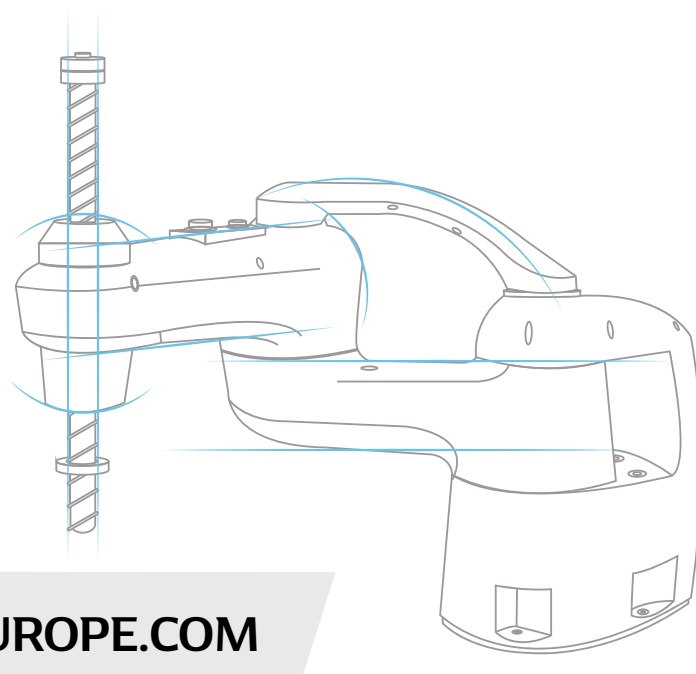


**DENSO**  
Crafting the Core

**DENSO**  
Crafting the Core



**/50 YEARS/**  
OF INNOVATION

**DENSOROBOTICS-EUROPE.COM**



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Your Area Dealer

Watch our latest videos



DENSO - Inventor of the QR Code

 **DENSORoboticsEurope**

 **DENSORoboticsEurope**

 **DENSORoboticsEU**

 **denso-robotics-europe**



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.

**/ DENSO Robotics /**

# /INNOVATION IS IN OUR DNA/

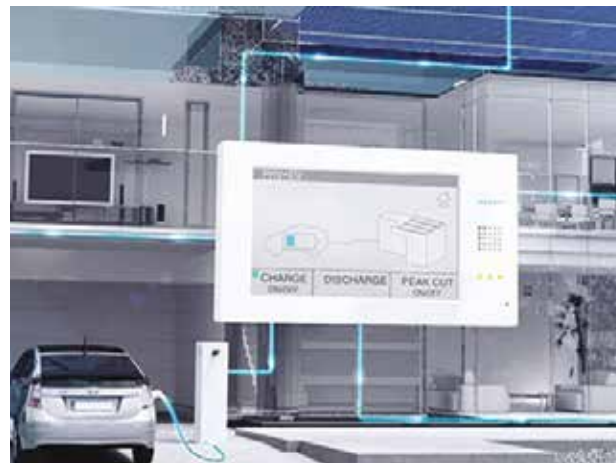
Our story began in **1949** when Nippondenso Co. Ltd. (today DENSO), a separate entity from **Toyota Motor Co. Ltd.**, was established.

## OUR BUSINESS FIELDS



One of TOP 3 auto parts suppliers worldwide

**Automotive**



**Consumer Products**



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

**New Business Fields**



**Industrial Products**

## 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<sup>st</sup>, 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.

# /THE DENSO DIFFERENCE/

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 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.



# /OUR INDUSTRIES/

DENSO robots are an excellent choice for numerous applications, from pick & place to highly complex tasks.



Parts feeding application with Eyefeeder at Danfoss

Application Video



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."

Svend 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



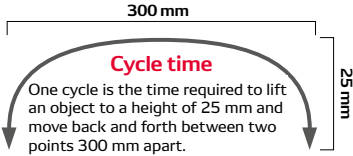
"Thanks to the 6-axis VS-087 robots, even difficult-to-access areas are now within reach during the assembly process. This makes the quality inspection highly flexible."

