

Instruction Manual

nEXT Service Tool Kit

Description	Item Number
nEXT Bearing Service Tool Kit	B80000805
nEXT Oil Cartridge Service Tool Kit	B80000812

Original Instructions



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For return of equipment, complete the HS Forms at the end of this manual.

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Associated publications

Publication title	Publication number
Vacuum pump and vacuum system safety	P400-40-100

1 Introduction

1.1 Scope and definitions

This manual provides instruction for the removal and insertion of the bearing module.

Remove the bearing module as specified in this manual.

2 Safety

The units used throughout this manual conform to the SI international system of units of measurement.



WARNING

Wait until the pump is stationary (no lights illuminated on the pump drive) before starting to work on the pump. Disconnect the pumping system and accessories from the electrical supply so that they cannot be operated accidentally.

3 Unpack and inspect

Remove all packaging and check that all items listed in Tables 1 and 2 have been received. If any item is missing, notify the supplier as soon as possible.

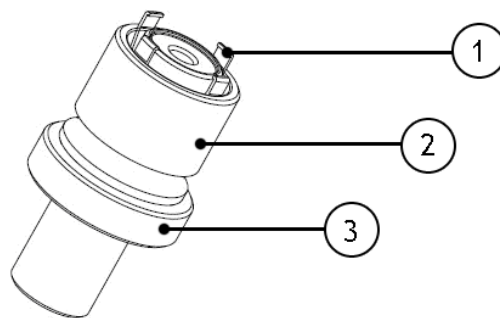
Table 1 - Checklist of components for bearing service tool kit B80000805

Qty	Description	Check (✓)
1	Bearing module removal/insertion tool (Figure 1).	<input type="checkbox"/>
1	Instruction manual	<input type="checkbox"/>

Table 2 - Checklist for oil cartridge service kit B80000812

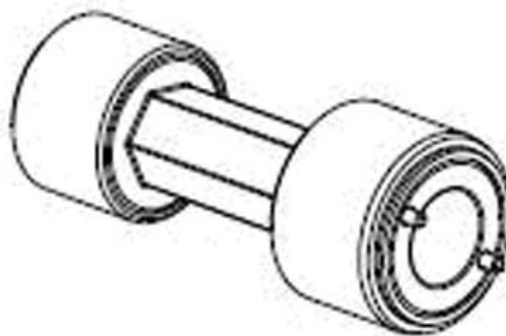
Qty	Description	Check (✓)
1	Pin spanner (Figure 2).	<input type="checkbox"/>
1	Instruction manual	<input type="checkbox"/>

Figure 1 - Bearing module



1. Bearing module grips
2. Collar
3. Ring nut

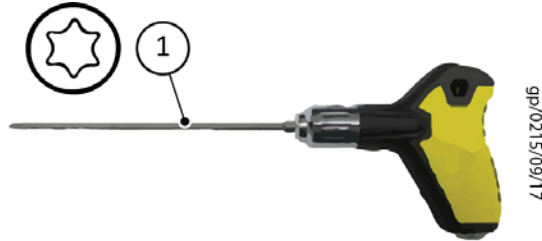
Figure 2 - Pin spanner



3.1 Additional tools required

- T15 Torx T-Type screwdriver. Similar to the one shown in Figure 3.

