

# INDUSTRIAL ROBOTS

SCARA robots for industrial applications



- » Reliable and versatile
- » Simple programming and quick set-up
- » Pick & Place

# A win-win mechatronics proposition

*Simplify your machines and reduce manufacturing times using SCARA robots. Flexibility and a wide range allow you to choose exactly the right model for your needs.*

*Mechanical features based on a simple (optimized) design offer high quality at a very competitive price. Easy programming and minimum maintenance reduce application start-up time and increase machine reliability.*

## Your benefits:

- Higher reliability (no belts in XG series, no electronic parts in movement)
- Higher precision and speed
- Minimum maintenance
- Easier to use
- Lower cost
- Higher rigidity
- Very compact design

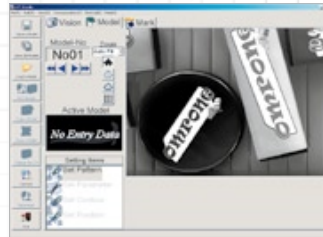


## Complete solution including vision and conveyor tracking

As a machine control specialist, Omron can offer a more complete mechatronics solution to automate your machine. The integration of SCARA robots, PLC and vision systems is supported by structured programs and Function Blocks that ensure optimal performance from the machine.

### Two options for vision system applications

#### Basic solution: SCARA vision studio

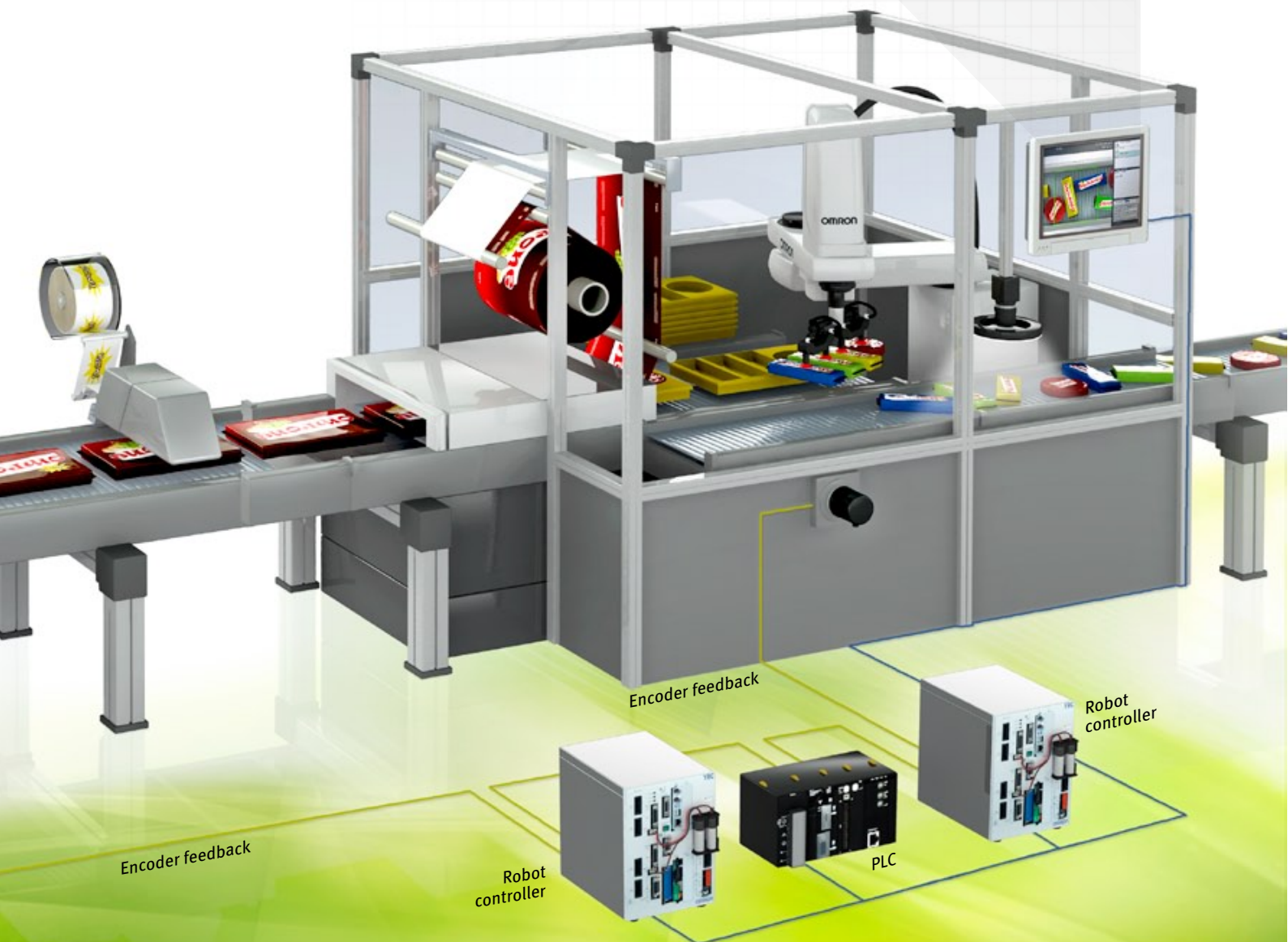


The integrated vision system offers a simple programming method for pick & place applications.

#### High-End solution: Xpectia vision system

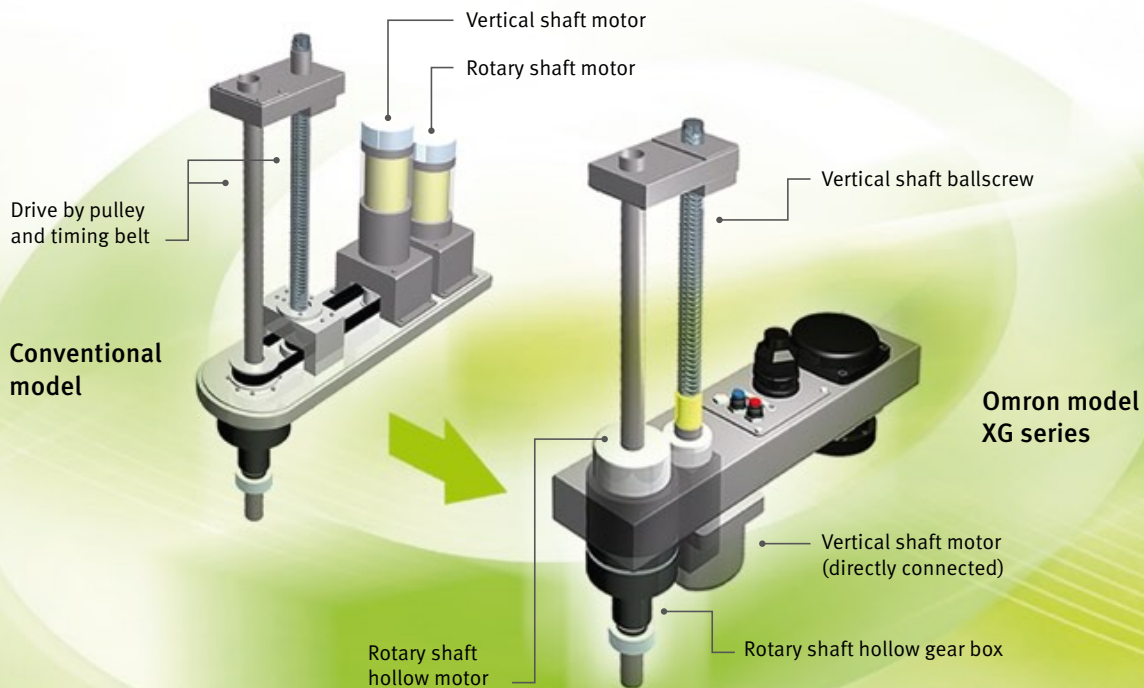


The Xpectia vision system combines high speed part identification and quality control to solve complex pick & place applications. It features a tailored user interface for automatic robot calibration.



