MITSUBISHI TURBOCHARGER

PERFORMANCE TURBOCHARGER

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CATALOG VOL 1.0

CONTENTS

WHY MITSUBISHI TURBOCHARGER?

A HERITAGE OF OVER 130 YEARS.

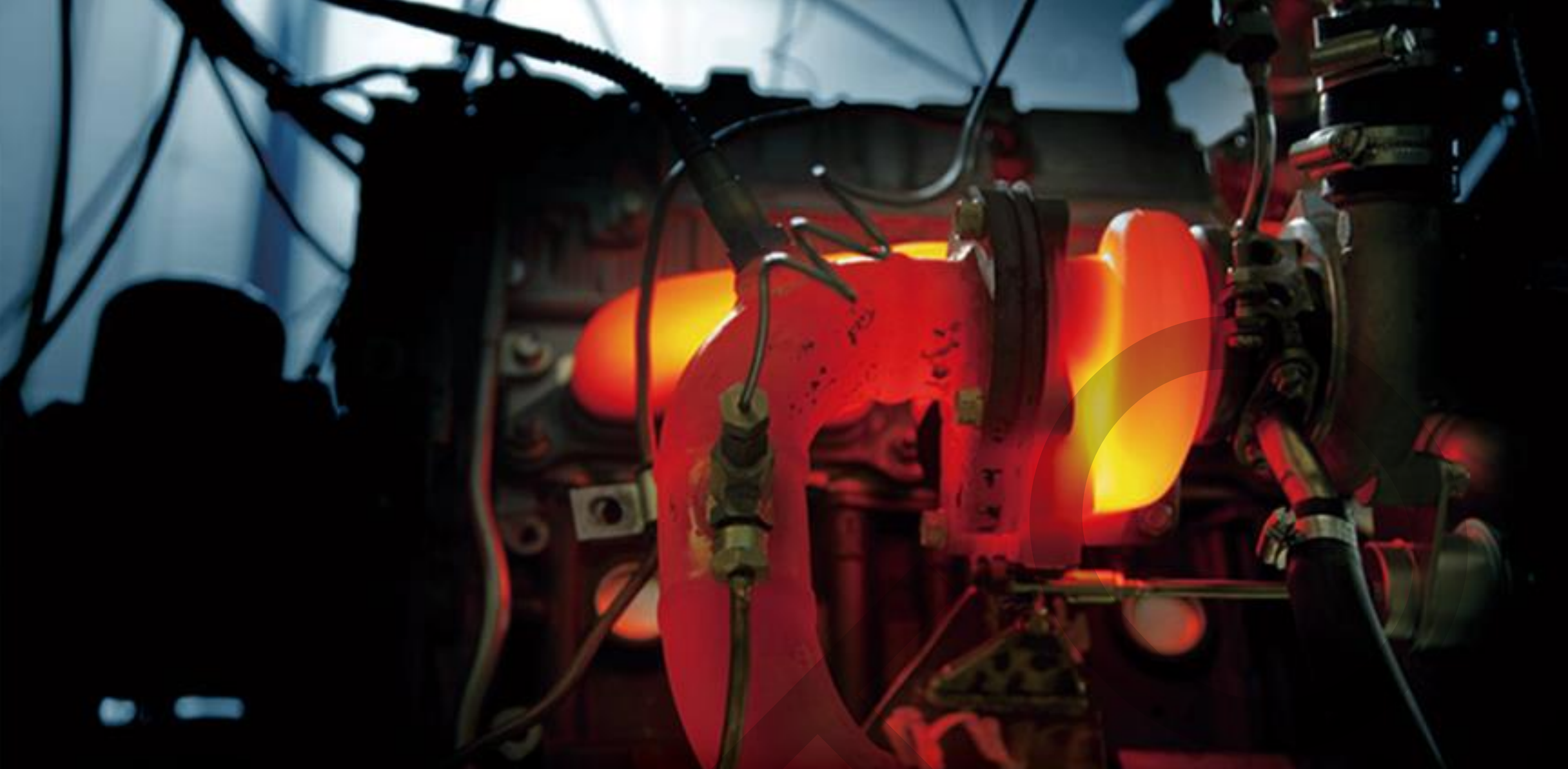
FROM YOUR DRIVEWAY TO OUTER SPACE.

For over 130 years, Mitsubishi Heavy Industries Group (MHI) has continuously pursued innovative technology to support its customers. In 1986, we successfully launched the first H-I launch vehicle, which marked the Group's full-fledged participation in space development. In the same year, MHI completed building the deep submergence research vehicle SHINKAI 6500, which can go deeper than any other manned submersible in the world. From deep ocean research to space systems, MHI Group continues to provide world-class technical and engineering solutions to contribute to the development of the world we live in. MHI has grown throughout its 130 years of history into a modern Japanese industrial pioneer.

Based on technological capabilities that have been developed over the years, MHI has been building up its technical experience for more than a century and is a leading company where it concerns knowledge of materials, chemistry, vibrations, thermodynamics, fluid dynamics, thermal conduction, tribology and electro physics.

MHI boasts a lineup of turbochargers covering a wide variety of engines for passenger cars and commercial vehicles to, ships and aircraft, with each one carrying its own history. However, the basic structure of turbochargers share many similarities with the gas turbine and the jet engine, two products that belong to MHI's realm of expertise. You only have to look at MHI's aerodynamically designed turbine rotors and compressor wheels to realize that MHI has condensed its wealth of experience and knowledge of high-speed rotating machines into its turbochargers.

Mitsubishi Turbocharger has been producing turbochargers for over half a century. The turbocharger production for industrial diesel engines started back in 1957. Later, the program was extended with turbocharger models for the automotive industry. The low incident rate of its turbochargers after they have been fitted in cars provides further evidence of their quality. This quality is also validated by users' high praise of the turbochargers. MHI's tradition of reliability lives on.



DEFY EXPECTATIONS

Turbochargers Require Experience, Resources, and Creativity

The development of turbochargers face endless challenges due to the vital role they play in defining engine performance. For example, developers of turbochargers for car engines are expected to satisfy strict criteria in terms of performance, quality, cost, and delivery dates, while also liaising closely with the automakers during their engine development process. This also involves providing expert engineering support to enable them to meet their customers' demanding requirements regarding engine output characteristics and positioning within the vehicle.

After the basic design has been completed at the Nagasaki Research & Development Center, the Turbocharger Engineering Department uses 3D imaging to analyze the thickness and angles of the blades, the most important components of the turbocharger's compressor wheel. The 3D imaging allows engineers to simulate the optimal balance between the conflicting requirements of strength and lightness.

PURSUIT OF QUALITY

Exploiting craftsmanship of man and machine

With an annual production level of passenger car engine turbochargers of more than 4.5 million units, accounting for more than 22% of the global market, Mitsubishi Turbocharger is aiming to capture the world's top share. This growth has been supported by complete automation in the production of cartridges, the core heart-like component of a turbocharger. By deploying automated production lines and standardizing production techniques, Mitsubishi Turbocharger has created a global mass production structure that consistently delivers extremely high quality. Mitsubishi Turbocharger's unique harnessing of the creative capabilities of both man and machines allows it to produce turbochargers of all sizes and for all purposes.

Automated production line that assembles cartridges, the core components of turbochargers. The various tasks of manufacturing, assembling, measuring, and inspecting turbine rotors and compressor wheels are efficiently performed by robots working at their assigned stations around the clock. The relentless accumulation of improvements has brought it to a level of automation that is unmatched anywhere in the world.

The term turbocharger evokes images of motor racing and powerful performance cars but it is a technology that has long been a common feature of many modern road vehicles.

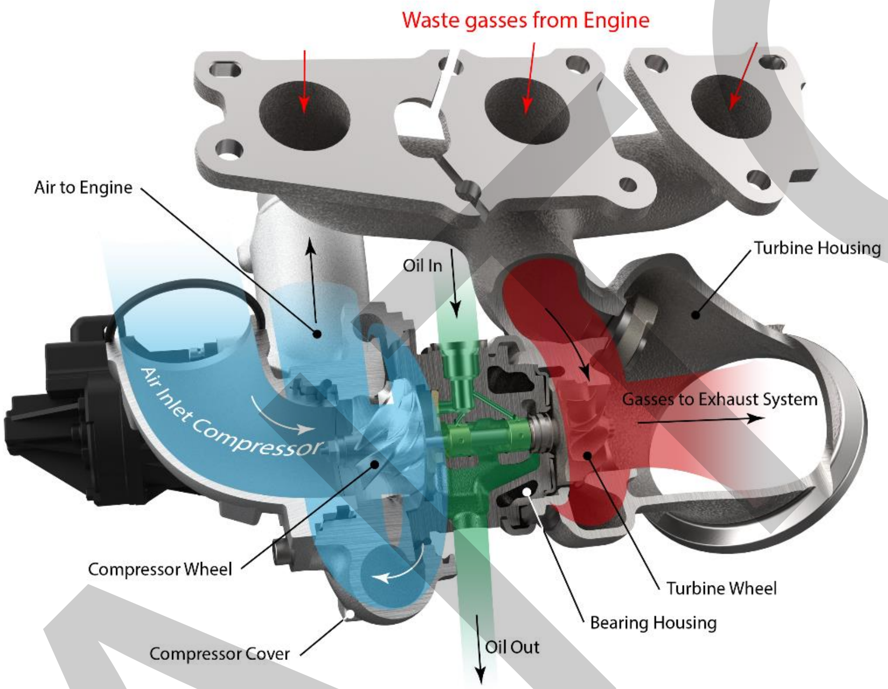
Fitting a turbocharger adds to an engine's efficiency by reusing the energy within exhaust gases to deliver additional drive from the same amount of fuel. That increased efficiency means less carbon dioxide is produced overall, making cars greener. Chances are you have had firsthand experience of our turbocharger in OEM production performance cars and did not even know.

Mitsubishi Turbocharger wanted to go back to those powerful images that captivated us, yet applying that same technology that makes our engine's more efficient and greener, to make the racing and performance cars even more powerful and efficient. Our high performance and racing turbocharger models have been produced for over 30 years and are world renowned in multitudes of motorsports.

TURBOCHARGER BASICS.

What is a Turbocharger?

A turbocharger is applied to make an engine more efficient and makes it possible to “downsize” the engine to a smaller size without any loss in performance. This is why many 6 cylinder engines have become 4 cylinder engines. A smaller engine is a cleaner engine, so the application of turbochargers leads to reduced emissions. A turbocharger utilizes the large amount of energy remaining in the exhaust gas of the combustion by using this energy to propel a turbine wheel. On the other end of the turbine shaft a compressor wheel is mounted. The spinning compressor wheel draws in fresh air through the air filter and then blows compressed air to the engine cylinders, first cooled by the intercooler. The extra oxygen contributes to an optimized combustion inside the engine significantly improving fuel economy, emissions, and power output.



ACTUATOR

An actuator is a device that operates a control mechanism in the turbocharger. Usually it controls the opening and closing of a wastegate or the nozzle in a VG (variable geometry turbine). Originally, most actuators were pneumatic, driven by either compressed air or by vacuum. As the demands on closing forces on the wastegates have increased, most actuators are now electrically driven. Many actuators now also feature a positioning sensor, enabling the vehicle to measure and/or steer the position of the wastegate more accurately.

A/R RATIO

The A/R ratio is the area of the volute at a specified location (for example at the tongue) where R is the distance from the turbine axis toward the center of A. The A/R is used during turbine matching. This is because changing the A/R changes the direction of the inflow at the rotor inlet. When increasing A/R the flow will become increasingly radial, while decreasing A/R the inflow will be more in the axial direction, which influences the efficiency and flow capacity of the turbine.

