



CHILLER  
OPTIMISATION

# INTRODUCTION

Optimising a chiller & associated air conditioning system first requires an understanding of how a building is used and how the occupants wish to use it. From there we can analyse the performance based on the chillers actual operating thermodynamics, devise and implement a strategy to deliver what is required through chiller monitoring, measurement, data collection, data analysis, diagnosis & actions.

Birdsall will evaluate the overall chilled water system performance and then support the owner with information so that they can make sure that their system works correctly.

Our chiller optimisation services incorporate ClimaCheck specialist software & hardware to undertake these tasks.

Investment in ClimaCheck technology enables Birdsall to offer our customers the benefits of chiller & system optimisation, creating better environments, delivering low energy costs, operating buildings more sustainably and delivering greater customer value.





# INSTALLING CLIMACHECK

The ClimaCheck fixed performance analyser is capable of monitoring Multi circuit chillers. It incorporates a modem enabling direct access to on-line ClimaCheck which permits remote monitoring. This enables a full history to be recorded to allow energy optimisation plus access to other uses.

The ClimaCheck performance analyser is installed & connected to the chiller via numerous sensor probes.

Once installed & connected, the cooling system is put into operation. The analyser simultaneously downloads all the performance data onto system specific software and that is monitored on a laptop by a Birdsall engineer.

The performance analysis technology provides instant data of the entire system from which accurate conclusions can be made.

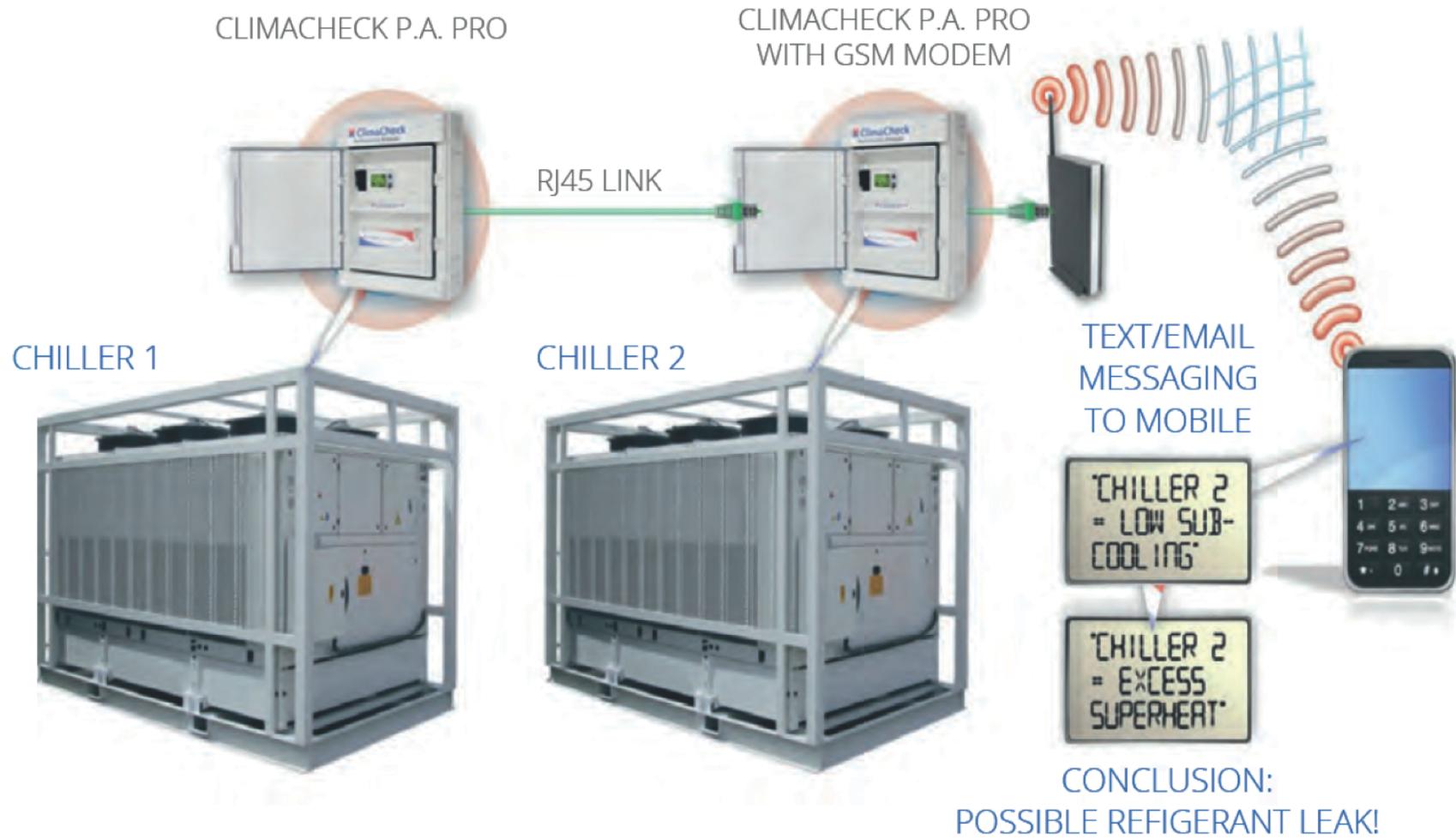
A reasonable analogy would be that this is similar in the medical profession to an MRI scan. Both of which provide detailed internal data from which an accurate diagnosis may be made.





