

TA-15...150/4Q

Instruction and Operation Manual

Caution:

*There is always a risk involved in the handling of electrical machinery!
Therefore mounting and maintenance should only be done by authorized personnel.*

Read these instructions carefully before installation, adjustment and operation of the drive control.

1. Technical Data

Dimensions	Refer to drawing 15-150/4Q 6P Drawing Nr.: 115 10 M1, 18007 M1, 18020 M1
Line Supply Voltage	380 V, three phase; 220 V, three phase; 460 V, three phase; 50/60 Hz.
Power	Depending on Type 15, 24, 40, 60, 100, 150KW
Armature Voltage	Depending on supply voltage, at 380 V, three phase -> 400 V d.c.
Armature Current	40, 70, 110, 170, 280, 400A
Field Voltage	Depending on supply voltage, at 380 V, three phase -> 250 V d.c.
Field Current	2 A, 4 A or 10 A
Ambient Temperature	0°C to 40°C
Speed Accuracy	Armature feedback controlled : 3% Tachometer feedback controlled : 1%

Two fully controlled three phase bridges in antiparallel circuit; No circular current, Field current control; Temperature control; Phase control with momentary switch-off function at phase loss, $t > 1ms$, and automatic re-switch-on within 1 - 3 sec.; Blocking protection; Zero speed control; Drift switch-off; Logical brake circuit; Fault memory (at Field loss, over-temperature, phase fault and short circuit); Automatic line synchronisation; Delayed drive release after line switch-on.

2. Connection of the drive control

L1 - L2 - L3	Line input, three phase, voltage and frequency according to type marking.
A - A	Armature connection
N - L1	Connections for fan, 220 V a.c.
1 - 2	Lower printed circuit board, separate line supply for the electronic circuit, 380 V a.c., 50/60 Hz
1 - 2	Relay contact, drive release "OPERATION", not self locking.
1 - 3	Relay contact "JOG SPEED", not self locking.
1 - 4	Relay contact, preselection of rotation of jog speed.
1 - 5	Relay supply voltage, 48 V a.c.
6	Electronic circuit, common
7	Reference signal input with ramp (acceleration/ deceleration)
8	Reference voltage - 10 V
9	Reference voltage + 10 V
10	Reference signal input without ramp
11	Electronic circuit, common
12	d.c.-Tachometer input, 20 - 200 V

13 - 14	depending on position 2/3/4 of switch S 1 These terminals must be jumpered for speed-controlling. 13 Current reference signal input, 14 Current reference signal output.
15 - 16	External fault-reset
17 - 18 - 19	Relay change-over contact, multiple fault, contact load capacity 2.0 A 250 V max.
20 - 21 - 22	Relay change-over contact, blocking indication, contact load capacity 2.0 A 250 V max.
23 - 24 - 25	Relay change-over contact for brake connection, contact load capacity 2.0 A 250 V max.

3. Drive control adjustments

Maximum Speed	P 7	Adjustment of the maximum speed during operation. To be adjusted at maximum reference value (+/- 10 V) only ! <u>THE OUTPUT VOLTAGE MUST NOT EXCEED 400 V (at 380 V line input)</u>
Jog Speed	P 12	Adjustment of the Jog speed.
Ramp-Adjustment	P 10 P 11	Adjustment of the linear acceleration or deceleration time (approx. 2 - 15 sec).
I x R Compensation	P 4	This potentiometer enables to compensate for the voltage drop in the armature and in the supply leads when armature feedback (UA) control is utilized.
Current Limit	P 1	Adjustment of the requested maximum armature current. Current increases with counter-clockwise setting of the potentiometer.
n-Stabilisation	P 5	Dynamical adaption of the speed control
I-Stabilisation	P 2	Dynamical adaption of the current control
Stability 1	P 9	Dynamical adaption; refer to circuit schematic
Stability 2	P 8	Dynamical adaption; refer to circuit schematic
Delay Time	P 3	Adjustment of the switch-off time of the anti-blocking relay (3-15 sec)
Line Switch-Off	P 14	Adjustment for the blocking of the automatical re-switch-on in case of loss of line supply voltage (1 - 3 sec)
n-Sero Point	P 6	Sero point adjustment of the speed control. This potentiometer is factory adjusted and sealed.
I-Sero Point	P 15	Sero point adjustment of current control. This potentiometer is factory adjusted and sealed.
Phase Balance	P 13	Unit contains 12 of these controls. All are factory adjusted and sealed. <u>DO NOT ATTEMPT TO CHANGE SETTING !</u>

4. Indicator Lamps

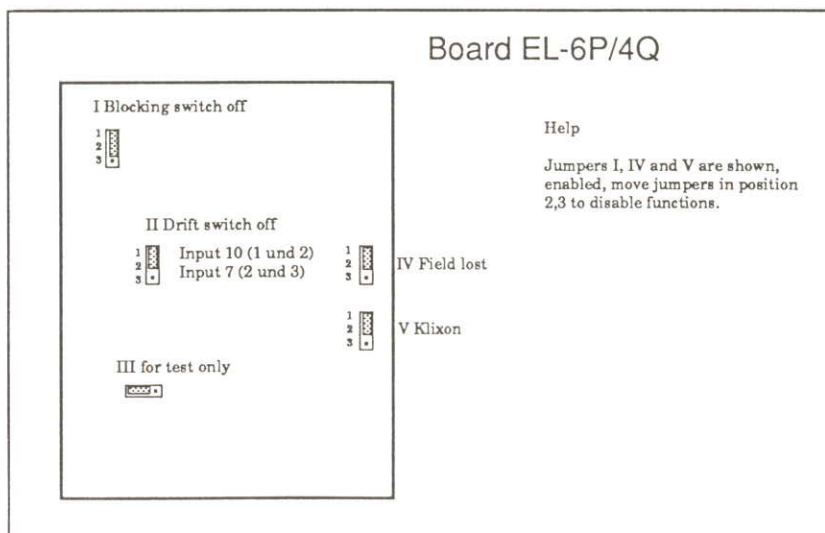
The following functions are indicated with light emitting diodes (LED's):

- | | | |
|--------------------------|-------|-------|
| a) Power On | LED 9 | green |
| b) Current Supply + 15 V | LED 7 | green |

c) Current Supply - 15 V	LED 4	green
d) Current Limit + I-limit	LED 1	red
e) Current Limit - I-limit	LED 2	red
f) Jog Speed On	LED 6	yellow
g) Jog Speed pre-setting (+ or -)	LED 8	yellow
h) Operation On	LED 5	yellow
i) Drive released	LED 3	yellow
k) Loss of line supply (Phase Loss)	LED 10	red
l) Phase Fault	LED 11	red
m) None or too low field current	LED 12	red
n) Heat-sink for Klixon is too hot	LED 13	red
o) Line supply loss for more than 3 sec	LED 14	red
p) Fault (multiple fault or short circuit)	LED 17	red
q) Ready for Operation	LED 15	green
r) Brake released	LED 16	green
s) Thyristor triggering 12 X, on lower P.C.-board ZES-12/4Q	LED	clear

5. Functional tests and preliminary adjustments before operation:

- a.) Armature feedback control
 - 1.) Check all connections with an Ohmmeter for short-circuit to ground. Check if line supply voltage corresponds with voltage indicated on the type-marking of the unit. Preselect the correct frequency with switch S 2 (50 or 60 Hz).
 - 2.) Setting of DIP-Switch S 1 : 1,2,3,4 = off, 5,6,7 = on.
 - 3.) Place the jumper-bridges in the correct positions.

