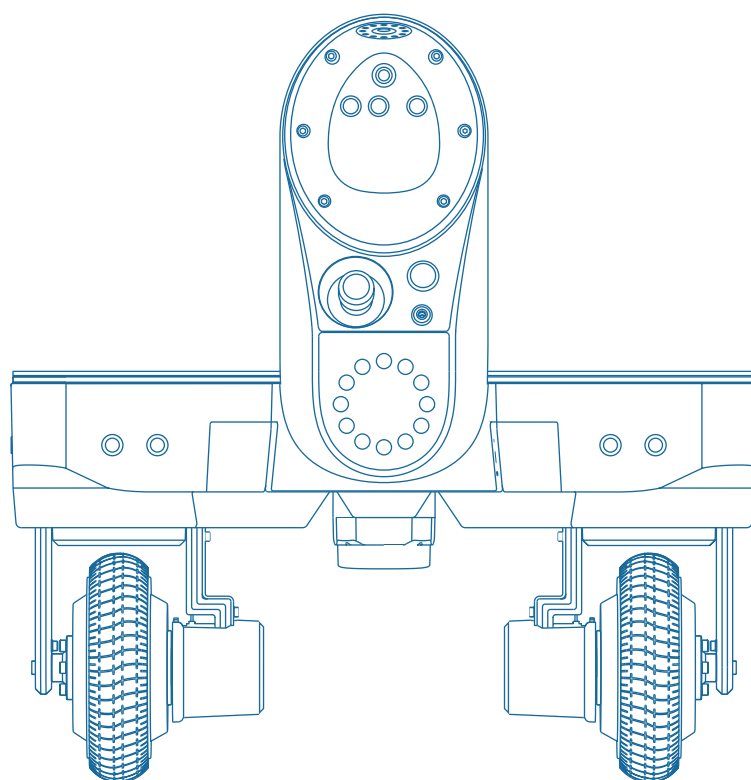


kilo™

pro™

Manual

ADMIN EDITION



PIAGGIO
FAST
FORWARD
for business

Rev 1 - 017-102208

WARNING: Before using your kilo robot, be sure to read and understand this user manual, including each of the warnings and safety instructions which appear on the following pages. Failure to do so may result in injury to you or others and/or damage to property. If you have any questions or concerns you can contact Piaggio Fast Forward Customer Care by phone (800) 791-0843 or on the piaggiofastforward.com website.

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Autonomy for Humans™
www.piaggiofastforward.com/business

Piaggio Fast Forward
52 Roland Street
Boston, MA 02129
www.piaggiofastforward.com

Warnings and safety instructions

Failure to heed the below warnings or to follow the safety instructions set forth below, may cause injury to you or someone else or property damage. Always check and obey any applicable laws or regulations which govern or restrict the use of your kilo robot. Use kilo robot at your own risk, with serious attention to your surroundings and safe operation at all times. Always use common sense.



Warnings

- Never allow anyone under 18 years old to use kilo robot.
- Never use kilo robot to transport children or pets.
- Never use kilo robot to transport hazardous cargo that is not properly packaged and secured.
- Never sit or stand on kilo robot, even if kilo robot is not being used.
- Never operate kilo robot near stairs, cliffs or drop-offs, on steep slopes, or in any other location where it could fall.
- Never operate kilo robot on escalators or stairs.
- Never submerge kilo robot in water.
- Never set kilo robot on fire or use it to transport flammable material.
- Never use kilo robot where prohibited by applicable laws or regulations.
- The battery charger is for indoor use only; use in dry locations only.
- Never charge the battery with any charger other than the one supplied with your kilo robot.
- Never operate kilo robot while under the influence of alcohol, drugs, or other controlled substances.

Safety

- When paired to kilo robot, be aware of how and where you walk because kilo robot will try to follow you.
- Take special care when entering enclosed spaces like elevators; keep in mind that kilo robot has to fit in as well.
- Take special care when entering small spaces that may be crowded or contain fragile goods or materials.
- Take special care when crossing streets; don't forget that kilo robot needs to cross safely as well.
- Always keep kilo robot safely away from cars and motor vehicle traffic.
- Always be aware of your surroundings, including people around you.
- Be aware that many people have never seen a kilo robot and don't know how it works or what it does.
- Be aware that people may not immediately realize that you are operating a kilo robot, so employ caution and think ahead.
- Be aware that kilo robot is behind you when you walk towards or among people.
- Always turn off kilo robot before lifting and transporting.

General

kilo robot has been carefully designed and tested to comply with all applicable US standards. The design is human-centric and human-friendly with a strong focus on safety.

Several cameras and sensors help kilo robot safely navigate its environment and stop before any contact with humans or objects. When kilo robot loses its leader, it stops and waits to re-pair. kilo robot’s control systems limit its top speed and the force applied by its drive motors.

kilo robot contains Lithium-Ion batteries. Do not attempt to service or repair the batteries. If damaged, contact Piaggio Fast Forward Customer Care at **(800) 791-0843**. Please dispose of kilo robot properly and in accordance with all local regulations. If you need instructions regarding proper disposal please contact Piaggio Fast Forward Customer Care at **(800) 791-0843**.

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kilo

What is kilo™ robot?

kilo robot is a 4-wheeled robotic flatbed with hands-free human following capabilities, designed to work alongside humans.

Your interactions with kilo robot happens through one button that changes its color, brightness, and pattern as a function of those interactions. kilo robot’s light bar and sounds communicate its current state. kilo robot carries up to 300 pounds. A USB-C charging port lets you power a mobile device while kilo robot is powered on. kilo robot uses Wi-Fi to complete software updates and upload performance and diagnostic logs to PFF pro.

The PFF pro™ app is available for iOS and Android smartphones. It may be required for kilo robot’s operation and adds advanced functionality: PFF smarts®, security, and support.



Information

Components

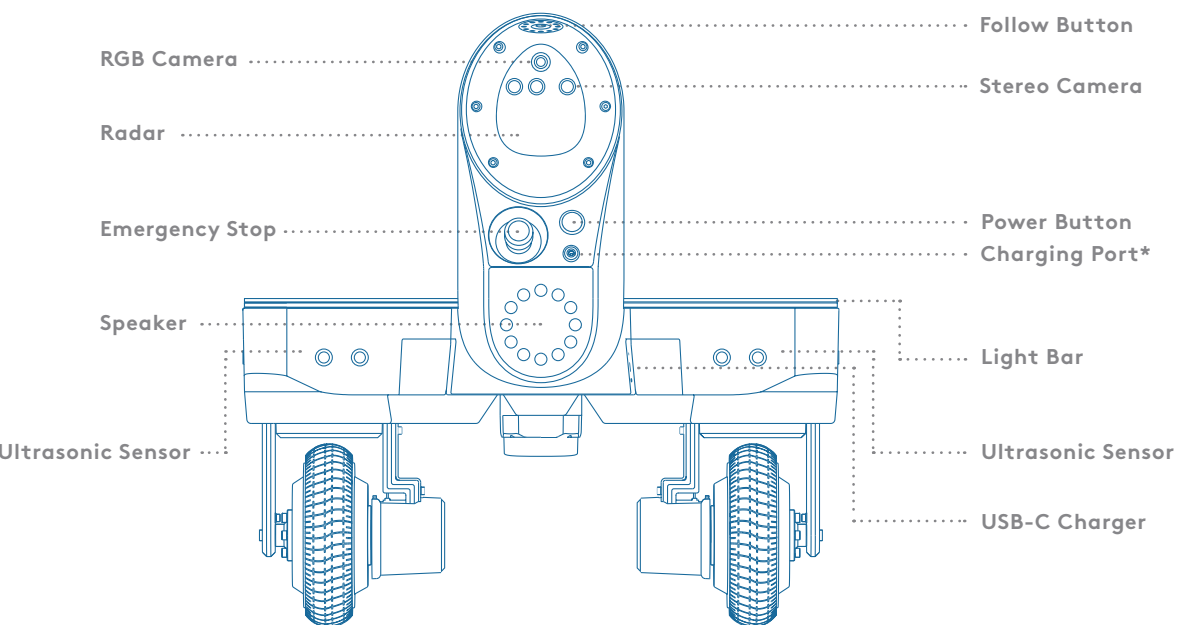


Figure 1.1

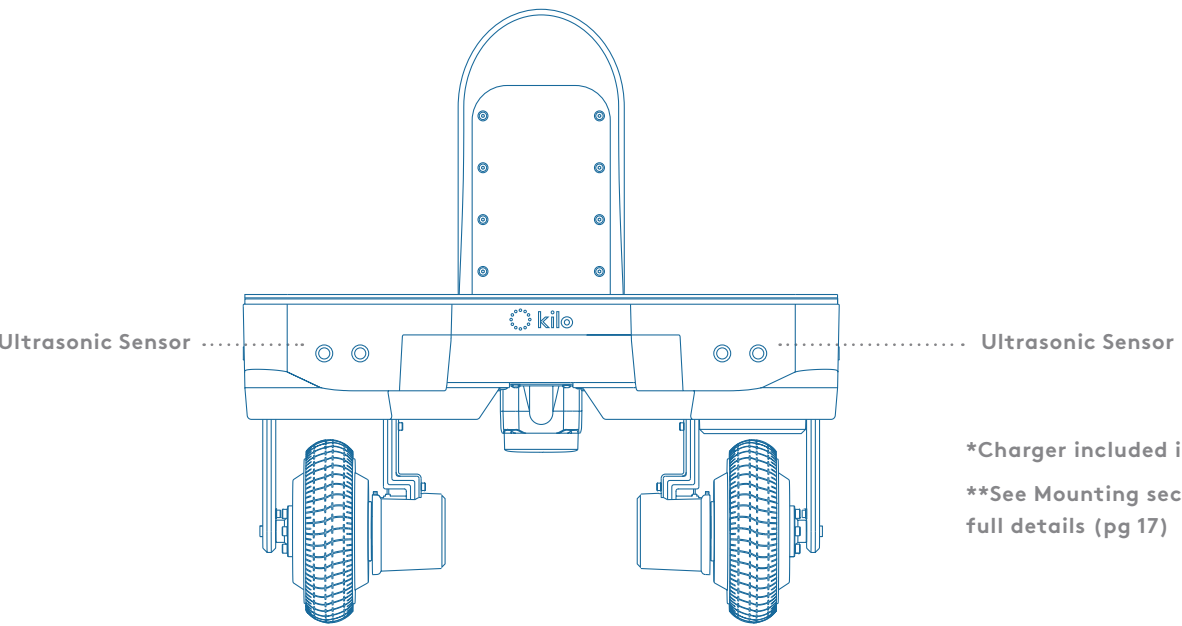
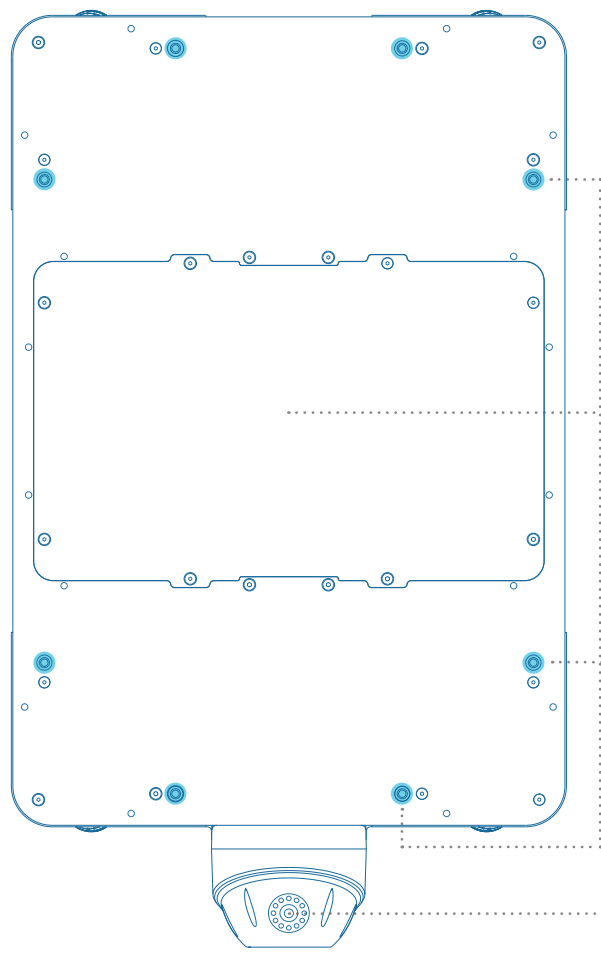


Figure 1.2

*Charger included in the box!
**See Mounting section for full details (pg 17)



WARNING: Do not step, stand or ride on the kilo robot. May cause injury and/or equipment damage.

Figure 1.3

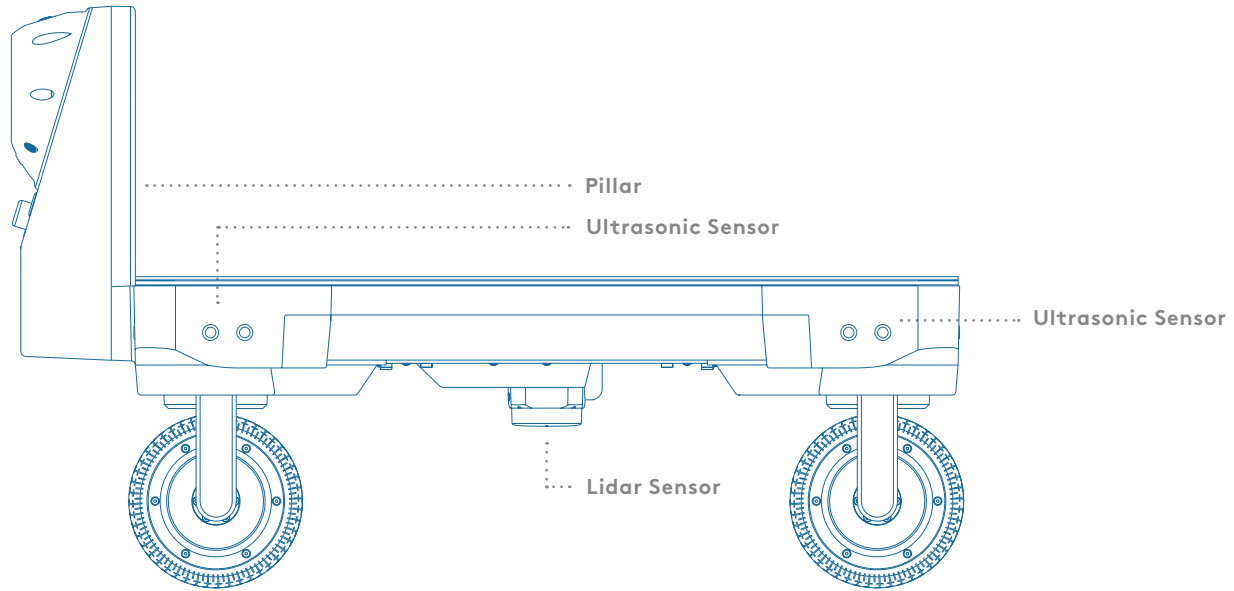


Figure 1.4

Specifications

Dimensions L x W x H	37 X 22 X 23 IN
Cargo Bed Dimensions L x W x H	32 x 22 x 12 IN
Payload	300 lbs
Weight	140 lbs
Top Speed	3 mph
Operating Temperature	10-100°F
Battery Technology	Lithium-Ion
Estimated Run Time	approximately 5 hours
Charge Time	approximately 3 hours
Battery Charger	40V DC 9A, Charger provided
Phone Charging Port	5V/1.5A USB-C
Wi-Fi	5 GHz
Bluetooth® wireless technology	Class 1

Note: Run time, travel distance and charging time may vary depending on usage and environment.

Mounting

kilo robot comes equipped with 8 mounting points for securing your preferred cart, shelves or other structure (Figure 2.1).

Bolt patterns are shown below. There are 8 mounting points — M10x 1.5mm threaded holes, 27mm depth. It is recommended that hardware has a minimum of 3 threads engagement when mounting carts to kilo robot. Account for the thickness of the cart when selecting hardware.

