



nEXT55/85 Service Tool Kit

INSTRUCTION MANUAL

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Published: 10/6/2022

Associated publications

Publication title	Publication number
Bearing exchange tool kit	B8G2XXXXX
Bearing exchange tool kit	B8E2XXXXX
Turbo instrument controller	D397228XX
nST Support toolkit instruction	D396498XX

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Product warranty and limit of liability are dealt with in our standard terms and conditions of sale or negotiated contract under which this document is supplied.

You must use this product as described in this manual. Read the manual before you install, operate, or maintain the product.

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1. Safety and compliance

For safe operation from the start, read these instructions carefully before you install or commission the equipment and keep them safe for future use. Read all the safety instructions in this section and the rest of this manual carefully and make sure that you obey these instructions.

1.1 Definition of Warnings and Cautions

Important safety information is highlighted as warning and caution instructions which are defined as follows. Different symbols are used according to the type of hazard.

WARNING:

If you do not obey a warning, there is a risk of injury or death.

CAUTION:

If you do not obey a caution, there is a risk of minor injury, damage to equipment, related equipment or process.

NOTICE:

Information about properties or instructions for an action which, if ignored, will cause damage to the equipment.

We reserve the right to change the design and the stated data. The illustrations are not binding.

1.2 Trained personnel

For the operation of this equipment “trained personnel” are:

- skilled workers with knowledge in the fields of mechanics, electrical engineering, pollution abatement and vacuum technology and
- personnel specially trained for the operation of vacuum pumps

1.3 Safety symbols

The safety symbols on the products show the areas where care and attention is necessary.

The safety symbols that we use on the product or in the product documentation have the following meanings:

	<p>Warning/Caution An appropriate safety instruction must be followed or caution to a potential hazard exists.</p>
	<p>Warning - Dangerous voltage Identifies possible hazards from hazardous voltages.</p>

2. Introduction

2.1 Scope and definitions

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

Remove the bearing module as specified in this manual.

3. Unpack and inspect

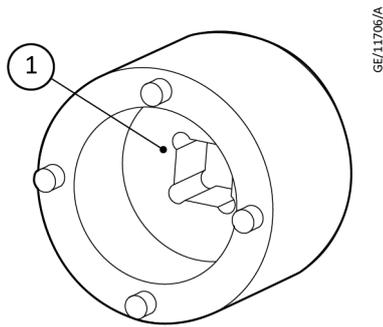
3.1 Unpack and inspect

Remove all packaging and check that all items in [Table: Checklist of items for B8G200840](#) or [Table: Checklist of items for B8E200845](#) have been received. It depends on the set of the tool kit which you ordered. If any items are missing, notify the supplier as soon as possible.

Table 1 Checklist of items for B8G200840

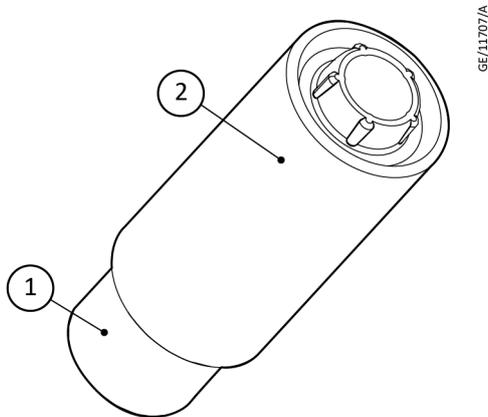
Quantity	Description	Refer to	Check (✓)
1	Pin spanner adaptor	Figure: Pin spanner adaptor	<input type="checkbox"/>
1	Bearing module extractor tool	Figure: Bearing module extractor tool	<input type="checkbox"/>
1	Bearing preload tool	Figure: Bearing preload measurement and setting tool	<input type="checkbox"/>

Figure 1 Pin spanner adaptor



1. 1/4" Square drive

Figure 2 Bearing module extractor tool



1. Bearing anti-rotating tube

2. Bearing extractor sleeve

Figure 3 Bearing preload measurement and setting tool

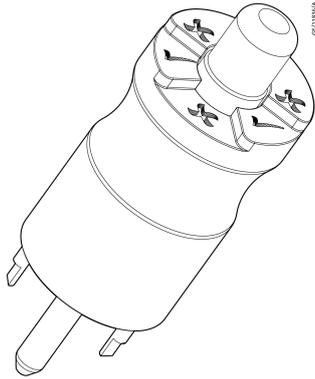
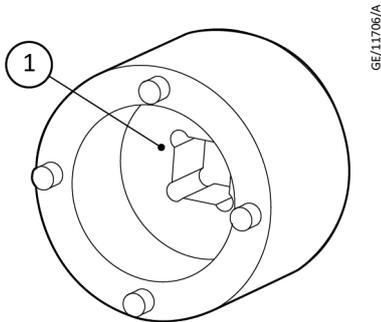


