

If the ES-480 fails to respond, first check to verify if the Particle Monitor appears to be powered. Verify the correct RS-232C connection. If it still does not respond then the unit may have been damaged in shipment. Contact your supplier for further instructions.

ES-480 Particle Monitor Operation Manual

The ES-480 is factory calibrated and ready to operate. Start by sending the ASCII character "H", or "h" to the Particle Monitor. This command causes the ES-480 to display it's system menu. (See Figure 1).

Introduction

The ES-480 Particle Monitor is a weatherproof particle counting system complete with pump, laser-based particle detector, microprocessor and internal heater. The ES-480 uses RS-232 serial communications to provide raw counts based on a 0.1 cfm sample flow rate. Using a terminal program such as ProComm Plus or MicroSoft Windows Terminal, the ES-480 can be sent commands to start counting, stop counting, select particle count size for the second channel, change sample time (seconds), or display current settings.

This manual provides the necessary operating guide for proper operation and Maintenance.

Unpacking

The Particle Monitor has been completely tested and calibrated to industry standards at the factory. A copy of the test documentation is included with your unit. Inspect your carton for obvious damage, if the carton is damaged notify the carrier. Unpack your unit and do a visual inspection, check for dents or other indication of poor handling. After you are satisfied with the apparent condition proceed to Checkout Section. Keep the carton to reuse for any later shipment.

Checkout

The ES-480 is ready to use when the AC power supply is connected to a source of 100-240 volts AC, 50 or 60 hz and the RS-232 cable is connected to a host P.C.

Establish communication between the host P.C. and the ES-480 using a terminal program set up for 9600 baud, no parity, 8 data bits, 1 stop bit (9600, N,8,1).

Strike <ENTER> on the host P.C. until an asterisk "*" appears. The asterik is a signal from the Es-480 verifying it is ready for a command.

If the ES-480 fails to respond, first check its power. If the Particle Monitor appears to be powered correctly, check for proper RS-232 connections. If it still does not respond then the unit may have been damaged in shipment. Contact your supplier for further instructions.

Operation

The ES-480 is factory calibrated and ready to operate. Start by sending the ASCII character "H", or "h" to the Particle Monitor. This command causes the ES-480 to display it's system menu. (See Figure 1).

WARNING

>Counter< System Menu

Select One of the Following:

- 0 - Start a Single Count
- 1 - Set Size
- 2 - Set Sample Time (seconds)
- 3 - Start Continuous Counts
- 4 - Stop Counter
- 5 - (None)
- 6 - (None)
- 7 - Display Settings
- 8 - Display > Counter < Utility Commands
- 9 - (None)

Press <Enter> to Exit a Selection

"0" start a single count at a specified sample interval

"1" Allows the user to select a micron particle size for cumulative counting. Selections include 0.5, 1.0, 2.0, 5.0 micron for channel 2. Channel 1 particle Size is set to 0.3 micron and is not changeable. Channel 2 particle size defaults to 0.5 micron at power-up.

"3" starts the continuous counter.

"4" stops the counter.

"7" displays the current settings.

"8" displays the Utility Command menu.

Remove the protective cap on the inlet and send the Particle monitor a "0" from the host P.C. The P.C. should display an asterisk and then, after a short pause, the raw particle counts. The first value on the screen represents the number of particles 0.3 μ and larger. The second value represents counts on Channel 2.

WARNING

DO NOT attempt to sample reactive gases, such as hydrogen and oxygen, with the ES-480. Reactive gases create an explosive hazard inside the ES-480. Contact the factory for further information.

WARNING

DO NOT sample any pressurized gases without using a pressure-reduction Device. The ES-480 is designed to operate only at atmospheric pressure.

CAUTION

The ES-480 is **NOT SUITABLE** for sampling vapors or liquids, smoke, coal dust or other powdered materials. These materials will coat the sensor optics, changing the calibration and sensitivity. Do not sample corrosive materials as they will damage the sensor.