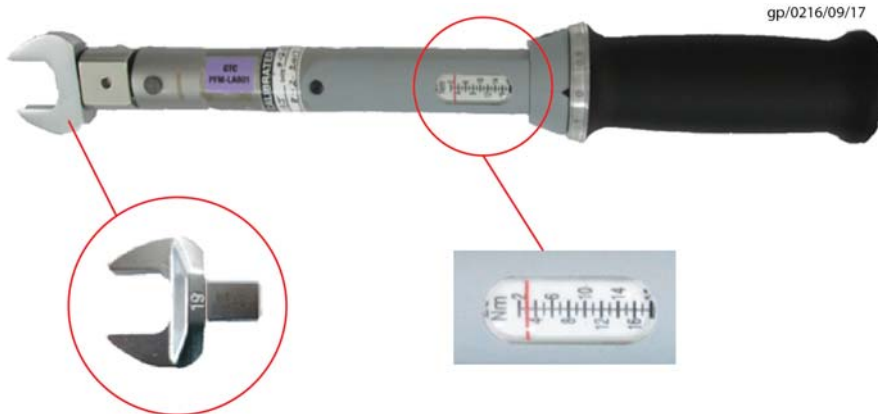
Figure 3 - T15 Torx T-type screwdriver



1. 5 mm maximum shaft diameter

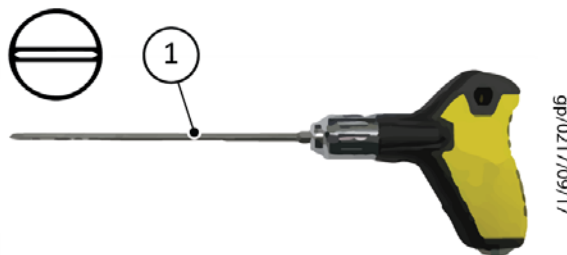
- 19 mm open ended torque wrench, (can be set to 3 Nm and 10 Nm). Similar to the one shown in Figure 4.

Figure 4 - 19 mm open ended torque wrench



- 4.5 mm parallel tip T-Type screwdriver. Similar to the one shown in Figure 5.

Figure 5 - 4.5 mm parallel tip T-Type screwdriver



1. 5 mm maximum shaft diameter

4 Bearing module removal

CAUTION

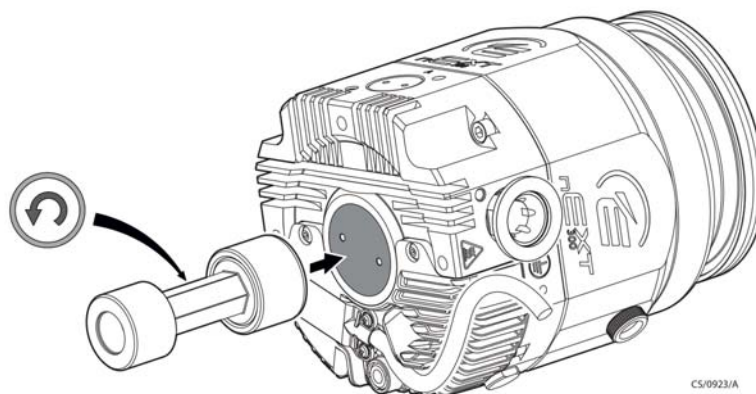
The bearing module should be handled with latex gloves or equivalent, and any cleaning of components must be done using lint free cloth.

4.1 Oil cartridge removal:

Refer to Figure 6.

- Locate the pin spanner into the holes on the oil cartridge (shaded) at the base on the pump.
- Using a 19 mm spanner on the flats on the middle section of the pin spanner, turn anti-clockwise to loosen the oil cartridge. Remove the oil cartridge from the pump body.

Figure 6 - Oil cartridge removal

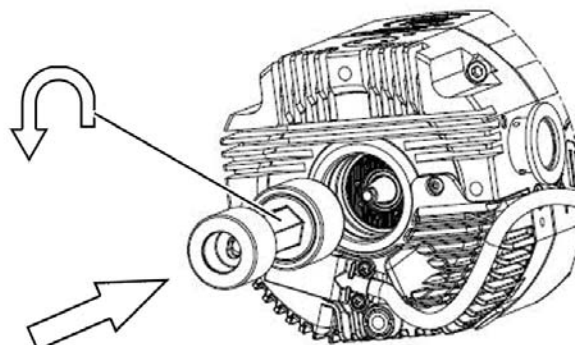


4.2 Bearing retainer ring removal

Refer to Figure 7.

- Locate the pin spanner onto the bearing retainer ring (shaded in Figure 7) inside the pump body.
- Using a 19 mm spanner on the flats on the middle section of the pin spanner, turn anti-clockwise to loosen the bearing nut. Remove the bearing nut from the pump body.

