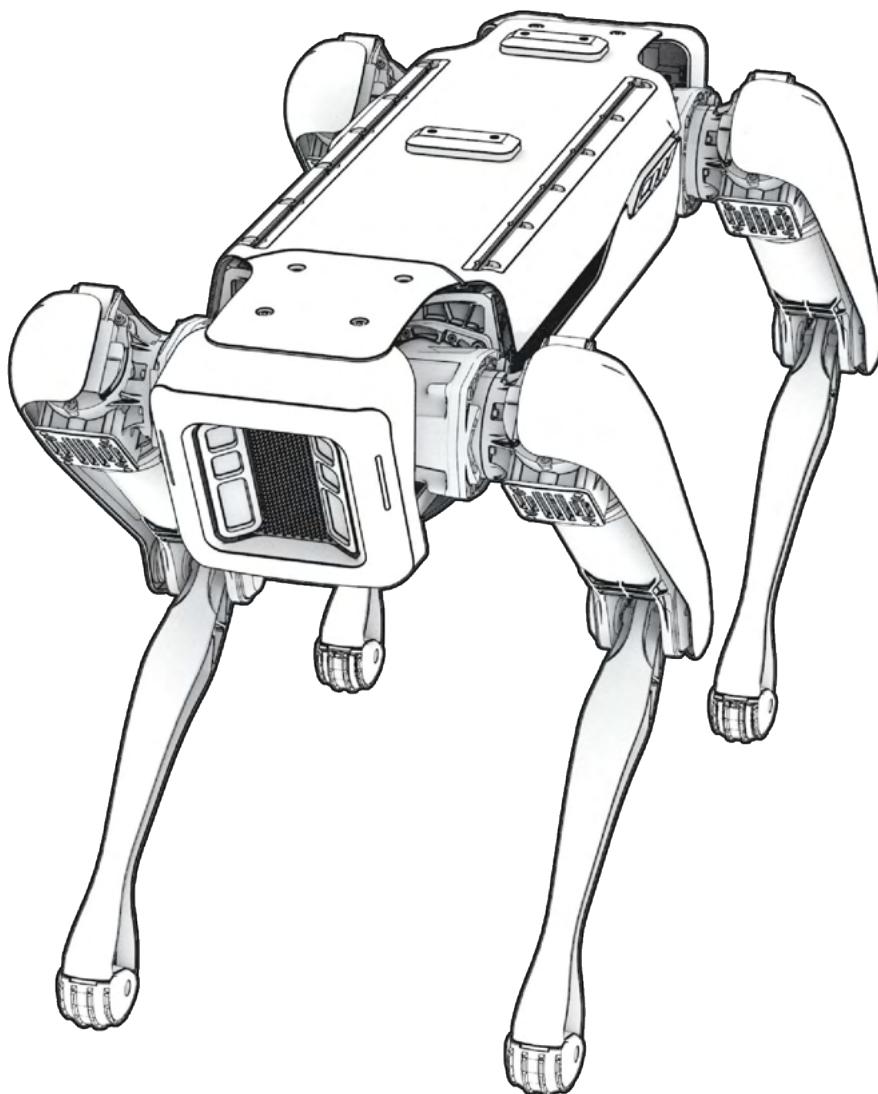




Spot® Instructions for Use

Safety and Operations Manual

Version 2.1.1 Original Instructions
January 2024



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1. Introduction

1.1. About this document

This document contains critical safety information for the Spot robot.

Responsible use of Spot is crucial to prevent dangerous conditions for those in close proximity to Spot. Read, understand, and comply with this document before initial use of Spot to decrease the risk of injuries or damage to yourself, Spot, or other property.

Boston Dynamics performed a risk assessment and derived the Instructions about residual risks based on the reasonably foreseeable use of Spot within its declared intended uses and in conditions subject to limitations. We recommend that you complete your own risk assessment concerning the integration and commissioning of Spot in your particular environment and conditions. Any deviation from the intended uses of Spot and the conditions in which Boston Dynamics estimated and evaluated risks (see [Risk assessment](#)) could be addressed by supplemental actions to further reduce application-specific residual risks.

Keep a copy of this document in a readily accessible location. Complete user and developer documentation on the Spot robot platform, including a digital version of this document, is available online in the Boston Dynamics Support Center (see [Appendix A: Supplemental information](#)).

This document is valid for the following designations of Spot:

Hardware	Model (P/N): 04-00143531-001 04-00143531-401 04-00143531-601 04-00143531-611
Software	v3.3.2

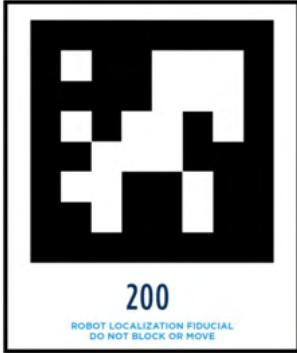
1.2. Manufacturer information

Spot is manufactured by:

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200 Smith St.
Waltham, MA 02451
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1.3. Key terminology

Term	Definition
Spot	A legged robot capable of mobility on a variety of terrains. Spot uses multiple sensors and three motors in each leg to navigate in indoor and outdoor environments, maintain balance and attain postures. Spot is capable of carrying and powering attachments.
Operator	Any person trained and authorized to manually operate, repair, handle, or supervise the automatic operation of Spot. This definition corresponds to the terms “Qualified person” and “Authorized person” as defined in ISO/TR 22053:2021, Clause 3.4.
Bystander	Any person who can be reasonably expected to be near Spot, but is not an Operator. This definition corresponds to the term “Affected person” as defined in ANSI B11.0-2020, Clause 3.4.
Task	An activity performed by a person, including manual operation of Spot.
Operation	An activity performed by Spot, whether as a result of manual or automatic operation.
Mission	A set of instructions and map data that allows Spot to navigate automatically along a known route while performing data capture actions and other operations. The features that allow Spot to record and replay missions are collectively called “Autowalk”.
Action	A predefined operation that can be performed during a mission. The Spot software includes several preset Actions, such as capturing images from robot cameras and docking with a Spot Dock. Custom Actions can be created using Spot’s software development tools.
Attachment	Any device or piece of hardware that is affixed to Spot to enhance or expand Spot’s functionality. Attachments for Spot are commonly called “payloads”.
Fiducials	 <p>Specially designed images similar to QR codes that Spot uses to match its internal map to the world around it. Fiducials are required at the beginning of every mission.</p> <p>Spot recognizes AprilTags that meet the following requirements:</p> <ul style="list-style-type: none"> • AprilTags in the Tag36h11 set. • The default Image size: 146 mm square. • Printed on white non-glossy U.S. letter-size sheets (preferably rigid).

1.3.1. Legend of hazard labels



DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



NOTICE

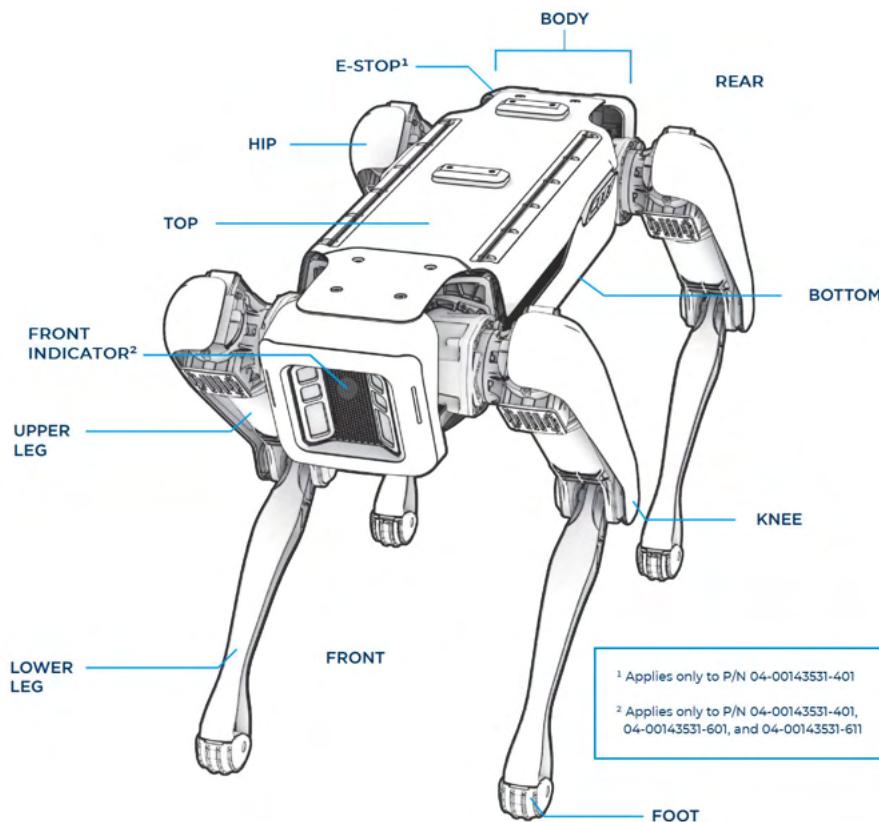
Indicates information considered important, but not hazard related.



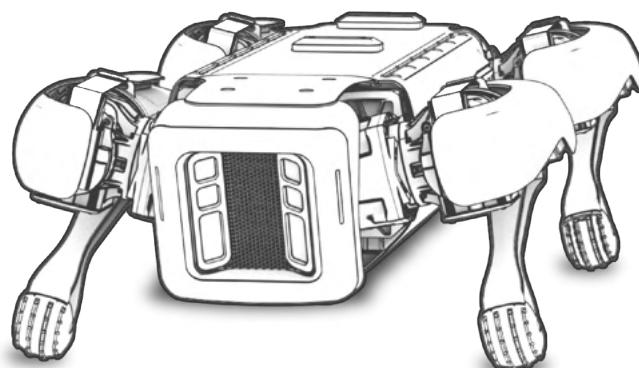
REQUIRED READING

Indicates a mandatory reading of Instructions for Use or other safety-related documentation.

1.3.2. Spot anatomy



Spot in the "stand" pose.



Spot in the "sit" pose. The body and all four feet rest on the ground.

1.4. Spot specifications

Category	Specification	Value
Dimensions	Length	1100 mm
	Width	500 mm
	Default height (walking)	610 mm
	Height (sitting)	191 mm
	Max height (walking)	700 mm
	Min height (walking)	520 mm
	Net mass/weight (with Battery)	33.6 kg
	Degrees of freedom	12
	Max speed ¹	1.6 m/s
Power	Battery capacity	564 Wh
	Max battery voltage	58.8 V
	Typical runtime	90 minutes
	Standby time (Spot powered, motors off)	180 minutes
	Spot Power Supply power output	400 W
	Max charge current	7 A
	Time to charge (Spot Dock ambient temp. 25°C)	Approximately 50 minutes for 80% charge Approximately 2 hours for 100% charge
	Time to charge (Spot Dock ambient temp. 35°C)	Approximately 2.5 hours for 80% charge Approximately 3.5 hours for 100% charge
	Time to charge (Spot Power Supply)	Approximately 1 hour
	Battery mass/weight	5.2 kg

Category	Specification	Value
Cameras	Camera functions	Black-and-white or color fisheye, range (depth), infrared
	Number of optical cameras(for image capture, fiducial recognition, displaying surroundings)	5 (front-left, front-right, left, right, rear)
	Overall optical field of view (FOV)	360 degrees
	Number of depth cameras (for robot perception, obstacle avoidance)	5 stereo pairs (front-left, front-right, left, right, rear)
	Overall depth camera field of view (FOV)	Approximately 90 degrees in each direction ²
	Depth camera range	~2 m
Attachments	Max weight	14 kg
	Max power per port	150 W
	Payload ports	2 (mirrored)
	T-slot rail bolt size	M5 x 1.0
Connectivity	Enterprise WiFi	2.4Ghz and 5Ghz 802.11b/g/n and 802.11ac
	Ethernet	1000Base-T

¹Max speed is determined against nominal environmental/navigational conditions. See [Restrictions on the environment](#).

²There are gaps near the hips where the depth camera field of view does not overlap. See [Obstacle avoidance](#).

2. Product safety overview

2.1. General principles

Spot is a legged robot capable of mobility on a variety of terrains. Spot uses multiple sensors and three motors in each leg to navigate in indoor and outdoor environments, maintain balance and attain postures. Spot is capable of carrying and powering attachments.



CAUTION

Spot's behavior while in motion is dynamic and can be subject to local conditions that may generate unexpected motion.

2.2. Intended use

Spot is intended for the professional use of its locomotion and carrying capabilities in either industrial, restricted, or supervised environments.

Spot is intended to be used in dedicated areas, where its possible presence is clearly demarcated or indicated. The limits of locomotion and environments are detailed in [Restrictions on the environment](#).

Spot can carry attachments intended for sensing, monitoring, or other non-contact interaction. Other uses are not intended. The integration of an attachment could in fact result in additional hazards or different risks when the attachment compromises the stability of Spot, includes dangerous materials, or creates hazardous emissions of all types. For the limits and conditions in which the integration of an attachment can no longer be considered within the intended use, see [Integrate attachments](#).

Spot is not intended for uses involving concurrent human-robot activities sharing the same space or the same equipment to complete an assigned task/mission (sometimes known as "collaborative applications"). People can be occasionally present in the same space as Spot for purposes unrelated to Spot operations (see "Bystander" in [Key terminology](#)). The limits of occasional exposure are detailed in [Risk assessment](#).

Any use outside of the intended use is subject to a risk assessment and reduction by the final user. Boston Dynamics recommends that you perform a specific risk assessment to verify:

- the finalized layout of deployment, the setup, and any training activity dedicated to illustrate Spot's working zones;
- the verification of the conditions of the environment, with particular attention to obstacles affecting Spot's navigation that may become apparent after the initial commissioning;
- any additional safeguards or other risk reduction measures;
- potential unplanned maintenance and troubleshooting.

The risk assessment for Spot considered reasonably foreseeable misuses. Explicitly prohibited uses include:

- Underwater and airborne applications.

- Military use.
- Any use as – or enabling the use of – a Certified Medical Device. Access and operation in healthcare facilities subject to limitations.
- Use in personal care, medical treatment or life-critical applications.
- Use in home environments.
- Transportation of persons or animals.
- Transportation of hazardous materials or substances.
- Intentionally harming any person with Spot or by using attachments mounted on Spot.
- Use for any illegal purpose.
- Use as a climbing aid.
- Interfering with Spot's sensors so as to impair their functioning, intentionally altering the environmental conditions so as to impair the functioning of Spot's sensors, or intentionally altering the environmental conditions so as to impair Spot's locomotion.



DANGER

Any misuse of Spot can potentially cause severe personal injuries or result in significant material hazards.

2.3. Modes of operation

Spot can be operated in various modes.

- **Manual:** Direct operation of Spot by displaying images from Spot's cameras on a remote controller. See [Remote controllers](#) and [Drive Spot with remote control](#). All Spot operations are supervised and executed by a human driver who is responsible for verifying the surrounding conditions.
- **Automatic:** Autowalk missions can be recorded and replayed by Spot. During replay Spot operates automatically. See [Automatic operation](#).

The frequency and duration of Spot operations in either manual or automatic modes varies greatly depending on the specific use of Spot.

For example, foreseeable uses in applications including routine inspections of industrial assets can be configured along a route in manual mode and then be repeated and completed largely in automatic mode. While operating in automatic mode, Spot is expected to encounter bystanders not involved in its operations for very brief moments along routes. While operating in manual mode, interactions with bystanders are expected to be longer, although limited in time, and may include people attending to their own tasks in the operating environment.

A complete analysis of foreseeable exposure to Spot is reported in [Risk assessment](#).



CAUTION

Spot should always be remotely controlled by properly trained Operators, or execute automatic operations configured or programmed by a trained professional.

Failure to properly verify programmed applications may result in unexpected hazards during operations.

2.4. Locomotion primitives: gaits and specialized modes

2.4.1. Walk (“trot”)

Spot’s default gait. Spot moves at variable speed on alternating pairs of legs (front-right/hind-left, front-left/hind-right).

On a firm flat surface such as concrete, wood floor, or thin carpet, Spot’s movement while walking is a regular cadence of each pair of legs swinging and touching the ground together. The body remains approximately stable at the same height and attitude.

Spot will change body posture, the pose of the legs, and gait pattern when necessary to perform programmed actions (e.g. pointing an attachment in a given direction) or to maintain balance under disturbances.

2.4.2. Crawl

Spot moves slower than trot on flat terrain and keeps three feet on the ground at all times.

2.4.3. Quick-step slip prevention

In the Walk gait, Spot may take extremely rapid steps while recovering from a slip. This greatly reduces the chance of falls on ice, wet or oily floors, and other slippery surfaces.

2.4.4. Stair mode

During both manual and automatic operations, when Spot detects a stairway in its path, it will automatically adjust its gait to a moderate speed and pitch its body to adjust to the slope of the stairway. Spot will automatically align itself with the center of the stairway to avoid colliding with walls or railings.

Stair locomotion involves sophisticated control and use of sensors. For the best and most reliable performance in these conditions, keep Spot’s software fully updated.



WARNING

Failures on stairs cannot be completely eliminated. When using Spot in manual mode, the best results are obtained when operators do not interfere with the automatic stair behavior by suspending, altering, or making rapid changes in manual commands. Actively stopping Spot on stairs has negative effects on stability (see [Hazards associated with stopping or other powerless motion](#)).

For more information about driving Spot on stairs, see [Navigate stairs](#).

2.5. Stopping functions

2.5.1. Operational stop

Spot monitors its sensors and can automatically pause movement or remove power from motors in certain situations:

- Signal loss: After 3 seconds without controller communication, Spot will sit. After 8 seconds without communication, Spot will turn off its motors. See [Enable AutoReturn to recover from loss of connection to the controller](#) and [Autowalk replay supervision](#).
- Fall detection: When Spot detects a fall, motors are immediately de-energized. Legs will not actively flail or remain stiff under contact.
- Low battery: When Spot's batteries reach critically low levels, Spot will sit and turn off its motors.
- Controller input: Commands to stop or de-energize Spot can be sent from a robot control device. See [Remote controllers](#) and [Stop Spot](#).



WARNING

If Spot is on stairs when an operational stop would occur, it will attempt to exit the staircase before performing the operational stop. This may result in automatic locomotion up or down the staircase, overriding other locomotion commands.

Do not stand on stairs, below open rails, or within 2 meters of the bottom of a staircase where Spot is active.



NOTICE

Spot can detect falls that unexpectedly occur. De-energization of legs during falls minimizes damage from the fall and prevents new hazards or bigger risks, such as further stumbling. This behavior is called "smart freeze."

2.5.2. Safety-related stop

Spot can be stopped by interfacing an external safe input signal to the payload port.

The stopping function will result in a de-energization of all motors (Stop Cat. 0 EN IEC 60204-1).



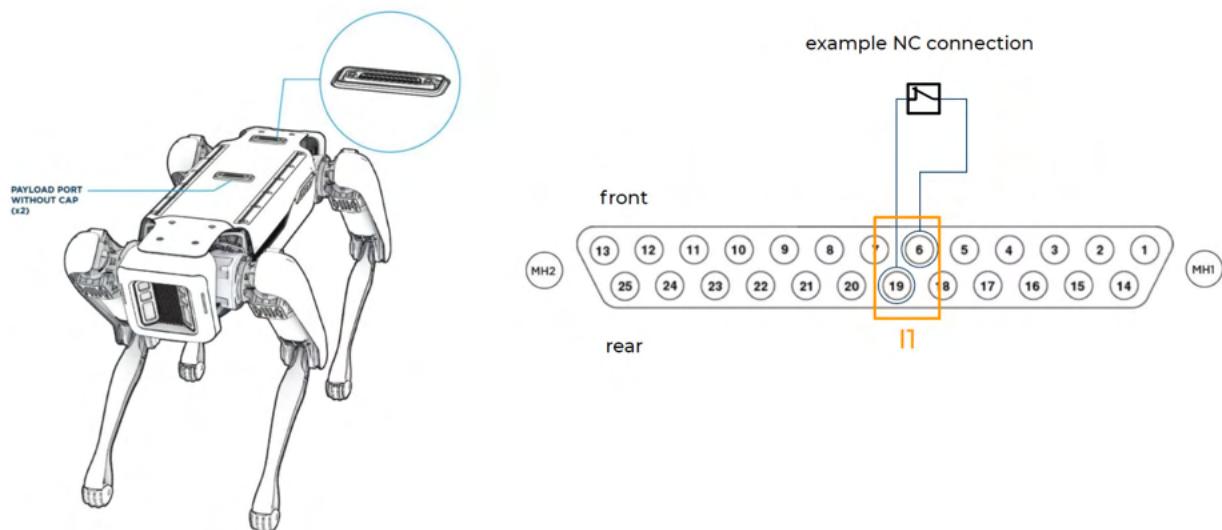
WARNING

When motors are de-energized, Spot will lose its ability to stand and balance. On flat ground, Spot will lower its body. On inclined surfaces or stairs, Spot may tip over.

The maximum response time for the stopping function is 200 ms.

Safe inputs for activating and triggering the stopping function are located on the payload ports as follows:

Item	Description
Safe input location (See figure below)	I1 = pin 19
Interface	<p>Use only one port, either front or rear. See example in figure below.</p> <p>Spot will not work without a cap or a properly configured attachment connected to each port.</p> <p>When a cap is used, the stopping function is disabled.</p>
Safe input default connection	6-19 pair normally closed (NC).
Type of stop	Stop Category 0 (IEC 60204-1) when contact on I1 is opened.
Stopping safety function	<p>Implemented in accordance with ISO 13849-1:2023, of Category 1 and performance level c.</p> <p>The PFHD is 1.1E-6/hr.</p>
Reset	6-19 pair is closed.
Restart	Enable power following commands on the manual controller or issued from programs.
Environment	The safety-related part of the control system operates within the same environment limits established for Spot.



Payload port external signal interface for protective stop.

**WARNING**

Use safety-related inputs only for connection to safeguards or emergency stop devices. Do not interface with non safety-related signals.

2.5.2.1. Stopping distance

On flat ground, a safety-related stop will result in a maximum stopping distance of 1 meter. On uneven or sloped surfaces, the stopping distance could be augmented by Spot's motion under gravity and will depend on factors such as the slope or unevenness of the walking surface. For more information, see [Hazards associated with stopping or other powerless motion](#).

2.5.3. Emergency stop (E-Stop)

**NOTICE**

The E-Stop button applies only to Spot model number 04-00143531-401. Information about additional Emergency Stop devices applies to all models.



Spot's E-Stop button. Press firmly to activate; twist clockwise to release (unlatch).

Spot includes an Emergency Stop (E-Stop) button located at the top rear corner of its body.

When pressed, the E-Stop button triggers the [Safety-related stop](#), resulting in an Emergency Stop function compliant with ISO 13850. Spot will not resume operations until a deliberate reset and restart procedure is initiated (see [Restarting after a stop using the tablet controller](#)).

Spot can be optionally fitted with additional Emergency Stop devices that comply with the same standard. Any additional Emergency Stop input device must meet the requirements of the safe input interface on the payload port as described in [Safety-related stop](#).

The Emergency Stop function is NOT a primary protective measure in any situation, and is manually activated. It should be used only when an immediate emergency cannot otherwise be resolved, for instance in case of accidental entrapment or insufficient clearances.



WARNING

The Emergency Stop function must be used only when you have full visibility of Spot and its surroundings. A manually activated Emergency Stop will override any active control, and therefore could determine additional hazards if it causes a forced loss of stability (see also [Hazards associated with stopping or other powerless motion](#)).



CAUTION

Always try to anticipate and escape entrapment conditions.

Do not activate the Emergency Stop function for routine interventions or as a means for a normal stop.

2.6. Velocity limitation

When operating Spot manually in the Walk gait, Spot's maximum speed is adjustable up to 1.6 m/s. To switch between the following maximum speed settings, see [Tablet controls \(Drive mode\)](#).

Speed setting	Velocity
Fast	1.6 m/s
Med (default)	0.9 m/s
Slow	0.5 m/s



CAUTION

Changes to speed settings take effect immediately. Spot may change speed mid-stride.

Speed settings limit the maximum speed that can be commanded by the controller. Spot's actual speed depends on a variety of factors including:

- The current speed setting.
- The current Ground Friction setting (see [Platform status panel](#)).
- Variable inputs from locomotion controls, such as the amount of tilt applied to the joysticks on the tablet controller.
- Disturbances that cause Spot to alter its gait so as to maintain balance (see [Quick-step slip prevention](#)).
- Disturbances or hardware failures that result in a fall, during which Spot's body or legs may briefly exceed the maximum speed before being de-energized and/or coming to rest.

On a firm flat surface such as concrete, wood floor, or thin carpet, most adults can easily outpace Spot at its default walking speed and there is limited kinetic energy associated with Spot's forward motion.

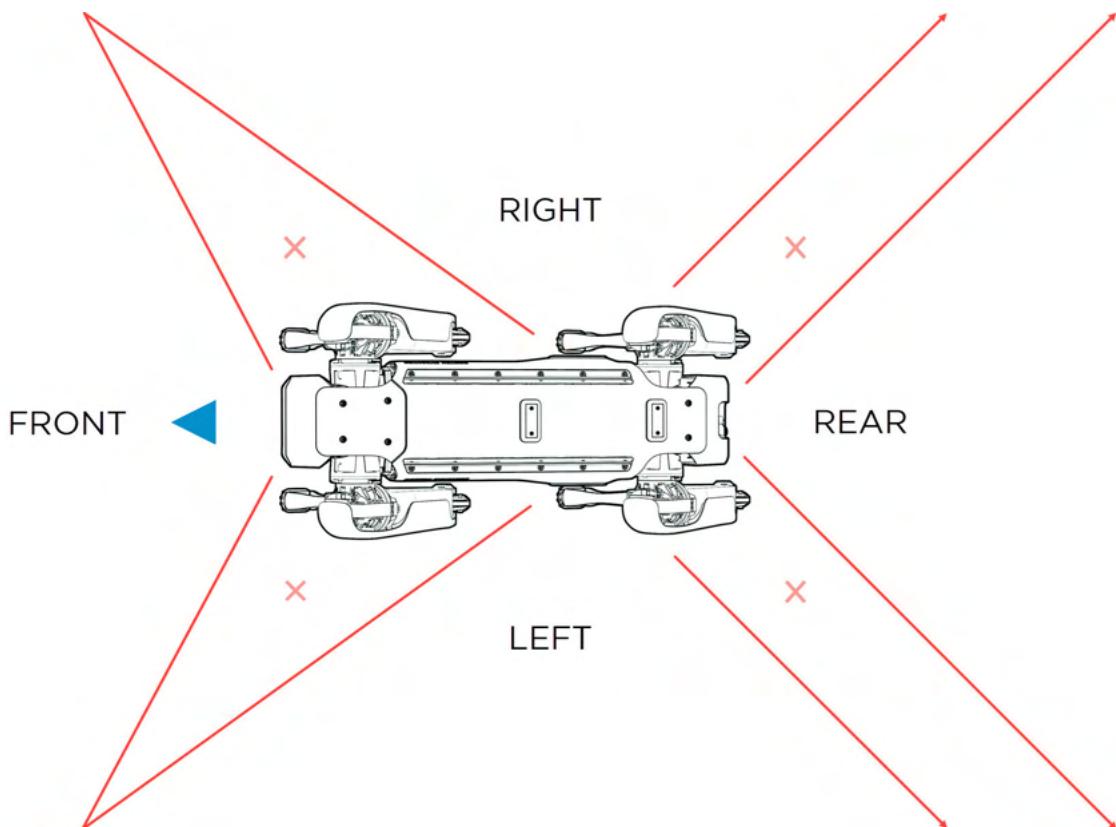
2.7. Obstacle avoidance

Spot uses its perception system to automatically avoid collisions with obstacles. The perception system consists of five depth cameras: two at the front, one at the rear, and one on each side of Spot.



NOTICE

Although the camera images displayed to an operator may show an overlapping field of view, the perception system has gaps, especially at the rear corners of Spot.



Approximation of gaps in the obstacle avoidance field of view.

Obstacles are mapped and remembered even when Spot's movement brings the obstacle into one of the gaps. However, Spot may fail to detect:

- Moving obstacles.
- Obstacles that are hard to detect until Spot is very close. (For details on the limits of the perception system, refer to [Navigational conditions](#).)
- Obstacles that remain in a gap in Spot's field of view during its entire approach path.

By default, Spot tries to keep a minimum distance of about 7.5 cm between itself and nearby obstacles. You can set an additional cushion of up to 50 cm using the controls described in [Drive Spot with remote control](#). The obstacle avoidance cushion may prevent Spot from traversing doorways and other confined spaces.

**CAUTION**

Spot may collide with people or objects, even with its obstacle detection system enabled.

Operators and bystanders should assume that Spot may move unexpectedly at any time.

2.8. Auditory and visual (A/V) warning system

**NOTICE**

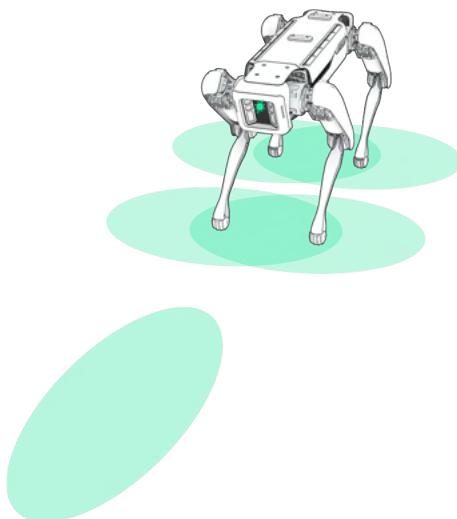
This information applies only to Spot model numbers 04-00143531-401, 04-00143531-601, and 04-00143531-611. To find your model number, check the label inside Spot's battery compartment.

Spot is equipped with an auditory and visual (A/V) warning system to alert nearby people of Spot's presence and operational status.

The warning system consists of five indicators that project colored light onto the ground to the front and sides of Spot's body, a buzzer, and a speaker. When the warning system is enabled, signal patterns activate automatically when specific operating conditions are met (see [Warning system light and sound patterns](#)).

The warning system is disabled by default. For instructions on enabling and configuring it, see [A/V warning system settings](#). The most recent configuration will persist across operating sessions and reboots.

2.8.1. Indicators



Areas illuminated by the indicators.

Each indicator can emit multiple colors. Brightness is adjustable and automatically adapts to ambient light conditions.

The indicators are located:

- On the front body panel (1 indicator).
- On the bottom body panel between the front hips (2 indicators).
- On the bottom body panel between the rear hips (2 indicators).

The indicators are angled to illuminate the ground in front, beneath, and to the sides of Spot. This is intended to maximize surface reflections and improve visibility from around corners, behind small obstacles, beneath grated surfaces such as stairs and walkways, and other directions where Spot might not be directly or easily visible.

The brightness and the intended maximum exposure to direct eyesight are in compliance with IEC 62471. To further reduce direct eye exposure, the indicators automatically power off when Spot tilts or rolls more than 90 degrees from the horizontal (neutral) position, and when it rolls onto its back.

Indicator location	Max lux ¹
Front panel	1030 lux
Front and rear hips	1010 lux

¹Lux measured by light projected onto the floor when Spot is in the stand position.

2.8.2. Buzzer

The buzzer produces a tone of 5,333 Hz. The high pitch is intended to make the buzzer distinct from other common tones.

The buzzer volume is adjustable and can produce a maximum sound pressure level of 110 dBA at 1 meter in front of Spot.



WARNING

At higher volumes, prolonged exposure to the noise produced by the buzzer can be harmful. See [Noise](#).

2.8.3. Speaker

Spot is equipped with a speaker that can produce a wide range of sounds.

The speaker volume is adjustable up to 80 dB (measured 1 meter in front of Spot).

2.8.4. Warning system light and sound patterns

Each light and sound pattern produced by the warning system corresponds to a specific Spot behavior or operational status. Two color palettes are available: **DEFAULT** and **ALTERNATE**.

For instructions on configuring the warning system during Spot operation, see [A/V warning system settings](#).

Default color palette

Color	Pattern	Buzzer	Robot status	Example
Green	Slow blink ¹	Off	Normal operations, motor power ON.	Most locomotion during manual and automatic operation.
	Fast blink ²	Off	Normal operations, while starting or changing motion.	Docking and undocking.
	Pulse ³ (front indicator off)	Off	Normal operations, waiting for an automated response (not for human intervention).	Waiting to regain sufficient clearance with respect to other moving objects along or near Spot's path during automatic operation. ⁴
Amber	Slow blink ¹	Slow beep ¹	Normal operations with an increased level of warning.	Traversing a crosswalk area during automatic operation. ⁴
	Fast blink ²	Fast beep ²	Normal operations, before starting activities with an increased level of warning.	About to traverse a crosswalk area during automatic operation. ⁴
	Flash ⁵ (front indicator off)	Slow beep ¹	Normal operations with an increased level of warning (special cases).	Traversing stairs.
	Solid	Off	Activation of safety response.	Motors powering off as a result of an operator command or protective stop.
Red	Fast blink ²	Off	Failure or emergency situation.	Emergency Stop pressed, or safety input interface not properly configured.
White	Pulse ³	Off	Normal operations, waiting for human intervention or during processes of variable length.	No or minimal apparent motion while capturing sensor data during automatic operation.

