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www.trimble.com

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Safety information

WARNING – Before performing maintenance on any part of the UX5 HP aerial imaging rover, always make sure that the UX5 HP battery is disconnected from the aircraft:

Recommended maintenance schedule

Parts should be replaced as soon as possible after you notice signs of wear or poor performance. In addition, Trimble strongly recommends replacing the following items regularly.

Note – Where alternative maintenance schedules are given for the same item, you should replace the item after whichever condition occurs first.

<table>
<thead>
<tr>
<th>Replace the...</th>
<th>After a total flight time of...</th>
<th>Or after...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Servo</td>
<td>25 hours</td>
<td>40 landings</td>
</tr>
<tr>
<td>Drive unit</td>
<td>75 hours</td>
<td>100 landings</td>
</tr>
<tr>
<td>Battery</td>
<td>—</td>
<td>75 charge cycles*</td>
</tr>
</tbody>
</table>

* A charge cycle is the process of charging and discharging the battery.
Introduction

- Standard UX5 HP toolkit
- Orderable parts
- Removing parts from service

The Trimble UX5 HP Aerial Imaging Solution Maintenance Guide provides instructions for customer maintenance of the Trimble UX5 HP aerial imaging rover and launcher. Customer maintenance is required to keep the UX5 HP in good working order, and to replace parts that are designed to take the impact of landing, in order to protect the more expensive parts of the UX5 HP.

Check the UX5 HP rover and launcher after each flight to ensure the equipment is in good working order, referring to the instructions in the Trimble UX5 HP Aerial Imaging Solution User Guide. Perform any maintenance required using the procedures in this maintenance manual. If you note any issues not covered in this guide, contact your Trimble distributor.

All procedures described in this manual apply exclusively to the Trimble UX5 HP aerial imaging rover and launcher.
Introduction

Standard UX5 HP toolkit

The maintenance procedures in this manual refer to tools provided in the standard UX5 HP toolkit. You received the standard UX5 HP toolkit as part of the UX5 HP system components. The standard UX5 HP toolkit comprises:

- Torx T10 screwdriver
- Torx T6 screwdriver

These tools should be stored in the flight case.

Orderable parts

Each maintenance procedure lists the orderable parts for that procedure. Some procedures provide one or more similar parts that can be ordered. Order the part that meets your requirements. The parts can be ordered from your Trimble distributor.

Removing parts from service

To ensure scrap parts and non-serviceable parts are removed from service, you must do the following:

1. As soon as the part is removed from the UX5 HP aerial imaging rover or launcher, it must be clearly labeled as a scrap part using the following template:

```
SCRAP

Name:

Date out of service (dd/mm/yyyy): __/__/Y

Reason: ____________________________
```

2. Put the part in quarantine storage until the moment it can be disposed of in a safe and environmentally responsible way.
UX5 HP body maintenance

- Replacing the servos
- Replacing the GNSS antenna
- Replacing the drive unit
- Replacing a propeller blade
- Replacing the camera filter
- Replacing a winglet or winglet screw
- Replacing the hot shoe cable
Replacing the servos

⚠️ CAUTION – Servos should be replaced as soon as possible after you notice signs of wear or poor performance. In addition, Trimble strongly recommends replacing the servos after 25 hours of flight or after 40 landings (whichever occurs first). Both servos should be replaced at the same time.

Orderable parts

<table>
<thead>
<tr>
<th>Part number (P/N)</th>
<th>This part comprises</th>
</tr>
</thead>
<tbody>
<tr>
<td>UX-S00118-01</td>
<td>• 2 x servo assembly, right</td>
</tr>
<tr>
<td></td>
<td>• 2 x servo assembly, left</td>
</tr>
<tr>
<td></td>
<td>• 2 x top servo housing</td>
</tr>
<tr>
<td></td>
<td>• 2 x bottom servo housing</td>
</tr>
<tr>
<td></td>
<td>• 8 x Torx T8 self-threading screws</td>
</tr>
<tr>
<td>UX-G00190-01</td>
<td>• Torx T8 screwdriver</td>
</tr>
<tr>
<td></td>
<td>• Calibrated torque (0.55 Nm) Torx T8 screwdriver</td>
</tr>
<tr>
<td></td>
<td>• Ball link pliers</td>
</tr>
<tr>
<td></td>
<td>• Spring clamp</td>
</tr>
</tbody>
</table>

