DOCUMENTATION ASSOCIATED TO THIS PROCEDURE:
PB540 DHR – 10021253
PB520 DHR – 10059729
PB560 DHR – 10038461
PB520\540\560 Electrical Safety Test Equipment Verification Log P/N 10060262

REV	ECO	PREPARED BY	APPROVED BY	DATE	SUMMARY
A	ECO-R194831	[redacted]	See Agile	See Agile	Initial Release revision A.
B	ECO-R227819	[redacted]	See Agile	See Agile	Updated to: - Add reference to Electrical safety test enclosure in equipment list and powerpack procedure to references - Add note (5) to testing notes Made formatting changes where required
C	ECO-R233462	[redacted]	See Agile	See Agile	Update procedure to clarify Leakage Current Test Procedure and add additional not regarding printout.
D	RC046641	[redacted]	See Agile	See Agile	Removing Ref. to Appendix 1 as the Test equipment is not used by the line.

1. PURPOSE

The purpose of this procedure is to define the process steps, safety requirements, required equipment and documention logs to complete buzzer card charging & electrical safety testing on the PB500 series ventilator range.

2. SCOPE

This procdure applies to all PB500 series model ventilators.

- PB560
- PB540
- PB520

3. DEFINITIONS

Electrical safety testing is used to verify electrical insulation in finished a product.

4. REFERENCES

PB560-520 Product Requirements Document (PRD) P/N 10035480
PB540 Product Requirements Document (PRD) P/N 10023276
PB540 System Test Criteria Project File, # 3364
PB540 Ventilator Electrical Safety Testing P/N 10022167
PB540/PB560/PB520/PB500 Powerpack Rework Procedure P/N 10021500

5. GENERAL REQUIREMENTS

Testing Notes

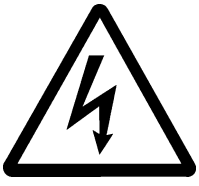
1) For each test section on the DHR, indicate Pass or Fail by signing initials in the appropriate Pass or Fail column on the DHR

2) If the ventilator fails any test step, describe the parameter out of spec in the problem section of the Final Inspection test section of the DHR and notify line technician or Manufacturing Engineer before switching off. Refer to PB540/PB560/PB520/PB500 Powerpack Rework Procedure p/n 10021500.

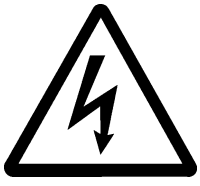
3) The Alarm Pause/ Silence button may be used to suppress alarms as needed.

4) If at any time you notice an abnormality of any kind then notify the line Engineer/Technician for clarification before continuing.

5) Ensure that both doors of Hi-pot enclosure are fully closed before completing the electrical safety test.



Warning: High Voltage Present Inside Unit
Disconnect the AC Mains supply before opening the ventilator unit



6. PROCEDURE

Warnings

Warning: High Voltage Present Inside Unit
Disconnect the AC Mains supply before opening the ventilator unit

BUZZER CARD BATTERY CHARGING

To ensure the buzzer card battery is sufficiently charged before Involuntary Alarm testing, perform the following steps:

1. Plug in the AC mains cord, Turn ON the vent power (do not ventilate) and **Record** the start date and time on the DHR
2. Leave the vent ON for at least 15 minutes to permit ample charging time of the buzzer board battery
3. When 15 minutes or more have elapsed, **Record** the end date and time on the DHR
4. Calculate the time elapsed from the end date/time to the start date/time, to verify that 15 minutes or more have elapsed. **Record** the elapsed time on the DHR
5. If 15 minutes or more have elapsed, continue testing.

HIPOT TEST - SETUP & DAILY CHECKS

Warning: High Voltage Present
Remove all rings, jewellery & watches before continuing.
Do not touch unit or test equipment during test.
Do not perform test if you are grounded.
Insulating Mat must be in position

If any cables or connectors are worn or damaged stop use of tester IMMEDIATELY and contact line supervisor or line technician / engineer

Do not perform these tests until you understand the hazards and are confident you can perform them safely.