Figure 7 - Bearing retainer ring removal



4.3 Taper nut removal (old style)

Refer to Figures 8 and 9.

- Insert a 4.5 mm parallel tip T-Type screwdriver through the pin spanner so the blade tip protrudes out of the end with the slot.
- Insert the tip of the screwdriver through the hole in the taper nut (shaded in Figure 9) and locate the tip into the slot on the pump shaft.
- Whilst holding the T-Type screwdriver still and using a 19 mm spanner on the flats on the middle section of the pin spanner, turn the pin spanner anti-clockwise to loosen the taper nut. Remove the taper nut from the pump shaft.

Figure 8 - Taper nut removal

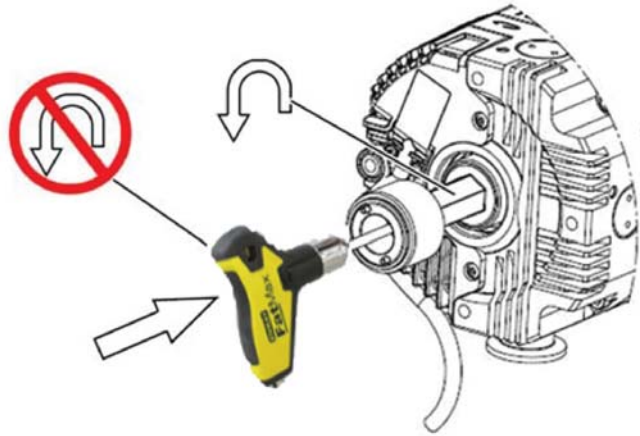
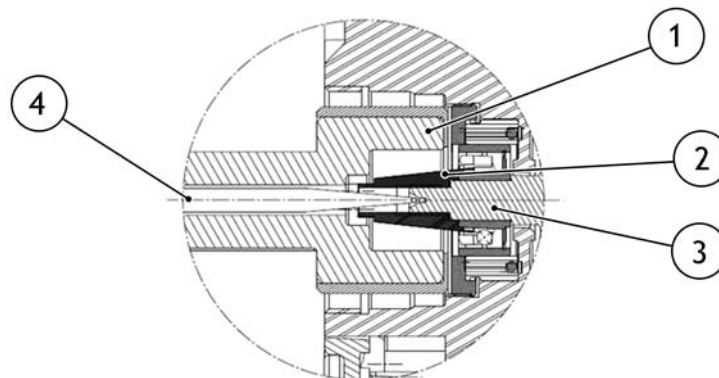


Figure 9 - Taper nut removal (sectioned view)



1. Pin spanner
2. Taper nut
3. Pump shaft
4. Screwdriver

4.4 Taper nut removal (new style)

Refer to Figures 10 and 11.

- Insert a T15 Torx T-Type screwdriver through the pump inlet/spider centre hole to Torx hole at the end of the shaft.
- Locate the pin spanner onto taper nut (shaded in Figure 11) inside the pump body.
- Whilst holding the T-Type screwdriver still and using a 19 mm spanner on the flats on the middle section of the pin spanner, turn the pin spanner anti-clockwise to loosen the taper nut. Remove the taper nut from the pump shaft.

