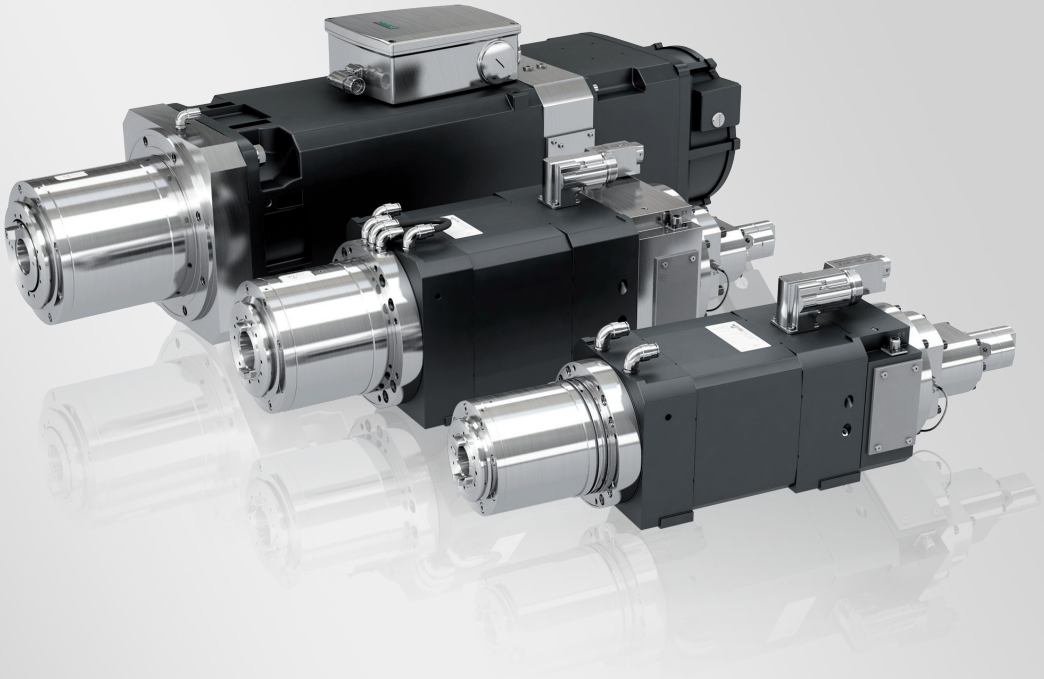


Hybrid Spindle

The better alternative instead of indirect spindle solutions

WEISS Spindeltechnologie
March 2024

WEISS
An Innomotics Business

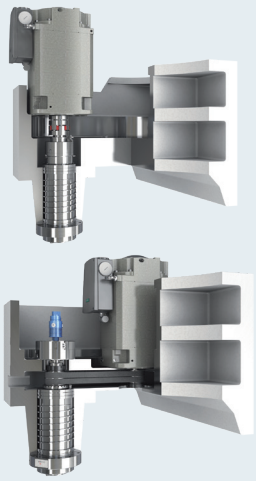
Hybrid Spindle

More than only an alternative for indirect spindle solutions

Weiss Spindle Technology GmbH is a 100% Siemens subsidiary, with over 30 years experience in developing spindles. All expertise in the field of motor spindles and indirect driven spindles is concentrated here.

A development is the Hybrid Spindle, a combination of a main spindle motor with an extension to a total milling spindle.

The design includes all necessary spindle functionality, maximum speed up to 24,000 rpm and high accuracy because of direct driven technology. The Hybrid Spindle gives to machine builders the possibility to improve the performance of machines originally built with indirect spindle solution.



Indirect spindle drive applications

limited in compactness, max. speed usability and accuracy.