Table 2 Checklist of items for B8E200845

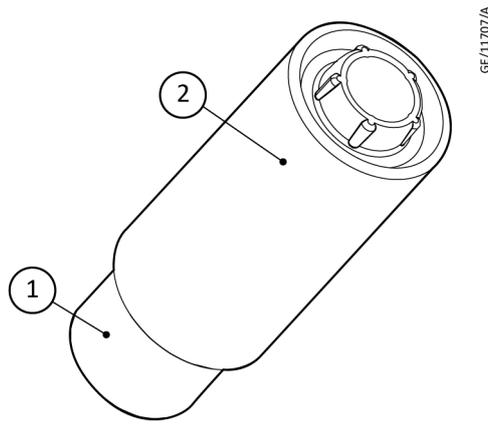
Quantity	Description	Refer to	Check (✓)
1	Pin spanner adaptor	<i>Figure: Pin spanner adaptor</i>	<input type="checkbox"/>
1	Bearing module extractor tool	<i>Figure: Bearing module extractor tool</i>	<input type="checkbox"/>
1	Bearing preload tool	<i>Figure: Bearing preload measurement and setting tool</i>	<input type="checkbox"/>

Figure 4 Pin spanner adaptor



1. ¼" Square drive

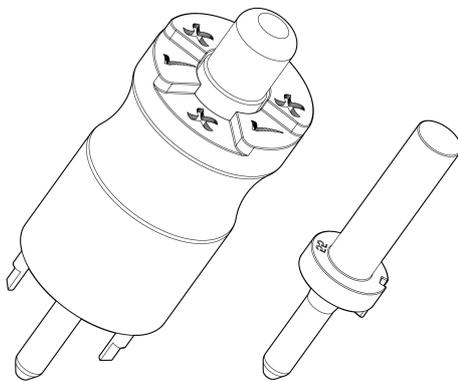
Figure 5 Bearing module extractor tool



1. *Bearing anti-rotating tube*

2. *Bearing extractor sleeve*

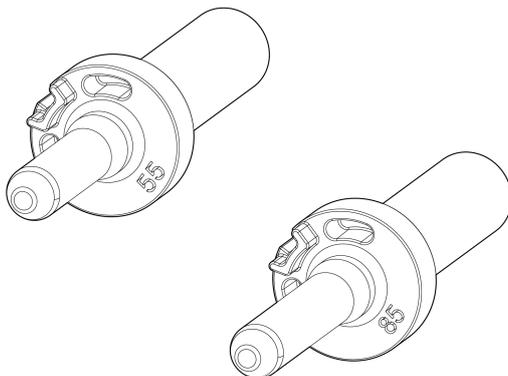
Figure 6 Bearing preload measurement and setting tool



3.2 Bearing preload measurement and setting tool preparation B8E200075

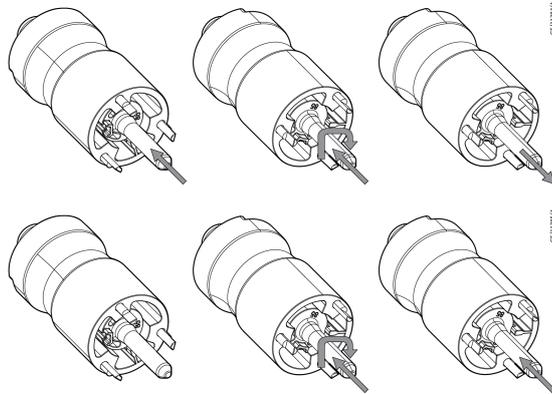
Bearing preload measurement and setting tool B8E200075 is multifunction tool for nEXT85 and nEXT55 variant. Tool can be used for all variants of nEXT55 and nEXT85 pumps. There are two plungers marked 85 or 55 depends on the pump. [Figure: Bearing preload measurement and setting plungers](#)

Figure 7 Bearing preload measurement and setting plungers



Plungers can be easily changed. Refer to the [Figure: Plunger change](#). Press the plunger and rotate and align the groove on the plunger to the pad on the body of the tool. Remove the plunger and make the opposite process with suitable plunger.

Figure 8 Plunger change



3.3 Additional tools and items required

Additional tools are required to perform a bearing module and oil cartridge replacement. These items are not part of the bearing exchange tool kit B8G200840 or B8E200845 and will need to be acquired separately. The example of tools shown below may look different depending their make and supplier.

Quantity	Description	Typical image
1	T15 Torx screwdriver	
1	Torque driver (Torque range required 2 to 6 N-m.)	
1	¼" square drive	
AR*	Lint-free cloth	
1	2.5 mm AF hex key, or T-bar	
1	T10 Torx drive bit	

Quantity	Description	Typical image
1	4 mm hex bit	
AR*	Latex gloves (recommended)	

* As required.

