Robot One
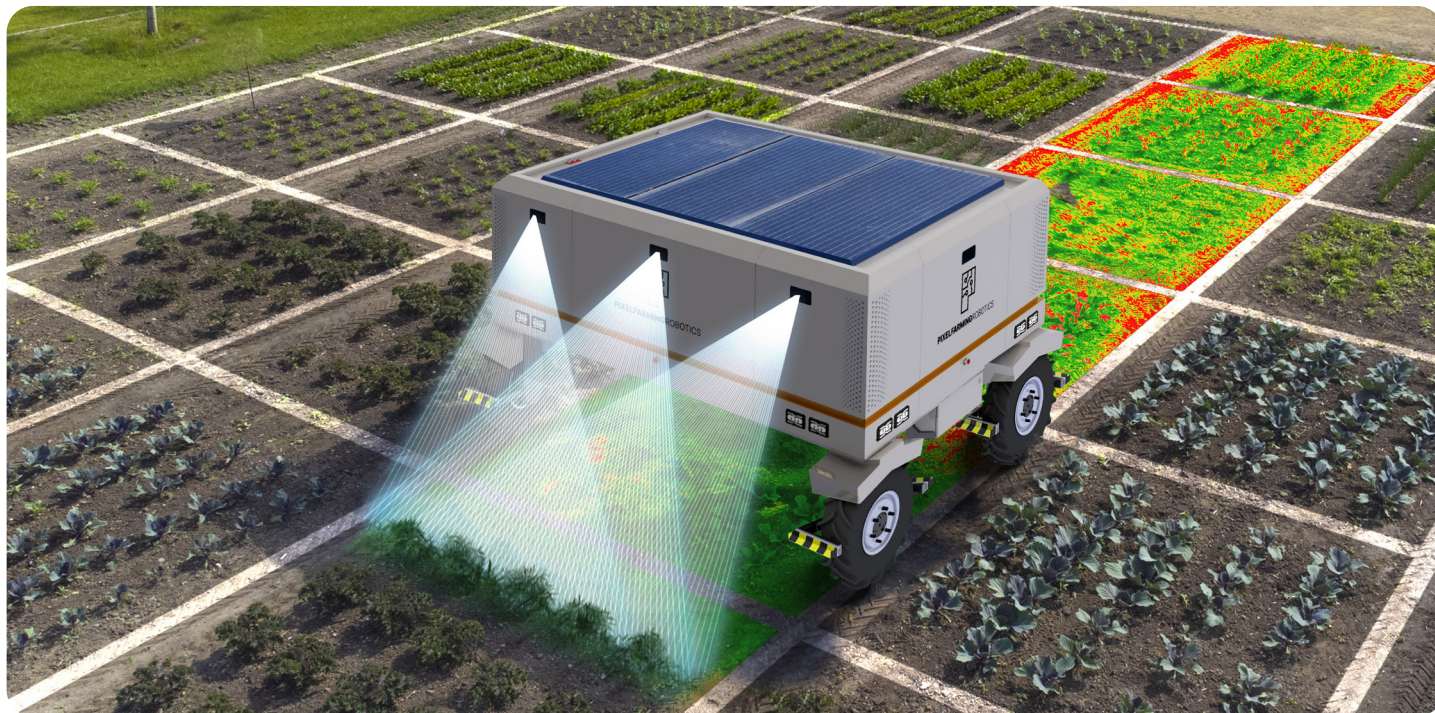## Brochure

Robot One

A smart agricultural robot designed for chemical-free weed control in large-scale environments.

Robot One is a automated agricultural robot designed for chemical-free weed control in large-scale environments. Equipped with 14 camera's for computer vision, solar panels and an optional hybrid range extender for all-day operation.

Can be equiped with up to 40 high-power lasers and include 10 controllable arms that are independently adjustable in row width and working depth.

Using both computer vision and data from its two GPS receivers, Robot One has an accuracy of up to 2 millimeters. This allows for plant specific crop treatment and chemical-free weed control.

