Driving the B400 & B600 cleaner with RadioPLC® manually.

To drive the cleaner manually,
use these keys only.
The cleaner is powered up automatically.

Control is made with short depressions.
Long depressions = key repetition.

Joy-stick principle, e.g. repeated depression
⬆ gives a higher speed until ⬇ or stop is
depressed.

STOP stops all activities, including
counting timers and automatic drive.

Indication of radio transmission ✹

Forwards. One more
depression, or a long one
gives high speed.

✹ Bad battery

Left turn while depressed.
Also at standstill.

Right turn while depressed.
Also at standstill.

Reverse. One more
depression, or a long one
gives high speed.

Example; A soft reverse from full speed forward until full speed reverse is obtained with a single long key depression due to the joystick functionality in cooperation with the automatic repeat function.

Manual drive is always done in cooperation with the always active bumper- and zero depth detection automatics.
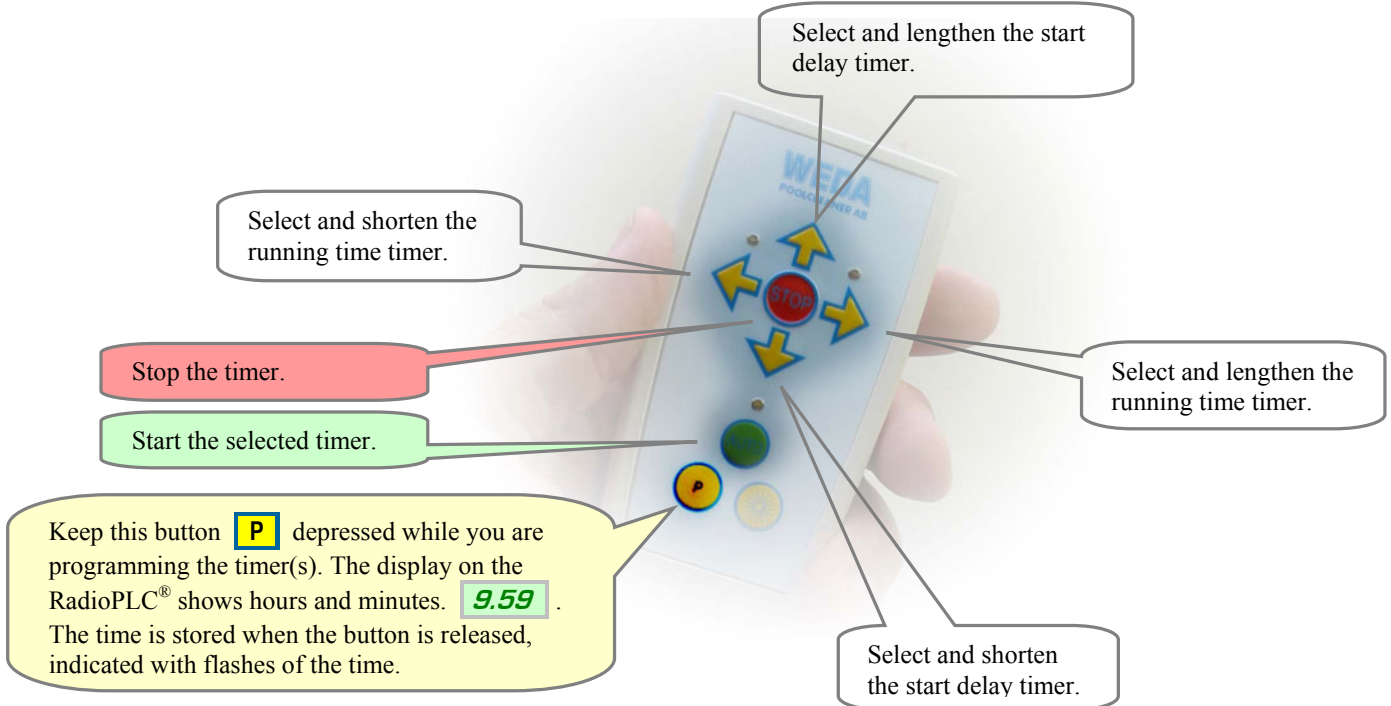
Timer operation of the B400 & B600 with RadioPLC® .

1. Power up the cleaner, drive it to the starting position.
2. Keep **P** depressed, then also depress **AUTO**. This starts the currently selected timer (delay or runtime). The display on the RadioPLC® counts down hours and minutes. When the timer(s) has elapsed, the power is automatically disconnected and **0.00** is displayed.

To again drive the cleaner manually, just use any buttons, and the cleaner is powered up automatically.

Keep this button, **P** depressed while programming the timer(s).

Select and lengthen the start delay timer.

Select and shorten the running time timer.

Stop the timer.

Start the selected timer.

Select and lengthen the running time timer.

Keep this button **P** depressed while you are programming the timer(s). The display on the RadioPLC® shows hours and minutes. **9.59** . The time is stored when the button is released, indicated with flashes of the time.

Select and shorten the start delay timer.

Active (counting down) timer is displayed on the RadioPLC® with a flashing decimal point.

You can at any time interact with, and change a counting timer. The new temporary time is not stored. If you move a waiting powerless cleaner, then it is automatically powered up and the wait is aborted. The then aborted start delay timer can be continued with a depression of the **P** + **AUTO** -keys.

You can at any time manually drive a cleaner running and powered by the running time timer. The running time timer is not affected as long as **STOP** is not depressed. If the running time timer is stopped, it can be continued with a depression of the **P** + **AUTO** -keys.

Automatic drive of the B400 & B600 with the RadioPLC® .

1. Drive the cleaner. (Manually or automatically)
2. Instruct the cleaner when to turn, and how to turn by keeping **AUTO** depressed and simultaneously depressing any of the arrow keys. The display on the RadioPLC® feedbacks reversal distance in meters or turning time in tenths of seconds. E.g: **A 9** . Done.

Start running according to these made instructions by depressing **AUTO** . Automatic reversals and turns are indicated on the RadioPLC® display **A 9** .

> Keep this button **AUTO** depressed while you instruct the automatic drive procedure.

> At reverse driving, instruct drive length by reversal to forward.

> Turn more to the left at the next turning point. (2,4,6,.. m) Each depression = 1/10 second.

> Remove all the made instructions! **A 0** .

> Turn more to the right at the next turning point. (2,4,6,.. m) Each depression = 1/10 second.

> Start using the automatics.

> At forward driving, instruct drive length by reversal to reverse.

> Keep the **AUTO** button depressed while you instruct an automatic drive manoeuvre.
>
> Number of meters, or 1/10 seconds turning time is displayed on the RadioPLC **A 9** .

> ✺ Automatic drive mode is indicated

The automatic drive mode can be activated to operate in conjunction with manual diving, bumpers, zero-depth indicator and also timer initiated cleaning runs.

The made instructions remain even if the cleaner is made powerless and thus need not be repeated.

