Product Information PI 31.2

Disk-type tool
with y-axis slide feet unit

Series **0.5.453.4xx**
0.5.493.5xx
0.5.693.1xx
0.5.439.1xx

2011-11-22

SAUTER

Index

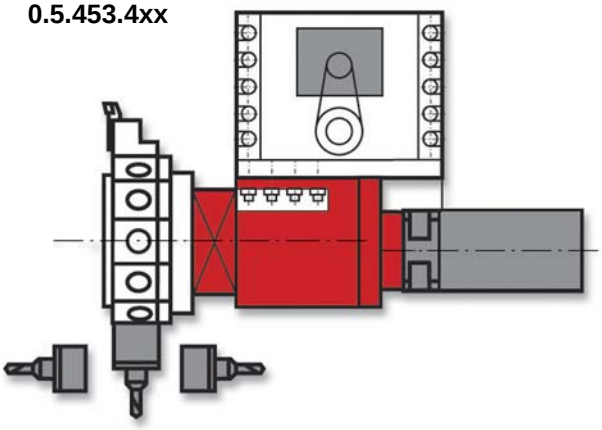
NOTES:

The information given in this product information is based on the details available at the time of printing. We explicitly reserve the right to make changes arising out ofthe continuous further development of the product.

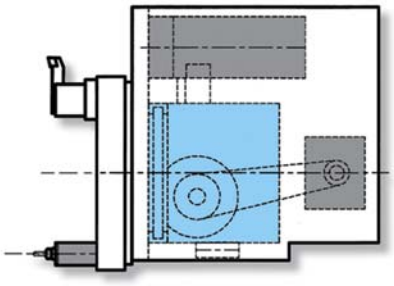
Description

Configuration of principle

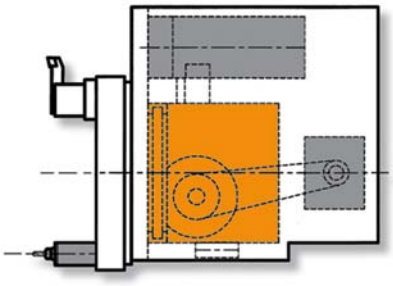
0.5.453.4xx



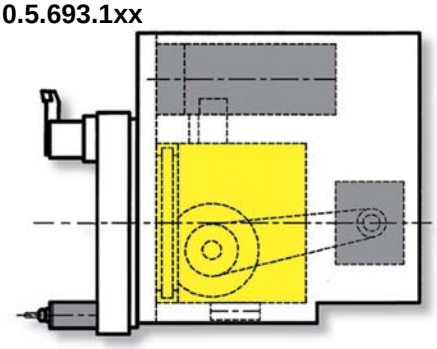
0.5.493.5xx



0.5.439.1xx



0.5.693.1xx



Description

SAUTER disk-type tool turret with y-axis-slide feet unit

SAUTER disk-type tool turret are available in different designs also featuring a y-axis slide feed unit adjustable with a CNC machine. This allows for off centre drilling with powered tools as well as tapping and CNC plane milling..

For **forward and reverse** maschine, the turret system

- **0.5.453.4xx** with servo electrical turret drive and hydraulic latching is available.

For **forward machining**, the turret systems

- **0.5.493.5xx** with electromechanical design
- **0.5.693.1xx** with rein hydraulcal function und
- **0.5.439.1xx** servo-electrical tool turret drive und hydraulic latching.

The slide feed units of the turrets 0.5.453.4xx and 0.5.693.1xx feature permanently lubricated, pre-stressed roller guides. They are powered by a servomotor with toothed belt and ball screw spindle.

DieThe slide feed unit position is detected by the motor sensor.
The slide feed unit guides of the turret system 0.5.493.5xx are constructed flat .
They are also powered by a servomotor, toothed belt and ball screw spindle.
The exact slide feed unit position is detected by a separated linear measurement system.

The slide feed units are also positioned by the motor in case of rotating operations so that any additional clamping or locking mechanisms are not required.

Technical Data 0.5.453.4xx

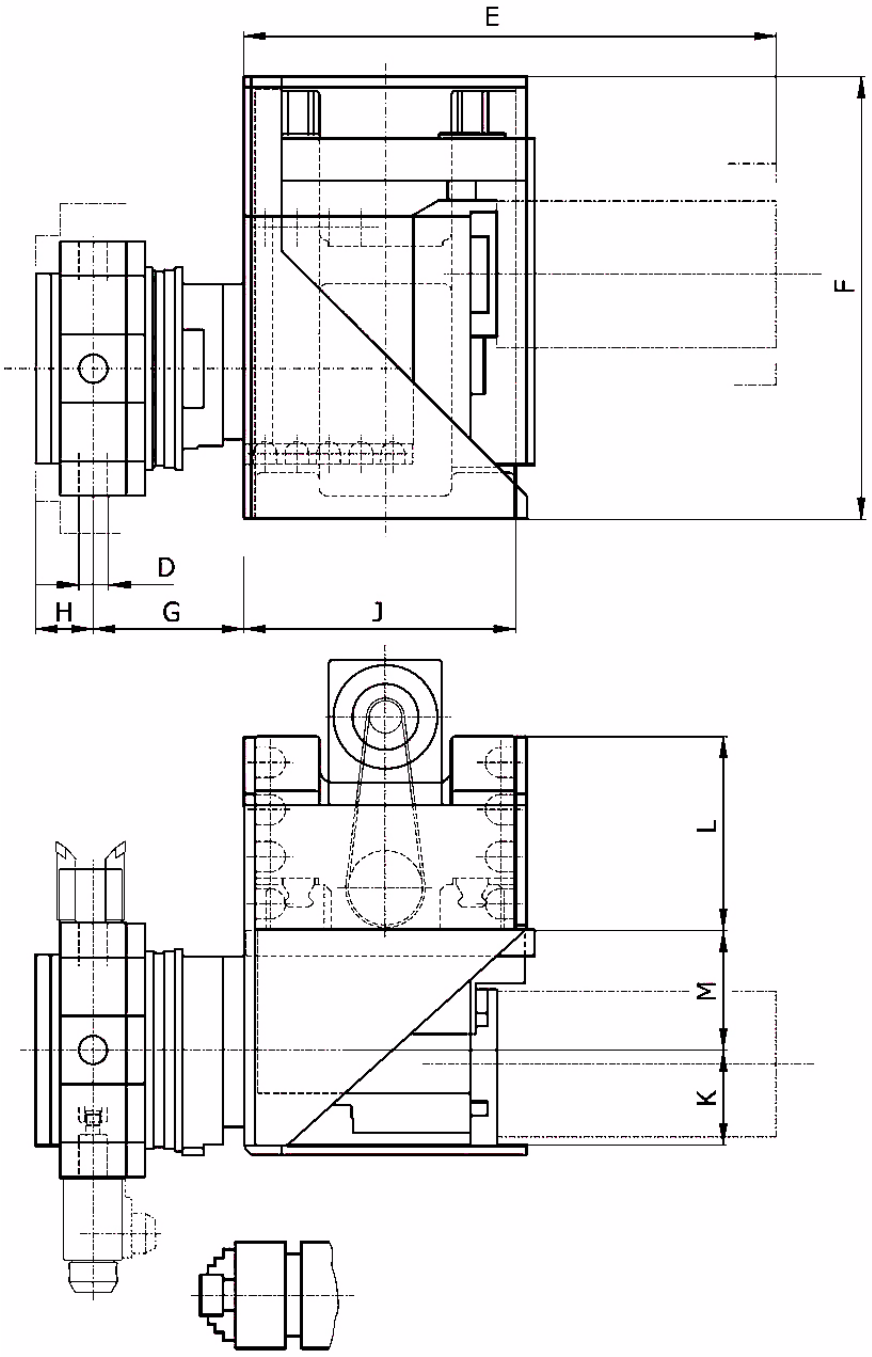
Series	
Disk-type tool turret 0.5.453.4xx	
Number of switching positions	
Loads	
Adm. tangential moment	kNm
Tooling	
Adm. mass moment of inertia	kgm^2
Adm. mass	kg
Adm. unbalenced mass	Nm
Switching times	
Rotation time per 30° -sub step	s
Rotation time per 30° -additional sub step	s
Turret unlocked or locked	s
Cooling lubricant	
Adm.. operating pressure	bar
Tool drive	
Drive motor 1) Model Siemens Servomotor	1FT6-..
Drive motor 1) Model Fanuc Servomotor	α..
Drive motor 1) Model Fanuc Spindlemotor	α..
Gear ratio	i
Max. torque 40% ED	Nm
Max. rpm	min^{-1}
Y-axis-slide feed unit	
Drive motor 1) Model Siemens/Fanuc with breake	
Gear ratio	i
Incline of ball screw spindle	mm
Adm. rapid feed speed	m/min
Working stroke ΔY	mm
Adm. feed force	kN
Linear messurement system	
Possible positioning precision	μm
Mass	
Turret, complete, without tool holder, approx.	kg

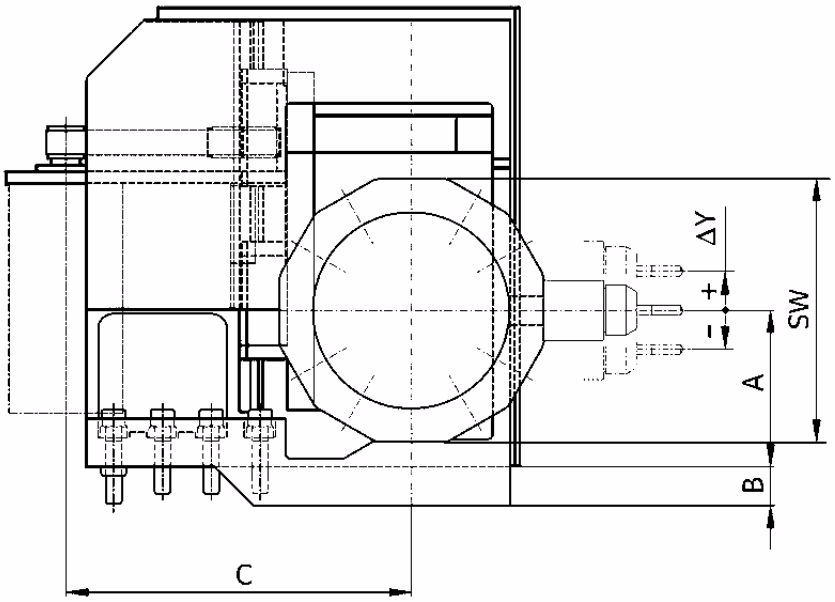
1) Not part of SAUTER-standard scope of dlivery.

All data are identical for right and left constructions. See product information PI 21.3 for additional information.

Size					
12		**16**		**20**	
12		12		12	
0,8		1,8		3,6	
0,8		1,8		3,2	
25		35		60	
12		25		40	
0,12		0,14		0,16	
0,05		0,05		0,06	
0,10		0,10		0,12	
5 ... 25		5 ... 25		5 ... 25	
..064..AK..		084..AK..		086..AH..	
8/4000 is		12/4000 is		22/4000 is	
1,5		2		3	
1,0		1,0		1,0	
14	15	28	25	40	40
6000		5000		4000	
1FT6- 061..AH..	Alpha 2/3000	1FT6- 061..AH..	Alpha 2/3000	1FT6- 064..AH..	Alpha M8/3000 i(s)
2,0		2,0		2,0	
5		5		5	
10	7,5	10	7,5	10	9
± 40		± 40		± 55	
1,6		2		3,2	
Transmitter		Transmitter		Transmitter	
10		10		10	
ca. 200		ca. 300		ca. 600	

Dimension illustration Series 0.5.453.4xx





Dimension

Series		Size		
Disk-type tool turret 0.5.453.4xx		**12**	**16**	**20**
Dimension	SW	220	270	320
	A	130	160	240
	B	40	40	80
	C[1)]	266	354	348
	Ø D	25	30	40
	E[1)]	597	564	642
	F	470	470	644
	G	124	160	200
	H	62	61	63
	J	288	288	412
	K	81	101	127
	L	206	206	276
	M	118	128	171

Dimensions in mm

1) Depends on motor
All dimensions are identical for right and left constructions.

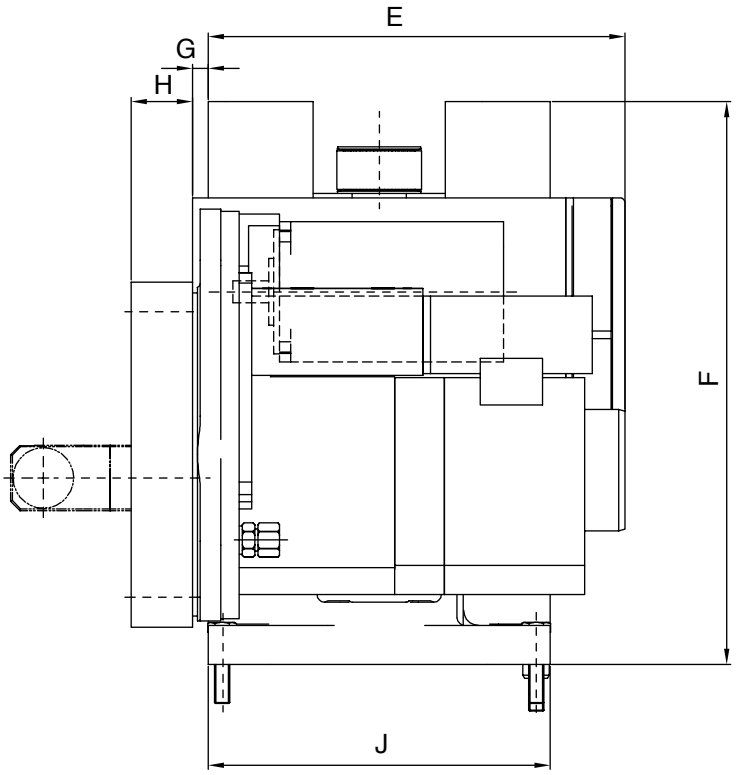
Technical Data 0.5.493.5xx

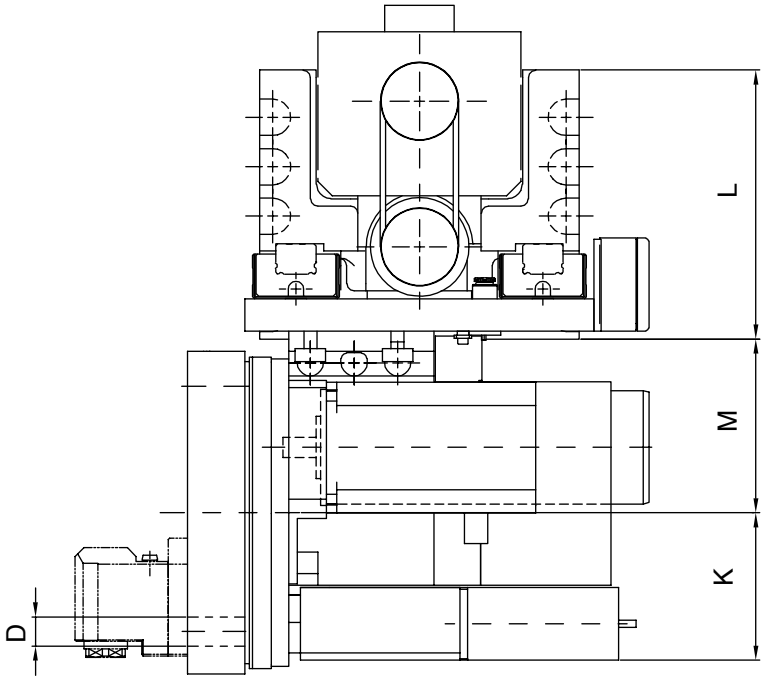
Series **Disk-type tool turret 0.5.493.5xx**		
Number of switching positions		
Loads		
Adm. tangential moment		kNm
Tooling		
Adm. mass moment of inertia		kgm^2
Adm. Mass		kg
Adm. unbalanced mass		Nm
Switching times		
cycle time per 30° -sub step		s
Rotation time per 30° -additional sub step		s
Adm. switching frequency		1/min
Cooling lubricant		
Adm. operating pressure	• standard • with medium pressure valve	bar bar
Tool drive		
Drive motor [1] Model Siemens/Fanuc		
Gear ratio		
max. torque 40% DC (duty cycle)		Nm
max. rpm		min^{-1}
Y-axis-slide feed unit		
Drive motor [1] Model Siemens/Fanuc with breake		
Gear ratio		
Incline of ball screw spindle		mm
Adm. rapid feed speed		m/min
Adm. feed stroke		mm
Working stroke ΔY		mm
Adm. feed force		kN
Linear measurement system, company Heidenhain		
Possible positioning precision		μm
Mass		
Turret, complete, without tool holder, approx.		kg

