

TA-14.1 & 24.1/6P

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

Measurements	:	Refer to drawing TA-14/6P , TA-24/6P
Line Voltage	:	380 V , three phase, 50/60 Hz other voltages on request.
Power	:	14 kW ; 24 kW
Armature Voltage	:	440 V
Armature Current	:	40 A max. ; 70 A max.
Field Voltage	:	200 V ; 250 V ; 340 V according to specifications.
Field Current	:	3 A max.
Ambient Temperature:		0°C to +40°C
Speed Accuracy	:	+/- 3% when armature feedback controlled +/- 0,5% when tachometer feedback controlled

Full controlled three phase bridge, Field current control, Current limit and Tachometer Signal indicator, Electronic circuit galvanically separated from line when tachometer feedback control is utilized. Automatic tachometer-polarity adaption. Acceleration- and deceleration integrator. I x R compensation. Line frequency 50 or 60 Hz.

2. Connection of the drive control (refer to drawing TA-14/6P ; TA-24/6P)

Ensure that your line voltage corresponds to the voltage indicated on the type marking of the unit.

Terminal Strip

L ₁ - L ₂ - L ₃	Three phase a.c. line input; Voltage according to type marking on unit; Frequency 50 or 60 Hz selected with switch on upper P.C.-board.
L1a	Line supply for fan (TA-24) (Phase)
N	Neutral line for fan (TA-24)
A+ , A-	Armature connection
F+ , F-	Field connection (refer to type-marking)
1 - 6	d.c. tachometer connection, terminal 1 positive, terminal 6 negative.
2 - 10	Drive release. If terminals 2 -10 are closed drive is released.
3	Current reference signal input.
4	Current reference signal output.
3 - 4	Terminals must be jumpered for speed control.
5 - 6	Tachometer connection, independent of polarity

7 - 8 - 9

Speed potentiometer. Connect center to terminal 8, start to terminal 7 and end to terminal 9

Whith this control the speed is infinite variable from minimum to maximum speed.

11 - 12 - 13

Change-over contacts (no potential) from drive release relay. Refer to drawing TA-14/6P
TA-24/6P

3. Drive control adjustments:

- | | | |
|-------------------------------------------------------------------------------------------------------------|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| a) Phase ballance | P1 | Adjustment of the triggering angles of the individual Thyristors in order to obtain equal currents for all Thyristors.
These controls are factory adjusted and sealed. |
| b) I x R compensation | P2 | This potentiometer enables to compensate for the voltage drop in the armature and in the supply line when armature feedback control is utilized.
<u>When tachometer feedback control is used the potentiometer must be set fully counter clockwise.</u> |
| c) Current limit | P3 | Adjustment of the requested max. armature current. Permissible current: 40 A max. or 70 A max. respectively. Fully clockwise = max. current. |
| d) Stability | P4 | Adjustment for the dynamical adaption to the load. |
| e) Maximum speed
Tachometer adaption,
actual value on terminal 1. Also for armature-feedback-control. | P5 | Adjustment of max. speed during operation. (set speed potentiometer fully clockwise). Speed increases when potentiometer is turned clockwise. |
| f) Deceleration rate | P6 | Adjustment of the linear deceleration time of the motor (provided: positive torque) from min. to max. speed (adjustable from 2 to 15 sec.). Counter-clockwise setting = short deceleration time. |
| g) Acceleration rate | P7 | Adjustment of the linear acceleration time of the motor from min. to max. speed. (adjustable from 2 to 15 sec.). Counter-clockwise setting = short acceleration time. |
| h) Maximum speed
Tachometer adaption,
actual value on terminal 5 | P8 | Adjustment of max. speed during operation (set speed potentiometer fully clockwise). |
| i) Min. speed | P9 | Adjustment of min. speed during operation (set speed potentiometer fully counter clockwise). |