Figure 10 - Taper nut removal

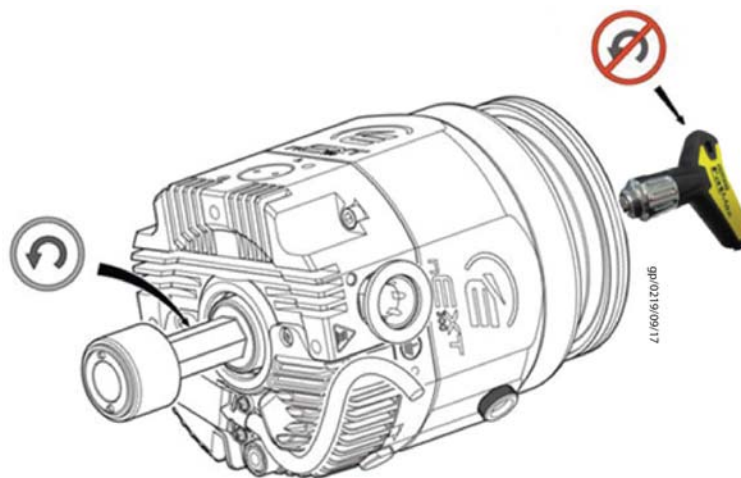
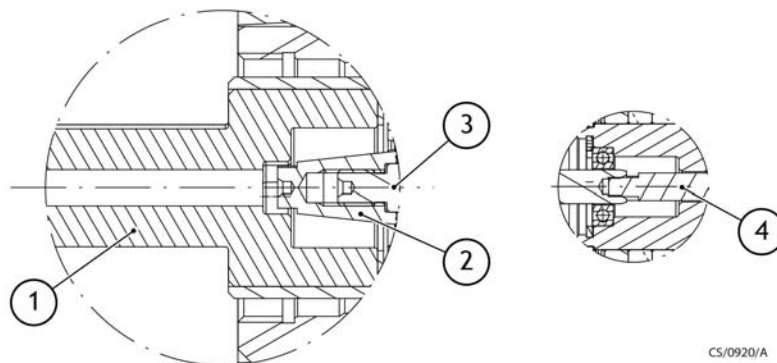


Figure 11 - Taper nut removal (sectioned view)



1. Pin spanner
2. Taper nut
3. Pump shaft
4. Screwdriver

4.5 Bearing module removal

Refer to Figures 12 and 13.

- Turn the ring nut (Figure 1, Item 3) anti-clockwise on the bearing module tool until the bottom of the nut is in-line with the bottom of the thread.
- Pull back the collar (2) until it touches the ring nut.
- Insert the tool into the pump body.
- Push the collar into the pump until it stops.
- Turn the ring nut clockwise until it stops.
- Remove the bearing module (shaded in Figure 12) by pulling out the tool (Figure 13).

Figure 12 - Bearing module removal (sectioned view)

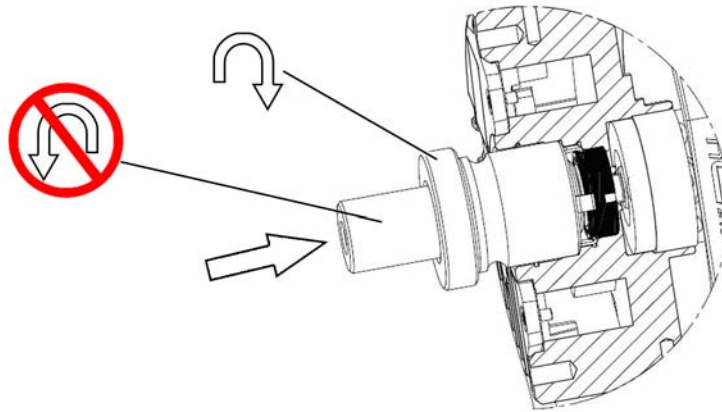
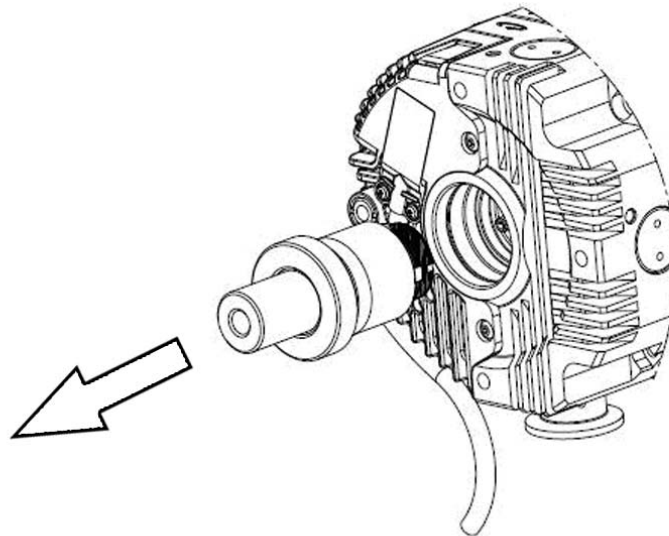


Figure 13 - Bearing module removal



5 Bearing module insertion

CAUTION

The bearing module must be kept free of contamination by particles (metallic fines, dust, human skin and hair).

