

CRACKED GAS COMPRESSORS

Application Solutions Guide

THE CHALLENGE

An ethylene plant's most critical pieces of equipment are its cracked gas compressor and turbine. If the compressor or turbine trips, whether due to excess vibration, malfunctioning instruments or surge, it can bring the entire operation to a halt for up to five working days. Since this valuable turbomachinery doesn't have a backup, it must run reliably for two to seven years so operators can efficiently and safely maximize production to meet market demands.

The path to improved cracked gas compressor performance.

Emerson's PlantWeb® digital architecture and related technologies help you know what's happening at every level of your operation – so you can keep your compressor and turbine up and running at their best.

The predictive capabilities of our smart digital instruments and asset management software can alert you to potential problems while there's still time to take corrective action.

Our Machinery Health Management technologies provide both continuous online monitoring and API 670-compliant protection of compressors, turbines, and other rotating equipment.

And our valves and instruments are engineered to provide accurate, reliable measurement and control in demanding conditions like yours. Combined with our DeltaV automation system, they enable you to run close to the surge line – consistently, safely, and reliably.

Performance Challenges	Business Consequence	Improvement Opportunities
Compressor Train Availability impacted by: <ul style="list-style-type: none"> • Mechanical and instrument failure • Surge • Unreliable mechanical overspeed protection 	Reduced Unit Availability	Prevent shutdowns by leveraging accurate process and machinery health data, reliable antisurge devices, and online electronic overspeed protection.
Machinery Health impacted by: <ul style="list-style-type: none"> • Fouling • Surge • Seal or impeller failure, excess vibration, shaft cracks, and misalignment and imbalance issues • Poor operator visibility to asset health • Inability to hold control setpoint 	Increased Maintenance Costs	Minimize maintenance, avoid compressor trips, and extend asset life with devices that alert operators to problems before they occur.
Optimized Production impacted by: <ul style="list-style-type: none"> • Instrument drift • Underperforming antisurge valve • Turbine control instability • Complex manual startup procedures 	Reduced Production	Maximize your plant's performance efficiently and safely with reliable process data that pinpoints your actual operating zone.
Energy Management impacted by: <ul style="list-style-type: none"> • Instrument drift • Fouling • High gas recycle rates 	Increased Energy Costs	Reduce energy waste and optimize antisurge valve use by leveraging reliable, real-time intelligence about asset health and your process.
Flaring impacted by: <ul style="list-style-type: none"> • Underperforming antisurge valve • Unexpected compressor failure 	Increased Environmental Costs	Avoid environmental releases and enable orderly shutdowns with fast, accurate antisurge valves and predictive diagnostics.

Chemical Application Solutions Guides are available on the following applications:

Furnace **Cracked Gas Compressors** Recovery Section

SERVICES & SUPPORT

Emerson's global service and support network of experts can help keep your cracked gas compressor and turbine running at peak performance.

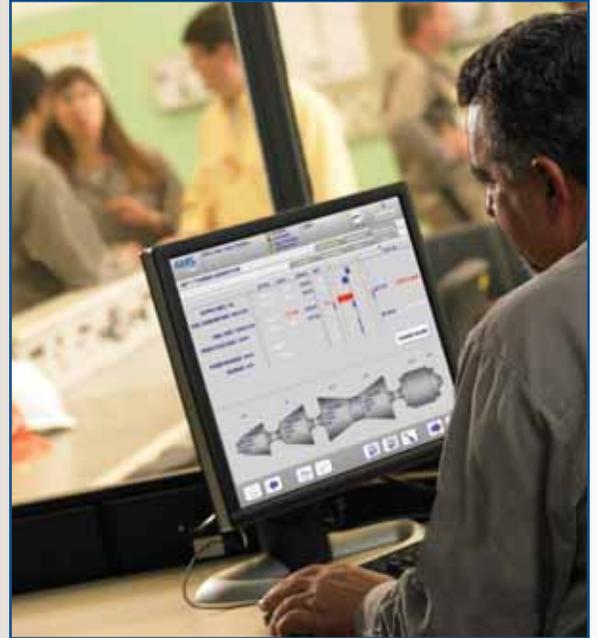
Our skilled technicians can lead or assist with installation, tuning, and commissioning of antisurge valves, as well as perform in-service inspections and report on performance.

With Machinery Health Monitoring, we can ensure that critical alarm tuning, backup, and maintenance services are performed regularly. Our field engineering experts will help implement changes or assist during outages or normal operations, or even help you prepare for planned outages. And our experts can perform accumulated maintenance tasks on your Machinery Health Monitoring system without diverting essential staff from other important tasks.