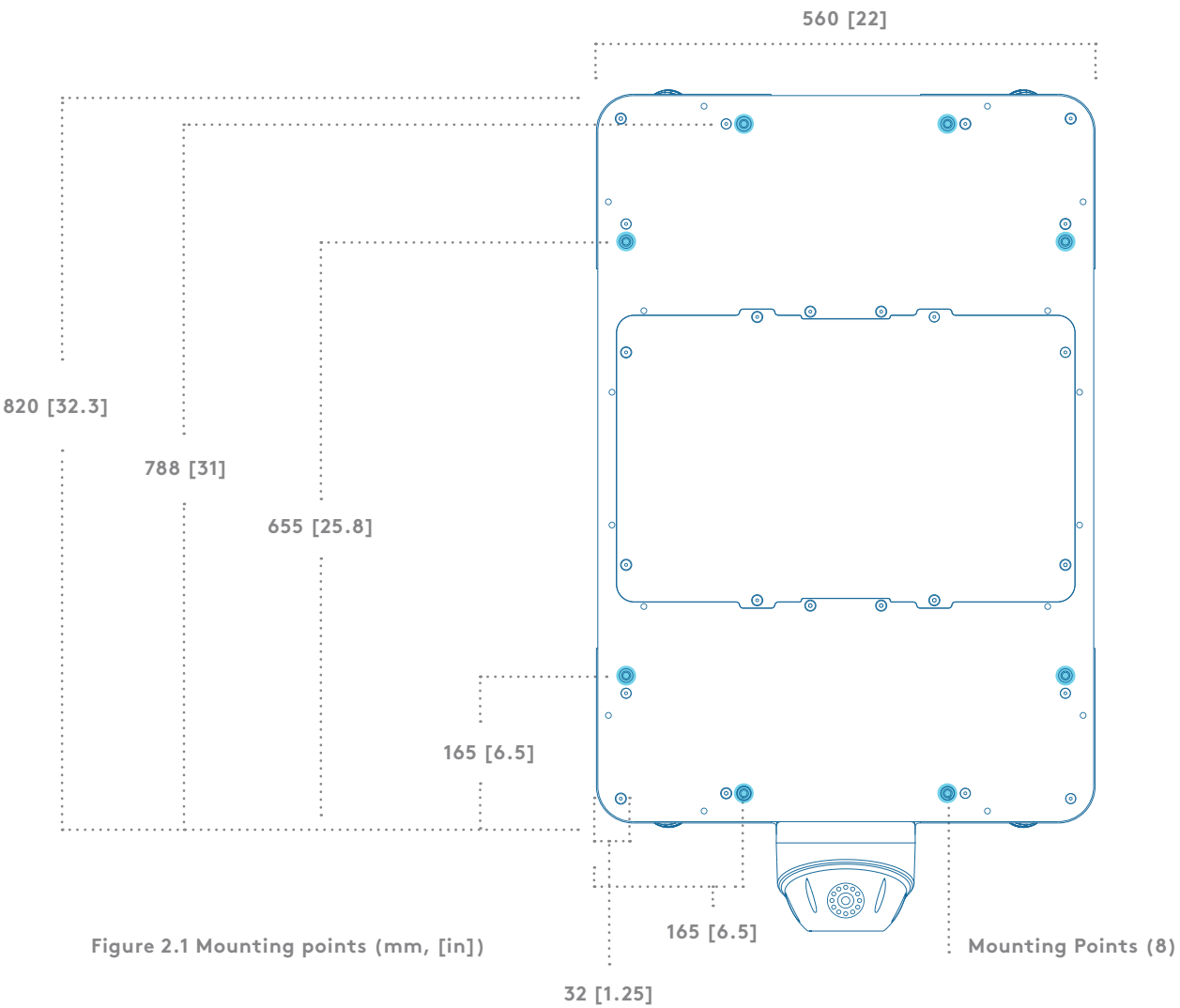


Figure 2.1 Mounting points (mm, [in])

Loading

Payload limit for the kilo robot is 300 lbs, including any cart or shelving. PFF does not recommend having shelving or onboard attachments more than 36 inches from the ground.

Whenever possible, heavier cargo should be loaded onto the bed of kilo robot or on the lowest available shelf to prevent uneven balancing or tipping of the kilo robot during use (Figure 3.1 and Figure 3.2).

Make sure payload is properly secured to the platform or shelving when using kilo robot, cargo can shift when is in motion (Figure 4.1 and Figure 4.2).



WARNING: Never transport people, pets, unstable or improperly packaged hazardous cargo with kilo robot.

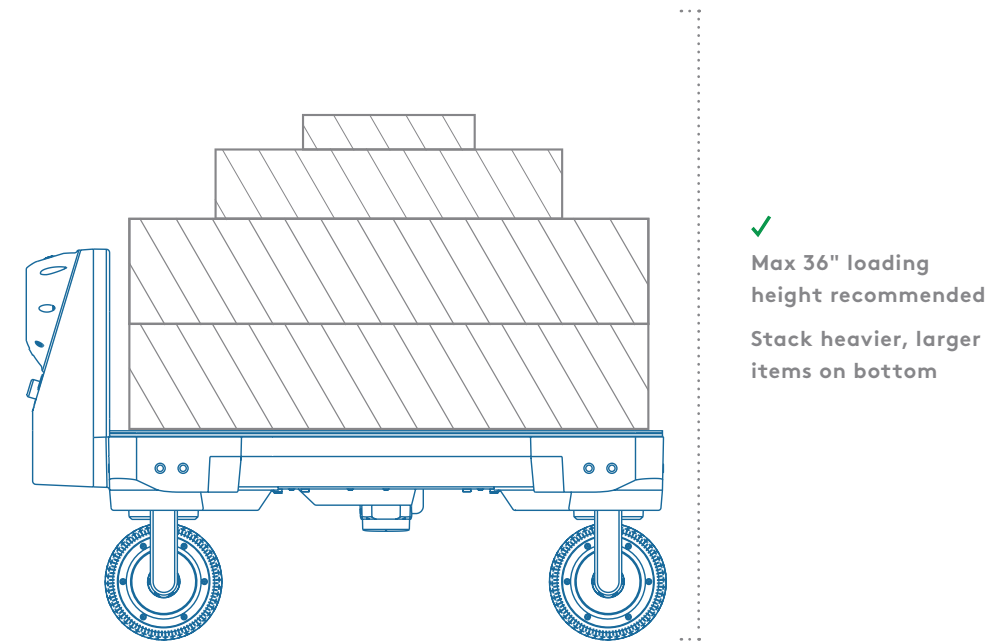


Figure 3.1
Proper loading of weight and size distribution

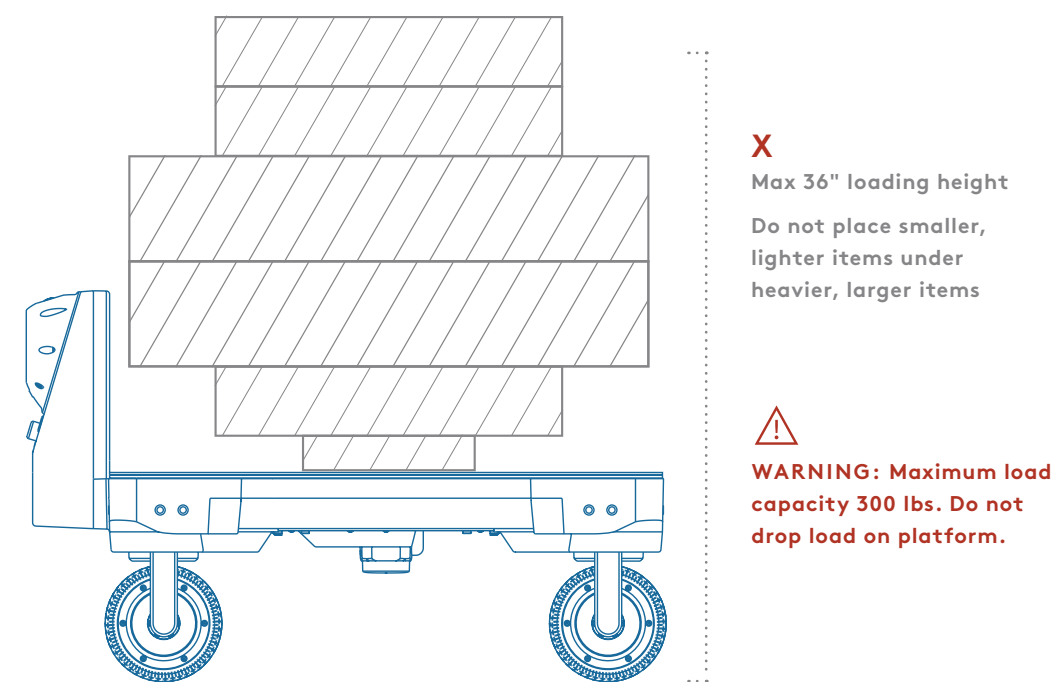
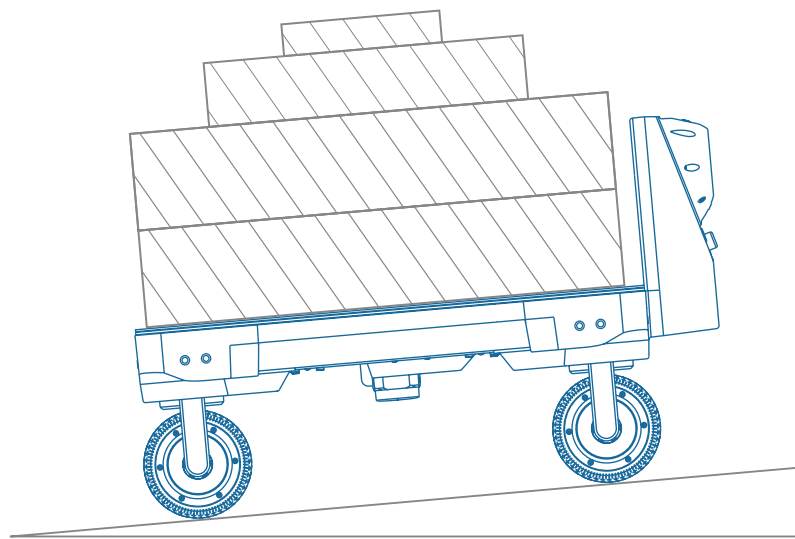


Figure 3.2
Improper loading of weight and size distribution



Max Grade: 1:12 Ramp
(5 degrees)

Figure 4.1
Proper loading for ramp usage

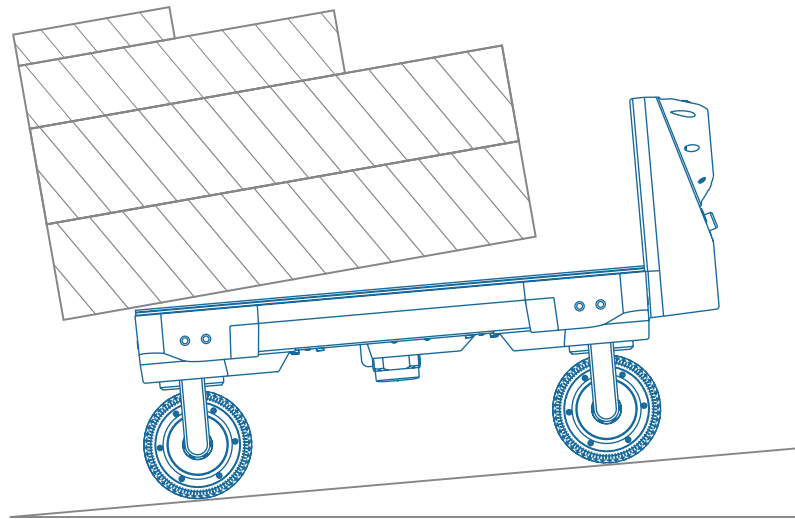


Figure 4.2
Improper loading for ramp usage

WARNING:
Materials and boxes can shift to lower edge of the cart when traveling on a ramp. Make sure payload is properly secured to the platform or shelving and avoid stacking items on the back of kilo robot to prevent tipping.

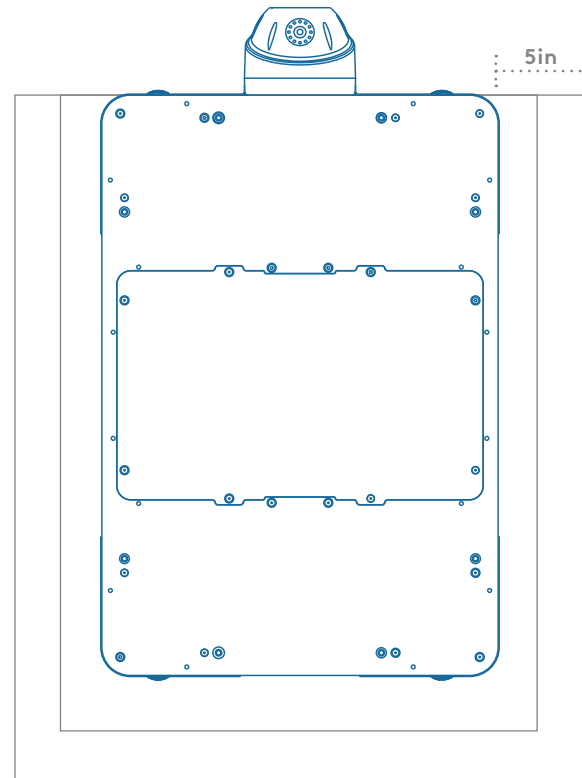


Figure 5.1
Loading objects with overhang

- <0" No decrease in performance
- 0–5" Decrease in obstacle avoidance performance
- >5" Decrease in kilo mobility and obstacle avoidance performance

WARNING: If the cargo and shelving on the kilo robot bed exceed the 22in x 32in footprint of the bed, it will not be included during obstacle avoidance and therefore could make contact with the environment.

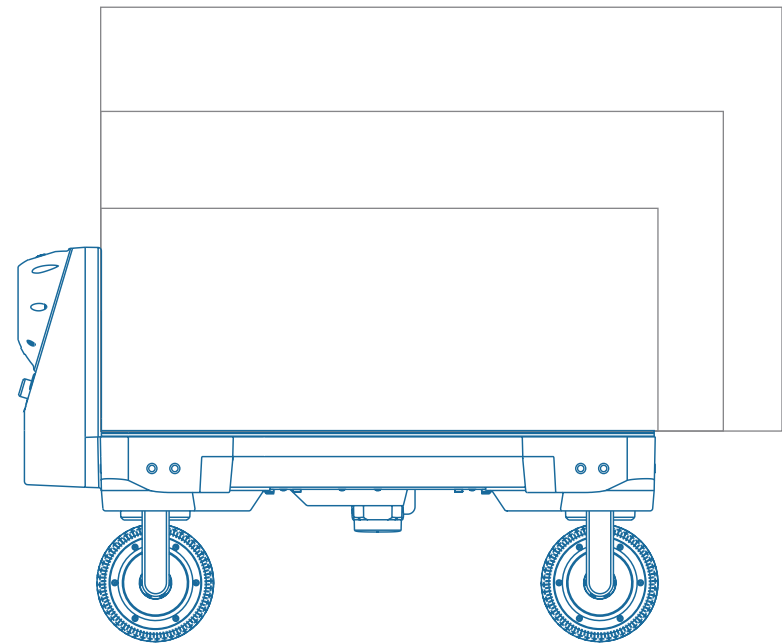


Figure 5.2
Loading height and overhang

- 36" Decreased mobility and obstacle avoidance performance
- 30" Ok mobility and obstacle avoidance performance
- 24" Great mobility and obstacle avoidance performance

Lighting

kilo robots communicate through lights and sounds. The table below shows what light colors correspond to behaviors and robot modes.

State	Color	UI Button	Light Bar
Power On/Off*	● Blue	Pulsing	Pulsing
Standby & Idle*	● Blue	Solid	Off
Pairing*	○ White	Fast Pulsing	Off
Follow*	○ White	Solid	Solid
Failed to Follow*	N/A	Single Pulse	N/A
Failed to Standby*	● Red	Single Pulse	Single Pulse
30-11% Battery	● Yellow	N/A	Solid (when applicable)
10% or Less Battery*	● Red	N/A	Solid (when applicable)
Charging*	● Green	Slow Pulsing	Off
Charged	● Green	Solid	Off

State	Color	UI Button	Light Bar
Error*	● Red	Fast Pulsing	Fast Pulsing
Mute/Unmute*	● Pink	Single Pulse	Single Pulse
Stealth	N/A	Fade to 50%	Fade to Off
Unstealth	N/A	Fade to On	Fade to On
OTA	● Orange	Slow Pulsing	Off
Inactive	● Green	Slow Pulsing	Off
Trips	● Purple	Pulsing	Pulsing
Checkout*	N/A	Fast Pulsing	Off
Training*	● Purple	N/A	Looping

*Sound Included

Interacting with kilo robot

The **Follow button** changes color, brightness, and pulse to make your interaction with kilo robot simple and straightforward. With this button, you switch back and forth between the two modes: **Standby** and **Follow**.

