

TA-2 E

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 operating of the drive control.

1. Technical Data

Measurements	:	Refer to drawing TA-1 / TA-4 0680
Line Voltage	:	230 V a.c., 50/60 Hz ; 380 V a.c., 50/60 Hz
Power	:	2 kW ; 3 kW
Armature Voltage	:	180 V ; 270 V
Armature Current	:	15 A ; 20 A
Field Voltage	:	210 V ; 340 V
Field Current	:	0,5 A max.
Ambient Temperature	:	0°C to +40°C
Speed Accuracy	:	3% with armature feedback 1% with tachometer feedback

Semiconrolled single phase bridge, inner loop current regulator, acceleration integrator.

2. Connection of drive control (refer also to drawing TA-2E 0482; 0883)

Ensure that the voltage indicated on the type marking of the unit corresponds with your a.c. line voltage.

Terminal Strip KL 1

1 - 2	a.c. input, voltage according to type-marking on unit, frequency 50 Hz or 60 Hz. Terminal 1 - Phase, Terminal 2 - neutral.
3 - 4	Armature, terminal 3 positive (+), terminal 4 negative (-).
5 - 6	Field winding, terminal 5 positive (+), terminal 6 negative (-).
7 - 8	Drive release, drive is released when contacts are closed.
12	Signal input (positive) without acceleration. Input voltage depends on rating of resistor R 31, however max. voltage 150 V d.c. Input current approx. 0,32 mA at max. speed. R 31 is calculated as follows: $R 31 \text{ in kOhm} = 3 \times UE - 30$ The speed potentiometer must be disconnected if input terminal 12 is used.

13 - 14

d.c. tachometer, terminal 13 common ground, terminal 14 negative (approx. 170 V at rated motor speed).

9 - 10 - 11

Speed potentiometer, connect center to terminal 10, start to terminal 11 and end to terminal 9. This potentiometer enables an infinite variable adjustment of the motor from minimum to maximum speed.

3. Drive control adjustment

Max. speed	P 3	Adjustment of maximum speed during operation, (set speed control fully clockwise).
Min. speed	P 1	Adjustment of minimum speed during operation, (set control fully counter clockwise).
Acceleration rate	P 2	Adjustment for linear acceleration of motor from minimum to maximum speed (adjustable from 2 sec to 20 sec.).
I x R Compensation	P 4	This control enables to compensate for the voltage drop in the armature and in the supply line when armature feedback is utilized. <u>This potentiometer must be set fully counter-clockwise when tachometer feedback is used.</u>
Current limit	P 5	Adjustment of the requested armature current. Max. permissible armature current : 15 A
Stability	P 6	With this potentiometer the drive is dynamically adapted to the load.

4. Indicator lamps

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

a) Drive release	yellow	LED 1
b) Power ON	green	LED 2
c) Current limit, over-speed	red	LED 3

5. Functional tests and preliminary adjustments before operating

a) Armature feedback control (UA-control)

1. Check all connections with an Ohm-meter for grounds.
2. Install R 18 (470 kOhm ; 750 kOhm respectively).
3. Check if your line voltage corresponds with marking on unit.
4. Check field-resistance between terminals 5 and 6 with an Ohm-meter, Resistance must read at least 400 Ohms (it might be necessary to reverse the polarity of the Ohm-meter leads).
5. Potentiometer P 1 Minimum speed , set fully counter clockwise
Potentiometer P 2 Acceleration rate, set in center position
Potentiometer P 4 I x R compensation, set fully counter clockwise
Speed potentiometer set fully counter clockwise
6. Switch on line voltage, the green diode LED 2 must now light up.
7. Switch on drive, the yellow diode LED 1 (drive release) will now light up.
8. Check the field voltage at terminals 5 (+F) and 6 (-F) with a multi-meter (moving coil type, min. 333 Ohms/V), should read 200 V. Measure voltage at potentiometer terminals 9 and 11 (+15 V). When turning the speed control clockwise, the armature voltage (and motor speed) will rise. With speed control turned fully clockwise adjust P 3 for the requested armature voltage (motor speed). Now turn speed control fully counter clockwise, the output voltage will drop back to 0 V, adjust potentiometer P 1 (minimum speed) for the requested minimum speed.
9. Adjust I x R compensation potentiometer P 4. Check for an approximate equal speed with and without motor load in the lower speed range. When the potentiometer is turned clockwise, the speed under load will increase. If the compensation potentiometer is set too high the drive will become unstable!
10. Current limit. For checking the current limit disconnect the motor field and block the motor. Switch on drive, preset a reference signal (speed) and adjust requested current with potentiometer P 5. (This must cause the red diode LED 3 (current limit) to light up. This adjustment must be performed within 10 sec ! otherwise damage to the commutator is possible.
11. Acceleration rate. Adjust potentiometer P 2 for the requested acceleration time. Turning this control clockwise will increase the acceleration rate

