Operator's Manual

Model 287a
Ionizer Performance Analyzer

P/N 0340172
287a-1/100
V1.12
111208

CONTENTS

Section 1

SPECIFICATIONS:

Charger:	±1100 volts, selectable polarity
Fieldmeter:	
Accuracy	±5% of reading, ±2% typical
Zero Drift	**<**±4V in 90s, ±2V typical
Trip points:	Fixed 1000V and 100V
Charge plate:	1.7"x4" (≈10.6 inches periphery)
Capacitance	≈25pF
Self-discharge	<10% of full scale in 200s
Display:	2x16 LCD, >5 updates per second
Timer	200.0s maximum, 0.1s resolution
Fieldmeter	±1250V, 1V resolution
Sensors:	
Humidity	±5% typ. from 10% to 90%RH @25ºC
Temperature	±2ºC typical
Oper. temp.:	25ºC, ±10ºC
Battery:	9 volt NEDA #1604A or equivalent alkaline (>40 hour life or >1300 charge cycles). Longer life may be achieved by using 9-volt lithium.
Dimensions:	8.1x4x1.9 inches (206x102x48 mm)
Weight:	1lb, 6 oz. (0.63 kg)

Accessories included:

Carrying case
Banana patch cord
Alligator clip with boot
Battery
This manual and a manual supplement

What this instrument does —

- Model 287a IPA meets and far exceeds the basic requirements of ESD Association (Draft) ***Standard Practice 3.3 for the Protection of Electrostatic Discharge Susceptible Items – Periodic Verification of Air Ionizers***.
- Model 287a IPA performs manual or automatic decay and balance tests for periodic verification of ionization equipment and stores the results and averaged decay times for up to ten manual tests and up to ten complete automatic test sequences.
- Provides real-time measurement and display of temperature and relative humidity.
- Performs self-tests.
- Battery powered and portable, sets up in seconds.

Section 2

GENERAL INFORMATION

The IPA 287a performs manual or automatic decay and balance tests for periodic verification of ionization equipment. It then stores the results and averaged decay times for up to ten manual tests and up to ten complete automatic test sequences. Temperature and relative humidity are displayed real-time and recorded with the test data.

All instrument functions are controlled by four pushbuttons.

Display contrast can be adjusted via access hole in case back.

In DECAY mode a built-in high voltage generator charges the plate to over 1050 volts. During the test the plate will discharge toward zero in the presence of ionization. The elapsed time of decay between 1000 volts and 100 volts is displayed.

USER NOTE — For very fast decay times – faster than one second – ZERO errors may occur.

In the BALANCE mode, isolated plate voltage, test duration Min and Max voltages are displayed.

Self-tests include battery check and tests for functional errors.

Memory is non-volatile. Setup and data are retained during battery replacement.

The specifics of usage of the Model 287a for periodic verification of air ionizers are given in detail in ESD Association (Draft) ***Standard Practice 3.3 for the Protection of Electrostatic Discharge Susceptible Items – Periodic Verification of Air Ionizers.***

Section 3

OPERATION
Getting Started, a Tutorial

Confidence Check – Three steps to get going —

If you received this instrument directly from the factory, a battery was included but not installed, memory was cleared and default settings are effective. The following will familiarize you with your new Ionizer Performance Analyzer Model IPA 287a:

1) Install battery
   a) Remove the two crosspoint screws from the battery compartment cover.
   b) Carefully lift the cover off of the compartment.
   c) Insert the battery, refer to label for orientation.
   d) Replace the cover.
2) Demonstrate basic functions. Pressing a single button and releasing within two seconds controls basic functions.
   a) Press and release 'ON-OFF'. The display will briefly show information about the instrument and then the battery voltage. A low battery condition will present an error message.

      The *main menu* startup screen will show a blank voltage, memory usage status, relative humidity, present temperature and battery voltage.

      NOTE — If the instrument has been used it may display the option of clearing the memory. Do so by scrolling to "Y" with σ or τ key then press 'ENTER'.
   b) Press and release 'AUTO'. This will start the first automatic test sequence:
      i) The instrument performs an autozero.
      ii) The floating plate is charged to >+1050 volts.
      iii) The plate begins to discharge. If allowed to discharge to <+1000 volts the timer will start at +1000 volts.
      iv) This test is the first automatic decay test. The first test in an automatic sequence is always positive. The test is labeled '**11+**' (Automatic Test Sequence **1**, Test Number **1** [in a sequence of 6 tests], and the test voltage is **+** [positive]).

