

Sheath Gas Module for PicoView®

Models PV-300 (Micromass), and PV-500 (Thermo Finnigan)

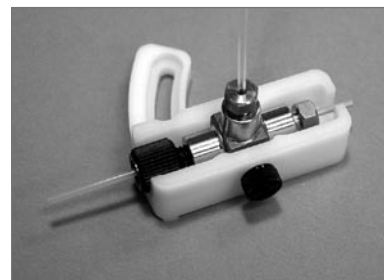
The new sheath gas module for PicoView® can extend your available flow rates into the microspray region (1-10 $\mu\text{L}/\text{min}$) or be used to assist droplet formation in highly aqueous mobile phases while running at nanospray flow rates. For use with PicoFrit® columns or uncoated TaperTip™ emitters, the sheath gas module is compatible with the uncoated tip module (UTM) found in the PV-300 and PV-500 PicoView models.

Features

- Easy-to-load design supports PicoFrit® columns and TaperTip™ emitters
- Compatible with variable lengths of fused silica
- Coaxial PEEK™ needle for low-pressure, ambient temperature sheath gas
- Gas delivered by 1/16" OD tubing for universal connectivity
- User-determined sheath nozzle distance for optimal control

Sheath gas module assembly

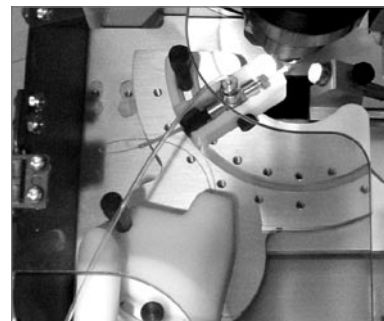
The sheath gas module, for PicoView® models PV-300 and PV-500 enables the use of coaxial sheath gas when using PicoFrit® columns or TaperTip™ emitters from New Objective. The economical, easy-to-use design is based on a conventional 1/16" bore stainless steel tee. Just thread the PicoFrit or TaperTip (distal end first) through the tee. Then mount the tee on the XYZ platform. Electrical contact is made at the distal end of the emitter inside the conventional uncoated tip module (UTM). The advantage of this design is that it adds no extra connections or volume to the plumbing path and allows for different length columns and emitters. For safety reasons, this module is not compatible with standard- or distal-coated PicoTips®. Figure 1 shows the sheath gas module components.



Sheath gas module



Sheath gas module in use on a PicoView® Model PV-300 with the uncoated tip module



Sheath gas module in use on a PicoView® Model PV-500

Module components

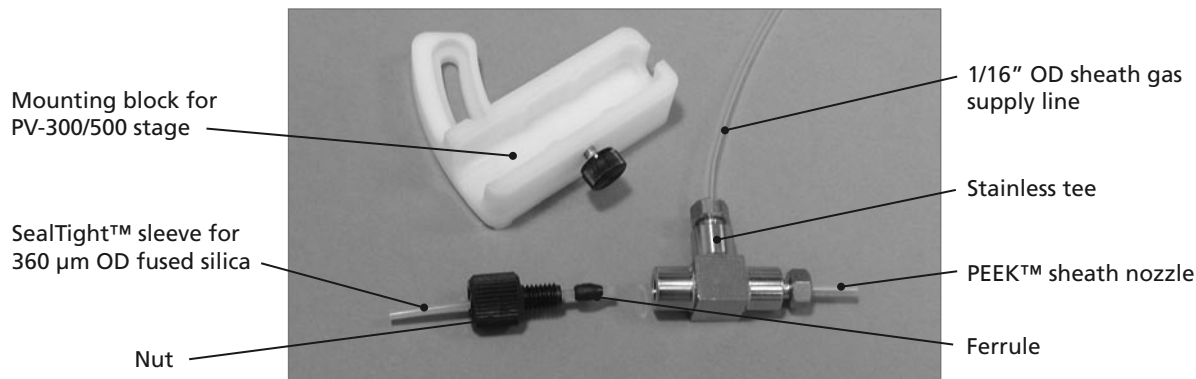


Figure 1 Sheath gas module components

IMPORTANT: Never try to feed an emitter or column through the tee tip-end first. You are likely to break the tip.

- 1) Loosen the nut securing the SealTight™ fitting by one-half to two turns and feed a PicoFrit® or TaperTip™ through the PEEK™ nozzle, distal end first, until it comes through the SealTight sleeve (Figure 2).
- 2) Pull the distal end of the emitter through the sleeve until the tip protrudes 0.5 to 2 mm past the end of the PEEK nozzle, as shown in Figure 3. Tighten the nut to lock the tip in place and ensure a gas-tight seal.

