Additional Information

Electrical Safety of Piezo Micropumps

Although the piezo micropumps operate at rather high peak to peak voltages (up to 250 V pp), they are driven at very low power which makes them safe in operation for most applications. However, based on the individual application conditions, failure modes and possibilities of human contact with the pumps and /or controllers, the safety according to the applicable standards need to be checked. In the following some examples should be given based on available standards regarding electrical safety.

According to the VDE 0411 / IEC 61010 standard (Safety requirements for electrical equipment for measurement control and laboratory use), in the following cases, voltages which are higher than the safety extra-low voltage (SELV) are considered non-harzardous contact voltages:

- Electrical capacitance <0.1 µF at voltages up to 450V
- Electrical charge <45 µC between 450V and 15 kV
- Electrical energy <350 mJ at Voltages above 15 kV

With our micropumps we would fall into the first category, as both piezos of the pump together have a capacitance of 0,016 µF, the pump will be below the mentioned maximum. Therefore the pump voltage should be considered non-hazardous.
As the electrical circuit connected to the pump and its failure modes will also play a role for checking the compliance with the items mentioned above. A more detailed proof is necessary to be carried out based on the final product design together with a provider of certifications in the field of electrical products.

Especially for medical equipment the products are classified regarding patient protection. Out of the three classes B, BF and CF in most cases the class BF applies for products using the Bartels micropumps. Here, especially the leakage current needs to be checked, based on a human body model. As again the specific

driving conditions of the pump, the power supply and the pump controller itself have a major impact on these measurements, these can only be carried out on an application specific basis.

Together with industrial partners for electrical certification and characterization we can offer to check the electrical safety of the micropumps for specific applications.

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

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

Contact Data:

Bartels Mikrotechnik GmbH
Konrad-Adenauer-Allee 11
44263 Dortmund Germany
www.bartels-mikrotechnik.de
info@bartels-mikrotechnik.de
Tel: +49-231-47730-500
Fax: +49-231-47730-501

Visit our Website

www.bartels-mikrotechnik.de/downloads

for further information on applications.

Tutorials and helpful answers to frequently asked questions can be found in our FAQ

www.bartels-mikrotechnik.de/en/faq-english/

or on our YouTube channel

https://www.youtube.com/user/BartelsMikrotechnik

Find us on Social Media: