Product information PI 44

Documents for interface-planning for tool turrets

Serie	**0.5.440.xxx**
	0.5.433.xxx
	0.5.435.xxx
	0.5.436.xxx

2010-07-15

NOTE:

The information contained in this Projcet Planning Guide is in conformity with the knowledge at the point of printing. Subject to modifications which occur within the framework of continuous further development.
The quality of our products can only be guaranteed, if the instructions of this project planning guide are complied with!

Overview: control circuit diagrams

Turret series	Wiring layout	Hydraulic diagram	Diagram of function
0.5.440.2xx	EPB – 1126	HP-489	SK-1473
0.5.433.2xx	EPB – 1155	HP-489	SK-1515
0.5.435.2xx	EPB – 1130	HP-490	SK-1471
0.5.436.2xx	EPB – 1155	HP-498	SK-1500

NOTES

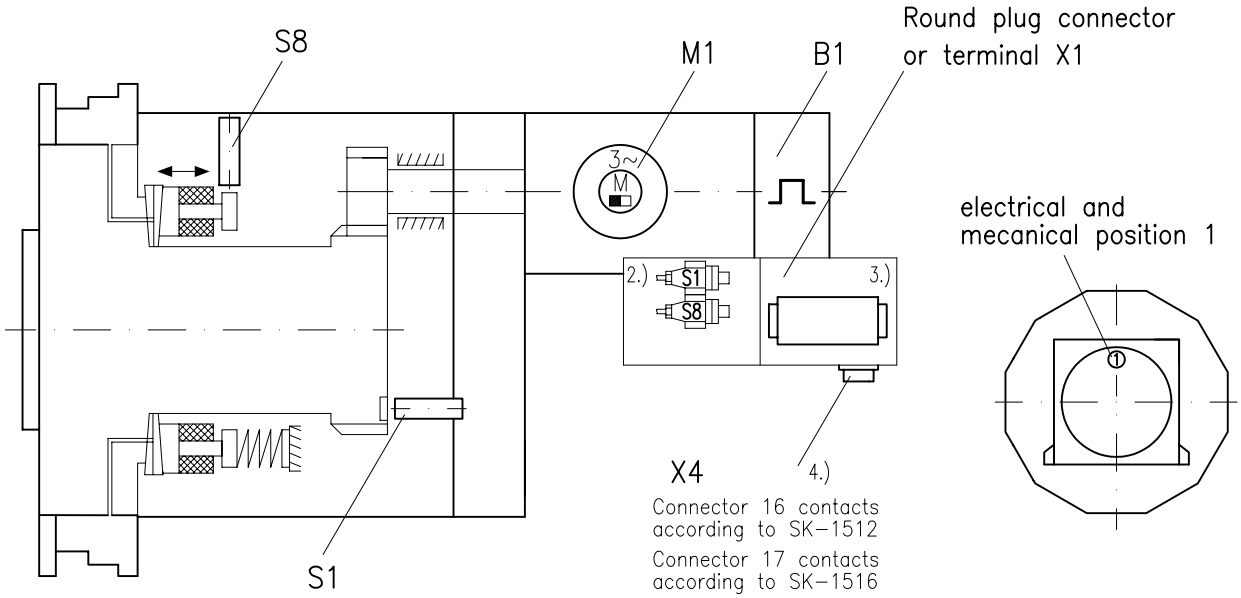
On turrer motor with absolute sensor:

- Reference position switch not required
- Move to reference position cancelled

On turrer motor with incremental tranducer:

- Reference position switch required
- Move to reference position must be made

Wiring layout	DISK Type Tool Turret 0.5.440.2..	EPB–1126 e Z–Doku–IdNr.090921



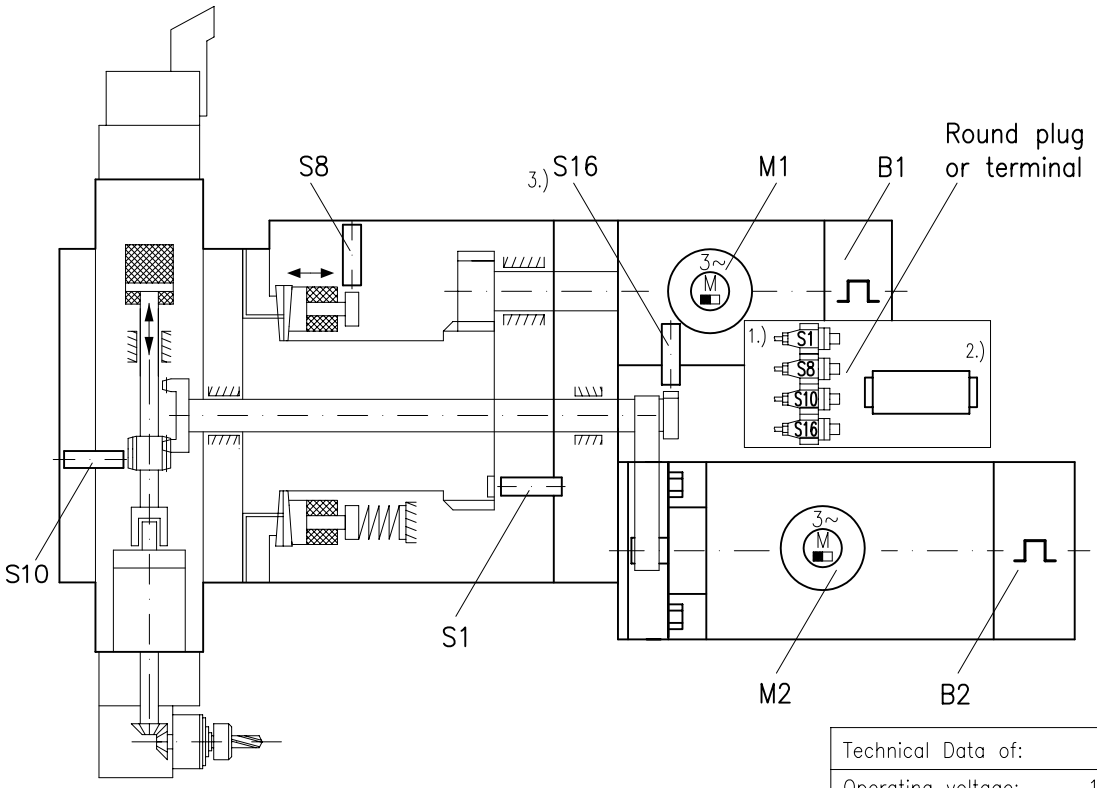
Designation	Element/Function	Line	Round plug 2.) connector M12 337248 Contact No.	Terminal 3.) X1	4.) Connector X4 16 contacts	4.) Connector X4 17 contacts	Type	Suppier
S1	Proximity switch 1.) Reference point tool turret	brown (+)	1	12	2	2	BES 516–324–E0–C	Balluff
		blue (–)	3	11	1	1		
		black	4	1	3	3		
S8	Proximity switch "Tool turret locked"	brown (+)	1	12			BES 516–300–S205–D	Balluff
		blue (–)	3	11				
		black	4	8	4	4		
B1	Encoder system 1.) Tool Turret						according to order	
M1	Tool Turret driving 1.) motor AC–Servo						according to order	
				41	11	11	terminal for customer	
				42	12	12		
	Ground	green–yellow		⏚	16	17		

