STAR REFRIGERATION

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Smart Thinking

Topic

Planned Preventative Maintenance and Remote Monitoring

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How Planned Preventative Maintenance and Remote Monitoring Can Help Your Businesses Slash Costs and Stay Compliant

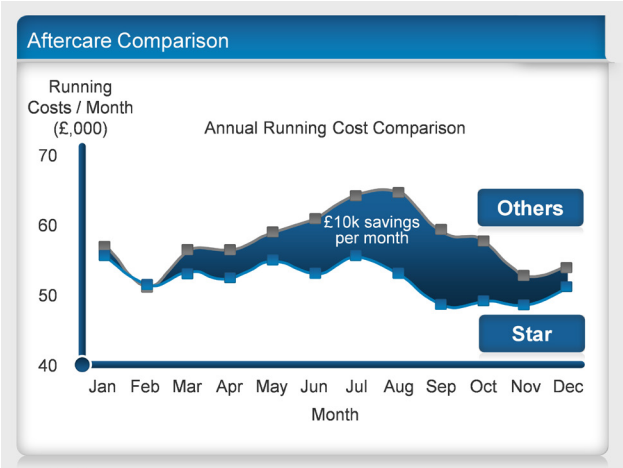
In the face of rising energy costs and more stringent environmental legislation and regulation, businesses with operating temperature controlled environments face some serious challenges. Planned aftercare and remote monitoring can help businesses simultaneously ace all of the above challenges with round the clock remote monitoring of industrial refrigeration systems.

Operating costs and reliability account for 80% of a system's total life cycle costs. Condition Based maintenance aided by remote monitoring systems designed exclusively to identify issues with industrial cooling solutions are currently helping businesses slash costs and stay compliant throughout the UK.

Round-the-clock monitoring

Remote monitoring systems actively collect data from the PLC of a refrigeration system and transmit it off-site via a Internet or broadband connection. Refrigeration specialists and data analysis programmes then analyse the data in-house and generate targeted task lists for the specialist engineers to focus on, therefore eliminating the need for costly on-site visits and traditional fixed schedule invasive maintenance.

Enhanced remote monitoring systems are currently used across a number of sectors such as process cooling and food manufacturers to achieve optimum plant performance and lower running costs. In the cold storage industries for example, Tesco was one of the precursors to demand analytical data to improve plant reliability and safety and cut maintenance costs. The grocery market leader uses remote monitoring at all their UK distribution warehouses. Following the implementation of measures derived from full data analysis of their refrigeration plants Tesco saved over £100K a year, just at one site.



Star Refrigeration Maintenance and Remote Monitoring saved Tesco an average of £10K per month per site.

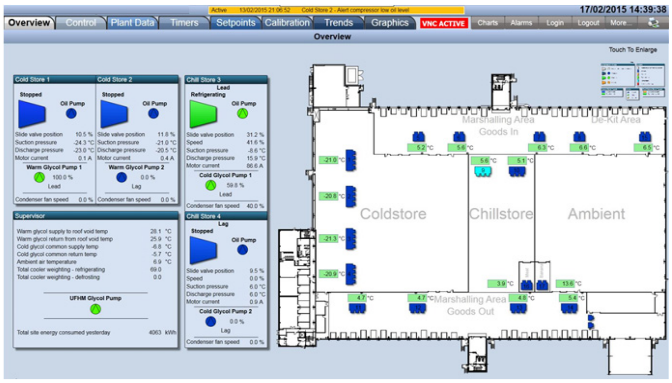
What is remote monitoring and diagnosis and how does it work?

Today, they're primarily used to remove sources of energy waste, drive down running costs and lower energy consumption through better maintenance. Live on-site data is transmitted 24/7 into a Data Monitoring Hub. Here, it undergoes analysis, trending, graphing, and reporting. Data is used to highlight areas that need investigation, issue alerts for emergency maintenance faults and measure the overall effectiveness of a maintenance programme. Part consumption, equipment operation, oil quality, refrigerant levels, water contamination and other refrigeration indicators are also analysed. Diagnostics solutions are used to consistently reduce refrigeration energy use, year after year.

