



Type 1000030

The core elements of the controller are: voltage stabilization, linear ramp former for positive and negative ramp, dither oscillator, fuse elements and chopped power output stage ($f = 240 \dots 400$ Hz). The dither frequency is adjustable by the potentiometer P3, the base current I_{min} by P5, the max. current I_{max} by P4, the ramp down time t_{off} by P1 and the ramp up time t_{on} by P2. An emergency stop function can be achieved by interrupting the supply voltage.

CE

These devices meet the requirements of the **EMC Directive 89/336/EEC**. Compliance with the following standards is confirmed: EN 55011 (VDE 0875, part 11, 1992) group 1, class A, Disturbance voltage, group 1, class B, Disturbance radiation, DIN EN 61000-4-3, (1997) level 3, DIN EN 61000-4-4, (1996) level 3, DIN EN 61000-4-5, (1996) level 3, DIN EN 61000-4-2, (1995) level 3.

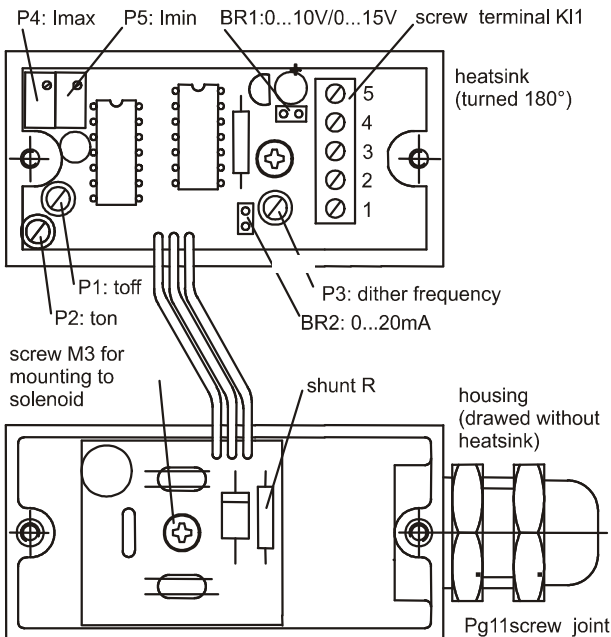
Low Voltage Directive 2006/95/EEC:

Compliance with the following standards is confirmed: HD 625.1S1 (1996), (VDE 0110) insulation coordination, EN 60529 (1991) IP 54 external mounting

Machinery Directive 2006/42/EC:

These products are considered components in the sense of Machinery Directive 2006/42/EC and must not be put into service until the machinery in which they are incorporated has been declared in conformity with the provisions of the EC Directives.

Connection diagram



Controller / amplifier in DIN43650-A-Connector
with ramp generator for one proportional solenoid

The controller / amplifier is designed to control proportional solenoids with constant current. It can be directly mounted on plug connectors, being conform to DIN 43 650 form A.

ROHS

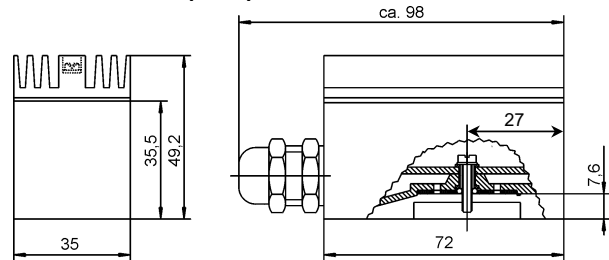
The above mentioned products comply with the requirements of the **directives 2002/95/EG, 2011/65/EU** and of the **delegated directive 2015/863/EU** for change of **attachment II of directive 2011/65/EU (RoHS III)**.

