

# Barrel and O-Ring Replacement for Disposable-Tip Pipette Heads

## User Guide



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## About this guide

### Who should read and use this guide

The instructions in this guide assume that you have the following:

- An understanding of the Bravo Platform
- Familiarity with disposable pipette tip heads
- Experience in working on mechanical equipment

### What this guide covers

This guide describes how to identify and fix faulty barrels and seals that cause leaks and dispensing errors in the Bravo Platform pipette head.

### When to perform this procedure

If you are observing a leak from a channel or observing that one or more channels is dispensing too much or too little liquid, the barrels and/or O-rings on these channels may need to be cleaned or replaced. This procedure will enable you to identify which channels are problematic and describe how to replace the broken or worn parts.

### Time required

Time required depends on the number of barrels or O-rings you are replacing. It could take up to 3-5 hours including testing.

#### CAUTION

**These procedures must be performed using the approved Agilent tooling. This applies specifically to the barrels, O-rings, and Agilent torque wrench, (which has to be set to 10 in oz to ensure proper installation of barrels).**

#### IMPORTANT

Agilent cannot guarantee performance of the head after service if it is not performed by Agilent personnel. There is a chance that incorrect replacement of barrels and O-rings can cause reduced CV or accuracy.

#### WARNING

**Using controls, making adjustments, or performing procedures other than those specified in the user documentation can expose you to moving-parts hazards and hazardous voltage. Before using the Bravo Platform, make sure you are aware of the potential hazards and understand how to avoid being exposed to them.**

## Before you start

#### WARNING

**The pipette head can be contaminated with bio-hazard material. Agilent recommends that you decontaminate the head before you handle the head for this procedure. Wear gloves, safety glasses, and a lab coat when handling the pipette head.**

**CAUTION**

Always check with your local Agilent field service representative to confirm that barrel and O-ring replacement is required.

**CAUTION**

If warranty seals have been removed or tampered with, ensure you report this to Agilent to maintain your service warranty.

**Figure** Location of the warranty seal

**IMPORTANT**

Work on a clean and empty workspace. Use small containers to collect the tiny parts.

### Required tools and materials

Item	Source or Agilent Part number
1.5, 2.0, 2.5, 3.0 mm hex wrench	General hardware supplier
Needle nose pliers	General hardware supplier
<i>Optional.</i> Ultrasonic cleaner	General laboratory supplier
1/8 in socket with torque wrench and bit	G5550-23589
O-ring grease	G5550-23598
O-ring LT	03812-001 (10 pk) 03812-002 (100 pk)
O-ring ST	04284-001 (10 pk) 04284-002 (100 pk)
Barrel LT	13919-001 (10 pk) 13919-002 (100 pk)
Barrel ST	17885-001 (10 pk) 17885-002 (100 pk)

## Identifying the problem channels

### Initial inspection

Identify the suspected channels by running a test protocol. If you notice one or more wells on a plate that has a suspect volume, locate the barrels on the head by aligning the A1 position on the plate with the A1 position on the head and marking the suspect barrels with a colored marker.

### Prepare the Bravo Platform

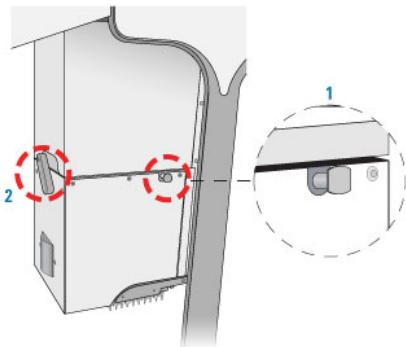
- In Bravo Diagnostics, home the Bravo head.
- Turn off the power to the Bravo Platform.

#### **Remove the head:**

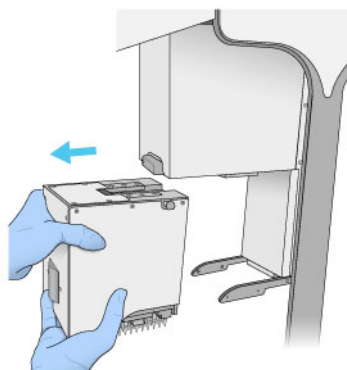
- 1 Pull and twist the two head-retainer pins (1) one-quarter turn (90°) so that they remain retracted.