3.4 Service kit

Before commencing with the bearing module service, confirm that you have purchased the correct bearing and oil cartridge service kit B8G200811.

4. Pre-service preload check



WARNING: ELECTRICAL HAZARD

Risk of electrical shock. Wait until the pump is stationary and electrically isolated before removing and servicing your pump.

The service instructions section describes how to perform an oil cartridge and bearing module replacement. Part of this process involves checking the bearing preload condition after the service has been completed (Refer to [Appendix](#) on page 29 for explanation of the bearing preload). In order to familiarise yourself on how to recognize bearing preload after a service, we recommend that you follow the “Bearing preload familiarisation” instructions below

4.1 Bearing preload familiarisation



CAUTION: PART CONTAMINATION

Risk of damage equipment. To avoid contamination of the rotor, make sure all tools are clean and free of dirt and grease.

If the pump has suffered any damage (i.e. the rotor does not spin freely or quietly), we recommend that you do not proceed with this service and that you should contact your local service centre for advice.

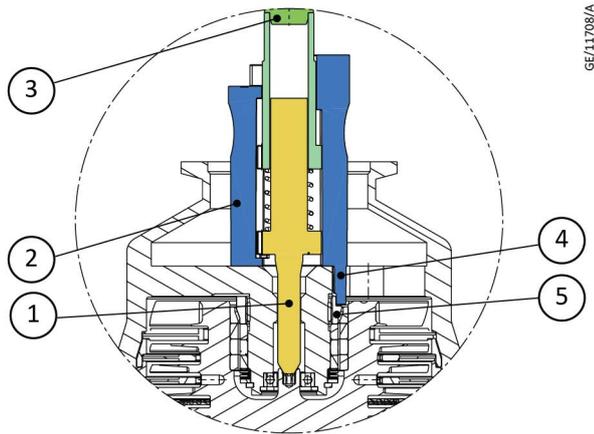
This procedure should be performed with the pump placed in the vertical position.

- Place the preload tool onto the inlet of the turbomolecular pump. The force probe must be located into the centre of the pump inlet with the adjuster legs engaged onto the magnetic bearing adjuster nut [Oil feed nut removal](#) on page 17.
- It is recommended that you support the preload tool body in position while performing the preload check.
- Apply pressure by pushing the test plunger until a change in preload can be detected*, releasing the test plunger will return the preload back to its original position. It is recommended that you press and release the test plunger slowly while performing this check.

Note

** Detection of the bearing preload can be recognised by a distinct sound , this maybe accompanied by a sensory feel through the tool and pump body. If you are unable to detect any preload change, you may carry on with the service but with caution.*

Figure 9 Locating the preload tool (nEXT85 NW40 variant shown)



GE/11708/A

- 1. *Preload tool force probe*
- 2. *Preload tool body*
- 3. *Preload test plunger*
- 4. *Preload tool adjuster legs*
- 5. *Magnetic bearing adjuster nut*

5. Service instructions



CAUTION: BEARING CONTAMINATION

Risk of injury. We highly recommend that the bearing module service should be performed in a clean environment, free from contamination (metallic fines, dust, human skin and hair).



CAUTION: SYSTEM SAFETY

Risk of damage to equipment. We recommend that the pump is in a stable horizontal position when performing this service. Make sure the vacuum ports are protected to prevent any damage.

To make sure this:

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

Make sure 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.

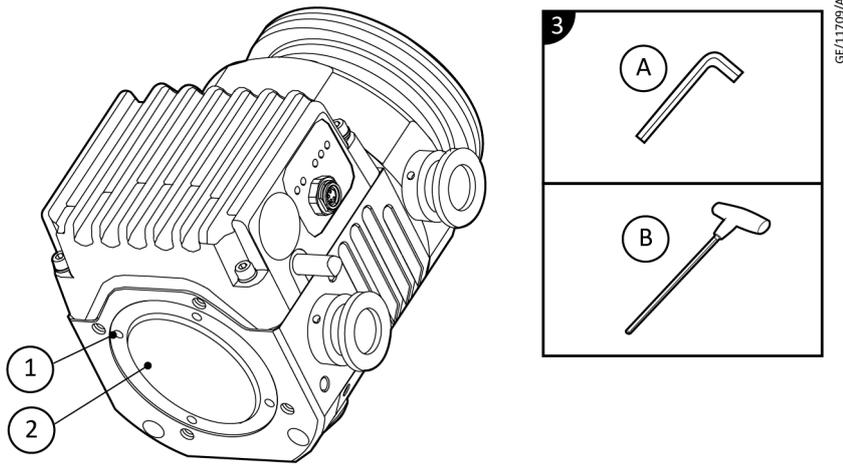
Note

For the purpose of removal and re-assembly, all screws and components with screw fixings use right handed threads.

5.1 Oil cartridge removal

- Unscrew and remove the 4 x M4 button head screws and remove the oil cartridge base cap from the pump body.

