Detectors

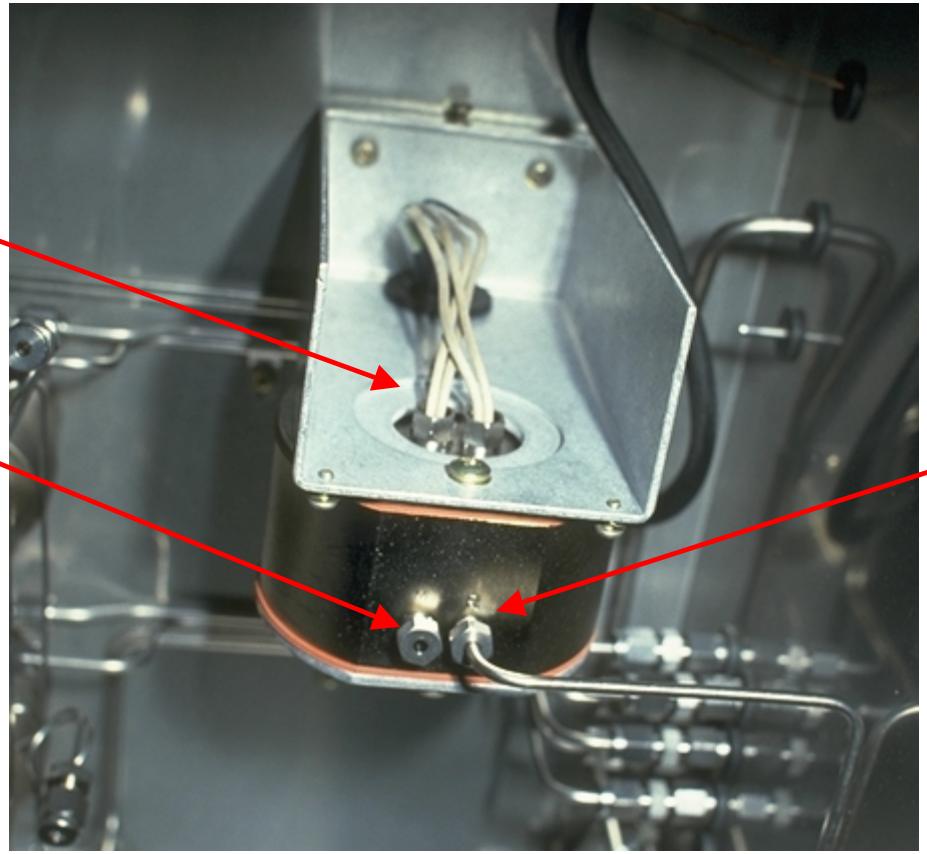
1. **Thermal Conductivity Detector (T.C.D)**
   Measurement of % levels of Hydrocarbons, inert gases and sulfur compounds.

2. **Flame Ionisation Detector (F.I.D)**
   Measurement of PPM levels of Hydrocarbons.

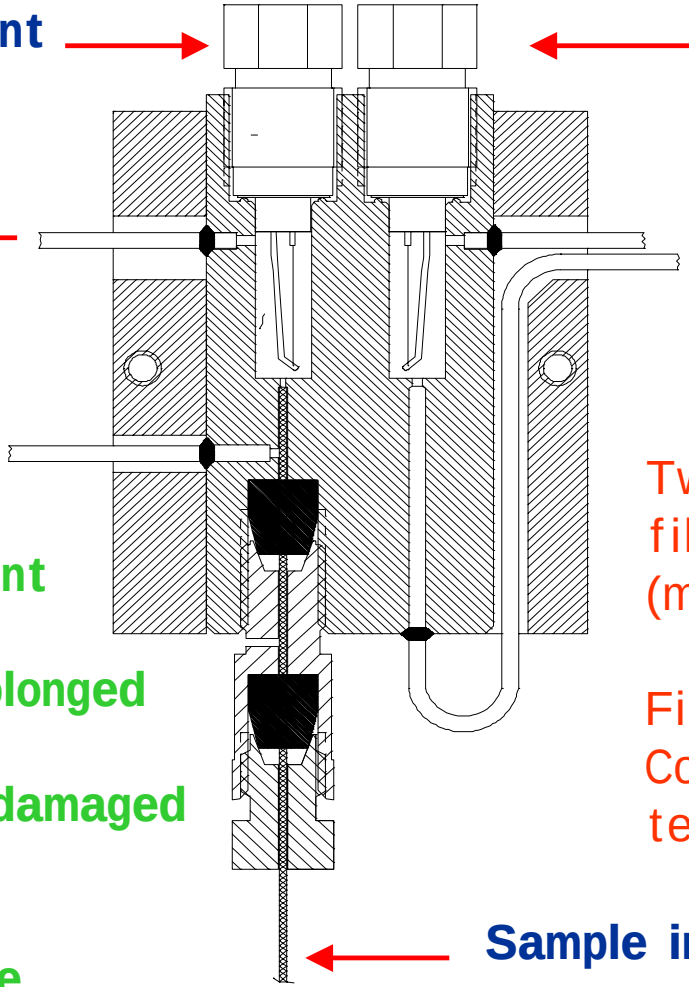
3. **Flame Photometric Detector (F.P.D)**
   Measurement of PPM and PPB levels of sulfur compounds.

Thermal Conductivity Detector

Filament Thermal Conductivity Detector



Micro TCD



Two matched tungsten filaments 45 ohms at 25°C (max. diff. 4Ω)

Filament burnout protection
Constant 300 degC (80Ω) temp.bridge amp.