In addition, data monitoring systems offer live fault reporting that allows the operation team to identify and visualize issues as they arise. A record of alerts and faults is usually kept for each site so that detailed reports of results can be presented to management in user-friendly

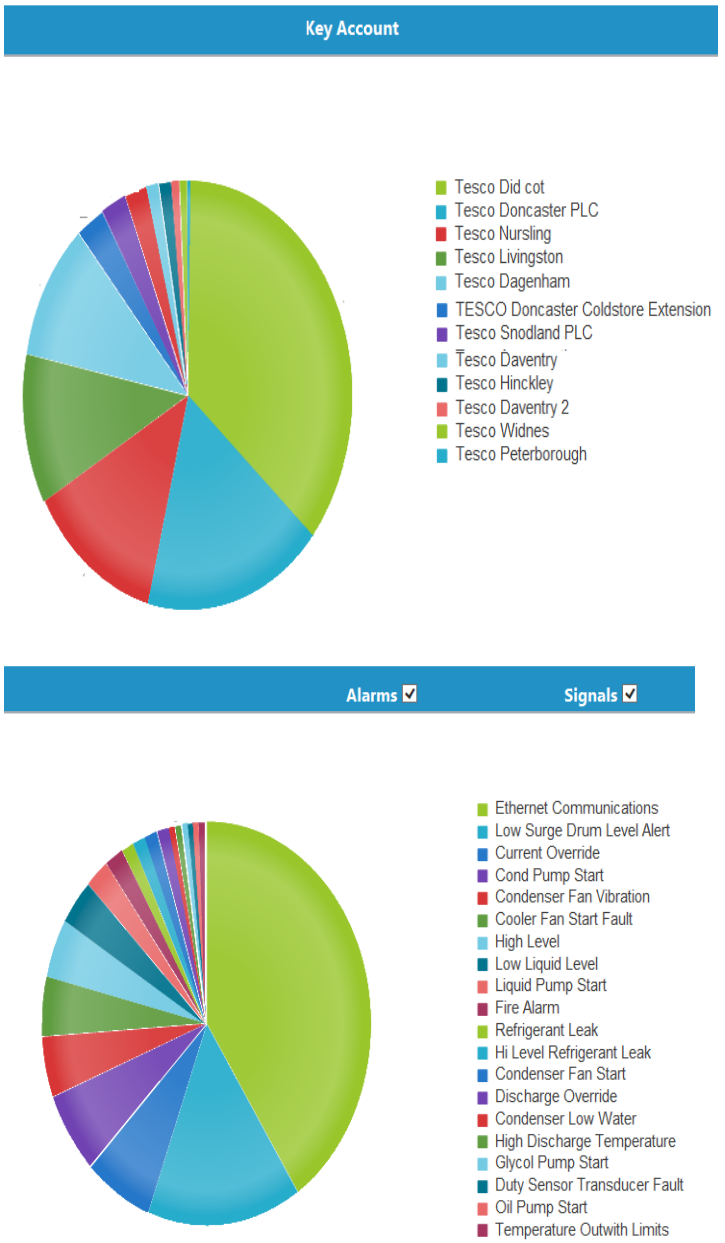
analytical graphs and pie charts in order to demonstrate the effectiveness of the work carried out and to allow targeted maintenance to eliminate potential issues. reference for management and plant operators to have fruitful discussions about how technical issues effectively affect the bottom line of the business.

Improved compressor efficiency provides the greatest opportunity for energy reduction. Screw and reciprocating compressors are typically used for industrial applications.

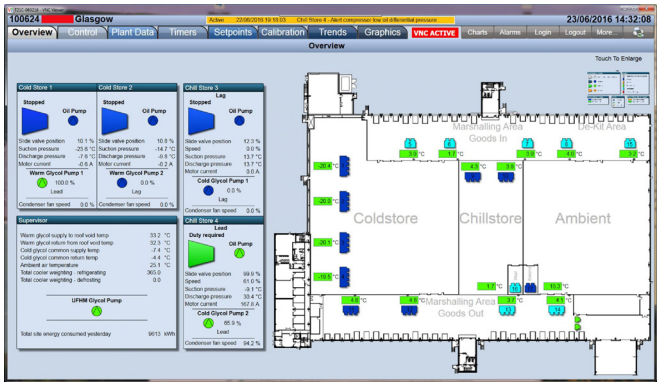


Screenshot from the latest version of Star HMI: The power chart demonstrates the ability to compare the daily energy consumed between the current month this year against the daily use for the same month of the previous year. The averages are also available with the average daily ambient temperature being plotted against the monthly daily power.

