

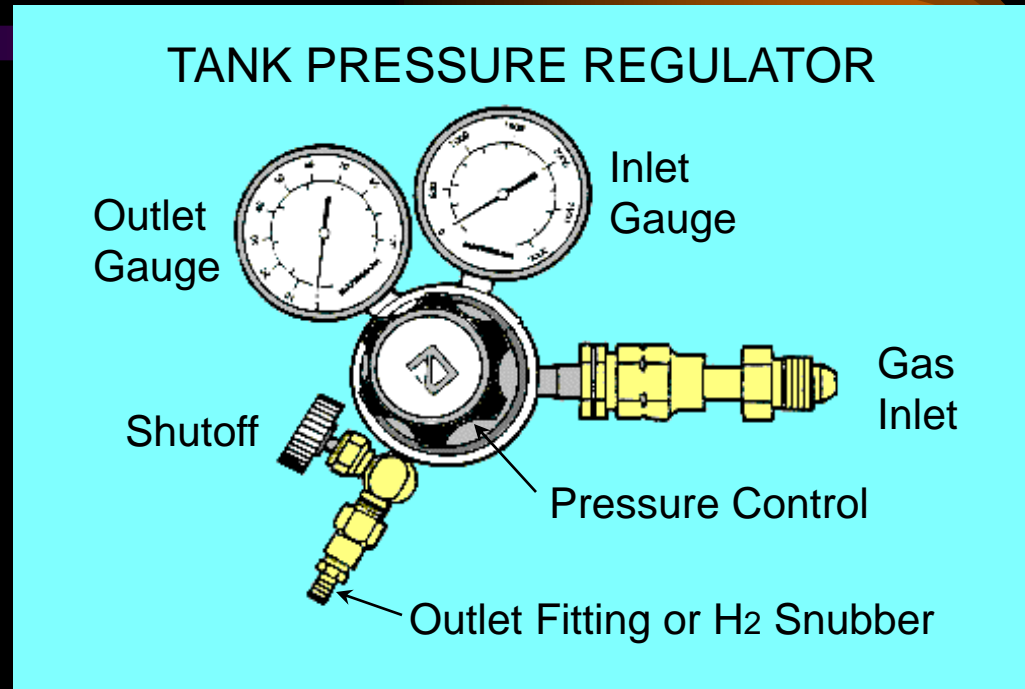
Gas Supplies and Control

Carrier Gas

- Nitrogen
- Helium
- H₂

Combustion Gases

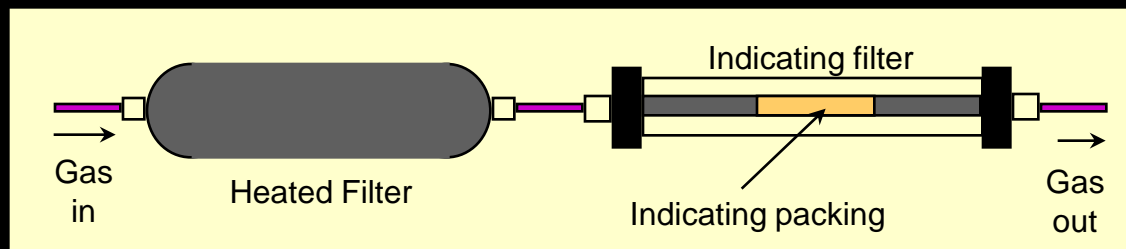
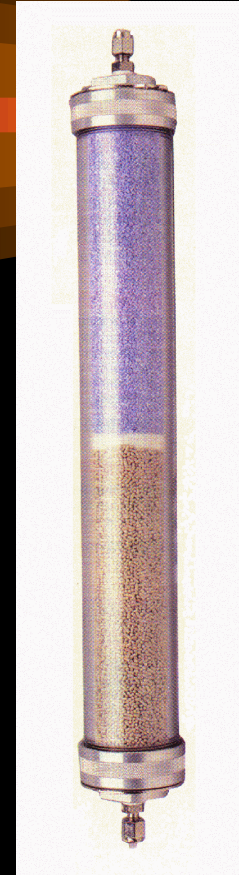
- ◆ Hydrogen
- ◆ Air



Use Ultra-High Purity gases only - 99.995% recommended.

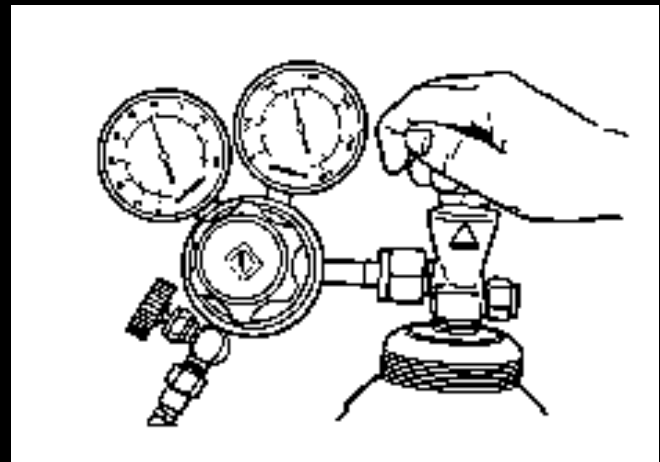
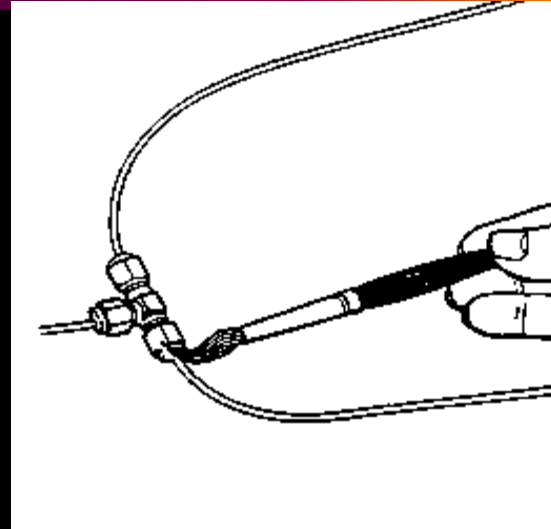
Gas Line Filters

- Use filter/drier for all gases
- Add O₂ filter for ECD carrier
- Use indicating O₂ trap in series with filter
- Change traps according to maintenance schedule
- Replace internal AutoSystem charcoal trap for ECD



Check for Leaks

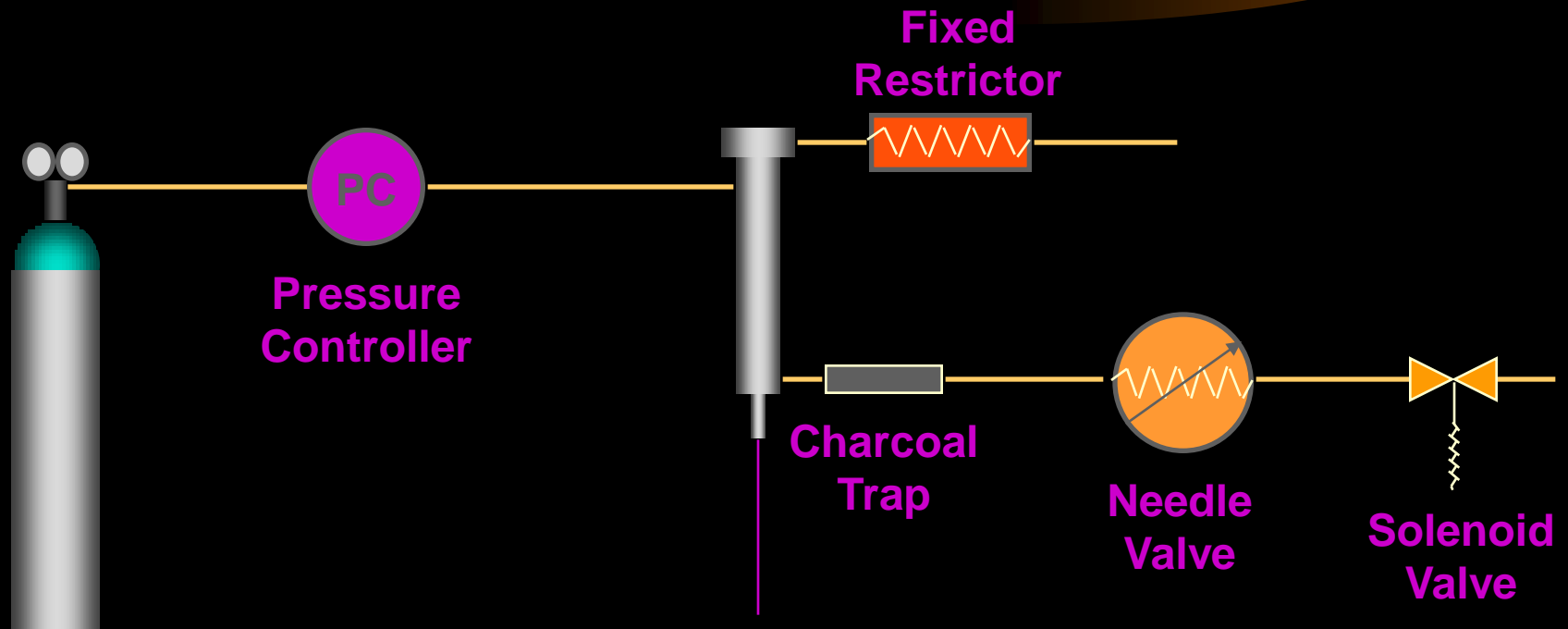
- Check all fittings for leaks
 - IPA and water mix
 - leak detector
- Pressure drop test



Types Of Gas Controls

- Pressure Regulator
 - controls at a fixed pressure regardless of flow
- Flow Controller
 - controls flow by regulating pressure
- Needle Valve
 - adjustable restrictor works with fixed pressure to produce a fixed flow
- Restrictor
 - sintered metal plug - creates constant flow by applying a fixed pressure

