

TURBOWIN

TURBO COMPRESSOR SERIES PRODUCT BROCHURE

BEYOND IMAGINATION
INNOVATION OF TURBO TECHNOLOGY
FOR OIL-FREE GLOBAL COMPRESSOR INDUSTRY

THE WORLD'S HIGHEST ENERGY EFFICIENCY

THE WORLD'S STRONGEST STABILITY WITH USER CONVENIENCE

THE WORLD'S BEST PATENTS AND CERTIFICATES

THE WORLD'S WIDEST PRODUCT LINE-UP

COMPANY INTRODUCTION

MAXIMIZED EFFICIENCY FROM PROVEN TECHNOLOGY

More than 80% of Turbowin's employees are professional engineers who have been researching and developing only turbo technology for over 20 years with complete dedication to participating in the new product development and registration of new technology patents and certificates every year. This indomitable passion for technology advancement has led the company to launch the 8th generation. New turbo technology addresses the world's growing demand for clean and affordable energy, which requires simultaneous advances in turbo science and technology to meet the performance demands of our global key end-users.

MAJOR CERTIFICATES & PATENTS

- 2015** ISO 9001 / ISO 14001 / ISO 45001
- 2016** IATF 16949 / SPAN Certificate / High-Efficiency Energy Equipment Certificate
 Korea - Valve Using Differential Pressure of Air (Patent No. 10-1651589)
 Korea - Airfoil bearing device for high speed and high load that can maintain precision (Patent No. 10-1632356)
 China - Single & Dual Cooling System (Patent No. ZL 2016 8 0000612.8)
 China - Water and Moisture Proof (Patent No. ZL 2016 8 0027904.0)
- 2017** EAC Certificate / Cover for preventing ingress of foreign substances for turbomachinery (Patent No. 10-1791977)
- 2018** NRTL Certificate / Certification of Designation of Excellent Product – Public Procurement Service, Korea (No. 2018057)
 Korea - Micro Turbo Compressor with Water-cooled Impeller (Patent No. 10-1969485)
- 2019** Korea - Surge Protection (Patent No. 10-1989588)
 Korea - Airfoiled Radial Bearing with Optimal Cooling Induction (Patent No. 10-2067286)
 Korea - Cooling Thermal Equilibrium (Patent No. 10-2050810)
 Japan - Water and Moisture Proof (Patent No. 6524499)
 Japan - Single & Dual Cooling System (Patent No. 6617903)
- 2020** USA - Water and Moisture Proof (Patent No. 10,648,476)
 USA - Single & Dual Cooling System (Patent No. 10753372)
 USA - Valve Using Differential Pressure of Air (Patent No. 10760581)
 Germany - Water and Moisture Proof (Patent No. 11 2016 004 029)
 Korea - Air-Cooled Multi-stage Turbo Compressor (Patent No. 10-2133245)
 Korea - IoT Remote Controlled Turbo Machine (Patent No. 10-2200680)
- 2021** Anti-Explosive (EX / IECEx) Certificate of Conformity (No. KTL 21.0009X) / ABS Certificate / ASME Certificate
 Excellent Production Designation Certificate / Innovative Water Company Designation Certificate
 UL-US-2127364-0 & UL-CA-2122511-0 Certificate / World-Class Product Certificate (No. 2021-308)
- 2022** API Certificate / ISO Class 0 Certification



TURBOWIN PRODUCT LINE-UP

2015	2016	2017	2018
 <p>WL & WL-s Series Turbo Blower & Separated Type Turbo Blower</p>	 <p>WL-d & WL-o Series Dual & Outdoor Type Turbo Blower</p>	 <p>WH & WH-s & WH-o Series Turbo Compressor & Separated & Outdoor Type Turbo Compressor</p>	 <p>WH-m & WH-d Series Micro Turbo Compressor & Dual type Turbo Compressor</p>
2019	2020	2021	2022
 <p>WL-m Series Micro Turbo Blower</p>	 <p>WL-i & WH-i Series Smart Turbo Blower & Compressor</p> <p>WL-ex & WH-ex Series Anti-Explosive Turbo Blower & Compressor</p>	 <p>WH-g Series Gas Turbo Compressor</p> <p>WH Series 9 Bar Turbo Compressor</p> <p>WL-e Series Eco Turbo Blower</p>	 <p>WL-v Series Vacuum Turbo Blower</p> <p>WL-t Series Triple Type Turbo Blower</p>

PRODUCT NAME	SERIES NAME	HP RANGE	BAR RANGE	LAUNCHED	DESCRIPTION
TURBO COMPRESSOR	WH	50-800 HP	1.5-9 bar(g)	2017	World-first 9 bar air-pressure air-bearing based turbo compressor
SMART TURBO COMPRESSOR	WH-i	50-800 HP	1.5-9 bar(g)	2020	World-first smart IoT air-bearing based turbo compressor
ANTI-EXPLOSIVE TURBO COMPRESSOR	WH-ex	50-800 HP	1.5-9 bar(g)	2020	World-first anti-explosive(Ex) air-bearing based turbo compressor
GAS TURBO COMPRESSOR	WH-g	75 HP	8 bar(g)	2021	World-first gas turbo compressor with air-bearing technology
OUTDOOR TYPE TURBO COMPRESSOR	WH-o	50-800 HP	1.5-9 bar(g)	2017	Outdoor type which doesn't need independent compressor room
DUAL CORE TYPE TURBO COMPRESSOR	WH-d	600-1,000 HP	1.5-9 bar(g)	2018	Dual type turbo compressor with dual cores and four impellers
SEPARATED TYPE TURBO COMPRESSOR	WH-s	50-800 HP	1.5-9 bar(g)	2017	Control and motor room can be separately installed and operated
MICRO TURBO COMPRESSOR	WH-m	3-40 HP	0.6-1.2 bar(g)	2018	World's smallest for hydrogen fuel cell and electric vehicles

