In servicing the inlet and exhaust system, use the following tools.

Special Tool Name	Part No.	Use
Socket	MH061242	For exhaust manifold attaching nuts
General tools and measuring tools Snap ring expander Plastic hammer Torque wrench Chisel Dial gauge Micrometer Thickness gauge		For overhaul of turbocharger

8-1 INLET MANIFOLD

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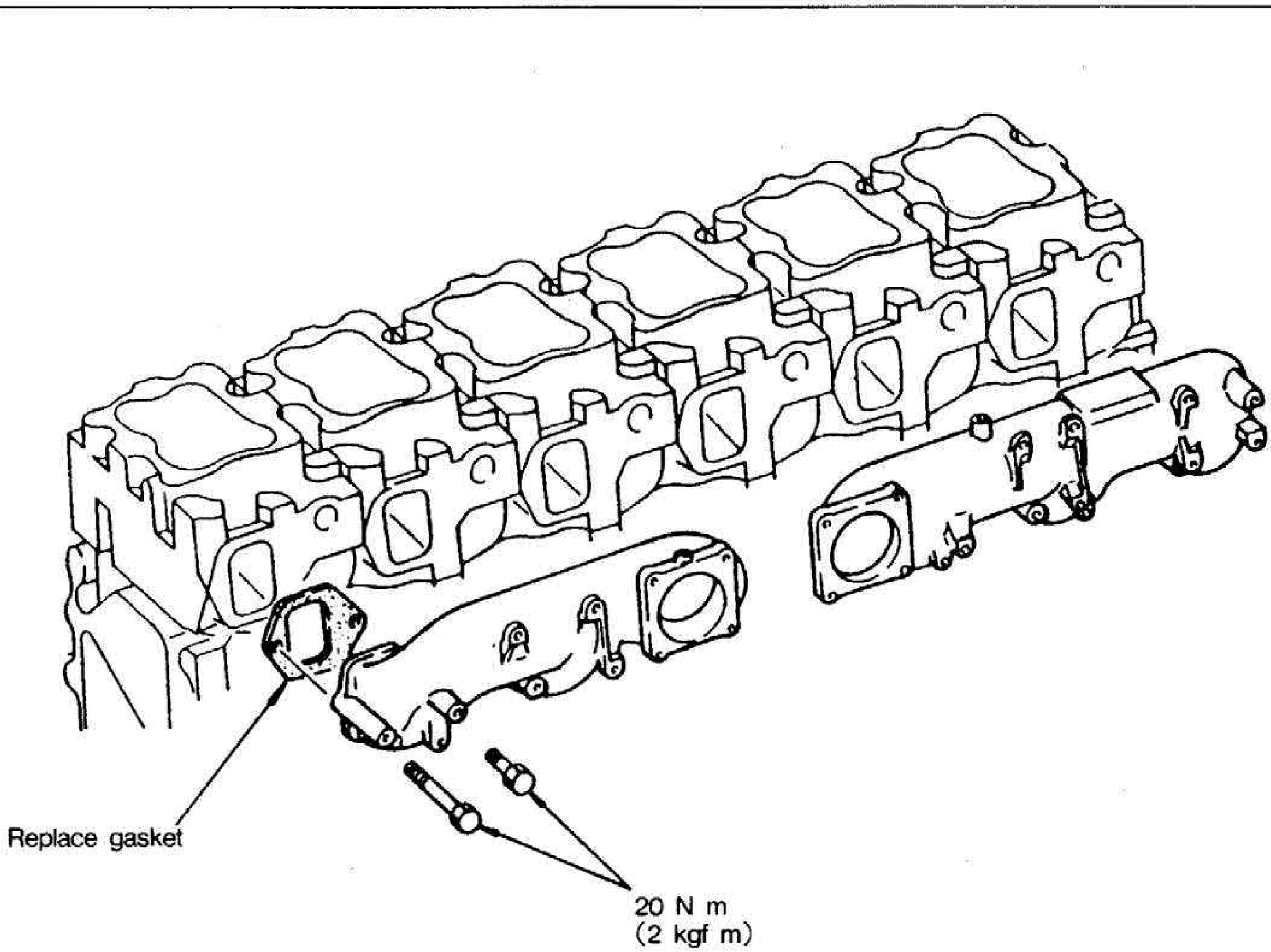
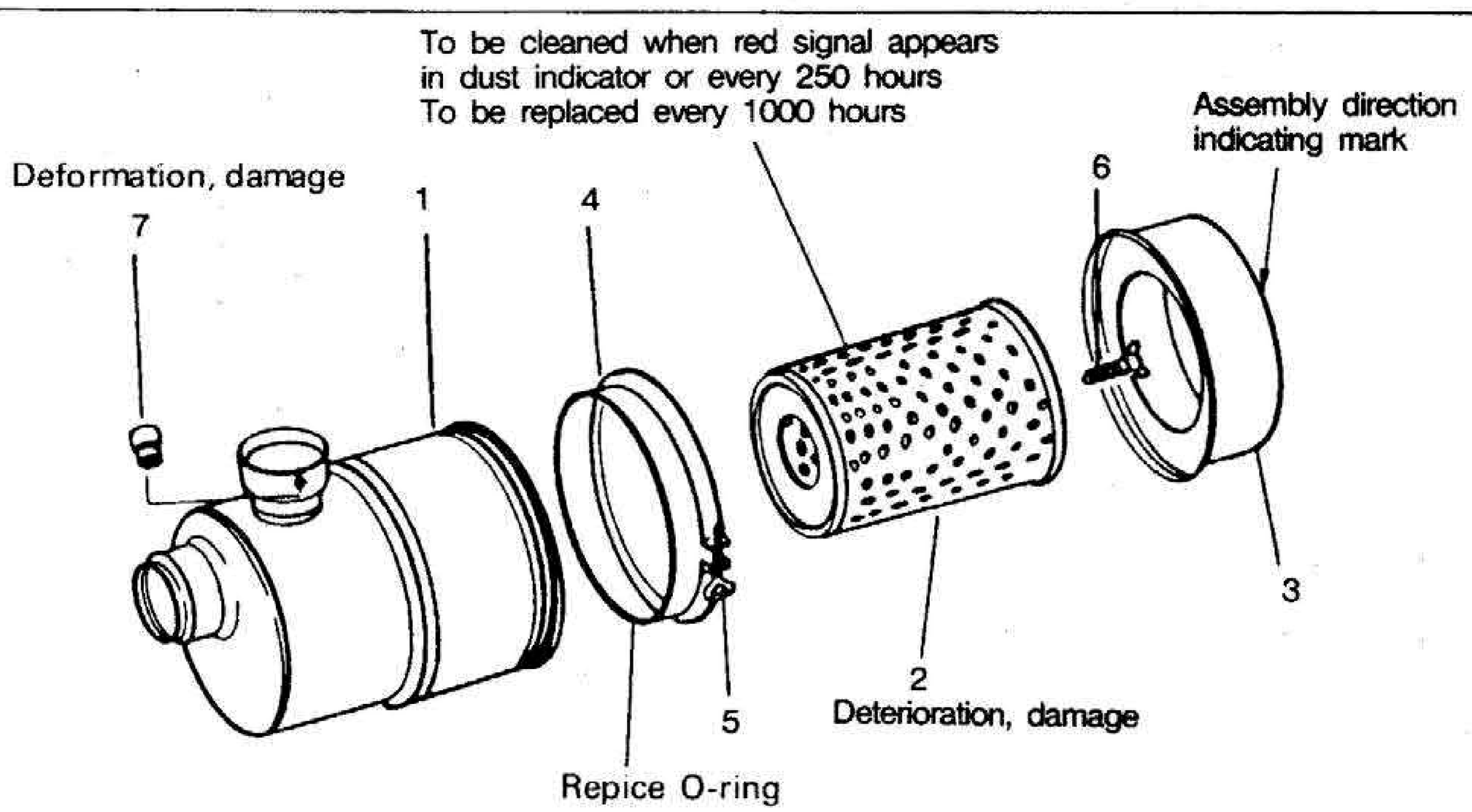


8-2 AIR CLEANER

8-2-1 Disassembly and Reassembly

(1) Single Element Type



1 Air cleaner body
2 Element
3 Dust cap
4 O-ring
5 Clamp
6 Wing screw
7 Dust indicator

8-2-2 Inspection and Cleaning

(1) Dry Dust

If there is dry dust on the element, clean the dust by blowing 685kPa(7 kgf/m^2) or lower compressed air against the element.

Blow the compressed air from inside the element up and down along the frills of the filter paper and clean the whole element evenly.

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NOTE : Do not strike the element or strike it against a hard object to loosen the dust.

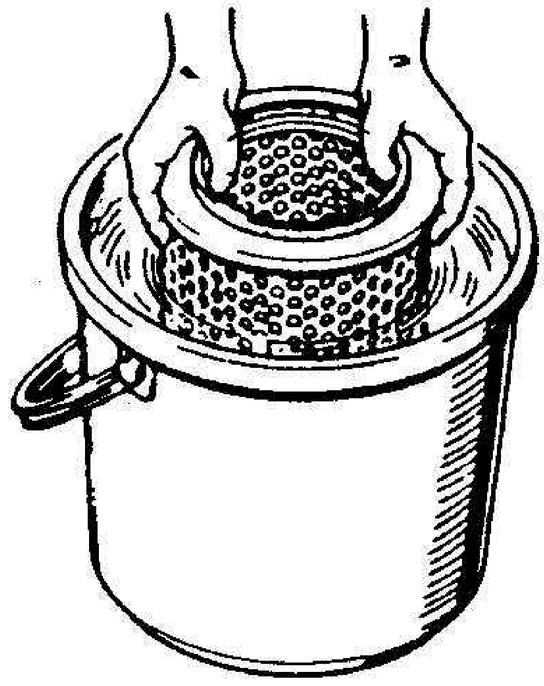
(2) Moist Dust

If the element has dust moistened with oil smoke or soot, wash the element, using the element cleaner ND-1500

Add 15 g of the cleaner per liter of approx. 40℃ hot water, stir, immerse the element for about 30 minutes, and wash.

After the element has been washed, rinse it in water(275 kPa or 2.8kgf/m^2) or lower water pressure) and let it dry in a well-ventilated place.

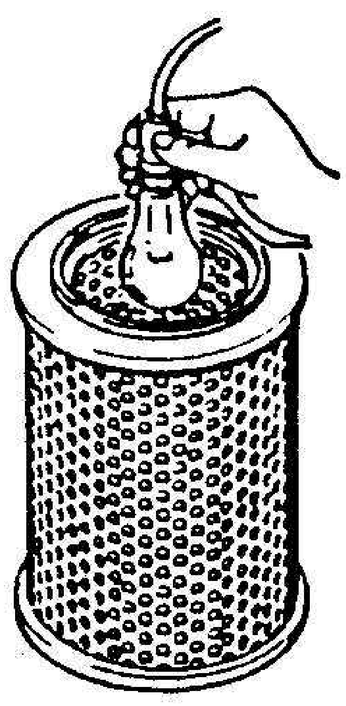
An element washed four times should be replaced regardless of the time in service.



NOTE : When the element has to be quickly dried, an electric fan, etc. may be used, but do not use compressed air or fire.

(3) Inspection of Element

After the element has been cleaned, put an electric lamp inside the element to check for damage and pin holes. If there are thin portions in the filter paper, replace the element. If the packing on the top surface of the element is broken, replace the packing.



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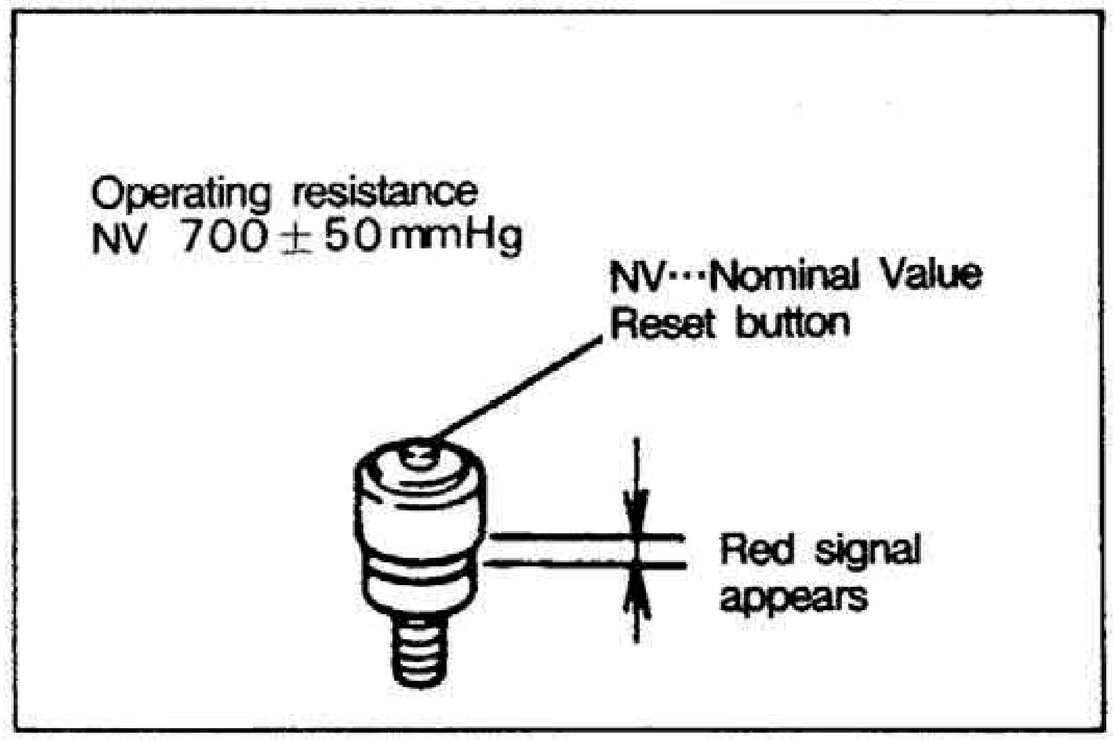
8-2-3 Inspection of Dust Indicator

Start the engine and slowly close the suction port of the air cleaner to increase the nagative pressure. If the red signal appears in the dust indicator, the dust indicator is good.

The simplest checking method is to put the suction port in your mouth and draw a breath. If the red signal appears at this time, then the dust indicator is good.