Figure 10 Oil cartridge removal



A. Tool - 2.5 mm AF hex key

1. M4 button head screw (4x)

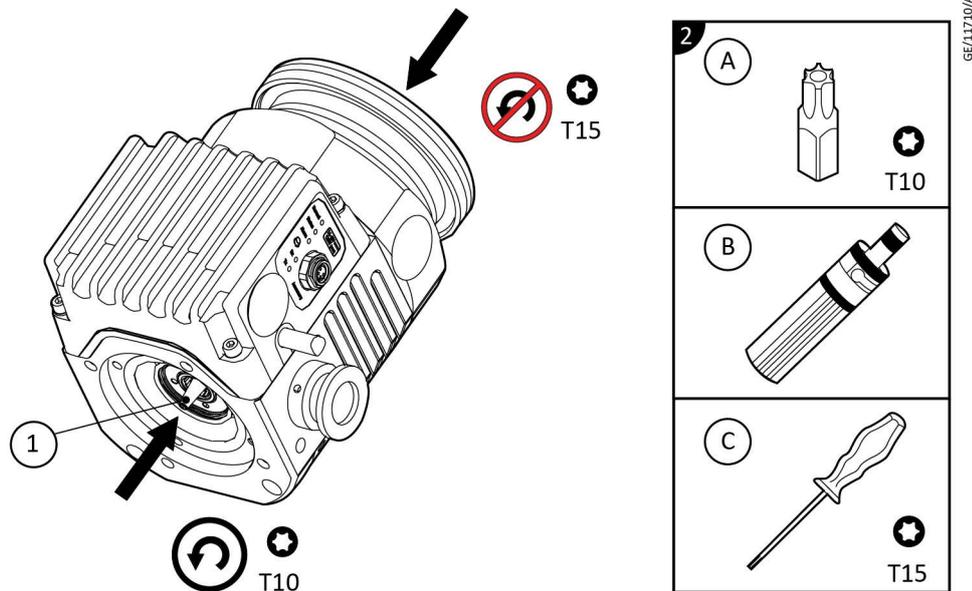
B. Tool - 2.5 mm AF hex T-bar

2. Oil cartridge

5.2 Oil feed nut removal

- Engage the T10 Torx with driver into the end of the oil feed nut, next engage the T15 Torx screwdriver onto the end of the shaft through the pump inlet.
- While keeping the T15 Torx screwdriver stationary, undo and remove the oil feed nut. Place the oil feed nut in a dry clean place.

Figure 11 Oil feed nut removal



A. Tool - T10 Torx bit

C. Tool - T15 Torx screwdriver

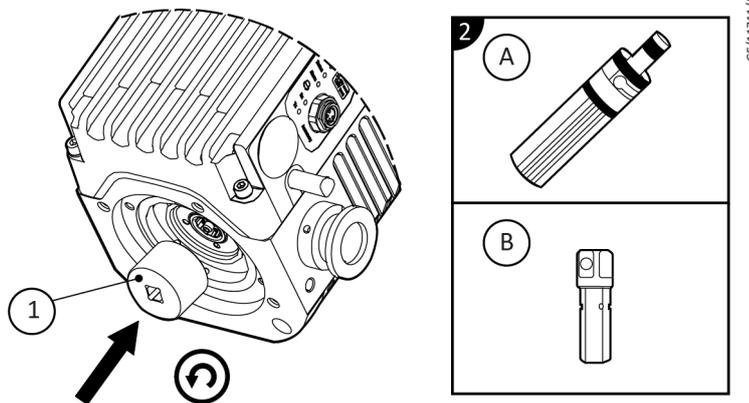
1. Oil Feed Nut

B. Tool - Torque screwdriver

5.3 Bearing retaining nut removal

- Using the combination of tools, engage the pins of the pin spanner adaptor into the pump bearing retaining nut.
- While holding the pump body, undo and remove the bearing retaining nut, place the retaining nut in a dry clean place.