Required parts

- 1 x servo assembly, right
- 1 x servo assembly, left
- 4 x Torx T8 self-threading screws

Required tools

- Torx T8 screwdriver, calibrated torque (0.55 Nm) Torx T8 screwdriver, ball link pliers, and spring clamp (included in P/N UX-G00190-01)
- Torx T6 screwdriver (included in the standard UX5 HP toolkit)
Steps

WARNING – Before performing maintenance on any part of the UX5 HP aerial imaging rover, always make sure that the UX5 HP battery is disconnected from the aircraft:

1. To disconnect the push rod from the outboard elevon:
   a. Position the ball link pliers with the large U-shaped side between the elevon horn and the push rod.
b. Close the pliers and align the extrusion on the inside of the pliers with the screw.

\[\text{Diagram showing pliers and extrusion alignment.}\]

c. Apply force on the pliers until the plastic part of the push rod detaches from the metal ball.

\[\text{Diagram showing force application on pliers.}\]

2. To remove the bottom servo housing:
   a. Turn the UX5 HP body upside down.
   b. Unscrew the two screws from the bottom servo housing using the Torx T8 screwdriver.
2 UX5 HP body maintenance

c. Remove the bottom servo housing and clearly mark the housing as a scrap item.

3. To remove the servo assembly from the UX5 HP body:
   a. Gently push the servo and top housing from the underside of the wing and out on the topside of the wing.
   b. Disconnect the servo connector by pushing down on the locking clip and pulling the two pieces apart.
   c. Clearly mark the removed servo and housing as a scrap item.
4. To connect and insert the new servo assembly:
   a. Turn over the UX5 HP body so that it is right-side-up.
   b. Connect the new servo assembly to the electronics of the UX5 HP body. Make sure the locking clip is secured.
      
      **Note** – *Make sure the connector clip has locked correctly in place. The locking clip is essential for safe operation as it prevents the connector from coming apart during flight.*

   c. Install the servo and top housing into the UX5 HP body from the upper side, making sure it sits flush with the wing surface.

5. To position the connector:
   a. Turn over the UX5 HP body so that it is upside down.
   b. Position the connector so that the wires going into the foam sit tidily inside the opening of the grey plastic and the wires on the servo side are left free.

   **CAUTION** – Poorly inserted wires might cause damage to the wires. This can lead to mid-air failure, resulting in damage to the UX5 HP.
6. To close the bottom servo housing:
   a. Insert the bottom servo housing in the UX5 HP, making sure that the servo wires are not squeezed between the two housing parts.
   b. Hold the servo in place using the spring clamp. Make sure that the clamp is positioned in the middle of the servo housing (the middle of a line between the two screws is a good reference) without obstructing the servo arm.
   c. Use the Torx T8 screwdriver to attach the two screws until they sit flush with the housing (do not tighten them).
   d. Move the spring clamp as close as possible to the rear screw and tighten the screw using the calibrated (0.55 Nm) Torx T8 screwdriver.
   e. Move the spring clamp as close as possible to the front screw and tighten the screw using the
calibrated (0.55 Nm) Torx T8 screwdriver.

7. To attach the push rod to the outboard elevon:
   a. Position the ball link pliers with the large U-shaped side at the push rod and the small U-shaped side on the other side of the elevon horn.
   b. Close the pliers and align the large U-shaped side of the pliers over the plastic part of the push rod.
c. Apply force on the pliers until the plastic part of the push rod attaches to the metal ball.

8. Check the elevon trim. To do this, you must run the flight checklist in the Aerial Imaging software and perform the Check elevon trim step of the checklist with the new servos.

