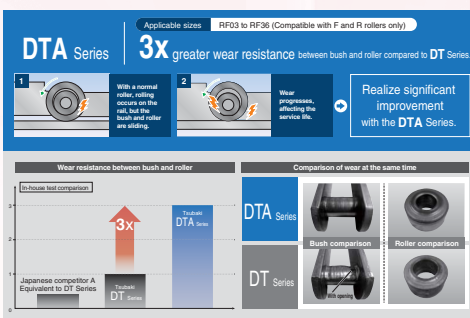
- This model provides the optimal specifications for special high-temperature environments where standard gear motors are difficult to operate.

Application example: Drive of transport conveyor at an oven exit or rice cooker

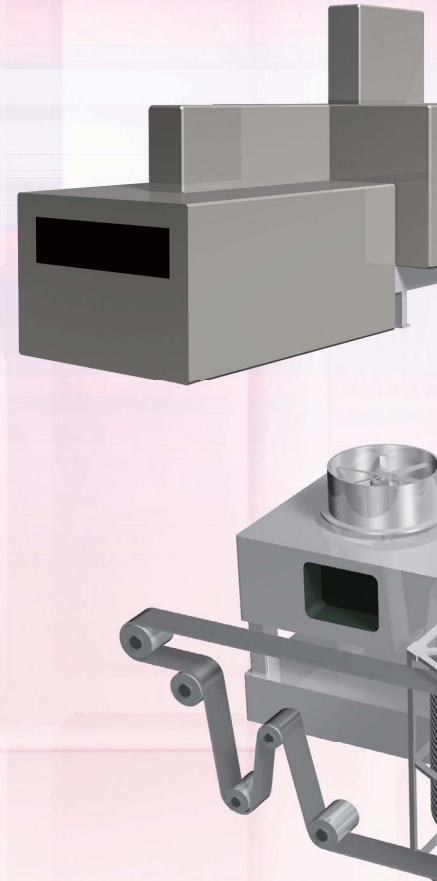


## Large-size Conveyor Chains Advanced Model (DTA Series / ATA Series)

- DTA and ATA Series feature improved wear resistance over conventional DT and AT Series for use in conveyors of heavy objects and long machinery and with a longer life.
- In addition, we can also manufacture chains for various environments including low-speed environments and long conveyor length at temperature environments at around 200°C.



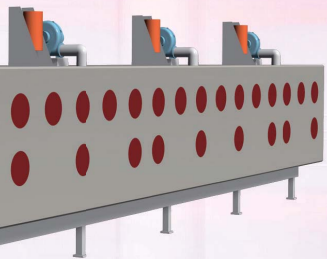
Application example: Transport in an oven or other high-temperature environment



- General-purpose drive chain
- Lambda Chain (KF Series)
- General-purpose small size conveyor chain
- Plastic roller (KV Series)
- Top chain (KV Series)
- Cold-resistant chain
- Freezer Series
- Standard gear motor
- Gear motors with heat-resistant specifications
- Gear motors with cold-resistant specifications



# (High and Low Temperatures)



Firing machine



Cooler (refrigerator)

## Cold-resistant Chain (KT Series)

- This chain is suitable when you need a transmission capacity similar to the RS roller chain but at a lower temperature range.

Application example: Transmission inside a freezer



## Plastic Modular Chain (Freezer Series (LTW))

- Can operate in temperatures of  $-20^{\circ}\text{C}$  to  $-70^{\circ}\text{C}$ , where normal top chains cannot perform.
- Complies with the Food Sanitation Act.

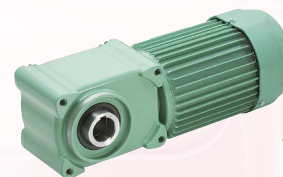
Application example: Transport inside a refrigerator or freezer



