

Monochromator Setup Components & Measurements - 2

Nadia Yahlali

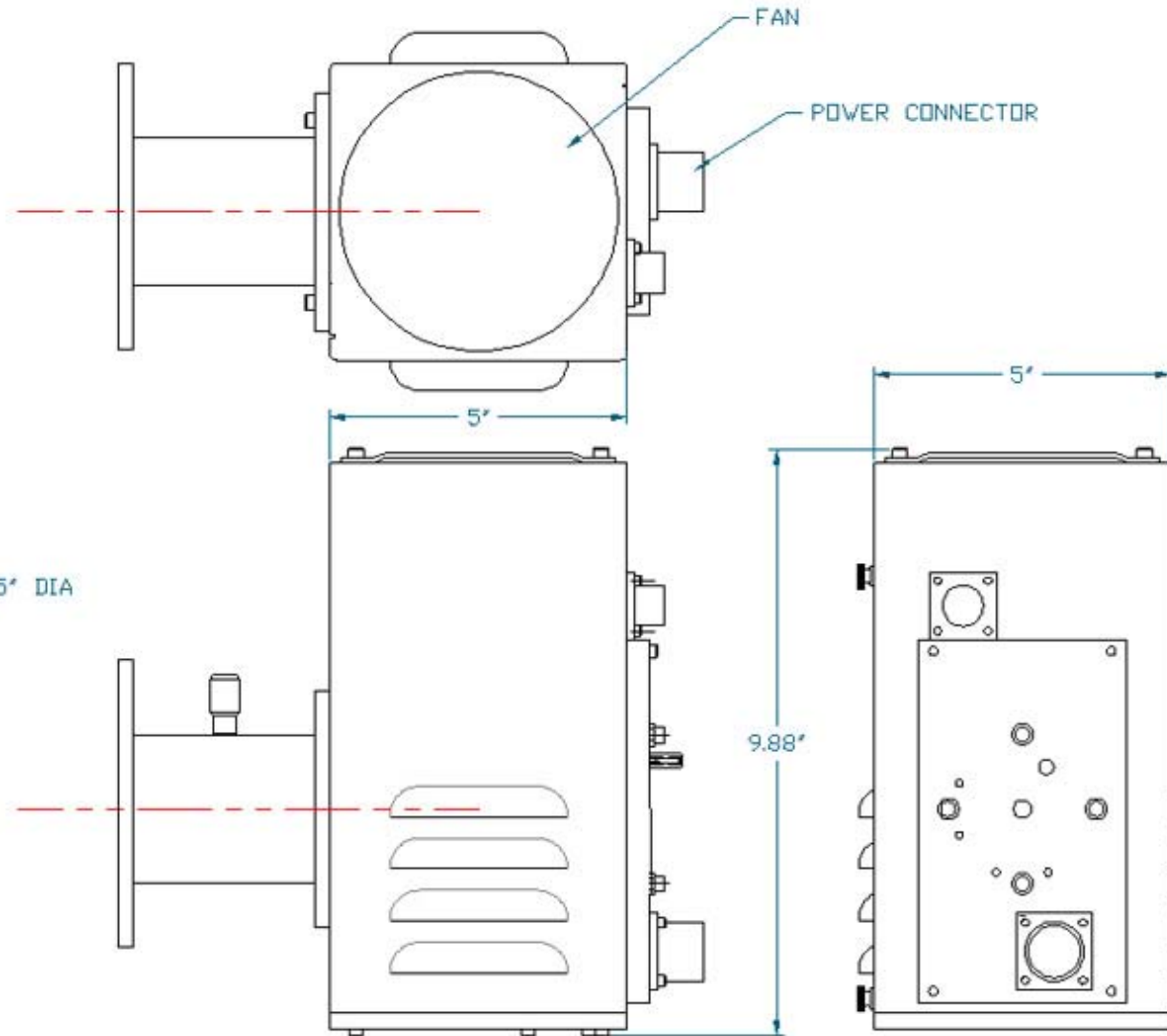
27/10/2021

McPherson Monocromator & accessories
are **to be delivered on November**

McPherson technical drawings of the whole system available
See in our IFIC repository

Tungsten lamp (delivered)

MODEL 621 UNIVERSAL SOURCE HOUSING
TUNGSTEN / XENON / IR EMITTER
PART 105-101717



Connection to the
Energy optimizer
through a quartz
window.
Cooling with air flow
(Fan on the top)

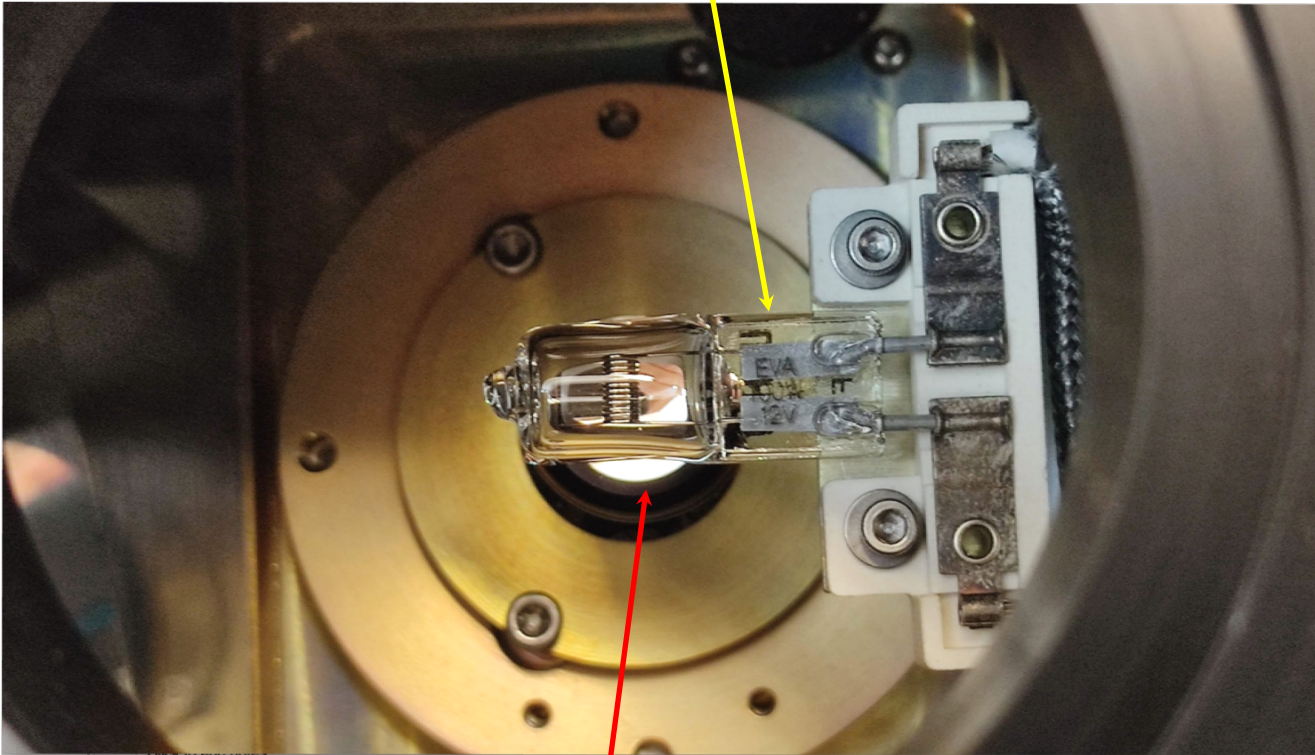
Tungsten lamp



European electrical standard (220/50Hz)
(confirmed by McPherson)

Tungsten lamp

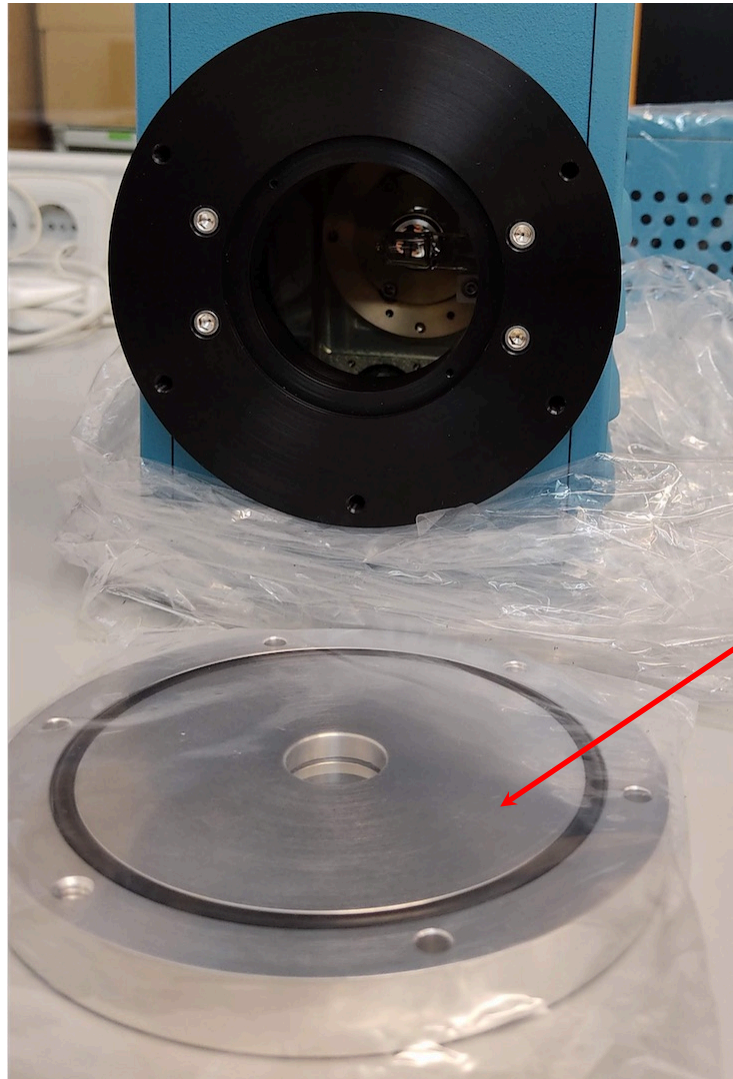
LAMP: tunable position from the rear side of the Housing (3 switches)