The better alternative

Hybrid Spindle
- Higher speed
- More accuracy
- Less installation time

The Hybrid Spindle is available in three main dimensions:

	Dimension 80	Dimension 100	Dimension 132
Speed [rpm] up to	24,000	18,000 (20,000)[1)]	12,000
Power [kW] up to (S1)	11.5	18.5	30
Torque [Nm] up to (S1)	21	54	191
Interface	SK30 (DIN 69871/72), BBT30 (MAS 45°)	SK40 (DIN 69871/72), BT40 / BBT40 (MAS 45°)	SK40 (DIN 69871/72), HSK-A63, BT40 (MAS 45°)
Bearings	Grease lubricated precision angular contact ball bearings, head cooling[2)]		
Motor	Asynchronous motor, water cooled		water- or air cooled
Fixation	With flange or fixing strips[1)] on machine slide		
Degree of protection	IP64 (labyrinth sealing with air purge)/ IP53		
Options	- Hydraulic release unit with/ without rotary union - Analog sensor for drawbar positioning monitoring - DRIVE-CLiQ		

[1)] on request
[2)] only dimension 100
[3)] only dimension 80

Technical Data

Perfect for a variety of applications

Vertical machine centers

Increased productivity thanks to hybrid spindles with shaft heights of 80 at up to 24,000 rpm.

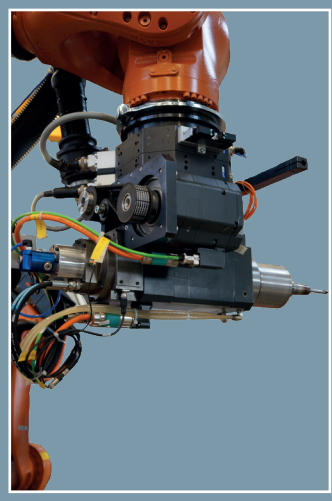
Series 100 hybrid spindles with speeds of up to 18,000 rpm, SK40 or HSB A63 tool interfaces and spindle head cooling are ideal for mold and die making applications.

Picture: Voortman Steel Machinery B.V.

Production machines with spindle units for drilling and milling

Series 132 hybrid spindles are available with water-cooled or air-cooled motors.

The sensor technology and unclamping unit options are well suited for automatic tool changing.



Robot applications

Thanks to their compact design, the hybrid spindles are ideal for robotics applications.

Technical Data

Dimensions 80 and 100

Order No.	Rated Power P_{rated} [kW]	Rated Torque M_{rated} [Nm]	Rated Speed n_{rated}[min^{-1}]	Rated current S1 [A]	Max. Speed n_{max}[rpm]
Dimension 80					
JBD: ■■BA089AP0-■■■ [1)]	5.1[2)]	5.4[2)]	9,000[2)]	18	24,000
JBD: ■■BA089BP0-■■■ [1)]	8.0[2)]	8.5[2)]	9,000[2)]	25	24,000
JBD: ■■BA083AP0-■■■ [1)]	11.5[2)]	9.2[2)]	12,000[2)]	30	24,000
Dimension 100					
JBD: ■■BA103MP1-■■■	11.7[3)]	34[3)]	3,300[3)]	30	18,000
JBD: ■■BA105MP1-■■■	18.5[3)]	54[3)]	3,300[3)]	45	18,000
JBD: on request	18.5[3)]	54[3)]	3,300[3)]	45	20,000

[1)] Standard Series
[2)] ALM and SLM
[3)] ALM

Options

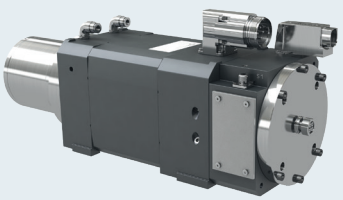
Flange for fixation
0: Without flange for fixation on the machine
1: With flange for fixation on the machine
2: With fixing strips for foot mounting (only dimension 80)

Sensors
A: Encoder with 17-pin connector/ without analog sensor for drawbar position monitoring
B: Encoder with DRIVE-CLiQ/ without analog sensor for drawbar position monitoring
D: Encoder with 17-pin connector/ with analog sensor for drawbar position monitoring
E: Encoder with DRIVE-CLiQ/ with analog sensor for drawbar position monitoring
F: as E + spindle sensor module SMI24 and spindle monitor, which can be optional integrated to SINUMERIK HMI

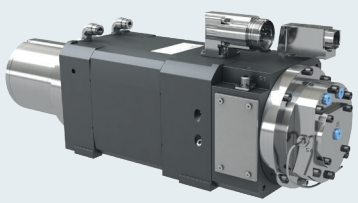
Release tool
A: Without release unit
C: With hydraulic release unit
D: With hydraulic release unit and rotary union

