

# ROTARY SCREW COMPRESSORS

## A Buyer's Guide

Practical advice for choosing, installing and operating a rotary screw compressed air system.



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## What is a Rotary Screw Compressor?

A rotary screw air compressor is an industrial compressed air system adopting two interlocking helical rotors to compress air continuously. As the rotors turn, air is drawn in, compressed and delivered as a steady, uninterrupted air flow.

This design differs from piston (reciprocating) compressors, which compresses air in pulses and pauses between cycles to prevent overheating.

Rotary screw compressors are designed for continuous duty and energy efficiency making them the preferred choice for industrial and commercial environments.

## Why and When To Choose a Rotary Screw Compressor

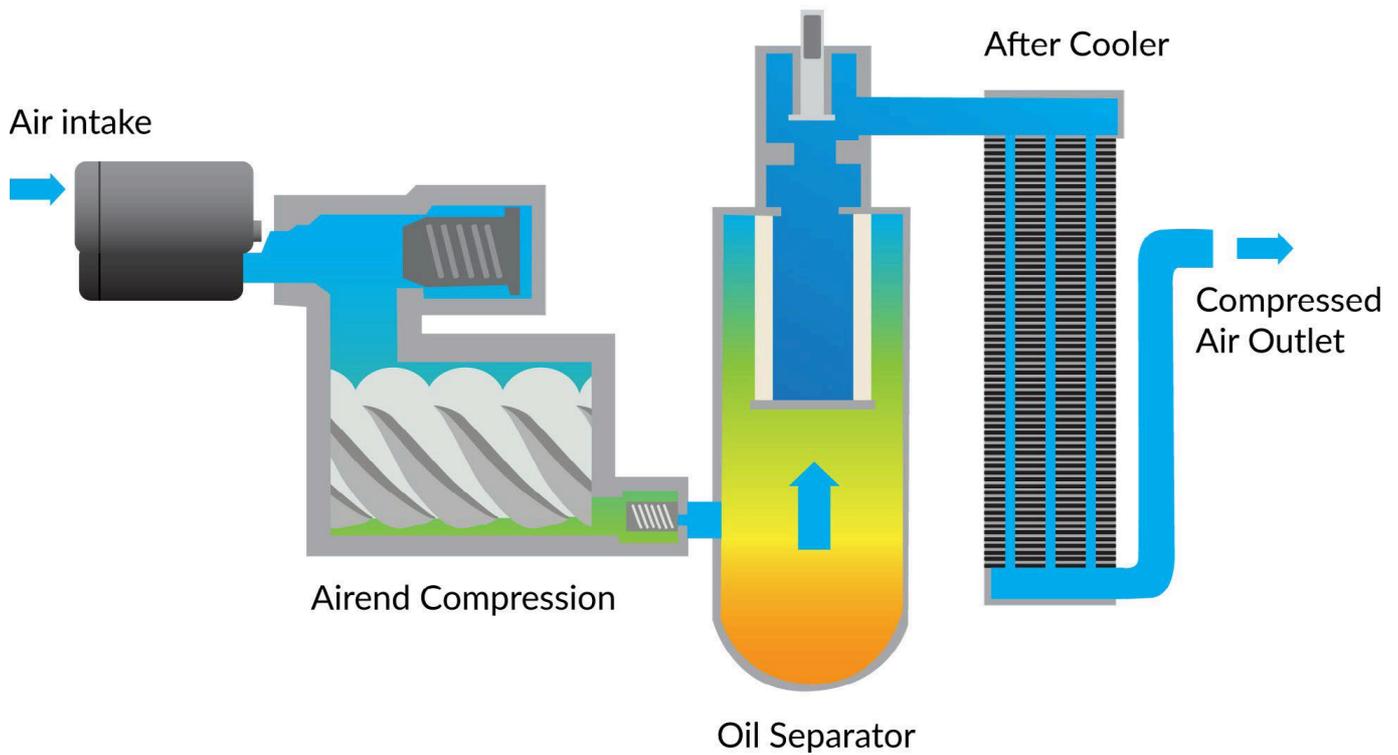
Rotary screw compressors are ideal when compressed air is a core utility rather than an occasional tool.

