

Airedale CLOUD DIAGNOSTICS

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Airedale Cloud Diagnostics is **not just a monitoring tool**.

It is a cloud-based monitoring and diagnostics platform developed for owners of mission critical HVAC plants and multiple site HVAC systems.

Airedale Cloud Diagnostics is a highly secure, military grade system that is deployed on your sites to collect and collate data from critical equipment. Data is seamlessly transmitted to our sophisticated cutting edge cloud diagnostics engine to enable anomaly detection if your equipment is working outside of Airedale's original design parameters.

Airedale's extensive field experience has been leveraged, along with leading data science, to develop powerful diagnostic tools, including a ground-breaking refrigerant leak detection algorithm.



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KEY BENEFITS AT A GLANCE

Global Access

Manage your HVAC plant remotely from anywhere in the world.

On-going Operational Analysis

Intelligent algorithms will continuously monitor the chiller's performance and detect and notify of any anomalous behaviour, identifying potential issues before compromising the operation of the units.

Reduced Costs of Ownership

Early detection of anomalous behaviour will avoid downtime and reduce maintenance and operational costs.

Reduced Environmental Footprint

Early detection of refrigerant leaks will help achieving net-zero equivalent carbon emissions.

Continuous Improvements

Leveraging the cloud connection, chiller's data models will improve over time becoming more efficient, new features and functions will be made available.

Easy to Install

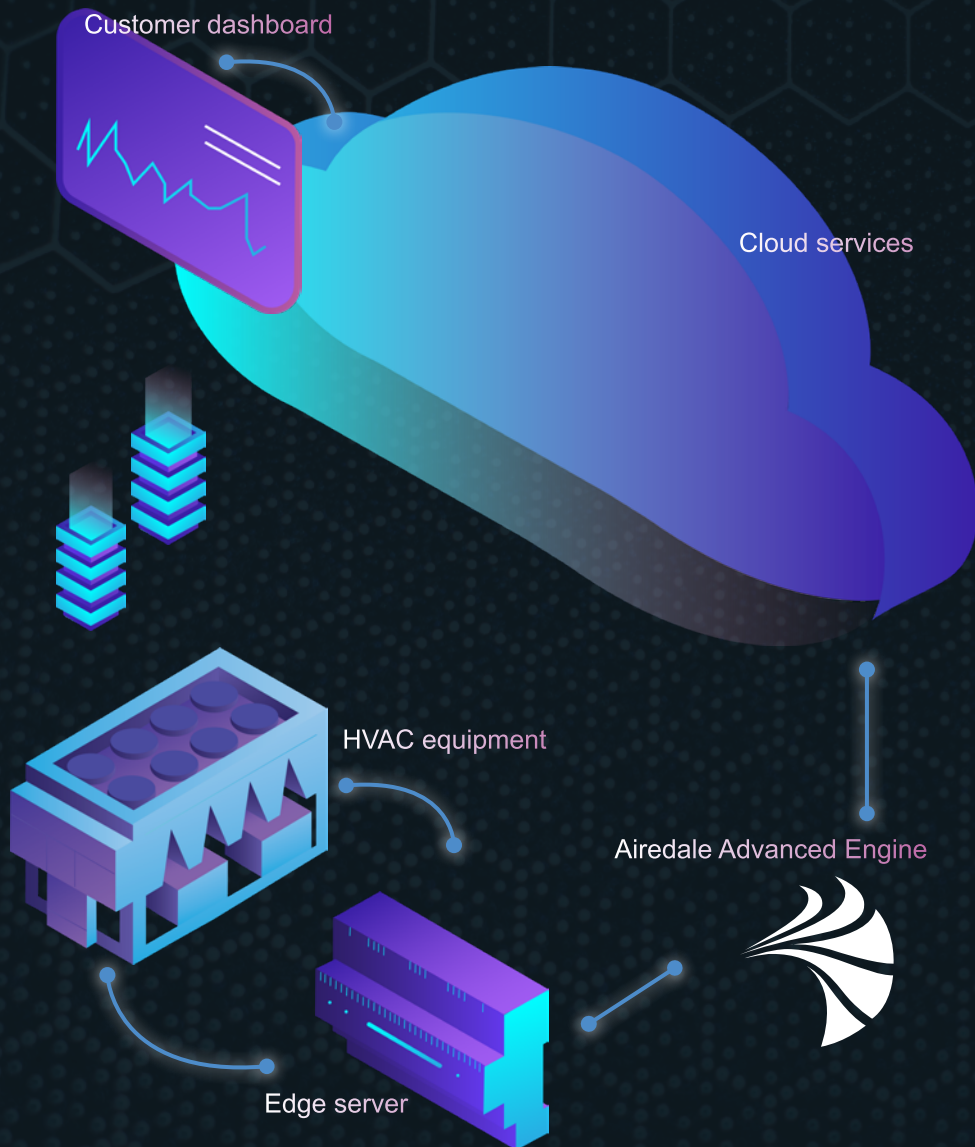
Cloud diagnostics is available for new and existing chillers, components have been designed and selected to be easy to retrofit.