Six different drive instructions can be given to the cleaner, and arbitrarily combine;

- Forward drive length, counted from last reversal or standstill.
- Reverse drive length, counted from last reversal or standstill.
- First turning point at 2 meters forward drive length.
- Following, equally made, turning points at 4, 6, 8, … meters forward drive length. (FwdCurve).
- First turning point at 2 meters reverse drive length.
- Following, equally made, turning points at 4, 6, 8, … meters reverse drive length. (RevCurve).

Made instructions can be altered while the cleaner is driving in the automatic drive mode.

Drive length 0,2 meter – 51 meters. Turn 0,1 second up to 3 seconds, right and left is plus and minus.

Stop terminates the automatic drive mode **A - -** , the made instructions remain stored.

Example of how to instruct forward auto-drive length.

1. Drive the cleaner manually forward. When the desired forward drive length has been reached, depress **AUTO** and then simultaneously ⬇

2. The RadioPLC® displays "Auto" and the travelled distance in meters, e.g. **A 12** . The cleaner reverses and is now instructed.
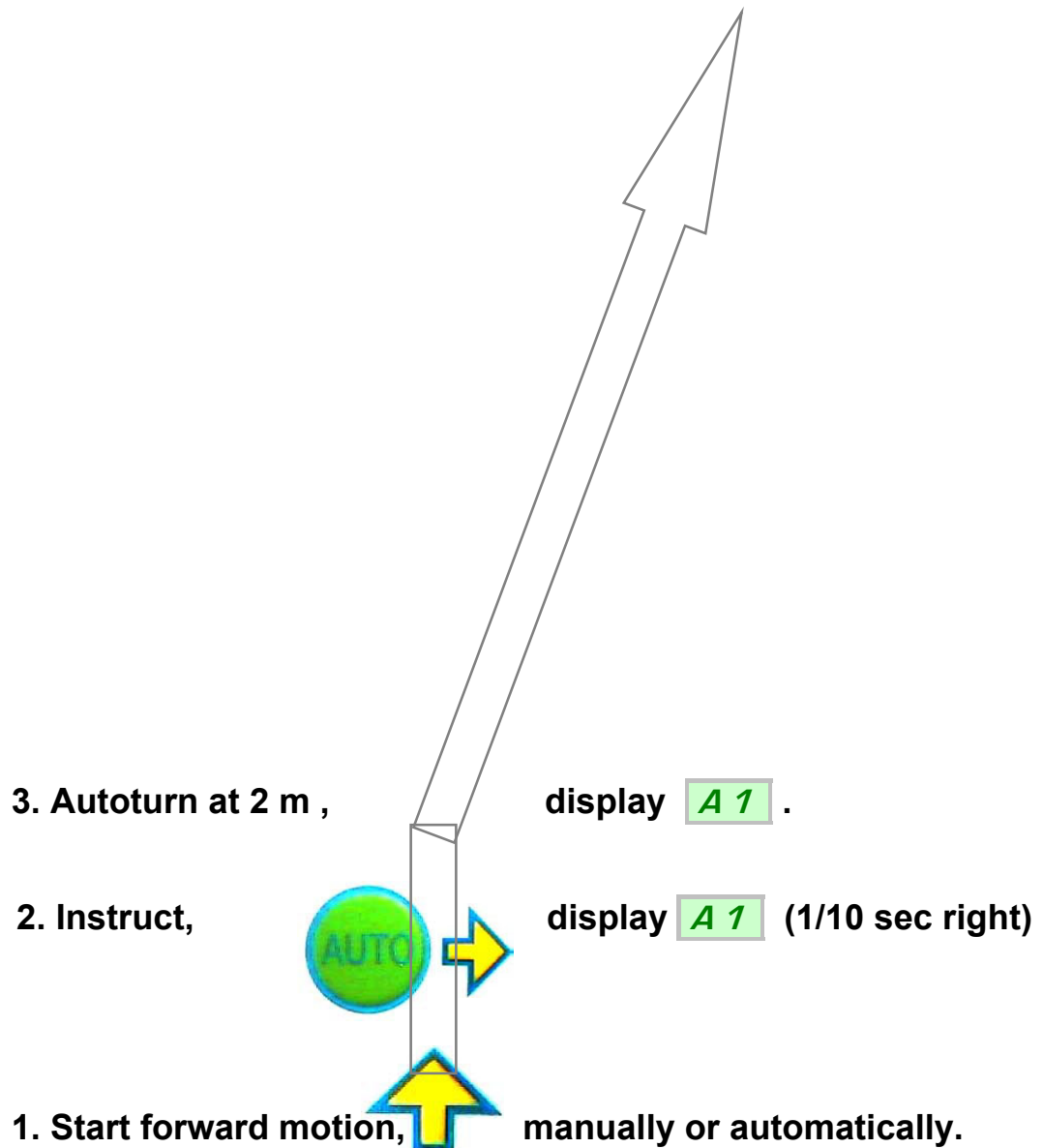
From now on, the cleaner always reverses after having travelled 12 meters forward if it is driven with the automatic drive mode activated. When these automatic reversals are made, the display shows e.g. **A 12** .