Conventional Pneumatics



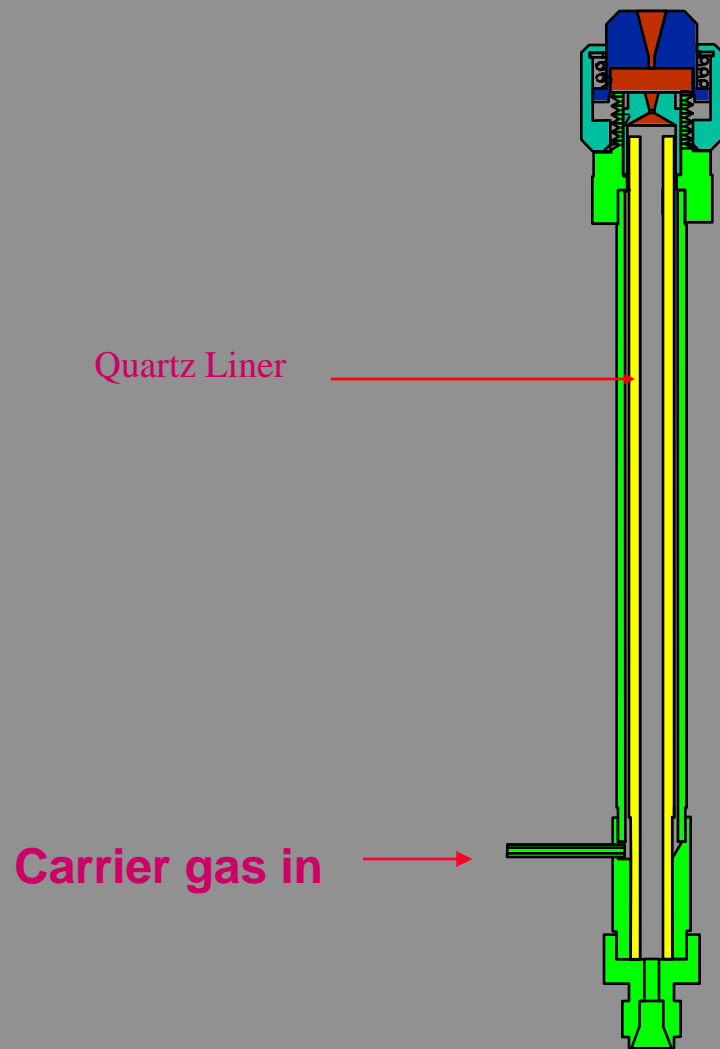


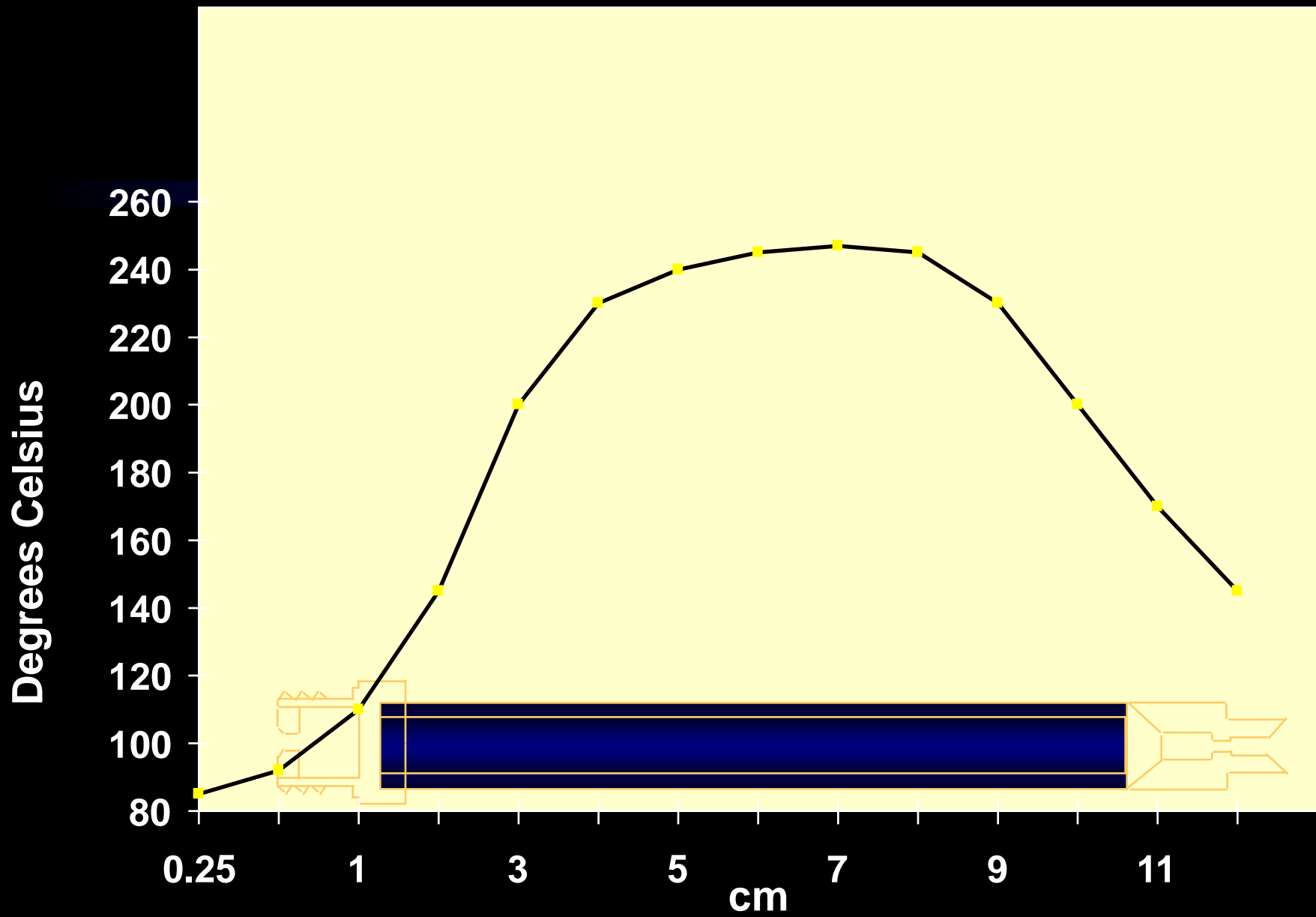
*Packed Column
Injector*

Injectors, Packed



- Used with 1/8" or 1/4" Columns
- Consists of:
 - Injector Body
 - Septum Cap
 - Needle Guide
 - Quartz Liner
- Adaptable for 0.53 Wide Bore Columns





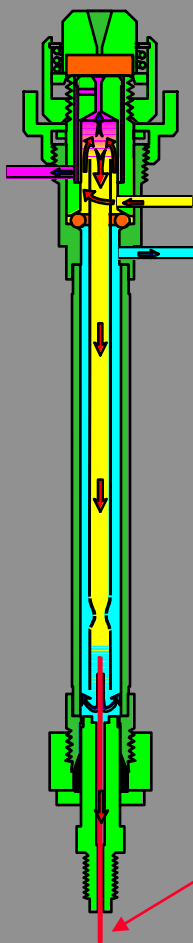


*Split/Splitless
Injector*

Injectors, Split/Splitless

- Injections, onto Capillary Columns are made in Split or Splitless Mode
- The Injector consists of:
 - Injector Body
 - Septum Purge assembly and Septum Cap
 - Two Types of Quartz Liner
 - Narrow Bore, 2mm-id. N612-1002
 - Wide Bore, 4mm-id. N610-1001

