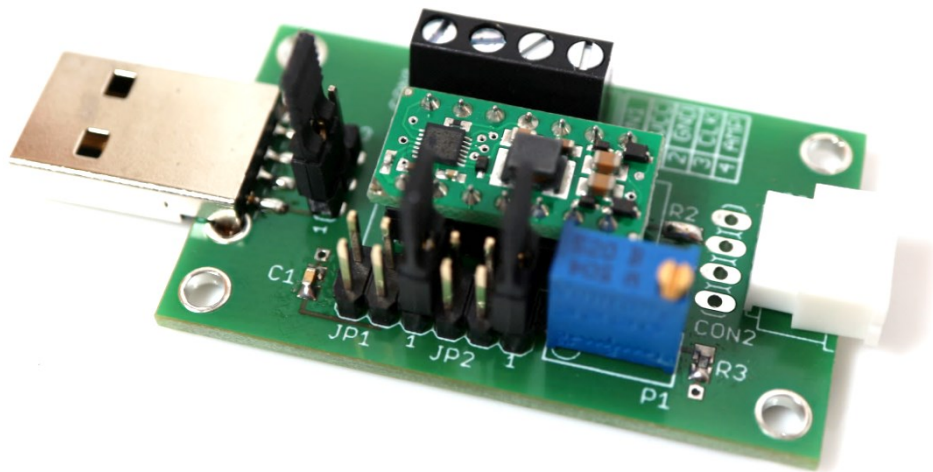


microComponents^m

Operating Manual for mp6-EVA Evaluation Board



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General

This operating manual contains all necessary instructions for the installation, commissioning, operation and maintenance of the evaluation board mp6-EVA. The manual is intended to help you achieving optimal results in a short time and shall assist avoiding possible sources of errors. The operating manual of the micropumps and other controllers are available separately.

The products have 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 comply 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 micropumps have been developed for the transport of gases or liquids. The controllers have been developed for operating the micropumps. Bartels Mikrotechnik can assume no liability for damages resulting from the pump media. This applies especially for hazardous fluids.

The pumps must be operated with Bartels Mikrotechnik electronics. Bartels Mikrotechnik GmbH cannot guarantee the proper work of the units with customer specific electronics. If other controllers than the ones from Bartels Mikrotechnik are used, Bartels Mikrotechnik disclaims any warranty.

Moreover, please note that components of the controller and pump are operating with high-voltage. Therefore, persons wearing pacemakers are recommended to avoid the operating system.

Bartels Mikrotechnik assumes no liability for abnormal handling, improper or negligent use of the micropump and the controller that is not conform to the specified purpose of the system. This applies especially for micropump controllers, components and systems of other manufacturers, which have not been certified by Bartels Mikrotechnik.

We guarantee that the micropumps comply with the actual state of scientific and technical knowledge and due to this, the operational risks are limited to a minimum.

Do not open the housing of the micropump and the controllers. 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 micropump is intended for pumping liquids or gases with varying flow rates controlled by the electronics. The controllers are intended for operating the micropumps. Any other use of the micropump or controller unit is deemed improper.

Do not make any modifications or extensions to the pump or controller 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 pump and risk and liability are automatically transferred to the operator.

Misuse.

The use of liquids, which may alone or in combination create explosive or otherwise health-endangering conditions (including vapors) is not permitted.

Staff selection and qualification.

All work in connection with the installation, assembly, commissioning/decommissioning, disassembly, operation, servicing, cleaning and repairing of the pump and the controller 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 mp6-EVA evaluation board

The evaluation board enables the simple use of one micropump of the mp6-series based on the mp6-OEM controller. Next to present standard parameter (270 Vpp, 100 Hz) the mp6-EVA also allows to adjust the pump parameters, partly by external tuning. As the supply voltage of the module can be provided via USB (no data interface), just attach it to a USB power supply and start the evaluation. Alternatively, it can also be supplied by a 2.5 – 5 V voltage source.



Safety notice.

The mp6-EVA generates voltages of up to 270 Vpp. All parts of the mp6-EVA evaluation board can carry voltages in this range. Therefore, the board should only be used by qualified personal. Although the output power of the module is very low, **proper insulation according to the application conditions needs to be considered by the customer.** This especially applies to the lower side of the PCB. Contact with water or other liquids needs to be prevented. The pump must not be changed while a driving voltage is applied to the board.

