Welcome

SitePrint Webinar: VP3.0 Technical Updates

Agenda

• VP3.0 New functionalities	Andrea Ballart
• HP SitePrint Robot Upgrade kit	Jack Carlile

VP3.0 New functionalities

HP SitePrint Value Pack 3.0

Increased Productivity

Up to 30% productivity increase by **improving navigation speed and reducing stop time**

- Navigation speed increased from **1.3 ft/s to 2.3 ft/s (0.4 m/s to 0.7 m/s)**
- Robot stop time has been reduced **1 second per stop**

Increased Autonomy

Reduce user intervention thanks to **HP Smart navigation system** and **Shadowing**

HP Smart Navigation System

Leading the race towards autonomy

Time of Flight Camera Integrated

This feature integrates a Time-of-Flight depth camera to enhance performance

Captured obstacles mapped in internal map

Mapped obstacles are stored in the robot's internal map and are cleared if not detected in subsequent passes

Smart Navigation for obstacle data processing

Processes obstacle data in real-time to adjust robot's trajectory, allowing it to navigate around unexpected obstacles

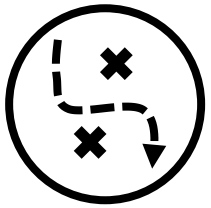
User-optional feature activated via toggle in the UI

Recommended for environments with obstacles not represented in the CAD

HP Smart Navigation System

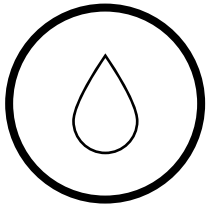
Expected behavior during operation

Navigating



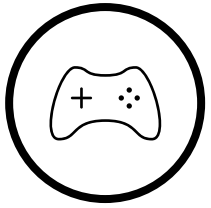
When SitePrint detects an unmapped obstacle while navigating between elements, it will **maneuver around the obstacle and continue movement** until it reaches the starting point of the next print element.

Printing



The Smart Navigation System will be **deactivated while the robot is printing an element,** and any obstacle that may appear will be **detected by the LiDAR sensors.**

Manual control



The Smart Navigation System will be **deactivated while the robot is being controlled manually**, and any obstacle that may appear will be **detected by the LiDAR sensors**.

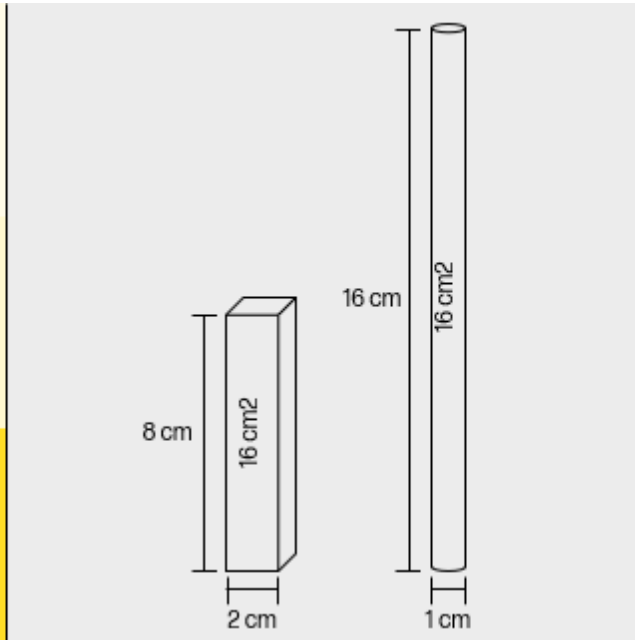
HP Smart Navigation System

Detection limits

Height:
Obstacles must be a minimum height of 8 cm (3.1 in).

Thickness:
Obstacles must be at least 1 cm (0.4 in) thick.

Area:
Minimum area of the obstacle must be at least 16 cm^2 (2.5 in^2)



Detected obstacles are:

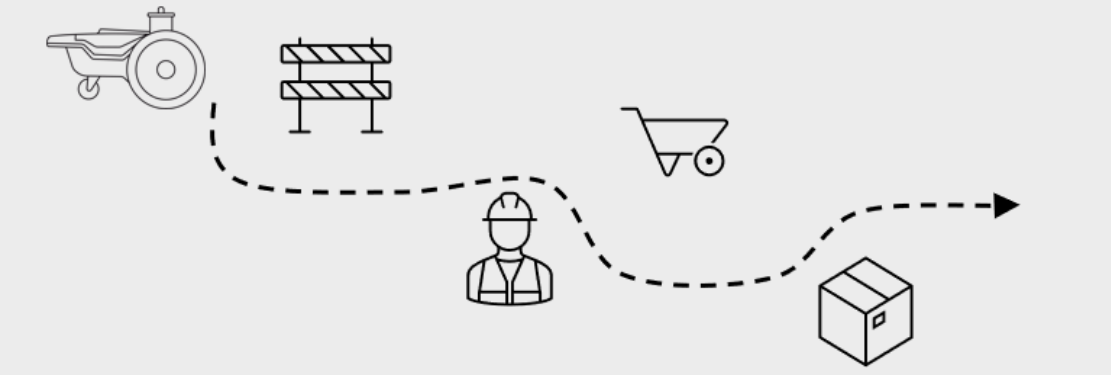
- Posts/rods/pipes
- Steps/Curbs
- Walls

HP Smart Navigation System

Elements and conditions causing false detections

ToF depth cameras are light-based sensors and may occasionally detect false-positive obstacles due to the inherent characteristics of the technology.

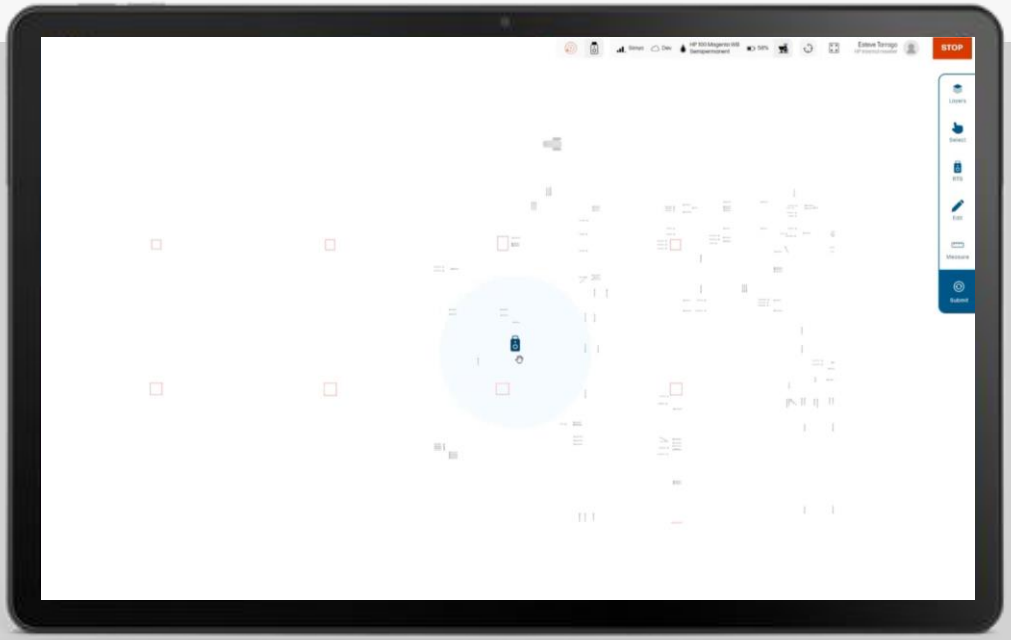
- **Polished dark floors**
- **Certain extreme light conditions**
- **Reflective obstacles or surfaces**