2. Instruct,   display **A 12** . (meters).

1. Start
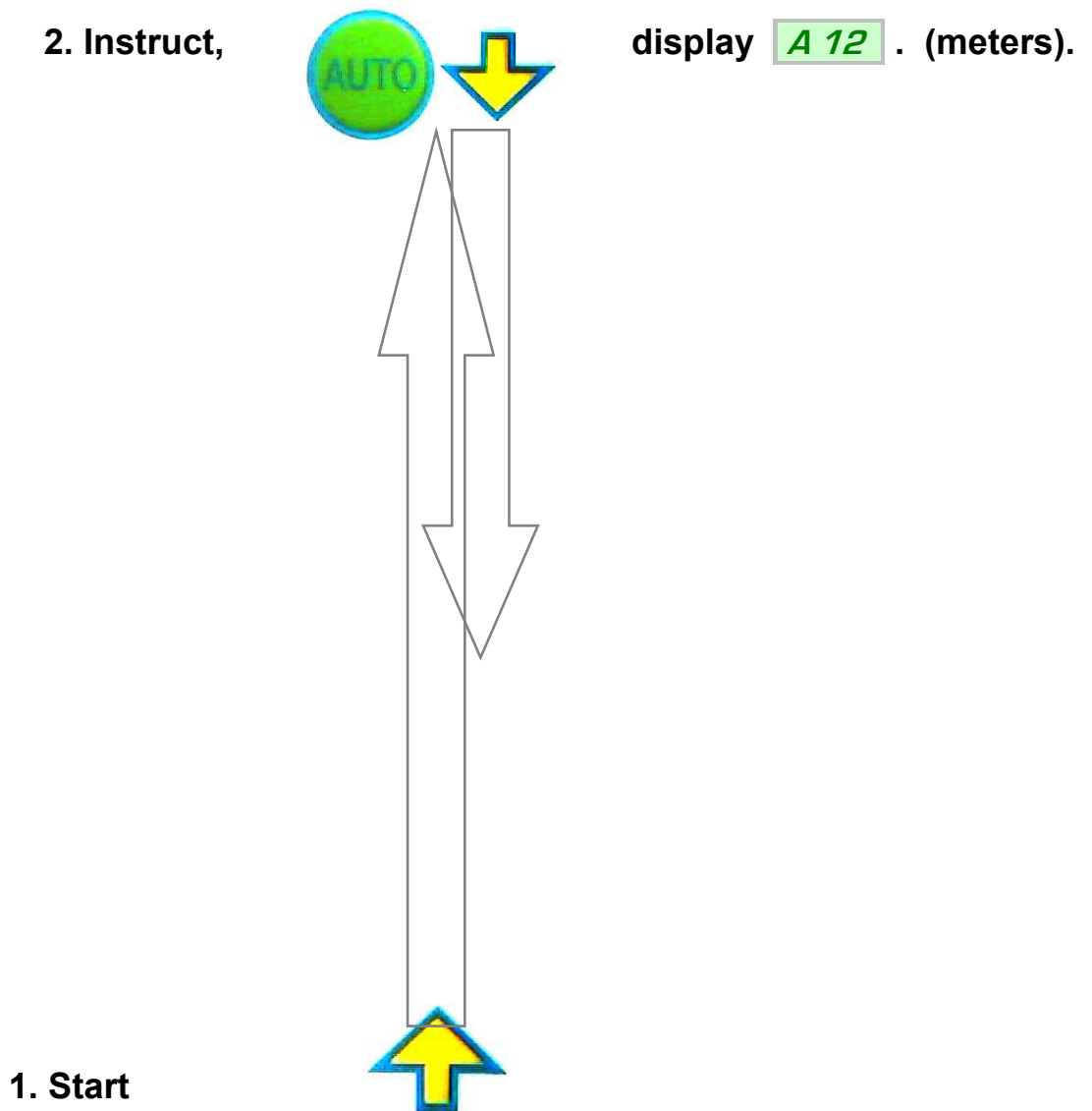
Example; Instruction of the first fwd. turn at the 2meter turning point.

1. Drive the cleaner, manually or automatically. Await, or manually steer, a change to forward motion.
2. <u>Before</u> the cleaner has reached the 2 meter turning point, instruct how the first turn is to be done. Depress **AUTO** and thereafter simultaneously the left or right arrow. The display on the RadioPLC® feedbacks "Auto" and the turn time in tenths of seconds. E.g. **A 1** =Automatic 1/10 sec turn to the right.
3. When the cleaner passes the 2 meter turning point, then the instructed turn is performed and displayed.

From now on the cleaner will always, when driven in automatic drive mode, make a turn when it drives forward past the 2 meter point. This instruction is normally used to give the cleaner a new heading after having made a reversal of the drive motion to forward.

3. Autoturn at 2 m ,   **display A 1 .**

2. Instruct,   **display A 1   (1/10 sec right)**

1. Start forward motion,   **manually or automatically.**

Instruction of repeated auto-turn (=curve) at forward motion.

1. Drive the cleaner, manually or automatically. Await, or manually invoke, a change to forward motion.
2. At any time <u>after</u> that the cleaner has passed the 2 meter turning point, instruct the repeated auto turns. Depress **AUTO** and thereafter simultaneously the ⬅ or ➡ arrow. The display on the RadioPLC® feedbacks "Auto" and the turn time in tenths of seconds. E.g. **A 1** =Automatic 1/10 sec turn to the right.
3. Whenever the cleaner passes one of the 4, 6, 8, 10, etc. meter points, a turn is made and displayed.

From now on the cleaner will always, when driven in automatic drive mode, make turns when it drives forward past the 4, 6, 8, 10, etc. meter points. This instruction is normally used to give the cleaner a turning movement (=curve) instead of passing the pool middle in a straight line when driving forward.

Etc. etc. at 10, 12, 14…m

Auto turn at 8 meters, display **A 1** .

Auto turn at 6 meters, display **A 1** .

3. Auto turn at 4 meters, display **A 1** .

2b. Instruct AUTO ➡

2a. Pass by 2 meter

1. Start forward motion, manually or automatically.
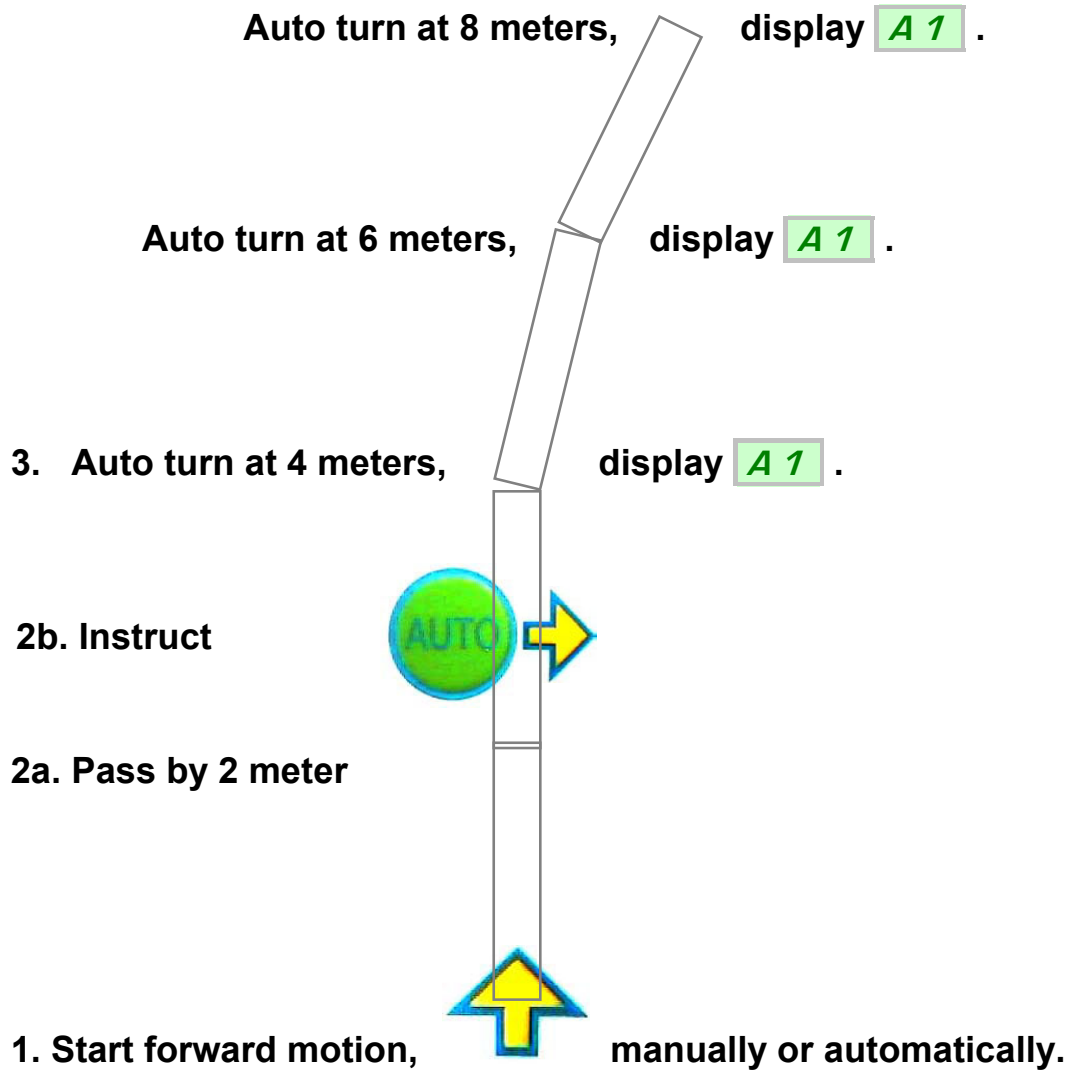
Example of automatic drive, pool with a deep end.

