Implementing a **High-Performance, Energy Saving Approach** to Compressed Air System Management

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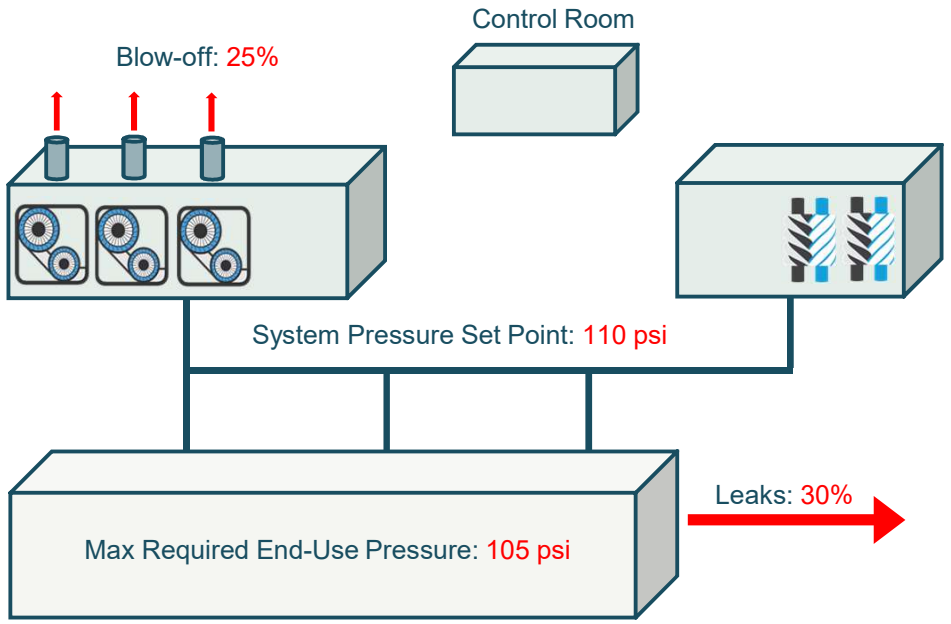
Industrial Compressed Air Trends: Post-COVID

- **Fewer people and less time dedicated to facilities** (and especially compressed air) improvement and optimization. Exacerbated by retirement of longtime operators and managers
- **Continuing increases in electricity prices** and a corresponding increase in compressed air system operating costs
- **Deferred investment in current compressed air management solutions:** networked compressor operation, continuous monitoring / KPI tracking, zoned operation for distinct air needs (e.g. paint).

Baseline: The Inefficient, Neglected Compressed Air System

Precise Pressure Regulation	No
Networked Controls	No
Adaptive Demand-Side Management	No
Remote Monitoring	No
Local Monitoring	No



How are End Users Dealing with the Current Environment?

1. **Outsourcing**: compressed air as a service / “over the fence” air
2. **Investment**: updating equipment, optimizing existing systems, becoming proactive (not reactive) consumers of compressed air
3. **Apathy:** status quo, kicking the can down the road until the next person has to deal with it

Opportunity

Outsourcing, **Investment**, and **Apathy** are **ALL** opportunities to deliver a high-performance compressed air system!

- **Outsourcing / Compressed Air as a Service:** Build a high-performance compressed air system from scratch to operate at the lowest cost / CFM.
- **Investment:** Evaluate the existing system, build a plan to improve and invest over time and increase efficiency and performance.
- **Apathy:** Take action.

High-Performance Compressed Air Systems

1. Reliable and Efficient Individual Compressor Control
2. Reliable and Efficient Compressor Network Control
3. Continuous Monitoring and Data-Driven Improvement
4. Compressed Air Supply – Demand Matching and Optimization

Reliable and Efficient Individual Compressor Control

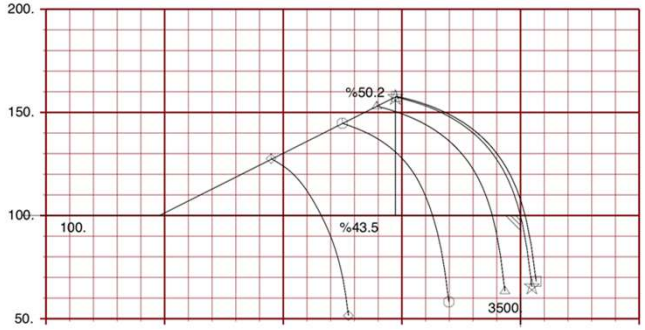
Current Generation Compressor Controller