Shadowing

Avoid navigation in areas without Total Station Line of Sight

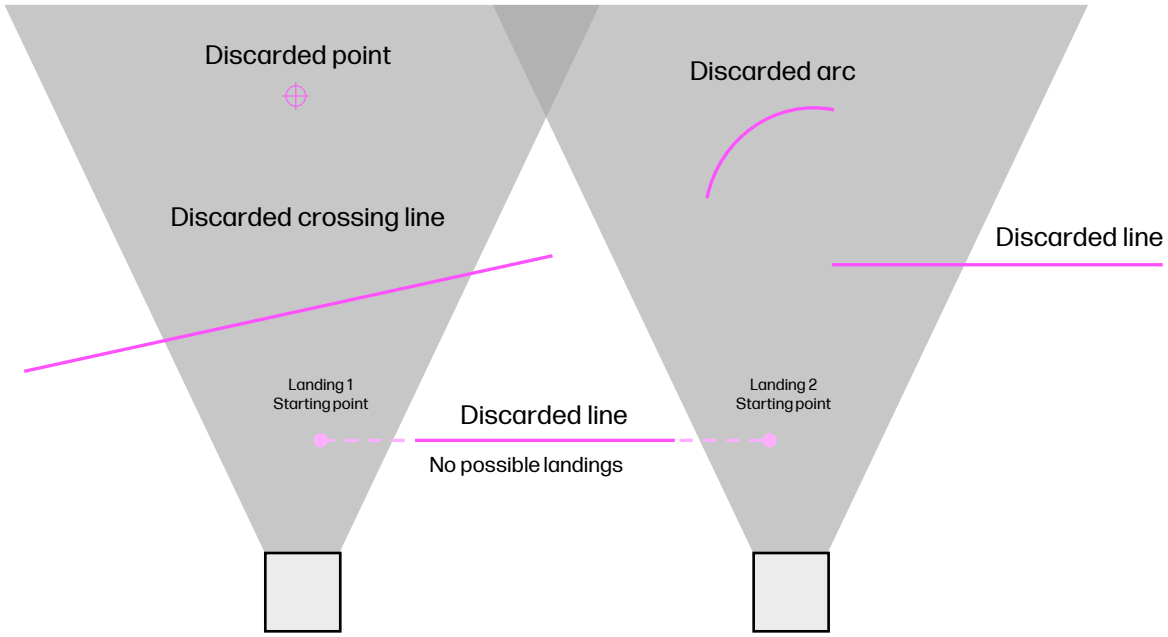
Software-based functionality	Shadowing is activated by the user in the control panel.
Optional feature activated via toggle.	Recommended for environments where CAD includes obstacles causing visual occlusions.
Project shadows on the map	Considers mapped obstacles using the Total Station as a reference.
Exclude obstacles from shadow projection.	Users can exclude mapped obstacles that don't cause visual occlusions.



Shadowing behavior

Non-printable elements due to shadows

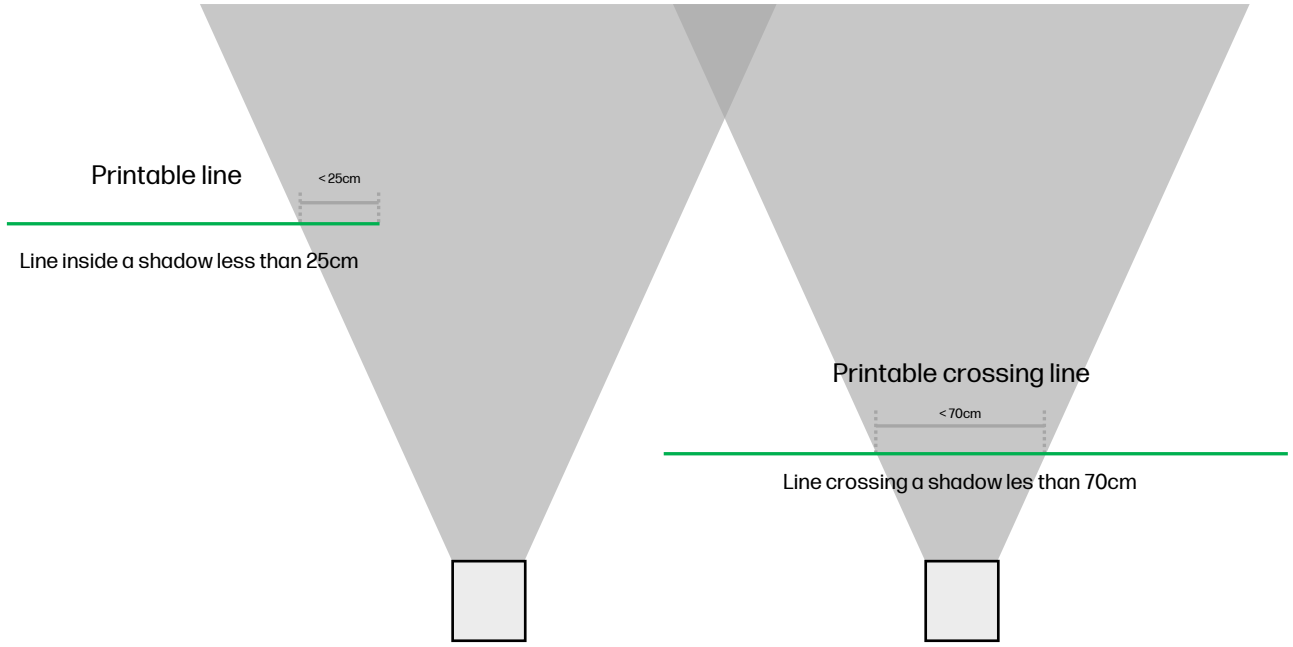
Printing elements that fall within shadowed areas are typically discarded to prevent loss of sight with the Total Station.



Shadowing behavior

Printable lines in shadowed areas

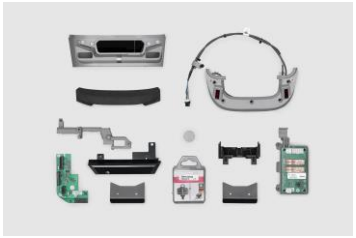
- **Lines that end in shadowed areas**, with a **remaining length of less than 25 cm (9.8 in),** can be completed by HP SitePrint, which will then automatically exit the shadowed area.
- Lines that **cross a shadowed area for a short distance, less than 70 cm (27.5 in)** can also be printed.



How can I upgrade to VP3.0?

Upgrade path to VP3.0 functionalities

All SitePrint users can install VP3.0.1 software, but full functionality is available only on robots with new hardware components.