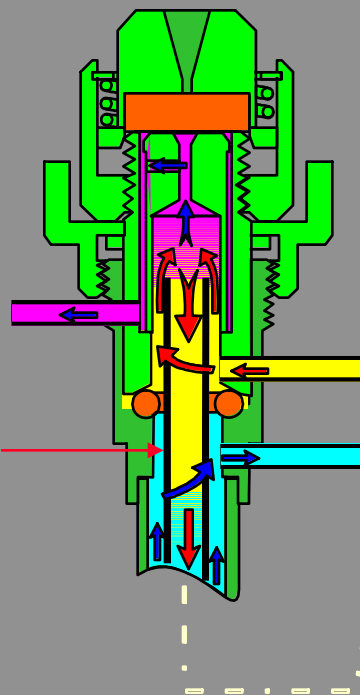
Septum Purge



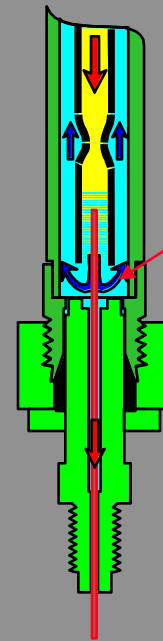
Carrier gas in Split Vent

Liner

Capillary Column



Split Point





*Programmed
Split/Splitless
Injector*

Injectors, PSS

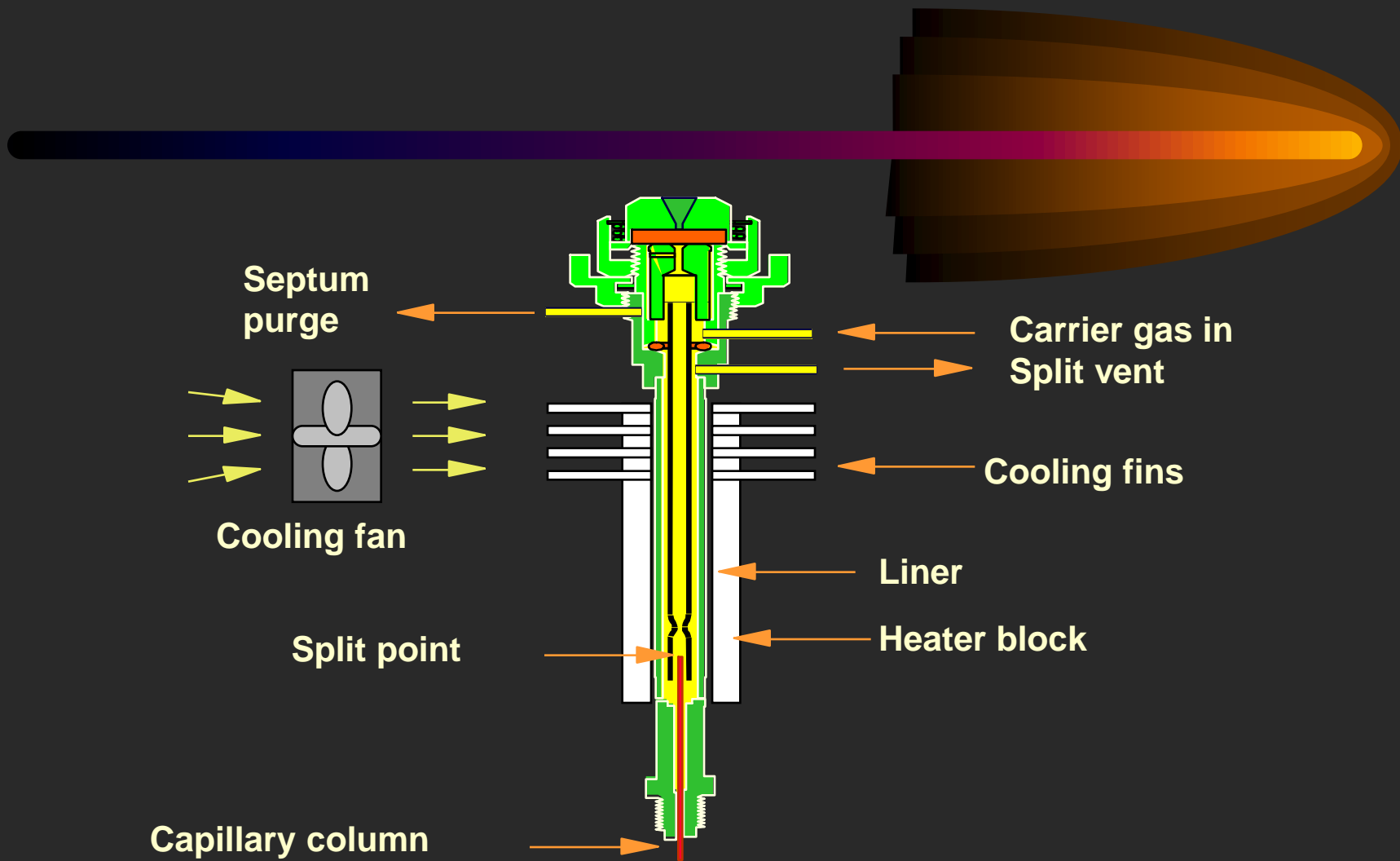


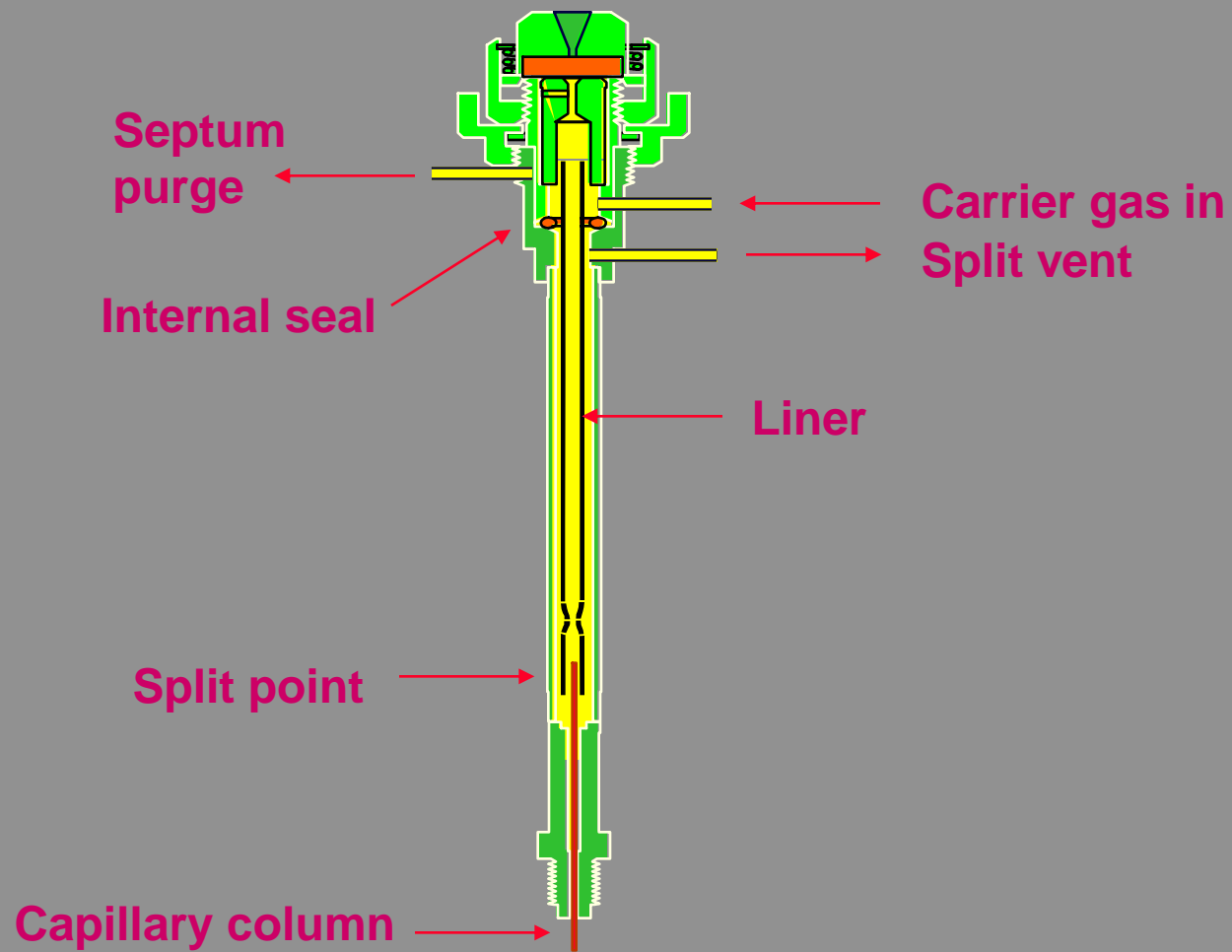
- Injections, onto Capillary Columns are made in Split or Splitless Mode
- The Injector consists of:
 - Injector Body
 - Septum Purge assembly and Septum Cap
 - Two Types of Quartz Liner
 - Narrow Bore, 1mm-id. N612-1002
 - Wide Bore, 2mm-id. N610-1001

Injectors, PSS



- Uses a 24V Fan for Cooling
- Can be used in the On-Column-Mode
- In this mode the Syringe needle must be 0.47-mm-o.d.







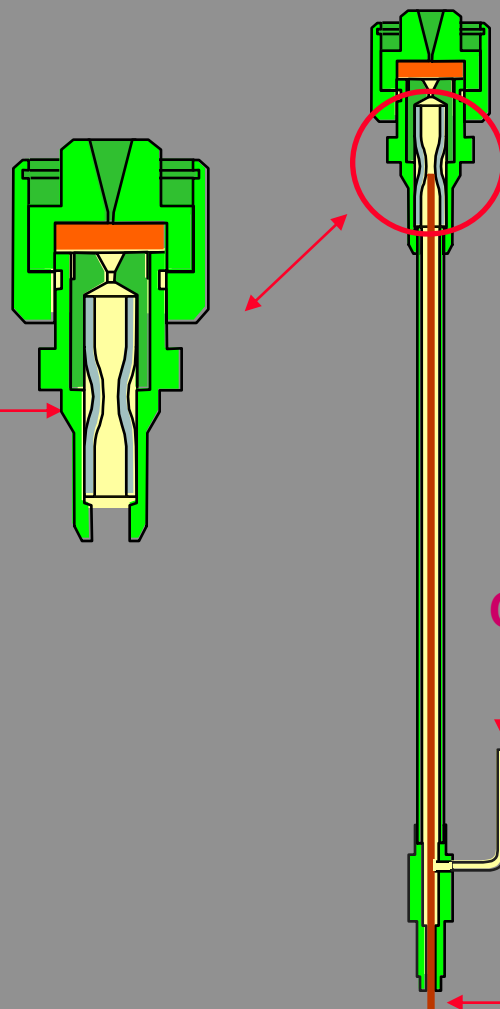
*Programmed
On-Column
Injector*

Injectors, POC



- The POC Injector Consists of:
- Injector Body
- Hour Glass Adapter
- De-activated 0.53 fused silica pre-column
- 1/16" Column connector
- Used for trace analyses or diluted solutions

