



# **DV 100 I**

**Micrometering valve with piezoelectric drive**

## **Technical Information**

Revision 1.3

# DV 100 I

## Micrometering valve with piezoelectric drive

### 1. Function Mode

The valve DV 100 I is driven by two piezoelectric actuators being arranged in a special way. The movement of same is imparted to a rod, which is then lifted or lowered. A sealing ball from resistive ceramics is fixed to the lower end of this rod. The tight fit from ceramics, which is also the nozzle, is closed by means of the sealing ball. When the sealing ball is lifted the medium can flow off the valve.

Due to the extremely fast piezoelectric drive it is possible to achieve a metering with a frequency of up to 1000 Hz. By means of the metering time of approx. 250  $\mu$ s (maximum stroke) it is possible to realize least metering quantities of up to approx. 2nl (subject to the medium). The metering time can be increased by a minimal value of 10  $\mu$ s with an incremental width of 10  $\mu$ s. Hereby, a very exact attitude of the metering quantity is possible.

The drive and the tight fit have an extremely long service life due to the arrangement of the piezoelectric actuators and the material used for the tight fit.

#### 1.1 Non-contact metering

- non-contact metering of drops without dosing needle
- non-contact metering of a medium jet

By means of the non-contact mode it is possible to meter the medium with a distance between valve and substrate of up to several centimeters. This way a Z-axis movement of the valve and the danger of the dosing needle running against the substrate are avoided.

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### 2. Technical Data

dimensions (L x W x H)	72 x 14 x 60 mm (without needle adapter)
measurable media	lubricants like oils and fats, varnishes and colours, hydrous solutions, organic solvents, adhesives and adhesive components, liquid polymers and polymeric solutions and many other liquids
measurable viscosity range	approx. 50 – 200.000 mPas (thixotrope)
measurable fillers in the medium	quartz powder, iron oxide, aluminium oxide, aluminium nitrite, nickel, silver, glass and polymeric particles up to a filling share of max. 50 % and grain sizes of max. 50 µm
minimum metering time	10 µs (one open and close)
minimum metering time for maximum stroke	250 µs (one open and close)
maximum metering time	infinite (permanent metering)
minimum dead time	10 µs (in the middle of two metering cycles)
maximum dead time	infinite (stop)
metering frequency	1000 Hz (however, not more than 150 metering cycles / s)
metering accuracy	approx. 2 % (with constant pressure and temperature)
maximum working pressure	100 bar
throughput	at least 300 g / min with 1000 mPas and 60 bar
ambient temperature range	up to +45 °C
medium temperature range	up to +100 °C (DV 100) up to +180 °C (DV 200) (non-boiling media)
tight fit ball / nozzle	self-adjustable from hard ceramics, removable for cleaning
diameter standard nozzle	300 µm, light-blocked (others on demand)
maintenance and control interval tight fit	approx. 1 x 10 <sup>7</sup> cycles up to 5 x 10 <sup>8</sup> cycles (depending on the medium)
maintenance and control interval piezoelectric drive	approx. 1.0 - 3.5 x 10 <sup>8</sup> cycles (depends on metering frequency and temperature)
materials in contact with the medium	Perfluoroelastomer, stainless steel 1.4305
electric supply	0.5 m cable with 10-pole circular connector, extension cable 4.5 m optional
min. bending radius	R 35 mm (one-time); R 100 mm (deliberate movement)
medium connection	M 10 x 1
fastening thread at the valve body	M 4; 6 mm deep Tightening torque: 2.5 Ncm +0.2
degree of protection	IP 54
explosion protection	no
storage temperature	-10 °C up to +85 °C
weight incl. connecting cable	approx. 290 g
suitable drive electronics	Control unit type CON 100 or CON 200 (for 1 valve each)
Dispensing Process Electronic	PDA1, PDA 2 <sup>+2</sup>

