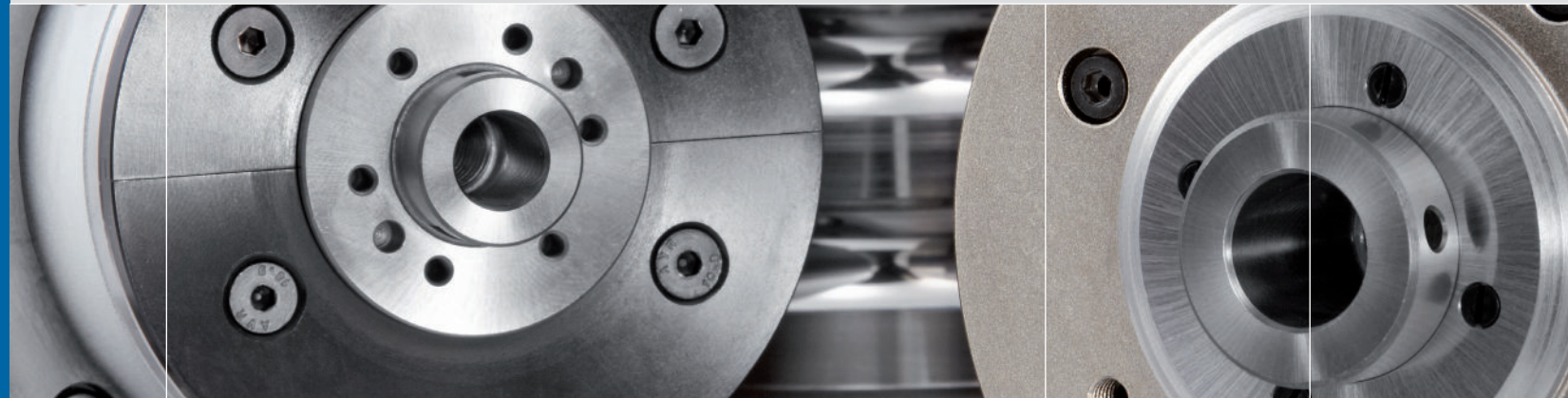


GMN

GMN



## High speed spindles for manual tool change

High speed spindles for manual tool change

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**GMN spindle technology**  
High speed spindles  
for manual tool change

Based on its many years of experience in the development and production of high-quality machine components, GMN has chosen to specialize, within the field of spindle technology, in the production of long-life, high performance, high-speed spindles.

Emphasis is placed on the highest precision in the development and production of GMN high frequency spindles. This ensures their certification to international standards and produces consistent, outstanding quality characteristics with respect to stability and long service life in combination with high speed suitability.

The standardized model series offer a large selection of feature options to furnish effective spindle solutions for almost any field of application.

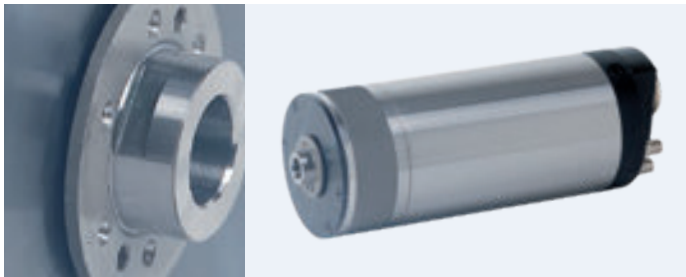
A myriad of special designs which have been successfully created by GMN confirm that optimal performance can be realized even for unusual structural specifications.



# GMN Motor spindles

## High speed spindles for manual tool change

Series: UHS, HS, HV-X, HSX, HV-P, HSP, HSP..g



**Housing Ø**

- 80–230 mm

**Speed**

- max. 250,000 rpm

**Power**

- S1 max. 45 kW

**Torque**

- S1 max. 85 Nm

**Motor**

- Asynchronous motor
- Synchronous motor

**Tool interface**

- GMN standard
  - Internal taper with flat contact face
  - Fitting bores with flat contact face
- HSK-C

**Tool change**

- Manual

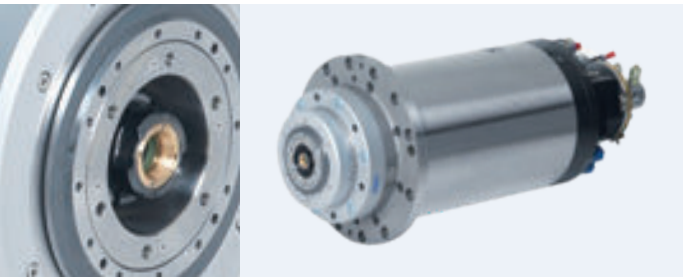
**Lubrication**

- Oil-air lubrication
- Permanent grease lubrication

Pages 22–69

## High speed spindles for automatic tool change

Series: HC, HCS



**Housing Ø**

- 80–380 mm

**Speed**

- max. 90,000 rpm

**Power**

- S1 max. 120 kW

**Torque**

- S1 max. 450 Nm

**Motor**

- Asynchronous motor
- Synchronous motor

**Tool interface**

- HSK-A / B / E / T / F
- SK / BT
- PSC (Capto)

**Tool change**

- Automatic

**Lubrication**

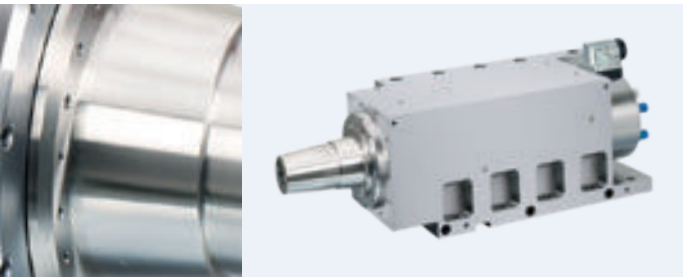
- Oil-air lubrication
- Permanent grease lubrication

Catalog 2505

Special solutions on request

## High performance spindles Tool spindles

Series: TSE, TSEV



**Housing Ø**

- According to customer specification

**Power**

- S1 max. 350 kW

**Torque**

- S1 max. 1,750 Nm

**Motor**

- Asynchronous motor
- Synchronous motor

**Tool interface**

- Standardized tool interfaces
- According to customer specification

**Tool change**

- Manual
- Automatic

**Lubrication**

- Oil-air lubrication
- Permanent grease lubrication

**Feature options**

- Automatic balancing systems
- A/E sensor
- Shaft clamping for lathe work
- Vibration sensor
- Shaft growth sensor

**Application examples**

- Dressing spindles
- External-rotor motor grinding spindles
- Grinding spindles

GMN spindles in this series are fabricated on request to customer specifications

## High performance spindles Special design

Series: ASE, HPD, WSE, ...



**Housing Ø**

- According to customer specification

**Power**

- S1 max. 350 kW

**Torque**

- S1 max. 1,750 Nm

**Motor**

- Asynchronous motor
- Synchronous motor

**Tool interface**

- Standardized tool interfaces
- According to customer specification

**Tool change**

- Manual
- Automatic

**Lubrication**

- Oil-air lubrication
- Permanent grease lubrication

**Application examples**

- Workpiece spindles
- Test stand motor
- High speed pump motor (helium, hydrogen)
- Energy-recovery generators
- Centrifuges

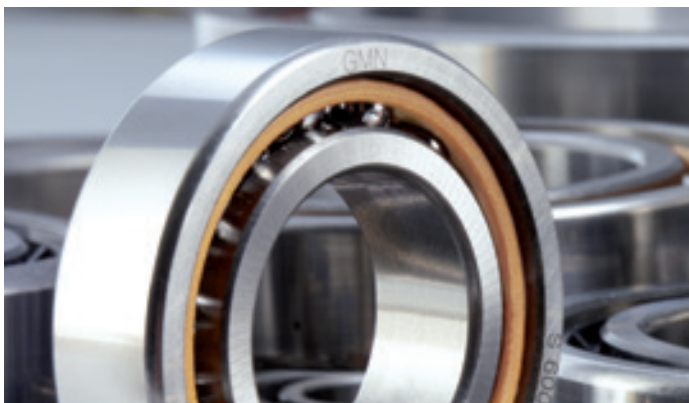
GMN spindles in this series are fabricated on request to customer specifications

# Spindle bearing

## GMN high precision ball bearings

Use of the highest quality components is the basis for the outstanding performance and long service life exhibited by GMN products.

Almost all spindles are equipped with GMN high precision ball bearings. These ensure reliable operation, smooth running and long service life.



Spindle technology from GMN is the result of the highest demands on quality – from development to production. Minimal tolerances for dimension, shape and running accuracy produce maximum performance capability, long service life and are defined by international (ISO 492) and national (DIN 620) standards.

GMN high precision ball bearings are produced in precision classes P4–P2 as well as ABEC 7–ABEC 9. GMN precision classes HG (high accurate) and UP (ultra precision) attain still greater levels of accuracy with even lower dimensional tolerances.

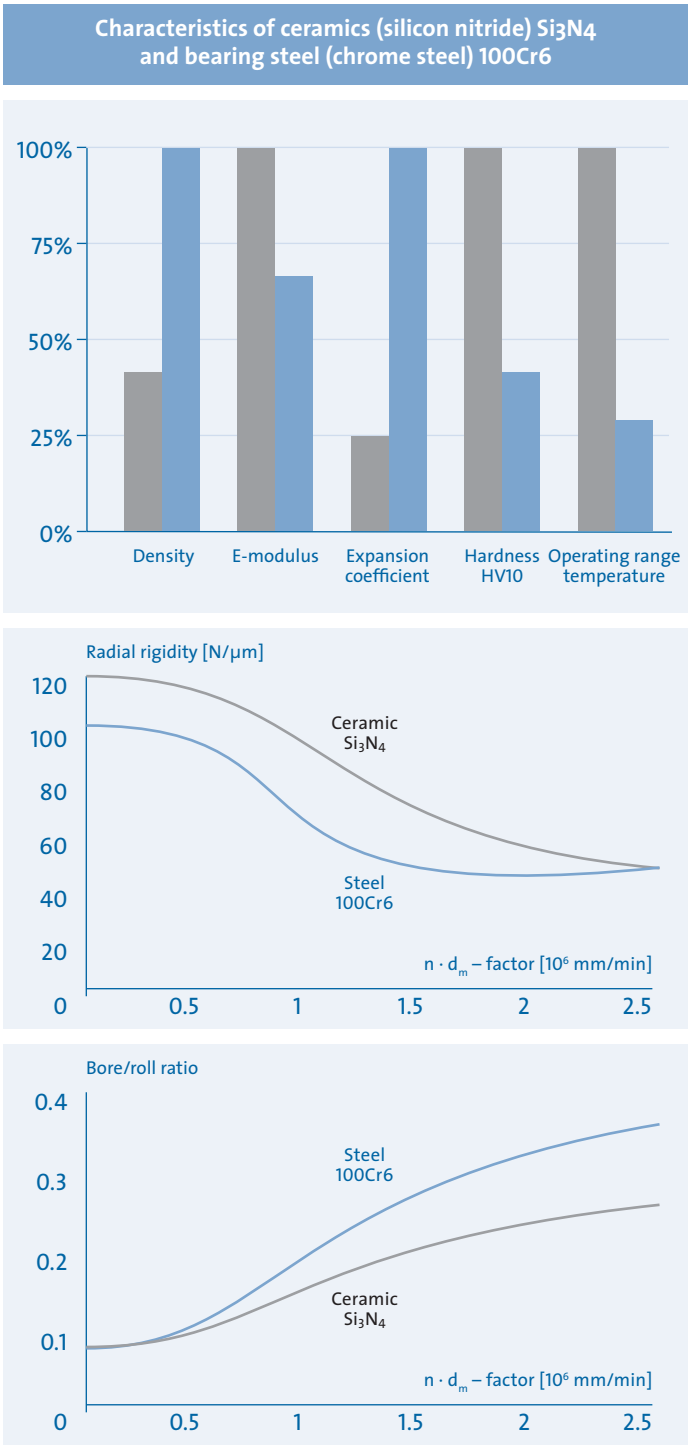
## GMN hybrid ball bearings

Hybrid ball bearings are characterized by a combination of materials; bearing steel (inner and outer rings) and ceramic (balls).

The material-based characteristics of ceramic balls (in comparison to bearings with steel balls) offer clear performance improvements in machine operation, especially under critical conditions.



- Material**  
Ceramic: Silicon nitride  $\text{Si}_3\text{N}_4$
- Material characteristics**
- Low affinity to 100Cr6
  - Low friction coefficient
  - Low heat conductivity
  - Corrosion resistance
  - Non magnetic
  - Electrically insulating



## Advantages

- Longer service life**  
Because of their material characteristics, hybrid bearings attain more than twice the service life of steel bearings. Machine operation time is significantly increased.
- Higher speeds**  
Due to their tribological characteristics and lower mass forces, speed increases – in comparison to bearings with steel balls – of up to 30% can be attained.
- Low-cost lubrication**  
The maximum speed for grease and oil lubrication is increased. Therefore grease lubrication can frequently be used instead of cost-intensive oil lubrication.
- Higher rigidity**  
The characteristics of the materials improve both, radial and axial rigidity. The advantages are increased accuracy and a higher frequency for critical resonance.
- Improved processing accuracy**  
Higher bearing rigidity, reduced thermal expansion and lower vibration excitation make it possible to achieve maximum processing accuracy.

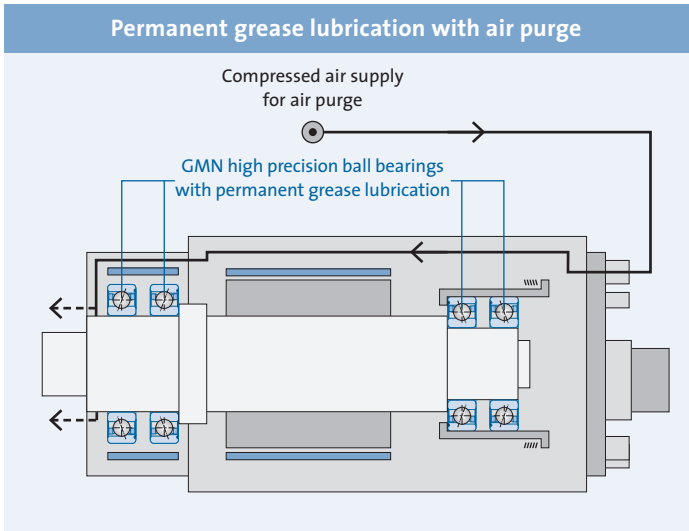


# Lubrication

## Permanent grease lubrication with air purge

GMN grease-lubricated spindle bearings ensure reliable, maintenance free operation over the bearing's entire service lifetime.

The high-performance greases selected by GMN to lubricate bearings are optimized in quantity and quality for the service lifetimes of the installed GMN ball bearings.  
A re-lubrication of the spindle bearing is not necessary.



Permanent grease lubrication is characterized by low technical overhead and low life-cycle costs:

- Maintenance free
- Simplified system design
- Reduced operating costs (no oil consumption)
- No oil residues
- Environmentally friendly

### Air purge (standard)

GMN standard series spindles with permanent grease lubrication are equipped with an air purge.  
• Protection against spindle contamination

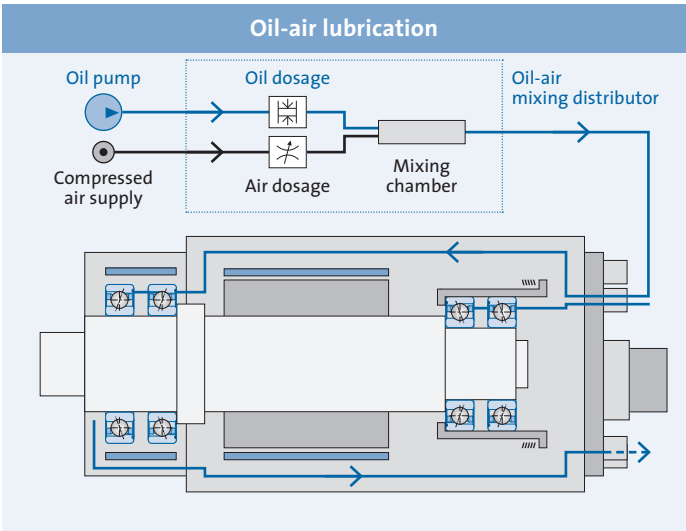
### Air purge

A continuous supply of compressed air through the ring gap between shaft and housing seals the working side of the spindle against contamination by abrasive particles and liquids – and also ensures long service life even under harsh operating conditions.

## Oil-air lubrication

Oil-air lubrication provides a specific supply of lubricant to the spindle bearing and is particularly well suited for very high speeds.

The lubricant is introduced at intervals and evenly dispersed to the lubrication points by a continuous stream of air.



Oil-air lubrication guarantees utmost effectiveness with respect to consumption and lubricating effect at maximum speeds:

- Minimum friction losses
- Low heat development
- High operating security
- Quantity-regulated supply of lubricant
- Low oil consumption
- Low oil fog formation
- Low material and maintenance overhead (oil cooling and oil filtering not necessary)

### Air purge (optional)

GMN spindles with oil-air lubrication are available with an optional air purge.  
• Protection against spindle contamination  
• Minimized oil escape

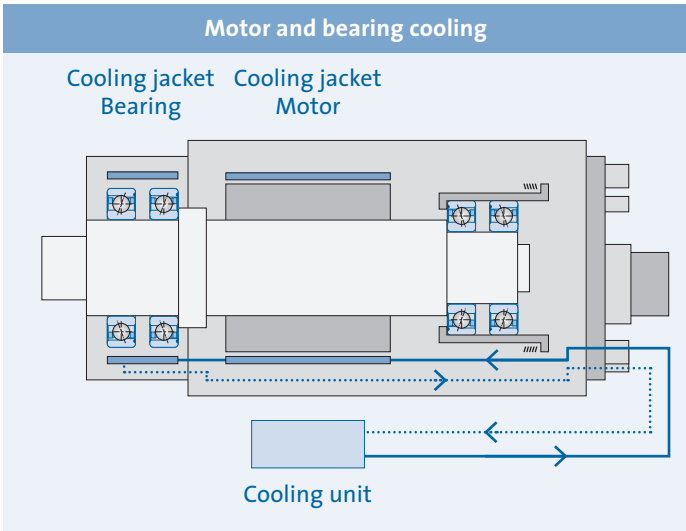
GMN lubrication units for simultaneous or separate regulation of the oil supply to as many as 4 spindles (page 80).

# Cooling

## Motor and bearing cooling

GMN high-speed spindles are equipped with an effective liquid cooling system.

Cooling jackets in the vicinity of shaft bearings and on the spindle motor minimize increases in operating temperature, especially those increases caused by bearing friction and motor energy losses.

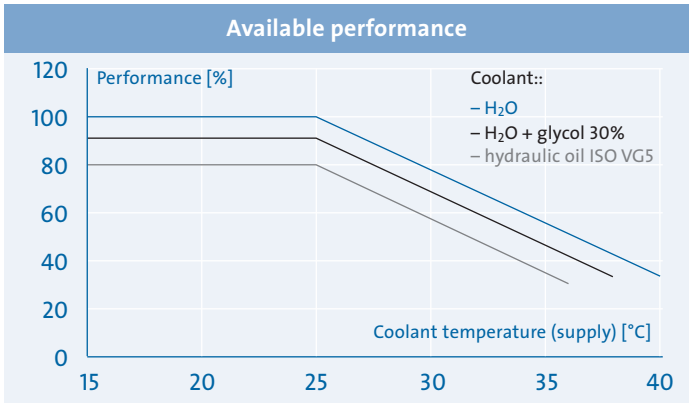


The reduction of operationally-induced heat development increases available spindle output performance, ensures maximum productivity and high processing quality.

## Coolant temperature

The spindle's maximum output performance is reached within a specified coolant temperature range of 20 °C to 25 °C.

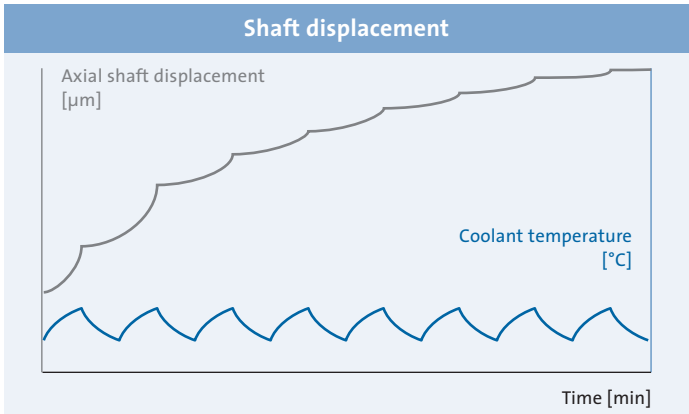
The actual performance attainable depends on the coolant's temperature and the medium used.



### High processing accuracy

Keeping coolant temperature differences small reduces axial shaft displacement and improves processing accuracy.

GMN cooling units with high regulation accuracy are available as accessories (page 82).



Motors

Requirements

Motor spindles with improved performance, rigidity and reliability are the essential prerequisites for economical milling production in many fields of application.

Depending on the processing task, it is important that a broad spectrum of different tools can be employed to the full extent of their performance capabilities:

Large tools demand high power at relatively low speeds, whereas a relatively low power demand is often sufficient for small tools.

