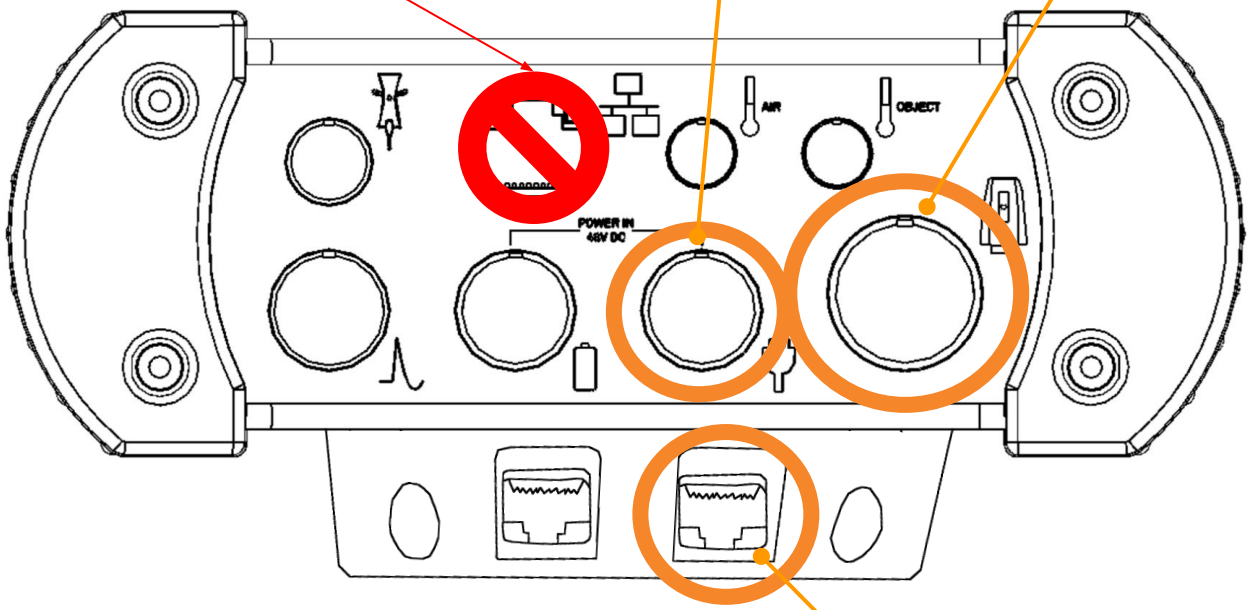
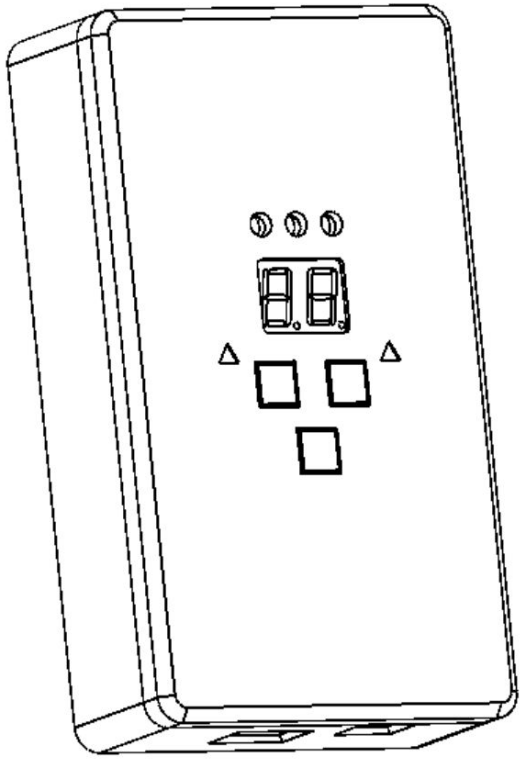
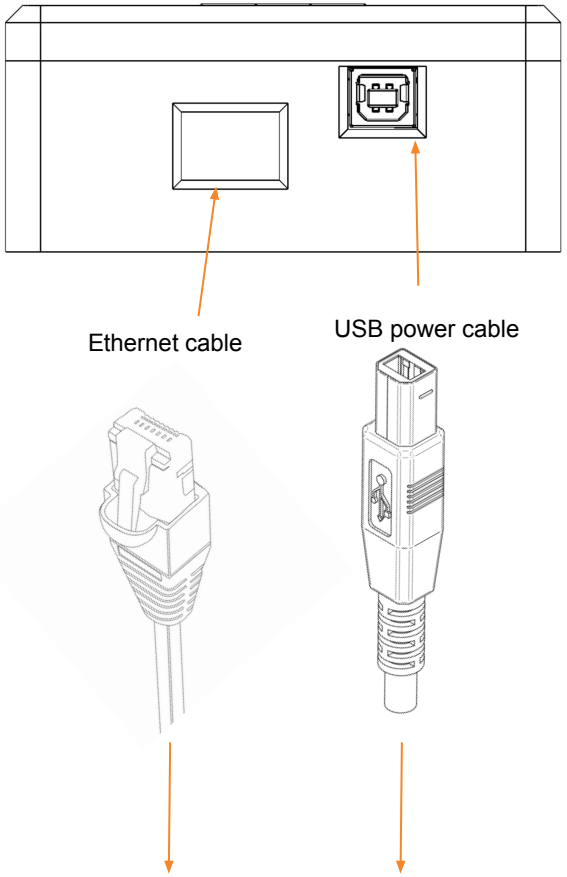
CONNECT THE WIRES



CONNECT THE WIRES

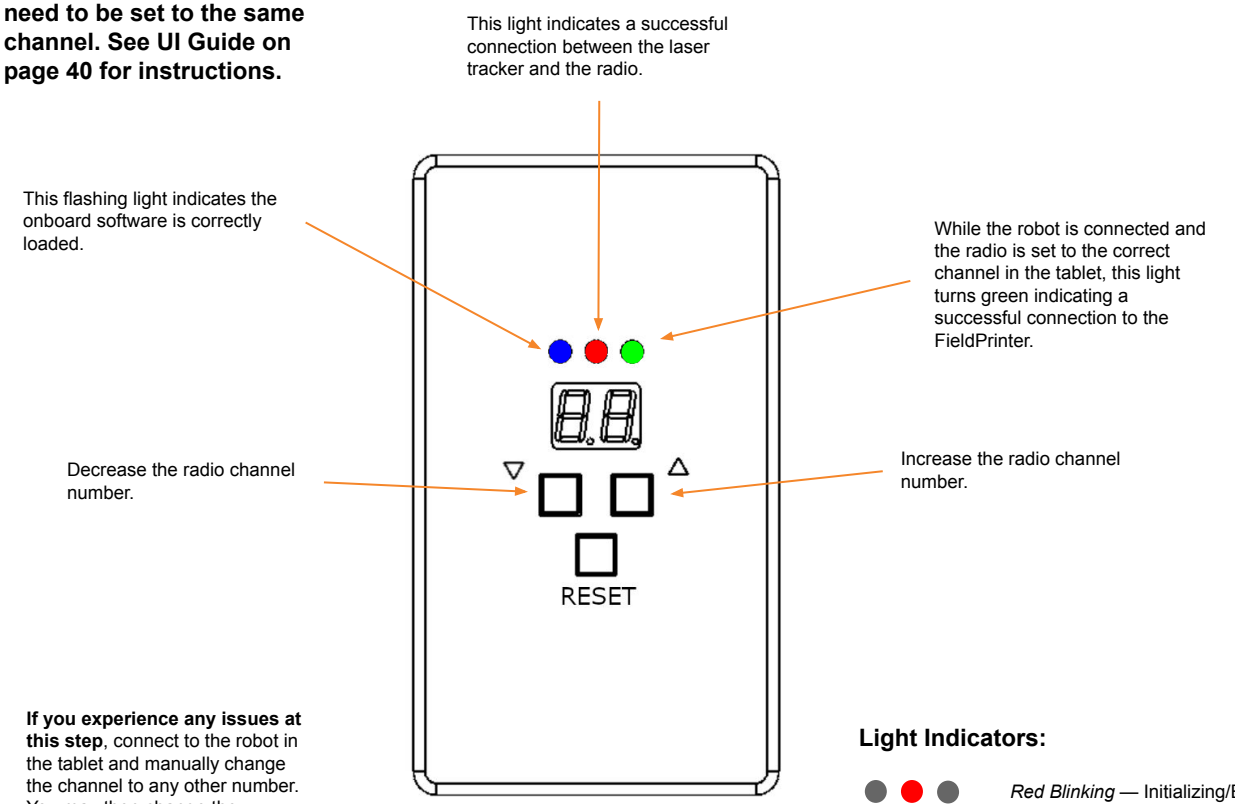
Connect the attached USB cable and the other end of the ethernet cable to the bottom of the radio box indicated here.