Figure 12 Bearing retaining nut removal



A. Tool - Torque screwdriver

B. Tool - ¼" Square drive

1. Pin spanner adaptor

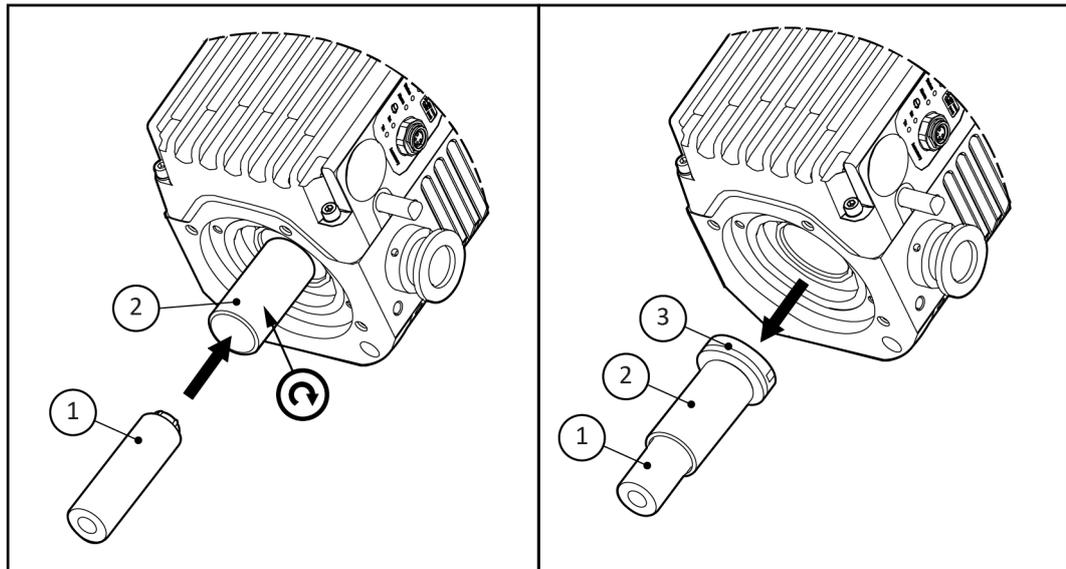
5.4 Bearing module removal

- Screw the bearing extractor sleeve onto the bearing module. Simply slide the tube inside the sleeve and apply a small force onto the bearing while rotating the extractor sleeve.

 **Note**

The bearing anti-rotating tube maybe used to prevent the bearing from slipping while the extractor sleeve is fitted.

- Firmly hold pump body and remove the bearing module by pulling the extractor sleeve squarely away from the pump body.
- Once extracted, remove the bearing module from the bearing extractor sleeve. As a precaution, clean any contamination that might be present from the extractor thread using a dry lint-free cloth.

Figure 13 Bearing module removal

1. Bearing anti-rotating tube
3. Bearing module

2. Bearing extractor sleeve

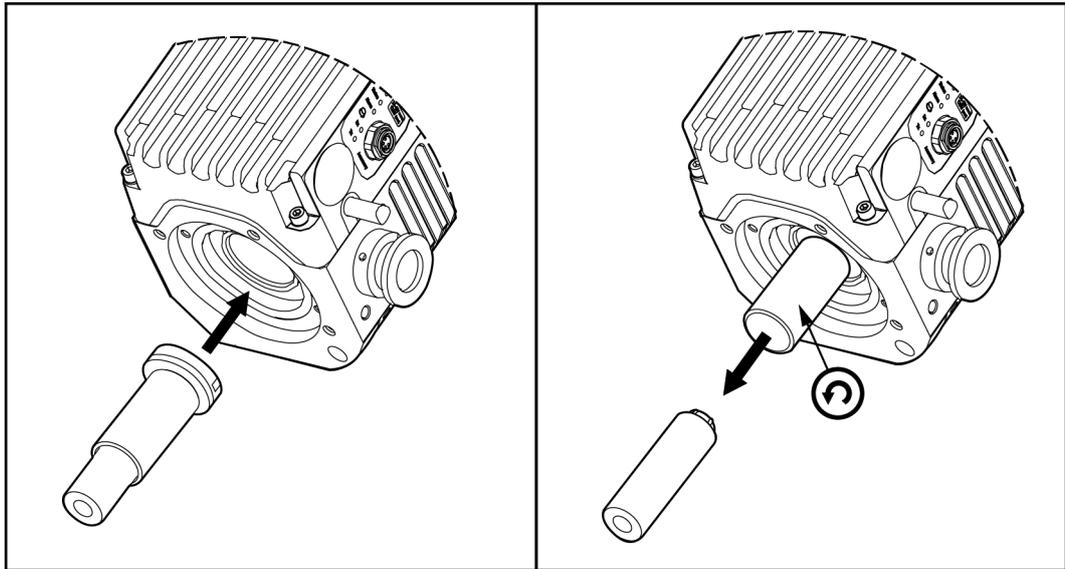
5.5 Bearing module insertion

- Remove the new bearing module from its packaging.
- Screw the bearing extractor sleeve onto the new bearing module.
- Carefully insert the bearing module into the bearing cavity of the pump in reverse order of removal, make sure that the bearing is pushed fully home.

Note

The bearing anti-rotating tube maybe used to prevent the bearing from slipping while the extractor sleeve is removed.

