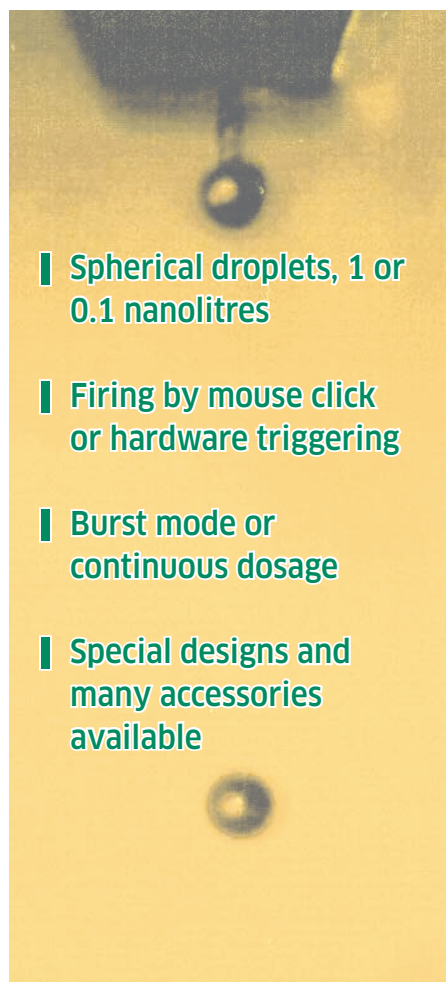


# Nanolitre Dosage

Piezoelectric Microdispensers



GESIM



**Spherical droplets, 1 or 0.1 nanolitres**

**Firing by mouse click or hardware triggering**

**Burst mode or continuous dosage**

**Special designs and many accessories available**

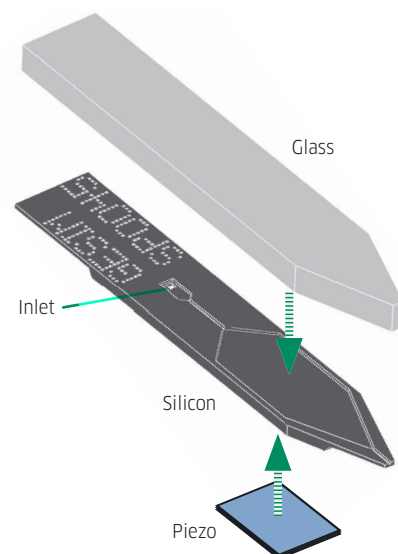
GESIM's contact-free and valveless print heads are manufactured by microsystems technology. They eject a droplet when the piezoelectric actuator is deformed by an electrical pulse ("drop on demand").

Applications: microarray spotting, screening, combinatorial chemistry, surface coating, sample preparation, generation of gradients by varying the droplet number, and more.

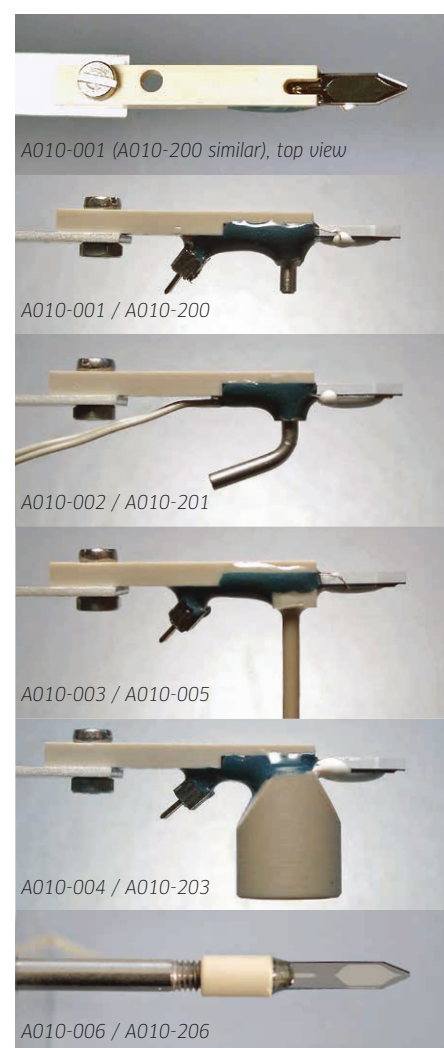
### Standard Pipettes SPIP and PICPIP

Both dispenser types are identical, except for their nozzle sizes, and each one is available with different inlet adapters, mostly including a mounting pad with two boreholes.

