Air Research Turbo The Complete Guide to History, Technology

If you have spent any time browsing old parts catalogues, digging through a project car engine bay, or chasing down a replacement for a tired force induction unit, chances are you have come across the name Air Research Turbo. For many enthusiasts and mechanics, the term is used loosely to describe a whole family of turbochargers built by AiResearch, the aerospacerooted manufacturer that later became known to the automotive world as Garrett. Understanding where these units came from, how they work and how they evolved into the turbochargers we use today is essential for anyone restoring a classic vehicle, sourcing parts, or simply trying to make sense of an unfamiliar part number stamped into a compressor housing.

This guide walks through the origins of the Air Research Turbo, explains the core technology behind every turbocharger family that followed it and helps you identify which model you might be dealing with. Whether you are rebuilding a vintage diesel truck turbo or shopping for a modern performance turbocharger, this article will give you the background you need before you spend a single dollar on parts.

Where the Name Air Research Comes From

The story begins in 1936, when Cliff Garrett founded a small company in Los Angeles that would go on to become one of the most influential names in aerospace and, eventually, automotive forced induction. In 1939, Garrett established a small research laboratory dedicated to studying pressurized air systems for aircraft cabins, an effort the company

internally referred to as air research.That project became the seed for what would later be formally organized as the AiResearch Manufacturing Company and the name stuck for decades afterward, which is why so many enthusiasts still refer to any older Garrettbuilt turbo simply as an Air Research Turbo.

During World War II, the company built intercoolers for aircraft such as the Boeing B17 and B25, technology that shared a great deal of engineering DNA with the turbochargers it would go on to build for trucks, industrial engines and eventually passenger cars. By the 1950s, AiResearch had diversified into hydraulics, avionics, cabin pressurization systems and turbochargers for industrial diesel engines, delivering its first T15 turbocharger to Caterpillar and forming a dedicated AiResearch Industrial Division shortly afterward.

The automotive chapter of the Air Research Turbo story really took off in the 1960s, when a Garrett T05 turbocharger was fitted under the hood of the 1962 Oldsmobile Jetfire, widely regarded as the first production car ever sold with a turbocharger. From that point forward, AiResearch turbochargers found their way into everything from diesel pickup trucks to turbocharged coupes and the company industrial division kept building larger units for trucks, generators, marine engines and heavy machinery.

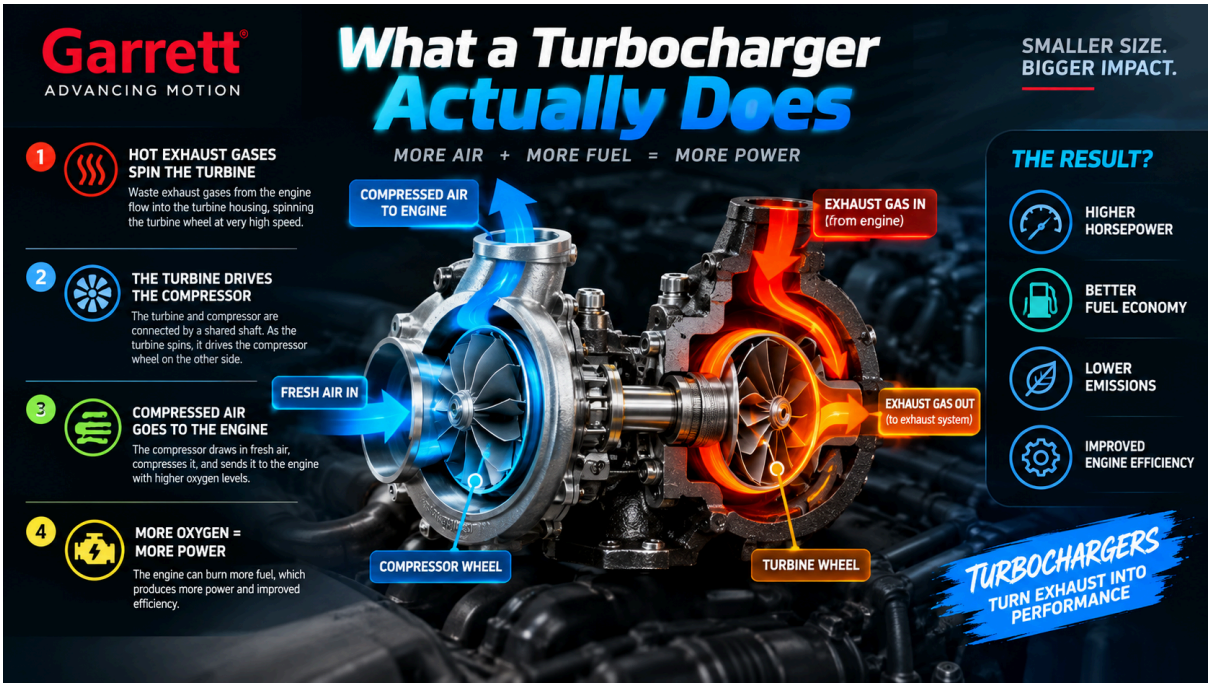
Corporate history complicates the naming a little further. In 1964, AiResearch merged with Signal Oil and Gas to form what eventually became Signal Companies and in the 1980s that company merged with Allied Corporation to form AlliedSignal. In 1999, AlliedSignal merged with Honeywell and took the Honeywell name and in 2018 Honeywell spun off its turbocharger division into an independent public company called Garrett Motion. That company continues to design and manufacture turbochargers today under the Garrett brand, which is why the terms Air Research Turbo, AiResearch Turbocharger and Garrett turbo are so often used interchangeably by mechanics who grew up working on these engines.

