



# Parts Feeder Combination Guide

CAT.No.7021/E



# Parts feeders support factory automation.

Parts feeders are important for automating the production line and assembly system, and are used by an overwhelming majority of manufacturers in automated industries.

NTN parts feeders are excellent at high speed feeding and, due to a unique horizontal vibration system and isolated bottom, are vibration resistant.

NTN has extensively developed a series of products, and not just parts feeders, but also the related peripheral equipment, necessary to contribute to an energy-conserving, high-speed production line and assembly system.



■ Structure of parts feeder

- |                    |                  |
|--------------------|------------------|
| 1 Auxiliary hopper | 2 Bowl           |
| 3 Isolated bottom  | 4 Upper vibrator |
| 5 Magnet           | 6 Plate spring   |
| 7 Lower vibrator   | 8 Base plate     |

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# Operation of parts feeders

Parts feeders can align scattered parts in order and convey them in a consistent posture. The device seems to be just a magic box, but as a matter of fact, it incorporates precision mechanisms.

Parts feeders have three major functions:

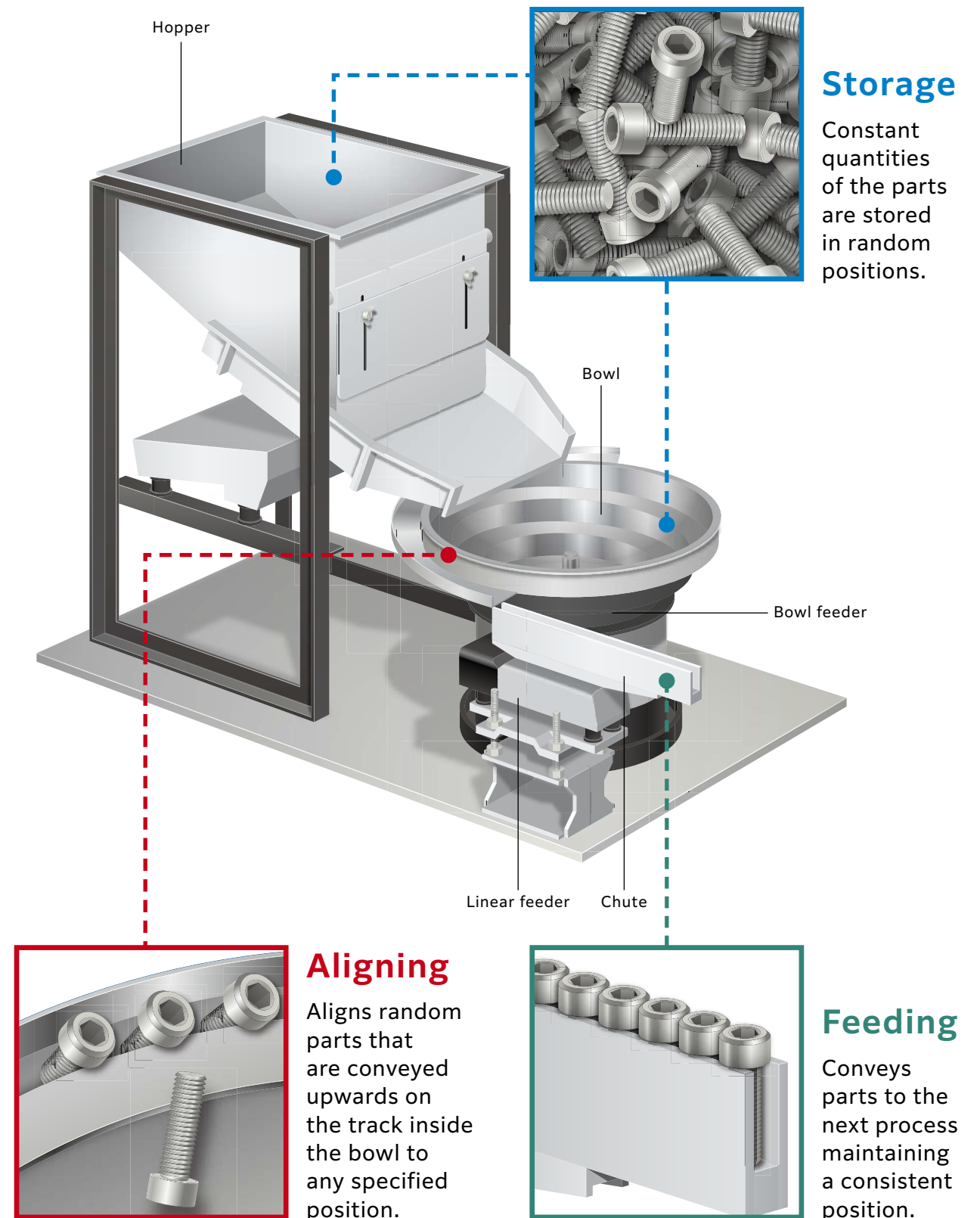
**Storage** **Aligning** **Feeding**

**Aligning** is the most important feature of the three (See the figure on the right). The parts are aligned using physical sensors in addition to the basic attachment aligning method.

