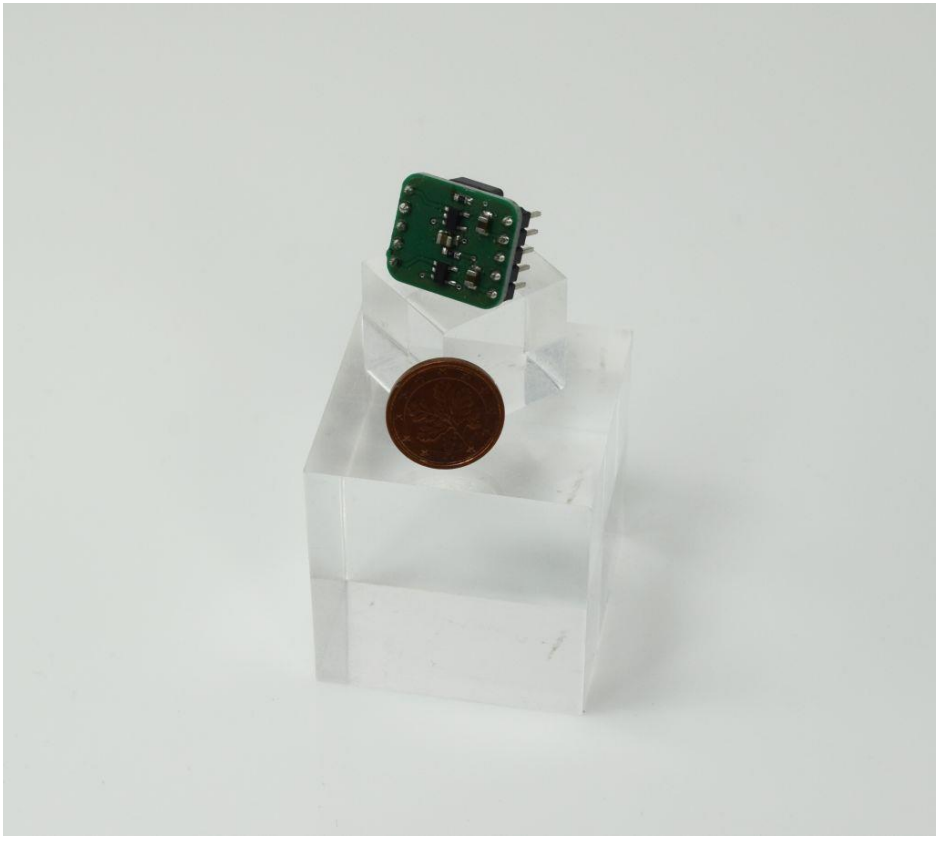
microComponents

Operating Manual for mp-valve driver



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General

This operating manual contains all necessary instructions for the commissioning, operation and maintenance of the valve driver. The manual is intended to help you achieving optimal results in a short time and shall also assist avoiding possible sources of errors.

The product has been designed with state-of-the-art technology and in accordance with all relevant safety regulations. However, a risk of damage to the units, other property, the operator and/or other persons cannot be fully excluded.

Always ensure that specialized and trained personnel will comply with the following general instructions.

Therefore, please keep this manual and hand out copies as required.

Bartels Mikrotechnik GmbH rejects any responsibility for damages to persons or property resulting from non-compliance with the instructions in this manual. In this case all warranties shall be void.

Declaration of conformity

Bartels Mikrotechnik GmbH declares that the products are compliant to the RoHS directive 2011/65/EU. The controller complies with the requirements of EMV 2014/30/EU and CE markings have been affixed to the devices. Additionally, the controllers are also compliant to the EU Low Voltage Directive 2014/35/EU.

Description of functions

The valve drivers have been developing for switching Takasago valves on and off. Bartels Mikrotechnik can assume no liability for damages resulting from the pump media. This applies especially for hazardous fluids.

The valve drivers can be switched on and off via the microcontroller digital I/O ports. The valve drivers must operate by external power supply with 5 Volt or by Vin at the Arduino Nano. Bartels Mikrotechnik GmbH cannot guarantee the proper work of the units with customer specific electronics.

We guarantee that the valve driver complies with the actual state of scientific and technical knowledge hence the operational risks are limited to a minimum.

Don't remove the single components of the valve driver. In those cases, Bartels Mikrotechnik cannot issue a guaranty anymore. Please keep this manual safe and give a copy to all users.

Proper use

Intended purpose

The valve drivers are intended for switching the Takasago SMV-2R-BN1F shape memory alloy valve on and off. Any other use of the micropump or controller unit is deemed improper.

Do not make any modifications or extensions to the valve driver without the prior written consent of the manufacturer. Such modifications may impair the safety of the unit and are prohibited! Bartels Mikrotechnik GmbH rejects any responsibility for damage to the unit caused by unauthorized modifications to the valve drivers and risk and liability are automatically transferred to the operator.

Staff selection and qualification

All work in connection with the installation, assembly, commissioning/decommissioning, disassembly, operation, servicing, cleaning and repairing of the valve drivers must be carried out by qualified, suitably trained and instructed personnel. Work on electrical components and assemblies must be carried out by personnel with the necessary qualifications and skills.

