



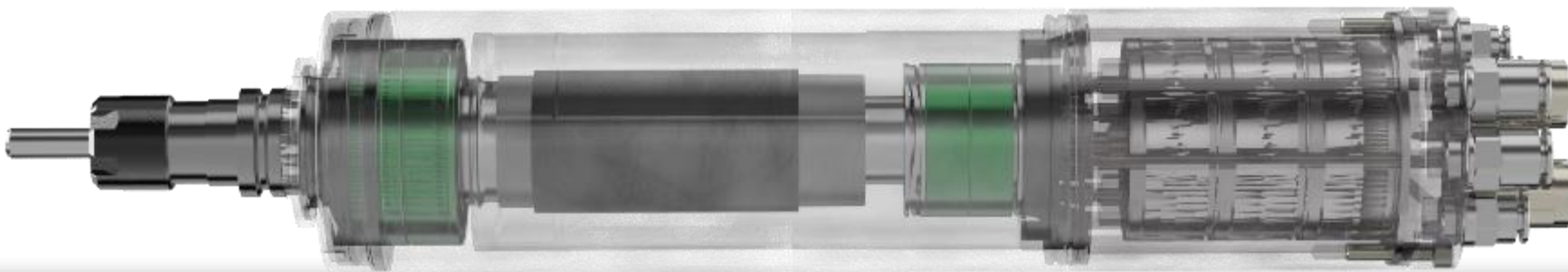
## Construction:

- High-performance ceramic ball bearings
- 4 bearings in tandem “O” arrangement
- Lifetime lubrication

## Benefits:

- Suitable for high speeds
  - 5 000 – 50 000 rpm