b) Tachometer feedback control

1. Check all connections with an Ohm-meter for grounds.
Remove jumper I from circuit.
2. For all further adjustments refer to the adjustments as described for the armature feedback control, however potentiometer P 4 (I x R compensation) must be set fully counter clockwise.
Tachometer adaption is performed with R 18.

6. Troubleshooting

For fast and effective troubleshooting proceed as follows:

Check drive for:

- a) intermittent or loose connections
- b) defective insulation on connecting leads
- c) defective motor (brushes etc.)

CAUTION !

Do not use any Megohm-meter, buzzer or similar test instruments.
Test instruments must be galvanically separated from the a.c. line.
The electronic circuit carries a voltage potential against ground !

Fault location

Sympton

possible causes

Relay d1 is not energized when drive is released, (yellow LED does not light up)

- a) check lead connections
- b) control voltage (+ 24 V) is missing; check power supply; LED 2 does not light up.
- c) defective relay

Output voltage does not increase when speed potentiometer is turned up

- a) motor load is too high, drive operates at current limit.
LED 3 (current limit) lights up.
- b) defective speed potentiometer

Drive runs unstable

- a) I x R compensation is set too high.
- b) defective tachometer or tachometer leads.
- c) improper adjustment of stability potentiometer P 6.
- d) auxiliary series winding of d.c. motor is wrong connected.

Speed varies without change of setting of speed potentiometer

- a) current limit is set too low (LED 3 (current limit) lights up).
- b) motor is overloaded (mechanical defect; (LED 3 (current limit) lights up).
- c) defective tachometer or tachometer leads.
- d) defective Thyristor (defective SCR bridge)
- e) defective supply for electronic circuit, +/- 15 V incorrect or missing.
- f) defective speed potentiometer.

Main fuses blow

- a) shorted or grounded armature connections, check Thyristor bridge, check power diodes.
- b) defective motor or armature.

