

Product information PI 42

Control Unit EK 501 / EK 502

for Tool Turrets

0.5.320.0xx

0.5.473.5xx

0.5.480.2xx

0.5.480.5xx

0.5.6xx.1xx

2014-04-23



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Hydraulic diagramm	HP – 451 HP – 472

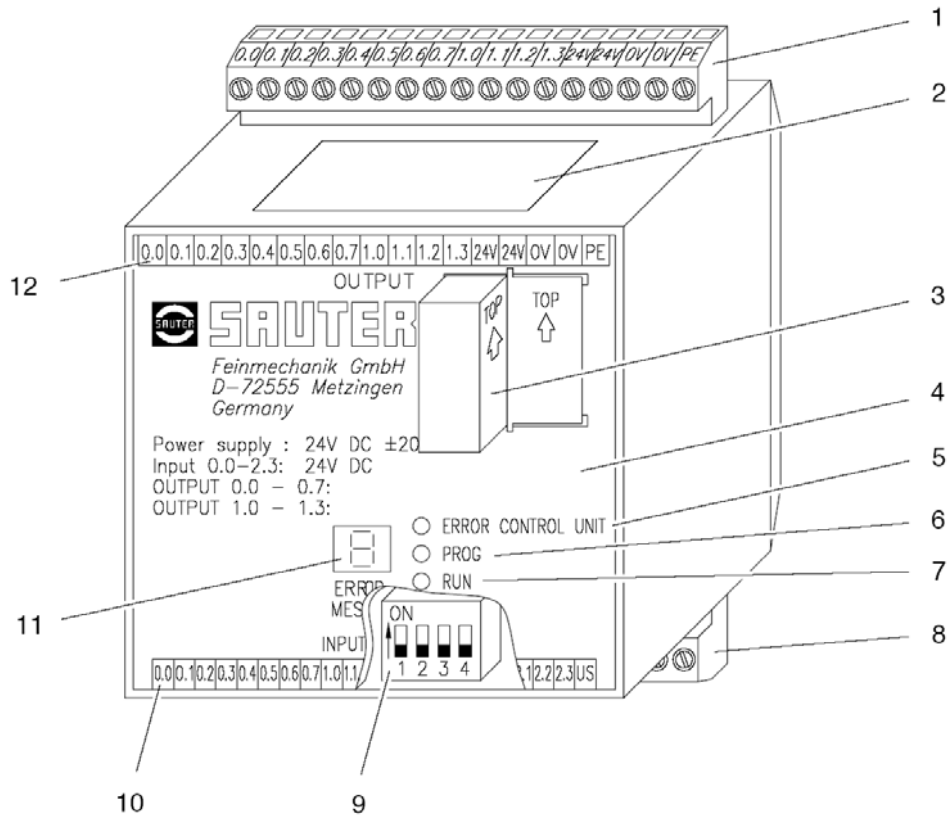
NOTE:

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!

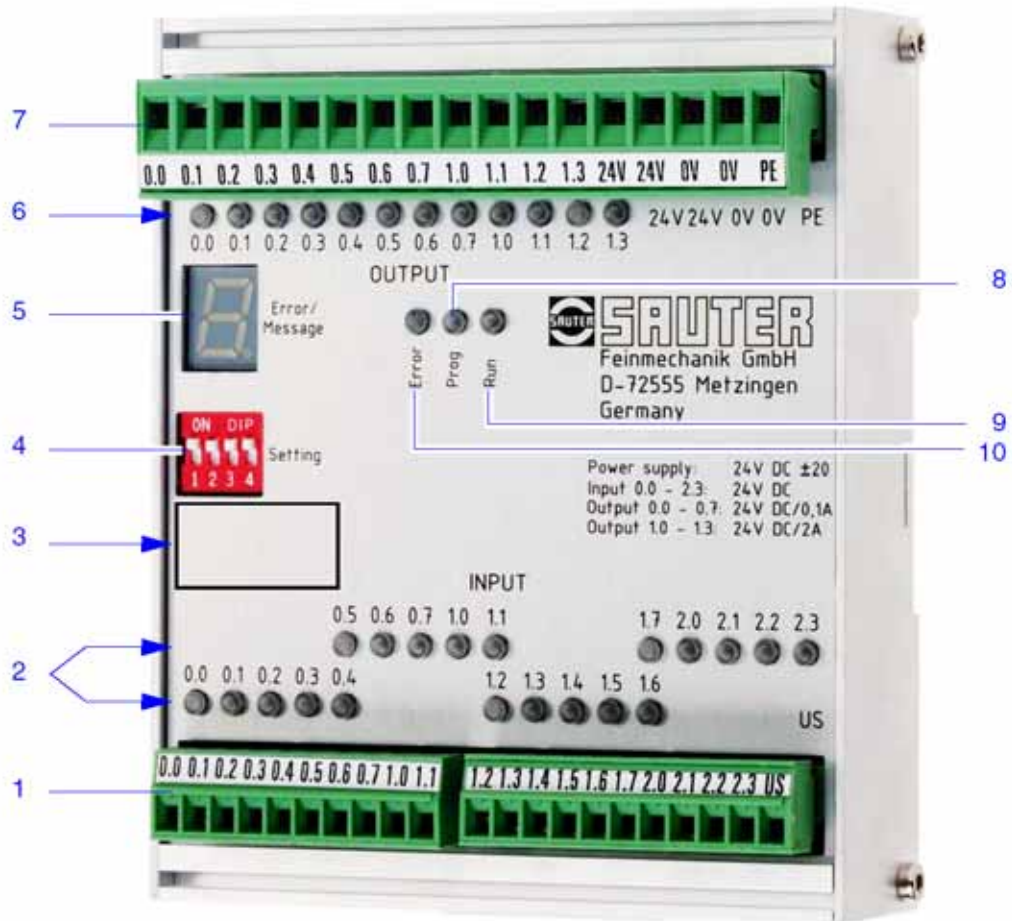
Detailed data on the control of the control unit are enclosed in our Operating Instructions:
BA-831, BA-832, BA-937, BA-945, BA-1016, BA-1101, BA-1102, BA-1103, BA-1104, BA-1105
 (available upon request).

Structure EK 501



- 1 Plug-in terminal (supply voltage/outputs)
- 2 Nameplate
- 3 Program memory unit (EEPROM)
- 4 Detachable front panel
- 5 LED, red: fault in control unit
- 6 LED, yellow: programming in progress
- 7 LED, green: RUN
- 8 Plug-in terminal (inputs)
- 9 Adjuster switch (turret size/direction of rotation)
- 10 LED-display (inputs)
- 11 Display
- 12 LED-display (outputs)

Structure EK 502



- 1 Plug-in terminals (inputs)
- 2 Status displays (inputs)
- 3 Nameplate
- 4 Setting switches
(Preselection of position, nominal value with/without parity)
- 5 Display (number of status or error message)
- 6 Status displays (outputs)
- 7 Plug-in terminal (outputs, supply voltage)
- 8 Status display (yellow: capacity utilization of control unit)
- 9 Status display (green: RUN)
- 10 Status display (red: fault in control unit)

Short description

The SAUTER EK 501 / EK 502 control unit is a compact and autonomous control device for SAUTER 0.5.320.0xx/0.5.473.5xx/0.5.480.2xx/0.5.480.5xx/0.5.6xx.1xx -series tool turrets.

This control unit makes it possible to achieve and monitor all the functions of the turret without any tool drive, as well as to report possible failures. Tool drive functions/modes are monitored on turrets provided with a tool drive.

Advantages

- No software development costs for the turret logic.
- No memory space required in the machine control for the turret logic.
- Response time < 20ms.
The short signal processing and switching times permit a correct control of the turret.
- Faultless turret control resulting in perfect turret function and longer service life of the turret.
- Easy update of the software by means of externally pluggable EEPROM (EK 501) / SD-Card (EK 502)
- Power output at 2.0A.
The valves can be controlled without additional switching elements (see electric circuit diagram).
- The DIP switches implemented make it possible to determine the size and sense of rotation on turret series 0.5.6xx.1xx, and the number of positions on turret series 0.5.320.0xx/0.5.473.5xx/0.5.480.2xx/0.5.480.5xx.
- Far-reaching monitoring of the turret for functional failures.
The failure messages are binary coded and are released to the outputs as well as to the digital display of the control unit. The detailed failure messages permit a fast failure diagnosis..

Technical data EK 501 / EK 502

General

Dimension:	height x width x depth 112 x 90 x 100mm (EK 501) / 112 x 92 x 40mm (EK 502)
Weight:	approx 500g (EK 501) / approx. 300g (EK 502)
Power supply:	24V DC \pm 20%, filtered
Max. residual ripple:	< 5%
Common reference potential for inputs and outputs:	terminal „0V“
Current consumption:	max. 300mA without output currents
Ambient temperature:	32 ... * 122°F (0 ... +50°C)
Degree of humidity (relative humidity):	\leq 95%, no condensation
Resistance to jamming:	EC 801-3
Testing voltage in-/outputs:	according to IEC 801, degree of sharpness 3
Housing, protection type:	IP 20
Controller memory:	CMOS-RAM, battery backup EEPROM (EK 501) / Flash memory (EK 502)
Battery working life:	10 years (EK 501) / -
Mounting type:	snap-on type on top hat rail acc. to DIN EN 50022-35

Inputs

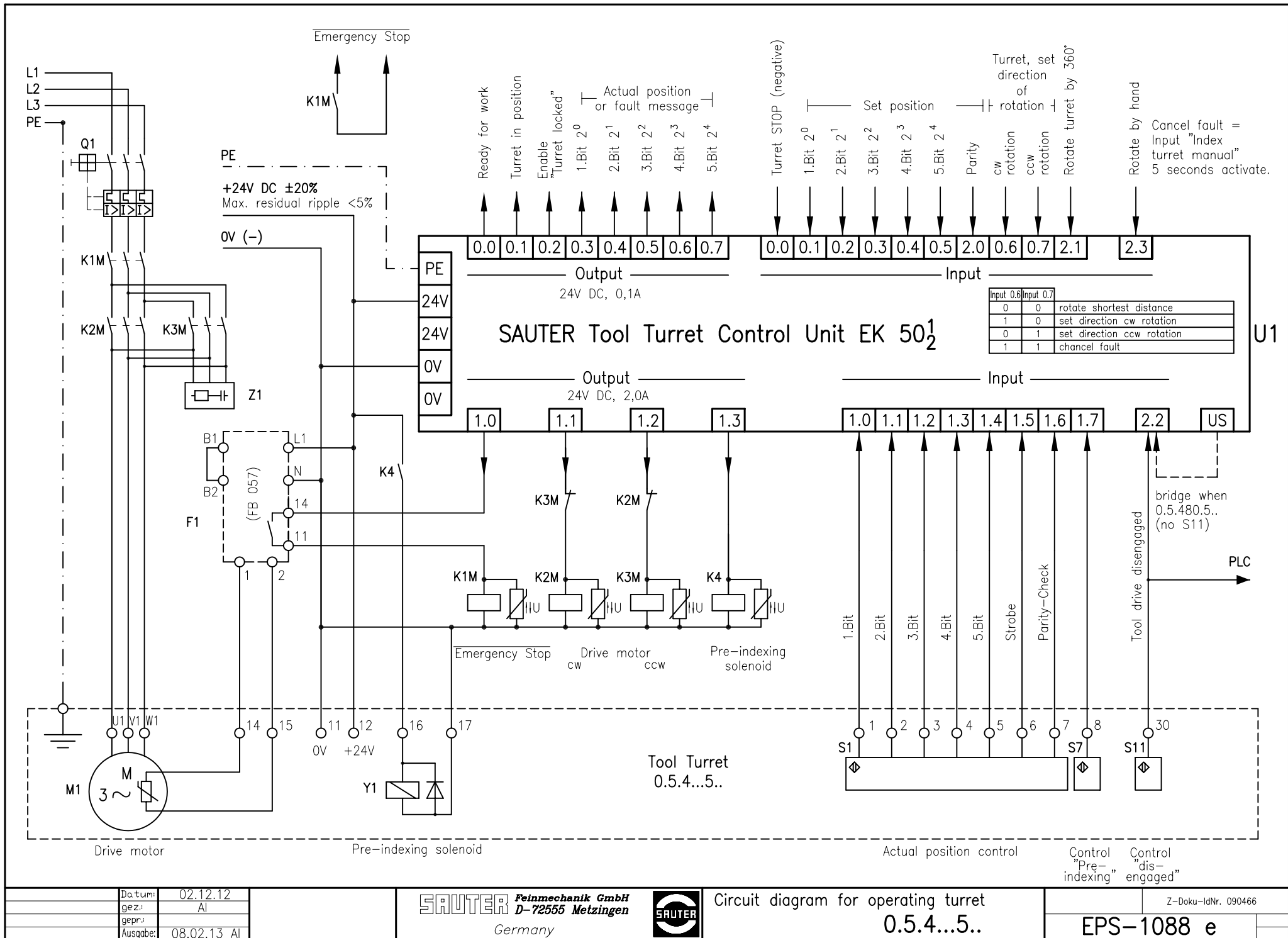
Number of inputs:	20 digital inputs, optical decoupled from electronic
Input current:	< 5mA per input
Status display:	illuminating diode (LED), rot
Input voltage range:	0 bis 29V DC
Switchover thresholds:	logical 1 \geq 16V DC logical 0 \leq 5V DC
Input delay:	\leq 4 ms

Outputs

Number of outputs:	12 semiconductor outputs, optically decoupled from electronic
Switching voltage:	24V DC
Switching current:	outputs 0.0 bis 0.7: 0,1A continuous short circuit proof, integrated protection circuit Ausgänge 1.0 bis 1.3 2,0A continuous short circuit proof, integrated protection circuit
Status display:	illuminating diode (LED), rot

Ordering details control unit EK 501 / 502

Revolver-Series	Positions	Name of the item	Ident-No.	Name of the item	Ident-No.
0.5.670.1xx 0.5.680.1xx 0.5.673.1xx 0.5.693.1xx	8	EK 501-446-D0-00	108 023	EK 502-446-D0-00	129 386
	12	EK 501-446-E0-00	108 024	EK 502-446-E0-00	129 389
	16	EK 501-446-F0-00	108 025	EK 502-446-F0-00	129 396
0.5.675.1xx 0.5.695.1xx	8	EK 501-446-H0-00	108 027	EK 502-446-H0-00	129 405
	12	EK 501-446-J0-00	108 028	EK 502-446-J0-00	129 408
	16	EK 501-446-K0-00	108 029	EK 502-446-K0-00	129 410
0.5.480.2xx 0.5.480.510	8	EK 501-446-N0-00	117 579	EK 502-446-N0-00	129 398
	12				
	16				
	24				
0.5.480.5xx 0.5.473.5xx	4	EK 501-446-L0-00	116 556	EK 502-446-L0-00	129 400
	6				
	8				
	12				
	16				
0.5.320.0xx	4	EK 501-446-M0-00	119 246	EK 502-446-M0-00	129 402
	6				
	8				



Datum: 02.12.12
 gez.: AI
 gepr.:
 Ausgabe: 08.02.13 AI

SAUTER Feinmechanik GmbH
 D-72555 Metzingen
 Germany



Circuit diagram for operating turret
 0.5.4...5..