MIRROR: tunable position from the rear side of the Housing (4 switches)



Tungsten lamp



Vacuum flange with two O-rings, on vacuum and air sides, and a quartz window (34,8 mm diameter)

Leak test certified

McPHERSON™

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EMAIL: Sales@mcphersoninc.com • http://www.mcphersoninc.com

LEAK TEST CERTIFICATE

Helium Mass Spectrometer Leak Detector

Customer: Photon Lines
Purchase Order Number: 210128
Part Number: 102-601
Part Name: QUARTZ WINDOW ASSY

Calibration Entry Number: 5504
Date: 10-4-21
Operator: Dave R
Job Number: 118504

Leak Detector: Varian MR15 V.S.

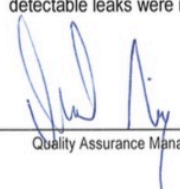
Test Type: Outside In ☒ Inside Out ☐ Other ☐

Leak Specification: 2×10^{-9} atm·cc/sec

Qty Tested: 1 UNIT Qty Passed: 1 UNIT Qty Failed:

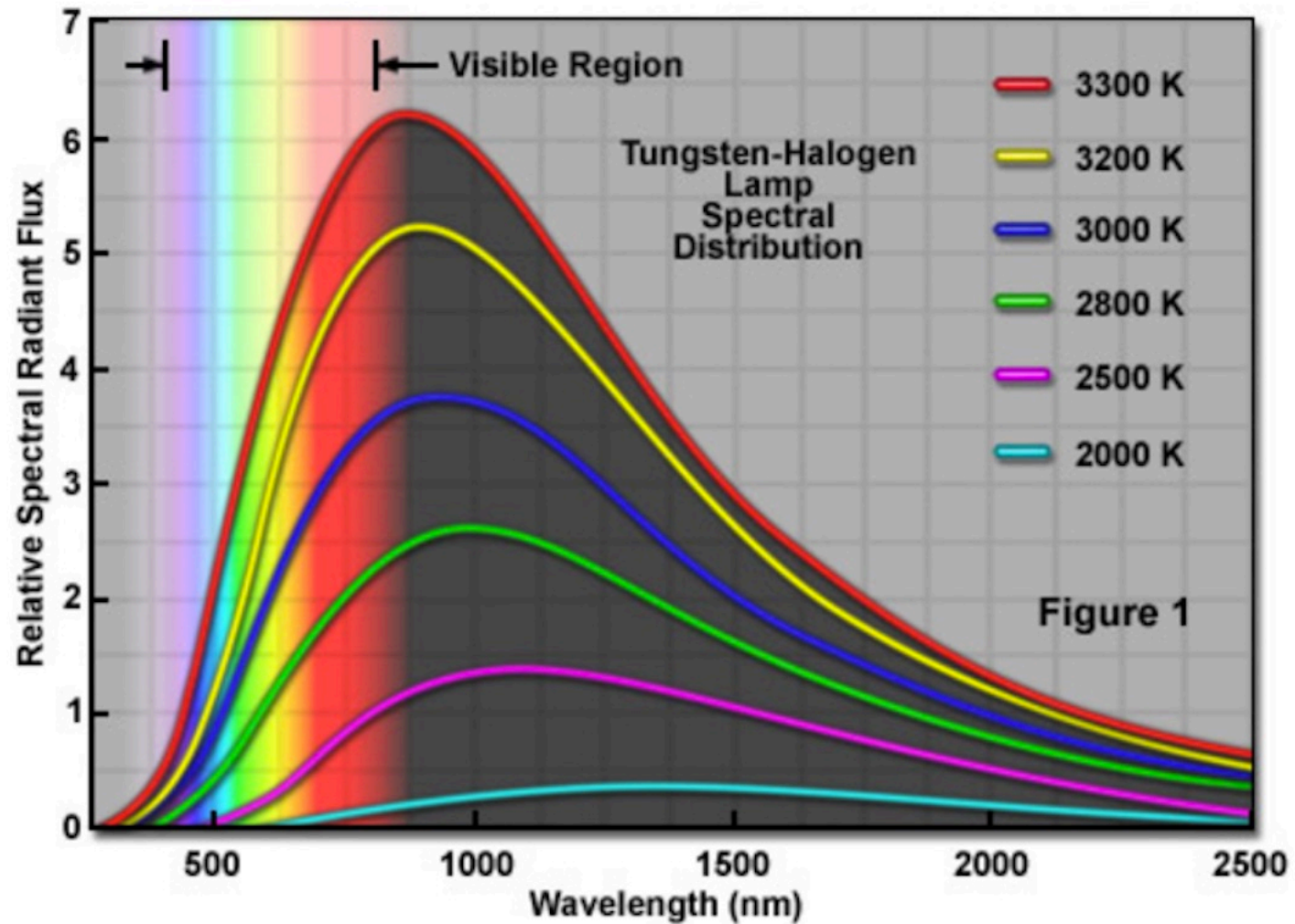
This certifies that the item(s) passing test adhere strictly to state-of-the-art vacuum standards. McPherson leak detection calibration standards comply with American Society for Testing Materials ASTM-E-493-73.

The item(s) passing test was/were checked using a helium mass spectrometer to a sensitivity of 2×10^{-9} atm·cc/sec and no detectable leaks were noted.

