Operating Instructions

BA 695 en

Disc-Type Tool Turret

0.5.480.516

2011-05-02

The present manual is part of the product.

- The manual should be kept in an easily accessible place during the product's lifetime.
- The manual should be passed on to the next owner /user of the product.
- Make sure that any possible supplement received is duly added to the manual.
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Manual Translation

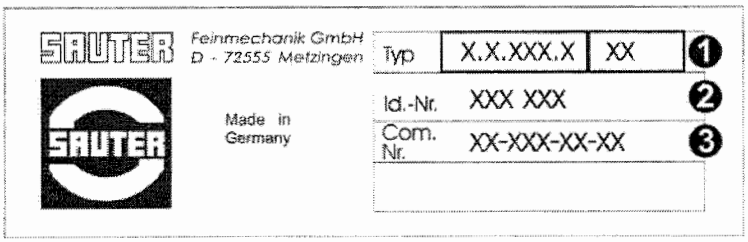
SAUTER

Type plate on turret housing

1 Classification number (series, size)

2 Identification number

3 Order number



Classification number (series, size)	Identification number
0.5.480.516	**088 632** **089 768** **089 778** **089 782** **105 232** **105 288** **105 652** **110 762** **111 072** **115 891** **116 896** **118 668**

Appendix

EP-870
Wiring diagram

SK-919
Diagram of functions

SK-920
Diagram of functions

Contact/Order information

1 Safety notes

The turret corresponds to the state of the art and the recognized technical safety rules. Nevertheless hazards and risks can occur.

1.1 Use within specifications

➢ Install and operate turret only in machines complying with the relevant regulations for workspace protection.
➢ Operate turret only in perfect condition and in compliance with the Operating Instructions.

1.2 Required skills

- Work may only be performed on the turret by qualified staff. These are persons who are able to identify risks and to prevent possible hazards on the basis of their special training and their experience (IEC 60 201-1).
- All work on the electrical system is to be carried out by a qualified electrical engineer only.
- Only trained and competent personnel may work on the turret; this personnel must have been instructed in accordance with the Operating Instructions and directly on the turret.

1.3 Notes on product-specific risks

Setting tasks require a 24 V DC power supply.

Clearing required prior to any work:

➢ Switch the machine off.
➢ Depressurize turret.

WARNING

In the event of a fault or a collision, unexpected rotation of the tool disk is possible.
Injury hazard.

CAUTION

Do not attempt any further switching operations, if the turret is damaged, as otherwise considerable consequential damage may be caused.

➢ Call SAUTER Service.

CAUTION

Functional faults may be caused by an ingress of chips and contamination.

➢ Close open tool locations and cooling lubricant bores by means of suitable closing plugs.

For manual operation, turn the motor shaft with the help of a hexagonal pin wrench, complete with T-grip.

WARNING

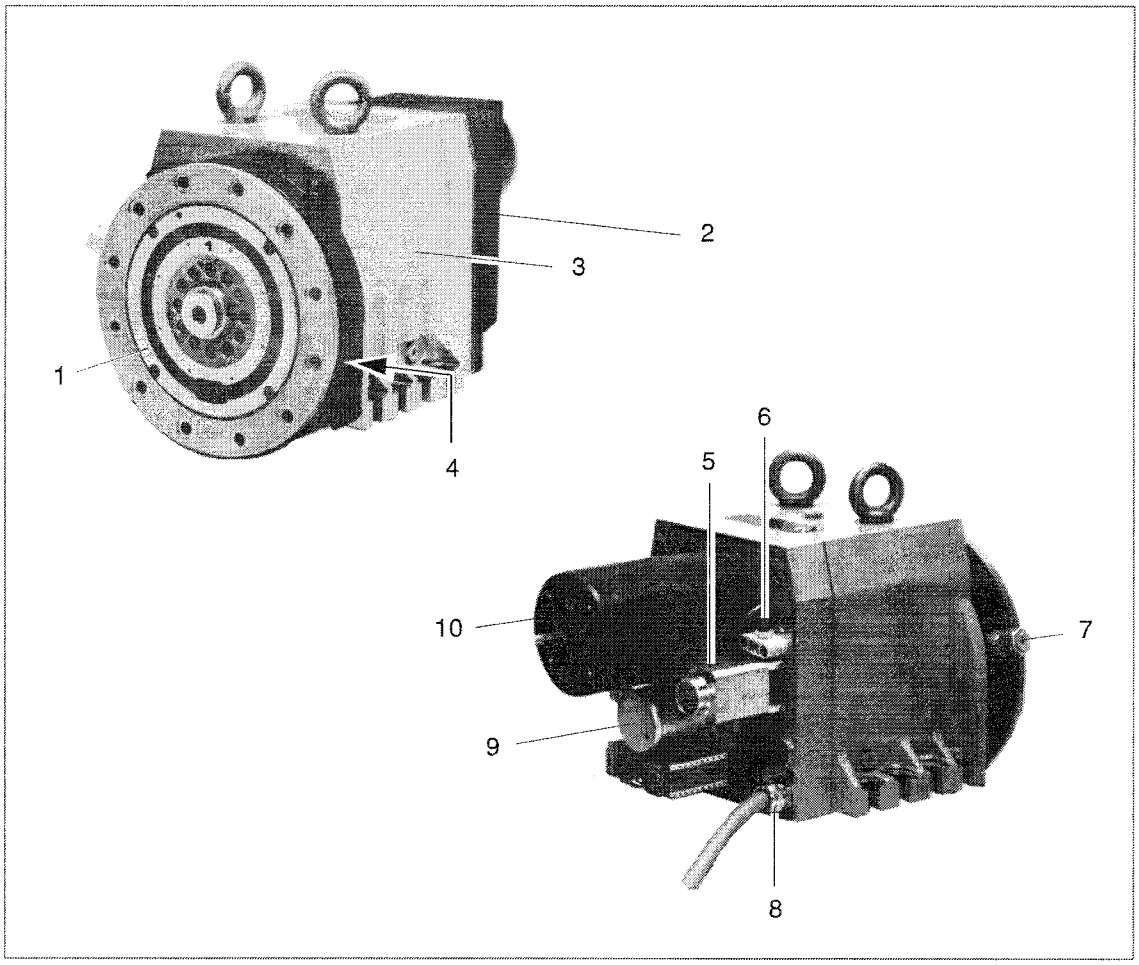
A reversal of the moment of the motor results in the acceleration of the motor shaft. The hexagonal pin wrench may thus be unexpectedly accelerated.
Therefore, in order to avoid the ejection of the hexagonal pin wrench and resulting injuries, firmly grip the hexagonal pin wrench.

1.4 Disposal

➢ Comply with all national and regional disposal regulations and laws.

2 Product description

2.1 Designation of parts



1	Locating disk
2	Covering hood for electric components
3	Turret housing
4	Cooling lubricant valve
5	Solenoid
6	Proximity switch S7 "Check pre-indexation"
7	Cooling lubricant connection
8	Electric supply for turret
9	Angular encoder
10	Turret motor

2.2 Technical data

Number of indexing positions			8 or 12 or 16
Perm. tangential torque [1] (turret locked) at calculated safety		Nm	1,250 1.3
Perm. mass moment of inertia of tool disk, tool holders, and tools		kgm^2	0.6 – 3.2 [2]
Perm. unbalance (load moment) caused by tool holders and tools		Nm	32
Indexing times [2]			
Theoretical cycle time (unlock/turn/lock) at rotating angle α [degrees]		s	$i \times \frac{41 + \alpha}{n} \times 0.17 + 0.1$
Gear ratio	i		see turret type plate
Motor speed	n	rpm	see motor rating plate
Perm. indexing frequency		min^{-1}	12.5 – 7 [2]
Operating voltage/mains frequency			see motor rating plate
Degree of protection			IP 65
Turret mass (without tool disk)		kg	approx. 46
Maximum mass of the tool disk inclusive of tool holders and tools		kg	80
Maximum mass of the tool holders and tools fitted [3]		kg	32
Perm. ambient temperature range		°C °F	+10 ... +40 +50 ... + 104
Operating pressure for cooling lubricant [4]			
Cooling lubricant valve – standard version constant supply externally switched supply Medium pressure valve (option)		 bar bar bar	 7 14 25

1) The perm. loads refer to processing without load shocks. Whenever processing is subject to intermittent cuts, shocks or impacts, a significantly reduction in the values needs to be taken into account.

2) Depending on gear ratio and mains frequency

3) For standard tool disks

4) In order to achieve an extended service life of the cooling lubricant valve, it is advisable to filter the cooling lubricant by ≤ 100µm. Post-connected loads (spindle units with internal cooling lubricant guide a.o.) may require a higher degree of filter fineness. Note and comply with the manufacturer's instructions!

3 Manual mode

In manual mode, the mechanical functions of the disk-type tool turret will be checked:

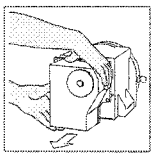
- following initial assembly to the machine
- during troubleshooting
- after a renewed setup following fault conditions

Clearing required prior to any work:

➢ Switch the machine off.