4. Indicator lamps:

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

- | | | | |
|------------------------------|-------|--------|---------|
| a) Thyristor triggering | LED 1 | clear | 6 lamps |
| b) Power supply -15V | LED 2 | green | |
| c) Power supply +15V | LED 3 | green | |
| d) Current limit /over-speed | LED 4 | red | |
| e) Control locked | LED 5 | yellow | |

5. Functional tests and preliminary adjustments before operation:

a) Armature feedback control (UA-control)

1. Check all connections with an Ohm-meter for grounds.
2. Install resistor R 59 (47 kOhm) and jumper II .
3. Check if line voltage corresponds with voltage indicated on the type-marking of the unit. Set switch for correct frequency (50 or 60 Hz).
4. Switch on line voltage. LED 3, green (+15V) and LED 2, green (-15V) must light up.
5. Measure field voltage at terminals F+ and F- with a multimeter (moving coil instrument with at least 330 Ohm/Volt). Voltage according to type-marking.
6. Measure voltage on speed potentiometer (terminal 9 pos., terminal 7 neg.) must read 15 V. Minimum speed potentiometer must be set fully counter clockwise during this measurement.
7. Potentiometer P7 acceleration set in center position
Potentiometer P6 deceleration set in center position
Potentiometer P2 I x R compensation set fully counter clockwise
Potentiometer P4 stability set in center position
8. Connect supply voltage L1 , L2 , L3 (voltage according to type marking)
When the speed potentiometer is turned in clockwise direction the armature voltage and the motor speed respectively will increase and the six clear diodes LED1 will light up (Thyristor triggering).
Set speed potentiometer fully clockwise and adjust P5 or P8 (depending on connection of tachometer input) for the requested armature voltage / motor speed. Now turn speed potentiometer fully counter clockwise, the output voltage must drop back to 0 volt. Now adjust potentiometer P9 for the requested minimum speed.
9. 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 in counter clockwise direction the speed under load will increase. If the compensation potentiometer is set too high, the drive will become unstable.
10. Current limit: In order to adjust the current limit the field must be disconnected, the motor must be blocked and the field control must be jumpered (terminals K-K on the terminal strip). Switch on drive, pre-select speed and adjust potentiometer P3 (current limit) for the requested current. During this adjustment the red LED4 (current limit) must light up. Important: this adjustment must be performed within 10 sec. in order to avoid damage to the commutator.

11. Stability potentiometer P4 : This potentiometer must be adjusted so that the drive operates without overshoot in the preset speed.

b) Tachometer feedback control - Tachometer input terminal 1

- 1) Check all connections with an Ohm-meter for grounds.
- 2) Remove R 59 and jumper II from circuit.
The electronic circuit is now without any potential.
- 3) R 58 is used to adapt the tachometer to the drive. The value of R 58 is calculated as follows:
R 58 in kOhm = tachometer voltage at rated motor speed minus 40.
Install resistor R 58 in circuit. (e.g. 82 kOhm if tachometer voltage reads 120 V).
- 4) For all further adjustments refer to the adjustments as previously described for the armature feedback control, however the I x R compensation potentiometer P2 must be set fully clockwise.

c) Tachometer feedback control - Tachometer input terminal 5

- 1) Check all connections with an Ohm-meter for grounds.
- 2) Remove R 59 and jumper II from circuit.
The electronic circuit is now without any potential.
- 3) R 52 is used to adapt the tachometer to the drive. The value of R 52 is calculated as follows:
$$R\ 52\ (kOhm) = \frac{\text{Tachometer voltage V}}{0,6\ mA} - 90\ kOhm ; \text{ e.g.: } \frac{130\ V}{0,6mA} - 90 = \text{approx. } 120\ k\Omega$$
- 4) For all further adjustments refer to the adjustments as previously described for the armature feedback control, however the I x R compensation potentiometer P2 must be set fully clockwise.
- 5) If this tachometer input terminal 5 is used the polarity of the tachometer is not important (automatic adaption).
- 6) It is also possible to use an a.c. tachometer on this input terminal.

