NOTE: The information contained in this brochure is intended for reference purposes only and is subject to change without prior notice. Please contact us for additional information.

European Headquarters:
DENSO Robotics Europe (DENSO EUROPE B.V.)
Waldeckerstr. 9
65466 Moerfelden-Walldorf
Germany

Telephone: +49 (0) 6105 27 35 150
Telefax: +49 (0) 6105 27 35 180

Commercial information email: info@densorobotics-europe.com
Technical support email: support@densorobotics-europe.com

Watch our latest videos

DENSO - Inventor of the QR Code

DENSO_Robotics_EU_2018_V1_EN

NOTE: The information contained in this brochure is intended for reference purposes only and is subject to change without prior notice. Please contact us for additional information.
INNOVATION IS IN OUR DNA

Our story began in 1949 when Nippondenso Co. Ltd. (today DENSO), a separate entity from Toyota Motor Co. Ltd., was established.

OUR BUSINESS FIELDS

Automotive

Consumer Products

Micro Grid, Electric Power Assist, Security, Healthcare, Biotechnology, Agriculture Support, Cold Chain, Community Network Solution Business

Industrial Products

New Business Fields

DENSO CORPORATION AT A GLANCE*

$40.4b
in annual revenue (USD)

154,000
employees in 200 group companies

9%
of revenue re-invested in R&D

QR Code
invented in 1994

Data as of March 31, 2017.

/ROBOTICS PIONEER/

50 years
Over 50 Years Developing Industrial Robots
Since 1967 we are developing robots for our automotive industry.

100,000 robots
Worldwide Market Leader
With over 100,000 DENSO robots we are the market leaders in small industrial robots.

OEM supplier
Trusted OEM Robot Supplier
Companies around the world trust in the quality of our products.

20,000 own use
One of the World’s Largest Robot Users
Over 20,000 DENSO robots work in our own manufacturing facilities.
Our highest priority at DENSO is offering you the best quality and cost-effective products, which allows you to maximise your production while delivering maximum ROI.

Over 10 Years Working Life and Reliability
DENSO robots are well-known for operating over a decade delivering the same precision and performance as from their first day.

Ease of Integration
Solutions to program DENSO robots and factory automation devices such as external axis, feed systems and sensors using only one interface.

Ease of Programming
Templates and wizards to program pick & place and palletising
Program DENSO robots with LabVIEW™, Matlab, C++, C#, Java and Visual Basic or via PLC.

Low Maintenance
DENSO robot gears are lubricated with lifetime grease. This results in a low cost of ownership.

Standard 24-Months Guarantee
DENSO offers a 24 months guarantee to all of our customers

Unique Technologies
Optional Ethernet and electrical internal wiring up to the robot’s flange to protect cables.

Compact Design
Small and slim robot arm
Smallest robot controller

Wide Variety of Options
Extensive array of robot arms and optional features, e.g. from standard to water protected and clean room.
DENSO robots are an excellent choice for numerous applications, from pick & place to highly complex tasks.

**OUR INDUSTRIES**

- Automotive
- Aerospace Industry
- Appliances
- Consumer Products
- Electronics
- Film Industry
- Food and Gastronomy
- General Manufacturing
- Greenhouses
- Machine Tools
- Measuring Technology
- Plastics
- Pharma and Medical
- And many more...

**WHAT OUR CUSTOMERS SAY**

"DENSO offers the largest range of models, as well as the same programming and controller for its 4 and 6-axis robots."

Sven Arne Dynnweber, Project Manager,
Danfoss, Denmark

"The robots can be calibrated precisely and are easy to programme. We were also convinced by the long life-cycle and technical reliability of DENSO robots."

Peter Klement, Managing Director
Klement Engineering, Germany

"DENSO robots were easy to integrate in our existing software environment."

Eva-Maria Mendez Montilla, Aerodynamics Testing,
Airbus Operations GmbH, Germany

"Thanks to the 6-axis VS-087 robots, even difficult-to-access areas are now within reach during the assembly process. This makes the quality inspection highly flexible."