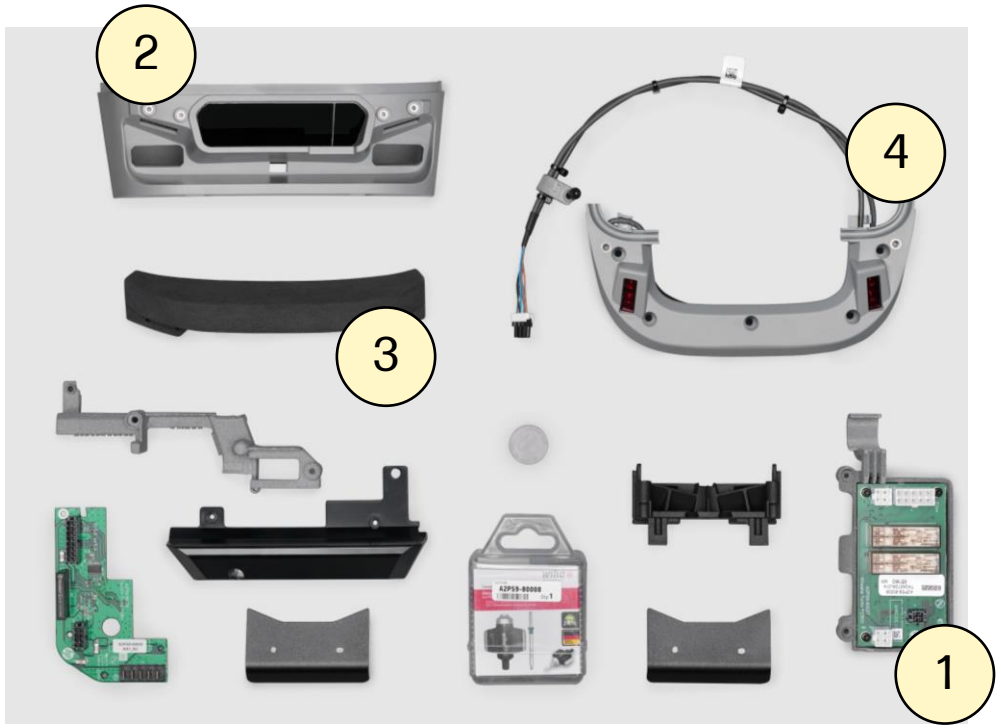
		Shadowing	Smart Navigation	Productivity increase	50°C Temperature Certification
Current SitePrint Users	 3F8P0A – HP SitePrint Robot	✓	✗	✗	✗
Current SitePrint Users + Upgrade Kit	 3F8P0A – HP SitePrint Robot +  A2PS8A – HP SitePrint Robot Upgrade Kit 3.0	✓	✓	✓	✓
New SitePrint Users	 A2PS9A – HP SitePrint Robot	✓	✓	✓	✓

HP SitePrint Upgrade kit process

Hardware Upgrade Kit

Key components

1	**NEW ELECTRONICS**	PCA Upgrades for the electronic boards are required to increase navigation speed.
2	**DEPTH CAMERA**	A new depth camera is necessary to enable HP Smart Navigation System.
3	**FRONTAL BUMPER**	To maintain safety certifications when increasing speed.
4	**SAFETY SENSORS**	Safety sensors are repositioned to aim closer to the robot



Hardware Upgrade Kit process

Upgrade Kit process steps

1. Assembly procedure preparation
2. Replace the Narcine PCA and Narcine PCA Cover
3. Replace the rear sensor and grommet
4. Replace the Rear Handle Safety Sensors
5. Replace the Wheelie PCA and Support
6. Replace the Sensor Cover Assembly
7. Assembly Retainer Lateral Cover
8. Install the Bumper
9. Update the Product number label
10. VP3.0 Diagnostics
11. Camera calibration
12. Additional HW upgrades

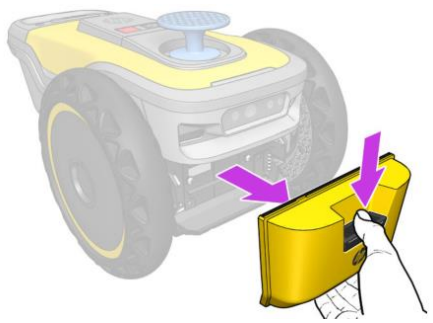
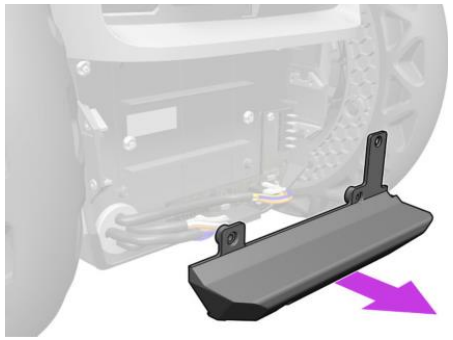
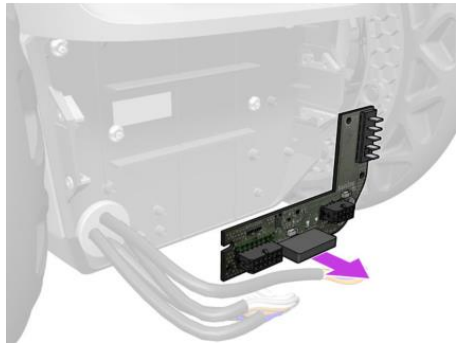
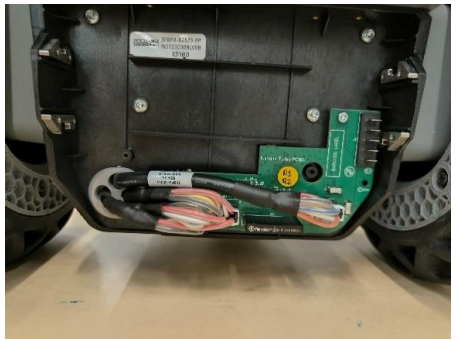
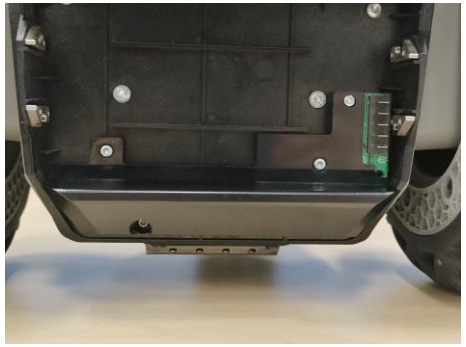
Hardware Upgrade Kit process

Assembly procedure preparation

a. Before starting the Hardware upgrade make sure that the Robot is upgraded to the latest FW version available: **VP3.0.1**
b. Perform a purge process.
c. Remove the cartridge.
d. Turn off the robot.
e. Remove the battery.
f. Remove the battery cover.

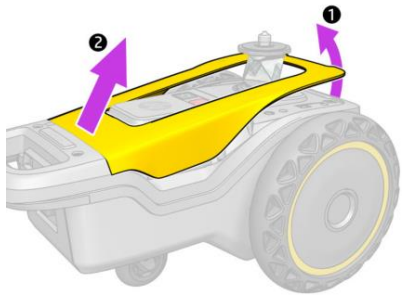
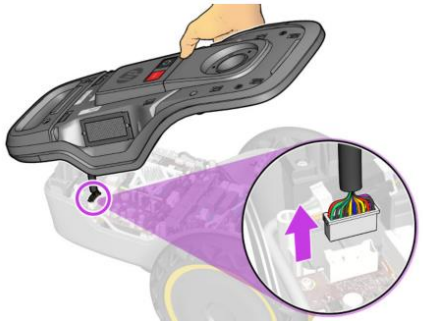
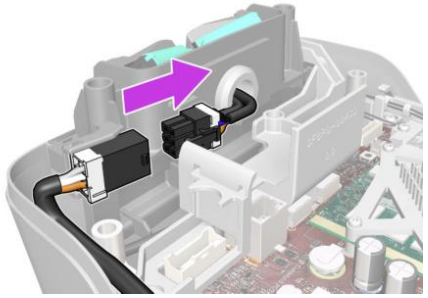
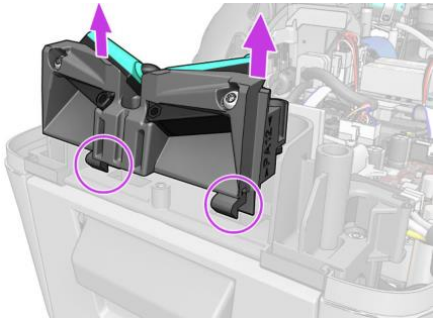
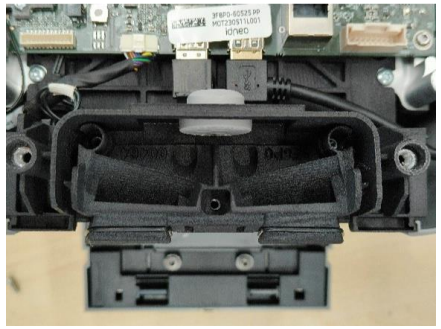
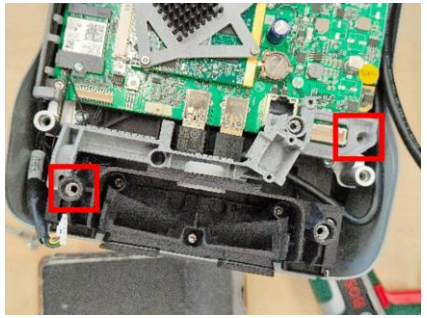
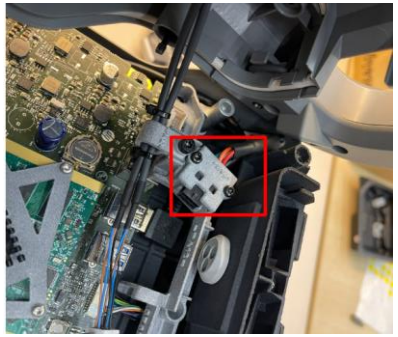
Hardware Upgrade Kit process

