

Turbo Chargers

Positive Pressure Requirement

TURBO ENERGY LIMITED

Company Overview:

- ✓ Turbo Energy Limited (TEL) incorporated in 1982.
- ✓ Turbo Energy Limited (TEL) is a technical & financial joint venture company between BorgWarner Turbo Systems (formerly KKK – Germany) Brakes India and Sundaram Finance.
- ✓ TEL manufacturing plants are located at Pulivalam village in vellore district, and at Paiyanoor (near Mahabalipuram), Tamilnadu.
- ✓ TEL manufactures turbocharger range from KP 35 to K 37 (from 60 hp to 400 hp)
- ✓ TEL exports turbochargers and turbocharger components to BorgWarner Turbo Systems GmbH.
- ✓ TEL is a TS 16949 : 2000 certified company.

TEL / BorgWarner Customers

- ✓ Ashok Leyland Ltd
- ✓ Bharat Earth Movers
- ✓ Eicher Volvo Motors Ltd
- ✓ Escorts JCB
- ✓ Fiat India Automobiles Ltd
- ✓ Ford India Ltd
- ✓ Force Motors Ltd
- ✓ General Motors India
- ✓ Greaves Cotton Limited
- ✓ International Cars & Motors Ltd
- ✓ Simpson & Co.
- ✓ SML Isuzu Ltd (Swaraj Mazda)
- ✓ TATA Motors Ltd
- ✓ Renault Nissan Automotive Ltd
- ✓ Volvo
- ✓ Volkswagen India
- ✓ Audi India
- ✓ Skoda India
- ✓ Hindustan Motors
- ✓ Kirloskar Oil Engines Ltd
- ✓ Mahindra & Mahindra
- ✓ Mahindra Navistar
- ✓ Premier Automobiles Ltd
- ✓ Maruti Suzuki

