

TA-05 SB

Instruction and Operation Manual

230V

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-05 SB 0183
Line voltage:	230 V a.c., 50/60 Hz.
Power:	0,7 kW
Armature voltage:	180 V
Armature current:	6 Ampere rms max. (approx. 4 A mean value without d.c. choke.
Field voltage:	210 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 the drive control

Ensure that your a.c. line voltage corresponds to the voltage shown on the type marking of the unit.

Terminal strip KL 1

30/31 - 28/27	a.c. input, voltage according to type marking on unit, frequency 50 or 60 Hz, terminals 30/31 phase, terminals 27/28 neutral.
23 - 21	Armature, terminal 23 + (positive), terminal 21 - (negative).
19 - 17	Field, terminal 19 + (positive), terminal 17 - (negative).
15 - 13	Drive control release, contact closed = released (run).
5	Reference input (positive) without acceleration. Input voltage depends on rating of resistor R 19, however max. voltage 150 V d.c. Input current approx. 0,32 mA at max. speed. Calculation of R 19 as follows: $R_{19} \text{ in kOhms} = 3 \times U_E - 30.$ If terminal 5 is used, speed potentiometer must be disconnected.

Terminals 8 and 6 must be interconnected, min. speed potentiometer P 1 must be set fully counterclockwise.

3 - 1

d.c. tachometer, terminal 3 + (positive), terminal 1 - (negative) (approx. 150 V at rated motor speed.

10 - 8 - 6

Speed potentiometer, connect center to terminal 8, start to terminal 6 and end to terminal 10. This potentiometer enables an infinite variable adjustment of the motor from min. to max. speed.

3. Drive control adjustment

Max. RPM	P 3	Adjustment for maximum speed during operation, (set speed control fully clockwise).
Min. RPM	P 1	Adjustment of minimum speed during operation, (set speed control fully counterclockwise).
Acceleration rate	P 2	Adjustment of the acceleration time of the motor from min. to max. speed. The acceleration time can be adjusted from 2 to 10 sec.
I x R compensation	P 4	This control permits to compensate for the voltage drop in the armature and in the supply line when armature feedback control is utilized. <u>When tachometer feedback is used, set this potentiometer fully counterclockwise.</u>
Current limit	P 5	Adjustment for requested armature current. Max. permissible armature current 6 A rms.
Stability	P 6	With this potentiometer the drive is dynamically adapted to the load.

4. Indicator lamps

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

a) Control release	yellow	LED 1
b) Line	green	LED 2
c) Current limit / overspeed	red	LED 3

5. Functional tests and preliminary adjustments before operating

a) Armature feedback control (UA - control)

1. Check all connections with an Ohmmeter for grounds.
2. Install resistor R 21 (150 kOhm).
3. Check if your a.c. line voltage corresponds to the marking on the unit.
4. Check the resistance of the field winding between terminals 17 and 19. Minimum resistance should read 400 Ohm (it might be necessary to reverse the polarity of the Ohmmeter).
5. Potentiometer P 1 Min. speed, set fully counterclockwise
Potentiometer P 2 Acceleration rate, set fully counterclockwise
Potentiometer P 4 IxR compensation, set fully counterclockwise
Speed potentiometer set potentiometer fully counterclockwise
6. Switch on a.c. line voltage, the green diode LED 2 must now light up.
7. Switch on drive control, the yellow LED 1 (control release) lights up.
8. Measure field voltage between terminals 19 (+F) and 17 (-F) with a Multimeter (moving coil type, min. 333 Ohms/V) (should read 200 V). Now measure voltage of potentiometer between terminals 10 and 6 (should read +15 V d.c.). When turning speed potentiometer clockwise, the armature voltage will rise and the motor speed will increase. Turn the speed potentiometer fully clockwise and adjust the armature voltage (motor speed) with P 3 (max. speed) for the requested maximum value. Now turn the speed potentiometer fully counterclockwise, the output voltage must drop back to 0 V and the potentiometer P1 (min. speed) can now be adjusted for the requested minimum speed.
9. Adjust the I x R compensation with potentiometer P 4. Check for 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 control is set too high, the drive will become unstable.
10. Current limit. For checking the current limit the field must be disconnected and the motor must be blocked. Preselect reference signal (speed) and adjust the 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 the requested acceleration time with potentiometer P 2. Turning this potentiometer clockwise will decrease the acceleration time.

b) Tachometer feedback control

1. Check all connections with an Ohmmeter for grounds.
Remove resistor R 21.
2. Install resistor R 20.
Calculation of R 20 as follows:
 $R\ 20\ \text{in}\ k\Omega = \text{Tachometer voltage at rated speed} \times 3 - 110$
3. For all further adjustments refer to the adjustments as explained for the armature feedback control, however P4 (I x R compensation) must be set fully counterclockwise.