ENERGY COST SAVING

ACTUAL ENERGY SAVING CASE 1

Project	Motor (kW)	Quantity (set)	Hour Power Consumption (kWh)	Annual Power Consumption (kWh)
BRAND A	250	1	317	2,776,920
TURBOWIN	220	1	217	1,900,920



END USER C company
LOCATION Busan City, Republic of Korea
MODEL WH300-90
APPLICATION Multi-purposed Service Air for Shipbuilding Yard

ENERGY SAVING RATIO

31.5%

Low Vibration Under 1.0 mm/s
 Low Noise Under 80dB ± 5dB

ACTUAL ENERGY SAVING CASE 2

Project	Motor (kW)	Quantity (set)	Hour Power Consumption (kWh)	Annual Power Consumption (kWh)
BRAND B	1,500	1	1,180	10,336,800
TURBOWIN	600	2	900	7,884,000



END USER D company
LOCATION Gunsan City, Republic of Korea
MODEL WH600-20
APPLICATION Fermentation Process

ENERGY SAVING RATIO

23.7%

Low Vibration Under 1.0 mm/s
 Low Noise Under 75dB ± 5dB

MAINTENANCE COST SAVING

Criteria	Unit	Oil Injected Screw	Oil Free Screw	Turbowin WH Series
POWER	kW	150	150	150
ANNUAL CONSUMABLE PARTS	USD	9,500	7,500	800
10 YEARS OVERHAUL COST	USD	24,000	64,000	25,000
10 YEARS TOTAL MAINTENANCE COST	USD	119,000	139,000	33,000
TOTAL M/T COST SAVING RATIO	%	0	0	72.3%-76.3%

MAINTENANCE COST SAVING RATIO

Up to 76.3%

Comparison with Oil-Injected & Oil-free Screw Compressor

MULTI-STAGE COMPRESSION

ULTRA HEPM MOTOR [Patent No. 6976001 / 6976000 / 10,753,372 / 6604494 / 6617903 / 3172706 / 3236947](#)

While the typical old-fashioned induction motor has IE2 (89.5% maximum efficiency) or IE4 (92.4% maximum efficiency), Turbowin's Ultra HEPM motor is based on global patent and certification technology to ensure 97% of the world's highest energy efficiency and stability. Turbowin's ultra HEPM motor can meet harsh temperature conditions such as cold and hot weather, and the demanding specifications required by extreme work environments such as waterproofing, flameproofing, and explosion-proof.



2 Stage Compression

1.5/2 bar model is composed of a single motor and only one impeller without any additional cooling systems at all, therefore lighter design and configuration simplifies the product and enhances durability.



2 Stage Compression

4 bar model is composed of a single motor, two impellers and coolers (inter & after). Plate-type heat exchanger is applied to obtain high cooling efficiency and minimized performance loss.



4 Stage Compression

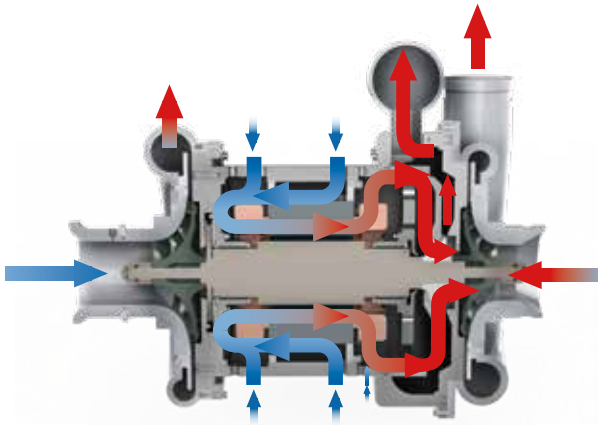
7/8/9 bar model uses its additional compression step to perform more efficiently. A higher volume output can be achieved with dual motors, four impellers and coolers (inter & after). For applications that require a larger volume of high-pressure air, this 4 stage difference can be key to select the right solution.

From 4 bar to 9 bar WH Series can apply for both air-cooling and water-cooling together with discharge temperatures more than 10 degrees Celsius lower than air-cooled screw compressors, eliminating the need for additional after-coolers at all. In addition, compared to shell & tube type heat exchangers, the plate type heat exchangers applied to the WH Series are small in size, efficient in heat conduction and simple in maintenance.



CORE OF EXCELLENCE

MAXIMIZED EFFICIENCY FROM PROVEN TECHNOLOGY



Dual Air-Cooling System

Patent No. 10-1580877 / 10-1607492

Turbowin can lower motor temperature by at least 10°C compared to other brands thanks to its patented dual cooling system. The air from outside of the motor cools down the stator, air foil bearing, winding and rotor by special internal structure. This technology keeps the motor free from separate cooling device such as an external cooling fan.

