

Installation Course



Lawn Mower Robot

Introduction & Characteristics	1
Installation.....	2
To remind before the installation	8
Robot Programming	9

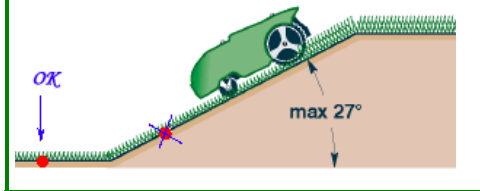
lawnbotts.com

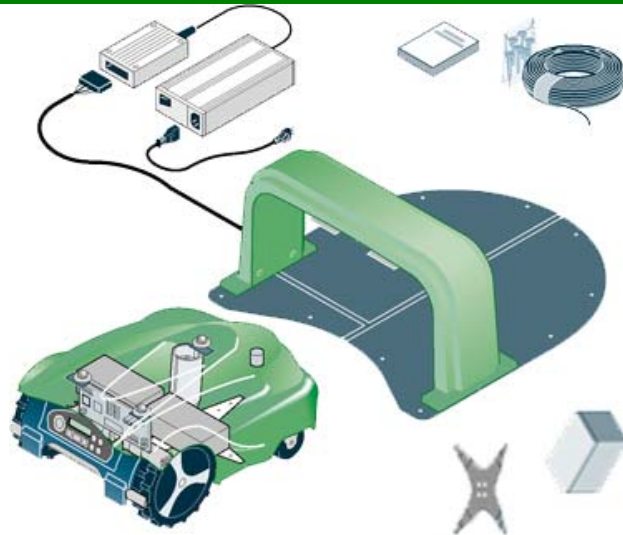
ZUCCHETTI
CENTRO SISTEMI
LE SOLUZIONI CHE CREANO SUCCESSO

Introduction & Characteristics

Remember that:

Maximum Covering: 3500 or 5000 square meters.	Each robot covers 3500 square meters maximum with 2 lithium batteries or covers 5000 square meters maximum with 4 lithium batteries. It is anyway good rule not to exaggerate and bear in mind that the most complicated gardens with separated areas reduce the square meters covered by the robot.
Cutting Blade of 36 Cm diameter.	The robot follows the perimeter cable to the centre and thus it cuts about 18 cm beyond the perimeter cable. That will be useful for the future.

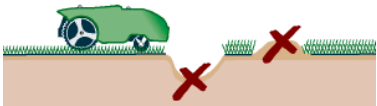
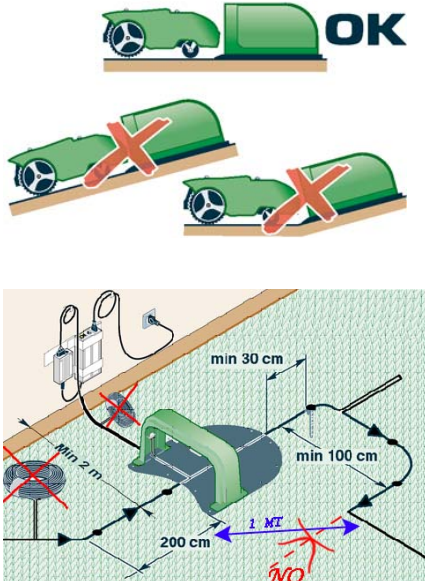
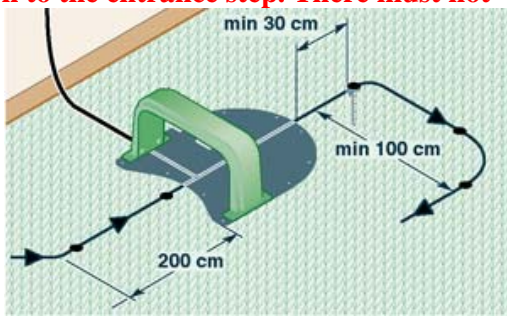
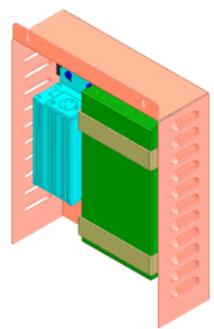
<p>Average covering: 400 square meters per working hour on the lawn.</p>	<p>The robot works averagely 4,5 hours with 2 lithium batteries and 9 hours with 4 lithium batteries. The time needed to completely fulfill a charging cycle can be between the 3, 5 hours and 4 hours. This will be useful during the programming. The double battery packet is the same as two batteries.</p>
<p>Maximum slope: 27°</p> 	<p>This is the maximum slope achieved by the robot. Remember that the main problem is the slope because when the robot reaches the cable it is not able to come back. In order to improve the performance of the robot, it is useful to set the spiked wheels on the machine. Before starting the installation we suggest you to have a test on a slide. In the user's menu, set out the option Border "NO", set the robot on a slide, let it feel a bump on the body and test that it doesn't slide while reversing or changing direction.</p>
<p>Secondary Areas Management.</p>	<p>The robot manages the main area and three secondary areas as well. With "secondary area" we mean a part of the garden connected to the main one thanks to a narrow passage and which can hardly be reached by chance. Saying if the passage is large or narrow for the robot depends on the primary area dimension.</p>
<p>Border Accomplishment.</p>	<p>At the end of the working time or when the robot has to recharge its batteries, it follows the cable continuing moving along the border while coming back to its base.</p> <p>In case you have a garden limited by a small wall, approximately the robot leaves from 5 to 10 Cm of not mowed grass. It is important to explain to the customer that it takes the same time to prepare a border with 5 or 10 cm of cable. The only thing which can be made after the installation is to place on the edge of the garden some small tiles which prevent from the need of cutting on the border.</p>



