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2508 0914 ENG

GMN

# High speed spindles
## for manual tool change

2508 0914 ENG

Contents:


## 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.

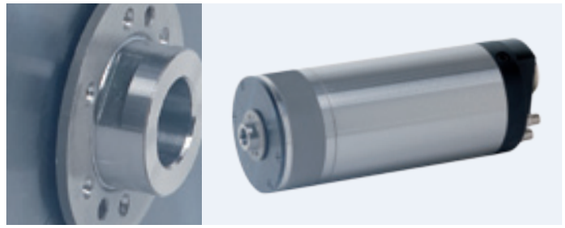
The standardized model series offer a large selection of feature options to furnish effective spindle solutions for almost any field of application.

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

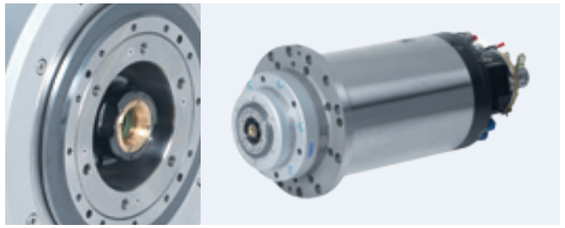
Tool change
· Manual

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

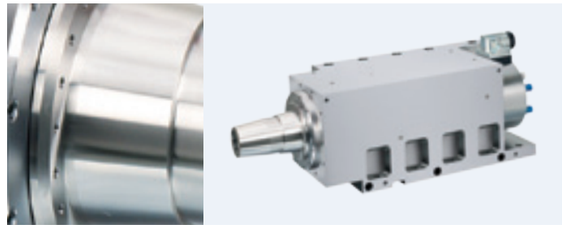
Lubrication
· Oil-air lubrication
· Permanent grease lubrication

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

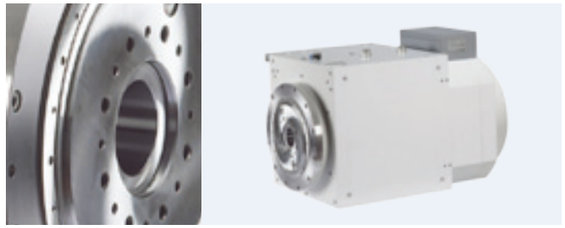
Feature options
· Automatic balancing systems
· A/E sensor
· Shaft clamping for lathe work
· Vibration sensor
· Shaft growth sensor

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

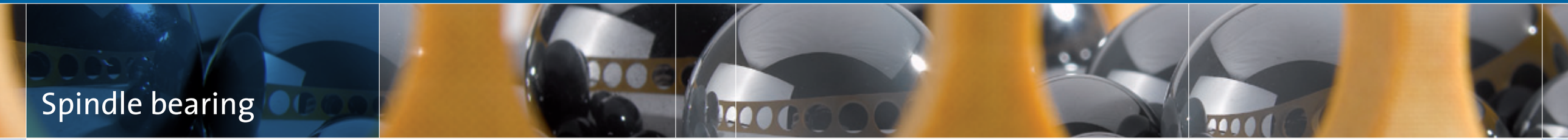
Tool interface
· Standardized tool interfaces
· According to customer specification

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

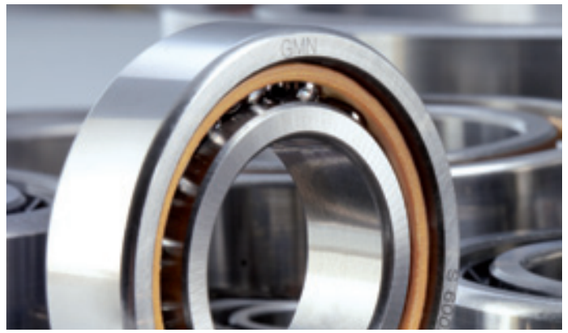
GMN spindles in this series are fabricated on request to customer specifications



# 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.



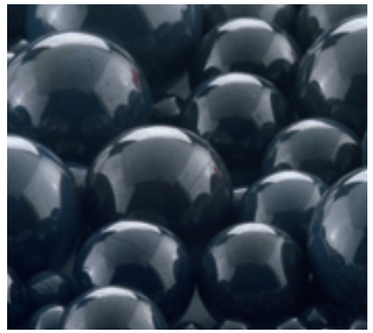
Spindle technology from GMN is the result of the highest demands on quality – from development to production.
Minimal tolerances for dimension, shape and running accuracy produce maximum performance capability, long service life and are defined by international (ISO 492) and national (DIN 620) standards.

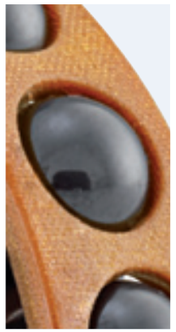
GMN high precision ball bearings are produced in precision classes P4–P2 as well as ABEC 7–ABEC 9.
GMN precision classes HG (high accurate) and UP (ultra precision) attain still greater levels of accuracy with even lower dimensional tolerances.

## 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.



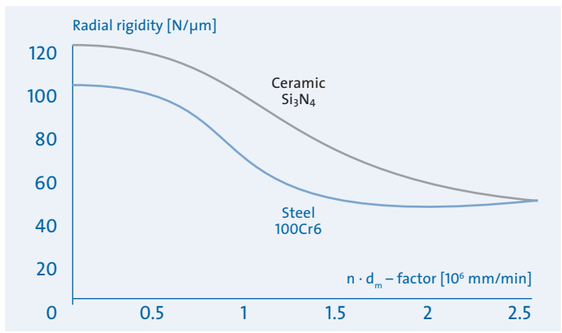


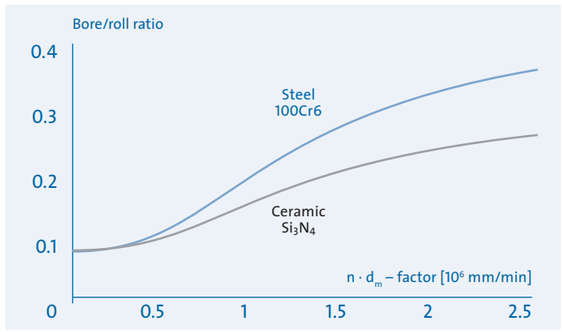
**Material**
Ceramic: Silicon nitride $Si_3N_4$

### Material characteristics

· Low affinity to 100Cr6
· Low friction coefficient
· Low heat conductivity
· Corrosion resistance
· Non magnetic
· Electrically insulating

**Characteristics of ceramics (silicon nitride) $Si_3N_4$ and bearing steel (chrome steel) 100Cr6**


## Advantages

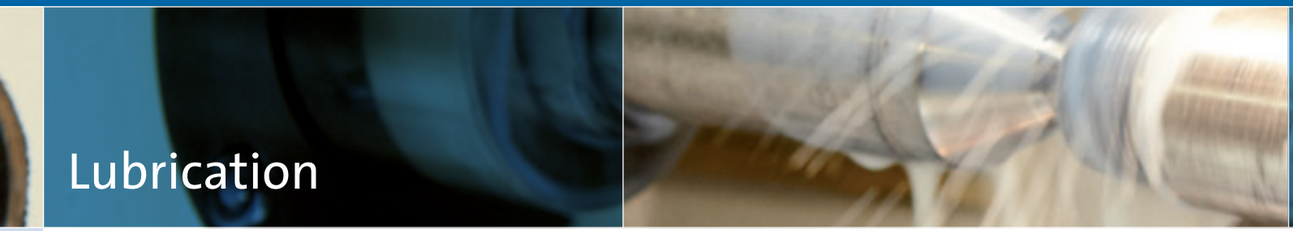
### Longer service life
Because of their material characteristics, hybrid bearings attain more than twice the service life of steel bearings.
Machine operation time is significantly increased.

### 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.



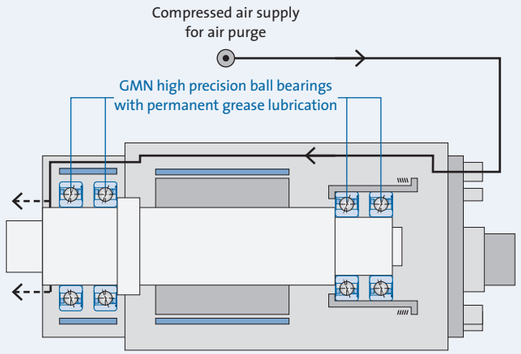
# Lubrication

## 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 with air purge**




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

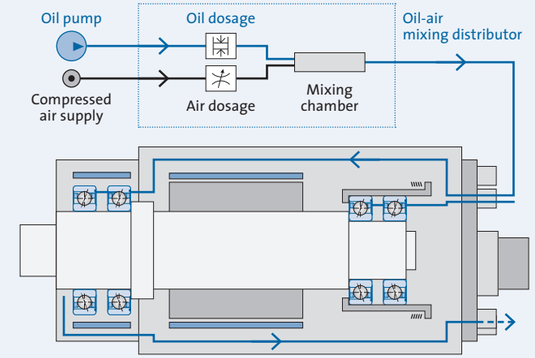
A continuous supply of compressed air through the ring gap between shaft and housing seals the working side of the spindle against contamination by abrasive particles and liquids – and also ensures long service life even under harsh operating conditions.

## 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**




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)*.

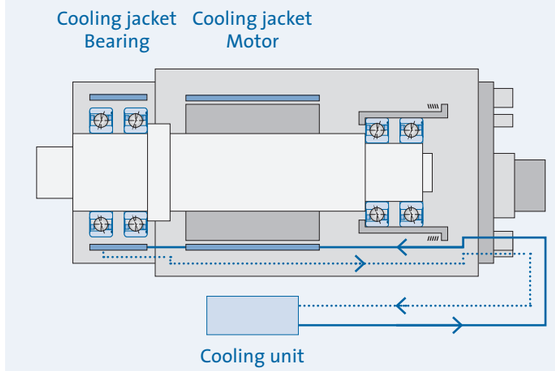
# Cooling

## 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.

**Motor and bearing cooling**



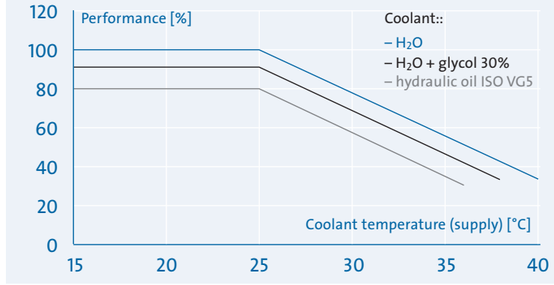

The reduction of operationally-induced heat development increases available spindle output performance, ensures maximum productivity and high processing quality.

## 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.

**Available performance**

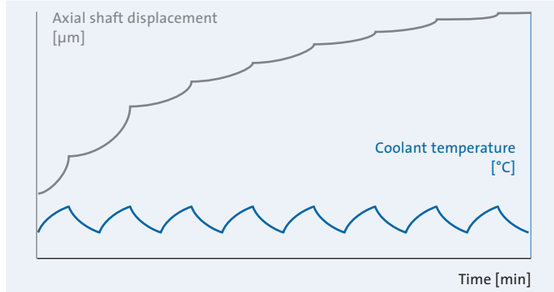



### High processing accuracy

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)*.

**Shaft displacement**



# 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.

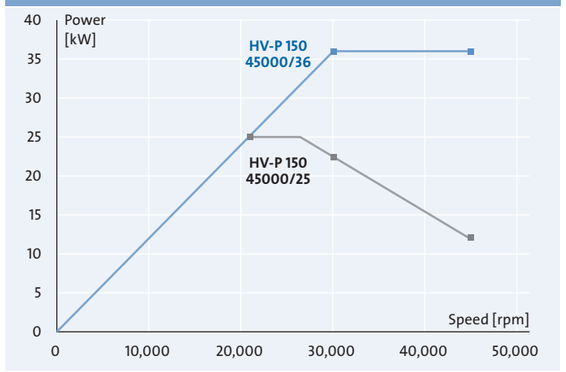
## Power and torque characteristics

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.

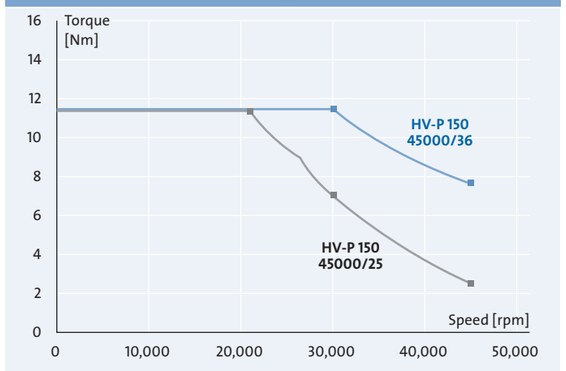
Example:
The HV-P 150 – 45000 spindle has two possible motor designs:

| **Power S6-60% [kW]** | | |
|---|---|---|
| **at speed** [min$^{-1}$] | 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 |

**Power**




**Torque**

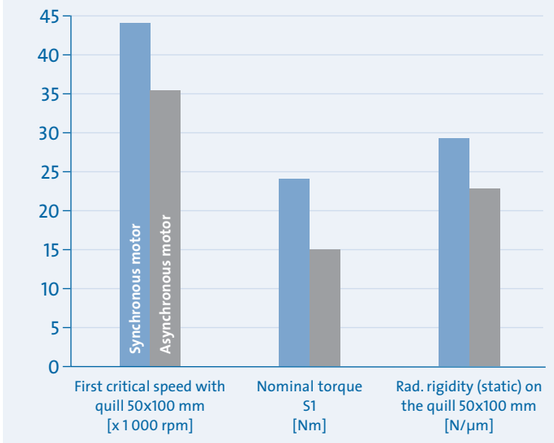



## Synchronous motor with permanent magnet rotor

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).

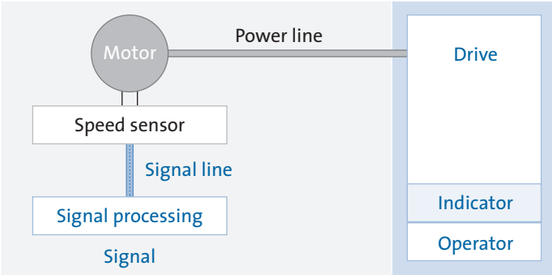
**Power comparison: HV-P 150 – 30000/26 with asynchronous or synchronous motor**



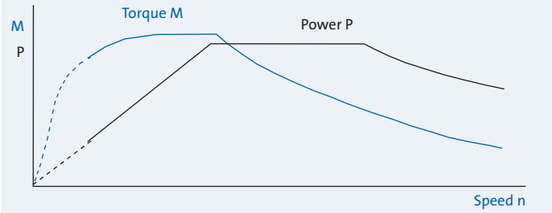

| **Power comparison: HV-P 150 – 30000/26 with asynchronous and synchronous motor** | | | | |
|---|---|---|---|---|
| **Motor type** | | | **Asynchronous motor** | **Synchronous motor** | **Change** |
| **Radial rigidity (static)** | **Spindle nose** | [N/µm] | 197.4 | 239.2 | +21.2% |
| | **on the mandrel** 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

## Drive without rotary encoder

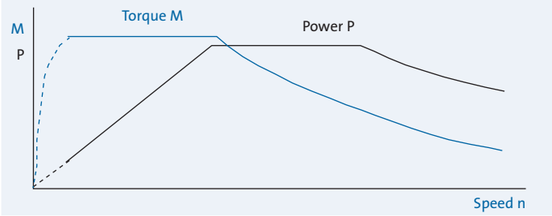



**Drive without regulation: Frequency controller with prescribed voltage across the U/f characteristic**



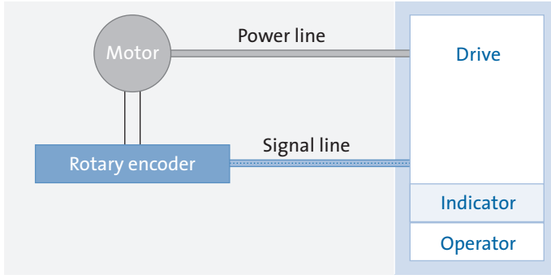

- Output frequency up to 3,000 Hz[1)]
- Adjustment range to about 1 : 10
- Ramp up and brake time about 10 sec
- Shaft in a specified fixed position
  "Speed monitors" or "Tacho box" necessary
- "Sparking" and "Load limit" reports
  with "effective load tracker" option

**Drive with regulation: Field oriented regulation**

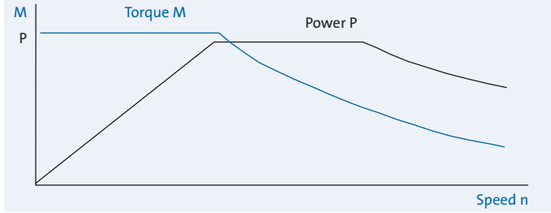



- Output frequency up to 1,400 Hz[1)]
- Within adjustment range 1 : 10 speed stability about 0.5%
- Field oriented regulation algorithm
- Ramp up and brake time about 1 sec

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




**Field oriented regulation with rotary encoder, C-axis operation**




- Output frequency up to 1,400 Hz[1)]
- Shaft positioning
- Ramp up and brake time about 1 sec

[1)] Various maximum output frequencies possible depending on manufacturer.



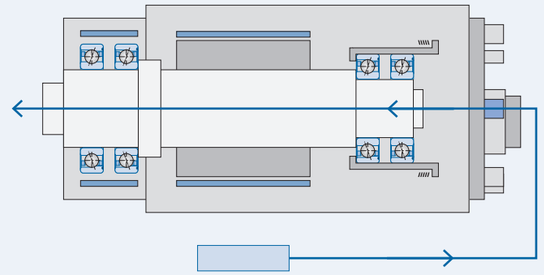
# Coolant supply through the spindle shaft

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:

**Coolant supply through the spindle shaft**




## Low pressure rotary union

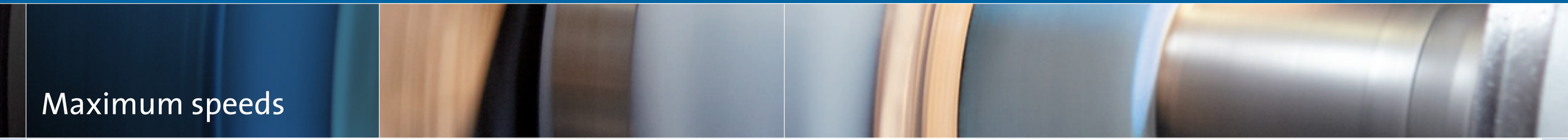
Speed range up to: 120,000 rpm

- 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: < 0.01 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

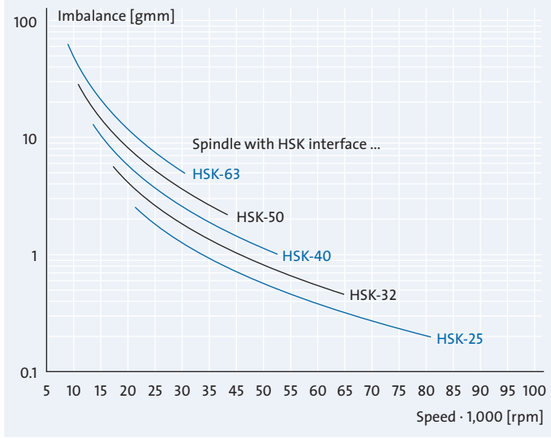
The highest processing quality in the production of GMN spindle shafts ensures a uniform mass distribution and minimum imbalance vibrations at maximum speeds.

### 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.

**Permissible residual imbalance**



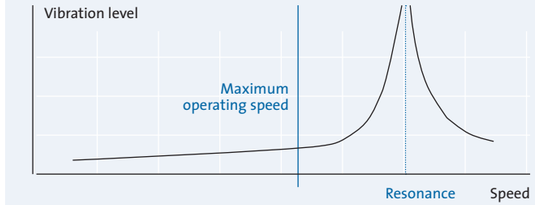

· Applicable for short tools.
· Even better balancing may be necessary for tools with a long overhang or where exceptionally high processing quality is required.
· Also applicable for spindles with grinding mandrel receiver (with comparable flat face diameter).

## Spindle resonance vibrations

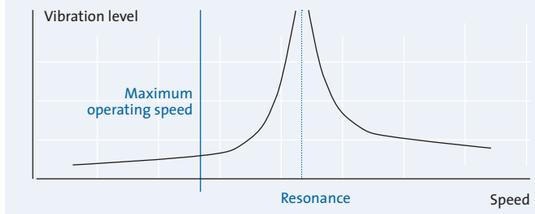
The resonance of rotating systems produces critical speed ranges in which extreme vibrations occur.

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.

**Maximum speed: Spindle**



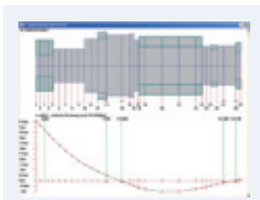

**Maximum speed: Spindle/tool system**

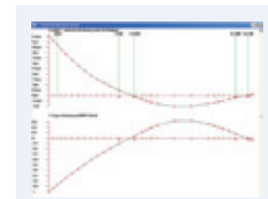



## Vibration calculation

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.

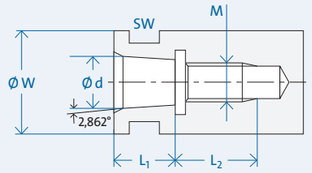
The selection and layout of such devices should be done such that vibrations caused by other machine components are disregarded.

# 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.

**Internal taper with flat contact face**

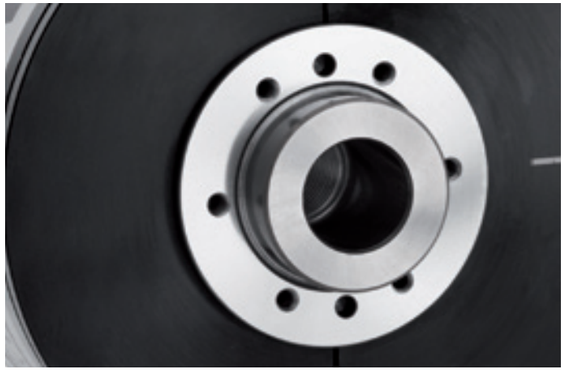



Series UHS *(pages 24–25)*

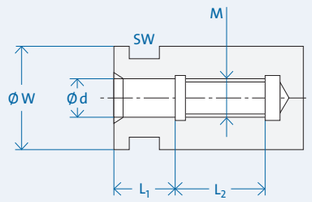
| Interface | d [mm] | W [mm] | M | $L_1$ [mm] | $L_2$ [mm] | SW |
|---|---|---|---|---|---|---|
| U 07/10 | 7 | 10 | M5 | 5 | 9 | - |
| U 09/16 | 9 | 16 | M8 (x 1.5) | 7 | 16 | 14 |
| U12/18 | 12 | 18 | M10 x 1.5 | 9 | 22 | 16 |
| U 16/23 | 16 | 23 | M14 x 1.25 | 12 | 22 | 20 |

## 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.



**Fitting bore with flat contact face**

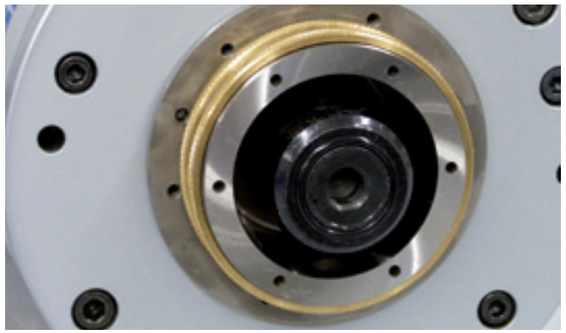



Series HS, HV-X, HSX *(pages 26–41)*

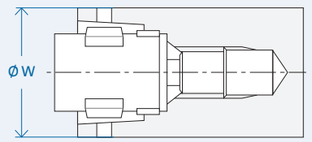
| Interface | d [mm] | d Tolerance [µm] | W [mm] | M | $L_1$ [mm] | $L_2$ [mm] | SW |
|---|---|---|---|---|---|---|---|
| D 04/08 | 4 | + 5 / + 2 | 8 | M4 (x 0.7) | 6 | 8 | 7 |
| D 06/12 | 6 | + 5 / + 2 | 12 | M6 (x 1) | 9 | 11 | 11 |
| D 08/14 | 8 | + 5 / + 2 | 14 | M8 (x 1.25) | 12 | 14 | 13 |
| D 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.