Hourglass
adapter



Carrier gas in

Capillary column
or Pre-column

Oven

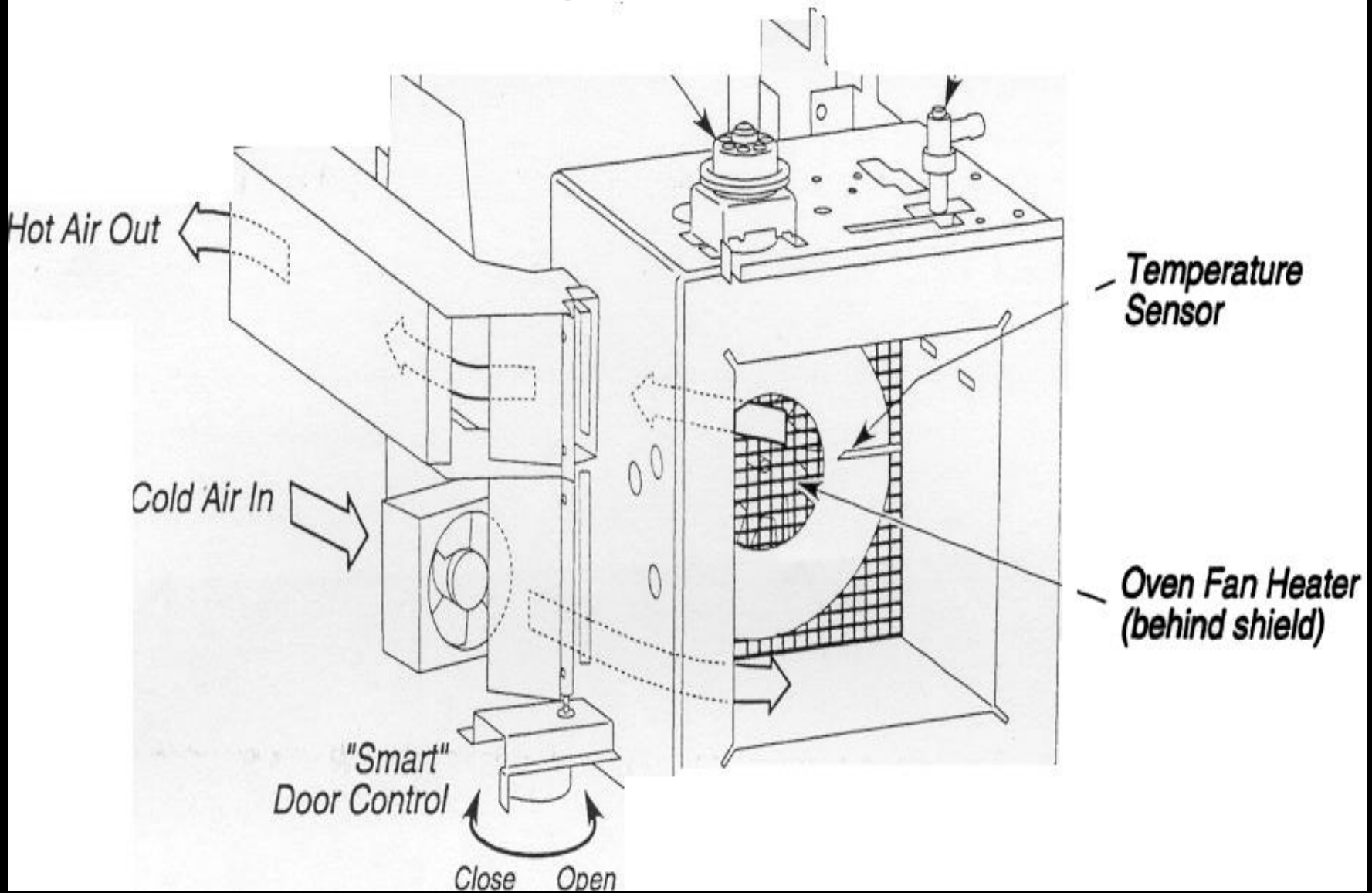
Oven



- Range of -99 to 450°C
- Minimum increment of 1°
- Can be used with LN₂ or CO₂ cooling
- Three ramp temperature program
- Two Injectors and Detectors can be fitted

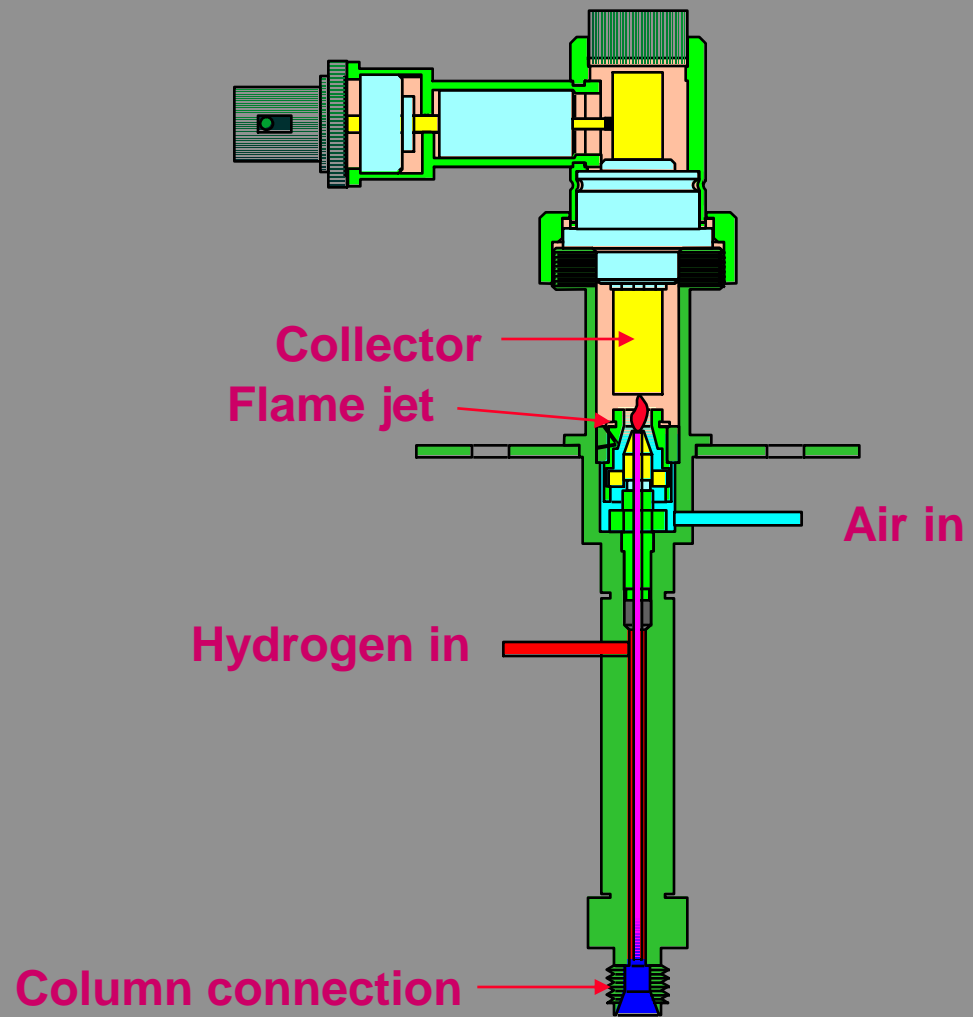
Injector

Detector






*Flame
Ionization
Detector*



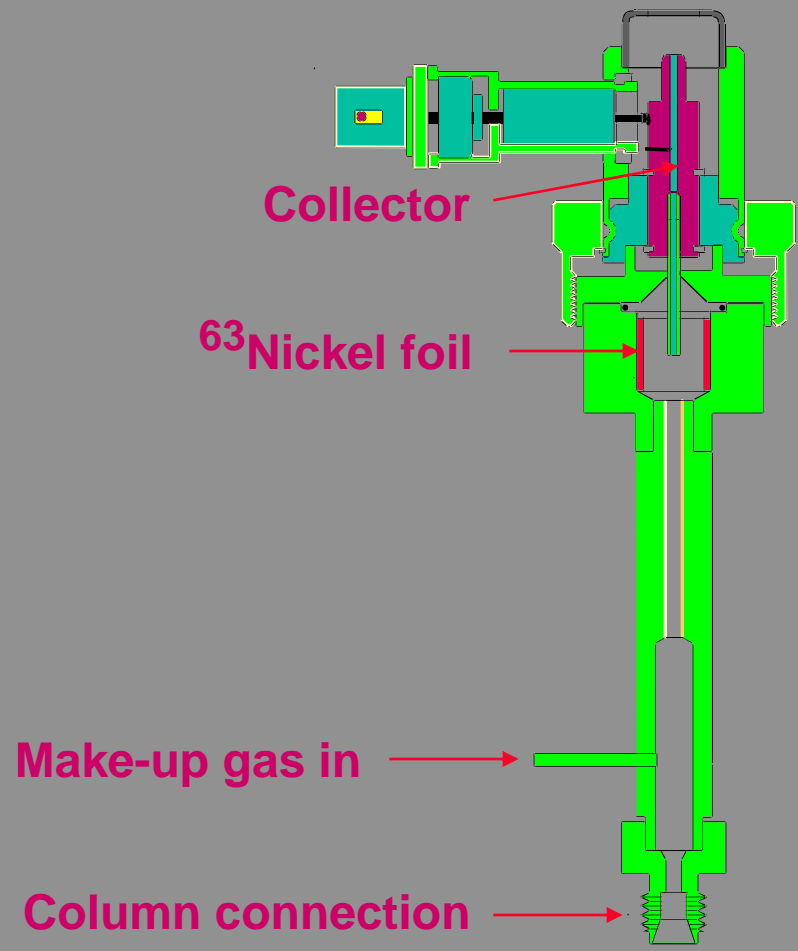
Detectors, FID



- Polarising Voltage
- Electrometer
- A/D Converter (Stage 1)
- Analogue signal O/P
- Voltage Reference (10V)