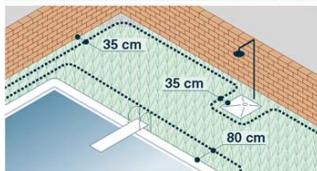
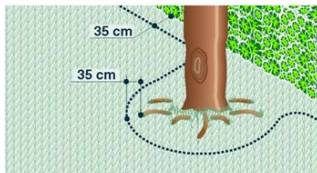
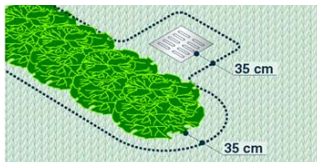
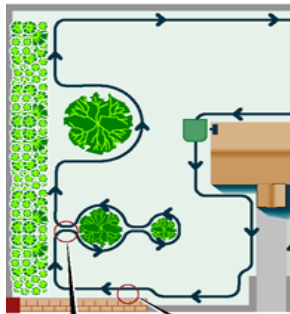
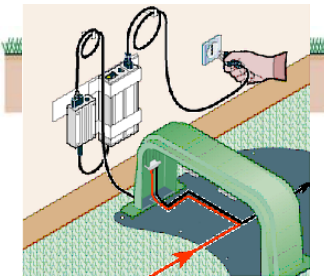
Installation

Preliminary Remarks

<p>Recharge of the robot</p>	<p>First of all put the robot in charge. At the end of the installation it will be useful in order to test the correct operating.</p>
<p>Arranging the garden</p>	<p>It is necessary to inform the customer about how to prepare the garden before the installation. The most common problems are small holes, small toys, stones, or all the objects that the robot can not recognize as an obstacle and that consequently might pass under the covering and be hit by the blade.</p>

	
<p>Watering System</p>	<p>Pay attention to the watering system! It is necessary to understand where the irrigators are and place the recharging base in a safe part of the garden, far from the irrigator that might wet the robot and especially the display side.</p>
<p>Recharging Base</p> 	<p>It is maybe the most difficult decision to take. The recharging base must be positioned according to some exact rules. The recharging base must be positioned on a:</p> <ul style="list-style-type: none"> - Plan area - Firm ground - In the widest area (if there is a big difference of square meters) Better but not compulsory. - Not nearby an irrigator - Not nearby an electric gate because of interferences <p>The recharging base must be well fixed to the ground and it is necessary to pay attention to the entrance step. There must not be any step. The problem can be solved by clearing away the grass surface or by putting an artificial grass mat in front of the recharging base, which makes easier for the robot to enter the station.</p> 
<p>Transformer</p> 	<p>The Transformer must be placed according to the following rules:</p> <ul style="list-style-type: none"> - Place it in an area protected from water. - Better to put it indoors. - If it is placed outside, please put it in a ventilated box and not exposed to sun or water. - It would be better to put it in a refreshed area. - It must be outside the garden and not inside it. - It must be at least 2-3 meters from the recharging base. - The cable connecting the transformer to the recharging base must not be twisted, but it has to be spread so as not to create any magnetic field. - Do not shorten the cable. - Do not lengthen the cable.