1.) Option
2.) Round plug connector (standard)
3.) Option terminal X1
4.) Option connector X4

Technical Data of:	S1 – S8
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:					Datum:	gez.:	gepr.:
08.05.27 AI			SAUTER Feinmechanik GmbH D–72555 Metzingen Germany	SAUTER	00.02.28	AI	

Wiring layout	DISK Type Tool Turret 0.5.435.2..	EPB–1130 e Z–Doku–IdNr.091149



Technical Data of:	S1 – S10
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

1.) Option
2.) Option: Driving motor manufacture Sauter
3.) Option: with tool drive gear i=2

Designation	Element/Function		Line	Round plug 1.) connector M12 337248 Contact No.	2.) terminal X1		Type	Suppier
S1	Proximity switch Reference point tool turret	1.)	brown (+)	1	12		BES 516–324–E0–C	Balluff
			blue (–)	3	11			
			black	4	1			
S8	Proximity switch "Tool turret locked"		brown (+)	1	12		BES 516–300–S205–D	Balluff
			blue (–)	3	11			
			black	4	8			
S10	Proximity switch "Tool drive engaged"		brown (+)	1	12		BES 516–324–E4–C	Balluff
			blue (–)	3	11			
			black	4	10			
S16	Proximity switch Reference point tool drive	3.)	brown (+)	1	12		BES 516–324–E4–C	Balluff
			blue (–)	3	11			
			black	4	34			
B1	Encoder system Tool turret	2.) MR	yellow		41			SAUTER
		MRR	blue		42			
		BAT	orange		43			
		MD	grey		44			
		MDR	white		45			
			lilac		46			
		P5	red		47			
		LG	black		48			
		screen	brown		49			
	Encoder system Tool Turret	1.)						
M1	Tool Turret driving motor AC–Servo	2.)	red		U1			SAUTER
			white		V1			
			black		W1			
	Tool Turret driving motor AC–Servo	1.)						
B2	Tool Drive driving motor AC–Servo	1.)						
M2	Encoder system Tool Drive	1.)						
	Ground		green–yellow	⏚				

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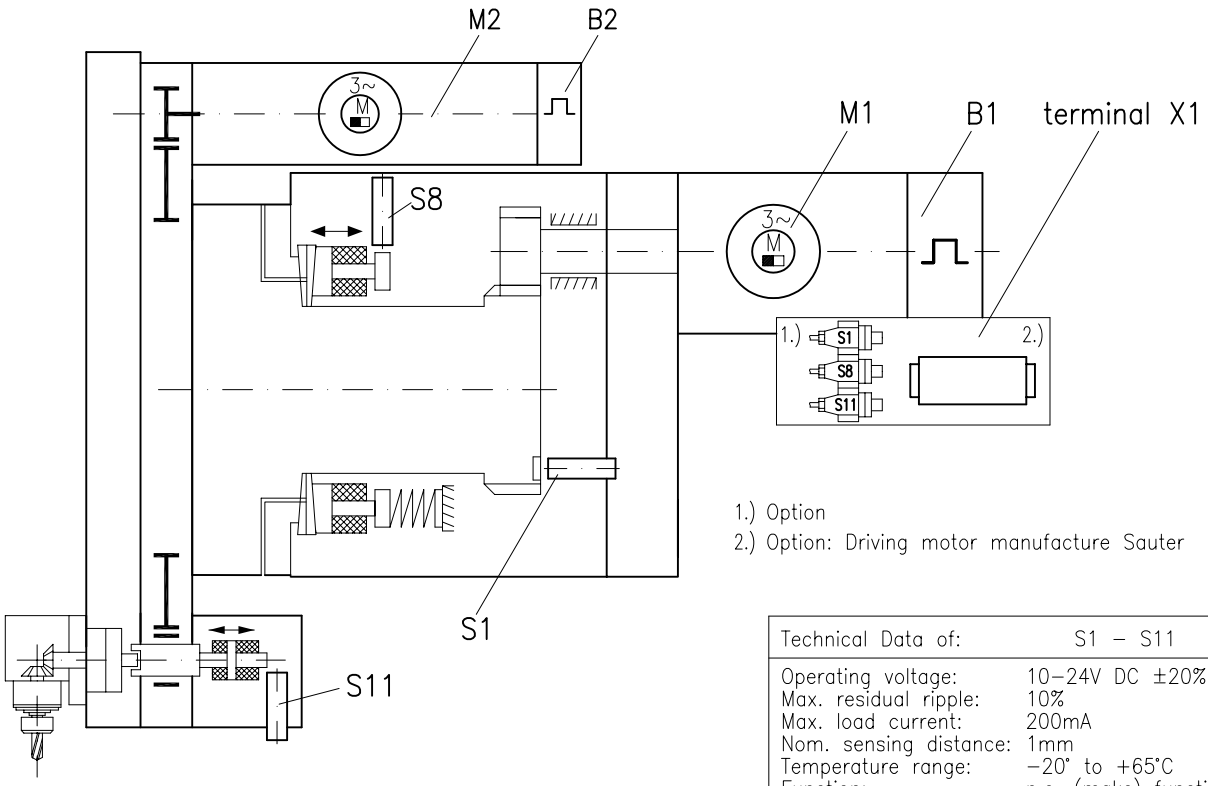
Wiring layout	DISK Type Tool Turret $0.5.43\frac{3}{6}.2..$	EPB–1155 e Z–Doku–IdNr.092406