¹Alternate on/off at 0.7 Hz²Alternate on/off at 1.4 Hz³Continuous oscillation of brighter and dimmer light⁴Requires additional equipment.⁵Brief flash at 1.4 Hz

Alternate color palette

Color	Pattern	Buzzer	Robot status	Example
Blue	Slow blink ¹	Off	Normal operations, motor power ON.	Most locomotion during manual and automatic operation.
	Fast blink ²	Off	Normal operations, while starting or changing motion.	Docking and undocking.
	Pulse ³ (front indicator off)	Off	Normal operations, waiting for an automated response (not for human intervention).	Waiting to regain sufficient clearance with respect to other moving objects along or near Spot's path during automatic operation. ⁴
Red	Slow blink ¹	Slow beep ¹	Normal operations with an increased level of warning.	Traversing a crosswalk area during automatic operation. ⁴
	Fast blink ²	Fast beep ²	Normal operations, before starting activities with an increased level of warning.	About to traverse a crosswalk area during automatic operation. ⁴
	Flash ⁵ (front indicator off)	Slow beep ¹	Normal operations with an increased level of warning (special cases).	Traversing stairs.
	Solid	Off	Activation of safety response.	Motors powering off as a result of an operator command or protective stop.
	Fast blink ²	Off	Failure or emergency situation.	Emergency Stop pressed, or safety input interface not properly configured.
White	Pulse ³	Off	Normal operations, waiting for human intervention or during processes of variable length.	No or minimal apparent motion while capturing sensor data during automatic operation.

¹Alternate on/off at 0.7 Hz²Alternate on/off at 1.4 Hz³Continuous oscillation of brighter and dimmer light⁴Requires additional equipment.⁵Brief flash at 1.4 Hz

2.9. Restrictions on the environment

Spot is designed for dynamic mobility in a variety of environments and terrains. The following tables describe the nominal environmental conditions in which Spot is expected to work as intended. Spot is assumed to be in like-new condition with no attachments or other modifications.

When walking at default speed on a firm flat surface such as concrete, wood floor, or thin carpet, Spot's motion resembles that of a dog or other quadruped and it can easily be outpaced by most adults (see [Walk \("trot"\)](#) and [Velocity limitation](#)).



WARNING

The listed environmental constraints are treated as independent variables, but will intersect in real-world conditions. For instance, assume Spot is operated on a sloped surface that is also covered in debris: Even if the slope and the debris are each within nominal tolerances, Spot's performance may degrade in ways that would not happen if the same slope was uncluttered or if the debris was on flat ground.

Any use in an unintended environment (i.e. outside limits) is not recommended. Boston Dynamics recommends that you perform a specific evaluation of environmental conditions using the guidance provided in [Risk assessment](#).

2.9.1. Environmental conditions

Environment	Nominal conditions
Surface	<ul style="list-style-type: none">• Minimum coefficient of friction: 0.4• Debris and/or uneven surfaces: height variations up to 25 cm• Avoid soft or pliable surfaces: minimum force 8 kN/m.
Space	<ul style="list-style-type: none">• Minimum height of obstacles overhanging the walking surface: 70 cm• Minimum doorway, gap, or corridor width (forward/reverse direction of travel): 60 cm• Minimum space to turn around (rotate in place): 122 cm x 122 cm
Slopes	<ul style="list-style-type: none">• Maximum pitch: +/- 30 degrees
Elevated Ground	<ul style="list-style-type: none">• Maximum height of negative obstacles (step up or down): 35 cm• Stable (unmoving) surfaces: less than 5 cm lateral motion

Environment	Nominal conditions
Stairways	<ul style="list-style-type: none"> • Minimum width: 64 cm • Maximum pitch: +/- 45 degrees • Maximum step height: 22 cm • Barriers at least 50 cm high at the sides, with gaps no more than 30 cm wide. • Straight direction of travel (no curvature or turns except on flat landings). • Minimum landing size (90-degree turn): 112 cm x 112 cm • Minimum landing size (180-degree turn): 97 cm x 226 cm • Minimum landing size (no turn): 64 cm x 107 cm • Free space in front of top or bottom of stairs: 112 cm x 112 cm
Lighting	<ul style="list-style-type: none"> • Dynamic range of ambient light: 68 dB • Minimum ambient light for clear visuals from robot cameras: 50 lux • High-contrast light that includes IR wavelengths (e.g. sunlight) may interfere with obstacle detection.
Climate/ Ingress	<ul style="list-style-type: none"> • Ingress protection: IP54 • Ambient temperature range for operation: -20°C to 45°C • Maximum non-condensing humidity: 99% relative humidity

Any deviation from the nominal environmental conditions (Surface, Space, Slopes, Elevated Ground, Stairways) may increase the occurrence of total or partial loss of stability (see [Unintended contacts and other hazards related to locomotion](#)). Effects of instability may include, but are not limited to:

- Falls
- Erratic movements for regaining balance
- Inability to proceed with locomotion

Exceeding the Climate/Ingress conditions may have a significant effect on the reliability of Spot hardware:

- Extreme temperatures or submersion in water may cause failures in various Spot components dedicated to perception and control (cameras, joints, CPU, etc.)
- Quick transitions ("thermal shock") may cause condensation on internal components, leading over time to corrosion.
- Intermittent, but frequent, exceeding of temperature or ingress limits may lead to latent damages that are not immediately visible but can originate failures over time.

2.9.2. Navigational conditions

Category	Spot capabilities/conditions
Obstacle sensing ranges/limitations	<ul style="list-style-type: none"> • Camera sensing range: ~2 m • Although the camera images on the tablet controller show an overlapping field of view, the perception system has gaps, especially at the rear corners of Spot. • Cannot detect obstacles directly above Spot (e.g. if Spot is sitting under a table and then attempts to stand, the top of Spot will hit the table).
Obstacle height	<ul style="list-style-type: none"> • Objects shorter than 30 cm: Spot will attempt to step on or over the obstacle. • Objects taller than 30 cm: Spot will attempt to avoid the obstacle.
Obstacle area/width	<ul style="list-style-type: none"> • Minimum area/width: 3 cm
Surfaces that interfere with navigation	<ul style="list-style-type: none"> • Reflective (mirrored) surfaces • Transparent objects/barriers • Under bright ambient light or dark matte surfaces • Repeating patterns of vertical lines
Energy sources that interfere with navigation	<ul style="list-style-type: none"> • Near-IR (780-2500 nm) light sources pointed at Spot or its surroundings. • High-contrast light that includes IR wavelengths (e.g. sunlight).

Any deviation from the nominal navigational conditions may:

- Increase the occurrence of failures in obstacle detection and avoidance.
- Impair Spot's ability to recognize features and fiducials.
- Impair Spot's ability to complete navigation as planned.

2.10. Risk assessment

Boston Dynamics has assessed and evaluated risks within the intended use of Spot (see [Intended use](#)). Review also [Declarations and marking](#) for compliance with regulations, if applicable.

The following paragraphs provide guidance about the additional risk assessment that is always recommended when using Spot. Refer to ISO 12100 for the general methodology of risk assessment.

Risks are the transformation of potential hazards into actual harms. To estimate risks it is necessary to combine a measure of:

- The severity of the effect of hazards.

- The occurrence of hazards (how often, how likely, how predictably, how well-anticipated).

2.10.1. Before starting a risk assessment

When completing your own risk assessment, consider:

1. **Intended use:** All the elements that correspond to the specified intended applications for the equipment when used by the expected users within a designated environment.
2. **Foreseeable misuse:** Anything that does not pertain to the intended use and appears as a form of misconduct. The occurrence of misuses can be estimated to be less likely than intended uses.
3. **Non-task-based interactions:** People can be close to Spot as a mere result of sharing the same facility. The occurrence of unrelated interactions is uncommon, infrequent, typically not permanent, and rarely known in advance. The intended and foreseeable hazardous exposures are limited in time, typically:
 - a. Less than 1 minute per interaction when Spot is operating in automatic mode.
 - b. Less than 10% of the total usage time when Spot is operating in areas with restricted access.
 - c. Several minutes, up to 1 hour, when Spot is being operated in manual mode (recording missions, remotely-controlled operations). Manual-mode events are longer than automatic-mode events, but happen much less frequently.
4. Role and type of **personnel**.
 - a. **Affected:** People can be occasionally present in the same space as Spot for purposes unrelated to Spot operations. This is the most generic class of exposed people.
 - b. **Qualified:** People assigned to operate Spot (e.g. programming missions, occasional manual driving). The frequency of these tasks depends on the application. Spot is commonly dedicated to automatic operations.
5. **Environment of operation:** The intended aspects of the actual space where Spot operates must be analyzed with respect to the generic conditions specified in [Restrictions on the environment](#). The final environment of Spot applications can significantly alter the conditions for the severity of hazards and alter (normally worsen) the probability of occurrence of failures or hazardous conditions. Important elements for the assessment of the environment include:
 - a. **Surfaces:** Material, texture, friction, stiffness, presence of contaminants or dirt or particles, etc., on walking surfaces.
 - b. **Spaces:** Layout, areas open to access.
 - c. **Slopes:** Length, inclination, material.
 - d. **Elevated grounds:** Highest points reachable with respect to ground levels.
 - e. **Stairways:** Type, run/rise dimensions, type of risers and treads, handrails, wear conditions, presence of landings, frequency of sharing with personnel.
 - f. **Lighting:** Diffuse ambient, collimated, visible/infrared.
 - g. **Climate:** Temperature and humidity, presence of condensation.
 - h. **Obstacles:** Size, shape, clusters of objects and their stability, free space over and under obstacles, firmness of objects.



NOTICE

Spot can walk over objects.

2.10.2. Electrical hazards

Spot uses a separated extra low-voltage (SELV) power supply design (<60 VDC), meeting the requirements in IEC 60204-1 for electrical equipment and IEC 62133 for batteries. There are no known significant residual risks associated with shocks, either apparent or as a result of faults.



CAUTION

Do not touch or operate Spot if any damage is noticed and wet parts of the body are exposed to contact.

Contact Boston Dynamics Support in case of apparent damage of parts.

Spot is not intended to be used in operating environments subject to high voltage conditions that may compromise the original SELV design:

- Presence of high voltage equipment that may be in range of any physical contact with Spot.
- Presence of potential low impedance paths, for example due to contaminants or low-conductance materials, in contact with high-voltage equipment.
- Presence of apparent faults in any electrical equipment that Spot may interact with. Report such conditions immediately to management.



WARNING

Exposure to severe electrical and electromagnetic environments may determine non-apparent damages or latent failures of Spot. Using Spot after exposure to high voltage or indirect contact may result in unexpected failure of the electrical system.

High voltage in the environment increases the otherwise negligible probability of accidental shocks because non-SELV conditions may become possible.

2.10.2.1. Charging equipment

Spot uses a series of approved accessories for charging.



REQUIRED READING

When assessing risks related to charging equipment, review the following documents in the Boston Dynamics Support Center (see [Appendix A: Supplemental information](#)):

- *Spot Power Supply Information for Use*
- *Spot Dock Information for Use*

2.10.3. Hazards due to non-ionizing radiation

Spot has no known significant residual risks associated with non-ionizing radiation within the limits of intended use. Risks are reduced by design using components or solutions compliant with all the relevant technical standards.

Boston Dynamics recommends that you review the following factors if using additional equipment (out of the scope of the intended use):

- Unintentional electromagnetic (EM) radiation: Most powered electronics components emit and are subject to the effects of electromagnetic radiation.
- Intentional radiation (radio frequencies): If wireless communications are used.
- Light sources, for example in attachments projecting visible lights.
- Laser sources, for example in attachments using measurement or pointing.

2.10.3.1. EM radiation considerations

Spot meets the requirements for unintentional radiators according to electromagnetic compatibility (EMC) standards related to heavy industrial environments (IEC 61000-6-4) and is able to withstand EM disturbances typically found in industrial environments (immunity) within standardized limits.

Test	Level (IEC 61000-6-2)
ESD	+/- 4 KV direct contact, +/ - 8 KV air discharge
RF Immunity	10 V/m 80 - 1000 MHz, 3 V/m 1 - 6 GHz



WARNING

Using Spot in environments with exceptionally high EM disturbances, or integrating high-emission attachments, may result in unexpected behavior from Spot.

2.10.3.2. Radio Frequencies (RF)

Spot uses a WiFi radio module and meets the requirements for intentional radiators set in the relevant international technical standards.

You should estimate the probability of augmented influence of RF that could affect or compromise the conditions for immunity of Spot from:

- The integration and configuration of attachments that can intentionally emit powerful RF.
- The proximity to equipment capable of powerful RF emission.

Additionally, the availability of the networking infrastructure and its potential failures may also affect the probability of unexpected loss of communication or alteration of the nominal wireless protocols.

2.10.3.3. Laser

Spot contains five stereo camera systems that contain a Class 1 laser projection system.

This product is classified as a Class 1 Laser Product under the EN/IEC 60825-1, Edition 2 (2007) and Edition 3 (2014).



CAUTION

Do not tamper with or make adjustments to any of Spot's laser components. Doing so may result in hazardous radiation exposure. Use of controls or adjustments or performance of procedures other than those specified herein may also result in hazardous radiation exposure.

2.10.3.4. Bright lights



NOTICE

This information applies only to Spot model numbers 04-00143531-401, 04-00143531-601, and 04-00143531-611. To find your model number, check the label inside Spot's battery compartment.

Prolonged direct exposure to the light from Spot's warning system indicators could cause irritation or damage to the eye, similar to any bright light source in the visible spectrum. Under normal operating conditions, such exposure is limited to short time intervals due to the intermittent nature of warning patterns. The warning system is intended for indirect projection of lights. A direct, persistent gaze is easily avoidable. The indicators comply with IEC 62471 and will automatically power off when Spot tilts or rolls more than 90 degrees from the horizontal (neutral) position, and when it rolls onto its back.

People with a medically diagnosed light sensitivity condition should exercise additional caution and use PPE to avoid prolonged exposure to the light from the indicators.

2.10.4. Noise

The airborne noise generated by Spot is determined by the environment Spot is operating in. For instance, Spot will generate much less noise walking across a padded carpet floor than it will walking up metal stairs.

Before putting Spot into regular use, work with your Environmental Health and Safety team to determine if additional Personal Protective Equipment (PPE) is required due to the noise Spot generates in its working environment.



WARNING

At higher volumes, Spot's prolonged exposure to the noise generated by the warning system buzzer can be harmful.

The maximum volume may be necessary only for very loud background environments. Recommended level is not higher than 80 dBA.



CAUTION

Verify the ability of affected personnel to hear the buzzer and that use of the buzzer complies with local noise requirements.



NOTICE

In environments where hearing protection is required, the buzzer's default tone is still audible by affected personnel wearing auditory PPE.

2.10.5. Fire, explosion and hazardous materials

There are no known significant risks associated with Spot's lubricants.

The battery pack contains cells that have electrolytes. All cells are fully enclosed in a sealed enclosure that has passed UN 38.3 transportation testing. In addition, the pack has CB Certification to IEC 62133 and has passed drop testing with no leakage of electrolyte.



DANGER

In the unlikely event of damage with visible breakage of any part of Spot or its batteries, **DO NOT** touch or attempt any recovery.

It is extremely unlikely that the battery generates fire under normal conditions of use and environment. If the battery catches fire, do not try to put it out. Evacuate to a safe area and call the fire department. Battery fires create toxic fumes and cannot be put out with conventional fire extinguishers or water.

2.10.6. Unintended contacts and other hazards related to locomotion

Spot is a legged robot: It maintains balance and moves using dynamic control principles. Spot uses sensors (not strictly necessary for locomotion) for improving the perception of the ground and the surrounding environment.

The conditions of the environment are the main, if not the only, reason for instability and the possibility of failures during locomotion.



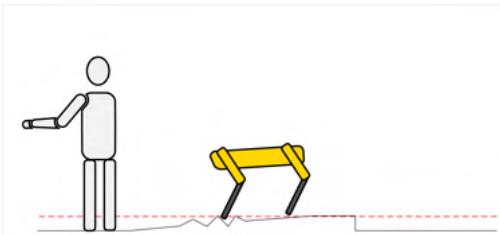
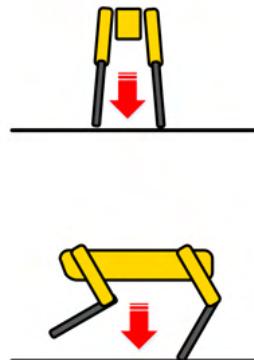
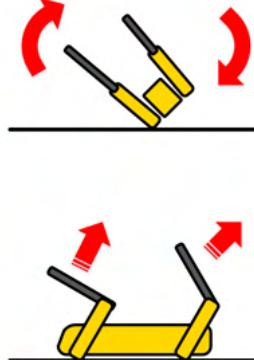
WARNING

Hazards during Spot locomotion happen in the form of unintended behaviors:

- Unpredictable movements of the legs, following a temporary loss of stability and consequent recovery attempts.
- Large deviations from planned and expected paths.
- Sudden accelerations of either the legs or the entire robot as a reaction to external disturbances, like physical impact or the appearance of obstacles.
- Unpredictable movements following a tripping event.
- Sliding or tumbling following a fall or tip-over.
- Any combination of the above.

Review the following paragraphs for information about the estimated risk in the intended use. Additional assessment may be necessary: Use the guidelines to estimate the severity and occurrence of the hazards related to locomotion.

2.10.6.1. Accidental impacts during normal locomotion on flat, non-elevated grounds

Reference situations		
 <p>Elevation < 300 mm</p>	 <p>(a)</p>	 <p>(b)</p>

Considerations for the severity of hazards

When Spot is actively moving, accidental minor impacts may occur only with the lower body (feet and lower legs). While Spot is moving and balancing on legs, any accidental impact with Spot would be a short event (< 100 ms), followed by a recoiling movement that will not sustain any pressure on the human body. The severity of impacts is in general low.

Even in case of a loss of stability, Spot would remain mostly in the same location.

- A sudden, mostly vertical collapse of Spot or a forced stop (a) is almost invariably associated with low or negligible risk.
- A tip-over on a predominantly flat surface rarely results in more than a half turn (b). In case of a tip-over, the legs are powered off. Legs can extend by the effect of inertia after motor power is disabled during the fall event. The severity associated to this situation is in general low due to the very limited energy of the residual motion (powerless legs).

Additional or unintended conditions

Alteration factors for the estimation of severity may include:

- Lateral and rear directions of approach may affect the reaction of human knees differently.
- Unforeseeable, indirect hazards caused by secondary effects (e.g. becoming entangled with and pulling on overhanging equipment).
- Unintended integration of very tall attachments.

When reviewing a risk assessment, always consider the position and the direction of approach of Spot with respect to an affected person to estimate the severity of hazardous conditions.

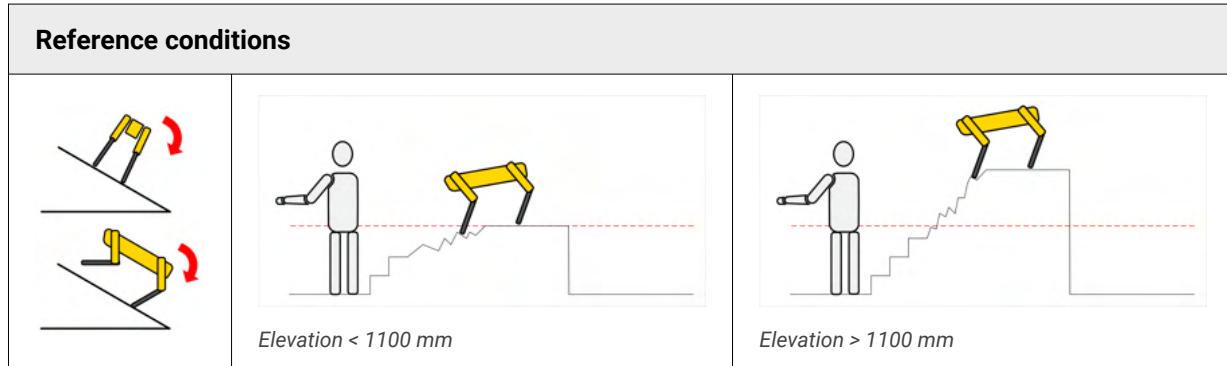
Considerations for the occurrence of hazards

Factor	Analysis
Frequency and duration of exposure	<p>Foreseeable hazardous exposures are limited in time, typically:</p> <ul style="list-style-type: none"> Less than 1 minute per interaction when Spot is operating in automatic mode. Less than 10% of the total usage time when Spot is operating in areas with restricted access. Several minutes, up to 1 hour, when Spot is being operated in manual mode (recording missions, remotely-controlled operations). Manual-mode events are longer than automatic-mode events, but happen much less frequently. <p>Low frequency leads invariably to low occurrence of collision hazards when associated with regular skills and high awareness of affected people.</p> <div style="border: 1px solid black; padding: 10px; margin-top: 10px;"> <p> NOTICE</p> <p>The condition of low occurrence does not hold when:</p> <ul style="list-style-type: none"> Qualified personnel are present for more than 25 percent of the total usage time. Affected people are present for up to 25 percent of the total usage time. Spot is operated in shared areas used by many people, increasing the total exposure </div>
Probability of failure (lack of availability)	<p>Spot normally activates its collision avoidance capability (see Obstacle avoidance).</p> <p>A low occurrence of collision hazards holds even if failures in detection of obstacles are possible, when all other factors are valid (low severity, regular skills, and high awareness of affected people).</p> <p>Using Spot outside environmental limitations (see Navigational conditions) may compromise the availability of obstacle detection or downgrade the performance of sensors in ways that are insufficient to generate complete failures but could determine a delay in the detection of obstacles.</p> <p>Sudden appearance of obstacles from blind directions decreases the probability that Spot reacts in time to avoid such obstacles.</p> <div style="border: 1px solid black; background-color: #ffffcc; padding: 10px; margin-top: 10px;"> <p> CAUTION</p> <p>Downgraded perception may determine irregular, possibly fast, movements in non-travel directions.</p> </div>

Factor	Analysis
Avoidability of potential collisions	<p>When used as intended, Spot allows for high avoidability:</p> <ul style="list-style-type: none"> • Spot is in general distinctively visible. For P/N 04-00143531-401, 04-00143531-601, and 04-00143531-611 only: Use of the A/V warning system (indicators and buzzer) increases awareness of Spot's presence even in noisy and high-traffic environments. • Missions follow very regular and repeatable paths. • Spot's size makes it possible to easily maintain clearances. • Standard human walking speed matches the fastest settings and exceeds the default settings of Spot velocity. • Qualified, but also affected personnel are normally familiar with other Autonomous Mobile Robots (AMRs). • Anticipation of Spot's behavior is always assumed after initial training. Failures to maintain balance are normally anticipated by short irregular walking patterns. • Sudden falls (not anticipated by some progressive instability) or unexpected lateral movements happen only under rare circumstances. • Accelerations and any change of pattern do not occur in a timeframe shorter than 1 second.
	<p>Unforeseeable conditions that lower the avoidability of hazards are:</p> <ul style="list-style-type: none"> • Frequent and combined blind corners and/or cluttered environments, which may result from unanticipated changes in layout. • Unsignalled concurrent presence on stairs when staircases are blind and narrow. • Unprotected open edges or elevated surfaces where the environment has not been prepared. • Failure to maintain training programs that ensure familiarity with the presence of Spot. • Unintended uses of Spot, specifically when untrained or not properly informed affected people may encounter Spot in unsupervised circumstances. • Use of Spot outside of intended limitations (very slippery ground, intrinsically weak or unmaintained walking surfaces with sudden structural collapse, almost invisible tripping hazards like ropes or rebar too thin to be distinguished from the background, etc.).

2.10.6.2. Loss of stability and falls

Spot stands up and keeps balancing only with active control. However, active control does not ensure that stable balancing is always attained.



Considerations for the severity of hazards

As a result of a loss of stability, Spot will de-energize its legs to avoid additional hazards during potential uncontrolled tip-over movements. If residual motion under gravity can occur (see also [Hazards associated with stopping or other powerless motion](#)), the severity will depend on the starting conditions:

- Elevation < 1100 mm: Low-severity minor impacts with the lower human body (feet and lower legs);
- Elevation > 1100 mm: High severity if impacts can affect the full human body, which is possible only for full-drop (almost vertical) falls or tumbles that originate in the upper region of the elevation.

Additional or unintended conditions

Alteration factors for the estimation of severity may include:

- Type of terrain, which may amplify or attenuate the effects of the event.
- Unintended exposure of children as affected persons (Spot's starting elevation does not correlate to body size, so the upper body could be exposed to danger).

Considerations for the occurrence of hazards

Loss of stability in elevated or inclined surfaces may occur. Spot's ability to maintain stability is based on state-of-the-art methods and the best practical implementation of control. The occurrence is not further reducible.

Additional or unintended conditions

The occurrence of instability is more likely in unintended uses out of limitations:

- Movable, tilting, or floating platforms or portions of walking surfaces in the area of operation that occur after the preparation of the environment.
- Areas of the environment such as the walking surface that are rendered weak, fragile, or unstable by changes in the operational layout (e.g. construction or excavation).
- Lubricants or other hazardous or slippery materials that occur in the operational environment and are not detected and resolved by site management.
- Undetected damage such as broken pipes, cords, or unstable materials in the operational environment.

2.10.6.3. Hazards associated with stopping or other powerless motion

Spot will automatically disable motor power in the following cases:

- As a result of a detected failure or a detected fall.
- As a result of a safety-related stopping function forcing a de-energized state.

Spot's legs will not be locked during and after a motor de-energization.



NOTICE

A random locked configuration of the legs would likely result in an unbalanced condition for the whole robot.

A random locked configuration of the legs during a tip-over or fall event would increase the likelihood of accidental impact with rigid objects (and increase severity).

During a stop event, Spot will attempt to lower its body in control before full de-energization. However, Spot may occasionally not finish reaching a safe state because the ground conditions (friction, firmness, etc.) may force Spot to iterate its gait to secure its footing. Spot will eventually de-energize but could have passive residual motion (e.g. slide down an incline).

Residual risks of passive residual motion are limited to the following conditions:

- Residual motion without power happens solely under gravity and elevated grounds.
- Residual motion is very unlikely to happen if an elevated ground has no inclines in proximity to Spot.
- Flat or slippery surfaces increase the likelihood of residual motion because they do not offer natural obstacles to stop Spot. Rough and uneven terrain may reduce sliding effects. Stairs, however, offer few and small contact points, making sliding and/or tumbling more likely to occur.
- High inclination of surfaces (out of specifications) will increase the likelihood of tumbling instead of simple sliding.
- The presence of tall attachments significantly increases the likelihood of tumbling.
- Residual motion can last longer when there is a long distance from the point where the de-energization happens to the next sufficiently large landing point.

The configuration of Spot (body attitude, configuration of legs, forward/backward swing direction of each leg, inclination with respect to the main direction of a slope) during a sudden stop or fall event is entirely unpredictable.

2.10.7. Pinch points during motion

Pinch points are present around the joints and legs (see [Pinch points](#)) and cannot be entirely eliminated without compromising the mobility of the legs, or the ability to walk and maintain balance.

Spot pinch points are situated in areas that are not normally reached in situations other than handling and transportation (while Spot is powered off). When motors are active, there is no foreseeable use that would require access to legs and joints.

The reference risk estimation for hazards associated with pinch points is:

Location	Severity	Occurrence
Hip pivot joint	<p>The potential pinch point is located in the turning element of the hip, approximately 5 cm beneath the external surface elements of the hips and legs, with a single finger-size gap.</p> <p>Up to partial laceration or minor fracture, unlikely to reach amputation level.</p> <p>Severity is moderate.</p>	<p>Very unlikely to reach the joint in normal situations or other than misuse.</p> <p>Occurrence is low.</p>
Hip rolling joint	<p>The potential pinching surface is wide (Spot's shoulder and large parts of the upper leg).</p> <p>There are no edges sharp or small enough to cause lacerations or cuts.</p> <p>Severity is low.</p>	<p>Possible but unlikely to reach the pinching state. The pinching would affect the hand or palm while grabbing the entire robot body to unduly interfere with balancing while Spot is powered (misuse).</p> <p>Overall occurrence is low.</p>



WARNING

Do not try to recover Spot by grasping or holding it up during an apparent loss of stability.

2.11. General warnings

- Attachments can alter the stability and the overall energy of an accidental loss of stability.
- While Spot is paused, the sudden appearance of an obstacle could cause Spot to move away from the obstacle to maintain a sufficient or predetermined separation distance. Spot could accelerate in a direction different from the main locomotion direction.
- When traversing stairs or uneven surfaces, Spot could accelerate in any direction or change body attitude in an attempt to maintain balance.
- Previous observations are not a guarantee of future performance. The behavior of Spot while in motion can be variable or unexpected with respect to planned trajectories or movements already observed in similar conditions or during previous executions of the same operations.
- When the environment presents narrow passages, corners, or cluttered layouts combined with ground obstacles, Spot could use high-speed movements to maintain or regain balance. Spot could accelerate in a direction different from the main locomotion direction.
- Check the availability of sufficient clearances or determine the need for signaling low-clearance locations.

- Survey the environment to determine any deviations from the nominal conditions described in [Restrictions on the environment](#) that can increase the chances of failures. Prepare the operating environment and layouts to reduce those identified risks.
- Consider introducing or upgrading guards in locations potentially exposed to falls from elevated grounds to best fit Spot's navigation capabilities (e.g. use dense mesh guards, avoid transparent materials, avoid ropes or thin elements).

3. Transport, handling, and storage

3.1. Transport

Spot is transported in two customized cases designed exclusively for Spot and its accessories.

3.1.1. Shipping case specifications

Category	Specification	Value
Spot robot shipping case	Length	927 mm
	Width	546 mm
	Height	464 mm
	Empty case weight	20.4 kg
	Combined weight (case and robot)	47.6 kg
Spot Power Supply & Battery shipping case	Length	559 mm
	Width	432 mm
	Height	267 mm
	Empty case weight	9.2 kg
	Combined weight (case, charger, and one battery)	18.1 kg
	Combined weight (case, charger, and two batteries)	22.7 kg



NOTICE

Do not discard the case after removing Spot and its accessories. The case is designed for transporting Spot and its accessories, and for returning them to Boston Dynamics for service when necessary.

3.2. Safe handling

Power off Spot before handling, moving, or lifting.



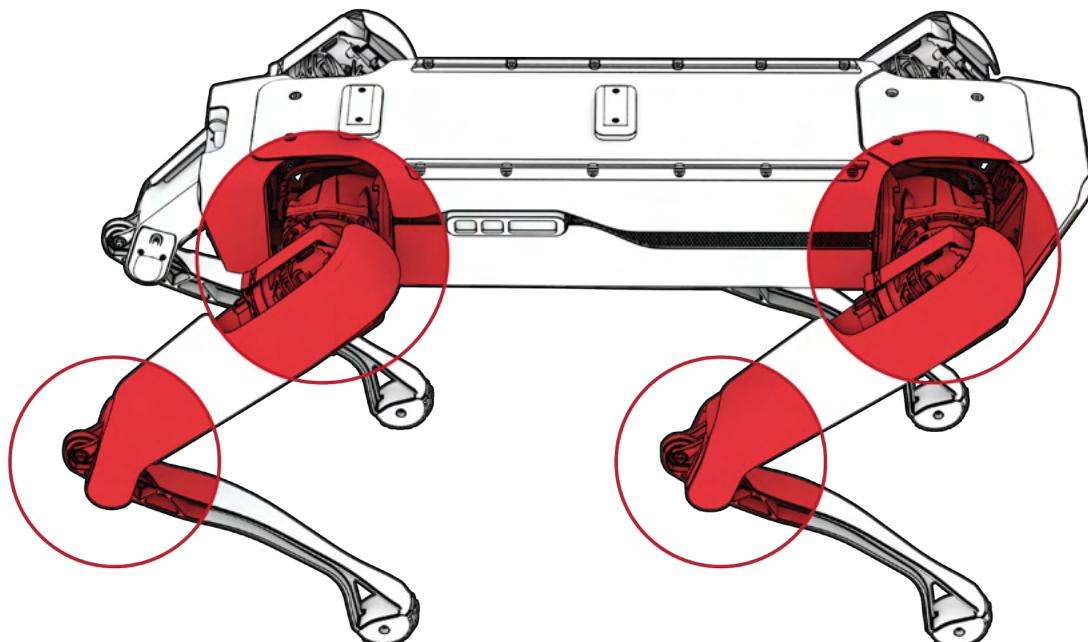
WARNING

Handling, moving, or lifting Spot without powering off Spot may result in unexpected motion and injury, as Spot may flail its legs in an attempt to control its balance.

For information about safely turning off Spot, see [Turn off Spot](#).

3.2.1. Pinch points

While Spot is powered off, loose legs and joints can still pinch fingers and other body parts and entangle clothing, long hair, and jewelry. Pinch point risk areas are highlighted below in red:



Spot pinch points.



CAUTION

Always keep hands away from knee joints. Use caution when rearranging or closing the legs.

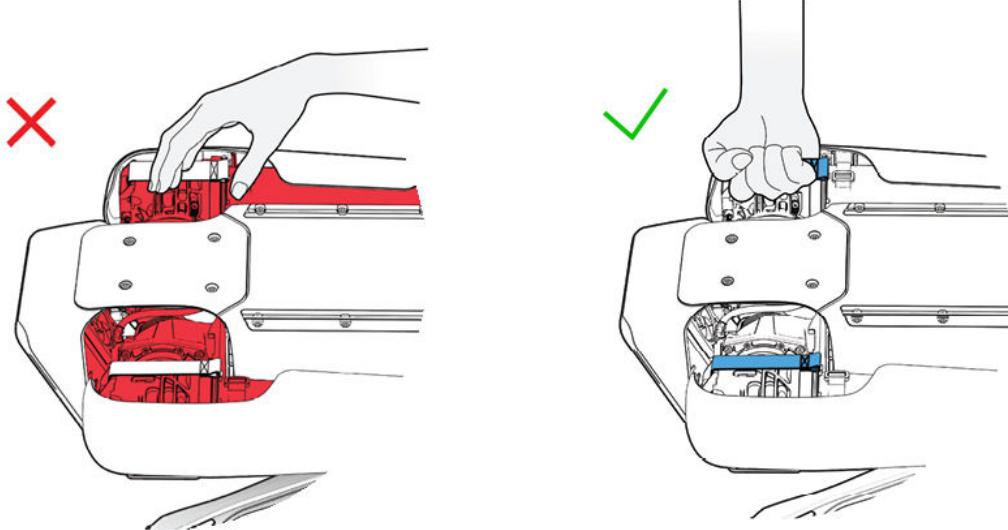
Always keep hands away from hip joints, except when grabbing the handles.

