



Series K31

Turbochargers can only be repaired by authorized workshops, as special tools and expert knowledge are required.

NO REPAIRS WITHOUT ORIGINAL KKK OVERHAUL KIT

Further informations about tightening torques, plays and gaps, permissible wear and repair tools are given in an other section of the CD-ROM.

1. DISMANTLING

1.1 Turbine housing and compressor housing

- Mark the position of the housings related to the bearing housing and backplate.
- Using a vice, clamp the turbine housing at the gas inlet flange (use vice jaw guards).
- Remove the fixings of the turbine housing.
- Remove the turbine housing (when tight, use a rust remover or copper hammer).
- Remove the fixings of the compressor housing. In case of 'V' clamp specifications, loosen the hex. nut of the 'V' clamp, press the 'V' clamp apart, using V clamp pliers.
- Remove the compressor housing (when tight, use a rubber hammer).

ATTENTION:

Danger of blade damage when tilted.

1.2 Compressor wheel

- Clamp the shaft & wheel hub in the special vice jaw plates.
- Remove the shaft & wheel nut using a T spanner (left handed threads!).
- Remove compressor wheel.

1.3 Bearing housing

- Carefully remove shaft & wheel from the bearing housing.
- Remove piston rings from shaft & wheel, using pliers.
- Remove heat shield.
- Remove O-ring (this operation does not apply to 'V' clamp specifications).
- Remove snap ring.
- Carefully remove bearing housing cover, using two screw drivers.
- Remove flinger sleeve from bearing housing cover.



- Remove O-ring from the bearing housing cover.
- Remove thrust bearing and thrust ring from the bearing housing.
- Remove snap rings, using snap ring pliers and bearings.

2. CLEANING AND INSPECTION OF THE PARTS

2.1 Cleaning of the parts

- Carefully clean all parts:
- Housings, nozzle ring, shaft & wheel, compressor wheel, heatshield and in case of
- 'V' clamp specification the 'V' clamp have to be wet sandblasted.

ATTENTION:

The bearing holes of the bearing housing and the shaft have to be protected from the blasting medium.

2.2 Checking the parts

2.2.1 Visual check

- Examine housings, heat shield, turbine and compressor wheel for cracks, any foreign matter and scratches.
- Inspect the oil feed holes in the bearing housing for foreign matter.
- Check piston ring sealing surfaces and bearing areas for damage.
- Examine the turbine housing for scaling.
- Examine gas inlet and outlet flanges of the turbine housing for distortion.
- Inspect the turbine and compressor wheels for bent or broken blades and the shaft for scoring at the bearing seats.
- Check piston ring seating in the backplate and bearing housing for scratches and damage.

LIMITS OF REUSAGE

Wear parts which show excessive wear, as well as rotating parts with cracks have to be replaced.



Turbine housing:

radial cracks up to 10 mm length are permissible in the vicinity of the tongue and the partitioning wall.

Cracks fully through the material are not permissible.

Slight scratching at the contour is permissible.

If scaling occurs to the bridge of the gas inlet flange and contour, these parts have to be replaced.

If deformity occurs to the gas inlet and outlet flanges, these parts have to be replaced.

Compressor housing:

check for rubbing traces at the contour and for deformation.

REMARK:

rubbing traces up to 0.2 mm are permissible.

ATTENTION:

replace deformed compressor housings.

Shaft & wheel:

do not straighten any bent blades. If blades are bent, the shaft & wheel has to be replaced.

Turbine and compressor wheels with rubbing traces and shaft & wheel bearing areas with scoring have to be replaced.

2.2.2 Checking of dimensions

- Place the shaft & wheel, supported at the bearing seats, in the twin v-blocks.
- Set the clock gauge feeler on the shaft, 5 mm from the compressor wheel end of the shaft.
- During measurement, press shaft firmly into v-blocks, distributing the pressure equally.
- If runout exceeds 0,008 mm, replace the shaft & wheel.

2.3 Dynamic balancing check of rotor assembly

- If the rotating parts are reused again, a dynamic balance check is necessary. Refer to the service information leaflet, code no. 7/03/007.



