



ABB Multiwave™ process photometers

PUV3402, PIR3502 and PFO3372
Measure vapor and liquid samples
in IR, NIR, UV and VIS regions

Power and productivity
for a better world™



Process photometers PUV3402, PIR3502, PFO3372

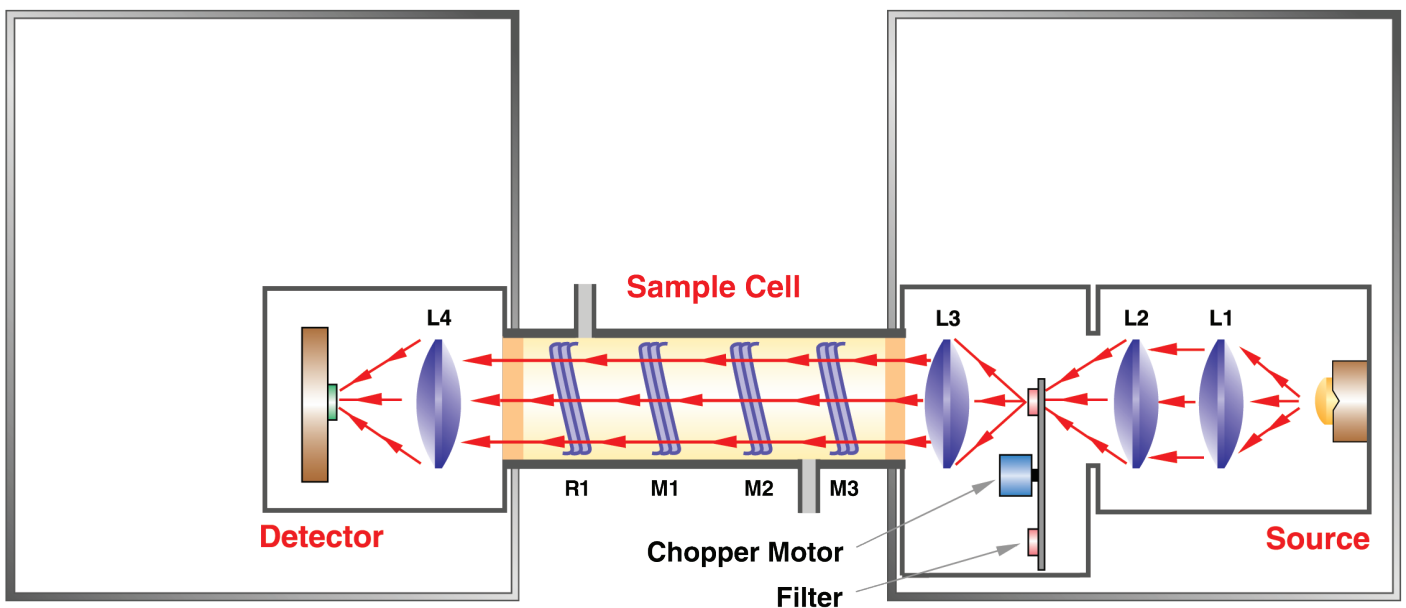
The Multiwave™ process photometers are designed to provide on-line measurements of gas or liquid components, in simple or complex process streams, for process control, product quality assurance, safety, catalyst protection and area monitoring.

The Multiwave™ is a fixed filter photometer that utilizes optical filters to make continuous measurements. The single beam, dual wavelength concept used in the Multiwave™ compensates for source and detector aging and the obstruction of cell windows, while allowing the sample cell to be isolated from the electronics.

The Multiwave™ design takes the single beam, dual wavelength concept one important step further, by adding up to eight filters to the filter wheel. This improved method provides more measurement solutions than a conventional single component process photometer. The use of multiple wavelengths enables the Multiwave™ to compensate for numerous interferences and perform multiple component applications.

The Multiwave™ process photometers offer even more performance, operating efficiency and versatility to the user. The Multiwave™ line features three basic models, each offering a wide range of applications capability.