Signed 
Quality Assurance Manager

The Spectrometry Specialists For Over 50 Years

Tungsten lamp – typical emission spectrum

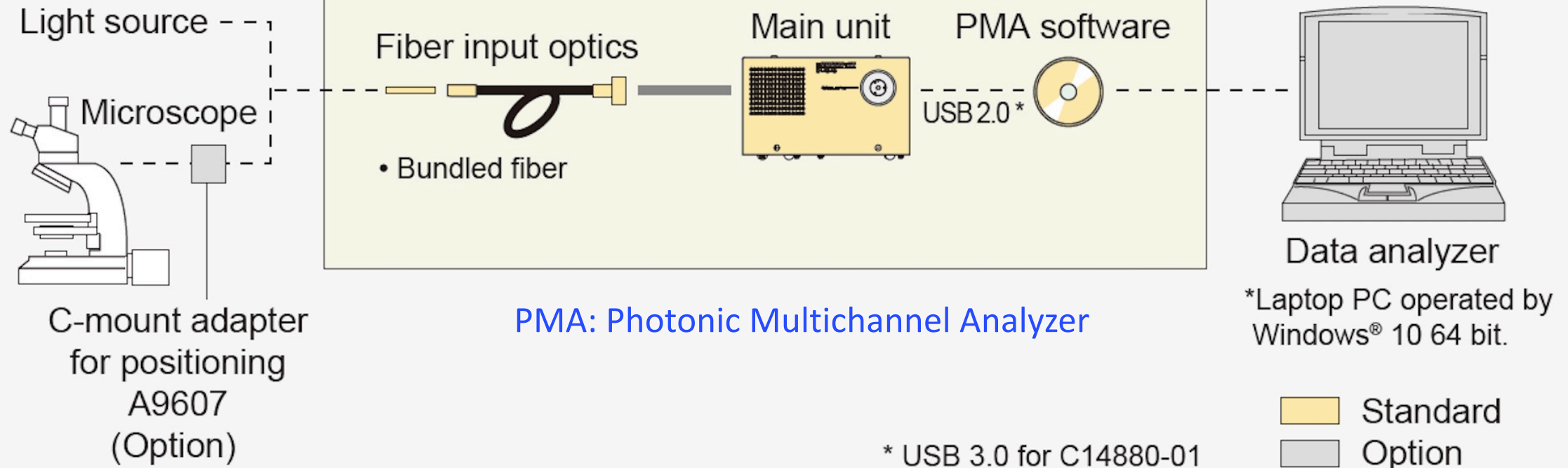


Tungsten lamp – measurement of emission spectrum at ICMOL

Light source measurements

Measurement of emission spectra in light sources such as lamps and LEDs

PMA-12 Standard Configuration

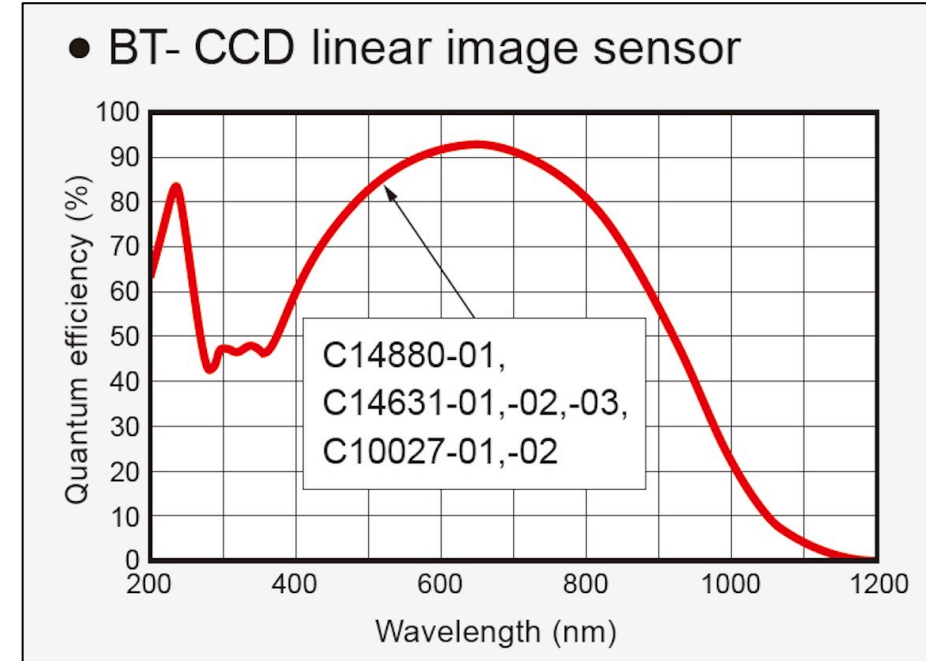
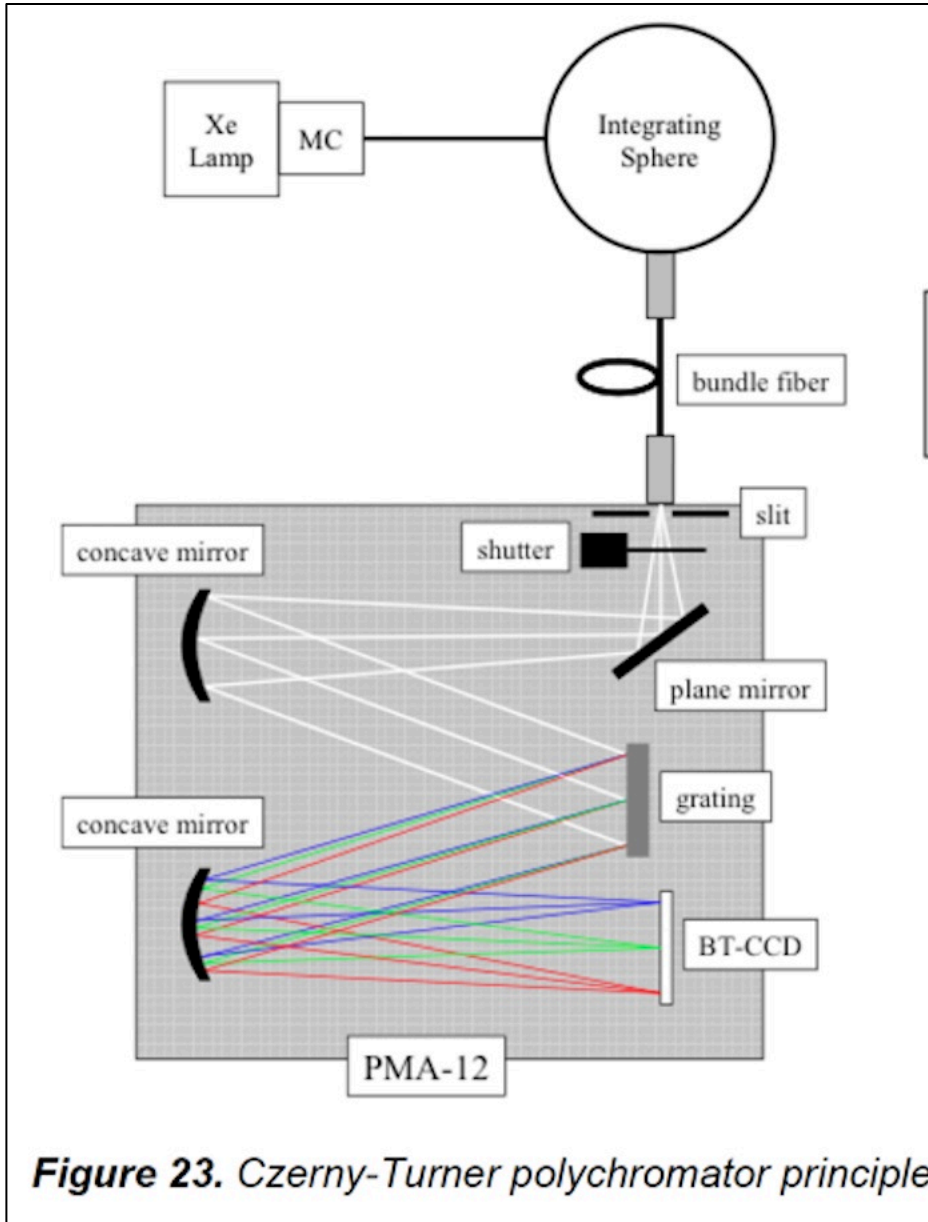


PMA 12 - C10027-01 - Specifications

Model	C14631-01	C14631-02	C14631-03	C14880-01	C10027-01	C10027-02	C10028-01	C10028-02
Photo-detector	BT- CCD linear image sensor							InGaAs linear image sensor
Wavelength (nm)	300 to 800	250 to 840	300 to 1040	200 to 990	200 to 950	350 to 1100	900 to 1650	1600 to 2350
Wavelength resolution (FWHM)*1	≤ 3 nm	≤ 3 nm (Less than 750 nm)	≤ 4 nm	< 2.5 nm	< 2 nm	< 2.5 nm	< 9 nm	
Wavelength accuracy	<±0.3 nm		<±0.5 nm	<±0.3 nm	<±0.75 nm		<±3.2 nm	
Exposure time (Internal trigger Mode)	18 ms to 64 s			19 ms to 64 s			5 ms to 64 s	5 ms to 0.05 s
Number of photosensitive device channels	1024 ch						256 ch	
Pixel size	24 μm × 1392 μm			24 μm × 2928 μm			50 μm × 250 μm	
Device cooling temperature	0 °C			-10 °C	-15 °C		-10 °C	
Read-out noise (electrons)	16						18 750	
Dark current (electrons/scan)	128 (0 °C : 20 ms)			64 (-10 °C : 20 ms)	32 (-15 °C : 20 ms)		163 000 (-10 °C : 20 ms)	6.47 × 10 ⁸ (-10 °C : 20 ms)
AD resolution	16 bit							
Spectrograph	Concave spherical grating type			Czerny-Turner type				
Spectrograph F number	3			4				
Fiber type				Bundled fiber Φ12 mm SUS tube				
Fiber length	2 m			1.5 m				
Fiber receiving area				Φ1 mm				
External trigger input	TTL level/High impedance							
Interface	USB 2.0*2			USB 3.0*2	USB 2.0*2			
Power supply	AC 100 V to AC 240 V, 50 Hz/60 Hz (Power supply voltage variation ±10 %)							
Power consumption	Approx. 40 VA			Approx. 50 VA	Approx. 70 VA		Approx. 50 VA	
Ambient operating temperature	+10 °C to +35 °C			+10 °C to +30 °C				

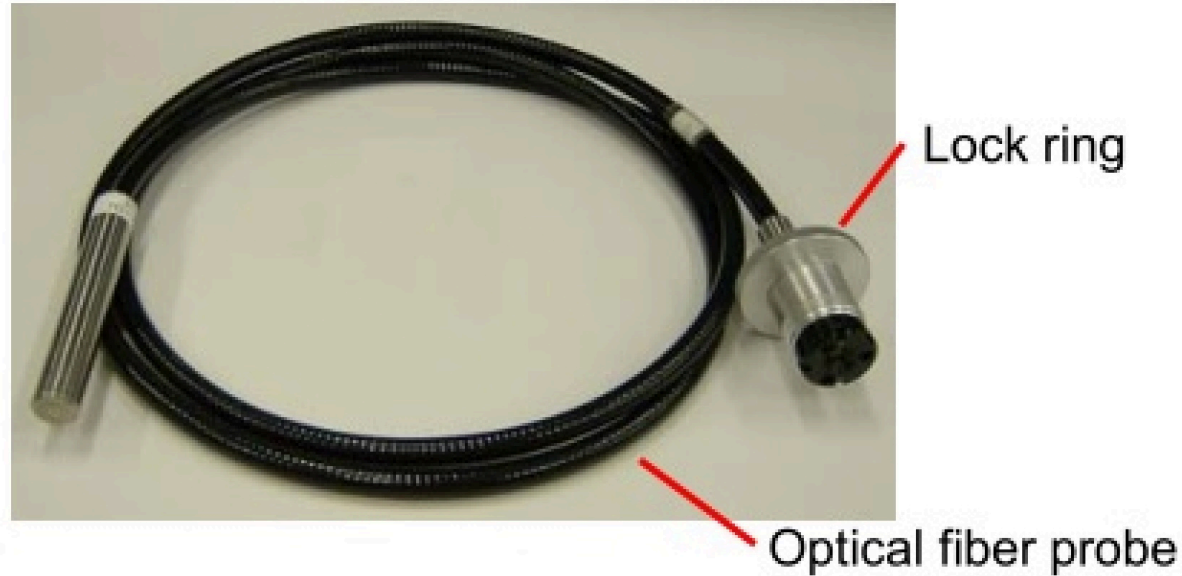
*1 Confirmed with mercury and argon atomic beams. *2 1.5 m cable is included as standard.