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HOW IT WORKS

- » A Solution allowing HVAC products to be connected, monitored and analysed via a secured communication channel to the Airedale Cloud Diagnostics cloud.
- » Offers live dashboard and alerts, ongoing performance analysis & predictive maintenance.
- » Ad-hoc user interface or “Smartboard” visualizes real-time data.
- » Ability to analyse performance of unit over time using machine learning techniques.
- » Ability to recognise “failure patterns” and warn the user of a potential failure before it happens.
- » If a drop in performance against operating conditions is detected, this will act as an early warning system for the customer/maintenance team to investigate further.



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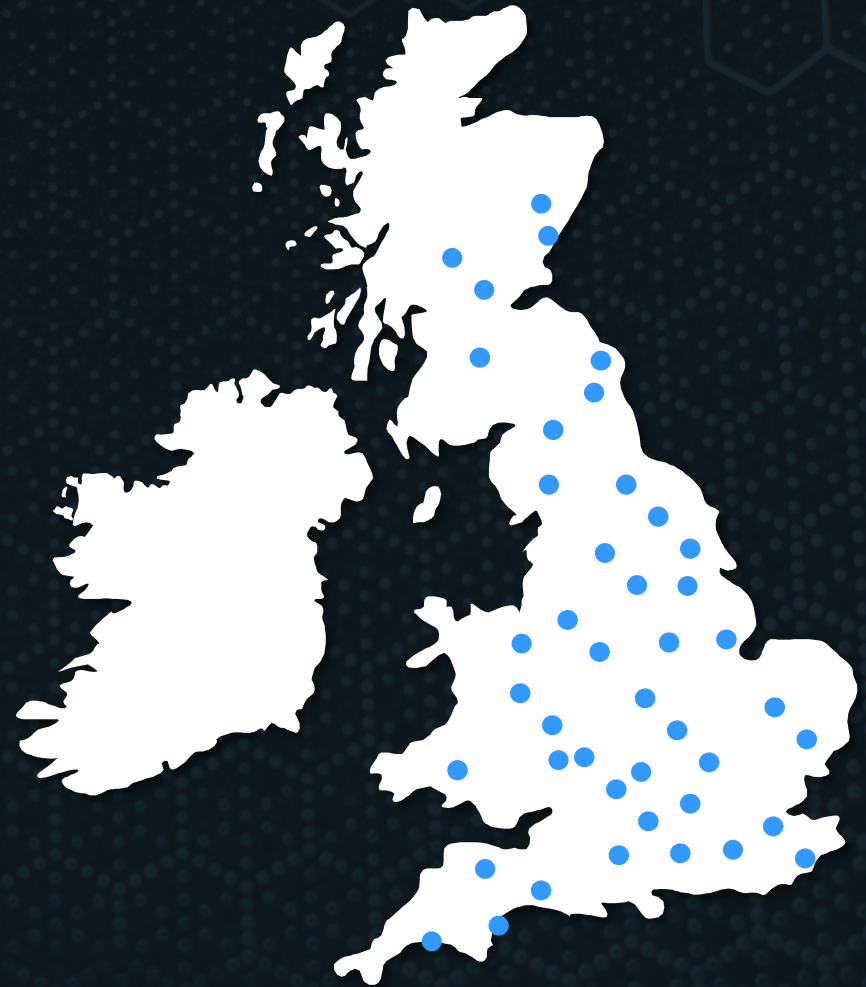
MULTI - SITE CONNECTIVITY