PIR3502 Multiwave™ photometers can be applied to Infrared and Near Infrared measurements. PUV3402 Multiwave™ photometers are designed for the Ultraviolet and Visible spectral regions. The PFO3372 Multiwave™ photometers utilize fiber optic accessories for remote measurements. Multiwave™ photometers can be connected to ABB Analytical's VistaNET™ Process Analyzer Network, enabling data interchange from the analyzer to the DCS, seamless connectivity to the Plant LAN and remote user access. With the addition of VistaNET™, all operator functions may be performed at the analyzer or from a remote PC.



Optical schematic

The VistaNET™ process analyzer network is a local area network that supports data interchange from process analyzers to the Distributed Control System (DCS), in a dedicated and secured manner. VistaNET™ also provides seamless connectivity to the plant operating system (Plant LAN).

Through the Multiwave™ Remote User Interface, the user can configure, operate, or troubleshoot the operation of the analyzer from a remote PC. With this remote access capability all operator functions may be performed.

- Remote configuration and observation of the Multiwave™ photometer, enabling technicians to use their time more efficiently.
- Graphic display of Absorbance vs. Concentration data, allowing the user to check the validity and linearity of calibration samples.
- Remote maintenance via modem – multiple users can view data simultaneously and work together in troubleshooting activities.
- Reports and tables can be printed and reviewed at remote locations.

VistaNet™ is designed for use with widely used and accepted PC hardware with Windows™ operating system. Connecting to other network systems is simple and very economical*.

Multiwave™ process photometers leading applications

PIR3502

- | | |
|----------------|--|
| Infrared: | Isocyanate in chloroaromatic solvent Ambient air monitoring Multicomponent monomers in polymer process |
| Near Infrared: | Measurement of hydrogenic compounds (C-H, N-H, O-H) Water in organics, such as Ethylene Dichloride (EDC) Caustic in acid gas scrubbers |

PUV3402

- | | |
|--------------|---|
| Visible: | Color measurements (ASTM, APHA, Saybolt color units) |
| Ultraviolet: | %T @ Multiple Wavelengths in glycol process Chlorine in phosgene |

Multiwave™ spectral regions

- Infrared (IR) 2.50–14.5 μm
- Near infrared (NIR) 800–2500 nm
- Visible (VIS) 400–800 nm
- Ultraviolet (UV) 200–400 nm



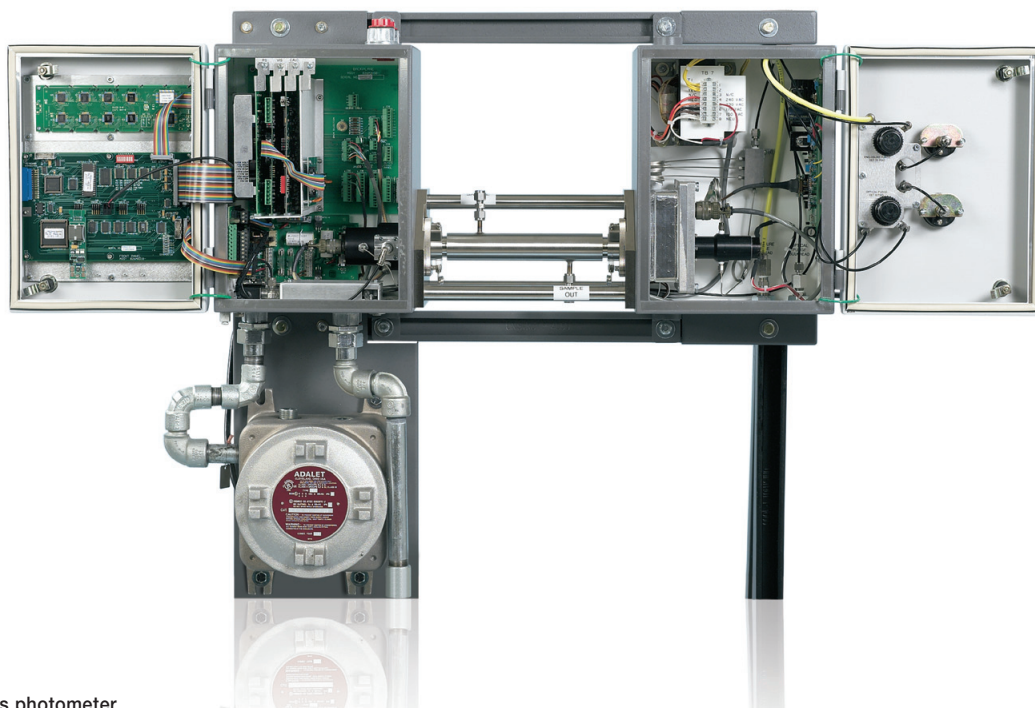
Designed for reliability and performance

