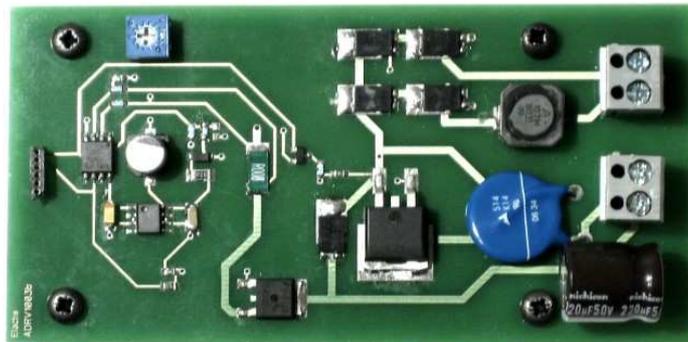


SOLENOID DRIVER¹

ADRV1003W



NEW up to 48VDC

¹ This datasheet is a preliminary description. Values and functions may change without notice.
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Features

- AC/DC input voltage
- Wide input voltage range
- Programmable pull-in time
- Customer selectable holding current
- Fast coil discharge
- Full protection against coil discharge
- High power capability

Description

The ADRV1003W is an interface electronics that increases the performance of a mono-stable solenoid. It allows charging the solenoid with full power for a limited time, then reduces the power to a low value to limit heating of the coil. The holding current is pre-set by Elactis but can be modified on a wide range with a potentiometer. It comes in two different versions: AC/DC operation or DC with fast turn-off. It can either be used to reduce power consumption for high power solenoids or to accelerate them when used with low resistance coils.

Ordering description:

ADRV1003W00VVYYTT

VV: Power supply options

VV value	03	04
Voltage range	24VAC	48VDC

YY: Holding power

YY value	10	20
I hold [A]	1.0	2.0

TT: Pull-in time

TT value	99	15
T pull-in [ms]	1000	150

Remark: other values available on request

Electrical Specifications, ADRV1003W00VVYYTT

Parameter		Minimum	Maximum	unit
Supply Voltage	DC	19	53	V
	AC	22	28	VAC
Threshold to close the solenoid		10	12	V rms
Maximum pulse current (1s)			10	A
Maximum average current			2.3	A
Pull in time	15	130	170	ms
	99	900	1100	
Current consumption		10	15	mA
Hold Current Range	YY=10	0.3	1.1	A
	YY=20	0.5	2.2	
Duty cycle		0	100	%
Reverse voltage protection			- 60	V
Protection against coil discharge			diode	
Operating temperature range		0	55	°C
Length			110	mm
Width			55	mm
Height			18	mm

Working principle

The ADRV1003W can be used with any monostable solenoid. For best performances it should be used with a coil rated voltage less than the power supply voltage. The ADRV1003W generates a special PWM signal which has the following characteristics:

- The supply voltage is connected to the solenoid during the pull-in time.
- A high frequency PWM signal generates a holding current with high power efficiency. This current is regulated until turn-off.
- The solenoid is discharged into a diode as soon as the supply voltage is reduced below the specified threshold level. Therefore the solenoid is not affected by residual voltages or current on the power supply line.
- The differences between the AC and the DC version are the following: the AC version allows both AC and DC power supply connections. The DC version has a fast discharge mode. The current is discharged nearly instantaneously from the coil while in the AC version the current decay is limited by a diode. Furthermore, the DC version has an automatic switching to the hold current position. As soon as the plunger has moved the power is reduced.

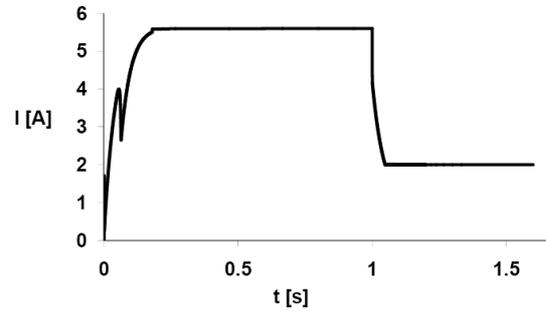


Figure 1: Typical current consumption using the ADRV1003W000399 with a 4 Ohm solenoid at 24V DC supply voltage.