Replace the **Narcine PCA** and **Narcine PCA Cover**

Remove the battery pull assembly. 	Remove and discard the Narcine plastic cover 	Remove the Narcine PCA. 	Install the new Narcine PCA (A2PS9-60021).  Note: Ensure that the upper cable rests over the bottom ones to close the Narcine PCA Cover without pinching them.	Install the new Narcine plastic cover (A2PS9-40004). Tighten the 3 screws to 0.9 Nm.  Note: Use the tightening screwdriver provided with the kit.

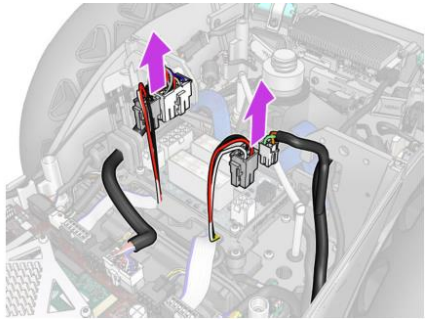
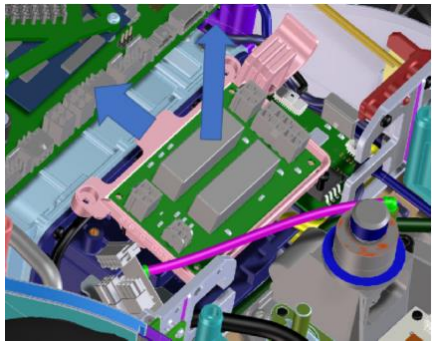
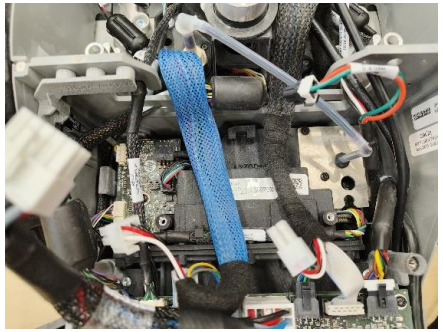
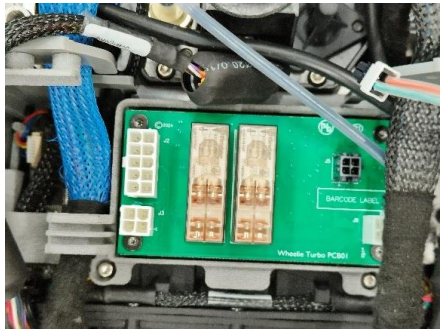
Hardware Upgrade Kit process

Replace the **Rear Sensor** and **Grommet**

Remove the prism/handle and the top cover by pulling it up to detach the magnets. 	Unscrew the screws to remove the entire assembly and disconnect the cable coming from the Cockle PCA to the cuttlefish PCA. 	Disconnect the rear sensors cable and remove the support with the sensors. Open ink  	Insert the blind grommet (A2PS9-00006) and fake sensor (A2PS9-60016). 	Secure and connect the cable coming from the sensors to the 3D printed cuttlefish support.  

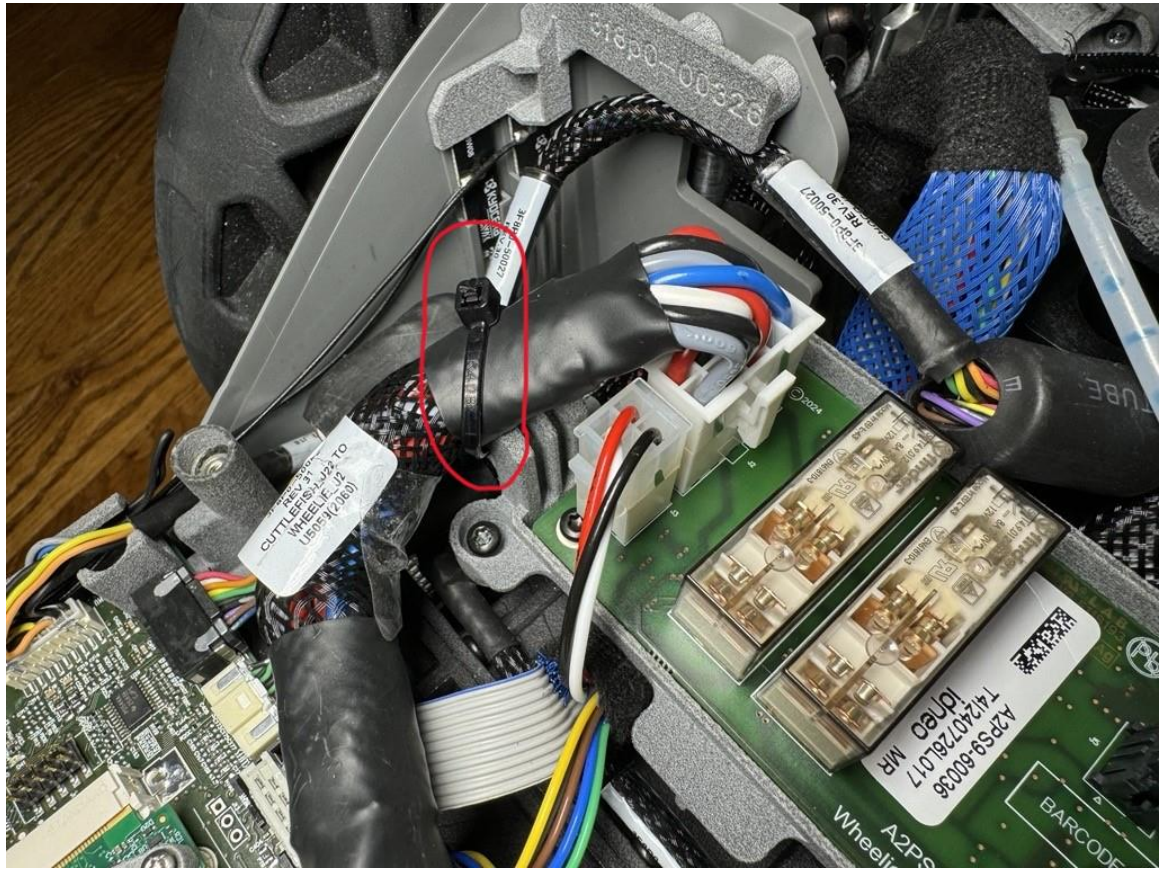
Hardware Upgrade Kit process

Replace the **Wheelie PCA** and **Support**

Unplug all the cables from the Wheelie PCA.	Remove the Wheelie PCA with the support.	Insert the new Wheelie PCA with the new support.	Tighten the two T-10 screws to 0.9 Nm
			
		IMPORTANT: Ensure the cable coming from the Cuttlefish PCA goes under the Wheelie support.	