- Communication Capabilities
- Connectivity & System Networking
- System Pressure Control - Pressure Band

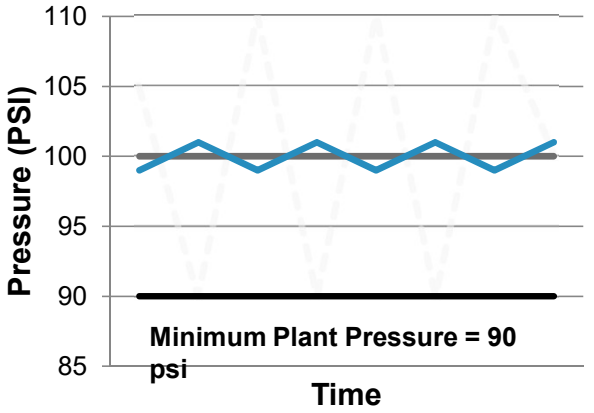
Recent Advancements

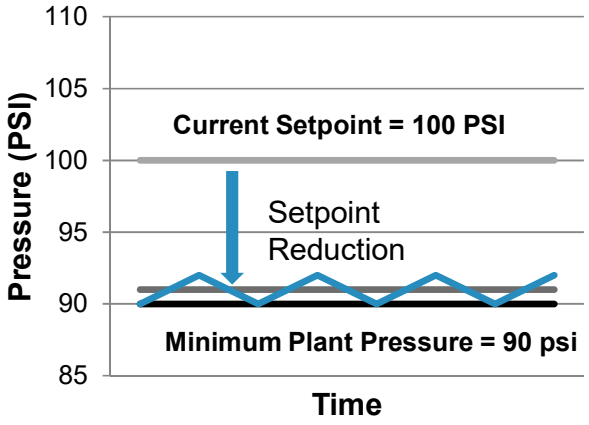
- Adaptive Network Optimization
- Auto-Tuning and Surge Testing
- Valve Profiling

Surge Testing, Tuning, and Maintenance



Precise Pressure Control





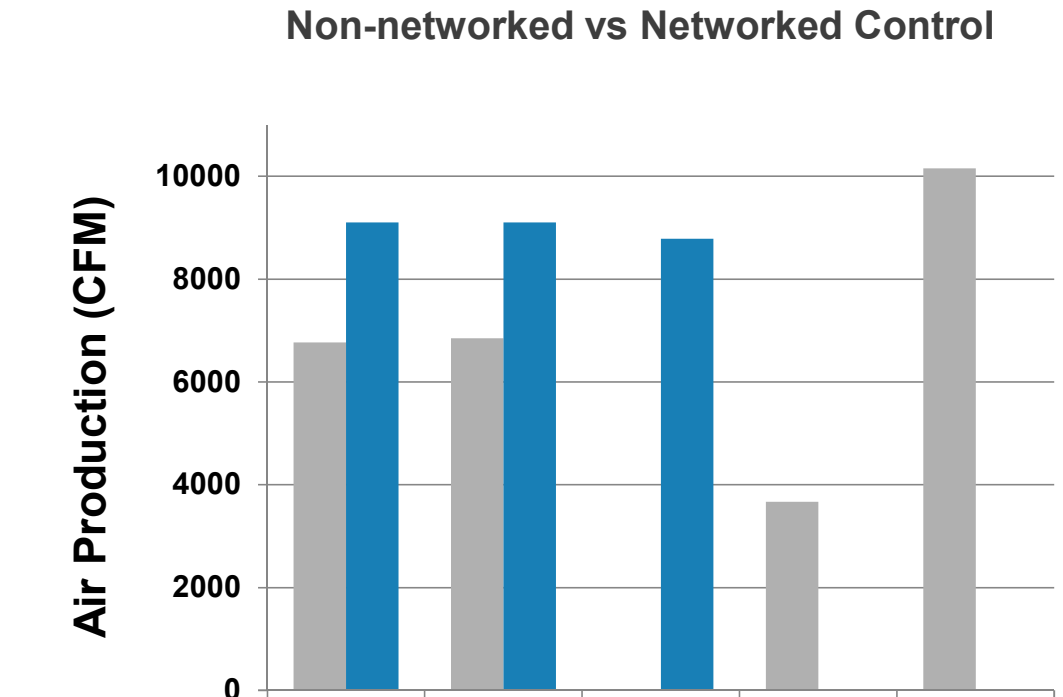
Reliable and Efficient Compressor Network Control