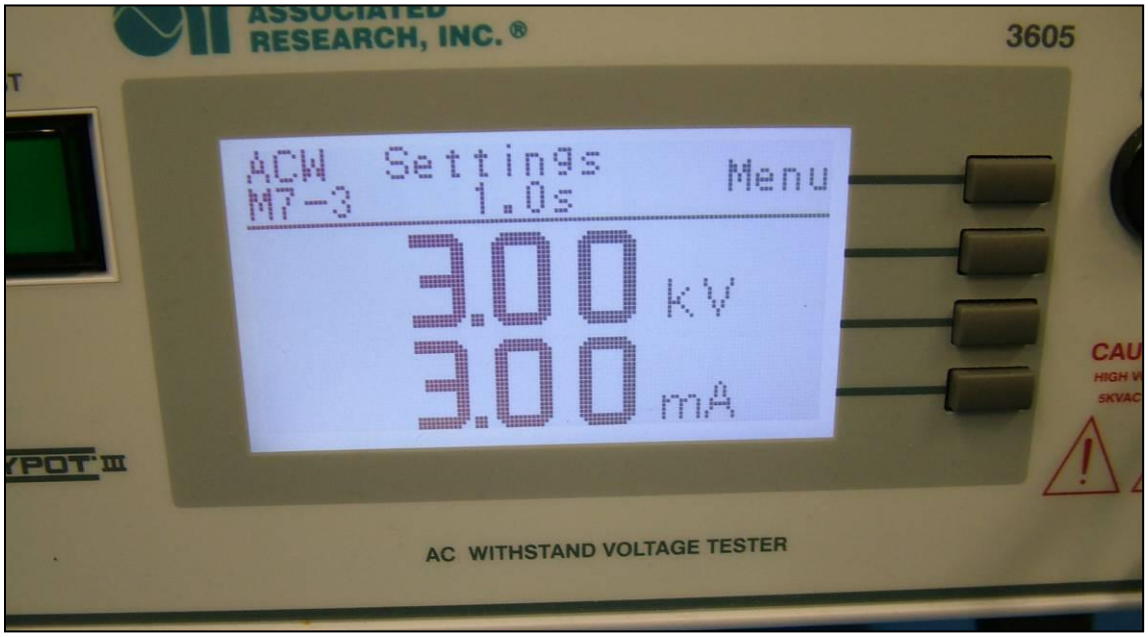
Warning: High Voltage Present During Hipot Testing. AC Voltages up to 3KV are used, take all necessary safety precautions.

Equipment Required

- Associated Research, AC Withstand Voltage Tester, AR Model 3605 or 3705
- Associated Research, Adapter Box with Cable AR P/N 36544
- Hipot Test Power Cable (PB540), P/N 10021744
- Hipot Test Load Box (PB540), P/N 10022189
- Electrical Safety Cable Continuity Test Box (PB540), P/N 10022190
- Fluke Handheld DMM Model 87 or equivalent
- Power Cord, Airox P/N 2966200 or equivalent (cord without ferrite)
- Electrical Safety Test Enclosure

Daily Check: Hipot Tester Power ON Settings Check

1. Turn ON the Hipot Tester and Check the settings on the display to be **1.0s, 3.00kV, 3.00mA** as shown in the picture below:
2. Leave the Hipot tester power ON when testing is completed.
3. Repeat this test whenever the Hipot Tester is powered ON having been previously powered OFF.
4. Record the Pass/Fail result in the Electrical Safety Test Equipment Verification Log, P/N 10060262.
5. Notify Test Engineering if this check fails.



Daily Check: Hipot Tester Current Limit Check

The Current Limit Test check is performed daily prior to use to ensure correct operation of the Hi-Pot tester and cable connections. The test load box contains a load resistor with a value to cause a Max Current Limit failure.

CAUTION: Verify HIPOT tester is not activated before handling cables!