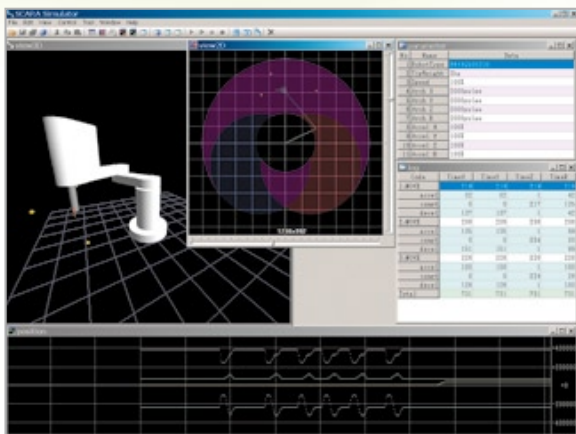
# For the reliability of your application

The standard XG series implements a very reliable technology thanks to the simplicity of the mechanical system used for all axes. Completely without belts! The motion transmission is simply realized by direct coupling between motors and gearboxes (ballscrew for vertical axis) that ensures high accuracy and reduces the required maintenance.



## Simulation software - ScaraSim

Using the simulation software it's possible to select the right robot type for your application. The motion planning calculation uses the same algorithm implemented in the robot controller in order to ensure the most reliable estimations.



## Easy programming plus integration

### Program Library:

- Standard programs for pick & place application with tracking and vision system
- Palletizing
- Sealing

### Function Blocks available for communicating with:

- Vision systems (Xpectia, ZFX)
- C) PLC series (DeviceNet, Ethernet, RS232, etc)



# Wide range providing the performance you need

The wide reach and payload ranges from 120 mm to 1200 mm and from 1 kg to 50 kg, allowing for precise adjustment of the robot to your application. Special versions, such as clean-room and dust/drip-proof types enable installation in critical environments for applications in the food and pharmaceutical industries.

For special customization please contact your Omron representative.