# ALARM MESSAGES

VIA SMS OR EMAIL



# CHILLER PERFORMANCE DATA

The chiller performance data continually downloaded includes:

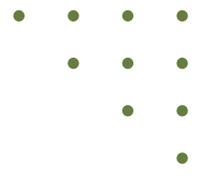
- Refrigerant charge level
- Expansion valve & controls, operation & superheat are at appropriate levels
- Condenser fan control optimisation to closely control condensing temperature to keep compressor at max efficiency
- Condenser fans performance, speed & number of fans running relative to duty. i.e. matched to load
- Condenser coils performance, measuring the actual heat of rejection. Identifying any fouling & to what degree effecting efficiency.



- Evaporator performance measuring the actual cooling duty
- Compressor performance liquid return, low efficiencies, any relative excessive discharge temperatures / pressures
- Condenser fan control optimisation to closely control condensing temperature to keep compressor at max efficiency
- Chilled water flow rates, and / or evaporator air flow rates, notoriously difficult to ascertain but vital for high efficiency. Can now be accurately measured & set.
- Head pressure & low ambient controls set accurately
- System Efficiency Index (SEI)

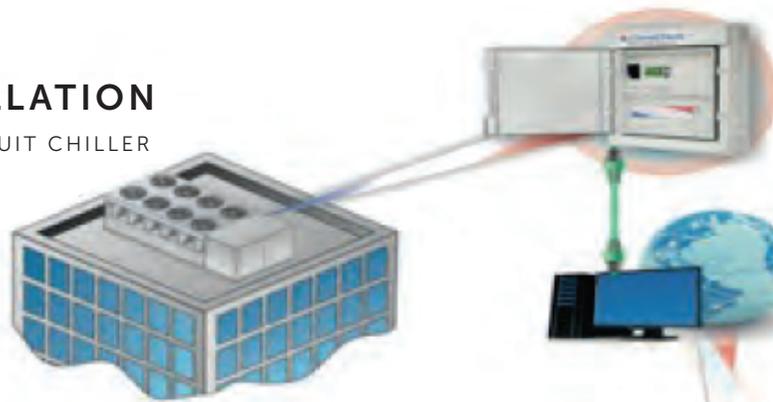


# DOWNLOAD DATA



## INSTALLATION

TWIN CIRCUIT CHILLER

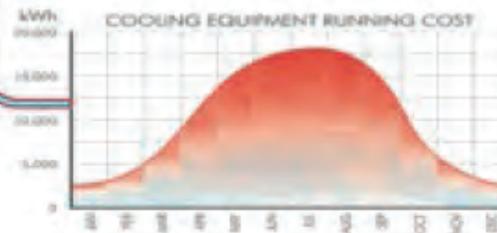
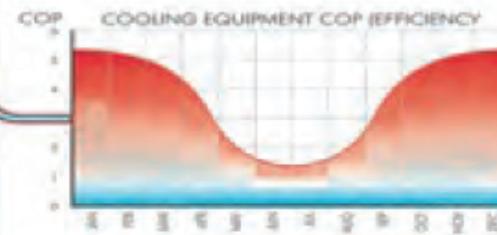
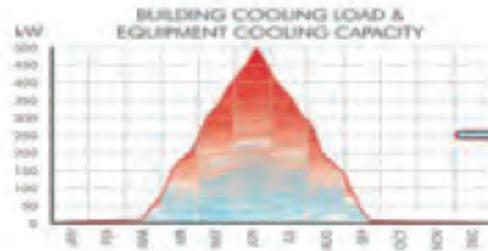
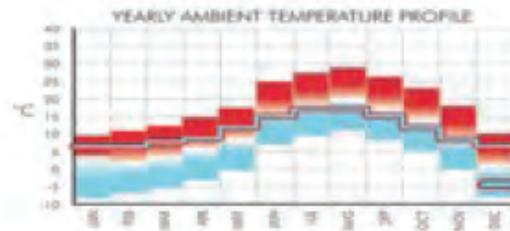


CLIMACHECK  
P.A. PRO

INTERNET  
SERVER

COMPUTER

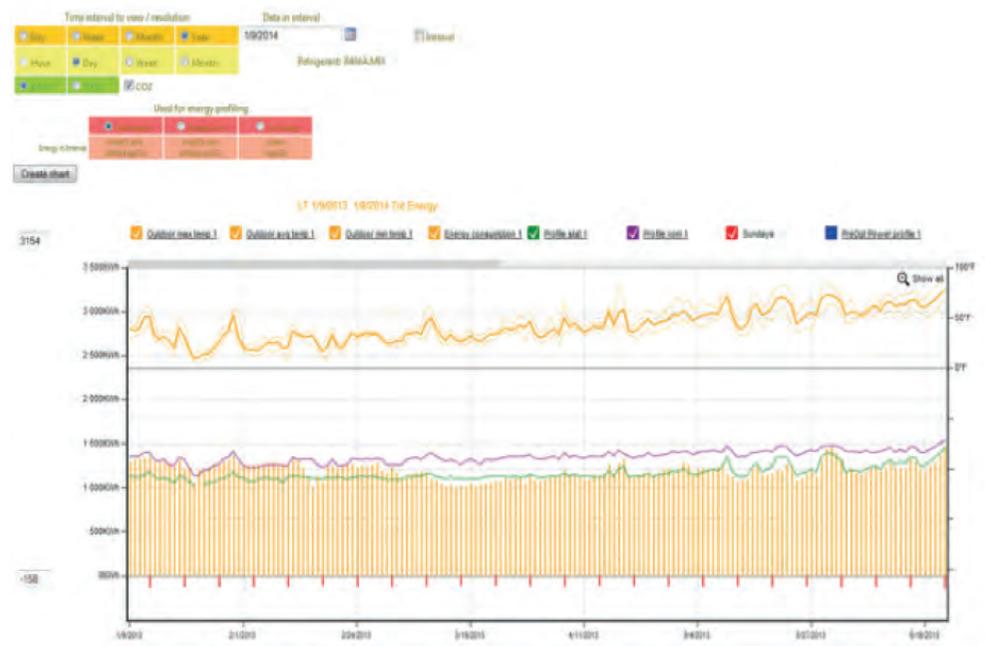
LOCATED ANYWHERE IN  
THE WORLD





# DATA & PERFORMANCE ANALYSIS

From this downloaded data, the Birdsell engineer can analyse the real & accurate overall chiller and system performance. With the aid of the ClimaCheck software they will identify any inefficiencies and incorrect settings.



# CHILLER OPTIMISATION

The next step is to rectify incorrect settings, faults & inefficiencies identified in the data performance analysis to achieve a fully optimised chiller system.

