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EPSON SPIDER RS3 AND RS4

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# OUR SPIDERS REACH EVERY CORNER



450° ENVELOPE AND SHORT CYCLE TIMES

**EPSON**<sup>®</sup>  
EXCEED YOUR VISION

# ABOUT EPSON

## SPIDER

About Epson	2
The Epson Spider	4
Comparison Epson Spider — SCARA robot	6
Production philosophy	7
Epson Spider RS3 and RS4	8
Technical data	10

Epson, a subsidiary of Seiko Corporation, launched the first robots in the 1980ies. Those were used for precise and fast assembly of Seiko watches. Soon Epson industrial robots and controllers started to conquer markets all over the world. Today, Epson Factory Automation is one of the leading companies producing high-quality robot systems with branches on all five continents.

- In-house Research and Development department for automation processes
- 1984 first freely available Epson SCARA robot in Japan
- One of the world's most comprehensive SCARA model ranges
- 1997 first PC-based controller
- Inventor of the SPIDER: a unique SCARA robot with 450° envelope



# EPSON ROBOT SYSTEMS — TO SPEED UP YOUR PRODUCTION RUN

Our robots palletise, saw, mill, drill, grind, mount, move and assemble. They work precisely and at breathtaking speed in these and many other applications — often up to 24 hours a day.

As one of the pioneers in robotics we know exactly what the main feature of the combination of kinematics and intelligent control must be apart from speed and precision: Reliability! That is because the standstill of an installation resulting in a loss of production is expensive, very expensive. Therefore to us, innovation means more than just up-to-date robot technology. Every day, our development engineers strive to make our robot systems even more economical, flexible and reliable — under all conditions.

### Integrated automation

We offer you a flexibly expandable range of products with different integrated components. Among these are a great number of SCARA robots and 6-axis robots for diverse applications as well as controllers and software. Everything engages perfectly and is easy to operate.

## SERVICE AND SUPPORT

Our service and support program helps you to tap the full potential of your Epson robot systems.

### Feasibility studies

Instead of theoretical simulations we offer cycle time tests with real robots. There are many ways in which you benefit from those studies. Prior to your investment you are provided with optimal robot configuration and installation site as well as precise cycle times. That is how you get maximum planning and project security.

### Pre-sales support

How can a robot system be efficiently integrated into an installation? How can cycle times be optimised? How can the robot program be integrated into external software? Our application engineers advise you during planning as well as during implementation.

### Training

Whether you need introductory seminars, or programming, maintenance or operator trainings — our experts share their knowledge with you and your employees.

### After-sales support

Hotline service, repair service on site, inspection and individual maintenance concepts as well as spare part packages tailored to your needs are only some examples of how we do everything to have your production running non-stop.

### Central spare part stocking

All spare parts are rapidly delivered from our central warehouse in Meerbusch, Germany.

# SPIDER — THE ROBOT REVOLUTION BY EPSON

Like a spider in its web ... thanks to unique engineering, the Epson Spider is not only extremely compact and incredibly fast-moving. It also makes 100 % use of the maximum envelope of its arm length and thus provides you with all you need for economical production.

The Epson Spider is a new species of SCARA robots. These 4-axis robots designed like a human arm work on horizontal planes and are ideal for fast pick-and-place applications and assembly processes. Apart from that, the Spider combines all advantages of the high-performance Epson SCARA robots. Among them are outstanding cycle times and joining properties, high insertion forces and rigidities, superb repeatability and an excellent deadload–payload ratio.

But the Epson Spider has yet more to offer. It is the first and only SCARA robot with a perfectly cylindrical envelope. Thanks to that, the impressively productive spider can reach all positions of its area of activity (100 %) and also convinces with short cycle times.

## The Epson Spider closes the gap

The Epson Spider does not have any dead space. Like a spider in its web, the tool axis is positioned in the centre above the production surface. The Epson Spider can therefore reach every point of the cylindrical envelope directly requiring only small space.

