Turbo Blower
Aerzen Turbo G5 and G5^{plus}

Volume flows from 300 m^3/h to 16,200 m^3/h

AERZEN
EXPECT PERFORMANCE

AERZEN technology
Always one innovation ahead

In a time of fiercely contested markets and increasing competition, a company with more than 150 years of history has become a rarity. Today, AERZEN is one of the few family-owned companies that remains well known for consistent quality and powerful innovations. The impressive performance of Aerzen's latest Generation 5 and 5^{plus} turbo blowers proves this once again, setting new standards in reliability and energy efficiency.

AERZEN – A tradition of innovation

Founded in 1864, today Aerzener Maschinenfabrik is a world leader in compressor technology. Used in countless applications, AERZEN positive displacement blowers, turbo blowers, and screw compressors have been renowned worldwide for decades. A dedicated R&D department ensures that AERZEN technology undergoes continual development. Pioneering innovations developed by the department, such as Delta Hybrid, the world's first rotary lobe compressor, and the Aerzen Turbo with air bearings, have exerted a major influence on technological progress. It is all in keeping with our company's motto: 'Expect performance'.

Energy consumption: a key issue in the future

With increasing demand for resilient, lasting technology that offers minimal energy consumption and high performance, rising energy costs and dwindling resources are of greater concern to companies, researchers, and end users now more than ever before. The increasing scarcity of resources gives particular cause for concern. Basic industrial processes are associated with some of the highest energy costs. Processes involving pumps and compressors, regardless of type, account for the highest percentage of total energy costs – 30%. This affects wastewater treatment applications as well. The treatment of wastewater in aeration tanks consumes a staggering 60% to 80% of the total energy required by a wastewater treatment plant. It is high time to construct a future with technologies based on low energy costs and sustainability.

The right solution for every application

AERZEN successfully introduced its innovative, air bearing turbo blower to the market in 2010. Today, more than 2500 installations worldwide attest to its superior reliability, and low energy and maintenance costs. AERZEN's turbo blowers are used for a wide range of different applications, including oxygen supply in the biological processes of wastewater treatment plants, fermentation in yeast production, providing oxidation air for lime and cement production, and many more...

Maximum efficiency

Perfectly attuned components

AERZEN manufactures and develops all of its products via in-house production. The advantages are obvious. Only this working method allows us to ensure components are perfectly matched to each other and can be ideally adapted to the operating process. The result is unparalleled durability, operational reliability, and cost-effectiveness, flawless operation around the clock, and maximum productivity at reduced operating costs.

Designed for perfection: the impeller design

What distinguishes a turbo impeller from an AERZEN turbo impeller? Basically everything. Take the design, for example. The Aerzen Turbo is the result of complex CFD-supported flow analyses. The shape of every impeller is optimally designed for the corresponding performance class. As a result, AERZEN turbo impellers are significantly more effective than those that are adjusted only for a few parameters, such as the diameter. Another distinguishing feature of AERZEN impellers is the material: they use stainless steel instead of aluminium. From a pure design standpoint, this material allows for vast improvement in aerodynamics. Stainless steel is a win not only for efficiency, but also for durability and sustainably low life-cycle costs. That's because stainless steel is corrosion-resistant and practically abrasion-free.

The Aerzen Turbo impeller

Efficient, intelligent, and future oriented: The AERZEN frequency converter

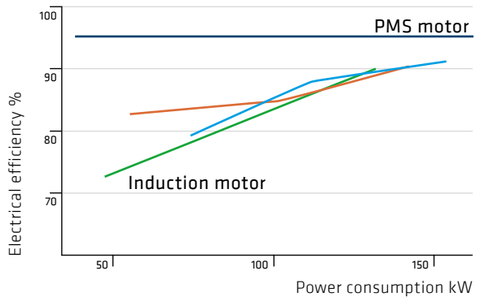
The innovation: AERZEN frequency converters based on multi-level topology. The converter power stage has a three-level structure, effectively halving the DC-Link voltage per switching cycle. As a result, heat loss in the drive motor is reduced to a minimum, leading to a decisive improvement in overall system efficiency. Another advantage of Aerzen's multi-level design is that it eliminates the need for an additional motor choke or the sine wave filter that is required for standard frequency converters. Furthermore, the AERZEN frequency converter offers considerably faster performance, thanks to special high-rise-to-surge technology (active surge protection).

