Smart Motor Control

- Increase productivity across the automation lifecycle
- Increase intelligence for better decision making
- Help enable safe operations
- Secure your environment
Efficient motors drive industrial performance

Across multiple applications, the electric motor keeps industry running, from motion systems, ventilators and conveyors to pumps and compressors. Central as they are to manufacturing and industrial performance, the impact of motor failure can be significant, costing thousands or even hundreds of thousands per hour of lost production. The most expensive motor isn’t necessarily the most critical: a failure on a small, single mixer motor can be enough to cause a major disruption to plant productivity.

How much do unforeseen motor failures cost you?

Motor costs
- Motors are the largest consumers of energy in industry
- Responsible for over 50% of the total energy used by industry
- Running a motor can cost 10 times its initial purchase price each year
- Reducing the speed of a motor by 20% can save up to 50% energy

Why motors fail
- The most common causes of motor failure are:
  - Thermal overloads
  - Single phasing
  - Bearing failure
  - Rotor failure
  - Stator failure
  - Contaminants

Cost of downtime
- Loss of production
- Manufacturing scrappage
- Establishing cause of failure (mechanical/electrical)
- Motor and system repair costs
- Safety issues
- Impact on other equipment

Maintenance options
- Advanced diagnostic information
- Preventative not reactive maintenance
- Planned downtime possible
- Be in control of your plant
- Reduced maintenance costs

Increased productivity
- Reducing unplanned downtime improves productivity
- Be in control of your production process
- Reduce energy costs
- Make fact-based decisions with advanced diagnostic information

75% of motor failures could be prevented by appropriate protection measures

Source: IEEE Petro-Chemical Paper PCIC-94-01
Motors are used in many industrial applications and these are critical to the productivity of the enterprise. With Smart Motor Control solutions, it is possible to monitor the health and performance of each motor to help identify, in advance, potential issues that could lead to unwanted downtime or reduced productivity levels.

Is a vital motor about to fail?

- **SCHEDULE MAINTENANCE ON CRUSHER MOTOR (DAYS)**
  - 0025

- **OPERATION HOURS MIXER 3**
  - 0500

- **TIME TO TRIP ON PUMP 1 (SECONDS)**
  - 1250

- **Warning Vibration alert On Pump 7. Maintenance required**

Are you aware of energy consumption from motor applications?

- **UNDERLOAD CONDITION**
  - Replace belt on Motor 1

- **Jam condition on conveyor infeed**

- **Shift change – change drive parameters**

- **FLC – Mixer Number 2**
  - 0475 Amps
Smart Motor Control provides a continuous flow of valuable process and diagnostic data to your design environment, visualization system, information software and GuardLogix® Programmable Automation Controller – facilitating The Connected Enterprise and helping to increase productivity and minimize downtime while reducing total cost of ownership.
Smart Motor Control enables Smart Machines for use in The Connected Enterprise

The integration of Allen-Bradley® Smart Motor Control solutions help reduce your programming time, ease start up and commissioning, and streamline diagnostics. By providing consolidated programming, device and system configuration, operation and maintenance within Studio 5000 engineering environment, complexity and potential errors can be minimized.

Smart Motor Control provides key diagnostic information that optimize performance with real time access to operation and performance trends.

Today’s Smart Approach

- Seamless communication and system visibility for increased performance and flexibility
- Control & maintain motor performance through smart equipment and networks
- Reduce unplanned downtime with alarms and advanced diagnostic information
- Monitor energy consumption
- Simplify troubleshooting and reduce start up times

Add-on profiles for simplified machine development, operation and maintenance

- % Thermal Capacity Utilization
- Trip / Warning Histories
- Current
- Voltage
- Time to Trip
- Time to Reset
- Energy & Power
- Number of Starts
- Operational Hours
Scenario 1

Motor underload

- Helps detect and inform of mechanical failures
- Reduces costs associated with production loss
- Can help minimize repair costs due to controlled shutdown
- Time to repair and restart process reduced
- Allows maximum efficiency to be benchmarked and monitored

Visit www.rockwellautomation.com/global/go/smartdevices to see more
Scenario 2

Process optimization

- Can help increase production throughput
- Reduces unnecessary wait times
- Helps increase product quality
- Optimizes efficient use of energy

1. Estimating optimum batch consistency is no longer guess work.
2. Operator starts batch process.
3. Batch viscosity draws more current the closer it gets to optimum state.
4. Optimum mix viscosity achieved when current draw reaches 4.4 Amps.
5. Operator notified automatically of batch completion.
6. Optimized mix released to next stage of production.