About this operating manual

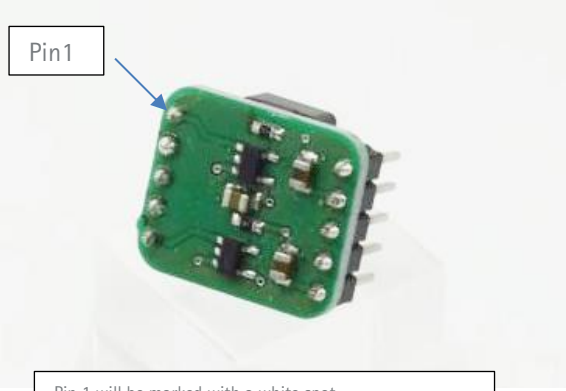
Warnings and important notes are clearly identified as such in the text. The relevant text sections feature a specific sign. However, this icon cannot replace the safety instructions. Therefore, carefully read all safety instructions in this manual. Warnings and important notes in this text are highlighted as shown below, according to the severity of the damage that might result from non-compliance.

⚠ DANGER
Danger indicates a hazard with a high level of risk that, if not avoided, will result in death or serious injury.

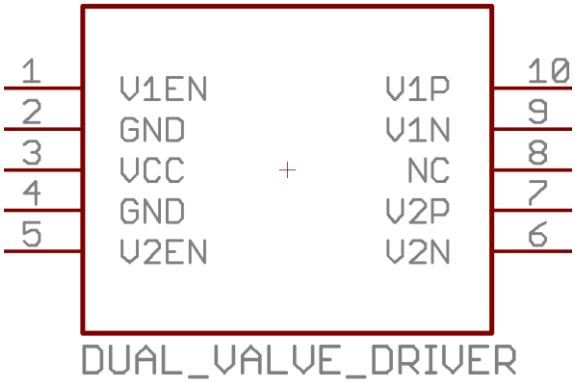
The mp-valve driver

The valve driver is a small, easy to use driving circuit developed for the Takasago SMV-2R-BN1F shape memory alloy valve as an accessory for the micropumps of the mp6-series.

Pin assignment



Pin 1 will be marked with a white spot.



Pin	Name	Function	Pin	Name	Function
1	V1EN	Enable pin. Float to enable	10	V1P	Valve 1 output pin+ *
2	GND	Ground	9	V1N	Valve 1 output pin- *
3	VCC	Input supply voltage	8	NC	not connected pin
4	GND	Ground	7	V2P	Valve 2 output pin+ *
5	V2EN	Enable pin. Float to enable	6	V2N	Valve 2 output pin- *

* Note: The Takasago valves do not have polarity. So positive and negative valve output pins can be swapped.

Technical specifications valve driver

Valve driver	Order code: mp-valve driver
The valve driver enables/disables up to two Takasago SMV-2R-BN1F shape memory alloy valves. It is meant to be used in combination with a micro controller. The valve is a normally-closed valve, so it is closed when there is no power supplied.	
Dimensions	17,78 x 15,24 x 1,6 mm
Power supply	4,5 – 17 VDC (5 V recommended for optimized performance)
Current consumption (one/two valves)	85 mA/170 mA at 5 V

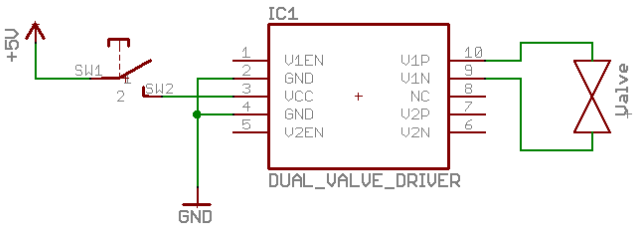
Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ.	Max	Unit
Supply voltage	VCC		4.5	5	17	V
Input current	IDD	Typical VCC = 5 V		85		mA
Source current	V1EN V2EN				±100	µA
VCC Shutdown supply current		EN = 0 V, VCC = 12 V	2.0	3.7	9	µA

Examples of circuiting the mp-valve driver

Manual operation

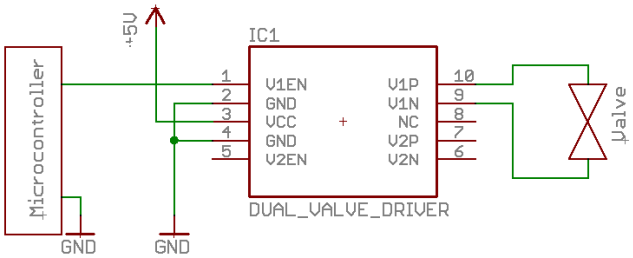
The first example shows the valves being operated manually by switching the power supply on and off. The valve driver is enabled by default, so the enable pins can be left floating.



Schematic 1: Manual operation

Operation via microcontroller

The second example shows the valves being operated by a microcontroller. The enable pins are controlled by the micro and the power supply is connected permanently.



Schematic 2: Operation via microcontroller

All values are approximate and no guarantee of specific technical properties.

For more information regarding the valve itself, please take a look into the Manual of the valve, available on our homepage.

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