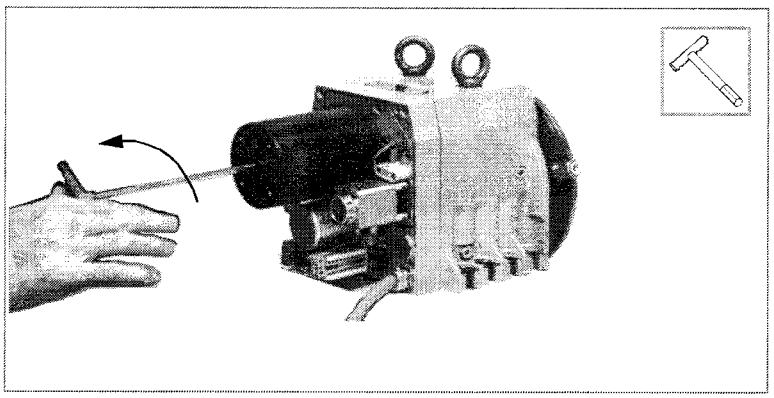
➢ Depressurize turret.

1. Undo fixing screws of covering hood, withdraw covering hood to rear. If necessary, use push-off screw.



2. Remove screw plug on motor housing.

Unlock turret



3. Use a hexagonal pin wrench, complete **with T-grip**, to rotate the motor shaft.

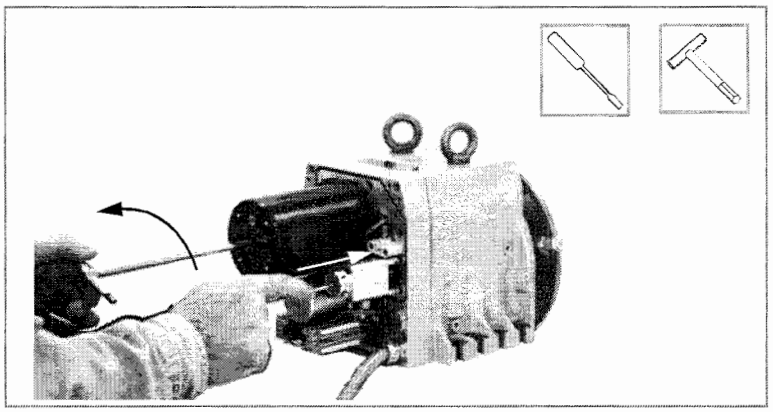
   ➪ If the disk-type tool turret is locked, the locating disk (or tool disk) does not co-rotate; the centre position of the lock can be felt.

WARNING

A reversal of the moment of the motor results in the acceleration of the motor shaft. The hexagonal pin wrench may thus be unexpectedly accelerated.
Therefore, in order to avoid the ejection of the hexagonal pin wrench and resulting injuries, firmly grip the hexagonal pin wrench.

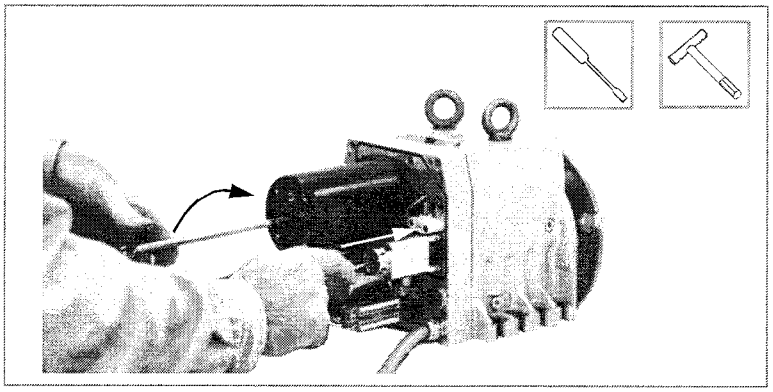
4. Keep the same direction of rotation, continue to rotate.
   ➪ The disk-type tool turret unlocks; a reversal of the moment on the motor shaft can be felt.

Rotate tool disk



5. Keep direction of rotation, continue to rotate disk until locating disk (or tool disk) starts to turn as well.
6. Keep direction of rotation, continue to rotate disk until locating disk (or tool disk) has reached the position required, then press in the keeper by means of a screwdriver.
   ➪ The preindexing bolt engages into a hole.
   ➪ The tool disk cannot be rotated any further.

Lock turret



7. Reverse direction of rotation on the motor shaft whilst simultaneously pressing in keeper.
   ⇨ The disk-type tool turret locks.
   The lock resistance can be felt when rotation is continued.
   The locking process ends, if the centre position of the lock can be felt.

On completion of setup or maintenance work:

8. Screw in plug and fit covering hood.
   Note position of cables in order to avoid any pinching of the same.

Lock turret in position 1

IMPORTANT

For some setup and maintenance work the disk-type tool turret has to be locked in position 1.

Precondition

- Numeral 1 of the locating disk has reached its 12 o'clock position relative to the turret base area.
  or
- Position 1 of the tool disk is in working position.

1. Use a hexagonal pin wrench, complete **with T-grip**, and rotate the motor shaft until position 1 has been reached.
2. Press in the keeper by means of a screwdriver and rotate the motor shaft until the disk-type tool turret locks (see above).

4 Maintenance

Safety notes

→ *Page 5*

4.1 Overview

4.2 Service life

The service life of the turret is
approx. 2–3 million indexing operations.

These values apply to

- collision-free operation,
- compliance with the specified operating conditions and the permissible loads,
  → *Technical data, page 8*

4.3 Service intervals

Plan your tasks carefully in order to provide for troublefree operation and reduce necessary downtimes to a minimum.

IMPORTANT

➢ Maintenance intervals must be adapted to the operating conditions involved.

after 4000 operating hours of the machine respectively	Check cooling lubricant valve for wear and leakage. Replace any defective parts.	User → *Page 23*
	Check oil of the turret gearbox chamber; if necessary, replenish oil.	User → *Page 14*
after 2½ years respectively	Check all electrical lines and connections for mechanical damage as well as embrittlement. Replace any defective parts.	User Specialist electrical engineer [1)]
after 8000 operating hours of the machine respectively	Change the oil of the turret gearbox chamber.	User → *Page 14*
after approx. 2–3 million indexing operations respectively	The service life of the turret may possibly be reached, depending on the operating conditions involved. A general overhaul is recommended for further trouble-free operation.	SAUTER Service

1) These are persons who are able to identify risks and to prevent possible hazards on the basis of their special training and their experience (IEC 60 201-1).

4.4 Maintenance work

Turret gearbox chamber

The turret gearbox chamber has to be serviced after 4,000 operating hours.

Clearing required prior to any work:

➢ Switch the machine off.

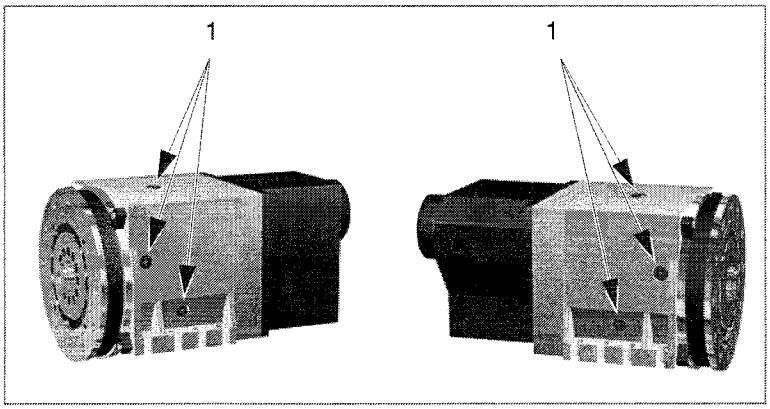
➢ Depressurize turret.

IMPORTANT

Improperly disposed used oil is a danger for our environment.

➢ Pay attention to the legal regulations for the waste disposal of used oil.

In line with the **setup position** of the disk-type tool turret, the following apertures (1) for draining or replenishing oil are provided:



Checking the oil

➢ Carefully unscrew oil drain plug and drain the oil (max. 10 cm^3) into a suitable container.

Assess oil condition

Condition	Cause	Action
Oil black or brown, without metallic abrasion	Natural consumption	–
Oil black or brown, with metallic abrasion	Internal parts of turret are damaged	Request SAUTER Service!
Oil white, mixed with cooling lubricant	Turret sealings are damaged	
None oil left	Turret sealings are damaged	

Changing the oil

➢ Open oil drain plug, drain waste oil.

➢ Close oil drain plug.

➢ Remove screw plug from oil charging hole.

Fill oil

170 cm^3

lubricating oil	C	acc. to ISO 6743/6
viscosity	ISO VG 46	acc. to DIN 51562

➢ Screw in screw plug.

4.5 Possible faults and remedies

Clearing required prior to any work:

➢ Switch the machine off.

➢ Depressurize turret.