Due to its design, the envelope of the classic SCARA robot is kidney-shaped leaving a big gap in the centre, the “dead space”. Moreover, long travel distances are the result of the external orientation of the robot arm. A waste of time, space and money!



Epson Spider:  
cylindrical envelope  
without dead space



SCARA robots:  
kidney-shaped envelope  
with dead space

# THE EPSON CONCEPT: TAKE IT ONE STEP FURTHER

We learn from the development experience and from more than 30 years of operation of industrial robots as well as from our customers' specific requirements. Every day. What is there to optimise? How can we improve the economic viability of your production cell? Can we speed up the process without loss of reliability? These questions are the basis for new developments. However, the best solutions often are just so very simple — such as with the Epson Spider. Its design is as unique as advantageous.

## The perfect design for increased productivity at reduced space requirement

### Overhead mounting

A basic requirement for the elimination of dead spaces, such as common for classic SCARA robots, is overhead mounting. Then, the robot mounting base is not an obstacle any more.

### Internal orientation of horizontal base axis #2

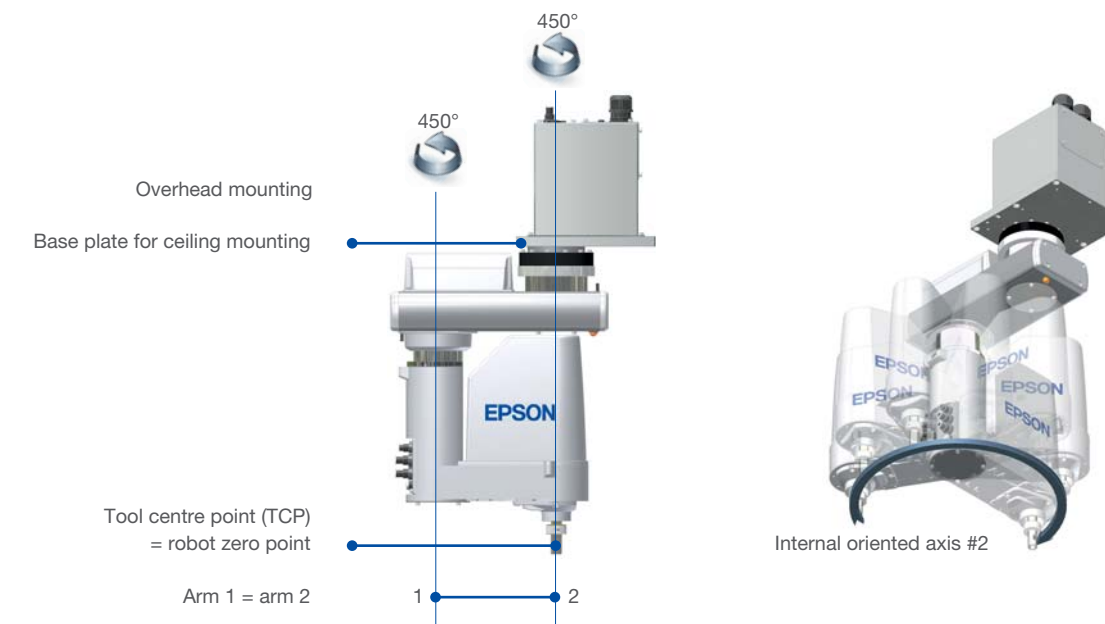
To realise compact motions also in narrow space, the zero point must be passed through. The internal orientation of horizontal base axis #2 allows that.

### Cylindrical envelope

To reach the zero point with the tool axis, the two horizontal base axes have the same arm length. Instead of the common kidney-shaped envelope, such as for SCARA robots, the envelope of the Epson Spider is perfectly cylindrical.

### Wiring in the robot interior

To allow the envelope of both horizontal base axes to be extended to 450° each, wiring is inside the robot. The resulting overlapping envelopes permit to approach one position with up to four different arm orientations.