Fault location

Sympton

Possible causes

Diode LED 3, LED 2 (+/- 15 V) does not light up

- a) One phase is missing
- b) Measure supply voltage +/- 24V ,
Check power supply.

Drive is released however drive does not run when terminals 2-10 are closed.

- a) Check switch-on contact (terminal 2-10).
- b) No reference voltage (terminal 8 no voltage; must be variable with speed potentiometer from 0 to 15 V).
- c) Check line input (all 3 phases)
- d) Check field voltage and field current.

cont.

Sympton

Possible causes

Output voltage does not increase when speed potentiometer is turned up

- a) Motor load is too high
- b) Drive operates at current limit LED4 lights up.
- c) Current limit is set too low.
- d) Defective speed potentiometer.

Drive runs unstable

- a) Wrong setting of I x R potentiometer P2.
- b) Defective tachometer or tachometer leads.
- c) Wrong adjustment of stability potentiometer P4
- d) Wrong connection of auxiliary winding of the d.c. motor.
- e) One Thyristor triggering temporarily intermittent. Check Thyristor triggering LED 1.

Speed varies without change of setting of speed potentiometer

- a) Current limit is set too low.
- b) Motor load is too high. Mechanical defect on motor or machine. Check motor brushes.
- c) Wrong or missing supply voltage (+/- 15 V) for electronic circuit. Check LED 3 and LED 2.
- d) Temporary malfunction of one Thyristor. Defective tachometer or tachometer leads. Defective minimum speed potentiometer.
- e) Defective speed potentiometer.

Mains fuse blows

- a) Shorted or grounded armature or armature connections. Check power Thyristors.
- b) Defective motor or armature. Check brushes.

Drive does not run

- a) Defective power supply
- b) Check drive release relay and control leads.
- c) Defective speed potentiometer
- d) Defective armature fuse.
- e) Check motor and motor brushes.

cont.