PMA 12 principle (Czerny-Turner)

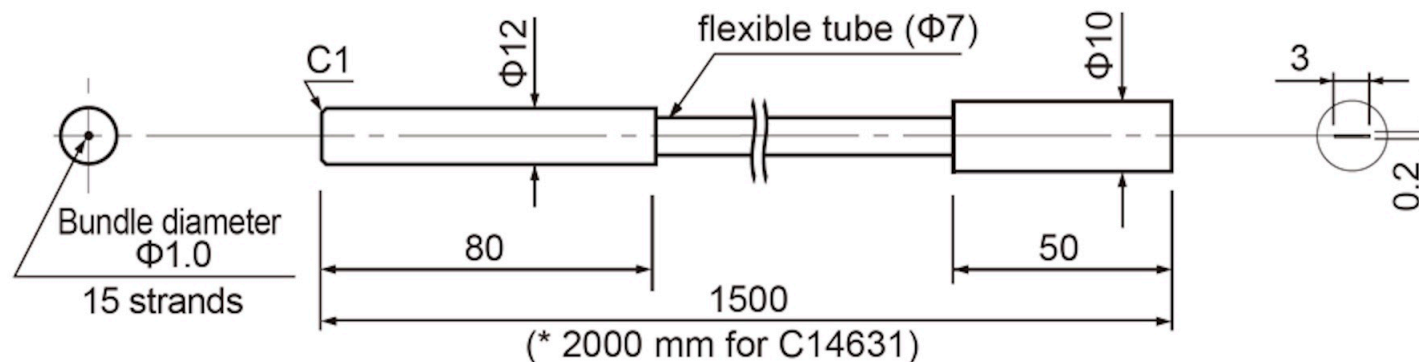


The Polychromator Multichannel Analyzer available at ICMOL is **Calibrated by Hamamatsu** (Spectrum deconvolution from detector quantum efficiency)

Tungsten lamp – measurement of emission spectra



Fiber input optics (Approx. 100 g)

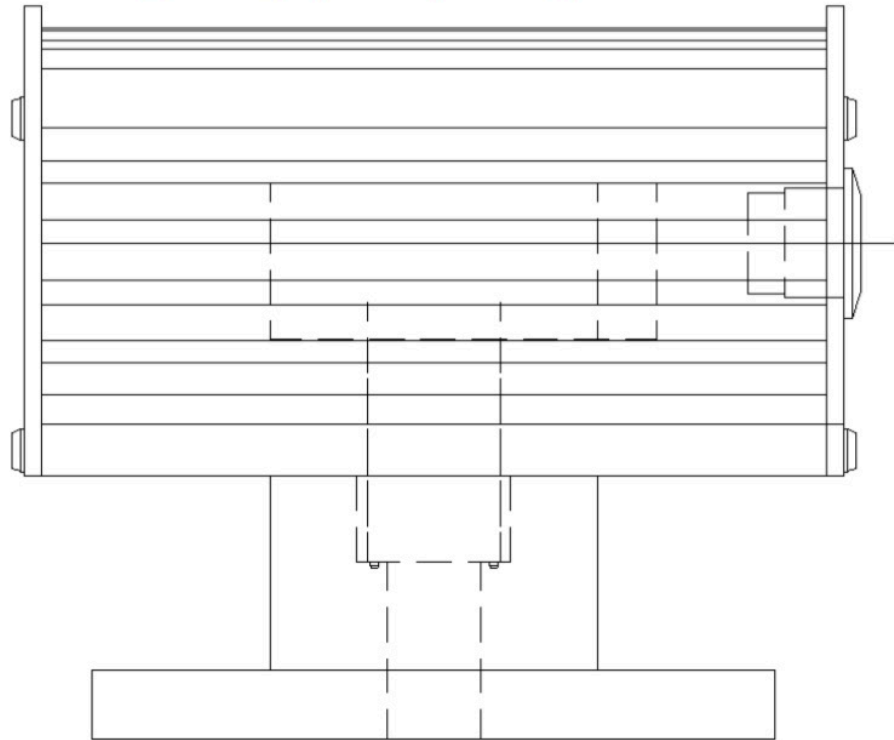


TO DO @IFIC: fabricate a simple adapter for the fiber bundle insertion onto the quartz window of the Lamp (use 3D printer).

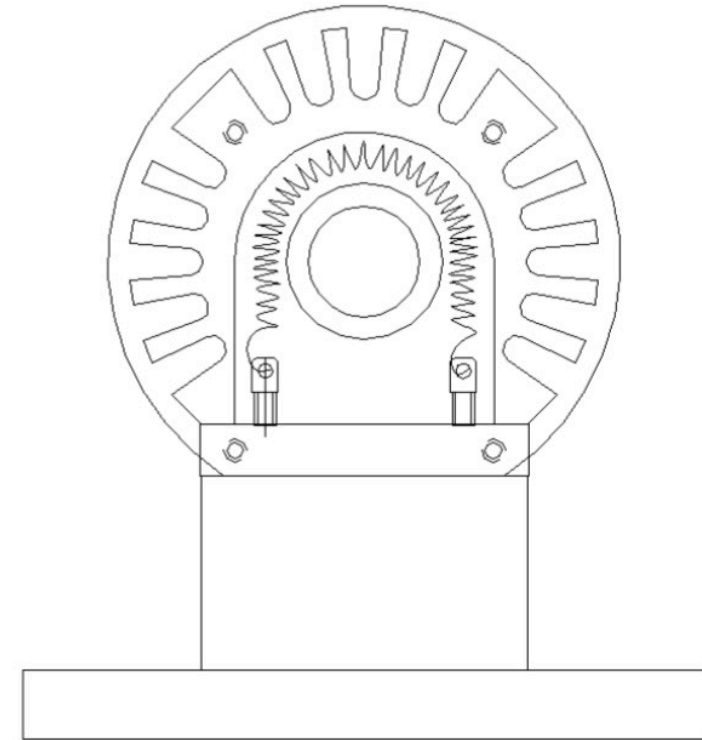
D2 Lamp (delivered)

30 W lamp | f/6 beam | Magnesium Fluoride window | No flowing gas, coolant or pumps
Optional, calibration & vacuum UV reflective condenser

This lamp has a 5" outer-diameter mounting flange. It is suitable for use on the slit assemblies found on most McPherson spectrometers. This light source system is convenient to use, demonstrates excellent stability, and has found widespread popularity through the vacuum and deep UV.



Model 634 Source system
Part No. 105-103053-0

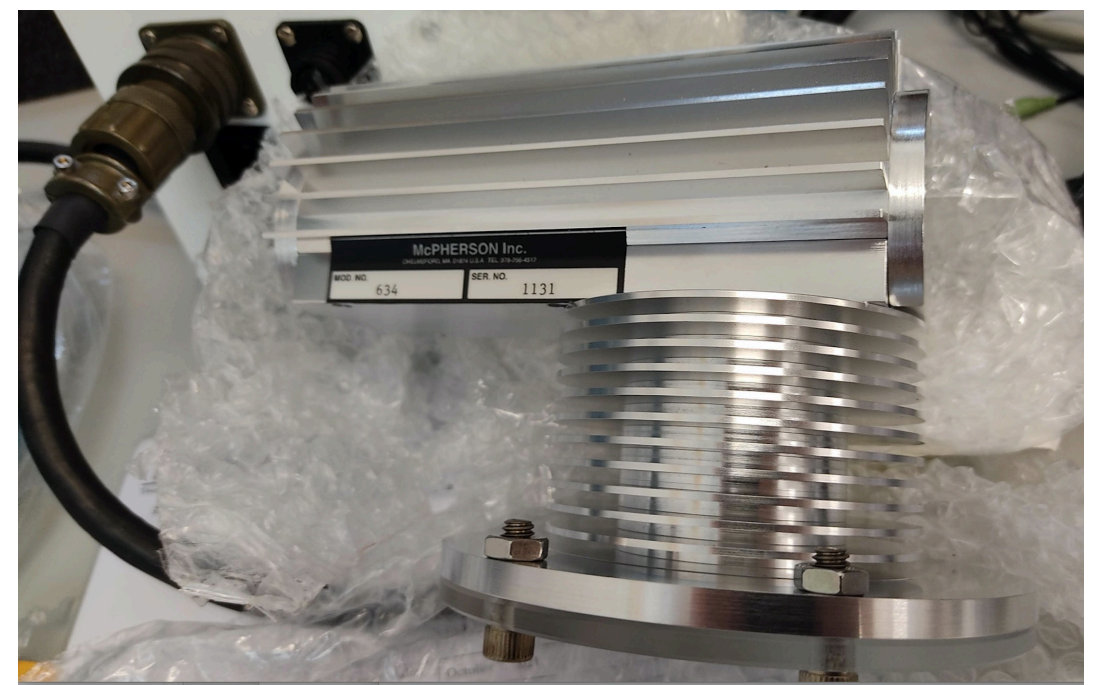
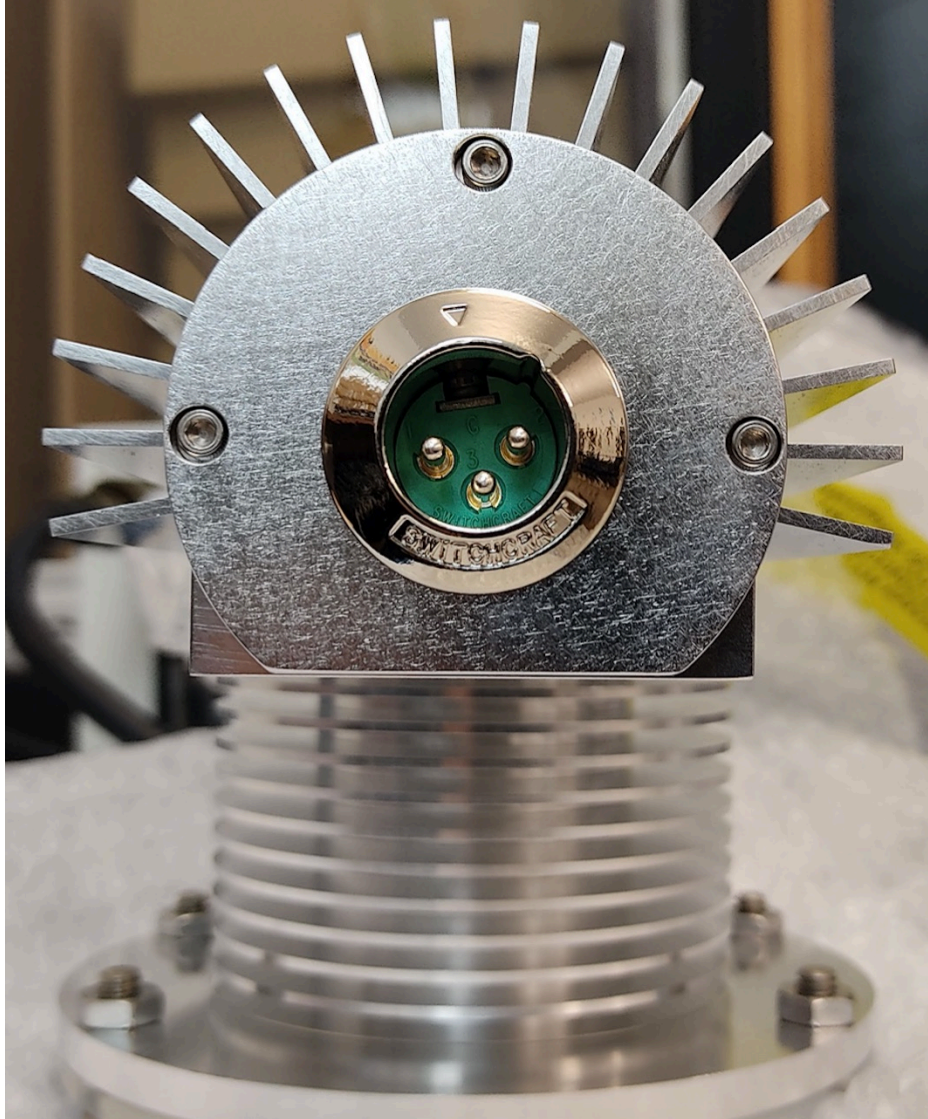