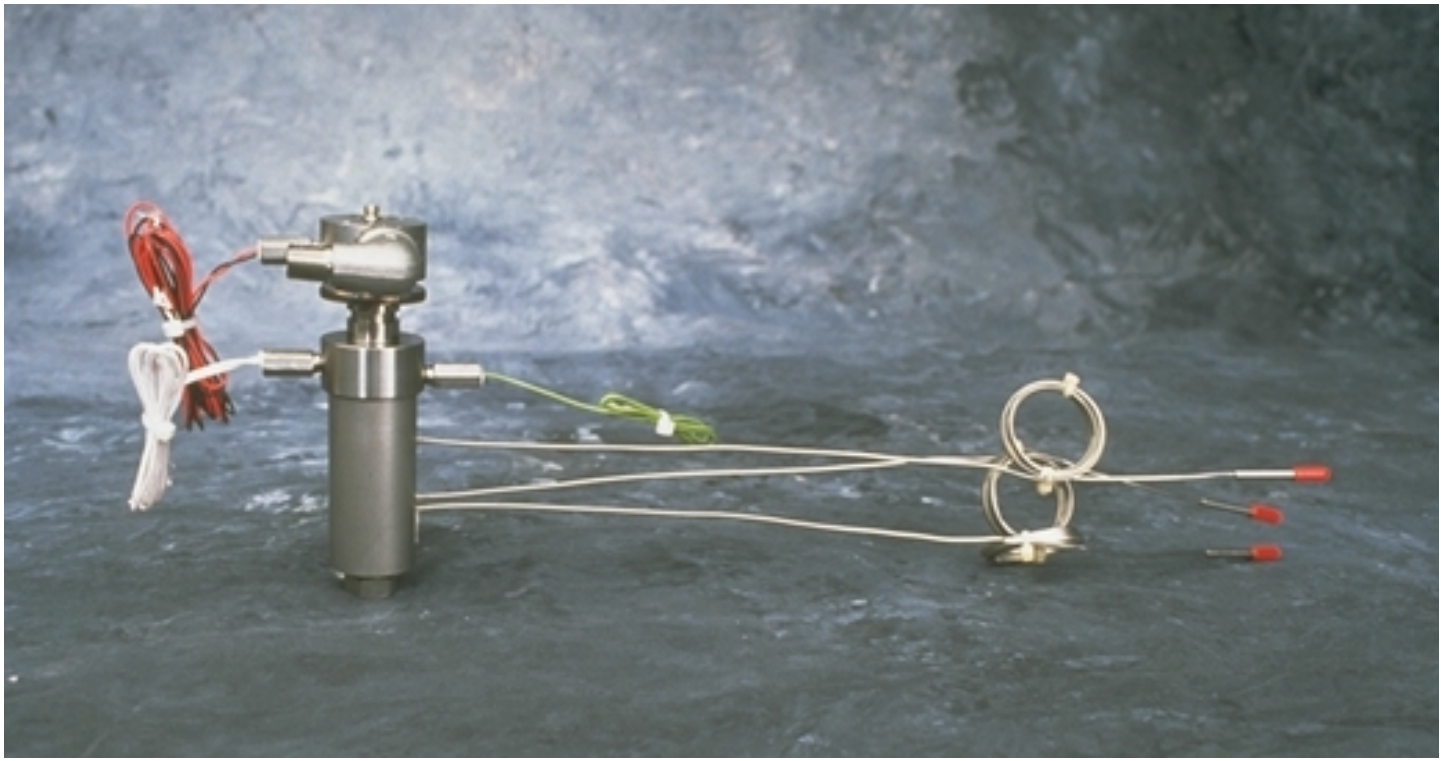
With constant filament temperature:

1. Filament life is prolonged
2. Filaments are not damaged by carrier gas loss
3. Sharper peak shape

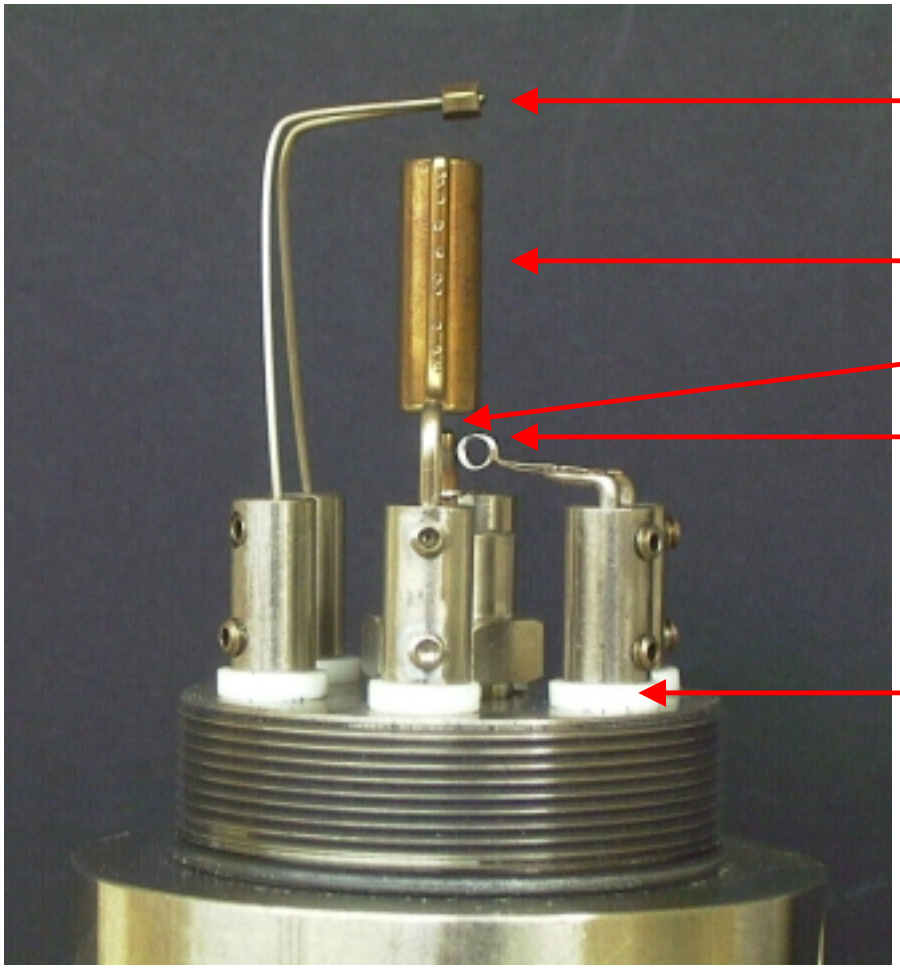
798A001B-2

Flame Ionisation Detector

799 Flame Ionisation Detector



Model 790 - FID



Thermocouple
Flame OUT >3mV
Flame ON <25mV

Collector Signal

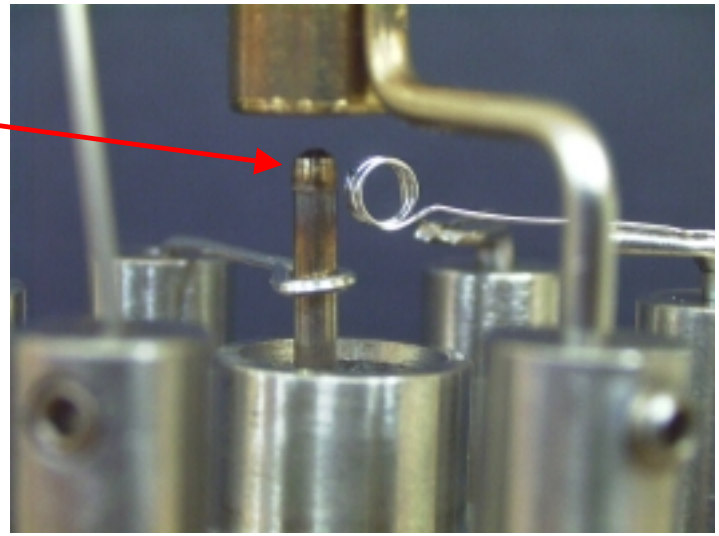
Jet Assembly 110v DC

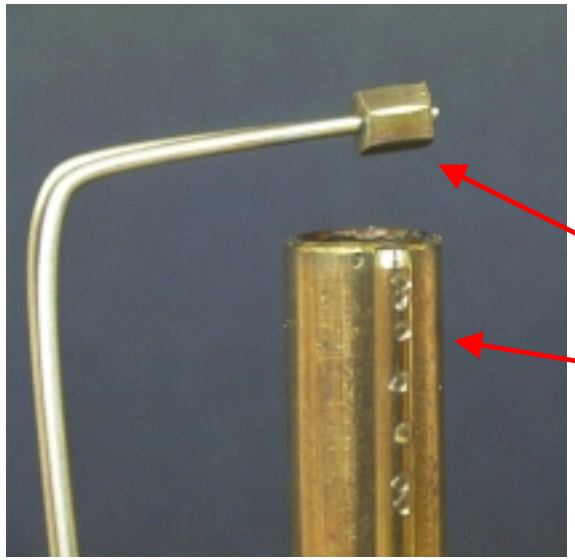
Ignitor Coil 1.5v AC

Insulating Posts

Model 790 - FID

Jet Assembly

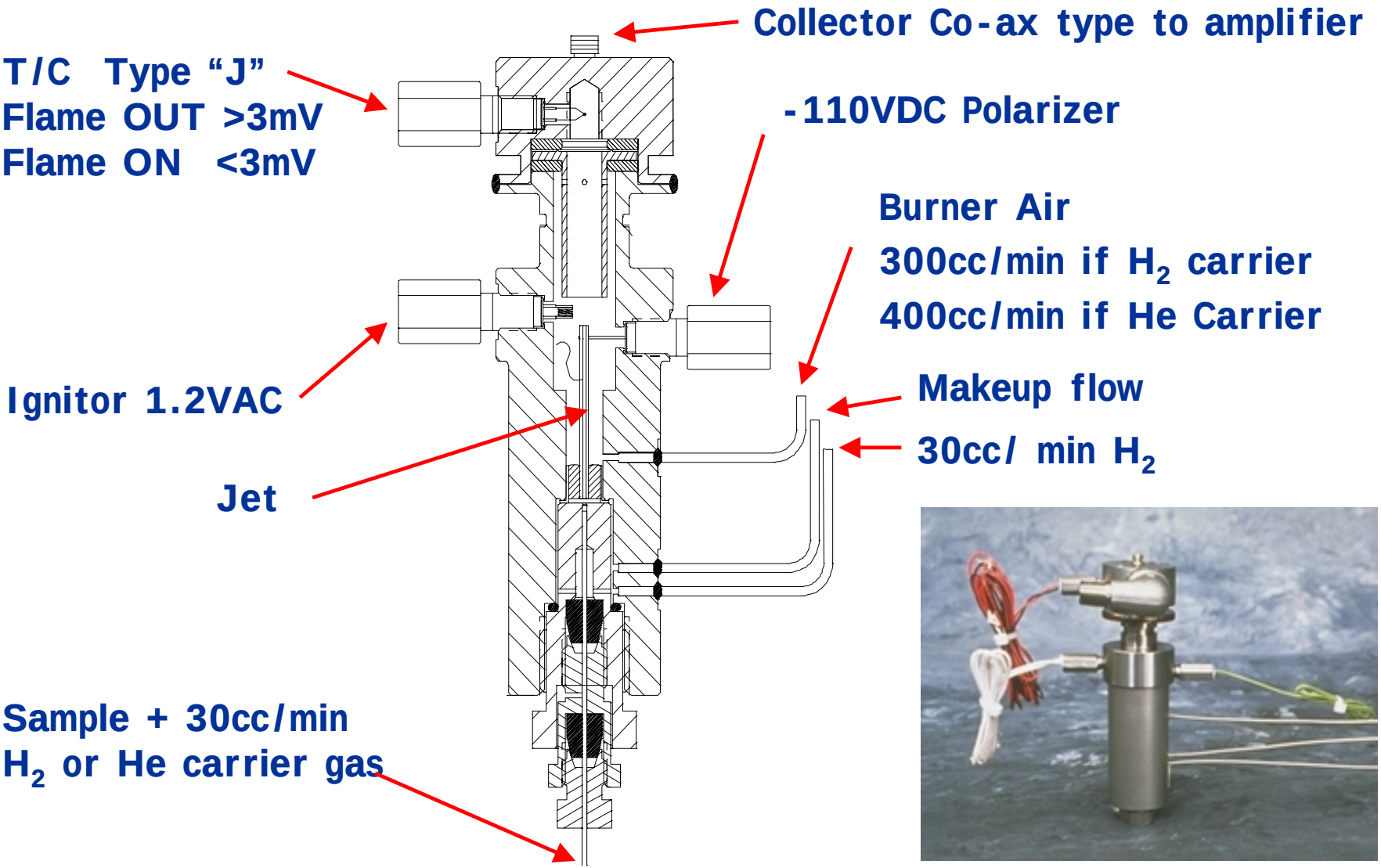




T/C

Collector

Model 799 Micro FID



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Model 799 Micro FID

Once the flame is lit, the temp. inside the FID is measured using the T/C. When it exceeds 3mV, the FID amplifier will turn off the "Flame Out" LED.

Thermocouple Assy 794A008B-1

The Polarizer physically touches the "JET" applying a -100vDC voltage to help extract the sample by polarizing the particles.

Polarizer Assy 794A009B-1

The 300cc/min burner air flow (400cc/min if He carrier) is combined with 30cc/min H_2 carrier + sample and ignited via a 1.2vAC "glowing coil".

Ignitor Assy 794A007B-1

Model 799 Micro FID

Tips and comments:

the Burner Air flow setting varies with carrier gas type.

If H_2 is used, the airflow is set to 300cc/ min.

If He is used, the airflow is set to 400cc/ min.

This ensures the flame burns “hotter” overcoming a problem often found resulting in a false “Flame Out” alarm when in fact the flame is still lit.