Compared to turbo blowers with standard converters, turbo assemblies from AERZEN are less sensitive to pressure fluctuations, and more responsive. As a result, Aerzen Turbo assemblies can be operated with far greater stability throughout the entire turbo range, which also happens to provide a basis for the reliable combination of positive displacement and turbo machines. All parameters are measured constantly to prevent the compressor surge that can occur with unexpected pressure fluctuations. This gives the AERZEN frequency converter a decisive advantage in operational reliability and energy efficiency.

Powering innovation: the PMS motor

The Aerzen Turbo is powered by a special motor. It's called a permanent magnet synchronous motor, or PMS motor for short. Its main characteristics: It is extremely efficient, energy-saving, highly innovative, and far superior to conventional motors. Why? Because AERZEN developed this motor specifically for its turbos. Because the rotor doesn't require any additional energy for its magnetisation. Because, like the AERZEN frequency converter, it was designed to meet the special high frequency and response-time requirements of turbo technology. And finally, because this motor demonstrates exceptional performance and a high power density with an outstanding efficiency up to 98%, even in partial load operation.
The AERZEN PMS motor already meets the future requirements of the IE5 classification (Ultra Premium Efficiency). In combination with the AERZEN multilevel frequency inverter, a system efficiency of IES2 is achieved, and thus the highest possible efficiency according to the EN 50598 standard.

Induction and PMS motor comparison

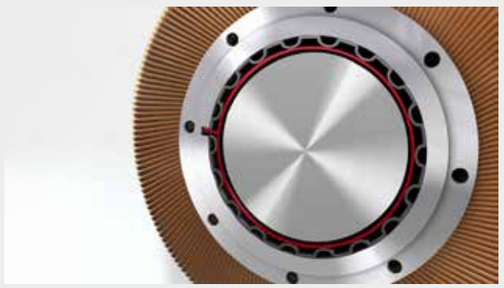


Capable of absorbing any pressure fluctuation: Air foil bearings for the PMS motor

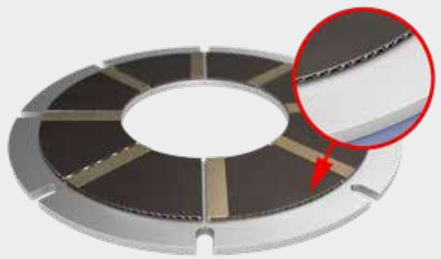
The AERZEN PMS motor comes equipped with air foil bearings. For a particular reason. Borrowed from the aerospace industry, this technology is extremely simple in construction and convincing in operation. A cushion of air is created as soon as the shaft begins to rotate. AERZEN has now taken this technology one decisive step further. Made of graphite and Teflon, our new, double-coated air foil bearings offer increased temperature resistance and a longer service life. Rather than facing problems associated with magnetic bearing systems and standard air foil technology, this type of bearing offers numerous advantages:

- Uncomplicated, closed system
- Contact- and vibration-free operation
- Theoretical bearing lifetime of >80,000 operating hours, regardless of stop and start cycles by soft start and corresponding operating
- No components susceptible to wear
- 100% maintenance- and oil-free
- Able to withstand even large-scale pressure variations (for example, SBR processes and pulsations from positive displacement machines).