Figure 14 Bearing module insertion

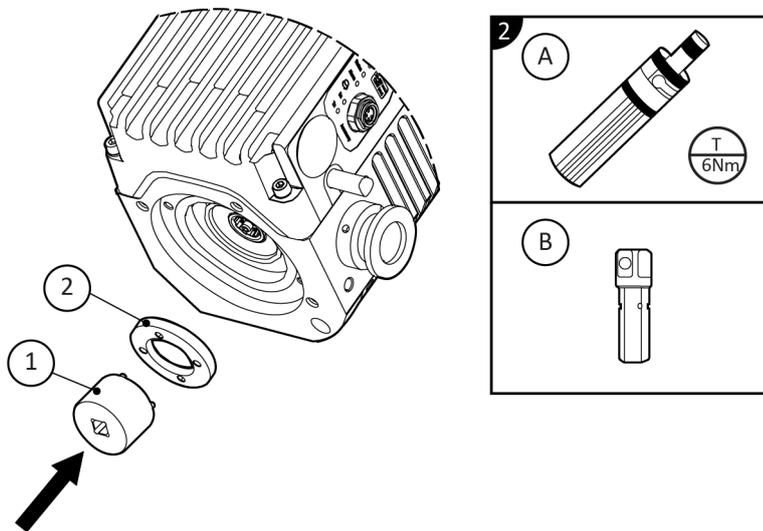


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5.6 Bearing retaining nut assembly

- Using the combination of tools, engage the bearing retaining nut onto the pins of the pin spanner adaptor.
- In reverse order of removal, fit the bearing retaining nut into position taking care not to cross thread the nut, torque the bearing retaining nut to 6 N-m.

Figure 15 Bearing retaining nut assembly



GE/11714/A

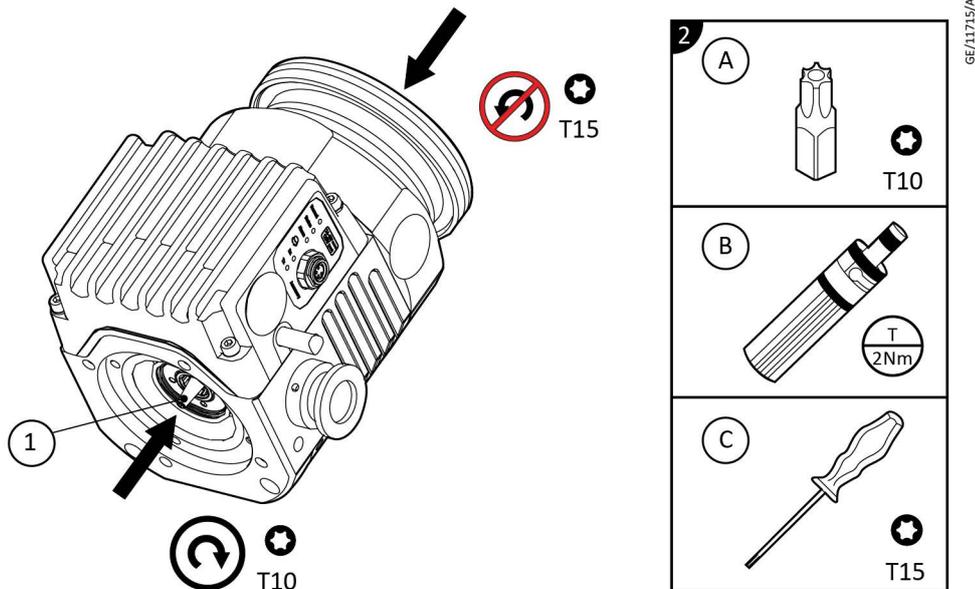
A. Tool - Torque screwdriver
1. Pin spanner adaptor

B. Tool - ¼" Square drive
2. Bearing retaining nut

5.7 Taper nut assembly

- Screw the oil feed onto the end of the shaft (as a recommendation, this can be performed by hand).
- Engage the T10 Torx with torque driver into the end of the oil feed nut, next engage the T15 Torx screwdriver onto the shaft through the pump inlet.
- While keeping the T15 Torx screwdriver stationary, Torque the oil feed nut to 2 N-m.