Z-Doku-IdNr. 090466
EPS-1088 e

+24V DC ±20%
max. residual ripple 5%

0V (-)

PE

Ready for work
Enable "Turret in position"
Enable "Turret locked"

Actual position or fault message

1.Bit 2⁰
2.Bit 2¹
3.Bit 2²
4.Bit 2³
5.Bit 2⁴

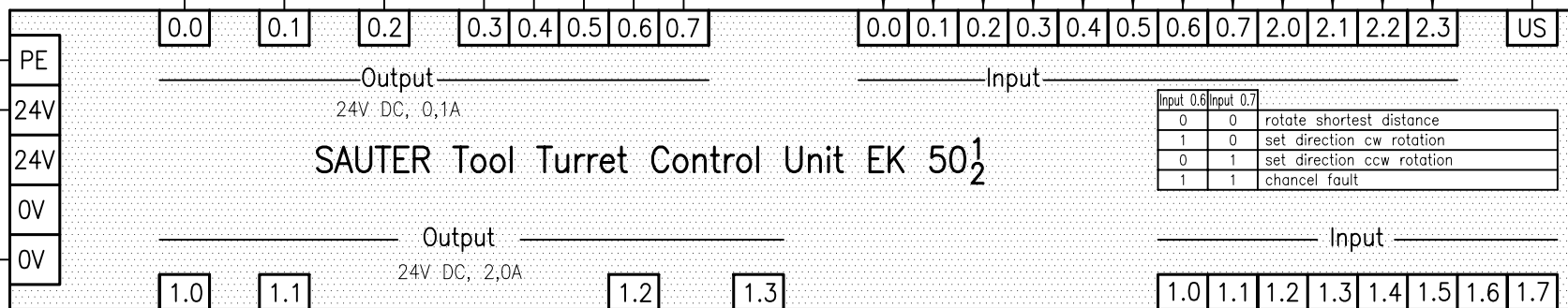
Turret STOP (negative)

1.Bit 2⁰
2.Bit 2¹
3.Bit 2²
4.Bit 2³
5.Bit 2⁴

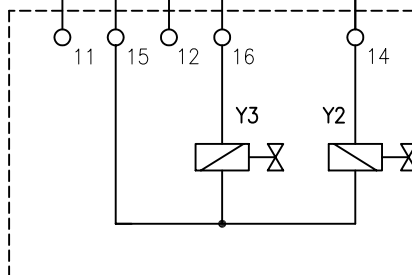
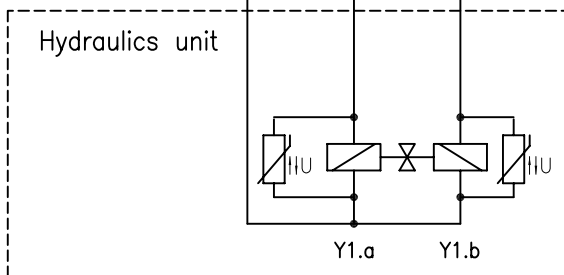
Turret, set direction of rotation by 360°
cw rotation
ccw rotation
Rotate turret by 360°

Unlock turret
Rotate by hand

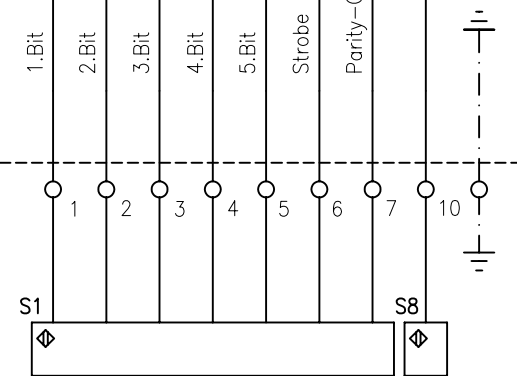
Cancel fault = Input "Index turret manual" 5 seconds activate.



U1



Tool turret 0.5.6...1..



4/3 way valve "Lock" "Unlock"

4/2 way valve Turret-sense of rotation, ccw rotation

3/2 way valve "START-STOP"

Proximity Actual position Proximity switch "Turret in set position"

Datum:	00.08.10
gez.:	AI
gepr.:	
Ausgabe:	08.02.13 AI

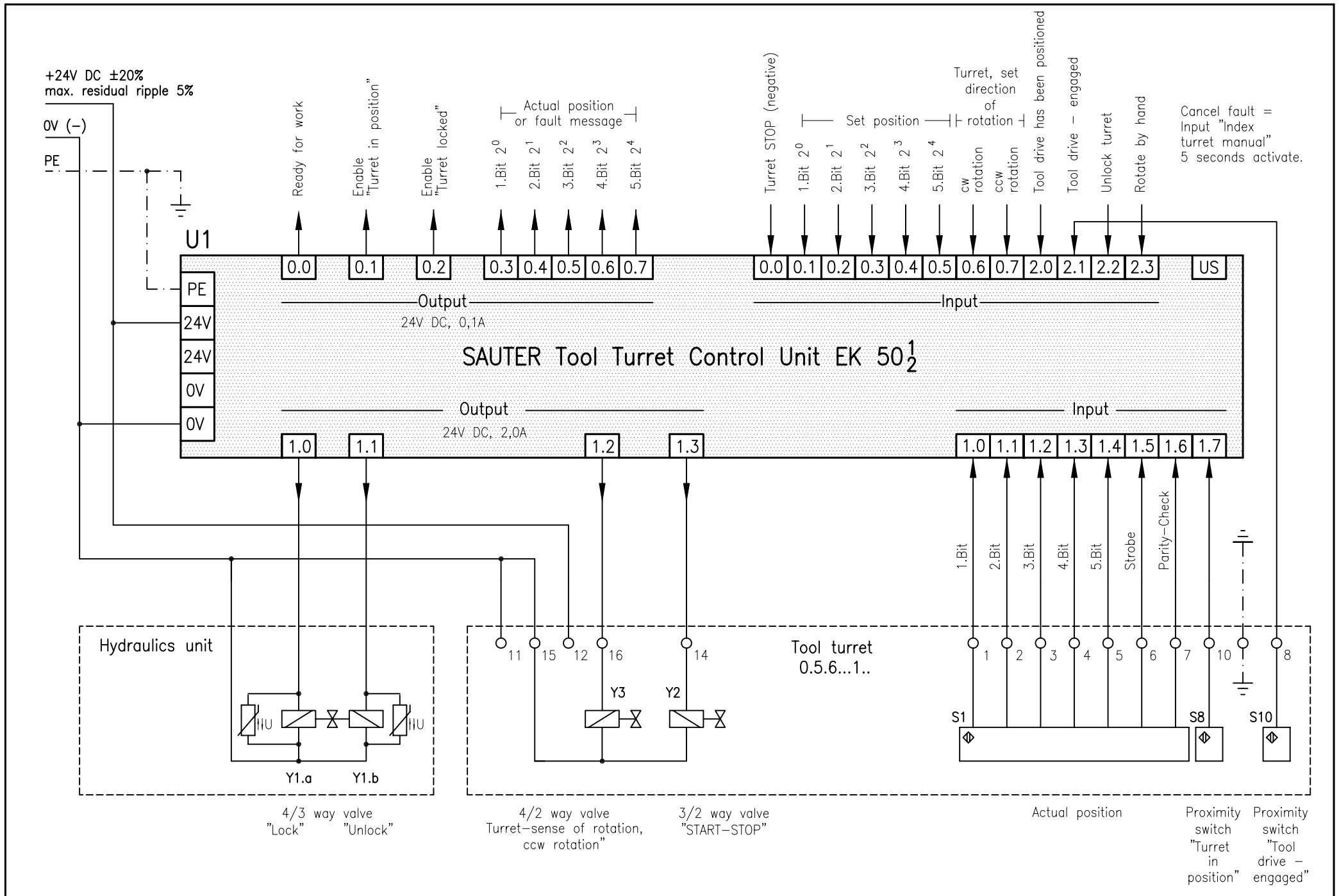
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Circuit diagram for operating turret
0.5.680.1..

Z-Doku-IdNr. 091305

EPS-1133 e



Datum:	00.08.16
gez.:	AI
gepr.:	
Ausgabe:	08.02.13 AI



Circuit diagram for operating turret
0.5.675.1..

Z-Doku-IdNr. 091310
EPS-1134 e

+24V DC ±20%
max. residual ripple 5%

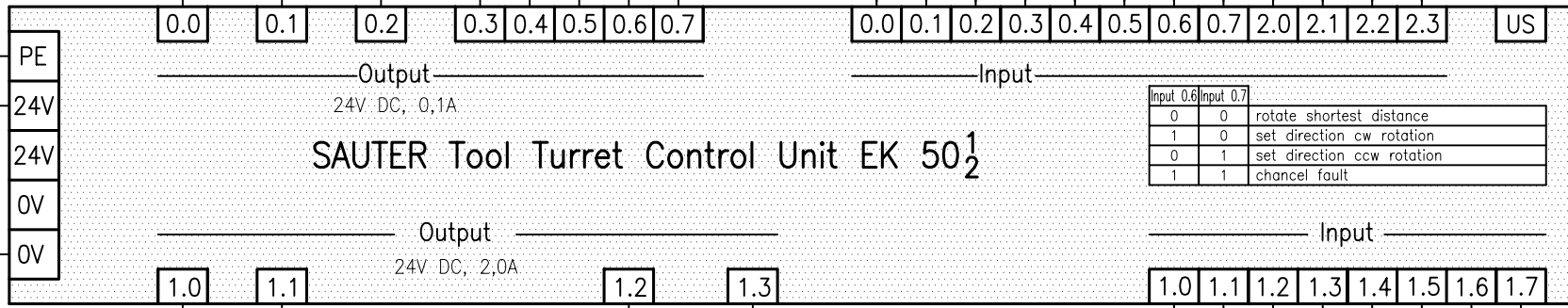
0V (-)

PE

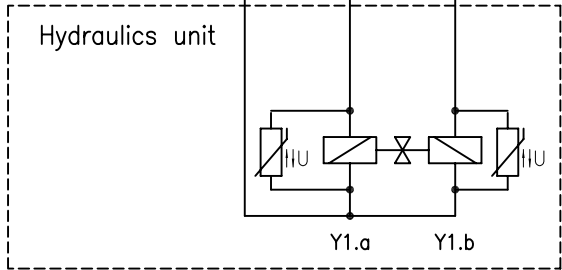
Ready for work
Enable "Turret in position"
Enable "Turret locked"
Actual position or fault message
1.Bit 2⁰
2.Bit 2¹
3.Bit 2²
4.Bit 2³
5.Bit 2⁴
Turret STOP (negative)
1.Bit 2⁰
2.Bit 2¹
3.Bit 2²
4.Bit 2³
5.Bit 2⁴
Turret, set direction of rotation
cw rotation
ccw rotation
Rotate turret by 360°
Tool drive disengaged
Unlock turret
Rotate by hand

Cancel fault =
Input "Index turret manual"
5 seconds activate.