BEARING WEAR

The most sensitive components of a turbocharger are its bearings. With tolerances smaller than the thickness of your hair, even the slightest imperfection can cause it to fail over its lifetime. There are 2 types of bearings in a turbocharger: a radial bearing (left) and an axial bearing (right). The radial bearing supports the side-to-side movement of the shaft of the turbocharger. The axial bearing supports the axial movement of the shaft. Both bearings are very dependent of the oil supplied to them. If the oil quality (particles in the oil) is bad or not enough oil is supplied, failure of the turbocharger can happen within seconds. Always stick to the prescribed oil change intervals to reduce bearing wear likelihood.

Both photos show a large amount of bearing damage due to oil starvation

BOOST

The pressure delivered by the compressor is sometimes called *boost*. By increasing the pressure of the air which goes into the combustion engine, its density is increased. The volume of combustion is determined by the bore and stroke of the piston. By compressing the air before it goes into the combustion chamber, its density is increased, thus a larger amount of oxygen is available for combustion.

BURST CONTAINMENT

Internally turbochargers rotate at extreme speeds. When the turbocharger is exposed to operating conditions far beyond the allowable conditions, the stresses in the wheels may become so high that they break. When a wheel breaks at these extreme speeds, the energy of the moving parts can cause parts to become airborne fragments. In order not to have these fragments cause any damage to the outer surroundings of the turbocharger, the turbocharger is designed to contain all fragments in case of the explosion of one of the wheels. Typically, this is done by creating sufficient wall thickness of the compressor cover and turbine housing.

CARTRIDGE

The cartridge is the core of the turbocharger, containing the shaft, the turbine wheel, the compressor wheel and the bearing system, all mounted to the bearing housing. Each cartridge is specifically designed for a particular type of engine (see MATCHING). The rotor of each cartridge is carefully balanced so that its g-level is within acceptable bounds. The bearing housing is typically a cast-iron part which is precision-machined to micrometer-tolerances for accurately supporting the rotor-bearing system.

CHOKE

Choking is a phenomenon where the maximum amount of fluid mass that can pass through a given area is reached.

COMPRESSOR

The centrifugal compressor consists of a rotating and stationary part. The flow enters the rotating part, the impellor, in axial direction. The flow exits the impellor onto the stationary part of the compressor namely the (vane less) diffuser after which it enters the volute. In the impellor, the diffuser, and the volute, the air diffuses so that the kinetic energy of the flow converts into pressure.

FOREIGN OBJECT DAMAGE

Turbochargers move at rotational speeds higher than 200,000 RPM (over 3300 rotations per second!). You can imagine that at those speeds, damage accumulates incredibly quickly. Since the tips of the blades move at a speed of around 2000 km/h, any object that enters the turbochargers, even as small as grains of sand, can damage a turbocharger enough to make it perform incorrectly or fail instantly. As protection, the auto manufacturer will design and install an air filter to prevent objects from entering the turbocharger so that this kind of failure is minimized. However, if an object should enter the turbocharger from the engine side, like for instance a part of a piston ring, it will not be caught by any filter. If this occurs, you will feel

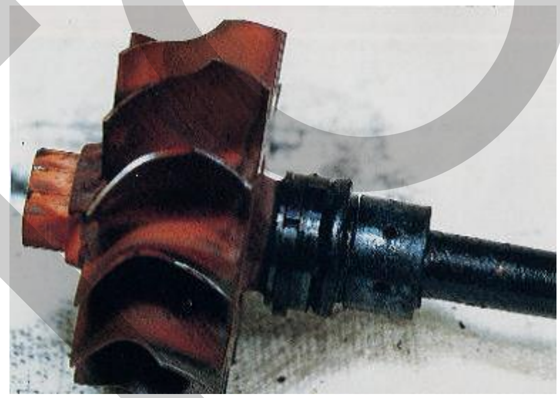
Foreign object damage due to hitting by larger metal fragments

an immediate drop in engine power or the engine will stall completely. The turbocharger will have to be replaced in this case.
By regularly checking your air filter, to make sure it is in good condition, you can prevent any objects coming in from the outside and potentially damage your turbocharger. It is a little more difficult to prevent foreign object damage caused by particles coming from the engine itself, except from making sure that the engine is regularly checked by a professional.

G-LEVEL

The production process of the compressor wheel and turbine rotor of a turbocharger causes an initial unbalance, where the center of mass does not align with the geometrical axis of the system. This resulting unbalance is responsible for vibrations of the T/C at a frequency synchronous with the rotational frequency. G-level is an extraction of synchronous vibration, and thus unbalance related vibration measured on the T/C housings using an acceleration sensor. It is an important parameter for turbocharger NVH considerations because a higher G-level implies that the turbocharger would create more noise during its operation. The G-level for a T/C can be reduced by proper balancing operations.

HEAT SOAK



Turbine rotor with oil coking on the bearing

The fact that a turbocharger works in a very hot environment already poses challenges of its own during operation. Sufficient cooling is needed to keep everything (primarily the bearings) functioning correctly. Shutting off the engine is inevitable after driving. Sometimes this occurs after the engine has been working hard with all the components being very hot. These so called “hot shutdowns” (sudden engine shutdown after period of high engine load) pose another potential risk for failure of the turbocharger. During operation there will be plenty of oil and coolant going through the turbocharger to keep all temperatures within the designed limits. However, when the engine is shut off quickly after a high engine load situation the flow of cool oil and coolant stops. This will cause the remaining oil in the turbocharger to “soak” the heat increasing the likelihood of oil coking which means that the oil will burn and leave particles in the bearing system and on the shaft. This will damage the bearings and the cartridge could become noisy due to this. During development of the engine the OEM’s test for heat soak. They can also implement independent pumps to keep oil and coolant running for a while after the engine is shut down. This will significantly reduce the heat soak and lower the chance of oil coking. If you have an older car with a turbocharger, it will help to account for this as a driver by driving less aggressively (no high loads on the engine) for the last few minutes before shutting down the engine or installing a turbo timer to lower the risk of oil coking due to heat soak.

MATCHING

Turbocharger matching is the process of selecting the optimal compressor and turbine combination to reach the engine performance requirements. Since these requirements are different for every engine type or model, a matching will always result in a solution specific to the application. Turbocharger matching is an iterative loop, where after each step the engine performance parameters are evaluated. Parameters such as torque, power, BSFC, inlet and exhaust temperatures and pressures. A suitable compressor will be selected based on the maximum torque and power target at a given engine rpm. Additionally, a turbine will be selected which is matched to drive the chosen compressor.

SINGLE SCROLL

A single scroll fixed geometry turbocharger design is characterized by a single volute for the turbine housing, transforming exhaust energy into compressor rotation. Designs can be straightforward and provide high efficiency for a chosen flow range. Single scroll fixed geometry turbochargers can be seen as a basic entry level or conventional turbocharger; more complex turbocharger technology such as Twin scroll, Variable Geometry (VG) or 2-stage technology is intended to either broaden the usable flow range or provide higher efficiency over a broader working range of the turbocharger.
Single scroll turbines can be provided for any desired flow range. Common designs range from single entry for cylinder head integrated manifolds to complex integrated casted manifold-designs. Mitsubishi Turbocharger’s single scroll turbochargers for gasoline engines are capable of operating at high turbine inlet temperatures up to 1050 degrees Celcius.

SURGE

A turbocharger forces extra air into the engine to be able to burn more fuel. In the industry, the compressed air is called boost. If you want to accelerate, boost is necessary. There are also scenarios when the turbocharger is still providing boost, but the engine does not need it. For example, when you shift gears. At this point the throttle valve closes. The turbocharger is however still rotating very quickly and is still building up boost. Due to the closed throttle valve this boost cannot be delivered to the engine anymore and the boosted air accumulates in the inlet manifold. When the amount of accumulated air becomes too much, it will start flowing backwards into the wrong direction over the compressor wheel. After this “release” the compressor wheel will again build up boost and the cycle repeats. This pulsating air flow is called surge and can be quite violent and puts a lot of stress on the bearing system, the shaft and the compressor wheel. When matching a turbocharger for your engine, consideration should be taken to ensure the main operating points do not cross to the left of the surge line. Any engine operating point on the left of the surge line of the compressor map would be operating under surge conditions. Prolonged exposure to surge can lead to catastrophic failure of the turbocharger.

TWIN SCROLL

The twin scroll turbine design is characterized by a volute that is divided meridionally by a wall with two parallel inlets. Each inlet is feeding the nozzle-less turbine through the entire rotor circumference. The divided volute itself is fed through an engine exhaust manifold with separated volumes. In this configuration the pulse dampening and interaction is minimized thereby maximizing the utilization of pulse energy for improved transient engine performance while minimizing engine pumping losses.

WASTEGATE

A wastegate works as a control mechanism in a turbocharger. It is used to control the amount of boost provided to the engine by directing excessive exhaust gas directly into the exhaust. The wastegate can open and close by the use of an actuator. By opening the gate, hot engine exhaust gas is bypassing the turbine and as such not utilized for power generation, hence the name “waste” gate.

MATCHING BASICS.

Pressure Ratio:
Pressure ratio is on the y-axis and is defined by the equation below

$$Pressure\ Ratio = \frac{(Desired\ Boost\ Gauge\ Pressure + Atmospheric\ Pressure)}{Atmospheric\ Pressure}$$

Air Flow Rate:
Air flow rate of the engine in m^3/s is on the x-axis. This can be converted from volumetric (air flow rate) to mass flow rate by multiplying by 159.27 (lbs/min @20°C) then can loosely be used to calculate horsepower by multiplying by 10.

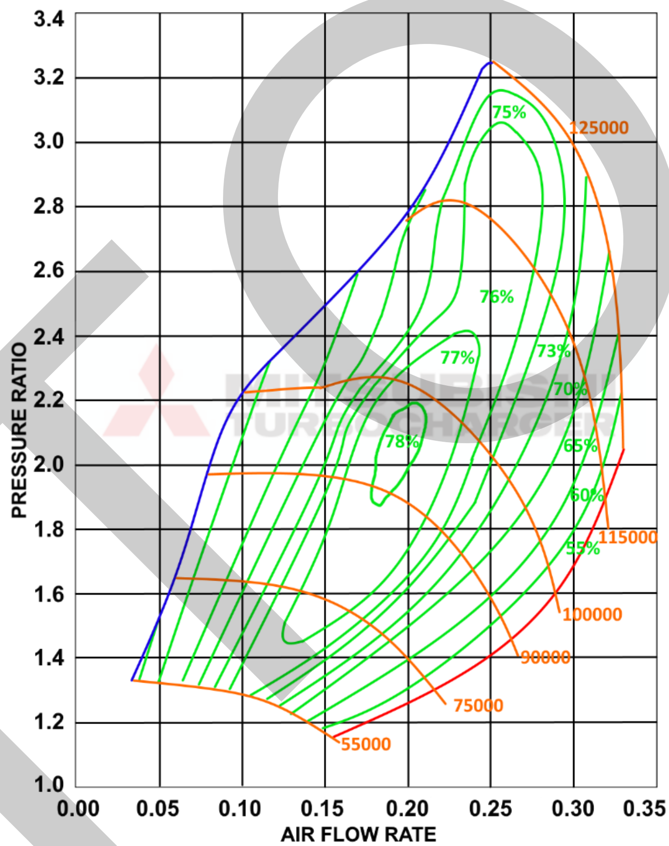
Surge Line:
The blue line indicated the surge line. Any engine operating point left of this line will be operating in surge condition. Advised to stay to the right of this line.

Choke Line:
The red line indicated the choke line. Any engine operating point right of this line will be operating in choke condition. Advised to stay to the left of this line.

Speed Lines:
The orange lines indicate turbocharger speed in rpm, the highest line being the maximum speed the turbocharger can be spun without damage.

Efficiency Islands:
The green lines indicate the turbocharger efficiency, the efficiency percentage can be viewed as the z-axis.