Note: The straight edge of the retainer pins should be horizontal.

- 2 Turn the head lock (2) counterclockwise until it clicks into position.



- 3 While supporting the head with your hands, slide the head out from the dovetail connector (head mount), being careful not to touch the barrels.



- 4 Place the head on the head stand upside down so the barrels are facing up.

**CAUTION**

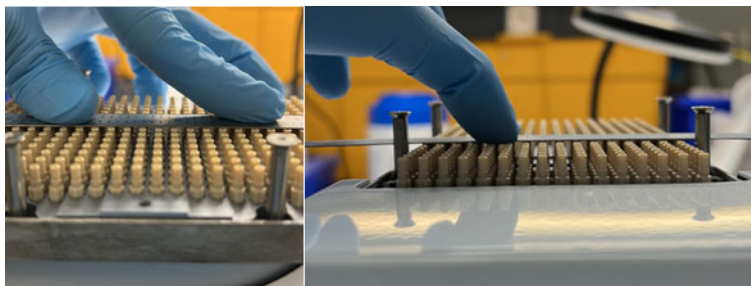
Placing the head directly on the barrels can damage them.

**Procedure****To identify the problem channels:**

- 1 Flip the head on the dove tail side to inspect the barrels.
- 2 Look down each row and then each column of the head channels. Keep your eye level and move the pipette head with your hand while maintaining your focus on each individual barrel. Using a colored marker, mark any barrels that are higher or lower than the others and the ones that look visibly damaged.

*Note:* barrels that are higher or lower than the others might indicate a double or missing O-ring respectively, or possibly an incorrect torque spec.

**Figure** Inspecting the channels of the pipette head



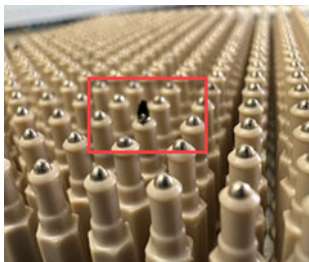
- 3 In addition, mark the channels that are dirty or have debris for cleaning or replacement.

**IMPORTANT**

Visual inspection is very important to do both before and after replacement or repair.

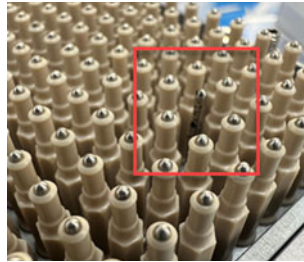
**Examples of problem channels**

**Figure** Excessive O-ring deterioration resulting from a double O-ring

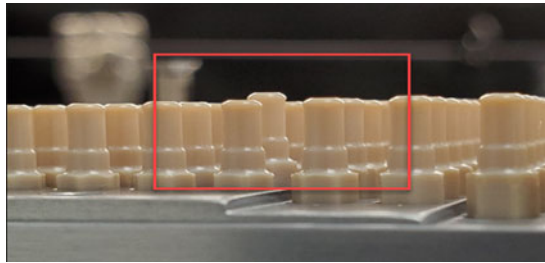


## Removing and replacing the barrels

**Figure** O-ring breakdown from a previously unsuccessful extraction



**Figure** Raised barrel indicating a double O-ring



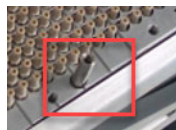
## Removing and replacing the barrels

### Procedure

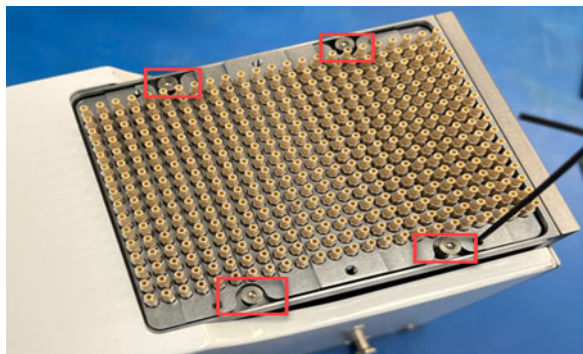
**To remove the barrels:**

- 1 Flip the head over on the table so that the barrels are facing up.
- 2 *96ST and 384ST heads only.* Remove the stripper plate:  
*Note:* If you are working on a 96LT head, you do not need to remove the stripper plate.
  - a If you have the older-style guide pins, remove them.