**Taper hollow shaft with flat contact face**




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

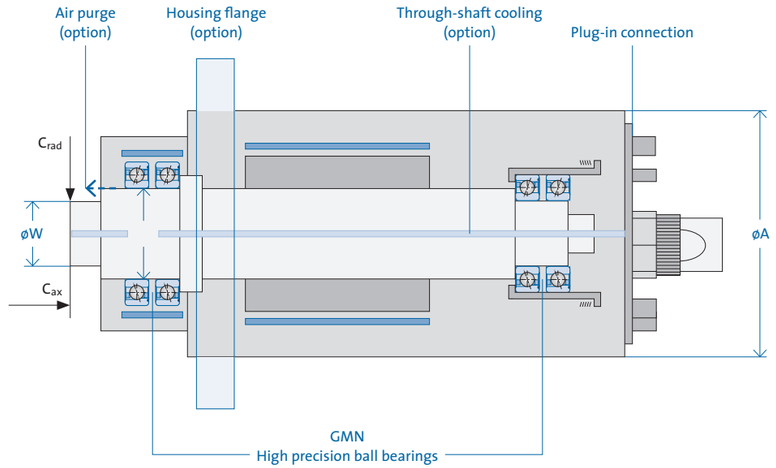
## Legend

**Dimensions:**
**ØW** = flat face Ø [mm]
**ØW1** = shaft Ø front [mm]
**ØA** = spindle housing Ø [mm]

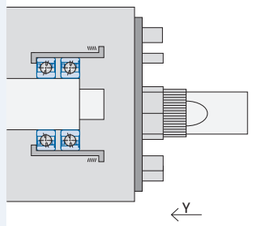
**Rigidity (static):**
$C_{ax}$ = axial rigidity [N/µm]
$C_{rad}$ = radial rigidity [N/µm]

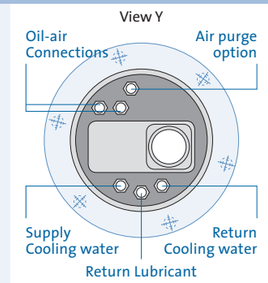
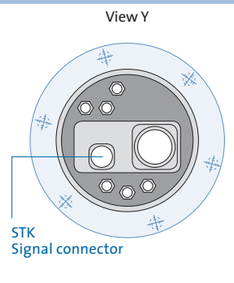
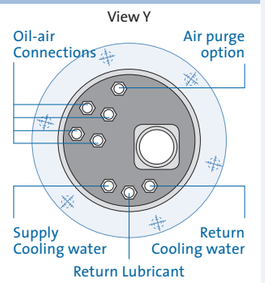
**Motor data:**
**f** = frequency max. [Hz]
**M** = torque moment [Nm]
**n** = speed [rpm]

**Rated power:**
**P** = power [kW]
**I** = current [A]



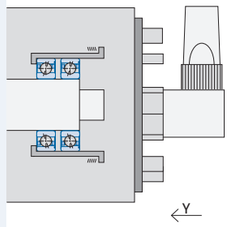

**Straight plug-in connection**

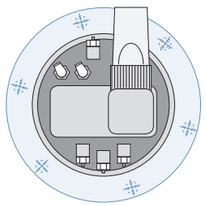
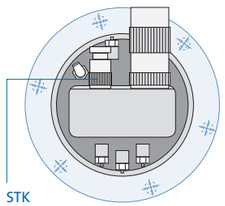
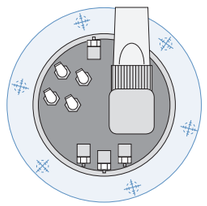



| GA | MAC/D500 | B048/B049 |
|---|---|---|
|  |  |  |



**Angle plug-in connection**




| GA | MAC/D500 | B048/B049 |
|---|---|---|
|  |  |  |



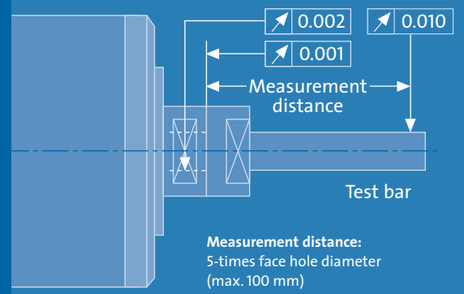
| Features | Standard | Option |
|---|---|---|
| **Housing** | Cylindrical housing<br>Bushing-Ø: 80–230 mm | Cylindrical housing with flange housing<br>Block housing |
| **Motor** *Series: UHS* | Motor voltage<br>200 V<br>Synchronous motor<br>Speed: max. 250,000 rpm<br>Power: S1 max. 4.4 kW | |
| *Series: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

[1] With the advantages from page 13

# Technical data
# Features

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

**Round and plane running accuracy**

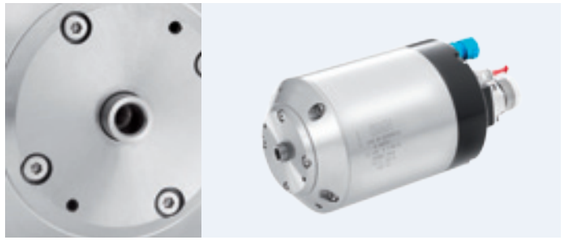



**Measurement distance:**
5-times face hole diameter
(max. 100 mm)

### UHS

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

- Housing Ø: 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 Ø: 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 Ø: 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

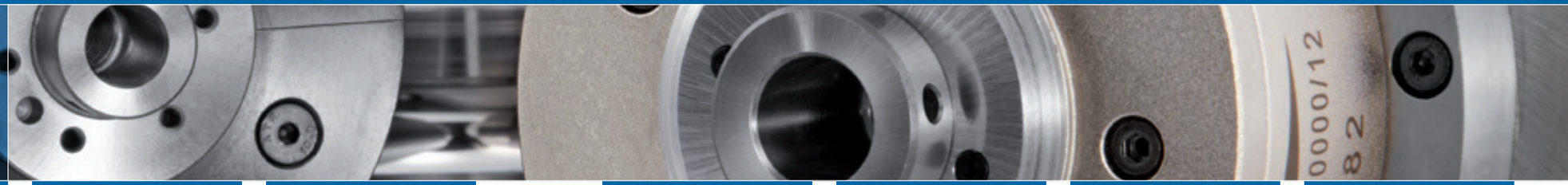
### HSX

High performance grinding spindles
Universal grinding applications

- Housing Ø: 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

# Series: UHS

Cylindrical housing:
Ø = 80 mm / 100 mm



Tool interface:
GMN standard

Motor:
Synchronous motor

Bearing arrangement:
GMN high-precision ball bearings

Lubrication:
Oil-air lubrication

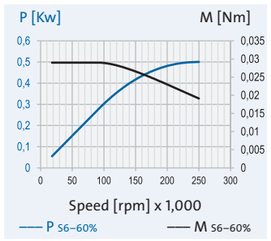
| TECHNICAL DATA | | | UHS 80 - 250000/0.5 | | | UHS 80 - 200000/1 | | |
|---|---|---|---|---|---|---|---|---|
| Spindle housing Ø A | | [mm] | 80 | | | 80 | | |
| Speed max. | $n_{max}$ | [rpm] | 250,000 | | | 200,000 | | |
| Bearing Ø front | $W_1$ | [mm] | 10 | | | 10 | | |
| Tool interface | | | U 07/10 | | | U 07/10 | | |
| Flat contact face Ø W | | [mm] | 10 | | | 10 | | |
| Static rigidity | | | | | | | | |
| axial | $C_{ax}$ | [N/µm] | 7 | | | 14 | | |
| radial | $C_{rad}$ | [N/µm] | 12 | | | 13 | | |
| Motor design | | | 200 V | – | – | 200 V | – | – |
| Frequency max. | $f_{max}$ | [Hz] | 4,167 | | | 3,333 | | |
| Nominal converter voltage[1] | | [V] | 200 | – | – | 200 | – | – |
| Power | $P_{S1}$ | [kW] | 0.45 | | | 0.9 | | |
| Torque | $M_{S1}$ | [Nm] | 0.02 | | | 0.04 | | |
| ... at speed | n | [rpm] | 250,000 | | | 200,000 | | |
| Current | $I_{S1}$ | [A] | 2.9 | – | – | 7.7 | – | – |
| Power | $P_{S6-60\%}$ | [kW] | 0.5 | | | 1 | | |
| Torque | $M_{S6-60\%}$ | [Nm] | 0.02 | | | 0.05 | | |
| ... at speed | n | [rpm] | 250,000 | | | 200,000 | | |
| Current | $I_{S6-60\%}$ | [A] | 3.2 | – | – | 8.5 | – | – |
| Electrical connection | | | | | | | | |
| Plug type | | | B049 | – | – | B049 | – | – |
| Straight plug-in connection | | | + | – | – | + | – | – |
| Angle plug-in connection | | | x | – | – | x | – | – |
| Fixed cable XXm | | | x | – | – | x | – | – |
| Coolant through the shaft | | | | | | | | |
| Low pressure (du) | | | – | | | – | | |
| High pressure (dh) | | | – | | | – | | |
| Sensor technology | | | | | | | | |
| Rotary encoder | | | – | | | – | | |
| Speed sensor | | | – | | | – | | |
| Housing | | | | | | | | |
| Cylindrical housing | | | + | | | + | | |
| Cylindrical housing with flange | | | x | | | x | | |
| Block housing | | | x | | | x | | |
| Air purge | | | + | | | + | | |

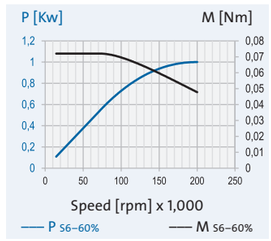
[1] Minimum required output voltage of the frequency converter

+ Standard

o Option

x on request



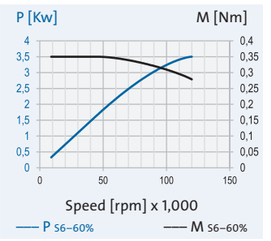

| TECHNICAL DATA | | | UHS 100 - 120000/3.5 | | | UHS 100 - 105000/4 | | | UHS 100 - 90000/5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Spindle housing Ø A | | [mm] | 100 | | | 100 | | | 100 | | |
| Speed max. | $n_{max}$ | [rpm] | 120,000 | | | 105,000 | | | 90,000 | | |
| Bearing Ø front | $W_1$ | [mm] | 17 | | | 20 | | | 25 | | |
| Tool interface | | | U 09/16 | | | U 12/18 | | | U 16/23 | | |
| Flat contact face Ø W | | [mm] | 16 | | | 18 | | | 23 | | |
| Static rigidity | | | | | | | | | | | |
| axial | $C_{ax}$ | [N/µm] | 48 | | | 51 | | | 57 | | |
| radial | $C_{rad}$ | [N/µm] | 29 | | | 37 | | | 58 | | |
| Motor design | | | 200 V | 350 V | – | 200 V | 350 V | – | 200 V | 350 V | – |
| Frequency max. | $f_{max}$ | [Hz] | 2,000 | | | 1,750 | | | 1,500 | | |
| Nominal converter voltage[1] | | [V] | 200 | 350 | – | 200 | 350 | – | 200 | 350 | – |
| Power | $P_{S1}$ | [kW] | 3 | | | 3.5 | | | 4.4 | | |
| Torque | $M_{S1}$ | [Nm] | 0.24 | | | 0.32 | | | 0.47 | | |
| ... at speed | n | [rpm] | 120,000 | | | 105,000 | | | 90,000 | | |
| Current | $I_{S1}$ | [A] | 14 | 8.2 | – | 14 | 7.9 | – | 17 | 9.7 | – |
| Power | $P_{S6-60\%}$ | [kW] | 3.5 | | | 4 | | | 5 | | |
| Torque | $M_{S6-60\%}$ | [Nm] | 0,28 | | | 0.36 | | | 0.53 | | |
| ... at speed | n | [rpm] | 120,000 | | | 105,000 | | | 90,000 | | |
| Current | $I_{S6-60\%}$ | [A] | 17 | 9.5 | – | 16 | 9 | – | 19 | 11 | – |
| Electrical connection | | | | | | | | | | | |
| Plug type | | | B048 | B048 | – | B048 | B048 | – | B048 | B048 | – |
| Straight plug-in connection | | | + | + | – | + | + | – | + | + | – |
| Angle plug-in connection | | | o | o | – | o | o | – | o | o | – |
| Fixed cable XXm | | | o | o | – | o | o | – | o | o | – |
| Coolant through the shaft | | | | | | | | | | | |
| Low pressure (du) | | | o | | | o | | | o | | |
| High pressure (dh) | | | – | | | – | | | – | | |
| Sensor technology | | | | | | | | | | | |
| Rotary encoder | | | – | | | – | | | – | | |
| Speed sensor | | | + | | | + | | | + | | |
| Housing | | | | | | | | | | | |
| Cylindrical housing | | | + | | | + | | | + | | |
| Cylindrical housing with flange | | | o | | | o | | | o | | |
| Block housing | | | x | | | x | | | x | | |
| Air purge | | | o | | | o | | | o | | |

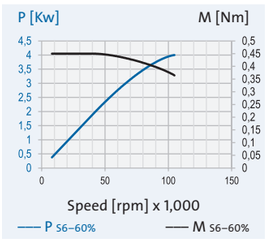
[1] Minimum required output voltage of the frequency converter

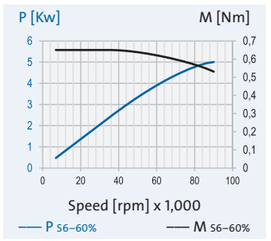
+ Standard

o Option

x on request

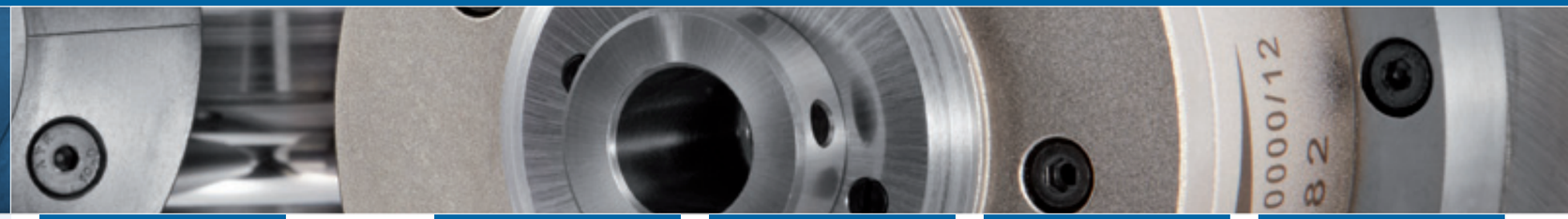


# Series: HS

Cylindrical housing:
Ø = 80 mm



Tool interface:
GMN standard

Motor:
Asynchronous motor

Bearing arrangement:
GMN high precision ball bearings

Lubrication:
Oil-air lubrication

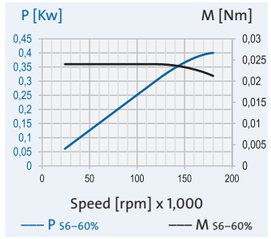
| TECHNICAL DATA | | | HS 80 - 180000/0.4 | | | HS 80 - 150000/0.5 | | | HS 80 - 120000/1.1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Spindle housing Ø A | | [mm] | 80 | | | 80 | | | 80 | | |
| Speed max. | $n_{max}$ | [rpm] | 180,000 | | | 150,000 | | | 120,000 | | |
| Bearing Ø front | $W_1$ | [mm] | 8 | | | 8 | | | 12 | | |
| Tool interface | | | D 04/08 | | | D 04/08 | | | D 06/12 | | |
| Flat contact face Ø W | | [mm] | 8 | | | 8 | | | 12 | | |
| Static rigidity | | | | | | | | | | | |
| axial | $C_{ax}$ | [N/µm] | 8 | | | 9 | | | 11 | | |
| radial | $C_{rad}$ | [N/µm] | 15 | | | 15 | | | 21 | | |
| Motor design | | | 200 V | – | – | 200 V | – | – | 200 V | – | – |
| Frequency max. | $f_{max}$ | [Hz] | 3,000 | | | 2,500 | | | 2,000 | | |
| Nominal converter voltage[1] | | [V] | 200 | – | – | 200 | – | – | 200 | – | – |
| Power | $P_{S1}$ | [kW] | 0.3 | | | 0.4 | | | 0.95 | | |
| Torque | $M_{S1}$ | [Nm] | 0.02 | | | 0.03 | | | 0.07 | | |
| ... at speed | n | [rpm] | 180,000 | | | 150,000 | | | 120,000 | | |
| Current | $I_{S1}$ | [A] | 1.8 | – | – | 2.3 | – | – | 5.4 | – | – |
| Power | $P_{S6-60\%}$ | [kW] | 0.4 | | | 0.5 | | | 1.1 | | |
| Torque | $M_{S6-60\%}$ | [Nm] | 0.02 | | | 0.03 | | | 0.09 | | |
| ... at speed | n | [rpm] | 180,000 | | | 150,000 | | | 120,000 | | |
| Current | $I_{S6-60\%}$ | [A] | 2 | – | – | 2.5 | – | – | 6.5 | – | – |
| | | | | | | | | | | | |
| Electrical connection | | | | | | | | | | | |
| Plug type | | | GA | – | – | GA | – | – | GA | – | – |
| Straight plug-in connection | | | + | – | – | + | – | – | + | – | – |
| Angle plug-in connection | | | x | – | – | x | – | – | x | – | – |
| Fixed cable XXm | | | o | – | – | o | – | – | o | – | – |
| Coolant through the shaft | | | | | | | | | | | |
| Low pressure (du) | | | | – | | | – | | | o | |
| High pressure (dh) | | | | – | | | – | | | – | |
| Sensor technology | | | | | | | | | | | |
| Rotary encoder | | | | – | | | – | | | – | |
| Speed sensor | | | | – | | | – | | | – | |
| Housing | | | | | | | | | | | |
| Cylindrical housing | | | | + | | | + | | | + | |
| Cylindrical housing with flange | | | | x | | | x | | | x | |
| Block housing | | | | x | | | x | | | x | |
| Air purge | | | | – | | | – | | | – | |

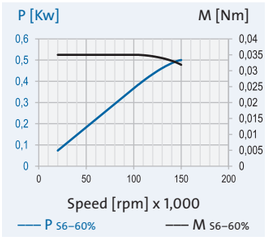
[1] Minimum required output voltage of the frequency converter

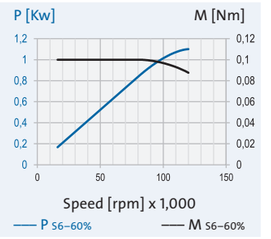
+ Standard

o Option

x on request




| 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[1] | | [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

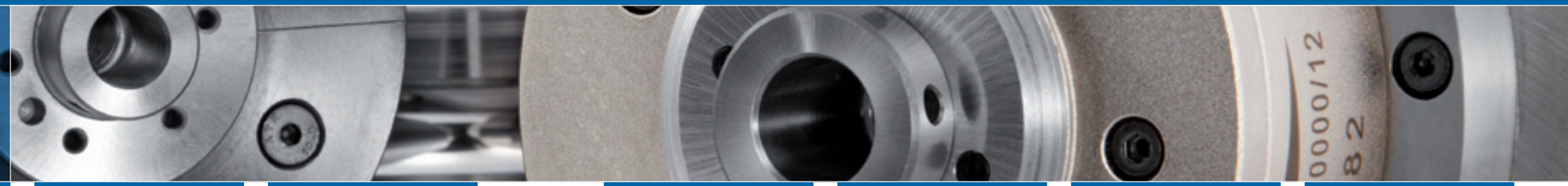
+ Standard

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

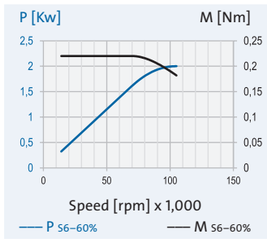
| TECHNICAL DATA | | | HV-X 100 - 105000/2 | | | HV-X 100 - 90000/3 | | | HV-X 100 - 75000/5 | | | HV-X 100 - 60000/9 | | | HV-X 100 - 45000/9 | | | HV-X 100 - 30000/9 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Spindle housing Ø A | | [mm] | 100 | | | 100 | | | 100 | | | 100 | | | 100 | | | 100 | | |
| Speed max. | $n_{max}$ | [rpm] | 105,000 | | | 90,000 | | | 75,000 | | | 60,000 | | | 45,000 | | | 30,000 | | |
| Bearing Ø front | $W_1$ | [mm] | 17 | | | 20 | | | 25 | | | 30 | | | 40 | | | 45 | | |
| Tool interface | | | D 09/16 | | | D 10/18 | | | D 14/23 | | | D 16/28 | | | D 22/38 | | | D 28/43 | | |
| Flat contact face Ø W | | [mm] | 16 | | | 18 | | | 23 | | | 28 | | | 38 | | | 43 | | |
| Static rigidity | | | | | | | | | | | | | | | | | | | | |
| axial | $C_{ax}$ | [N/µm] | 33 | | | 37 | | | 53 | | | 62 | | | 76 | | | 80 | | |
| radial | $C_{rad}$ | [N/µm] | 35 | | | 40 | | | 56 | | | 73 | | | 85 | | | 74 | | |
| Motor design | | | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V |
| Frequency max. | $f_{max}$ | [Hz] | 1,750 | | | 1,500 | | | 1,250 | | | 2,000 | | | 1,500 | | | 1.000 | | |
| Nominal converter voltage[1] | | [V] | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 |
| Power | $P_{S1}$ | [kW] | 1.8 | | | 2.5 | | | 4 | | | 7.5 | | | 7.5 | | | 7.5 | | |
| Torque | $M_{S1}$ | [Nm] | 0.16 | | | 0.27 | | | 0.51 | | | 1.4 | | | 2.39 | | | 3.41 | | |
| ... at speed | n | [rpm] | 105,000 | | | 90,000 | | | 75,000 | | | 51,000 | | | 30,000 | | | 21,000 | | |
| Current | $I_{S1}$ | [A] | 9.6 | 5.5 | 4.2 | 13 | 7.5 | 5,7 | 18 | 11 | 8 | 42 | 24 | 18 | 42 | 24 | 18 | 49 | 28 | 21 |
| Power | $P_{S6-60\%}$ | [kW] | 2 | | | 3 | | | 5 | | | 9 | | | 9 | | | 9 | | |
| Torque | $M_{S6-60\%}$ | [Nm] | 0.18 | | | 0.32 | | | 0.64 | | | 1.69 | | | 2.86 | | | 4.09 | | |
| ... at speed | n | [rpm] | 105,000 | | | 90,000 | | | 75,000 | | | 51,000 | | | 30,000 | | | 21,000 | | |
| Current | $I_{S6-60\%}$ | [A] | 11 | 6 | 4.6 | 16 | 9 | 6.8 | 23 | 13 | 9.9 | 49 | 28 | 21 | 49 | 28 | 21 | 53 | 30 | 23 |
| Electrical connection | | | | | | | | | | | | | | | | | | | | |
| Plug type | | | GA | GA | GA | GA | GA | GA | GA | GA | GA | GA | GA | GA | GA | GA | GA | MAC | GA | GA |
| Straight plug-in connection | | | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Angle plug-in connection | | | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o |
| Fixed cable XXm | | | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o |
| Coolant through the shaft | | | | | | | | | | | | | | | | | | | | |
| Low pressure (du) | | | o | | | o | | | o | | | o | | | o | | | o | | |
| High pressure (dh) | | | x | | | x | | | x | | | x | | | x | | | x | | |
| Sensor technology | | | | | | | | | | | | | | | | | | | | |
| Rotary encoder | | | – | | | – | | | – | | | – | | | – | | | – | | |
| Speed sensor | | | + | | | + | | | + | | | + | | | + | | | + | | |
| Housing | | | | | | | | | | | | | | | | | | | | |
| Cylindrical housing | | | + | | | + | | | + | | | + | | | + | | | + | | |
| Cylindrical housing with flange | | | o | | | o | | | o | | | o | | | o | | | o | | |
| Block housing | | | x | | | x | | | x | | | x | | | x | | | x | | |
| Air purge | | | o | | | o | | | o | | | o | | | o | | | o | | |

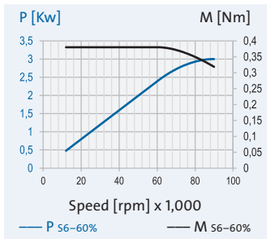
[1] Minimum required output voltage of the frequency converter