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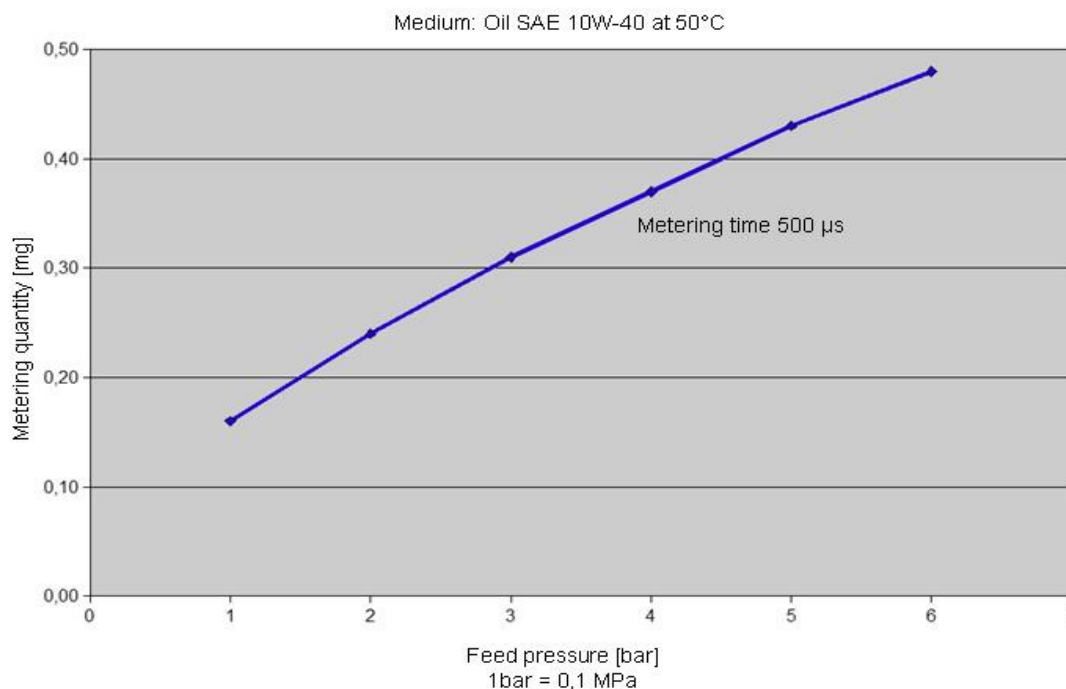
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### 3. Examples for non-contact metering of micro-quantities with 300 µm nozzle

Medium	Viscosity [mPas]	Feed pressure [MPa]	Metering time [µs]	Distance to substrate [mm]	Valve temperature [°C]	Metering quantity [µl]
Motor oil	SAE 10W-40	0,1	250	10	50	0,070
1-k acrylate UVB-curing	165.000 thixotrop	2,5	250	7	40	0,030
1-k silikon heat-curing	750	1	260	10	30	0,004
1-k epoxy	4.000	4,2	250	13	30	0,100
1-k epoxy	36.000 thixotropic	4,6	250	11	45	0,060
1-k disperse colour (acrylate based)	50	0,5	250	6	30	0,002
1-k acrylate UVB-curing	80	0,6	260	11	30	0,002
1-k acrylate heat-curing	8.000	3	250	4	30	0,006

