DET

innovations in chemical detection

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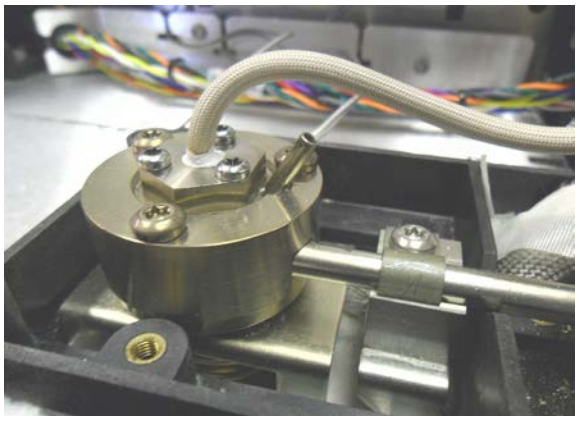
DET CERAMIC ION SOURCES (BEADS) FIT AGILENT 6890/7890 NPD EQUIPMENT



FEATURES OF DET ION SOURCES:

Unlike glass NP beads, robust ceramic materials do not soften or melt at the 600 – 800ºC temperature required for NP detection;

Wire core protected from corrosive exposure by a unique inert ceramic sub-layer coating;

Unlimited shelf life under ambient conditions;

Wide variety of possible surface coatings for variations in the selectivity of ionization and catalytic activity for converting the same equipment to other selective detection modes.

2 ION SOURCE COATING CHOICES ARE AVAILABLE FOR NP DETECTION:

TID-2 type (black ceramic) for non-tailing Phosphorus peaks, but Nitrogen response not as large as TID-4 type – recommended for applications requiring P or both N and P detection (e.g., pesticides) - 70fg P/sec detectivity;

TID-4 type (white ceramic) for best possible Nitrogen response, but some tailing of Phosphorus peaks – recommended for applications requiring only N detection (e.g., drugs of abuse) – 70fg N/sec detectivity;

THERMIONIC SURFACE IONIZATION (TID) & CATALYTIC COMBUSTION IONIZATION (CCID)

Agilent NPD equipment is easily converted to other modes by changing the ion source type and the composition of detector gases – other modes work even better when a stand-alone DET Current Supply is used instead of Agilent's Bead Voltage to power the ion source.

TID Modes – detector gases are Nitrogen, Air, Oxygen, or combinations thereof – selectivity for Nitro compounds, Oxygenates, Halogenates, Pyrrole functional group, etc., depending on the type of ion source used;

CCID Mode – detector gases are Air or Oxygen – selectivity for compounds containing chains of Methylene (CH_2) functional groups such as Petroleum Hydrocarbons, FAMEs, and Triglycerides, with discrimination between compounds having saturated vs. unsaturated Carbon bonds depending on the concentration of Oxygen in the detector gas.

DET RETROFIT NPD/TID/CCID/FID HARDWARE FOR DIFFERENT GC MODELS

DET retrofit hardware is easily mounted onto an existing NPD or FID base, and uses the existing heater and pneumatics controls connected to that base. All DET retrofits consist of a tower structure featuring a common concentric cylinder geometry that positions an electrically-heated ion source in the center of a collector electrode, with top access for easy interchange of ion sources. Mounting on the bottom of the tower is custom designed to be compatible with the detector base on the GC being retrofitted. DET hardware is compatible with all DET ion source elements so that NPD, TID, CCID, and FID modes of detection can be accommodated with the same equipment.

THERMO TRACE ULTRA GC (part 010-860-55, price $2340). Replaces the Thermo NPD hardware which had a side mounted ion source, with a more optimum concentric cylinder geometry and a top mounted ion source. Hardware includes a ceramic tipped jet. Any DET ion source priced at **$495** each can be accommodated. Hardware is fully compatible with Thermo NPD electronics, and the combination provides the most versatile NPD, TID, CCID, FID equipment currently available. Tandem TID hardware is also available for 2 simultaneous signals from one sample, as well as Remote FID hardware for added selectivity of P, Pb, Sn, Si compounds.