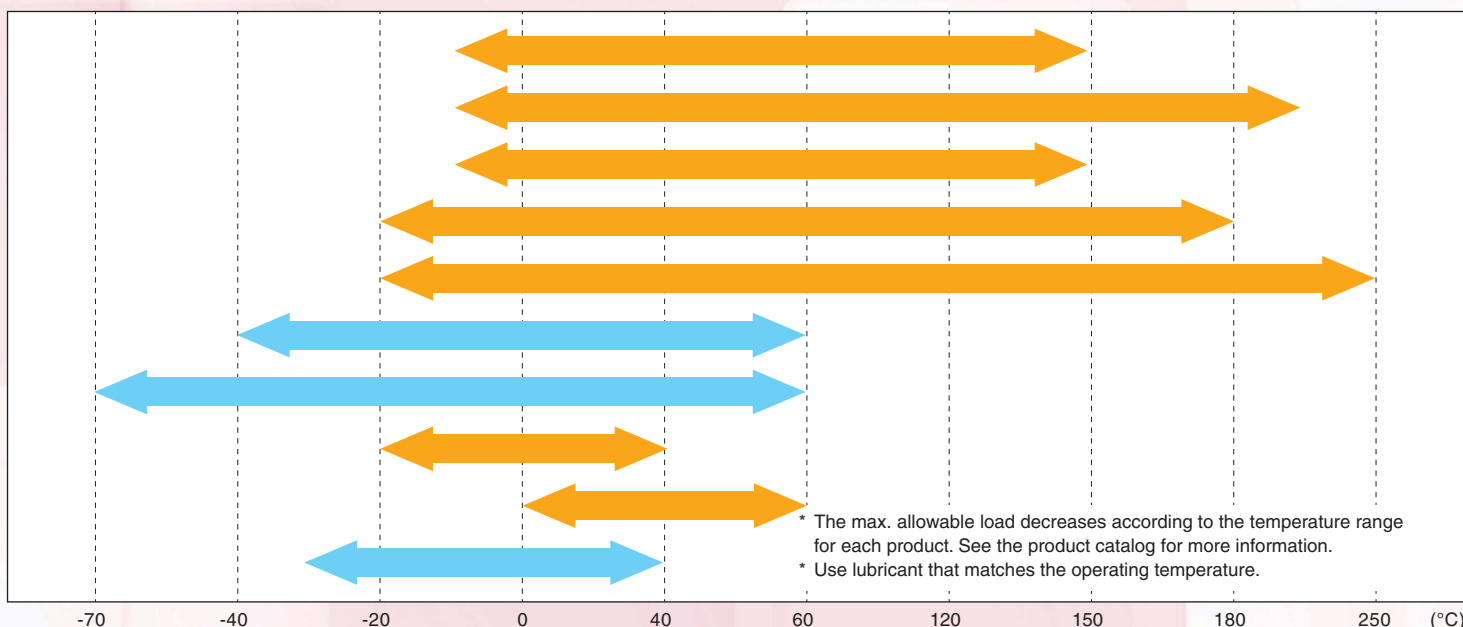
## Small Size Gear Motor Cold-resistant Specifications

- This model provides the optimal specifications for special low-temperature environments where standard gear motors are difficult to operate.
- Same dimensions as standard models to ensure compatibility.

Application example: Drive inside a refrigerator or freezer



## Operating temperature range





# Higher Efficiency

## Sprocket — Indicator Pins (With Replacement Indicator)

- By marking the position where wear occurs and usage limit is reached, the replacement period can be known, thereby greatly reducing the inspection time and man-hours.
- Continued use of a worn sprocket can lead to chain wear and short service life, so this feature helps to ensure a longer life of the chain.
- As an option, hole drilling and use of special ink can be used for food processing machinery.



Application example: Machinery with high operation ratio, areas and equipment that are difficult to inspect

## Shock Monitor

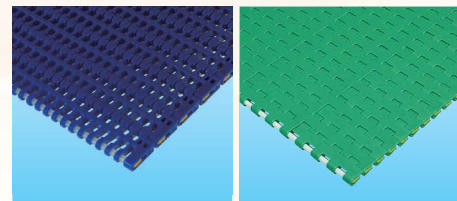
- Uses an electric overload protector that monitors power to detect small load fluctuations that occur such as when out of chain lubricant, thereby providing notification of insufficient lubrication or lubrication timing.



Application example: All food processing machinery

## Plastic Modular Chain

- This is made completely of plastic parts and has a wide belt-like transport surface to realize reliable drive with less meandering or slipping.
- The link construction enables easy sectional replacement for improved maintenance.
- Complies with the Food Sanitation Act.