This method aligns the parts within a series of shaped tracks and conveyances running inside or outside the bowl.

**NTN** parts feeders ensure consistent production quality throughout automated lines, in combination with alignment methods suitable for the features of individual parts.

## Standard composition of the parts feeder system



## Born in the U.S. raised in Europe, matured in Japan

"Why would **NTN**, a bearing manufacturer, produce parts feeders?"  
It's an interesting story. Here's a little background on how **NTN** became involved with parts feeders.

The parts feeder was invented around 1940 in the United States by the Syntron Company. It was a simple device, composed of small magnets and a few plate springs, but it could convey parts one at a time by vibrating them on an upward slant.

Could the inventor have known how important parts feeders would be to manufacturing around the world? Syntron parts feeders were popular first in the U.S. before the technology gradually spread, arriving in Japan around 1955. Sales of these Syntron parts feeders expanded gradually.

Some years later, a European bearing manufacturer not satisfied with the feeding speed and stability of Syntron parts feeders developed their own highly efficient parts feeders. This company had recently sold several production facilities to **NTN** and was also providing us with needle bearings. Their parts feeders achieved



satisfactory results at our own facilities, so **NTN** arranged to begin production of this improved parts feeder around 1975 — not only for use inside our own facilities, but also for general use in the Japanese market.

Since then, **NTN** parts feeders have become widely used in the Japanese market and we have introduced subsequent technological improvements, expanded the series' lines, and expanded into servicing the peripheral equipment. **NTN** is now the leading manufacturer of parts feeders in Japan.

The Syntron method: born in the U.S., modified in Europe, and brought to maturity in Japan by **NTN**.



# Introduction of applications

While **NTN** parts feeders are used in applications that handle a wide range of uniform parts, they also handle parts that may surprise you.



## Metallic parts

**NTN** parts feeders can align and feed anything from general nuts and bolts to specific industrial metallic parts. For feeding springs which are easily tangled, the parts feeder is provided with a special unraveling mechanism.



## Plastics

As the engineering of various molded plastic parts improves, their shapes tend to become more complicated. **NTN** parts feeders' optimum aligning and feeding systems can accommodate complicated shapes.



## Rubber parts

Rubber parts are soft and thought to be difficult to feed due to rubber's large coefficient of friction, but **NTN** parts feeders can align and feed rubber parts using technologies we have developed such as matching the vibration characteristics with the rubber's characteristics and a special-processing of the bowl.



## Electronic equipment parts

A variety of feeder systems are available from **NTN** for electronic parts, from transistors to condenser or microchip components. In particular, special bowl feeders for high-frequency operation can be prepared for high-speed supply of ultra-small chip parts.



## Foodstuffs

**NTN** parts feeders can convey various foodstuffs, such as candies and crackers, products in cartons such as ice cream or dry soups, or other packaged goods. These parts feeders can accommodate the wide ranges of size, shape and weight.



## Medical equipment

**NTN** parts feeders are important contributors to the clean environments required in the manufacture of medications in pill or tablet form, as well as for medical equipment, such as syringes.



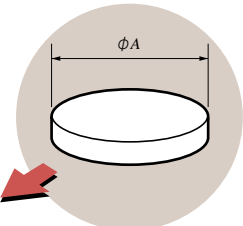
# Selection of bowl and bowl feeder

NTN parts feeders enable you to choose the optimum system among a range of feeders.

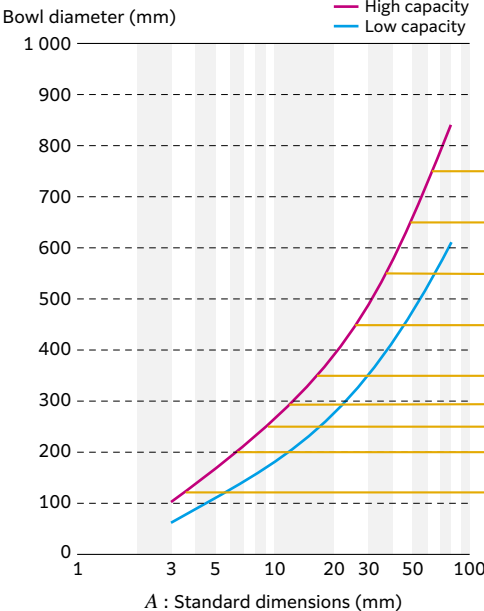
When selecting a parts feeder, first determine the size and type of bowl to use and then choose the bowl feeder. The graphs below will identify the three basic shapes of most parts, and the bowl dimensions (for either a cylindrical or stepped bowl) and bowl feeders to accommodate them. As a practical matter, consider all of the variables, such as the shape, material, weight, feeding capacity, feeding position, and feed-in quantity. The graphs serve as a standard guideline.