Robot One helps farmers transition to regenerative farming. This not only increase soil fertility, but also improve water retention, reduce erosion, and promote biodiversity. In addition it can also lead to more resilient crops and higher yields.

Nett weight	**10.000 shots**	**Battery**	**Connectivity**	**Capacity**
2140 kg	Per laser, per hour	13 kWh	Dual RTK-GPS + Ntrip	1 hectare per hour

Proven technology

Each part of Robot One has been rigorously tested and validated in real-world conditions, ensuring that what we offer is not just a promise, but a reality.

Eradicate weeds with our high-power lasers

130 Watts and 10.000 shots per laser per hour.

Laser Technology is a well-known method used in a variety of industries. However, this technology is rarely used within the agricultural sector. We think this technology is a game-changer for farmers who are looking for a sustainable and efficient way to remove weeds.

Our CO2 high power laser module is designed to enable targeted weed control, without harming the soil or surrounding crops. This offers high precision and eco-friendly solution that encourages the rebuilding of healty soil and microbiome.

Compared to traditional weed removal methods such as the use of chemicals and mechanical weeding, laser technology offers a more sustainable and efficient solution to weed management. The use of chemicals has led to the increase of herbicide-resistant weeds and unwanted contamination of the soil.

With the laser module of Robot One the location of the weed is targeted, causing the plant to die off. The remaining plant material is reabsorbed by the soil and decomposed into nutrients that become usefull for the surrounding crops. This makes reduced use of fertilizer possible.

The use of laser technology improves, crop yield, plant health and more.

One Robot, two sizes

Robot One is designed to support the most used track widths up to 3.60 meters. With its compact dimensions it can be transported with a standard trailer.

Robot One

├─────── **3.60 M** ───────┤
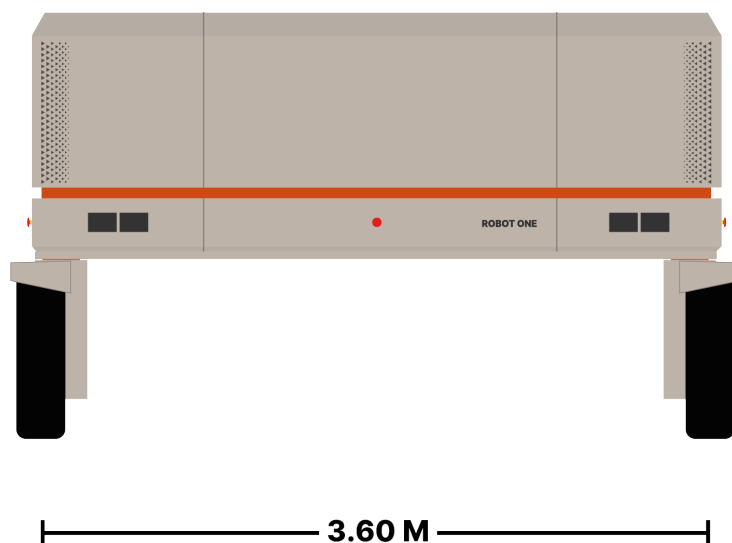
20 high-power lasers