CONNECT THE RADIO TO THE CORRECT CHANNEL

The FieldPrinter and radio need to be set to the same channel. See UI Guide on page 40 for instructions.



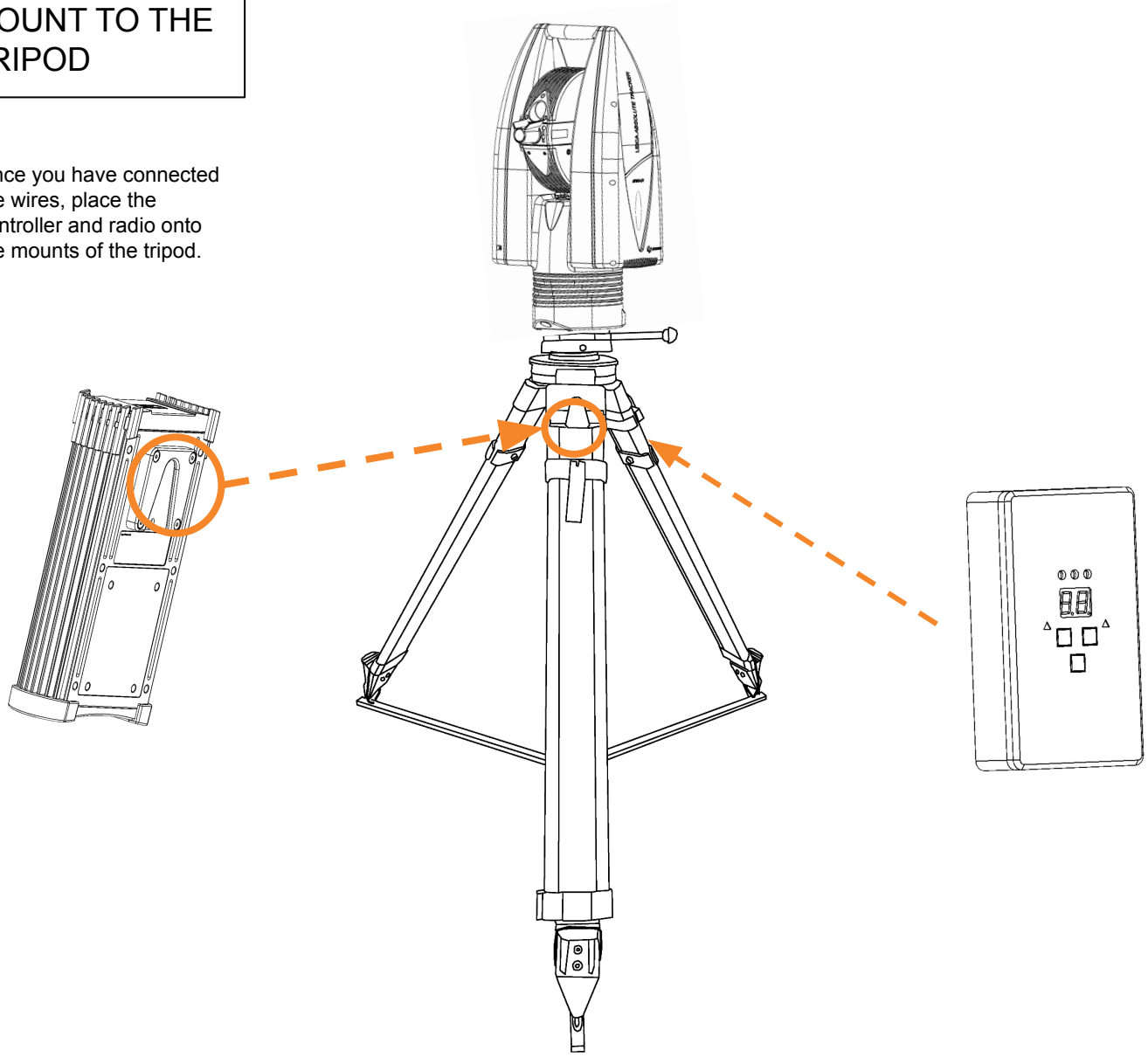
If you experience any issues at this step, connect to the robot in the tablet and manually change the channel to any other number. You may then change the channel on this box to match that newly set channel.

Light Indicators:

- *Red Blinking* — Initializing/Bootup
- *Blue Blinking* + *Red Solid* — On but not connected to FieldPrinter or brief signal reduction (harmless and temporary)
- *Blue Blinking* + *Green Solid* — On and connected to robot

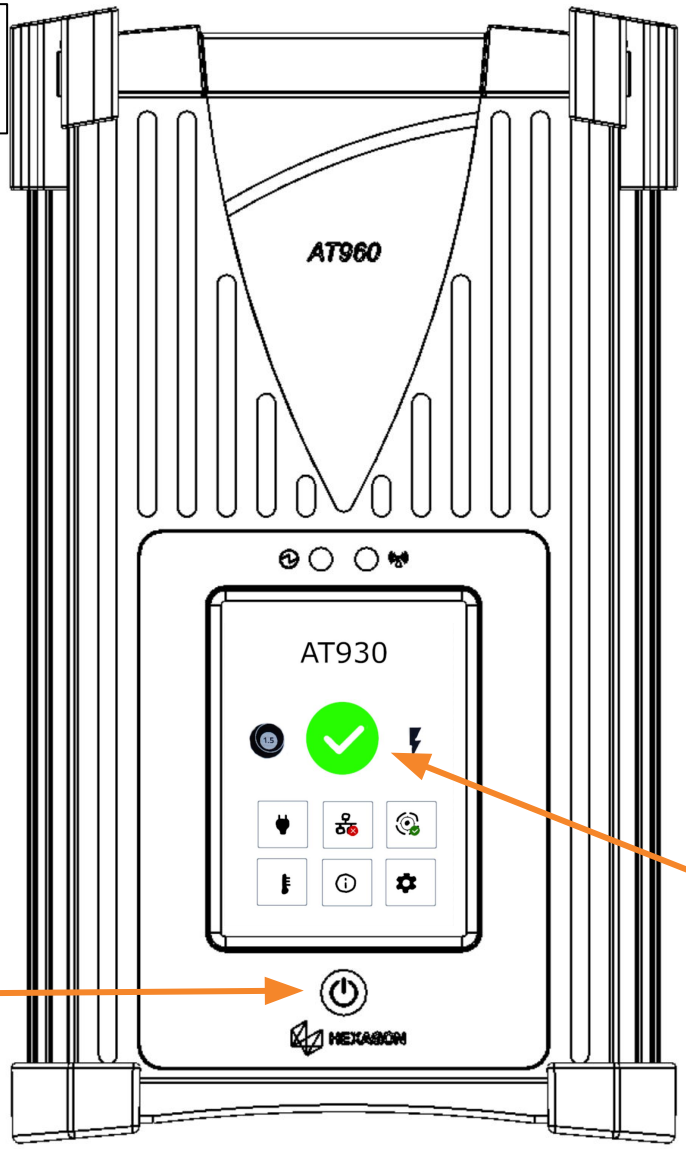
MOUNT TO THE TRIPOD

Once you have connected the wires, place the controller and radio onto the mounts of the tripod.

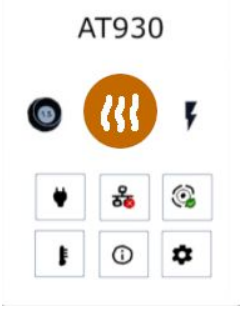


POWER THE LASER TRACKER ON

Now that everything is connected and the laser tracker is leveled, power the laser tracker on.