Matthias Scheel, Managing Director  
**Handke Industrial Solutions GmbH**, Germany

/ OUR FULL RANGE OF SMALL INDUSTRIAL ROBOTS /

6-AXIS	VP SERIES		VS SERIES		NEW VS SERIES				VM SERIES			
	VP-5243G	VP-6242G	VS-6556G	VS-6577G	VS-050	VS-060	VS-068	VS-087	VM-6083G	VM-60B1G		
												
	Max arm reach	430 mm	432 mm	653 mm	854 mm	505 mm	605 mm	710 mm	905 mm	1,021 mm	1,298 mm	
	Max payload	3kg	2.5 kg	7 kg		4 kg		7 kg		13 kg		
	Repeatability	± 0.02 mm		± 0.02 mm	± 0.03 mm	± 0.02 mm		± 0.02 mm	± 0.03 mm	± 0.05 mm,	± 0.07 mm	
Cycle time	0.99 sec <sup>1</sup>		0.49 sec <sup>1</sup>	0.59 sec <sup>1</sup>	0.35 sec <sup>1</sup>		0.31 sec <sup>1</sup>	0.34 sec <sup>1</sup>	0.89 sec <sup>2</sup>	0.95 sec <sup>2</sup>		
Options	Standard (IP30)		<ul style="list-style-type: none"><li>• Standard (IP40)</li><li>• Dust &amp; splash-proof (IP65/54)</li><li>• Cleanroom (ISO 5 &amp; 3)</li><li>• UL specifications</li></ul>		<ul style="list-style-type: none"><li>• Standard (IP40)</li><li>• Dust &amp; splash-proof (IP65/54)</li><li>• Protected (IP67)</li></ul>				<ul style="list-style-type: none"><li>• Cleanroom (ISO 5 &amp; 3)</li><li>• UL specifications</li></ul>		<ul style="list-style-type: none"><li>• Standard (IP40)</li><li>• Dust &amp; splash-proof (IP65/54)</li><li>• Cleanroom (ISO 5)</li></ul>	

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



THE NEW RC8A CONTROLLER



4-AXIS	HS-A1 SERIES			HSR SERIES			HM SERIES				
	HS-035A1	HS-045A1	HS-055A1	HSR-048	HSR-055	HSR-065	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			
	Max payload	5 kg			8 kg			10 / 20 kg			
Repeatability	+/- 0.015 mm	+/- 0.02 mm	+/- 0.02 mm	+/- 0.01 mm	+/- 0.012 mm	+/- 0.012 mm	+/- 0.02 mm			+/- 0.025 mm	
Cycle time	0.29 sec <sup>3</sup>			0.28 sec <sup>3</sup>			0.31 sec <sup>3</sup>		0.29 sec <sup>3</sup>		0.31 sec <sup>3</sup>
Options	<ul style="list-style-type: none"><li>• Standard type (IP40)</li><li>• Bellows on 3rd axis</li><li>• Dust &amp; splash-proof (IP65)</li><li>• Cleanroom (ISO 3)<sup>4</sup></li><li>• UL specifications<sup>5</sup></li></ul>		<p>Ceiling-mounted (Only HS-045A1 &amp; HS-055A1)</p> 	<ul style="list-style-type: none"><li>• Standard type (IP40)</li><li>• Dust &amp; splash-proof (IP65)</li><li>• Cleanroom (ISO 5 &amp; 3)</li></ul>		<p>Ceiling-mounted (All models)</p> 	<ul style="list-style-type: none"><li>• Standard type (IP40)</li><li>• Bellows on 3rd axis</li><li>• Dust &amp; splash-proof (IP65)</li><li>• UL specifications<sup>6</sup></li></ul>			<p>Ceiling-mounted (Only HM-4070*G &amp; HM-4085*G 10 kg and 20 kg models)</p> 	

# /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, H<sub>2</sub>O<sub>2</sub> (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)