VARIAN GC MODELS (part 010-860-20, price $2100). Replaces the Varian TSD/NPD hardware which had a side mounted NP bead, with a more optimum concentric cylinder geometry and a top mounted ion source. DET tower structure is about half the size of the Varian tower. Hardware includes a ceramic tipped jet that seals into the detector base with a standard stainless steel ferrule rather than the crushable Vespel/Graphite ferrule required by a Varian/ jet. Any DET ion source priced at **$495** each can be accommodated. Hardware is compatible with Varian TSD electronics that suffice for NPD. However, signal-to-noise for TID, CCID, FID modes can be substantially improved by powering ion sources with a stand-alone DET Current Supply described below. Tandem TID and Remote FID hardware assemblies are also available.

SRI INSTRUMENTS GC MODELS (part 050-864-98, price $2340). Replaces the SRI NPD/FID hardware with a more optimum concentric cylinder geometry and an end mounted ion source. Hardware includes a ceramic tipped jet. Ion sources used with this hardware have bare wire terminations **(priced at $460),** and any type DET ion source can be accommodated. SRI's existing NPD or FID electronics can be used to power the ion sources and measure signals.

AGILENT 6890/7890 NPD MODELS

All DET ion sources are compatible with mounting into existing Agilent 6890/7890 NPD hardware. Agilent electronics suffice for NPD operation, but substantial improvement for TID and CCID modes of detection is achieved by substituting a stand-alone DET Current Supply to power ion sources with a higher polarization voltage. DET also recommends replacing the small orifice Agilent NPD jet with a wide bore jet as described below.

DETECTOR CURRENT SUPPLY (part 001-901-01, 115Vac) - - - - - - - - - - - - - - - - - $2244. each

Stand-alone module provides heating current and a selection of -5, -15, or -45 V polarization voltages for DET thermionic sources or the Agilent NP source. Recommended for use in place of the Bead Voltage supply on the Agilent NPD because it provides more stable Constant Current heating power for thermionic sources versus the Constant Voltage power provided by the Bead Voltage supply. Also, for modes of detection other than NP, the higher polarizations available from the DET supply provide as much as a factor of 10 improvement in signal-to-noise versus the fixed low polarization available from the Agilent supply. The DET supply also includes a green/red status light to immediately indicate that the source has burned out or the source power cable is not properly connected.

WIDE BORE JET & COLUMN SPACING KIT

Allows capillary columns of 0.53 mm diameter or less to be inserted through the jet to a termination close to the ion source as defined by a spacer tool. Eliminates sample degradation from interaction with jet metal; eliminates jet clogging from sample matrices; and eliminates the need to ever replace the jet.

(010-886-13) - column spacer & 64 mm long jet for Agilent's adaptable fitting NPD base - **$ 190. each**

(010-887-13) – column spacer & 43 mm long jet for Agilent's dedicated capillary base - - **$ 250. each**

