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Fotometer 2008 - datasheet

Optical smoke density measurement device consists of modulated light source, synchronous light detector and a control unit. The device measures intensity of light travelling from light source into the detector. Thanks to the synchronization of light source and light detector (system works as lock-in amplifier) the device is, to some extent, immune to ambient light and thus might be operated under normal daylight conditions.

As standard the light source is fitted with halogen lamp and the detector uses Si PIN diode with human eye sensitivity correction filter. The light beam is collimated with diameter of 2.54mm (1"). This configuration conforms to most testing standards. On request different types of light sources and detectors could be used.

Light source

Light source uses 10W halogen light bulb with color temperature of 2400K. Light from the source is modulated by mechanical light chopper. The optical system focuses the light into the collimated light beam with diameter of 25mm (1"). On request the source may be fitted with light source with different spectral curve (different type of light ball) or a monochromatic light source can be used (LED diode, laser diode). The diameter of a light beam can be modified in request as well.

Light detector

Large area Si PIN photo diode is used as a light sensing component in a standard device. Photo diode has integrated optical filter which corrects the spectral response of the diode so it is almost identical with the sensitivity of human eye. The diode is mounted directly on a preamplifier with four decadic ranges. The preamplifier is controlled by control unit. There is an optical filter holder in front of the detector input window that can accommodate 50x50x2mm optical filter.

Harsh environment version

Light source and light detector are available in two versions. Standard version is designed to be mounted outside the test chamber. Windows must be provided on the chamber so the light can travel freely through the chamber from the light source to the detector.

Light source and light detector in the harsh environment version can be mounted directly into the test chamber. These devices are equipped with water cooling and air purge system of input/output window which prevents any dust from spoiling the window. Devices can operate in temperatures up to 150°C.

Control unit

Control unit has large LCD display (4 lines, 40

characters each) on which the measured data and status information is displayed in a easy to read way. Device is operated using buttons. The control unit works as a lock-in amplifier and therefor is able to suppress ambient light. Thanks to that the measurement could be conducted on normal day light conditions.

Control unit has four ranges in a decadic steps. Measured value is displayed in a linear arbitrary units (units are not directly related to any power units like wats etc.) The measured value can be also displayed in logarithmic scale in dB related to a reference. Reference must be set by operator prior measurement in dB. The value in dB is directly related to optical density once the reference is set when the actual optical density value is zero.

Overall range of device across all ranges is five decades. In optical density scale it corresponds with range 0 to 5.

The control unit has two communication interfaces: USB and RS232 serial line. Both interfaces can be used to control the device and acquire measured data. Standard communication protocol uses ASCII strings in human readable format.

Plug-in modules

The device can be extended using several types of plug-in modules. Modules provide additional input/output functionality which can be used to control external devices or to measure additional values like temperature, pressures etc.

Digital input and digital output modules can be used to monitor status of external switches or devices and to control relays or another devices.

Analog input module can be used to measure additional values, temperatures, pressures etc. K type thermocouple preamplifier is also available to be connected via analog input module.

Analog output module can control any external device with analog input.

Software for data acquisition

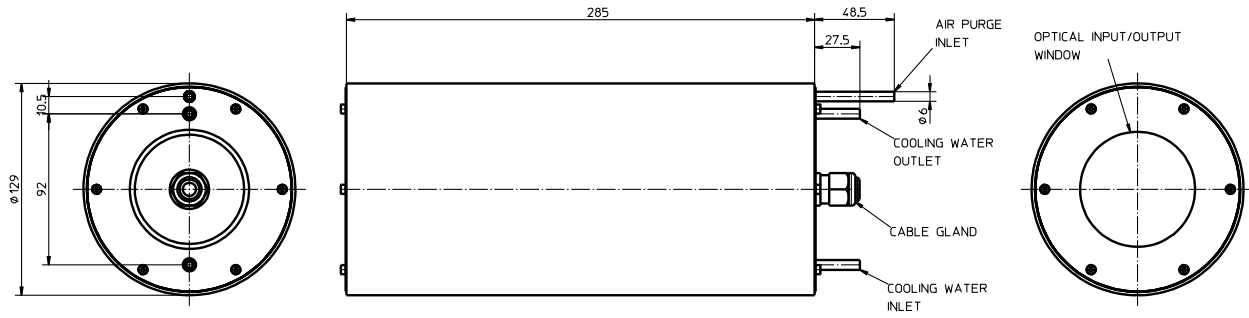
Software application for Windows XP operating system is designed to log data from device. It also supports device calibration.