*Note – If required, use the Torx T6 screwdriver to adjust the elevons. The outboard elevon should be leveled with the inboard elevon (less than 1 mm of offset).*
Replacing the GNSS antenna

Orderable parts

<table>
<thead>
<tr>
<th>Part number (P/N)</th>
<th>This part comprises</th>
</tr>
</thead>
<tbody>
<tr>
<td>UX-S00176-01</td>
<td>• 1 x GNSS antenna</td>
</tr>
<tr>
<td></td>
<td>• 1 x GNSS antenna top housing</td>
</tr>
<tr>
<td></td>
<td>• 1 x GNSS antenna bottom housing</td>
</tr>
<tr>
<td></td>
<td>• 4 x Torx T8 self-threading screws</td>
</tr>
<tr>
<td></td>
<td>• 2 x Tool #8mm wrench</td>
</tr>
<tr>
<td>UX-G00166-01</td>
<td>• Calibrated torque (0.55 mm) Torx T8 screwdriver</td>
</tr>
</tbody>
</table>

Required parts

- 1 x GNSS antenna
- 1 x top and bottom housing
- 4 x Torx T8 self-threading screws

Required tools

- Torx T8 screwdriver, calibrated torque (0.55 Nm) Torx T8 screwdriver
- #8mm wrench

Steps

⚠️ WARNING – Before performing maintenance on any part of the UX5 HP aerial imaging rover, always make sure that the UX5 HP battery is disconnected from the aircraft:
1. To remove the GNSS antenna:
   a. Turn the UX5 HP body upside-down.
   b. Unscrew the four screws from the bottom housing using the Torx T8 screwdriver.
   c. Remove the bottom housing.
   d. Disconnect the GNSS antenna connector.
   e. Clearly mark the removed GNSS antenna as a scrap item.
   f. Remove the top housing.
2. To connect and insert the new GNSS antenna:
   a. Turn over the UX5 HP body so that it is right-side-up.
   b. Connect the new GNSS antenna (facing upward) to the GNSS antenna cable fitted inside the body and firmly tighten the connector using the wrench. Do not over-tighten. The wrench provided is designed to prevent over-tightening.
   c. Slide the new bottom housing into the GNSS antenna compartment.
   d. Hold the bottom housing while positioning the connector so that the cables sit tidily inside the opening of the bottom housing. Insert the GNSS antenna.

⚠️ CAUTION – Poorly inserted wires might cause damage to the wires. This can lead to mid-air failure, resulting in damage to the UX5 HP.
3. To close the housing:
   a. Insert the new top housing.
   b. Turn the UX5 HP body upside-down.
   c. Hold the housing in place while using the calibrated torque (0.55 Nm) Torx T8 screwdriver to attach the four screws without tightening them. Finish by tightening the screws in a cross sequence.

4. Check the GNSS reception:
   a. Put the rover in a place where the GNSS antenna has a clear view of the sky.
   b. Insert a charged battery into the battery compartment of the rover and connect the main power connector to the power connector in the rover.
   c. Verify that the gBox can lock onto more than 4 satellites. The orange LED should be blinking.
Replacing the drive unit

⚠️ CAUTION – The drive unit should be replaced as soon as possible after you notice signs of wear or poor performance. In addition, Trimble strongly recommends replacing the drive unit after 75 hours of flight or after 100 landings (whichever occurs first).

Orderable parts

<table>
<thead>
<tr>
<th>Part number (P/N)</th>
<th>This part comprises</th>
</tr>
</thead>
<tbody>
<tr>
<td>UX-G00202-01</td>
<td>• 1 x Trimble UX5 HP drive unit</td>
</tr>
<tr>
<td></td>
<td>• 10 x Trimble UX5 HP drive unit screws, M3x10 Torx SS-A2 locking coated</td>
</tr>
<tr>
<td></td>
<td>• 5 metal washers</td>
</tr>
<tr>
<td></td>
<td>• 5 plastic washers</td>
</tr>
<tr>
<td>UX-G00207-01</td>
<td>• 1 x Trimble UX5 HP drive unit</td>
</tr>
<tr>
<td></td>
<td>• 10 x Trimble UX5 HP drive unit screws, M3x10 Torx SS-A2 locking coated</td>
</tr>
<tr>
<td></td>
<td>• 5 metal washers</td>
</tr>
<tr>
<td></td>
<td>• 5 plastic washers</td>
</tr>
<tr>
<td></td>
<td>• 1 x tool – fixed 1.2 Nm torque screwdriver with T10 bit</td>
</tr>
</tbody>
</table>

Required parts

- 1 x Trimble UX5 HP drive unit
- 3 x Trimble UX5 HP drive unit screws, M3x10 Torx SS-A2 locking coated
- 3 x metal washers
- 3 x plastic washers
The parts of the drive unit are shown below:

1. Propeller
2. Prop holder
3. Motor housing
4. Motor controller
5. Capacitors
6. Power cables
7. Signal cable

**Required tools**
- Torx T10 screwdriver (included in the standard UX5 HP toolkit)
- Fixed 1.2 Nm torque screwdriver with T10 bit

**Steps**

⚠️ **WARNING** – Before performing maintenance on any part of the UX5 HP aerial imaging rover, always make sure that the UX5 HP battery is disconnected from the aircraft:
1. To remove the eBox from the body of the UX5 HP:
   a. Use the Torx T10 screwdriver to remove the screw of the eBox from the body.

   b. To remove the eBox, pull the pitot tube holder (do not pull the pitot tube) so that the eBox pivots around its back.

2. To disconnect the three cable connectors running along the bottom of the eBox bay:
   a. Remove the cables from their cable duct.
      
      Note – Do not use sharp tools to perform this action.

   b. For the power cables, pull the connector parts apart. For the signal cable, push down the clip and then pull the connector parts apart.
3. To remove the drive unit from the body:
   a. Use the Torx T10 screwdriver to loosen the three screws that attach the motor housing to the body.

   b. Gently push the two capacitors of the motor controller backward through the tail of the body until the drive unit loosens from the body.
c. Remove the drive unit from the body and then *mark the drive unit as a scrap part.*
4. To attach the new drive unit to the body:
   a. Insert the three cables from the new motor controller through the tail of the body into the eBox bay.
   b. Gently pull the red and black power cable further into the eBox bay until the motor housing slides over the tail of the body. Do not pull on the signal cable.
   c. Fasten the motor housing onto the body with the new, coated Torx T10 screws and washers using the 1.2 Nm torque screwdriver. Make sure that the plastic washer is on the side of the motor housing. You may need to push the drive unit slightly to align it with the screw holes.

   ![Diagram of motor housing attachment](image)

   Note – Do not use the old Torx T10 screws and do not use the normal Torx T10 screwdriver. The 1.2 Nm torque screwdriver makes a clicking sound at the moment the screw is tightened to the correct torque setting.

5. To connect the connectors of the three cables running through the eBox bay:
   a. Connect the connectors. For the power cables, make sure to connect the black wire to the black connector and the red wire to the red connector. For the signal cable, make sure the clip is well secured. If the cables are too long at the rear of the eBox bay, push the motor controller a few
millimeters back toward the tail of the body.

b. Insert the cables into their cable duct. The connector of the signal cable fits into the cavity near the wiring box. Once this is finished the cables in the eBox bay should look like this:

6. Check the following:

   The red power cable is connected to the red connector. [ ]
   The black power cable is connected to the black connector. [ ]
   The signal cable connector is well-secured. [ ]
   All cables are inserted into their duct. [ ]
   All three screws attaching the motor housing to the body have a metal and plastic washer and are tightened to the correct torque. [ ]

7. Insert the eBox again and fasten it to the body using the Torx T10 screwdriver.

8. Go through the flight checklist and make sure the motor is emitting a sound after arming the UX5 HP. Disarm the UX5 HP immediately after this check.

   **WARNING** – Do not leave the system armed. Once the system is armed, the motor can start, causing parts of the UX5 HP to move. This can cause personal injury and/or damage to objects from moving parts.

9. Scrap the old drive unit and make sure that it does not return to service.
Replacing a propeller blade

Note – Trimble recommends replacing both propeller blades at the same time.

Orderable parts

<table>
<thead>
<tr>
<th>Part number (P/N)</th>
<th>This part comprises</th>
</tr>
</thead>
<tbody>
<tr>
<td>UX-S00173-01</td>
<td>30 x Trimble UX5 HP pair of propeller blades (14 x 9&quot;)</td>
</tr>
</tbody>
</table>

Required parts

- 1 x Trimble UX5 HP pair of propeller blades

Required tools

- Torx T10 screwdriver (included in the standard UX5 HP toolkit)

Steps

⚠️ WARNING – Before performing maintenance on any part of the UX5 HP aerial imaging rover, always make sure that the UX5 HP battery is disconnected from the aircraft:
1. Use the Torx T10 screwdriver to remove the screw of the propeller blade that you want to replace.

