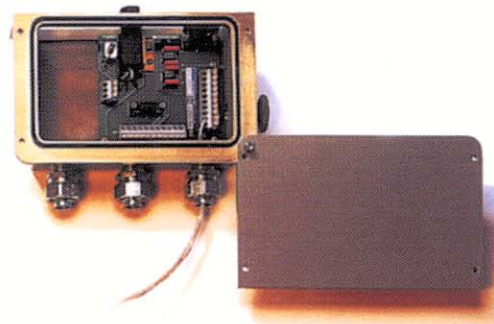
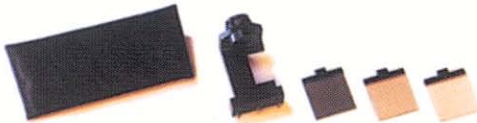




LightHawk™

DIRECT INTERFACE – MODEL 560DI OPACITY/DUST MONITOR

A Direct Interface Compliance Opacity and Dust Monitor
for OEM and System Integrator Applications

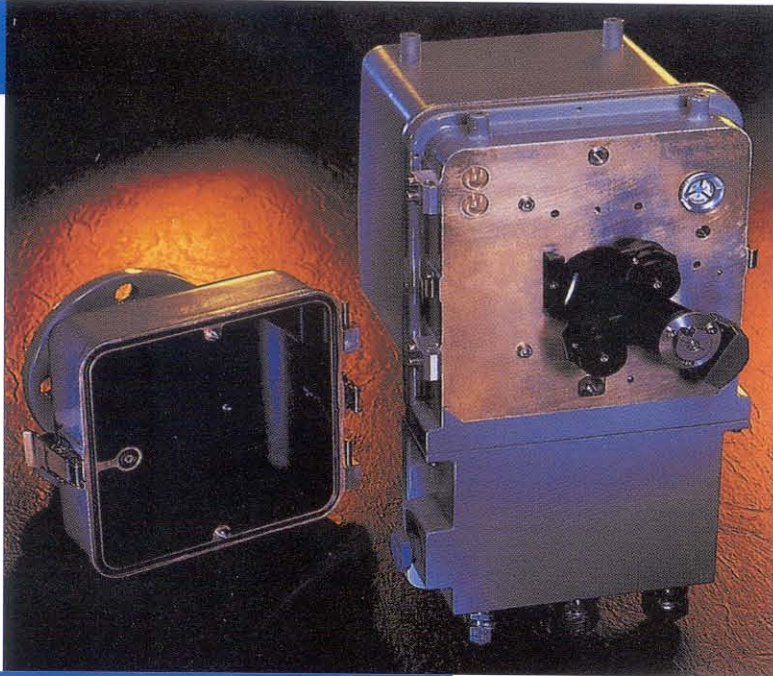


**TELEDYNE
INSTRUMENTS**
Monitor Labs

A Teledyne Technologies Company



DIRECT INTERFACE OPACITY/DUST MONITOR - MODEL 560DI



The LightHawk DI measures zero, upscale cal and dust compensation using only one moving part. The LightHawk DI employs a single gearmotor that, unlike competitors' designs, is located safely inside the sealed optical housing, completely isolated from the potential of damage from stack gas. The gear mechanism is also brake-isolated from the effects of vibration. Finally, both the span and zero surfaces are iris-adjustable, eliminating the need to open up the optical housing to change a span filter when regulations change.

Exceeds EPA and ASTM standards

The LightHawk DI was developed to comply with 40CFR60 App. B, PS-1 and the ASTM D6216-03 "Standard Practice for Opacity Manufacturers to Certify Conformance with Design and Performance Specifications".

