

TA-05KB-SMD & TA-1K-SMD

Instruction & Operating manual

Warnung:

As with any form of electrical equipment, there is always a risk involved in the handling of electrical machinery. The greatest care must always be exercised during installation and maintenance, and it is recommended this be carried out by authorized personnel.

TA-05KB-SMD & TA-1K-SMD

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

1 Technical data

	TA-05 KB-SMD	TA-1 K-SMD
Measurements:	refer to drawing chapter 9	
Line voltage:	230VAC, 50/60Hz	
Power:	0,7kW	1,0kW
Armature voltage:	180V	
Armature current (average):	ca. 4,7A / max. 7A	ca. 6,7A / max. 10A
Field voltage:	210V	
Field current:	max. 0,5 Ampere	max. 0,6 Ampere
Ambient temperature:	0 ± 40° C	
Speed accuracy:	3% with armature feedback, 1% with tachometer feedback	
Semi controlled single-phase bridge, inner loop current regulator, acceleration integrator.		

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2 Connection of the drive control (refer to connection diagram)

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

Terminal strip

- | | |
|-------------|---|
| 1 – 2 | AC input, voltage according to type marking on unit, frequency 50 or 60 Hz, terminal 1 -phase, terminal 2 -neutral. |
| 3 – 4 | Armature, terminal 3 + (positive), terminal 4 -(negative). |
| 5 - 6 | Field, terminal 5 + (positive), terminal 6 -(negative). |
| 7 – 8 | Drive control release, contact closed = released (run). |
| 12 | Reference input (positive) without acceleration. Input voltage depends on rating of resistor R1, however max. voltage 150VDC Input current approx. 0,32mA at max. speed.
Calculation of R1 as follows:
$R1 \text{ (kOhm)} = 3 \times U_E \text{ (V)} - 30$
If terminal 12 is used, speed potentiometer must be disconnected.
Terminals 10 and 11 must be interconnected, min. speed potentiometer P1 must be set fully counter clockwise. |
| 13 - 14 | DC tachometer, terminal 13 + (positive)(electronic ground), terminal 14 -(negative) (approx. 150 V at rated motor speed). Matching of tachometer with R36. |
| 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 min. to max speed. |

3 Drive control adjustment

- | | | |
|--------------------|----|--|
| Min. RPM | P1 | Adjustment of minimum speed during operation. |
| Acceleration rate | P2 | Adjustment of the acceleration time of the motor from min. to max. speed.
The acceleration time can be adjusted from 2 to 10 sec. |
| Max. RPM | P3 | Adjustment for maximum speed during operation. |
| I x R compensation | P4 | 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 counter clockwise .</u> |
| Current limit | P5 | Adjustment of the requested armature current. Max. permissible armature current 7A DC at TA-05KB and 10A DC at TA-1K. |
| Stability | P6 | 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/over speed | red | LED 3 |

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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 R8= 150k ohm (is built-in at delivery status at armature regulation).
At tachometer regulation please demount.
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 5 and 6. Minimum resistance should read 400 Ohm (it might be necessary to reverse the polarity of the Ohmmeter).
5. Potentiometer P1, Min. speed, set fully clockwise
Potentiometer P2, Acceleration rate, set fully clockwise
Potentiometer P4, IxR-compensation, set fully counter clockwise
6. Switch on AC 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 5 (+F) and 6 (-F) with a Multimeter (should read 210VDC). Now measure voltage of potentiometer between terminals 9 and 11 (should read +15VDC). 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 P3 (max. speed) for the requested maximum value. Now turn the speed potentiometer fully counter clockwise, 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 P4. 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 to high, the drive will become unstable.
10. Current limit. For checking the current limit the field must be disconnected and the motor must be blocked¹⁾. Preset reference signal (speed) and adjust the requested current with potentiometer P5 (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 P2. Turning this potentiometer clockwise will decrease the acceleration time.

¹⁾ **A short-circuit of the connections from the field, never the connection of the device!**

b) Tachometer feedback control

1. Check all connections with an Ohmmeter for grounds. Remove resistor R8.
2. Install resistor R36. Calculation of R36 as follows:
 $R36 \text{ in (kOhm)} = \text{Tachometer voltage (V). at rated speed} \times 3 - 110$
3. For all further adjustments refer to the adjustments as explained for the armature feedback control, however P4 (1 x R compensation) must be set fully counter clockwise.