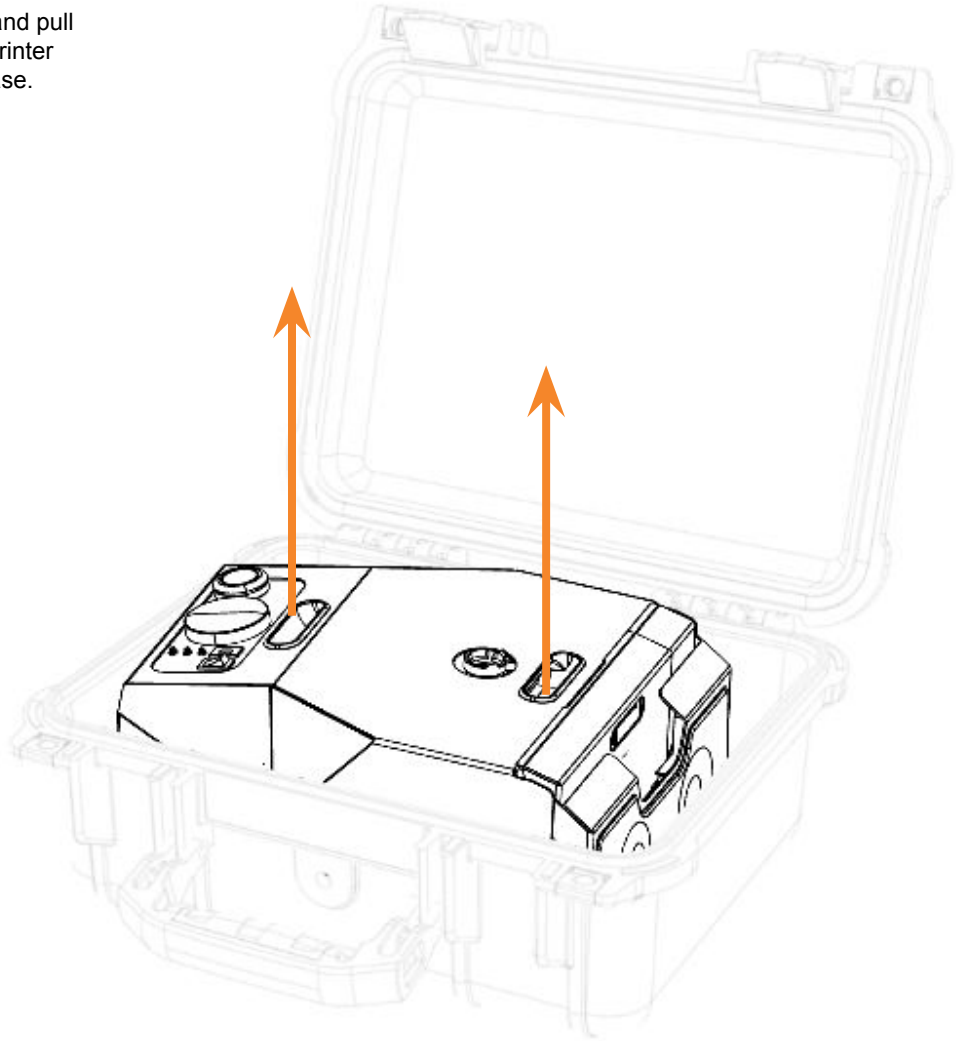
This icon is visible during the warmup process.



The laser tracker takes about 10 minutes to start up. Once ready, the controller will show a green checkmark on the screen.

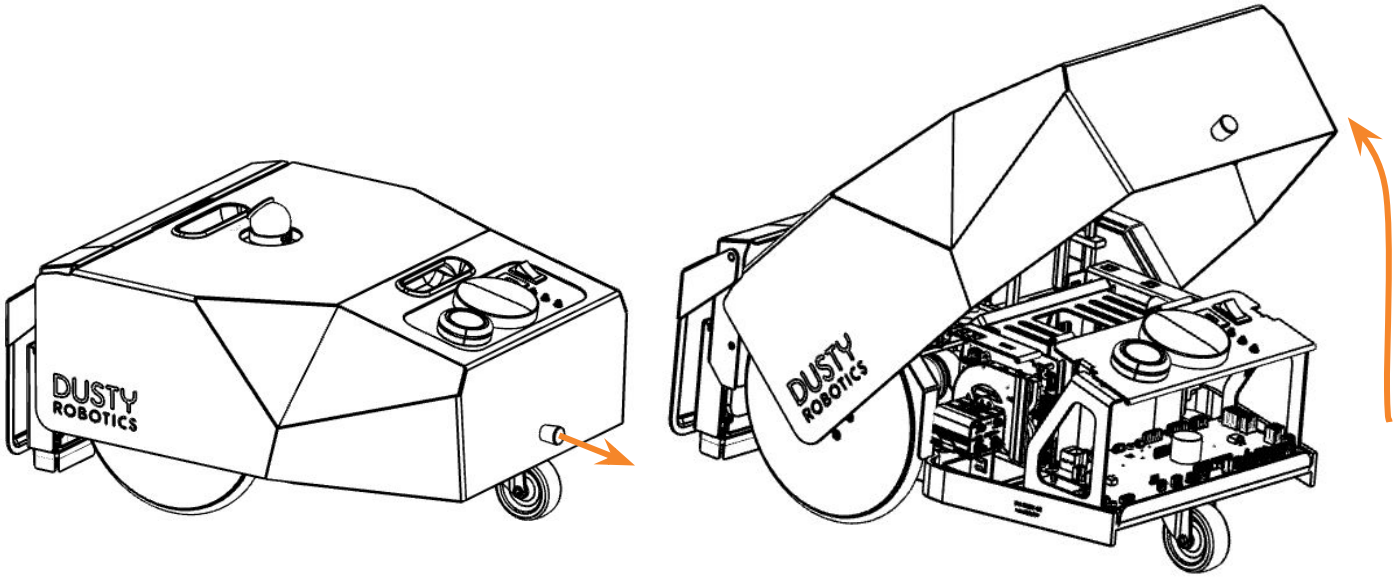
LIFTING THE PRINTER

Grab the handles and pull up to remove the printer from its carrying case.



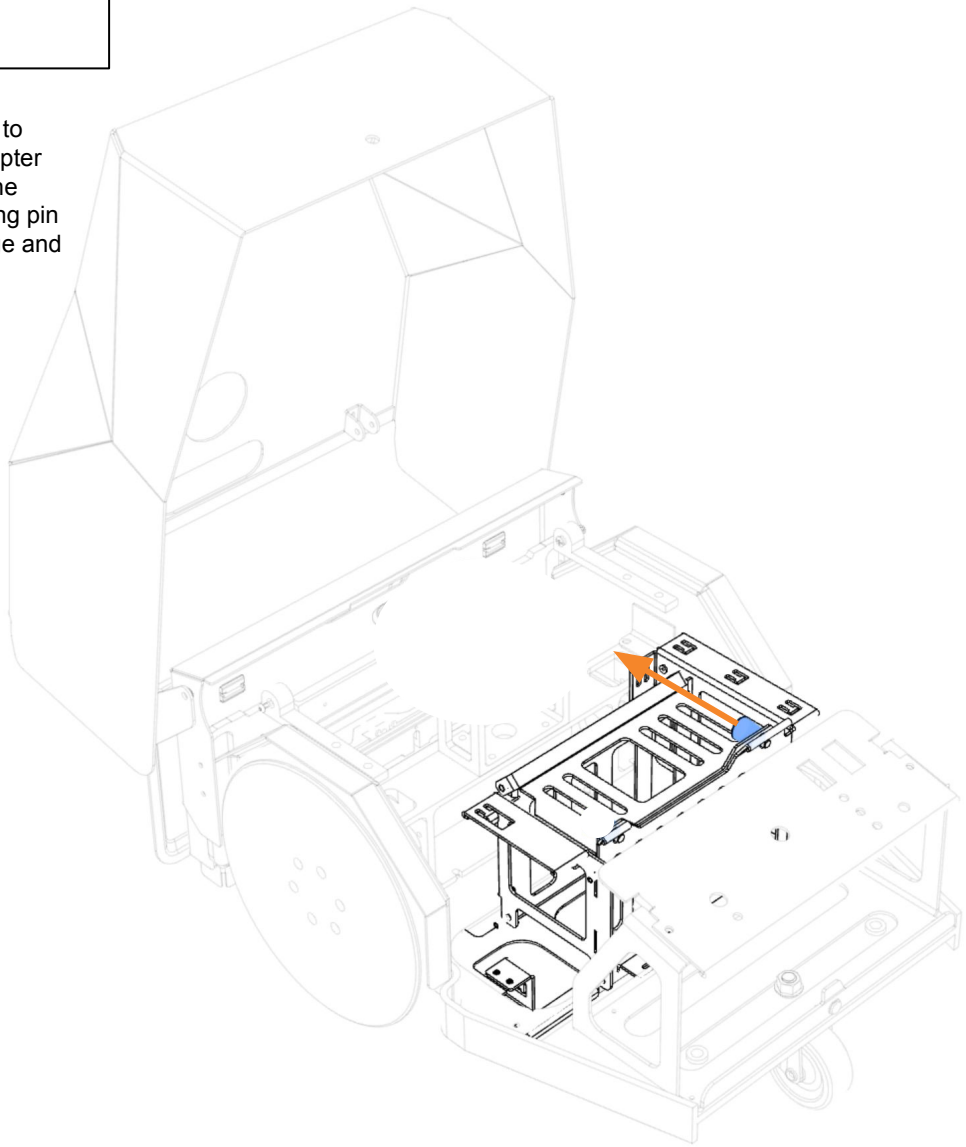
OPEN THE COVER

The battery compartment is located inside the printer. To access it, pull the spring pin out and raise the cover to open.