**Figure** Older-style guide pin screws



**Figure** Four guide pin screws



- b** If you have the newer-style guide pins continue to [step c](#).

**Figure** Newer-style guide pin screws



- c** Remove the six screws that hold the stripper plate in place.

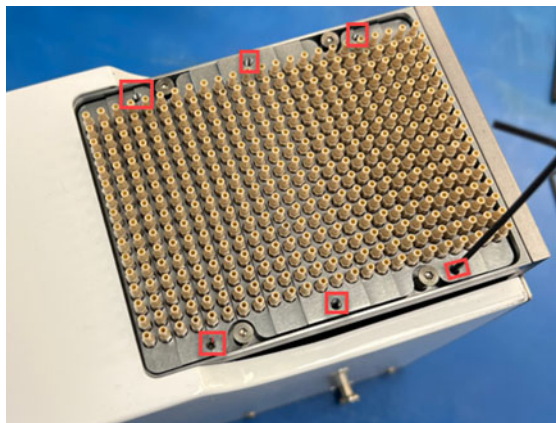
**IMPORTANT**

Turn each screw two rotations at a time, otherwise the stripper plate will be twisted, and the screws could be damaged.

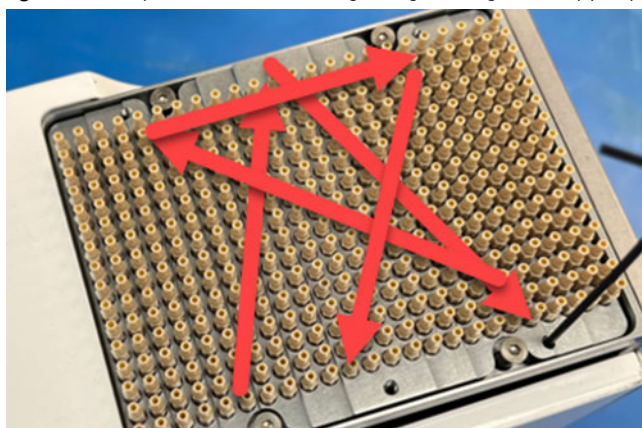
**IMPORTANT**

These screws are reverse threaded. Turn them clockwise to loosen. When loosening or tightening these screws, it is important to turn each screw a little bit at a time to prevent stripping the stripper plate holes. Loosen or tighten these screws in a "star pattern" method, like tightening the lug nuts on a car wheel.

**Figure** Six screws holding stripper plate



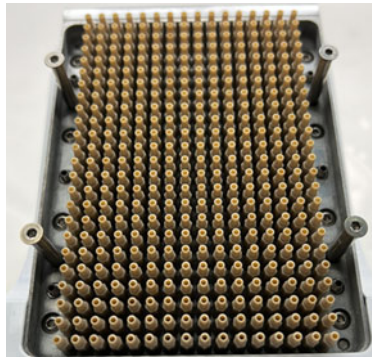
**Figure** Star pattern for loosening or tightening the stripper plate screws



- d** Using a small hex wrench, insert it into one of the screw holes and carefully lift the stripper plate off.

## Removing and replacing the O-rings

**Figure** Stripper plate removed



- 3 Using the 1/8 in socket with torque wrench, remove the damaged (marked) barrels you marked in [step 2](#) and [step 3](#).
- 4 If you are not replacing the O-rings, replace the discarded barrels continue to [step 4](#) in the following procedure, "Removing and replacing the O-rings" on [page 8](#), to check the barrel seal.
- 5 If you are replacing the O-rings, proceed to the "Removing and replacing the O-rings" on [page 8](#).