They are typically chosen when:

- ✓ Air is required for long periods or continuously
- ✓ Multiple tools or machines operate simultaneously
- ✓ Stable pressure is essential for production quality
- ✓ Noise and vibration need to be minimised
- ✓ Energy efficiency matters over the long term

For businesses that rely on compressed air as part of daily operations, a rotary screw compressor offers reliability, consistency, and lower total cost of ownership.





## How Rotary Screw Compressors Work

Rotary screw compressors operate by drawing air into the compression chamber, where it is compressed between two rotating screws. Oil is injected during compression to seal, cool, and lubricate the process. The compressed air and oil are then separated, cooled, and filtered before clean compressed air exits the system.

## Key Benefits Of Rotary Screw Technology



### Continuous Operation

Rotary screw compressors are designed for 100% duty cycle, making them suitable for multi-shift and 24/7 operations.



### High Airflow Capacity

They deliver large volumes of air relative to their size, maintaining pressure even when multiple tools are in use.



### Energy Efficiency

Rotary screw air compressors are highly energy efficient and variable speed drive models offer superior energy-saving.



### Quiet, Low-Vibration Operation

Smooth rotary motion results in lower noise and vibration compared to piston compressors.



### Durability and Longevity

Fewer wear-prone components allow rotary screw compressors to maintain performance and longevity.

# Who Needs a Rotary Screw Compressor?

Rotary screw compressors are recommended for:

- Businesses with continuous or near-continuous air demand
- Operations running multiple shifts
- Facilities using multiple air-powered machines and tools
- Applications where downtime impacts productivity
- Businesses seeking to reduce energy consumption and reduce their carbon footprint.

Piston compressors remain suitable for intermittent or low-volume use. However, when compressed air becomes critical to operations, upgrading to a rotary screw compressor is the recommended solution.

## Industries and Applications

Rotary screw compressors are used across a wide range of industries, including:



### Manufacturing and Metal Fabrication

CNC machining, laser cutting, assembly lines, actuators



### Automotive Workshops and Dealerships

Impact tools, tyre systems, paint booths, vehicle lifts



### Food and Beverage Processing

Packaging, filling, pneumatic conveyors, instrumentation



### Packaging and Warehousing

Automation, palletising, labelling systems



### Woodworking and Joinery

CNC routers, sanders, spray finishing



### Industrial and Mining Operations

Plant wide master units, remote monitoring, 24/7 operation

Additional sectors include pharmaceuticals, agriculture, electronics manufacturing, and medical facilities.

# Fixed Speed VS Variable Speed Compressors

## Fixed Speed Compressors

Operate at a constant motor speed and deliver full output when running. Best suited to applications with stable, predictable air demand. They offer a lower upfront cost and simpler mechanical design.

## Variable Speed Drive (VSD) Compressors

Adjust motor speed in real time to match air demand. This reduces energy consumption during low-demand periods and provides soft starting, reducing electrical and mechanical stress. If air demand fluctuates throughout the day, a VSD compressor will deliver significant energy savings over time.

Feature	Fixed Speed Compressor	Variable Speed (VSD) Compressor
<b>Motor Operation</b>	Runs at a constant speed when switched on	Adjusts motor speed continuously to match demand
<b>Air Output Control</b>	On/off or load unload operation	Output precisely matches air demand
<b>Best Suited To</b>	Stable, predictable air demand	Fluctuating or variable air demand
<b>Energy Efficiency</b>	Efficient at full load, less efficient at partial load	Highly efficient across varying loads
<b>Energy Savings</b>	Limited opportunity for savings	Can reduce energy consumption by 20–35%
<b>Electrical Impact</b>	Higher inrush current at start-up	Soft start reduces electrical stress
<b>Mechanical Wear</b>	More frequent cycling can increase wear	Smoother operation reduces wear
<b>Noise Levels</b>	Consistent noise when running	Often quieter during low demand
<b>Upfront Cost</b>	Lower initial purchase cost	Higher upfront cost
<b>Long-Term Operating Cost</b>	Lower upfront, potentially higher energy costs	Higher upfront, lower lifetime energy cost
<b>Typical Applications</b>	Production lines with constant demand, single-shift operations	Workshops, manufacturing with variable usage, multi-shift operations

# Decision Summary Box

## Which Option Is Right for Your Business?

If your compressed air demand is steady and predictable, a fixed speed compressor is often the most cost-effective solution.