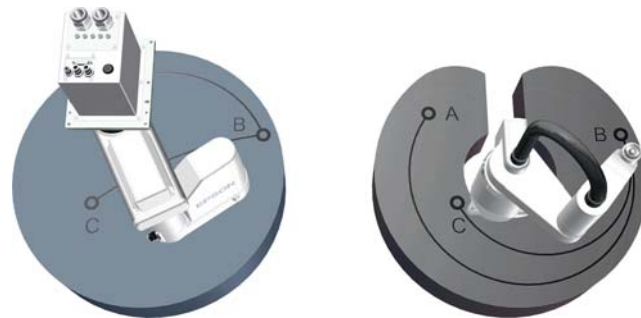
# EPSON SPIDER: SAVES TIME, SPACE AND MONEY

EPSON SPIDER RS3 AND RS4

## Comparison of Epson Spider and SCARA robot

### Cycle time

Classic SCARA robots work with external orientation. The arm must be completely extended to change orientation. With the Epson Spider, however, cycle times can be considerably reduced thanks to "short-cut motion". Internal orientation and overlapping envelopes allow to program the optimal motion for a specific application.



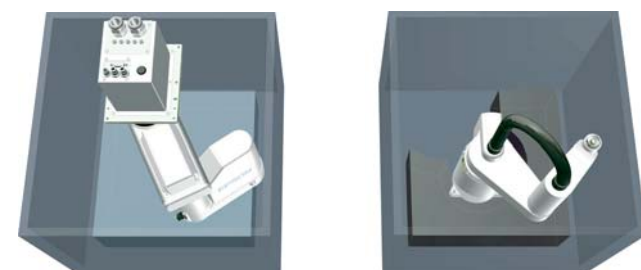
### Envelope

Compared to a SCARA robot, the Epson Spider multiplies its continuous, rectangular envelope by 5. To cover the same envelope, a SCARA robot with a considerably longer arm would have to be used.



### Space requirements

Often, there is small space in production cells. While the freedom of movement of SCARA robots is strongly limited by dead spaces and external orientation, the Epson Spider can reach all positions of its area of activity (100%) even under most unfavourable mounting conditions.



Epson Spider

Classic SCARA robot

# THE NEW PRODUCTION PHILOSOPHY: ECONOMICAL AND FLEXIBLE

Thanks to its unique motion dynamics with short travel distances and to its low deadload, systems can be designed and operated saving resources. With a cell design based on an innovative production philosophy, the Epson Spider offers unprecedented economical benefits.

No expensive idling of systems, quick conversion of production lines for new products, flexible adaptation of the system to market sales, easy connection to existing work cells ... what sounds like a wish list for increased economic viability becomes reality in a cell design with the Epson Spider in the lead role.

### Production clusters for several production lines

Free and open system design: The cell is designed and engineered with units of independent functions. Each unit has common mechanical and electrical interfaces for easy exchange, easy combination, fast transfer and precise positioning.

### The advantages at a glance

- Increased production flexibility
- Reduced costs due to compact standard units and reuse
- No specific cell design required
- Simplified programming due to middleware
- Reduced spare parts stocking
- Reduced cycle times due to parallel systems
- Decentralised production of optional features



Palletiser

Combined work  
processes

Supply/separation  
of bulk material

# THE DREAM TEAM: EPSON SPIDER RS3 AND RS4

Both Epson Spiders are equal in design and thus offer the same benefits; they only differ in reach and payload. The Epson Spider RS4 has “more strength in the arm” and a longer reach. The Epson Spider RS4 can thus carry heavier loads and is perfectly suitable for applications with a larger envelope.



## Epson Spider RS3

Payload: 3 kilograms  
Reach: 350 mm  
Max. square envelope: 495 x 495 mm  
Pallet size: e.g. 400 x 600 mm



## Epson Spider RS4

Payload: 4 kilograms  
Reach: 550 mm  
Max. square envelope: 777 x 777 mm  
Pallet size: e.g. 600 x 800 mm



User wiring



Flexible cable layout

### User wiring

Pneumatic or electrical connections for end effectors? A standard of Epson robots. Your advantages: high availability and operational safety. Just connect and get started!