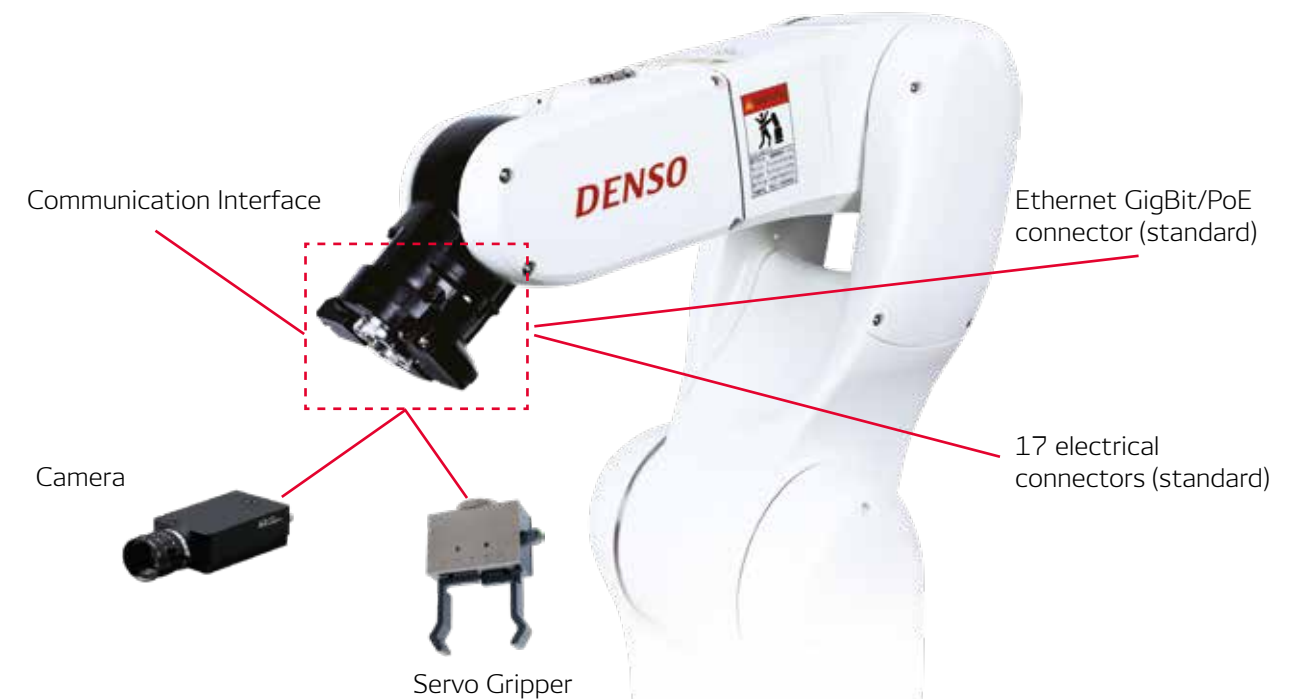
For the USA and Canada.



# /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.





# ROBOT CONTROLLER - THE NEW RC8A /CONNECTIVITY/

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.

## COMPACT, YET POWERFUL

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

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



### Control Expansion Boards

- Parallel I/O
- DeviceNet Slave
- DeviceNet Master
- PROFIBUS Slave
- PROFINET I/O Device
- CC-Link RD
- EtherNet/IP
- EtherCAT Slave
- CONTEC Serial Comm.
- CONTEC Analog I/O
- CONTEC Digital I/O
- External Axis



### Operating Devices

#### Teach Pendant



#### Mini Pendant



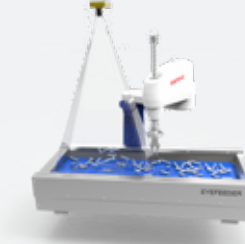
#### Emergency Stop Box



### Additional Axis



### Eyefeeder with Camera



### Safety Devices

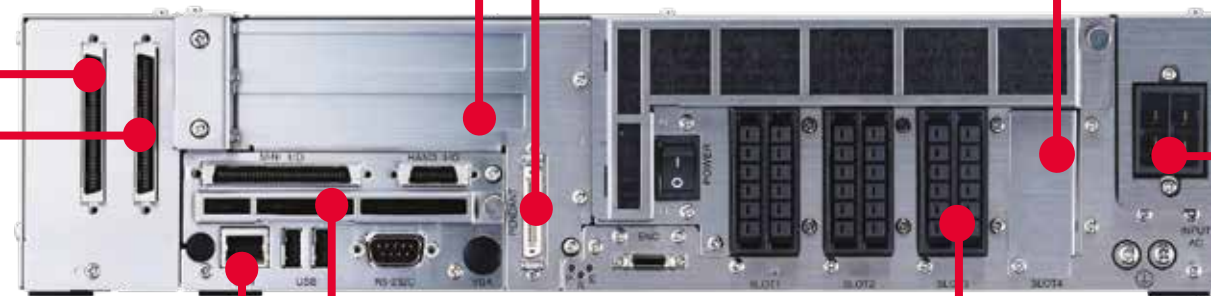
Safety Laser Scanner  
Safety Light Curtain,  
Safety Mat

### Safety PLC



Safety Motion Input Cable (8m, 15m)

Safety Motion Output Cable (8m, 15m)



Power-Supply Cable

Mini II O Cable (8 m, 15 m)

Robot Connector Cable (2, 4, 6, 12, 15m)