NBW Air Foil Bearing

Patent No. 10-1632356 / 30-0858674

Traditional compressors such as piston, lobe, or screw should have obvious limitations and disadvantages in energy efficiency, maintenance, and durability even though they are advertising “oil-free” which still use lubricating oil in their main operating part. Turbowin’s air foil bearing is manufactured without any bending or welding process which can cause structural weakness, therefore guarantees at least 150,000 cycles of on & off operation. This feature is one of the core technological differences making Turbowin’s WH Series extremely durable and reliable.



Supersonic Impeller

Certificate No. NDMM8.E519212 / OBJY2.E520241 / QDGS.E519211

Turbowin’s supersonic impeller is designed and manufactured with 100% of its own technology. With its quality proven by patents and certifications, we can meet any type of requests from end-users. Aluminum, stainless steel or titanium can be used as base material and hard anodizing or nano coating will be applied to achieve excellent resistance against corrosion and chemical substances. Also, machining and processing tolerance is less than 0.001mm, this difference in sophistication to the fine parts is an important reason for global big players to choose Turbowin.



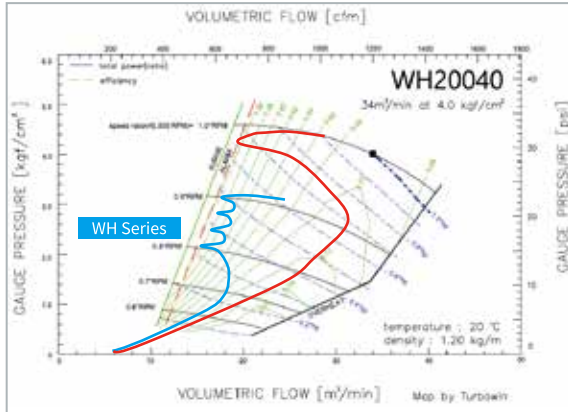
ALUMINUM



STAINLESS



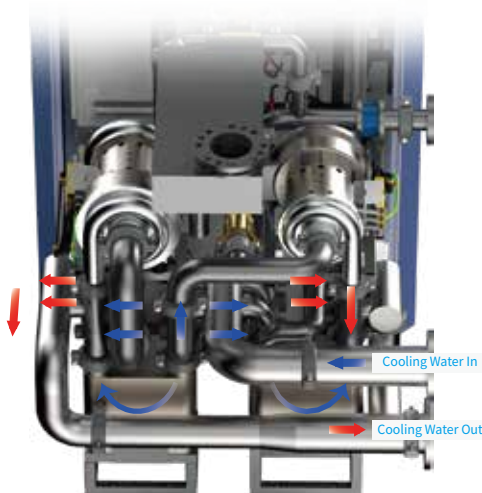
TITANIUM



Surge Protection System

Patent No. 10-1989588

Compressor surge can damage the system and has been a major obstacle to the adoption of centrifugal type compressors. However, Turbowin's patented surge protection system can minimize such concerns. In the event of entering into surge area, sub-solenoid valve is activated 3~4 times to minimize the mechanical impact and protects the product safely from sudden stops.



Dual Effective Discharge Air Cooling System

Patent No. 10-1607492

Based on Turbowin's patented dual cooling system, no additional cooling device is required and the inverter is also cooled by internal circulation air. 1.5bar and 2bar models are equipped with air cooling system, while models from 4bar and above cooled by water cooling system, which keeps the temperature of the discharge air only +5°C higher than the ambient air temperature.



Smart Applications of Various Air/Gas Compression Means

Patent No. 10 2021 122 314.8 / 202110980488.9 / 2021-138349 / 17/459,709 / 10 2021 122 315.6 / 17/459,399 / 2021-139643 / 202110993337.7 / 10 2021 121 817.9 / 17/412,981 / 2021-138342 / 202110967360.9

The traditional technology caused noise and condensate by emitting air into the atmosphere as well as vulnerable durability instilled in people for decades air bearing is not applicable for turbo compressors. But Turbowin was able to launch the world's 1st 9 bar WH Series by allowing air vents to be made inside the compression system as well as by reducing thrust inside the compressor. In addition, by recompressing used gas and utilizing pressure difference, the world's 1st WH-g Series was launched. Based on these Turbowin's global patented brand-new technologies, WH Series has robust durability and reliable operation through more efficient and effective compression.

SIMPLIFIED STRUCTURE

INNOVATIVE STRUCTURE WITH PATENTS AND CERTIFICATES

Steve Jobs in Apple once mentioned, “Simple can be harder than complex”. TurboWin's turbo compressor products were invented by the grandmaster of turbo industry who launched the world's first air-bearing based turbo-blower and turbo-compressor. Based on the accumulated global patents and technology certifications, Turbowin's turbo compressor could be more simplified with an optimized structure and design.



COOLING JET SILENCER
Patent No. 10-2200680

Cooling jet silencer is an aircraft jet engine shaped unique cooling air silencer developed by Turbowin's accumulated fluid mechanics technology and know-how. This silencer can decrease noise level more than 5 dB, also it is made in an ultra-small size that does not affect the installation field site, providing smart control of airflow.