Tool interface
Dimension 80:
AA: SK30 (DIN69871/72)[1)]
EA: BT30 (MAS45°) [1)]
GB: HSK-F63

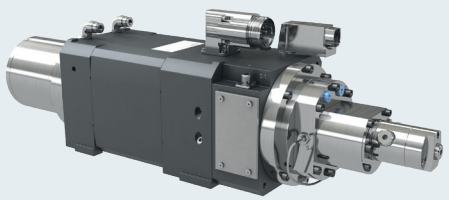
Dimension 100:
AB: SK40 (DIN69871/72)[1)]
EB: BT40 (MAS45°) [1)]
GC: HSK-A63
HB: BBT40 (MAS45°)



Hybrid Spindle
without release unit



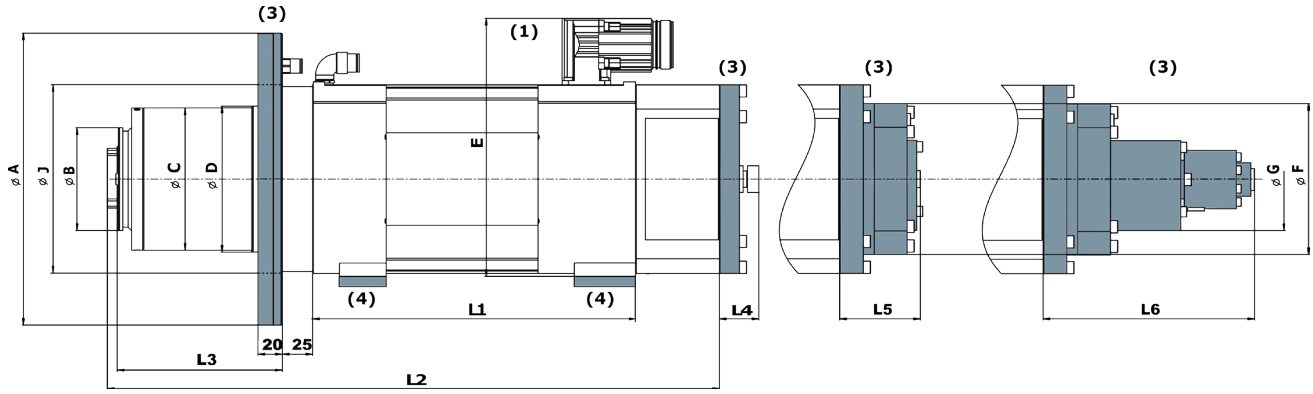
...with hydraulic release unit



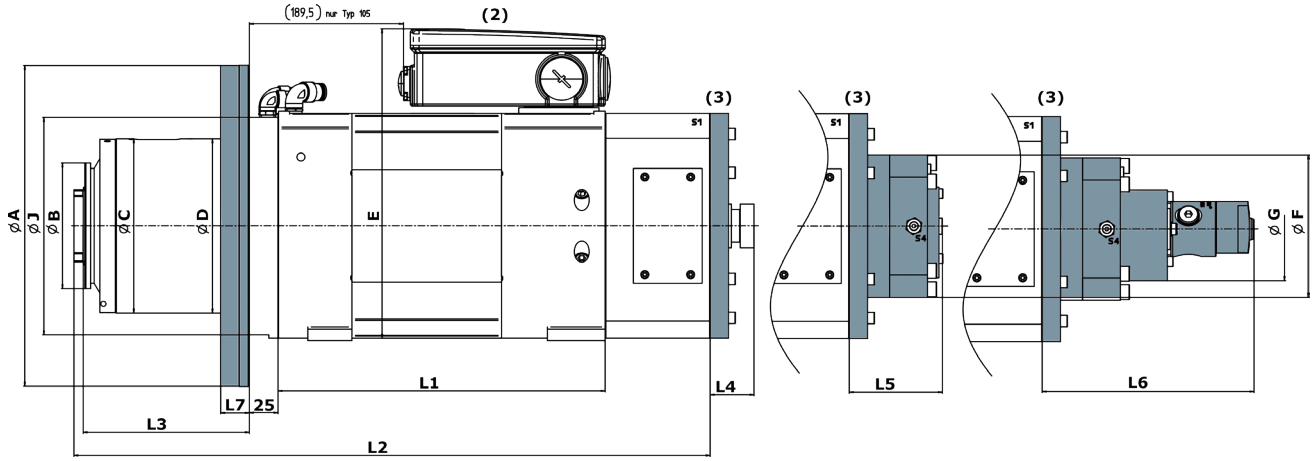
...with hydraulic release unit
and rotary union