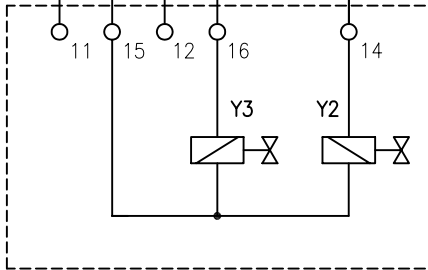
PLC



U1

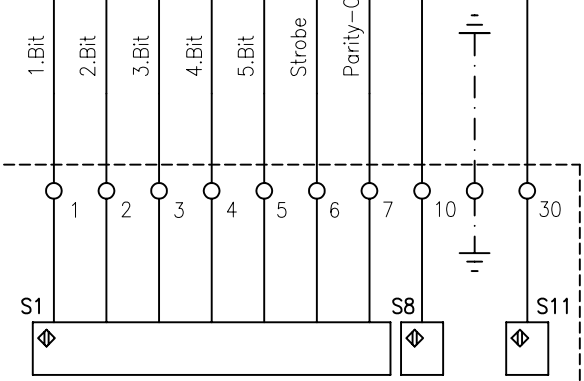


4/3 way valve
"Lock" "Unlock"



4/2 way valve
Turret-sense of rotation,
ccw rotation"

3/2 way valve
"START-STOP"



Proximity Actual position Proximity switch "Turret in position" disengaged" Proximity switch "Tool drive - position"

Datum: 00.08.10
gez.: AI
gepr.:
Ausgabe: 08.02.13 AI

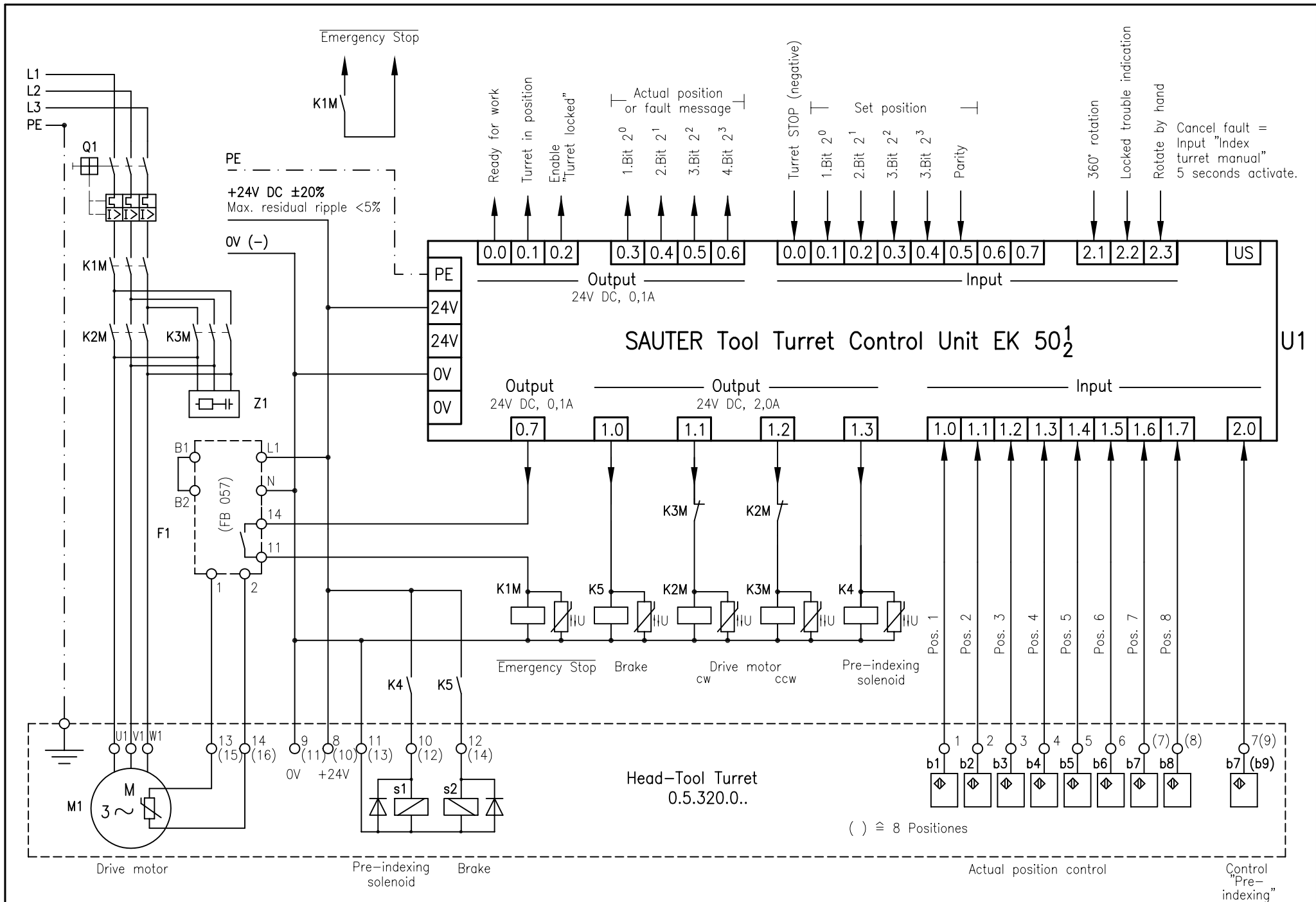
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Circuit diagram for operating turret
0.5.673.1..
0.5.676.2..

Z-Doku-IdNr. 091317

EPS-1136 e



Datum:	08.01.04
gez.:	AI
gepr.:	
Ausgabe:	08.02.13 AI

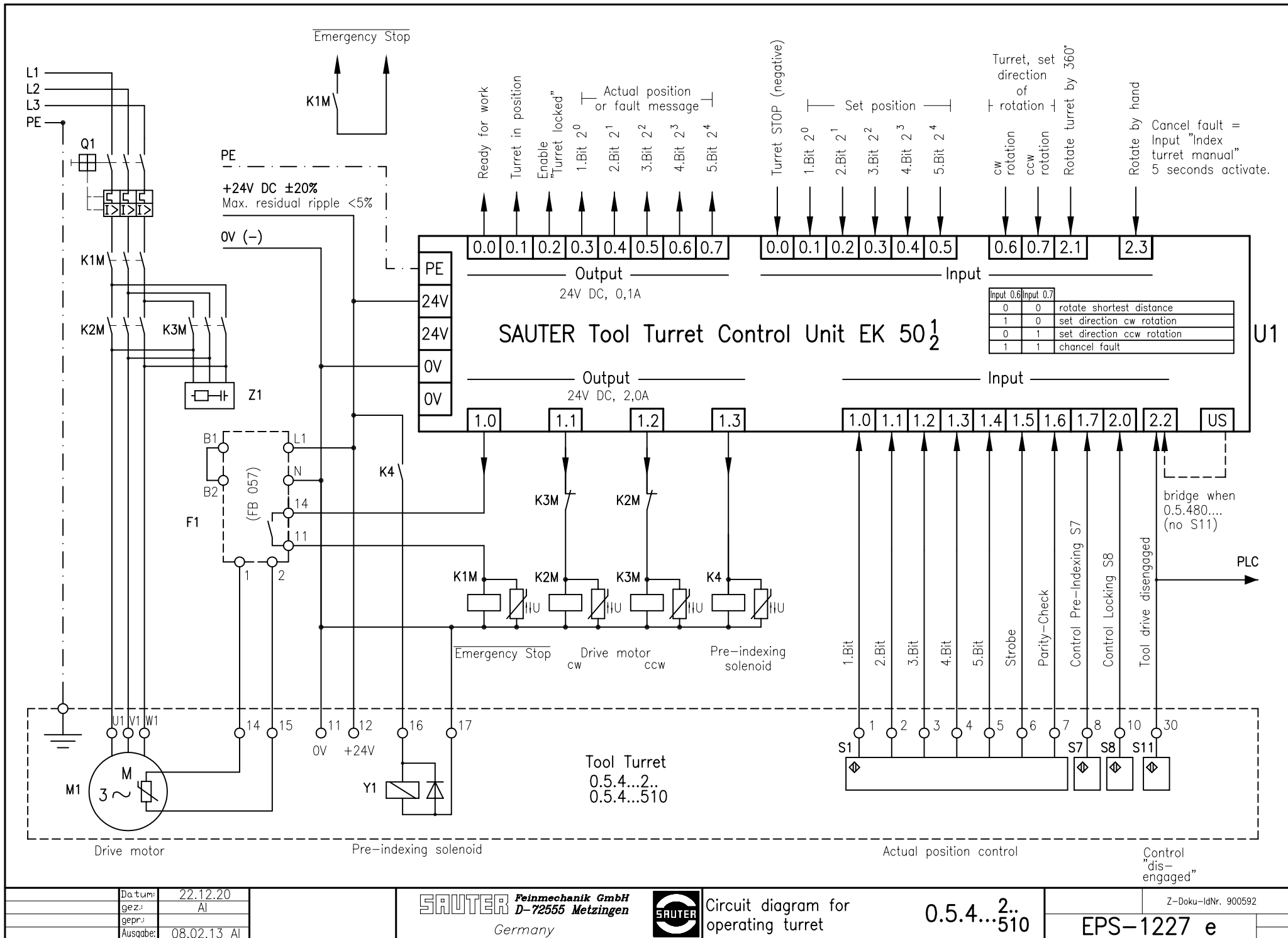
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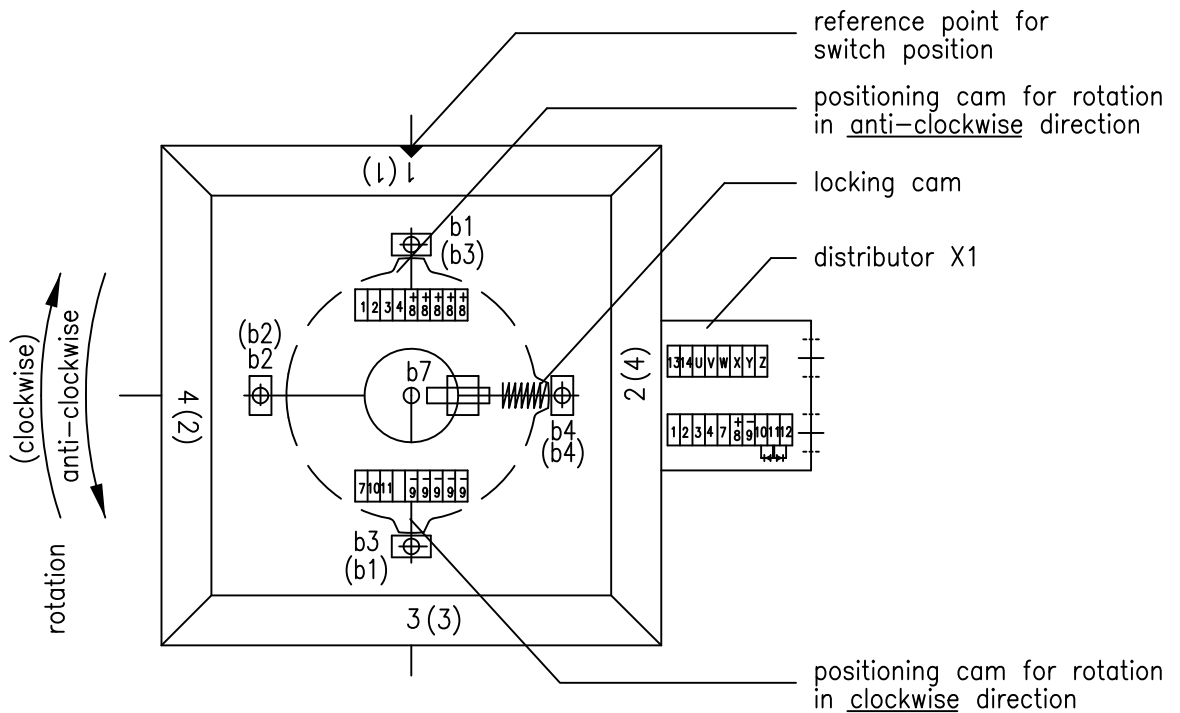
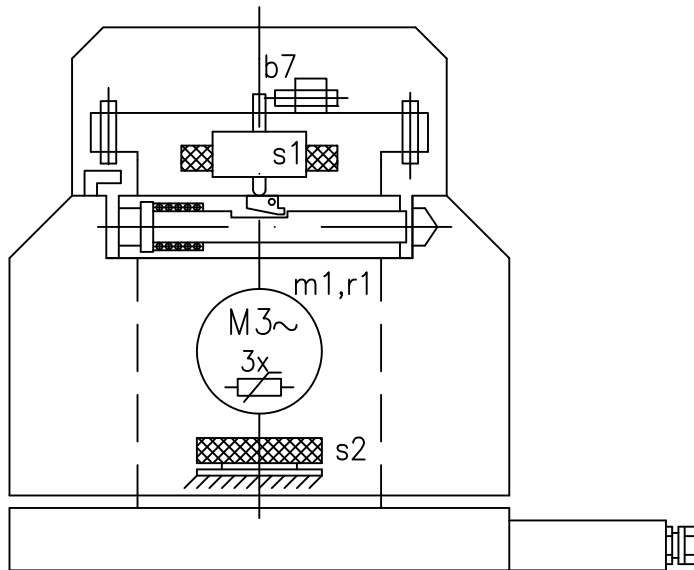
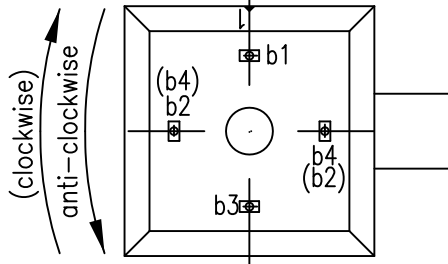
Circuit diagram for operating turret
0.5.320.0..