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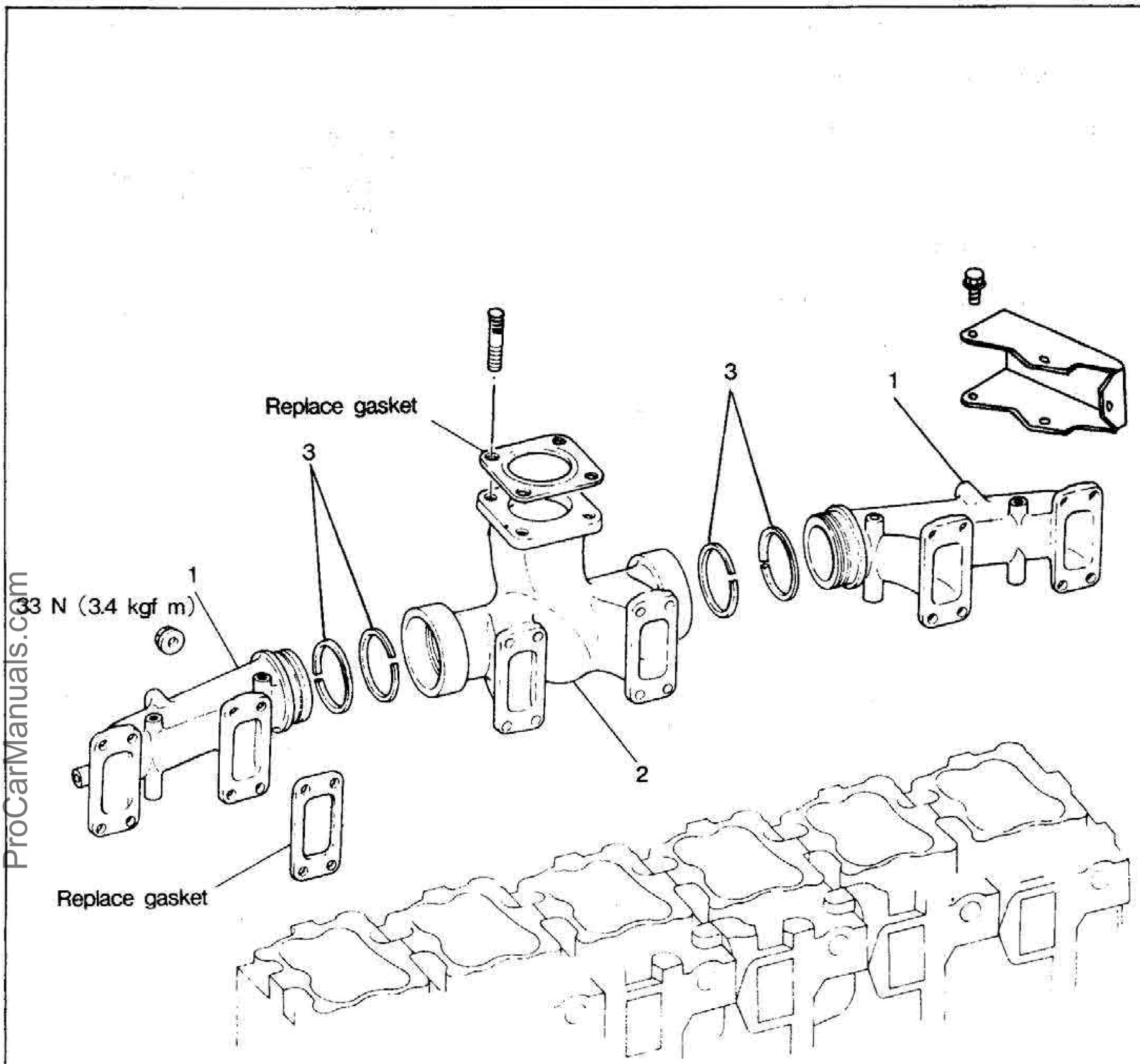
8-3 EXHAUST MANIFOLD



1 Exhaust manifold
2 Center exhaust manifold
3 Exhaust manifold ring

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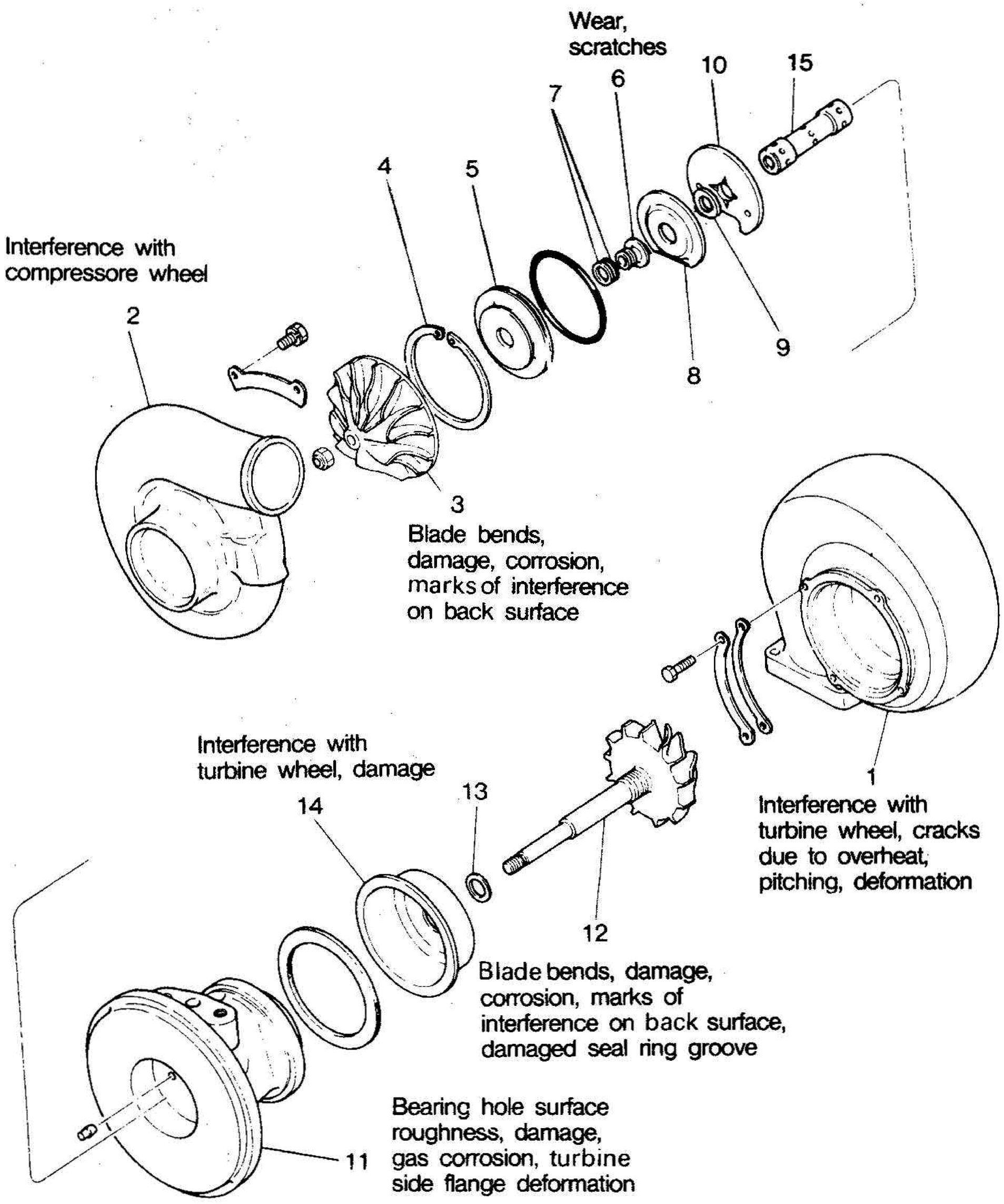
8-4 TURBOCHARGER

8-4-1 Disassembly



1 Turbine housing
2 Compressor cover
3 Compressor wheel
4 Snap ring
5 Insert
6 Thrust sleeve
7 Piston ring
8 Oil deflector
9 Thrust ring
10 Thrust bearing
11 Bearing housing
12 Turbine wheel shaft
13 Piston ring
14 Turbine backing plate
15 Bearing

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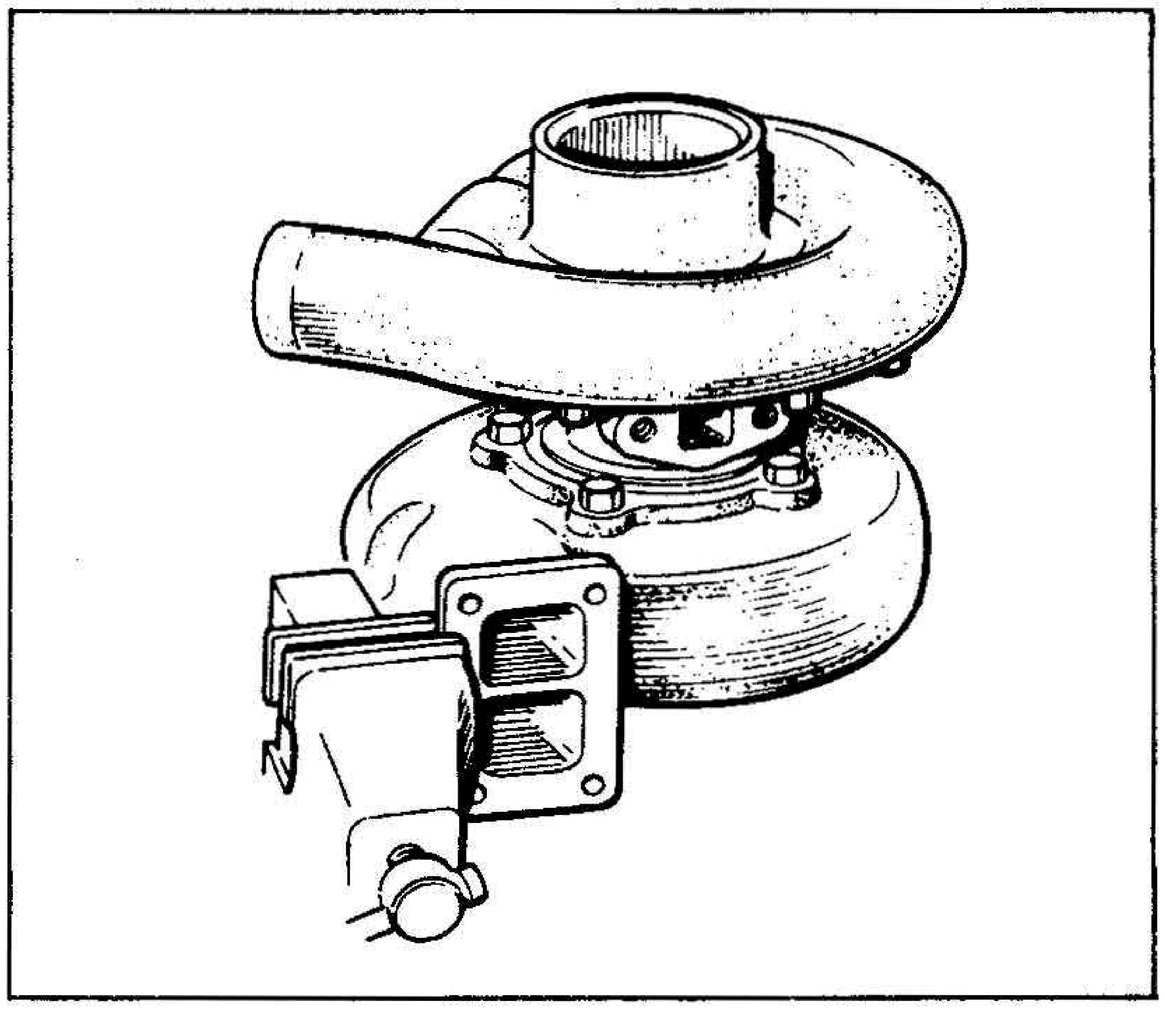
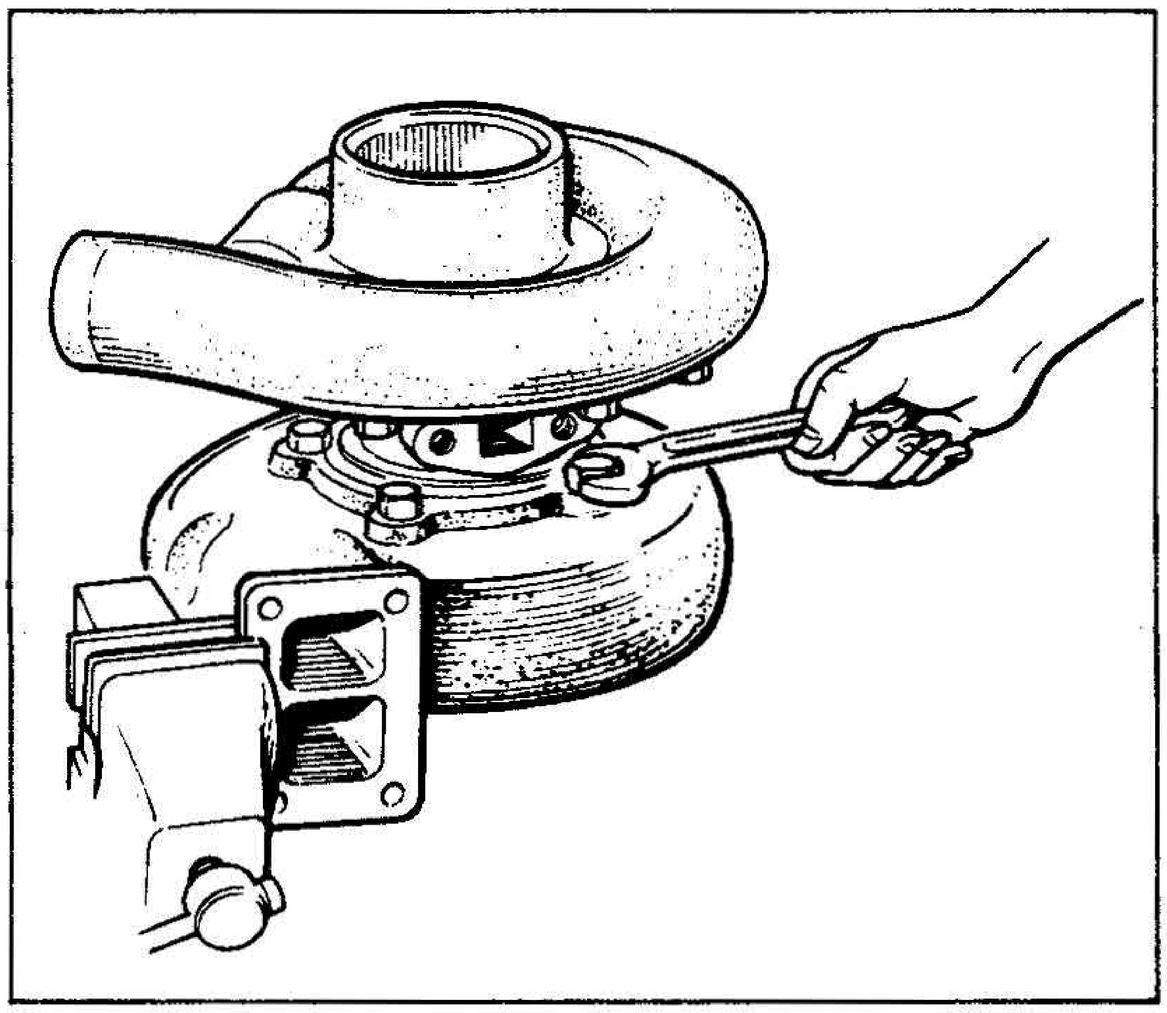
(1) Hold the flange portion of the turbine housing in a vice.

NOTE : Make sure to put alignment marks on the compressor cover, bearing housing and turbine housing for correct positional relationships at reassembly.

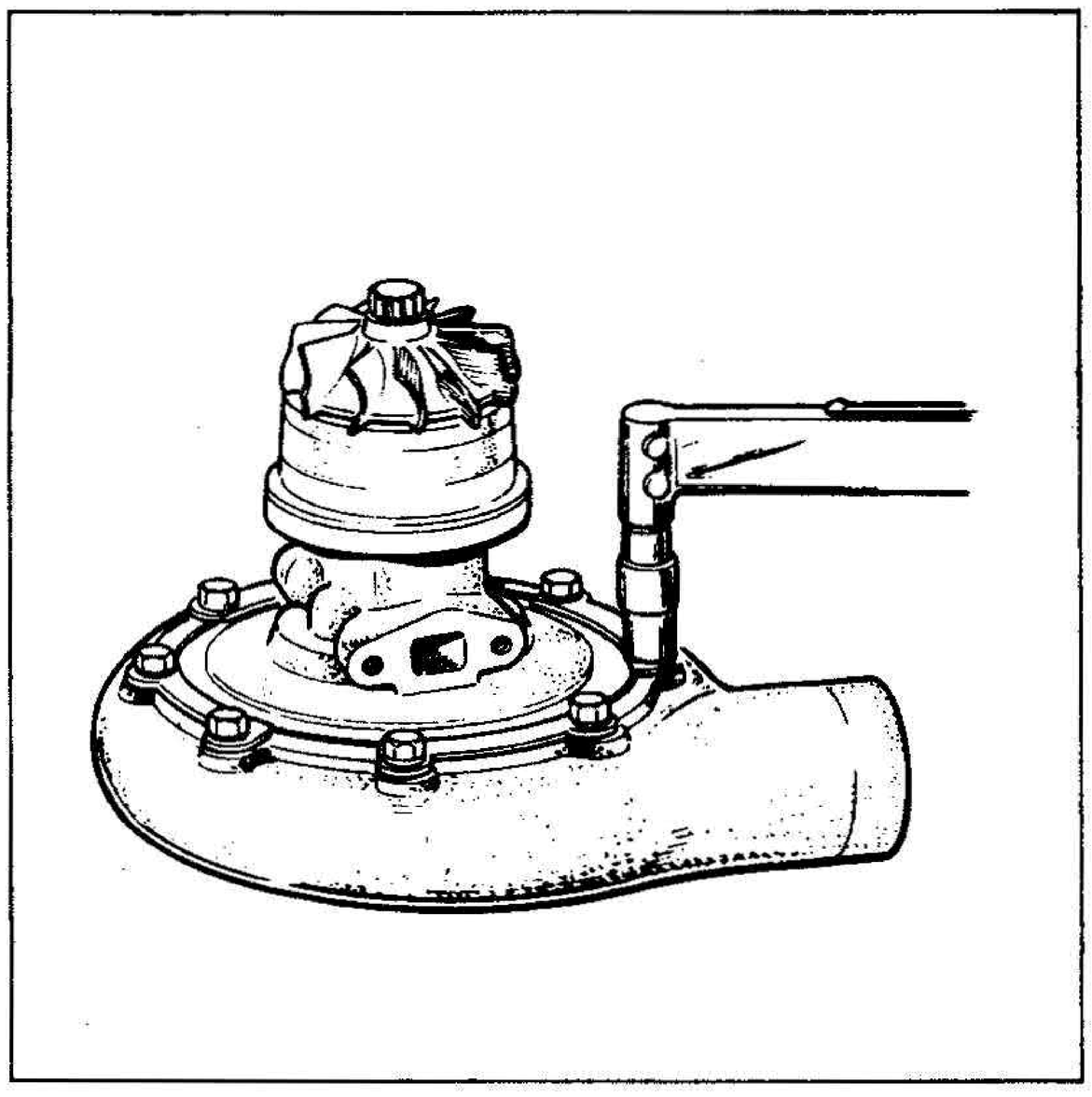


(2) Remove the turbine housing 1.