Technical Data

Dimension 80



Dimension 100

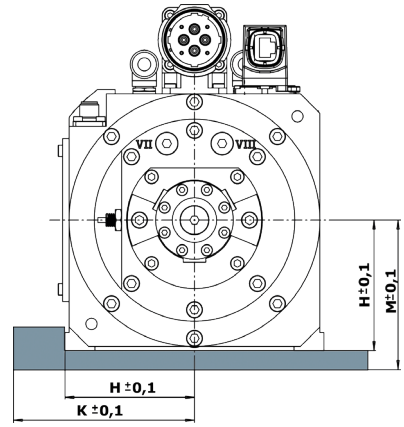


Option - Dimension 80

Option: fixing strips for foot mounting

As an option, hybrid spindles of dimension 80 can be fitted with fixing strips for foot mounting. The spindle is attached directly to the Z carriage of the machine. As a result, the construction of a Z carriage with corresponding spindle housing for flange mounting, is not required.

The strips that are attached to the spindle are aligned in an X and Y direction in relation to the spindle axis. The spindle is aligned to the Z carriage via three stopper surfaces on the fixing strips.



Dimension foot mounting

Order No.	H [mm]	K [mm]	M [mm]
Dimension 80			
JBD: ■ABA089A0- ■■2	80	105	100
JBD: ■ABA089B0- ■■2	80	105	100
JBD: ■ABA083A0- ■■2	80	105	100

Technical Data

Dimensions 80 and 100 - Dimensions

Dimension 80 Order No.	Weight [kg]	A Ø h6 [mm]	J Ø [mm]	B Ø [mm]	C Ø [mm]	D Ø h7 [mm]	G Ø [mm]	F Ø [mm]	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [mm]	L6 [mm]	L7 [mm]	E [mm]
JBD: ■ABA089AP0- ■■■	55	240	152	84.5	117	120	84	124	216	453	136	31.5	68	189	20	212[1)]
JBD: ■ABA089BP0- ■■■	55	240	152	84.5	117	120	84	124	216	453	136	31.5	68	189	20	212[1)]
JBD: ■ABA083AP0- ■■■	62	240	152	84.5	117	120	84	124	266	503	136	31.5	68	189	20	212[1)]

Dimension 100 Order No.	Weight [kg]	A Ø h6 [mm]	J Ø [mm]	B Ø [mm]	C Ø [mm]	D Ø h7 [mm]	G Ø [mm]	F Ø [mm]	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [mm]	L6 [mm]	L7 [mm]	E [mm]
JBD: ■BBA103MP1-■■■	108	280	-	109.5	152	155	90	124	285.5	555	145	38.2	82	185	25	253[1)]
JBD: ■BBA105MP1-■■■	123	280	-	109.5	152	155	90	124	345.0	615	145	38.2	82	185	25	284[2)]
JBD: on request	123	280	-	109.5	152	155	90	124	345.0	615	145	38.2	82	185	25	284[2)]

1) Power socket, size 1.5
2) Terminal box
3) Options
4) Option only Dimension 80

Additional weight by options:
Release unit: Dimension 80: 4.2 kg/ Dimension 100: 4.9 kg
Rotary union: Dimension 80: 2.7 kg/ Dimension 100: 2.7 kg
Flange: Dimension 80: 5.1 kg/ Dimension 100: 8.1 kg
Fixing Strips: Dimension 80: 2.4 kg