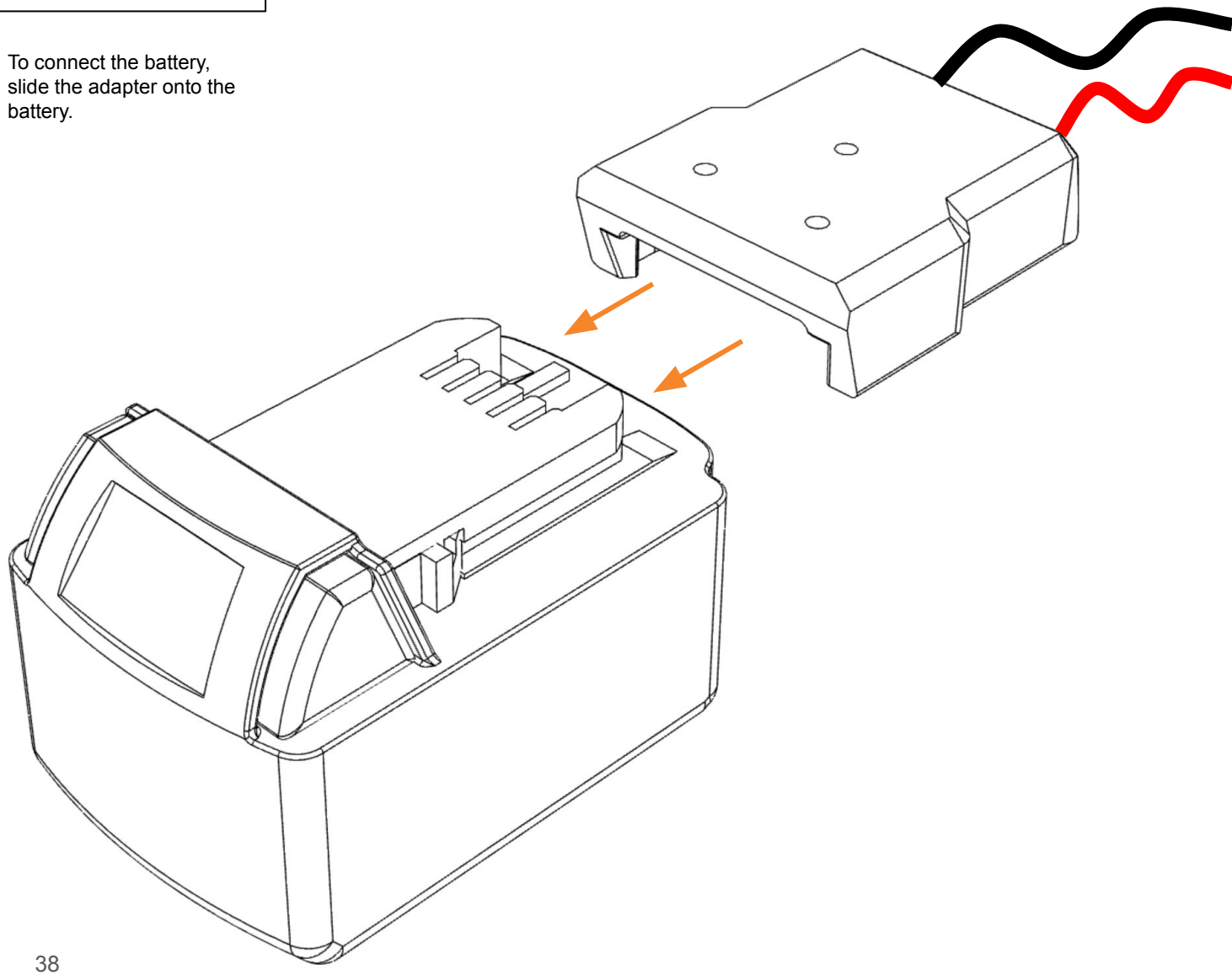
OPEN THE CAGE

The battery needs to connect to the adapter housed inside of the cage. Pull the spring pin to open up the cage and access the battery connector.



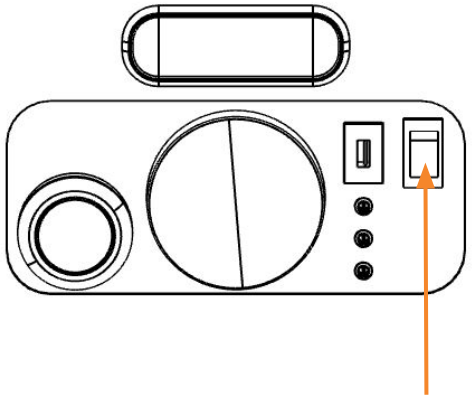
CONNECTING THE BATTERY

To connect the battery, slide the adapter onto the battery.

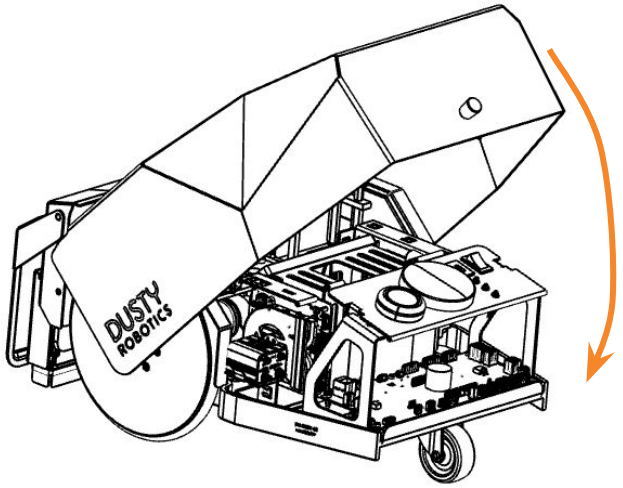


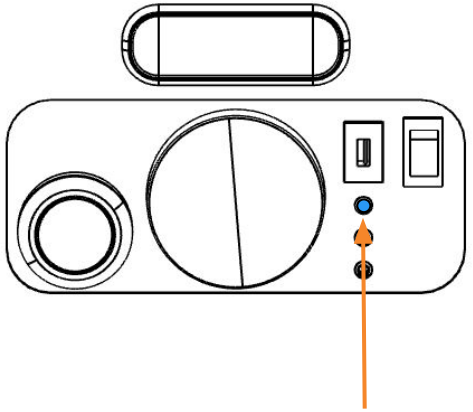
TURN THE PRINTER ON

Once the battery has been correctly connected, close the cage and cover, then turn the printer on by switching the power button to the forward ON position.



The power button is located here.





This blue light will then flash on and off indicating the on-board computer is powering on.

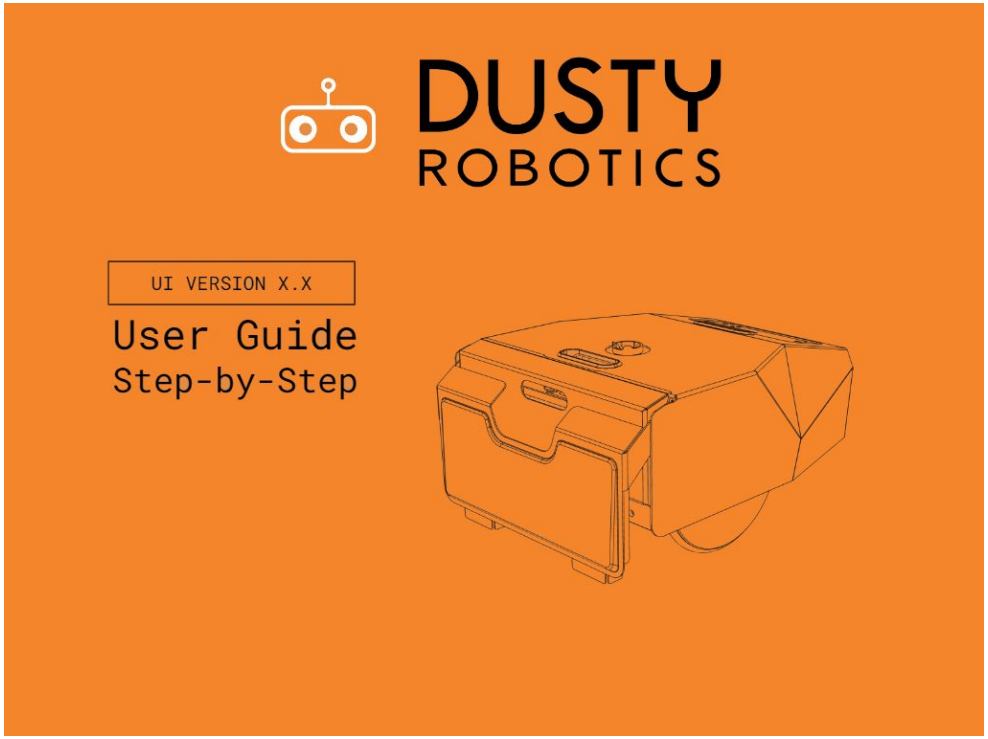
When powering off, turn the robot off and wait until the blue light stops blinking before disconnecting the battery.