3.2.2. Handles

There is a handle at each hip joint to lift, carry, and roll Spot. Hands and fingers may still be pinched when using the handles.

**WARNING**

Always make a fist when gripping handles to keep your fingers away from pinch points. Never carry Spot with fingers extended.



Use of handles for lifting Spot.

3.2.3. Lifting Spot

Always use two people to lift Spot, one at the front and one at the rear.

Lift Spot by the handles while it is sitting upright, or by the lower legs if on its back. Always grab the handles or legs with clenched fists.



Lifting Spot by the handles.



Lifting Spot by the lower legs.



CAUTION

Spot is not a rigid single body, and its legs may be lost during lifting.

Sudden loss of grip while lifting will result in a sudden impact that may damage feet or equipment directly under Spot.

3.2.4. Personal Protective Equipment (PPE)

While handling Spot, it is recommended to wear safety footwear. If the A/V warning system is in use, hearing protection may be recommended based on the configured volume of the buzzer (see [Noise](#)). Check for additional PPE that may be required in the application environment.

3.3. Storage

Spot is best stored in the case or at a Spot Dock when not in use. Store Spot in a dry location with temperatures between -40°C and 75°C, with relative humidity between 30% and 70%.

3.3.1. Battery storage

The Spot Battery should be stored at temperatures between -30°C and 25°C. It is recommended to develop a battery storage and charging safety policy consistent with industry standards and local regulations.



NOTICE

Always remove the battery when Spot is not in use unless Spot is connected to the Spot Power Supply or sitting on a powered Spot Dock. Batteries left in Spot while not in use will continue to discharge, even when Spot is powered off. Batteries left in a powered off robot for more than 24 hours may be damaged beyond repair.

**CAUTION**

When shipping the battery, make sure it has been discharged to a 30% or less State Of Charge (SOC). US and international transportation regulations require that lithium-ion batteries of this size be at no greater than a 30% SOC when shipped, regardless of the shipping method (air, ground, rail, or sea). To determine the SOC of the Spot battery, push the button on the battery and read the led indicators. When the indicator shows 1 bar, it means it has less than 30% SOC.

4. Setup

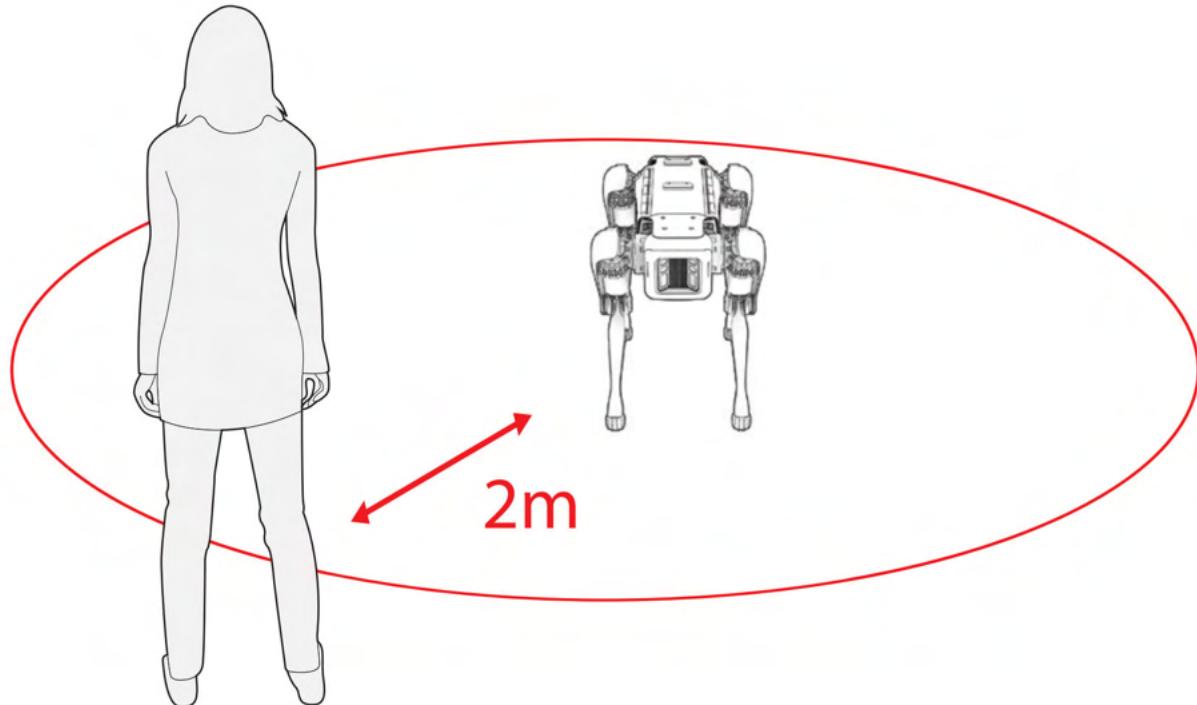
4.1. Before setting up Spot

Spot does not require any special installation fixtures, such as anchoring mechanisms, anti-vibration pads, etc. Setup can be done in any location.

Consider the following typical conditions for initial setup:

- Attachments may change the balance of Spot and must be configured for optimal control.
- Charging devices and cords may be present in the setup area. See also [Charge the battery](#).

In general, initial power-ups, standing, and movements of legged robots may be unfamiliar to first users. Ensure that all bystanders are trained in the use of Spot and about the residual risks of Spot applications.



2-meter safety zone around Spot.



CAUTION

Before setting up or operating Spot, ensure there is at least 2 meters of clearance around Spot in all directions.

Prepare Spot on a flat, stable, and clean surface.

4.2. Integrate attachments

Attachments are often essential components to further specify the intended use of a particular application of Spot. Attachments may substantially change the estimation of risks for the assembly of Spot and attachments, including:

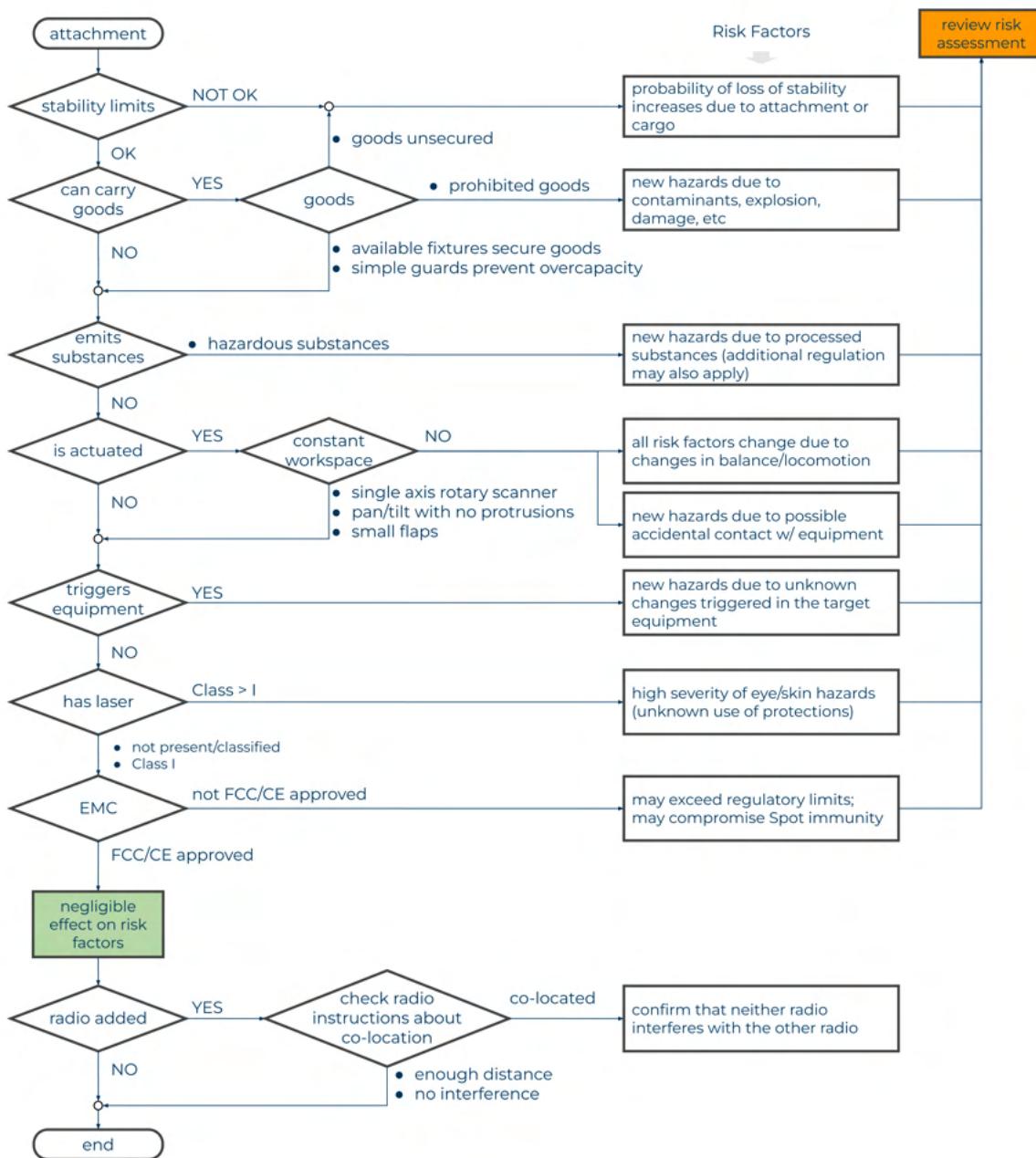
- Introducing new hazards to Spot applications.
- Changing the risks associated with Spot's intended use.
- Changing the conditions for compliance with standards or local regulations.

4.2.1. Analysis of attachments

You must complete your own risk assessment for the use of the assembly of Spot and attachments (see the full procedure in [Risk assessment](#) for Spot's baseline risk estimation), considering the following elements that will affect the risk factors:

- a. An attachment is outside the mounting limits established in [Attachment mount points and dimensions](#) to ensure stability.
- b. If an attachment can carry goods, the transported loads are:
 - Hazardous substances (chemicals, explosive and corrosive materials) either carried or dispersed (e.g. sprayed)
 - Non-hazardous materials that are not secured so that they cause a change in the physical properties of the load, are ejected, or accidentally come in contact with equipment or people.
 - Non-hazardous materials that, once loaded, exceed the stability limits in terms of rated mass or center of mass.
- c. An attachment is actuated and capable of independent mobility, unless the movement is limited to one axis and/or does not exceed the geometry of the attachment (e.g. rotary cameras or scanners, pan/tilt cameras). Mobile attachments may in fact determine unforeseeable conditions for Spot:
 - Intentional or accidental contact with equipment or people.
 - Physical interaction or manipulation tasks that can have a direct or indirect effect on the touched objects.
 - Changes in stability conditions due to the disturbance introduced by physical contact with the environment.
- d. An attachment emits light or collimated/amplified light like in lasers, unless classified as an IEC 60825-1 Class 1 device.
- e. An attachment emits electro-magnetic (EM) radiation (unintentional emitter) and could have effects on the electromagnetic compatibility (EMC) of Spot.
 - If the attachment is not approved under local EMC regulations, Spot's conformity to EMC regulations does not extend to the attachment and the combination of Spot and the attachment is not in conformity to EMC regulations.
 - If the attachment is independently approved under local EMC regulations, you are still responsible for the EMC of the combination of Spot and the approved attachment, typically verified through testing.

- f. An attachment has provisions for remotely triggering other equipment or processes, for example interfacing with components that start or stop processes or motion in target equipment.



Flowchart of the process for analyzing attachments.



NOTICE

Radio equipment on attachments

Attachments may include radio devices. It is necessary to review installation conditions and approvals of radio modules.

- If the additional radio equipment is NOT an approved module for local radio regulation, the conformity to local radio regulation of Spot is invalidated and not extended to the attachment.
- If the additional radio equipment is an approved module for local radio regulation, multiple radio modules must still not be co-located (i.e. antennas are more than 20 cm apart). If co-located, testing must be performed according to the co-located radio device requirements for the local radio regulation.

Additionally, radiated emissions will need to be repeated with all radio modules enabled and activated to ensure that EMC has been maintained by the entire system (Spot and attachment). This applies to co-located and non co-located radio devices.



WARNING

Attachments that:

- emit ionizing radiation
- include laser equipment designated as IEC 60825-1 Class greater than 1
- carry or disperse hazardous substances

can be potentially very dangerous. Users and integrators will be responsible for providing additional safeguards.



WARNING

Spot has been tested to EMC Industrial standards. Attachments that emit radiation in excess of the levels Spot has been tested to may cause harm to Spot and degrade its performance in a dangerous manner.

Boston Dynamics is not responsible for any damage caused by radiating attachments.

You must also verify the presence of specific local regulations about the technology and materials used in attachments.

Spot Arm is an actuated, variable-configuration attachment, and every solution integrating Spot Arm requires a risk assessment for the intended manipulation application.



REQUIRED READING

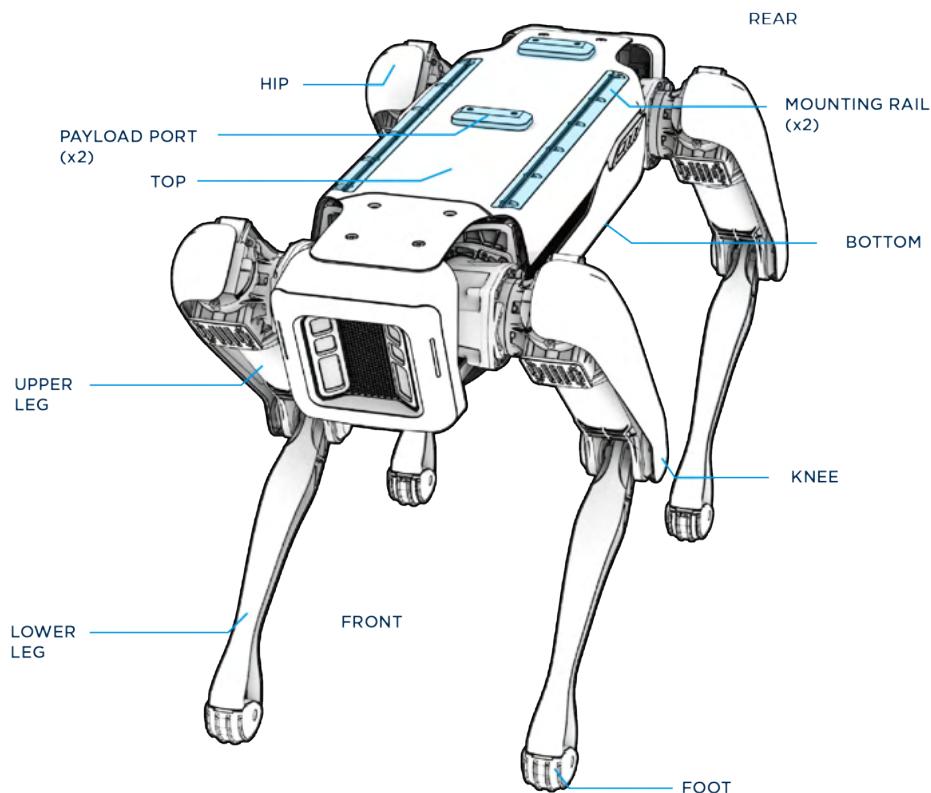
For additional instructions and safety information about Spot Arm, review *Spot Arm Information for Use in the Boston Dynamics Support Center* (see [Appendix A: Supplemental information](#)).

All other attachments produced and sold by Boston Dynamics cause little or no modification in the risk estimation of Spot if used without further customization.

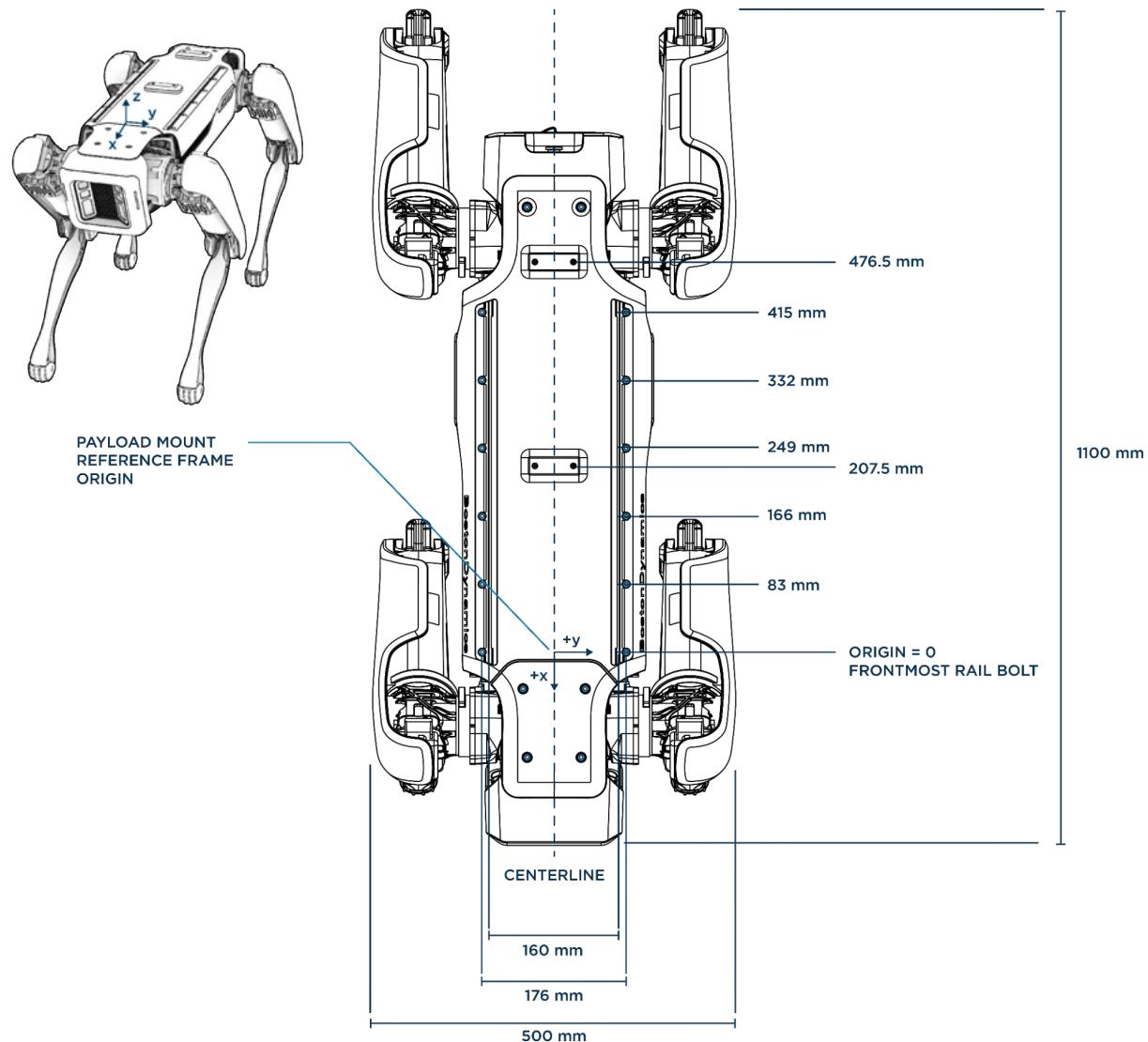
4.2.2. Attachment mount points and dimensions

Aluminum mounting rails are located along the top left and top right edges of Spot's body and provide a secure means of mounting attachments to Spot. The rails accept T-slot nuts such as Misumi HNTR5-5.

Power and data interfaces are available through Spot's forward and rear payload ports.

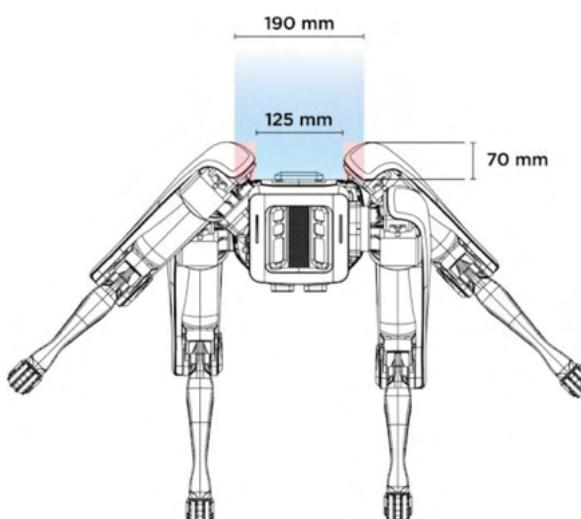


Spot mounting rails and payload ports (highlighted in light blue).



Spot dimensions with respect to mounting attachments.

The maximum recommended width for a body-mounted attachment is 190 mm. Attachments should avoid interference with the legs in the areas immediately adjacent to the hips, as illustrated below.



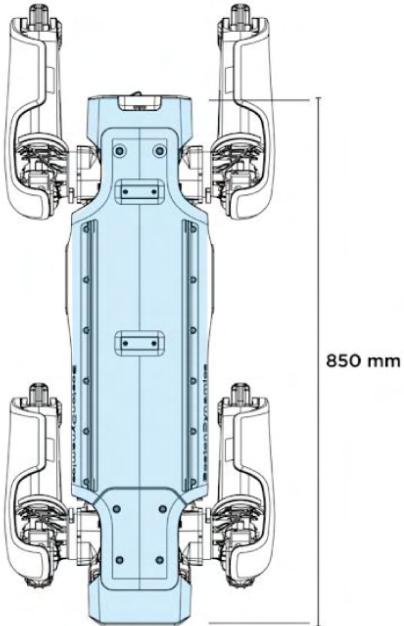
Attachment limit dimensions (lateral).



CAUTION

Attachments that exceed width limits will result in reduced overall mobility and significant interference with the legs, causing unintended loss of stability.

The maximum recommended length for a body-mounted attachment is 850 mm.



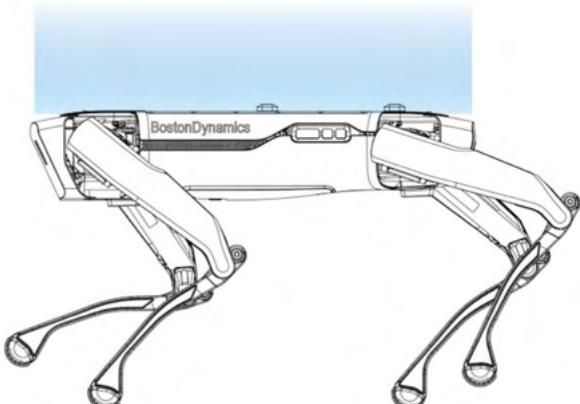
Attachment limit dimensions (longitudinal).



CAUTION

Attachments that overhang Spot's body to the front or rear will reduce maneuverability, increasing the probability of unintended movements to maintain stability or continue along a planned path.

The height of attachments impacts Spot's ability to self-right and increases the height of the center of mass. Keep the center of mass low, as Spot may not self-right if top heavy.



Vertical attachment zone (side view).

Spot can support 14 kg total combined capacity distributed over the top of its body. This total attachment capacity must include all attachments. Spot can better handle payload mass if the combined center of mass lies between the front and rear hips. Spot will be more agile and less likely to fall if the total attachment mass is centered on the middle of its body.

4.2.3. Mount attachments



NOTICE

Attachments vary in size, shape, functionality, and configuration. The instructions in this section are a general guide. Refer to documentation specific to the attachment for instructions that add to or modify this procedure.

To mount an attachment on Spot:

1. Start with Spot powered off in the sit position on a stable work surface.
2. Position the attachment over Spot to identify where it will be bolted to the mounting rails and payload ports.



NOTICE

Some attachments can only be mounted in a front or rear configuration.

3. For each point where the attachment will be bolted to a mounting rail, insert one T-slot nut into the mounting rail. Position the T-slot nut along the rail, then gently tighten the set screw to hold the T-slot nut in place.
4. Insert the included machine screws through the holes in the attachment and into the T-slot nuts in the mounting rails, then tighten to 5 N·m of torque. Do not over-tighten.
5. If the attachment requires a power or data interface with Spot:
 - a. Remove the screws holding the payload port cap in place, then remove the cap. Store the cap and screws in a secure location.



NOTICE

Spot cannot be operated with an exposed payload port.

- b. Insert the connector at the end of the attachment's ribbon cable into the payload port. Fasten the connector with the included screws.

Attachments must be configured in Spot's system software before use. For details, see [Configure attachments](#).



WARNING

Mounting attachments incorrectly may cause failures in balancing and potential loss of stability, impaired functionality, and unforeseen hazards.

4.2.4. Configure attachments



NOTICE

Attachments vary in size, shape, functionality, and configuration. The instructions in this section are a general guide. Refer to documentation specific to the attachment for instructions that add to or modify this procedure.

To configure an attachment for Spot:

1. Mount the attachment to Spot as described in [Mount attachments](#).
2. Log in to Spot's Admin Console as described in [Log in to the Admin Console](#).
3. Select **Payloads**.
4. Some attachments will auto-register with Spot to streamline setup. If your attachment already appears on the page:
 - a. Select **AUTHORIZE**.
 - b. Select the configuration that matches your attachment (model and front or rear mount location), then select **AUTHORIZE**.
 - c. To modify the default settings, select the attachment name. Configure settings for the attachment, then select **APPLY**.
5. If your attachment does not appear on the page:
 - a. Select **ADD PAYLOAD**.
 - b. Select an attachment type from the list.
 - c. Configure settings for the attachment, then select **APPLY**.



WARNING

Incorrectly configuring attachments may cause failures in balancing and potential loss of stability, impaired functionality, and unforeseen hazards.

4.3. Battery setup and charging

Spot is powered by a removable lithium-ion battery pack.



WARNING

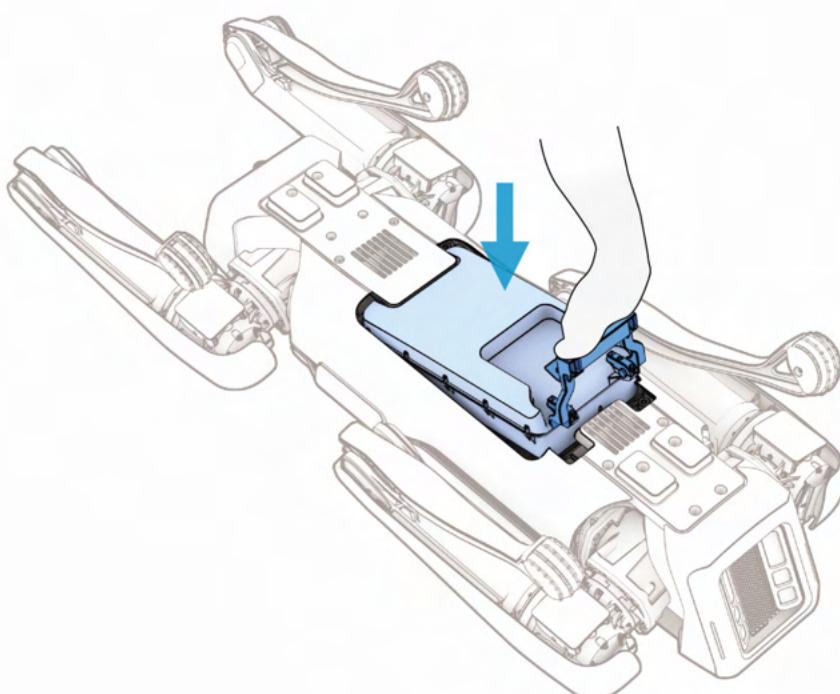
- Do not short or contact battery pads.
- Do not burn, disassemble, submerge, puncture, crush, drop, or damage the battery.
- Do not dispose of the battery with household waste. Refer to local electric waste regulations.
- Do not charge, or operate Spot with, a battery that is cracked or otherwise damaged. For assistance with damaged batteries, contact Boston Dynamics Support.



DANGER

It is extremely unlikely that the battery generates fire under normal conditions of use and environment. If the battery catches fire, do not try to put it out. Evacuate to a safe area and call the fire department. Battery fires create toxic fumes and cannot be put out with conventional fire extinguishers or water.

4.3.1. Insert the battery

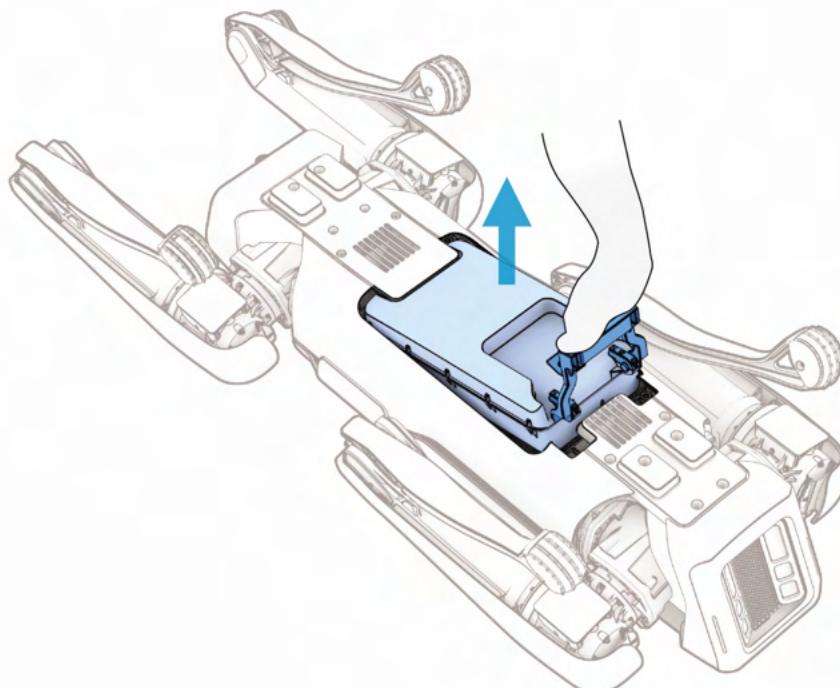


Insert the battery.

To insert the battery:

1. With Spot on its back and disconnected from power and Ethernet cables, slide the battery's non-handle side into the rear of Spot's battery compartment and latch the handle.
2. Ensure the battery is properly latched.

4.3.2. Remove the battery



Remove the battery.

To remove the battery:

1. Ensure Spot is powered off and disconnected from power and Ethernet cables.
2. With Spot on its back, lift the battery handle and slide the battery out of the battery compartment.

4.3.3. Charge the battery

Spot's battery can be charged in several ways:

- Removed from Spot, using the Spot Power Supply.
- While installed in Spot, using the Spot Power Supply.
- While installed in Spot, using the Spot Dock.



REQUIRED READING

Before charging a battery with the Spot Power Supply, review *Spot Power Supply Information for Use* in the Boston Dynamics Support Center.

Before charging a battery with the Spot Dock, review *Spot Dock Information for Use* in the Boston Dynamics Support Center.

See [Appendix A: Supplemental information](#)

Only charge the battery with the Spot Dock or the Spot Power Supply provided by Boston Dynamics.



Charging a battery with the Spot Power Supply.



Charging a battery in Spot with the Spot Power Supply.



Charging a battery in Spot with the Spot Dock.



DANGER

To reduce the risk of electric shock and fire:

- Use a properly grounded outlet. Do not use ground adapters or replace plugs.
- Do not touch uninsulated parts of the output connector or battery terminals.
- Do not open or disassemble the Spot Power Supply or Spot Dock.
- Do not use the Spot Power Supply or Spot Dock if any power cord is damaged.



WARNING

Power cords present tripping hazards and may cause the Spot Power Supply to fall from an elevated position.

- Place the Spot Power Supply on a dry floor, out of the path of people or robots, while charging.
- Do not operate Spot while connected to the Spot Power Supply. Doing so could damage Spot or the Spot Power Supply. Dragging cords could become entangled with Spot, people, or objects in the environment.

4.4. Spot Dock setup

The Spot Dock is a recharging station for Spot. The Spot Dock can also provide a pass-through connection for Spot's Ethernet port.

Before using the Spot Dock, check that the following conditions are met:

- The Spot Dock is securely installed on level ground.
- Clear space is available around the dock.
 - Front: 1200 mm
 - Sides: 50 mm
 - Rear: 600 mm
- The Spot Dock is undamaged.



REQUIRED READING

For installation instructions and safety information about the Spot Dock, review *Spot Dock Information for Use* in the Boston Dynamics Support Center (see [8 Appendix A: Supplemental information](#)).

4.5. Spot system settings

Spot's system settings are managed from the Admin Console, which is a web server hosted locally on Spot.

Settings page	Description
User Management ¹	<p>Create and manage operator and admin accounts.</p> <div style="border: 1px solid black; padding: 10px; margin-top: 10px;"><p>NOTICE</p><p> Spot's default usernames and passwords are printed on a label in the battery compartment. Boston Dynamics strongly recommends changing the default passwords.</p></div>
Network Setup	Configure Spot's WiFi and Ethernet settings.
Software Update ¹	<ul style="list-style-type: none">• Review current software version information.• Upload and install new Spot software and monitor update progress.
Spot License	View and install license files required for Spot operation.