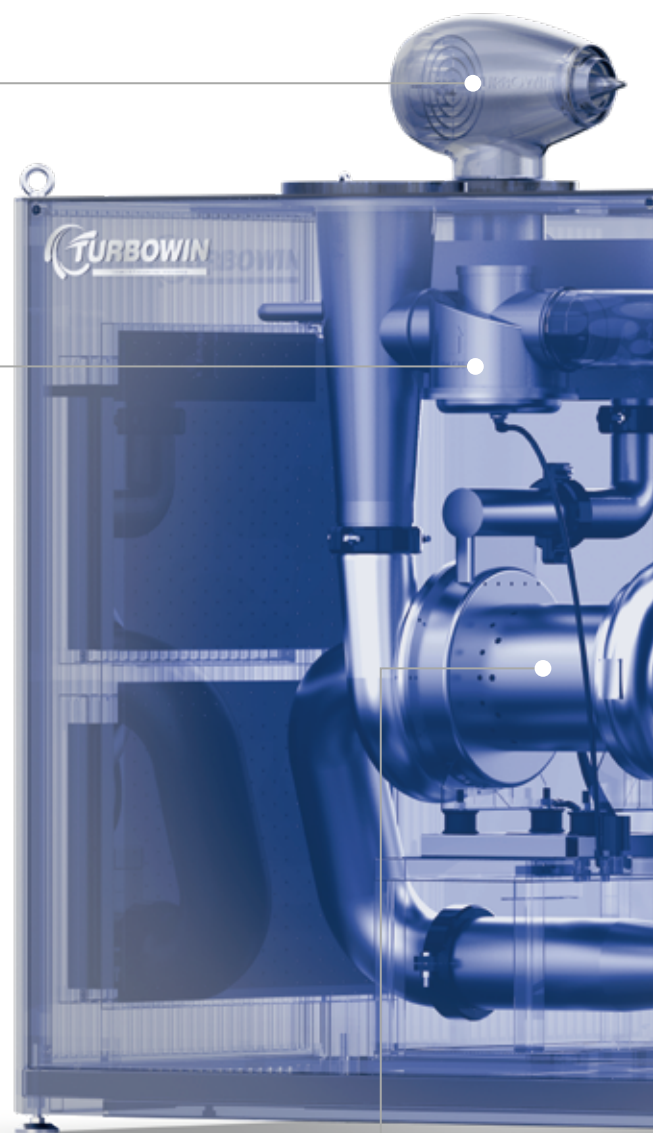
INTELLIGENT BOV
Patent No. 10-1651589

Turbowin's patented Intelligent BOV (Blow-Off Valve) has a unique design that is operated by internally generated differential pressure. With its simple structure, it works very quickly to prevent compressor surge.

ANTI-EXPLOSIVE / WATER PROOF / MOISTURE PROOF

Certificate of Conformity, No. IECEx KTL 21.0009X
Patent No. 10-1616274

Turbowin is the only company with anti-explosive certification in the air foil bearing applied turbo machinery field. Our turbo compressor can be operated safely even in the explosive gas surrounding. Also, our patented water & moisture proof design will be a good solution to provide user friendliness and durability, along with anti-explosive feature.





SMART HMI (Human Machine Interface)

Certificate No. E082015 / Q165915 / OHK000221 / C-2016-014346

Applying WEB and APP with IoT and AI, Turbowin's smart turbo system, which is easy to connect with our own server system, has raised user convenience, operation and maintenance efficiency, and system durability to the world's highest level.



VFD COOLING SYSTEM

Patent No. 16/888,201 / 202010528492.7 / 10 2020 115 650.2 / 16/888,162 / 10 2020 115 249.3 / 202010533762.3

Our patented dual cooling system enables effective cooling for both motor and inverter without any additional cooling devices. Inner circulating air cools the VFD which is very sensitive to overheating. So, even in a very hot place, Turbowin's VFD cooling system strongly supports both energy-saving and user convenience.

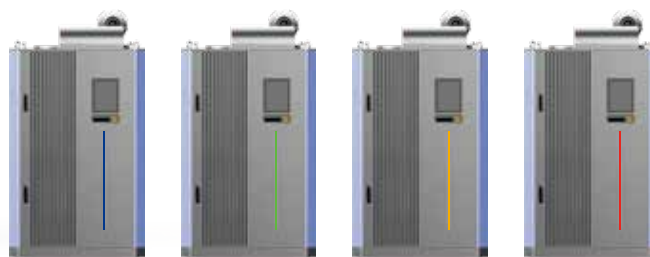


AMBIENT LIGHTING

Certificate No. 30-0914031

Visibility of system status is important factor of product design. Turbowin applied ambient lighting on the front cover for the visibility of product operation status for users to check the status more easily.

