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EPSON SCARA G-SERIES

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# OUR SCARAS GET TO THE POINT FASTER



FOR RELIABLE HANDLING

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

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# ABOUT EPSON

## EPSON SCARA G-SERIES

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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
- 1982 first freely available Epson SCARA robot in Japan
- 1986 world's first class 1 clean-room robot
- One of the world's most comprehensive SCARA model ranges
- 1997 first PC-based controller
- 2008 inventor of the G3 with righty or lefty arm orientation
- 2009 inventor of the SPIDER: a unique SCARA robot with 450° work envelope



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# EPSON ROBOT SYSTEMS — TO SPEED UP YOUR PRODUCTION RUN

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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.

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## SERVICE AND SUPPORT

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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.

# WE ARE SCARA!

SCARA (Selective Compliance Assembly Robot Arm) robots, also referred to as “horizontal articulated arm robots”, are a success story of automation. With four degrees of freedom, they can freely position and join a payload with every possible horizontal orientation. They are relatively easy to set up and work particularly precisely and reliably.

## In the beginning was Epson

In a study, Professor Hiroshi Makino from Yamanashi University in Tokyo found that the majority of joining processes in production are vertical processes executed from above — that was when the SCARA was born! The Seiko Epson company immediately took on that method and developed a robot type for in-house production. That was even before that kinematics was brought on the market as the first freely available SCARA in 1982.

## The SCARA principle: simply reliable

The design of SCARA robots is similar to a human arm, since they have an articulated arm which can only swing horizontally. Usually, they have four freely programmable axes allowing handling in plane-parallel surfaces. The shaft serves to install tools and can rotate independently from its vertical motion to freely orientate the product within the work envelope. Thanks to their design, SCARAs feature high vertical rigidity.

## Adapt your installation to the robot? Why not just choose the Epson robot you need?

### Different arm lengths / payloads



### Different protection classes



### Mounting options



**Experience, expertise, inventiveness or, put more simply: the specialists**

Ever since we started, we have been continuously further developing the SCARA technology and have realised milestones such as ball screw splines, brushless motors with absolute encoder, Smart Motion Control and much more. Today, Epson has the most comprehensive SCARA robot product range worldwide – offering more than 200 variants.

**Good – better – Epson**

With Epson you can be sure. We develop SCARA robots in our in-house research centres and produce them in our quality-certified manufacturing facilities. The result: SCARAs that work with perfect precision and reliability, convince through short cycle times and are incredibly user-friendly.

**Different arm lengths / payloads**



**Different shaft lengths**



# COMPACT, FAST, PRECISE — AND EXTREMELY VERSATILE

There are more than 200 SCARA variants, arm lengths ranging from 175 mm to 1,000 mm, payloads ranging from 1 kg to 20 kg and different mounting options. The robots are available in different protection classes or as cleanroom versions — we are absolutely certain that we can offer you just the right SCARA robot for your application.

## Robust design

The reduced number of assemblies as well as the integrated feed-through allow reliable operation without expensive maintenance work.

Small interference contours reduce the risk of collision, which is particularly important if there are several robots working together in most confined spaces. High arm rigidities make the Epson SCARA insensitive to high insertion forces.

## Your advantages with Epson SCARA robots

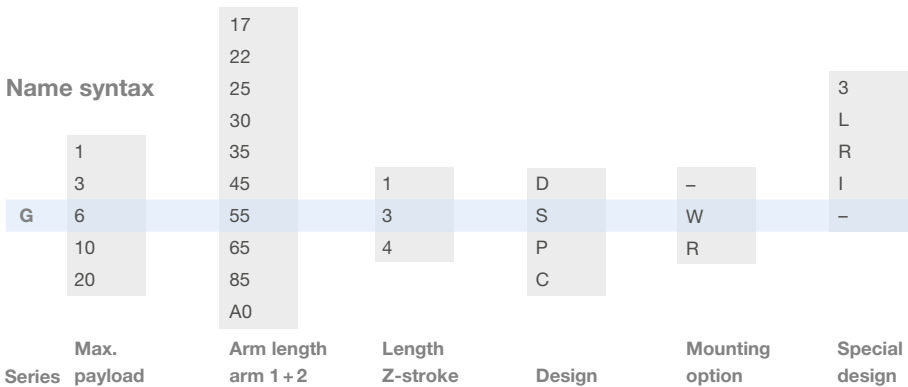
- Fast thanks to Smart Motion technology
- Optimal repeatability and accuracy
- Outstanding joining properties
- Self-supporting design allows direct teaching
- High availability
- Particularly low-maintenance
- High point accuracy
- Low vibration
- High insertion forces due to high arm rigidity
- Space-saving thanks to compact design
- Different payloads and reaches for different applications
- Low deadload — easy integration and high dynamics



G6-551S

### How to decode the G-series names

There is a lot of information already in the designations of the G-series. We give you an example to show you how to “read” the names: G6-553 SW.



**Example**  
 Payload up to 6 kg,  
 550 mm arm length,  
 330 mm shaft length,  
 standard design  
 wall mounting  
**G6-553SW**

### Configuration of the Epson SCARA G-series

	G1	G3	G6	G10	G20
<b>Payload (nom./max.)</b>	0.5/1.5 kg	1/3 kg	3/6 kg	5/10 kg	10/20 kg
<b>Reach (arm 1 + arm 2)</b>	(mm) 175				
	(mm) 225				
		(mm) 250			
		(mm) 300			
		(mm) 350			
			(mm) 450		
			(mm) 550		
			(mm) 650	(mm) 650	
				(mm) 850	(mm) 850
				(mm) 1,000	
<b>Z-stroke (with bellows)</b>	(mm) 100 (80)				
		(mm) 150 (120)			
			(mm) 180 (150)	(mm) 180 (150)	(mm) 180 (150)
			(mm) 330 (300)		
<b>Mounting option</b>	-	floor	floor	floor	floor
	W		MM (not G3-251x)	wall	wall
	R		MM (not G3-251x)	ceiling	ceiling
multi-mount = MM					
<b>Design</b>	S	IP20	IP20	IP20	IP20
	D			IP54	IP54
	P			IP65	IP65
	C	ISO3 / ESD	ISO3 / ESD	ISO3 / ESD	ISO3 / ESD
special design		3 (3-axis)	L / R (lefty/ righty arm optimised)	I (inverted)	I (inverted)

Multi-mount: One robot can be used for different mounting options without modifying the kinematics.

# G FOR GENIUS — THE EPSON G-SERIES

## Epson SCARA G1 Our mini — compact power

The solution for tasks in most confined spaces: the Epson G1 — developed as a micromanipulator, transfer unit or high-performance feeder for larger robots. Designed for work where a thousandth of a millimetre matters, such as for electronic manufacturing or precision-mechanical work processes. Ultralight due to its high-strength aluminium design and at the same time compact and powerful.



### Epson G1

Max. payload  
4-axis robot: 1 kg  
3-axis robot: 1.5 kg  
Reach: 175/225 mm  
Z-stroke: 100 mm

## Epson SCARA G3 It's all about the curve

SCARA G3 are just the right choice for use in confined spaces as they are common in automated component manufacture, since these robots, despite their compact size, cover a large work envelope.

However, we did not stop there and have further developed the G3 based on the fact that a high percentage of all assembly work is performed in the same arm orientation. Therefore, Epson G3 are also available with a left-curved or right-curved first arm. Thanks to this arm geometry especially developed by Epson, the Epson G3-351-L/G3-351-R is the only SCARA of that size on the market whose maximum rectangular work envelope covers an area larger than an ISO A4 sheet.

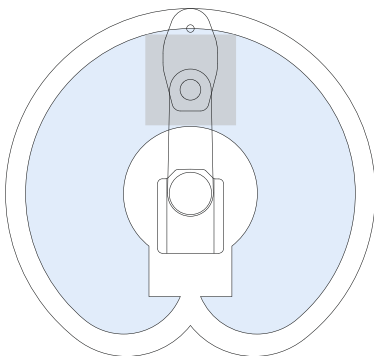


### Epson G3

Max. payload: 3 kg  
Reach: 250/  
300/350 mm  
Z-stroke: 150 mm

**37,600 mm<sup>2</sup>**

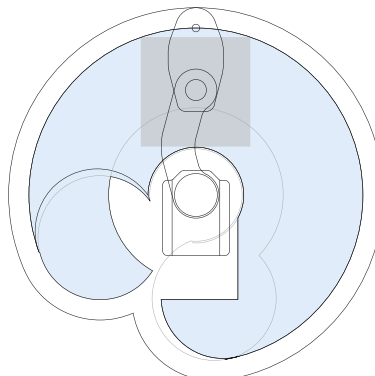
Max. square work envelope



Work envelope for a standard arm

**52,900 mm<sup>2</sup>**

Max. square work envelope



Work envelope for a lefty optimised arm

## Maximum work envelope at minimum space requirement

A comparison of the G3-351S with the lefty arm optimised G3-351-L shows that the maximum square work envelope can be increased by about 40%. That is just the space productivity needed in modern automation.