Figure 16 Taper nut assembly



A. Tool - T10 Torx bit

C. Tool - T15 Torx screwdriver

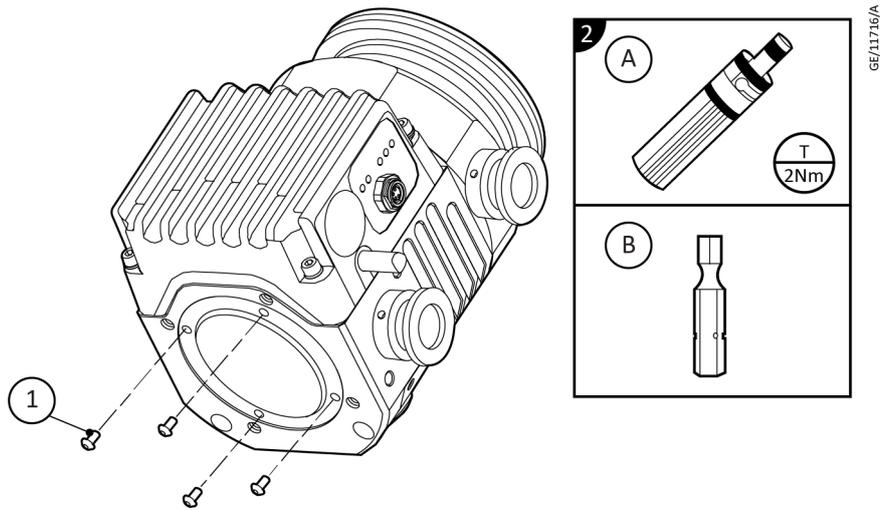
1. Oil feed nut

B. Tool - Torque screwdriver

5.8 Oil cartridge assembly

- Carefully remove the new oil cartridge from its packaging.
- Fit the oil cartridge into position while ensuring the fixing screw holes and threads are aligned.
- Fasten the oil cartridge using the 4 x M4 button head screws previously removed, evenly tighten all screw to 2 N-m.

Figure 17 Oil cartridge assembly



A. Tool - Torque screwdriver
1. 4 x screws

B. Tool - 4 mm hex bit

6. Bearing preload check



CAUTION: OPERATION SAFETY

Risk of damage. This operation is required to check and if necessary set the bearing preload using the bearing preload tool, failure to do so may shorten the service life of the turbo pump.

6.1 Bearing pre-load checking

The bearing preload tool checks that the bearing preload force is correctly set. If necessary, the tool can be used to correct the bearing preload force if adjustment is required.

6.2 Checking the bearing preload

Fit and use the preload tool in accordance to the [Pre-service preload check](#) on page 14. While performing this check, you must note the position of the test indicator when a change in preload transition occurs, ([Figure: Preload tool](#)).

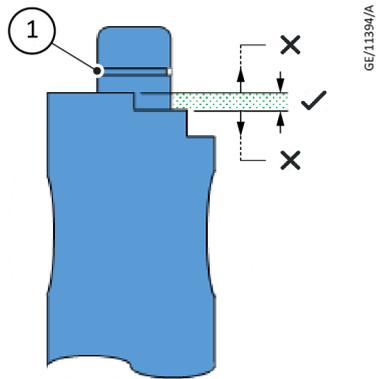
- If the test indicator falls within the pass limit, then no further action is required and you should now proceed to the next section [Service counter reset](#) on page 25.
- Adjustment of the bearing preload force is required if the test indicator falls above or below the Pass limit when a change in preload transition occurs. Using the preload tool body, rotate the magnetic bearing adjuster nut (viewed from top) clockwise for above and anti-clockwise for below*.

Note

** It is advisable to monitor the preload force using the preload tool test plunger between 1 mm rotational increments. Continue this process until the test indicator falls within the pass limit. When you are confident that the preload force has been correctly set, proceed to the next section [Service counter reset](#) on page 25.*

- If no preload is detected, slowly turn the preload tool body clockwise until preload is established in accordance to the [Pre-service preload check](#) on page 14. When the preload has been verified, measure the preload force and follow the corresponding instructions above.

Figure 18 Preload tool



1. Pass/Fail test indicator

 **Note**

To check if the bearing is set with the correct preload force, the test indicator must be within the pass limits when the preload transition occurs.

7. Service counter reset

WARNING:



Following a Service Counter Reset the pump may enter a short setup / test routine. During this period some movement of the rotor may occur. To make sure your safety, in line with the product instruction manual, install the pump in the vacuum system before connecting the motor controller to the power supply. This will make sure that the pump cannot operate and injure people.

After completing an oil cartridge change or an oil cartridge and bearing module change, it is important to reset the service interval in order to schedule the next service and reset the status LED. Depending on your preferred method, you may follow procedures listed below.

Reset the service interval using a TIC (Turbo Instrument Controller)

You can follow the quick guide below or follow the instructions in accordance to the TIC instruction manual D397228xx.

Step	Quick guide procedure
1	 <p>View screen</p> <p>Starting from the top level view screen, press the MENU  button to enter into the MAIN MENU.</p>
2	<p>Using the  down button, scroll down to the "Turbo Status" option then press the  select button to enter into the TURBO STATUS menu.</p>
3	<p>Using the  down button, scroll down to the "Service menu – enter" option then press the  select button to enter into the nEXT SERVICE menu.</p>
4	<p>Using the  down button, scroll down to the "Reset Service Due. . ." option then press the  select button to enter into the nEXT SERVICE RESET menu.</p>
5	<p>Using the  down button, scroll down to the "Reset oil due" option then press the  select button to reset the oil service schedule.</p>

Step	Quick guide procedure
6	To confirm that the service reset has been successful, press the MENU  button to return back to the nEXT SERVICE menu. Check that "run" and "until" hours have been reset, also check that status LED has been reset and is no longer flashing.
7	Once the service counter reset has been completed, you must perform a power cycle to complete the process.