Fault	Cause	Remedy	Who carries out this task?
Turret			
Incorrect center height, tool disk offset relative to locating disk	Collision when turret is locked	Turn back tool disk in the annular groove and align	User → *Page 29*
Tool disk does not rotate	Gearwheels are defective	SAUTER Service	
Turret is difficult to operate	Insufficient oil in the gearbox chamber	Check oil	User → *Page 14*
(Thermo protection device has responded)	Contactor is defective	Check motor drive	User
Turret no longer locks or the pre-indexing bolt gets caught	Collision during pivoting	SAUTER Service	
Tool disk does not stop in the selected position	Angular encoder is not correctly adjusted or defective	Check angular encoder, set or replace if necessary	User → *Page 18, page 20*
	Proximity switch S7 does not switch	Check proximity switch S7, set or replace if necessary	User → *Page 26*
Tool disk stops in between two positions	Chips between tool disk and turret	Remove tool disk, remove chips	User
Leakage oil escapes	Seals are defective	SAUTER Service	

Fault	Cause	Remedy	Who carries out this task?
Cooling lubricant is not being transferred	Cooling lubricant valve is defective	Replace cooling lubricant valve	User → *Page 23*
	Cooling lubricant valve/ line is blocked	Blow cooling lubricant valve/line clear	
Cooling lubricant escapes between tool disk and turret	Cooling lubricant valve is defective	Replace cooling lubricant valve	
Tangential play of tool disk when turret is locked	Collision while turret is locked	SAUTER Service	
	Wear due to lack of oil		

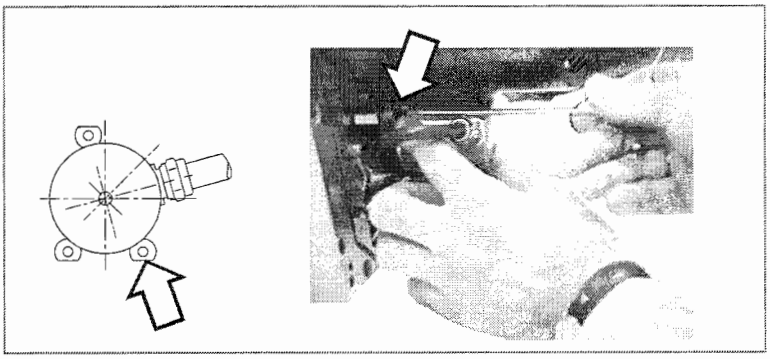
4.6 Adjusting the angular encoder

IMPORTANT
Setting tasks require a 24 V DC power supply.

Preparation

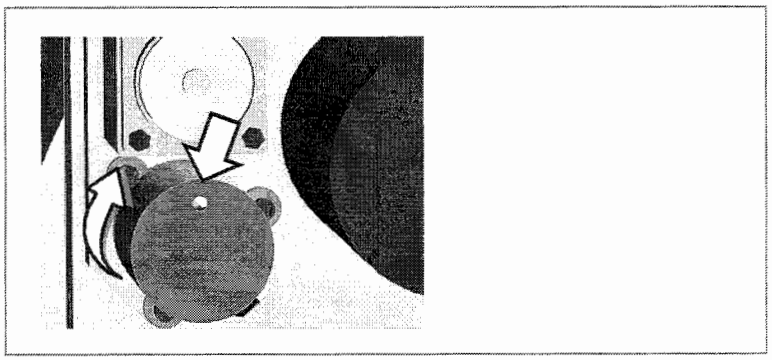
➢ Lock disk-type tool turret in position 1.

→ *Manual mode, page 9*



➢ Undo claws by means of a hexagonal pin wrench.

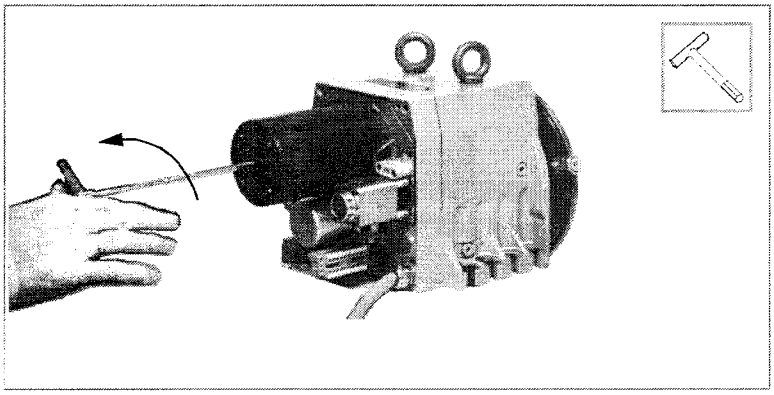
Adjusting



➢ Rotate angular encoder out of position until illuminated diode lights up.

➢ Clamp in angular encoder by means of the claws.

Checking the setup for symmetry



1. Use hexagonal pin wrench **with T-grip** for rotating the motor shaft.
2. Rotate motor shaft until illuminated diode on the angular encoder or the indication "Position 1" on the machine are extinguished.
3. Note the T-grip position.

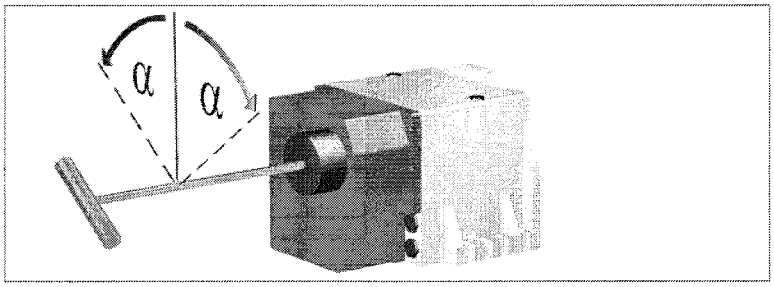
WARNING

A reversal of the moment of the motor results in the acceleration of the motor shaft. The hexagonal pin wrench may thus be unexpectedly accelerated.
Therefore, in order to avoid the ejection of the hexagonal pin wrench and resulting injuries, firmly grip the hexagonal pin wrench.

4. Carefully continue to rotate until a moment reversal can be felt on the motor shaft.
5. Note the T-grip position.

The distance between the two grip positions characterizes the angle range.

6. Repeat steps 1 to 5 with reverse direction of rotation. The angle α must be the same for both directions of rotation!



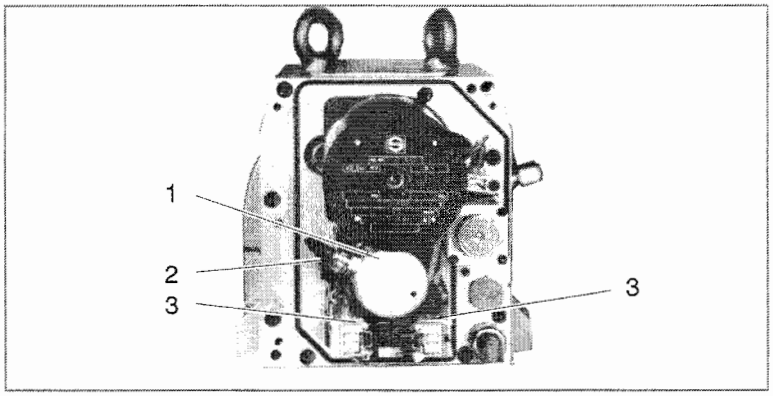
By turning the angular encoder out of position, any dissymmetry can be removed.

4.7 Replacing the angular encoder

IMPORTANT
Setting tasks require a 24 V DC power supply.

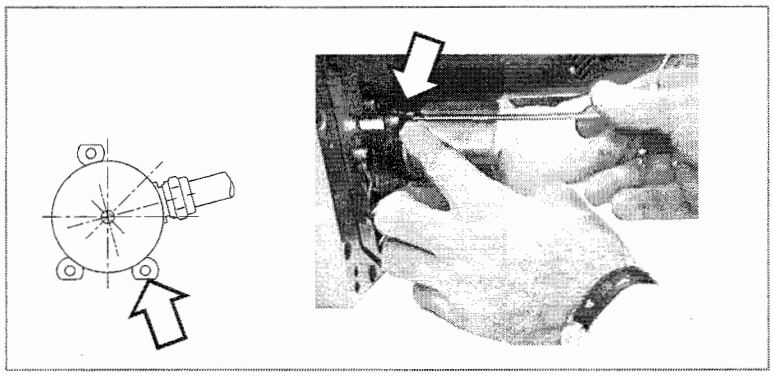
Preparation

➢ Lock disk-type tool turret in position 1.
→ *Manual mode, page 9*



➢ Note the position of the cable outlet (2) on the angular encoder (1), remove attachment.

➢ Undo cables (3) on terminal strip (note where they are connected).



➢ Undo claws by means of a hexagonal pin wrench.

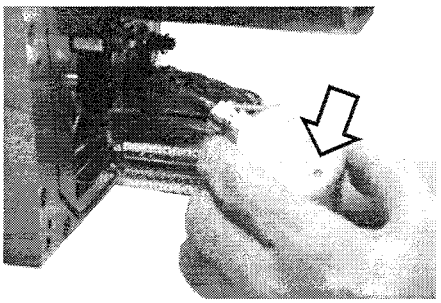
Replacing

➢ Undo setscrew.

➢ Carefully withdraw angular encoder.

➢ Connect new angular encoder electrically.