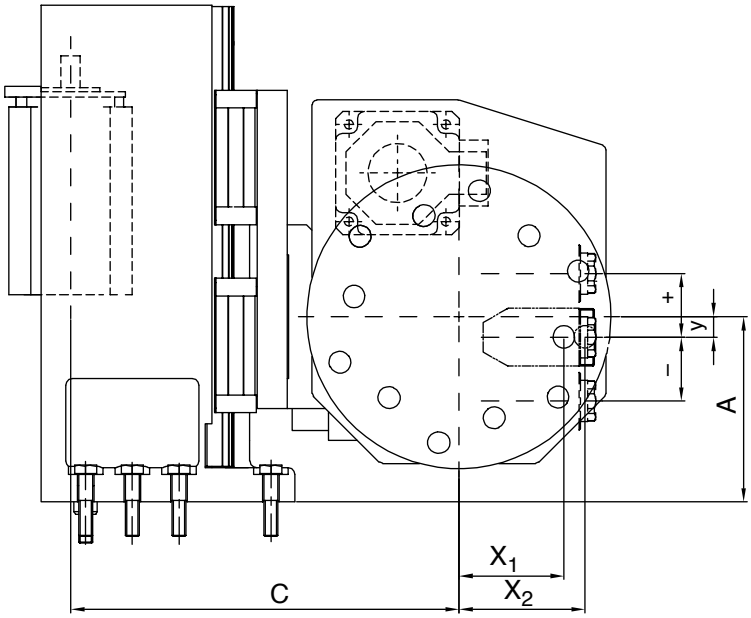
1) Not part of SAUER standard scope of delivery
2) With external deactivation

All data are identical for right and left construction. See brochure R54 for additional information.

Size				
10	**25**		**32**	
12	12		12	
0,3	6		12	
0,20	7		28	
100	100		160	
14	135		250	
0,45	0,89		1,35	
0,16	0,34		0,54	
16	6,3		3,3	
7/14 [2)] 5 ... 25	7/14 [2)] 5 ... 25		7/14 [2)] 5 ... 25	
α 4/5000 is	1FT6-102 ...	α 30/3000	1PH7107-2NF 22	α 12
1	1,938	1,348	1,625	1,238
8	63	63	130	110
6000	2300	2250	3000	3000
α 2/5000 is	1FT6-084 ...	α 6	1FT6-- 105	α 40
1	2		2	
5	10		10	
10	10		10	
± 25	± 58		± 80	
± 25	± 65		± 80	
???	4,5		8	
—	LS 406		LS 406	
10	10		10	
—	ca. 650		ca. 1050	


E
G
H
F
J


L
M
K
D

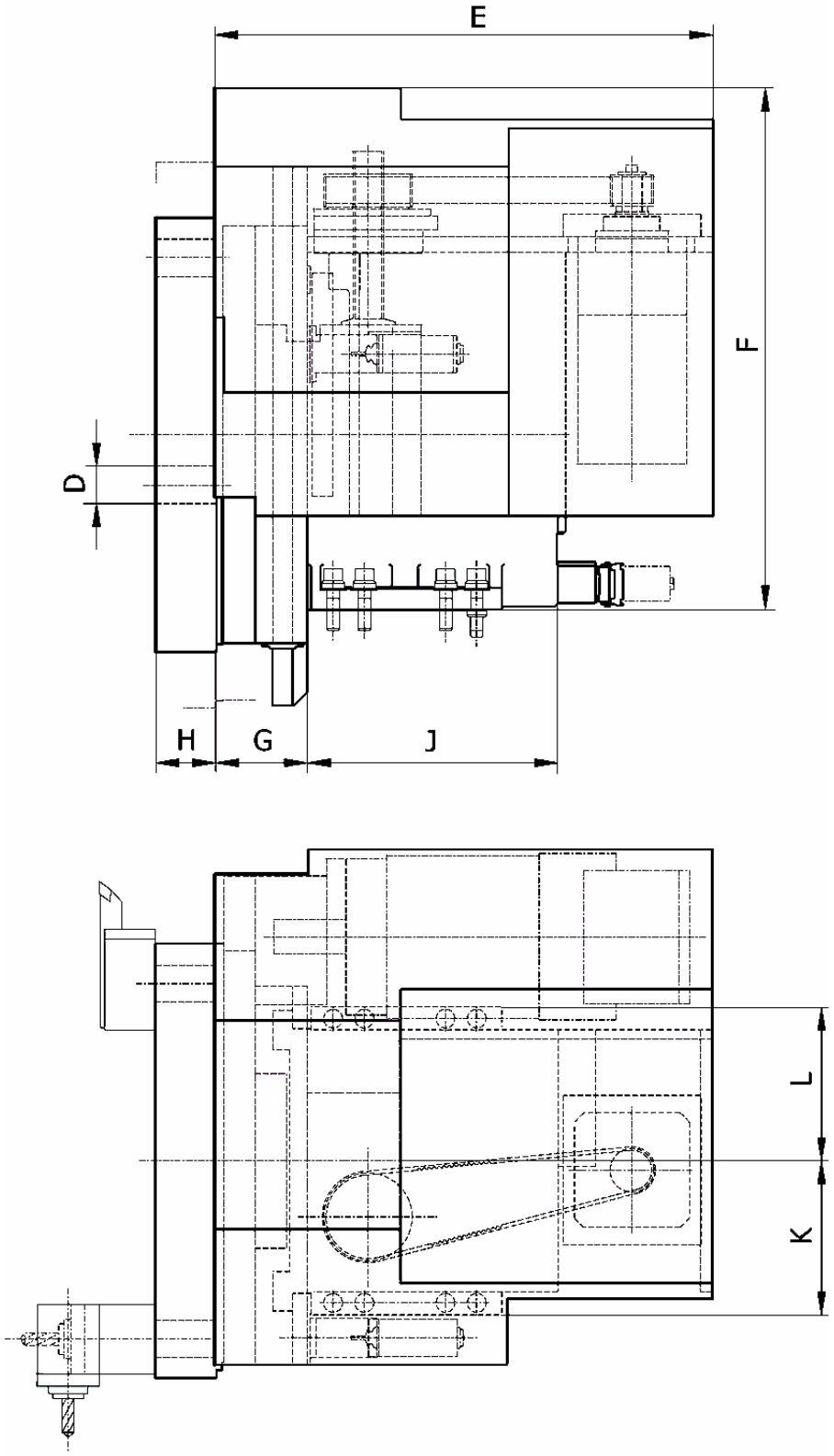


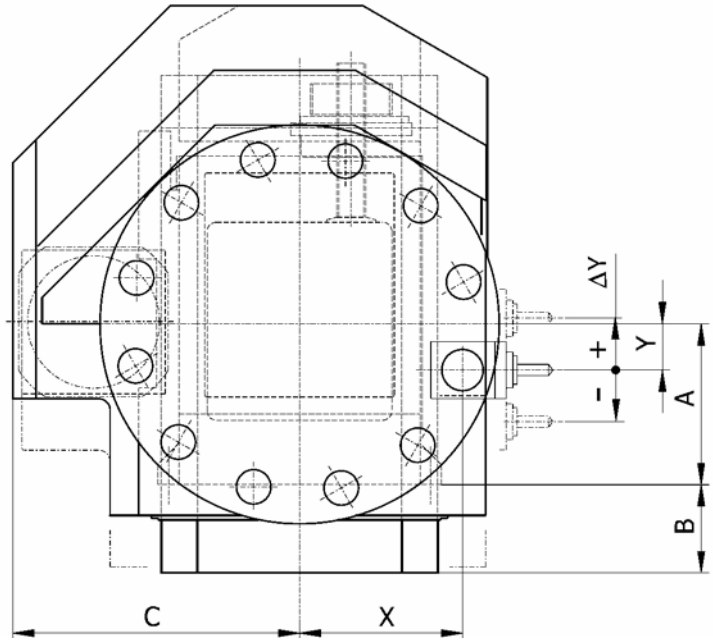
Dimension

Series		Size
Disk-type tool turret 0.5.493.5xx		**10**
Dimension	X_1 / X_2	76,5 / 93
	Y	15
	A	135
	C[1)]	283
	D	16
	E	268
	F	362
	G	10
	H	39,5
	J	220
	K	101,5
	L	18,5
	M	119,5

Dimension in mm

1) Depends on motor.
All dimensions are identical for right and left constructions.


E
F
D
H
G
J
L
K



Dimensio

Series		Baugröße	
Disk-type tool turret 0.5.493.5xx		**25**	**32**
Dimension	X	224,33	283,95
	Y	70	80
	A	230	280
	B	102	154
	C[1)]	389	460
	D	50	60
	E	655	795
	F	711	836
	G	122	146
	H	82	98
	J	329	401
	K	176	247
	L	211	247

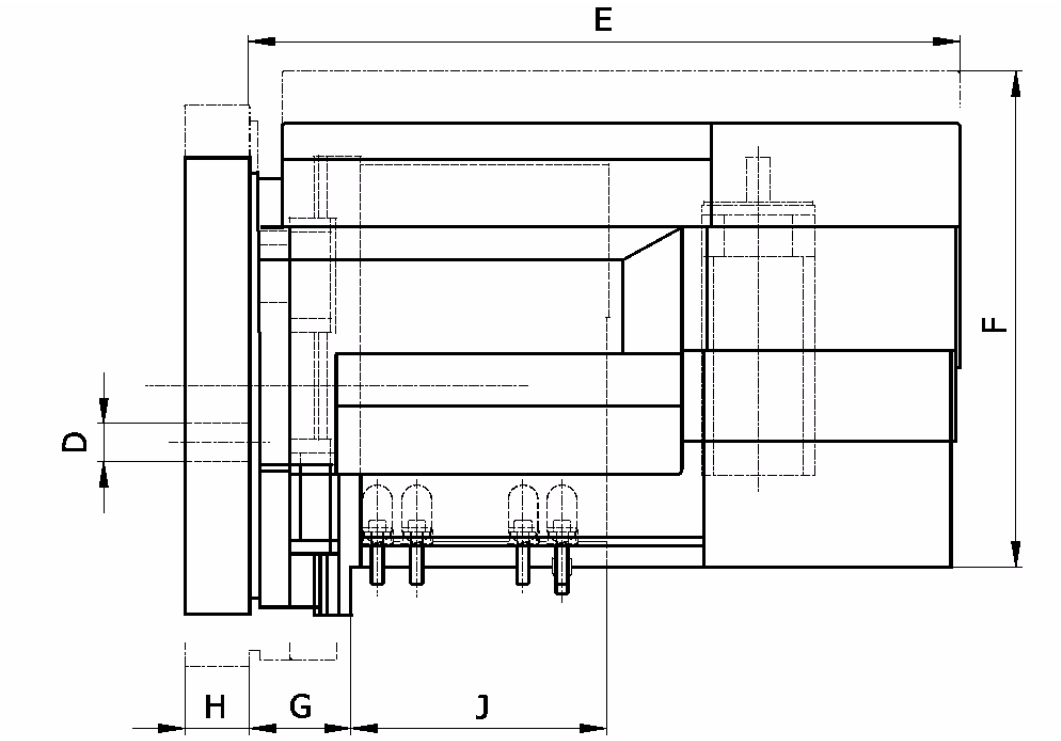
Dimension in mm

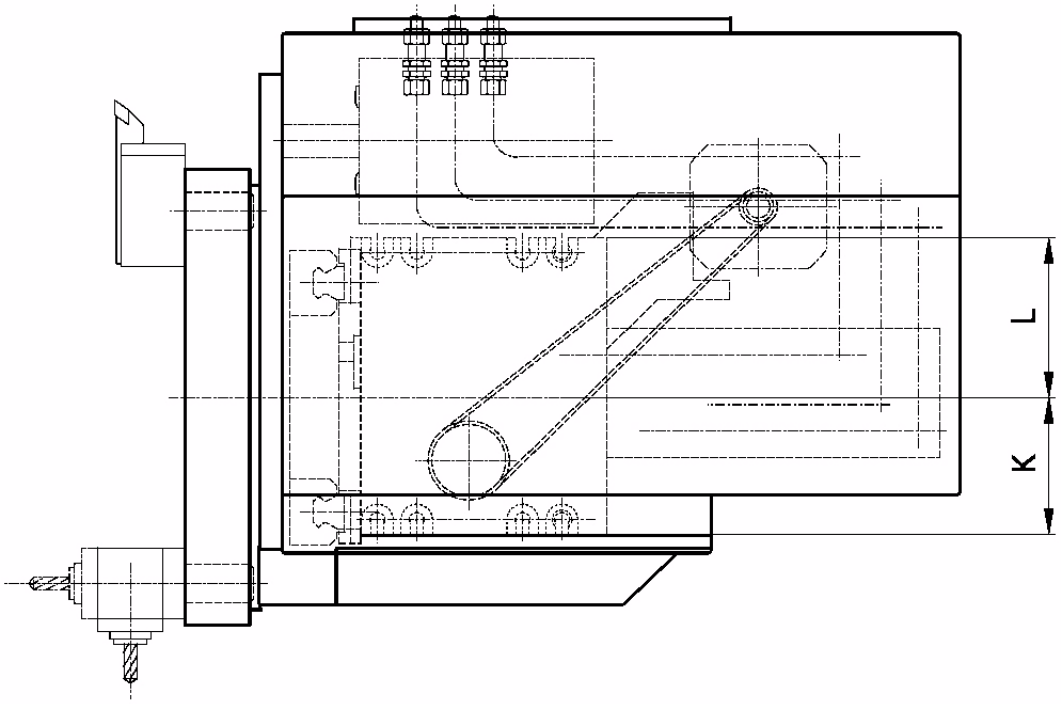
1) Depends on motor.
All dimensions are identical for right and left constructions.