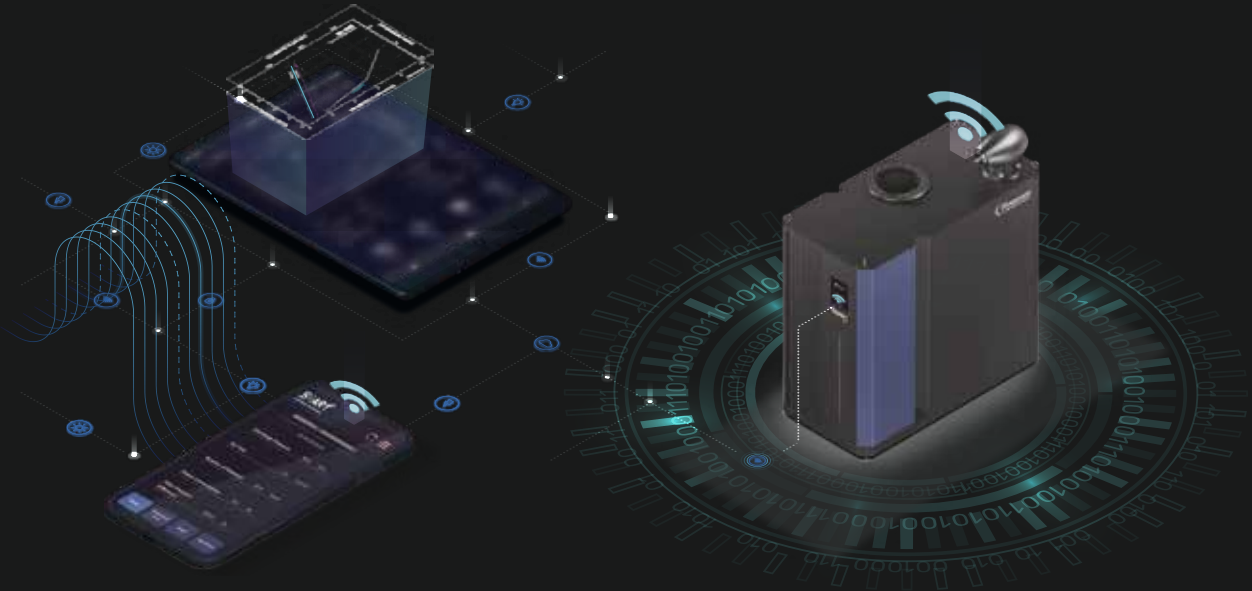
READY ▶ BLUE | RUN ▶ GREEN | WARNING ▶ ORANGE | STOP ▶ RED



WH-i SERIES

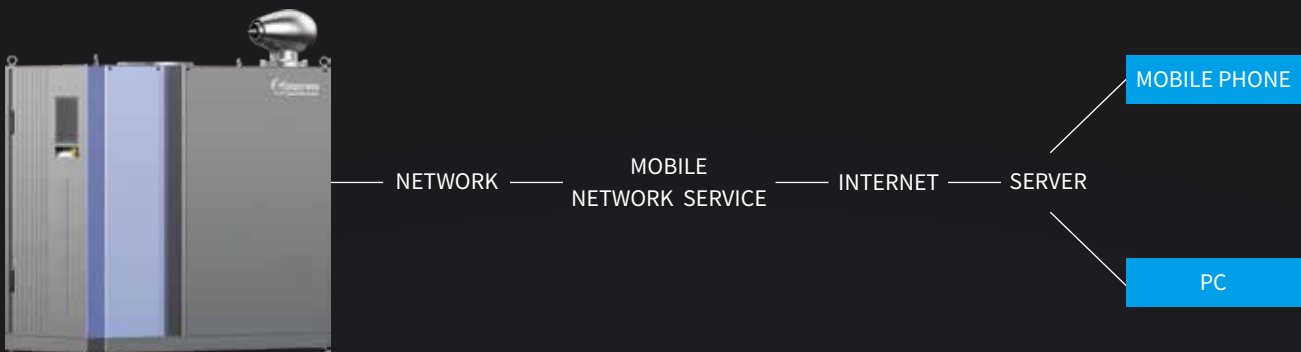
Smart Turbo Compressor

Patent No. 202011277468.7 / 10 2021 112 755.6 / 17/326,094 / 2021-087306 / 10-2315945



World's First Air Foil Bearing Turbo Compressor with IoT based Remote Control System

Turbowin has been researching to develop better industrial solution providing safety, user friendliness and optimized energy efficiency for industry 4.0 era. As a result of the efforts, we launched world's first IoT applied turbo compressor. Users can control and monitor the products on smart phone, tablet or other devices connected wireless communication. Customers can establish wireless automation control system with our products, especially industries like semi-conductor, display, fuel cell, bio chemical, F&B where accurate compressed air is needed can have benefit from our products. With our certifications (CE, UL, IATF, EAC, ASME, API, ABS, etc.) and patents combined with these special features, our global customers are satisfied with the performance and reliability.



