

## ADN601 digital valve amplifier



The ADN601 is a valve amplifier for actuation of two proportional valves, primarily in mobile driven machines. The device 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 two 10-pole spring terminal strips, 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 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

Right of modification reserved

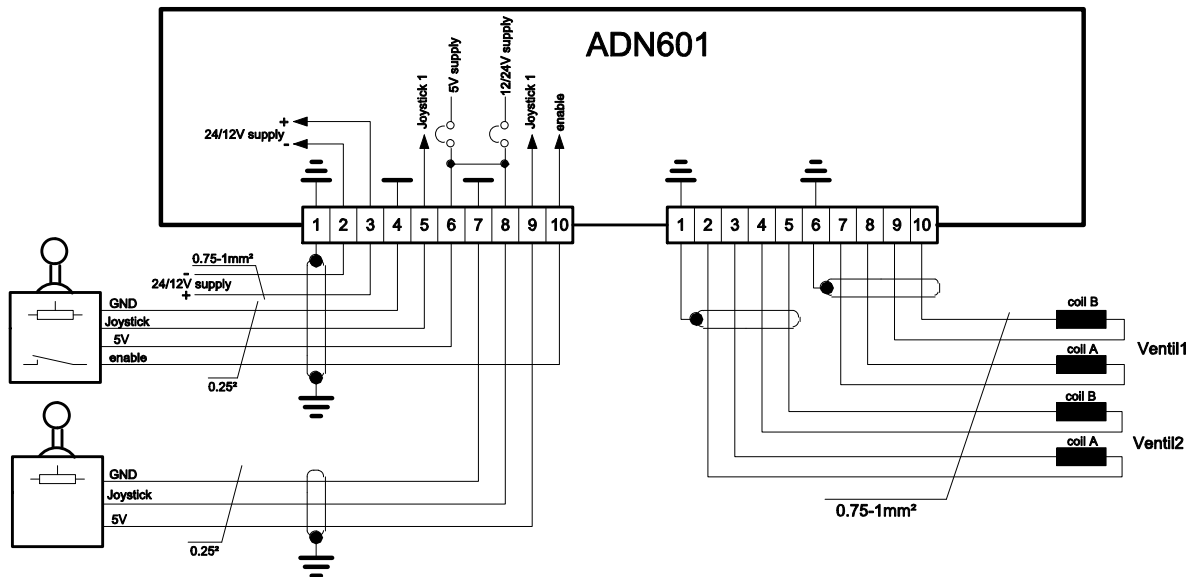
## Technical data

Supply voltage	12-28V
Max. valve level	12V max. 2 Amp 24V max. 1 Amp
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	0.1 —10 s
Dither frequency adjustable	50—150 Hz
Enable (dead man's switch)	Operation at 3 to 24V
Operating temperature	-40 to 60° C
Power take-up	approx. 30 VA
Fuse	Resettable fuse 2.5 Amp
PWM frequency	4.8KHz; dither is modulated on

## Connection of the device

Two 10-pole spring terminal strips are 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 1mm<sup>2</sup> in case of distances of more than 10m between the ADN601 and the driven machine. The cross-sections for the connection between the joystick and the dead man's switch can be made using 0.25mm<sup>2</sup>. 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 strips.

Figure 1



## Setting of operating parameters for a valve

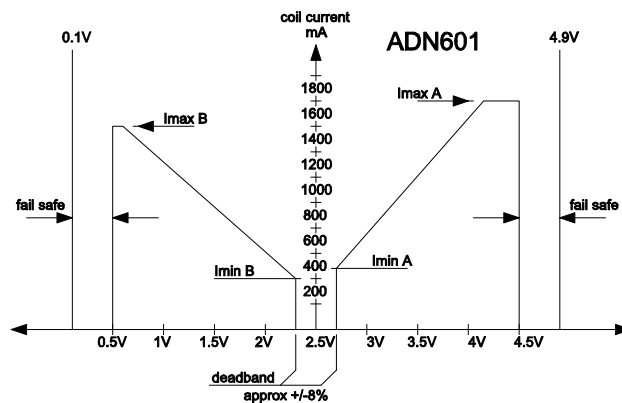
The device includes a selector switch, a potentiometer and a push-button with a "Confirm" display for input of the operating parameters.