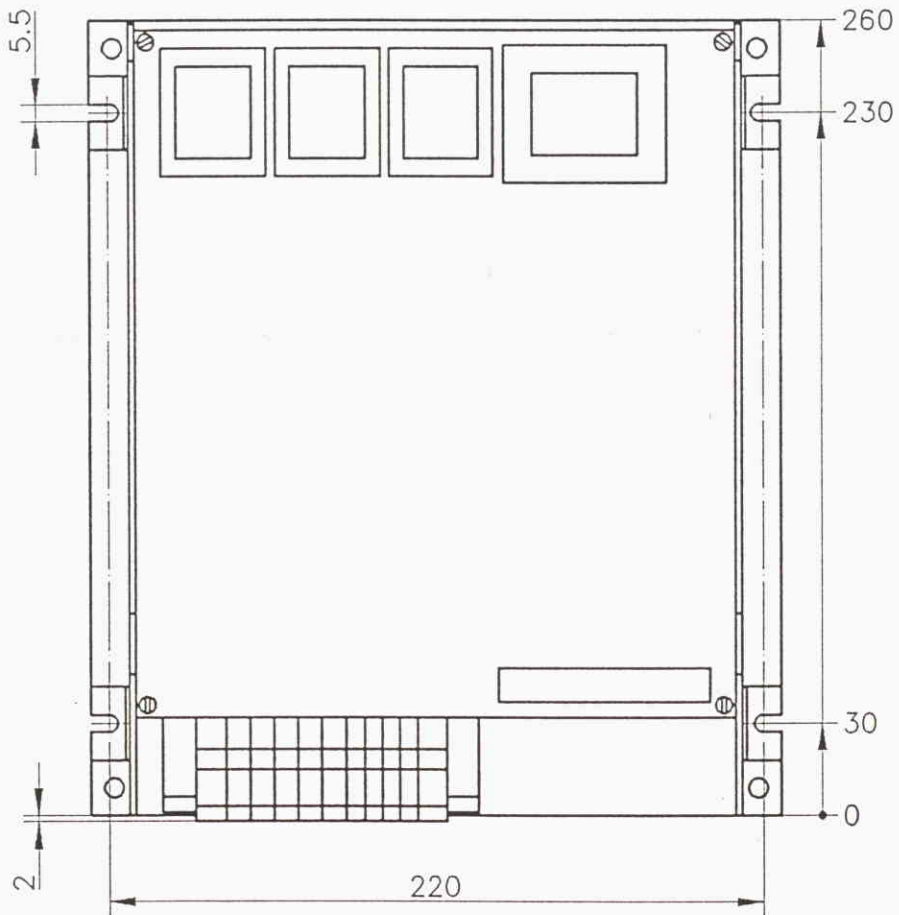
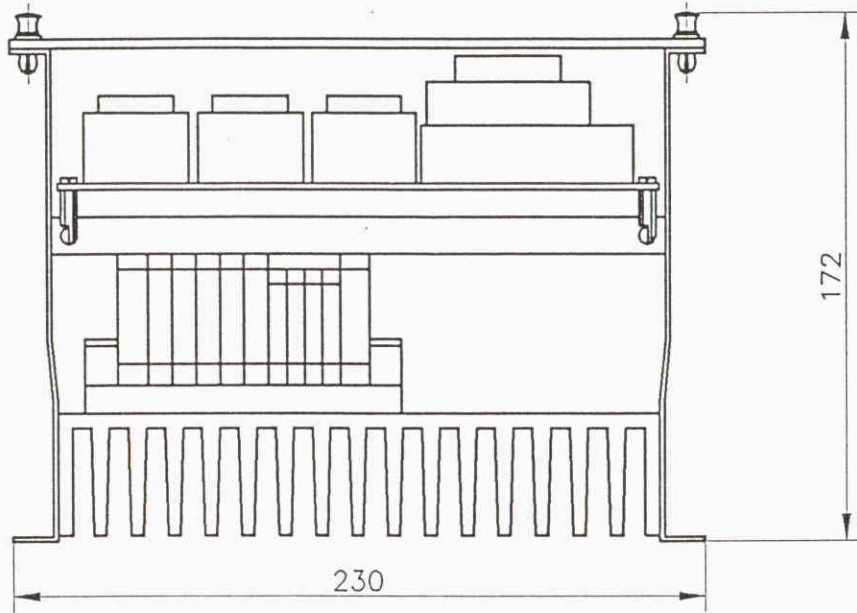
Symptom

Possible causes

Drive runs at maximum speed however speed potentiometer is set at zero speed or low speed

- a) Intermitten tachometer feedback.
Defective tachometer.
R 58 or R 52 respectively is missing.
- b) Armature feedback intermittent
Jumper II is missing.
(cause b) only when armature feedback is applied).
- c) Defective maximum speed potentiometer P5 .
- d) Defective minimum speed potentiometer P9.
- e) Intermittent potentiometer leads from terminal 8 to start of speed potentiometer.
- f) Wrong polarity of tachometer connection when terminals 1 and 6 are used. (not applicable when terminals 5 and 6 are used).

This concludes the preliminary preparation and adjustment of the Thyristor-Drive-Control Type TA-14/6P and TA-24/6P respectively.

