

Operating Instructions 4064 SK.



Always on the safe side.



With Compliments

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A 1 User information


A 1.1 Meaning of the pictograms

 Situations where failure to follow the instructions may lead to danger, damage to material or operating faults.


 Important information for operator and engineer.


 Automatic mode
Automatic sequence


 Close, screw in, fasten, etc.


 Open, release, loosen

 + more, higher


 - less, lower

 Continuous operation

 Time, time sequence

 Disconnect mains plug

A 1.2 Important information

 *The instructions for use should be read by the user before starting up the unit for the first time, in order to avoid incorrect operation and other damage. If other language versions are required, please request these from your responsible KaVo agent. Duplication and distribution of the instructions for use (IU) require KaVo's prior consent.*

All technical data, information and properties of the product described in the IU correspond to the state on going to press.

Modifications and improvements to the product as a result of new technical developments are possible.

This does not imply any right to retrofitting of existing units.

KaVo assumes no responsibility for damage arising through:

- external influences (poor quality of the media or inadequate installation)
- use of incorrect information
- improper use
- improperly performed repairs.

Repair and maintenance work - apart from the activities described in these instructions for use - may be performed only by qualified technical personnel.

In the event of modifications by third parties, the approvals become null and void. KaVo recommends using only original spare parts for operation and for repair.

A 1.3 Precautions

Safe operation and protection of the unit are ensured only through proper use in accordance with the instructions for use and using the tools approved for the purpose. The following should also be observed:

- the tool manufacturer's instructions,
- the work safety regulations,
- the accident prevention regulations.



■ *Each time before switching on, check the set speed.*

■ *Observe the permissible maximum speed and maximum pressure of the tools (according to tool manufacturer's instructions).*

■ *Use safety screens when working with rotating tools.*

■ *To avoid danger through accidental switching on, place the handpiece on a suitable shelf or tool support.*

In the event of an unsatisfactory condition of the unit or improper use, e.g.:

- unsuitable tools
- tool shafts not manufactured according to DIN-ISO
- improper use or use not in accordance with the purpose
- unapproved speeds for tools used
- incorrect clamping of the tools in the chuck
- insufficient retaining force of the chuck (wear, soiling, failure to follow the product care instructions for the chuck system, etc.)
- different sizes of tool shaft and chuck
- lack of regular cleaning of the chuck
- failure to follow the maintenance instructions
- failure to comply with the accident prevention regulations (e.g. failure to use safety screens, safety devices, etc.)
- Non-conformity with the EMW Guidelines regarding radiation from low frequency, radio frequency and microwaves (use shielded cable)
- failure to take into account signs of wear and damage
- tool shafts which have slipped out (potential danger = bending of the tool shafts)
- operating the spindle when not connected to compressed air can cause defects

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there is a danger of injury and damage to material and unit, e.g. due to:

- Bending of the tool shafts
 - Accidental withdrawal of the tools from the chuck
 - Breaking or splintering of the tool.

 - Eccentric rotation or shattering of tools, or
 - Snagging and rolling up
 - Catapulting of small material-parts
- in order to prevent this, safety precautions must be incorporated into the unit.



Any liability shall be excluded if defects or the consequences thereof are due to manipulation or modification to the product by the customer or by any third parties not authorized by KaVo.



The electro-magnetic compatibility analysis must be carried out and evaluated in conjunction with the commutator.

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A 1.4 Possible uses and applications

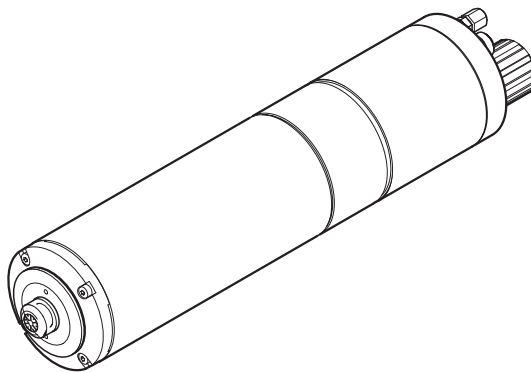
The motorised spindle 4064 SK is designed to be used in machines for filing processes, such as drilling, milling, cutting etc.

A 2 Scope of delivery - Accessories

A 2.1 Scope of delivery

Check to make sure delivery is complete:

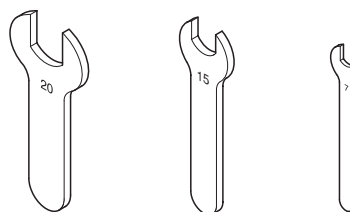
1 HF Motor-spindle 4064 SK with dummy



Fork spannerl 7 Mat. No. 1.003.0098

Fork spanner 15 Mat. No. 1.003.0099

Fork spanner 20 Mat. No. 1.003.0100



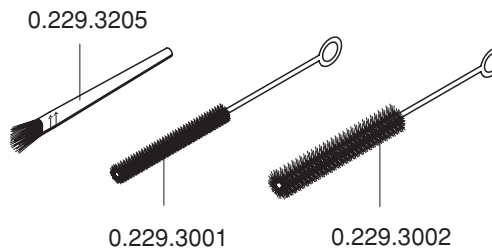
Set of brushes Mat. No. 0.411.0190

Consisting of:

① Cleaning brush Mat. No. 0.229.3205

② Fine-hair brush Mat. No. 0.229.3001

③ Cylindrical brush Mat. No. 0.229.3002



Case (Mat. No. 0.684.4116) and padding (Mat. No. 0.684.4109) please retain for use when returning products for inspection or repair.

Operating Instruction Mat. No. 1.002.7869

A 2.2 Optional accessories

For external air or water cooling:

Chucking device 4864

Mat. No. 1.002.7351

use shielded cable connecting cable 5 m

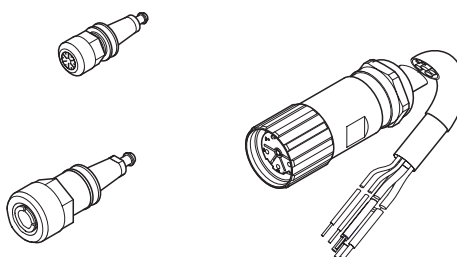
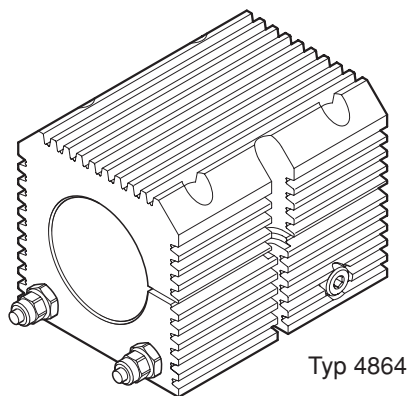
Mat. No. 1.000.1564

Chuck holder, for sizes up to 6,0 mm

Mat. No. 1.002.5075

Chuck holder, for sizes 6,35 and 8,0 mm


Mat. No. 1.002.7696



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A 3 Electrical connection



Check that the available voltage and frequency agree with the data on the frequency converter.