How to install the perimeter cable



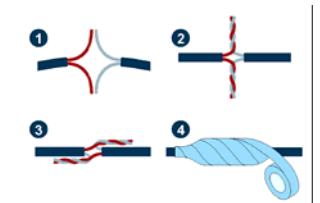
After deciding where to place the recharging base it is possible to install the perimeter cable. To install it, it is necessary follow some rules:

- For the first times, we suggest installing the perimeter cable on the ground rather than burying it. After some weeks, it will be soaked up by the ground. (The first weeks the blade has to be about 5 cm higher than the usual) . Once become more experts, the best installation is the one made with the Wire layer machine.
- Start with the black connector. Follow the cable-trace on the recharging base and come out with the cable from the rear side of the base.
- It is suggested to leave a cable store for possible future modifications in front of the base and behind it (to create this store it is necessary to make a flowerbed and leave cable intermingled with the cable delimiting the surface)

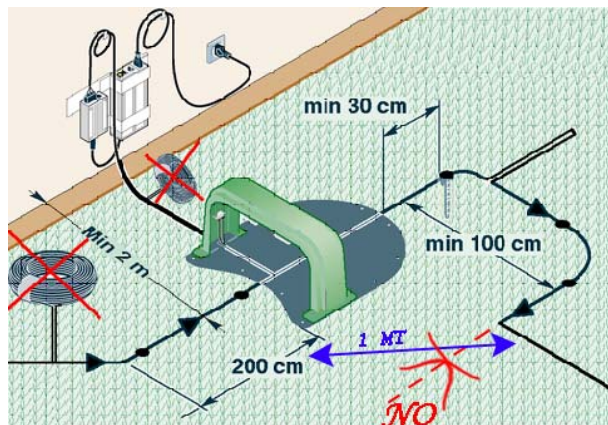
- Work in a clockwise direction
- Remember to position properly the fast returns to the base or “Arrows” (see next paragraph).
- When there is a flowerbed the installation has to be made anticlockwise. If you make a mistake, the robot feels the flowerbed before reaching the cable.
- If there are two flowerbeds close to each other, you shall lay the cable passing from one to the other.



- Respect the following distances:
 - o Sidewalk at the same grass height : 0-5Cm
 - o Wall 35 Cm
 - o Hedge 35 Cm
 - o Swimming pool, Hole, Precipice 80 Cm

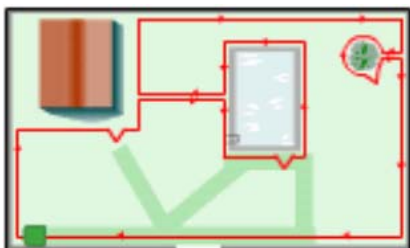
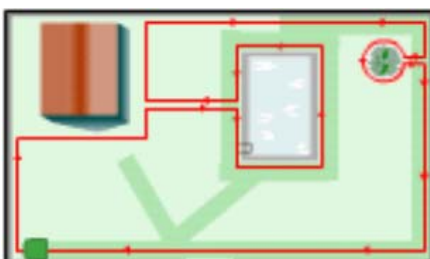


- As far as possible, all the bents must not be done like a 90° angle.
- Every connection must be made with proper material like the 3M self stretching tape “scotch 23”.
- It is suggested to leave a cable store for possible future modifications in front of the base and behind it (to create this store it is necessary to make a flowerbed and leave cable intermingled with the cable delimiting the surface).
- in front of the base, the cable must be positioned straight for the total length of 2 meters.
- The extra cable must not be left gathered.
- At the end of the installation it is necessary to connect the going in of the cable to the red connector.
- The maximum cable length is 600mt +- 20%. By means of the “Border Powered” it can reach 1000mt+-20%.