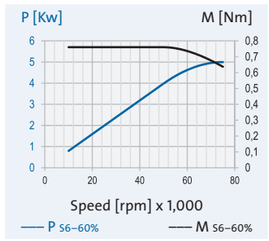
\+ Standard

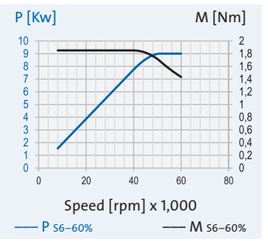
o Option

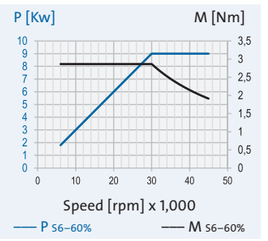
x on request

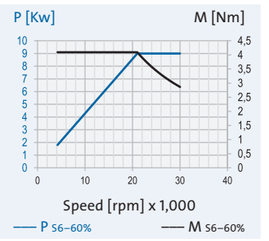


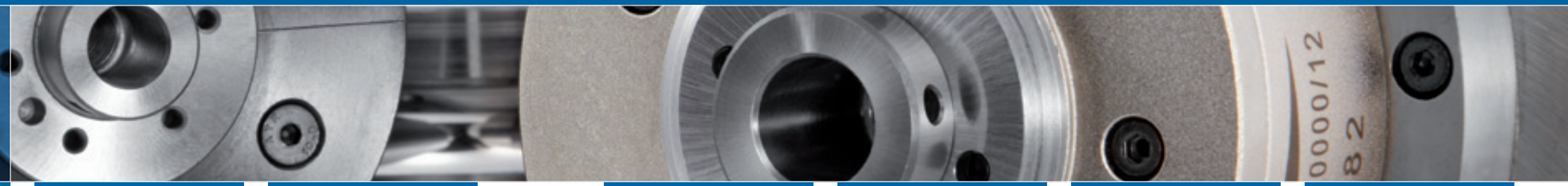



# Series: HV-X

Cylindrical housing:
Ø = 120 mm



Tool interface:
GMN standard

Motor:
Asynchronous motor

Bearing arrangement:
GMN high precision ball bearings

Lubrication:
Oil-air lubrication

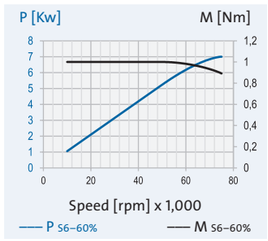
| TECHNICAL DATA | | | HV-X 120 - 75000/7 | | | HV-X 120 - 60000/13 | | |
|---|---|---|---|---|---|---|---|---|
| Spindle housing Ø A | | [mm] | 120 | | | 120 | | |
| Speed max. | $n_{max}$ | [rpm] | 75,000 | | | 60,000 | | |
| Bearing Ø front | $W_1$ | [mm] | 25 | | | 30 | | |
| Tool interface | | | D 14/23 | | | D 16/28 | | |
| Flat contact face Ø W | | [mm] | 23 | | | 28 | | |
| Static rigidity | | | | | | | | |
| axial | $C_{ax}$ | [N/µm] | 54 | | | 69 | | |
| radial | $C_{rad}$ | [N/µm] | 68 | | | 97 | | |
| Motor design | | | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V |
| Frequency max. | $f_{max}$ | [Hz] | 1,250 | | | 2,000 | | |
| Nominal converter voltage[1] | | [V] | 200 | 350 | 460 | 200 | 350 | 460 |
| Power | $P_{S1}$ | [kW] | 6 | | | 11 | | |
| Torque | $M_{S1}$ | [Nm] | 0.76 | | | 3.5 | | |
| ... at speed | n | [rpm] | 75,000 | | | 30,000 | | |
| Current | $I_{S1}$ | [A] | 32 | 18 | 14 | 58 | 33 | 25 |
| Power | $P_{S6-60\%}$ | [kW] | 7 | | | 13 | | |
| Torque | $M_{S6-60\%}$ | [Nm] | 0.89 | | | 4.14 | | |
| ... at speed | n | [rpm] | 75,000 | | | 30,000 | | |
| Current | $I_{S6-60\%}$ | [A] | 42 | 20 | 18 | 65 | 37 | 28 |
| Electrical connection | | | | | | | | |
| Plug type | | | GA | GA | GA | MAC | GA | GA |
| Straight plug-in connection | | | + | + | + | + | + | + |
| Angle plug-in connection | | | o | o | o | o | o | o |
| Fixed cable XXm | | | o | o | o | o | o | o |
| Coolant through the shaft | | | | | | | | |
| Low pressure (du) | | | o | | | o | | |
| High pressure (dh) | | | x | | | o | | |
| Sensor technology | | | | | | | | |
| Rotary encoder | | | o | | | o | | |
| Speed sensor | | | + | | | + | | |
| Housing | | | | | | | | |
| Cylindrical housing | | | + | | | + | | |
| Cylindrical housing with flange | | | o | | | o | | |
| Block housing | | | x | | | x | | |
| Air purge | | | o | | | o | | |

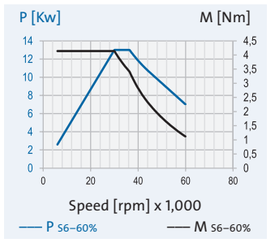
[1] Minimum required output voltage of the frequency converter

\+ Standard

o Option

x on request




| HV-X 120 - 60000/12 | | | HV-X 120 - 45000/18 | | | HV-X 120 - 30000/18 | | |
|---|---|---|---|---|---|---|---|---|
| 120 | | | 120 | | | 120 | | |
| 60,000 | | | 45,000 | | | 30,000 | | |
| 30 | | | 45 | | | 55 | | |
| D 16/28 | | | D 28/43 | | | D 32/53 | | |
| 28 | | | 43 | | | 53 | | |
| | | | | | | | | |
| 69 | | | 91 | | | 99 | | |
| 97 | | | 125 | | | 145 | | |
| 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V |
| 1,000 | | | 1,500 | | | 1,000 | | |
| 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 |
| 10.5 | | | 15 | | | 15 | | |
| 1.97 | | | 4.77 | | | 5.97 | | |
| 51,000 | | | 30,000 | | | 24,000 | | |
| 44 | 25 | 19 | 72 | 41 | 31 | 72 | 41 | 31 |
| 12 | | | 18 | | | 18 | | |
| 2.25 | | | 5.73 | | | 7.16 | | |
| 51,000 | | | 30,000 | | | 24,000 | | |
| 51 | 29 | 22 | 89 | 51 | 39 | 89 | 51 | 39 |
| | | | | | | | | |
| GA | GA | GA | MAC | GA | GA | MAC | GA | GA |
| + | + | + | + | + | + | + | + | + |
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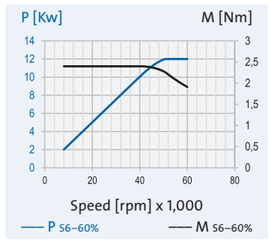
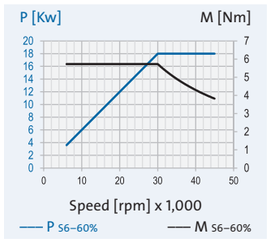
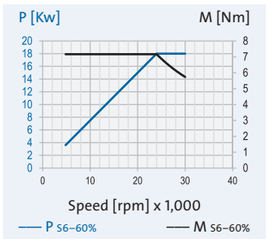



| TECHNICAL DATA | | |
|---|---|---|
| Spindle housing Ø A | | [mm] |
| Speed max. | $n_{max}$ | [rpm] |
| Bearing Ø front | $W_1$ | [mm] |
| Tool interface | | |
| Flat contact face Ø W | | [mm] |
| Static rigidity | | |
| axial | $C_{ax}$ | [N/µm] |
| radial | $C_{rad}$ | [N/µm] |
| Motor design | | |
| Frequency max. | $f_{max}$ | [Hz] |
| Nominal converter voltage[1] | | [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

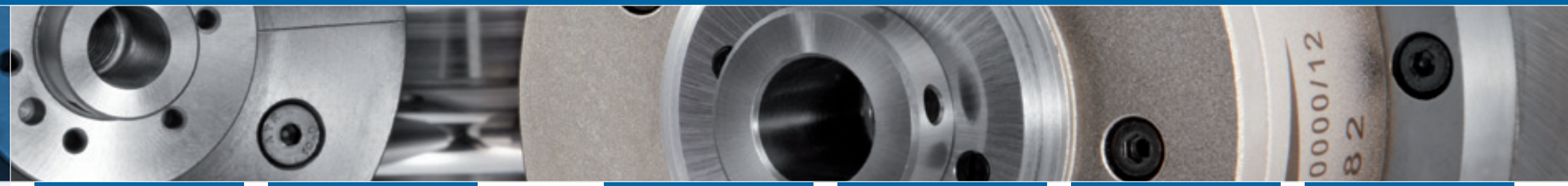
\+ Standard

o Option

x on request

# Series: HV-X

Cylindrical housing:
Ø = 150 mm



Tool interface:
GMN standard

Motor:
Asynchronous motor

Bearing arrangement:
GMN high precision ball bearings

Lubrication:
Oil-air lubrication

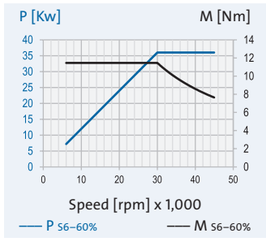
| TECHNICAL DATA | | | HV-X 150 - 45000/36 | | | HV-X 150 - 45000/25 | | | HV-X 150 - 30000/37 | | | HV-X 150 - 30000/26 | | | TECHNICAL DATA | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Spindle housing Ø A | | [mm] | 150 | | | 150 | | | 150 | | | 150 | | | Spindle housing Ø A | | [mm] |
| Speed max. | $n_{max}$ | [rpm] | 45,000 | | | 45,000 | | | 30,000 | | | 30,000 | | | Speed max. | $n_{max}$ | [rpm] |
| Bearing Ø front | $W_1$ | [mm] | 45 | | | 45 | | | 65 | | | 65 | | | Bearing Ø front | $W_1$ | [mm] |
| Tool interface | | | D 28/43 | | | D 28/43 | | | D 36/63 | | | D 36/63 | | | Tool interface | | |
| Flat contact face Ø W | | [mm] | 43 | | | 43 | | | 63 | | | 63 | | | Flat contact face Ø W | | [mm] |
| Static rigidity | | | | | | | | | | | | | | | Static rigidity | | |
| axial | $C_{ax}$ | [N/µm] | 91 | | | 91 | | | 121 | | | 121 | | | axial | $C_{ax}$ | [N/µm] |
| radial | $C_{rad}$ | [N/µm] | 150 | | | 150 | | | 197 | | | 197 | | | radial | $C_{rad}$ | [N/µm] |
| Motor design | | | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | Motor design | | |
| Frequency max. | $f_{max}$ | [Hz] | 1,500 | | | 1,500 | | | 1,000 | | | 1,000 | | | Frequency max. | $f_{max}$ | [Hz] |
| Nominal converter voltage[1] | | [V] | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | Nominal converter voltage[1] | | [V] |
| Power | $P_{S1}$ | [kW] | 32 | | | 22 | | | 33 | | | 23 | | | Power | $P_{S1}$ | [kW] |
| Torque | $M_{S1}$ | [Nm] | 10.2 | | | 10 | | | 15 | | | 14.6 | | | Torque | $M_{S1}$ | [Nm] |
| ... at speed | n | [rpm] | 30,000 | | | 21,000 | | | 21,000 | | | 15,000 | | | ... at speed | n | [rpm] |
| Current | $I_{S1}$ | [A] | 152 | 87 | 66 | 105 | 60 | 46 | 147 | 84 | 64 | 105 | 60 | 46 | Current | $I_{S1}$ | [A] |
| Power | $P_{S6-60\%}$ | [kW] | 36 | | | 25 | | | 37 | | | 26 | | | Power | $P_{S6-60\%}$ | [kW] |
| Torque | $M_{S6-60\%}$ | [Nm] | 11.5 | | | 11.4 | | | 16,8 | | | 16.6 | | | Torque | $M_{S6-60\%}$ | [Nm] |
| ... at speed | n | [rpm] | 30,000 | | | 21,000 | | | 21,000 | | | 15,000 | | | ... at speed | n | [rpm] |
| Current | $I_{S6-60\%}$ | [A] | 166 | 95 | 72 | 117 | 67 | 51 | 161 | 92 | 70 | 117 | 67 | 51 | Current | $I_{S6-60\%}$ | [A] |
| Electrical connection | | | | | | | | | | | | | | | Electrical connection | | |
| Plug type | | | D500 | D500 | MAC | D500 | MAC | MAC | D500 | D500 | MAC | D500 | MAC | MAC | Plug type | | |
| Straight plug-in connection | | | + | + | + | + | + | + | + | + | + | + | + | + | Straight plug-in connection | | |
| Angle plug-in connection | | | o | o | o | o | o | o | o | o | o | o | o | o | Angle plug-in connection | | |
| Fixed cable XXm | | | o | o | o | o | o | o | o | o | o | o | o | o | Fixed cable XXm | | |
| Coolant through the shaft | | | | | | | | | | | | | | | Coolant through the shaft | | |
| Low pressure (du) | | | x | | | x | | | x | | | x | | | Low pressure (du) | | |
| High pressure (dh) | | | o | | | o | | | o | | | o | | | High pressure (dh) | | |
| Sensor technology | | | | | | | | | | | | | | | Sensor technology | | |
| Rotary encoder | | | o | | | o | | | o | | | o | | | Rotary encoder | | |
| Speed sensor | | | + | | | + | | | + | | | + | | | Speed sensor | | |
| Housing | | | | | | | | | | | | | | | Housing | | |
| Cylindrical housing | | | + | | | + | | | + | | | + | | | Cylindrical housing | | |
| Cylindrical housing with flange | | | o | | | o | | | o | | | o | | | Cylindrical housing with flange | | |
| Block housing | | | x | | | x | | | x | | | x | | | Block housing | | |
| Air purge | | | o | | | o | | | o | | | o | | | Air purge | | |

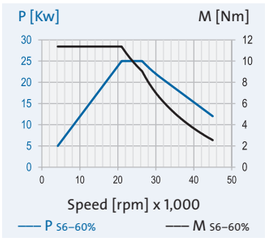
[1] Minimum required output voltage of the frequency converter

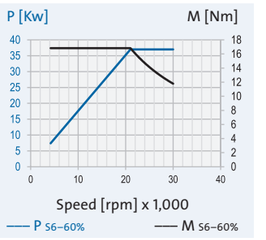
+ Standard

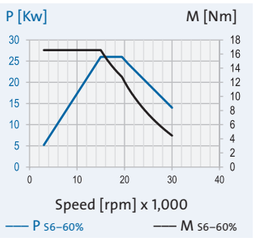
o Option

x on request




[1] Minimum required output voltage of the frequency converter

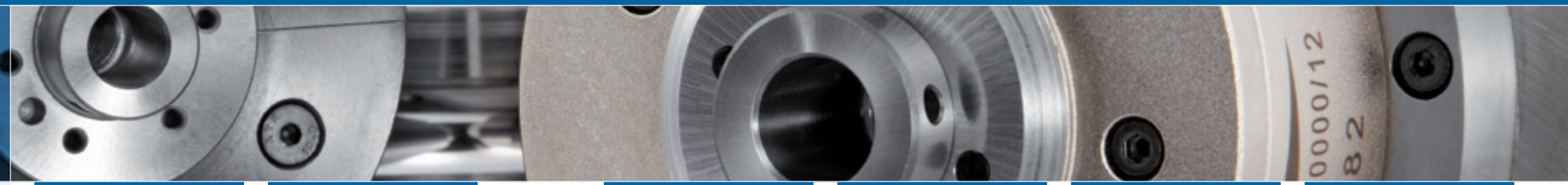
+ Standard

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

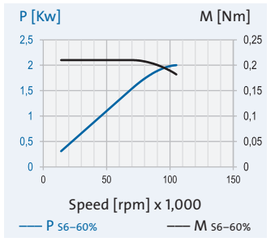
| TECHNICAL DATA | | | HSX 100 - 105000/2 | | | HSX 100 - 90000/3 | | | HSX 100 - 75000/5 | | | HSX 100 - 60000/5 | | | TECHNICAL DATA | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Spindle housing Ø A | | [mm] | 100 | | | 100 | | | 100 | | | 100 | | | Spindle housing Ø A | | [mm] |
| Speed max. | $n_{max}$ | [rpm] | 105,000 | | | 90,000 | | | 75,000 | | | 60,000 | | | Speed max. | $n_{max}$ | [rpm] |
| Bearing Ø front | $W_1$ | [mm] | 15 | | | 17 | | | 20 | | | 25 | | | Bearing Ø front | $W_1$ | [mm] |
| Tool interface | | | D 08/14 | | | D 09/16 | | | D 10/18 | | | D 14/23 | | | Tool interface | | |
| Flat contact face Ø W | | [mm] | 14 | | | 16 | | | 18 | | | 23 | | | Flat contact face Ø W | | [mm] |
| Static rigidity | | | | | | | | | | | | | | | Static rigidity | | |
| axial | $C_{ax}$ | [N/µm] | 26 | | | 36 | | | 48 | | | 53 | | | axial | $C_{ax}$ | [N/µm] |
| radial | $C_{rad}$ | [N/µm] | 29 | | | 33 | | | 46 | | | 53 | | | radial | $C_{rad}$ | [N/µm] |
| Motor design | | | 200 V | 350 V | – | 200 V | 350 V | – | 200 V | 350 V | – | 200 V | 350 V | – | Motor design | | |
| Frequency max. | $f_{max}$ | [Hz] | 1,750 | | | 1,500 | | | 1,250 | | | 1,000 | | | Frequency max. | $f_{max}$ | [Hz] |
| Nominal converter voltage[1] | | [V] | 200 | 350 | – | 200 | 350 | – | 200 | 350 | – | 200 | 350 | – | Nominal converter voltage[1] | | [V] |
| Power | $P_{S1}$ | [kW] | 1.7 | | | 2.5 | | | 4.2 | | | 4.2 | | | Power | $P_{S1}$ | [kW] |
| Torque | $M_{S1}$ | [Nm] | 0.16 | | | 0.27 | | | 0.54 | | | 0.67 | | | Torque | $M_{S1}$ | [Nm] |
| ... at speed | n | [rpm] | 105,000 | | | 90,000 | | | 75,000 | | | 60,000 | | | ... at speed | n | [rpm] |
| Current | $I_{S1}$ | [A] | 8,8 | 5 | – | 13 | 7.5 | – | 18 | 11 | – | 18 | 11 | – | Current | $I_{S1}$ | [A] |
| Power | $P_{S6-60\%}$ | [kW] | 2 | | | 3 | | | 5 | | | 5 | | | Power | $P_{S6-60\%}$ | [kW] |
| Torque | $M_{S6-60\%}$ | [Nm] | 0.18 | | | 0.32 | | | 0.64 | | | 0.8 | | | Torque | $M_{S6-60\%}$ | [Nm] |
| ... at speed | n | [rpm] | 105,000 | | | 90,000 | | | 75,000 | | | 60,000 | | | ... at speed | n | [rpm] |
| Current | $I_{S6-60\%}$ | [A] | 11 | 6.5 | – | 16 | 9 | – | 23 | 13 | – | 23 | 13 | – | Current | $I_{S6-60\%}$ | [A] |
| Electrical connection | | | | | | | | | | | | | | | Electrical connection | | |
| Plug type | | | GA | GA | – | GA | GA | – | GA | GA | – | GA | GA | – | Plug type | | |
| Straight plug-in connection | | | + | + | – | + | + | – | + | + | – | + | + | – | Straight plug-in connection | | |
| Angle plug-in connection | | | o | o | – | o | o | – | o | o | – | o | o | – | Angle plug-in connection | | |
| Fixed cable XXm | | | o | o | – | o | o | – | o | o | – | o | o | – | Fixed cable XXm | | |
| Coolant through the shaft | | | | | | | | | | | | | | | Coolant through the shaft | | |
| Low pressure (du) | | | o | | | o | | | o | | | o | | | Low pressure (du) | | |
| High pressure (dh) | | | – | | | – | | | – | | | – | | | High pressure (dh) | | |
| Sensor technology | | | | | | | | | | | | | | | Sensor technology | | |
| Rotary encoder | | | – | | | – | | | – | | | – | | | Rotary encoder | | |
| Speed sensor | | | + | | | + | | | + | | | + | | | Speed sensor | | |
| Housing | | | | | | | | | | | | | | | Housing | | |
| Cylindrical housing | | | + | | | + | | | + | | | + | | | Cylindrical housing | | |
| Cylindrical housing with flange | | | o | | | o | | | o | | | o | | | Cylindrical housing with flange | | |
| Block housing | | | x | | | x | | | x | | | x | | | Block housing | | |
| Air purge | | | o | | | o | | | o | | | o | | | Air purge | | |

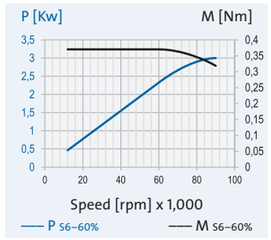
[1] Minimum required output voltage of the frequency converter

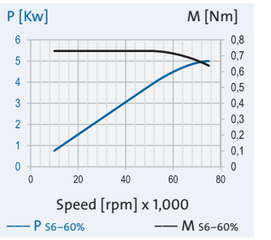
+ Standard

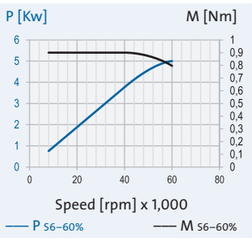
o Option

x on request




[1] Minimum required output voltage of the frequency converter

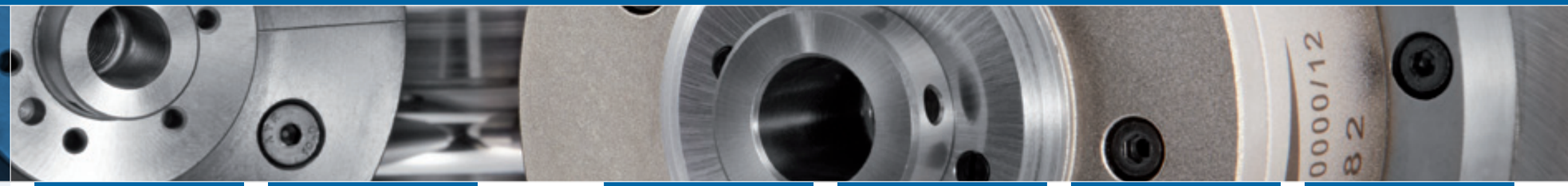
+ Standard

o Option

x on request

# Series: HSX

Cylindrical housing:
Ø = 120 mm



Tool interface:
GMN standard

Motor:
Asynchronous motor

Bearing arrangement:
GMN high precision ball bearings

Lubrication:
Oil-air lubrication

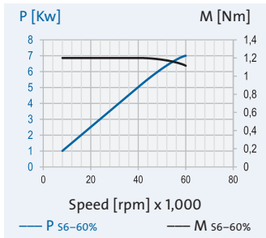
| TECHNICAL DATA | | | HSX 120 - 60000/7 | | | HSX 120 - 51000/12 | | | HSX 120 - 42000/12 | | | HSX 120 - 30000/13 | | | TECHNICAL DATA | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Spindle housing Ø A | | [mm] | 120 | | | 120 | | | 120 | | | 120 | | | Spindle housing Ø A | | [mm] |
| Speed max. | $n_{max}$ | [rpm] | 60,000 | | | 51,000 | | | 42,000 | | | 30,000 | | | Speed max. | $n_{max}$ | [rpm] |
| Bearing Ø front | $W_1$ | [mm] | 25 | | | 30 | | | 40 | | | 45 | | | Bearing Ø front | $W_1$ | [mm] |
| Tool interface | | | D 14/23 | | | D 16/28 | | | D 22/38 | | | D 28/43 | | | Tool interface | | |
| Flat contact face Ø W | | [mm] | 23 | | | 28 | | | 38 | | | 43 | | | Flat contact face Ø W | | [mm] |
| Static rigidity | | | | | | | | | | | | | | | Static rigidity | | |
| axial | $C_{ax}$ | [N/µm] | 54 | | | 70 | | | 90 | | | 98 | | | axial | $C_{ax}$ | [N/µm] |
| radial | $C_{rad}$ | [N/µm] | 57 | | | 102 | | | 121 | | | 131 | | | radial | $C_{rad}$ | [N/µm] |
| Motor design | | | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | Motor design | | |
| Frequency max. | $f_{max}$ | [Hz] | 1,000 | | | 1,700 | | | 1,400 | | | 1,500 | | | Frequency max. | $f_{max}$ | [Hz] |
| Nominal converter voltage[1] | | [V] | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | Nominal converter voltage[1] | | [V] |
| Power | $P_{S1}$ | [kW] | 6 | | | 11 | | | 11 | | | 11 | | | Power | $P_{S1}$ | [kW] |
| Torque | $M_{S1}$ | [Nm] | 0.96 | | | 3.5 | | | 3.5 | | | 5.84 | | | Torque | $M_{S1}$ | [Nm] |
| ... at speed | n | [rpm] | 60,000 | | | 30,000 | | | 30,000 | | | 18,000 | | | ... at speed | n | [rpm] |
| Current | $I_{S1}$ | [A] | 28 | 16 | 12 | 63 | 36 | 27 | 63 | 36 | 27 | 72 | 41 | 31 | Current | $I_{S1}$ | [A] |
| Power | $P_{S6-60\%}$ | [kW] | 7 | | | 12 | | | 12 | | | 13 | | | Power | $P_{S6-60\%}$ | [kW] |
| Torque | $M_{S6-60\%}$ | [Nm] | 1.11 | | | 3.82 | | | 3.82 | | | 6.9 | | | Torque | $M_{S6-60\%}$ | [Nm] |
| ... at speed | n | [rpm] | 60,000 | | | 30,000 | | | 30,000 | | | 18,000 | | | ... at speed | n | [rpm] |
| Current | $I_{S6-60\%}$ | [A] | 32 | 18 | 14 | 67 | 38 | 29 | 67 | 38 | 29 | 84 | 48 | 37 | Current | $I_{S6-60\%}$ | [A] |
| Electrical connection | | | | | | | | | | | | | | | Electrical connection | | |
| Plug type | | | GA | GA | GA | MAC | GA | GA | MAC | GA | GA | MAC | GA | GA | Plug type | | |
| Straight plug-in connection | | | + | + | + | + | + | + | + | + | + | + | + | + | Straight plug-in connection | | |
| Angle plug-in connection | | | o | o | o | o | o | o | o | o | o | o | o | o | Angle plug-in connection | | |
| Fixed cable XXm | | | o | o | o | o | o | o | o | o | o | o | o | o | Fixed cable XXm | | |
| Coolant through the shaft | | | | | | | | | | | | | | | Coolant through the shaft | | |
| Low pressure (du) | | | o | | | o | | | o | | | o | | | Low pressure (du) | | |
| High pressure (dh) | | | x | | | x | | | x | | | x | | | High pressure (dh) | | |
| Sensor technology | | | | | | | | | | | | | | | Sensor technology | | |
| Rotary encoder | | | x | | | x | | | x | | | x | | | Rotary encoder | | |
| Speed sensor | | | + | | | + | | | + | | | + | | | Speed sensor | | |
| Housing | | | | | | | | | | | | | | | Housing | | |
| Cylindrical housing | | | + | | | + | | | + | | | + | | | Cylindrical housing | | |
| Cylindrical housing with flange | | | o | | | o | | | o | | | o | | | Cylindrical housing with flange | | |
| Block housing | | | x | | | x | | | x | | | x | | | Block housing | | |
| Air purge | | | o | | | o | | | o | | | o | | | Air purge | | |