Settings page	Description
Logs	<ul style="list-style-type: none"> Manage log files saved on Spot. Upload logs directly to Boston Dynamics Support or download and send them from your own device. Enable or disable image logging.
About	<ul style="list-style-type: none"> Rename Spot. Review software version. Check cumulative runtime data. Review legal information.
Payloads	<ul style="list-style-type: none"> Add and configure new attachments. Review attachment settings.
General Settings	<ul style="list-style-type: none"> Enable/disable privacy mode to prevent Spot from automatically capturing image data in log files. <div style="border: 1px solid black; padding: 10px; margin-top: 10px;"> <p>NOTICE</p>  <p>Enabling privacy mode will not delete images stored in existing log files.</p> </div> <ul style="list-style-type: none"> Configure fiducial image size and applicable ranges.
Battery	<ul style="list-style-type: none"> View battery health metrics. Clear battery logs.
	Access a history of WiFi network connections to Spot.
	Visualize the position and orientation of Spot's limbs and attached payloads.

¹Admin users only.

4.5.1. Log in to the Admin Console

To log in to the Admin Console from the tablet controller:

- Start with Spot powered on as described in [Power on Spot's computers](#).
- Connect the tablet controller as described in [Connect the tablet controller to Spot](#).
- Navigate to **Menu ≡ > ADMIN CONSOLE**.
- Log in with the admin username and password printed on the label in Spot's battery compartment, or using credentials provided by your Spot system administrator.

To log in to the Admin Console from a computer:

1. Start with Spot powered on as described in [Power on Spot's computers](#).
2. Connect a computer to Spot using the information in [Default network configuration](#), or the current network settings as determined by your Spot system administrator.
3. Open the Chrome browser and navigate to Spot's IP address. For the default network configuration, the address is `https://192.168.80.3` when connected by WiFi and `https://10.0.0.3` when connected by Ethernet.
4. Log in with the admin username and password printed on the label in Spot's battery compartment, or using credentials provided by your Spot system administrator.

4.6. Network configuration

Spot requires an active network connection for remote controlled operation and remote supervision of automatic operation (see [Autowalk replay supervision](#)). Communication requirements will vary based on where and how Spot is used.

Loss of communications may trigger an operational stop as described in [Operational stop](#).

Network type	Description
WiFi	Spot can host its own WiFi access point, allowing controllers and other devices to connect directly to Spot. Spot can also join enterprise WiFi networks.
Ethernet	There is one Ethernet port at the rear of Spot. Spot can also receive "pass-through" Ethernet while docked on a Spot Dock.
LTE	Requires additional hardware.
Mesh radios	Requires additional hardware.

Before operating Spot, ensure that Spot's network configuration is appropriate for your use case and operating environment.

4.6.1. Default network configuration

Default networking information is printed on the label inside Spot's battery compartment.

Network protocol	Setting	Default value
WiFi	Network type	Access Point (Spot hosts its own WiFi network)
	Network name (SSID)	See label in battery compartment
	Password	

Network protocol	Setting	Default value
	Robot IP address	192.168.80.3
Ethernet (Direct wired connection between computer and Spot)	Robot IP address	10.0.0.3
	Netmask	255.255.255.0

4.6.2. Change Spot's network configuration

To change Spot's network configuration:

1. Log in to Spot's Admin Console as described in [Log in to the Admin Console](#).
2. Select **Network Setup**.
3. Navigate between the tabs to access settings.
4. For each tab, make changes and then select **APPLY**.



WARNING

Changing Spot's network configuration during operation may trigger signal-loss behaviors, which could result in falls or unsupervised automatic movements. See [Operational stop](#) and [Enable AutoReturn to recover from loss of connection to the controller](#).

4.7. Spot software updates

For the best and most reliable performance, keep software fully updated on Spot and related equipment.

Boston Dynamics recommends that you:

- Update Spot and each controller to the latest software version as soon as it becomes available.
- Keep each attachment updated to the latest available software version for that attachment.
- Keep each controller's operating system and firmware up to date.



CAUTION

Version mismatches between Spot and controller software can result in unexpected or hazardous behavior. Always match the software versions between Spot and its controller.

To check the current software version:

- In the Admin Console, navigate to the **Software Update** page.
- In the Spot App, navigate to **Menu ≡ > ABOUT**.

4.7.1. Update Spot robot software

To download updated Spot software:

1. Visit <https://support.bostondynamics.com/s/downloads> and log in with your customer account.
2. Download the .bde file for the Spot base platform.

NOTICE

 Skipping over intermediate major or minor releases may cause the update to fail. Always install the most up-to-date version of the major or minor software release that immediately follows your current software.

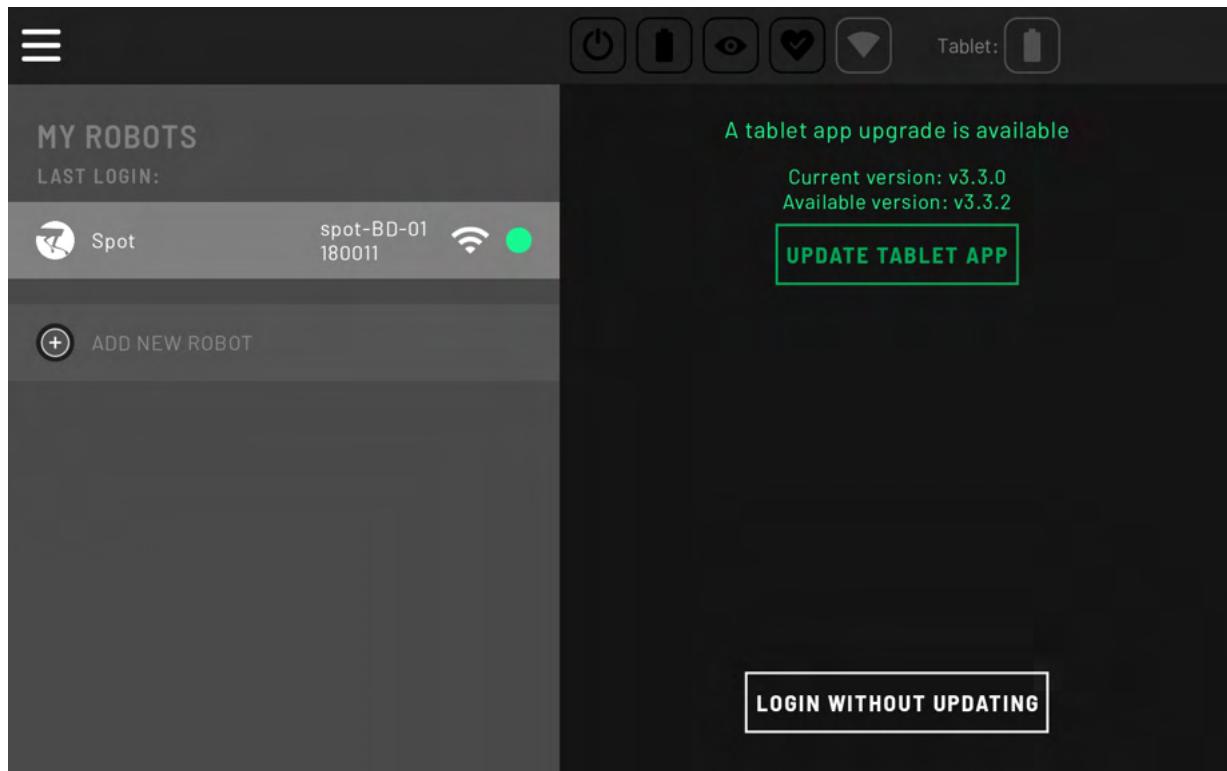
Major and minor releases correspond to the first and second numerals of the software version number.

To update the Spot robot software:

1. Connect Spot to a power source (i.e. a Spot Dock or the Spot Power Supply).
2. Power on Spot as described in [Power on Spot's computers](#).
3. Connect a computer to Spot using the information in [Default network configuration](#), or the current network settings as determined by your Spot system administrator.
4. Log in to the Admin Console as described in [Log in to the Admin Console](#), then navigate to the **Software Update**.
5. Drag-and-drop the .bde file, or select **CHOOSE FILE** and select the .bde file from the file browser.
6. Select **UPLOAD**, then wait for the file to upload.
7. Select **INSTALL AND REBOOT**.
8. Wait for the software to install and for Spot to reboot. When Spot has finished rebooting, you may need to reload the page to verify that the update was successful.

4.7.2. Update Spot tablet controller software

Updates to the Spot tablet controller software (the Spot App) are bundled with updates to the Spot robot software. The Spot App will recommend an update when you connect to an updated Spot robot.



A tablet app upgrade is available.



CAUTION

Version mismatches between Spot and controller software can result in unexpected or hazardous behavior. Always match the software versions between Spot and its controller.

To update tablet software from within the Spot App:

1. Select a robot from the **MY ROBOTS** list.
2. When prompted, select **UPDATE TABLET APP**.
3. Follow the prompts to install the update, then reopen the app.

Boston Dynamics recommends that you also keep the operating system and firmware of the controller up to date. To update the operating system and firmware, follow manufacturer instructions.

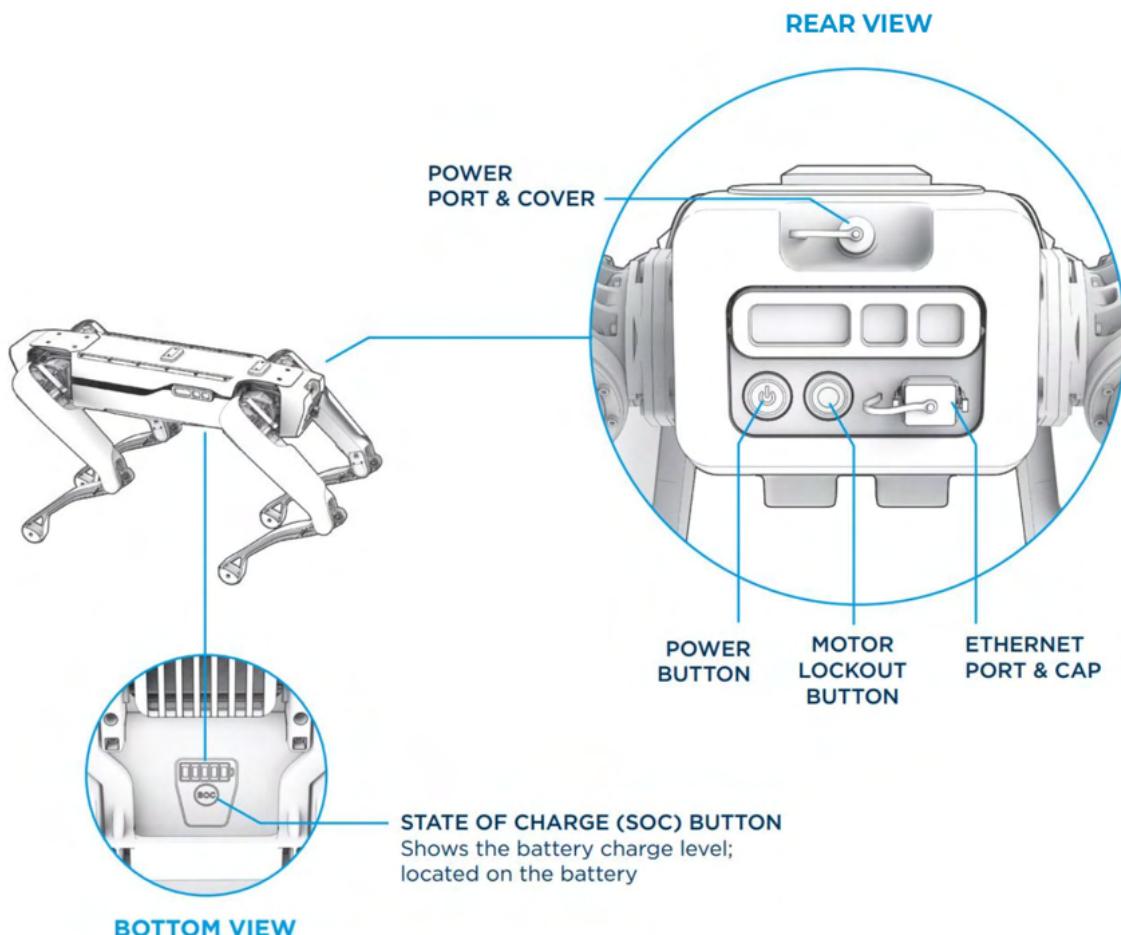


NOTICE

Changing system settings or installing third-party software (e.g. custom keyboards) on the tablet controller may interfere with the performance of the Spot App. Boston Dynamics recommends that you keep the tablet controller in its default configuration whenever possible.

5. Use of the machine

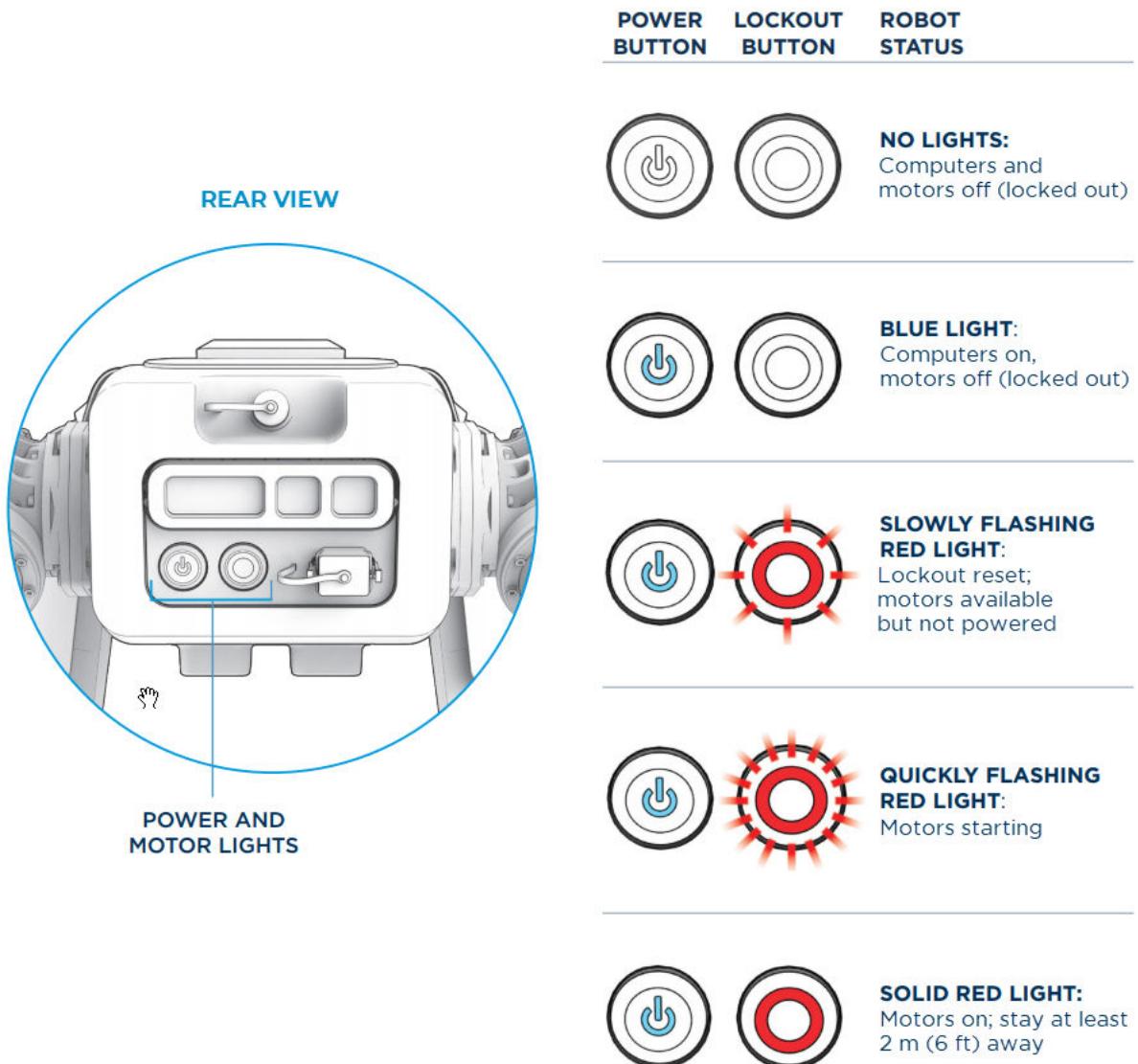
5.1. Controls and interfaces on Spot



Battery and power controls.

5.1.1. Power and motor status lights

The power and motor lockout buttons are located at the rear of Spot's body. The power button illuminates blue when Spot's computers are on. The motor lockout button illuminates red when the motor lockout is reset.

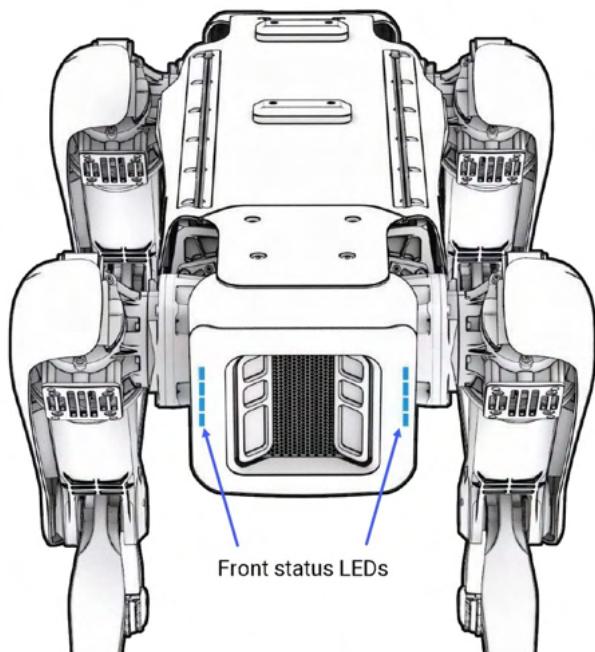


Power and motor status lights.

When Spot is powered on and motors are locked out (blue light only), motion commands are disabled. Spot will not move until the motor lockout is reset and Spot receives a start command as described in [Start Spot](#).

5.1.2. Robot status lights

Spot's LED status lights are located on the front of its body.



Status light location.

Light pattern	Description	Robot status
	Yellow	System booting up
	Moving rainbow	Powered on, ready to connect
	Solid blue	Lockout button engaged; Spot is safe to handle
	Filling blue	Charging, dots indicate percentage of charge
	Solid blue with gap	Plugged in or docked, no battery
	Slow blink green	Spot connected; motors may turn on
	Fast blink green	Motors turning on
	Solid green	Motors on
	Draining orange	Low battery

Light pattern	Description	Robot status
	Blinking orange	Serious error or perception fault; operation degraded

**NOTICE**

When the A/V warning system is active, the status light color will match the color of the front and bottom indicators. See [Warning system light and sound patterns](#).

5.2. Remote controllers

Spot can be operated with the tablet controller that ships with Spot, or from a computer running the Scout browser application. This document describes the use of the tablet controller. For instructions on using Scout, refer to documentation in the Boston Dynamics Support Center (see [Appendix A: Supplemental information](#)).

Control can be passed from one controller to another while Spot is in use. See [Connect the tablet controller to Spot](#).

Spot may be compatible with other control devices and software. Only use controllers provided or approved by Boston Dynamics to operate Spot.

5.2.1. Spot tablet controller

The Spot tablet controller is a wireless device for manually operating Spot robots. Spot can be operated without the tablet controller, but the tablet controller is required for recording missions.

The controller that ships with Spot is a handheld touchscreen computer running the Android operating system and the Spot App. The controller can be integrated with hardware devices that include buttons and joysticks.



Spot tablet controller.

5.2.2. Connect the tablet controller to Spot

To connect the tablet controller to a Spot robot for the first time:

1. Start with Spot and the tablet controller powered on. See [Power on Spot's computers](#).
2. On the tablet controller, open the Spot App.
3. Select **+ ADD NEW ROBOT**.
4. Select the network that matches the information in [Default network configuration](#), or that matches Spot's current network settings as determined by your Spot system administrator.
 - a. If you are taken to the Android network settings screen, select the correct network and enter the password if required.
 - b. If you see a message about the network having no Internet access, select **Always connect**.
 - c. Press the tablet controller's back button to return to the Spot App.
5. If Spot appears in the **NEW ROBOTS** list, select it. Otherwise, select **+ ADD ROBOT** and enter Spot's IP address. (For the default network configuration, the address is 192.168.80.3)
6. Log in with the admin username and password printed on the label in Spot's battery compartment, or using credentials provided by your Spot system administrator.
7. When prompted, press the **Cut Motor Power** button combination.
8. Select a start command as described in [Start Spot's motors](#), or select **OBSERVE** to access cameras, menus, and settings without starting Spot's motors.

To reconnect the tablet controller to a known Spot robot:

1. Start with Spot and the tablet controller powered on. See [Power on Spot's computers](#).

2. On the tablet controller, open the Spot App.
3. Select a robot from the **MY ROBOTS** list.
4. Log in with the admin username and password printed on the label in Spot's battery compartment, or using credentials provided by your Spot system administrator.
5. When prompted, press the **Cut Motor Power** button combination.
6. Select a start command as described in [Start Spot's motors](#), or select **OBSERVE** to access cameras, menus, and settings without starting Spot's motors.

To take control of Spot from another controller:

If you see a different button such as **OPERATE** or **HIJACK** when connecting to Spot, it may mean that Spot has already been started and is operating in automatic mode or under the control of another Operator. To finish connecting to Spot:

1. Select **OPERATE** (if applicable), then select **HIJACK**.
2. When prompted with the question "Do you want to acquire cut motor power authority?", select **YES**. Spot will sit and turn off its motors.
3. When prompted, open the Motor status panel and toggle **Motor Power** to **ON**.



WARNING

Without cut motor power authority it may not be possible to stop Spot quickly. If another controller cuts power while you are operating Spot it may result in unexpected hazards. Do not operate Spot from a controller that does not have cut motor power authority.



CAUTION

Taking control of Spot during operation does not require the permission of other Operators and may cause unexpected hazards. Always carefully assess the situation and communicate with other Operators before taking control of Spot.

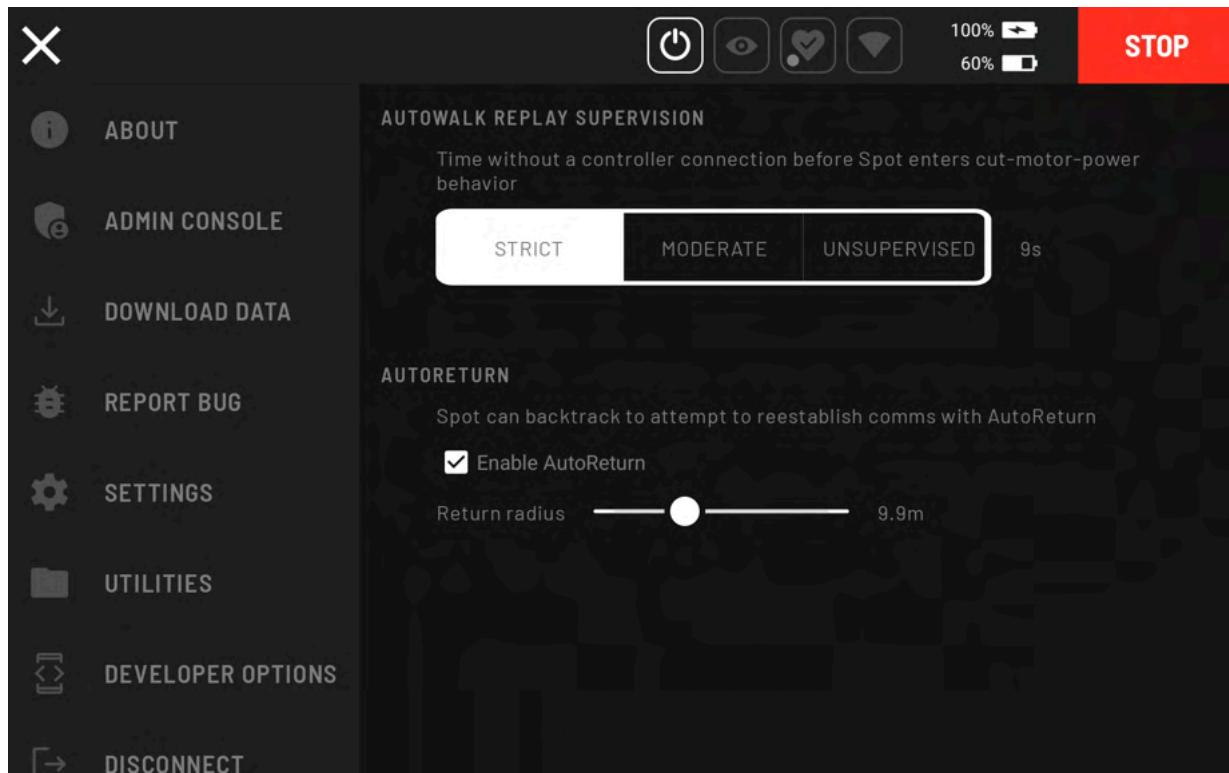
5.2.3. Enable AutoReturn to recover from loss of connection to the controller

Spot maintains a connection to a remote controller while operating manually. If the signal is lost, Spot will sit and power off its motors as described in [Operational stop](#).

Possible reasons for loss of signal include:

- Poor network performance.
- Weak or intermittent signal strength.
- The tablet controller powering off, entering a sleep or standby mode (such as turning off the screen), or changing its network settings.
- The Spot App crashing, being backgrounded, or being closed.

When enabled, AutoReturn allows Spot to backtrack automatically to a location within a set radius as it attempts to restore its connection to the controller. If the signal is restored, manual operation resumes. If the signal is not restored, Spot will sit and power off its motors.



AutoReturn settings.

To enable AutoReturn:

1. Navigate to **Menu ≡ > COMMS**.
2. Toggle the **Enable AutoReturn** checkbox.
3. Drag the **Return radius** slider to change how far Spot can backtrack when AutoReturn is triggered.



WARNING

AutoReturn can result in automatic movement. When the tablet controller is not connected to Spot, it may not be possible to stop Spot quickly. Use this setting only after carefully assessing the operating environment and the risks of unsupervised operation.

5.3. Start Spot

Before starting Spot, make sure that it:

- Has a charged battery.
- Is unplugged from power and Ethernet.

- Has its power plug cover and Ethernet port cover inserted.

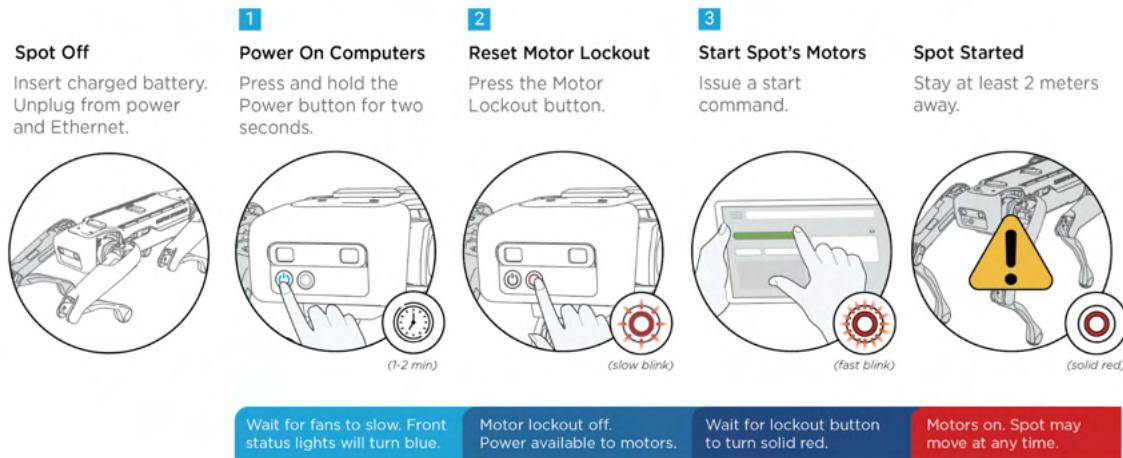


CAUTION

Before setting up or operating Spot, ensure there is at least 2 meters of clearance around Spot in all directions.

Starting Spot involves three steps:

1. Power on Spot. This boots up Spot's computers, but does not deliver power to Spot's motors.
2. Reset the motor lockout. The motor lockout prevents motor power. Once reset, power is available to motors but no motion command is enabled or allowed yet.
3. Start Spot's motors. This step is done on a remote controller. Motors are energized and Spot may move at any time.



Spot startup sequence.



NOTICE

There may be additional power-up procedures for attachments installed on Spot and which use one of the two payload ports on Spot's top.

5.3.1. Power on Spot's computers

To power on Spot's computers:

1. Press and hold the Power button for two seconds.
2. The fans will turn on and spin for approximately two minutes. During this time, Spot's computers are booting and its hosted WiFi network is initiating.
3. When the noise of the fans is audibly lower and the status lights at the front of Spot change to solid blue, Spot's computers are powered on.

5.3.2. Reset the motor lockout

To reset the motor lockout:

1. Press the Motor Lockout button on the rear of Spot.
2. If Spot's computers are already powered on, the button will illuminate red and slowly blink to indicate that the lockout is reset.

Spot will not start yet. A deliberate start command is necessary from an externally connected control device.

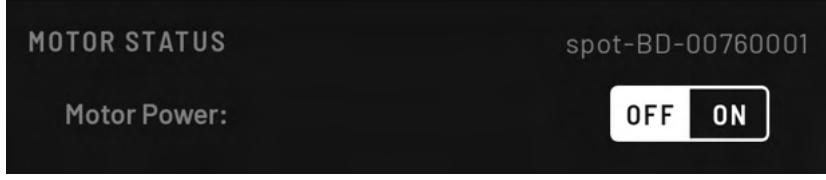
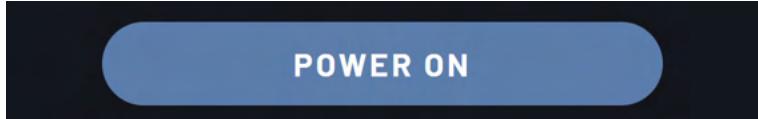


CAUTION

If a software command to start Spot is pending when the motor lockout is reset, Spot may immediately start its motors and begin moving.

5.3.3. Start Spot's motors

Start commands vary depending on mode of operation, controller type, and robot state. Examples:

Mode	Controller	Start commands
Manual	Tablet	 
		
	Scout	 
Automatic		Spot's motors may start automatically, remain started, or re-start automatically to replay scheduled or looping Autowalk missions.

The motor lockout button will blink quickly for several seconds while motors are starting. When motors are fully started, the button will glow steady red.



CAUTION

Once started, Spot may move suddenly and unexpectedly.

5.4. Stop Spot

During normal operations, two stop commands are available:

- **STOP:** Immediately suspends all robot motion.
- **CUT POWER:** Fully de-energizes Spot's motors.

When **STOP** or **CUT POWER** is commanded, it takes precedence over all active commands on the controller. When **CUT POWER** is commanded, motors cannot be turned on until the stop is canceled.

An operational stop can be triggered:

- Manually by an operator.
- Automatically by Spot's internal control system.
- By additional software or attachments.



NOTICE

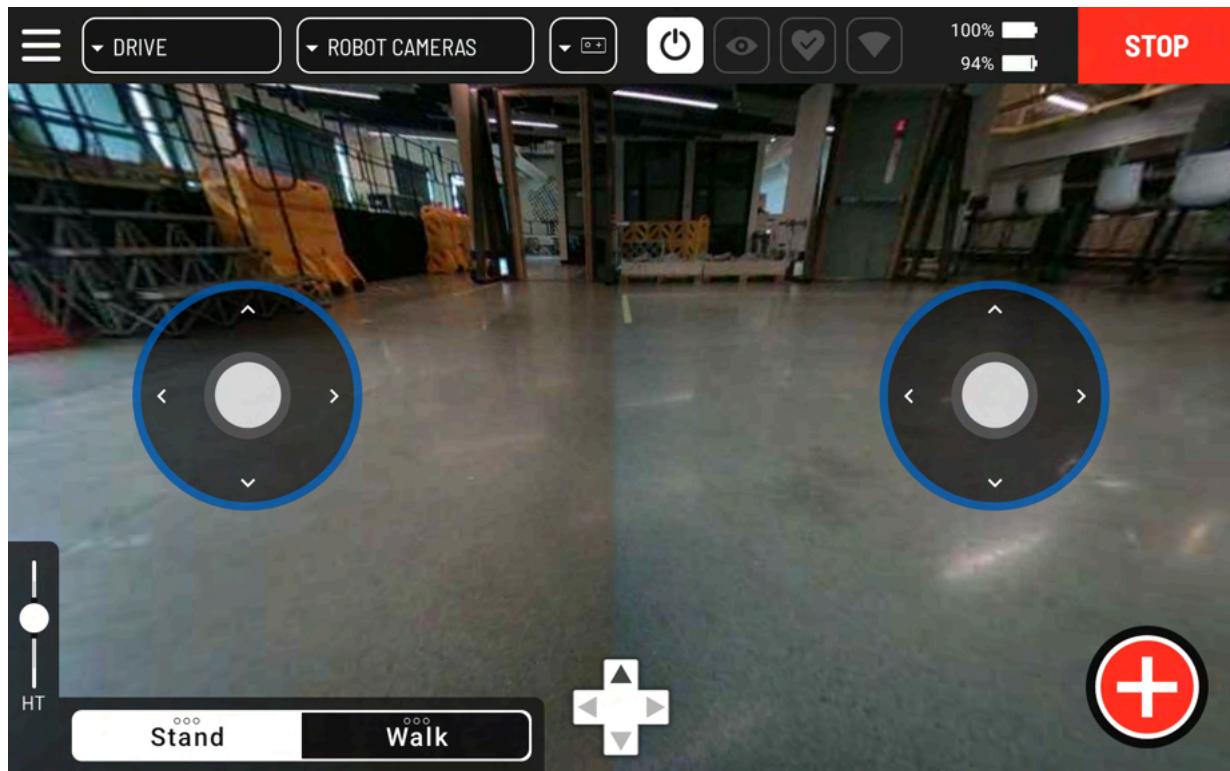
Many Spot behaviors can also be paused or canceled with on-screen controls or physical button shortcuts, however this document only describes the general stop function.