Can mount up to 4 rows of laser units, 5 lasers per row
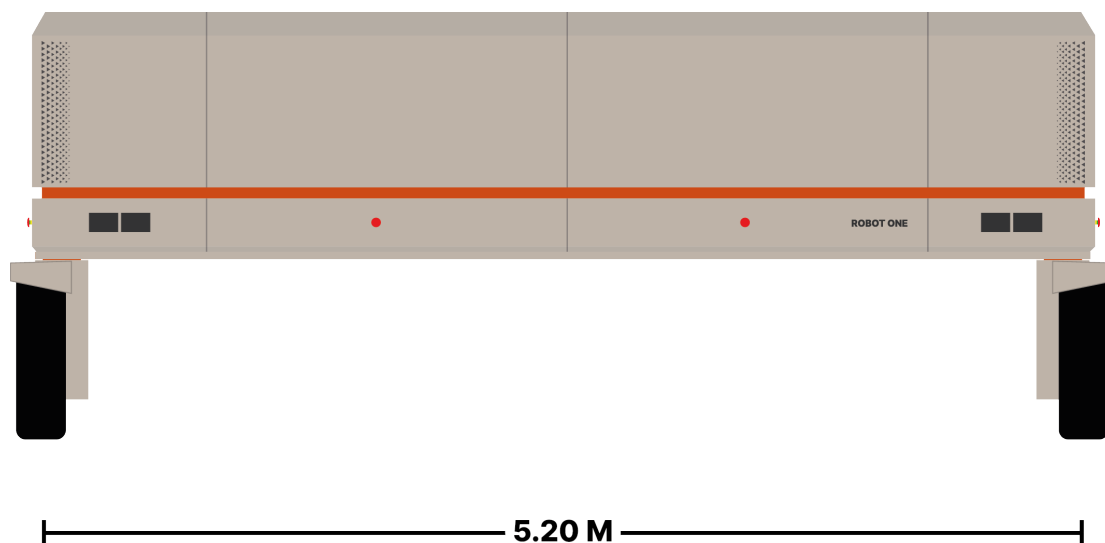
200.000 shots

Per hour with 4 laser units mounted

2.6 kWh power

130 Watt per laser per hour

Robot One L goes one step further and is aimed at large scale industrial farming with track widths up to 5.20 meters and required specialized transport.

Robot One L

5.20 M

40 high-power lasers

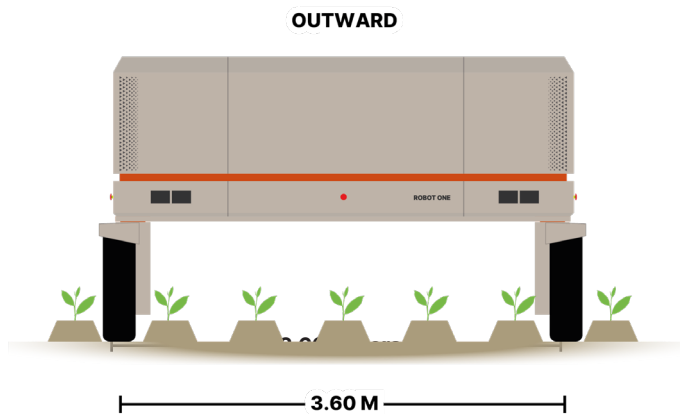Can mount up to 4 rows of laser units, 10 lasers per row

400.000 shots

Per hour with 4 laser units mounted
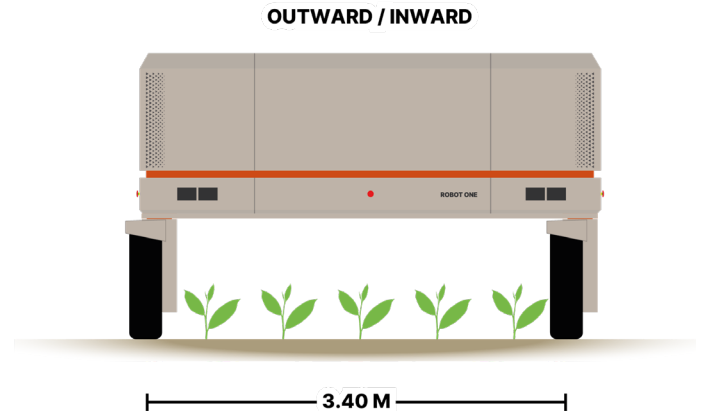
5.2 kWh power