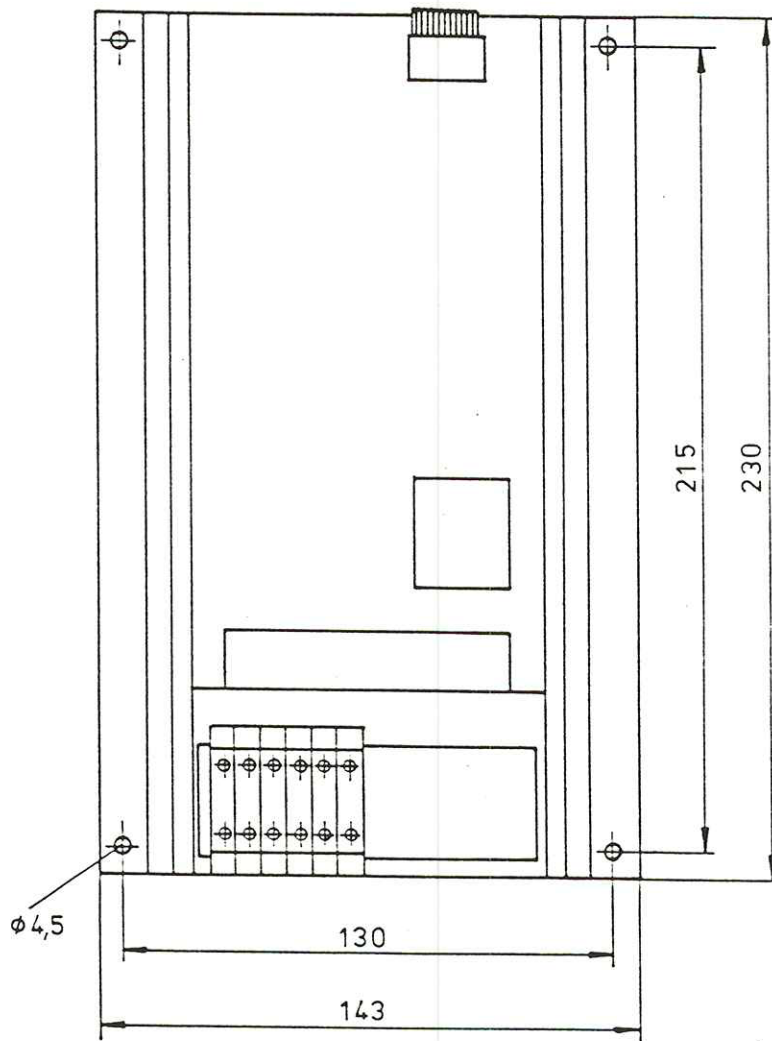
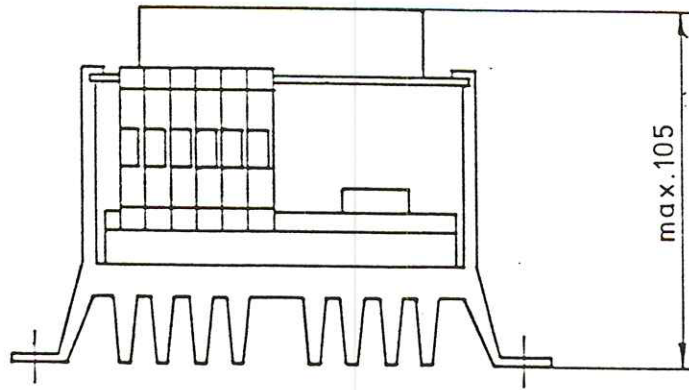
Drive does not run

- a) defective power supply.
- b) check relay and relay function.
- c) defective speed potentiometer.
- d) check motor and motor brushes.