Advanced optical design for consistent operation

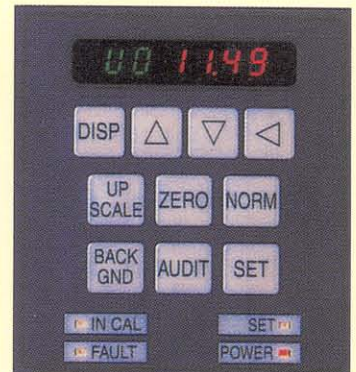
Some opacity monitors don't operate well in heat, high noon conditions or when stack or duct walls shift slightly due to temperature, wind, etc. Not the LightHawk DI. Its electronically modulated intensity-controlled solid state LED (light emitting diode) ensures unusually stable operation, without interference from sunlight or room lights. The uniform LED beam provides accuracy even with small shifts in alignment. Alignment is always visible on the built-in indicator. The LED is guaranteed for many years, minimizing your replacement problems.

Rugged construction holds up under toughest conditions

The Optical Head and Retroreflector are built of heavy gauge aluminum parts and finished with acid-resistant enamel paint. All exposed hardware is stainless steel. The rugged design and extremely low heat generation allows operation over a wide range of ambient temperatures. It is built to withstand the typical hostile environment associated with outdoor industrial applications, including substantial shock and vibration.

Ideal for OEM Applications

The LightHawk DI is easy to calibrate. Just match the standard Optical Head with the appropriate Retroreflector and calibration mechanism filters, focus for distance and use the onboard keypad to set-up energy levels for the clear path condition. No potentiometer adjustments or resistor changes are required. In addition, linearized opacity, optical density or particulate concentration data can be transmitted directly to a DAHS or datalogger via isolated analog signals from the transceiver. Two isolated current loop analog outputs, two relay outputs and two discrete opto-isolator inputs are available directly from the Optical Head via the Six Point I/O board.



Labor saving on-stack controls

All of the hardware and software needed for system setup, control and maintenance are packaged within a single optical housing. Via a membrane-sealed keypad and diital display, the user can perform clear-stack zeroing, setup span and zero, reset window dirt calculation following maintenance, input dust load correlation data and access the full set of diagnostic parameters.