- High rigidity and high load capacity
  - Precise machining of hardest materials
- Maintenance free operation

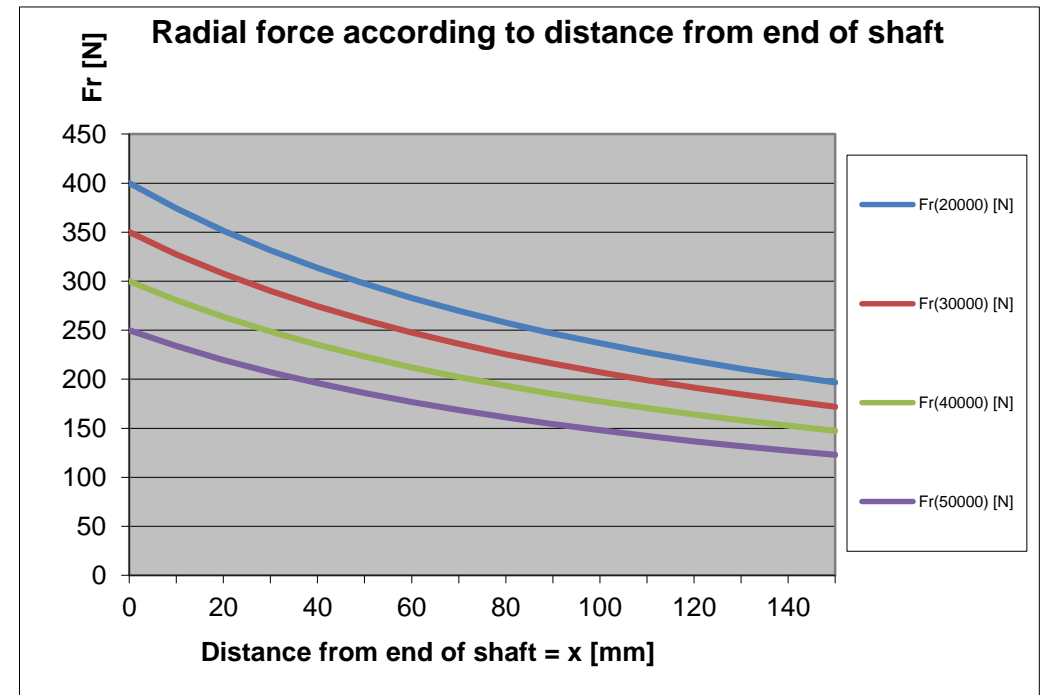
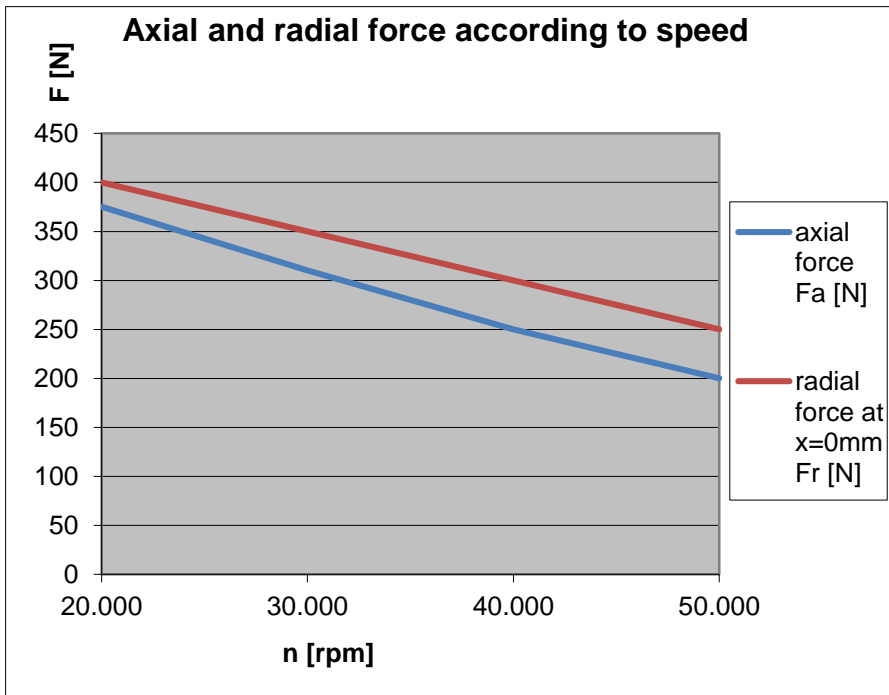
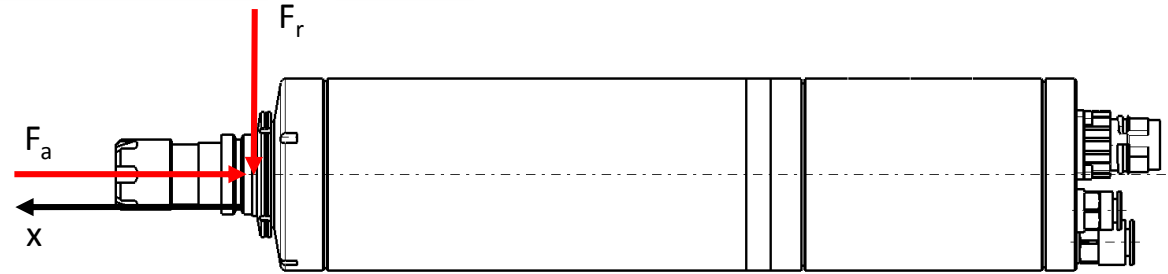
max. bearing load