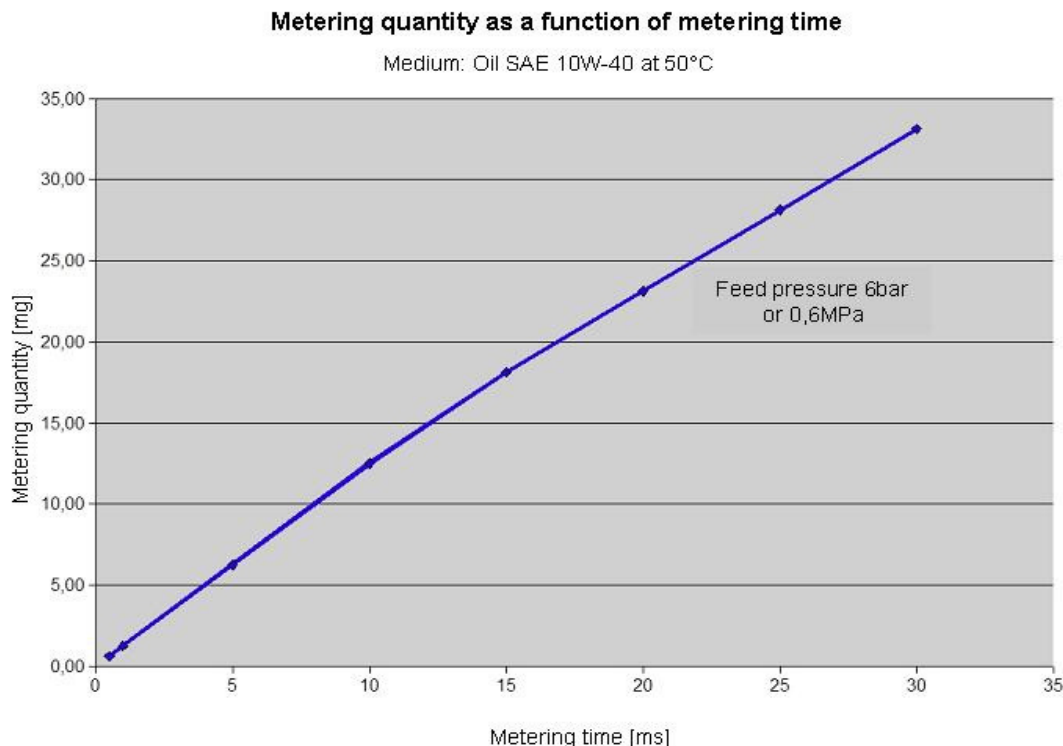
### 4. Characteristic curves with 300 µm nozzle

**Metering quantity as a function of feed pressure**



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### 5. Important Comments Regarding Technical Information

The information regarding the medium to be metered do not lay claim to completeness. If you have some questions or need further advice, please get in contact with PICODOSTEC.

Due to the variety of the medium that can basically be metered the mentioned examples can only give a general overview which is based on the experiences of PICODOSTEC. Same are on no account a guaranteed characteristic as defined by a technical specification. This is also valid for the service life of the valve being influenced by the metered medium (e.g. fillers in the medium).

PICODOSTEC recommends to the user to check at any rate the metering properties of the medium, the resistance of the sealings used in the valve and the service life of the valve depending on the medium to be metered by means of field tests.

It is not allowed to meter medium, which cure irreversibly in the valve, like e.g. anaerobic adhesives and superglues (cyanacrylates) or materials damaging the sealing material ISOLAST.

In case you have difficulties regarding the valuation of your medium, please just get in contact with us – we will certainly give you the required support.

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### 6. Safety Instructions

The described electric devices and machines are equipment to be used in industrial installations.

During operation several parts of the micrometering valves type DV carry dangerous voltages and could have surface temperatures of up to 200°C. Therefore do not open on no account the casing and provide for sufficient protection against accidental contact. Repair work shall only be carried out by the qualified personnel of PICODOSTEC.

Therefore the persons in charge for the safety of this installation have to guarantee that

- unqualified personnel is not allowed to work on the devices and machines or in close proximity to same
- only qualified personnel will be instructed to work on the devices and machines
- among other things the operating manual and the other documents will always be at the disposal of these persons while effecting the corresponding work and that they will be obliged to observe these documents resolutely

Qualified personnel are persons, who – due to their training, experience and instruction as well as to their knowledge of relevant standards, regulations and rules for prevention of accidents and operating conditions – have been entitled by the person in charge for the safety of the installation to effect the required work and who are able to recognize and avoid possible dangers on this occasion. (definitions for specialists according to VDE 105 or ICE 364)

The warranty for the products of PICODOSTEC GmbH follows exclusively the current setting of our general business conditions.