These diverse requirements can be substantially covered by a single spindle model with GMN high-speed spindles. They provide – depending on model size – high torque and thus make it possible to achieve high processing performance even in the low speed range.

This is made possible by asynchronous and synchronous motors especially designed for this field of application as well as by efficient liquid cooling of the spindles. The motors have high power density and achieve a very good efficiency rating.

Power and torque characteristics

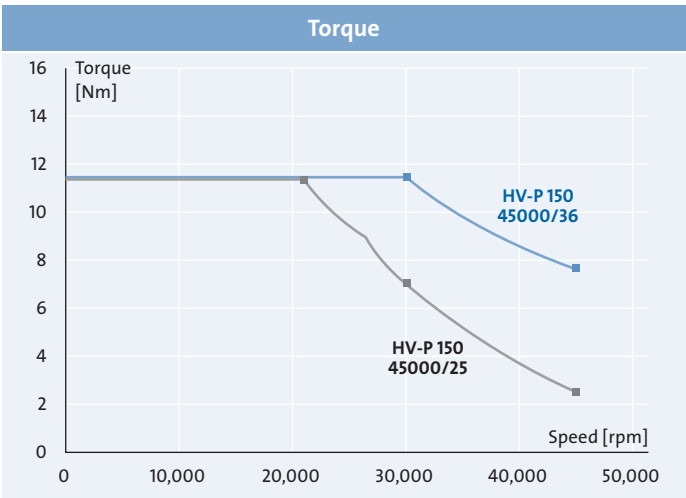
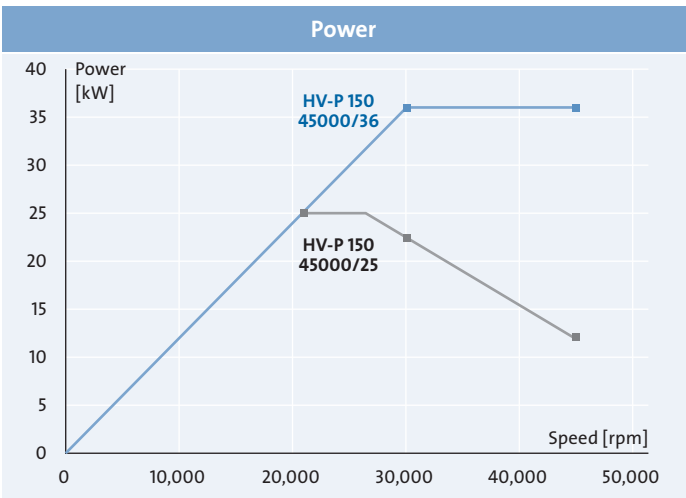
In this catalog, GMN offers high speed spindles in a broad spectrum of model sizes and power ratings.

Various motor performance characteristics are available to meet your requirements.

Models with a large weak-field area are an economical solution when the power demand in the upper speed range is not very high.

Example:  
The HV-P 150 – 45000 spindle has two possible motor designs:

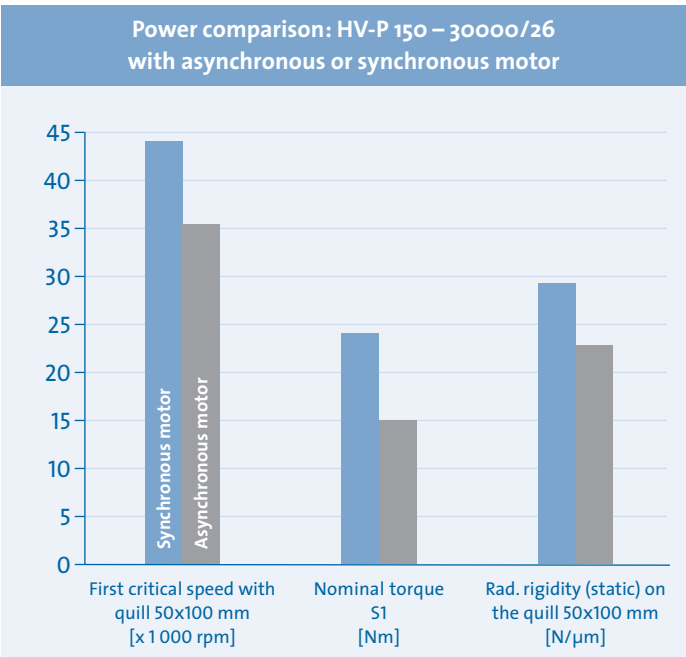
Power S6-60% [kW]		
at speed [min <sup>-1</sup> ]	HV-P 150-45000/25	HV-P 150-45000/36
21,000	25	25
30,000	22	36
45,000	12	36
Input power S6-60% [kVA]		
	40	57



Synchronous motor with permanent magnet rotor

Where high demands are made on the spindle's performance capabilities, or for very high speeds (UHS spindles), GMN optionally employs synchronous motors with permanent magnet rotors.

- Very high power and torque density
- Low rotor losses (no slip) reduce load-dependent heat development in critical areas of the spindle.
- The permanent magnet rotor permits realization of very rigid spindle shafts with high critical speed.
- Appropriate CFRP bandaging make it possible to achieve very high rotor circumferential speeds (circumferential speed up to 260 m/s for UHS spindles).

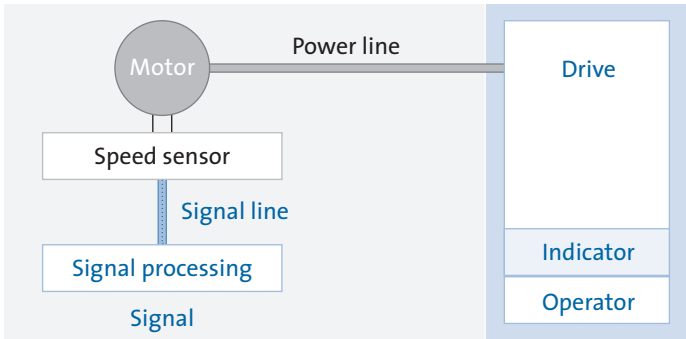


Power comparison: HV-P 150 – 30000/26 with asynchronous and synchronous motor				
Motor type		Asynchronous motor	Synchronous motor	Change
Radial rigidity (static)	Spindle nose [N/μm]	197.4	239.2	+21.2%
	on the mandrel 50 x 100 mm [N/μm]	23.1	29.1	+26.0%
Radial rigidity (30,000 rpm)	Spindle nose [N/μm]	129.4	151.6	+17.2%
	on the mandrel 50 x 100 mm [N/μm]	19.4	24.9	+28.4%
First critical speed with mandrel 50 x 100 mm [rpm]		35,260	44,450	+26.1%
Nominal torque S1 [Nm]		15	24	+60.0%

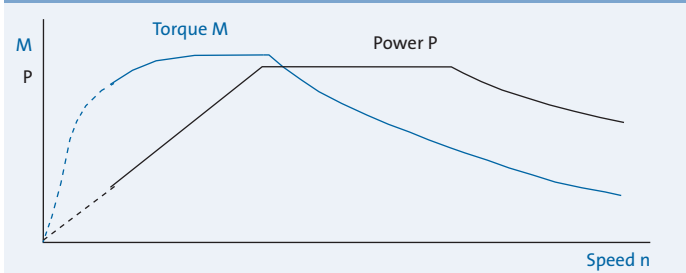
# Drive systems

# Coolant supply through the spindle shaft

## Drive without rotary encoder

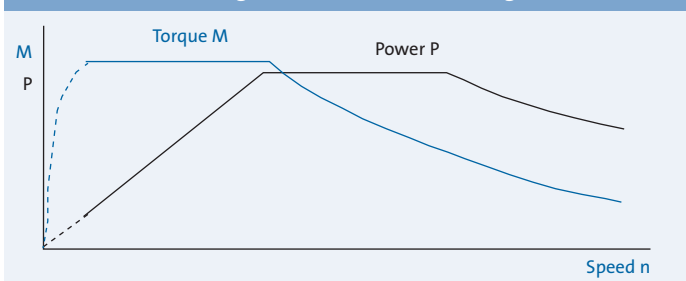


Drive without regulation: Frequency controller with prescribed voltage across the U/f characteristic



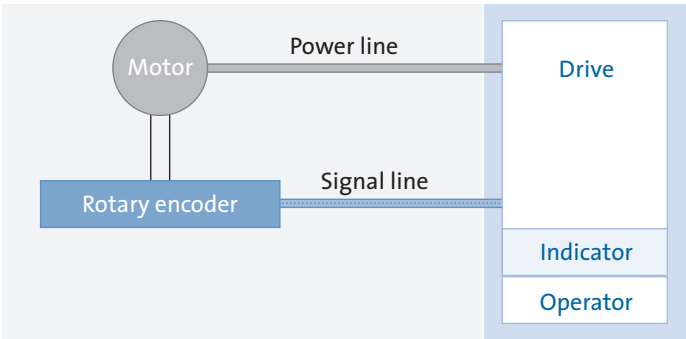
- Output frequency up to 3,000 Hz<sup>1)</sup>
- Adjustment range to about 1 : 10
- Ramp up and brake time about 10 sec
- Shaft in a specified fixed position
- "Speed monitors" or "Tacho box" necessary
- "Sparking" and "Load limit" reports with "effective load tracker" option

## Drive with regulation: Field oriented regulation

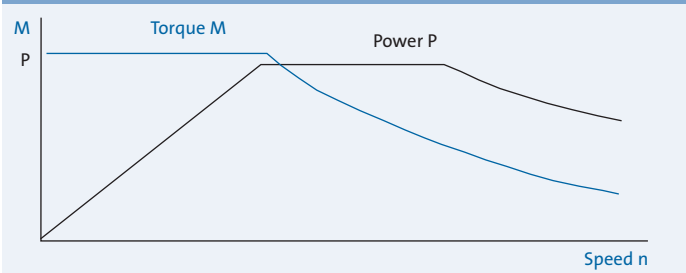


- Output frequency up to 1,400 Hz<sup>1)</sup>
- Within adjustment range 1 : 10 speed stability about 0.5%
- Field oriented regulation algorithm
- Ramp up and brake time about 1 sec

## Drive with rotary encoder (C-axis operation)



Field oriented regulation with rotary encoder, C-axis operation



- Output frequency up to 1,400 Hz<sup>1)</sup>
- Shaft positioning
- Ramp up and brake time about 1 sec

<sup>1)</sup> Various maximum output frequencies possible depending on manufacturer.

Equipping the spindle with a supplementary central coolant supply through the spindle's shaft is possible. This feature provides a substantial improvement in workpiece cooling when processing offset holes and blind holes.

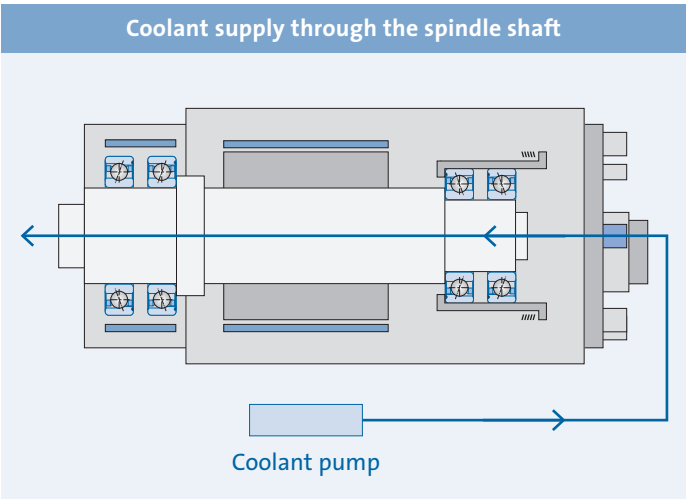
- Cycle time reduction
- Improved surface quality
- Improved dimensional stability due to cooler finishing temperature
- Reduced risk of heat cracking for high performance grinding

In consideration for different processing requirements, GMN offers two different systems to supply coolant through the shaft:

### Low pressure rotary union

Speed range up to: 120,000 rpm

- Seal: gap seal / air purge
- Maximum coolant pressure: 4 bar
- Dry run permissible
- Insensitive to pressure surges
- Necessary filter fineness: < 0.1 mm
- Installed spindle orientation: horizontal (other orientations on request)



### High pressure rotary union

Speed range up to: 75,000 rpm

- Seal: contact disc seal
- Maximum coolant pressure: dependent on spindle type, up to max. 50 bar (higher pressures on request)
- Minimum pressure 3 bar
- Dry run permissible
- Pressure surges must be avoided
- Necessary filter fineness: < 0.05 mm
- Installed spindle orientation: horizontal (other orientations on request)



# Maximum speeds

GMN high-speed spindles are designed for processing procedures carried out at extremely high cutting speeds. Their performance profiles indicate the maximum speed values that can be achieved with consideration for the greatest possible running smoothness.



## Imbalance spindle vibrations

Imbalanced mass distribution of rotating parts (spindle shaft, tool) with increasing speed induces sinusoidal imbalance vibrations which may be detrimental to machine operation and the quality of desired processing results.

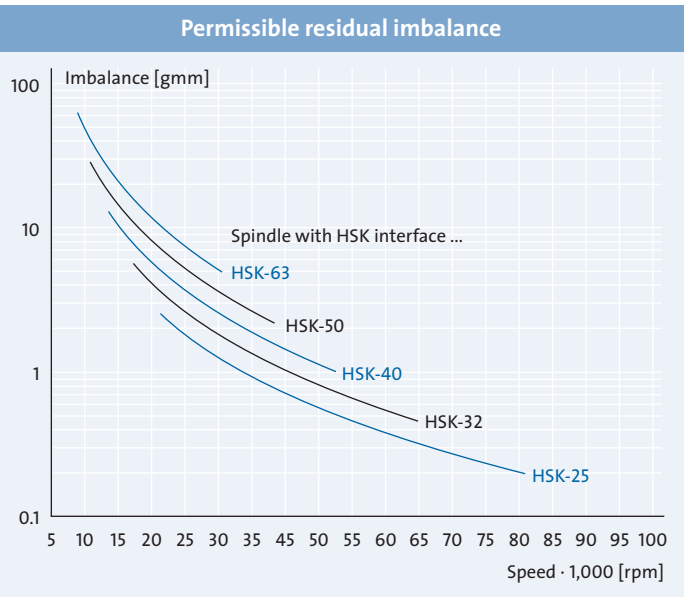
### Shaft

The highest processing quality in the production of GMN spindle shafts ensures a uniform mass distribution and minimum imbalance vibrations at maximum speeds.

### Tool

Speed-intensive production processes demand particular attention to imbalance testing and may require the balancing of production-relevant tools in order to maintain vibration tolerances.

Long-term, comprehensive practical experience with precision milling has resulted in specific guidelines for maximum imbalance vibrations that still permit GMN spindles to provide optimal performance.

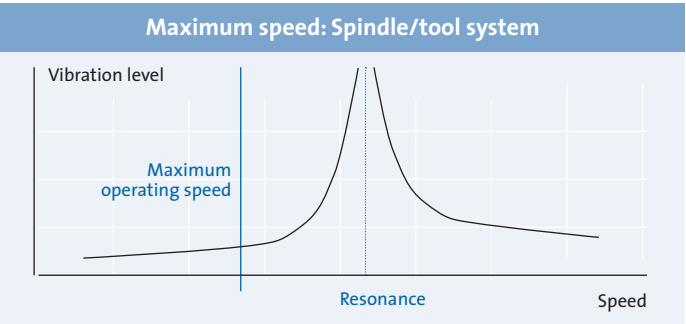
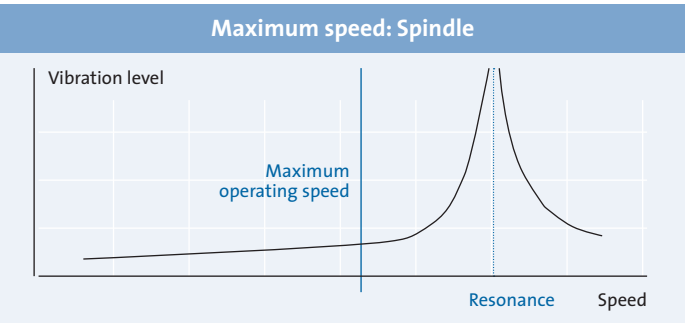


- Applicable for short tools.
- Even better balancing may be necessary for tools with a long overhang or where exceptionally high processing quality is required.
- Also applicable for spindles with grinding mandrel receiver (with comparable flat face diameter).

## Spindle resonance vibrations

The resonance of rotating systems produces critical speed ranges in which extreme vibrations occur.

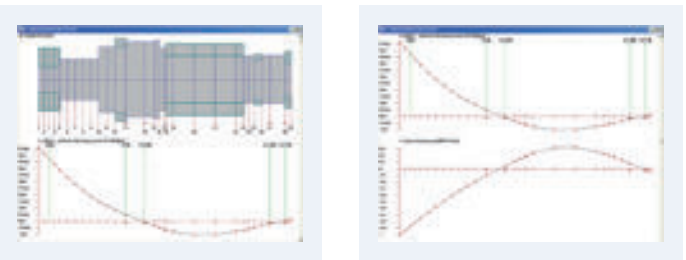
The use of tool attachments for machine operation can lower the critical speed range of the spindle/tool system and thus lead to a reduction of the maximum operating speed.



## Vibration calculation

If tools with unusual dimensions or heavy weight are to be used, GMN offers to calculate the static and dynamic behavior of the envisioned spindle/tool system under operational conditions.

The proper analysis of calculation results delivers specific information about spindle selection and about tool optimization with consideration for load-dependent bending lines, rigidity, resonance and bearing loads.



## Vibration monitoring

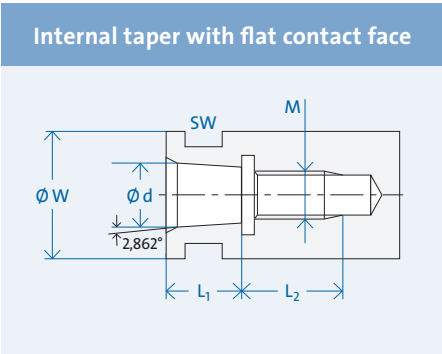
Vibration monitoring devices detect the spindle's operational movements and initiate a fault shutdown if critical values are reached in order to maintain the system's mechanical safety. Detection of vibrations causing wear to the spindle's bearing indicates when additional preventative maintenance is necessary to ensure long machine service life.

The selection and layout of such devices should be done such that vibrations caused by other machine components are disregarded.

# Tool interfaces

## GMN standard: Internal taper with flat contact face

Because of the very high maximum speed ratings for type UHS, a GMN standard with internal taper/flat contact face and internal threads has been selected. This ensures a secure connection between shaft and tool over the entire speed range for the given spindle.

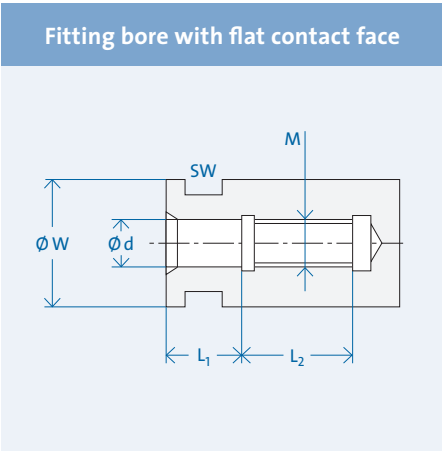
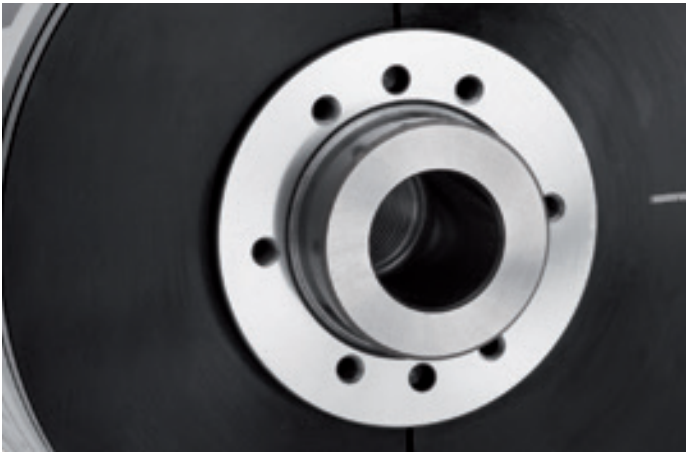


## Series UHS (pages 24–25)

Interface	d [mm]	W [mm]	M	L <sub>1</sub> [mm]	L <sub>2</sub> [mm]	SW
U 6.5/10	6.5	10	M5	5	9	-
U 09/16	9	16	M8 (x 1.5)	7	16	14
U 12/18	12	18	M10 x 1.5	9	22	16
U 16/23	16	23	M14 x 1.25	12	22	20

## GMN standard: Fitting bores with flat contact face

High-speed spindles in type series HS, HV-X and HSX are equipped with the GMN standard – fitting bore/flat contact face and internal threads – that has proven itself over many decades.

