

PICO®

PIEZOELECTRIC
DISPENSING
SYSTEMS

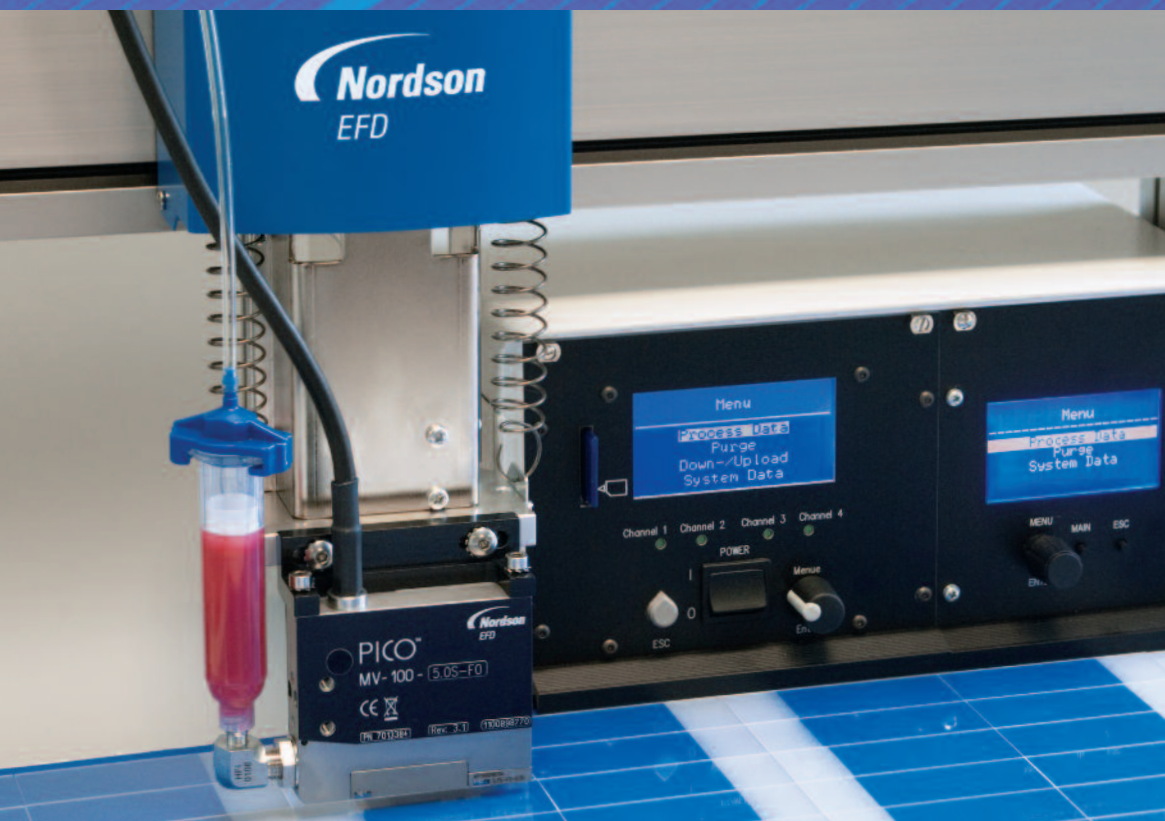
Unparalleled speed and accuracy for your
most challenging dispensing applications


Nordson
EFD



Nordson EFD's PICO dispensing systems use piezoelectric technology to deliver high production speeds with exceptional deposit accuracy and superior process control.

- Continuous operation at 500 cycles/second (Hz)
- Bursts of 150 at 1,000 cycles/second (Hz)
- Consistent shots as small as .5 nanoliters
- Ideal for hard-to-access or uneven substrates
- Non-contact jetting systems eliminate Z-axis movement, for significantly faster production speeds
- Configurable for high-speed needle dispensing
- Compatible with a wide range of fluids
- Slider valve systems available for solder pastes and other filled materials



Applications

Electronics

Oils, greases and adhesives for production of electronic components
UV adhesives on mobile phone speaker membranes to attach voice coils
Fluxes and conformal coatings
Partial dispensing on already printed circuit boards
Glob-top and underfill materials
Non-contact dispensing prevents damage to delicate LED bond wires

Chemical

Adhesive ingredients
Solved polymers and reactive components
Materials for pressure-sensitive adhesive tapes