Power supply: Easy to use, line operated, universal input

- Width: 8.38 In (21.3 cm)
- Height: 5.22 In (13.3 cm)
- Depth: 14.38 In (36.5 cm)

D2 Lamp

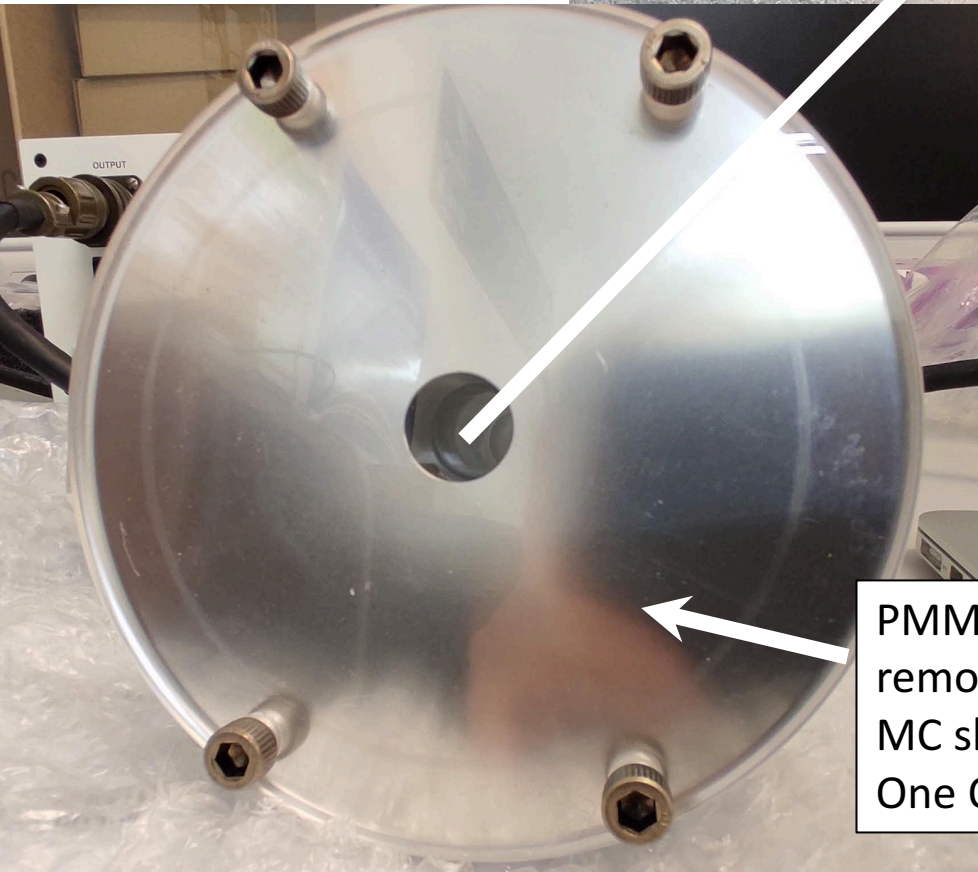
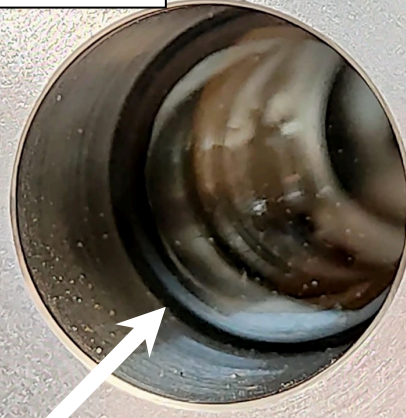
Design of the metallic housing favors cooling with air flow



European electrical
standard confirmed
by McPherson

D2 Lamp

MgF2 window
Leak test certified



PMMA cover flange, to be removed for assembly onto the MC slit or Energy-Optimizer (EO)
One O-ring only on MC or EO side.

McPHERSON™

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EMAIL: Sales@mcphersoninc.com • http://www.mcphersoninc.com

LEAK TEST CERTIFICATE

Helium Mass Spectrometer Leak Detector

Customer: PHOTON LINES / FRANCE

Calibration Entry Number: 5493

Purchase Order Number: _____

Date: 3/17/2021

Part Number: 105-113661

Operator: DAVE R

Part Name: 634 D2 SOURCE

Job Number: 117446

Leak Detector: Varian MR15 V.S.

Test Type: Outside In ☒ Inside Out _____ Other _____

Leak Specification: 2 x 10⁻⁹ atm·cc/sec

Qty Tested: 1 PC Qty Passed: 1 PC Qty Failed: _____

This certifies that the item(s) passing test adhere strictly to state-of-the-art vacuum standards. McPherson leak detection calibration standards comply with American Society for Testing Materials ASTM-E-493-73.

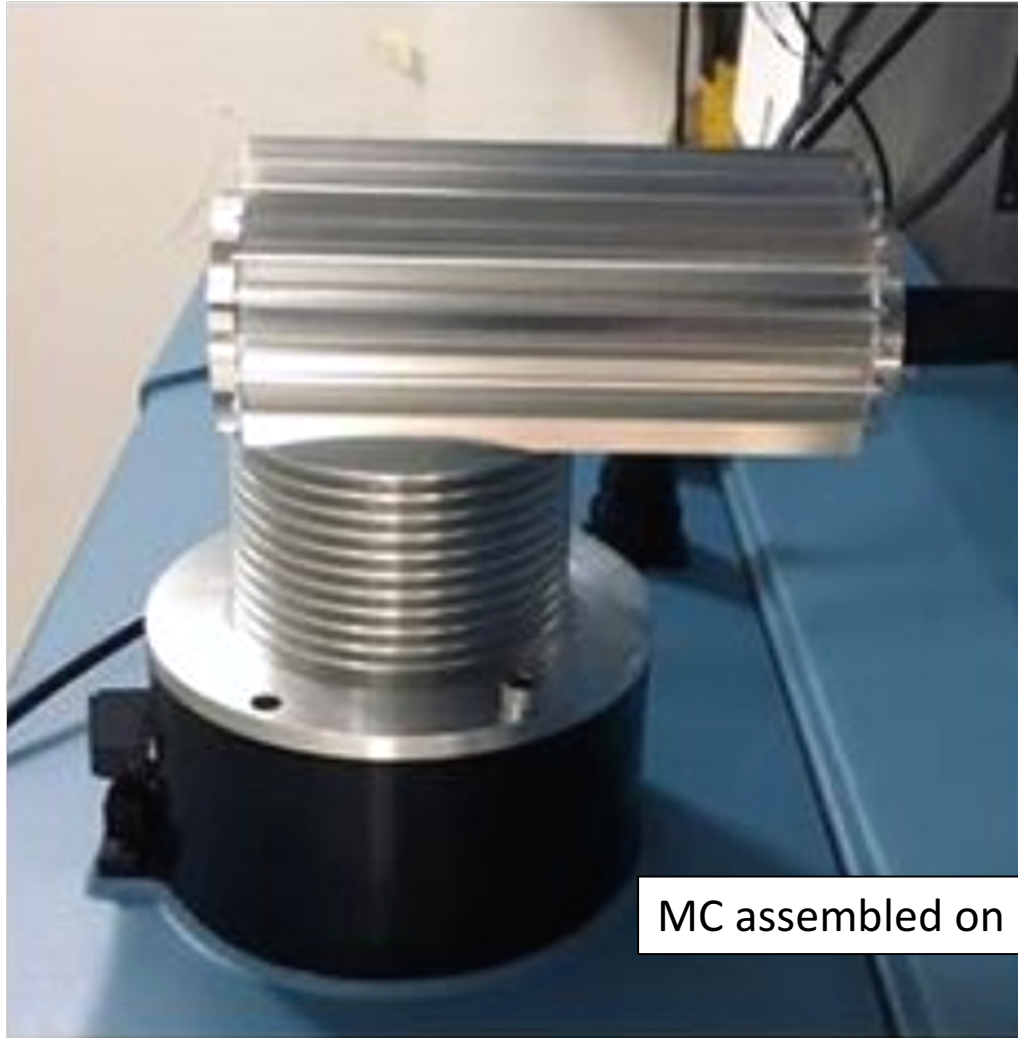
The item(s) passing test was/were checked using a helium mass spectrometer to a sensitivity of 2 x 10⁻⁹ atm·cc/sec and no detectable leaks were noted.