Radial bearing

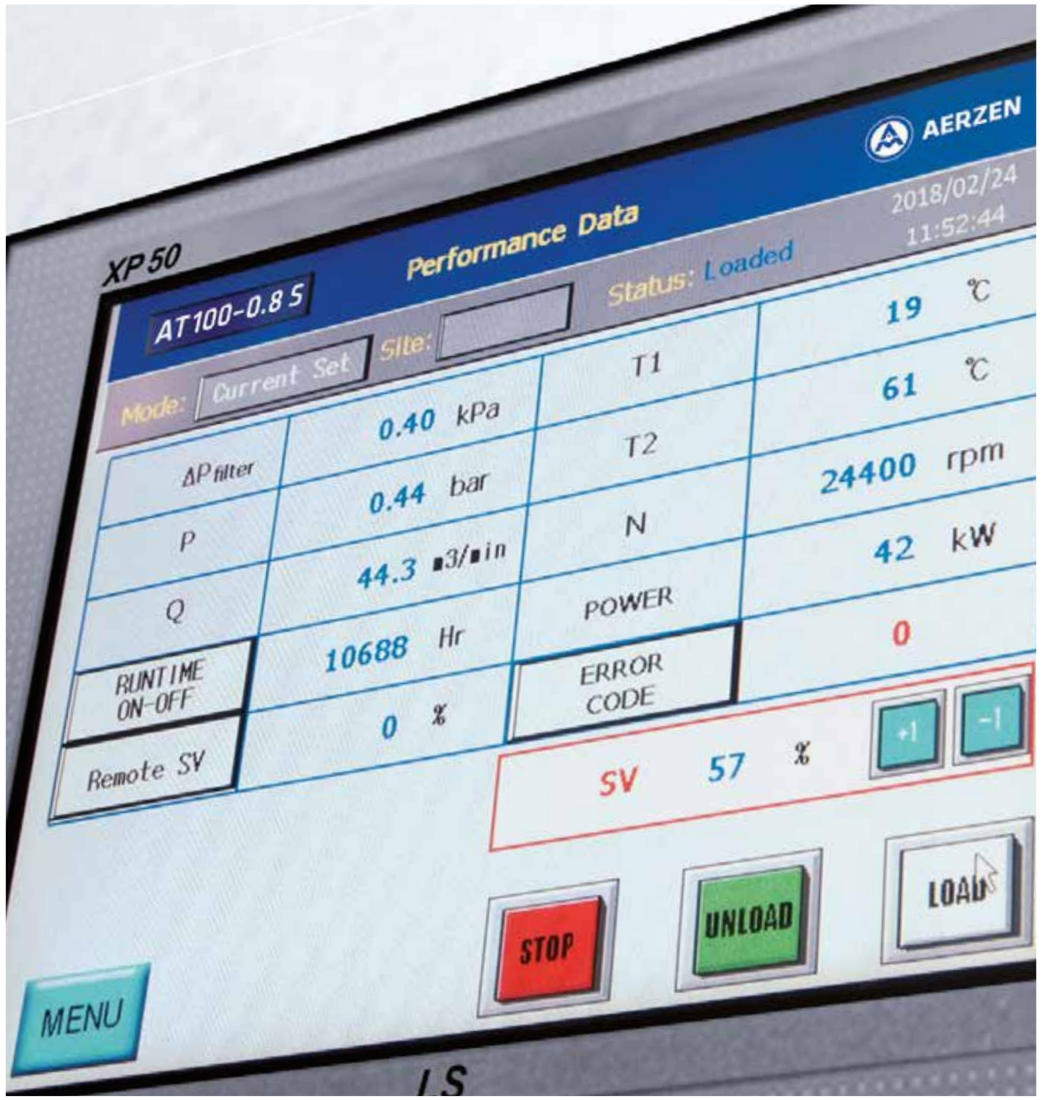


Thrust bearing



Reliability, convenience and transparency: **the Turbo control system**

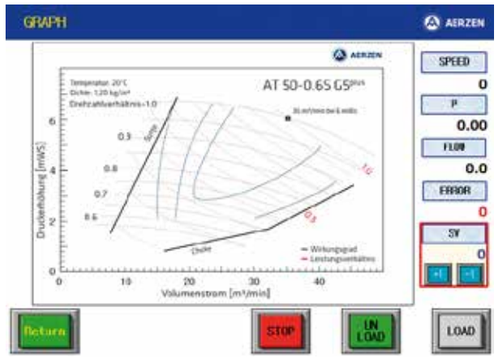
The reason we chose to develop the hardware especially for our high-efficiency turbo rather than rely on a standard control system. The result is a fully integrated digital system with unrivalled functionality Convenient use via the touchscreen. and equipped with all the relevant interfaces, for example, for your scada system.



Real-time transparency:

The Aerzen Turbo control system integrates all the parameters of the turbo blower with the corresponding permissible minimal and maximal values (surge limit, maximal speed, overload, etc.):

- Differential pressure of the intake filter
- Differential pressure
- Volume flow
- Intake and discharge temperature
- Speed
- Electrical rating
- Operating hours
- Warnings, error codes, and error history
- Live visualisation inside the turbo performance map



Actual volume flow measurement

When it comes to high-performance, reliable plant operation, we don't like to compromise. That's why with the Aerzen Turbo we don't take the conventional, indirect route of measuring volume flow from the blower's power consumption. Instead, we measure it for real, based on the Venturi effect. To be precise, the actual volume flow is measured at the inlet cone, based on a measurement of the generated differential pressure. This approach is unrivalled and has decisive advantages. On the one hand, it