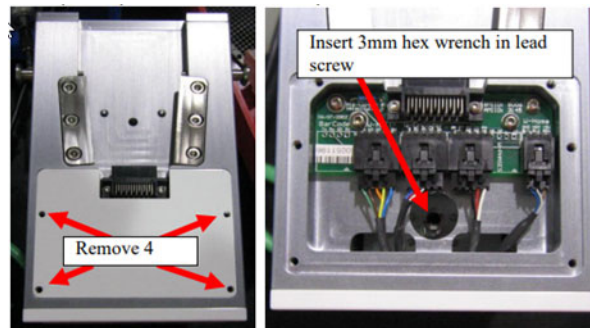
## Removing and replacing the O-rings

### Procedure

#### **To remove the O-rings:**

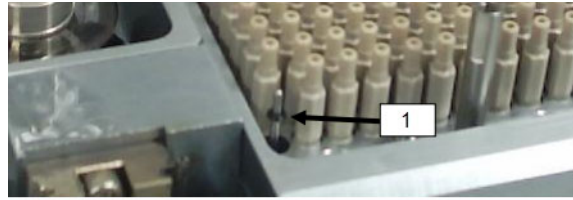
- 1 Flip the head over on the head stand and remove the four 2 mm button-head cap screws on the dovetail sheet metal protection cover and place the cover aside.

**Figure** Dovetail cover plate (left) and lead screw location



- 2 Flip the head over so the barrels are facing up.
- 3 Move the w-axis up and back:
  - a Using a 3 mm hex wrench turn the lead screw clockwise (refer to the figure above) until you reach the hard stop, the point at which there is resistance. This moves the W-axis to the top of where it can travel.
  - b Turn the lead screw counterclockwise to raise the piston and expose the O-ring as shown in the following figure (1).

**Figure** O-ring exposed after cycling the lead screw



- c** Check the O-ring to be sure it is lightly greased and not cracked.
- d** If no O-ring appears, repeat the cycling of the lead screw. Do not assume there is no O-ring.

**IMPORTANT**

If after repeating this step, there is still no O-ring, contact your local service representative or Technical Support. This issue may require further disassembly of the head. Adding an O-ring risks creating a double-O-ring situation that can cause other issues.

- e** If necessary, replace the O-ring with a pre-greased O-ring.

**IMPORTANT**

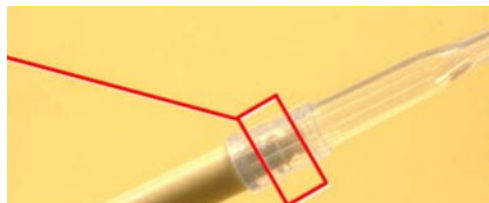
Do not over grease the O-ring. Use only enough grease to make the O-ring “shiny”. You should not see any grease on the O-ring.

**4** Check the barrel as follows:

- a** Place a disposable tip on the barrel and check the seal. If the seal is adequate, a thin, white circle will be visible all the way around the barrel. Replace the barrel if there is an uneven seal, even if you have any doubt.

*Note:* This is easiest to observe with a magnifying glass.

**Figure** Examining the barrel for a complete seal with the tip



- b** Inspect the inside of the barrel to ensure nothing is rubbing on the piston or O-ring. If necessary, clean the barrel in an ultrasonic cleaner for 30-60 minutes at a setting recommended in the device’s documentation and then inspect the barrels for cleanliness.

**IMPORTANT**

If you use a sonic bath to clean any barrel, make sure the barrel is completely dry before reinstalling it.

- c** Use the cleaned, dry barrel to carefully push the O-ring down on the piston until it reaches the O-ring plate.
  - d** Slowly screw the barrel onto the O-ring plate.
  - e** When the barrel just stops, use the torque wrench to tighten the barrel to 10-in-oz and turn the barrel until you feel the torque clutch slip.
- 5** Go to [“Reassembling the pipette head” on page 10](#) to complete the procedure.

## Reassembling the pipette head

***To Reassemble the pipette head:***

- 1 Reinstall the stripper plate, if it had been removed.
- 2 Reinstall the dovetail sheet metal cover plate.
- 3 Reinstall the stripper pin screws, if they had been removed.
- 4 Visually inspect the channels on the head as performed in [step 1](#) of “[Identifying the problem channels](#)” on [page 4](#).
- 5 Install the head and run the test protocol that exposed the problem channels initially.

## Contacting Agilent Technologies technical support

If you need help or find a problem with the Bravo Platform, contact Agilent Technical Support. For contact information, go to

<https://www.agilent.com/en/contact-us/page>