Micro-mechanical

Adhesives used in watch production
Oils and greases on measuring instruments and watch movements
10 nl of special grease onto a 20-30 μm watch bearing

Food and Beverage

Disinfectants, flavorings, colorings
De-foaming agents prior to filling bottles

Automotive

Adhesives
Marking and color coding inks
Grease dot-on-dot buildup between cogs of gears
Glass frit dielectrics onto exhaust sensors

Mobile Devices

UV-cure adhesives for bonding applications (camera modules, keypads, microspeakers, touchpads, and displays)
Hydrophobic fluids for protective treatment applications
Lubricants for internal and external ports and connectors
Epoxies for underfill applications

Medical Devices/Cosmetics

Solvents and adhesives on syringes, filters, tubes and other consumables
UV adhesives
Reagents
Cleaning and disinfecting agents
Active ingredients and catalysts
Greases during assembly of precision gearboxes, drives for small electronic devices like toothbrushes, dental water jets, shavers
High-performance lubricant on gears during assembly of electric toothbrushes
Silicone oils
Lubricants on interiors of plastic spray pumps

Packaging

Colors
Hot melt adhesives
Sealing lacquers
Silicone oils

Marking Fluids

Inks and paints

Mechanical

Oils and greases
Cooling lubricants
Adhesives, including hotmelts
Solvents and primers
Markers

Photovoltaics

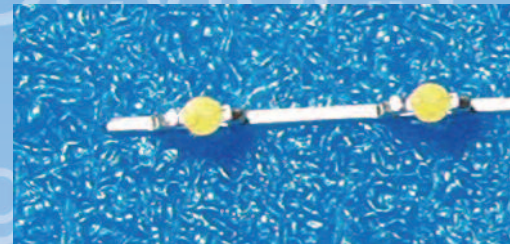
Flux: stringing and tabbing, PV bus bars and ribbons
Silver epoxy: stringing and tabbing, bus bars, ribbons, between contacts
Silver epoxy/inks on TCO Glass
UV dielectrics for TF cell edge isolation
Etching paste for crystalline cell edge isolation
UV dielectrics for short prevention

Photovoltaics Electronics



Chemical Industries

Medical Devices



Packaging

Mechanical Engineering

Precision Mechanics



Food & Beverage

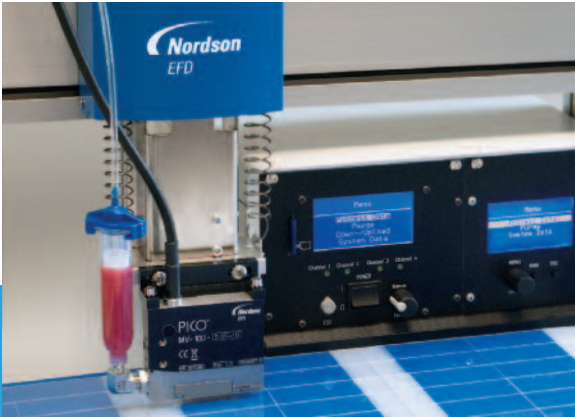
Cosmetics

Assembly

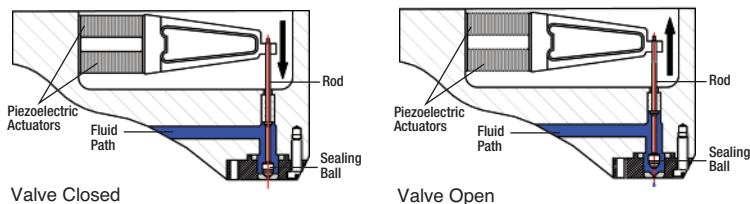


Automotive Mobile Devices

System Overview – Valves



Nordson EFD's PICO piezoelectric jet dispensing systems have four components: (1) a PICO valve, (2) a DCON valve driver, (3) a PICO controller and (4) a fluid reservoir. All components are engineered to work together as a complete, integrated system that produces exceptionally fast, accurate deposits of a wide range of fluids.



Jet Valves (for Non-contact Metering)

PICO jet valves incorporate two piezoelectric actuators composed of stacked ceramic coins that expand and contract in response to changes in voltage supplied from the valve driver. Both actuators are connected to a vertical rod with a wear-resistant ceramic sealing ball at its lower end. When the valve is closed, the ball is seated in the valve nozzle plate.