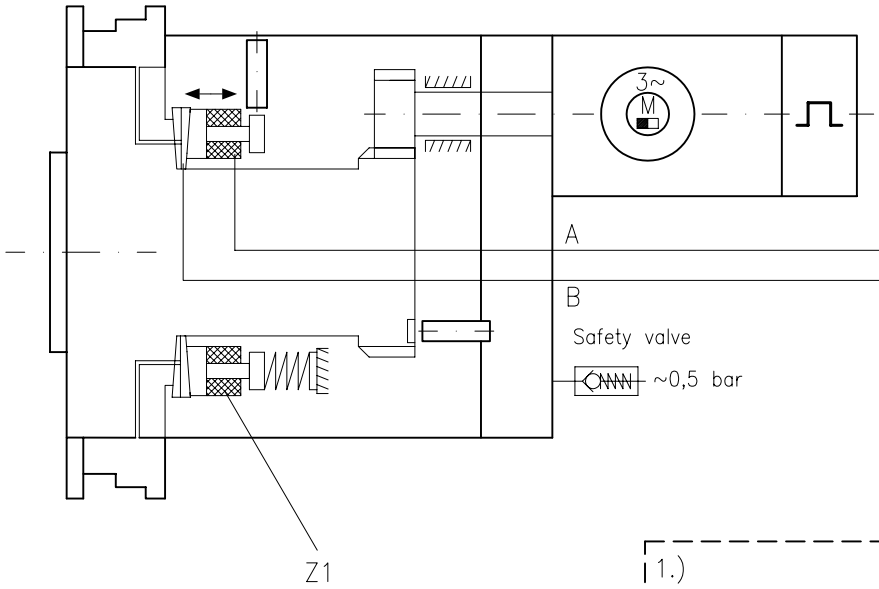


1.) Option
2.) Option: Driving motor manufacture Sauter

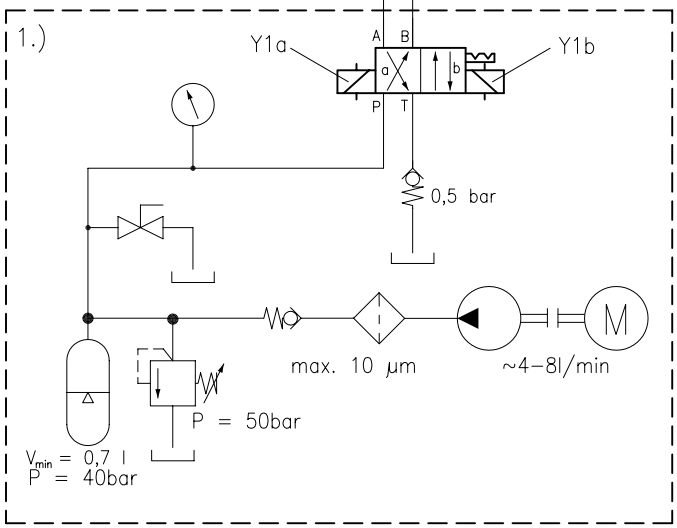
Technical Data of:	S1 – S11
Operating voltage:	10–24V DC ±20%
Max. residual ripple:	10%
Max. load current:	200mA
Nom. sensing distance:	1mm
Temperature range:	–20° to +65°C
Function:	n.o. (make) function
Type:	pnp logic

Designation	Element/Function		Line	Round plug connector M12 337248 Contact No. 1.)	terminal X1 2.)		Type	Suppier
S1	Proximity switch Reference point tool turret 1.)		brown (+)	1	12		BES 516–324–E0–C	Balluff
			blue (–)	3	11			
			black	4	1			
S8	Proximity switch "Tool turret locked"		brown (+)	1	12		BES 516–300–S205–D	Balluff
			blue (–)	3	11			
			black	4	8			
S11	Proximity switch "Tool drive disengaged"		brown (+)	1	12		BES 516–324–E4–C	Balluff
			blue (–)	3	11			
			black	4	30			
B1	2.) Encoder system Tool turret	MR	yellow		41			SAUTER
		MRR	blue		42			
		BAT	orange		43			
		MD	grey		44			
		MDR	white		45			
			lilac		46			
		P5	red		47			
		LG	black		48			
		screen	brown		49			
	Encoder system Tool Turret 1.)							
M1	Tool Turret driving motor AC–Servo 2.)		red		U1			SAUTER
			white		V1			
			black		W1			
	Tool Turret driving motor AC–Servo 1.)							
B2	Tool Drive driving motor AC–Servo 1.)							
M2	Encoder system Tool Drive 1.)							
	Ground		green–yellow	⏚				

Edition: 08.05.27 AI			SAUTER Feinmechanik GmbH D–72555 Metzingen Germany	SAUTER	Datum: 01.06.21	gez.: AI	gepr.:



Hydraulics supply (example)



1.) Not included in SAUTER delivery volume.

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

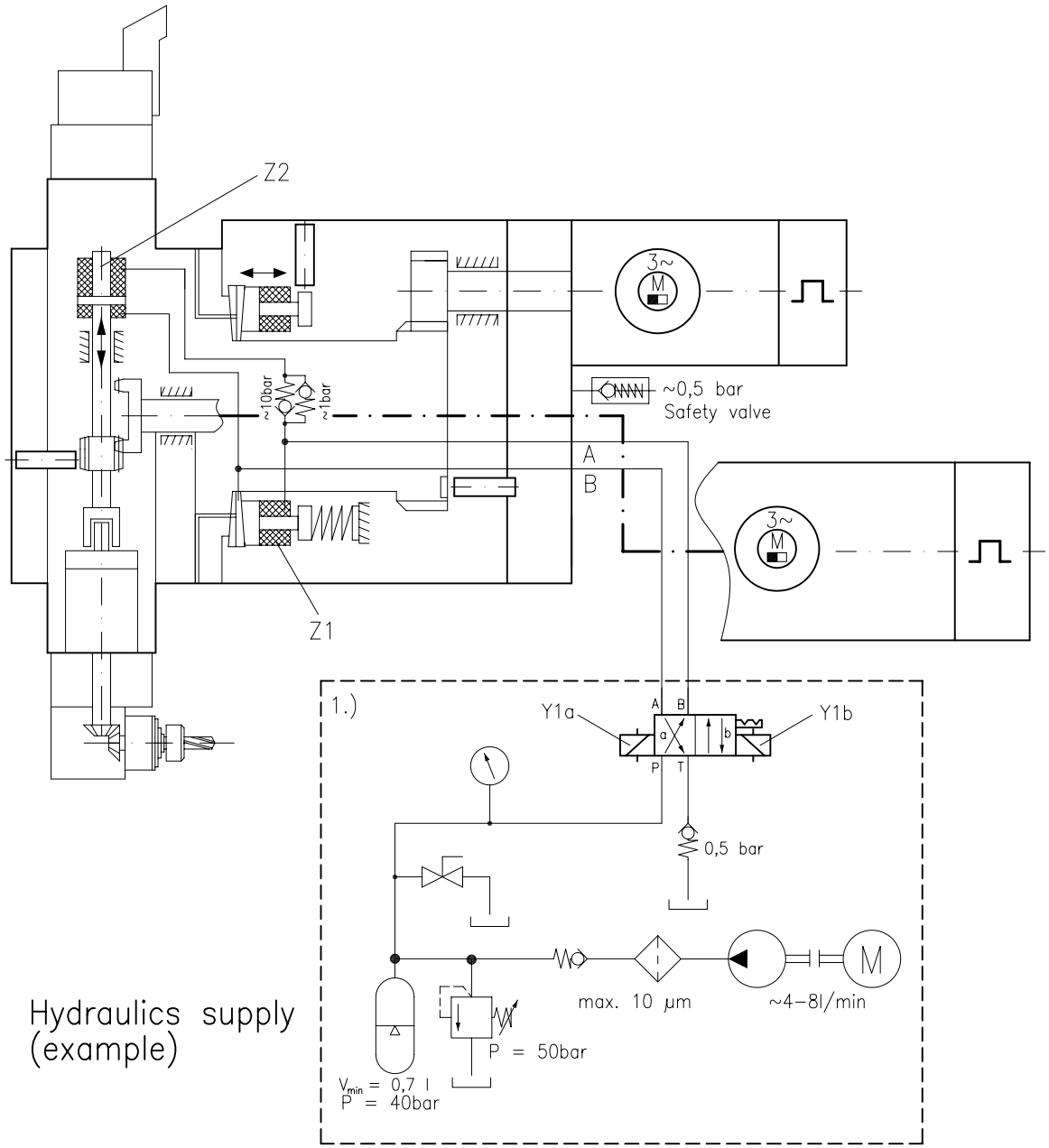
Table of functions		Y1a	Y1b
Turret	lock	1	0
	unlock	0	1

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

Hydraulics diagram	Disk–Type Tool Turret 0.5.435.2..	HP–490 en Z–Doku–IdNr. 091160