We can then verify & advise on external services, faults, potential faults and any deviating operating parameters, which all affect the performance and running costs. From experience, the most common problems found that will allow the system to run inefficiently are those which have been or are most difficult to establish, measure or see without performance analysis. These include:

-  Chilled water & evaporator air flow rates. They are not easy to accurately measure via typical external devices. By being out by only a small amount can cause havoc to the operation of the whole system.
-  Incorrect chilled water flow rates can lead to a chiller running for many hours longer necessary, greatly effecting the operating costs.
-  Incorrect condenser water / air flow rates can lead to a chiller running for many hours longer than necessary, greatly effecting the operating costs & significantly at higher discharge pressures which in turn increase compressor power consumption to unnecessary levels.
-  Efficient sequencing of multi compressor equipment
-  Expansion valve selection, operating range, matched to the system load, is also a vital & often not undertaken accurately due to lack of visible data.
-  Accurate sequencing of multi condenser fans, can now lead to improved efficient operation keeping the compressor (bigger energy user) operating at the precise levels required.
-  Levels of both sub-cooling & superheat can be easily seen, adjusted to more appropriate levels & results.
-  Having the precise & correct refrigerant charge in the system also seriously effects its performance. With the analysis system this can be obtained accurately.

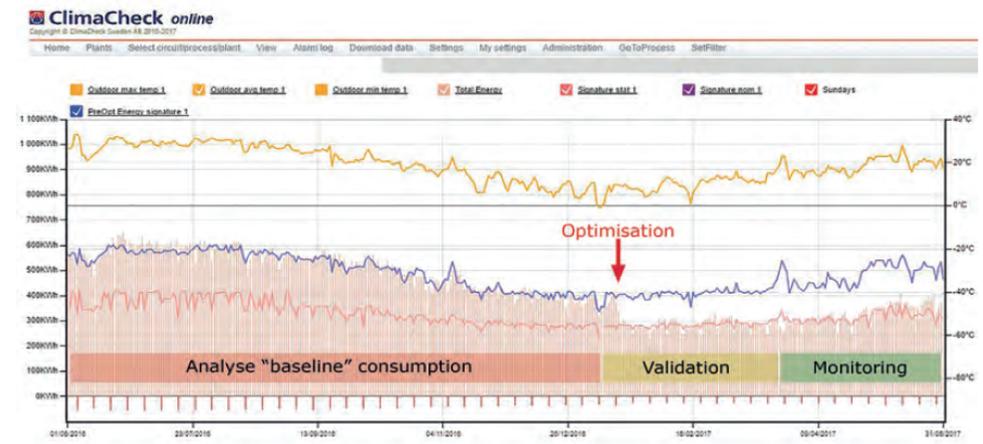
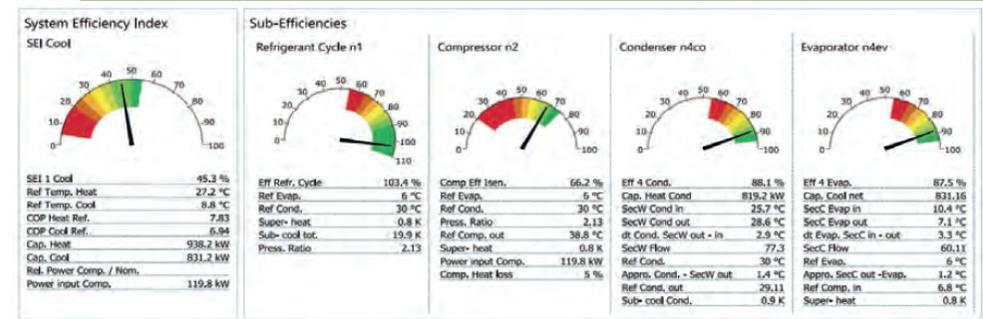
Once complete the cooling system is effectively recommissioned, operating to a fully optimised performance. This unbiased total thermodynamic analysis validates the chillers most efficient performance. From the experience of others an increase in efficiency of between 5 - 10% can be expected, and in some cases 40% has been achieved.



# ONGOING OPTIMISATION

Under our maintenance services contract Birdsall will continue to monitor & optimise the chillers 24/7, ensuring a highly efficient operation. This will further minimise savings PREDICTIVE data & reports are generated with so much accurate data, faults, failure can be predicted & either avoided or properly and economically planned for.

Maintenance costs can now be significantly reduced as much of our work is undertaken off-site remotely by a chiller engineer.





# THE BENEFITS

The benefits of our chiller optimisation services are significant & include:

-  Operating chiller performance
-  Optimised energy efficiency on both chillers & the chilled water system
-  Optimised asset lifecycle with predictive maintenance
-  Significant financial savings in operating costs
-  Significant financial savings in operating costs
-  Significant financial savings in lifecycle
-  Significant financial savings in maintenance costs





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