Maintenance

5.1 Cleaning in place (CIP)

The pump can be manually cleaned or cleaned in place (CIP). The following is an example of typical CIP procedure. However specific advice for each application should be sought from the pump supplier.

Typical CIP procedure

1. Flush through the system with cold water or boil water (6°C) (43°C).
2. Run hot caustic soda (70-80°C) (158-176°F) at 25% dilution through the system for 20-30 minutes.
3. Final flush through with cold water again.

5.2 Maintenance schedule

It is advisable to install pressure gauges on both sides of the pump so that any problems within the pump/pipework can be monitored.

Maintenance schedule

Your weekly schedule should include:

- Checking the oil level in the gear case with the pump stationary.
- Checking the seals for leakage.
- Checking the oil seals for leakage.
- Check pumping pressures.

In certain operational circumstances the pump will pose a thermal hazard and as suck should not be touched during operation.

After shutdown the pump unit should be allowed time cool.

Oil should be changed every 3000 hours of operation or a period of 2 years, whichever is the soonest.

Recommended spare parts (See the File named "Exploited view of Kataluein ALS model pump")

The table shows recommended spare parts that should be retained within your maintenance schedule.

Part description	Quantity
Lip seal drive end (oil seal-back)	1
O-ring rotor case cover (front cover –O-ring)	1
Lip seal gland end (oil seal-front)	2
O-ring rotor sealing shaft end	2
O-ring rotor sealing nut end	2
Prim art seals (Mech seals)	2

Rotor nut O-ring seal Replacement Interval
It is recommended that the rotor nut O-ring seal is replaced every 12 months to maintain a bacteria tight seal.

Rotor Nut seal Inspection
Periodically inspect the rotor nut O-ring seal for any discoloration, nicks, or cracks. If any of the defects above are noticed, the O-ring seal must be replaced. Inspection and replacement refer to the seal replacement procedure below.

Seal Replacement Procedure

1. Remove rotor case Cover (see 5.3 Dismantling, step 1),
2. Undo rotor nuts and ensure components are dry before servicing.
3. With a penlight, inspect rotor nut blind tapped hole for contamination. If soiled refer to cleaning procedure below.
4. Remove and discard rotor nut O-ring seal.
5. Fir new rotor nut O-ring seal.
6. Fir rotor nut and use a torque wrench to tighten to correct torque value.
7. Fit the rotor case cover.

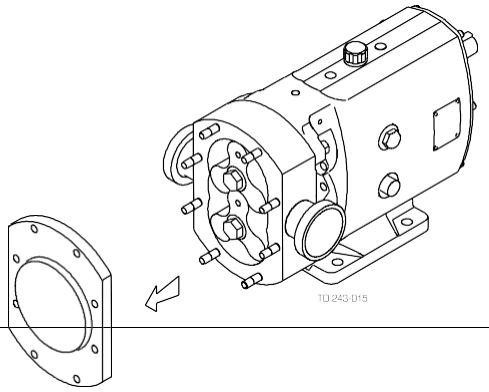
Cleaning Procedure for Soiled Rotor Nut Tapped Hole

1. Remove rotor nut from the shaft.
2. Submerge and soak nut for 5 minutes in COP tank with 2% caustic wash.
3. Scrub the hole with internal thread vigorously by plunging a clean sanitary bristle pipe brush in and out of the hole for two minutes while submerged.

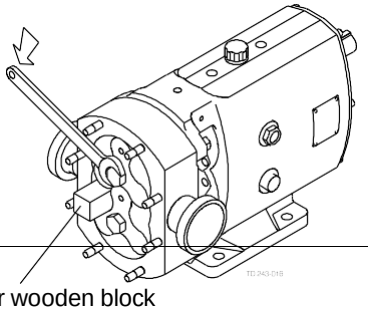
4. Soak nut in acid sanitizer for 5 minutes, and then scrub the hole again with the pipe brush for two minutes.
5. Rinse well with clean water and blow-dry blind tapped hole with clean air.
6. Swab test the inside of the tapped hole to determine cleanliness.
7. Should the swab test fail, repeat steps 2 thru 6 above until swab test is passed. Should swab testing continue to fail, or time is of the essence, install a new rotor nut.