Robot



WINCAPS III



EMU



Robot Tools



VRC



ORIN 2 SDK



RC Vision

### Software



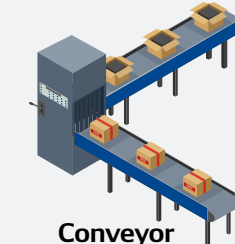
Mobile Tools



Industrial  
Cameras



PLC



Conveyor

### Peripheral Devices

# / ROBOT CONTROLLER - RC8A /

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

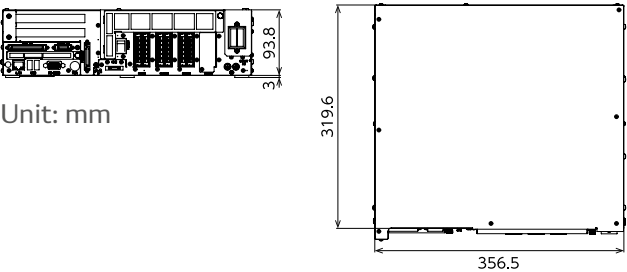


RC8A Standard  
Controller

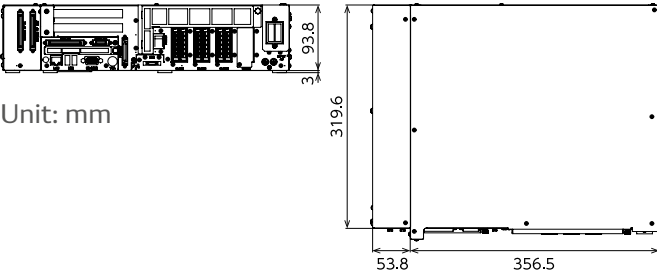
## BENEFITS

- 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

### Standard Controller



### Safety Motion Controller



## TECHNICAL SPECIFICATIONS

Description		Specifications
Power supply	Power supply capacity	3.0 kVA
	Input voltage range	3-phase AC 200V -15% ~ AC 240V +10% Single phase AC 230V -10% ~ AC 240V +10%
	Power supply frequency	50/60 Hz
Power supply cable length		5 m
Number of controlled axis		8
Method of control		PTP, CP3-dimensional direct line, 3-dimensional arc (PTP control only for the additional axis)
Drive type		All axes digital AC servo
Language used		DENSO robot language (PacScript)
Memory capacity		User area, variable area: 1.75 MB (32,766 point equivalent), file area: 400 MB (5000 steps x 256 files)
Teaching system		1) Remote teaching, 2) Numerical Input (MDI), 3) Direct teaching
External signals (I/O, etc.)	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: input: 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: 1024 points / Output 1024 points
	EtherNet/IP Adaptor Board (option)	Expansion slot: PCI Express. Input: 4032 points / Output: 4032 points
	PROFIBUS Slave Board (option)	Expansion slot: PCI Express. Input: 256 points / Output: 256 points
External communication	PROFINET I/O Device Board (option)	Expansion slot: PCI Express. Input: 8192 points / Output: 8192 points
	EtherCAT Slave Board (option)	Expansion slot: PCI Express. Input: 2048 points / Output: 2048 points
		RS-232C: 1 line, Ethernet: 1 line (GbE: Gigabit Ethernet), USB: 2 lines, VGA: 1 line (option)
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 <sup>1</sup>
Size	Standard controller	W 357 x D 320 x H 94 mm
	Safety Motion controller	W 411 x D 320 x H 94 mm