Flame Photometric Detector

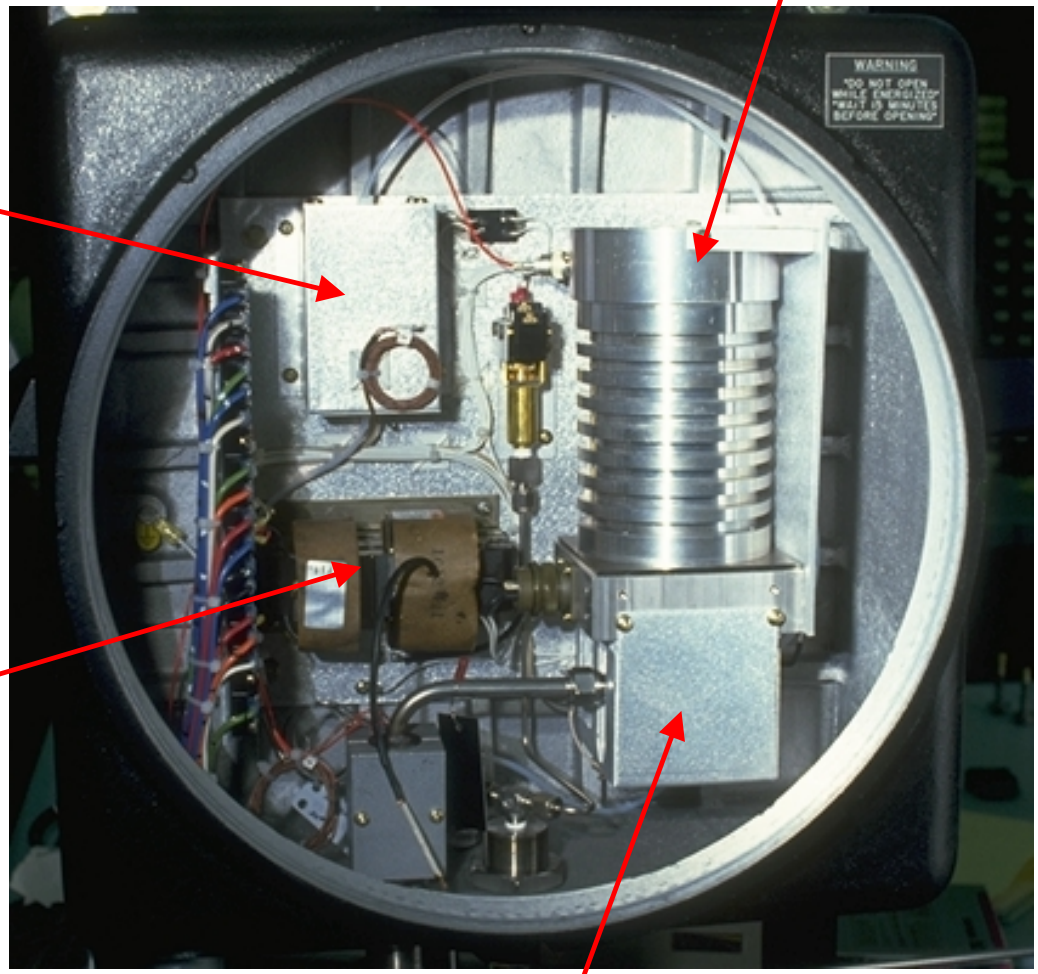
Flame Photometric Detector- CENELEC

Detector

Sulfur addition module

The CENELEC version has the detector housing in an EX-proof enclosure which is located next to the Vista II GC unit.

20kV transformer



Burner Block

Flame Photometric Detector- NEC

The NEC Detector housing is located on the side of the Vista II GC unit.

Photo-multiplier Tube

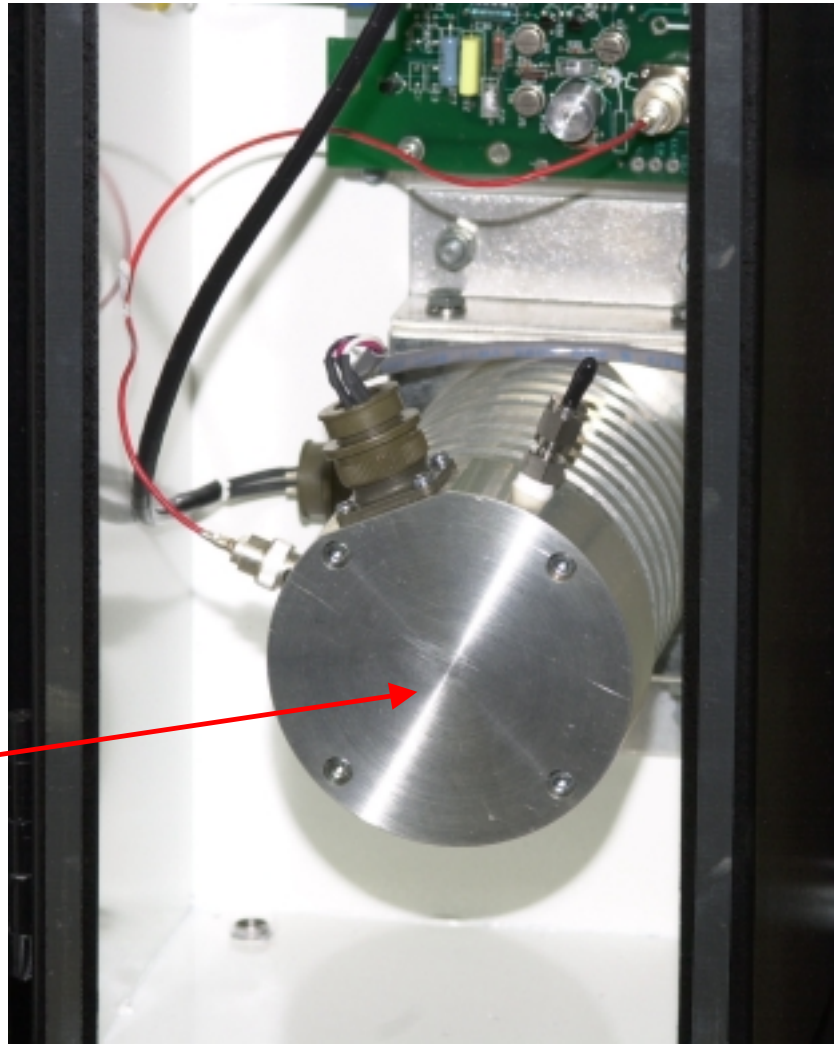
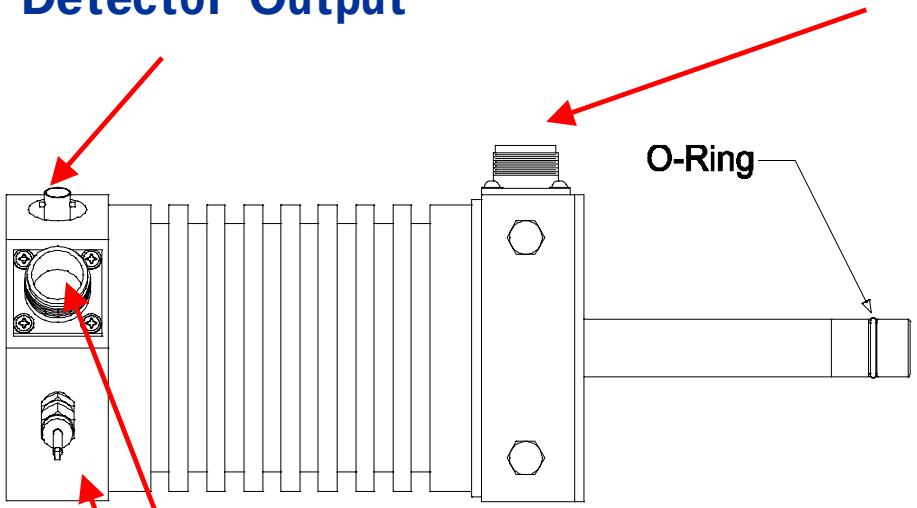