For further technical details please refer to the robot datasheet

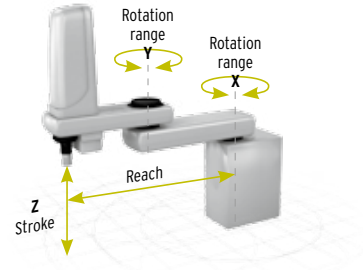
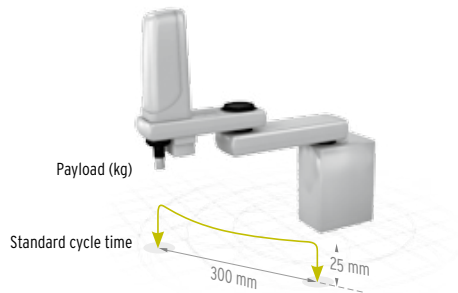
|                           |     |                     |     |           |           |                                         |  |                    |           |           |           |           |           |
|---------------------------|-----|---------------------|--------------------------------------------------------------------------------------|-----------|-----------|-----------------------------------------|-------------------------------------------------------------------------------------|--------------------|-----------|-----------|-----------|-----------|-----------|
| STANDARD MODELS           |     |                     | XG series - Tiny type                                                                |           |           |                                         | X series                                                                            |                    |           |           |           |           |           |
|                           |     |                     | R6YXG120                                                                             | R6YXG150  | R6YXG180  | R6YXG220                                | R6YXH250                                                                            | R6YXH350           | R6YXH400  |           |           |           |           |
| Max. payload (kg)         |     |                     | 1                                                                                    | 1         | 1         | 1                                       | 3                                                                                   | 3                  | 3         |           |           |           |           |
| Reach (mm)                |     |                     | 120                                                                                  | 150       | 180       | 220                                     | 250                                                                                 | 350                | 400       |           |           |           |           |
| Repeatability (mm) *1     | X,Y | ±(mm)               | 0,005                                                                                | 0,005     | 0,005     | 0,01                                    | 0,01                                                                                | 0,01               | 0,01      |           |           |           |           |
|                           | Z   | ±(mm)               | 0,01                                                                                 | 0,01      | 0,01      | 0,01                                    | 0,01                                                                                | 0,01               | 0,01      |           |           |           |           |
|                           | R   | ±(º)                | 0,004                                                                                | 0,004     | 0,004     | 0,01                                    | 0,005                                                                               | 0,005              | 0,005     |           |           |           |           |
| Axis specifications       | X   | Arm length (mm)     | 45                                                                                   | 75        | 105       | 111                                     | 125                                                                                 | 225                | 225       |           |           |           |           |
|                           |     | Rotation range ±(º) | 125                                                                                  | 125       | 125       | 120                                     | 115                                                                                 | 115                | 115       |           |           |           |           |
|                           | Y   | Arm length (mm)     | 75                                                                                   | 75        | 75        | 109                                     | 125                                                                                 | 125                | 175       |           |           |           |           |
|                           |     | Rotation range ±(º) | 145                                                                                  | 145       | 145       | 140                                     | 140                                                                                 | 140                | 140       |           |           |           |           |
|                           | Z   | Stroke (mm)         | 50                                                                                   | 50        | 50        | 100                                     | 150                                                                                 | 150                | 150       |           |           |           |           |
|                           | R   | Rotation range ±(º) | 360                                                                                  | 360       | 360       | 360                                     | 360                                                                                 | 360                | 360       |           |           |           |           |
| Maximum speed             | X,Y | Combined (mm/s)     | 3300                                                                                 | 3400      | 3300      | 3400                                    | 4000                                                                                | 5000               | 6000      |           |           |           |           |
|                           | Z   | (mm/s)              | 900                                                                                  | 900       | 900       | 700                                     | 1000                                                                                | 1000               | 1000      |           |           |           |           |
|                           | R   | (º/s)               | 1700                                                                                 | 1700      | 1700      | 1700                                    | 1020                                                                                | 1020               | 1020      |           |           |           |           |
| Standard time cycle (sec) |     |                     | 0.33(*2)                                                                             | 0.33 (*2) | 0.33 (*2) | 0.46 (*2)                               | 0.54 (*3)                                                                           | 0.54 (*3)          | 0.49 (*3) |           |           |           |           |
| Weight (kg)               |     |                     | 6                                                                                    | 6,1       | 6,2       | 7                                       | 15                                                                                  | 15                 | 15        |           |           |           |           |
|                           |     |                     |                                                                                      |           |           |                                         | H: Stroke =300                                                                      |                    |           |           |           |           |           |
| Regeneration unit         |     |                     | N.A.                                                                                 | N.A.      | N.A.      | N.A.                                    | N.A.                                                                                | N.A.               | N.A.      |           |           |           |           |
|                           |     |                     |  |           |           |                                         |                                                                                     |                    |           |           |           |           |           |