Hybrid Spindle: order no. on request

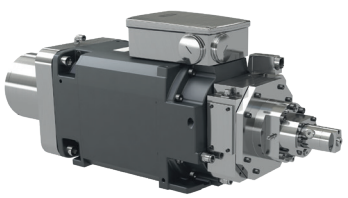
Technical Data

Dimension 132

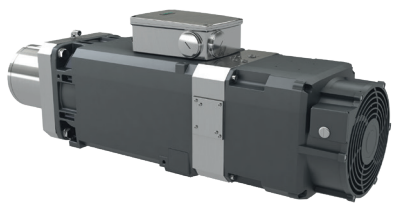
Asynchronous motor - water cooled						
Motor size	Engine-Power Class	Rated Power P_{rated} [kW]	Rated Torque M_{rated} [Nm]	Rated Speed n_{rated}[rpm]	Rated Current S1 [A]	Maximum Speed [rpm]
131	F2	15	96	1,500	30	11,000
131	G2	18	86	2,000	40	12,000
133	F2	17	108	1,500	38	12,000
133	G2	22	105	2,000	52	12,000
135	F2	22	140	1,500	51	12,000
135	G2	29	138	2,000	64	12,000
137	F2	27	172	1,500	67	12,000
138	F2	30	191	1,500	80	12,000

Asynchronous motor - air cooled						
Motor size	Engine-Power Class	Rated Power P_{rated} [kW]	Rated Torque M_{rated} [Nm]	Rated Speed n_{rated}[rpm]	Rated Current S1 [A]	Maximum Speed [rpm]
131	F	11	70	1,500	24	11,000
133	D	12	115	1,000	30	10,000
133	F	15	96	1,500	34	12,000
133	G	20	96	2,000	45	12,000
135	F	18.5	118	1,500	43	12,000
137	D	17	162	1,000	43	12,000
137	F	22	140	1,500	56	12,000
137	G	28	134	2,000	60	12,000

	Hybrid Spindle AH 132 - water cooled	Hybrid Spindle AH 132 - air cooled
Flange for fixation	x	x
Encoder with DRIVE-CLiQ	x	x
Release tool without release unit	x	not possible
Hydraulic release unit	x	x
Rotary union (only with release unit)	x	x
Spindle Sensor Module	x	x
Tool interfaces	x	x
SK40 (DIN69871/72)	x	x
BT40 (MAS45°)	x	x
HSK A63	x	x
HSK C63	x	x
others on request	x	x



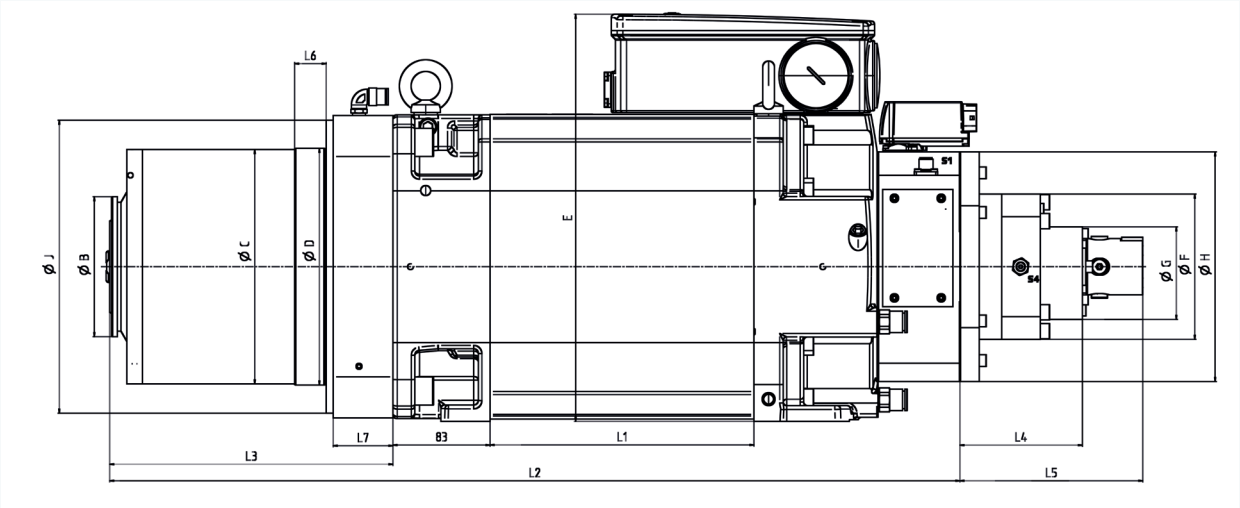
Hybrid Spindle Dimension 132 - water cooled