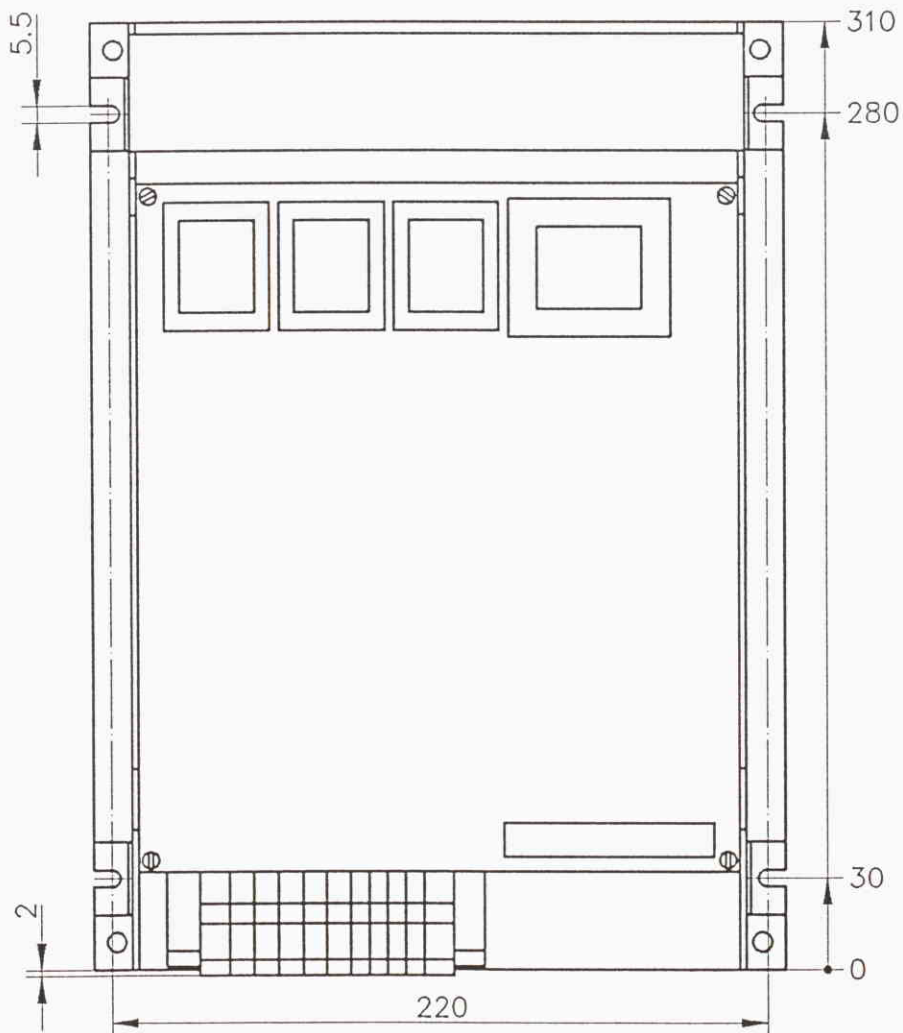
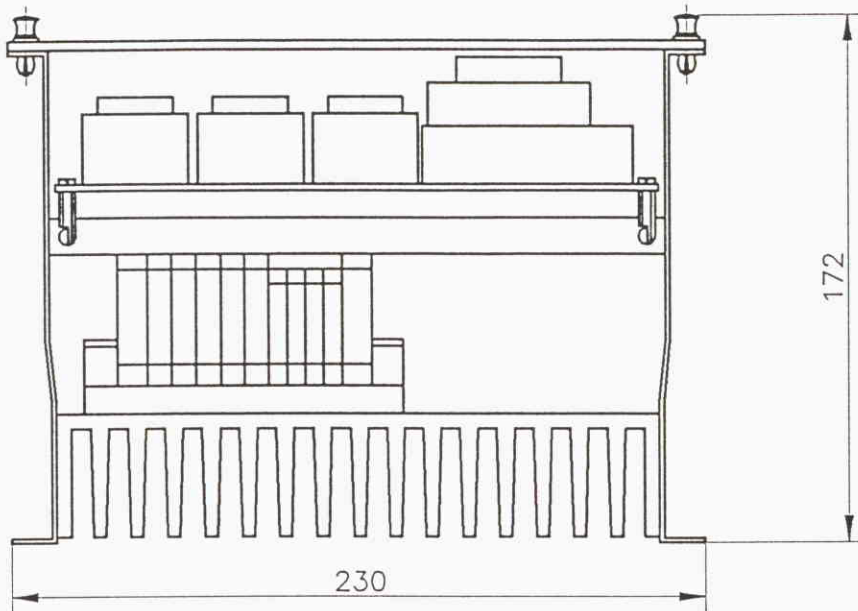