# Bearing System



## Max. Continuous Bearing Load



Graph shows calculated values for max. continuous axial and radial forces. Values only for axial or radial force! No combined forces!

For Example:  $n=20\,000$ rpm  $\rightarrow F_a=375$ N and  $F_r=0$ N or  $F_a=0$ N and  $F_r=400$ N

## Construction:

- DC Technology (PMSM)
- Rotor position sensor not required
- Motor protection by PTC thermistors

max. Power:	5 kW
max. Torque:	120 Ncm

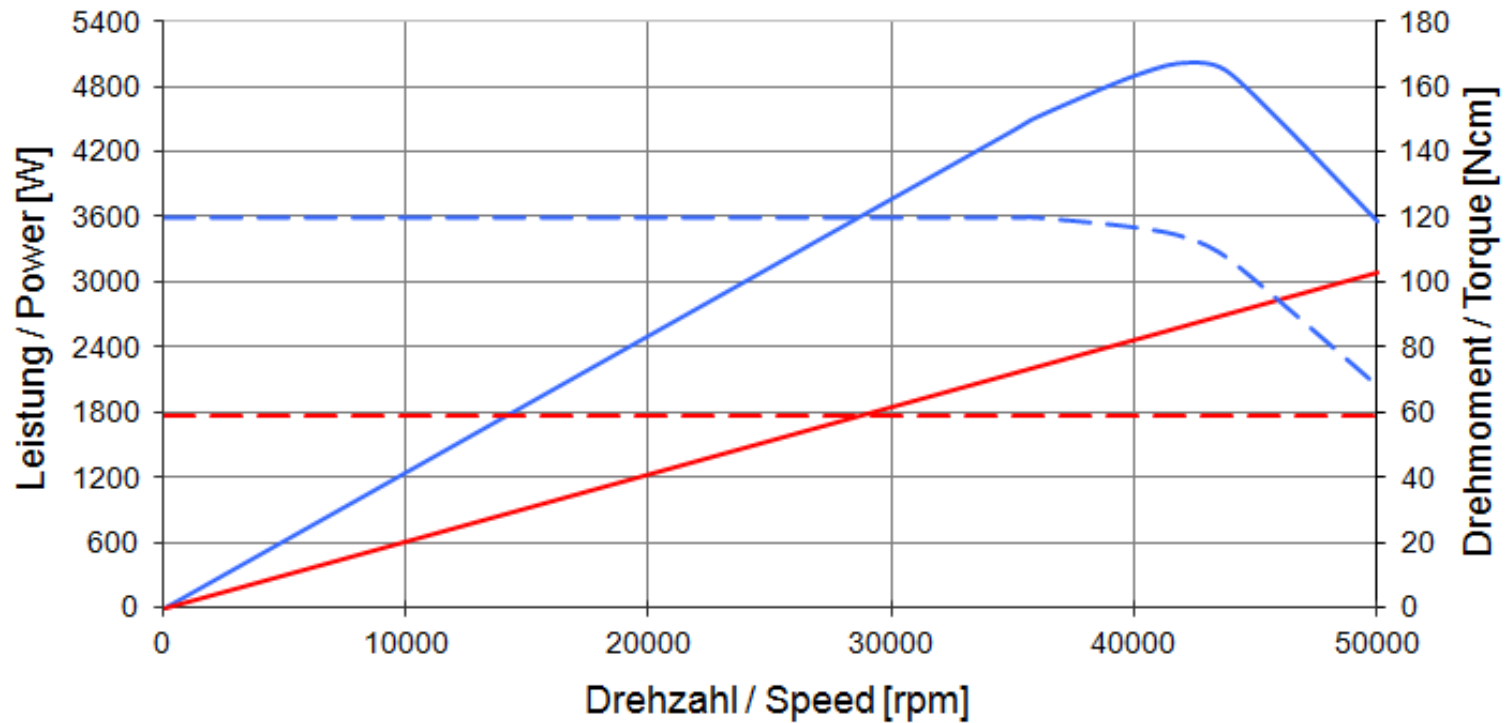
S1-Power:	3.1 kW
S1-Torque:	59 Ncm

## Benefits:

- Reduced frame-size by high power density
  - most powerful motor spindle with Housing Ø60
  - even the hardest of materials can be machined quickly and precisely
- Reduced heat generation
- Simple control
- Protection against thermal overload

characteristics motor system

## Power – Torque 4064 DC HSK25



# Cooling System

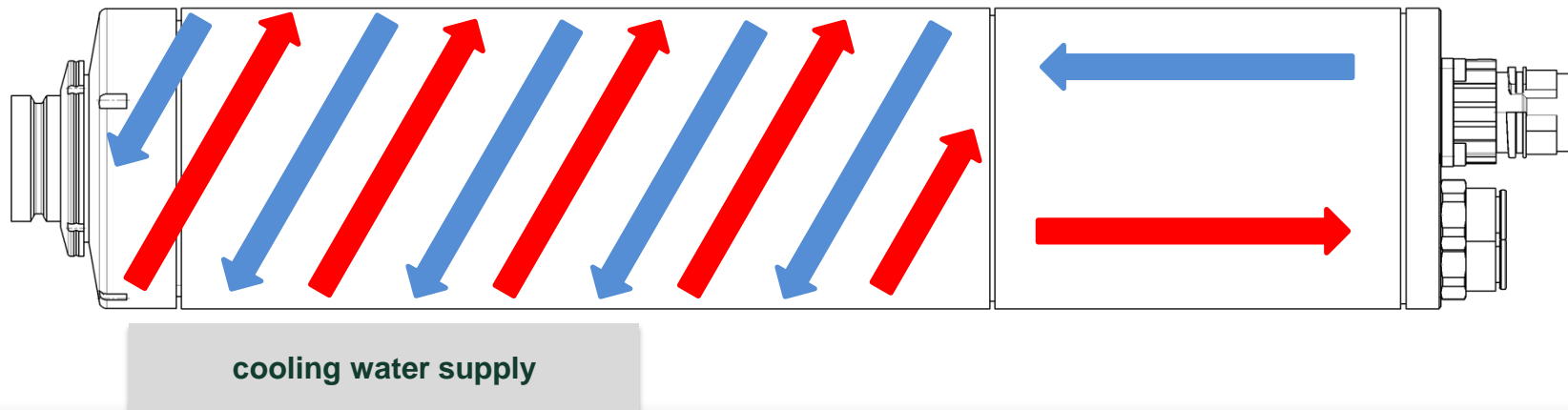


## Construction:

- Cooling cycle in housing of spindle
  - front bearing – motor element – back bearing

## Benefits:

- Liquid cooling of the bearings and motor
- No cooling via clamping bracket necessary
- Fast heat removal
  - no overheating at bearing or motor element
- Well-balanced heat transfer
  - no internal tensions due to different thermal loads