WH-m SERIES

Micro Turbo Compressor

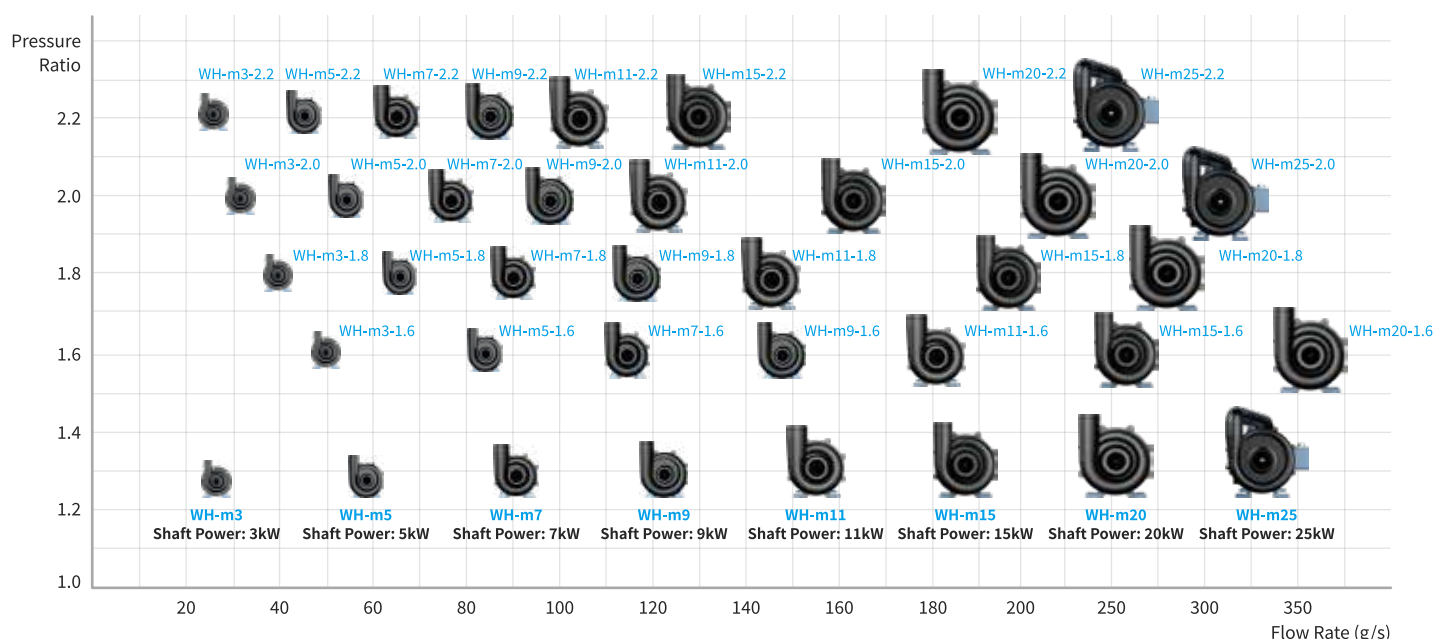
Patent No. 10 2019 110 737.7 / 16/400,345 / 2021-523455 / 17/290,252 / 11 2019 004 941.0 / 201980072527.6



Turbowin micro turbo compressor has achieved power range of 3kW~25kW, maximum 220,000RPM and pressure ratio of 1.0 ~ 2.2 with its air foil bearing technology basis. Also CE, UL and IP65 certification prove energy efficiency and durability even under harsh condition.

CATEGORY	SPECIFICATION
PRODUCT NAME	WH-m Series
MOTOR	PM Motor / Air Bearing / AL Impeller
FLOW CONTROL	Speed variation (VFD)
VOLTAGE RANGE	250~450 / 450~750 VDC
VOLTAGE SCHEMATIC	Inverter input VDC → Inverter output & motor input VAC → motor output
COOLING	Water-cooled by distilled water (inverter & motor)
TEMPERATURE	-20°C ~ +70°C
HUMIDITY	~95%RH
CONTROL MODE	Local (Keypad) / Remote (CAN 2.0B Communication)

The Performance Map of WH-m Series



WH-ex SERIES

Anti-Explosive Turbo Compressor

Certificate of Conformity, No. IECEx KTL 21.0009X, Patent No. 10-1616274

An explosion at an industrial site can determine whether a company can exist or not as well as whether the person in a charge is legally bound. Especially, an explosion in the field or factory may very risky factor in the specialized industries such as petrochemical, biochemical, F&B, mining, and cement transfer, to prevent any kind of explosion which can harm a company's reputation or sustainable development. Therefore, a certified air-bearing-based Ultra HEPM Motor is ideal for hazardous environments, where sparks or high outer temperatures might otherwise explosive gases, vapor, or dust. Turbowin's WH-ex Series guarantees user safety and convenience with IECEx international certification, in compliance with the European Union's ATEX Directive on equipment for potentially explosive environments.



WH-g SERIES

Gas Turbo Compressor

Patent No. 10 2021 122 314.8 / 202110980488.9 / 2021-138349 / 17/459,709

A gas compressor is essential industrial equipment for the extraction or treatment of oil and gas. Before the Turbowin's WH-g Series appearance, most of the existing gas compressors were positive displacement type old-fashioned compressors which have a lot of disadvantages such as low efficiency, high maintenance cost, big noise, and frequent part breakage. Turbowin's WH-g Series is in the spotlight as a new alternative to overcoming these shortcomings, especially the insulators and heaters with TurboWin's proprietary technology, offering a range of compression ratios from 2.0 to 8.0 even in harsh environments below minus one hundred degrees Celsius. Another benefit of pure oil-free with an air-bearing solution is that it also prevents any contamination within the system and limits the risk of any compressed pipeline fires caused by oil carryover. Turbowin ensures superior components and quality with no exception and is globally backed due to our years of expertise and knowledge.



