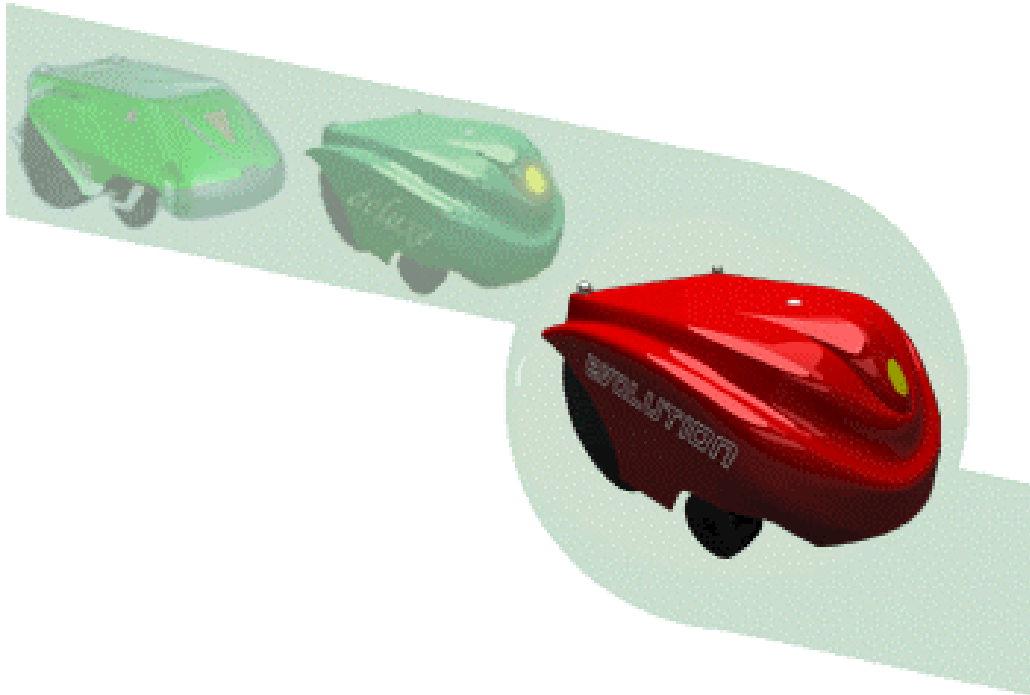


Installation Course



Lawn Mower Robot

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 socket in the widest area ?
	How big is the garden? Is it inferior to 3000 sm?
During the installation	You must put the robot into charge at once.
	Check the slides, by trying the robot with the option No Border.
	Secondary areas. We manage the main area and two secondary areas.
	You must decide where to install the recharging base <ul style="list-style-type: none"> - Widest area - Socket - Flat area - Water system
	Check the water systems .
At the end of the installation	Settle the rain sensor
	Try the following of the border cable <ul style="list-style-type: none"> • (With the key– Switch the blade off)
	Try the recognition of the arrows. <ul style="list-style-type: none"> • (With not too charged batteries) • With the key charge You simulate the low batteries.
	Programme 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 opportune not to install them until the border cable has been absorbed by the ground.

Introduction & Characteristics

Remember that:

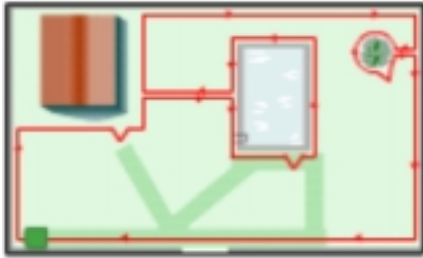
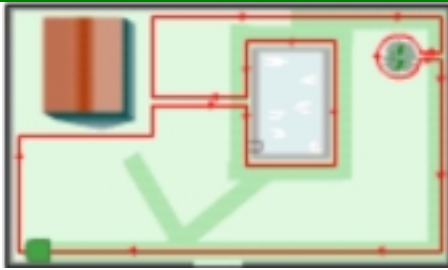
Maximum Covering: 3000 square metres.	Every robot covers maximum 3000 square metres. Do not exaggerate and bear in mind that the most complicated gardens with separated areas reduce the square metres covered by the robot.
Cutting Blade of 30 cm diameter.	The robot follows the perimeter cable to the centre and thus it cuts about 15 cm beyond the perimeter cable. That will be useful for the future.
Average covering: 300 square metres per working hour on the lawn.	Remember that the robot (if it is programmed) spends half of its time to mow the lawn and half of it in the recharging base. It will be useful during the programming
Maximum slope: 27°	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. The solutions to make the robot work for the best are: lithium batteries, wheel spikes and hooked wheels. Before starting the installation we suggest to You to make a test in a slide at once. In the user's menu You have to set out the option Border "NO", set the robot on a slide, let it feel a bump on the body and test that while reversing and while changing direction it doesn't slide
Secondary Areas Management.	The robot manages the main area and two secondary areas as well. The secondary area is a part of the garden connected to the main one thanks to a narrow passage hardly to be reached. Saying if the passage is large or narrow for the robot depends on the primary area dimension.
Border Accomplishment.	At the end of the working time or when the robot has to recharge its batteries, it goes back to the base. During this phase the border is mowed. In case we 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 to You the same time to make 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 us from the need of cutting on the border
Rain Sensor	The robot is provided with this sensor that allows the robot to return to the recharging base when it rains. This is better for the grass.

Installation

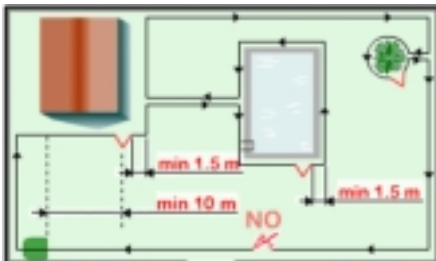
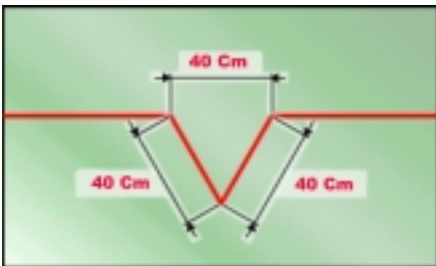
Preliminary Remarks

Recharge of the robot	First of all put the robot in charge. At the end of the installation it will turn to be useful in order to test the correct operating.
Arranging the garden	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.
Watering System	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 display side. The concept is that water must not enter the recharging base, while, on the contrary it can wet the front side of the robot.

Recharging Base	<p>Maybe it is the most difficult decision to take. The recharging base must be positioned respecting some rules. The recharging base must be in a place:</p> <ul style="list-style-type: none"> - plan - Firm ground - In the biggest area (if there is a big difference of square metres) - Not near an irrigator <p>The recharging base must be well fixed to the ground and it is necessary to pay attention to the entrance step. It must not be there. The problem can be solved by clearing away the grass surface or putting the artificial grass mat in front of the recharging base.</p>
Transformer	<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 Gewiss box and not exposed to the sun. - It would be better to put it in a refreshed area - It must stay outside the garden and not inside it - It must stay at least 3 metres 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	<p>After deciding where to place the recharging base it is possible to install the perimeter cable. To install it, it is necessary to respect some rules:</p> <ul style="list-style-type: none"> - 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) - Start from the rear part of the recharging base and connect the black connector. - Work in a clockwise direction - Remember the fast returns to the base or “Arrows” - 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 each other, you pass from one to the another. - Respect the following distances: <ul style="list-style-type: none"> o Wall 30 Cm o Hedge 35 Cm o Swimming pool, Hole, Precipice 40Cm - Leave two straight perimeter cable metres before the recharging base. - The excess cable must not be left as a mass. - Every connection must be made with proper material like the 3M self stretching tape “scotch 23”. - As far as possible, all the bents must not be done like a 90° angle. - It is suggested to leave a cable store for possible future moves 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) - At the end of the installation it is necessary to connect the going in of the cable to the red connector.
Quick Return “Arrows”	<p>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</p>



Measures to make arrows.