REFER TO UI GUIDE

Once the laser tracker and the FieldPrinter have been setup, it is time to move to the tablet to setup the Dusty file and station the robot.

Access the UI Guide by scanning the QR code.

Scan QR code to view this document.



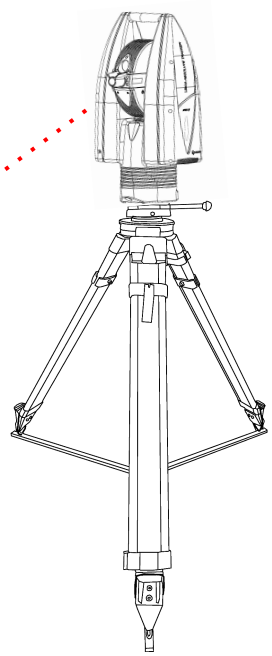
Recording the control points on the next page must be done in tandem with the Dusty Controller User guide. **Refer to the last page for more information on how to access more guides.**

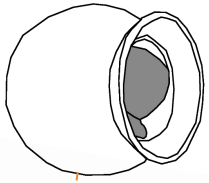
RECORDING CONTROL POINTS

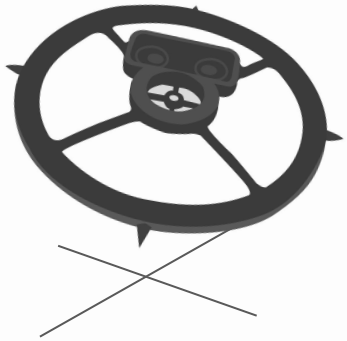
Before recording control points into the tablet, ensure that the laser tracker has an unobstructed view to each of the control points you plan to use.

Set the reflector directly onto the control point and ensure the laser is pointing towards the reflector.

Be wary of reflective surfaces. The laser could lock on to the reflective surface instead of the reflector on the robot.





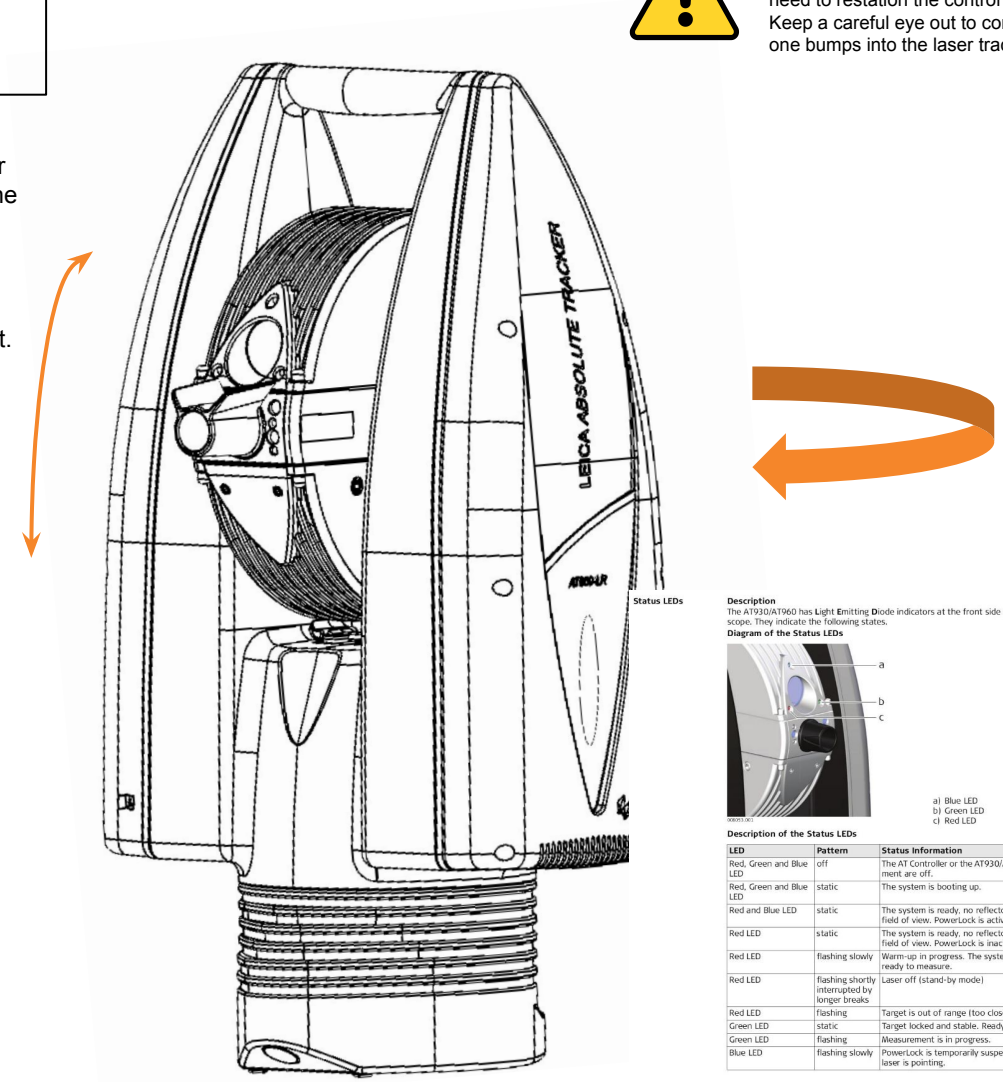


Ensure the center of the control point target is placed in the middle of the actual control point. Accurate target placement improves accuracy of layout.

This laser is a class 2 laser. These products are safe for momentary exposures but can be hazardous for deliberate staring into the beam.

RECORDING CONTROL POINTS

When pointing the laser tracker head towards the reflector, it is okay to **gently** rotate the head with one hand while to manually point it at the reflector or control point.



Do not move the tripod after it has been stationed. If the tripod is moved even a fraction of an inch, you will need to restation the control points! Keep a careful eye out to confirm no one bumps into the laser tracker.

Status LEDs

Description
The AT930/AT960 has **L**ight **E**mitting **D**iode indicators at the front side of the telescope. They indicate the following states.