Z-Doku-IdNr. 095805

EPS-1184 e



Information: Proximity-Detector
installation position until 12/99

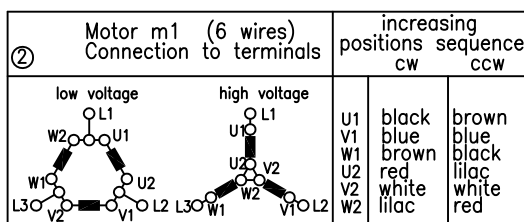


Designation	Element/Function	Line from element	Terminal X1	④ Cable 18x0,75mm ²	Type	Supplier
b1	Proximity-Detector Control turret position and locking 1	brown (+)	8	8	M8x45 Id. Nr. 4157	
		blue (-)	9	9		
		black	1	1		
b2	Proximity-Detector Control turret position and locking 2	brown (+)	8		M8x45 Id. Nr. 4157	
		blue (-)	9			
		black	2	2		
b3	Proximity-Detector Control turret position and locking 3	brown (+)	8		M8x45 Id. Nr. 4157	
		blue (-)	9			
		black	3	3		
b4	Proximity-Detector Control turret position and locking 4	brown (+)	8		M8x45 Id. Nr. 4157	
		blue (-)	9			
		black	4	4		
b7	Proximity-Detector Control pre-indexing	brown (+)	8		M8x45 Id. Nr. 4157	
		blue (-)	9			
		black	7	7		
r1	① Posistor-heat detector	blue	13	13	PTC-Thermistor DIN 44081 U _≤ 4V DC	SAUTER Standard 380V 50Hz
m1	3-Phase A.C. Motor (release-indexing- locking) ②		U	15	sz 012 0,4/0,55A	
			V	16	sz 016 0,6/0,85A	
			W	17	sz 020 0,8/1,1A	
			X		sz 025 1,6/2,2A	
			Y		sz 032 1,1/2,2A	
			Z		sz 040 1,45/2,5A	
s1	Solenoid pre-indexing	brown (+) 	10	10	24V DC, 50% ED to size 012 28W, from size 016 42W	
		blue (-)	11	11		
s2	Solenoid controlled disk brake	blue (-) 	11		sz 012 5,3W sz 016 5,3W sz 020 6,5W sz 025 8,0W sz 032 8,3W sz 040 12W	24VDC
		brown (+)	12	12		
	Ground		⊥	ye-gn		

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).

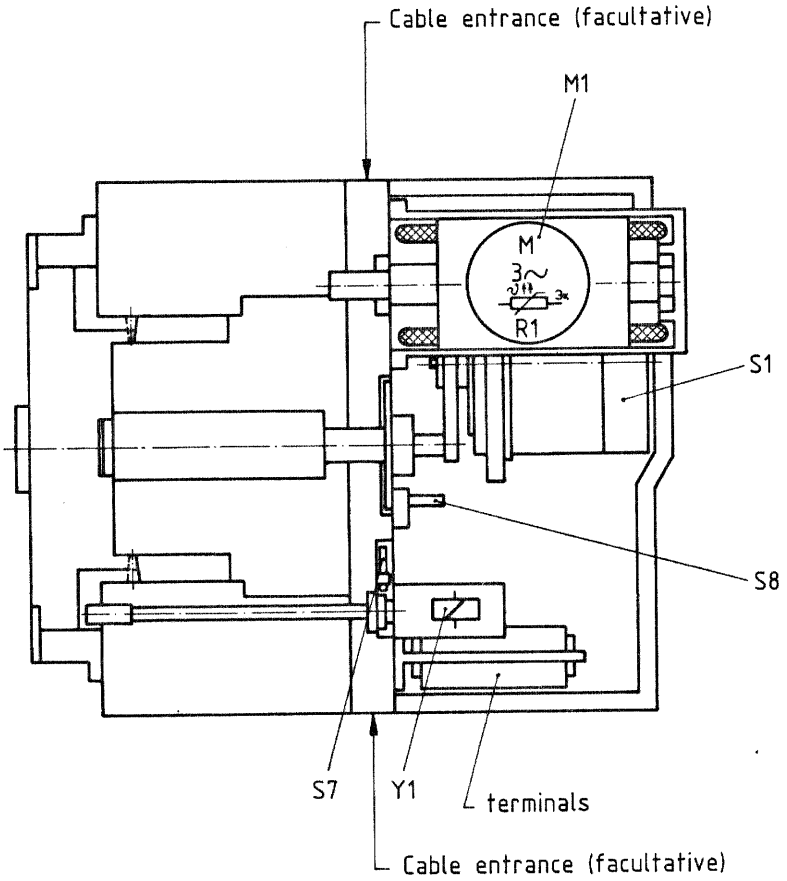
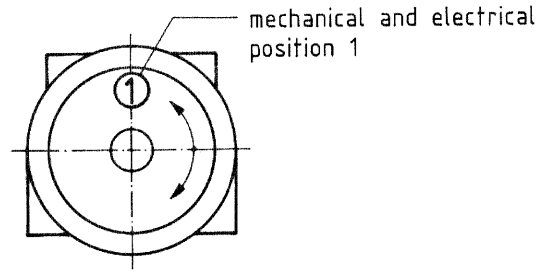
④ depending on the turret's outfit.



Technical Data of:		b1-b7	
Operating voltage:	10-24 V DC	±20%	
Max. residual ripple:	10%		
Max. load current:	200mA		
Nom. sensing distance:	1mm		
Temperature range:	-20° bis + 65°C		
Function:	n.o. (make) function		
Type:	pnp logic		

Wiring layout

Terminal arrangement plan	
Size	Drawing No.
25	SK-612
32	SK-612
40	SK-612
20	

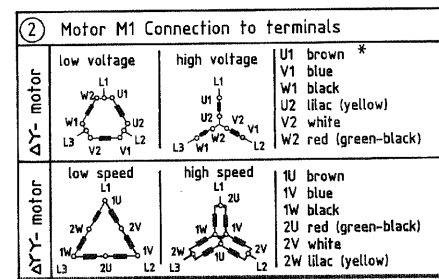


De-sig-nation	Element / Function	Line	terminal No.	Wire-colour/ No.	Type	Supplier	
S1	Angular encoder	brown (+)	12 (+)	10	BRGB ₂ -W ⁰⁸ B ₁₀ -EP- -P- L_K0,5 R SAZ	Balluff Neuhausen	
		blue (-)	11 (-)	9			
	1. Bit	white	1	1			
	2. Bit	yellow	2	2			
	3. Bit	green	3	3			
	4. Bit	lilac	4	4			
	Strobe	black	6	5			
	Parity-Check screen	pink	7	6			
S7	Proximity-Detector control pre-indexing	brown (+)	12 (+)		BES 516-324-E0-K-1	Balluff Neuhausen	
		blue (-)	11 (-)				
		black	8	7			
S8	Proximity-Detector control of locking	brown (+)	12 (+)		BES 516-324-E0-K-1	Balluff Neuhausen	
		blue (-)	11 (-)				
		black	10	8			
R1	Posistor-heat detector	blue	14	11	PTC thermistor in acc. with German Standard DIN 44081 U ≅ 4V DC	Sauter	
		blue	15	12			
M1	3-Phase A.C. Motor (release - indexing - locking)	②	U1	* 2U	15		
			V1	2V	16		
			W1	2W	17		
			U2	1U			
			V2	1V			
			W2	1W			
Y1	Solenoid pre-indexing		Ground	green-yellow	24V DC; 2,8A 50% duty rating	Schütz Memmingen	
		brown (+)	16 (+) ③	13			
			blue (-)	17 (-) ④	14		

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 SUPERFLEX-N-number cable (Cable drag chains) 18x0,75mm², Length acc. to order



Technical Data of:		S1	S7 / S8
Operating voltage:		15 - 30 V DC	10 - 24 V DC ±20%
Max. residual ripple:		10%	10%
Max. load current:		50 mA	200 mA
Nom. sensing distance:		-	1 mm
Temperature range:		0° to +60°C	-20° to +65°C
Function:		-	make contact
Type:		pnp logic	pnp logic

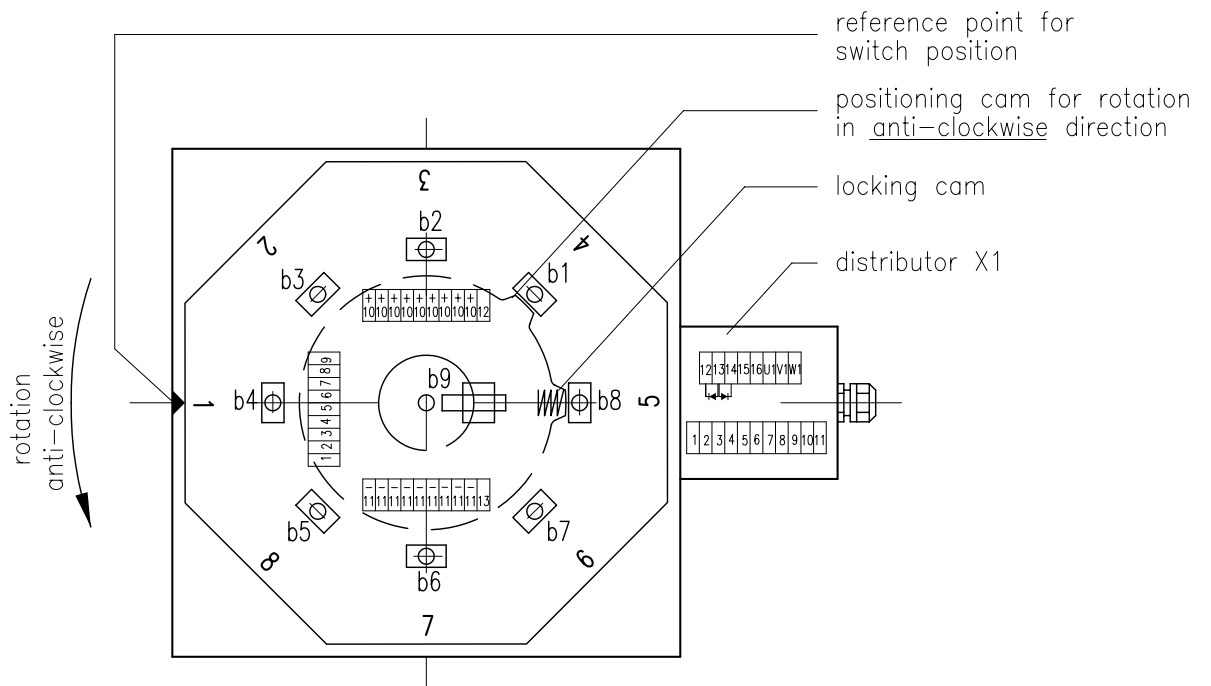
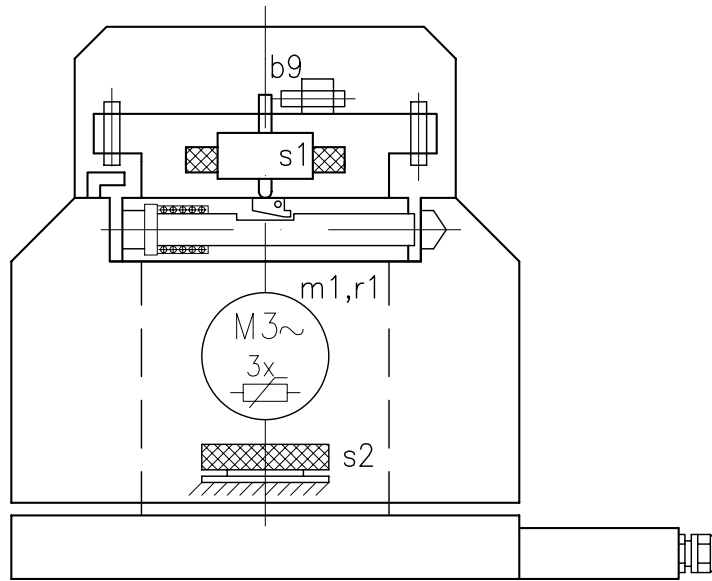
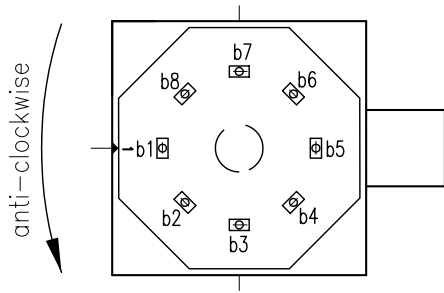
③ Kabel geä. 01.09.86 Wi

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D-7430 Metzingen
West-Germany



Datum 10.02.86
gez Wi
gepr

Information: Proximity-Detector
installation position until 12/99

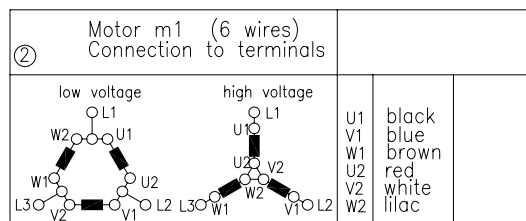


Designation	Element/Function	Line from element	Terminal X1	④ Cable 25x0,75mm ²	Type	Supplier		
b1	Proximity-Detector Control turret position and locking	1	brown (+)	10	10	M8x45 Id. Nr. 4157		
			blue (-)	11	11			
			black	1	1			
b2	Proximity-Detector Control turret position and locking	2	brown (+)	10		M8x45 Id. Nr. 4157		
			blue (-)	11				
			black	2	2			
b3	Proximity-Detector Control turret position and locking	3	brown (+)	10		M8x45 Id. Nr. 4157		
			blue (-)	11				
			black	3	3			
b4	Proximity-Detector Control turret position and locking	4	brown (+)	10		M8x45 Id. Nr. 4157		
			blue (-)	11				
			black	4	4			
b5	Proximity-Detector Control turret position and locking	5	brown (+)	10		M8x45 Id. Nr. 4157		
			blue (-)	11				
			black	5	5			
b6	Proximity-Detector Control turret position and locking	6	brown (+)	10		M8x45 Id. Nr. 4157		
			blue (-)	11				
			black	6	6			
b7	Proximity-Detector Control turret position and locking	7	brown (+)	10		M8x45 Id. Nr. 4157		
			blue (-)	11				
			black	7	7			
b8	Proximity-Detector Control turret position and locking	8		10		M8x45 Id. Nr. 4157		
				11				
				8	8			
b9	Proximity-Detector Control pre-indexing			10		M8x45 Id. Nr. 4157		
				11				
				9	9			
r1	① Posistor-heat detector	blue	15	15	PTC-Thermistor DIN 44081 U _≤ 4V DC			
		blue	16	16				
m1	3-Phase A.C. Motor (release-indexing- locking)	②		U1	17	sz 012 0,4/0,55A sz 016 0,6/0,85A sz 020 0,8/1,1A sz 025 1,6/2,2A sz 032 1,1/2,2A sz 040 1,45/2,5A	Standard 380V 50Hz	SAUTER
				V1	18			
				W1	19			
				U2				
				V2				
				W2				
s1	Solenoid pre-indexing		brown (+) ▲	③ 12	12	24V DC, 50% ED to size 012 28W, from size 016 42W		
			blue (-)	③ 13	13			
s2	Solenoid controlled disk brake		blue (-) ▼	③ 13		sz 012 5,3W sz 016 5,3W sz 020 6,5W sz 025 8,0W sz 032 8,3W sz 040 12W	24VDC	
			brown (+)	③ 14	14			
	Ground		⊥	ye-gn				

