Kawasaki Robot

Kawasaki Robots (USA), Inc.
28140 Lakeview Drive, Wixom, MI 48393, USA
Phone: +1-248-446-4100 Fax: +1-248-446-4200

Kawasaki Robotics (UK) Ltd.
Unit 4 Easter Court, Europa Boulevard, Westbrook Warrington
Cheshire, WA5 7ZB, United Kingdom
Phone: +44-1925-71-3000 Fax: +44-1925-71-3001

Kawasaki Robotics GmbH
29 Sporerweg, 41468 Neuss, Germany
Phone: +49-2131-3426 Fax: +49-2131-3426-22

Kawasaki Robotics Korea, Ltd.
43, Namdong-daero 215beon-gil, Namdong-gu, Incheon, 21633, Korea
Phone: +82-32-821-6941 Fax: +82-32-821-6947

Kawasaki Robotics (Tianjin) Co., Ltd.
1 2/F, Building 6, No.19 Xinhuan Road, TEDA, China
Phone: +86-22-5983-1888 Fax: +86-22-5983-1889

Kawasaki Motors Enterprise (Thailand) Co., Ltd.
(Rayong Robot Center)
119/10 Moo 4 T Pruak Daeng, A Pruak Daeng, Rayong 21140
Thailand
Phone: +66-38-955-040-58 Fax: +66-38-955-145

https://robotics.kawasaki.com/

**Global Network**

Kawasaki Heavy Industries, Ltd.
ROBOT DIVISION
Tokyo Head Office/Robot Division
1-14-5, Kaigan, Minato-ku, Tokyo 105-8315, Japan
Phone: +81-3-3435-2501 Fax: +81-3-3437-9880

Akashi Works/Robot Division
1-1, Kawasaki-cho, Akashi, Hyogo 673-8666, Japan
Phone: +81-78-921-2546 Fax: +81-78-913-6548

CAUTIONS TO BE TAKEN TO ENSURE SAFETY

- For those persons involved with the operation / service of your system, including Kawasaki Robot, they must strictly observe all safety regulations at all times. They should carefully read the Manuals and other related safety documents.
- Products described in this catalogue are general industrial robots. Therefore, if a customer wishes to use the Robot for special purposes, which might endanger operators or if the Robot has any problems, please contact us. We will be pleased to help you.
- Be careful as Photographs illustrated in this catalogue are frequently taken after removing safety fences and other safety devices stipulated in the safety regulations from the Robot operation system.

- Materials and specifications are subject to change without notice.

Printed in Japan
The “duAro” Dual-arm SCARA Robot by Kawasaki Robotics:
A Brand-new Offering that Realizes the Concept of an Innovative Dual-arm SCARA Robot

Features:

Coexistent operations with people
Low-power motors and a speed-reducing function helps the duAro to coexist with people in customers’ work operations. Also, in the event of a collision with people and other object, the collision detection function will help to make the duAro’s movement stop.

In order to reduce risk, customers shall, at their own responsibility, establish and implement a risk assessment to coexist with people in customers’ work operations before and during use of the duAro.

Saves space
The “duAro” dual-arm robot, with its two coaxial arms controlled by a single controller, can fit into a single-person space. The coaxial dual-arm configuration makes it possible to perform coordinated movement, which has been impossible for even two SCARA robots, in addition to dual-arm operations.

Ease of introduction
The wheeled base on which the arms are placed accommodates the controller. This enables the user to move the robot together with its base to any location desired.

Ease in teaching operation
Direct teaching by holding the robot’s arms allows the user to easily teach the robot the movements required of them.

Various options
Teaching operations can be conveyed via tablet or teaching pendant, both of which can be connected to multiple robots. A vision system and standard gripper options are also available.

Occupying only a space equal to one person, the dual-arm SCARA robot works well with people.
### Specifications