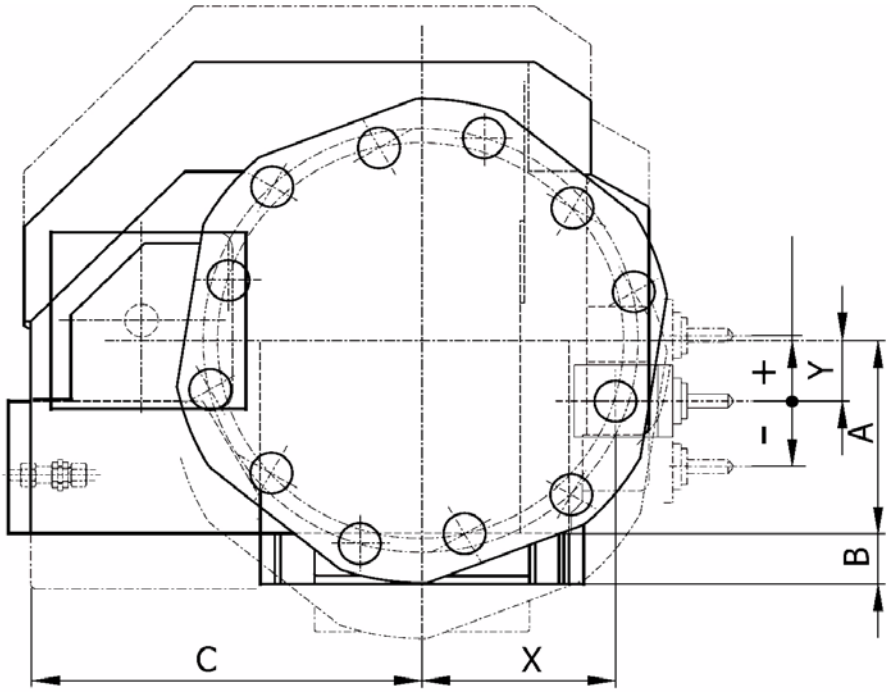
Notes:

Seires **Disk-type tool turret 0.5.693.1xx**		**Size** **20**
Number of switching positions		12
Loads		
Adm. tangential moment	kNm	3,2
Tooling		
Adm. mass moment of inertia	kgm^2	5
Adm. Mass)	kg	60
Adm. unbalanced mass	Nm	63
Switching times		
cycle time per 30° -sub step	s	0,24
Rotation time per 30° -additional sub step	s	0,15
Adm. switching frequency	s	0,20
Cooling lubricant		
Adm. operating pressure • Standard • with medium pressure valve	bar bar	7/14[1)] 5 .. 25
Tool drive		
Drive motor [2)] Model Siemens		1FT6-086..AH..
Gear ratio		1,0
max. torque 40% DC (duty cycle)	Nm	32
max. rpm	min^{-1}	3000
Y-axis-slide feed unit		
Drive motor [2)] Model Siemens/Fanuc with break		1FT6-064..AH..
Gear ratio		2
Incline of ball screw spindle	mm	5
Adm. rapid feed speed	m/min	10
Working stroke	mm	± 55
Adm. feed force	kN	3,2
Linear measurement system, company Heidenhain		Transmitter
Possible positioning precision	μm	10
Mass		
Turret complete, without tool holder	kg	ca. 400

1) With external deactivation
2) Not part of SAUER standard scope of delivery


E
F
D
H
G
J


L
K



Dimension

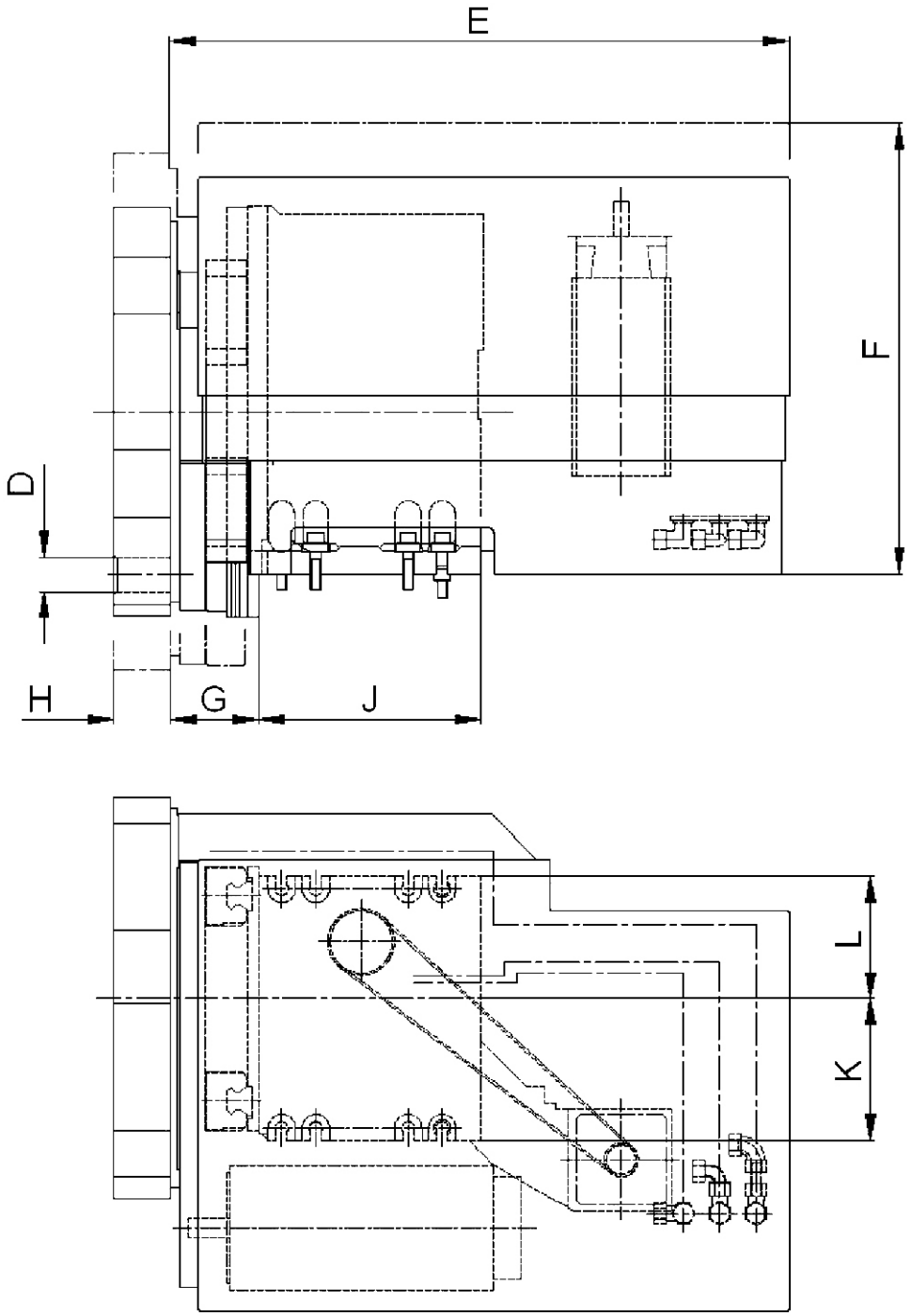
Seires		Size
Disk-type tool turret 0.5.693.1xx		**20**
Dimension	X	185,54
	Y	60
	A	190
	B	50
	C[1)]	435
	D	40
	E	723
	F	338
	G	103
	H	66
	J	260
	K	143
	L	167

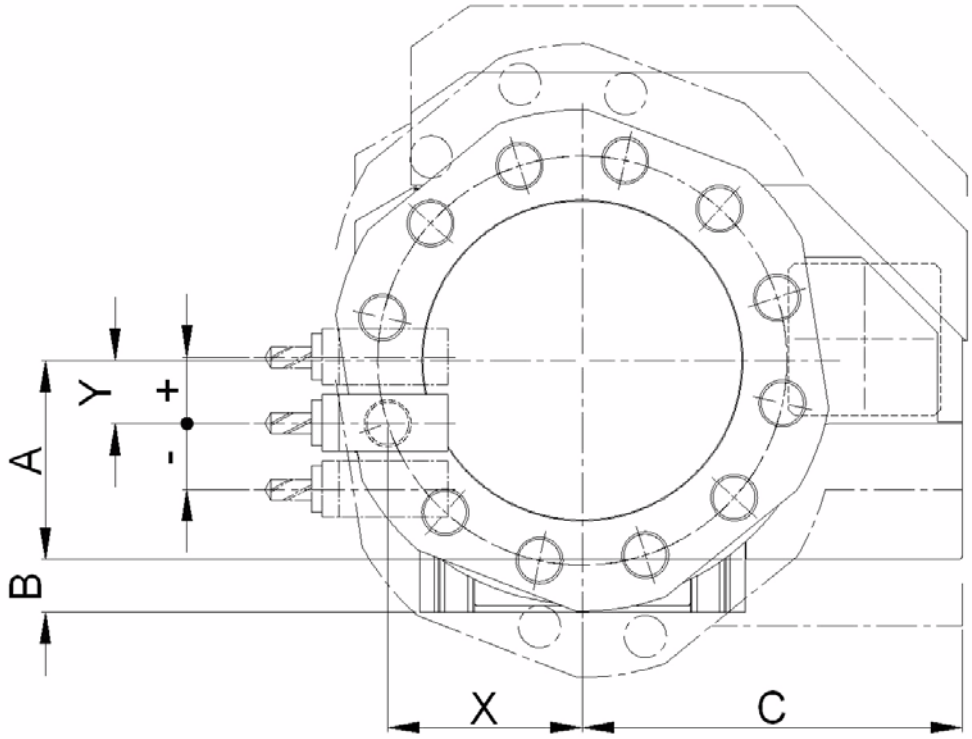
Dimension in mm

1) Depends on motor

Series **Disk-type tool turret 0.5.439.1xx**		**Size** **20**
Number of switching positions		12
Loads		
Adm. tangential moment	kNm	3,6
Tooling		
Adm. mass moment of inertia	kgm^2	5
Adm. Mass	kg	70
Adm. unbalanced mass	Nm	63
Switching times		
cycle time per 30° -sub step	s	0,15
Rotation time per 30° -additional sub step	s	0,09
Revolver	s	0,13
Cooling lubricant		
Adm. operating pressure • Standard	bar	7/14[1)]
Tool drive		
Drive motor [2)] Model Siemens / Fanuc		1FT6-086..AH..
Gear ratio		1,0
max. torque 40% DC (duty cycle)	Nm	32
max. rpm	min^{-1}	3000
-axis-slide feed unit		
Drive motor [2)] Model Siemens/Fanuc with breake		1FT6-064..AH..
Gear ratio		2
Incline of ball screw spindle	mm	5
Adm. rapid feed speed	m/min	10
Working stroke ΔY	mm	± 55
zul. Vorschubkraft	kN	3,2
Linear measurement system, company Heidenhain		Motorgeber
Possible positioning precision	μm	10
Mass		
Turret, complete, without tool holder	kg	ca. 400

1) With external deactivation
2) Not part of SAUER standard scope of delivery


E
F
D
H
G
J
L
K



Dimensionen

Series		Size
Disk-type tool turret 0.5.439.1xx		**20**
Dimension	X	185,54
	Y	60
	A	190
	B	50
	C[1)]	435
	D	40
	E	724
	F	528
	G	103
	H	66
	J	260
	K	143
	L	167