COMPRESSOR MAP



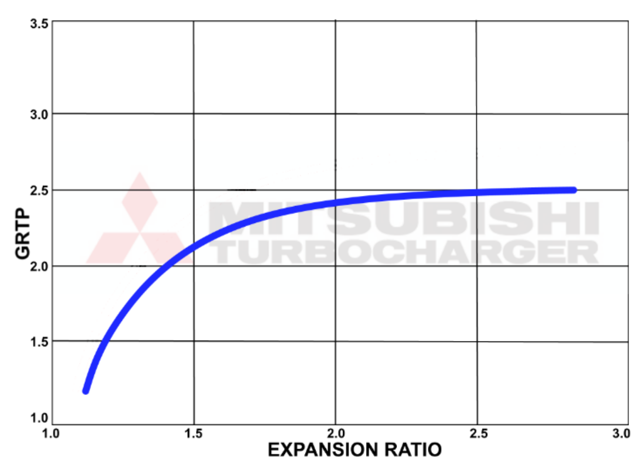
Expansion Ratio:
Pressure ratio is on the x-axis and is defined by the equation below $Expansion\ Ratio = \frac{Turbine\ Inlet\ Pressure}{Turbine\ Outlet\ Pressure}$

GRTP:
Turbine mass flow rate of the engine in kg/s*√K/(kg/cm²)is on the y-axis. T3 is the turbine inlet gas temperature, P3 is turbine inlet gas pressure.

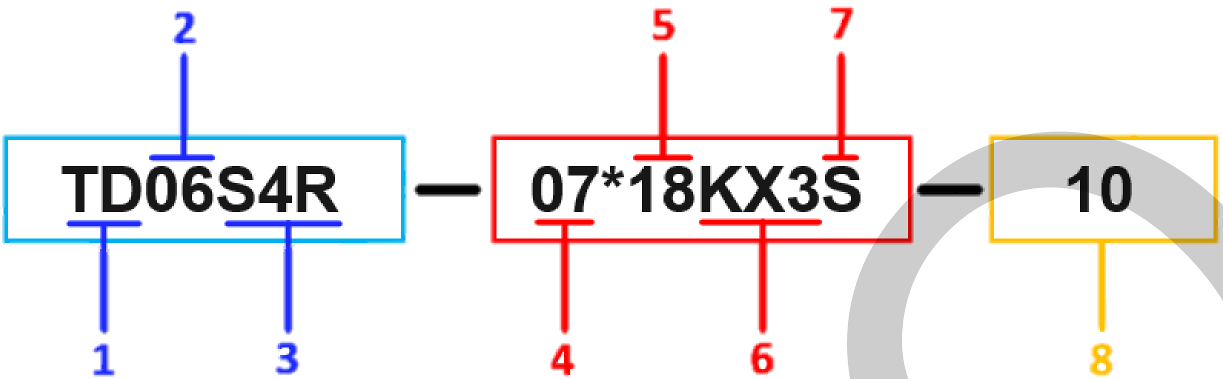
$$GRTP = (Actual\ Flow)[kg/s] \times \frac{\sqrt{T3[degC] + 273.15}}{(P3[kPa]/98.0665[kg/cm2])}$$

Turbine Flow Rate Line:
Indicated as the blue line. Multiple lines which will be labeled in the legend in the top left corner can be present on a turbine map showcasing multiple turbine housing throat area sizes.

TURBINE MAP



MITSUBISHI TURBOCHARGER BASICS.



1. **Turbine Design Series:**
   There are three options available: TD, TE, & TF

2. **Turbine Wheel Frame Size:**
   Sizes from TD025 to TD09. Ex. TD06 = 65mm inducer.

3. **Optional Turbine Modifiers:**
   Multiple modifiers can be applied to one turbine design, below are the possible modifiers.

H	S	M	L	LL	#	R	A	W
Larger Turbine Wheel Diameter	Small Inducer Width	Medium Inducer Width	Large Inducer Width	Extra Large Inducer Width	Sequential number, larger is newer	Reverse Rotation	TiAl Turbine Wheel	MM246 Turbine Wheel

Material	713C	TiAl TA2	MM246
Max Temp. (C)	980	950	1050
Density (g/cm3)	7.91	4	8.44

4. **Compressor Wheel Size:**
   Any turbocharger type code with an asterisks prefix denotes a hybrid turbocharge typically with a larger matched compressor wheel. Example 07*18KX3S = TD07-18KX3S.

5. **Flow Rate:**
   Flow rate in m^3/s at 2.0 pressure ratio and maximum efficiency of the compressor type.

6. **Compressor Wheel Design Series:**
   Many designs are available from Mitsubishi Turbocharger for compressor wheels, including the legendary G series compressor wheels.

7. **Optional Compressor Modifiers:**
   Internal modifiers for Mitsubishi Turbocharger.

8. **Turbine Housing:**
   Turbine housing inlet area in cm^2, this is Mitsubishi Turbos equivalent to turbine area “A” in Area/Radius (A/R).

Material	HISI-DUC	D5S	F5N	SS1.4837	SS1.4848	A3K	KN2
Max Gas Temp. (C)	750	930	930	950	980	1000	1000

MITSUBISHI TURBOCHARGER

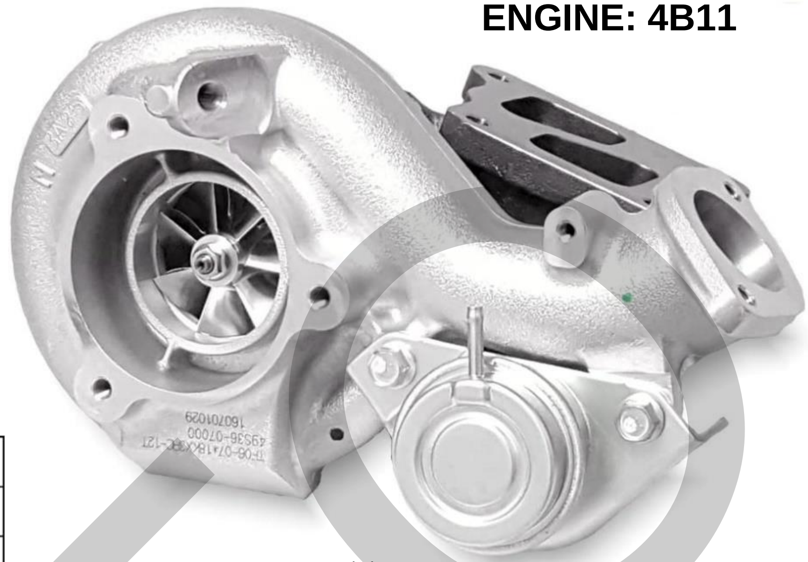
BOLT-ON UPGRADE SERIES

MITSUBISHI LANCER EVOLUTION X
ENGINE: 4B11

TF06-07*18KX3-12T

Features:
- 3” Inlet with a ported shroud for surge protection
- 24 PSI high pressure wastegate actuator

Peak Power Output:
- 540 HP / 402 KW



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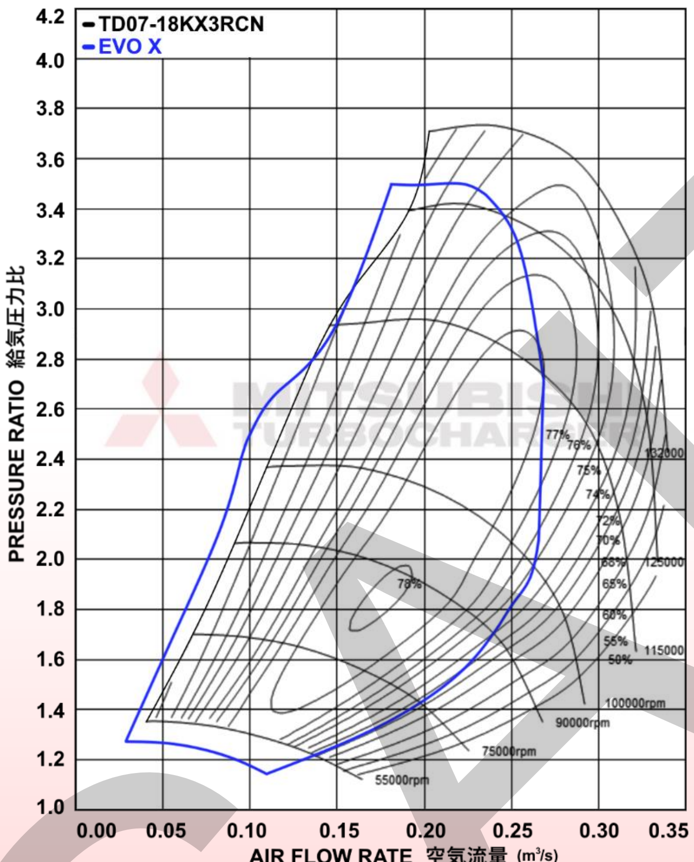
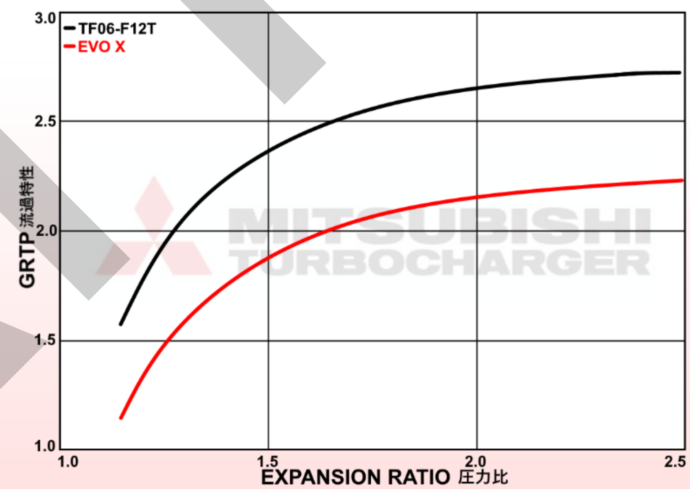
Note:
- Inlet Elbow Recommended: 48S36-59500
- Both turbocharger and inlet elbow included in kit 49S36-A0100



COMPRESSOR MAP



TURBINE MAP

Part Number	Compressor Wheel			Turbine Wheel			Turbine Housing		
	Inducer (mm)	Exducer (mm)	Type	Inducer (mm)	Exducer (mm)	Material	Area (cm^2)	WG ⌀ (mm)	Material
49S36-07000	55.1	75	Billet KX	61.5	54	713C	12	40	KN2

Note:
Off-Road Competition Use ONLY.