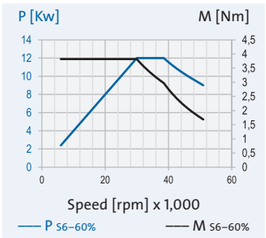
[1] Minimum required output voltage of the frequency converter

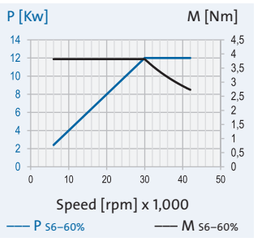
+ Standard

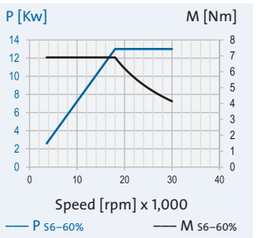
o Option

x on request




[1] Minimum required output voltage of the frequency converter

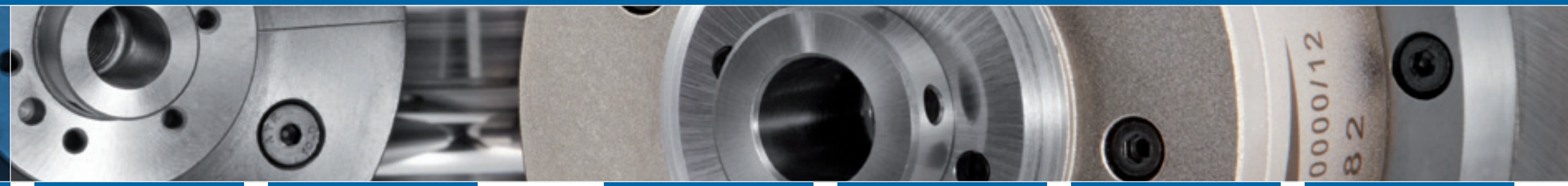
+ Standard

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

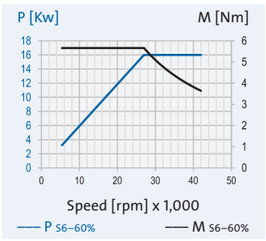
| TECHNICAL DATA | | | HSX 150 - 42000/16 | | | HSX 150 - 42000/11 | | | HSX 150 - 30000/23 | | | HSX 150 - 30000/16 | | | HSX 150 - 24000/23 | | | HSX 150 - 24000/17 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Spindle housing Ø A | | [mm] | 150 | | | 150 | | | 150 | | | 150 | | | 150 | | | 150 | | |
| Speed max. | $n_{max}$ | [rpm] | 42,000 | | | 42,000 | | | 30,000 | | | 30,000 | | | 24,000 | | | 24,000 | | |
| Bearing Ø front | $W_1$ | [mm] | 40 | | | 40 | | | 55 | | | 55 | | | 65 | | | 65 | | |
| Tool interface | | | D 22/38 | | | D 22/38 | | | D 32/53 | | | D 32/53 | | | D 36/63 | | | D 36/63 | | |
| Flat contact face Ø W | | [mm] | 38 | | | 38 | | | 53 | | | 53 | | | 63 | | | 63 | | |
| **Static rigidity** | | | | | | | | | | | | | | | | | | | | |
| axial | $C_{ax}$ | [N/µm] | 90 | | | 90 | | | 111 | | | 111 | | | 130 | | | 130 | | |
| radial | $C_{rad}$ | [N/µm] | 147 | | | 147 | | | 177 | | | 177 | | | 147 | | | 147 | | |
| **Motor design** | | | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V |
| Frequency max. | $f_{max}$ | [Hz] | 1,400 | | | 1,400 | | | 1,000 | | | 1,000 | | | 800 | | | 800 | | |
| Nominal converter voltage[1] | | [V] | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 |
| Power | $P_{S1}$ | [kW] | 14 | | | 9.5 | | | 18 | | | 14 | | | 18 | | | 14 | | |
| Torque | $M_{S1}$ | [Nm] | 4.95 | | | 5.04 | | | 9.55 | | | 9.9 | | | 9,55 | | | 12,2 | | |
| ... at speed | n | [rpm] | 27,000 | | | 18,000 | | | 18,000 | | | 13,500 | | | 18,000 | | | 11,000 | | |
| Current | $I_{S1}$ | [A] | 86 | 49 | 37 | 47 | 27 | 21 | 86 | 49 | 37 | 63 | 36 | 27 | 86 | 49 | 37 | 65 | 37 | 28 |
| Power | $P_{S6-60\%}$ | [kW] | 16 | | | 11 | | | 23 | | | 16 | | | 23 | | | 17 | | |
| Torque | $M_{S6-60\%}$ | [Nm] | 5.66 | | | 5.84 | | | 12.2 | | | 11.3 | | | 12.2 | | | 14,8 | | |
| ... at speed | n | [rpm] | 27,000 | | | 18,000 | | | 18,000 | | | 13,500 | | | 18,000 | | | 11,000 | | |
| Current | $I_{S6-60\%}$ | [A] | 102 | 58 | 44 | 54 | 31 | 24 | 110 | 63 | 48 | 70 | 40 | 30 | 110 | 63 | 48 | 79 | 45 | 34 |
| **Electrical connection** | | | | | | | | | | | | | | | | | | | | |
| Plug type | | | MAC | MAC | GA | MAC | GA | GA | MAC | MAC | GA | MAC | GA | GA | MAC | MAC | GA | MAC | GA | GA |
| Straight plug-in connection | | | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Angle plug-in connection | | | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o |
| Fixed cable XXm | | | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o |
| **Coolant through the shaft** | | | | | | | | | | | | | | | | | | | | |
| Low pressure (du) | | | o | | | o | | | x | | | x | | | – | | | – | | |
| High pressure (dh) | | | x | | | x | | | x | | | x | | | x | | | x | | |
| **Sensor technology** | | | | | | | | | | | | | | | | | | | | |
| Rotary encoder | | | x | | | x | | | x | | | x | | | x | | | x | | |
| Speed sensor | | | + | | | + | | | + | | | + | | | + | | | + | | |
| **Housing** | | | | | | | | | | | | | | | | | | | | |
| Cylindrical housing | | | + | | | + | | | + | | | + | | | + | | | + | | |
| Cylindrical housing with flange | | | o | | | o | | | o | | | o | | | o | | | o | | |
| Block housing | | | x | | | x | | | x | | | x | | | x | | | x | | |
| **Air purge** | | | o | | | o | | | o | | | o | | | o | | | o | | |

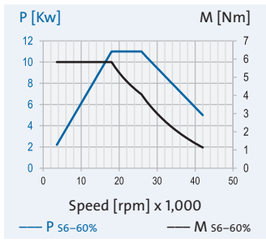
[1] Minimum required output voltage of the frequency converter

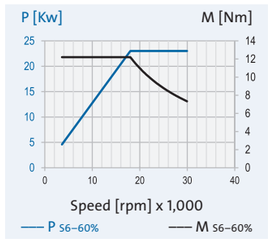
\+ Standard

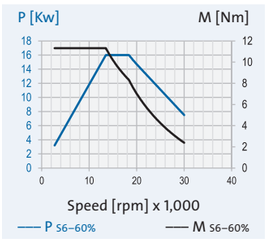
o Option

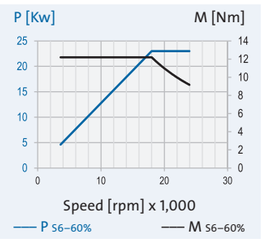
x on request

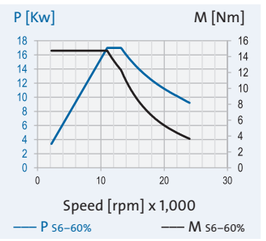


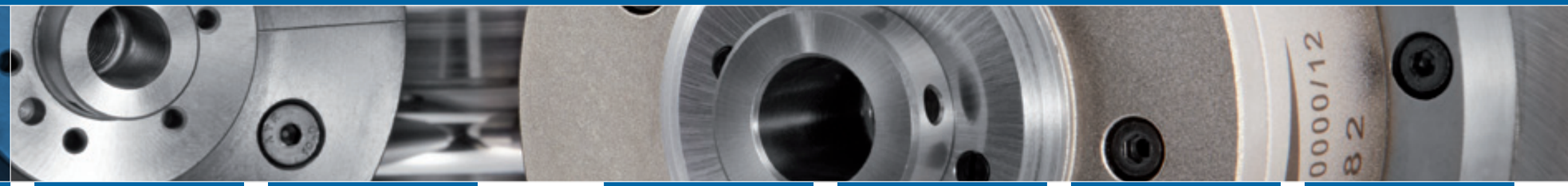



# Series: HSX

Cylindrical housing:
Ø = 170 mm



Tool interface:
GMN standard

Motor:
Asynchronous motor

Bearing arrangement:
GMN high precision ball bearings

Lubrication:
Oil-air lubrication

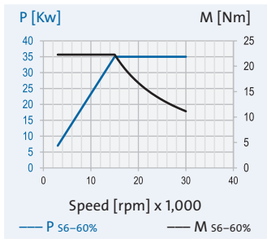
| TECHNICAL DATA | | | HSX 170 - 30000/35 | | | HSX 170 - 30000/21 | | | HSX 170 - 24000/35 | | | HSX 170 - 24000/21 | | | HSX 170 - 18000/34 | | | HSX 170 - 18000/23 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Spindle housing Ø A | | [mm] | 170 | | | 170 | | | 170 | | | 170 | | | 170 | | | 170 | | |
| Speed max. | $n_{max}$ | [rpm] | 30,000 | | | 30,000 | | | 24,000 | | | 24,000 | | | 18,000 | | | 18,000 | | |
| Bearing Ø front | $W_1$ | [mm] | 55 | | | 55 | | | 65 | | | 65 | | | 70 | | | 70 | | |
| Tool interface | | | D 32/53 | | | D 32/53 | | | D 36/63 | | | D 36/63 | | | D 36/68 | | | D 36/68 | | |
| Flat contact face Ø W | | [mm] | 53 | | | 53 | | | 63 | | | 63 | | | 68 | | | 68 | | |
| **Static rigidity** | | | | | | | | | | | | | | | | | | | | |
| axial | $C_{ax}$ | [N/µm] | 111 | | | 111 | | | 130 | | | 130 | | | 201 | | | 201 | | |
| radial | $C_{rad}$ | [N/µm] | 203 | | | 203 | | | 231 | | | 231 | | | 325 | | | 325 | | |
| **Motor design** | | | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V |
| Frequency max. | $f_{max}$ | [Hz] | 1,000 | | | 1,000 | | | 800 | | | 800 | | | 600 | | | 600 | | |
| Nominal converter voltage[1] | | [V] | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 |
| Power | $P_{S1}$ | [kW] | 32 | | | 19 | | | 32 | | | 19 | | | 29 | | | 20 | | |
| Torque | $M_{S1}$ | [Nm] | 20.4 | | | 20.2 | | | 20.4 | | | 20.2 | | | 25.2 | | | 25.5 | | |
| ... at speed | n | [rpm] | 15,000 | | | 9,000 | | | 15,000 | | | 9,000 | | | 11,000 | | | 7,500 | | |
| Current | $I_{S1}$ | [A] | 140 | 80 | 61 | 82 | 47 | 36 | 140 | 80 | 61 | 82 | 47 | 36 | 117 | 67 | 51 | 89 | 51 | 39 |
| Power | $P_{S6-60\%}$ | [kW] | 35 | | | 21 | | | 35 | | | 21 | | | 34 | | | 23 | | |
| Torque | $M_{S6-60\%}$ | [Nm] | 22.3 | | | 22.3 | | | 22.3 | | | 22.3 | | | 29.5 | | | 29.3 | | |
| ... at speed | n | [rpm] | 15,000 | | | 9,000 | | | 15,000 | | | 9,000 | | | 11,000 | | | 7,500 | | |
| Current | $I_{S6-60\%}$ | [A] | 151 | 86 | 65 | 93 | 53 | 40 | 151 | 86 | 65 | 93 | 53 | 40 | 137 | 78 | 59 | 102 | 58 | 44 |
| **Electrical connection** | | | | | | | | | | | | | | | | | | | | |
| Plug type | | | D500 | MAC | MAC | MAC | MAC | MAC | D500 | MAC | MAC | MAC | MAC | MAC | D500 | MAC | MAC | D500 | MAC | MAC |
| Straight plug-in connection | | | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Angle plug-in connection | | | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o |
| Fixed cable XXm | | | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o |
| **Coolant through the shaft** | | | | | | | | | | | | | | | | | | | | |
| Low pressure (du) | | | – | | | – | | | – | | | – | | | – | | | – | | |
| High pressure (dh) | | | x | | | x | | | x | | | x | | | x | | | x | | |
| **Sensor technology** | | | | | | | | | | | | | | | | | | | | |
| Rotary encoder | | | x | | | x | | | x | | | x | | | x | | | x | | |
| Speed sensor | | | + | | | + | | | + | | | + | | | + | | | + | | |
| **Housing** | | | | | | | | | | | | | | | | | | | | |
| Cylindrical housing | | | + | | | + | | | + | | | + | | | + | | | + | | |
| Cylindrical housing with flange | | | o | | | o | | | o | | | o | | | o | | | o | | |
| Block housing | | | x | | | x | | | x | | | x | | | x | | | x | | |
| Air purge | | | o | | | o | | | o | | | o | | | o | | | o | | |

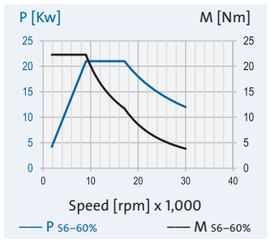
[1] Minimum required output voltage of the frequency converter

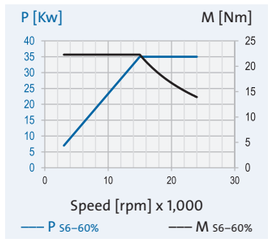
\+ Standard

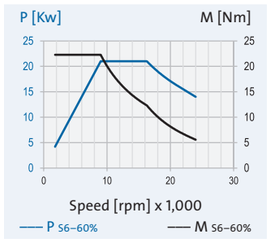
o Option

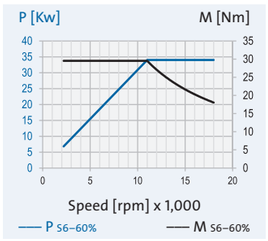
x on request

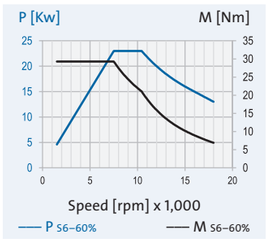


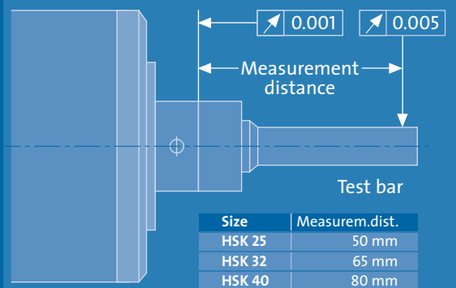



# Technical data
# Features

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

**Round and plane running accuracy**

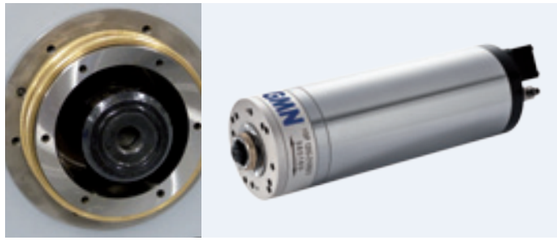



| Size | Measurem.dist. |
|---|---|
| HSK 25 | 50 mm |
| HSK 32 | 65 mm |
| HSK 40 | 80 mm |
| HSK 50 | 100 mm |
| HSK 63 | 125 mm |
| HSK 80 | 125 mm |

### 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

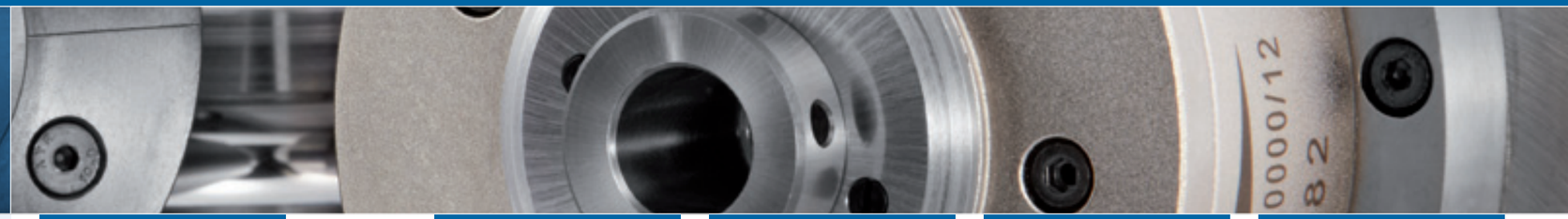
### HSP.. g

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

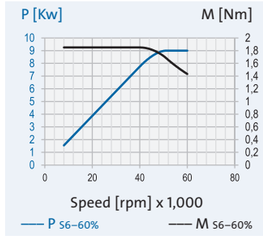
| TECHNICAL DATA | | | HV-P 100 - 60000/9 | | | HV-P 100 - 45000/9 | | | HV-P 100 - 30000/9 | | | TECHNICAL DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Spindle housing Ø A | | [mm] | 100 | | | 100 | | | 100 | | | Spindle housing Ø A [mm] |
| Speed max. | $n_{max}$ | [rpm] | 60,000 | | | 45,000 | | | 30,000 | | | Speed max. $n_{max}$ [rpm] |
| Bearing Ø front | $W_1$ | [mm] | 30 | | | 40 | | | 45 | | | Bearing Ø front $W_1$ [mm] |
| Tool interface | | | HSK-C 25 | | | HSK-C 32 | | | HSK-C 40 | | | Tool interface |
| Flat contact face Ø W | | [mm] | 25 | | | 32 | | | 40 | | | Flat contact face Ø W [mm] |
| Static rigidity | | | | | | | | | | | | Static rigidity |
| axial | $C_{ax}$ | [N/µm] | 62 | | | 76 | | | 80 | | | axial $C_{ax}$ [N/µm] |
| radial | $C_{rad}$ | [N/µm] | 73 | | | 85 | | | 74 | | | radial $C_{rad}$ [N/µm] |
| Motor design | | | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | Motor design |
| Frequency max. | $f_{max}$ | [Hz] | 2,000 | | | 1,500 | | | 1,000 | | | Frequency max. $f_{max}$ [Hz] |
| Nominal converter voltage[1] | | [V] | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | Nominal converter voltage[1] [V] |
| Power | $P_{S1}$ | [kW] | 7.5 | | | 7.5 | | | 7.5 | | | Power $P_{S1}$ [kW] |
| Torque | $M_{S1}$ | [Nm] | 1.4 | | | 2.39 | | | 3.41 | | | Torque $M_{S1}$ [Nm] |
| ... at speed | n | [rpm] | 51,000 | | | 30,000 | | | 21,000 | | | ... at speed n [rpm] |
| Current | $I_{S1}$ | [A] | 42 | 24 | 18 | 42 | 24 | 18 | 49 | 28 | 21 | Current $I_{S1}$ [A] |
| Power | $P_{S6-60\%}$ | [kW] | 9 | | | 9 | | | 9 | | | Power $P_{S6-60\%}$ [kW] |
| Torque | $M_{S6-60\%}$ | [Nm] | 1.69 | | | 2.86 | | | 4.09 | | | Torque $M_{S6-60\%}$ [Nm] |
| ... at speed | n | [rpm] | 51,000 | | | 30,000 | | | 21,000 | | | ... at speed n [rpm] |
| Current | $I_{S6-60\%}$ | [A] | 49 | 28 | 21 | 49 | 28 | 21 | 53 | 30 | 23 | Current $I_{S6-60\%}$ [A] |
| Electrical connection | | | | | | | | | | | | Electrical connection |
| Plug type | | | GA | GA | GA | GA | GA | GA | MAC | GA | GA | Plug type |
| Straight plug-in connection | | | + | + | + | + | + | + | + | + | + | Straight plug-in connection |
| Angle plug-in connection | | | o | o | o | o | o | o | x | x | x | Angle plug-in connection |
| Fixed cable XXm | | | o | o | o | o | o | o | o | o | o | Fixed cable XXm |
| Coolant through the shaft | | | | | | | | | | | | Coolant through the shaft |
| Low pressure (du) | | | – | | | – | | | – | | | Low pressure (du) |
| High pressure (dh) | | | x | | | x | | | x | | | High pressure (dh) |
| Sensor technology | | | | | | | | | | | | Sensor technology |
| Rotary encoder | | | – | | | – | | | – | | | Rotary encoder |
| Speed sensor | | | + | | | + | | | + | | | Speed sensor |
| Housing | | | | | | | | | | | | Housing |
| Cylindrical housing | | | + | | | + | | | + | | | Cylindrical housing |
| Cylindrical housing with flange | | | o | | | o | | | o | | | Cylindrical housing with flange |
| Block housing | | | x | | | x | | | x | | | Block housing |
| Air purge | | | o | | | o | | | o | | | Air purge |

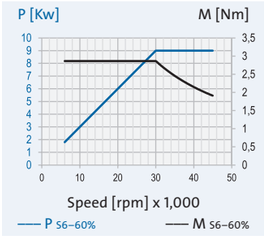
[1] Minimum required output voltage of the frequency converter