Literature cited: For the Application of Parts Feeder/Japan Parts Feeder Industrial Committee. (Oct.1994)

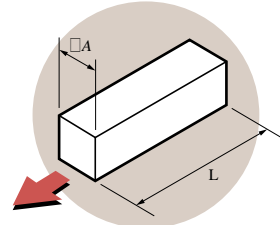
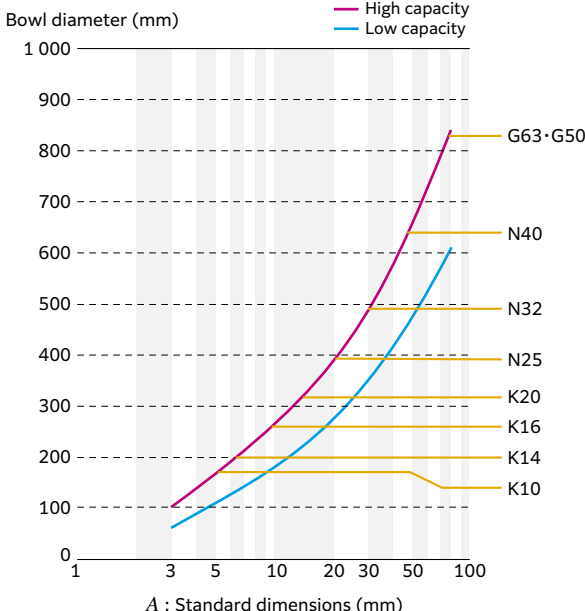
## Standard graphs for selecting the bowl size and bowl feeder



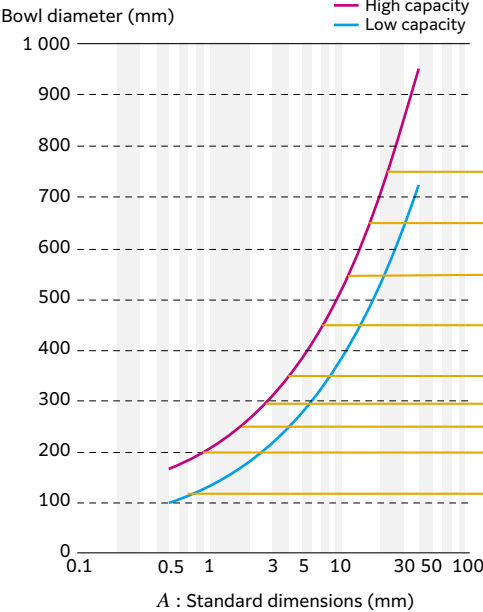
### Cylindrical bowl



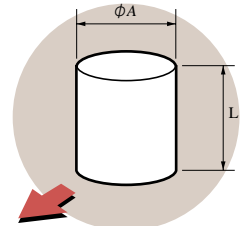
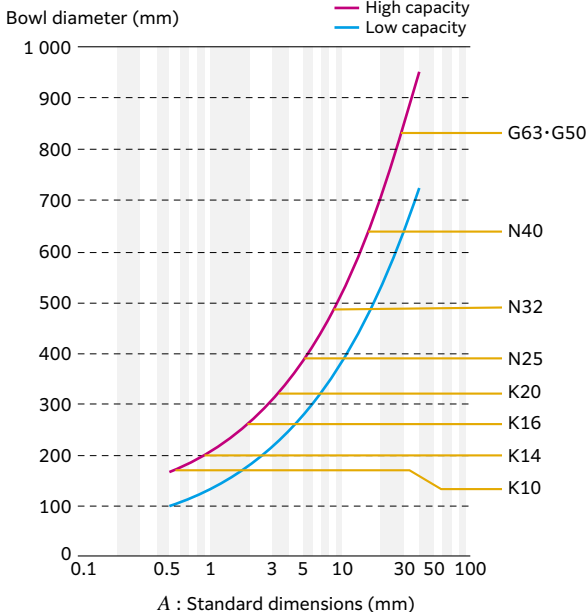
### Stepped bowl