| SPECIAL MODELS            |     |                     | XC series - Clean type                                                               |           |           |                                         |                                                                                     |                    |           |           |           |           |           |
|                           |     |                     | R6YXC180                                                                             | R6YXC220  | R6YXCH250 | R6YXCH350                               | R6YXCH400                                                                           | R6YXC500           | R6YXC600  | R6YXC700  | R6YXC800  | R6YXC1000 | R6YXP2    |
| Max. payload (kg)         |     |                     | 1                                                                                    | 1         | 3         | 3                                       | 3                                                                                   | 10                 | 10        | 20        | 20        | 20        | 3         |
| Reach (mm)                |     |                     | 180                                                                                  | 220       | 250       | 350                                     | 400                                                                                 | 500                | 600       | 700       | 800       | 1000      | 250       |
| Repeatability (mm) *1     | X,Y | ±(mm)               | 0,01                                                                                 | 0,01      | 0,01      | 0,01                                    | 0,01                                                                                | 0,02               | 0,02      | 0,02      | 0,02      | 0,02      | 0,01      |
|                           | Z   | ±(mm)               | 0,01                                                                                 | 0,01      | 0,01      | 0,01                                    | 0,01                                                                                | 0,01               | 0,01      | 0,01      | 0,01      | 0,01      | 0,01      |
|                           | R   | ±(º)                | 0,004                                                                                | 0,004     | 0,005     | 0,005                                   | 0,005                                                                               | 0,005              | 0,005     | 0,005     | 0,005     | 0,005     | 0,005     |
| Axis specifications       | X   | Arm length (mm)     | 71                                                                                   | 111       | 125       | 225                                     | 225                                                                                 | 250                | 350       | 350       | 450       | 550       | 125       |
|                           |     | Rotation range ±(º) | 120                                                                                  | 120       | 115       | 115                                     | 115                                                                                 | 120                | 120       | 120       | 120       | 120       | 115       |
|                           | Y   | Arm length (mm)     | 109                                                                                  | 109       | 125       | 125                                     | 175                                                                                 | 250                | 250       | 350       | 350       | 450       | 125       |
|                           |     | Rotation range ±(º) | 140                                                                                  | 140       | 130       | 128                                     | 143                                                                                 | 142                | 145       | 145       | 145       | 145       | 130       |
|                           | Z   | Stroke (mm)         | 100                                                                                  | 100       | 150       | 150                                     | 150                                                                                 | 200(300)           | 200(300)  | 200(400)  | 200(400)  | 200(400)  | 150       |
|                           | R   | Rotation range ±(º) | 360                                                                                  | 360       | 360       | 360                                     | 360                                                                                 | 360                | 360       | 360       | 360       | 360       | 360       |
| Maximum speed             | X,Y | Combined (mm/s)     | 3300                                                                                 | 3400      | 4000      | 5000                                    | 6000                                                                                | 4900               | 5600      | 6700      | 7300      | 8000      | 4000      |
|                           | Z   | (mm/s)              | 700                                                                                  | 700       | 1000      | 1000                                    | 1000                                                                                | 1700               | 1700      | 1700      | 1700      | 1700      | 1000      |
|                           | R   | (º/s)               | 1700                                                                                 | 1700      | 1020      | 1020                                    | 1020                                                                                | 876                | 876       | 600       | 600       | 600       | 1020      |
| Standard time cycle (sec) |     |                     | 0.42 (*2)                                                                            | 0.45 (*2) | 0.54 (*3) | 0.54 (*3)                               | 0.66 (*3)                                                                           | 0.53 (*3)          | 0.56 (*3) | 0.57 (*3) | 0.57 (*3) | 0.6 (*3)  | 0.54 (*3) |
| Weight (kg)               |     |                     | 6,5                                                                                  | 6,5       | 16        | 16                                      | 16                                                                                  | 31                 | 33        | 57        | 58        | 59        | 15        |
| User wiring (sq x wires)  |     |                     | 0.1 sq x 8 wires;                                                                    |           |           | 0.2 sq x 10 wires;                      |                                                                                     | 0.2 sq x 20 wires; |           |           |           |           |           |
| User tubing (ø)           |     |                     | ø 3 x 2                                                                              |           |           | ø 4 x 3                                 |                                                                                     | ø 6 x 3            |           |           |           |           |           |
|                           |     |                     | Class 10; Suct. vol. (NI/min) = 30;                                                  |           |           | Class 10; Suction volume (NI/min) = 60; |                                                                                     |                    |           |           |           |           |           |
| Regeneration unit         |     |                     | N.A.                                                                                 | N.A.      | N.A.      | N.A.                                    | N.A.                                                                                | RGU2               | RGU2      | RGU2      | RGU2      | RGU2      | N.A.      |