Photo-Multiplier Assembly

Thermo-Electric Cooler Supply

Detector Output



PMT power supply

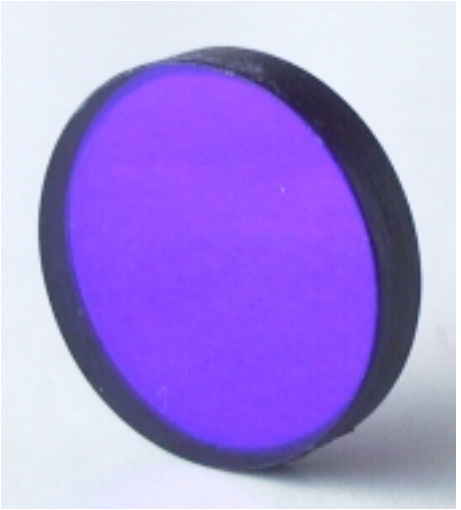
Used to Vacuum enclosure

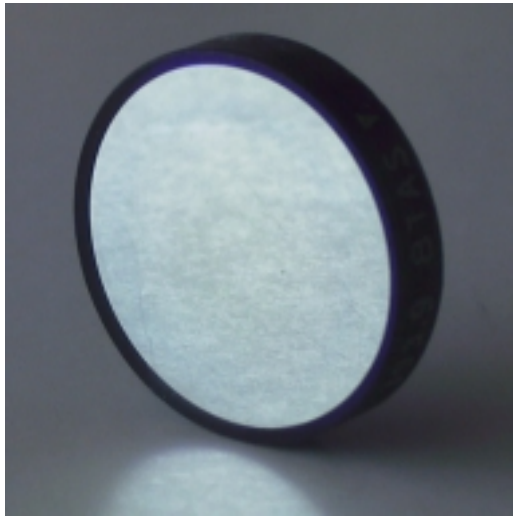
Filter “looks” at burner block

There are no user serviceable parts inside this assembly

804A003-1

Filter



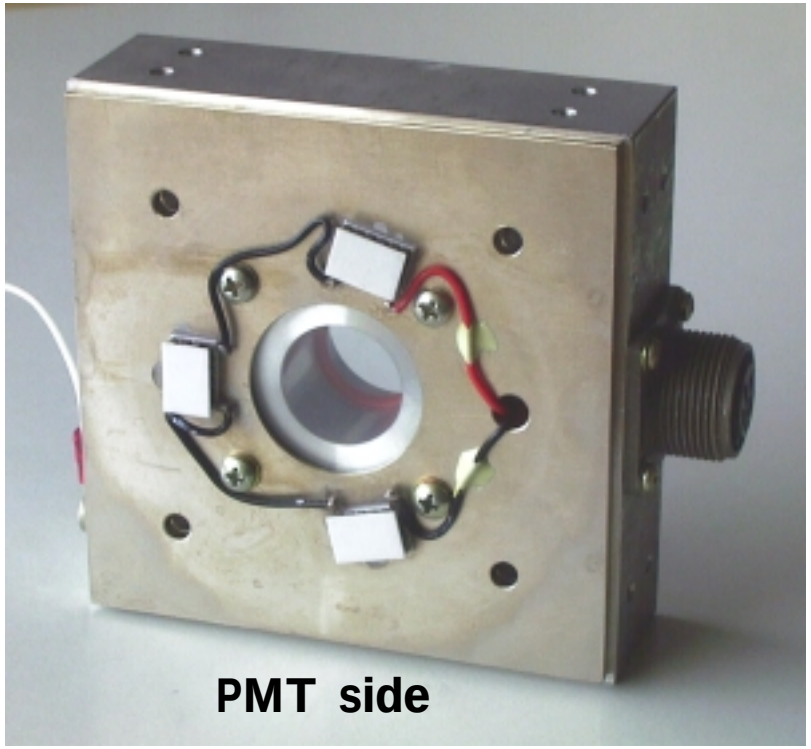


The narrow band-pass filter allows a sulfur spectra-centred transmission at 394 nm +/- 5nm to achieve a specific ratio of sulfur to non-sulfur compounds between 10,000 to 30,000:1

The opposite side has a mirror finish which prevents any reflected light from passing backwards. All light is reflected onto the PMT tube for max. sensitivity.

After some yrs the faces get dirty Clean with a lint free cloth

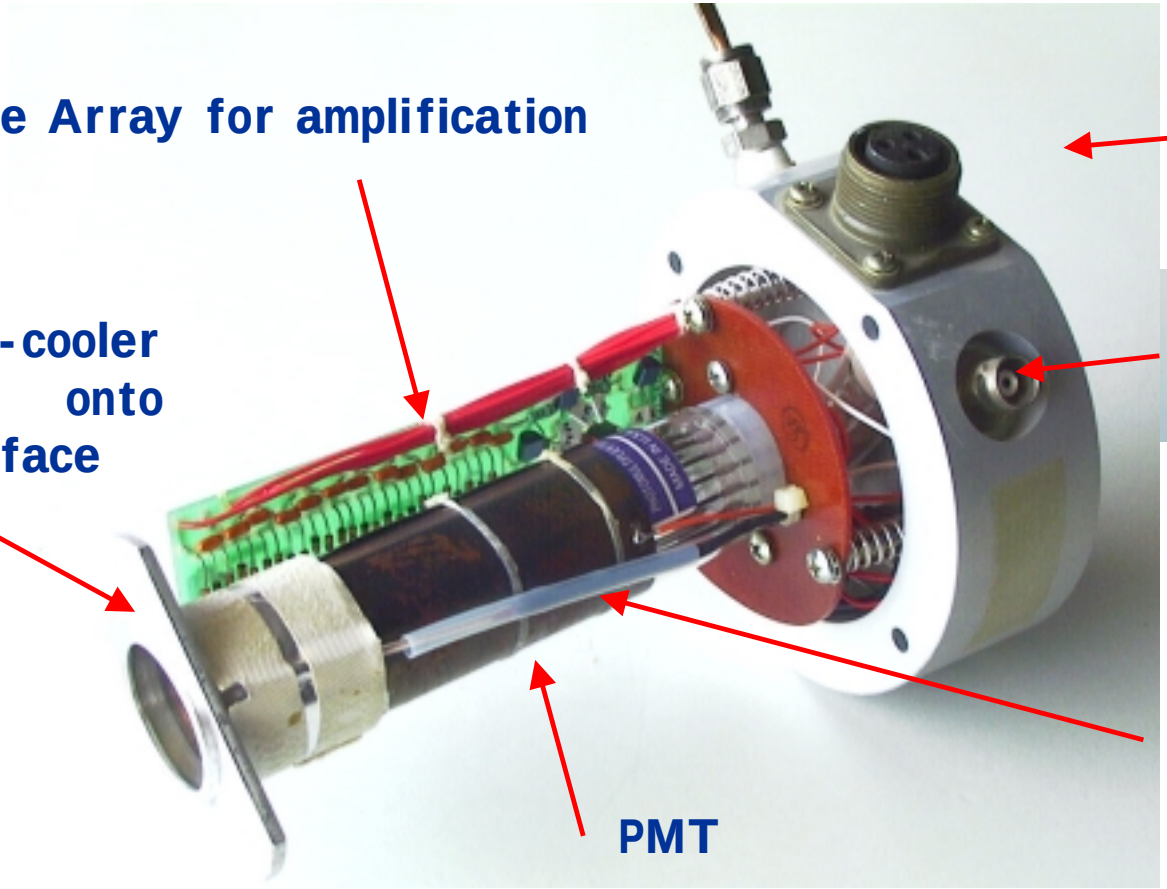
Thermo-Electric Cooler



The Thermo-Electric cooler assembly connects onto the burner block which is hot. In order to keep the PMT enclosure temp. constant, thermo coolers controls the block temp. @ 25 degC.

