Performance Turbochargers

2017

CATALOG

borgwarnerboosted.com

BorgWarner

About BorgWarner Turbo Systems

BorgWarner turbochargers provide customers worldwide with a comprehensive range of 3K and Schwitzer replacement turbochargers and spare parts.

For over 100 years, BorgWarner has demonstrated its commitment to advancing the automotive industry and motorsports through a continuous stream of technological advances. In particular, these advancements flourished in the late 1990s when BorgWarner embarked on a series of critical initiatives that immediately turned them into a pacesetter within the turbo technology industry.

In October of 1998, BorgWarner purchased 100% of the net assets of German turbocharger and turbo machinery manufacturer, AG Kühnle, Kopp & Kausch, renaming it 3K-Warner Turbosystems. In March of the following year, BorgWarner acquired Kuhlman Corporation as a means to gain access to Schwitzer, Inc., a leading manufacturer of turbochargers for commercial transportation and industrial equipment.

With the integration of 3K-Warner Turbosystems and Schwitzer, BorgWarner continues to set new technological standards in the field of engine boosting.

Fast forward to the new millennium where BorgWarner Turbo Systems has become a well positioned player in the engine boosting arena, with development centers, production sites and sales offices throughout the world.

In keeping with our maxim "Local Power—Global Strength" we use all of the resources and talents available within our worldwide organization to exceed the expectations of our customers. To ensure that our sites work efficiently around the world, we have standardized vital processes and best practice methods, without compromising location-specific flexibility and autonomy. Our goal is to continually offer you solutions that are perfectly tailored to meet the specific requirements of you and your market.

Louis Schwitzer
Automotive Hall of Fame

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FORGED MILLED COMPRESSOR WHEEL WITH EXTENDED TIP TECHNOLOGY

TECHNOLOGY

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AIRWERKS TURBOCHARGER TECHNOLOGY

Innovation, speed, flexibility, quality and an acute customer focus are the benchmarks by which our customers measure us.

As a result, we not only are constantly developing new technologies internally, but are also seeking ways to continually improve the external relationships with our customers. We value the spirit of cooperation and strive to always enhance the processes regarding product development, manufacturing and quality assurance.

The speed in which we share product data with our customers is also becoming an increasingly important factor in setting up optimum processes. From the very start of development, we involve people from the design, production, purchasing and quality assurance areas.

+ innovation

By collaborating at the beginning of the process we are able to save both time and money, ensuring that the turbocharging systems we supply meet proven serial production quality, reliability and performance standards at the onset of production.

The latest generations of compressor and turbine stages assure optimum thermodynamic results. With the further development of materials and processing methods – such as forged milled compressor wheels – we not only optimize performance, but also enhance durability and reliability of our turbocharging systems.

Turbocharger assembly

Forged-milled compressor wheel production

TECHNOLOGY + innovation

EFR durability test

Compressor wheel with extended tip technology

Extended Tip Technology

Select BorgWarner turbochargers employ BorgWarner “S” generation compressor wheels that incorporate extended tip technology. This compressor wheel design feature promotes greater airflow using a low inertia wheel that performs like a wheel of greater size and mass. Extended tip technology enables the user to have faster spool-up at lower engine speeds while providing the boost for the powerful top-end performance that most turbocharger enthusiasts have come to desire. Turbochargers have to meet different requirements with regard to map height, map width, efficiency characteristics, moment of inertia of the rotor and conditions of use. New compressor and turbine types are continually being developed for various engine applications with compressor wheels having an increased influence on the engine’s operational characteristics. These wheels are designed using computer programs that develop a three-dimensional calculation of the airflow and pressure.

The twin scroll turbocharger generates higher boost pressure at low revs

Twin scroll technology produces results similar to twin-turbo applications, but in a smaller package with lower weight and cost. In turbochargers of this type, the channels between the exhaust manifold and turbocharger of the first and fourth as well as the second and third cylinders are separated from each other. The exhaust gas streams are directed into so-called scrolls (spirals) and then reunited again directly at the turbine wheel. Separating the streams in this way offers improved performance. With this type of charging, spontaneous boost pressure can be built up 1000 RPMs earlier, which significantly improves response in the low rev band. The engineers at BorgWarner have also mastered the problem of high exhaust gas temperature in gasoline engine turbocharging despite the genuine challenge presented by such a compact turbine casing with two scrolls. One approach employed by the engineers here was to develop a new downsizing method of casting turbine housings to improve their temperature resistance and guarantee the quality needed. The benefits of the twin scroll turbocharging technology and other market-leading technologies by BorgWarner Turbo Systems offer passenger vehicles, dynamic performance, low fuel consumption and lower $C0_2$ emissions.

Turbo functional testing

commitment to PERFORMANCE

Mercedes Silver Arrow C11

Mercedes Silver Arrow C11,
World Sportscar Champion.
5.0 liter V8 twin 3K turbo engine

Audi 90 (quattro) GTO

Audi 90 (quattro) GTO was one of the most technologically advanced four-door race cars to ever hit the tracks. The 1988 Trans Am Manufacturer's champion was banned from the 1989 season due to its dominance. Boost was provided by a single BorgWarner K-series turbocharger.

AirWerks is an independent aftermarket program from BorgWarner Turbo Systems. This venture is focused on creating exceptionally high engine performance through forced induction technology. Why do the world's most prominent auto manufacturers select products from BorgWarner Turbo Systems? Simply put, we are the world leader in turbos for high speed, high temperature gasoline engines. The BorgWarner Turbo Systems performance line features an assortment of carefully chosen K and S series turbochargers and the EFR series to meet a wide array of high-performance engine requirements. These turbos will be steadily improved based on the latest findings in aerodynamic and materials technology.

Innovation, a fruit of competition

Racing has long been known as a fertile research and development arena and proving ground for new technology. BorgWarner takes full advantage of its rich racing heritage using some of the same materials and aerodynamic techniques that produced boost for winning cars, elevating and incorporating it into the hardware available through BorgWarner Turbo Systems. Partnerships fostered at the track can create alignment and uncommon results, in the marketplace.

The Borg-Warner Trophy™

The Borg-Warner Trophy, is synonymous with high performance, speed and leading-edge automotive technology. In 1936, Eddie Rickenbacker,of the Indianapolis Speedway, unveiled the Borg-Warner Trophy and officially announced it as the prize for the champion of the Indy 500.

Commissioned by The BorgWarner Automotive Company in 1935, the trophy is made of sterling silver and stands over 5 feet tall, weighing nearly 155 pounds. The Trophy features a checkerboard pattern that bears the likeness of every winning driver since 1911 along with the date of their victory, and their average speed.

Today, the trophy is housed in the Hall of Fame Museum at the Indianapolis Motor Speedway. Each May, the Borg-Warner Trophy is featured at a number of Indianapolis 500 events. These include the drivers' meeting at the track and the 500 Festival Parade in downtown Indianapolis,both on the day before the race. Immediately after each race, the trophy is hoisted into Victory Circle along with the winning car and driver for photographs. A tradition dating back to 1936 when after winning his third race, Louis Meyer received the first trophy and promptly said, "winning the Borg-Warner Trophy is like winning an Olympic medal."

a legacy of

BorgWarner, is proud of its long history of pushing the limits of technology.

From the first appearance of forced induction motor vehicles at the Indianapolis Motor Speedway in 1952 to the Mulsanne Straight of Le Mans and the winding roads of Nürburgring, BorgWarner turbochargers have made their mark.

Our decades of participation at the highest level in professional motorsports has provided tremendous experience and allowed us to further sharpen our precise engineering skills. And that legacy of excellence is embedded in every genuine BorgWarner turbocharger that we produce today.

In 2012, the IZOD IndyCar Series (now known as the Verizon IndyCar Series) saw the return of the turbo-charged engine with BorgWarner leading the way with its pace setting engine boosting technology.

Twin EFR-7163 turbochargers used to boost the Verizon IndyCar® series.

Mixed Flow Turbine Technology currently used on the EFR-7163 turbocharger.

2016 Indianapolis 500 winner, Alexander Rossi

Team: Stuckey Racing

Driver: Phillip Palmer

Vehicle: Dodge 5.9

Racing Venue: NHRDA

Current Turbos of choice:
Compound S400SX & S500SX

Team: Team Guss Racing

Driver: Jeremy McElrath

Vehicle: 1998 Ford Mustang

Racing Venue: ORSCA & PTRA

Current Turbo of choice:
Twin S500SX

Team: Team VCMC

Driver: Richard Basford & Sead Causevic

Vehicle: VW Jetta GLI

Racing Venue: Knox Mountain Hill Climb, Pikes Peak Hill Climb

Current Turbo of choice: **S200SX**

Team: Jager Racing

Driver: Mark Jager

Vehicle: 2006 Subaru Sti

Racing Venue:
Global Time Attack, Redline Time Attack

Current Turbo of choice:
EFR-9174

Team: Aaron Parker Motorsports

Driver: Aaron Parker

Vehicle: 1993, Mazda Fd3s Rx7

Racing Venue: Formula Drift Pro-Am, Just Drift - Top Drift, Southwest Drift, Golden Gate Drift

Current Turbo of choice:
EFR-9174

Team: Four Rings Performance Engineering

Driver: Jeff Gerner

Vehicle: 1992 Audi S4

Racing Venue: World Land Speed Racing, Bonneville

Current Turbo of choice:
S400SX 82mm

Team: PZ Tuning

Driver: Will Au-Yeung

Vehicle: 2012 Honda Civic Si

Racing Venue: Redline Time Attack, Global Time Attack, Gridlife

Current Turbo of choice:
EFR-9174

Simari Photography

Team: Mike Ryan Motorsports

Driver: Mike Ryan

Vehicle: Freightliner

Racing Venue: Pikes Peak International Hill Climb

Current Turbo of choice:
S510SX

Driver: Eric Calabrese

Vehicle: Volkswagen Bug

Racing Venue: Pro Racing Association

Current Turbo of choice:
Single S400SX

Driver: Mike Reichen

Vehicle: Mitsubishi EVO

Racing Venue: Standing mile/ Drag Racing/Dyno

Current Turbo of choice:
Single S400SX

Team: Papadakis Racing/
Need for Speed,Scion tC

Driver: Fredric Aasbo

Vehicle: 2011 Scion tC
RWD conversion

Racing Venue: Formula Drift

Current Turbo of choice:
EFR-9174

OSTED

Driver: Michael Essa

Vehicle: 2005 BMW M3

Racing Venue: Formula Drift

Current Turbo of choice:
EFR-9174

"To be competitive in Formula Drift, you need mid-range power and throttle response to be instant, and still have tons of power in the top end. BorgWarner EFR turbos are the only units on the market capable of high power and fast response! There is no longer a need to sacrifice top end power by running a small turbo to increase response, the EFR design is truly the best of both worlds."

M I C H A E L E S S A

Team: RealTime Acura TLX

Vehicle: Acura TLX

Racing Venue: Pirelli World Challenge, GT

Current Turbo of choice:
Twin EFR-6258s

Team: XDP

Vehicle: 1995 Dodge Ram

Racing Venue: NHRDA

Current Turbos of choice:
Compound S400SX
& S500SX

Team: DeltaWing Racing Cars

Vehicle: DeltaWing® Coupe

Racing Venue: IMSA WeatherTech SportsCar Championship

Current Turbo of choice:
EFR-6758

Team: DNA Racing

Driver: Alexa Taylor

Vehicle: 1968 Camaro

Racing Venue: Drag Week 1320

Current Turbo of choice:
Twin S300SXs

Team: MotoIQ.com

Driver: Chuck Johnson

Vehicle: Nissan S13 240SX

Racing Venue: World Land Speed Racing, Bonneville

Current Turbo of choice:
EFR 8374

Team: MUGEN

Drivers: Hideki Muto
Daisuke Nakajima

Vehicle: Mugen CR-Z GT300

Racing Venue: Japan Super GT Series

Current Turbo of choice:
Twin EFR-6258s

match-bot
INSTRUCTIONAL

The team at BorgWarner has developed Match-Bot, an interactive turbo matching program that is internet based. The program begins by entering the engine input data. For each piece of input data, helpful pop-up's are provided. These useful tips guide the user through entering appropriate engine targets by means of giving optimal example ranges. Parameters such as BSFC, VE, and exhaust gas temperature are often difficult for the user to estimate, but helpful suggestions are offered each step of the way.

Solutions for single or twin turbo configurations

Corrects turbo speed and capability for operating altitude

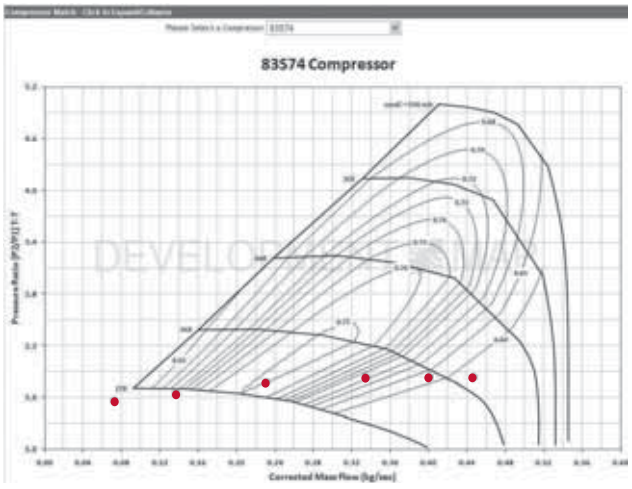
Each required input has suggested ranges that help users estimate values for categories such as Volumetric Efficiency and Brake Specific Fuel Consumption

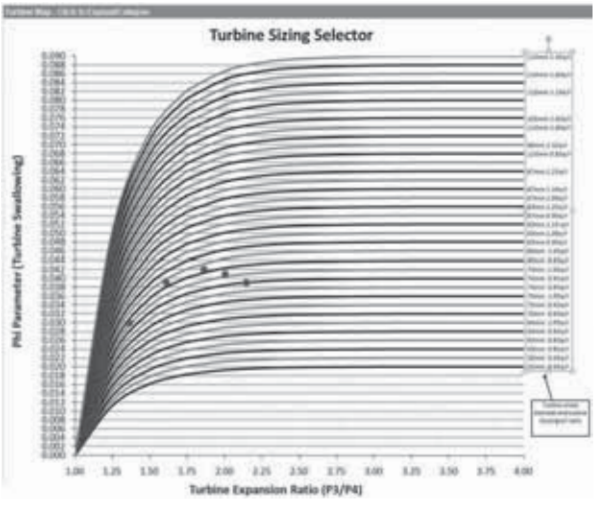
CALCULATED OUTPUTS

		#1	#2	#3	#4	#5	#6
Compressor Pressure Ratio	\	1.36	1.71	2.07	2.22	2.23	2.23
Compressor Outlet Temp	deg F	149.05	200.46	240.46	252.92	263.94	282.25
Intake Manifold Air Temp	deg F	75.74	81.27	83.25	89.23	93.89	95.72
Intake Manifold Air Density	lb/in3	0.000057	0.000071	0.000085	0.000009	0.000089	0.000088
Density Ratio (Intercooled)	\	1.34	1.67	2.01	2.12	2.1	2.09
Actual Flow Rate (Not Corrected)	lb/min	5.89	12.29	20.69	27.32	34.13	39.69
Actual Flow Rate (Not Corrected)	cfm	85.4	178.13	300.03	396.14	494.94	575.52
Correct Air Flow Rate	lb/min	5.94	12.4	20.91	27.67	34.64	40.33
Correct Air Flow Rate	kg/sec	0.045	0.094	0.158	0.209	0.262	0.305
Correct Air Flow Rate	kg/hr	161	337	568	752	941	1096
Correct Air Flow Rat	m3/sec	0.041	0.085	0.143	0.189	0.237	0.276
1/BSAC	hp-min/lb	12	11.5	10.8	10.3	9.9	9.3
Turbo Shaft Power	Hp	2.49	8.79	19.49	27.74	36.8	46.94
Engine Power	Hp	71.5	142.4	224.9	285.1	342.5	376.5
Torque	lb-ft	187.67	249.36	295.31	299.45	299.78	282.5
Fuel Requirement	lb/hr	30.7	64.1	108	142.5	178.1	207.1
TURBINE MATCH OUTPUTS							
Exhaust Manifold Pressure	psi	3.2	6.6	10.9	14.4	17.7	21.4
Engine Delta Pressure (dP)	psi	2	3	4	3	-1	-4
Turbine Swallowing Parameter	PHI	0.0219	0.0213	0.0258	0.0267	0.0283	0.0287
Turbine Corrected Flow @ 59F	lb/min	9.2	15.2	18.4	19	20.2	20.5
Is the Wastegate Flow Choked	\	No	No	No	No	Yes	Yes
Wastegate Flow Area @ CF=0.8	in2	0.03	0.13	0.44	0.73	0.96	1.11
Port Diameter Requirement	mm	5	11	19	24	28	30

Text-Based Output is Provided as Well as Graphical Mapping

THE MATCH-BOT INTERACTIVE TOOL CAN BE FOUND AT:
borgwarnerboosted.com





An Equation for Engine

EFR
BorgWarner

Team: Ryan Litteral Racing
Driver: Ryan Litteral
Vehicle: 1998 Nissan 240SX
Racing Venue: Formula Drift

Current Turbo of choice: **EFR-8374**

Team: ADF Motorsport
Vehicle: BMW 335i
Racing Venue: Bridgestone Production Car Championship

Current Turbo of choice: **EFR-7670**

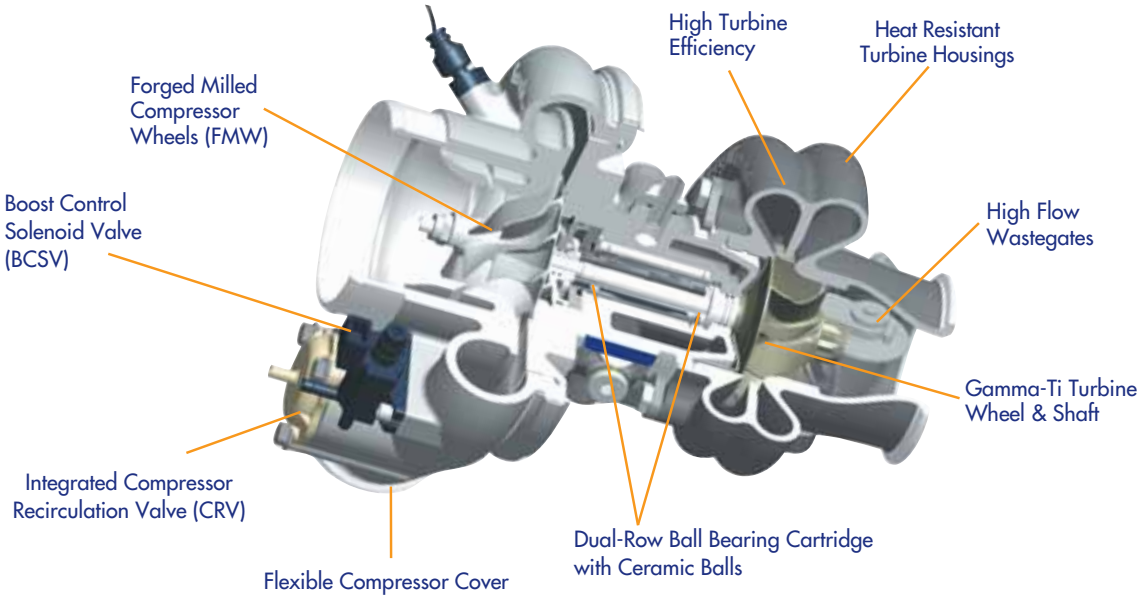
Boosting Excellence

So, you're probably wondering, "What does a new product line of high-performance turbochargers have to do with commercial applications?" The answer lies in the fact that commercial/industrial turbo products have extreme requirements for durability, reliability, and aerodynamic performance. Since modern passenger car applications use turbos smaller than 55mm in turbine wheel diameter, it's the aerodynamic development from the commercial side of the business (i.e. everything larger) that feeds into the performance enthusiast's desire for big power production. Boost pressures of 45-50 psi (3 bar+) are the norm, not the exception. Also required is resistance to abusive thrust loads, high vibrations, and robustness for a wide range of lubrication conditions. Additionally, our commercial product validation standards are among the highest in the engine boosting industry – all good things that also benefit the performance enthusiast or racer. Those are the commonalities, but there are also differences. Unlike commercial applications, high performance users want lightweight, compact, versatile designs. They also deliver the turbocharger very high exhaust gas temperatures with high expectations for fast response. Cosmetic appearance is also valued as are integrated features that aid the installation process and remove the need for other turbo related accessories. Those performance and packaging requirements are quite common among the modern aftermarket passenger car turbo customer.

So, what happens when you combine all of those necessities and put them in front of passionate car people looking to advance the pace of aftermarket boosting solutions? You discover that something new is required to meet the demands of the next generation turbo consumer. There is a fierce desire to take engine boosting to the next level. It was this need for big power that led to EFR.