Technical data

Type	1000030
Supply voltage V_s	18 ...32 V
Residual ripple	≤ 10 %
Max. output current I_{max}	2,4 A
Chopper frequency	240 ... 400 Hz adjustable
Temperature drift	$\leq \pm 1$ % of I_{max}
Voltage dependency	$\leq \pm 0,5$ % of I_{max}
Initial current I_{min} (adjustable)	0...2 A
Maximal Output current I_{max} , (adjustable)	$I_{min} + 2,4$ A (max. 2,6 A)
Stabilized voltage (Kl 4)	15 V $\pm 0,6$ V
max. loadability (Kl 4)	≤ 5 mA
Setpoint signal (Kl 3) (selectable; BR1, BR2)	0...15 V / 0...10 V / 0...20 mA / 4 ... 20 mA upon request
Ramp up time (adjustable; P2) Ramp down time (adjustable; P1) (related to setpoint signal 0...max.)	0,1 ...7 s
Ambient temperature	-20 ...+70 °C
Connection (via PG11)	screw terminal 5-pole, 1,5² fine wire
Fuse	TR5 F2A

Factory settings	1000030
I_{min}	0 A
I_{max}	1,6 A
Setpoint	0 – 10 V
$t_{up} = t_{down}$	$\leq 0,1$ s
Dither frequency	400 Hz

Dimensions (mm)



Selection of setpoint signal:

...0030	BR1	BR2
0..10 V	X	
0..15 V		
0..20 mA	X	X

Protection type:

As per EN 60529: IP 65

Terminal assignment:

- KL1: GND (supply voltage)
- KL2: GND (setpoint)
- KL3: Setpoint
- KL4: Stabilized voltage
- KL5: V_s Supply voltage

Subject to design modifications without notice.

Please observe operating instructions and ordering data!

1. Mounting and connecting instructions



Attention!

Setup and start-up has to be done by qualified personnel. Check before, that mains is switched off.

Adjustment and operation is allowed only within the limits of the specified technical data.

1.1 Supply voltage

The device has to be supplied with potential-free voltage. Type 33 43502C01: 18..32 V. Smoothed d.c. voltage with residual ripple ≤ 10 %. If bridge-rectified supply voltage is applied, the size of the capacitors used for voltage smoothing has to be adjusted to the selected maximum current. Guiding values: 2200 µF / 40 V to I_{max} = 1,2 A; 4700 µF / 40 V to I_{max} = 2,6 A.

Attention: Overvoltage will damage the controller.

- 1.2 It is necessary to connect the supply line directly to the battery or the mains.
- 1.3 If the connecting cable is longer than 3 m, a shielded cable is to be used for the signal cords. The shield has to be connected to terminal 2.
- 1.4 The cables must not be laid parallel to power cables.
- 1.5 The setpoint voltage must not be < -10 V or > +15 V. The current controller may be damaged by prolonged application of setpoint voltages being outside of that range.

2. Setting instructions

For all subsequent settings the potentiometer P3 (Dither) is to be turned to zero (counter-clockwise). It is advisable to define the current flowing through the solenoid by measuring the voltage drop over the shunt resistor R (see 3.4).

2.1 Adjustment of the initial current (I_{min}) by potentiometer P5.

- a) Adjust nominal value to zero.
- b) Turn potentiometer P5 (I_{min}) clockwise until the desired magnitude (pressure or quantity) is reached.

2.2 Adjustment of the maximum current (I_{max}) by potentiometer P4.

- a) Adjust nominal value to maximum.
- b) Turn potentiometer P4 (I_{max}) clockwise until the desired magnitude (pressure or quantity) is reached.

Note: I_{max} must not exceed the solenoids limit current I_{lim}.

2.3 Adjustment of ramp up time and ramp down time by potentiometer P1 (toff) and P2 (tup).

Turn the potentiometers to adjust the shift time in such a manner that the desired transient response is achieved.

2.4 Adjustment of the dither signal by potentiometer P3.

- a) Adjust approx. 0,4 x I_{max} by nominal value.
- b) Turn potentiometer P3 clockwise, but stop before the oscillations are transmitted to the hydraulic system. The current must not change more than 10 mA (current measuring see 3.4).

Note: Check the dither over whole current area!

