

Comprehensive Technical Guide to Atlas Copco GA 11-26 Rotary Screw Compressors: Maintenance, Parts, and Engineering Excellence

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In the realm of industrial manufacturing, compressed air is often referred to as the "fourth utility." Its reliability is paramount to the operational continuity of assembly lines, pneumatic tools, and sophisticated control systems. Among the various technologies available, the **Atlas Copco GA series**—specifically the **GA 11, GA 15, GA 18, GA 22, and GA 26** models—stands as a benchmark for oil-injected rotary screw compression. These stationary air compressors are engineered to deliver high-quality air under demanding conditions while maintaining energy efficiency. This guide provides an exhaustive technical analysis of these systems, focusing on their mechanical architecture, maintenance protocols, and the critical role of genuine parts catalogs in maximizing equipment lifecycle.

The Core Mechanics of Oil-Injected Rotary Screw Technology

The Atlas Copco GA series utilizes the principle of **positive displacement** via two asymmetric helical rotors. The primary rotor (male) and the secondary rotor (female) mesh together within a precision-machined housing. As these rotors rotate, the volume between them and the housing decreases, compressing the trapped air. Unlike dry screw compressors, the GA series injects oil into the compression chamber. This serves three vital functions:

- **Sealing:** The oil creates a thin film between the rotors and the housing, preventing air from leaking back to the inlet, thereby increasing volumetric efficiency.
- **Lubrication:** It reduces friction between the moving parts, although the rotors are typically timed to avoid direct metal-to-metal contact.
- **Cooling:** Compression generates significant heat (the heat of compression). The oil absorbs this heat, which is later removed via an oil cooler, allowing for a near-isothermal compression process compared to adiabatic alternatives.

Thermodynamic Considerations

The efficiency of the GA 11 through GA 26 range is dictated by its ability to manage the temperature rise during the compression cycle. The specific energy requirement (SER) of these units is a key metric. By injecting oil at a controlled temperature, Atlas Copco ensures that the discharge temperature remains within a range that prevents moisture condensation within the element while protecting the lubricant from thermal degradation. The **Elektronikon® controller**, a standard feature on these models, monitors these parameters in real-time to adjust operations based on demand.

Technical Specifications and Model Differentiation

While the GA 11, GA 15, GA 18, GA 22, and GA 26 share a common design philosophy, they are differentiated by their motor power, Free Air Delivery (FAD), and physical footprint. Understanding these differences is crucial for facility managers when selecting a unit or sourcing spare parts from a **Parts List**.

Model	Motor Power (kW)	Motor Power (hp)	Max Working Pressure (bar)	FAD (l/s) at 7.5 bar
GA 11	11	15	7.5 - 13	31.4 - 35.8

As indicated in the table, the jump from a GA 11 to a GA 26 represents a nearly 130% increase in air delivery capacity. However, many internal components, such as the **oil separator** and certain **valve kits**, may be shared across specific frames (e.g., GA 15-22), which simplifies inventory management for large-scale operations.

The Critical Role of the Parts List and Documentation

Technical documentation, such as the *Atlas Copco GA 15, GA 18, GA 22 Parts List (Serial No. WUX 580604 onwards)*, is not merely a catalog; it is an essential engineering tool. These documents provide exploded views of the compressor assembly, allowing technicians to identify the exact **part numbers** required for repairs. Using the correct serial number is vital, as Atlas Copco frequently introduces incremental engineering changes to improve reliability or energy efficiency.

Key Components in the GA Parts Catalog

When reviewing a parts list for the GA 11-26 series, several core sub-assemblies require constant attention:

1. The Air End (Element): The heart of the compressor. Parts lists specify the element type, which is often a proprietary Atlas Copco design.
2. The Unloader Valve: This component regulates the air intake. During "unload" periods, it closes the intake to reduce power consumption while keeping the motor running.
3. The Minimum Pressure Valve (MPV): Located above the oil separator, this ensures that a minimum pressure is maintained within the oil vessel to facilitate oil circulation even when the outlet pressure is low.
4. The Oil Separator Element: A multi-stage filter designed to reduce oil carryover to less than 3 ppm (parts per million).
5. Thermostatic Valve: This valve directs oil either to the cooler or directly back to the element based on the current operating temperature.

Maintenance Protocols and Preventative Strategies

To maintain the high efficiency of an **Atlas Copco stationary air compressor**, a rigorous maintenance schedule must be followed. Failure to replace consumables using the official **spare parts PDF** guidelines can lead to "varnishing" of the oil, increased energy costs, and catastrophic element failure.