5.4.1. Manual stop using the tablet controller

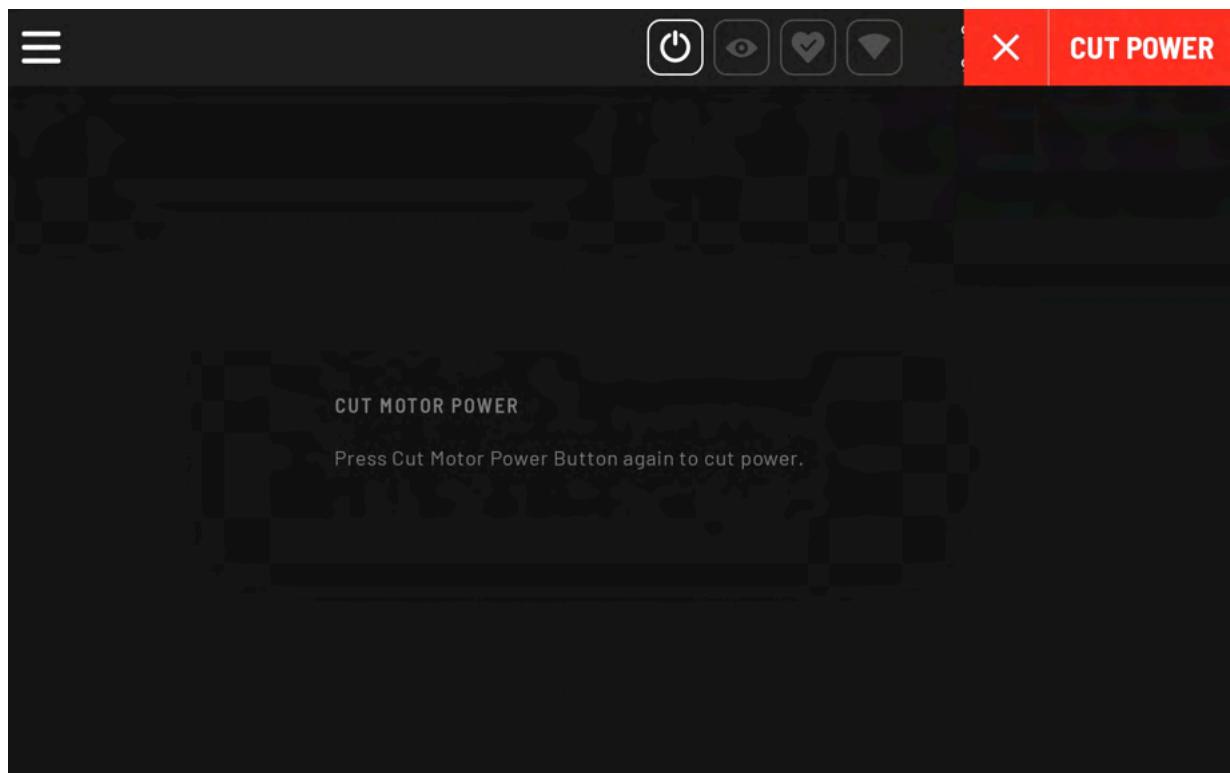
To suspend robot motion while driving Spot with the tablet controller, select **STOP**. Spot will pause and stand in place. If Spot is seated, it will remain seated.

To de-energize Spot's motors, use either of these methods:

- Press a shortcut combination of physical buttons to **Cut Motor Power**. This shortcut differs depending on tablet configuration and is displayed in the Spot App when an Operator connects to Spot.
- Select **STOP** twice in quick succession. The first selection will suspend robot motion and change the button label to **CUT POWER**. The second selection will de-energize the motors.



Tablet controller **STOP** button.



Tablet controller **CUT POWER** button.

**WARNING**

When motors are de-energized, Spot will lose its ability to stand and balance. On flat ground, Spot will lower its body. On inclined surfaces or stairs, Spot may tip over.

5.4.2. Restarting after a stop using the tablet controller

To resume operation with the tablet controller after a stop:

1. First make sure safety conditions are met, and sufficient clearance is maintained.
2. If the E-Stop button or another Emergency Stop device was pressed, release (unlatch) it.



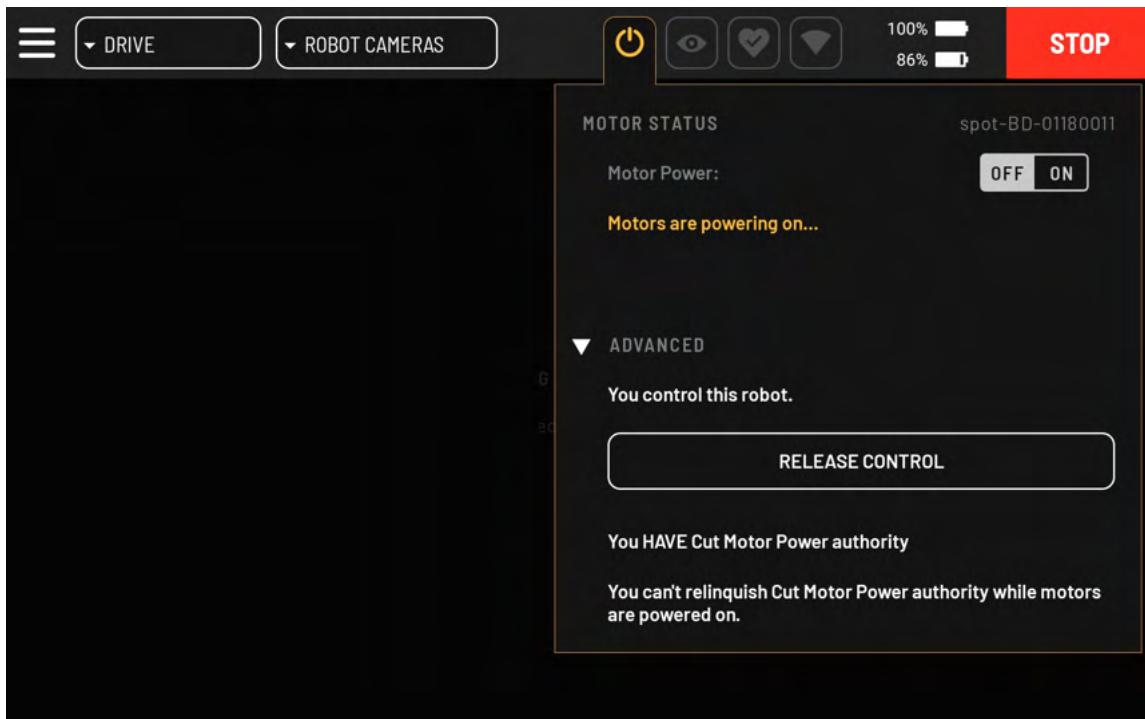
To release (unlatch) the E-Stop button, twist clockwise until it pops up.

3. On the tablet controller, select the red X to clear the stop (if applicable).



Tablet controller during a stop.

4. Open the Motor status panel and toggle **Motor Power** to **ON**.



Tablet controller Motor status panel.

5. Resume operation. If Spot continues to stop unexpectedly, contact Boston Dynamics Support.

5.5. Change Spot's mode of operation

In most situations, Spot can be switched between manual and automatic modes of operation without powering off motors.

If Spot is running an Autowalk mission unsupervised or under the supervision of another remote controller, you will be prompted to power off and restart Spot's motors as part of the mode change.



CAUTION

Changing modes will bring any current robot motion to a standstill, and may cause Spot to immediately begin moving along a new trajectory.

5.5.1. Switch to automatic mode

Spot enters automatic mode whenever it begins to replay an Autowalk mission, or whenever AutoReturn is triggered. This may be the result of:

- A direct command from an Operator.
- A mission that was scheduled to run at a specific time.
- A command from software running on Spot, an attachment, or an external networked device such as a computer or server.

- Signal loss between Spot and a remote controller, if Spot is configured to use AutoReturn.

Spot remains in automatic mode during a mission and between looping or scheduled missions, including while stationary or docked, until any of the following occurs:

- The Autowalk mission ends, and there is no looping or scheduled mission pending.
- Spot is stopped by any stopping function described in [Stopping functions](#).
- Spot receives a command to switch to manual mode as described in [Switch to manual mode](#).
- Spot regains its connection to a remote controller as a result of AutoReturn.
- Spot is powered off.



NOTICE

While in automatic mode, Spot's motors may start automatically, remain started, or re-start automatically. For more information, see [Start Spot's motors](#) and [Automatic operation](#).

5.5.2. Switch to manual mode

Spot enters manual mode whenever an Operator takes direct control of Spot via a remote controller. This may be the result of:

- Connecting a remote controller to Spot and issuing a start command as described in [Start Spot's motors](#).
- Pausing an Autowalk mission replay, for instance by selecting **Pause**  on the tablet controller.
- Exiting Autowalk mode, for instance by selecting **EXIT AUTOWALK** on the tablet controller.
- Canceling an upcoming scheduled mission, for instance by selecting **CANCEL MISSION** on the tablet controller.
- A restored connection between Spot and a remote controller as a result of AutoReturn.

Spot will remain in manual mode until it is switched to automatic mode or powered off, or until AutoReturn is triggered.

5.6. A/V warning system settings



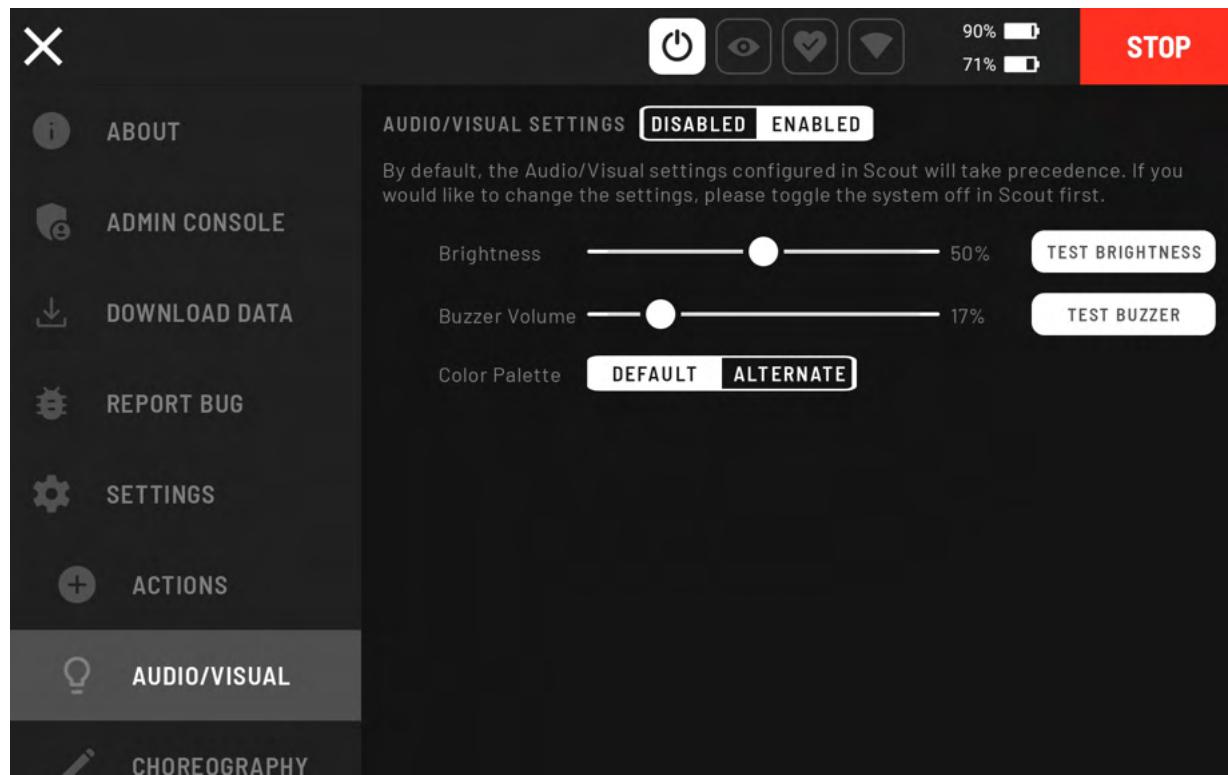
NOTICE

This information applies only to Spot model numbers 04-00143531-401, 04-00143531-601, and 04-00143531-611. To find your model number, check the label inside Spot's battery compartment.

When enabled, the warning system produces preset light and sound patterns to alert nearby people of Spot's presence and operational status. For details, see [Auditory and visual \(A/V\) warning system](#).

To manage A/V warning system settings:

- On the tablet controller, navigate to **Menu ≡ > SETTINGS > AUDIO/VISUAL**.



A/V warning system settings.

Control	Description
AUDIO/VISUAL SETTINGS	Enable or disable the A/V warning system.
Brightness	Set the brightness of the indicators.
Buzzer Volume	<p>Set the volume of the buzzer.</p> <div style="border: 1px solid black; padding: 10px; background-color: #fffacd;"> WARNING  At higher volumes, prolonged exposure to the noise generated by the buzzer may lead to severe damage or loss of hearing. Hearing protection is recommended. </div>
Color Palette	Switch between available color palettes. For details, see Warning system light and sound patterns .

5.7. Dock and undock Spot

During docking, Spot:

1. Orient itself in front of the Spot Dock with its rear facing the dock.
2. Walks backward to position itself over the dock.
3. Aligns its body with dock fixtures.
4. Lowers its body to connect to the charging pins on the rear tower.
5. Lifts its legs and powers off its motors.

During undocking, Spot:

1. Starts its motors, if they are not already started.
2. Slowly unfolds and lowers its legs, then stands up.
3. Walks forward until its rear legs are clear of the Spot Dock.

Spot uses its perception system to recognize the Spot Dock and navigate automatically during docking and undocking.



NOTICE

Before docking or undocking Spot, ensure that the Spot Dock has been installed correctly and is in usable condition. See [Spot Dock setup](#).

The Spot Dock may become damaged during docking and undocking. Periodically check the dock for signs of damage, including the pins that connect Spot to power and Ethernet.



CAUTION

Do not operate Spot with a visibly damaged Spot Dock. For details on what to do with a damaged dock, refer to *Spot Dock Information for Use* in the Boston Dynamics Support Center (see [Appendix A: Supplemental information](#)).

Docking and undocking involve automatic robot locomotion and physical contact between Spot and the Spot Dock.



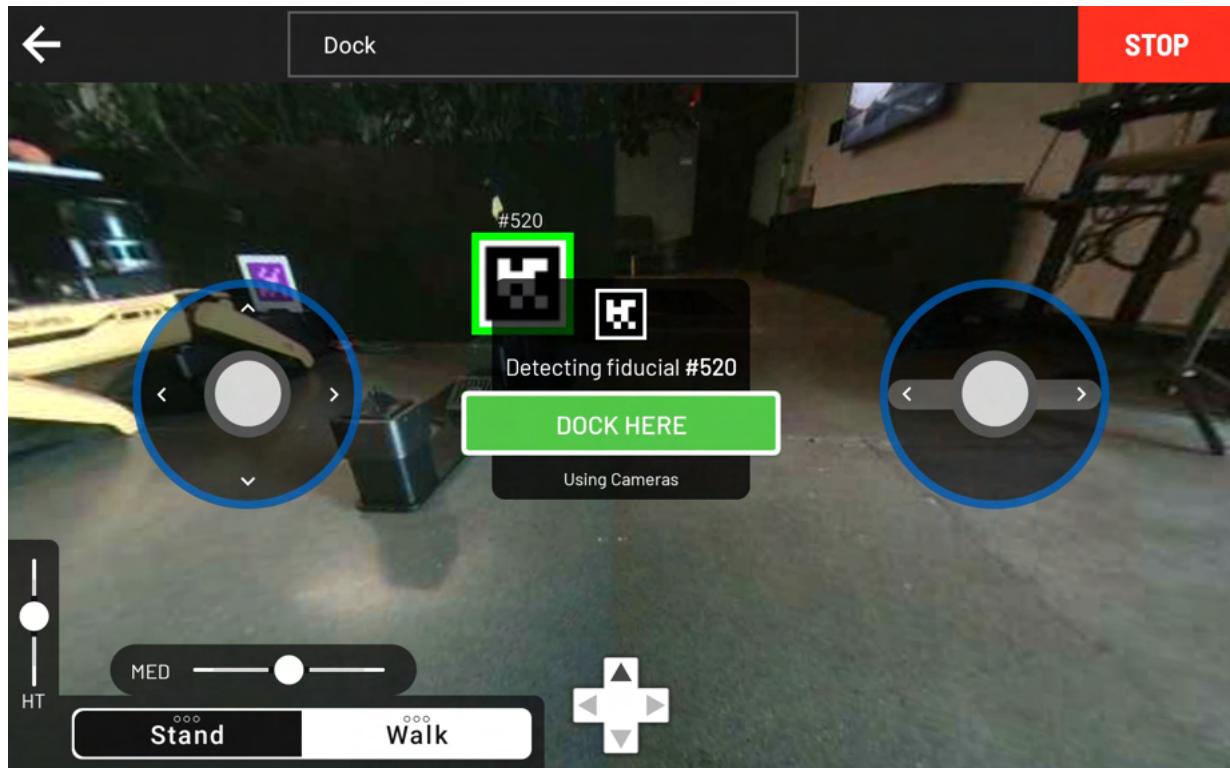
WARNING

- Spot could trip on the Spot Dock and fall.
- The layout of the Spot Dock and its surroundings (e.g. inclines, etc.) could cause Spot to be unstable.
- In case of a fall or lateral displacement, sensitive equipment could be damaged.

Ensure the area around the Spot Dock is clear and remove any sensitive electrical equipment.

Do not try to recover Spot from any instability. Do not approach Spot in any circumstance to attempt any troubleshooting during docking and undocking.

5.7.1. Dock and undock in manual mode



Docking Spot with the tablet.

To dock Spot using the tablet controller:

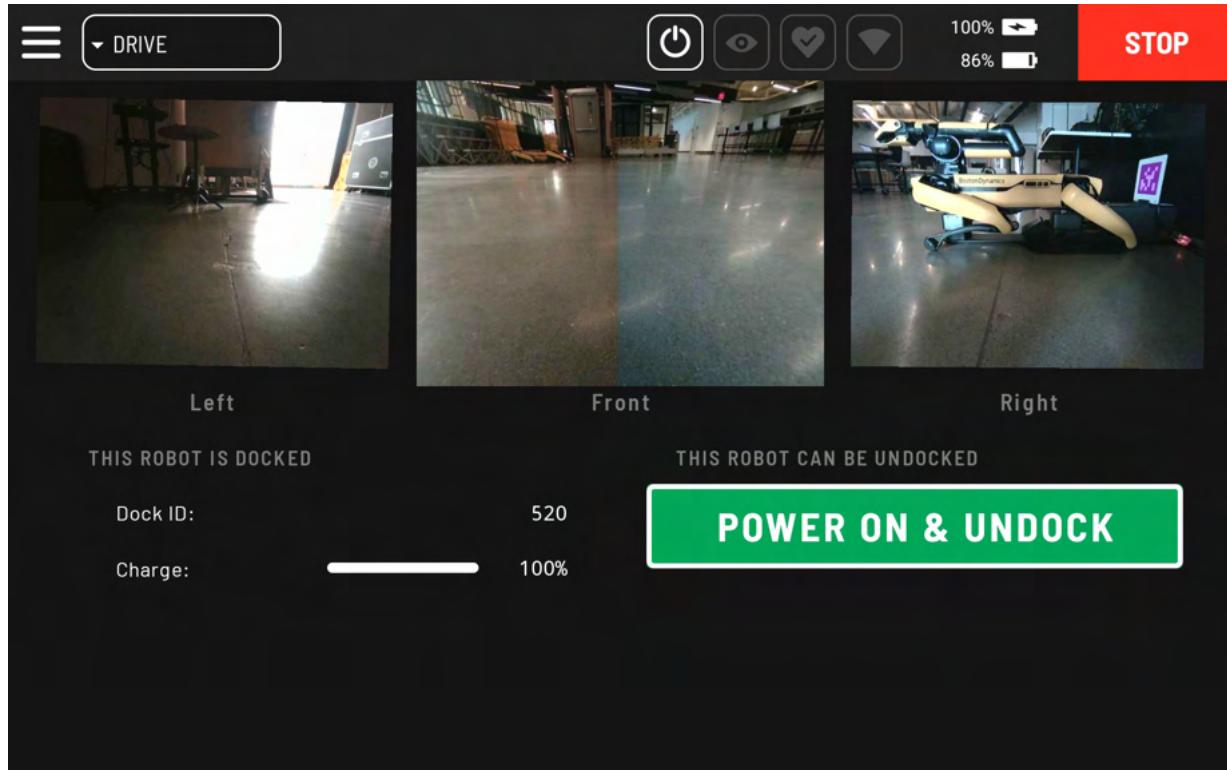
1. Drive Spot toward an unoccupied Spot Dock.



CAUTION

Ensure that you have a clear and complete view of the surroundings of the Spot Dock. If your ability to observe the operation remotely is compromised, abort docking.

2. When Spot is close enough, the dock fiducial will be highlighted in purple on the controller screen. Generally, this happens within 4 meters of the dock.
3. On the controller, select **Add Action** .
4. Select **ACTIONS > Dock**.
5. Select the docking fiducial, which will now be highlighted in green.
6. Select **DOCK HERE**.
7. Spot will automatically dock.



Preparing to undock Spot.

To undock Spot using the tablet controller:

1. Select the Undock button.
 - If Spot's motors are running, the undocking button reads: **UNDOCK**
 - If Spot's motors are off, the undocking button reads: **POWER ON & UNDOCK**
2. Spot will automatically undock.

5.7.2. Dock and undock during Autowalk missions

If an Autowalk mission includes a docking Action, Spot can:

- Start and end the mission from the dock.
- Automatically recharge between looping or scheduled missions.
- Automatically return to the dock to recharge if its battery runs low during a mission.



NOTICE

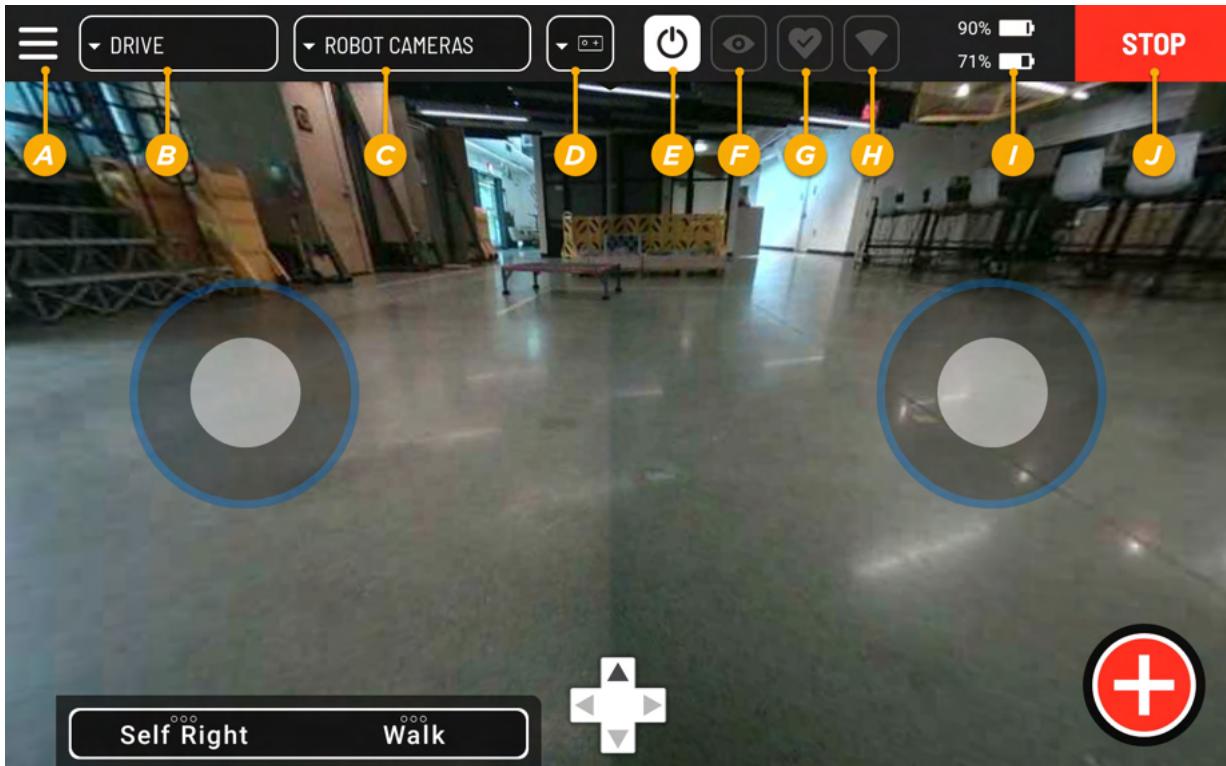
You can set the charge level at which Spot will return to the dock for recharging when configuring the mission replay. For details, see [Configure Autowalk mission replay options](#).

Each mission can include only one docking Action, which is tied to a specific Spot Dock as identified by the docking fiducial. The docking Action must be added at the end of the mission recording. For instructions on recording a mission, see [Record an Autowalk mission](#).

5.8. Drive Spot with remote control

When driving with remote control, you are in direct control of Spot's movements and behaviors.

5.8.1. Tablet controls (Menu bar)

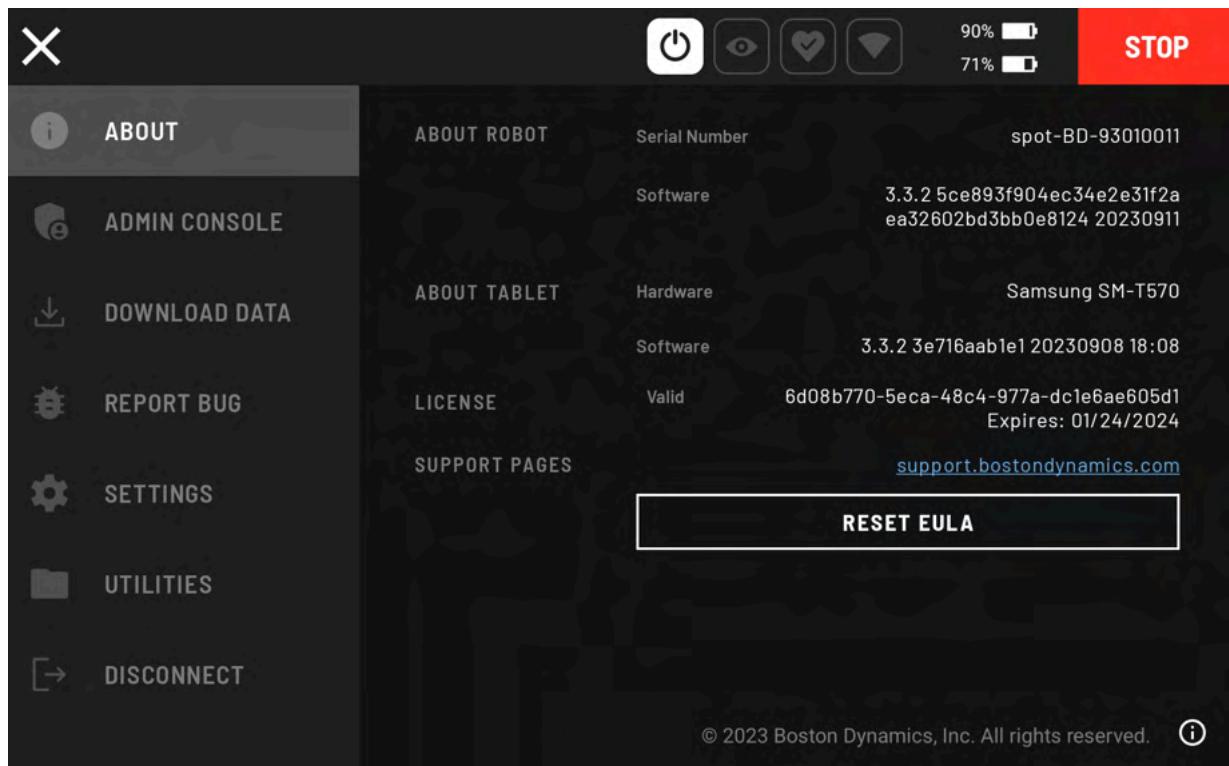


The Spot App's menu bar.

Label	Control	Description
A	Main Menu	Access app-wide settings and features.
B	Modes dropdown	Switch between Drive mode, Autowalk mode, and other modes when available.
C	Cameras dropdown	Select from available camera views.
D	Controls dropdown	Select the gamepad to drive with joysticks. Select the hand to drive with Touch-to-Go.
E	Motor status panel	Access motor power controls.
F	Perception status panel	Access obstacle avoidance and navigation controls.
G	Platform status panel	Access step height and ground friction controls.
H	Comms status panel	See information about Spot's current network configuration and performance.

Label	Control	Description
I	Battery status panel	See information about Spot and tablet controller battery levels, and trigger Spot's Roll Over behavior.
J	STOP	Suspend all robot motion. See Stop Spot .

5.8.1.1. Main Menu



The main menu of the Spot App.

Menu item	Description	
ABOUT	View Spot's serial number, current robot and tablet software, and Spot license.	
ADMIN CONSOLE	Access Spot's Admin Console without leaving the Spot App.	
DOWNLOAD DATA	Transfer images and other data generated by Actions during Manual or Automatic operation from Spot to the tablet.	
REPORT BUG	Create log entries that can be uploaded to Boston Dynamics Support to help diagnose issues with Spot.	
SETTINGS	ACTIONS	Configure the default Actions and Inspections to show in the Actions menu, and create custom Inspections. See also: Add an Action during Autowalk recording .

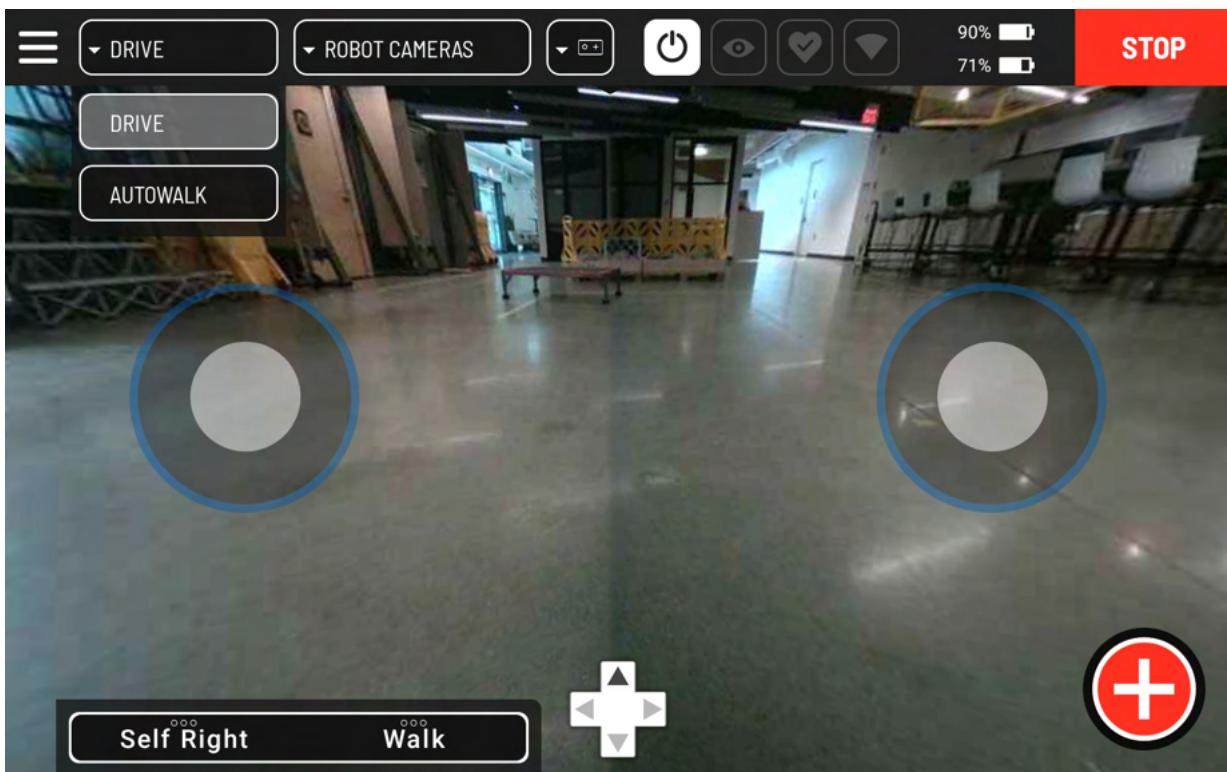
Menu item	Description
COMMS	<p>Configure how Spot will react to a loss of signal between itself and the controller.</p> <p>For details, see Autowalk replay supervision and Enable AutoReturn to recover from loss of connection to the controller.</p>
	TABLET Change the language and temperature units of the Spot App.
UTILITIES	ATTACH PAYLOADS Turn on or off the flow of power to Spot's payload ports, and set previously configured attachments as attached or detached from Spot.
	ODOMETER View cumulative operating statistics such as steps taken and distance traveled.
	SPOTCHECK Run self-diagnostic routines on Spot's joints and cameras. For details, see SpotCheck (joint and camera calibration) .
	SPOTMETRICS Review, upload, and configure options for the basic performance data Spot generates to help Boston Dynamics improve our products.
DISCONNECT	Select SIGN OUT to disconnect from Spot. If motor power is off, options to power off or reboot Spot will also be available.