6. Troubleshooting

For fast and effective troubleshooting proceed as follows:

Check drive for:

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

C A U T I O N !

Do not use any Megohmmeter, 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

Symptom

Possible causes

Relay d 1 is not energized when drive is released, (yellow diode LED 1 does not light up).

- a) Check lead connections, terminals 13 and 15.
- b) no control voltage, plus 24 V, check power supply. LED 2, line, does not light up.
- c) defective fuse Si 1 (10 A FF).
- d) relay d 1 is defective.

Output voltage does not increase when speed potentiometer is turned up.

- a) motor load is too high.
- b) defective speed potentiometer.
- c) current limit is set too low.

Drive runs unstable

- a) I x R compensation is set too high (when armature feedback controlled).
- b) defective tachometer or tachometer leads.
- c) improper setting of stability potentiometer P 6.
- d) wrong connection of auxiliary series field of d.c. motor.

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 supply for electronic circuit, +/- 15 V d.c. incorrect.
- d) defective Thyristor (defective SCR-bridge).
- e) defective tachometer or tachometer leads.
- f) defective speed potentiometer.

Main fuse blows

- a) shorted or grounded armature or field connections, defective SCR-bridge and /or field-diodes.
- b) defective motor or armature.

Drive does not run

- a) defective power supply
- b) check function of relay and relay wiring (control release, terminals 15 and 13).
- c) defective speed potentiometer.
- d) check motor and motor brushes.
- e) defective fuse Si (10 A ff).

Drive runs after release at maximum speed, however adjustment is set for low speed.

- a) intermittent tachometer feedback or defective tachometer.
- b) check armature feedback.
- c) potentiometer P 3 , max. speed , is defective.

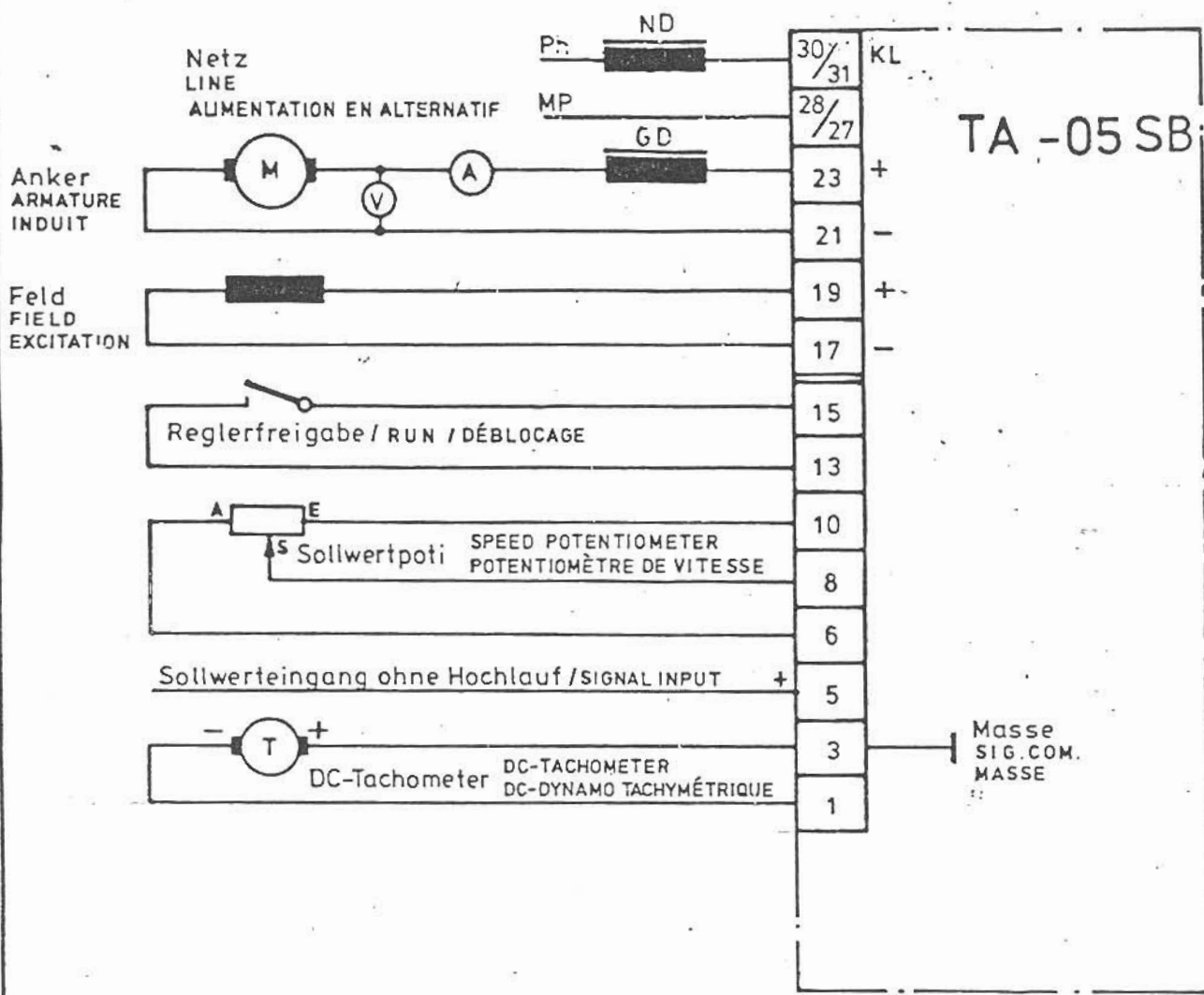
Drive runs after release at maximum speed without keeping reference value. (preset speed).