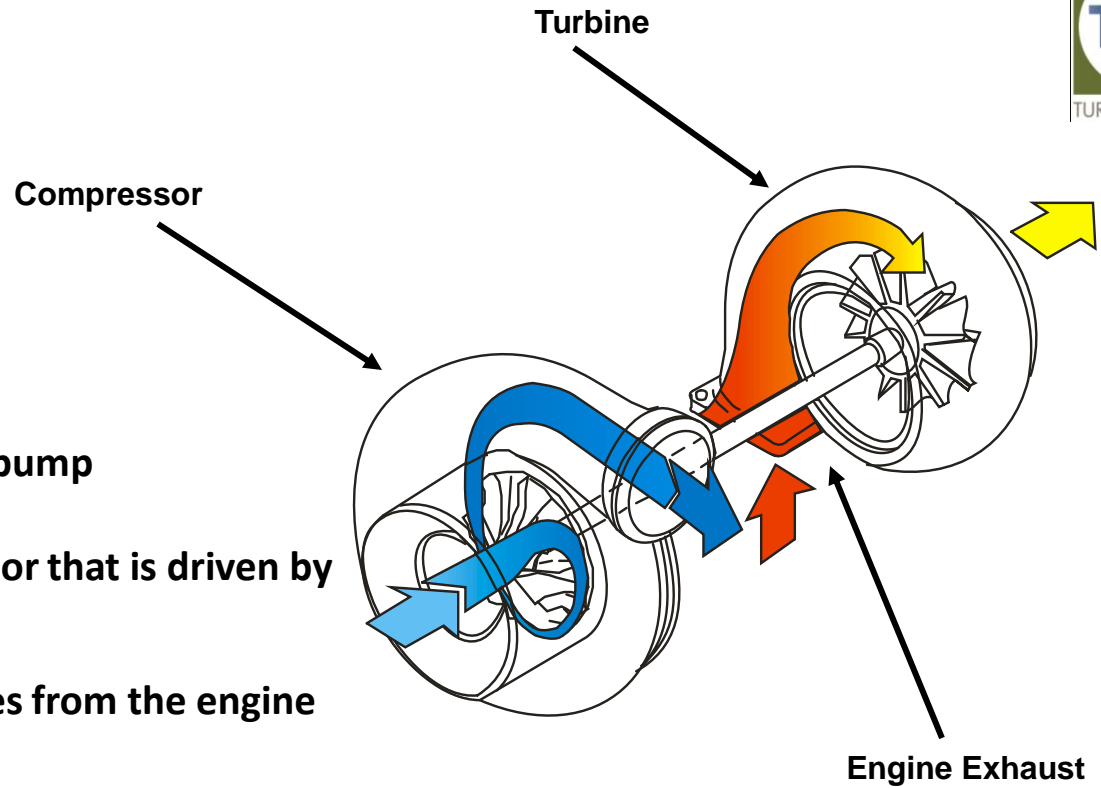


Company Overview:

- ✓ Service Centre for TEL turbochargers since 2003
- ✓ ISO 9001:2000 certified by TUV SUD, South Asia for all service centers
- ✓ Experience of servicing more than 10,000 turbochargers till date.
- ✓ Full fledged Service centers' in Palakkad , Kozhikode & Kochi
- ✓ Collection centers in Kannur and Trivandrum