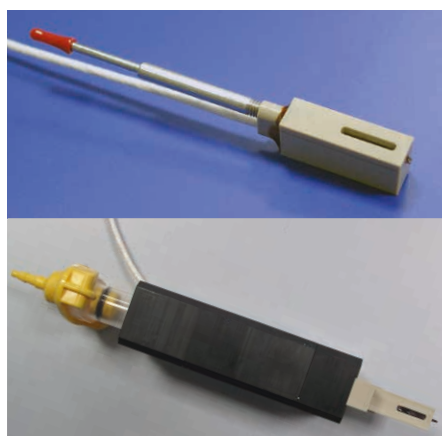
- Volume per droplet: **SPIP** 0.6...1.1 nl, **PICPIP** 0.1...0.2 nl
- Low-power piezoelectric actuators (at about 70 V, pulse duration 100  $\mu$ s)
- Pump chamber 0.8  $\mu$ l
- Droplet frequency 16 – 1000 Hz
- Max. flow SPIP/PICPIP: 70/12  $\mu$ l/min
- Max. viscosity: 5 mPa·s (5 cP)
- Volume accuracy around 1 % when dispensing 1000 droplets
- Surfaces in contact to liquid: SiO<sub>2</sub>, PEEK, stainless steel (when used)
- Overall length 32 mm (except A010-006/A010-206)



How the dispensers are made: a channel is etched in the silicon, glass is anodically bonded, and the dispenser is cut out from the wafer. Piezo and cable/plug are attached, and the pipette mounted in the PEEK housing. Bottom: dispenser types. The dispenser tip is 2.8 mm wide. Note the mounting pad with two 2.2 mm boreholes.



Article Number	Description	Figure
<b>Microdosage Heads / Micropipettes (Some Special Tips not Listed)</b>		
A010-001	SPIP, stainless steel inlet (perpendicular to dispense axis), mounting pad, OD 1.6 mm	●
A010-200	PICPIP, stainless steel inlet (perpendicular to dispense axis), mounting pad, OD 1.6 mm	●
A010-002	SPIP, bent steel capillary (parallel to dispense axis), mounting pad	●
A010-201	PICPIP with bent steel capillary (parallel to dispense axis), mounting pad	●
A010-003	SPIP, PEEK capillary, mounting pad (no metals in contact with liquid)	●
A010-005	PICPIP, PEEK capillary, mounting pad (no metals in contact with liquid)	●
A010-004	SPIP, 1/16 inch HPLC bushing (PEEK)	●
A010-203	PICPIP, 1/16 inch HPLC bushing (PEEK)	●
A010-006	SPIP, cylindrical housing with fluid connector for tubes	●
A010-206	PICPIP, cylindrical housing with fluid connector for tubes	●
A010-007	SPIP, stainless steel inlet (angled), LEMO electrical connector	
A010-202	PICPIP, stainless steel inlet (angled), LEMO electrical connector	
A010-300	Nano-Tip, heatable, with flange for tubes (requires temp. control system A070-453)	●
A010-302	Pico-Tip, heatable, with flange for tubes (requires temp. control system A070-453)	(●)
A010-301	Nano-Tip, heatable, with flange for cartridges (needs temp. control system A070-453)	●
<b>Microdosage Heads with Cartridge (Some Specials and Tube Sets not Listed)</b>		
A010-400	Dispenser head, PEEK housing, with PEEK reservoir (complete setup; available for drop volumes from 10 to 600 pl, please inquire)	
A010-401	Dispenser head, PEEK housing, without reservoir	
A010-402	Cartridge for the PEEK dispense head (spare part)	
A010-403	Accessory pack for cartridge dispenser, with filter and sealing (spare parts)	



Heatable dispensers A010-300 (top) and A010-301 (bottom), the latter one with 3 ml heated reservoir that can be connected to compressed air

We offer designs for practically every application, e. g. multiple dosage heads (for thicker lines) or mixing heads with two inlets (please inquire). Viscous solutions (e. g. glues, liquid crystals, semiconducting polymers) can be dispensed at high temperature, up to ca. 700 mPa-s. A temperature controller is necessary.

### Control Unit multi-dos

For up to eight controller boards. The programme **mds8** drives all controller modules independently. In addition, the application programming interface in the **multi-dos** allows the integration of dispensers in customized environments (incl. LabVIEW) by sending string commands via the serial interface.