NOTE : Do not drop and strike the compressor wheel and turbine wheel, as their blades are readily bent.



(3) Remove the compressor cover 2.



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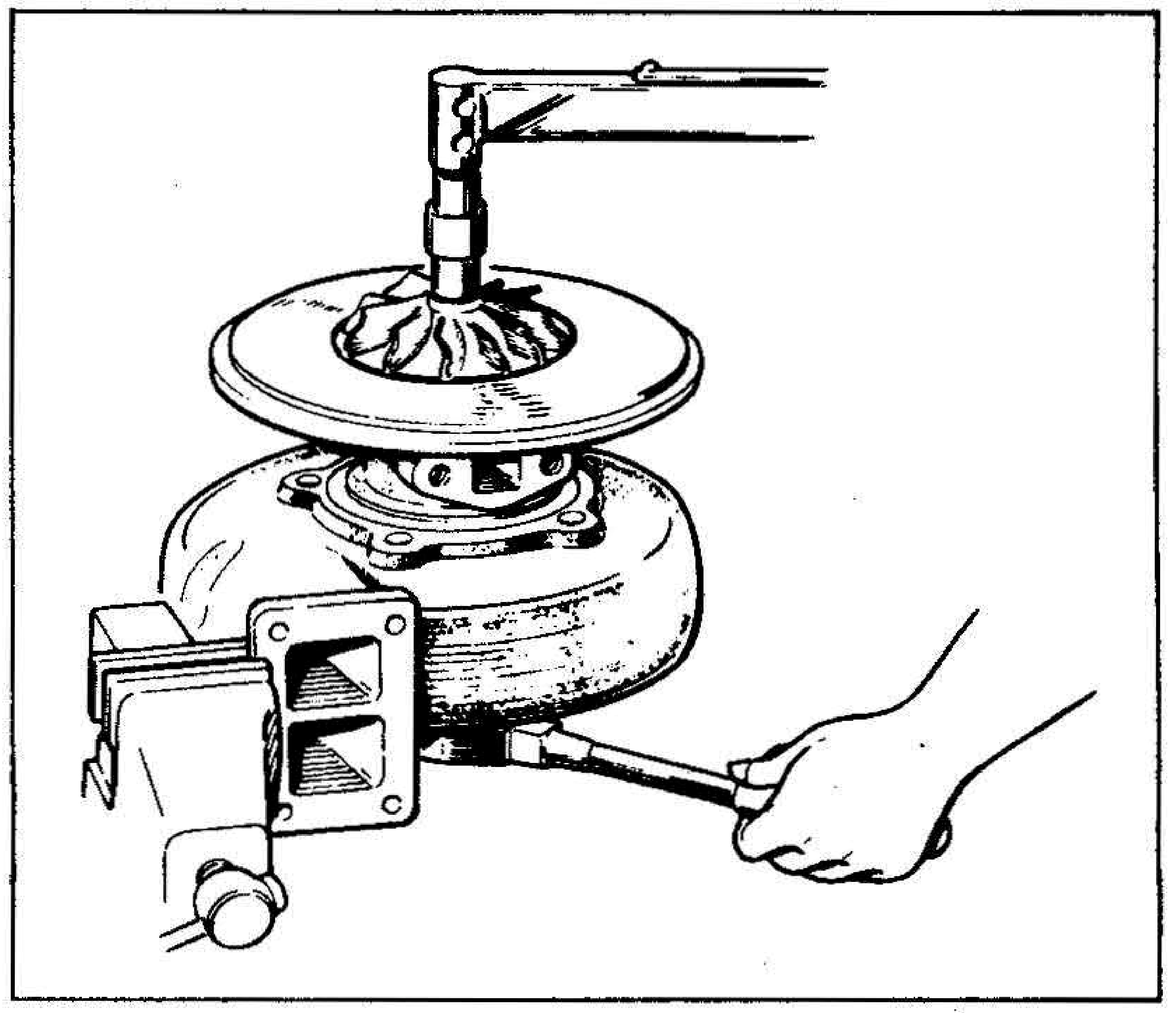
(4) Fit the core assembly detached from the compressor cover in the turbine housing. Hold the turbine housing end of the turbine wheel shaft to prevevt its rotation and remove the following parts.

3 Compressor wheel

4 Snap ring

NOTE : If the compressor wheel has bent blades, do not attempt correcting the bend but replace parts.



(5) Remove the following parts.

5 Insert

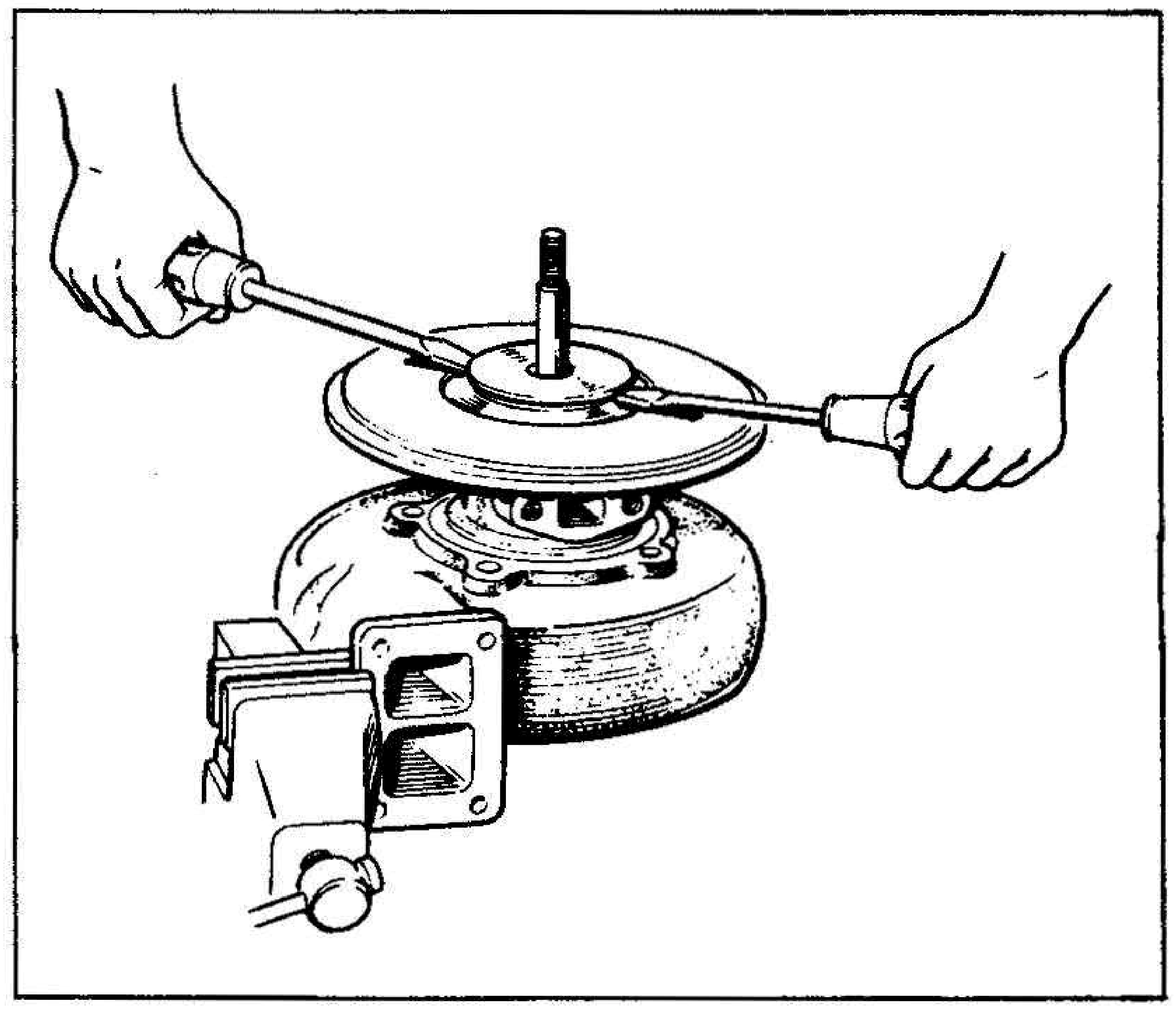
6 Thrust sleeve

7 Piston ring

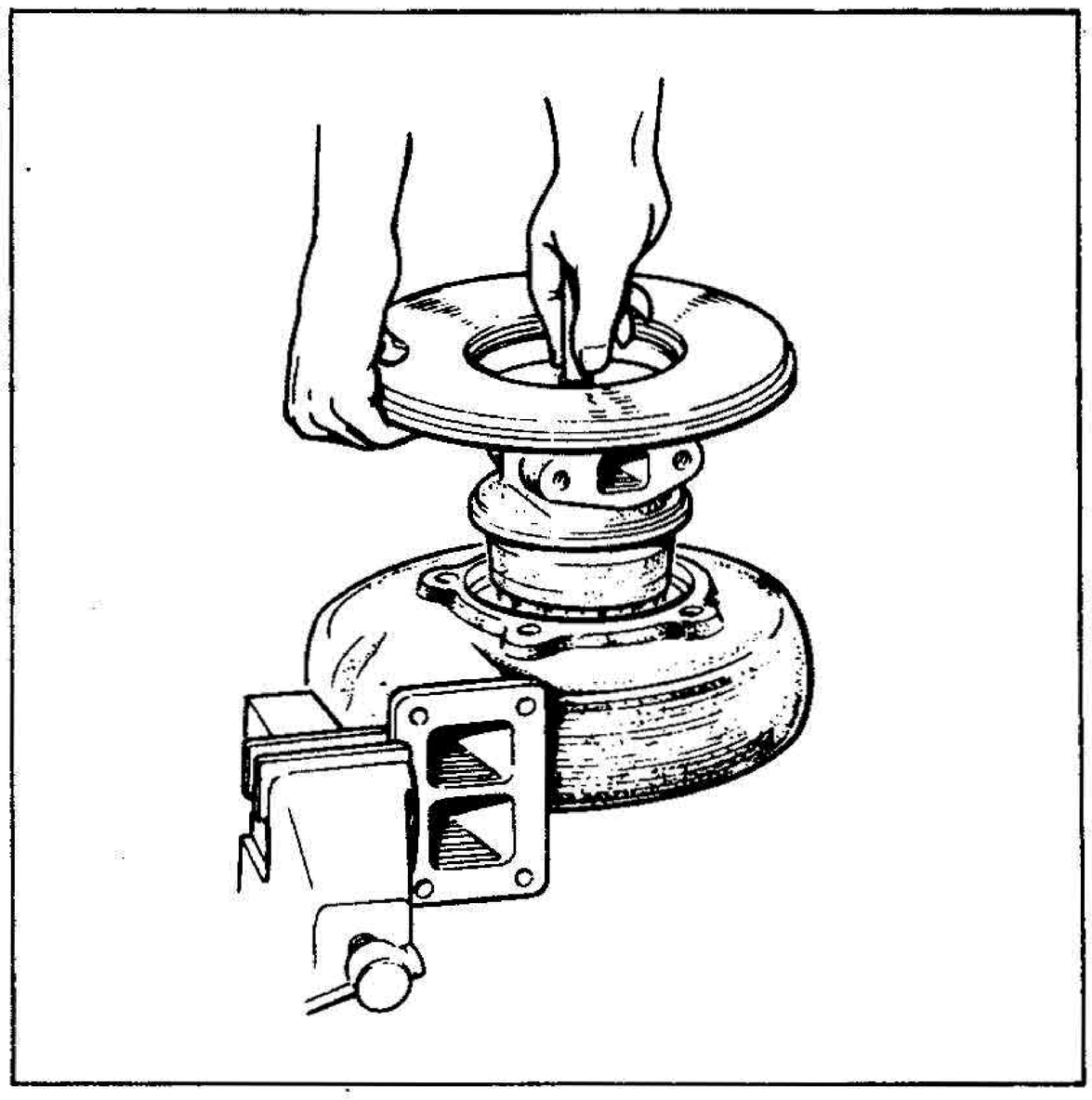
8 Oil deflector

9 Thrust ring

10 Thrust bearing



(6) Remove the bearing housing 11 from the turbine housing.



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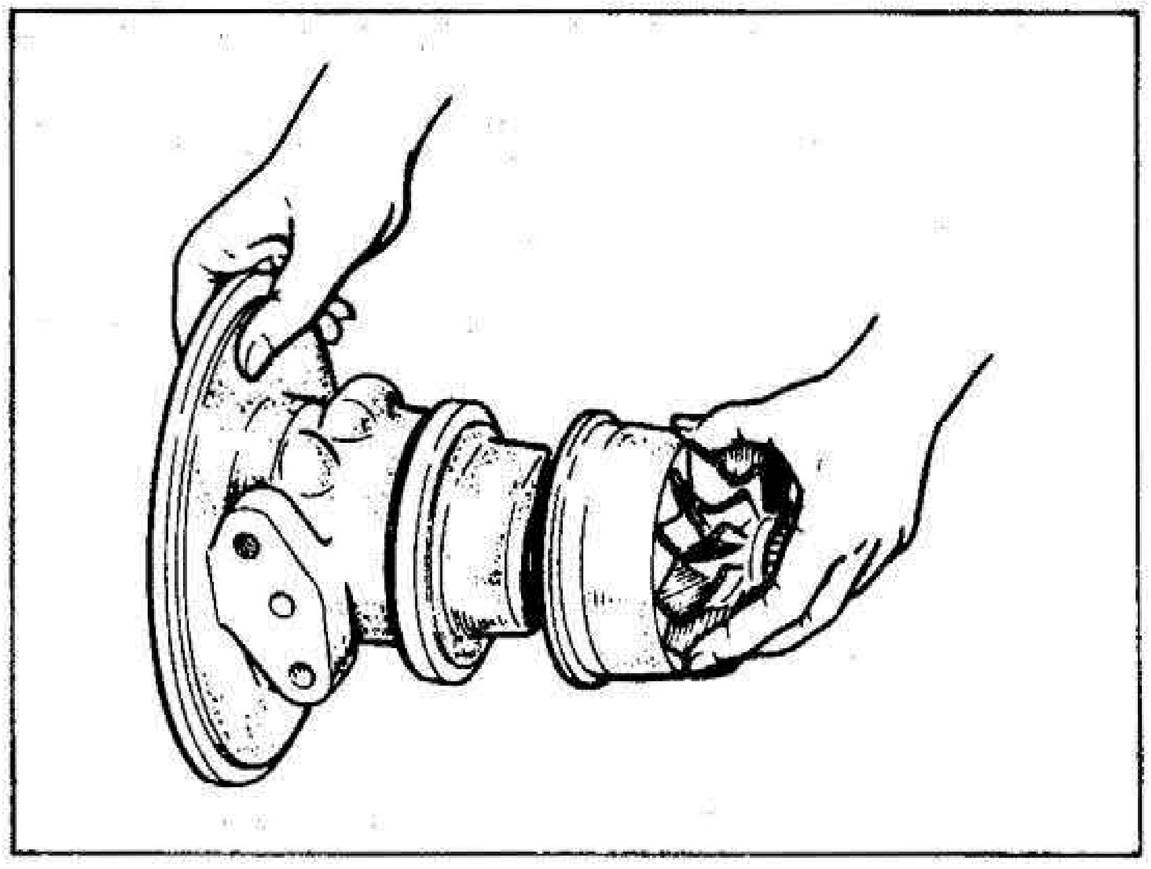
(7) Remove the following parts.