Standby

Standby is kilo robot’s static position. You can enter or exit **Standby** by pressing the **Follow button**.

Should kilo robot’s stability or safety be compromised, such as on a very uneven surface, it automatically stops moving and switches to **Standby**.

Follow

Follow is kilo robot’s core functionality. All you have to do is stand in front of kilo robot and press the **Follow button**. kilo robot pairs with you and follows you as you walk away or reverse as you walk towards it, while differentiating you from fellow pedestrians. kilo robot is designed to match your pace, up to 3 miles per hour. It decelerates when you slow down and accelerates when you speed up.

kilo robot changes from **Standby** to **Follow** mode when you press the **Follow button**.

Walking with kilo robot

Your organization may require you to checkout robots before use and return them afterwards. For more information on checking out/returning robots, see the “Checking Out/Returning Robots” section (pg 36).

1. Stand facing the kilo robot and press the **Follow button**. kilo robot will pair with you. The **Follow button** will turn ○ **white** when it is ready to follow you.
2. Turn around and walk away or walk towards the kilo robot and it will follow you or reverse.
3. Press the **Follow button** again and kilo robot will unpair. The **Follow button** will turn ● **blue** in **Standby**.

Trips

Trips is a PFF smarts behavior that allows you to send robots on a path without needing a user. Learn more in the “Trips” section (pg. 40).

kilo robot indicates this temporary mode with lighting and the PFF smarts sound. ● **Purple** pulsing buttons and light bar indicate that the PFF smarts mode is active.

Charging

kilo robot is battery-powered and requires recharging. Under normal operating conditions, the battery supports an estimated 5 hours of continuous use and can be recharged in approximately 3 hours. We recommend that you plan your journeys accordingly.

kilo robot communicates its current charge status through the charge indicator in the PFF Pro app and its light bar:

- When the battery level is below 30%, the light bar changes from ○ **white** to ● **yellow**.
- When the battery level is below 10%, the light bar changes to ● **red**.
- **When the battery level drops below 5%, kilo robot is no longer able to move.** It enters **Standby** mode, and powers off. It can be used again once it has been recharged.

To charge kilo robot, ensure the unit is in **Standby** mode, then plug the charging cable into the charging port at the front and the power plug into a regular 3-prong wall outlet. While the charging cable is plugged in, it is not possible to exit the **Standby** mode.

While the battery is being charged, the **Follow button** pulses ● **green**; it changes to ● **solid green** once the battery has been fully charged.

The PFF pro app provides you with a detailed indication of the battery’s status during the charge process.

Phone Charging

A charging port in the pillar lets you charge your mobile phone and other small electronic devices.

Power on and off

Automatic power off:

- When in **Standby** mode, kilo robot powers off automatically after 30 minutes.
- When in **Standby** mode and locked, kilo robot does not power off automatically.

Should circumstances require you to power kilo robot off manually, press and hold the **Power button** and release it after 3 seconds to properly shut down all of kilo robot’s systems. To power on, briefly press and release the **Power button**. Wait 20–30 seconds between powering off and powering on your kilo robot.

Robot Settings via PFF pro app

When you have a checked out robot, the robot name becomes clickable and you can access its status information and control certain robot settings. See “Individual Robot Profile” (pg 48) to learn more.

Transporting kilo robot

Occasionally you may need to move your kilo robot around a difficult obstacle or into a tight parking place. In order to do so, always power off kilo robot.

kilo robot weighs approximately 140 pounds. When empty, kilo robot can be lifted by two people by gripping under the long sides of the robot; if you do not lift it in this manner, you run the risk of injuring yourself and damaging your kilo robot. Do not lift from the sensor tower. Keep hands clear of wheels (Figure 6.1).

If you are using a hand truck or other device to move kilo robot, first make sure it is off, then remove any cargo and employ the lifting procedure described above. Then properly secure kilo robot onto the moving device. If you do not properly secure kilo robot, you run the risk of damaging the robot. Damage caused by the failure to secure kilo robot is not covered by your warranty.



WARNING: Equipment exceeds 100 lbs. Two person lift required.

WARNING: Do not lift kilo robot by the front pillar, the wheels or any mounted structures; if you do so, you run the risk of injuring yourself and of seriously damaging your robots. Damage caused by improper lifting is not covered by your kilo robot warranty, so please use proper lifting procedures.

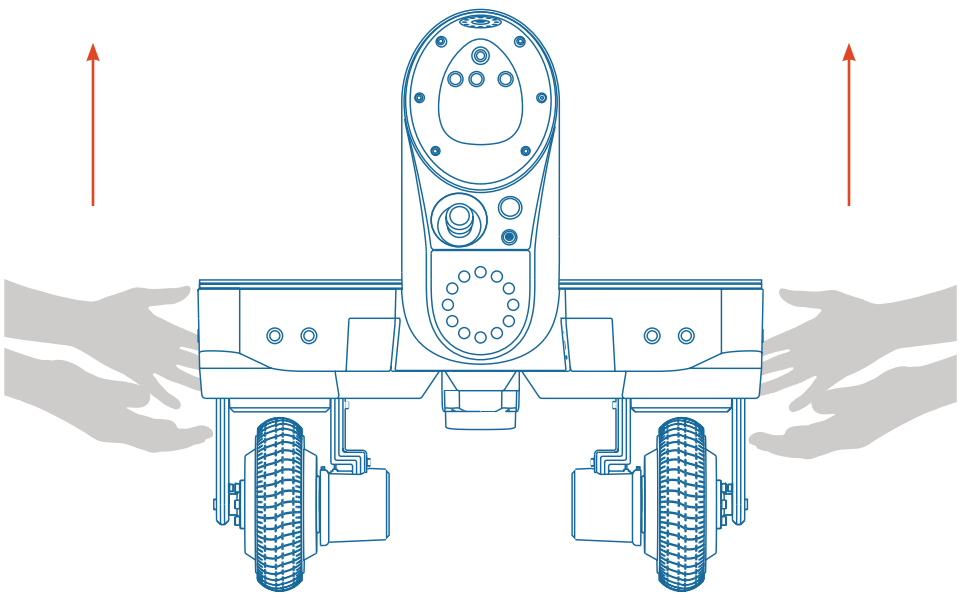


Figure 6.1 Proper lifting of kilo robot

Maintenance and Service

It is important to care for your kilo robot properly to ensure it functions at its best ability.

We recommend that you wipe kilo robot clean regularly, particularly the base which tends to accumulate dirt during walks. For the base, a clean damp cloth works well.

Don't leave kilo robot outdoors in the rain or exposed to extreme temperatures. Although kilo robot operates in temperatures from 10°F to 100°F, exposure to extreme heat or cold can affect the components and the battery's performance.

Ensure you don't cover the lenses or sensor areas. Blocking cameras and sensors with tape, cargo or other materials results in poor robot performance and limited range of motion.

Power on and charge kilo robot at least once a month to ensure the battery's health. The battery pack makes sure that the battery is being charged to just the right level.

Should you encounter a problem, you can find additional documentation, detailed FAQs, and troubleshooting information online at knowledge.piaggiofastforward.com. You can also directly contact [Customer Care](#).

kilo robot improvements and bug fixes are delivered through over-the-air (OTA) updates. Use PFF pro app to check for and install updates (pg 55).



WARNING: Opening, modifying, or tampering with kilo robot voids the warranty.

PFF pro

What is PFF pro™?

PFF pro is an application where PFF robot users can maintain their robots, perform software updates on their robots, monitor usage data, and more. PFF pro is designed specifically for businesses and organizations with employees that use multiple robots.

PFF pro tools consists of 2 digital applications, **PFF pro web** and **PFF pro app**.

Subscription Tiers

Depending on your subscription, additional features are available. You can view your tier status and upgrade to the next tier in your user settings (pg 60). **Features that require Fleet Tier status are labeled accordingly throughout the manual.**

Features	Starter	Fleet
Create PFF pro Account	X	X
Add and Operate a Robot	X	X
Update Robots in App	X	X
Enable/Disable Robots		X
Manage Wi-Fi Networks on Web		X
Enable/Disable User Checkout		X
View Performance Data		X
Trips	X	X

Getting Started

Download the app

You can download the PFF pro app on your smartphone from the [Apple App Store](#) or [Google Play Store](#).

Using PFF pro app

PFF pro app is a mobile application, accessible by anyone at an organization that uses a PFF robot, for day-to-day operations such as:

- Checkout/return robots
- Register new robots
- Trips
- Update robots
- Report issue

Login

To use the PFF pro app, you need to be added to your organization by an admin through PFF pro web (See “How to Create New User”, pg 59). Once added, you will receive an email invitation with temporary login credentials. You will be prompted to create a new password once logged in.

For existing users, open the app on your smartphone and log in using your username/email and password.

Once logged in, you can use the bottom navigation bar to switch between different tabs.

My robots

This is the primary tab that serves as the homepage of the PFF pro app. Here you can see the robots that are available for use, check them out and control their settings, see robots that are currently checked out by you, and return them.

Support

This tab allows you to contact the PFF Customer Care team for any further support. Fill out the form to create a Customer Care ticket. Your email address will be used for follow up if necessary.

Account

You can view and edit your account information, as well as log out of the app.

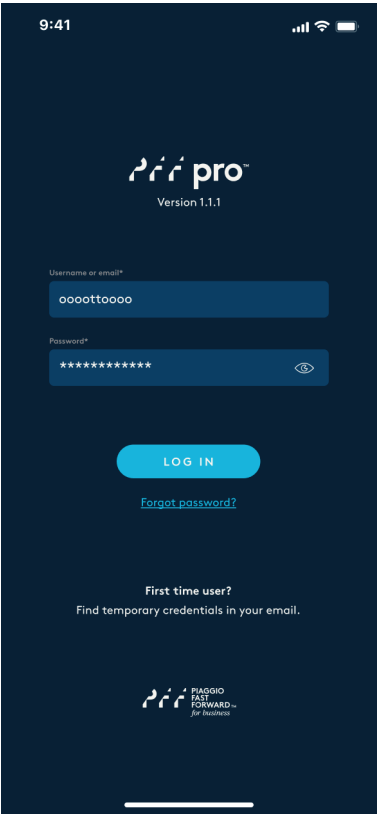


Figure 7.1 Login

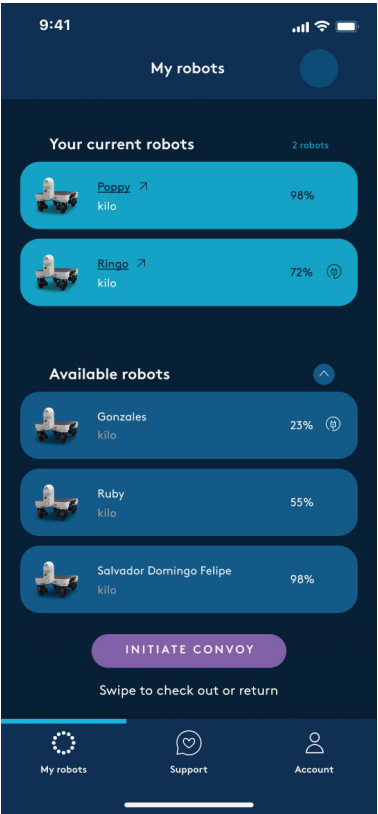


Figure 7.2 App homescreen

Using PFF pro web

PFF pro web is a browser-based application intended for admins and/or managers. Admins have full access to the PFF pro web as well the PFF pro app. A regular user will not have access to PFF pro web. The core functionalities of PFF pro web include:

- Monitoring usage data
- Control access to robots
- Edit user access level (admin vs. non-admin)
- Updating robots
- Create/remove users

Login

If this is your first time logging into PFF pro web, you should receive an email that contains temporary credentials for you to log in. Once logged in, you will be prompted to update your account information.

For existing users, open your internet browser and go to robots.pffpro.com. On this page you will be prompted to enter your username and password for your organization.

Once you are logged in, you can use the sidebar to navigate and access different features and functionalities within each tab.

Robot management

The robot management tab shows you the list of your organization’s robots, each robots’ status, and software version. You can update your robot, edit robot permission, and toggle on/off robot’s usability in this tab.

User management

The user management tab shows you the users within your organization. You can invite new users, and view current user information, control user permissions, and access certain advanced robot features.

Settings

The settings tab contains information about your company as well as your PFF pro account. You can edit company information, account information, and promote/demote users to administrators.

Support

The support tab allows you to contact the PFF Customer Care team for any further support.

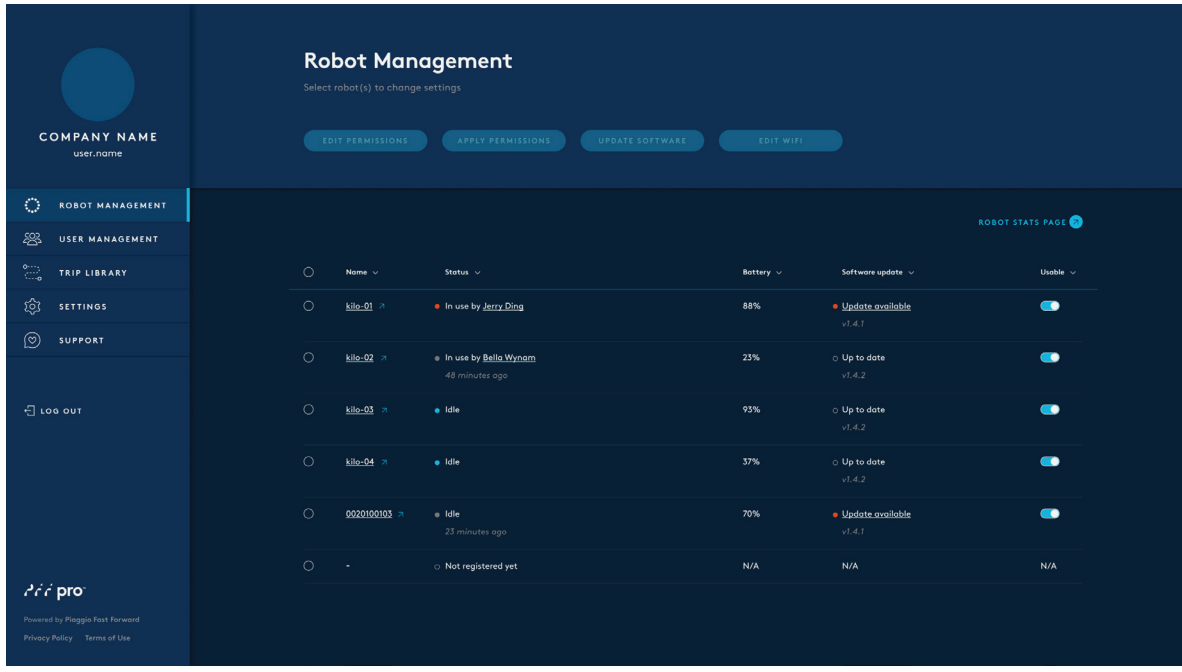


Figure 8.1 PFF pro web dashboard

My Robots Homepage

Below is what you might see on the app homepage and what it means:

No robot checked out

You currently have no robots checked out. Depending on your subscription tier, you can check out up to 5 robots at a time from the Available robots list (Figure 9.1).

Checked out robots

Once a robot is checked out, it will show in Your current robots (Figure 9.2).

No available robots to check out

This appears when there are no robots available for you to checkout. It may be that certain robots are not available to you, or the admin from your organization hasn't registered robots (Figure 9.3) (See "Register new robots," pg 38).

Checking Out/Returning Robots

Checking out and returning robots is the core function of the PFF pro app. As a user, you can select which robot(s) to check out based on your task. Once checked out, you can pair with the robot(s) by pushing the **Follow** button on the robot(s). Admin will be able to see who is currently using a robot via the PFF pro web. When users check out a robot, they are responsible for making sure they are using the correct one and that they are being used in accordance with your organization's regulations. To lock robots from following, see "Pairing" (pg43) and "Usability" (pg 47).

Checking out

You can check out a robot by swiping the robot name from the Available robots list. Swiping can be done to the left or the right (Figure 9.4).

Returning robots

Once you're done using the robot(s), swipe the robot(s) from Your current robots. The robot(s) will return back to the pool and become available for other users (Figure 9.5).