2. To attach the new propeller blade:
   a. Mount the new propeller blade, taking care to correctly position the blade. Confirm that the white text on the propeller is facing toward the wing.

   **WARNING** – Incorrectly positioned propellers can cause personal injury and/or damage to the UX5 HP.
b. Insert the screw into the holder and through the propeller, making sure that the orientation of the screw is correct. The screw should move from the thin part of the motor holder to the thicker part (the thicker part has a slit and tread in it).

c. Tighten the screw until you feel a slight resistance to the propeller movement.
Replacing the camera filter

Orderable parts

<table>
<thead>
<tr>
<th>Part number (P/N)</th>
<th>This part comprises</th>
</tr>
</thead>
<tbody>
<tr>
<td>UX-S00174-01</td>
<td>• 20 x Trimble UX5 HP UV filter, 77 mm, Tiffen (for RGB camera)</td>
</tr>
<tr>
<td>UX-S00175-01</td>
<td>• 5 x Trimble UX5 HP yellow-orange filter, 77 mm, Schneider Kreuznach (for NIR camera)</td>
</tr>
</tbody>
</table>

Required parts

You will need one of the filters listed in the table above.

*Note – Using the incorrect filter will affect the quality of images captured during flight. Make sure you are using the correct filter for your camera.*

Required tools

No tools are required for this procedure.

Steps

⚠️ WARNING – Before performing maintenance on any part of the UX5 HP aerial imaging rover, always make sure that the UX5 HP battery is disconnected from the aircraft:
1. To remove the filter, unscrew it from the UX5 HP body.

2. To insert a new filter, screw it into the UX5 HP body, taking care not to damage the filter thread by over-tightening it.
2 UX5 HP body maintenance

Replacing a winglet or winglet screw

Note – Trimble recommends replacing both winglet screws at the same time.

Orderable parts

<table>
<thead>
<tr>
<th>Part number (P/N)</th>
<th>This part comprises</th>
</tr>
</thead>
<tbody>
<tr>
<td>UX-S00100-01</td>
<td>• 5 x Trimble UX5 HP winglet pairs</td>
</tr>
<tr>
<td>UX-S00101-01</td>
<td>• 1000 x Trimble UX5 HP spare screws for the winglet</td>
</tr>
</tbody>
</table>

Required parts

- 1 x Trimble UX5 HP winglet
- 2 x Trimble UX5 HP spare screws for the winglet

Required tools

- Torx T6 screwdriver (included in the standard UX5 HP toolkit)

Steps

⚠️ WARNING – Before performing maintenance on any part of the UX5 HP aerial imaging rover, always make sure that the UX5 HP battery is disconnected from the aircraft:
1. Use the Torx T6 screwdriver to remove the screws of the winglet that you want to replace.

2. To mount the winglet, align the rivet pins into the correct position on the winglet and fasten the winglet screws without over-tightening them.
Replacing the hot shoe cable

Orderable parts

<table>
<thead>
<tr>
<th>Part number (P/N)</th>
<th>This part comprises</th>
</tr>
</thead>
<tbody>
<tr>
<td>UX-S00171-01</td>
<td>3 x Trimble UX5 HP camera feedback cable (hot shoe cable)</td>
</tr>
</tbody>
</table>

Required parts

- 1 x Trimble UX5 HP camera feedback cable (hot shoe cable)

Required tools

No tools are required for this procedure.

Steps

⚠️ WARNING – Before performing maintenance on any part of the UX5 HP aerial imaging rover, always make sure that the UX5 HP battery is disconnected from the aircraft:

1. As much as possible, loosen the Velcro strap in the payload bay.
2. Disconnect the hot shoe connector from the camera and remove the camera from the payload bay.
3. Remove the battery from the payload bay.
4. Open the compartment under the battery. To do so, put your finger in the hole and pull the lid.

5. Disconnect the hot shoe cable from the connector in the body and pull the hot shoe cable out of the cable duct in the payload bay.
6. Connect the new hot shoe cable to the connector in the body and insert the hot shoe cable into the cable duct.