→ *Wiring diagram Disk-type tool turret EP-870 in the appendix to these Operating Instructions*

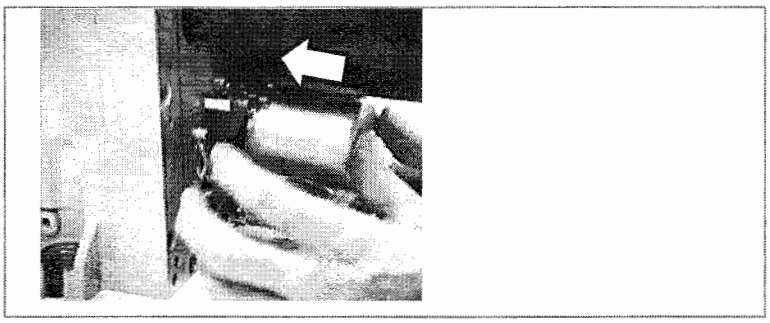


➢ Rotate shaft of the angular encoder until the illumination of the LED on the angular encoder indicates the "Position 1" setting.

This indication must remain whilst the following steps are carried out.

IMPORTANT

The LED is used only to indicate position 1 during the adjustment work. It is no position indicator during operation.



- ➢ Ensure that the cable outlet is in its correct position.
- ➢ Insert the shaft of the angular encoder into the bore of the flexible shaft and introduce carefully until the angular encoder is in contact with the plate. Ensure that the claws are in their correct position!
- ➢ Use setscrew to attach the angular encoder to the shaft.
- ➢ If necessary, check the adjustment of the angular encoder.
  → *Page 19*
- ➢ Use claws to secure the angular encoder.
- ➢ Fit covering hood. Note position of cables in order to avoid any pinching of the same.

4.8 Cooling lubricant valve

- Cooling lubricant valves for SAUTER Disk-type tool turrets are executed depending on the order involved.
  The cooling lubricant connection may be situated on the valve.
- Cooling lubricant valves are wearing parts and must therefore be inspected after 4,000 operating hours of the machine respectively.
- For ordering replacement parts, the identification number of the cooling lubricant valve can be indicated, if engraved. Otherwise, the order number (i.e. Comm. No. on the turret nameplate) must be given.
- Operating pressure and filter fineness for cooling lubricant:
  → *Technical data*

Replacing the cooling lubricant valve

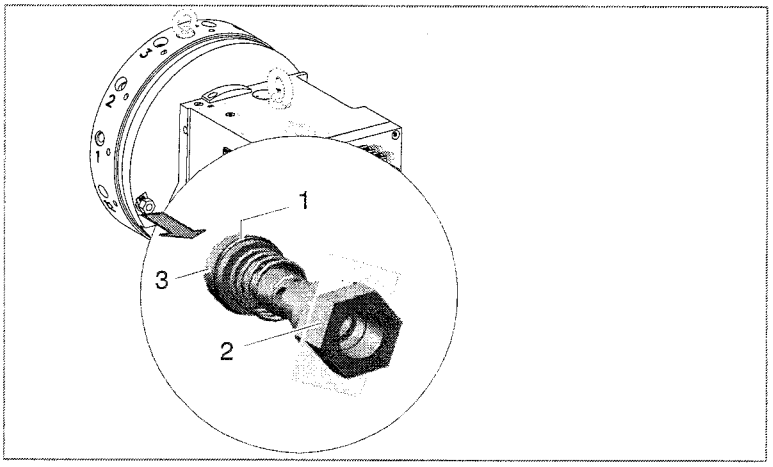
Clearing required prior to any work:

➢ Switch the machine off.

➢ Depressurize turret.

➢ Turn off cooling lubricant supply unit.

Example 1 Cooling lubricant cartridge



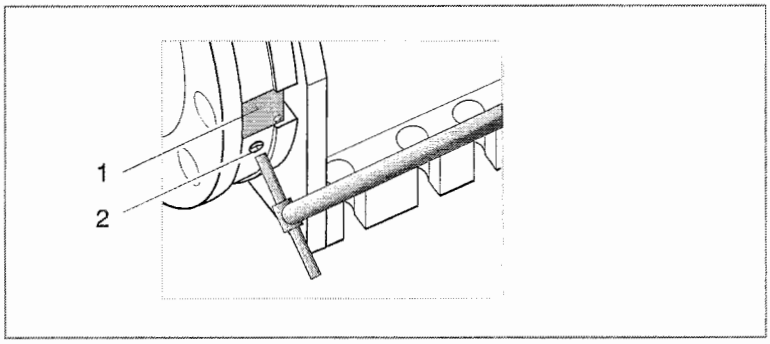
➢ Unscrew screw plug (2).

➢ Withdraw cooling lubricant cartridge complete with screw plug (2).

➢ Check cooling lubricant cartridge; if necessary, replace bushing (3) and O-ring seal (1).

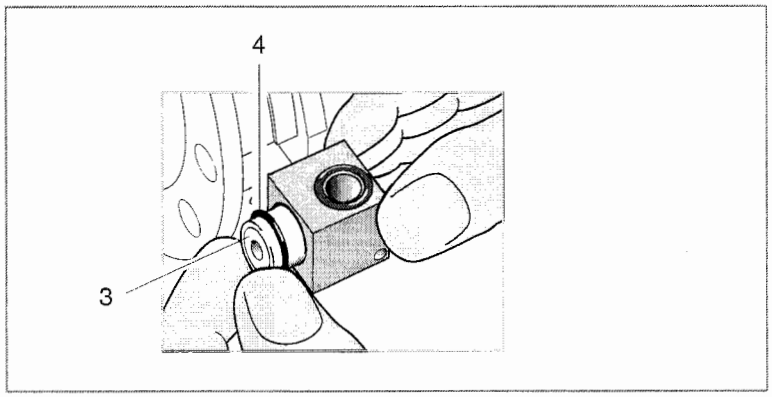
➢ Refit cooling lubricant cartridge complete with screw plug.

Example 2 Cooling lubricant valve with valve carrier



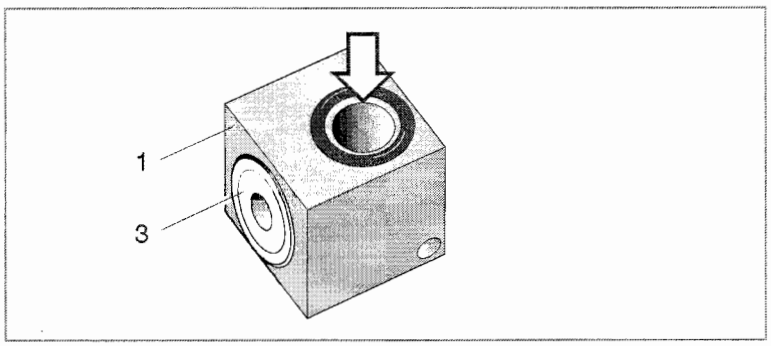
➢ Loosen setscrew (2).

➢ Withdraw valve carrier (1).

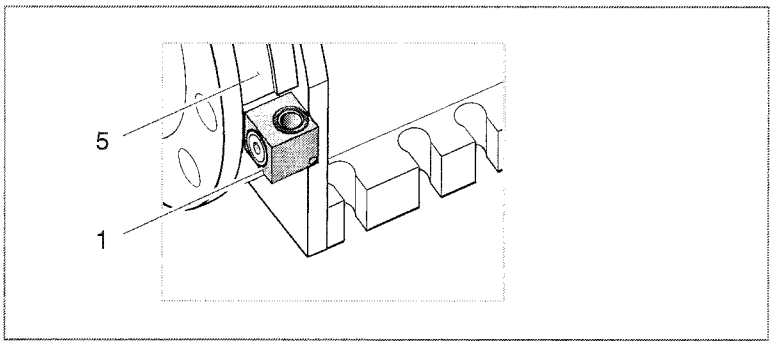


➢ Remove valve bushing (3), note any loose internal parts!

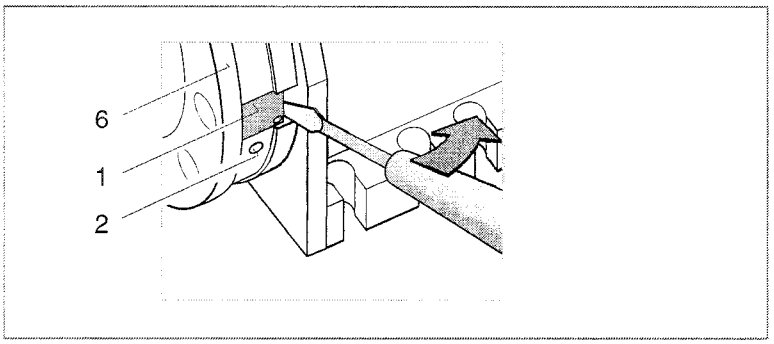
➢ Check O-ring seal (4).
Replace cooling ubricant valve, if necessary.



➢ Insert valve bushing (3), with land on the inside, into the valve carrier (1) such that the openings for cooling lubricant supply are located one above the other.



➢ Insert valve carrier (1) into the cooling lubricant ring (5).



➢ Press valve carrier (1) against locating disk (6).

➢ Tighten setscrew (2).

In the process, ensure that setscrew (2) engages in the groove of valve carrier (1).

4.9 Proximity switch S7

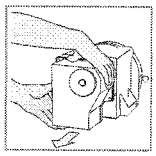
IMPORTANT
Setting tasks require a 24 V DC power supply.

Clearing required prior to any work:

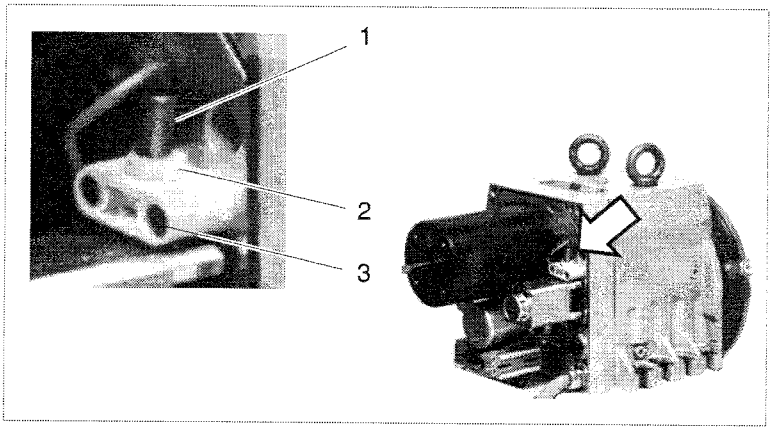
➢ Switch the machine off.

➢ Depressurize turret.

➢ Undo fixing screws of covering hood, withdraw covering hood to rear. If necessary, use push-off screw.

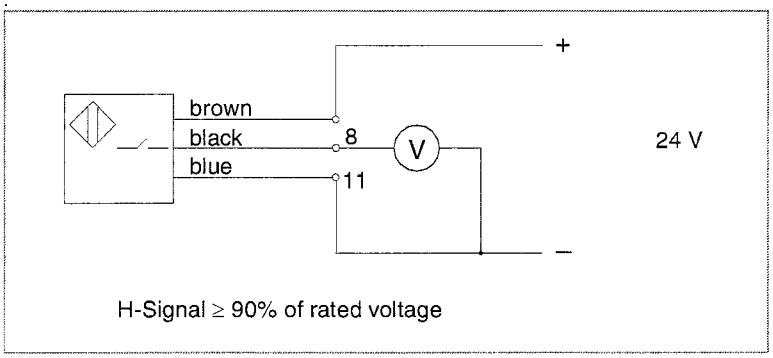


Replacing



➢ Undo clip (3) and withdraw proximity switch (1) from eccentric bushing (2).

Checking



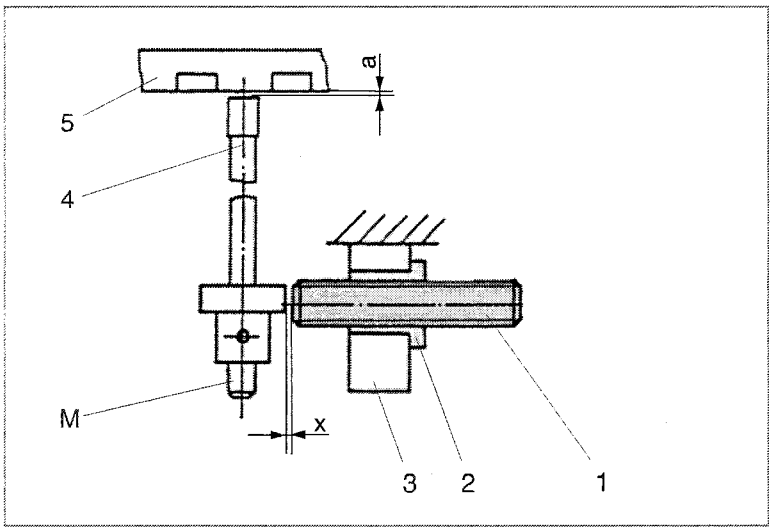
➢ Apply a voltage of 24 V DC to the proximity switch (1).
The proximity switch is energized when the LED lights up.

➢ Insert tested/new proximity switch (1).

Adjusting

➢ Unlock disk-type tool turret.
→ *Manual mode, page 9*

➢ Move disk-type tool turret into a location between two positions.
If the keeper (M) is operated, the preindexing bolt (4) can be pressed in partially only.



➢ Set switching distance x = 0.3 – 0.5 mm.

➢ Determine dimension a.
a = stroke of the preindexing bolt (4) up to the damping ring (5) when the solenoid is operated manually (corresponds to the press-in depth of the keeper (M)).

➢ Adjust proximity switch (1) on eccentric bushing (2) such that its signal begins to drop after a+ $2^{+0.5}$ mm immersion depth of the preindexing bolt.

Any greater immersion depth may cause the motor to be blocked.

➢ Tighten clip (3).

➢ Fit covering hood. Note position of cables in order to avoid any pinching of the same.

Function test

➢ Switch on turret.

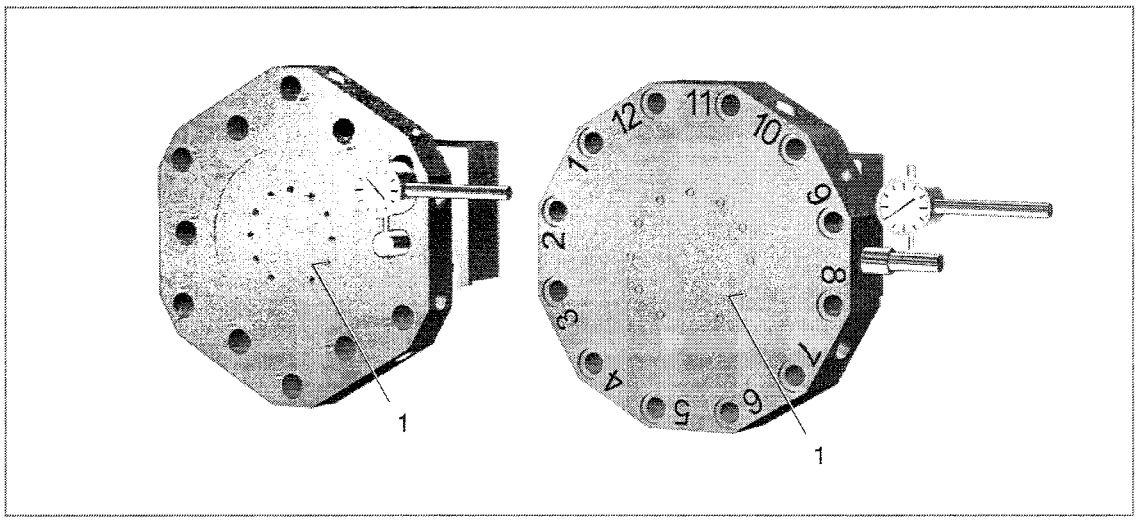
➢ Check switching process repeatedly.

4.10 Aligning the tool disk

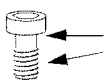
Preparation

➢ Lock turret.
→ *Manual mode, page 9*

Aligning



➢ If necessary, undo screws (1).
➢ Align the locating hole to center height of the machine; use a plug gauge (2) if required.
➢ Tighten screws (1).

M8 - 12.9		MoS_2	 39 Nm

5 Replacement parts

IMPORTANT

➢ Please contact SAUTER Services.

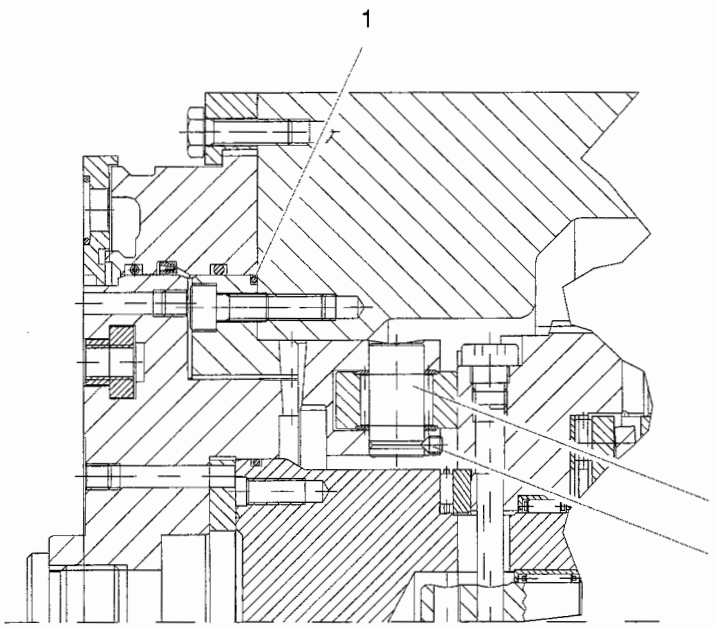
➢ Please follow the ordering instructions.