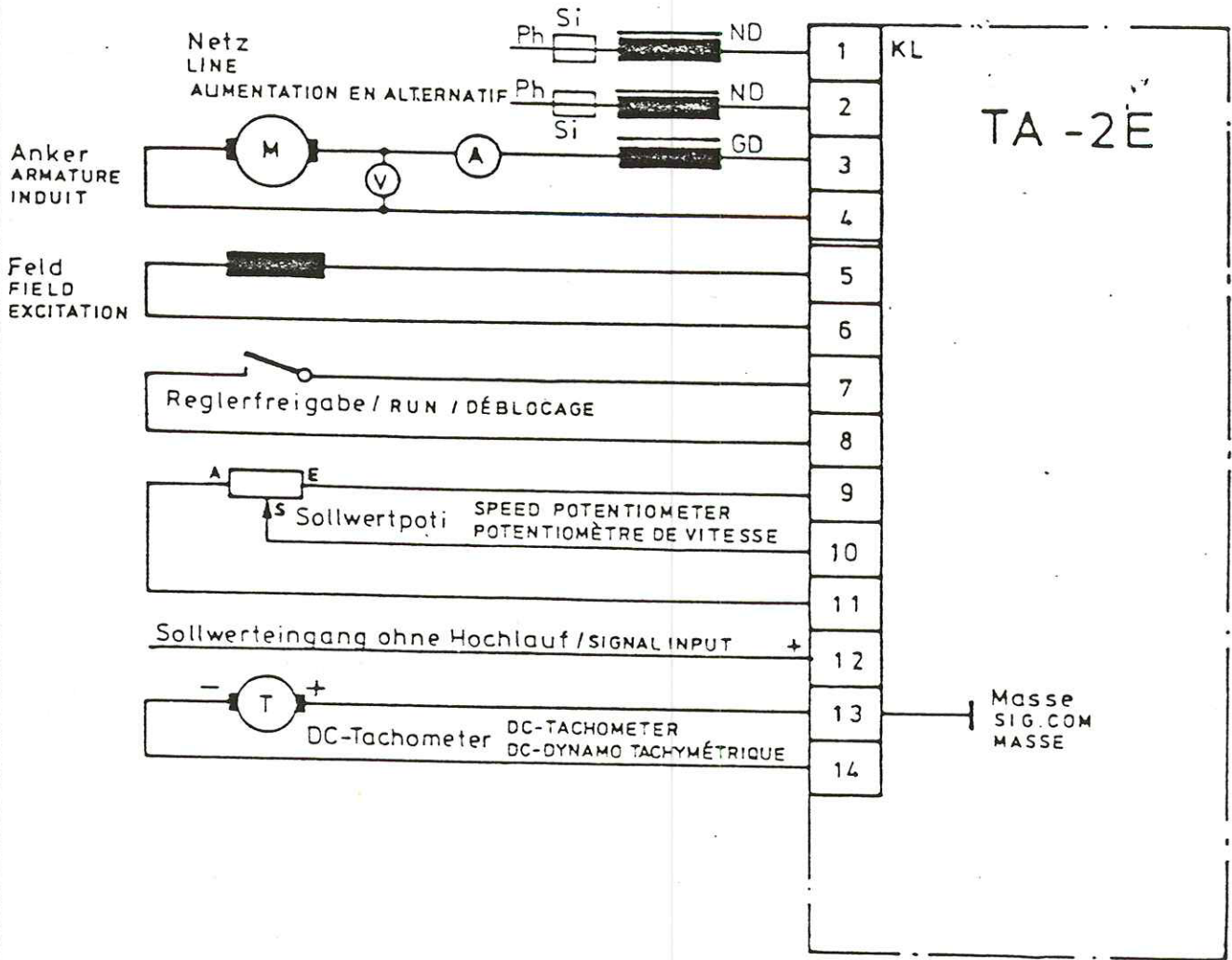
Drive runs at maximum speed when released, however speed control is set in zero position

- a) defective tachometer or intermittent tachometer leads.
- b) check armature connections (feedback).
- c) defective maximum speed potentiometer P 3.
- d) intermittent minimum speed potentiometer P 1.
- e) intermittent speed potentiometer or intermittent lead from terminal 11 to potentiometer.
- f) wrong polarity on tachometer connections (refer to point 13 - 14)