### EPSON SCARA G6

#### The new efficiency class

The new G6 design allows for a large work envelope at very compact dimensions. The robots can carry out tasks with an arm length of e. g. 550 mm when usually 600 mm would be required. G6 are the ideal solution for applications with a focus on high speed at maximum precision, such as is the case with the production of mechanical and electrical parts, pick-and-place applications, equipping with small parts, dosing or feeding.



#### Epson G6

Max. payload: 6 kg  
Reach: 450/550/  
650 mm  
Z-stroke: 180/330 mm

### EPSON SCARA G10

#### Fast and strong

Ultrafast speed and higher payload? A combination that Epson G10 can perfectly handle due to the high arm rigidity. G10 are fast in every sense of the word — for assembly and configuration as well as for handling with multi-grippers. They use all their advantages particularly in applications such as the assembly of heavy parts, packaging and palletising as well as loading and unloading. Since there are no tubes, the design is very compact.



#### Epson G10

Max. payload: 10 kg  
Reach: 650/850 mm  
Z-stroke: 180/420 mm

### EPSON SCARA G20

#### Long arm with high strength

Manipulators of the G20 series are suitable for high payloads such as heavy parts or packaging units (up to 20 kg). Since the arm of the G20 is 1,000 mm or 850 mm long, the work envelope is large. Due to the high moment of inertia of the U joint, heavy loads can be handled fast and reliably — without any vibration of the robot arm as is the case for many competition models with a similar arm length.



#### Epson G20

Max. payload: 20 kg  
Reach: 850/1,000 mm  
Z-stroke: 180/420 mm

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# SOLUTIONS WITH SYSTEM — AND FUTURE

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Epson SCARA robots prove their strong performance and unparalleled reliability in diverse applications.

## Loading and unloading machines

Expectations are high: With high point accuracy, the robot must still move at high speed to achieve the required installation throughput. During loading and unloading, the work pieces are defined on pallets, work carriers or conveyors or they are fed to the installation as bulk material with subsequent separation and passed on after the process. Epson SCARAs carry out these tasks precisely and reliably in pace with the machine cycle.

## Assembling and equipping

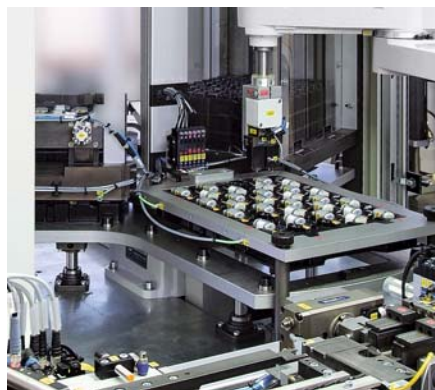
Manual activities during assembling and equipping are inefficient as well as error-prone. Apart from that, the human arm is naturally limited in its range of motion. Thanks to the optimised ratio of arm 1 and arm 2, Epson SCARAs, on the contrary, have maximum freedom of movement and are able to precisely assemble even the smallest parts. Due to their excellent dynamics, high insertion forces and rigidities as well as the good deadload–payload ratio, Epson robots are perfectly suitable for assembly and equipping tasks — even for small batch sizes.

## Packaging and palletising

Modern packagings require a high degree of flexibility of the packaging lines. That is because ever shorter product change times as well as a high process reliability must be ensured. Epson robots package and palletise even highly sensitive parts. With Conveyor Tracking, the robots can also be used for picking up parts from moving conveyors or placing them there. In that process, objects are detected by a camera or sensor.

## Testing, measuring and checking

Quality checks, measurements, test runs prior to series production — precise detection is most important here. Epson SCARA robots with the integrated Epson vision system handle these tasks also at high clock rates. The PC-based Epson RC620 master controller allows use with other software and hardware for measuring and checking. Moreover, the master controller can be easily combined with pattern recognition systems or force-torque sensors from other manufacturers. If the product deviates from the tolerance values with respect to the predefined parameters, it is detected as faulty at an early stage and safely sorted out.



# SO THAT YOU KNOW BEFOREHAND WHAT YOU WILL NEED LATER

Trial & error — why not? Before using an Epson SCARA robot in your application, you can try, compare and visualise sequences at no risk. Not only in the design phase, but also during integration and operation does the free Epson RC+ Simulator help you save time and money.

## The design phase — easy planning and cost reduction

Already during the design phase, you can accurately plan your robot cell quickly and easily and reliably estimate the cycle time for your application. This way, feasibility is proven before a single part of the installation is manufactured. You can also prepare for later installation expansions in the simulation so that the installation must only be shut down when it cannot be avoided.

## The integration phase — reducing integration times, avoiding damage

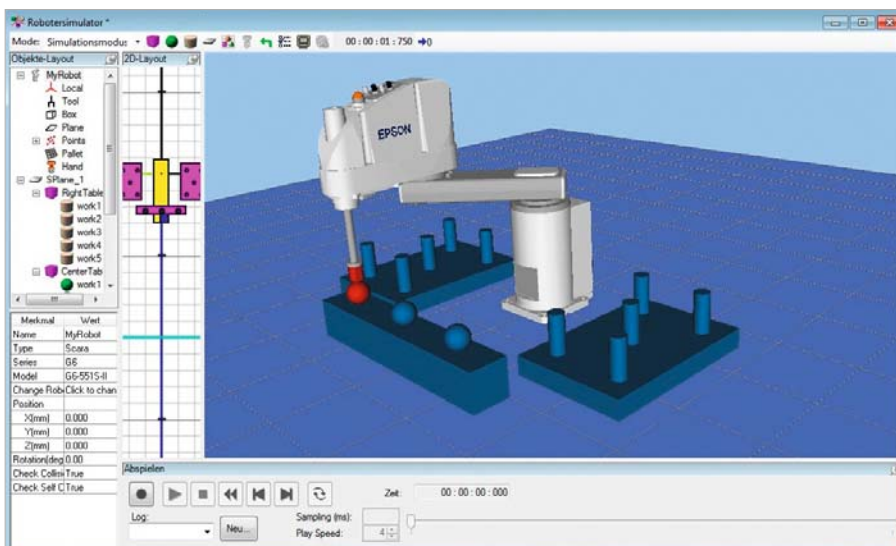
Prior to the robot delivery, an offline program validation is carried out. Programs can be created parallelly and even complex motion sequences can be visualised and evaluated. This serves to detect risks of collision and avoid damage to the equipment.

## The operation and maintenance phase — reduction of downtimes

Troubleshooting and program modifications can be comfortably carried out from your office. Collision detection, reachability checks and robot motion are visualised in 3-D.

## The Epson RC+ development environment — powerful, efficient, intuitive

With its intuitive Windows operator interface, the open structure and integrated Machine Vision, the powerful Epson RC+ project management and development environment is ideal for the uncomplicated programming of your applications. Now, we have also added a graphical 3-D environment to allow you to almost entirely simulate the robot program and obtain visualised robot motion.