Matthias Scheel, Managing Director
Handke Industrial Solutions GmbH, Germany
## OUR FULL RANGE OF SMALL INDUSTRIAL ROBOTS

### VP SERIES
- VP-5243G
- VP-6242G

### VS SERIES
- VS-060
- VS-068
- VS-087
- VS-050
- VS-6556G
- VS-6577G
- VS-068
- VS-087

### NEW VS SERIES
- VM-6083G
- VM-6081G

### VM SERIES

<table>
<thead>
<tr>
<th>6-AXIS</th>
<th>6-AXIS</th>
<th>6-AXIS</th>
<th>6-AXIS</th>
<th>6-AXIS</th>
<th>6-AXIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max arm reach</td>
<td>Max arm reach</td>
<td>Max arm reach</td>
<td>Max arm reach</td>
<td>Max arm reach</td>
<td>Max arm reach</td>
</tr>
<tr>
<td>430 mm</td>
<td>432 mm</td>
<td>653 mm</td>
<td>854 mm</td>
<td>505 mm</td>
<td>605 mm</td>
</tr>
<tr>
<td>Max payload</td>
<td>Max payload</td>
<td>Max payload</td>
<td>Max payload</td>
<td>Max payload</td>
<td>Max payload</td>
</tr>
<tr>
<td>3 kg</td>
<td>2.5 kg</td>
<td>7 kg</td>
<td>8 kg</td>
<td>4 kg</td>
<td>4 kg</td>
</tr>
<tr>
<td>Repeatability</td>
<td>Repeatability</td>
<td>Repeatability</td>
<td>Repeatability</td>
<td>Repeatability</td>
<td>Repeatability</td>
</tr>
<tr>
<td>+ 0.02 mm</td>
<td>+ 0.02 mm</td>
<td>+ 0.03 mm</td>
<td>+ 0.02 mm</td>
<td>+ 0.02 mm</td>
<td>+ 0.03 mm</td>
</tr>
<tr>
<td>Cycle time</td>
<td>Cycle time</td>
<td>Cycle time</td>
<td>Cycle time</td>
<td>Cycle time</td>
<td>Cycle time</td>
</tr>
<tr>
<td>0.59 sec</td>
<td>0.49 sec</td>
<td>0.59 sec</td>
<td>0.35 sec</td>
<td>0.31 sec</td>
<td>0.34 sec</td>
</tr>
<tr>
<td>Options</td>
<td>Options</td>
<td>Options</td>
<td>Options</td>
<td>Options</td>
<td>Options</td>
</tr>
</tbody>
</table>

### VS SERIES
- VP-5243G
- VP-6242G
- VS-060
- VS-068
- VS-087

### VM SERIES
- VM-6083G
- VM-6081G

### THE NEW RC8A CONTROLLER

### HS-A1 SERIES
- HS-035A1
- HS-045A1
- HS-055A1

### HSR SERIES
- HSR-048
- HSR-055
- HSR-065

### HM SERIES
- HM-4060*G
- HM-4070*G
- HM-4085*G
- HM-40A0*G

### Max arm reach
- 350 mm
- 450 mm
- 550 mm
- 480 mm
- 550 mm
- 650 mm
- 600 mm
- 700 mm
- 850 mm
- 1,000 mm

### Vertical Stroke
- 100, 150, 200 and 320 mm
- 100, 200 and 320 mm (with bellows 170 and 290 mm)
- 200, 300 and 400 mm
- 10 / 20 kg

### Max payload
- 5 kg
- 8 kg
- 10 kg / 20 kg

### Repeatability
- + 0.015 mm
- + 0.02 mm
- + 0.02 mm
- + 0.01 mm
- + 0.02 mm
- + 0.02 mm

### Cycle time
- 0.29 sec
- 0.28 sec
- 0.31 sec
- 0.29 sec
- 0.31 sec

### Options
- Standard type [IP40]
- Dust & splash-proof [IP65]
- Cleanroom [ISO 5 & 3]
- UL specifications

### Ceiling-mounted
- Only HM-4060*G
- Only HM-4070*G
- Only HM-4085*G
- Only HM-40A0*G

---

1. With 3 kg payload
2. With 5 kg payload
3. With 2 kg payload
4. Cleanroom type is only suitable for floor mounting (HS-A1 Series)
5. UL specifications are only for floor mounting (HS-A1 Series)
6. UL specifications are for floor and ceiling mounting (HM Series)

---

DENSO Robotics
/SPECIAL ROBOT TYPES/

**XR SERIES**

Payload: 5 kg.  
Motion range: up to 1660 mm.  
R-axis stroke: 1660 mm.  
Application examples: palletising, assembly, pick & place, feeding & carrier, etc.