EFR 58mm and 80mm Gamma-Ti turbine wheels

EFR PRODUCT FEATURE SET



ROTOR GROUPS

COMPRESSOR
TURBINE

	62 mm / 58 mm (62K80) (58J88)	67 mm / 58 mm (67X80) (58J88)	71 mm / 63 mm (71X80) (63W90)
Frame size ▶	**B1**	**B1**	**B1**
	450hp	**500hp**	**550hp**
Super-Core, Aluminum	11587105002	11587105001	11637105000
Super-Core, Iron	179140	179375	
 **A-TYPE** B1 Frame Size 0.64 A/R, T25 Flange Single Scroll Wastegated	**179150** 11581009006	**179388** 11581009006	
 **F-TYPE** B1 Frame Size 0.85 A/R, T25 Flange Single Scroll Wastegated		**11589880034** 11581008000	**11639880005** 11631008000
 **F(v)-TYPE** B1 Frame Size 0.85 A/R, V-Band Inlet Single Scroll Wastegated		**11589880035** 11581008001	**11639880006** 11631008001
 **G-TYPE** B1 Frame Size 0.80 A/R, T4 Flange Twin Scroll Wastegated	**11589880036** 11581008002	**11589880037** 11581008002	**11639880002** 11631008002
 **I-TYPE** B1 Frame Size 0.85 A/R, V-Band Inlet Single Scroll Non-Wastegated		sold as turbine housing kit 11581008003	sold as turbine housing kit 11631008003

	70 mm (70S75)	64 mm (64J88)	76 mm (76S75)	70 mm (70J88)	83 mm (83S75)	74 mm (74A87)	91 mm (91S74)	74 mm (74A87)	91 mm (91S74)	80 mm (80M92)
	B2		**B2**		**B2**		**B2**		**B2**	
	550hp		**650hp**		**750hp**		**1000hp**		**1000hp**	
Super-Core, Aluminum	12709097006		12769097001		12839097000		12919097000		12919097001	
Super-Core, Iron	179354		179350		179257		12919097002		179356	
 **B-TYPE** B2 Frame Size 0.83 A/R, T3 Flange Single Scroll Wastegated	**179355** 12641008006		**179351** 12701008014		**179258** 12741008000				**179358** 12801008002	
 **C-TYPE** B2 Frame Size 0.92 A/R,T4 Flange Twin Scroll Wastegated	**179389** 12641008007		**179390** 12701008016		**179357** 12741008001				**12809880000** 12801019009	
 **D-TYPE** B2 Frame Size 1.05 A/R, T4 Flange Twin Scroll Non-Wastegated	**179391** 12641019016		**179392** 12701019047		**179393** 12741019002				**179394** 12801019001	
 **H-TYPE** B2 Frame Size 1.45 A/R, T4 Flange Twin Scroll Non-Wastegated					sold as turbine housing kit 12741008003				sold as turbine housing kit 12801008006	

KEY

Turbo Assembly
Turbine Housing Assembly

EFR 6258-A | EFR 6258-G

225 - 450 HP Turbo

FEATURES

- **Gamma-Ti turbine wheel**
- **Integrated Compressor Recirculation Valve (CRV)**
- **Dual ceramic ball bearing assembly with metal cage**
- **Boost Control Solenoid Valve (BCSV)**
- **Forged Milled Compressor Wheel (FMW)**
- **Extended tip technology**
- **Compressor cover with speed sensor mounting provisions**

Product - (TYPE)	Complete Turbo	Bearing Housing Material	Super-Core**	TURBINE HOUSING				
				Assembly	A/R	Inlet	Scroll	Waste-gate
6258-A	179150	Iron	179140	11581009006	0.64	T25	Single	Yes
6258-G	11589880036	Aluminum*	11587105002	11581008000	0.85	T25	Single	Yes
6258	–	Aluminum*	11587105002	–	–	–	–	–
6258	–	Iron	179140	–	–	–	–	–
6258	–	–	–	11581008001	0.85	V-Band	Single	Yes
6258	–	–	–	11581008002	0.80	T4	Twin	Yes
6258	–	–	–	11581008003	0.85	V-Band	Single	No

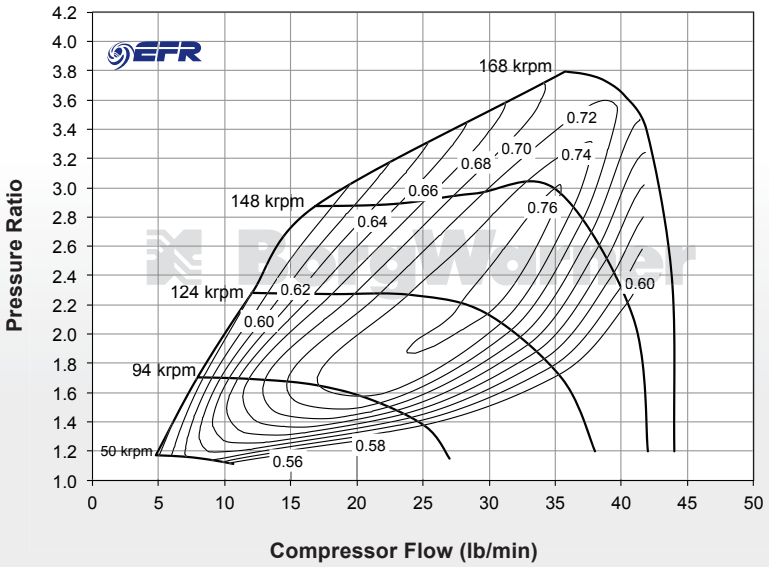
Turbo Frame Size	B1
Comp. Wheel Inducer Dia. (mm)	49
Comp. Wheel Outer Dia. (mm)	62
Turbine Wheel Outer Dia. (mm)	58

*Aluminum bearing housings require cooling

**The following components are not included as part of the Super-Core: Turbine Housing, Clamp Plate Hardware, Wastegate, and Actuator

COMPRESSOR MAP Applicable to all 6258 Units

Comp. Wheel Inducer Dia. (mm) 49
Comp. Wheel Outer Dia. (mm) 62



OPTIONAL HARDWARE

See page 33 for: Speed Sensor, Turbine Gaskets & V-Bands, Oil Drain Gasket & Fitting, Actuators & Brackets

Compressor Cover SX-E Style	Compressor Cover with 90° Outlet	I- Type Turbine Housing
11621013032	11621003002	11581008003

SEE PAGE 30 FOR FRAME DIMENSIONS

EFR 6758-A | EFR 6758-F | EFR 6758-F(v) | EFR 6758-G

250 - 500 HP Turbo

FEATURES

- **Gamma-Ti turbine wheel**
- **Integrated Compressor Recirculation Valve (CRV)**
- **Dual ceramic ball bearing assembly with metal cage**
- **Boost Control Solenoid Valve (BCSV)**
- **Forged Milled Compressor Wheel (FMW)**
- **Extended tip technology**
- **Compressor cover with speed sensor mounting provisions**

Product - (TYPE)	Complete Turbo	Bearing Housing Material	Super-Core**	TURBINE HOUSING				
				Assembly	A/R	Inlet	Scroll	Waste-gate
6758-A	179388	Iron	179375	11581009006	0.64	T25	Single	Yes
6758-F	11589880034	Aluminum*	11587105001	11581008000	0.85	T25	Single	Yes
6758-F(v)	11589880035	Aluminum*	11587105001	11581008001	0.85	V-Band	Single	Yes
6758-G	11589880037	Aluminum*	11587105001	11581008002	0.80	T4	Twin	Yes
6758-I	–	–	–	11581008003	0.85	V-Band	Single	No
6758	–	Aluminum*	11587105001	–	–	–	–	–
6758	–	Iron	179375	–	–	–	–	–

Turbo Frame Size	B1
Comp. Wheel Inducer Dia. (mm)	54
Comp. Wheel Outer Dia. (mm)	67
Turbine Wheel Outer Dia. (mm)	58

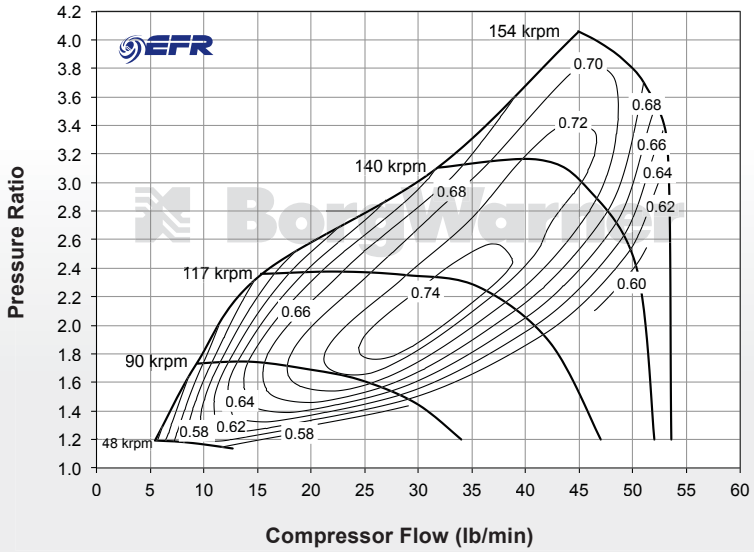
*Aluminum bearing housings require cooling

**The following components are not included as part of the Super-Core: Turbine Housing, Clamp Plate Hardware, Wastegate, and Actuator

COMPRESSOR MAP

Applicable to all 6758 Units

Comp. Wheel Inducer Dia. (mm) 54
Comp. Wheel Outer Dia. (mm) 67



OPTIONAL HARDWARE

See page 33 for: Speed Sensor, Turbine Gaskets & V-Bands, Oil Drain Gasket & Fitting, Actuators & Brackets

Compressor Cover SX-E Style	Compressor Cover with 90° Outlet	I- Type Turbine Housing
11671013004	11671003001	11581008003

SEE PAGE 30 FOR FRAME DIMENSIONS

EFR 7163-F | EFR 7163-F(v) | EFR 7163-G

300 - 550 HP Turbo

FEATURES

- **Gamma-Ti mixed flow turbine wheel**
- **Integrated Compressor Recirculation Valve (CRV)**
- **Dual ceramic ball bearing assembly with metal cage**
- **Boost Control Solenoid Valve (BCSV)**
- **Forged Milled Compressor Wheel (FMW)**
- **Extended tip technology**
- **Compressor cover with speed sensor mounting provisions**

Product - (TYPE)	Complete Turbo	Bearing Housing Material	Super-Core**	TURBINE HOUSING				
				Assembly	A/R	Inlet	Scroll	Waste-gate
7163-F	11639880005	Aluminum*	11637105000	11631008000	0.85	T25	Single	Yes
7163-F(v)	11639880006	Aluminum*	11637105000	11631008001	0.85	V-Band	Single	Yes
7163-G	11639880002	Aluminum*	11637105000	11631008002	0.80	T4	Twin	Yes
7163-I	–	–	–	11631008003	0.85	V-Band	Single	No
7163	–	Aluminum*	11637105000	–	–	–	–	–

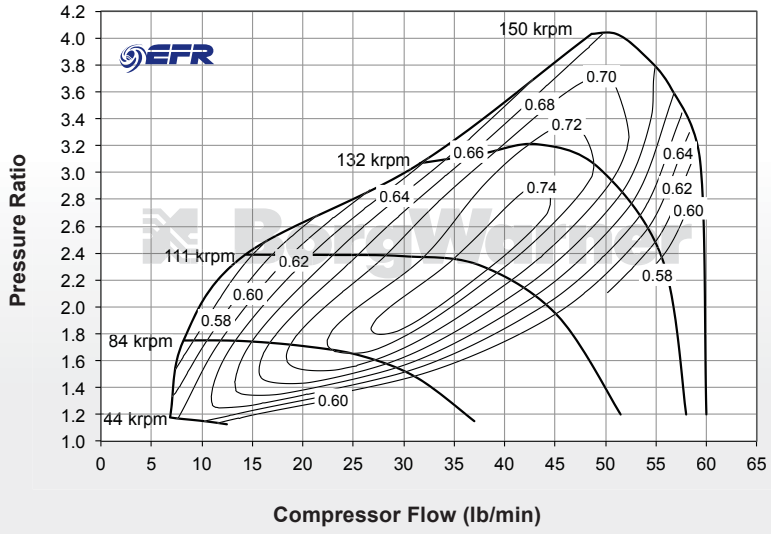
Turbo Frame Size	B1
Comp. Wheel Inducer Dia. (mm)	57
Comp. Wheel Outer Dia. (mm)	71
Turbine Wheel Outer Dia. (mm)	63

*Aluminum bearing housings require cooling

**The following components are not included as part of the Super-Core: Turbine Housing, Clamp Plate Hardware, Wastegate, and Actuator

COMPRESSOR MAP Applicable to all 7163 Units

Comp. Wheel Inducer Dia. (mm) 57
Comp. Wheel Outer Dia. (mm) 71



OPTIONAL HARDWARE

See page 33 for: Speed Sensor, Turbine Gaskets & V-Bands, Oil Drain Gasket & Fitting, Actuators & Brackets

Compressor Cover SX-E Style	Compressor Cover with 90° Outlet	I- Type Turbine Housing
11711013004	11711003001	11631008003

SEE PAGE 30 FOR FRAME DIMENSIONS

EFR 7064-B | EFR 7064-C | EFR 7064-D

300 - 550 HP Turbo

FEATURES

- **Gamma-Ti turbine wheel**
- **Integrated Compressor Recirculation Valve (CRV)**
- **Dual ceramic ball bearing assembly with metal cage**
- **Boost Control Solenoid Valve (BCSV)**
- **Forged Milled Compressor Wheel (FMW)**
- **Extended tip technology**
- **Compressor cover with speed sensor mounting provisions**

Product - (TYPE)	Complete Turbo	Bearing Housing Material	Super-Core**	TURBINE HOUSING				
				Assembly	A/R	Inlet	Scroll	Waste-gate
7064-B	179355	Iron	179354	12641008006	0.83	T3	Single	Yes
7064-C	179389	Iron	179354	12641008007	0.92	T4	Twin	Yes
7064-D	179391	Iron	179354	12641019016	1.05	T4	Twin	No
7064	–	Aluminum*	12709097006	–	–	–	–	–
7064	–	Iron	179354	–	–	–	–	–

Turbo Frame Size	B2
Comp. Wheel Inducer Dia. (mm)	52
Comp. Wheel Outer Dia. (mm)	70
Turbine Wheel Outer Dia. (mm)	64

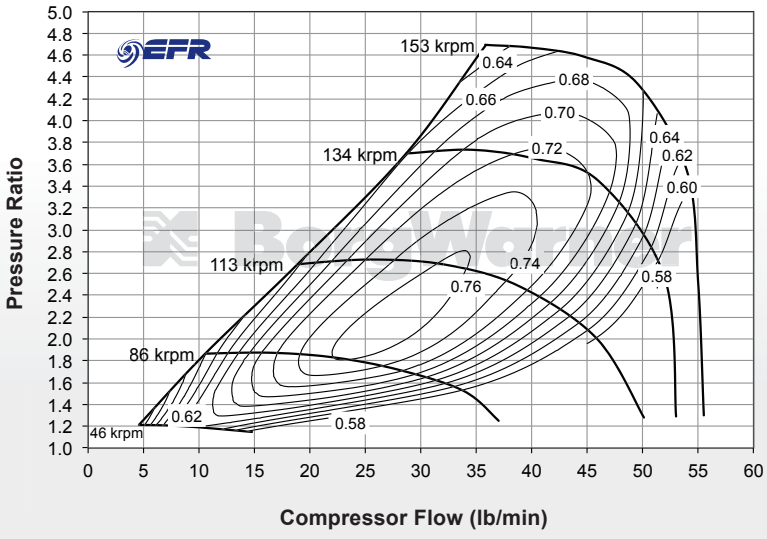
*Aluminum bearing housings require cooling

**The following components are not included as part of the Super-Core: Turbine Housing, Clamp Plate Hardware, Wastegate, and Actuator

COMPRESSOR MAP

Applicable to all 7064 Units

Comp. Wheel Inducer Dia. (mm) 52
Comp. Wheel Outer Dia. (mm) 70



OPTIONAL HARDWARE

See page 33 for: Speed Sensor, Turbine Gaskets & V-Bands, Oil Drain Gasket & Fitting, Actuators & Brackets

Compressor Cover SX-E Style
12701013022

SEE PAGE 31 FOR FRAME DIMENSIONS

EFR 7670-B | EFR 7670-C | EFR 7670-D

375 - 650 HP Turbo

FEATURES

- **Gamma-Ti turbine wheel**
- **Integrated Compressor Recirculation Valve (CRV)**
- **Dual ceramic ball bearing assembly with metal cage**
- **Boost Control Solenoid Valve (BCSV)**
- **Forged Milled Compressor Wheel (FMW)**
- **Extended tip technology**
- **Compressor cover with speed sensor mounting provisions**

Product - (TYPE)	Complete Turbo	Bearing Housing Material	Super-Core**	TURBINE HOUSING				
				Assembly	A/R	Inlet	Scroll	Waste-gate
7670-B	179351	Iron	179350	12701008014	0.83	T3	Single	Yes
7670-C	179390	Iron	179350	12701008016	0.92	T4	Twin	Yes
7670-D	179392	Iron	179350	12701019047	1.05	T4	Twin	No
7670	–	Aluminum*	12769097001	–	–	–	–	–
7670	–	Iron	179350	–	–	–	–	–

Turbo Frame Size	B2
Comp. Wheel Inducer Dia. (mm)	57
Comp. Wheel Outer Dia. (mm)	76
Turbine Wheel Outer Dia. (mm)	70

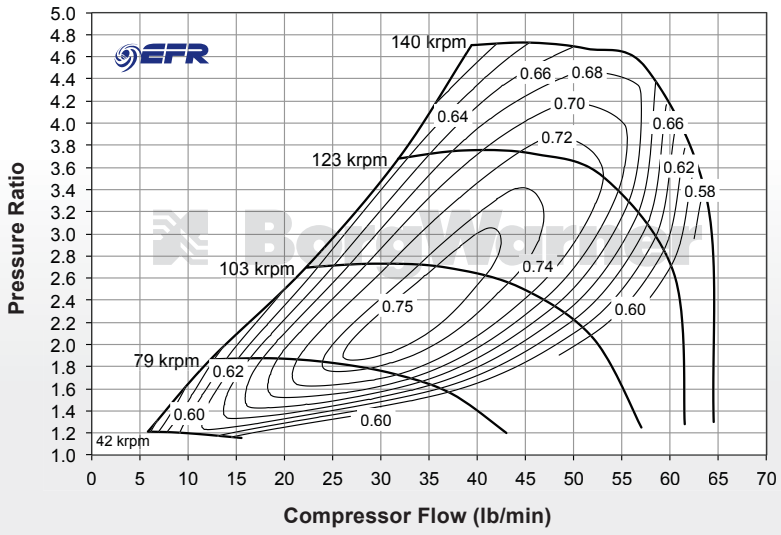
*Aluminum bearing housings require cooling

**The following components are not included as part of the Super-Core: Turbine Housing, Clamp Plate Hardware, Wastegate, and Actuator

COMPRESSOR MAP

Applicable to all 7670 Units

Comp. Wheel Inducer Dia. (mm) 57
Comp. Wheel Outer Dia. (mm) 76



OPTIONAL HARDWARE

See page 33 for: Speed Sensor, Turbine Gaskets & V-Bands, Oil Drain Gasket & Fitting, Actuators & Brackets

Compressor Cover SX-E Style
12761013034

SEE PAGE 31 FOR FRAME DIMENSIONS

EFR 8374-B | EFR 8374-C | EFR 8374-D

475 - 750 HP Turbo

FEATURES

- **Gamma-Ti turbine wheel**
- **Integrated Compressor Recirculation Valve (CRV)**
- **Dual ceramic ball bearing assembly with metal cage**
- **Boost Control Solenoid Valve (BCSV)**
- **Forged Milled Compressor Wheel (FMW)**
- **Extended tip technology**
- **Compressor cover with speed sensor mounting provisions**

Product - (TYPE)	Complete Turbo	Bearing Housing Material	Super-Core**	TURBINE HOUSING				
				Assembly	A/R	Inlet	Scroll	Waste-gate
8374-B	179258	Iron	179257	12741008000	0.83	T3	Single	Yes
8374-C	179357	Iron	179257	12741008001	0.92	T4	Twin	Yes
8374-D	179393	Iron	179257	12741019002	1.05	T4	Twin	No
8374-H	–	–	–	12741008003	1.45	T4	Twin	No
8374	–	Aluminum*	12839097000	–	–	–	–	–
8374	–	Iron	179257	–	–	–	–	–

Turbo Frame Size	B2
Comp. Wheel Inducer Dia. (mm)	62
Comp. Wheel Outer Dia. (mm)	83
Turbine Wheel Outer Dia. (mm)	74

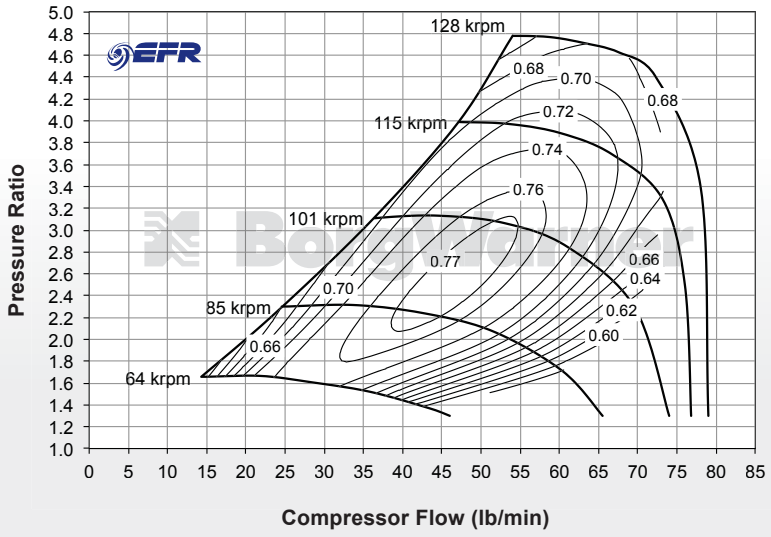
*Aluminum bearing housings require cooling

**The following components are not included as part of the Super-Core: Turbine Housing, Clamp Plate Hardware, Wastegate, and Actuator

COMPRESSOR MAP

Applicable to all 8374 Units

Comp. Wheel Inducer Dia. (mm) 62
Comp. Wheel Outer Dia. (mm) 83



OPTIONAL HARDWARE

See page 33 for: Speed Sensor, Turbine Gaskets & V-Bands, Oil Drain Gasket & Fitting, Actuators & Brackets

Compressor Cover SX-E Style	H-Type Turbine Housing
12831013012	12741008003

SEE PAGE 31 FOR FRAME DIMENSIONS

EFR 9174 Aluminum Super-Core | EFR 9174 Iron Super-Core

600 - 1000 HP Turbo

F E A T U R E S

- **Gamma-Ti turbine wheel**
- **Integrated Compressor Recirculation Valve (CRV)**
- **Dual ceramic ball bearing assembly with metal cage**
- **Boost Control Solenoid Valve (BCSV)**
- **Forged Milled Compressor Wheel (FMW)**
- **Extended tip technology**
- **Compressor cover with speed sensor mounting provisions**

Product - (TYPE)	Complete Turbo	Bearing Housing Material	Super-Core**	TURBINE HOUSING				
				Assembly	A/R	Inlet	Scroll	Waste-gate
9174	–	Aluminum*	12919097000	–	–	–	–	–
9174	–	Iron	12919097002	–	–	–	–	–
9174	–	–	–	12741008000	0.83	T3	Single	Yes
9174	–	–	–	12741008001	0.92	T4	Twin	Yes
9174	–	–	–	12741019002	1.05	T4	Twin	No
9174	–	–	–	12741008003	1.45	T4	Twin	No

Turbo Frame Size	B2
Comp. Wheel Inducer Dia. (mm)	68
Comp. Wheel Outer Dia. (mm)	91
Turbine Wheel Outer Dia. (mm)	74

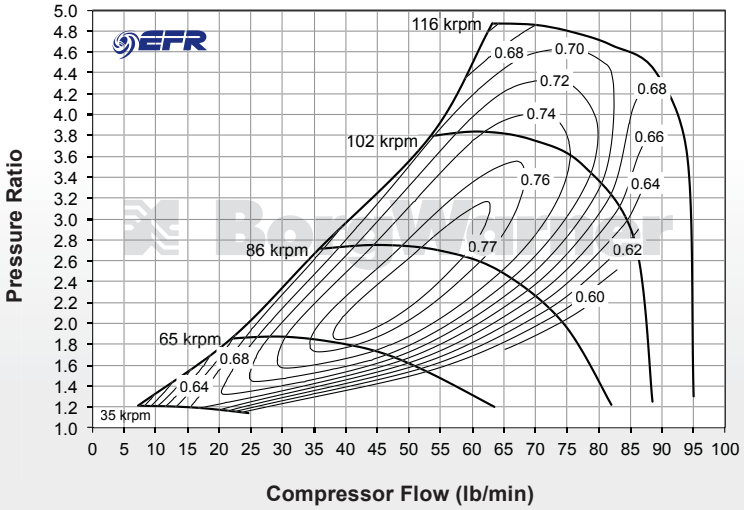
*Aluminum bearing housings require cooling

**The following components are not included as part of the Super-Core: Turbine Housing, Clamp Plate Hardware, Wastegate, and Actuator