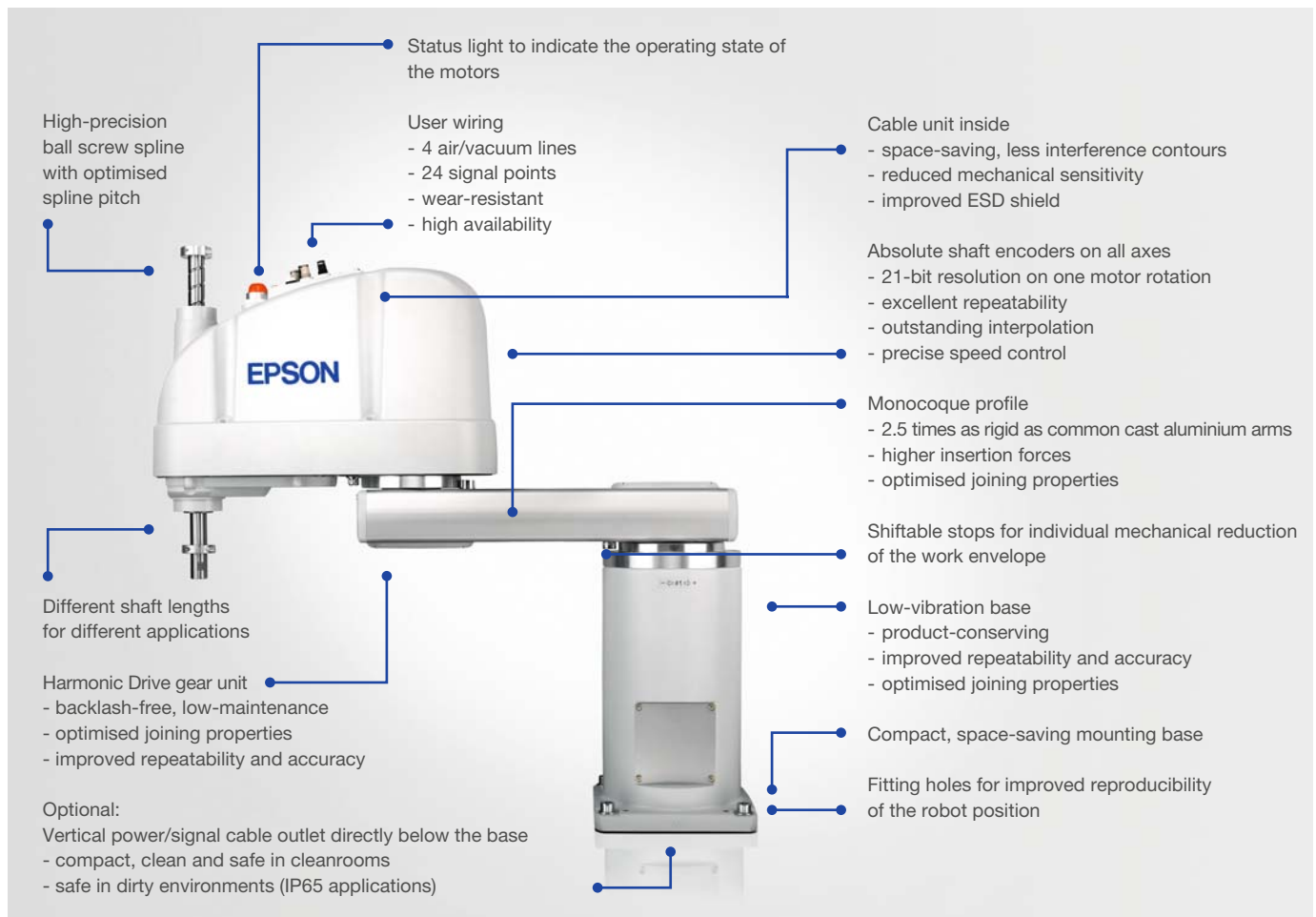


SCARA, 6-axis or the Epson SPIDER — all of these robots as well as different motion sequences can be imaged with the Epson RC+ Simulator.

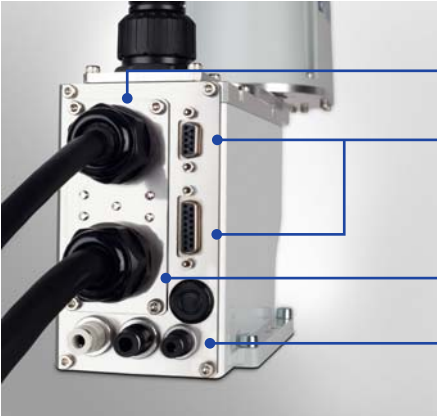
# THE EPSON CONCEPT: TO TAKE IT ONE STEP FURTHER

As a SCARA specialist we aim to permanently optimise every detail of our robot systems — and to reach those aims. How do you benefit? Unequalled repeatability. Improved joining properties. Higher insertion forces and speeds. A space-saving design with reduced interference contours. We could just go on and on and on ...

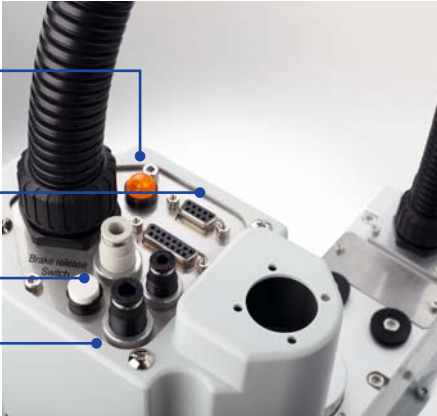
## The Epson SCARA — perfect design with many advantages



Connections on the Epson SCARA G1

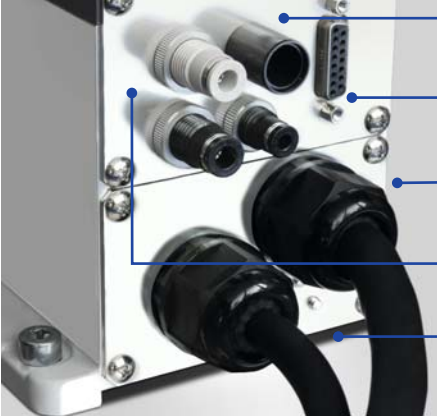


- Signal cable
- Connection for user wiring  
1 x (9-pin D-sub connector)  
1 x (15-pin D-sub connector)
- Power cable
- Three connections for compressed-air supply (1 x Ø 4 mm and 2 x Ø 6 mm)



- Motor function indicator lamp
- Brake release button

Connections on the Epson SCARA G3

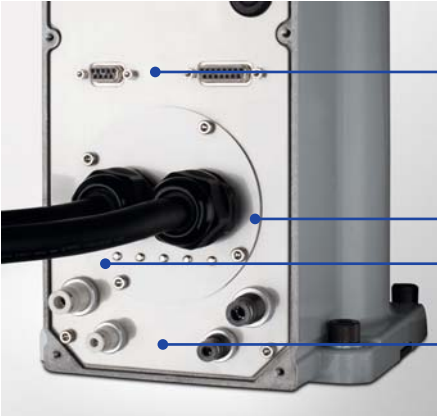


- Exhaust port for cleanroom models
- Connection for user wiring  
1 x (15-pin D-sub connector)
- Power cable
- Three connections for compressed-air supply (1 x Ø 4 mm and 2 x Ø 6 mm)
- Signal cable



- Motor function indicator lamp
- Brake release button

Connections on the Epson SCARA G6, G10 and G20



- Connection for user wiring  
1 x (9-pin D-sub connector)  
1 x (15-pin D-sub connector)
- Signal cable
- Power cable
- Four connections for compressed-air supply (2 x Ø 4 mm and 2 x Ø 6 mm)



- Brake release button
- Motor function indicator lamp

# BECAUSE QUALITY IS THE BEST RECIPE

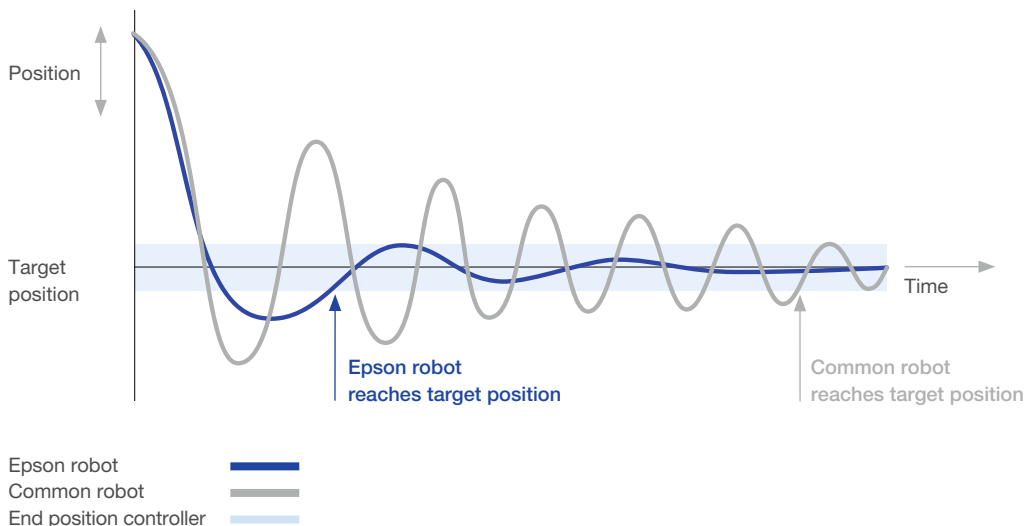
Just like all other Epson robot systems, robots of the Epson SCARA G-series also feature a great number of advantages. High-quality components ensure longevity and high availability. The design also focuses on reliability — starting from well-established design principles to easy accessibility of all components.