130 Watt per laser per hour

Supported track widths

Robot One with its flexible layout and wheel orientation is able to adapt to all commonly used row widths and bed types.
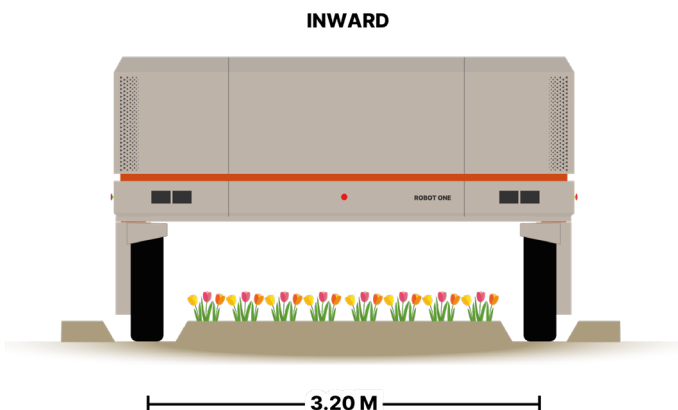
OUTWARD
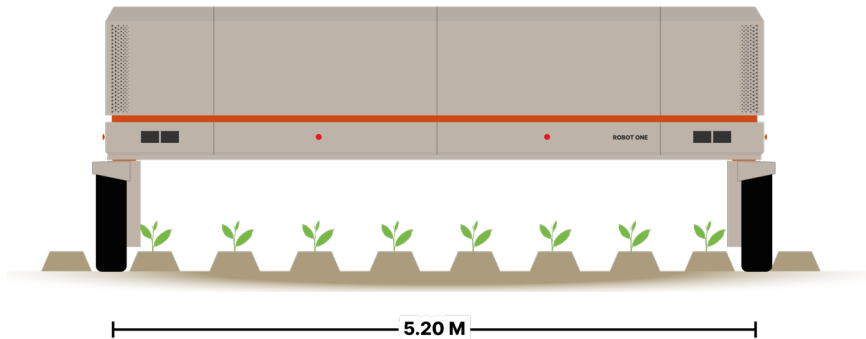
3.60 M