COMPRESSOR MAP

Applicable to all 9174 and 9180 Units

Comp. Wheel Inducer Dia. (mm) 68
Comp. Wheel Outer Dia. (mm) 91



OPTIONAL HARDWARE

See page 33 for: Speed Sensor, Turbine Gaskets & V-Bands, Oil Drain Gasket & Fitting, Actuators & Brackets

Compressor Cover SX-E Style	H-Type Turbine Housing
12911013005	12741008003

SEE PAGE 31 FOR FRAME DIMENSIONS

EFR 9180-B | EFR 9180-C | EFR 9180-D

600 - 1000 HP Turbo

FEATURES

- **Gamma-Ti turbine wheel**
- **Integrated Compressor Recirculation Valve (CRV)**
- **Dual ceramic ball bearing assembly with metal cage**
- **Boost Control Solenoid Valve (BCSV)**
- **Forged Milled Compressor Wheel (FMW)**
- **Extended tip technology**
- **Compressor cover with speed sensor mounting provisions**

Product - (TYPE)	Complete Turbo	Bearing Housing Material	Super-Core**	TURBINE HOUSING				
				Assembly	A/R	Inlet	Scroll	Waste-gate
9180-B	179358	Iron	179356	12801008002	0.83	T3	Single	Yes
9180-C	12809880000	Iron	179356	12801019009	0.92	T4	Twin	Yes
9180-D	179394	Iron	179356	12801019001	1.05	T4	Twin	No
9180-H	–	–	–	12801008006	1.45	T4	Twin	No
9180	–	Aluminum*	12919097001	–	–	–	–	–
9180	–	Iron	179356	–	–	–	–	–

Turbo Frame Size	B2
Comp. Wheel Inducer Dia. (mm)	68
Comp. Wheel Outer Dia. (mm)	91
Turbine Wheel Outer Dia. (mm)	80

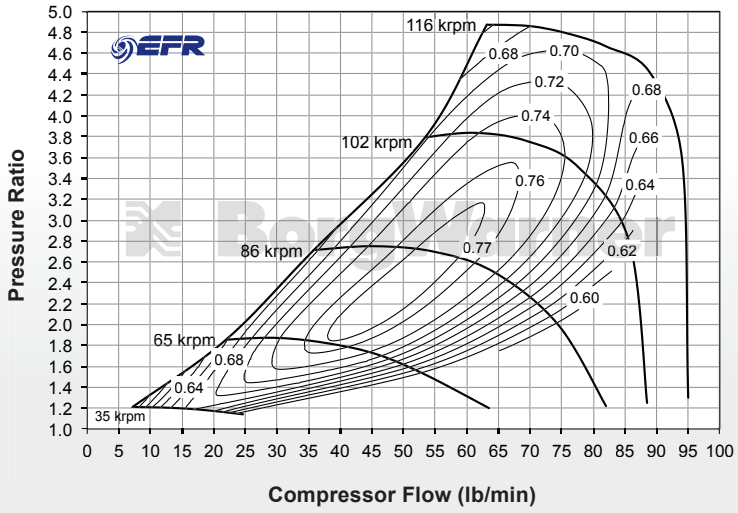
*Aluminum bearing housings require cooling

**The following components are not included as part of the Super-Core: Turbine Housing, Clamp Plate Hardware, Wastegate, and Actuator

COMPRESSOR MAP

Applicable to all 9174 and 9180 Units

Comp. Wheel Inducer Dia. (mm) 68
Comp. Wheel Outer Dia. (mm) 91



OPTIONAL HARDWARE

See page 33 for: Speed Sensor, Turbine Gaskets & V-Bands, Oil Drain Gasket & Fitting, Actuators & Brackets

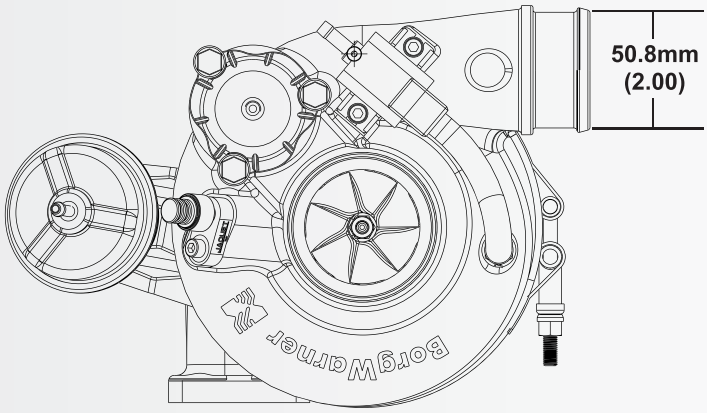
Compressor Cover SX-E Style	H-Type Turbine Housing
12911013005	12801008006

SEE PAGE 31 FOR FRAME DIMENSIONS

Turbo Frame Dimensions

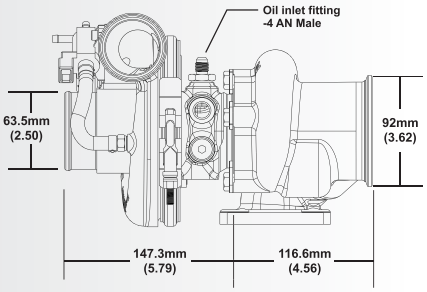
For all 6258 / 6758 / 7163 EFR models.*

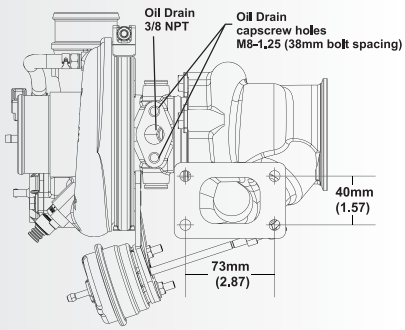
B1 FRAME SIZE



*Speed sensor details, see page 55

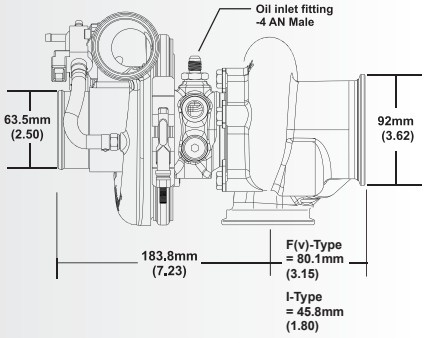
A & F - TYPE

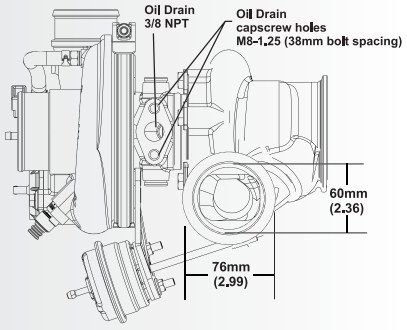




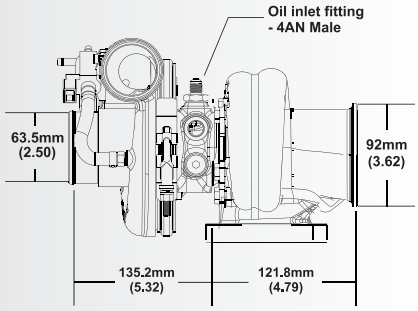
F (V) & I - TYPE

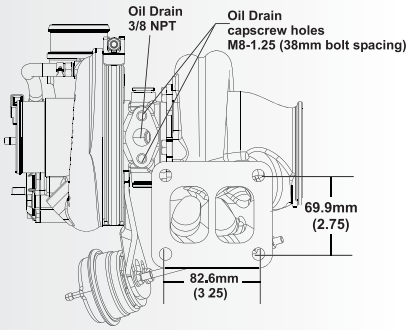
Note: I-type is not wastegated





G - TYPE

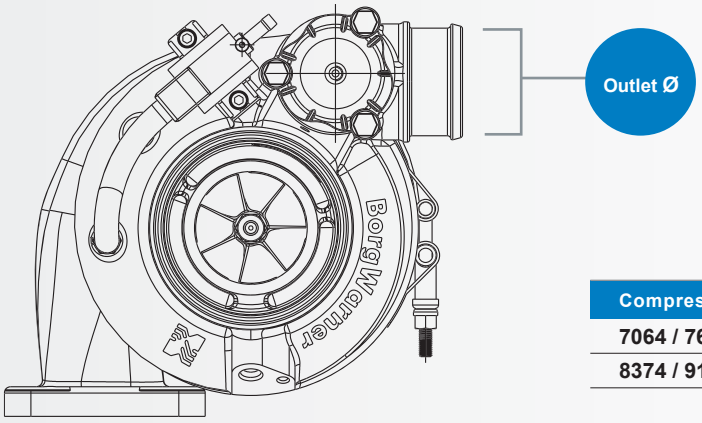




Turbo Frame Dimensions

For all 7064 / 7670 / 8374 / 9174 and 9180 EFR models.*

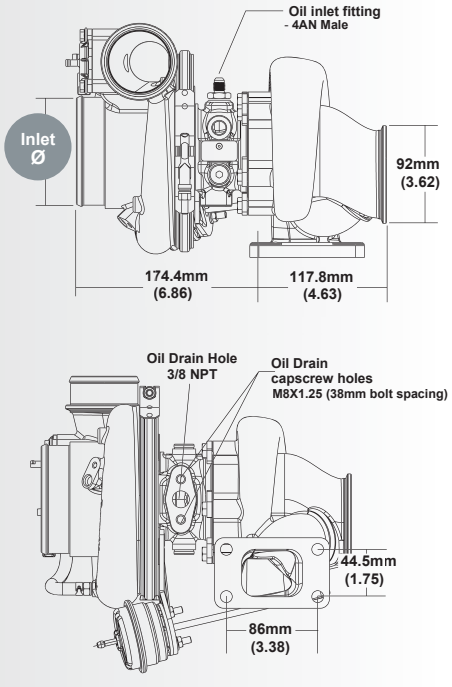
B2 FRAME SIZE



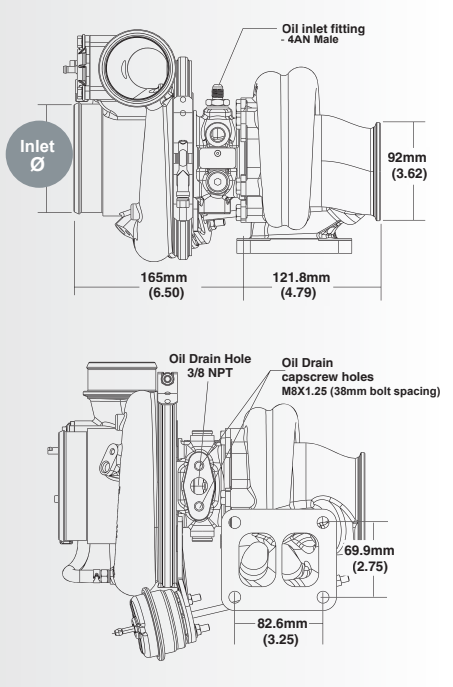
Compressor Outlet Ø
7064 / 7670 = 50.8mm (2.00)
8374 / 9174 / 9180 = 63.5mm (2.50)

*Speed sensor details, see page 55

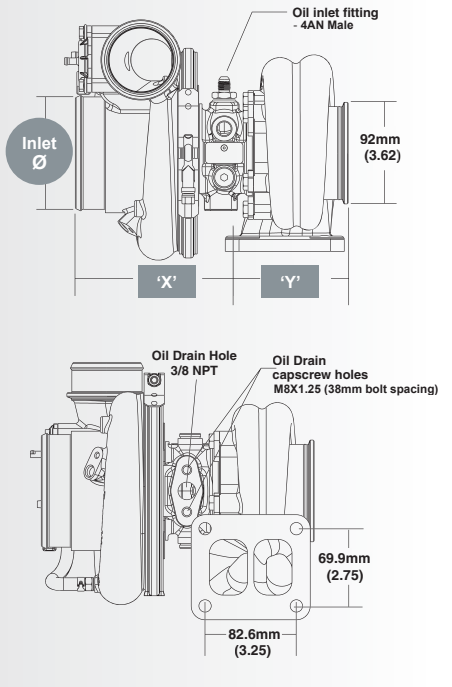
B - TYPE



C - TYPE



D & H - TYPE



Compressor Inlet Ø
7064 / 7670 = 88.9mm (3.50)
8374 / 9174 / 9180 = 101.6mm (4.00)

Dimension 'X'
7064 / 7670 D-Type = 142mm (5.60)
8374 / 9180 D-Type = 148mm (5.82)
8374 / 9180 H-Type = 140mm (5.51)

Dimension 'Y'
D-Type = 98.6mm (3.88)
H-Type = 106.4mm (4.19)

Ancillary Parts

EFR WASTEGATE CANISTER SELECTION GUIDE

Core Assy.	A-TYPE 0.64a/r TH	G-TYPE 0.80a/r TH	B-TYPE 0.83a/r TH	F & F(v)- TYPE 0.85a/r TH	C-TYPE 0.92a/r TH
6258	179282, 179283, or 179284 **Optional Super Short Canister** 58251107255, 58251107262, or 58251107261	179420, 179421, or 179422		179282, 179283, or 179284 **Optional Super Short Canister** 58251107255, 58251107262, or 58251107261	
6258*					
6758					
6758*					
7163*					
7064			179285, 179286, or 179287		179285, 179286, or 179287
7670					
8374					
9180					

EFR WASTEGATE CANISTER BRACKET KIT SELECTION GUIDE

Core Assy.	A-TYPE 0.64a/r TH	G-TYPE 0.80a/r TH	B-TYPE 0.83a/r TH	F & F(v)- TYPE 0.85a/r TH	C-TYPE 0.92a/r TH
6258	179427 Super Short Canister 59007119007	179428		179427 Super Short Canister 59007119007	
6258*					
6758					
6758*					
7163*					
7064			179428		179428
7670					
8374			179429		179429
9180					

Each Wastegate Bracket Kit Includes:

- (1) Stainless steel bracket
- (3) Bracket to bearing housing screws
- (2) Canister to bracket lock nuts
- (1) Actuator rod nut (outboard side)
- (1) Long 410mm wastegate signal hose
- (2) Hose clamps

EFR CANISTER PRELOAD GUIDE

ROD & SPRING FULL STROKE		LOW BOOST 179282, 179420, OR 179285 STANDARD CANISTER 59001107255 SUPER SHORT CANISTER		MEDIUM BOOST 179283, 179421, OR 179286 STANDARD CANISTER 59001107262 SUPER SHORT CANISTER		HIGH BOOST 179284, 179422, OR 179287 STANDARD CANISTER 59001107261 SUPER SHORT CANISTER	
PRELOAD	CAPABILITY						
(mm / nut turns)	inches (mm)	WG Crack-Open Pressure (psi)	Full Stroke Pressure (psi)	WG Crack-Open Pressure (psi)	Full Stroke Pressure (psi)	WG Crack-Open Pressure (psi)	Full Stroke Pressure (psi)
0	0.67” (17mm)	4.0 psi	13.7 psi	8.8 psi	20.6 psi	16.8 psi	32.3 psi
1	0.63” (16mm)	4.9 psi	13.8 psi	9.6 psi	20.6 psi	17.3 psi	32.3 psi
2	0.59” (15mm)	5.7 psi	14.0 psi	10.8 psi	20.6 psi	17.6 psi	32.3 psi
3	0.55” (14mm)	6.1 psi	14.1 psi	11.2 psi	20.6 psi	17.8 psi	32.3 psi
4	0.51” (13mm)	6.8 psi	14.3 psi	11.9 psi	20.6 psi	17.9 psi	32.3 psi
5	0.47” (12mm)	7.3 psi	14.4 psi	12.3 psi	20.6 psi	18.1 psi	32.3 psi
6	0.43” (11mm)	8.0 psi	14.4 psi	13.2 psi	20.6 psi	18.6 psi	32.3 psi
7	0.39” (10mm)	8.5 psi	14.6 psi	14.0 psi	20.6 psi	19.0 psi	32.3 psi
8	0.35” (9mm)	9.1 psi	14.6 psi	14.5 psi	20.6 psi	19.3 psi	32.3 psi
9	0.31” (8mm)	9.6 psi	14.7 psi	14.8 psi	20.6 psi	19.4 psi	32.3 psi
10	0.28” (7mm)	9.9 psi	14.7 psi	15.9 psi	20.6 psi	19.6 psi	32.3 psi
		Use with up to 13 psi applied pressure		Use with up to 19 psi applied pressure		Use with up to 31 psi applied pressure	

Note 1: Avoid too little preload. The diaphragm can rub (and wear) against the top of the can. We recommend 3mm of preload as a starting point.

Note 2: Avoid too much preload. Too much preload can cause premature diaphragm wear, but can be used functionally to limit travel and avoid boost droop at high RPM.

Note 3: When using solenoid valve boost control, the signal pressure that the WG canister sees can be bled off. Select a canister that will allow nearly full stroke.

Note 4: The “use with up to” pressures avoid long-term wear. By bottoming out the stroke, the diaphragm can be distressed over the course of time.

Note 5: EFR turbo assemblies come standard with the “Medium Boost” WG canisters. “Low” or “High” as well as Super Short boost actuator canisters can be purchased from an EFR dealer.

Ancillary Parts

Hardware/Installation Kit

#179423

(1) Turbine housing outlet V-band clamp
(2) V-band clamp nuts
(2) Water port plugs
(6) Water port plug sealing washers
(1) Oil inlet fitting (-4an) w/seal and washer
(1) Compressor cover outlet V-band clamp for 83 & 91mm
(5) Clamp plate bolts
(5) Clamp plates, 1-hole
(1) Turbine inlet gasket for T25 flange
(1) Turbine inlet gasket for T3 flange
(1) Turbine inlet gasket for T4 divided flange

Clamp Kit, Turbine Housing to Bearing Housing for Aluminum B2 Bearing Housings

#59007119005

(1) Clamp Plate, 3-hole
(1) Clamp Plate, 2-hole
(5) Bolts, Cross drilled A286
(1) Shim

V-Band, Turbine Inlet for F(v) Housings

#59001095100

Super Short Canister

59001107255 Low Boost
59001107262 Medium Boost
59001107261 High Boost

Wastegate Bracket Kit for Super Short Canisters

#59007119007

(1) Stainless steel bracket
(2) Bracket to bearing housing screws
(2) Canister to bracket lock nuts
(1) Actuator rod nut (outboard side)
(1) Long 410mm wastegate signal hose
(2) Hose Clamps

Boost Control Solenoid Valve (BCSV) Kit

#179425

(1) Boost control solenoid valve
(2) BCSV screws
(4) Hose clamps
(1) Compressor cover boost port fitting
(1) Comp cover boost port washer
(1) Wastegate signal hose, 110mm
(1) Wastegate signal hose, 410mm

Compressor Recirculation Valve Kit (CRV)

#179424

(1) Plastic cover w/hose nipple
(1) CRV disabling block-off plate
(1) Diaphragm/piston assembly
(1) Stiffer Spring #58061191364
(3) Cover plate bolts w/locking compound

CRV Spring

Standard w/ blue mark
#58061191379

Stiffer w/o mark
#58061191364

CRV Cover, Angled Port

Kit #59001123522

modification required

(1) #59001123514 CRV cover, angled port
(1) Washer, CRV
(3) Cover Plate Bolts w/locking compound

Wastegate Hose Kit

#179426

(1) Wastegate signal hose, 410mm
(2) Hose clamps

Speed Sensor Kit

#179430

(1) Speed sensor, frequency output
(1) Speed sensor hold-down bolt

***Note: Speed Sensor signal conversion and display accessories can be purchased at: www.roadragegages.com

AIRWerks
BorgWarner

The passion of power

Team: DNA Racing
Driver: Dennis Taylor
Vehicle: 1972 Chevy Nova SS
Racing Venue: Hot Rod Drag Week

Current Turbo of choice:
Twin S400SX-E 88mm

When DSport magazine started building a Honda engine for the 72MM class limit turbo, they reached for the S400SX3 from BorgWarner's AirWerks division. This turbo is capable of supporting over 1000 horsepower, offers super-quick response and the durability associated with the BorgWarner name.

In 2002, the aftermarket group of BorgWarner Turbo Systems started a program named AirWerks. This independent aftermarket program was created to assist the needs of BorgWarner distributors who currently sell into the market of competitive motorsports or are assisting those customers who are looking for a little more performance to a factory turbocharged car or to retrofit a naturally aspirated engine.