Note

If the bearing module has also been replaced, then repeat the operation above by selecting the "Reset bearing due" option.

Reset the service interval using a PC serial command

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
---------	---	---	---	---	---	----	---	----

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

To confirm that the service reset has been successful, check that status LED has been reset and is no longer flashing. Once the service counter reset has been completed, you must perform a power cycle to complete the process.

Reset the service interval using an nST PC program

The nST PC program is PC-based software that can be used with the nEXT pump either via the serial interface or via the USB service port.

It can be used to control, monitor, configure and data log the nEXT pump, and also to view service status, reset service intervals and upgrade the software embedded in the motor controller.

This software is available for download from the our upgrades website:
www.upgrades.edwardsvacuum.com

Currently, nST software requires a free license in order to be used. To obtain a free license please follow the onscreen instructions, fill out the user data form and then send the automatically generated email to us.

For first time users, we recommend that you refer the nST Support Toolkit instruction manual D396498xx. The manual will guide you on how to:

- Install the nST software application
- Register and activate the product

- Communicate with the nEXT55 or nEXT85
- Perform a service rest

To confirm that the service reset has been successful, check that status LED has been reset and is no longer flashing. Once the service counter reset has been completed, you must perform a power cycle to complete the process.

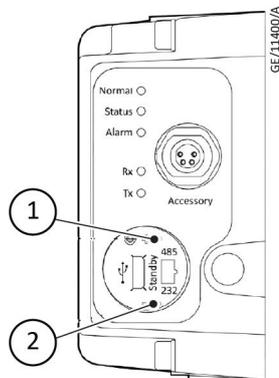
Reset the service interval using the turbo drive standby speed control buttons

The service interval maybe reset using the nEXT55/85 drive standby speed control buttons. To proceed, make sure the drive is powered. Using a suitable implement such as the end of a ball point pen, press both the increase and decrease standby speed buttons simultaneously for more than 5 seconds.

Notes

This method will reset both the oil cartridge and bearing module service interval.

Figure 19 nEXT55/85 Drive



1. Standby speed increase button

2. Standby speed decrease button

To confirm that the service reset has been successful, check that status LED has been reset and is no longer flashing. Once the service counter reset has been completed, you must perform a power cycle to complete the process.

8. Pump checks



WARNING: ELECTRICAL HAZARD

Risk of electrical shock. Make sure the turbo pump is electrically isolated before performing any manual checks.

Before running your pump, we recommend carrying out a number of checks. These checks are designed to make sure that the pump is in the best possible health with the limited test equipment that may be available to you.

8.1 Clearance check

The first check ensures that the rotating and static parts are still in clearance. This can only be performed before installation. Using the end of a pen for example, carefully rotate the rotor, while the rotor is spinning, listen out for any clashing between the rotating and static parts. Make sure the rotor spins freely.

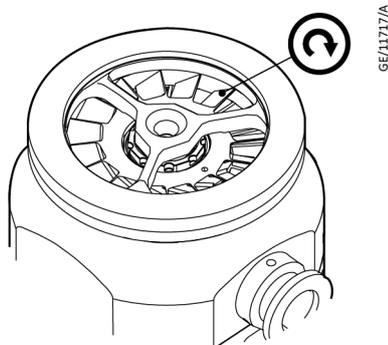
- Does the rotor spin freely with no clashing?

Yes

No

If No, then please contact your supplier.

Figure 20 Clearance check



8.2 Vacuum leak check

If you have a helium leak detector, we highly recommend that you leak check the pump on your system against your specified system leak rate.

8.3 Operational checks

Refer to section “Operation of the nEXT85” of your nEXT85 pump instruction manual.

9. Appendix

Preload is the process wherein a permanent thrust load is applied to the main bearing. Thrust is applied by the misalignment between the inner static and the out rotating passive magnetic bearing located at the inlet of the pump.

10. Service

10.1 Return the equipment or components for service

Before you send your equipment to us for service or for any other reason, you must complete a Declaration of Contamination Form. The form tells us if any substances found in the equipment are hazardous, which is important for the safety of our employees and all other people involved in the service of your equipment. The hazard information also lets us select the correct procedures to service your equipment.

If you are returning equipment note the following:

- If the equipment is configured to suit the application, make a record of the configuration before returning it. All replacement equipment will be supplied with default factory settings.
- Do not return equipment with accessories fitted. Remove all accessories and retain them for future use.
- The instruction in the returns procedure to drain all fluids does not apply to the lubricant in pump oil reservoirs.

Download the latest documents from edwardsvacuum.com/HSForms/, follow the procedure in HS1, fill in the electronic HS2 form, print it, sign it, and return the signed copy to us.



NOTICE:

If we do not receive a completed form, your equipment cannot be serviced.