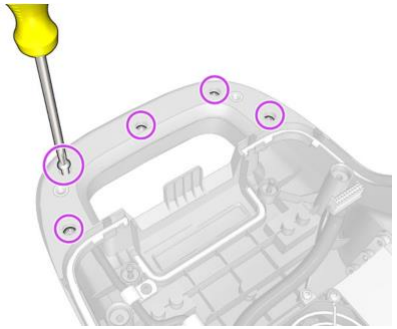
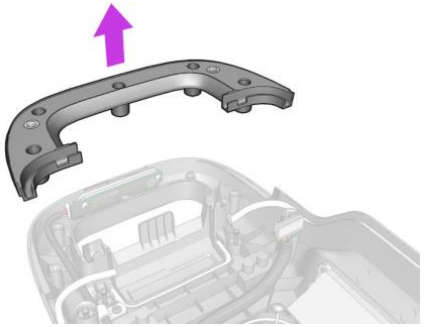
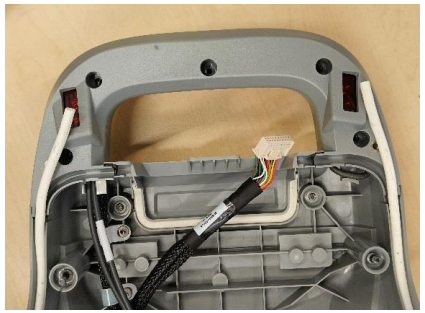
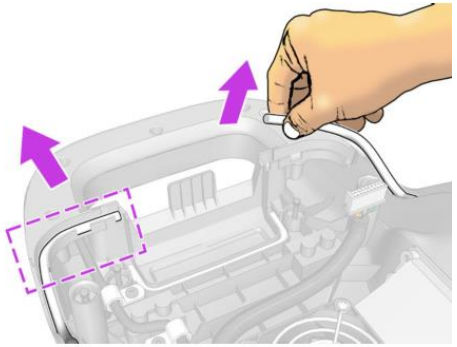
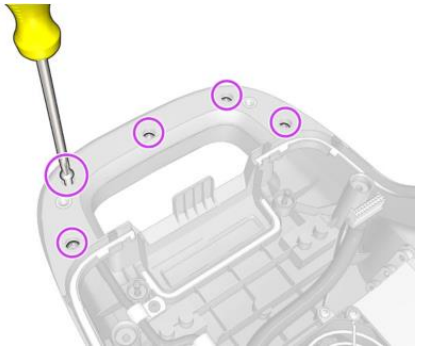
Hardware Upgrade Kit process

Wheelie PCA Zip Tie Placement



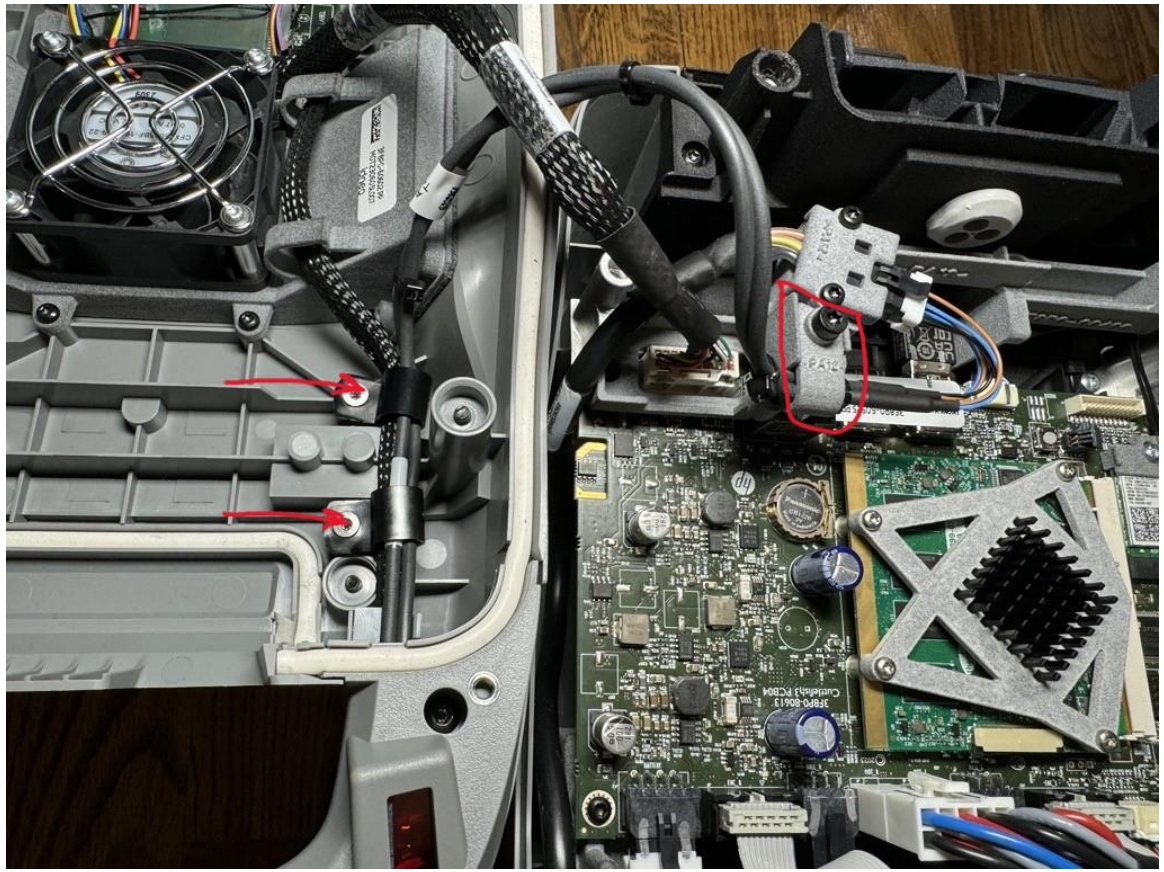
Hardware Upgrade Kit process

Replace the **Rear Handle Safety Sensors**

Remove 5 screws from the rear handle.	Remove the sealing gasket from both sides and the rear handle.	Insert the new handle, ensure that the two sealing gaskets are well placed, and the wires are not pinched.	Insert the sealing gasket for both sides of the rear handle.	Assembly the new Rear Handle and tighten the 5 screws at 1.4Nm to continue guaranteeing the IP44 protection grade
				

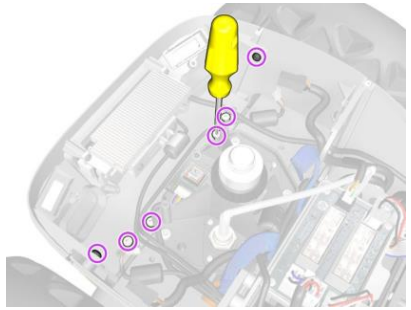
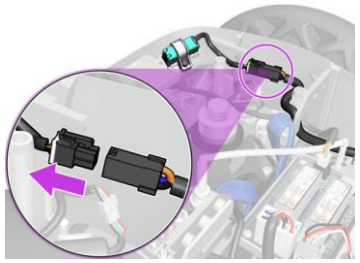
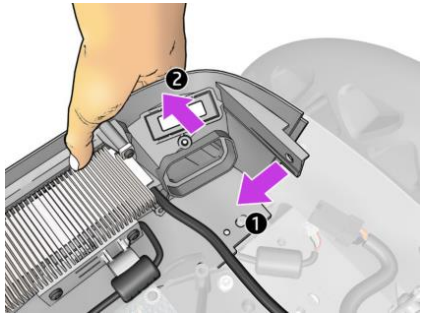
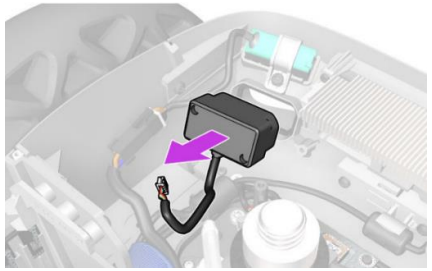
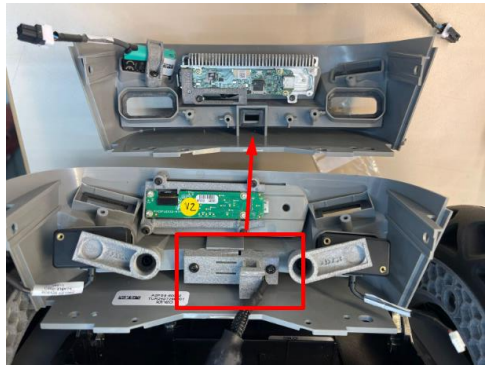
Hardware Upgrade Kit process