Driver: Glen Hunter
Vehicle: 1956 Chevrolet Bel Air
Racing Venue: Hot Rod Drag Week

Current Turbo of choice:
Twin S400SX-E 88mm

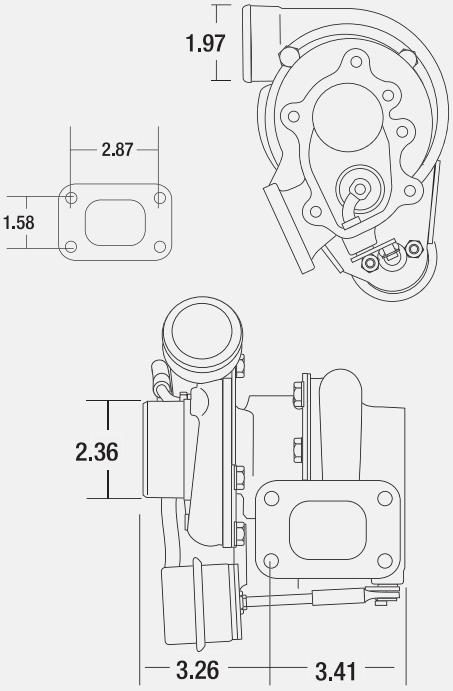
S1BG

120 - 320 HP Turbo

F E A T U R E S

- **Twin hydrodynamic journal bearings**
- **Integrated wastegate assembly**
- **Adjustable compressor and turbine housing orientation**

TURBO FRAME DIMENSIONS

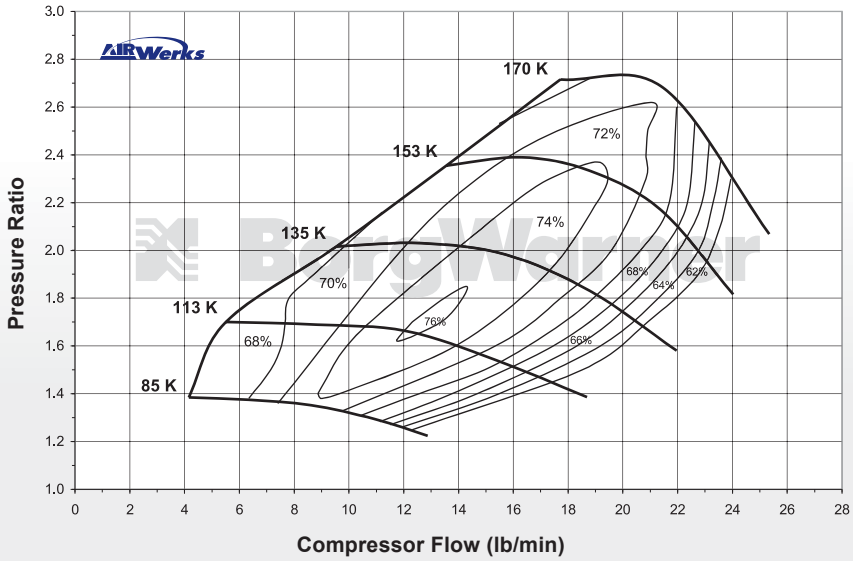


Turbo Part #	Comp. Wheel O.D. (in)	Comp Wheel O.D. (mm)	Comp Wheel Inducer Dia. (in)	Comp Wheel Inducer Dia. (mm)	Turbine Wheel O.D. (in)	Turbine Wheel O.D. (mm)	Turbine Wheel Exducer (in)	Turbine Wheel Exducer (mm)	Turbine Housing A/R	Cartridge Assembly	Service Kit
313295	1.90	48.31	1.35	34.21	1.85	46.99	1.58	40.00	0.35	N/A	318374
313296	2.08	52.91	1.55	39.32	2.08	52.92	1.80	45.73	0.46	315358	318374
313683	2.08	52.91	1.55	39.32	2.08	52.92	1.80	45.73	0.61	N/A	318374
313297	2.28	57.96	1.70	43.28	2.08	52.92	1.80	45.73	0.61	313737	318374
313798	2.28	57.96	1.70	43.28	2.08	52.92	1.80	45.73	0.61	313737	318374

COMPRESSOR MAP

Applicable to part number 313296

Comp. Wheel Inducer Dia. (mm) 39.32
Comp. Wheel Outer Dia. (mm) 52.91



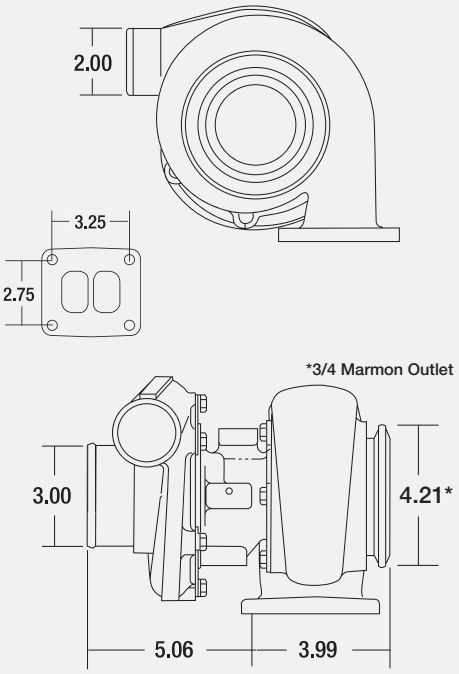
S200SX

220 - 580 HP Turbo

FEATURES

- Twin hydrodynamic journal bearings
- Extended tip technology compressor wheel
- Twin scroll turbine housing
- Adjustable compressor and turbine housing orientation

TURBO FRAME DIMENSIONS



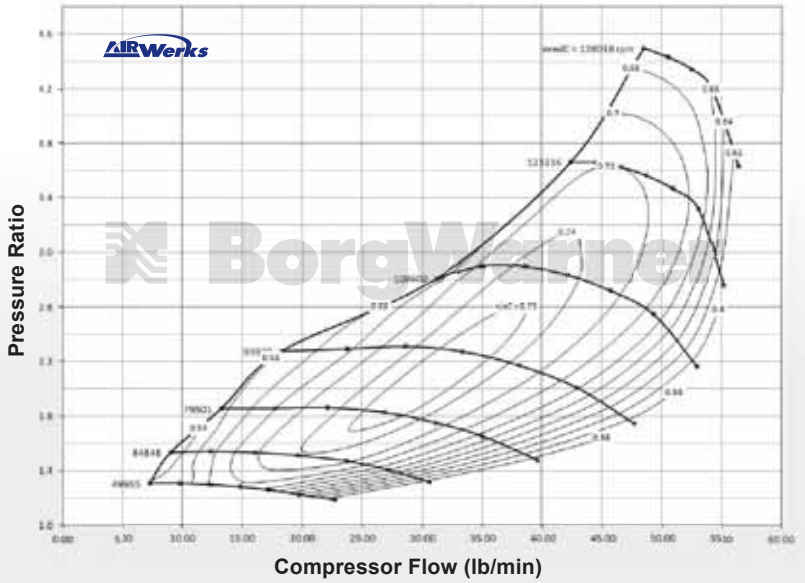
Turbo Part #	Comp. Wheel O.D. (in)	Comp Wheel O.D. (mm)	Comp Wheel Inducer Dia. (in)	Comp Wheel Inducer Dia. (mm)	Turbine Wheel O.D. (in)	Turbine Wheel O.D. (mm)	Turbine Wheel Exducer (in)	Turbine Wheel Exducer Dia (mm)	Turbine Housing A/R	Turbine Inlet	Cartridge Assembly	Service Kit
177258	2.74	69.57	1.81	45.90	2.74	69.56	2.42	61.43	0.83	VTF	176639	318383
177267	2.74	69.57	1.95	49.56	2.74	69.56	2.42	61.43	1.09	VTF	176642	318383
177257	2.74	69.57	2.00	50.72	2.74	69.56	2.42	61.43	0.83	VTF	176638	318383
177268	3.00	76.20	2.20	55.80	2.74	69.56	2.42	61.43	1.22	VTF	176637	318383
178034*	3.00	76.20	2.20	55.80	2.74	69.56	2.42	61.43	1.22	VTF	N/A	318383
178042*	3.00	76.20	2.20	55.80	2.74	69.56	2.42	61.43	1.27	VTF	N/A	318383

* Compressor inlet diameter 4.00”

COMPRESSOR MAP

Applicable to part number 177268

Comp. Wheel Inducer Dia. (mm) 55.80
Comp. Wheel Outer Dia. (mm) 76.20



TURBINE HOUSING

Part #	A/R	Inlet Configuration		Notes
177191	0.83	Volute, Twin Flow	T4 Bolt Pattern T3 Volute Opening	70mm Turbine Wheel
177193	1.00			
177196	1.09			
177192	1.15			
177194	1.22			
178331	1.27			

S200SX-E

300 - 650 HP Super-Core

FEATURES

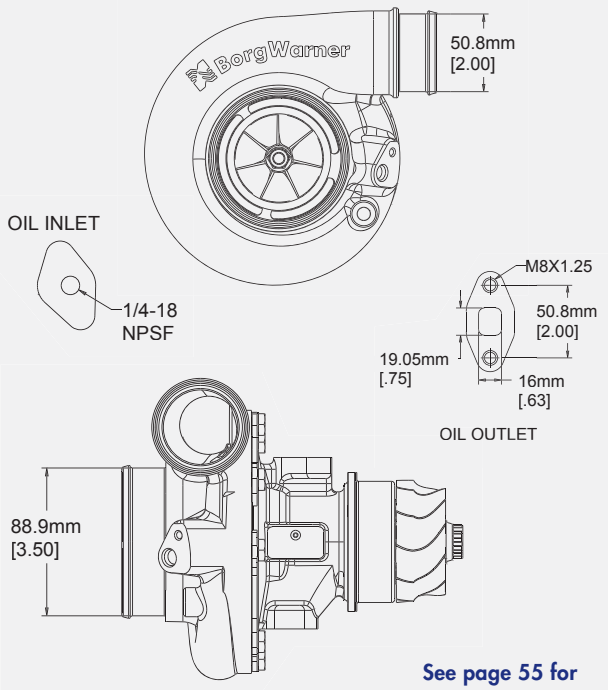
- **Integrated speed sensor port**
- **Forged milled compressor wheel**
- **Pre-machined boost port**
- **Optimized compressor stage aerodynamics**

Not included with turbo assemblies: Speed sensor, Turbine outlet V-Band, Drain port fitting

Compressor Wheel Extended Tip Technology

FMW TECHNOLOGY

SUPER-CORE FRAME DIMENSIONS



See page 55 for speed sensor details

Super-Core Part #	Comp. Wheel O.D. (in)	Comp. Wheel O.D. (mm)	Comp Wheel Inducer Dia. (in)	Comp Wheel Inducer Dia. (mm)	Turbine Wheel O.D. (in)	Turbine Wheel O.D. (mm)	Turbine Wheel Exducer (in)	Turbine Wheel Exducer (mm)	Service Kit
12709095019	2.74	69.60	2.05	52.17	2.74	69.56	2.42	61.43	318383
12769095003	3.00	76.20	2.25	57.15	2.74	69.56	2.42	61.43	318383

TURBINE HOUSING

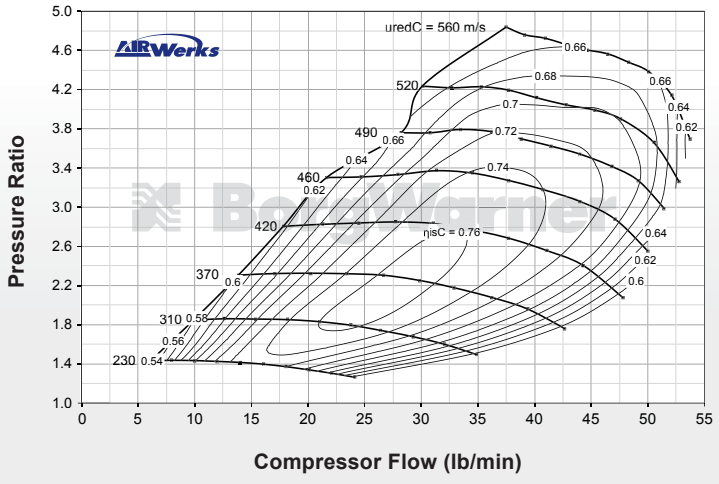
Part #	A/R	Inlet Configuration		Notes
177191	0.83	Volute, Twin Flow	T4 Bolt Pattern T3 Volute Opening	70mm Turbine Wheel
177193	1.00			
177196	1.09			
177192	1.15			
177194	1.22			
178331	1.27			

All turbine housing mounting hardware, clamp plates and cap screws are included with Super-Core.

COMPRESSOR MAPS

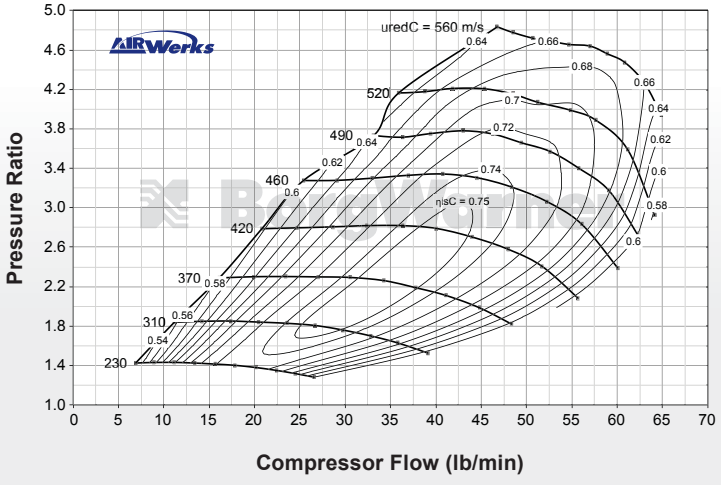
S200SX-E 300 - 550 HP Super-Core Part #: 12709095019

Comp. Wheel Inducer Dia. (mm) 52.17
Comp. Wheel Outer Dia. (mm) 69.60



S200SX-E 300 - 650 HP Super-Core Part #: 12769095003

Comp. Wheel Inducer Dia. (mm) 57.15
Comp. Wheel Outer Dia. (mm) 76.20



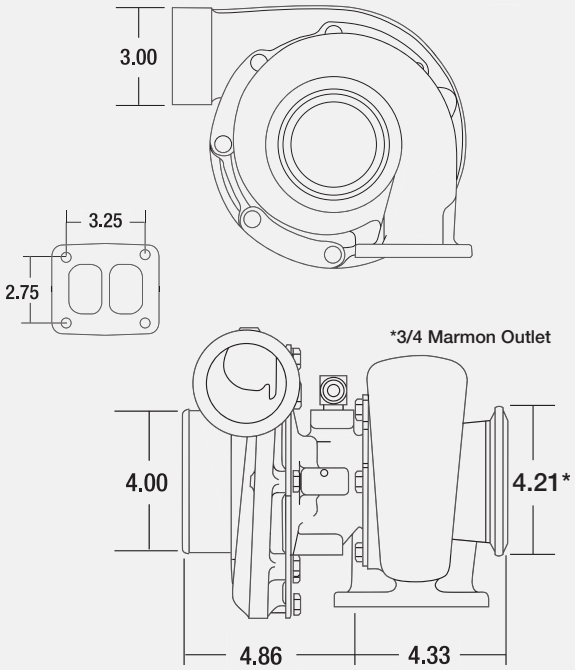
S300SX3

320 - 800 HP Turbo

FEATURES

- Twin hydrodynamic journal bearings
- Extended tip technology compressor wheel
- Twin scroll turbine housing options available
- Adjustable compressor and turbine housing orientation
- Compressor cover recirculation grooves

TURBO FRAME DIMENSIONS

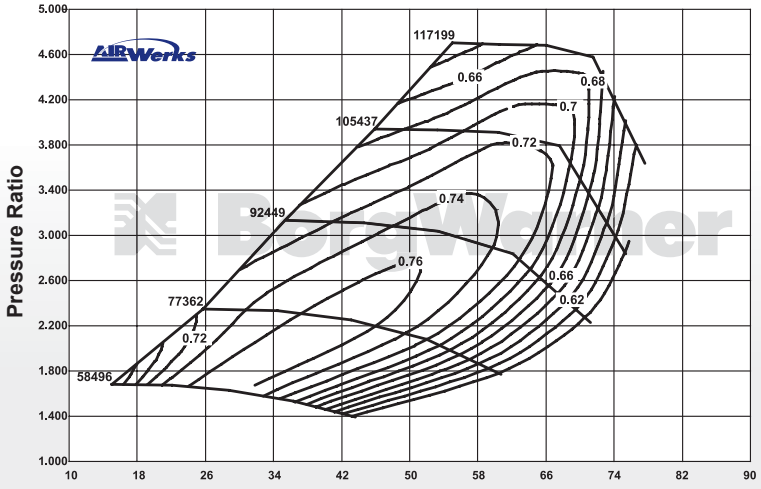


Turbo Part #	Comp. Wheel O.D. (in)	Comp Wheel O.D. (mm)	Comp Wheel Inducer Dia.	Comp Wheel Inducer Dia. (mm)	Turbine Wheel O.D. (in)	Turbine Wheel O.D. (mm)	Turbine Wheel Exducer (in)	Turbine Wheel Exducer (mm)	Turbine Housing A/R	Cartridge Assembly	Service Kit (Standard)	Service Kit (360° thrust bearing)
177281	3.60	91.44	2.60	66.11	3.14	79.76	2.89	73.37	0.88	176634	318393	13007110005
177275	3.60	91.44	2.60	66.11	3.14	79.76	2.89	73.37	0.91	176646	318393	13007110005
177272	3.29	83.47	2.36	60.03	3.00	76.20	2.66	67.56	0.91	176635	318393	13007110005

COMPRESSOR MAP

Applicable to part number 177281 & 177275

Comp. Wheel Inducer Dia. (mm) 66.11
Comp. Wheel Outer Dia. (mm) 91.44



TURBINE HOUSING

Part #	A/R	Inlet Configuration		Notes
177211	0.88	Volute, Open Flow	T4 Inlet	80mm Turbine Wheel
177208	0.91	Volute, Twin Flow		
179905	1.00	Volute, Twin Flow		
177210	0.88	Volute, Open Flow		76mm Turbine Wheel
177207	0.91	Volute, Twin Flow		
177209	1.00	Volute, Twin Flow		

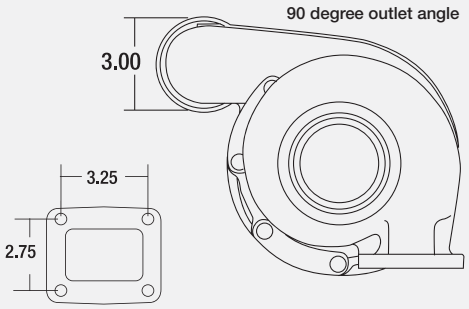
S300SX3

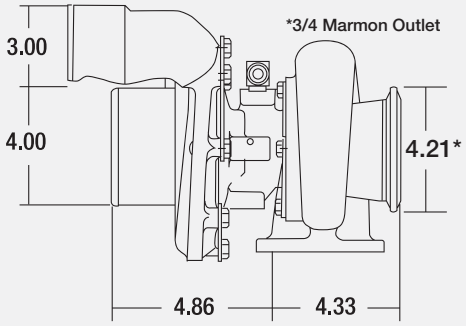
320 - 800 HP Turbo

FEATURES

- Twin hydrodynamic journal bearings
- Extended tip technology compressor wheel
- Twin scroll turbine housing options available
- Adjustable compressor and turbine housing orientation
- Compressor cover recirculation grooves

TURBO FRAME DIMENSIONS



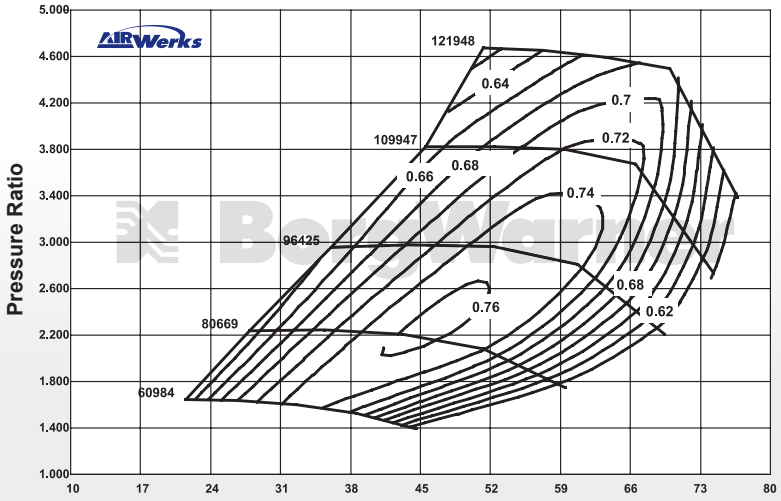


Turbo Part #	Comp. Wheel O.D. (in)	Comp Wheel O.D. (mm)	Comp Wheel Inducer Dia. (in)	Comp Wheel Inducer Dia. (mm)	Turbine Wheel O.D. (in)	Turbine Wheel O.D. (mm)	Turbine Wheel Exducer (in)	Turbine Wheel Exducer (mm)	Turbine Housing A/R	Cartridge Assembly	Service Kit (Standard)	Service Kit (360° thrust bearing)
177280	3.29	83.47	2.36	60.03	3.00	76.20	2.66	67.56	0.88	171901	318393	13007110005
177283	3.44	87.37	2.48	62.99	3.00	76.20	2.66	67.56	0.88	176648	318393	13007110005
177284	3.60	91.44	2.60	66.11	3.14	79.76	2.89	73.37	0.91	176650	318393	13007110005

COMPRESSOR MAP

Applicable to part number 177283

Comp. Wheel Inducer Dia. (mm) 62.99
Comp. Wheel Outer Dia. (mm) 87.37



TURBINE HOUSING

Part #	A/R	Inlet Configuration		Notes
177211	0.88	Volute, Open Flow	T4 Inlet	80mm Turbine Wheel
177208	0.91	Volute, Twin Flow		
179905	1.00	Volute, Twin Flow		
177210	0.88	Volute, Open Flow		76mm Turbine Wheel
177207	0.91	Volute, Twin Flow		
177209	1.00	Volute, Twin Flow		

S300GX

Cummins 5.9 Upgrade

BorgWarner S300G Upgrade Turbo for Cummins 5.9 Engines

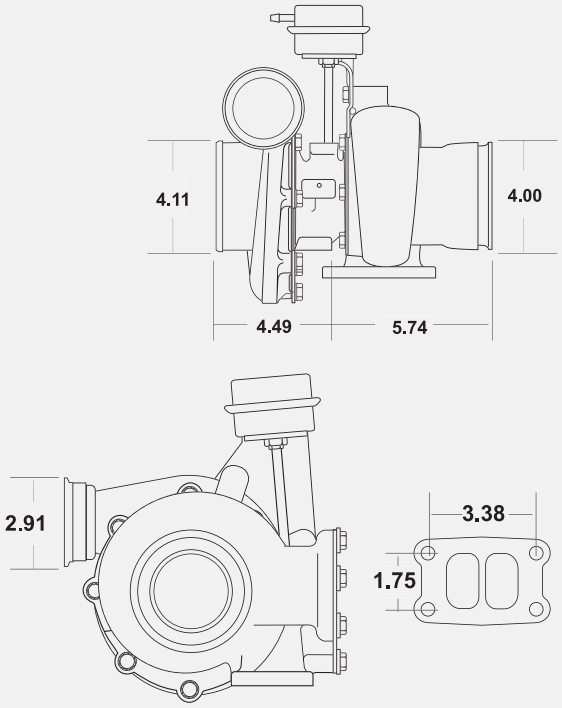
F E A T U R E S

The BorgWarner S300GX replacement turbo is more than a great match for your Cummins 5.9 engine. The S300G is aerodynamically designed to provide boost that can propel your Cummins 5.9 engine to 400 wheel horsepower. A rugged thrust bearing system helps insure the durability of your S300G, even under these extreme load conditions.