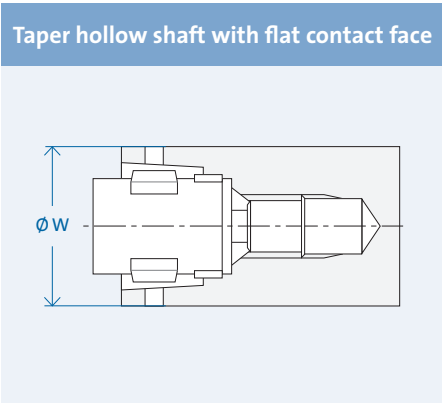
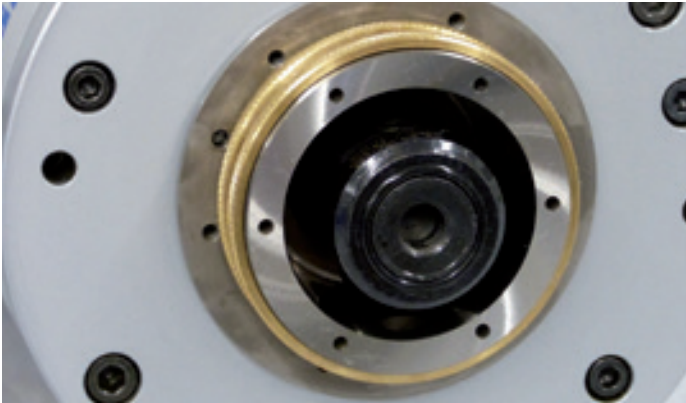


## Series HS, HV-X, HSX (pages 26–41)

Interface	d [mm]	d Tolerance [µm]	W [mm]	M	L <sub>1</sub> [mm]	L <sub>2</sub> [mm]	SW
D 04/08	4	+ 5 / + 2	8	M4 (x 0.7)	6	8	7
D 06/12	6	+ 5 / + 2	12	M6 (x 1)	9	11	11
D 08/14	8	+ 5 / + 2	14	M8 (x 1.25)	12	14	13
D 09/16	9	+ 5 / + 2	16	M9 (x 1.25)	13	14	14
D 10/18	10	+ 5 / + 2	18	M10 (x 1.5)	15	19	16
D 14/23	14	+ 7 / + 2	23	M14 x 1.5	20	19	20
D 16/28	16	+ 7 / + 2	28	M16 x 1.5	24	19	24
D 22/38	22	+ 7 / + 2	38	M22 x 2	34	25	32
D 28/43	28	+ 8 / + 3	43	M28 x 2	42	25	38
D 32/53	32	+ 8 / + 3	53	M32 x 2	46	25	48
D 36/63	36	+ 8 / + 3	63	M36 x 2	50	30	55
D 36/68	36	+ 8 / + 3	68	M36 x 2	50	30	60

## Taper hollow shaft with flat contact face: HSK-C

Taper hollow shafts (HSK) with flat contact faces are standardized per DIN 69893. The various shapes differ with respect to pusher dog recess and collar. Form C has been especially developed for use with manual tool change systems. Spindles in type series HV-P/HSP/HSP.g can accept tools with taper hollow shafts of form A and C. The HSK interface allows these spindles to be operated in both directions of rotation.



## Series HV-P, HSP, HSP.. g (pages 42–69)

Interface	W [mm]	Dimensions
HSK-C25	25	remaining dimensions per DIN 69893-1
HSK-C32	32	
HSK-C40	40	
HSK-C50	50	
HSK-C63	63	
HSK-C80	80	
HSK-C100	100	



Legend  
and features

Legend	
<p><b>Dimensions:</b></p> <p><math>\varnothing W</math> = flat face <math>\varnothing</math> [mm]</p> <p><math>\varnothing W_1</math> = shaft <math>\varnothing</math> front [mm]</p> <p><math>\varnothing A</math> = spindle housing <math>\varnothing</math> [mm]</p> <p><b>Rigidity (static):</b></p> <p><math>C_{ax}</math> = axial rigidity [N/<math>\mu</math>m]</p> <p><math>C_{rad}</math> = radial rigidity [N/<math>\mu</math>m]</p> <p><b>Motor data:</b></p> <p><math>f</math> = frequency max. [Hz]</p> <p><math>M</math> = torque moment [Nm]</p> <p><math>n</math> = speed [rpm]</p> <p><b>Rated power:</b></p> <p><math>P</math> = power [kW]</p> <p><math>I</math> = current [A]</p>	<p>Air purge (option)</p> <p>Housing flange (option)</p> <p>Through-shaft cooling (option)</p> <p>Plug-in connection</p> <p><math>C_{rad}</math></p> <p><math>\varnothing W</math></p> <p><math>\varnothing W_1</math></p> <p><math>C_{ax}</math></p> <p><math>\varnothing A</math></p> <p>GMN</p> <p>High precision ball bearings</p>

Straight plug-in connection	GA	MAC/D500	B048/B049
	<p>View Y</p> <p>Oil-air Connections</p> <p>Air purge option</p> <p>Supply Cooling water</p> <p>Return Cooling water</p> <p>Return Lubricant</p>	<p>View Y</p> <p>STK Signal connector</p>	<p>View Y</p> <p>Oil-air Connections</p> <p>Air purge option</p> <p>Supply Cooling water</p> <p>Return Cooling water</p> <p>Return Lubricant</p>
Angle plug-in connection	GA	MAC/D500	B048/B049
	<p>View Y</p>	<p>View Y</p> <p>STK Signal connector</p>	<p>View Y</p>

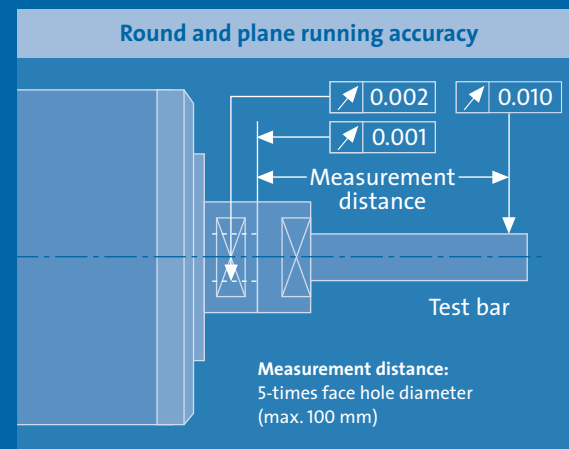
Features	Standard	Option
Housing	Cylindrical housing Bushing- $\varnothing$ : 80–230 mm	Cylindrical housing with flange housing Block housing
Motor	<i>Series: UHS</i>  Motor voltage 200 V Synchronous motor Speed: max. 250,000 rpm Power: S1 max. 4.4 kW	
	<i>Series: HS</i>  Motor voltage 200 V Asynchronous motor Speed: max. 180,000 rpm Power: S1 max. 0.95 kW	Synchronous motor <sup>1)</sup>
	<i>Series HV-X, HSX</i>  Motor voltage 350 V Asynchronous motor Speed: max. 105,000 rpm Power: S1 max. 33 kW	Motor voltage 200 V / 460 V Synchronous motor <sup>1)</sup>
	<i>Series: HV-P, HSP</i>  Motor voltage 350 V Asynchronous motor Speed: max. 60,000 rpm Power: S1 max. 45 kW	Motor voltage 200 V / 460 V Synchronous motor <sup>1)</sup>
Lubrication	Oil-air lubrication  Permanent grease lubrication (HSP..g)	Air purge Permanent grease lubrication with air purge
Coolant supply through spindle shaft		Low pressure (du) (gap seal / air purge) High pressure (dh) (contact disc seal)
Sensor technology	Speed sensor beginning with housing $\varnothing$ 100 mm	Rotary encoder only with HV-X and HV-P beginning with housing $\varnothing$ 120 mm, remaining spindles on request

<sup>1)</sup> With the advantages from page 13



## Technical data Features

## GMN High speed spindles for manual tool change GMN standard tool interface



### UHS

High-speed grinding spindles  
Machining of small and very small bores  
Delivery incl. frequency converter and lubricating device

- Housing  $\varnothing$ : 80 / 100 mm
- Speed: max. 250,000 rpm
- Power: S1 max. 4.4 kW
- Motor: Synchronous motor
- Tool interface: GMN standard  
Internal taper with flat contact face
- Lubrication: Oil-air lubrication



### HV-X

High performance grinding spindles  
Grinding applications  
with high rigidity and power requirements

- Housing  $\varnothing$ : 100 / 120 / 150 mm
- Speed: max. 105,000 rpm
- Power: S1 max. 33 kW
- Motor: Asynchronous motor
- Tool interface: GMN standard  
Fitting bore with flat contact face
- Lubrication: Oil-air lubrication



### HS

High-speed grinding spindles  
Machining of small bores

- Housing  $\varnothing$ : 80 mm
- Speed: max. 180,000 rpm
- Power: S1 max. 0.95 kW
- Motor: Asynchronous motor
- Tool interface: GMN standard  
Fitting bore with flat contact face
- Lubrication: Oil-air lubrication

### HSX

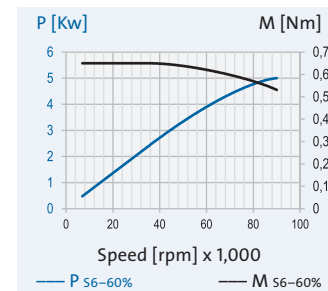
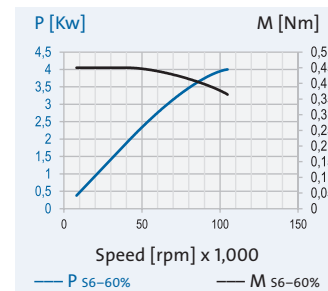
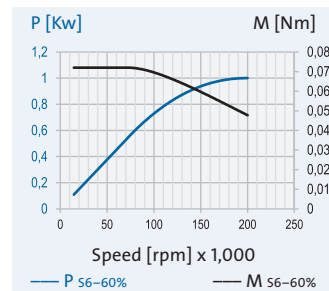
High performance grinding spindles  
Universal grinding applications

- Housing  $\varnothing$ : 100 / 120 / 150 / 170 mm
- Speed: max. 105,000 rpm
- Power: S1 max. 32 kW
- Motor: Asynchronous motor
- Tool interface: GMN standard  
Fitting bore with flat contact face
- Lubrication: Oil-air lubrication

Cylindrical housing:  
 $\varnothing = 80 \text{ mm} / 100 \text{ mm}$

Lubrication:  
Oil-air lubrication

- + Standard
- o Option
- x on request



- + Standard
- o Option
- x on request

B049	-	-
+	-	-
x	-	-
x	-	-
	-	
	-	
	-	
	-	
	+	
	x	
	x	
	+	

B048	B048	-
+	+	-
o	o	-
o	o	-
	o	
	-	
	-	
	+	
	+	
	o	
	x	
	o	

B048	B048	-
+	+	-
o	o	-
o	o	-
	o	
	-	
	-	
	+	
	+	
	o	
	x	
	o	

B048	B048	-
+	+	-
o	o	-
o	o	-
	o	
	-	
	-	
	+	
	+	
	o	
	x	
	o	

Electrical connection
Plug type
Straight plug-in connection
Angle plug-in connection
Fixed cable XXm
Coolant through the shaft
Low pressure (du)
High pressure (dh)
Sensor technology
Rotary encoder
Speed sensor
Housing
Cylindrical housing
Cylindrical housing with flange
Block housing
Air purge

Series: HS

Cylindrical housing:  
 $\varnothing = 80 \text{ mm}$

Tool interface:  
GMN standard

Motor:  
Asynchronous motor

Bearing arrangement:  
GMN high precision ball bearings

Lubrication:  
Oil-air lubrication

TECHNICAL DATA		
Spindle housing $\varnothing$ A		[mm]
Speed max.	$n_{\max}$	[rpm]
Bearing $\varnothing$ front	$W_1$	[mm]
Tool interface		
Flat contact face $\varnothing$ W		[mm]
Static rigidity		
axial	$C_{ax}$	[N/ $\mu$ m]
radial	$C_{rad}$	[N/ $\mu$ m]
Motor design		
Frequency max.	$f_{\max}$	[Hz]
Nominal converter voltage <sup>1)</sup> [V]		
Power	$P_{S1}$	[kW]
Torque	$M_{S1}$	[Nm]
... at speed	$n$	[rpm]
Current	$I_{S1}$	[A]
Power	$P_{S6-60\%}$	[kW]
Torque	$M_{S6-60\%}$	[Nm]
... at speed	$n$	[rpm]
Current	$I_{S6-60\%}$	[A]

Electrical connection
Plug type
Straight plug-in connection
Angle plug-in connection
Fixed cable XXm
Coolant through the shaft
Low pressure (du)
High pressure (dh)
Sensor technology
Rotary encoder
Speed sensor
Housing
Cylindrical housing
Cylindrical housing with flange
Block housing
Air purge

1) Minimum required output voltage of the frequency converter

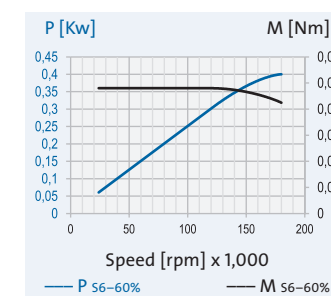
+ Standard

- o Option

x on request

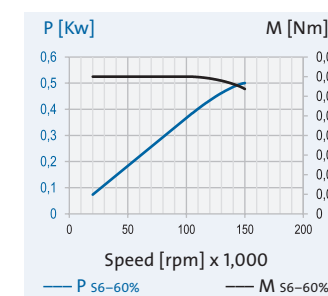
HS 80 - 180000/0.4		
	80	
	180,000	
	8	
	D 04/08	
	8	
	8	
	15	
200 V	—	—
	3,000	
200	—	—
	0.3	
	0.02	
	180,000	
1.8	—	—
	0.4	
	0.02	
	180,000	
2	—	—

GA	-	-
+	-	-
x	-	-
o	-	-
	-	
	-	
	-	
	-	
	+	
	x	
	x	
	-	



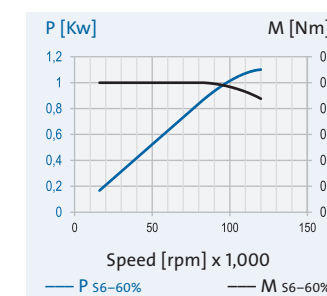
HS 80 - 150000/0.5		
	80	
	150,000	
	8	
	D 04/08	
	8	
	9	
	15	
200 V	—	—
	2,500	
200	—	—
	0.4	
	0.03	
	150,000	
2.3	—	—
	0.5	
	0.03	
	150,000	
2.5	—	—

GA	-	-
+	-	-
x	-	-
o	-	-
	-	
	-	
	-	
	-	
	+	
	x	
	x	
	-	



HS 80 - 120000/1.1		
	80	
	120,000	
	12	
	D 06/12	
	12	
	11	
	21	
200 V	—	—
	2,000	
200	—	—
	0.95	
	0.07	
	120,000	
5.4	—	—
	1.1	
	0.09	
	120,000	
6.5	—	—

GA	-	-
+	-	-
x	-	-
o	-	-
o		
-		
-		
-		
+		
x		
x		
-		



TECHNICAL DATA		
Spindle housing Ø A		[mm]
Speed max.	$n_{\max}$	[rpm]
Bearing Ø front	$W_1$	[mm]
Tool interface		
Flat contact face Ø W		[mm]
Static rigidity		
axial	$C_{ax}$	[N/μm]
radial	$C_{rad}$	[N/μm]
Motor design		
Frequency max.	$f_{\max}$	[Hz]
Nominal converter voltage <sup>1)</sup>		[V]
Power	$P_{S1}$	[kW]
Torque	$M_{S1}$	[Nm]
... at speed	$n$	[rpm]
Current	$I_{S1}$	[A]
Power	$P_{S6-60\%}$	[kW]
Torque	$M_{S6-60\%}$	[Nm]
... at speed	$n$	[rpm]
Current	$I_{S6-60\%}$	[A]

Electrical connection
Plug type
Straight plug-in connection
Angle plug-in connection
Fixed cable XXm
Coolant through the shaft
Low pressure (du)
High pressure (dh)
Sensor technology
Rotary encoder
Speed sensor
Housing
Cylindrical housing
Cylindrical housing with flange
Block housing
Air purge

1) Minimum required output voltage of the frequency converter

+ Standard

- o Option

x on request



Series: HV-X

Cylindrical housing:
Ø = 100 mm

Tool interface:
GMN standard

Motor:
Asynchronous motor

Bearing arrangement:
GMN high precision
ball bearings

Lubrication:
Oil-air lubrication

Table with 2 columns: Parameter and Value. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity (axial/radial), Motor design (Frequency max., Nominal converter voltage, Power, Torque, etc.), and Current.

Table with 2 columns: Feature and Availability. Rows include Electrical connection (Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm), Coolant through the shaft (Low pressure, High pressure), Sensor technology (Rotary encoder, Speed sensor), and Housing (Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge).

1) Minimum required
output voltage of the
frequency converter

- + Standard
- o Option
- x on request

Table for HV-X 100 - 105000/2. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, etc.

Table for HV-X 100 - 105000/2. Columns: Feature, GA, GA, GA. Rows: Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Sensor technology, Housing.

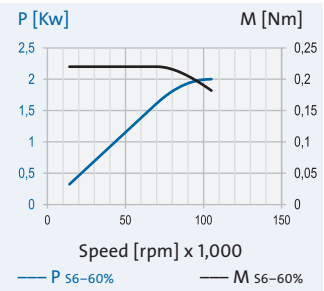


Table for HV-X 100 - 90000/3. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, etc.

Table for HV-X 100 - 90000/3. Columns: Feature, GA, GA, GA. Rows: Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Sensor technology, Housing.

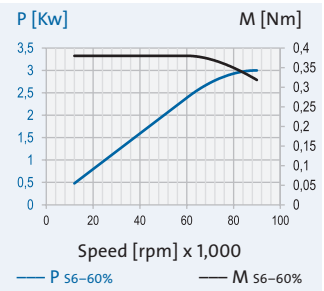


Table for HV-X 100 - 75000/5. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, etc.

Table for HV-X 100 - 75000/5. Columns: Feature, GA, GA, GA. Rows: Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Sensor technology, Housing.

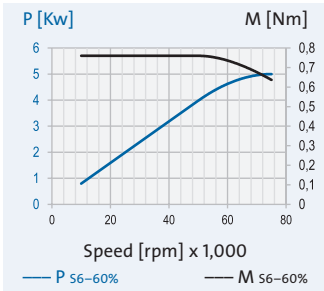


Table for HV-X 100 - 60000/9. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, etc.

Table for HV-X 100 - 60000/9. Columns: Feature, GA, GA, GA. Rows: Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Sensor technology, Housing.

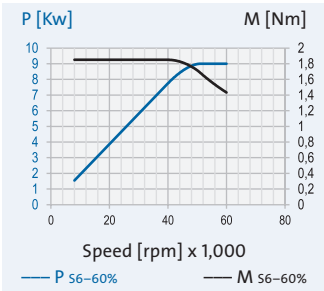


Table for HV-X 100 - 45000/9. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, etc.

Table for HV-X 100 - 45000/9. Columns: Feature, GA, GA, GA. Rows: Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Sensor technology, Housing.

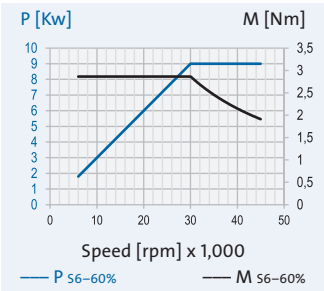
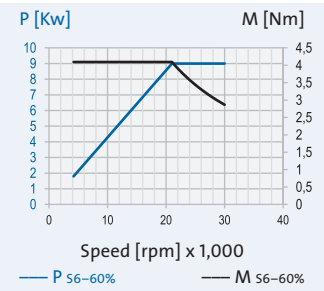


Table for HV-X 100 - 30000/9. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, etc.

Table for HV-X 100 - 30000/9. Columns: Feature, MAC, GA, GA. Rows: Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Sensor technology, Housing.



