

# Compact Multi-Purpose Vending Machine

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The demand is increasing for vending machines that allow customers to purchase products without face-to-face interaction, as society seeks to prevent the spread of COVID-19. There is also a growing demand mainly among urban retailers to increase sales opportunities outside of store hours in limited spaces, such as storefronts. To meet these demands, Fuji Electric has developed and released “Multi-kun,” a space-saving, compact multi-purpose vending machine that can be installed outdoors.

## 1. Features of “Multi-kun”

Multi-kun, a compact multi-purpose vending machine, will expand sales opportunities in various places such as inside and in front of retail stores, commercial facilities, hotels, offices, and public transportation stations. Figure 1 shows the appearance of Multi-kun, and Table 1 shows its specifications.

### 1.1 Saving space

Conventional multi-purpose goods vending machines use a spiral system (see Fig. 2) for the product delivery unit. In this system a spiral-shaped conveyor rotates to push out a product that has been inserted into the structure. While the mechanism is simple, restrictions have been established to prevent products

Table 1 Specifications of “Multi-kun”

Items	Specifications
Model	FRM10D5CZ1NM
Dimensions (mm)	W745 × D756 × H1,830
Stock-keeping units	10 selections, 10 selection buttons
Storable product weight	25 to 350 g
Weight	248 kg
Lighting	LED
Installation environment	Installable indoors and outdoors
Product storage temperature *	Refrigerated (0°C to 10°C) Ambient temperature (18°C ± 5°C)

\* The cabinet has two compartments on the left and right sides, and temperature modes can be selected from three settings (Refrigerated only, Ambient temperature only, or both).

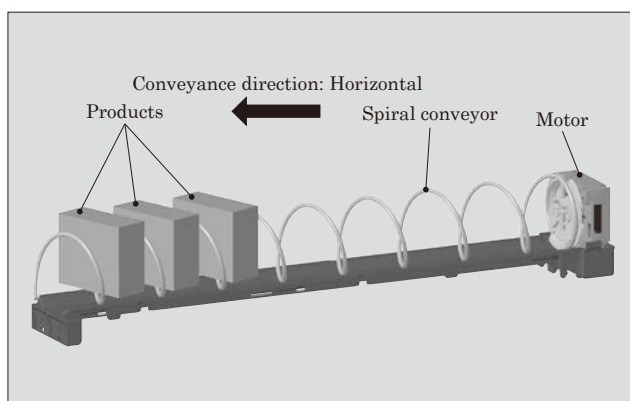


Fig.2 Conventional product delivery unit (spiral system)

that are too tall and unstable from falling over during conveyance and to prevent packaging bags that are too large relative to their contents from being caught in the spiral.

For Multi-kun, a chain system is adapted (see Fig. 3) for its product delivery unit. By conveying products vertically, frictional resistance caused by the dead weight of the products is reduced, allowing the product to be conveyed in a stable position. Without using any tools, the gaps between the product shelves can be freely and easily changed according to the product. This mechanism has increases the number of product varieties to be vended.

In addition, changing the product delivery system to a chain system has also reduced the depth dimension of the machine, allowing the installation area to be reduced by 20% that of Fuji Electric’s conventional machines. Such space-saving with a small footprint allows the machine to be installed both indoors and



Fig.1 “Multi-kun”

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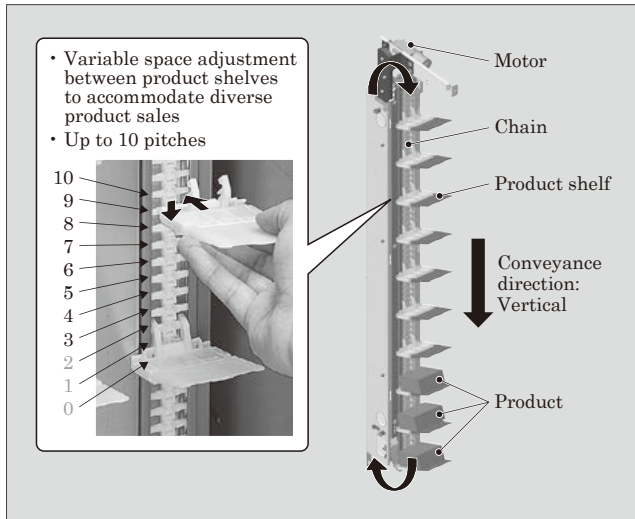


Fig.3 Product delivery unit (chain system)

outdoors in places with high traffic, such as building entrances, storefronts, and offices.

### 1.2 Out-of-stock detection function

To detect products that are out of stock, conventional goods vending machines employ a countdown system. In this system, the number of times a product can be sold is configured when the product is replenished, and this number is counted down each time the product is sold to detect when it is out of stock. This system does not require an out-of-stock detection mechanism, but a person must configure the number of times a product can be sold. For this reason, insufficient replenishment of products and configuration errors can lead sales opportunity issues.