7. Close the lid of the compartment.
Camera maintenance

- Assembling the camera body and lens (Sony a7R)
- Disassembling the camera body and lens (Sony a7R)
- Adjusting the camera focus (Sony a7R)
Assembling the camera body and lens (Sony a7R)

Orderable parts

<table>
<thead>
<tr>
<th>Part number (P/N)</th>
<th>This part comprises</th>
</tr>
</thead>
<tbody>
<tr>
<td>UX-G00198-01 (RGB)</td>
<td>1 x camera body, battery, charger, international power kit, UV filter (x2), 64 GB memory card, multislot card reader</td>
</tr>
<tr>
<td>UX-G00199-01 (NIR)</td>
<td>1 x camera body, battery, charger, international power kit, NIR filter (x2), 64 GB memory card, multislot card reader</td>
</tr>
<tr>
<td>UX-G00204-01</td>
<td>1 x 15 mm lens, 0.9 mm Allen key, lens tissues (wet and dry)</td>
</tr>
<tr>
<td>UX-G00200-01</td>
<td>1 x 25 mm lens, 0.9 mm Allen key, lens tissues (wet and dry)</td>
</tr>
<tr>
<td>UX-G00201-01</td>
<td>1 x 35 mm lens, 0.9 mm Allen key, lens tissues (wet and dry)</td>
</tr>
</tbody>
</table>

Required tools

- You need a dust-free environment to complete this procedure

Steps

⚠️ CAUTION – To avoid damage to the lens or optics, make sure you work in a dust-free environment when handling the lens and camera body. Do not touch the internal optics. Always put the dust cap on the internal optics when the lens or camera body is not in use.
3 Camera maintenance

1. Mount the lens onto the camera body. Make sure it is tightly screwed.

2. The camera comes with the correct aperture setting, which is fixed with the aperture stop screw.

<table>
<thead>
<tr>
<th>Focal length</th>
<th>Aperture</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 mm</td>
<td>4.5</td>
</tr>
<tr>
<td>25 mm</td>
<td>5.6</td>
</tr>
<tr>
<td>35 mm</td>
<td>5.6</td>
</tr>
</tbody>
</table>

*Note* – If you need to change the lens aperture, loosen the aperture stop screw using the 0.9 mm Allen key (do not remove the screw). Set the correct aperture and then tighten the aperture stop screw using the 0.9 mm Allen key.
Disassembling the camera body and lens (Sony a7R)

Required tools
- You need a dust-free environment to complete this procedure

Steps

⚠️ **CAUTION** – To avoid damage to the lens or optics, make sure you work in a dust-free environment when handling the lens and camera body. Do not touch the internal optics.

1. Unscrew the lens from the camera body.

2. Put the dust cap on the internal optics when the lens or camera body is not in use.
Adjusting the camera focus (Sony a7R)

Required tools
- Allen key 0.9 mm (included in the lens kit – see Assembling the camera body and lens (Sony a7R))
- Target with straight edges (for example, a building) and a stable surface at 100 m (328 ft) from the target
- You need a dust-free environment to complete this procedure

Steps
1. Insert the camera battery.
2. The camera comes with the correct aperture setting, which is fixed with the aperture stop screw.

<table>
<thead>
<tr>
<th>Focal length</th>
<th>Aperture</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 mm</td>
<td>4.5</td>
</tr>
<tr>
<td>25 mm</td>
<td>5.6</td>
</tr>
<tr>
<td>35 mm</td>
<td>5.6</td>
</tr>
</tbody>
</table>

*Note – If you need to change the lens aperture, loosen the aperture stop screw using the 0.9 mm Allen key (do not remove the screw). Set the correct aperture and then tighten the aperture stop screw using the 0.9 mm Allen key.*
3. Camera maintenance

3. Loosen the focus ring stop screw using the 0.9 mm Allen key (do not remove the screw).

4. Turn on the camera and make sure that the grid lines are displayed. To show the grid, select Menu / Custom setting / Grid Line and select the Diag. + Square Grid option.

5. To adjust the focus:
   a. Place the camera on a stable surface (preferably a tripod), 100 m (328 ft) away from the target. Make sure that the center of the grid on the camera display focuses on the straight edges of the target.
   b. Turn the rear dial to set the shutter speed so that the lighting is good for the camera.
3 Camera maintenance

c. Click the Enlarge button once to select the area that you want to piece out. Then click the Enlarge button twice to make the area 14.4 times larger.

d. Turn the focus ring back and forth until you find the position that provides the largest number of red pixels around the straight lines of the target.

e. Make a note of the focal length value.
3 Camera maintenance

f. With this position selected, tighten the focus ring stop screw with the 0.9 mm Allen key. Make sure not to turn the focus ring as you do this.