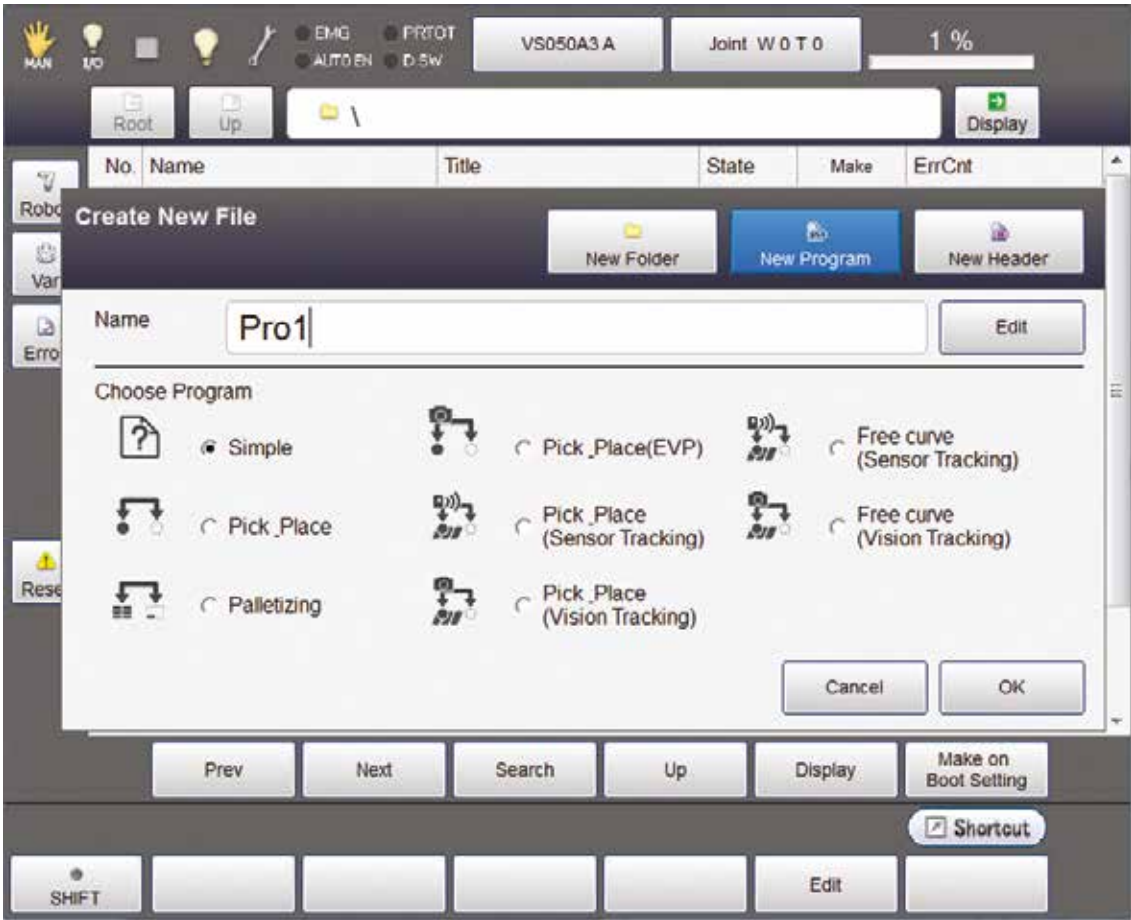
<sup>1</sup> The weight of the accessory cable is not included.



# /PROGRAMMING MADE EASY/

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.