## The economical and future-oriented complete solution

All main components are Epson products; they are developed in our research centres and produced in our quality-certified manufacturing facilities. Hardware and software match perfectly.

### 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!



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.

# FLEXIBLE CONTROLLER CONCEPT

A central controller or compact slave controller — Epson SCARA G-series robots can be perfectly controlled by means of Epson controllers and can be smoothly integrated into your production processes.

## **Epson RC180 — the most compact, most lightweight and fastest controller of its performance class on the market**

With its compact dimensions, the Epson RC180 is incredibly small. The controller is mainly intended to work as a stand-alone slave.

## **Epson RC620 — the powerful master controller for up to 20 axes**

This controller has it all under control: robots, conveyors and many other peripherals. Due to its open, Windows-based system design, the controller offers unlimited possibilities and allows easy operation. The RC620 supports Conveyor Tracking as well as most diverse bus protocols and interface expansions.

For even higher demands of system resources, such as fieldbus masters or the integration of external .dll files, there is the Epson RC620+. It features a higher-performance processor and an even greater memory expansion.

## **For robots with eye contact**

The powerful, integrated vision systems reliably detect and position parts — even in case of manufacturing deviations, part changes or varying light conditions. Epson Machine Vision: That is perfectly matching hardware and software.



### **Epson Vision**

Epson Vision allows high-speed communication between robot and Machine Vision. Bar codes are identified, and so are characters and icons — even if backgrounds are changing or clock rates are high.



### **TP1**

Monitoring, operation and parametrisation with the portable TP1 Teach Pendant



### **Epson RC180**

The slave controller — compact, smart and powerful



### **Epson RC620**

The master for several kinematics and complex installation control



### **OP1**

OP1 Operator Pendant for operation and visualisation tasks even in complex installations

# TECHNICAL DATA

## Specifications

	EPSON SCARA G1-171S	EPSON SCARA G1-221S	EPSON SCARA G1-171SZ	EPSON SCARA G1-221SZ
<b>DESIGN</b>	4 axes, external oriented horizontal articulated arm		3 axes, external oriented horizontal articulated arm	
<b>PAYLOAD</b>	(kg) nom./max. 0.5/1		(kg) nom./max. 0.5/1.5	
<b>REACH</b>	horizontal (J1+J2) vertical (J3) orientation (J4)	(mm) <b>175</b> (75+100) (mm) 100 or 80 (cleanroom) (°) +/-360	(mm) <b>225</b> (125+100) (mm) 100 or 80 (cleanroom) (°) +/-360	(mm) <b>175</b> (75+100) (mm) 100 or 80 (cleanroom) –
<b>REPEATABILITY</b>	horizontal (J1+J2) vertical (J3) orientation (J4)	(mm) +/-0.005 (mm) +/-0.01 (°) +/-0.01	(mm) +/-0.008 (mm) +/-0.01 (°) +/-0.01	(mm) +/-0.005 (mm) +/-0.01 –
<b>MOMENT OF INERTIA</b>		(kgm <sup>2</sup> ) nom./max. 0.0003/0.004	(kgm <sup>2</sup> ) nom./max. 0.0003/0.004	–
<b>USER WIRING</b>	electrical D-sub (15-pin + 9-pin) pneumatic tubes (1 x Ø4 mm and 2 x Ø6 mm)			
<b>SHAFT</b>	(mm) Ø 8 H7			
<b>INSERTION FORCE</b>	(N) permanent 50			
<b>WEIGHT</b>	(kg) 8			
<b>CONTROLLER</b>	RC180 / RC620 / RC620+			
<b>MANIPULATOR MODEL</b>	mounting option floor, cleanroom (ISO3) & ESD			
<b>AVAILABLE OPTIONS</b>	longer cables (5 m/10 m/20 m), bellows			

## Scope of delivery

- Epson robot and controller
- 1 Epson RC+ program CD including Simulator
- 2 sets of mounting brackets for the robot controller (RC180)
- 70 g grease for shaft
- 1 set 3 m motor and signal cable
- 1 emergency stop connector
- 1 connector for standard I/O
- 1 set connectors for user wiring
- 1 back-up disc for the robot controller (RC180)
- 1 USB programming cable (RC180)
- Manuals on CD
- 1 installation/safety manual

## Manipulator options

- Longer motor and signal cables (5 m / 10 m / 20 m)
- Bellows option: 1 piece bellows for mounting on shaft. Protects spline and environment from dirt.



Dimensions of the Epson SCARA G1

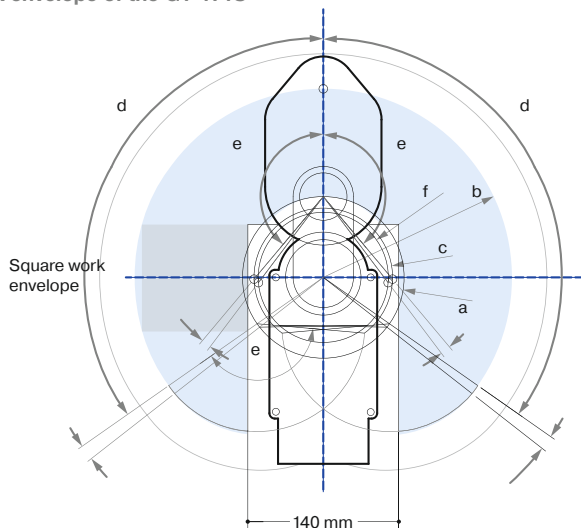
	G1-171S	G1-221S	G1-171SZ	G1-221SZ
	<b>4 axes</b>	<b>4 axes</b>	<b>3 axes</b>	<b>3 axes</b>
	external oriented horizontal articulated arm			
A	(mm) 75	(mm) 125	(mm) 75	(mm) 125
B	(mm) 515 max.	(mm) 545 max.	(mm) 515 max.	(mm) 545 max.

Work envelope of the Epson SCARA G1

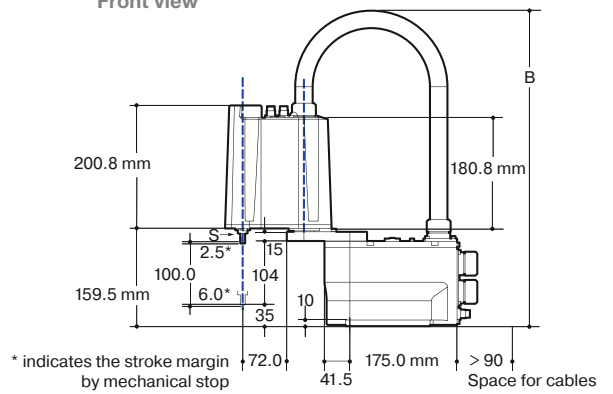
	G1-171S	G1-221S	G1-171SZ	G1-221SZ
	<b>4 axes</b>	<b>4 axes</b>	<b>3 axes</b>	<b>3 axes</b>
	external oriented horizontal articulated arm			
a	(mm) 75	(mm) 125	(mm) 75	(mm) 125
b-a	(mm) 100	(mm) 100	(mm) 100	(mm) 100
c	(mm) 64.3	(mm) 59.6	(mm) 70.9	(mm) 89.2
d	125°	125°	125°	125°
e	140°	152°	135°	135°
f	(mm) 60.4	(mm) 52.8	(mm) 69.2	(mm) 82.2

- a Length of arm #1
- b Length of arm #2
- c Work envelope
- d Work envelope of axis #1
- e Work envelope of axis #2
- f Area of the mechanical stop