Remote monitoring and diagnostics are ideal tools when it comes to managing multiple sites and units.

With the machine learning of Airedale Cloud Diagnostics, on-going operational analysis continuously monitors each individual unit's performance across multiple sites. It intelligently identifies and notifies maintenance teams of any potential issues, and allows for predictive maintenance based on a profile.

Our experience in the Telecoms sector has shown that installing remote monitoring can reduce site visits by approx. 33%

With the deep insights gained through Airedale Cloud Diagnostics, you can manage and optimise your HVAC plant remotely from anywhere in the world, avoid downtime and significantly reduce maintenance and operational costs.



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PERFORMANCE ANALYSIS



Connected units will be analysed for performance utilising many algorithms and machine learning techniques. If a drop in performance against operating conditions is detected, this will act as an early warning system for the customer/maintenance team to investigate further.

Early intervention can prevent prolonged periods of higher energy consumption and eventual breakdown, and all the costs associated with that.

The system will judge the unit's performance on a variety of factors – for a refrigerant based cooling system for example superheat, sub-cool, suction/head pressures, water flow/airflow are all analysed for deviations against “normalised” behaviour, however the overall output of the unit such as cooling duty/capacity, efficiency, power consumption against its operating conditions are all considered instantaneously and over time as well.

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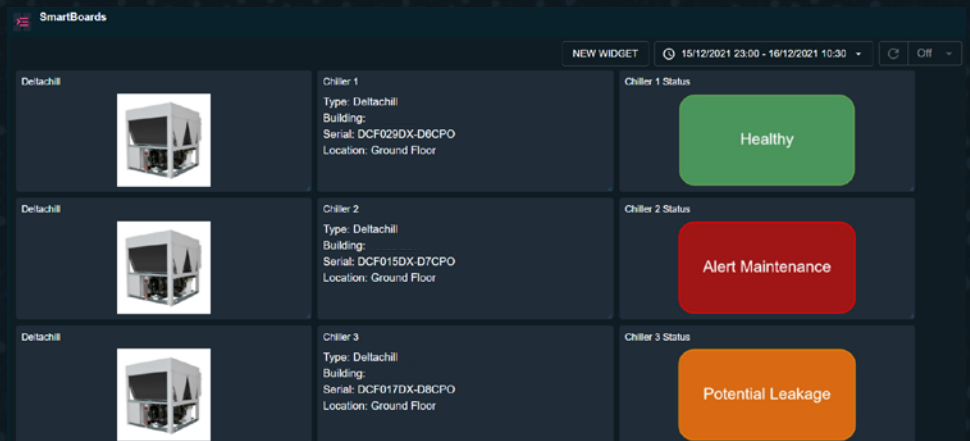
LEAK DETECTION

One of the main problem areas for refrigerant based cooling systems is leakage of refrigerant into the atmosphere, which can happen for several reasons including degradation of copper coils over time.

Often refrigerant leaks aren't detected until too late, at which point an engineer is called to site to find a non-operational system. If we can catch this earlier by detecting small losses in performance or changes in the power profile then the benefits are huge in terms of environmental impact, operational impact and overall cost savings to the end user.