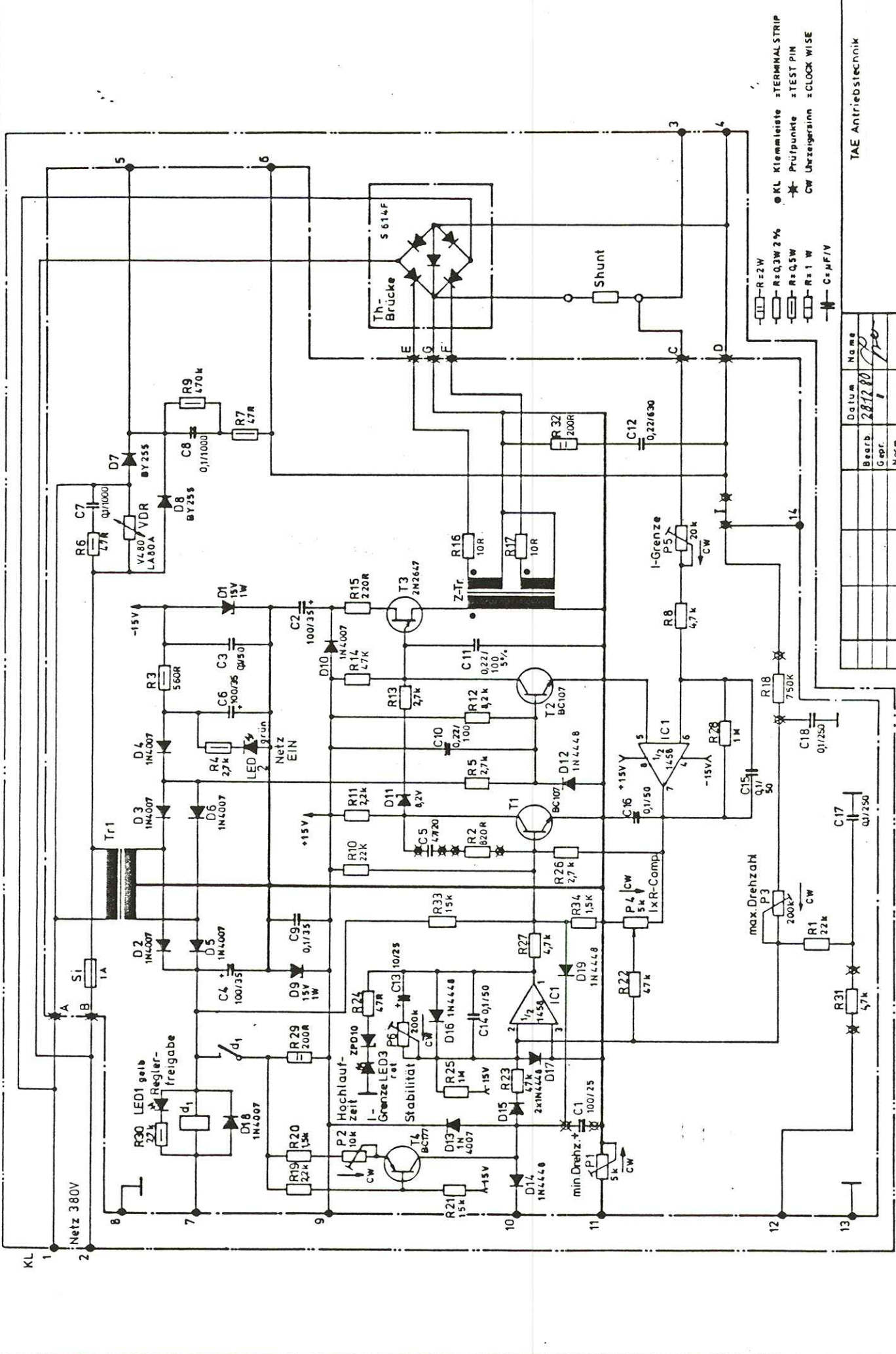
This concludes the preliminary preparation and adjustment of the Thyristor Drive Control Type TA-2E.



			Datum	Name	TAE Antriebstechnik
		Bearb.	16.6.80	<i>[Signature]</i>	
		Gepr.	"	<i>[Signature]</i>	
		Norm			
		Maßstab	Benennung		Zeichnungs - Nr.
		1:2	TA-1/TA-4 Maßblatt DIMENSIONS		TA-1/TA-4 0680 10100 M1
1	16.6.80	<i>[Signature]</i>			
Ausgabe	Datum	Name			



			Datum	Name	TAE Antriebstechnik
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		Gepr		<i>[Signature]</i>	
		Norm			
		Maßstab	Benennung		Zeichnungs-Nr.
			TA-2E Anschlußbild CUSTOMER CONNECTIONS SCHEMA DE BRANCHEMENT		
					TA-2E 0482
					10202 A1
1	7.4.81	<i>[Signature]</i>			
Ausgabe	Datum	Name			