Embedded
Network Control

Piggyback
Network Control

Surge Testing, Tuning and Maintenance Delivers:

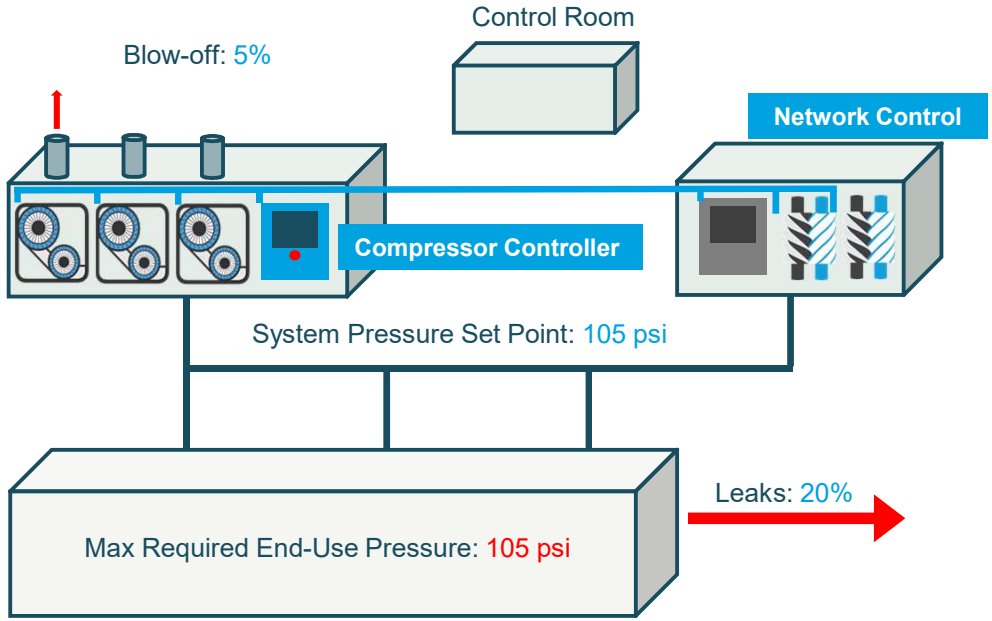
- Precise pressure control
- Increased turndown range
- Reduced blow-off
- Energy savings of up to 10%



	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
Non Networked	6765	6846	0	3667	10151
Networked	9100	9100	8781	0	0

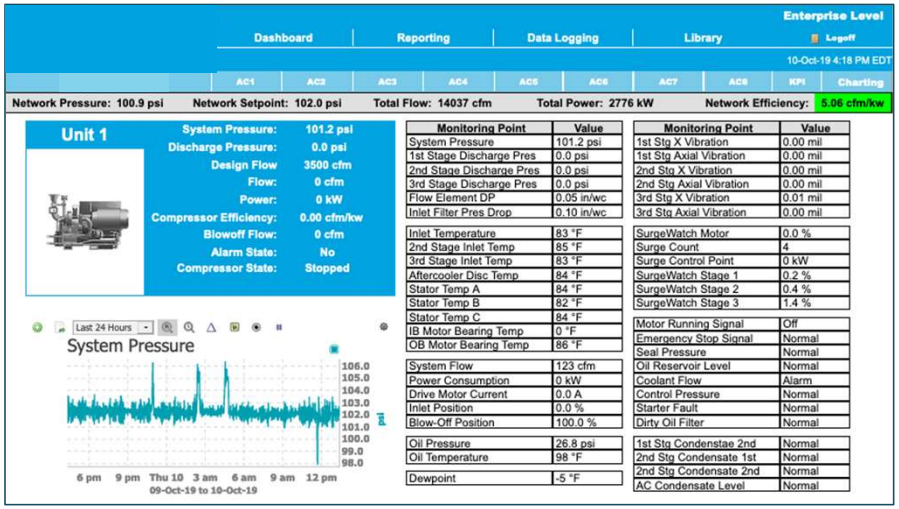
Optimized Individual and Network Compressor Control

