

Robot Technology

The future
of turf care

ECHO[®]
ROBOTICS



CENTAUR
ASIA PACIFIC

Robot Technology

The future of turf care

Centaur Asia Pacific partners with ECHO Robotics

Listening to the requests of turf managers in the golf and sports industry to become carbon neutral, Centaur Asia Pacific formed a partnership with ECHO Robotics, a global leader in commercial robotic mowing and golf-ball picking for sport fields and driving ranges.

The ECHO Robotics range is completely autonomous, quiet in operation and, most importantly, they are 100% emission-free. This matches Centaur's mission to become as environmental-friendly as possible and to have a green approach. We now have the best solutions for automatic ball picking and mowing at driving ranges that allows turf managers to re-allocate their labour as well as creating a better experience for customers.

Robotic mowers and golf ball-pickers are already in use by thousands of professionals at sportclubs and driving ranges and are working in complex public and private facilities in Europe. It is Centaur Asia Pacific's goal to introduce the ECHO Robotics to Asia. Centaur Asia Pacific is the ECHO Robotic distributor in numerous Asian countries (Hong Kong, Macau, Singapore, Vietnam, Cambodia, and Malaysia)



TM-1000



Safety: 5 sonars



Mowing capacity: up to 12,000 m²



Cutting: 3 independent floating heads



TM-2000



Safety: 5 sonars



Mowing capacity: up to 24,000 m²



Cutting: 5 independent floating heads



RangePicker
(RP-1200)



Safety: 4 sonars



Mowing capacity: up to 30,000 m²



Efficiency: 300 balls

Unloading the balls

In just a few seconds, the balls are emptied into the retrieval ditch.



Benefits

Your four main exclusive benefits



50 % more savings than conventional mowing

Quality conventional mowing requires a considerable amount of labour, regular maintenance of the equipment and energy costs. None of this is needed with ECHO Robotics robots. They work independently and tirelessly, are made of robust materials and only need the electricity needed to recharge them.

What more can you ask for?



Labour optimised to the maximum

Day and night, the ECHO Robotics robot mowers run their program at any time to maintain the perfect result. **You will benefit from a workforce that is very economical, available 24/7 and which performs with quality.**

This allows both you and your team to concentrate on other tasks. With our automowers to support you.



Perfect turf, uniform grass

Nothing is more pleasant than to be able to show healthy, impeccably mown grass to your visitors and players.

ECHO Robotics automatic lawn mowers are fitted with floating heads and stainless steel blades that cope perfectly with any unevenness of the ground.

It is an unrivalled technology that maintains your turf and by extension, your reputation. They will admire and talk about your grounds.



90 % reduction in CO2 emissions, to ensure sustainability

You can dispense with using excessive chemical fertilisers, waste management for grass cuttings and lawns that are not weather-resistant. The result of mowing carried out by ECHO Robotics smart lawn mowers is 100 % natural, because they are fitted with blades that ensure perfect mulching, which means fertilising your grounds, while drastically limiting evaporation.

This is a technology that ties in with ECHO Robotics' responsible, global approach to the long term.

And if the future were simply to be green?

Uncompromising operation and technology

Guide wire and autonomous mowing

Well-designed installation is the key to the performance of ECHO Robotics smart lawn mowers. A detailed diagram of the grounds allows the working areas to be defined properly, by way of a buried perimeter wire. Furthermore, GPS technology allows for sub-areas to be created, for example high-density spots where the grass requires more frequent mowing.

This means the mowing strategy is never interrupted and is performed completely autonomously.

A history of operation and productivity will allow you to refine the mowing program.

Safe charging station

The ECHO Robotics automatic lawn mowers are programmed to charge their batteries whenever necessary. This is a process that can be carried out flawlessly thanks to a charging arm positioned at 45° and a completely safe low voltage power supply. Robot mowers connect to the charging station in automatic mode.

Guidance and navigation without detours

The on-board technology of ECHO Robotics smart lawn mowers was designed from the start to be able to operate on very large areas. The quality of guidance signal is such that stray signals will not disrupt the work of the robot mowers, even in an extreme or industrial environment.