*Electron
Capture
Detector*



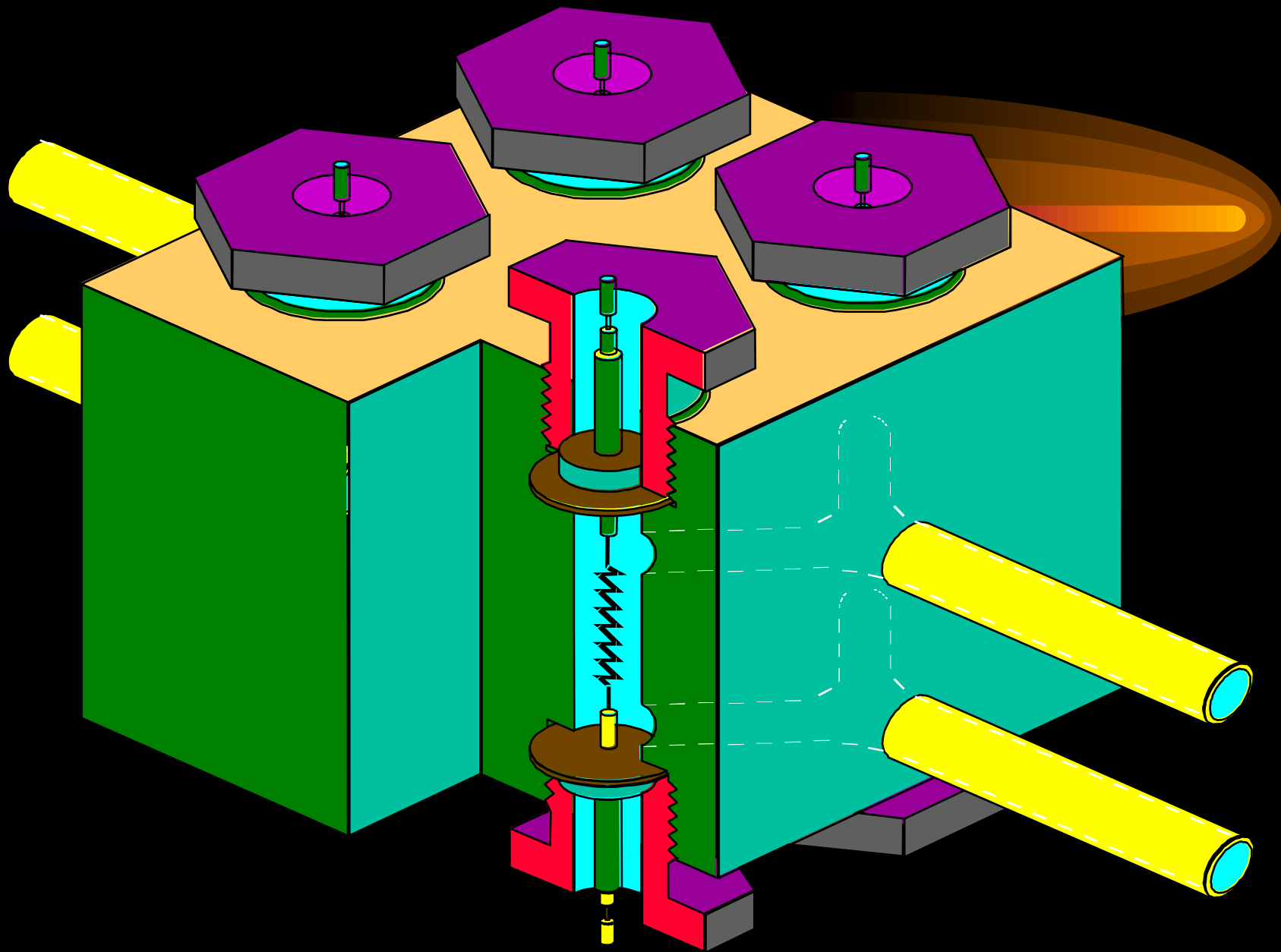
Detectors, ECD



- Standing Current Feedback Control
- Frequency to Voltage Converter
- A/D Converter, Stage 1
- Analogue Signal O/P
- Voltage Reference (10V)



*Thermal
Conductivity
Detector*




Maximum Temperature Setting (°C)

Setting	Current (mA)	He/H ₂	N ₂	Ar
4	160	100	XX	XX
3	120	300	XX	XX
2	80	350	110	XX
1	40	350	350	350
0	Off	Off	Off	Off

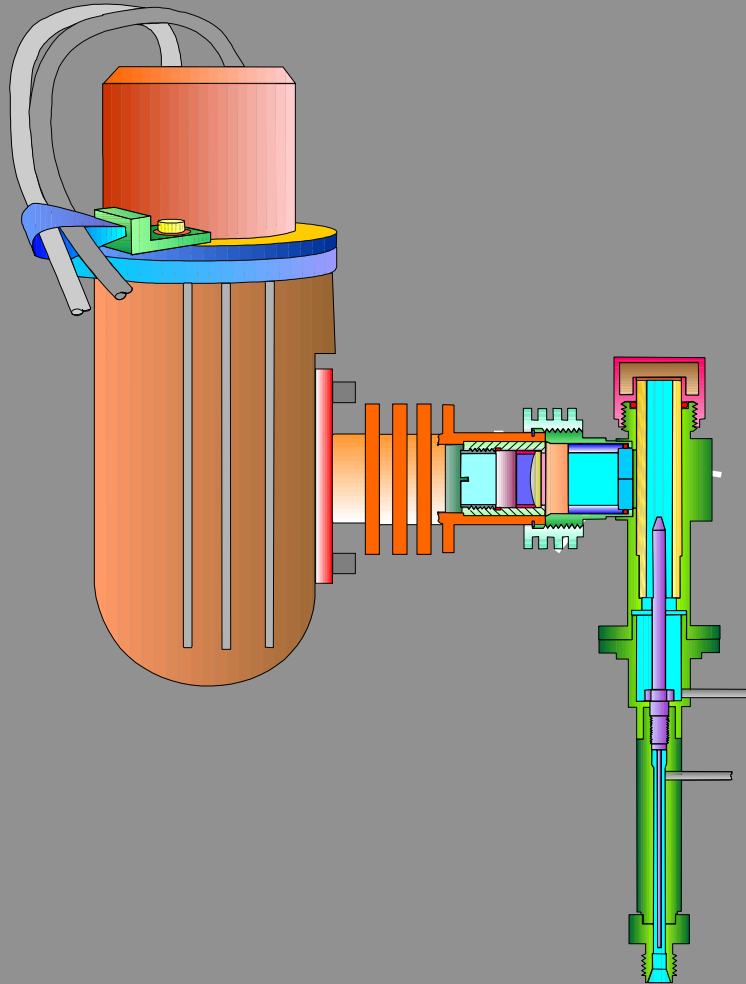
Detectors, TCD



- Command Decoding
- Bridge Ground System
- Bridge Current Range Select
- Safety Circuits
- A/D Converter, Stage 1
- Analogue Signal Output
- Voltage Reference (10V)



*Flame
Photometric
Detector*



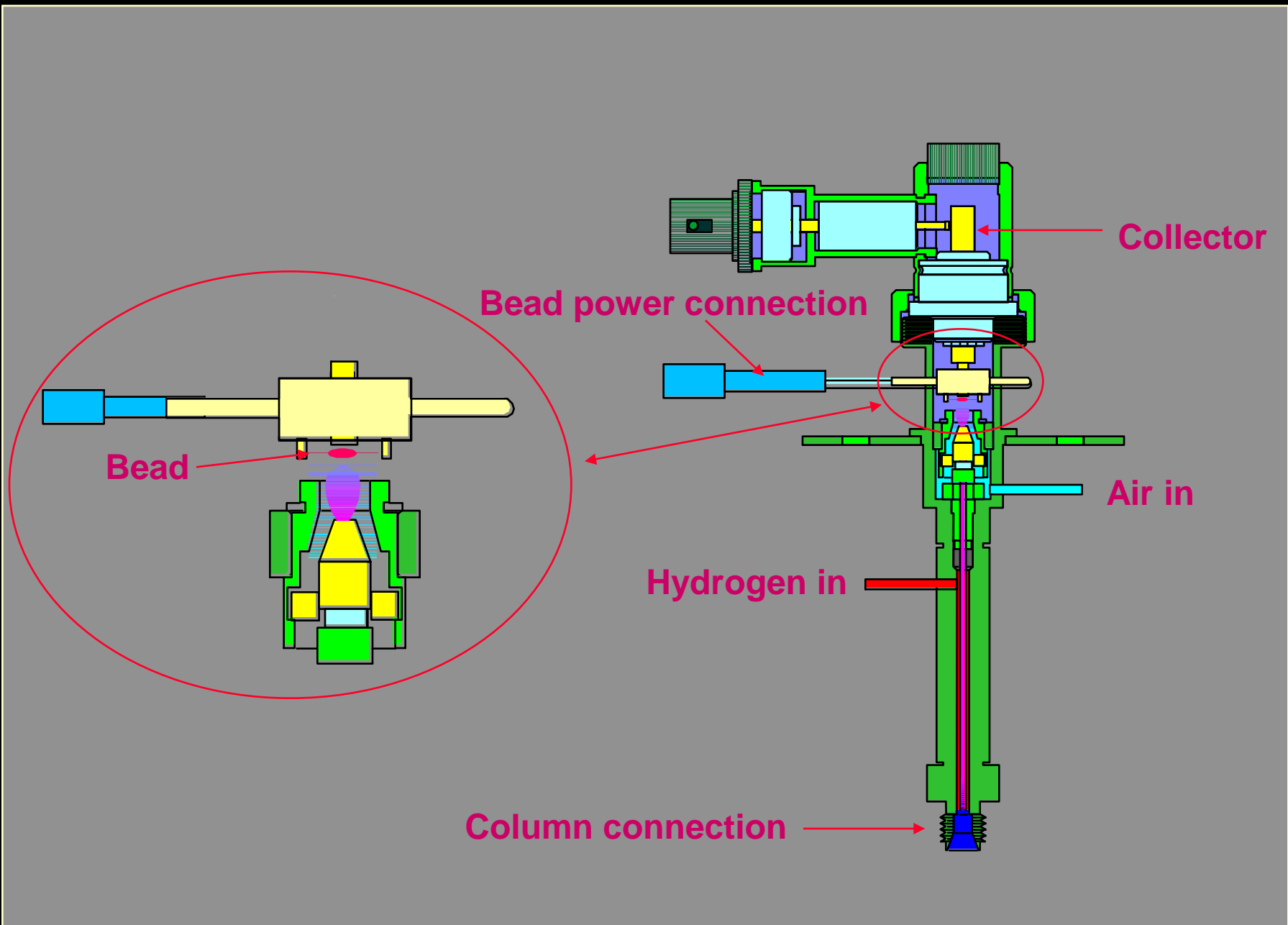
Detectors, FPD



- High Voltage Selection (-500V nominal)
- Electrometer (Photomultiplier)
- A/D Converter, Stage 1
- Analogue Signal O/P
- Voltage Reference (10V)



