

ARTICMASTER TEST REPORT
Demonstration Installation
Major Sydney Car Dealership

Introduction

Two Articmaster units were installed on a package air conditioning heat pump which served the new car showroom of the car dealer in Sydney, Australia. The heat pump unit is comprised of twin compressors with associated evaporator and condenser equipment.

Electronic monitoring equipment was installed on the heat pump system before the Articmaster installation and again after the Articmaster was commissioned. In each case a period of slightly greater than forty-eight hours of monitoring was completed, each using measurement frequencies of forty seconds, each measuring the same days (Friday to Sunday) of the week, and the same hours of the respective days.

The measurements taken included:-

- Car Showroom temperature and humidity
- Amp draw on each leg of each compressor (total six readings)
- Supply and Return temperatures of the condenser and evaporator
- External Ambient temperature

The measurement periods were chosen to be as representative and as easily comparable as possible.



Results

The "pre" and "post" measurement periods saw sharply differing ambient conditions, with the "post" period being considerably warmer at night, and having one particular day of high temperatures (Sunday). Relative Humidity was also higher during the post period. Day 1 of each measurement period was very similar, which allowed a very good comparison, as it also represented the same day of the week. Thus it was highly likely that the showroom was subjected to similar heating/cooling demands by the

visiting public.

The following conclusions can be drawn from the charts:-

- The temperature measurements inside the showroom indicate that the specified environmental conditions were maintained at all times.
- The showroom humidity was slightly higher during the after period, merely reflecting the external ambient conditions. Humidity levels however were maintained well within acceptable levels.

Comparison of the detailed hobo pre and post installation charts provide the following detailed measurements:-

Finding	Source of Comparison
Compressor A: High Leg Amps were reduced from 8.8A to 8.0A	Day 1 of pre and post.
Compressor B: High Leg Amps were reduced from 8.7A to 8.1A	Day 2 pre and post
Compressor A: Low Leg Amps were reduced from 8.4A to 6.8A	Day 1 pre and post
Compressor B: Low Leg Amps were reduced from 7.2A to 6.7A	Day 2 pre and post
Evaporator Supply and Return Air increased 4°F and 3.5°F	Day 1 and Day 2 pre and post respectively

Calculated Savings

Savings were calculated in two ways. Firstly from reductions in Amps used to drive the twin compressors, and secondly the increased cooling capacity secured by fitting the Articmaster system, i.e. the cooler air being supplied to the showroom.

Amp Draw

Compressor A High Leg $0.8/8.8 = 9.1\%$

Compressor B High Leg $0.6/8.7 = 6.9\%$

Compressor A Low Leg $0.5/7.2 = 6.9\%$

Compressor B Low Leg $1.6/8.4 = 19.0\%$

Average reduction using two High Legs and One Low Leg readings = 9.6%

Cooling Capacity

Increase in delta temperature equals:-

4.0 degree F x 5% per degree = 20%

3.5 degree F x 5% per degree = 17.5%

Average assumed to be approximately 18.5%

Total Saving

Amp draw of 9.6% and Cooling Capacity of 18.5%

= Approximate Efficiency improvement 28%

Appendix A - Pre and Post Installation Charts

Note: Red equals measurements taken in the pre installation period, and Blue the post installation period.

Chart 1: Comparison of Compressor Amps and Ambient Temperatures

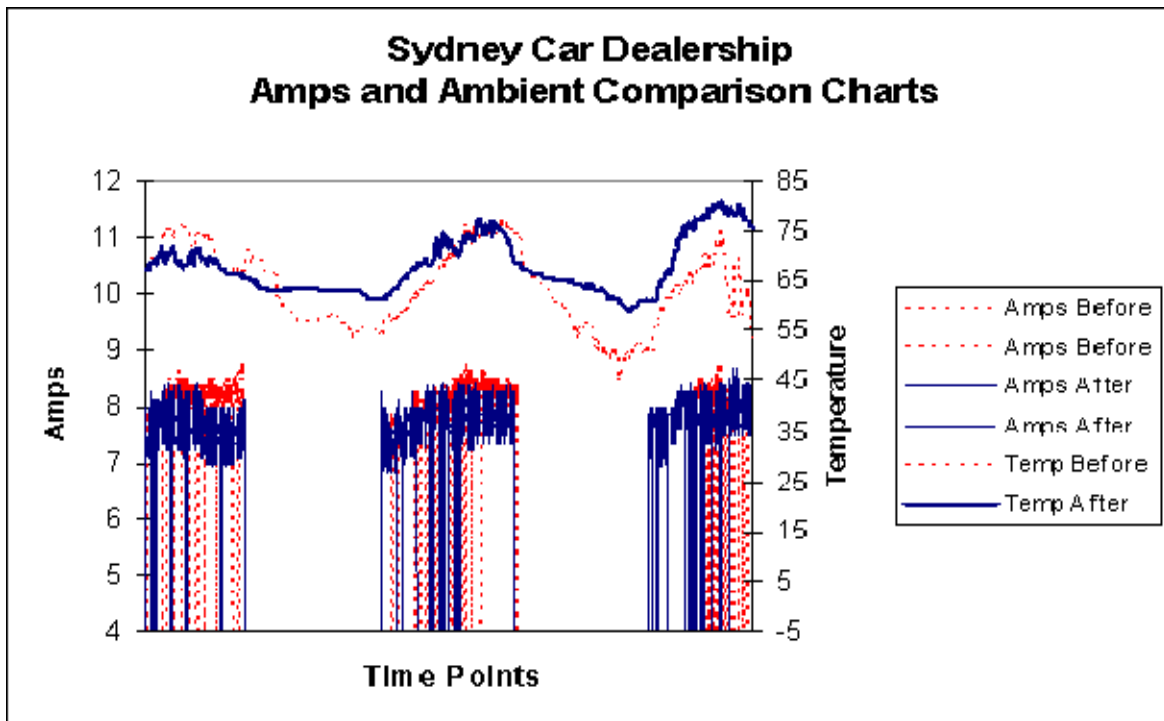


Chart 2: Supply and Return Evaporator Air Temperatures

Major Sydney Car Dealership Evaporator Efficiency Chart