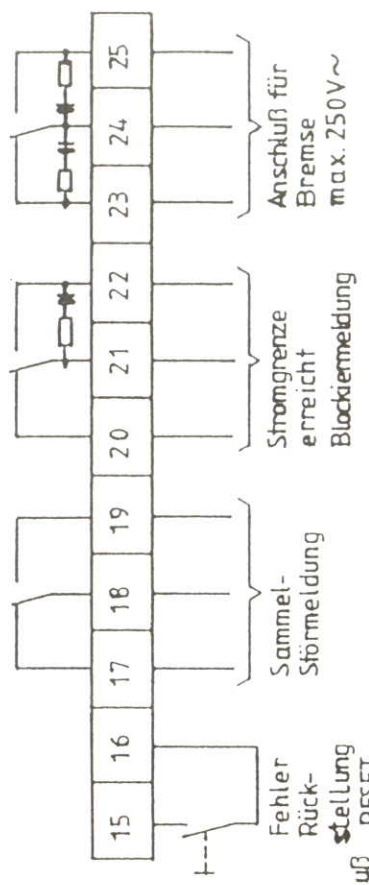
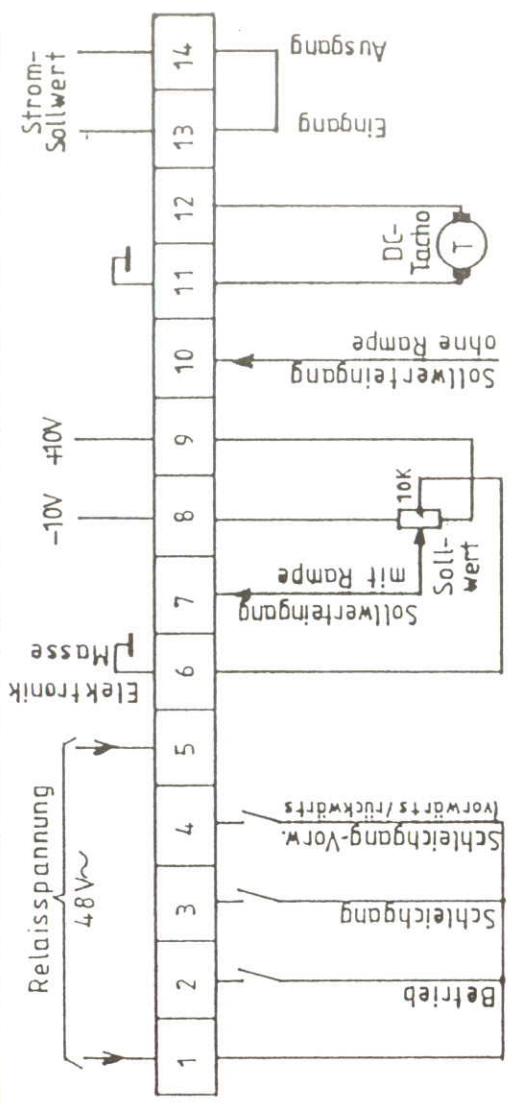
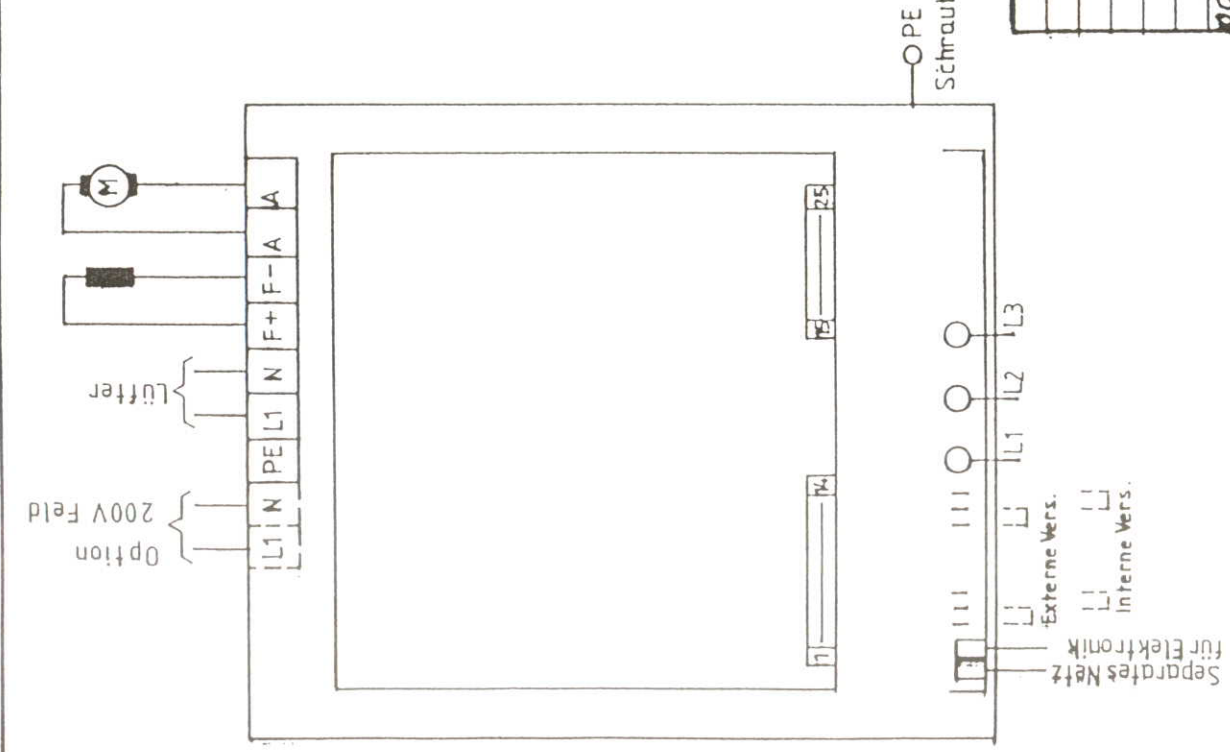


- 4.) Preselect the correct supply voltage for the electronic circuit, refer to drawing 704 11 S1, 115 10 S1,115 10 A1
- 5.) Basic control settings (DO NOT CHANGE SETTING OF SEALED CONTROLS!):
 - P 1 centre position; P 2 centre position; P 3 fully clockwise;
 - P 4 fully counter clockwise; P 5 fully counter clockwise and then 90 - 180 degrees clockwise; P 7 centre position; P 8 fully clockwise; P 9 fully clockwise and then turn back 90 degrees; P 10 centre position; P 11 centre position; P 12 fully counter clockwise; P 14 fully clockwise.