1. Remove possibly old stored instructions with **AUTO** + **STOP** , the display indicates **A 0** . Drive the cleaner forwards with ⬆.

2. Reverse the cleaner before the inclination with **AUTO** + ⬇ . The forward driving length (from the starting point) is now instructed.

3. Now at the reverse travel, or at the next reverse, instruct a turn with **AUTO** + ➡ before the 2 meter turning point. The turn can be adjusted at the following reverse travel, as usual before 2 meters travelled distance.

The instructions is now done, let the cleaner proceed until done.
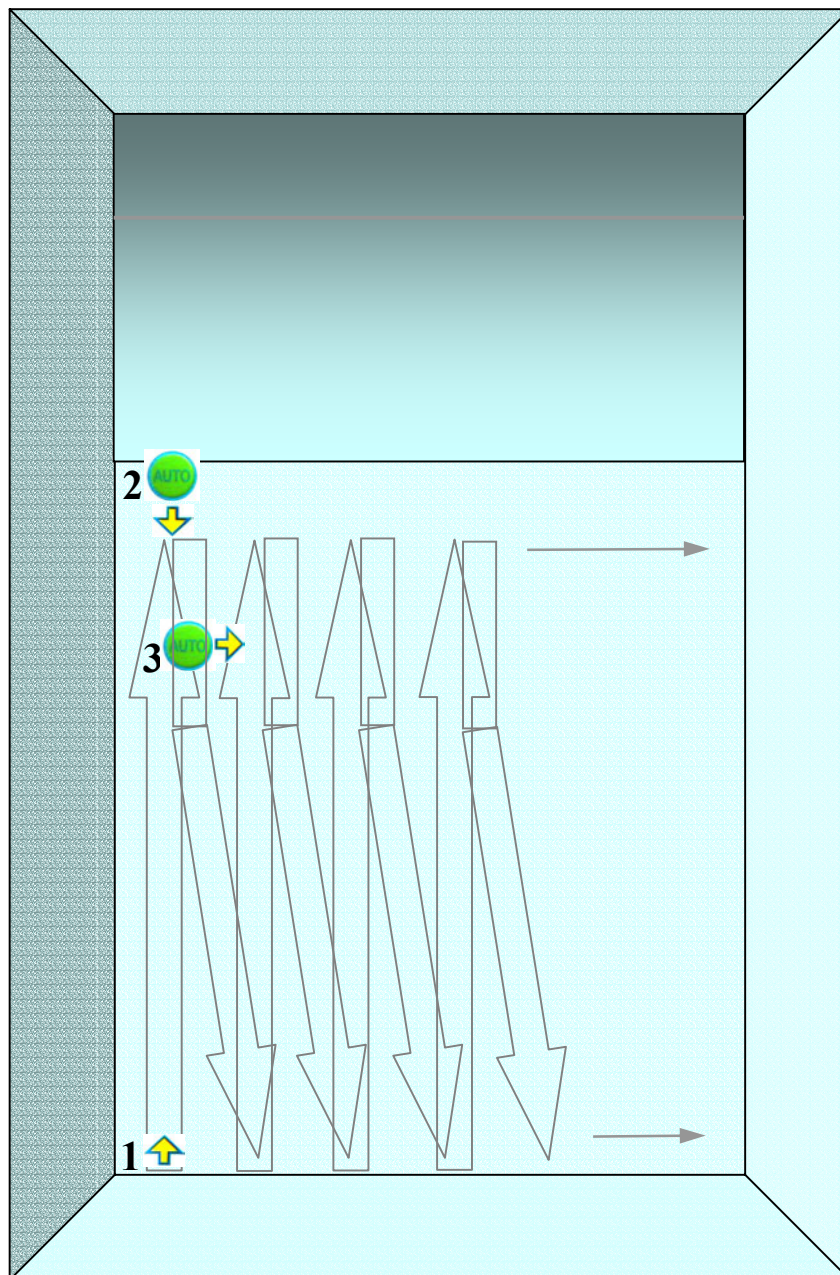
Example of automatic drive, pool with rounded floor corners.
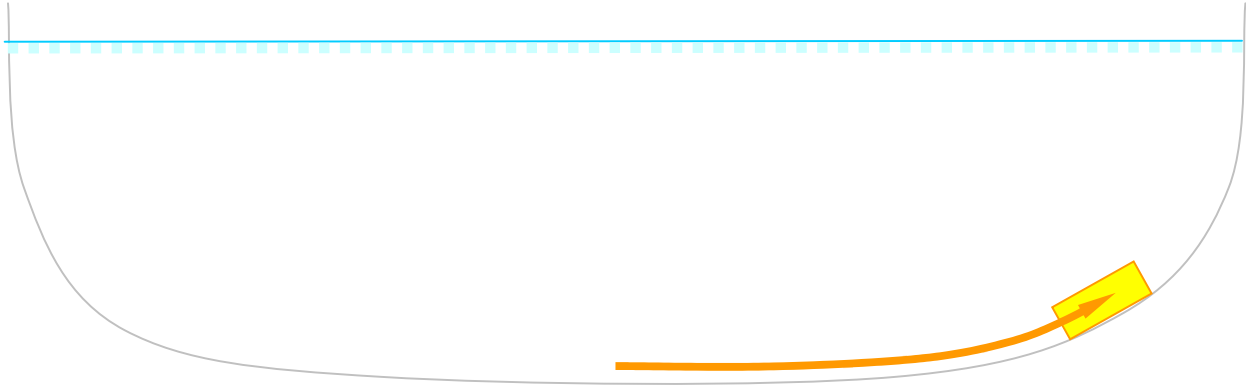
Here comes an example of how to use a two instructed turns, one at forward drive and one at reverse drive, to in effect obtain the sideways displacement that cannot be achieved with the rulers as the pool does not have walls connected to the pool bottom with a 90 degree angle.

