

The real alternative ...

**Compact and 'all-inclusive'  
in the spindle box**

Ever more demanding requirements for higher metal removal rates with higher speeds in combination with a more compact design have resulted in the increased use of motorized spindles. With the ECO 2SP1 series, Siemens provides motorized spindles for milling machines with an extremely attractive price/performance ratio, proving once again its expertise as a system supplier of equipment for machine tools.

**Compact and complete  
with all the spindle functions  
required**

The new motorized spindle family is optimized in terms of its performance data such that it represents a real alternative to conventional belt-driven solutions. It also consumes much less space and can be installed quickly and easily thanks to its cartridge-type design. All the important components of a motorized spindle are available. These include:

- Different types of tool interfaces (SK40, CAT40, BT40 or HSK A63)
- Pneumatic or hydraulic tool clamping and releasing mechanism
- Rugged spindle bearings in maintenance-free greased design to absorb the machining forces
- Water-cooled drive motors in synchronous or asynchronous design
- Enclosed spindle housing with mounting flange
- Sensors for indexing and monitoring tool changing

eco motor spindle  
2SP1

**SIEMENS**

# ECO Motor Spindle 2SP1

For milling machines in particular, this range of complete motorized spindles gives you the opportunity to obtain a complete, pretested system unit in which the mechanical components such as bearings, sensors, cooling, clamping units are perfectly matched. They also offer the maximum possible compactness.

## High torque output and universal applicable

The ECO motorized spindle 2SP1 as standard has a high output torque and can therefore be used both for roughing and finishing.

The motorized spindles are characterized by their extremely rugged construction. Different levels of performance with various output values and speed characteristic values are available, based on two different diameter sizes, whereby several different output levels are possible within the same milling machine family.

There are different torque classes (40 Nm / 80 Nm / 100 Nm / 150 Nm S1 mode) and two speed classes (10,000 rpm / 15,000 rpm / 18,000 rpm) to satisfy different torque and speed requirements.

## Expertise in spindle manufacture – Reliable in use

Reliable operation of the ECO motorized spindles 2SP1 is guaranteed by the experience in spindle manufacturing gained by the company Weiss Spindeltechnologie GmbH over many years and the expertise of Siemens in control and drive systems for machine tools.

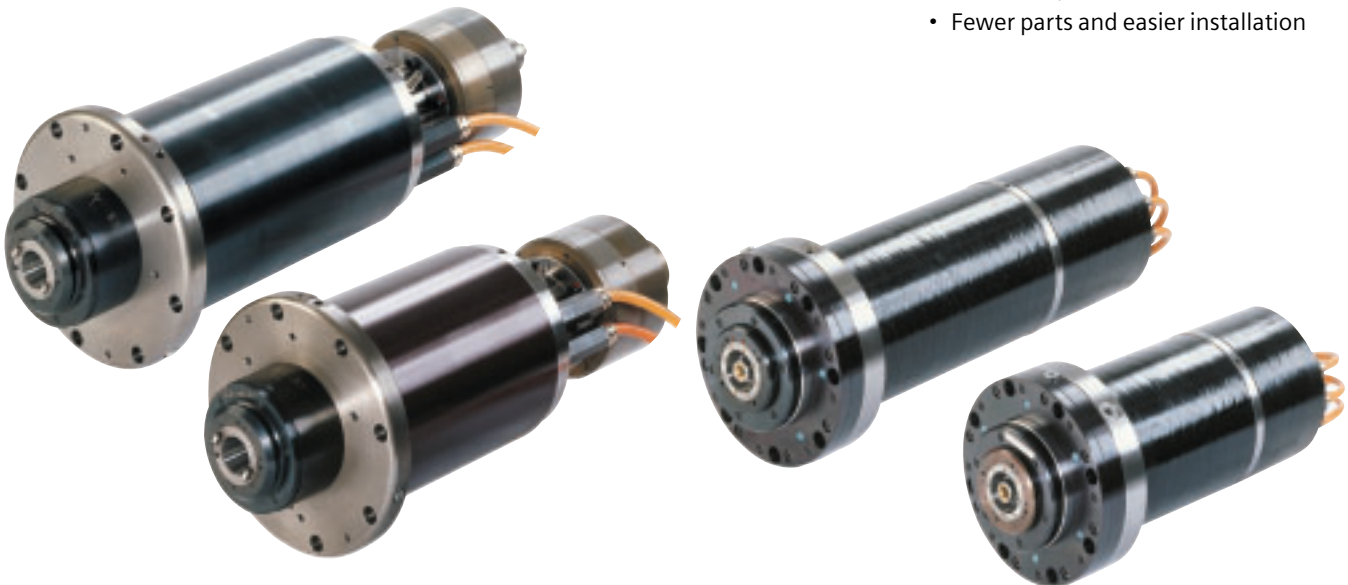
This mechatronic unit is a symbiosis of high-quality mechanical engineering and bearing technology combined with the latest motor technology and electronics. ECO motorized spindles are manufactured by Weiss.