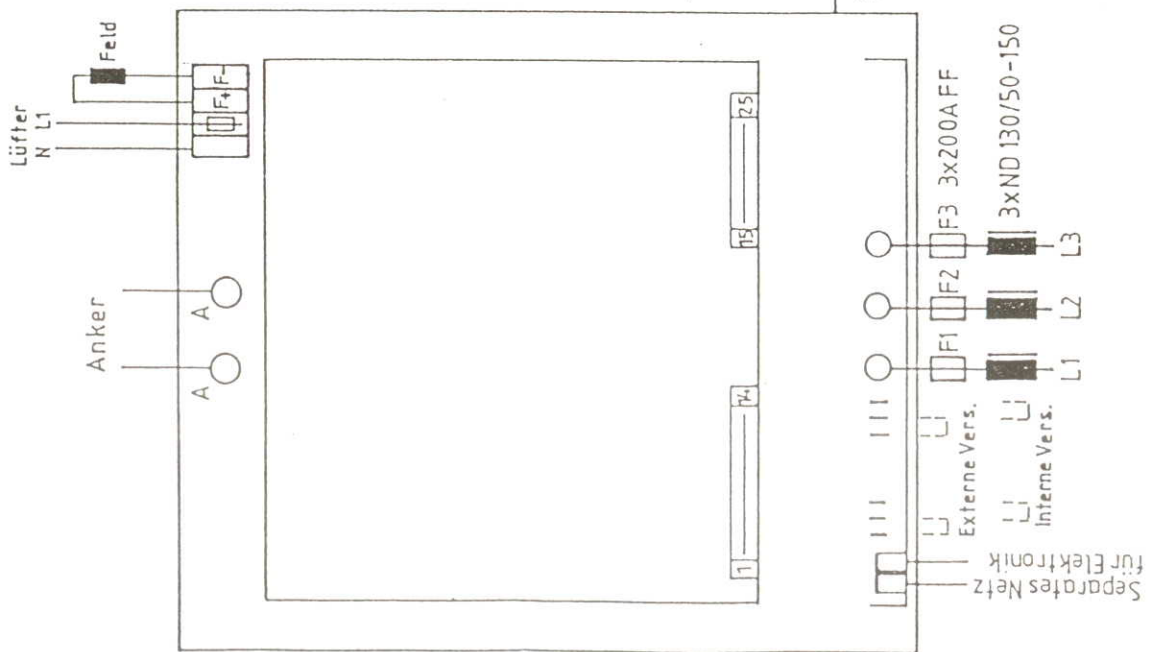
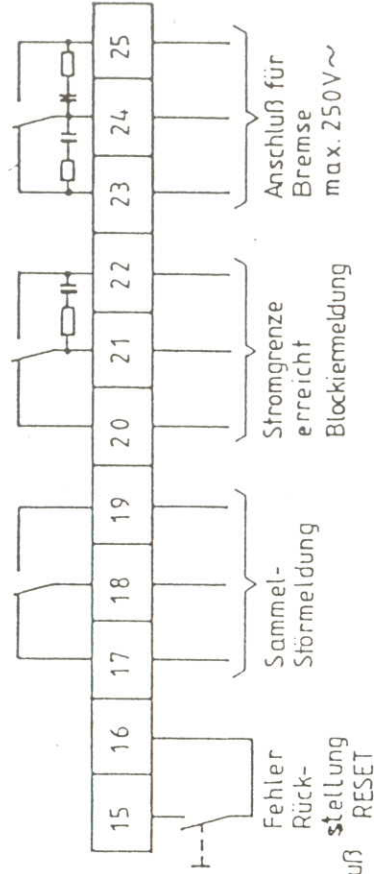
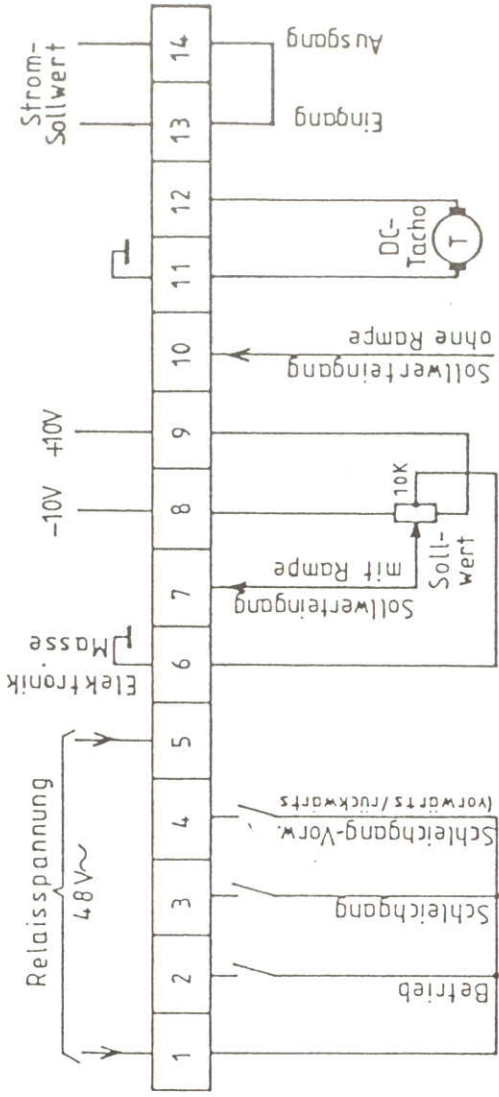
- 6.) Switch on line supply voltage.
A brief switching of the relays will be noticed and also the LED's LED 11, LED 12, LED 13, and LED 17 (red) will briefly light up.
The LED's : LED 4, LED 7, LED 9 and LED 15 (green) will light up.
In case any red LED remains on, then check for the fault accordingly.
 - 7.) Check for the correct reference signal voltage ± 10 V (terminals 8/9) with reference to the common connection of the electronic circuit (terminals 6/11/16).
Set reference value at input terminal 7 or terminal 10 to 0 Volt (< 10 mV) and connect jumper bridge II with the used input terminal.
 - 8.) Adjustment of the current limit:
Switch off line supply, disconnect field (short circuit the leads from the field, DO NOT SHORT CIRCUIT THE FIELD CONNECTIONS ON THE UNIT !), block the motor and switch off the field control (change jumper bridge). Connect Amperemeter to armature circuit.
Switch on line supply and release drive. Preselect reference value with potentiometer P 1. The current will decrease if this potentiometer is turned clockwise. The adjusted current refers to both directions of rotation.
 - 9.) Adjustment of the I x R compensation:
Check for an approximate equal speed with and without motor load in the lower speed range.
If the potentiometer is turned clockwise the speed under load will increase. If the potentiometer is set too high then the drive will become unstable !
 - 10.) Jog speed:
Switch off operation and switch on jog speed.
Adjust P 12 for the requested speed.
The direction of the rotation can be reversed by using the additional terminals 1 - 4.
 - 11.) If the drive runs unstable the machine can be adapted to the drive by adjusting potentiometer P 5 (n-Stability).
- b.) Tachometer feedback control:
- 1.) Check all connections with an Ohmmeter for short-circuit to ground.
 - 2.) Preselect the maximum possible tachometer voltage with the DIP switch S 1 , (5,6 and 7 must be open)

all switches open	: 220 V max.
Switch 2 closed	: 160 V max.
Switches 2 and 3 closed	: 110 V max.
Switches 2, 3 and 4 closed	: 70 V max.

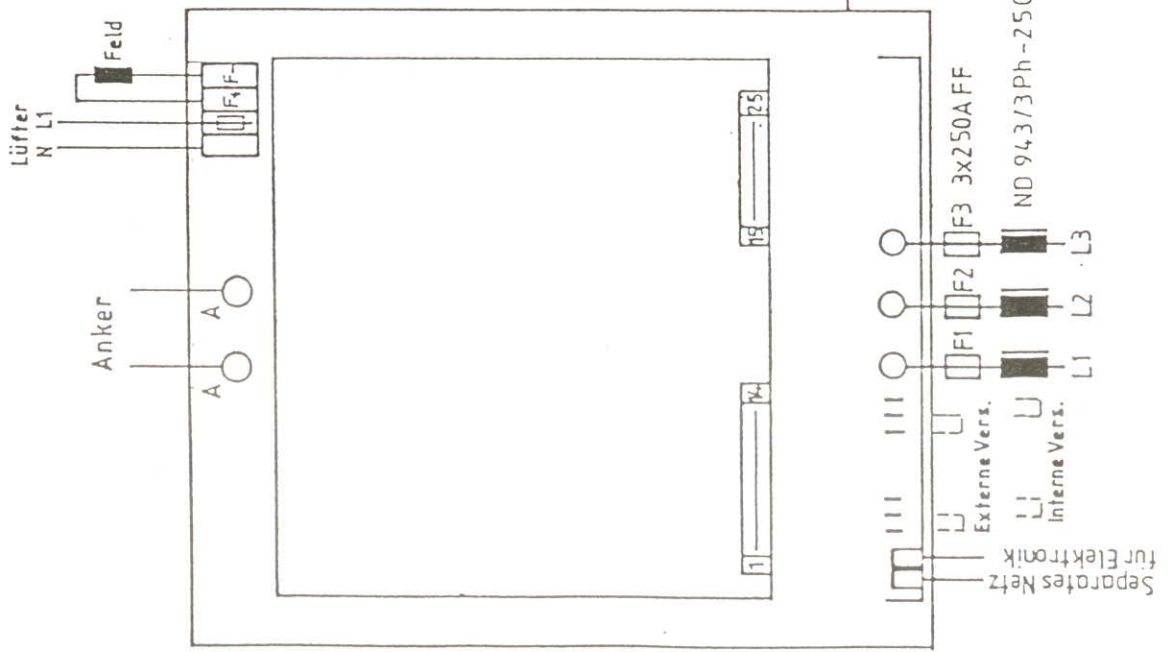
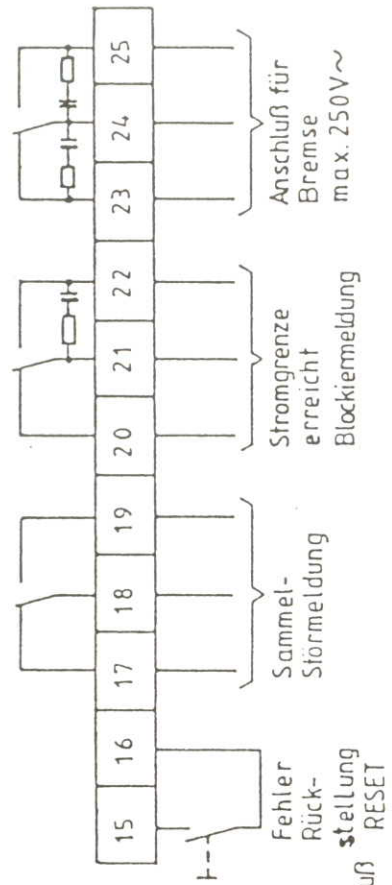
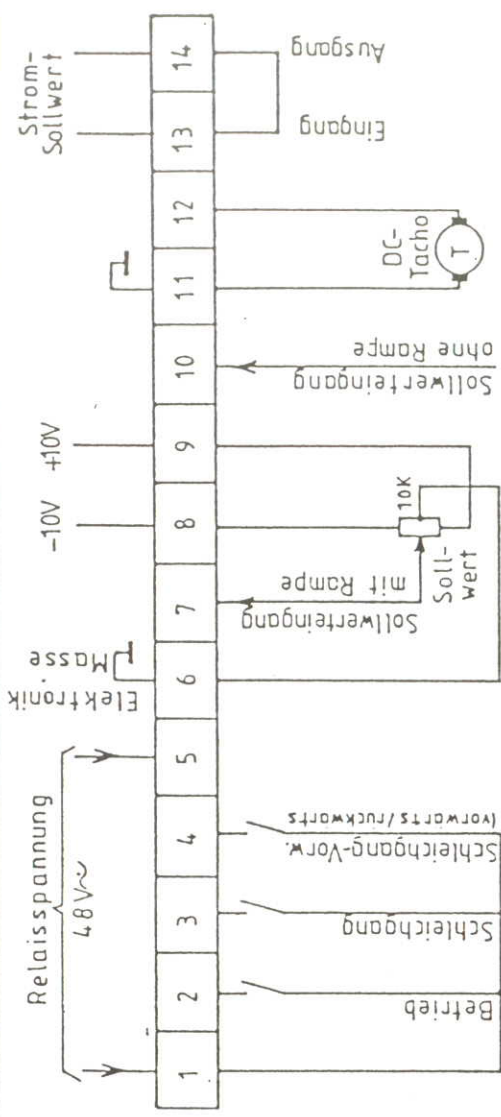
When tachometer feedback control is utilized the electronic circuit will have no potential, providing the switches 5,6 and 7 of the DIP switch S1 are open.
 - 3.) For all further adjustments refer to the adjustments as previously described for the armature feedback control



