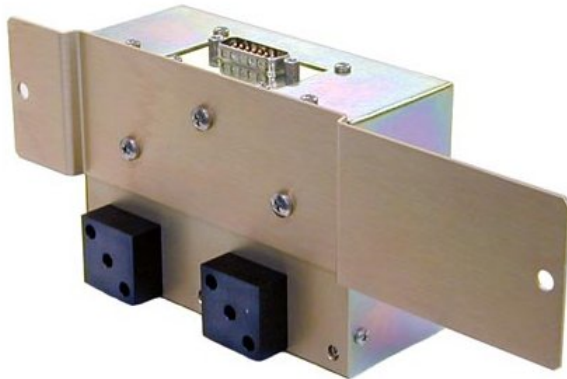


Detectors Dual Wavelength

PM220 PM225



PM220 Detector



PM225 Detector

Features and Benefits

- Improved endpoint detection through measurement of two wavelengths
- Cost-effective and compact through the use of interference filters
- Enables measurement in low light applications through high-gain photomultiplier tube (PMT)
- Adjusts for varying light conditions through automatic gain control feature when used with Verity's system controllers
- Simple installation through a KF40 flange or mounting bracket

Description

The PM220/225 Series detectors are used to measure two fixed wavelengths in the range of 185–830nm. When used with Verity's system controllers, the PM220/225 Series provides robust endpoint detection in appropriate applications. This series is most commonly used in applications where the chemistry is simple enough that overlapping spectra allow the use of a 10nm bandpass filter — but where two signals are necessary to ensure endpoint, or where two wavelengths are useful for alternative process recipes.

The PM225 detector accommodates two light emission inputs through fiber optic cables. The PM220 detector includes a KF40 flange for direct mounting to the vacuum chamber. A quartz or sapphire window provides vacuum isolation, although the sapphire window provides better resistance to window etching than the quartz window.

PM220/225 Pin-Out Assignments

DB15M D-Subminiature Connector		
Pin	Sensor	Connection
1	2	Signal output, 0–10VDC
2	1	Signal output, 0–10VDC
3	2	Circuit Ground Return
4	1	Circuit Ground Return
5	2	Circuit Ground Return
6	1	Circuit Ground Return
7	N/A	Not used
8	N/A	Not used
9	2	Power input line, +12V to +15V (7mA), polarity protected
10	1	Power input line, +12V to +15V (7mA), polarity protected
11	2	Power input line, –12V to –15V (1mA), polarity protected
12	1	Power input line, –12V to –15V (1mA), polarity protected
13	2	¹ Remote high voltage programming, 2–10VDC
14	1	¹ Remote high voltage programming, 2–10VDC
15	N/A	Not used

¹This enables automatic gain control when used with any of Verity's system controllers.

