SMART MOTOR CONTROL SOLUTIONS FOR THE WATER INDUSTRY

Rockwell Automation architectures for more **sustainable water management**



expanding human possibility°

Sustainable water management matters

Water quality. Flooding. Ground water issues. Water scarcity.

Today's municipal water utilities are challenged to maintain a consistent supply of affordable clean water - and to do so sustainably.

And that means focusing on ways to improve resource management - and energy efficiency. Smart Motor Control Solutions can help utilities achieve their goals in critical applications including:

- Pumping
- Dewatering
- Aeration



Rockwell Automation Smart Water solutions

accelerate the transformation to digital operations and help utilities improve resource management.

30-40% OF MUNICIPAL ENERGY

Used for water/wastewater plants.



Attributed to energy.



45 TONS ANNUALLY OF GREENHOUSE GASES

Generated by US drinking/ wastewater operations.

Source: U.S. Environmental Protection Agency

Sustainable water management PG₂

Unified solution

PG4

Pumping systems PG 10

Dewatering systems PG 12

Case study

Solution architecture for municipal water/wastewater systems

Our integrated solution featuring Allen-Bradley® PowerFlex® AC drives optimizes lifecycle performance

A unified solution

that integrates automation systems and motor control

Reduces engineering and costs	When used with Logix controllers, PowerFlex drives deliver a Premier Integration experience that simplifies design and integration.
Decreases energy usage	 Enables reduction of motor speed, resulting in significant energy savings. Reducing speed 20% can result in 50% less energy.
Improves power quality	Provides built-in harmonic mitigation and power factor correction.
Maximizes uptime	Delivers monitoring and predictive maintenance capabilities.

Sustainable water management PG2

Unified solution architecture PG 3

Pumping systems

PG4

PG 10

PG 12

Case study

Smart Motor Control for pumping systems

Solutions designed to meet key utility challenges:

- Increase pump output to meet increased capacity demands
- Improve energy efficiency
- Reduce engineering and installation costs
- Avoid unexpected downtime



Sustainable water management PG 2 Unified solution architecture PG 3 Pumping systems PG 4

Dewatering systems
PG 10

s Aeration systems PG 12 Case study PG 15

Critical role of pumping systems in water applications



"Pumping accounts for 90–99% of energy consumption by public water systems."

Source: U.S. Environmental Protection Agency

Sustainable water management PG 2 Unified solution architecture PG 3 Pum PG 4

Pumping systemsDewatering systemsPG 4PG 10

ems Aeration systems PG 12

Case study PG 15

Simplified motor control architecture for pumping systems



Sustainable water management PG 2 Unified solution architecture PG 3 Pumping systems PG 4

ems Dewatering systems PG 10 Aeration syster PG 12 Case study PG 15

Improving system visibility, communication and performance

Process Control for Water/Wastewater:

Increase flexibility and enable better decision making with the PlantPAx[®] distributed control system (DCS).

Based on open communication standards leveraging EtherNet/IP, this modern DCS connects process, discrete, power, information and safety control into one plant-wide infrastructure.

ControlLogix® Controller:

Configure drive operation and control in the Logix environment and enable a simpler, Premier Integration experience.

Speed development time and more easily connect to critical device information in one unified software environment.

PowerFlex 7000 Medium Voltage Solutions:

- Easy and fast power connections.
- Master-follower configuration.
- Premier Integration with Logix control platform to simplify parameter and tag programming and reduce development time.

Dynamix[™] Integrated Condition Monitoring System:

Dvnamically monitor sensor information (vibration, speed, etc.) to identify potential equipment issues before failure occurs.



Open EtherNet/IP Network Across All Levels:

Reduce engineering and maintenance costs by securely integrating devices like your MCC, I/O, field instruments and other third-party devices over an EtherNet/IP network.

FactoryTalk[®] InnovationSuite:

Remotely monitor assets, predict equipment failure and identify improvement opportunities.

Wastewater treatment plant PlantPAx DCS client PlantPA DCS server (() П Remote erminal unit 品品 Stratix 部: ControlLogix EtherNet/IP controlle hll 883 Stratix managed switch Operator work station IntelliCENTER low voltage MCC Ð P (8) PowerMonitor 5000 nower meter PowerFle 753 low voltage drives Circuit Circuit breaker F 庍 PowerFlex 755TL low voltage drive (III) n Pr Dynamix integrated .∎#® condition monitoring High service High service Return Waste Influent pump pump 2 pump 1 activated sludge (RAS) activated sludge (WAS) pump pump

PowerFlex Drives with TotalFORCE® Technology:

Reduce equipment wear and tear by implementing smooth acceleration and deceleration curves instead of the traditional trapezoidal motion profiles - no special programming required.

Continuously monitor operation and remaining life of components based on actual operating conditions.

IntelliCENTER® MCCs:

Streamline setup and enhance visibility between process and motor controls. Use network connectivity to quickly monitor, troubleshoot and diagnose issues.

PowerFlex Low Voltage Drives:

Enable seamless integration into Logix control architectures along with Automatic Device Configuration, thanks to Premier Integration.

Drives with Active Front End technology deliver built-in harmonic mitigation:

- Reduce the impact of harmonic distortion to support IEEE 519 compliance.
- Decrease panel and floor space requirements.
- Cut wiring and installation time/costs.

Sustainable water management PG2

Unified solution architecture

PowerMonitor™ 5000 Power Meter:

those occurring throughout a facility.

PG4

Incorporate detailed power quality information into

The power meter measures current and voltage and

calculates an extensive array of power quality information

to help uncover not only incoming power issues, but also

management systems for analysis and resolution.