 *Repair and maintenance work - apart from the activities described in these instructions for use - may be performed only by qualified technical personnel.*

- *Dangers from disturbances in the energy supply, breaking of machine parts or other malfunctions, e.g.*
 - *unforeseen ejection*
 - *unexpected starting*
 - *unexpected slipping/over-revving*
 - *incorrect rotation (chuck mechanism can loosen)*

must be prevented by appropriate safety features incorporated in the control unit (e.g. max. revolutions). KaVo EWL recommends operation by use of Frequency Converter "e@sy Drive 4452".


 *Disconnect the converter plug.*


	KaVo Elektrotechnisches Werk GmbH D-88299 Leutkirch i.A.
	Typ 4064 SK REF 1.002.4425 SN-XXXXXX
	max. 50 000 /min 3,0 kW 230 V 3~ 833 Hz
	Druck: Werkzeugwechsel 5-6 bar Sperrluft 0,5-0,8 bar
	 Made in Germany

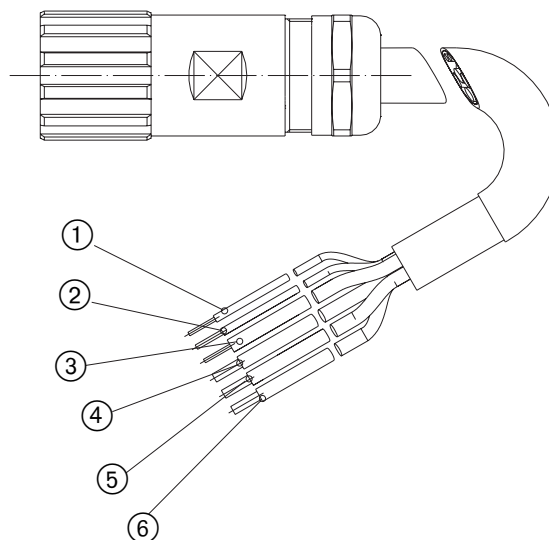
A 3.1 Specifics of the motor connection cable

- ① PTC cold conductor BR1
- ② PTC cold conductor BR2
- ③ Potential earthing conductor, green/yellow
- ④ Phase U
- ⑤ Phase V
- ⑥ Phase W

Fasten the connecting wires to the converter connection terminal.

 *Ensure that the ground wire is correctly fixed to the provided grounding terminal.*

 *Pay attention to the rotation of the spindle (if necessary, exchange two phases)!*



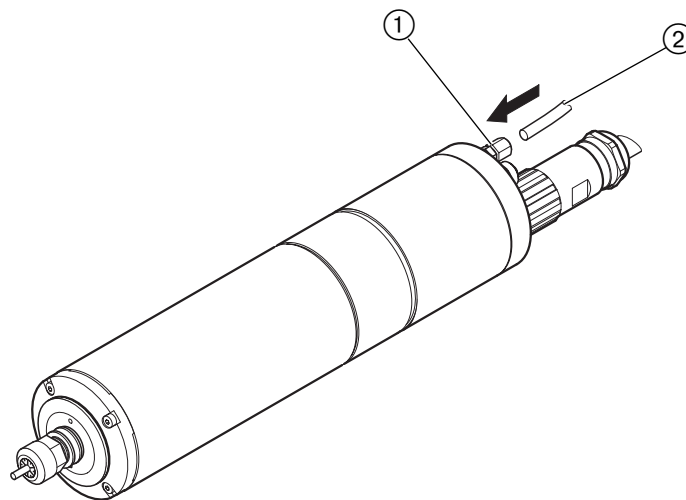
4064 SK.

A 4 Fitting and commencing operation of HF Motor-spindle 4064 SK



- Air-lock supply of 0,5 to 0,8 bar must be clean and dry.
- Never operate the spindle without air lock.
- The inflow and outflow for air lock must always be kept clear
- Prevent any foreign bodies or lubricants being drawn into the air-lock

Attach the 3 mm air-lock hose ② to the air-lock connector ① in the direction of the arrow, then secure.



Installation in spindle holder or clamping device

It is recommended to use Clamping Device 4864 (1.002.7371).

Initial torque when clamping the spindle 1,5 Nm \pm 20 % is to be maintained.

Operation in any position between horizontal and vertical (tool pointing down) is possible, using cooling through the spindle holder or an external cooling jacket.

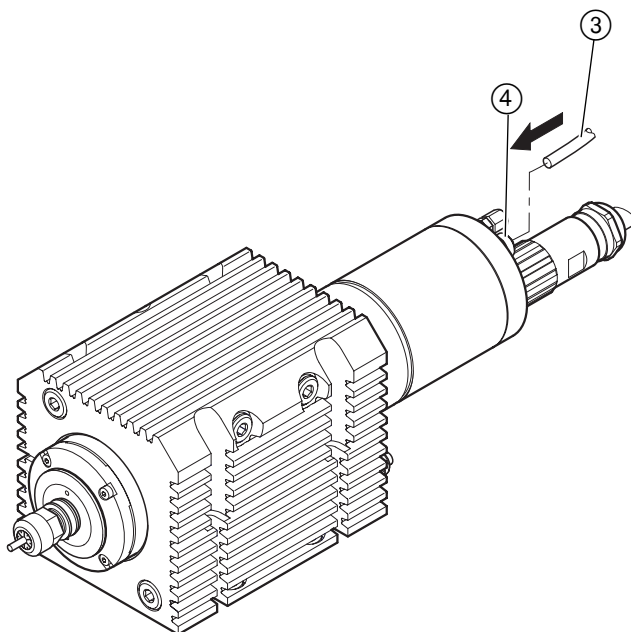


When inserting the spindle ensure it is located cylindrically.

The spindle is designed for cooling via the spindle holder .

Motor spindle 4064 SK is moisture-proof, but must not be immersed in water.

Tension can be applied over the whole housing. However it is recommended to clamp over a wide surface, and when possible in the middle of the spindle.



When commencing operation of HF Motor spindle 4064 SK fit the compressed air hose ③ $d_i = 4$ mm, $D_a = 6$ mm in the direction of the arrow to the connection nozzle ④ and connect up.