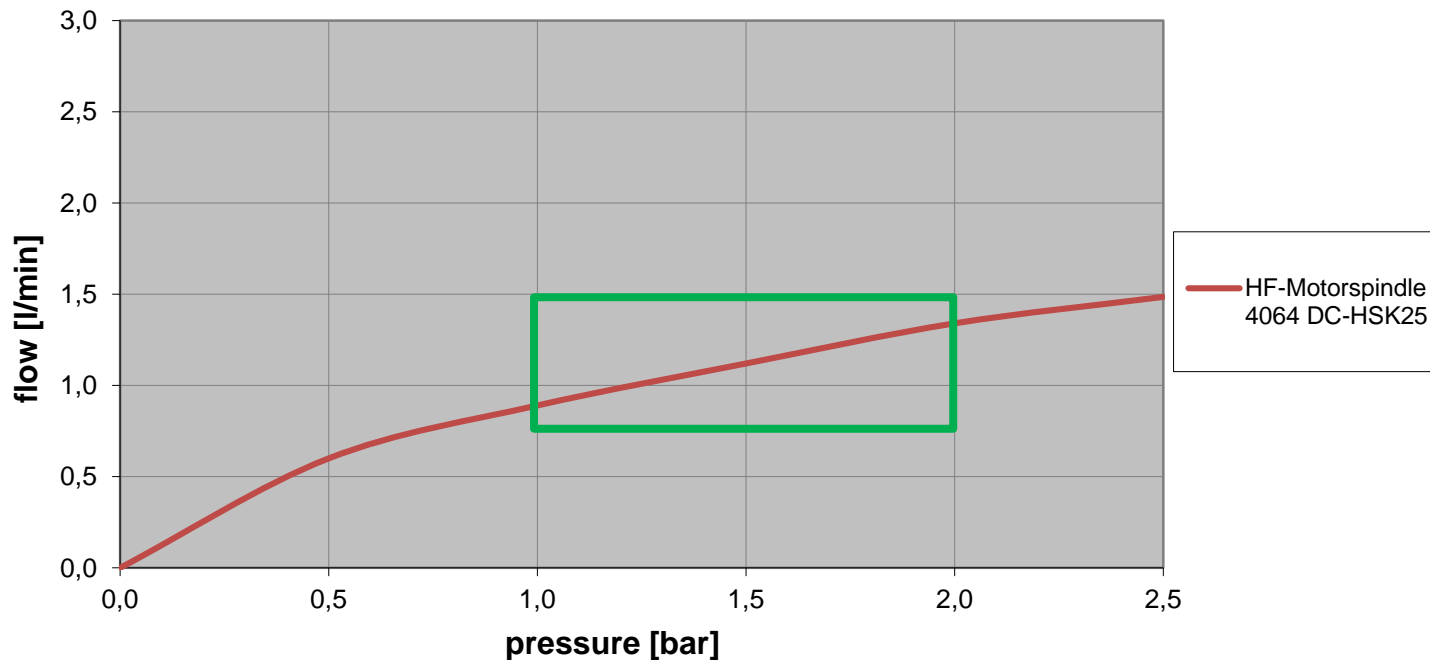
# Cooling Water Supply



## Conditions for cooling:

- Cooling capacity: >300W
- Temp. range: 20-25°C

flow-pressure characteristic



chiller

flow:

min.: 0.7 l/min

pressure:

min. : 1.0 bar

max. : 2.0 bar

## Construction:

- Continuous clamping query by analog sensor

## Benefits:

- Increased safety at workstation
- High degree of process automation – high level of efficiency

clamping situation	
<b>Tool out</b> Actuated pneumatic – Tool pushed out	<b>Tool can be changed safely</b>
<b>Tool clamped</b> Released pneumatic – Tool clamped	<b>Safe operation is possible</b>
<b>Clamped without tool</b> Released pneumatic – No tool clamped	<b>Spindle should not be accelerated</b>

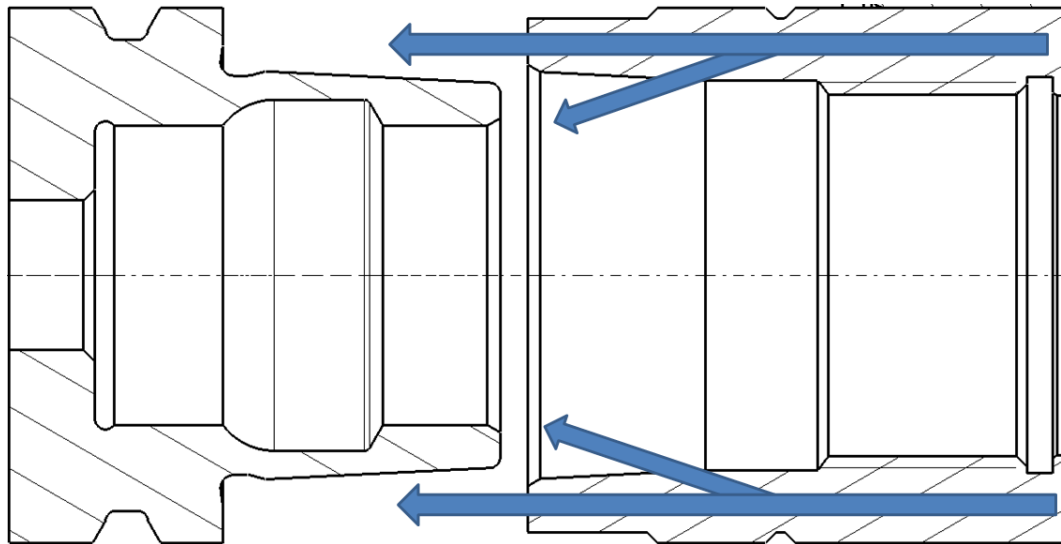


## Construction:

- Taper cleaning of tool interface by compressed air
- Automatic taper cleaning by every tool change

## Benefits:

- Tool change repeatability and process reliability
- No separately connection or signal necessary