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Application</strong></td>
<td>Assembly, Material handling, Machine tending, Dispensing</td>
</tr>
<tr>
<td><strong>Degree of freedom (axes)</strong></td>
<td>4 × 2 arms</td>
</tr>
<tr>
<td><strong>Max. payload (kg)</strong></td>
<td>2 (1 arm)</td>
</tr>
<tr>
<td><strong>Positional repeatability (mm)</strong></td>
<td>±0.05</td>
</tr>
<tr>
<td><strong>Motion range (°)</strong></td>
<td>Arm 1 (lower arm) Arm 2 (upper arm)</td>
</tr>
<tr>
<td></td>
<td>-170 - +170 (JT1) -140 - +150 (JT1)</td>
</tr>
<tr>
<td></td>
<td>-140 - +140 (JT2) -140 - +140 (JT2)</td>
</tr>
<tr>
<td></td>
<td>0 - +150 (JT3)* 0 - +150 (JT3)*</td>
</tr>
<tr>
<td></td>
<td>-360 - +360 (JT4)* -360 - +360 (JT4)*</td>
</tr>
<tr>
<td><strong>Number of controlled axes</strong></td>
<td>Max. 12</td>
</tr>
<tr>
<td><strong>Drive system</strong></td>
<td>Full digital servo system</td>
</tr>
<tr>
<td><strong>Programming</strong></td>
<td>Direct teaching method. Simple teaching method through tablets</td>
</tr>
<tr>
<td><strong>Axis capacity (MB)</strong></td>
<td>4</td>
</tr>
<tr>
<td><strong>I/O Signal</strong></td>
<td>General input (number of input): NPN model: 12 (Max 28) / PNP model: 6 (Max 16) / Cubic-S model: 6 (Max 16) General output (number of output): NPN model: 4 (Max 12) / PNP model: 10 (Max 24) / Cubic-S model: 0 (Max 14)</td>
</tr>
<tr>
<td><strong>Power requirements</strong></td>
<td>AC200-230V ±10%, 50/60Hz±2%, 1ø, Max. 2.0kVA</td>
</tr>
<tr>
<td><strong>Mass (kg)</strong></td>
<td>about 200</td>
</tr>
<tr>
<td><strong>Installation Location</strong></td>
<td>Floor</td>
</tr>
<tr>
<td><strong>Environmental condition</strong></td>
<td>Temperature (°C): 5 - 40 Humidity (%): 35 - 85 (No dew, nor frost allowed)</td>
</tr>
</tbody>
</table>

---

### Features

#### Easy to introduce

- Using only a power line and an air hose, the robot can replace one worker within the space for a person.

#### System is easy to configure

- A tablet is available for teaching multiple robots.

#### Benefits of introduction

- **Lower total cost**
  - Even simple hands are able to carry large workpieces by using both hands
  - The coaxial configuration enables the robot to reach equipment at its back
  - Two arms perform different operations to reduce cycle time

- **Easy to deploy**
  - Connect power supply
  - Connect an air hose

- **Easy to introduce**
  - Even simple hands are able to carry large workpieces by using both hands

- **System is easy to configure**
  - A tablet is available for teaching multiple robots
Application examples

Available for a wide range of applications

- Fastening screws
- Arranging electronic parts in bulk
- Part-mounting
- Spray-coating / UV curing
- Loading onto and unloading off of a board inspection device
- Inspecting electronic chips
- Bagging boards
- Inspecting boards
- Dispensing
- Packaging plastic bottles in boxes
- Packaging confections
- Loading rice balls onto trays

Options

Tablet and software

Robot Teacher 2

Offers an easy-to-teach method with intuitive touch operations. Tablet software for duAro

You can use familiar touch operations on a visually simple display to operate and teach your robots. Wireless support eliminates the need for complicated wiring. User-friendliness even for those with little experience operating a robot helps reduce working hours.

System requirement for tablets

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>Android 4.3 or later&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>dp&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Width of the smallest side of the Tablet in 600dp or greater&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>Network</td>
<td>Wi-Fi</td>
</tr>
<tr>
<td>Processor</td>
<td>ARMv7</td>
</tr>
</tbody>
</table>

<sup>1</sup> From Android 5.0 to any version earlier than 7.0 shall be required for Cubic-S supported version.
<sup>2</sup> Refer to the Web site for the Google™ Android Developer for further information about dp (Density-independent pixel).
<sup>3</sup> Supports RobotTeacher2 Revision7 or later.
<sup>4</sup> Essential only for Cubic-S supported version.

Tested Device

<table>
<thead>
<tr>
<th>Device</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZenPad 8.0</td>
<td>ASUS</td>
</tr>
<tr>
<td>ZenPad 10</td>
<td>ASUS</td>
</tr>
</tbody>
</table>

An intuitive and user-friendly display allows even beginners to easily operate the robot.

While monitoring the robot’s status, including its current state, you can easily stop or restart operation with the push of a button.

<sup>*Google, Android is a trademark of Google Inc.*
**Device type** Slave (remote I/O device)

**Baud rate** Select one from 156 Kbit/s, 625 Kbit/s, 2.5 Mbit/s, 5 Mbit/s or 10 Mbit/s

**I/O counts**
- **Max. bit count** Input: 224, Output: 224 (the last 16/16 bits are for system)
- **Max. word data** Input: 32, Output: 32

**Version** Version 1.0 / 1.1 / 2.0

**Communication service** Polling

**Transmission medium** Cable exclusive for CC-Link

**Configurable stations/address on CC-Link** 1-64

---

## I/O Extension

External I/O signals are available for connecting external sensors, valves, switches and/or lamps.

If the number of standard I/O signals (12 inputs, 4 outputs) is not enough, you can add a board to increase the number of signals. (1) Extension I/O board and/or (2) CC-Link board are available.

**Additional Option** = (A) Board + (B) Harness in the cart + (C) Connector panel

**I/O extension board**

This option provides an additional 16 inputs and 8 outputs for hardware signals (up to 28 input and 12 output ports, together with the standard I/O).

![I/O extension board](A)

**CC-Link board**

This option enables you to connect the robot controller to a CC-Link fieldbus network (as a remote device station).