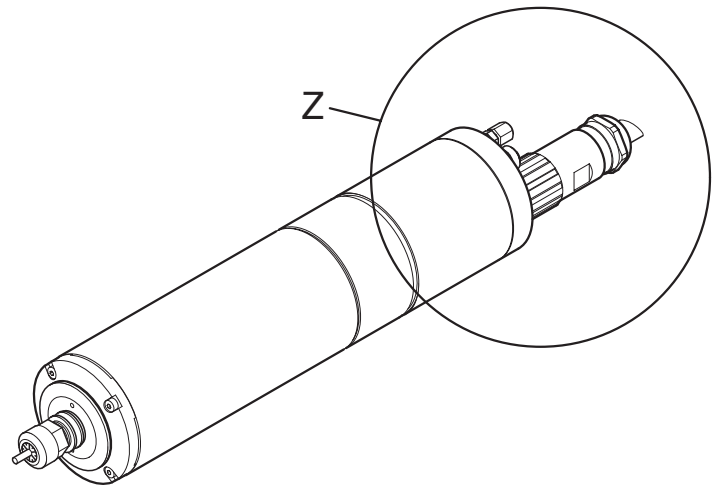


Use only compressed air (5 - 6 bar). free from dirt, water, and oil.

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- Please apply no violence at all.
- The whole region of the cylinder (Z), as well as the compressed air and the electric connection must be protected against the penetration of dirt and water.
- Spindles must only be mounted and operated in appropriate receptacles and machines, according to the application possibilities of the spindle.
- Mind the direction of rotation (see arrow on the rating plate).
- Only operate HF motor spindle 4064 SK with a tool or test-pin clamped in the chuck. Avoid, at all times, impact or blows against the spindle or a clamped-in tool.
- Regulations for the prevention of accidents are to be observed!
- Only work with concentric tools.
- Operate the spindle only in a suitable position.
- A too-high tension is to be avoided (effects the rotation and lifetime of the spindle)



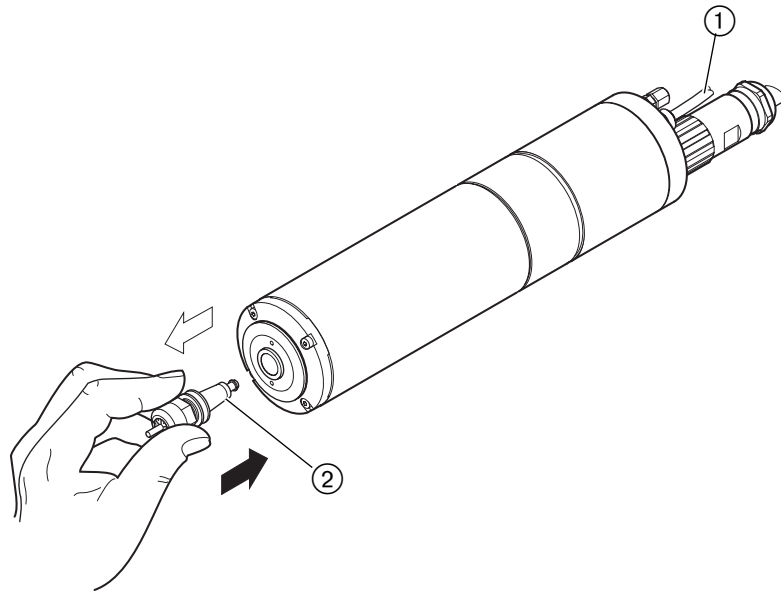
4064 SK.

A 5 Changing tools

Removing the tool

To release the chuck holder ②, allow compressed air at a pressure of minimum 5 bar to maximum 6 bar to flow through the air tubing ①.

When the chuck holder ② is loose, pull it out by hand in the direction of the arrow.



Release the tool by loosening the locking nut ⑤ with open wrench ④, applying reverse pressure with open wrench ③.

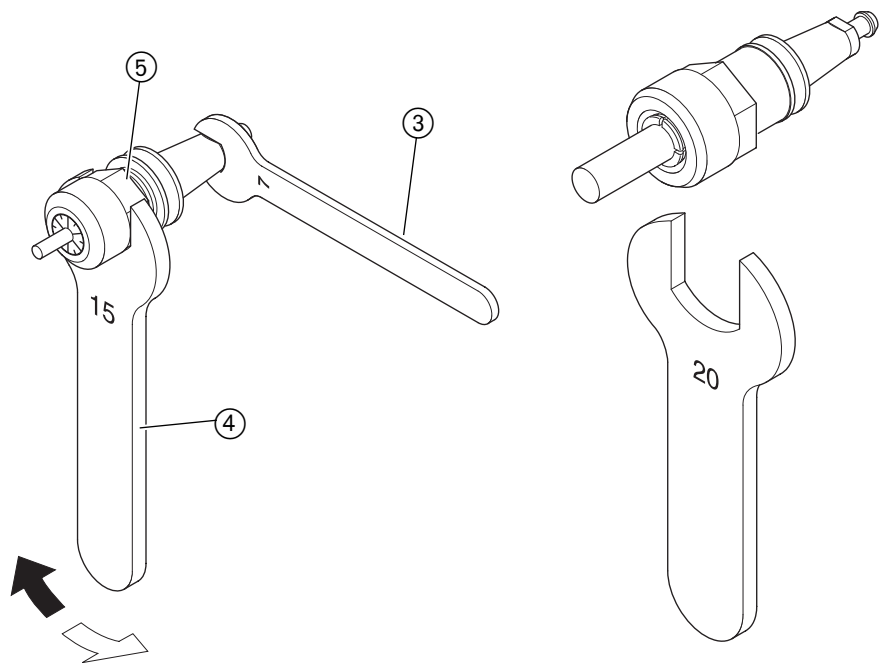
Inserting the tool

i Tighten the tool corresponding to the shaft length and details from the tool manufacturer.

Tighten the locking nut ⑤ with open wrench ④, applying reverse pressure with open wrench ③.

To tighten the chuck holder ② in the spindle, allow compressed air at a pressure of minimum 5 bar to maximum 6 bar to flow through the air tubing ①.

Release the air pressure – chuck holder ② is now tightened.



