



# Artesis

# mcm

motor condition monitor



**SIMPLE, EFFECTIVE  
CONDITION MONITORING**

**“...IT SIMPLY WORKS”**

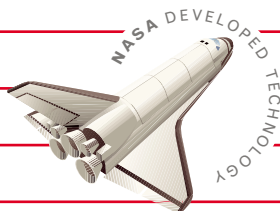
SIMPLE TO INSTALL AND USE

CONTINUOUS MONITORING AND FAULT DETECTION

RELIABLE AUTOMATED FAULT DIAGNOSIS

CONNECTS WITH OTHER SYSTEMS

COST EFFECTIVE FOR WIDEST RANGE OF EQUIPMENT



# Introducing Artesis MCM

**ARTESIS MCM IS A NEW APPROACH TO CONDITION MONITORING, PROVIDING ALL THE BENEFITS WITHOUT THE HIGH COMPLICATION AND COST OF TRADITIONAL SYSTEMS.**

**ARTESIS MCM MONITORS THE CONDITION OF EQUIPMENT DRIVEN BY AN ELECTRIC MOTOR, EFFECTIVELY USING THE MOTOR ITSELF AS A SOPHISTICATED TRANSDUCER. IT REQUIRES ONLY CONNECTION INTO THE MOTOR'S ELECTRICAL SUPPLY, AVOIDING THE NEED FOR SPECIALISED SENSORS. BECAUSE ARTESIS MCM IS PERMANENTLY INSTALLED, IT PROVIDES CONTINUOUS FAULT MONITORING AND DOESN'T DEPEND ON EXPENSIVE MANUAL DATA COLLECTION.**

**ARTESIS MCM USES ADVANCED, NASA-DEVELOPED TECHNOLOGY TO PROVIDE A SELF-LEARNING CAPABILITY IN A COMPACT, AFFORDABLE, PANEL-MOUNTED INSTRUMENT. IT AUTOMATICALLY TEACHES ITSELF ABOUT THE NORMAL OPERATION ENVIRONMENT OF YOUR EQUIPMENT SO THAT IT CAN ACCURATELY IDENTIFY AND DIAGNOSE FAULTS LONG BEFORE THEY BECOME A THREAT. THIS GREATLY REDUCES THE SPECIALIST DIAGNOSTIC SKILLS REQUIRED OF THE USER, MAKING THE BENEFITS OF CONDITION MONITORING AVAILABLE TO MANY GROUPS WHO HAVE CONSIDERED IT TOO DIFFICULT IN THE PAST.**



## SIMPLE TO INSTALL

Installing Artesis MCM is a simple matter of connecting it to the three supply phases of the motor using current (and sometimes voltage) transformers and mounting the monitor in any convenient panel. Artesis MCM is typically located in or near the motor control centre, making especially valuable in situations where the plant is not easily accessible, either because it is remote or because the local environment is hazardous or inhospitable. This approach gives you all the advantages of using online systems without the high cost of running cables to sensors mounted on the machine itself.

When you first switch it on, MCM begins an automatic self-training process during which it learns the normal operating condition of your equipment. At the end of this short training period it's ready to start monitoring, without forcing you to go through lengthy manual setups.

## CONTINUOUS MONITORING OF YOUR MACHINERY

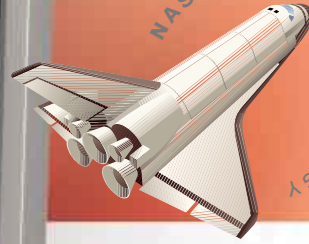
Artesis MCM monitors your machinery continuously, constantly taking measurements and comparing them with what it learned during the self-training process to make sure everything is working normally.

Always under your control, Artesis MCM only demands your attention when it detects a problem. This makes it very attractive in comparison with workaround systems which require considerable effort and cost just to find out whether you have a problem or not. And unlike conventional online systems, its unique self-training system allows it to recognise normal operation in a wide range of conditions, such as different speeds or loads – allowing tight control without false alarms. If Artesis MCM identifies a new operating state not experienced during the self-training phase, it gives you the option of including this state in all future monitoring.

## RELIABLE, AUTOMATED FAULT INDICATION

Artesis MCM is very sensitive to machinery faults, even when they are just starting to develop. It automatically assesses the severity of any variations from normal operation and presents the results of its sophisticated analysis to the user in a simple, compelling traffic light display. As a fault starts to progress, the traffic light changes from green to orange, indicating that maintenance action will be required in the future. A red traffic light indicates that the high severity of the problem requires immediate attention.