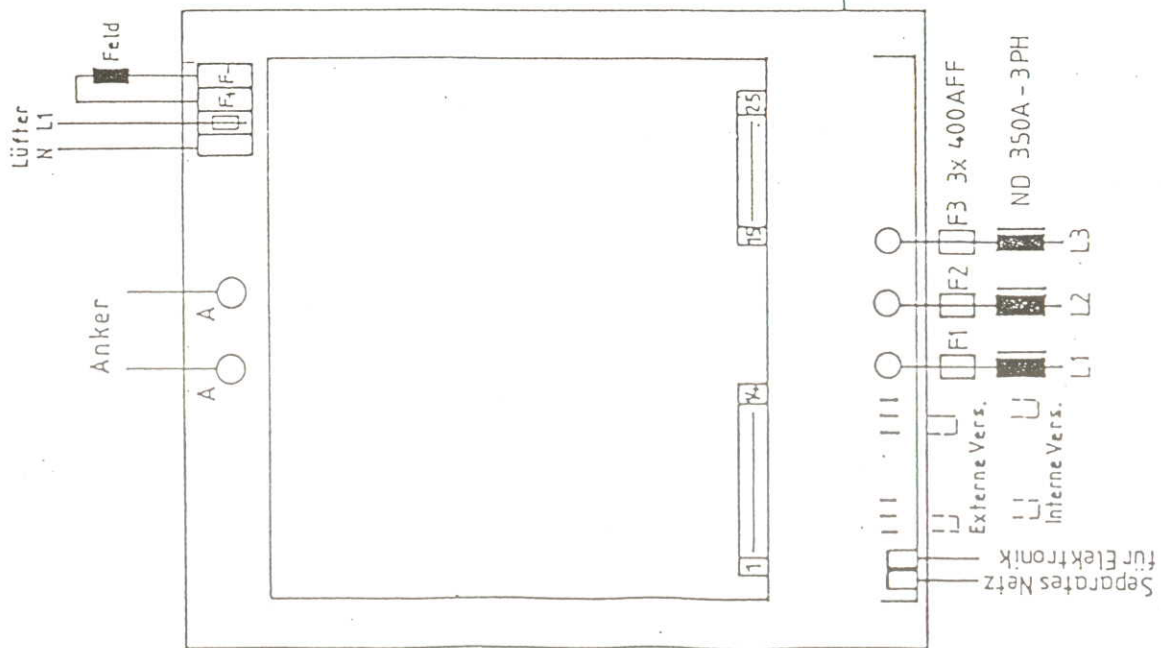
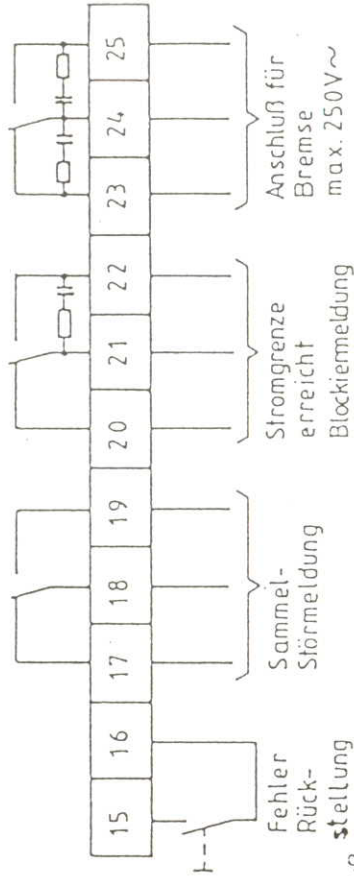
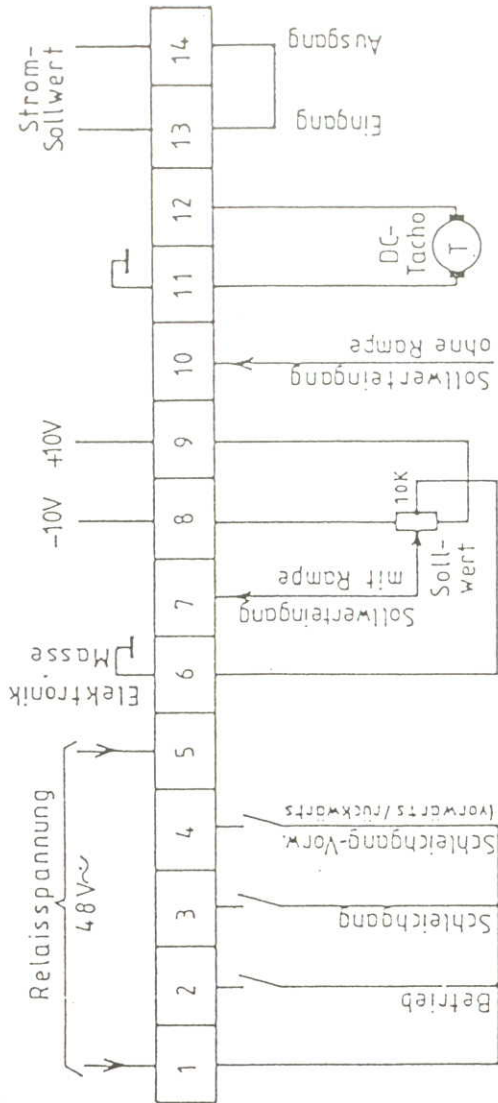
TAE Antriebstechnik	
Bearb	21.1.89
Gepr	
Norm	
Meldest	
Benennung	Anschlußbild
Zeichnungs-Nr. (Konmissions-Nr.)	11510 A1
And-Nr.	TA-15...40/4Q-6P
Datum	21.1.89
Name	
00290	20.2.90
002389	29.9.89
001787	29.6.89
002687	3.11.87
00002	2.12.87
And-Nr.	Datum
	Name



TAE Antriebstechnik			
Zeichnungs-Nr. (Kommissions-Nr.)		16010 A1	
Anschlußbild		TA - 60/4Q-6P	
Maßstab		Benennung	
Bearb	Datum	Name	
Gepr	21.1.89		
Norm			
And-Nr.	Datum	Name	
00001	29.9.89		



TAE Antriebstechnik		Zeichnungs-Nr. (Kommissions-Nr.) 18007 A1	
Anschlußbild TA -100/4Q-6P		Blatt	
Benennung		Blatter	
Datum	Name	Blatt	
21.1.89	<i>[Signature]</i>	Blatt	
Bearb. Gepr. Norm	Maßstab	Blatt	
		Blatt	
00001	29.1.89	Blatt	
And-Nr.	Datum	Blatt	
		Blatt	
	Name	Blatt	
	<i>[Signature]</i>	Blatt	



TAE Antriebstechnik

Zeichnungs-Nr.
(Kommissions-Nr.)