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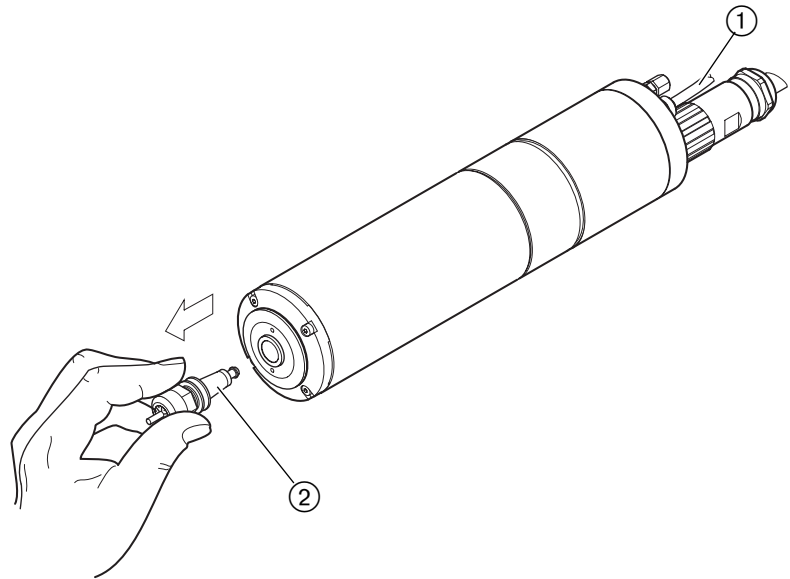
A 6 Changing chucks

⚠ *Changing tools or the chuck holder must be done only when the motorised spindle 4064 SK is at a complete standstill. Ensure that the converter is protected against unexpected operation, e.g., by pressing the main switch to the "OFF" position.*

A 6.1 Removing the chuck

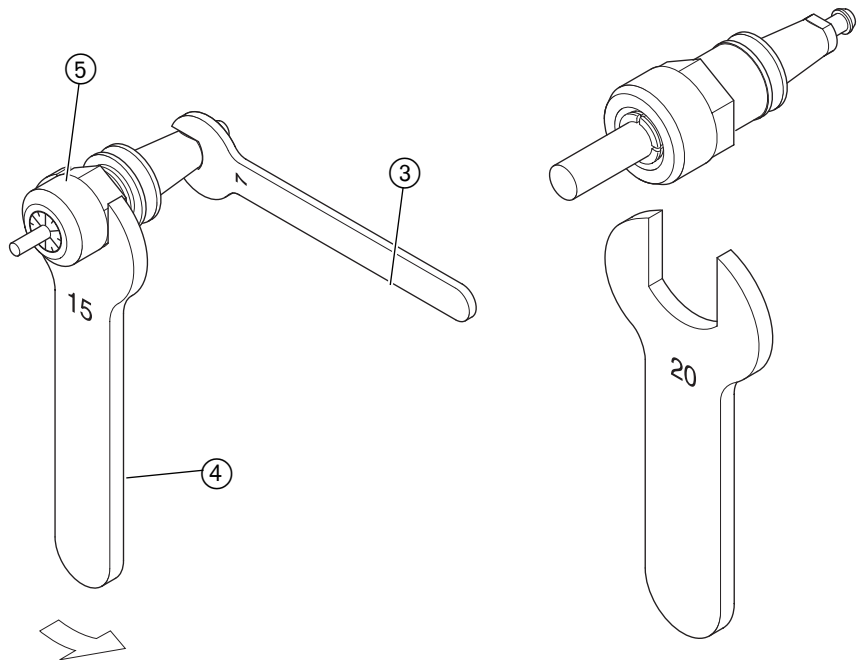
To release the chuck holder ②, allow compressed air at a pressure of minimum 5 bar to maximum 6 bar to flow through the air tubing ①.

When the chuck holder ② is loose, pull it out by hand in the direction of the arrow.



A 6.2 Removing the chuck from the chuck holder

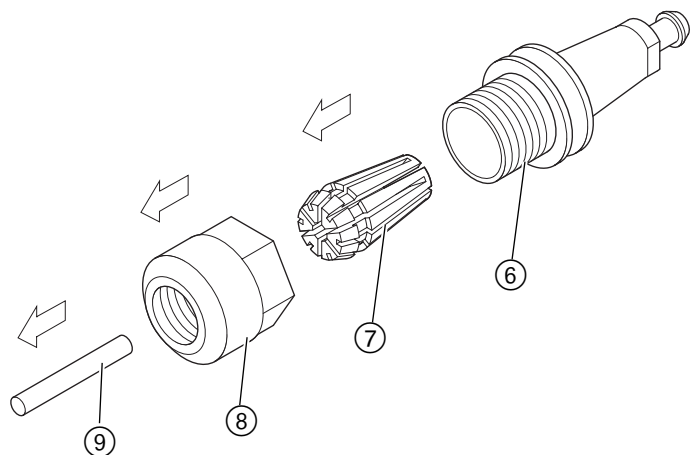
Release the tool by opening the locking nut ⑤ with open wrench ④, applying reverse pressure with open wrench ③.



Remove the tool ⑨.

Unscrew locking nut ⑧.

Remove the chuck ⑦.



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A 6.3 Inserting the chuck in the chuck holder

Inserting chuck ②, up to size 6,35 mm

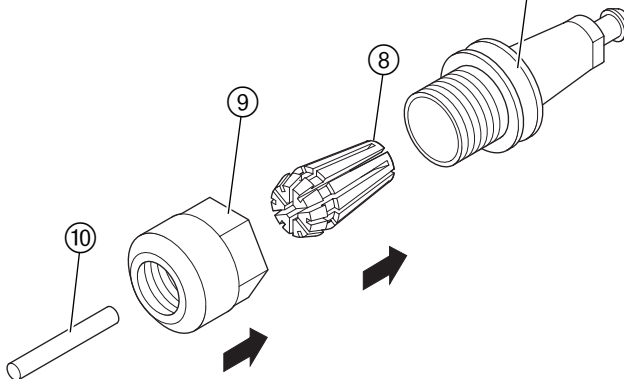
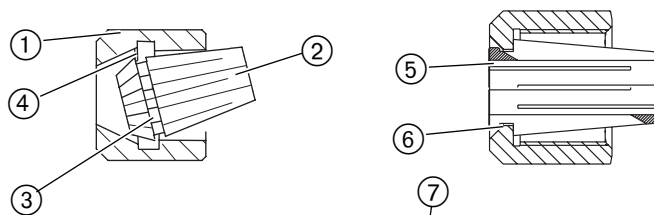
⚠ *Non-observance of the operating instructions when inserting the chuck can cause damage to the chuck and the segment of the locking nut.*

Guide the chuck ② at an angle into the locking nut ①.

The segment ④ must engage in the groove ③ of the chuck.

Screw the locking nut ⑨ (with installed chuck ⑧) onto the holder ⑦.

Insert the required tool ⑩ into the chuck ⑧.

