

ADN600 digital valve amplifier for automotive actuator systems



The ADN600 is a valve amplifier for actuation of proportional valves, primarily in mobile driven machines. The device is can be operated at supply voltages from 11 to 28V dc, changeover from 24V supplies to 12V operating voltage occurs automatically by means of the built-in supply-voltage monitor. Switchover occurs when voltage falls below 16V.

The device is normally accommodated in a plastic or metal housing. Protection against overcurrent is provided by means of a built-in resettable fuse (PTC thermistor). Connection is accomplished via a 12-pole spring terminal strip, one earthing (grounding) terminal being available for screening of each of the two cables. Actuation of the valve is effected primarily by means of a joystick, input voltage being 0.5V—2.5V—4.5V 2.5V (zero point). The joystick is monitored in such a way that the device is deactivated in case of breakage of one or all wires. Parameter setting is accomplished via a coded rotary switch in combination with a button, a built-in potentiometer and an LED (setting is described in detail below). The device is equipped with an Enable input.

The following data can be entered for setting of the parameters:

1. Calibrate joystick
2. Imin A via internal potentiometer
3. Imin B via internal potentiometer
4. Imax A via internal potentiometer
5. Imax B via internal potentiometer
6. Ramp UP via internal potentiometer
7. Ramp DOWN via internal potentiometer
8. Dither frequency via internal potentiometer

Technical data

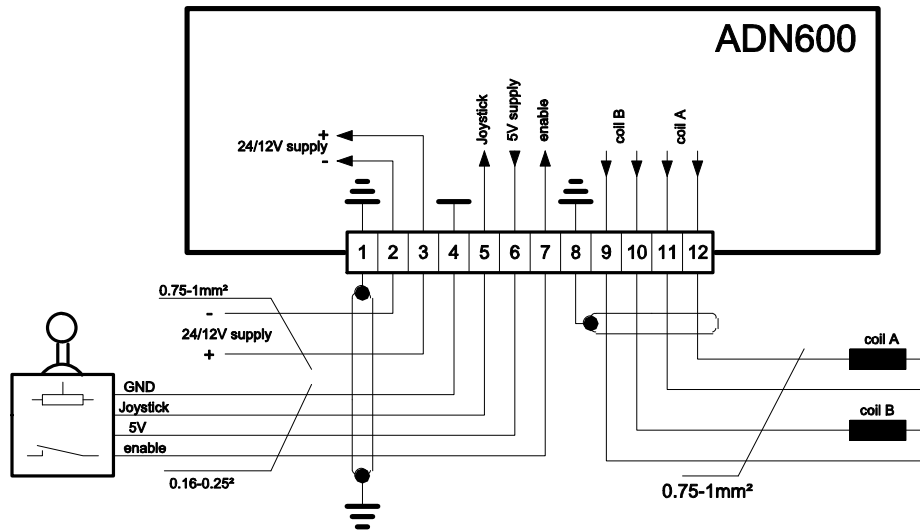
Supply voltage	12-28V
Max. valve level	12V max. 2Amp 24V max. 1Amp
Reference voltage for joystick feed	5V
Working range / 0 point for the two magnets	0.5V—2.5V—4.5V
Ramp setting separately adjustable for the (A) and (B) magnets	0.25 —12 s
Dither frequency adjustable	50—150 Hz
Enable (dead man's switch)	Operation at 4—24V
Operating temperature	-40 to 85° C
Power take-up	approx. 30 VA
Fuse	Resettable fuse 2.5 Amp
PWM frequency	4.8KHz; dither is modulated on

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Connection of the device

A twelve-pole spring terminal strip is provided to permit trouble-free connection of the device. The cable cross-sections must be selected in accordance with the supply-line length; the cross-section should be 1mm² in case of distances of more than 10m between the ADN600 and the driven machine. The cross-sections for the connection between the joystick and the dead man's switch can be made using 0.25mm². Cables of differing cross-sections, e.g. Lütze Silflex (c) Combi (2x1.0 4x0.25) CE-1, Article No. 116241, should be used for the supply line for the joystick and dead man's switch. The cables must, for EMC reasons, be of screened type. Figure 1 shows the connection terminal strip.

Abb. 1



Setting of operating parameters

The device includes a selector switch, a potentiometer and a push-button with a "Confirm" display for input of the operating parameters.