- Leave the robot at least 1 meter away from the point where the robot makes the signal synchronization (when it comes out of the base it turn with an angle of 90°)

Quick Return “Arrows”



The quick return or “Arrow”, is a perimeter cable symbol recognized by the robot in order to come back quickly to the recharging base. There are many advantages:

- The robot goes back to the recharging base earlier, so there is a lower consumption of batteries.
- The robot goes back earlier to the recharging base and resumes quickly mowing the lawn again.
- There are fewer traces on the ground.

The first picture aside shows the installation without arrows, the second one shows the installation with arrows. As you can see the route made by the robot is shorter. We recommend to position the arrows as shown in the second picture.

An arrow is often put shortly after the recharging base because, if the robot fails to enter the base, it returns quickly to recharge again.

Remember that the robot recognizes consequently a maximum of three arrows each working cycle.

IMPORTANT!!!!. Never put an arrow in the return way otherwise the robot never comes back to the recharging base.

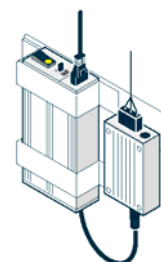
IMPORTANT!!!!. Once the installation is completed and the perimeter cable is connected, check that the transformer and the transmitter are working properly.

Transmitter Led Explanation:

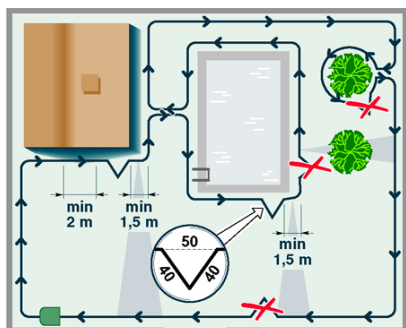
- Flashing Green /Yellow : Border Ok.
- Steady Green : Interrupted or not connected border
- Flashing red : Too short border
- Switched off Led : Not connected Battery Charger, Faulty fuse in the transmitter, Faulty Transmitter

Battery Charger Led Explanation:

- Steady Green : Working Battery charger
- Steady red : Working Battery Charger with batteries in fast charge.
- Off : Switched off or faulty Battery Charger.



Arrows measures.



IMPORTANT!!!!. The measures are approximate. Sometimes and especially in case of sliding, it is recommended to increase the measure with some more cms. It would be helpful to test the correct recognition with not completely charged batteries and therefore in the same conditions occurring while the robot is normally working.

Secondary Area

The secondary area is a part of the garden connected to the main garden by



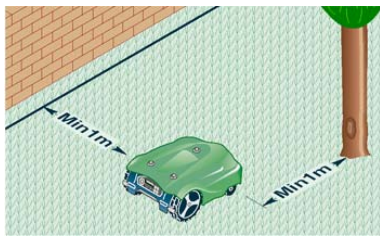
a narrow passage that is hard to be achieved by chance. Saying if the passage is big or small for the robot depends on the primary area dimension. Obviously the secondary area must be at the same level of the primary area (without steps).

The robot can manage up to three secondary areas (the primary and three secondary areas).

The minimum passage is 70 cm from cable to cable. So the passage that you need is 1 meter and 40 cm wide. It is better to increase the distance if the passage is very long. On the contrary, if the passage is shorter than 2 meters, we can venture some centimeters less.

During the programming it is necessary to set in the robot the dimensions of the secondary areas with percentage in relation to the lawn and to the best way for the robot to reach them faster (clockwise/anticlockwise), and obviously in relation to the meters the machine has to follow the cable in order to reach the secondary area.

Closed secondary area



The secondary area is a part of the garden separated from the main area but connected to it with the going in and out of cable.

The robot must be carried to the closed area by hand and it must be taken again to the primary area to recharge its batteries.

These solutions do not fit big gardens because the management will be difficult.

In fact the robot cannot fulfill the charging cycle completely and the mulching effect is not completely successful because it is highly probable that the customer won't punctually move the machine from one area to the other or may forget to do it.