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

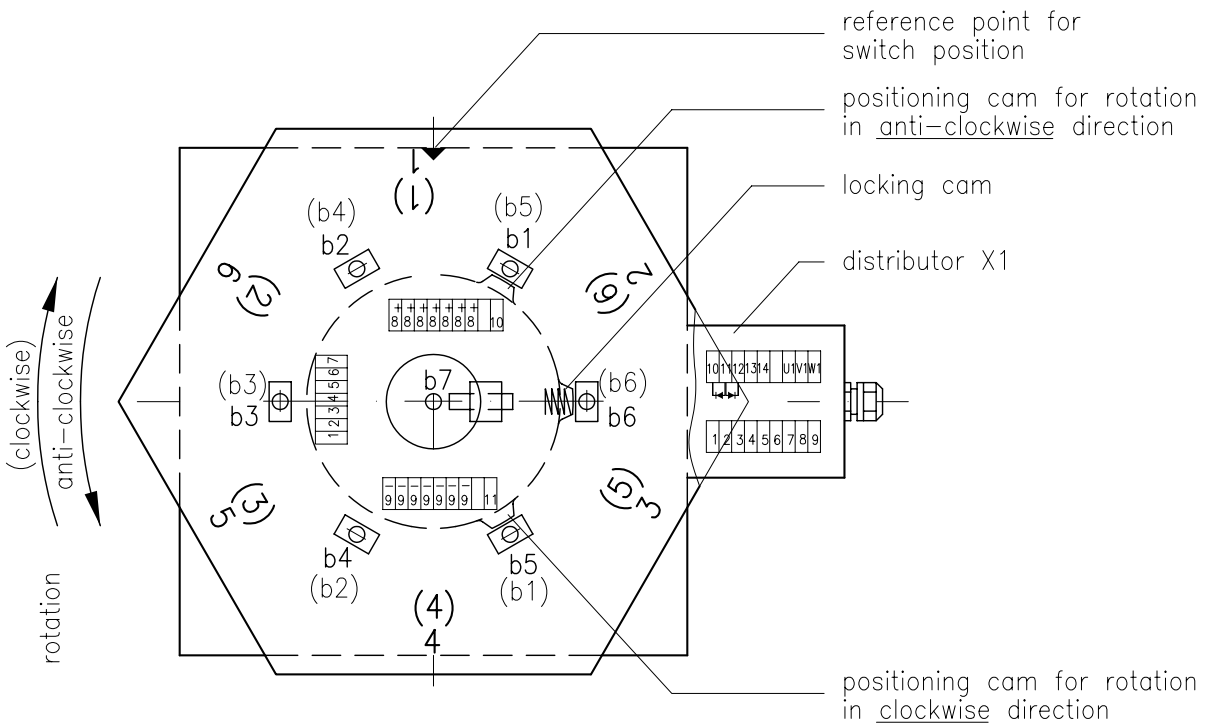
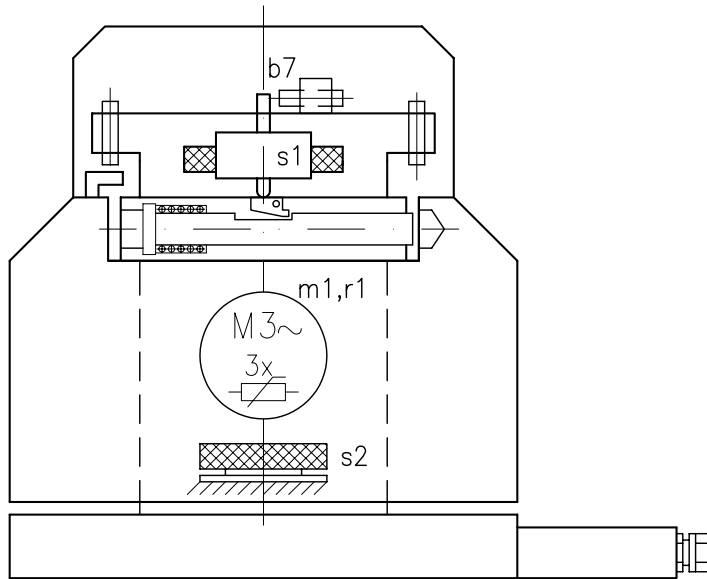
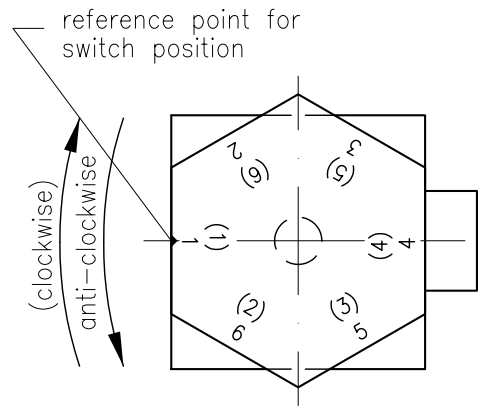
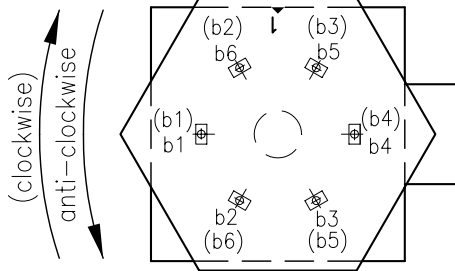
③ Diode 1N4006 (mounted to terminals).

④ depending on the turret's outfit.



Technical Data of:		b1-b9	
Operating voltage:	10-24 V DC ±20%		
Max. residual ripple:	10%		
Max. load current:	200mA		
Nom. sensing distance:	1mm		
Temperature range:	-20° bis + 65°C		
Function:	n.o. (make) function		
Type:	pnp logic		

Information: Proximity-Detector
installation position until 12/99

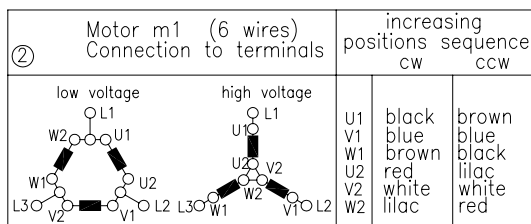


Designation	Element/Function	Line from element	Terminal X1	④ Cable 18x0,75mm ²	Type	Supplier		
b1	Proximity-Detector Control turret position and locking	brown (+)	8	8	M8x45 Id. Nr. 4157			
		blue (-)	9	9				
		black	1	1				
b2	Proximity-Detector Control turret position and locking	brown (+)	8		M8x45 Id. Nr. 4157			
		blue (-)	9					
		black	2	2				
b3	Proximity-Detector Control turret position and locking	brown (+)	8		M8x45 Id. Nr. 4157			
		blue (-)	9					
		black	3	3				
b4	Proximity-Detector Control turret position and locking	brown (+)	8		M8x45 Id. Nr. 4157			
		blue (-)	9					
		black	4	4				
b5	Proximity-Detector Control turret position and locking	brown (+)	8		M8x45 Id. Nr. 4157			
		blue (-)	9					
		black	5	5				
b6	Proximity-Detector Control turret position and locking	brown (+)	8		M8x45 Id. Nr. 4157			
		blue (-)	9					
		black	6	6				
b7	Proximity-Detector Control pre-indexing	brown (+)	8		M8x45 Id. Nr. 4157			
		blue (-)	9					
		black	7	7				
r1	① Posistor-heat detector	blue	13	13	PTC-Thermistor DIN 44081 U _≤ 4V DC			
m1	3-Phase A.C. Motor (release-indexing- locking)	②	U1	15			sz 012 0,4/0,55A sz 016 0,6/0,85A sz 020 0,8/1,1A sz 025 1,6/2,2A sz 032 1,1/2,2A sz 040 1,45/2,5A	Standard 380V 50Hz
			V1	16				
			W1	17				
			U2					
			V2					
			W2					
s1	Solenoid pre-indexing	brown (+)	10	10	24V DC, 50% ED to size 012 28W, from size 016 42W			
		blue (-)	11	11				
s2	Solenoid controlled disk brake	blue (-)	11		sz 012 5,3W sz 016 5,3W sz 020 6,5W sz 025 8,0W sz 032 8,3W sz 040 12W	24VDC		
		brown (+)	12	12				
	Ground		⊥	ye-gn				

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).

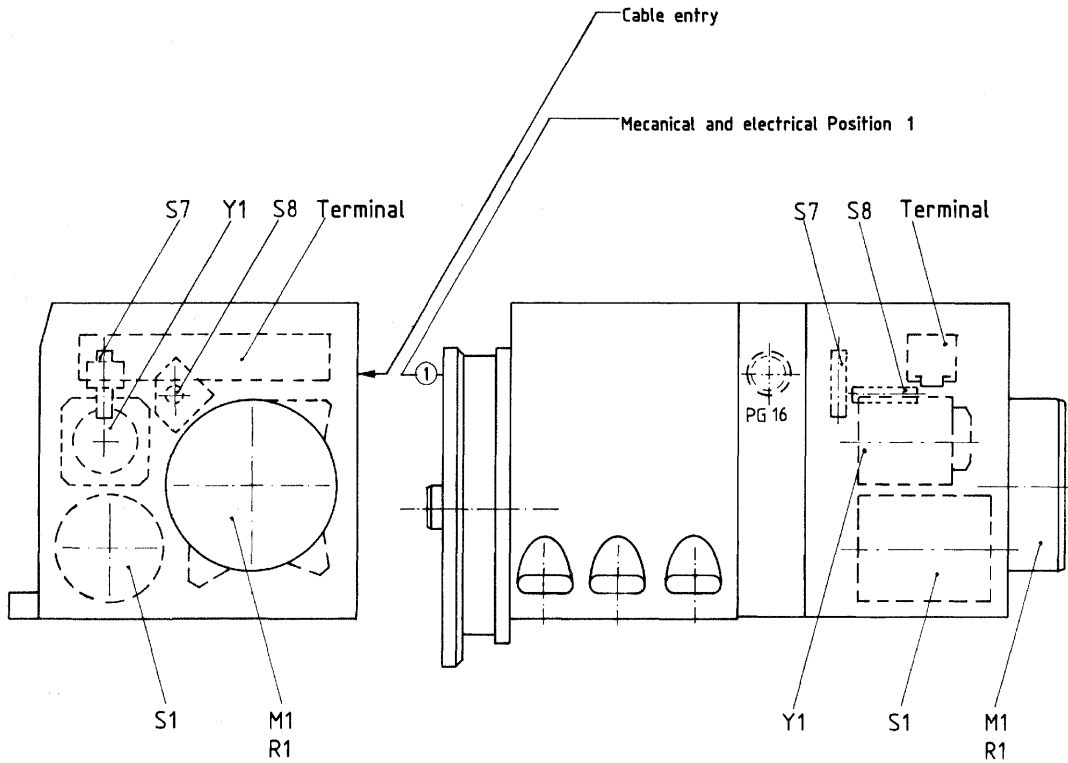
④ depending on the turret's outfit.