Cable Management for new sensors



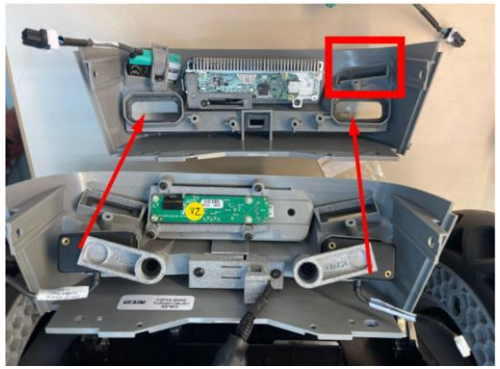
Hardware Upgrade Kit process

Replace the **Sensor Cover Assembly**

Remove 6 screws and unclip the front sensor cover from the robot. 	Disconnect all sensors.  	Remove all 4 sensors from front sensor cover. 	Unplug USB from camera if applicable. Camera stays on old front sensor cover. 	Remove sharp sensor from front sensor cover. Transfer glass into new sensor cover to preserve water resistant rating. 

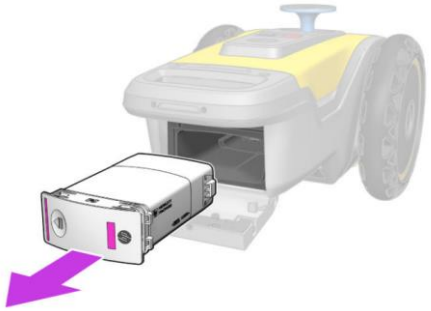
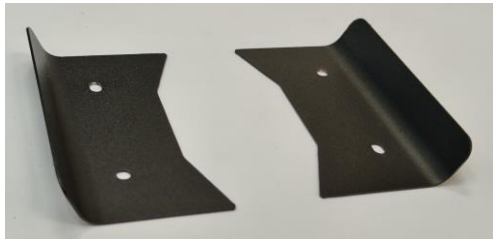
Hardware Upgrade Kit process

Replace the **Sensor Cover Assembly**

Transfer 3 of the 4 sensors into new front sensor cover. Leave top right sensor out. Screw Sharp sensor in with 2 screws.	New camera will come attached to front sensor cover. Plug it into existing USB.	With camera plugged in, you can transfer 4th sensor into new front sensor cover.	Attach new sensor cover to front of robot with 6 screws. Ensure it is clipped on and fully flat.
			

Hardware Upgrade Kit process

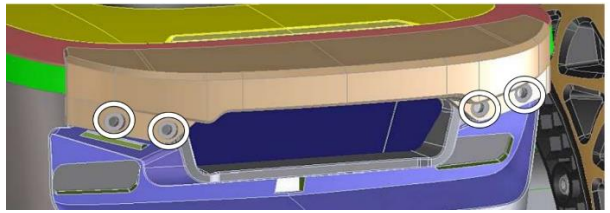
Assemble the **Retainer Lateral Covers**

	Do not rest robot on front sensors during this process. 	Remove 4 screws. We will reuse them to add cover plates. 	Metal plates increase robustness.  

Hardware Upgrade Kit process

Install the **Bumper**

Use provided security torx bit to screw in 4 screw with washers.



NOTE: When placing the Upper Cover make sure that the bumper is on top of the Upper Cover

Hardware Upgrade Kit process

Update the **Product number label**

Stick the new Part Number label in the space above the Caster Wheel

Hardware Upgrade Kit process

Transport Case Service Kit

Remove the old top foam from the SitePrint case by pulling it.
Install the new foam with the new features added by removing the protective plastic and sticking it directly in the box.

NOTE: to better remove the old foam, it is possible to use a heat gun or a spatula.

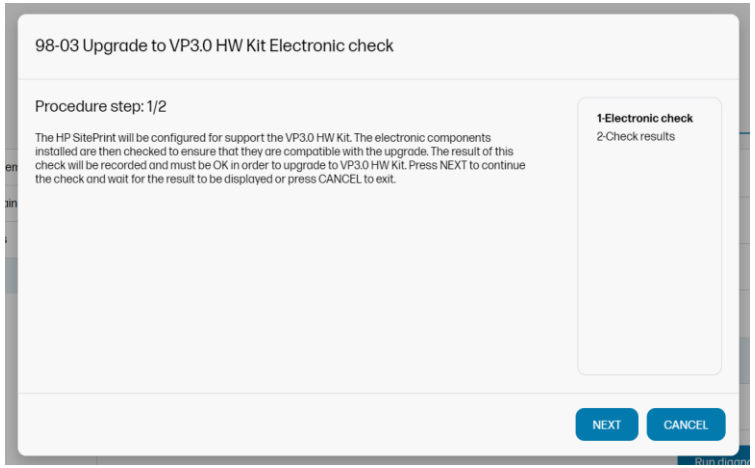
Hardware Upgrade Kit process

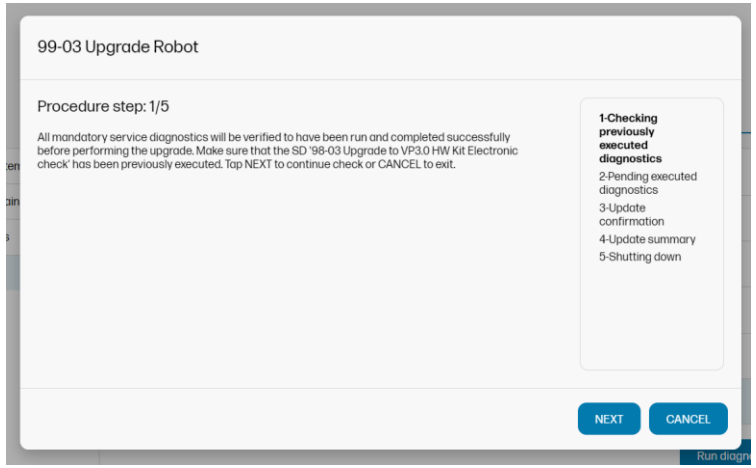
VP3.0 Diagnostics

Turn on the robot and run **VP3.0 Diagnostics** in the Support menu of the User Interface:

- **98-03 Upgrade to VP3.0 HW Kit Electronic check:** checks if electronic components installed are compatible for upgrade to VP3.0 HW kit.
- **99-03 Upgrade Robot**: Diagnostic to upgrade to VP3.0 HW Kit.

NOTE: It is mandatory to run and complete the above service diagnostics in this menu without errors.