### Flexible cable layout

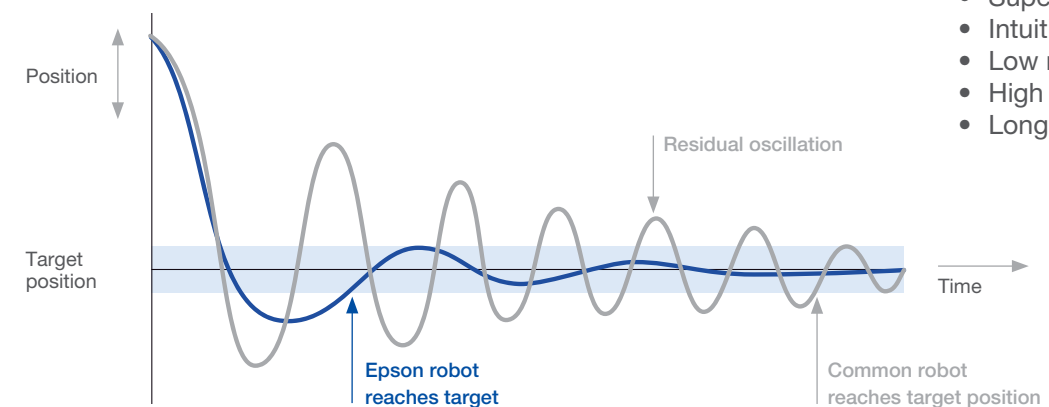
You can lead connecting cables of the Epson Spider away towards the top or — to reduce the overall height — to the side.

### Up-to-date servo technology

Like all other Epson kinematics, the two Spiders are also equipped with most up-to-date servo technology. In combination with the special Epson Spider design, cycle times are achieved that you could only dream about.

### We get to the point fast: Smart Motion

Smart Motion is the revolutionary motor management by Epson used in all Epson robot systems. At low vibration, Epson robots reach the end position much faster and much more precisely. Optimum positioning, short cycle times and increased path accuracy — be on the economical side with Smart Motion!



Epson robot  
Common robot  
End position controller

As a result of overshooting, common motor controllers lead to increased deviations. The result: imprecise positioning, poor interpolation and longer process times. Epson Smart Motion, however, minimises overshooting. Epson robots are more precise and product-conserving and get to the point faster — even if cycle times are extreme.

### Spider — specific advantages

- Short cycle times
- Ceiling mounting
- No dead spaces
- Internal orientation
- Overlapping envelope

### “Inherited” SCARA robot advantages

- Outstanding joining properties
- High insertion forces
- High rigidity
- Superb repeatability
- Intuitive direct teaching
- Low maintenance effort
- High operational safety
- Longevity

# TECHNICAL DATA

Like all other Epson robot systems, Epson Spiders also feature maximum speed, precision and reliability. With a guaranteed repeatability of 10 µm, they are suitable for applications of particularly high demands with respect to point and path accuracy.

High-quality components ensure longevity and high availability. The design also focuses on reliability – starting from well-established design principles to easy accessibility of all components.

The Epson Spider is either controlled with the Epson RC180, the most compact and lightweight controller of its performance class on the market, or with the PC-based multi-manipulator RC620 master controller.

Detailed information on the powerful Epson controllers is provided in our brochure “Epson RC180 and RC620 Controllers”.

## Scope of delivery

- Epson robot and controller
- 50 g grease for shaft
- 1 emergency stop connector
- 1 set user connector
- 1 back-up disc for the robot controller
- 1 Epson RC+ program CD
- 1 USB programming cable
- 1 CD manuals
- 1 Installation/safety manual
- 1 set 3 m motor and signal cable

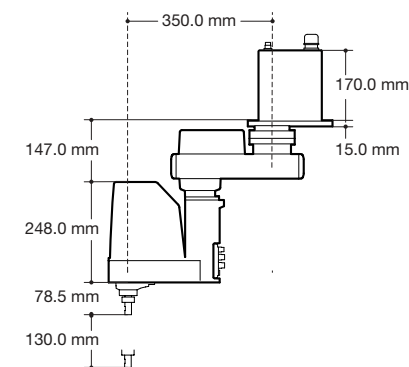
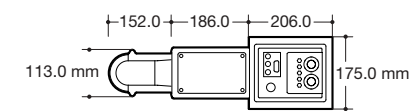
## Options