Turbochargers

Working Principle & Positive Pressure Requirement



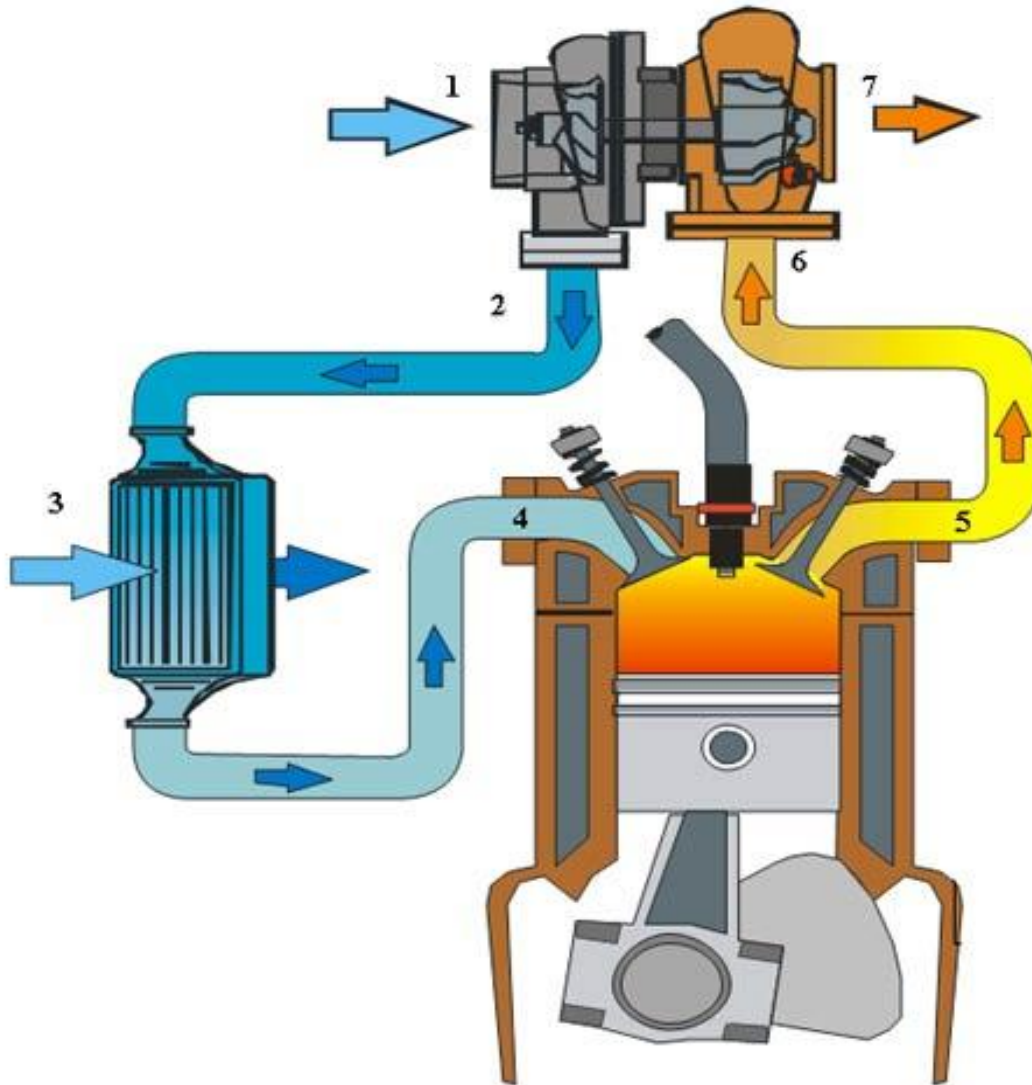
The Turbocharger is an air pump

- ✓ It consists of a compressor that is driven by a turbine.
- ✓ The turbine power comes from the engine exhaust

Principle of Exhaust Gas Turbocharger :

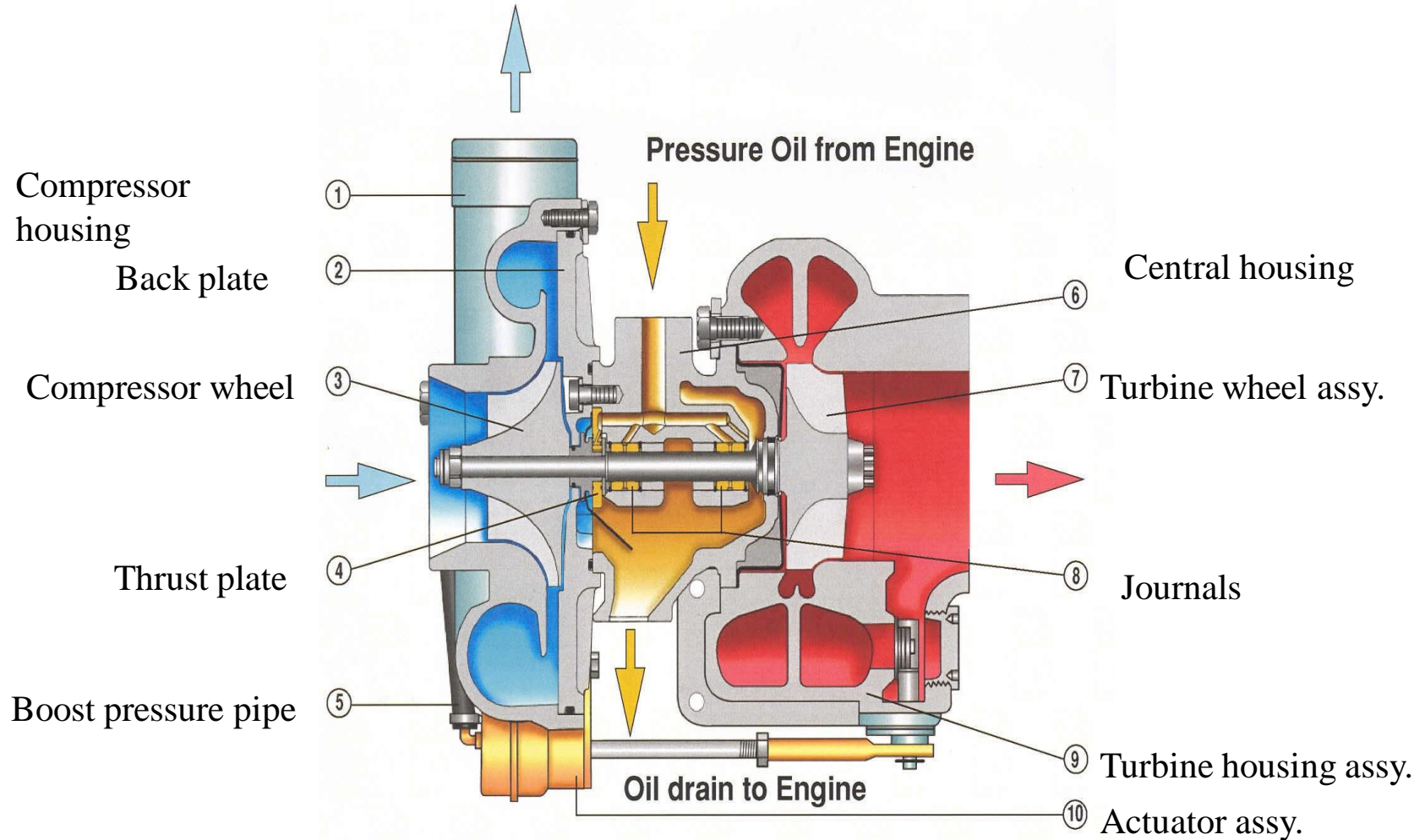
In exhaust gas Turbocharging, part of exhaust gas energy, which would normally be wasted is used to drive a turbine. The turbine shaft is connected to a compressor, which draws in combustion air, compresses it, and then supplies it to the engine. The increased air supply enables more fuel to be burnt, hence the engine develops higher power. Increased air availability improves combustion of fuel, thus leading to lower fuel consumption and less emission.