To realize the full horsepower potential of your S300G, we highly recommend the use of the following upgrade components:

- **4" Exhaust System**
- **Performance Chip**
- **High Flow Fuel Injectors**
- **High Flow Air Filter**
- **Ram Air Intake Tube**
- **Boost Control Fitting**

TURBO FRAME DIMENSIONS

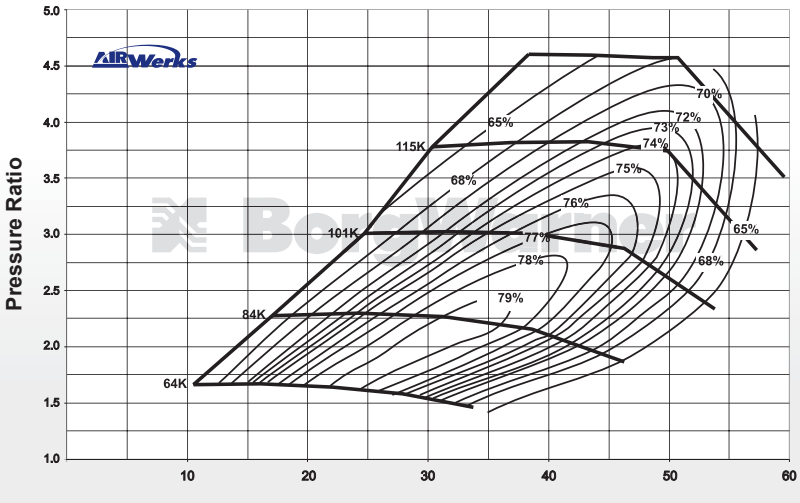


Turbo Part #	Comp. Wheel O.D. (in)	Comp. Wheel O.D. (mm)	Comp Wheel Inducer Dia. (in)	Comp Wheel Inducer Dia. (mm)	Turbine Wheel O.D. (in)	Turbine Wheel Exducer (in)	Turbine Wheel Exducer (mm)	Turbine A/R
174430	3.29	83.47	2.25	57.10	2.92	2.54	64.50	.80

COMPRESSOR MAP

Applicable to part number 174430

Comp. Wheel Inducer Dia. (mm) 57.10
Comp. Wheel Outer Dia. (mm) 83.47



Compressor Flow (lb/min)

DODGE 5.9 ENGINE PERFORMANCE TURBO UPGRADE CHART

Model Year	Transmission Type	Stock Horsepower	BWTS Turbo Part #	Turbo Mfr. Model #
1994	Auto	160	**174430**	S300G
	Manual	175		
	One Ton Truck	240		
1995	Auto	160	**174430**	S300G
	Manual	175		
1996	Auto	180	**174430**	S300G
	Manual	215		
	Calif. Emission	180		
1997	Auto	180	**174430**	S300G
	Manual	215		
	Calif. Emission	180		
1998	12 Valve Auto	180	**174430**	S300G
	12 Valve Manual	215		
	12 Calif. Emission	180		
1998.5	12 V Auto & Manual	215	**174430**	S300G
1999	Auto	215	**174430**	S300G
	Manual	230		
2000	Auto	215	**174430**	S300G
	Manual	230		
2001	Auto	235	**174430**	S300G
	Manual	245		
2002	Auto	235	**174430**	S300G
	Manual	245		

S300SX-E

320 - 1000 HP Super-Core

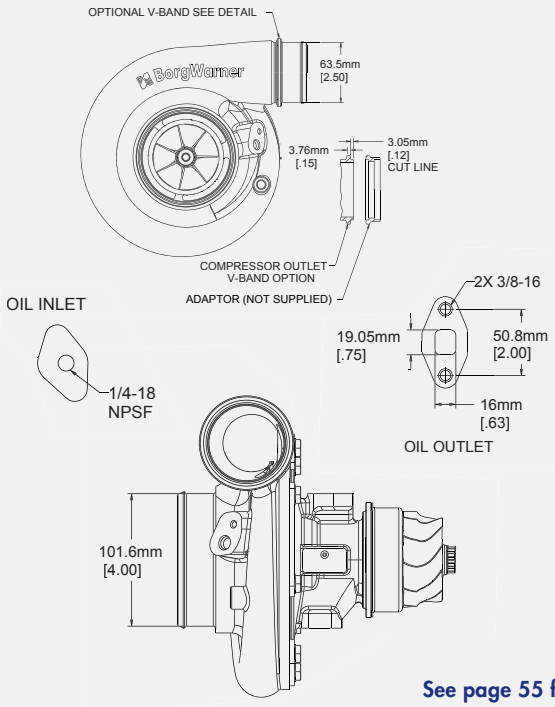
F E A T U R E S

- **360 degree thrust bearing**
- **Integrated speed sensor port**
- **Forged milled compressor wheel**
- **Flexible compressor cover outlet options**
- **Pre-machined boost port**
- **Optimized compressor stage aerodynamics**

Compressor Wheel Extended Tip Technology

FMW TECHNOLOGY

SUPER-CORE FRAME DIMENSIONS



See page 55 for speed sensor details

Not included with turbo assemblies: Speed sensor, Turbine outlet V-Band, Drain port fitting

Super-Core Part #	Comp. Wheel O.D. (in)	Comp. Wheel O.D. (mm)	Comp Wheel Inducer Dia. (in)	Comp Wheel Inducer Dia. (mm)	Turbine Wheel O.D. (in)	Turbine Wheel O.D. (mm)	Turbine Wheel Exducer (in)	Turbine Wheel Exducer (mm)	Service Kit (360° thrust bearing)
13009097056	3.29	83.47	2.42	61.44	3.00	76.20	2.66	67.56	13007110005
13009097053	3.29	83.47	2.42	61.44	3.14	79.76	2.89	73.37	13007110005
13009097006	3.44	87.37	2.48	62.99	3.00	76.20	2.66	67.56	13007110005
13009097047	3.44	87.37	2.48	62.99	3.14	79.76	2.89	73.37	13007110005
13009097008	3.44	87.37	2.54	64.47	3.00	76.20	2.66	67.56	13007110005
13009097055	3.44	87.37	2.54	64.47	3.14	79.76	2.89	73.37	13007110005
13009097049	3.60	91.44	2.60	66.11	3.14	79.76	2.89	73.37	13007110005
13009097051	3.60	91.44	2.72	69.00	3.14	79.76	2.89	73.37	13007110005

All turbine housing mounting hardware, clamp plates and cap screws included with Super-Core.

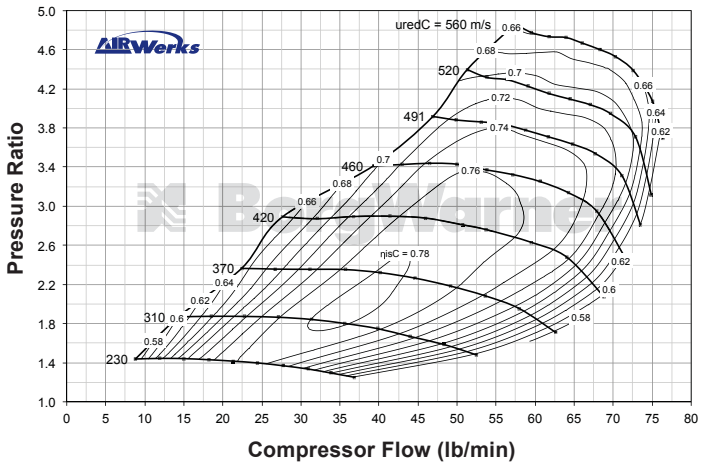
TURBINE HOUSING

Part #	A/R	Inlet Configuration		Notes
177211	0.88	Volute, Open Flow	T4 Inlet	80mm Turbine Wheel
177208	0.91	Volute, Twin Flow		
179905	1.00	Volute, Twin Flow		
177210	0.88	Volute, Open Flow		76mm Turbine Wheel
177207	0.91	Volute, Twin Flow		
177209	1.00	Volute, Twin Flow		

S300SX-E 400 - 775 HP

Part #: 13009097053, 13009097056

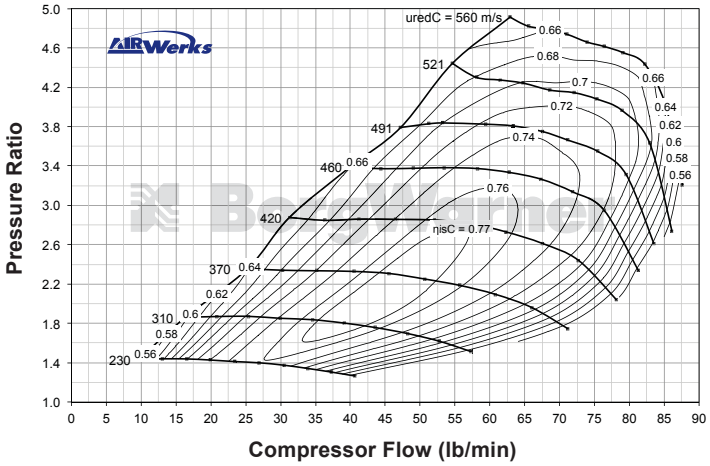
Comp. Wheel Inducer Dia. (mm) 61.44
Comp. Wheel Outer Dia. (mm) 83.47



S300SX-E 500 - 875 HP

Part #: 13009097049

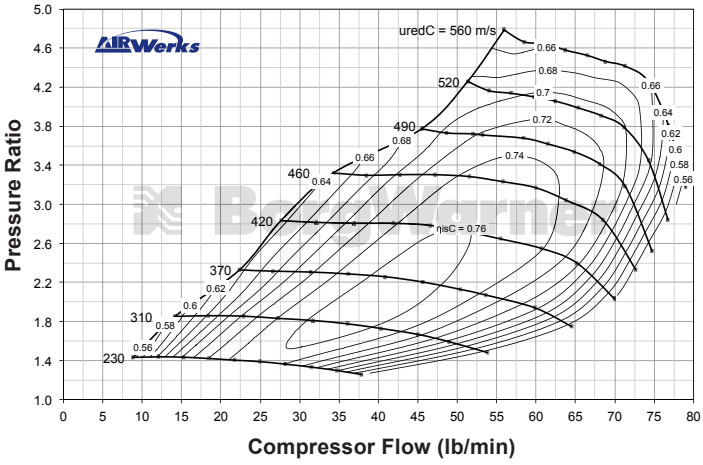
Comp. Wheel Inducer Dia. (mm) 66.11
Comp. Wheel Outer Dia. (mm) 91.44



S300SX-E 450 - 785 HP

Part #: 13009097006, 13009097047

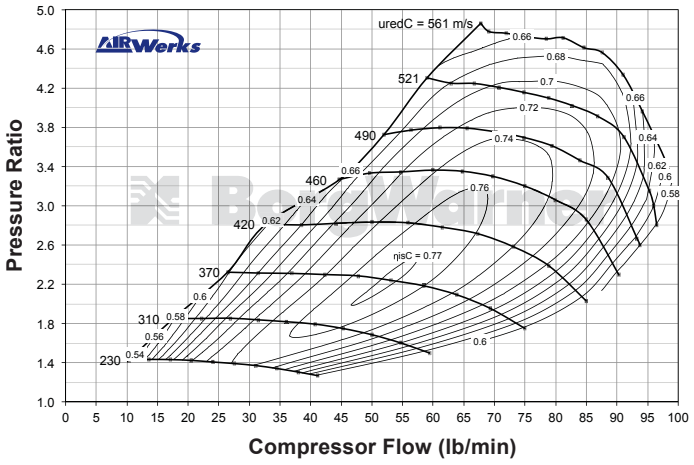
Comp. Wheel Inducer Dia. (mm) 62.99
Comp. Wheel Outer Dia. (mm) 87.37



S300SX-E 500 - 1000 HP

Part #: 13009097051

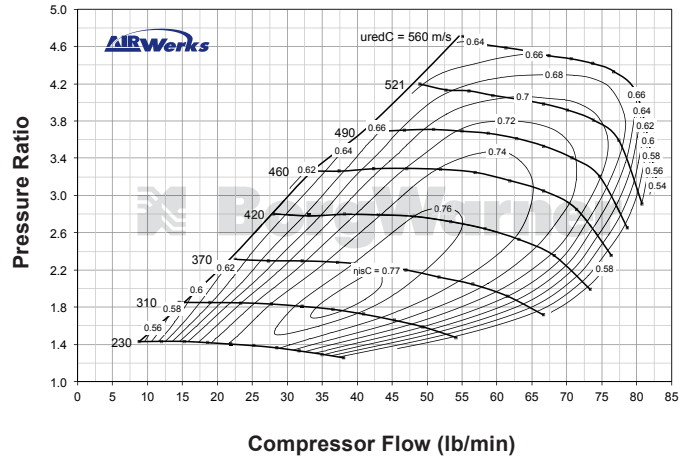
Comp. Wheel Inducer Dia. (mm) 69.00
Comp. Wheel Outer Dia. (mm) 91.44



S300SX-E 450 - 825 HP

Part #: 13009097008, 13009097055

Comp. Wheel Inducer Dia. (mm) 64.47
Comp. Wheel Outer Dia. (mm) 87.37



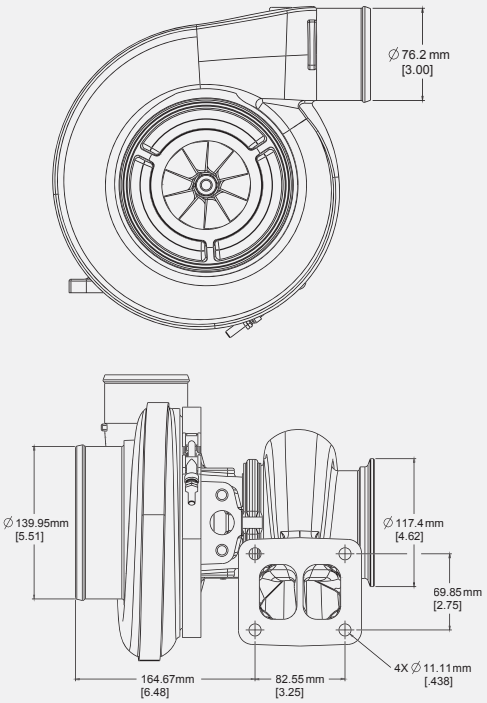
S400SX

400 - 1300 HP Turbo

FEATURES

- Twin hydrodynamic journal bearings
- Extended Tip Technology Compressor Wheel
- Twin Scroll Turbine Housing
- Adjustable compressor and turbine housing orientation
- Standard turbine inlet and outlet connections
- Compressor cover recirculation grooves

TURBO FRAME DIMENSIONS



Turbo Part #	Comp. Wheel O.D. (in)	Comp Wheel O.D. (mm)	Comp Wheel Inducer Dia. (in)	Comp Wheel Inducer Dia. (mm)	Turbine Wheel O.D. (in)	Turbine Wheel O.D. (mm)	Turbine Wheel Exducer (in)	Turbine Wheel Exducer (mm)	Turbine A/R	Super-Core	Cartridge Assembly	Service Kit (Stan-dard)	Service Kit (360° thrust bearing)
178855	3.60	91.44	2.66	67.66	3.29	83.47	2.92	74.29	1.10	179352	178856	318396	14007110000
14879880082	3.78	96.00	2.83	72.00	3.44	87.37	3.22	81.74	1.10	14009097006	14009097007	318396	14007110000
179174	3.94	100.17	2.94	74.56					1.10	14009097001	14009097001	318396	14007110000
179176	4.13	104.84	2.99	76.00					1.10	178781	178782	318396	14007110000
179180	4.32	109.73	3.16	80.30					1.25	179179	179181	318396	14007110000
179182	4.32	109.73	3.24	82.20					1.25	179184	179183	318396	14007110000

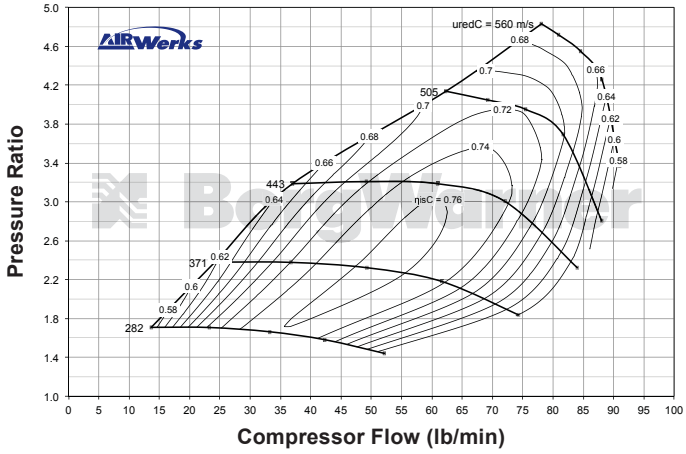
TURBINE HOUSING

Part #	A/R	Inlet Configuration		Notes
177102	0.90	Volute, Twin Flow	T4 Inlet	83mm Turbine Wheel
177103	1.00			
177104	1.10			
177105	1.25			
178787	0.90	Volute, Twin Flow	T4 Inlet	87mm Turbine Wheel
178788	1.00			
178789	1.10			
178790	1.25			

S400SX 400 - 900 HP

Part #: 178855

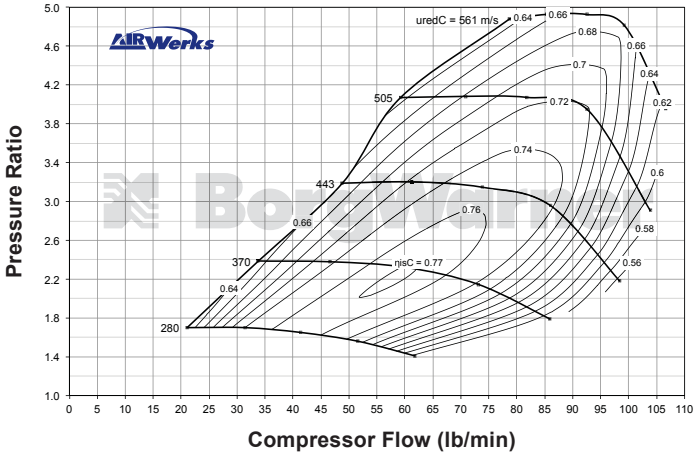
Comp. Wheel Inducer Dia. (mm) 67.66
Comp. Wheel Outer Dia. (mm) 91.44



S400SX 550 - 1100 HP

Part #: 179176

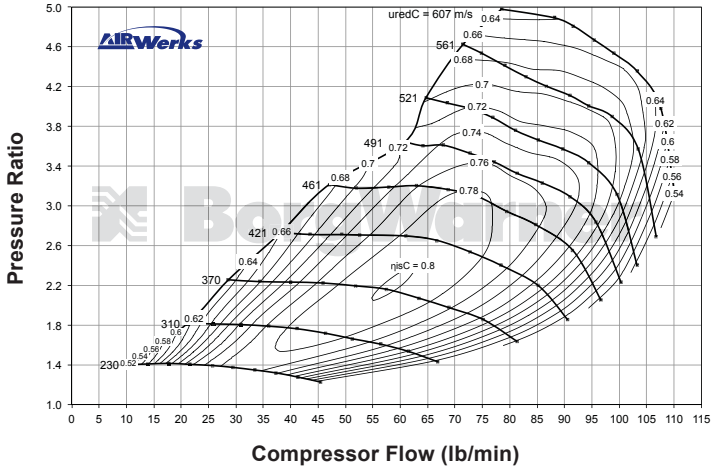
Comp. Wheel Inducer Dia. (mm) 76.00
Comp. Wheel Outer Dia. (mm) 104.84



S400SX-E 500 - 1100 HP

Part #: 14879880082

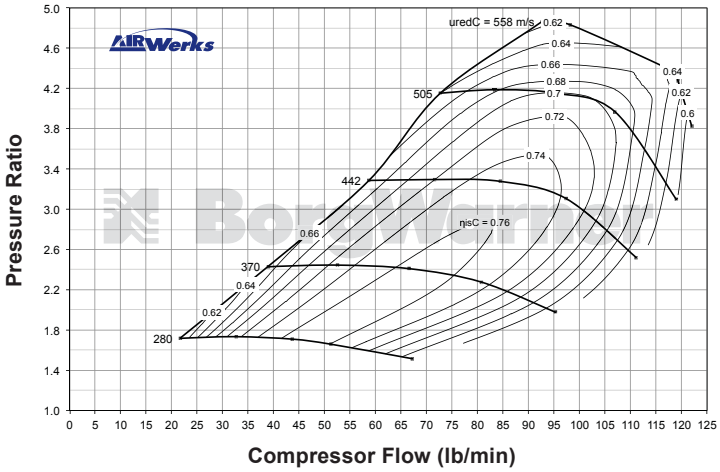
Comp. Wheel Inducer Dia. (mm) 72.00
Comp. Wheel Outer Dia. (mm) 96.00



S400SX 750 - 1250 HP

Part #: 179180

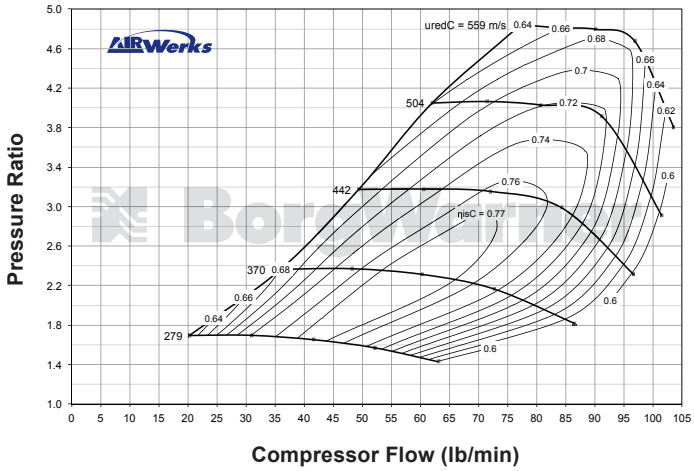
Comp. Wheel Inducer Dia. (mm) 80.30
Comp. Wheel Outer Dia. (mm) 109.73



S400SX 500 - 1050 HP

Part #: 179174

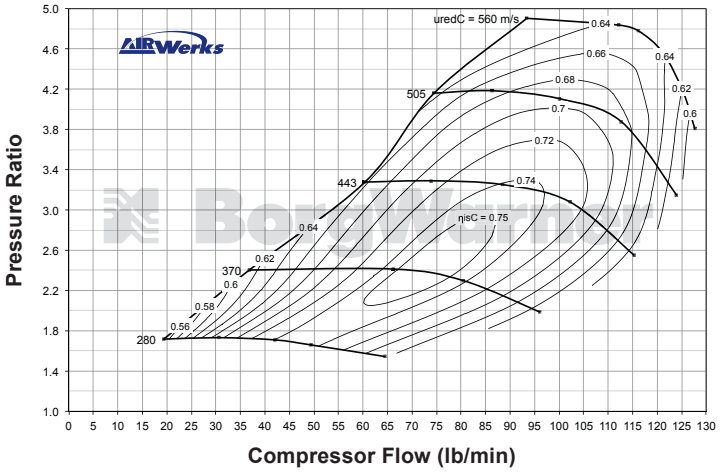
Comp. Wheel Inducer Dia. (mm) 74.56
Comp. Wheel Outer Dia. (mm) 100.17



S400SX 750 - 1300 HP

Part #: 179182

Comp. Wheel Inducer Dia. (mm) 82.20
Comp. Wheel Outer Dia. (mm) 109.73



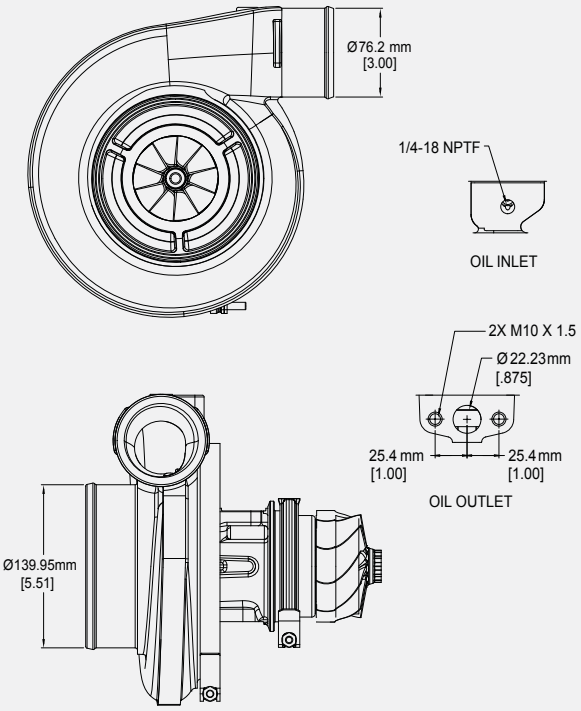
S400SX-E

500 - 1200 HP Turbo

F E A T U R E S

- Twin hydrodynamic journal bearings
- Extended Tip Technology Compressor Wheel
- Twin Scroll Turbine Housing
- Adjustable compressor and turbine housing orientation
- Standard turbine inlet and outlet connections
- Compressor cover recirculation grooves