*Nitrogen
Phosphorus
Detector*



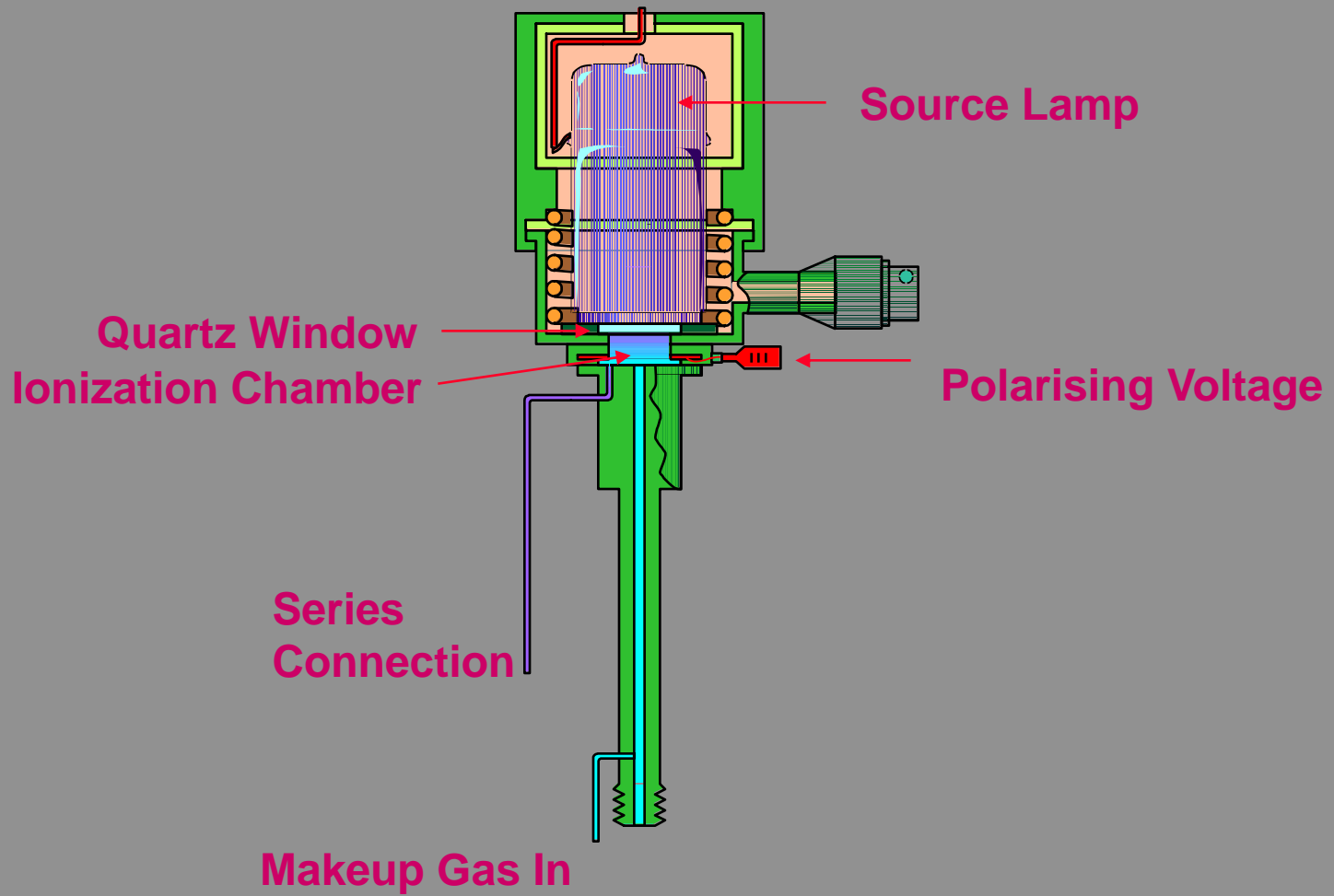
Detectors, NPD



- Polarising Voltage (-36V DC)
- Electrometer
- A/D Converter, Stage 1
- Voltage Reference (10V)
- Bead Voltage Conversion, RMS to DC
- Pulse Width Modulation Control
- NPD Transformer



*Photoionization
Detector*



Detectors, PID



- Polarising Voltage (+100V)
- Electrometer
- A/D Converter, Stage 1
- Analogue Signal Output
- Voltage Reference (10V)

Detector Gasses

Detector	Gas	Flow Range
FID	H ₂	30-70
FID	Air	400-600
ECD	N ₂	10-60
TCD	He/N ₂	5-60
NPD	H ₂	1 – 5
NPD	Air	100 –200
FPD	H ₂	50-90
FPD	Air	80-170

Servicing the Electrical System

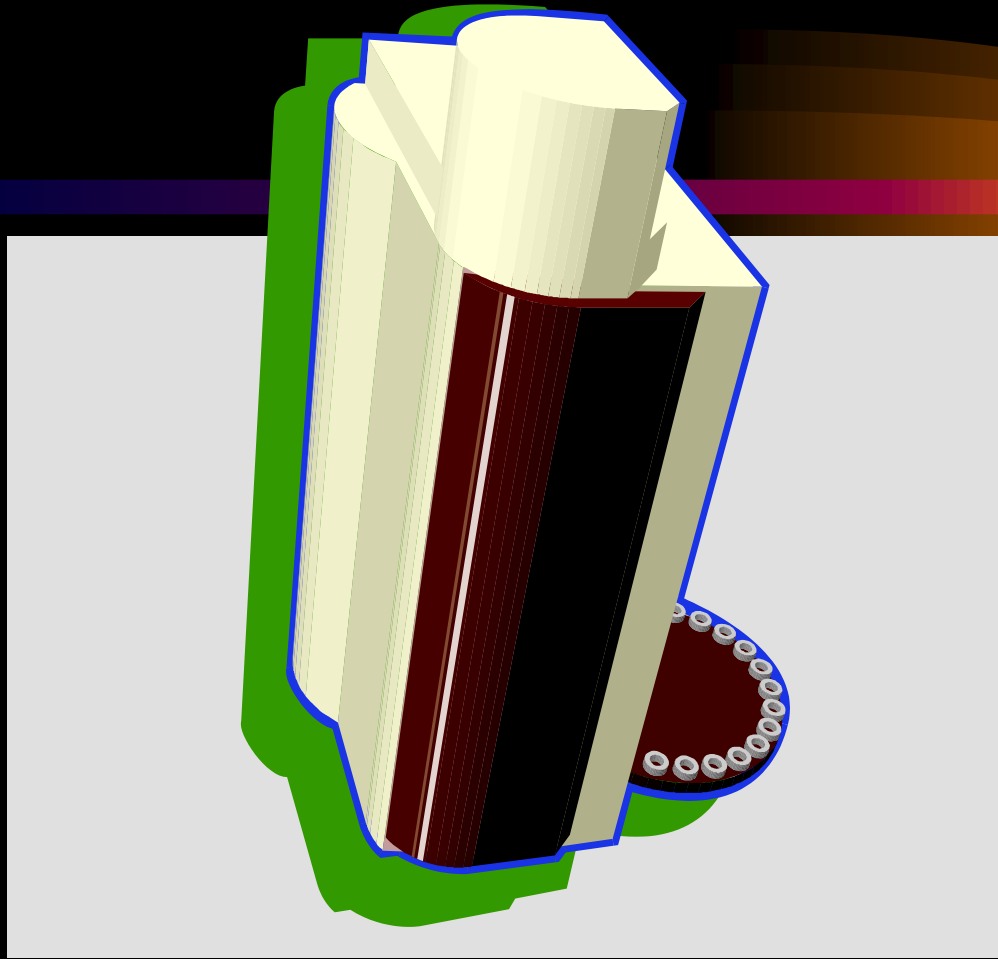
- Pressure Transducer Zero Adjustment 5-67
- Pressure Transducer Span Adjustment 5-68
- Fuse Replacement On:
 - AC Dist. Bd. 1 x 2A and 2 x 10A
 - TCD Power Supply 1x 1A and 2 x 0.25A
 - Autosampler Tfrm. 2 x 4A and 1 x 10A

Servicing the Electrical System

- Checking Resistance Values:
- All Temperature Sensors - 110 ohms
- TCD Heater - 142 ohms
- Oven Heater - 10 ohms
- Detector and Injector Heaters - 148 ohms
- TCD Filaments - 69 ohms across bridge
- TCD Filaments - 49 ohms across leg



Autosampler



Autosampler



All-electronic actuation

- Stepper motor driven
- Positively encoded tower and tray positions
- Intelligent vial sensing
- Patented vial alignment
- Syringe and plunger position error sensing
- Automatic re-calibration upon power up

Autosampler



83 sample vial capacity

- 48 outer vials
- 34 inner vials
- One priority vial
- 2 mL standard crimp and screw top vials
- 50 uL micro vials

Autosampler

Wash and Separate waste vials

- 4 x 4 mL solvent vials
- 4 x 4 mL waste vials
- Diffusion caps
- Septa
- Programmable as two groups of two vials or one group of four
- Alternating usage to maximize sample injection capacity and minimize sample carryover

Autosampler



Thermostated vial tray

- Heating or cooling
- Removable tray
- Requires external source water bath for heating or cooling