Figure 9.1
No robots checked out

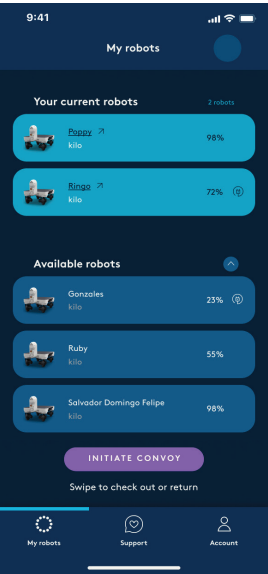


Figure 9.2
Checked out robots

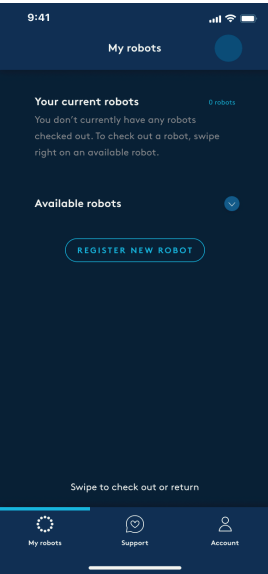


Figure 9.3
No robots available

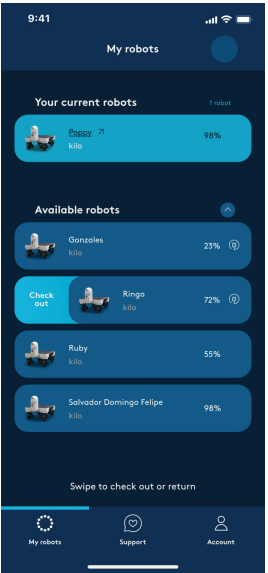


Figure 9.4
Swipe to checkout



Figure 9.5
Swipe to return

Register New Robots

When logging in with an admin account, the Register new robot option will show at the bottom of available robots (Figure 9.3).

1. Select robot

Make sure your robots are powered on and nearby. The robots that are associated with your organization will show on the list. Select the robot you want to register and start the registering process. You can only register one robot at a time (Figure 10.2).

2. Select Wi-Fi

Select a Wi-Fi network to connect to. PFF robots require a Wi-Fi connection to sync with the PFF pro web. For full functionality of PFF pro, you should connect to a Wi-Fi network (Figure 10.4).

3. Change robot name

You will be prompted to change the robot’s name. You can skip this step and change the name later via the PFF pro web (Figure 10.5).

4. Success + Register more

When complete, you will get a success pop-up. Clicking OK will bring you back to the Register new robots homepage where you can repeat the process with a new robot (Figure 10.6).

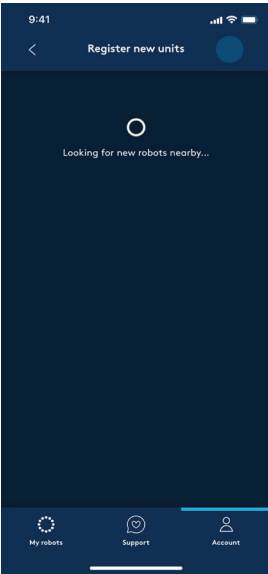


Figure 10.1
Searching nearby robots

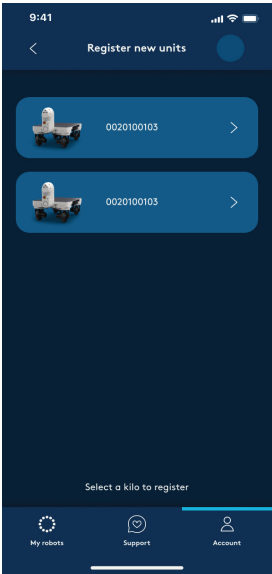


Figure 10.2
Robots available



Figure 10.3
Connecting to robot

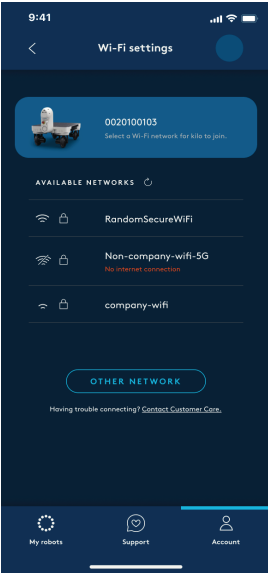


Figure 10.4
Select Wi-Fi network

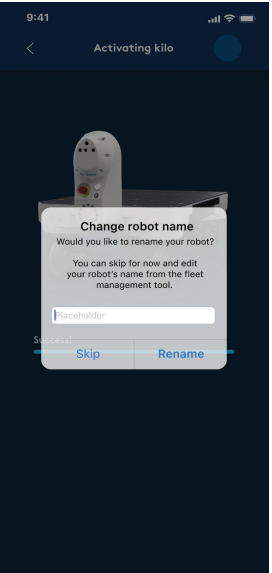


Figure 10.5
Renaming robot

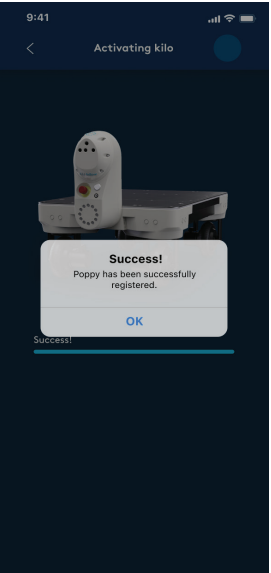


Figure 10.6
Successfully registered

Trips

Trips is a PFF smarts behavior that allows users to send robots on a common path without accompanying them. Users can create Trips on the PFF pro app and save them to the Trip Library for future use.

Create a Trip

Select the kilo robot you would like to use to create a Trip.

On the kilo robots profile, click Trip Library. This will show you all saved Trips for the robot and allow you to add a new Trip (Figure 11.1).

When you click Add New Trip, you'll be asked to place the robot at the start of the Trip. (Figure 11.2) Make sure there is enough space for the robot to follow you. When ready, stand in front of the robot and click Begin.

Once connected, kilo robot will follow the path you take and record it. When the path is complete, click Complete Training (Figure 11.3).

When Trip is complete, you can redo or confirm the Trip (Figure 11.4). Name your Trip and add a description if needed before saving.

Send kilo robots on a Trip

To send kilo robot on a Trip, swipe left or right on the desired Trip (Figure 11.5). Verify the Trip and switch direction if necessary before selecting Send on Trip (Figure 11.6).

While traveling, the robots card will appear **purple** saying where it is traveling to (Figure 11.7). When the Trip is complete, you will receive a push notification and the robots card will be back to its resting state.



WARNING: Parking kilo robot for an extended period of time during training will end the Trip training.

WARNING: Maximum Trip distance is 330ft. Robot will automatically end the Trip when distance is reached.

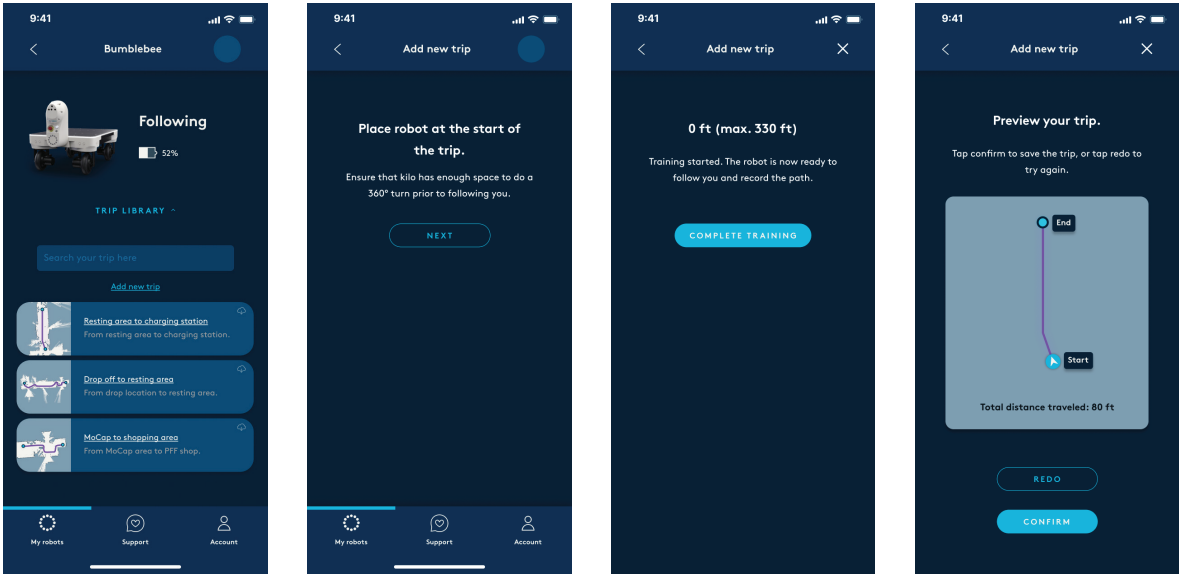


Figure 11.1 Add new Trip in Trip Library

Figure 11.2 Starting Trip

Figure 11.3 Walk the desired Trip

Figure 11.4 Preview Trip before saving

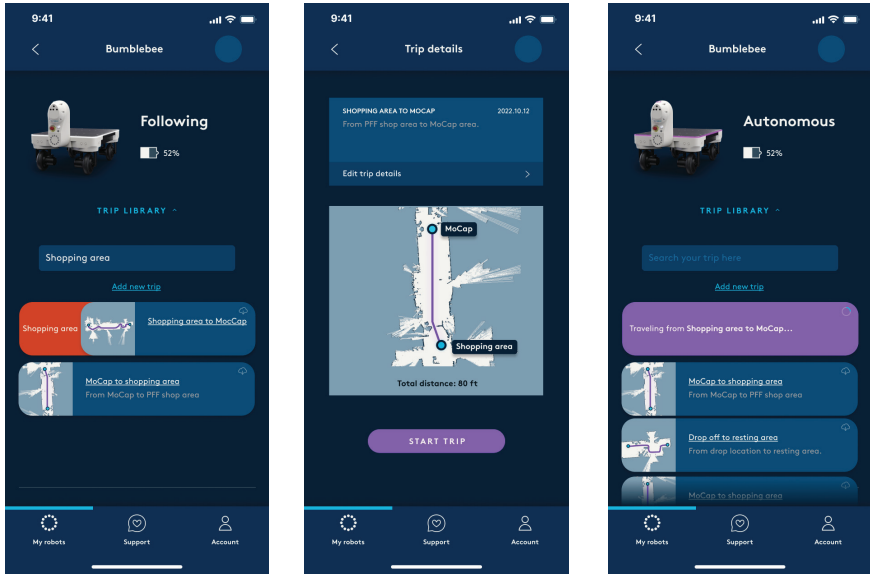


Figure 11.5 Send on Trip

Figure 11.6 Review selected Trip

Figure 11.7 Trip in progress

Manage Trips

Your Trip Library allows you to select saved Trips, edit existing details, or delete the Trip (Figure 12.1).

To delete multiple Trips, in your Trip Library select the radio button on the left of the desired Trips name. Click Remove Trips, you will be asked to verify this action before completing the deletion (Figure 12.2).

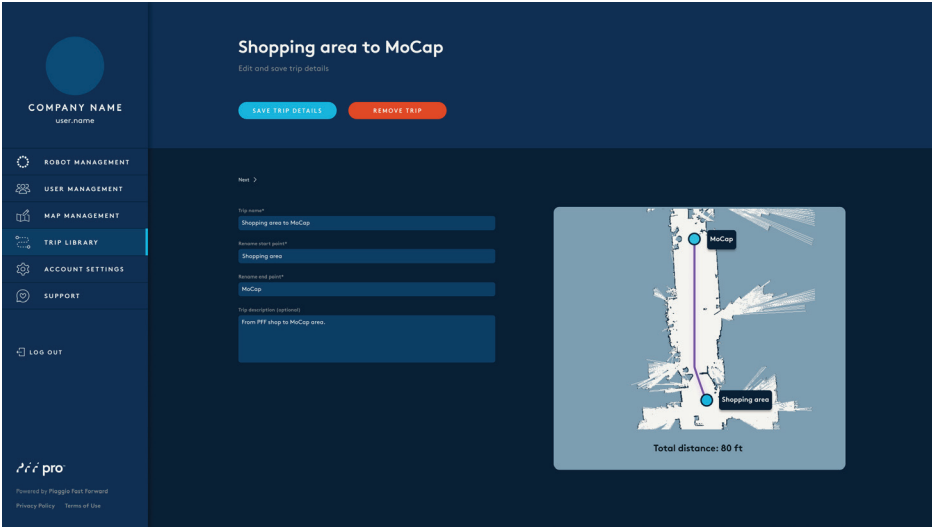


Figure 12.1 Manage Trip details

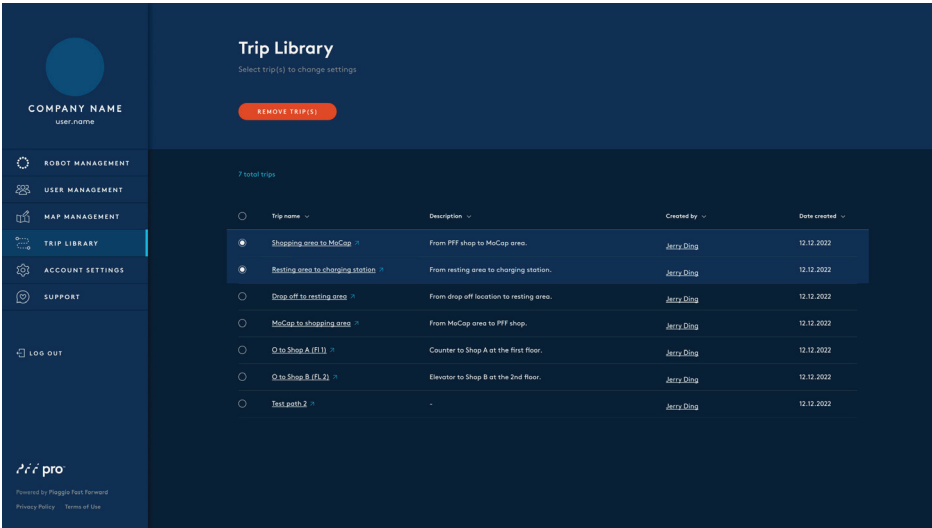


Figure 12.2 Delete multiple Trips

Robot Management

In-App Robot Settings

When you have a checked out robot, the robot name becomes clickable and you can access its status information and control certain robot settings.

1. Battery

Icon	Meaning
100%	White: 31–100% Battery is charged and the robot is ready to use.
30%	Yellow: 11–30% Battery is low. Robot should be plugged in after use.
10%	Red: 10% or less Robot should be plugged in as soon as possible, or it will shut down. Charging is required to use the robot again.
52%	Any color: plug icon next to battery level Robot is currently plugged in and charging.

2. Pairing

Toggle on/off to disable the Following function.

3. Sounds

Adjust the sound volume, or toggle on/off to completely mute the robot’s sounds. Note that certain critical error sounds cannot be muted.

5. Stealth

Toggle on/off to dim the lighting.

Robot Management Dashboard

The robot management dashboard serves as the homepage of PFF pro web (Figure 13.1). In this dashboard you will find all of the PFF robots at your organization, live status on each robot, and data. Depending on your subscription tier, you can also update robot settings in this dashboard, update software, and edit robot permissions.

1. Header

Shows all the actions you can take with the selected robot(s). The buttons might change based on how many and which robots you’re selecting at a time. See “Robot Action List” (pg 52) on what you can do with selected robot(s).

2. Robot stats page

Access to the Robot stats page where you can access information such as how many robots are checked out and by whom, the distance your robots have traveled in a specific amount of time, robot check out history, check out time, etc.

3. Robot list

Shows the list of robots with below information. To see more robots, scroll to the bottom of the page and additional records will load. To sort by a column, click on its title.

3.1 Select and edit robot(s)

Select a robot (or multiple robots) by clicking the circle to the left of the robot’s name in order to complete an action. You can also click the circle at the top of the table to select all robots currently in the list.

3.2 Name

By clicking the display name of each robot, you can access individual robot statistics and edit each robot’s name.