Series: HV-X

Cylindrical housing:  
Ø = 120 mm

Tool interface:  
GMN standard

Motor:  
Asynchronous motor

Bearing arrangement:  
GMN high precision  
ball bearings

Lubrication:  
Oil-air lubrication

TECHNICAL DATA		
Spindle housing Ø A	[mm]	
Speed max.	n <sub>max</sub> [rpm]	
Bearing Ø front	W <sub>1</sub> [mm]	
Tool interface		
Flat contact face Ø W	[mm]	
Static rigidity		
axial	C <sub>ax</sub> [N/µm]	
radial	C <sub>rad</sub> [N/µm]	
Motor design		
Frequency max.	f <sub>max</sub> [Hz]	
Nominal converter voltage <sup>1)</sup>	[V]	
Power	P <sub>S1</sub> [kW]	
Torque	M <sub>S1</sub> [Nm]	
... at speed	n [rpm]	
Current	I <sub>S1</sub> [A]	
Power	P <sub>S6-60%</sub> [kW]	
Torque	M <sub>S6-60%</sub> [Nm]	
... at speed	n [rpm]	
Current	I <sub>S6-60%</sub> [A]	

Electrical connection		
Plug type		
Straight plug-in connection		
Angle plug-in connection		
Fixed cable XXm		
Coolant through the shaft		
Low pressure (du)		
High pressure (dh)		
Sensor technology		
Rotary encoder		
Speed sensor		
Housing		
Cylindrical housing		
Cylindrical housing with flange		
Block housing		
Air purge		

<sup>1)</sup> Minimum required  
output voltage of the  
frequency converter

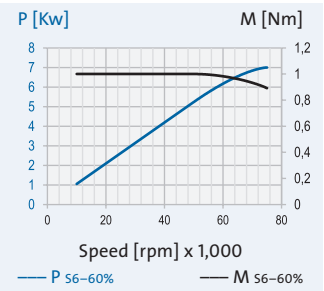
+ Standard

o Option

x on request

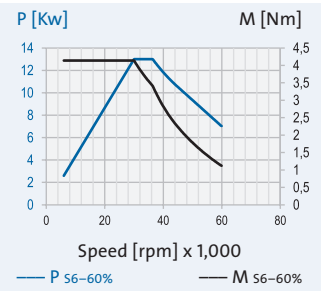
HV-X 120 - 75000/7		
120		
75,000		
25		
D 14/23		
23		
54		
68		
200 V	350 V	460 V
1,250		
200	350	460
6		
0.76		
75,000		
32	18	14
7		
0.89		
75,000		
42	20	18

GA	GA	GA
+	+	+
o	o	o
o	o	o
o		
o		
o		
+		
+		
o		
x		
o		



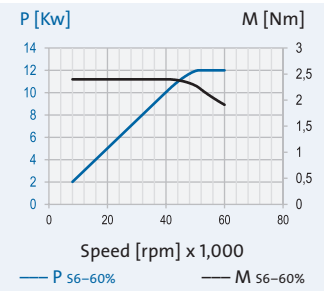
HV-X 120 - 60000/13		
120		
60,000		
30		
D 16/28		
28		
69		
97		
200 V	350 V	460 V
2,000		
200	350	460
11		
3.5		
30,000		
58	33	25
13		
4.14		
30,000		
65	37	28

MAC	GA	GA
+	+	+
o	o	o
o	o	o
o		
o		
o		
+		
+		
o		
x		
o		



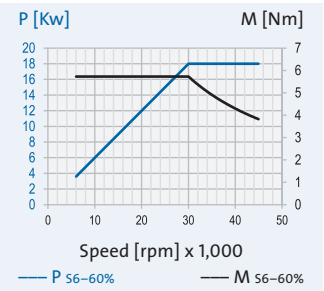
HV-X 120 - 60000/12		
120		
60,000		
30		
D 16/28		
28		
69		
97		
200 V	350 V	460 V
1,000		
200	350	460
10.5		
1.97		
51,000		
44	25	19
12		
2.25		
51,000		
51	29	22

GA	GA	GA
+	+	+
o	o	o
o	o	o
o		
o		
o		
+		
+		
o		
x		
o		



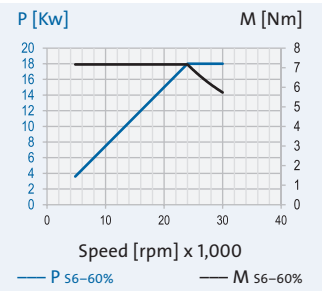
HV-X 120 - 45000/18		
120		
45,000		
45		
D 28/43		
43		
91		
125		
200 V	350 V	460 V
1,500		
200	350	460
15		
4.77		
30,000		
72	41	31
18		
5.73		
30,000		
89	51	39

MAC	GA	GA
+	+	+
o	o	o
o	o	o
o		
o		
o		
+		
+		
o		
x		
o		



HV-X 120 - 30000/18		
120		
30,000		
55		
D 32/53		
53		
99		
145		
200 V	350 V	460 V
1,000		
200	350	460
15		
5.97		
24,000		
72	41	31
18		
7.16		
24,000		
89	51	39

MAC	GA	GA
+	+	+
o	o	o
o	o	o
o		
o		
o		
+		
+		
o		
x		
o		



TECHNICAL DATA		
Spindle housing Ø A	[mm]	
Speed max.	n <sub>max</sub> [rpm]	
Bearing Ø front	W <sub>1</sub> [mm]	
Tool interface		
Flat contact face Ø W	[mm]	
Static rigidity		
axial	C <sub>ax</sub> [N/µm]	
radial	C <sub>rad</sub> [N/µm]	
Motor design		
Frequency max.	f <sub>max</sub> [Hz]	
Nominal converter voltage <sup>1)</sup>	[V]	
Power	P <sub>S1</sub> [kW]	
Torque	M <sub>S1</sub> [Nm]	
... at speed	n [rpm]	
Current	I <sub>S1</sub> [A]	
Power	P <sub>S6-60%</sub> [kW]	
Torque	M <sub>S6-60%</sub> [Nm]	
... at speed	n [rpm]	
Current	I <sub>S6-60%</sub> [A]	

Electrical connection		
Plug type		
Straight plug-in connection		
Angle plug-in connection		
Fixed cable XXm		
Coolant through the shaft		
Low pressure (du)		
High pressure (dh)		
Sensor technology		
Rotary encoder		
Speed sensor		
Housing		
Cylindrical housing		
Cylindrical housing with flange		
Block housing		
Air purge		

<sup>1)</sup> Minimum required  
output voltage of the  
frequency converter

+ Standard

o Option

x on request

Series: HV-X

Cylindrical housing:
Ø = 150 mm

- Tool interface:
GMN standard
- Motor:
Asynchronous motor
- Bearing arrangement:
GMN high precision ball bearings
- Lubrication:
Oil-air lubrication

Table with 2 columns: Parameter and Unit. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, and more.

Table with 4 columns: Parameter, 200 V, 350 V, 460 V. Rows include HV-X 150 - 45000/36, HV-X 150 - 45000/25, HV-X 150 - 30000/37, and HV-X 150 - 30000/26.

Table with 4 columns: Parameter, 200 V, 350 V, 460 V. Rows include HV-X 150 - 45000/36, HV-X 150 - 45000/25, HV-X 150 - 30000/37, and HV-X 150 - 30000/26.

Table with 4 columns: Parameter, 200 V, 350 V, 460 V. Rows include HV-X 150 - 45000/36, HV-X 150 - 45000/25, HV-X 150 - 30000/37, and HV-X 150 - 30000/26.

Table with 4 columns: Parameter, 200 V, 350 V, 460 V. Rows include HV-X 150 - 45000/36, HV-X 150 - 45000/25, HV-X 150 - 30000/37, and HV-X 150 - 30000/26.

Table with 2 columns: Parameter and Unit. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, and more.

Table with 2 columns: Option and Unit. Rows include Electrical connection, Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Low pressure (du), High pressure (dh), Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, and Air purge.

Table with 4 columns: Option, D500, MAC, MAC. Rows include HV-X 150 - 45000/36, HV-X 150 - 45000/25, HV-X 150 - 30000/37, and HV-X 150 - 30000/26.

Table with 4 columns: Option, D500, MAC, MAC. Rows include HV-X 150 - 45000/36, HV-X 150 - 45000/25, HV-X 150 - 30000/37, and HV-X 150 - 30000/26.

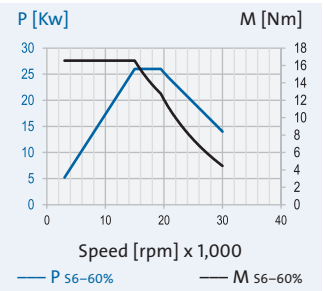
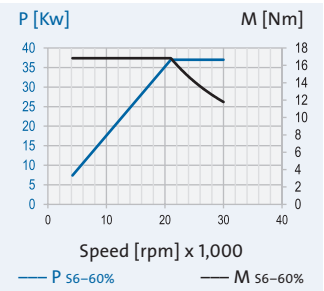
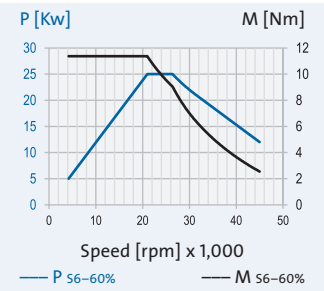
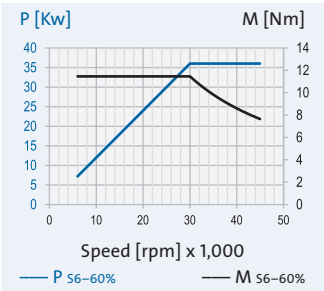
Table with 4 columns: Option, D500, MAC, MAC. Rows include HV-X 150 - 45000/36, HV-X 150 - 45000/25, HV-X 150 - 30000/37, and HV-X 150 - 30000/26.

Table with 4 columns: Option, D500, MAC, MAC. Rows include HV-X 150 - 45000/36, HV-X 150 - 45000/25, HV-X 150 - 30000/37, and HV-X 150 - 30000/26.

Table with 2 columns: Option and Unit. Rows include Electrical connection, Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Low pressure (du), High pressure (dh), Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, and Air purge.

1) Minimum required
output voltage of the
frequency converter

- + Standard
- o Option
- x on request



1) Minimum required
output voltage of the
frequency converter

- + Standard
- o Option
- x on request



Series: HSX

Cylindrical housing:  
Ø = 100 mm

Tool interface:  
GMN standard

Motor:  
Asynchronous motor

Bearing arrangement:  
GMN high precision ball bearings

Lubrication:  
Oil-air lubrication

TECHNICAL DATA		
Spindle housing Ø A	[mm]	
Speed max. n <sub>max</sub>	[rpm]	
Bearing Ø front W <sub>1</sub>	[mm]	
Tool interface		
Flat contact face Ø W	[mm]	
Static rigidity		
axial C <sub>ax</sub>	[N/µm]	
radial C <sub>rad</sub>	[N/µm]	
Motor design		
Frequency max. f <sub>max</sub>	[Hz]	
Nominal converter voltage <sup>1)</sup> [V]		
Power P <sub>s1</sub>	[kW]	
Torque M <sub>s1</sub>	[Nm]	
... at speed n	[rpm]	
Current I <sub>s1</sub>	[A]	
Power P <sub>s6-60%</sub>	[kW]	
Torque M <sub>s6-60%</sub>	[Nm]	
... at speed n	[rpm]	
Current I <sub>s6-60%</sub>	[A]	

Electrical connection		
Plug type		
Straight plug-in connection		
Angle plug-in connection		
Fixed cable XXm		
Coolant through the shaft		
Low pressure (du)		
High pressure (dh)		
Sensor technology		
Rotary encoder		
Speed sensor		
Housing		
Cylindrical housing		
Cylindrical housing with flange		
Block housing		
Air purge		

<sup>1)</sup> Minimum required  
output voltage of the  
frequency converter

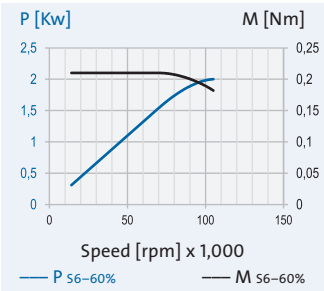
+ Standard

o Option

x on request

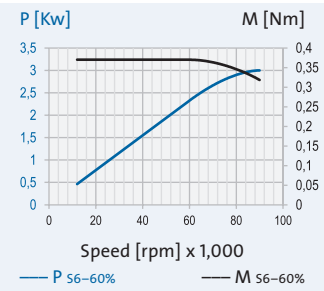
HSX 100 - 105000/2		
100		
105,000		
15		
D 08/14		
14		
26		
29		
200 V	350 V	–
1,750		
200	350	–
1.7		
0.16		
105,000		
8,8	5	–
2		
0.18		
105,000		
11	6.5	–

GA	GA	–
+	+	–
o	o	–
o	o	–
o		
o		
–		
–		
+		
+		
o		
x		
o		



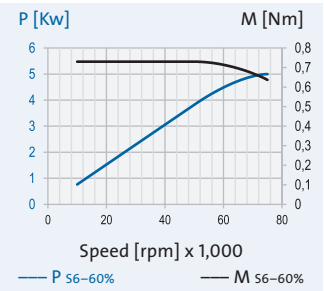
HSX 100 - 90000/3		
100		
90,000		
17		
D 09/16		
16		
36		
33		
200 V	350 V	–
1,500		
200	350	–
2.5		
0.27		
90,000		
16	7.5	–
3		
0.32		
90,000		
23	9	–

GA	GA	–
+	+	–
o	o	–
o	o	–
–		
+		
+		
o		
x		
o		



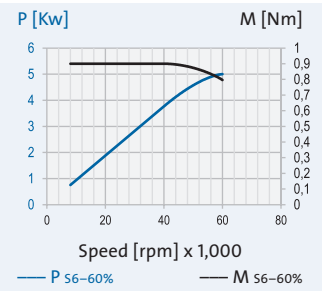
HSX 100 - 75000/5		
100		
75,000		
20		
D 10/18		
18		
48		
46		
200 V	350 V	—
1,250		
200	350	—
4.2		
0.54		
75,000		
18	11	—
5		
0.64		
75,000		
23	13	—

GA	GA	–
+	+	–
o	o	–
o	o	–
–		
+		
+		
o		
x		
o		



HSX 100 - 60000/5		
100		
60,000		
25		
D 14/23		
23		
53		
53		
200 V	350 V	—
1,000		
200	350	—
4.2		
0.67		
60,000		
18	11	—
5		
0.8		
60,000		
23	13	—

GA	GA	–
+	+	–
o	o	–
o	o	–
–		
+		
+		
o		
x		
o		



TECHNICAL DATA		
Spindle housing Ø A	[mm]	
Speed max. n <sub>max</sub>	[rpm]	
Bearing Ø front W <sub>1</sub>	[mm]	
Tool interface		
Flat contact face Ø W	[mm]	
Static rigidity		
axial C <sub>ax</sub>	[N/µm]	
radial C <sub>rad</sub>	[N/µm]	
Motor design		
Frequency max. f <sub>max</sub>	[Hz]	
Nominal converter voltage <sup>1)</sup> [V]		
Power P <sub>s1</sub>	[kW]	
Torque M <sub>s1</sub>	[Nm]	
... at speed n	[rpm]	
Current I <sub>s1</sub>	[A]	
Power P <sub>s6-60%</sub>	[kW]	
Torque M <sub>s6-60%</sub>	[Nm]	
... at speed n	[rpm]	
Current I <sub>s6-60%</sub>	[A]	

Electrical connection		
Plug type		
Straight plug-in connection		
Angle plug-in connection		
Fixed cable XXm		
Coolant through the shaft		
Low pressure (du)		
High pressure (dh)		
Sensor technology		
Rotary encoder		
Speed sensor		
Housing		
Cylindrical housing		
Cylindrical housing with flange		
Block housing		
Air purge		

<sup>1)</sup> Minimum required  
output voltage of the  
frequency converter

+ Standard

o Option

x on request

Series: HSX

Cylindrical housing:
Ø = 120 mm

- Tool interface:
GMN standard
- Motor:
Asynchronous motor
- Bearing arrangement:
GMN high precision ball bearings
- Lubrication:
Oil-air lubrication

Table with 2 columns: TECHNICAL DATA and values. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, etc.

Table with 4 columns: HSX 120 - 60000/7 and values. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, etc.

Table with 4 columns: HSX 120 - 51000/12 and values. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, etc.

Table with 4 columns: HSX 120 - 42000/12 and values. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, etc.

Table with 4 columns: HSX 120 - 30000/13 and values. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, etc.

Table with 2 columns: TECHNICAL DATA and values. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, etc.

Table with 2 columns: Electrical connection and values. Rows include Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Low pressure (du), High pressure (dh), Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

Table with 4 columns: GA and values. Rows include Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Low pressure (du), High pressure (dh), Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

Table with 4 columns: MAC and values. Rows include Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Low pressure (du), High pressure (dh), Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

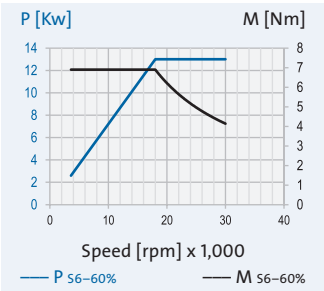
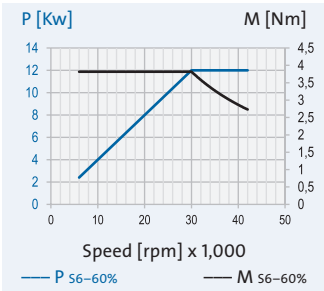
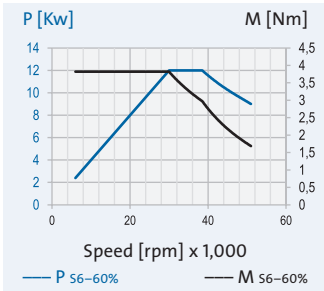
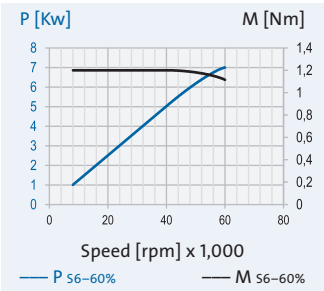
Table with 4 columns: MAC and values. Rows include Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Low pressure (du), High pressure (dh), Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

Table with 4 columns: MAC and values. Rows include Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Low pressure (du), High pressure (dh), Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

Table with 2 columns: Electrical connection and values. Rows include Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Low pressure (du), High pressure (dh), Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

1) Minimum required output voltage of the frequency converter

- + Standard
- o Option
- x on request



1) Minimum required output voltage of the frequency converter

- + Standard
- o Option
- x on request

Series: HSX
Cylindrical housing:
Ø = 150 mm

Tool interface:
GMN standard

Motor:
Asynchronous motor

Bearing arrangement:
GMN high precision
ball bearings

Lubrication:
Oil-air lubrication

Table with 2 columns: Parameter and Value. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, and more.

Table with 2 columns: Feature and Availability. Rows include Electrical connection, Plug type, Coolant through the shaft, Sensor technology, Housing, and Air purge.

1) Minimum required output voltage of the frequency converter

+ Standard
o Option
x on request

Table for HSX 150 - 42000/16. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing, Speed, Bearing, Tool interface, Flat contact face, Static rigidity, Motor design, Frequency, Voltage, Power, Torque, Current.

Table for HSX 150 - 42000/16. Columns: Feature, MAC, GA. Rows: Plug type, Coolant, Sensor, Housing, Air purge.

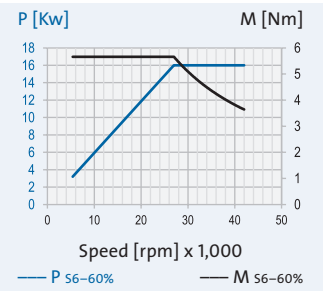


Table for HSX 150 - 42000/11. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing, Speed, Bearing, Tool interface, Flat contact face, Static rigidity, Motor design, Frequency, Voltage, Power, Torque, Current.

Table for HSX 150 - 42000/11. Columns: Feature, MAC, GA. Rows: Plug type, Coolant, Sensor, Housing, Air purge.

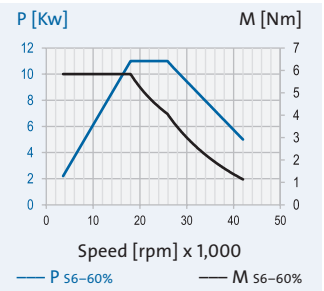


Table for HSX 150 - 30000/23. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing, Speed, Bearing, Tool interface, Flat contact face, Static rigidity, Motor design, Frequency, Voltage, Power, Torque, Current.

Table for HSX 150 - 30000/23. Columns: Feature, MAC, GA. Rows: Plug type, Coolant, Sensor, Housing, Air purge.

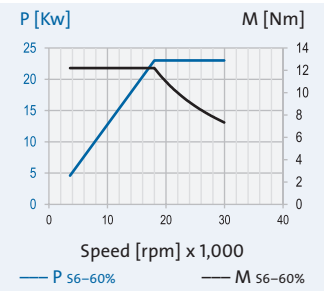


Table for HSX 150 - 30000/16. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing, Speed, Bearing, Tool interface, Flat contact face, Static rigidity, Motor design, Frequency, Voltage, Power, Torque, Current.

Table for HSX 150 - 30000/16. Columns: Feature, MAC, GA. Rows: Plug type, Coolant, Sensor, Housing, Air purge.

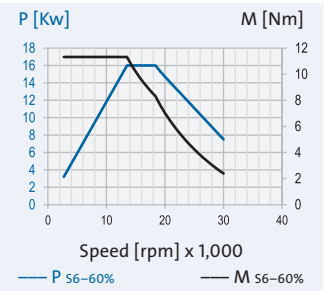


Table for HSX 150 - 24000/23. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing, Speed, Bearing, Tool interface, Flat contact face, Static rigidity, Motor design, Frequency, Voltage, Power, Torque, Current.

Table for HSX 150 - 24000/23. Columns: Feature, MAC, GA. Rows: Plug type, Coolant, Sensor, Housing, Air purge.

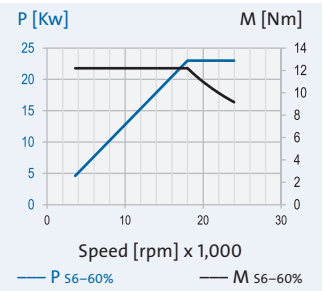
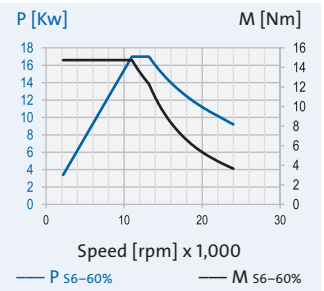


Table for HSX 150 - 24000/17. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing, Speed, Bearing, Tool interface, Flat contact face, Static rigidity, Motor design, Frequency, Voltage, Power, Torque, Current.