MITSUBISHI LANCER EVOLUTION IX

ENGINE: 4G63

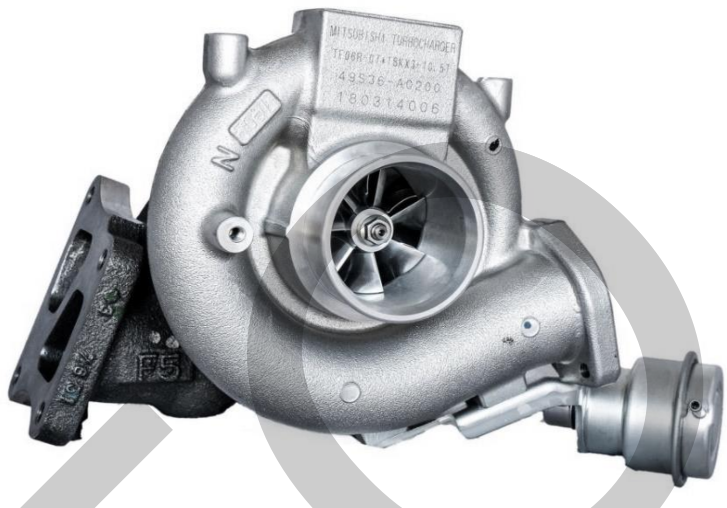
TF06R-07*18KX3-10.5T

Features:

- Reverse rotation
- 18 PSI high pressure wastegate actuator

Peak Power Output:

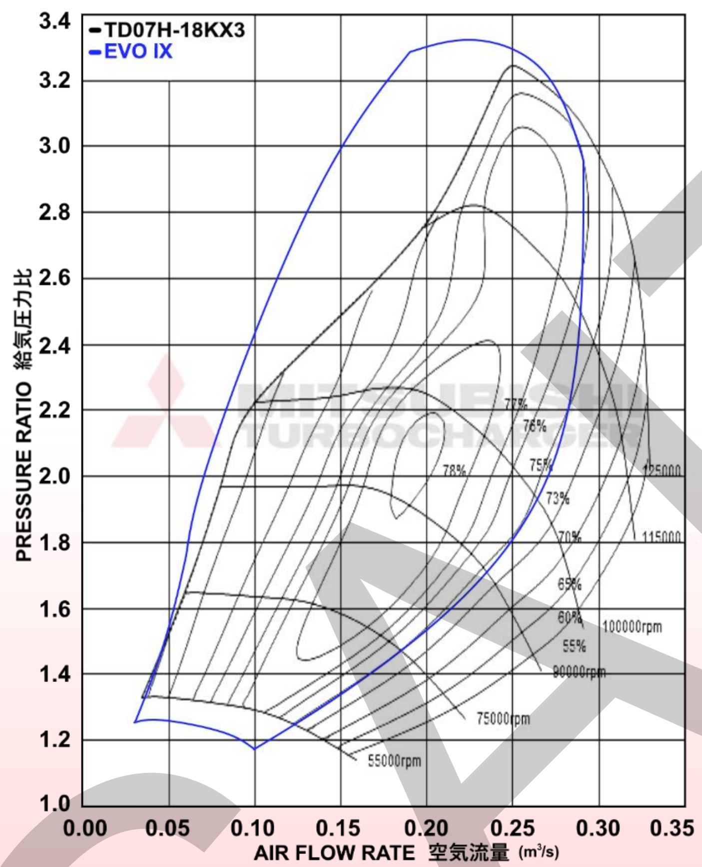
- 540 HP / 402 KW



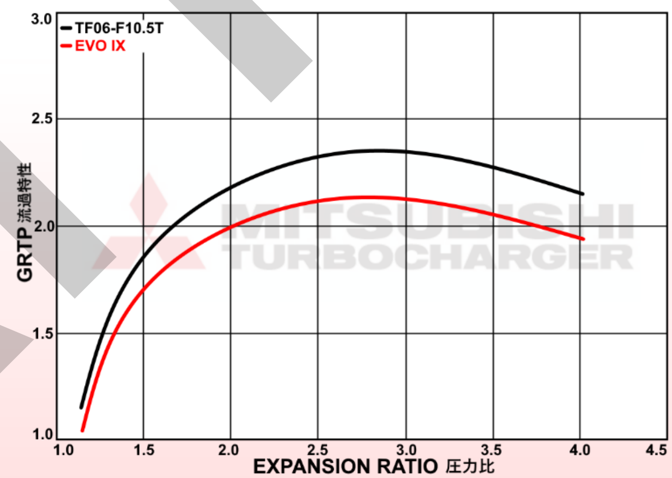
Click image to view more. Image provided by Full-Race.

Note:

- Fits Evolution 4-5 with Evolution 9 compressor inlet and outlet pipe.
- Fits Evolution 6-8 with Evolution 9 compressor outlet pipe.



COMPRESSOR MAP



TURBINE MAP

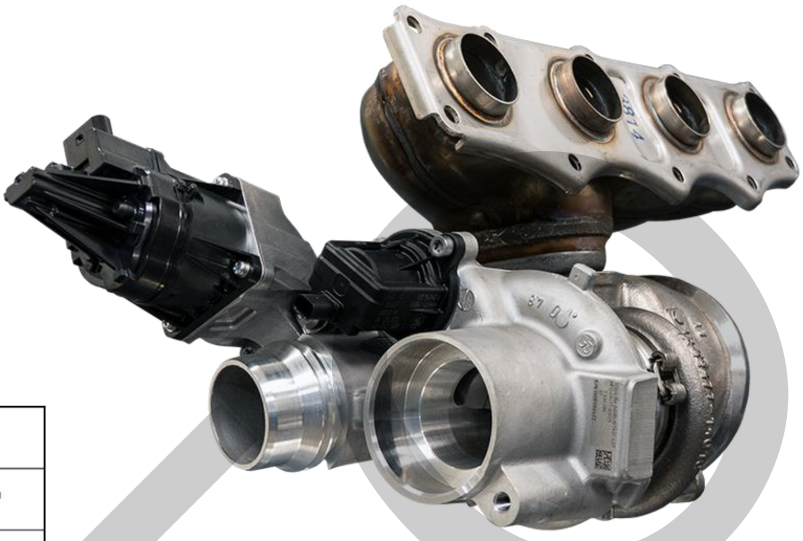
Part Number	Compressor Wheel			Turbine Wheel			Turbine Housing		
	Inducer (mm)	Exducer (mm)	Type	Inducer (mm)	Exducer (mm)	Material	Area (cm^2)	WG ⌀ (mm)	Material
49S36-A0200	55.1	75	Billet KX	61.5	54	713C	10.5	33	F5N

Note:

Off-Road Competition Use ONLY.

MITSUBISHI TURBOCHARGER

BMW 228i, 328i, 428i, 538i, Z4
ENGINE: N20



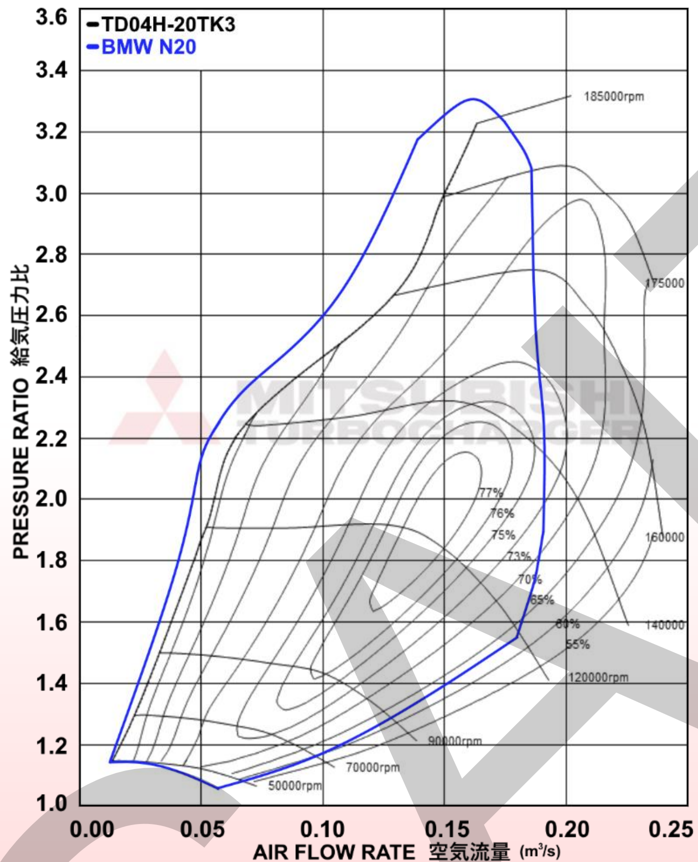
Click image to view more. Image provided by Full-Race.

TD04L6R-04H*20TK3S-6

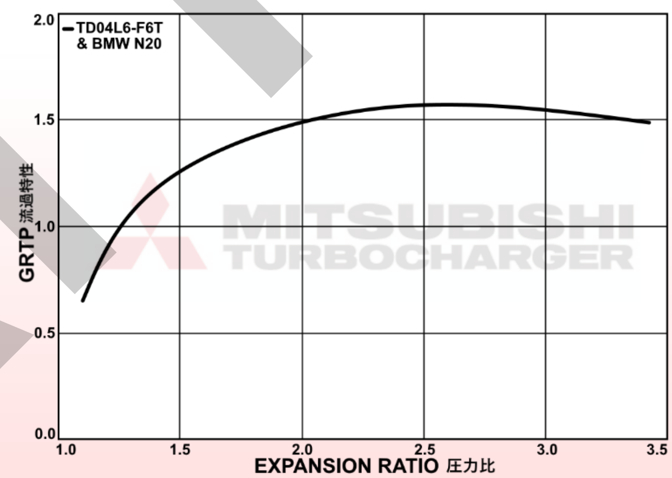
Features:
- Upgrade developed by OEM turbo supplier MHI with BimmerWorld
- New design 20TK3 billet compressor wheel
- Integrated exhaust manifold

Peak Power Output:
- 380HP / 283KW

Note:
- Includes electronic wastegate actuator



COMPRESSOR MAP



TURBINE MAP

Part Number	Compressor Wheel			Turbine Wheel			Turbine Housing		
	Inducer (mm)	Exducer (mm)	Type	Inducer (mm)	Exducer (mm)	Material	Area (cm^2)	WG ⌀ (mm)	Material
49U77-A0000	47	58	Billet TK3	47	41.2	713C	6	42	SS 1.4848

Note:
Off-Road Competition Use ONLY.

CHEVROLET CAMARO
ENGINE: LTG

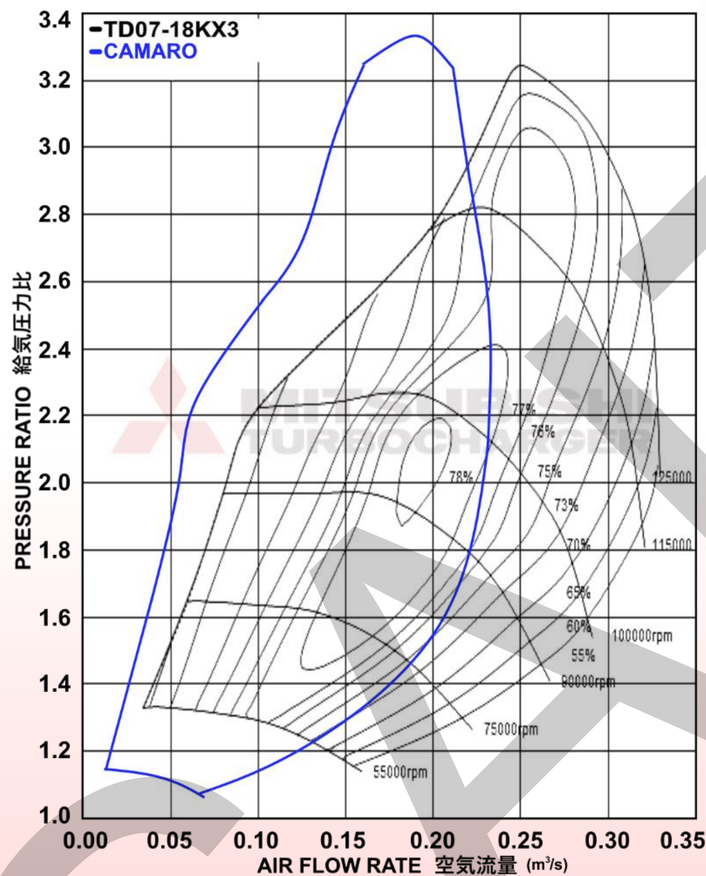
TF06-07*18KX3-12T

Features:
- Upgrade developed by OEM turbo supplier MHI
- Billet 18KX3 compressor wheel
- 29 PSI high pressure wastegate actuator

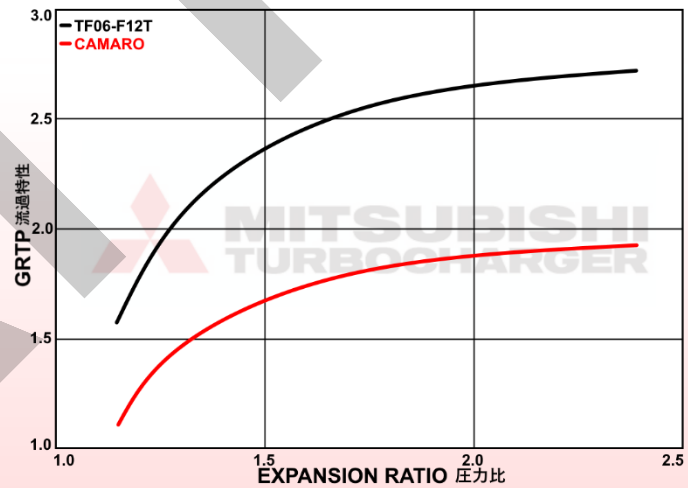
Peak Power Output:
- 540 HP / 402 KW

Click image to view more.