Visit [www.rockwellautomation.com/global/go/smartdevices](http://www.rockwellautomation.com/global/go/smartdevices) to see more
Scenario 3

Motor overload

- Early warning and diagnostic functions provided
- Minimizes production downtime
- Helps protect your critical assets from costly failure
- Fact-based decision making using real time diagnostic information
- Opportunity for predictive, rather than reactive maintenance

1. Cleaning before batch one starts.
2. Cleaning before batch 74 starts.
3. Repetitive cleaning may impact moving parts.
4. Operator automatically notified of overcurrent on motor and its location.
5. Preventative maintenance can be conducted minimizing downtime.
6. Planned maintenance is minimized as machine will alert when maintenance is needed.

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Scenario 4

Ground fault current detection

- Predictive monitoring of motor health
- Proactive maintenance can be achieved
- Reduced downtime of critical equipment

1. Motor winding insulation breaking down over time.
3. Ground fault notification sent to operator from E300 Smart Motor Control Device.
4. Motor location and fault type communicated.
5. Motor can be quickly replaced.
6. Production running with minimum downtime.

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Scenario 5

Network issue

- Local management of process in event of network communication issue
- DeviceLogix™ allows for decentralized intelligence and reduces unnecessary network traffic
- Critical asset health can be maintained
- Batch production can be completed reducing clearing and cleaning issues

1. SMC-50 Soft Starter controlling mixer motor.
2. Communication lost to SMC-50 Soft Starter.
3. Automatic communication to operator about issue.
4. DeviceLogix in SMC-50 Soft Starter takes over and runs to end of batch.
5. Batch completed and DeviceLogix™ stops process.

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A comprehensive family of Smart Motor Control solutions

For fixed and variable speed control to precise torque and position control, Rockwell Automation supports you with application knowledge, industry experience and a complete portfolio of Smart Motor Control solutions, helping you achieve the control you need.

**Fixed Speed Control**
**Motor Starters and Protection**
For fixed speed control of your application, the comprehensive portfolio of direct online starters, electronic overloads and soft starters with embedded protection capabilities allows you to achieve the control, protection and integration you need. With electronic overload protection and communication capabilities networked into your Integrated Architecture®, you can achieve system visibility, protection and diagnostics that conventional solutions simply cannot offer.

**Variable Speed Control**
**PowerFlex® AC Drives**
A comprehensive portfolio from 0.2 kW low voltage to 25 MW medium voltage drives, including options of configured versions to your specific needs are available. With built-in specific features to benefit many applications and seamless integration into the Rockwell Automation Integrated Architecture®, the PowerFlex® family of AC drives offer you powerful performance and flexible control whatever your needs.

**Motion Control**
**Kinetix® Integrated Motion**
Kinetix integrated motion provides you with the hardware, software and application knowledge to achieve full integration of logic and motion control within the Rockwell Automation Integrated Architecture.
With a comprehensive portfolio of motion drives matched to servo motors, integration of Kinetix can simplify your application without compromising the control you need.

**Condition Monitoring**
**Detect and Protect Solutions**
Condition monitoring products help you keep your plant floor running productively by detecting potential equipment failures. Smart Condition Monitoring solutions include real time protection modules, sensors, portable instruments and surveillance software.
Working together with Rockwell Automation

Make more of your Connected Enterprise by connecting with Rockwell Automation and our PartnerNetwork™ program member companies.

- Get answers to your questions on sales, products, services and technical support on www.rockwellautomation.com/global/support
- Access help to design, build and maintain your system solution through the Rockwell Automation PartnerNetwork program of leading distributors, system integrators and others. Find a Sales office or Partner location on www.rockwellautomation.com/global/sales-partner

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