Turbocharger Working Principle



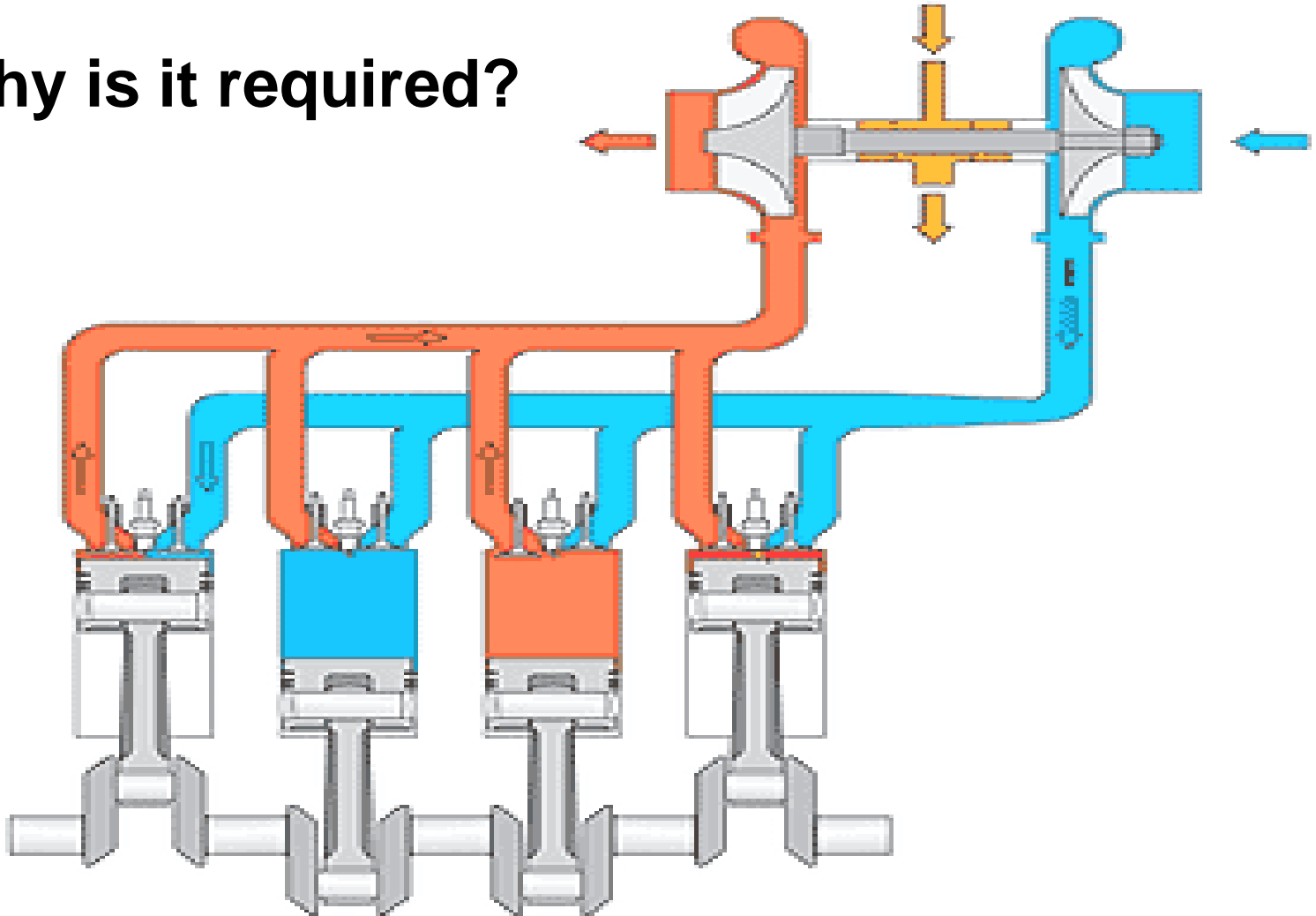
- 1) Compressor Inlet
- 2) Compressor Discharge
- 3) Charge air cooler (CAC)
- 4) Intake Valve
- 5) Exhaust Valve
- 6) Turbine Inlet
- 7) Turbine Discharge