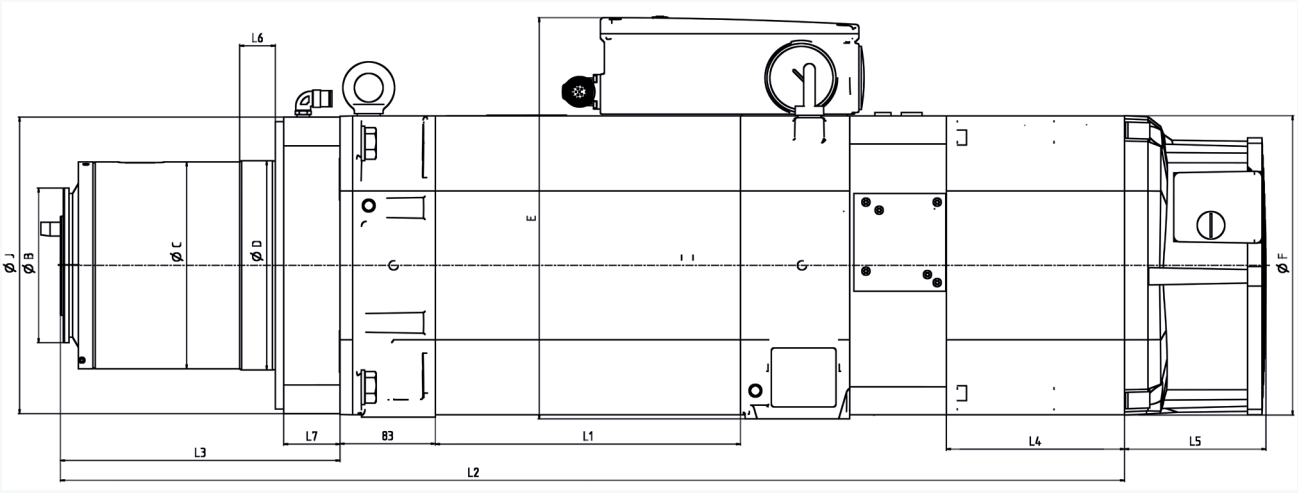


Hybrid Spindle Baugröße 132 - air cooled

Technical Data

Dimension 132

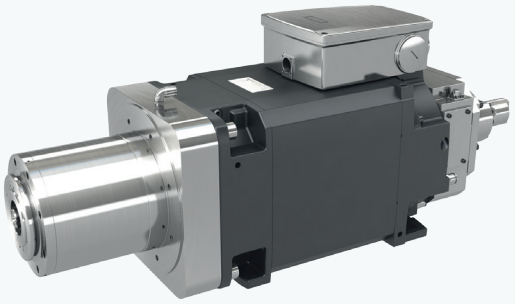




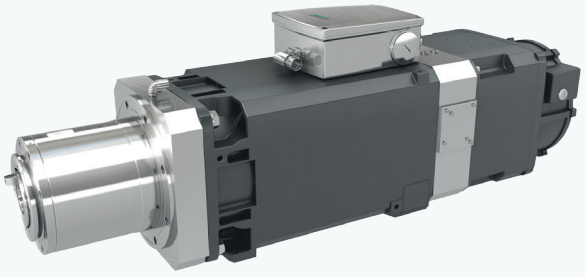
Technical Data

Dimension 132

Asynchronous motor - water cooled																
Motor size	Weight [kg]	J Ø [mm]	B Ø [mm]	C Ø [mm]	D Ø [mm]	E [mm]	F Ø [mm]	G Ø [mm]	H Ø [mm]	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [mm]	L6 [mm]	L7 [mm]
131	240	250	109.5	167	170	349	124	90	196	135.5	636.5	242	105	156	27	51
133	250	250	109.5	167	170	349	124	90	196	180.5	681.5	242	105	156	27	51
135	260	250	109.5	167	170	349	124	90	196	225.5	726.5	242	105	156	27	51
137/ 138	270	250	109.5	167	170	349	124	90	196	265.5	766.5	242	105	156	27	51