When voltage is applied to the actuators, the rod and sealing ball are raised so that the pressurized fluid can flow to the nozzle. When the voltage is changed, the rod and sealing ball descend rapidly to "jet" the fluid out of the nozzle and onto the substrate.

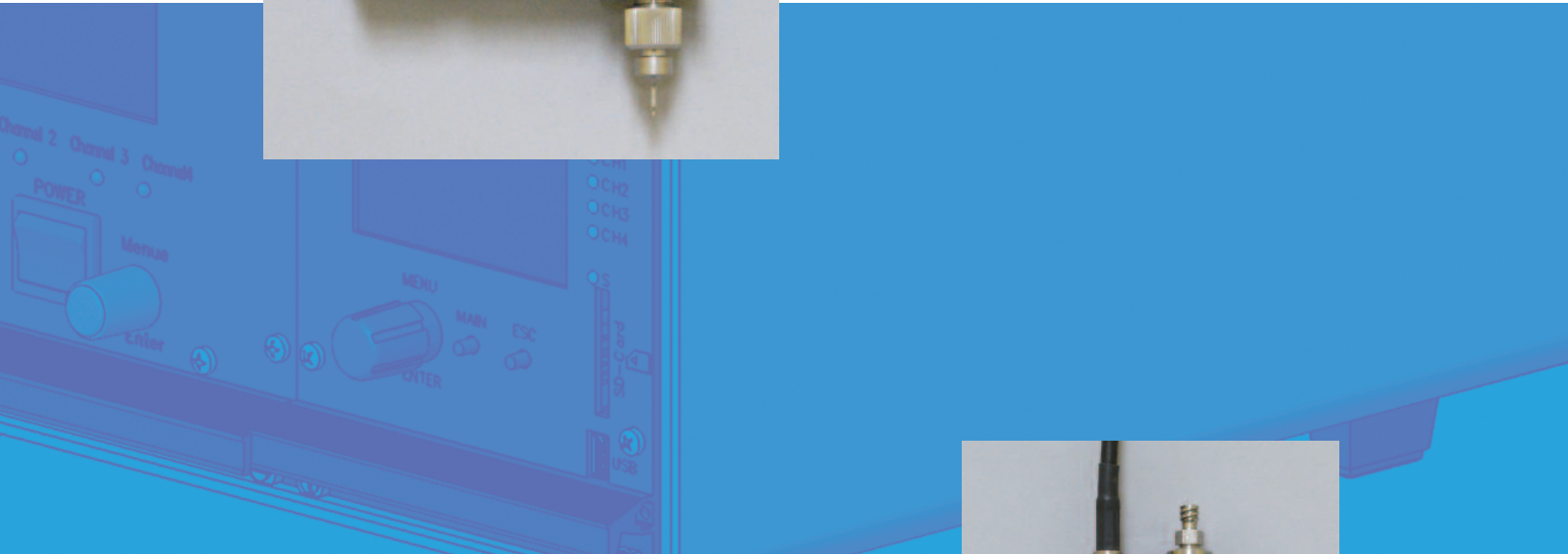
The extremely fast action of the piezoelectric actuators makes it possible to dispense fluid continuously at speeds of up to 150 cycles per second. Depending on the fluid, the system can produce consistent shots as small as 2 nanoliters.





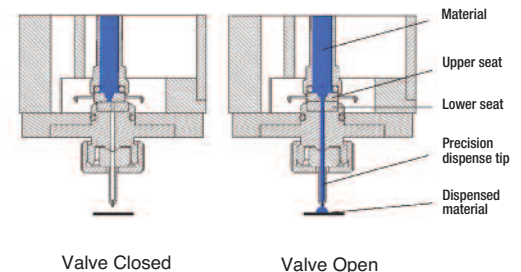
Needle Valves (for Contact Metering)

PICO needle dispensing systems provide exceptional deposit accuracy and process control for a wide range of fluids. Fast-acting piezoelectric actuators make it possible to apply extremely small dots and well-defined lines with precise control of the beginning and end points. An adapter attached to the nozzle plate allows the use of precision dispensing needles.



Slider Valves (for Solder Paste and Highly Filled Adhesives)

Slider valves are designed for needle dispensing of particle-filled fluids and incorporate two sliding ceramic plates, each with a small opening in its center. The fluid feed tube is attached to the upper plate, and the dispensing nozzle is attached to the lower plate. In the closed position, the ceramic plates are offset so that the openings are not aligned. When the piezoelectric actuators are energized, the upper plate slides over the lower plate until both openings are aligned so that fluid can flow to the needle.