Precise Pressure Regulation	Yes
Networked Control	Yes
Adaptive Demand-Side Management	No
Remote Monitoring	No
Local Monitoring	No

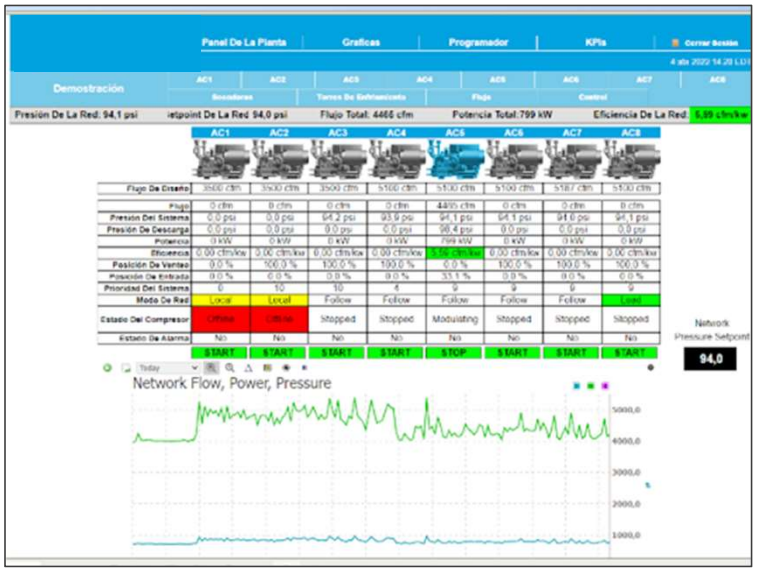


Continuous Monitoring and Data-Driven Improvement Experience

Remote Monitoring, Alerting, and Analysis



Local Monitoring, Control and Scheduling



Continuous Monitoring and Data-Driven Improvement

KPIs for Assessing Compressed Air Systems

System KPIs
Network Setpoint
System Pressure
Total System Flow
Total Compressor Power
Total Blow-off Flow
System Efficiency (cfm/kW)

Compressor KPIs
Inlet Temperature
Discharge Pressure
System Pressure
Compressor Power
Compressor Flow
System Flow
Blow-off Flow (if centrifugal)
Compressor Efficiency (cfm/kW)

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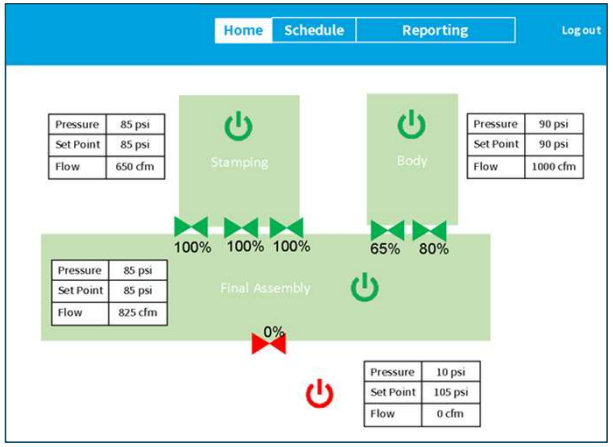
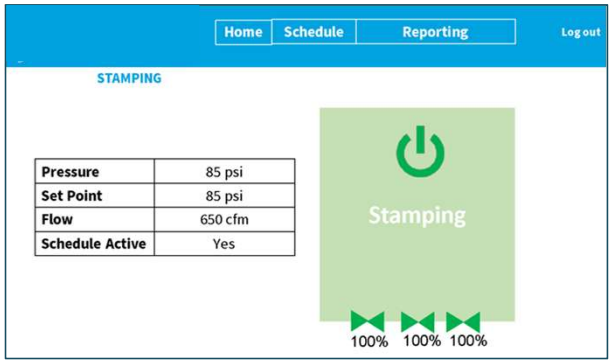
Compressed Air Supply – Demand Matching and Optimization





Demand-Side Zone Control

- Segments large compressed air systems into individually controlled zones
- Operates individual zones at their ideal pressure versus operating the entire system at the highest pressure needed by a single end use
- Scheduling capability to reduce pressure in zones or completely shut them down when they are not needed for production purposes
- Dramatically reduce leak loss