Table for HSX 150 - 24000/17. Columns: Feature, MAC, GA. Rows: Plug type, Coolant, Sensor, Housing, Air purge.





Series: HSX
Cylindrical housing:
Ø = 170 mm

- Tool interface:
GMN standard
- Motor:
Asynchronous motor
- Bearing arrangement:
GMN high precision
ball bearings
- Lubrication:
Oil-air lubrication

Table with 2 columns: Parameter and Value. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, and more.

Table with 2 columns: Feature and Availability. Rows include Electrical connection (Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm), Coolant through the shaft (Low pressure, High pressure), Sensor technology (Rotary encoder, Speed sensor), and Housing (Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge).

1) Minimum required output voltage of the frequency converter
+ Standard
o Option
x on request

Table for HSX 170 - 30000/35. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing, Speed, Bearing, Tool interface, Flat contact face, Static rigidity, Motor design, Frequency, Power, Torque, Current.

Table for HSX 170 - 30000/35. Columns: Feature, D500, MAC, MAC. Rows: Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable, Coolant, Sensor technology, Housing.

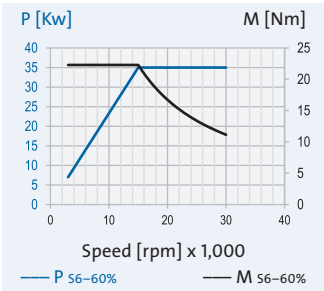


Table for HSX 170 - 30000/21. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing, Speed, Bearing, Tool interface, Flat contact face, Static rigidity, Motor design, Frequency, Power, Torque, Current.

Table for HSX 170 - 30000/21. Columns: Feature, MAC, MAC, MAC. Rows: Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable, Coolant, Sensor technology, Housing.

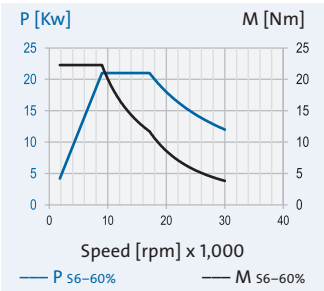


Table for HSX 170 - 24000/35. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing, Speed, Bearing, Tool interface, Flat contact face, Static rigidity, Motor design, Frequency, Power, Torque, Current.

Table for HSX 170 - 24000/35. Columns: Feature, D500, MAC, MAC. Rows: Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable, Coolant, Sensor technology, Housing.

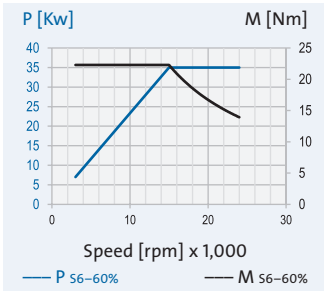


Table for HSX 170 - 24000/21. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing, Speed, Bearing, Tool interface, Flat contact face, Static rigidity, Motor design, Frequency, Power, Torque, Current.

Table for HSX 170 - 24000/21. Columns: Feature, MAC, MAC, MAC. Rows: Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable, Coolant, Sensor technology, Housing.

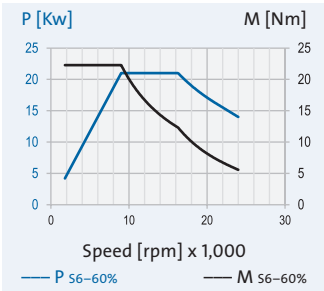


Table for HSX 170 - 18000/34. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing, Speed, Bearing, Tool interface, Flat contact face, Static rigidity, Motor design, Frequency, Power, Torque, Current.

Table for HSX 170 - 18000/34. Columns: Feature, D500, MAC, MAC. Rows: Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable, Coolant, Sensor technology, Housing.

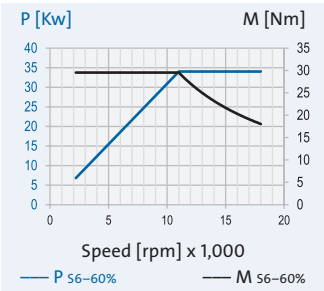
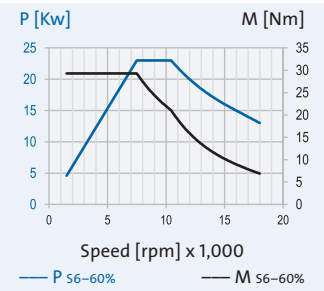


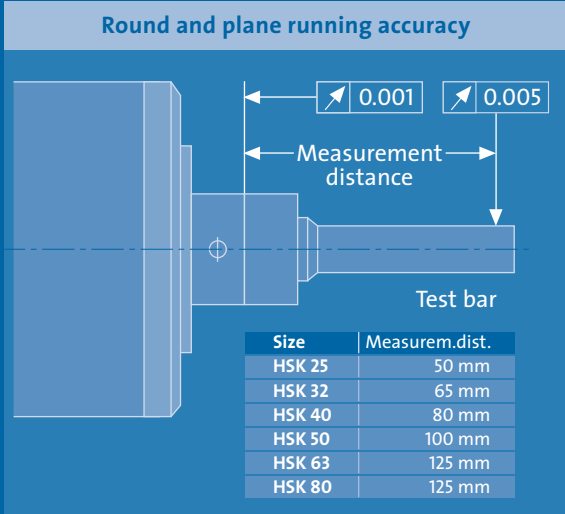
Table for HSX 170 - 18000/23. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing, Speed, Bearing, Tool interface, Flat contact face, Static rigidity, Motor design, Frequency, Power, Torque, Current.

Table for HSX 170 - 18000/23. Columns: Feature, D500, MAC, MAC. Rows: Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable, Coolant, Sensor technology, Housing.



# Technical data Features

## GMN High speed spindles for manual tool change HSK interface



### HV-P

High-performance all-round spindles  
Grinding, milling and drilling applications  
with high rigidity and performance requirements

- Housing Ø: 100 / 120 / 150 mm
- Speed: max. 60,000 rpm
- Power: S1 max. 33 kW
- Motor: Asynchronous motor
- Tool interface: HSK-C
- Lubrication: Oil-air lubrication



### HSP

High-performance all-round spindles  
Universal grinding, milling and drilling applications

- Housing Ø: 100 / 120 / 150 / 170 / 230 mm
- Speed: max. 51,000 rpm
- Power: S1 max. 45 kW
- Motor: Asynchronous motor
- Tool interface: HSK-C
- Lubrication: Oil-air lubrication

### HSP..g

High-performance all-round spindles  
Universal grinding, milling and drilling applications

- Housing Ø: 100 / 120 / 150 / 170 / 230 mm
- Speed: max. 30,000 rpm
- Power: S1 max. 45 kW
- Motor: Asynchronous motor
- Tool interface: HSK-C
- Lubrication: Permanent grease lubrication

Series: HV-P

Cylindrical housing:  
Ø = 100 mm

Tool interface:  
HSK-C

Motor:  
Asynchronous motor

Bearing arrangement:  
GMN high precision ball bearings

Lubrication:  
Oil-air lubrication

TECHNICAL DATA		
Spindle housing Ø A	[mm]	
Speed max.	n <sub>max</sub> [rpm]	
Bearing Ø front	W <sub>1</sub> [mm]	
Tool interface		
Flat contact face Ø W	[mm]	
Static rigidity		
axial	C <sub>ax</sub> [N/µm]	
radial	C <sub>rad</sub> [N/µm]	
Motor design		
Frequency max.	f <sub>max</sub> [Hz]	
Nominal converter voltage <sup>1)</sup>	[V]	
Power	P <sub>S1</sub> [kW]	
Torque	M <sub>S1</sub> [Nm]	
... at speed	n [rpm]	
Current	I <sub>S1</sub> [A]	
Power	P <sub>S6-60%</sub> [kW]	
Torque	M <sub>S6-60%</sub> [Nm]	
... at speed	n [rpm]	
Current	I <sub>S6-60%</sub> [A]	

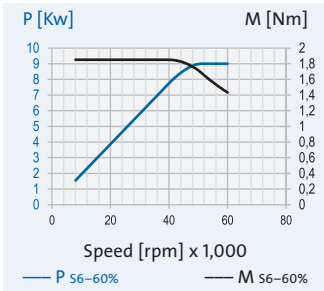
Electrical connection		
Plug type		
Straight plug-in connection		
Angle plug-in connection		
Fixed cable XXm		
Coolant through the shaft		
Low pressure (du)		
High pressure (dh)		
Sensor technology		
Rotary encoder		
Speed sensor		
Housing		
Cylindrical housing		
Cylindrical housing with flange		
Block housing		
Air purge		

<sup>1)</sup> Minimum required  
output voltage of the  
frequency converter

+ Standard  
o Option  
x on request

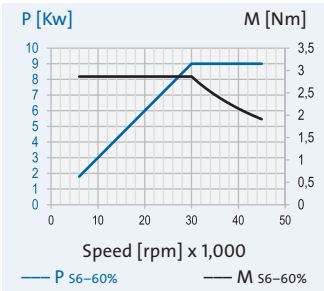
HV-P 100 - 60000/9			
100			
60,000			
30			
HSK-C 25			
25			
62			
73			
200 V	350 V	460 V	
2,000			
200	350	460	
7.5			
1.4			
51,000			
42	24	18	
9			
1.69			
51,000			
49	28	21	

GA	GA	GA
+	+	+
o	o	o
o	o	o
-		
x		
-		
+		
+		
o		
x		
o		



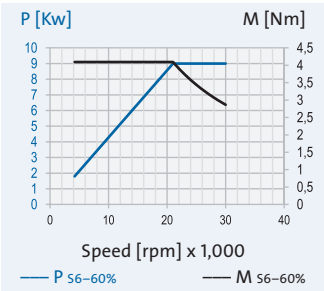
HV-P 100 - 45000/9			
100			
45,000			
40			
HSK-C 32			
32			
76			
85			
200 V	350 V	460 V	
1,500			
200	350	460	
7.5			
2.39			
30,000			
42	24	18	
9			
2.86			
30,000			
49	28	21	

GA	GA	GA
+	+	+
o	o	o
o	o	o
-		
x		
-		
+		
+		
o		
x		
o		



HV-P 100 - 30000/9			
100			
30,000			
45			
HSK-C 40			
40			
80			
74			
200 V	350 V	460 V	
1,000			
200	350	460	
7.5			
3.41			
21,000			
49	28	21	
9			
4.09			
21,000			
53	30	23	

MAC	GA	GA
+	+	+
x	x	x
o	o	o
-		
x		
-		
+		
+		
o		
x		
o		



TECHNICAL DATA		
Spindle housing Ø A	[mm]	
Speed max.	n <sub>max</sub> [rpm]	
Bearing Ø front	W <sub>1</sub> [mm]	
Tool interface		
Flat contact face Ø W	[mm]	
Static rigidity		
axial	C <sub>ax</sub> [N/µm]	
radial	C <sub>rad</sub> [N/µm]	
Motor design		
Frequency max.	f <sub>max</sub> [Hz]	
Nominal converter voltage <sup>1)</sup>	[V]	
Power	P <sub>S1</sub> [kW]	
Torque	M <sub>S1</sub> [Nm]	
... at speed	n [rpm]	
Current	I <sub>S1</sub> [A]	
Power	P <sub>S6-60%</sub> [kW]	
Torque	M <sub>S6-60%</sub> [Nm]	
... at speed	n [rpm]	
Current	I <sub>S6-60%</sub> [A]	

Electrical connection		
Plug type		
Straight plug-in connection		
Angle plug-in connection		
Fixed cable XXm		
Coolant through the shaft		
Low pressure (du)		
High pressure (dh)		
Sensor technology		
Rotary encoder		
Speed sensor		
Housing		
Cylindrical housing		
Cylindrical housing with flange		
Block housing		
Air purge		

<sup>1)</sup> Minimum required  
output voltage of the  
frequency converter

+ Standard  
o Option  
x on request



Series: HV-P

Cylindrical housing:
Ø = 120 mm

- Tool interface:
HSK-C
- Motor:
Asynchronous motor
- Bearing arrangement:
GMN high precision ball bearings
- Lubrication:
Oil-air lubrication

Table with 2 columns: TECHNICAL DATA and values. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, etc.

Table with 4 columns: HV-P 120 - 60000/13 and values. Rows include 120, 60,000, 30, HSK-C 25, 25, 69, 97, 200 V, 350 V, 460 V, 200, 350, 460, 11, 3.5, 30,000, 58, 33, 25, 13, 4.14, 30,000, 65, 37, 28.

Table with 4 columns: HV-P 120 - 60000/12 and values. Rows include 120, 60,000, 30, HSK-C 25, 25, 69, 97, 200 V, 350 V, 460 V, 200, 350, 460, 10.5, 1.97, 51,000, 44, 25, 19, 12, 2.25, 51,000, 51, 29, 22.

Table with 4 columns: HV-P 120 - 45000/18 and values. Rows include 120, 45,000, 45, HSK-C 40, 40, 91, 125, 200 V, 350 V, 460 V, 200, 350, 460, 15, 4.77, 30,000, 72, 41, 31, 18, 5.73, 30,000, 89, 51, 39.

Table with 4 columns: HV-P 120 - 30000/18 and values. Rows include 120, 30,000, 55, HSK-C 50, 50, 99, 145, 200 V, 350 V, 460 V, 200, 350, 460, 15, 5.97, 24,000, 72, 41, 31, 18, 7.16, 24,000, 89, 51, 39.

Table with 2 columns: TECHNICAL DATA and values. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, etc.

Table with 2 columns: Electrical connection and values. Rows include Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Low pressure (du), High pressure (dh), Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

Table with 4 columns: MAC, GA, GA and values. Rows include +, x, o, -, o, o, +, +, o, x, o.

Table with 4 columns: GA, GA, GA and values. Rows include +, o, o, -, o, o, +, +, o, x, o.

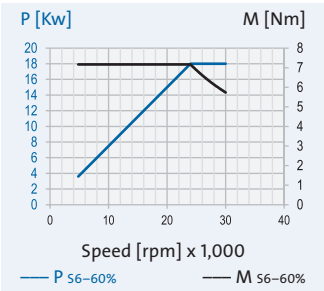
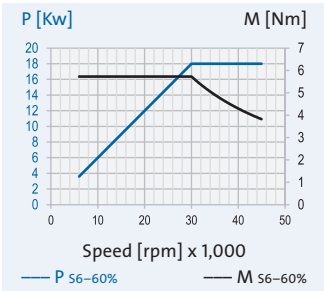
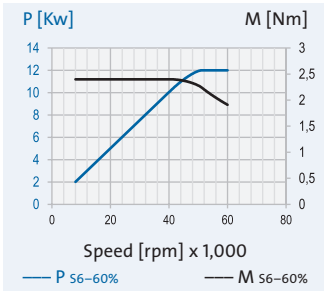
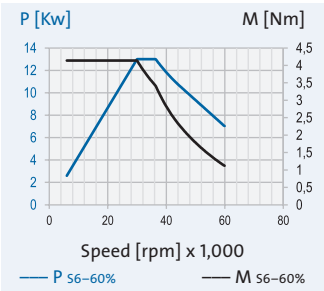
Table with 4 columns: MAC, GA, GA and values. Rows include +, o, o, -, o, o, +, +, o, x, o.

Table with 4 columns: MAC, GA, GA and values. Rows include +, o, o, -, o, o, +, +, o, x, o.

Table with 2 columns: Electrical connection and values. Rows include Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Low pressure (du), High pressure (dh), Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

1) Minimum required output voltage of the frequency converter

- + Standard
- o Option
- x on request



1) Minimum required output voltage of the frequency converter

- + Standard
- o Option
- x on request

Series: HV-P

Cylindrical housing:
Ø = 150 mm

Tool interface:
HSK-C

Motor:
Asynchronous motor

Bearing arrangement:
GMN high precision ball bearings

Lubrication:
Oil-air lubrication

Table with 2 columns: Parameter and Value. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, etc.

Table with 4 columns: Parameter, 200 V, 350 V, 460 V. Rows include HV-P 150 - 45000/36, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, etc.

Table with 4 columns: Parameter, 200 V, 350 V, 460 V. Rows include HV-P 150 - 45000/25, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, etc.

Table with 4 columns: Parameter, 200 V, 350 V, 460 V. Rows include HV-P 150 - 30000/37, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, etc.

Table with 4 columns: Parameter, 200 V, 350 V, 460 V. Rows include HV-P 150 - 30000/26, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, etc.

Table with 2 columns: Parameter and Value. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, etc.

Table with 2 columns: Option and Value. Rows include Electrical connection, Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Low pressure (du), High pressure (dh), Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

Table with 4 columns: Option, D500, D500, MAC. Rows include HV-P 150 - 45000/36, Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Low pressure (du), High pressure (dh), Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

Table with 4 columns: Option, D500, MAC, MAC. Rows include HV-P 150 - 45000/25, Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Low pressure (du), High pressure (dh), Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

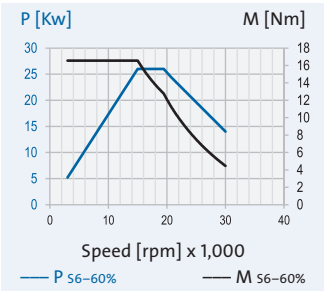
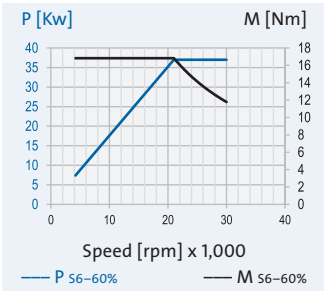
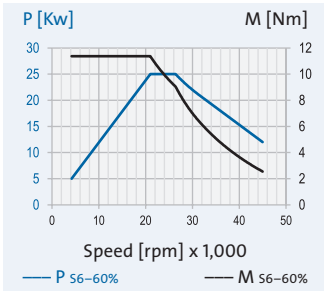
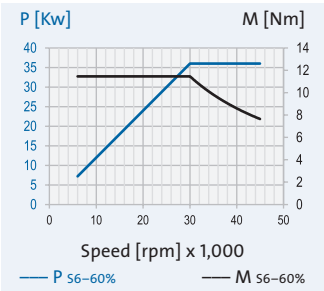
Table with 4 columns: Option, D500, MAC, MAC. Rows include HV-P 150 - 30000/37, Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Low pressure (du), High pressure (dh), Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

Table with 4 columns: Option, D500, MAC, MAC. Rows include HV-P 150 - 30000/26, Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Low pressure (du), High pressure (dh), Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

Table with 2 columns: Option and Value. Rows include Electrical connection, Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Low pressure (du), High pressure (dh), Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

1) Minimum required output voltage of the frequency converter

+ Standard
o Option
x on request



1) Minimum required output voltage of the frequency converter

+ Standard
o Option
x on request

# Series: HSP

Cylindrical housing:  
Ø = 100 mm

Tool interface:  
HSK-C

Motor:  
Asynchronous motor

Bearing arrangement:  
GMN high precision ball bearings

Lubrication:  
Oil-air lubrication

TECHNICAL DATA		
Spindle housing Ø A	[mm]	
Speed max. n <sub>max</sub>	[rpm]	
Bearing Ø front W <sub>1</sub>	[mm]	
Tool interface		
Flat contact face Ø W	[mm]	
Static rigidity		
axial C <sub>ax</sub>	[N/µm]	
radial C <sub>rad</sub>	[N/µm]	
Motor design		
Frequency max. f <sub>max</sub>	[Hz]	
Nominal converter voltage <sup>1)</sup> [V]		
Power P <sub>S1</sub>	[kW]	
Torque M <sub>S1</sub>	[Nm]	
... at speed n	[rpm]	
Current I <sub>S1</sub>	[A]	
Power P <sub>S6-60%</sub>	[kW]	
Torque M <sub>S6-60%</sub>	[Nm]	
... at speed n	[rpm]	
Current I <sub>S6-60%</sub>	[A]	

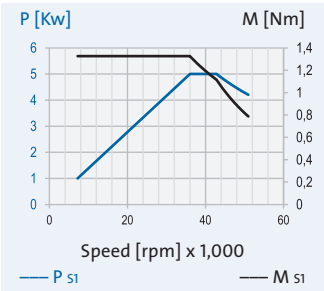
Electrical connection		
Plug type		
Straight plug-in connection		
Angle plug-in connection		
Fixed cable XXm		
Coolant through the shaft		
Low pressure (du)		
High pressure (dh)		
Sensor technology		
Rotary encoder		
Speed sensor		
Housing		
Cylindrical housing		
Cylindrical housing with flange		
Block housing		
Air purge		

<sup>1)</sup> Minimum required  
output voltage of the  
frequency converter

+ Standard  
o Option  
x on request

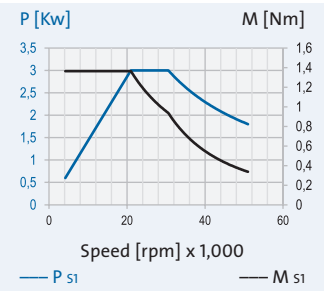
HSP 100 - 51000/5		
100		
51,000		
30		
HSK-C 25		
25		
63		
77		
200 V	350 V	460 V
1,700		
200	350	460
5		
1.33		
36,000		
26	15	11
6		
1.59		
36,000		
32	18	14