WH-o SERIES

Outdoor-Type Turbo Compressor

Patent No. 10-1616274

Considering installing your compressor outside? Think again. The temptation to save space may sound enticing, but in the long haul, it will cost you. Here are the 3 “W’s” to consider before moving or installing your air compressor outdoors : Water, Weather and Wear. Turbowin’s WH-o Series is an outdoor type turbo compressor that can perfectly withstand rainwater, snow, salt, and various other hazards in a working environment where an independent compressor room cannot be installed. Especially, WH-o Series has international certifications of IEC motor protection grade IP55 and IP65 in all parts including structure, material, and painting in both enclosure and package, therefore it can be completely protected from any fine dust (dust-tight) and water jets pouring in all directions. In addition, Turbowin’s dual cooling system plays a decisive role in stably operating the outdoor turbo compressor without a separate cooling device even at high external temperatures.



WH-d SERIES

Dual-Core Turbo Compressor

Patent No. 16/888,162 / 10 2020 115 249.3 / 202010533762.3 / 16/888,201 / 202010528492.7 / 10 2020 115 650.2

WH-d Series is an air-bearing-based high-efficiency turbo compressor with the world's largest capable of outputting up to 1000 horsepower with dual motors and dual impellers. With the installment of only one Turbowin WH-d Series, end users can eliminate the burden of installing multiple old-fashioned compressors and achieve extremely high energy efficiency, ease of management, and product durability at the same time.



WH-s SERIES

Separated-Type Turbo Compressor

Certificate No. E082015 / Q165915 / OHK000221 / K11441/M18

If you need to transport explosive power or work in a hazardous chemical environment, WH-s Series could be a very good alternative to protect your precious worker from these risk factors. WH-s Series has an independent motor room and control room which can be separated from each other. In particular, if WH-s Series is combined with Turbowin’s IoT smart and explosion-proof technology, this can have a more powerful performance.



SPECIFICATION

COMPONENT MATERIAL

CASING	Aluminum Alloy
IMPELLER	A7075-T6
CASING SEAL - AIR	Labyrinth Seal
SHAFT	Titanium Alloy
BEARING TYPE	Hydro Dynamic Air Foil
BEARING LUBRICATION	Air (Zero-Oil)