The PUV3402 and PIR3502 Multiwave™ process photometers are designed to meet all the significant challenges of the process environment, including ambient temperature variation, moisture, corrosive and explosive stream compositions, electrical hazards, dust and vibration.

- **Accessibility:** Every major component may be easily removed and replaced, significantly reducing maintenance time.
- **Solid state detectors:** The PIR3502 and PUV3402 use solid state detectors. These detectors are thermally stable and insensitive to vibration. They require no mechanical adjustment and minimal interconnecting circuitry. They provide excellent linearity and long service life.
- **Brushless chopper motor:** Provides good mechanical reliability and long service life.
- **Linearizer circuit with up to 8 points:** Ensures a $\pm 2\%$ of full scale linearity and allows the user to select the best accuracy for a specific range.
- **Isolated sample cell:** Prevents flammable and corrosive streams from contacting electronics, permits cell heating

to optimum sample conditions, allows easy access and optimum optical pathlength selection.

- **Self-aligning optics:** Saves time during maintenance operations.
- **Temperature controlled filter assembly:** Eliminates temperature effects on filters, improving long term stability.
- **Electric cell heating concept:** The first ever Division 1/ Zone 1 electrically heated sample cell. Employs a unique heat pipe concept that reduces temperature gradients across the cell, providing a more stable output and accurate temperature control.
- **Data validation** to ensure the reliability of Multiwave™ data.
- **Self-diagnostics** to aid in troubleshooting operations.
- **Functional user interface:** Direct user interface at the analyzer is simple and easy using the Multiwave™'s front panel keyboard and display screen. And with built-in VistaNET™ capability, all operator functions may also be performed from a remote PC.



Multiwave™ process photometer

UV/VIS/NIR Fiber optics option

The PFO3372 Multiwave™ offers a fiber optic option for applications that require remote sampling capability. With this option, light is transmitted via one waveguide to the remote sample cell. A second waveguide is used to return the sample-modified light to the detector.

This fiber optics option is effective in UV/Visible/NIR applications where:

- The sample stream is highly toxic.
- Corrosive products are analyzed.
- Fast response time is required.
- The sample is at high pressure.

Cell-in-oven sample system

The Multiwave™ cell-in-oven design provides a simple and effective package for high temperature applications. The major benefit of this design is that the sample cell and sample handling components are together in one common temperature controlled enclosure. The elimination of heat trace requirements for sampling lines minimizes the risk of “cold spots”. This design also offers excellent accessibility for fast cell removal during maintenance.