Procedure:

1. Connect the Hipot Test Load Box P/N 10022189 to the Hipot Tester output
2. When ready to start the test, press the green TEST button on the Hipot Tester to begin the testing
3. The Hipot test must FAIL (long audible beep, red failure indicator will light up) to indicate a successful test. To stop the alarm press the red RESET button on the HIPOT tester. If the Hipot test does not FAIL please contact Test Engineering.
4. Record the Pass/Fail result in the Electrical Safety Test Equipment Verification Log, P/N 10060262

Daily Check: Hipot Test Cables Continuity Check

The Hipot Test Power Cable P/N 10021744 is to be continuity tested daily prior to use with a DMM to be less than 0.5Ω using the Electrical Safety Cable Continuity Test Box P/N 10022190.

Procedure:

1. Set the DMM to the resistance (Ω) mode. Measure and record the lead resistance (Ω), DMM Cal ID, and Due Date in the Electrical Safety Test Equipment Verification Log, P/N 10060262.
2. Connect both ends of the System Hipot Test Power Cable P/N 10021744 to the Electrical Safety Cable Continuity Test Box P/N 10022190, see photo.

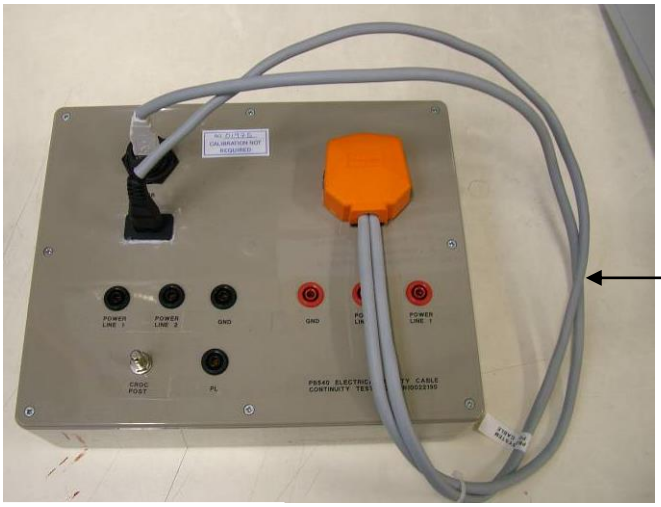


Photo for Step 2

3. Connect the DMM probes to the Power Line 1 terminals of the Cable Continuity Test Box P/N 10022190 and record the resistance measured in the Electrical Safety Test Equipment Verification Log, P/N 10060262. Subtract the lead resistance measured in Step 1, verify that the final resistance is less than 0.5Ω and record the result on the log.
   Note: If this measurement fails, reverse the AC mains connector on the Cable Continuity Test Box P/N 10022190 and repeat the measurement. If the measurement now passes, proceed with the next test step.
4. Connect the DMM probes to the Power Line 2 terminals of the Cable Continuity Test Box P/N 10022190 and record the resistance measured in the Electrical Safety Test Equipment Verification Log, P/N 10060262. Subtract the lead resistance measured in Step 1, verify that the final resistance is less than 0.5Ω and record the result on the log.
5. Connect the DMM probes to the Ground Line terminals of the Cable Continuity Test Box P/N 10022190 and record the resistance measured in the Electrical Safety Test Equipment Verification Log, P/N 10060262. Subtract the lead resistance measured in Step 1, verify that the final resistance is less than 0.5Ω and record the result on the log.
6. Remove the Hipot Test Power Cable P/N 10021744 from the Cable Continuity Test Box P/N 10022190 and plug into the Associated Research, Adapter Box receptacle
7. If any resistance measurement exceeds the resistance limit, call Test Engineering

LEAKAGE CURRENT TESTS - SETUP & DAILY CHECKS

Warning: High Voltage Present During Electrical Safety Testing, take all necessary safety precautions.

CAUTION: Never touch the Device Under Test(DUT) or anything connected to it while high voltage is being applied by the Electrical Safety Test Equipment

Equipment Required

- Safety Analyzer Tester, Metron Model QA-90 or Fluke 601 PRO XL
- Electrical Safety Test Ground Cable (PB540), P/N 10021745
- Electrical Safety Cable Continuity Test Box (PB540), P/N 10022190
- AC Power Cord, Airox P/N 2966200 or equivalent cable (without ferrite)
- Fluke Handheld DMM Model 87 or equivalent

Daily Check: Cable Continuity

The following cables are to be continuity tested daily prior to use with a DMM to be less than 0.5Ω using the Electrical Safety Cable Continuity Test Box P/N 10022190.

