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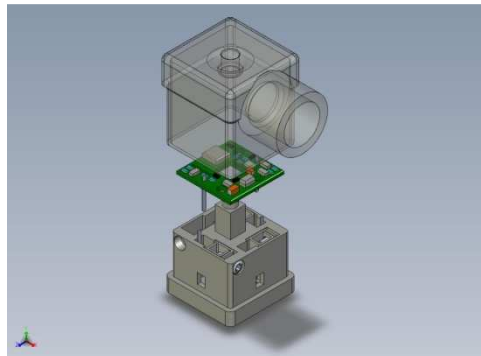
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**Elactis**  
Electronics for Actuators and Integrated Systems

# SOLENOID VALVE POWER SAVING DRIVER<sup>1</sup>

**ADRV0008A**



**Preliminary**

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<sup>1</sup> This datasheet is a preliminary description. Values and functions may change without notice.  
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### Features

- Wide input voltage range
- AC/DC input voltage
- Increased solenoid performances
- Power saving
- Limited heating
- Full protection against coil discharge

### Description

The ADRV0008A is a small interface electronics integrated into the EN 175301-803 Form A connector. It includes a power saving circuit with regulated current output that allows for the use of the same valve over a wide supply voltage range without significant coil heating. Both the pull-in current and the hold current are regulated and are independent of the power supply.

### Ordering description

#### ADRV0008ACCVVXXXYYTT

CC: Cable length

CC value	00	05	10	20	50	99
To power supply side	No cable	500mm cable	1m cable	2m cable	5m cable	10m cable

VV: Voltage range

VV value	03	13	05
Supply voltage	24V AC/DC	24V AC/DC	110-230VAC/DC
LED	NO	YES	NO

XXX: In-rush current

XXX value	008	020	050
I pull-in (mA)	80	200	500

YYY: Hold current

YYY value	050	100	300	500
I hold [mA]	50	100	300	500

TT: In-rush time

TT value	01	15	45
Typical pull-in time [ms]	10	150	450

Other values available upon request

### Electrical Specifications, ADRV0008ACC03XXXYYTT version

Parameter	Minimum	Maximum	unit
Power Supply On	13 21	33 27	VDC VAC
In-rush current range		1.5	A
Tolerance on In-rush current	-15	15	% nominal value
Hold current range	15	500	mA
Tolerance on hold current	-25	+25	% nominal value
In-rush time range	1	400	ms
Tolerance on pull-in time	-20	+20	% nominal value

Power consumption of the electronics		1	mA
Voltage loss on the electronics	0.8	2	V
ESD protection	23 (IEC 61000-4-2 level 4)		kV
Protection against coil discharge		diode	
Operating temperature range	-30	60	°C

**Electrical Specifications, ADRV0008ACC05XXXYYYTTversion**

Parameter	Minimum	Maximum	unit
Power Supply On	13	300	VDC
	21	250	VAC
In-rush current range		0.6	A
Tolerance on In-rush current	-15	15	% nominal value
Hold current range	15	300	mA
Tolerance on hold current	-25	+25	% nominal value
In-rush time range	1	400	ms
Tolerance on pull-in time	-20	+20	% nominal value
Power consumption of the electronics		1	mA
Voltage loss on the electronics	1.6	5	V
ESD protection	23 (IEC 61000-4-2 level 4)		kV
Protection against coil discharge		diode	
Operating temperature range	-30	60	°C

If your application is out of the specifications listed above, do not hesitate to contact Elactis. We can then customize the driver to meet your most demanding needs.

**Working principle**

The ADRV0008A can be used with any monostable solenoid valve or electro-magnets. DC coils can be used with both DC and AC power supplies. For best performances it should be used with a coil rated voltage less than the power supply voltage. The ADRV0008A generates a special PWM signal which has the following characteristics:

- The inrush current is limited in the connector and lasts during the in-rush time. Both of these parameters are programmed to customer specifications
- After that the inrush time has elapsed, the current is reduced to the hold value.

The performance of both the electronics and the whole system therefore becomes independent of the power supply voltage and the temperature.

**Applications**

The ADRV0008A 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
- coil will prematurely wear out
- plastic and rubber components may deteriorate
- coil heating limits the useful external temperature range

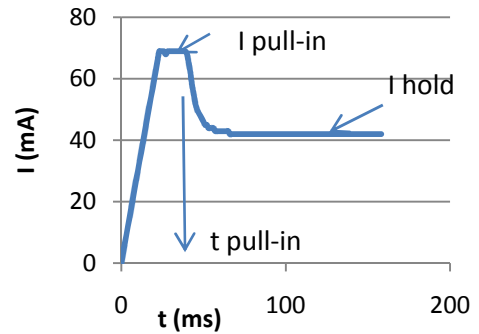


Figure 1: Typical current consumption using the ADRV0008A with 70 mA in-rush current, 40 mA hold current and 50 ms inrush time.

The ADRV0008A is a high efficiency driver which will dissipate very little power in the electronics. The holding power set for the coil is in all standard configurations sufficient to maintain the valve in its active position while the temperature increase is limited to a few °C.

The ADRV0008A allows for a **wide range of input voltages**. Therefore one can simply use a coil in any applications with supply voltages equal or higher than the rated voltage. For example using a 24V coil in a 48V application, the driver will regulate the power to accommodate for the 24V coil. It even improves the performance of the valve as the opening time will be more stable.

The ADRV0008A 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.

The ADRV0008A adapts to your power needs. In many applications the **performance of the valve** is limited by the solenoid power. You may increase the plunger stroke, the applied pressure range or the orifice size. To do this, select a lower resistance coil and use it with the driver. Warning: always consult with the valve manufacturer before exceeding the rated pressure.

## Application examples

**Universal coil:** Valve manufacturers are often confronted to the logistics for different supply voltages. The combination of the connector with a standard 24VDC coil solves the problem. The valve will work on any supply voltages whether DC or AC within the specified range of 24V to 230V.

**Coil wire size:** Small valves at high voltages require very fine copper wire. In many cases, it is not possible to make the appropriate wire. The combination of a 24V coil with the ADRV0008A connector solves the problem.

**Valve island: Reducing the coil temperature.** The connector efficiently reduces the coil temperature without affecting other parameters. It works also with very fast valves. Furthermore, there is no risk of burn-out for coils in AC applications.

## Recommendation for design

One of the advantages of the ADRV0008A 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. Indeed the power dissipation is limited to the amount necessary to activate the valve. A lower resistance coil at the same supply voltage will not dissipate more than a higher resistance coil. Use 10% to 50% lower resistance than without the driver.

The driver rectifies the current. Use preferably a DC coil. In case your coil has an electrical response time below 10ms, consult Elactis for proper holding current.

## Mechanical drawing

EN 175301-803 type A connector (ex - DIN43650 Industrial). Connector aspect and material can be subject to changes.

**Figure 2: Drawing of the connector. The connector comes with NBR sealing and holding screw.**

## Electrical connection

### Warnings!

In case, you use a low voltage coil with supply voltages above 48V, make sure that the coil is connected to the Earth. The connector does not separate the valve from the mains.

Danger of high voltages! Never open the connector when connected to the supply!

ESD discharge: While manipulating the inside of the connector (inserting cable), avoid touching the board or connect to the ground to avoid electrostatic discharges.

**History records**

Rev.	Change	Date
01	Creation of ADRV0008A	30.03.11