The input values are as follows:

1. Calibrate zero point
2. Imin(A)
3. Imin(B)
4. Imax(A)
5. Imax(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. The joystick must be in the 0 position and the selector switch set to 0 for this calibration. Now press the button; the LED will flash and the joystick is calibrated. This calibration must be performed with the selector switch in the 0 position for Joystick 1 and with the selector switch in the 8 position for Joystick 2. The internal potentiometer must be set to 0.
2. **Setting of I min for the A and B magnets.**  
Joysticks are generally equipped with an extremely small potentiometer, using which it is difficult to set small level values. For this reason, setting of I min using the internal potentiometer is implemented here, since setting of I min can be achieved with less difficulty using this potentiometer. The I min is dependent on the particular valve, and is generally around 20% of I max. Setting is performed by selecting Level 1 (for Magnet A) or Level 2 (for Magnet B) using the selector switch or, for the second valve, Level 9 or A, and then increasing magnet current by means of the internal potentiometer until the actuator system gradually starts to move. Press the button and the value is saved. The internal potentiometer must be reset to 0 after every save.
3. **Setting of I max for Magnets A and B.**  
Setting of maximum velocity is also performed using the internal potentiometer. Use the selector switch to select the required magnet, e.g. 3 or 4 for Valve 1, and B or C for Valve 2, and increase the valve current using the internal potentiometer up to the required maximum velocity. Then press the button to save the value. 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 internal potentiometer and the push-button should also be used to store the required values. The internal potentiometer must then be reset to 0.
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. Dither frequency is identical for all magnets and is set only once, with the selector switch in position 7.

Figure 2



### Examples of settings

	Selector switch	Potentiometer	"Confirm" button	LED
1. Calibration 1	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	Adjust to required frequency	2sec	flashes
9. Calibration 2	8	0	2sec	flashes
10. Imin A 2	9	Adjust until actuator starts to move	2sec	flashes
11. Imin B 2	A	Adjust until actuator starts to move	2sec	flashes
12. Imax A 2	B	Adjust up to maximum velocity	2sec	flashes
13. Imax B 2	C	Adjust up to maximum velocity	2sec	flashes
14. Ramp 2 UP	D	Adjust up to required acceleration	2sec	flashes
15. Ramp 2 DOWN	E	Adjust up to required deceleration	2sec	flashes

Dither frequency is set only once in Stage 7. It is then identical for all magnets.

Right of modification reserved

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.

The Enable input can be operated at 4 to 28V. The device is activated by applying a voltage of 4 to 28V. Interruption of the loop causes automatic deactivation of the device.

Figure 3  
Figure 3 shows the arrangement of the operating elements for storage of the setting parameters.

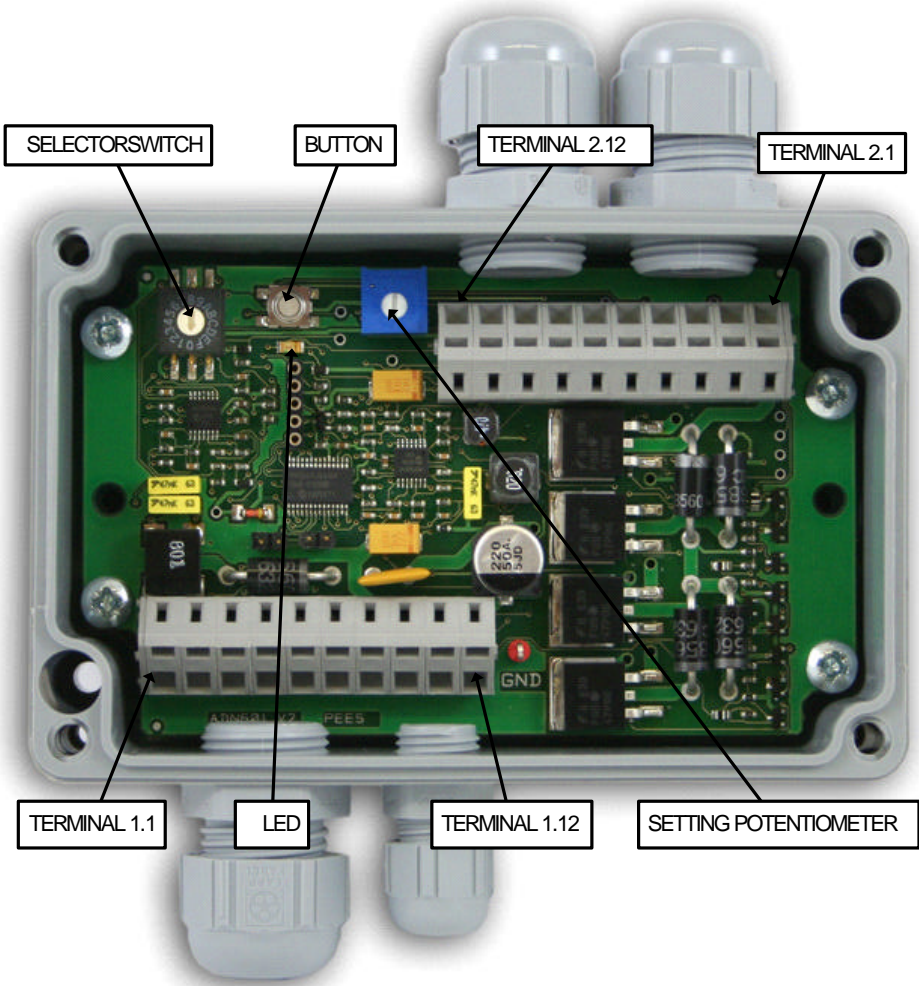


Figure 4  
Figure shows the dimensions for drilling of the fixing holes.