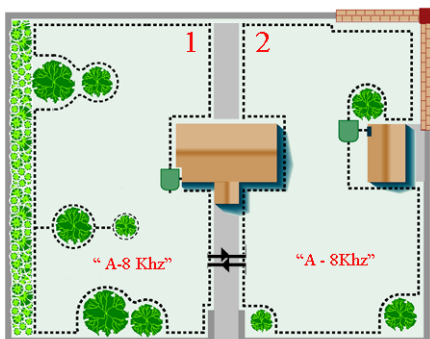
To program the machine for closed areas it is necessary to turn it on when is within the closed area, wait for **PAUSE** and then press - +. **The display will show "external" and from this moment on the robot knows that it is in a closed area and that when it finishes working it must not look for the recharging base but has to stop.**

Installation without perimeter

It's possible to let the robot work even without a border. We do not suggest this option. It is normally used for demonstrations only or for small gardens situated near the main lawn and completely delimited by fences (even the flowerbeds).

Installation of neighboring perimeters

Situation : 1 – Solution "A"



Situation 1 – Solution "B" and Situation 2

Situation 1 : (Same owner with 2 different and separated gardens not accessible to the same robot)

- In these situations there are 2 different solutions.
- **Solution "A"**. Have only one installation of the garden 1 and 2 by linking the 2 gardens together. The recharging base in garden no 1 is connected as usual. The recharging base in garden no 2 is placed on the border wire without connecting the cable to the black and red connector.

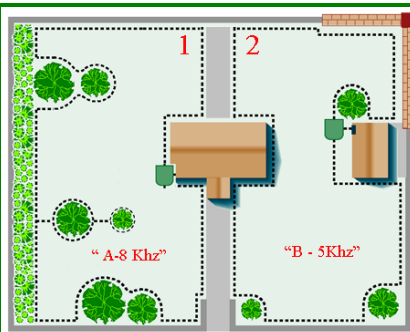
Advantages:

- o No change must be done with the robots you have.
- o In case of failure of the robot in garden no 1, the robot no 2 can be taken to garden 1 and there put at work.

Disadvantages

- o The length of the border wire can be excessive. Please keep in mind the limit is 600MT, beyond that limit the (48V) signal amplifier is required.
- o If the border wire is interrupted both the robots stop.
- o An extra battery charger can be necessary. The one given as equipment is used to supply the signal transmitter, the other one charges the batteries of the robot.

- **Solution "B"**. Have two normal and different installations



Advantages:

- If the border wire is interrupted only one robot stops.
- There are no problems in finding a passage to connect the 2 gardens.

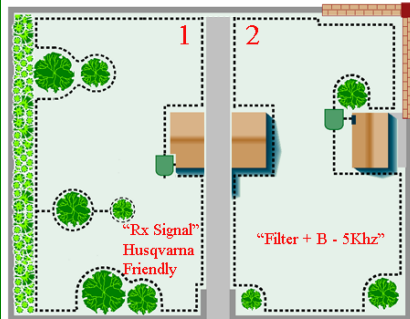
Disadvantages

- The B channel (receiver + transmitter) must be installed in the robot no. 2
- In case of failure of one robot the other one cannot be used to mow the zone 1 as well.

Situation 2 : (Different owners with both the 2 Ambrogios with sinusoidal signal)

- Follow the same solution of situation 1 Solution "B". One of the 2 owners must have a B channel robot and the distance between the 2 gardens must be at least 90 cm.

Caso : 3



Situation 3 : (Installation of Ambrogio and in the neighbouring garden there is another trade marked robot or an Ambrogio robot with "RX" or normal signal).

- Install the disturb filter and the B channel.
- A distance of 120 cm must be left between the 2 gardens.