Major Parts of Turbochargers :



Positive Pressure –

Why is it required?



Results of Positive Pressure Loss

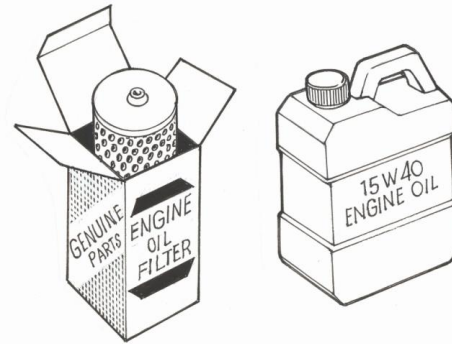
- Leaks from compressor side
- Smoke through engine breather pipe
- Loss of power
- High engine oil consumption
- Damage to turbocharger

NEEDS OF A TURBOCHARGER

Turbocharger components are made from special materials, processes and are precision built to work under extreme operating conditions.

However a turbocharger needs

- ❑ ADEQUATE CLEAN ENGINE OIL



- ❑ CLEAN AIR



for it's proper performance and extended life.

Why does a Turbocharger need them?

Why a Turbocharger needs them

- The clearances between the rotor and the journal are extremely small and the parts are machined to very close tolerances.
- Turbocharger rotor-assembly rotates at extremely high speeds.
- Turbocharger uses fully floating journals and will rotate at less than half the speed of the rotor.
- The turbocharger components are balanced to very fine balancing limits.
- The air / gas entering the compressor and turbine housing travels at very high speeds.
- Adequate clean oil supply to the journals is a must to stabilize, lubricate and cool.
- Oil supply to the turbocharger immediately after the start of the engine and minimum oil pressure during it's operation, ensures proper functioning of the journals.
- Oil contaminated with dirt or foreign material will wear the journals and journal seating area of the shaft.
- Dirt in the oil blocks the oil holes in the journals and central housing leading to oil starvation to the turbocharger.
- Dust, sand or any foreign particle entering into the turbocharger compressor housing will damage the aluminum compressor wheel blades, thus leading to turbocharger failure.