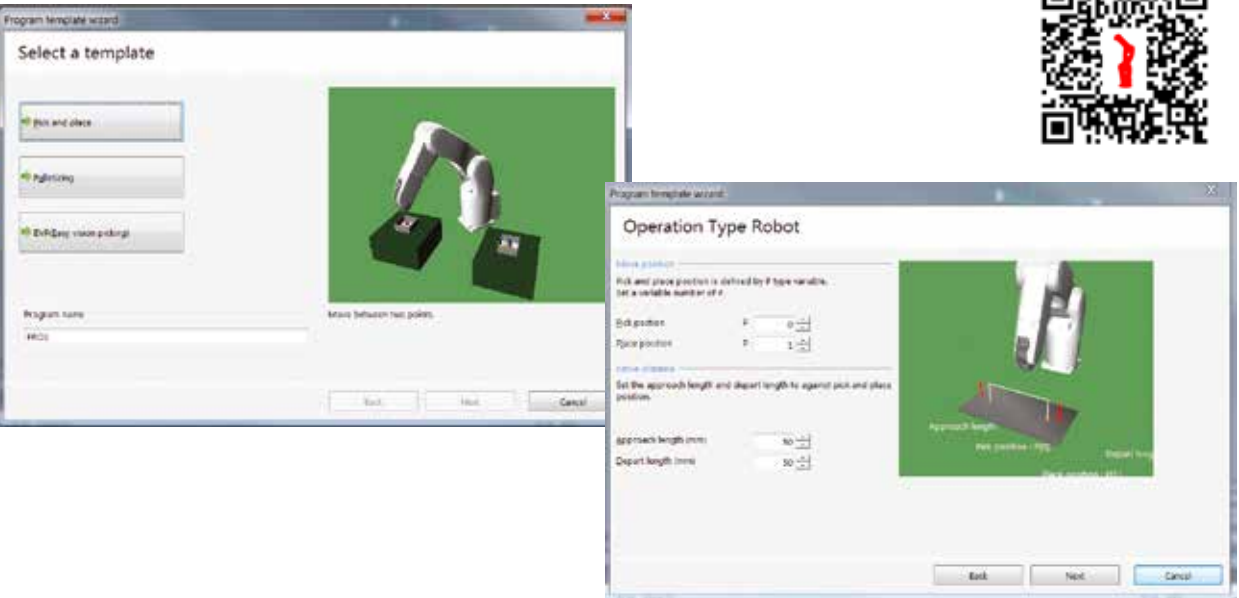


## Program Wizards

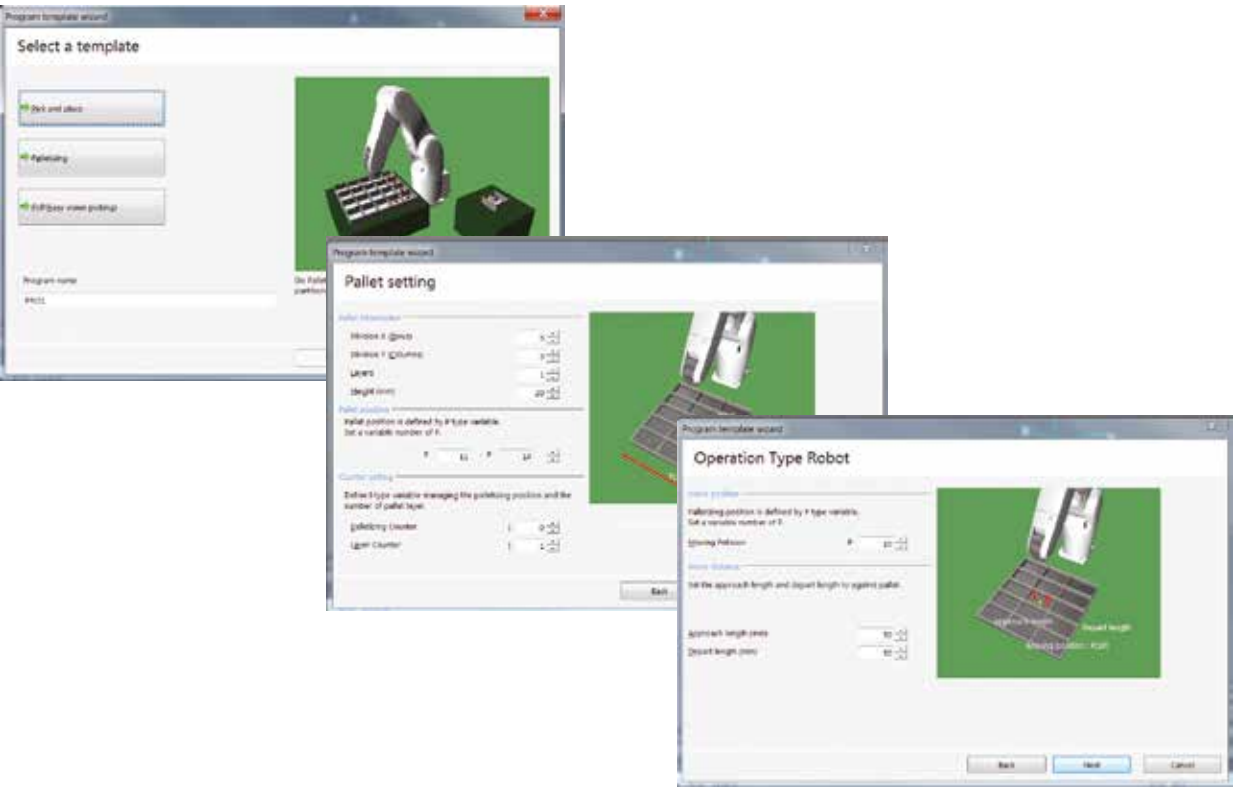
Set up programs in few steps fast and comfortably with the support of easy-to-use wizards.

### Example: Pick & Place

Video "Pick and Place with DENSO Easy Programming"



### Example: Palletising



## Additional Programming Options

LabVIEW™, RPS (ArtiMinds) and drag&bot (Fraunhofer).