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.).

CAUTION!

Not use any Megohmmeter, buzzer or similar test instruments. Test instruments must be galvanically separated from the AC line. The electronic circuit carries a voltage potential against ground.

Fault location

Symptom

Relay K1 is not energized when drive is released, (yellow diode LED 1 does not light up)

Output voltage does not increase when speed potentiometer is turned up

Drive runs unstable

Speed varies without change of setting of speed potentiometer

Possible causes

- a) check lead connections, terminals 7 and 8.
- b) no control voltage, plus 24 V, check power supply. LED 2, line, does not light up.
- c) defective fuse Si (10A FF - TA-1K) (16A FF - TA-1K).
- d) relay K1 is defective.
- a) motor load is too high.
- b) defective speed potentiometer.
- c) current limit is set too low.
- 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 P6.
- d) wrong connection of auxiliary series field of d.c. motor.
- 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 DC incorrect.
- d) defective Thyristor (defective SCR-bridge).
- e) defective tachometer or tachometer leads.
- f) defective speed potentiometer.

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Main fuse blows

- a) shorted or grounded armature or field connections, defective SCR-bridge check 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 7 and 8).
- c) defective speed potentiometer.
- d) check motor and motor brushes.
- e) defective fuse Si (10A FF - TA-1K)
(16A FF - TA-1K).

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 P3, max. speed, is defective.

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

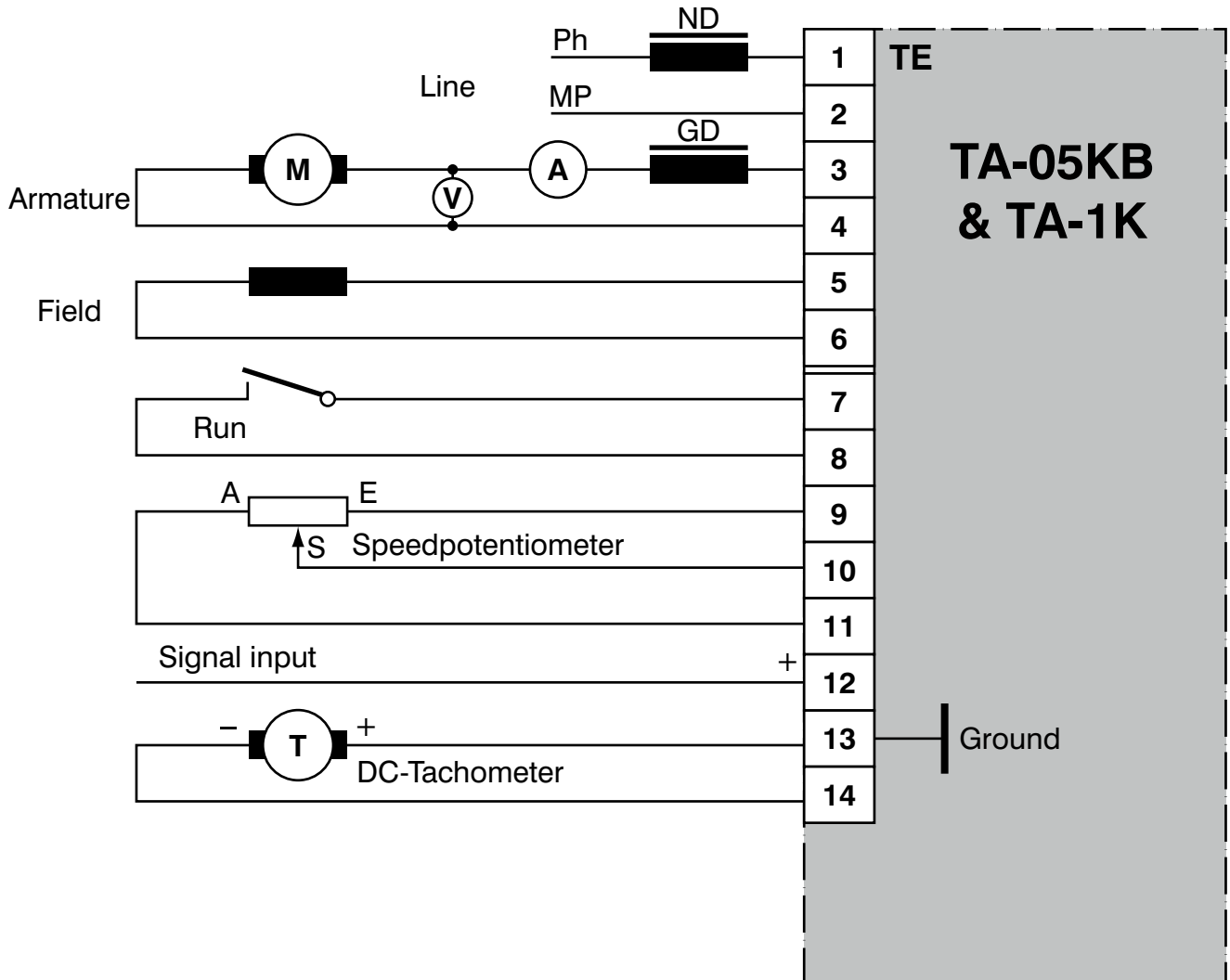
- a) intermittent potentiometer P1, min. speed.
- b) intermittent speed potentiometer or intermittent wiring from terminal 11 to potentiometer.