NOTICE

Other options may be available depending on your Spot license and the presence of additional attachments or software.

5.8.1.2. Modes dropdown



The Modes dropdown.

To change modes:

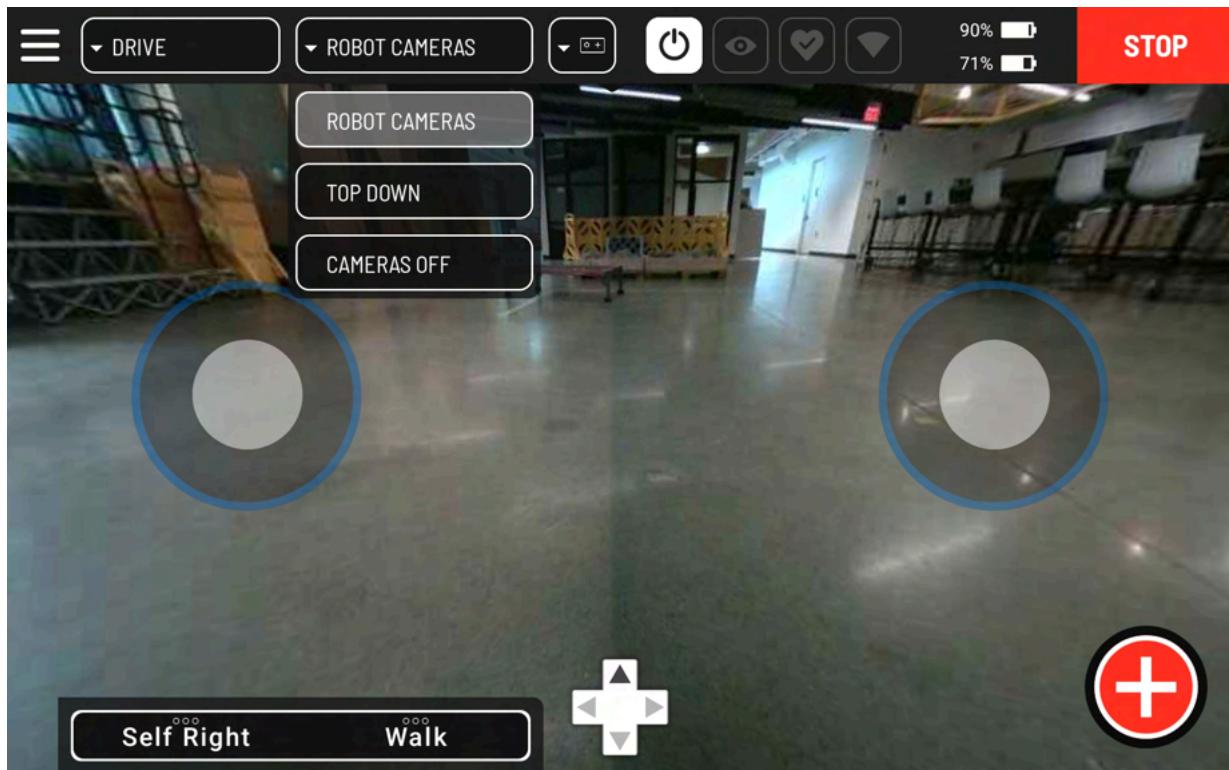
- Select **DRIVE** to operate Spot in Manual mode.
- Select **AUTOWALK** to record or replay Autowalk missions.



NOTICE

Other options may be available depending on your Spot license and the presence of additional attachments or software.

5.8.1.3. Cameras dropdown



The Cameras dropdown

To change camera views:

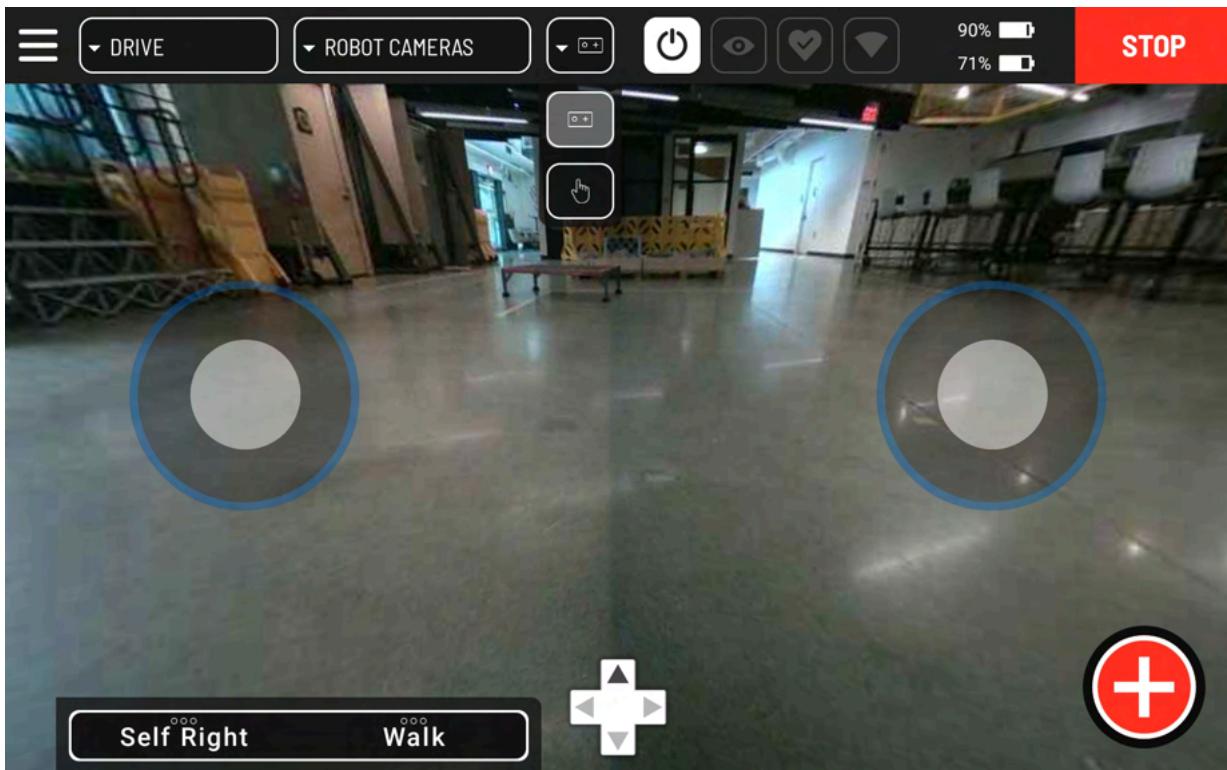
- Select **ROBOT CAMERAS** to see the live feed from any of Spot's body cameras.
- Select **TOP DOWN** to see a simulation of Spot's environment from above, using images and depth data from the body cameras.
- Select **CAMERAS OFF** to disable the viewscreen.



NOTICE

Other options may be available depending on the presence of additional attachments or software.

5.8.1.4. Controls dropdown



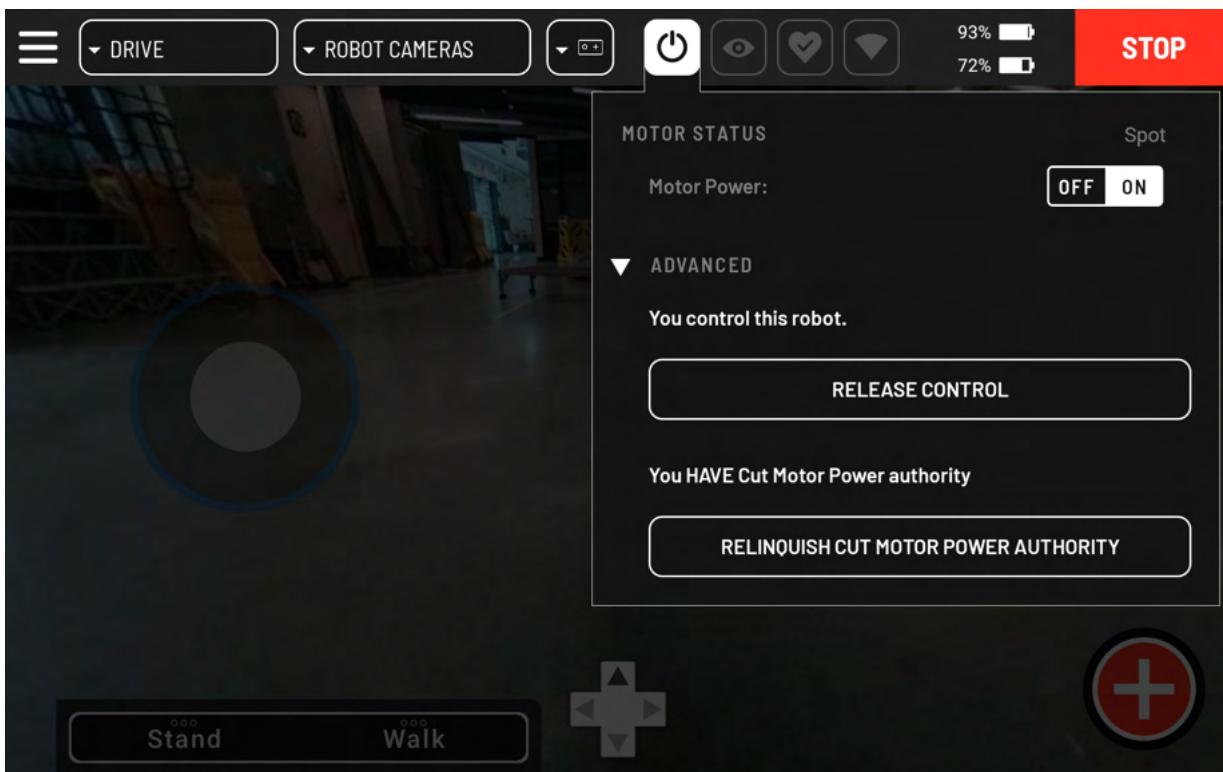
The Controls dropdown.

To switch between control schemes:

- Select the gamepad to drive with joysticks.
- Select the hand to drive with Touch-to-Go.

For a full list of drive controls, see [Tablet controls \(Drive mode\)](#) and [Tablet controls \(Autowalk mode\)](#).

5.8.1.5. Motor status panel

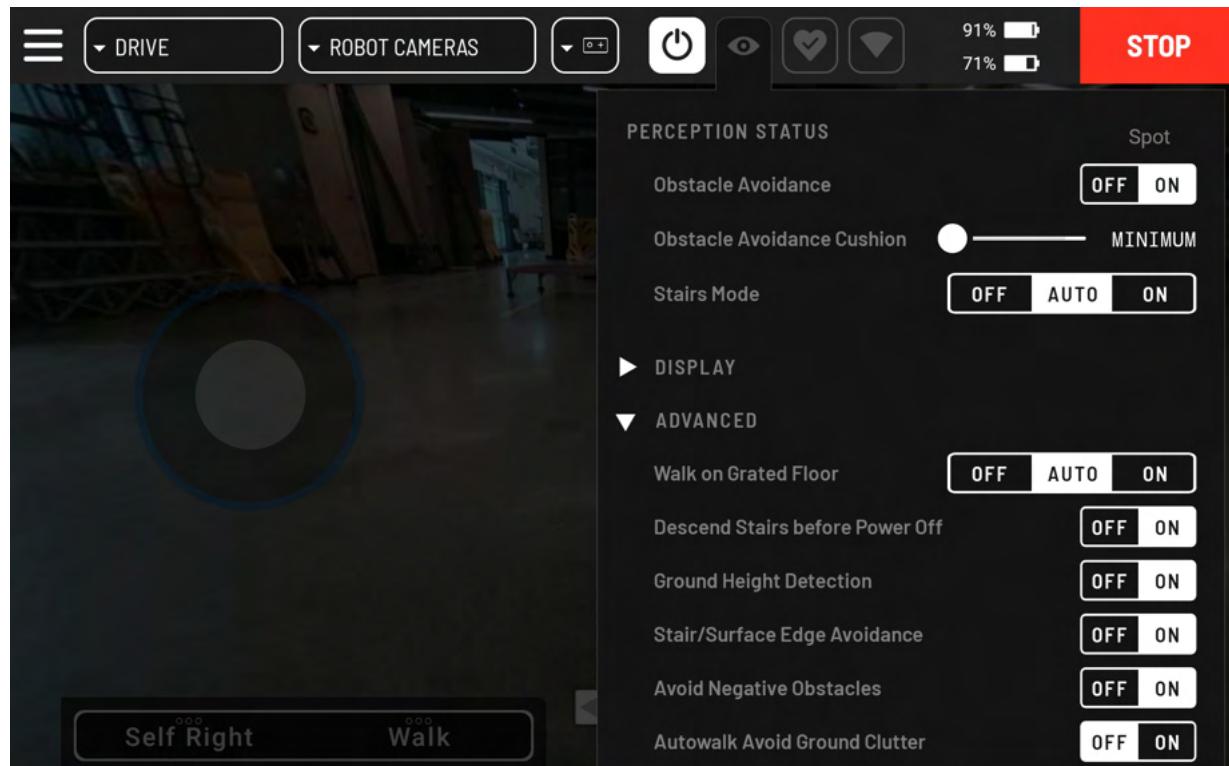


The Motor status panel.

Control	Description
Motor Power	Turn Spot's motors on and off.
Take or Release Control	<p>Control is required to issue drive commands to Spot.</p> <p>See also: Connect the tablet controller to Spot.</p> <div style="border: 1px solid black; padding: 10px; background-color: #ffffcc;"> <p> CAUTION</p> <p>Taking control of Spot during operation does not require the permission of other Operators and may cause unexpected hazards. Always carefully assess the situation and communicate with other Operators before taking control of Spot.</p> </div>

Control	Description
Acquire or Relinquish Cut Motor Power Authority	<p>Cut motor power authority is required to issue STOP and CUT POWER commands to Spot. Cut motor power authority is not required to issue drive commands to Spot.</p> <p>See also: Connect the tablet controller to Spot and Manual stop using the tablet controller.</p> <div style="border: 1px solid black; padding: 10px; margin-top: 10px;"> <p> WARNING</p> <p>Without cut motor power authority it may not be possible to stop Spot quickly. If another controller cuts power while you are operating Spot it may result in unexpected hazards. Do not operate Spot from a controller that does not have cut motor power authority.</p> </div> <div style="border: 1px solid black; padding: 10px; margin-top: 10px;"> <p> NOTICE</p> <p>Cut motor power authority can only be acquired, relinquished, or transferred when motors are off.</p> </div>

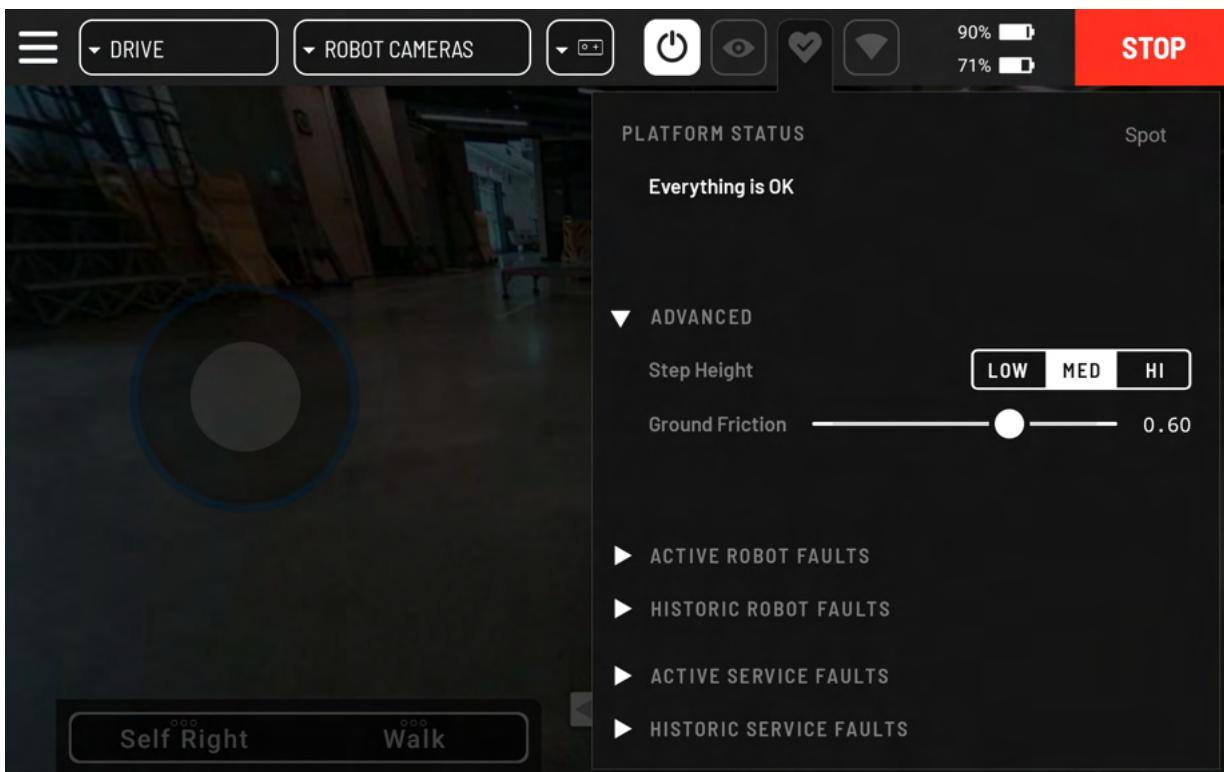
5.8.1.6. Perception status panel



The Perception status panel.

Control	Description
Obstacle Avoidance	<p>Turn Spot's obstacle avoidance system on and off.</p> <p>See also: Obstacle avoidance.</p> <div style="border: 1px solid black; padding: 10px; margin-top: 10px;">  CAUTION <p>Turning off obstacle avoidance will increase the likelihood of collisions with people and objects in the environment.</p> </div>
Obstacle Avoidance Cushion	<p>Slide to adjust how much distance Spot will try to keep between itself and obstacles.</p> <p>See also: Obstacle avoidance.</p>
Stairs Mode	<p>By default, Spot automatically detects stairs and adjusts its gait. Turning this on or off will force or prevent this behavior.</p> <p>See also: Navigate stairs</p>
Walk on Grated Floor	<p>By default, Spot automatically detects grated floors and adjusts its perception system to more accurately model the ground surface. Turning this on or off will force or prevent this behavior.</p>
Descend Stairs Before Power Off	<p>Spot will automatically exit stairs in cases where it would otherwise attempt to sit, such as in the event of a communications loss, critically low battery power, or receiving a command to turn off motor power.</p> <p>The direction of travel will generally be to descend the stairs, unless Spot has already reached the top landing.</p> <p>See also: Navigate stairs</p>
Ground Height Detection	<p>Helps Spot navigate over obstacles approximately 30 cm or less in height.</p>
Stair/Surface Edge Avoidance	<p>Prevents Spot from navigating too close to edges.</p>
Avoid Negative Obstacles	<p>Prevents Spot from stepping into pits, trenches, potholes, or other similar terrain.</p>
Autowalk Avoid Ground Clutter	<p>When replaying an Autowalk mission, makes Spot less willing to step on or over objects on the ground that were not present during recording.</p>

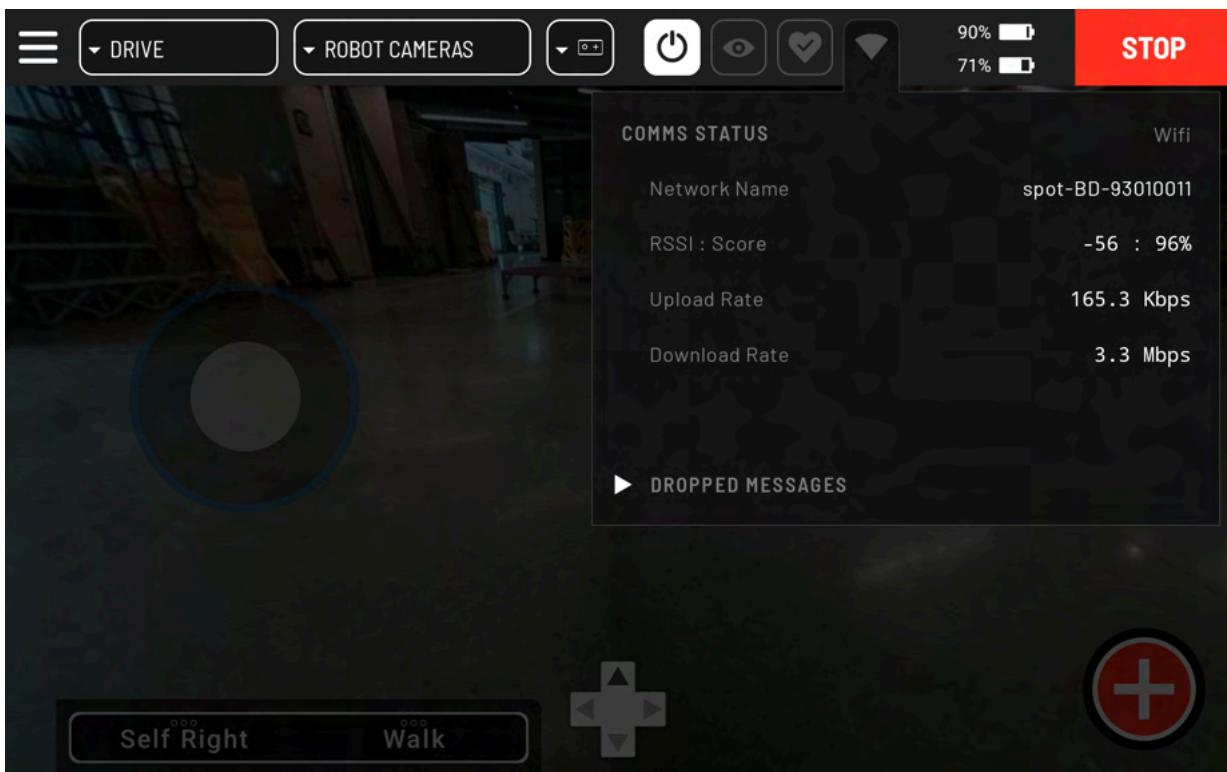
5.8.1.7. Platform status panel



The Platform status panel.

Control	Description
Step Height	Control the height of Spot's step.
Ground Friction	Slide to adjust Spot's step height and speed to compensate for different surface types. Lower settings result in slower, smaller steps which may improve stability on slipperier surfaces.

5.8.1.8. Comms status panel



The Comms status panel.

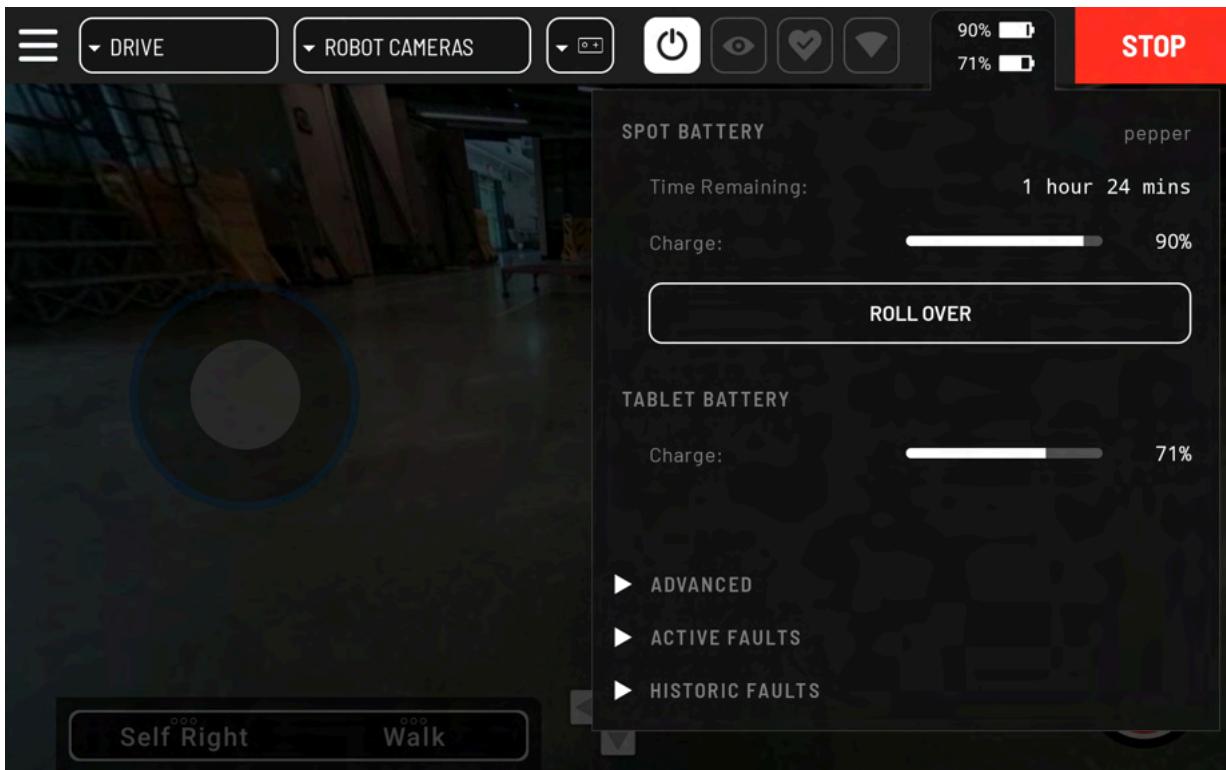
The Comms status panel provides information about the network connection between the tablet controller and Spot.



NOTICE

The Comms status panel icon will flash yellow to indicate a poor connection between the tablet and Spot.

5.8.1.9. Battery status panel



The Battery status panel.

The Battery status panel provides information about the state and performance of the Spot Battery.

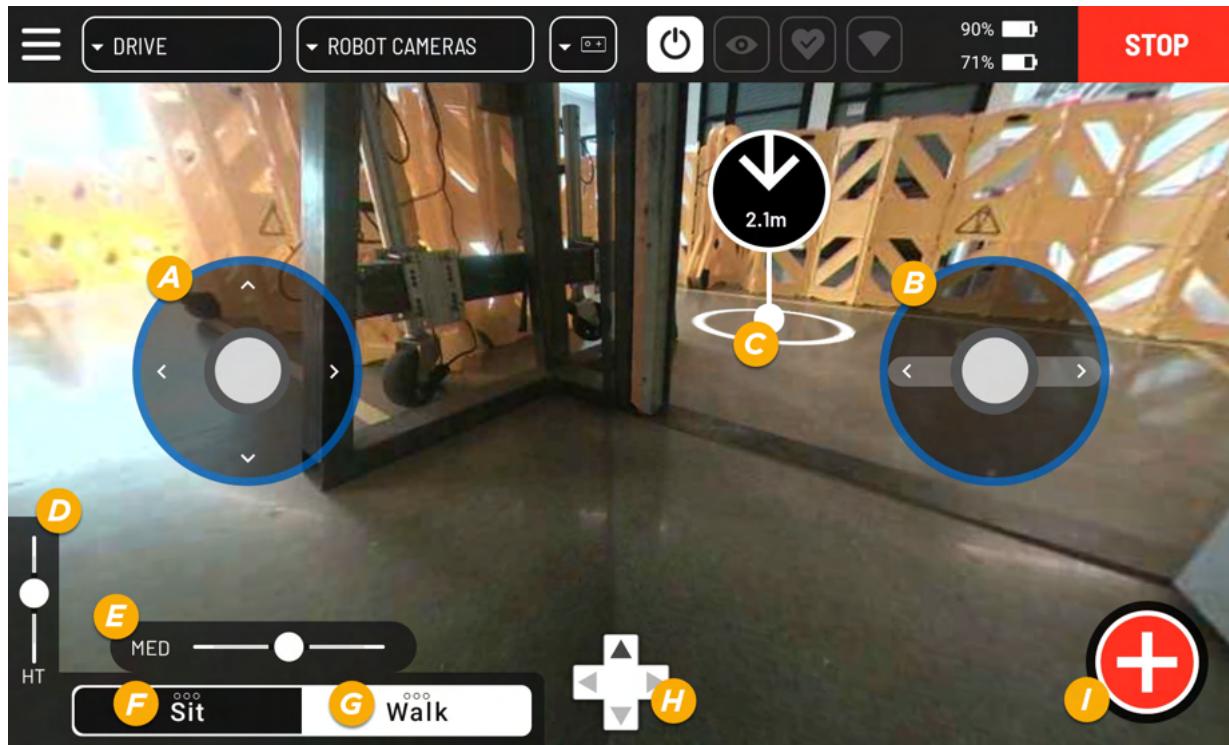
5.8.1.9.1. Roll Over

The semi-automatic Roll Over behavior makes it easier to access the battery without needing to manually lift or roll Spot.

To command Spot to roll over, exposing the battery:

1. On the tablet controller, open the Battery status panel.
2. Select **ROLL OVER**.
3. Confirm there is at least 1 meter of clear space around Spot, then select **ROLL OVER**. Spot will sit, roll onto its right side, then power off motors.

5.8.2. Tablet controls (Drive mode)

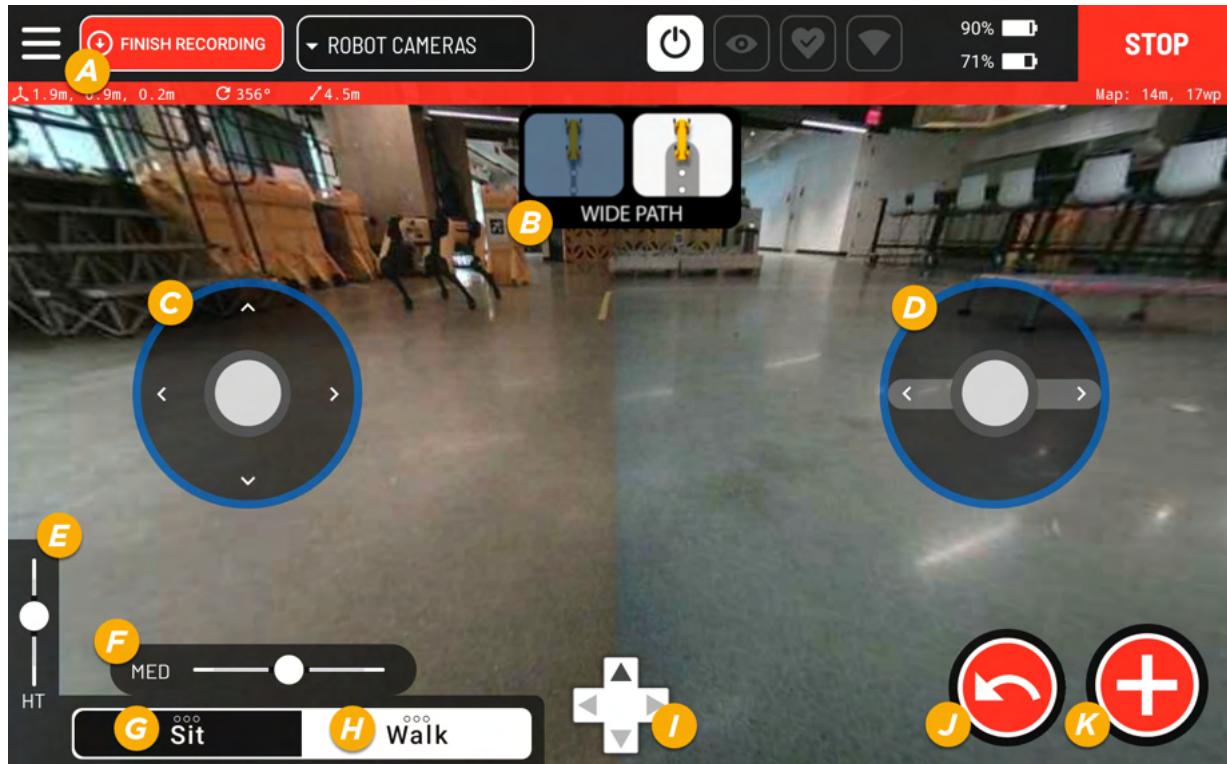


Tablet Drive mode controls.

Label	Control	Description
A	Left joystick	Move Spot forward, backward, left, and right.
B	Right joystick	Rotate Spot clockwise or counterclockwise.
C	Touch-to-Go	Spot will walk to the location you select. Select  to cancel.
D	Height slider	Adjust Spot's walking height.
E	Speed slider	Switch between three maximum speed settings (SLOW , MED , FAST).
F	Pose selector	<p>Long-press, then select an option:</p> <ul style="list-style-type: none"> Sit: Spot lowers its body to the ground. Stand: Spot stands in place. Joysticks control height, roll, pitch, and yaw. Self Right: Spot attempts to reach a sitting position with its body flat on the ground, moving its legs and body as needed to flip or reorient itself.
G	Gait selector	<ul style="list-style-type: none"> Long-press on the right, then select Walk (regular speed) or Crawl (slow speed) to enable movement controls.

Label	Control	Description
H	Directional arrows	Switch camera views.
I	Add Action 	Perform programmable behaviors like capturing an image or docking with a Spot Dock.

5.8.3. Tablet controls (Autowalk mode)



Tablet Autowalk mode controls.