3.60 meters

Supports interdistance 50 cm, 75 cm

OUTWARD / INWARD

3.40 M

3.40 meters

Supports interdistance 50 cm, 75 cm

INWARD

3.20 M

3.20 meters

Supports bed sizes up to 285 cm

OUTWARD

5.20 M

5.20 meters

Supports interdistance 50 cm, 75 cm

OUTWARD / INWARD
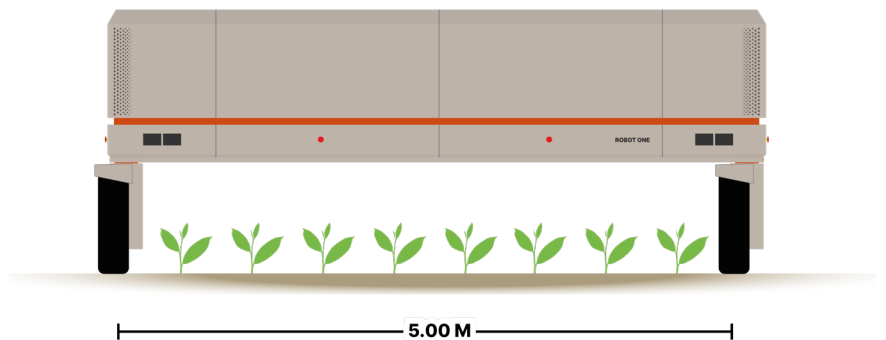
5.00 M

5.00 meters

Supports interdistance 50 cm, 75 cm

INWARD
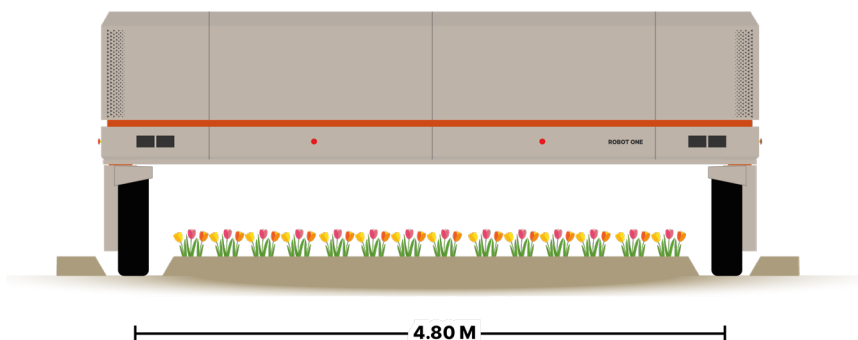
4.80 M

4.80 meters

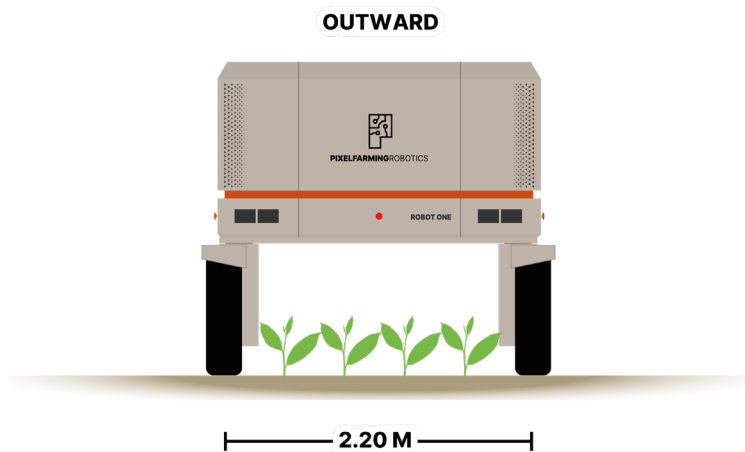Supports bed sizes up to 425 cm

Alternative drive

Robot One also has alternative driving modes to support specific row widths and bed sizes.

OUTWARD
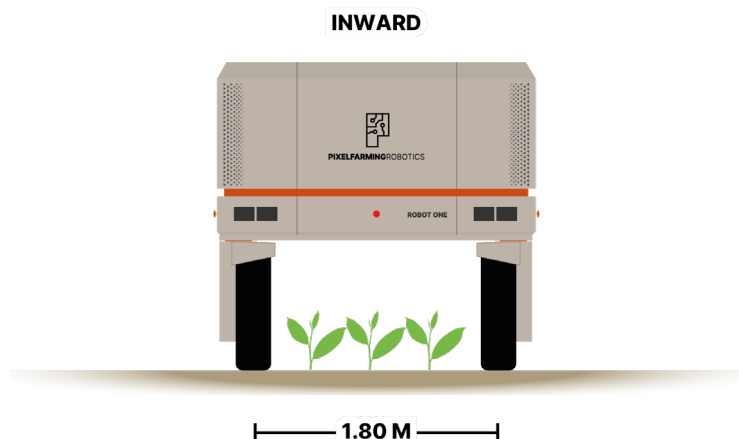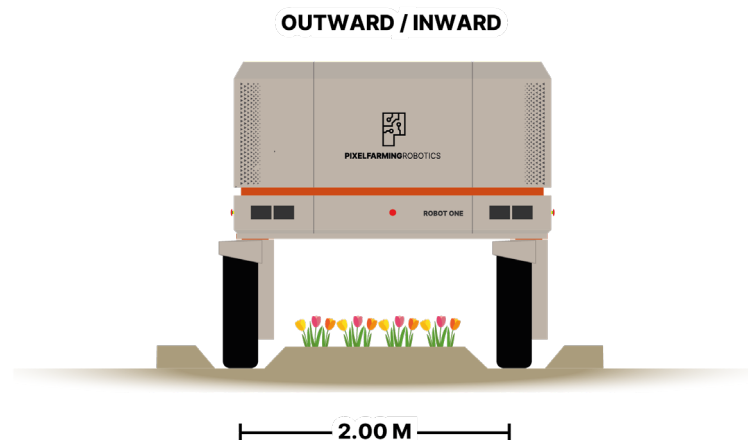
2.20 meters

Supports interdistance 37.50 cm, 50 cm, 75 cm

2.20 M

OUTWARD / INWARD

2.00 meters

Supports bed sizes up to 180 cm

2.00 M

INWARD

1.80 meters

Supports interdistance 37.50 cm, 50 cm, 75 cm

1.80 M

Upgradability and customization

Robot One is designed to be modular at its core. Therefor being able to customize and upgrade your Robot One is essential.