means the assembly uses real values for its safety system, for example, the AERZEN High-Rise-to-Surge feature (active surge protection). On the other, our customers know at any point the actual air quantities that they are putting into their aeration tanks (this parameter is displayed for you directly via the software).

Comfort written large

From comprehensive analysis tools and a multitude of security features to modern interfaces, the Aerzen Turbo control system leaves nothing to be desired.

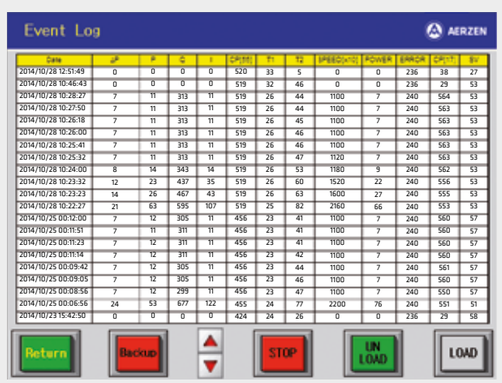
Communication interfaces:
Profibus, Modbus, Ethernet IP, Profinet, direct connection to an oxygen probe and analogue signals (4-20 mA).

Safety features

- Unique AERZEN ASP software (Automatic Surge Protection). Automatic control of blower speed when surge limits and critical operating ranges are reached
- Constant monitoring of all relevant operating parameters (for example, pressure, temperature, speed, etc.)

Tools for Analysis

Fault log with operating values, trend curves, and data loggers for motor and frequency converters.



Aerzen Turbo G5
More compact, greater efficiency, better

Again and again, AERZEN has set new records with its forward-looking solutions. A case in point is our new Turbo generation, Aerzen Turbo G5^{plus}. The Plus means greater compactness, as well as optimal efficiency and durability. Aerzen Turbo G5^{plus}, the most compact and efficient Turbo in its class. Experience innovations that will make all the difference. Turbo technology from AERZEN.