Service Recommendations for Turbocharger maintenance

- ✓ Check the engine breather system and oil separator. Blocked breather will restrict the free flow of oil from turbocharger. This will result in seepage of oil from the turbocharger into the air intake as well as exhaust system.
- ✓ Fill the oil inlet hole of the turbocharger with clean engine oil, when the engine is started after long storage. After the oil change, prime (dead crank) the engine before starting and before starting the engine in during cold ambient conditions.
- ✓ The turbocharger is designed such that it will usually last as long as the engine. It does not require any special maintenance.
- ✓ Checks have to be made on oil feed pipes, return pipes, air intake and exhaust piping for leakages & restriction. The connections & joints should be checked to ensure that they are still tight and no damage has occurred.
- ✓ Turbocharger and boost pressure control valve do not require any special maintenance. However check the boost pressure pipe for its proper fitment, damage, wither etc.



Do not open the turbocharger yourself

✓ **Contact PARAMOUNT AUTOZONE for Quality Service**

If the TC engine does not work as it should, check the engine first as you check for a naturally aspirate engine before suspecting the TC. After checking other parameters check the TC visually.

PREMATURE TURBOCHARGER FAILURES CAN BE AVOIDED BY INSTALLING IT CORRECTLY FIRST TIME, EVERY TIME.

Service Recommendations

- ❑ The turbocharger has to be serviced using overhaul kit and other parts at suitable intervals before any damage that can occur by rubbing of either the compressor or turbine wheel with the housings.
- ❑ This interval depends on proper maintenance of the engine as well as the nature of duty and the severity to which the engine is subjected. Recommendations regarding this will have to be given by the engine manufacturers.

Servicing turbocharger is a task for trained specialists and should only be done in TEL authorized service center.

Service Centers:

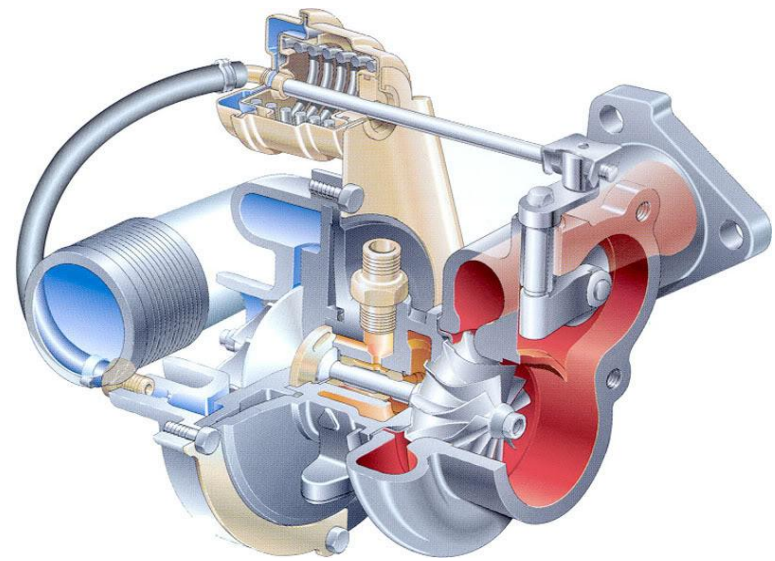
Palakkad
17/550(9),KTV Tower,
West Fort Road, Palakkad – 678 001
Phone : 0491 – 3260808, 3208000

Kochi
40/618, Bhagavathy Parambil Building,
Near Federal Bank, Palarivattom, Kochi – 682 025
Phone : 0848 -3114333

Kozhikode
3/165-A,Nano Building,
Major Santhosh Road, Behind Co-Op Urban Bank,
Vandipetta, West Nadakkavu, Kozhikode – 673 011
Phone : 0495 3104333

Service Helpline : +91 491 3208000
Technical Assistance : +91 93491 27136

Website : www.paramountautozone.com
www.paramountgrp.net



Collection Centers:

Kannur
EP III/178, EVES Arcade,
Opposite Technical High School, Thottada,
Kannur – 670 007
Phone : 0497 – 3268785

Thiruvananthapuram
TC 36/1090(9), Narayan Nilayam,
Eanchakkal Junction, Vallakadavu P.O.,
Thiruvananthapuram – 695 008
Phone : 0471 – 3198785



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