Hardware upgradability refers to the ability to upgrade or replace components of a computer or other electronic device, such as the main processing unit, onboard GPU's for machine learning, mechanical arms and tools or its stereoscopic camera units. Hardware upgradability is an important feature for professionals who want to stay ahead of the curve and accieve maximum effiency within their specialty.

Prolonging the operational lifespan

As technology advances, upgrading components can keep it up-to-date and operational for a longer periods of time, reducing the need for frequent unit replacements.

Customization and flexibility

Professionals have different requirements and workloads. Hardware upgradability allows you to choose and upgrade specific components based on your needs and budget.

Improved performance

Upgrading to newer components can significantly enhance performance and efficiency.

Cost-effectiveness

Upgrading components is often more cost-effective than buying a new device, as it only requires the cost of the upgraded component rather than the cost of a whole new device.
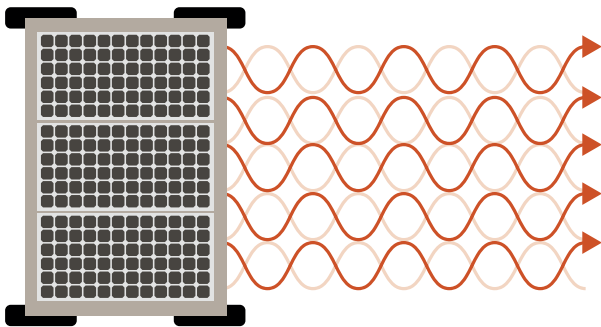
Scan and act

After the first detection run is complete you can start planning which actions need to be done. Use a laser to combat weed stems or use a finger-weeder to clear weeds from within the plant row. Our vision-based approach offers maximum tool flexibility.
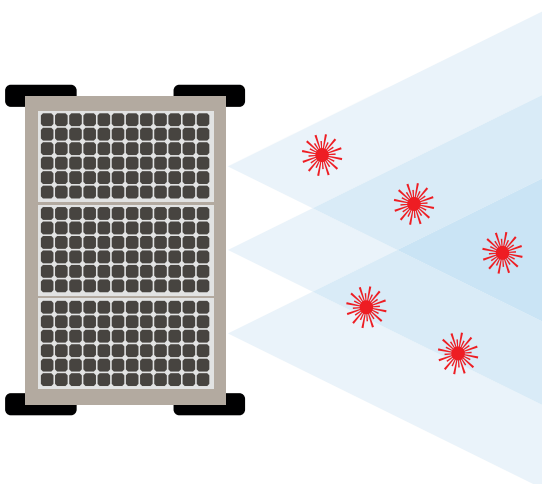
Obstacle avoidance

Vision based obstacle avoidance uses cameras and image processing algorithms to analyze the environment and identify potential hazards. Robot One uses this information to calculate a safe path and navigate around the obstacle.
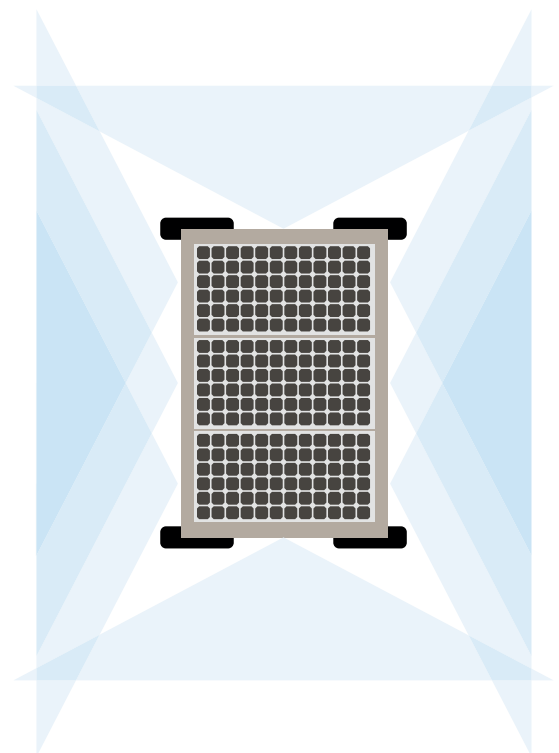
Fine-tuning the detection model

With every operation, Robot One collects new images which can be used to fine-tune your plant detection model. This increases its accuracy and its value. As a new revenue model you can make your detection model available for sale.