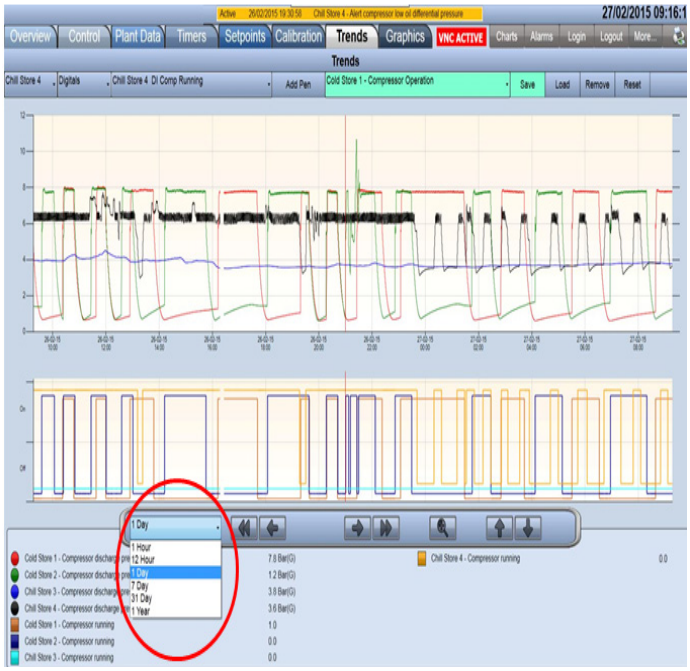
Star Monitoring System: the 'Trends' tab shows how selected input and output data changes over time. The time bases are fully adjustable with 5 second data logging for up to 31 days and 15 minutes for 2 years.



Plant alarm and alert statistics are displayed in an easily understood pie chart form on Star Remote Monitoring. The left hand pie chart displays the total alarms and alerts for different customer sites.The right hand pie chart displays the detailed breakdown of the alarms or alerts or both, relevant to any customer. Further analysis is then displayed on the timing of each alarm/alert.



Screenshot from the latest version of Star HMI: The power chart demonstrates the ability to compare the daily energy consumed between the current month



Star Monitoring System showing an overview of the complete plant with information about all units. Status of the main units are displayed as colour coded blocks.

Helping businesses harness savings

Industrial refrigeration is a major energy consumer and in some industry sectors it can make up a huge chunk of the overall business energy costs. As an example, the Carbon Trust recently revealed that refrigeration accounts for 90% of energy costs in the Cold Storage sector, which further highlights the potential for savings. Business can harness the savings potential with comprehensive maintenance and remote monitoring services. This includes looking at ways to minimise running costs, as well as maintaining equipment to ensure longevity and performance. Not only do these solutions save cash, but they are also helping put businesses on-track for meeting the increasing decarbonisation ambitions and energy efficiency targets for UK business and industry set by the Government in March 2020 with the ratification of an extension to the Climate Change Agreement scheme.

If a plant is not maintained and effectively monitored then problems will naturally occur, resulting in the plant running inefficiently, unreliably, and potentially unsafely. Over time these problems will increase the running costs.

Benefits of StarCare monitoring and Condition Based Maintenance plans

Since 1983 Star Refrigeration has been refining and improving its monitoring tools.

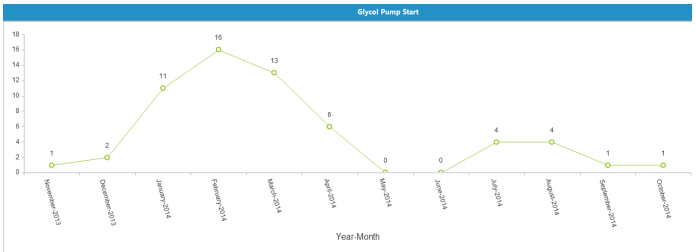
Using cutting edge technology, Star Refrigeration has developed a state of the art remote monitoring system for users of industrial cooling plants across a wide range of industries. With 24/7 live coverage across a national network of nine branch offices, 10 experienced management teams and over 100 mobile field engineers, it's comprehensive, reliable and results driven.

A unique collection of remote analysis tools utilised by a skilled team of engineers is used to diagnose customer's plant performance.

From this analysis we have found that we are able to;

1. Establish the root cause of plant faults quicker
2. Reduce the number of costly on site visits by our engineers
3. Focus maintenance on key areas
4. Maintain design efficiency
5. Forecast and prevent potential faults
6. Track results of operational change
7. The fault/alarm monitoring system developed by Star Refrigeration has been adapted and optimised to report on refrigeration systems specifically. It now tracks and records plant faults and alerts throughout the working life of an industrial refrigeration plant.

Every fault or alert that occurs on site is communicated 365/24/7 through this system to our local on call engineering teams to enable the necessary action to take place. Each link within the communication pathway is constantly monitored and tested to ensure 100% functionality of the system.