Maintenance

To insure that the ES-480 will continue to operate according to specifications:

1. The inlet cap should be in place whenever the unit is not being in order used to protect the internal optics.
2. The flow rate was set at the factory to 0.1 cfm using a non-loading precision mass flow meter. Any adjustment without use of an external flow meter will alter the 0.1 cfm sampling flow rate and seriously affect the accuracy of the unit.

Specifications

Particle size range	0.3 u.m. and greater
Signal/Noise at 0.3 micron	2/1 or greater
Concentration range	0-3,000,000 particles per cubic foot
Flow rate	0.1 cfm (2.83 lpm)
Sample time	Selectable
Cumulative count particle size	Channel 2 Selectable 0.5, 1.0, 2.0, or 5.0 um
Operating temperature	0 to +50°C
Power	100-240 VAC 50/60 Hz converted to 9 VDC
Size	9.75" H x 7.75" W x 5.95" D
Weight	7.5 lbs.
Supplied Accessories	AC Adapter with cord
Optional Accessories	Iso-kinetic Sample Head

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Met One SERVICE/CALIBRATION

COMPANY LICK OBSERVATORY

SALES NO. 101573

RA NO. 56287

PRODUCT NO. ES-480 (60004)

SERIAL NO. A6364

DATE REC'D 1/21/2014

Completed - Shipped

Comp Date 1/24/2014

Repair Calibrate

ITEM	QTY	PN/SN	DESCRIPTION	PRICE	DISC%	TOTAL
* 1	1	8650	PUMP ASSEMBLY (FURGUT)	\$250.00	5	\$237.50
* 2	1	80340	FILTER, IN LINE, MODIFIED	\$25.00	5	\$23.75
3	1	SVC-AIR	Calibration	\$300.00		\$300.00
4	1	FRT	FED EX GROUND	\$20.00		\$20.00

ServiceTotal \$581.25

CONDITION WHEN REC'D Return Ship Method FedEx Ground

Pump does not come on.
Last service in 2003 on RA17181
Custom firmware R1.00.00

REPAIR ESTIMATE EST OK'D BY DATE

LABOR DESCRIPTION/COMMENTS: Tech: Kevin Ricks

Pump bearings are seized. Pump needs replacement - OK
Internal filter needs replacement - OK
Counter appears functional.

Calibration - OK



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Calibration Certificate

The calibration results on this report certify that this instrument complies with the product specifications at the time of calibration. Calibration was performed according to accepted industry methods using equipment, procedures, and standards that are traceable to NIST and ASTM and JIS.

ES-480 (60004)

Recommended calibration interval is 12 months from the first day of use.

Instrument Model# ES-480 Instrument Serial# A6364

Date of Calibration 1/24/2014 Sensor # 2293

Kevin Ricks

AKA

Calibration Technician

Quality Check

Temperature 22 °C

Relative Humidity 25 %

Test Procedure: 8720 - 6100

PSL Size (µm)	Test Results	Test Spec.	Lot# NIST	Expiration
0.3	Pass	± 10%	40134	02/28/2015
0.5	Pass	± 10%	39699	11/30/2014
1.0	Pass	± 10%	40849	07/31/2015
2.0	Pass	± 10%	42335	08/31/2016
5.0	Pass	± 10%	REF	NA

Standards	Model	SN	Cal Due
Bench Top Partical Counter	BT-637	K16859	7/22/2014
Dry Cal	Defender 510 high flow	133419	8/8/2014
DMM	289	23740018	04/05/2014
RH & Temp	083E-1-6	N13972	11/14/2014

This calibration certificate shall not be reproduced except in full, without the written approval of Met One Instruments Inc.