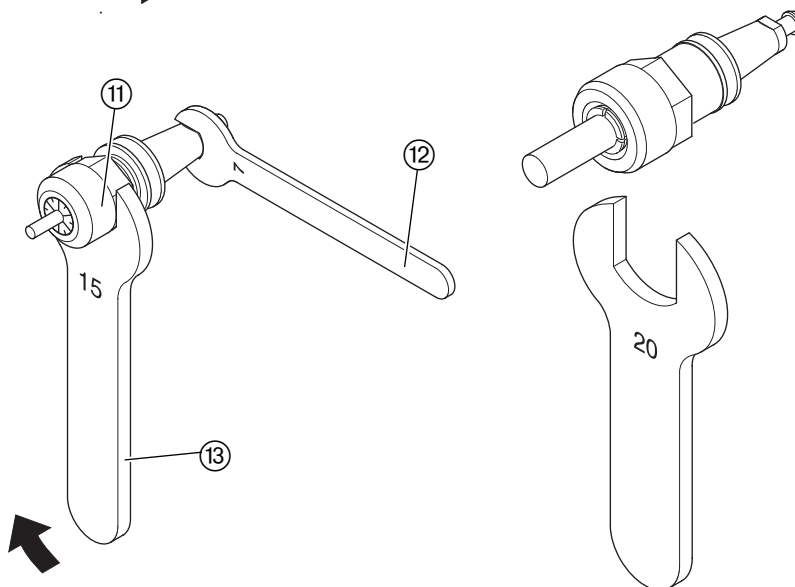


Inserting chuck, sizes 6,35 and 8 mm

Guide the chuck ⑤ straight into the locking nut ⑥, and use pressure to engage in the cleft.

Screw the locking nut ⑨ (with installed chuck ⑧) onto the holder ⑦.

Insert the required tool ⑩ into the chuck ⑧.



Tightening the tool

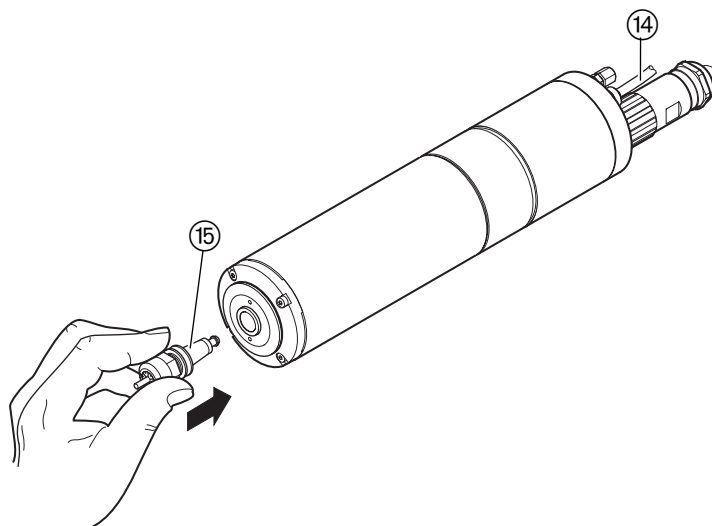
i *Tighten the tool in accordance with the shaft length and details from the tool manufacturer.*

Closing the locking nut ⑪ with open wrench ⑬, applying reverse pressure with open wrench ⑭.

A 6.4 Inserting the chuck holder

Insert chuck holder ⑮ in the direction of the arrow.

To close the chuck holder ⑮, release the air pressure, chuck holder ⑮ is tightened.

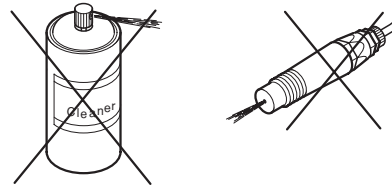


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A 7 Maintenance



- On no account clean the HF Motor-Spindle 4064 SK with ultrasound, steam jet, compressed air, etc.
- Under no circumstances should detergents like e.g. spray purifier, fat solvents, etc. get into the inside of the HF Motor-Spindle 4064 SK.

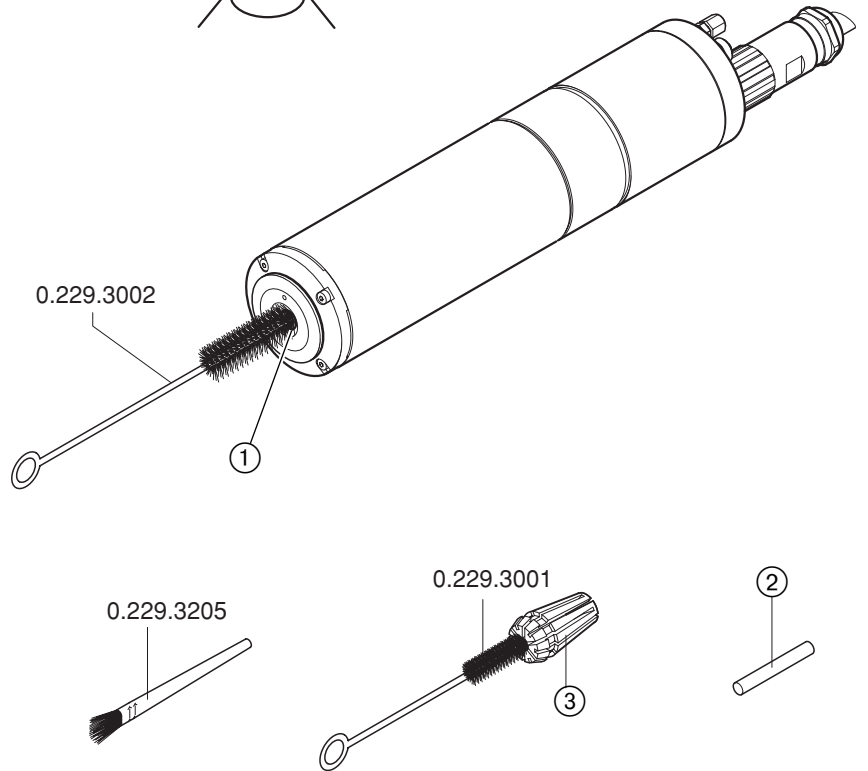


Clean the chuck ③ regularly.

Changing chuck see A 6.

Clean chuck receptacle ① and chuck ③ with a brush.

Reinsert the clean chuck 3 with tool ② or test pin ② in HF Motor-Spindle 4064 SK (see A 6.3-6.4).



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A 8 Technical data

i Further installation dimensions, with tolerances, are available on request from KaVo.

i Applicable Standard EN 60034-1 "Rotating electrical machinery"

A 8.1 HF-Spindle 4064 SK

Type of motor:	BLDC
max. operating voltage.	230 volts
max. torque.	60 Ncm
max. consumption.	3000 watts
max. speed	50.000 min ⁻¹
max. current:	12 amps
max. frequency:	833 Hz
protection class:	I
protection art:	IP 54
Weight without supply cables	3500 grams
Direction of rotation (looking from the front:)	left
Exhaust air:	0.5 - 0.8 bar
Chuck sizes:	2,5 – 8,0 mm