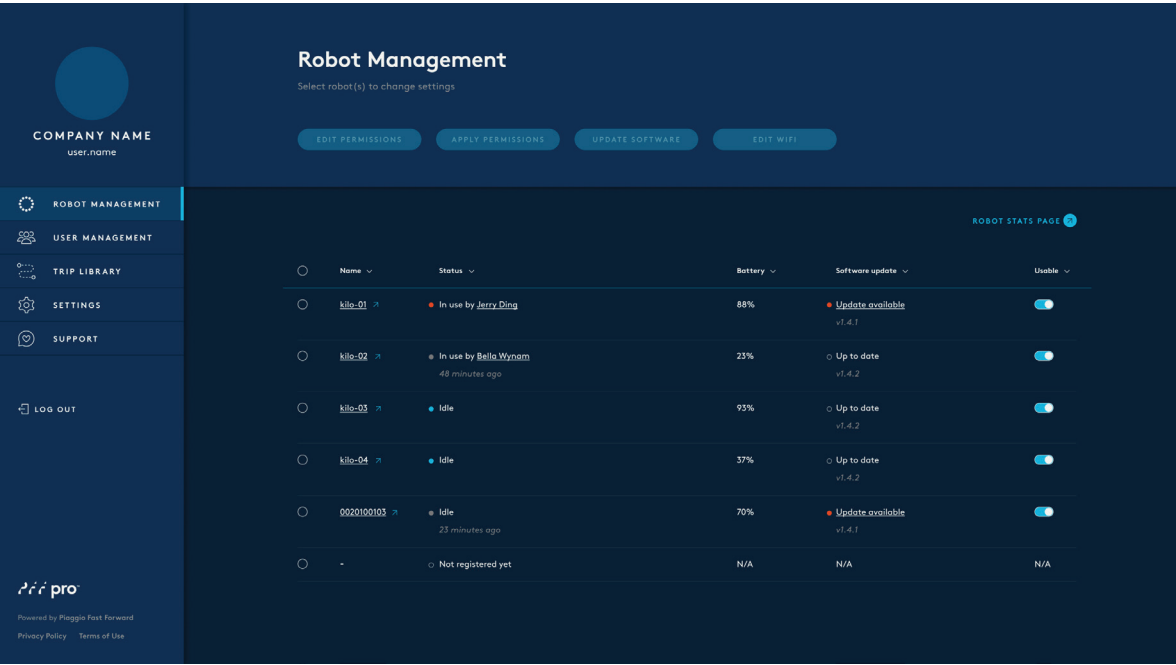



Figure 13.1 Robot management dashboard

3.3 Status

Preview	Meaning
<div><div></div><div>In use by Jane Doe</div></div>	Robot is currently being used by a specific user, within Wi-Fi range.
<div><div></div><div>In use by Jane Doe 43 minutes ago</div></div>	Robot is outside of Wi-Fi range. Time and status were updated the last time the robot was within range. Time stamp indicated how long it has been since the robot has been within range.
<div><div></div><div>Idle</div></div>	Robot is idle and ready to be used.
<div><div></div><div>Idle</div></div>	Robot is outside of Wi-Fi range. Time and status were updated the last time the robot was within range. Time stamp indicated how long it has been since the robot has been within range.
Not registered yet	Robot is not yet registered and not ready to be used.

3.4 Battery

Icon	Meaning
70%	White: 31–100% Battery is charged and the robot is ready to use.
25%	Yellow: 11–30% Battery is low. Robot should be plugged in after use.
5%	Red: 10% or less Robot should be plugged in as soon as possible, or it will shut down. Charging is required to use the robot again.
37% 	Any color: plug icon next to battery level Robot is currently plugged in and charging.

3.5 Software Update

Icon	Meaning
<div><div></div><div>Up to date v1.4.2</div></div>	Robots software is up to date.
<div><div></div><div>Update available v1.4.1</div></div>	Robots software is not up to date. An update is available to install.
<div><div></div><div>Update scheduled for next available time</div></div>	Robot’s software will update the next time it meets all requirements: within Wi-Fi range, plugged in, and above 50% battery level.
<div><div></div><div>Updating 24% <div></div></div></div>	Robot’s software is currently being updated.
<div><div></div><div>Update available Last update could not complete</div></div>	Last attempt to update software could not be completed. Please try again.

3.6 Usability (FLEET TIER)

This is a quick way to toggle robot access on or off for all employees without changing the permission list. If a robot is already in use, it will be made unavailable automatically when it is returned by the user and will not be available to check out until it is marked as usable. To allow certain employees to access each robot, check the “Edit permissions” sections (pg 52, pg 59).

Individual Robot Profile (FLEET TIER)

Click on a robot's name to access their individual information. Use arrows at the top to move to next and previous robots alphabetically by name.

Edit robot

Including robot name, Wi-Fi, permissions, and software update.

Info

See basic information for each robot.

Statistics

Statistics are only available if User Checkout function is enabled.

See statistics for individual robots. You can hover and click each bar in the graph to access specific information. After you select a bar, you can use the navigation to move to the next and previous bars.

Time Filters

Adjust filters to show data from different periods of time between 7 days, 30 days, and all time.

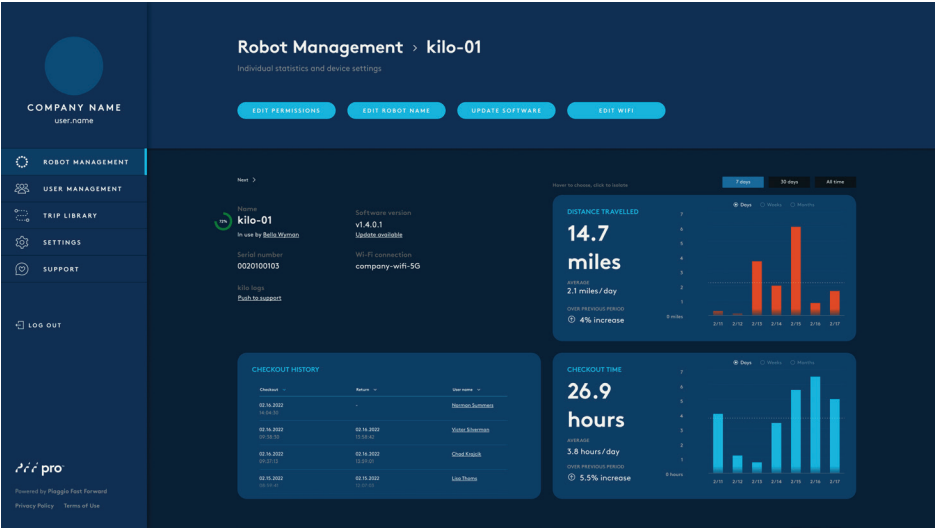


Figure 14.1 Individual robot statistics

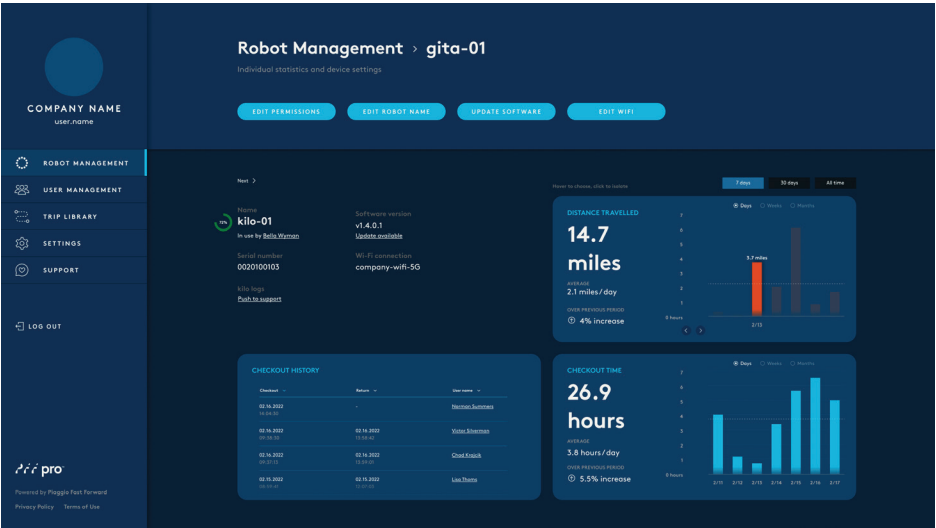


Figure 14.2 Click a bar to access more specific information

Fleet Statistics (FLEET TIER)

Statistics are only available if User Checkout function is enabled.

Navigate to the Robot statistics page by clicking Robot stats on the Robot management dashboard.

Time filters

Adjust filters to show data from different periods of time between 7 days, 30 days, and all time.

Checked out

Shows how many robots have been checked out over a period of time. You can quickly see how long a robot has been checked out by noting the length of the bar. The longer the bar, the more check out time the robot has.

Checkout history

Shows who checked a specific robot out and when.

Distance traveled

Shows distance this robot traveled over a set number of days. You can hover and click each bar in the graph to access specific information. After you select a bar, you can use the navigation to move to the next and previous bars.

Checkout time

Shows total time this robot has been checked out. You can hover and click each bar in the graph to access specific information. After you select a bar, you can use the navigation to move to the next and previous bars.

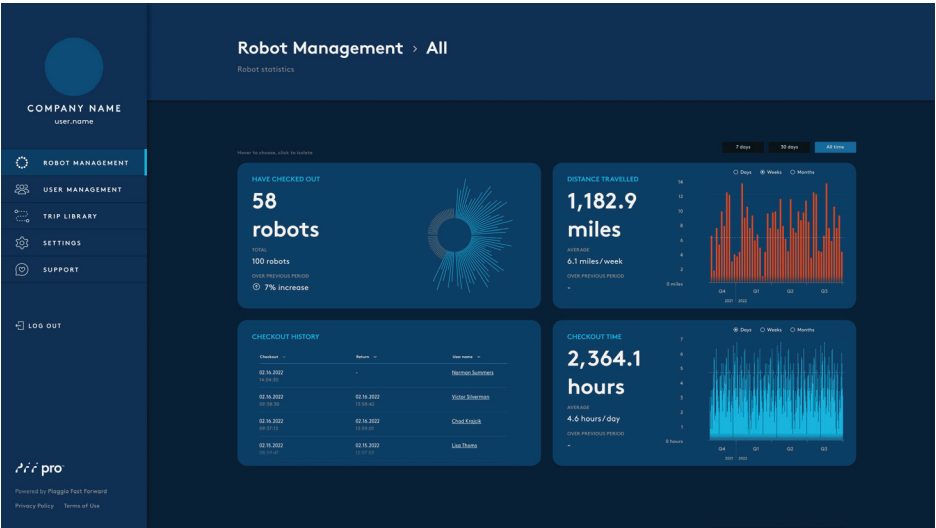


Figure 15.1 Fleet statistics

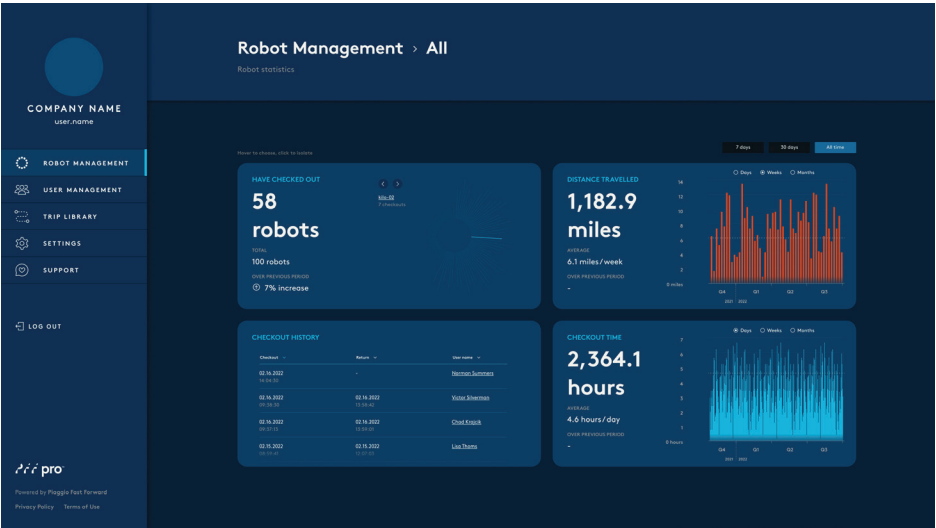


Figure 15.2 Click a bar to access specific information

Robot Actions List

Shows all the actions you can take with the selected robot(s). Features vary based on your subscription level.

Edit permissions (FLEET TIER)

Permissions can only be edited for one robot at a time.

Add permissions

Use the search bar to look up existing users. You can select multiple users, and then select Add to confirm your choices.

Remove permission

Use the trash icon to remove users from the robot's permissions. Admins are added and removed in Account Settings.

Apply permissions (FLEET TIER)

Select the robot from which you'd like to copy permissions and apply to all other selected robots. You may only select one robot that you wish to copy.

Edit Wi-Fi (FLEET TIER)

Edit multiple robots' network

When multiple robots are selected, only the networks available to all robots will show.

No network available

There are no Wi-Fi connections to be made. Try restarting your app, router, or phone. If you still cannot see an available network, contact your IT department to see if there's an issue with the Wi-Fi. If you need further assistance, contact Customer Care.

Network error (unable to connect)

The Wi-Fi connection was unable to connect. Confirm your network name and your password. If those are correct, try restarting your router or robot and connect again. If this doesn't work, speak with your IT department to find out if the connection is being blocked or if there are issues with your Wi-Fi. If you need further assistance, contact Customer Care.

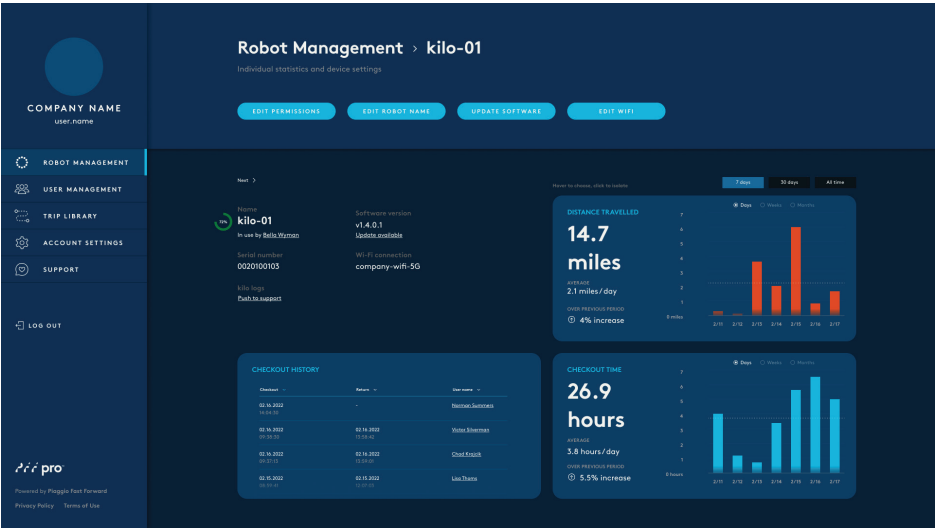


Figure 16.1 Robot settings

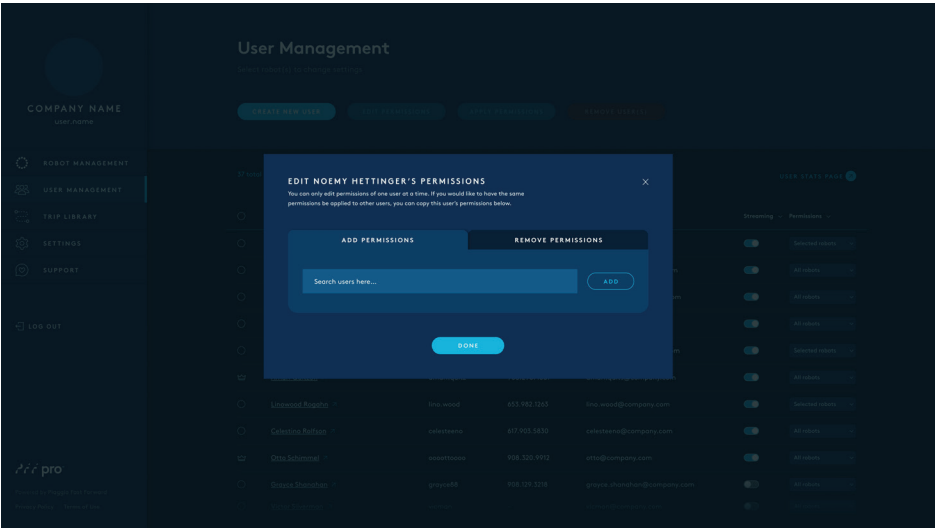


Figure 16.2 Edit permissions

Updating Robots

When an update is available, you will be notified with a pop-up when visiting robot details. You will also see a reminder as shown below.