If you want to browse the modern descendants of this lineage, you can find the full range of current production turbochargers under the Garrett product category, which covers everything from entry level replacement units to serious performance hardware.

What a Turbocharger Actually Does

Before diving into model numbers and part identification, it helps to understand the underlying turbocharger technology, since the same basic principles apply whether you are looking at a 1970s AiResearch unit bolted to a farm tractor or a modern ballbearing turbo on a track car.

A turbocharger is a forced induction system that increases an engine's power output without increasing its displacement. It does this by using exhaust gas energy, which would otherwise be wasted, to spin a turbine wheel. That turbine wheel is connected by a shaft to a compressor wheel on the opposite end of the unit and as the turbine spins, so does the compressor. The compressor draws in fresh air, compresses it and forces it into the engine's intake manifold at a pressure higher than atmospheric, a value commonly referred to as boost pressure.



More air packed into each cylinder means more oxygen is available to burn fuel and when the engines fuel and ignition are tuned to match, the result is a meaningful increase in engine performance without the added weight, friction and complexity of a larger naturally aspirated engine. This is the entire premise behind forced induction and it is why turbochargers became so popular first in diesel engine applications, where they dramatically improve efficiency and torque and later in petrol engine performance builds, where they are used to extract significant horsepower from relatively small engine blocks.

The Main Components

Every Air Research Turbo and every turbocharger built since, shares the same fundamental architecture:

- Compressor wheel and compressor housing the compressor wheel spins at extremely high speed to draw in and compress incoming air, while the compressor housing shapes and directs that airflow toward the intake system.
- Turbine wheel and turbine housing the turbine wheel is spun by exhaust gas exiting the engine and the turbine housing controls how that exhaust energy is directed onto the wheel, which has a major effect on how quickly the turbo spools up.
- Center housing rotating assembly (CHRA) often just called the CHRA turbo, this is the core section that houses the shaft connecting the compressor and turbine wheels, along with the bearings, seals and oil (and sometimes water) passages that keep everything lubricated and cool.

Together, these three sections make up the complete unit and nearly every rebuild, repair, or upgrade conversation you will have about a turbocharger comes back to one or more of these components. If you are shopping for a modern equivalent to a classic unit, categories like the G Series and GT Series represent the current evolution of that same threepart architecture, refined with decades of additional engineering.

Air Research Turbocharger Models Through the Years

Because AiResearch supplied turbochargers to such a wide range of industries, the model lineup is broad and identification can be genuinely tricky for anyone who did not grow up around these parts. Broadly speaking, the historical Air Research Turbo lineup can be grouped into a few families:

Small automotive and light truck units are the turbochargers most commonly associated with 1960s through 1980s turbocharged passenger cars and light trucks, including the units used on early turbo diesel pickups and performance coupes of the era.

Industrial and heavy duty units larger frame turbochargers built for Caterpillar, Cummins, Detroit Diesel and similar heavy equipment and truck engines, often identifiable by their larger compressor and turbine housings and heavier duty CHRA construction.

Aerospacederived turboshaft and turbofan hardware while not turbochargers in the automotive sense, AiResearch's aviation turbine work, including engines like the Garrett F109 turbofan, shared design philosophy and manufacturing expertise with the company's automotive turbocharger business and this crosspollination is part of why AiResearch turbochargers earned a reputation for aerospace grade engineering.

As the automotive division grew into what eventually became Garrett, the model naming shifted toward the alphanumeric system many enthusiasts recognize today, including the Tseries, TBseries and eventually the modern GT, GTX and GTW model families. If you are trying to identify an old housing casting number, crossreferencing it against current Garrett catalogues is often the fastest way to find a modern equivalent and browsing spare parts listings can help you match housing shapes, flange patterns and wheel sizes even when the original part number has worn away.

