Application
Compressor Efficency Testing

Goal
Evaluating and enhancing the efficiency of compressors

Sector
Electronics Manufacturing

Customer
Leading electronics manufacturing company

Optimizing Compressor Performance

Targeted Analysis and Recommendations for Electronics Manufacturing

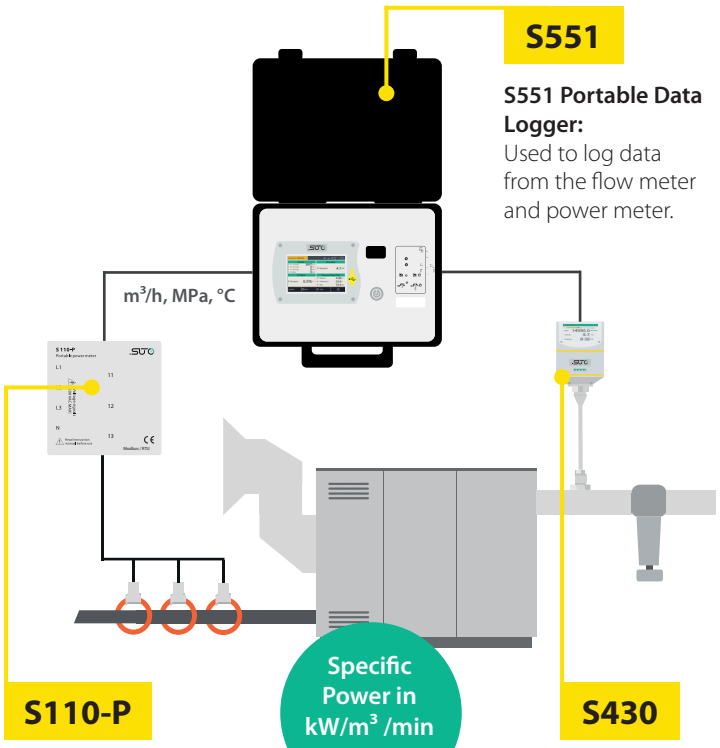
Overview

This case study focuses on a compressor efficiency test conducted for a leading electronics manufacturing company. The test utilized the S430 Flow Meter for Wet Air, S110-P Power Meter, and S551 Portable Data Logger from SUTO iTEC.

- The objective was to measure and analyze the performance of five different compressors in terms of flow, power, and overall efficiency.

Equipment and Methodology

The following equipment was used:



S551 Portable Data Logger:
Used to log data from the flow meter and power meter.

S110-P Power Meter:
Installed at the incoming power supply to measure power consumption.

S430 Flow Meter for Wet Air:
Installed after the compressor outlet pipe to measure compressed air flow.

Objective

The aim was to evaluate and improve the efficiency of compressors in the electronics manufacturing industry using a portable measurement solution capable of measuring compressor power consumption in relation to air delivery.

- **Assess Performance:** Measure and analyze compressor flow, power consumption, and efficiency.
- **Identify Issues:** Detect problems like excess power consumption and flow inefficiencies
- **Recommend Solutions:** Provide targeted recommendations to address issues and improve efficiency.
- **Enhance Operations:** Implement solutions for cost savings, reduced downtime, and optimized performance.

Test Procedure

1. The S430 wet air flow meter was installed at the compressor outlet pipe.
2. The S110-P power meter was installed at the incoming power supply.
3. The compressors were run at full load, and data was collected for 20 minutes.
4. Data points were analyzed to determine flow efficiency, power efficiency, and overall operational efficiency.

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Summary of Results

Com-pressor	Model	Efficiency	Peak Power (kW)	Rated Power (kW)	Observations
1	EP200	90%	164	150	**Healthy, age-related power increase:** The peak power observed exceeded the manufacturer's rating, likely due to the compressor's age. Peak flow and peak power did not coincide, indicating fluctuations in pressure and power.
2	EP200	96%	169	150	**Very healthy, minor fluctuations:** This compressor demonstrated high efficiency, with peak power again exceeding the rated value. The data suggested a healthy state with fluctuations similar to Compressor 1.
3	MM160	85%	169	160	**Needs check, wear indicated:** This compressor showed a lower flow efficiency, indicating potential issues. It is recommended for further checks. Power efficiency was within acceptable limits but indicated wear and tear.
4	MM160	94%	173	160	**Very healthy, slight power increase:** This unit showed very healthy performance metrics, though with peak power slightly above the rated value.
5	R160N	99%	179	160	**Extremely healthy, inverter impact:** The highest efficiency was observed with this VSD compressor, suggesting excellent health. The higher peak power could be attributed to the inverter's function.

Recommendations to Address Identified Issues

Based on the compressor efficiency test results, several recommendations can be made to address the identified issues and enhance overall compressor performance. These recommendations are tailored to tackle the specific problems found during the testing of each compressor.

Com.	Issue	Recommendations
1	Peak power exceeded manufacturer's rating.	▸ Increase maintenance frequency ▸ Replace worn-out parts ▸ Ensure regular lubrication
2	Minor pressure and power fluctuations.	▸ Install pressure stabilizers ▸ Use real-time monitoring tools ▸ Optimize load management
3	Lower flow efficiency and wear signs.	▸ Conduct detailed inspections ▸ Optimize airflow pathways ▸ Upgrade to higher efficiency components
4	Slightly above-rated peak power.	▸ Analyze power usage patterns ▸ Install an inverter ▸ Implement energy efficiency measures
5	High peak power due to inverter.	▸ Calibrate the inverter ▸ Use advanced control systems ▸ Implement continuous monitoring

General Recommendations for All Compressors

- Implement predictive maintenance.
- Conduct regular energy audits.
- Provide maintenance staff training.

By implementing these recommendations, the electronics manufacturing company can enhance compressor efficiency, reliability, and lifespan, leading to cost savings and improved operational performance.

Conclusion

The compressor efficiency test revealed valuable insights into the performance and health of the compressors. Using the S430 Flow Meter, S110-P Power Meter, and S551 Portable Data Logger from SUTO iTEC, the test provided accurate and actionable data.

Compressors 2, 4, and 5 showed excellent efficiency, while Compressor 3 needs maintenance. This testing method proves effective for ensuring compressor health and optimizing performance.

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