Signed _____

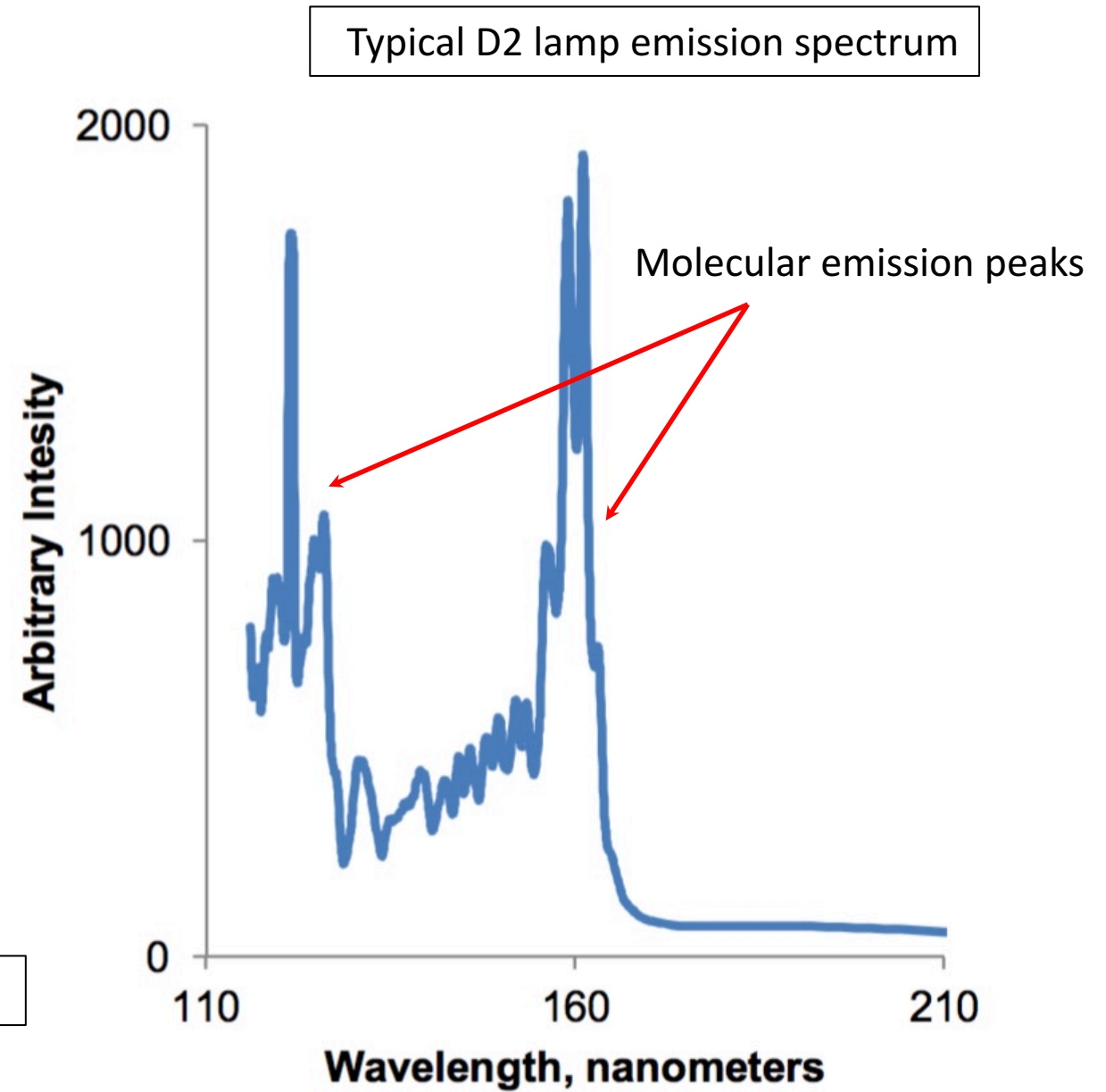
Quality Assurance Manager

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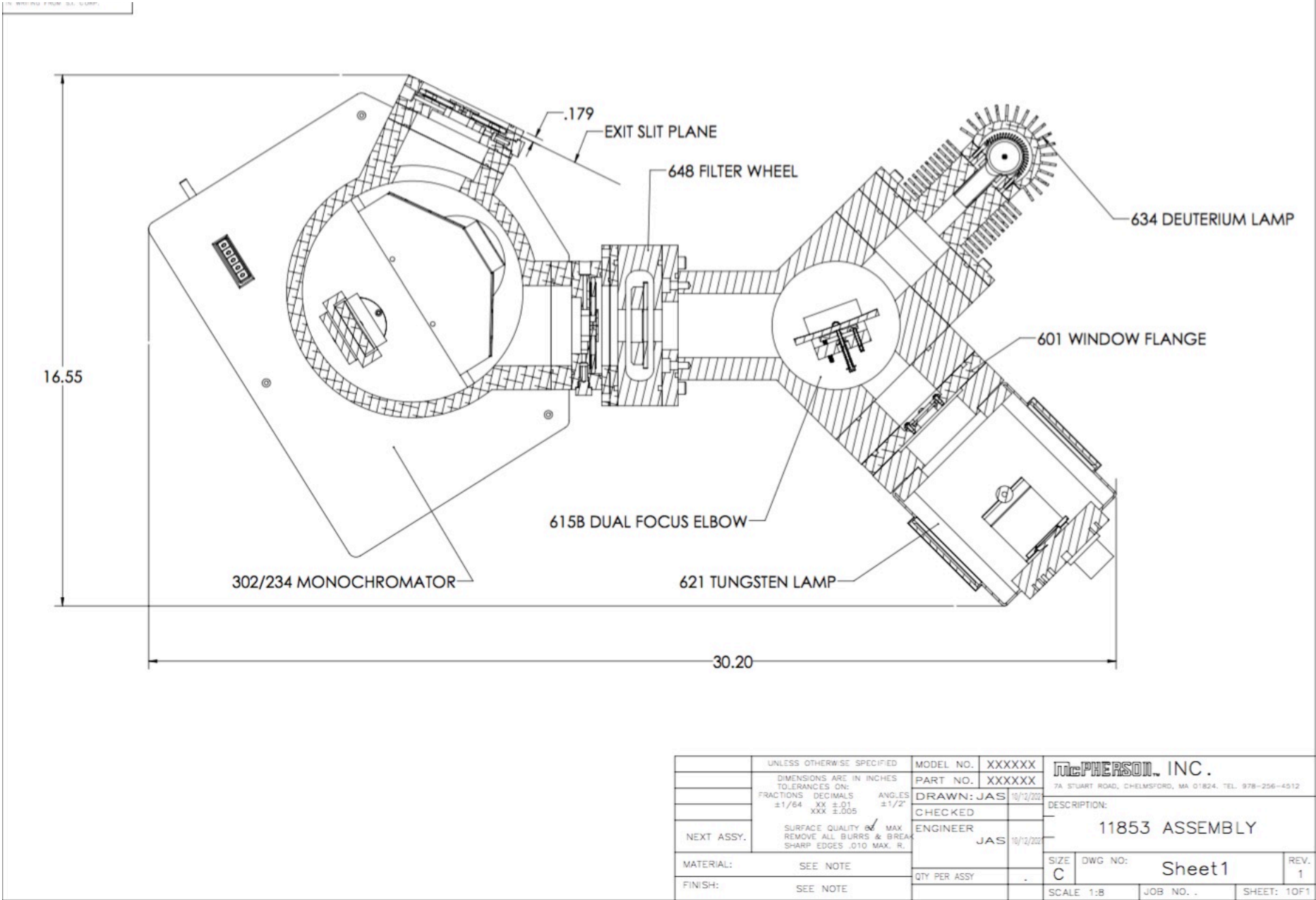
D2 Lamp