Dimension in mm

1) Depends on motor

Ordering details

++49 (0) 7123-926-190

++49 (0) 123-926-0

info@sauter-feinmechanik.com

Sauter Feinmechanik GmbH
Postfach 1551
D-72545 Metzingen
Germany

Firma: _____

Straße: _____

PLZ, Ort: _____

Name: _____

Tel.: _____

Fax: _____

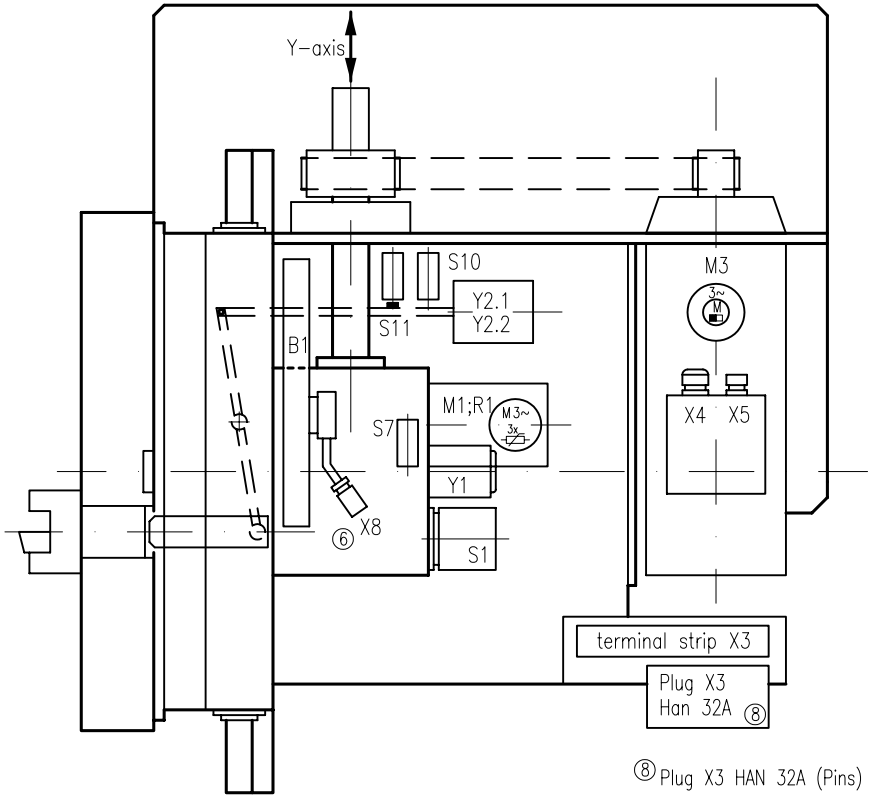
E-Mail: _____

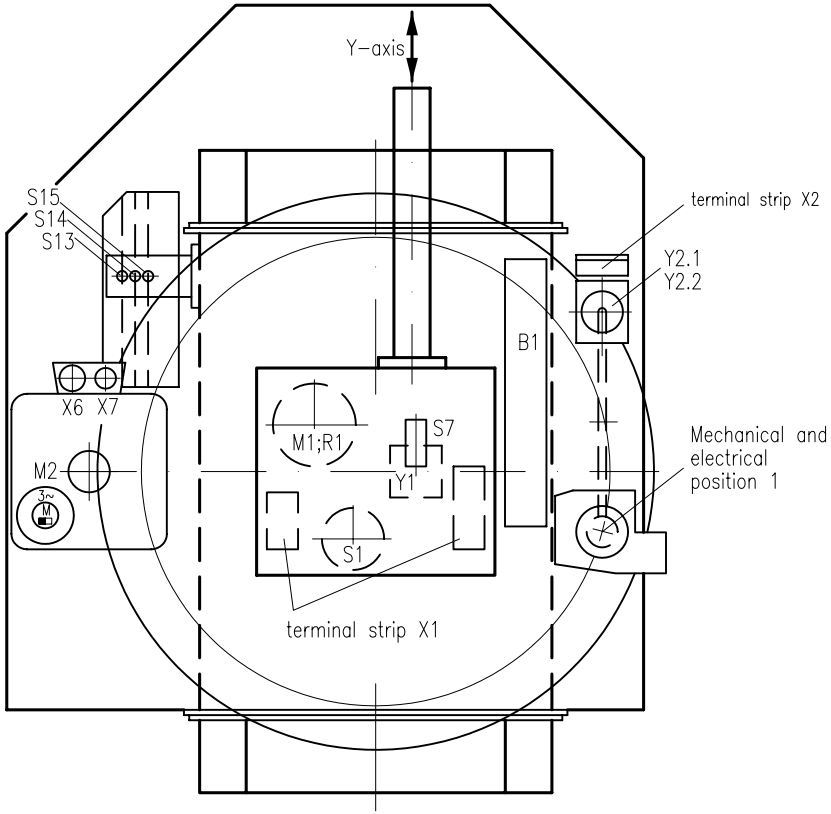
SAUTER-Disk-type tool turret Y-axis slide feed unit		
Ordering detailss	Alternate configurations	Your selection
Turret-Type	0.5.453.412 - Rechts / Links 416 - Rechts / Links 420 - Rechts / Links	
	0.5.493.525 - Rechts / Links 532 - Rechts / Links	
	0.5.693.120 - Rechts / - 0.5.439.120 - - / Links	
Driving motors	Fabrikat Siemens / Fanuc	
Cooling lubricant	Max. Betriebsdruck 7/14 bar 25 bar	
Special requirements:		
Quantity:		

Assignment of control plans

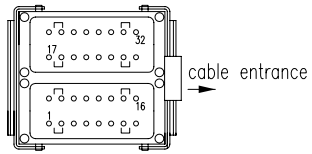
Turret-type	0.5.**453**.4xx	0.5.**493**.5xx	0.5.**693**.1xx	0.5.**439**.1xx
Wiring schematic Standard design	EPB - 1175	EP - 937	EP - 1076	EPB - 1251
Hydraulic plan	HP - 496	-	HP - 451	HP - 498
Function diagram	SK - 1487	SK - 919 SK - 940	SK - 940 SK - 1307	SK - 940 SK - 1473

Wiring layout	SAUTER DISK-Type Tool Turret Tool drive – Y-axis 0.5.493.5..	EP-937 e 2 sheet 1





⑧ Plug X3 HAN 32A (Pins)



⑥ Optional (Adapter cable)

⑧ Optional

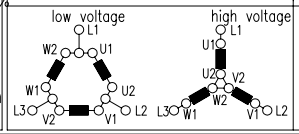
Edition						
07.11.05 AI			SAUTER Feinmechanik GmbH D-7430 Metzingen Germany	SAUTER	Datum: 27.03.92	gez.: AI	gepr.:

		Wiring layout	SAUTER DISK-Type Tool Turret Tool drive – Y-axis 0.5.493.5..	EP-937 e 2 sheet 2

Designation	Element/Function	Line	Terminal strip X1	Cable from X1 to X3 12x0,75qmm	Cable from X1 to X3 12x0,34qmm	Cable from S13 to X3 6x0,5qmm	Terminal strip X2	Cable from X2 to X3 12x0,75qmm	Terminal strip X3	⑧ Plug X3 Han 32A	AC-servo-motor terminal strip X4	Plug, signal line X5	AC-servo-motor terminal strip X6	Plug, signal line X7	Plug X8	Type	Supplier
S1	Angular encoder	brown (+)	12 (+)		brown (+)				12 (+)	12						BRGB2-W$^{C}_{D}$B$^{08}_{12}$-EP-P-$^{L}_{R}$-K BRGD0-WCD16-EP-P-$^{L}_{R}$-K	Balluff
		blue (–)	11 (–)						11 (–)	11							
	1.Bit	white	1						1	1							
	2.Bit	yellow	2						2	2							
	3.Bit	green	3		green				3	3							
	4.Bit	lilac	4		lilac				4	4							
	⑤ 5.Bit	grey	5		grey				5	5							
	Strobe	black	6		black				6	6							
	Parity	pinc	7		pinc				7	7							
	screen		13		transparent				13	13							
S7	Proximity-Detector control pre-indexion	brown (+)	12 (+)													BES 516-324-E0-C-01	Balluff
		blue (–)	11 (–)														
		black	8		red				8	8							
S10	Proximity-Detector control Tool drive engaged	brown (+)					12 (+)	9	12 (+)	16						BES 516-324-E0-C-01	Balluff
		blue (–)					11 (–)	10	11 (–)	20							
		black					29	7	29	9							
S11	Proximity-Detector control Tool drive disengaged	brown (+)					12 (+)		12 (+)							BES 516-324-E0-C-01	Balluff
		blue (–)					11 (–)		11 (–)								
		black					30	8	30	10							
S13	Proximity detector in series Reference point	C	1						12 (+)	22						⑦ BNS 113-B03-R12-61-A-12-03	Balluff
		Nc				weiss											
		No	2			schwarz			33	21							
S14	Proximity detector in series End limitation y-axis above	C	1														
		Nc															
		No	2			blau			34	23							
S15	Proximity detector in series End limitation y-axis below	C	1														
		Nc															
		No	2			braun			35	24							
Y1	Solenoid Pre-indexing	brown (+)	② 16 (+)	6					16 (+)	14						24V DC; 2,8A; 40% ED	Schultz
		blue (–)	17 (–)	7					17 (–)	15							
Y2.1 Y2.2	Solenoid tool-drive engaged	3					23 (+)	1	23 (+)	17						GTUW 050 T43 A2 24V DC; 21,2W	Schultz
		4					② 24 (–)	2	24 (–)	18							
	disengaged	1					24 (–)		24 (–)								
		2					25 (+)	3	25 (+)	19							
R1	① Posistor-heat detector	blue	14	4					14	25						PTC-Thermistor nach DIN 44081 U≦ 4V DC	SAUTER
		blue	15	5					15	26							
M1	3-Phase A.C. Motor (release-indexing-locking)	③	U1	1					U1	27							
			V1	2					V1	28							
			W1	3					W1	29							
			U2														
			V2														
			W2														
M2	Motor for tool drive AC-servomotor												U1 V1 W1	Order.Ref.-Nø 6FC9348-7AD		according to order	Siemens
M3	Motor for Y-axis AC-servomotor										U1 V1 W1	Order.Ref.-Nø 6FC9348-7AD				according to order	Siemens
B1	Length measuring system														⑥	LS 406/486 or LC 481/483 (absolute)	Heidenhain
		⏚		green-yellow		⏚		⏚			⏚		⏚				

Technical Data of:	S1	S7;S10;S11
Operating voltage:	15 – 30 V DC	10 – 24 V DC ñ20%
Max. residual ripple:	10%	10%
Max. load current:	50mA (⑤ 25mA)	200mA
Nom. sensing distance:	–	1mm
Temperature range:	0ø bis +60øC	–20ø bis + 65øC
Function:	–	n.o. (make) function
Type:	pnp logic	pnp logic

Motor M1 (6 wires) ③ Connection to terminals



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

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

② Diode 1N4006 (mounted to terminals).

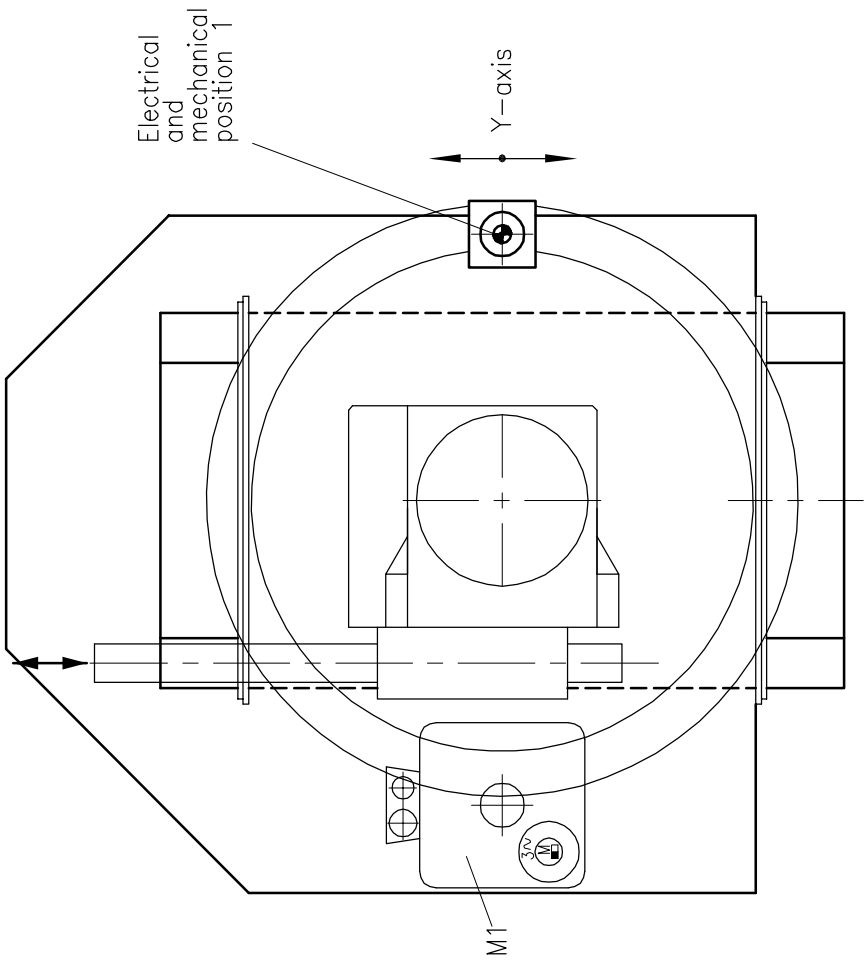
⑤ for 16 positions only.

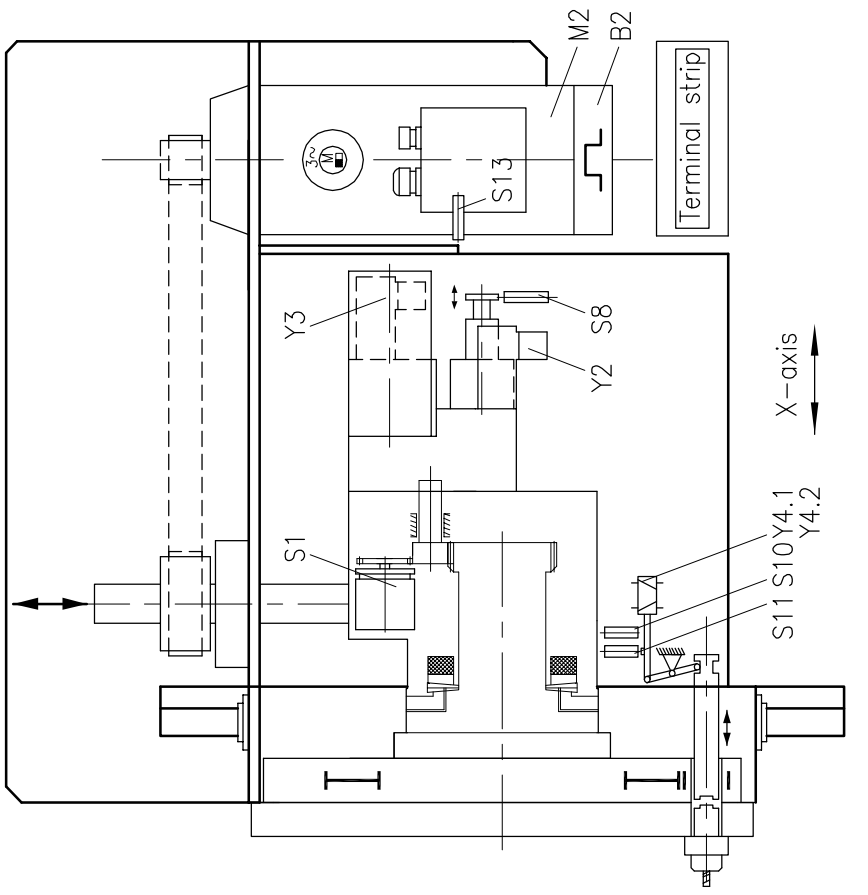
⑥ Optional (Adapter cable)

⑦ Not required with LC 481

⑧ Optional (Plug X3)

Edition			SAUTER Feinmechanik GmbH D-7430 Metzingen Germany		Datum:	gez.:	gepr.:
07.11.05 Al				SAUTER	27.03.92	Al	