# / HUMAN-ROBOT COLLABORATION /

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

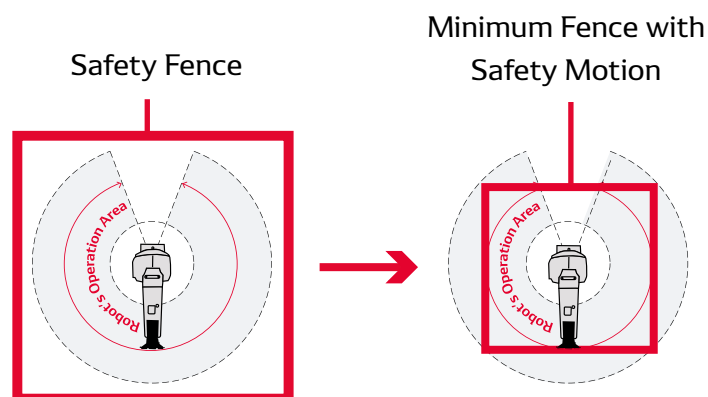


## BENEFITS

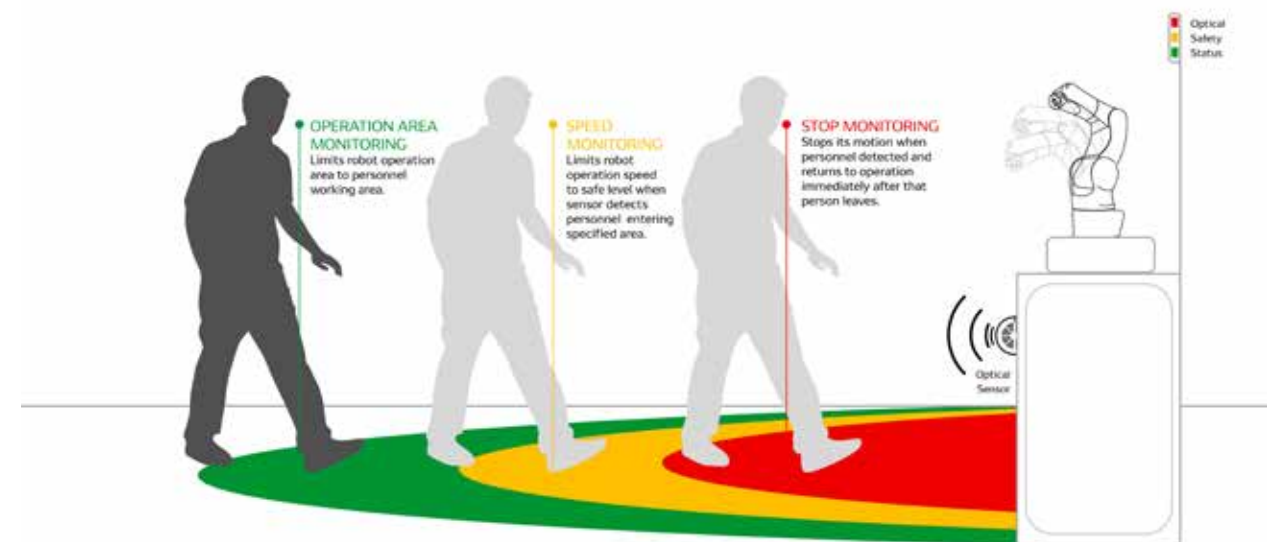
### Space Reduction

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

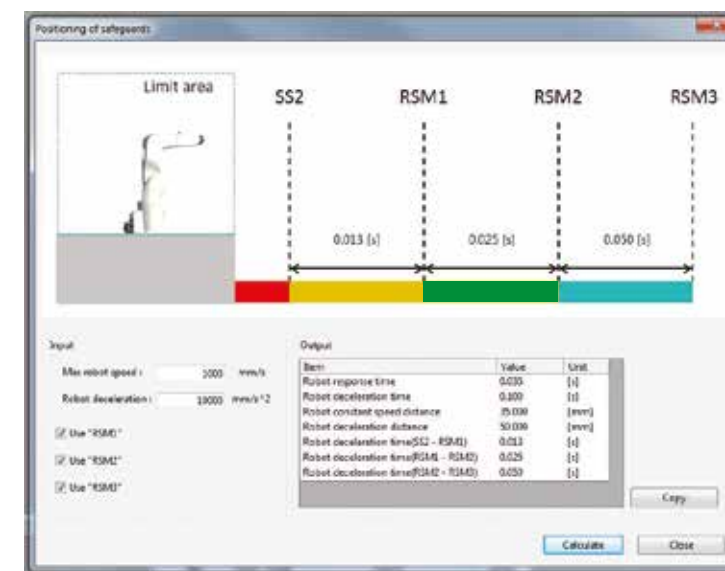
- Save valuable space.
- More flexibility in production layout.
- Avoid installation of safety fences.
- Monitor motion space, speed and stop position.
- Deploy projects in the USA and Canada (optional UL controller).
- Use safety devices such as light curtains, laser scanners, safety mats and door switches.