18020 A1

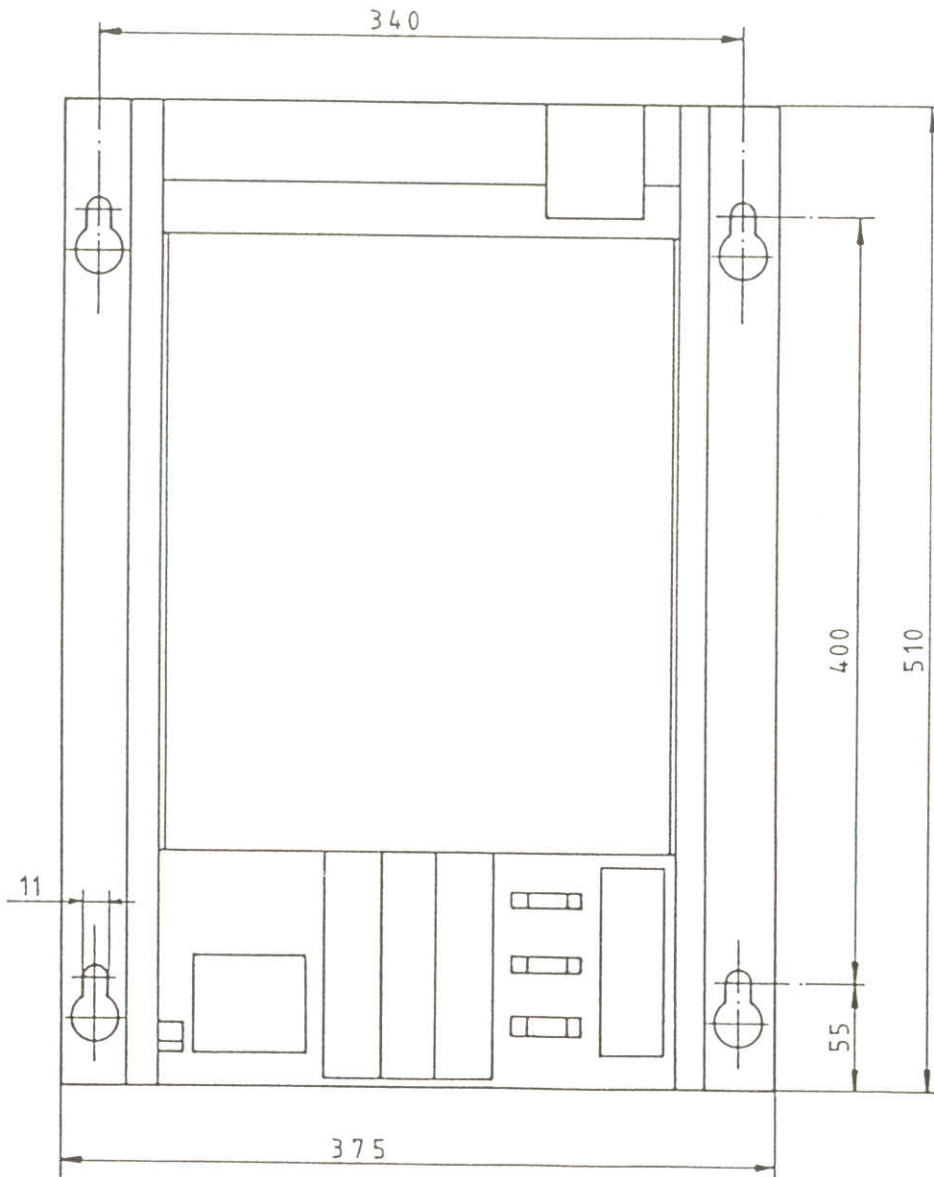
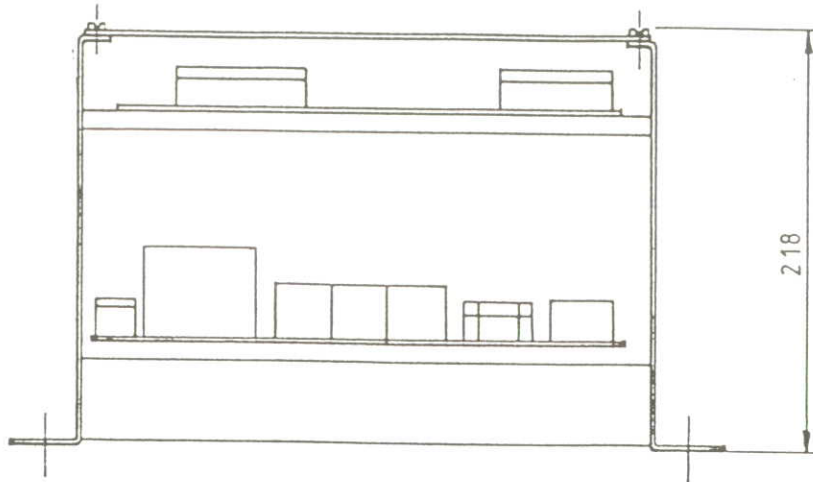
Anschlußbild
TA-150/4Q-6P