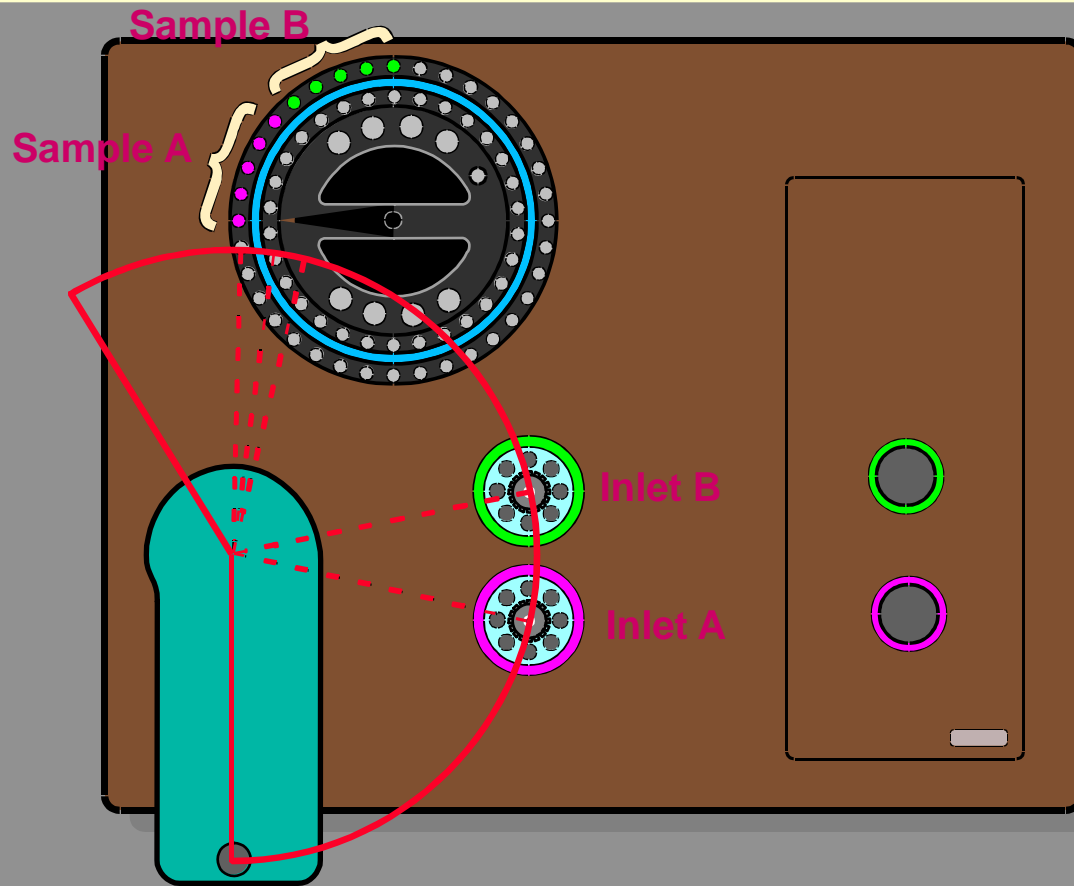
Autosampler

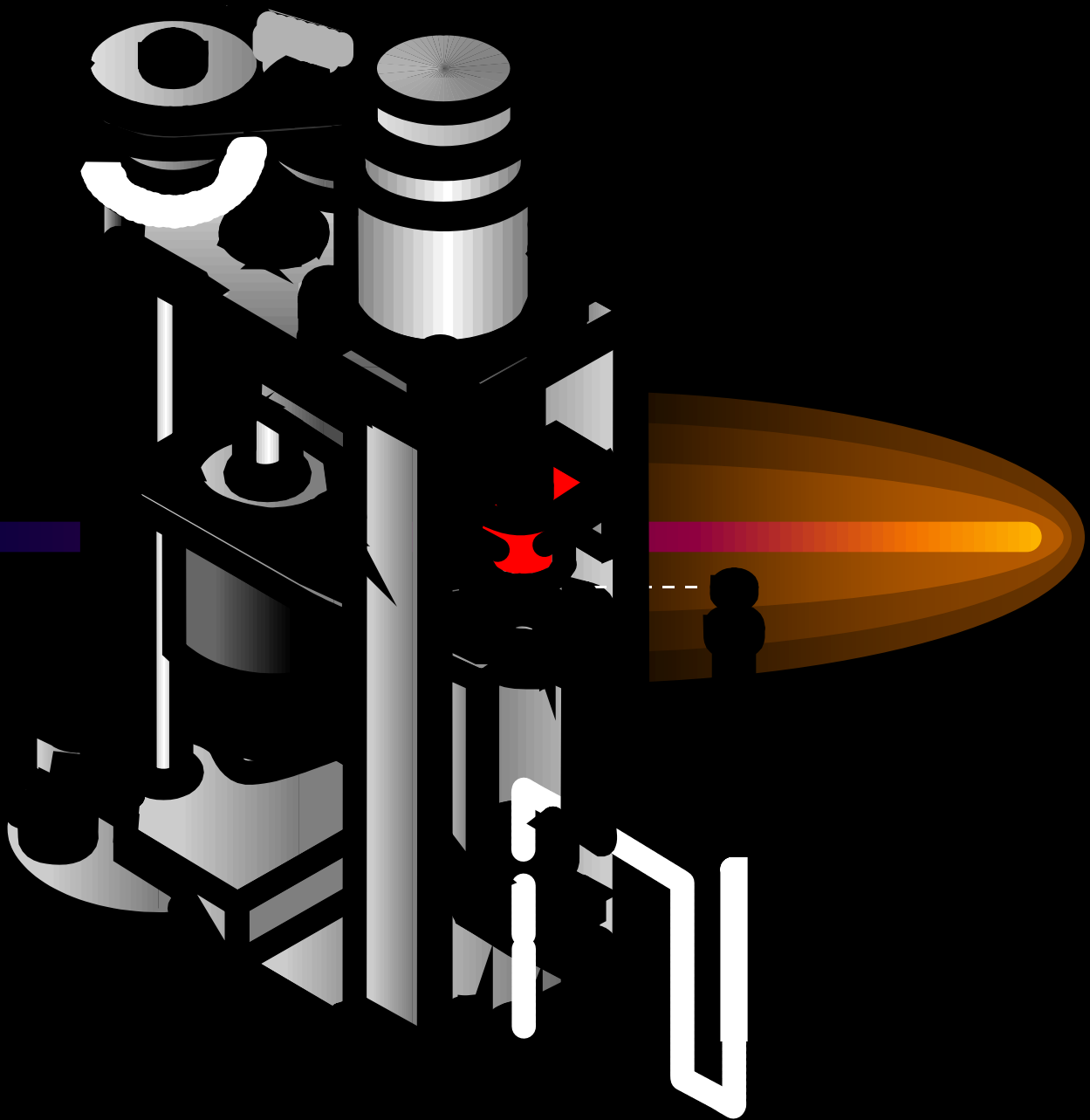


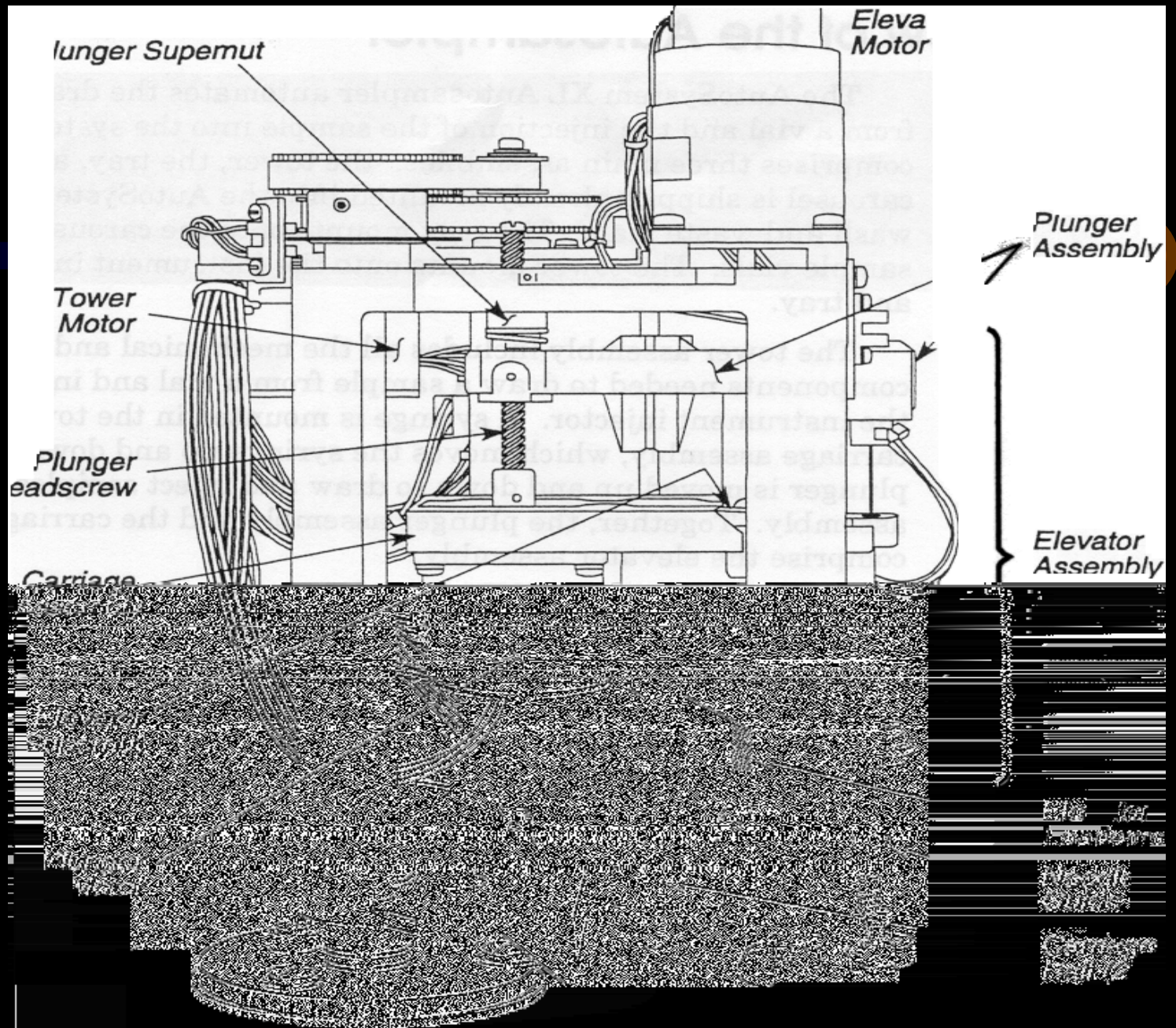
Syringes

- 5 uL teflon tipped plunger standard
- 5 uL all metal plunger optional
- 0.5 uL or 50 uL optional
- 0.63 or 0.47 mm O.D. needle
- Simplified removal and replacement
- Repeatability < 0.5% with packed columns using C₉ in C₇ solution