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

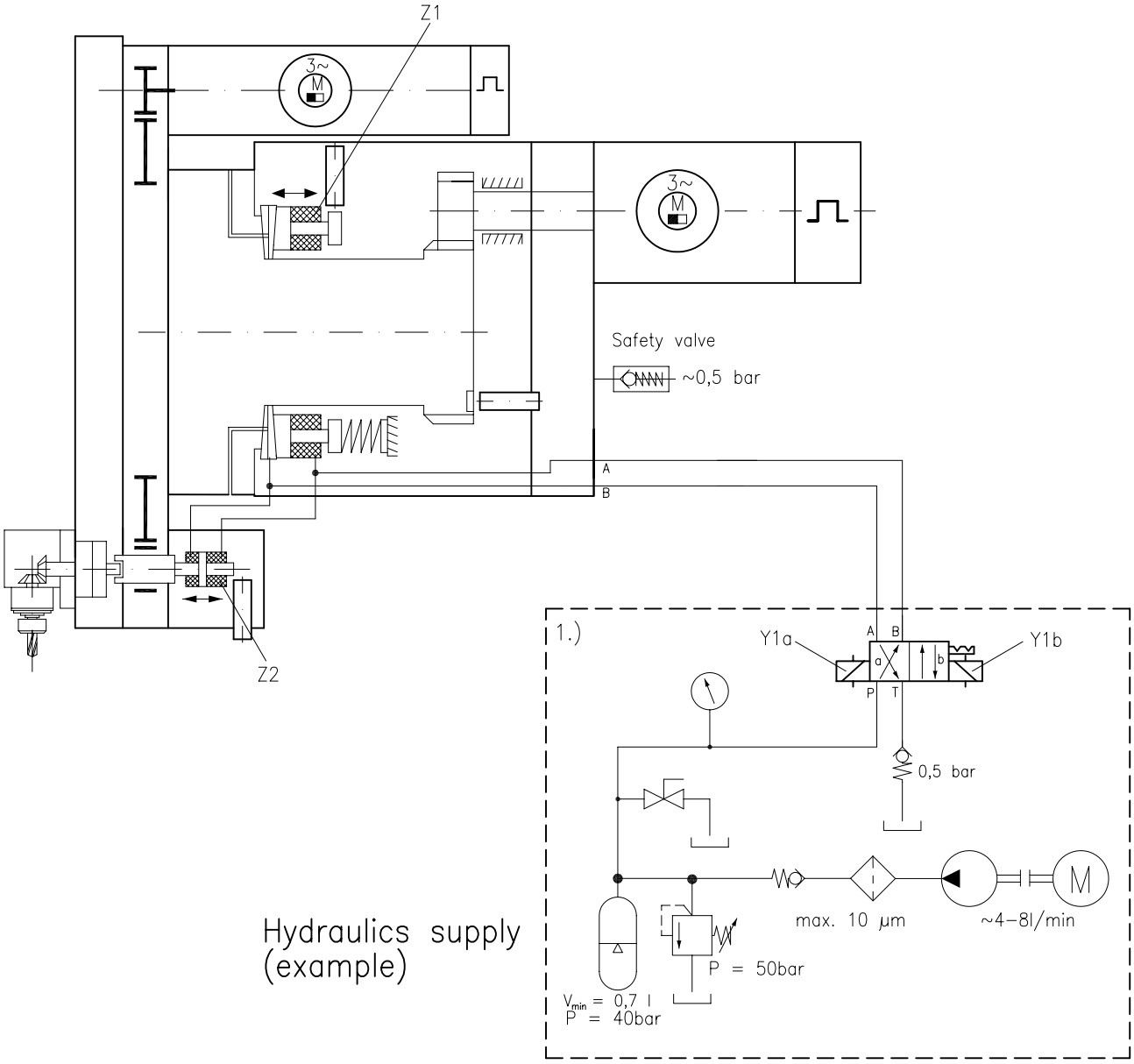
Hydraulic operating pressure	50 bar ±10%
Oil viscosity:	32–46 mm^2/s
Recommended operating temperature of the hydraulic oil	25–55°C

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					Datum:	gez.:	gepr.:
10.06.15 Jo			SAUTER Feinmechanik GmbH D–72555 Metzingen Germany	SAUTER	00.04.28	Al	

Hydraulic Diagram	Disk–Type Tool Turret $0.5.43\frac{3}{6}.2..$	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				

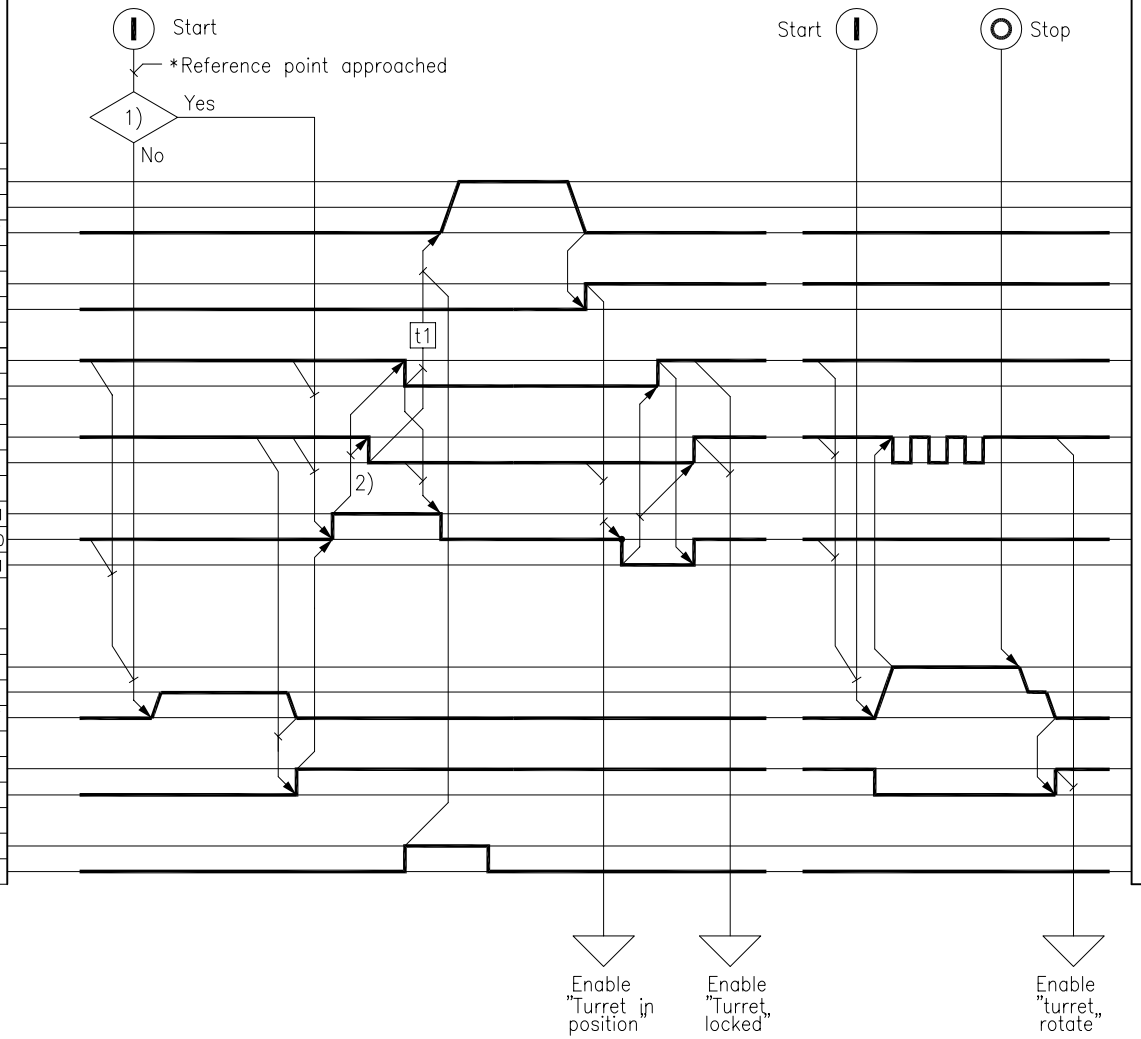
Recommended nominal diameter of line between distributing valve and turret:					
Turret Size / Length [m]	.12	.16	.20	.25	.32
≤ 6	8	8	10	12	12
> 6	10	10	12	15	15
Recommended rated quantiti of valve	6	6	6	10	10