Slide 12

SP2 De-brand this

Stephen Parry, 4/23/2024

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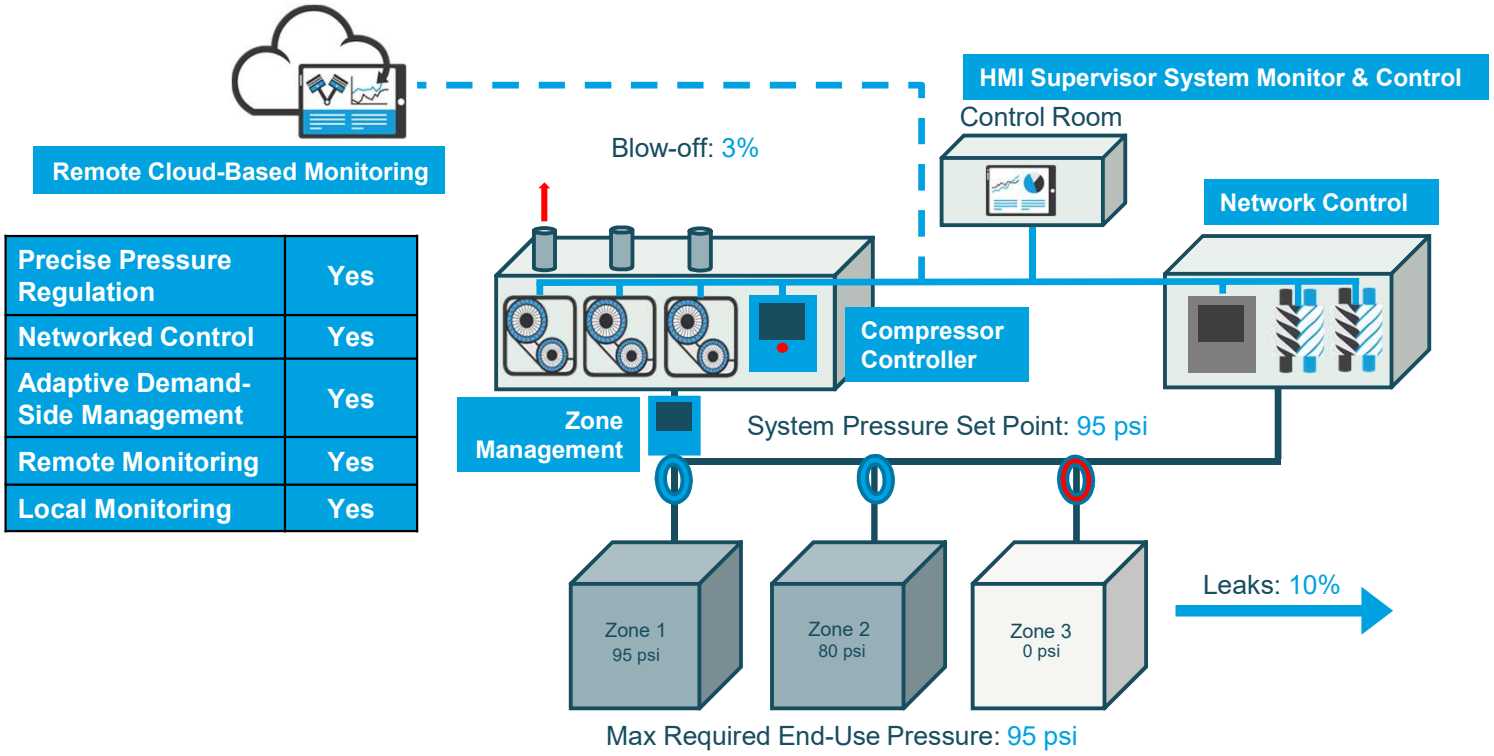
A Complete High-Performance Compressed Air System

Precise Pressure Regulation	Yes
Networked Control	Yes
Adaptive Demand-Side Management	Yes
Remote Monitoring	Yes
Local Monitoring	Yes



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Additional Ways to Optimize Over-the-fence-systems

1. Cloud-based remote monitoring and control for non-uniform (multiple compressor brands and types) compressed air systems
2. Customized, automated reporting tailored to the requirements of over-the-fence air providers and customers
3. Local monitoring and automation solutions for manned and unmanned compressed air installations

Contact

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