Faced with an obstacle on return to the charging station, the smart lawn mower makes use of GPS technology to avoid these, which saves a considerable amount of time, indirectly improving cutting capacity.

Multiple safety systems

The ECHO Robotics robot mowers are fitted with sonars and sensors allowing them to detect obstacles, touching them at very low speed. Front bumper's built-in sensors gather cartography elements. Your equipment and your visitors will remain safe.

The cutting blades are equipped with protective deflectors. And if the robot mower is lifted, the rotation of the blades stops immediately. You can be assured that we have thought of everything.

Anti-theft system and warning in case of malfunction

If the robot lawn mower is lifted or overturned, it immediately stops working.

Built-in GPS and dedicated apps will warn all allowed entities, from user to ourselves at ECHO Robotics, through dealer and distributor. And, of course, GPS will do a great deal in retrieving the robot. A reassuring point and, in fact, our robots being quite specific, they are no designated preys to the illegal market, as extremely low figures show.

Clean cutting and 100 % natural fertilisation

Grass can grow at up to 4 - 8 cm a week. The ECHO Robotics robot mowers are programmed to obtain constant and effective mulching. Depending on the program chosen, the total area of your field will be mown at least 3 to 5 times a week.

The vegetable matter from mulching will fertilise the soil in a 100 % natural way, while slowing evaporation. The turf will be in top condition and you can say goodbye to weeds.

Slopes of up to 45%

ECHO Robotics robots are fitted with anti-slip wheels controlled by a powerful motor

This guarantees efficient operation even on damp ground or on a 30% slope, of 45% if the slope upgrade kit is provided.

Silent operation

ECHO Robotics robots provide acoustic comfort. They are almost inaudible from tens of meters away (maximum 52 dB A), so mowing can be done overnight and on Sundays.

For any time - ECHO Robotics automowers never stop

Appropriate programming and durable materials allow continuous outdoor operation in any atmospheric condition.



TM-1000

Endurance in green spaces



The TM-1000 is the automatic lawn robot best suited to individuals and public bodies and businesses that manage green spaces up to 12,000 m²

The TM-1000 takes care of maintaining your grounds completely autonomously.

Prepare to save more time and money than ever before.

The time has come for you to delegate.

Both day and night

The TM-1000 is fitted with three floating cutting heads that adapt instantly to the ground elevation. All in all, it is these 9 stainless steel blades that ensure impeccable constant mulching. The TM-1000 is also fitted with sonars to detect any unexpected obstacle and stop operating instantly.

**Permanent quality mowing, without disruptive noise.
A cutting width of 63.3 cm (24.9") for uniform mowing.**



TM-2000

The undisputed all-terrain champion



The TM-2000 is the world's best-performing robotic mower

It is capable of maintaining up to 24,000 m² of lawn, which means it has ambition.

The TM-2000 is recommended for sports pitches, driving ranges, public spaces or private estates.

It is up to the challenge.

Uncompromised cutting method

The TM-2000 is fitted with five floating heads that adapt instantly to the ground elevation. A total of 15 stainless steel blades provide perfect, constant mulching. Fitted with five sonars, the automower will instantly deactivate its cutting system if it encounters an unexpected obstacle.

A cutting width of 103 cm (40.55 inches) for uniform, safe working.



Electricity costs:

Extreme low energy consumption
(830 kWh / year)



Safety:

5 sonars

Smart Mowing

The TM-2000 works completely autonomously in all the zones delimited by the perimeter wire.

Its activity remains quiet (max 52 dB A), and it is logged on so its productivity can be controlled and adjusted if necessary.

The charging at a low voltage station is entirely automatic and safe.

A durable mow with average annual energy consumption of barely 830 kWh.

The 10 extras that make the difference

1. 24,000 m² in a few hours
2. Replaces several small robot mowers
3. Much cheaper than a garden tractor
4. 10 x lower CO₂ emissions*
5. 8 x lower energy costs*
6. No noise pollution
7. 100 % ecological
8. Impeccable turf in better condition
9. Warning in case of theft or malfunction
10. GPS guidance system



Cutting method

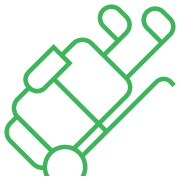
5 independent floating heads



Mowing capacity:

up to 24,000 m²

*compared with a diesel ride-on mower



RP-1200 Rangepicker

Automate ball collection on the driving range



The dream team for greenkeepers

A nurtured driving range commands the respect of players and guarantees the image of the club. It is therefore necessary to organise a regular golf course mowing system combined with efficient ball collection.