There are no user serviceable parts on this assembly

PMT Tube Exposed View

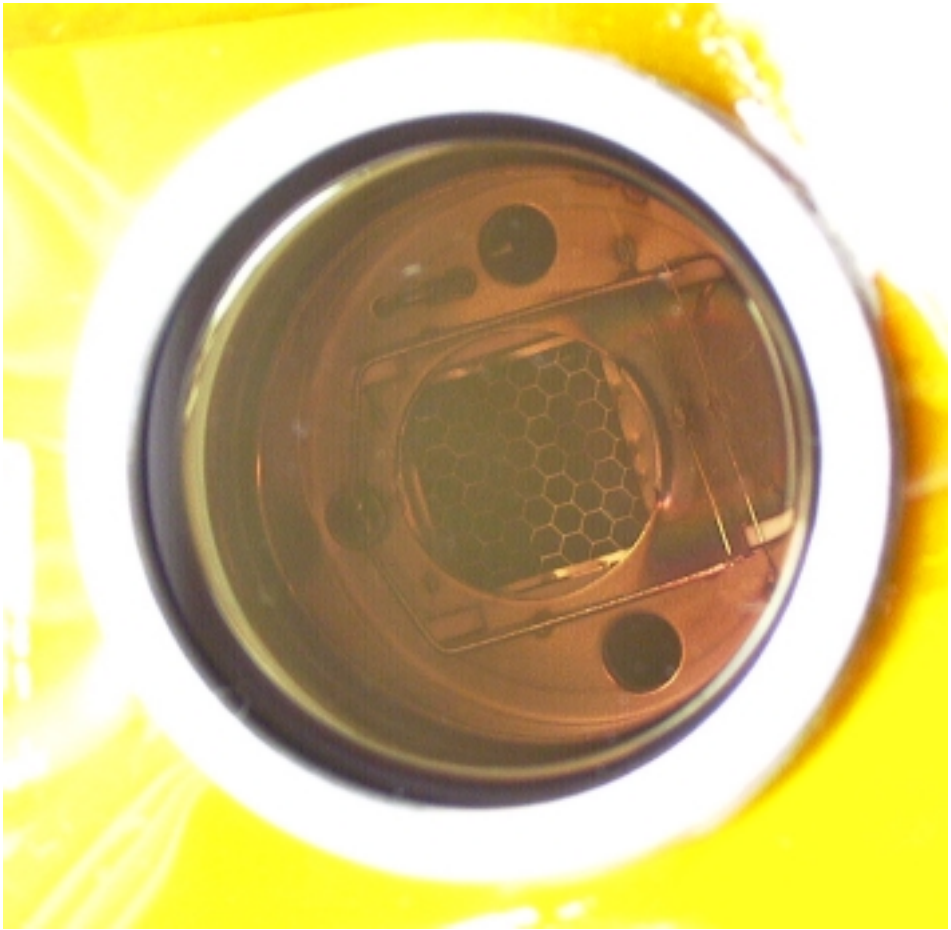


Detector Output voltage is proportional to the intensity of the filtered luminescence squared.

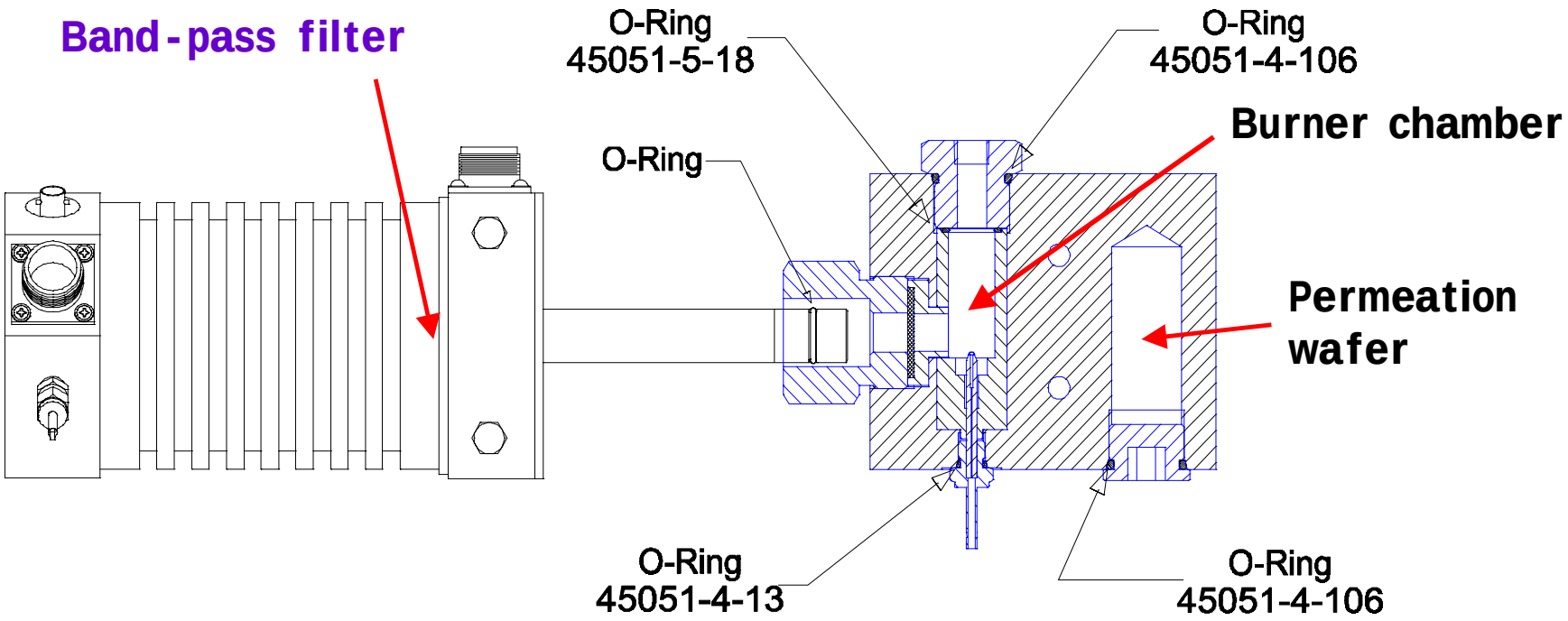
PMT Tube - End View

Close-up of PMT tube. Anode is visible through window.

Life of PMT tube varies but is approx. 7 yrs before sensitivity starts to decrease.



Photomultiplier / Burner Assembly



When the sample burns in the chamber, light is produced which passes through the window and UV filter. This signal reaches the PMT tube and is amplified resulting in “peaks”.