Perfect additions
Accessories, modifications and extensions

- Option: pipe suction
- Pressure loss optimised check valve
- Bellow type expansion joint with internal conduit tube
- Plug & Play container solutions
- Discharge silencer for reducing piping noise
- Transformer for 500 V - 700 V applications
- Special solutions for high ambient temperatures > 45°C
- Option: pre-filter
- Master machine control system

Ready to connect:
the extent of supply in the standard version

1 BOV (Blow OFF valve)
- For discharging the machine during start-up and shut-down processes

2 Process filter
- Readily accessible
- Filters are easy to change
- Optional: Pre-filter

3 Motor cooling
- Via an integrated fan impeller on the motor
- Optional use of waste heat

4 Silencer Box
- Significant reduction of exhaust noise from motor cooling air and BOV
- Combined silencer for BOV and motor cooling exhaust air
- Exhaust air can be discharged directly via pipe connection

5 Frequency inverter
- Fully integrated, including line reactor for reducing circuit feedbac
- RFI filter (as option)

6 Cone silencer
- Flow-optimised pressure generation
- Silencing of machine and piping noises

7 Aerzen Turbo control system
- Reliable, convenient, and transparent

8 Turbo motor
- Single configuration, one blower stage and integrated motor cooling
- Air foil bearing, impeller, and PMS motor (as per IE5 classification)
- With integrated airflow measurement

9 Quiet and efficient
- Flow-optimised and noise-reducing process air guidance through sound absorbing louvers

Aerzen Turbo G5^{plus}
The plug & play concept

Simply connect and start. It's that simple. After all, your Turbo package has already been fully configured and assembled at the factory, and is ready to connect and operate at the installation site. Tailored to your exact process requirements, of course. Turbo convenience from day one. Typical of AERZEN, and one reason why the Turbo will be well received at your plant.

Perfect additions
Accessories, modifications and extensions

- Option: duct intake
- Pressure loss optimised check valve
- Bellow type expansion joint with internal conduit tube
- Discharge silencer for reducing piping noise
- Transformer for 500 V - 700 V applications
- Special solutions for high ambient temperatures > 45°C
- Option: pre-filter

Ready to connect:
the extent of supply in the standard version

1 BOV (Blow OFF valve)
- For discharging the machine during start-up and shut-down processes

2 Process filter
- Readily accessible
- Filters are easy to change
- Option: pre-filter

3 Cooling fan
- Needs-based and energy-efficient cooling of the main motor
- Optional use of motor waste heat

4 BOV silencer
- Significant reduction of exhaust noise

5 Frequency inverter
- Completely integrated including line reactor for reducing circuit feedback
- With retractable cabinet and RFI filter (optional)

6 Cone silencer
- Flow-optimised pressure generation

7 Aerzen Turbo control system
- Reliable, convenient and transparent

8 Turbo motor
- Twin configuration, one blower stage each per shaft end
- Air foil bearing, impeller, and PMS motor
- With integrated airflow measurement

9 Intake silencer
- Flow-optimised and noise-reducing process air guidance

10 Optional
- Suction via inlet air duct

There’s a lot to say about the economical Aerzen Turbo **We’ll make it brief**

AERZEN has built turbo blowers since 1911. Over the years, we’ve continued to perfect the technology of our assemblies. Along the way, we’ve developed expertise that today sets standards worldwide. This is reflected in all the performance characteristics, every component, and all the details of the newest Turbos. Discover the new Turbo Generation 5 and Generation 5^{plus}.

100% Turbo
- For small and large volume flows
- From 300 m³/h to 16,200 m³/h
- Speed-controlled
- 100% oil-free
- Quiet operation

Efficient peak values
- Improved energy efficiency by up to 10% compared to conventional turbo technology
- Control range of 35% to 100%
- Highly efficient individual components

Powering innovation: the permanent magnet motor
- Extremely efficient and energy-saving permanent magnet motor
- Requires no additional energy to magnetise the rotor
- Outstanding efficiency of up to constant 98%, even in partial load operation
- Meets the future requirements of the IE5 classificaiton (Ultra Premium Efficiency)
- System efficiency IES2 and highest possible efficiency according to EN 50598

Innovative AERZEN air foil bearings
- Forward-thinking double coating made of Teflon and graphite
- Theoretical bearing lifetime of >80,000 operating hours, regardless of stop and start cycles by soft start and corresponding operating modes
- Resistant to pressure peaks (for example, SBR processes, pulsations caused by positive displacement machines) and compressor surge
- Highly functional without necessary accessories (for example, electric control system, back-up bearings, auxiliary electronics such as battery systems), highly reliable operation even during voltage fluctuations and power supply failures.
- 100% maintenance free