→ *Information at the end of the present manual*

IMPORTANT

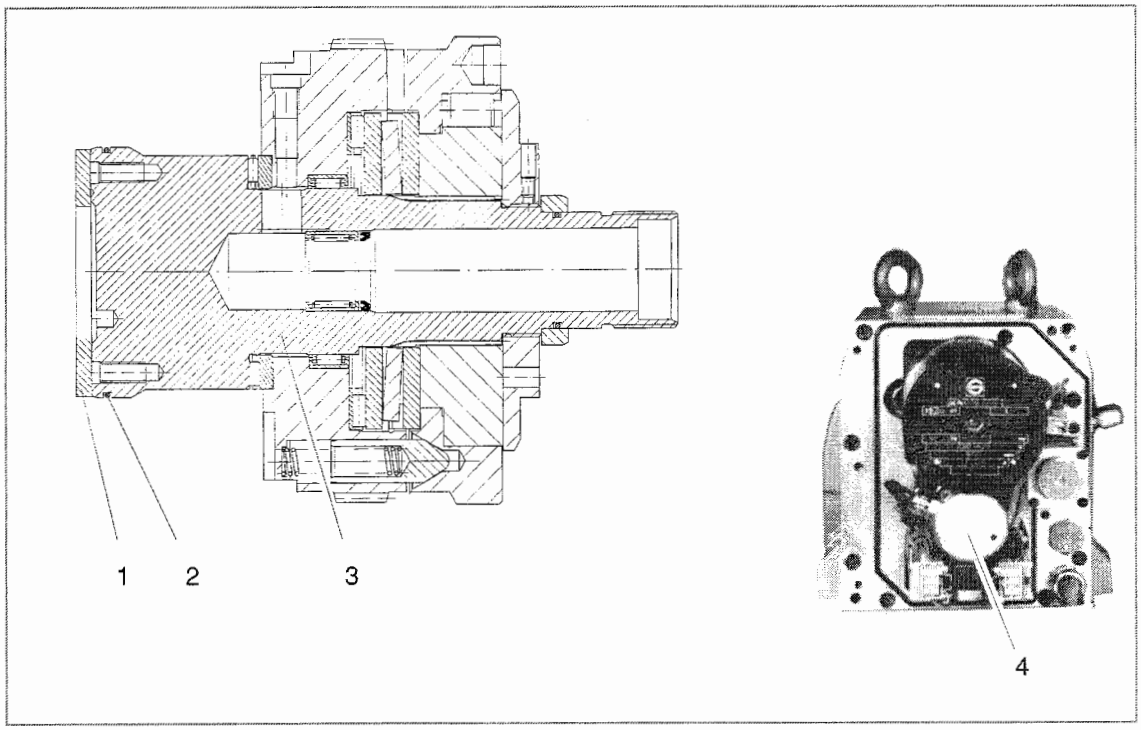
Request assembly guideline MR 02.025!

Indexing



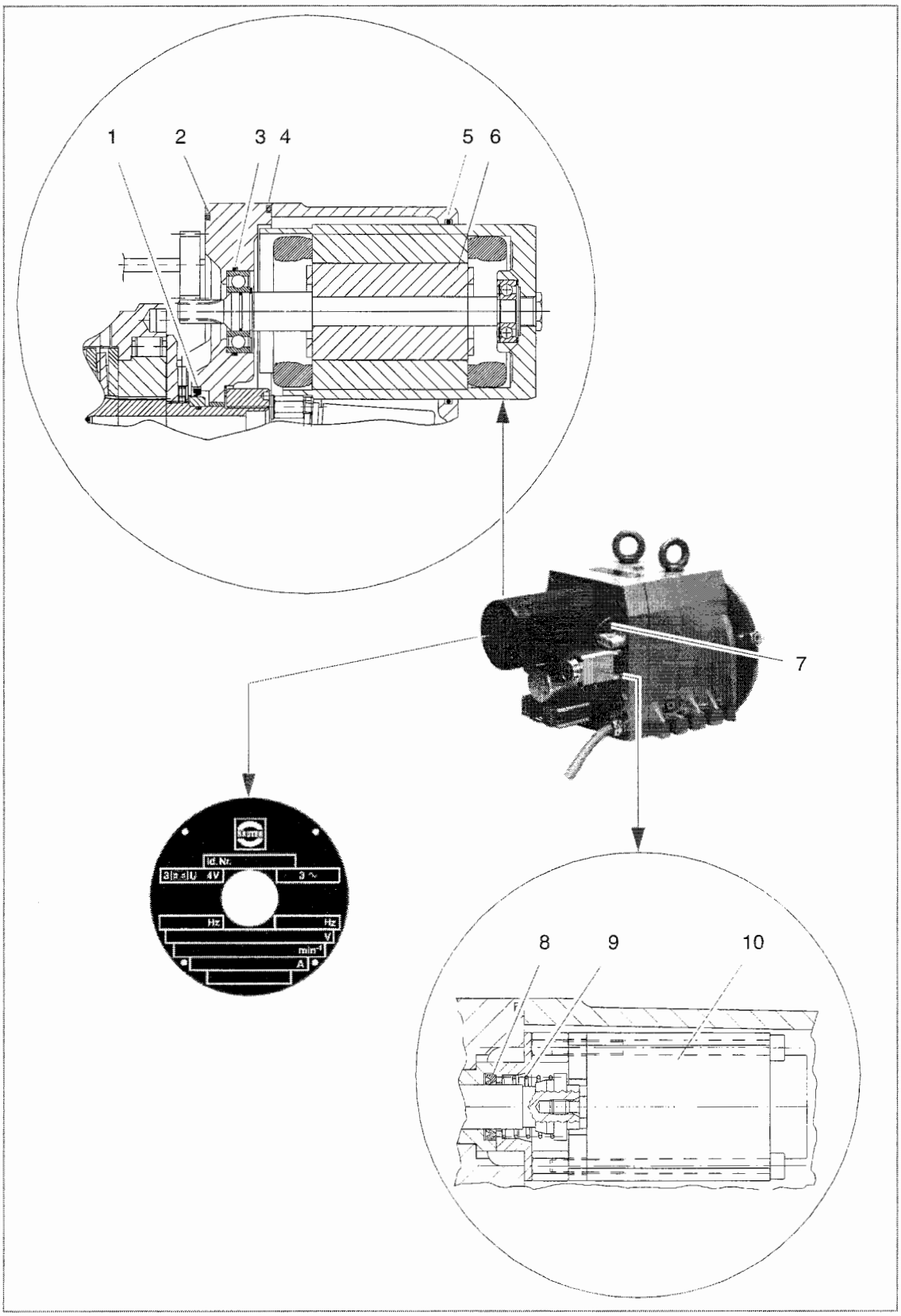
No.	Ident No.	Designation	Qty.
1	058 943	O-ring seal	1
2	101 419	Replacements parts group *Indexing*	3

Clamping and angular encoder



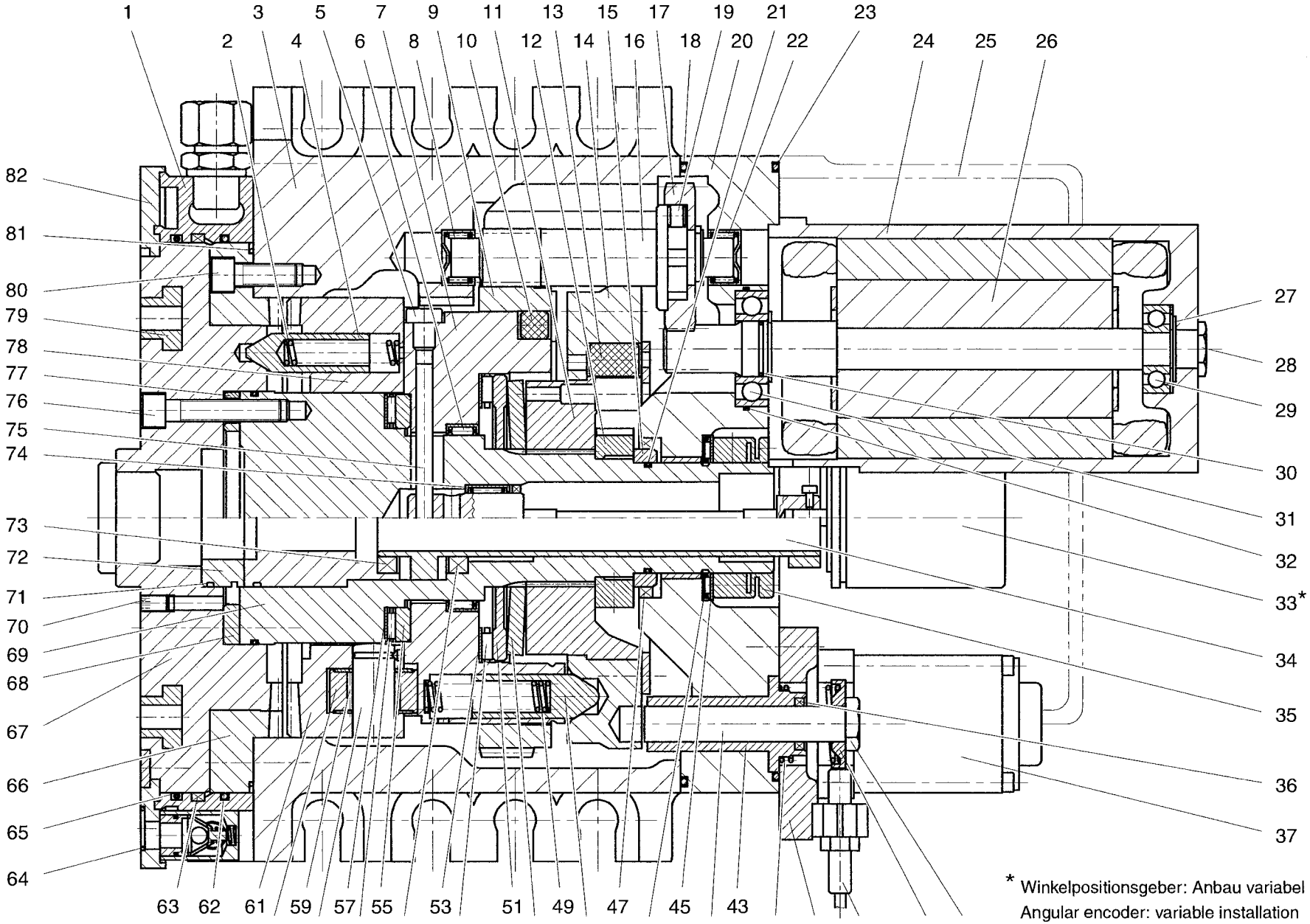
No.	Ident No.	Designation	Qty.
1	069 947	Disk (for tuning)	1
2	063 360	O-ring seal	1
3		Replacements parts group *Clamping*	1
4	105 500	Angular encoder	1