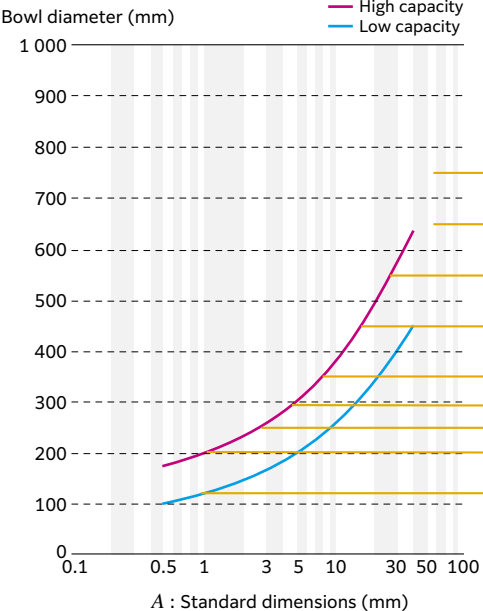
### Cylindrical bowl



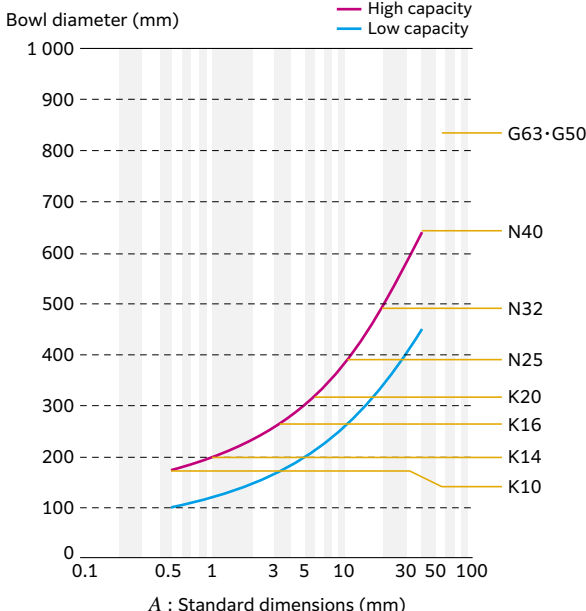
### Stepped bowl



### Cylindrical bowl



### Stepped bowl



# Introduction of series

Various types of parts feeders can accommodate a wide variety of parts.

## Bowl feeder series\*



### K-series

**Aligns and conveys minute parts such as electronic parts and others.**

- Maintains a stable and suitable full-wave vibration for aligning microparts.
- Easy spring adjustment due to a convenient cover-less construction.



### HF-series

**Precision conveyance of microparts such as electronic parts for chips.**

- Using the combination of a horizontal driving system and a high frequency driver, the precision feeding of parts at high speed is possible.

\* No bowl is included. Please specify separately.



### N-series

**Conveys middle size parts.**

- Adopting the traditional isolated bottom and a horizontal driving system, this best-selling series offers typical **NTN** parts feeders that provide stable operation and high durability.
- An auxiliary hopper can be attached to the bowl to easily increase the storage capacity of parts.



### G-series

**Aligns and conveys large and heavy parts.**

- Adopting the powerful double spring unit, it can also readily handle large amplitude operation using a large size bowl (G63).
- As with the N-series models, the isolated bottom can be provided. Even though heavy parts are thrown in, it maintains a stable feeding speed.

## Bowl series



### Precision cut-out bowl

**Suitable for aligning and feeding minute parts.**

- Various high precision track shapes can be formed because of precision machining.



### Stepped bowl

**For general purposes (universal type).**

- Clogging of parts does not occur in the bowl.
- Two materials are prepared: cast aluminum alloy which is very light and stainless steel which enables an easy assembly of attachment.
- The black polyurethane coating on the inner surface is optional.



### Stepped bowl made of SUS steel plate

**Suits foods and pharmaceuticals.**

- Since the inside of the truck can be finished smoothly around the entire circumference, even fine parts can be discharged.
- Clogging of parts does not occur in the bowl.
- The SUS fabric is left as it is on the inner surface.



### Cylindrical bowl

**For general purpose and special applications.**

- Installation of long attachments with complicated shapes are possible.
- Setting of the attachment is easy since the external form is even.



### Cone bowl

**For general purpose.**

- Clogging of parts does not occur in the bowl.
- Setting of the attachment is easy since the external form is even.



### Dish bowl

**For high speed feeding of thin parts.**

- Flat parts can be easily supplied at a high speed by providing slim tracks.

# Introduction of series

Various types of parts feeders can accommodate a wide variety of parts.

## Controller series



### Variable frequency controller

Parts feeders can be operated regardless of the power source frequency.

- No leaf spring adjustment is required.
- Easy to configure with the digital display.
- Also applicable to large size parts feeders.



### General purpose variable frequency controller

Achieves a light weight and a low price by narrowing down the functions of the variable frequency controller. Provides the same operating performance as conventional products even with a reduced number of provided functions.

- No leaf spring adjustment is required.
- Easy to configure with the digital display.
- Ideal for controlling linear feeders and hoppers.



### I/O control unit

Controls the system of a parts feeder by just specifying the program number and setting the timer.

- Parts feeders can be operated only by setting the program number and timer.
- Significantly reduces the installation space.
- Low price and short lead-time.

## Linear feeder series



### S-series

General model (for conveyance to automated machines by combining with bowl feeder series).

- These sturdy linear feeders provide a uniform feeding speed and long-term stable operation.
- Easy installation and adjustment location using the fitted base.



### HS-series

For the precision conveyance of microparts such as electronic chips.

- Used in combination with the bowl feeder HF-series, the precision feeding of parts at high speed is possible.



### L-series

For high speed conveyance of thin parts.

- Introducing the horizontal driving system based on an entirely new principle of operation, smooth feeding with few jumps at a high speed is possible.
- Chute can be easily designed.
- The feeder can be driven with a good balance by placing the center of gravity of the chute at the center of the upper vibrator.