TAE Antriebstechnik

Zeichnungs - Nr. TA-2E 12 82
10202 S1

Benennung TA-2E
380V Anschluss

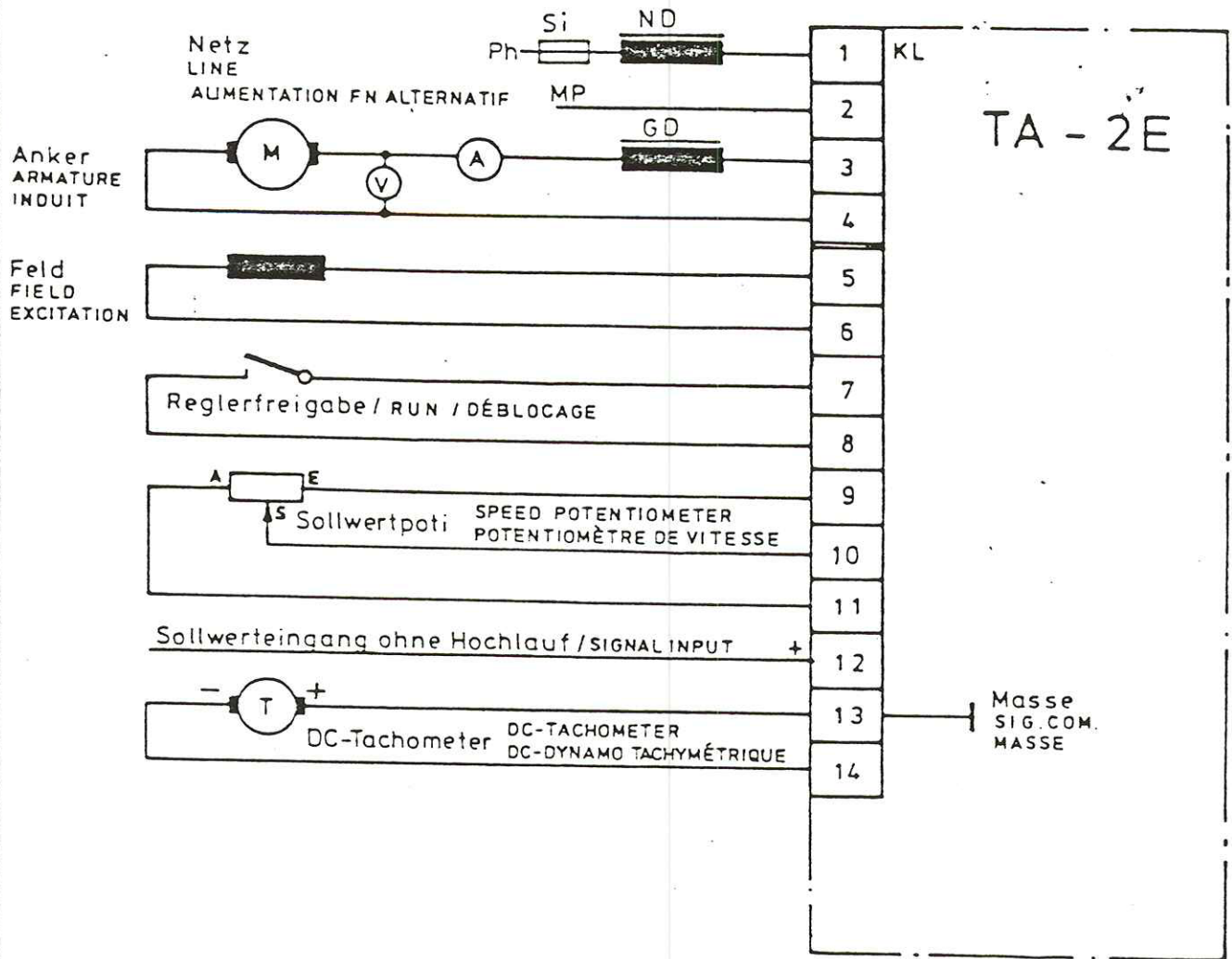
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Norm		Maßstab	
Ausg.		And-Nr.	
3	00884	08.84	
2	00483	22.8.83	
1		28.12.80	
		Datum	Name