To update multiple robots at once and have more control on when to update, we recommend updating robot software via PFF pro web. Once the update is initiated, you will return to the My robots page. The robot will continue updating in the background.

Update software on web

Select one or multiple robots to update when a new software is available. If any of the multiple robots selected are already up to date, only the robots that have new software available will be updated.

Update now

Perform the update on the robot selected immediately. Once performed, update status changes to “Updating” on Dashboard.

Schedule update

Depending on your subscription level, you may be able to schedule updates. Schedule selected robot(s) to update their software the next time they meet all the requirements (connected to Wi-Fi, 50% battery, plugged in). Once scheduled, update status will change to “update scheduled” on the Dashboard and the date for scheduled time is shown.

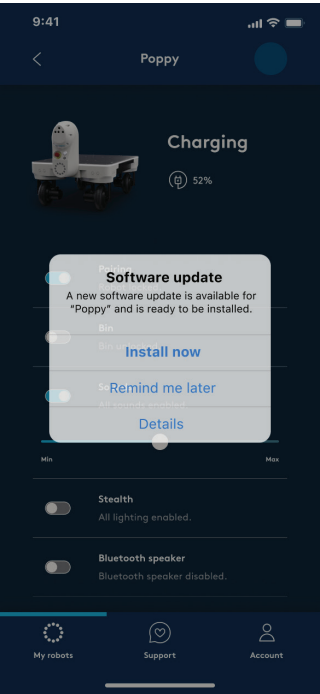


Figure 17.1 App pop-up

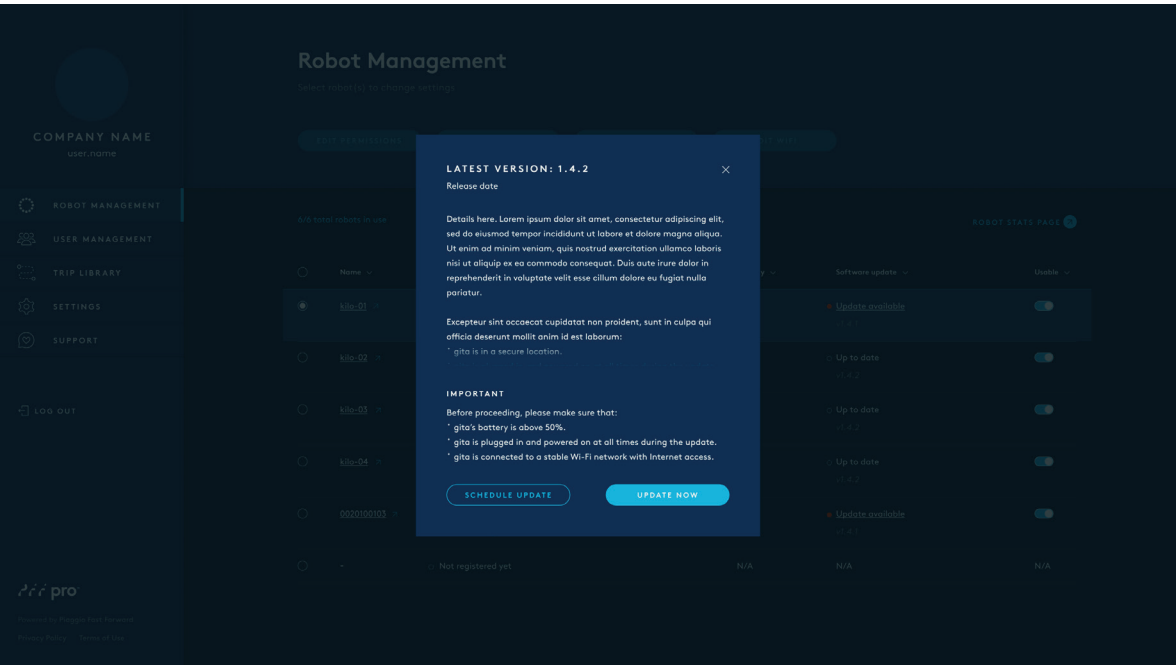


Figure 17.2 Update on web

User Management

In order for a person in your organization to use a robot, they must first be added as a user in the web portal and given permissions to the robot(s). Administrators can perform this action through the User Management dashboard.

User Management Dashboard

Shown in Figure 18.1, user management dashboard shows all the users in your organization. You can view user information, quickly update user permissions as well as create and remove users. You can also access the user stats page.

1. Header

Shows all the actions you can take with the selected user(s). The options may change based on how many and which users you’re selecting. See “User Action List” (pg 58) for what you can do with selected robot(s).

2. Total users

Shows the total number of users in your organization.

3. User stats page (FLEET TIER)

Statistics are only available if User Checkout function is enabled. Access to the User stats page. Here you will find information such as how many robots are checked out and by who, the distance your robots have traveled in a specific amount of time, robot check out history, check out time, etc.

4. User list

Shows the list of users with below information:

- Admin vs User status
- Name
- Username
- Phone
- Email
- Streaming
- Permissions

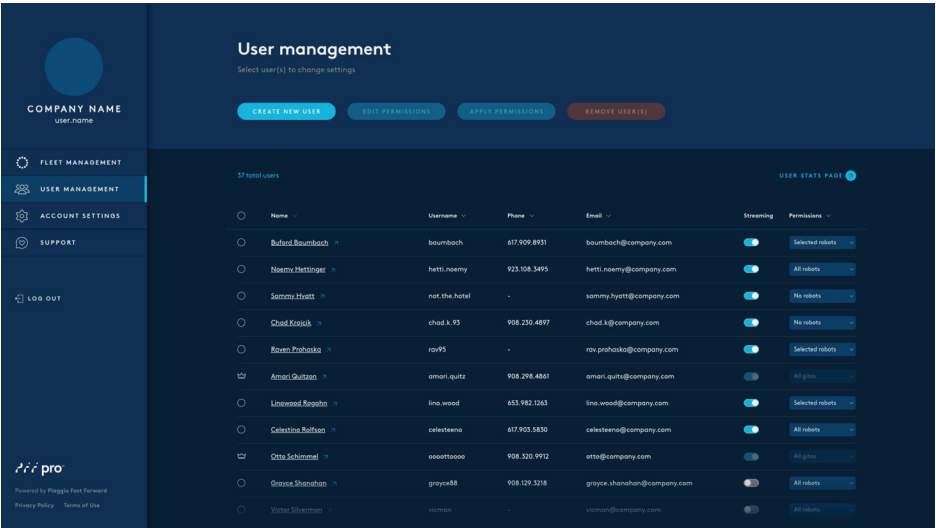


Figure 18.1 User management dashboard

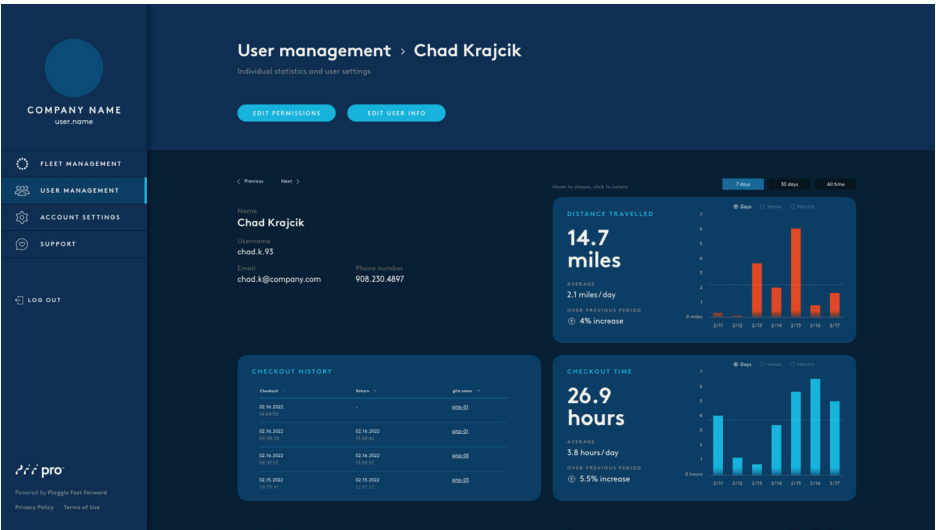


Figure 18.2 User statistics dashboard

Individual User Profile (FLEET TIER)

Statistics are only available if User Checkout function is enabled.

Click on a user’s name or the arrow icon to access their individual statistics.
Use top arrows to navigate between users (Figure 18.2).

Edit user info

Including user information and permissions.

Filters

Adjust filters to show data from different periods of time between 7 days, 30 days, and all time.

Statistics

See statistics for individual robots. You can hover and click each bar in the graph to access specific information.

Checked out

See how many robots have been checked out over a period of time. You can quickly see how long a robot has been checked out by noting the length of the bar. The longer the bar, the more check out time the robot has.

Checkout history

See which robot(s) the selected user(s) have checked out and checked in, which dates they did that, and for how long the user has had robot(s) checked out.

Distance traveled

See how many miles the selected user(s) traveled.

User actions list

From header of user management, you can take one of below actions:

Create new user

Enter a valid email address and press enter; you can enter as many email addresses as you need. Once your list is complete, click Send to send an invite email to the user(s). The user(s) will have to check their email inbox to finish creating their account (Figure 18.3).

New users will be added to the list on the dashboard. Only the email address will be present until the user finishes setting up their account and choses to enter in their information. The default permission is access to all robots.

Edit permissions (FLEET TIER)

Permission edits can only be done for one user at a time.

Add permissions

Use the search bar to look for robots. You can select multiple robots, and then select Add to confirm your choices.

Remove permissions

Use the trash icon to delete users from the robot's permissions.

Apply permissions (FLEET TIER)

Select the user from which you'd like to copy permissions and apply to all other selected users. You may only select one user that you wish to copy.

Remove user(s)

Delete the user from your account. This will remove their permissions for all robots. This action cannot be undone.

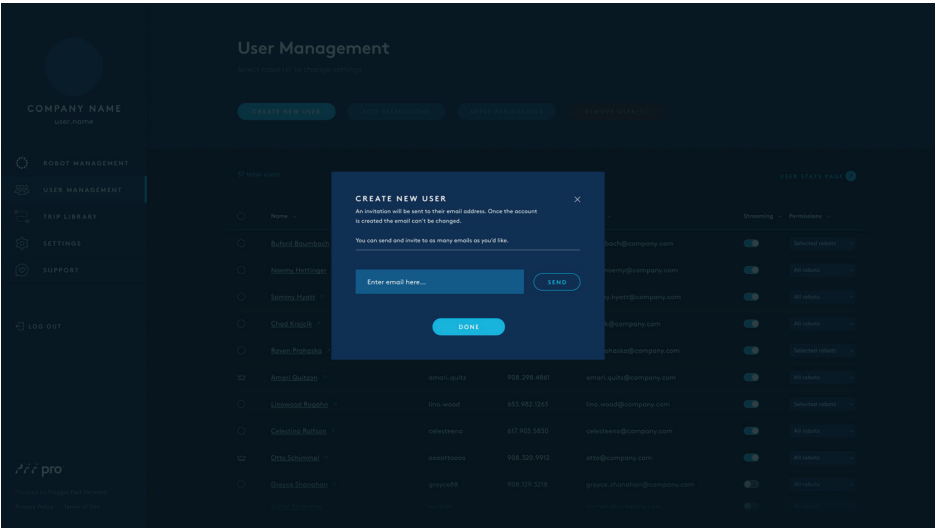


Figure 18.3 Create new user

Settings (Web)

This section covers both your user information as well as the company's account information. Here, you can edit your information and the account information as well as promote a regular user to an administrator, allowing them access to PFF pro web (Figure 19.1).

Edit Company Info

Changes across the entire company platform for all users within the organization.

Edit Account Info

Changes made here are specific to your user account.

Change password

Change the password associated with your user account. Your password will need to be at least 8 characters long, include upper and lower case letters, include at least one number, and include at least one special character.

Manage Admins

Add admins

Shown in Figure 19.2, to add administrators enter a valid email address. This can be an existing user or a new user.

Remove/Demote admins

You can demote administrators to users or you can delete the administrator account completely.

Manage Subscription

You can view your current subscription status and upgrade your subscription to the next tier.

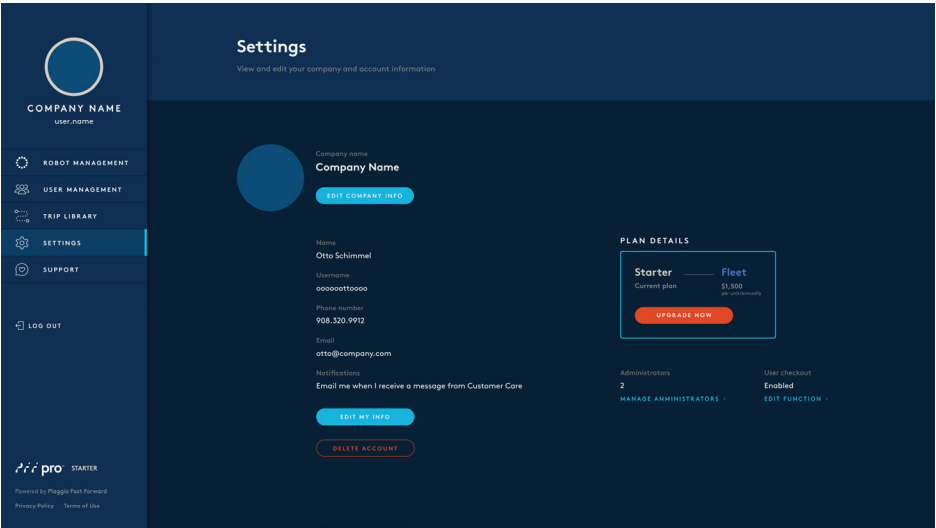


Figure 19.1 Web account settings

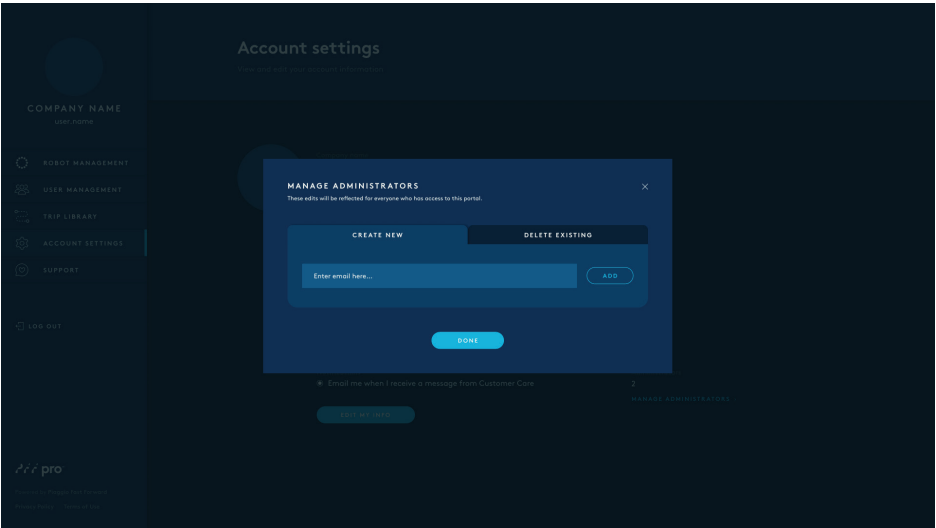


Figure 19.2 Manage admins on web

Settings (App)

You can view and edit your account information in the Account tab, as well as log out of the app.

Edit Information

By clicking the edit icon, you can change name, username, phone number, and password (Figure 21.1).

Delete account

Selecting Delete Account will delete your account; this action cannot be undone. You will be prompted to enter your password to confirm account deletion (Figure 21.2).