Weiss Spindeltechnologie GmbH  
A Siemens Company  
Rudolf Diesel Str. 35  
D-97424 Schweinfurt  
Germany

## Economical standard solution with a number of advantages

The ECO motor spindle 2SP1 is the ideal drive solution for main spindles in standard milling machines and machining centers and offers the customer significant advantages in comparison with conventional belt-driven solutions:

- The low-cost complete solution is comparable with belt-driven solutions and more economical than the classical customized motorized spindle designs
- Hydraulic or pneumatic tool clamping and releasing mechanism depending on customer preference
- Thanks to the pneumatic tool clamping and releasing mechanism, a hydraulic unit is not required
- Integrated sensors (for indexing and monitoring tool change)
- Worldwide supply of complete systems including spindle mechanics from a single source, from Siemens
- Higher max. speed and shorter acceleration time compared to conventional solutions
- Drive train with greater rigidity
- More compact solution
- Fewer parts and easier installation



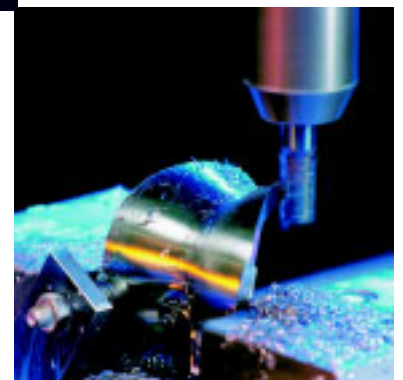
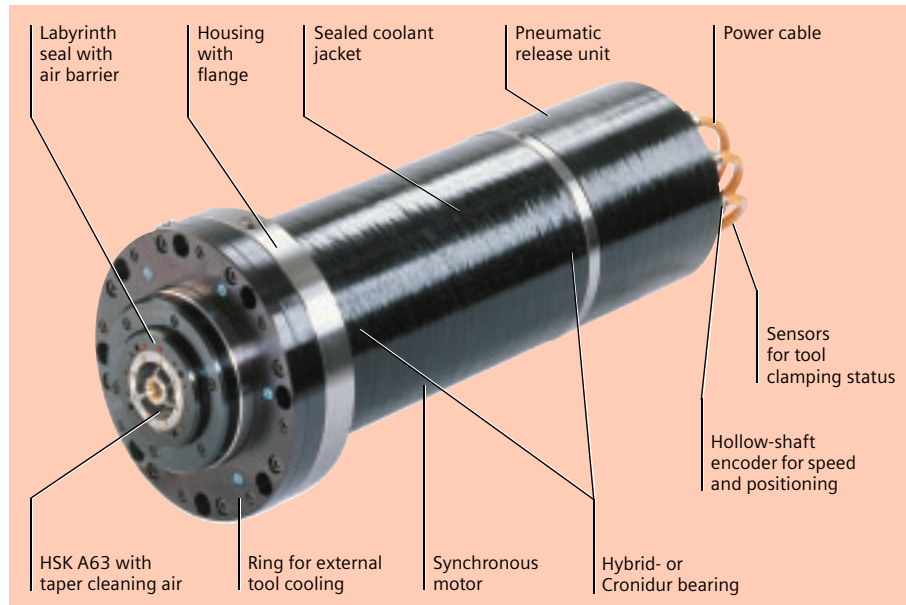
# Design of the ECO Motor Spindle 2SP120