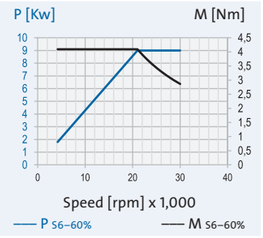
+ Standard

o Option

x on request




[1] Minimum required output voltage of the frequency converter

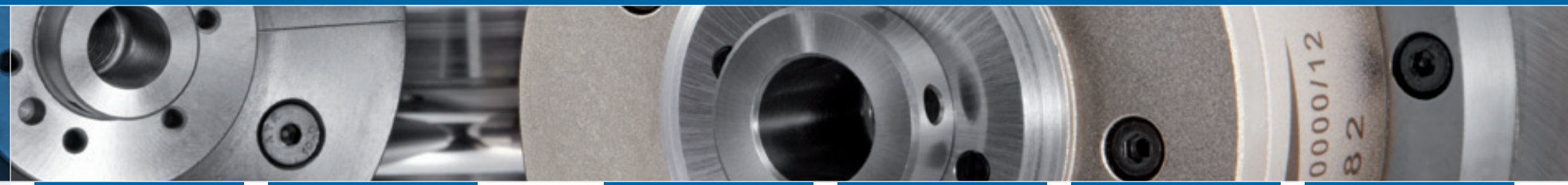
+ Standard

o Option

x on request

# Series: HV-P

Cylindrical housing:
Ø = 120 mm



Tool interface:
HSK-C

Motor:
Asynchronous motor

Bearing arrangement:
GMN high precision ball bearings

Lubrication:
Oil-air lubrication

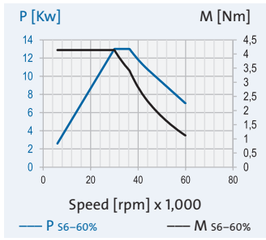
| TECHNICAL DATA | | | HV-P 120 - 60000/13 | | | HV-P 120 - 60000/12 | | | HV-P 120 - 45000/18 | | | HV-P 120 - 30000/18 | | | TECHNICAL DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Spindle housing Ø A | | [mm] | 120 | | | 120 | | | 120 | | | 120 | | | Spindle housing Ø A [mm] |
| Speed max. | $n_{max}$ | [rpm] | 60,000 | | | 60,000 | | | 45,000 | | | 30,000 | | | Speed max. $n_{max}$ [rpm] |
| Bearing Ø front | $W_1$ | [mm] | 30 | | | 30 | | | 45 | | | 55 | | | Bearing Ø front $W_1$ [mm] |
| Tool interface | | | HSK-C 25 | | | HSK-C 25 | | | HSK-C 40 | | | HSK-C 50 | | | Tool interface |
| Flat contact face Ø W | | [mm] | 25 | | | 25 | | | 40 | | | 50 | | | Flat contact face Ø W [mm] |
| Static rigidity | | | | | | | | | | | | | | | Static rigidity |
| axial | $C_{ax}$ | [N/µm] | 69 | | | 69 | | | 91 | | | 99 | | | axial $C_{ax}$ [N/µm] |
| radial | $C_{rad}$ | [N/µm] | 97 | | | 97 | | | 125 | | | 145 | | | radial $C_{rad}$ [N/µm] |
| Motor design | | | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | Motor design |
| Frequency max. | $f_{max}$ | [Hz] | 2,000 | | | 1,000 | | | 1,500 | | | 1,000 | | | Frequency max. $f_{max}$ [Hz] |
| Nominal converter voltage[1] | | [V] | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | Nominal converter voltage[1] [V] |
| Power | $P_{S1}$ | [kW] | 11 | | | 10.5 | | | 15 | | | 15 | | | Power $P_{S1}$ [kW] |
| Torque | $M_{S1}$ | [Nm] | 3.5 | | | 1.97 | | | 4.77 | | | 5.97 | | | Torque $M_{S1}$ [Nm] |
| ... at speed | n | [rpm] | 30,000 | | | 51,000 | | | 30,000 | | | 24,000 | | | ... at speed n [rpm] |
| Current | $I_{S1}$ | [A] | 58 | 33 | 25 | 44 | 25 | 19 | 72 | 41 | 31 | 72 | 41 | 31 | Current $I_{S1}$ [A] |
| Power | $P_{S6-60\%}$ | [kW] | 13 | | | 12 | | | 18 | | | 18 | | | Power $P_{S6-60\%}$ [kW] |
| Torque | $M_{S6-60\%}$ | [Nm] | 4.14 | | | 2.25 | | | 5.73 | | | 7.16 | | | Torque $M_{S6-60\%}$ [Nm] |
| ... at speed | n | [rpm] | 30,000 | | | 51,000 | | | 30,000 | | | 24,000 | | | ... at speed n [rpm] |
| Current | $I_{S6-60\%}$ | [A] | 65 | 37 | 28 | 51 | 29 | 22 | 89 | 51 | 39 | 89 | 51 | 39 | Current $I_{S6-60\%}$ [A] |
| Electrical connection | | | | | | | | | | | | | | | Electrical connection |
| Plug type | | | MAC | GA | GA | GA | GA | GA | MAC | GA | GA | MAC | GA | GA | Plug type |
| Straight plug-in connection | | | + | + | + | + | + | + | + | + | + | + | + | + | Straight plug-in connection |
| Angle plug-in connection | | | x | x | x | o | o | o | o | o | o | o | o | o | Angle plug-in connection |
| Fixed cable XXm | | | o | o | o | o | o | o | o | o | o | o | o | o | Fixed cable XXm |
| Coolant through the shaft | | | | | | | | | | | | | | | Coolant through the shaft |
| Low pressure (du) | | | – | | | – | | | – | | | – | | | Low pressure (du) |
| High pressure (dh) | | | o | | | o | | | o | | | o | | | High pressure (dh) |
| Sensor technology | | | | | | | | | | | | | | | Sensor technology |
| Rotary encoder | | | o | | | o | | | o | | | o | | | Rotary encoder |
| Speed sensor | | | + | | | + | | | + | | | + | | | Speed sensor |
| Housing | | | | | | | | | | | | | | | Housing |
| Cylindrical housing | | | + | | | + | | | + | | | + | | | Cylindrical housing |
| Cylindrical housing with flange | | | o | | | o | | | o | | | o | | | Cylindrical housing with flange |
| Block housing | | | x | | | x | | | x | | | x | | | Block housing |
| Air purge | | | o | | | o | | | o | | | o | | | Air purge |

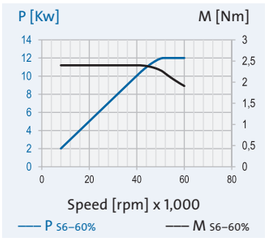
[1] Minimum required output voltage of the frequency converter

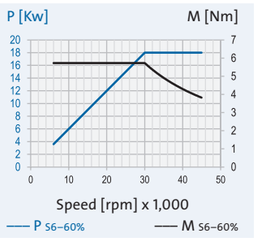
+ Standard

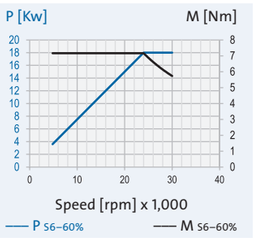
o Option

x on request




[1] Minimum required output voltage of the frequency converter

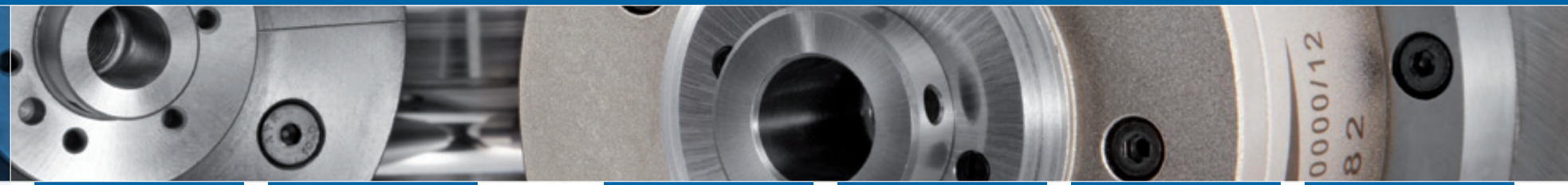
+ Standard

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

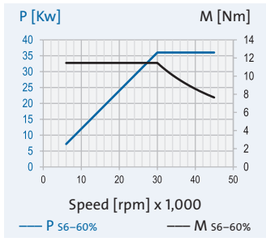
| TECHNICAL DATA | | | HV-P 150 - 45000/36 | | |
|---|---|---|---|---|---|
| Spindle housing Ø A | | [mm] | 150 | | |
| Speed max. | $n_{max}$ | [rpm] | 45,000 | | |
| Bearing Ø front | $W_1$ | [mm] | 45 | | |
| Tool interface | | | HSK-C 40 | | |
| Flat contact face Ø W | | [mm] | 40 | | |
| Static rigidity | | | | | |
| axial | $C_{ax}$ | [N/µm] | 91 | | |
| radial | $C_{rad}$ | [N/µm] | 150 | | |
| Motor design | | | 200 V | 350 V | 460 V |
| Frequency max. | $f_{max}$ | [Hz] | 1,500 | | |
| Nominal converter voltage[1] | | [V] | 200 | 350 | 460 |
| Power | $P_{S1}$ | [kW] | 32 | | |
| Torque | $M_{S1}$ | [Nm] | 10.2 | | |
| ... at speed | n | [rpm] | 30,000 | | |
| Current | $I_{S1}$ | [A] | 152 | 87 | 66 |
| Power | $P_{S6-60\%}$ | [kW] | 36 | | |
| Torque | $M_{S6-60\%}$ | [Nm] | 11.5 | | |
| ... at speed | n | [rpm] | 30,000 | | |
| Current | $I_{S6-60\%}$ | [A] | 166 | 95 | 72 |
| Electrical connection | | | | | |
| Plug type | | | D500 | D500 | MAC |
| Straight plug-in connection | | | + | + | + |
| Angle plug-in connection | | | o | o | o |
| Fixed cable XXm | | | o | o | o |
| Coolant through the shaft | | | | | |
| Low pressure (du) | | | – | | |
| High pressure (dh) | | | o | | |
| Sensor technology | | | | | |
| Rotary encoder | | | o | | |
| Speed sensor | | | + | | |
| Housing | | | | | |
| Cylindrical housing | | | + | | |
| Cylindrical housing with flange | | | o | | |
| Block housing | | | x | | |
| Air purge | | | o | | |

[1] Minimum required output voltage of the frequency converter

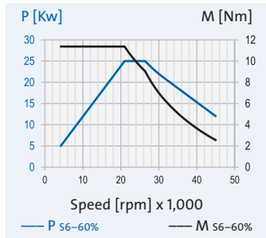
+ Standard

o Option

x on request




| HV-P 150 - 45000/25 | | |
|---|---|---|
| 150 | | |
| 45,000 | | |
| 45 | | |
| HSK-C 40 | | |
| 40 | | |
| | | |
| 91 | | |
| 150 | | |
| 200 V | 350 V | 460 V |
| 1,500 | | |
| 200 | 350 | 460 |
| 22 | | |
| 10 | | |
| 21,000 | | |
| 105 | 60 | 46 |
| 25 | | |
| 11.4 | | |
| 21,000 | | |
| 117 | 67 | 51 |
| | | |
| D500 | MAC | MAC |
| + | + | + |
| o | o | o |
| o | o | o |
| | | |
| – | | |
| o | | |
| | | |
| o | | |
| + | | |
| | | |
| + | | |
| o | | |
| x | | |
| o | | |




| HV-P 150 - 30000/37 | | |
|---|---|---|
| 150 | | |
| 30,000 | | |
| 65 | | |
| HSK-C 63 | | |
| 63 | | |
| | | |
| 121 | | |
| 197 | | |
| 200 V | 350 V | 460 V |
| 1,000 | | |
| 200 | 350 | 460 |
| 33 | | |
| 15 | | |
| 21,000 | | |
| 147 | 84 | 64 |
| 37 | | |
| 16.8 | | |
| 21,000 | | |
| 161 | 92 | 70 |
| | | |
| D500 | MAC | MAC |
| + | + | + |
| o | o | o |
| o | o | o |
| | | |
| – | | |
| o | | |
| | | |
| o | | |
| + | | |
| | | |
| + | | |
| o | | |
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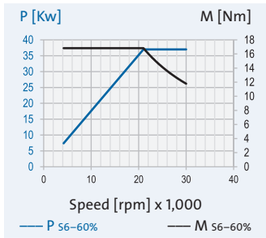
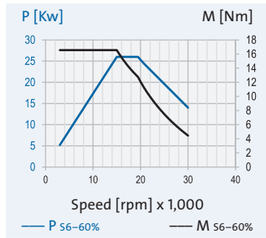
| o | | |




| HV-P 150 - 30000/26 | | |
|---|---|---|
| 150 | | |
| 30,000 | | |
| 65 | | |
| HSK-C 63 | | |
| 63 | | |
| | | |
| 121 | | |
| 197 | | |
| 200 V | 350 V | 460 V |
| 1,000 | | |
| 200 | 350 | 460 |
| 23 | | |
| 14.6 | | |
| 15,000 | | |
| 105 | 60 | 46 |
| 26 | | |
| 16.6 | | |
| 15,000 | | |
| 117 | 67 | 51 |
| | | |
| D500 | MAC | MAC |
| + | + | + |
| o | o | o |
| o | o | o |
| | | |
| – | | |
| o | | |
| | | |
| o | | |
| + | | |
| | | |
| + | | |
| o | | |
| x | | |
| o | | |




| 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[1] | | [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

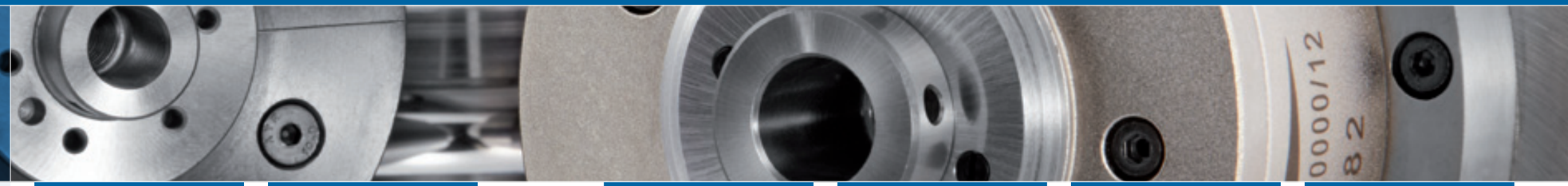
+ Standard

o Option

x on request

# Series: HSP

Cylindrical housing:
Ø = 100 mm



Tool interface:
HSK-C

Motor:
Asynchronous motor

Bearing arrangement:
GMN high precision ball bearings

Lubrication:
Oil-air lubrication

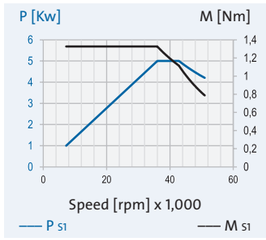
| TECHNICAL DATA | | | HSP 100 - 51000/5 | | | HSP 100 - 51000/3 | | | HSP 100 - 42000/5 | | | HSP 100 - 42000/3 | | | TECHNICAL DATA | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Spindle housing Ø A | | [mm] | 100 | | | 100 | | | 100 | | | 100 | | | Spindle housing Ø A | | [mm] |
| Speed max. | $n_{max}$ | [rpm] | 51,000 | | | 51,000 | | | 42,000 | | | 42,000 | | | Speed max. | $n_{max}$ | [rpm] |
| Bearing Ø front | $W_1$ | [mm] | 30 | | | 30 | | | 35 | | | 35 | | | Bearing Ø front | $W_1$ | [mm] |
| Tool interface | | | HSK-C 25 | | | HSK-C 25 | | | HSK-C 32 | | | HSK-C 32 | | | Tool interface | | |
| Flat contact face Ø W | | [mm] | 25 | | | 25 | | | 32 | | | 32 | | | Flat contact face Ø W | | [mm] |
| Static rigidity | | | | | | | | | | | | | | | Static rigidity | | |
| axial | $C_{ax}$ | [N/µm] | 63 | | | 63 | | | 69 | | | 69 | | | axial | $C_{ax}$ | [N/µm] |
| radial | $C_{rad}$ | [N/µm] | 77 | | | 77 | | | 81 | | | 81 | | | radial | $C_{rad}$ | [N/µm] |
| Motor design | | | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | Motor design | | |
| Frequency max. | $f_{max}$ | [Hz] | 1,700 | | | 1,700 | | | 1,400 | | | 1,400 | | | Frequency max. | $f_{max}$ | [Hz] |
| Nominal converter voltage[1] | | [V] | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | Nominal converter voltage[1] | | [V] |
| Power | $P_{S1}$ | [kW] | 5 | | | 3 | | | 5 | | | 3 | | | Power | $P_{S1}$ | [kW] |
| Torque | $M_{S1}$ | [Nm] | 1.33 | | | 1.36 | | | 1.33 | | | 1.36 | | | Torque | $M_{S1}$ | [Nm] |
| ... at speed | n | [rpm] | 36,000 | | | 21,000 | | | 36,000 | | | 21,000 | | | ... at speed | n | [rpm] |
| Current | $I_{S1}$ | [A] | 26 | 15 | 11 | 18 | 10 | 7,6 | 26 | 15 | 11 | 18 | 10 | 7.6 | Current | $I_{S1}$ | [A] |
| Power | $P_{S6-60\%}$ | [kW] | 6 | | | 4 | | | 6 | | | 4 | | | Power | $P_{S6-60\%}$ | [kW] |
| Torque | $M_{S6-60\%}$ | [Nm] | 1.59 | | | 1.59 | | | 1.59 | | | 1.59 | | | Torque | $M_{S6-60\%}$ | [Nm] |
| ... at speed | n | [rpm] | 36,000 | | | 24,000 | | | 36,000 | | | 24,000 | | | ... at speed | n | [rpm] |
| Current | $I_{S6-60\%}$ | [A] | 32 | 18 | 14 | 21 | 12 | 9.1 | 32 | 18 | 14 | 21 | 12 | 9.1 | Current | $I_{S6-60\%}$ | [A] |
| Electrical connection | | | | | | | | | | | | | | | Electrical connection | | |
| Plug type | | | GA | GA | GA | GA | GA | GA | GA | GA | GA | GA | GA | GA | Plug type | | |
| Straight plug-in connection | | | + | + | + | + | + | + | + | + | + | + | + | + | Straight plug-in connection | | |
| Angle plug-in connection | | | o | o | o | o | o | o | o | o | o | o | o | o | Angle plug-in connection | | |
| Fixed cable XXm | | | o | o | o | o | o | o | o | o | o | o | o | o | Fixed cable XXm | | |
| Coolant through the shaft | | | | | | | | | | | | | | | Coolant through the shaft | | |
| Low pressure (du) | | | – | | | – | | | – | | | – | | | Low pressure (du) | | |
| High pressure (dh) | | | x | | | x | | | x | | | x | | | High pressure (dh) | | |
| Sensor technology | | | | | | | | | | | | | | | Sensor technology | | |
| Rotary encoder | | | – | | | – | | | – | | | – | | | Rotary encoder | | |
| Speed sensor | | | + | | | + | | | + | | | + | | | Speed sensor | | |
| Housing | | | | | | | | | | | | | | | Housing | | |
| Cylindrical housing | | | + | | | + | | | + | | | + | | | Cylindrical housing | | |
| Cylindrical housing with flange | | | o | | | o | | | o | | | o | | | Cylindrical housing with flange | | |
| Block housing | | | x | | | x | | | x | | | x | | | Block housing | | |
| Air purge | | | o | | | o | | | o | | | o | | | Air purge | | |

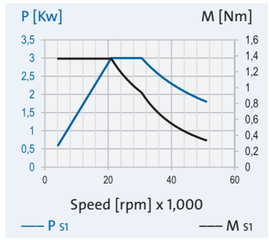
[1] Minimum required output voltage of the frequency converter

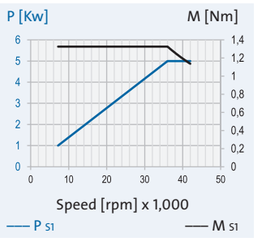
+ Standard

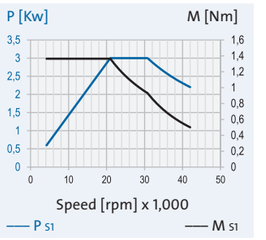
o Option

x on request



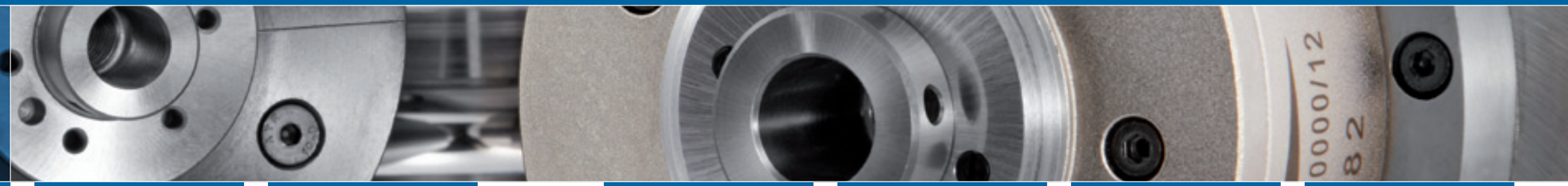



# Series: HSP

Cylindrical housing:
Ø = 120 mm



Tool interface:
HSK-C

Motor:
Asynchronous motor

Bearing arrangement:
GMN high precision ball bearings

Lubrication:
Oil-air lubrication

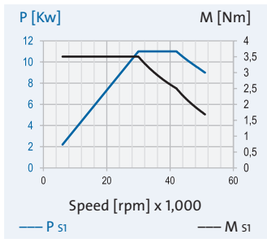
| TECHNICAL DATA | | | HSP 120 - 51000/11 | | | HSP 120 - 51000/6 | | |
|---|---|---|---|---|---|---|---|---|
| Spindle housing Ø A | | [mm] | 120 | | | 120 | | |
| Speed max. | $n_{max}$ | [rpm] | 51,000 | | | 51,000 | | |
| Bearing Ø front | $W_1$ | [mm] | 30 | | | 30 | | |
| Tool interface | | | HSK-C 25 | | | HSK-C 25 | | |
| Flat contact face Ø W | | [mm] | 25 | | | 25 | | |
| Static rigidity | | | | | | | | |
| axial | $C_{ax}$ | [N/µm] | 70 | | | 70 | | |
| radial | $C_{rad}$ | [N/µm] | 102 | | | 102 | | |
| Motor design | | | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V |
| Frequency max. | $f_{max}$ | [Hz] | 1,700 | | | 1,700 | | |
| Nominal converter voltage[1] | | [V] | 200 | 350 | 460 | 200 | 350 | 460 |
| Power | $P_{S1}$ | [kW] | 11 | | | 6 | | |
| Torque | $M_{S1}$ | [Nm] | 3.5 | | | 3.18 | | |
| ... at speed | n | [rpm] | 30,000 | | | 18,000 | | |
| Current | $I_{S1}$ | [A] | 63 | 36 | 27 | 30 | 17 | 13 |
| Power | $P_{S6-60\%}$ | [kW] | 12 | | | 7 | | |
| Torque | $M_{S6-60\%}$ | [Nm] | 3.82 | | | 3.71 | | |
| ... at speed | n | [rpm] | 30,000 | | | 18,000 | | |
| Current | $I_{S6-60\%}$ | [A] | 67 | 38 | 29 | 35 | 20 | 15 |
| Electrical connection | | | | | | | | |
| Plug type | | | MAC | GA | GA | GA | GA | GA |
| Straight plug-in connection | | | + | + | + | + | + | + |
| Angle plug-in connection | | | o | o | o | o | o | o |
| Fixed cable XXm | | | o | o | o | o | o | o |
| Coolant through the shaft | | | | | | | | |
| Low pressure (du) | | | – | | | – | | |
| High pressure (dh) | | | o | | | o | | |
| Sensor technology | | | | | | | | |
| Rotary encoder | | | x | | | x | | |
| Speed sensor | | | + | | | + | | |
| Housing | | | | | | | | |
| Cylindrical housing | | | + | | | + | | |
| Cylindrical housing with flange | | | o | | | o | | |
| Block housing | | | x | | | x | | |
| Air purge | | | o | | | o | | |

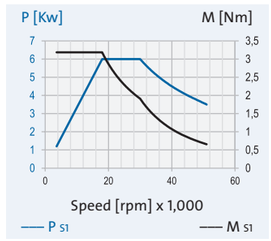
[1] Minimum required output voltage of the frequency converter