Specification

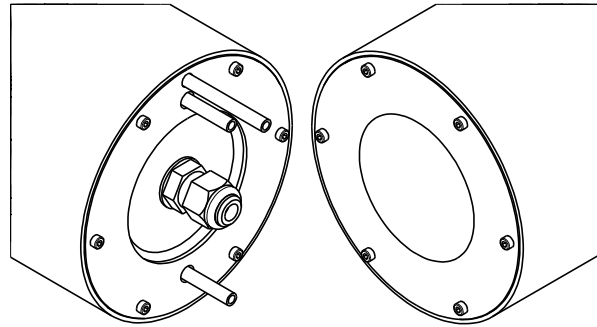
Light source	Halogen light bulb power	W	10
	Color temperature	K	2400
	Light beam diameter	mm	25
Light detector	Detector device		Si PIN diode with human eye correction filter
	Optical filter to fit in holder	w. x h. x d.	50x50x2
Control unit	Optical density measurement range		0..5 in four ranges
	Measurement ranges		4 dekadicky odstupňované
	Linearity	%	2 of range
	Distance from source to detector	m	0.5
	Com. interface		USB, RS232
	Power (max.)	VA	100
	Supply voltage	V	230V 50Hz
	Dimensions	w. x h. x d.	132 x 482 x 405 (3U 19" rack case)
Harsh environment version	Max. ambient temperature	°C	150 continuously
	Outer materials		stainless steel AISI 304
			PTFE
			silicon (cable isolation, hoses)
	Max. cooling water flow rate	l/min	5
Max. air purge system pressure	bar	1	
Analog input module	Channels		8 differential
	Range	V	-2..+2
	AD converter resolution		16 bits
	Accuracy	%	1 of range
K type thermocouple module (connected via analog input module)	Channels		8
	Cold junction sensor		YES
Analog output module	Channels		4
	Range	V	0..5
	DA converter resolution		12 bits
Digital input module	Channels		8
	Optically isolated		YES
	TTL compatible		YES
	Max. input voltage	V	24
Digital output module	Channels		8
	Optically isolated		YES
	Output type		open-collector
	Max. current through one output	mA	500
	Max. current through all outputs	mA	1000

Basic mounting dimensions

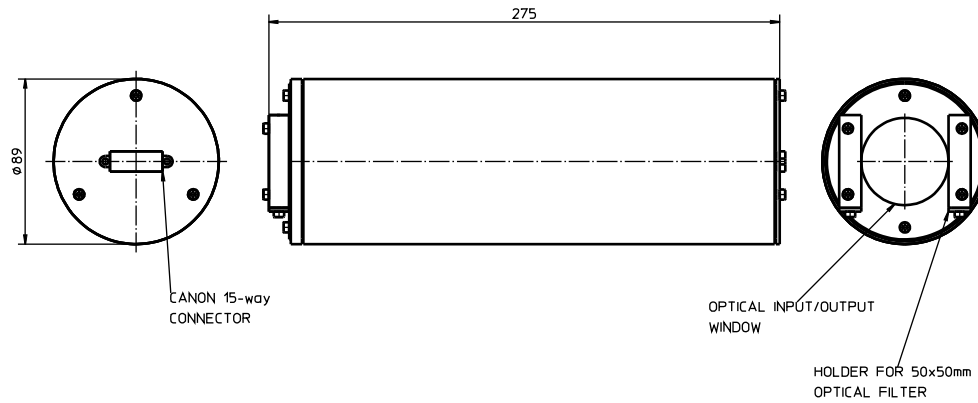
Harsh environment version



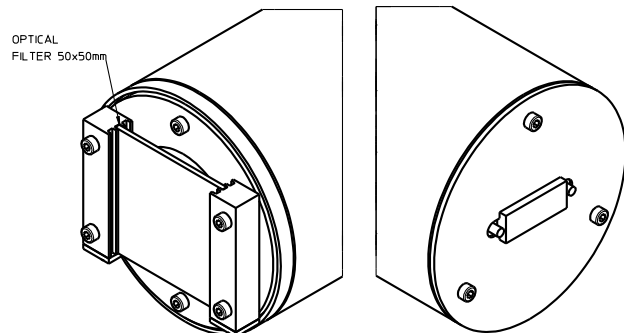
- Light source and light detector dimensions are the same.



Standard version



- Light source and light detector dimensions are the same.



the

Control unit