Note:
- Includes required lines and fittings



COMPRESSOR MAP



TURBINE MAP

Part Number	Compressor Wheel			Turbine Wheel			Turbine Housing		
	Inducer (mm)	Exducer (mm)	Type	Inducer (mm)	Exducer (mm)	Material	Area (cm²)	WG ⌀ (mm)	Material
49S36-A0300	55.1	75	Billet KX	61.5	54	713C	12	42	DS5

Note:

Off-Road Competition Use ONLY.

HONDA CIVIC (SI) & CR-V
ENGINE: L15B7

MITSUBISHI TURBOCHARGER

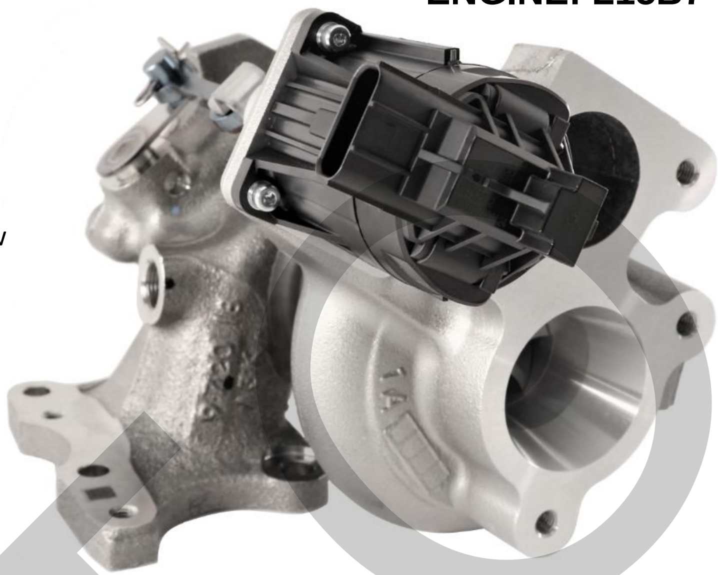
TD03LL1-04*11HR2-5.1

Features:

- Upgrade developed by OEM turbo supplier MHI
- New design HR2 billet compressor wheel
- Larger turbine wheel designed for increased exhaust flow

Peak Power Output:

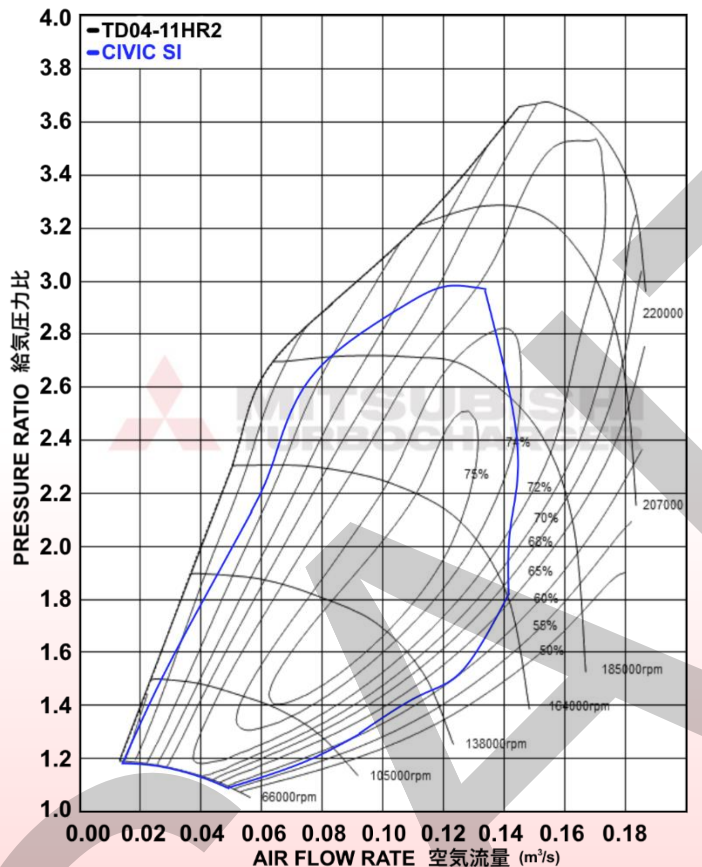
- 290HP / 216KW



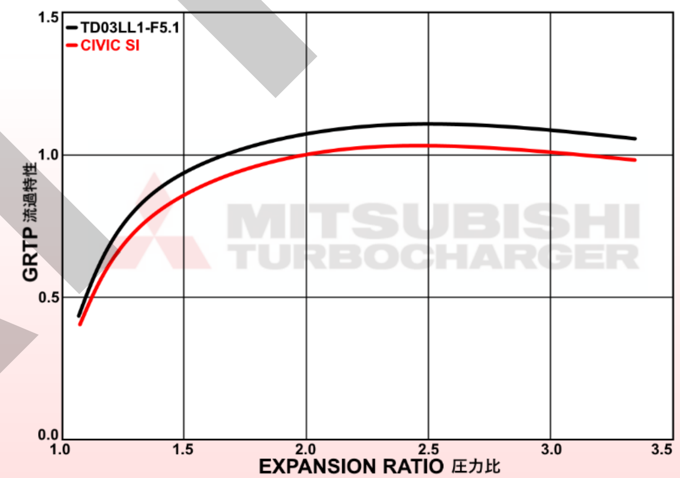
Click image to view more. Image provided by Full-Race.

Note:

- Hondata FlashPro recommended for optimal performance tuning
- 10W-40 oil is required



COMPRESSOR MAP



TURBINE MAP

Part Number	Compressor Wheel			Turbine Wheel			Turbine Housing		
	Inducer (mm)	Exducer (mm)	Type	Inducer (mm)	Exducer (mm)	Material	Area (cm²)	WG ⌀ (mm)	Material
49S31-A0100	39.4	49	Billet HR2	40	36.7	713C	5.1	35	A3K

Note:

Off-Road Competition Use ONLY.

10W-40 oil is required.

SUBARU IMPREZA (WRX/STI) STAGE OG

ENGINE: EJ20/EJ25

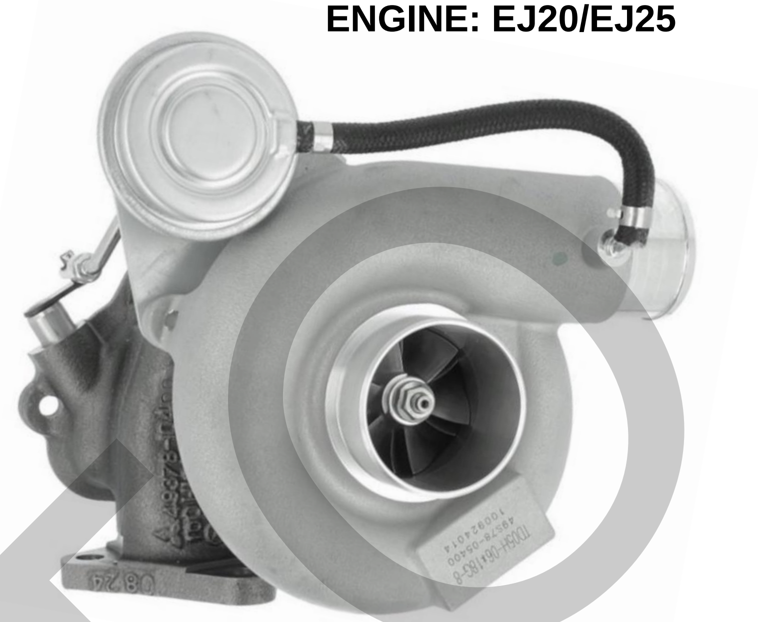
TD05H-06*18G-8

Features:

- "Stage OG" previous variation
- Legendary 18G cast compressor wheel design
- 60mm compressor inlet

Peak Power Output:

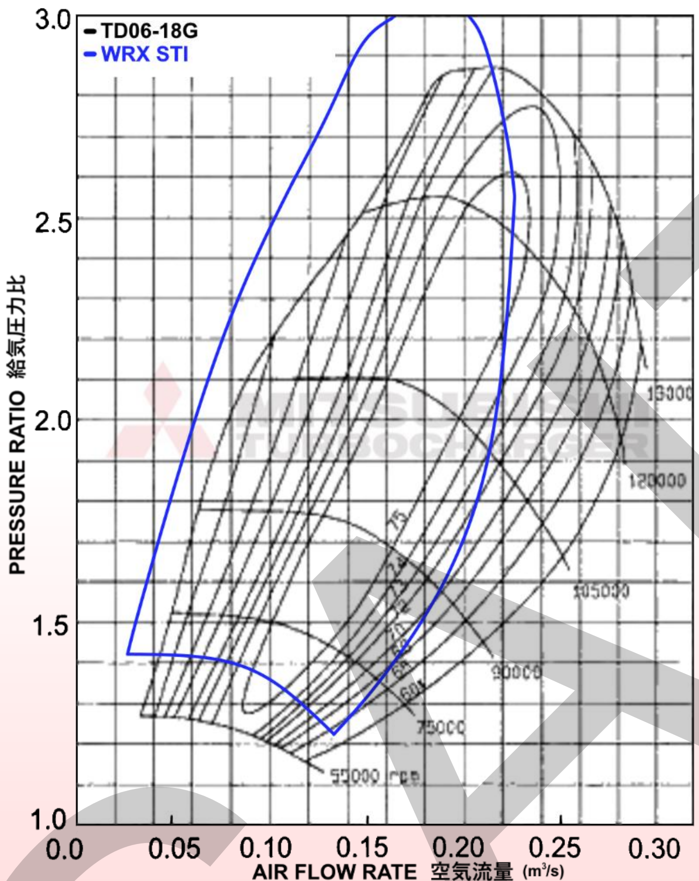
- 470HP / 350KW



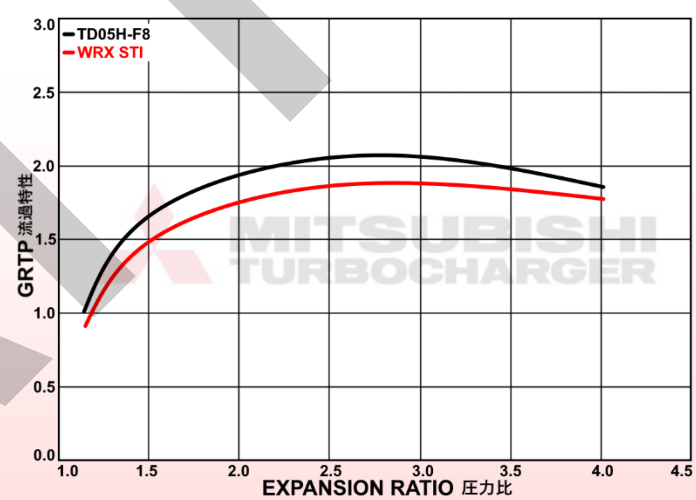
Click image to view more. Image provided by TurboZentrum.