\*1 This is the value at constant ambient temperature

\*2 With 0.1 kg payload. When reciprocating 100mm in horizontal and 25mm in vertical directions.

\*3 With 2 kg payload. When reciprocating 300mm in horizontal and 25mm in vertical directions.

# eed...



| XG series  |            |            |            |            |            |            | X series  |
|------------|------------|------------|------------|------------|------------|------------|-----------|
| R6YXG500   | R6YXG600   | R6YXGH600  | R6YXG700   | R6YXG800   | R6YXG900   | R6YXG1000  | R6YXX1200 |
| 10         | 10         | 20         | 20         | 20         | 20         | 20         | 50        |
| 500        | 600        | 600        | 700        | 800        | 900        | 1000       | 1200      |
| 0,01       | 0,01       | 0,02       | 0,02       | 0,02       | 0,02       | 0,02       | 0,05      |
| 0,01       | 0,01       | 0,01       | 0,01       | 0,01       | 0,01       | 0,01       | 0,02      |
| 0,004      | 0,004      | 0,004      | 0,004      | 0,004      | 0,004      | 0,004      | 0,005     |
| 200        | 300        | 200        | 300        | 400        | 500        | 600        | 600       |
| 130        | 130        | 130        | 130        | 130        | 130        | 130        | 125       |
| 300        | 300        | 400        | 400        | 400        | 400        | 400        | 600       |
| 145        | 145        | 150        | 150        | 150        | 150        | 150        | 150       |
| 200(300)   | 200(300)   | 200(400)   | 200(400)   | 200(400)   | 200(400)   | 200(400)   | 400       |
| 360        | 360        | 360        | 360        | 360        | 360        | 360        | 360       |
| 7600       | 8400       | 7700       | 8400       | 9200       | 9900       | 10600      | 7400      |
| 2300(1700) | 2300(1700) | 2300(1700) | 2300(1700) | 2300(1700) | 2300(1700) | 2300(1700) | 750       |
| 1700       | 1700       | 1020       | 1020       | 1020       | 1020       | 1020       | 600       |
| 0.45 (*3)  | 0.46 (*3)  | 0.47 (*3)  | 0.42 (*3)  | 0.48 (*3)  | 0.49 (*3)  | 0.49 (*3)  | 0.91 (*3) |
| 30         | 31         | 48(50)     | 50(52)     | 52(54)     | 54(56)     | 56(58)     | 124       |
| RGU3       | RGU3       | RGU3       | RGU3       | RGU3       | RGU3       | RGU3       | RGU2      |