To remind before the installation

You have to keep in mind that :

Before the installation :	Have You cut the garden before the installation, especially the edges?
	Is there a plug socket in the widest area ?
	How wide is the garden? check the model specification and the batteries provided
During the installation	Put the robot into charge on “PAUSE” modality.
	Check the slides, by trying the robot with the option No Border.
	Secondary areas. We manage the main area and three secondary areas.
	Decide where to install the recharging base <ul style="list-style-type: none"> - “Preferred” Widest area - Socket - Flat area - Water system
	Check the water systems
At the end of the installation	Settle the rain sensor
	Test how the robot follows the border cable <ul style="list-style-type: none"> • (With the key– Switch the blade off)
	Test the recognition of the arrows. <ul style="list-style-type: none"> • (With not too charged batteries) • With the key “CHARGE” you simulate low batteries.
	Program the working times of the Robot. (Pay attention to the working times of the irrigators).
	Inform the customer that he has to set out a password.
	Leave the blade at 5-6 Cm and inform the customer that he has to lower it when the border cable has been absorbed.
	Hooked wheels. It would be helpful not to install them until the border cable has been absorbed by the ground.

Robot Programming

Programming and other.

Explanation of the keys



“ON” : To switch the robot on.
“OFF “: To switch the robot off.
“PAUSE”: To put the robot in Pause mode or to resume working.
“CHARGE”: To make the robot come out while it is in the recharging base. To let it enter the recharging base while working.
“_“: To change the values during the programming. To turn off the blade while the robot is working.
“+ “: To change the values during the programming. To turn the blade on while the robot is working.
“ENTER”: To confirm the choice during the programming. To activate the spiral while the robot is working.

Programming Menu

It is necessary to set the robot in the PAUSE mode and then press the ENTER key to enter the programming menu. The following menu allows to change the values with the “+” and “-“ keys and to confirm them with the “ENTER” key. With the programming menu you can plan :

- Alarm: This option is only available for robots provided with the alarm and if it has been activated in the service menu. With the ENTER key you can skip to the next option or enable/disable it.
- Language: The language through which it is possible to show the user’s menu and all the robot error messages.
- Date: It is important it is correct otherwise the robot works in wrong days.
- Hour: It is important to make the robot work in the right working hours.
- Working days: For every working day it is possible to show with “1” if the robot must work and with “0” if not. The robot must work every day or every other day to exploit the mulching effect.
- Working hours 1 :
- Working hours 2: It is possible to plan two working hours to make the robot come out. Always remember that in order to charge the batteries the robot needs from 3.5 to 4 hours. So between the working time 1 and the working time 2 this break will be necessary.

- Secondary area 1 _ Dimension % : it allows to set out the dimension of the secondary area in relation with the entire surface.
 - o 20% Indicates a very very small area.
 - o 30% Indicates an area which is approximately ¼ of the whole garden.
 - o 50% Indicates an area, which is approximately the half of the whole garden.
 - o 80% Indicate a secondary area which is bigger than the primary area.
 - o 100%. Every time the robot goes out of the docking station, It will follow the border cable to mow the secondary area.

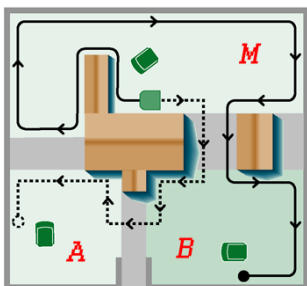
- Secondary area 1_Direction: it indicates the fastest direction to follow in order to reach the secondary area. The direction can be both clockwise or anticlockwise. Coming out the recharging base, the robot will follow the cable according to the settled direction in order to cut in the secondary area.

- Secondary area 1_Distance: it allows to set out the distance (in meters) the robot needs to reach the secondary area, following the perimeter cable. It is recommended to measure the distance on the half of the secondary area, so that you can be sure that the robot will be in the secondary area when it starts mowing.