SUPER-CORE FRAME DIMENSIONS



Super-Core	Comp. Wheel O.D. (in)	Comp Wheel O.D. (mm)	Comp Wheel Inducer Dia. (in)	Comp Wheel Inducer Dia. (mm)	Turbine Wheel O.D. (in)	Turbine Wheel O.D. (mm)	Turbine Wheel Exducer (in)	Turbine Wheel Exducer (mm)	Service Kit (360° thrust bearing)
14009097006	3.78	96.00	2.83	72.00	3.44	87.37	3.22	81.74	14007110000
14009097014	3.94	100.00	2.99	76.00	3.44	87.37	3.22	81.74	14007110000

TURBINE HOUSING

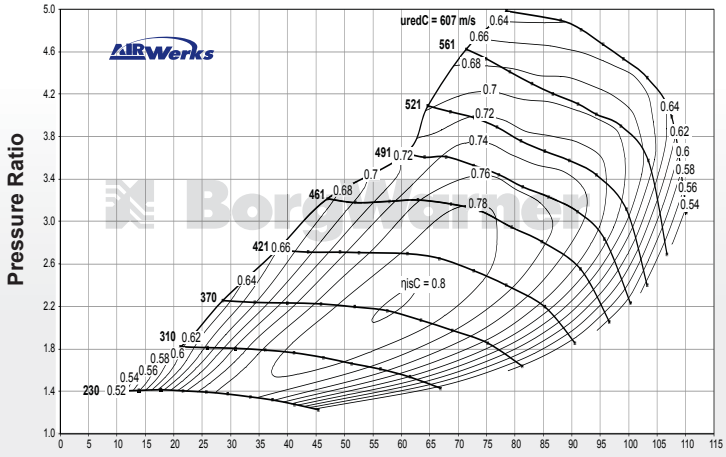
Part #	A/R	Inlet Configuration		Notes
178787	0.90	Volute, Twin Flow	T4 Inlet	87mm Turbine Wheel
178788	1.00			
178789	1.10			
178790	1.25			

COMPRESSOR MAPS

S400SX-E 500 - 1100 HP

Part #'s: 14009097006

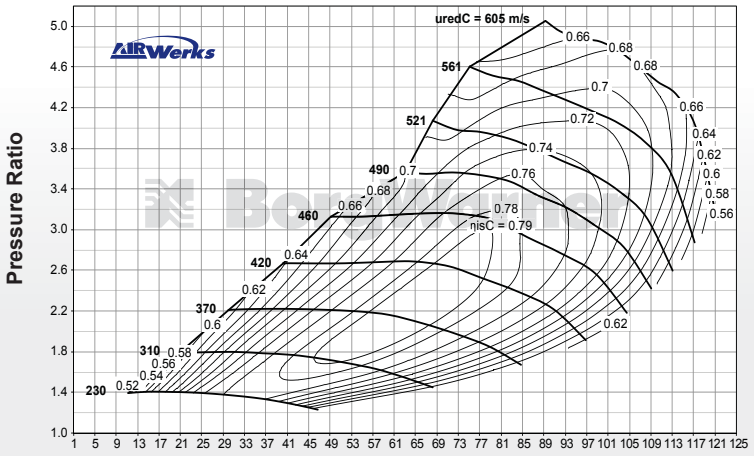
Comp. Wheel Inducer Dia. (mm) 72.00
Comp. Wheel Outer Dia. (mm) 96.00



S400SX-E 550 - 1200 HP

Part #'s: 14009097013 & 14009097014

Comp. Wheel Inducer Dia. (mm) 76.00
Comp. Wheel Outer Dia. (mm) 100.00



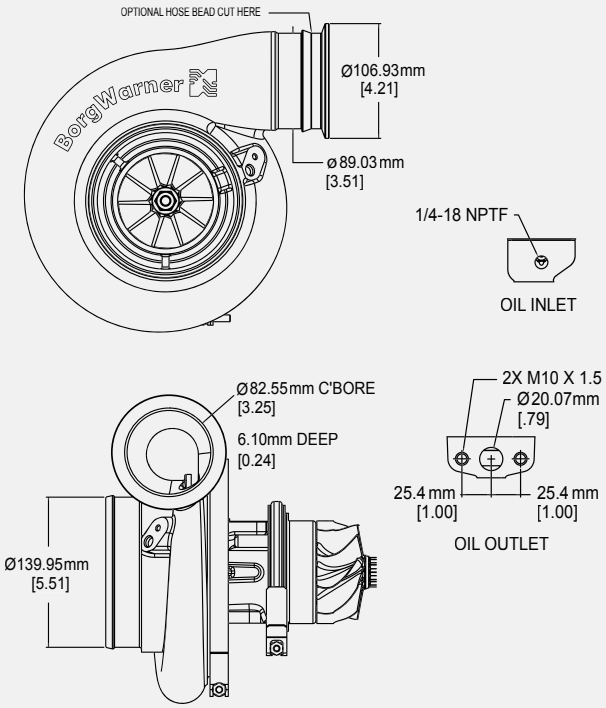
S400SX-E

650 - 1575 HP Turbo

F E A T U R E S

- Twin hydrodynamic journal bearings
- Extended Tip Technology Compressor Wheel
- Twin Scroll Turbine Housing
- Adjustable compressor and turbine housing orientation
- Standard turbine inlet and outlet connections
- Compressor cover recirculation grooves

SUPER-CORE FRAME DIMENSIONS



Super-Core	Comp. Wheel O.D. (in)	Comp Wheel O.D. (mm)	Comp Wheel Inducer Dia. (in)	Comp Wheel Inducer Dia. (mm)	Turbine Wheel O.D. (in)	Turbine Wheel O.D. (mm)	Turbine Wheel Exducer (in)	Turbine Wheel Exducer (mm)	Service Kit (360° thrust bearing)
***14009097013**	3.94	100.00	2.99	76.00	3.77	95.70	3.47	88.05	14007110003
14009097010	4.33	110.00	3.16	80.30	3.77	95.70	3.47	88.05	14007110003
14009097008	4.33	110.00	3.46	87.93	3.77	95.70	3.47	88.05	14007110003

*See page 46 for compressor map

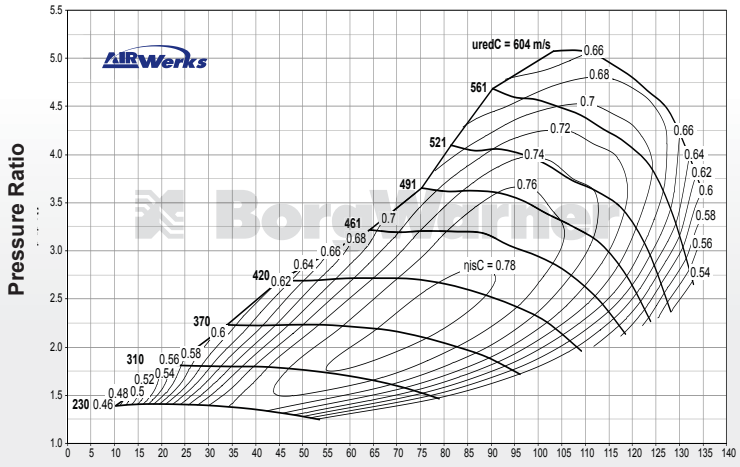
TURBINE HOUSING

Part #	A/R	Inlet Configuration		Notes
14961019007	1.15	Volute, Twin Flow	T6 Inlet	96mm Turbine Wheel
171698	1.32			
14961016101	1.45			
14961016100	1.58			

COMPRESSOR MAPS

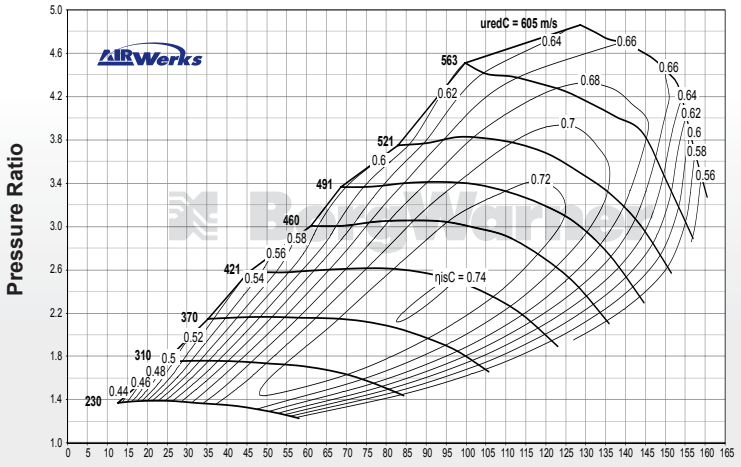
S400SX-E 650 - 1350 HP Part #: 14009097010

Comp. Wheel Inducer Dia. (mm) 80.30
Comp. Wheel Outer Dia. (mm) 110.00



S400SX-E 750 - 1575 HP Part #: 14009097008

Comp. Wheel Inducer Dia. (mm) 87.93
Comp. Wheel Outer Dia. (mm) 110.00



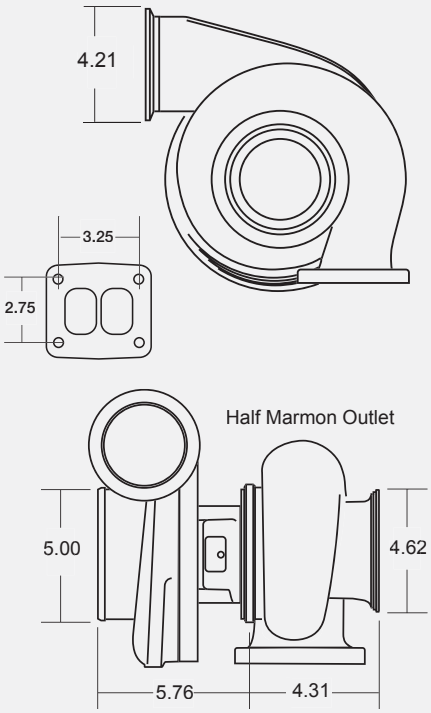
S400SX3

500 - 1050 HP Turbo

FEATURES

- Twin hydrodynamic journal bearings
- Extended tip technology compressor wheel
- Twin scroll turbine housing
- Adjustable compressor and turbine housing orientation
- Standard turbine inlet and outlet allows for drop-in to existing turbocharged applications
- Compressor cover recirculation grooves

TURBO FRAME DIMENSIONS

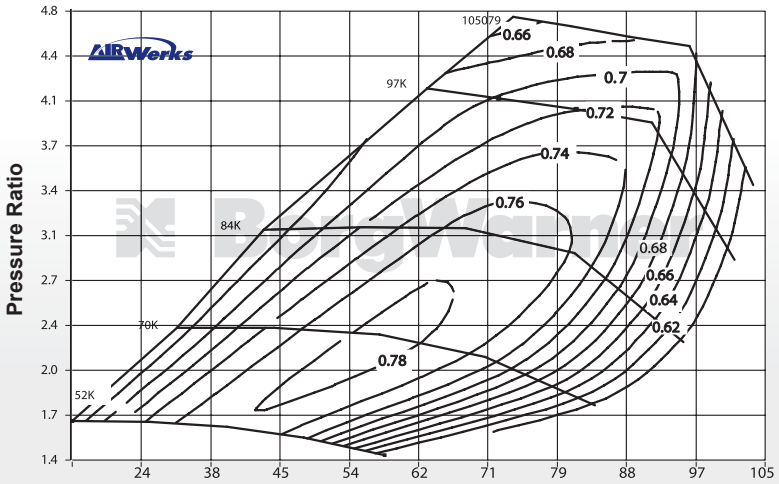


Turbo Part #	Comp. Wheel O.D. (in)	Comp Wheel O.D. (mm)	Comp Wheel Inducer Dia. (in)	Comp Wheel Inducer Dia. (mm)	Turbine Wheel O.D. (in)	Turbine Wheel O.D. (mm)	Turbine Wheel Exducer (in)	Turbine Wheel Exducer (mm)	Turbine Housing A/R	Cartridge Assembly	Service Kit (Standard)	Service Kit (360° thrust bearing)
177248	3.94	100.17	2.80	71.08	3.29	83.47	2.92	74.29	1.10	177249	318396	14007110000
177101	3.94	100.17	2.94	74.56	3.29	83.47	2.92	74.29	1.10	176807	318396	14007110000

COMPRESSOR MAP

Applicable to part number 177101

Comp. Wheel Inducer Dia. (mm) 74.56
Comp. Wheel Outer Dia. (mm) 100.17



TURBINE HOUSING

Part #	A/R	Inlet Configuration		Notes
177102	0.90	Volute, Twin Flow	T4 Inlet	83mm Turbine Wheel
177103	1.00			
177104	1.10			
177105	1.25			

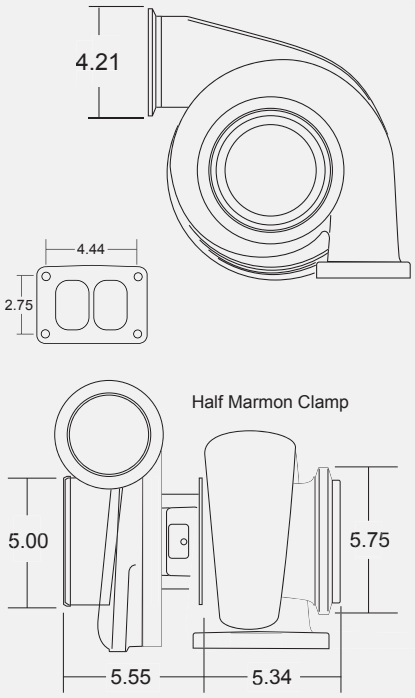
S400SX4

500 - 1050 HP Turbo

FEATURES

- Twin hydrodynamic journal bearings
- Extended tip technology compressor wheel
- Twin scroll turbine housing
- Adjustable compressor and turbine housing orientation
- Compressor cover recirculation grooves

TURBO FRAME DIMENSIONS

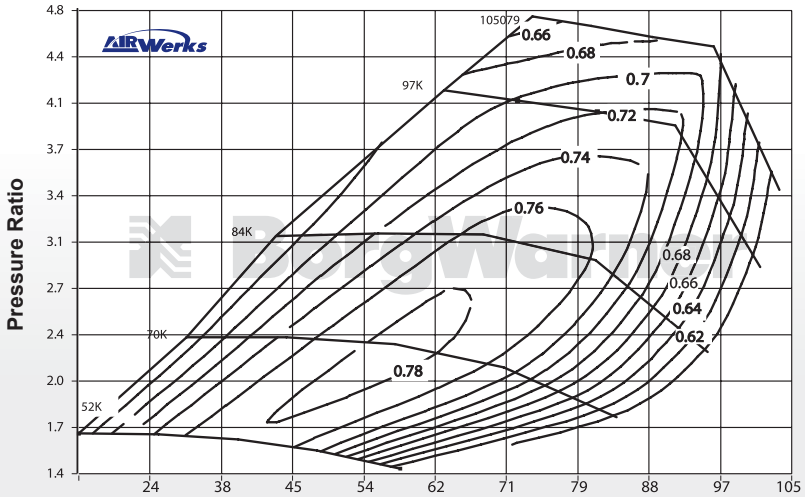


Turbo Part #	Comp. Wheel O.D. (in)	Comp Wheel O.D. (mm)	Comp Wheel Inducer Dia. (in)	Comp Wheel Inducer Dia. (mm)	Turbine Wheel O.D. (in)	Turbine Wheel O.D. (mm)	Turbine Wheel Exducer (in)	Turbine Wheel Exducer (mm)	Turbine Housing A/R	Cartridge Assembly	Service Kit (Standard)	Service Kit (360° thrust bearing)
171701	3.94	100.17	2.80	71.08	3.77	95.70	3.47	88.05	1.32	171699	176391	14007110003
171702	3.94	100.17	2.94	74.56	3.77	95.70	3.47	88.05	1.32	171703	176391	14007110003
176806	3.94	100.17	2.94	74.56	3.29	83.47	3.29	74.29	1.10	176807	318396	14007110000

COMPRESSOR MAP

Applicable to part numbers 171702 and 176806

Comp. Wheel Inducer Dia. (mm) 74.56
Comp. Wheel Outer Dia. (mm) 100.17



TURBINE HOUSING FOR 176806 ONLY

Part #	A/R	Inlet Configuration		Notes
176809	0.90	Volute, Twin Flow	T6 Inlet	83mm Turbine Wheel
176810	1.00			
176811	1.10			
176812	1.25			

TURBINE HOUSING FOR 171701 AND 171702

Part #	A/R	Inlet Configuration		Notes
14961019007	1.15	Volute, Twin Flow	T6 Inlet	96mm Turbine Wheel
171698	1.32			
14961016101	1.45			
14961016100	1.58			

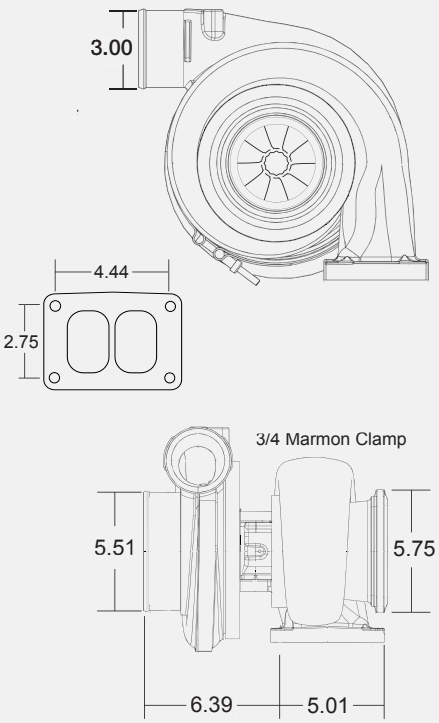
S400SX4

750 - 1250 HP Turbo

FEATURES

- Twin hydrodynamic journal bearings
- Extended tip technology compressor wheel
- Twin scroll turbine housing
- Adjustable compressor and turbine housing orientation
- Compressor cover recirculation grooves

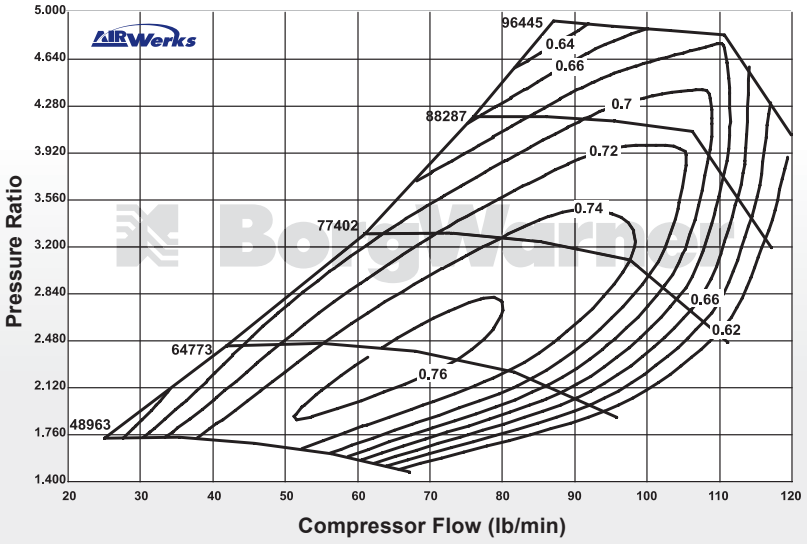
TURBO FRAME DIMENSIONS



Turbo Part #	Comp. Wheel O.D. (in)	Comp Wheel O.D. (mm)	Comp Wheel Inducer Dia. (in)	Comp Wheel Inducer Dia. (mm)	Turbine Wheel O.D. (in)	Turbine Wheel O.D. (mm)	Turbine Wheel Exducer (in)	Turbine Wheel Exducer (mm)	Turbine Housing A/R	Cartridge Assembly	Service Kit (Standard)	Service Kit (360° thrust bearing)
177287	4.32	109.73	3.16	80.30	3.77	95.70	3.47	88.05	1.32	176654	176391	14007110003

COMPRESSOR MAP

Comp. Wheel Inducer Dia. (mm) 80.30
Comp. Wheel Outer Dia. (mm) 109.73



TURBINE HOUSING

Part #	A/R	Inlet Configuration		Notes
14961019007	1.15	Volute, Twin Flow	T6 Inlet	96mm Turbine Wheel
171698	1.32			
14961016101	1.45			
14961016100	1.58			

S400SX Super-Core

400 - 1300 HP Turbo

F E A T U R E S

83MM (O.D.) TURBINE WHEEL

FMW FORGED MILLED WHEEL TECHNOLOGY

Component	Part Number
Turbo	**178855**
Super-Core	**179352**

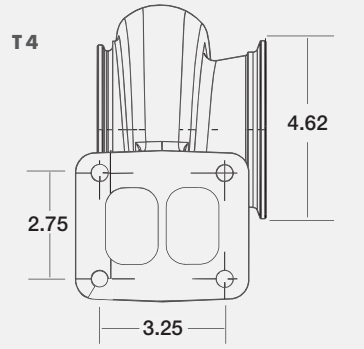
87MM (O.D.) TURBINE WHEEL

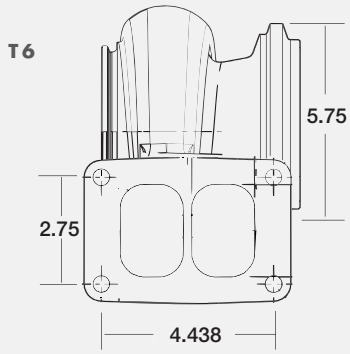
Component	Part Number	Part Number	Part Number	Part Number	Part Number
Turbo	**14879880082**	**179174**	**179176**	**179180**	**179182**
Super-Core	**14009097006**	**179175**	**178781**	**179179**	**179184**

TURBINE HOUSING OPTIONS

Part #	A/R	Inlet Configuration		Outlet Configuration	Turbine Wheel
177102	0.90	Volute, Twin Flow	T4 Inlet	Half Marmon	83mm Turbine Wheel
177103	1.00				
177104	1.10				
177105	1.25				
178787	0.90	Volute, Twin Flow	T4 Inlet	Half Marmon	87mm Turbine Wheel
178788	1.00				
178789	1.10				
178790	1.25				
176809	0.90	Volute, Twin Flow	T6 Inlet	Half Marmon	83mm Turbine Wheel
176810	1.00				
176811	1.10				
176812	1.25				
14961019007	1.15	Volute, Twin Flow	T6 Inlet	Full Marmon	96mm Turbine Wheel
171698	1.32				
14961016101	1.45				
14961016100	1.58				

TURBO FRAME DIMENSIONS





RICKY EVERLY, SFWD | S400SX3

S500SX

900 - 1475 HP Turbo

S500SX

900 - 1575 HP Turbo

F E A T U R E S

- **Twin hydrodynamic journal bearings**
- **Extended Tip Technology Compressor Wheel**
- **Available in twin scroll and open flow turbine volute options**
- **Adjustable compressor and turbine housing orientation**
- **Compressor cover recirculation grooves**
- **Optimized compressor inlet geometry**
- **Dual machined compressor cover discharge connection (v-band or hose bead)**
- **Premachined speed sensor mounting boss**