3. ASSEMBLY

Absolute cleanliness is necessary

- Examine all parts for blasting medium residues.
- For watercooled bearing and turbine housings: replace plugs and sealing. Check tightness of the housing.
- The following bearing parts have to be oiled before fitting:
 - Bearing seats of the shaft
 - Bearings
 - Thrust bearing
 - Flinger sleeve
 - Thrust ring
 - Piston rings

ATTENTION:

During the installation of bearings, particular attention should be paid to cleanliness.

3.1 Bearings

- Fit bearings and snap rings (dished side faces the bearing) into the bearing housing.

3.2 Bearing housing

- Clamp shaft & wheel in the vice jaw plates equipped with six/twelve edged cutouts.
- Fit two piston rings to the shaft & wheel.
- Attention have to be paid to concentricity.
- Piston ring slots have to be positioned at 180° to one another.
- Place the heat shield concentrically on shaft & wheel.
- Protect the rotor threads with a brass sleeve.
- Mount bearing housing carefully onto rotor shaft.

CHECK:

Piston rings are properly seated, when the heat shield and bearing housing turn freely.



- Mount thrust ring onto rotor shaft.
- Place thrust bearing with oil groove onto the thrust ring into bearing housing.
- Mount piston ring onto flinger sleeve.
- Fit flinger sleeve with piston ring carefully in the bearing housing.
- Coat the O-ring with acid-free grease, e.g. SKF ball bearing grease and place in grooved position of the bearing housing cover.
- Press bearing housing cover into bearing housing, if necessary use a mounting device.
- Secure bearing housing cover with snap ring. Mount the tapered ring with the bevelled side towards the compressor housing. Check afterwards that the snap ring is properly seated.
- Coat the O-ring with acid-free grease and fit in the bearing housing groove. This operation does not apply to 'V' clamp specifications.
- Measuring the turbine contour gap:
Place core assembly, without compressor wheel and nut into the turbine housing and fix it with hex. screws.
Place the measuring point of the clock gauge on the turbine wheel hub.
Press down shaft & wheel and set the clock gauge at '0'.
Press shaft & wheel against clock gauge and note the result of measurement.
Remove compressor housing after the measurement.

3.3 Compressor wheel

- Mount compressor wheel on the shaft.
- Measuring the compressor contour gap:
Mount the compressor housing onto core assembly with compressor wheel, but without shaft nut.
Place the measuring point of the clock gauge on the compressor wheel hub and set the clock gauge at '0'.
Lift the compressor wheel to the maximum and note the result of measurement.
Remove compressor housing after the measurement.
- Tighten shaft nut to tightening torque and angle.

ATTENTION:

When tightening shaft nut take care that no bending effects occur to the shaft.

CHECK:

Piston ring on turbine side is properly seated when heat shield and bearing housing turn freely after the assembly of the compressor wheel.



- Seal shaft nut and projecting threads of shaft & wheel with safety varnish.
- Measuring the axial play:
Clamp core assembly at the bearing housing in a vice (use vice jaw guards).
Place the measuring point of a clock gauge on top face of turbine wheel hub.
Press down shaft & wheel and set the clock gauge at '0'.
Press shaft & wheel against clock gauge and note the result of the measurement.

3.4 Compressor housing

- Assemble the compressor housing with the fixing elements. For 'V' clamp specifications, use a new hex. nut and mount the 'V' clamp.

ATTENTION:

Avoid tilting when positioning housing.

CHECK:

Compressor housing is properly seated when the shaft turns freely after assembly.

- If a new housing is needed, refer to the application list for branch position.

3.5 Turbine housing

- Coat fixing screws with heat resistant lubrication paste, e.g. NEVER SEEZ.
- Install turbine housing in the marked position, using corresponding fixing components.

ATTENTION:

Avoid tilting when positioning housing.

- If a new housing is needed, refer to the application list for branch position.

3.6 Nameplate and plugs

- For repaired turbochargers the blue nameplate has to be replaced by the repairers own nameplate and fixed with blind rivets.
- Oil feed and return, inlet and outlet of the turbine and compressor housing have to be protected by plugs.

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Whilst every care has been taken in compiling the information in this repair instructions KKK can not accept legal liability for any inaccuracies.