## Standard functions

- Tool interface:
  - HSK A63
- Tool clamping device
  - Released by pneumatic cylinder 6 bar
  - Clamping cup springs
- Tool cleaning
  - Compressed air through draw-bar 5–6 bar
- Working position:
  - Horizontal / vertical
- Housing:
  - Cartridge with flange mounting
- Bearing lubrication
  - Grease, permanently lubricated
- Front bearing seal
  - Sealing air 1.0–1.5 m<sup>3</sup>/h
  - Filter mesh 8 µm
- Hollow-shaft encoder
  - Incremental, sin/cos 1V<sub>pp</sub> 256 S/R with zero indication
- Motor temperature sensor
  - KTY84-130
- Sensor (analog) for clamping status
  - Tool clamped
  - Draw bar in release position
  - Clamped without tool
- Sensor (digital) for position status
  - Release piston
- Cooling
  - Water, max. 5 bar, 10 l/min
  - Max. 25% anticorrosion fluid Clariant Antifrogen N or Tyfocor
  - Filter mesh 100 µm
- Media connections
  - 2 x flexible tube connector Ø 10/12 mm, coolant
  - 1 x G 1/8 radial and Ø 5 mm axial, air barrier
  - 1 x G 1/4, taper cleaning air
  - 1 x G 1/4, pneumatic tool release
  - 1 x G 1/8, pneumatic tool clamping
- Electrical connections
  - Power via 1.5 m cable
  - Sensors via signal plugs

## High feature options

- Internal tool cooling
  - 50 bar, up to 54 l/min
  - Filter mesh 50 µm acc. -16/13 ISO 4406
  - 1 x G1/4, cooling lubrication,
  - 1 x G1/8, leakage
- Max. speed
  - 18,000 rpm
- Tool clamping device
  - Release by hydraulic cylinder 80 bar
  - Clamping by cup springs
  - 1 x G 1/4, hydraulic tool release
  - 1 x G 1/4, hydraulic tool clamping
- Ring for external tool cooling



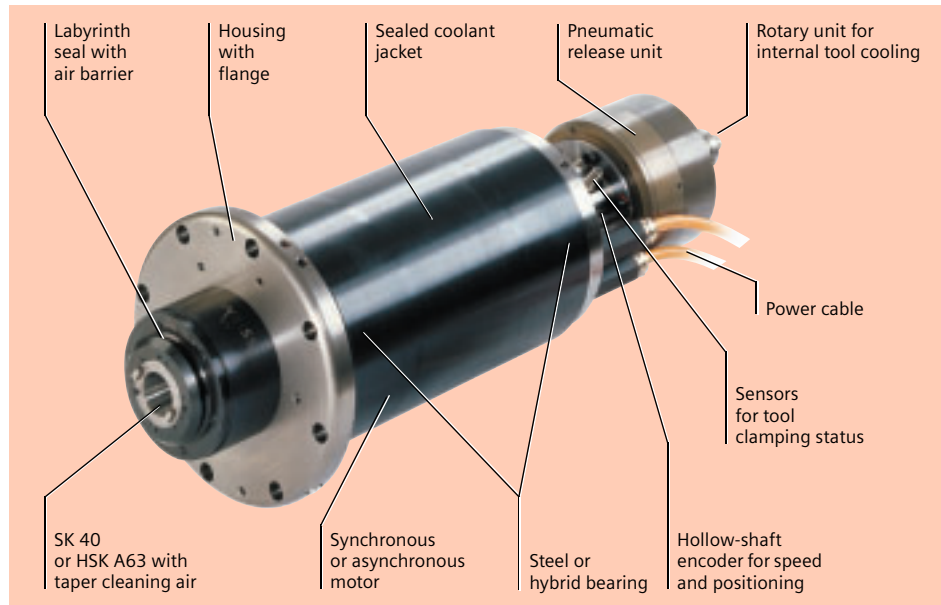
# Design of the ECO Motor Spindle 2SP125