12 Turbine wheel shaft

13 Piston ring

14 Turbine backing plate

15 Bearing



NOTE : 1. There are two pins driven into the turbine housing. Do not remove the pins.

2. Do not attempt correcting bent blades but replace them.

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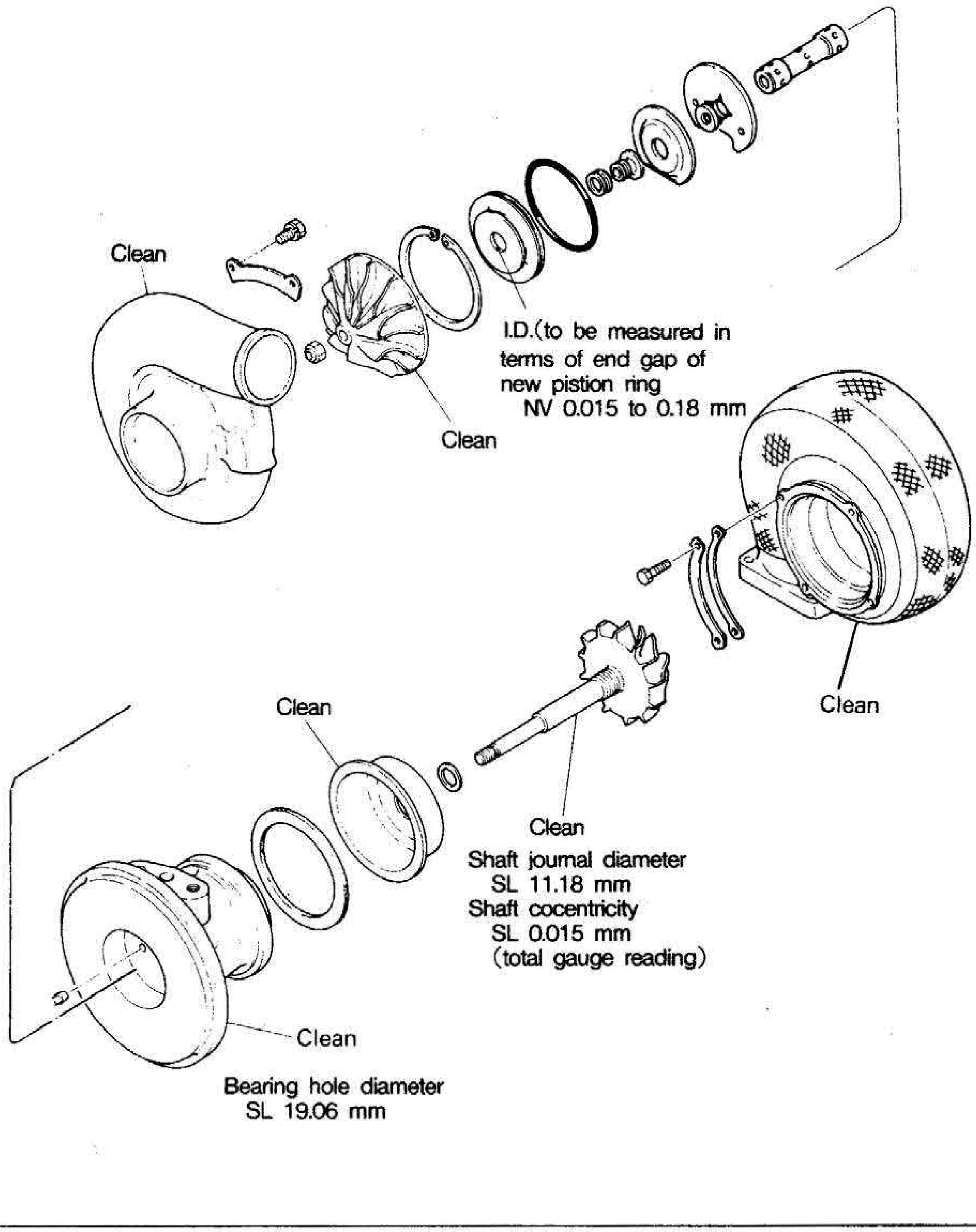
8-4-2 Cleaning and Inspection

NV···Nominal Value
SL···Service Limit



NOTE: The parts may be cleaned by use of a blast equipment or any other effective methods, but a non-corrosive neutral detergent should be used.

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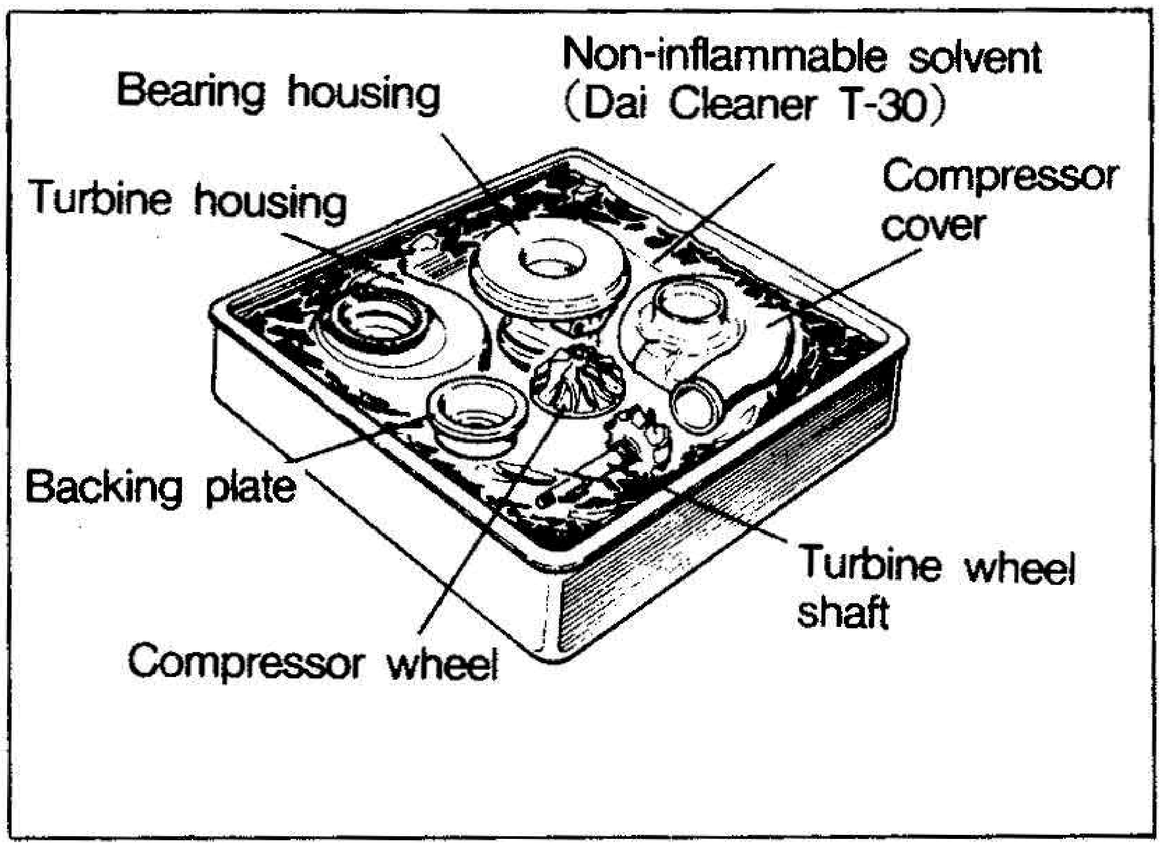
(1) Cleaning

Turbocharger manufacturers use a blasting equipment for cleaning parts at their workshops. As an alternative effective method for overhaul at the dealer's workshop, use the following procedures.

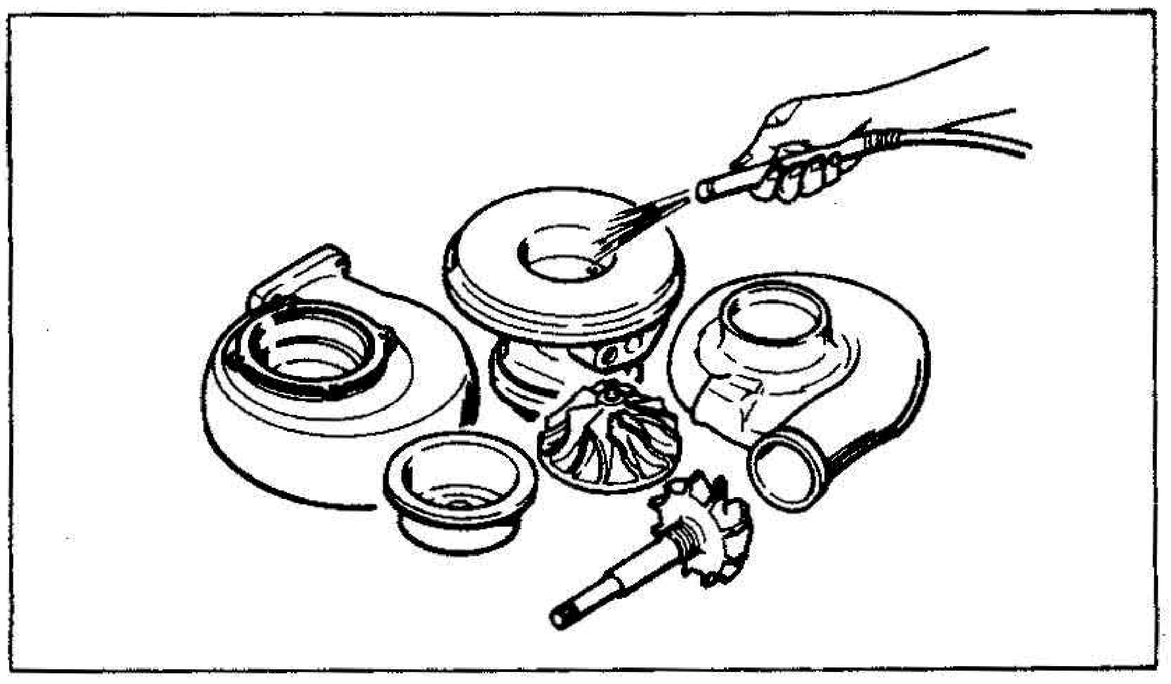
When a commercially available neutral detergent is used for cleaning, make sure that it does not contain corrosive component.

(a) Before cleaning, visually check the condition of the parts. Check for burns, wear, etc. which could not be identified after washing.

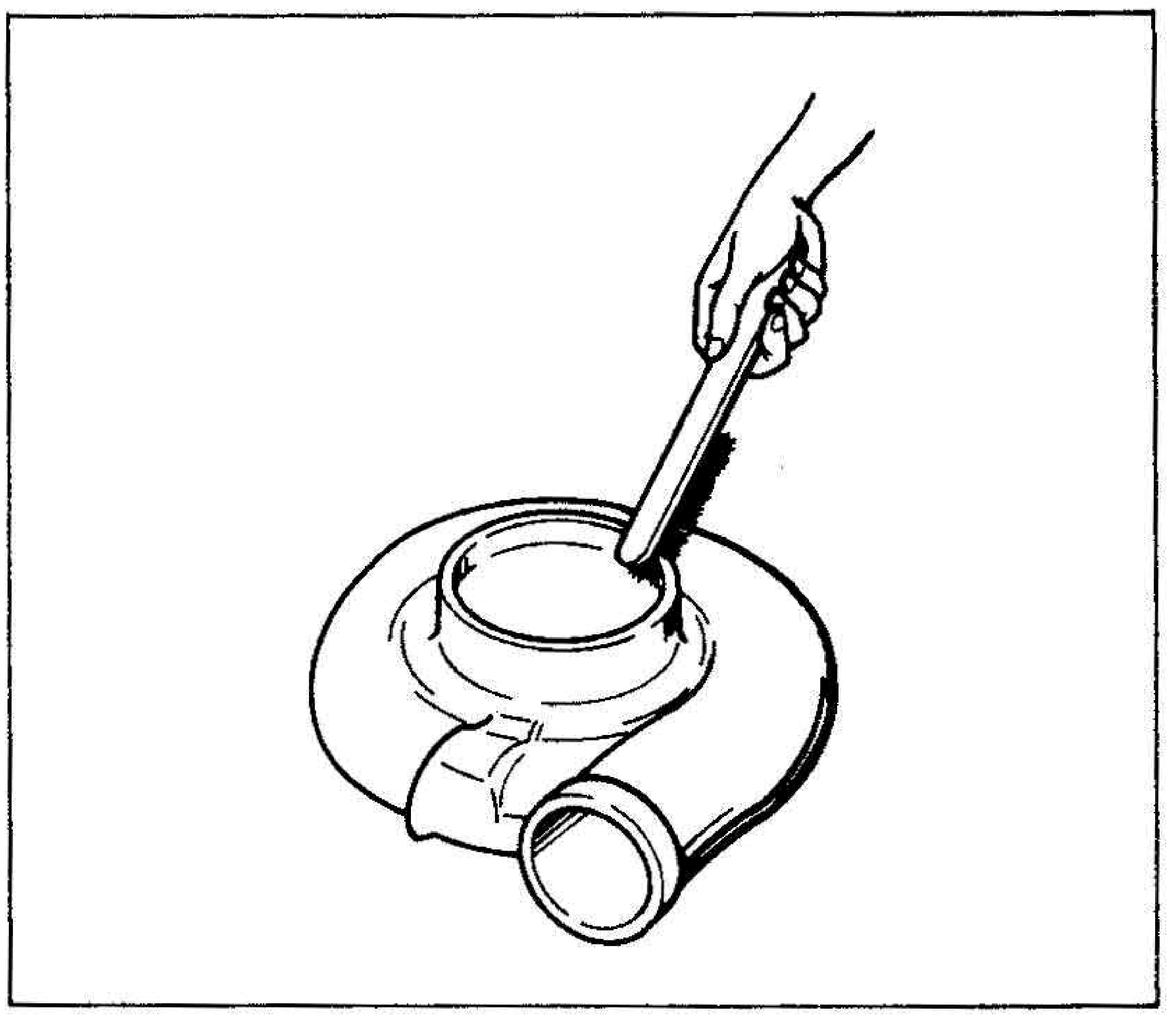
(b) Immerse all the parts in a non-inflammable solvent to clean oily contamination.



(c) Blow clean compressed air against the entire internal and external surfaces.



(d) Clean deposites, using a plastic scraper or bristle brush.