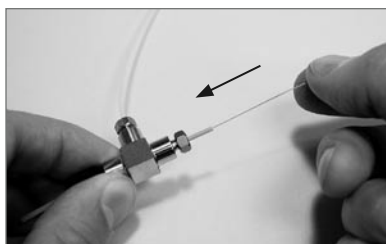


Figure 2 Feed the emitter, distal-end first, through the PEEK™ nozzle.

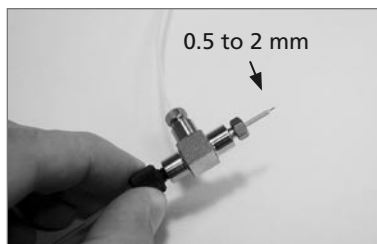


Figure 3 The tip of the emitter protrudes 0.5 to 2 mm past the PEEK™ nozzle.

Mounting the module on the PicoView® stage

WARNING: Do not attempt to mount the module or replace the emitter unless the ESI voltage is turned off and the instrument is in standby mode.

IMPORTANT: Ensure that gas flow has been reduced to zero prior to connecting the sheath to the gas line.

Failure to adhere to these warnings may result in serious injury to the operator. These operations should only be carried out by trained, qualified personnel.

Prepare your instrument by placing it into standby mode and reduce the ESI voltages to zero. Unlock the PicoView® mounting system and pull the PicoView base and housing into the open position. Disconnect the high voltage cable from and remove the standard-emitter mounting hardware. Place the UTM in the rear stage position. The sheath gas mounting block will fit into the forward stage position. Consult the PicoView manual for instructions on installing the UTM in the rear stage position.

Load the stainless steel tee into the sheath gas mounting fixture with the tip-end protruding past the slot on the face of the block, as shown in Figure 4. Tighten the set screw (on the right-hand side of the fixture) so that the tee is held firmly in place.

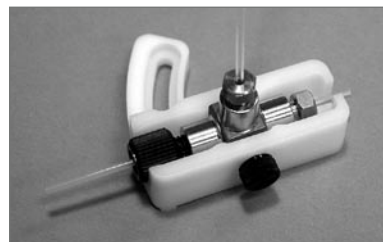


Figure 4 Stainless steel tee loaded into the sheath gas mounting fixture

Mount the sheath gas fixture in the forward slot of the PicoView stage; the UTM should be fitted into the rear slot. High voltage will be applied through the UTM to the distal end of the emitter. Remove the cover of the UTM. Trim the distal end of the TaperTip™ or PicoFrit® and connect to the MicroTee included with the UTM, as shown in Figure 5. Consult the PicoView manual for further instructions on loading the MicroTee. The other end of the MicroTee should be connected to your sample injector or mobile phase pumping system with fused-silica tubing.



Figure 5 UTM in rear stage position loaded with the MicroTee

Replace the UTM cover and lock it into position, as shown in Figure 6. Connect the 1/16" OD sheath gas line to your mass spectrometer's sheath gas supply line. Reconnect the ESI high-voltage cable to the UTM. Carefully slide your PicoView system into the operating position. Use caution to make certain that the tip does not contact the mass spectrometer inlet before locking your PicoView into operating position. Adjust the position of the XYZ stage if necessary. You are now ready to initiate operation.



Figure 6 UTM with cover locked into position onto the stage

Tuning Hints

- For initial setup and system parameter tuning (sheath gas flow, ESI voltage, emitter position), it is best to work with a well characterized standard. Delivery of a standard by continuous infusion is preferred, as this method provides sufficient time to optimize each parameter.
- Sheath gas is best used with the emitter mounted orthogonal, or nearly orthogonal, to the MS inlet.
- Use the minimal amount of sheath gas to achieve the desired effect. Too high a gas flow setting will reduce ion current, reducing sensitivity.
- Using sheath gas will change both the optimal emitter position and the ESI voltage. Optimal emitter location is usually farther from the MS inlet (typically 20-30% greater than the non-sheath set point).
- Optimal settings will be a function of mobile-phase flow rate. Higher mobile-phase flow rates will typically require more sheath gas and higher operating voltages.
- Optimal settings will also be a function of mobile-phase composition. For use with gradient chromatography, it is best to optimize conditions using a standard prepared in an average mobile-phase elutant, such as one prepared with 20% organic cosolvent.

WARNING: Sheath gas assembly components have been selected to work with gas at ambient temperature. No attempt should be made to use gas at an elevated temperature.

WARNING: Electrospray ionization involves the use of potentially lethal high-voltage electrical current. Observe all manufacturers' safety recommendations in the use of such equipment. No equipment modifications should be made except by trained personnel using methods approved by the manufacturer in accordance with all safety requirements. Installation of equipment should be performed by qualified personnel in accordance with all applicable electrical codes.

WARNING: Never use this product with defective, damaged, or faulty equipment. Serious injury or death could result.

Safety Precautions

Only qualified personnel should use this product. Provide a safe workplace equipped with all necessary safety equipment.

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