1. Remove possibly old stored instructions with **AUTO** + **STOP** , the display indicates **A 0** . Start the cleaner forward movement with ⬆.

2. Whenever the cleaner have turned to forwards driving, <u>before</u> the 2 meter point is passed, instruct a small right turn with **AUTO** + ➡ Notice the length (on the display in tenths of seconds) when the turn executes as the 2 meter point is passed.

3. When the cleaner has reversed to reverse drive, instruct an equally sized turn (watch the display) with **AUTO** + ➡, again <u>before</u> the cleaner has reversed past the 2 meter point.

The instruction is now done. You can adjust the turns, and thus in effect the sideways displacement, at the following cycles before the 2 meter turning points. Make them equal as not to introduce a gradually increasing angular displacement. Let the cleaner continue until done.
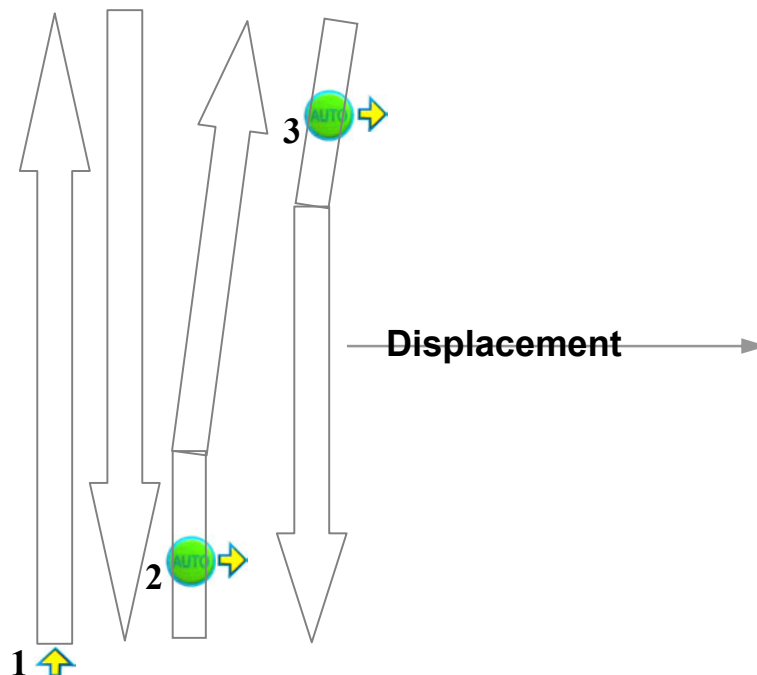
Example of automatic drive, irregular pool with one straight side.

It is possible to use one straight pool side as a reference for the below described automatic drive.

1. Remove possibly old stored instructions with **AUTO** + **STOP** , the display indicates *A 0* . Start the forward movement with ⬆.
2. As the cleaner drives forward, instruct the forward drive length by reversing it with **AUTO** + ⬇ .
3. Instruct a turn at the reverse drive path with **AUTO** + ➡ , <u>before</u> the 2 meter point is passed.

The instruction is now done, let the cleaner complete the job, possibly using the run time timer. After the completion of the automatic drive, the irregular sides are cleaned off manually with the remote control.
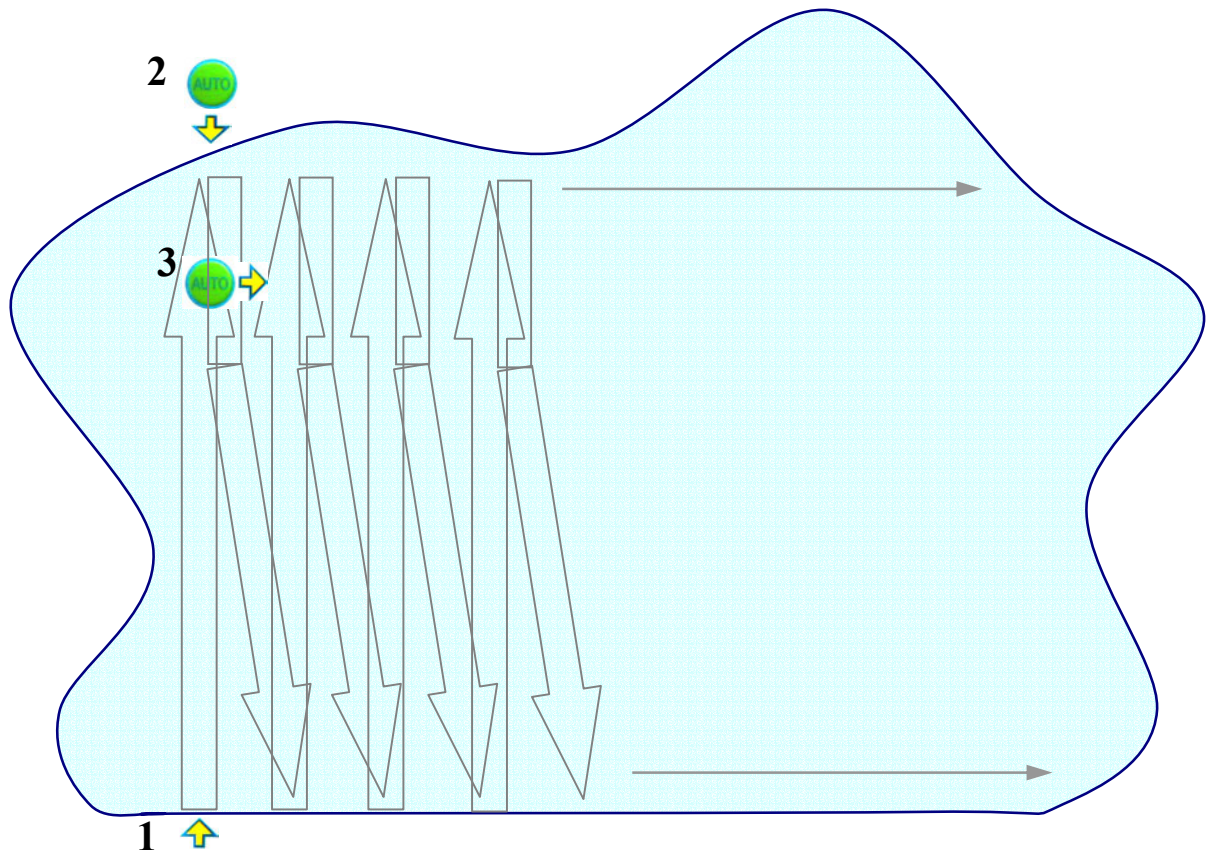
Example of automatic drive, adventure type pool.

Here comes an example of how to use an instructed driving length at forward drive as well as for reverse drive, together with automatic turns at the forward run as well as in the reverse run.

1. Remove possibly old stored instructions with **AUTO** + **STOP** , the display indicates **A 0** . Start the forward movement with ⬆.