The system enables various reports to be produced over a selected time period as shown above and provides:

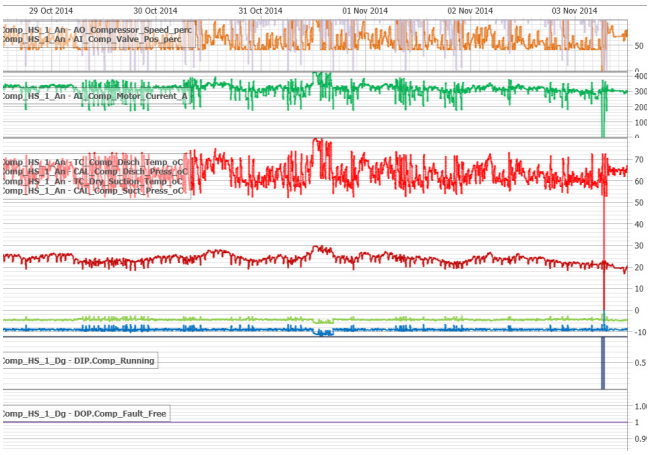
1. The number and type of Faults/Alerts that occurred for each monitored site
2. The precise time of each Fault/Alert
3. The trend of any particular Fault/Alert over the previous 12 months
4. MES Data Graphing

Industrial Refrigeration plants are generally controlled following the analysis of real time data collected by a PLC. As can be seen in the Fault Reports above, events

occur that are not always planned. It is then the maintaining engineer's role to establish what went wrong, fix it asap and resolve the issue to prevent reoccurrence.

The operating data showing what was happening leading up to the fault and at the time of the fault is often lost and replicating the fault is not always possible.

In order to overcome this issue Star Refrigeration have developed a system that is capable of capturing all the PLC data collected on site and storing it on a remote data base. This data base is then interrogated by the monitoring hub team using adapted graphing software and pre configured reports as shown in the following example.



The software enables the user to view appropriate analogue, digital, thermocouple and set point readings all together and has proved invaluable in resolving on site problems and forecasting potential issues.

The graphing software allows the user to zoom in multiple times so as to be able to determine the precise timing of any sequence of events.

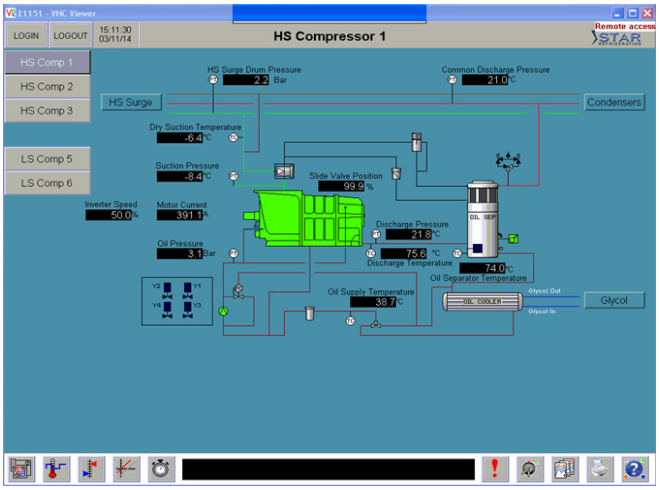
The data collected from site and stored remotely can be taken as often as every second, however it has been found that storing the data every 15 seconds is usually sufficient.

Remote Dial In to Site

Star Refrigeration offers the facility of a secure managed broadband service to enable remote dial up access to its maintained sites. This system gives the monitoring hub team and Star's engineers the ability to log directly into site and establish the current running status from any remote location with broadband access.

Once connected to site, plant can often be reset and alterations made to restore plant functionality without the need for a costly engineer site visit.

For a more in depth demonstration of the capability and functionality of the monitoring hub please get in touch with our Head of Key Accounts William Little.



About Star Refrigeration – StarCare

Star Refrigeration is the largest independent industrial refrigeration engineering company in the UK, established in Glasgow in 1970. With over 250 employees nationwide, we provide fast response and 24-hour technical support from a network of nine branches to customers throughout the whole of the UK.

Star prides itself on being unique within the industry by putting customers first. This is why all Star branches, including the Bellshill branch, are not just outposts of the head office. They are almost autonomous, and supported locally by a multi-disciplined team of sales, technical and administrative personnel. Business support systems and processes are standardised throughout the company and deploy the latest technology.

This professional local support is complemented by our complete range of services – from design through to commissioning and maintenance of cooling solutions which are proven to reduce energy consumption, increase efficiency and drive down lifecycle operating costs.

Our national customer base requires rapid support when a refrigeration/production related problem arises. At all times, we endeavour to provide onsite support within 2 hours of notification by employing skilled engineers from within the immediate geographical area. Star have branches in Glasgow, Aberdeen, Newcastle, Manchester, Derby, Leeds, Bristol, Oxford and London.

Star Refrigeration promotes youth employment through its apprenticeship scheme and has been recognised as one of the top "100 Best Companies to work for" by The Sunday Times.

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