3. Trouble shooting

3.1 Measuring the supply voltage between KI1.5 and KI1.1

Type 10000080: 18..32 V. Measuring the internal reference between KI1.4 and KI1.2. Device 10000080: +15V. Measuring the nominal value between KI1.3 and KI1.2 respectively before KI1.3 with a current as setpoint signal. Note jumper BR1 and BR2 (see table 2).

3.2 Measuring the current IM flowing through the solenoid by measuring the voltage drop over the shunt resistor R.

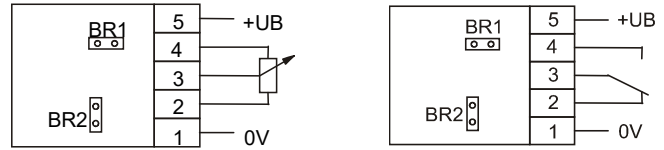
I_M = 5 A/V x UR ± 5 % (100 mV are equal to 500 mA) Note: The controller/amplifier has to be mounted correctly on the solenoid!

3.3 Current controlling

The desired maximum current can only be reached until the following condition is maintained: I_M ≥ (VS – 2 V)/R_M.
 I_M: Highest possible maximum current.
 VS: Momentary value of the supply voltage. Voltage drop at the controller: max. 2 V.
 R_M: Momentary resistance of the excitation winding of the solenoid (changes with temperature).

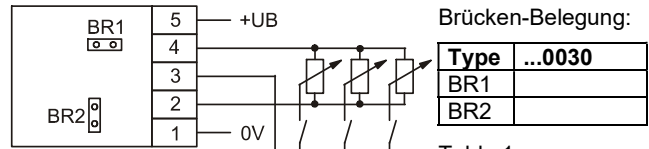
4. Connection samples

4.1 Use off he internal, stabilized voltage (KI1.4)



Potentiometer 5 ... 20 kOhm

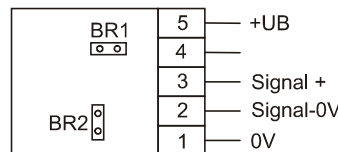
Nominal value Switch



Several potentiometers

Total value of all potentiometers: >5kΩ!

4.2 External setpoint signal

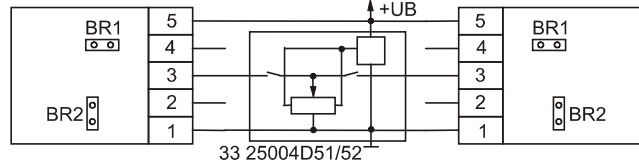


Selection of setpoint signal:

...0030	BR1	BR2
0..10 V	X	
0..15 V		
0..20 mA	X	X

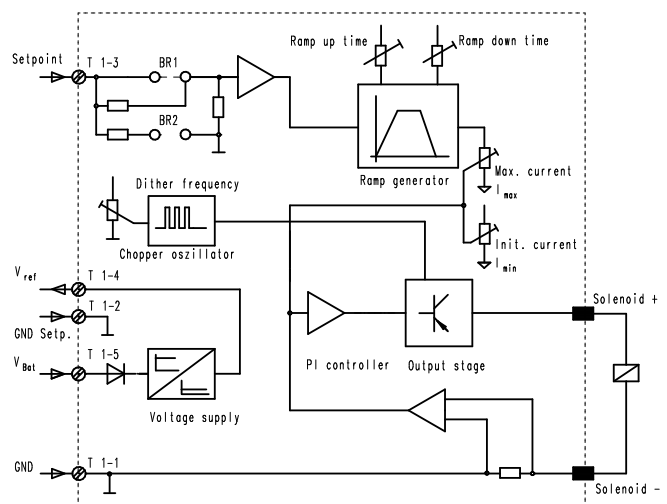
Table 2

4.3 Connection of 4/3-way proportional valve



2 controllers with a joystick for example Kendrion 33 25004D51/52

5. Block diagram



Ordering data:

Amplifier for proportional valves in DIN-connector

10000030