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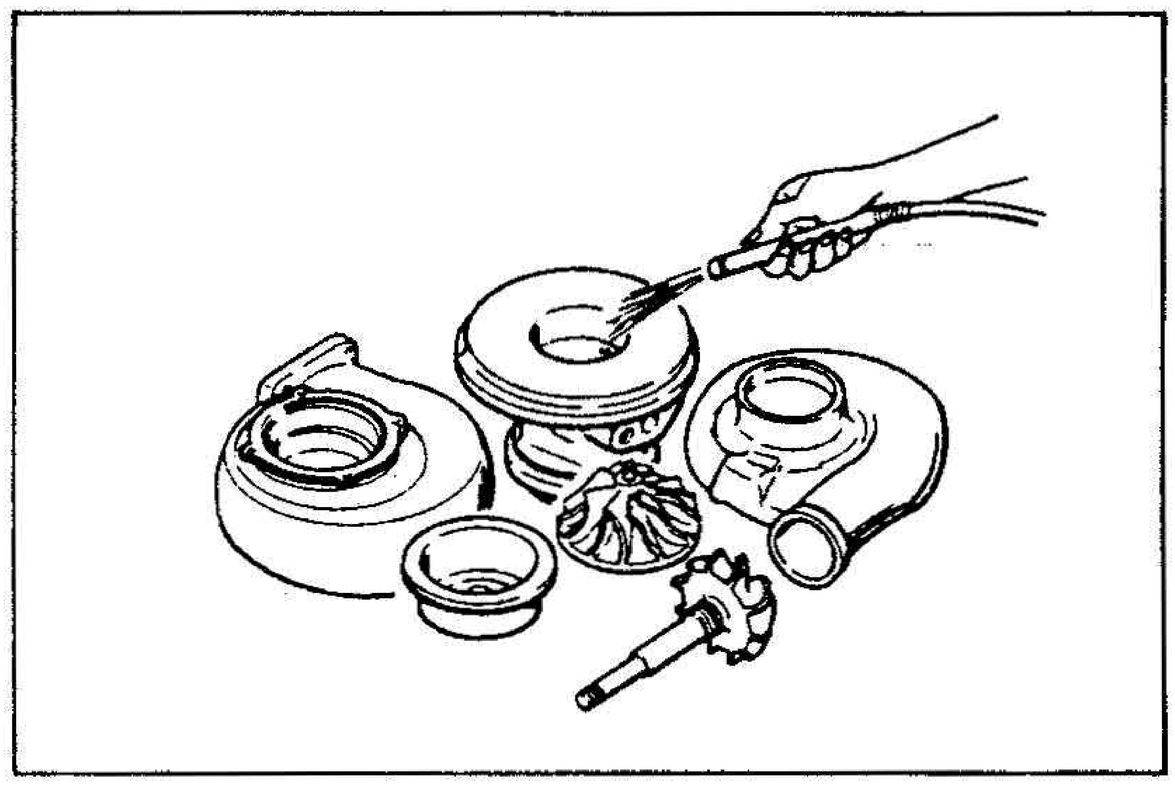
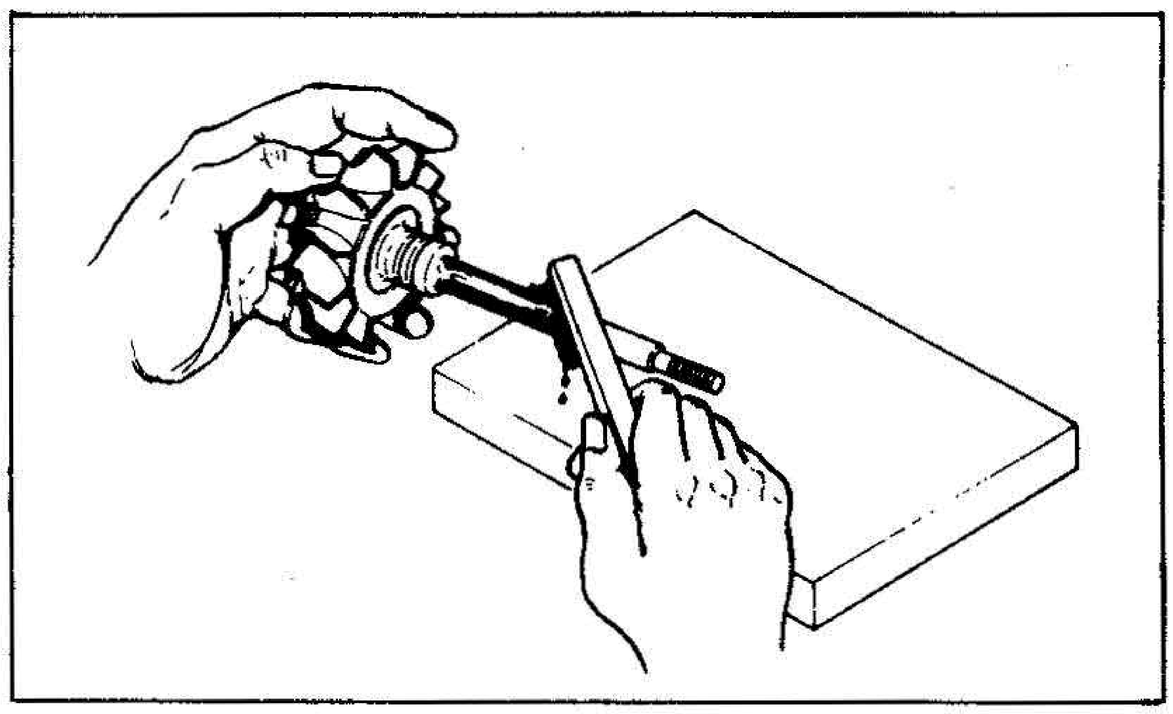
(e) Blow clean compressed air again against the entire internal and external surfaces.

NOTE : The bearing housing and turbine wheel shaft should be re-immersed in a non-inflammable detergent after Step (d). After deposits have been removed, blow compressed air.

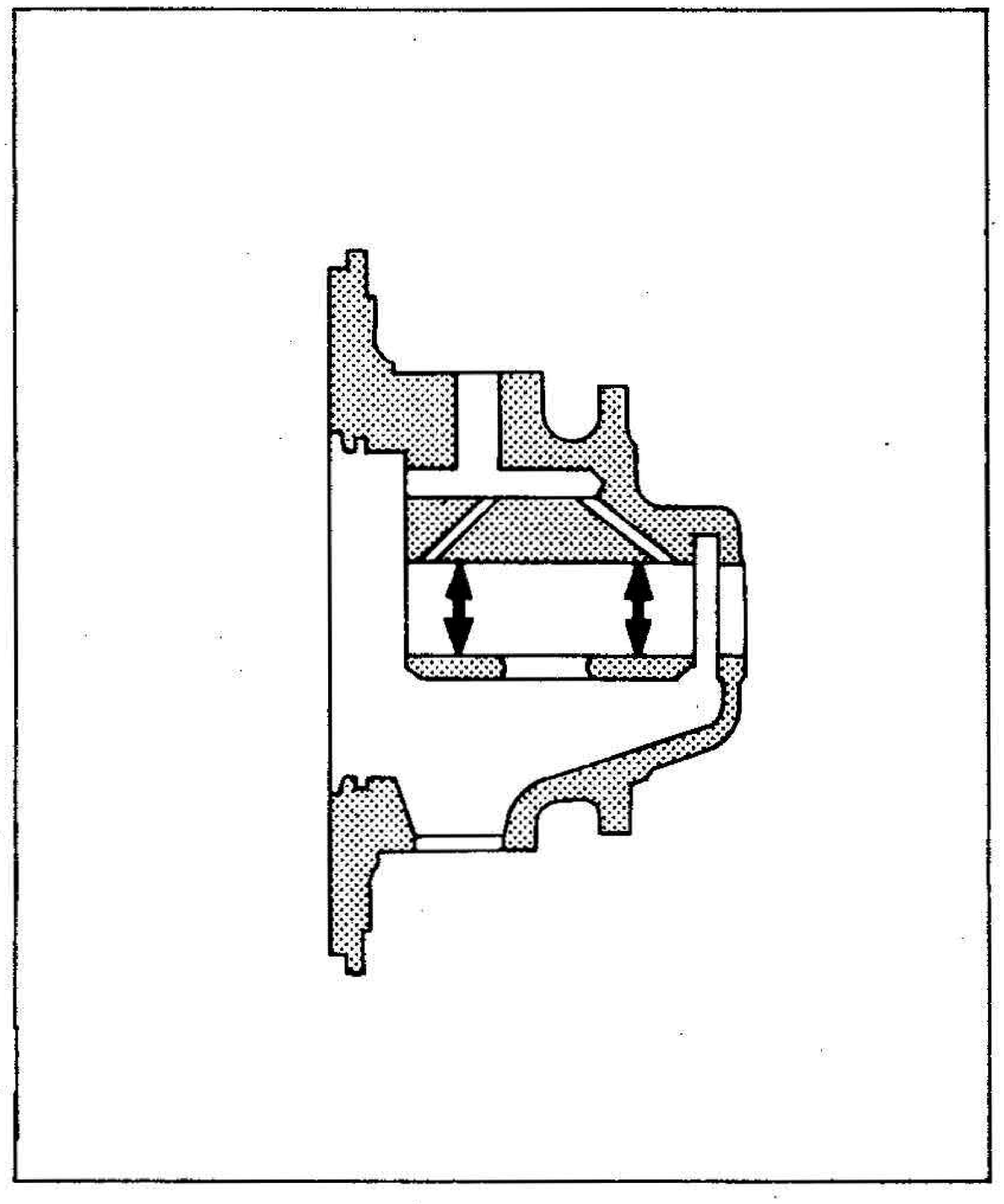


(f) To prevent rust, apply engine oil to the entire internal and external surfaces of the bearing housing, turbine housing and turbine backing plate and the shaft portion of the turbine wheel shaft.



(2) Inspection

(a) If the bearing hole diameter and piston ring hole diameter are beyond the service limit, replace the bearing housing.



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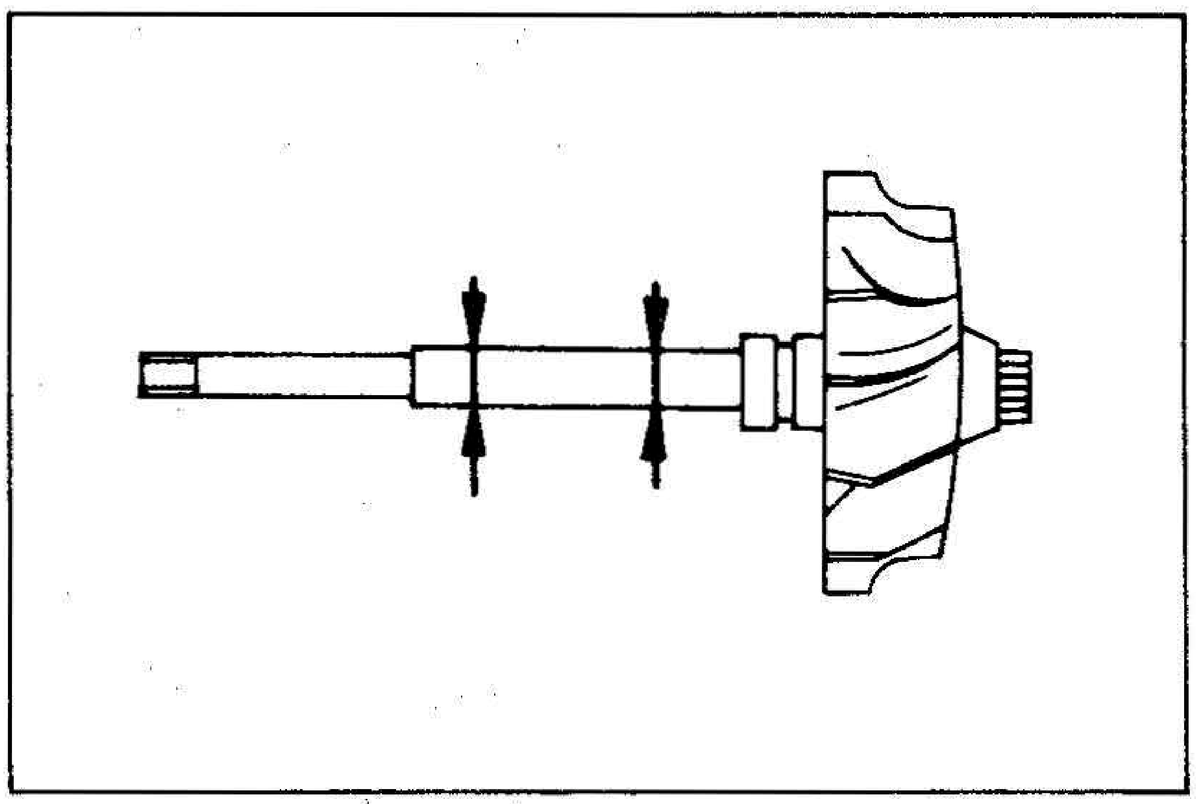
(b) Measure the shaft journal diameter.

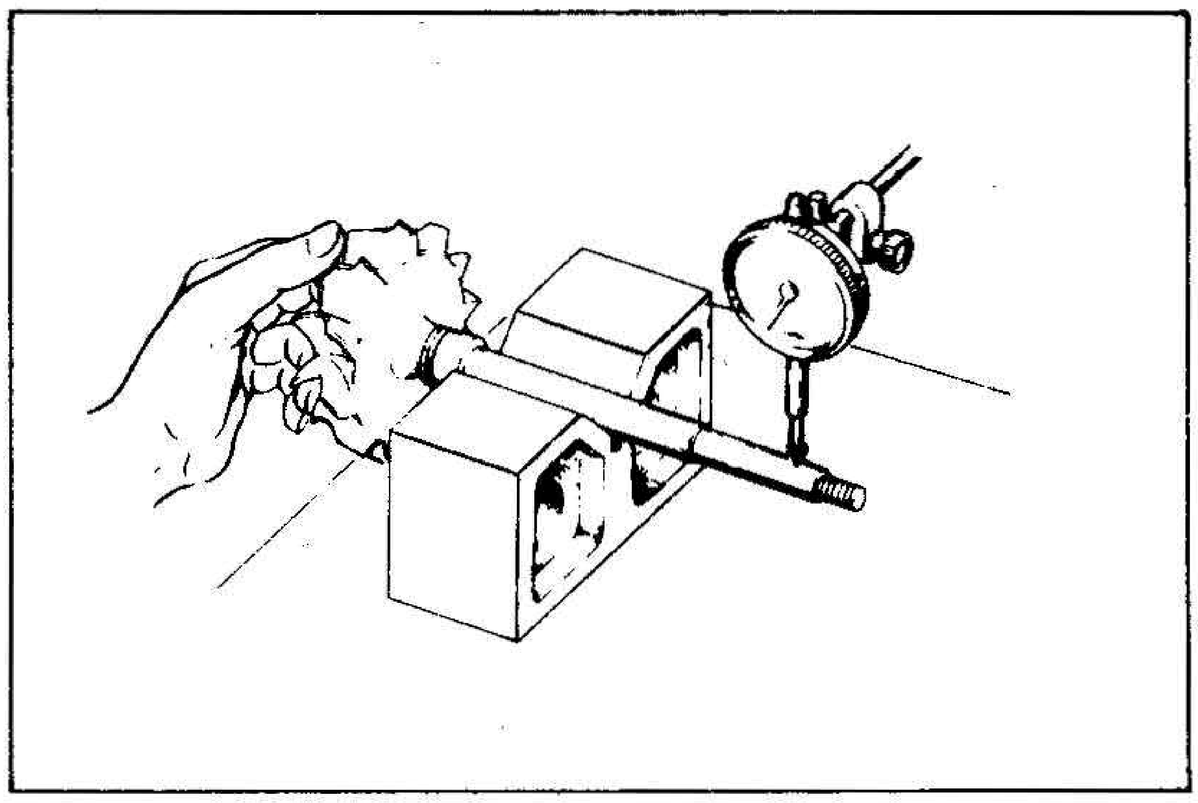
If the measured diameter is less than the service limit, replace the turbine wheel shaft.



(c) Set a dial indicator beside the threaded portion of the shaft to measure the bend.

If the deflection of the dial indicator is beyond the service limit, replace the turbine wheel shaft.

NOTE : Do not correct but replace a bent shaft.