2. As the cleaner drives forward, instruct the forward drive length by reversing it with **AUTO** + ⬇ .

3. Instruct the reverse driving length with **AUTO** + ⬆ . See to it that these running lengths are equally long, you can let the cleaner go just forth and back for a while, and meanwhile it is possible to adjust the lengths by shortening them. If the driving lengths are unequal, the cleaner will gradually by each cycle displace. The next example shows the use of this effect.

4. Instruct a small turn at the reverse drive path with **AUTO** + ➡ , before the 2 meter point is passed. Check the resulting length of the turn on the display as the turn is executed when the cleaner is passing the 2 meter point.

5. Instruct an equally small turn (watch the display) using **AUTO** + ⬅➡ at the forward drive path, before the 2 meter point is passed.

The instruction is now done. You can adjust the turns at the following cycles before the 2 meter turning point. Let the cleaner continue until done.
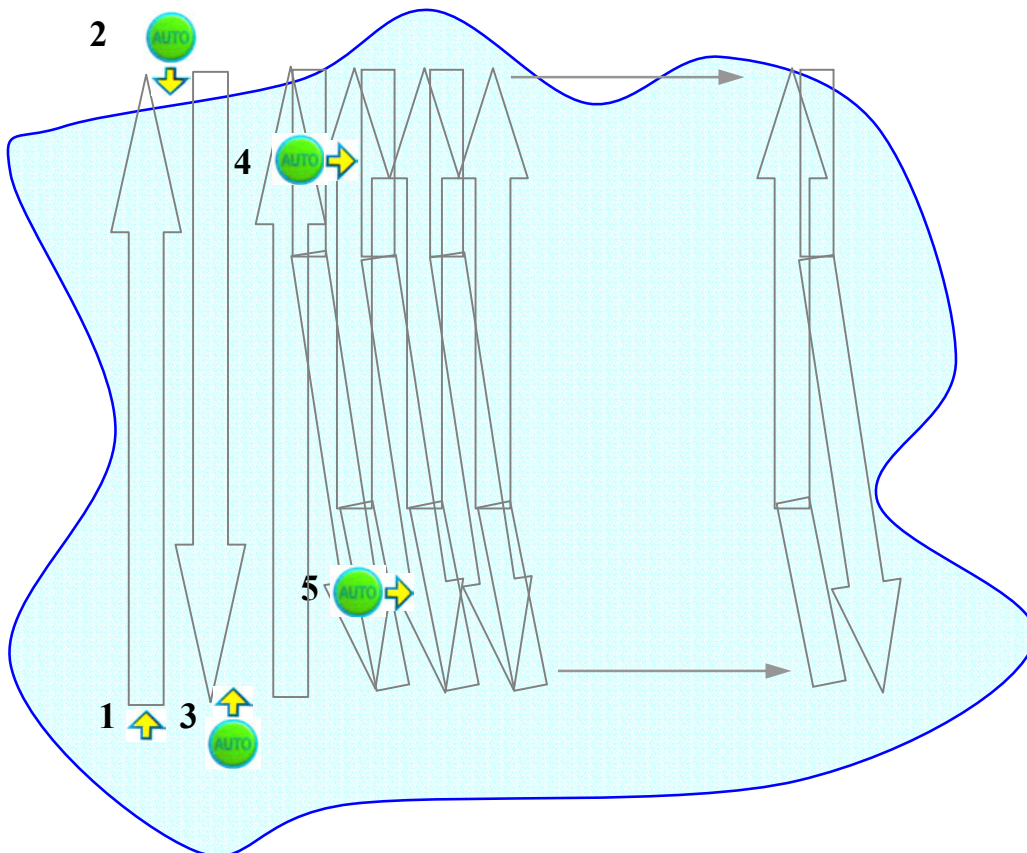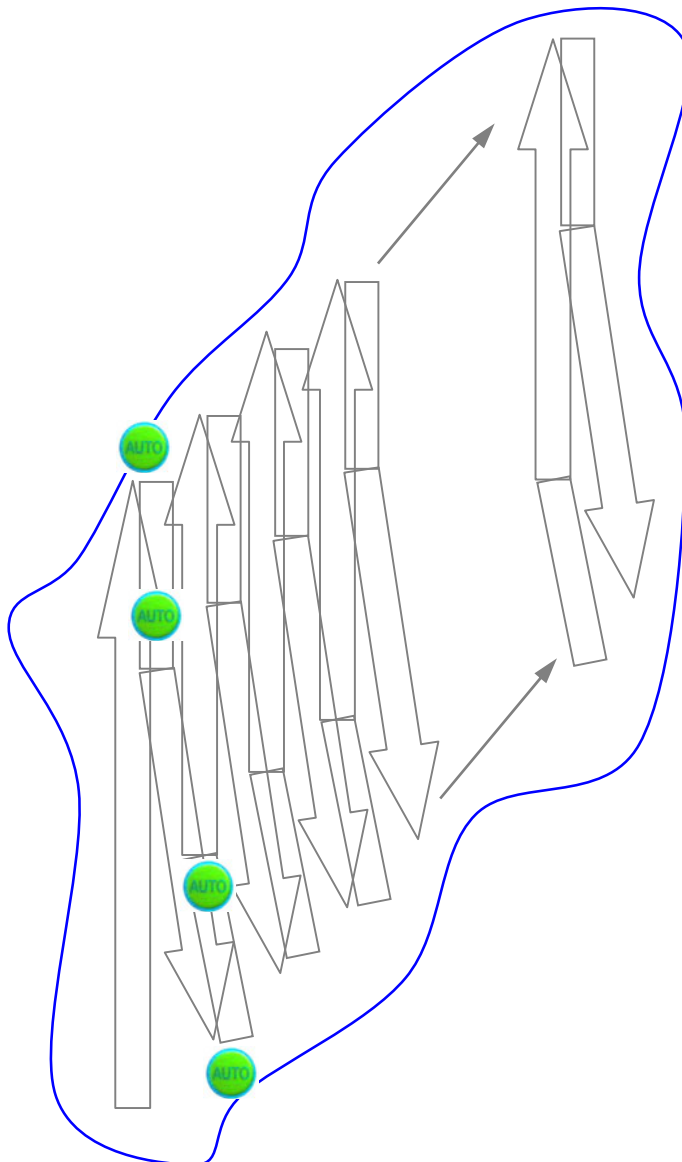
Example of automatic drive, rhomboid shaped adventure type pool.

You can use the possibility of having a different automatic forward and reverse drive length in order to get a displacement of the cleaner by each cycle. This type of programming however requires that you are familiar with the handling of the automatic drive as you need to enter the instructions with "flow". The middle of irregularly shaped surfaces can however be cleaned with great efficiency.

1. Reset previous instructions. Notice the starting point, start the forward drive. Instruct the reversal point.
2. Instruct a slight turn at the reverse drive path, before the 2 meter point is passed. Watch the display.
3. Instruct the reverse driving distance. Make this instruction before the cleaner moves all the way back, it will result in a gradual displacement forward by each cycle.
4. Instruct an equally small turn (watch the display) at the forward drive path, before the 2 meter point is passed.