Note:

- Oil cooling only. M10 oil inlet.



COMPRESSOR MAP



TURBINE MAP

Part Number	Compressor Wheel			Turbine Wheel			Turbine Housing		
	Inducer (mm)	Exducer (mm)	Type	Inducer (mm)	Exducer (mm)	Material	Area (cm²)	WG ⌀ (mm)	Material
49S78-05400	50.43	68	G	56	49.1	713C	8	33	HISI-DUC

Note:

Off-Road Competition Use ONLY.

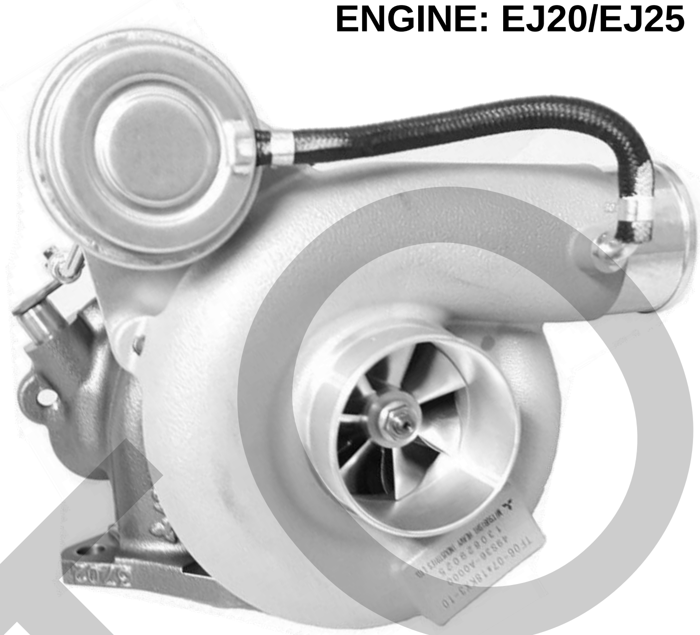
MITSUBISHI TURBOCHARGER

SUBARU IMPREZA (WRX/STI) STAGE 1
ENGINE: EJ20/EJ25

TD05H-06*16KX3S-8

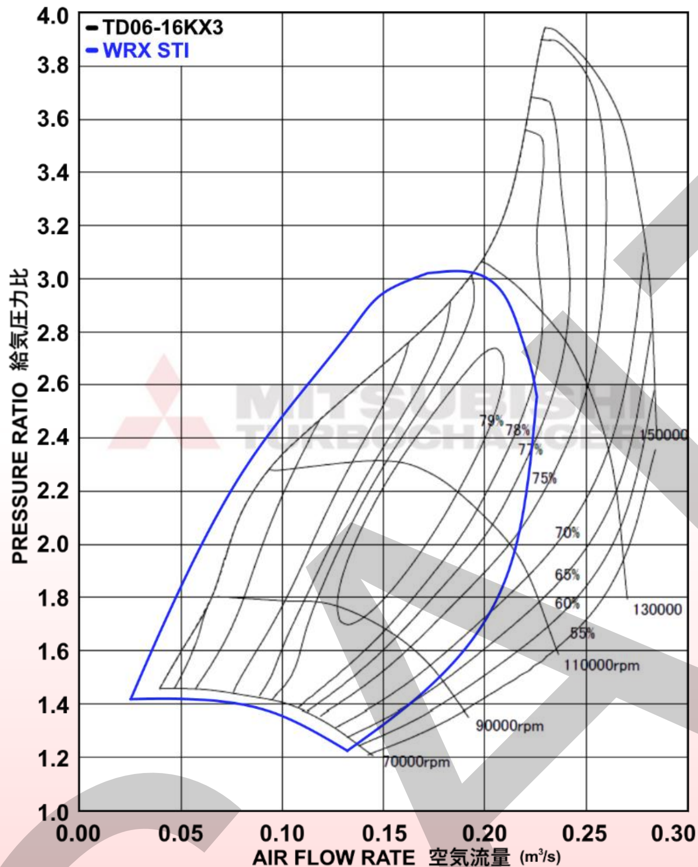
Features:
• "Stage 1" new design 16KX3 compressor
• 56mm compressor inlet

Peak Power Output:
• 450HP / 335KW

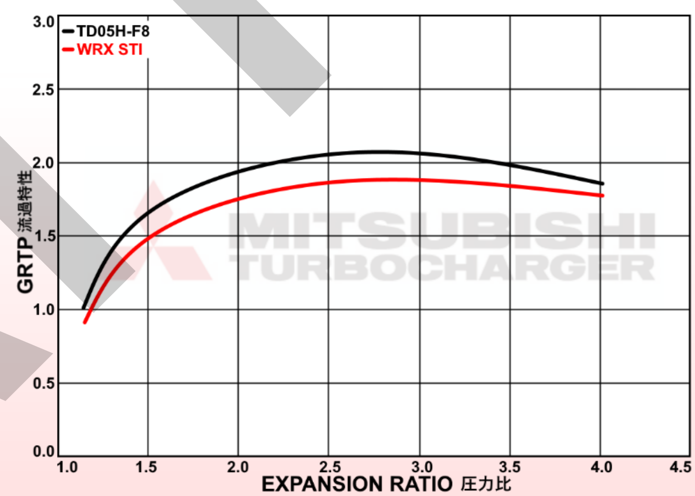


Click image to view more.

Note:
• M12 oil inlet.



COMPRESSOR MAP



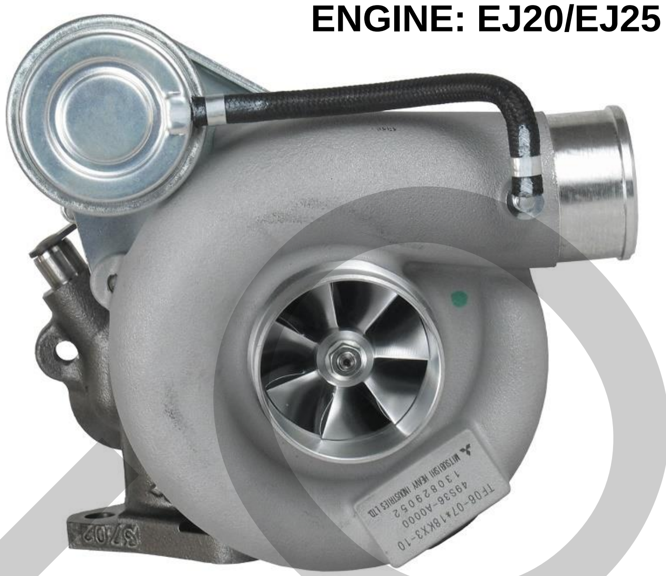
TURBINE MAP

Part Number	Compressor Wheel			Turbine Wheel			Turbine Housing		
	Inducer (mm)	Exducer (mm)	Type	Inducer (mm)	Exducer (mm)	Material	Area (cm^2)	WG ø (mm)	Material
49S78-A0000	49.96	68	KX3	56	49.1	713C	8	33	HISI-DUC

Note:
Off-Road Competition Use ONLY.

MITSUBISHI TURBOCHARGER

SUBARU IMPREZA (WRX/STI) STAGE 2
ENGINE: EJ20/EJ25



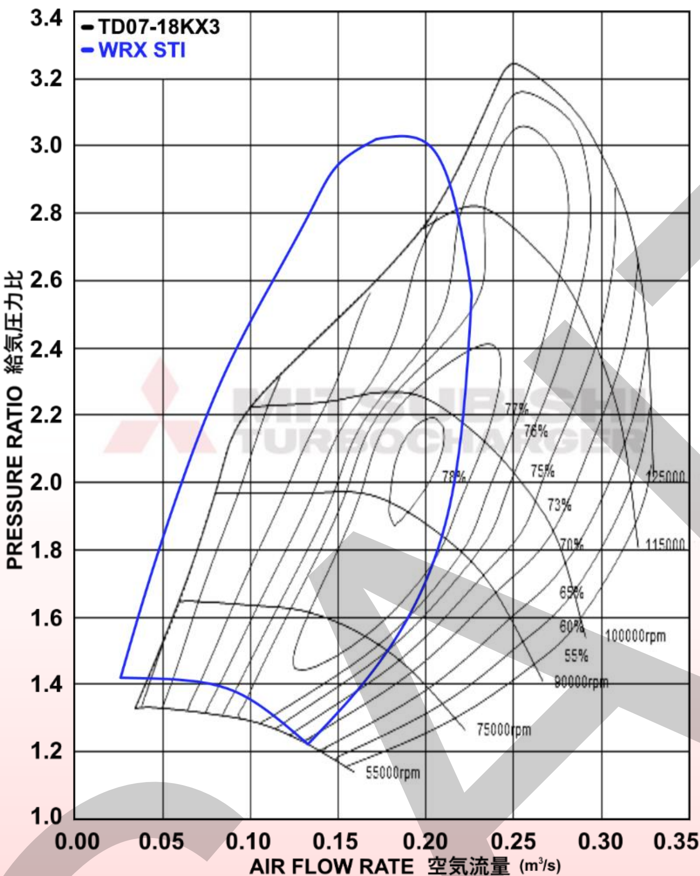
Click image to view more. Image provided by turboturbos.com

TF06-07*18KX3-10

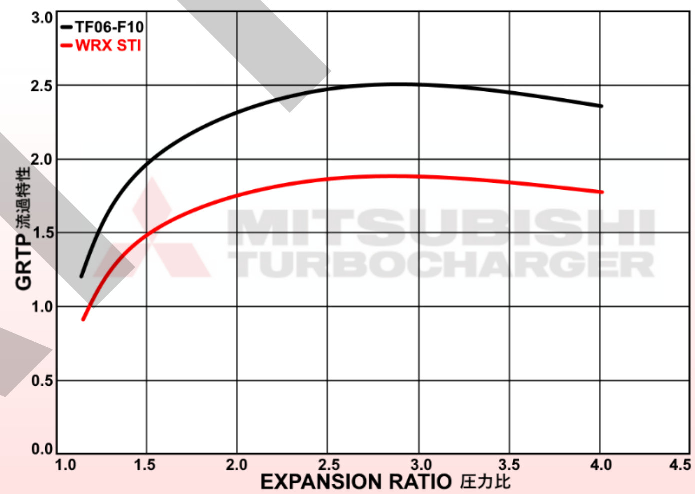
Features:
- “Stage 2” new design 18KX3 billet compressor wheel
- 60mm compressor inlet

Peak Power Output:
- 540HP / 402KW

Note:
- M12 oil inlet.
- 49S36-B0000 model has a rotated (angled) oil drain flange



COMPRESSOR MAP



TURBINE MAP

Part Number	Compressor Wheel			Turbine Wheel			Turbine Housing		
	Inducer (mm)	Exducer (mm)	Type	Inducer (mm)	Exducer (mm)	Material	Area (cm^2)	WG ⌀ (mm)	Material
49S36-A0000	55.1	75	Billet KX3	61.5	54	713C	10	33	HISI-DUC
49S36-B0000	55.1	75	Billet KX3	61.5	54	713C	10	33	HISI-DUC

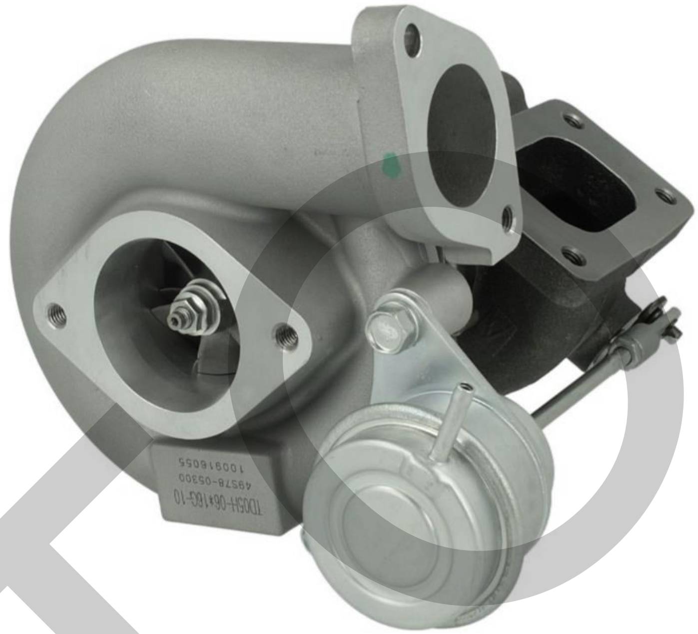
Note:
Off-Road Competition Use ONLY.