To ensure this:

Clean the immediate working area and wipe clean the base of the pump with lint-free cloth before starting work

Ensure all hand tools are scrupulously clean and free from damage or burrs (de-magnetizing hand tools is recommended)

Always wear gloves when handling the bearing unit and surrounding parts

A laminar flow bench or clean room is helpful but not essential

CAUTION

The bearing module should be handled with latex gloves or equivalent, and any cleaning or components must be done using lint free cloth.

5.1 Bearing module insertion

Refer to Figures 14, 15 and 16.

- Place the bearing module onto the tool as shown in Figure 14.
- Secure the bearing module on to the tool by winding the ring nut clockwise until it stops and the bearing module is gripped, as shown in Figure 15.
- Insert the bearing module into the pump body ensuring it is located fully home.
- Remove the tool by winding the ring nut anti-clockwise, pulling back the collar and pulling the tool out from the pump body.

Figure 14 - Bearing module unsecured

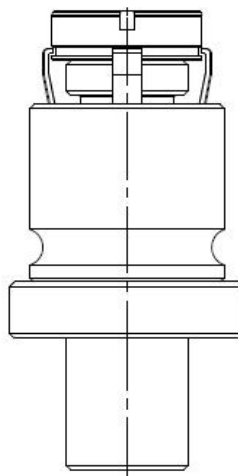


Figure 15 - Bearing module secured

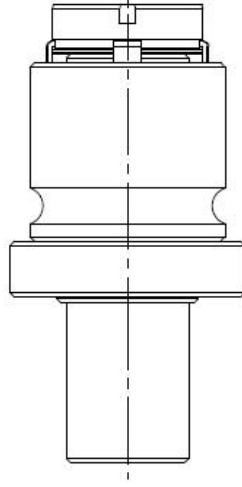
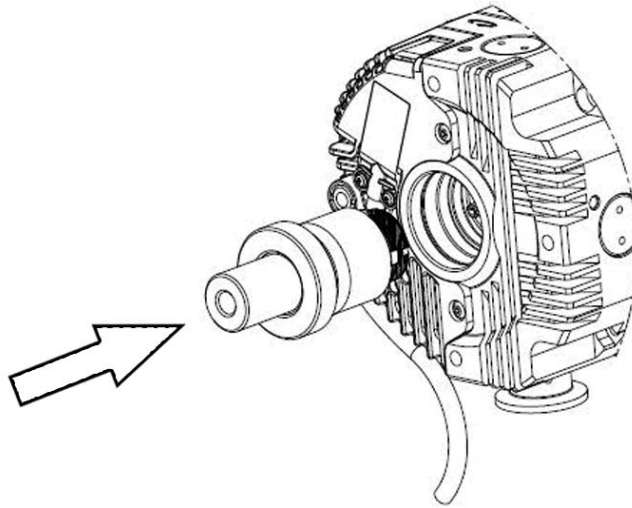