Diagram of the Status LEDs

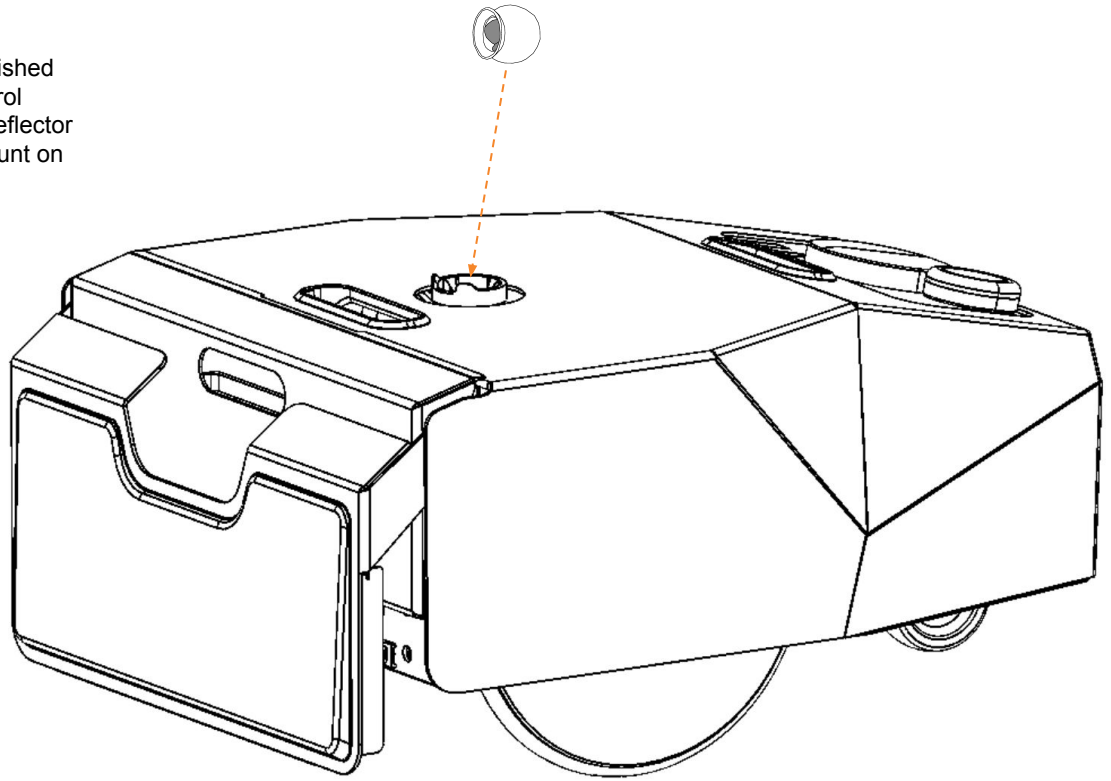
a) Blue LED
b) Green LED
c) Red LED

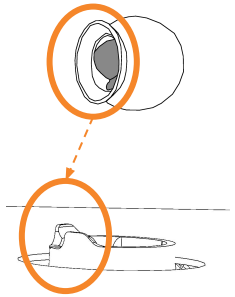
Description of the Status LEDs

LED	Pattern	Status Information
Red, Green and Blue LED	off	The AT Controller or the AT930/AT960 instrument are off.
Red, Green and Blue LED	static	The system is booting up.
Red and Blue LED	static	The system is ready, no reflector is in the field of view. PowerLock is activated.
Red LED	static	The system is ready, no reflector is in the field of view. PowerLock is inactive.
Red LED	flashing slowly	Warm-up in progress. The system is not ready to measure.
Red LED	flashing shortly interrupted by longer breaks	Laser off (stand-by mode)
Red LED	flashing	Target is out of range (too close or too far).
Green LED	static	Target locked and stable. Ready to measure.
Green LED	flashing	Measurement is in progress.
Blue LED	flashing slowly	PowerLock is temporarily suspended while laser is pointing.

RECORDING CONTROL POINTS

Once you have finished recording the control points, move the reflector to the reflector mount on the FieldPrinter.





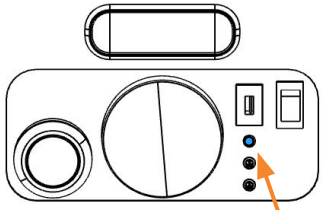
Ensure the reflector is seated correctly within the reflector mount. Once seated in the mount, push the rim of the reflector down between the mount ridges.

Restationing

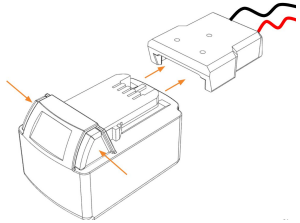
TAKEDOWN

SYSTEM TAKEDOWN

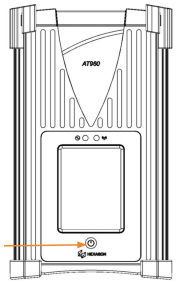
Taking the system down is much like setting it up, but in reverse.



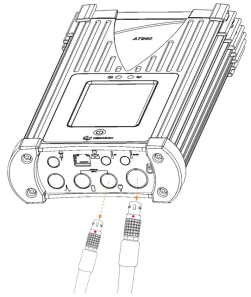
Power the robot down. **Wait for the blue light to stop flashing.**



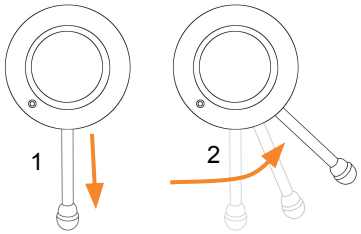
Disconnect the battery in the robot.



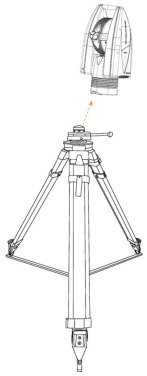
Power down the laser tracker by holding the power button for a few seconds. The screen will shut off indicating a power down.



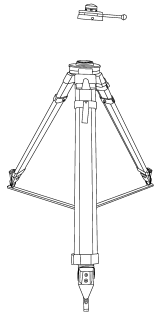
Once the laser tracker is powered down, disconnect the cables and detach the controller and radio from the tripod.



Pull out and push the tripod mount handle to the right to unlock the adapter.



Carefully remove the head from the tripod. **Use both hands!**



Remove the adapter from the tripod. **Lower the tripod legs**, detach the stabilizer, and fold the tripod back to its original position.

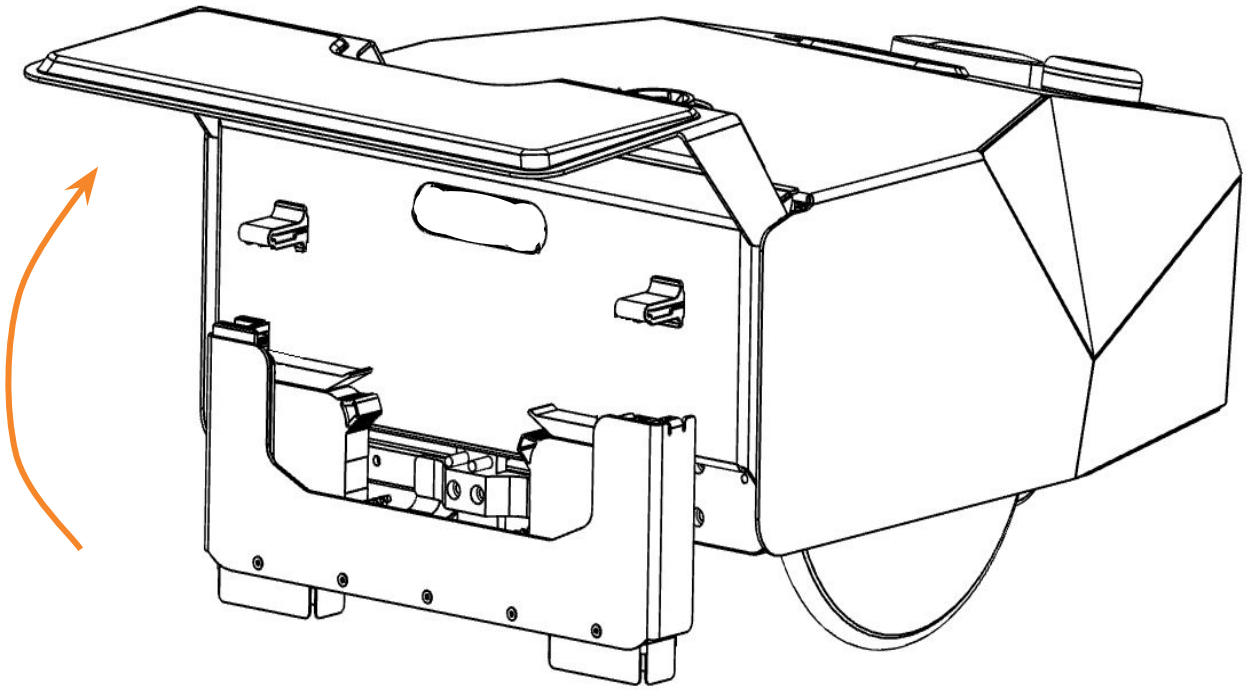
Once everything is powered down and unplugged, begin placing everything back into its respective box in the **same location it was stored.**

OPERATING CONDITIONS

ENVIRONMENT	YES	NO
Surface type	Dry conditions Concrete Wood Asphalt Any Smooth/Polished Surface	Wet or damp conditions Bumpy Surfaces Sloped Surfaces Dirt/Debris covered
Space	Open flooring Spaces with stubs and sleeves Light reshores	Full reshores Scaffolding Material covered floors Cabling/Extension Cords