NISSAN SKYLINE (R32/R33/R34)
ENGINE: RB26DETT

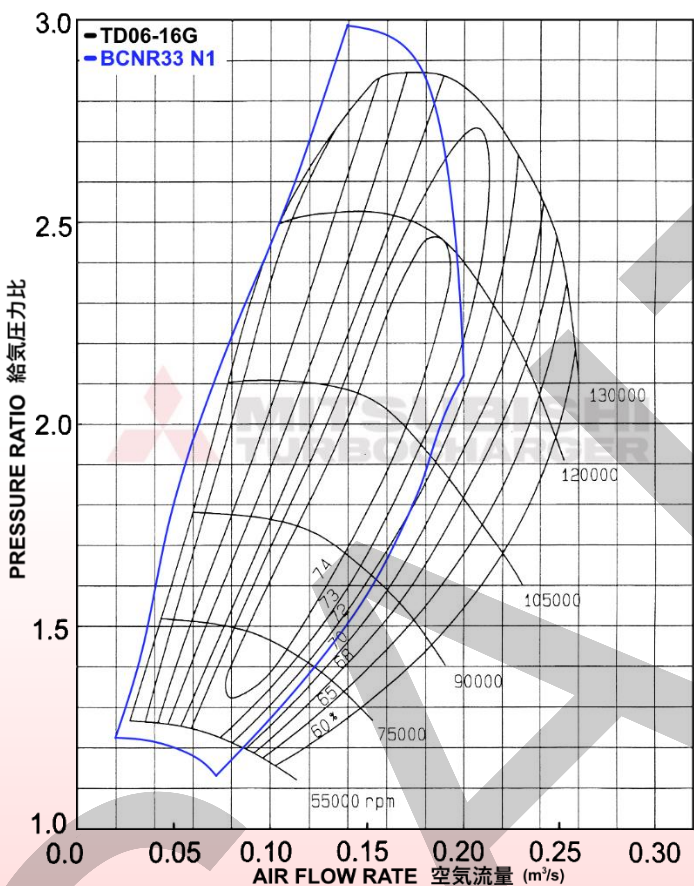
TD05H-06*16G

Features:
- Legendary 16G cast compressor wheel design
- Available in both 8cm² and 10cm² turbine housings

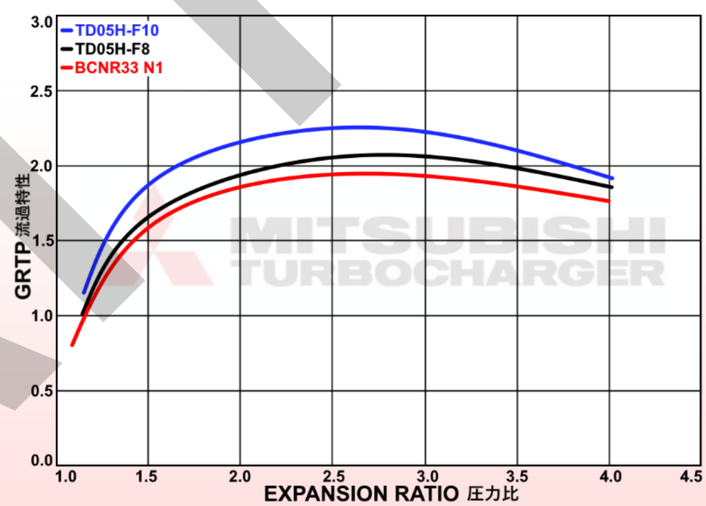
Peak Power Output:
- 400HP / 298KW Each



Click image to view more. Image provided by TurboZentrum.



COMPRESSOR MAP



TURBINE MAP

Part Number	Compressor Wheel			Turbine Wheel			Turbine Housing		
	Inducer (mm)	Exducer (mm)	Type	Inducer (mm)	Exducer (mm)	Material	Area (cm²)	WG ⌀ (mm)	Material
49S78-05190	48.06	68	G	56	49.1	713C	8	30	HISI-DUC
49S78-05300	48.06	68	G	56	49.1	713C	10	30	HISI-DUC

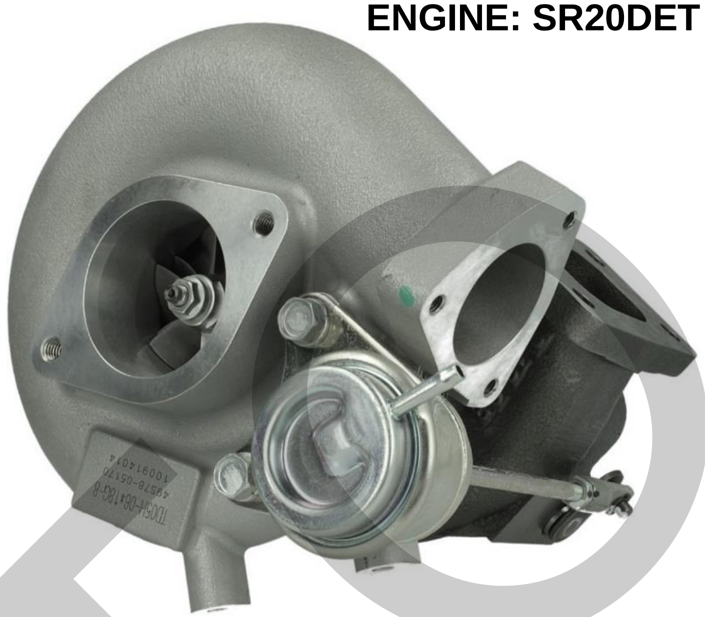
Note:
Off-Road Competition Use ONLY.

NISSAN SILVIA (S13/S14/S15)
ENGINE: SR20DET

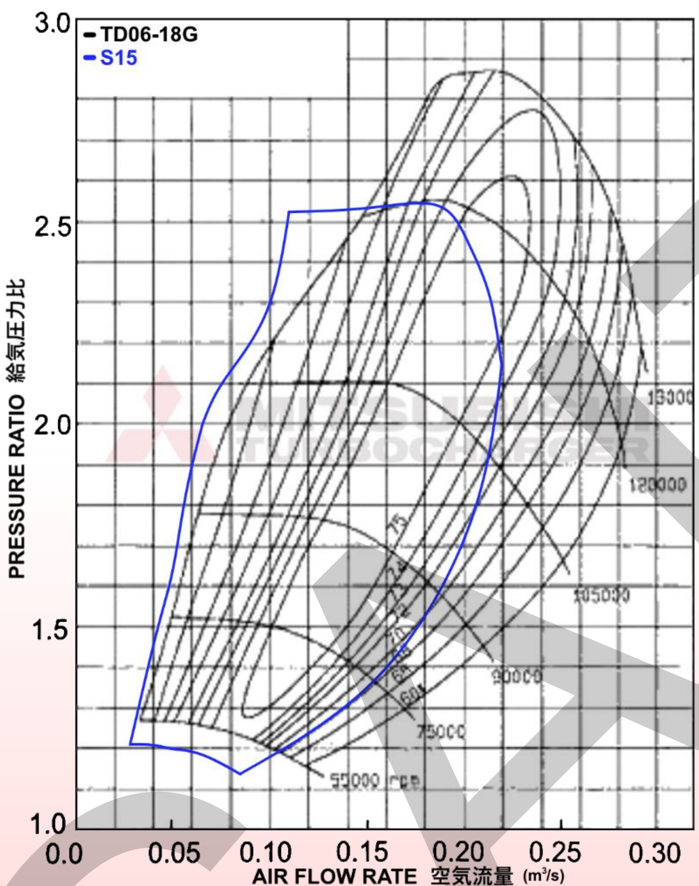
TD05H-06*18G

Features:
- Legendary 18G cast compressor wheel design
- Available in both 8cm^2 and 10cm^2 turbine housings

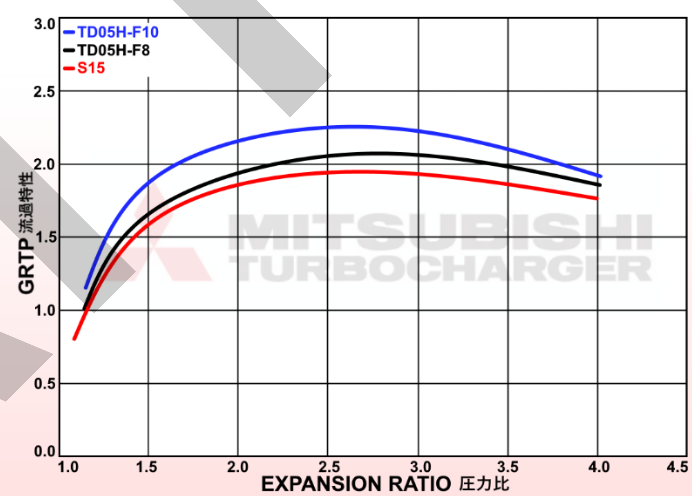
Peak Power Output:
- 470HP / 350KW



Click image to view more. Image provided by TurboZentrum.



COMPRESSOR MAP



TURBINE MAP

Part Number	Compressor Wheel			Turbine Wheel			Turbine Housing		
	Inducer (mm)	Exducer (mm)	Type	Inducer (mm)	Exducer (mm)	Material	Area (cm^2)	WG ⌀ (mm)	Material
49S78-05170	50.43	68	G	56	49.1	713C	8	30	HISI-DUC
49S78-05180	50.43	68	G	56	49.1	713C	10	30	HISI-DUC

Note:
Off-Road Competition Use ONLY.