KL Klemmleiste = TERMINAL STRIP
 * Prüfpunkte = TEST PIN
 CW Uhrzeigersinn = CLOCK WISE
 — G=MFV

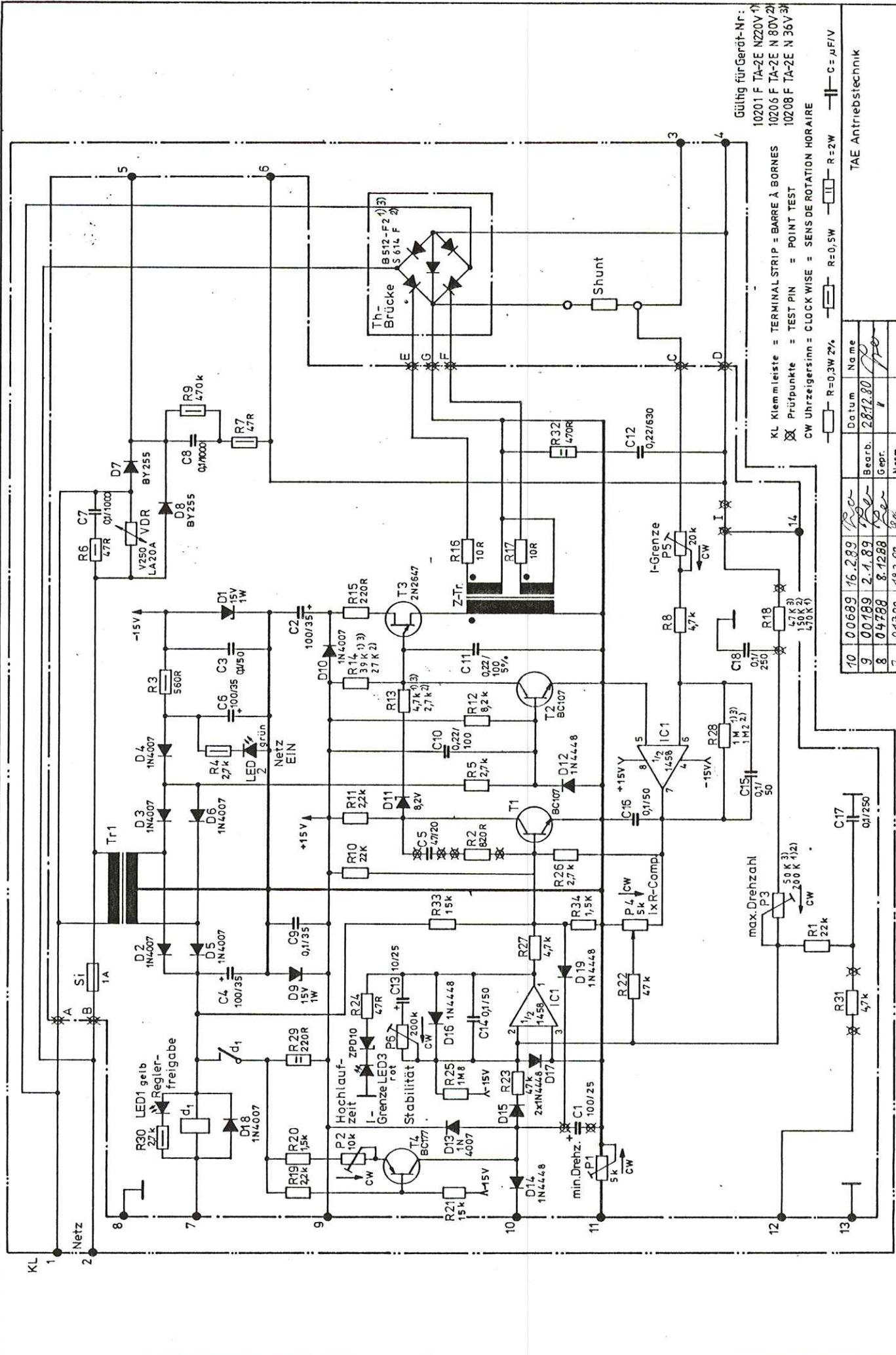
BEZUGSKODIERUNG
 Ozillogramme gemessen gegen Masse (nicht Erde)
 I = Stop
 II = Start (Drehzahl 0)
 III = Start (Drehzahl 50%)
 Wiebildg. 1
 Alle Messungen müssen potentialfrei durchgeführt werden,
 da Masse Spannung gegen Erde führt (Masse = KL / 0 u. 13)