## Construction:

- Labyrinth and sealing air 30 l/min
- Tested up to IP 55

## Benefits:

- Very good protection against dirt and cooling lubricant

## Video sample:

- Spray with  $\varnothing 8.5$  mm
- Water volume = 12.5 l/min

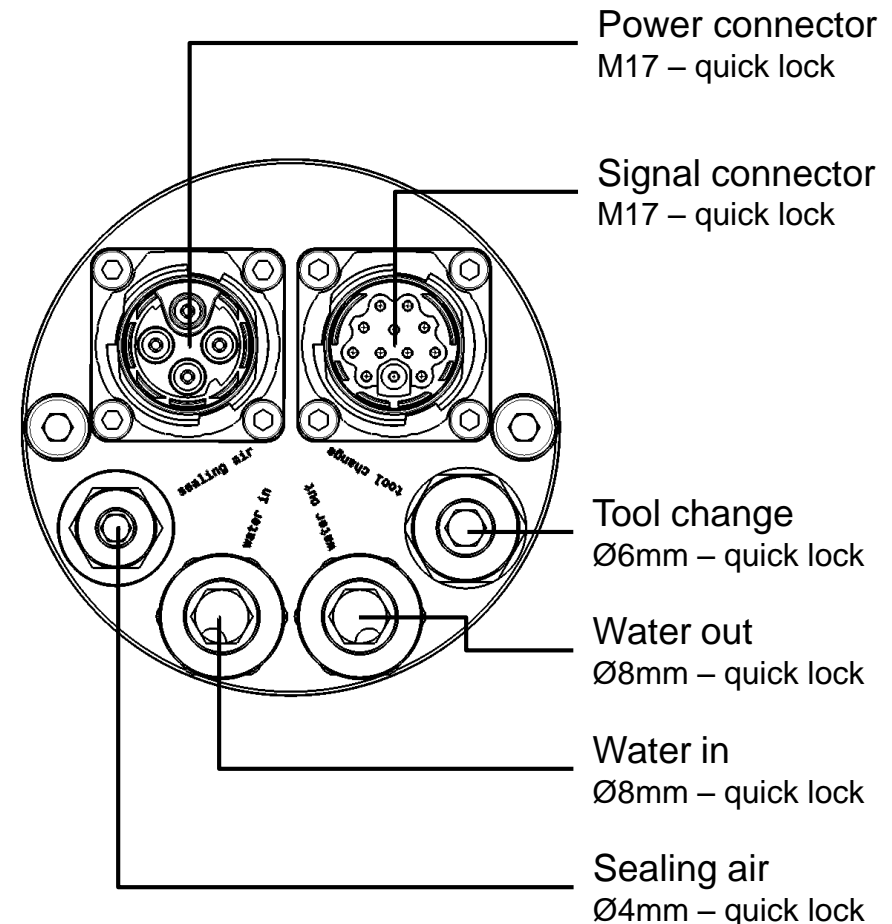


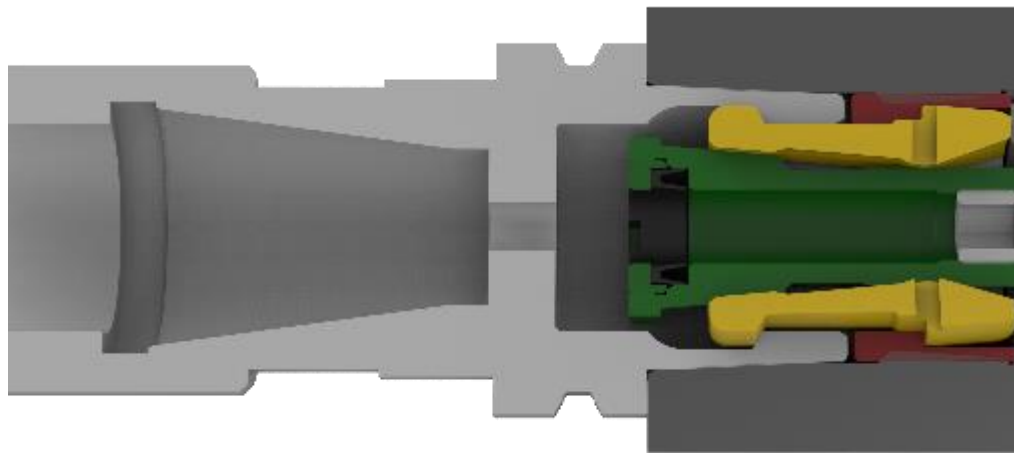
## Construction:

- All connectors are located to the rear
- Power connection separately from signal connection
- Various diameters for the media connections

## Benefits:

- Easy mounting and accessibility
- No signal interference
- No risk of confusion





tool holder

## Benefits:

- DIN standard
- High static and dynamic stiffness
- Tool change repeatability  $<0.002\text{mm}$
- Best solution for high speed cutting
- Easy handling, high reliability