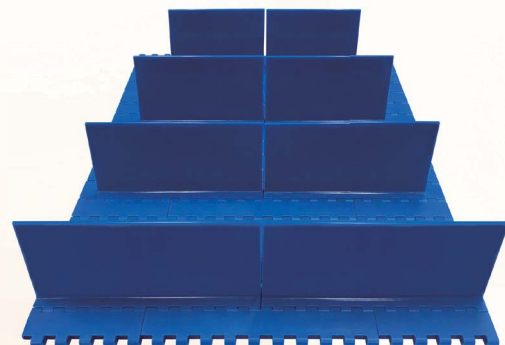
Application example: For all transport including container and cardboard transport

## Plastic Modular Chain (WT2515F-W Series) Flight Series

- This is made completely of plastic parts and is suitable for incline transport of cut vegetables or scattered products.
- The flight is integrated with the link, reducing the number of man-hours required for the customer to install the flight.
- Select a flight mounting interval from 2L and select from two flight heights according to the products being conveyed.



Application example: Inclined transport of cut vegetables



# (Improved Maintenance and Work)

## ZIP CHAIN ACTUATOR

- A unique construction using two chains can create a long stroke for pushing and pulling.
- In comparison to conventional hydraulic and pneumatic systems:
  - This system can be made more compact for superior space-saving.
  - Power is consumed only during operation for energy saving.
  - The engaging method enables high speed, high frequency, and multi-point stopping.
- Abundant options are available including a bellows, greasing nipple, and input shaft on the opposite side for interlocking of two units.

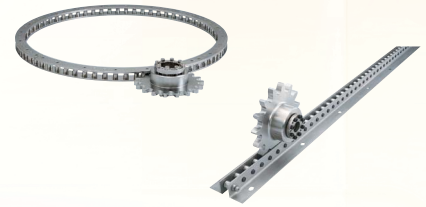
Application example: Lifting part in stacking and destacking processes



## Pin Gear Drive Unit

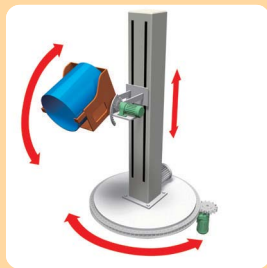
- This drive includes a pin mechanism wheel rack and special tooth gear to widen the degree of freedom of rotation and linear drive.
- Uses the split segment system for installation at the desired angle.
- Uses a hollow pin for easy installation to an opposing device.
- Compatible with stainless steel models and high anti-rust steel models for corrosive environments.

Application example: Stirring machine rotation and tilting, and door opening and closing



## Modular Proposals (Mini Systems)

- We can propose optimal selections and modules with combined functions from the Tsubaki Group's diverse product lineup to meet customer needs.



Lift

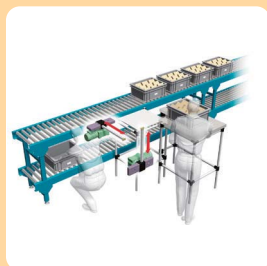
+

Rotate

+

Invert

- |                       |                               |
|-----------------------|-------------------------------|
| <b>Module example</b> | <b>Benefit</b>                |
| ● Lift Master / Lift  | ● Simplification of mechanism |
| ● PDU / Rotate        | ● Combined operation          |
| ● Reducer / Invert    |                               |



Lift

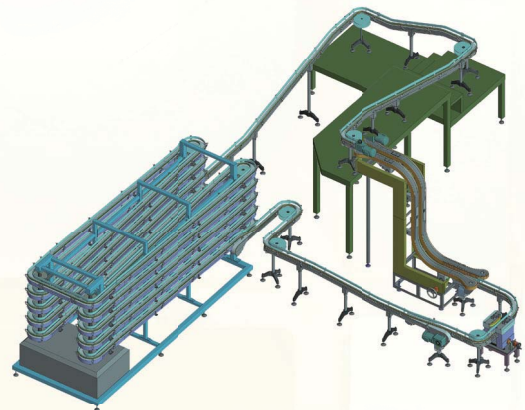
+

Horizontal

- |                          |
|--------------------------|
| <b>Module example</b>    |
| ● Zip Chain / Horizontal |
| ● Zip Chain / Lift       |
| <b>Benefit</b>           |
| ● Pitless                |
| ● Compact                |
| ● Reduced work burden    |

## U-TOP Conveyor System

- This conveyor system comes with a hygienic stainless steel frame as standard and plastic chain with easily configurable layout. The modular construction enables a variety of layouts, and easy assembly improves maintenance.





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