UV/VIS/NIR fiber optics option

Specifications

Performance specifications

| | |
|--------------------------------------|---|
| Precision: | ± 1 % of full scale |
| Noise: | ± 1% of full scale at 0.02 absorption units ± 0.5 % of full scale at 0.20 absorption units |
| Linearity: | Standard ± 2% of full scale |
| Zero drift: | ± 0.5 % of full scale per day for IR; ± 1.0% of full scale per/day for UV |
| Response time: | Programmable |
| Ambient electronic stability: | ± 1 % of full scale for 18°F (10°C) in 4 hours |

Operating specifications

| | |
|--|---|
| Wavelength range: | Ultraviolet 200–400 nm Visible 400–800 nm Near infrared 800–2500 nm Fundamental infrared 2.50–14.50 μ m. |
| Ambient temperature range: | 32° to 113°F (0–45°C) |
| Max. cell heat: | 302°F (150°C) |
| Electric cell heat: | Power consumption 450 watts maximum (temperature is application dependant) |
| Sample flow rate: | Typical 20–500 cc/min for vapors; 5–120 cc/min for liquids |
| Sample pressure: | 0–500 PSIG (0–34 bar) standard |
| Voltage input variation: | 10 % fluctuation without causing an output variation of 0.05 % of full scale |
| Electrical power to analyzer: | 100/115/220/230 VAC, 45–66 HZ, 150W, Maximum power consumption 600W with electric heat |
| Instrument air supply for enclosure purge (safety): | Pressure 40–80 psi (3–6 bars) Flow rate 0.5 CFM (15L/min.) |
| Optical purge, typically nitrogen: | Pressure @ 15–30 psi (1–2 bar) Flow rate 10–15 cc/min |

General installation

Protect the instrument from direct sunlight and rain at operating temperature between 32°–113° F (0–45°C)

Dimensions

| | |
|------------------------|--|
| Weight: | Approximately 80 lbs (36.28 kg) |
| Height: | 13.5 inches (342.9 mm) |
| Depth: | 10.5 inches (266.7 mm) |
| Width: | 10 inches (254 mm) per module |
| Overall length: | (Based on cell pathlength) |
| Minimum: | 26.8 inches (681.4 mm) for 0.5 to 16 mm cell |
| Maximum: | 65.5 inches (1665 mm) for 1 meter cell |

Tube fittings

| | | |
|-----------------------------|--|------------------------|
| Sample inlet/outlet: | Metallic cells | Teflon cell |
| Size: | 1/4" | 1/8" |
| Brand: | Standard Gyrolok (Swagelok available) | Gallek or Fluorocarbon |
| Material: | 316 SS Hastelloy "C", Monel | Teflon |

Purge inlet and outlet: **Metal cell size:** 1/4" NPT-F
Brand: Gyrolok
Material: 316 SS

Power:
Size: 18 AWG, 3/4" Conduit Hub
Type: 3 conductors each

Output signals

Analog outputs: 4 ea. 4-20 mA isolated into 600 ohms max.
Contact closures: 2 ea. Relay, 3W at 0.25 A or 28 VDC, 5 ea. isolated solid state. Both relay and solid state contact closures N.O. or N.C.
Digital inputs: 8 ea., 2 ea. are dedicated
Digital outputs: 4 ea., 110 VDC, 25 watts ea., max. standard, 110 VDC.

Area classification

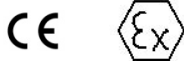
PUV3402, PIR3502 and PFO3372:

NEC Class I Groups B,C,D Division 2 without enclosure purge
Class I Groups B,C,D Division 1 with enclosure Y-Purge

PUV3402 and PIR3502:



Class I Groups B,C,D Division 2 with enclosure Z-Purge
Class I Groups B,C,D Division 1 with enclosure X-Purge



EMC Directive 2004/108/EC for Class A environments

ATEX Directive 94/9/EC for Zone 1 area
II2G Ex px de [ib] ib IIB+H2 T4, T3, T2 (LCIE 03ATEX 6007X)

IECEX Ex px de [ib] ib IIB+H2 T4, T3, T2 (IECEX LCI 08.0019)

Features

- Continuous measurements
- VistaNET™ connectivity
- Multiple component measurements
- Measures vapor or liquid samples
- Operates in IR, NIR, UV and VIS regions
- Fiber optic option for NIR applications
- Multiple interference compensation capability

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