The input values are as follows:

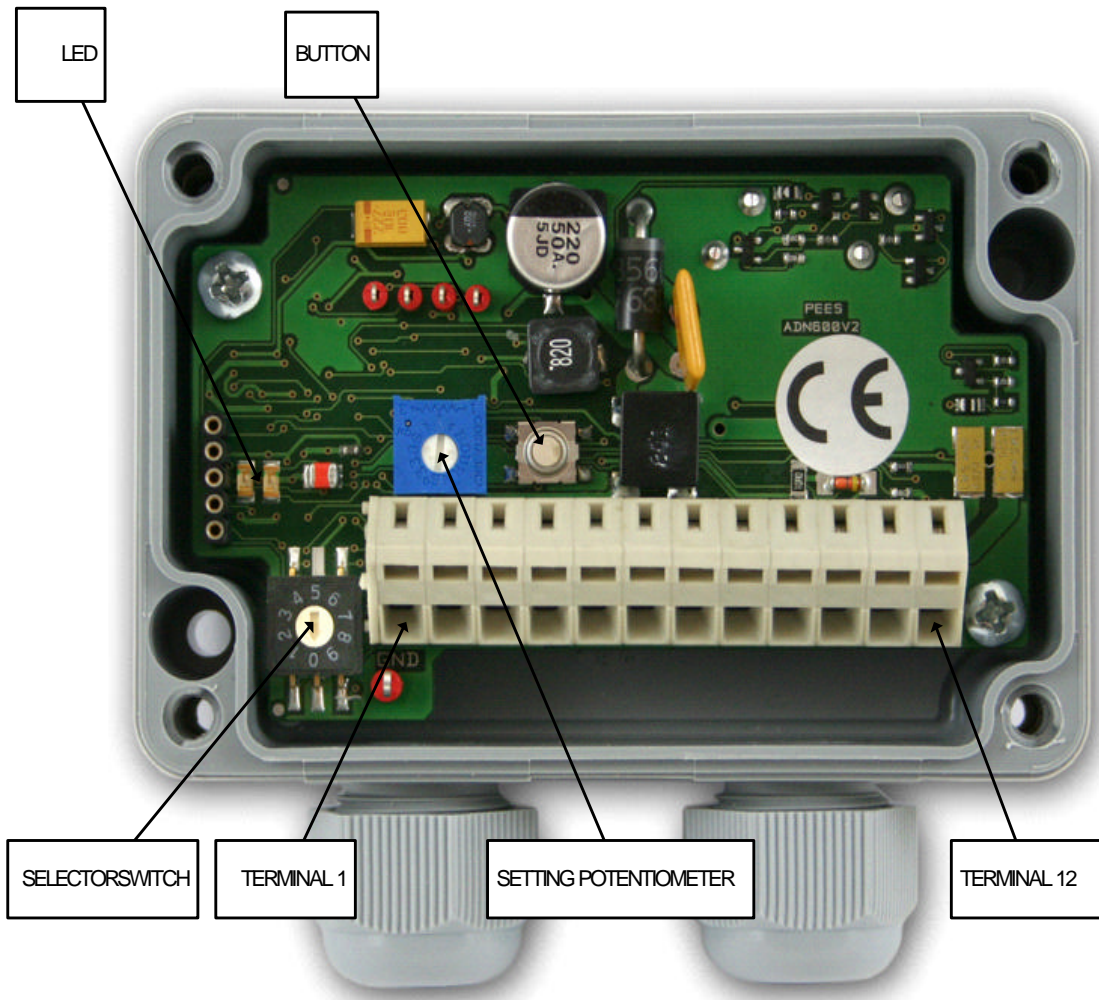
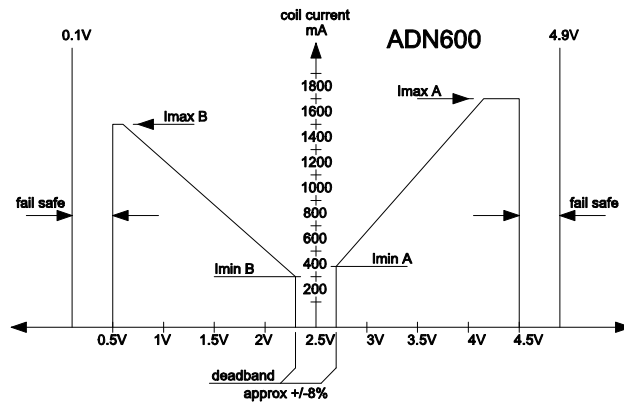
1. Calibrate zero point
2. I_{min}(A)
3. I_{min}(B)
4. I_{max}(A)
5. I_{max}(B)
6. Ramp UP
7. Ramp DOWN
8. Dither frequency