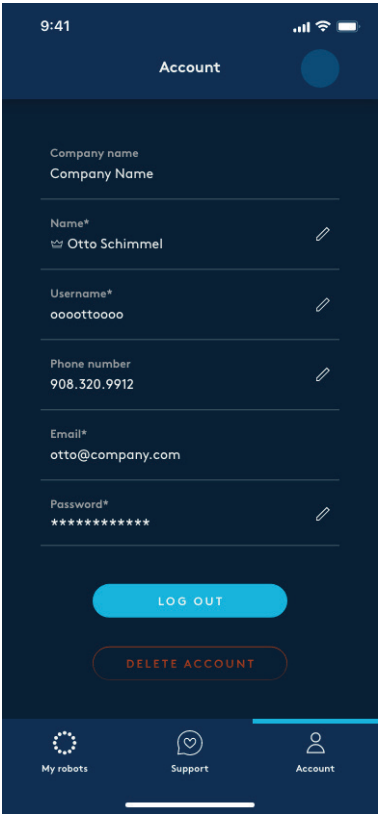


Figure 21.1
App account settings

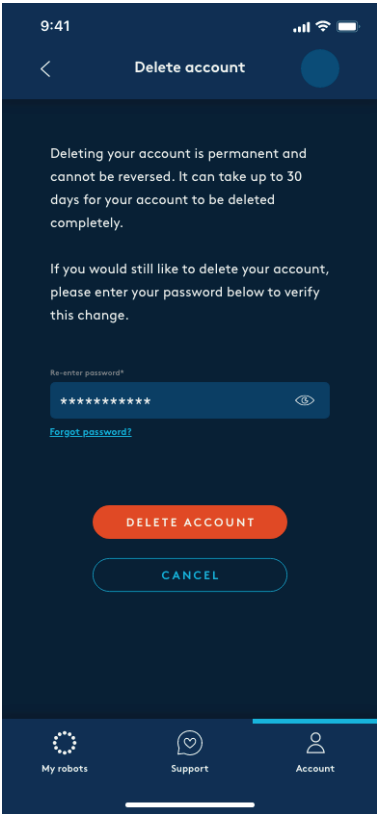
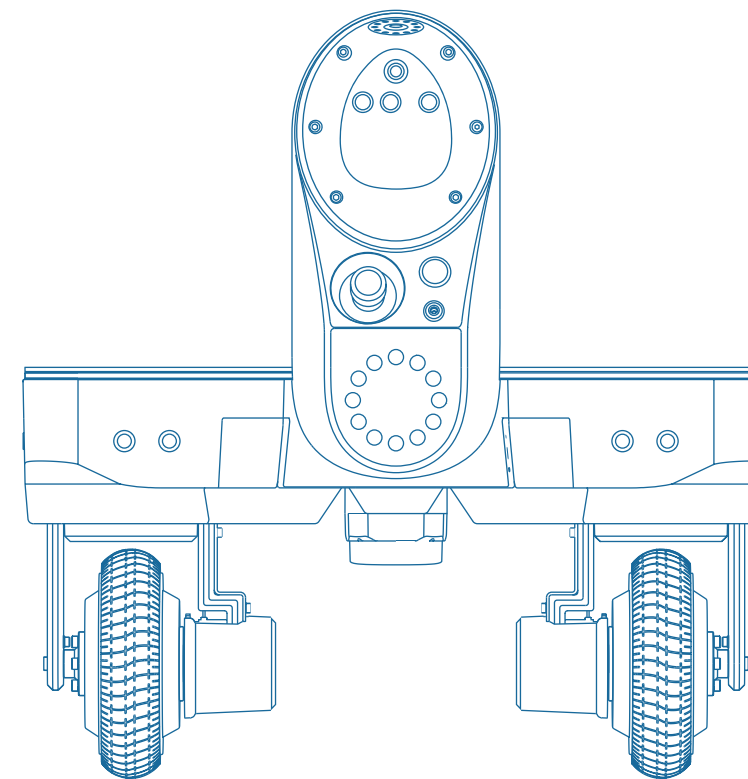


Figure 21.2
Delete account confirmation

kilo™ **piaggio** pro™

Manual

USER EDITION



PIAGGIO
FAST
FORWARD
for business

Rev 1 - 017-102208

User Edition

What is kilo™ robot?

kilo robot is a 4-wheeled robotic flatbed with hands-free human following capabilities, designed to work alongside humans.

Your interactions with kilo robot happens through one button that changes its color, brightness, and pattern as a function of those interactions. kilo robot’s light bar and sounds communicate its current state. kilo robot carries up to 300 pounds. A USB-C charging port lets you power a mobile device while kilo robot is powered on. kilo robot uses Wi-Fi to complete software updates and upload performance and diagnostic logs to PFF pro.

The PFF pro™ app is available for iOS and Android smartphones. It may be required for kilo robot’s operation and adds advanced functionality: PFF smarts®, security, and support.



WARNING: Do not step, stand or ride on the kilo mobile robot. May cause injury and/or equipment damage.

WARNING: Maximum Load Capacity 300 lbs. Do not drop load on platform.

WARNING: Never transport people, pets, unstable or improperly packaged hazardous cargo with kilo robot.

WARNING: If the cargo and shelving on the kilo robot bed exceed the 22in x 32in footprint of the bed, it will not be included during obstacle avoidance and therefore could make contact with the environment.

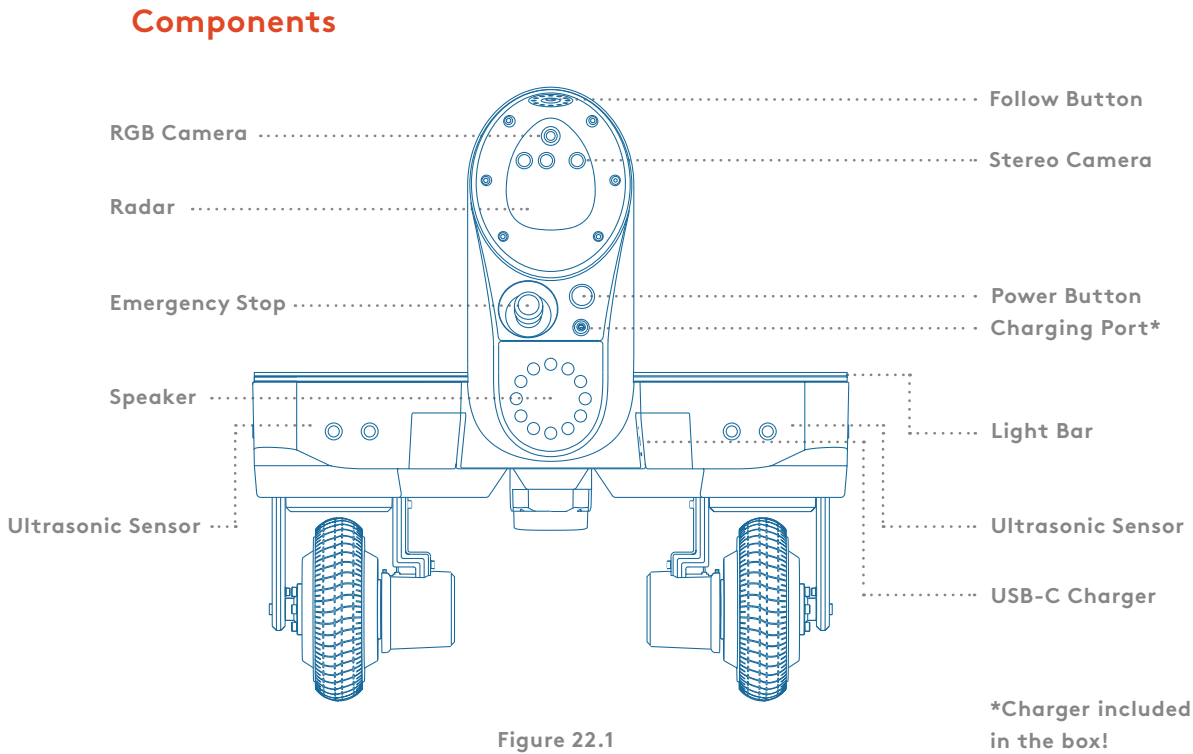


Figure 22.1

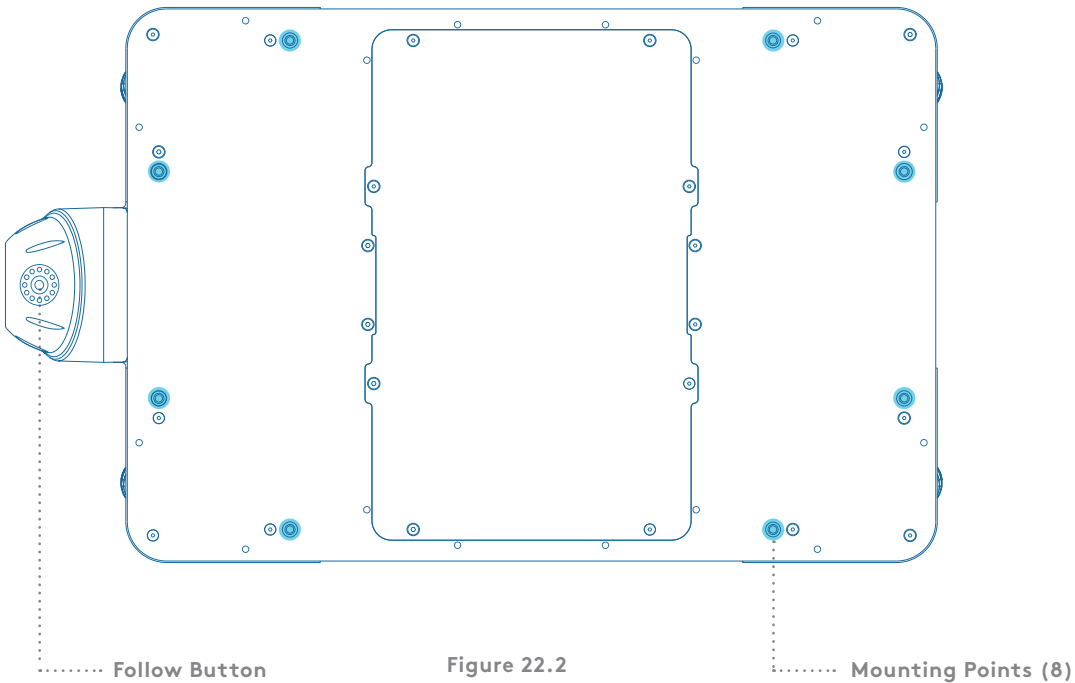


Figure 22.2

Interacting with kilo robot

The **Follow button** changes color, brightness, and pulse to make your interaction with kilo robot simple and straightforward. With this button, you switch back and forth between the two modes: **Standby** and **Follow**.

Standby

Standby is kilo robot's static position. You can enter or exit **Standby** by pressing the **Follow button**.

Should kilo robot's stability or safety be compromised, such as on a very uneven surface, it automatically stops moving and switches to **Standby**.

Follow

Follow is kilo robot's core functionality. All you have to do is stand in front of kilo robot and press the **Follow button**. kilo robot pairs with you and follows you as you walk away or reverse as you walk towards it, while differentiating you from fellow pedestrians. kilo robot is designed to match your pace, up to 3 miles per hour. It decelerates when you slow down and accelerates when you speed up.

kilo robot changes from **Standby** to **Follow** mode when you press the **Follow button**.

Walking with kilo robot

Your organization may require you to checkout robots before use and return them afterwards. For more information on checking out/returning robots, see the "Checking Out/Returning Robots" section (pg 76).

1. Stand facing the kilo robot and press the **Follow button**. kilo robot will pair with you. The **Follow button** will turn ○ **white** when it is ready to follow you.
2. Turn around and walk away or walk towards the kilo robot and it will follow you or reverse.
3. Press the **Follow button** again and kilo robot will unpair. The **Follow button** will turn ● **blue** in **Standby**.

Trips

Trips is a PFF smarts behavior that allows users to send robots on a path without needing a user. Learn more in the "Trips" section (pg. 78).

kilo robot indicates this temporary mode with lighting and the PFF smarts sound. ● **Purple** pulsing buttons and light bar indicate that the PFF smarts mode is active.

Charging

kilo robot is battery-powered and requires recharging. Under normal operating conditions, the battery supports an estimated 5 hours of continuous use and can be recharged in approximately 3 hours. We recommend that you plan your journeys accordingly.

kilo robot communicates its current charge status through the charge indicator in the PFF Pro app and its light bar:

- When the battery level is below 30%, the light bar changes from ○ **white** to ● **yellow**.
- When the battery level is below 10%, the light bar changes to ● **red**.
- **When the battery level drops below 5%, kilo robot is no longer able to move.** It enters **Standby** mode, and powers off. It can be used again once it has been recharged.

To charge kilo robot, ensure the unit is in **Standby** mode, then plug the charging cable into the charging port at the front and the power plug into a regular 3-prong wall outlet. While the charging cable is plugged in, it is not possible to exit the **Standby** mode.

While the battery is being charged, the **Follow button** pulses ● **green**; it changes to ● **solid green** once the battery has been fully charged.

The PFF pro app provides you with a detailed indication of the battery's status during the charge process.

Phone Charging

A charging port in the pillar lets you charge your mobile phone and other small electronic devices.

Power on and off

Automatic power off:

- When in **Standby** mode, kilo robot powers off automatically after 30 minutes.
- When in **Standby** mode and locked, kilo robot does not power off automatically.

Should circumstances require you to power kilo robot off manually, press and hold the **Power button** and release it after 3 seconds to properly shut down all of kilo robot's systems. To power on, briefly press and release the **Power button**. Wait 20–30 seconds between powering off and powering on your kilo robot.

Transporting kilo robot

Occasionally you may need to move your kilo robot around a difficult obstacle or into a tight parking place. In order to do so, always power off kilo robot.

kilo robot weighs approximately 140 pounds. When empty, kilo robot can be lifted by two people by gripping under the long sides of the robot; if you do not lift it in this manner, you run the risk of injuring yourself and damaging your kilo robot. Do not lift from the sensor tower. Keep hands clear of wheels (Figure 23.1).

If you are using a hand truck or other device to move kilo robot, first make sure it is off, then remove any cargo and employ the lifting procedure described above. Then properly secure kilo robot onto the moving device. If you do not properly secure kilo robot, you run the risk of damaging the robot. Damage caused by the failure to secure kilo robot is not covered by your warranty.



WARNING: Equipment exceeds 100 lbs. Two person lift required.

WARNING: Do not lift kilo robot by the front pillar, the wheels or any mounted structures; if you do so, you run the risk of injuring yourself and of seriously damaging your robots. Damage caused by improper lifting is not covered by your kilo robot warranty, so please use proper lifting procedures.

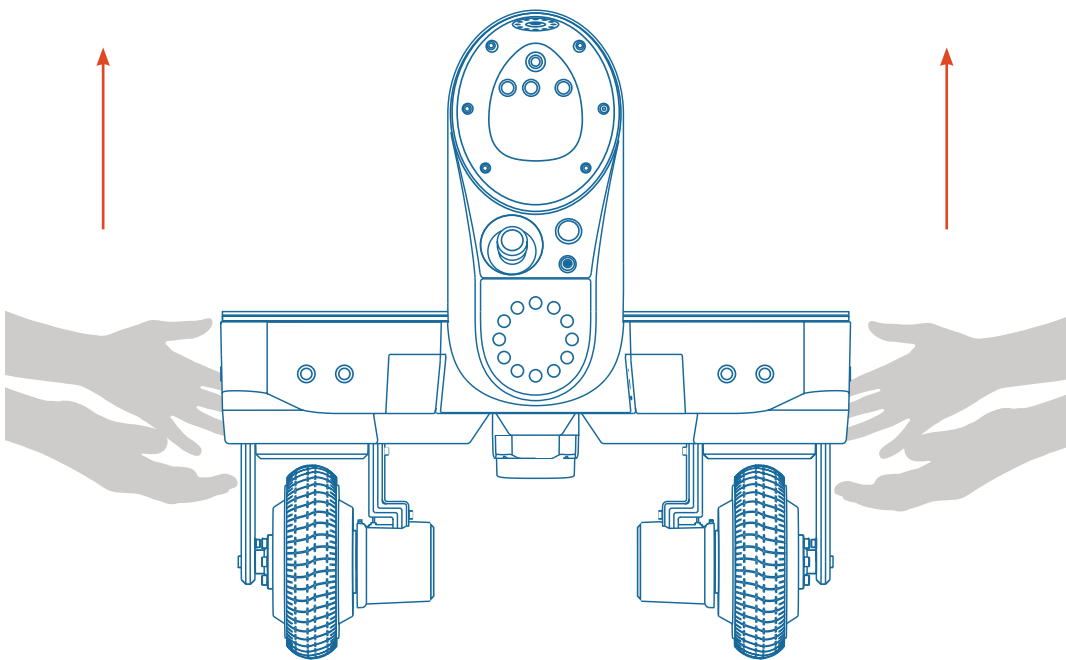


Figure 23.1 Proper lifting of kilo robot

Lighting

kilo robots communicate through lights and sounds. The table below shows what light colors correspond to behaviors and robot modes.