Direct volume flow measurement
- Real measurement based on the Venturi effect

Convenient scope of supply
- Assembled and ready to connect
- Slight modifications of duct or pipe intake
- Diverse range of accessories

New multi-level frequency inverter technology (>55kW)
- High efficiency rating, up to 90% less power loss in the motor compared to conventional converter technology
- No need for a motor choke or sine wave filter
- Low temperature generation on the motor side, resulting in high reliability
- Consistent air cooling, expanded field of application for up to 50° ambient temperature
- Active surge protection (high-rise-to-surge) Speed control based on motor current
- Can be used reliably in combination with positive displacement machines

Convenient Turbo control system
- Integrated real-time transparency, display of all parameters including live visualisation of the Turbo performance map.
- Real airflow measurement for increased transparency and operational reliability
- Advanced AERZEN ‘Automatic Surge Protection’ software, active surge protection via automatic speed control
- Universal interface

The impeller design
- High efficiency due to optimised design
- Improved aerodynamics, corrosion resistant and practically abrasion-free thanks to the use of stainless steel

Low space requirements
- Reduced dimensions: Existing blowers can be exchanged quickly and easily (series G5^{plus})
- Small machine room dimensions
- Fits through any door

Intelligently designed:
- Easy transport, installation, and commissioning
- Low sound pressure level, on average < 73 db(A)
- Low pipe noise

Efficiency as a matter of fact
The Turbo in numbers

Fig. 1

Fig. 2

Fig. 3

Aerzen Turbo Generation 5^{plus} - performance data, dimensions, and weights

Blower size	Performance data					Dimensions and weights					
	Nom. pressure mbar	Volume flow * in m³/h min	Volume flow * in m³/h max	Assembly-performance max.kW	Sound pressure level max. dB(A)	Width (W) mm	Length (D) mm	Height (H) mm	DN¹	DN²	Weight kg
AT 25-0.8 S G5^{plus}	800	360	900	25	72	800	1.040	1.500	300	100	520
AT 35-0.8 S G5^{plus}	800	360	1.200	33	72	800	1.040	1.500	300	100	550
AT 50-0.6 S G5^{plus}	600	600	2.700	45	72	800	1.040	1.500	300	150	550
AT 50-0.8 S G5^{plus}	800	600	1.900	45	72	800	1.040	1.500	300	150	550
AT 60-0.9 S G5^{plus}	900	900	2.650	50	73	800	1.040	1.500	300	150	600
AT 75-0.6 S G5^{plus}	600	900	3.900	65	73	900	1.140	1.600	350	200	750
AT 75-0.8 S G5^{plus}	800	900	2.900	65	73	900	1.140	1.600	350	200	750
AT 100-0.6 S G5^{plus}	600	1.200	5.100	85	73	900	1.140	1.600	350	250	750
AT 100-0.8 S G5^{plus}	800	1.200	3.900	85	73	900	1.140	1.600	350	200	750
AT 100-1.0 S G5^{plus}	1.000	1.400	3.000	85	73	900	1.140	1.600	350	200	750
AT 150-0.6 S G5^{plus}	600	2.700	7.800	130	73	1.000	1.300	1.850	400	250	870
AT 150-0.8 S G5^{plus}	800	1.800	5.400	130	73	1.000	1.300	1.850	400	250	870
AT 150-1.0 S G5^{plus}	1.000	1.500	4.800	130	73	1.000	1.300	1.850	400	250	870
AT 200-0.8 S G5^{plus}	800	2.700	8.400	165	73	1.000	1.300	1.850	400	250	870
AT 200-1.0 S G5^{plus}	1.000	1.800	6.000	165	73	1.000	1.300	1.850	400	250	870
AT 250-0.9 S G5^{plus}**	900	2.700	9.400	190	76	1.000	1.300	1.850	400	250	870