\+ Standard

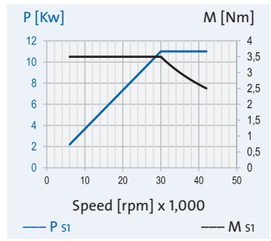
o Option

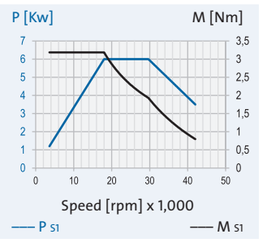
x on request

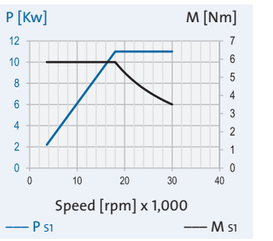


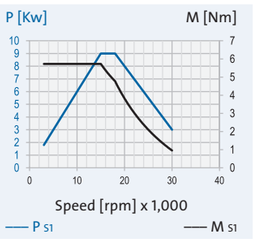




| HSP 120 - 42000/11 | | | HSP 120 - 42000/6 | | | HSP 120 - 30000/11 | | | HSP 120 - 30000/9 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 120 | | | 120 | | | 120 | | | 120 | | |
| 42,000 | | | 42,000 | | | 30,000 | | | 30,000 | | |
| 40 | | | 40 | | | 45 | | | 45 | | |
| HSK-C 32 | | | HSK-C 32 | | | HSK-C 40 | | | HSK-C 40 | | |
| 32 | | | 32 | | | 40 | | | 40 | | |
| | | | | | | | | | | | |
| 90 | | | 90 | | | 98 | | | 98 | | |
| 121 | | | 121 | | | 131 | | | 131 | | |
| 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V |
| 1,400 | | | 1,400 | | | 1,500 | | | 1,500 | | |
| 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 |
| 11 | | | 6 | | | 11 | | | 9 | | |
| 3.5 | | | 3.18 | | | 5.84 | | | 5.73 | | |
| 30,000 | | | 18.000 | | | 18,000 | | | 15,000 | | |
| 63 | 36 | 27 | 30 | 17 | 13 | 72 | 41 | 31 | 58 | 33 | 25 |
| 12 | | | 7 | | | 13 | | | 11 | | |
| 3.82 | | | 3.71 | | | 6.9 | | | 7 | | |
| 30,000 | | | 18,000 | | | 18,000 | | | 15,000 | | |
| 67 | 38 | 29 | 35 | 20 | 15 | 84 | 48 | 37 | 68 | 39 | 30 |
| | | | | | | | | | | | |
| MAC | GA | GA | GA | GA | GA | MAC | GA | GA | MAC | GA | GA |
| + | + | + | + | + | + | + | + | + | + | + | + |
| o | o | o | o | o | o | o | o | o | o | o | o |
| o | o | o | o | o | o | o | o | o | o | o | o |
| | | | | | | | | | | | |
| – | | | – | | | – | | | – | | |
| o | | | o | | | o | | | o | | |
| | | | | | | | | | | | |
| x | | | x | | | x | | | x | | |
| + | | | + | | | + | | | + | | |
| | | | | | | | | | | | |
| + | | | + | | | + | | | + | | |
| o | | | o | | | o | | | o | | |
| x | | | x | | | x | | | x | | |
| o | | | o | | | o | | | o | | |



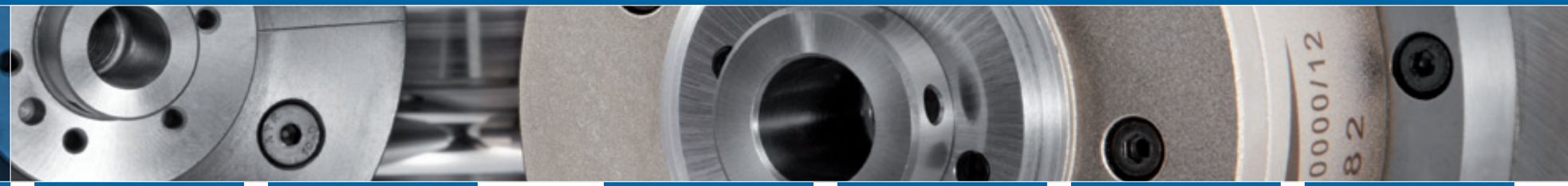



# Series: HSP

Cylindrical housing:
Ø = 150 mm



Tool interface:
HSK-C

Motor:
Asynchronous motor

Bearing arrangement:
GMN high precision ball bearings

Lubrication:
Oil-air lubrication

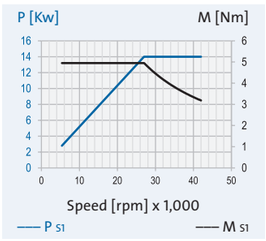
| TECHNICAL DATA | | | HSP 150 - 42000/14 | | | HSP 150 - 42000/9.5 | | | HSP 150 - 30000/18 | | | HSP 150 - 30000/14 | | | HSP 150 - 24000/18 | | | HSP 150 - 24000/14 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Spindle housing Ø A | | [mm] | 150 | | | 150 | | | 150 | | | 150 | | | 150 | | | 150 | | |
| Speed max. | $n_{max}$ | [rpm] | 42,000 | | | 42,000 | | | 30,000 | | | 30,000 | | | 24,000 | | | 24,000 | | |
| Bearing Ø front | $W_1$ | [mm] | 40 | | | 40 | | | 55 | | | 55 | | | 65 | | | 65 | | |
| Tool interface | | | HSK-C 32 | | | HSK-C 32 | | | HSK-C 50 | | | HSK-C 50 | | | HSK-C 63 | | | HSK-C 63 | | |
| Flat contact face Ø W | | [mm] | 32 | | | 32 | | | 50 | | | 50 | | | 63 | | | 63 | | |
| **Static rigidity** | | | | | | | | | | | | | | | | | | | | |
| axial | $C_{ax}$ | [N/µm] | 90 | | | 90 | | | 111 | | | 111 | | | 130 | | | 130 | | |
| radial | $C_{rad}$ | [N/µm] | 147 | | | 147 | | | 177 | | | 177 | | | 196 | | | 196 | | |
| **Motor design** | | | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V |
| Frequency max. | $f_{max}$ | [Hz] | 1,400 | | | 1,400 | | | 1,000 | | | 1,000 | | | 800 | | | 800 | | |
| Nominal converter voltage[1] | | [V] | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 |
| Power | $P_{S1}$ | [kW] | 14 | | | 9.5 | | | 18 | | | 14 | | | 18 | | | 14 | | |
| Torque | $M_{S1}$ | [Nm] | 4.95 | | | 5.04 | | | 9.55 | | | 9.9 | | | 9.55 | | | 12.2 | | |
| ... at speed | n | [rpm] | 27,000 | | | 18,000 | | | 18,000 | | | 13,500 | | | 18,000 | | | 11,000 | | |
| Current | $I_{S1}$ | [A] | 86 | 49 | 37 | 47 | 27 | 21 | 86 | 49 | 37 | 63 | 36 | 27 | 86 | 49 | 37 | 65 | 37 | 28 |
| Power | $P_{S6-60\%}$ | [kW] | 16 | | | 11 | | | 23 | | | 16 | | | 23 | | | 17 | | |
| Torque | $M_{S6-60\%}$ | [Nm] | 5.66 | | | 5.84 | | | 12.2 | | | 11.3 | | | 12.2 | | | 14.8 | | |
| ... at speed | n | [rpm] | 27.000 | | | 18,000 | | | 18,000 | | | 13,500 | | | 18,000 | | | 11,000 | | |
| Current | $I_{S6-60\%}$ | [A] | 102 | 58 | 44 | 54 | 31 | 24 | 110 | 63 | 48 | 70 | 40 | 30 | 110 | 63 | 48 | 79 | 45 | 34 |
| **Electrical connection** | | | | | | | | | | | | | | | | | | | | |
| Plug type | | | MAC | MAC | GA | MAC | GA | GA | MAC | MAC | GA | MAC | GA | GA | MAC | MAC | GA | MAC | GA | GA |
| Straight plug-in connection | | | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Angle plug-in connection | | | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o |
| Fixed cable XXm | | | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o |
| **Coolant through the shaft** | | | | | | | | | | | | | | | | | | | | |
| Low pressure (du) | | | – | | | – | | | – | | | – | | | – | | | – | | |
| High pressure (dh) | | | o | | | o | | | o | | | o | | | o | | | o | | |
| **Sensor technology** | | | | | | | | | | | | | | | | | | | | |
| Rotary encoder | | | x | | | x | | | x | | | x | | | x | | | x | | |
| Speed sensor | | | + | | | + | | | + | | | + | | | + | | | + | | |
| **Housing** | | | | | | | | | | | | | | | | | | | | |
| Cylindrical housing | | | + | | | + | | | + | | | + | | | + | | | + | | |
| Cylindrical housing with flange | | | o | | | o | | | o | | | o | | | o | | | o | | |
| Block housing | | | x | | | x | | | x | | | x | | | x | | | x | | |
| Air purge | | | o | | | o | | | o | | | o | | | o | | | o | | |

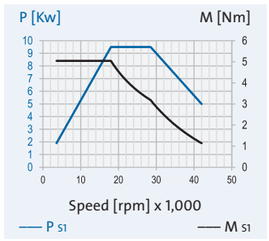
[1] Minimum required output voltage of the frequency converter

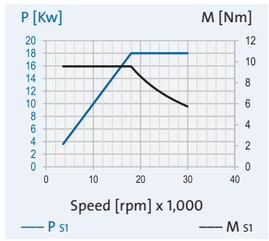
\+ Standard

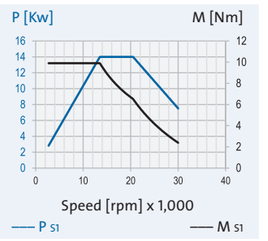
o Option

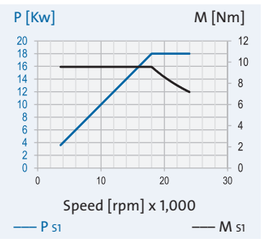
x on request

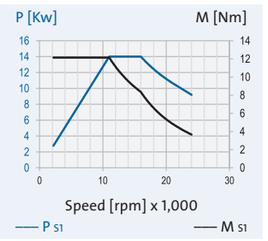


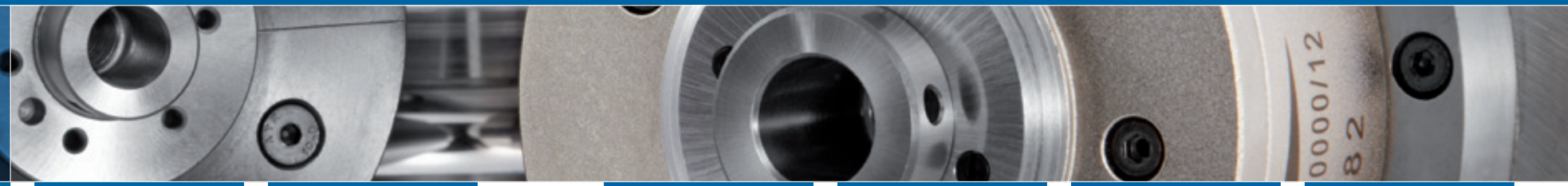



# Series: HSP

Cylindrical housing:
Ø = 170 mm



Tool interface:
HSK-C

Motor:
Asynchronous motor

Bearing arrangement:
GMN high precision ball bearings

Lubrication:
Oil-air lubrication

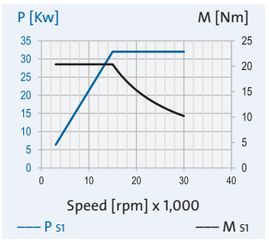
| TECHNICAL DATA | | | HSP 170 - 30000/32 | | | HSP 170 - 30000/19 | | | HSP 170 - 24000/32 | | | HSP 170 - 24000/19 | | | HSP 170 - 18000/29 | | | HSP 170 - 18000/20 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Spindle housing Ø A | | [mm] | 170 | | | 170 | | | 170 | | | 170 | | | 170 | | | 170 | | |
| Speed max. | $n_{max}$ | [rpm] | 30,000 | | | 30,000 | | | 24,000 | | | 24,000 | | | 18,000 | | | 18,000 | | |
| Bearing Ø front | $W_1$ | [mm] | 55 | | | 55 | | | 65 | | | 65 | | | 70 | | | 70 | | |
| Tool interface | | | HSK-C 50 | | | HSK-C 50 | | | HSK-C 63 | | | HSK-C 63 | | | HSK-C 63 | | | HSK-C 63 | | |
| Flat contact face Ø W | | [mm] | 50 | | | 50 | | | 63 | | | 63 | | | 63 | | | 63 | | |
| **Static rigidity** | | | | | | | | | | | | | | | | | | | | |
| axial | $C_{ax}$ | [N/µm] | 111 | | | 111 | | | 130 | | | 130 | | | 201 | | | 201 | | |
| radial | $C_{rad}$ | [N/µm] | 203 | | | 203 | | | 231 | | | 231 | | | 325 | | | 325 | | |
| **Motor design** | | | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V |
| Frequency max. | $f_{max}$ | [Hz] | 1,000 | | | 1,000 | | | 800 | | | 800 | | | 600 | | | 600 | | |
| Nominal converter voltage[1] | | [V] | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 |
| Power | $P_{S1}$ | [kW] | 32 | | | 19 | | | 32 | | | 19 | | | 29 | | | 20 | | |
| Torque | $M_{S1}$ | [Nm] | 20.4 | | | 20.2 | | | 20.4 | | | 20.2 | | | 25.2 | | | 25.5 | | |
| ... at speed | n | [rpm] | 15,000 | | | 9,000 | | | 15,000 | | | 9,000 | | | 11,000 | | | 7,500 | | |
| Current | $I_{S1}$ | [A] | 140 | 80 | 61 | 82 | 47 | 36 | 140 | 80 | 61 | 82 | 47 | 36 | 117 | 67 | 51 | 89 | 51 | 39 |
| Power | $P_{S6-60\%}$ | [kW] | 35 | | | 21 | | | 35 | | | 21 | | | 34 | | | 23 | | |
| Torque | $M_{S6-60\%}$ | [Nm] | 22.3 | | | 22.3 | | | 22.3 | | | 22.3 | | | 29.5 | | | 29.3 | | |
| ... at speed | n | [rpm] | 15,000 | | | 9,000 | | | 15,000 | | | 9,000 | | | 11,000 | | | 7,500 | | |
| Current | $I_{S6-60\%}$ | [A] | 151 | 86 | 65 | 93 | 53 | 40 | 151 | 86 | 65 | 93 | 53 | 40 | 137 | 78 | 59 | 102 | 58 | 44 |
| **Electrical connection** | | | | | | | | | | | | | | | | | | | | |
| Plug type | | | D500 | MAC | MAC | MAC | MAC | GA | D500 | MAC | MAC | MAC | MAC | GA | D500 | MAC | MAC | D500 | MAC | GA |
| Straight plug-in connection | | | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Angle plug-in connection | | | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o |
| Fixed cable XXm | | | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o | o |
| **Coolant through the shaft** | | | | | | | | | | | | | | | | | | | | |
| Low pressure (du) | | | | – | | | – | | | – | | | – | | | – | | | – | |
| High pressure (dh) | | | | o | | | o | | | o | | | o | | | o | | | o | |
| **Sensor technology** | | | | | | | | | | | | | | | | | | | | |
| Rotary encoder | | | | x | | | x | | | x | | | x | | | x | | | x | |
| Speed sensor | | | | + | | | + | | | + | | | + | | | + | | | + | |
| **Housing** | | | | | | | | | | | | | | | | | | | | |
| Cylindrical housing | | | | + | | | + | | | + | | | + | | | + | | | + | |
| Cylindrical housing with flange | | | | o | | | o | | | o | | | o | | | o | | | o | |
| Block housing | | | | x | | | x | | | x | | | x | | | x | | | x | |
| Air purge | | | | o | | | o | | | o | | | o | | | o | | | o | |

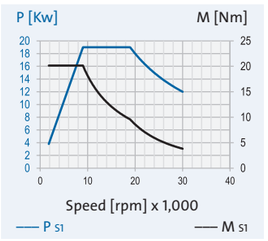
[1] Minimum required output voltage of the frequency converter

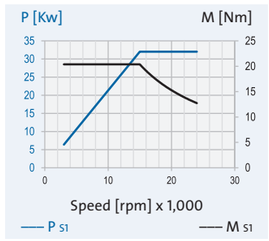
\+ Standard

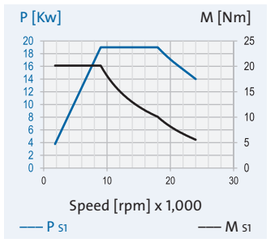
o Option

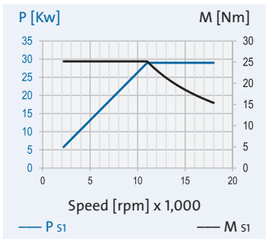
x on request

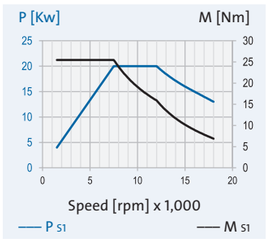


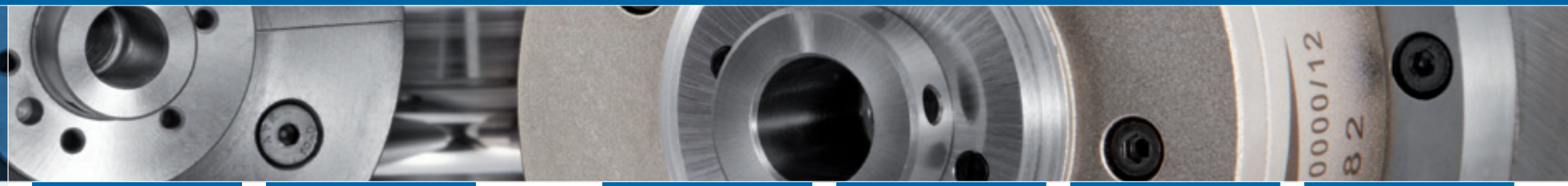



# Series: HSP

Cylindrical housing:
Ø = 230 mm



Tool interface:
HSK-C

Motor:
Asynchronous motor

Bearing arrangement:
GMN high precision ball bearings

Lubrication:
Oil-air lubrication

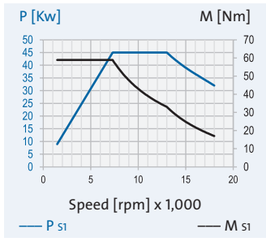
| TECHNICAL DATA | | | HSP 230 - 18000/45 | | | HSP 230 - 18000/18 | | | HSP 230 - 15000/42 | | | HSP 230 - 15000/25 | | | TECHNICAL DATA | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Spindle housing Ø A | | [mm] | 230 | | | 230 | | | 230 | | | 230 | | | Spindle housing Ø A | | [mm] |
| Speed max. | $n_{max}$ | [rpm] | 18,000 | | | 18,000 | | | 15,000 | | | 15,000 | | | Speed max. | $n_{max}$ | [rpm] |
| Bearing Ø front | $W_1$ | [mm] | 70 | | | 70 | | | 90 | | | 90 | | | Bearing Ø front | $W_1$ | [mm] |
| Tool interface | | | HSK-C 63 | | | HSK-C 63 | | | HSK-C 80 | | | HSK-C 80 | | | Tool interface | | |
| Flat contact face Ø W | | [mm] | 63 | | | 63 | | | 80 | | | 80 | | | Flat contact face Ø W | | [mm] |
| Static rigidity | | | | | | | | | | | | | | | Static rigidity | | |
| axial | $C_{ax}$ | [N/µm] | 196 | | | 196 | | | 461 | | | 461 | | | axial | $C_{ax}$ | [N/µm] |
| radial | $C_{rad}$ | [N/µm] | 375 | | | 375 | | | 483 | | | 483 | | | radial | $C_{rad}$ | [N/µm] |
| Motor design | | | 200 V | 350 V | – | 200 V | 350 V | – | 200 V | 350 V | – | 200 V | 350 V | – | Motor design | | |
| Frequency max. | $f_{max}$ | [Hz] | 600 | | | 600 | | | 500 | | | 500 | | | Frequency max. | $f_{max}$ | [Hz] |
| Nominal converter voltage[1] | | [V] | 200 | 350 | – | 200 | 350 | – | 200 | 350 | – | 200 | 350 | – | Nominal converter voltage[1] | | [V] |
| Power | $P_{S1}$ | [kW] | 45 | | | 18 | | | 42 | | | 25 | | | Power | $P_{S1}$ | [kW] |
| Torque | $M_{S1}$ | [Nm] | 58.9 | | | 59.3 | | | 85.3 | | | 85.3 | | | Torque | $M_{S1}$ | [Nm] |
| ... at speed | n | [rpm] | 7,300 | | | 2,900 | | | 4,700 | | | 2,800 | | | ... at speed | n | [rpm] |
| Current | $I_{S1}$ | [A] | 172 | 98 | – | 100 | 57 | – | 168 | 96 | – | 121 | 69 | – | Current | $I_{S1}$ | [A] |
| Power | $P_{S6-60\%}$ | [kW] | 50 | | | 20 | | | 47 | | | 28 | | | Power | $P_{S6-60\%}$ | [kW] |
| Torque | $M_{S6-60\%}$ | [Nm] | 65.4 | | | 65.9 | | | 95.5 | | | 95.5 | | | Torque | $M_{S6-60\%}$ | [Nm] |
| ... at speed | n | [rpm] | 7,300 | | | 2,900 | | | 4,700 | | | 2,800 | | | ... at speed | n | [rpm] |
| Current | $I_{S6-60\%}$ | [A] | 189 | 108 | – | 112 | 64 | – | 187 | 107 | – | 135 | 77 | – | Current | $I_{S6-60\%}$ | [A] |
| Electrical connection | | | | | | | | | | | | | | | Electrical connection | | |
| Plug type | | | – | D500 | – | D500 | MAC | – | – | D500 | – | D500 | MAC | – | Plug type | | |
| Straight plug-in connection | | | – | + | – | + | + | – | – | + | – | + | + | – | Straight plug-in connection | | |
| Angle plug-in connection | | | – | o | – | o | o | – | – | o | – | o | o | – | Angle plug-in connection | | |
| Fixed cable XXm | | | + | o | – | o | o | – | + | o | – | o | o | – | Fixed cable XXm | | |
| Coolant through the shaft | | | | | | | | | | | | | | | Coolant through the shaft | | |
| Low pressure (du) | | | | – | | | – | | | – | | | – | | Low pressure (du) | | |
| High pressure (dh) | | | | o | | | o | | | o | | | o | | High pressure (dh) | | |
| Sensor technology | | | | | | | | | | | | | | | Sensor technology | | |
| Rotary encoder | | | | x | | | x | | | x | | | x | | Rotary encoder | | |
| Speed sensor | | | | + | | | + | | | + | | | + | | Speed sensor | | |
| Housing | | | | | | | | | | | | | | | Housing | | |
| Cylindrical housing | | | | + | | | + | | | + | | | + | | Cylindrical housing | | |
| Cylindrical housing with flange | | | | o | | | o | | | o | | | o | | Cylindrical housing with flange | | |
| Block housing | | | | x | | | x | | | x | | | x | | Block housing | | |
| Air purge | | | | o | | | o | | | o | | | o | | Air purge | | |

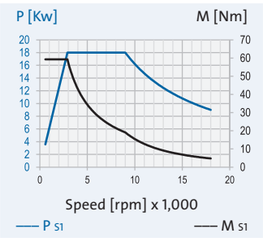
[1] Minimum required output voltage of the frequency converter