- Electrical Safety Test Ground Cable
- Ventilator AC Power Cord

Procedure:

1. Connect both ends of the AC Power Cord to the Electrical Safety Cable Continuity Test Box P/N 10022190.

2. Set the DMM to the resistance mode. Measure and record the lead resistance (Ω), DMM Cal ID, and Due Date in the Electrical Safety Test Equipment Verification Log, P/N 10060262 if this has not already been completed for today's date

3. Connect the DMM probes to the Power Line 1 terminals on the Cable Continuity Test Box P/N 10022190 and record the resistance measured in the Electrical Safety Test Equipment Verification Log, P/N 10060262. Subtract the lead resistance recorded in the log, verify that the final resistance is less than 0.5Ω and record the result on the log. Note: If this measurement fails, reverse the AC mains connector on the Cable Continuity Test Box and repeat the measurement. If the measurement now passes, proceed with the next test step.

4. Connect the DMM leads to the Power Line 2 terminals on the Electrical Safety Cable Continuity Test Box P/N 10022190 and record the resistance measured in the Electrical Safety Test Equipment Verification Log, P/N 10060262. Subtract the lead resistance recorded in the log, verify that the final resistance is less than 0.5Ω and record the result on the log.

5. Remove the Ventilator AC Power Cord from the Electrical Safety Cable Continuity Test Box P/N 10022190 and connect the USB connector end of the Electrical Safety Test Ground Cable, P/N 10021745 to the Electrical Safety Cable Continuity Test Box P/N 10022190 and connect the other end to the COM terminal of the DMM.

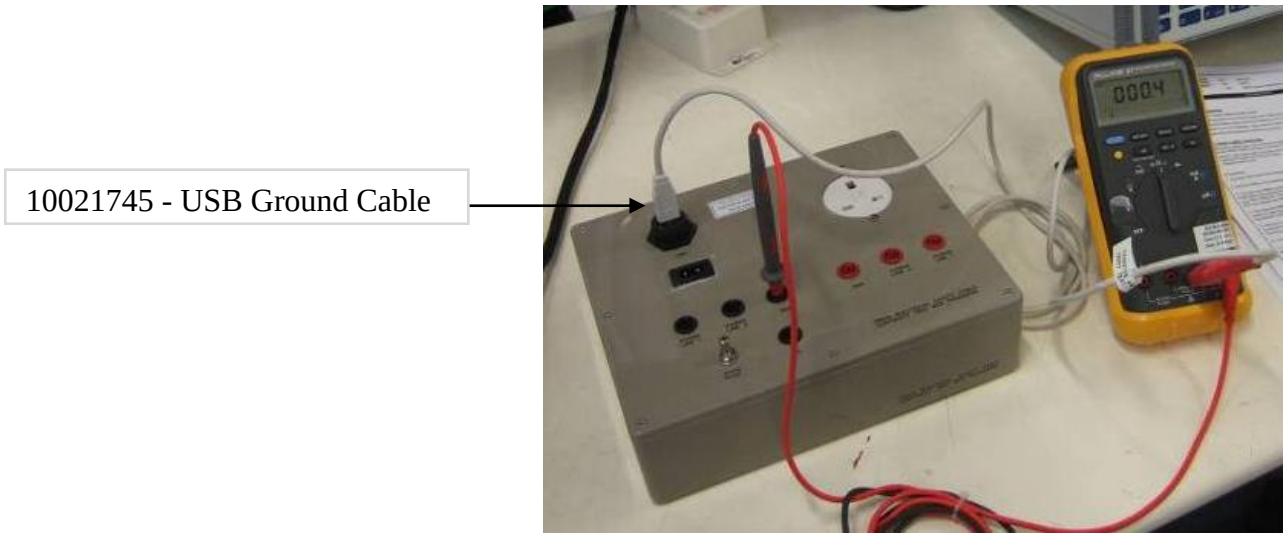


Photo for Step 5 & 6

6. Connect the probe from the VΩ port of the DMM to the Black GND terminal of the Electrical Safety Cable Continuity Test Box P/N 10022190 and record the resistance measured in the Electrical Safety Test Equipment Verification Log, P/N 10060262. Subtract the lead resistance recorded in the log, verify that the final resistance is less than 0.5Ω and record the result on the log
7. Remove the Electrical Safety Test Ground Cable, P/N 10021745 from the Electrical Safety Cable Continuity Test Box P/N 10022190
8. If any resistance measurement exceeds the limit, call Test Engineering