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

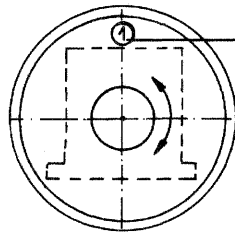
Wiring layout	SAUTER DISK-Type Tool Turret 0.5.4.80.510 8/12/16/24-positions	EP-831e
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De-signa-tion	Element / Function	Line from	to terminal	Type	Supplier
S1	Angular encoder	brown (+)	12 (+)		BRGB2-WBB-08-EP-PL-SA2 BRGB2-WAB-12-EP-PL-SA2 BRGDO-WAD-16-EP-PLK-SA1 BRGDO-WAD-24-EP-PLK-SA1
	1.Bit	white	1		
	2.Bit	yellow	2		
	3.Bit	green	3		
	4.Bit	lilac	4		
	5.Bit	grey	5		
	Strobe	black	6		
	Parity	pink	7		
	Screen		13		
S7	Proximity-Detector control pre-indexing	brown (+) blue (-) black	12 (+) 11 (-) 8	BES 518-324-E4-X-3	Balluff Neuhausen
S8	Proximity-Detector control of locking	brown (+) blue (-) black	12 (+) 11 (-) 10	BES 518-324-E4-X-3	Balluff Neuhausen
R1	① Posistor-heat Detector	blue blue black	14 15 U1	PTC Thermistor in acc. with German Standart DIN 44081 UH4V DC	SAUTER
M1	3-Phase A.C. Motor (release-indexing-locking)	blue brown	V1 W1		
	Terre		+		
Y1	Solenoid pre-indexing	white/yellow white/yellow	16 (+) ③ 17 (+)	24V DC, 2 A 40% ED	Schultz Memmingen

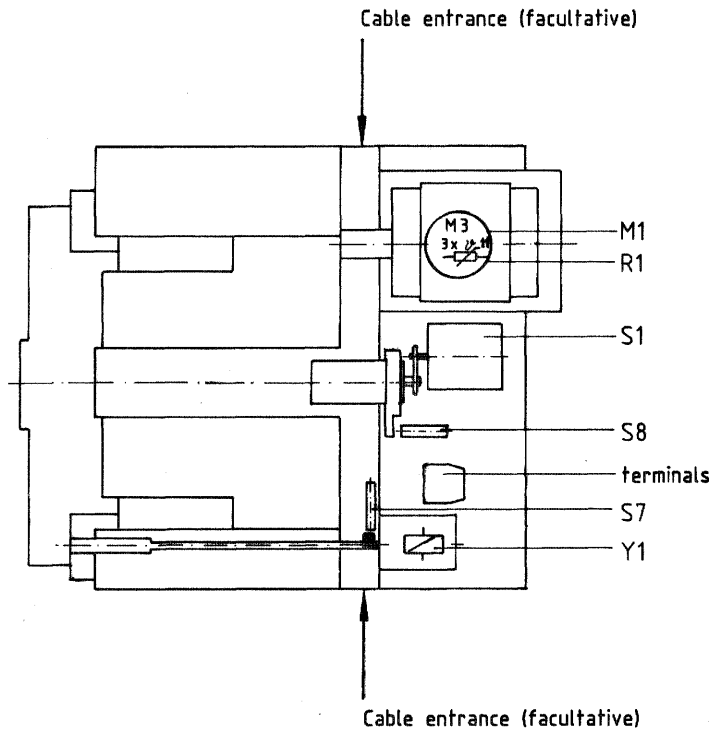


- ① For this protective motor switch (thermistor) is required. Without thermistor motor protector no guarantee in case of motor failure.
- ③ Diode 1N4006 (mounted to terminals)
- ④ for 16/24 positions only

Technical Data of:	S1	S7 S8
Operating voltage:	15 - 30 V DC	10 - 24 V DC ±20%
Max. residual ripple:	10%	10%
Max. load current:	50 mA	200 mA
Nom. sensing distance:	-	1 mm
Temperature range:	0° to +60°C	-20° to +65°C
Function:	-	n.o. (make) function
Type:	pnp logic	pnp logic

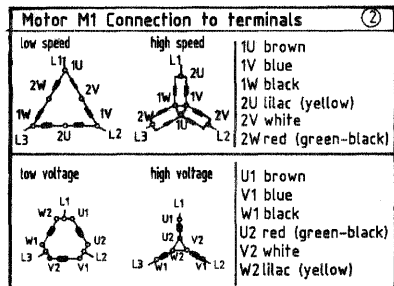


mechanical and electrical position 1

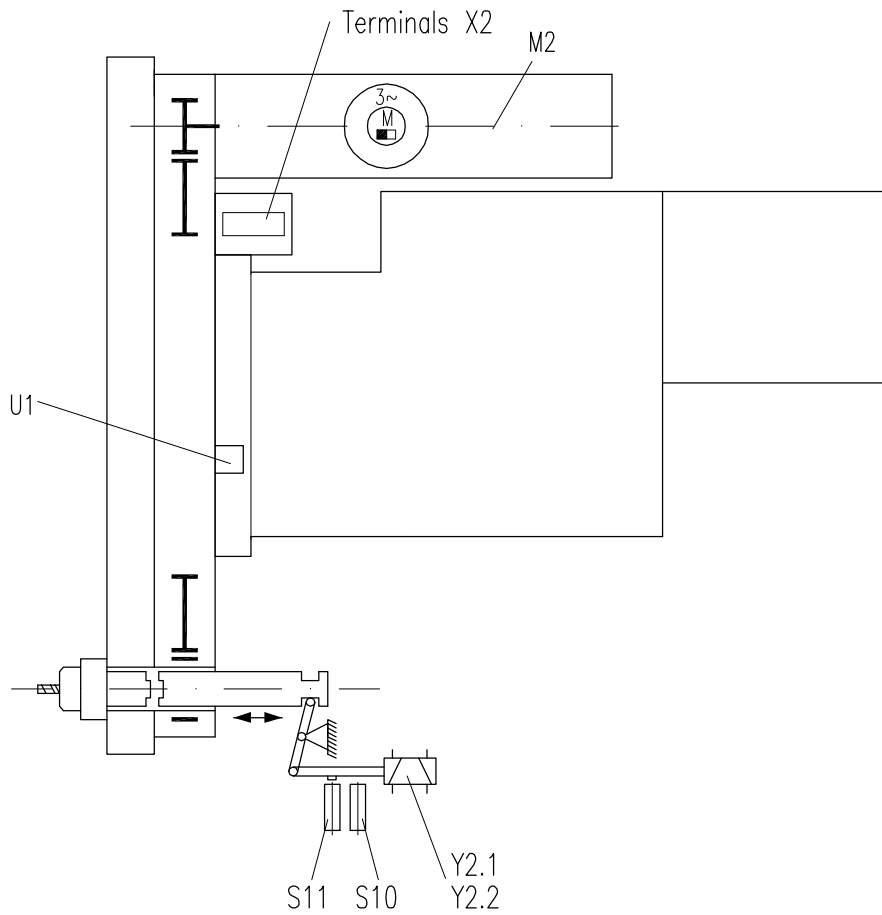


De-signation	Element / Function	Line	Terminal No.	Wire-No. ⁽⁴⁾	Type	Supplier
S1	Angular encoder	brown (+)	12	12	BRGB ₂ -W ₂ D- ¹⁴ / ₂₄ -EP-P- ¹⁴ / ₂₄ -MS SA2 BRGD ₀ -W ₂ D- ¹⁴ / ₂₄ -EP-PLK-SA1	Balluff Neuhausen
		blue (-)	11 ⁽⁶⁾	11		
	1.Bit	white	1	1		
	2.Bit	yellow	2	2		
	3.Bit	green	3	3		
	4.Bit	lilac	4	4		
	5.Bit ⁽⁵⁾	grey	5	5		
	Strobe	black	6	6		
	Parity	pink	7	7		
		Screen		13		
S7	Proximity-Detector control pre-indexing	brown (+) blue (-) black	12 11 8	8	BES 516-324-E0-K-01	Balluff Neuhausen
S8	Proximity-Detector control of locking	brown (+) blue (-) black	12 11 10	10	BES 516-324-E0-K-01	Balluff Neuhausen
R1	Posistor-heat detector	blue	14	13	PTC thermistor in acc. with German Standard DIN 44081 U ± 4V DC	SAUTER
M1	3-Phase A.C. Motor (release - indexing - locking)	blue	15	14		
			U1	15		
			V1	16		
			W1	17		
			U2			
			V2			
			W2			
Y1	Solenoid preindexing	brown (+) blue (-)	16 17	9	24V DC; 2,8A; 50% ED	Schulz Memmingen
	Ground		±	green-yellow		

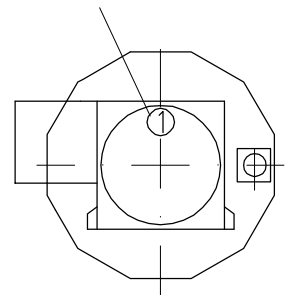
- ① for this, protective motor switch (thermistor) is required. Without thermistor motor protector no guarantee in case of motor failure.
- ② Diode 1N4006 (mounted to terminals)
- ③ depending on the turret's outfit. SUPERFLEX-N-number cable (cable drag chains) 18x0.75mm², Length acc. to order.
- ④ for 16/24 positions only
- ⑤ When turret's outfit is with the cable connection, connect the borne 11 with the borne 17.



Technical Data of:	S1	S8, S7
Operating voltage:	15 - 30 V DC	10 - 24 V DC ±20%
Max. residual ripple:	10%	10%
Max. load current:	50 mA	200 mA
Nom. sensing distance:	-	1 mm
Temperature range:	0° to +60°C	-20° to +65°C
Function:	-	n.o. (make) function
Type:	pnp logic	pnp logic



Electrical and mechanical position 1

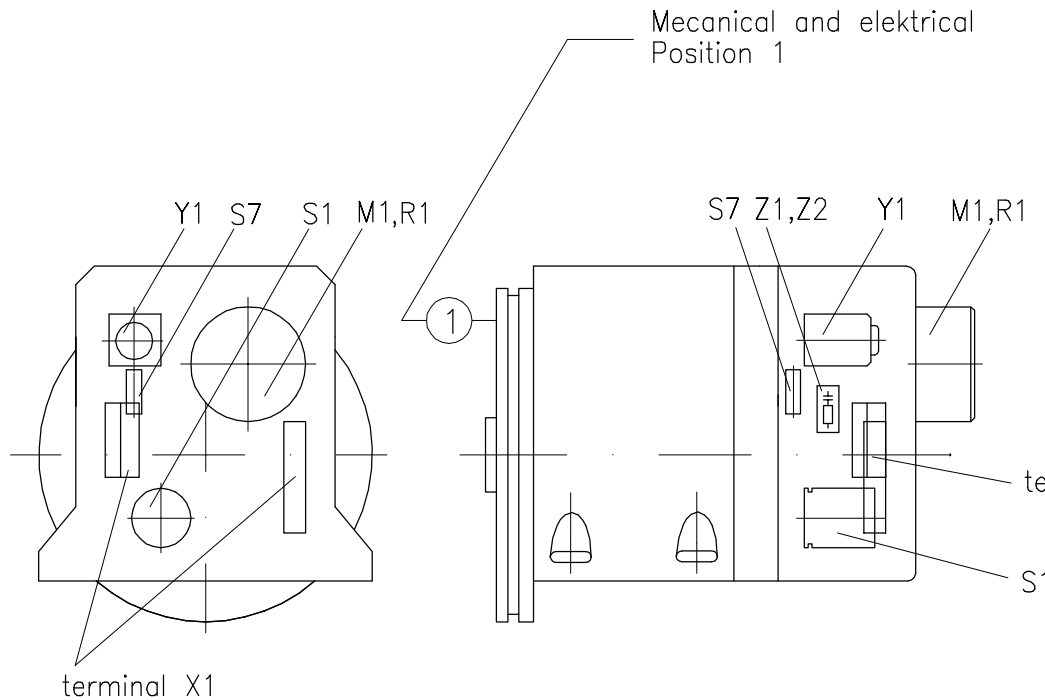


- ① Diode 1N4006 (mounted to terminal strip)
- ② Optional
- ③ Optional (Cable SUPERFLEX-N 12x0,75 mm make LUETZE)
SAUTER Id.-No.: 070.921

Operating data of:	S10, S11
Operating voltage:	10 - 24 VDC ±20%
Max. residual ripple:	10%
Load current:	200mA
Rated operating distance:	1mm
Temperature range:	-20° bis +65°C
Function:	NO switch
Design:	pnp-principle

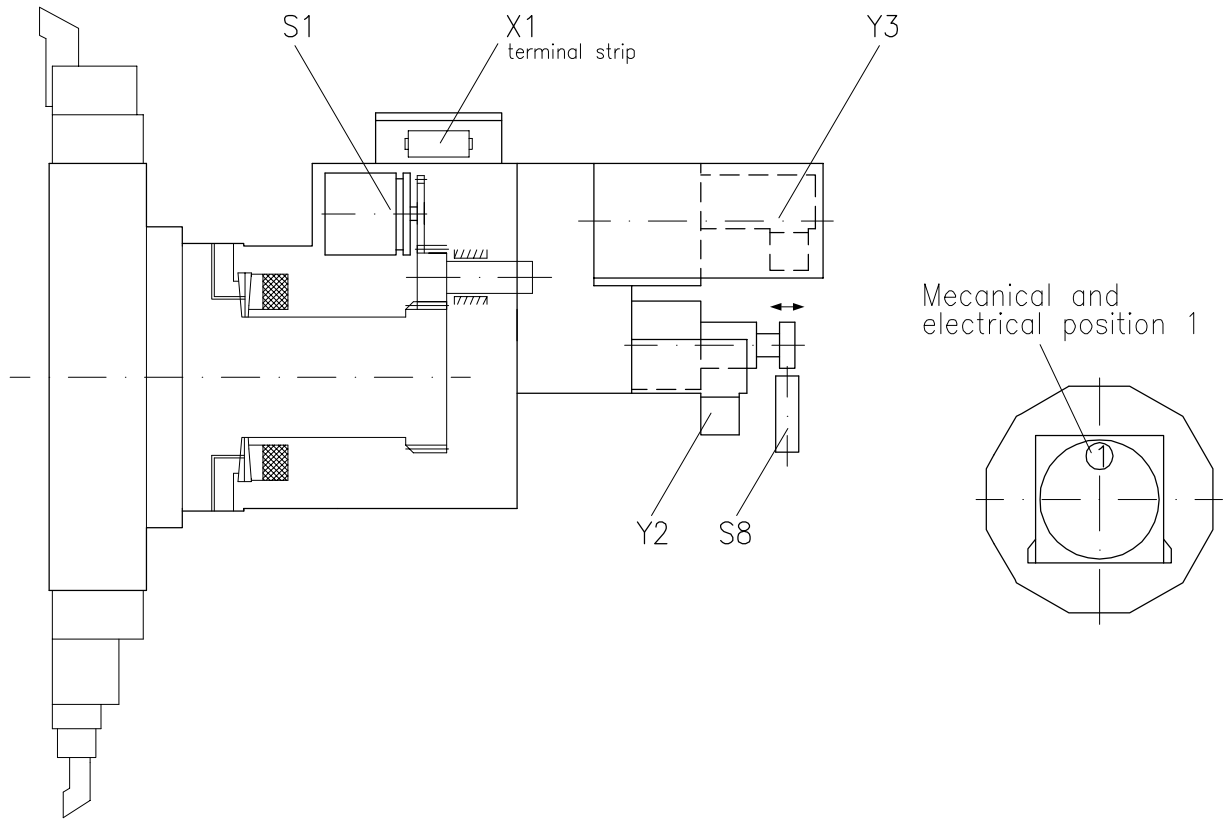
De- sig- nation	Element/function	Wire from element	Terminals X2	Cable ③ 12x0,75 qmm			Supplier
S10	Proximity detector control "Tool drive engaged"	brown (+)	31	1		BES 516-324-E4-C-01	Balluff Neuhausen
		blue (-)	32	2			
		black	29	3			
S11	Proximity detector control "Tool drive disengaged"	brown (+)	31			BES 516-324-E4-C-01	Balluff Neuhausen
		blue (-)	32				
		black	30	4			
Y2.1	Solenoid engage	2	23 (+) ↑	7		GTUW 050 T43 D04 24V DC; 21,2W	Schultz Memmingen
Y2.2	Tool drive disengage	3	① 24 (-) ↑	6			
		1	25 (+) ↓	5			
M2	Tool drive motor AC servomotor						②
U1	Measuring system- measuring pin						②
	Ground		⊥				