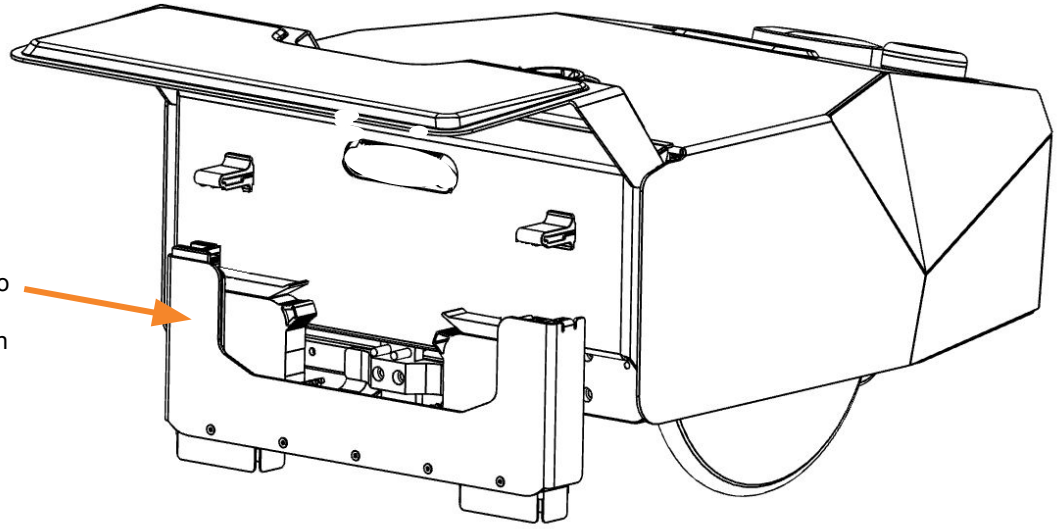
REPLACE INK CARTRIDGE

Raise the front panel to access the ink cartridges.

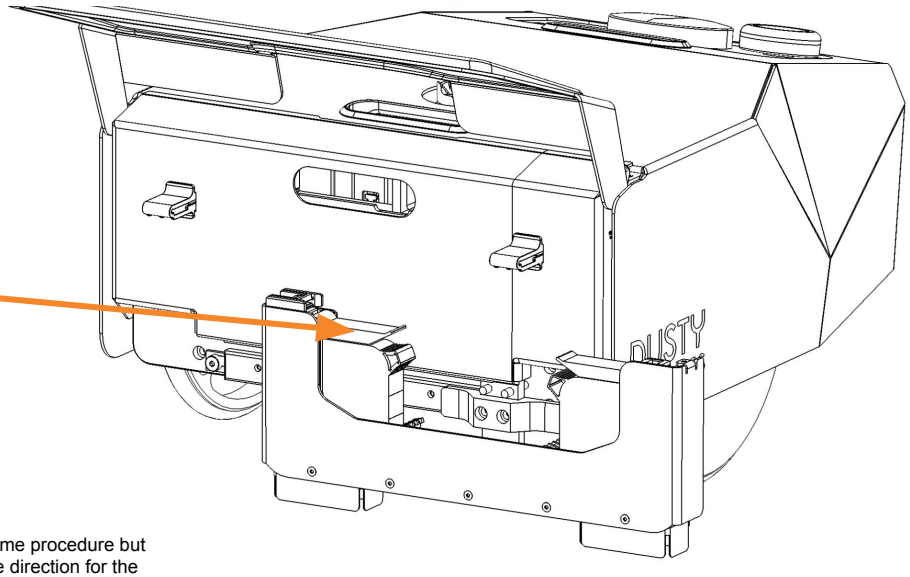


REPLACE INK CARTRIDGE

Before replacing the cartridge, the print stall should be manually moved to the right-most or left-most position to avoid any collision with the cartridge latch.

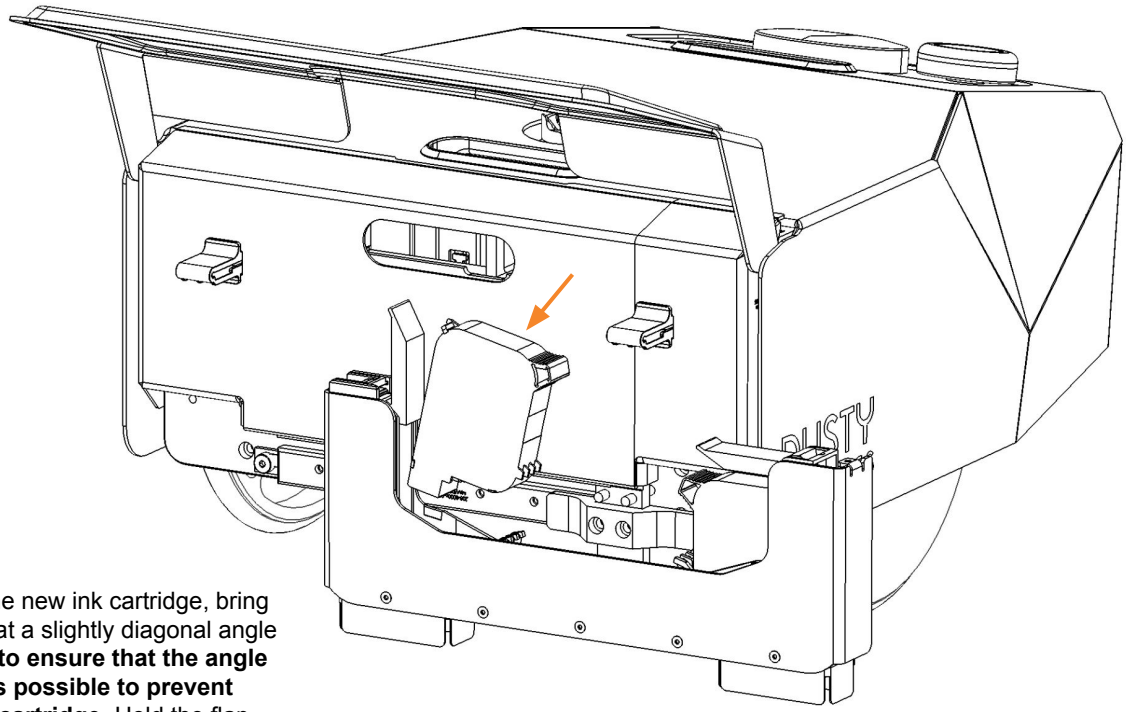


Once the print stall has been moved to one side, raise the cartridge latch to gain access to the ink.



Repeat the same procedure but in the opposite direction for the other cartridge.

REPLACE INK CARTRIDGE

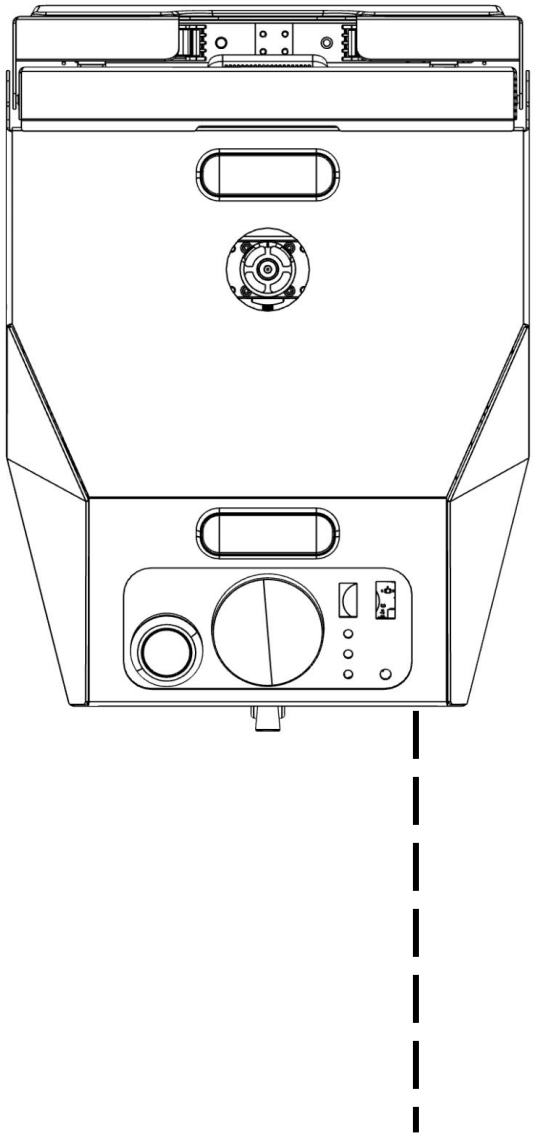


When placing the new ink cartridge, bring the cartridge in at a slightly diagonal angle like shown. **Try to ensure that the angle is as vertical as possible to prevent damage to the cartridge.** Hold the flap fully open while inserting the cartridge. Close the lever when the cartridge has been replaced.

Do not put too much pressure and force the cartridge in. It is possible to damage the cartridge and/or the latch in the process!