SPECIFICATIONS

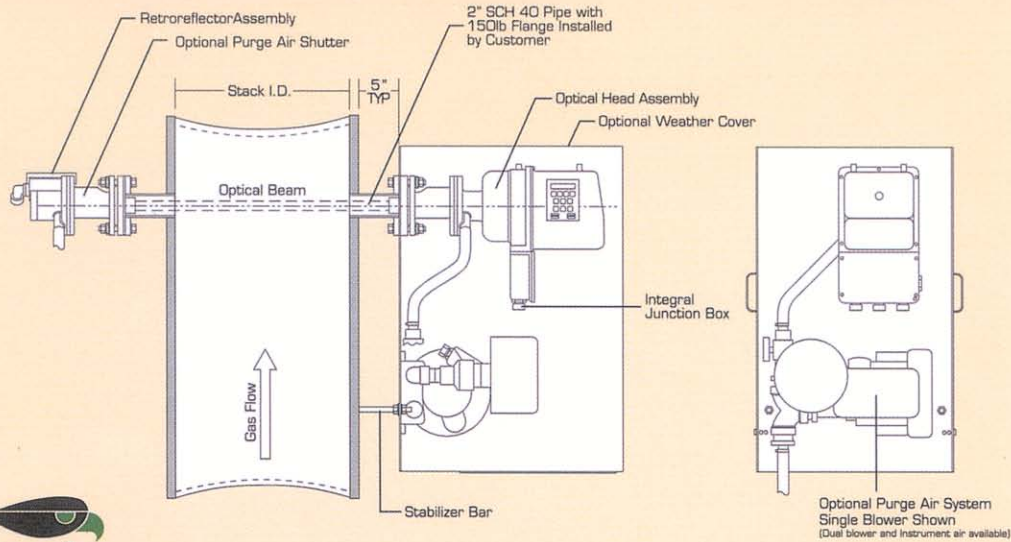
PHYSICAL DIMENSIONS	Optical Head (w/o Purge Shutter)	17" (423mm) (L) x 9-1/4" (235mm) (W) x 15" (381mm) (H)
	Optical Head (with Purge Shutter)	22" (559mm) (L) x 9-1/4" (235mm) (W) x 15" (381mm) (H)
	Retro Assembly (w/o Purge Shutter)	10" (254mm) (L) x 7" (178mm) (Diameter)
	Retro Assembly (w/o Purge Shutter)	15" (381mm) (L) x 7" (178mm) (Diameter)
	Single Purge Blower Assembly	22-1/4" (565mm) (L) x 20" (508mm) (W) x 33" (838mm) (H)
	Dual Purge Blower Assembly	2 assemblies with Single Purge Blower dimensions
OPTICAL CHARACTERISTICS	Optical Measurement Technique	Double Pass Extinction
	Angle of View	Less than 4 degrees
	Angle of Projection	Less than 4 degrees
	Spectral Response	Peak: 500 to 600 nm Mean: 500 to 600 nm 94% of energy: 500 to 600 nm
SYSTEM MEASUREMENT CHARACTERISTICS**	Response Time (to 95% of change)	Less than 10 seconds
	Calibration Zero Operation	On Command
	Upscale Calibration Operation	On Command
	Calibration Error (Mean Error + Confidence Coefficient)	2.0% Opacity Maximum
	Long Term (60 day) Drift	Zero: 0.5% Opacity Maximum Span: 0.5% Opacity Maximum
	Stability Over Operating Temperature Range	± 2.0% Opacity Maximum per 40°F (22.2°C) change in temperature (as per ASTM D6216)
	Stability Over Operating Mains Voltage Range	± 1.0% Opacity Maximum (as per ASTM D6216)
POWER REQUIREMENTS	Optical Head	85-245 VAC, 47-63 Hz, Single Phase, 30 VA Maximum
	Single Purge Blower System	115 VAC/230 VAC, 60/50 Hz, Single Phase, 414 VA Max
	Dual Purge Blower System*	Two circuits, each with same requirements as Single Purge Blower
AMBIENT OPERATING CONDITIONS	Optical Head	Temperature Range: -4 to +140°F (-20 to +60°C) (startup) -25 to +140°F (-32 to 60°C) Relative Humidity Range: 0 to 100% condensing
	Static Pressure Range***	Single Purge Blower: -15.0 to +5.0 inches H ₂ O Gauge Dual Purge Blower: -15.0 to +15.0 inches H ₂ O Gauge (> +15 inches H ₂ O consult factory)
MEASUREMENT MEDIUM CONDITIONS	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 temperature operation
	Display Type	Six 7 segment LED's
OPTICAL HEAD HMI CHARACTERISTICS	Indicating LED's	Fault, Set, In Cal, Power
	User Input Controls	10-key keypad
	Number:	2
SIX POINT I/O BOARD CHARACTERISTICS**	Output Type:	4-20mA with live 4mA zero, or 0-20mA w/o live zero
	Maximum Load	
	Resistance:	900 ohms
	Isolation Type:	Optical & capacitive barriers; channel to channel, channel to circuit common and earth
	Digital Inputs	Number: 2 Modes: Isolated (5 VDC-24 VDC user supplied) and Non-isolated (dry contract)
	Relay Outputs	Number & Type: 2 SPST, N.O. or N.C. (Single Pole Single Throw, Normally Open or Normally Closed (jumper selectable))

* Optional Equipment

** Measurement based on single pass response with a PLCF of 1.00

*** Does not apply to Instrument Air Purge version. Consult factory

LightHawk DI SYSTEM ASSEMBLY



LightHawk™

U.S. Patents 4,937,461 5,077,480

Ideal for retrofit applications

The LightHawk DI is more compact than its predecessors, so that it can easily fit inside most existing weather covers. It only requires a 2" mounting pipe; adapters are available for most previously installed opacity monitors.

With an optional I/O module, the Optical Head meets all PS-1 and ASTM requirements without the need of a Remote Panel, making it ideal for OEM applications.

Optional equipment

Optional equipment with the LightHawk DI includes: non-corroding aluminum purge air shutters, blower systems, weather covers, optional flange nozzle materials, high-temperature hardware and adapter flanges. Consult factory for application criteria and options.

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



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