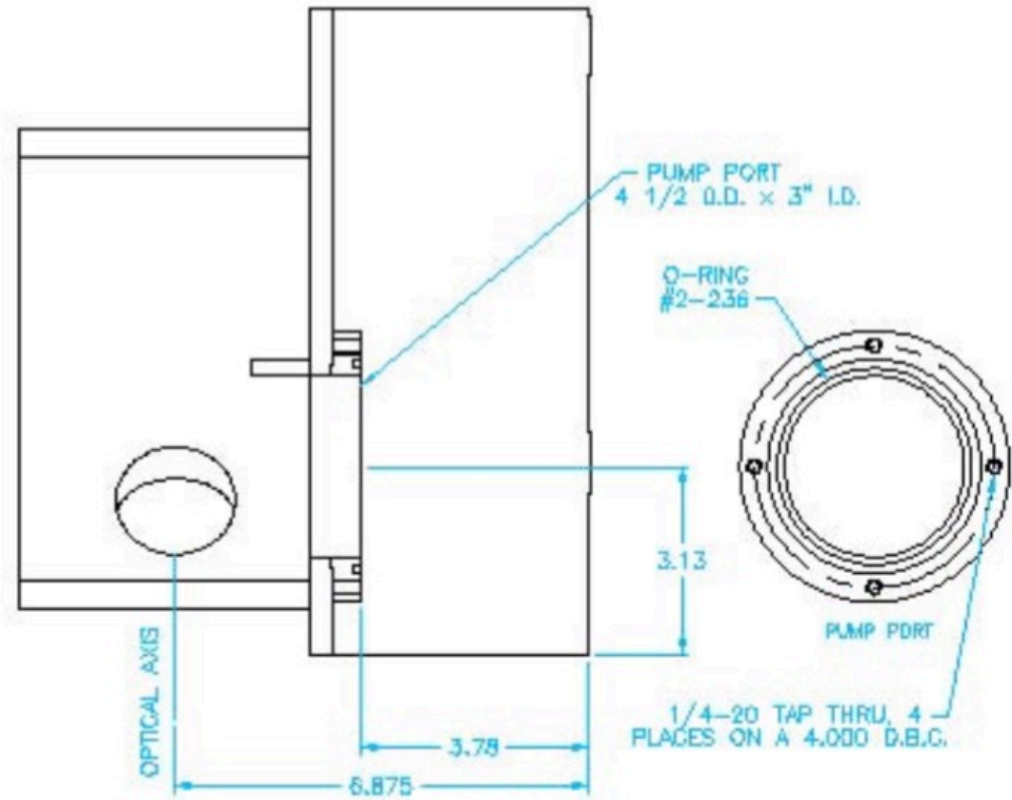
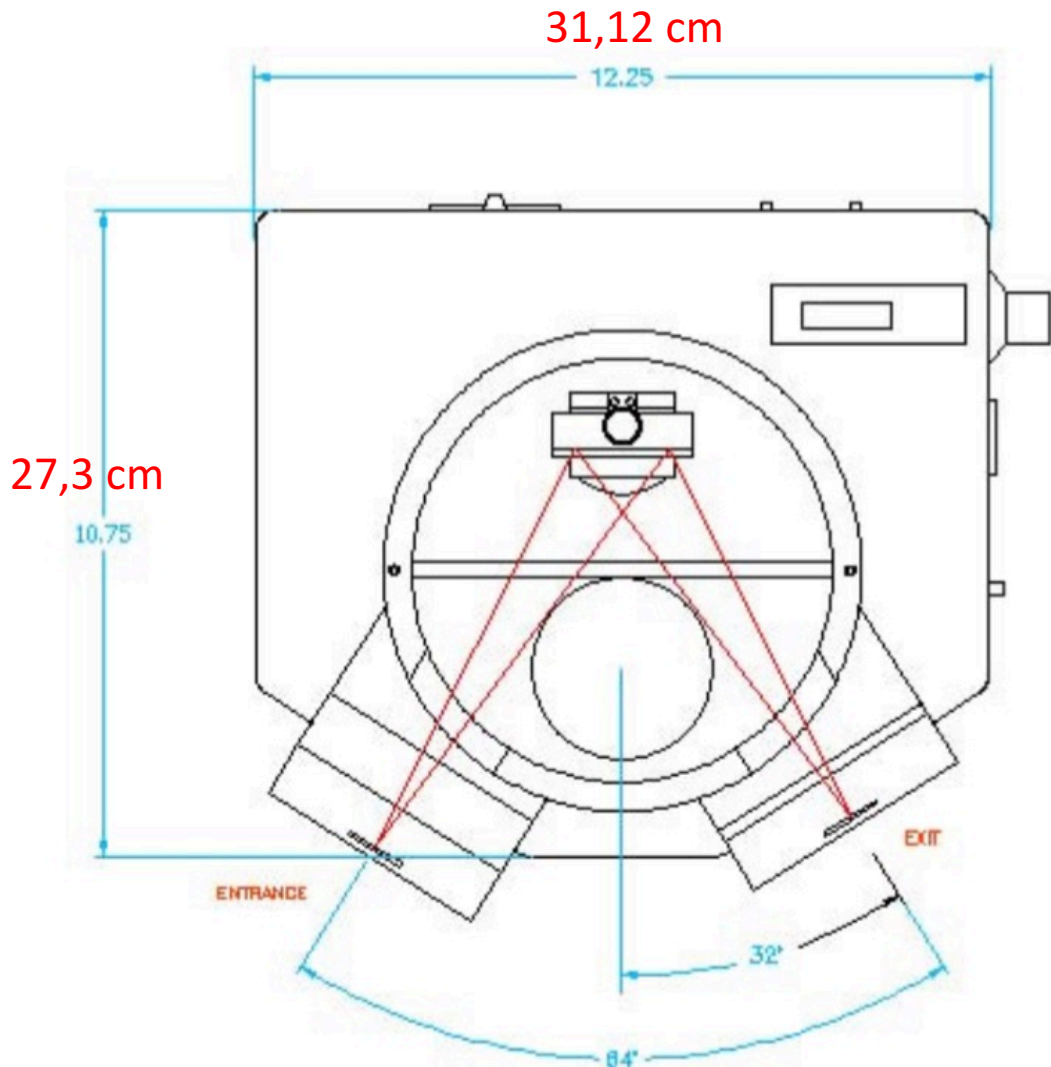
MC assembled on MC slit

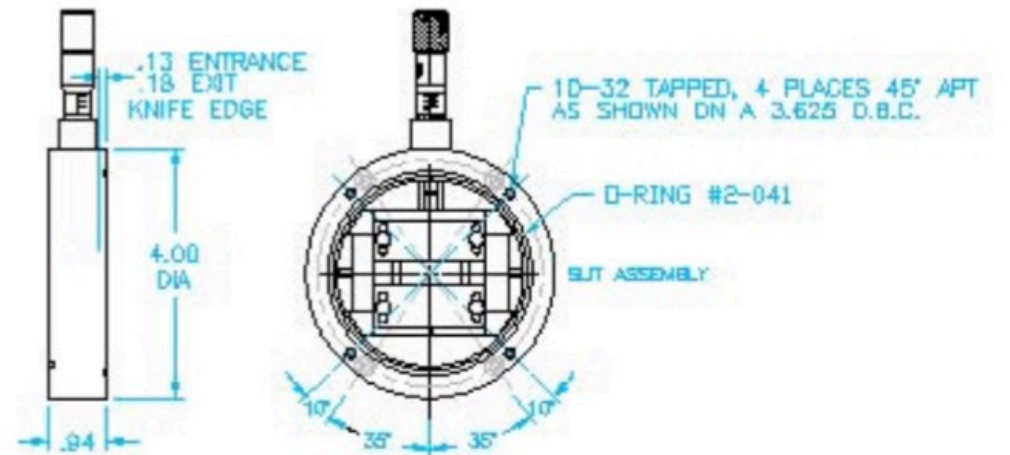
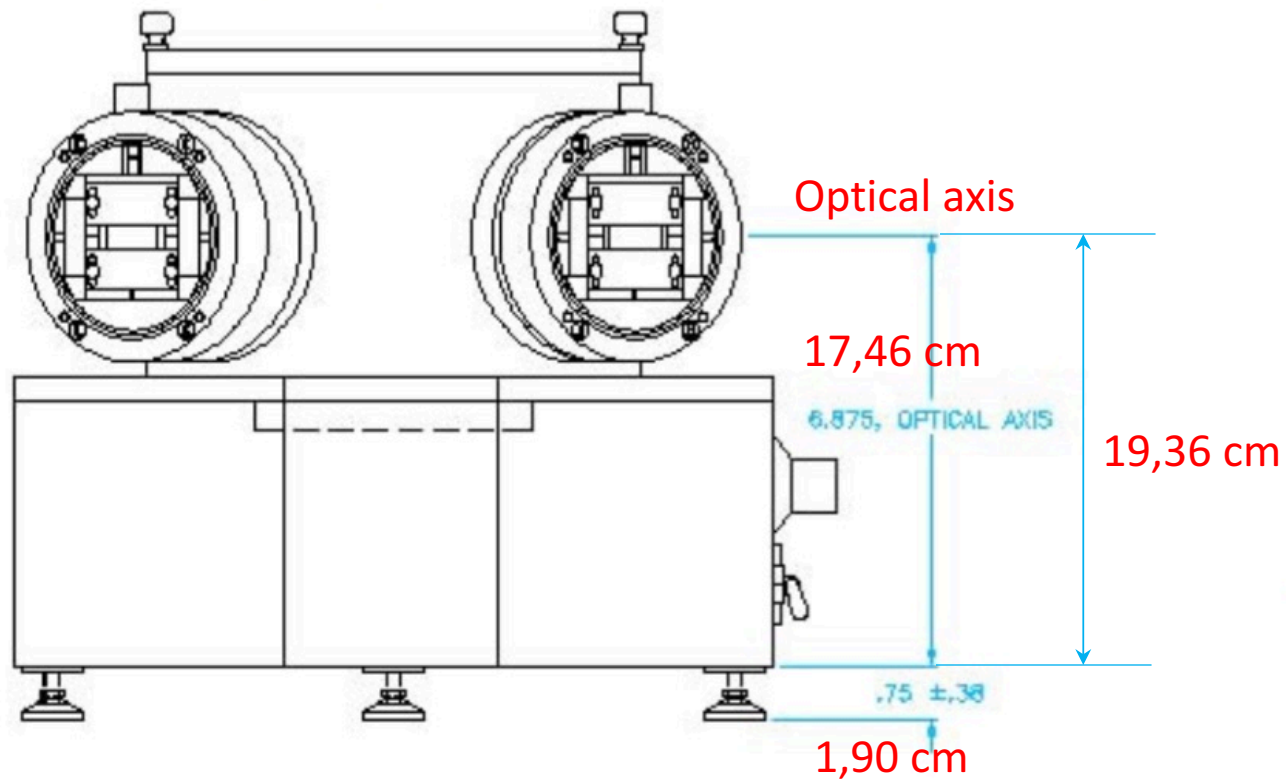