![CC-Link board](A)

---

## Programming tool

Kawasaki Robot's offline programming tool enables a variety of production configurations

The application can build 3D models of robots, peripherals and products to verify various system configurations. Verification of operation time of robots and interference with surrounding objects ahead of introduction can reduce the risks associated with the initial system launch. The tool also has rich support functionality to create motions and programs for the robots, thereby contributing to a reduction in working hours.

**Robot simulation technology**

- The virtual robot controller technology that Kawasaki has developed over the years can estimate motion trajectories and cycle times as accurately as the hardware robot controllers.
- You can operate the same tablet as one used for the real machine.

**Layout design**

- Capture data from 3D-CAD to arrange the products (STL format)
- Intersection check function allows you to check if there is contact among models.
- (Interactive) Wizard ensures reliable operations even for those who are unfamiliar with layout design.

**Operation environment**

- Available in common Windows environments
  - Supported OS: Windows® XP, 7 (x86, x64)
- On a 64-bit computer, it runs in the 32-bit compatible mode.
- Available in four languages.
  - Japanese/English/Chinese/German

**Teaching and programming**

- Teach point modeling facilitates checks for working positions and moves robots to their working positions.
- Coordinated movement setting allows you to easily teach multiple arms.
- You can check the status of robot operations and I/O signals.

**Linking with a tablet**

The tool can link with a tablet for actual robots.

**Program editing**

- Keeping those who are unfamiliar in mind, this tool allows you to add an item that offers instructions for editing a program.
- Comparing the programs before and after modification, you can review modification details during a programming operation.

**Drawing**

- Interfering models are highlighted and a robot's working position (teaching point model) and motion trajectories are displayed.

**Monitoring**

- The states of I/O signals are shown in graphs. You can monitor running program steps and robot status.

---

## Power harness

A 5m-long harness for supplying primary electricity can be linked with the cart connector.

![Power harness](7 8)
**Kawasaki vision system**

We’ve customized and introduced an advanced 2D-vision system that can flexibly and quickly support broad applications into duAro.

**Features**

**Pursuit for “Easy to Use”**

The easy operation menu customized for duAro enables those who handle industrial robots or vision devices for the first time to make full use of the functionality quickly (an advanced menu is also available according to customers’ applications). Also, you can use a tablet to make duAro conduct correction movements easily, with no need to edit any program.

(Sophisticated processing, such as variety discrimination or barcode recognition, requires AS programs.)

**Embedded in duAro’s compact body**

All vision devices are embedded in or can be attached to duAro; without any need to rearrange wiring after moving duAro.

**Minimize burden of reconfiguration after movement of duAro**

Reconfiguration of a robot is usually required after moving it or moving equipment around it. However, with the vision system, the “device correction” corrects the position information to restart duAro swiftly.

**Device selection**

According to the type of work and environment, select the combination of “camera,” “lens” and “light” from the choices below. Use the flowchart if you are not clear about selection criteria.

**Mounted camera Option types**

<table>
<thead>
<tr>
<th>Camera</th>
<th>Lens</th>
<th>Light</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monochrome</td>
<td>View 50mm</td>
<td>Ring light</td>
</tr>
<tr>
<td>Monochrome</td>
<td>View 80mm</td>
<td>Bar light</td>
</tr>
<tr>
<td>Color</td>
<td>View 50mm</td>
<td>Bar light</td>
</tr>
<tr>
<td>Monochrome</td>
<td>View 30mm</td>
<td>Ring light</td>
</tr>
<tr>
<td>Monochrome</td>
<td>View 50mm</td>
<td>Flat dome light</td>
</tr>
<tr>
<td>Monochrome</td>
<td>View 30mm</td>
<td>Flat dome light</td>
</tr>
</tbody>
</table>

*The view is estimated with a distance of 100mm from an object.

*Depending on the height of Z axis (JT3), attention should be paid to interference with the second arm.

**Specifications**

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Camera</th>
<th>Lens</th>
<th>Light</th>
<th>Weight</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camera</td>
<td>Monochrome</td>
<td>Color</td>
<td>View 50mm</td>
<td>66g</td>
<td>Pixel count: 1.3 million pixels</td>
</tr>
<tr>
<td>Lens</td>
<td>View 50mm</td>
<td>54g</td>
<td>Standard lens (resolution: 0.054mm/pix)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lens</td>
<td>View 80mm</td>
<td>56g</td>
<td>Lens suitable for a broader range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lens</td>
<td>View 30mm</td>
<td>51g</td>
<td>Lens suitable for a small object</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ring light</td>
<td>130g</td>
<td>Standard light that can clearly discover irregularities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bar light</td>
<td>75g</td>
<td>Small, with configurable position and angle, available even at a position where ring light is unavailable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flat dome light</td>
<td>270g</td>
<td>Provides even irradiations, suitable for glossy works</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Examples**

**Features**

- A vision camera directly attached to duAro JT4 axis.
- Camera and fixture brackets set.
- The angle is configurable to ±30° or ±60°.
- Supports ring lights, dome lights and bar lights.
- Depending on the height of Z axis (JT3), attention should be paid to interference with the second arm.