This is the role of the robots: while the TM-2000 maintains the grass, the Rangepicker takes care of collecting the balls.

So, the robots free up your staff to perform various other tasks. Furthermore, the players will be able to continue their course unhindered in a quality, innovative club.

Simplify your life by delegating

- Reduced labour or devoted to other activities
- Continuous ball collection: working autonomously with automatic charging
- Endurance: 24/7 in all seasons
- An ideal combination with TM-2000 and other Rangepickers



The Rangepicker method

If you like word exclusives, you are going to love the Rangepicker.

When its routes are programmed, it will not stop running over the driving range outfield. All the more, it will demonstrate its capacity in areas where there is a high density of balls.

As soon as its ball tank is full (>300), it goes back to its base to unload them.

In a few seconds the balls will be automatically unloaded into the drop-pit.

They are then available again. The Rangepicker periodically connects to its docking station by GPS guidance, so as not to waste time. We have thought of everything.

Performance and connectivity

The Rangepicker is a technological marvel. It manages areas of 20,000 or even 30,000 m² thanks to its collection width of 95 cm (37.40 inches).

For each cycle, it can absorb an average of 300 balls on golf courses that have a slope of up to 30 %, and detecting obstacles by sonars. A complete charging of its LiFePO₄ type batteries takes barely 75 minutes.

For the sake of connectivity, the Rangepicker can be integrated into your fleet that you can remotely control.

- Management via an app for tablet and smartphone
- Anti-theft solution for geofencing alert
- Maintenance history for guaranteed proactivity

Quiet running and ball protection

What would you say to owning quiet-running equipment to obtain a more effective result?

The “Golf” TM-2000 can mow golf driving ranges without destroying balls due to patented protection discs which keeps the balls away from the cutting blades. This is a world exclusive.

The Rangepicker is virtually inaudible from a few metres away (max. 52 dB) and does not cause any disturbance. Thanks to its limited weight (70 kg), it never pushes balls into the ground.

You will therefore benefit from an exclusive and patented collection system that recovers all the balls and then takes care of them.

- Works quietly and with a cruising speed of 3.6 km/h
- Saves thousands of balls that are always recovered
- Robust equipment and patented collection system

Respect the environment and take a sustainable approach

Golf and nature are, of course, inextricably linked.

The ECHO Robotics robots have a low electrical consumption (540 kWh/year on average) and have 10 times lower CO2 emission than equivalent combustion engine machines.

With the combination of TM-2000 and Rangepicker enable the spreading of chemical fertiliser to be reduced significantly and for balls to be collected efficiently, without practically any human intervention.

- Releases 10 x lower CO2 emissions*
- No noise disruption: maximum 52 dB A
- Sustainability policy for the club

Working at night and in multiple zones

By day, the Rangepicker works at full capacity according to the density of balls to be collected. At night, it can continue and bridge any delay which would have been caused by a period of too great accumulation.

Even stronger: the multiple zone program. In peak periods, it concentrates exclusively on zones where the density of balls is the greatest.

In a second phase, the robot will proceed with collecting balls in the other zones. It is you that decides.





The Connected Line

GPS RTK



ECHO Robotics - GPS RTK

Equipped with the latest navigation technology available, our robots can now navigate in pattern mode.

All the advantages of our connected robots in addition to some new features with the robots equipped with a GPS RTK system.