Easy to operate

With our intuitive controller with integrated display.

Robot One is designed with ease of use in mind and can be easily operated with our controller with integrated display. The display screen provides intuitive navigation through the robot's various functions and settings, allowing for quick adjustments to be made on the spot.

Robot One is user-friendly and requires minimal training to operate, making it a great choice for professionals.

Working mode
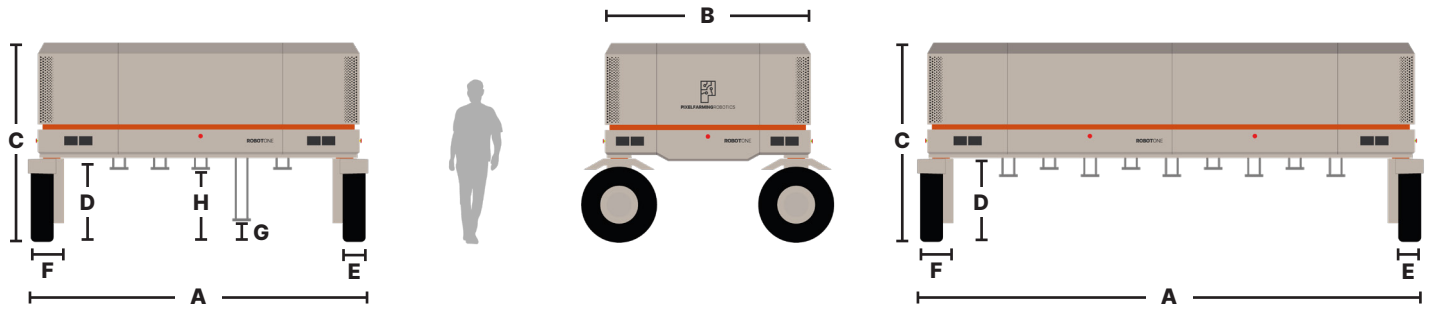
Measurements			Robot One	Robot One L
	A	Overall width	3740 mm	5340 mm
	B	Overall length	2400 mm	2400 mm
	C	Overall height	2230 mm	2230 mm
	D	Clearance excl. tools	860 mm	860 mm
	E	Wheel width	250 mm	250 mm
	F	Wheel with axle	350 mm	350 mm
	G	Clearance with arms extended	295 mm	295 mm
	H	Clearance with arms retracted	895 mm	895 mm
	I	Transportation width	4260 mm	5860 mm
	J	Transportation length	2450 mm	2450 mm
		Weight excl tools	2200 kg	3200 kg
		Maximum mechanical horsepower	32 hp	32 hp

*Measurements can vary per Robot One configuration

Transportation mode

Internals	Processing Unit	AI Performance	Up to 7926 TFLOPS
		Memory	64GB 256-bit LPDDR5 204.8GB/s
		Storage	128GB eMMC 5.1
Camera's	RGB & Sterographic sensor	Quantity of camera's	12 camera's for 3D vision and 10 camera's for remote view
		DFOV / HFOV / VFOV	81° / 69° / 54°
		Resolution	8,3MP (3840 × 2160)
		Focus	50cm – ∞
		Focus type	Fixed focus
		Max Framerate	30 fps
Powertrain	Driving	Power	Electric (hybrid range extender available)
		Drive modes	Transport mode, inward, inward/outward, outward
		Steering modes	4 wheel steering, crabbing, rotation mode
Laser	130W CO2 laser	Aiming technique	3D vision combined with focus lenses and mirror technique
		Axis of aiming	3 at all times (X/Y + focus)
		Shots per hour	10.000 shots per hour per laser
		Accuracy	<2mm
		Coverage speed	1 hectare/hour
Operation	Support	Support plan	2 year onboarding programme
		Supported crops	Open system, train your own models
	Operator	Operated by	One operator can operate multiple Robot One's

*Specifications can vary per Robot One configuration

Robot One
Origin

Campus Almkerk

The birthplace of Robot One and home of agricultural innovation.

