

Casella Microdust pro Particulate Monitor

Introduction

The Microdust Pro from Casella USA is a portable, real time monitor for assessing the concentration of suspended particulate matter, and is probably the most versatile instrument available with the ability to measure from $1\mu\text{gm}^{-3}$ to 2500mgm^{-3} . It is the only hand-held real-time dust monitor on the market capable of graphically presenting variations in dust concentration on a real time scrolling graph – no longer is it necessary to wait to analyze results on a PC.



Key benefits

- ❑ Wide range from $1\mu\text{gm}^{-3}$ to 2500mgm^{-3} in single meter
- ❑ Data-logger with >15,700 readings
- ❑ Detachable probe
- ❑ TSP, PM_{10} , $\text{PM}_{2.5}$ or respirable measurements
- ❑ Firmware calibration and zero in the field
- ❑ 4 user defined calibration routines available for differing dust types
- ❑ Alkaline or rechargeable batteries or mains power
- ❑ 32bit *WinDustPro* PC software as standard

Applications

- ❑ Occupational health & safety monitoring
- ❑ Walk through surveys
- ❑ Site boundary monitoring & environmental measurement
- ❑ Industrial process monitoring
- ❑ Testing respiratory equipment or air filtration efficiency
- ❑ Research activities

Each Microdust Pro is individually **factory calibrated**, using a gravimetric technique. The instrument can be returned to this “factory” calibration setting at any time during its life by the use of a non-degradable **calibration insert** (supplied with every unit). An individual **gravimetric calibration** is also possible. This involves the

simultaneous collection of a gravimetric (filtered) sample of the dust. In this way, two averages are collected over the exposure period. One is from the filter, whilst the other is provided by the averaging function within the instrument. It is then possible to derive the difference in these two figures and correct accordingly.

Operation and use

The Microdust Pro measures particulate concentrations using a near forward angle light scattering technique. Infrared light of 880nm wavelength is projected through the sampling volume where contact with particles causes the light to scatter. The amount of scatter is proportional to the mass concentration and is measured by the photo detector. By using a narrow angle of scatter ($12\text{-}20^\circ$) the majority of light scattered is in the diffracted and refracted components, which minimizes the uncertainty associated with particle color, shape and refractive index.



real time scrolling display of concentration levels with user selectable time bases and auto ranging y-axis scale

The Microdust Pro features an internal logger that can store up to 15,700 data points over 32 separate runs. The logging interval can be set from 2 seconds to 10 minutes. At 2 seconds, it is possible to record 8.75 hours of data; at 5 minutes, this equates to a total logging time of 50 days. Recorded values include:

- Average concentration over the logging period (mgm^{-3})
- Maximum concentration over the logging period (mgm^{-3})
- Date and time stamp

Logged results are downloaded to the included MS Windows software package.

Technical Information	
Sensing Technique:	Near forward light scattering - 880nm infra red
Ranges:	All instruments provide 0 to 2500 mgm ⁻³ over four ranges as standard:
Resolution:	0.001 mgm ⁻³ (1µgm ⁻³)
Operating Temp Range:	32 to 122 °F (0 to 50°C) non condensing
Storage Temp Range:	-4 to 131 °F (-20°C to +55°C)
Calibration:	Gravimetric method using 'Arizona Fine' calibration dust (ISO12103-1, A2)
Zero Stability:	±0.002 mgm ⁻³ / °C
Span Stability:	<0.7% FSD / °C
POWER	
Battery:	4 x AA / MN1500 cells - Alkaline or rechargeable NiCad
Operating Duration:	Alkaline (2700mAh) typically >20 hours NiCad cells (950mAh) typically >10 hours
Battery Charging:	Internal NiCad fast charger circuitry (with time-out protection)
Charge Rate:	Fast charge rate 450mA, Standby charge rate 55mA
Power Adapter:	Universal input voltage range 100-240VAC, 47-63Hz
Output:	12VDC @ 800 mA
GENERAL	
Analogue Output:	0 to 2.5 V _{DC} FSD, 500Ω output impedance (3ms update rate)
Keypad:	7 key tactile membrane
Weight:	Instrument only = 34.6 oz (0.97 Kg) (complete kit plus case = 10lb - 4.5Kg)
Dimensions:	Probe = 1.4 Ø x 11.6 in (35mm Ø x 290mm) total length Instrument H x W x D = 9.8 x 3.8 x 2.0 in (245 x 95 x 50mm)
Maintenance:	Factory cleaning required annually depending on measurement conditions
DISPLAY	
Display:	128 x 64 pixel LCD graphics panel with backlight
Displayed Values:	
<i>Instantaneous reading:</i>	Rolling average concentration over a user selectable period (1 to 60 sec)
<i>Other readings:</i>	AVE & MAX concentration since power on or reset
Scrolling Graphs:	100 / 200 seconds, 15 minutes or 60 minutes (Y Axis auto-ranging or fixed)
Battery voltage:	Battery Voltage with 'OK' / 'Low' status message.
CALIBRATION	
Factory Calibration:	Traceable isokinetic technique (wind tunnel) and ISO 12103-1
User Calibration:	Four user defined calibration settings available stored for later use.
Routine Calibration:	Firmware calibration for zero & span setting in the field by user. Optical calibration filter supplied (restores factory calibration)
DATA LOGGING	
Internal Memory:	64K EEPROM providing 15,700 data points
Logging Interval:	Adjustable from 2 to 600 seconds.
Recorded Values:	Average, spot, max & min concentration over logging period
Serial Interface:	RS232 up to 38.4K baud
Ordering Information	
176000A	Microdust pro kit in carrying case with standard accessories
176093A	Environmental enclosure with pump, adaptor and rechargeable battery pack
103214B	Gravimetric dust adaptor
103187B	Aspirated adaptor
103182B	Respirable dust adaptor
151280B	Size selective adaptor
103396B	Iso-kinetic adaptor (for use with stack sampler)