Datum	Name
14.6.95	Alb
Gepr	Alb
Norm	11
Maßstab	Benennung

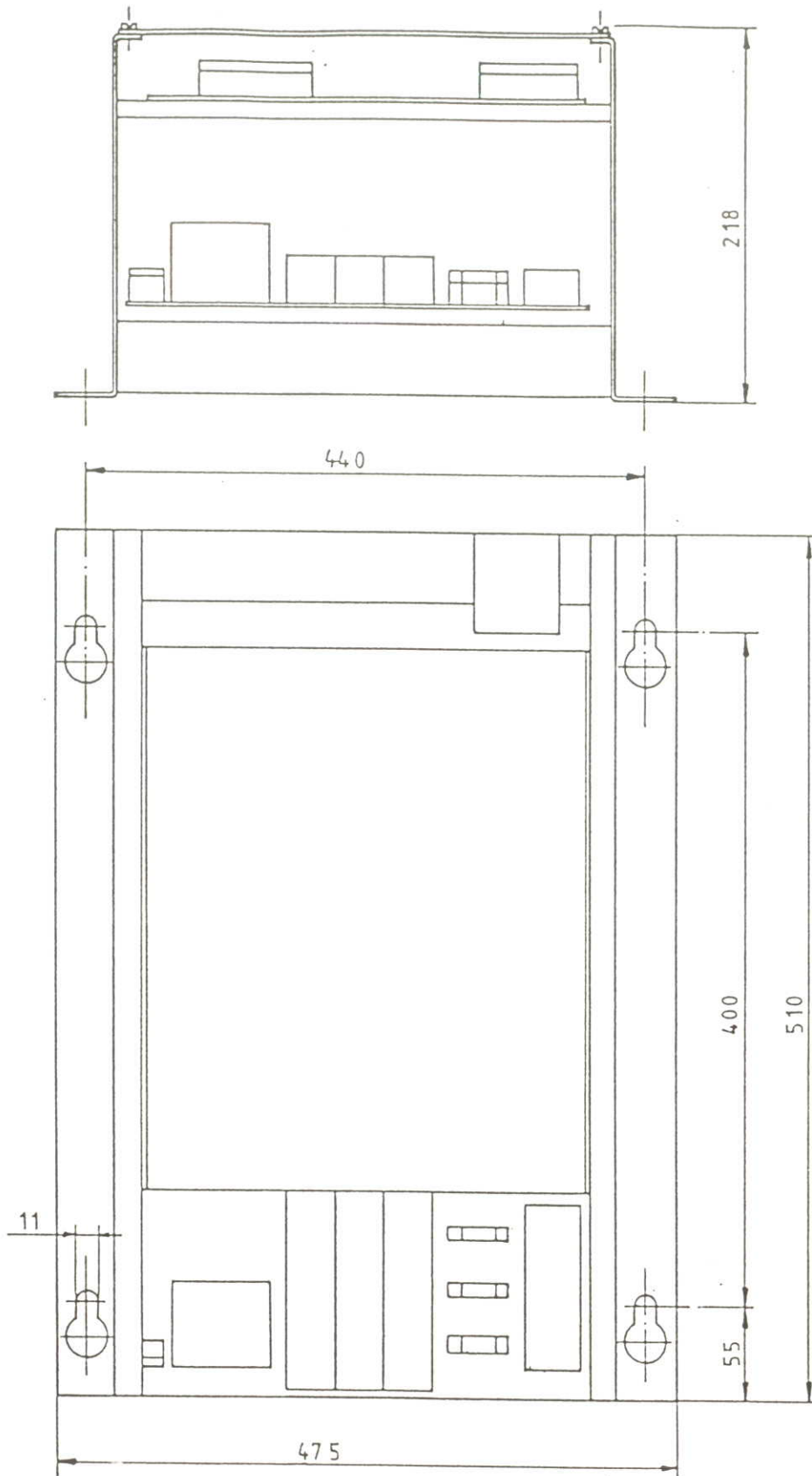
00001	14.6.95	Name
Änd.-Nr.	Datum	Name

Blatt

Blatt

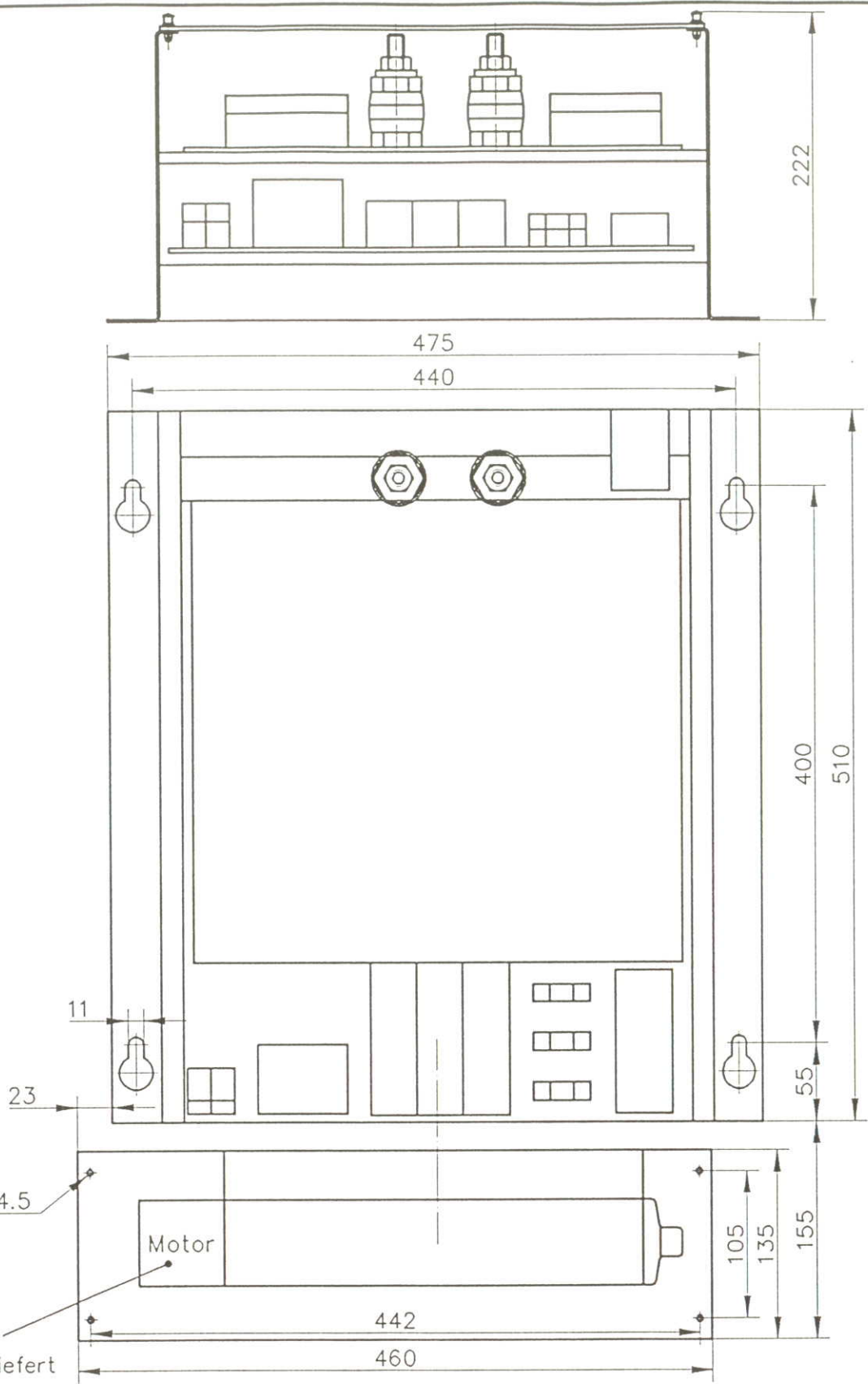


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		Gepr.			
		Norm			
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			TA-15...60/4Q-6P		
			Maßblatt DIMENSIONS		115 10 M1
00002	23.2.87	<i>Re</i>			
Änd-Nr.	Datum	Name			

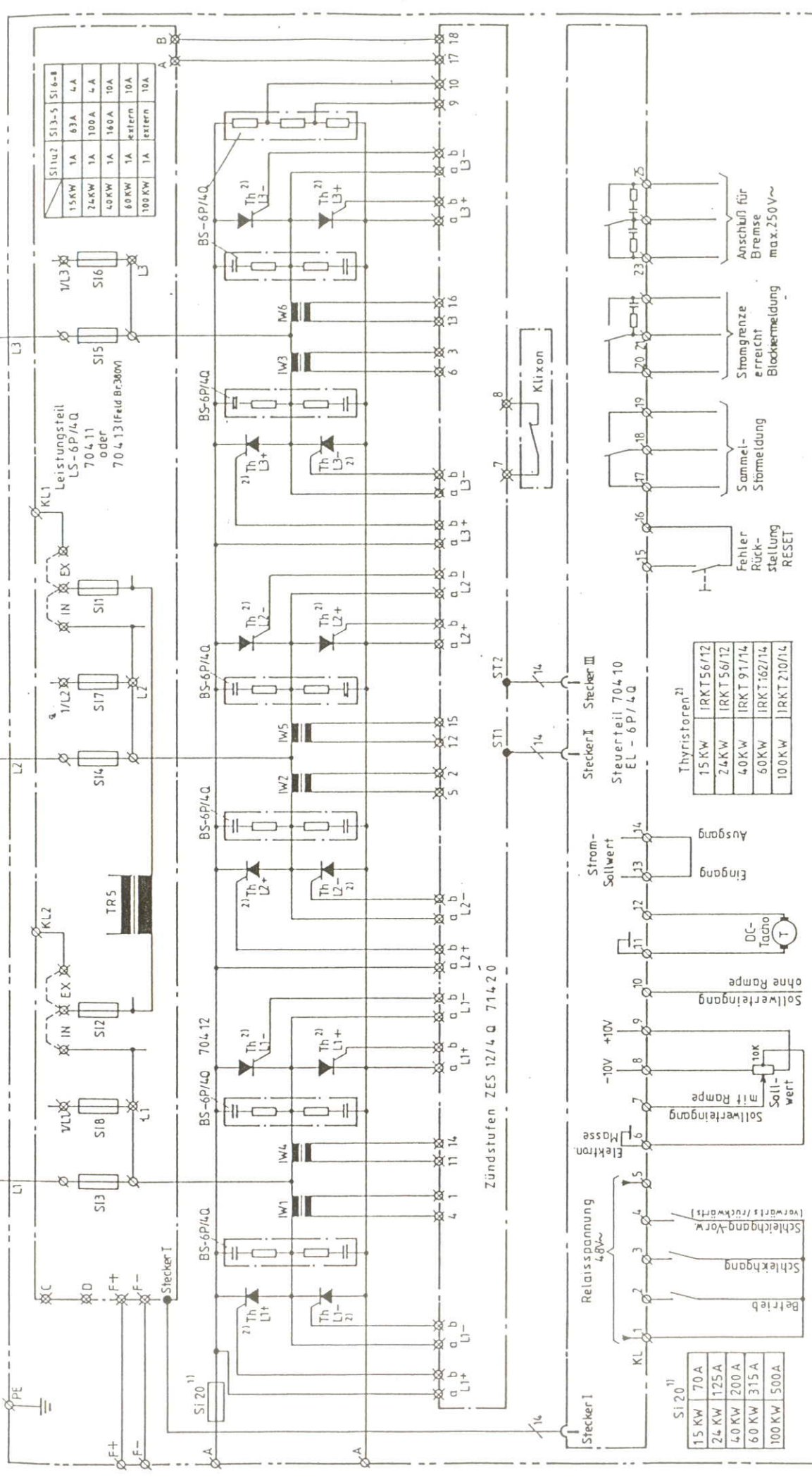


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		Bearb.	15.2.86	<i>Re</i>	
		Gepr.			
		Norm			
		Maßstab	Benennung		Zeichnungs-Nr. (Kommissions-Nr.)
			TA- 100 /4Q-6P		18007 M1
			Maßblatt DIMENSIONS		
00001	23.2.37	<i>Re</i>			
Änd-Nr.	Datum	Name			Blatt
					Blätter

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				Datum	Name	TAE Antriebstechnik
			Bearb.	30.05.95	PP	
			Gepr.			
			Norm			
			Maßstab	Halbzeug, Werkstoff, Ausgangsteil		Bezeichnung: TA-150 / 4Q-6P Maßblatt/Diensions
			—	Oberfläche		
			Maße ohne Toleranzang.	—		Zeichnungsnummer: 18020 M1
00002	23.06.95		—	Ersatz für	Änd.-Nr.00001	
Änd.-Nr.	Datum	Name	—	Ersetzt durch		Blatt: 1 Blätter: 1



SI 11 u2	SI 13-5	SI 16-B
15 KW	1A	63 A
24 KW	1A	100 A
40 KW	1A	160 A
60 KW	1A	extern
100 KW	1A	extern

Thyristoren ²¹⁾	15 KW	IRKT 56/12
	24 KW	IRKT 56/12
	40 KW	IRKT 91/14
	60 KW	IRKT 162/14
	100 KW	IRKT 210/14