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

Diagram of functions	DISK–Type Tool Turret 0.5.435.2..	2 sheet 1 SK–1471 e Z–Doku–IdNr. 091164

	Element/function	Code	Designation of state	State
01				
02				
03				
04				
05				
06				
07	Turret driving motor			
08	Turret "rotate"	M1	$n_{max.}$	ON
09				ON
10				OFF
11				
12	Setpoint pos. = actual pos.			1
13	(±0,16° Tool disk)			0
14				
18	Proximity switch "Turret locked"	S8		1
19				0
20				
21	Proximity switch "Tool drive engaged" 1)	S10		1
22				0
23				
24	Valve solenoid "Turret unlock – lock"	Y1	unlock	b 1
25				0
26			lock	a 1
27				
28				
29	Tool drive motor			
30	Tool drive working speed	M2	$n_{max.}$ = 4000min^{-1}	ON
31	Tool drive, approach engage position			ON
32				OFF
33				
34	Tool drive in engage position			1
35				0
36				
37	Command from control of machine "Enable turret rotate"			1
38				0

Shown here:
Rotate Tool Turret — Tool drive

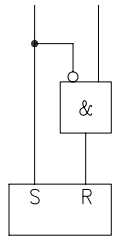


Comments

See also: EPB–1130
HP–490

t1 = 50ms

1) S10 Y1.b



Control
Tool drive
engaged

1) Tool drive in engage position?

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

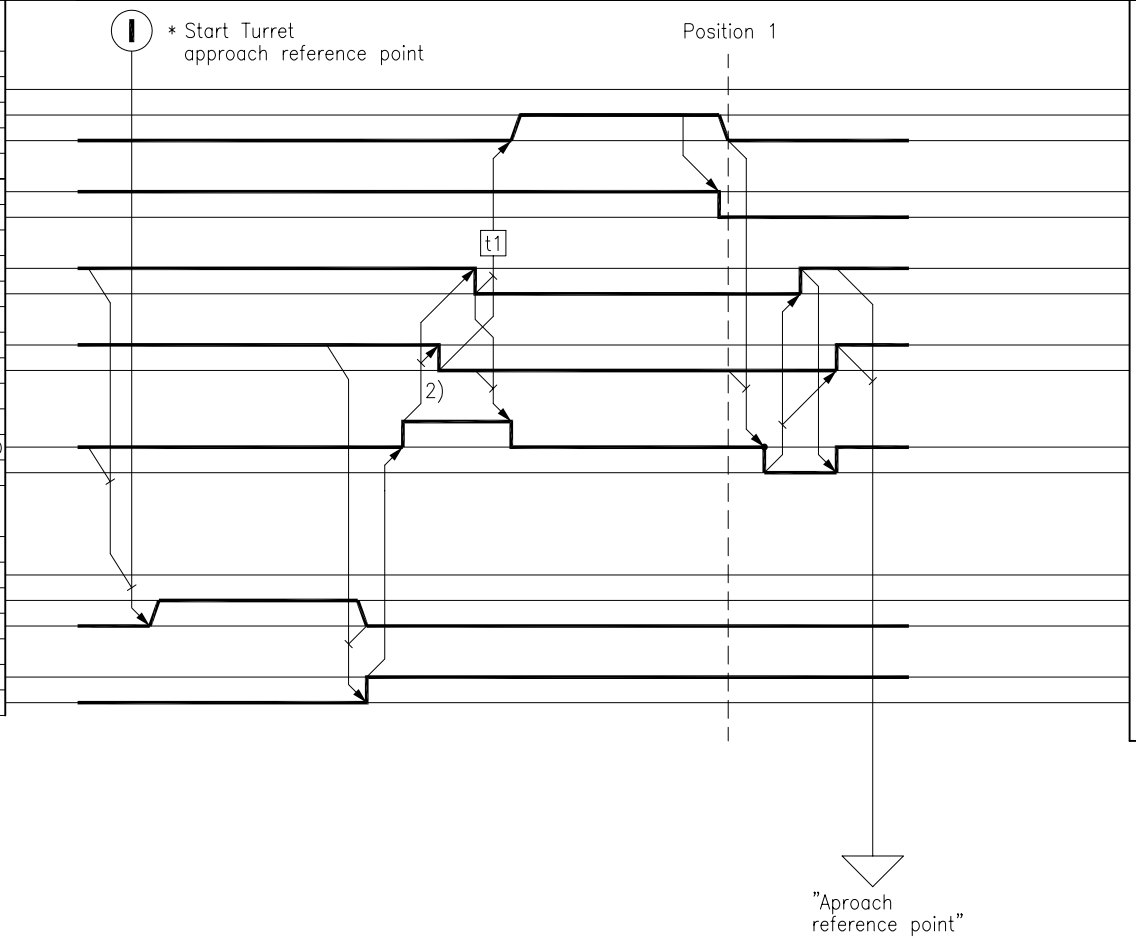
On turret drive motor with incremental tranducer:
- S1 required
- Move to reference position must be made

Edition				Datum:	gez.:	gepr.:
08.05.27 AI			SAUTER Feinmechanik GmbH D–72555 Metzingen Germany	00.05.02	AI/Wi	

Diagram of functions	DISK–Type Tool Turret 0.5.435.2..	2 sheet 2 SK–1471 e Z–Doku–IdNr. 091164

	Element/function	Code	Designation of state	State
01				
02				
03	Turret driving motor	M1		
04				
05	Turret "approach reference point"*			ON
06				OFF
07				
14	Proximity switch * Reference point turret	S1		1
15				0
16				
17	Proximity switch "Turret locked"	S8		1
18				0
19				
20	Proximity switch "Tool drive engaged" 1)	S10		1
21				0
22				
23	Valve solenoid "Turret unlock – lock"	Y1	unlock	b 1
24				0
25			lock	a 1
26				
27				
28	Tool drive motor	M2		
29				
30	Tool drive, approach engage position			ON
31				OFF
32				
33	Tool drive in engage position			1
34				0