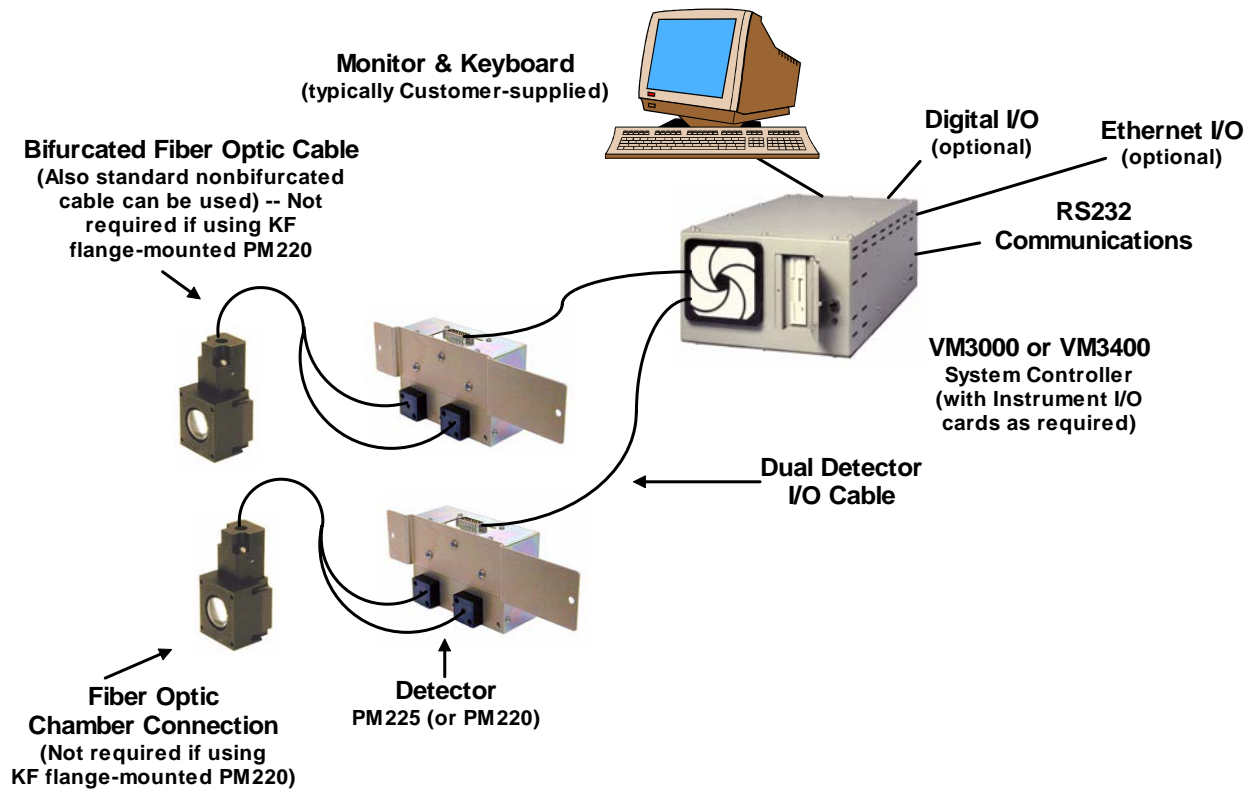
Operation

In the PM220, light enters through a quartz or sapphire window and is then split into two beams. The resultant beams are filtered and are then detected by two high-gain photomultiplier tubes (PMTs). Similarly, in the PM225, fiber optic cables transmit light signals to the instrument. The light then passes through the bandpass filter and is detected by the high-gain PMT.

When used with any of Verity's system controllers, automatic gain control of the detector is enabled. The system controller provides automatic gain control by driving the PMT's high voltage power supply to obtain the desired detector output. This compensates for the effects of both short and long-term optical signal deterioration. See page 7, Automatic Gain Control, for additional information.

System Schematic

Depicted below is a typical system schematic. A wide range of configurations are possible to meet the needs of different applications.



System Controller

The system controller provides:

- Endpoint detection using proprietary Neural Network or threshold software
- A graphical user interface
- External communications through digital I/O, RS232, and Ethernet
- Power to detector
- Automatic gain control of photomultiplier tube

System controller platforms include:

- VM3400 provides asynchronous control using Windows NT-based ScanView IV software
- VM3000 provides synchronous control using DOS-based ScanView III software

- SDC2001 provides an OEM synchronous embedded control of manual monochromators and detectors

Optical Connection

- Direct viewing through a KF-flanged PM220
- Fiber optic cable-based using PM225. Bifurcated fiber optic cables are available to simplify installation

Instrument Interface Cards/Instrument Cables

- Operation of each detector requires a dedicated dual detector interface card (DAS-225) in the VM3000/3400 and a dual detector I/O cable interface