To address these shortcomings, Multi-kun employs an out-of-stock detection mechanism that monitors whether products are present on the shelves. The out-of-stock detection mechanism comprises an out-of-stock lever that is in contact with the product shelf, a spring for lifting the out-of-stock lever, and a switch for detecting the position of the out-of-stock lever. When the product shelf is lowered from above, the product shelf stop position detection lever rotates and the detection switch is pressed, stopping the product shelf at the out-of-stock detection position [see Fig. 4 (a)]. This mechanism detects the difference in torque caused by the presence or absence of product to determine whether a product is out of stock [see Fig. 4 (b)]. To reliably detect out-of-stock products even for lightweight products, which produce small differences in torque, it is necessary to suppress variations in stop positions of the product shelves. The rotation fulcrums of the out-of-stock lever and the product shelf stop position detection lever are placed coaxially to suppress variations between the levers, thereby reducing variations in product shelf stop positions and enabling detection of the presence or absence of products with a weight as light as 25 g.

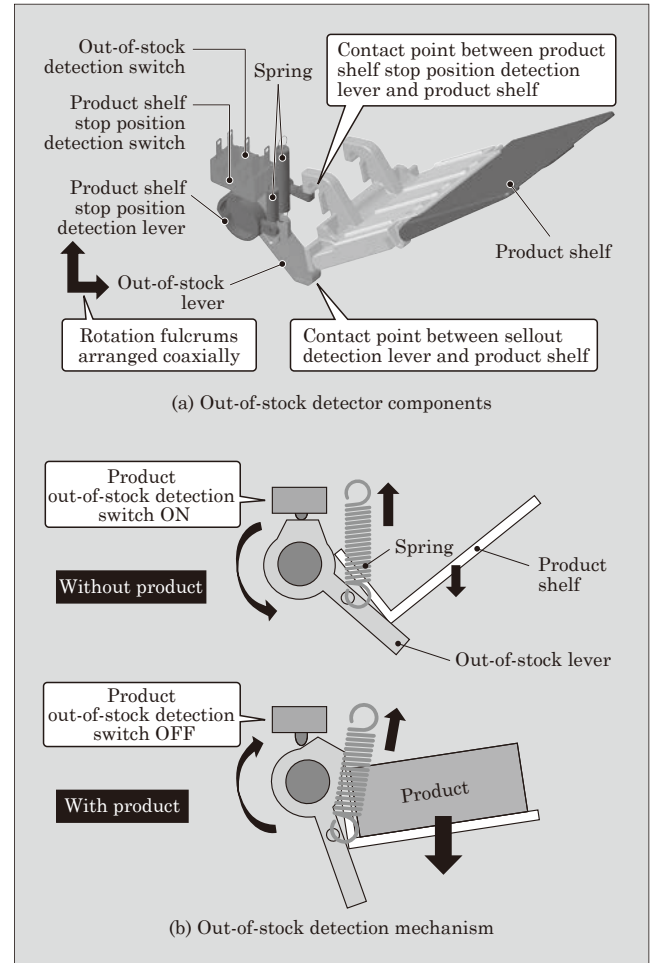


Fig.4 Out-of-stock detection mechanism

### 1.3 Outdoor installation specifications

Conventional multi-purpose goods vending machines use glass doors so that products are visible. Not only are glass doors prone to theft and have poor waterproof performance, it is also possible for the temperature of products behind glass doors to rise due to sunlight. For these reasons, these machines must have been installed only in indoor spaces.

Multi-kun uses the door structure of a beverage vending machine to improve theft resistance and waterproof performance. Because of its excellent heat insulation and airtightness, it is the first outdoor vending machine that can sell chilled foods, for which temperature control is difficult.

### 1.4 Product display

Conventional vending machines employ a structure in which one product is displayed on the display shelf assigned to a specific product selection button. For this reason, the number and size of products that can be displayed is limited, and display locations are fixed.

To enable Multi-kun to sell products of various shapes and sizes and display products accordingly, the

product selection buttons are placed in a single location as shown in Fig. 5. This enables products to be

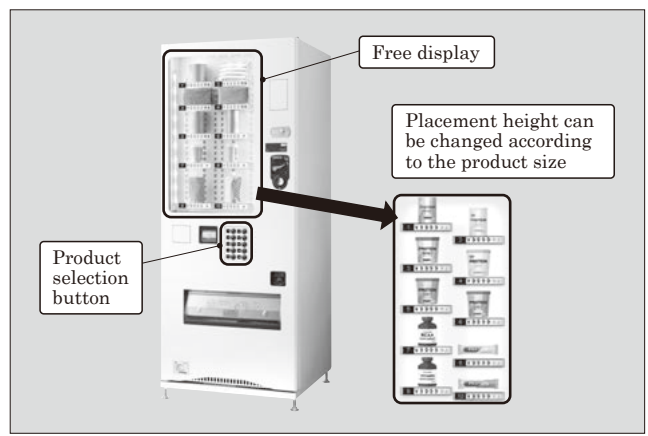


Fig.5 Example of free display

displayed freely regardless of the position of the selection buttons. The “free display” structure allows the display to be freely arranged by hooking the claws of the display stand to the board on the back. In addition, the transparent display stand and high-intensity LED lighting brightly illuminate the products for sale to draw customers.

**Launch Date**

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**Product Inquiries**

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