Analysis of concentricity and stability

Concentricity at the cone: <= 0.003 mm

Concentricity at a distance of 16 mm from the chuck

at standard- chucks >= 0,015 mm

at high precision- chucks >= 0,008 mm

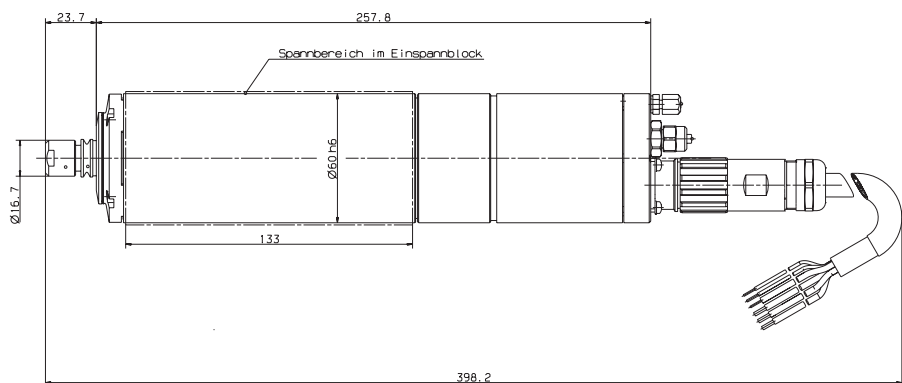
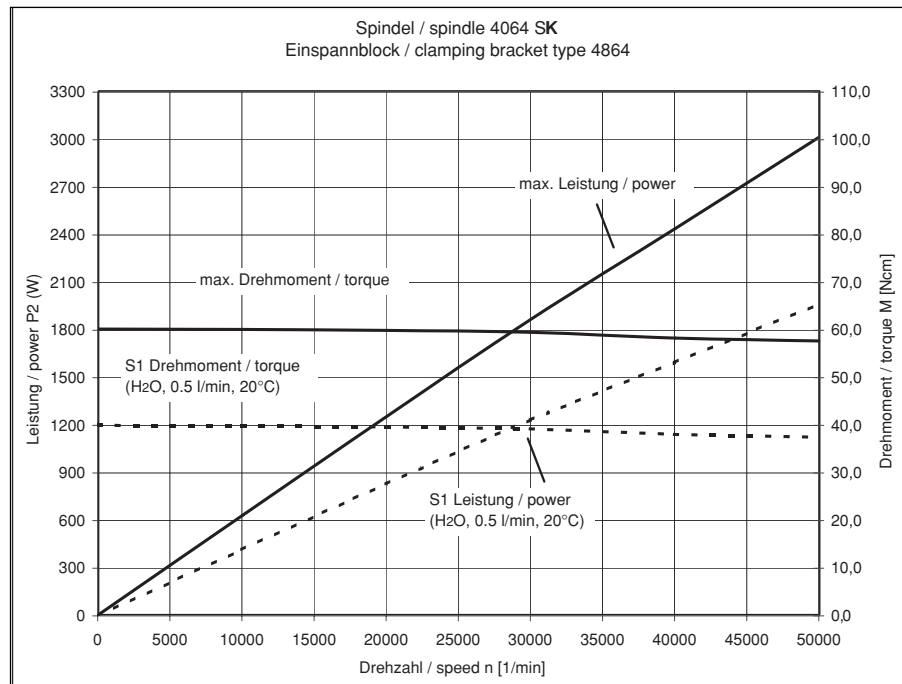
Load direction axial + radial

Operating position horizontal + vertical pointing down)

tool changing pneumatic (5-6 bar)

Cooling water cooling, sh.diagramm

Ballbearings: triple system with lifetime lubrication

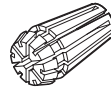


4064 SK.

A 9 Available chucking systems

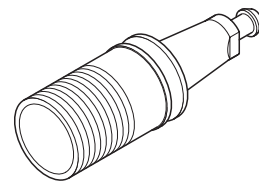
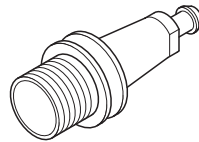
Standard precision chucks:

- Chuck, diameter 2,5 mm
Mat. No. 1.002.7689
- Chuck, diameter 3,0 mm
Mat. No. 1.002.7690
- Chuck, diameter 3,175 mm
Mat. No. 1.002.7691
- Chuck, diameter 6,0 mm
Mat. No. 1.002.7693
- Chuck, diameter 6,35 mm
Mat. No. 1.002.7832



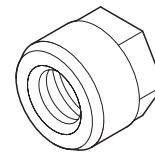
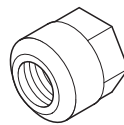
- Chuck holder, for sizes up to 6,0 mm
Mat. No. 1.002.5075

- Chuck holder, for sizes 6,35 mm and 8,0 mm
Mat. No. 1.002.7696



- Locking nut, for sizes up to 6,0 mm
Mat. No. 1.002.4941

- Locking nut, for sizes 6,35 mm and 8,0 mm
Mat. No. 1.002.7695



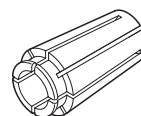
High precision chucks:

- Chuck, diameter 2,35 mm
Mat.-No. 1.003.2015
- Chuck, diameter 2,5 mm
Mat.-No. 1.003.2022
- Chuck, diameter 3,0 mm
Mat.-No. 1.003.2016
- Chuck, diameter 3,175 mm
Mat.-No. 1.003.2017
- Chuck, diameter 4,0 mm
Mat.-No. 1.003.2018
- Chuck, diameter 5,0 mm
Mat.-No. 1.003.2019
- Chuck, diameter 6,0 mm
Mat.-No. 1.003.2020
- Chuck, diameter 6,35 mm
Mat.-No. 1.003.2021



type D:

- Chuck, diameter 8,0 mm
Mat. No. 1.002.7694



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Customer setting 4064 SK

Customer:

Date:

Motor/spindle: HF - Spindle 4064 SK

Official responsible:

Remark :