Pumping systems Dewatering systems PG 10

PG 12

Case study

SOLUTION AT A GLANCE Integration with IntelliCENTER **Motor Control Center**

Enhanced safety

- Isolated devices, patented CENTERLINE[®] bus structure, rigorous global certification and testing
- Best-in-class features, including ArcShield[™] and SecureConnect[™] technology

Streamlined maintenance

- IntelliCENTER software delivers real-time diagnostics and MCC documentation
- Displays device data, including critical status information



Simpler configuration

 IntelliCENTER software enables configuration and programming of all intelligent motor control devices in Studio 5000®

Better system security

- Tighter control of sensitive assets
- Complies with IEC 62443-3-3

Powerful network integration

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- Centralized location for power and motor control devices
- Incorporates vibration monitors, surge protectors and power monitors
- Ships preprogrammed and ready to install

LESS RISK

FASTER COMMISSIONING

LOWER MAINTENANCE COSTS

Sustainable water management

Unified solution

Pumping systems

PG4

PG 10

PG 12



SOLUTION AT A GLANCE **Energy Management Solution**

Optimize operations with better energy management

- Improve awareness of energy consumption, demand and real-time power quality
- Identify root cause of costly energy-related downtime and equipment failures
- Enable better monitoring and reporting and advanced analytics enterprise-wide SOLUTION



Real-time Energy Management

- Performance KPIs Data correlation
 - Reporting · Advanced analytics

· Energy monitoring

• Emissions monitoring



- Meters electric
- and non-electric
- Production data
- Other databases /

 Power control Hardware Applications PLANT MANAGER **OPERATOR OR TECHNICIAN OPERATIONS MANAGER** MAINTENANCE MANAGER SUSTAINABILITY MANAGER Unified solution **Pumping systems** Dewatering systems

Sustainable water management PG2

architecture PG 3

PG 4

PG 10

PG 12

Aeration systems

Case study PG 15

Smart Motor Control for dewatering

Solutions designed to meet key challenges in centrifuge applications:

- Optimize moisture removal and increase dry solids content
- Maximize energy efficiency
- Maintain reliable performance
- Enable remote operations
- Avoid unexpected downtime



Sustainable water management PG 2 Unified solution architecture PG 3 Pumping systems PG 4 Dewatering systems PG 10

Aeration systems PG 12 Case study PG 15

Typical dewatering centrifuge control/power cabinet layout

Centrifuge cabinet layout with primary components



Centrifuge

Sustainable water management PG 2 Unified solution architecture PG 3 Pumping systems PG 4

ems Dewatering systems PG 10

NS Aeration PG 12 Case study PG 15

Smart Motor Control for aeration

Solutions designed to meet key challenges in aeration applications:

- Conserve energy while processing large volumes of water
- Ease operation
- Minimize unplanned downtime
- Enable real-time monitoring



Sustainable water management PG 2 Unified solution architecture PG 3 Pumping systems PG 4 Dewatering systems PG 10 Aeration systems PG 12 Case study PG 15

Simplified motor control architecture for aeration systems





Sustainable water management PG 2 Unified solution architecture PG 3 Pumping systems PG 4

ns Dewatering systems PG 10

Aeration systems PG 12 Case study PG 15

Driving more uptime and energy savings

CompactLogix[™] Controller:

Configure drive operation and control in the Logix environment and enable a simpler, Premier Integration experience.

Speed development time and more easily connect to critical device information in one unified software environment.

PowerFlex Low Voltage Drive:

Enable seamless integration into Logix control architectures along with Automatic Device Configuration, thanks to Premier Integration.

Drives with Active Front End technology deliver built-in harmonic mitigation:

- Reduce the impact of harmonic distortion to support IEEE 519 compliance.
- Decrease panel and floor space requirements.
- Cut wiring and installation time/costs.

PowerMonitor 5000 Power Meter:

Incorporate detailed power quality information into management systems for analysis and resolution.

The power meter measures current and voltage and calculates an extensive array of power quality information to help uncover not only incoming power issues, but also those occurring throughout a facility.

Aeration area architecture



Process Control for Water/Wastewater:

Increase flexibility and enable better decision making with the PlantPAx distributed control system (DCS).

Based on open communication standards leveraging EtherNet/IP, this modern DCS connects process, discrete, power, information and safety control into one plant-wide infrastructure.

FactoryTalk InnovationSuite:

Remotely monitor assets, predict equipment failure and identify improvement opportunities.

SMC[™]-50 Soft Starter:

Enable advanced monitoring and protection – and superior communication capabilities.

Increase efficiency and reduce downtime with Energy Efficiency mode.

Open EtherNet/IP Network Across All Levels:

Reduce engineering and maintenance costs by securely integrating devices like your MCC, I/O, field instruments and other third-party devices over an EtherNet/IP network.

Sustainable water management PG 2 Unified solution architecture Pum PG 4

Pumping systems Dewar PG 4 PG 10

Dewatering systems Aeration systems PG 10 PG 12

r**ms** Case study PG 15



California sanitation district reduces energy consumption 47%

Challenge

Obsolete aeration system accounted for 85% of plant's electricity usage.

Solution

Integrated motor control and SCADA system features PowerFlex AC drives, Logix controllers and FactoryTalk software.

Results

Decreased energy consumption – and qualified for significant state rebate.

Sustainable water management PG 2 Unified solution architecture PG 3 Pumping systems PG 4

s Dewatering systems PG 10 Aeration systems PG 12

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