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			Maße ohne Toleranzang.			
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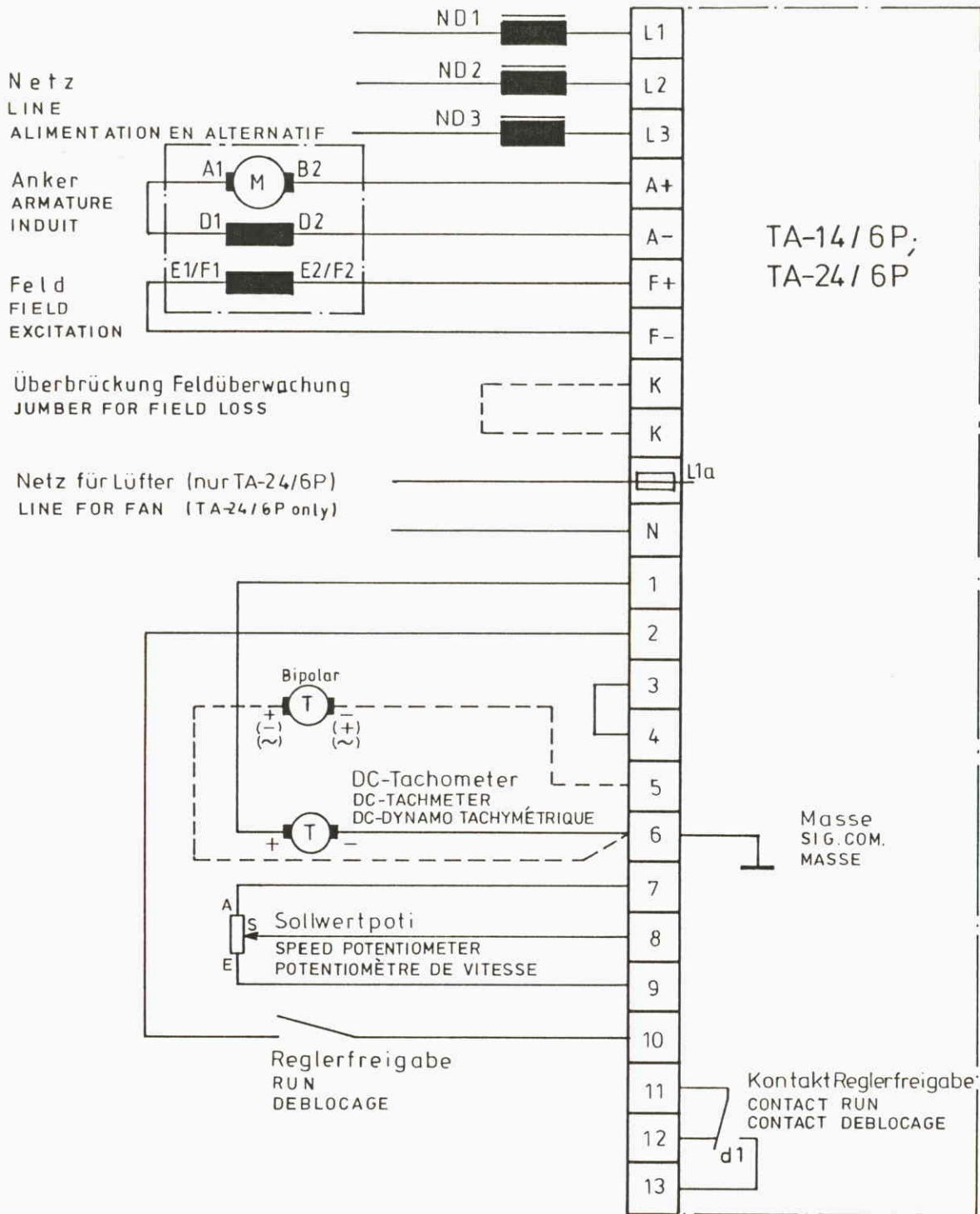


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		Gepr.			
		Norm			
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			Anschlußbild CUSTOMER CONNECTIONS SCHEMA DE BRANCHEMENT		
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