## Standard functions

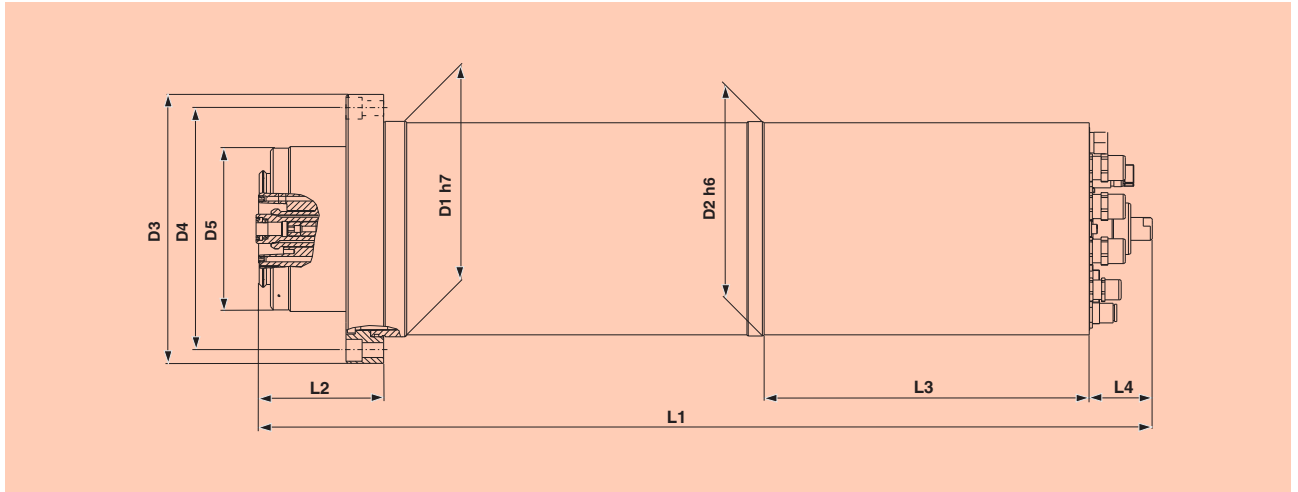
- Tool interface:
  - SK 40 for tools with asymmetrical slot arrangements
- Tool clamping device
  - Released by pneumatic cylinder 6 bar
  - Clamping cup springs
- Tool cleaning
  - Compressed air through draw-bar 5–6 bar
- Working position:
  - Horizontal / vertical
- Housing:
  - Cartridge with flange mounting
- Bearing lubrication
  - Grease, permanently lubricated
- Front bearing seal
  - Sealing air 1.0-1.5 m<sup>3</sup>/h
  - Filter mesh 8 μm
- Hollow-shaft encoder
  - Incremental, sin/cos 1V<sub>pp</sub> 256 S/R with zero indication
- Motor temperature sensor
  - KTY84-130
- Sensor for clamping status
  - Tool clamped
- Cooling
  - Water, max. 5 bar, 10 l/min
  - Max. 25% anticorrosion fluid Clariant Antifrogen N or Tyfocor
  - Filter mesh 100 μm
- Media connections
  - 2 x G 1/2 (Ø 9 mm), coolant
  - 1 x G 1/8 (Ø 5 mm), air barrier
  - 1 x G 1/4, taper cleaning air
  - 1 x M16x1.5 pneumatic tool release
  - 1 x G 1/8, pneumatic tool clamping
- Electrical connections
  - Power via 1.5 m cable
  - Sensors via signal plugs

## High feature options

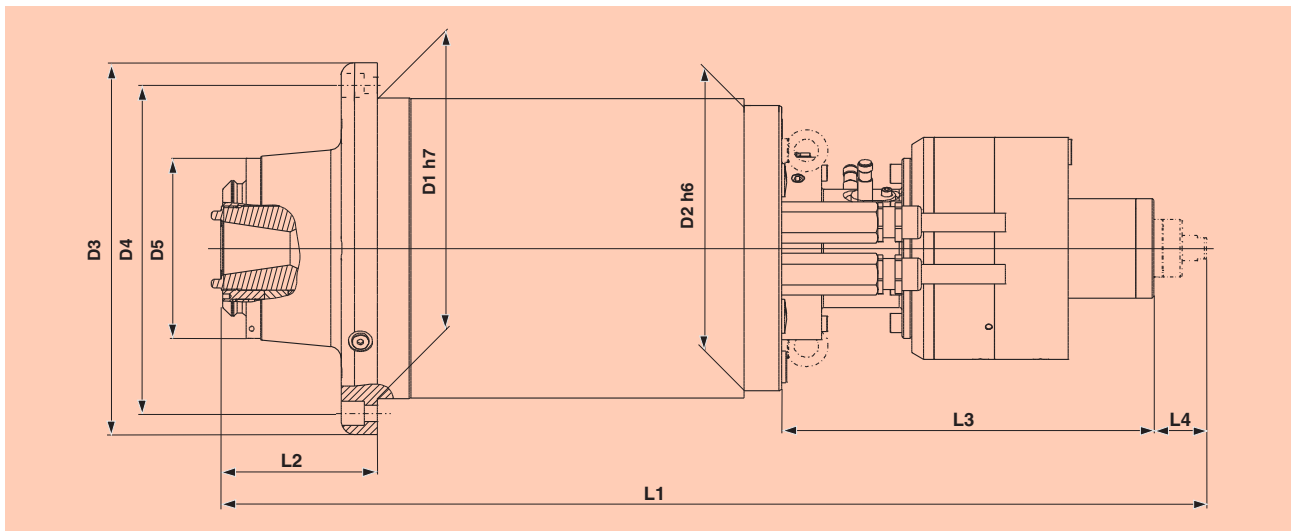
- Internal tool cooling
  - 50 bar, up to 54 l/min
  - Filter mesh 50 μm acc. -/16/13 ISO 4406
  - 1 x G1/4, cooling lubrication,
  - 1 x G1/8, leakage
- Max. speed
  - 15,000 rpm (with HSK A63)
- Tool interface
  - BT 40
  - CAT 40
  - HSK A63
- Sensor for clamping status
  - Draw-bar in release position
  - Clamped without tool



# Dimensions of the ECO Motor Spindle 2SP1



2SP120..