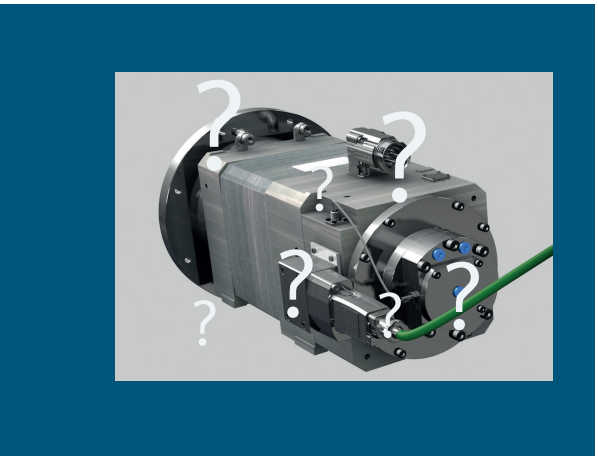


Asynchronous motor - air cooled														
Motor size	Weight [kg]	J Ø [mm]	B Ø [mm]	C Ø [mm]	D Ø [mm]	E [mm]	F [mm]	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [mm]	L6 [mm]	L7 [mm]
131	230	250	134.5	180	182	349	260	135.5	641	243	200	123	31	49
133	240	250	134.5	180	182	349	260	180.5	686	243	200	123	31	49
135	250	250	134.5	180	182	349	260	225.5	731	243	200	123	31	49
137	260	250	134.5	180	182	349	260	265.5	771	243	200	123	31	49



WEISS Spindle with Sensor Modul - SMI24

1 + 1 = 3



Current situation

When it comes to spindles in machine tools, only little information or none at all is currently available in most cases about the current operating conditions and previous operating indicators of the spindle in the machine. For this reason, it is difficult to determine parameters for wear rates that could be used to prevent unexpected machine downtime.

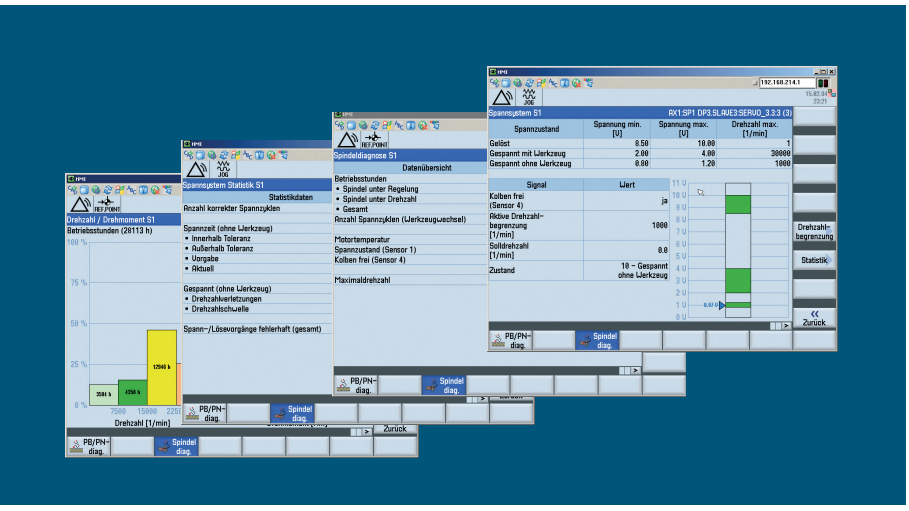
The following questions cannot currently be answered:

- What is the run time of the spindle under speed and under control?
- What are the speed and torque ranges during the duration of spindle use?
- How many clamping cycles have been performed until now?
- What are the operating conditions of the tool clamping system?

Aim

Integration of WEISS motor spindles – SINAMICS and SINUMERIK in one intelligent system.

This leads to a simplification of spindle commissioning and the integration of signals into the PLC. Collection, analysis and visualization of information and data during spindle run time. Evaluation of data to determine spindle states that could cause downtime. Increased duration of spindle use through better planning of preventive measures for spindle maintenance, thereby increasing machine productivity.