(Data and dimensions non-binding. Subject to technical modifications)
Fig. 2: Standard suction from the room | Fig 3: Optional - Suction via piping
* Corresponds to the delivery volume flow measured according to ISO 5167 and converted to the reference suction conditions
** In preparation

Aerzen Turbo Generation 5 - performance data, dimensions, and weights

Blower size	Performance data					Dimensions and weights				
	Nom. pressure mbar	Volume flow * in m³/h min	Volume flow * in m³/h max	Assembly-performance max. kW	Sound pressure level max. dB(A)	Width (W) mm	Lenght (D) mm	Hight (H) mm	DN²	Weight kg
AT 300-0.6 G5	600	5,400	15,000	250	72	2,450	2,170	2,105	500	2,070
AT 300-0.8 G5	800	3,600	11,400	250	72	2,450	2,170	2,105	400	1,980
AT 300-1.0 G5	1,000	3,000	9,600	250	72	2,450	2,170	2,105	400	1,980
AT 400-0.8 G5	800	5,400	16,200	330	72	2,450	2,170	2,105	500	2,220
AT 400-1.0 G5	1,000	3,600	11,200	330	72	2,450	2,170	2,105	400	2,130

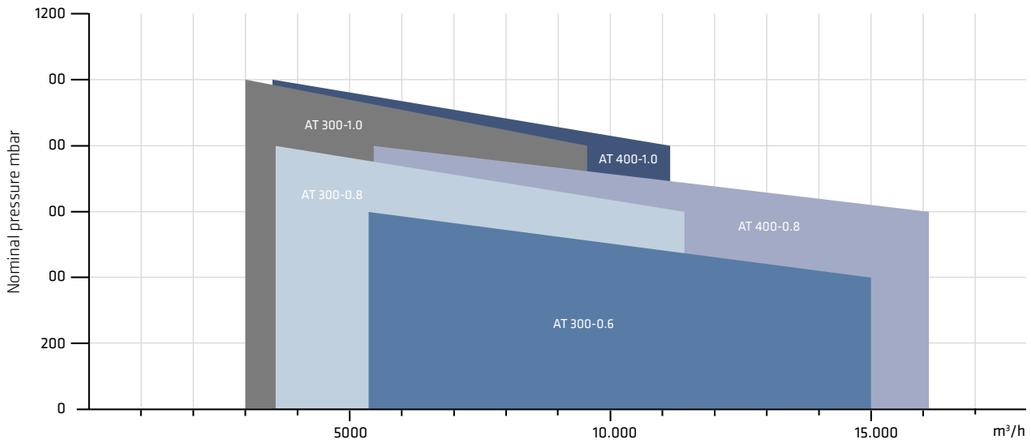
(Data and dimensions non-binding. Subject to technical modifications)
DN2 Flange connection discharge side
* Corresponds to the delivery volume flow measured according to ISO 5167 and converted to the reference suction conditions

Right-sized is the magic word for efficient plant operation. The AERZEN Turbo assembly is available in different sizes, and for good reason. But that's precisely the starting point for our perfectly designed Turbo technology. Just ask the experienced experts at AERZEN.