Sett.- Prio. P	Description	Display	Use			Unit	Factory setting	Customer setting
			ASM	BLDC	BLDCS			
Special settings								
B 42	Max. motor frequency	f_mot_max	X	X	X	Hz	f_mot_nom	
O 43	Max. motor voltage	V_mot_max	X	X	X	V	U_mot_nom	230 V
B 44	Current limit	I_limit	X	X	X	A~	1.5 * I_nom	12 A
O2 46	Rise time	t_rise	X	X	X	s	5.0	
O2 47	Delay time	t_fall	X	X	X	s	5.0	3 sec.
O2 48	Delay time at stop	t_stop	X	X	X	s	t_fall	
O2 50	Start option (catch)	Motorstart	X	-	-	-	Normal	
O2 51	Start time	t_start	-	X	-	s	without ramp	0.5 sec.
O2 52	Start current	I_start	-	X	-	A~	0.4	
O2 53	Start frequency	f_start	-	X	-	Hz	5	
O2 54	Switch-off time WR	t_off	-	X	-	µs	600	
O2 55	DC brake time	t_DC brake	X	-	-	s	2	
O2 56	DC brake current	I_DC brake	X	-	-	A-	1.0	
O2 57	Stop current	I_DC stop	X	X	X	A-	OFF	
O2 58	Flag emergency stop at mains failure	emerg.stop	X	X	X	-	off	
B 59	Speed sensor pulse count	emerg.stop	X	X	X	-	no sensor	
U/f Table								
O 60	Startup voltage	V_start	X	-	-	V~	3% U_nom	
O 61	Frequency 1	f1	X	-	-	Hz	f_mot_nom	
O 62	Voltage 1	V1	X	-	-	V~	U_mot_nom	
O 63	Frequency 2	f2	X	-	-	Hz	f_mot_nom	
O 64	Voltage 2	V2	X	-	-	V~	U_mot_nom	
O 65	Frequency 3	f3	X	-	-	Hz	f_mot_nom	
O 66	Voltage 3	V3	X	-	-	V~	U_mot_nom	
Control								
O 70	Control (U/f, I*R, slip, N)	Control	X	-	-	-	U/f table	
O2 71	I*R comp. rise factor	I*R-factor	X	-	-	V/A	off	
O2 72	Load comp. rise factor	Loadkomp.	X	-	-	%	off	
O2 73	I*R and load comp. filter time	comp-T-filt	X	-	-	ms	20	
O2 75	Slip comp. P-factor	Slipkomp	X	-	-	Hz/A	off	
O2 76	Slip comp filter time	slip-T_filt	X	-	-	Hz/A	20	
W 77	Current limitation	I-limtr-KP	X	X	X	%	40	
W 78	Current limitation	I-limtr-Tn	X	X	X	ms	10	
W 79	Voltage control	V-contr-KP	X	X	X	%	20	
W 80	Voltage control	V-contr-Tn	X	X	X	ms	10	
O3 81	Speed control	N-contr-KP	X	X	X	%	50	
O3 82	Speed control	N-contr-Tn	X	X	X	ms	250	
O3 83	Speed control	N-contr-Tv	X	X	X	ms	30	
O3 84	Speed control	N-con-T_fil	X	X	X	ms	200	
Monitoring:								
B 85	Sensor type	Motor_prot	X	X	X	-	off	PTC
O 86	Resistance	R_protect	X	X	X	ohm	1200	
Nominal motor data: (according to rating plate)								
E 90	Motor design	motortype	X	X	X	-	no motor	BLDC
E 91	Nominal frequency	f_mot_nom	X	X	X	Hz	50	833
E 92	Nominal voltage	V_mot_nom	X	X	X	V	30	200
E 93	Nominal current	I_mot_nom	X	X	X	A	1.0	8
E 94	cos. phi	cos_phi	X	X	X	%	85	98
E 96	Number of poles	no.of_poles	X	X	X	-	2	

Setting priority:

E = Necessary, minimum input,
 B = required according to mode,
 O =set for optimization (opt level)
 W = best left at factory

4064 SK.

Warranty conditions

Under valid KaVo delivery and payment conditions, KaVo gives a warranty of satisfactory function and freedom from faults in material and manufacture for the duration of 12 months from the date of sale certified by the vendor.

In the case of justifiable complaints, KaVo shall supply spare parts or carry out repairs free of charge. KaVo accepts no liability for defects and their consequences which have arisen or could have arisen as a result of natural wear, improper handling, cleaning or maintenance, noncompliance with the maintenance, operating and connecting instructions, corrosion, impurities in the air supply or chemical or electrical influences which are unusual or not admissible in accordance with KaVo's instructions. The warranty claims shall become null and void if defects or their consequences can be attributed to interventions in or modifications to the product. Warranty claims can only be validated if they are notified immediately in writing to KaVo.

Konformitätserklärung;**Declaration of conformity;****KE 59****Déclaration de conformité;****Declaración de conformidad;****CE-Dichiarazione di conformità;**

Wir, We, Nous, Nosotros, Noi,

KaVo ELEKTROTECHNISCHES WERK GmbH
Wangener Str. 78
D-88299 Leutkirch im Allgäu

erklären, dass das Produkt	HF-Spindeln	Typ 4064 SK
declare that the product	HF-Spindle	type 4064 SK
déclarons que le produit	Broche HF	type 4064 SK
declaramos que el producto	Husillo del motor AV	tipo 4064 SK
dichiariamo che il nostro prodotto	Motore industriale	tipo 4064 SK

auf das sich diese Erklärung bezieht, mit den wesentlichen Schutzanforderungen gemäß den Bestimmungen der Richtlinie(n) übereinstimmt.
to which this declaration relates conforms to the essential safety requirements according to the provisions of Directive(s)
auquel se réfère cette déclaration, est conforme aux exigences essentielles de protection conformément aux dispositions de la/ des Directive(s)
al lo cual se refiere esta declaración, coincide con las esenciales exigencias de protección según las determinaciones de la(s) norma(s)
a cui si fa riferimento in questa dichiarazione, è conforme alle misure di sicurezza secondo le direttive delle norm

98/376/EWG	Maschinen Richtlinie
73/23/EWG	Niederspannungsrichtlinie

Zur Beurteilung des Erzeugnisses wurden folgende Normen oder normativen Dokumente angewandt:
The following standards or normative documents were used for assessing the product:
Les normes ou autres documents normatifs suivants sont utilisés pour le jugement de ce produit :
Para la evaluación del producto se aplicaron las siguientes normas o documentos norma:
Per la valutazione del prodotto sono state applicate le seguenti normative o altri documenti normat:

EN 50178	Ausrüstung von Starkstromanlagen mit elektronischen Betriebsmitteln
EN 60034-1	Drehende, elektrische Maschinen

