

# Robotics Human Assist

Our aim in the robotics human assist business domain is to focus on our core business of industrial robots. At the same time, we also intend to create a market for robots that are easier to use and that function in domains more closely involved with people. The key words that inspire these new robot markets are: co-existence with people, close proximity to people, and assistance for people.

On the one hand, we are pressing ahead with the development of next-generation service robots, starting with the SmartPal, on the assumption that robots will coexist and collaborate with human beings in the society of the future. On the other hand, we are also working to further accelerate the rapid expansion of the service robot market by going ahead and placing existing industrial robots in the service field first, and we have initiated measures to open up that market even sooner.

## 1 Service Robot

Yaskawa-kun is an initiative to deploy the Yaskawa industrial robot MOTOMAN series in the service (nonmanufacturing) business.

### As our first move, here is a soft-serve ice cream vendor.

As our first move, we have developed the Yaskawa-kun Soft-Serve Ice Cream Vendor, a robot that sells soft-serve ice cream in a vending unit that takes up about 3.3 square meters. The Yaskawa-kun Soft-Serve Ice Cream Vendor is built on the MOTOMAN-SDA10 new-generation industrial robot configured with equipment required to sell soft-serve ice cream. Customers insert payment and make a selection from the touch panel menu. The Yaskawa-kun then retrieves a cone from a large pile and operates the soft-serve ice cream freezer controls to neatly

dispense ice cream into the cone. The robot then pours on the strawberry, melon, or other topping the customer selected from the menu and places the order on the delivery rack. When the robot has finished putting down the order, the door on the customer side opens to allow the customer to pick up the completed soft-serve ice cream order. The concept design for the Yaskawa-kun gives it an external image, background music, and other elements to portray the robot as a character that customers will easily relate to. We intend to proceed both with the SmartPal as prior technology development conducted with a view to the service robots of the future, and with Yaskawa-kun as an effort aimed at using existing products to open up the existing service market. These two are indispensable twin aspects of our integrated effort.



1 Dispensing ice cream into a cone



2 Pouring on sauce and toppings



3 Placing on the delivery rack

●Exterior view of the Yaskawa-kun Soft-Serve Ice Cream Vendor



## 2 R1000 PROJECT

### What exactly is the "R1000 Project"?

With the goal of introducing robot-based, automated in-house facilities and developing new production technologies and functional parts, in 2009 we instituted the R1000 project, where the "R" stands for "robot" and the "1000" stands for our goal of installing 1,000 robots. We are moving forward every day under the slogan "We will install 1,000 robots in our facilities."

This program has now entered its third year, and we are continuing with daily efforts to deploy even better installations than before within the company. For the automation equipment itself, deployment is following the keywords of "compact" and "fast" to concentrate on small-sized installations.

In parallel with the project to automate our equipment and facilities, we are also developing components for visual, tactile, force, and other such sensors. Our aim is to combine the sensors we will develop with our robots to create robots that have the capability to work while making judgments as people do about what they see and touch, and about the proper force of their grip.

### Examples of How the "R1000 Project" is Working Out

We will introduce a compact dual-arm robot called the MOTOMAN-SDA5D (hereafter SDA5D) as a representative example of the equipment introduced under the R1000 Project. (Please see the figures and explanatory text to the right.)

Use of the SDA5D made it possible to install the entire device within an area smaller than two square meters, thus saving space. Changing the tools held in the robot's hands would also make it possible to handle different kinds of work with the same size device. Given a screwdriver to hold, the robot can be used as a screw-tightening device, and given an applicator, it can be used as a coating device.

Future aims of the R1000 Project are to promote further automation and to expand deployment with an eye to Yaskawa plants in other countries. By advancing with automation, we will make our plants around the world capable of manufacturing products with the same quality. The result should be to enhance the Yaskawa brand image. We also intend to pursue a variety of measures for energy conservation, such as reducing standby power consumption when robots are not operating, and eliminating compressed air as a power source by switching to all electric-powered equipment.



▲ Small parts (cooling fin) assembly device installed at our AC drive plant  
We are automating small part assembly work by installing equipment that uses the SDA5D at the Drive Center of our Drives Division to work on preparatory processes in the circuit board fabrication process. Parts were formerly put together manually, after which the job of screw tightening would be carried out. We have automated this work, equipping one of the robot's arms with a hand that holds parts and the other with a hand that holds an electric screwdriver. This enables the robot to perform the same work as a person at greater speed.



▲ Motor parts assembly device installed at our Tokyo Plant  
We are installing a device using the SDA5D in the motor fabrication process at our Tokyo Plant to automate the work of motor assembly. This device has an SDA5D with hands for holding motor parts. The device is carrying out assembly work by grasping parts with both hands.

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