The ability for connected units to be able to learn from and compare against each other utilising intelligent unit modelling means that the performance analysis techniques continually improve and get stronger over time.

In our tests we have been able to detect refrigerant leaks as small as 5% of total refrigerant volume instantaneously, we are now gathering data to qualify the smallest leak that is detectable by the machine learning algorithm.



The above smartboard displays the analysis result of one chiller where refrigerant was temporarily removed from one of the circuits (area highlighted in red), the machine learning algorithm compared the telemetry received from the chiller against a pre-learned model and correctly detected numerous anomalies on the chiller's behaviour.

Once the test was completed, refrigerant was then reintroduced in the chiller, automatically the algorithm no longer detected anomalous data in the following compressors cycles (green area).

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LEAK DETECTION

Refrigerant leaks are inevitable in pressurised machines like chillers. Unfortunately they can also have a huge impact on both cost and the environment.

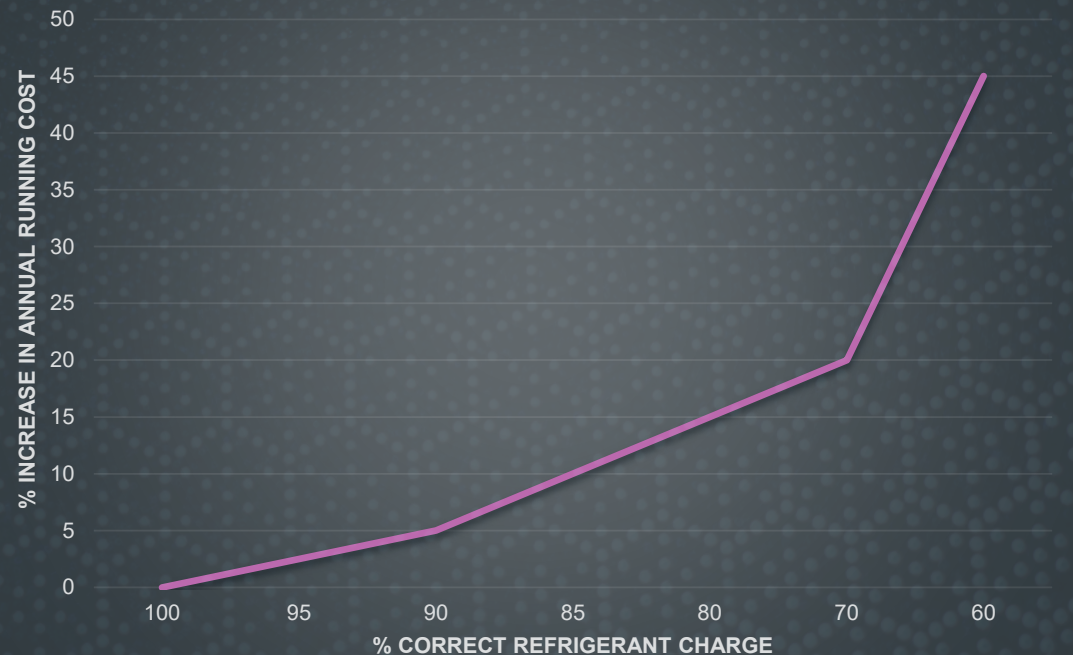
A 30% leak of R410A refrigerant on a 500kW scroll chiller will cost approximately £5500 to repair (reclaim refrigerant, fix leak, re-gas)

The leak of the gas into the atmosphere will result in a global warming effect equivalent to 36.3 tonnes of CO₂.

It will result in an annual increase in the chiller's running costs of 20%

With Airedale Cloud Diagnostics, the system has you covered, saving you money and significantly reducing the impact of your operations on the planet at the same time.

Relationship between annual running costs and refrigerant leakage



LEWIS, D., MENZER, M., Using Refrigerants Responsibly, ASHRAE Journal September 2006

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OTHER KEY FEATURES