System Overview – Drivers and Controllers



DCON Valve Drivers

Piezoelectric dispense valves are powered by valve drivers that use an amplifier to generate the signal for the piezoelectric actuators. DCON drivers are available with or without temperature controllers. The temperature control version is designed for use with valves that incorporate a heater to keep the fluid at optimal jetting viscosity.

DCON valve drivers:

- Supply voltage to actuate the piezoelectric elements in the valve
- Control the temperature of the valve heater (select models)
- Keep the valve closed in case of power loss, for a maximum of 20 minutes

Features include:

- Ability to operate up to 4 channels with one device (saves space in multi-valve installations)
- 35 x 63mm digital display
- Real-time clock
- Available with Clock Generator feature for single line pulse time programming of valves
- Over 200 DCON Driver configurations are available for use with low viscosity, medium viscosity, high viscosity and slider valves

PICO Valve Controllers

PICO valve controllers are used to set the fluid dispensing parameters for each valve. Graphical displays and user-friendly menus make it simple to create complex jetting processes on a PC, and then download them to the controller via an integrated SD card slot. Features include:

- High speed precision timer for programming pulse time and dispense sequences
- Pulse time adjustable in 50 microsecond or 10 microsecond increments
- 128 x 64 pixel graphic display
- 10 individual pattern sequences programmable via txt file and SD memory card (included)
- Continuous operation mode
- 25-pin sub-D PLC interface

Models

PICO Controller 2+2-2CH-V2-N 2 channels, upgradeable to 4 channels

PICO Controller 2+2-4CH-V2-N 4 channels

Optional housings provide convenient mounting for controllers and drivers.



Features/Benefits

Nordson EFD's PICO dispensing systems combine high production speed with exceptional accuracy and process control. Three configurations are available to handle virtually any application:

Non-contact jet valve systems make it possible to apply fluid in hard-to-access areas or onto uneven or delicate substrates where a dispensing needle cannot be used.

Needle valve systems produce extremely small dots and well-defined lines with precise control of beginning and end points.

Slider valve systems provide fast, precise application of solder paste and other particle-filled materials.

Benefits

- Now more than 3x faster
- 500Hz permanent dispensing
- Make lines and dots faster and better for higher production yield / UPH (Units Per Hour)
- Eliminates Z-axis movement and the need for precise height positioning, resulting in significantly faster dispensing speeds
- Outstanding process control for high dot-to-dot consistency
- Reduces downtime and scrap by eliminating risk of substrate-nozzle collision
- Fast change-over without the need for time-consuming process readjustments

Features

- Integrated heaters and different nozzle orifice sizes allow the dispensing process to be optimized for a wide range of fluids
- State-of-the-art piezoelectric actuators provide fast cycle time and long life
- Long-wearing ceramic sealing ball and seat
- Replaceable nozzle plates for extended valve life

Capabilities

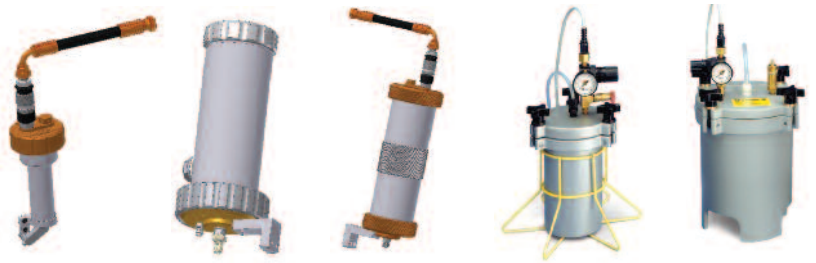
- Ideal for use on uneven substrates or hard-to-access areas
- Consistent shot size, with droplets starting at 0.002 μ l (2 nl) and flow rates up to 300 g/min (10 oz/min)
- Continuous operation at 500 cycles/second (Hz)
- Bursts of 150 at 1,000 cycles/second (Hz)
- Dispenses a wide range of low- to high-viscosity fluids
- Non-contact jetting of droplets
- Non-contact jetting of lines
- Covering areas by jet dispensing of droplet arrays
- Non-contact jetting onto three-dimensional substrates
- Optional needle adapter allows contact dispensing of dots and beads with superior consistency and precise positioning



PICO Fluid Reservoirs and Dispensing Needles

PICO reservoir systems are designed to function with Nordson EFD Optimum® barrel and cartridge components as a complete, integrated system that improves yields and reduces costs in fluid dispensing processes. A comprehensive selection is available to meet the fluid capacity needs of your jetting or needle valve applications.