- Longer motor and signal cables (5m/10m/20m)
- Tool adaptor for easy mounting of end effectors to shaft
- Internal wiring unit leading 15 electrical wires and 2 pneumatic cables inside the manipulator to the end effector

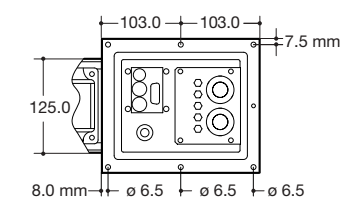
## Specifications

	EPSON SPIDER RS3-351S	EPSON SPIDER RS4-551S
<b>DESIGN</b>	internal oriented horizontal articulated arm	internal oriented horizontal articulated arm
<b>PAYLOAD</b>	(kg) nom./max. 1/3	(kg) nom./max. 1/4
<b>REACH</b>	(mm) horizontal (J1+J2) <b>350</b> (175+175) (mm) vertical (J3) 130 or 100 (cleanroom) (°) orientation (J4) +/-720	(mm) horizontal (J1+J2) <b>550</b> (275+275) (mm) vertical (J3) 130 or 100 (cleanroom) (°) orientation (J4) +/-720
<b>REPEATABILITY</b>	(mm) horizontal (J1+J2) +/-0.01 (mm) vertical (J3) +/-0.01 (°) orientation (J4) +/-0.01	(mm) horizontal (J1+J2) +/-0.015 (mm) vertical (J3) +/-0.01 (°) orientation (J4) +/-0.01
<b>MOMENT OF INERTIA</b>	(kgm <sup>2</sup> ) nom./max. 0.005/0.05	(kgm <sup>2</sup> ) nom./max. 0.005/0.05
<b>USER WIRING</b>	electrical 15 (1x D-Sub) pneumatic 3 (1x4 & 2x6mm)	electrical 15 (1x D-Sub) pneumatic 3 (1x4 & 2x6mm)
<b>SHAFT</b>	(mm) external/internal 16H7 / 11 max.	(mm) external/internal 16H7 / 11 max.
<b>INSERTION FORCE</b>	(N) permanent 150	(N) permanent 150
<b>WEIGHT</b>	(kg) 17	(kg) 20
<b>CONTROLLER</b>	RC180/RC620	RC180/RC620
<b>MANIPULATOR MODEL</b>	mounting option ceiling cleanroom & ESD ISO3 & ESD	mounting option ceiling cleanroom & ESD ISO3 & ESD
<b>AVAILABLE OPTIONS</b>	internal wiring unit, longer cables (5m/10m/20m), tool adaptor	internal wiring unit, longer cables (5m/10m/20m), tool adaptor

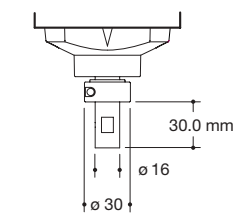
Epson Spider RS3



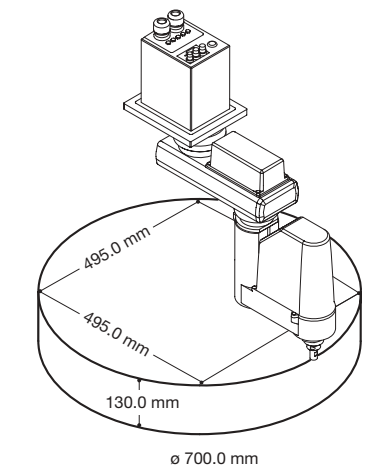
Enlarged details



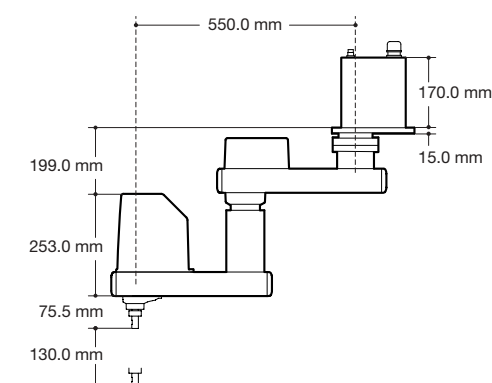
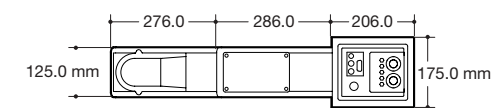
Base