![Diagram of camera focus ring with Allen key]

g. Verify that the focal length still has the value that you noted down in step e. If not, repeat steps d, e, and f.
eBox maintenance

- Checking the pitot tube
Checking the pitot tube

Orderable parts

<table>
<thead>
<tr>
<th>Part number (P/N)</th>
<th>This part comprises</th>
</tr>
</thead>
<tbody>
<tr>
<td>UX-S00103-01</td>
<td>• 50 x Trimble UX5 HP spare pitot tubes</td>
</tr>
</tbody>
</table>

Required parts

• 1 x Trimble UX5 HP spare pitot tube

Required tools

No tools are required for this procedure.

Steps

⚠️ WARNING – Before performing maintenance on any part of the UX5 HP aerial imaging rover, always make sure that the UX5 HP battery is disconnected from the aircraft:
1. To remove the pitot tube, hold the housing and firmly pull the tube straight out of the housing.

2. Make sure the tube is not damaged or bent.
3. Blow into the tube to make sure nothing is blocking it.

**CAUTION** – Only blow into the pitot tube after you have removed it from the eBox. Do not blow into the pitot tube when it is connected to the eBox because this will damage the barometric sensors.

4. To insert the pitot tube, hold the housing and gently push the pitot tube straight into the housing until it reaches the end of the housing.
Launcher maintenance

- Replacing the launcher cord
- Replacing the wheels of the launcher dock
Replacing the launcher cord

Orderable parts

<table>
<thead>
<tr>
<th>Part number (P/N)</th>
<th>This part comprises</th>
</tr>
</thead>
<tbody>
<tr>
<td>UX-S00117-01</td>
<td>• 2 x Trimble launcher cord</td>
</tr>
<tr>
<td></td>
<td>• 2 x Mounting plate</td>
</tr>
<tr>
<td></td>
<td>• 4 x Torx T10 screws</td>
</tr>
</tbody>
</table>

Required parts

- 1 x Trimble launcher cord
- 1 x mounting plate
- 2 x Torx T10 screws

Required tools

- Torx T10 screwdriver (included in the standard UX5 HP toolkit)
- Stork pliers (optional tool)

Steps

1. Assemble the launcher, but without installing the launch dock:

For more information, refer to the *Trimble UX5 HP Launcher Quick Start Guide*. 
2. To remove the launcher cord (the elastic and rope) from the launch slide:
   a. Lift the release handles in the front of the launcher and then pull the cord out of the launch slide until the end.

b. To detach the launcher cord, use the Torx T10 screwdriver to remove the two screws of the mounting plate that holds the end of the rope.
3. To insert a new cord in the launch slide:
   a. Insert the end of the rope in the front of the launcher, as shown:

   ![Diagram of inserting a rope into the front of the launcher]

   b. Guide the rope through the launch slide until you reach the launch hook at the bottom end of the launcher.

   ![Diagram of guiding the rope through the launch slide]

c. Take the end of the rope out of the launcher, guide it downward around the wheel and then pull it through the launch slide toward the front of the launcher. Make sure the rope forms two parallel lines without any twists.

![Diagram of rope being pulled through launch slide](image)

d. Guide the rope through the wheel system using the pliers. Follow the yellow line as shown. Using the pliers, pull the rope out of the launch slide.

![Diagram of pliers pulling rope](image)
e. Position the rope on the slot located on the axis of the wind-up wheel. Fix the new mounting plate with the two screws using the Torx T10 screwdriver. When both screws are inserted, tighten them firmly.

**Note** – *Do not to tighten the first screw until you have fixed the second screw. The mounting plate can bend if there is high tension on one side.*

4. To verify everything has been fitted correctly:
   a. Slide the launch dock over the ends of the launcher cord and attach the ends of the launcher cord to the launch dock.
   b. Slide the launch dock over the hook at the beginning of the launch slide. Make sure the launch dock clicks into position.
   c. Insert the safety pin into the launch dock.
   d. Insert the crank in the launch slide and tighten the launch cord (but not as much as when preparing the an actual launch).