Figure 16 - Bearing module insertion

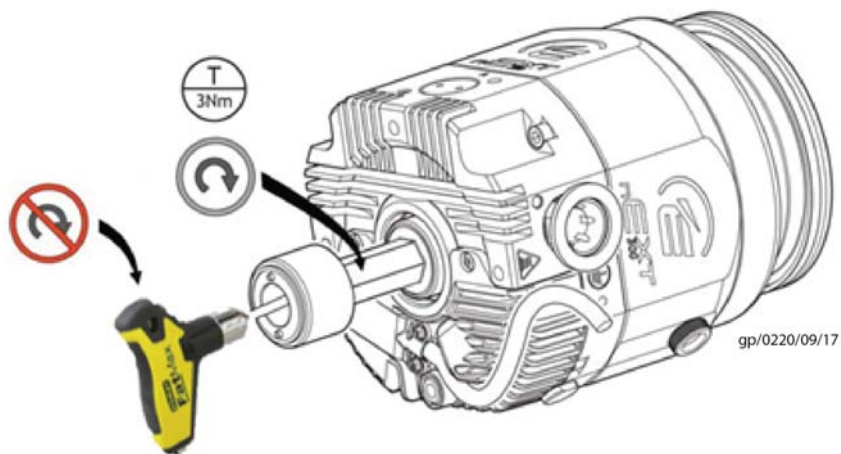


5.2 Taper nut assembly (old style)

Refer to Figure 17.

- Screw the taper nut onto the pump shaft.
- Secure the taper nut using a 4.5 mm parallel tip T-Type screwdriver and pin spanner. Apply a torque of 3 Nm to the taper nut using a 19 mm open ended torque wrench (Figure 4) across the flats on the middle part of the pin spanner and a suitably sized torque wrench.

Figure 17 - Taper nut insertion

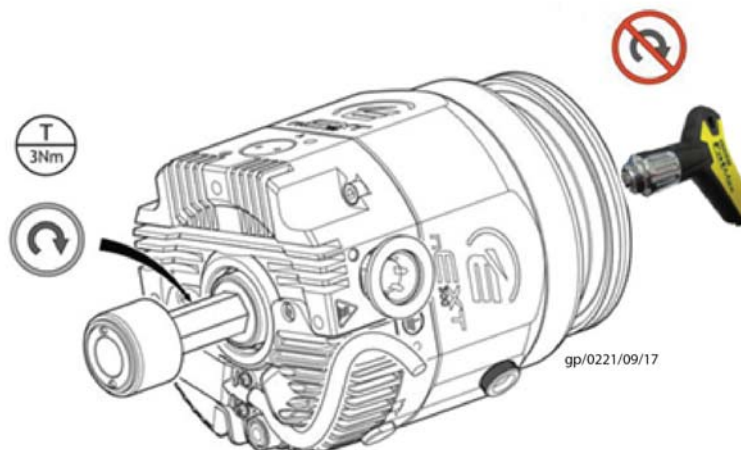


5.3 Taper nut assembly (new style)

Refer to Figure 18.

- Screw the taper nut onto the pump shaft.
- Secure the taper nut using a T15 Torx T-Type screwdriver (Figure 3) and pin spanner. Apply a torque of 3 Nm to the taper nut, by using a 19 mm open ended torque wrench (Figure 4) across the flats on the middle part of the pin spanner and a suitably sized torque wrench.

Figure 18 - Taper nut insertion

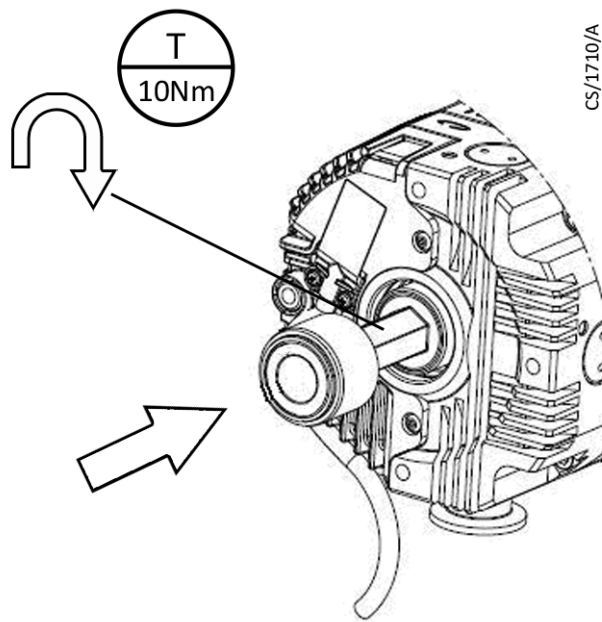


5.4 Bearing retainer nut insertion

Refer to Figure 19.