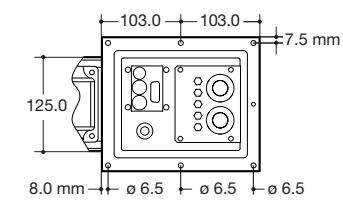
Flange for hand



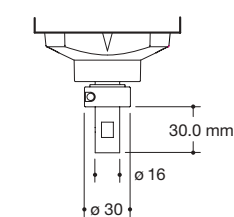
Epson Spider RS4



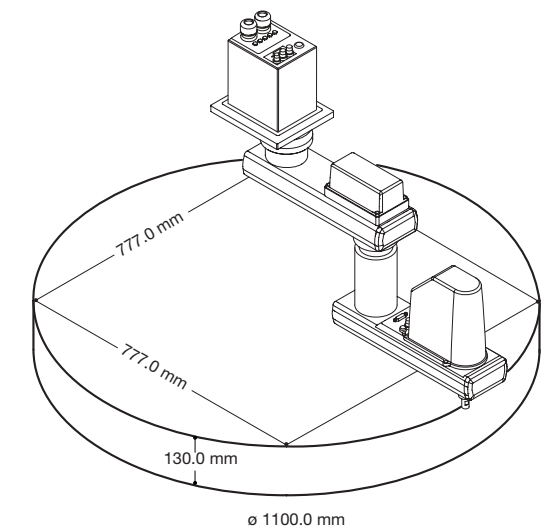
Enlarged details



Base



Flange for hand



This and further brochures are available in PDF as well as in CAD format at: [www.epson.de/robots](http://www.epson.de/robots)



### Epson Industry Solutions Center — that's where we find your solution!

Expertise concentrated on 500 m<sup>2</sup>: In cooperation with our partners, in our Meerbusch Industry Solutions Center we present solutions for the most diverse applications in industry. The fields include large format printing, retail solution and factory automation.

**Factory automation:** See all Epson robots in action. Our experts help you to set up, simulate and optimise your automation application in a workshop cell. The cell can be controlled and networked with all standard fieldbuses. In addition, we provide up-to-date peripheral equipment such as a Vision and Conveyor Tracking system.

You would like to arrange an appointment?  
Call us at +49 2159 5381391 or just e-mail us at:  
[robot.infos@epson.de](mailto:robot.infos@epson.de)



**Epson Deutschland GmbH**  
Factory Automation Division  
Otto-Hahn-Straße 4  
40670 Meerbusch

Tel.: +49 2159 5381391  
Fax: +49 2159 5383170  
E-Mail: [robot.infos@epson.de](mailto:robot.infos@epson.de)  
[www.epson.de/robots](http://www.epson.de/robots)

**Epson America Inc.**  
Factory Automation Division  
18300 Central Avenue  
Carson, CA 90746

Tel.: +1562290 - 5910  
Fax: +1562290 - 5999  
E-Mail: [info@robots.epson.com](mailto:info@robots.epson.com)  
[www.robots.epson.com](http://www.robots.epson.com)

**Seiko Epson Corp**  
1010 Fujimi, Fujimi-machi,  
Suwa gun  
399-0295 Nagano-ken

Tel.: +81 2666 11804  
Fax: +81 2666 11846  
E-Mail: [epsonrb@exepson.co.jp](mailto:epsonrb@exepson.co.jp)  
[www.epson.jp/fa/e](http://www.epson.jp/fa/e)

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