Modern Successors Worth Knowing

If your goal is to replace or upgrade an aging Air Research Turbo rather than restore it to factory original condition, it is worth understanding where the current Garrett lineup sits relative to the old AiResearch designs:

- The GT Series covers a broad range of journalbearing turbochargers suited to both OEMstyle replacement and moderate performance builds.
- The GTX Series represents Garrett's ballbearing performance line, designed for faster spool and higher boost capability in serious builds.
- The garrett gtw family sits at the top end of Garrett's performance range, built for high horsepower applications where extreme boost pressure and airflow are required.
- The GBC Series offers a more compact, budget conscious option for builders who still want ballbearing performance without stepping up to the largest frame sizes.

Each of these families traces its engineering lineage back to the same fundamental compressor wheel, turbine wheel and CHRA architecture pioneered decades ago, just refined with modern materials, tighter tolerances and improved compressor maps.

Turbocharger Identification: How to Read an Old Air Research Unit

Identifying a genuine AiResearch or Air Research turbocharger usually comes down to a combination of casting markings, tag information and physical measurements:

1. Look for a stamped or cast part number on the compressor housing, turbine housing, or CHRA. Early units often used a numeric part number system before Garrett standardized its alphanumeric model codes.
2. Check for a manufacturer's tag or plate, which on many industrial units lists the model designation, along with information useful for cross referencing against current turbocharger sizing charts.
3. Measure the compressor inducer and exducer diameters, along with the turbine wheel dimensions, since these measurements can be matched against modern compressor maps even when a part number is illegible.
4. Inspect the flange pattern on both the turbine inlet and the exhaust outlet, as bolt patterns and flange shapes are often unique to specific engine families and can help narrow down the correct application.
5. Note the housing material and finish, since industrial units built for heavy duty diesel applications are typically constructed from thicker castings than the lighter automotive units of the same era.

If identification proves difficult, comparing your unit against a current spare parts catalogue is often more productive than trying to decode a worn casting mark alone, since many core dimensions have carried forward into the modern lineup even where model names have changed.

Why This History Still Matters for Today Buyers

Some readers may wonder why any of this matters if you are simply trying to buy a working turbocharger for a build in progress. The answer is that understanding turbocharger technology and its evolution helps you make smarter buying decisions. Knowing the difference between a journalbearing CHRA and a ballbearing CHRA, for example, tells you a lot about expected spool characteristics and maintenance intervals. Understanding how compressor and turbine housing sizing affects boost pressure delivery helps you avoid buying a unit that is mismatched to your engine's displacement and intended use, whether that is a stock diesel engine turbo replacement or a heavily built petrol engine performance project.

It also helps explain why so many original Air Research Turbo units are still highly sought after today. These parts were engineered by a company with genuine aerospace pedigree, at a time when turbocharger technology was still relatively new to the automotive world and that engineering rigor is part of why so many original units have survived in running order for decades.

Conclusion

The Air Research Turbo is more than a nostalgic name for enthusiasts who remember the early days of turbocharged engines. It represents the origin point of a turbocharger technology lineage that stretches from 1930s aerospace research labs all the way to the ballbearing performance turbochargers used in today's most serious builds. Understanding that history, along with the core mechanics of the compressor wheel, turbine wheel and center housing rotating assembly that every turbocharger relies on, puts you in a far better position to identify, rebuild, or replace a unit correctly.

Whether you are trying to track down an obscure part number on a decades old industrial turbo or planning a full boost pressure upgrade on a modern build, the same engineering principles that Cliff Garrett's air research lab first explored back in 1939 are still at work under the hood. For parts, spares and modern replacements across the full Garrett lineup, from entry level G Series units to top tier garrett gtw performance turbochargers, browsing a dedicated catalogue is the most reliable way to find the right match for your engine.

Frequently Asked Questions (FAQs)

What is the difference between an Air Research Turbo and a Garrett turbo?

They are, in effect, the same lineage. AiResearch was the original manufacturer and through a series of corporate mergers and spinoffs, its automotive turbocharger business eventually became Garrett and today Garrett Motion. Older units are commonly labeled Air Research or AiResearch, while modern equivalents carry the Garrett name.

Are original AiResearch turbochargers still usable today?

Many original units can still be rebuilt and returned to service, provided the housings are not cracked and a suitable CHRA rebuild kit can be sourced or fabricated. However, for high mileage or heavily worn units, a modern replacement often offers better reliability and easier parts availability.

How do I know what size turbocharger my engine needs?

Turbocharger sizing depends on engine displacement, desired power output, intended boost pressure and how the vehicle will be used. Comparing your engine's specifications against a compressor map is the most accurate way to size a replacement or upgrade correctly.

Can I upgrade an old Air Research Turbo to a modern equivalent?

In many cases, yes. Because flange patterns and mounting dimensions were often carried forward, it is frequently possible to fit a modern GT, GTX, or GTW series turbocharger in place of an original unit, sometimes with minor adapter work.

Where can I find parts for an Air Research or Garrett turbocharger?

Spare parts, rebuild components and full replacement units for the Garrett lineage, the modern continuation of the original AiResearch turbocharger business, can be found through dedicated Garrett parts catalogues.