Applications

The ADRV1003W can be used for a large variety of applications. The simplest is **heat reduction**. In applications where the coil must be powered for a long time it will heat up with the following disadvantages:

- the coil might reach temperatures beyond 60°C which creates a risk of injury
- high temperature may influence the fluid's properties in case of a solenoid valve
- coil will prematurely wear out
- coil heating limits the useful external temperature range

The ADRV1003W can be used for **overpowering** the solenoid and therefore reduce the size, weight and price of the actuator. In such applications use a coil with low resistance. The value should be such that the pull-in force is sufficient and the holding current is not beyond the specifications.

The ADRV1003W can be used to accelerate solenoid switching. Thanks to the high precision of the driver it is possible to use very low resistance coils and run at high frequency. Both the turn on and the turn-off is accelerated. This allows more precise plunger movement and higher precision dosing for solenoid valves. The driver can be matched to the solenoid by Elactis. In that case, it is possible to increase the lifetime of the solenoid.

The ADRV1003W with a DC coil can **replace an AC coil**. It reproduces the effect of the strong pull in force of an AC coil without the risk of the coil burn-out if the plunger is stuck.

The ADRV1003W has an **integrated protection feature**. The client does not need to worry about induced reverse voltages or residual voltages on the cable. The driver closes automatically at voltages below the minimum operating voltage and eliminates the coil discharge voltage.

Recommendation for design

One of the advantages of the ADRV1003W is that it can absorb many fluctuations of electrical and environmental parameters. It is always recommended to use a coil with lower resistance than for designs without the driver. Use 10% to 50% lower resistance than without the driver. This will allow for a more reliable operation of the solenoid and eliminates problems linked to friction or sticking of the plunger.

Connection schematic

The preliminary PCB is designed for evaluation purposes. For the production version, size and connection type can be changed on request.

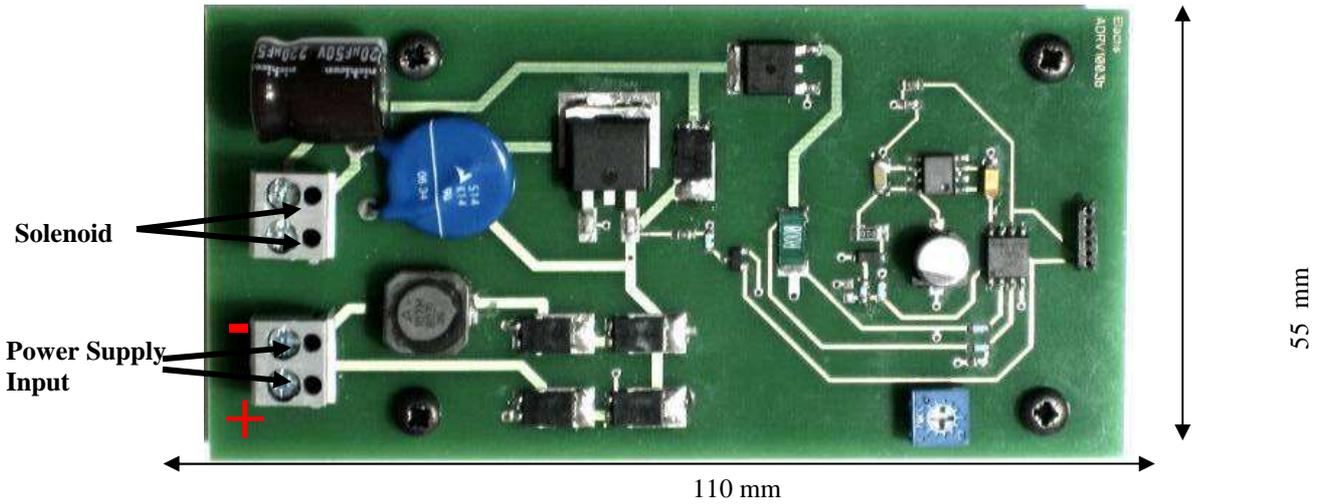


Figure 2: Connection schematic and dimensions, top view. The polarity for the DC version is indicated in red



Figure 3: Dimension schematic, front view

Coming soon

A new version in DIN Rail box will be shortly available.



History records

Rev.	Change	Date
01	Creation	11.02.08
02	Up-date for 1A	10.06.08
03	Current potentiometer and 48V operation	08.06.09
04	Indication for polarity for DC version	28.09.09