Label	Control	Description
A	Finish recording	End recording and save the mission.
B	Path following tolerance	Determine how closely Spot should adhere to the recorded mission route on replay. This setting is recorded separately for each path segment. <ul style="list-style-type: none"> WIDE PATH (default): Spot may deviate up to 1.5 meters from the recorded mission route to avoid obstacles. STRICT PATH: Spot will adhere closely to the recorded mission route, keeping the center of its body within a 25 cm corridor along the recorded path.
C	Left joystick	Move Spot forward, backward, left, and right.

Label	Control	Description
D	Right joystick	Rotate Spot clockwise or counterclockwise.
E	Height slider	Adjust Spot's walking height.
F	Speed slider	Switch between three maximum speed settings (SLOW , MED , FAST).
G	Pose selector	Long-press, then select an option: <ul style="list-style-type: none"> Sit: Spot lowers its body to the ground. Stand: Spot stands in place. Joysticks control height, roll, pitch, and yaw. Self Right: Spot attempts to reach a sitting position with its body flat on the ground, moving its legs and body as needed to flip or reorient itself.
H	Gait selector	<ul style="list-style-type: none"> Long-press on the right, then select Walk (regular speed) or Crawl (slow speed) to enable movement controls.
I	Directional arrows	Switch camera views.
J	↶ Undo	Select-and-hold to undo recent activity. For details, see Undo during Autowalk recording .
K	Add Action 	Perform programmable behaviors like capturing an image or docking with a Spot Dock.

5.8.4. Record an Autowalk mission

Autowalk missions must be recorded manually using the tablet. During recording, Spot creates a map of the route you drive and any Actions you perform along the way.



NOTICE

Many incidental operations during recording, such as standing idle or switching camera views, are not included in the mission map and will not be repeated by Spot during replay.

To start a mission recording, at least one fiducial marker must be placed in the operating environment.

To record an Autowalk mission:

1. On the tablet, open the Modes dropdown and select **AUTOWALK**.
2. Select **RECORD**.
3. Select **START RECORDING**.

4. Drive Spot and perform Actions.
5. Select **FINISH RECORDING**, then select **YES**. The mission is stored on the tablet.

**NOTICE**

To allow Spot to start and end the mission at a Spot Dock, end the recording with a docking action as described in [Dock and undock in manual mode](#).

5.8.4.1. Add an Action during Autowalk recording

To add an Action to an Autowalk mission:

1. While recording an Autowalk mission, navigate Spot to the location where the Action will be performed.

**NOTICE**

During mission replay, Spot's position and orientation may differ slightly from the way the Action was recorded.

2. On the controller, select **Add Action** .
3. Select an option from the **INSPECTIONS** tab or the **ACTIONS** tab.
4. Follow any prompts to create the Action. When complete, the Action is added to the mission.

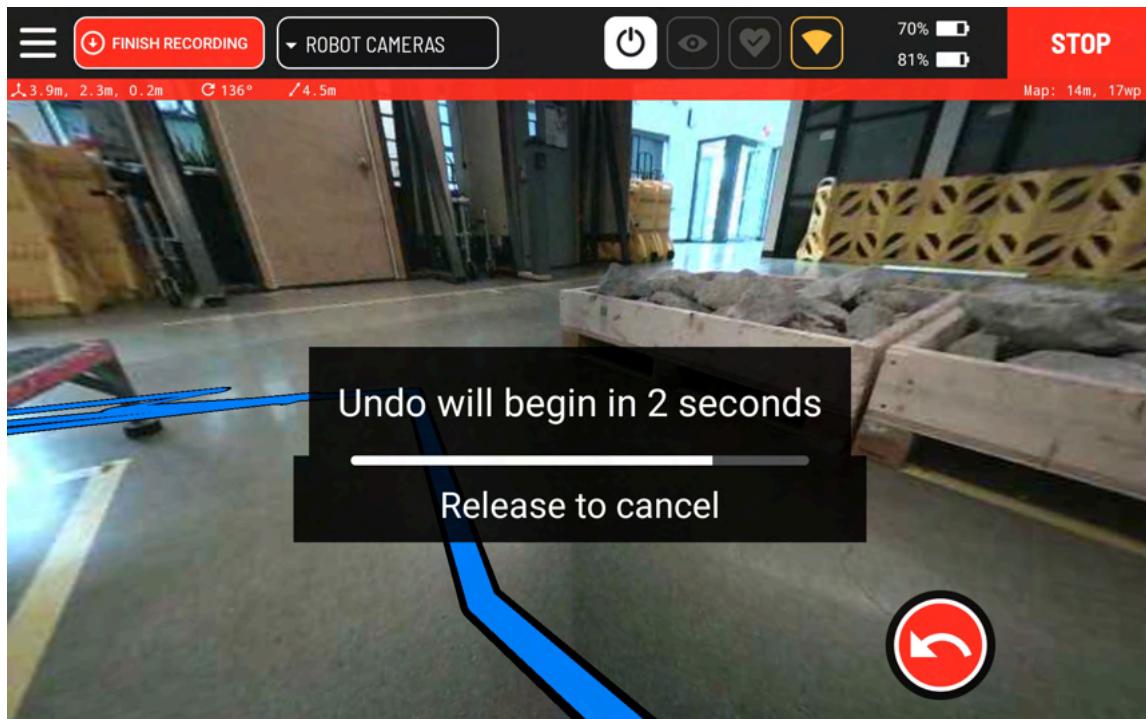
**CAUTION**

Actions may cause Spot or its attachments to move in ways that a bystander might not predict from observing normal locomotion, and that could cause collisions with objects in the environment. Ensure the location where the Action is recorded will have sufficient clearances when the mission is replayed.

5.8.4.2. Undo during Autowalk recording

To undo part of an Autowalk recording:

1. While recording or extending an Autowalk mission, tap-and-hold  **Undo**. A 2-second timer will appear before undo begins.



2. Continue to hold ↻ Undo while Spot backtracks along the mission route. At any location where an Action was recorded, another 2-second timer will appear before the Action is deleted.
3. Release ↻ Undo to finalize the process. Spot will position itself at the closest waypoint in the mission map. All path segments that were added to the current recording past that point will be deleted.

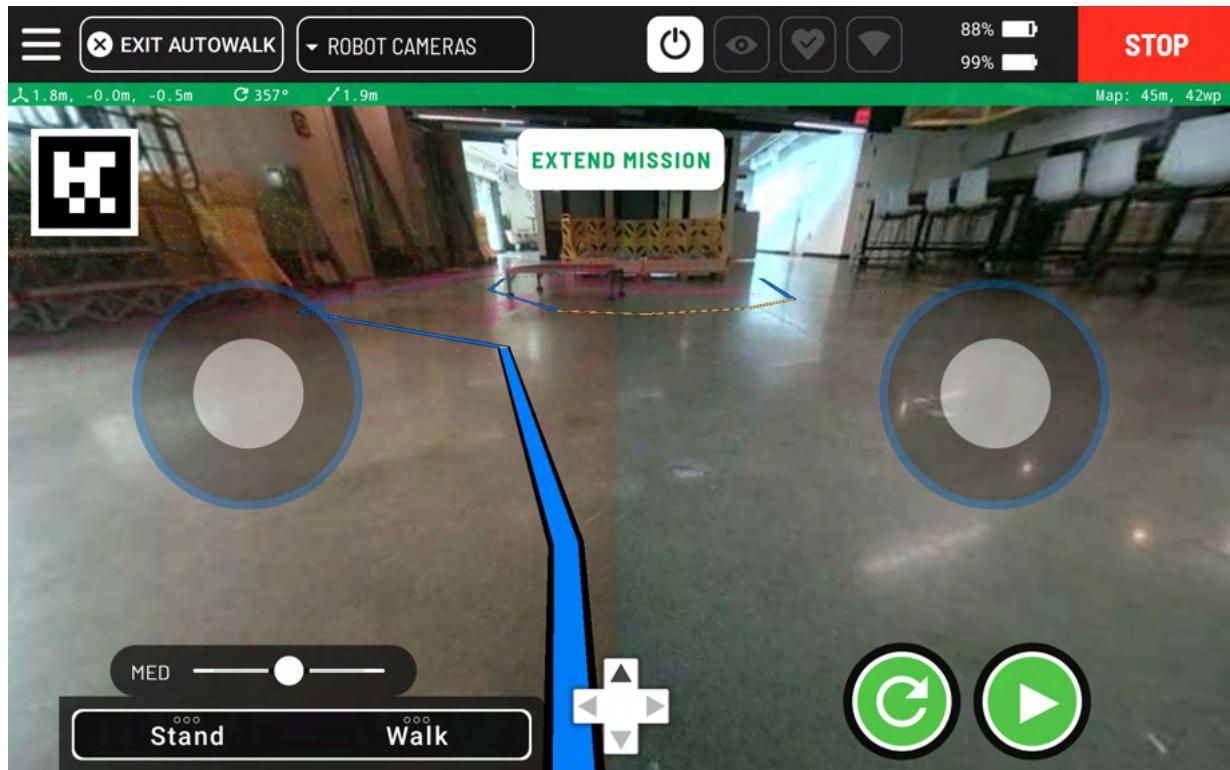


NOTICE

Undo is not reversible.

Undo can only affect path segments and Actions that were added during the current recording session.

5.8.5. Extend an Autowalk mission



Pausing an Autowalk replay reveals the option to extend the mission.

Extending an Autowalk mission adds new path segments and Actions to a previously recorded mission map. Use this to create complex missions with branching paths and loops.

To extend a previously recorded Autowalk mission:

1. Replay the mission as described in [Replay an Autowalk mission](#).
2. Select **Pause** (II) at the point where you want to extend the mission route.
3. Select **EXTEND MISSION**.
4. When prompted, select **EXTEND MISSION**.
5. Drive Spot and perform Actions.
6. Select **FINISH RECORDING**, then select **YES**. The extension is added to the mission and the replay ends.

5.8.5.1. Add an Action to a previously recorded Autowalk mission

Actions can be added to Autowalk missions along paths you have previously recorded.

To add an Action to a previously recorded Autowalk mission:

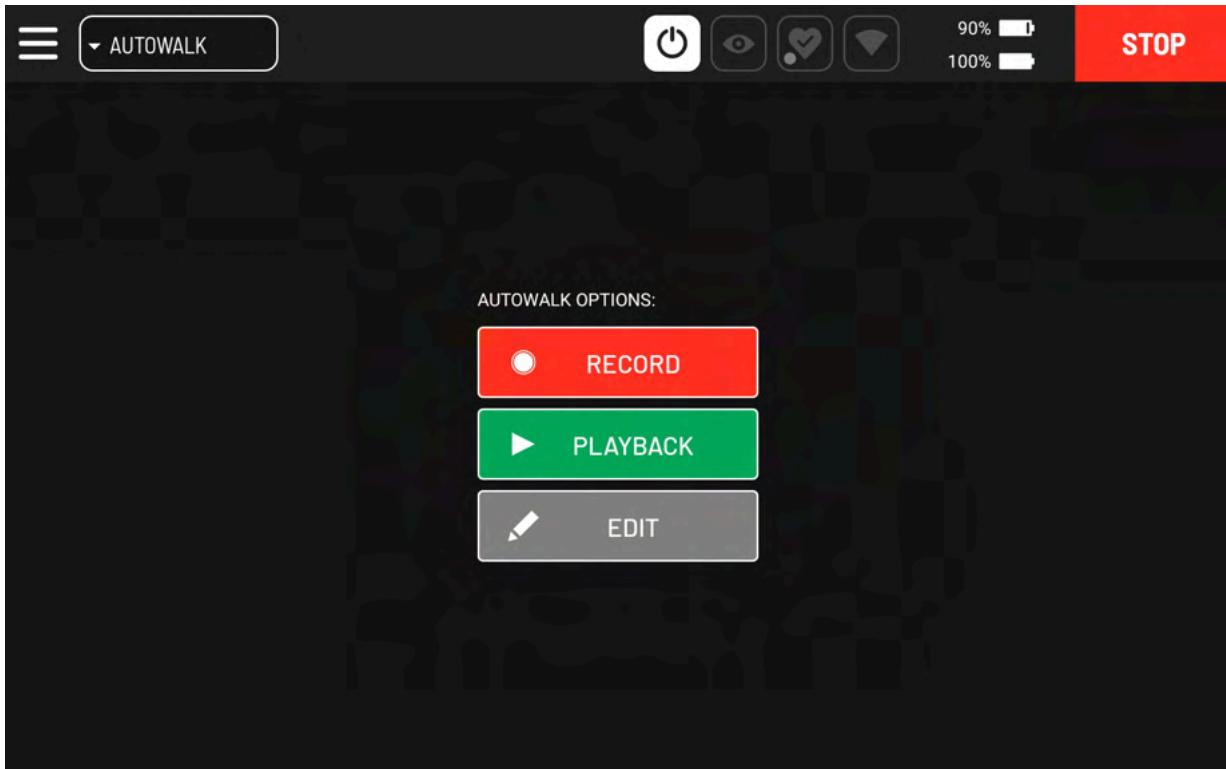
1. Replay the mission as described in [Replay an Autowalk mission](#).
2. Select **Pause** (II) at the point where you want to add an Action.
3. Select **EXTEND MISSION**.
4. When prompted, select **ADD ACTION**.
5. Follow any prompts to create the Action. When complete, the Action is added to the mission.

6. To resume the mission replay, select **Play** . To end the replay, select **EXIT AUTOWALK**.

5.9. Automatic operation

During automatic operation, Spot follows the route set by a pre-recorded Autowalk mission, performs Actions, and attempts to resolve navigation challenges according to mission replay settings.

5.9.1. Replay an Autowalk mission

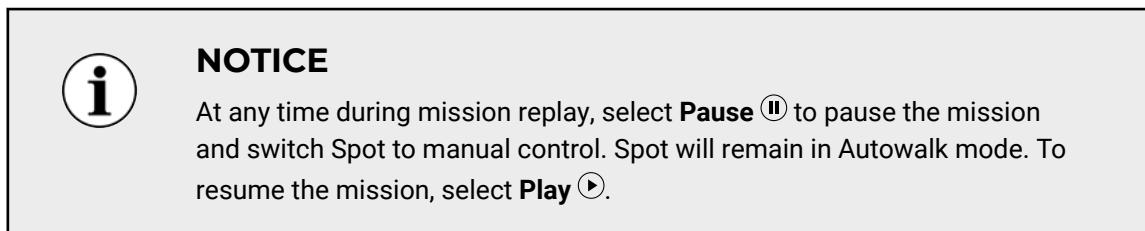


The Autowalk main screen.

To replay an Autowalk mission from the tablet:

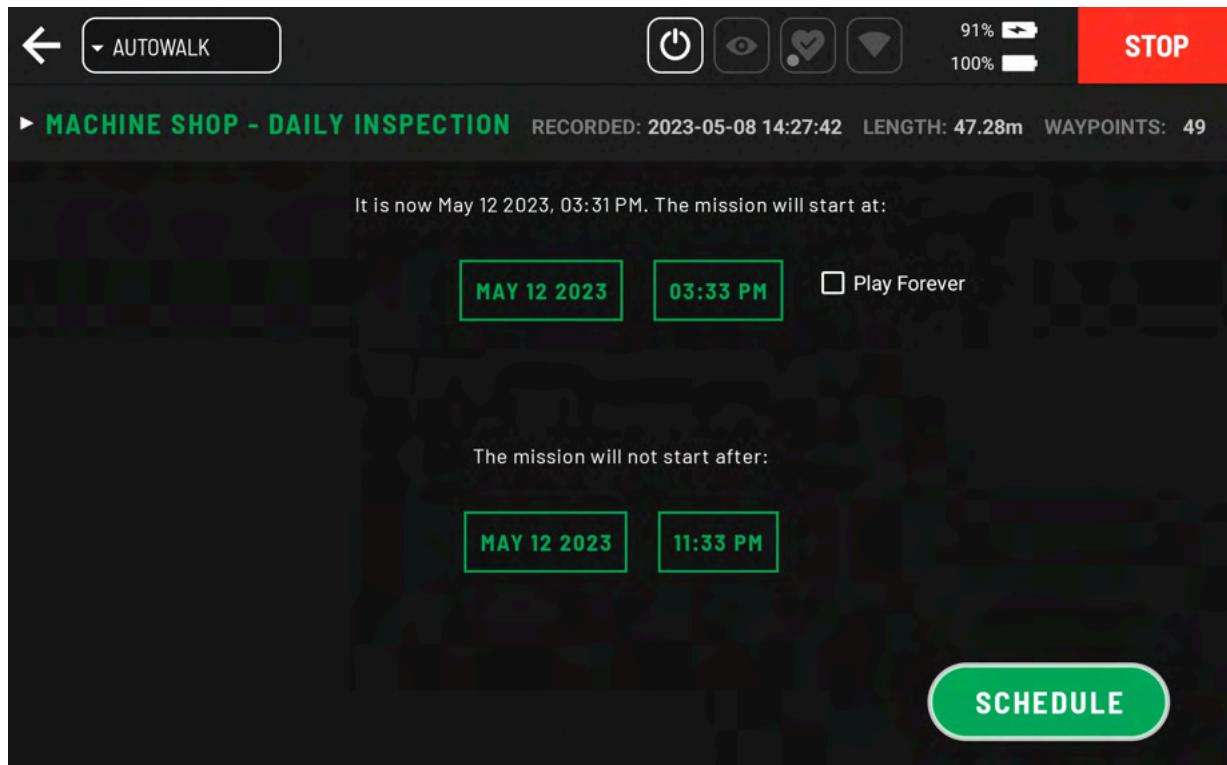
1. If the mission begins or ends at a Spot Dock, ensure Spot is on the dock. Otherwise, ensure Spot is within sight of at least one fiducial that was recognized during mission recording.
2. Open the Modes dropdown and select **AUTOWALK**.
3. Select **PLAYBACK**.
4. Select a mission to replay, then select **CONTINUE**.
5. Confirm Action and route parameters, then select **CONTINUE**. For details on these settings, see [Configure Autowalk mission replay options](#).
6. Confirm mission replay options:
 - a. For details on these settings, see [Configure Autowalk mission replay options](#).
 - b. Check the Supervision setting. For details, see [Autowalk replay supervision](#).
 - c. When finished, select **PLAY NOW**.
7. If prompted, select **INITIALIZE**.

8. Select **Play** . Spot carries out the mission.



5.9.2. Schedule Autowalk mission replays

Autowalk missions can be scheduled in advance and set to run on a recurring basis. To be eligible for scheduling, the mission must end with a docking Action.



Scheduling an Autowalk mission.

To schedule a mission replay using the tablet controller:

1. Ensure Spot is on the same Spot Dock where the mission recording ends.
2. Follow steps 2 through 6 as described in [Replay an Autowalk mission](#). At the end of step 6, select **PLAY LATER**.
3. Enter the date and time when the mission will begin. If the mission is configured to loop, enter an end time or select **Play forever**.
4. Select **SCHEDULE**.
5. A countdown to the next scheduled mission start appears. At the scheduled time, Spot carries out the mission.

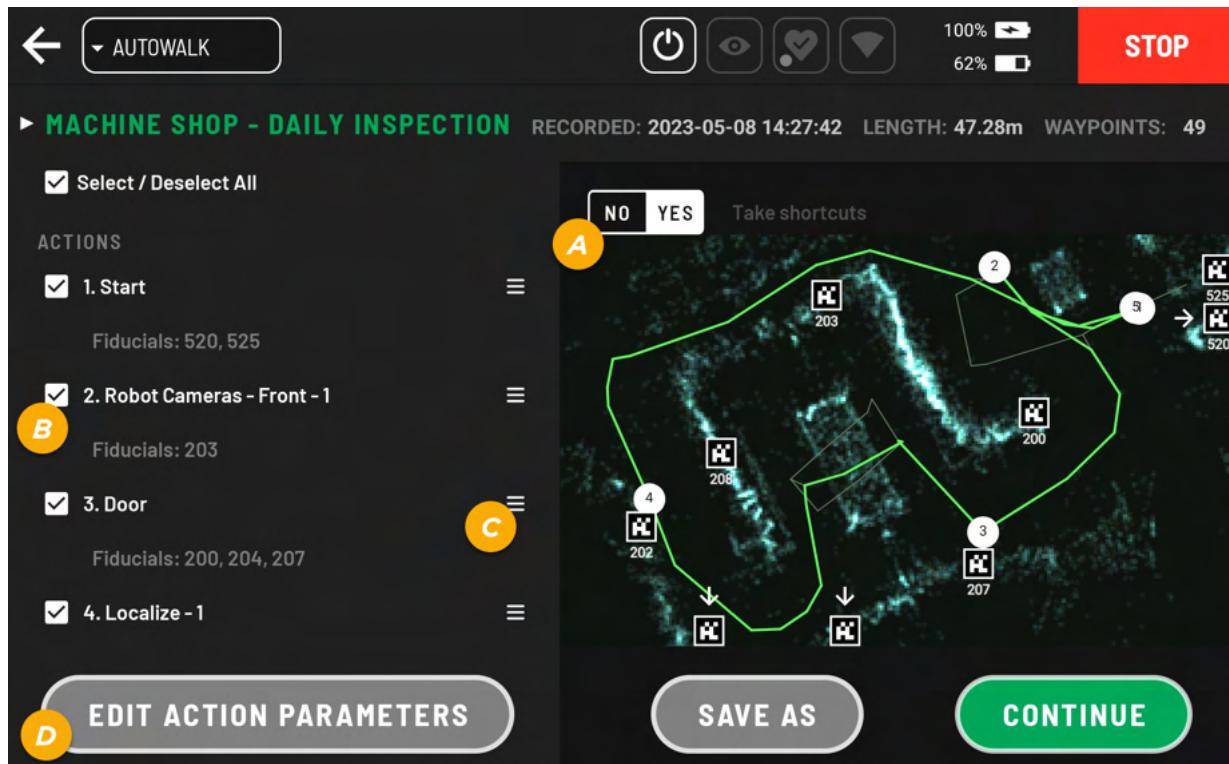
To cancel a scheduled mission:

1. Select **CANCEL MISSION**.
2. Select **YES** to exit Autowalk mode.

5.9.3. Configure Autowalk mission replay options

Mission replay options modify Spot's behavior as it carries out an Autowalk mission. Options are configured on the tablet at the time playback is initiated.

5.9.3.1. Mission route settings

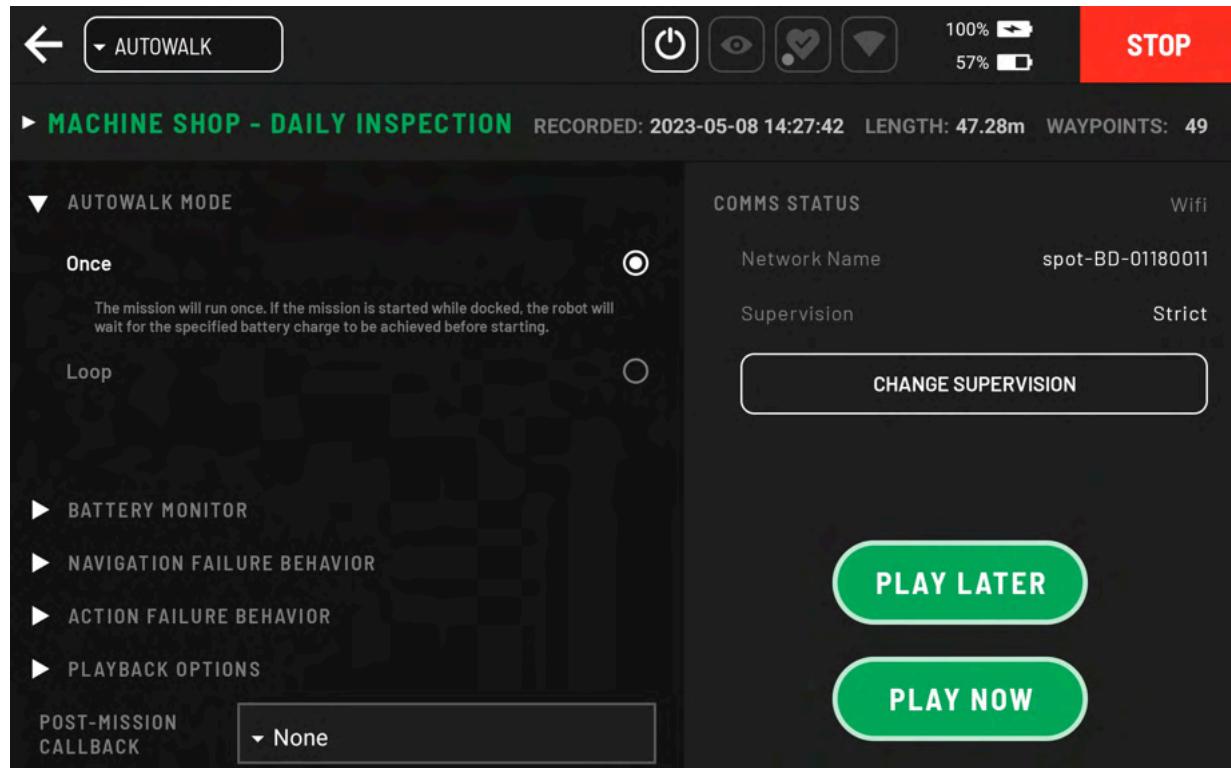


Autowalk mission route preview.

Label	Control	Description
A	Take shortcuts	To use the most efficient mission route that includes all enabled Actions, set Take shortcuts to YES . Otherwise, Spot will follow the mission route as recorded.
B	Enable/Disable Actions	To enable or disable an Action, toggle its checkbox. Disabled Actions will be skipped during replay.
C	Re-order Actions	Drag-and-drop to change the order in which Actions will be performed. This may cause Spot to backtrack along the mission route.

Label	Control	Description
D	Edit Actions	If an Action includes parameters that can be edited after recording, select EDIT ACTION PARAMETERS to modify those settings.

5.9.3.2. Mission replay options



Autowalk mission replay options.

AUTOWALK MODE

Option	Description
Once	The mission will run once.
Loop	The mission will run repeatedly at the specified time interval.

BATTERY MONITOR

Option	Description
Minimum charge for undocking	Spot will wait for the specified battery charge to be achieved before starting the mission.
Charge to return to dock	During a mission, if the battery charge is running low, Spot can return to the dock automatically to recharge before finishing the mission.

NAVIGATION FAILURE BEHAVIOR

Option	Description
Prompt Timeout	If no operator responds to the prompt within the allotted time, the mission will continue automatically. See also: Mission prompts and Operator intervention
Automatic Retries	When a prompt times out, Spot will attempt navigation again until it either succeeds or reaches the specified retry limit.
Navigation failure behavior	When there are no more retries, Spot will perform the specified operation.

ACTION FAILURE BEHAVIOR

Option	Description
Prompt Timeout	If no operator responds to the prompt within the allotted time, the mission will continue automatically. See also: Mission prompts and Operator intervention
Automatic Retries	When a prompt times out, Spot will attempt navigation again until it either succeeds or reaches the specified retry limit.
Navigation failure behavior	When there are no more retries, Spot will perform the specified operation.

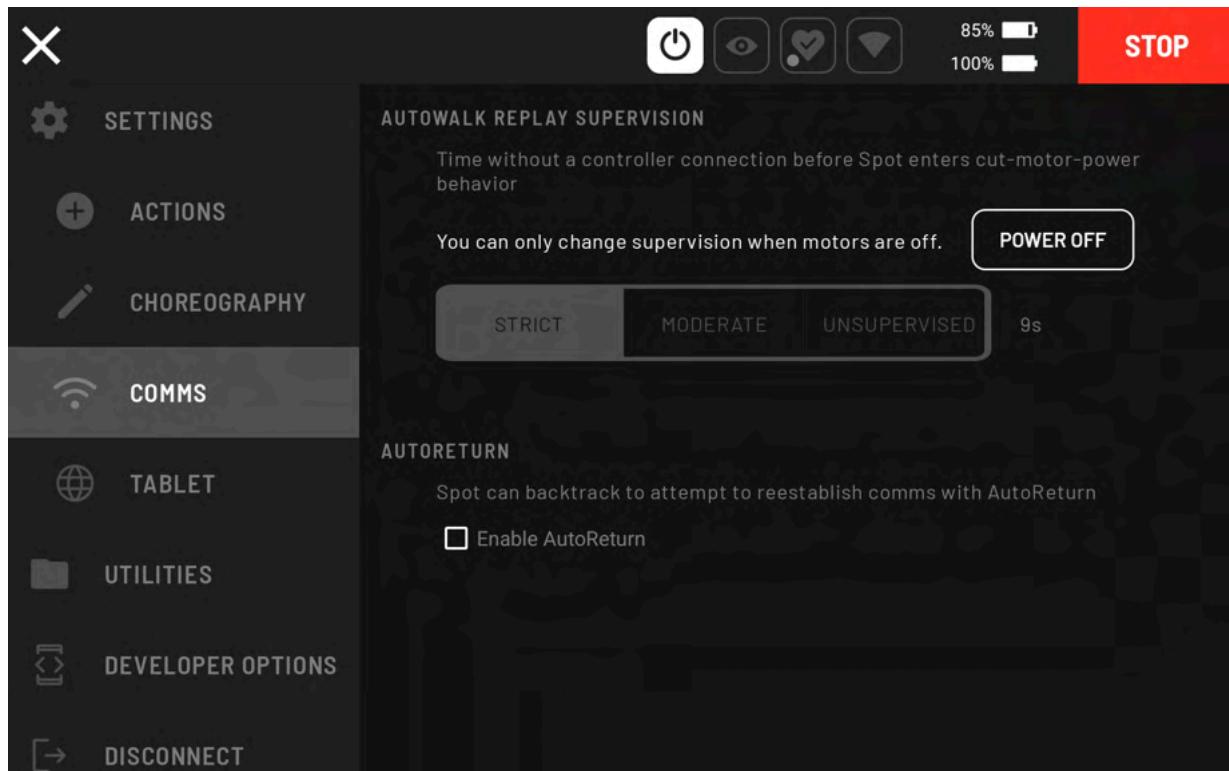
PLAYBACK OPTIONS

Option	Description
Replace Actions with short sleeps	Spot will walk the mission route, but no Actions will be performed. Useful for confirming Spot's ability to navigate the mission route, and when extending previously recorded missions.
Enable strict path following	If this box is checked, Spot will attempt to follow the recorded path exactly without navigating around obstacles, even for parts of the mission route where wide path following was enabled during recording.
Patience	If people or other obstacles are blocking the mission route, Spot will wait for the specified interval before attempting to reroute.
Enable ground clutter avoidance	If checked, Spot will attempt to detect and avoid low obstacles during playback, unless the objects were stepped on during mission recording. If this box is unchecked, Spot may step on or over low obstacles.
Goal radius	Spot will perform each Action when it is within the specified radius of the location where the Action was recorded. Useful if Spot frequently gets stuck trying to reach the Action location and the Action doesn't require precise positioning.
Automatic Self Rights	When Spot falls, it can autonomously self-right. To prevent Spot from falling repeatedly, you can cap the number of times this happens. See also: Mission prompts and Operator intervention

5.9.4. Autowalk replay supervision

By default, Spot maintains a connection to a remote controller while operating automatically. This allows you to monitor automatic operation and intervene when necessary to ensure safety or help Spot overcome navigation challenges that are preventing it from completing a mission (see [Mission prompts and Operator intervention](#)).

The Autowalk replay supervision setting determines how long Spot can continue operating in automatic mode without a connection to a remote controller. After the set duration, Spot will sit and power off its motors as described in [Operational stop](#).



Autowalk replay supervision settings.

Supervision setting	Duration of automatic operation
STRICT (default)	9 seconds
MODERATE	30 seconds
UNSUPERVISED	18.2 hours



WARNING

When Spot is operating "Unsupervised", it may not be possible to stop Spot quickly. Use this setting only after carefully assessing the operating environment and the risks of unsupervised operation.

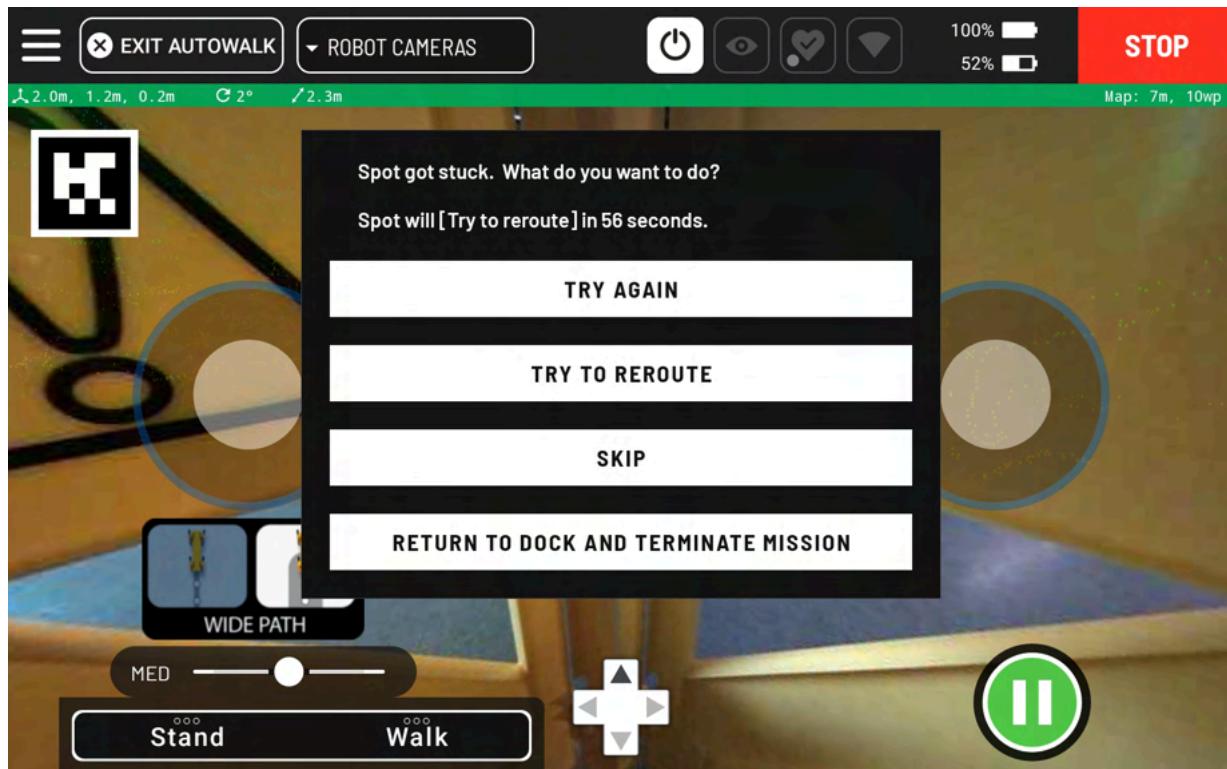
To change Autowalk replay supervision:

1. On the tablet controller, Navigate to **Menu ≡ > SETTINGS > COMMS**.
2. If Spot's motors are running, select **POWER OFF**.
3. Select a supervision setting.