Motor starts immediately when connected to AC 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

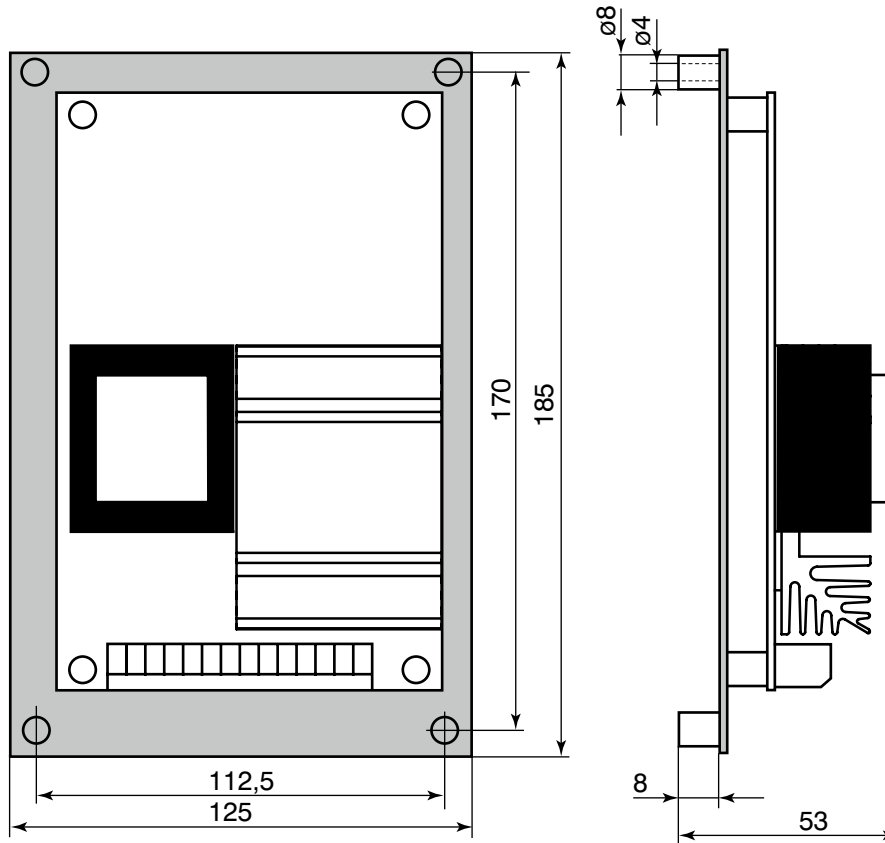
7 Connectiondiagramm



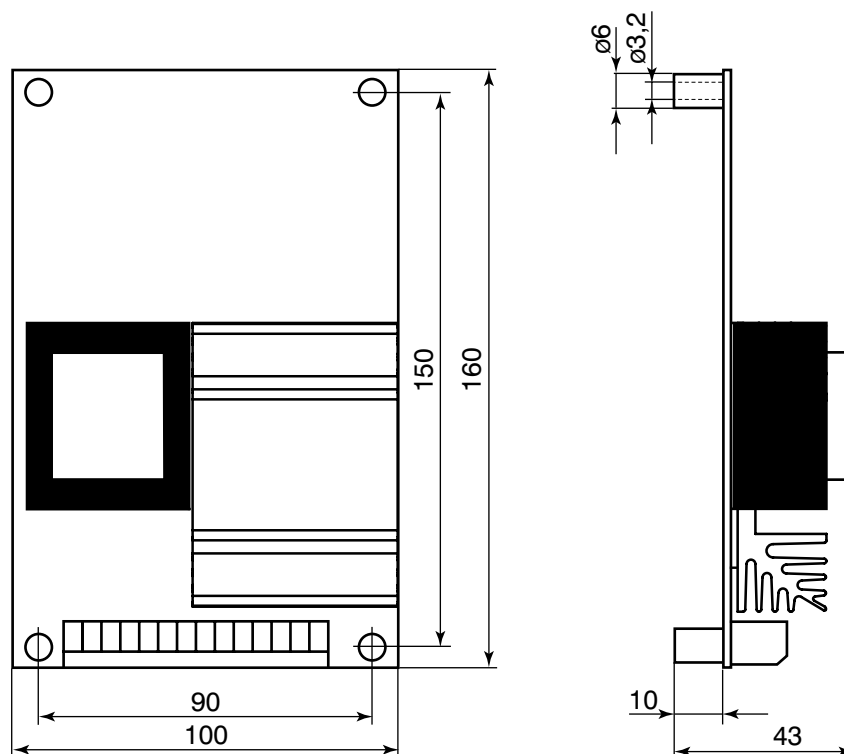
