1.1 Keyless propeller demounting procedure

- For demounting sufficient space is needed.
- Hoisting facilities must be arranged.

1.1.1 Documents

- Instruction “General warnings and cautions”.
- Drawing “Propeller boss”.
- Drawing “Assembly of hydraulic nut / ring” (if WPNL supply).
- Instructions for hydraulic nut / ring / (if not WPNL supply).
- Propeller push–up diagram (located on drawing “Propeller boss”).
- Instruction “Assembly of pump holder”.
- Instruction “Tools and equipment for (de-) mounting of propeller”.

1.1.2 Preparations

Pay attention to instruction “General warnings and cautions”.

<table>
<thead>
<tr>
<th>Tools provided with the propeller (see scope of supply for exact WPNL delivery)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifting eyebolt for propeller.</td>
</tr>
<tr>
<td>Pump holder with pressure gauges and high-pressure pumps.</td>
</tr>
<tr>
<td>Hydraulic hand pump with high-pressure hose.</td>
</tr>
</tbody>
</table>

**Provided by the yard**

Hoisting facilities and sufficient space.
Check the “Safe Work Load” of every hoisting tool against the weight of the propeller.

Save positions for workers.
Cleaning materials.

Thermometer.
Dial gauge.

Fresh and clean mineral oil, viscosity 4,5º Engler (33,4 cSt.) at 50°C.
A sufficient sized oil catch tank, oil will drain from between the coupling parts

- All parts that are fitted for temporary protection, such as covers, caps and plates, have to be left in place as long as possible and are only to be removed for immediate connection to opposite parts.
- All temporarily unprotected parts are to be kept extremely clean.

1.1.3 Preparations to loosen the propeller from the shaft cone

1. Secure the propeller shaft against accidental rotation and axial movement.
2. Remove the plug and fit the lifting eyebolt (if applicable).
3. Connect the hoisting facilities to the propeller.
4. Remove the rope-guard and dis-connect the aft seal liner from the propeller.
5. Clean the propeller boss, cap and shaft.
6. Remove the propeller cap.
7. Unscrew the nut by a distance equal to the axial drive-up plus 3 mm minimum, but not more than the maximum distance as given on the drawing “Assembly hydraulic nut” or in the instruction manual of the hydraulic nut / ring.
8. Loosen and remove all plugs from the oil inlet connections.
9. Assemble and install the pump holder with the pressure gauges. See the instruction “Assembly of pump holder”.
10. Provide for all other necessary tools. See instruction “Tools and equipment for (de-) mounting of propeller”.
11. Bleed all air from the hydraulic nut / ring.
12. Pump the piston of the hydraulic nut / ring forward just enough to regain contact with the aft face of the propeller boss.

1.1.4 Loosen and demount the propeller from the shaft cone

**WARNINGS**

- MAKE SURE THAT HIGH PRESSURISED OIL CANNOT LEAK. PLACE PROTECTIVE GUARDS IN POSITION.
- ALWAYS WEAR PROTECTIVE GLASSES AND CLOTHES WHEN YOU WORK ON EQUIPMENT.
- OIL PIPES OR HOSES OF INSUFFICIENT STRENGTH CAN BURST UNDER PRESSURE. SEVERE INJURY CAN RESULT.
- DO NOT DISCONNECT HYDRAULIC PIPES OR HOSES WHEN PUMPS ARE OPERATING.
- MAKE SURE THAT ALL PROTECTIVE GUARDS AND COVERS ARE CORRECTLY INSTALLED.
- MAKE SURE THAT THE PROPELLER CONE AND SHAFT CONE PRESSURE IS TOTALLY RELEASED BEFORE RELEASING THE NUT PRESSURE.
- DANGER COULD RESULT IF THE PROCEDURES ARE NOT FOLLOWED. WÄRTSILÄ PROPULSION NETHERLANDS BV DOES NOT ACCEPT ANY CLAIM WITH RESPECT TO DAMAGE DONE AS WELL AS TO OPERATIONAL HAZARDS.

- THE INFORMATION GIVEN IN THIS CHAPTER IS FOR GUIDANCE ONLY. THE RESPONSIBILITY FOR FITTING REMAINS IN THE HANDS OF THE SHIPYARD AND TO THE SATISFACTION OF THE OWNERS AND THE CLASSIFICATION SOCIETIES.

- The protrusion of the piston of the hydraulic nut / ring shall not exceed the maximum value as given on the drawing “Assembly hydraulic nut / ring” or see the supplier’s manual.
1. Inject oil into the propeller boss by means of the oil injectors.
  The grip stress given on the drawing “Propeller boss” gives an indication of the required pressure level to be injected into the boss before the propeller start to loosen. The grip stress
for the ambient temperature (in N/mm², times 10 for bar) increased with an additional 15 % will be sufficient in most cases.

2. The propeller should soon start to move down the taper against the cushioning effect of the oil in the hydraulic nut / ring. After the propeller has moved the pump valve can be opened allowing oil to be ejected from the hydraulic nut / ring. The propeller should now move rapidly afterwards. It is important to keep pressure on the boss injectors during loosening of the propeller.

**Note**

If the propeller fails to move immediately, maintain the pressure at the maximum until it does move.

3. When the piston of the hydraulic nut / ring is fully closed and the propeller is not yet in its free position, release boss injector pressures while maintaining the hydraulic nut / ring pressure. Allow the propeller boss to settle and oil to drain off for a period of not less than 30 minutes. After that repeat steps 1 and 2.

4. Disconnect all hoses.

5. Put all plugs of the oil inlet connections into place.

6. Remove the pump holder.

7. Carefully pull–off the propeller from the shaft cone.

8. Put the propeller carefully in a safe position.

9. Clean the propeller bore, check the bore for burrs and damages, repair when necessary, clean and lightly oil the propeller bore. Pack the propeller hub.

10. Clean the propeller shaft cone, check the cone for burrs and damages, repair when necessary, clean and lightly oil the shaft cone. Pack the shaft cone.

11. Clean and store all tools and auxiliary equipment.