| XP series – Dust-proof & drip-proof type |           |           |                               |           |           |           |           | XS series – Wall-hanging, ceiling-hanging, inverse type |           |                               |           |           |           |           |
|------------------------------------------|-----------|-----------|-------------------------------|-----------|-----------|-----------|-----------|---------------------------------------------------------|-----------|-------------------------------|-----------|-----------|-----------|-----------|
| 50                                       | R6YXP350  | R6YXP400  | R6YXP500                      | R6YXP600  | R6YXP700  | R6YXP800  | R6YXP1000 | R6YXSH300                                               | R6YXSH400 | R6YXS500                      | R6YXS600  | R6YXS700  | R6YXS800  | R6YXS1000 |
|                                          | 3         | 3         | 10                            | 10        | 20        | 20        | 20        | 3                                                       | 3         | 10                            | 10        | 20        | 20        | 20        |
|                                          | 350       | 400       | 500                           | 600       | 700       | 800       | 1000      | 300                                                     | 400       | 500                           | 600       | 700       | 800       | 1000      |
|                                          | 0,01      | 0,01      | 0,02                          | 0,02      | 0,02      | 0,02      | 0,02      | 0,01                                                    | 0,01      | 0,02                          | 0,02      | 0,02      | 0,02      | 0,02      |
|                                          | 0,01      | 0,01      | 0,01                          | 0,01      | 0,01      | 0,01      | 0,01      | 0,01                                                    | 0,01      | 0,01                          | 0,01      | 0,01      | 0,01      | 0,01      |
|                                          | 0,005     | 0,005     | 0,005                         | 0,005     | 0,005     | 0,005     | 0,005     | 0,005                                                   | 0,005     | 0,005                         | 0,005     | 0,005     | 0,005     | 0,005     |
|                                          | 225       | 225       | 250                           | 350       | 350       | 450       | 550       | 175                                                     | 225       | 250                           | 350       | 350       | 450       | 550       |
|                                          | 115       | 115       | 120                           | 120       | 120       | 120       | 120       | 115                                                     | 115       | 120                           | 120       | 120       | 120       | 120       |
|                                          | 125       | 175       | 250                           | 250       | 350       | 350       | 450       | 125                                                     | 175       | 250                           | 250       | 350       | 350       | 450       |
|                                          | 130       | 140       | 145                           | 145       | 145       | 145       | 145       | 140                                                     | 140       | 135                           | 145       | 145       | 145       | 145       |
|                                          | 150       | 150       | 200(300)                      | 200(300)  | 200(400)  | 200(400)  | 200(400)  | 150                                                     | 150       | 200(300)                      | 200(300)  | 200(400)  | 200(400)  | 200(400)  |
|                                          | 360       | 360       | 360                           | 360       | 360       | 360       | 360       | 360                                                     | 360       | 360                           | 360       | 360       | 360       | 360       |
|                                          | 5000      | 6000      | 4900                          | 5600      | 6700      | 7300      | 8000      | 4400                                                    | 6000      | 4900                          | 5600      | 6700      | 7300      | 8000      |
|                                          | 1000      | 1000      | 1700                          | 1700      | 1700      | 1700      | 1700      | 1000                                                    | 1000      | 1700                          | 1700      | 1700      | 1700      | 1700      |
|                                          | 1020      | 1020      | 876                           | 876       | 600       | 600       | 600       | 1020                                                    | 1020      | 876                           | 876       | 600       | 600       | 600       |
| 3)                                       | 0.54 (*3) | 0.66 (*3) | 0.53 (*3)                     | 0.56 (*3) | 0.57 (*3) | 0.57 (*3) | 0.6 (*3)  | 0.54 (*3)                                               | 0.66 (*3) | 0.53 (*3)                     | 0.56 (*3) | 0.57 (*3) | 0.57 (*3) | 0.6 (*3)  |
|                                          | 15        | 15        | 30                            | 32        | 56        | 57        | 58        | 15                                                      | 15        | 30                            | 32        | 56        | 57        | 58        |
| 0.2 sq x 10 wires;<br>ø 4 x 3            |           |           | 0.2 sq x 20 wires;<br>ø 6 x 3 |           |           |           |           | 0.2 sq x 10 wires;<br>ø 4 x 3                           |           | 0.2 sq x 20 wires;<br>ø 6 x 3 |           |           |           |           |
|                                          | N.A.      | N.A.      | RGU2                          | RGU2      | RGU2      | RGU2      | RGU2      | N.A.                                                    | N.A.      | RGU2                          | RGU2      | RGU2      | RGU2      | RGU2      |