## Hopper series



### Detached hopper

Contains a high volume at storage and supplies a wide range of parts from small parts to large billets matching the bowl feeder series.

- Stable feeding of light works and heavy works is possible.
- Note: The level switch is an optional part.



### Space-saving type hopper

Most suitable for saving installation space.

- The work storage tank is mounted above the parts feeder to make the installation space compact.
  - The tank can be easily moved up and down, also turned to the rotation direction. This enables the easy maintenance of the attachments and parts feeder.
- Note: The level switch is an optional part.


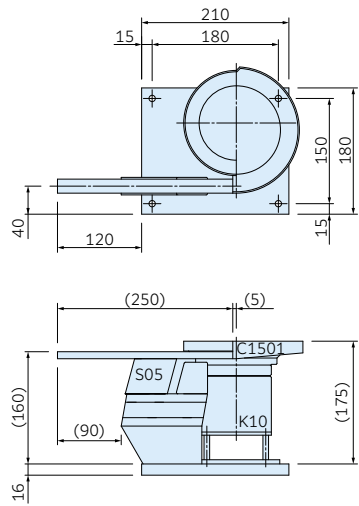
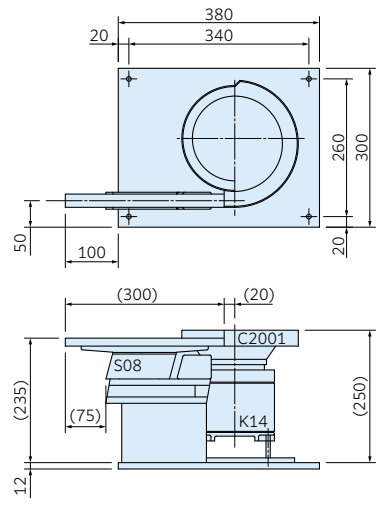


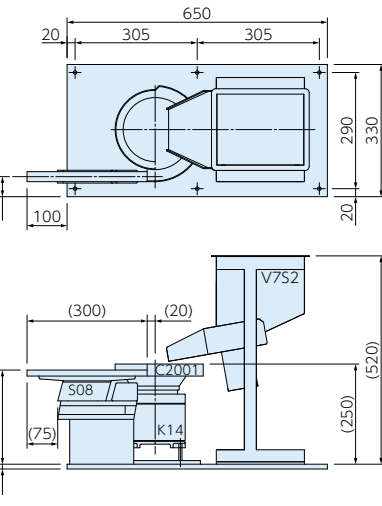

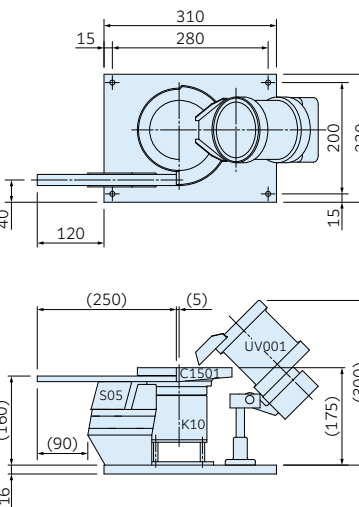
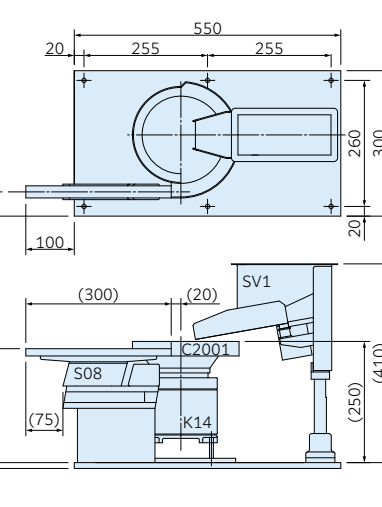



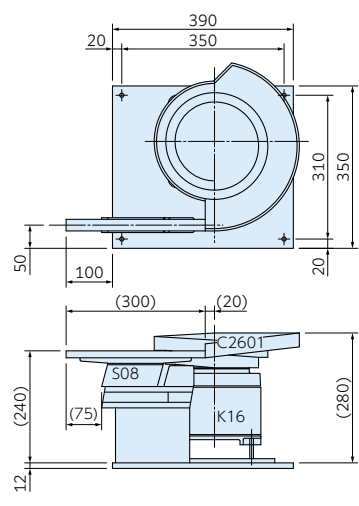
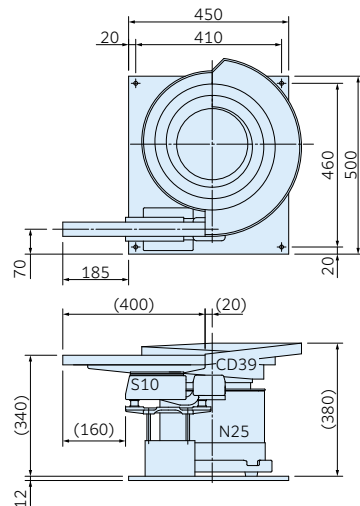

