

MST-0432

MWA Receiver Node Enclosure

Test: Air Conditioner Performance

(Additional one-off Testing)

Serial number: 001

Tester: C. Coleman

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Jig details

Use the MWA Air Conditioner Control Box to switch each individual component of the air conditioner to confirm its operation.

- MWA JIG-001 - MWA Air Conditioner Control Box
- MWA JIG-002 - MWA PSU

Test procedure

1. Install the modified test AC unit into PSI test enclosure.
2. Connect PSI test jig and 12V PSU.
 - Confirm all three motors can be switched on and off.**
3. Put a 400W heat source (lamp) into the enclosure.
4. Use a thermocouple to monitor the enclosure air temperature (location of thermocouple to be determined).
5. Turn on the evaporator fans.
6. Turn compressor and condenser fan off.
7. Allow enclosure temperature to rise to 45°C (*may have to think about letting this go to 60°C in view of MWA request; but need to check that this is possible for AC unit, it was never designed or selected for this*).
8. Connect current probe to AC supply and oscilloscope.
9. Turn on condenser fan and compressor.
10. Check compressor starts.
 - Observe startup current: 20 A**
 - Surge current not to exceed 6 A/C cycles at 25 A Peak.**
 - Number of high current cycles: 7**
11. Leave running for 12 minutes
 - Temperature of enclosure successfully drops below 20 °C**
12. Turn off compressor and condenser fan.
13. Allow enclosure temperature to rise to 20°C and start a timer.
14. Measure the time it takes to rise to 30°C
 - Must not be less than 8 minutes.**

Comments

See sheet 2 for trial results

The following steps were conducted in an empty enclosure, with 400W simulation load:

Step 11		
Initial Temperature	After 12 minutes	20°C after
45°C	24.5°C	16 mins 20 sec

Step 14		
Initial temperature	End Temperature	Rise / Fall Time
20°C	30°C	2 mins 47 sec
30°C	20°C	5 mins 30 sec

The above steps were repeated with additional internal components and a different thermistor location:

Step 11		
Initial Temperature	After 12 minutes	20°C after
45°C	22.9°C	15 mins 00 sec

Experimental Temperature Ranges (20°C - 30°C)		
Initial temperature	End Temperature	Rise / Fall Time
20°C	30°C	4 mins 02 sec
30°C	20°C	4 mins 35 sec
20°C	30°C	4 mins 30 sec
30°C	20°C	3 mins 25 sec
20°C	30°C	3 mins 21 sec
30°C	20°C	4 mins 16 sec

The temperature range was then extended for additional testing:

Experimental Temperature Ranges (18°C - 32°C)		
Initial temperature	End Temperature	Rise / Fall Time
20°C	32°C	5 mins 05 sec
32°C	18°C	7 mins 08 sec
18°C	32°C	6 mins 19 sec
32°C	18°C	7 mins 01 sec
18°C	32°C	6 mins 22 sec
32°C	18°C	7 mins 01 sec
18°C	32°C	6 mins 25 sec
32°C	18°C	6 mins 58 sec
18°C	32°C	5 mins 59 sec
32°C	18°C	7 mins 02 sec
18°C	32°C	6 mins 43 sec