

Mi-ACE

MIMOS Autonomous Chiller Control & Energy Efficiency

Mi-ACE is an intelligent system for chiller optimisation, energy audits and supports overall engineering services. The engineering solution utilises IoT, AI and cloud computing technology.

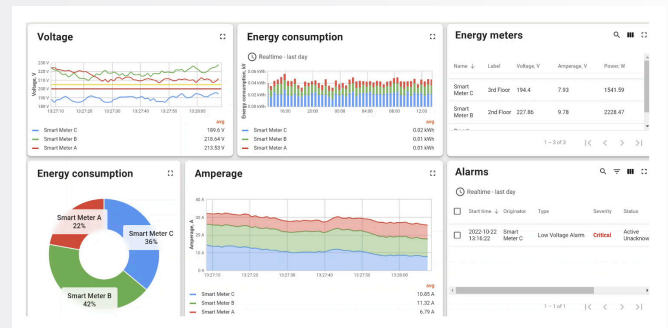
Technology Overview

MIMOS Autonomous Chiller Control & Energy Efficiency (Mi-ACE) is an intelligent system that enables chillers to maximise efficiency, saving 12 to 20% of a chiller plant's total energy consumption. Mi-ACE's algorithm analyses data from all sensors and devices installed at strategic locations in a building to determine the optimum performance needed for chiller efficiency while ensuring occupants stay comfortable. Mi-ACE has a direct interface to the chiller compared to other energy saving devices and services. It uses the manufacturer's interface card, thereafter automatically monitoring, scheduling and optimising chiller operational efficiency.

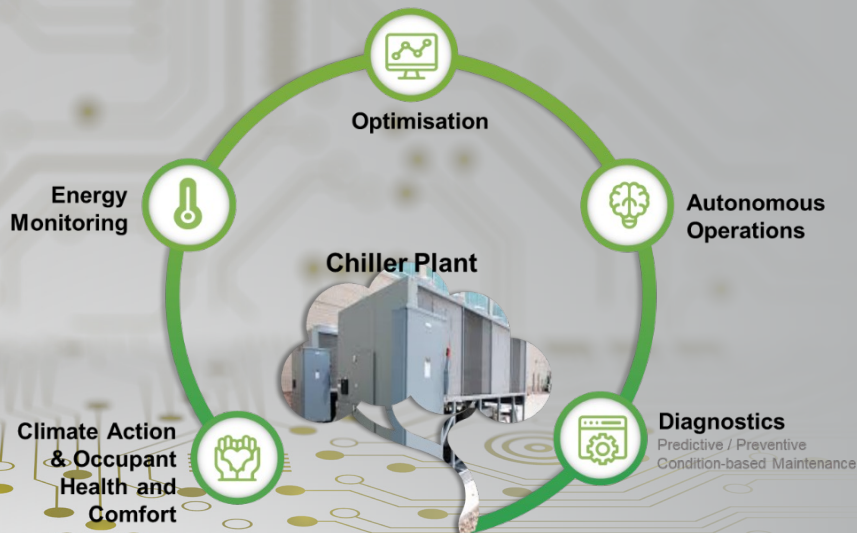
Technology Benefits

- Increase Electricity Bill Savings**
 Mi-ACE enables an estimated reduction in electricity bill charges of between 12 to 20% from the current chiller system.
- Enhance Asset Life Expectancy**
 The system prolongs chiller life expectancy by enabling soft start and stop. The median life cycle of a water-cooled chiller is 20 to 30 years, while air-cooled chillers have a life expectancy of 15 to 20 years.
- Digital Maintenance System**
 Computerised Maintenance Management System (CMMS) provides real-time information on the current condition of chillers and associated equipment such as pumps, cooling tower, air handling unit (AHU) and valves.
- Optimum Building Climate Control**
 An optimum temperature is maintained in a building at all times. This ensures that occupants do not feel too cold or warm throughout the day.

- Minimise Manpower Deployment**
 Mi-ACE is fully automated and thus reduces day-to-day routine maintenance. It requires little or no human supervision.
- Continuous Monitoring for Predictive Maintenance**
 Chiller performance is monitored and analysed at all times which aids predictive maintenance.
- Minimise Carbon Footprint**
 Mi-ACE enables chillers to run at optimal efficiency at all times minimising the greenhouse effect and leads to a reduction in noise and emission.
- BAS/BMS Companion**
 Mi-ACE complements existing Building Automation Systems (BAS) or Building Management Systems (BMS) to further improve energy saving initiatives.



Mi-ACE real-time energy monitoring configurable dashboard



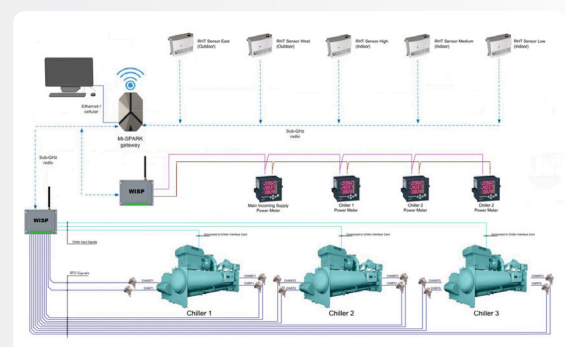
Key Features

- **Genetic Algorithm (GA)**
The Mi-ACE system is designed to acquire real-time psychrometric data. Its algorithm modelling software uses Genetic Algorithm (GA) to derive, for each building or facility, its own unique dynamic thermal control algorithm.
- **Fuzzy Logic Control Algorithm**
Mi-ACE with Fuzzy Logic Control algorithm, is able to optimise and manage building/facility's chillers load. This matches the dynamic changes of the external and internal heat gains throughout operation.
- **Real-time Heat Transfer Monitoring**
Mi-ACE monitors heat transfer from external and internal sources and through chiller heat gain and heat rejection. A desired indoor temperature with $\pm 2\%$ accuracy of the indoor set point temperature can be achieved.
- **State-of-the-Art IoT Technology**
Mi-ACE deploys state-of-the-art IoT technology using field devices for data gathering solutions.
- **Cloud-based Platform**
All results, including energy dashboard, are delivered to the client over a cloud platform and through mobile channels.
- **Big Data Analytics**
Multidimensional readings are taken every 10 seconds, making Mi-ACE data rich. This enables the generation of multiple analytics, including future potential for monetisation.

- **Facility Management Capabilities**
Mi-ACE connects to sensors and devices across a building enabling capabilities such as engineering diagnostics, condition-based monitoring, predictive maintenance and other applications.
- **Hardware-Light**
Mi-ACE deploys an intelligent optimisation approach. Furthermore, it is a hardware light, intelligent efficiency solution.
- **Non-Intrusive System**
As an independent system, Mi-ACE does not interfere with other initiatives, such as solar, but complements them.

Application

- **Suitable: Centralised Air Conditioning Facilities**
Malls, office buildings, hospitals, airports, industrial facilities and many others.
- **Compatible: Air-cooled and Water-cooled Chillers**
Reciprocating, centrifugal, screw and scroll compressors.



Single line diagram of Mi-ACE with MIMOS Wireless Industrial Sensor Platform (WISP) operating with other Building Management Systems (BMS)