Abort this test by pressing the 'AUTO' button again ('CANCEL').

c) Press and release '+ CHARGE'. This will start a manual test where the test voltage is positive.

(i) The instrument performs an autozero.

(ii) The floating plate is charged to >+1050 volts.

(iii) The plate begins to discharge. If allowed to discharge to <+1000 volts the timer will start at +1000 volts.

(iv) This is a single positive manual decay test. The test is labeled '**M1+**' (**M**anual, Test **1**, **+** [positive]).

Abort this test by pressing the 'CANCEL' button.

d) Use the '– CHARGE' button similarly to perform negative manual decay tests. Up to ten manual decay tests may be run in any polarity order. The ten tests will be labeled **1** thru **0** with the polarity indicated. Thus, the 5th test might be labeled '**M5**–'.

3) Shut the instrument off (press and release 'ON-OFF'). You will need at least an ionizer and a ground connection to proceed.

Further familiarization —

In order to become more familiar with the accumulation and presentation of data we will perform two automatic test sequences and a few manual tests and then examine the results:

1. Set up the ionizer.
2. Ground the IPA 287a. A ground jack is provided on the side of the instrument case.
3. Access the main menu. The display should show 0% values for Automatic and Manual memory usage.

   If a message prompts you to *ClrData* (clear data),

   a) Scroll to 'Y' with either the ↑ or ↓ button.

   b) Accept this by pressing 'ENTER'.

4. Run an automatic test sequence —

   a) Press 'AUTO'.

   b) Let the test run its course. This is '*Test 1*'.

      i) Six decay tests are run. These are in the order +++––– or +–+–+– depending on the current autosequence setup.

      ii) A balance test is run. The duration of the balance test may be any value between 10 and 90 seconds or it may be turned off in the SETUP menu.

iii) The test results are displayed at the end of the test. The results are displayed in three windows which may be scrolled with either the ↑ or ↓ button. The first window shows the positive and negative decay times (from 1000 volts to 100 volts) for tests number 1 and 2 in the sequence. The second window shows decay times for test number 3 and the average times for three + and three – decay tests. The third window shows the + and – balance peak voltages and the temperature and humidity taken during the test sequence.

c) Press 'ENTER' to return to the main menu.

d) Repeat a, b and c to gather a second set of data. This will be '*Test 2*'.

5. Run manual decay tests —

   a) Press and release '+ CHARGE' and let the first manual decay test run its course and display a result. That manual decay test will be labeled '**M1+**'. To return to the main menu, press 'ENTER'.

   b) Press and release '+CHARGE' again and run the test to completion. This second manual decay test will be labeled '**M2+**'. To abort one of these tests at any time during the test press the button that got the test started.

   c) Return to the main menu. Press and release '–CHARGE'. This third manual decay test will be labeled '**M3**–' when completed. Return to the main menu.

6. Run manual balance tests —

   a) Press and hold either the ↑ or ↓ button until Balance test is indicated on the display then release. This will start your fourth manual test. It will be labeled '**M4B**' when finished. Return to the main menu.

   b) Repeat for a fifth manual test. This test will be labeled '**M5B**'. Note that if you hold the button down too long to start the test, the test will be nullified. Following test '**M5B**', return to the main menu. The memory usage will be displayed as 'A20%M50%'. You have conducted 2 out of 10 automatic sequences and 5 out of 10 manual tests.

7. At this point, you may elect to shut the equipment down and retire to a different location to contemplate the results.

Test results —

Press and release the 'ON-OFF' button. You will be prompted for a Y/N? response to the *ClrData* (clear data) question. **NO!!** Press 'ENTER' to accept "N". That will take you to the main menu while retaining the data.

To display the data, press and hold the 'SETUP' button (same button as 'ON-OFF') until the display goes past 'Off' and shows the word 'Set-up', then release. If you hold the button too long the action will be nullified.

To review the data, press 'ENTER' to accept and use the ↑ or ↓ keys to scroll. Press 'ENTER' when you are done to return to the main menu.