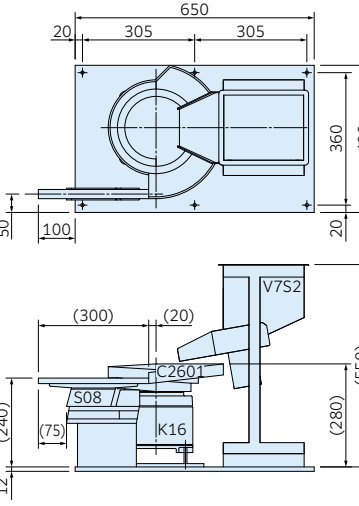
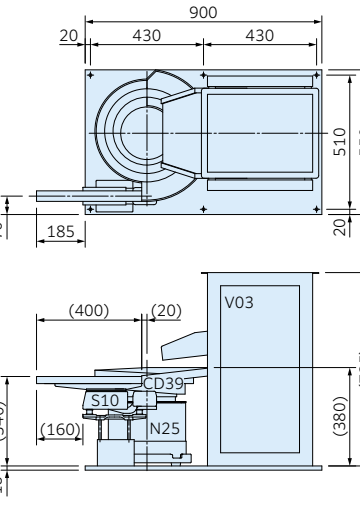

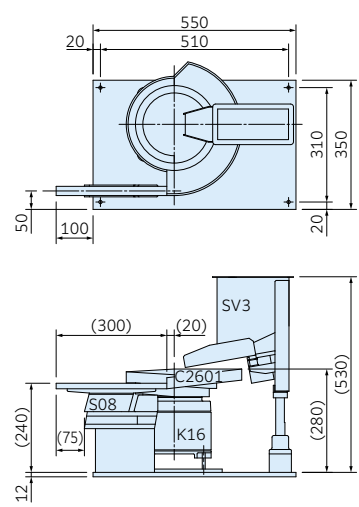
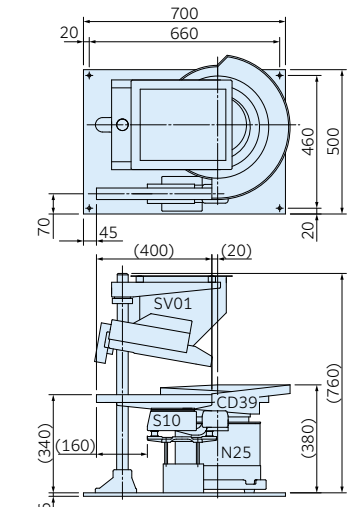
# Assembly layout

<Typical combinations of products and boundary dimensions of combination>

If you have limited space, a space-saving type hopper model is available.

Bowl feeders use the stepped-bowl specification settings.

| Model<br>Combination   | K10   | K14  |
|--|---|--|
| <br><b>Bowl feeder</b><br><b>+</b><br><b>Linear feeder</b>  |    |    |
| <br><b>Bowl feeder</b><br><b>+</b><br><b>Linear feeder</b><br><b>+</b><br><b>Detached hopper</b>                          |  |  |
| <br><b>Bowl feeder</b><br><b>+</b><br><b>Linear feeder</b><br><b>+</b><br><b>Space-saving type hopper (Rotary hopper)</b> |  |  |


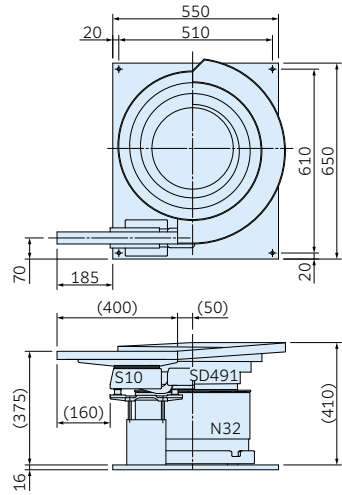
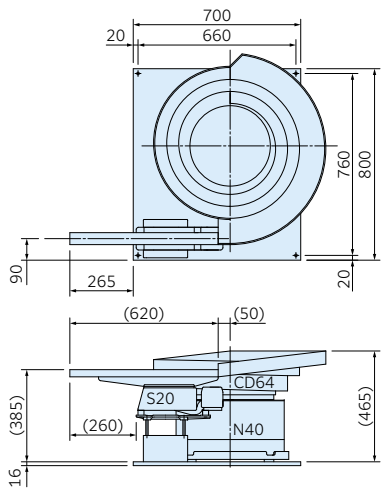

