

Comprehensive Technical Guide to Atlas Copco XA, XAS, and XATS Series: Parts Management and Operational Maintenance

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In the global industrial landscape, the reliability of compressed air systems is not merely a convenience but a fundamental requirement for operational continuity. Atlas Copco, a leader in the field of portable air solutions, has established the XA, XAS, and XATS series as the gold standard for diesel-driven screw compressors. These machines are engineered to perform in the most demanding environments, from mining and construction to large-scale infrastructure projects. However, the longevity and efficiency of these units depend heavily on a rigorous understanding of their technical components, spare part management systems, and the underlying engineering principles that govern their operation.

The Architecture of Portable Screw Compressors

The Atlas Copco XA series, including the XAS and XATS variants, operates on the principle of **rotary screw compression**. This technology involves two intermeshing helical rotors—the male and female rotors—turning in opposite directions within a housing. As the rotors rotate, the volume between them and the housing decreases, thereby compressing the trapped air. The precision of these components is measured in microns, making the use of **Original Equipment Manufacturer (OEM) parts** critical for maintaining the intended tolerances and preventing premature air-end failure.

Differentiating the XA, XAS, and XATS Series

Understanding the nomenclature is essential for procurement and maintenance teams. The prefix 'X' generally denotes a portable compressor, 'A' indicates air-cooled, and 'S' typically stands for 'Silenced' or 'Single-stage.' The 'T' in XATS often refers to high-pressure variants optimized for specific drilling or industrial applications. For instance, the **XAS 125** is a diesel-driven, single-stage oil-injected screw compressor designed for versatility, while the **XATS 125** might be configured for different pressure setpoints despite sharing many structural components.

Navigating the 'Parts Online' Ecosystem

Modern asset management has shifted from physical paper catalogs to interactive digital platforms. Atlas Copco's **Parts Online** system serves as a centralized repository for technical documentation, spare parts manuals, and exploded-view drawings. For the XA 90, XA 125, and XA 175 models, this platform allows users to cross-reference **Reference Numbers** found in technical drawings with actual **Part Numbers**.

A critical technical distinction in these manuals is the difference between an 'Assembly' and a 'Component.' Parts Online provides visual representations where certain parts may appear in a drawing without a reference number. These are included solely to illustrate the assembly context and are typically not available for individual purchase. Instead, they must be procured as part of a larger kit or sub-assembly. This design philosophy ensures that when a critical repair is made, all related seals, gaskets, and fasteners are replaced simultaneously to maintain the integrity of the pressure system.

Lubrication Science: Synthetic vs. Mineral Oil

The performance of the XAS 370-125 and similar models is inextricably linked to the quality of lubrication. The compressor oil serves four primary functions: lubrication of the bearings, sealing the gaps between rotors, cooling the compressed air, and protecting internal surfaces from corrosion. The JSON data highlights two primary types: **Atlas Copco Synthetic Compressor Oil** and **Mineral Engine Oil**.

1. Synthetic Compressor Oil (Paroil S)

Synthetic lubricants are engineered for extreme temperature ranges and high-pressure environments. They exhibit high oxidation stability, which prevents the formation of varnish and sludge on the rotors. For a unit like the XATS 125, which may operate under varying loads, synthetic oil ensures that the viscosity remains stable, preventing metal-to-metal contact even at high discharge temperatures.

2. Mineral Engine Oil (Paroil M)

Mineral oils are typically used in the diesel engine component of the compressor. While more cost-effective, they have shorter drain intervals and are more susceptible to thermal degradation. It is vital for technicians to never mix compressor oil with engine oil, as the additive packages are fundamentally different. Compressor oil contains anti-foaming agents that are crucial for the oil-separator element's function—a feature not found in standard engine lubricants.

Technical Specifications and Comparison Matrix

The following table provides a structured comparison of the common models found in the XA/XAS technical documentation. These specifications are indicative of the performance envelopes that dictate part selection and maintenance schedules.

Model Specification	XA 90	XA 125	XA 140	XA 175
Normal Working Pressure (bar)	7.0	7.0	7.0	7.0
Actual Free Air Delivery (l/s)	88	125	141	175
Engine Model (Typical)	Deutz / Kubota	Deutz F3M	Deutz F4M	Deutz BF4M
Oil Capacity (Liters)	8.5	11.0	14.5	18.0
Max. Ambient Temp (°C)	45	45	50	50

Engineering Calculations for Flow and Pressure

When selecting parts or diagnosing performance drops, engineers often use the following formula to determine the efficiency of the compressor unit:

Specific Energy Requirement (SER) = Power Input (kW) / Free Air Delivery (m³/min)

A rise in SER typically indicates internal leakage, fouled air filters, or a degrading oil-separator element. In the XAS 125 model, if the FAD (Free Air Delivery) drops below its rated 125 l/s while fuel consumption remains constant, it is a clear indicator that the screw tolerances have changed or the unloader valve is not fully opening.

The Role of the Oil Separator Element

One of the most critical maintenance components mentioned in the Atlas Copco parts list is the **Oil Separator**. In an oil-injected screw compressor, the air-oil mixture leaves the air-end and enters a separator tank. The separator element uses a coalescing process to remove oil droplets from the air stream.

- **Primary Stage:** Centrifugal force separates the bulk of the oil from the air.
- **Secondary Stage:** The separator element filters out the remaining microscopic mist.
- **Scavenge Line:** A return line (scavenge line) sucks the collected oil from the bottom of the separator element and returns it to the air-end.