⚠ DANGER

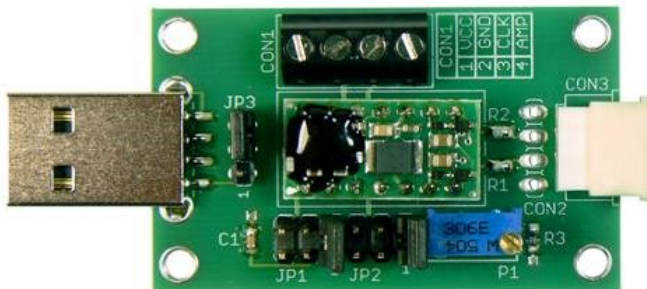
The EVALUATION BOARD can carry high voltage!

Be careful, WHILE CONNECTING AND HANDLING THE BOARD!

Electrical specifications mp6-EVA evaluation board.

As the evaluation board is based on the mp6-OEM module, all electrical characteristics and specifications of this product must be considered. Please have a look at the corresponding manual for more details.

Functional elements.



1 Elements are listed with their names according to the printed description on the PCB.

Connectors:

CON 1 – Screw terminal for external power supply and external clock / amplitude signal

CON 2 – Solder terminal for extension cable to connect one micropump of the mp6-series

CON 3 – Molex connector to connect one micropump of the mp6-series

USB connector for voltage supply via USB

Jumpers:

JP1 – Jumper for pump frequency setting

JP2 – Jumper for pump amplitude setting

JP3 – Jumper for power supply setting

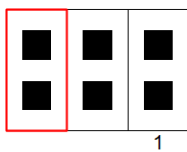
Others:

P1 – Variable resistor for amplitude adjustment

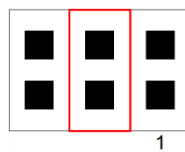
Operation.

To operate a pump with the evaluation board, the following steps are necessary:

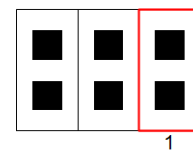
- Step 1:** Connect the micropump of the mp6-series to the board. Due to the orientation of the connector, the pump needs to be inserted with its metallic contacts upwards.
- Step 2:** Choose the pump frequency setting with Jumper 1
- Step 3:** Choose the pump amplitude setting with Jumper 2
- Step 4:** Choose the power supply setting with Jumper 3 (CON 1- or USB-port).
- Step 5:** Connect the board with the voltage source.

Pump frequency setting with jumper JP1.

Frequency defined by
clock signal at Pin 3 (CLK)
at screw terminal CON1



Frequency defined by
capacitor C1
(at delivery set to 226 Hz)*



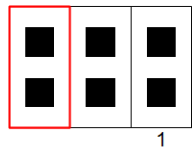
Internal frequency of the mp6-OEM
(100 Hz)

2 *versions before July 2011 had a setting of 50 Hz

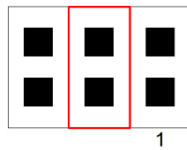
More information on the frequency setting with the CLK signal can be found in the mp6-OEM manual. The capacitor C1 can as well be changed by re-soldering, see image "OEM-Behavior 2" in the mp6-OEM manual.



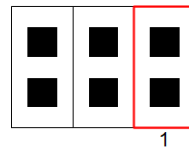
Pump amplitude setting with jumper JP2.



Amplitude defined by AMPLITUDE signal at Pin 4 (AMP) of screw terminal CON1



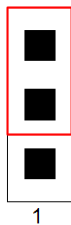
Amplitude defined by position of potentiometer P1



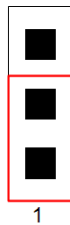
Maximal amplitude (270 Vpp)

More information on the amplitude setting with the AMP signal can be found in the mp6-OEM manual.

Operation voltage setting with jumper JP3.



Supply voltage via Pin 1 (Vcc) and Pin 2 (GND) of screw terminal CON1



Supply voltage via USB-port

Connecting the pump via CON2.

If the micropump of the mp6-series shall not be connected directly to the PCB with the Molex connector CON 3, an extension cable can be soldered to the connector CON 2.

The solder pads have the following pin assignment:

- P2 - (negative voltage Piezo 2)
- P2 + (positive voltage Piezo 2)
- P1 + (positive voltage Piezo 1)
- P1 - (negative voltage Piezo 1)



Please make sure that the cable can handle voltages up to 270 Vpp and ensure proper insulation of the cable!



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

Changes in the course of technical progress are possible without notice.

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