Secondary Area



advantages:

- The robot returns to the recharging base quickly and there is a low consumption of batteries.
- The robot returns quickly to the recharging base and resumes quickly mowing the lawn again.
- There are fewer traces on the ground.

In the first picture there is the way without arrows, in the second one there is the way with arrows. As it can be seen the route made by the robot is shorter. The arrow must be made as in the second picture.

An arrow is often put shortly after the recharging base because if the robot fails the return to the base, it returns quickly to recharge itself again. Remember that the robot recognizes only three arrows.

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

Explanation Led of the transmitter :

Flashing Green /Yellow : Border Ok.

Steady Green : Interrupted or not connected border

Flashing red : Too short border

Switched off Led : Not corrected Battery Charger, Faulty fuse of the transmitter, Faulty Transmitter

Explanation of the Led of the Battery Charger:

Steady Green : Working Battery charger

Steady red : Working Battery Charger with batteries in fast charge.

Off : Switched off or faulty Battery Charger.


IMPORTANT!!!!!!. The measures are indicated In some cases, especially in the machines with completely charged lithium batteries and the Dunker Motors, the speed results to be elevated and it is opportune to increase the measure of some cm. . It would be opportune to test the correct recognition with not completely charged batteries and therefore in the same conditions which would happen on the robot.

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. The secondary area must be naturally at the same level of the primary area (without stairs).

The robot can manage two secondary areas (the primary and two secondary areas)

The minimum passage is 70 cm from cable to cable. So the passage that we need is 1 metre and 30 cm. It is better to increase the distance if the passage is very long. On the contrary, if the passage is short we can venture some centimetre less.

During the programming it is necessary to select after how many times the robot must go to the secondary area after mowing in the primary area. Please program time necessary to reach that secondary area.

<p>Closed secondary area</p> 	<p>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.</p> <p>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.</p> <p>These solutions do not fit big gardens because the management is difficult. In fact the robot can not be well and the mulching effect is not well achieved because there will be days in which the customer can not move the machine from one area to the other or may forget it.</p> <p>To program the machine for closed areas it is necessary to turn it when is inside 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.</p> <p>ATTENTION. The robot must be in its working hours and days to start to work.</p>
<p>Installation without perimeter</p>	<p>It's possible to make the robot work even without a border. We do not suggest this option. It is normally used for demonstrations or for small gardens situated near the main area and completely delimited by fences (even the flowerbeds).</p>

Programming

Programming and Other

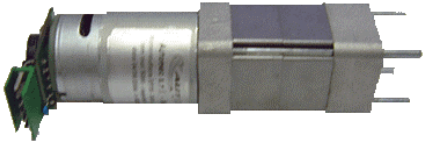
<p>Explanation of the keys</p>	<p>“ON” : To start the robot “OFF “: To turn off the robot. “PAUSE”: To put the robot in Pause mode or to resume working. “CHARGE”: To make the robot come out while is in the recharging base. To make it go to the recharging base while is working. “-“: To change the values during the programming. To turn the blade off while the robot is working. “+ “: To change the value during the programming. To turn the blade on while the robot is working. “ENTER”: To confirm the choice during the programming. To make the spiral while the robot is working.</p>
<p>Programming Menu</p>	<p>It is necessary to put the robot in the PAUSE mode and then press the ENTER key to enter the programming menu. The flowing 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 :</p> <ul style="list-style-type: none"> - 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 it must not. The robot must work every day or every other day to exploit the mulching effect. - Working hours 1 :