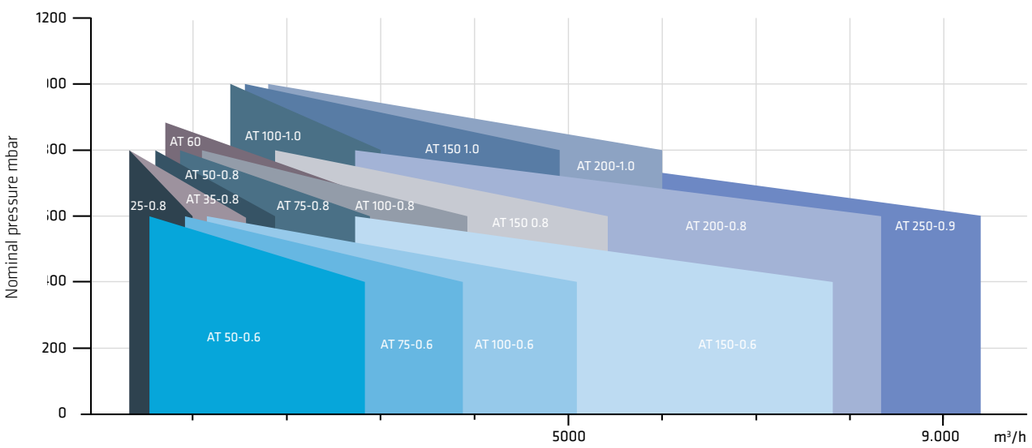
Strength on display. A variety of types for optimal plant configuration

Which Turbo assembly carries which load? You can find the answer in the breakdown of types, presented here for the Aerzen Turbo. Depending on the pressure requirements and the volume flow, you can choose between 19 different assembly variants.

Pressure and volume flow ranges for Generation 5



Pressure and volume flow ranges for Generation 5plus



In good hands
Technology from **AERZEN**

As a plant operator, we can support you in many more ways than simply supplying top technological solutions. We also offer comprehensive support through our application know-how, experience and expertise. Around the world, 24 hours a day, 7 days a week.

Service when you need it, no matter where you are

You need service – even when you don't need it. Our service teams will take care of your plant over its entire life cycle, helping to protect the value of your investment. We have created a close network that spans the globe: Over 50 subsidiaries and representatives in more than 100 countries, so that we are never far from where you are. Should you ever need it, you can depend on one of our 150 service mechanics to be there for you quickly.

Well prepared: our application expertise

Our familiarity with a wide range of compressor technology applications builds on 150 years of history and more than 30,000 configured waste water plants on every continent. A veritable treasure trove of experience. It provides the basis for our unique expertise and innovation and makes us valuable advisers for all your application questions. Take advantage of our know-how in the technical and economic preparation of your treatment plant for the coming decades.and anywhere you need us.

Security = AERZEN

- Commissioning by qualified experts
- Individualised training for your in-house staff
- Client-specific service and maintenance contracts
- On-site service also available

Contact worldwide
2,600 employees work for AERZEN. On every continent. With six sales offices in Germany alone, we're there for you. And with more than 50 subsidiaries in over 100 countries around the world. Hence we're never far away – should you ever need us. Give us a call:
+49 5154 81 0

Service-Infoline
Our German Service Centre is available for customers and operators. We are happy to help you. We look forward to your call:
+49 700 49318551

Customer Net
Where you can learn more about the company and the leading compressor technologies from Aerzen? It's simple: In our Customer Net on our website, where we have stored everything that is worth knowing for you:
www.aerzen.com

LET'S TALK
Find your local contact
www.aerzen.com/worldwide

AERZEN. Compression is the key to our success

The Aerzener Maschinenfabrik GmbH was founded in 1864. In 1868, we built Europe's first positive displacement blower. The first turbo blowers followed in 1911, the first screw compressors in 1943, and in 2010 the world's first rotary lobe compressor package. Innovations "made by AERZEN" keep driving forward the development of compressor technology. Today, AERZEN is among the world's longest established and most significant manufacturers of positive displacement blowers, rotary lobe compressors, screw compressors and turbo blowers. And among the undisputed market leaders in many areas of application.

In more than 50 subsidiaries around the world, more than 2,600 experienced employees are working hard on shaping the future of compression technology. Their technical competence, our international network of experts and the continual feedback from our customers are the basis of our success. AERZEN products and services set standards. In particular, with regard to reliability, stability of value and efficiency. Challenge us.

LET'S TALK

Find your local contact

www.aerzen.com/worldwide

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Aerzen Turbo (T1-015-07)_EN
04|2024