TEST INK

Once the new ink has been installed, ensure the ink is flowing correctly from the nozzle. Check to ensure printed text lines are legible as well.



Don’t forget to ensure that the wind guards are installed. They help prevent the ink from getting affected by the wind.

TROUBLESHOOTING

The location of the robot or the laser tracker in the field does not match the location seen on the tablet.
Possible Cause: The control points were not selected after stationing.
Solution: Ensure that the control points are highlighted in the Station tab. Click the unlock button to confirm they are indeed highlighted.

Possible Cause: The robot disconnected itself from the tablet.
Solution: This can happen from time to time when the robot is operating in an environment with a lot of Wi-Fi interference, or when a user walks out of Wi-Fi range from the robot (tablet-to-robot distance exceeds ~50 feet). Simply reconnect the robot on the tablet to continue printing. If you don't see the robot's Wi-Fi network on the tablet, wait two to three minutes before restarting the robot.

The robot is not printing lines where it should be.
Possible Cause: The laser tracker was bumped.
Solution: If the laser tracker is moved after stationing, it will offset/skew the lines relative to lines printed before the bump. Restation the control points and reprint previously-correct lines to confirm accuracy. The verification reflector will check every 15 minutes if the laser tracker has moved.

Possible Cause: The laser tracker adapter is not tightened firmly to the screw threads on the tripod.
Solution: If the adapter is not mounted correctly, it is possible for the laser tracker head to gradually move over time, creating skewed or rotated lines.

Possible Cause: The calibration is off.
Solution: The robot's calibration could have become displaced from mechanical shifts caused by unforeseen mechanical issues. Test calibration by contacting Dusty support.

Possible Cause: The ink cartridges are not correctly inserted.
Solution: Take out the ink cartridges and replace them with new ones or correctly place the existing ones.

The keyboard on the tablet doesn't show up.
Possible Cause: The tablet on-screen keyboard was accidentally disabled.
Solution: Enable the on-screen keyboard. Go to Start > Settings > Personalization > Taskbar > "Turn System Icons on or off" > Touch Keyboard.
The touch keyboard button will now appear at the bottom of your screen.

The reflector is rotating too slowly or won't catch the laser.
Possible Cause: The robot is not connected to the radio.
Solution: Ensure that there is a green light on the radio that is establishing the connection between the robot and the laser tracker. If not, confirm the wires are correctly placed and change the channel to confirm connection.

Possible Cause: The robot is too far away and the laser tracker is pointing to another reflection.
Solution: Try to cover up the reflective surface that is catching the laser tracker's attention or restation in a better location. Sometimes the laser tracker laser will point at a window or metal reflection in the background.

Possible Cause: The reflector is damaged/dirty.
Solution: Use the other reflector packaged with the robot.

Possible Cause: The robot needs to be restarted.
Solution: Try to restart the robot.

When selecting lines to print, the robot doesn't move.
Possible Cause: The robot is trying to cross some boundaries or obstacles.
Solution: There might be an obstacles surrounding the lines that you selected. Disable or adjust which obstacles you want the robot to be affected by. Ensure that the robot is not outside an obstacle surrounding the selected lines. Remove the obstacles or drive the robot outside the obstacle.

TROUBLESHOOTING

The joystick is unresponsive to commands.
Possible Cause: The joystick is not connected to the robot.
Solution: Be sure to the robot has fully booted (approx 3 minutes) and the USB receiver on the robot is inserted.

Possible Cause: The joystick is not set to “X” input.
Solution: Refer to the page. 15 to ensure that the front of the controller is correctly set to “X” and not “D.”

The robot is printing faded lines.
Possible Cause: Ink cartridge is dried out, clogged, or low.
Solution: First try to use an ink wipe to unclog the dirty or clogged inks. Try to print some more lines and if there is no improvement, replace the ink cartridge.

Possible Cause: The robot is set to solvent ink type when using water-based ink.
Solution: Change the ink type in the Settings tab in the tablet from solvent to water.

The robot is leaking ink on the ground.
Possible Cause: The ink is not set to the correct type of ink.
Solution: After connecting to the robot, navigate the tablet UI to the ‘Print’ tab and change the ink setting from ‘water’ to ‘solvent’.

Possible Cause: The ink cartridge is damaged.
Solution: Replace the ink cartridge with a new one.

The robot prints wavy lines.
Possible Cause: The wind guards are not installed or not installed properly.
Solution: Install the wind guards to eliminate wind effect.

Possible Cause: The laser tracker adapter is not in the locked position or not fastened tightly.
Solution: Ensure that the adapter is correctly connected.

The FieldPrinter Wifi does not appear.
Possible Cause: The robot is not yet booted up.
Solution: Restart the robot then wait at least 3 minutes for the robot to boot up.

The robot is not where it should be on the tablet.
Possible Cause: The control points were not selected in the tablet before locking those control points and proceeding.
Solution: Unlock the control points and ensure that you select the right ones before locking them in.

Possible Cause: The reflector is not seated correctly on the mount.
Solution: Ensure that the reflector is correctly seated in the mount. Refer to the page 43 for more detailed instructions.

The tolerance is too high (>1/8") between control points when stationing.
Possible Cause: Incorrect or misaligned control points.
Solution: Ensure that you are matching the control points in the digital file to the correct ones in real life. Ensure that you are placing the control point target directly on the center of the control point as carefully as possible.

Possible Cause: The control points from the original CAD file are incorrect.
Solution: The control points in the field are not consistent with the control points in the digital layout file.The quickest fix is if your Dusty UI file contains the gridlines, you can create your control points by offsetting gridlines on the UI. Otherwise the points can be fix using AutoCAD.

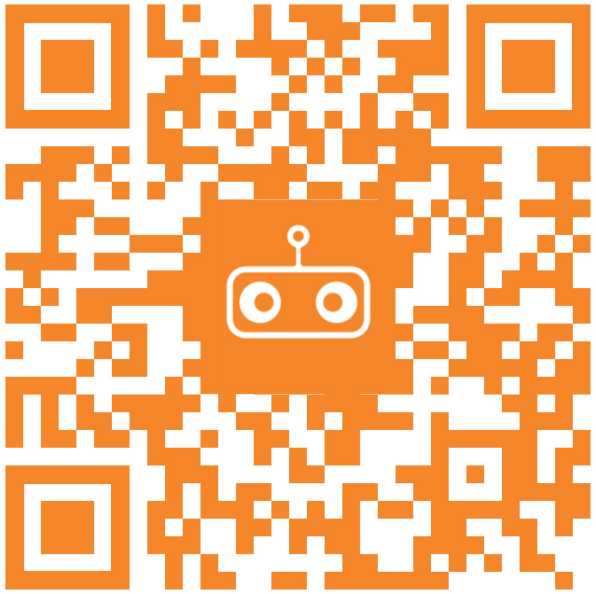
The Radio (black box) won’t stay connected to the robot (will not remain green).
Possible Cause: The wires are not connected or are too loosely fit on the radio.
Solution: Confirm the wiring of the radio by rechecking the User Guide (pages 30 - 31) and ensure that they are tightly inserted.

Possible Cause: The channel is too busy or the robot is not connected on the right channel.
Solution: Sometimes there is interference in the channel and it is worth confirming to see if another radio channel works better. Change the channel on the radio and the tablet to see if it improves things.

If the problem you are facing is not listed here, try to restart the FieldPrinter, radio, or laser tracker before contacting support.
Dusty Support: (510) 210-3658

SUPPORT

Dusty Robotics Website QR code



Dusty Robotics Support
Phone: 510-210-3658
Email: support@dustyrobotics.com

Contact support for more information on how to access more guides and documentation regarding the FieldPrinter system.

FCC Statement:
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter must be at least 23 cm from the user and must not be co-located or operating in conjunction with any other antenna or transmitter.

IC Statement:
This device complies with Innovation, Science and Economic Development Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

(1) This device may not cause interference; and
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme aux flux RSS exemptés de licence d'Innovation, Science et Développement économique Canada. L'opération est soumise aux deux conditions suivantes:

(1) Cet appareil ne doit pas provoquer d'interférence; et
(2) Cet appareil doit accepter toute interférence, y compris les interférences susceptibles de provoquer un fonctionnement indésirable de l'appareil.
[English] Radiation Exposure Statement: This equipment complies with the IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 23 cm between the radiator and your body.

[French] Énoncé d'exposition aux rayonnements: Cet équipement est conforme aux limites d'exposition aux rayonnements ioniques RSS-102 Pour un environnement incontrôlé. Cet équipement doit être installé et utilisé avec un Distance minimale de 23 cm entre le radiateur et votre corps.

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