Items of shipment: controller for single microdispenser, wide-range power supply, serial cable (RS-232; USB adapter available), cable to microdispenser, trigger input, setup and programming manual, Windows control software **mds8** (adjustment of dispensing parameters,



Stroboscope unit (A020-302) with holder for piezo dispenser (here: heatable, with cylindrical housing)

ters, start/stop or pre-set bursts of 1 – 65535 drops). Dimensions: 19 cm x 14 cm x 5 cm.

### Stroboscope for Droplet Visualization

Provides a live view of microdrops and thus helps to adjust dispensing parameters. Contains a yellow illuminating diode, a video camera, and a holder for SPIIP or PICPIP. The stroboscope control board occupies a slot in the multi-dos.

### Syringe Pump / Dilutor

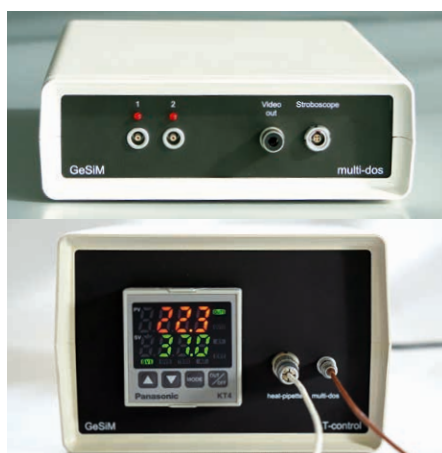
Micro-dosage heads can be filled manually using a syringe. A dilutor system consisting of a computer-controlled syringe pump with three-way valve gives you additional functions: flushing with system liquid (usually water) and automatic sample uptake from the nozzle or feeding of the sample from the back via the fluidic inlet. Requires a second serial interface (RS-232). The syringe pump is also controlled by a string command instruction set.



Dilutor module with one channel (A072-102, external power supply not shown)

### Selected Liquids

Acetic anhydride, acetone, acetonitrile, betaine < 1 M, chloroform, cyclohexanone, dextrane solutions, detergents (e. g. 2 % Triton X-100 or Tween-20), dichloromethane, DMF, DMSO, 1,4-dioxane, DNA (oligos < 3 mg/ml, plasmid < 1 mg/ml), ethanol, ethyleneglycole, N-FMOC-amino acids (200 mM in DMF), glues (Epoxy Technologies OG169, UVO-114, 301-2), glycerol < 50 %, iodine (in THF/pyridine/H<sub>2</sub>O 3:75:20:75), isopropanol, liquid crystals (Merck Licristal ZLI-2222, MLC-6681, 43 °C), MALDI matrix (e. g. CHCA in NMP, HPA in 20 % acetonitrile), methanol, 1-methyl-2-pyrrolidone (NMP), 1-methylimidazole (16 % in THF), NaCl < 3 M, PDMS (up to 30 % in GBL), phosphoramidite in acetonitrile, PEG 10000 5 %, polymers (P30T 1 mg/ml in trichloroethylene or chlorobenzene, PEDOT:PSS 0.14/2.6 %), Protein (< 5 mg/ml in PBS), silane (2-3 % in propanol), 3x SSC (saline sodium citrate), THF, tetrazole (in acetonitrile), toluene, urea < 7 M, water



Top, multi-dos 2 for two pipettes and strobe; bottom, temperature control unit for a heatable dispenser

Article Number	Description	Figure
<b>Control Hardware (Rental Devices not Listed)</b>		
A020-301	Control unit multi-dos 2, with PC software *	●
A020-303	Extension module MP1 for multi-dos (additional dosage channel), with cable	
A020-004	Trigger button for manual burst release	
A020-302	Stroboscope system for droplet visualization in multi-dos 2, complete	●
A020-010	Stroboscope control extension module for multi-dos (only LED, without video camera)	
A020-305	LED with connection cable, naked (plugs into stroboscope control unit)	
A070-453	Temperature control unit for heatable pipette (also for Nano-Plotter)	●
* comes with application programming interface for adaptation to external equipment		
<b>Liquid Handling (Exemplary)</b>		
A072-102	Dilutor module, 1 channel (syringe pump with 3-way valve, with housing) *	●
A072-108	Dilutor module, 4 channels (see A072-102, complete in single housing) *	
Please inquire for tubes, filters, fittings, bottles, and further dispensers!		

# GESIM Nanolitre Dispensers

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