The instruction is now done. You can adjust the turns at the following cycles before the 2 meter turning point. You can also adjust the driving lengths, but only to shorten them. Let the cleaner continue until done.
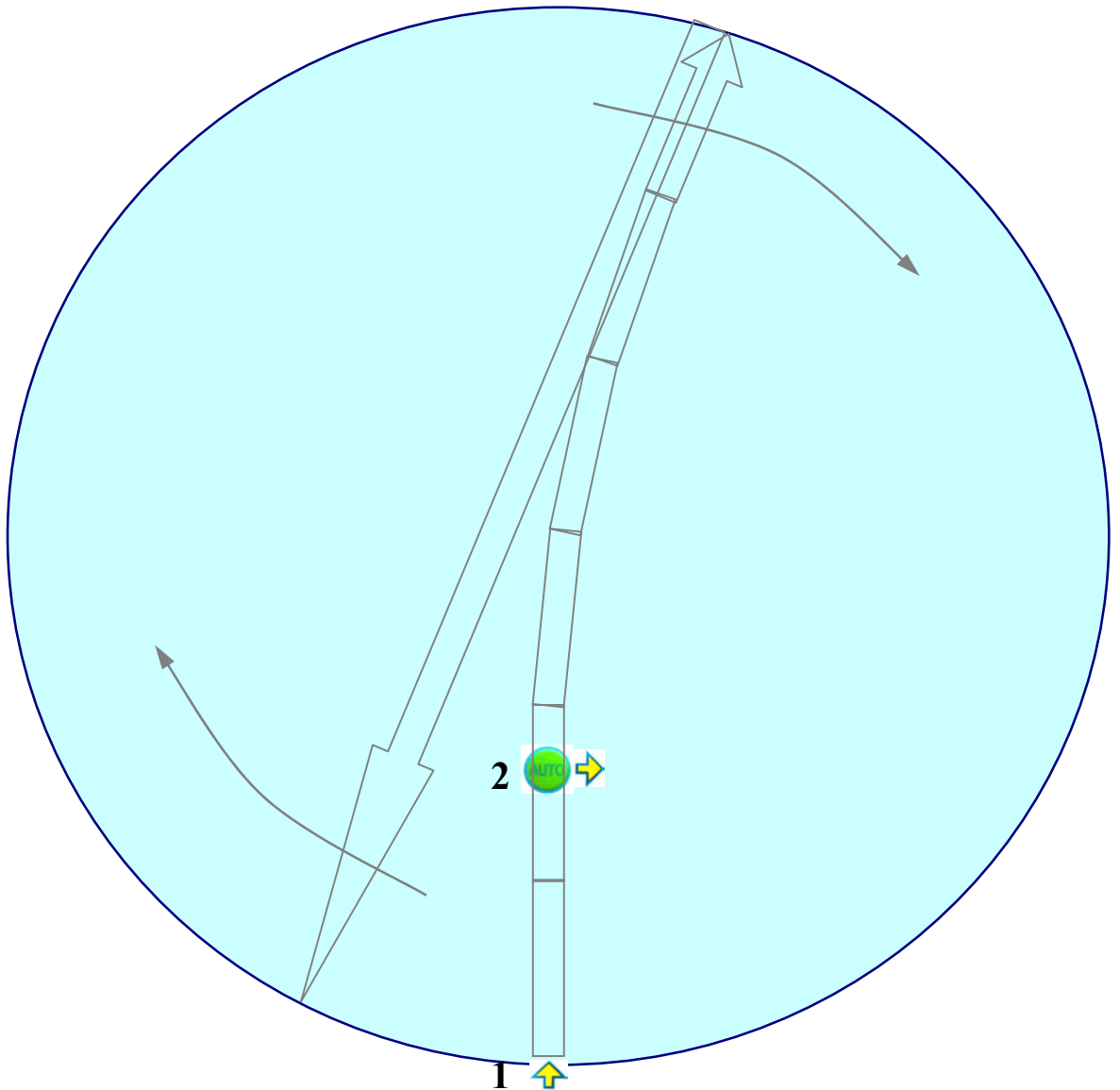
Example of automatic drive, fan-shaped drive pattern.

This example uses equal forward and reverse driving length but different angle of the turn at the 2 meter turning point. The turn made at forward movement is made sharper (longer turning time) thus resulting in an overall movement shaped as a fan.

1. Reset previously made instructions. Instruct the forward driving length.
2. Instruct the reverse driving length. See to it that these running lengths are equally long, you can let the cleaner go just forth and back for a while, and meanwhile it is possible to adjust the lengths by shortening them. If the driving lengths are unequal, the cleaner will gradually by each cycle move a little bit farther or closer away. You can of course on purpose make use of this to get an elongated fan-shaped drive pattern.
3. Instruct a slight turn at the reverse drive path, <u>before</u> the 2 meter point is passed. Watch the display.
4. Instruct an longer turn (watch the display) at the forward drive path, <u>before</u> the 2 meter point is passed. The longer (=higher turning angle) turn on the forward drive make the resulting overall fan shape.