# Overview Tool Holders



hydraulic  
chuck

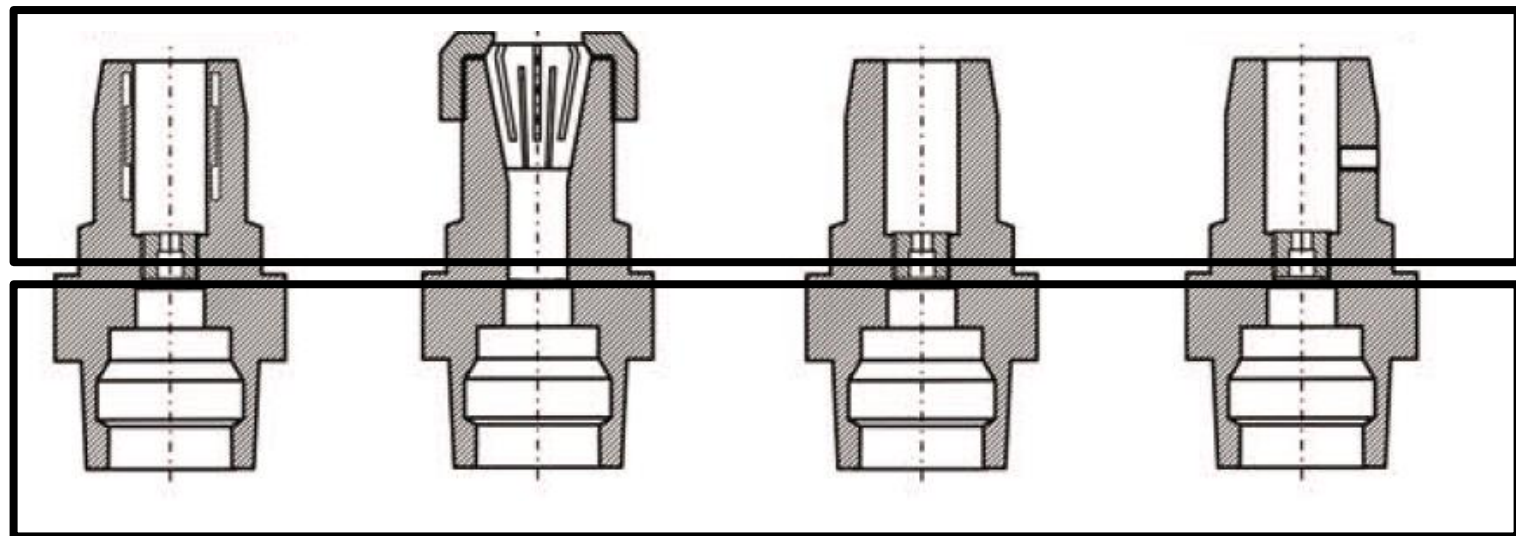
collet  
chuck

shrink  
chuck

weldon-  
system

Clamping  
possibilities

HSK-Interface



collet chuck ER

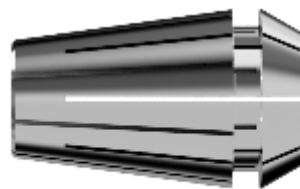
## Tool Holder HSK-E25xER16Mini

Collet Chucks  
for collets type ER/ESX



## Chuck

Range: 0.5–10mm



## Nut

Easy Handling  
Only wrench necessary

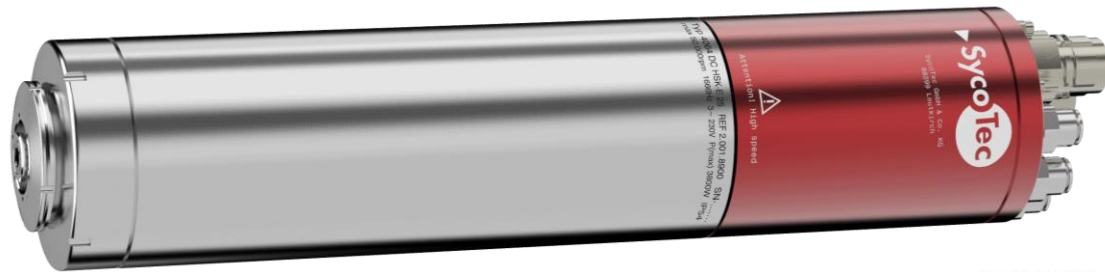


## Single source / complete supply

- No interface problems
- Reduction of the sourcing costs
- System partner – all necessary components match and from one supplier



Tool - Holder HSK-25



Recirculating Chiller



Inverter e@syDrive 4638



# Inverter - e@syDrive 4638



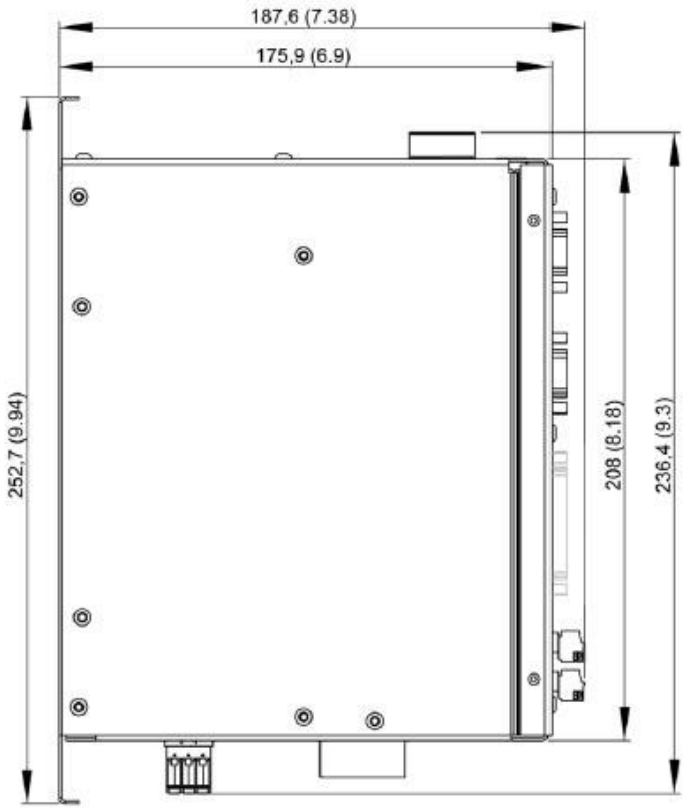
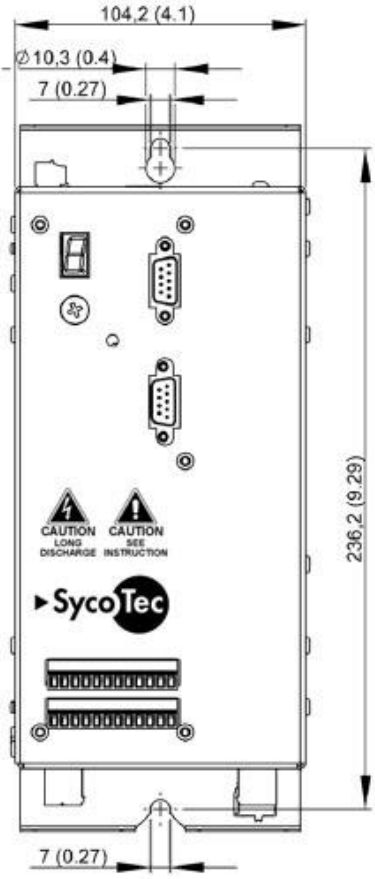
**inverter – technical drawing**

Part No. 2001 6091

Input voltage	1 x 230 V AC (-10%/+10%) / 50/60 Hz
Output voltage	200 V AC
Output current	11 A (max. 20 A)
Rated power output	3,800 VA
Output frequency	max. 8,000 Hz
Modulation type	SVC, HSPAM/VF, HSBLOCK/FPAM, HSPWM
Brake resistor (internal)	22 ohm / 50 W
Ambient temperature	5 - 60°C
Protection category	IP 20
EMC	EN 61800-3
Weight	3.5 kg
Power supply	integrated
Supplement	incl. mating connector set
Configuration	via computer interface (USB/RS232) via e@syDrive® 4638 control
Interfaces	5 x digital output 2 x analogue output 9 x digital input 2 x analogue input



# Inverter – Technical Drawing



## Rückkühler Recirculating Chiller

Typ: Type:	RC-2005-010082-19-1		
Art.-Nr.: Part-No.:	2005010082191		
Serien-Nr.: Serial-No.:	SED2005260001		
Spannung: Voltage:	230VAC $\pm$ 10% / PE / 50/60Hz ~N		
I Nenn / Anl.: I rated / start:	3.2 A / 7.0 A	Pel.: Power input:	700 W
Schutzart: Sealed:	IP44		
Nutzkühlleistung: Cooling capacity:	500 W	Tw = 25 °C, Tu = 40 °C	
Kältemittel: Refrigerant:	R134a / 330 g		
Temp. Kl.:	T	Gewicht Weight	28 kg
Max Druck: Max Pressure:	PS35 / PO30		
Baujahr: Fab. Year:	07 / 2016	US-Pat	
Sicherung/F use: 6 AT; Leistungsschutzschalter/CB: C6A			
Einsatzbereich: Min/Max. 10°C bis 40°C (luft/air)			
Einsatzbereich: Min/Max. 20°C bis 25°C (wasser/coolant)			
Dichtheit geprüft / Leakage tested EN378-2			
	5812769		
	SED2005260001		
			