- Place the bearing nut onto the “pinned” end of the pin spanner with the flat face resting on the pin spanner.
- Insert the bearing retainer nut into the pump body and tighten loosely by hand.
- Apply a torque of 10 Nm to the bearing retainer ring, by using a 19 mm open ended torque wrench (Figure 4) across the flats on the middle part of the pin spanner and a suitably sized torque wrench.

Figure 19 - Bearing retainer nut insertion

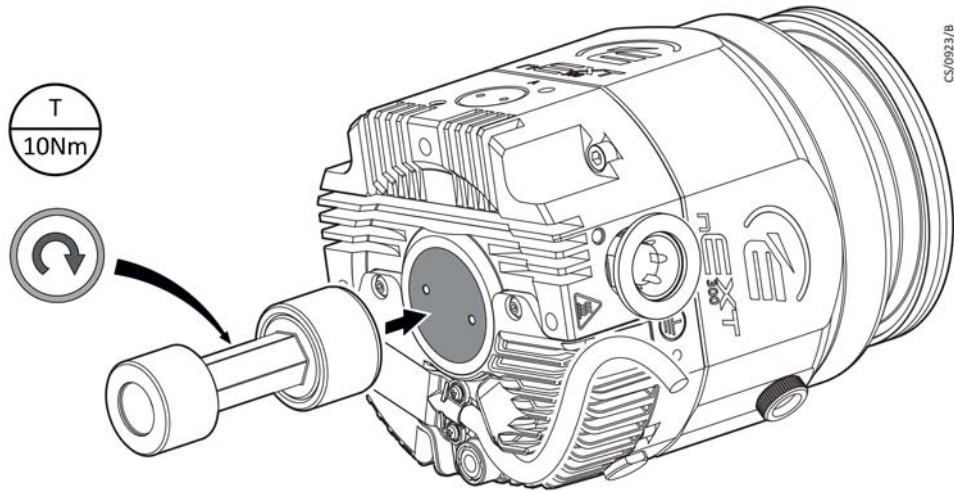


5.5 Oil cartridge assembly

Refer to Figure 20.

- Locate the oil cartridge into the pump body loosely by hand.
- Tighten the oil cartridge using the pin spanner and 19 mm spanner.
- Apply a torque of 10 Nm to the oil cartridge, by using a 19 mm open ended torque wrench (Figure 4) across the flats on the middle part of the pin spanner and a suitably sized torque wrench.

Figure 20 - Oil cartridge assembly



CAUTION

Discard gloves and wash hands thoroughly before handling the re-assembled pump. Avoid contaminating the vacuum flanges or other high vacuum parts with lubrication oil or other hydrocarbons.

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6 Port adaptor tool

The port adaptor tool (Figure 21) can be used for the removal and insertion of port flanges used on the nEXT range of turbo pumps.

The tool is inserted into the flange port where the pins at the end of the tool locate with the slots machined into the bore of the port.

Figure 21 - Port adaptor tool






6.1 Additional tools required

- 15 mm A/F spanner.
- 15 mm socket.
- Torque wrench capable of applying a 15 Nm torque.

6.2 nEXT flange ports

The following flange ports are used on the nEXT turbo pumps:

Table 3 - nEXT port flanges

<p>NW25 flange/M28 thread used on 'I' variants.</p>	
<p>NW25 flange/M22 thread used as backing port on all variants & booster port flange on 'T' variants.</p>	
<p>'C' - clamp port adaptor NW16/M22 thread used in place of the backing port for use in confined spaces.</p>	

6.3 Port removal/insertion

6.3.1 Port removal

- Insert the port adaptor tool into port to be removed, ensuring the pins on the tool locate with the slots in the bore.
- Rotate the tool anti-clockwise using a 15 mm A/F spanner.
- Remove the port from the pump.

6.3.2 Port insertion

- Insert the port to the pump loosely by hand ensuring the O-ring is in place.
- Insert the port adaptor tool into the port ensuring the pins on the tool locate with the slots in the bore.
- Rotate the port adaptor tool clockwise using either a 15 mm A/F spanner or a 15 mm socket.
- Apply a 15 Nm torque to the port.

