

CTECK

OPTIMAL AIR CONDITIONING SOLUTIONS



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CTECK PROOF OF CONCEPT RESULTS

The CTECK is the latest generation of air conditioning Compressor Performance Enhancement by Optimal Air Conditioning Solutions (Optimal).

The following are the results obtained on a Fujitsu 18kW ducted air conditioning system following the installation of a CTECK.

Below is the CTECK installed into the condenser of the ducted system interfacing to the Demand Response Enable Device (DRED) and measuring the current consumed by the condenser.

TESTING

To identify the energy consumption, we based our energy analysis on the International Performance Measurement and Verification Protocol (IPMVP) Option B, End Use Retrofits, measured consumption, and measured capacity.

Using the direct metering method negates the need for base load comparisons in accordance with IPMVP guidelines.

“Cooling degree days”, or “CDD”, are a measure of how much (in degrees), and for how long (in days), outside air temperature was higher than a specific base temperature. They are used for calculations relating to the energy consumption required to cool buildings.

The Energy Conservation Method (ECM) used is the Optimal Compressor Performance Enhancement Solution.

Our comparison time was three days without the CTECK running and three days with the CTECK running.

This consumption was then compared to the Cooling Degree Day figures obtained from the Underground weather web site for the North Lakes Queensland area relative to the recording days.

www.degreedays.net (using temperature data from www.wunderground.com)



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GENERAL RESULTS

The table below shows the average daily power consumption, daily average temperature, daily average CDD and the associated dates.

The CDD comparison relative to the kWh/CDD is the measurement recognised by the International Performance Measurement and Verification Protocol (IPMVP) for comparing the effect of energy reduction solutions and the effect of ambient temperatures as endorsed by ASHRAE.

The brown highlighted data compares the energy consumed with the CTECK, OFF.

The green data compares the energy consumed with the CTECK, ON.

The kWh/CDD comparison calculates the effect the warmer temperature has on the energy consumed by the air conditioning system and calculates the comparison energy consumption.

RESULTS

The table shows excellent energy reduction with and without the CDD analysis.

Savings without adjustments are 31.8%

Savings with CDD adjustments are 27.71%

FUJITSU 18 KWR DUCTED AIR CONDITIONING UNIT

24 HR AVERAGES					
KWH	CDD	KWH/CDD	AVG TEMP	DATE	CPE
24.56	9.70	2.53	22.47	8-Feb-22	OFF
29.76	11.00	2.71	23.45	9-Feb-22	OFF
30.03	11.80	2.55	24.35	10-Feb-22	OFF
23.29	11.80	1.97	24.30	11-Feb-22	ON
15.30	10.60	1.44	23.18	12-Feb-22	ON
23.64	10.70	2.21	23.00	13-Feb-22	ON

	METERED KWH	CDD AVERAGE	NORMALISED KWH/CDD
OFF	28.12	10.83	2.59
ON	19.30	11.2	1.88
Difference	8.82		0.72
Savings	31.38%		27.71%

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The results also show the ability of the CTECK to reduce energy consumption and Demand on warmer days during the comparisons.

The graphs below show the energy recorded for the energy consumption of the air conditioning unit for each day. These are real time recordings by a Wattwatchers Auditor 6M power meter.

The data from this meter is collected into our cloud, which has been developed specifically for air conditioning systems to measure and compare the power consumed directly with:

- Ambient temperature
- Humidity
- Dew Point
- Cooling Degree Days
- kWh/CDD
- Green House Gas Emissions

Graph 1

Shows the Power consumption and temperature profiles from 8th February to 13th February