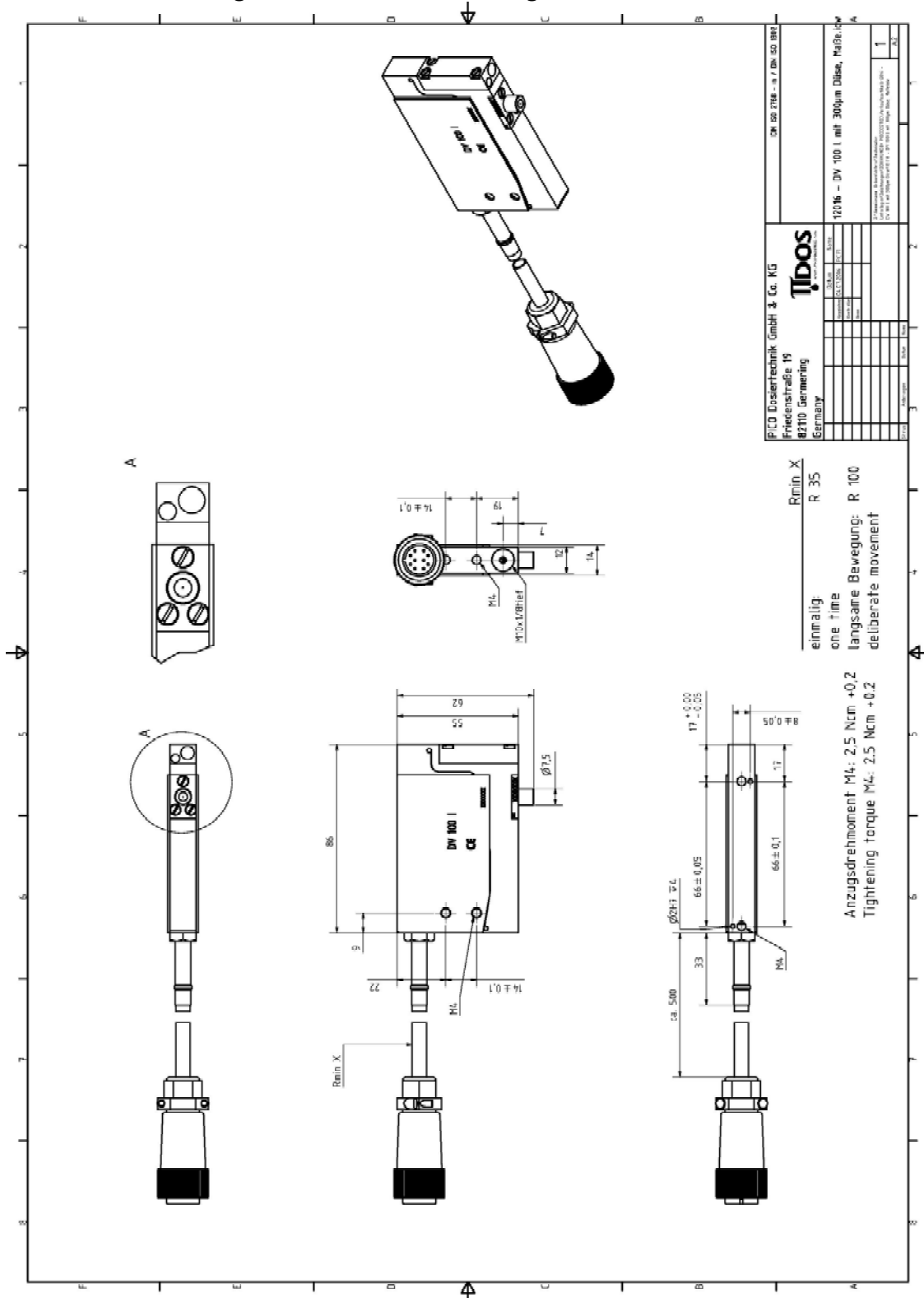
These safety instructions do not lay claim to completeness.

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## 7. Dimensioned drawing for non-contact metering



# PICO Dosiertechnik GmbH & Co. KG

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We scrutinized this product manual very carefully. However, we cannot guarantee that same is without faults. If you have further questions or need some advice please get in contact with:

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