Routine Service Intervals

- 2,000 Hours: Change the oil filter and air filter. Inspect the drive belts (if applicable) and clean the coolers.
- 4,000 Hours: Replace the oil separator element and change the lubricant (specifically using Atlas Copco Roto-Inject NDurance or equivalent high-performance oil).
- 8,000 Hours / Annual: Comprehensive service including the unloader valve kit, MPV kit, and thermostatic valve kit. Check motor lubrication and electrical connections.

Calculated Maintenance: The Impact of Pressure Drop

An often overlooked aspect of maintenance is the **pressure drop** across filters. For every 1 bar (14.5 psi) of pressure drop caused by a clogged air filter or oil separator, the compressor requires approximately 7% more energy to achieve the same output pressure. Using the GA 22 as an example (22 kW motor), a 10% increase in

energy consumption due to poor maintenance could result in thousands of dollars in wasted electricity annually.

Troubleshooting Common Operational Failures

Even with robust engineering, stationary compressors face challenges in diverse industrial environments. Below is a diagnostic matrix for common GA series issues.

Symptom	Potential Cause	Technical Solution
High Discharge Temperature	Fouled oil cooler or low oil level	Clean cooler fins using compressed air; top up lubricant. Check thermostatic valve function.

The "Scavenge Line" Phenomenon

A common technical error during maintenance involves the **scavenge line**. This small tube extracts oil collected at the bottom of the separator element and returns it to the compression chamber. If this line is blocked or the internal non-return valve fails, the compressor will begin "spitting" oil into the air lines, potentially damaging downstream equipment such as air dryers and pneumatic actuators.

Integration and Field Implementation

When installing a GA 11-26 unit, several engineering factors must be considered to ensure the unit operates within its design envelope. Stationary air compressors generate a significant amount of heat; therefore, **ventilation** is the most critical factor in a compressor room layout. The cooling air required for a GA 26 is substantial—approximately 2.5 to 3.0 m³/s.

Piping and Receiver Sizing

To prevent "short-cycling" (where the compressor loads and unloads too frequently), an appropriately sized air receiver is necessary. A general rule of thumb for the GA series is 1-2 gallons of storage for every CFM of output. For a GA 22 producing approximately 140 CFM, a 200-gallon (750-liter) receiver is a standard recommendation. Furthermore, the piping should be sized to keep air velocity below 6 m/s in main headers to minimize frictional pressure losses.

The Future of Compressed Air: VSD vs. Fixed Speed

While the standard GA 11-26 models are often fixed-speed units, Atlas Copco also offers **VSD (Variable Speed Drive)** versions. A fixed-speed compressor is most efficient when running at 100% load. However, most industrial processes have fluctuating air demands. In such cases, a VSD unit can reduce energy consumption by up to 35% by matching motor speed to air demand. For users of the GA 15 or GA 22, upgrading to a VSD variant or integrating a central controller can provide a significant Return on Investment (ROI) through energy savings.

Summary of Engineering Best Practices

The longevity of an Atlas Copco GA series compressor is directly proportional to the quality of its maintenance and the authenticity of the parts used. By utilizing the **Parts List GA 15, GA 18, GA 22, GA 26**, technicians ensure that every seal, filter, and valve meets the original equipment manufacturer (OEM) specifications for pressure rating and material compatibility. In the high-pressure environment of industrial air, there is no substitute for technical precision and documented maintenance procedures. As facilities move toward Industry 4.0, the data provided by the Elektronikon® systems will continue to bridge the gap between mechanical operation and digital optimization, ensuring that the "fourth utility" remains as efficient as possible.

Baca Juga (Artikel Terkait)

- [Comprehensive Technical Guide to AIRMAN PDS Series Portable Diesel Air Compressors: Operation, Maintenance, and Engineering Specifications](#)

URL: <http://alaskawriters.com/airman-pds-series-compressor-technical-guide.pdf>

- [The Ultimate Technical Guide to Airman PDS 185 Series: Engineering, Operation, and Maintenance](#)

URL: <http://alaskawriters.com/airman-pds185-technical-guide-operation-maintenance.pdf>

- [Comprehensive Engineering Guide to Atlas Copco GA Series: Rotary Screw Compressor Technology and Operational Excellence](#)

URL: <http://alaskawriters.com/atlas-copco-ga-series-rotary-screw-compressor-guide.pdf>

- [The Engineering Blueprint of Atlas Copco GX 7 and GX 11 Rotary Screw Compressors: A Technical Deep Dive](#)

URL: <http://alaskawriters.com/atlas-copco-gx7-gx11-rotary-screw-compressor-technical-guide.pdf>

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