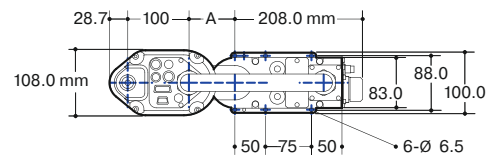
Work envelope of the G1-171S



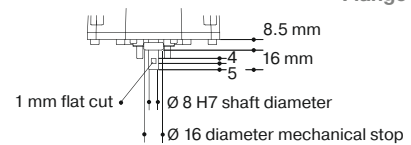
Front view



Top view standard



Flange for hand



Detail of S: Calibration point position of joints #3 and #4

# TECHNICAL DATA

## Specifications

	EPSON SCARA G3-251S	EPSON SCARA G3-301S EPSON SCARA G3-301S-L EPSON SCARA G3-301S-R	EPSON SCARA G3-351S EPSON SCARA G3-351S-L EPSON SCARA G3-351S-R	
<b>DESIGN</b>	external oriented horizontal articulated arm			
<b>PAYLOAD</b>	(kg) nom./max. 1/3			
<b>REACH</b>	horizontal (J1+J2) vertical (J3) orientation (J4)	(mm) <b>250</b> (120+130) (mm) 150 or 120 (cleanroom) (°) +/-360	(mm) <b>300</b> (170+130) (mm) 150 or 120 (cleanroom) (°) +/-360	(mm) <b>350</b> (220+130) (mm) 150 or 120 (cleanroom) (°) +/-360
<b>REPEATABILITY</b>	horizontal (J1+J2) vertical (J3) orientation (J4)	(mm) +/-0.008 (mm) +/-0.010 (°) +/-0.005	(mm) +/-0.010 (mm) +/-0.010 (°) +/-0.005	(mm) +/-0.010 (mm) +/-0.010 (°) +/-0.005
<b>MOMENT OF INERTIA</b>	(kgm <sup>2</sup> ) nom./max. 0.005/0.05			
<b>USER WIRING</b>	electrical D-sub (15-pin) pneumatic tubes (1 x Ø4 mm and 2 x Ø6 mm)			
<b>SHAFT</b>	(mm) Ø outside/inside 16 H7/11			
<b>INSERTION FORCE</b>	(N) permanent 150			
<b>WEIGHT</b>	(kg) 14			
<b>CONTROLLER</b>	RC180 / RC620 / RC620+			
<b>MANIPULATOR MODEL</b>	mounting option floor cleanroom (ISO3) & ESD	mounting option floor, multi-mount		
<b>AVAILABLE OPTIONS</b>	longer cables (5 m/10 m/20 m), tool adaptor, bellows			

## Scope of delivery

- Epson robot and controller
- 1 Epson RC+ program CD including Simulator
- 2 sets of mounting brackets for the robot controller (RC180)
- 70 g grease for shaft
- 1 set 3 m motor and signal cable
- 1 emergency stop connector
- 1 connector for standard I/O
- 1 set connectors for user wiring
- 1 back-up disc for the robot controller (RC180)
- 1 USB programming cable (RC180)
- Manuals on CD
- 1 installation/safety manual

## Manipulator options

- Longer motor and signal cables (5 m / 10 m / 20 m)
- Tool adaptor for easy mounting of end effectors to shaft
- Bellows option: 2 pieces bellows for mounting on shaft. Protects spline and environment from dirt.

Dimensions of the Epson SCARA G3

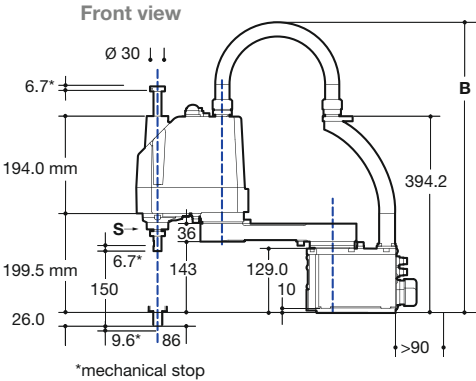
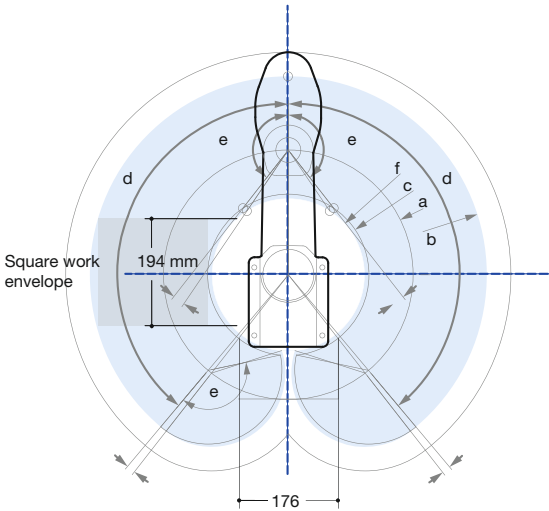
	G3-251S	G3-301S	G3-351S
A	(mm) 120	(mm) 170	(mm) 220
B	(mm) 545 max.	(mm) 575 max.	(mm) 595 max.

Work envelope of the Epson SCARA G3

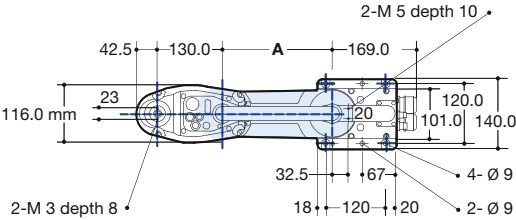
	G3-251S	G3-301S	G3-351S	G3-301S-L	G3-301S-R	G3-351S-L	G3-351S-R
a	(mm) 120	(mm) 170	(mm) 220	(mm) 170	(mm) 170	(mm) 220	(mm) 220
b-a	(mm) 130	(mm) 130	(mm) 130	(mm) 130	(mm) 130	(mm) 130	(mm) 130
c	(mm) 84	(mm) 104.8	(mm) 142.3	(mm) 120.7	(mm) 120.7	(mm) 191.6	(mm) 191.6
c1	-	-	-	(mm) 86.8	(mm) 86.8	(mm) 100.3	(mm) 100.3
d	140°	140°	140°	150°	125°	165°	110°
d1	-	-	-	125°	150°	110°	165°
e	141°	142°	142°	150°	135°	165°	120°
e1	-	-	-	135°	150°	120°	165°
f	(mm) 79.3	(mm) 96.2	(mm) 134.2	(mm) 79.5	(mm) 79.5	(mm) 97	(mm) 97
f1	-	-	-	(mm) 113.2	(mm) 113.2	(mm) 183	(mm) 183

- a Length of arm #1
- b Length of arm #2
- (c, c1) Work envelope
- (d, d1) Work envelope of axis #1
- (e, e1) Work envelope of axis #2
- (f, f1) Area of the mechanical stop

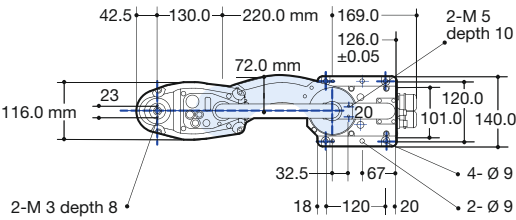
Work envelope of the G3-351S



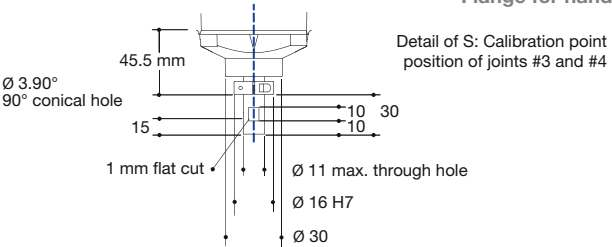
Top view standard



Top view curved



Flange for hand



This and further information as well as CAD data are available at: [www.epson.de/robots](http://www.epson.de/robots)