Gear, drive, pre-indexation



No.	Ident No.	Designation	Qty.
1	069 916	Sealing ring	1
2	058 506	O-ring seal	1
3	001 031	O-ring seal	1
4	060 254	O-ring seal	1
5	065 718	O-ring seal	1
6		Motor [1) 2)]	1
7	004 157	Proximity switch	1
8	040 690	Sealing ring	1
9	065 754	Compression spring	1
10	066 293	Solenoid	1

1) will be supplied complete with housing and bearing
2) data according to motor's nameplate

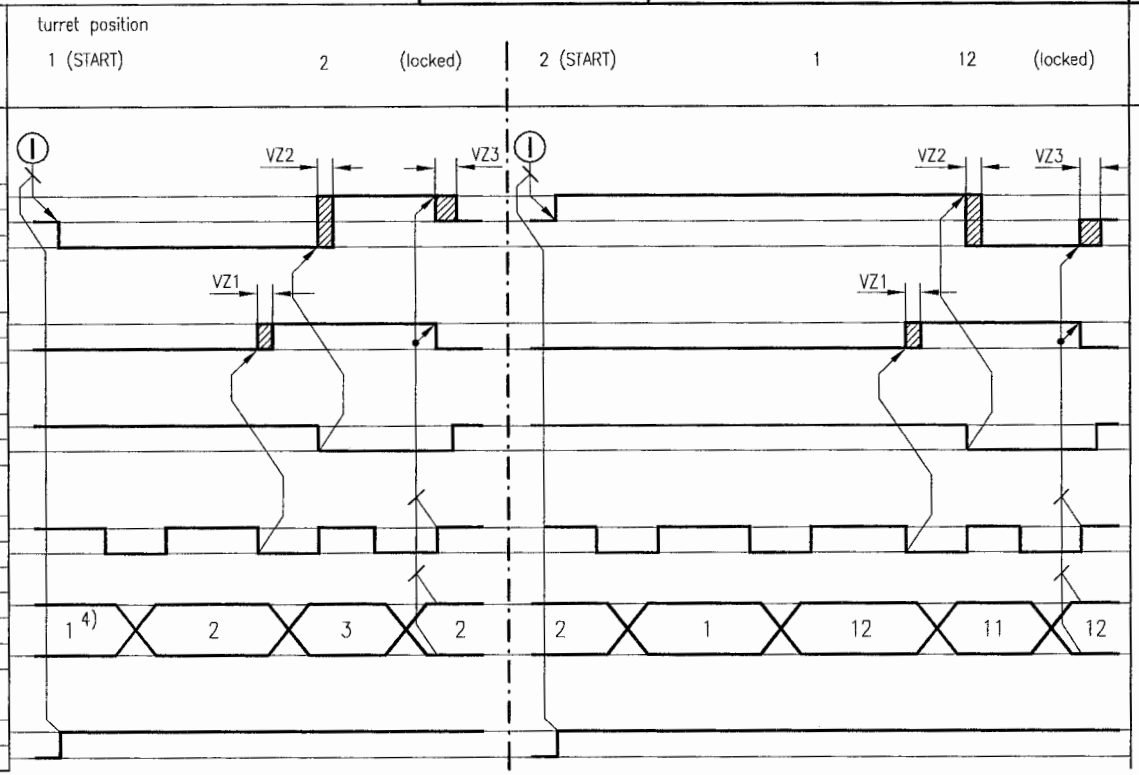


* Winkelpositionsgeber: Anbau variabel
Angular encoder: variable installation
Capteur de position angulaire: Montage variable

SAUTER

Control sequence diagram	SAUTER–DISK–type tool turret 0.5.4...5.. 12/16 Positionen	SK–919 e Z–Doku–idNr. 090571

	denomination	designation	situation	dimension
01				
02				
03				
04	Driving motor	M1	CCW ↺ CW 1) ↻	
05			OFF	
06			CW ↻ CCW 1) ↺	
07				
08				
09	Solenoid pre–indexing	Y1	on	
10			off	
11				
12				
13	Proximity detector / pre–indexing control	S7		1
14				0
15				
16				
17	Angular encoder Positions and locking control For positioning Code see table 1	S1	Strobe	1
18				0
19			Bit–Signale 1.– 5.Bit	1
20				
21				
22				0
23				
24				
25	For tool drive 0.5.473.5.. "Check tool drive disengaged"	S11		1
26				0



note

For VZ1 – VZ3 see table 2

1) Turret C.C.W. – Pos. sequence left handed

2) VZ2 Min.: Account users specifications of producer.

3) Only 16 postions.

4) Angular encoder position

Table 1

Funktion	Angular encoder position 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Strobe	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1.Bit	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0
2.Bit	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0
3.Bit	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0
4.Bit	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0
5.Bit 3}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Parity–Check	1	1	0	1	0	0	1	1	0	0	1	0	1	1	0	1
	↻ → ← ↺															
	[↺ → 1) ← ↻]															

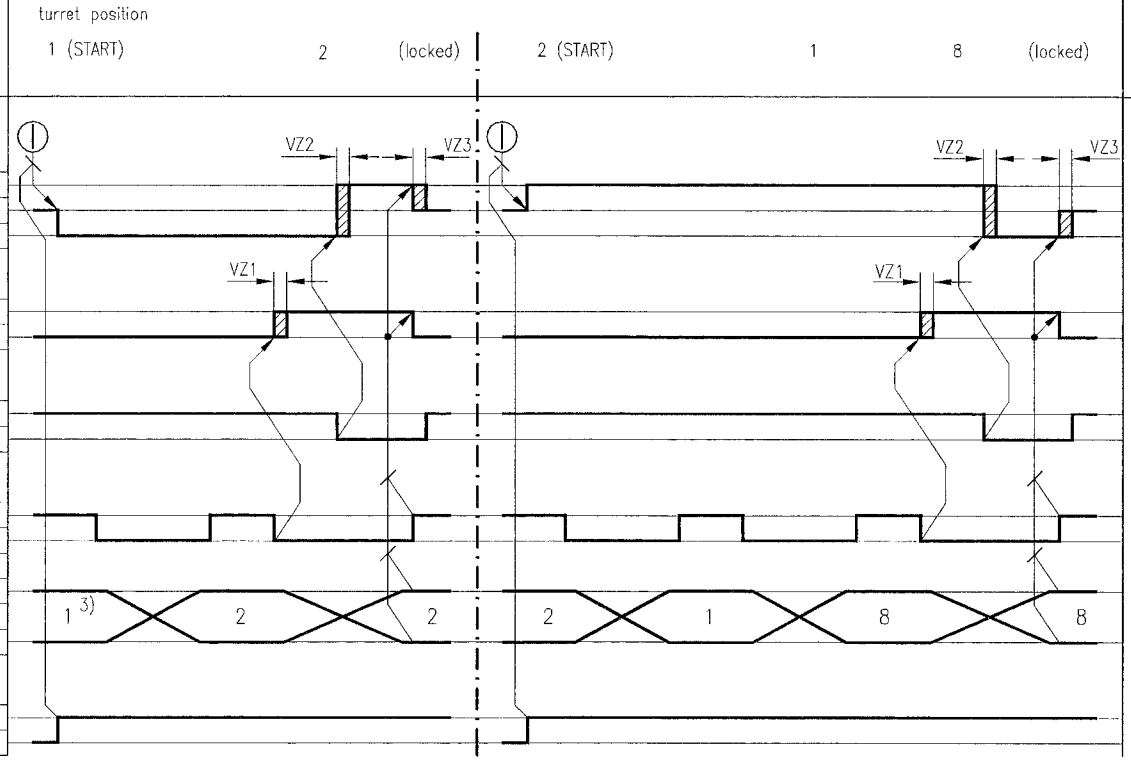
Table 2

		Min.	Max.
Admissible delay time	VZ1 (ms)		30
	VZ2 (ms)	2)	60
	VZ3 (ms)		40

Edition: 01.06.12			SAUTER Feinmechanik GmbH D–72555 Metzingen Germany	Datum: 17.03.89	gez.: Wa	gepr.:

Control sequence diagram	SAUTER–DISK–type tool turret 0.5.4...5.. 8/10 Positionen	SK–920 e Z–Doku–IdNr. 090572

	denomination	designation	situation	dimension
01				
02				
03				
04	Driving motor	M1	CCW ↺ CW 1) ↻	
05			OFF	
06			CW ↻ CCW 1) ↺	
07				
08				
09	Solenoid pre–indexing	Y1	on	
10			off	
11				
12				
13	Proximity detector / pre–indexing control	S7		1
14				0
15				
16				
17	Angular encoder Positions and locking control For positioning Code see table 1	S1	Strobe	1
18				0
19			Bit–Signale 1.– 4.Bit	1
20				
21				
22				0
23				
24				
25	For tool drive 0.5.473.5.. "Check tool drive disengaged"	S11		1
26				0



note

For VZ1 – VZ3 see table 2

1) Turret C.C.W. – Pos. sequence left handed

2) VZ2 Min.: Account users specifications of producer.

3) Angular encoder position

Table 1

Funktion	Angular encoder position 1	2	3	4	5	6	7	8	9	10
Strobe	1	1	1	1	1	1	1	1	1	1
1.Bit	1	0	1	0	1	0	1	0	1	0
2.Bit	0	1	1	0	0	1	1	0	0	1
3.Bit	0	0	0	1	1	1	1	0	0	0
4.Bit	0	0	0	0	0	0	0	1	1	1
Parity–Check	1	1	0	1	0	0	1	1	0	0
	↺ → ← ↻									
	[↻ → 1) ← ↺]									

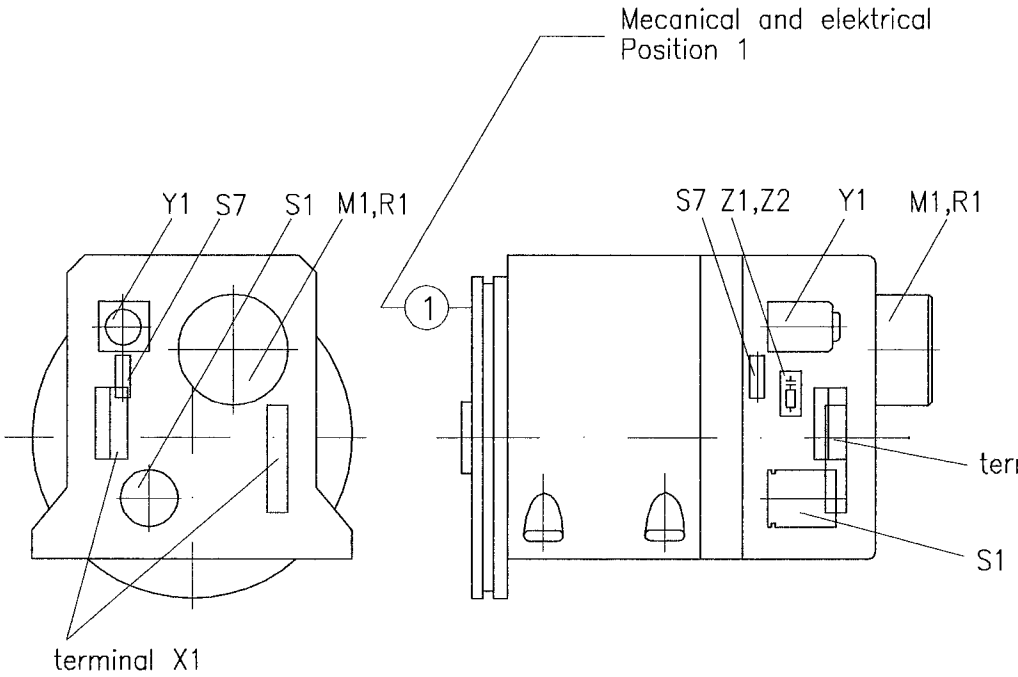
Table 2

		Min.	Max.
Admissible delay time	VZ1 (ms)		30
	VZ2 (ms)	2)	60
	VZ3 (ms)		40

Edition:			SAUTER Feinmechanik GmbH D–72555 Metzingen Germany	Datum:	gez.:	gepr.:
01.06.12 Al				17.03.89	Wa	

Wiring layout	SAUTER DISK-type tool turret $0.5.48^{0}_{1}.5..$	EP-870 e Z-Doku-IdNr. 090505

desig-nation	Element/Function		Line	terminal X1		cable ④ 14x0,34 mm²	cable ④ 12x0,75 mm²		Type	Supplier
S1	Angular encoder		brown (+)	12		brown			BRGB2-$W^{C}_{D}B^{08}_{12}$-EP-P-$^{L}_{R}$-K BRGD0-WCD16-EP-P-$^{L}_{R}$-K	Balluff
			blue (−)	11		blue				
		1.Bit	white	1		white				
		2.Bit	yellow	2		yellow				
		3.Bit	green	3		green				
		4.Bit	lilac	4		lilac				
	⑤	5.Bit	grey	5		grey				
		Strobe	black	6		black				
		Parity	pink	7		pink				
		screen	transparent	13		transp.				
S7	Proximity-Detector control pre-indexing		brown (+)	12					BES 516-324-E^{4}_{0}-C-01	Balluff
			blue (−)	11						
			black	8		red				
R1	① Posistor-heat detector		blue	14			4		PTC-Thermistor DIN 44081 U≦ 4V DC	SAUTER
			blue	15			5			
M1	3-Phase A.C. Motor (release-indexing-locking)		② * 2U	U1			1			
			2V	V1			2			
			2W	W1			3			
			1U	U2			8			
			1V	V2			9			
			1W	W2			10			
	Ground			⏚			yellow-green			
Y1	Solenoid pre-indexing		brown (+)	③ 16			6		24V=; 2,0A to size 516 40%ED; 2,8A from 520	Schultz
			blue (−)	③ 17			7			
Z1	Motor screening unit	④	black 1	U1	* 2U				RC3/PG 91.206	Peters
			black 2	V1	2V					
			black 3	W1	2W					
Z2	Motor screening unit	④⑥	black 1		1U				RC3/PG 91.206	Peters
			black 2		1V					
			black 3		1W					



① for this, protective motor switch (thermistor) is required. Without thermistor motor protector no guarantee in case of motor failure.

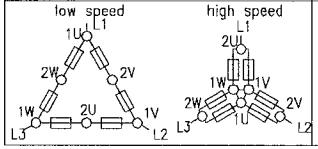
③ Diode 1N4006 (mounted to terminals).

④ depending on the turret's outfit.

⑤ for 16 positions only.

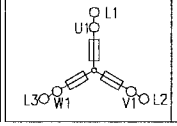
⑥ for ΔΥΥ-motor only.

Motor M1 ⑥ Driving Motor with two speeds



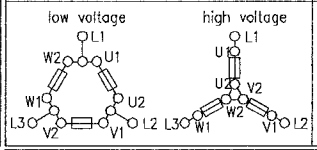
*	increasing positions sequence cw	ccw
1U	black	brown
1V	blue	blue
1W	brown	black
2U	lilac	red
2V	white	white
2W	red	lilac

Motor M1 (3-wires) ②



	increasing pasitians sequence cw	ccw
U1	black	brown
V1	blue	blue
W1	brown	black

Motor M1 (6 wires) Connection to terminals ②



	increasing positions sequence cw	ccw
U1	black	brown
V1	blue	blue
W1	brown	black
U2	red	lilac
V2	white	white
W2	lilac	red

Technical Data of:	S1	S7
Operating voltage:	15-30V DC	10-24V DC ±20%
Max. residual ripple:	10%	10%
Max. load current:	50mA (⑤ 25mA)	200mA
Nom. sensing distance:	–	1mm
Temperature range:	0° bis +60°C	-20° bis + 65°C
Function:	–	n.o. (make) function
Type:	pnp logic	pnp logic

Edition					Datum:	gez.:	gepr.:
00.03.27 Al				SAUTER Feinmechanik GmbH D-72555 Metzingen Germany	05.03.91	Al	

Contact
Order information

	Service SAUTER Feinmechnanik GmbH Postfach 1551 D-72545 Metzingen Germany
	++49(0) 7123–926–0
	++49(0) 7123–926–193
@	service@sauter-feinmechanik.com

IMPORTANT

Please indicate in your orders:

Product data as per nameplate on the housing

1. Classification number (series, size)
2. Identification number
3. Order number

Ordering data as per replacement-parts drawing and table

4. Identification number and quantity of the spare part requested.

Client

5. Company
6. Client's name and phone number.