State	Color	UI Button	Light Bar
Power On/Off*	● Blue	Pulsing	Pulsing
Standby & Idle*	● Blue	Solid	Off
Pairing*	○ White	Fast Pulsing	Off
Follow*	○ White	Solid	Solid
Failed to Follow*	N/A	Single Pulse	N/A
Failed to Standby*	● Red	Single Pulse	Single Pulse
30-11% Battery	● Yellow	N/A	Solid (when applicable)
10% or Less Battery*	● Red	N/A	Solid (when applicable)
Charging*	● Green	Slow Pulsing	Off
Charged	● Green	Solid	Off

State	Color	UI Button	Light Bar
Error*	● Red	Fast Pulsing	Fast Pulsing
Mute/Unmute*	● Pink	Single Pulse	Single Pulse
Stealth	N/A	Fade to 50%	Fade to Off
Unstealth	N/A	Fade to On	Fade to On
OTA	● Orange	Slow Pulsing	Off
Inactive	● Green	Slow Pulsing	Off
Trips	● Purple	Pulsing	Pulsing
Checkout*	N/A	Fast Pulsing	Off
Training*	● Purple	N/A	Looping

*Sound Included

Using PFF pro app

PFF pro app is a mobile application, accessible by anyone at an organization that uses a PFF robot, for day-to-day operations such as:

- Checkout/return robots
- Trips
- Report issue

Download the app

You can download the PFF pro app on your smartphone from the [Apple App Store](#) or [Google Play Store](#).

Login

To use the PFF pro app, you need to be added to your organization by an admin through PFF pro web. Once added, you will receive an email invitation with temporary login credentials. You will be prompted to create a new password once logged in.

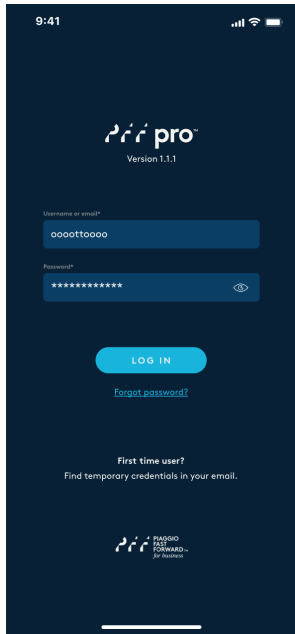


Figure 24.1 Login

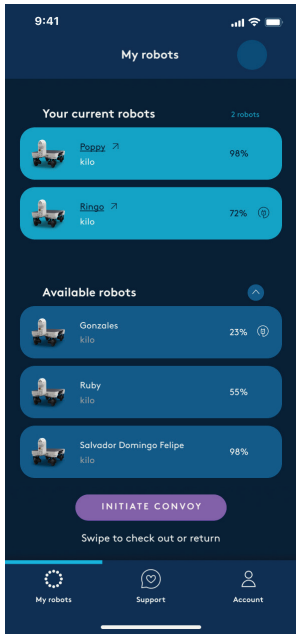


Figure 24.2 App homescreen

For existing users, open the app on your smartphone and log in using your username/email and password.

Once logged in, you can use the bottom navigation bar to switch between different tabs.

My robots

This is the primary tab that serves as the homepage of the PFF pro app. Here you can see the robots that are available for use, check them out and control their settings, see robots that are currently checked out by you, and return them.

Support

This tab allows you to contact the PFF Customer Care team for any further support. Fill out the form to create a customer care ticket. Your email address will be used for follow up if necessary.

Account

You can view and edit your account information, as well as log out of the app.

My Robots Homepage

Below is what you might see on the homepage and what it means:

No robot checked out

You currently have no robots checked out. Depending on your subscription tier, you can check out up to 5 robots at a time from the Available robots list (Figure 25.1).

Checked out robots

Once a robot is checked out, it will show in Your current robots (Figure 25.2).

No available robots to check out

This appears when there are no robots available for you to checkout. It may be that certain robots are not available to you, or the admin from your organization hasn't registered robots (Figure 25.3).

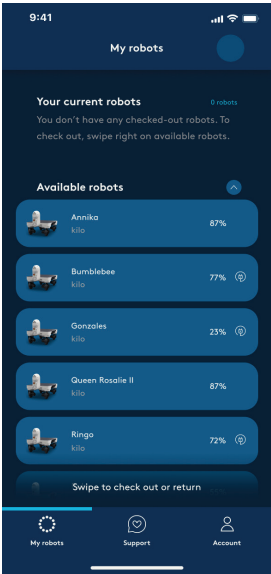


Figure 25.1
No robots checked out

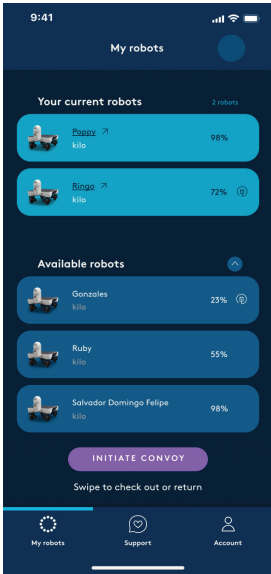


Figure 25.2
Checked out robots

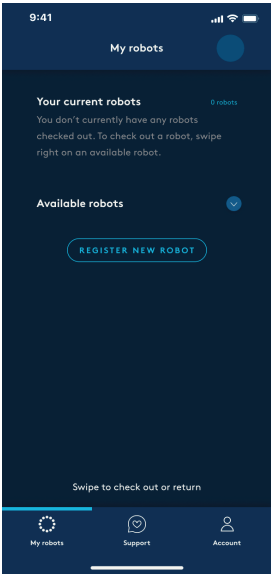


Figure 25.3
No robots available

Checking Out/Returning Robots

Checking out and returning robots is the core function of the PFF pro app. As a user, you can select which robot(s) to check out based on your task. Once checked out, you can pair with the robot(s) by pushing the **Follow button** on the robot(s). Admin will be able to see who is currently using a robot via the PFF pro web. When users check out a robot, they are responsible for making sure they are using the correct one and that they are being used in accordance with your organization's regulations.

Checking out

You can check out a robot by swiping the robot name from the Available robots list. Swiping can be done to the left or the right.





Returning robots

Once you're done using the robot(s), swipe the robot(s) from Your current robots. The robot(s) will return back to the pool and become available for other users.

Robot Settings

When you have a checked out robot, the robot name becomes clickable and you can access its status information and control certain robot settings.

1. Battery

Icon	Meaning
 100%	White: 31-100% Battery is charged and the robot is ready to use.
 30%	Yellow: 11-30% Battery is low. Robot should be plugged in after use.
 10%	Red: 10% or less Robot should be plugged in as soon as possible, or it will shut down. Charging is required to use the robot again.
 52%	Any color: plug icon nex to battery level Robot is currently plugged in and charging.

2. Pairing

Toggle on/off to disable the Following function.

3. Sounds

Adjust the sound volume, or toggle on/off to completely mute the robot's sounds. Note that certain critical error sounds cannot be muted.

5. Stealth

Toggle on/off to dim the lighting.

Trips

Trips is a PFF smarts behavior that allows users to send robots on a common path without accompanying them. Users can create Trips on the PFF pro app and save them to the Trip Library for future use.

Create a Trip

Select the kilo robot you would like to use to create a Trip.

On the kilo robots profile, click Trip Library. This will show you all saved Trips for the robot and allow you to add a new Trip (Figure 26.1).

When you click Add New Trip, you'll be asked to place the robot at the start of the Trip. Make sure there is enough space for the robot to follow you. When ready, stand in front of the robot and click Begin (Figure 26.2).

Once connected, kilo robot will follow the path you take and record it. When the Trip is complete, click Complete Training (Figure 26.3).

When Trip is complete, you can redo or confirm the Trip (Figure 26.4). Name your Trip and add a description if needed before saving.

Send kilo robots on a Trip

To send kilo robot on a Trip, swipe left or right on the desired path (Figure 26.5). Verify the Trip and switch direction if necessary before selecting Send on Trip (Figure 26.6).

While traveling, the robots card will appear **purple** saying where it is traveling to (Figure 26.7). When the Trip is complete, you will receive a push notification and the robots card will be back to its resting state.



WARNING: Parking kilo robot for an extended period of time during training will end the Trip training.

WARNING: Maximum Trip distance is 330ft. Robot will automatically end the Trip when distance is reached.

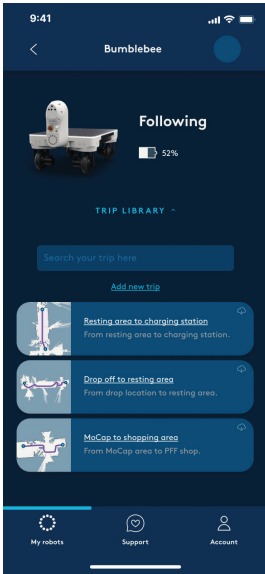


Figure 26.1
Add new Trip in
Trip Library

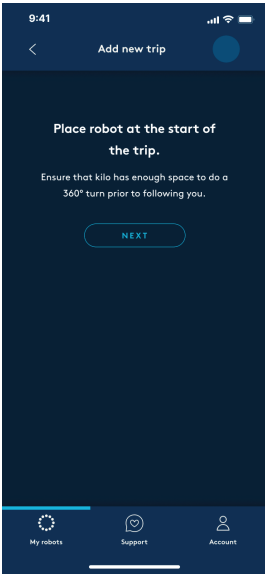


Figure 26.2
Starting Trip

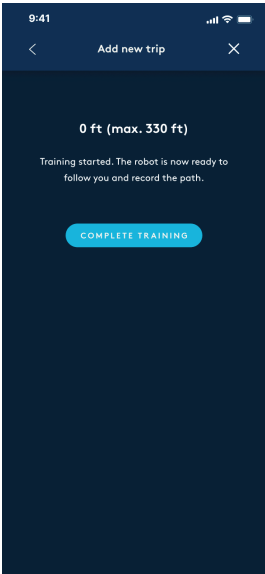


Figure 26.3
Walk the desired path

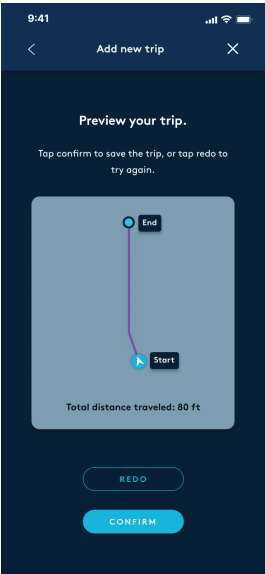


Figure 26.4
Preview Trip before
saving

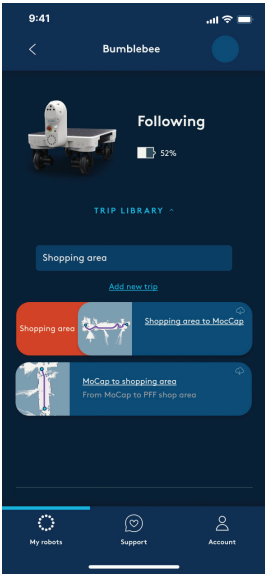


Figure 26.5
Send on Trip

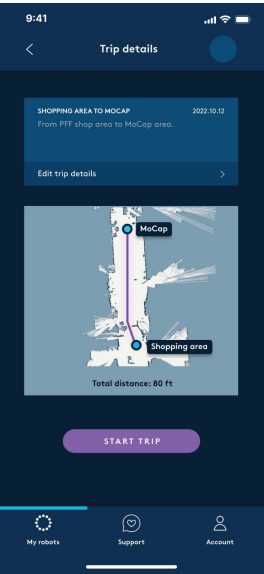


Figure 26.6
Review selected Trip

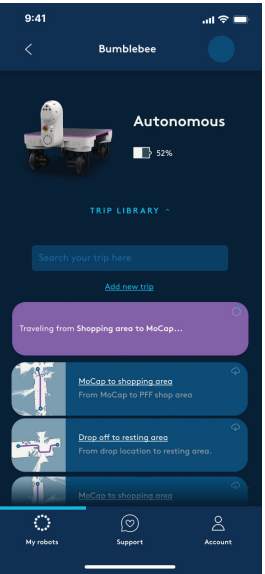


Figure 26.7
Trip in progress

Settings

You can view and edit your account information in the Account tab, as well as log out of the app.

Edit information

By clicking the edit icon, you can change name, username, phone number, and password (Figure 27.1).

Delete account

Selecting Delete Account will delete your account; this action cannot be undone. You will be prompted to enter your password to confirm account deletion (Figure 27.2).

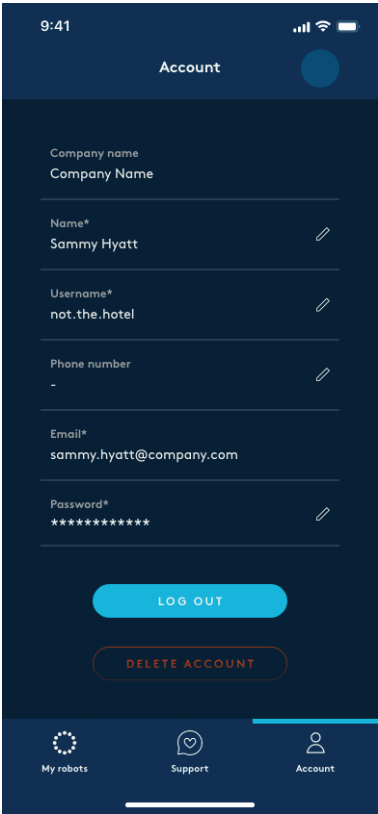


Figure 27.1
App account settings

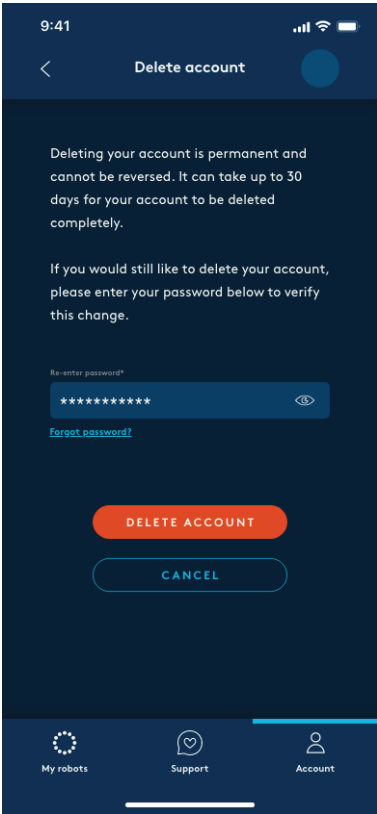


Figure 27.2
Delete account confirmation

Support

PFF pro Support allows you to contact the PFF Customer Care team for any further support. You can email [Customer Care](mailto:support@piaggiofastforward.com) or create a customer care ticket by filling in the form. Your email address will be used to follow up if necessary.

How to reach Customer care:

(800) 791-0843

support@piaggiofastforward.com

Where to find additional documentation, faqs, and Troubleshooting information:

knowledge.piaggiofastforward.com

Intellectual Property Notices

Registered trademarks

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Free and open source software

Information on free and open source software licenses for your kilo robot's software can be found at piaggiofastforward.com/open-source.

Regulatory Information

FCC

Supplier's Declaration of Conformity per 47 CFR § 2.1077

kilo Robot, K02129-KILO

Contains:

FCC ID: SQG-LWB5PLUS, IC: 3147A-LWB5PLUS (Laird, Sterling LWB5+)

FCC ID: 2AY6H-101187, IC: 27808-101187 (Piaggio Fast Forward, 012-101187)

kilo Robot, K02129.v2-KILO

Contains:

FCC ID: SQG-LWB5PLUS, IC: 3147A-LWB5PLUS (Laird, Sterling LWB5+)

FCC ID: RI7LE910CXWWX, IC: 5131A-LE910CXWWX (NimbeLink, NL-SW-LTE-TC1WWG)

FCC ID: 2A35D-DWM3001, IC: 23794-DWM3001 (Qorvo, DWM3001C)

FCC ID: 2AY6H-101187, IC: 27808-101187 (Piaggio Fast Forward, 012-101187)

Responsible Party Contact Information

Piaggio Fast Forward

52 Roland Street

Boston, MA 02129

857-997-2320

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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

CAN ICES-3(A)/NMB-3(A)

FDA

kilo Robot contains two Class 1 Laser Devices and is classified as a Class 1 Laser Product under IEC 60825-1 Ed. 3 (2014).

Complies with FDA performance standards for laser products except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.

FDA Accession Number: 2412100-000



CAUTION: Tampering with or adjusting any of the laser devices is not allowed. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

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