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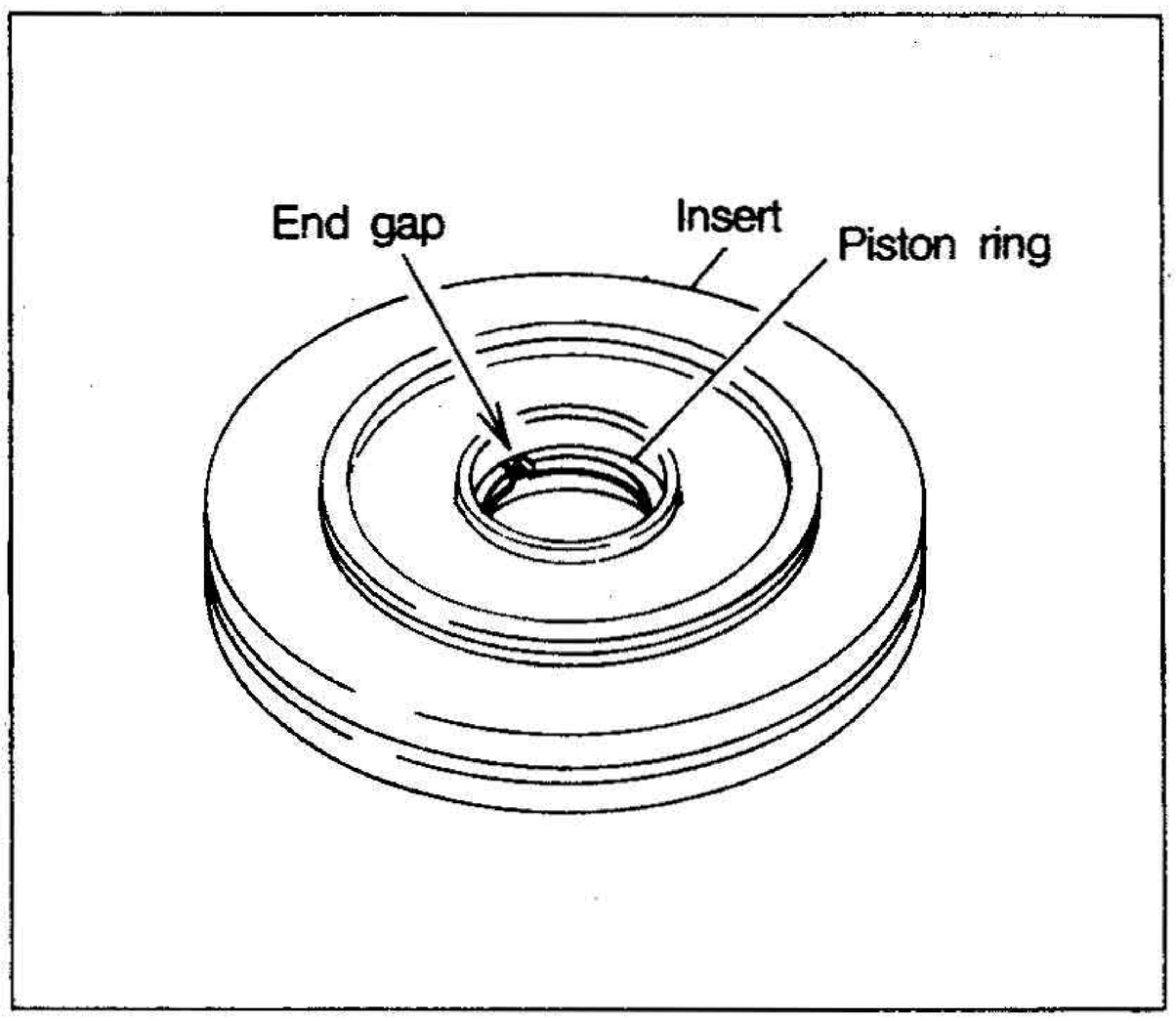
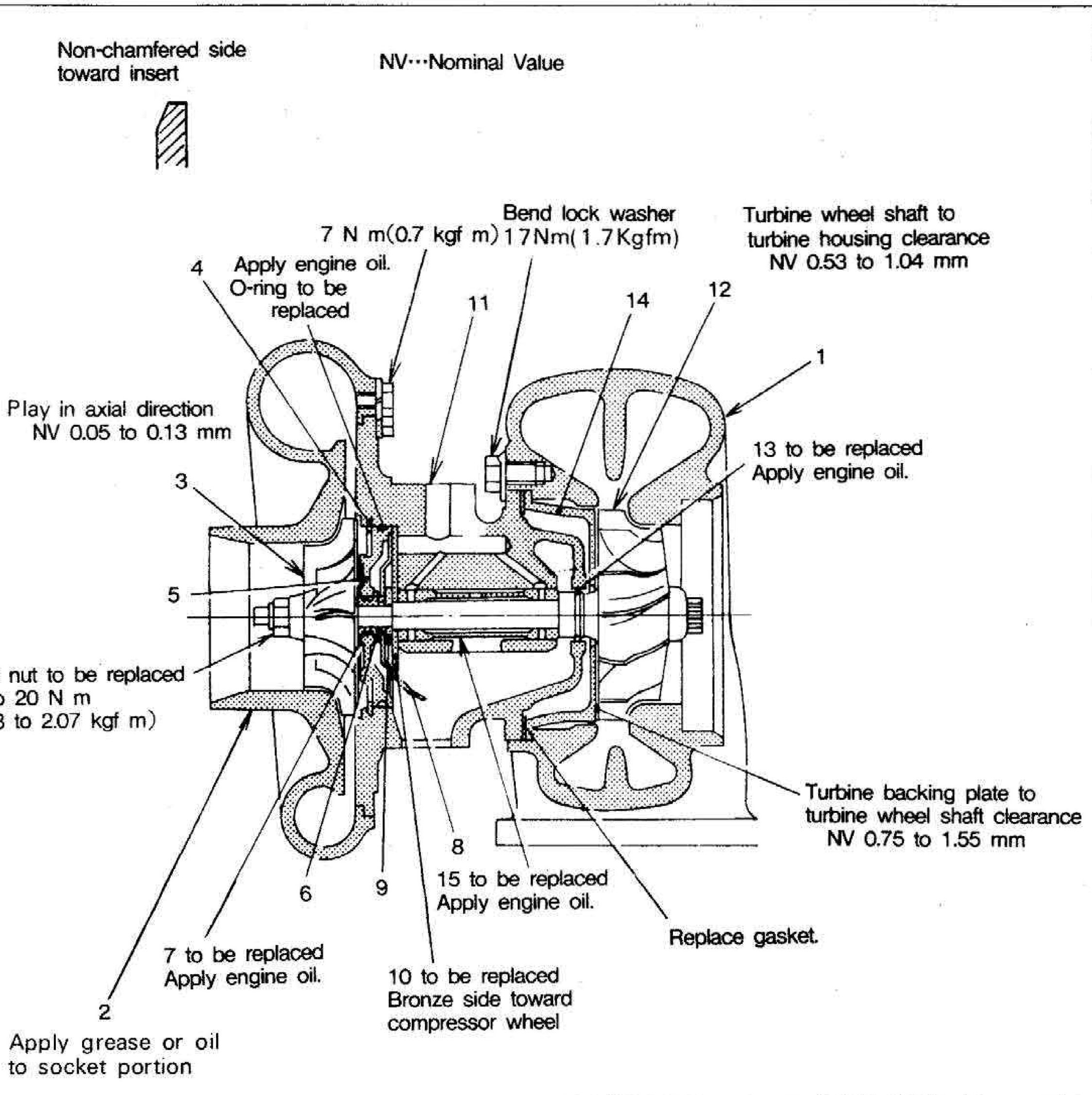
(d) Insert

Insert a new piston ring securely in the bore in the insert and measure the end gap of the piston ring.

If the end gap is out of specification, replace the insert.



8-4-3 Reassembly



NOTE: After an overhauled turbo charger has been installed to the engine, run the engine at low idle speed for more than three minutes.

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(1) Assemble the following parts.

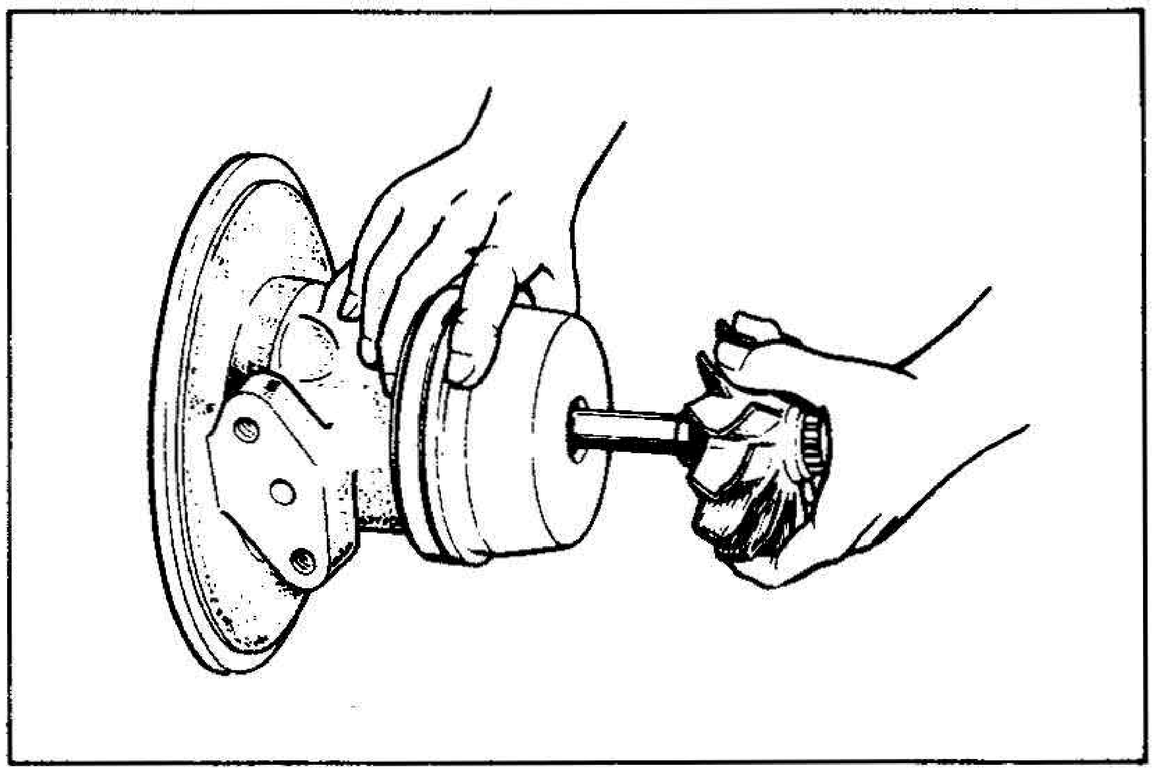
11 Bearing housing

14 Turbine backing plate

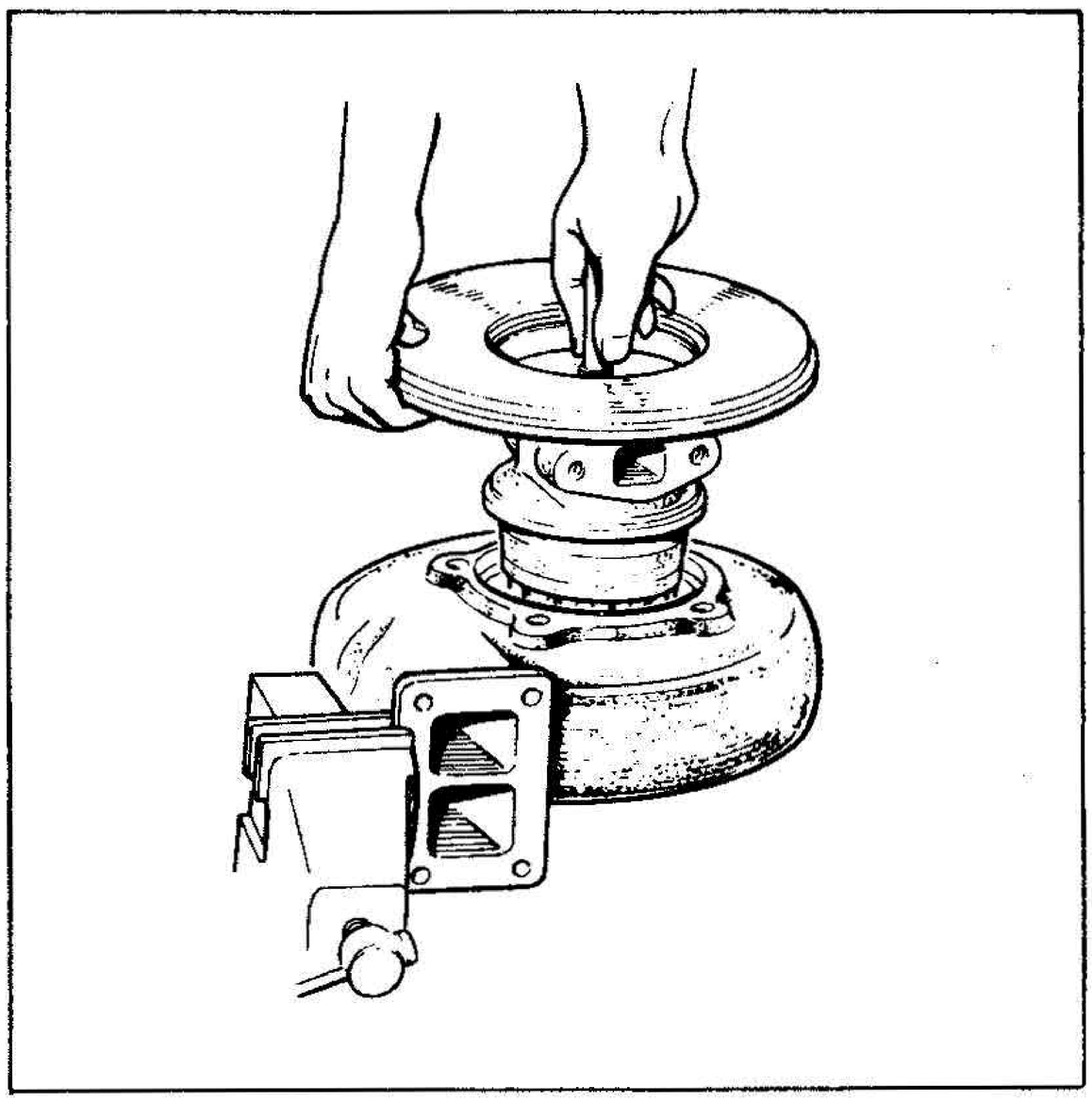
13 Piston ring

12 Turbine wheel shaft

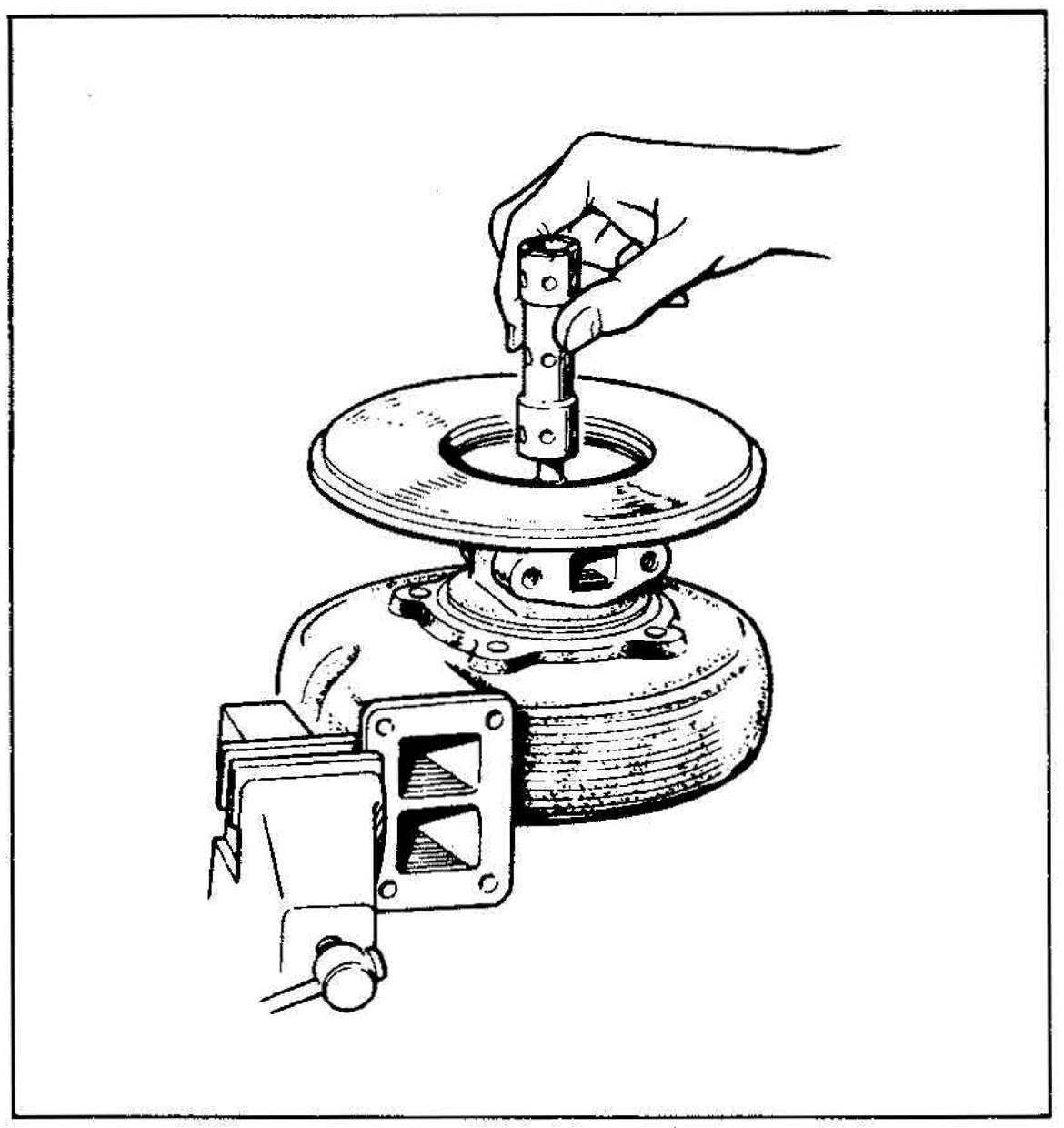
NOTE : Apply engine oil to the piston ring.