GA	GA	GA
+	+	+
o	o	o
o	o	o
-		
x		
-		
+		
+		
o		
x		
o		



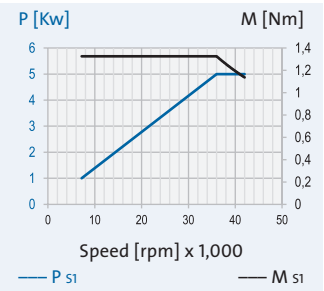
HSP 100 - 51000/3		
100		
51,000		
30		
HSK-C 25		
25		
63		
77		
200 V	350 V	460 V
1,700		
200	350	460
3		
1.36		
21,000		
18	10	7,6
4		
1.59		
24,000		
21	12	9.1

GA	GA	GA
+	+	+
o	o	o
o	o	o
-		
x		
-		
+		
+		
o		
x		
o		



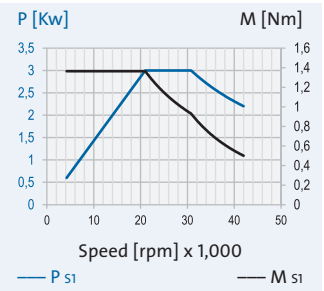
HSP 100 - 42000/5		
100		
42,000		
35		
HSK-C 32		
32		
69		
81		
200 V	350 V	460 V
1,400		
200	350	460
5		
1.33		
36,000		
26	15	11
6		
1.59		
36,000		
32	18	14

GA	GA	GA
+	+	+
o	o	o
o	o	o
-		
x		
-		
+		
+		
o		
x		
o		



HSP 100 - 42000/3		
100		
42,000		
35		
HSK-C 32		
32		
69		
81		
200 V	350 V	460 V
1,400		
200	350	460
3		
1.36		
21,000		
18	10	7.6
4		
1.59		
24,000		
21	12	9.1

GA	GA	GA
+	+	+
o	o	o
o	o	o
-		
x		
-		
+		
+		
o		
x		
o		



TECHNICAL DATA		
Spindle housing Ø A	[mm]	
Speed max. n <sub>max</sub>	[rpm]	
Bearing Ø front W <sub>1</sub>	[mm]	
Tool interface		
Flat contact face Ø W	[mm]	
Static rigidity		
axial C <sub>ax</sub>	[N/µm]	
radial C <sub>rad</sub>	[N/µm]	
Motor design		
Frequency max. f <sub>max</sub>	[Hz]	
Nominal converter voltage <sup>1)</sup> [V]		
Power P <sub>S1</sub>	[kW]	
Torque M <sub>S1</sub>	[Nm]	
... at speed n	[rpm]	
Current I <sub>S1</sub>	[A]	
Power P <sub>S6-60%</sub>	[kW]	
Torque M <sub>S6-60%</sub>	[Nm]	
... at speed n	[rpm]	
Current I <sub>S6-60%</sub>	[A]	

Electrical connection		
Plug type		
Straight plug-in connection		
Angle plug-in connection		
Fixed cable XXm		
Coolant through the shaft		
Low pressure (du)		
High pressure (dh)		
Sensor technology		
Rotary encoder		
Speed sensor		
Housing		
Cylindrical housing		
Cylindrical housing with flange		
Block housing		
Air purge		

<sup>1)</sup> Minimum required  
output voltage of the  
frequency converter

+ Standard  
o Option  
x on request



Series: HSP
Cylindrical housing:
Ø = 120 mm

Tool interface:
HSK-C

Motor:
Asynchronous motor

Bearing arrangement:
GMN high precision
ball bearings

Lubrication:
Oil-air lubrication

Table with 2 columns: Parameter and Value. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, etc.

Table with 2 columns: Feature and Availability. Rows include Electrical connection, Plug type, Coolant through the shaft, Sensor technology, Housing, etc.

1) Minimum required output voltage of the frequency converter

+ Standard
o Option
x on request

Table for HSP 120 - 51000/11. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, etc.

Table for HSP 120 - 51000/11. Columns: Feature, MAC, GA, GA. Rows: Plug type, Coolant through the shaft, Sensor technology, Housing, etc.

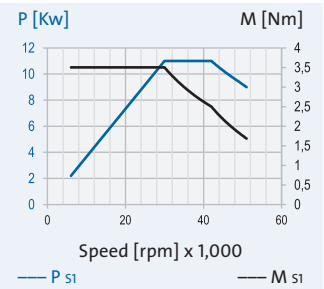


Table for HSP 120 - 51000/6. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, etc.

Table for HSP 120 - 51000/6. Columns: Feature, GA, GA, GA. Rows: Plug type, Coolant through the shaft, Sensor technology, Housing, etc.

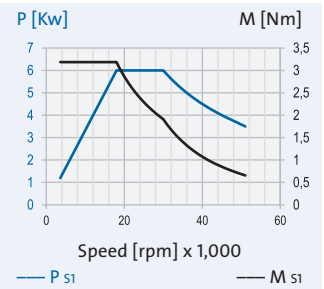


Table for HSP 120 - 42000/11. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, etc.

Table for HSP 120 - 42000/11. Columns: Feature, MAC, GA, GA. Rows: Plug type, Coolant through the shaft, Sensor technology, Housing, etc.

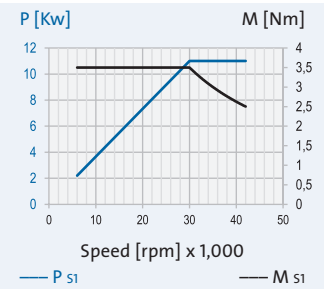


Table for HSP 120 - 42000/6. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, etc.

Table for HSP 120 - 42000/6. Columns: Feature, GA, GA, GA. Rows: Plug type, Coolant through the shaft, Sensor technology, Housing, etc.

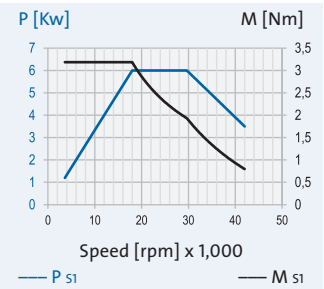


Table for HSP 120 - 30000/11. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, etc.

Table for HSP 120 - 30000/11. Columns: Feature, MAC, GA, GA. Rows: Plug type, Coolant through the shaft, Sensor technology, Housing, etc.

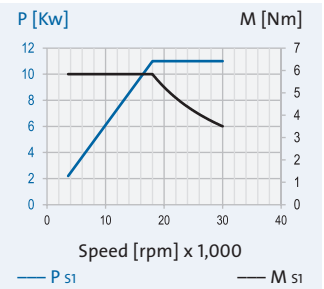
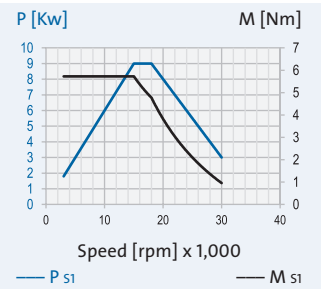


Table for HSP 120 - 30000/9. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, etc.

Table for HSP 120 - 30000/9. Columns: Feature, MAC, GA, GA. Rows: Plug type, Coolant through the shaft, Sensor technology, Housing, etc.



Series: HSP
Cylindrical housing:
Ø = 150 mm

Tool interface:
HSK-C

Motor:
Asynchronous motor

Bearing arrangement:
GMN high precision
ball bearings

Lubrication:
Oil-air lubrication

Table with 2 columns: Parameter and Value. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, and more.

Table with 2 columns: Feature and Availability. Rows include Electrical connection, Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Low pressure (du), High pressure (dh), Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, and Air purge.

1) Minimum required output voltage of the frequency converter

+ Standard
o Option
x on request

Table for HSP 150 - 42000/14. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current.

Table for HSP 150 - 42000/14. Columns: Feature, MAC, GA. Rows: Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Low pressure (du), High pressure (dh), Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, and Air purge.

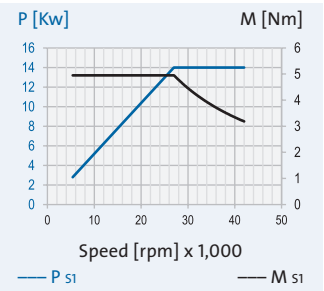


Table for HSP 150 - 42000/9.5. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current.

Table for HSP 150 - 42000/9.5. Columns: Feature, MAC, GA. Rows: Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Low pressure (du), High pressure (dh), Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, and Air purge.

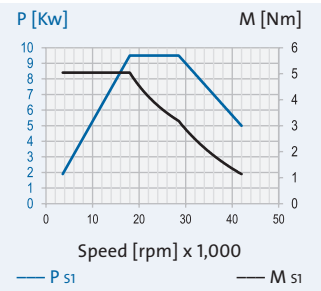


Table for HSP 150 - 30000/18. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current.

Table for HSP 150 - 30000/18. Columns: Feature, MAC, GA. Rows: Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Low pressure (du), High pressure (dh), Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, and Air purge.

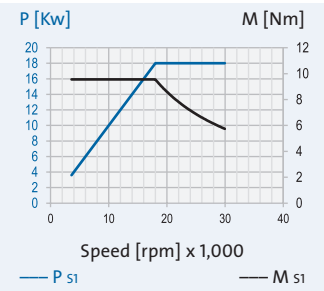


Table for HSP 150 - 30000/14. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current.

Table for HSP 150 - 30000/14. Columns: Feature, MAC, GA. Rows: Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Low pressure (du), High pressure (dh), Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, and Air purge.

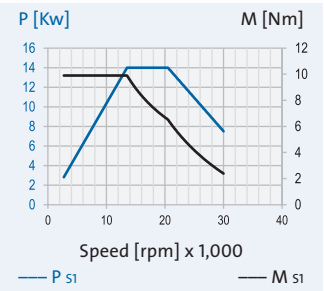


Table for HSP 150 - 24000/18. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current.

Table for HSP 150 - 24000/18. Columns: Feature, MAC, GA. Rows: Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Low pressure (du), High pressure (dh), Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, and Air purge.

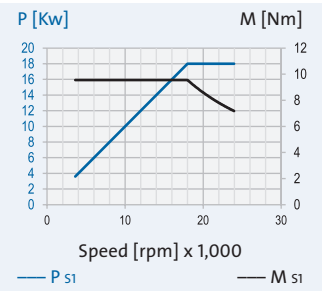
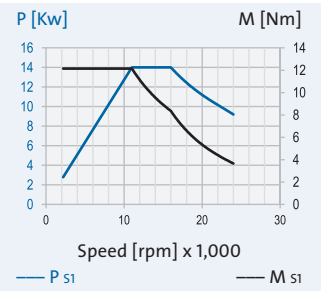


Table for HSP 150 - 24000/14. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current.

Table for HSP 150 - 24000/14. Columns: Feature, MAC, GA. Rows: Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Low pressure (du), High pressure (dh), Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, and Air purge.



Series: HSP
Cylindrical housing:
Ø = 170 mm

Tool interface:
HSK-C

Motor:
Asynchronous motor

Bearing arrangement:
GMN high precision
ball bearings

Lubrication:
Oil-air lubrication

Table with 2 columns: Parameter and Value. Includes technical data such as Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, and more.

Table with 2 columns: Feature and Availability. Includes electrical connection (Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm), Coolant through the shaft (Low pressure, High pressure), Sensor technology (Rotary encoder, Speed sensor), and Housing (Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge).

1) Minimum required output voltage of the frequency converter

+ Standard
o Option
x on request

Table for HSP 170 - 30000/32. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current.

Table for HSP 170 - 30000/32. Columns: Feature, D500, MAC, MAC. Rows: Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Sensor technology, Housing.

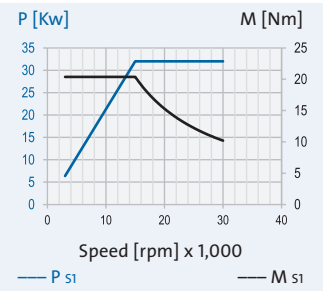


Table for HSP 170 - 30000/19. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current.

Table for HSP 170 - 30000/19. Columns: Feature, MAC, MAC, GA. Rows: Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Sensor technology, Housing.

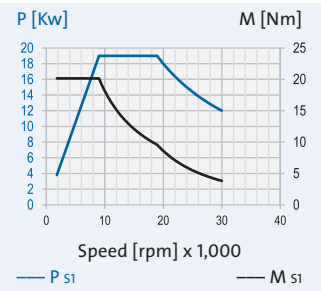


Table for HSP 170 - 24000/32. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current.

Table for HSP 170 - 24000/32. Columns: Feature, D500, MAC, MAC. Rows: Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Sensor technology, Housing.

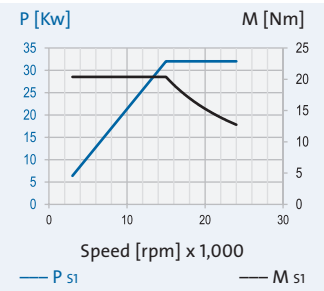


Table for HSP 170 - 24000/19. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current.

Table for HSP 170 - 24000/19. Columns: Feature, MAC, MAC, GA. Rows: Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Sensor technology, Housing.

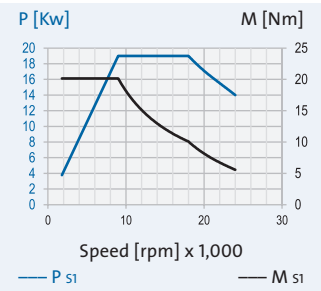


Table for HSP 170 - 18000/29. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current.

Table for HSP 170 - 18000/29. Columns: Feature, D500, MAC, MAC. Rows: Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Sensor technology, Housing.

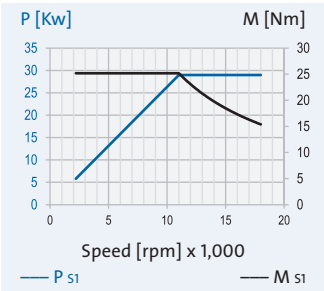
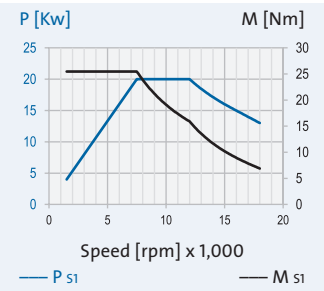


Table for HSP 170 - 18000/20. Columns: Parameter, 200 V, 350 V, 460 V. Rows: Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current.

Table for HSP 170 - 18000/20. Columns: Feature, D500, MAC, GA. Rows: Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Sensor technology, Housing.





Series: HSP

Cylindrical housing:  
 $\varnothing = 230 \text{ mm}$

## Tool interface: HSK-C

Motor:  
Asynchronous motor

Bearing arrangement:  
GMN high precision ball bearings

Lubrication:  
Oil-air lubrication

TECHNICAL DATA		
Spindle housing $\varnothing$ A		[mm]
Speed max.	$n_{\max}$	[rpm]
Bearing $\varnothing$ front	$W_1$	[mm]
Tool interface		
Flat contact face $\varnothing$ W		[mm]
Static rigidity		
axial	$C_{ax}$	[N/ $\mu$ m]
radial	$C_{rad}$	[N/ $\mu$ m]
Motor design		
Frequency max.	$f_{\max}$	[Hz]
Nominal converter voltage <sup>1)</sup> [V]		
Power	$P_{S1}$	[kW]
Torque	$M_{S1}$	[Nm]
... at speed	$n$	[rpm]
Current	$I_{S1}$	[A]
Power	$P_{S6-60\%}$	[kW]
Torque	$M_{S6-60\%}$	[Nm]
... at speed	$n$	[rpm]
Current	$I_{S6-60\%}$	[A]

HSP 230 - 18000/45		
230		
18,000		
70		
HSK-C 63		
63		
196		
375		
200 V	350 V	—
600		
200	350	—
45		
58.9		
7,300		
172	98	—
50		
65.4		
7,300		
189	108	—

HSP 230 - 18000/18		
230		
18,000		
70		
HSK-C 63		
63		
196		
375		
200 V	350 V	—
600		
200	350	—
18		
59.3		
2,900		
100	57	—
20		
65.9		
2,900		
112	64	—

HSP 230 - 15000/42		
	230	
	15,000	
	90	
HSK-C 80		
	80	
	461	
	483	
200 V	350 V	—
	500	
200	350	—
	42	
	85.3	
	4,700	
168	96	—
	47	
	95.5	
	4,700	
187	107	—

HSP 230 - 15000/25		
230		
15,000		
90		
HSK-C 80		
80		
461		
483		
200 V	350 V	—
500		
200	350	—
25		
85.3		
3,000		
121	72	—
28		
95.5		
3,000		
135	78	—

TECHNICAL DATA		
Spindle housing $\varnothing$ A		[mm]
Speed max.	$n_{\max}$	[rpm]
Bearing $\varnothing$ front	$W_1$	[mm]
Tool interface		
Flat contact face $\varnothing$ W		[mm]
Static rigidity		
axial	$C_{ax}$	[N/ $\mu$ m]
radial	$C_{rad}$	[N/ $\mu$ m]
Motor design		
Frequency max.	$f_{\max}$	[Hz]
Nominal converter voltage <sup>1)</sup> [V]		
Power	$P_{S1}$	[kW]
Torque	$M_{S1}$	[Nm]
... at speed	$n$	[rpm]
Current	$I_{S1}$	[A]
Power	$P_{S6-60\%}$	[kW]
Torque	$M_{S6-60\%}$	[Nm]
... at speed	$n$	[rpm]
Current	$I_{S6-60\%}$	[A]

Electrical connection
Plug type
Straight plug-in connection
Angle plug-in connection
Fixed cable XXm
Coolant through the shaft
Low pressure (du)
High pressure (dh)
Sensor technology
Rotary encoder
Speed sensor
Housing
Cylindrical housing
Cylindrical housing with flange
Block housing
Air purge

-	D500	-
-	+	-
-	o	-
+	o	-
-		
o		
x		
+		
+		
o		
x		
o		

D500	MAC	-
+	+	-
o	o	-
o	o	-
	-	
	o	
	x	
	+	
	+	
	o	
	x	
	o	

-	D500	-
-	+	-
-	o	-
+	o	-
-		
o		
x		
+		
+		
o		
x		
o		

D500	MAC	-
+	+	-
o	o	-
o	o	-
-		
o		
X		
+		
+		
o		
X		
o		

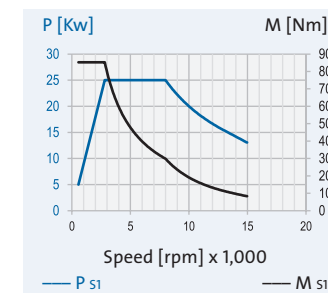
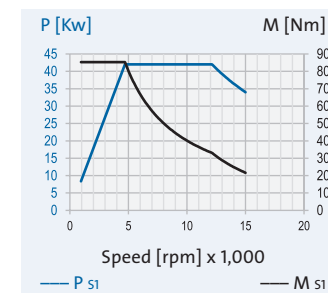
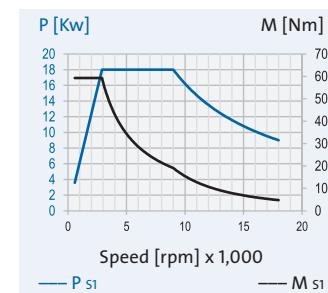
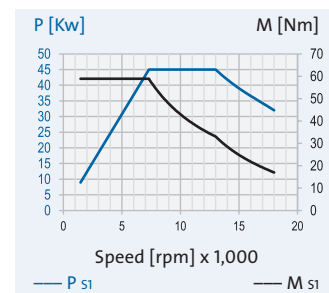
Electrical connection
Plug type
Straight plug-in connection
Angle plug-in connection
Fixed cable XXm
Coolant through the shaft
Low pressure (du)
High pressure (dh)
Sensor technology
Rotary encoder
Speed sensor
Housing
Cylindrical housing
Cylindrical housing with flange
Block housing
Air purge

1) Minimum required output voltage of the frequency converter

+ Standard

- o Option

x on request



1) Minimum required output voltage of the frequency converter

+ Standard

- o Option

x on request

Series: HSP.. g

Cylindrical housing:  
Ø = 100 mm

Tool interface:  
HSK-C

Motor:  
Asynchronous motor

Bearing arrangement:  
GMN high precision ball bearings

Lubrication:  
Permanent grease lubrication

TECHNICAL DATA		
Spindle housing Ø A	[mm]	
Speed max.	n <sub>max</sub> [rpm]	
Bearing Ø front	W <sub>1</sub> [mm]	
Tool interface		
Flat contact face Ø W	[mm]	
Static rigidity		
axial	C <sub>ax</sub> [N/µm]	
radial	C <sub>rad</sub> [N/µm]	
Motor design		
Frequency max.	f <sub>max</sub> [Hz]	
Nominal converter voltage <sup>1)</sup>	[V]	
Power	P <sub>s1</sub> [kW]	
Torque	M <sub>s1</sub> [Nm]	
... at speed	n [rpm]	
Current	I <sub>s1</sub> [A]	
Power	P <sub>s6-60%</sub> [kW]	
Torque	M <sub>s6-60%</sub> [Nm]	
... at speed	n [rpm]	
Current	I <sub>s6-60%</sub> [A]	