Dismantling

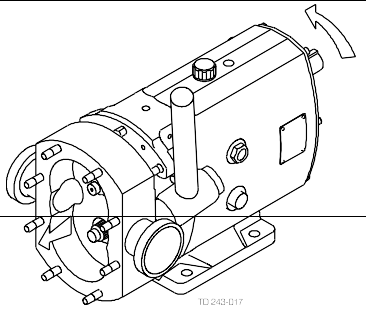
Step 1
Before dismantling the pump refer to safety precautions. See exploded view drawings (chapter 7 Parts list).
Removing rotor case cover
1. Remove rotor case cover nuts (13) and cover (12).



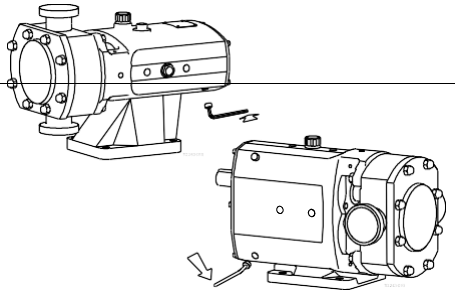
Step 2
Removing rotors
1. Insert a plastic/wooden block between the two rotors (17) to stop them turning.
2. Remove rotor retention nuts (22) and rotors. Pump series 6 rotors are retained by torque locking assemblies, TLA's (19) and can be removed by:
   - Remove the rotor cap to reveal the TLA.
   - The screws now visible are unscrewed and the TLA is removed.



Step 3
1. For packed gland seals loosen the gland followers to relieve the packing pressure on the shaft.
   For flushed mechanical seal arrangements, remove the seal housing retaining nuts and ease the seal housings from the rotor case.
2. Remove rotor case retaining nuts (4) and washers (4A).
3. Tap both sides of the rotor case (9) with a soft mallet.
4. Take care not to damage mechanical seals. The rotor case must not be allowed to drop onto the shafts (24 and 25) during the removal process.
5. Shims (8) should not be removed unless rotor clearances require resetting.



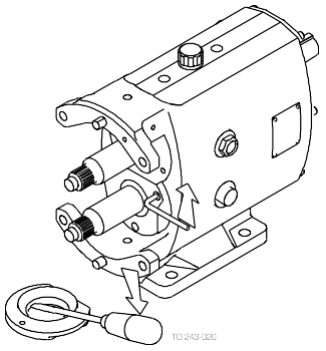
Step 4
Draining pump lubrication
1. Place a tray under the gear case to collect the waste lubricating oil.
2. Remove the lower drain plug (45) at the side of the gear case (1).



Step 5

Removing seal retainers

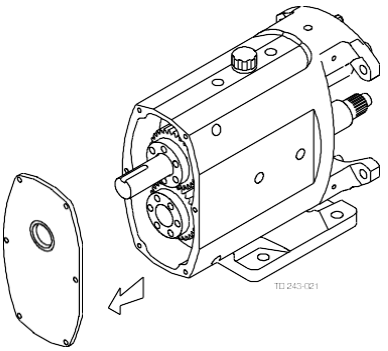
1. Remove screws (15).
2. Then remove seal retainers (14) - as a liquid sealant has been used a lever may be required to remove retainers.
3. The lip seals (16) can be removed using a screwdriver/ lever once the seal retainers are removed. It is essential to renew the lip seals and it is recommended that new gaskets or sealant be used prior to reassembly.



Step 6

Removing Gear case Cover

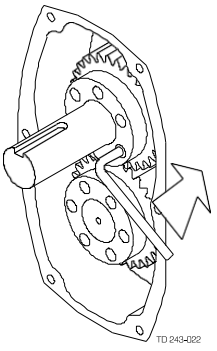
1. Remove screws (6).
2. Remove gear case cover (5) after breaking the gasket seal then press out the lip seal (7). It is essential to renew the lip seal prior to reassembly.