Electrical and mechanical position 1
Y–axis
M1

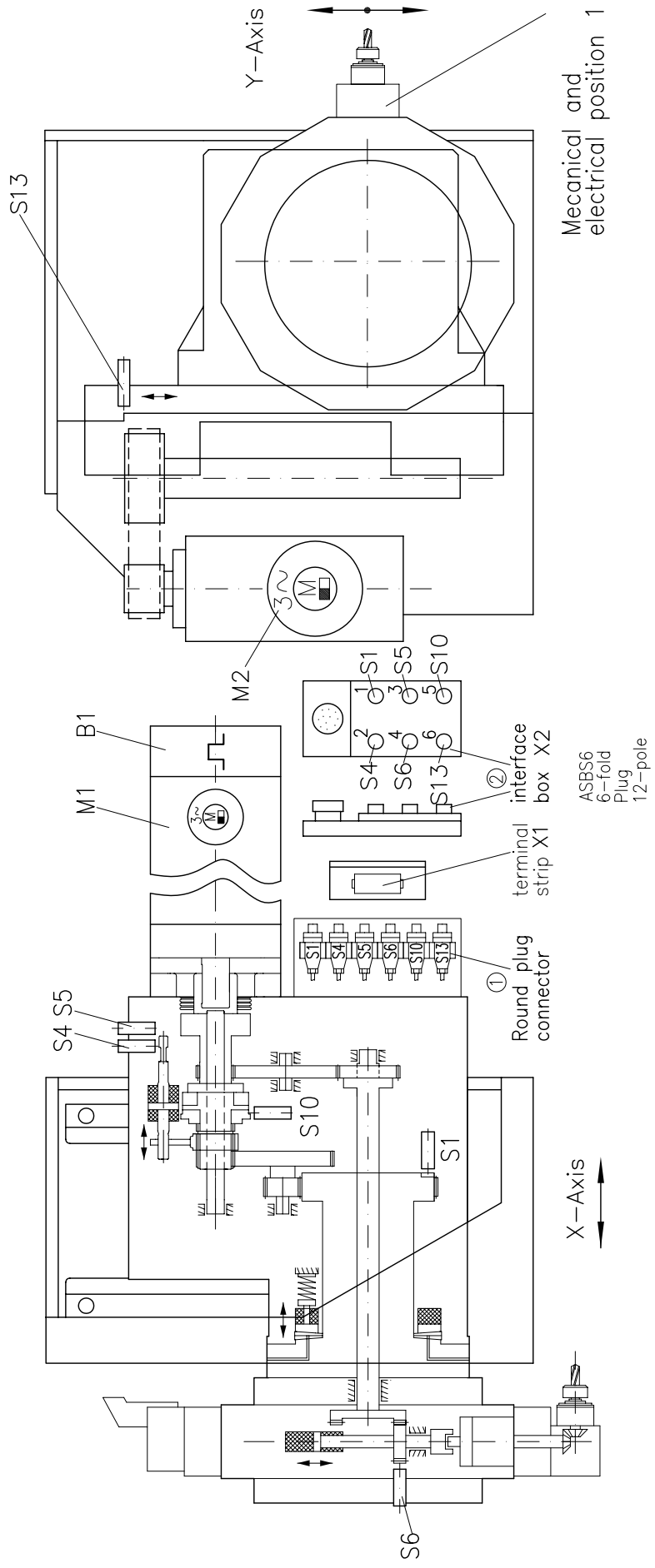

M2
B2
Terminal strip
S13
Y3
S8
Y2
X–axis
S1
Y4.1
Y4.2
S10
S11

Designation	Element/function	Line from element	Terminals X1	④ 14x0,34 qmm	④ 8x0,75 qmm		Type	Manufactura
S1	Angular position encoder	brown (+)	12	brown			BRGD2-W(08/12/16/24)B-(12/16/24)-EP-P(L/R)-K01	Balluff
		blue (−)	11	blue				
	1.Bit	white	1	white				
	2.Bit	yellow	2	yellow				
	3.Bit	green	3	green				
	4.Bit	violet	4	violet				
	③ 5.Bit	grey	5	grey				
	Strobe	black	6	black				
	Parity	pink	7	pink				
		transparent	13					
S8	Proximity switch "Turret in position"	brown (+)	12				BES 516-324-E0-C-01	Balluff
		blue (−)	11					
		black	10	red				
S10	Proximity switch control Tool drive engaged	brown (+)	12				BES 516-324-E0-C-01	Balluff
		blue (−)	11					
		black	29	red-blue				
S11	Proximity switch control Tool drive disengaged	brown (+)	12				BES 516-324-E0-C-01	Balluff
		blue (−)	11					
		black	30	grey-pink				
S13	Proximity switch Reference point Y-axis ④	brown (+)	12				BES 516-324-E0-C-01	Balluff
		blue (−)	11					
		black	33	white-green				
Y2	3/2 way valve "Start-Stop" 1	brown (+)	① 14		1		WKED 0813O-04X-G24 24VDC; 1,04A	Hydac
	2	blue (−)	① 15		2			
Y3	4/2 way valve "Turret-sense of rotation" 1	brown (+)	① 16		3		WKEY 0814O-04X-G24 24VDC; 1,04A	Hydac
	2	blue (−)	① 15					
Y4.1	Solenoid tool-drive engeged	brown (+)	23 (+)		4		GTUW 050 T43 D04 24VDC; 21,2W	Schultz
		blue (−)	② 24 (−)		5			
Y4.2	disengaged	brown (+)	24 (−)					
		blue (−)	25 (+)		6			
M1	Driving motor – Tool drive AC-servomotor						according to order	
B2	Incremental pulse coder						according to order	
M2	Driving motor – Y-axis AC-servomotor						according to order	
			⏚		green-yellow			

① Supressor circuit (Z-diode) in the angle connector
② Diode 1N4006 (mounted to terminals)
③ Only for 16/24 positions
④ Optional

Operating data of:	S1	S8, S10, S11, S13
Operating voltage:	15–30V DC	10–24V DC ±20%
Max. residual ripple:	10%	10%
Max. load current:	25mA	200mA
Nom. sensing distance:	–	1mm
Temperature range:	0° to + 60°C	−20° to + 65°C
Function:	–	n.o. (make) function
Type:	pnp-logik	pnp-logik

Wiring layout	DISK Type Tool Turret 0.5.453.4/5..	2-sheet-1 EPB-1175 e Z-Doku-IdNr. 095227

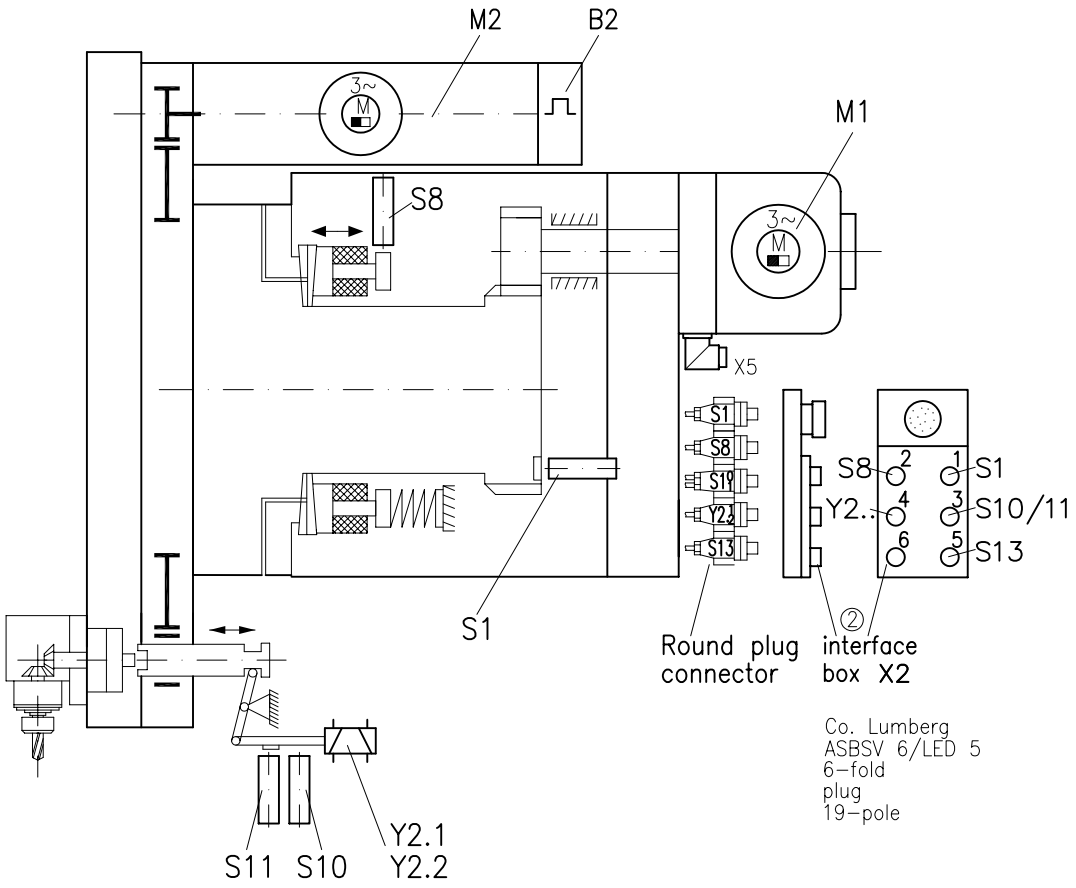


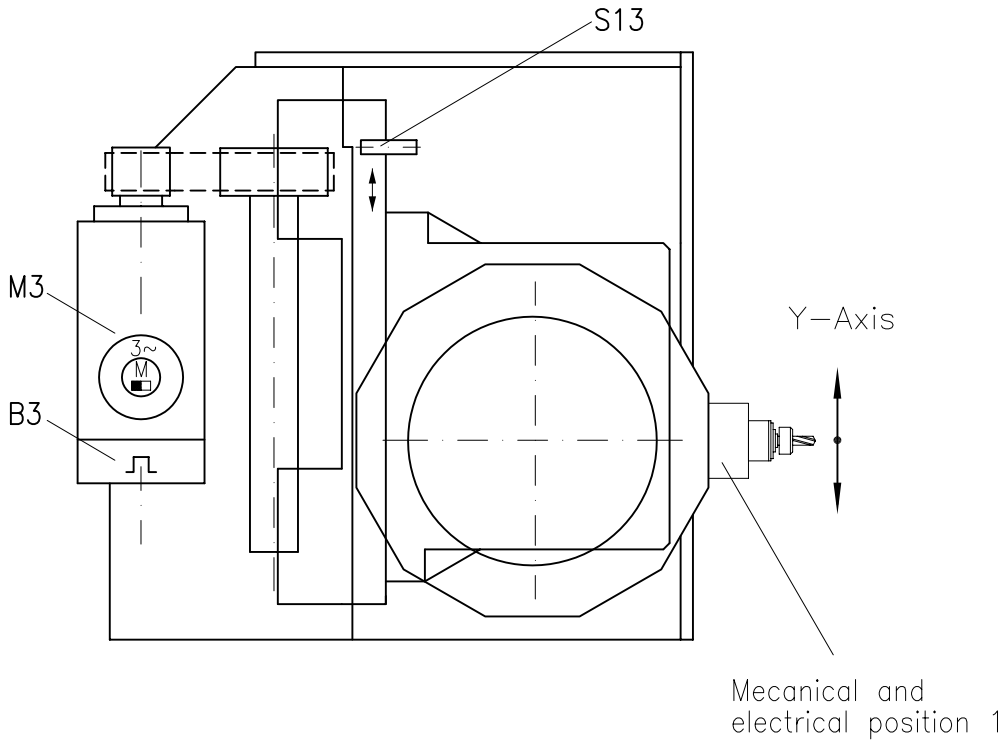
Edition 04.07.26 AI			SAUTER Feinmechanik GmbH D-72555 Metzingen Germany	SAUTER	Datum: 02.10.14	gez.: AI	gepr.:

Designation	Element/Function	Line	terminal	Round plug connector ① Contact No.	coupler plug No.	Quick connect ② interface box X2 plug 12 contacts pin assignment	Type	Supplier
S1	Proximity switch Reference point tool disk	brown (+)	12	1 (+)	1	11 (+)	BES 516-324-E0-C-01	Balluff
		blue (−)	11	3 (−)		9 gebrückt 10		
		black	1	4		1		
S4	Proximity switch Turret drive "disengaged"	brown (+)	12	1 (+)	2		BES 516-324-E4-C-01	Balluff
		blue (−)	11	3 (−)				
		black	4	4		2		
S5	Proximity switch Turret drive "engaged"	brown (+)	12	1 (+)	3		BES 516-324-E4-C-01	Balluff
		blue (−)	11	3 (−)				
		black	5	4		3		
S6	Proximity switch Tool drive "engaged"	brown (+)	12	1 (+)	4		BES 516-324-E4-C-01	Balluff
		blue (−)	11	3 (−)				
		black	6	4		4		
S10	Proximity switch Ratchetting clutch "engaged"	brown (+)	12	1 (+)	5		BES 516-324-E0-C-01	Balluff
		blue (−)	11	3 (−)				
		black	10	4		5		
S13	Proximity switch Reference point Y-axis	brown (+)	12	1 (+)	6		BES 516-324-E0-C-01	Balluff
		blue (−)	11	3 (−)				
		black	33	4		6		
	Ground					12 (PE)		
B1	Incremental pulse coder						according to order	
M1	Driving motor A.C. Servomotor						according to order	

① Option
② Option

Technical data of:	S1 – S13
Operating voltage:	10–24V DC ±20%
Max. residual ripple:	10%
Max. load current:	200mA
Nom. sensing distance:	1mm
Temperature range:	−20° to +65°C
Function:	n.o. (make) function
Type:	pnp logic


M2
B2
M1
S8
X5
S1
S8
S10
Y2.2
S13
S1
S8
Y2..
2
1
4
3
6
5
S1
S10/11
S13
S1
Round plug connector
② interface box X2
Co. Lumberg
ASBSV 6/LED 5
6–fold
plug
19–pole
S11
S10
Y2.1
Y2.2


S13
M3
B3
Y–Axis
Mecanical and electrical position 1

Designation	Element/Function	Line	Round plug connector M12 4pol. Pin Contact No.	Round plug connector M12 5pol. Pin Contact No.	Y-junction Round plug connector M12 4pol. Pin Contact No.	coupler plug No.	Quick connect ② interface box X2 plug 19 contacts pin assignment Co. Lumberg	Motor-Connector X5 GR1 6pol. Pin Contact.-No.		Type	Suppier
S1	Proximity switch Reference point tool turret	brown (+)	1			1	19 (+)			BES 516-324-E0-C	Balluff
		blue (−)	3				6 (−)				
		black	4				15				
S8	Proximity switch Tool turret locked	brown (+)	1			2				BES 516-300-S205-D	Balluff
		blue (−)	3								
		black	4				5				
S10	Proximity switch Tool drive engaged	brown (+)			1	3				BES 516-324-E4-C	Balluff
		blue (−)			3						
		black			2		8				
S11	Proximity switch Tool drive disengaged	brown (+)			1					BES 516-324-E4-C	Balluff
		blue (−)			3						
		black			4		16				
S13	Proximity switch Reference point Y-axis	brown (+)	1			4				BES 516-324-E0-C	Balluff
		blue (−)	3								
		black	4				3				
Y2.a	Solenoid engage	2		2		5	9			GTUW 050 060 T43 D04 24V DC; 21,2W; 0,9A 33,6W; 1,4A	Schultz
		3		① 3							
Y2.b	Tool drive disengage			3							
		1		4			17				
	Ground	green-yellow		⏚ 5			12 (PE)				
M1	Tool Turret driving motor AC-Servo	black						1		sensorless drive	SAUTER
		blue						2			
		brown						6			
	Ground	green-yellow						⏚			
B2	Tool Drive driving motor AC-Servo									Option	
M2	Encoder system Tool Drive									Option	
B3	Motor Y-axis motor AC-Servo									Option	
M3	Encoder system Motor Y-axis									Option	

① Diode 1N4007 (installed in round plug connector)

② Option

Technical Data of:	S1 – S13
Operating voltage:	10–24V DC ±20%
Max. residual ripple:	10%
Max. load current:	200mA
Nom. sensing distance:	1mm
Temperature range:	−20° to +65°C
Function:	n.o. (make) function
Type:	pnp logic