Burner Block - NEC

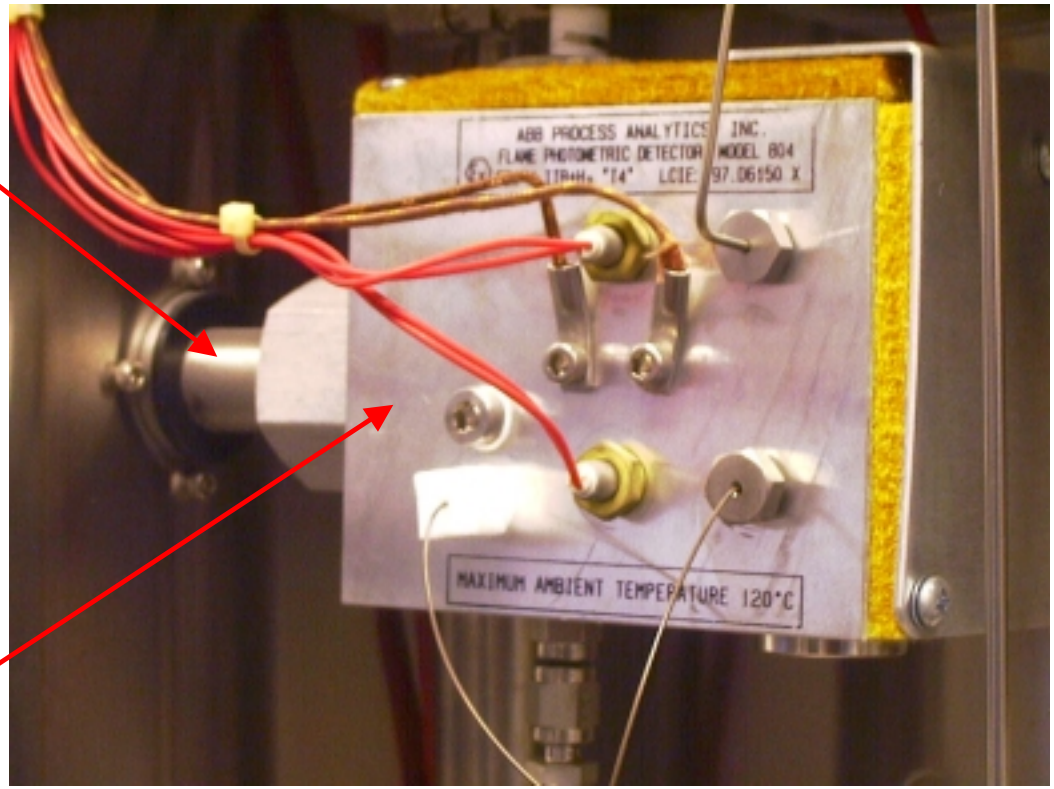
To PMT Tube

The burner block is located in the GC oven assembly and connects to the PMT tube detector through the wall of the GC oven.

It is heated to 120 degC

Check for leaks around all fittings !!!!

Burner Block



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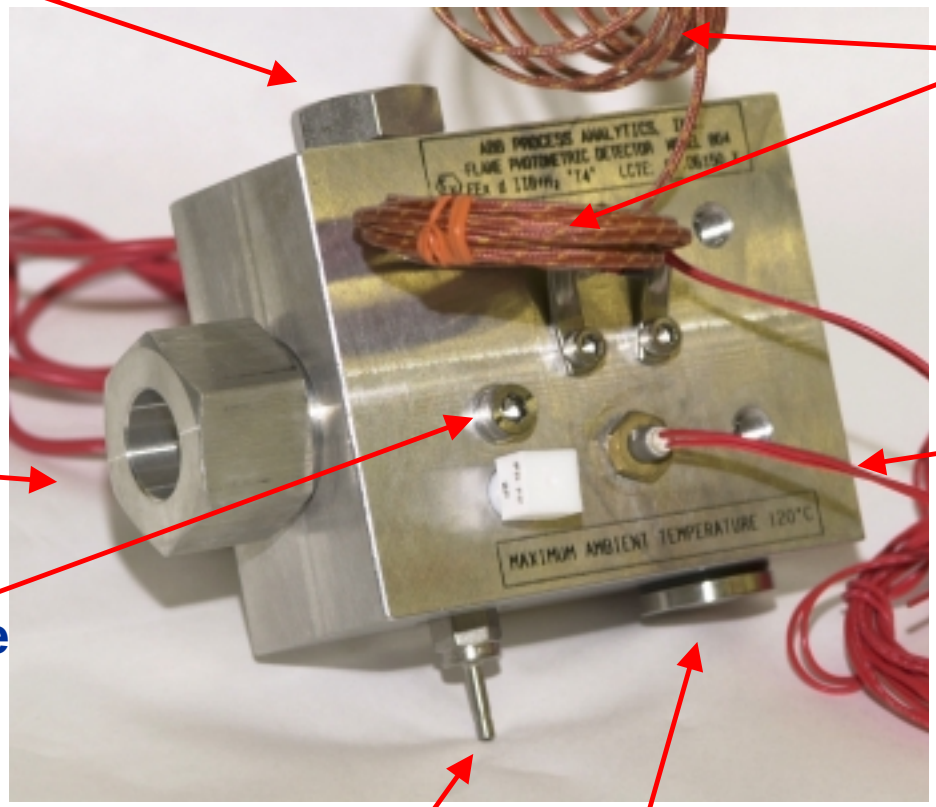
Burner Block - Front View



Sample "OUT"

15kV Igniter (at rear)