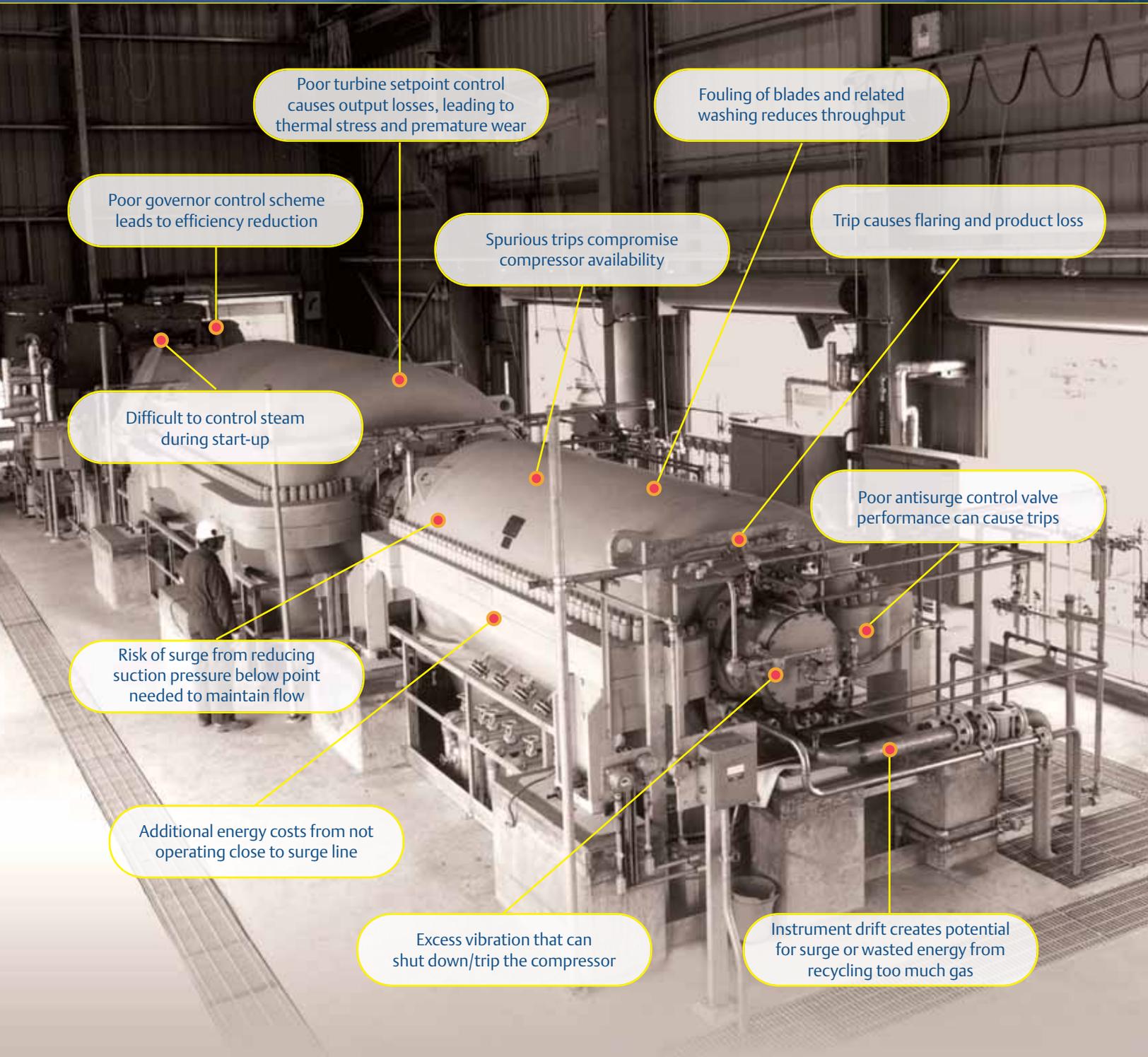
During each site visit, our engineers will resolve any pre-identified issues, update/back-up software, inspect the integrity of network communications, perform file clean-up, inspect the integrity of sensors and signals, and perform other necessary maintenance tasks.

For users of AMS Performance Advisor, an experienced engineer can be scheduled for periodic tuning of the software to accommodate seasonal or operational variations in optimization requirements.