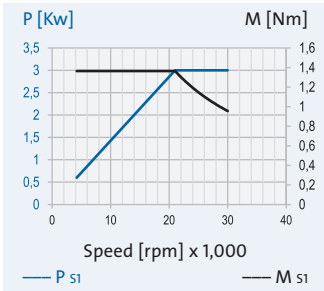
Electrical connection		
Plug type		
Straight plug-in connection		
Angle plug-in connection		
Fixed cable XXm		
Coolant through the shaft		
Low pressure (du)		
High pressure (dh)		
Sensor technology		
Rotary encoder		
Speed sensor		
Housing		
Cylindrical housing		
Cylindrical housing with flange		
Block housing		
Air purge		

<sup>1)</sup> Minimum required  
output voltage of the  
frequency converter

+ Standard  
o Option  
x on request

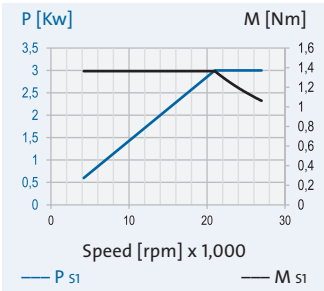
HSP 100g - 30000/3		
100		
30,000		
30		
HSK-C 25		
25		
63		
77		
200 V	350 V	–
1,000		
200	350	–
3		
1.36		
21,000		
18	10	–
4		
1.59		
24,000		
21	12	–

GA	GA	–
+	+	–
o	o	–
o	o	–
–		
x		
–		
+		
+		
o		
x		
+		



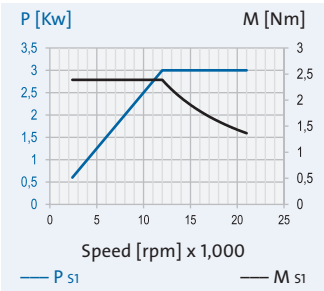
HSP 100g - 27000/3		
100		
27,000		
35		
HSK-C 32		
32		
69		
81		
200 V	350 V	–
900		
200	350	–
3		
1.36		
21,000		
18	10	–
4		
1.59		
24,000		
21	12	–

GA	GA	–
+	+	–
o	o	–
o	o	–
–		
x		
–		
+		
+		
o		
x		
+		



HSP 100g - 21000/3		
100		
21,000		
45		
HSK-C 40		
40		
91		
80		
200 V	350 V	–
700		
200	350	–
3		
2.39		
12,000		
18	10	–
4.5		
2.86		
15,000		
21	12	–

GA	GA	–
+	+	–
o	o	–
o	o	–
–		
x		
–		
+		
+		
o		
x		
+		



TECHNICAL DATA		
Spindle housing Ø A	[mm]	
Speed max.	n <sub>max</sub> [rpm]	
Bearing Ø front	W <sub>1</sub> [mm]	
Tool interface		
Flat contact face Ø W	[mm]	
Static rigidity		
axial	C <sub>ax</sub> [N/µm]	
radial	C <sub>rad</sub> [N/µm]	
Motor design		
Frequency max.	f <sub>max</sub> [Hz]	
Nominal converter voltage <sup>1)</sup>	[V]	
Power	P <sub>s1</sub> [kW]	
Torque	M <sub>s1</sub> [Nm]	
... at speed	n [rpm]	
Current	I <sub>s1</sub> [A]	
Power	P <sub>s6-60%</sub> [kW]	
Torque	M <sub>s6-60%</sub> [Nm]	
... at speed	n [rpm]	
Current	I <sub>s6-60%</sub> [A]	

Electrical connection		
Plug type		
Straight plug-in connection		
Angle plug-in connection		
Fixed cable XXm		
Coolant through the shaft		
Low pressure (du)		
High pressure (dh)		
Sensor technology		
Rotary encoder		
Speed sensor		
Housing		
Cylindrical housing		
Cylindrical housing with flange		
Block housing		
Air purge		

<sup>1)</sup> Minimum required  
output voltage of the  
frequency converter

+ Standard  
o Option  
x on request

Series: HSP.. g

Cylindrical housing:
Ø = 120 mm

Tool interface:
HSK-C

Motor:
Asynchronous motor

Bearing arrangement:
GMN high precision ball bearings

Lubrication:
Permanent grease lubrication

Table with 2 columns: Parameter, Value. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, etc.

Table with 2 columns: Feature, Status. Rows include Electrical connection, Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

1) Minimum required
output voltage of the
frequency converter

+ Standard
o Option
x on request

Table for HSP 120g - 30000/6. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current.

Table for HSP 120g - 30000/6. Rows include Electrical connection, Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

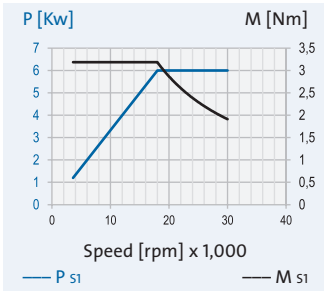


Table for HSP 120g - 24000/6. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current.

Table for HSP 120g - 24000/6. Rows include Electrical connection, Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

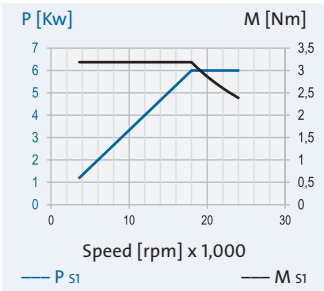


Table for HSP 120g - 21000/9. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current.

Table for HSP 120g - 21000/9. Rows include Electrical connection, Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

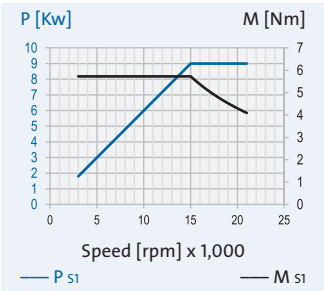


Table with 2 columns: Parameter, Value. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, etc.

Table with 2 columns: Feature, Status. Rows include Electrical connection, Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

1) Minimum required
output voltage of the
frequency converter

+ Standard
o Option
x on request



Series: HSP.. g

Cylindrical housing:
Ø = 150 mm

Tool interface:
HSK-C

Motor:
Asynchronous motor

Bearing arrangement:
GMN high precision ball bearings

Lubrication:
Permanent grease lubrication

Table with 2 columns: Parameter, Value. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, etc.

Table with 2 columns: Feature, Status. Rows include Electrical connection, Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

1) Minimum required
output voltage of the
frequency converter

- + Standard
- o Option
- x on request

Table for HSP 150g - 24000/9.5. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current.

Table for HSP 150g - 24000/9.5. Rows include MAC, GA, GA, +, o, o, o, -, x, x, +, +, o, x, +.

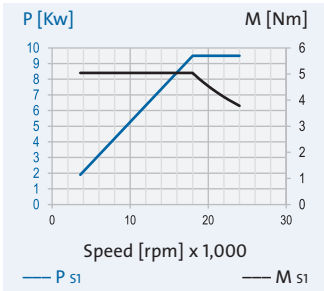


Table for HSP 150g - 18000/14. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current.

Table for HSP 150g - 18000/14. Rows include MAC, GA, GA, +, o, o, o, -, x, x, +, +, o, x, +.

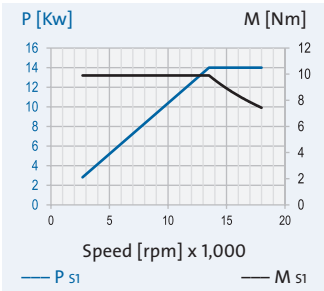


Table for HSP 150g - 15000/14. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current.

Table for HSP 150g - 15000/14. Rows include MAC, GA, GA, +, o, o, o, -, x, x, +, +, o, x, +.

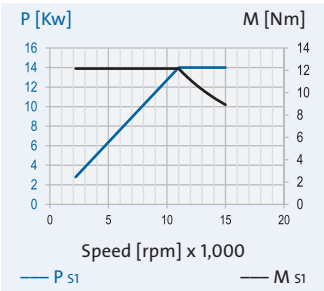


Table with 2 columns: Parameter, Value. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, etc.

Table with 2 columns: Feature, Status. Rows include Electrical connection, Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

1) Minimum required
output voltage of the
frequency converter

- + Standard
- o Option
- x on request

Series: HSP.. g

Cylindrical housing:
Ø = 170 mm

- Tool interface:
HSK-C
- Motor:
Asynchronous motor
- Bearing arrangement:
GMN high precision ball bearings
- Lubrication:
Permanent grease lubrication

Table with 2 columns: Parameter, Value. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, etc.

Table with 2 columns: Feature, Availability. Rows include Electrical connection, Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

1) Minimum required output voltage of the frequency converter

- + Standard
- o Option
- x on request

Table for HSP 170g - 18000/19. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current.

Table for HSP 170g - 18000/19. Rows include Electrical connection, Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

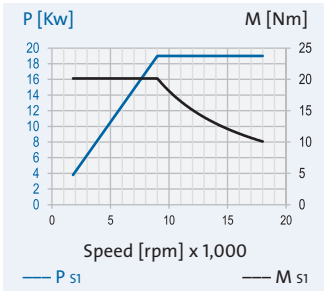


Table for HSP 170g - 15000/19. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current.

Table for HSP 170g - 15000/19. Rows include Electrical connection, Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

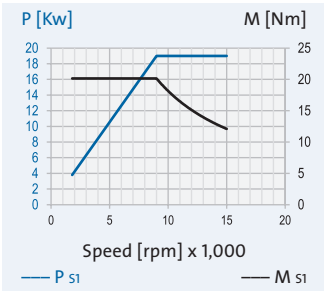


Table for HSP 170g - 12000/20. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current.

Table for HSP 170g - 12000/20. Rows include Electrical connection, Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

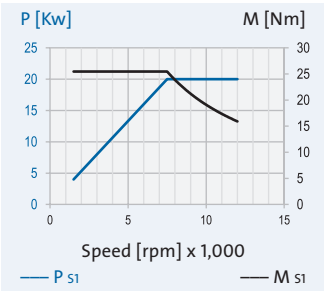


Table with 2 columns: Parameter, Value. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity, Motor design, Frequency max., Nominal converter voltage, Power, Torque, Current, etc.

Table with 2 columns: Feature, Availability. Rows include Electrical connection, Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm, Coolant through the shaft, Sensor technology, Rotary encoder, Speed sensor, Housing, Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge.

1) Minimum required output voltage of the frequency converter

- + Standard
- o Option
- x on request

Series: HSP.. g

Cylindrical housing:
Ø = 230 mm

Tool interface:
HSK-C

Motor:
Asynchronous motor

Bearing arrangement:
GMN high precision ball bearings

Lubrication:
Permanent grease lubrication

Table with 2 columns: Parameter, Value. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity (axial, radial), Motor design (Frequency max., Nominal converter voltage, Power, Torque, etc.).

Table with 4 columns: Parameter, 230, 12,000, 70, HSK-C 63, 63, 196, 375, 200 V, 350 V, 460 V, 400, 200, 350, 460, 18, 59.3, 2,900, 100, 57, 43, 20, 65.9, 2,900, 112, 64, 49.

Table with 4 columns: Parameter, 230, 10,000, 90, HSK-C 80, 80, 461, 483, 200 V, 350 V, 460 V, 333, 200, 350, 460, 25, 85.3, 3,000, 121, 72, 53, 28, 95.5, 3,000, 187, 78, 81.

Table with 2 columns: Parameter, Value. Rows include Spindle housing Ø A, Speed max., Bearing Ø front, Tool interface, Flat contact face Ø W, Static rigidity (axial, radial), Motor design (Frequency max., Nominal converter voltage, Power, Torque, etc.).

Table with 2 columns: Parameter, Value. Rows include Electrical connection (Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm), Coolant through the shaft (Low pressure, High pressure), Sensor technology (Rotary encoder, Speed sensor), Housing (Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge).

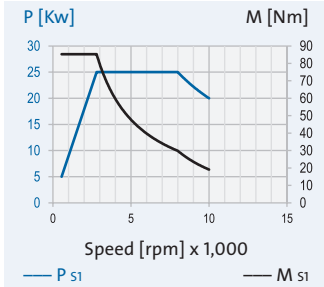
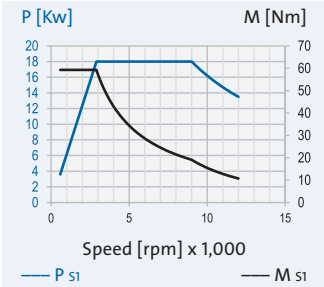
Table with 4 columns: Parameter, D500, MAC, GA, +, +, +, o, o, o, o, -, x, x, +, +, o, x, +.

Table with 4 columns: Parameter, D500, MAC, MAC, +, +, +, o, o, o, o, -, x, x, +, +, o, x, +.

Table with 2 columns: Parameter, Value. Rows include Electrical connection (Plug type, Straight plug-in connection, Angle plug-in connection, Fixed cable XXm), Coolant through the shaft (Low pressure, High pressure), Sensor technology (Rotary encoder, Speed sensor), Housing (Cylindrical housing, Cylindrical housing with flange, Block housing, Air purge).

1) Minimum required
output voltage of the
frequency converter

- + Standard
- o Option
- x on request



1) Minimum required
output voltage of the
frequency converter

- + Standard
- o Option
- x on request



Technical data  
Features

GMN  
High speed spindles  
for manual tool change  
Dressing spindles

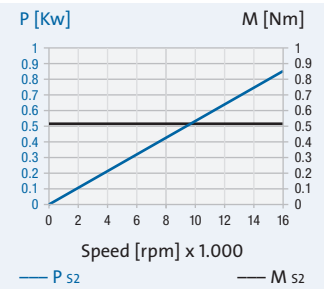
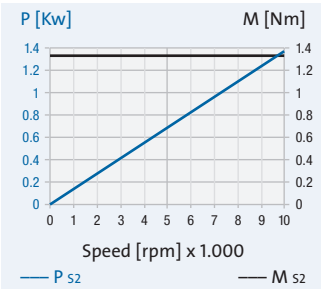
GMN dressing spindles

GMN offers highly effective dressing spindles for precisely shaping and dressing grinding disks.

GMN series TSE dressing spindles are equipped with a permanent grease-lubricated bearing that ensures great running smoothness and offers outstanding rigidity. With a choice of horizontal or vertical installation orientation as well as optional left or right spindle shaft rotation, GMN dressing spindles can be compactly integrated into existing machine systems.



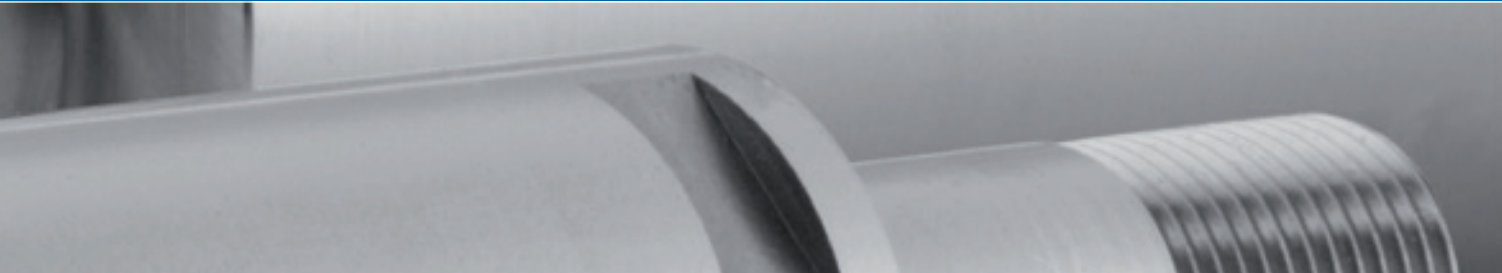
TECHNICAL DATA			TSE 80 - 10000/1.37	TSE 80cg - 16000/0.85
Spindle housing $\varnothing$	A	[mm]	80	80
Speed max.		[rpm]	10,000	16,000
Bearing $\varnothing$ front	W <sub>1</sub>	[mm]	35	35
Tool interface				
Flat contact face $\varnothing$	W	[mm]	71.8	71.8
Centering diameter			D40h2	D40h2
Static rigidity				
axial	C <sub>ax</sub>	[N/ $\mu$ m]	88	89
radial	C <sub>rad</sub>	[N/ $\mu$ m]	35	40
Motor design				
Frequency max.		[Hz]	334	533
Converter voltage		[V]	230	230
Power	P <sub>S2</sub>	[kW]	1.37	0.85
Torque	M <sub>S2</sub>	[Nm]	1.31	0.51
... at speed	n	[rpm]	10,000	16,000



GMN A/E sensor

GMN dressing spindles equipped with an optional acoustic emission sensor improve processing quality and extend the service life of grinding disks.

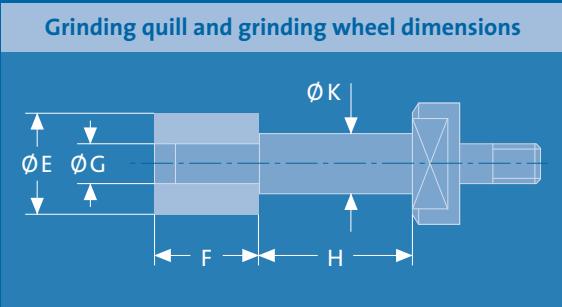
- Improved tool usage-period
- Reduced maintenance overhead
- High processing accuracy



# GMN

## High speed spindles for manual tool change

### Grinding quills



### Spindle/grinding quill selection for GMN standard tool interface

GMN spindle		Cutting speed for spindle speed [m/s]													
HS	80 - 180000/...	56													
HS	80 - 150000/...	47													
HSX	80 - 120000/...	38													
HS	80 - 120000/...	38													
HSX	100 - 105000/...		44	55	71										
HS	80 - 90000/...		38	47	61										
HV-X	100 - 105000/...		44	55	71										
HSX	100 - 90000/...		38	47	61	75									
HV-X	100 - 90000/...		38	47	61	75									
HSX	100 - 75000/...			39	51	63	79								
HV-X	100 - 75000/...			39	51	63	79								
HV-X	120 - 75000/...			39	51	63	79								
HSX	100 - 60000/...				41	50	63	79							
HSX	120 - 60000/...				41	50	63	79							
HV-X	100 - 60000/...				41	50	63	79							
HV-X	120 - 60000/...				41	50	63	79							
HSX	120 - 51000/...					43	53	67	85						
HV-X	100 - 45000/...					37	47	59	75						
HSX	120 - 42000/...						44	55	70	88					
HSX	150 - 42000/...						44	55	70	88					
HV-X	120 - 45000/...						47	59	75	94					
HV-X	150 - 45000/...						47	59	75	94					
HV-X	100 - 30000/...							39	50	63	79				
HSX	120 - 30000/...							39	50	63	79				
HV-X	120 - 30000/...							39	50	63	79				
HSX	150 - 30000/...							39	50	63	79	99			
HSX	170 - 30000/...							39	50	63	79	99			
HV-X	150 - 30000/...								50	63	79	99	125		
HSX	150 - 24000/...								40	50	63	79	101		
HSX	170 - 24000/...								40	50	63	79	101		
HSX	150 - 18000/...								30	38	47	59	75		
HSX	170 - 18000/...									38	47	59	75	94	

Grinding wheel dimensions [mm]		E	6	8	10	13	16	20	25	32	40	50	63	80	100
		F	8	10	10	13	16	20	25	25	32	40	40	40	40
		G	2	3	4	4	6	8	10	13	16	20	25	32	36
Grinding disk fixation			KI	KI	KI	PS/PL	PS/PL	PS/PL	PS/PL	PS/PL	MU	MU	MU	MU	MU
see illustrations page 74			1	1	1	2+3	2+3	2+3	2+3	2+3	4	4	4	4	4
Grinding mandrel diameter [mm]	K	4	5	6	8	10	13	16	20	25	32	40	50	56	
Grinding mandrel length H [mm]		Grinding quill rigidity [N/μm]													
16		1.8	4.7	9.8											
20		1	2.4	5	15.8	38.7									
25			1.2	2.6	8.1	19.8	56.5								
32					3.9	9.4	27	61.9	151						
40						4.8	13.8	31.7	77.3	189					
50							7.1	16.2	39.6	96.6	259				
63							3.5	8.1	19.8	48.3	130	317	773	1216	
80										23.6	63.3	155	378	594	
100											32.4	79.2	193	304	
125												40.5	99	156	
160													47.2	74.3	

# GMN Grinding quills for GMN standard tool interface

## Grinding quills

GMN produces grinding quills having high round and flat contact face accuracy for all available GMN standard tool interfaces.