(2) Insert the core assembly into the turbine housing held in a vice.



(3) Apply engine oil to the I.D. and O.D. of the bearing 15 before installing the bearing in the bearing housing.



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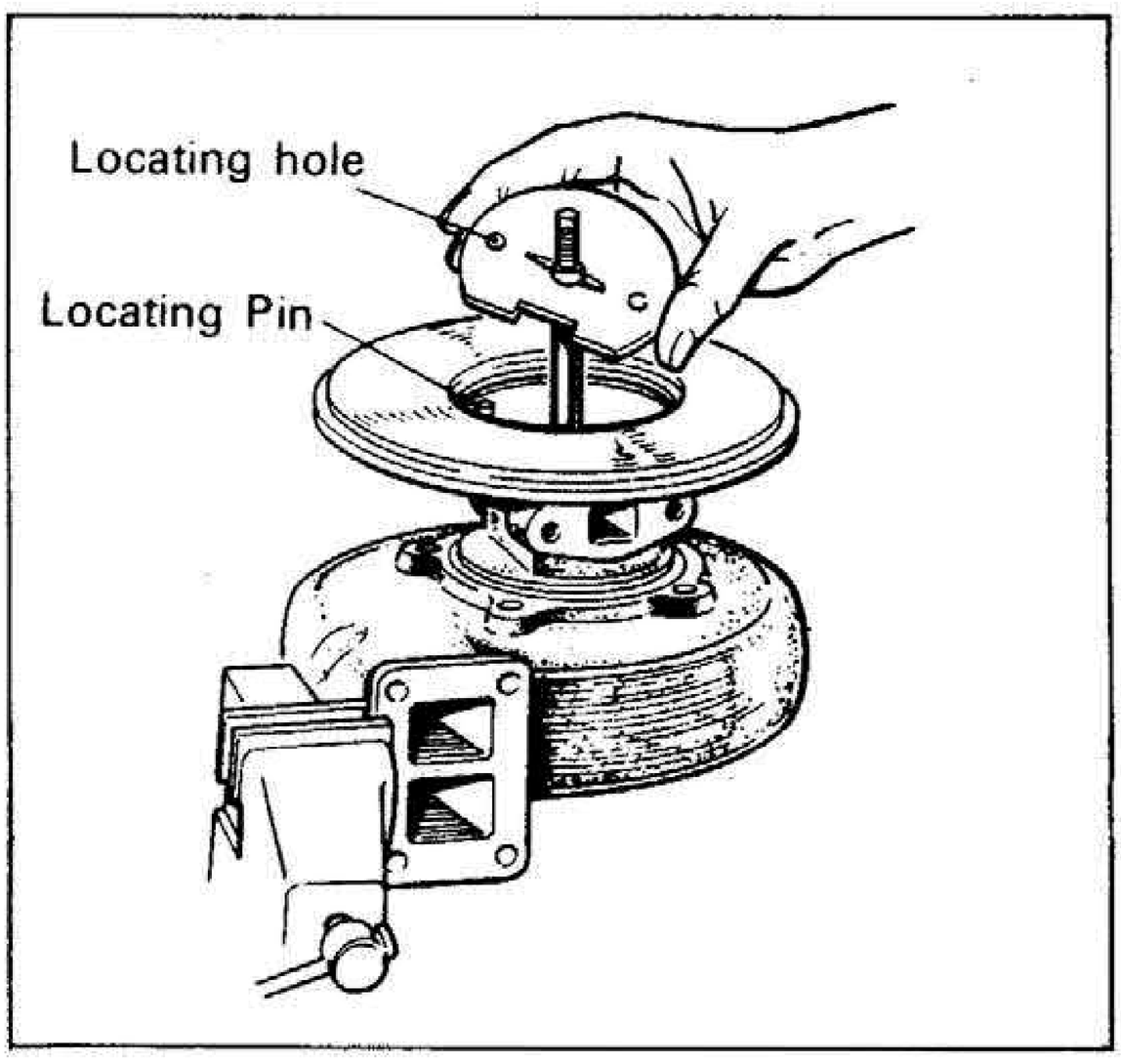
(4) Apply engine oil to both sides of the thrust bearing 10 and thrust ring 9 before assembling them on the turbine wheel shaft. Then install the oil deflector 8.

NOTE : Install the thrust bearing with the bronze side up.



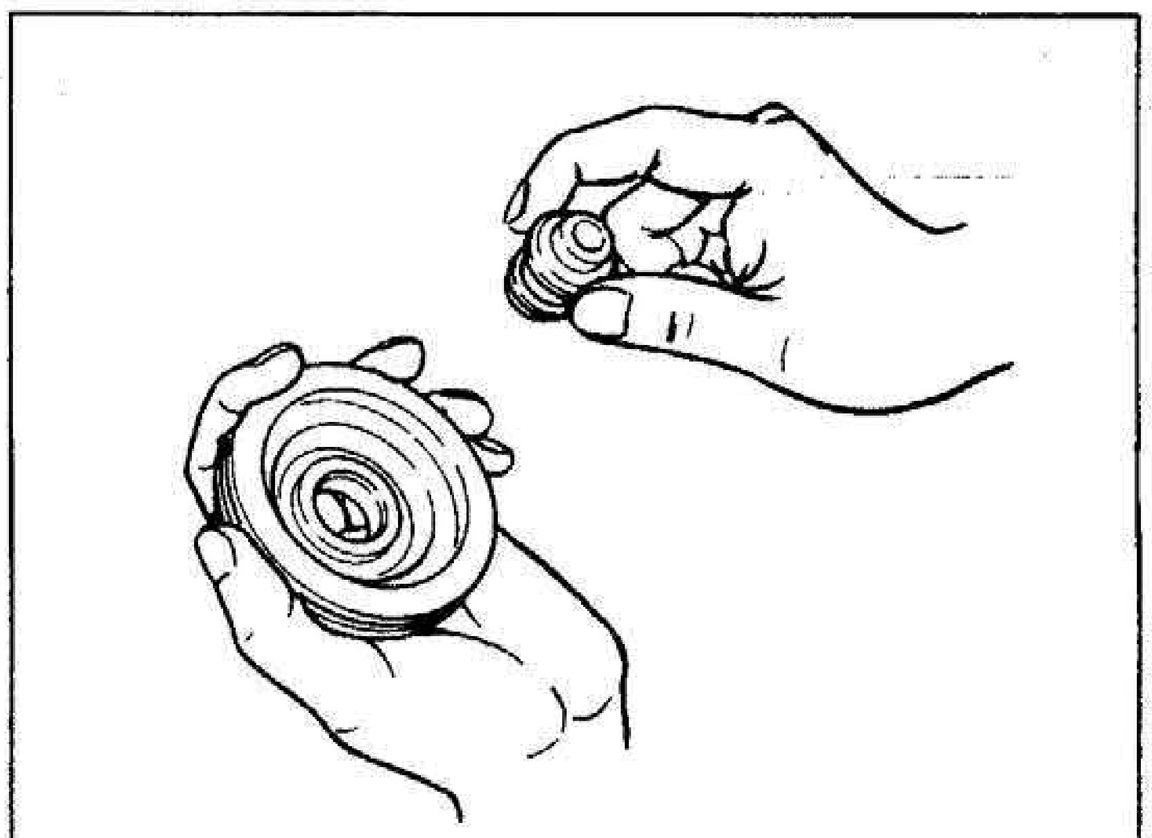
(5) Assemble the following parts and install them in the bearing housing.

5 Insert

7 Piston ring

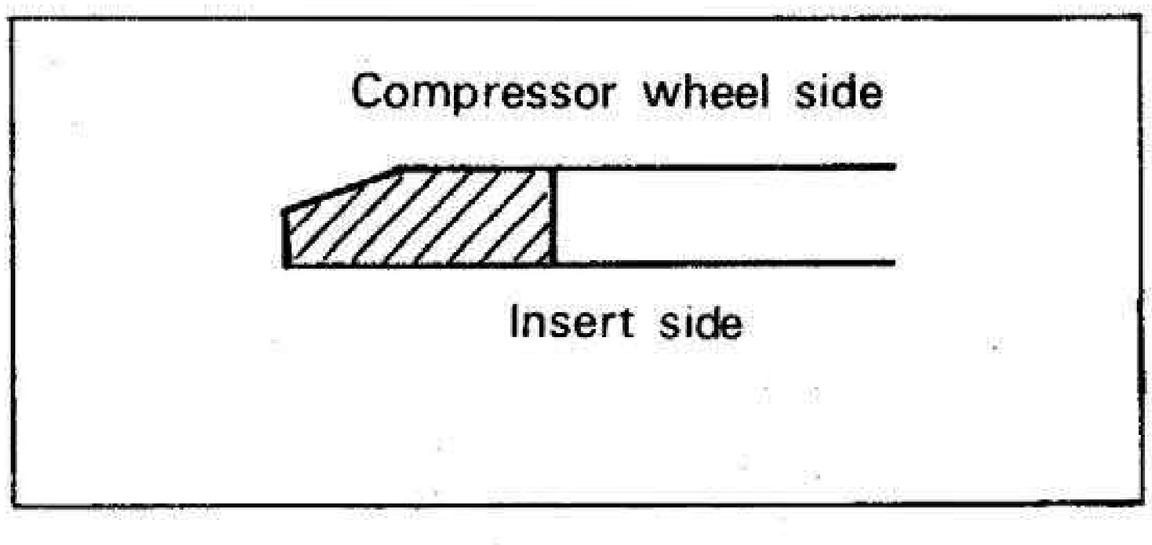
6 Thrust sleeve

NOTE : Apply engine oil to piston ring, flinger sleeve, O-ring and bearing housing before assembly.



(6) Install the snap ring 4.

NOTE : Face the non-chamfered side toward the insert.



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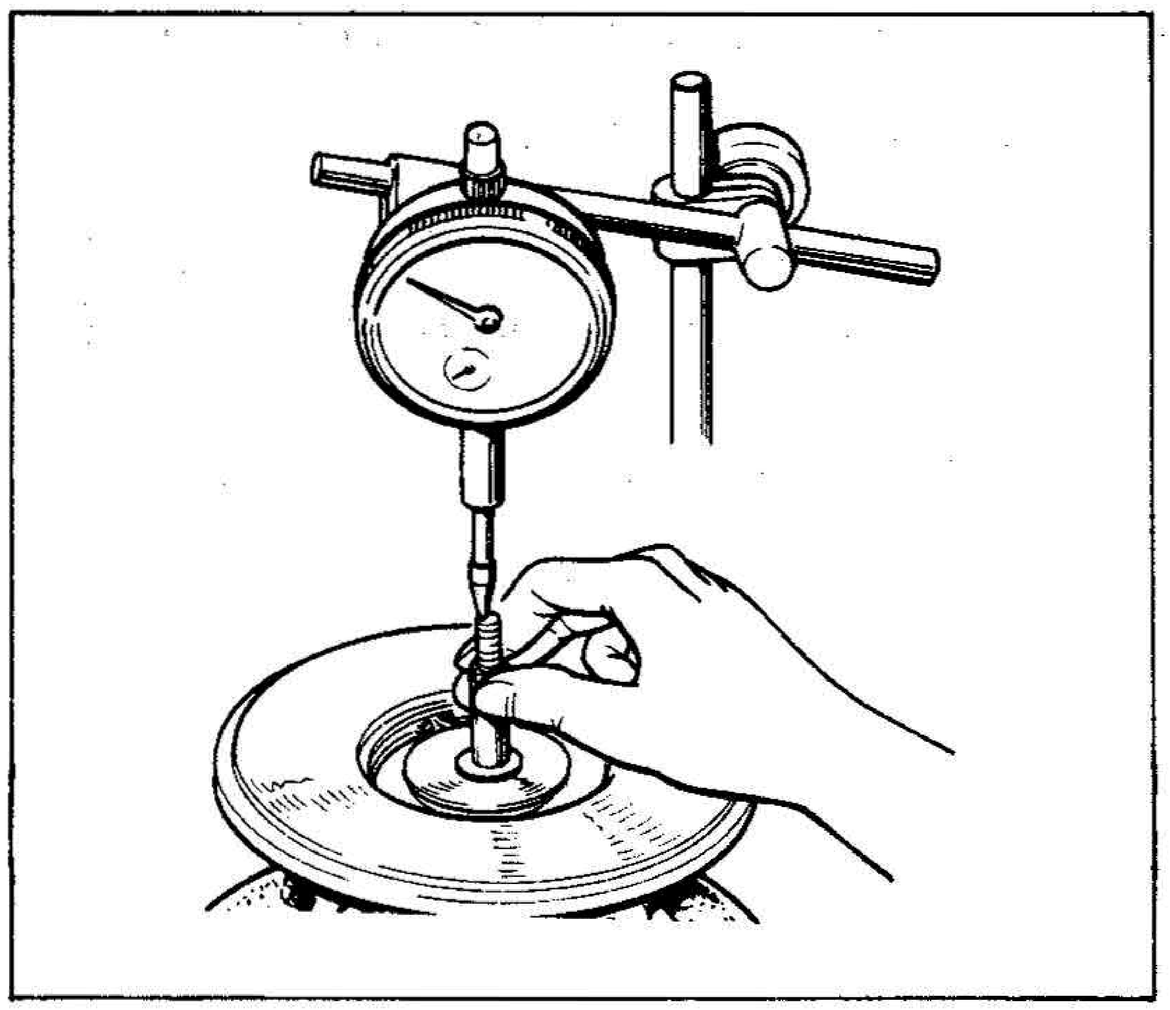
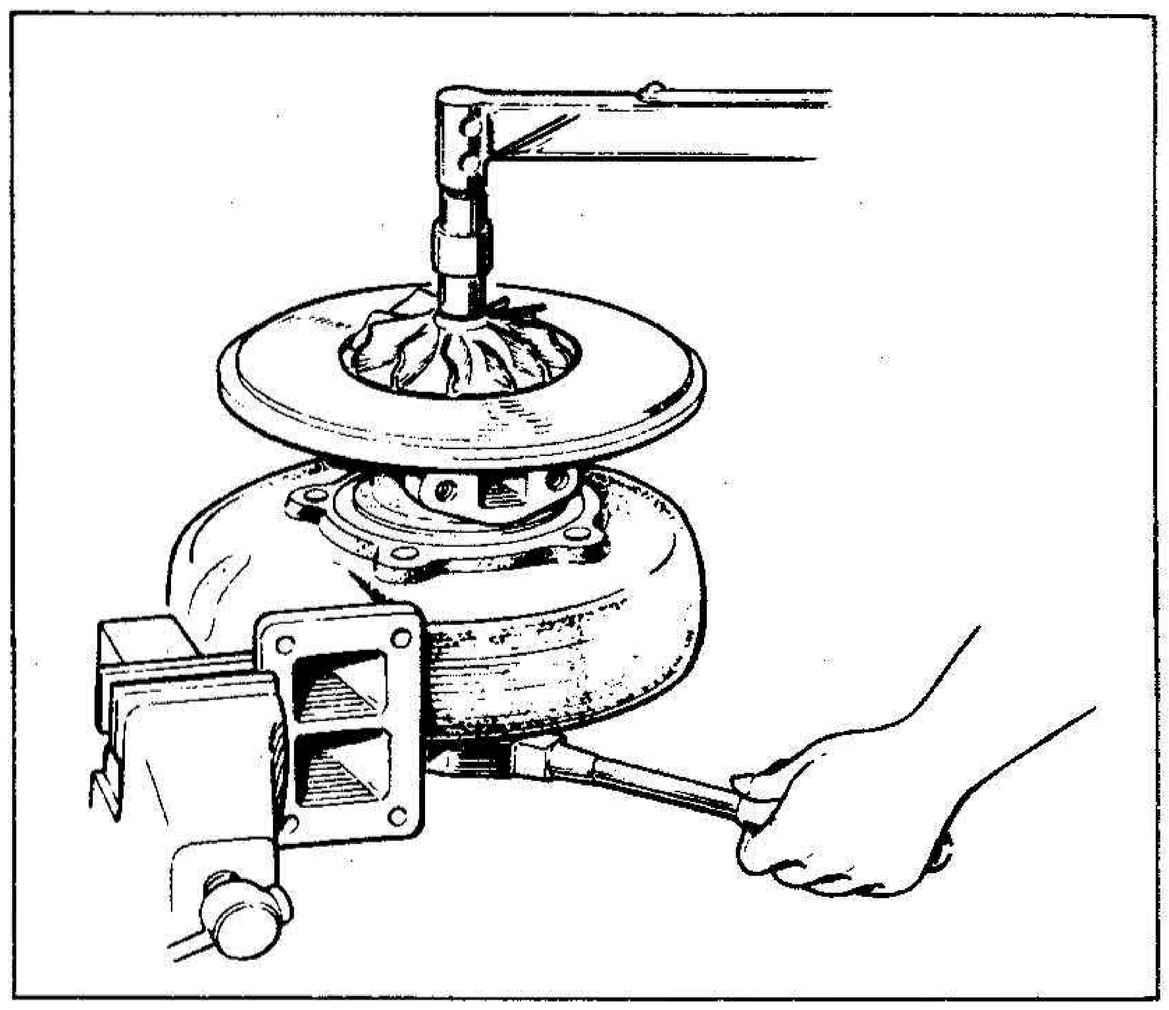
(7) Set a dial indicator on the end of the turbine wheel shaft.