Edition: 07.05.07 AI

SAUTER Feinmechanik GmbH D-72555 Metzingen Germany

Datum: 07.03.19

gez.: AI

gepr.:

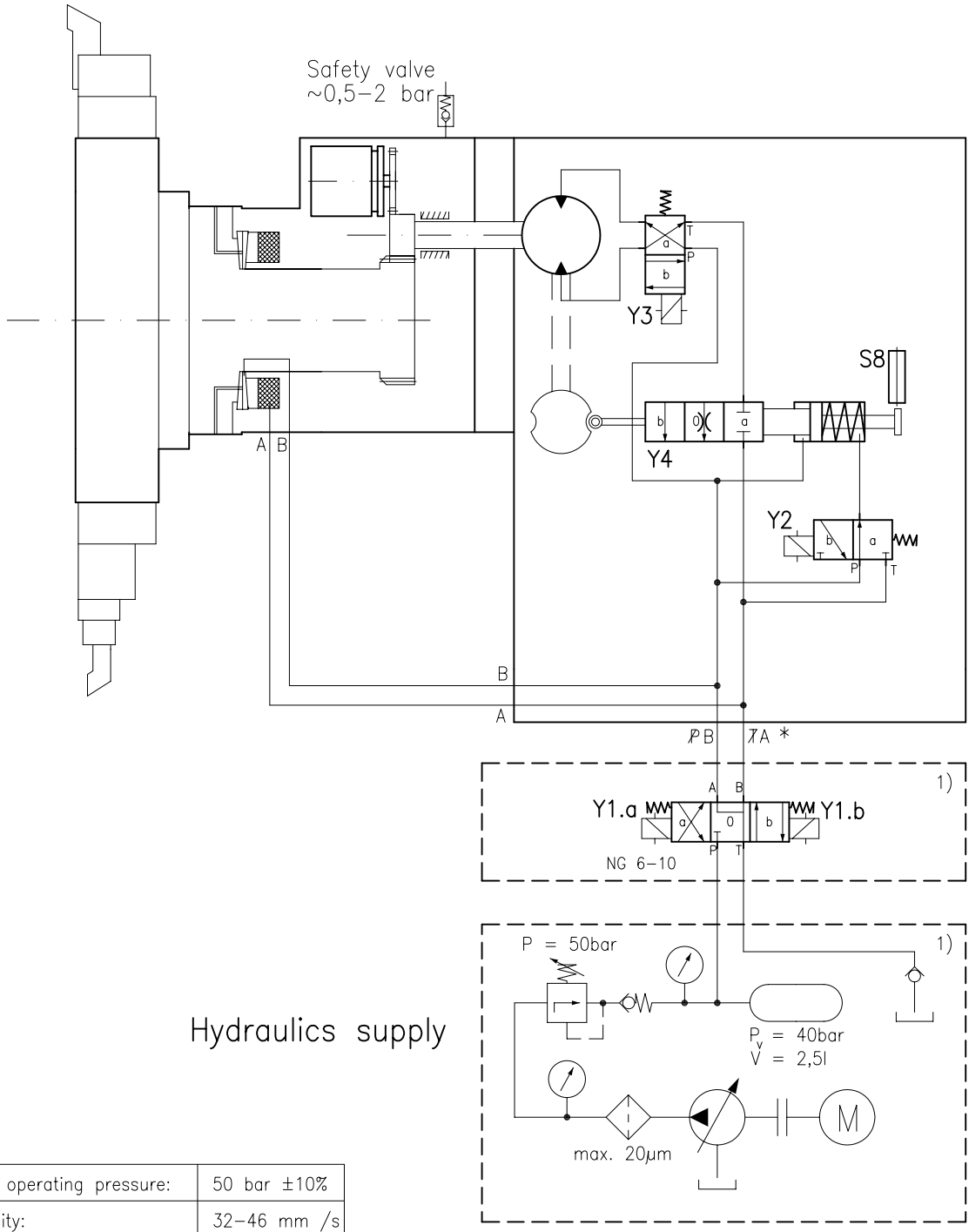
Wiring layout

DISK Type Tool Turret 0.5.439.1..

EPB-1251 e

Z-Doku-IdNr. 901148

Hydraulics diagram	Disk-Type Tool Turret 0.5.6...1..	HP-451 e Z-Doku-IdNr. 090551



Hydraulics supply

Hydraulic operating pressure:	50 bar ±10%
Oil viskosity:	32-46 mm /s
Recommanded operating temperature of the hydrulic oil at the turret:	30-50°C

1) Not included in SAUTER delivery volume.

* Attention:
Permissible dynamic pressure $P_{perm.} \leq 6$ bar on turret connection when rotating locating disc / tool disc.

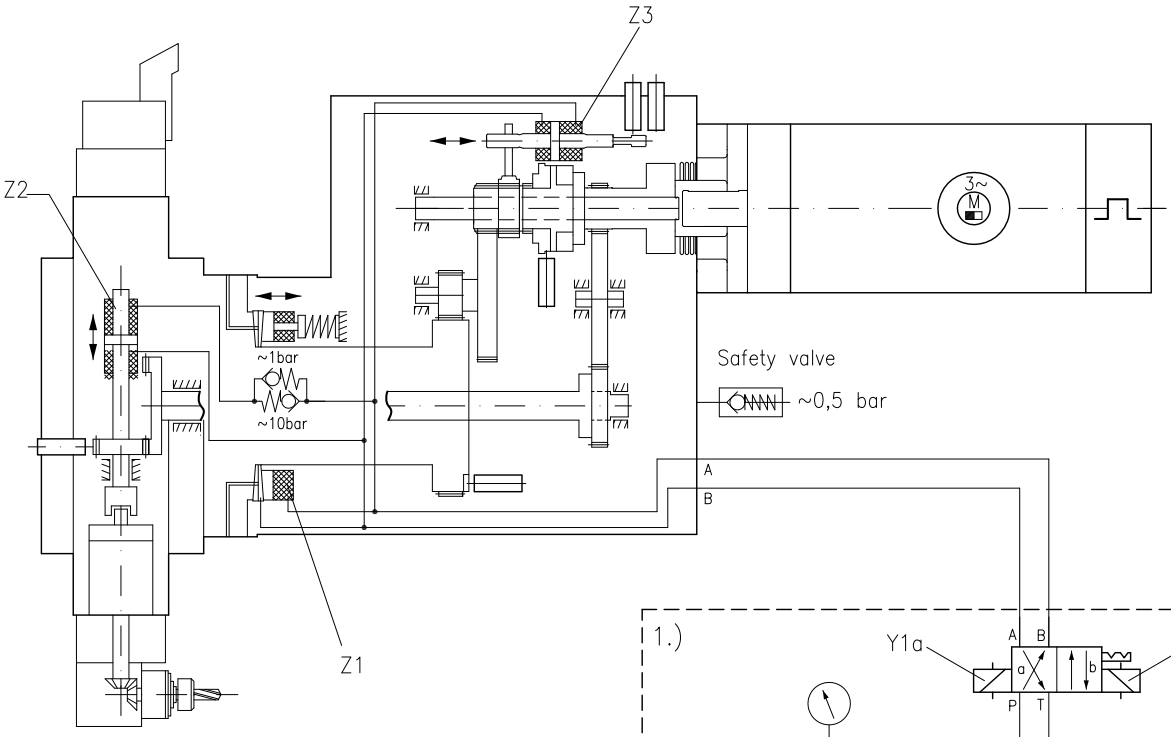
X depending on sense of rotation

Nominal width required for piping between hydraulic control unit and turret:						
Length [m] \ Turret size	.12	.16	.20	.25	.32	.40
≤ 6	10	10	10	12	12	12
> 6	12	12	12	15	15	15
Recommended rated quantiti of valve	Rated quantity 6			Rated quantity 10		

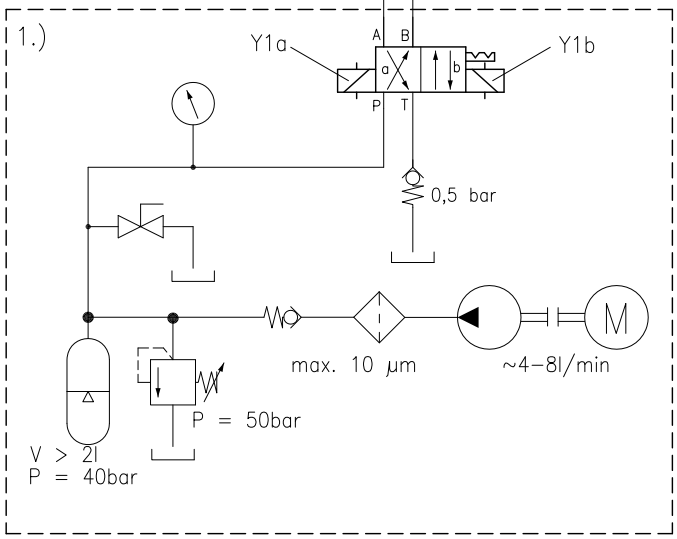
Table of functions		Y1			Y2		Y3		Y4		
		a	0	b	a	b	a	b	a	0	b
Lock		1	0	0	1	0	1	0	1	0	0
Unlock		0	0	1	1	0	X	X	1	0	0
Rotate right	*	0	0	1	0	1	1	0	0	0	1
Rotate left	*	0	0	1	0	1	0	1	0	0	1
Position right		0	0	1	1	0	1	0	0	1	0
Position left		0	0	1	1	0	0	1	0	1	0
Stop		0	1	0	1	0	1	0	1	0	0

Edition				Datum:	gez.:	gepr.:
09.04.06 Jo			SAUTER Feinmechanik GmbH D-72555 Metzingen Germany	22.10.96	Al	

Hydraulic Diagram	Disk–Type Tool Turret 0.5.450.4..	HP–496 en Z–Doku–IdNr. 092350



Hydraulics supply (example)



Size	V_{min} [l]
.12	0,7
.16	0,7
.20	0,7
.25	2,0
.32	2,0

1.) Not included in SAUTER delivery volume.

Air in the hydraulic system endangers the trouble–free operation of the turret. Hydr. supply and pipes to the turret must have options to exhaust.

Table of functions		Y1a	Y1b
Turret	lock	1	0
	unlock	0	1
Turret drive	engage	0	1
	disengage	1	0
Tool drive	engage	1	0
	disengage	0	1

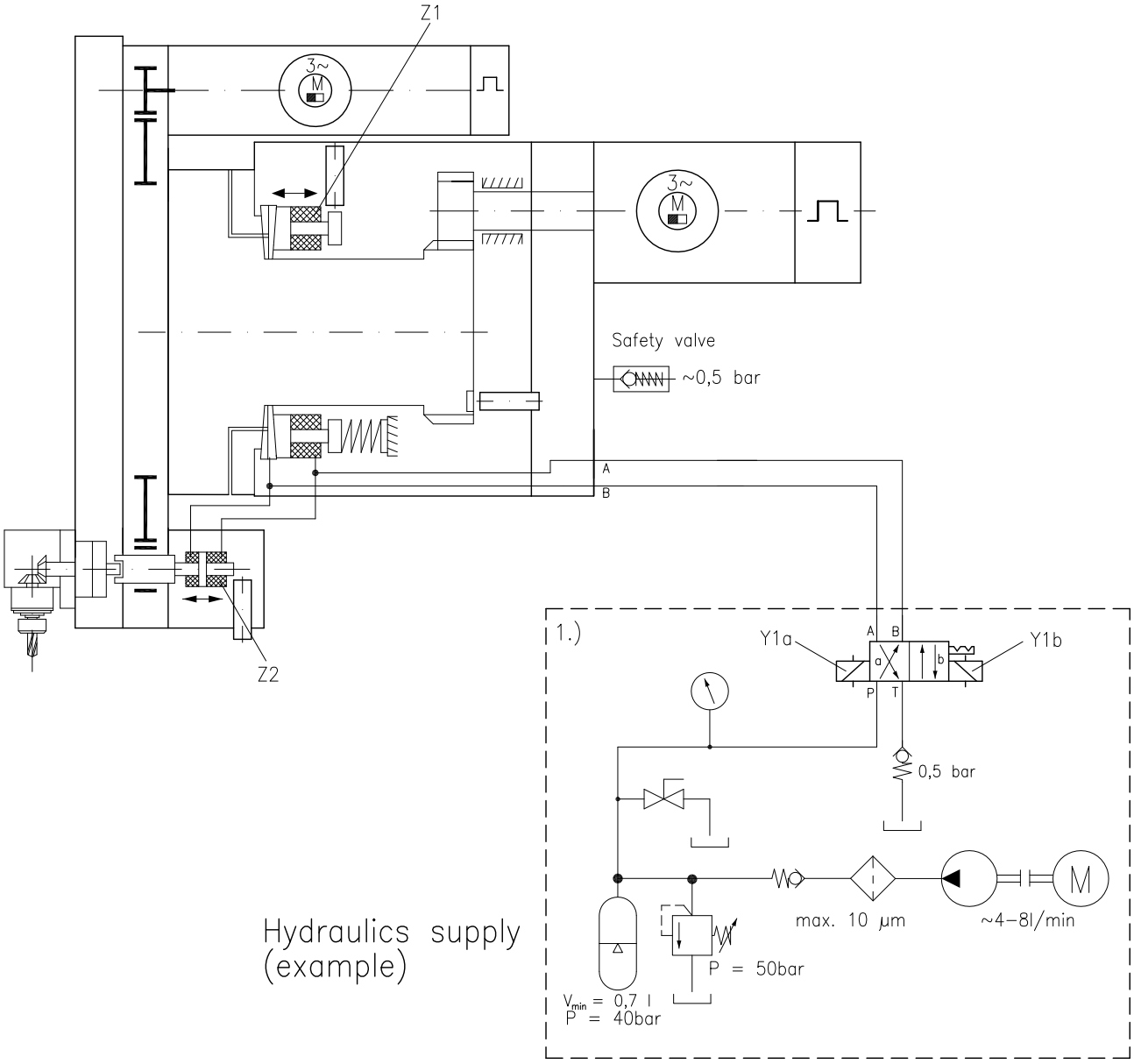
Oil quantity required per indexing cycle [cm^3]					
	Size				
	.12	.16	.20	.25	.32
V	≈15	≈30	≈45	≈65	≈114
$\dot{V}$	≈20 l/min				

Hydraulic operating pressure	50 bar ±10%
Oil viscosity:	32–46 mm^2/s
Recommended operating temperature of the hydraulic oil	25–55°C

Recommended nominal diameter of line between distributing valve and turret:					
Turret Size / Length [m]	.12	.16	.20	.25	.32
<4	6				
4–6	8	8	10	12	12
> 6	10	10	12	15	15
Recommended rated quantiti of valve	6	6	6	10	10

Edition					Datum:	gez.:	gepr.:
11.11.08 Jo			SAUTER Feinmechanik GmbH D–72555 Metzingen Germany	SAUTER	01.05.16	AI	

Hydraulic Diagram	Disk–Type Tool Turret 0.5.433.... 0.5.436.2..	HP–498 en Z–Doku–IdNr. 092407



Hydraulics supply (example)

1.) Not included in SAUTER delivery volume.