	<ul style="list-style-type: none"> - Working hours 2: It is possible to plan two working hours to make the robot come out. Always remember that to charge the batteries the robot needs from 3 to 4 hours. So between the working time 1 and the working time 2 there will be the necessity of this break. - Secondary area 1_cycles: It allows to plan after how many cycles of the primary area the secondary area must be mowed. - Secondary area 1_Time: It is the time necessary to the robot to come to the secondary area following the cable from the recharging base in a clockwise direction. It is better to take the time when the robot is in the middle of the secondary area. The robot makes about 20 linear metres a minute according to a rough estimate. - Secondary area 2: This is like the preceding option but for the area number 2. - Perimeter. It is possible to make the robot work without perimeter, for demonstration for instance. Moreover, with the option x2, x3, it is possible to delay the no signal recognition if there is too much iron, in other words if the signal is weak or confused. - Spiral. Only for models equipped for it. It is possible to select or not the intelligent spiral function. The robot makes the intelligent spiral function only when it meets high grass. The normal spiral function is random. - Self programming. Only for models equipped for it. Selecting the self programming the robot verifies the mowed lawn percentage. According to the mowed lawn quantity, the robot introduces some pause cycles that are an advantage for the garden and the robot as well. - Password. It is possible to select a password which is required every time the robot is started up. 																																								
<p>Work and Programming example of the secondary area.</p>	<p>Examples of programming without self programming :</p> <table border="0"> <thead> <tr> <th>Mq.</th> <th>Time 1</th> <th>Time 2</th> </tr> </thead> <tbody> <tr> <td>0200Sm</td> <td>10:00 - 11:00</td> <td></td> </tr> <tr> <td>0300Sm</td> <td>10:00 - 11:00</td> <td></td> </tr> <tr> <td>0600Sm</td> <td>10:00 - 12:00</td> <td></td> </tr> <tr> <td>0900Sm</td> <td>10:00 - 11:30</td> <td>16:00 - 17:30</td> </tr> <tr> <td>1200Sm</td> <td>10:00 - 12:00</td> <td>16:00 - 18:00</td> </tr> <tr> <td>1500Sm</td> <td>10:00 - 12:00</td> <td>16:00 - 19:00</td> </tr> <tr> <td>2000Sm</td> <td>08:00 - 21:00</td> <td></td> </tr> <tr> <td>2500Sm</td> <td>08:00 - 22:30</td> <td></td> </tr> <tr> <td>3000Sm</td> <td>07:00 - 23:30</td> <td></td> </tr> </tbody> </table> <p>Examples of programming with self programming :</p> <table border="0"> <thead> <tr> <th>Mq.</th> <th>Time 1</th> </tr> </thead> <tbody> <tr> <td>0500Sm</td> <td>10:00 - 13:00</td> </tr> <tr> <td>1000Sm</td> <td>10:00 - 19:00</td> </tr> <tr> <td>2000Sm</td> <td>10:00 - 22:00</td> </tr> <tr> <td>3000Sm</td> <td>07:00 - 23:30</td> </tr> </tbody> </table> <p>Secondary areas</p> <ul style="list-style-type: none"> - Secondary area 1 (Cycles) : 02 - Secondary area 1 (Time the robot needs to follow the cable) : 05 <p>The robot will go to the secondary area following the cable in a clockwise</p>	Mq.	Time 1	Time 2	0200Sm	10:00 - 11:00		0300Sm	10:00 - 11:00		0600Sm	10:00 - 12:00		0900Sm	10:00 - 11:30	16:00 - 17:30	1200Sm	10:00 - 12:00	16:00 - 18:00	1500Sm	10:00 - 12:00	16:00 - 19:00	2000Sm	08:00 - 21:00		2500Sm	08:00 - 22:30		3000Sm	07:00 - 23:30		Mq.	Time 1	0500Sm	10:00 - 13:00	1000Sm	10:00 - 19:00	2000Sm	10:00 - 22:00	3000Sm	07:00 - 23:30
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	<p>direction for 05 minutes every two cycles in the main area. MMAMMMAMMA</p> <p>Another example</p> <ul style="list-style-type: none"> - Secondary area 1 (Cycles) : 02 - Secondary area 1 (Time the robot needs to follow the cable) : 5 - Secondary area 2 (Cycles) : 01 - Secondary area 2 (Time the robot needs to follow the cable) : 12 <p>The area will be organized with this frequency MBMABMBMABMBMABMBM</p> <p>IMPORTANT !!!. Remind that:</p> <ul style="list-style-type: none"> - When there are secondary areas, increase the working times of the robot. <p>Don't exaggerate with the number of cycles. We suggest not to set out more than 3 cycles, otherwise the robot passes with a low frequency of time in the garden.</p>
Service Menu	<p>The service menu is selected by pressing CHARGE + -.</p> <p>The most important passages are :</p> <ul style="list-style-type: none"> - Statistics: All the robot errors are stored. - Test Motor: To test motors. - Test Signal : It verifies the signal - Motor Type: To select the type motor. - Battery Type: To select the lithium or lead type.