designa- tion	Element/Function	Line	terminal X1	cable ④ 14x0,34 mm ²	cable 12x0,75 mm ²	Type	Supplier
S1	Angular encoder	brown (+)	12	brown		BRGB2-W ₀₈ B ₁₂ -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			BRGD0-WCD16-EP- P-L-R-K		
screen transparent	13	transp.					
S7	Proximity-Detector control pre-indexing	brown (+) blue (-) black	12 11 8			BES 516-324-E ₀ C-01	Balluff
R1	① Posistor-heat detector	blue blue	14 15		4 5	PTC-Thermistor DIN 44081 U _s ≤ 4V DC	
M1	3-Phase A.C. Motor (release-indexing- locking)	②	* 2U	U1	1		SAUTER
			2V	V1	2		
			2W	W1	3		
			1U	U2	8		
			1V	V2	9		
			1W	W2	10		
	Ground				yellow-green		
Y1	Solenoid pre-indexing	brown (+) blue (-) ③	16 17		6 7	24V-; 2,0A to size 516 40%ED; 2,8A from 520	Schultz
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 ΔYY-motor only.

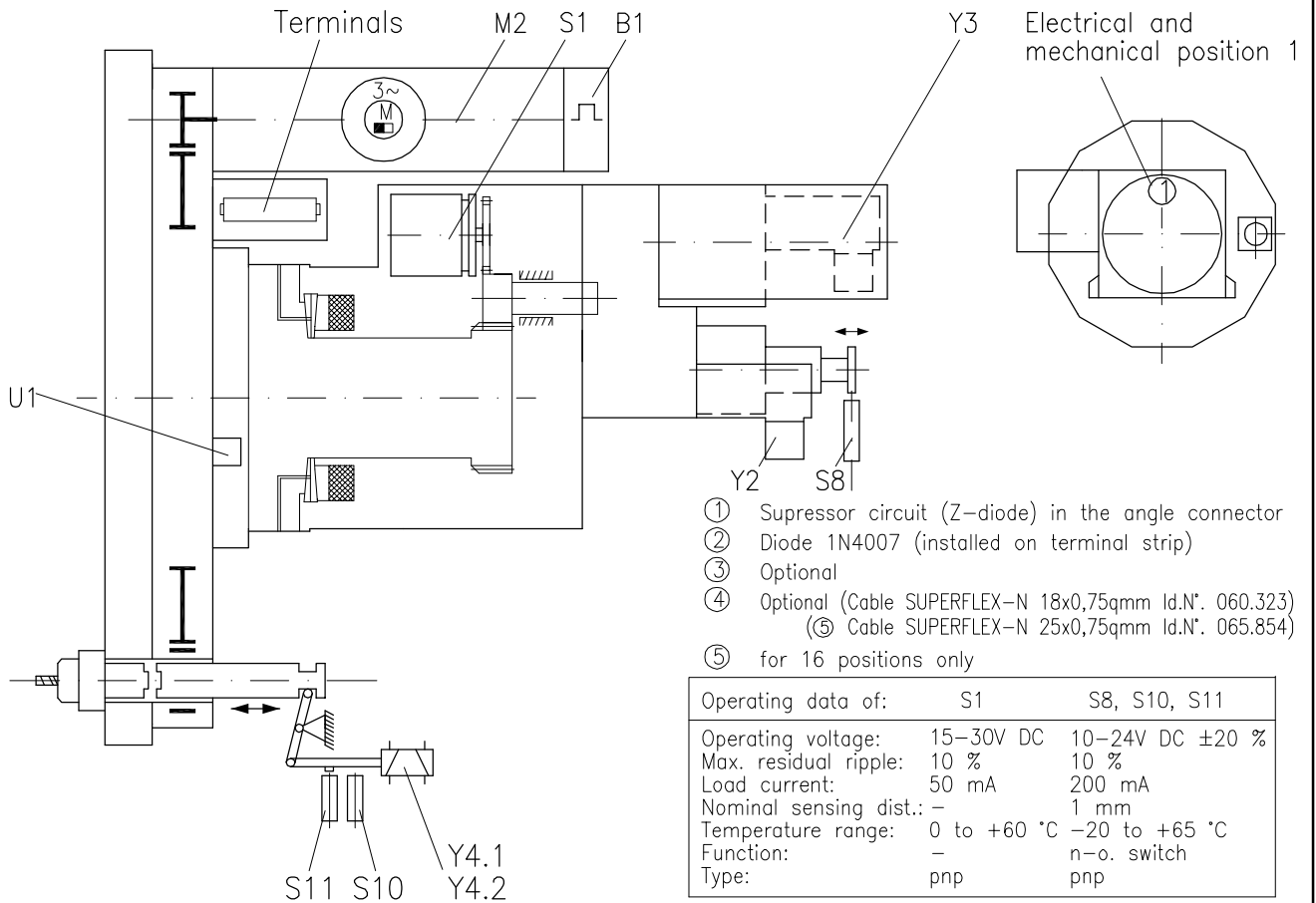
Motor M1 ⑥ Driving Motor with two speeds	increasing positions sequence CW	increasing positions sequence CCW	Motor M1 (3-wires) ②	increasing positions sequence CW	increasing positions sequence CCW	Technical Data of:																																																																												
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>low speed</p> </div> <div style="text-align: center;"> <p>high speed</p> </div> </div>	<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>*</td><td>1U</td><td>black</td><td>brown</td></tr> <tr><td></td><td>1V</td><td>blue</td><td>blue</td></tr> <tr><td></td><td>1W</td><td>brown</td><td>black</td></tr> <tr><td></td><td>2U</td><td>lilac</td><td>red</td></tr> <tr><td></td><td>2V</td><td>white</td><td>white</td></tr> <tr><td></td><td>2W</td><td>red</td><td>lilac</td></tr> </table>	*	1U	black	brown		1V	blue	blue		1W	brown	black		2U	lilac	red		2V	white	white		2W	red	lilac			<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>U1</td><td>black</td><td>brown</td></tr> <tr><td>V1</td><td>blue</td><td>blue</td></tr> <tr><td>W1</td><td>brown</td><td>black</td></tr> </table>	U1	black	brown	V1	blue	blue	W1	brown	black	<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>U1</td><td>black</td><td>brown</td></tr> <tr><td>V1</td><td>blue</td><td>blue</td></tr> <tr><td>W1</td><td>brown</td><td>black</td></tr> <tr><td>U2</td><td>red</td><td>lilac</td></tr> <tr><td>V2</td><td>white</td><td>white</td></tr> <tr><td>W2</td><td>lilac</td><td>red</td></tr> </table>	U1	black	brown	V1	blue	blue	W1	brown	black	U2	red	lilac	V2	white	white	W2	lilac	red	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th colspan="2">S1</th> <th>S7</th> </tr> <tr> <td>Operating voltage:</td> <td>15-30V DC</td> <td>10-24V DC ±20%</td> </tr> <tr> <td>Max. residual ripple:</td> <td>10%</td> <td>10%</td> </tr> <tr> <td>Max. load current:</td> <td>50mA (⑤ 25mA)</td> <td>200mA</td> </tr> <tr> <td>Nom. sensing distance:</td> <td>-</td> <td>1mm</td> </tr> <tr> <td>Temperature range:</td> <td>0° bis +60°C</td> <td>-20° bis + 65°C</td> </tr> <tr> <td>Function:</td> <td>-</td> <td>n.o. (make) function</td> </tr> <tr> <td>Type:</td> <td>pnp logic</td> <td>pnp logic</td> </tr> </table>		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
*	1U	black	brown																																																																															
	1V	blue	blue																																																																															
	1W	brown	black																																																																															
	2U	lilac	red																																																																															
	2V	white	white																																																																															
	2W	red	lilac																																																																															
U1	black	brown																																																																																
V1	blue	blue																																																																																
W1	brown	black																																																																																
U1	black	brown																																																																																
V1	blue	blue																																																																																
W1	brown	black																																																																																
U2	red	lilac																																																																																
V2	white	white																																																																																
W2	lilac	red																																																																																
S1		S7																																																																																
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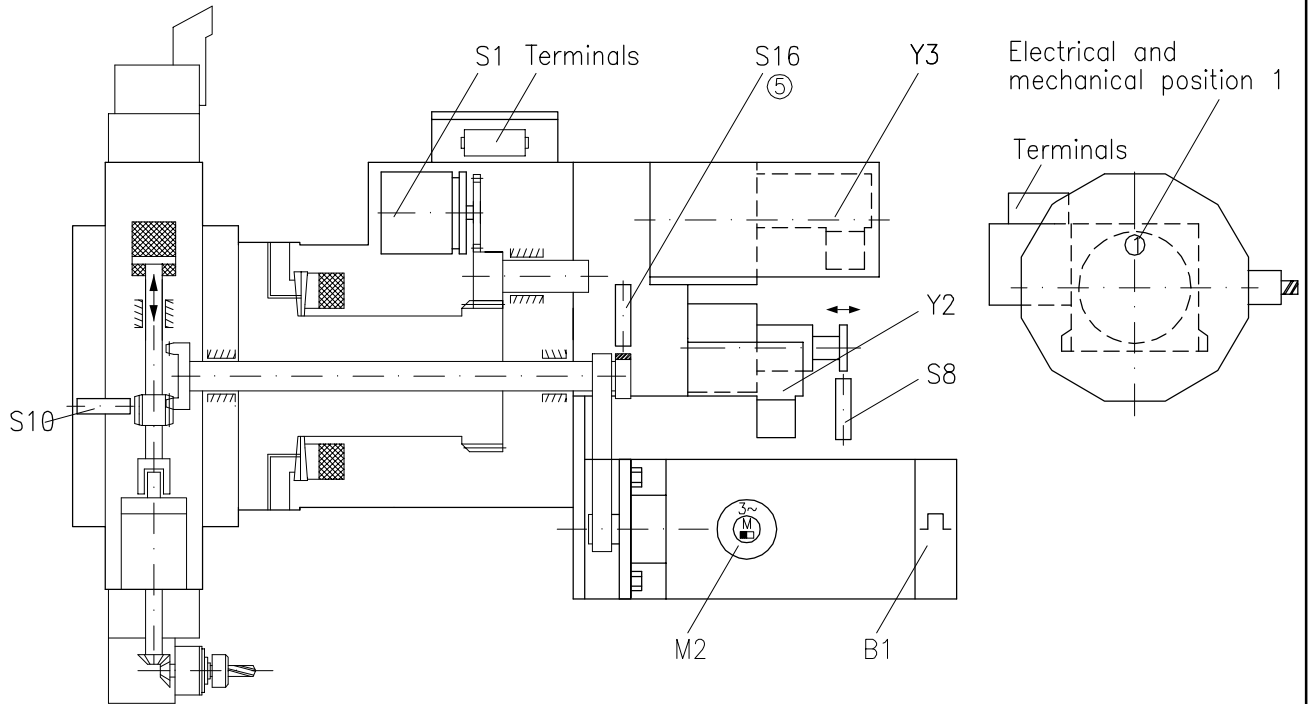
- ① Supressor circuit (Z-diode) in the angle connector
- ② Optional (Cable SUPERFLEX-N 18x0,75mm² Fab. LUETZE) SAUTER-Ident-N°. 060.323
- ③ Only for 16/24 positions

Designation	Element/Function	Line from element	Terminal X1	Cable 18x0,75mm ² ②	Type	Supplier
S1	Angular position encoder	brown (+)	12	12	BRGD2-W _B ^C -12-16-EP-PL-K01 24	Balluff
		blue (-)	11	11		
		Bit 1 white	1	1		
		Bit 2 yellow	2	2		
		Bit 3 green	3	3		
		Bit 4 violet	4	4		
		③ Bit 5 grey	5	5		
		Strobe	6	6		
		Parity	7	7		
S8	Proximity switch "Turret in position"	Shield transparent	13		BES 516-324-E0-C-01	Balluff
		brown (+)	12			
		blue (-)	11			
Y2	3/2 way valve "Start-Stop"	1 brown (+)	14	9	WKED 08130-04X-G24 24VDC; 1,04A	Hydac
		2 blue (-)	15	10		
Y3	4/2 way valve "Turret-sense of rotation"	1 brown (+)	16	13	WKEY 08140-04X-G24 24VDC; 1,04A	Hydac
		2 blue (-)	15			
	Erde		≡	green-yellow		