Leutkirch, 22.03.2004

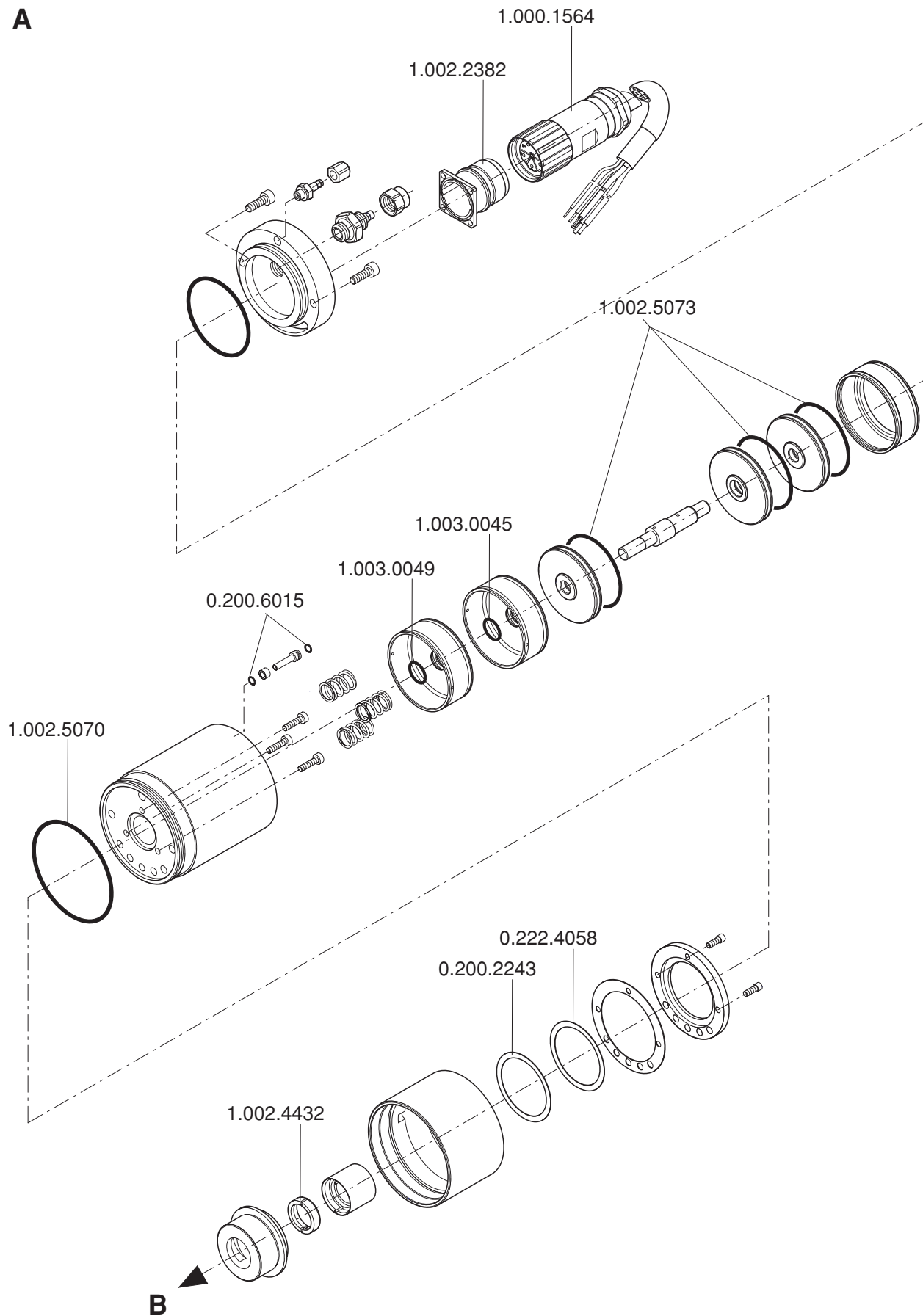


M. Mohr
-Managing Director-

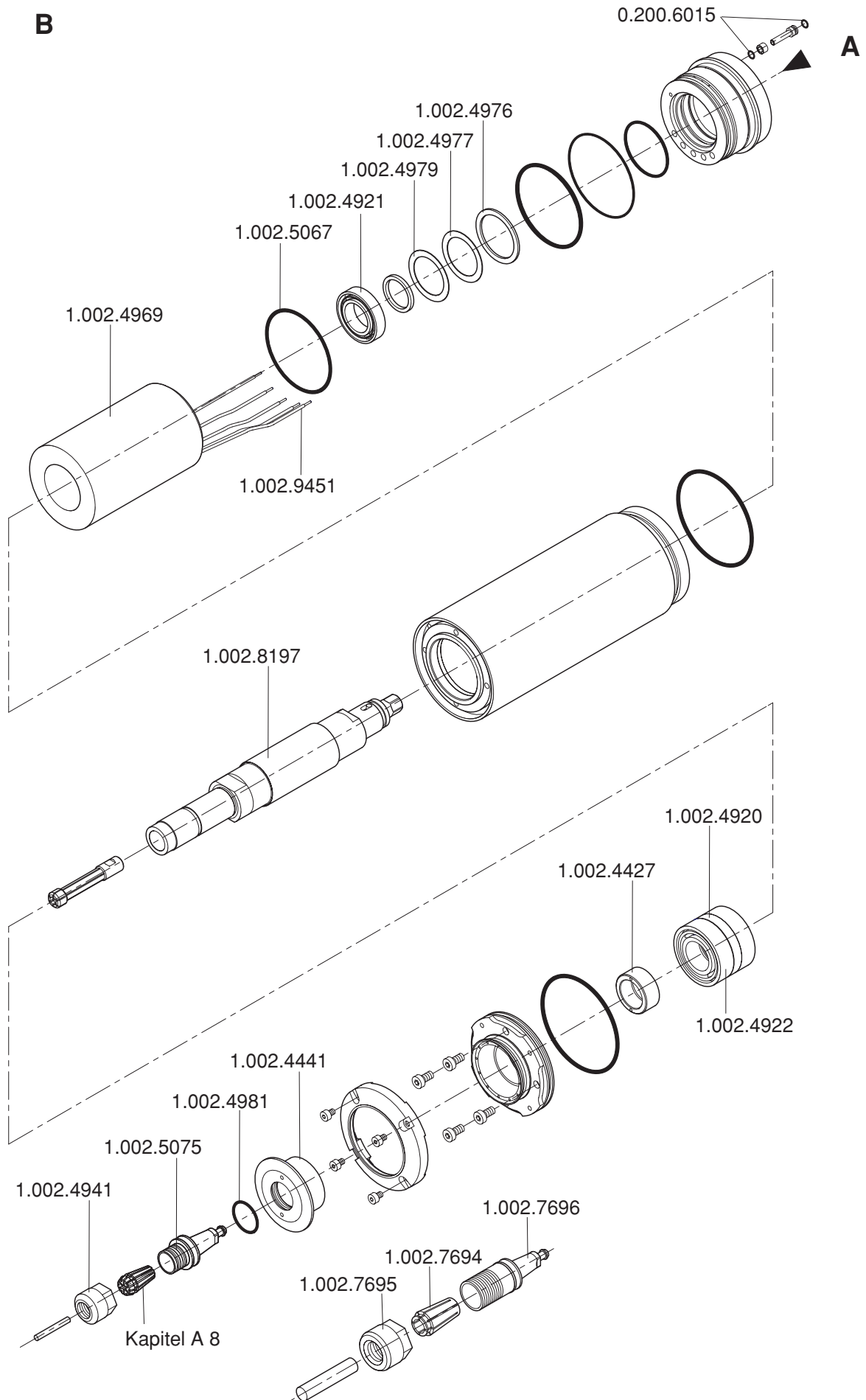
4064 SK.

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4064 SK.





KaVo.Drive Systems

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