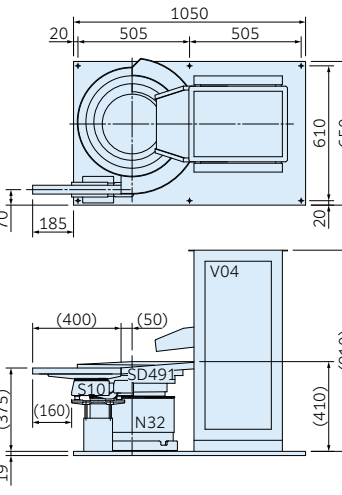
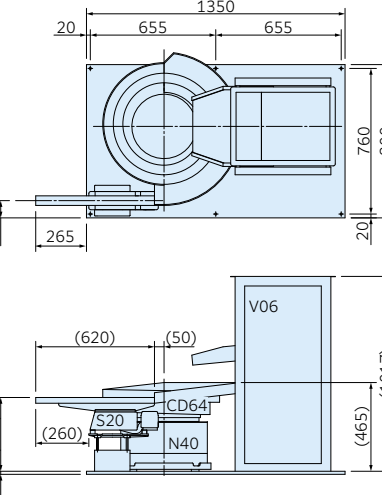

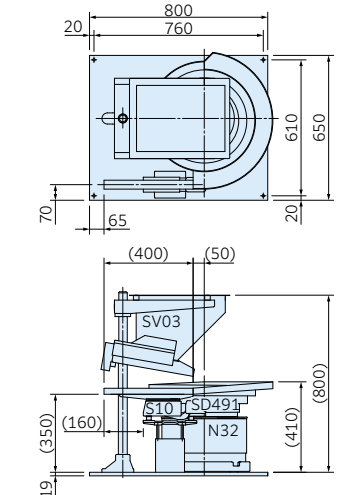
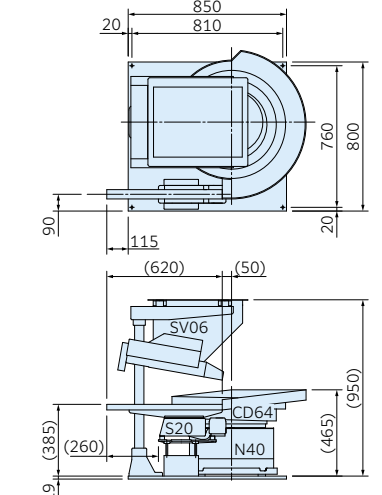
| Model<br>Combination   | K16   | N25   |
|--|---|---|
| <br><b>Bowl feeder</b><br><b>+</b><br><b>Linear feeder</b>  |    |    |
| <br><b>Bowl feeder</b><br><b>+</b><br><b>Linear feeder</b><br><b>+</b><br><b>Detached hopper</b>                          |  |  |
| <br><b>Bowl feeder</b><br><b>+</b><br><b>Linear feeder</b><br><b>+</b><br><b>Space-saving type hopper (Rotary hopper)</b> |  |  |


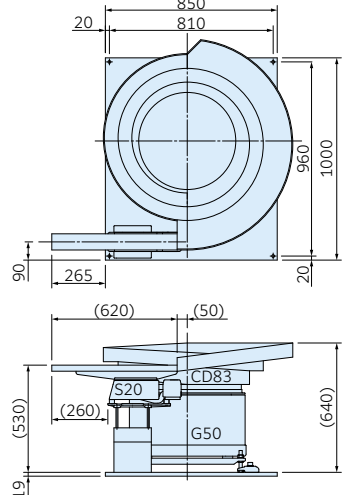
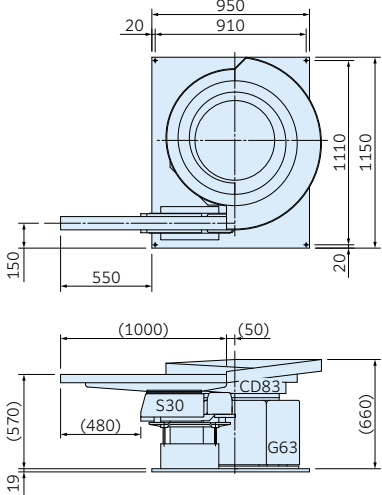

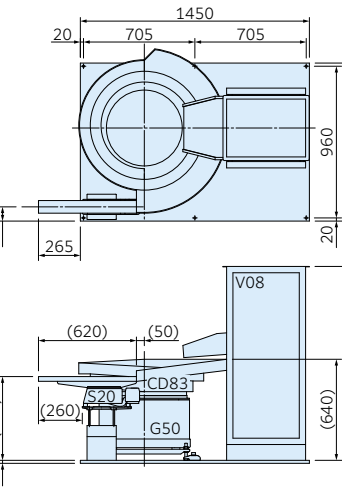
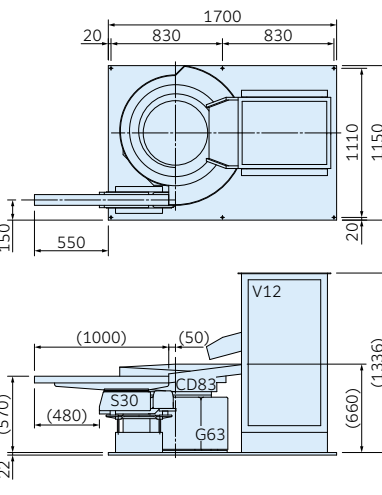

