SAVE ENERGY

Air compressor – Surge, Choke, Operating Area - Protection

Smint TIQ

Condition Based Monitoring (CBM)

www.oursmint.com
sales@oursmint.com
+91 98419 71785

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BENEFIT'S - VALUE

- ❑ Provide protection from surge during the worst possible operating scenarios.
- ❑ Provide flow that is greater than steady-state operation on the surge control line.
- ❑ Prevent operation of the compressor in the stonewall (choke) region.
- ❑ Avoid process air instability issues.
- ❑ Linear characteristics are preferred for anti-surge valve trim.
- ❑ Larger anti-surge valves may provide a better response to equalize pressure faster, but can have poor controllability for throttling purposes during process control operation. If the recycle valve must operate in throttling mode, then it may be necessary
- ❑ to install a small parallel valve to improve the control at low recycle-throttling rates. In parallel valve applications, the antisurge controller can be set up for split-range output.
- ❑ Valve overshoot should not exceed roughly 10% of the step change in controller output in both opening and closing directions.
- ❑ Anti-surge valve opening time from fully closed to at least 95% open should be two seconds or less. Valve closing time should not be more than two to three times the opening time. Overshoot should not be greater than 10% in either direction and hysteresis should be less than 0.2 seconds on change of direction.
- ❑ A "cushioning" feature should be implemented in the actuation system (typically in the last 5% of the full stroke) to prevent the actuator from "slamming" against the mechanical stops at the end of the stroke, which could potentially damage the actuator or the valve.

Energy Saving ~8 to 22 %

The optimum surge setpoint follows the shape of the surge curve with an offset to intersect longitudinal efficiency ellipses. The offset is large enough to prevent surge.

Plotting the air compressor Operating Region Graph

- ➢ To know whether the air compressor is within the operating region.
- ➢ The algorithm tracks the best operating point according to the air demand.

- Anti-surge valve noise should be limited to 85 dB(A) at 3 ft. (1 m). Noise abatement trim may be required for some valves to achieve noise reduction. Whisper trim requires clean gas to avoid plugging. If process gas is not clean, downstream diffusion and start-up trash trim should be considered
- One of the critical application in the compressor is “Surge, Choke, Operating Area – Protection System” it require lot of experience, and fine knowledge of both electronics, mechanical, compressor operating system.
- Once the operating areas are mapped with the use of VFD system – throughout the operating region – then the compressor shall be operated in the best efficiency region to improve the Air Energy saving in the Air Compressor system.
- The proposed system monitors all the real time compressor operating parameters – the algorithm decides the surge and choke points and operating region without affecting the compressor health.

INFORMATION RETRIEVAL

- Browser based monitoring and control
- Web, Mobile – Monitoring system
- Alert, event – messages
- Automatic REPORT generation and emailing
- Discard based Chatbot system
- Without visiting the web service – retrieve any information through discard application.
- AI based performance report and emailing
- Thresholds based alerts
- Trend, event, history – analysis
- Real Time Monitoring and Control
- AI based, fault prediction and safe guarding the compressor from Surge, Choke and controlling the compressor within the operating range