Technical data of:	S1	S8
Operating voltage:	15 - 30 V DC	10 - 24 V 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 logic	pnp logic



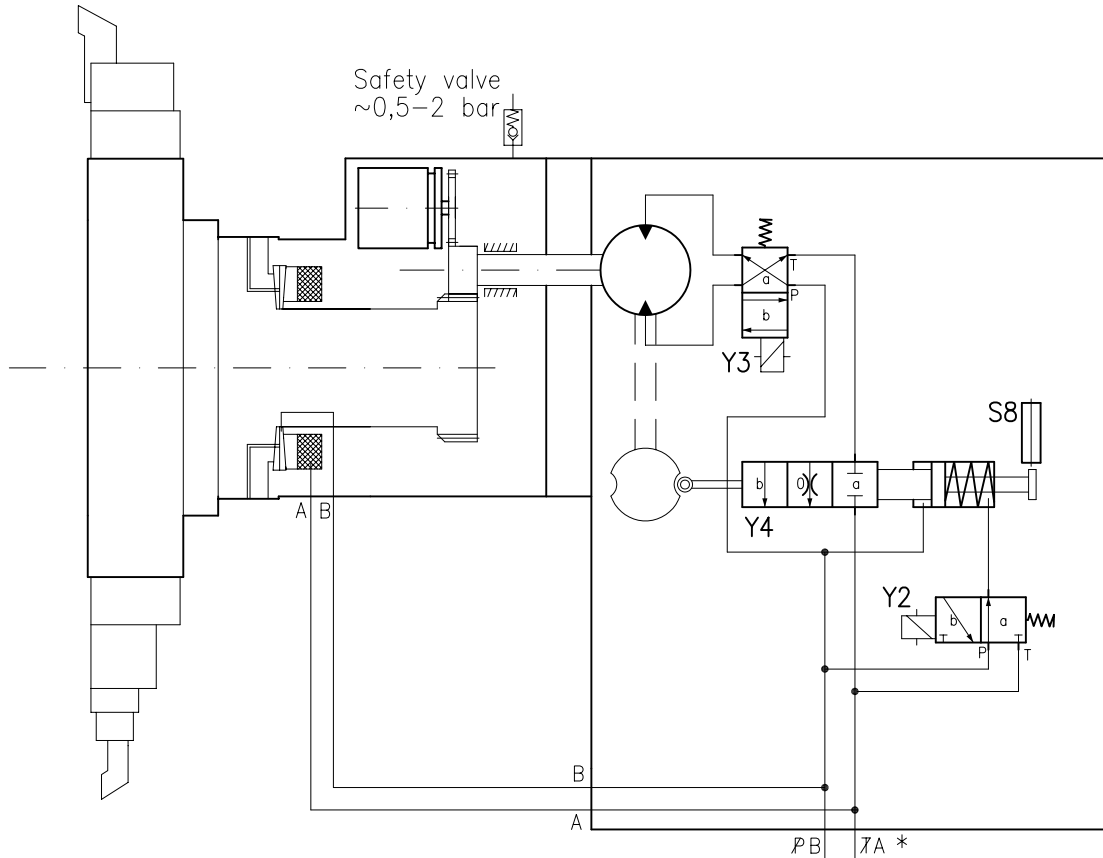
Designation	Element/function	Line from element	Terminals	Cable 18x0,75mm ² ④ 25x0,75mm ² ⑤	Type	Made by
S1	Angular position encoder	brown (+)	12	9	BRGD2-W ₀₈ ⁰⁸ ₁₆ -EP-PL-K01	Balluff
		blue (-)	11	8		
		1.Bit white	1	1		
		2.Bit yellow	2	2		
		3.Bit green	3	3		
		4.Bit violet	4	4		
		⑤ 5.Bit gris	5	18		
		Strobe black	6	5		
S8	Proximity switch "Turret in position"	brown (+)	12	7	BES 516-324-E0-C-01	Balluff
		blue (-)	11			
		black	10			
S10	Proximity switch Check "Tool drive engaged"	brown (+)	12	16	BES 516-324-E4-C-01	Balluff
		blue (-)	11			
		black	29			
S11	Proximity switch Check "Tool drive disengaged"	brown (+)	12	17	BES 516-324-E4-C-01	Balluff
		blue (-)	11			
		black	30			
Y2	3/2 way valve "Start-Stop"	1 brown (+)	① 14	10	WKED 08130-04X-G24 24VDC; 1,04A	Hydac
		2 blue (-)	① 15			
Y3	4/2 way valve "Turret-sense of rotation"	1 brown (+)	① 16	12	WKEY 08140-04X-G24 24VDC; 1,04A	Hydac
		2 blue (-)	① 15			
Y4.1	Solenoid engage	2	23 (+)	13	GTUW 050 T43 D04 24V DC; 21,2W	Schultz
		3	② 24 (-)			
Y4.2	Tool drive disengage	1	25 (+)	15		
M2	Tool drive motor AC servomotor				③	
B1	Incremental pulse coder				③	
U1	Measuring system probe				③	
	Ground		⊕	green-yellow		



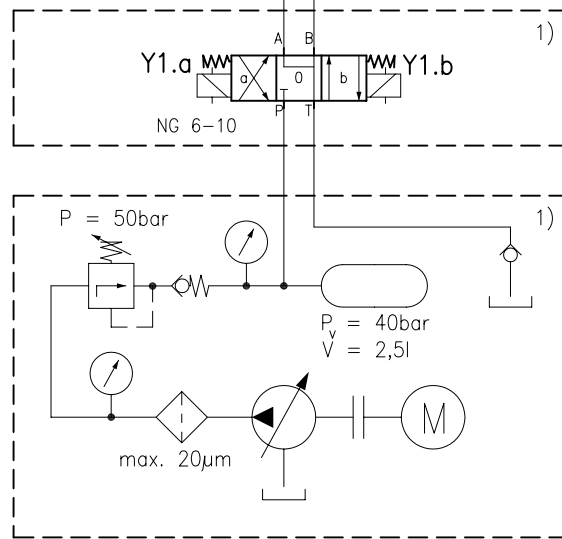
Designation	Element/function	Line from element	Terminals X1	Cable 18x0,75 qmm ②	Type	Made by
S1	Angular position encoder	brown (+)	12	12	BRGD2-W ⁰⁸ B-1 ¹² -EP-P ¹ R-K01 24	Balluff
		blue (-)	11	11		
		1.Bit white	1	1		
		2.Bit yellow	2	2		
		3.Bit green	3	3		
		4.Bit violet	4	4		
		④ 5.Bit grey	5	5		
		Strobe black	6	6		
S8	Proximity switch "Turret in position"	brown (+)	12	8	BES 516-324-E0-C-01	Balluff
		blue (-)	11			
		black	10			
S10	Proximity switch ③ for controlling "tool drive: incorrect position engaged"	brown (+)	12	10	BES 516-324-E4-C-01	Balluff
		blue (-)	11			
		black	8			
S16	Proximity switch ⑤ for controlling Reference point tool drive	brown (+)	12	9	BES 516-324-E4-C-01	Balluff
		blue (-)	11			
		black	34			
Y2	3/2 way valve "Start-Stop"	1 brown (+)	14	14	WKED 08130-04X-G24 24VDC; 1,04A	Hydac
		2 blue (-)	15			
Y3	4/2 way valve "Turret-sense of rotation"	1 brown (+)	16	16	WKEY 08140-04X-G24 24VDC; 1,04A	Hydac
		2 blue (-)	15			
M2	Tool drive motor AC servomotor				③	
B1	Incremental pulse coder				③	
	Ground		≡	green-yellow		

- ① Supressor circuit (Z-diode) in the angle connector
- ② Optional (Cable SUPERFLEX-N 18x0,75 mm² Fab. LUETZE) SAUTER-Ident-N°.: 060.323
- ③ Optional
- ④ Only 16/24 pos.
- ⑤ Optional, with Tool drive gear i=2

Operating data of:	S1	S8, S10, S16
Operating voltage:	15-30 VDC	10-24 VDC ±20 %
Max. residual ripple:	10 %	10 %
Load current:	50 mA	200 mA
Nominal sensing distance:	-	1 mm
Temperature range:	0 to +60 °C	-20 to +65 °C
Function:	-	n-o. switch
Type:	pnp	pnp



Hydraulics supply



1) Not included in SAUTER delivery volume.

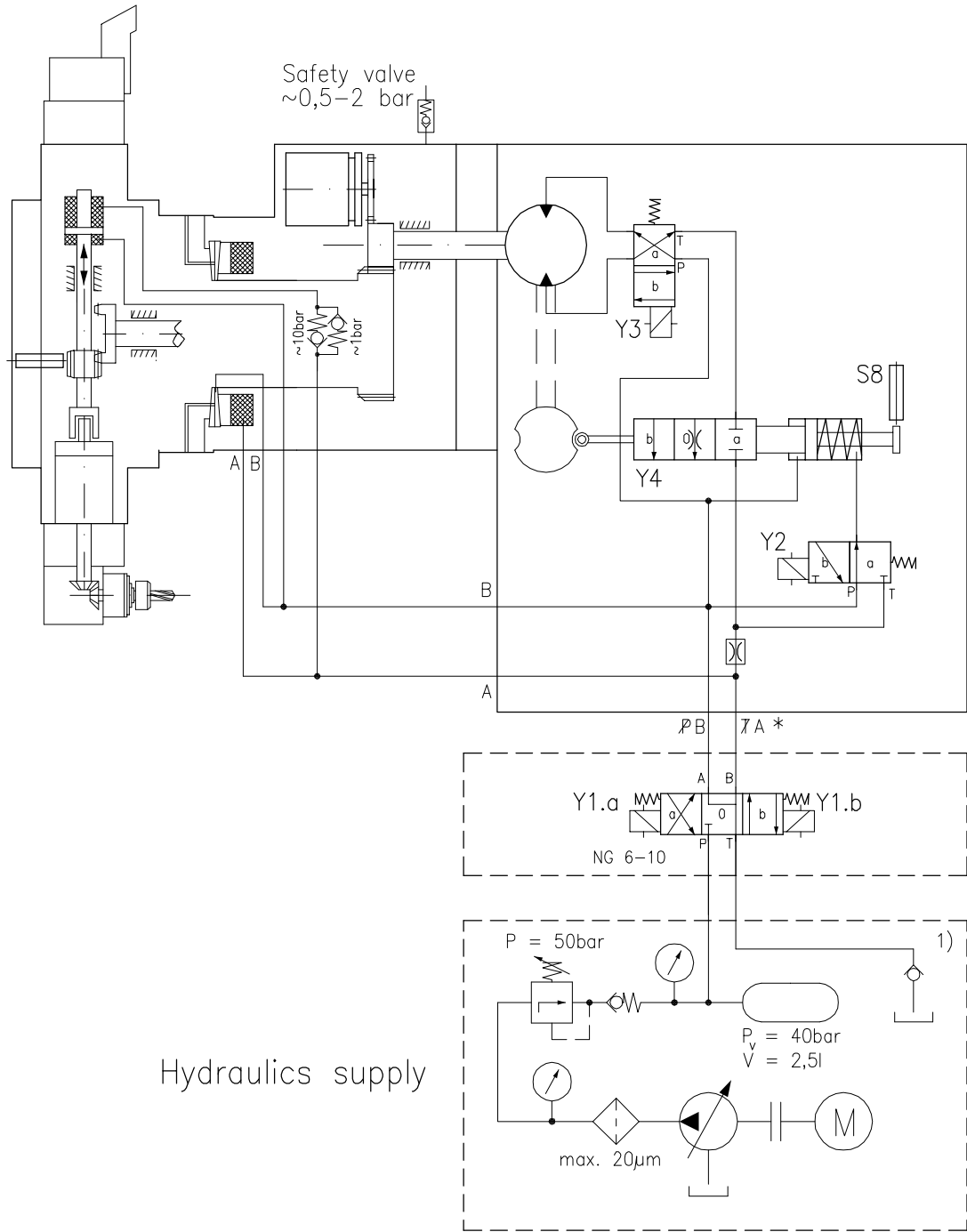
Hydraulic operating pressure:	50 bar ±10%
Oil viscosity:	32-46 mm ² /s
Recommended operating temperature of the hydraulic oil at the turret:	30-50°C

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

X depending on sense of rotation

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 quantity of valve	Rated quantity 6			Rated quantity 10		

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



Hydraulics supply

Hydraulic operating pressure:	50 bar ±10%
Oil viscosity:	32-46 mm ² /s
Recommended operating temperature of the hydraulic oil at the turret:	30-50°C

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

Nominal width required for piping between hydraulic control unit and turret:		Turret size				
Length [m]		.12	.16	.20	.25	.32
≤ 6		10	10	10	12	12
> 6		12	12	12	15	15

X Depending on sense of rotation

Table of functions	Y1		Y2		Y3		Y4			
	a	0	b	a	b	a	b	a	0	b
locking	1	0	0	1	0	1	0	1	0	0
unlocking	0	0	1	1	0	X	X	1	0	0
rotation right *	0	0	1	0	1	1	0	0	0	1
rotation left *	0	0	1	0	1	0	1	0	0	1
positioning right	0	0	1	1	0	1	0	0	1	0
positioning left	0	0	1	1	0	0	1	0	1	0
Stop	0	1	0	1	0	1	0	1	0	0
Tool drive engage	1	0	0	1	0	1	0	1	0	0
Tool drive disengage	0	0	1	1	0	X	X	1	0	0