1. **Calibrate zero point.** Joysticks normally function with an output voltage of 0.5V ---(2.5V 0-point)--- 4.5V. The joystick's supply voltage is 5V (provided on the terminal strip). The median voltage of 2.5V should be a stable 2.5V wherever possible although, in practice, this value often deviates from the ideal value, with the result that a once-only calibration, in which the internal computer measures the actual zero voltage and makes corresponding compensation, should be performed.
2. **Setting of I_{min} for the A and B magnets.** Joysticks are generally equipped with an extremely small potentiometer, with which it is difficult to set small level values. For this reason, setting of I_{min} by means of the internal potentiometer is implemented here, making this setting is easier. I_{min} is dependent on the particular valve, and is generally around 20% of I_{max}. Select Position 1 (for Magnet A) or Position 2 (for Magnet B) and adjust the current by means of the internal potentiometer until the actuator system gradually starts to move. To improve operability, dither should be deactivated during this setting. The button should now be pressed for approx. 2 sec.; the green LED flashes to indicate that the value has been stored. The internal potentiometer must then be reset to 0.
3. **Setting of I_{max} for Magnets A and B.** Setting of maximum velocity is also performed without dither, using the internal potentiometer. Use the selector switch to select Position 3 (for Magnet A) or Position 4 (for Magnet B) and then set the required maximum velocity using the internal potentiometer. It is, of course, also possible to perform this setting using the maximum velocity of the driven machine, without measuring the current. After specifying the velocity for Magnets A and B, confirm the velocity by pressing the button; the required value is then stored. The internal potentiometer must then be reset to 0.
4. **Ramp UP and Ramp DOWN.** The ramps can be set using the internal potentiometer. Ramp times can be set from 0.25---12sec. The push-button should also be used to store the required values.
5. **Dither frequency.** Dither frequency can be set using the internal potentiometer. Frequency can be varied from 50---150Hz. The required values can be stored as described above. The internal potentiometer must then be reset to 0.

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Figure 2

Figure 2 shows the arrangement of the operating elements for storage of the setting parameters. The device is programmed with standard values, with the result that it can also be operated without any entry of parameters.



Examples of settings

	Selector switch	Setting potentiometer	"Confirm" button	LED	Joystick to 0
1. Calibration	0	0	2sec	flashes	
2. Imin A	1	Adjust until actuator starts to move	2sec	flashes	
3. Imin B	2	Adjust until actuator starts to move	2sec	flashes	
4. Imax A	3	Adjust up to maximum velocity	2sec	flashes	
5. Imax B	4	Adjust up to maximum velocity	2sec	flashes	
6. Ramp UP	5	Adjust up to required acceleration	2sec	flashes	
7. Ramp DOWN	6	Adjust up to required deceleration	2sec	flashes	
8. Dither	7	Dither frequency	2sec	flashes	

The setting potentiometer must be reset to 0 after every entry of a parameter, since the next parameter entry will otherwise not be possible.

Potentiometer	0	Ramp	= 0.25 sec	Potentiometer	0	Imin	= 0
Potentiometer	100%	Ramp	= 12 sec	Potentiometer	100%	Imin	= max.
Potentiometer	0	Dither	= 50 Hz	Potentiometer	0	Imax	= 0
Potentiometer	100%	Dither	= 150 Hz	Potentiometer	100%	Imax	= max.

Dither must be deactivated while setting Imin A, Imin B, Imax A, and Imax B: it is active again at the 0 position of the selector switch, however. This provision is implemented to ensure easier setting of the operating values.

Option:
Moulded-in ADN600.

Option:
Installation of pressure-equalisation element for outdoor installation.

Abb.3

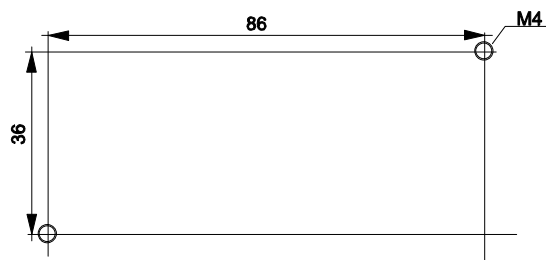


Figure 3 shows the drilling template for mounting of the device

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09.11.2010