SI 20 ¹¹⁾	70 A
	125 A
	200 A
	315 A
	500 A

TAE Antriebstechnik

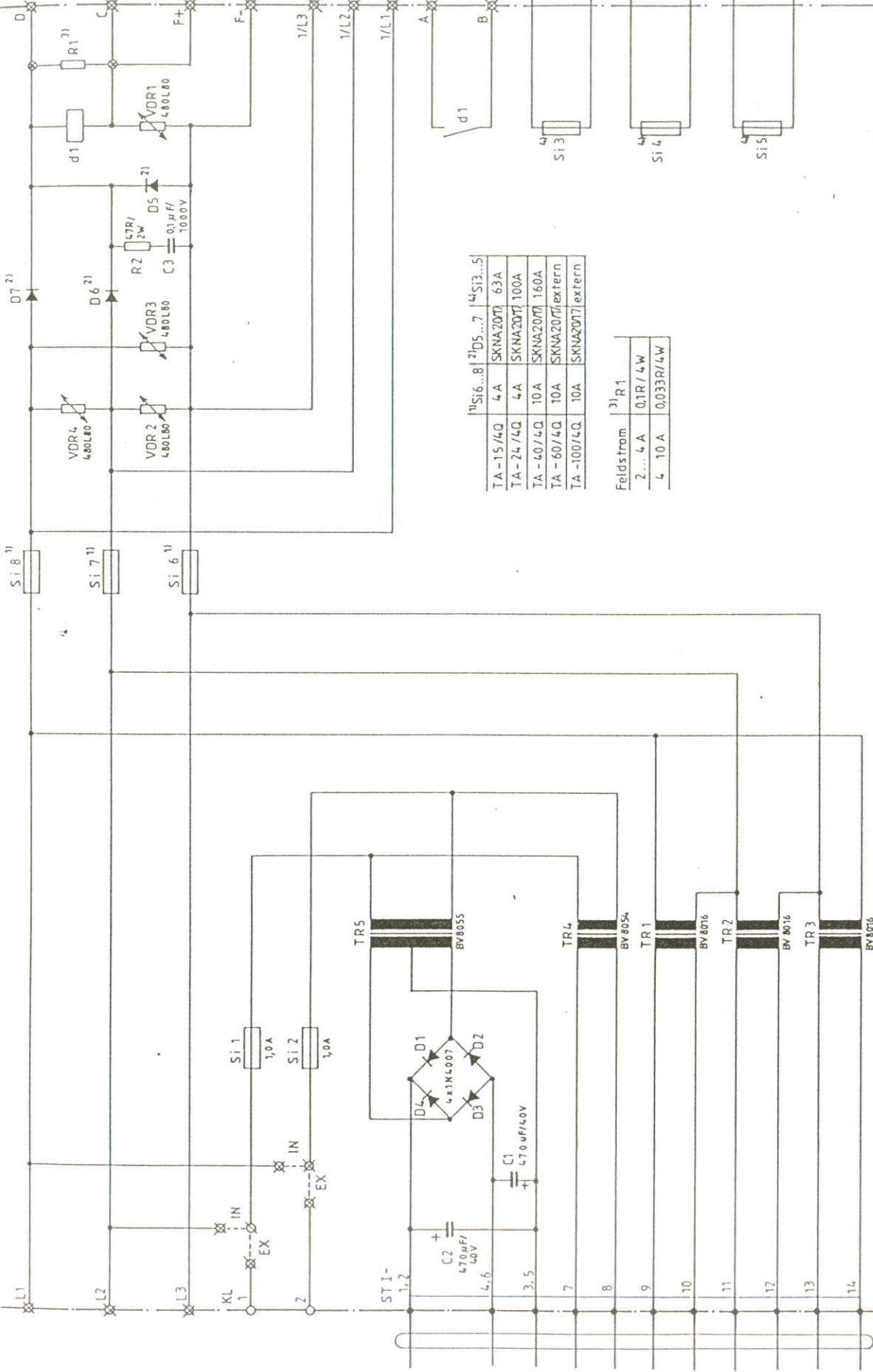
Hierzu 11510A1, 70410 S1, 70411 S1, 70412 S1, 71420 S1, 70413 S1

Bearb.	Gepr.	Datum	Name	Benennung
		3.2.77		TA-15...100/4Q-6P

Zerchnungs-Nr.
(Kommissions-Nr.)

11510 S1

Blatt | Blätter



¹⁾ Si6...8	²⁾ DS...7	⁴⁾ Si3...5
TA-15/4Q	4 A	SKNA207
TA-24/4Q	4 A	SKNA207
TA-40/4Q	10 A	SKNA207
TA-60/4Q	10 A	SKNA207
TA-100/4Q	10 A	SKNA207
		extern

Feldstrom	³⁾ R 1
2... 4 A	0,1R / 4W
4... 10 A	0,033R / 4W

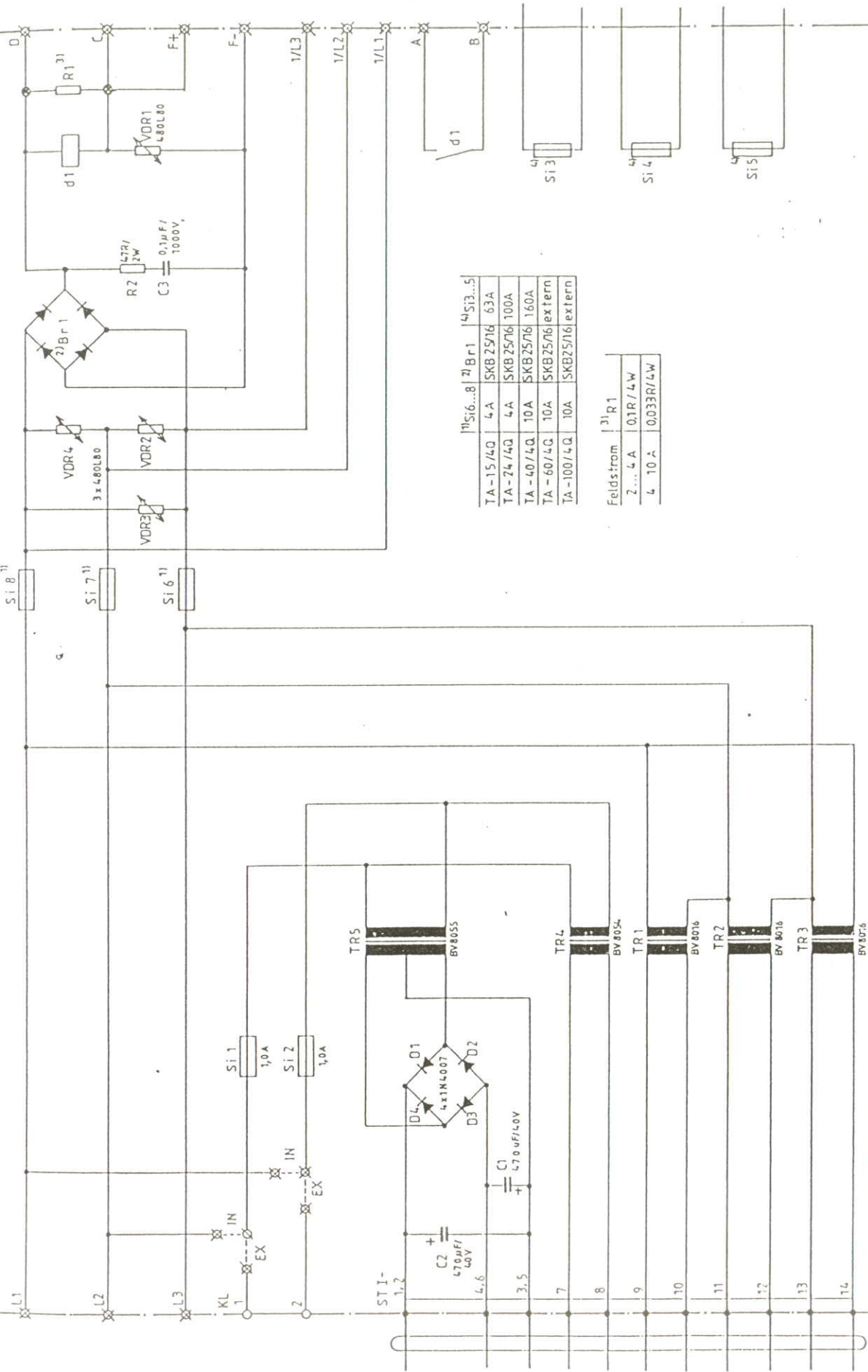
Hierzu 115 10 S1-A1

TAE Antriebstechnik

Beord.	Datum	Name
18.5.87		
Gepr.		
Norm.		
Maßstab	Benennung	
	Leistungsteil LS-6P/4Q	
Zrechnungs-Nr. (Kommissions-Nr.)		
70411 S1		

029 B9	27.11.89	
2992	07.05.87	
0000118.5.87		
And-Nr.	Datum	Name

Blatt | Blatt



1) Si 6...8	2) Br 1	4) Si 3...5
TA-15/4Q	4 A	SKB 25/16 63A
TA-24/4Q	4 A	SKB 25/16 100A
TA-40/4Q	10 A	SKB 25/16 160A
TA-60/4Q	10 A	SKB 25/16 extern
TA-100/4Q	10 A	SKB 25/16 extern