# TECHNICAL DATA

## Specifications

	EPSON SCARA G6-45xS	EPSON SCARA G6-55xS	EPSON SCARA G6-65xS	
<b>DESIGN</b>	external oriented horizontal articulated arm			
<b>PAYLOAD</b>	(kg) nom./max. 3/6			
<b>REACH</b>	horizontal (J1+J2)	(mm) <b>450</b> (200+250)	(mm) <b>550</b> (300+250)	(mm) <b>650</b> (400+250)
	vertical (J3)	<b>x=1</b> 180 or 150 (cleanroom and IP54 and IP65) <b>x=3</b> 330 or 300 (cleanroom and IP54 and IP65)		
	orientation (J4)	(°) +/-360	(°) +/-360	(°) +/-360
<b>REPEATABILITY</b>	horizontal (J1+J2)	(mm) +/-0.015	(mm) +/-0.015	(mm) +/-0.015
	vertical (J3)	(mm) +/-0.010	(mm) +/-0.010	(mm) +/-0.010
	orientation (J4)	(°) +/-0.005	(°) +/-0.005	(°) +/-0.005
<b>MOMENT OF INERTIA</b>	(kgm <sup>2</sup> ) nom./max. 0.01/0.12	(kgm <sup>2</sup> ) nom./max. 0.01/0.12	(kgm <sup>2</sup> ) nom./max. 0.01/0.12	
<b>USER WIRING</b>	electrical D-sub (15-pin + 9-pin) pneumatic tubes (2 x Ø 4 mm and 2 x Ø 6 mm)			
<b>SHAFT</b>	(mm) Ø outside/inside 20 H7/14			
<b>INSERTION FORCE</b>	(N) permanent 150			
<b>WEIGHT</b>	(kg) 27 floor	(kg) 27 floor	(kg) 28 floor	
<b>MOUNTING OPTION</b>	(kg) 27 ceiling	(kg) 27 ceiling	(kg) 28 ceiling	
	(kg) 29 wall	(kg) 29 wall	(kg) 29.5 wall	
<b>CONTROLLER</b>	RC180 / RC620 / RC620+			
<b>MANIPULATOR MODEL</b>	mounting option floor, wall, ceiling cleanroom (ISO3) & ESD, IP protection class: standard / IP54 / IP65			
<b>AVAILABLE OPTIONS</b>	longer cables (5 m/10 m/20 m), tool adaptor, for floor and ceiling mounting: cable outlet directly below or above the base (power/signal cable and user wiring), external wiring unit, bellows			

x=shaft length; x=1 180mm; x=3 330mm

## Scope of delivery

- Epson robot and controller
- 1 Epson RC+ program CD including Simulator
- 2 sets of mounting brackets for the robot controller (RC180)
- 70 g grease for shaft
- 1 set 3 m motor and signal cable
- 1 emergency stop connector
- 1 connector for standard I/O
- 1 set connectors for user wiring
- 1 back-up disc for the robot controller (RC180)
- 1 USB programming cable (RC180)
- Manuals on CD
- 1 installation/safety manual

## Manipulator options

- Longer motor and signal cables (5 m/10 m/20 m)
- Tool adaptor for easy mounting of end effectors to shaft
- External wiring unit: The external empty conduit allows the clean feeding of further user media very near to the corresponding end effector (recommended e.g. for fluid lines).
- Downward cable: Serves as an outlet for motor and signal lines through a hole in the mounting plate directly below the manipulator so that robot cables are not visible in the robot cell (recommended e.g. for cleanroom applications).
- Bellows option: 2 pieces bellows for mounting on shaft. Protects spline and environment from dirt.

Dimensions of the Epson SCARA G6

	G6-45xS	G6-55xS	G6-65xS
A	(mm) 200	(mm) 300	(mm) 400
B		(mm) 180	(mm) 330
C		(mm) 119	(mm) -31
D		(mm) 684	(mm) 834

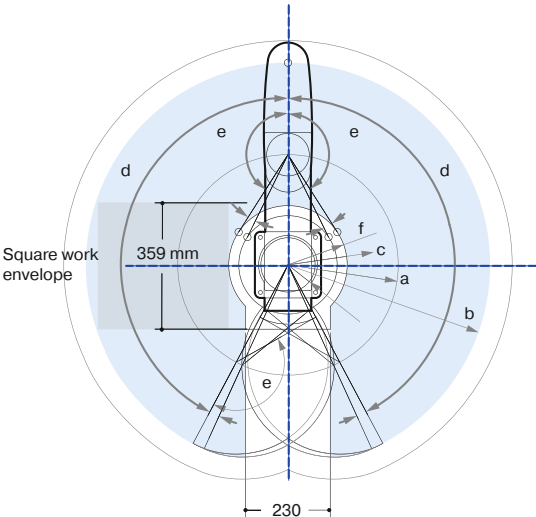
Work envelope of the Epson SCARA G6

	G6-45xS	G6-55xS	G6-65xS
a	(mm) 200	(mm) 300	(mm) 400
b-a	(mm) 250	(mm) 250	(mm) 250
c	Z: 0 to -270 (mm) 134.8	(mm) 161.2	(mm) 232
	Z: -270 to -330 (mm) 143.5		
d	152°	152°	152°
e	Z: 0 to -270 147.5°	147.5°	147.5°
	Z: -270 to -330 145°		
f	(mm) 124.4	(mm) 133.8	(mm) 207.5

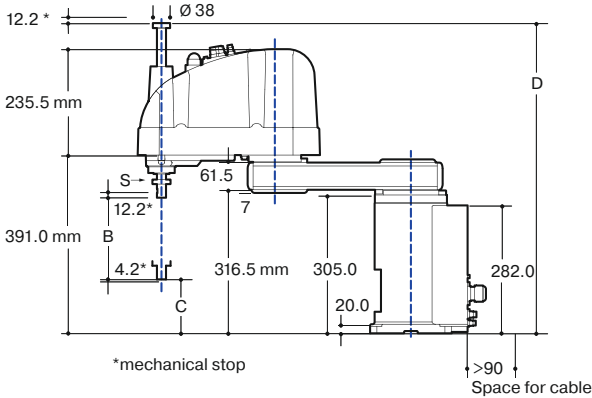
In Z-area: 0 to -270 mm, the area is limited by the collision area of manipulator body and arm.

- a Length of arm #1
- b Length of arm #2
- c Work envelope
- d Work envelope of axis #1
- e Work envelope of axis #2
- f Area of the mechanical stop

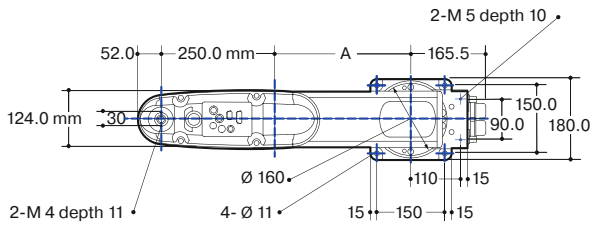
Work envelope of the G6-55xS



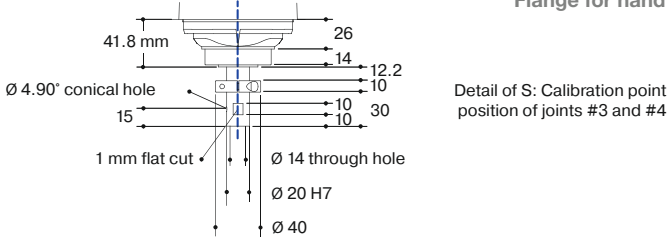
Front view



Top view standard



Flange for hand



Detail of S: Calibration point position of joints #3 and #4

## Specifications

	EPSON SCARA G10-65xS	EPSON SCARA G10-85xS
<b>DESIGN</b>	external oriented horizontal articulated arm	
<b>PAYLOAD</b>	(kg) nom./max. 5/10	
<b>REACH</b>	horizontal (J1+J2)	(mm) <b>650</b> (250+400)
	vertical (J3)	<b>x=1</b> 180 or 150 (cleanroom and IP54 and IP65) <b>x=4</b> 420 or 390 (cleanroom and IP54 and IP65)
	orientation (J4)	(°) +/-360
<b>REPEATABILITY</b>	horizontal (J1+J2)	(mm) +/-0.025
	vertical (J3)	(mm) +/-0.010
	orientation (J4)	(°) +/-0.005
<b>MOMENT OF INERTIA</b>	(kgm <sup>2</sup> ) nom./max. 0.02/0.25	(kgm <sup>2</sup> ) nom./max. 0.02/0.25
<b>USER WIRING</b>	electrical D-sub (15-pin + 9-pin) pneumatic tubes (2 x Ø 4 mm and 2 x Ø 6 mm)	
<b>SHAFT</b>	(mm) Ø outside/inside 25 H7/18	
<b>INSERTION FORCE</b>	(N) permanent 250	
<b>WEIGHT</b>	(kg) 46 floor	(kg) 48 floor
<b>MOUNTING OPTION</b>	(kg) 46 ceiling	(kg) 48 ceiling
	(kg) 51 wall	(kg) 53 wall
<b>CONTROLLER</b>	RC180 / RC620 / RC620+	
<b>MANIPULATOR MODEL</b>	mounting option floor, wall, ceiling cleanroom (ISO3) & ESD, IP protection class: standard / IP54 / IP65	
<b>AVAILABLE OPTIONS</b>	longer cables (5 m/10 m/20 m), tool adaptor, for floor and ceiling mounting: cable outlet directly below or above the base (power/signal cable and user wiring), external wiring unit, bellows	

x=shaft length; x=1 180mm; x=4 420mm

## Scope of delivery

- Epson robot and controller
- 1 Epson RC+ program CD including Simulator
- 2 sets of mounting brackets for the robot controller (RC180)
- 70 g grease for shaft
- 1 set 3 m motor and signal cable
- 1 emergency stop connector
- 1 connector for standard I/O
- 1 set connectors for user wiring
- 1 back-up disc for the robot controller (RC180)
- 1 USB programming cable (RC180)
- Manuals on CD
- 1 installation/safety manual

## Manipulator options

- Longer motor and signal cables (5 m/10 m/20 m)
- Tool adaptor for easy mounting of end effectors to shaft
- External wiring unit: The external empty conduit allows the clean feeding of further user media very near to the corresponding end effector (recommended e.g. for fluid lines).
- Downward cable: Serves as an outlet for motor and signal lines through a hole in the mounting plate directly below the manipulator so that robot cables are not visible in the robot cell (recommended e.g. for cleanroom applications).
- Bellows option: 2 pieces bellows for mounting on shaft. Protects spline and environment from dirt.