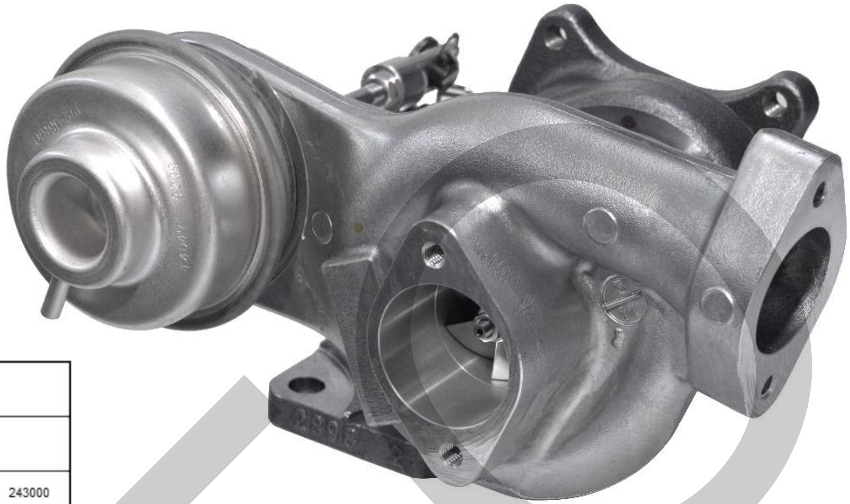
SUZUKI SWIFT
ENGINE: K14

MITSUBISHI TURBOCHARGER

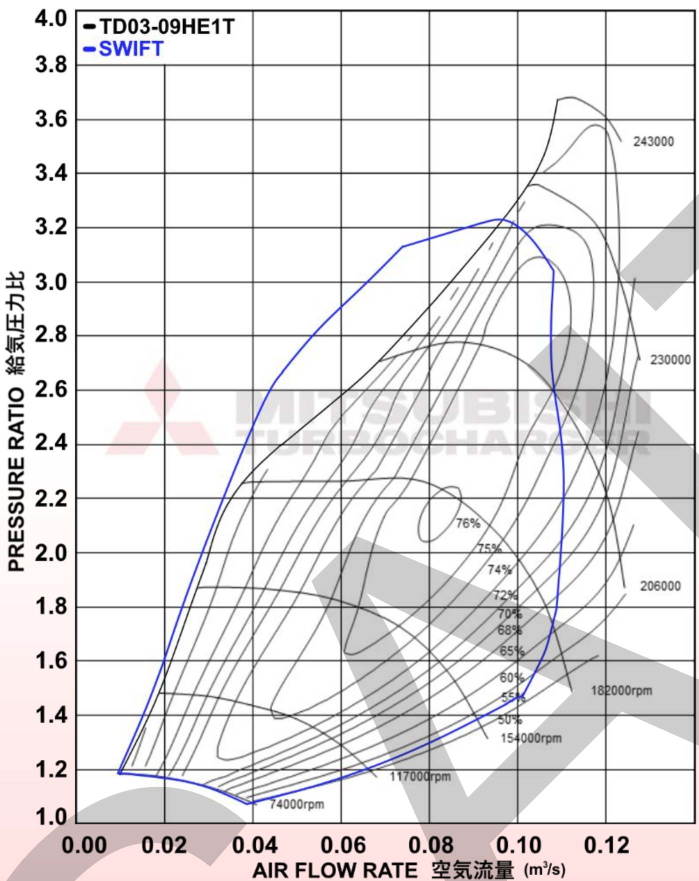
TD025LL1b-03*09HE1T-3.4

Features:
- Upgrade developed by OEM turbo supplier MHI
- HE1T cast compressor wheel

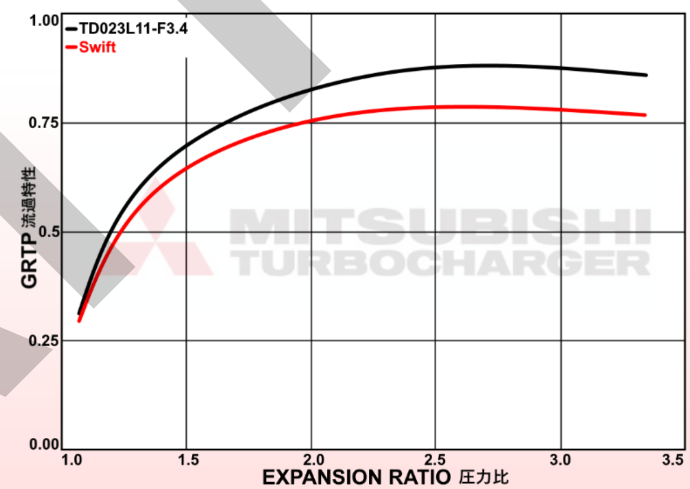
Peak Power Output:
- 200HP / 149KW



Click image to view more.



COMPRESSOR MAP



TURBINE MAP

Part Number	Compressor Wheel			Turbine Wheel			Turbine Housing		
	Inducer (mm)	Exducer (mm)	Type	Inducer (mm)	Exducer (mm)	Material	Area (cm^2)	WG ø (mm)	Material
49S73-A0000	34.6	44	HE1T	37	34	713C	3.4	22	D5S

Note:
Off-Road Competition Use ONLY.

HONDA S660
ENGINE: S07A

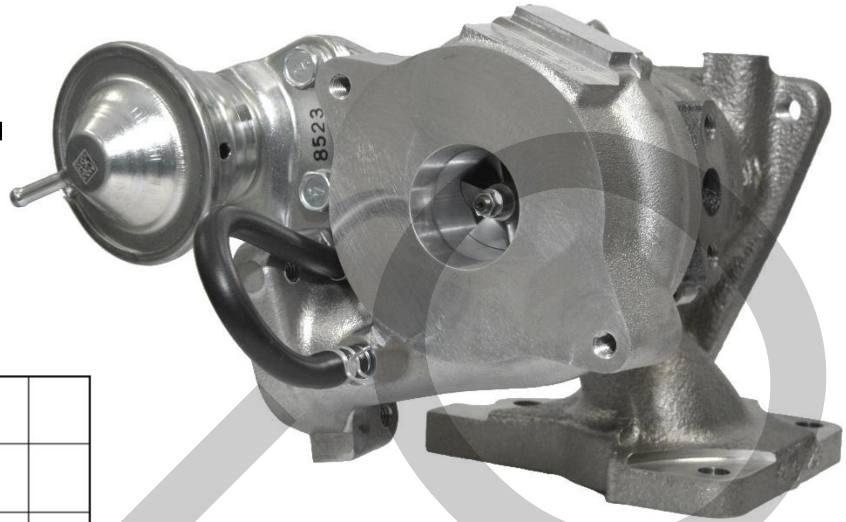
TD02L11-045WDS-1.8

Features:

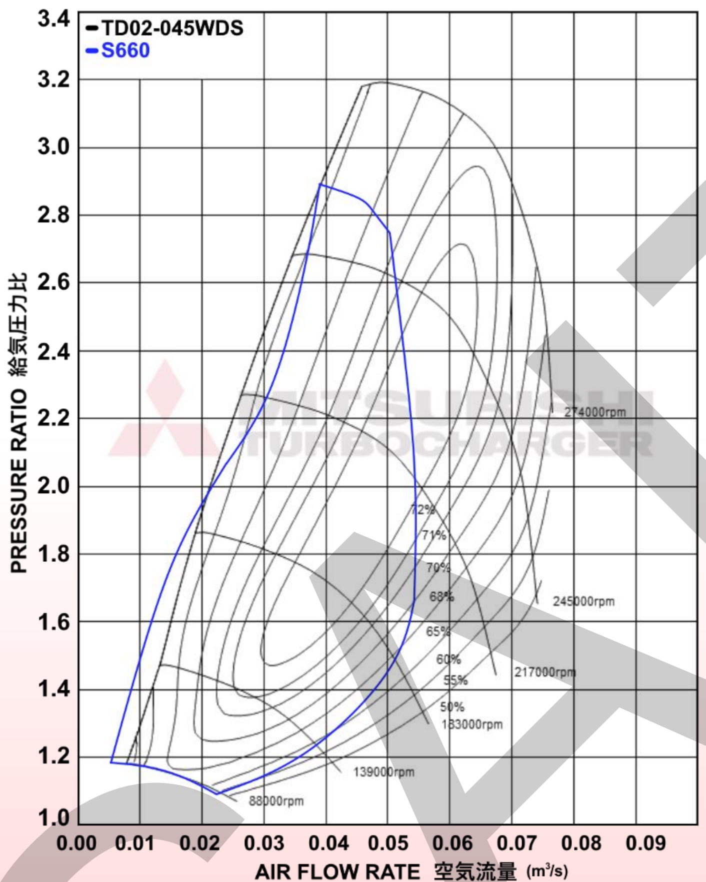
• Upgrade developed by OEM turbo supplier MHI
• 045WDS cast compressor wheel

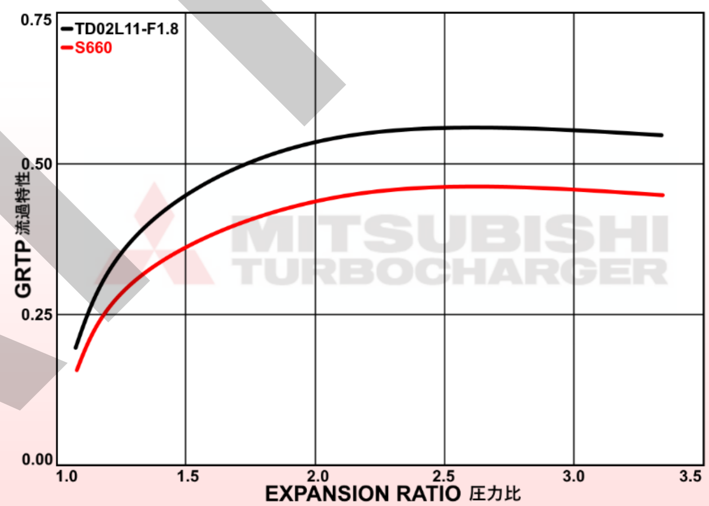
Peak Power Output:

• 120HP / 89KW



Click image to view more.





COMPRESSOR MAP **TURBINE MAP**

Part Number	Compressor Wheel			Turbine Wheel			Turbine Housing		
	Inducer (mm)	Exducer (mm)	Type	Inducer (mm)	Exducer (mm)	Material	Area (cm^2)	WG ø (mm)	Material
49S72-A0000	25.6	37	WDS	34	28.9	713C	1.8	14	F5N

Note:
Off-Road Competition Use ONLY.

MITSUBISHI TURBOCHARGER

Bolt-On Application Chart

Make	Model	Year	Trim	Engine	Part Number	Page #
BMW	125i	2012-2017	ALL	N20B20	49U77-A0000	16
	220i	2014-2016				
	228i	2014-2016				
	320i	2012-2018				
	328i	2011-2016				
	420i	2014-2016				
	428i	2013-2016				
	520i	2013-2016				
	528i	2012-2016				
	Z4 sDrive28i, 20i, 18i	2011-2016				
	X1 xDrive28i, 20i	2011-2017				
	X3 xDrive28i, 20i	2011-2017				
	X4 xDrive28i, 20i	2014-2018				
	X5 xDrive40e	2016-2018				
GM	Chevrolet Camaro	2016-2020	1LS, 1LT, 2LT	LTG	49S36-A0300	17
	Cadillac ATS[1]	2019	Base, Luxury			
	Cadillac CTS[1]	2019	Base, Luxury			
Honda	Civic	2017-2020	ALL	L15B7	49S31-A0100	18
	CR-V	2017-2020				
	S660	2015-2020		S07A	49S72-A0000	25
Mitsubishi	Lancer Evolution X	2007-2016	ALL	4B11	49S36-07000	14
	Lancer Evolution IX	2003-2007		4G63	49S36-A0200	15
	Lancer Evolution IV, V, VI, VII, VIII[2]	1998-2003				
Nissan	Silvia	1994-2002	ALL	SR20DET	49S78-05170, 49S78-05180	23
	Skyline GT-R	1989-2002	ALL	RB26DETT	49S78-05190, 49S78-05300	22
Subaru[3]	Impreza WRX STI, WRX STI	2004-2020	ALL	EJ257	49S78-05400, 49S78-A0000, 49S36-A0000, 49S36-B0000	19, 20, 21
	Impreza WRX	2002-2005		EJ205		
	Impreza WRX	2006-2008		EJ255		
	Impreza WRX STI	1993-2002		EJ20/EJ22		
	Impreza WRX	1993-2000		EJ20		
Suzuki	Swift	2017-2020	Sport	K14C	49S73-A0000	24

1 - May require alternative oil and coolant lines. Not Included.

2 - Requires OEM Evo IX compressor outlet and inlet pipe and coolant lines. Not Included.

3 - All Subaru turbochargers are for single scroll turbine type EJ engines.