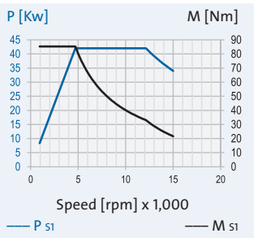
+ Standard

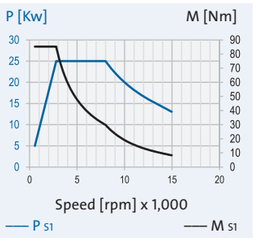
o Option

x on request




[1] Minimum required output voltage of the frequency converter

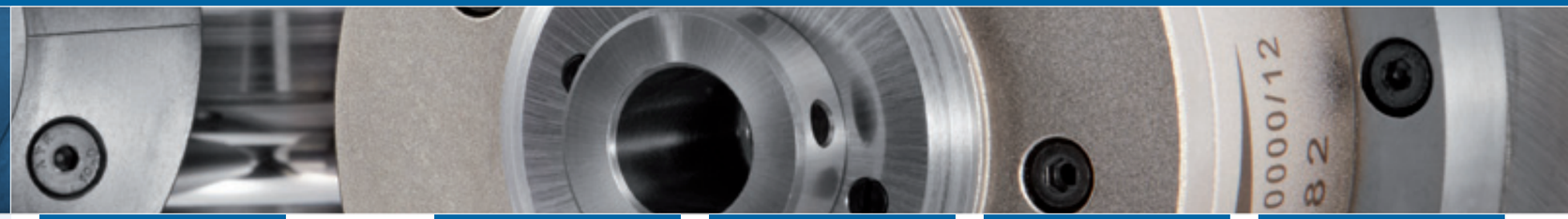
+ Standard

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

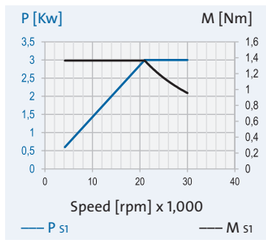
| TECHNICAL DATA | | | HSP 100g - 30000/3 | | | HSP 100g - 27000/3 | | | HSP 100g - 21000/3 | | | TECHNICAL DATA | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Spindle housing Ø A | | [mm] | 100 | | | 100 | | | 100 | | | Spindle housing Ø A | | [mm] |
| Speed max. | $n_{max}$ | [rpm] | 30,000 | | | 27,000 | | | 21,000 | | | Speed max. | $n_{max}$ | [rpm] |
| Bearing Ø front | $W_1$ | [mm] | 30 | | | 35 | | | 45 | | | Bearing Ø front | $W_1$ | [mm] |
| Tool interface | | | HSK-C 25 | | | HSK-C 32 | | | HSK-C 40 | | | Tool interface | | |
| Flat contact face Ø W | | [mm] | 25 | | | 32 | | | 40 | | | Flat contact face Ø W | | [mm] |
| Static rigidity | | | | | | | | | | | | Static rigidity | | |
| axial | $C_{ax}$ | [N/µm] | 63 | | | 69 | | | 91 | | | axial | $C_{ax}$ | [N/µm] |
| radial | $C_{rad}$ | [N/µm] | 77 | | | 81 | | | 80 | | | radial | $C_{rad}$ | [N/µm] |
| Motor design | | | 200 V | 350 V | – | 200 V | 350 V | – | 200 V | 350 V | – | Motor design | | |
| Frequency max. | $f_{max}$ | [Hz] | 1,000 | | | 900 | | | 700 | | | Frequency max. | $f_{max}$ | [Hz] |
| Nominal converter voltage[1] | | [V] | 200 | 350 | – | 200 | 350 | – | 200 | 350 | – | Nominal converter voltage[1] | | [V] |
| Power | $P_{S1}$ | [kW] | 3 | | | 3 | | | 3 | | | Power | $P_{S1}$ | [kW] |
| Torque | $M_{S1}$ | [Nm] | 1.36 | | | 1.36 | | | 2.39 | | | Torque | $M_{S1}$ | [Nm] |
| ... at speed | n | [rpm] | 21,000 | | | 21,000 | | | 12,000 | | | ... at speed | n | [rpm] |
| Current | $I_{S1}$ | [A] | 18 | 10 | – | 18 | 10 | – | 18 | 10 | – | Current | $I_{S1}$ | [A] |
| Power | $P_{S6-60\%}$ | [kW] | 4 | | | 4 | | | 4.5 | | | Power | $P_{S6-60\%}$ | [kW] |
| Torque | $M_{S6-60\%}$ | [Nm] | 1.59 | | | 1.59 | | | 2.86 | | | Torque | $M_{S6-60\%}$ | [Nm] |
| ... at speed | n | [rpm] | 24,000 | | | 24,000 | | | 15,000 | | | ... at speed | n | [rpm] |
| Current | $I_{S6-60\%}$ | [A] | 21 | 12 | – | 21 | 12 | – | 21 | 12 | – | Current | $I_{S6-60\%}$ | [A] |
| Electrical connection | | | | | | | | | | | | Electrical connection | | |
| Plug type | | | GA | GA | – | GA | GA | – | GA | GA | – | Plug type | | |
| Straight plug-in connection | | | + | + | – | + | + | – | + | + | – | Straight plug-in connection | | |
| Angle plug-in connection | | | o | o | – | o | o | – | o | o | – | Angle plug-in connection | | |
| Fixed cable XXm | | | o | o | – | o | o | – | o | o | – | Fixed cable XXm | | |
| Coolant through the shaft | | | | | | | | | | | | Coolant through the shaft | | |
| Low pressure (du) | | | – | | | – | | | – | | | Low pressure (du) | | |
| High pressure (dh) | | | x | | | x | | | x | | | High pressure (dh) | | |
| Sensor technology | | | | | | | | | | | | Sensor technology | | |
| Rotary encoder | | | – | | | – | | | – | | | Rotary encoder | | |
| Speed sensor | | | + | | | + | | | + | | | Speed sensor | | |
| Housing | | | | | | | | | | | | Housing | | |
| Cylindrical housing | | | + | | | + | | | + | | | Cylindrical housing | | |
| Cylindrical housing with flange | | | o | | | o | | | o | | | Cylindrical housing with flange | | |
| Block housing | | | x | | | x | | | x | | | Block housing | | |
| Air purge | | | + | | | + | | | + | | | Air purge | | |

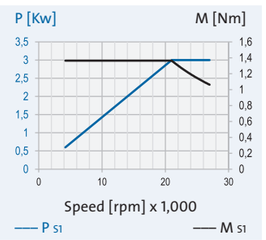
[1] Minimum required output voltage of the frequency converter

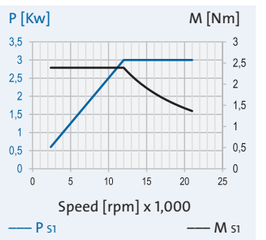
+ Standard

o Option

x on request




[1] Minimum required output voltage of the frequency converter

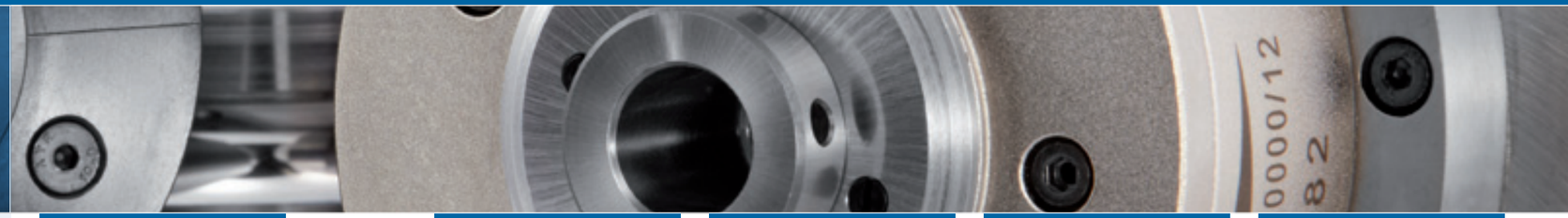
+ Standard

o Option

x on request

# Series: HSP.. g

Cylindrical housing:
Ø = 120 mm



Tool interface:
HSK-C

Motor:
Asynchronous motor

Bearing arrangement:
GMN high precision ball bearings

Lubrication:
Permanent grease lubrication

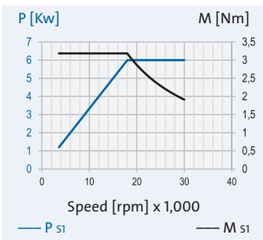
| TECHNICAL DATA | | | HSP 120g - 30000/6 | | | HSP 120g - 24000/6 | | | HSP 120g - 21000/9 | | | TECHNICAL DATA | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Spindle housing Ø A | | [mm] | 120 | | | 120 | | | 120 | | | Spindle housing Ø A | | [mm] |
| Speed max. | $n_{max}$ | [rpm] | 30,000 | | | 24,000 | | | 21,000 | | | Speed max. | $n_{max}$ | [rpm] |
| Bearing Ø front | $W_1$ | [mm] | 30 | | | 40 | | | 45 | | | Bearing Ø front | $W_1$ | [mm] |
| Tool interface | | | HSK-C 25 | | | HSK-C 32 | | | HSK-C 40 | | | Tool interface | | |
| Flat contact face Ø W | | [mm] | 25 | | | 32 | | | 40 | | | Flat contact face Ø W | | [mm] |
| Static rigidity | | | | | | | | | | | | Static rigidity | | |
| axial | $C_{ax}$ | [N/µm] | 70 | | | 90 | | | 98 | | | axial | $C_{ax}$ | [N/µm] |
| radial | $C_{rad}$ | [N/µm] | 102 | | | 121 | | | 131 | | | radial | $C_{rad}$ | [N/µm] |
| Motor design | | | – | 350 V | 460 V | – | 350 V | 460 V | 200 V | 350 V | 460 V | Motor design | | |
| Frequency max. | $f_{max}$ | [Hz] | 1,000 | | | 800 | | | 1,050 | | | Frequency max. | $f_{max}$ | [Hz] |
| Nominal converter voltage[1] | | [V] | – | 350 | 460 | – | 350 | 460 | 200 | 350 | 460 | Nominal converter voltage[1] | | [V] |
| Power | $P_{S1}$ | [kW] | 6 | | | 6 | | | 9 | | | Power | $P_{S1}$ | [kW] |
| Torque | $M_{S1}$ | [Nm] | 3.18 | | | 3.18 | | | 5.73 | | | Torque | $M_{S1}$ | [Nm] |
| ... at speed | n | [rpm] | 18,000 | | | 18,000 | | | 15,000 | | | ... at speed | n | [rpm] |
| Current | $I_{S1}$ | [A] | – | 17 | 13 | – | 17 | 13 | 70 | 40 | 30 | Current | $I_{S1}$ | [A] |
| Power | $P_{S6-60\%}$ | [kW] | 7 | | | 7 | | | 13 | | | Power | $P_{S6-60\%}$ | [kW] |
| Torque | $M_{S6-60\%}$ | [Nm] | 3.71 | | | 3.71 | | | 6.9 | | | Torque | $M_{S6-60\%}$ | [Nm] |
| ... at speed | n | [rpm] | 18,000 | | | 18,000 | | | 18,000 | | | ... at speed | n | [rpm] |
| Current | $I_{S6-60\%}$ | [A] | – | 20 | 15 | – | 20 | 15 | 84 | 48 | 37 | Current | $I_{S6-60\%}$ | [A] |
| Electrical connection | | | | | | | | | | | | Electrical connection | | |
| Plug type | | | – | GA | GA | – | GA | GA | MAC | GA | GA | Plug type | | |
| Straight plug-in connection | | | – | + | + | – | + | + | + | + | + | Straight plug-in connection | | |
| Angle plug-in connection | | | – | o | o | – | o | o | o | o | o | Angle plug-in connection | | |
| Fixed cable XXm | | | – | o | o | – | o | o | o | o | o | Fixed cable XXm | | |
| Coolant through the shaft | | | | | | | | | | | | Coolant through the shaft | | |
| Low pressure (du) | | | | – | | | – | | | – | | Low pressure (du) | | |
| High pressure (dh) | | | | x | | | x | | | x | | High pressure (dh) | | |
| Sensor technology | | | | | | | | | | | | Sensor technology | | |
| Rotary encoder | | | | – | | | – | | | – | | Rotary encoder | | |
| Speed sensor | | | | + | | | + | | | + | | Speed sensor | | |
| Housing | | | | | | | | | | | | Housing | | |
| Cylindrical housing | | | | + | | | + | | | + | | Cylindrical housing | | |
| Cylindrical housing with flange | | | | o | | | o | | | o | | Cylindrical housing with flange | | |
| Block housing | | | | x | | | x | | | x | | Block housing | | |
| Air purge | | | | + | | | + | | | + | | Air purge | | |

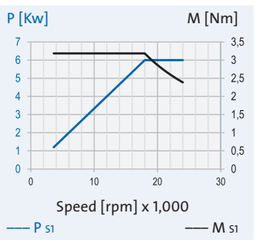
[1] Minimum required output voltage of the frequency converter

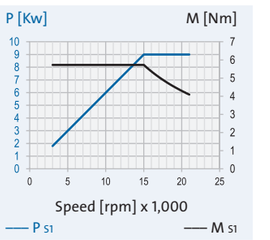
+ Standard

o Option

x on request




[1] Minimum required output voltage of the frequency converter

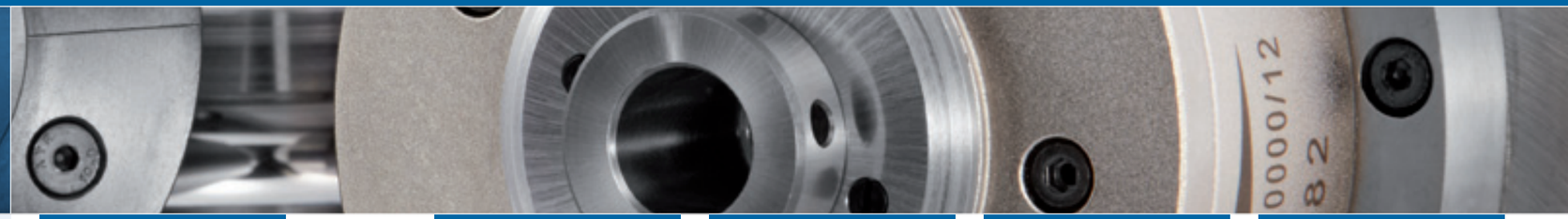
+ Standard

o Option

x on request

# Series: HSP.. g

Cylindrical housing:
Ø = 150 mm



Tool interface:
HSK-C

Motor:
Asynchronous motor

Bearing arrangement:
GMN high precision ball bearings

Lubrication:
Permanent grease lubrication

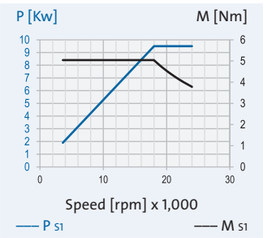
| TECHNICAL DATA | | | HSP 150g - 24000/9.5 | | | HSP 150g - 18000/14 | | | HSP 150g - 15000/14 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Spindle housing Ø A | | [mm] | 150 | | | 150 | | | 150 | | |
| Speed max. | $n_{max}$ | [rpm] | 24,000 | | | 18,000 | | | 15,000 | | |
| Bearing Ø front | $W_1$ | [mm] | 40 | | | 55 | | | 65 | | |
| Tool interface | | | HSK-C 32 | | | HSK-C 50 | | | HSK-C 63 | | |
| Flat contact face Ø W | | [mm] | 32 | | | 50 | | | 63 | | |
| Static rigidity | | | | | | | | | | | |
| axial | $C_{ax}$ | [N/µm] | 90 | | | 111 | | | 130 | | |
| radial | $C_{rad}$ | [N/µm] | 147 | | | 177 | | | 196 | | |
| Motor design | | | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V |
| Frequency max. | $f_{max}$ | [Hz] | 800 | | | 600 | | | 500 | | |
| Nominal converter voltage[1] | | [V] | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 |
| Power | $P_{S1}$ | [kW] | 9.5 | | | 14 | | | 14 | | |
| Torque | $M_{S1}$ | [Nm] | 5.04 | | | 9.9 | | | 12.2 | | |
| ... at speed | n | [rpm] | 18,000 | | | 13,500 | | | 11,000 | | |
| Current | $I_{S1}$ | [A] | 47 | 27 | 21 | 63 | 36 | 27 | 65 | 37 | 28 |
| Power | $P_{S6-60\%}$ | [kW] | 11 | | | 16 | | | 17 | | |
| Torque | $M_{S6-60\%}$ | [Nm] | 5.84 | | | 11.3 | | | 14.8 | | |
| ... at speed | n | [rpm] | 18,000 | | | 13,500 | | | 11,000 | | |
| Current | $I_{S6-60\%}$ | [A] | 54 | 31 | 24 | 70 | 40 | 30 | 79 | 45 | 34 |
| Electrical connection | | | | | | | | | | | |
| Plug type | | | MAC | GA | GA | MAC | GA | GA | MAC | GA | GA |
| Straight plug-in connection | | | + | + | + | + | + | + | + | + | + |
| Angle plug-in connection | | | o | o | o | o | o | o | o | o | o |
| Fixed cable XXm | | | o | o | o | o | o | o | o | o | o |
| Coolant through the shaft | | | | | | | | | | | |
| Low pressure (du) | | | – | | | – | | | – | | |
| High pressure (dh) | | | x | | | x | | | x | | |
| Sensor technology | | | | | | | | | | | |
| Rotary encoder | | | x | | | x | | | x | | |
| Speed sensor | | | + | | | + | | | + | | |
| Housing | | | | | | | | | | | |
| Cylindrical housing | | | + | | | + | | | + | | |
| Cylindrical housing with flange | | | o | | | o | | | o | | |
| Block housing | | | x | | | x | | | x | | |
| Air purge | | | + | | | + | | | + | | |

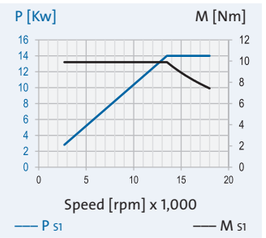
[1] Minimum required output voltage of the frequency converter

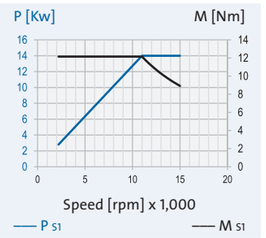
+ Standard

o Option

x on request




| 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[1] | | [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

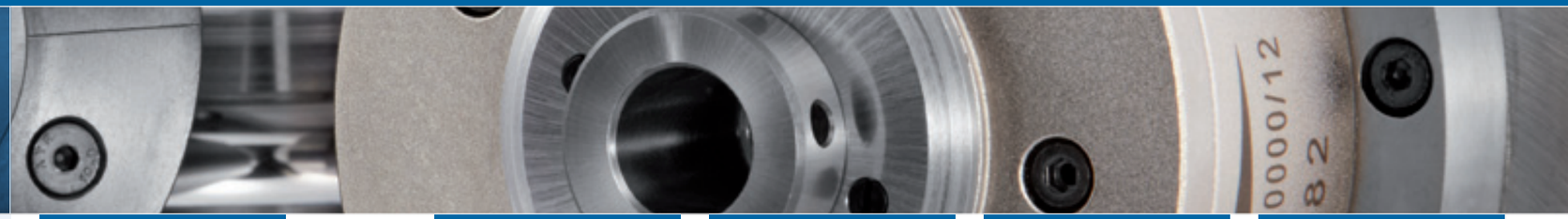
+ Standard

o Option

x on request

# Series: 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

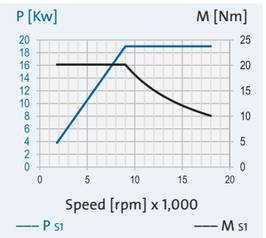
| TECHNICAL DATA | | | HSP 170g - 18000/19 | | | HSP 170g - 15000/19 | | | HSP 170g - 12000/20 | | | TECHNICAL DATA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Spindle housing Ø A | | [mm] | 170 | | | 170 | | | 170 | | | Spindle housing Ø A [mm] |
| Speed max. | $n_{max}$ | [rpm] | 18,000 | | | 15,000 | | | 12,000 | | | Speed max. $n_{max}$ [rpm] |
| Bearing Ø front | $W_1$ | [mm] | 55 | | | 65 | | | 70 | | | Bearing Ø front $W_1$ [mm] |
| Tool interface | | | HSK-C 50 | | | HSK-C 63 | | | HSK-C 63 | | | Tool interface |
| Flat contact face Ø W | | [mm] | 50 | | | 63 | | | 63 | | | Flat contact face Ø W [mm] |
| Static rigidity | | | | | | | | | | | | Static rigidity |
| axial | $C_{ax}$ | [N/µm] | 111 | | | 130 | | | 201 | | | axial $C_{ax}$ [N/µm] |
| radial | $C_{rad}$ | [N/µm] | 203 | | | 231 | | | 325 | | | radial $C_{rad}$ [N/µm] |
| Motor design | | | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | Motor design |
| Frequency max. | $f_{max}$ | [Hz] | 600 | | | 500 | | | 400 | | | Frequency max. $f_{max}$ [Hz] |
| Nominal converter voltage[1] | | [V] | 200 | 350 | 460 | 200 | 350 | 460 | 200 | 350 | 460 | Nominal converter voltage[1] [V] |
| Power | $P_{S1}$ | [kW] | 19 | | | 19 | | | 20 | | | Power $P_{S1}$ [kW] |
| Torque | $M_{S1}$ | [Nm] | 20.2 | | | 20.2 | | | 25.5 | | | Torque $M_{S1}$ [Nm] |
| ... at speed | n | [rpm] | 9,000 | | | 9,000 | | | 7,500 | | | ... at speed n [rpm] |
| Current | $I_{S1}$ | [A] | 82 | 47 | 36 | 82 | 47 | 36 | 89 | 51 | 39 | Current $I_{S1}$ [A] |
| Power | $P_{S6-60\%}$ | [kW] | 22 | | | 22 | | | 23 | | | Power $P_{S6-60\%}$ [kW] |
| Torque | $M_{S6-60\%}$ | [Nm] | 21 | | | 21 | | | 29.3 | | | Torque $M_{S6-60\%}$ [Nm] |
| ... at speed | n | [rpm] | 10,000 | | | 10,000 | | | 7,500 | | | ... at speed n [rpm] |
| Current | $I_{S6-60\%}$ | [A] | 93 | 53 | 40 | 93 | 53 | 40 | 102 | 58 | 44 | Current $I_{S6-60\%}$ [A] |
| Electrical connection | | | | | | | | | | | | Electrical connection |
| Plug type | | | MAC | MAC | GA | MAC | MAC | GA | D500 | MAC | GA | Plug type |
| Straight plug-in connection | | | + | + | + | + | + | + | + | + | + | Straight plug-in connection |
| Angle plug-in connection | | | o | o | o | o | o | o | o | o | o | Angle plug-in connection |
| Fixed cable XXm | | | o | o | o | o | o | o | o | o | o | Fixed cable XXm |
| Coolant through the shaft | | | | | | | | | | | | Coolant through the shaft |
| Low pressure (du) | | | – | | | – | | | – | | | Low pressure (du) |
| High pressure (dh) | | | x | | | x | | | x | | | High pressure (dh) |
| Sensor technology | | | | | | | | | | | | Sensor technology |
| Rotary encoder | | | x | | | x | | | x | | | Rotary encoder |
| Speed sensor | | | + | | | + | | | + | | | Speed sensor |
| Housing | | | | | | | | | | | | Housing |
| Cylindrical housing | | | + | | | + | | | + | | | Cylindrical housing |
| Cylindrical housing with flange | | | o | | | o | | | o | | | Cylindrical housing with flange |
| Block housing | | | x | | | x | | | x | | | Block housing |
| Air purge | | | + | | | + | | | + | | | Air purge |

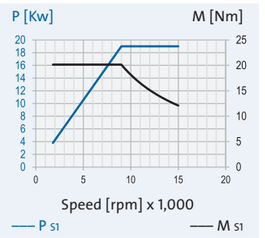
[1] Minimum required output voltage of the frequency converter