Autosampler



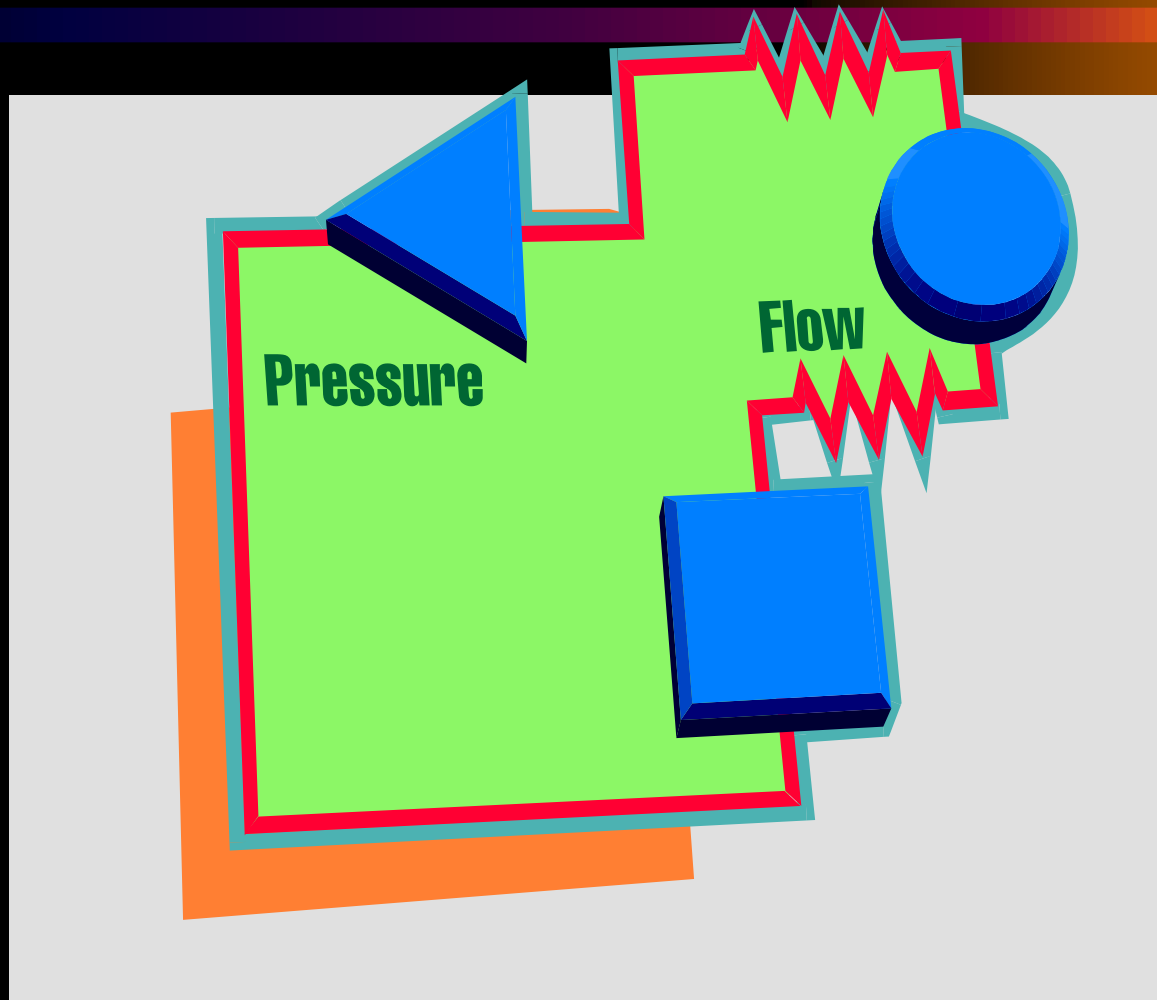




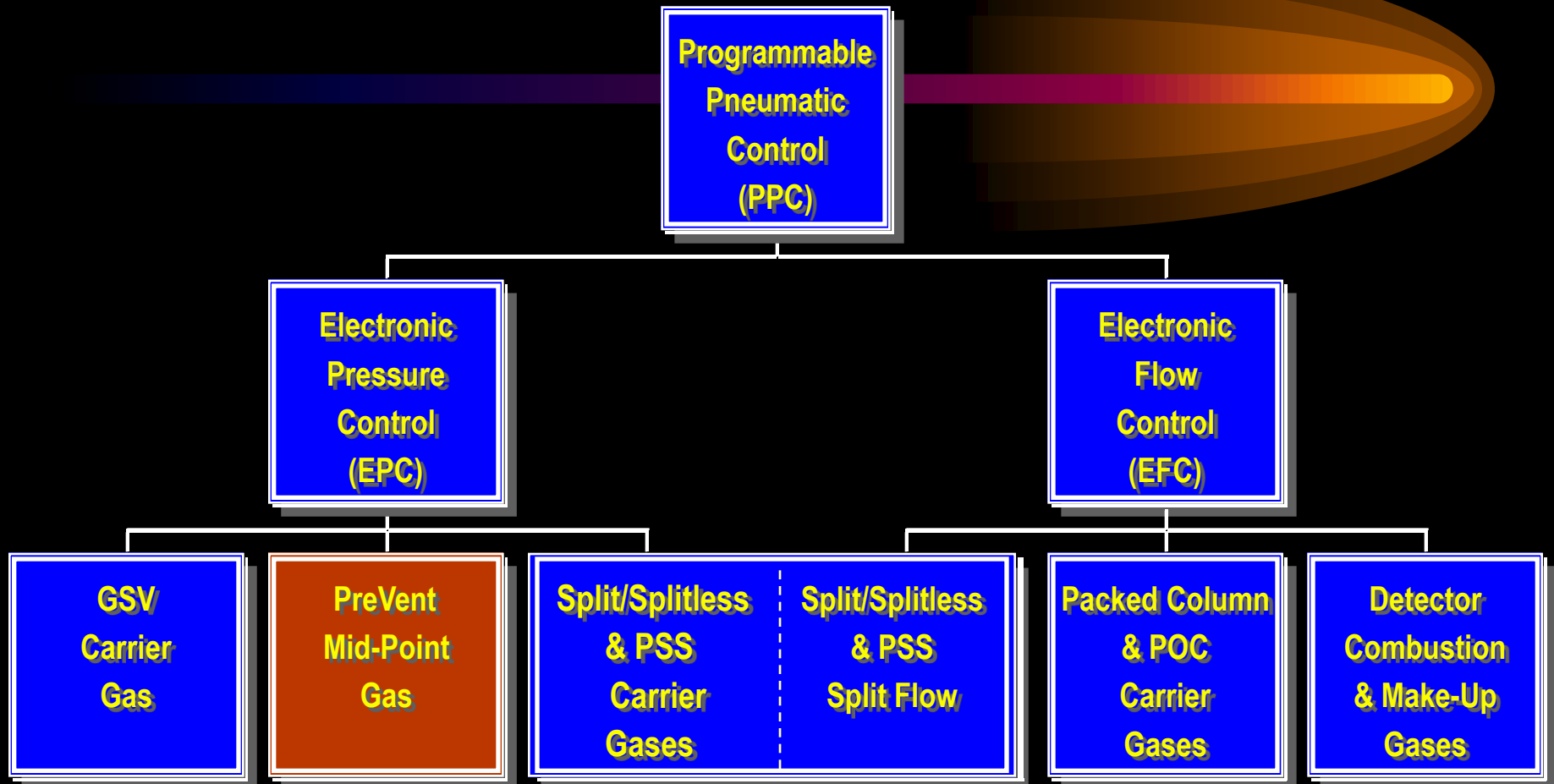


*Programmable
Pneumatic
Control*

*No more knobs with PPC,
Programmable Pneumatic Control*



PPC Functionality

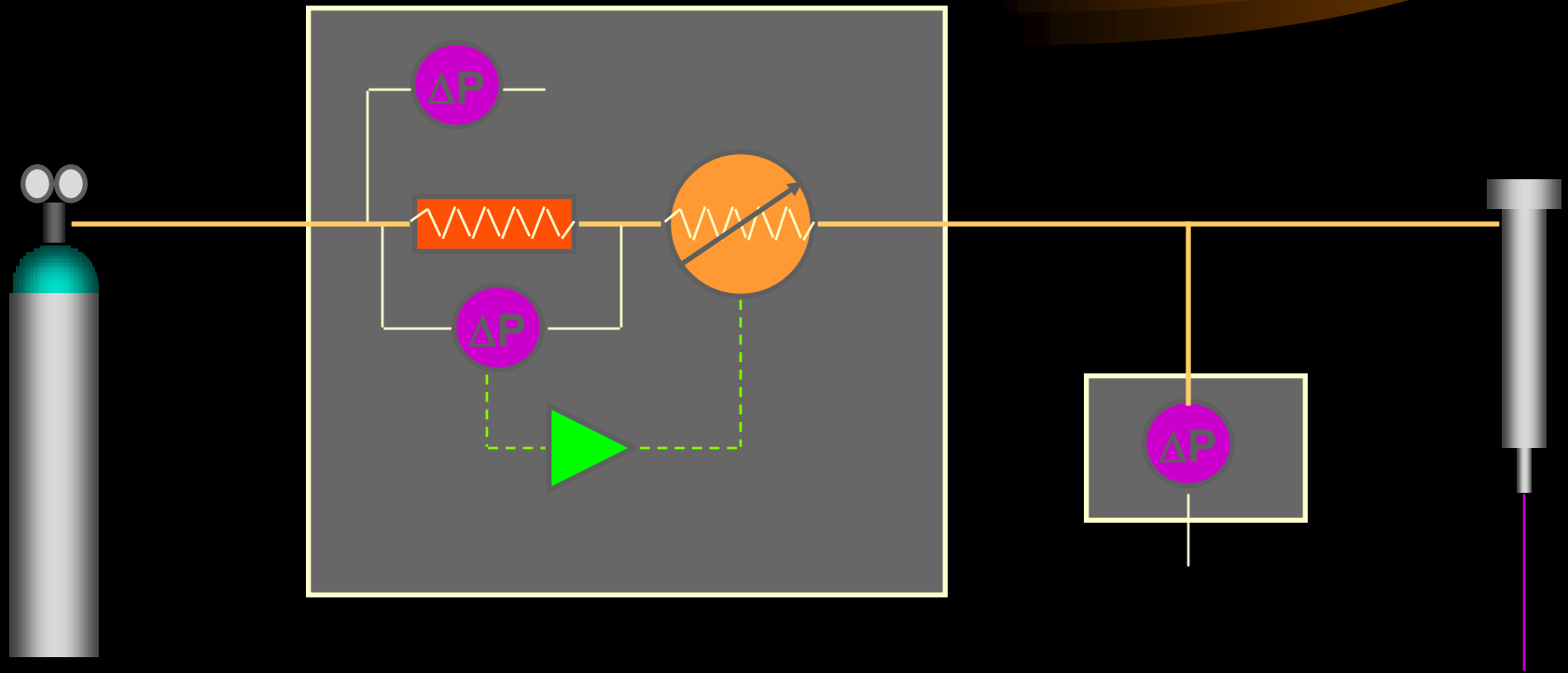


Carrier Gas Flow Control - Features



- Linear programming
- Choice of carrier gas
- Compensation for ambient temperature
- Easy calibration for compliance
- Interchangeable frits for optimum performance

Carrier Gas Flow Control with Pressure Readout



Carrier Gas Flow Control with Pressure Readout - Features

- Visible confirmation of applied column inlet pressure
- Automated leak testing
- Available as a PPC pressure readout accessory

Stable Peak Retention Times



- Retention times not significantly affected by
 - Split flow
 - Liner geometry
 - Liner packing
 - Liner temperature
- Benefits
 - Aids method development
 - Simplifies data handling