⚠️ **CAUTION** – *Never launch without the UX5 HP sitting on the dock as it will damage the launch dock. The design of the launcher takes into account the weight of the UX5 HP sitting on the*
5. To release the tension, release the force with the crank very gently while pulling the release handles in the front of the launcher upward. This is safest done by two people, with one person carefully winding the crank counter-clockwise to counteract the force on the elastics.
Replacing the wheels of the launcher dock

Note – Trimble recommends replacing all of the launcher dock wheels at the same time.

Orderable parts

<table>
<thead>
<tr>
<th>Part number (P/N)</th>
<th>This part comprises</th>
</tr>
</thead>
<tbody>
<tr>
<td>UX-G00158-01</td>
<td>• 16 x Launcher dock wheels</td>
</tr>
<tr>
<td></td>
<td>• 1 x Tool – T-30 L-wrench</td>
</tr>
</tbody>
</table>

Required parts

- 8 x Launcher dock wheels

Tools

- T30 L-wrench

Steps

For each wheel:

1. Use the Torx T30 L-wrench to remove the screw that runs through the wheel.

2. Remove the wheel.

3. Insert the new wheel, making sure the holes through the wheel and the mounting plates are aligned.
4. Insert the screw and tighten.
   The replaced wheel appears as shown:
Battery maintenance

- Checking the battery health
- Storing the battery
- Recommended preventive maintenance
Checking the battery health

Before each flight, check the health of the battery using the LiPo Checker. To do this:

1. Make sure the battery is fully charged.

2. Connect the balance connector of the battery to the LiPo Checker, as shown below. Make sure the black wire of the balance connector aligns with the GND pin on the LiPo Checker.

When the battery is connected, the results are shown. In the example above, the highest cell voltage is 4.20 V (cell 4). Cells 1 and 3 are within 0.03 V. Cell 2 has 4.09 V, which is a difference of 0.11 V and is therefore out of specification. This battery would need reconditioning.

3. Check the result and then perform the appropriate action. Refer to the table below:

<table>
<thead>
<tr>
<th>Result</th>
<th>Do the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td>The voltage of one cell is &lt; 3.1 V</td>
<td>Scrap the battery.</td>
</tr>
<tr>
<td>The difference between the highest and lowest cell voltage is &gt; 0.03 V</td>
<td>Recondition the battery: 1. Connect the battery to the office charger. 2. Perform 3 charge cycles. A charge cycle is the process of charging and discharging the battery using an appropriate charger. We recommend using the office charger. For more information, refer to the Office Charger Quick Start Guide. 3. Check the battery health again. If the voltage difference between cells is still &gt; 0.03 V, scrap the battery.</td>
</tr>
<tr>
<td>The difference between the highest and lowest cell voltage is &lt; 0.03 V</td>
<td>The battery is properly balanced. No action is required.</td>
</tr>
</tbody>
</table>
Storing the battery

WARNING – LiPo batteries should never be stored at full charge for more than a few hours.

Battery storage recommendations

Batteries should be properly balanced (see Checking the battery health, page 58) and stored at 50% of full charge.

To charge or discharge the battery to the voltage level for safe and healthy storage, we recommend using the Graupner Ultramat 16S office charger. For more information, refer to the Graupner Ultramat 16S Office Charger Quick Start Guide.

Note – The Graupner Ultramat 14 Plus field charger can only charge the battery; it cannot discharge the battery.

Store the batteries in a cool, dry area (below 30 °C/86 °F) that is subject to little temperature change. Elevated temperatures can result in reduced battery service life.

Do not place batteries near heating equipment, nor expose to direct sunlight for long periods.

Do not store batteries above 60 °C (140 °F) or below -20 °C (-4 °F). Battery exposure to temperatures in excess of 130 °C (266 °F) will result in the battery venting flammable liquid and gases.

Batteries should be separated from other materials and stored in a noncombustible, well ventilated, sprinkler-protected structure with sufficient clearance between walls and battery stacks.

Recommended preventive maintenance

To maximize battery performance and service life, we recommend performing a charge cycle of the battery after every 20 flights, or prior to a flight when the battery has been stored for more than 4 weeks, even if the cell voltage difference of the fully charged battery is below 0.03 V.