DESIGNATION
 * DÉBRAYAGE DE REGULAEUR
 * VITESSE MIN
 * ACCELERATION
 * VITESSE MAX
 * COMPENS D'INDUCT
 * LIMIT-COURANT
 * STABILITE

DESIGNATION
 * CONTROL RELEASE
 * MIN SPEED
 * ACCEL RATE
 * MAX SPEED
 * IxR COMP
 * CURR-LIMIT
 * STABILITY

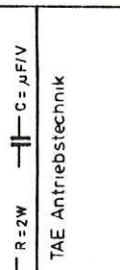


			Datum	Name	TAE Antriebstechnik
		Bearb	17.8.83	<i>[Signature]</i>	
		Gepr		<i>[Signature]</i>	
		Norm			
		Maßstab	Benennung		Zeichnungs-Nr.
			TA-2E		TA 2E 0883
			Anschlußbild		10201 A1
			CUSTOMER CONNECTIONS		
			SCHEMA DE BRANCHEMENT		
1	17.8.83	<i>[Signature]</i>			Ersatz für TA-2E 0482 220V~
Ausgabe	Datum	Name			



Gültig für Gerät-Nr.:
 10201 F TA-2E N220V 1)
 10206 F TA-2E N 80V 2)
 10208 F TA-2E N 36V 3)

KL Klemmleiste = TERMINAL STRIP = BARRE À BORNES
 X Prüfpunkte = TEST PIN = POINT TEST
 CW Uhrzeigersinn = CLOCK WISE = SENS DE ROTATION HORAIRE



TAE Antriebstechnik			
Datum	Name		
10 00689	16.2.89		
9 00789	2.1.89		
8 04788	8.12.88		
7 01788	19.3.88		
6 01085	5.11.85		
5 00884	8.8.84		
4 00483	22.8.83		
3	13.3.83		
2	7.9.82		
1	28.12.80		
Ausg.	And.-Nr.	Datum	Name

Zeichnungs-Nr.
 TA-2E 12 80
 10201 S1

Bezeichnungen:
 Reglerfreigabe
 P1 min. Drehzahl
 P2 Hochlauf
 P3 max. Drehzahl
 P4 IxR Kompensation
 P5 Stromgrenze
 P6 Stabilität

DÉSIGNATION
 = CONTROL RELEASE
 = MIN SPEED
 = ACCEL RATE
 = MAX SPEED
 = IxR COMP
 = LIMIT-COURANT
 = STABILITÉ

REMARKS
 Oszillogramme gemessen gegen Masse (nicht Erde)
 I & St op
 III & Start (Drehzahl 0)
 Vitesse MAX
 COMPENS. INDUIT
 LIMIT-COURANT
 STABILITÉ

Alle Messungen müssen potentialfrei durchgeführt werden,
 da Masse Spannung gegen Erde führt (Masse = KL / 8 u. 13)