Move the turbine wheel shaft up and down to measure the clearance between the turbine wheel and turbine housing. If the clearance is out of specification, disassemble and check to locate the cause.

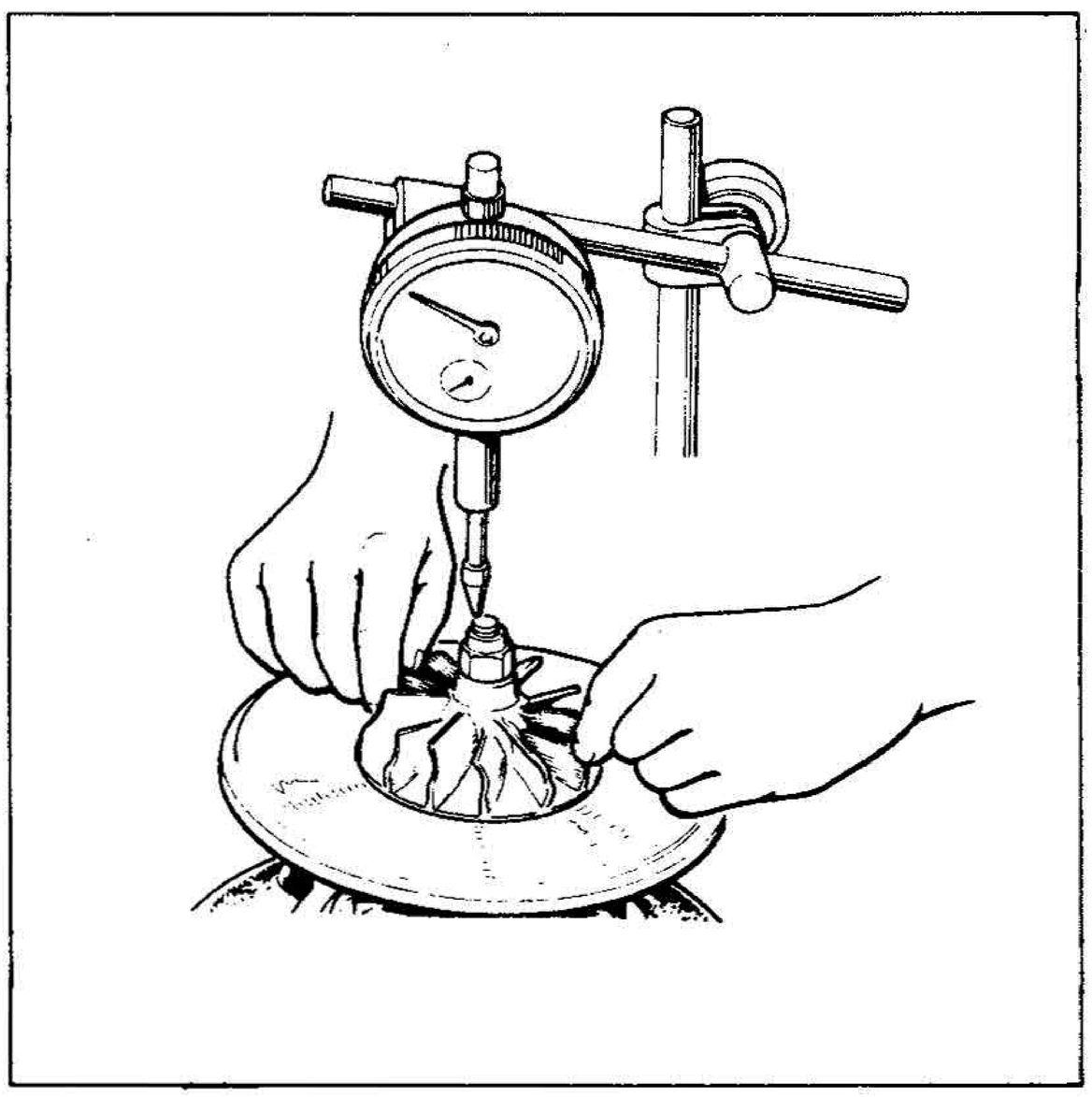


(8) Install the compressor wheel 3 on the turbine wheel shaft and tighten the lock nut to the specified torque.



(9) Set a dial indicator on the turbine wheel shaft end. Move the compressor wheel up and down to measure the end play.

If the play is out of specification, desassemble and check to locate the cause.



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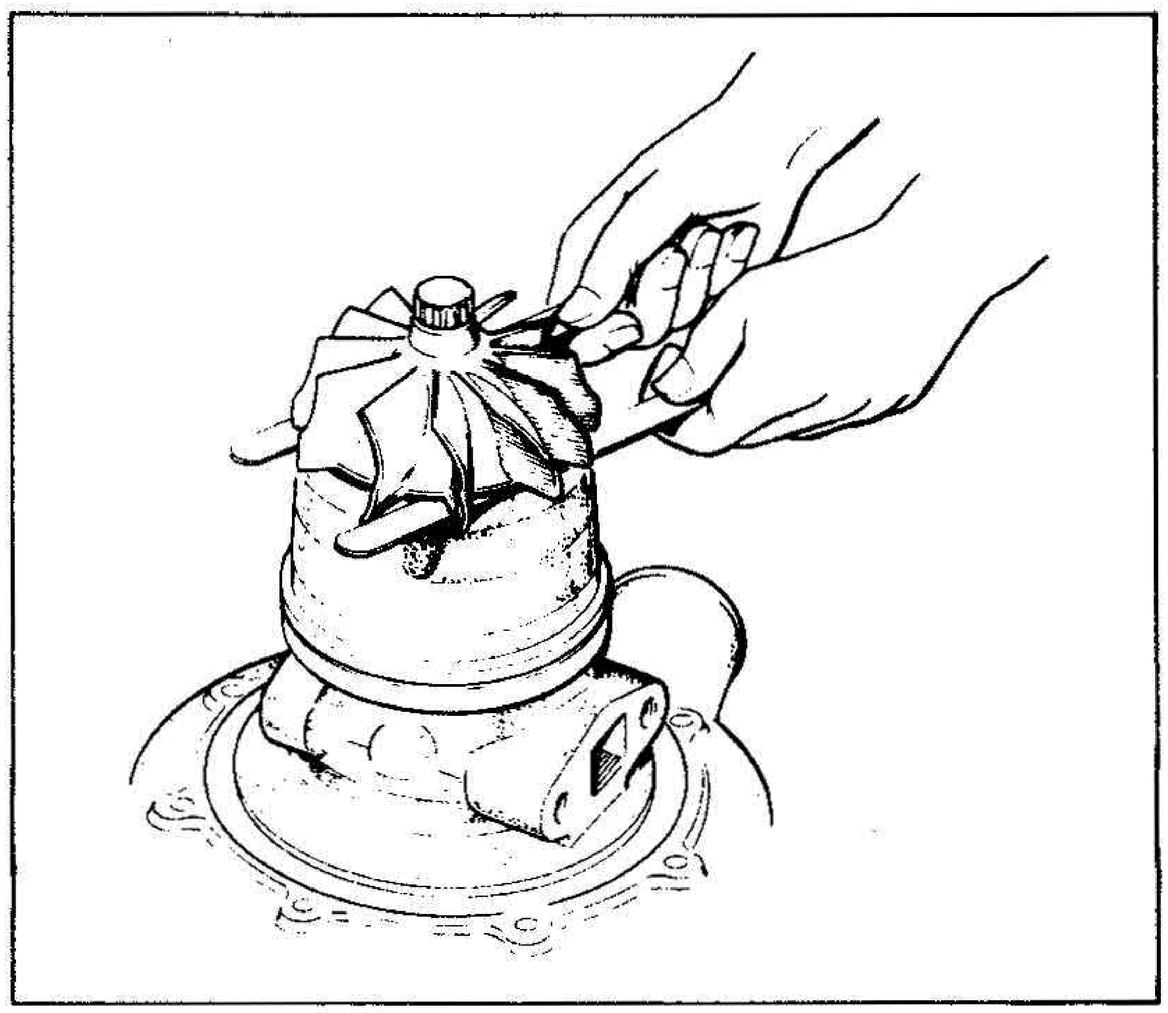
(10) Apply grease or engine oil to the socket portion of the compressor cover.

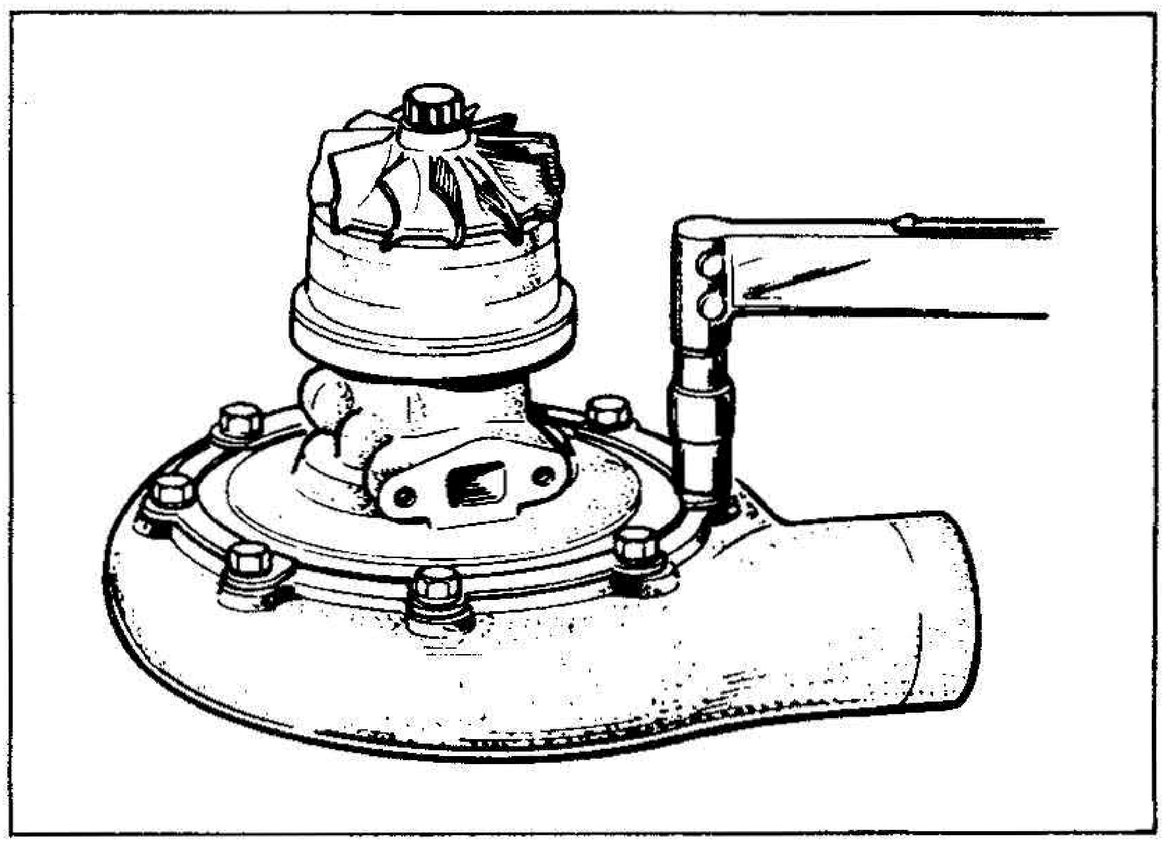
Remove the core assembly from the turbine housing and insert into the compressor cover.

Using two thickness gauges, measure the clearance between the turbine backing plate and turbine wheel shaft back surface.

If the clearance is out of specification, disassemble and check to locate the cause.

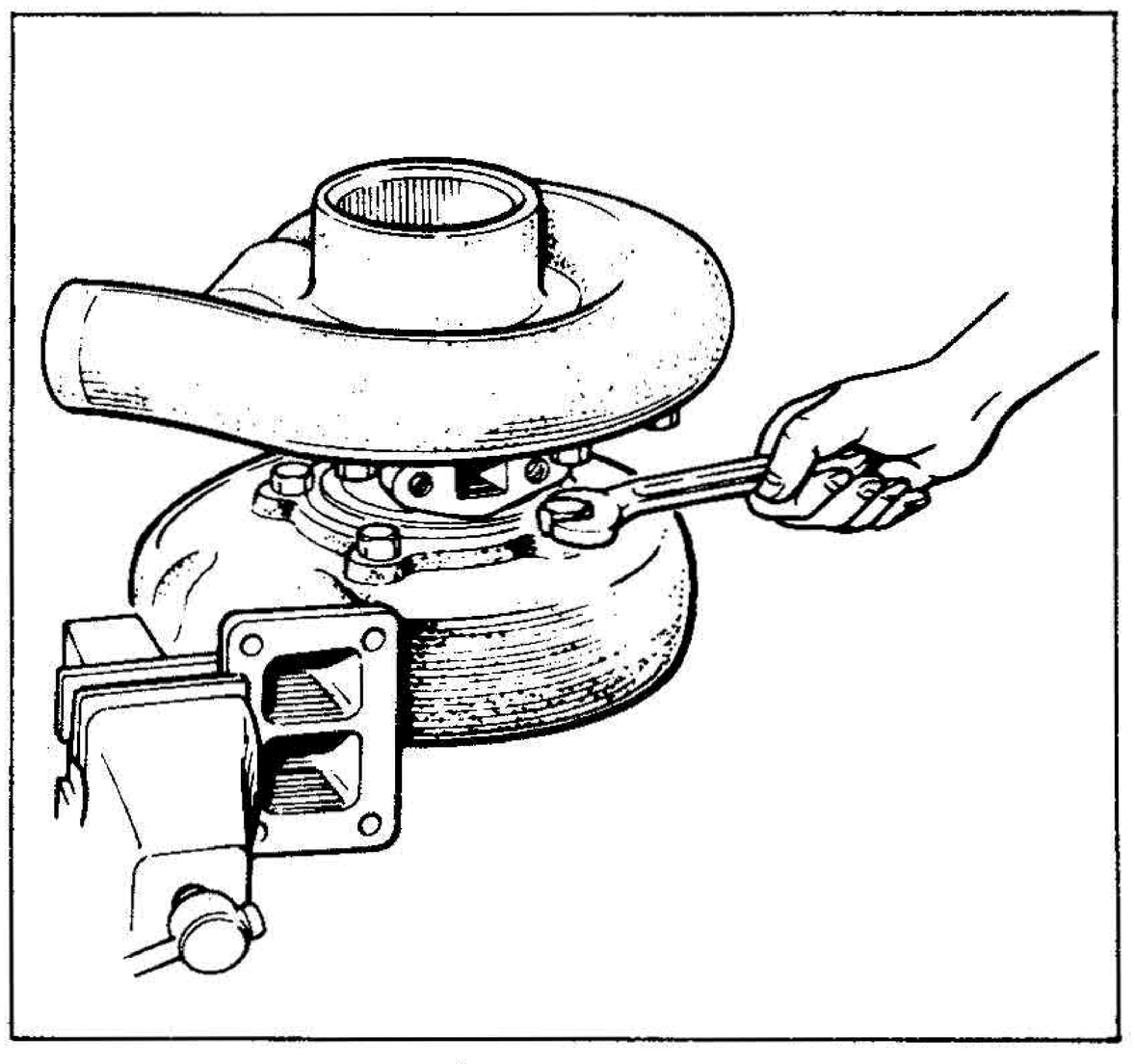


(11) Install the compressor cover 2 by tightening the bolts to the specified torque.



(12) Install the turbine housing 1 by tightening the bolts to the specified torque.

NOTE : Apply an anti-seizure agent to the cap screw.



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