Monochromator Assembly Setup



234/302 Dimensions





MC Assembly & N2 Glove box



Dimensions of the full Monochromator assembly are compatible with the PMMA glove box

Assembly Aluminum Plate

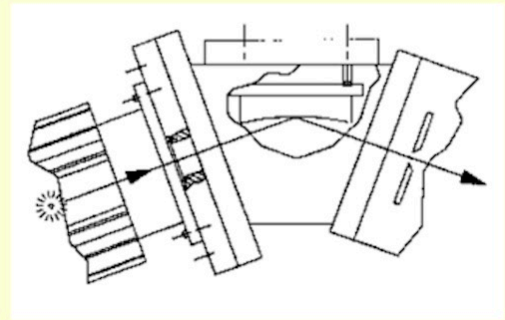
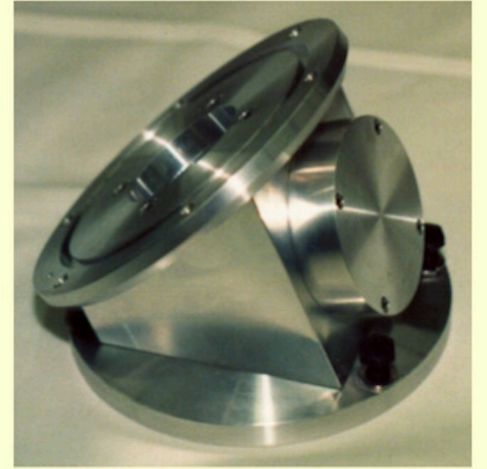
Example of Aluminum assembly
To support the MC system
Existing plates are compatible
with the MC assembly



Energy Optimizer

Model 615B vacuum UV energy optimizer with two source branches. Uses reflective condenser mirror to collect light from sources and focus at monochromator entrance slit. Mirror can be rotated 180deg to choose from between two sources in vacuum. Manually operated
8102-0113-0

Model 615 - Energy Optimizer

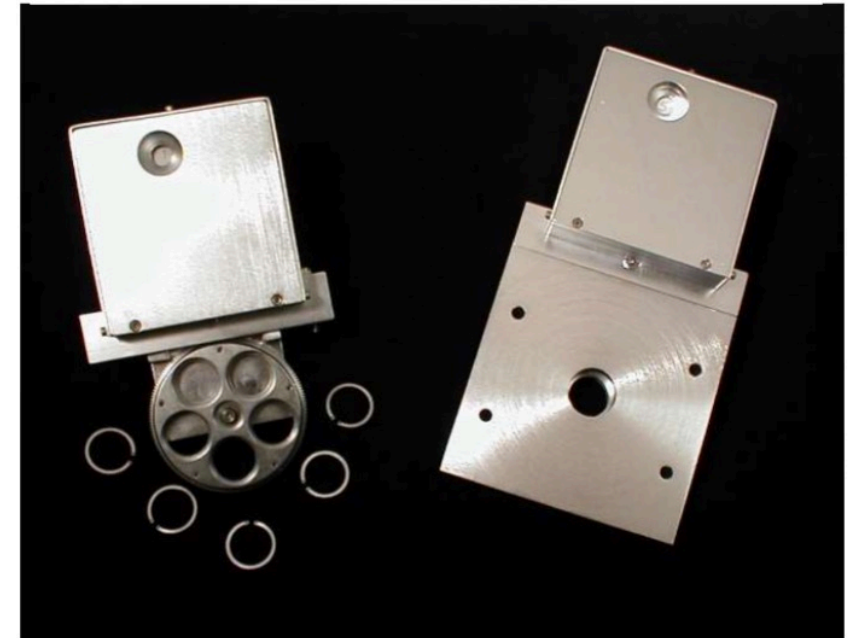
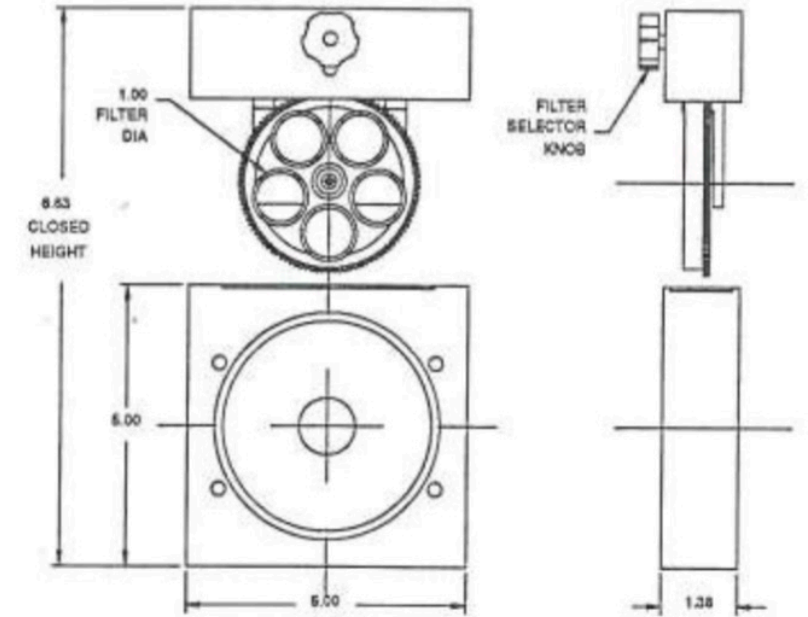
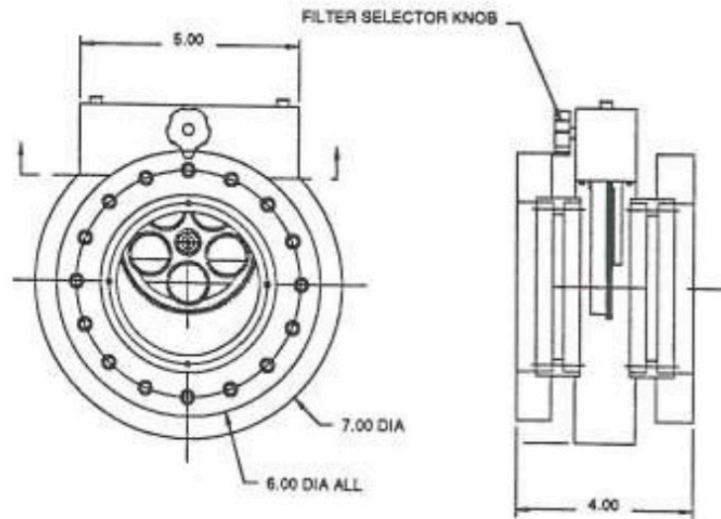
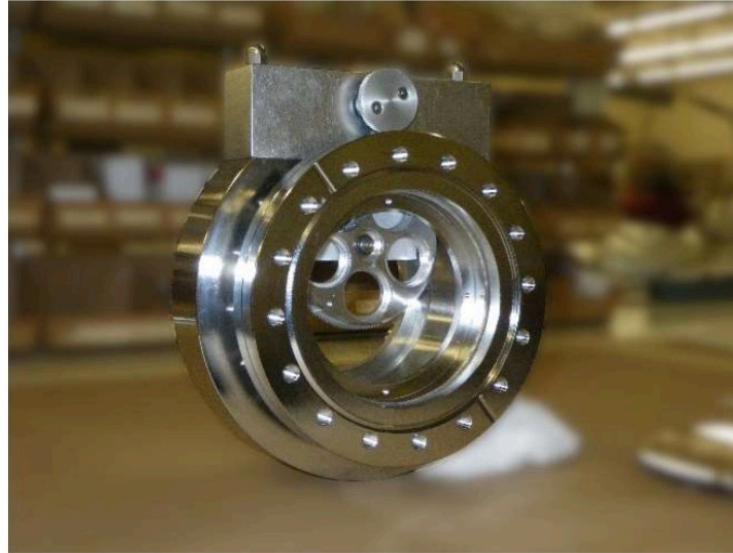


Filter wheel

Vacuum manual filter wheel, 5X
25mm DIA. Easy to change
filters via slide
out selector wheel. Fits
McPherson slit housings

225 nm long pass filter, 90%T
+
400 nm long pass filter

If system requirements call for automation, the
model 648-1 should be specified. The 648-1
(pictured) features motorized filter changes and
RS232 operation.



Filter wheel assembly