Around the corner or around the globe, we're there to help you make the most of your automation investment.



CRACKED GAS COMPRESSOR CHALLENGES



Poor turbine setpoint control causes output losses, leading to thermal stress and premature wear

Fouling of blades and related washing reduces throughput

Poor governor control scheme leads to efficiency reduction

Spurious trips compromise compressor availability

Trip causes flaring and product loss

Difficult to control steam during start-up

Poor antisurge control valve performance can cause trips

Risk of surge from reducing suction pressure below point needed to maintain flow

Additional energy costs from not operating close to surge line

Excess vibration that can shut down/trip the compressor

Instrument drift creates potential for surge or wasted energy from recycling too much gas

You can achieve an optimally controlled and more reliable cracked gas compressor train.

Emerson Process Management has the technology and expertise to make it happen.

A STRATEGY FOR A SMART COMPRESSOR

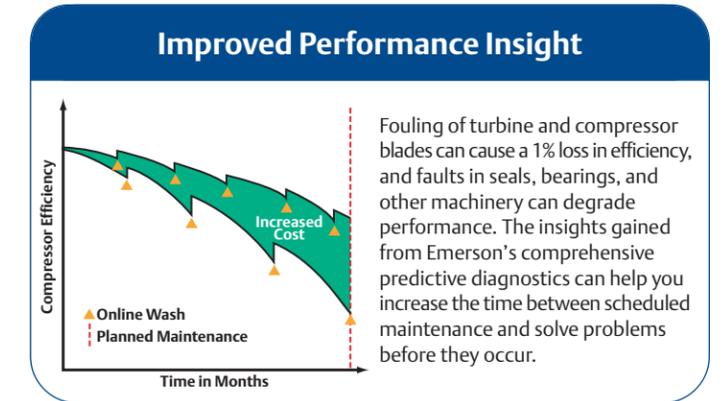
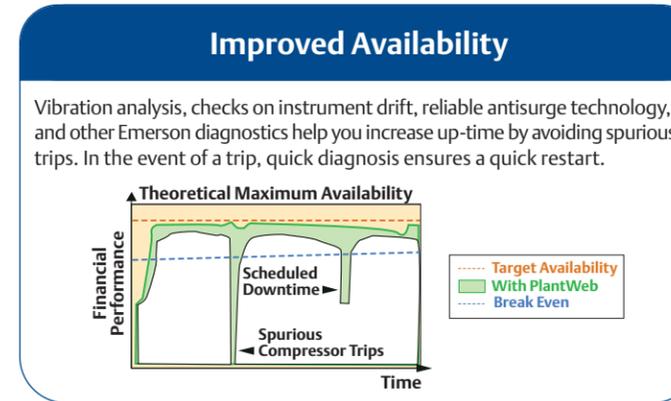
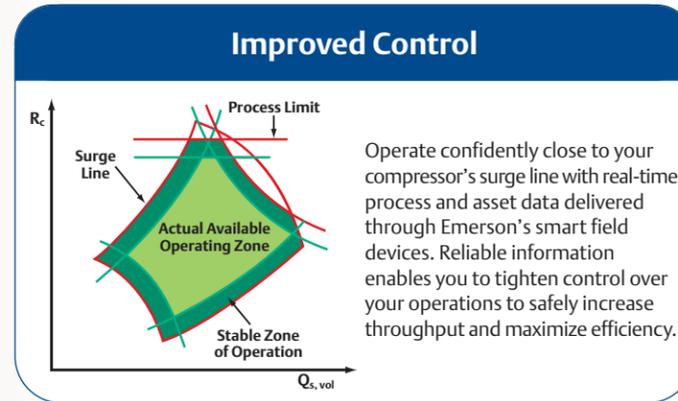
PLANTWEB IN ACTION



Predictive Intelligence and the Power to Use It

Emerson's PlantWeb digital Smart Cracked Gas Compressor architecture enables you to harness the power of predictive intelligence to operate more efficiently, safely, and effectively.

With PlantWeb you gain unmatched capabilities to improve profitability through reduced cost and improved output.



Protection, Control, and Asset Optimization



Smart digital control and asset management systems power PlantWeb by enabling operations and maintenance staff to optimize production and availability as well as run their plants safely. Fed by rich and reliable process information from intelligent field devices, you are empowered to raise performance, improving overall yield and profitability.

At the same time, asset health diagnostics give you clear direction on which assets – including automation, electrical, process and rotating equipment – are in most need of attention, and how to avoid operational interrupts.