Thermocouple 3617462-1

Fits on end of PMT Tube

70Watt Heaters 804A005-1

Quartz "grounding" electrode for flame ignition

Sample "IN" via JET

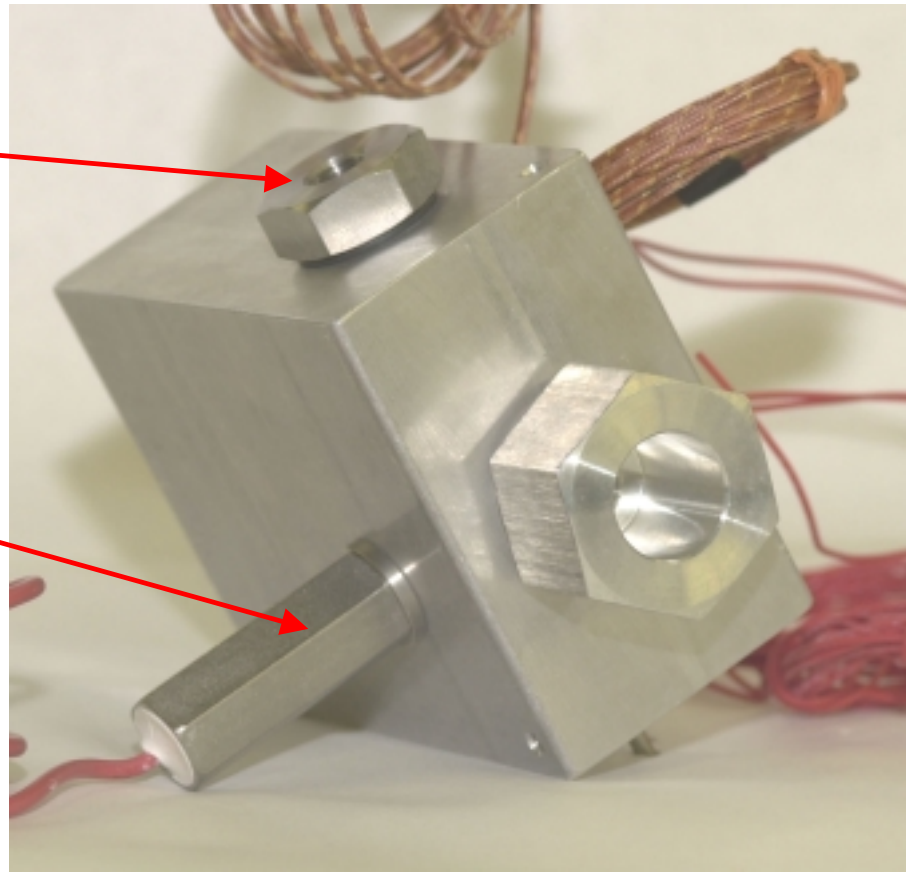
Sulfur Addition Wafer

804A005-1 burner block

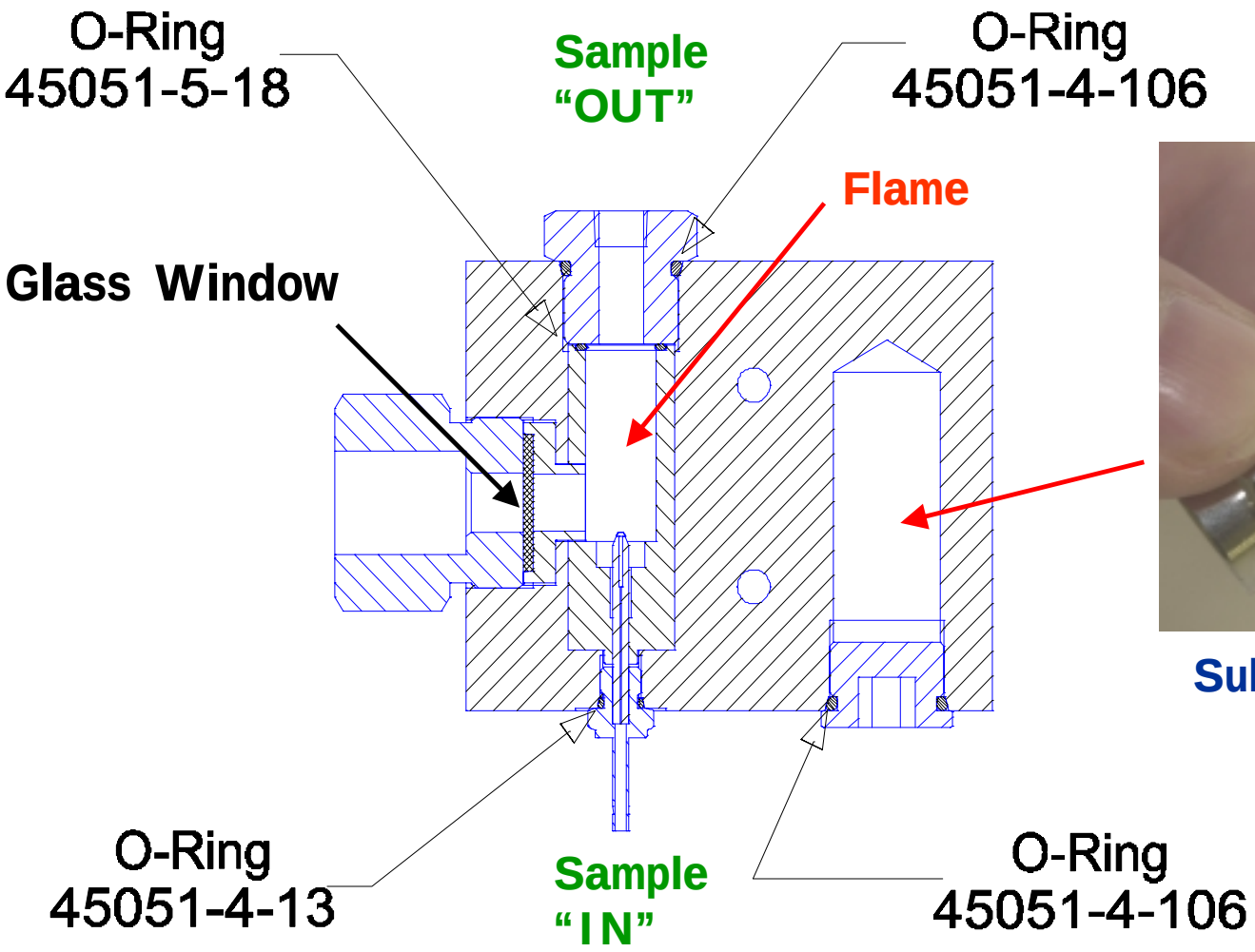
Burner Block - Rear View

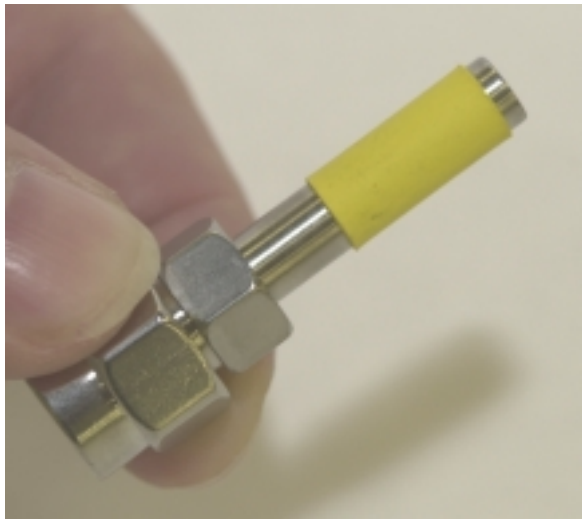
Sample outlet to breather vent

Ignitor - connects to 15kV Transformer



Burner Block





Sulfur addition wafer

804A005-1

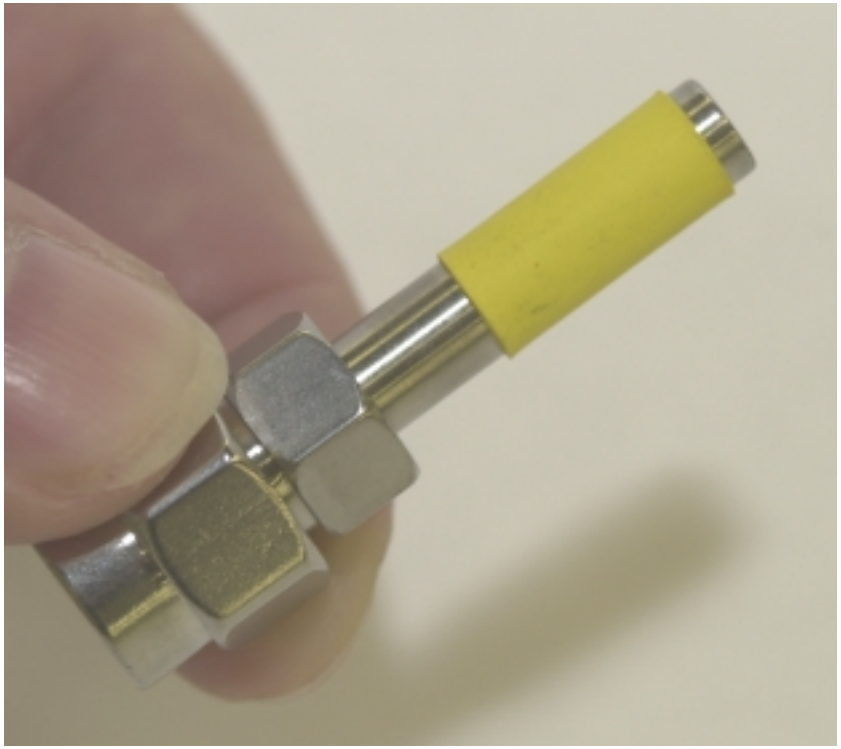
Sulfur Addition Wafer

The permeation device consists of a Di-Butyl Sulfide wafer having a constant output of 20ng/min @ 120degC.

Output (ppm) = ng x K / flow

where K factor for DBS = 0.167

The constant output results in a small background luminescence which overcomes the inherent detector background noise as well as the initial non-linear response of the PMT tube at very low levels.



3617453- application specific

PMT Response