Shown here:
Approach reference point

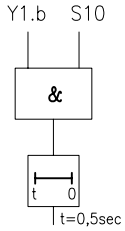


Comments

See also: EPB–1130
HP–490

t1 = 50ms

2)
Required supervision



Fault:
Hydraulic supply

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

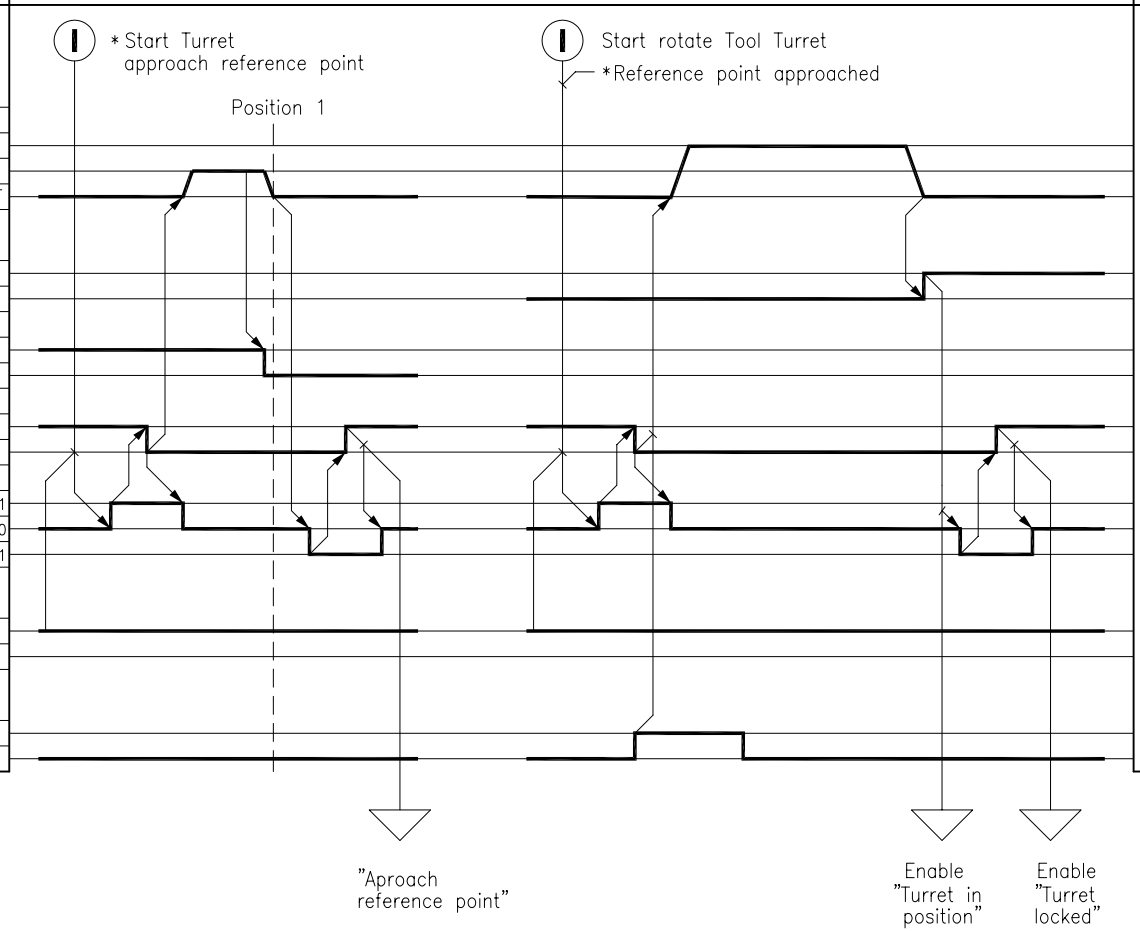
On turret drive motor with incremental tranducer:
- S1 required
- Move to reference position must be made

Edition						
08.05.27 AI			SAUTER Feinmechanik GmbH D–72555 Metzingen Germany	Datum: 00.05.02	gez.: AI/Wi	gepr.:

Diagram of functions	DISK–Type Tool Turret 0.5.440.2.. 0.5.433.2..	SK–1473 e Z–Doku–IdNr. 091265

	Element/function	Code	Designation of state	State
01				
02				
03				
04				
05	Turret driving motor	M1		
06	Turret "rotate"		$n_{max.}$ 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

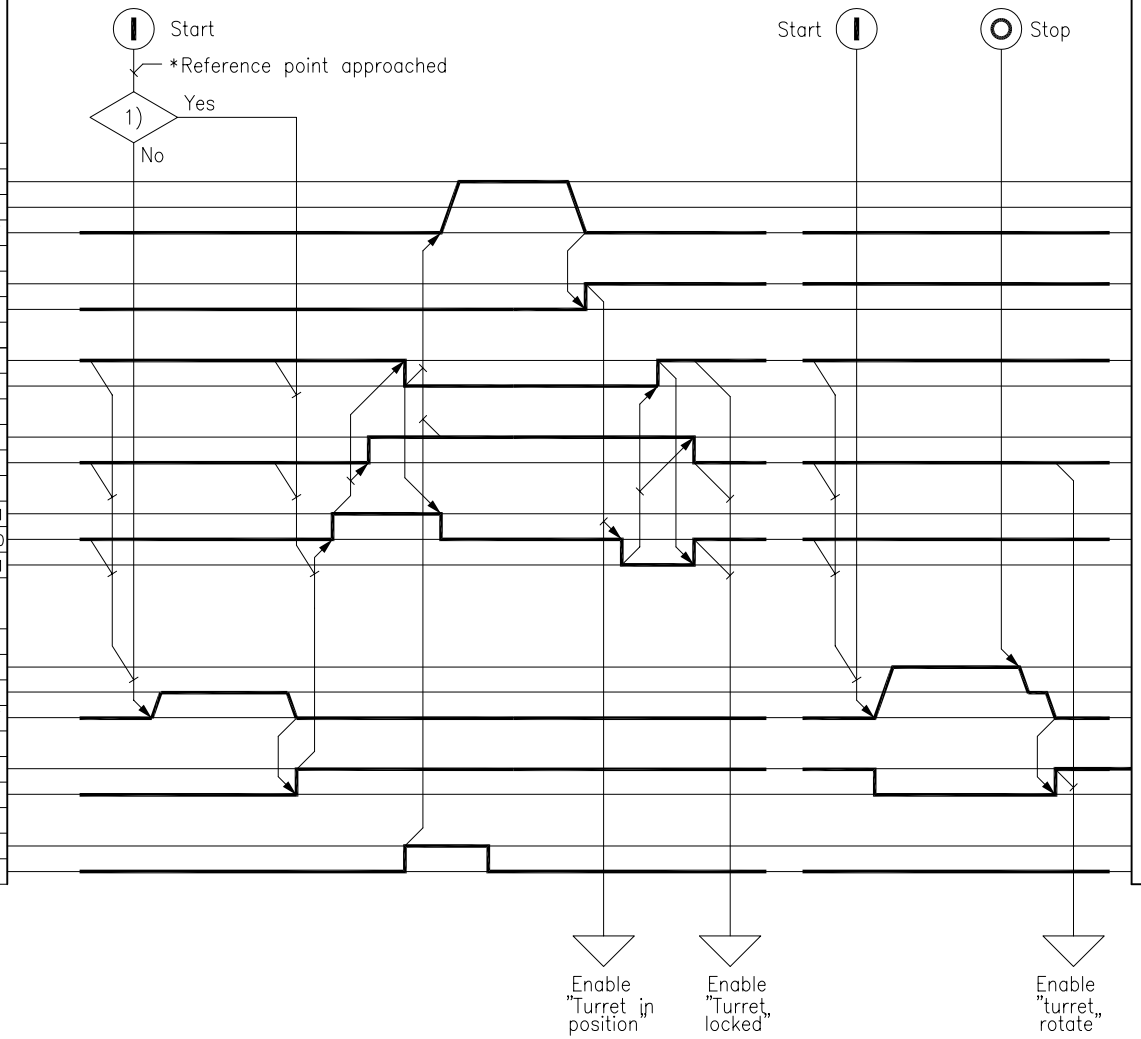
Edition						
08.05.27 AI			SAUTER Feinmechanik GmbH D–72555 Metzingen Germany	SAUTER	Datum: 00.04.28	gez.: AI/Wi	gepr.:

Diagram of functions	DISK–Type Tool Turret 0.5.436.2..	2 sheet 1 **SK–1500 e** Z–Doku–IdNr. 092404

	Element/function	Code	Designation of state	State
01				
02				
03				
04				
05				
06				
07	Turret driving motor			
08	Turret "rotate"	M1	$n_{max.}$	ON
09				
10				OFF
11				
12	Setpoint pos. = actual pos.			1
13	(±0,16° Tool disk)			0
14				
18	Proximity switch "Turret locked"	S8		1
19				0
20				
21	Proximity switch "Tool drive disengaged"	S11		1
22				0
23				
24	Valve solenoid "Turret unlock – lock"	Y1	unlock	b 1
25				0
26			lock	a 1
27				
28				
29	Tool drive motor			
30	Tool drive working speed	M2	$n_{max.}$	ON
31	Tool drive, approach engage position			ON
32				OFF
33				
34	Tool drive in engage position			1
35				0
36				
37	Command from control of machine "Enable turret rotate"			1
38				0

Shown here:
Rotate Tool Turret

Tool drive



Comments

See also: EPB–1155
HP–498

1) Tool drive in engage position?

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

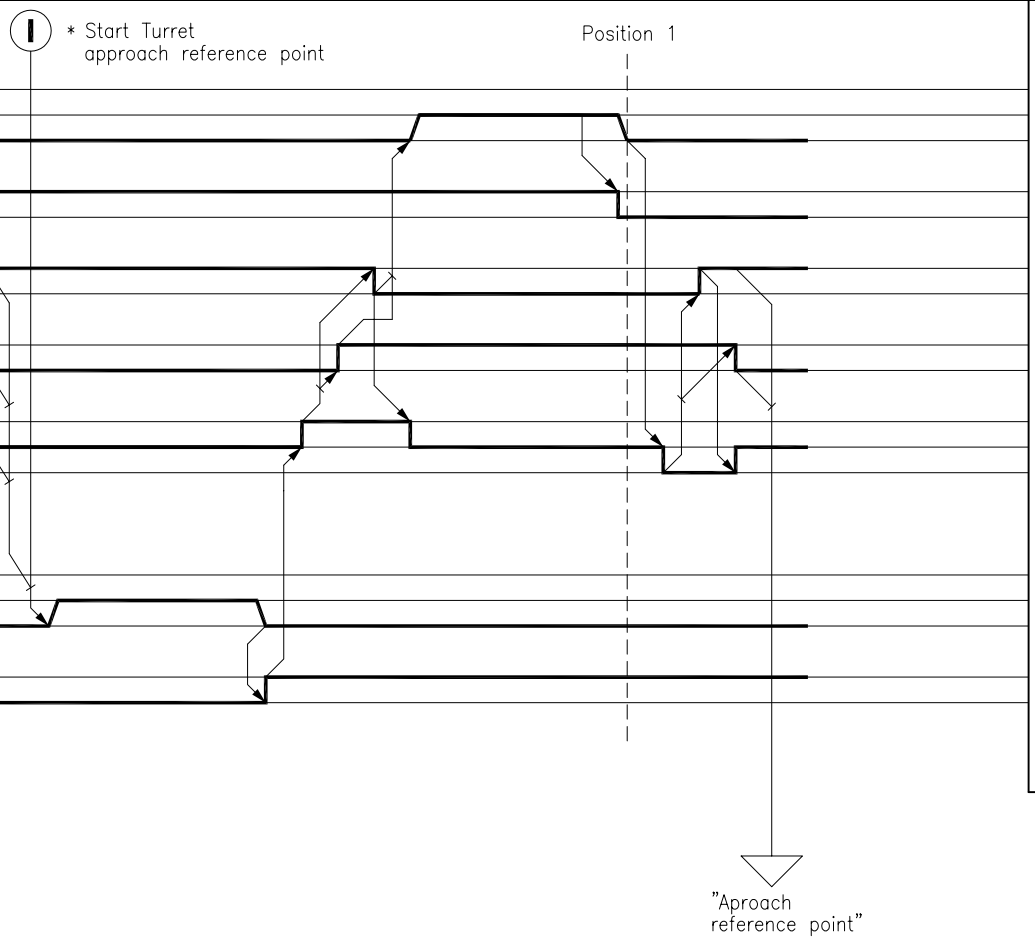
On turret drive motor with incremental tranducer:
- S1 required
- Move to reference position must be made

Edition				Datum:	gez.:	gepr.:
08.05.27 Al			SAUTER Feinmechanik GmbH D–72555 Metzingen Germany	01.06.25	Al	

Diagram of functions	DISK–Type Tool Turret 0.5.436.2..	2 sheet 2 SK–1500 e Z–Doku–IdNr. 092404

	Element/function	Code	Designation of state	State
01				
02				
03	Turret driving motor			
04				
05	Turret "approach reference point"*	M1		ON
06				OFF
07				
14	Proximity switch *			1
15	Reference point turret	S1		0
16				
17	Proximity switch "Turret locked"	S8		1
18				0
19				
20	Proximity switch			1
21	"Tool drive disengaged"	S11		0
22				
23			unlock	b 1
24	Valve solenoid "Turret unlock – lock"	Y1		0
25			lock	a 1
26				
27				
28	Tool drive motor			
29				
30	Tool drive, approach engage position	M2		ON
31				OFF
32				
33	Tool drive in engage position			1
34				0
35				