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8 Dimensions

8.1 TA-05KB (with mounting plate)

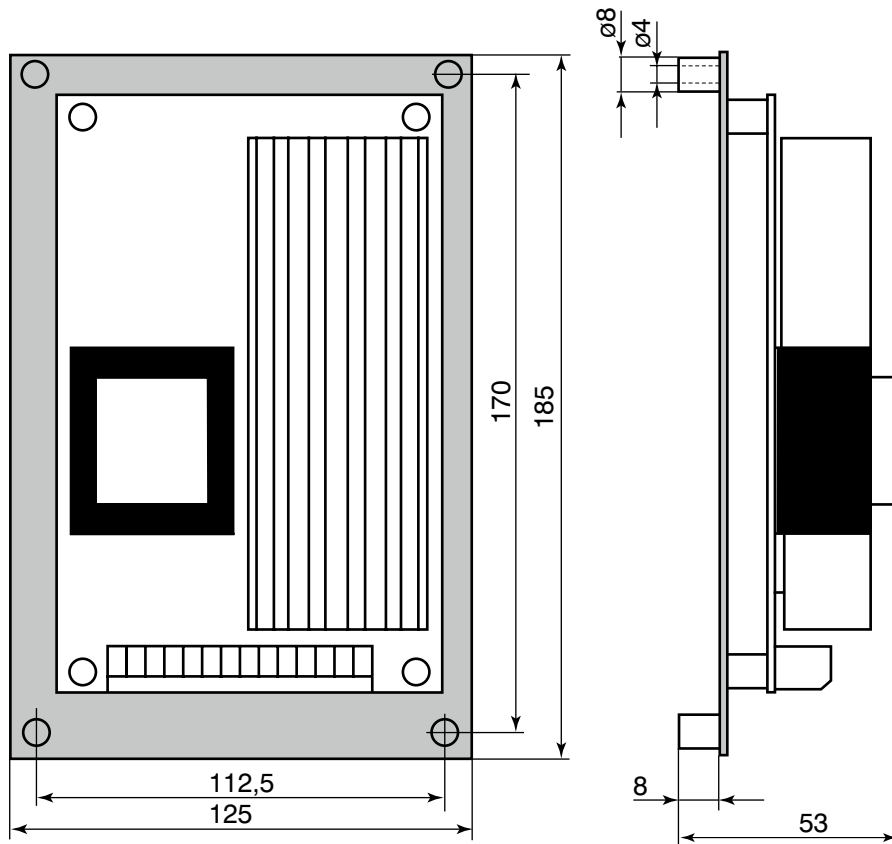


8.2 TA-05KB



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8.3 TA-1K (with mounting plate)



8.4 TA-1K