-
- Secondary area 2: This is like the previous options but for the area

- number 2
- Secondary area 3: This is like the previous options but for the area number 3
- Perimeter. It is possible to make the robot work without perimeter, for demonstration for instance.
- Rain sensor. It is possible to settle out 3 different programs in case of rain:
 - o disabled : in case of rain it goes on working
 - o pause : in case of rain the robot goes back to the charging base and enter automatically the pause-modality. In order to start it again it is necessary to press the Pause key.
 - o Restart : in case of rain the robot goes back to the charging base and re-starts his work just after the batteries are fully uploaded.
- Blade Safety. It is possible to activate or de-activate the control of the safety blade sensor. It is recommended to leave the safety sensors always active.
- Self Programming. By enabling the self programming the robot controls the cutting motor effort. In case the motor works mostly without effort, it means that the garden is mowed and therefore it introduces some cycles of pause, with advantages for the garden and the robot.
- Bluetooth. The handy phone must have a connection between robot and remote control. After selecting “Setup” and choosing one of the three places where the handy phone has to be set up, we must select “Robot Research” on the handy phone. The robot issues a tone to confirm the connection. The software on the handy phone must have been previously installed.
- Change your password. It is possible to select a password which is required to disable the alarm, or every time you want to turn on the robot (If you selected the option “start-up password”).
- Start-up password. This option let you define the use of your password.
 - o Start-up password: YES. Every time you switch on the robot, a password is required. It is required also for the alarm, if you set it.
 - o Start-up password: NO. you need the password only to manage the alarm. Everyone can switch on the robot.

Work and Programming example of the secondary area.



Examples of programming the work-cycles.

Sq. mts.	time 1	time 2	
0400Sq mts	10:00 - 11:30		
0800Sq mts	10:00 - 13:00		
1200Sq mts	10:00 - 14:00		
2000Sq mts	10:00 - 13:00	17:00 - 20:00	
3000Sq mts	09:00 - 13:00	17:00 - 21:00	
4000Sq mts	08:00 - 13:00	17:00 - 22:30	(4 Lithium Batteries)
5000Sq mts	07:00 - 13:00	17:00 - 23:00	(4Lithium Batteries)

Secondary Areas.

While configuring the secondary area, you must be very careful in setting out the percentage-parameter, which is extremely important. The percentage-parameter represents the dimension of the secondary area in relation with the whole garden (100%).

Let's see some examples that show how often the robot mows the secondary area according to percentage variations.

P=Primary A=Secondary

50% 5 Times every 10 Cycles PAPAPAPAPA
40% 4 Times every 10 Cycles PAPAPPAPAP
30% 3 Times every 10 Cycles PPAPPAPPPA
20% 2 Times every 10 Cycles PPPPAPPPPA

With percentage superior to 50%, we can manage gardens where the secondary area is bigger than the primary. For example:

80% 8 Times every 10 Cycles AAAAPAAAAP

Other examples for managing Secondary Areas:

- Secondary Area 1 (Dimension) : 50%
- Secondary Area 1 (Direction) : Anticlockwise
- Secondary Area 1 (Distance) : 80Mts

After every cycles the robot fulfils in the primary area, it will then go in the secondary area following the cable in anticlockwise direction for 80 meters.
PAPAPAPAPAPAPAPA

Another Example:

- Secondary Area 1 (Dimension) : 50%
- Secondary Area 1 (Direction) : Anticlockwise
- Secondary Area 1 (Distance) : 80Mt
- Secondary Area 2 (Dimension) : 30%
- Secondary Area 2 (Direction) : Time
- Secondary Area 2 (Distance) : 120Mt

The area will be mowed with the following frequency:

PAPAB PAPAB PAPAPAB

IMPORTANT!!!. Remember that:

- When there are secondary areas, increase the working times of the robot.
- Set out very low percentage values for dimensions only when the area is very small, otherwise the robot will go considerably seldom in this area to mow the grass.
- Use both the working times in order to lower the times when the robot mows a secondary area.

Examples of Secondary Areas Configuration

PA = Sq mts Primary Area

SA1= Sq mts Secondary Area 1 SAD1= Secondary Area Dimension 1

SA2= Sq mts Secondary Area 1 SAD2= Secondary Area Dimension 2

PA	SA1	SA2	SAD1	SAD2
1000	1000	1000	30%	30%
1000	800	800	30%	30%
1000	800	200	40%	20%
1000	400	400	20%	20%

In case the primary area, where the recharging base is positioned, is smaller, please set out the values as follows:

PA	SA1	SAD1
1500	2000	60%
1000	2000	70%
500	2000	80%

In case the base is positioned in a closed and very narrow area and you need to set out the robot for working in the secondary areas, it is possible to settle the robot as follows:

PA	SA1	SA2	SAD1	SAD2
0	2000	1000	70%	30%