Shown here:
approach reference point



Comments

See also: EPB–1155
HP–498

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

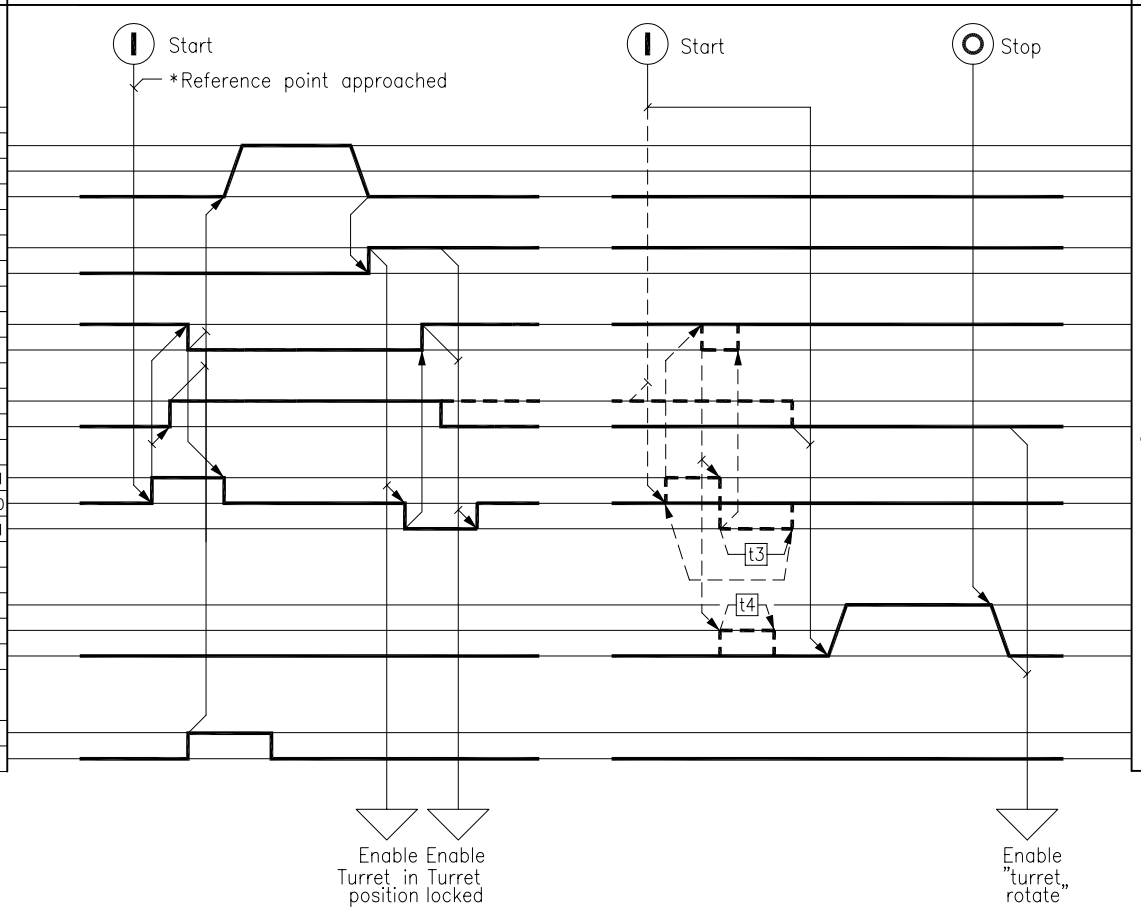
On turret drive motor with incremental tranducer:
- S1 required
- Move to reference position must be made

Edition				Datum:	gez.:	gepr.:
08.05.27 Al			SAUTER Feinmechanik GmbH D–72555 Metzingen Germany	01.06.25	Al	

Diagram of functions	DISK–Type Tool Turret 0.5.433.2..	2 sheet 1 SK–1515 e Z–Doku–IdNr. 094838

	Element/function	Code	Designation of state	State
01				
02				
03				
04				
05	Turret driving motor			
06	Turret "rotate"	M1	$n_{max.}$	ON
07				
08				OFF
09				
10	Setpoint pos. = actual pos.			1
11	(±0,16° Tool disk)			0
12				
13	Proximity switch "Turret locked"	S8		1
14				0
18				
19	Proximity switch "Tool drive disengaged"	S11		1
20				0
21				
22	Valve solenoid "Turret unlock – lock"	Y1	unlock / disengage	b 1
23				0
24	"Turret disengage – engage		lock / engage	a 1
25				
26	Tool drive motor			
27	Tool drive working speed	M2	$n_{max.}$	ON
28	Tool drive, engage speed		$60min^{-1}$	ON
29				OFF
30				
31				
32	Command from control of machine			0
33	"Enable turret rotate"			1

Shown here:
Rotate Tool Turret — Tool drive



Comments

See also: EPB–1155
HP–498

Tool holders for non–driven tools as well as plugs are not coupled, i.e. S11 will receive no LOW–Signal.

t3 = 300ms
t4 = 200ms

– – – Oscillating required, if the spindle unit is on working position and not coupled.

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

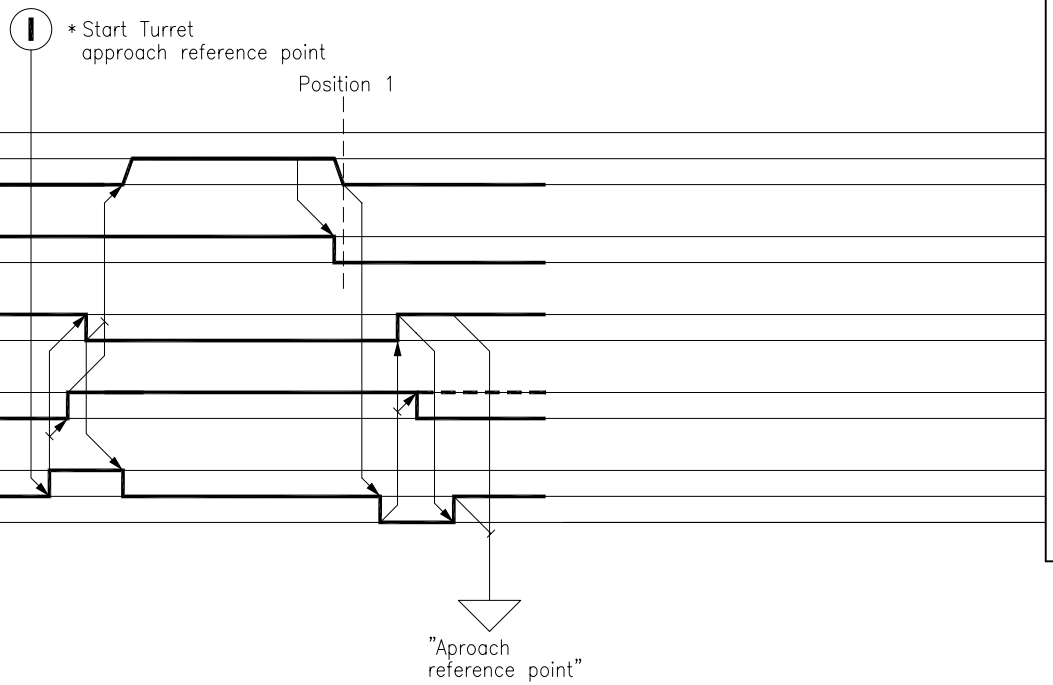
On turret drive motor with incremental tranducer:
- S1 required
- Move to reference position must be made

Edition				Datum:	gez.:	gepr.:
08.05.27 Al			SAUTER Feinmechanik GmbH D–72555 Metzingen Germany	02.04.22	Al	

			Diagram of functions	DISK–Type Tool Turret 0.5.433.2..	2 sheet 2 SK–1515 e Z–Doku–IdNr. 094838

	Element/function	Code	Designation of state	State
01				
02				
03				
04				
05	Turret driving motor	M1		
06				
07	Turret "approach reference point"*			ON
14				OFF
15				
16	Proximity switch * Reference point turret	S1		1
17				0
18				
19	Proximity switch "Turret locked"	S8		1
20				0
21				
22	Proximity switch "Tool drive disengaged"	S11		1
23				0
24				
25	Valve solenoid "Turret unlock – lock"	Y1	unlock / disengage	b 1
26				0
27	"Turret disengage – engage		lock / engage	a 1
28				

Shown here:
approach reference point



Comments

See also: EPB–1155
HP–498

Tool holders for non–driven tools as well as plugs are not coupled, i.e. S11 will receive no LOW–Signal.

* 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						
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