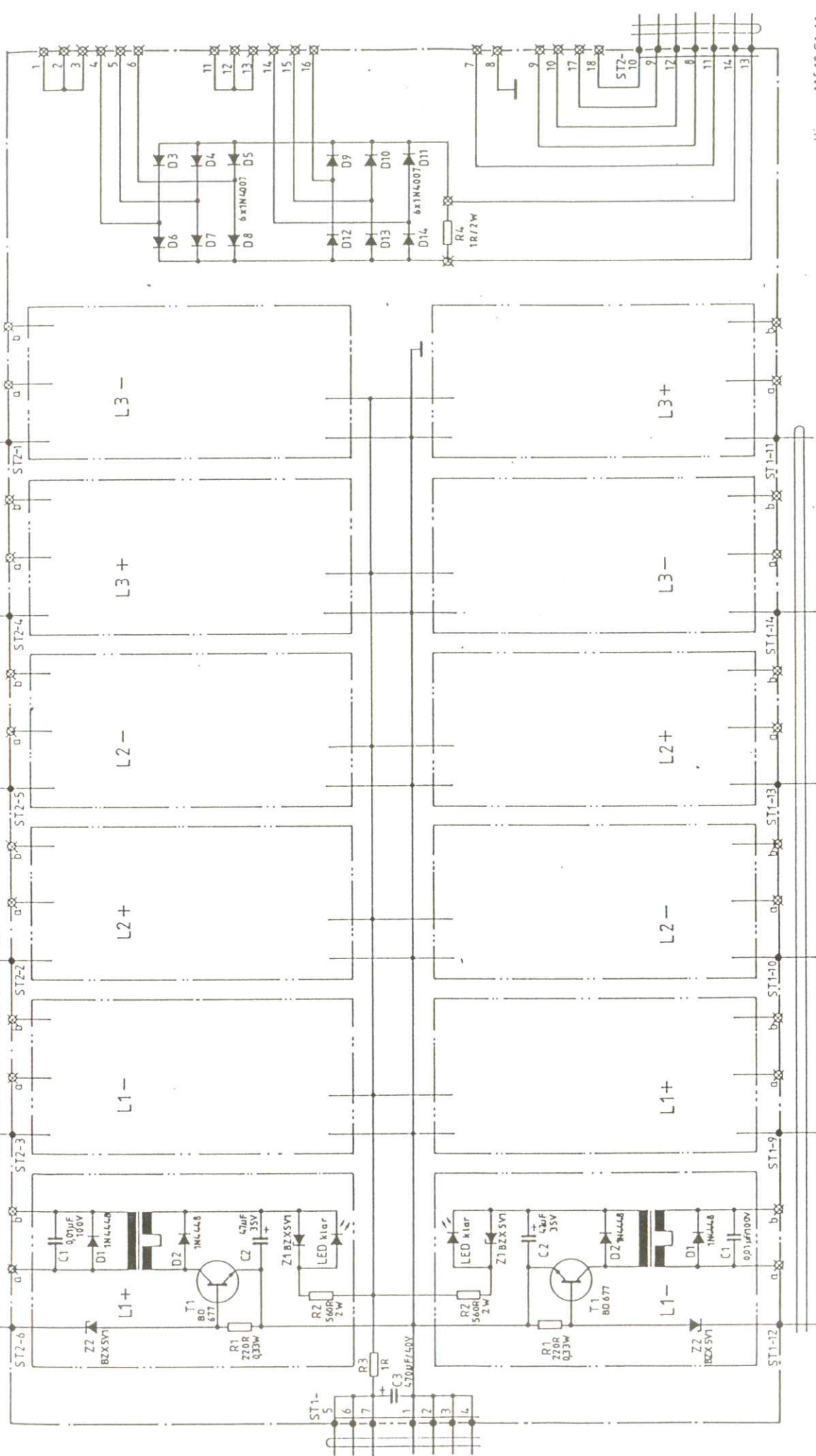
3) R 1	
Feldstrom	
2...4 A	0.1R/4W
4...10 A	0.033R/4W

Hierzu 115 10 S1-A1
TAE Antriebstechnik

15.82	Datum	Name
Bearb.	6.6.87	
Gepr.		
Norm.		

KabStac:
 dienennung:
 Zeichnungs-Nr (Kommissions-Nr):
 704 13 S1
 Leistungsstück
 LS-6P/4Q
 Feld-Brücke (380V)

Ant-Nr	Chlor	Name
029891	20.11.89	
029892	20.11.89	
0000	6.6.87	



Hierzu 11510 S1, A1
 TAE Antriebstechnik
 Zeichnungs-Nr.
 (Kommission-Nr.)
 714 20 S1
 Blatt / Blätter

Beord.		Datum		Name	
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Gepr.		Norm.		Bemerkung	
Maßstab:		—		Zündstufen ZES-12/4Q	
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00004	19.5.67				
Ano.-Nr.	Datum	Name			

Potentiometer Positionen

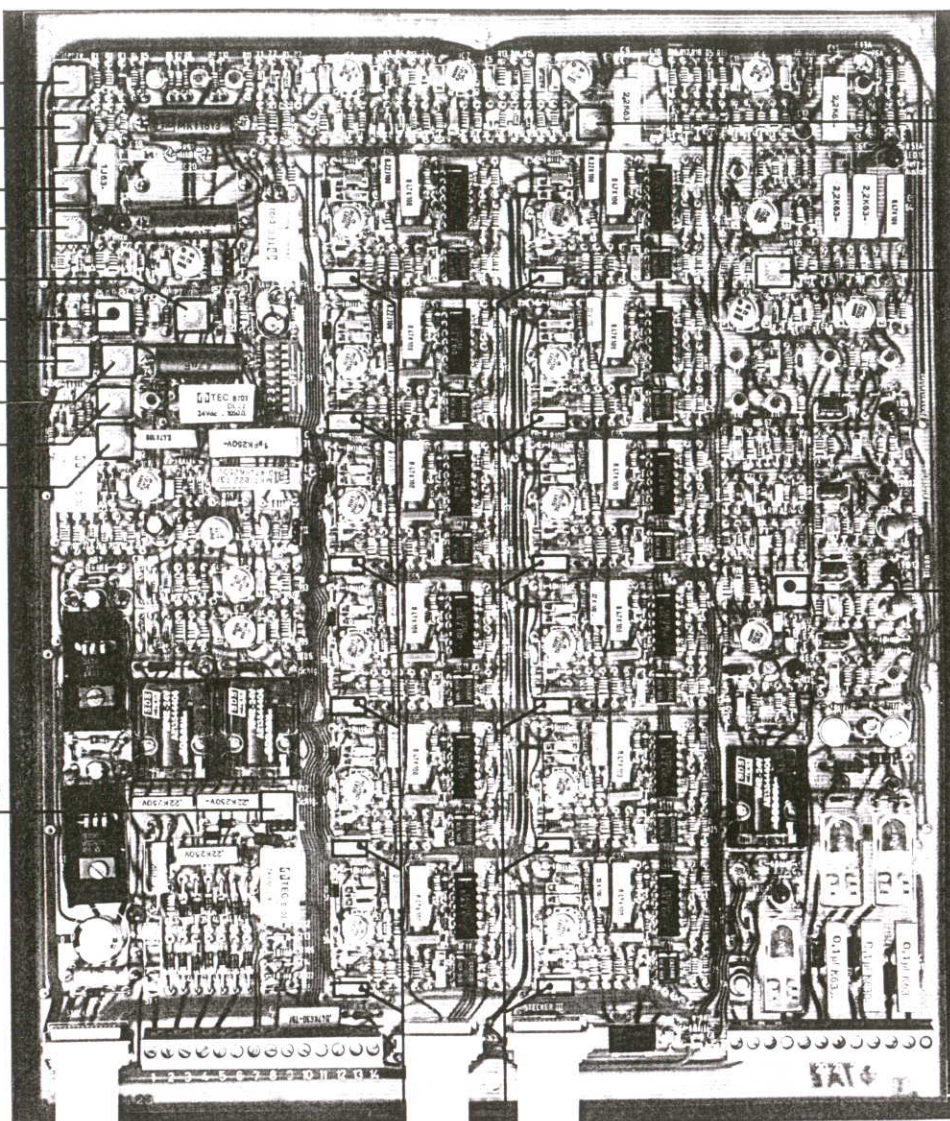
- Stromgrenze P 1
- I-Stabilität P 2
- I x R-Comp. P 4
- n-Stabilität P 5
- n-Nullpunkt P 6
- max.Drehzahl P 7
- Stabilität 2 P 8
- Stabilität 1 P 9
- Rampe P10
- Rampe P11

P 3 Abfallzeit

P14 Abschaltzeit
für Netzausfall

P15 I-Nullpunkt

Schleichgang P12



Phasenbalance
P13

Achtung!
Werkseinstellung, darf nicht verändert werden.

TA 15-100 40