**Longer motion range**  
Compared to 4 and 6-axis robots thanks to X-R structure.

**Compact**  
Ideal for shortened production lines with restricted spaces and low-height areas.

**VS-050-S2**

FOR PHARMACEUTICAL AND MEDICAL INDUSTRIES

Payload: 4 kg.  
Arm reach: 520 mm.  
Application examples: cell culture handling, probes pick & place, medicine packaging, etc.

**Communication Interface (optional)**

Connect servo grippers to the robot’s flange.

**Resistant**  
E.g. UV light, H₂O₂ (35% concentration) and other chemicals.

**Hygienic design according to GMP**  
Spot and clean dirt easily (cleanroom class ISO 5).

**Underside connector**  
Protect cables, save space and keep bacteria out.

**Round edges & no external screws**  
Avoid bacteria accumulation.

**UL certified (optional)**  
For the USA and Canada.

/OPTIONAL FEATURES/

**COMMUNICATION INTERFACE – PATENTED TECHNOLOGY**

• Connect servo grippers and GigE devices easily to the robot’s flange.  
• Avoid long cables and their entanglement with surrounding equipment.  
• Available for new VS and VS-050-S2.

**BOTTOM CONNECTOR**

• Protect cables and connectors.  
• Save installation space.

**EXTERNAL BATTERY UNIT**

• Replace motor encoder batteries easily.
DENSO robots are delivered with a compact, yet powerful controller, which allows the connection to a wide range of factory automation devices, providing flexibility to your projects.

**Control Expansion Boards**
- Parallel I/O
- DeviceNet Slave
- DeviceNet Master
- PROFIBUS Slave
- PROFIBUS Device
- CC-Link RD
- EtherCat/IP

**Operating Devices**
- Teach Pendant
- Mini Pendant
- Emergency Stop Box

**Additional Axis**
- Eyefeeder with Camera

**Safety Devices**
- Safety Laser Scanner
- Safety Light Curtain
- Safety Mat

**Safety PLC**

**Software**
- WINCAPS III
- EMU
- Robot Tools
- VRC
- ORIN 2 SDK
- RC Vision

**Mobile Tools**

**Industrial Cameras**

**Peripheral Devices**

**Robot**

Controller model shown: RC8A Safety Motion. W 411 × D 320 × H 94 mm

EN ISO 13849-1 (safety function). Certified by TÜV Rheinland.

DENSO Robotics

ANSI, CE, UL, CSA
## BENEFITS

**One controller type** for all robot models  
**Programming Flexibility** (Java, C++, C#, VB, LabVIEW etc. or PLC)  
**One interface** for programming robots and factory automation devices  
**Support** of common industrial interfaces  
**Performance data for analysis** in the cloud can be collected  
**Up to 8-axis robot** control (e.g. 6-axis robot + 2 additional axis)  
**Space saving** (volume 10.6l). All connectors are in front  
**Certifications** TÜV Rheinland, ANSI, CE, UL and CSA

### TECHNICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Description</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply capacity</td>
<td>3.0 kVA</td>
</tr>
</tbody>
</table>
| Power supply | 3-phase AC 200V -15% ~ AC 240V +10%  
Single phase AC 230V -10% ~ AC 240V +10% |
| Input voltage range | 50/60 Hz |
| Power supply frequency | 5 m |
| Power supply cable length | 8 |
| Number of controlled axis | PTP, CP3-dimensional direct line, 3-dimensional arc  
(PTP control only for the additional axis) |
| Method of control | All axes digital AC servo |
| Drive type | DENSO robot language (PacScript) |
| Language used | User area, variable area: 1.75 MB (32,768 point equivalent),  
file area: 400 MB (5000 steps x 256 files) |
| Memory capacity | 1.75 MB (32,768 point equivalent),  
file area: 400 MB (5000 steps x 256 files) |
| Teaching system | 1) Remote teaching, 2) Numerical Input (MDI), 3) Direct teaching |
| Mini I/O | Input: 8 points available for the user + 14 points fixed for the system  
Output: 8 points available for the user + 17 points fixed for the system |
| Hand I/O | Input: 8 points available for the user  
Output: 8 points available for the user |
| Safety Motion I/O (option) | Input: 30 points for safety circuit signals  
Output: 14 points for safety circuit signals |
| Parallel I/O Expansion Board (option) | Expansion slot: PCI. Input: 40 points / Output: 48 points |
| CC-Link Remote Device Board (option) | Expansion slot: PCI Express. Input: 8192 points / Output: 8192 points  
Remote register: 2048 words / Output: 2048 words |
| DeviceNet Slave Board (option) | Expansion slot: PCI Express. Input: 256 points / Output: 256 points |
| DeviceNet Master Board (option) | Expansion slot: PCI Express. Input: 256 points / Output: 256 points |
| EtherNet/IP Adaptor Board (option) | Expansion slot: PCI Express. Input: 256 points / Output: 256 points |
| PROFIBUS Slave Board (option) | Expansion slot: PCI Express. Input: 256 points / Output: 256 points |
| PROFINET I/O Device Board (option) | Expansion slot: PCI Express. Input: 256 points / Output: 256 points |
| EtherCAT Slave Board (option) | Expansion slot: PCI Express. Input: 256 points / Output: 256 points |
| Expansion slot | PCI: 1 slot. PCI Express: 1 slot |
| Self-diagnosis function | Overrun, servo abnormality, memory abnormality, input error, short circuit  
detection (user wiring), etc. |
| Environmental conditions (when moving) | Temperature: 0-40°C. Humidity: 90% RH (with no condensation) |
| Safety category | Standard controller (Safety I/O): Category 4 PL-e  
(Safety Motion I/O): Category 3 PL-d |
| Environmental resistance | IP20 |
| Weight | Standard controller: approx. 10 kg  
Safety Motion controller: approx. 11 kg |
| Size | Standard controller: W 357 x D 320 x H 94 mm  
Safety Motion controller: W 411 x D 320 x H 94 mm |

1. The weight of the accessory cable is not included.

---

**Compact Controller**  
RC8A Standard (mm): W 357 x D 320 x H 94  
RC8A Safety Motion (mm): W 411 x D 320 x H 94
Programming DENSO robots is simple and user-friendly. We offer intuitive and flexible tools which allow you to create programs in a matter of minutes.

Program Templates (available in WINCAPS III and in robot controller)
Save time and effort with default program templates for applications such as pick and place, palletising and conveyor tracking.

Program Wizards
Set up programs in few steps fast and comfortably with the support of easy-to-use wizards.

Example: Pick & Place

Example: Palletising

Additional Programming Options
LabVIEW™, RPS (ArtiMinds) and drag&bot (Fraunhofer).
The RC8A Safety Motion controller enables safe human-robot collaborations. It complies with:

- EN ISO 13849-1 (safety function). Certified by TÜV Rheinland.
- Performance level PL = d/SIL2 (standard controller; PL = e/SIL3).

**SAFETY MOTION UNIT**

**BENEFITS**

**Space Reduction**

Thanks to Safety Motion robot operation area can be restricted to smaller spaces and thus, build more compact work cells.

- Save valuable space.
- More flexibility in production layout.
- Avoid installation of safety fences.
- Monitor motion space, speed and stop position.
- Deploy projects in the USA and Canada (optional UL controller).
- Use safety devices such as light curtains, laser scanners, safety mats and door switches.

**FENCELESS OPERATION**

**OUR INTEGRATED TOOL TO CALCULATE AND DEFINE SAFETY AREAS**

Fenceless Work Areas

Constant monitoring of motion space, speed and stop position allows the setup of fenceless work areas.

Safety areas can be easily calculated and defined in our software WINCAPS III.

![Diagram of fenceless operation and safety motion unit]
Because our controllers utilise ORIN, DENSO robots can be connected to data clouds where performance information is saved and analysed. This allows you to access this information from anywhere.

**BENEFITS**

- Monitor robot condition for preventive maintenance purposes.
- Program and control DENSO robots remotely.
- Supervise robot’s cycle time to measure productivity.
No matter where you need us, our team of highly qualified specialists are ready to help you; fast and personal contact, no hotlines. We offer a vast range of services such as:

**Training (standard and customised, on and off-site)**
- Programming
- Operator
- Maintenance
- Repair
- And more

**Technical support**
- Simulations
- Tests
- Troubleshooting
- Programming
- And more

**Repair centre located in Germany**
- Quick and professional repair (on and off-site)
- Robot overhaul

**Local spare parts centres that provide fast delivery**