33 40301C.. Product Specification





Controller / amplifier for proportional solenoids

33 40301C00

The controller / amplifier is designed to control proportional solenoids with constant current. It can be mounted on 35 mm switch panel rails.

The main components of the controller are a voltage stabilization, linear ramp generator for positive and negative ramp, dither oscillator, status LED and a chopped output stage (short circuit and earth contact proof). The dither amplitude, the initial current I_{min} , the maximum current I_{max} and the ramp times t_{up} and t_{down} can be adjusted by means of the corresponding potentiometers.

An emergency Stopp function is accomplished by supplying <2 V voltage to the terminal KI.1-6 or by shorting the terminal to GND.

Attention!

The ramp function is disabled when switching the emergency stop function on and off. The LED lights up, if the current controller is ready for operation and flashes in case of a short circuit or excessive excitation current.

The maximum adjustment of the excitation current is internal limited to 2.5 A.

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. EN 61000-4-3, (1997) level 3. EN 61000-4-4, (1996) level 3. EN 61000-4-5, (1996) level 2. EN 61000-4-2, (1995) level 3. The products are considered components in the sense of the **Machinery Directive** 98/37/EEC and are not to be

used until the machine in which they are to be incorporated is declared to conform to the requirements of the EC Directives.

Technical data

Туре 33 40301	C00	C01
Supply voltage V _S	836 VDC	
Residual ripple	≤10 %	
max. output current I _{max}	2,4 ADC	
Chopper frequency	approx. 3 kHz	
Temperature drift	≤±1 % of I _{max}	
Voltage dependency	$\leq \pm 2$ % of I _{max}	
Initial current I _{min} (adjustable)	01,4 A	
Maximum current Imax. (adjustable)	I _{min} + 2,4 A (max. 2,5 A)	
Dither frequency (selectable;BR1)	55 / 110 Hz	
Dither amplitude (adjustable)	0 750 mA	
Stabilized voltage (KI1.2)	5,0 ±0,3 VDC	
max. loadability	≤10 mA	
Setpoint signal (KI1.3)	05/010/015	05/010/015
selectable (BR1, BR2)	V/020 mA	V / 020 / 420 mA
Ramp up time ramp down time,	0.08 1.0	
separate adjustable,	υ,υδ4 S	
	flat blada connectors 6.2 x 0.8 / 2.8 × 0.8	
Connections Vs, UV, ⊨icap current measurement terminals	fiat blade connectors 6,3 x 0,8 / 2,8 x 0,8 femal 2 x Ø2 0 mm ⁻ 0 2 V / A	
All other connections	screw terminals 2 x 3-pole, 2,5 mm ² fine wire	
Ambient temperature	-20+70 °C	
Protection type as per EN60529	IP 00	
Factory settings	33 40301C00	33 40301C01
Imin	0 A	
Imax	1,6 A	
Setpoint	0 – 5 V (Br.3 auf Pos. 2)	
tup = tdown	<0,1 s	
Dither amplitude	0 mA	
Dither frequency	110 Hz	

Subject to design modifications without notice. Please observe operating instructions and ordering data!

Admissible current load at ambient temperature



¹ distance between 1_N 2 devices minimum 30 mm 1 0 (2)distance between 0,8 2 devices below 30 mm 0,6 0,4 0,2 0 -20 20 40 60 80 / ° C Type 33 40301Cxx θ₁₃

Block diagram

1. Mounting and connecting instructions

1.1 Supply voltage

The device has to be supplied with potential-free voltage. Smoothed d.c. voltage 8 – 36 V with residual ripple ≤10 % is necessary. 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 $I_{max} = 1,2 \text{ A}$; 4700 μ F / 40 V to $I_{max} = 2,6 \text{ A}$.

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 KI.1-3.
- 1.4 The cables must not be laid parallel to power cables.
- 1.5 The setpoint voltage must not be negative 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 dither potentiometer (Di) is to be turned to zero (counter-clockwise) at first. It is advisible to define the current flowing through the solenoid by measuring the voltage over the measuring terminals at the front of the device (see 3.4).

- 2.1 Adjustment of the initial current by potentiometer Imin
 - Adjust nominal value to zero. a)
 - b) Turn potentiometer $I_{\mbox{\scriptsize min}}$ clockwise until the desired
- magnitude (pressure or quantity) is reached. 2.2 Adjustment of the maximum current by potentiometer I_{max}.
 - C) Adjust nominal value to maximum.

 - Turn potentiometer $I_{\mbox{\scriptsize max}}$ clockwise until the desired d) magnitude (pressure or quantity) is reached.
 - Note: Imax must not exceed the solenoids limit current Ilim.

- 2.3 Adjustment of ramp up time and ramp down time by potentiometer t_{dn} and t_{up}. 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 Di.
 - Select the dither frequency depending on magnet and e) valve size.
 - Adjust approx. 0,4 x I_{max} by nominal value. f)
 - Turn potentiometer Di clockwise, but stop before the g) oszillations are transmitted to the hydraulic system. The current must not change more than 10 mA (current measuring see 3.4).

3. Trouble shooting

- 3.1 Measuring the supply voltage 8 ... 36V between ST.1, KI.1-3 or KI.1-4 (0 V) and St.2.
- 3.2 Measuring the internal stabilized voltage 4,7 ... 5,1 V between KI.1-2 and KI.1-3.
- 3.3 Measuring the setpoint signal between KI.1-1 and KI.1-3 corresponding to table 1.
- 3.4 Measuring the current I_M flowing through the solenoid by measuring the voltage drop over the shunt resistor at the current measurement terminals. A voltage drop of 200 mV corresponds to a current of 1 A. Note: The current is only measurable if the controller is
- connected to the solenoid correctly. 3.5 Current controlling The desired maximum current can only be reached until the following condition is maintained: $I_M = (V_s - 2V)/R_M$.
 - Highest possible maximum current. M:
 - Momentary value of the supply voltage. Vs:
 - Voltage drop at the controller: max. 2 V. R_M: Momentary resistance of the excitation winding of the
 - solenoid (changes with temperature)!.

Dimensions (mm) and connections



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Ordering example:



(BR2)

-

-

-

-

BR2

1-2

1-2

1-2

1-2

2-3

BR3

2

3

4

1 and 3

BR3

2

3

4

1 and 3

1 and 3

00: Standard type 01: with option setpoint 4...20 mA -