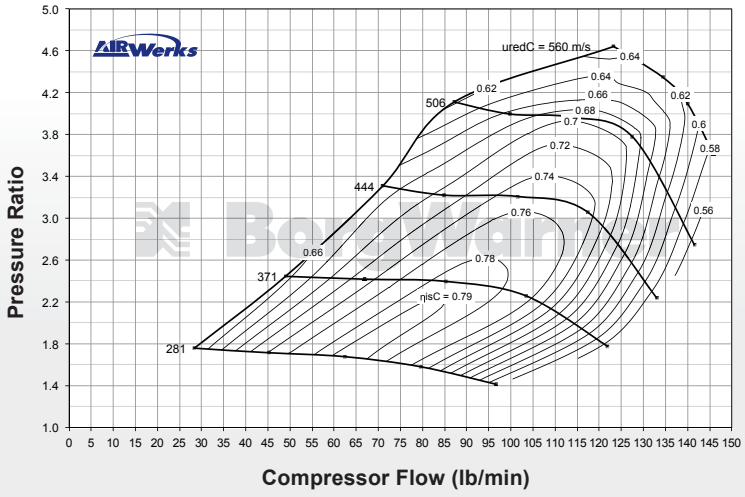
Turbo Part #	Comp. Wheel O.D. (in)	Comp. Wheel O.D. (mm)	Comp Wheel Inducer Dia. (in)	Comp Wheel Inducer Dia. (mm)	Turbine Wheel O.D. (in)	Turbine Wheel O.D. (mm)	Turbine Wheel Exducer (in)	Turbine Wheel Exducer (mm)	Turbine Housing A/R	Super-Core	Cartridge Assembly	Service Kit (360° thrust bearing)
179188	4.73	120.20	3.47	88.19	4.32	109.73	3.90	99.08	0.85	179186*	179187	173611
179191	4.73	120.20	3.57	90.67	4.32	109.73	3.90	99.08	0.85	179190*	179189	173611

* Super-Core options found on page 53

COMPRESSOR MAPS

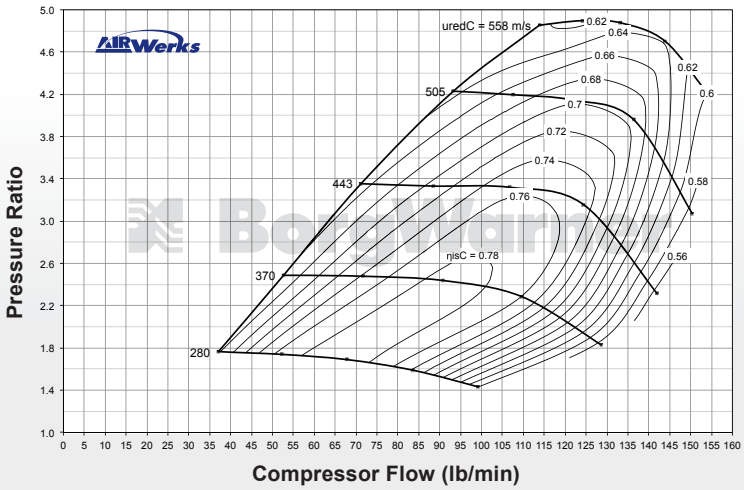
S500SX 900 - 1475 HP Turbo Part #: 179188

Comp. Wheel Inducer Dia. (mm) 88.19
Comp. Wheel Outer Dia. (mm) 120.20



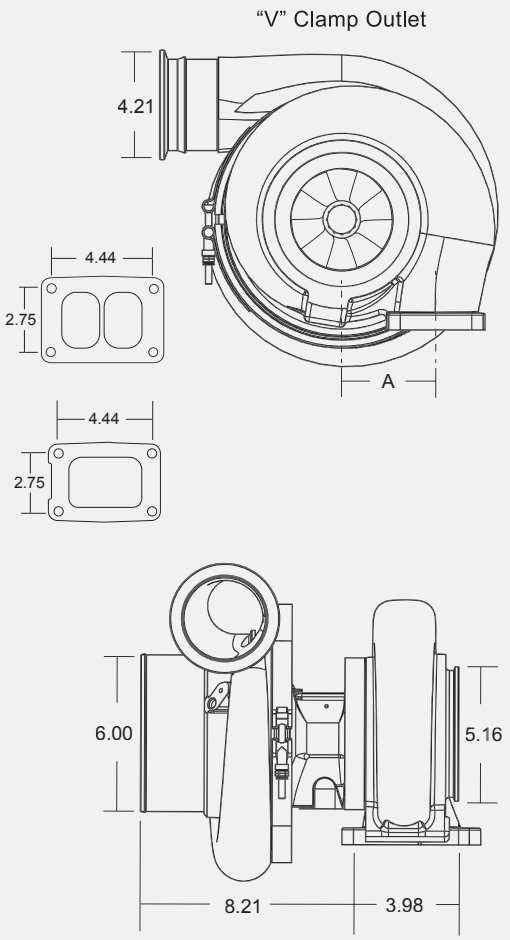
S500SX 900 - 1575 HP Turbo Part #: 179191

Comp. Wheel Inducer Dia. (mm) 90.67
Comp. Wheel Outer Dia. (mm) 120.20



S500SX

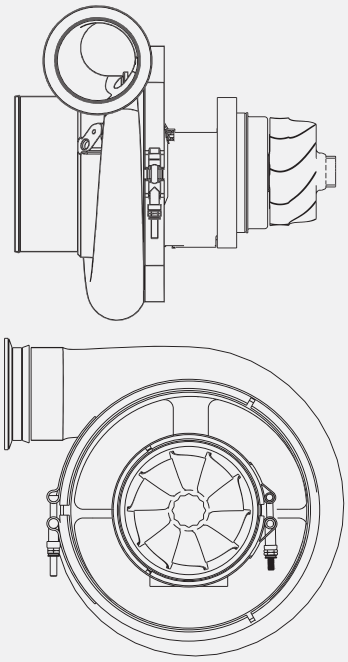
TURBO FRAME DIMENSIONS



TURBINE HOUSING

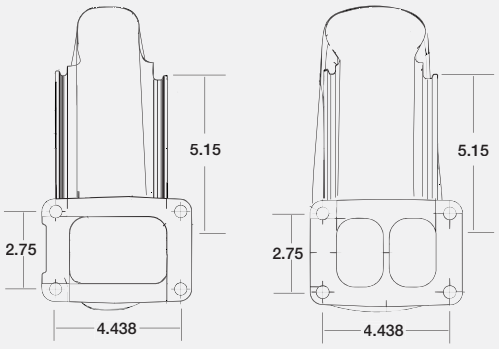
Part #	A/R	Turbine Inlet Centerline (A)	Other Notes
179159	0.85	3.62"	Volute, Open Flow
179160	1.00	3.62"	Volute, Open Flow
179161	1.15	4.25"	Volute, Open Flow
178498	1.30	3.62"	Volute, Open Flow; .50" Longer Turbine Discharge
179162	1.45	4.25"	Volute, Open Flow
179478	1.15	3.62"	Volute, Twin Flow (Divided)
179192	1.45	3.62"	Volute, Twin Flow (Divided)
179193	1.60	3.62"	Volute, Twin Flow (Divided)

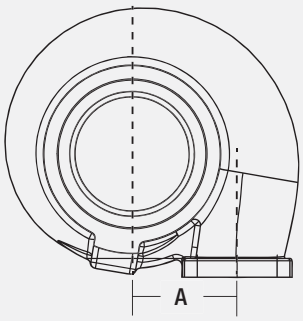
S500SX Super-Core



T6

TURBO FRAME DIMENSIONS





110MM (O.D.) TURBINE WHEEL

Component	Part #	Part #
Turbo	**179188**	**179191**
Super-Core	**179186**	**179190**

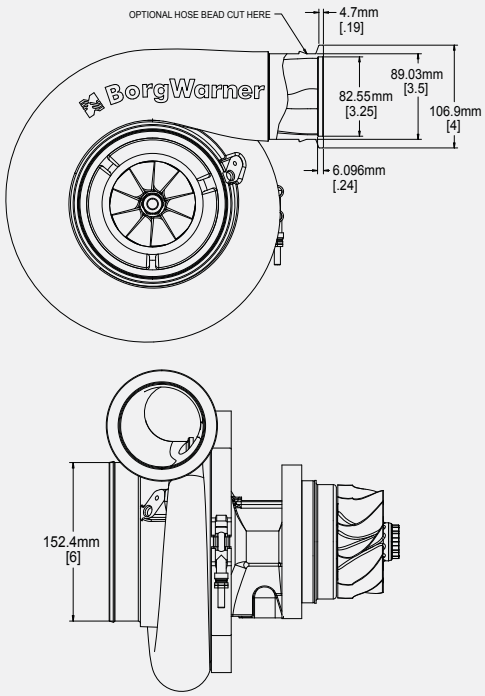
S500SX-E

900 - 1875 HP Turbo

FEATURES

- Twin hydrodynamic journal bearings
- Extended Tip Technology Compressor Wheel
- Twin Scroll Turbine Housing
- Adjustable compressor and turbine housing orientation
- Standard turbine inlet and outlet connections
- Compressor cover recirculation grooves

TURBO FRAME DIMENSIONS



Super- Core	Comp. Wheel O.D. (in)	Comp Wheel O.D. (mm)	Comp Wheel Inducer Dia. (in)	Comp Wheel Inducer Dia. (mm)	Turbine Wheel O.D. (in)	Turbine Wheel O.D. (mm)	Turbine Wheel Exducer	Turbine Wheel Exducer (mm)	Service Kit (360° thrust bearing)
15009097001	4.72	120.00	3.46	87.93	4.32	109.73	3.90	99.08	173611
15009097002	4.72	120.00	3.69	93.80	4.32	109.73	3.90	99.08	173611

TURBINE HOUSING

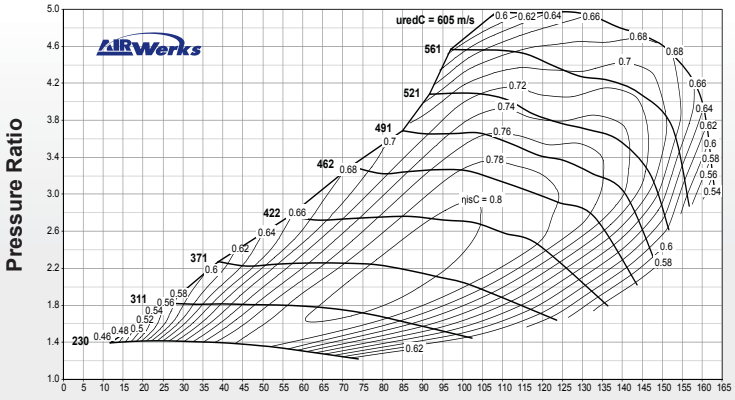
*See page 53

Part #	A/R	Inlet Configuration		Turbine Inlet to Centerline*	Notes
179159	0.85	Volute, Open Flow	T6	3.62”	110 Turbine Wheel
179160	1.00	Volute, Open Flow		3.62”	
179161	1.15	Volute, Open Flow		4.25”	
178498	1.30	Volute, Open Flow (50” longer discharge)		3.62”	
179162	1.45	Volute, Twin Flow		4.25”	
179478	1.15	Volute, Twin Flow		3.62”	
179192	1.45	Volute, Twin Flow		3.62”	
179193	1.60	Volute, Twin Flow		3.62”	

COMPRESSOR MAPS

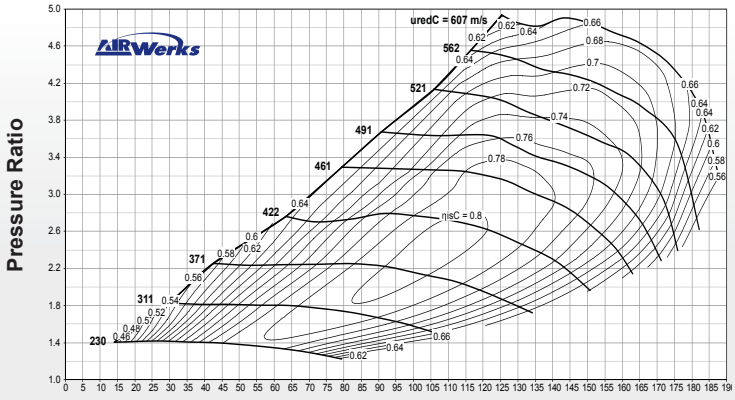
S500SX-E 900 - 1575 HP Part #: 15009097001

Comp. Wheel Inducer Dia. (mm) 87.93
Comp. Wheel Outer Dia. (mm) 120.00



S500SX-E 900 - 1875 HP Part #: 15009097002

Comp. Wheel Inducer Dia. (mm) 93.80
Comp. Wheel Outer Dia. (mm) 120.00



OPTIONAL SPEED SENSOR, BOOST PORT AND V-BAND CONNECTIONS INSTRUCTIONS

Select BorgWarner turbochargers offer convenient pre-machined options to help users get the most out of their turbocharger in terms of customization and installation needs. These additional features require the user to perform some basic drilling, cutting and de-burring. Please seek help if you are uncomfortable with these operations.

Speed Sensor & Boost Port

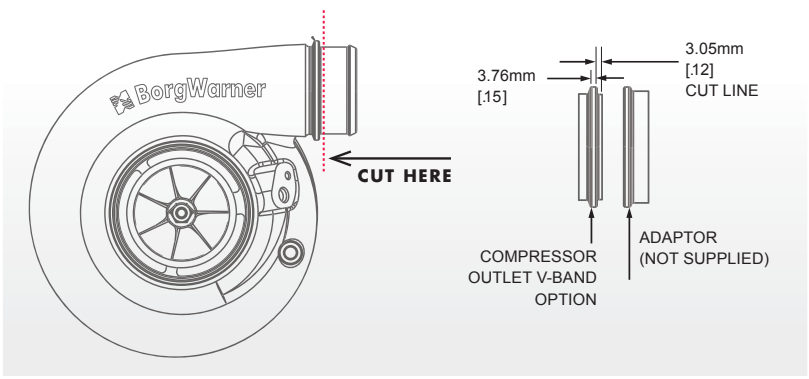
1. Carefully remove the compressor cover from turbo.
2. Place cover on a table, with some kind of backing so that it is secure while being drilled.
3. Using a hand drill with a ¼" drill bit, drill through bottom of speed senor or boost port hole while being careful not to damage the pre-machined speed sensor O-ring sealing surface or the boost port threads.
4. De-burr the inside edge of the hole in the compressor cover.
5. **SPEED SENSOR:** Lubricate O-ring and install speed sensor while checking for a good fit. Ensure that the sensor tip is nearly flush with the edge of the hole (within .5mm/.020") and install speed sensor bolt.
   BOOST PORT: Install 1/8 - 27 NPT boost fitting with thread sealant or Teflon tape and ensure the joint is leak free.
6. Carefully re-install compressor cover on turbo and verify that the compressor wheel spins freely.

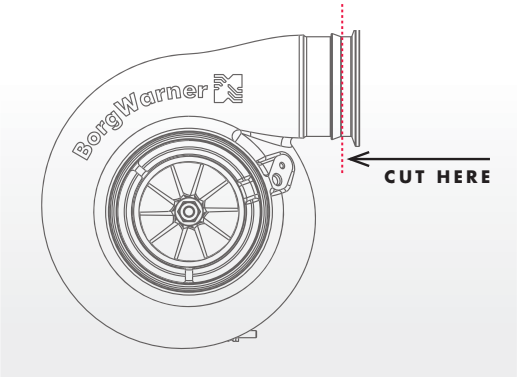
PREMACHINED SPEED SENSOR

PREMACHINED BOOST PORT

Optional v-band or hose bead

1. Carefully remove the compressor cover from turbo.
2. Secure compressor cover and remove connection feature with a straight, clean cut.
   Reference the drawings below. Be sure to remove all sharp edges when complete.
3. Carefully re-install the compressor cover on turbo and verify that the compressor wheel spins freely.





BorgWarner Turbos for Upgraded Passenger Car Engines

OEM	Vehicle	Build Date	Engine	Stock Turbo(s)	Original Rating	Stock Turbo Limit
Audi	various vehicles with longitudinal engine	up to 1999	1.8T 20V	K03-005, K03-013	150 hp	195 hp
Audi	various vehicles with transverse engine	up to 2000	1.8T 20V	K03-011, K03-026, K03-035, K03-044, K03-045	150-180 hp	200 hp
Audi	various vehicles with longitudinal engine	from 2000	1.8T 20V	K03-025, K03-029	150-180 hp	200 hp
Audi	various vehicles with transverse engine	from 2004	2.0 TFSI	K03-086, K03-105 (integrated manifold)	185-200 hp	245 hp
Audi	A4	from 2007	1.8 TFSI	K03-119, K03-141 (integrated manifold)	120-160 hp	220 hp
Audi	various		1.8T 20V	various K03, K04	150-225 hp	–
Audi	various		1.8T 20V	various K03, K04	150-225 hp	–
Audi	S4, A6, allroad		2.7T 30V biturbo	K03-016 + K03-017	230-265 hp	315 hp
Ford	Focus ST/XR5, Kuga, Mondeo, S-Max	from 2003	HUBA, HUWA, HYDA, B5254	K04-033, K04-130 (integrated manifold)	200-230 hp	305 hp
Mini	Cooper S	from 2006	EP6 DTS/ CDTS	K03-118, K03-181 (twin-scroll turb/hsg)	163-184 hp	220 hp
Mini	Cooper S	from 2009	EP6 DTS/ CDTS	K03-163 (twin-scroll turb/hsg)	163-200 hp	220 hp
Opel	Astra, Zafira	from 2000	Z20LET	K04-024	190-200 hp	240 hp
Opel	Astra, Zafira	from 2005	Z20LER, Z20LEL	K04-048	170-200 hp	240 hp
Peugeot, Citroen	207, 208, DS3	from 2006	EP6 DT/ CDT	K03-104, K03-120, K03-121 (twin-scroll turb/hsg)	140-156 hp	180 hp
Peugeot, Citroen	308, RCZ, DS4	from 2009	EP6 DTS/ CDTS	K03-163 (twin-scroll turb/hsg)	163-200 hp	220 hp
Peugeot, Citroen	207, 208, DS3	from 2009	EP6 DT/ CDT	K03-179, K03-217, K03-243 (twin-scroll turb/hsg)	140-156 hp	180 hp
Porsche	911 turbo (model 993)	1994 to '97	3.6 biturbo	K16-6735 + K16-6736	408 hp	500 hp
Porsche	911 turbo (model 996)	2000 to '05	3.6 biturbo	K16-6726 + K16-6727	420 hp	500 hp
Porsche	911 turbo (model 997)	from 2005	3.6 biturbo	K04-0060 + K04-0061 (VTG)	480 hp	575 hp
Seat	Alhambra	up to 2000	1.8T 20V	K03-022	150 hp	195 hp
Seat	Alhambra	from 2000	1.8T 20V	K03-049	150 hp	200 hp
Seat/Skoda	various		1.8T 20V	various K03, K04	150-225 hp	–
Seat/Skoda	various		1.8T 20V	various K03, K04	150-225 hp	–
VW	various vehicles with longitudinal engine	up to 1999	1.8T 20V	K03-005, K03-013	150 hp	195 hp
VW	Sharan	up to 2000	1.8T 20V	K03-022	150 hp	195 hp
VW	Sharan	from 2000	1.8T 20V	K03-049	150 hp	200 hp
VW	various vehicles with transverse engine	up to 2000	1.8T 20V	K03-011, K03-026, K03-035, K03-044, K03-045	150-180 hp	200 hp
VW	various vehicles with transverse engine	up to 2000	1.8T 20V	K03-011, K03-026, K03-035, K03-044, K03-045	150-180 hp	200 hp
VW	various vehicles with longitudinal engine	from 2000	1.8T 20V	K03-025, K03-029	150-180 hp	200 hp
VW	various		1.8T 20V	various K03, K04	150-225 hp	–
VW	various		1.8T 20V	various K03, K04	150-225 hp	–
VW	various vehicles with transverse engine	from 2004	2.0 TFSI	K03-086, K03-105 (integrated manifold)	185-200 hp	245 hp
Volvo	C30, S40, V50, XC60, C70	from 2003	T3 / T6 / T7 / T8	K04-033, K04-130 (integrated manifold)	200-230 hp	305 hp

Upgrade Turbo	Plug & Play	Upgrade Turbo Limit	Max. T3 continuously	Max. T3 temporarily
5304 988 7500	yes	225 hp	930°C	950°C
5304 988 7501	yes	230 hp	930°C	950°C
5304 988 7500	yes	225 hp	930°C	950°C
5304 988 0064	yes**	305 hp	1025°C	1050°C
5303 988 0106	yes	245 hp	930°C	950°C
5316 988 6717	NO	250 hp	950°C	980°C
5324 988 7200	NO***	340 hp	950°C	980°C
5304 988 0025 + 5304 988 0026	yes	475 hp	930°C	950°C
5316 998 0010	yes******	375 hp	950°C	980°C
5303 988 0146	yes****	245 hp	950°C	980°C
5303 988 0298	yes	245 hp	950°C	980°C
5304 998 0049	yes*****	290 hp	930°C	950°C
5304 998 0049	yes	290 hp	930°C	950°C
5303 988 0117	yes	220 hp	950°C	980°C
5303 988 0298	yes	245 hp	950°C	980°C
5303 988 0426	yes	220 hp	950°C	980°C
5324 988 7003 + 5324 988 7004	yes	555 hp	950°C	980°C
5324 988 7005 + 5324 988 7006	yes	555 hp	950°C	980°C
5304 988 0080 + 5304 988 0081	yes	610 hp	950°C	980°C
5304 988 7500	NO*	225 hp	930°C	950°C
5304 988 7500	NO*	225 hp	930°C	950°C
5316 988 6717	NO	250 hp	950°C	980°C
5324 988 7200	NO***	340 hp	950°C	980°C
5304 988 7500	yes	225 hp	930°C	950°C
5304 988 7500	NO*	225 hp	930°C	950°C
5304 988 7500	NO*	225 hp	930°C	950°C
5304 988 7501	yes	230 hp	930°C	950°C
5304 988 7501	yes	230 hp	930°C	950°C
5304 988 7500	yes	225 hp	930°C	950°C
5316 988 6717	NO	250 hp	950°C	980°C
5324 988 7200	NO***	340 hp	950°C	980°C
5304 988 0064	yes**	305 hp	1025°C	1050°C
5316 998 0010	yes******	375 hp	950°C	980°C

*Compressor housing orientation different.

**Original turbo has electronic pop-off valve integrated into comp/hsg, upgrade turbo has not.

External pop-off valve has to be fitted. Moreover, K04-064 has a larger compressor housing discharge.

***Upgrade turbo without wastegate, external wastegate required.

****Turbine housing outlet gasket with BMW OE part no. 7 589 503 required.

*****Piece of coolant pipe already fitted, may require adaptation of coolant piping.

******Slightly different position and size of compressor discharge.

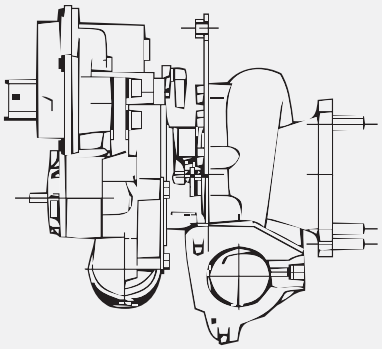
BV50

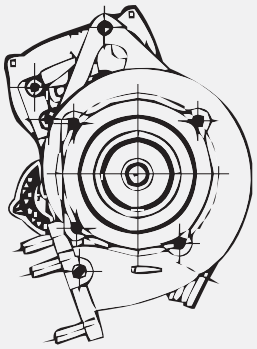
Porsche 997 Upgrade

F E A T U R E S

BorgWarner was the first manufacturer in the world to offer VTG turbochargers for gasoline engines in mass production. BV turbos employ materials and designs that are optimally tuned to the high thermal loads in gasoline engines. BorgWarner has developed a robust VTG mechanism that works reliably even in the toughest of conditions and also employ a CFD-Optimized vane design that provides excellent efficiency.