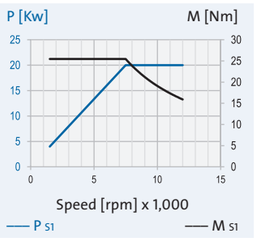
+ Standard

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 = 230 mm


Tool interface:
HSK-C

Motor:
Asynchronous motor

Bearing arrangement:
GMN high precision ball bearings

Lubrication:
Permanent grease lubrication

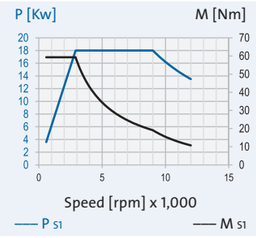
| TECHNICAL DATA | | | HSP 230g - 12000/18 | | | HSP 230g - 10000/25 | | | TECHNICAL DATA | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Spindle housing Ø A | | [mm] | 230 | | | 230 | | | Spindle housing Ø A | | [mm] |
| Speed max. | $n_{max}$ | [rpm] | 12,000 | | | 10,000 | | | Speed max. | $n_{max}$ | [rpm] |
| Bearing Ø front | $W_1$ | [mm] | 70 | | | 90 | | | Bearing Ø front | $W_1$ | [mm] |
| Tool interface | | | HSK-C 63 | | | HSK-C 80 | | | Tool interface | | |
| Flat contact face Ø W | | [mm] | 63 | | | 80 | | | Flat contact face Ø W | | [mm] |
| Static rigidity | | | | | | | | | Static rigidity | | |
| axial | $C_{ax}$ | [N/µm] | 196 | | | 461 | | | axial | $C_{ax}$ | [N/µm] |
| radial | $C_{rad}$ | [N/µm] | 375 | | | 483 | | | radial | $C_{rad}$ | [N/µm] |
| Motor design | | | 200 V | 350 V | 460 V | 200 V | 350 V | 460 V | Motor design | | |
| Frequency max. | $f_{max}$ | [Hz] | 400 | | | 333 | | | Frequency max. | $f_{max}$ | [Hz] |
| Nominal converter voltage[1] | | [V] | 200 | 350 | 460 | 200 | 350 | 460 | Nominal converter voltage[1] | | [V] |
| Power | $P_{S1}$ | [kW] | 18 | | | 25 | | | Power | $P_{S1}$ | [kW] |
| Torque | $M_{S1}$ | [Nm] | 59.3 | | | 85.3 | | | Torque | $M_{S1}$ | [Nm] |
| ... at speed | n | [rpm] | 2,900 | | | 2,800 | | | ... at speed | n | [rpm] |
| Current | $I_{S1}$ | [A] | 100 | 57 | 43 | 121 | 69 | 53 | Current | $I_{S1}$ | [A] |
| Power | $P_{S6-60\%}$ | [kW] | 20 | | | 28 | | | Power | $P_{S6-60\%}$ | [kW] |
| Torque | $M_{S6-60\%}$ | [Nm] | 65.9 | | | 95.5 | | | Torque | $M_{S6-60\%}$ | [Nm] |
| ... at speed | n | [rpm] | 2,900 | | | 2,800 | | | ... at speed | n | [rpm] |
| Current | $I_{S6-60\%}$ | [A] | 112 | 64 | 49 | 187 | 107 | 81 | Current | $I_{S6-60\%}$ | [A] |
| Electrical connection | | | | | | | | | Electrical connection | | |
| Plug type | | | D500 | MAC | GA | D500 | MAC | MAC | Plug type | | |
| Straight plug-in connection | | | + | + | + | + | + | + | Straight plug-in connection | | |
| Angle plug-in connection | | | o | o | o | o | o | o | Angle plug-in connection | | |
| Fixed cable XXm | | | o | o | o | o | o | o | Fixed cable XXm | | |
| Coolant through the shaft | | | | | | | | | Coolant through the shaft | | |
| Low pressure (du) | | | – | | | – | | | Low pressure (du) | | |
| High pressure (dh) | | | x | | | x | | | High pressure (dh) | | |
| Sensor technology | | | | | | | | | Sensor technology | | |
| Rotary encoder | | | x | | | x | | | Rotary encoder | | |
| Speed sensor | | | + | | | + | | | Speed sensor | | |
| Housing | | | | | | | | | Housing | | |
| Cylindrical housing | | | + | | | + | | | Cylindrical housing | | |
| Cylindrical housing with flange | | | o | | | o | | | Cylindrical housing with flange | | |
| Block housing | | | x | | | x | | | Block housing | | |
| Air purge | | | + | | | + | | | Air purge | | |

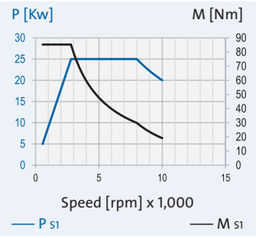
[1] Minimum required output voltage of the frequency converter

+ Standard

o Option

x on request




[1] Minimum required output voltage of the frequency converter

+ Standard

o Option

x on request

# Technical data
# Features

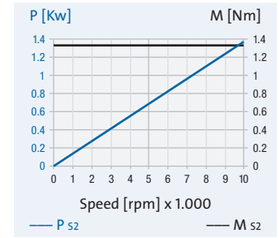
GMN
High speed spindles
for manual tool change
Dressing spindles

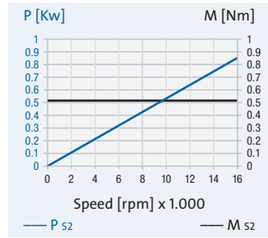
## GMN dressing spindles

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 Ø | A | [mm] | 80 | 80 |
| Speed max. | | [rpm] | 10,000 | 16,000 |
| Bearing Ø front | $W_1$ | [mm] | 35 | 35 |
| Tool interface | | | | |
| Flat contact face Ø | W | [mm] | 71.8 | 71.8 |
| Centering diameter | | | D40h2 | D40h2 |
| Static rigidity | | | | |
| axial | $C_{ax}$ | [N/µm] | 88 | 89 |
| radial | $C_{rad}$ | [N/µm] | 35 | 40 |
| Motor design | | | 230 V | 230 V |
| Frequency max. | | [Hz] | 334 | 533 |
| Converter voltage | | [V] | 230 | 230 |
| Power | $P_{S2}$ | [kW] | 1.37 | 0.85 |
| Torque | $M_{S2}$ | [Nm] | 1.31 | 0.51 |
| ... at speed | n | [rpm] | 10,000 | 16,000 |

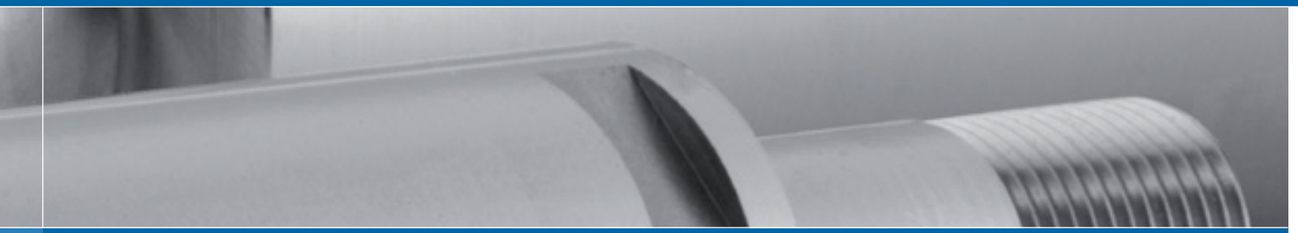



## GMN A/E sensor

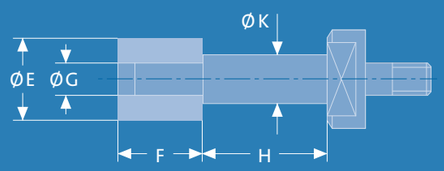
GMN dressing spindles equipped with an optional acoustic emission sensor improve processing quality and extend the service life of grinding disks.

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



# GMN
# High speed spindles for manual tool change
# Grinding quills

## Grinding quill and grinding wheel dimensions






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

| GMN spindle | Cutting speed for spindle speed [m/s] | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HS 80c - 180000/... | 56 | | | | | | | | | | | | |
| HS 80c - 150000/... | 47 | | | | | | | | | | | | |
| HSX 80 - 120000/... | 38 | | | | | | | | | | | | |
| HS 80c - 120000/... | 38 | | | | | | | | | | | | |
| HSX 100 - 105000/... | | 44 | 55 | 71 | | | | | | | | | |
| HS 80c - 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 | 3 | 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.

· **GMN 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

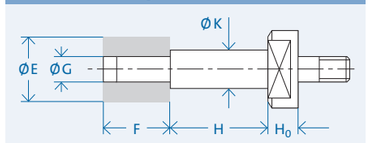



Fig. 2: with fitting bolt (PS)

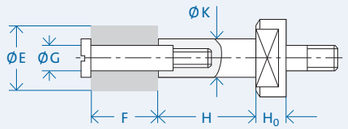



Fig. 3: for grinding wheels on threaded pin (PL)*

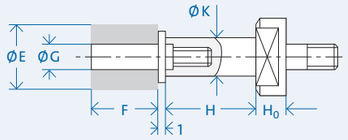
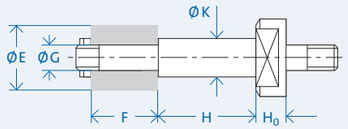


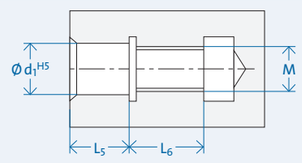

Fig. 4: with nut (MU)




* Fig. 3: Threaded pin not in delivery complement

| Interface | K [mm] | H [mm] | Grinding wheel E x F [mm] | G [mm] | Grinding wheel fixation | $H_0$ [mm] |
|---|---|---|---|---|---|---|
| D 14/23 | 6 | 20 | 10 x 10 | 4 | KI | |
| | 10 | 25 | 16 x 16 | 6 | PS/PL | 8 |
| | 16 | 32 | 25 x 25 | 10 | PS/PL | |
| D 16/28 | 10 | 25 | 16 x 16 | 6 | PS/PL | |
| | 13 | 32 | 20 x 20 | 8 | PS/PL | 10 |
| | 16 | 40 | 25 x 25 | 10 | PS/PL | |
| D 22/38 | 13 | 32 | 20 x 20 | 8 | PS/PL | |
| | 20 | 40 | 32 x 25 | 13 | PS/PL | 12 |
| | 25 | 50 | 40 x 32 | 16 | MU | |
| D 28/43 | 16 | 40 | 25 x 25 | 10 | PS/PL | |
| | 20 | 50 | 32 x 25 | 13 | PS/PL | 12 |
| | 32 | 63 | 50 x 40 | 20 | MU | |
| D 32/53 | 20 | 50 | 32 x 25 | 13 | PS/PL | |
| | 32 | 63 | 50 x 40 | 20 | MU | 12 |
| | 40 | 80 | 63 x 40 | 25 | MU | |
| D 36/63 | 25 | 50 | 40 x 32 | 16 | MU | |
| | 32 | 63 | 50 x 40 | 20 | MU | 15 |
| | 50 | 100 | 80 x 40 | 32 | MU | |
| D 36/68 | 32 | 63 | 50 x 40 | 20 | MU | |
| | 40 | 80 | 63 x 40 | 25 | MU | 15 |
| | 56 | 125 | 100 x 40 | 36 | MU | |

Fitting hole for fig. 2 and 3




| $d_1$ | M | L5 | L6 |
|---|---|---|---|
| 4 | M3 | 5 | 8 |
| 6 | M5 | 7 | 11 |
| 8 | M6 | 9 | 12 |
| 10 | M8 | 12 | 14 |
| 13 | M12 | 13 | 17 |

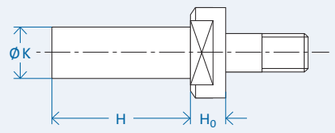
Ordering designation:
[quill ø K] x [quill length H] - [grinding wheel ø G] x [grinding wheel width F] [interface] [quill fixation]
Example: Grinding quill 16 x 40 - 10 x 25 D16/28 PS

## 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

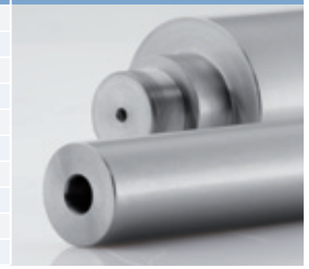
**Semifinished products**




No processing is permissible in area $H_0$.

| Interface | K [mm] | H [mm] |
|---|---|---|
| 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 semifinished products**

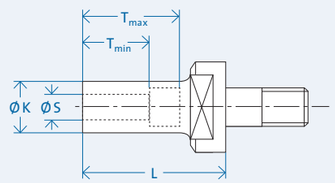


## Shrink fit chucks

GMN shrink fit chucks have substantially more clamping force than hydro-expansion or collet chucks and they achieve maximum smooth running at the highest speeds as a consequence of the best possible roundness accuracy.

· **GMN shrink fit chucks** for interfaces D04/08 ... D16/28 and U07/10 ... U16/23;
Right-hand direction of rotation available at short notice
· Other dimensions and left-hand direction of rotation on request

**Shrink fit chucks**




| Interface | | S [mm] | $T_{min}$ [mm] | $T_{max}$ [mm] | K [mm] | L [mm] |
|---|---|---|---|---|---|---|
| D 04/08 | - | 3 | 10 | 11 | 7,5 | 14 |
| D 06/12 | U 07/10 | 3 | 10 | 11 | 7,5 | 14 |
| D 08/14 | - | 3 | 10 | 15 | 7,5 | 24 |
| D 09/16 | U 09/16 | 3 | 10 | 15 | 7,5 | 24 |
| D 10/18 | - | 3 | 10 | 15 | 7,5 | 24 |
| D 10/18 | U 12/18 | 4 | 13 | 21 | 10 | 25 |
| D 10/18 | U 12/18 | 5 | 16 | 26 | 11 | 30 |
| D 10/18 | U 12/18 | 6 | 19 | 26 | 12 | 30 |
| D 14/23 | U 16/23 | 3 | 10 | 15 | 7,5 | 24 |
| D 14/23 | U 16/23 | 4 | 13 | 21 | 10 | 25 |
| D 14/23 | U 16/23 | 5 | 16 | 23 | 11 | 27 |
| D 14/23 | U 16/23 | 6 | 19 | 26 | 12 | 30 |
| D 16/28 | - | 3 | 10 | 15 | 7,5 | 24 |
| D 16/28 | - | 4 | 13 | 21 | 10 | 25 |
| D 16/28 | - | 5 | 16 | 23 | 11 | 27 |
| D 16/28 | - | 6 | 19 | 26 | 12 | 30 |

Ordering designation: "Shrink fit chucks" [chucking Ø S] x [max. chucking depth Tmax] / [chuck length L] [interface]
Example: Shrink fit chucks 6 x 26 / 30 D10/18

# 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.

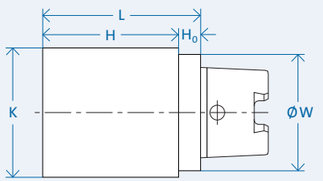
- **GMN grinding quills** for interfaces HSK-C25 ... HSK-C100 per DIN 69893-1 are available at short notice
- Other dimensions are available on request

## 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

**Semifinished products**




No processing is permissible in area $H_0$.

| Interface | W [mm] | K [mm] | H [mm] | L [mm] | $H_0$ [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 |

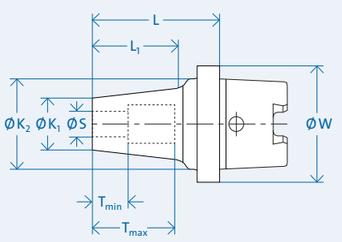
Ordering designation: "Semifinished product" [shaft Ø K] x [shaft length H] [interface]
Example: Semifinished product 81 x 186 HSK-C63

## Shrink fit chucks

GMN shrink fit chucks have substantially more clamping force than hydro-expansion or collet chucks. They achieve maximum smooth running at the highest speeds as a consequence of the best possible roundness accuracy.

- **GMN shrink fit chucks** for interfaces HSK-C25 ... HSK-C40 per DIN 69893-1 are available at short notice
- Other dimensions are available on request

**Shrink fit chucks**




| Interface | S [mm] | $T_{min}$ [mm] | $T_{max}$ [mm] | $K_1$ [mm] | $K_2$ [mm] | $L_1$ [mm] | L [mm] | W [mm] |
|---|---|---|---|---|---|---|---|---|
| HSK-C25 | 3 | 10 | 27 | 7,5 | 18 | 17 | 35 | 25 |
| HSK-C25 | 4 | 13 | 24 | 10 | 18 | 17 | 35 | 25 |
| HSK-C25 | 5 | 16 | 25 | 11 | 18 | 17 | 35 | 25 |
| HSK-C25 | 6 | 19 | 25 | 12 | 18 | 17 | 35 | 25 |
| HSK-C32 | 3 | 10 | 30 | 7,5 | 20 | 22 | 40 | 32 |
| HSK-C32 | 4 | 13 | 24 | 10 | 20 | 22 | 40 | 32 |
| HSK-C32 | 5 | 16 | 26 | 11 | 26 | 22 | 40 | 32 |
| HSK-C32 | 6 | 19 | 28 | 12 | 26 | 22 | 40 | 32 |
| HSK-C40 | 3 | 10 | 30 | 7,5 | 26 | 22 | 40 | 40 |
| HSK-C40 | 4 | 13 | 30 | 10 | 26 | 22 | 40 | 40 |
| HSK-C40 | 5 | 16 | 26 | 11 | 26 | 22 | 40 | 40 |
| HSK-C40 | 6 | 19 | 28 | 12 | 26 | 22 | 40 | 40 |

Ordering designation: "Shrink fit chucks" [chucking Ø S] x [max. chucking depth Tmax] / [chuck length L] [interface]
Example: Shrink fit chucks 6 x 28 / 40 HSK-C32



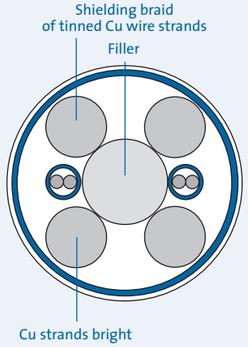
GMN
High speed spindles
for manual tool change
Accessories

# Cables

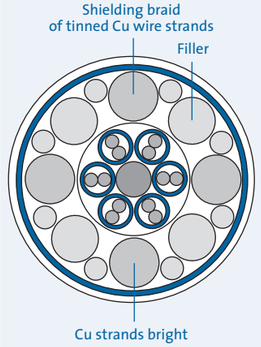
## Spindle/converter connection

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

**SAK 12 ... 135**




**SAK 44C**




**STK**

## 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 mm² | 2 | AD 12,5 mm | 5 x AD | 10 x AD |
| SAK 18 | 18 | 4 x 1.5 mm² | 3 | AD 16 mm | 5 x AD | 10 x AD |
| SAK 26 | 26 | 4 x 2.5 mm² | 2 | AD 16 mm | 5 x AD | 10 x AD |
| SAK 34 | 34 | 4 x 4 mm² | 2 | AD 17 mm | 5 x AD | 12 x AD |
| SAK 44 | 44 | 4 x 6 mm² | 2 | AD 23.8 mm | 5 x AD | 12 x AD |
| SAK 44 C | 44 | 4 x 6 mm² | 6 | AD 23.8 mm | 5 x AD | 12 x AD |
| SAK 61 | 61 | 4 x 10 mm² | 2 | AD 23.8 mm | 5 x AD | 12 x AD |
| SAK 90 | 90 | 4 x 16 mm² | 2 | AD 32 mm | 5 x AD | 12 x AD |
| SAK 108 | 108 | 4 x 25 mm² | 2 | AD 32 mm | 5 x AD | 12 x AD |
| SAK 135 | 135 | 4 x 35 mm² | 2 | AD 32 mm | 5 x AD | 12 x AD |

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

| | | | | | | |
|---|---|---|---|---|---|---|
| STK | | | 12 x 0,22 mm² | PUR AD 6.2 mm | 5 x AD | 20 x AD |

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 mm²

**B049 plug-in connection:** up to 30 A; cable cross section 4 mm²

**GA plug-in connection:** up to 44 A; cable cross section 6 mm²

**MAC plug-in connection:** up to 100 A; cable cross section 25 mm²

**D500 plug-in connection:** up to 150 A; cable cross section 50 mm²

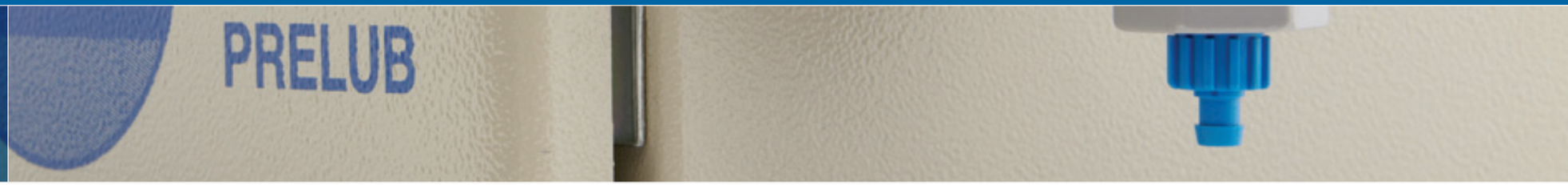
## Signal lines

**STK plug-in connection:** Cable cross section 1 mm²

**Rotary encoder flanged socket:** Cable cross section 1.5 mm²

Plug with cable is available from the converter manufacturer. (Not included in the GMN spindle's delivery complement.)

# 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)*.

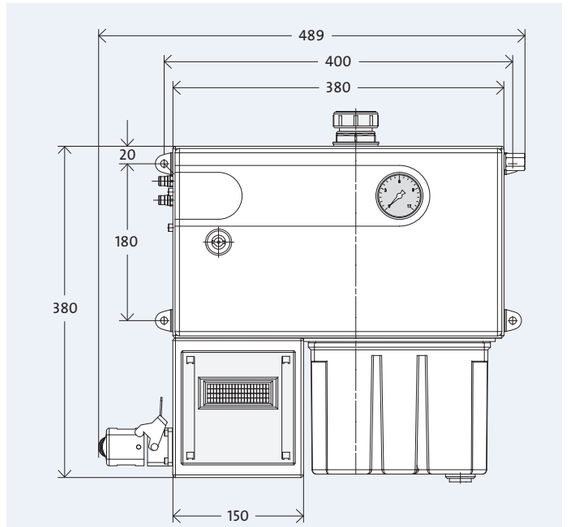
The precisely regulated dosage of lubricant ensures effective bearing lubrication and maximum operational reliability during start-up and shut-down phases.

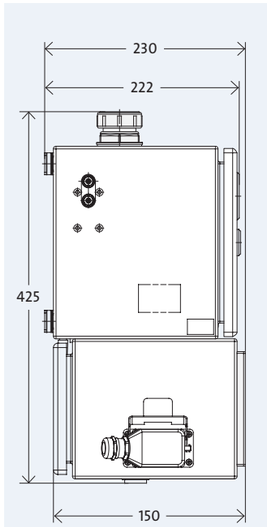
With its 8 connections (maximum), this lubrication unit is capable of simultaneously providing individual supplies to a maximum of 4 spindles while requiring only a minimum amount of space.

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

## PRELUB GP

- Up to 4 internal and a maximum of 8 external (GP 0: e.g. 2 x 4-fold mixing distributors) lubrication point connections
- Separate evaluation of fill-level
- Electronic control with display
- PC control possible
- 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 (2, 4 or 6 lubrication point connections)

## Features

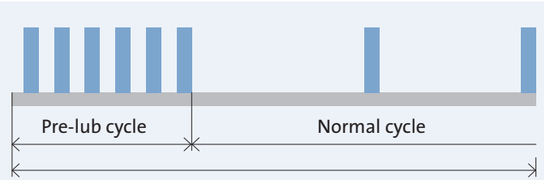
- Compressed air filter/regulator with manometer:
  Filter unit, 5 µm
- Enable signal for the machine controller following checks on:
  - Oil level
  - Oil pressure rise and drop
  - Air pressure
  - Pre-lub cycle
- Timer:
  for adapting the cycle time to oil viscosity and spindle data
- Lubrication point connections:
  for PVC pipe 6 x 1
- Line voltage:
  115 or 230 V AC, 50/60 Hz
- Air supply G1/4":
  $p_{min}$ = 5 bar, $p_{max}$ = 10 bar
- Plug-in connection for power and signal transfers
- Dimensions:
  about 489 x 425 x 230 mm (W x H x D);
  Protection class IP 54
- Color:
  RAL 7032 textured (pebble gray);
  other colors on request
- Fuse:
  for 230 V: 1 A · 115 V: 2 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.

**Model F**

**Model T**

· 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 T: RAL 5019 (capri blue)
- Model F: RAL 7032 (pebble gray)
- Other RAL colors (on request)

| Cooling unit model | Cooling perform.[2] [kW] | for spindle power [kW] S6–60% | S1 | Tank capacity [l] | Supply voltage [3] | Dimensions L x W x H [mm] |
|---|---|---|---|---|---|---|
| K 0.9-T/2 | 0.9 | 6 | 4.5 | 18 | 1 x 230 V, 50 Hz | 705 x 510 x 450 |
| K 1.4-T/2 | 1.4 | 9.3 | 7 | 18 | 1 x 230 V, 50 Hz | 705 x 510 x 450 |
| K 2.5-T/ 2 | 2.5 | 16.6 | 12.5 | 18 | 1 x 230 V, 50 Hz | 705 x 510 x 450 |
| K 3.9-T/2 | 3.9 | 26 | 19.5 | 30 | 1 x 230 V, 50 Hz | 755 x 600 x 500 |
| K 5.3-T/2 | 5.3 | 35.3 | 26.5 | 30 | 1 x 230 V, 50 Hz | 755 x 600 x 500 |
| K 4.1-F [1] | 4.1 | 27.3 | 20.5 | 120 | 3 x 400 V, 50 Hz | 715 x 715 x 1545 |
| K 6.7-F [1] | 6.7 | 44.6 | 33.5 | 120 | 3 x 400 V, 50 Hz | 715 x 715 x 1545 |
| K 7.9-F [1] | 7.9 | 52.7 | 39.5 | 120 | 3 x 400 V, 50 Hz | 715 x 715 x 1545 |
| K 11.8-F [1] | 11.8 | 78.7 | 59 | 120 | 3 x 400 V, 50 Hz | 715 x 715 x 1545 |

[1] In addition to high pressure monitoring, also low pressure monitoring of the coolant circuit.
[2] At 37 °C ambient temperature and 20 °C water temperature. Performance drops at higher ambient temperatures.
[3] Other voltages and frequencies possible on request.



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 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 is therefore not only able to offer an extensive standard program but also customer-oriented special solutions.
A world-wide GMN service network offers competent customer advice as well as individual 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 9001:2008.

### 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