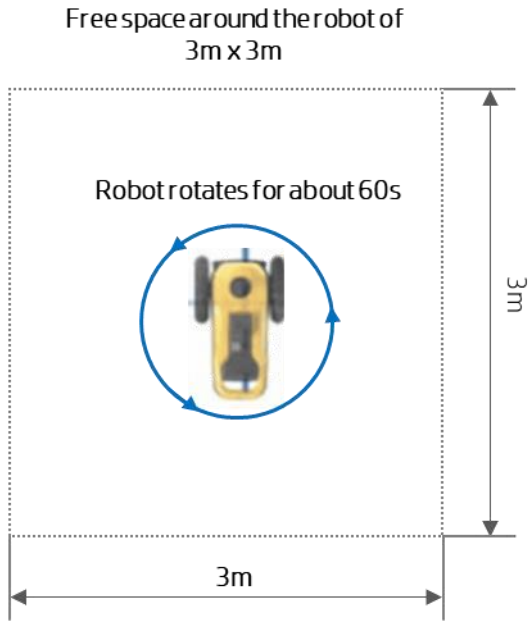
Camera calibration

Diagnostic available from VP3.0.2 onwards

Sensors > Camera Calibration or Upgrade to VP3.0 HW Kit > Camera Calibration

Preconditions:

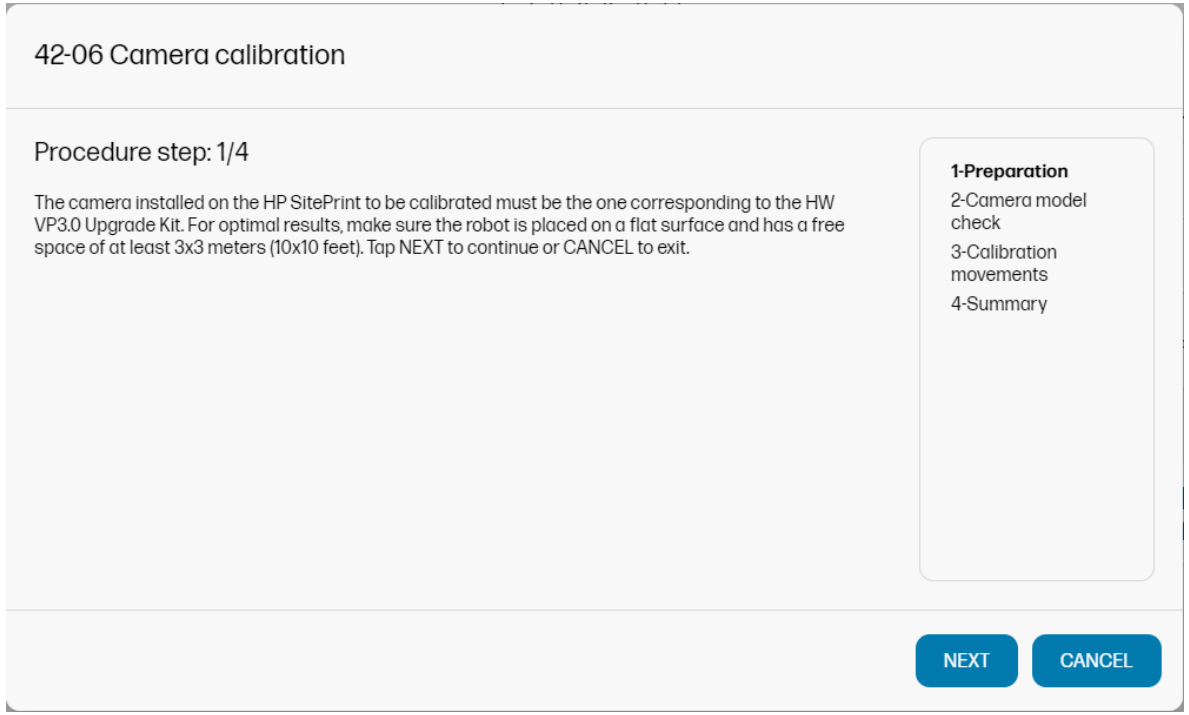
- Space of 2.5m radius around the robot, without obstacles.
- Flat floor.

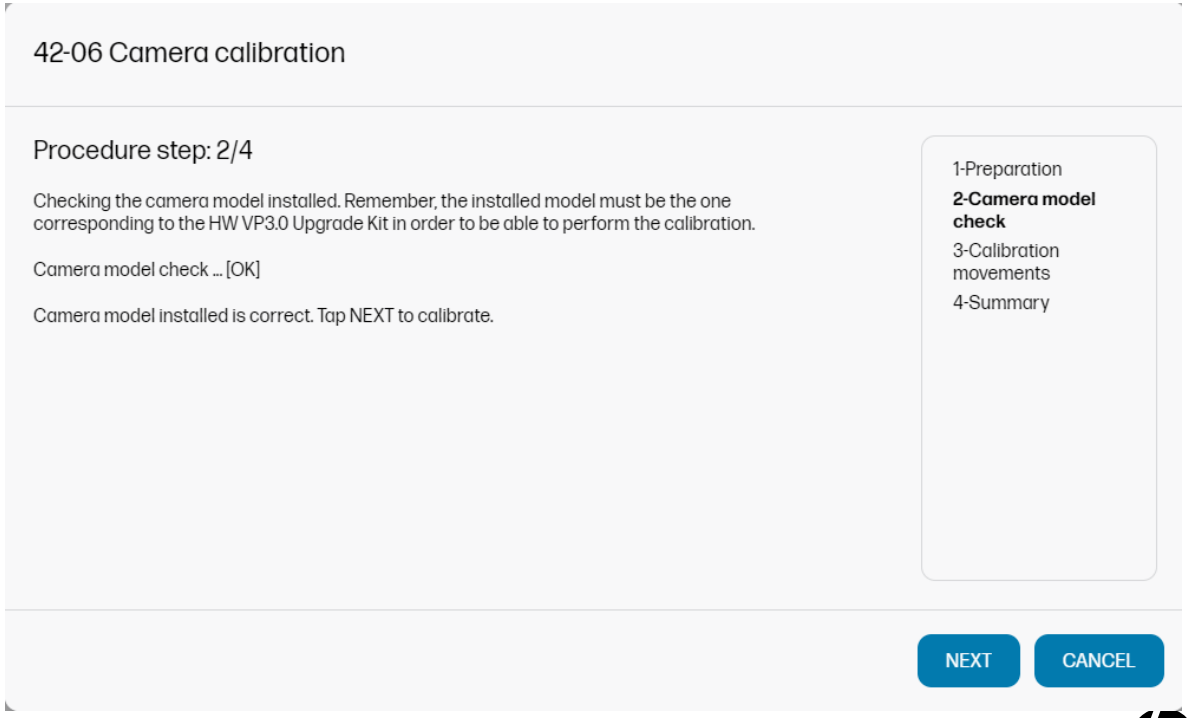


Camera calibration

Diagnostic available from VP3.0.2 onwards

The diagnostic first makes some initial checks and preparation to launch the calibration (the electronics are checked to ensure that the camera is properly installed):

