



**TELEDYNE  
MONITOR LABS**

A Teledyne Technologies Company



## The 360P is a solid-state laser-based particulate monitor specifically designed for process applications.

The 360P, like the LaserHawk<sup>®</sup> 360, is a well-proven, reliable and accurate particulate monitor for measuring dust load concentrations. However, the 360P has a specifically designed detection system for measuring high dust load concentrations (0-10g/m<sup>3</sup>) typically seen before “pre” air pollution control equipment (APC), but yet is sensitive enough for measuring the low dust concentrations found in “post” APC applications (0-20mg/m<sup>3</sup>). This enables customers to easily measure precipitator or baghouse efficiencies, validate warranties and control energy management to help save vital energy costs. This is a non-compliance monitor ideal for process applications.

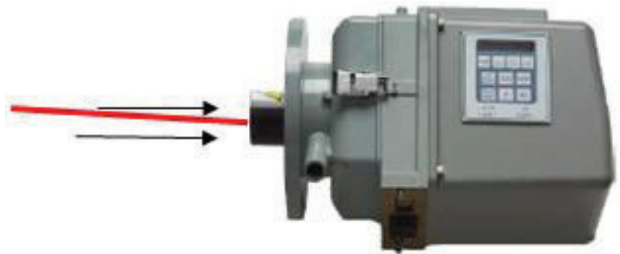
### How the LaserHawk<sup>®</sup> Works

The heart of the LaserHawk<sup>®</sup> is an electronically modulated, intensity controlled solid-state red laser located in the Optical Head Assembly. A beam from the laser is projected from the Optical Head into the stack and is scattered in all directions by the particulate matter. Light scattered in the backwards direction is collected by the optics for evaluation by a signal detector. The measured signal is correlated to dust concentration (using one of several optional operator selected mathematical correlation curves). Outputs in mg/m<sup>3</sup> or a simple 4-20ma signal are available. Zero and upscale calibration is easily done using an external calibration kit. If high accuracy is desired, the 360P can be correlated to a gravimetric reference method such as USEPA 40CFR60 Appendix A Method 17 or Method 5. If a set-point indication is sufficient, a factory pre-calibrated correlation is possible.

Two 4-20ma analog outputs signals come standard with the product, along with 2 dry status contacts for fault indication. An optional 10/100 Based T Ethernet interface module is available that provides Modbus TCP and browser based interfaces enabling easy communication and control either directly or over a plant LAN.

### Rugged Construction

The Optical Head is a NEMA 4 heavy gauge aluminum casting which houses all the active electronics necessary for accurate measurement of dust concentration. The casting is finished with acid-resistant enamel paint and all exposed hardware is stainless steel. The head is hinged for easy removal from the stack or attachment of the external calibration kit. The rugged design is built to withstand the typical hostile environments associated with outdoor industrial applications including those with substantial shock and vibration.



### Optical Head Keyboard Display

The Optical Head is equipped with a 10 button keypad and 6 digit readout to display and/or enter:

- Instantaneous particulate concentration
- Average particulate concentration
- Status codes and other diagnostics
- Correlation curve coefficients
- Optical gains
- Configure I/O
- Identify Alarms
- Many other operational variables

### Calibration Kit

The external calibration kit, standard with the LaserHawk<sup>®</sup> 360P, is used as a check of the unit's operation and calibration. The external calibration fixture attaches to the front face of the optical head and various audit standards (attenuators) can be inserted to challenge the instrument over the dynamic particulate concentration range that is established during on-site reference method calibrations. A zero (particulate free) condition can also be checked.



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35 Inverness Drive East, Englewood, CO 80112  
Phone 303-792-3300 / Fax 303-799-4853  
www.teledyne-ml.com



Intertek

Teledyne Monitor Labs, Inc. reserves the right to make changes in construction, design, specifications and/or prices without prior notice.

<b>SPECIFICATIONS</b>	
<b>PHYSICAL DIMENSIONS</b>	
Optical Head	15-3/4"(40cm)(L) X 9"(22.9cm)(W) X 14"(35.6cm)(H)
Purge Blower Assembly	22-1/4"(56.5cm)(L) X 20"(50.8cm)(W) X 33"(83.8cm)(H)
<b>PHYSICAL WEIGHTS</b>	
Optical Head	27 lbs. (12.3kg)
Purge Blower Assembly	65 lbs. (29.5kg)
<b>OPTICAL CHARACTERISTICS</b>	
Optical Measurement Technique	Optical backscatter of light from a red laser
Spectral Response	655 nanometers (nominal) +/- 20 nanometers
<b>SYSTEM MEASUREMENT CHARACTERISTICS</b>	
Response Time (To 95% of change)	Less than 10 seconds
Stability Over Operating Temperature	±2.0% of Full Scale, Maximum per 40°F (22.2°C) change in temperature
Stability Over Operating Mains Voltage Range	±1.0% of Full Scale
<b>SYSTEM PERFORMANCE</b>	
Resolution	0.5 mg per actual m3
Measurement Range Minimum Maximum	0 - 20 mg per actual m3 0 - 10,000 mg per actual m3
<b>POWER REQUIREMENTS</b>	
Optical Head	85-245 VAC, 47-63Hz, Single Phase, 30 VA Maximum
Purge Blower System***	115VAC/230VAC, 60/50 Hz, Single Phase, 414 VA Maximum
<b>AMBIENT OPERATING CONDITIONS</b>	
Optical Head	Temp Range: -4 to +140°F (-20 to +60°C) (startup) -25 to +140°F (-32 to +60°C) (operating); RHum 0-100% condensing
<b>MEASUREMENT MEDIUM CONDITIONS</b>	
Static Pressure Range***	Standard Purge Blower:-15.0 to +5.0 inches H2O (-3736 to + 1246 Pa)Gauge. Range: > +5 in. H2O consult factory
Gas Composition	Not Critical
Humidity	must be noncondensing for valid measurement
Maximum Temperature***	+500°F (260°C) (without High Temperature Option); +1500°F (816°C) (with High Temperature option). Consult factory for higher temp operation.
<b>OPTICAL HEAD HUMAN/MACHINE INTERFACE (HMI) CHARACTERISTICS</b>	
Display Type	Six 7 Segment LED's
Indicating LED's	Fault, Set, Power
User Input Controls	10-key keypad
<b>WIRING REQUIREMENTS, OPTICAL HEAD TO CUSTOMER EQUIPMENT</b>	
Cable Type 1	4/TSP, 24 AWG, PVC Insl., .33" Dia
Cable Type 2	4/C, 20 AWG, PVC Insl., .168 Dia units (for relays)
<b>SIX POINT I/O BOARD CHARACTERISTICS - ANALOG OUTPUTS</b>	
Number	2
Isolation Type	Optical & capacitive barriers; channel to channel, channel to circuit common & earth
Minimum Isolation Voltage	500V <sub>peak</sub> *, 500VDC*
Output Type	4-20mA with live 4mA zero, or 0-20mA w/o live zero
Maximum Load Resistance	900 ohms
Maximum Offset	±0.05% of full scale
Total Output Error	±0.30% of full scale
<b>SIX POINT I/O BOARD CHARACTERISTICS - RELAY OUTPUTS</b>	
Number	2 Single Pole Single Throw, Normally Open or Normally Closed
Minimum Isolation	500V <sub>rms</sub> *
Maximum Contact Voltage	250VAC*
Maximum Contact Current	1Amp AC, 1Amp DC

\*I/O wiring with respect to earth

\*\*\*Specification applies only to systems with purge blowers