TURBO FRAME DIMENSIONS

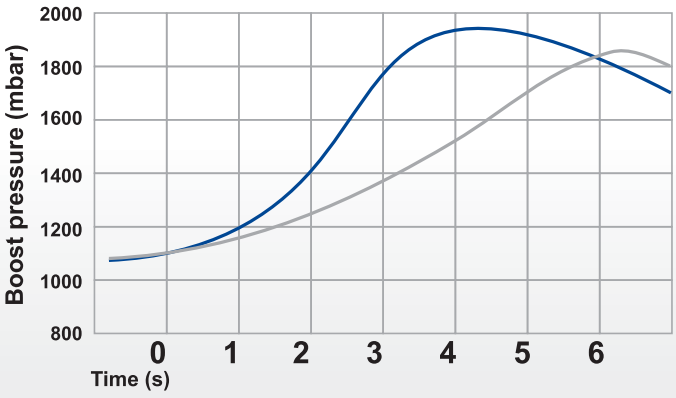




Manufacturer	Vehicle	Reference No.	Year	HP	Liters	Service Turbo No.	Model Spec	Remarks
Porsche	911 Turbo (997)	997.123.014.72	2005	480	3.6	5304 988 0060	BV50-2277	Stock Turbo (Right Side)
Porsche	911 Turbo (997)	997.123.013.72	2005	480	3.6	5304 988 0061	BV50-2277	Stock Turbo (Left Side)
Porsche	911 GT2 (997)	997.123.078.71	2007	530	3.6	5304 988 0080	BV50-2280	Upgrade Turbo (Right Side)
Porsche	911 GT2 (997)	997.123.014.70	2007	530	3.6	5304 988 0081	BV50-2280	Upgrade Turbo (Left Side)

TURBO COMPARISON

~ VTG ~ Wastegate



PORSCHE 911 GT2 (997)

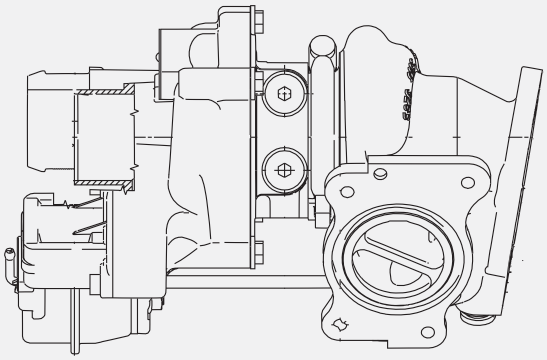
K03-2080

Mini Upgrade

FEATURES

- High temperature alloy turbine housing
- Extended tip compressor wheel
- Twin scroll turbine housing
- Water cooled bearing housing

TURBO FRAME DIMENSIONS



Turbo Part #	Comp. Wheel O.D. (mm)	Comp Wheel Inducer Dia. (in)	Comp Wheel Inducer Dia. (mm)	Turbine Wheel O.D. (in)	Turbine Wheel O.D. (mm)	Turbine Wheel Exducer (in)	Turbine Wheel Exducer (mm)	Turbo Area	Cartridge Assembly	Service Kit
5303 988 0146	51.00	1.61	41	1.77	45	1.58	40.3	4 cm^2	–	–

Manufacturer	Year	Engine	Stock Turbo	Stock Turbo	Upgrade HP	Upgrade Turbo Part #	Model Spec	Remarks
Mini	From 2006	EP6 DTS	5303 988 0163	215	255	**5303 988 0146**	K03-2080	Twin Scroll Turbine Housing

MINI COOPER

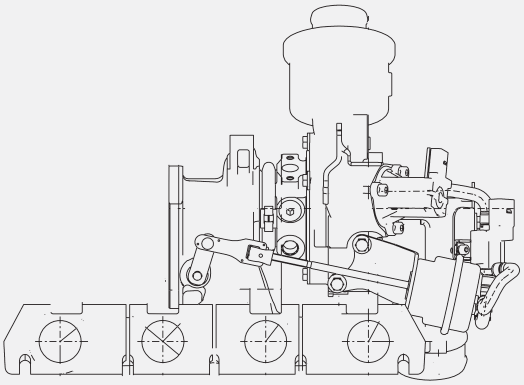
K03-2080

Audi A4 Upgrade

F E A T U R E S

- **High temperature alloy turbine housing**
- **Extended tip compressor wheel**
- **Water cooled bearing housing**

TURBO FRAME DIMENSIONS



The 1.8 TFSI also uses a compact integrated turbocharger module. Since the manifold and turbine housing are combined to form a single component made of a highly heat-resistance material, this system not only saves space, it also offers thermodynamic advantages.

Manufacturer	Vehicle	Year	Engine	Stock Turbo	Stock Turbo HP Limit	Upgrade HP	Upgrade Turbo Part #	Model Spec	Remarks
Audi	A4	From 2007	1.8 TFSI	5303 988 0141	215	255	**5303 988 0106**	K03-2080D	Integrated Manifold
Audi	A4	From 2007	1.8 TFSI	5303 988 0119	160	255	**5303 988 0106**	K03-2080D	Integrated Manifold

"The 1.8 TFSI also uses a compact integrated turbocharger module. Since the manifold and turbine housing are combined to form a single component made of a highly heat-resistance material, this system not only saves space, it also offers thermodynamic advantages."

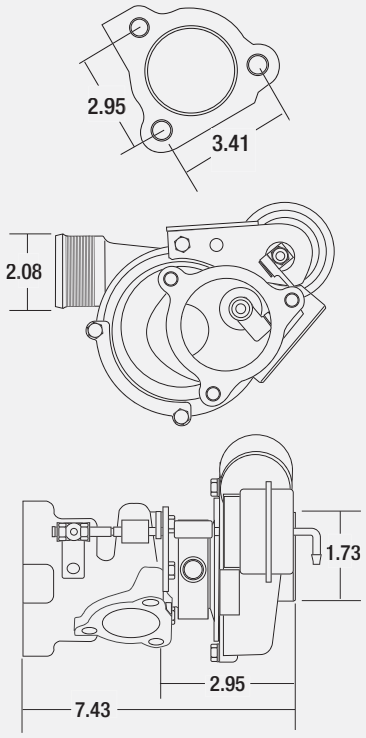
K04-2075

220 HP Turbo

F E A T U R E S

How about a BorgWarner AirWerks K04 series performance upgrade turbo, developed specifically for Audi and VW 1.8 liter engines? This upgrade option can enhance engine performance as much as 15%. Ultimate output may vary depending on prior engine condition, fuel settings and other supporting performance components. Only qualified companies and tuner shops should attempt to make performance modifications to the engine and the vehicle.

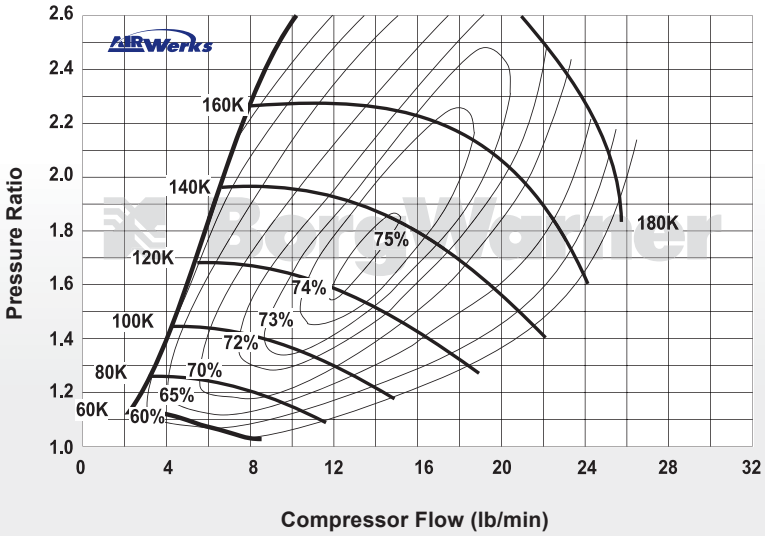
TURBO FRAME DIMENSIONS



Turbo Part #	Comp. Wheel O.D. (in)	Comp. Wheel O.D. (mm)	Comp Wheel Inducer Dia. (in)	Comp Wheel Inducer Dia. (mm)	Turbine Wheel O.D. (in)	Turbine Wheel O.D. (mm)	Turbine Wheel Exducer (in)	Turbine Wheel Exducer (mm)	Turbine Area	Cartridge Assembly	Service Kit
5304 988 7500	1.97	50.04	1.48	37.60	1.81	46	1.65	42	4 cm^2	5304 710 0503	5303 711 0000

COMPRESSOR MAP

Comp. Wheel Inducer Dia. (mm) 37.60
Comp. Wheel Outer Dia. (mm) 50.04



VEHICLE APPLICATION DATA

Application Model	Model Year	Engine Spec	Rated HP
Audi A4 A6 / 1.8T	95-99	1.8 liter 5-Valve, Inline	220
Passat	96-99	1.8 liter 5-Valve, Inline	220

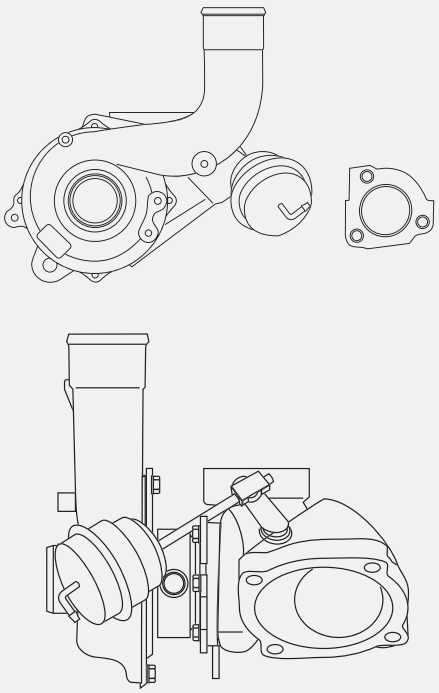
K04-2075

220 HP Turbo

F E A T U R E S

How about a BorgWarner AirWerks K04 series performance upgrade turbo, developed specifically for Audi and VW 1.8 liter engines? This upgrade option can enhance engine performance as much as 15%. Ultimate output may vary depending on prior engine condition, fuel settings and other supporting performance components. Only qualified companies and tuner shops should attempt to make performance modifications to the engine and the vehicle.

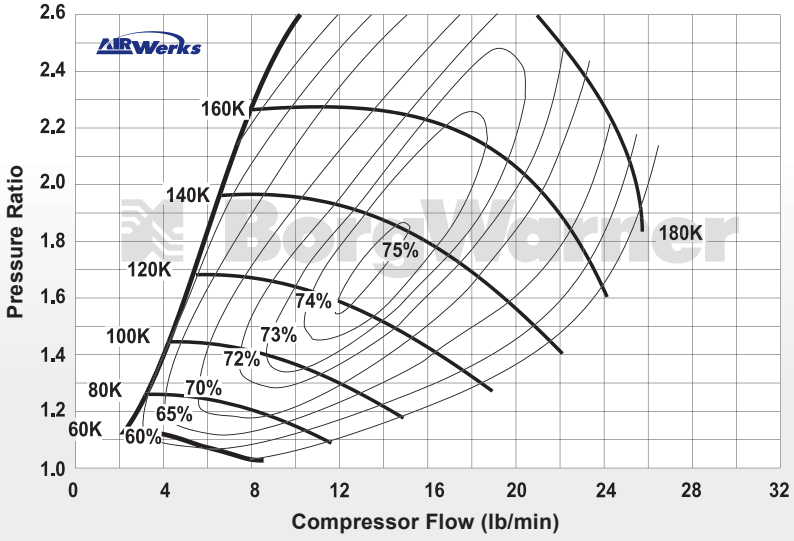
TURBO FRAME DIMENSIONS



Turbo Part #	Comp. Wheel O.D. (in)	Comp. Wheel O.D. (mm)	Comp Wheel Inducer Dia. (in)	Comp Wheel Inducer Dia. (mm)	Turbine Wheel O.D. (in)	Turbine Wheel O.D. (mm)	Turbine Wheel Exducer (in)	Turbine Wheel Exducer (mm)	Turbine Area	Cartridge Assembly	Service Kit
5304 988 7501	1.97	50.04	1.48	37.60	1.81	46	1.65	42	5 cm^2	N/A	5303 711 0000

COMPRESSOR MAP

Comp. Wheel Inducer Dia. (mm) 37.60
Comp. Wheel Outer Dia. (mm) 50.04



VEHICLE APPLICATION DATA

Application Model	Model Year	Engine Spec	Rated HP
Audi A3 1.8T, VW Beetle	96-01	1.8 Liter 5-Valve, Transverse	220
Golf	1996	1.8 Liter 5-Valve, Transverse	220

K04-2283

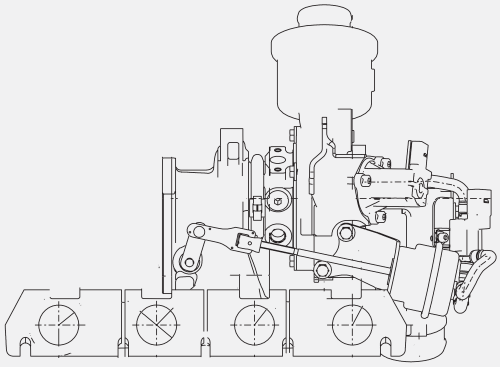
325 Peak Horsepower

F E A T U R E S

- **High-temperature alloy turbine housing**
- **Extended tip compressor wheel**
- **Water cooled bearing housing**

***Upgrade turbo does not come with a compressor recirculation valve or the mounting detail for one. An external valve will have to be used.**

TURBO FRAME DIMENSIONS



The electrical recirculation valve, which is also integrated into the compressor casing, guarantees fast response times when closing the throttle valve. The use of a "latest generation" turbine wheel helps increase the efficiency of the turbocharger significantly, while optimized thermodynamics have led to further improvements in fuel consumption and transient behavior, i.e. the acceleration of the engine at full throttle. **Original turbo has electronic pop-off valve integrated into comp/hsg, upgrade turbo has not. External pop-off valve has to be fitted.** Moreover, K04-064 has a larger compressor housing discharge.

Manufacturer	Vehicle	Year	Engine	Stock Turbo	Stock Turbo HP Limit	Upgrade HP	Upgrade Turbo Part #	Model Spec	Remarks
Audi	A3	From 2004	2.0 TFSI	5303 988 0105	255	325	**5304 988 0064***	K04-2283D	Integrated Manifold
Audi	A3	From 2003	2.0 TFSI	5303 988 0086	255	325	**5304 988 0064***	K04-2283D	Integrated Manifold

A U D I A 3

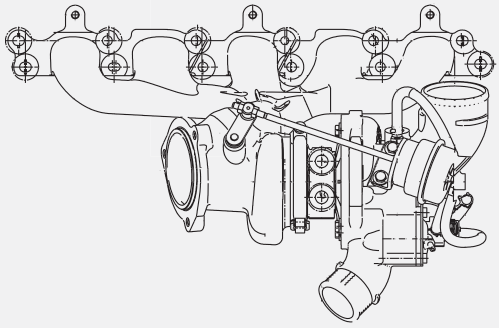
K16-2480

370 Peak Horsepower

F E A T U R E S

- **High-temperature alloy turbine wheel**
- **Extended tip compressor wheel**
- **Water cooled bearing housing**

TURBO FRAME DIMENSIONS



Volvo's requirement for the developers at BorgWarner was to replace the bi-turbo boosting of the previous engine with a new unit with single-turbo boosting. The new 6-cylinder engine also had to possess at least the same transient response as its predecessor, and of course fuel consumption and emissions needed to be brought up to date. With the K16 used in the Volvo 6-cylinder engine, BorgWarner unveils the first in a wide range of turbos for gasoline engines displacing from 1.6 to 3.0 liters or between 150 and 285 bhp.

Manufacturer	Vehicle	Year	Engine	Stock Turbo	Stock Turbo HP Limit	Upgrade HP	Upgrade Turbo Part #	Model Spec	Remarks
Volvo	S40/V50/ XC60/C70	From 2003	2.5L RNC-RS	5304 988 0033	300	370	**5316 998 0010**	K16-2480D	Integrated Manifold
Ford	Focus	From 2005	2.5L RNC-RS	5304 988 0033	300	370	**5316 998 0010**	K16-2480D	Integrated Manifold

VOLVO

Warranty Statement

LIMITED WARRANTY:

BorgWarner Turbo Systems, Inc. (“BWTS”) warrants that its goods or merchandise will be free from defects in material and workmanship for its intended use and service. This warranty shall extend for a period of twelve (12) months from the date of purchase by end user. BWTS will repair or provide a replacement product, at BWTS’s sole option, for any defective part. Replaced parts will be warranted in time only through the remaining period of this warranty. BWTS shall not be obligated to repair or replace any defective part unless it receives notice, in writing, within 14 days of discovery of a defect. Any action for breach of warranty, contract or otherwise, shall be barred unless BWTS is provided with notice as provided herein. Specifically excluded from this warranty are design defects or damage caused by improper installation, misuse, neglect, improper maintenance, handling or operation of the product or unauthorized repair or alterations or externally induced physical damage.

Further, this warranty shall not apply if any person attempts to repair or replace the defective part without BWTS written authorization. Any auxiliary equipment sold hereunder and not manufactured by BWTS carries only such warranty as given by the manufacturer thereof and which is hereby assigned without recourse to BWTS. No warranty is made for any other claims or special, indirect or consequential damages (including but not limited to component removal or installation, equipment down time, prospective profits or other economic losses) because of any defect deemed warrantable by BWTS.

This is BWTS’s sole warranty and is in lieu of all other warranties, express or implied, including, without limitation, implied warranty of merchantability, or fitness for a particular purpose.

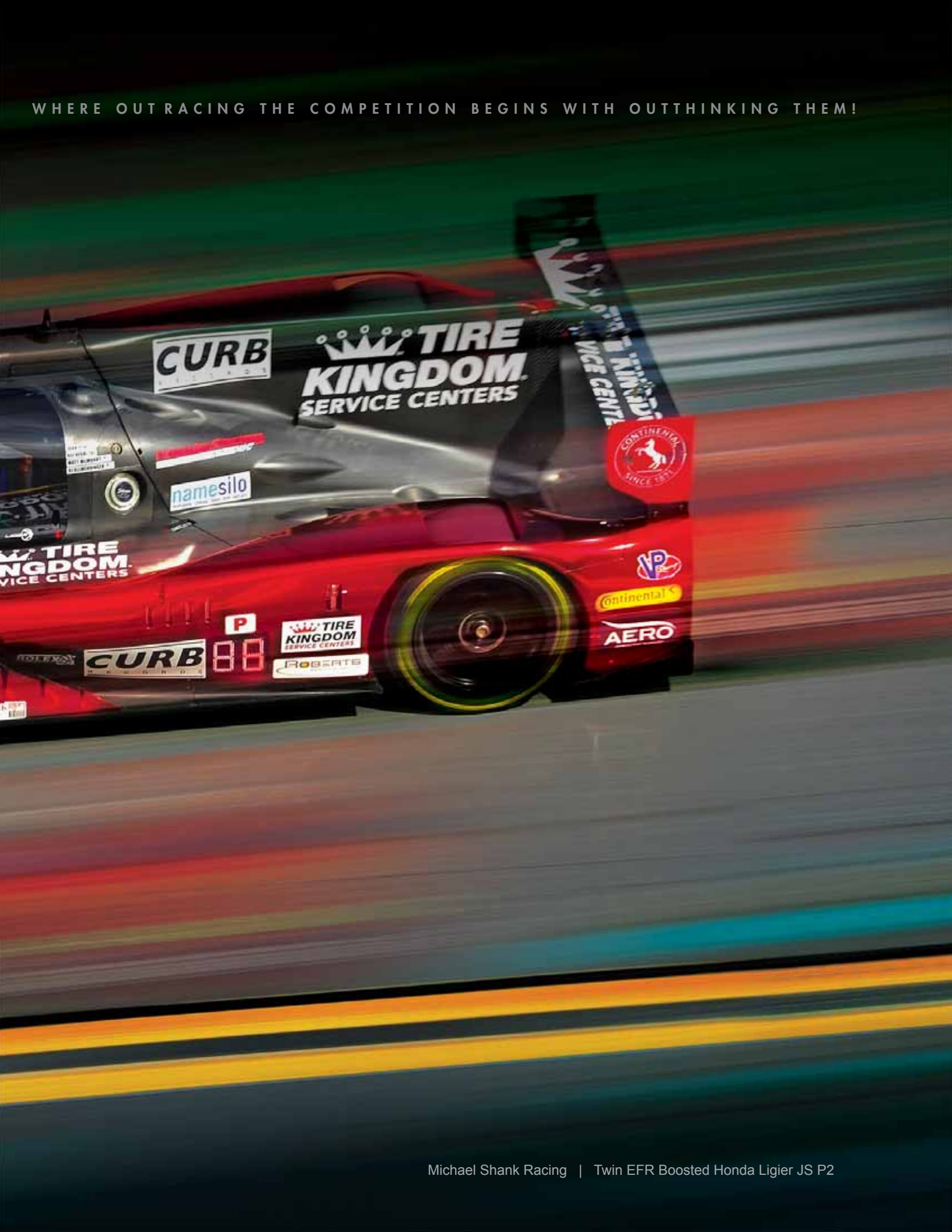
No representative or distributor of BWTS has the authority to change or alter this warranty. This warranty may only be modified by an agreement signed by an authorized officer of BWTS.

Any claim made under this limited warranty must be presented to BWTS, with valid proof of date of purchase by end-user. All merchandise or goods shipped to BWTS, for warranty consideration, must be shipped prepaid - freight. Collect shipments will be refused.

No warranty on competition applications or applications not approved in writing by BorgWarner Turbo Systems.

BORGWARNER TURBOCHARGERS

WHERE OUTRACING THE COMPETITION BEGINS WITH OUTTHINKING THEM!



Michael Shank Racing | Twin EFR Boosted Honda Ligier JS P2

Innovation

WORLDWIDE HEADQUARTERS

Kirchheimbolanden, Germany

starts here

"In our history, we have produced over 110 million turbochargers and are still learning new things every day. With our manufacturing footprint, we also secure proximity to our customers and offer specific expertise in the various market segments for which we produce."

FRED LISSALDE,
President of BorgWarner Turbo Systems

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TURBOCHARGER FACILITY
Asheville, North Carolina

BorgWarner Inc.

North America
info-NA@borgwarner.com

Europe
info-EU@borgwarner.com

borgwarnerboosted.com

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