Choose EFD Optimum reservoirs for standard operating fluid feed pressures under 7 bar (100 psi). For fluid pressures greater than 100 psi, select PICO stainless steel reservoir retainer systems that accommodate standard EFD Optimum barrels or 2.5, 6.0, 12, 20, and 32 oz cartridges. PICO stainless steel reservoir systems can accommodate input pressures as high as 50 bar (725 psi).



Precision stainless steel needles for contact dispensing applications are available, with orifices ranging from 16 to 32 gauge. All tips have chamfered outlet ends, and some sizes are available with PTFE-coated tip shafts for use in specific applications.



Specialty sizes and tip configurations are also available. Please contact your local PICO representative for assistance.

Testing

To ensure that the PICO system is the appropriate solution for our customers' applications, every fluid is tested in one of our global jetting labs, and the results supplied in a timely manner.

Viscosity

Examples of fluids that are suitable for jetting

Greases and oils

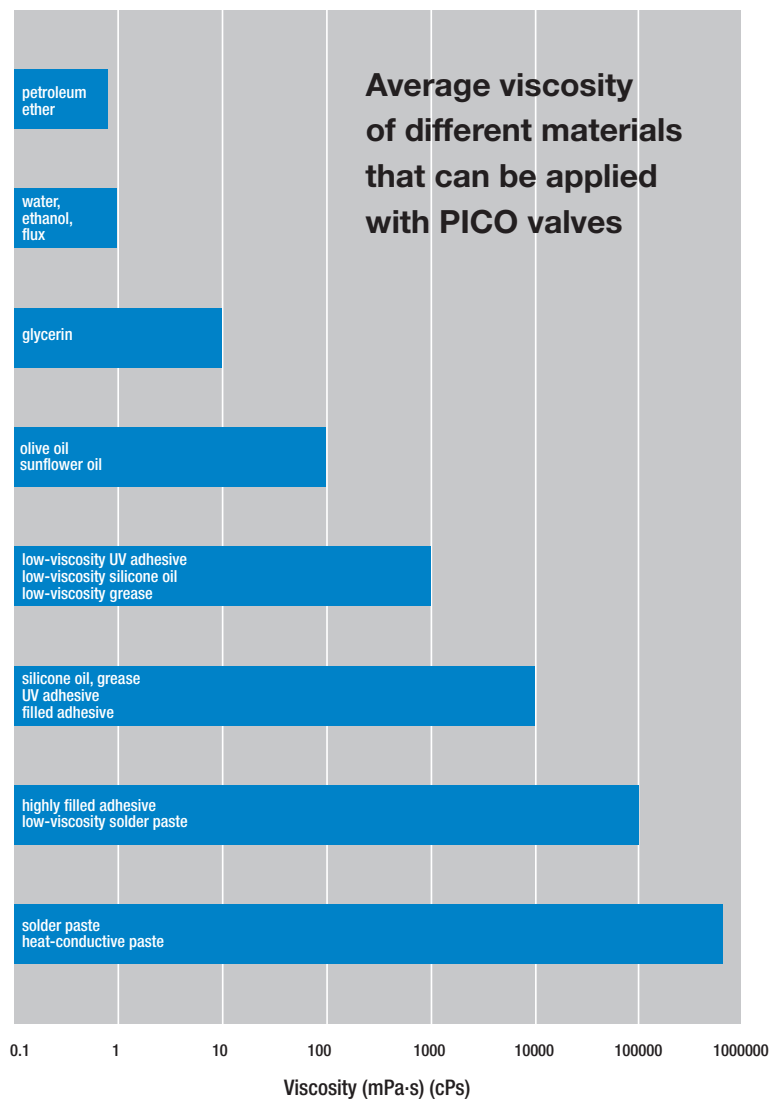
Non-curing fluids such as disinfectants, flavorings, medical reagents, etc.

UV-cure adhesives

Silicones

Filled materials with evenly distributed small particles

Cyanoacrylates (valve must be conditioned with special fluid to remove moisture)



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