In addition to the equipment needed for a connected line unit, the following equipment is required to benefit from these innovative features

- A Robot
- A docking station
- GPS RTK base with Wifi
- GPS RTK License

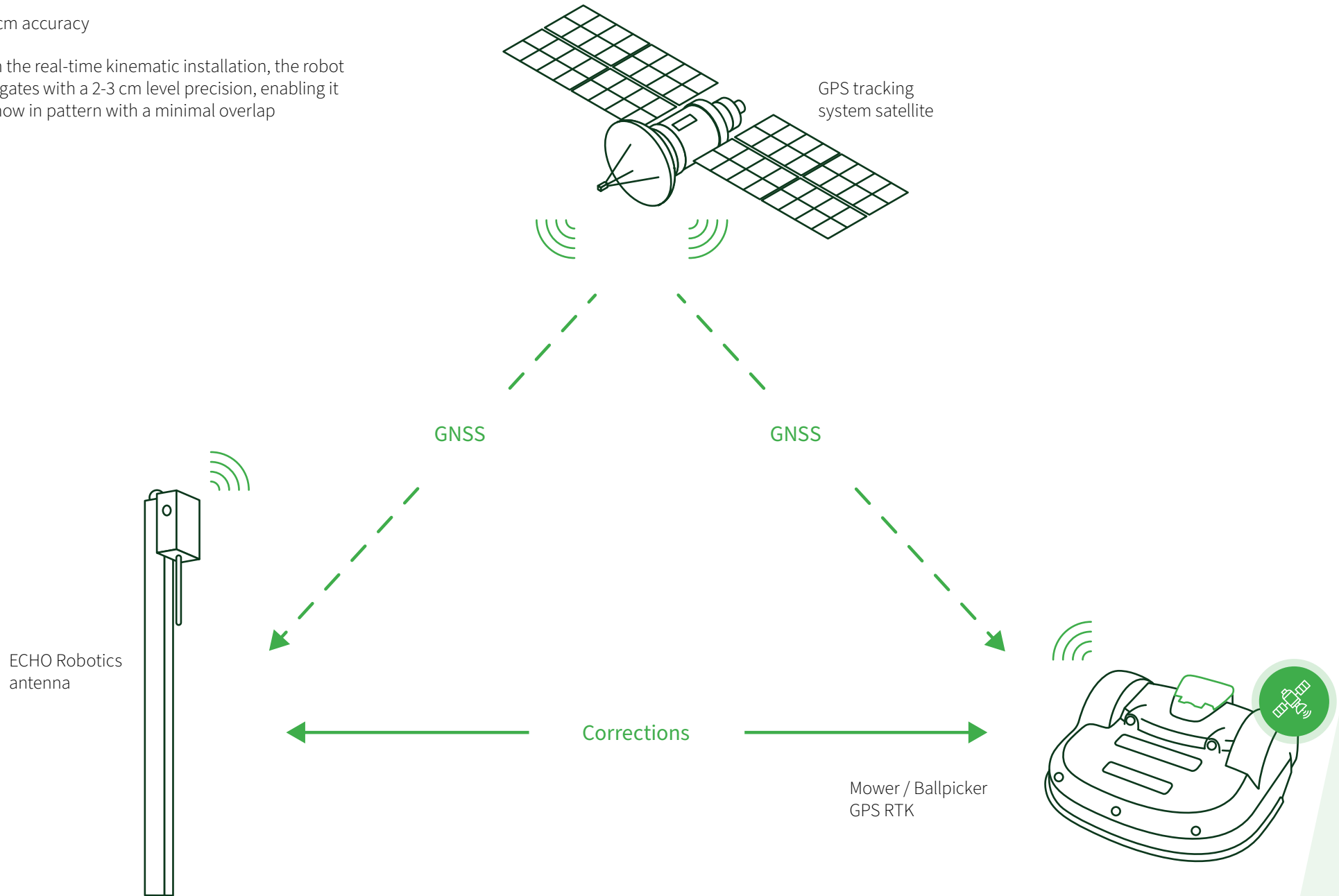
The robot is now able to:

- **Mow in a pattern mode:** say goodbye to random lines, your field can now be mown in straight lines.
- **Triple the mowing capacity:** with its cutting edge new technology, the robot's performance is enhanced, it takes less time to mow entirely a sport field, leaving the pitch available for the players for a longer period, the single machine can now take care of more areas.
- **Enhance its ball collecting capacity:** with the pattern mode, the ballpicker is now able to collect and navigate to the drop pit in a much faster mode.

The GPS RTK Process

2-3 cm accuracy

With the real-time kinematic installation, the robot navigates with a 2-3 cm level precision, enabling it to mow in pattern with a minimal overlap





Online services

Web interface & App

An unrivalled experience for users

The ECHO Robotics portal and app work in parallel.