The Set-up Menu —

The Set-up menu allows the user to modify several functions of the IPA 287a. You have already accessed the Set-up menu above to review your data. To enter the Set-up menu from the main menu, press and hold the 'SETUP' button until the display goes past 'Off' to 'Set-up'. To scroll the items, use the ↑ or ↓ keys. The ↓ key scrolls down from the top of the logical list. To EXIT the Setup menu at any time, press 'ON'. Items are as follows:

1. **RvwData** — Review Data. 'Enter' to review data or scroll to next item.
2. **ClrData** — Clear Data. 'Enter' prompts Y/N? Use ↑ or ↓ key to select, 'ENTER' to execute.
3. **Auto Seq** — Auto Sequence. 'Enter' presents options. ↑ or ↓ key selects option. 'ENTER' accepts choice. Default is +++–––.
4. **Tst dly** — Test delay. Delay between automatic decay tests. Range is 0 to 30 seconds. Default is 5 seconds.
5. **Bal (Y/N)** — Balance test included in automatic sequence? Default is "Y"
6. **Bal dur** — Balance test duration. Over what period of time to you wish to test ionizer balance if the balance test is enabled. Range is 10 to 90 seconds. Default is 60 seconds.
7. **AutoShtDwn** — Auto Shut Down. Time before automatic instrument shutdown on lack of activity. Battery saver. Range is 1 to 15 minutes. Disable by setting to '0min'. Default is 1 minute.
8. **Fac. Deflt** — Reset factory defaults. 'ENTER' prompts "Y/N?" response. Resetting defaults does not disturb accumulated data.
9. **Exit**

Section 4

MAINTENANCE

Precautions —

User maintenance should be limited to keeping the instrument clean and free from physical damage. Store the instrument in its protective carrying pouch when not in use. Do not allow any object to come in contact with the white insulators under the measurement plate. Do not wrap cords around these insulators.

Cleaning —

If self-discharge becomes excessive (out of spec.), clean the insulators with a clean swab and a 70%/30% mix of clean technical grade isopropyl alcohol and de-ionized water. Fingerprints and other contaminants may be removed from the case with a clean lint-free cloth dampened in the same solution. DO NOT use soap or detergent.

Battery —

Need for battery replacement is indicated by a warning message whenever the battery voltage persistently dips below 7.5 volts. A fresh battery should be installed when this occurs. The battery should be removed if the unit is to be stored for an extended period of time. Removal of the battery when the unit is off does not disturb settings or data.

Calibration —

Calibration is not a user function and is beyond the scope of this manual. Calibration information is available from the factory. Monroe Electronics recommends annual calibration and/or when the instrument is damaged or repaired or where called for more often by contract. We offer repair and calibration services for a fee.

Section 5

GLOSSARY

– – –	Blank voltage (Main Menu Startup screen)
+ or –	Polarity indicator (positive or negative voltage)
σ or τ	Scroll up or down list
A	Refers to Automatic test
Adjust	Displays while plate voltage is being adjusted to 1050 volts
Auto Seq	See The Set-up Menu (Page 6)
AutoShtDwn	See The Set-up Menu (Page 6)
Bal	See The Set-up Menu (Page 6)
Bal dur	See The Set-up Menu (Page 6)
C	Celsius temperature
Chrg	Indicates that the plate is being charged
ClrData	See The Set-up Menu (Page 6)
Decay	Indicates that the plate voltage is decaying
Delay	Pause between auto tests
Enter	When displayed, press ENTER to view or modify the present option
Err Decay>200sec	Voltage did not decay to 100
Exit	See The Set-up Menu (Page 6)
Fac. Deflt	See The Set-up Menu (Page 6)
M	Refers to Manual test
MDA	Average times for Manual Decay tests
MemUsed	Shows percentage of Automatic and Manual memory currently in use
Min	Minutes (see AutoShtDwn and The Set-up Menu (Page 6)
Mn	Min voltage in balance tests
Mx	Max voltage in balance tests
M*n*B	Balance results for Manual test n where n is test number
M*n*+ or M*n*–	Decay time for Manual test n where n is test number (1-0)
M*n*TH	Temperature and Humidity data for Manual decay test n
*N*AD	Average Decay times for automatic sequence N
*N*Ba	Balance results for automatic sequence N
*Nn*D+ or *Nn*D–	Decay times for automatic test number n (1-3) in test sequence N (1-0)
*N*TH	Temperature and Humidity for automatic sequence N
Null	Results from holding any primary key too long — reverts to main display
Off	If ON/OFF key is released while Off is displayed, the unit will be shut off
ON=EXIT	Press ‘ON’ key to exit Set-up menu
RH	Relative Humidity in percent
RvwData	See The Set-up Menu (Page 6)
Sec or s	Time in seconds
Set-Up	Release key to enter Set-Up mode
Tst dly	See The Set-up Menu (Page 6)
V	Volts
Ver	Firmware version
Zero	Indicates that the instrument is being autozeroed