2SP125..

	D1 [mm]	D2 [mm]	D3 [mm]	D4 [mm]	D5 [mm]	L1 <sup>1)</sup> [mm]	L2 [mm]	L3 [mm]	L4 [mm]
2SP1202	200	199	250	225	150	727 <sup>4)</sup>	115.5	301 <sup>4)</sup>	58.2 <sup>4)</sup>
2SP1204	200	199	250	225	150	827 <sup>4)</sup>	115.5	301 <sup>4)</sup>	58.2 <sup>4)</sup>
2SP1253 <sup>2)</sup>	250	237	310	275	150	813	124.4	310	43
2SP1255 <sup>2)</sup>	250	237	310	275	150	913	124.4	310	43
2SP1253 <sup>3)</sup>	250	237	310	275	150	819	130.0	310	43
2SP1255 <sup>3)</sup>	250	237	310	275	150	919	130.0	310	43

Specifications subject to change

1) Without internal tool cooling, the spindle length is shorted by approx. 43 mm

2) Tool interface HSK A63

3) Tool interface SK40, CAT40, BT40

4) With hydraulic tool clamping device the spindle length L1 is shorted approx. 91 mm and L3 is approx. 121 mm shorter and L4 is approx. 30 mm longer

# ECO Motor Spindle 2SP1

## Spectrum of ECO motorized spindles 2SP1

Order No.	Rated power S1 [kW]	Rated torque S1 [Nm]	Rated speed [rpm]	Rated current S1 [A]	Rated power S6-40% [kW]	Rated torque S6-40% [Nm]	Rated power S1 [kW]	Rated torque S1 [Nm]	Rated speed [rpm]	Rated current S1 [A]	Maximum speed [rpm]
<b>Synchronous</b>											
	Star operation						Delta operation				
2SP1202-1HA-1DF2	12.0	42	2,700	30	12.0	55					15,000
2SP1202-1HB-2DF2	15.5	42	3,500	42	15.5	55					18,000
2SP1204-1HA-1DF2	26.4	84	3,000	60	26.4	110					15,000
2SP1204-1HB-2DF2	35.0	78	4,300	79	35.0	110					18,000
<b>Asynchronous</b>											
2SP1253-8HA0-0-2	13.2	70	1,800	28	18.9	100	13.2	32	4,000	29	10,000
2SP1253-8HA0-1D-2	13.2	70	1,800	28	18.9	100	13.2	32	4,000	29	15,000
2SP1255-8HA0-0-2	11.7	140	800	30	16.7	200	11.7	62	1,800	29	10,000
2SP1255-8HA0-1D-2	11.7	140	800	30	16.7	200	11.7	62	1,800	29	15,000
<b>Synchronous</b>											
2SP1253-1HA0-0-2	26.0	100	2,500	53	29.0	130					10,000
2SP1253-1HB0-1D-2	35.0	100	3,300	68	38.0	130					15,000
2SP1255-1HA0-0-2	46.3	170	2,600	95	55.0	236					10,000
2SP1255-1HB0-1D-2	53.4	170	3,000	120	64.0	236					15,000

## Options for 2SP1 motorized spindles

### Sensors

- B: Sensor "Tool clamped"
- C: B + Sensor "Draw-bar in release position"
- D: C + Sensor "Clamped without tool"
- F: D + Sensor „Position release piston“

### Tool interfaces

- A: SK 40 tool interface
- B: BT 40 45° tool interface
- C: CAT 40 tool interface
- D: HSK A 63 tool interface
- E: BT 40 30° tool interface

### Cooling

- 1: closed cooling jacket
- 3: closed cooling jacket and internal tool cooling
- 5: closed cooling jacket, internal tool cooling and ring for external tool cooling (only 2SP120..)

### Tool clamping- and -releasing device

- 0: pneumatic
- 1: hydraulic

You can find information about this product on the Internet at:



<http://www.siemens.com/sinumerik>

For contact addresses, visit:

<http://www.siemens.com/automation/partners>

You can e-mail us at:



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