- a) intermittent potentiometer P 1, min. speed.
- b) intermittent speed potentiometer or intermittent wiring from terminal 6 to potentiometer.

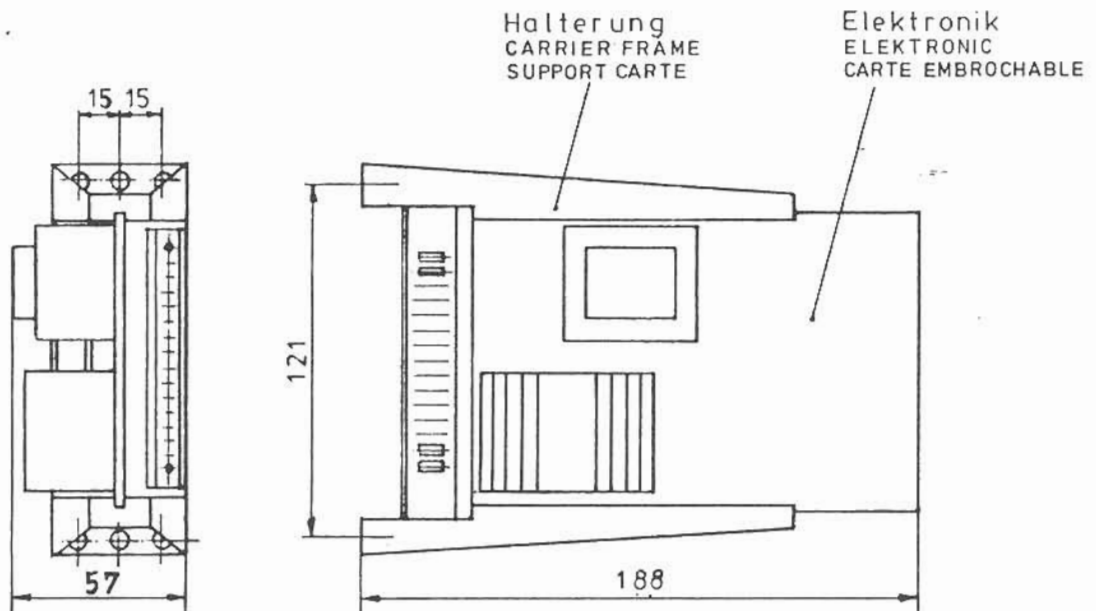
Motor starts immediately
when connected to a.c. line,
without drive being released.

- a) grounded armature wiring
- b) defective SCR-bridge.

This concludes the preliminary preparation and adjustment of the
Thyristor Drive Control Type TA-05 SB.



			Datum	Name	TAE Antriebstechnik
		Bearb.	7.4.81	<i>[Signature]</i>	
		Gepr.		<i>[Signature]</i>	
		Norm			
		Maßstab	Benennung		Zeichnungs-Nr.
			TA-05 SB Anschlußbild CUSTOMER CONNECTIONS SCHEMA DE BRANCHEMENT		
1	7.4.81	<i>[Signature]</i>			TA-05 SB 04 81 10054 A1
Ausgabe	Datum	Name			



			Datum	Name	TAE Antriebstechnik
		Bearb.	4.2.83	<i>[Signature]</i>	
		Gepr.	#	<i>[Signature]</i>	
		Norm			
		Maßstab	Benennung		Zeichnungs-Nr.
		1:2,5	TA-05Sb Maßblatt DIMENSIONS		TA-05Sb 0183 100 54 M1
		Maße o. Toleranz			
1	4.2.83	<i>[Signature]</i>			
Ausgabe	Datum	Name			