In 2017 we moved the office to an old farm in Almkerk. We restored the farm to it's former glory and built a campus. It is on these grounds that we started to experiment with the first prototypes of the Robot One.

What started as a side project for saturdays, became a company in 2019. Inspired by the idea of autonomous, chemical-free farming with the use of robotics, our engineers went to work. To this day we use this location as home for our research and development team. Here we have the ability to design, build and test the robots directly in the fields of our own pixelfarm and other fields.

Private funding
8 Million

Founded in
2019

Almkerk
Noord-Brabant

A team of
25 people

10 hectares
of test fields

Our purpose

We dream of a world with healthy food from healthy soil. With Robot One we want to offer growers a way to realize this dream.

**Robot One is ready to revolutionize agriculture.**

Built by our Engineers
Supported by farmers

Over the years we have gathered a diverse team of young professionals and engineers. Ranging from AI specialists to mechanical engineers and from designers to software engineers, we have everything in house to create robots. However, when building a Robot for the future generation of farmers, you do need to work with farmers.

During our development we have come to know a wide variety of innovative farmers. Some just a few kilometers away and some overseas in North America. They share their knowledge on how they farm and on how the want to farm.

Our team together with these farmers form a community that aims to improve the Robot One and make it operable for any farmer. We challenge ourselves daily to create robots for the future generation of farmers.
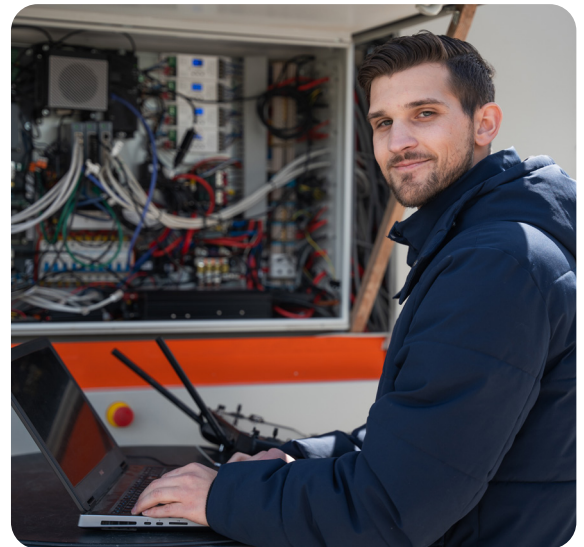
Sharing knowledge and building communities

We are building a global network of Robot One users. At the heart of this network are the HUBs, where forward-thinking farmers work with the technology of the future.

What is a HUB?

At a Pixelfarming Robotics HUB, interested parties can get business ideas, see Robot One in action and follow (parts of) the onboarding programme. Joint actuators can be developed, and education plays an important role.

There is always one Robot One at a HUB, and the owner is preferably a crop specialist. By collaborating in working groups, crop-specific problems can be rethought using robotics and AI. New solutions can be tested and turned into projects. Perhaps with opportunities for grants or other financial support.

New revenue model

Offering an onboarding programme is an additional revenue model, as is the use of digital growth models. This is all about sharing knowledge. You will experience the format for yourself during the onboarding programme when you buy your own Robot One. Let the farm become the new robotics school! Pixelfarming Robotics will help you.

Dealerships

In some cases, it is combined with the Pixelfarming Robotics dealership and you can go there for spare parts. As a dealer you can

Your company as a HUB?

We expect you to be innovative and to think about the social and societal aspects of future growth. You communicate clearly, enjoy working with like-minded people and are proud to show off your robot and company.
Pixelfarming Robotics will help you to establish your company as a hub and attract market attention. But it all starts with choosing Robot One!

We believe in robotic technologies in agriculture. Pixelfarming Robotics was founded in 2019 to support the robotics transition in agriculture. We design and manufacture advanced agricultural robots to support regenerative and biodiverse farming.

Pixelfarming Robotics

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