To serve you even better. Thanks to them, your personal login gives access to new features that are unique on the market: modify the settings and deal with notifications remotely, geolocate and filter according to your criteria, and obtain technical support from your dealer remotely and in real time...

Customized experience

In addition to the offline features, you can benefit from advanced features. ECHO Robotics offers you two types of subscription: Basic and Premium.



Offline offering

ECHO Robotics guarantees software updates during technical maintenance operations.

Free



Basic Offering

The ideal formula for users who want to make the most of remote control of their Connected Line.

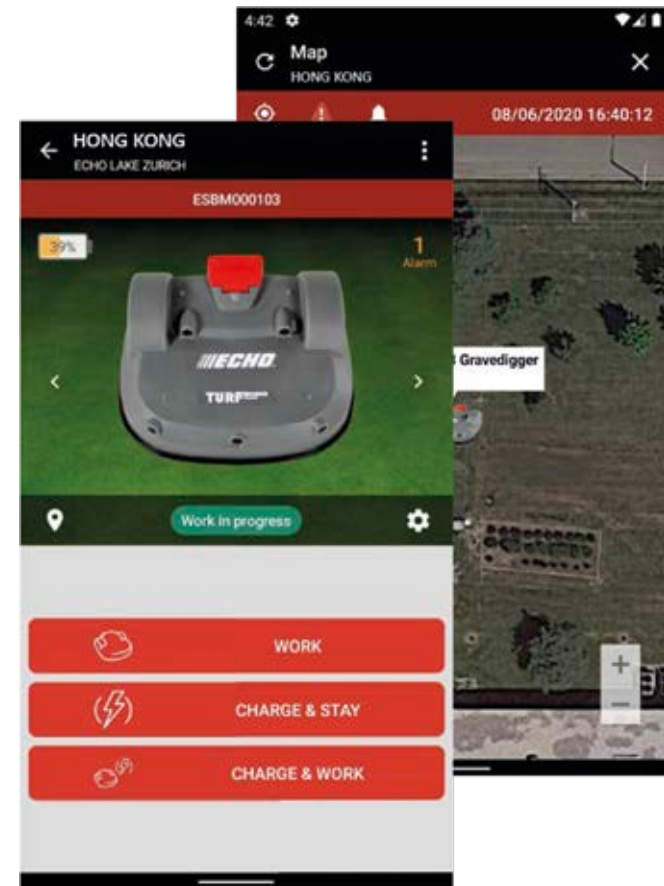
Request to quote / year



Premium offering

The most complete package on the market for demanding professional users: fleet management and remote support.

Request to quote / year





Robotic Mowers

Specifications

MODEL	MOWER CONNECTED TM-2000	MOWER CONNECTED TM-1000	BALLPICKER CONNECTED RP-1200	MOWER CONNECTED RTK TM-2050	MOWER CONNECTED RTK TM-1050	COMMENTS
CAPACITY						
Maximum working area (m ²)	Mowing: 24,000	Mowing: 12,000	30,000	Mowing: 75,000	Mowing: 45,000	Depends on the fertilization and watering of the lawn. The presence of obstacles and slopes reduces capacity
Recommended working area (m ²)	Mowing: 20,000	Mowing: 10,000	24,000	Mowing: 55,000	Mowing: 35,000	
# sports pitches / robot	1-2	1	-	1-3	1-2	Depends on scheduled use of the pitch, as well as fertilization and watering of the lawn.
Mowing / picking Width (mm (/inch))	1,033 (40.77")	633 (24.90")	956 (37.60")	1,033 (40.77")	633 (24.90")	
Speed (km/h)	3.6	2.8	3.6	3.6	2.8	
Standard maximum slope	30%	35%	30%	30%	35%	
Maximum slope with option (Kit)	45%	-	-	45%	-	Robotic mower equipped with stronger motors
Basket capacity	-	-	300 balls	-	-	
CUTTING / PICKING						
# Mowing Heads	5	3	-	5	3	
# Blades	15	9	-	15	9	
Lowest cut (mm) minimum	22	22	-	22	22	
Highest cut (mm) maximum	100	100	-	100	100	
Cutting height setting	Electronic	Electronic	-	Electronic	Electronic	
Max Noise (dB)	52 at 1m	52 at 1m	61 at 1m, 52 at 5m	52 at 1m	52 at 1m	
BATTERY						
Battery Type	LiFePo4	LiFePo4	LiFePo4	LiFePo4	LiFePo4	
Standard Battery capacity (Ah)	19.2	19.2	19.2	19.2	19.2	
Battery tension (V)	26.4	26.4	25.6	26.4	26.4	
Average charging time (min)	80	80	80	80	80	1-year-old battery at 15°C
Average mowing duration per charging cycle	110	280	240	110	280	1-year-old battery at 15°C
Optional more powerful batteries (Ah)	-	-	-	-	-	
Average yearly consumption (kWh)	830	580	620	830	580	