Table of functions		Y1a	Y1b
Turret	lock	1	0
	unlock	0	1
Tool drive	engage	1	0
	disengage	0	1

Hydraulic operating pressure	50 bar ±10%
Oil viscosity:	32–46 mm^2/s
Recommended operating temperature of the hydraulic oil	25–55°C

Oil quantity required per indexing cycle [cm^3]					
	Size				
	.12	.16	.20	.25	.32
V	≈15	≈30	≈45	≈65	≈114
$\dot{V}$	≈20 l/min				

Recommended nominal diameter of line between distributing valve and turret:					
Turret Size / Length [m]	.12	.16	.20	.25	.32
≤ 6	8	8	10	12	12
> 6	10	10	12	15	15
Recommended rated quantiti of valve	6	6	6	10	10

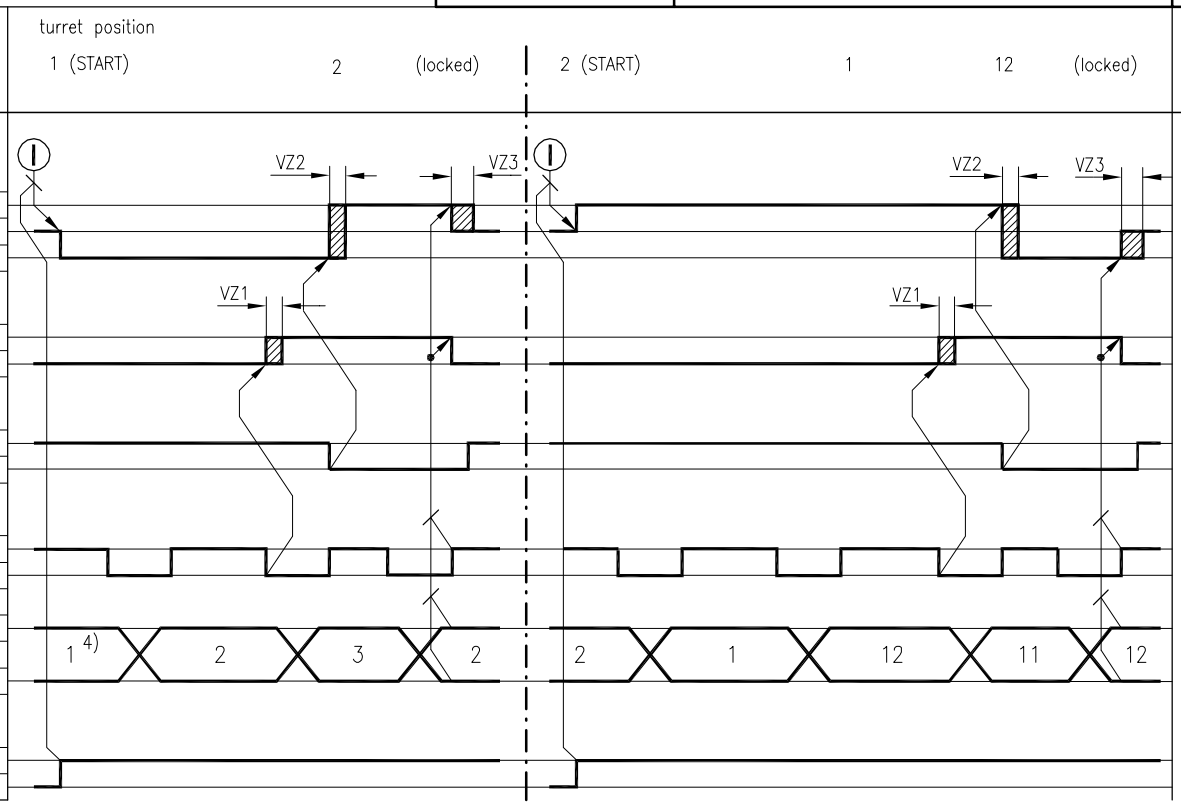
Edition						
11.06.27 Jo			SAUTER Feinmechanik GmbH D–72555 Metzingen Germany	SAUTER	Datum: 01.06.21	gez.: Al	gepr.:

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) ← ↻]															

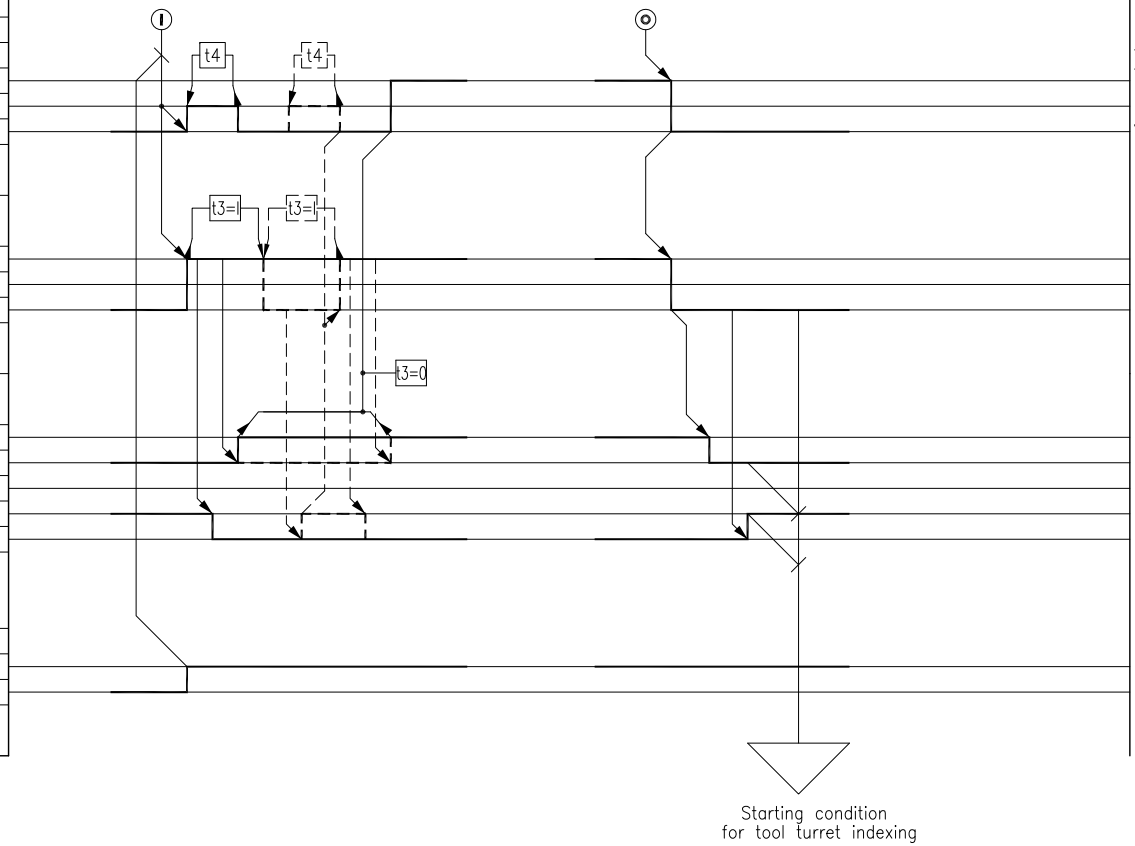
Table 2

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

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

Diagram of functions	Tool drive 0.0.073.... for SAUTER DISK-type tool turret Series 0.5.433.1.. 0.5.473.1.. 0.5.673.1..	SK-940 en Z-Doku-IdNr. 090964

	Denomination	Designation	Situation		Dimension	
01						
02						
03	Tool drive:					
04	Motor	M2	CCW rotation or CW rotation	1	min^{-1}	
05				1	min^{-1}	60
06				0		
07						
08						
09						
10	Tool drive clutch					
11	Reversing stroke solenoid	$Y^{2}_{4}.1$	engage	1		
12				0		
13		$Y^{2}_{4}.2$	disengage	1		
14						
15						
16						
17	Tool drive clutch control:					
18	Proximity switch	S10	engaged	1		
19				0		
20						
21	Proximity switch	S11	disengaged	1		
22				0		
23						
24						
25						
26	Enable					
27	Turret		Locked and in set position	1		
28				0		
29						
30						



Comments:

Duration:
t3 =300ms
t4 =200ms

– – – Tool drive does not engage:
1. Time t3=300ms reached.
2. Disengage tool drive until proximity detector S11 actuated.
3. Motor on, engage tool drive and restart t3 and t4.

Definition of sens of rotation; seen in direction to motor schaft M2:

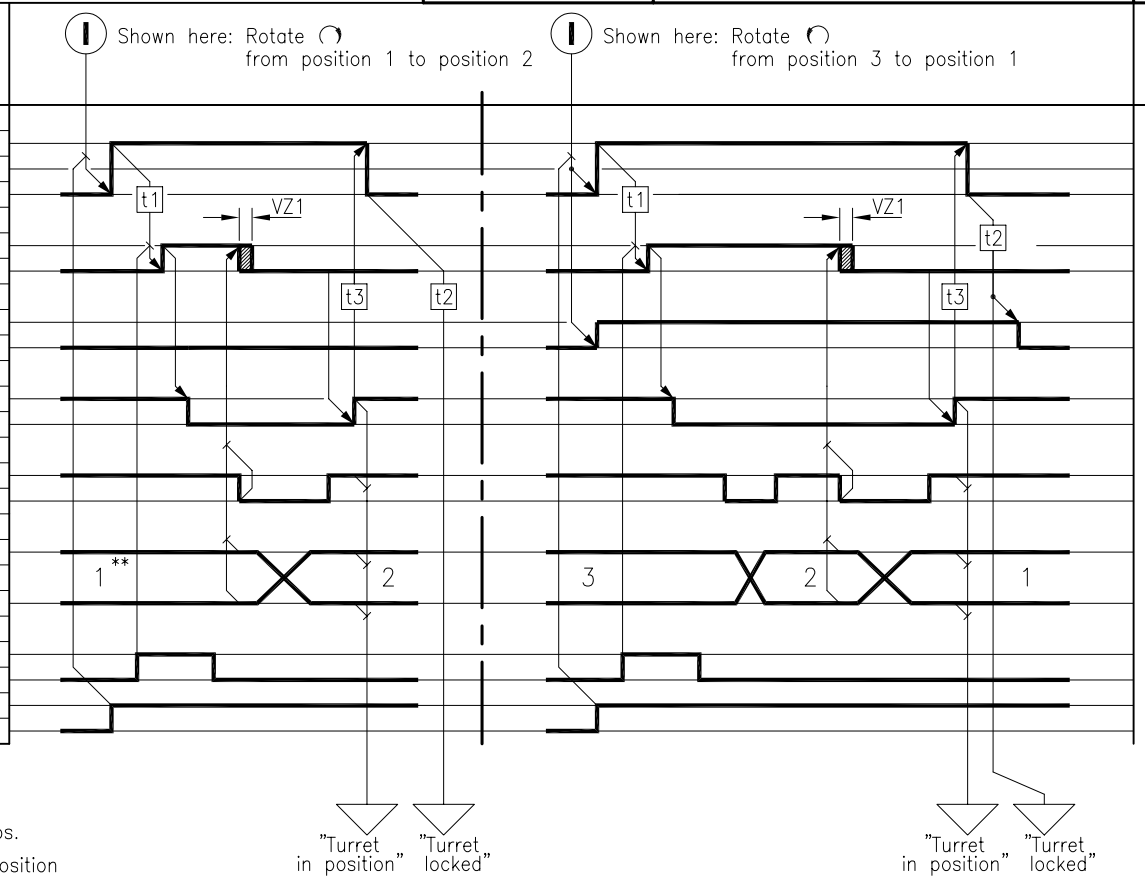
For right-hand cutting tools with:
1. Spindle unit, straight: Motor M2 in CCW rot.
2. Spindle unit, angular: Motor M2 in CW rot.

Conditions for tool turret indexing:
1. Solenoid $Y^{2}_{4}.2$ energized.
2. Proximity-detector S11 actuated.

Edition: 11.04.13 Jo			SAUTER Feinmechanik GmbH D-72555 Metzingen Germany		Datum: 18.04.95	gez.: Al	gepr.:

Diagram of functions	Disk–Type Tool Turret 0.5.6...1..	SK–1307 e Z–Doku–IdNr. 090539

	Element/function	Code	Designation of state	State
01				
02	4/3 way valve "Unlock–lock turret"	Y1	unlock	b
03			stop	0
04			lock	a
05				
06	3/2 way valve "Start–Stop"	Y2	start	b
07			stop	a
08				
09	4/2 way valve "Turret – sense of rotation"	Y3	left ↺	b
10			right ↻	a
11				
12	Proximity switch "Turret in position"	S8		1
13				0
14				
15	Angular position encoder see tabble 1	S1	Strobe	1
16				0
17				
18			Bit–Signale 1.– 5.Bit	1
19				0
20				1
21				
22	Command from control of machine "Enable turret rotate"			1
23				0
24	For tool drive 0.5.673.1.. "Check tool drive disengaged"	S11		1
25				0



* only for 16/24 pos.

** angular encoder position

Comments

Make use of HP–451

Required delay t1, t2, t3 see tabelle 2

Max. adm. delay $VZ1_{max.}$= 30ms

Note:
The turrets of series 0.5.680.1.. with sizes 32 and 40 have 16 resp. 24 indexing positions.
I. e. a turret with an 8 position tool disc has to be regarded as a 16 position turret.
I. e. a turret with an 12 position tool disc has to be regarded as a 24 position turret.
(Information in this regard see product information PI36.3).