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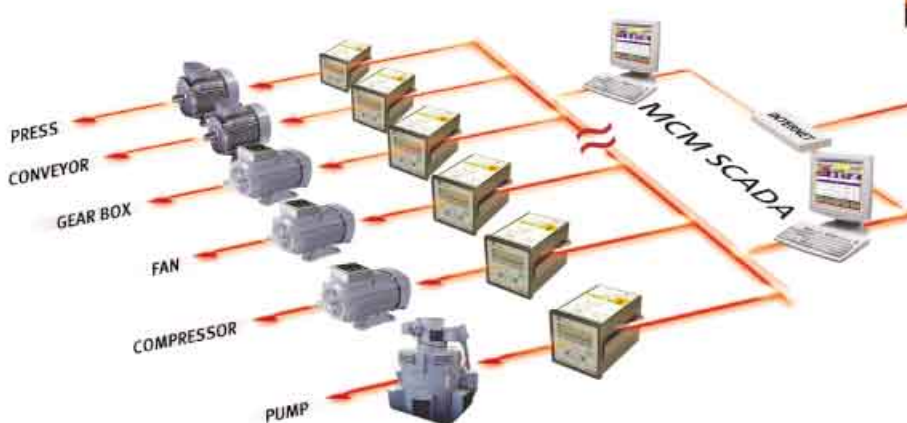
## ADVANCED FAULT DIAGNOSIS

Conventional condition monitoring systems are great at collecting data, but require a lot of expertise to turn it into actionable information – just the part you really need. Artemis MCM is able to use its knowledge of your machinery built up during the self-training process not just to detect when a fault is developing but also to recognise the type of fault. This allows your maintenance team to focus their efforts in exactly right area, without relying on the presence of a diagnostics expert.

The diagnostic system is able to identify most of the common mechanical faults associated with typical electric motor-driven equipment, from unbalance and misalignment to bearing problems. Additionally, since Artemis MCM works by measuring the current and voltage taken by the electric motor it can also diagnose problems with the electric motor, as well as giving an insight into the process conditions and the potential to optimise them on the basis of power, phase angle and total harmonic distortion.

## INTEGRATES WITH PLANT-WIDE SYSTEMS

Artesis MCM is specifically designed to be self-sufficient, only requiring your intervention when it detects a problem. It can also act as an intelligent component of a complete, plant-wide monitoring and diagnosis system. You can connect Artemis MCM into your own systems using its standard interfaces, allowing results to be presented to your staff through existing display systems. Artemis can supply MCMScada software to collect and manage information from all your Artemis MCM units, provide enhanced diagnostic capability, and to allow remote operation of the complete system. This can also allow Artemis to help out with your condition monitoring program by providing remote advanced interpretation services.





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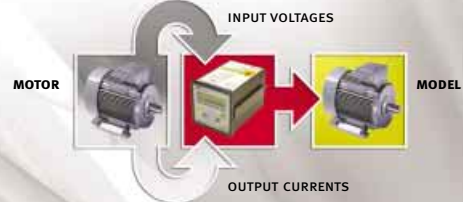
## HOW IT WORKS

Artesis MCM uses a mathematical modelling technique to detect and diagnose faults in electric motors and connected equipment. The mathematical model, which consists of a set of differential equations representing the electromechanical properties of the system, is built up during the self-training phase of operation. During this phase, the three input voltages and three output currents are continuously measured and processed using system identification algorithms which determine the model parameters under a full range of operating states. Once complete, Artesis MCM has a complete model representing normal behaviour of the machinery in a full range of operating states.

When a fault starts to develop in either the motor or the driven equipment, this has an effect on the output current waveform, making the real system behave differently from the model system. For example, small radial and torsional displacements resulting from an imbalance in a driven fan are transmitted through the coupling to the motor, changing its electrical characteristics in a measurable and repeatable way. This allows Artesis MCM to use the motor as a sensor that can detect faults in both the motor and the driven equipment.

When monitoring, Artesis MCM continuously compares model parameters with those held in the reference model created during the self-training phase. By matching changes in each of these parameters against the equivalent physical characteristic of the motor or driven system and assessing the severity of the change, Artesis MCM determines whether the present condition of the equipment is normal, and if not what action should be taken. This approach not only allows much more sensitive and reliable alerting than is possible with conventional level-alarms, but also recognises the type of defect causing the problem.

### 1. Training phase



### 2. Operating phase

