Turbochargers NR24/R and NR26/R
Modification of the compressor wheel seat and labyrinth ring for engines with impulse-pressure supercharging

Cus 177 • 03/00

Reasons for the modification

The high stresses on the rotor from the pulsating exhaust gas in engines with impulse-pressure supercharging caused damage to turbochargers of sizes NR24/R and NR26/R; in some cases, this led to failure of the turbocharger after a relatively short operating period.

Type of damage

On the damaged parts, fretting corrosion was found on the compressor wheel, axially on the contact surface between the rear of the compressor wheel and the labyrinth ring. The fretting corrosion observed on the axial contact surfaces enlarges the axial lubricating gap, so that the equilibrium of lube-oil supply to the bearings is disturbed. The result is insufficient lubrication of the bearing on the turbine side and excessive wear of the bearing bush, causing failure of the turbocharger.

Improvements

In order to improve reliability, the seat of the compressor wheel and the labyrinth ring have been modified, and the tightening torque has been increased in the

NR24/R from 120 Nm to 240 Nm, and in the

NR26/R from 190 Nm to 350 Nm,

by using a titanium or steel nut.

By installing a disk spring (see Figure 1) as well, a constant pre-loading is provided, which prevents fretting corrosion in case of pulsating admission.

Notes on installation

Due to the alteration of the compressor wheel's seating from close sliding fit to shrink fit, the compressor wheel must be warmed up before installation or removal. To do this, heat the compressor wheel carefully and uniformly with a suitably adjusted flame in the vicinity of the hub between the blades to a temperature of 80° C.
Before installation, the heating can also be done by means of a hot-plate. As soon as the warm compressor wheel has been mounted, tighten the magnet nut with the specified tightening torque. Since the compressor wheel shrinks axially while cooling, the tightening torque must be checked again when it is cold.

Retrofitting

Turbochargers supplied previously can be retrofitted correspondingly.

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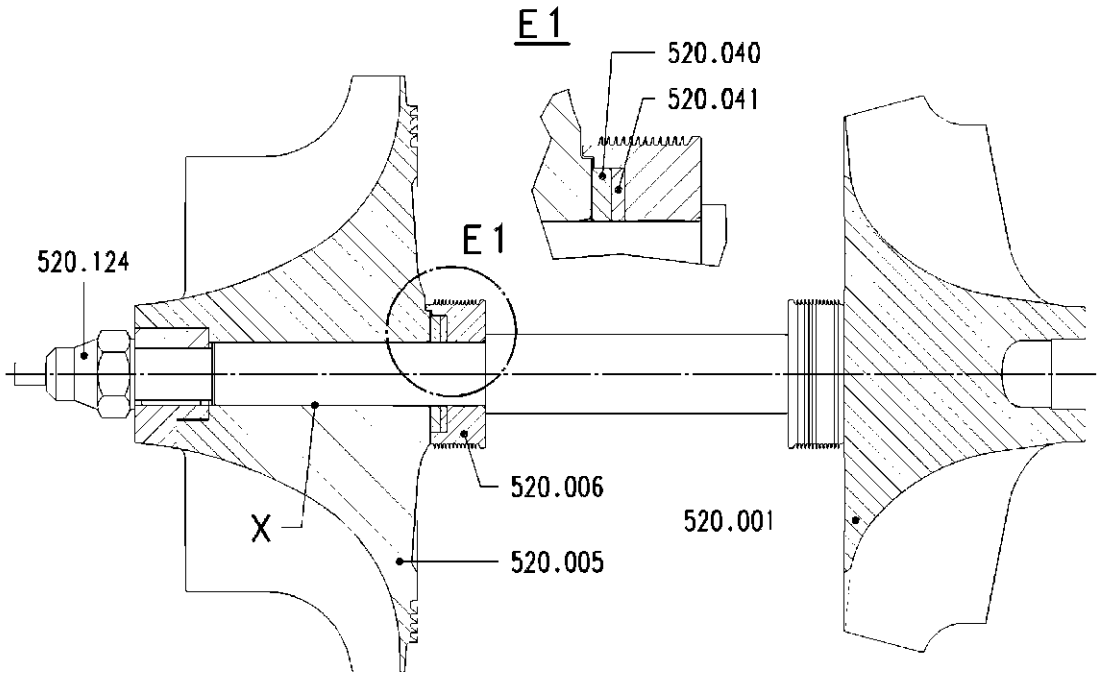

X: *Compressor wheel seat*
Old sliding fit
New: shrink fit

520.001 Turbine rotor
520.005 Compressor wheel
520.006 Labyrinth ring

520.040 Washer
520.041 Disk spring
520.124 Magnet nut

Figure 1. Modified rotor

ATK/TKU