

# 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**

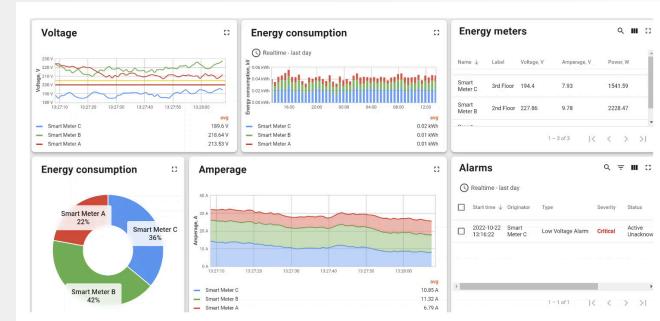
Chiller performance is monitored and analysed at all times which aids predictive maintenance.

- 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*



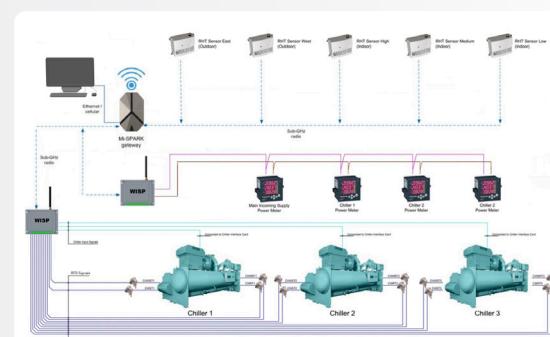
## Key Features

- 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 +/-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)