# Technical Datasheet

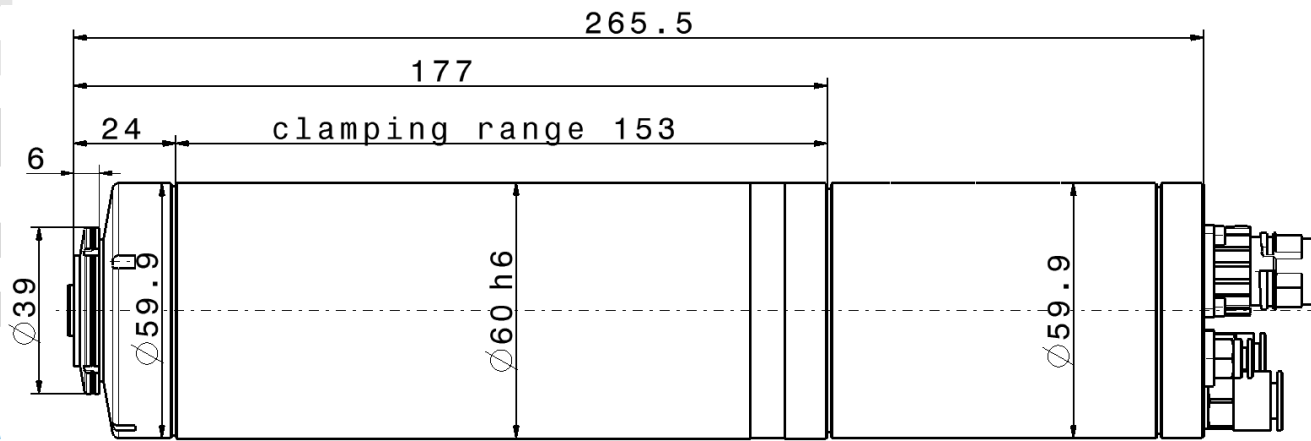
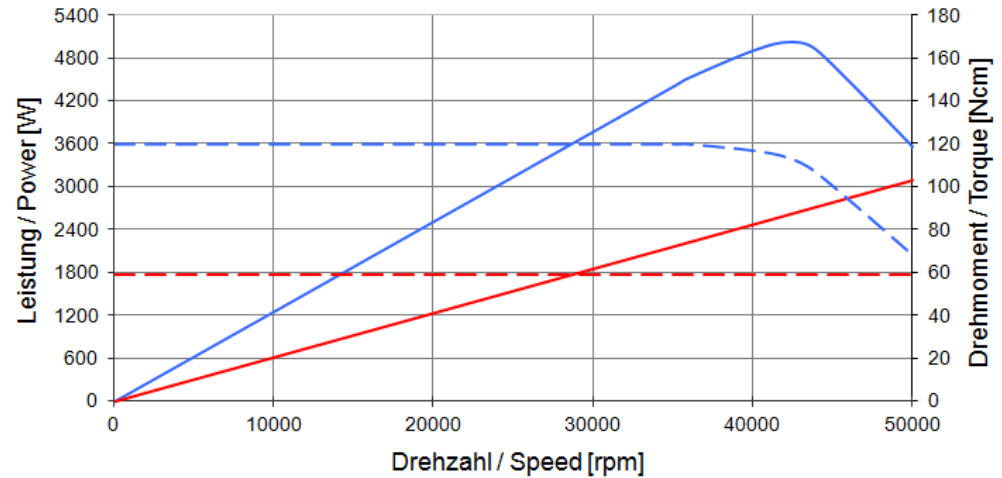


Part No. 2001 8900

Applications	Drilling, Milling, Grinding, Engraving
Tooling system	Hollow taper shank HSK-E25
Clamping diameter	60 mm
Motor system	Brushless DC motor (BLDC)
Speed range	5,000 - 50,000 rpm
Voltage	230 V
Current	max. 14 A
Torque	max. 120 Ncm
Frequency	1,667 Hz
Output power	max. 5,000 W
Weight	3.5 kg
Bearing system	4 x hybrid, lifetime lubrication
Protection category	IP 55
Motor protection	PTC - 100°C
Working position	

Load direction	axial + radial
Run-out (taper)	$\leq 1 \mu\text{m}$
Chuck clamping range	typ. $\varnothing 1 - 10 \text{ mm}$ (HSK-E25)
Tool holder recommendation	HSK-E25xER16Mini (2002 0681)
Tool change	Pneumatic 5 - 6 bar (hose $\varnothing 6 \text{ mm}$ )
Cooling system	Internal cooling 0.7 l/min (hose $\varnothing 8 \text{ mm}$ )
Protected against dirt and cooling lubricant	Sealing air 30 l/min@STP (hose $\varnothing 4 \text{ mm}$ )
Housing material	Stainless steel
Inverter recommendation	e@syDrive® TV 4538, 4638
Taper cleaning	Integrated
Highlights	<ul style="list-style-type: none"> <li>• Water cooling system</li> <li>• Clamping monitoring: clamped, unclamped, clamped without tool</li> </ul>

Subject to change without notice



# Summary of Benefits



Most powerful motor element on market  $\varnothing 60$

5 000W / 120Ncm

Big and high precision bearings

High speed (50 000rpm) and high load

High precision (standardized) tool interface HSK 25

Tool change replaceability <0.002mm

Integrated cooling system in housing of spindle  
well-balanced and fast heat transfer

High lifetime

Clamping monitoring (even on fly)  
tool out – tool in – clamped without tool

High degree of process automation  
High level of safety

Excellent sealing system IP 55

Machining in rough environment

Single source / complete supply

All necessary parts match to each other

4064 DC-HSK25

Best solution for ...

Quick



Precise



Safe



Automated

Machining