Table 1

Angular encoder position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Strobe	1	1	1	1	1	1	1	1	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	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	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	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	0	0	0	0	0	0	0	1
5.Bit *	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
Parity–Check	1	1	0	1	0	0	1	1	0	0	1	0	1	1	0	1	0	0	1	0	1	1	0	0

Table 2

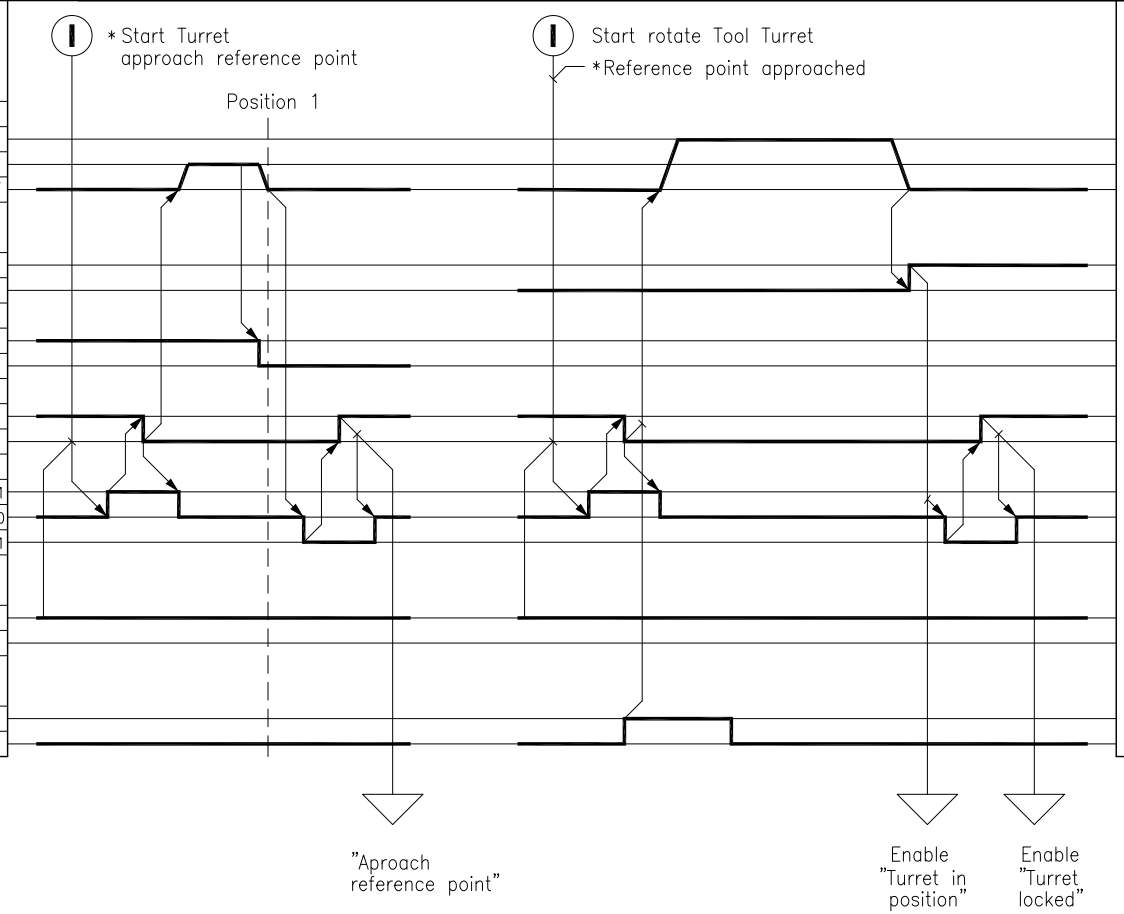
Turret size	$t1_{(ms)}$	$t2_{(ms)}$	$t3_{(ms)}$
12	100	100	–
16	120	120	100
20	170	170	100
25	260	260	100
32	450	450	150
40	450	450	150

Edition: 08.02.06 AL			SAUTER Feinmechanik GmbH D–72555 Metzingen Germany	SAUTER	Datum: 22.10.96	gez.: AI	gepr.:

Diagram of functions	DISK–Type Tool Turret 0.5.440.$^{2..}_{6..}$ 0.5.433.1..	SK–1473 en Z–Doku–IdNr. 091265

	Element/function	Code	Designation of state	State
01				
02				
03				
04				
05	Turret driving motor			
06	Turret "rotate"	M1	$n_{max.}$ app. PI 43	ON
07	Turret "approach reference point"*			ON
08				OFF
09				
10				
11	Setpoint pos. = actual pos.			1
12	(±0,16° Tool disk)			0
13				
14	Proximity switch *	S1		1
15	Reference point turret			0
16				
17	Proximity switch "Turret locked"	S8		1
18				0
19				
20	Valve solenoid	Y1	unlock	b 1
21	"Turret unlock – lock"			0
22			lock	a 1
23				
24				
25	For Tool drive 0.5.433....	S11		1
26	"Check tool drive disengaged""			0
27				
28				
29	Command from control of machine			1
30	"Enable turret rotate"			0

Shown here: Approach reference point
Rotate Tool Turret



Comments

See also: EPB–1126
EPB–1131
HP–489

* On turret drive motor with absolute sensor:
- S1 not required
- Move to reference position cancelled

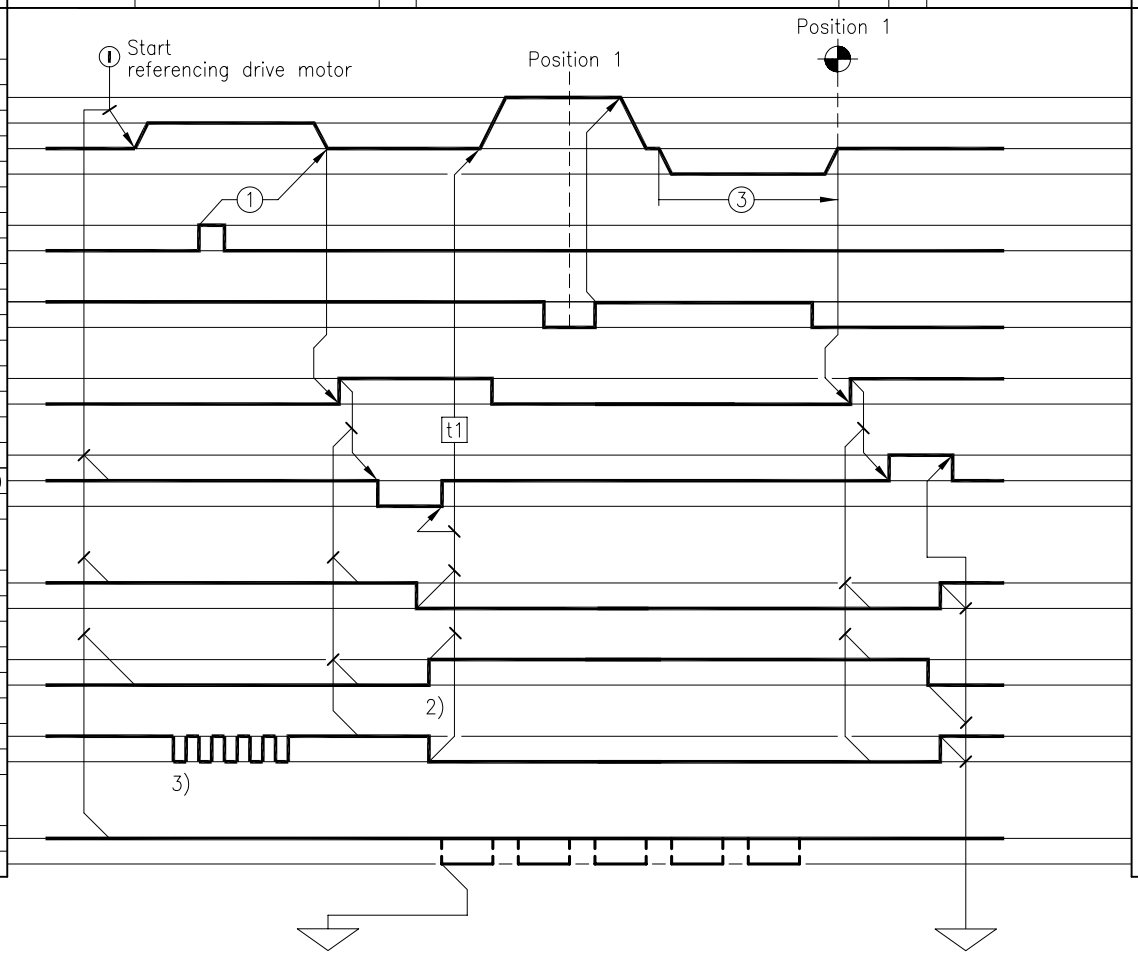
On turret drive motor with incremental tranducer:
- S1 required
- Move to reference position must be made

Edition			SAUTER Feinmechanik GmbH D–72555 Metzingen Germany		Datum:	gez.:	gepr.:
11.04.13 Jo				SAUTER	00.04.28	Al/Wi	

Diagram of functions	Disk–Type Tool Turret 0.5.450.4..	2 Page 1 SK–1487 e Z–Doku–IdNr. 092269

	Element/Function	Code	State	State
01				
02				
03	Drive motor	M1		
04	Reference point "approach+"			1
05	Referencing drive motor			1
06				0
07	Reference position1 "approach–"			1
14				
15	Incremental encoder	B1		1
16	Zero point			0
17				
18	Proximity switch	S1		1
19	Reference point turret			0
20				
21	Drive in engage position			1
22	Exactposition ±0,5°			0
23				
24		Y1		a 1
25	Directional control valve ②			0
26				b 1
27				
28				
29	Proximity switch	S4		1
30	Turret drive "disengaged"			0
31				
32	Proximity switch	S5		1
33	Turret drive "engaged"			0
34				
35	Proximity switch 1)	S6		1
36	Tool drive "engaged"			0
37				
38				
39	Proximity switch	S10		1
40	Ratchetting clutch "engaded"			0

Shown here: Approach reference point



Fault
Ratchetting clutch has responded. Motor must be switched of immediately. Having clarified the reason for the fault, the clutch can be reengaged by rotating of the clutch axis. New approach referene point.

"Approach reference point"
(Turret in position 1)
Enable for
–Working with the machine, or
–Working with the tool drive.

Comments

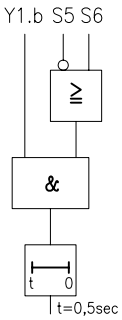
See also: EPB–1150
HP–496

① Reference point offset

③ Drive to engage position

t1 = 50ms

2) Required supervision



Fault:
Hydraulic supply

②

Table of functions		Y1a	Y1b
Turret	lock	1	0
	unlock	0	1
Turret drive	engage	0	1
	disengage	1	0
Tool drive	engage	1	0
	disengage	0	1

Edition				Datum:	gez.:	gepr.:
08.09.10 AI			SAUTER Feinmechanik GmbH D–72555 Metzingen Germany	01.04.04	AI	

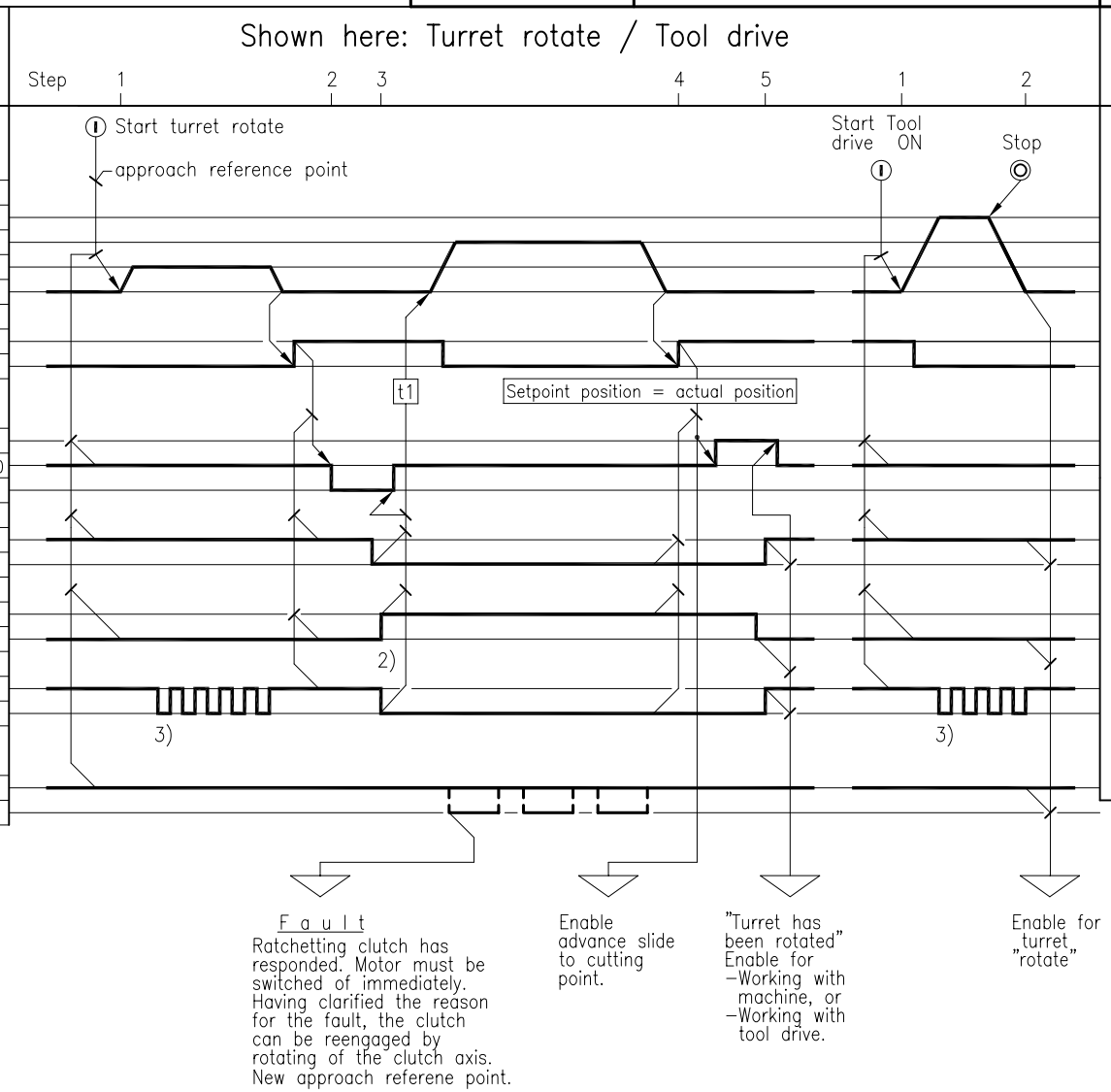
Diagram of functions

Disk–Type Tool Turret 0.5.450.4..

SK–1487 e

Z–Doku–IdNr. 092269

	Element/Function	Code	State	State
01				
02				
03				
04	Drive motor	M1		
05	Tool drive working speed			1
06	Turret "rotate"			1
07	Tool drive, approach engage position			1
08				0
09				
10	Drive in engage position			1
11	Exactposition ±0,5°			0
12				
13				
14		Y1		a 1
18	Directional control valve ②			0
19				b 1
20				
21	Proximity switch	S4		1
22	Turret drive "disengaged"			0
23				
24	Proximity switch	S5		1
25	Turret drive "engaged"			0
26				
27	Proximity switch 1)	S6		1
28	Tool drive "engaged"			0
29				
30				
31	Proximity switch	S10		1
32	Ratchetting clutch "engaded"			0



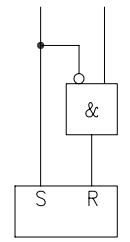
Comments

See also: EPB–1150
HP–496

3)
At size ≤ 412 by small tooth size perhaps no signal changing

t1 = 50ms

1) S6 Y1.b



Control Tool drive engaged

②

Table of functions		Y1a	Y1b
Turret	lock	1	0
	unlock	0	1
Turret drive	engage	0	1
	disengage	1	0
Tool drive	engage	1	0
	disengage	0	1

Edition 08.09.10 Al

SAUTER Feinmechanik GmbH D–72555 Metzingen Germany

Datum:	gez.:	gepr.:
01.04.04	Al	