MODEL	MOWER CONNECTED TM-2000	MOWER CONNECTED TM-1000	BALLPICKER CONNECTED RP-1200	MOWER CONNECTED RTK TM-2050	MOWER CONNECTED RTK TM-1050	COMMENTS
WEIGHT AND DIMENSIONS						
Weight (kg)	71.9	52.9	85	71.9	52.9	
Dimensions ((L)ength × (W)idth × (h)eight) cm	111x127x51	100x104x46	118x134x54	111x127x51	100x104x46	
SOFTWARE AND MONITORING						
Pin Code security	Yes	Yes	Yes	Yes	Yes	Keyboard locked by Pin code
GPS Localization	Standard	Standard	Standard	Standard	Standard	Localization of the robot by GPS in case of theft.
Server and App for robot management	Standard	Standard	Standard	Standard	Standard	Remote control of the robot via an App and a web interface.
INTELLIGENCE						
Sonar for obstacle detection.	5 Sonar units Detection at diameter 7 cm x 50 cm height	5 Sonar units Detection at diameter 7 cm x 50 cm height	4	5 Sonar units Detection at diameter 7 cm x 50 cm height	5 Sonar units Detection at diameter 7 cm x 50 cm height	The robot detects obstacles by means of its sonar units, slows down, touches the obstacle gently, manoeuvres and leaves in another direction.
Economy adapted mowing	Standard	Standard	-	Standard	Standard	The robot detects when the grass is not growing by the resistance on the mowing heads. It then skips one or more mowing cycles.
Back to station via GPS	Yes	Yes	Yes	Yes	Yes	In open spaces only
Multiple Starting Zone	Yes	Yes	Yes	Yes	Yes	Possibility to program the start of mowing at different parts of the ground
Multi-terrain	Option	Option	Yes, more than 2	Option	Option	Possibility to program the robot to work on several adjacent terrains
Multirobot	Yes	Yes	Yes	Yes	Yes	TM-1000 and TM-2000: possibility of working with several robots on a single ground Ballpicker: maximum 2 robots using the drop pit station
SECURITY						
Lift sensors	Yes	Yes	No	Yes	Yes	The robot stops immediately when lifted
Reverse sensors	-	-	Yes	-	-	Ballpicker: causes the robot to change direction
Tilt sensors	-	-	Yes	-	-	Ballpicker: causes the robot to stop when lifted more than 41°
Rear silent blocks	Yes	Yes	-	Yes	Yes	When the cover is being pushed by an obstacle, the robot will manoeuvre and leave in another direction
Safety bumper	Electronic	Electronic	Electronic	Electronic	Electronic	Manoeuvres at 200 N for the electric bumper
Deflectors on cutting head	External heads	-	-	External heads	-	



CENTAUR

ASIA PACIFIC

CENTAUR-ASIAPACIFIC.COM

e-mail: info@centaur-asiapacific.com

Hong Kong Office

Unit 801 & 802
Wing Fat Industrial Building
12 Wang Tai Road, Kowloon Bay
Hong Kong

Tel: (852) 2527 0007

Singapore Office

Tel: (65) 8690 6322

Malaysia Office

Tel: (60) 7570 5979

Centaur Asia Pacific has warehousing and workshop facilities in Hong Kong, Singapore and Malaysia.