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MET ONE INSTRUMENTS SERVICE/CALIBRATION WORKSHEET

COMPANY Lick Observatory

SALES NO. 55188

RA NO. 17181

PRODUCT NO. ES-480

SERIAL NO. A6364

DATE REC'D 10/13/2003

Completed - Shipped

Comp Date 10/15/2003

Repair Calibrate

ITEM	QTY	PN/SN	DESCRIPTION	PRICE	TOTAL
1	1	680840	Pump	250.00	\$250.00
2	1	520259	Laser	74.00	\$74.00
3	1	SVC	Standard calibration ES-480	150.00	\$150.00
4	1	SVC	Labor	65.00	\$65.00
				ServiceTotal	\$539.00

CONDITION WHEN REC'D Return Ship Method UPS Ground

ES-480 for repair
 Was counting low or not at all, and now will not communicate via serial port.

Pump will not turn.
 Rs-232 is working.
 Low samples counts.

REPAIR ESTIMATE EST OK'D BY DATE

LABOR DESCRIPTION/COMMENTS: Tech: Mark Bailey

Pump will not turn, Bearing binding can not repair.
 Replace Pump.
 Optical sensor 8520 has low output and high curent. Laser end stage failure.
 Replace laser and recalibrate 8520. One hour labor.
 Replace internal tubing
 Checked 9VDC Power Supply.
 Checked flow.
 Firmware Cant be upgraded custom firmware
 Upgraded unit to current specifications and drawings.
 No upgades needed.
 Tested New RS-232 interface and Cable.
 Standard calibration and test of ES-480.



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Certificate Calibration

The calibration results on this report certify that this instrument complies with the product specifications at the time of calibration. Calibration was performed according to accepted industry methods using equipment, procedures and standards that are traceable to NIST, ASTM, and JIS. The calibration system Complies with MIL-STD-45662A.

Instrument model # ES-640 Instrument Serial # A6364

Date of Calibration 10-15-03 Next Calibration 10-15-04 Sensor # 2239

Quality Control Technician Berley M AT

Temperature 23.3 °C Relative Humidity 37.5 %

Test Procedures: 7060-6100, 7063-6100, 7065-6100, 7066-6100

PSL Size Micron	Lot # NIST	Threshold millivolts	PSL Size Micron	Lot # NIST	Threshold millivolts
0.3	23249	13.1	3.0	25065	NA
0.5	22984	169	2.5	Ref	NA
0.7	23365	NA	5.0	Ref	4801
1.0	23500	582	7.0	Ref	NA
2.0	24933	1282	10.0	Ref	NA

Standards	Model	SN	Cal Date
DMM	HP3468B	2231A01057	01/06/03
TEMPERATURE	Rosemount 78N01N00N	746835	07/29/03
RELATIVE HUMIDITY	VAISALA HMP-35	10025	11/26/02
LASER PARTICLE COUNTER	GT-521	B6309	02/26/03
PRIMARY FLOW METER	Bios DryCal DC-Lite	537	07/29/02

ATTN RMA # RA 17181



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Certificate Calibration

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Instrument model # ES-480 Instrument Serial # A6364

Date of Calibration 11-20-01 Next Calibration 11-20-02 Sensor # 2239

Quality Control Technician Barbara M. M. M.

Temperature 23.0 °C Relative Humidity 39.1 %

Test Procedures: GT531-7063, GT521-7066, GT521-7065, GT321-7307

PSL Size Micron	Lot # NIST	Threshold millivolts	PSL Size Micron	Lot # NIST	Threshold millivolts
0.300	20822	103	3.063	20979	NA
0.486	17933	119	2.500	Ref	NA
0.701	20533	NA	5.000	Ref	4556
0.933	20377	543	7.000	Ref	NA
2.013	18189	1281	10.000	Ref	NA

Standards	Model	SN	Cal Due
DMM	HP3468B	2231A01057	12/27/2001
TEMPERATURE	FISHER T-200	746835	7/19/2002
RELATIVE HUMIDITY	VAISALA HMP-35	10025	4/14/2002
BAROMETRIC PRESSURE	M.O.I. 090B-STD	H6507	2/28/2002
FREQUENCY	PROTEK B-2000A	U20003371	3/6/2002
FLOW METER	BIOS DCL-M Rev 1.08	573	6/29/2002

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