If the scavenge line or its integrated check valve becomes clogged—a common troubleshooting scenario for the XAS series—the compressor will 'carry over' oil into the downstream air lines, leading to contaminated tools and excessive oil consumption.

Maintenance Protocols and Procedural Execution

Effective maintenance of the XA 125 and XATS 125 involves a tiered approach, often referred to as 'Service Kits' in the Atlas Copco catalog. Using these kits (500-hour, 1000-hour, or 2000-hour) ensures that all necessary seals and filters are replaced in a single intervention.

Step-by-Step Procedure for Air Filter Replacement

1. **Safety Initialization:** Shut down the unit and allow the internal pressure to vent. Check the pressure gauge to ensure it reads 0 bar.

2. Access: Unlock the side panels and locate the heavy-duty air filter housing.
3. Inspection: Remove the primary element. Check the 'safety element' (the inner filter). If the safety element is dirty, it indicates the primary element has failed or was improperly installed.
4. Cleaning: Wipe the inside of the housing with a clean, lint-free cloth. Do not use compressed air to clean the housing, as this can force dust into the intake manifold.
5. Installation: Insert the new OEM filter element and ensure the vacuum indicator is reset.

Case Study: Troubleshooting Overheating in XAS 370-125 Diesel Units

Overheating is a common operational challenge for diesel-driven compressors in tropical environments like Indonesia. A technical analysis of a recurring overheating issue in an XAS 370-125 unit revealed the following diagnostic flow:

1. Symptom Identification

The unit would shut down via the high-discharge temperature switch (set at 120°C) after approximately 45 minutes of full-load operation.

2. Root Cause Analysis

- Oil Cooler Fouling: External inspection showed dust buildup on the cooling fins, reducing heat transfer efficiency.
- Thermostatic Valve Failure: The valve responsible for bypassing the cooler until the oil reached operating temperature was stuck in the bypass position.
- Oil Level: Low oil level reduced the residence time in the separator tank, preventing proper cooling.

3. Resolution

Technicians replaced the thermostatic valve (sourced via the Parts Online catalog for the specific XAS 370-125 serial number) and performed a chemical cleaning of the oil cooler fins. Post-intervention data showed a stabilized discharge temperature of 85°C at an ambient temperature of 32°C.

Advanced Part Lookup: The Importance of Serial Numbers

A common pitfall for procurement officers is ordering parts based solely on the model name (e.g., "XA 125"). However, the JSON data notes that models like the XA 125 Al. Hd have specific lists. Atlas Copco compressors undergo frequent 'Product Improvement Programs' (PIPs). Therefore, a serial number is the only definitive way to ensure part compatibility. The **Parts Manual Book Catalog Lists** are often organized by serial number ranges to account for changes in engine suppliers or air-end revisions.

Operational Safety and Battery Maintenance

The technical documentation emphasizes reading the instruction manual before working on the battery. Diesel compressors use high-cold-cranking ampere (CCA) batteries to start the engines in adverse conditions. Safety protocols include:

- Hydrogen Gas Venting: Lead-acid batteries release hydrogen during charging; ensure the compressor doors are open during jump-starting.
- Fuse Resetting: The control panels of XATS units feature reset fuses that protect the electronic regulating system. Constant tripping of these fuses usually indicates a short circuit in the solenoid valves or a failing alternator.

Summary and Broader Implications for Fleet Management

The effective management of Atlas Copco XA, XAS, and XATS series compressors requires a synthesis of digital literacy (using Parts Online), chemical understanding (selecting the correct synthetic lubricants), and mechanical discipline. By adhering to the documented parts lists and maintenance intervals, operators can significantly reduce the Total Cost of Ownership (TCO).

Furthermore, the integration of these technical standards into a broader fleet management strategy allows for predictive maintenance. Instead of reactive repairs, data-driven decisions regarding part replacement can be made based on the mathematical models of wear and the historical performance of units in the field. Ultimately, the precision of Atlas Copco engineering is only as good as the maintenance it receives, making the technical manual not just a reference book, but the blueprint for operational excellence.

As industries move toward more sustainable operations, the role of efficient air compression becomes even more critical. Well-maintained screw compressors consume less fuel and produce fewer emissions, aligning technical maintenance with corporate environmental goals. Whether it is a XAS 77 DD or a high-capacity XA 175, the path to reliability is paved with OEM parts, correct lubrication, and an uncompromising adherence to technical documentation.

Baca Juga (Artikel Terkait)

- [Comprehensive Guide to Atlas Copco Condensate Management: Analyzing EWD 330 and WSD Water Separator Systems](#)

URL: <http://alghafgolden.com/atlas-copco-ewd-330-condensate-drain-technical-guide.pdf>

- [The Definitive Technical Guide to Atlas Copco GA 55, GA 75, and GA 90 Air Compressors: Engineering, Maintenance, and Parts Optimization](#)

URL: <http://alghafgolden.com/atlas-copco-ga55-ga75-ga90-technical-guide.pdf>

- [The Comprehensive Guide to Compressed Air Technology: Engineering, Maintenance, and Operational Excellence](#)

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- [Comprehensive Engineering Guide to Atlas Copco XAS 90 Series: Operations, Maintenance, and Technical Specifications](#)

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