## 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.

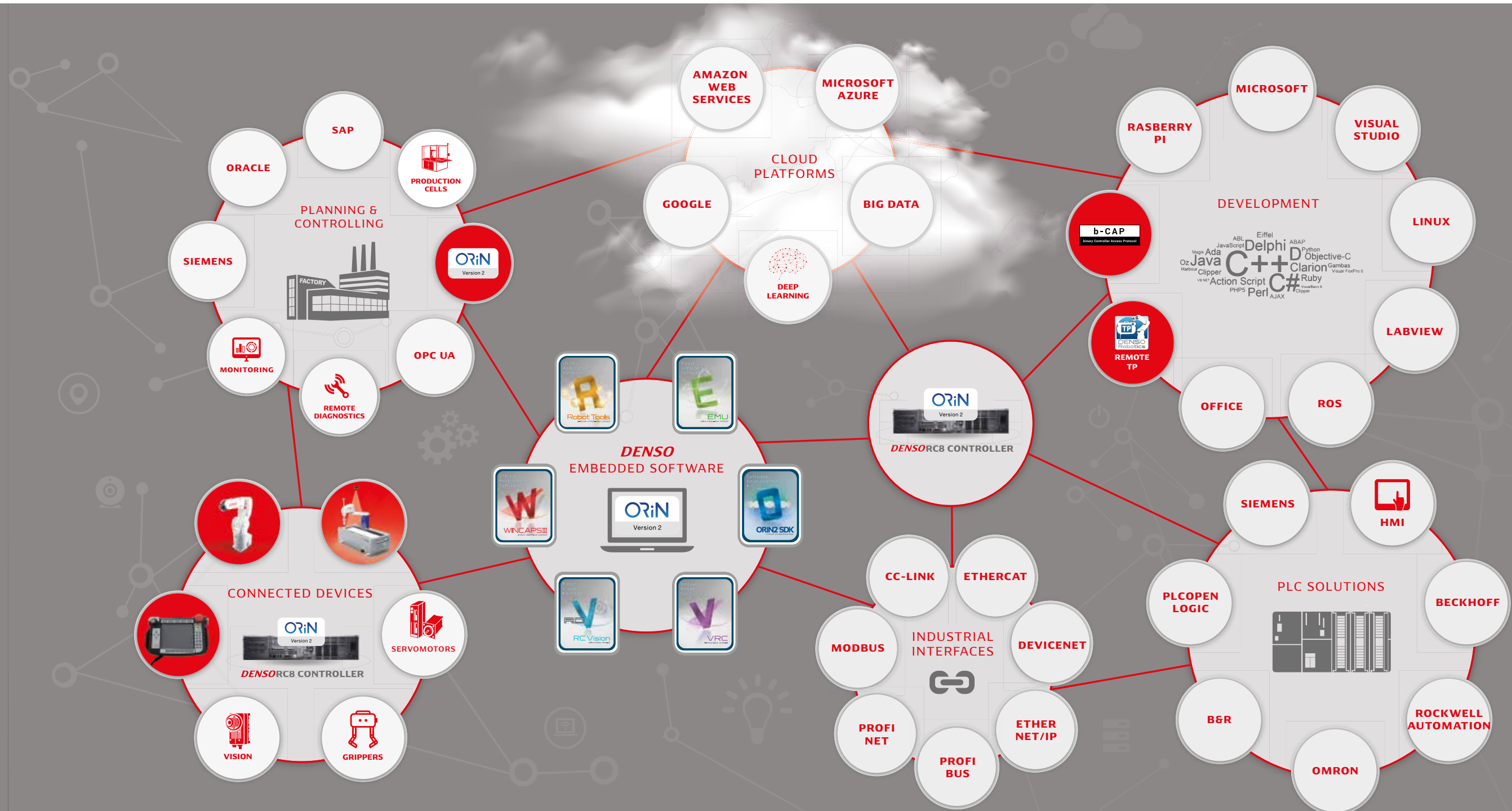


# ROBOT CONTROLLER - THE NEW RC8A / INDUSTRY 4.0 & IoT /

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.





# OUTSTANDING WORLDWIDE SERVICE & SUPPORT

support@densrobotics-europe.com  
Tel. +49 (0) 6105 2735 150

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