- **quills** for interfaces D14/23 ... D36/68;  
Right-hand direction of rotation available at short notice
- Other dimensions and left-hand direction of rotation on request

Grinding quills

Fig. 1: cemented

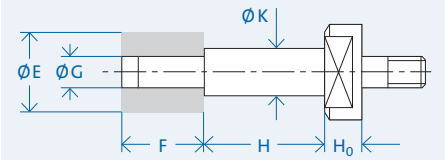


Fig. 2: with fitting bolt (PS)

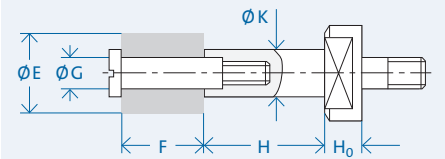


Fig. 3: for grinding wheels on threaded pin (PL)\*

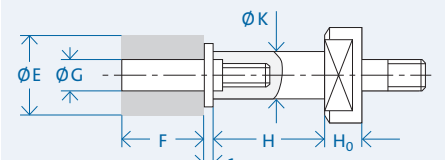
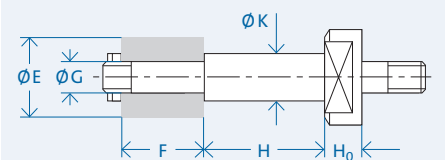
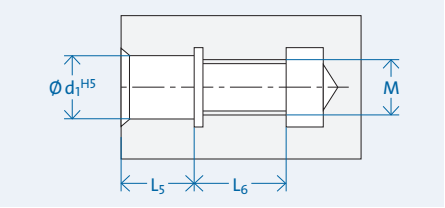


Fig. 4: with nut (MU)



\* Fig. 3: Threaded pin not in delivery complement

Interface	K [mm]	H [mm]	Grinding wheel E x F [mm]	G [mm]	Grinding wheel fixation	H <sub>0</sub> [mm]
D 14/23	6	20	10 x 10	4	KI	8
	10	25	16 x 16	6	PS/PL	
	16	32	25 x 25	10	PS/PL	
D 16/28	10	25	16 x 16	6	PS/PL	10
	13	32	20 x 20	8	PS/PL	
	16	40	25 x 25	10	PS/PL	
D 22/38	13	32	20 x 20	8	PS/PL	12
	20	40	32 x 25	13	PS/PL	
	25	50	40 x 32	16	MU	
D 28/43	16	40	25 x 25	10	PS/PL	12
	20	50	32 x 25	13	PS/PL	
	32	63	50 x 40	20	MU	
D 32/53	20	50	32 x 25	13	PS/PL	12
	32	63	50 x 40	20	MU	
	40	80	63 x 40	25	MU	
D 36/63	25	50	40 x 32	16	MU	15
	32	63	50 x 40	20	MU	
	50	100	80 x 40	32	MU	
D 36/68	32	63	50 x 40	20	MU	15
	40	80	63 x 40	25	MU	
	56	125	100 x 40	36	MU	

Fitting hole for fig. 2 and 3				
	d <sub>1</sub>	M	L5	L6
	4	M3	5	8
	6	M5	7	11
	8	M6	9	12
	10	M8	12	14
	13	M12	13	17

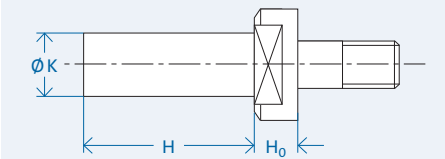
Ordering designation:  
[quill Ø K] x [quill length H] - [grinding wheel Ø G] x [grinding wheel width F] [interface] [quill fixation]  
Example: Grinding quill 16 x 40 - 10 x 25 D16/28 PS

## Semifinished products


GMN semifinished products allow individual adaptation of the tool receiver for any type of connection.

- **GMN semifinished products** for interfaces D08/14 ... D36/63;  
Right-hand direction of rotation available at short notice
- Other dimensions and left-hand direction of rotation on request

Semifinished products



No processing is permissible in area H<sub>0</sub>.

Interface	K [mm]	H [mm]	GMN semifinished products
D 08/14	14	70	
D 09/16	16	84	
D 10/18	18	90	
D 14/23	23	135	
D 16/28	28	229	
D 16/33	33	180	
D 22/38	38	174	
D 28/43	43	240	
D 32/53	53	235	
D 36/63	63	150	



# GMN Grinding quills for HSK interface

## Grinding quills

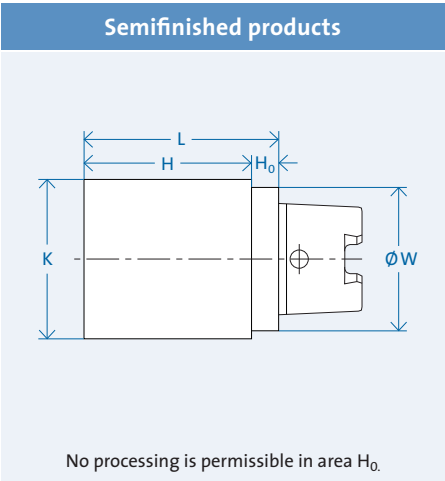
GMN produces grinding quills having high round and flat contact face accuracy for all available HSK-C interfaces.

- **GMN grinding quills** for interfaces HSK-C25 ... HSK-C100 per DIN 69893-1 are available at short notice
- Other dimensions are available on request

## Semifinished products

GMN semifinished products allow individual adaptation of the tool receiver for any type of connection.

- **GMN semifinished products** for interfaces HSK-C25 ... HSK-C100 per DIN 69893-1 are available at short notice
- Other dimensions are available on request



Interface	W [mm]	K [mm]	H [mm]	L [mm]	H <sub>0</sub> [mm]	Wt. [kg]
HSK-C25	25	30	90	100	10	1
HSK-C32	32	41	139	150	11	1,50
HSK-C40	40	51	169	180	11	2,81
HSK-C50	50	64	186	200	14	4,92
HSK-C50	50	64	76	90	14	2,15
HSK-C63	63	81	186	200	14	7,90
HSK-C63	63	81	86	100	14	3,89
HSK-C80	80	101	193	210	17	12,90
HSK-C100	100	124	208	225	17	21,70

Ordering designation: "Semifinished product" [shaft Ø K] x [shaft length H] [interface]  
Example: Semifinished product 81 x 186 HSK-C63

GMN  
High speed spindles  
for manual tool change  
Accessories

# Cables

## Spindle/converter connection

For the spindle/converter connection, GMN supplies UL/CSA approved electrical cables suitable for use in drag chains.

SAK 12 ... 135

Shielding braid of tinned Cu wire strands  
Filler  
Cu strands bright

SAK 44C

Shielding braid of tinned Cu wire strands  
Filler  
Cu strands bright

STK

Cu strands bright

## Cable type SAK 12 ... 135

Cable type	Nom. current [A]	Energy transfer Copper strands shielded	Signal transfer Control pair shielded	Jacket Insulation TPE/PUR	Bending radius min. static	Bending radius min. dynamic
SAK 12	12	4 x 0,5 mm <sup>2</sup>	2	OD 12,5 mm	5 x OD	10 x OD
SAK 18	18	4 x 1.5 mm <sup>2</sup>	3	OD 16 mm	5 x OD	10 x OD
SAK 26	26	4 x 2.5 mm <sup>2</sup>	2	OD 16 mm	5 x OD	10 x OD
SAK 37	37	4 x 4 mm <sup>2</sup>	2	OD 17 mm	5 x OD	12 x OD
SAK 44	44	4 x 6 mm <sup>2</sup>	2	OD 23.8 mm	5 x OD	12 x OD
SAK 44 C	44	4 x 6 mm <sup>2</sup>	6	OD 23.8 mm	5 x OD	12 x OD
SAK 61	61	4 x 10 mm <sup>2</sup>	2	OD 23.8 mm	5 x OD	12 x OD
SAK 90	90	4 x 16 mm <sup>2</sup>	2	OD 32 mm	5 x OD	12 x OD
SAK 108	108	4 x 25 mm <sup>2</sup>	2	OD 32 mm	5 x OD	12 x OD
SAK 135	135	4 x 35 mm <sup>2</sup>	2	OD 32 mm	5 x OD	12 x OD

## Cable type STK abrasion resistant, oil and gasoline resistant

STK			12 x 0,22 mm <sup>2</sup>	PUR OD 6.2 mm	5 x OD	20 x OD
-----	--	--	---------------------------	------------------	--------	---------

Conductor lengths must be limited to meet the legally prescribed electromagnetic compatibility requirements. The layout and operation must be in compliance with applicable EMC laws and directives.

## Spindle/converter connection

GMN high speed spindles are equipped with plug-in connectors - with flanged socket and plug - which differ according to nominal current (*page 20*).

Ready-made cables with B048, B049, GA, MAC, D500 and STK plugs are available on request.

## Power conductors

### B048 plug-in connection: up to 30 A; cable cross section 4 mm<sup>2</sup>



### B049 plug-in connection: up to 30 A; cable cross section 4 mm<sup>2</sup>



### GA plug-in connection: up to 44 A; cable cross section 6 mm<sup>2</sup>



### MAC plug-in connection: up to 100 A; cable cross section 25 mm<sup>2</sup>



### D500 plug-in connection: up to 150 A; cable cross section 50 mm<sup>2</sup>

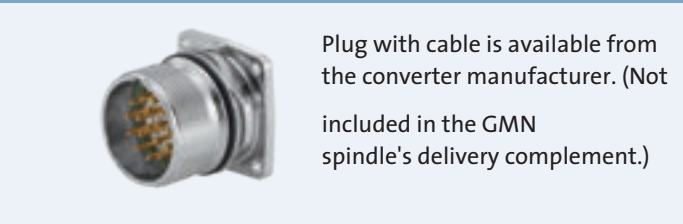


## Signal lines

### STK plug-in connection: Cable cross section 1 mm<sup>2</sup>



### Rotary encoder flanged socket: Cable cross section 1.5 mm<sup>2</sup>



# GMN Lubrication units

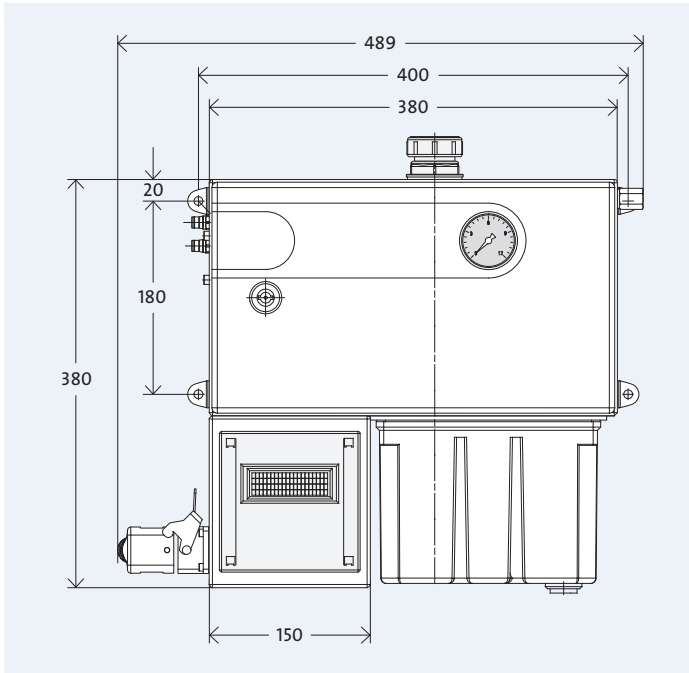
## PRELUB

PRELUB, the electronically controlled lubrication unit, is optimally matched to oil-air lubricated GMN spindles and a guarantor for long service life (page 10).

The precisely regulated dosage of lubricant ensures effective bearing lubrication and maximum operational reliability during start-up and shut-down phases.

With its 4 connections (maximum), this lubrication unit is capable of simultaneously providing individual supplies to a maximum of 2 spindles while requiring only a minimum amount of space.

Connection to a conventional PC computer supports clearly comprehensible operation with a multi-lingual menu structure.



## PRELUB GP

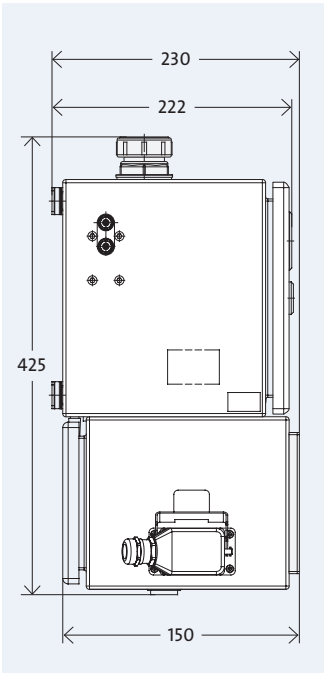
· Up to 4 internal or external (GP 0: e.g. 1 x 4-fold mixing distributors) lubrication point connections

· Separate evaluation of fill-level

· Electronic control with display

· Very convenient to operate

· Menu languages: DE, ENG, ES, FR, IT, JP, CN



## Device types

**PRELUB GP 2** (standard)  
2 lubrication point connections

**PRELUB GP 4**  
4 lubrication point connections

**PRELUB GP 0**  
for external mixing distributors (max. 4 lubrication point connections)

**PRELUB GP-S**  
(max. 12 lubrication point connections)

## Features

· **Compressed air filter/regulator with manometer:**  
Filter unit, 5 µm

· **Enable signal for the machine controller following checks on:**

- Oil level
- Oil pressure rise and drop
- Air pressure
- Pre-lub cycle

· **Timer:**  
for adapting the cycle time to oil viscosity and spindle data

· **Lubrication point connections:**  
for PVC pipe 6 x 1

· **Line voltage:**  
90 ... 260 V AC, 50/60 Hz

· **Air supply G1/4":**  
 $p_{min} = 5 \text{ bar}$ ,  $p_{max} = 10 \text{ bar}$

· **Plug-in connection for power and signal transfers**

· **Dimensions:**  
about 484 x 432 x 222 mm (W x H x D);  
Protection class IP 55

· **Color:**  
RAL 7032 textured (pebble gray);  
other colors on request

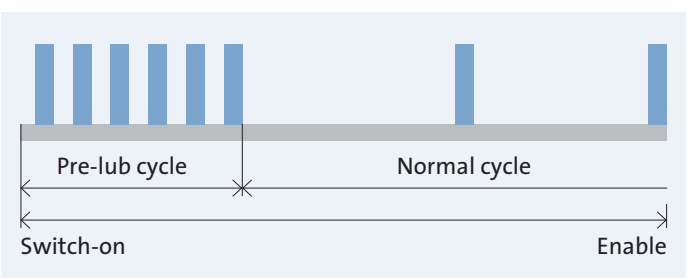
· **Max. fuse protection:**  
6 A

## Accessories

Accessory parts necessary for assembly, e.g. lubrication hoses, hydraulic and compressed air hoses, monitor manometer and filtered lubrication oil, are available from GMN.

## Pre-lubrication

Automatic time lapse



1. Start pre-lubrication (enable signal to operate the spindle not issued)
2. Multiple lubrication pulses within short time, depending on the length of line between spindle and mixing distributor (pre-lub cycle)
3. Enable signal following expiration of the pre-lub time
4. Transition to normal cycle (cycle time) according to GMN operating instructions

The length of the pre-lub period depends on the length of connected lubrication lines.

(For details: see operating instructions)

## Maintenance

Filtration of the oil and air supplies are necessary to ensure the unit provides a long-term, consistent lubricating function. The cartridges intended for a routine maintenance filter change are available from GMN.

## Lubricant selection

The use of filtered oils with friction and wear reducing additives ensures long-term reliable operation of the spindle at maximum speeds.

Detailed specifications for the necessary lubricants as well as rules for cycle times and lubrication pressures are provided in the operating instructions included in the delivery complement.



# GMN Cooling units

## Coolant supply

Reducing the heat caused by operation and obtaining maximum spindle performance depend on a reliable supply of coolant in the necessary quantity and at the proper temperature *(page 11)*.

GMN cooling units ensure the precise coolant temperature and volume regulation necessary to obtain constant low operating temperatures.

Highly precise regulation accuracy reduces axial shaft elongations caused by temperature fluctuations of the coolant.



- **Coolant:**  
R407c (FCKW free)
- **Coolant temperature:**  
20 °C – 25 °C
- **Regulation accuracy:**
  - Model T: ± 2 °K
  - Model F: ± 1 °K
- **High-precision regulation accuracy (on request):**  
(for minimal axial spindle shaft elongation)
  - Model T: ± 1.2 °K
  - Model F: ± 0.5 °K
- **Permissible ambient temperature:**  
+ 42 °C
- **Connections for multiple spindles (on request)**  
(parallel or series connection)
- **Coolant sensor:**  
Level and flow volume monitoring  
with fault alert contact
- **Color:**
  - Model F: RAL 5019 (capri blue)
  - Model T: RAL 9005 (deep black)
  - Other RAL colors (on request)

Cooling unit model	Cooling perform. <sup>2)</sup> [kW]	for spindle power [kW]		Tank capacity [l]	Supply voltage <sup>3)</sup>	Dimensions L x W x H [mm]
		S6–60%	S1			
K 0.9-T/3	0.9	6	4.5	6	1 x 230 V, 50 Hz	570 x 580 x 370
K 1.4-T/3	1.2	9	7	20	1 x 230 V, 50 Hz	720 x 640 x 465
K 2.5-T/3	2.5	16.5	12.5	20	1 x 230 V, 50 Hz	720 x 640 x 465
K 3.9-T/3	3.9	26	19.5	26	1 x 230 V, 50 Hz	720 x 640 x 465
K 5.3-T/3	5.3	35	26.5	26	1 x 230 V, 50 Hz	770 x 765 x 515
K 4.1-F <sup>1)</sup>	4.1	27	20.5	120	3 x 400 V, 50 Hz	715 x 715 x 1545
K 6.7-F <sup>1)</sup>	6.7	44.5	33.5	120	3 x 400 V, 50 Hz	715 x 715 x 1545
K 7.9-F <sup>1)</sup>	7.9	52.5	39.5	120	3 x 400 V, 50 Hz	715 x 715 x 1545
K 11.8-F <sup>1)</sup>	11.8	98.5 <sup>4)</sup>	59	120	3 x 400 V, 50 Hz	715 x 715 x 1545

<sup>1)</sup> In addition to high pressure monitoring, also low pressure monitoring of the coolant circuit.  
<sup>2)</sup> At 37 °C ambient temperature and 20 °C water temperature. Performance drops at higher ambient temperatures.  
<sup>3)</sup> Other voltages and frequencies possible on request.  
<sup>4)</sup> Assumption: Spindle power ≥ 80 kW leads to reduced cooling efficiency from 12% respectively 10% in relation to the spindle power.

GMN  
High speed spindles  
for manual tool change  
Service



## Service

### GMN Spindle service

On the basis of long experience in the practical application of machine components, GMN provides comprehensive consultation and competent services in the field of spindle technology in order to support successful design and long-term economic operation of machine systems.

GMN's service network, available around the world and through authorized GMN affiliates, assures quick, professional, on-site services.

### Consultation

GMN is able to support its customers with technically-oriented knowhow and comprehensive expertise during the planning phase of machine systems as well as in the necessary selection of spindles.

- Analysis of performance requirements
- Spindle selection, service life calculation, characteristic values, installation dimensions ...
- Interfaces, tool selection, grinding mandrels
- Recoding of competitive products
- Special solutions
- Cooling units, lubrication units

### Assembly

Upon customer request, GMN will provide GMN professionals to support the commissioning of spindles and spindle systems – in foreign countries this support can be provided by authorized affiliates.

- Inspection of setup data on lubrication and cooling systems
- Availability of necessary accessory products
- Conducting tests for spindle operation (test protocol)

### Spindle analysis

In the event of degraded spindle functionality or the occurrence of reduced processing quality, GMN offers comprehensive testing techniques which allow the causes of problems to be determined.

- Spindle bearing noise testing (bearing frequencies)
- Microscopic and measured bearing inspection
- Lubricant investigation
- Calculation review (e.g. check of preload)
- Weak-point analysis

### Repair

The sophisticated spindle analysis results and the availability of special technical facilities enable reliable repair solutions to be identified.

- Investigation of causes for spindle damage or inadequate processing results
- Repair
- Prevention of identical or similar damage
- Spindle optimization with respect to processing requirements

### Training courses

GMN provides qualified training courses in theory and practice for high frequency spindles and their applications, both at customer locations and also on our premises.

Subjects and contents of training courses are focused on individual customer requirements.

- Essentials: products, designs, materials, accuracies and tolerances
- Engineering: nomenclature, spindle selection, spindle installation, preload, matching, lubrication, calculation
- Maintenance: workplace layout, tools, control measurements, lubrication, installation, grease distribution run



**Internet**

Our Internet website [www.gmn.de](http://www.gmn.de) contains comprehensive product information for downloading.

**GMN**

GMN Paul Müller Industrie GmbH & Co. KG manufactures high precision ball bearings, machine spindles, freewheel clutches and seals for a broad spectrum of applications at its Nuremberg, Germany plant.

Based on many years of experience in the development and production of machine components, GMN specializes in the production of high quality products in the field of spindle technology and, beyond a comprehensive standard product line, also offers customer-oriented special solutions.

A global GMN service network offers competent customer consultation and individualized solutions.



**GMN quality management – audited and awarded.**

GMN guarantees the highest quality products and services based on long-term reliability. Modern development and production processes ensure products are always at the leading edge of state-of-the-art engineering.

The transparent structure of all GMN company divisions and the clarity of organization flows ensure customer-oriented services and economic security.

All GMN company divisions are certified to DIN ISO 9001.



**GMN – safeguarding the future.**

At GMN, progress means the best possible customer support and the performance optimization of technical products.

This aspiration is turned into reality at GMN, particularly by conforming to national and international environmental standards for efficient and responsible use of ecological resources.



**GMN**

High Precision Ball Bearings  
Spindle Technology  
Sprag Type Freewheel Clutches  
Non Contact Seals