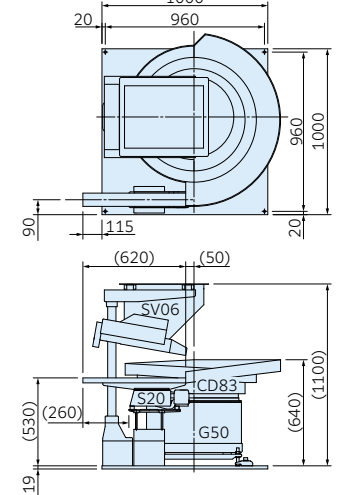
Assembly layout

<Typical combinations of products and boundary dimensions of combination>

If you have limited space, a space-saving type hopper model is available.

Bowl feeders use the stepped-bowl specification settings.

| Model<br>Combination  | N32   | N40  |
|---|---|--|
| <br>Bowl feeder<br>+<br>Linear feeder                                    |    |    |
| <br>Bowl feeder<br>+<br>Linear feeder<br>+<br>Detached hopper          |  |  |
| <br>Bowl feeder<br>+<br>Linear feeder<br>+<br>Space-saving type hopper |  |  |

| Model<br>Combination  | G50   | G63   |
|---|---|---|
| <br>Bowl feeder<br>+<br>Linear feeder                                    |    |    |
| <br>Bowl feeder<br>+<br>Linear feeder<br>+<br>Detached hopper          |  |  |
| <br>Bowl feeder<br>+<br>Linear feeder<br>+<br>Space-saving type hopper |  |   |

# Escapement

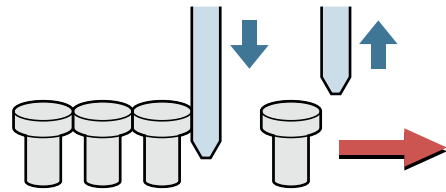
Well-developed escapements enable us to provide flexible solutions suitable for your needs.

## Escapement

The word "escapement" means to detach and separate parts one at a time or in several pieces, and these are conveyed forward continuously after alignment by a parts feeder. **NTN** can suggest the most suitable escapement to match the customer's requirements using our many years of experience.

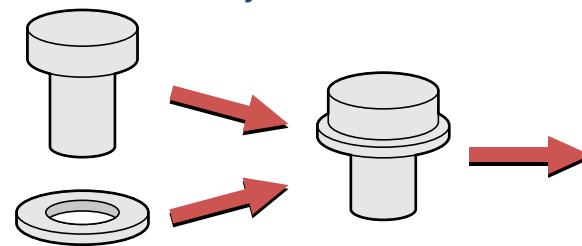
## Separating one part

Using a cylinder, it separates a part.



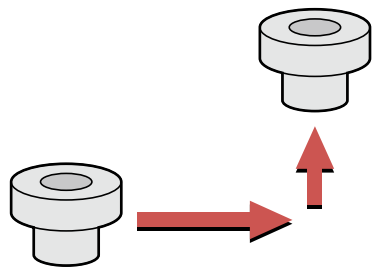
## Combining

Combines parts fed separately and sets them mechanically.



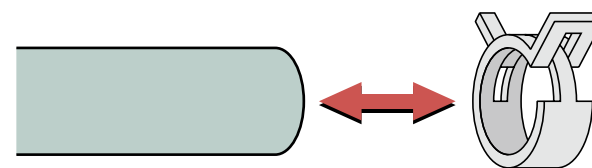
## Lift-up

A part is elevated using the hole as a guide.



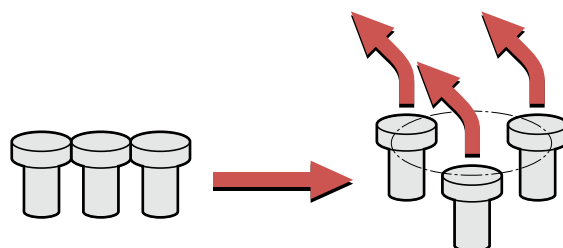
## Assembly of the hose clamp

Loosens the hose clamp metal fitting and loads it onto a hose.



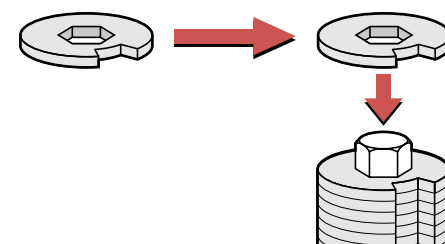
### 3-row feeding by pneumatic pressure

This process distributes parts in single row alignment into three rows and feeds them using pneumatic pressure.



## Stacking

Aligns notched parts in the same direction, and skewers them onto a rod.



# NTN corporation



## ◀ Sales Network

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