SMART DIGITAL CONTROL

DeltaV's embedded advanced process control tools:

- Allow for high speed, redundant control of key variables such as suction pressure which impacts plant yield and energy efficiency.
- Safely adjust setpoints to maintain the process within all constraints with model predictive control.
- Utilize DeltaV Insight to continuously monitor loop variability, identify underperforming control valves, and perform online, adaptive tuning of key loops.
- Achieve fast and accurate PID governor control with SmartProcess® Turbine.

www.EasyDeltaV.com



SMART ASSET OPTIMIZATION

Monitor equipment condition and performance so you can optimize operations and identify potential problems before they grow.

- Avoid excess energy usage by using AMS® Performance Advisor to check compressor blade fouling and compare actual to expected efficiency.
- Predict mechanical degradation and avoid unplanned shutdown using AMS Machinery Manager diagnostics and analysis.
- Anticipate antisurge valve problems with online diagnostics in AMS ValveLink® SNAP-ON™.

www.EmersonProcess.com/Optimize



Field Intelligence

With the right intelligence, your field assets not only provide more precise and reliable information on the process, but they also self-diagnose their health and alert you to potential problems.

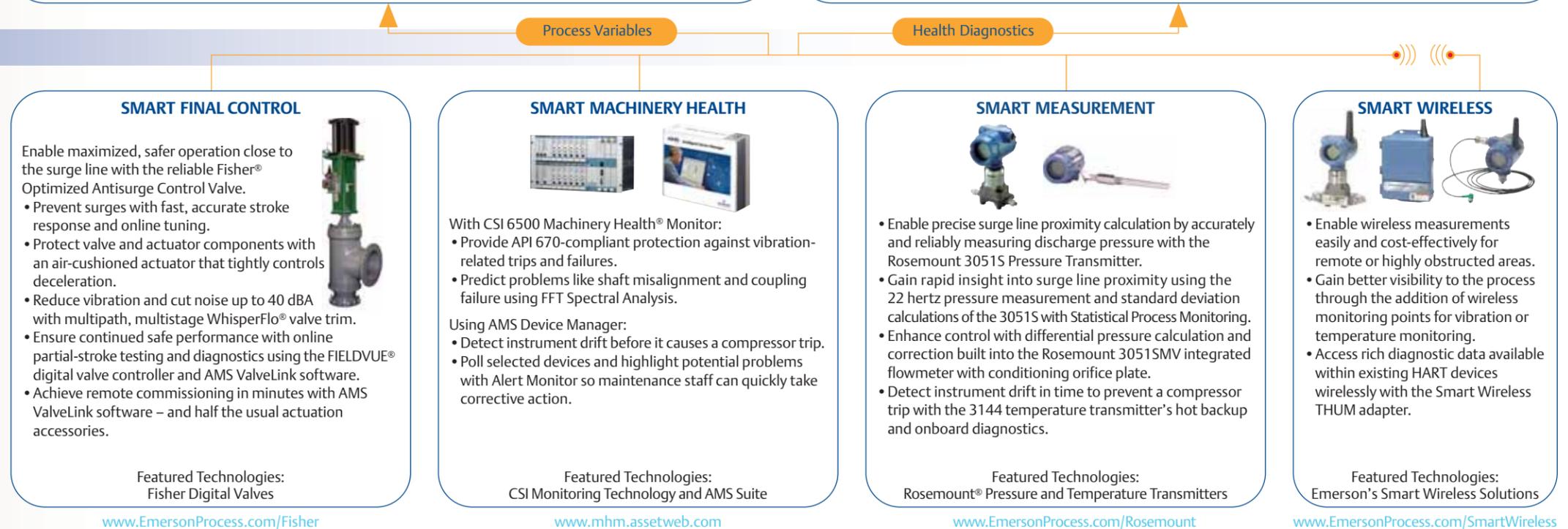


Devices, instruments, and software designed with best-in-class intelligence power PlantWeb by enabling you to extract rich and reliable data from your process to optimize control.

What makes PlantWeb better?

- It's the only digital architecture with proven success in thousands of projects.
- Predictive intelligence enables detection and avoidance of potential problems.
- It's networked, not centralized.
- It's engineered to seamlessly gather and manage information to enable highly optimized operations.
- It uses open standards at every level of the architecture.
- It provides process control, plus asset optimization and integration with other systems.

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**With over 600 major sales, project execution,
and support locations in more than 85 countries,
we are here for you.**

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