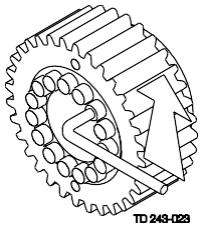


Step 7

Removing timing gears

1. Release clamp plate screws (40) and remove clamp plate (39) on pump series 1,2 and 3. For pump series 4,5 and 6 remove the torque locking assembly screws in several stages.
2. Remove gears (36) using the tapped extraction holes provided, or remove shaft assembly as shown in step 8 below.

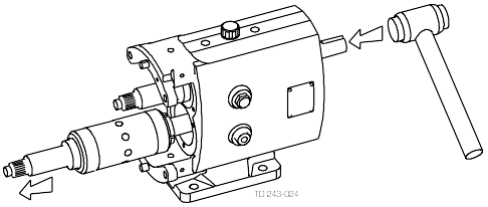




Step 8

Shaft assembly removal

1. Using a soft mallet gently tap the rear end of each shaft (24 and 25), to remove through the front of the gear case (1).
2. Support each shaft during removal from the gear case.
3. Remove the shaft abutment spacer (27).
   - For vertically ported pumps this is placed in the right hand bearing bore when viewed on the front face of the gear case.
   - For horizontally ported pumps the shaft abutment spacer is placed in the top bearing bore.



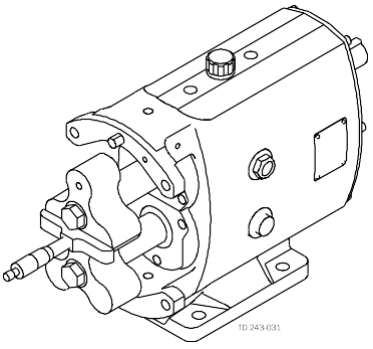
Checking rotor abutment alignment

Step 1

Incorrect setting of rotor alignment will damage the pump.
Fit rotors onto shafts (24 and 25) and tighten rotor retention nuts (22).

Step 2

1. Using a depth micrometer ensure axial alignment is within tolerance of 0.012mm (0.0005 in).
2. If the alignment is incorrect, the shaft abutment spacer (27) must be replaced/machined.



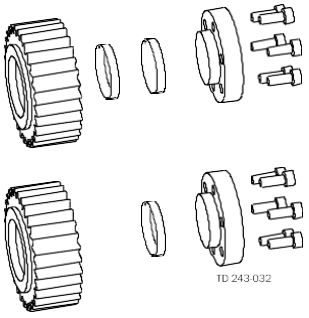
Fitting timing gears

Step 1

Slide timing gears (36) onto shafts (24 and 25), realigning timing marks.

Step 2

1. Before fitting the torque locking devices (38) lubricate them with gear oil. Series 1, 2 and 3 high pressure pumps (i.e. LD and HD models) have two sets of elements.
2. Series 4, 5 and 6 pumps have torque locking assemblies.

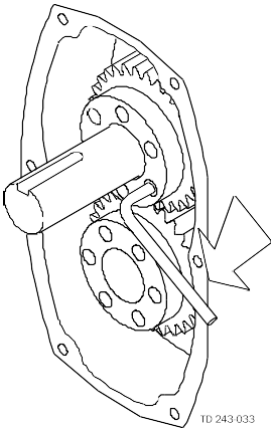


Step 3

Fit timing gear clamp plates (39) - series 1, 2 and 3 only.
Fit torque locking assemblies (37) - series 4, 5 and 6 only.

Step 4

Timing adjustment is now required:
Tighten one clamp plate/torque locking assembly only, allowing rotation of the shaft in the other gear for timing adjustment. See Adjusting Rotor Timing section 5.4.6.