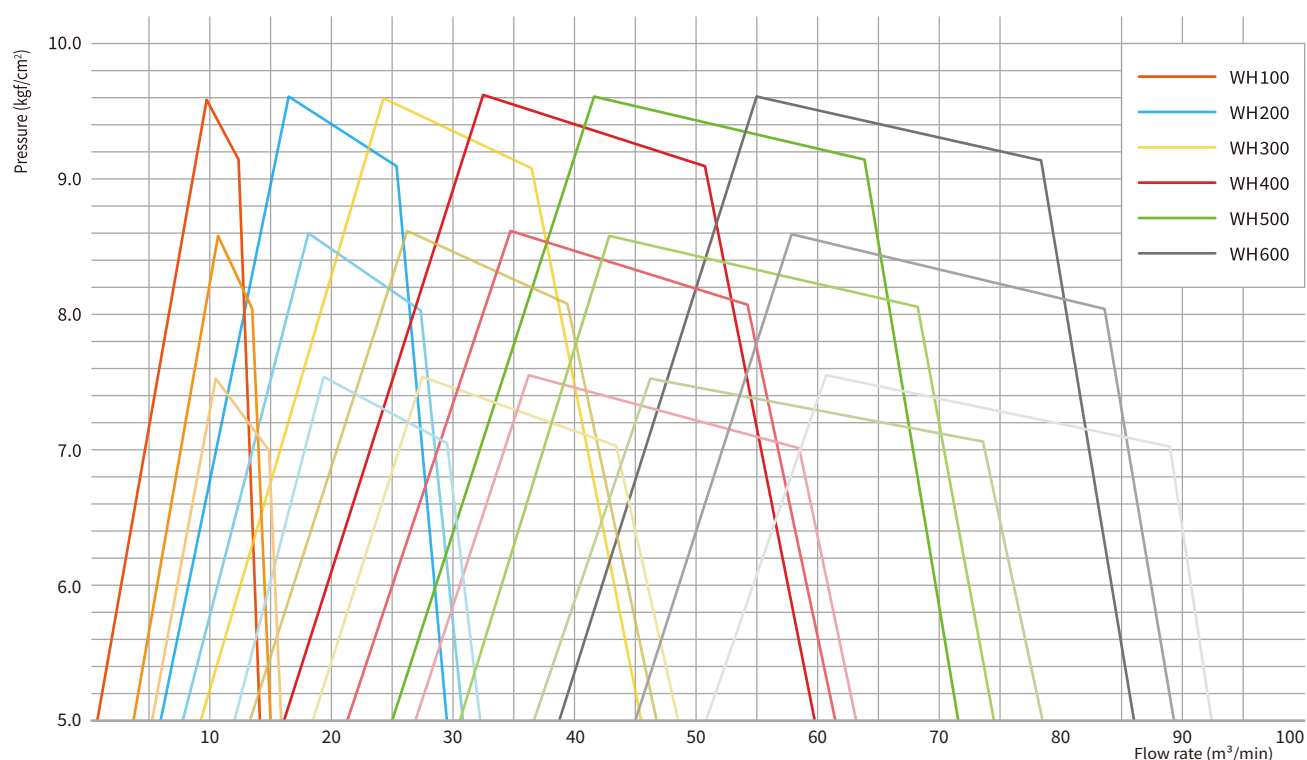
***1.5 ~ 4.0 kgf/cm²G**

MODEL	MAX. WORKING PRESSURE		CAPACITY		MOTOR POWER		DISCHARGE AIR OUTLET	COOLING WATER INLET / OUTLET	NOISE (FREE FIELD)	DIMENSION (LxWxH)	WEIGHT
	kgf/cm ² G	psig	m ³ /min	cfm	kW	HP	A(B)	A(B)/A(B)	dB(A)	mm	kg
WH50	1.5	24.3	9.6~16	339~565	37	50	100(4)	Air cooled	80±5	750x1,700x1,250	600
	2.0	28.4	7.2~12	254~423			100(4)				
WH75	1.5	24.3	14.4~24	509~847	55	75	125(5)	Air cooled	80±5	850x1,850x1,450	750
	2.0	28.4	10.8~18	381~635			100(4)				
WH100	1.5	24.3	19.2~32	678~1,130	75	100	150(6)	Air cooled	80±5	850x1,850x1,450	900
	2.0	28.4	15~25	530~883			100(4)				
	4.0	56.9	10.8~18	381~636			100(4)	65(2 ½)/65(2 ½)			
WH150	1.5	24.3	28.8~48	1,017~1,695	112	150	150(6)	Air cooled	80±5	1,050x2,100x1,700	1,100
	2.0	28.4	22.2~37	784~1,306			150(6)				
WH200	1.5	24.3	39~65	1,377~2,295	150	200	200(8)	Air cooled	80±5	1,050x2,100x1,700	1,200
	2.0	28.4	30~50	1,059~1,766			150(6)				
	4.0	56.9	21.6~36	7,63~1,271			125(5)	80(3)/80(3)			
WH300	1.5	24.3	57.6~96	2,034~3,390	225	300	250(10)	Air cooled	80±5	1,600x2,600x1,800	1,800
	2.0	28.4	45~75	1,589~2,649			200(8)				
	4.0	56.9	33~55	1,165~1,942			150(6)	80(3)/80(3)			
WH400	1.5	24.3	76.2~127	2,691~4,485	300	400	250(10)	Air cooled	80±5	2,000x2,800x2,000	2,500
	2.0	28.4	60~100	2,119~3,532			200(8)				
	4.0	56.9	43.2~72	1,526~2,543			150(6)	100(4)/100(4)			
WH500	1.5	24.3	96.6~161	3,411~5,686	375	500	300(12)	Air cooled	80±5	2,000x3,000x2,000	3,200
	2.0	28.4	75~125	2,649~4,414			250(10)				
	4.0	56.9	54~90	1,907~3,178			200(8)	100(4)/100(4)			
WH600	1.5	24.3	117.6~195	4,153~6,922	450	600	350(14)	Air cooled	80±5	2,200x3,200x2,100	4,500
	2.0	28.4	90~150	3,178~5,297			300(12)				
WH800	1.5	24.3	152.4~254	5,382~8,970	600	800	400(16)	Air cooled	80±5	2,200x3,500x2,100	5,500
	2.0	28.4	120~200	4,238~7,063			350(14)				

*7.0 ~ 9.0 kgf/cm²G

MODEL	MAX. WORKING PRESSURE		CAPACITY		MOTOR POWER		DISCHARGE AIR OUTLET	COOLING WATER INLET / OUTLET	NOISE (FREE FIELD)	DIMENSION (LxWxH)	WEIGHT
	kgf/cm ² G	psig	m ³ /min	cfm	kW	HP	A(B)	A(B)/A(B)	dB(A)	mm	kg
WH100	7.0	100	8.2~13.7	290~484	75	100	65(2 ½)	65(2 ½)/65(2 ½)	80±5	1,300x2,200x2,000	1,800
	8.0	114	7.5~12.5	265~441							
	9.0	128	6.78~11.3	239~399							
WH200	7.0	100	17.1~28.5	604~1,006	160	200	80(3)	80(3)/80(3)	80±5	1,500x2,400x2,000	2,200
	8.0	114	15.9~26.5	561~936							
	9.0	128	14.7~24.5	519~865							
WH300	7.0	100	25.5~42.5	900~1,501	225	300	80(3)	80(3)/80(3)	80±5	1,700x2,400x2,000	2,500
	8.0	114	23.4~39	826~1,377							
	9.0	128	21.3~35.5	752~1,254							
WH400	7.0	100	34.8~58	1,229~2,048	300	400	100(4)	80(3)/80(3)	80±5	1,900x3,500x2,000	3,000
	8.0	114	32.4~54	1,144~1,907							
	9.0	128	30~50	1,059~1,766							
WH500	7.0	100	43.8~73	1,547~2,578	375	500	125(5)	100(4)/100(4)	80±5	2,100x3,500x2,000	3,300
	8.0	114	40.8~68	1,441~2,401							
	9.0	128	37.8~63	1,335~2,225							
WH600	7.0	100	52.8~88	1,864~3,108	450	600	150(6)	100(4)/100(4)	80±5	2,200x3,500x2,000	3,500
	8.0	114	49.8~83	1,758~2,931							
	9.0	128	46.8~78	1,653~2,755							

*PERFORMANCE MAP





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