Dimensions of the Epson SCARA G10

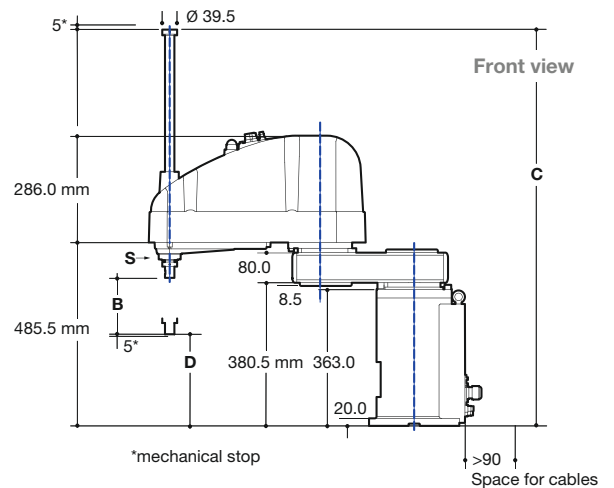
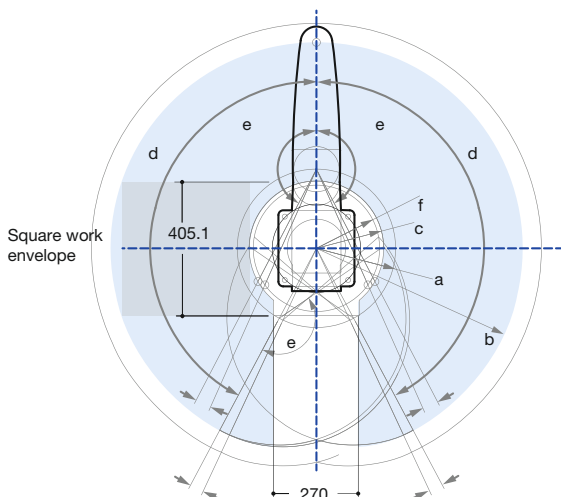
	G10-65xS	G10-85xS	G10-XX1S	G10-XX4S
A	(mm) 250	(mm) 450		
B			(mm) 180	(mm) 420
C			(mm) 813.5	(mm) 1,053.5
D			(mm) 213.5	(mm) -26.5

Work envelope of the Epson SCARA G10

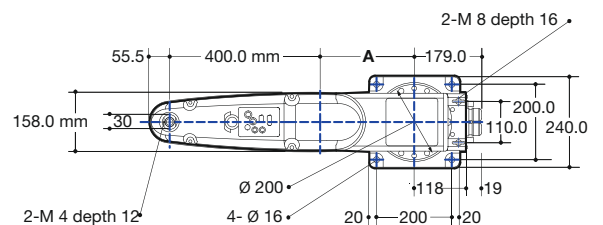
	G10-65xS	G10-85xS
a	(mm) 250	(mm) 450
b-a	(mm) 400	(mm) 400
c	(mm) 212.4	(mm) 207.8
d	152°	152°
e	152.5°	152.5°
f	(mm) 199.4	(mm) 183.3

- a Length of arm #1
- b Length of arm #2
- c Work envelope
- d Work envelope of axis #1
- e Work envelope of axis #2
- f Area of the mechanical stop

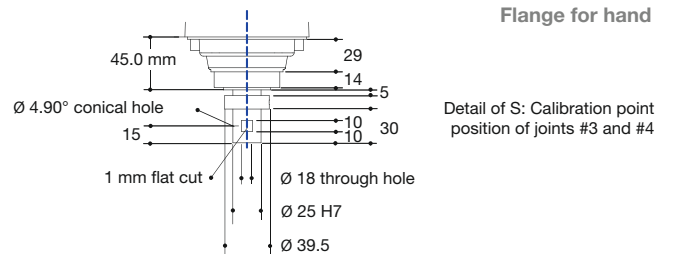
Work envelope of the G10-65xS



Top view standard



Flange for hand



## Specifications

	EPSON SCARA G20-85xS	EPSON SCARA G20-A0xS
<b>DESIGN</b>	external oriented horizontal articulated arm	
<b>PAYLOAD</b>	(kg) nom./max. 10/20	
<b>REACH</b>	horizontal (J1+J2)	(mm) <b>850</b> (450+400)
	vertical (J3)	<b>x=1</b> 180 or 150 (cleanroom and IP54 and IP65) <b>x=4</b> 420 or 390 (cleanroom and IP54 and IP65)
	orientation (J4)	(°) +/-360
<b>REPEATABILITY</b>	horizontal (J1+J2)	(mm) +/-0.025
	vertical (J3)	(mm) +/-0.010
	orientation (J4)	(°) +/-0.005
<b>MOMENT OF INERTIA</b>	(kgm <sup>2</sup> ) nom./max. 0.05/0.45	(kgm <sup>2</sup> ) nom./max. 0.05/0.45
<b>USER WIRING</b>	electrical D-sub (15-pin + 9-pin) pneumatic tubes (2 x Ø 4 mm und 2 x Ø 6 mm)	
<b>SHAFT</b>	(mm) Ø outside/inside 25 H7/18	
<b>INSERTION FORCE</b>	(N) permanent 250	
<b>WEIGHT</b>	(kg) 48 floor	(kg) 50 floor
<b>MOUNTING OPTION</b>	(kg) 48 ceiling	(kg) 50 ceiling
	(kg) 53 wall	(kg) 55 wall
<b>CONTROLLER</b>	RC180 / RC620 / RC620+	
<b>MANIPULATOR MODEL</b>	mounting option floor, wall, ceiling cleanroom (ISO3) & ESD, IP protection class: standard / IP54 / IP65	
<b>AVAILABLE OPTIONS</b>	longer cables (5 m/10 m/20 m), tool adaptor, for floor and ceiling mounting: cable outlet directly below or above the base (power/signal cable and user wiring), external wiring unit, bellows	

x=shaft length; x=1 180mm; x=4 420mm

## Scope of delivery

- Epson robot and controller
- 1 Epson RC+ program CD including Simulator
- 2 sets of mounting brackets for the robot controller (RC180)
- 70 g grease for shaft
- 1 set 3 m motor and signal cable
- 1 emergency stop connector
- 1 connector for standard I/O
- 1 set connectors for user wiring
- 1 back-up disc for the robot controller (RC180)
- 1 USB programming cable (RC180)
- Manuals on CD
- 1 installation/safety manual

## Manipulator options

- Longer motor and signal cables (5 m/10 m/20 m)
- Tool adaptor for easy mounting of end effectors to shaft
- External wiring unit: The external empty conduit allows the clean feeding of further user media very near to the corresponding end effector (recommended e.g. for fluid lines).
- Downward cable: Serves as an outlet for motor and signal lines through a hole in the mounting plate directly below the manipulator so that robot cables are not visible in the robot cell (recommended e.g. for cleanroom applications).
- Bellows option: 2 pieces bellows for mounting on shaft. Protects spline and environment from dirt.