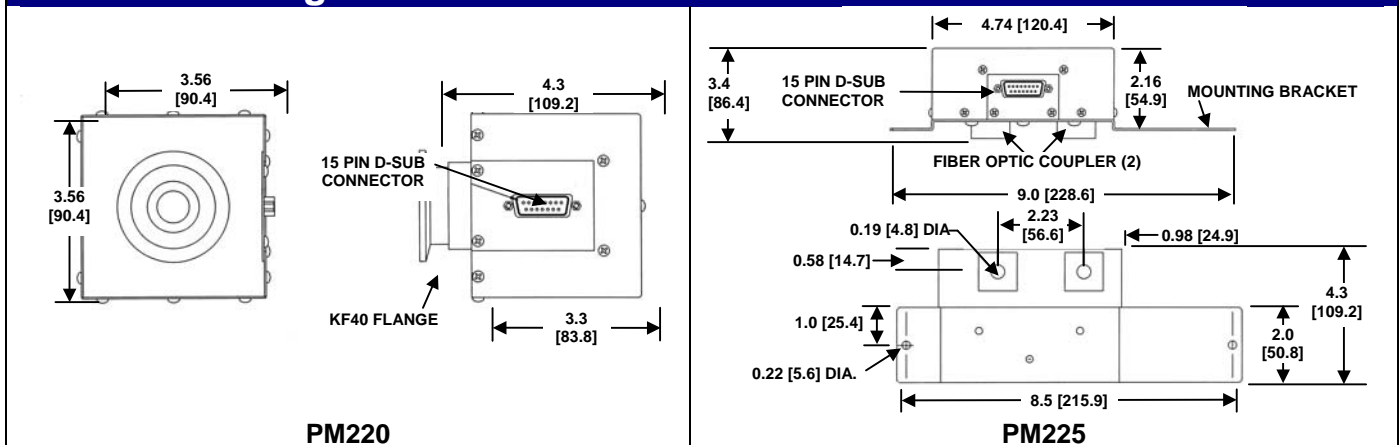
Specifications

Model Number	PM220	PM225
Type	Bracket Mounted	KF40 Flange Mounted
Performance/Optics		
Range	185–830nm	
Resolution ¹	10nm FWHM	
Photomultiplier Tube	185–650nm (UV/VIS) 185–830nm (UV/VIS/NIR) (See page 6, Quantum Efficiency vs. Wavelength, for each PMT)	
Filter Diameter [inches (mm)]	0.5 (12.7)	
Min. Peak Transmittance	30% to 50% typical, depends on wavelength and bandpass	
Filter Blocking	0.01%, X-ray to 3.5 μ m	
Temp. Coefficient of Center Wavelength	0.01 to 0.03nm/°C	
Temp. Coefficient at High Voltage	100ppm/°C typical	
Electronics		
Power ²	+12 to +15VDC @ 7mA maximum (Two) –12 to –15VDC @ 1mA maximum (Two)	
Input Signal for PMT Gain ²	2–10 VDC (Two)	
Output Signal ²	0–10 VDC (Two)	
Mechanical		
Dimensions [inches (mm)]	3.56 (90.4) x 3.56 (90.4) x 4.3 (109.2)	9.0 (228.6) x 3.4 (86.4) x 4.3 (109.2)
Window	Quartz or Sapphire	None
Environmental		
Operating Temperature	5 to 50°C	
Storage Temperature	–20 to 50°C	
Warm Up Time	10 minutes	
Safety		
Compliance	CE and Semi S2-93 Compliant, Year 2000 (Y2K) not applicable	

¹ Alternate bandpass filters may be available on a specials basis. Consult factory.

² A DAS-225 dual instrument card interface card, installed in a VM3000/3400, supports the power, input signals, and output signals. For OEM applications, the SDC2001 provides the same functionality.

Outline Drawing

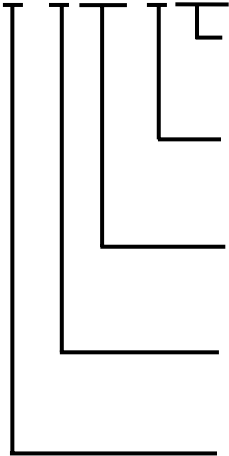


Ordering Information – PM220/PM225 Detectors

Part Number

PM220*b* – *c* *ddd* – *g* *hhh*

KF40 Flange Mounted



Wavelength #2

xxx..... Select any wavelength that is a multiple of 10 from 330–900nm, or from wavelengths of 220, 260, 280, 300, or 310nm

Photomultiplier Tube Range #2

V..... UV/VIS (185–650nm)

R..... UV/VIS/NIR (185–830nm)

See page 6, Detector Spectral Response, for additional information.

Wavelength #1

xxx..... Select any wavelength that is a multiple of 10 from 330–900nm, or from wavelengths of 220, 260, 280, 300, or 310nm

Photomultiplier Tube Range #1

V..... UV/VIS (185–650nm)

R..... UV/VIS/NIR (185–830nm)

See page 6, Detector Spectral Response, for additional information.

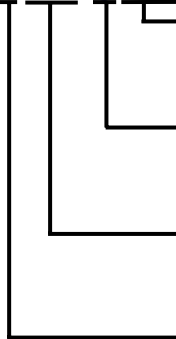
Window Type

Q..... Quartz

S..... Sapphire

PM225 – *c* *ddd* – *g* *hhh*

Bracket Mounted



Wavelength #2

xxx..... Select any wavelength that is a multiple of 10 from 330–900nm, or from wavelengths of 220, 260, 280, 300, or 310nm

Photomultiplier Tube Range #2

V..... UV/VIS (185–650nm)

R..... UV/VIS/NIR (185–830nm)

See page 6, Detector Spectral Response, for additional information.

Wavelength #1

xxx..... Select any wavelength that is a multiple of 10 from 330–900nm, or from wavelengths of 220, 260, 280, 300, or 310nm

Photomultiplier Tube Range #1

V..... UV/VIS (185–650nm)

R..... UV/VIS/NIR (185–830nm)

See page 6, Detector Spectral Response, for additional information.

Ordering Information – Ancillary Equipment

6. System controller page 54
7. **PM225 Series Only:** Fiber optic cable and chamber connector.....page 56
8. Dual detector cable to VM3000/3400 Series system controller:

<i>Dual Detector I/O Cables (Select one for each dual detector)</i>		
Length		Part No.
3 ft	(0.9m)	1000312
9 ft	(2.7m)	1000313
12 ft	(3.6m)	1002131

Ordering Information – Spare Parts (PM220 Only)

Description	Part No.
Spare Quartz Window	1000350
Spare Sapphire Window	1002101