Adjusting rotor timing

Step 1

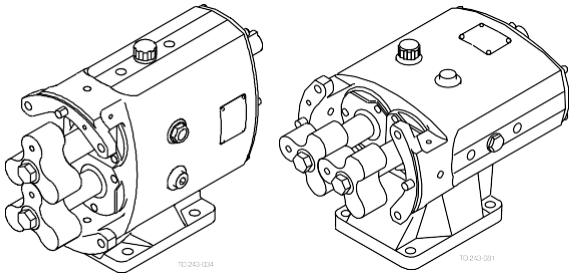
If the rotor timing requires adjustment (and assuming the pump has not yet been re-built), it is important to establish the cause for the rotors mistiming before proceeding.

To allow timing adjustment ensure that one shaft is able to rotate within the torque locking assembly/element. The other torque locking assembly/element should be tightened to the recommended torque.

Step 2

Set the rotors (17) to the positions shown with the rotor dimples in the 6-12 o'clock plane (horizontally ported pumps) or 3-9 o'clock plane (vertically ported pumps).

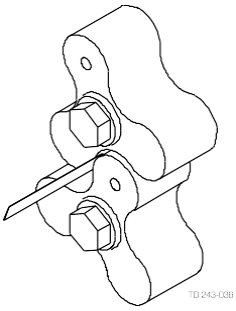
For the rotor on the drive shaft the rotor dimple should be aligned with the drive shaft keyway.



Dimples

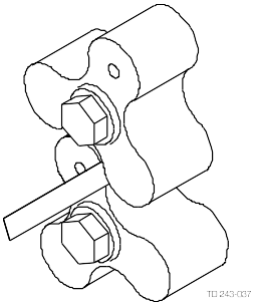
Step 3

Turn the shaft so that the rotors are in the new positions as shown.



Step 4

Using feeler gauges measure between the points indicated, turning the shaft as required.



Step 5

If the measurement points are unequal tap the rotor which is on the free turning shaft until equal measurement through 6 points is achieved.

Step 6

Tighten the torque locking assemblies or clamp plate screws. Confirm timing is still correct. Remove the rotors

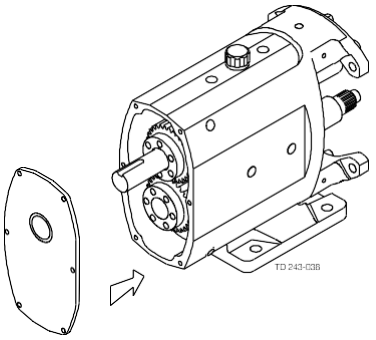
Fitting gear case cover

Step 1

Clean the gear case cover bore and remove all gasket material from the face. Press a new lip seal (7) into the cover (5). For temperatures greater than 130°C (266°F) FPM lip seals are fitted.

Step 2
Apply liquid gasket to the face of the cover where it mates with the gear case.

Step 3
Smear oil on the inner lip of the lip seal and carefully slide the cover over the shaft ensuring the lip seal is centered and not cut or damaged. Tighten the screws (6).



Fitting and shimming rotor case

The rotor case may require re-shimming if new components have been fitted. Back clearances must be checked before operating the pump. See 5.2 Pump head Clearance information.

NOTE!
Your supplier can advise the correct clearances from the pump serial number. Should they need adjustment follow steps below. Any incorrect setting of clearances is likely to damage the pump in operation. Plastic shims vary in color for different thickness, and are grouped in packs at the top and bottom of the rotor case held in place by shim retainers. For temperatures greater than 130°C (266°F) and/or for ATEX stainless steel shims are fitted. Shims can be stacked unequally providing the clearances are achieved.

Step 1
1. Remove the shim retainers (8A) and fit one of the thinnest shims (8) to top and bottom position.
2. Replace shim retainers and screws (8B).
3. Fit the rotor case (9) to the gear case (1), tighten the rotor case retaining nuts (4) and fit the rotors (17).

The back clearances can now be measured using feeler gauges. The additional shimming required to bring the clearances within tolerance can be determined, fit additional shims and re-check the clearances.

Step 2
Remove the rotor case to allow fitting of product seals.