# One controller for all robot models

The YRC is the smallest robot controller able to control the complete SCARA line-up. It is easy to use because it implements application functions while being a powerful tool that enables low-level programming.

## Key features and benefits:

- Compact controller
- Simple programming by teaching pendant or software
- Advanced motion functions
- Absolute data
- Separate power source system: control + main power
- Up to 4 optional boards for increased functionality
- Integrated vision system and conveyor tracking function (optional)



| YRC – ROBOT CONTROLLER                                                              |                                  |                                                        |                                                                                                                                                                                             |                                                                       |
|-------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| Motion                                                                              | Drive method                     |                                                        | PTP (point-to-point) motion, arch motion, linear interpolation, circular interpolation                                                                                                      |                                                                       |
|                                                                                     | Coordinates                      |                                                        | Cartesian coordinates, Joint coordinates, User coordinates, Tool coordinates                                                                                                                |                                                                       |
|                                                                                     | Position indication units        |                                                        | Pulses, mm (millimetres), deg (degrees)                                                                                                                                                     |                                                                       |
|                                                                                     | Acceleration setting             |                                                        | Automatic acceleration setting based on robot model type and end mass parameter<br>Setting based on acceleration and deceleration parameter (Setting by 1% unit, changeable in the program) |                                                                       |
|                                                                                     |                                  |                                                        | Zone control (optimum speed suitable for the arm position of the SCARA robot)                                                                                                               |                                                                       |
| Programming                                                                         | Program language                 |                                                        | Pseudo-Basic (Conforming to JBS B8439 SLIM language)                                                                                                                                        |                                                                       |
|                                                                                     | Multitasks                       |                                                        | 8 tasks                                                                                                                                                                                     | Sequence program                      1 program                       |
|                                                                                     | Memory size                      |                                                        | 364 KB: Total of program and point data, 84KB: Size for program when maximum numbers of points is used                                                                                      |                                                                       |
|                                                                                     | Programs                         |                                                        | 100 programs; maximum 9.999 lines per program; 98 kB maximum capacity per program                                                                                                           |                                                                       |
|                                                                                     | Points                           |                                                        | 10,000 points: maximum numbers of points                                                                                                                                                    |                                                                       |
| I/O                                                                                 | Point-data input method          |                                                        | Manual data input (coordinate data input). Direct teaching. Communications.<br>Teaching playback, off-line teaching (data input from outside)                                               |                                                                       |
|                                                                                     | Memory backup                    |                                                        | Lithium battery (service life 4 years at 0°C to 40°C)                                                                                                                                       |                                                                       |
|                                                                                     | STD. DIO                         | I/O Input                                              | General input: 16 points, dedicated input 9 points (NPN/PNP specifications selectable)                                                                                                      |                                                                       |
|                                                                                     |                                  | I/O output                                             | General output: 8 points, dedicated output 11 points                                                                                                                                        |                                                                       |
|                                                                                     | SAFETY                           | Emergency stop input                                   | Relay contact                                                                                                                                                                               |                                                                       |
|                                                                                     |                                  | Service mode input                                     | 1 point (NPN/PNP specifications is set according to STD. DIO setting)                                                                                                                       |                                                                       |
|                                                                                     | Brake output                     |                                                        | Relay contact                                                                                                                                                                               |                                                                       |
| External communications                                                             |                                  | RS232C: 1CH (D-SUB9 (female)) RS422: 1CH (for PB only) |                                                                                                                                                                                             |                                                                       |
| Basic specifications                                                                | Maximum power consumption        |                                                        | 2500VA                                                                                                                                                                                      | Capacity of the connected motor                      1600W            |
|                                                                                     | Dimensions/Weight                |                                                        | W180 x H250 x D235 mm (main unit only) / 6,5 kg (main unit only)                                                                                                                            |                                                                       |
|                                                                                     | Power supply voltage             |                                                        | Single phase AC200 to 230V, +/- 10% maximum (50/60 Hz)                                                                                                                                      |                                                                       |
|                                                                                     | Operating temperature            |                                                        | 0°C to 40°C                                                                                                                                                                                 | Storage temperature                      -10°C to 65°C                |
|                                                                                     | Operating humidity               |                                                        | 35% to 85% RH (non-condensing)                                                                                                                                                              | Noise resistance capacity                      IEC61000-4-4 Level 3   |
|                                                                                     | Battery for absolute data backup |                                                        | Lithium battery, data retention time of 1 year                                                                                                                                              |                                                                       |
|                                                                                     |                                  |                                                        |                                                                                                                                                                                             |                                                                       |
| Options                                                                             | Parallel DIO board               |                                                        | General purpose input 24 points/board<br>General purpose output 16 points/board (4 boards maximum, compatible with NPN/PNP specifications)                                                  |                                                                       |
|                                                                                     | DeviceNet, PROFIBUS              |                                                        | Dedicated input 11 points, dedicated output 11 points                      General input 96 points, general output 96 points                                                                |                                                                       |
|                                                                                     | Ethernet                         |                                                        | Conforming to IEEE802.3, 10 Mbps (10BASE-T)                                                                                                                                                 |                                                                       |
|                                                                                     | Vision board                     |                                                        | Camera input (2ch), camera trigger input, PC connection input                                                                                                                               |                                                                       |
|                                                                                     | Tracking board                   |                                                        | AB phase input, lighting trigger input, PC connection input                                                                                                                                 |                                                                       |
|                                                                                     | Lighting control board           |                                                        | Lighting trigger input, lighting power input/output                                                                                                                                         |                                                                       |
|                                                                                     | Teaching pendant                 |                                                        | PB                                                                                                                                                                                          | Software for PC                      Scara Studio                     |
| PROGRAMMING TOOLS:                                                                  |                                  |                                                        |                                                                                                                                                                                             |                                                                       |
| TEACHING PENDANT                                                                    |                                  |                                                        |                                                                                                                                                                                             |                                                                       |
|  | Display                          |                                                        | 40 characters 15 lines                                                                                                                                                                      | Enabling switch                      Optional                         |
|                                                                                     | Emergency stop switch            |                                                        | Normally closed contact point (with lock function)                                                                                                                                          |                                                                       |
|                                                                                     | Serial interface                 |                                                        | RS-422: 1CH (dedicated to communication with controllers)                                                                                                                                   |                                                                       |
|                                                                                     | Operating temperature            |                                                        | 0 to 40°C                                                                                                                                                                                   | Operating humidity                      35 to 80% RH (non-condensing) |
|                                                                                     | Weight                           |                                                        | 600g                                                                                                                                                                                        | Cable length                      5m, 12m (option)                    |
|                                                                                     | Dimensions                       |                                                        | W 180 x H 250 x D 50 mm (Note: projection of emergency stop button is not included.)                                                                                                        |                                                                       |
| SOFTWARE                                                                            |                                  |                                                        |                                                                                                                                                                                             |                                                                       |
|  | Scara Studio                     |                                                        | Programming, setup and backup function.                                                                                                                                                     |                                                                       |

**OMRON EUROPE B.V.** Wegalaan 67-69, NL-2132 JD, Hoofddorp, The Netherlands. Tel: +31 (0) 23 568 13 00 Fax: +31 (0) 23 568 13 88 [www.industrial.omron.eu](http://www.industrial.omron.eu)

**Austria**

Tel: +43 (0) 2236 377 800  
[www.industrial.omron.at](http://www.industrial.omron.at)

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