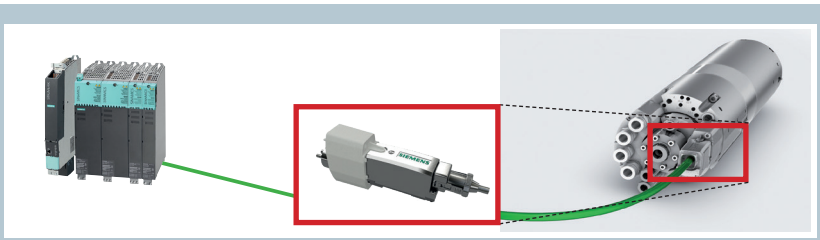


Solution

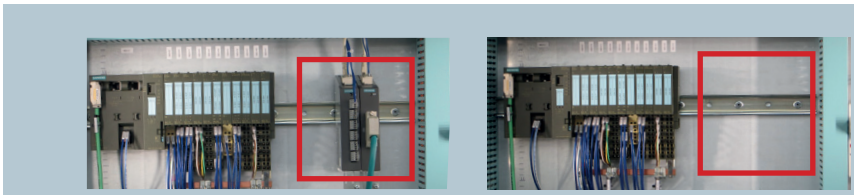
The WEISS Spindle Sensor Module SMI24 facilitates spindle commissioning, reduces the amount of hardware required for the integration of spindle signals into controls and displays spindle state information on the HMI. The SINUMERIK option „Integrated Spindle Monitor" ISM can be used to access additional information on spindle state and data on spindle use via HMI screens.

Cycle-independent signal transmission for increased productivity
Visualization of operating conditions for easier diagnosis.
More control cabinet space thanks to fewer components.

Easy wiring with **only one Drive-CliQ cable** for the signals of encoder, motor temperature, clamping status query and piston query.

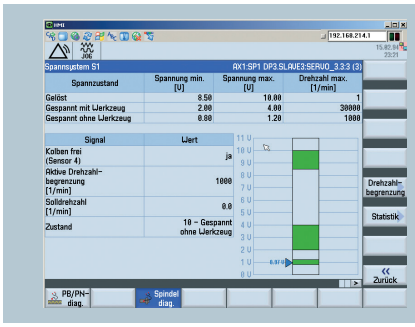


This means **fewer components** (cables, processing units) in the control cabinet for feeding of analog and digital spindle signals.



Display and **visualization** of the current clamping status.

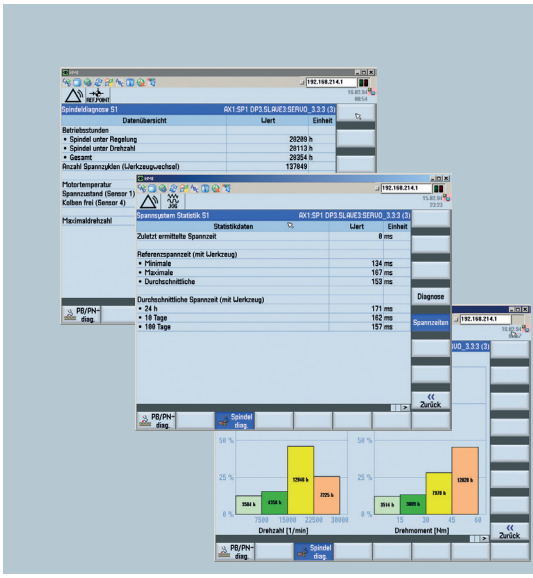
SMI24 enables **changing tools as fast as possible** thanks to its independence from the PLC cycle. Simple and fast configuration of the tool change without the need to involve the PLC. Quick access to spindle information thanks for example to the display of spindle designation and serial number.



SINUMERIK option:
Integrated Spindle Monitor ISM

- Clamping cycle counter tool
- Clamping time diagnosis tool
- Temperature monitoring motor/bearing[1)]
- Operating conditions in speed and torque histograms

[1)] Option



Spindle option:
Expansion with temperature and/or digital sensor

- Temperature sensor
  - Bearing protection
  - Compensation for linear thermal expansion
- Additional digital sensor
  - e.g. query rotatory angular position of shaft
  - e.g. query tool clamped

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