Dimensions of the Epson SCARA G20

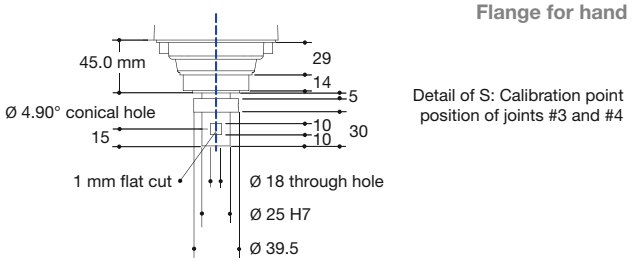
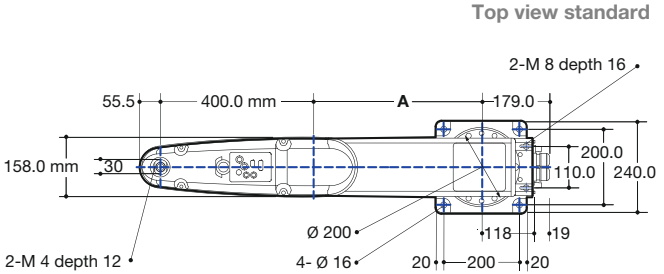
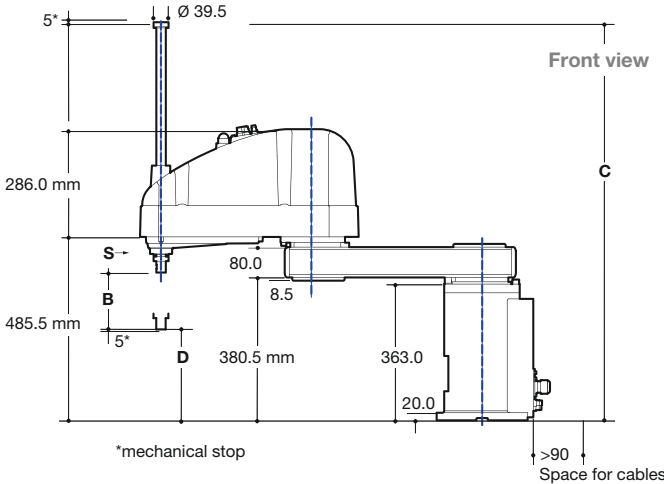
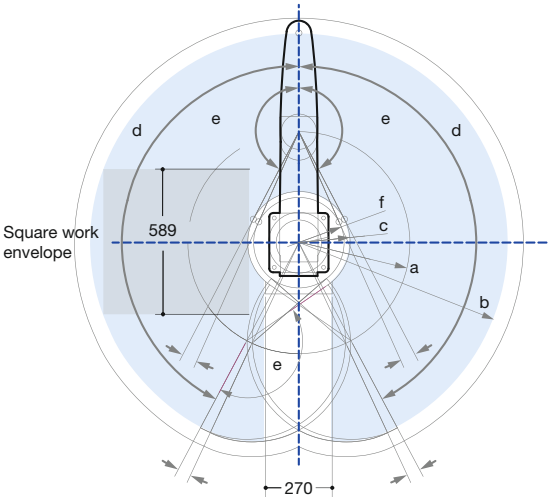
	G20-85xS	G20-A0xS	G20-XX1S	G20-XX4S
A	(mm) 450	(mm) 600		
B			(mm) 180	(mm) 420
C			(mm) 813.5	(mm) 1,053.5
D			(mm) 213.5	(mm) -26.5

Work envelope of the Epson SCARA G20

	G20-85xS	G20-A0xS
a	(mm) 450	(mm) 600
b	(mm) 400	(mm) 400
c	(mm) 207.8	(mm) 307
d	152°	152°
e	152.5°	152.5°
f	(mm) 183.3	(mm) 285.4

- a Length of arm #1
- b Length of arm #2
- c Work envelope
- d Work envelope of axis #1
- e Work envelope of axis #2
- f Area of the mechanical stop

Work envelope of the G20-85xS



# EFFICIENTLY USING RESOURCES

Reduced mass but increased power. Optimised efficiency. Compact design but a larger work envelope. We always consider the next step. It is not all about the initial investment, but also about the operating and follow-up costs of our robots in your application. Our aim: to be efficient in every way.

## More power in reduced space

Slim design and minimised weight lead to considerable savings in operating costs. Compared to previous models, we have reduced our G-series by 10% in height, for example. Since the robots have no tubes and the user wiring inside, the design is particularly compact.

## Larger work envelope

We have increased the working range of our SCARA kinematics by an average 23%. The result is an work envelope which is equal to that of non-Epson robots of the next bigger size.

## Higher speed

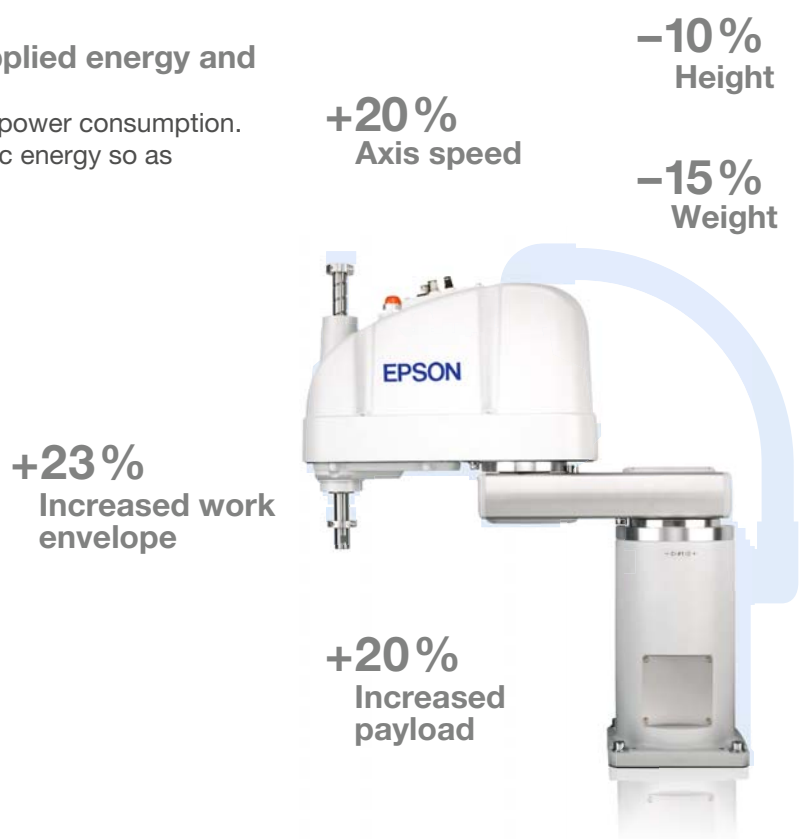
We have achieved an average increase in axis speed of 20%, just the same as the payload. Every kinematics has the highest position accuracy of its class.

## High efficiency, optimised ratio of supplied energy and payload

All Epson robots stand out for a particularly low power consumption. That way, electric energy is converted into kinetic energy so as to achieve high efficiency and short cycle times.

## Economical — also in the long run

The combination of maximum reliability, a reduced number of components and reusability of components results in a high added value.



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# THE GREEN WAY: ENVIRONMENT AND SUSTAINABILITY

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Environmental protection has a long tradition at Epson and is an integral part of the company philosophy. It is our aim to reduce the environmental impact of our products — from the concept to recycling, from the choice of materials and components to transport to reuse.

## **Saving energy — and costs**

Energy is money and a real economic factor. Therefore, we consistently strive to develop particularly reliable, failsafe products which consume less and less energy. Since 1995, Epson has implemented an environmental management system based on a holistic approach.

## **Environmental Vision 2050 — our goals**

With our Environmental Vision 2050, we set an example. One of our main intentions is to reduce our CO<sub>2</sub> emissions during the complete life cycle of a product by 90% by 2050. Moreover, we are going to introduce reuse and recycling for all of our products and are engaged in protecting biodiversity.

## **Sustainable and environmentally friendly**

Within the framework of our sustainability initiative, we have committed ourselves to high ethical and ecological standards. The annual “Epson Sustainability Report” documents how we ensure and continuously improve the good environmental performance of our products and production processes.

## **Life cycle assessment**

Since the year 2000, we have been registering the environmental impact of individual items of our manufacturing program. Life cycle assessment gives information about how much raw material and energy a product consumes within the course of its production, use and disposal and what emissions are generated.

Download the “Sustainability Report” at:  
<http://global.epson.com/sr/report/>

**Better Products for a Better Future™**

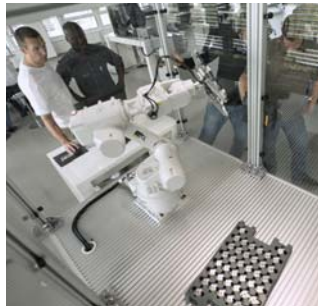


### Epson Industry Solutions Center – that's where we find your solution!

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 538 1800 or just e-mail us at:  
[robot.infos@epson.de](mailto:robot.infos@epson.de)



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