5.9.5. Mission prompts and Operator intervention

Spot may prompt you for input during automatic operation, for instance to respond to a navigation challenge which is preventing it from progressing in a mission.

If you don't respond to the prompt, Spot will abort or continue the mission according to the mission replay options. Prompt timeouts and Spot's behavior if no input is received are configurable as described in [Configure Autowalk mission replay options](#).



Autowalk mission prompt asking for Operator input.

Mission prompt response	Description
TRY AGAIN	Spot will attempt to continue along the mission route. If the obstacle has been removed, the mission will continue as recorded.
TRY TO REROUTE	Spot will attempt to compute an alternate path to the next Action based on the recorded mission route. If successful, Spot will continue the mission.
SKIP	Spot will skip the next Action and attempt to continue the mission by performing any subsequent Actions.
RETURN TO DOCK AND TERMINATE MISSION	Spot will immediately return to the dock and abort the mission.

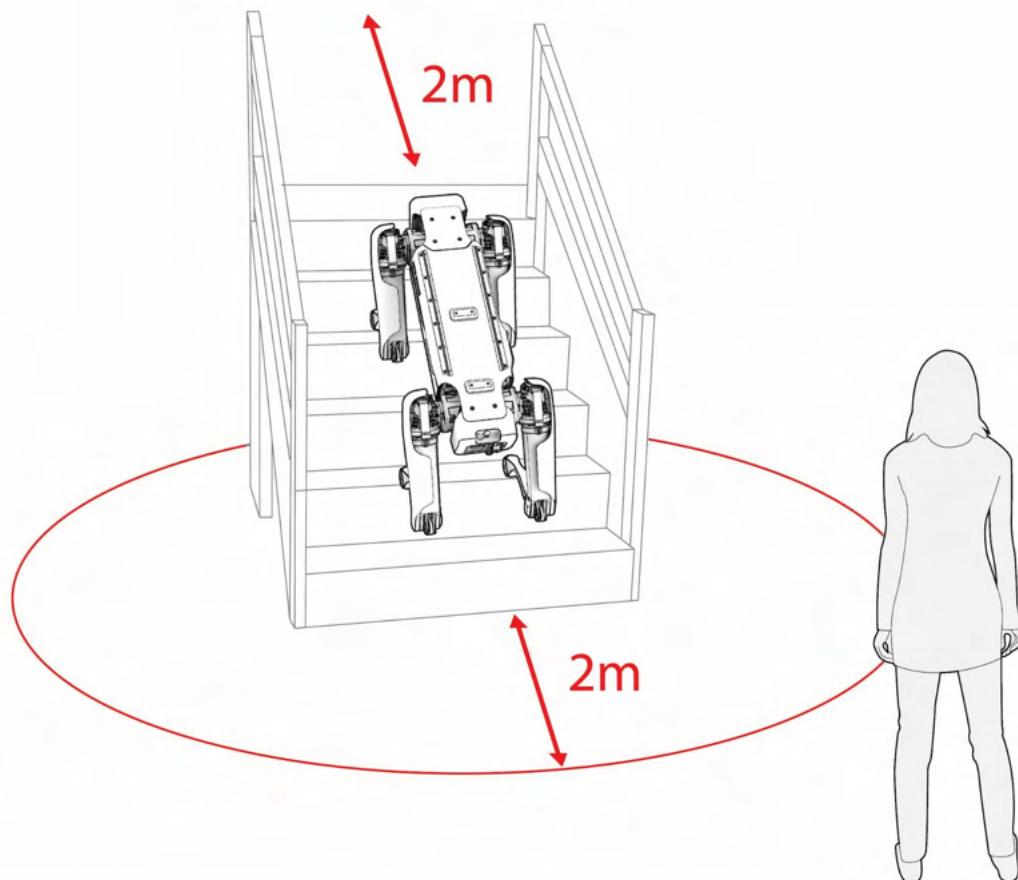
5.10. Navigate stairs

Stairs are very particular environments that can be shared by both Spot and humans. Staircases are always associated with fall hazards and residual risks. You must review the layout and restrict access

to areas with stairs as much as practically possible as part of the site preparation and mark the areas with visual signs.

When manually controlling Spot on stairs or recording an Autowalk mission that includes stairs, follow these guidelines:

1. To climb stairs, position Spot at the base of the staircase, and push the Left joystick forward to walk Spot straight up the stairs.
2. To descend stairs, always operate Spot in reverse, pushing the Left joystick backward so that Spot descends rear-first.



Stair safety.

The following conditions and/or actions are critical for safe stairway navigation and must be checked whether manually controlling Spot or recording/replaying an Autowalk mission:

- Grated stairs, open-riser stairs, or partially transparent stairways pose significant perception challenges during stair locomotion.
- Spot should always descend stairs rear-first.



DANGER

Spot could fall from stairs and cause personal injuries or material hazards.

Do not stand beneath or downhill of Spot when it is on an elevated surface, such as a staircase or elevated platform. Stay at least 2 meters away from the bottom of any staircase or incline where Spot is active.

When manually controlling Spot or recording an Autowalk mission:

- Position yourself at the top or 2 meters away from the bottom of the staircase before driving Spot onto the stairs.
- Do not follow Spot up the stairs until it has come to a standstill on a flat landing with sufficient clearance.
- Avoid turning Spot on stairs. Wait for Spot to reach a complete landing and secured zone before turning.
- Do not attempt to climb stairs by side-stepping.

5.11. Recover from a fall



WARNING

Before recovery, perform a risk assessment of any conditions in the environment which may have contributed to the fall and/or could potentially make Spot fall again.

To help Spot recover from a fall during remote controlled or manual operation:

1. Wait for Spot to come to a complete stop.
2. Check for visible damage to Spot's legs, actuators, battery, and battery compartment. If any of these components appear damaged, cease operation immediately and contact Boston Dynamics support. If Spot is only cosmetically damaged or appears undamaged, continue with this procedure.
3. If Spot is resting stably on a level surface:
 - a. Clear a 1-meter radius around Spot.
 - b. Follow the instructions in [Restarting after a stop using the tablet controller](#).
 - c. Activate **Self Right** as described in [Drive Spot with remote control](#).
4. If Spot is not resting stably on a level surface or if Spot fails to self-right:
 - a. Press the motor lockout button.
 - b. Move Spot by hand so it is resting stably on a level surface in the "sit" position.
 - c. Reset the motor lockout as described in [Reset the motor lockout](#).
 - d. Follow the instructions in [Restarting after a stop using the tablet controller](#).

5. As you resume operation, watch for erratic or unexpected behavior that could indicate damage.
If you suspect Spot is damaged, cease operation immediately and contact Boston Dynamics support.

5.12. Create a log entry

If you experience unexpected behavior from Spot, an attachment, or related software, you can create a log entry to help Boston Dynamics Support diagnose and address the issue.

Log type	Description
Bug Report	Generates a log entry including the previous 30 seconds of operational data. Use this option to quickly note that something unexpected happened.
Experiment Log	Generates a log entry by recording up to 10 minutes of new operational data. Use this option to document repeatable issues that occur over time or require a specific sequence of steps to reproduce.

To create a bug report:

1. On the tablet controller, navigate to **Menu ≡ > REPORT BUG**.
2. Enter a short description of the behavior you observed.
3. Select **REPORT BUG**. The resulting log will include the 30 seconds of operational data from before you entered the Report Bug screen.

To generate an experiment log:

1. On the tablet controller, navigate to **Menu ≡ > REPORT BUG**.
2. Select **START LOG**.
3. Recreate the sequence of events that produced the unexpected behavior.
4. Return to the Report Bug screen and select **STOP LOG**.



NOTICE

Depending on Spot's network configuration and other settings, logs may be automatically uploaded to Boston Dynamics. You can also download logs to your own device from the Admin Console (see [Spot system settings](#)).

5.13. Turn off Spot

When you are finished operating Spot, return it to a Spot Dock as described in [Dock and undock Spot](#) or follow the procedure below.

To turn off Spot:

1. Drive Spot to a charging, storage, or transport location. Drive Spot instead of carrying it whenever possible.
2. Sit Spot.
3. Open the Motor status panel and toggle **Motor Power** to **OFF**.
4. Press Spot's motor lockout button. This will set the motor lockout.
5. Power off Spot by pressing and holding the power button for two seconds.
6. On the tablet controller, open the **Menu** \equiv and select **DISCONNECT**, then select **SIGN OUT**.
7. Connect Spot to the Spot Power Supply to charge the battery in the robot, or remove the battery and charge it with the Spot Power Supply.

**NOTICE**

Always remove the battery when Spot is not in use unless Spot is connected to the Spot Power Supply or sitting on a powered Spot Dock. Batteries left in Spot while not in use will continue to discharge, even when Spot is powered off. Batteries left in a powered off robot for more than 24 hours may be damaged beyond repair.

5.14. Recommended practices during Spot operation

When you are near Spot during robot operations, observe the following precautions:

- Stay at least 2 meters away from Spot at all times.
- Always give Spot the right of way, especially during automatic operation.
- Do not stand beneath or downhill of Spot when it is on an elevated surface, such as a staircase or elevated platform. Stay at least 2 meters away from the bottom of any staircase or incline where Spot is active.
- Do not enter a staircase where Spot is active. If Spot enters a staircase you are already using, exit the staircase and stay at least 2 meters away until Spot has exited the staircase.
- Do not enter confined spaces where Spot is active, such as hallways, if you cannot stay at least 2 meters away while passing or avoiding Spot.
- Do not touch, move, power off, or otherwise interact with Spot when you are not operating it, even if Spot appears inactive.
- Do not move, alter, damage, or block fiducials.
- Do not intentionally block mission paths, place objects in Spot's way, or otherwise alter the operating environment in ways that deliberately interfere with robot operation.

6. Maintenance

6.1. Service and repair

Do not attempt to service or repair Spot yourself. If errors or other issues persist during robot operation, Spot may need attention from Boston Dynamics Support engineers. Include the following information when contacting Support:

- Spot serial number
- Description of the issue

To contact Boston Dynamics Support, visit: <https://support.bostondynamics.com/s/contactsupport>.

6.2. Clean and maintain Spot

Spot requires regular cleaning and basic preventive maintenance.

While conducting cleaning or maintenance operations, always follow safe handling guidance as described in [Safe handling](#).



DANGER

Damage or ingress of foreign objects to charging ports and connectors may result in electrical hazards. Do not operate Spot or plug in any electrical equipment to Spot if there is visible damage or foreign objects are present.



CAUTION

- Dirty or damaged camera windows may impair Spot's obstacle detection and navigation capabilities, and may prevent remote Operators from assessing the condition of the environment around Spot. Do not operate Spot if cameras are obscured or damaged.
- Damage to Spot's legs or ingress of foreign objects to Spot's joints may result in unpredictable motion and falls. Do not operate Spot if legs are damaged or foreign objects have infiltrated Spot's joints.
- Worn foot treads may result in an increased chance of slips and falls, especially on low-friction surfaces. Regularly inspect Spot's foot treads and replace any that show excessive wear.
- Turn Spot off before touching it or performing maintenance inspections.

6.2.1. Exterior cleaning

When cleaning Spot's exterior:

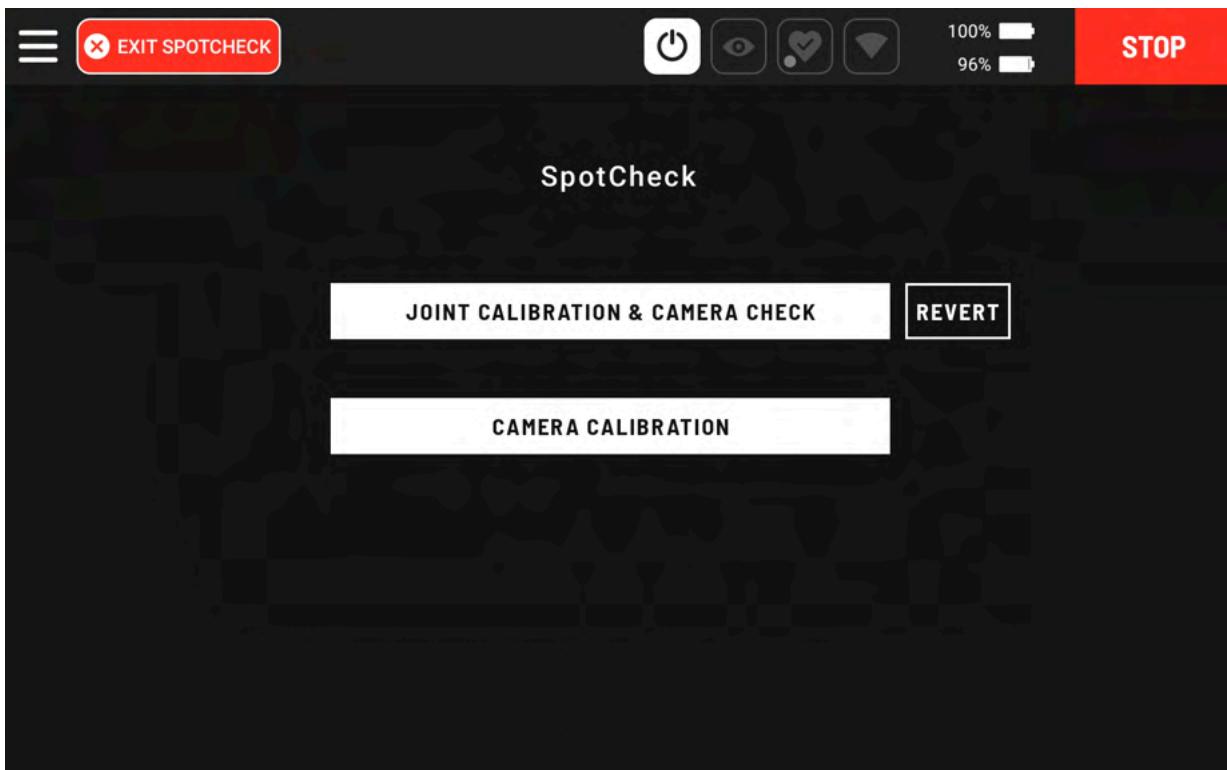
- Use a non-abrasive cloth dampened with glass cleaner to clean camera windows.
- Use a magic eraser or a mild detergent to clean superficial scuffs on Spot's body or leg panels.
- Do not use bleach.
- Do not use strong solvents.
- Do not submerge Spot. Spot is resistant to light sprays of water but should not be sprayed forcibly with water jets or submerged in water. Submerging Spot will permanently damage it.
- Consider purchasing new body panels if they become overly damaged/scuffed.

6.2.2. Preventive maintenance

Performing monthly inspections for Spot will help to identify preventative maintenance items for successful and safe operation. For example, if Spot's cooling fans are clogged with dirt, an overheating fault may be generated and Spot may not be safe for operation.

If any damage is found during periodic inspection, contact Boston Dynamics Support.

6.3. SpotCheck (joint and camera calibration)



SpotCheck is a set of self-diagnostic routines that can correct calibration issues with Spot's leg joints and body cameras. Calibration issues may occur after Spot falls or as a result of normal usage over time.

SpotCheck routine	Description	Indications	When to run
<u>Joint calibration and camera check</u>	<ul style="list-style-type: none"> • Tests and recalibrates the load cell sensor for hip and knee joints. • Tests and recalibrates the joint position sensor for hips and knees. • Checks body cameras to identify potential issues that may require camera calibration. 	<p>Problems with Spot's gait, such as unexpected stumbling or limping.</p>	<p>Every 30 days (as measured in robot operational time, not calendar days) or whenever Spot exhibits signs of joint or camera calibration issues.</p> <div style="border: 1px solid black; padding: 10px; margin-top: 10px;"> <p> NOTICE</p> <p>After 30 days of operational time without joint recalibration, Spot will display a fault that can only be cleared by running a joint calibration and camera check.</p> </div>
<u>Camera calibration¹</u>	<ul style="list-style-type: none"> • Recalibrates each of Spot's body cameras. 	<p>Problems with Spot's obstacle detection, such as unexpected failure to avoid obstacles.</p>	<p>When indicated by the results of a joint calibration and camera check.</p>

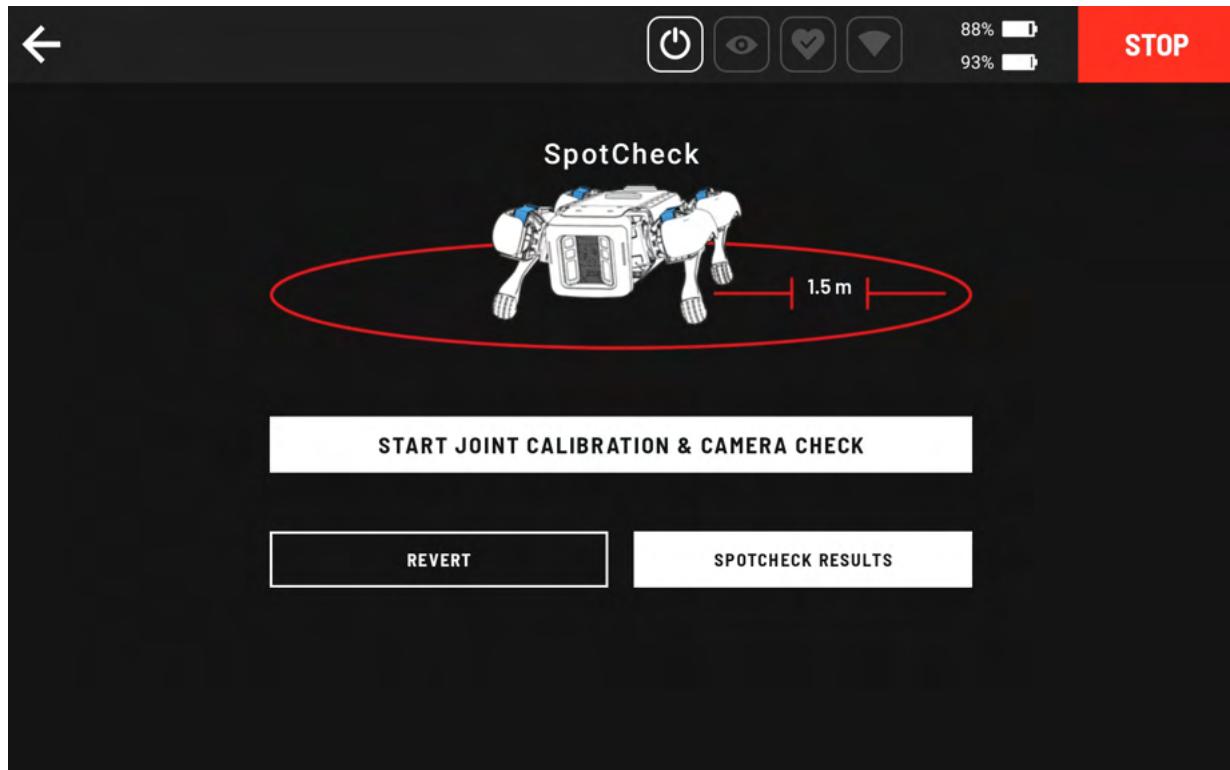
¹Requires the camera calibration panel that is shipped with Spot.



CAUTION

Poor calibration of Spot's joints and/or cameras increases the likelihood of falls, collisions, and other hazards. Run SpotCheck diagnostics promptly when calibration issues are indicated, and on the preventive schedule recommended by Boston Dynamics.

6.3.1. Joint calibration and camera check



Joint calibration and camera diagnostics are sensitive processes that require careful setup in a suitable environment including:

- Flat, manufactured, non-reflective floor.



NOTICE

Outdoor environments may not be flat enough for this procedure.

- No objects within a 1.5-meter radius around Spot.
- No bright lights, including overhead lights and windows with direct or bright indirect sunlight.



NOTICE

Misconfigured attachments may result in poor joint calibration values. Before running joint calibration, check that attachments are affixed securely and correctly configured.

This process takes 2 to 3 minutes.

To recalibrate Spot's leg joints and identify potential calibration issues with Spot's body cameras:

1. Start with Spot in the Sit pose.
2. On the tablet controller, navigate to **Menu ≡ > UTILITIES > SPOTCHECK**.
3. Select **JOINT CALIBRATION & CAMERA CHECK**.

4. Confirm that the environment is suitable, and then select **START JOINT CALIBRATION & CAMERA CHECK**.
5. Wait for Spot to complete the recalibration process.



CAUTION

During recalibration, movement controls are disabled. Spot will automatically stand up and move its legs and body, but will not walk around.

To stop this process and power off Spot's motors, select **ABORT**. Calibration will revert to previous values.

6. When recalibration is complete, Spot will sit and power off motors. Results of the calibration process and camera check will be displayed on the tablet controller.
7. If the camera check detects any performance issues, run [Camera calibration](#).

6.3.1.1. Revert to previous joint calibration

In rare cases, joint calibration may result in degraded performance. This may be the result of running the calibration in an unsuitable environment, or an indication of mechanical failures that cannot be fixed via calibration.

To allow you to revert an incorrect calibration, Spot stores the previous joint calibration as a backup.

To revert Spot to the previous joint calibration:

1. On the tablet controller, navigate to **Menu ≡ > UTILITIES > SPOTCHECK**.
2. Select **REVERT**. Spot will power off its motors.
3. Wait for the previous calibration to be applied.

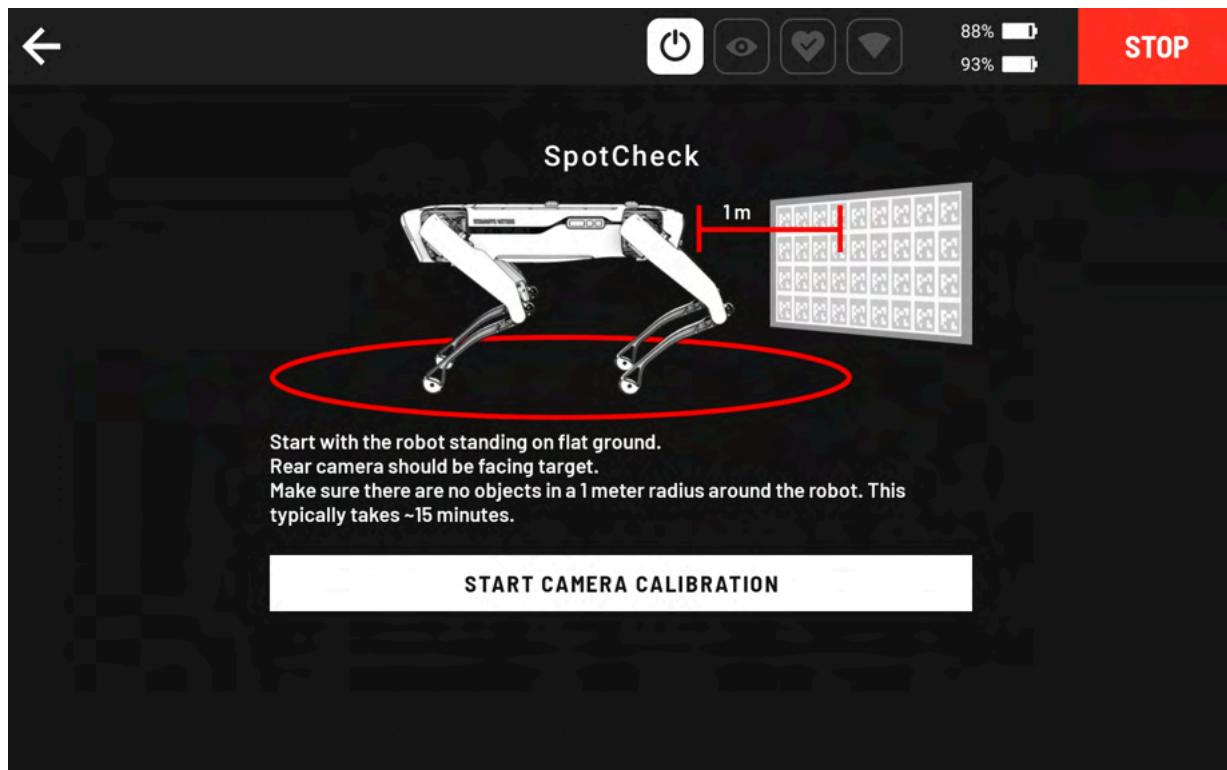
After reverting, attempt joint calibration again in a more suitable environment. If performance issues persist, contact Boston Dynamics Support.



NOTICE

Spot only stores a backup of the last joint calibration it ran. Earlier calibrations are deleted. Always test the results of joint calibration by observing Spot's performance before running additional calibrations.

6.3.2. Camera calibration



Camera calibration is a sensitive process that requires careful setup in a suitable environment including:

- Flat, manufactured, non-reflective floor.



NOTICE

Outdoor environments may not be flat enough for this procedure.

- No objects within a 1.5-meter radius around Spot.
- No bright lights, including overhead lights and windows with direct or bright indirect sunlight.

Camera calibration requires the calibration panel that is shipped with Spot. The calibration panel is a flat board approximately 118.5 cm x 50 cm that shows a set of 18 fiducials spaced evenly on a black background and a pair of arrows labeled "Up".



NOTICE

Folds, creases, or damage to the camera calibration panel can cause the calibration operation to fail or produce unexpected results. Do not store or use the panel in a way that would cause it to warp over time.

This process takes about 15 minutes.

To recalibrate Spot's body cameras:

1. Position the calibration panel.
 - The panel may be mounted vertically with the bottom edge no more than 5 cm from the floor, or leaned against a support within 5 degrees of vertical.
 - The arrows must point up.
 - The panel must be adequately and evenly lit throughout the calibration process, with no glare.
 - No other calibration panel should be visible to Spot.
2. Perform a visual inspection to confirm that Spot's body cameras are undamaged and unobstructed, and to wipe the lenses clean.



CAUTION

While conducting cleaning or maintenance operations, always follow safe handling guidance as described in [Safe handling](#).

3. Position Spot in the Stand pose about 1 meter in front of the panel, with the rear body camera directly facing the panel.
4. On the tablet controller, navigate to **Menu ≡ > UTILITIES > SPOTCHECK**.
5. Select **CAMERA CALIBRATION**.
6. Confirm that the environment is suitable, then select **START CAMERA CALIBRATION**.
7. Wait for Spot to complete the recalibration process.



CAUTION

During camera recalibration, movement controls are disabled. Spot will automatically reposition itself to view the calibration panel at various angles, but will not leave the area immediately in front of the calibration panel.

To stop this process and power off Spot's motors, select **ABORT**. Calibration will revert to previous values.

8. When recalibration is complete, Spot will sit and power off motors. Results of the calibration process will be displayed on the tablet controller.

Camera calibration provides small corrections to camera misalignments. It will not repair physical damage to cameras or mitigate network connectivity or latency issues with camera feeds. If performance issues persist after recalibration, contact Boston Dynamics Support.

6.3.3. SpotCheck with Spot Arm

For Spot with Spot Arm, the joint calibration and camera check will additionally:

- Open and close the gripper several times to recalibrate it.
- Move the arm through several positions to check that joint sensors are working properly.

**CAUTION**

During SpotCheck, the arm will fully extend above and to the front and side of Spot. Ensure 2 meters of clearance around and above the robot before beginning this process.

**NOTICE**

SpotCheck does not check or recalibrate the gripper camera.

7. Declarations and marking

7.1. EU Declaration of Conformity

This is a copy of the signed document prepared in accordance with Machinery Directive 2006/42/EC, Annex II 1-A and supplied separately.

Manufacturer		
Boston Dynamics, Inc. 200 Smith Street Waltham, MA 02451 USA		
Person authorised to compile the Technical File, established in the Community		
Alura Group BV Kroonwiel 2 6003 BT Weert The Netherlands		
Description and designation of the machinery		
Description and identification of the machinery Product and function: Legged robot (multiple-axes machine that uses articulated limbs for locomotion) intended for professional use of its locomotion and carrying capabilities in either industrial, restricted, or supervised environments. See Intended use for full description of intended use and limitations. See Integrate attachments for full description of scope and validity of the conditions when Spot is assembled with attachments.		
Designation		
Spot	Model (P/N): 04-00143531-001 04-00143531-401 04-00143531-601 04-00143531-611	s/n: BD-33390001 or higher

For a full description of intended use and limitations, see [Intended use](#).

For a full description of scope and validity of the conditions when Spot is assembled with attachments, see [Integrate attachments](#).

Declarations

It is declared that the above product, for what is supplied, fulfills all the relevant provisions of the following directives, according to which the product is CE marked: Machinery Directive 2006/42/EC as amended ("MD"), EMC Directive 2014/30/EU as amended ("EMCD"), Radio Equipment Directive 2014/53/EU as amended ("RED").

It is declared that the relevant technical documentation has been compiled in accordance with Part A of Annex VII of the MD.

Harmonized Standards Used, as referred to in:

MD: EN ISO 12100:2010, EN 60204-1:2018, EN IEC 62133-2:2017, EN IEC 60825-1:2014/A11:2020

EMCD: EN 61000-6-4:2007/A1:2011, EN 61000-6-2:2005/AC:2005

RED: ETSI EN 301 489-1 V2.2.3 (2019-11), ETSI EN 301 489-17 V3.2.4 (2020-09), EN 55032:2012

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Authorised Representative

Jason P. Fiorillo, Chief Legal Officer

Waltham, MA (USA)

Jan 9, 2024

7.2. Labels

The following labels and nameplates appear on Spot. Labels are located inside the battery compartment and are visible before installation.

The year of production is the first digit of the serial number (S/N) following "BD-". For instance, the serial number BD-3##### indicates a Spot produced in 2023.



Spot nameplate & label.

8. Appendix A: Supplemental information

Additional information and resources about Spot are available online at the following URLs:

Resource	Section	URL
<i>Spot Power Supply Information for Use</i>	2.10.2.1 4.3.3	https://support.bostondynamics.com/s/spot-product-safety
<i>Spot Dock Information for Use</i>	2.10.2.1 4.3.3 4.4 5.7	https://support.bostondynamics.com/s/spot-product-safety
<i>Spot Arm Information for Use</i>	4.2.1	https://support.bostondynamics.com/s/spot-product-safety
Site readiness for Spot operation	2.10	https://support.bostondynamics.com/s/article/Creating-a-Spot-friendly-environment
Payload Developer Guide	4.2	https://dev.bostondynamics.com/docs/payload/readme
Electrical Interface	2.5.2 4.2	https://dev.bostondynamics.com/docs/payload/robot_electrical_interface.html
Maintaining Spot system software	4.7	https://support.bostondynamics.com/s/article/Updating-the-Spot-system-software
Payload configuration requirements	4.2	https://support.bostondynamics.com/s/article/Payload-configuration-requirements
Spot tablet configurations	5.2.1	https://support.bostondynamics.com/s/article/Spot-controller
About the Spot Industrial Inspection Package	5.2	https://support.bostondynamics.com/s/article/scout-inspection-solution-architecture
Scout Administration and Settings	5.2 5.9.1 5.9.2 5.9.3	https://support.bostondynamics.com/s/article/Scout-Administration-and-Settings

Resource	Section	URL
Scout Operator controls	5.3.3 5.8.2 5.8.3	https://support.bostondynamics.com/s/article/Preparing-your-virtual-control-room-for-robot-operation
Transfer an Autowalk Mission to Scout	5.9.1	https://support.bostondynamics.com/s/article/Preparing-Autowalk-missions-for-use-in-Scout
Running Autowalk Missions via Scout	5.9.1 5.9.2 5.9.3 5.9.5	https://support.bostondynamics.com/s/article/Running-Autowalk-Missions-via-Scout
Getting started with Autowalk	5.5 5.8.3 5.8.4 5.9	https://support.bostondynamics.com/s/article/Getting-Started-with-Autowalk
Editing Autowalk missions	5.8.5 5.9.3	https://support.bostondynamics.com/s/article/Editing-Autowalk-missions
Creating robust Autowalk missions	5.8.4 5.8.5 5.9.3	https://support.bostondynamics.com/s/article/Creating-a-robust-Autowalk-mission-framework
Spot robot logs	5.12	https://support.bostondynamics.com/s/article/Spot-robot-logging
Preventative maintenance for Spot	6.2	https://support.bostondynamics.com/s/article/Preventative-maintenance-for-Spot
Recalibration with SpotCheck	6.3	https://support.bostondynamics.com/s/article/Recalibration-with-SpotCheck
Spot Battery air shipment	3.3.1	https://support.bostondynamics.com/s/article/Battery-Air-Shipment-Guidance