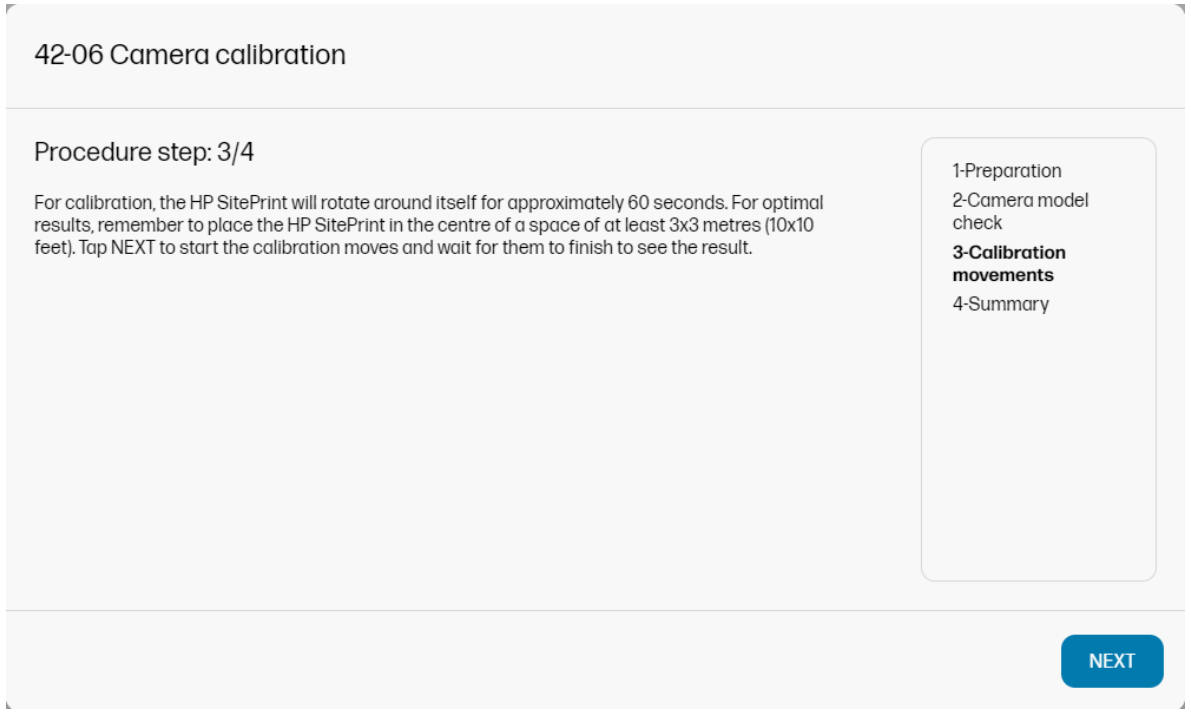


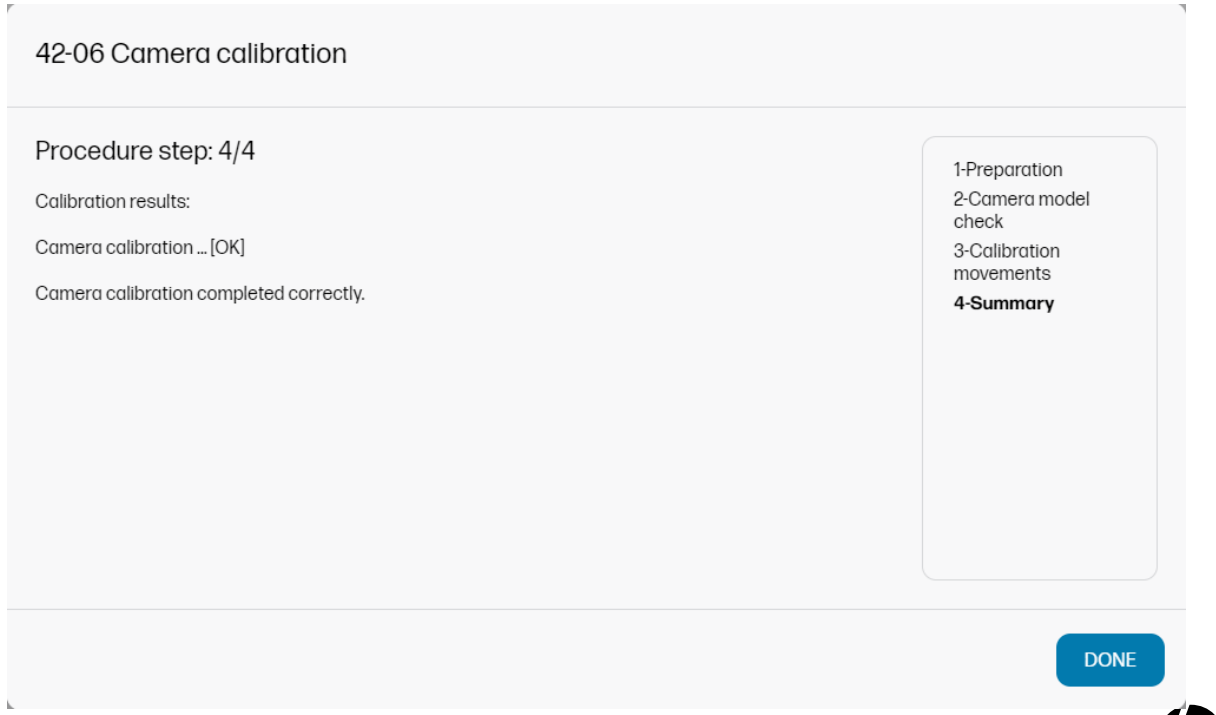


Camera calibration

Diagnostic available from VP3.0.2 onwards

After that, the robot starts to move, rotating for about 60s. If the calibration is properly completed, the test will notify an [OK]





Hardware Upgrade Kit process

Additional HW upgrades

In order to provide the best support, we will inform you if your unit needs any additional part upgraded so you have your robot completely updated.

Give us your feedback!

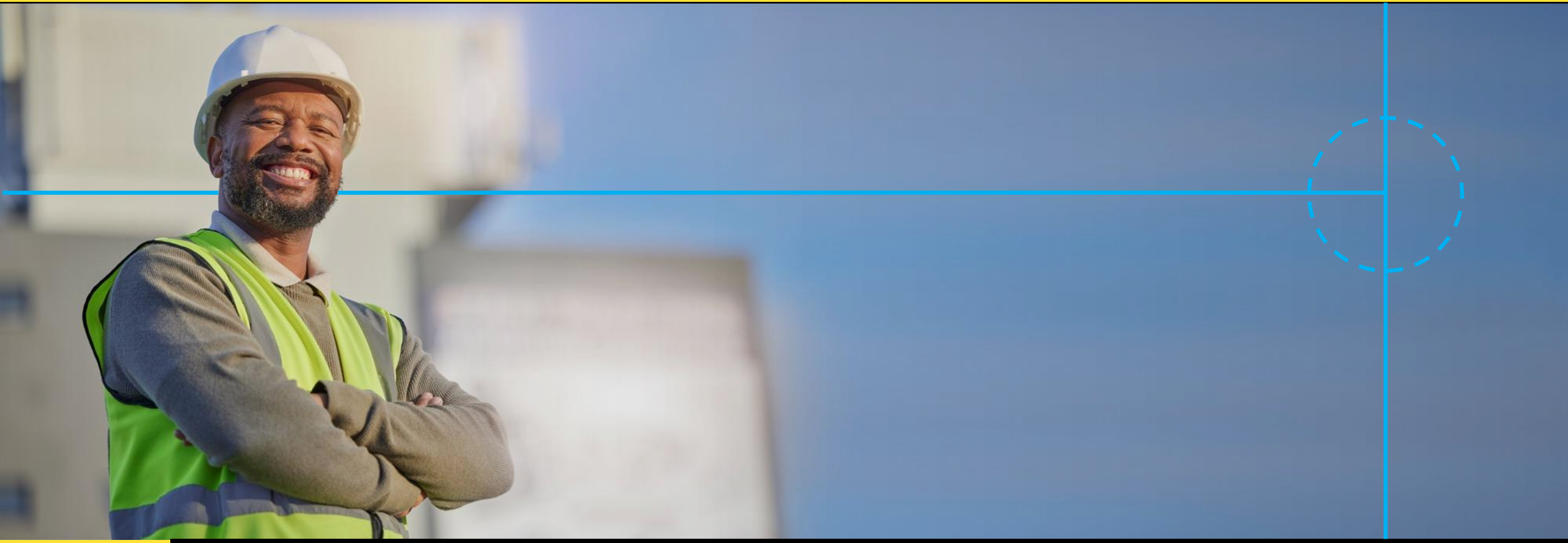
Fill in the survey after the session

Q&A Session

Recap...

VP3.0 Technical Updates

Thank you!



See you soon!