If air usage varies throughout the day, with peaks and idle periods, a variable speed (VSD) compressor can significantly reduce energy consumption and lower long-term operating costs.

In most mixed-use or growing operations, a VSD compressor provides the greatest flexibility and future-proofing.

## Choosing The Right Compressor For Your Business

While every operation is different, general guidelines can help narrow down options.



### Small Workshops

7.5kW - 11kW rotary screw compressor system is an ideal solution.



### Medium Operations

Daily use, steady demand. Typically suited to 15–37 kW rotary screw compressors.



### Large or Continuous Operations

High airflow, multi-shift production. Often require larger compressors or multiple units for redundancy.

Correct sizing is critical. Oversizing wastes energy; undersizing causes pressure drops and excessive wear. Talk to our technical team for expert advice.



## Installation And System Considerations



A well-designed system maximises performance and lifespan. Key considerations include:

- Correct compressor sizing
- Receiver tank capacity
- Air dryers and filtration
- Pipe layout and pressure drop
- Ventilation and cooling
- Electrical supply and protection
- Service access

## Maintenance And Long-Term Ownership

Rotary screw compressors require regular maintenance to perform reliably.



### Routine Checks

Oil levels, drains, general inspection.



### Scheduled Servicing

Oil and filter changes at defined intervals.



### Long-Term Costs

Energy consumption is the largest lifetime expense - efficiency matters.

## Getting Expert Advice

Compressed air systems are technical and highly application-specific. Consulting a specialist ensures the correct equipment selection, installation, and configuration.

- Current and future air demand
- Usage patterns
- Environment
- Budget and operating costs

## Common Mistakes To Avoid

- Undersizing the compressor
- Ignoring air treatment requirements
- Poor ventilation
- Incorrect pipe sizing
- Not planning for future growth

# Pilot Air Compressor Options

Pilot Air supplies a comprehensive range of rotary screw compressors designed for Australian conditions, including fixed-speed, variable-speed, and advanced remote monitoring systems. Our team will customise a rotary screw compressed air solution for your needs.

With onshore technical support, add ons including air storage, dryers and air distribution, spare parts, and nationwide service, Pilot Air supports businesses through the full lifecycle of their compressed air system.



## NGS Series 7.5kW - 250kW VDS

The ideal workhorse at a competitive price

The most powerful rotary screw workhorse in its class, Pilot Air offers a full range of sizes and customisation options to meet any industrial application. The Next Generation Screw series is the ideal solution for businesses that need performance, reliability and longevity in an affordable package.



## ALTA TEC variable speed rotary screw

Top of the range 7.5kW - 315kW

Pilot Air's premium ALTA TEC rotary screw air compressors lead the industry in rotary screw technology, scalability, performance and customisation. Superior energy efficiencies, connectivity and integration are just a few reasons to choose an ALTA TEC series air compressor.



## The PAC Industrial fixed speed air compressor range 4.5kW - 75kw

The fixed speed rotary screw PAC air compressors are built tough for Australian conditions. The poly-v belt-driven system offers long life and minimum maintenance, and the electronic controller is a big advantage. Built with an Italian-designed and manufactured air end and available in a range of sizes.

## Next Steps

If you're considering a rotary screw compressor or reviewing your existing system, Pilot Air's technical team can help assess your requirements and recommend the right solution.



Book a system assessment



Speak to a specialist:  
1300 667 579



[www.pilotair.com.au](http://www.pilotair.com.au)

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Submit an Enquiry