Errors showed by the robot

Errors list

<p>E01 – E02 Motor error</p> 	<p>The damage can be in :</p> <ul style="list-style-type: none"> - Motor - Encoder - Mother board drive
<p>E03 Blade motor error</p>	<p>The damage can be in :</p> <ul style="list-style-type: none"> - After hitting a stone - Burned motor - Encoder - Bearing - Mother board relay
<p>High grass</p>	<ul style="list-style-type: none"> - Really high grass - Material that blocks the shaft - Blocked bearing - Wasted brushes - Faulty motor - Encoder
<p>No signal</p>	<ul style="list-style-type: none"> - Faulty transformer - Transformer in heat protection - Really broken cable

	<ul style="list-style-type: none"> - Detached coil in the robot - Broken receiver <p>Transmitter led meanings</p> <p>Flashing Green/Yellow : Perimeter Ok. Fixed Green : The perimeter is interrupted or is not connected. Fixed Yellow : Initial reset of about 5 seconds. Flashing Red : Too short perimeter. Fixed Red : Broken Transmitter. Led out : Battery Charger not connected, faulty fuse of the transmitter, Broken transmitter.</p> <p>Tests to be made</p> <p>Take off the battery charger for 5 minutes and try again. Try to make a little bridge near the recharging base. Then check the transmitter led.</p>
Lead batteries. Reference values	<p>When the display shows “battery”</p> <ul style="list-style-type: none"> - 2200 The mother board turns off. - 2300 It turns off the blade. - 2350 It goes to the recharging base. - 2740 Tension of stabilization. It is the recharging value of the battery. During the recharge the battery reaches about 2940 and then it goes down again to 2740. During the fast recharge phase the transformer led shows the yellow flashing or the red colour fixed.
Lithium Batteries. Reference values.	<p>When the display shows “battery L”</p> <ul style="list-style-type: none"> - 2200 the mother board turns off. - 2440 It turns off the blade. - 2490 It goes to the recharging base. - 2880-2950 Tension of stabilization. It is the recharging value of the battery. During the recharge the battery reaches about 2990 and then goes down again to 2880. During the fast recharge phase the transformer led shows the yellow flashing or the red colour fixed
Coil	Check if there is water in the compartment.
Receiver	Check if it has been properly inserted.
Blocked	When the robot does not feel the cable or a shock for about 5 minutes, it tries to turn of 90° for 3 times and then it stops showing the message “blocked”. Generally, it happens when the robot is held up into a hole or if the wheels are loose.
Out of perimeter.	<p>Possible causes:</p> <ul style="list-style-type: none"> - The transformer reaches the temperature protection during the hottest days. In this case, move the transmitter and install the recharging base in a aired place. - Too much slope. The solutions are: the lithium battery and hooked spikes and hooked wheels. - Troubles with wheel motors (Encoder).
Checksum Error	Update to the last version >=27.09.2004
Clock	Update to the last version >=27.09.2004
Entrance errors in the recharging base	<p>Check:</p> <ul style="list-style-type: none"> - The entrance errors in the base in statistics. - Contacts of micro switch.
Robot stopping	<p>Check :</p> <ul style="list-style-type: none"> - Not good fuse contacts. Take them away, clean and screw them. - Mother board with faulty relay.

	- Keyboard with “off” short key.
ETFLASH Update	
AREPORT report software	
Update Servicing	<p>Whenever a robot returns to our premises for servicing we suggest as follows:</p> <ul style="list-style-type: none"> - Download the report to check programming and possible errors with the “Lawn Mower Report” software - Update the software version of the robot using ETFLASH. - Check and clean the contacts of all fuses - Check the impedance of the recharging plates and the “MICROSWITCH” cable - Clean the recharging plates using sandpaper - Check and grease all bearings (Front wheels and blade). The grease must be waterproof. - Check the batteries (they must be in good conditions)