7 Resetting the service indicator

7.1 Introduction

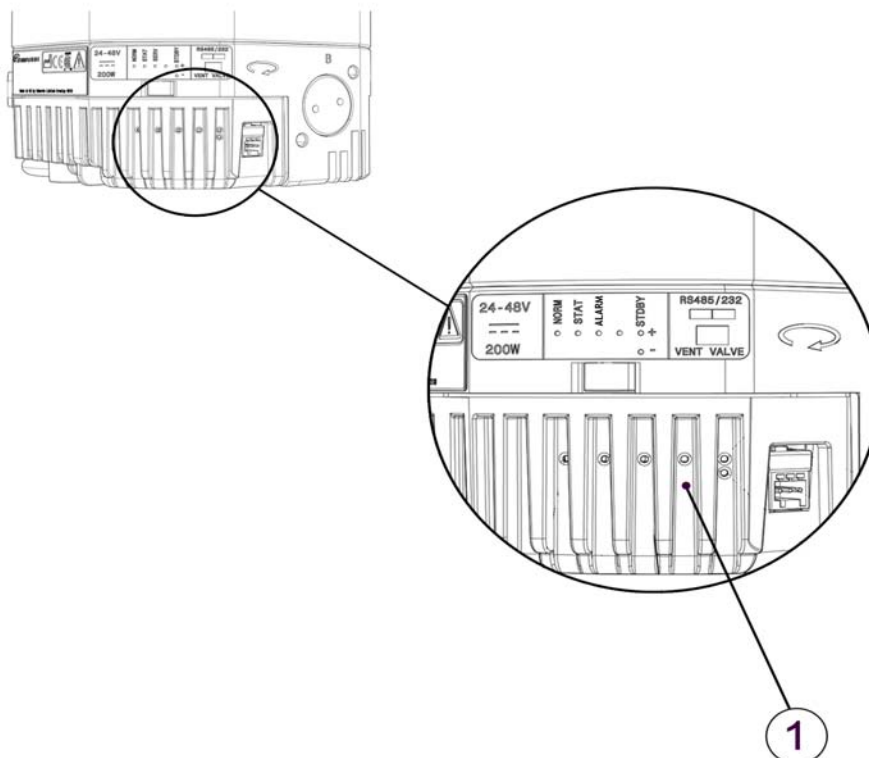
Whenever an oil cartridge and or bearing module are replaced, it is recommended that the service indicator LED is reset to maintain the service scheduling of the pump.

7.2 Indicator reset procedure (manual method)

- Plug the logic interface cable from the nEXT pump into either the TIC controller or customer supplied control system if a TIC is not being used.
- Push and hold the service reset button as indicated in [Figure 1](#) using a suitable fine nib tool.
- Switch on the TIC controller via the switch at the rear of the unit, or customer supplied control system if a TIC is not being used.
- Wait 3 seconds.
- Release the service reset button.

The service indicator has been now been reset to zero.

Figure 22 - nEXT drive service reset button



1. Reset button

7.3 Indicator reset procedure (serial communications method)

To reset the oil cartridge service interval following an oil cartridge change, send the following command over the serial communications link:

Command	!	C	8	8	6	sp	1	cr
---------	---	---	---	---	---	----	---	----

The reply received will be as follows:

Command	*	C	8	8	6	sp	1	cr
---------	---	---	---	---	---	----	---	----

To reset the bearing service interval following a bearing change, send the following command over the serial communications link:

Command	!	C	8	8	5	sp	1	cr
---------	---	---	---	---	---	----	---	----

The reply received will be as follows:

Command	*	C	8	8	5	sp	1	cr
---------	---	---	---	---	---	----	---	----

8 Disposal

Dispose of the oil cartridge, bearing module and any components from the pump safely and in accordance with all local and national safety and environmental regulations.

Refer to [Section 2](#) of the pump instruction manual B80000880 for details of the materials exposed to gases pumped.

Take particular care with the following:

- Components that have come into contact with pump fluid.
- Components which have been contaminated with dangerous process substances.

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