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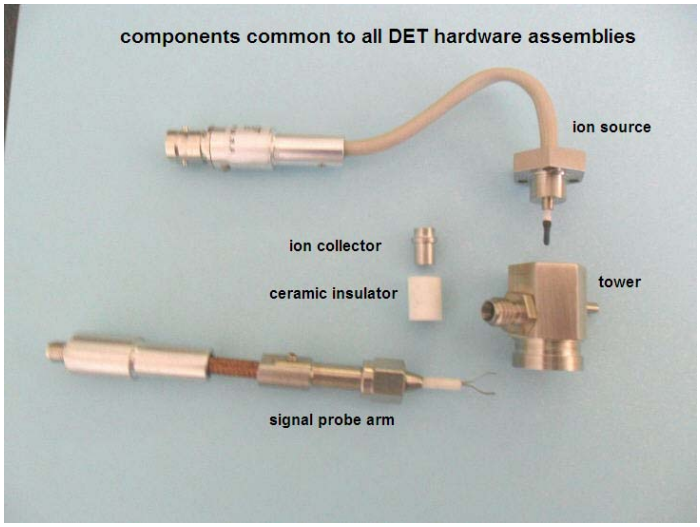
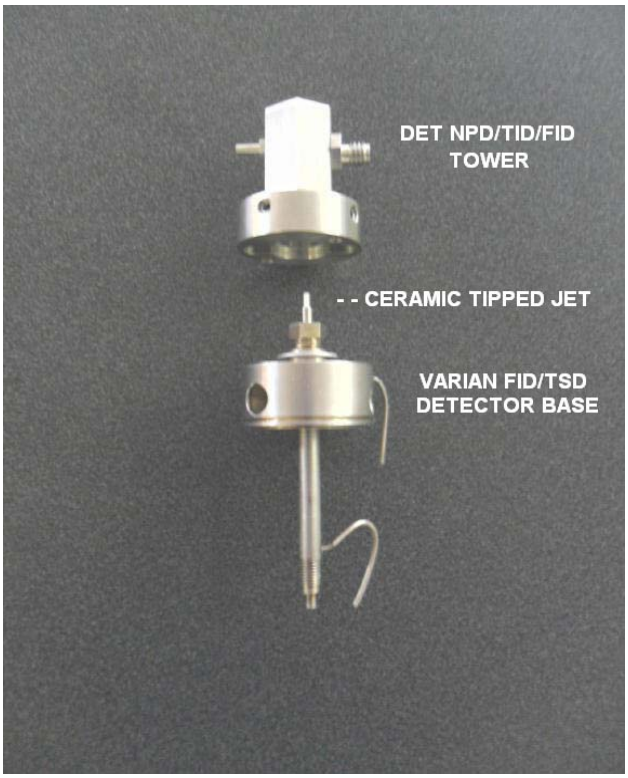
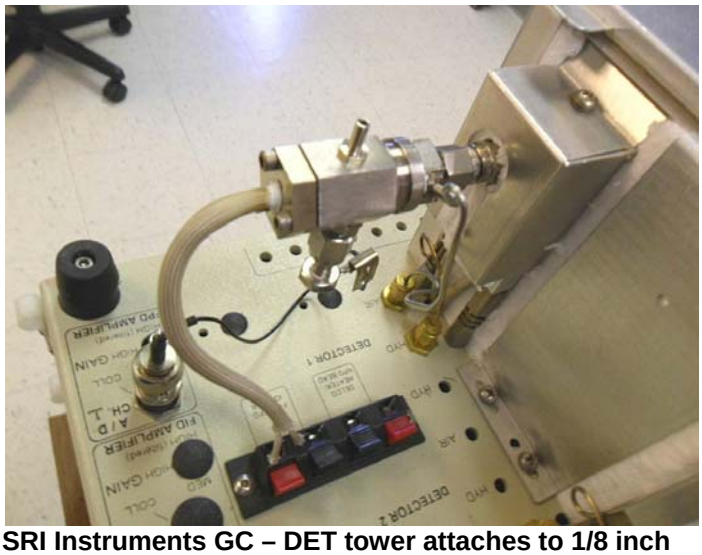


Tower body is 0.75 inch stainless steel hexagonal stock. Base of tower can be fit with a Swage or Tube gas fitting, or machined to custom fit existing detector base on a GC. Fiberglass insulated ion source cable is available with a standard Twinex connector, or with no connector. Standard signal probe arm terminates in a BNC connector and extends 4.75 inches from side of the tower body. If needed, center of probe arm can be bent 90 degrees to reduce extension to 2.50 inches from tower. Gas flows in through bottom of tower and out the back side.



Varian/Bruker GCs – DET tower base and flange designed to custom fit existing FID/TSD base.

Thermo Trace Ultra GC – custom fits Thermo base. Signal probe terminates in an SMA type connector.



SRI Instruments GC – DET tower attaches to 1/8 inch diameter jet via a Swage fitting. 1/16 inch side Swage port adds Air flow to detector. Custom signal probe arm extends 1.5 inches from tower and bends down in unshielded bare wire.