Metron QA-90 Setup (see Appendix 1 for using the Fluke 601 PRO XL)

Perform these steps to setup the Metron QA-90 prior to testing to load test sequence 'XL2-TEST':

1. Power ON the Metron QA-90
2. After the bootup, press the Memory (F2) button
3. Press the SEQ. MEM (F2) button
4. Press the SEQ (F3) button
5. Press the XL2-TEST (F7) button
6. The Metron is now ready to be used for testing

HIPOT TEST

Warning: High Voltage Present
Remove all rings, jewellery & watches before continuing
Do not touch unit or test equipment during test
Do not perform test if you are grounded
Insulating Mat must be in position

If any cables or connectors are worn or damaged stop use of tester IMMEDIATELY and contact line supervisor or line technician / engineer
Do not perform these tests until you understand the hazards and are confident you can perform them safely.

Warning: High Voltage Present During HIPOT Testing. AC Voltages up to 3KV are used, take all necessary safety precautions.

Hipot Test Procedure

1. Turn the PB500 Ventilator power ON
2. Connect the System HIPOT Test Power Cable power lead P/N 10021744 from the HIPOT tester to the AC Mains line input jack at the rear of the PB500 Ventilator.
3. Connect the USB connector ground connection lead from the HIPOT Test Power Cable to one of the two USB ports at the rear of the PB500 Ventilator.
4. When ready to start the test, press the green TEST button on the HIPOT Tester to begin the test
5. The HIPOT test result will be indicated as follows when the test is finished:

   PASS – short audible beep and the display will indicate Pass on the LCD screen

   FAIL – long audible beep, red failure indicator will light up. To stop the alarm press the red RESET button on the HIPOT tester

LEAKAGE CURRENT TESTS

Warning: High Voltage Present During Electrical Safety Testing, take all necessary safety precautions.

CAUTION: Never touch the Device Under Test (DUT) or anything connected to it while high voltage is being applied by the Electrical Safety Test Equipment

Leakage Current Test Procedure

1. Connect the PB500 Power Cord from the AC jack on the front of the Metron QA-90 to the AC inlet of the ventilator
2. Connect the Electrical Safety Test Ground Cable P/N 10021745 from the 'ENCL' located next to the AC jack on the front of the Metron QA-90 to one of the two USB connectors at the rear of the ventilator
3. Turn the PB500 Ventilator power switch ON
4. If the Sequence Name on the Metron QA-90 does not indicate XL2-TEST perform the Metron QA-90 Setup
5. Press the F7 button, enter the PB500 Ventilator serial number and press the enter <┘ button
6. Press the F4 button to start testing
7. When the test is complete, the display will indicate Test Passed or Test Failed.
8. Press the F6 button to print the test results and again to print a second copy.
9. Verify that the vent has passed the 'Electrical Safety - HIPOT Test' by recording a PASS result on the DHR and write "Passed Electrical Safety HIPOT Test" in the comments section of both copies of the test results
10. Sign and date both copies of the METRON QA-90 print-out test results sheet at the bottom, and draw a diagonal line from the lines Serial no to Location and write 'N/A'
11. Indicate the overall Pass or Fail test result for the Hipot and Leakage Current test by signing initials in the appropriate Pass or Fail column on the DHR. Only if both tests pass, is the DHR result a pass.
12. Attach both copies of the print-out of test results to the DHR. One copy will remain with the DHR and the other will be placed in ths shipping carton at ventilator pack station.
13. Press F4 to return to the Main Menu

PROCESS MONITORING

Fill in appropriate Pareto chart.