The instruction is now done. You can adjust the turns at the following cycles before the 2 meter turning point. You can also adjust the driving lengths, but only to shorten them. Let the cleaner continue until done.
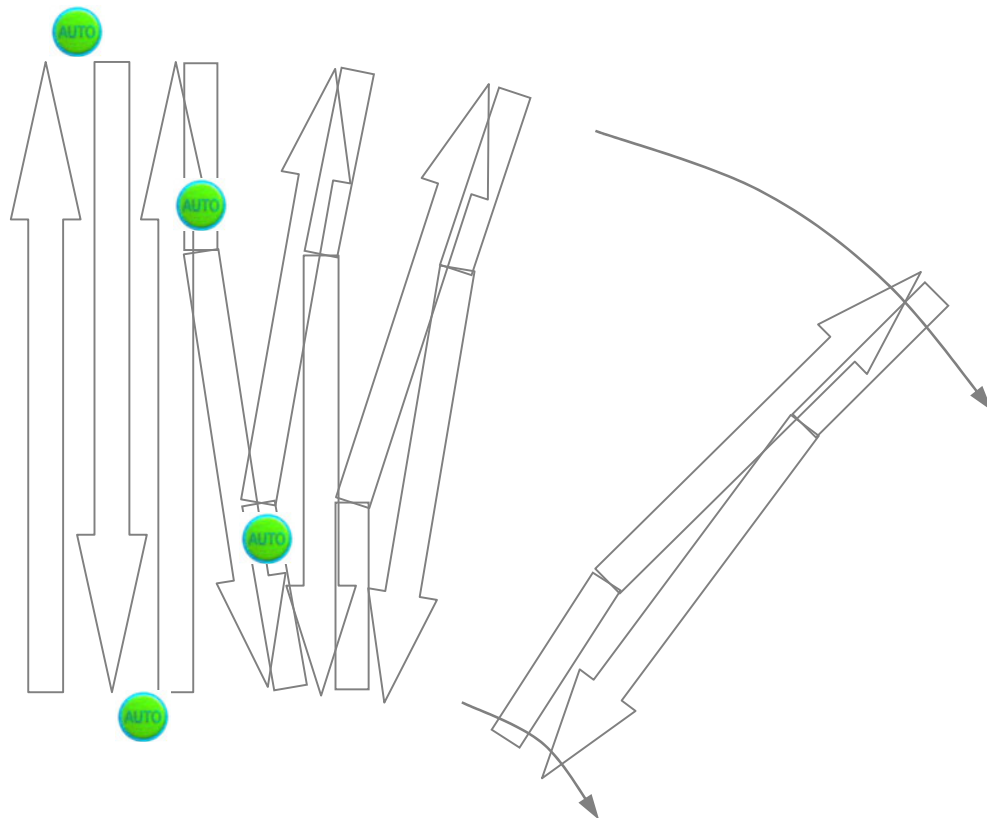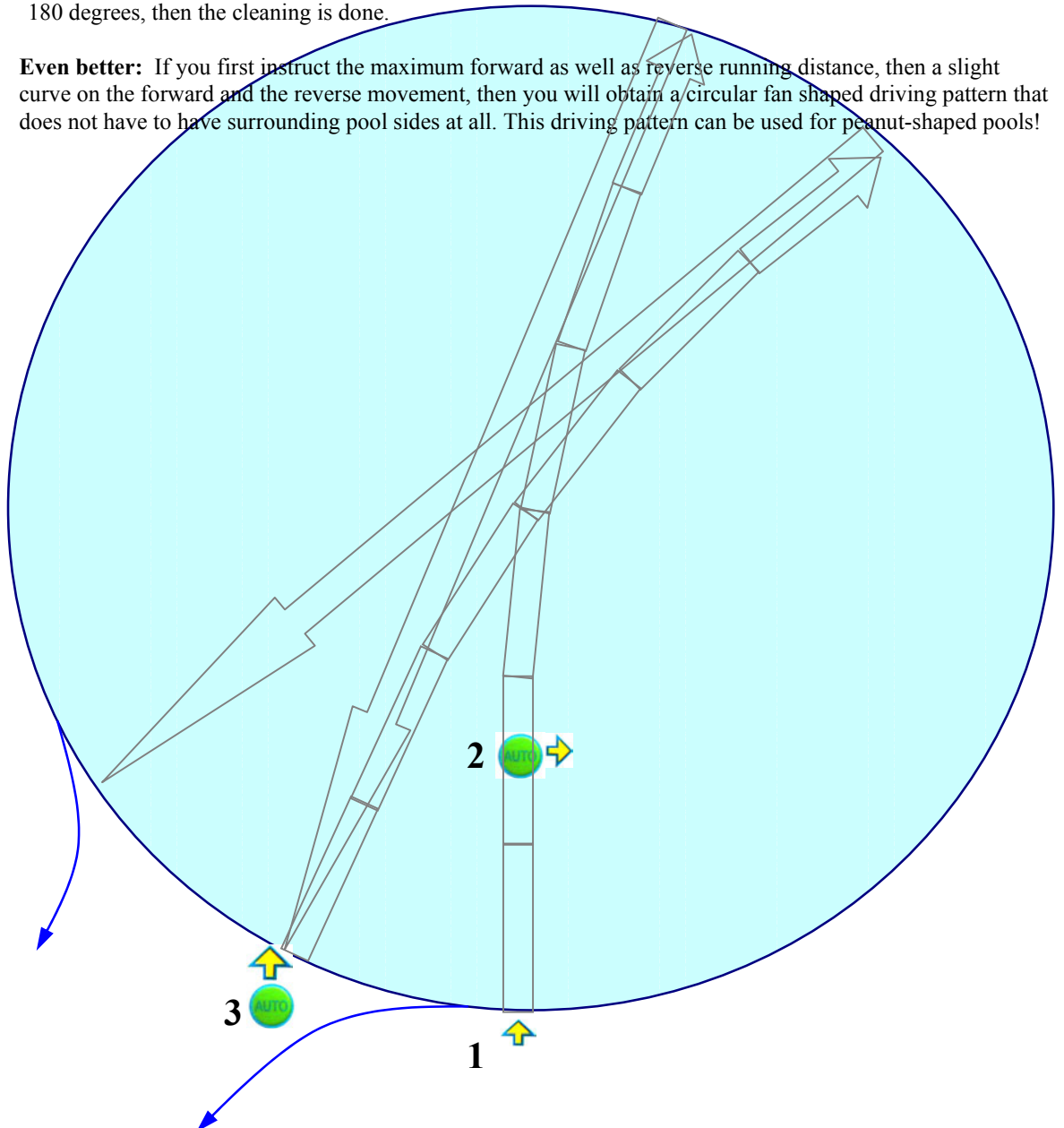
Example of automatic drive, circular pool.

It is possible to utilize a forward multiple turn (curve) that will, together with a straight reversal, result in a fan shaped "rotating" drive pattern.

1. Remove possibly old stored instructions with **AUTO** + **STOP** , the display indicates **A O** . Start the forward drive with ⬆.
2. Instruct a curve with with **AUTO** + ➡ during forward movement after that the cleaner has passed the 2 meter turning point.

The instruction is now done. The sharpness of the bow can be corrected at any time during forward motion after that the cleaner has passed the 2 meter turning point. Let the cleaner continue, the movement pattern "rotates" and when it has rotated 180 degrees, then the cleaning is done.

Example of automatic drive, circular pool with opening.

It is possible to utilize a forward multiple turn (curve) that will, together with a straight reversal, result in a fan shaped "rotating" movement pattern. This movement can be given a maximum reverse drive distance as to prevent the cleaner from escaping into an adjacent pool.

1. Remove possibly old stored instructions. Select a starting position that will result in that the cleaner will, at first reverse or quite soon, reverse into the opening. Start the forward drive with ⬆.

2. Instruct a curve with **AUTO** + ➡ during forward movement <u>after</u> that the cleaner has passed the 2 meter turning point.

3. When the cleaner reverses into the opening, instruct it to go forward with **AUTO** + ⬆

The instruction is now done. Let the cleaner continue, the movement pattern "rotates" and when it has rotated 180 degrees, then the cleaning is done.

Even better: If you first instruct the maximum forward as well as reverse running distance, then a slight curve on the forward and the reverse movement, then you will obtain a circular fan shaped driving pattern that does not have to have surrounding pool sides at all. This driving pattern can be used for peanut-shaped pools!

Example of automatic drive, quick-clean of a circular pool.

The automatic curve drive can be used to make the cleaner follow the side of a circular pool where most of the visible dirt gathers, to get a "quick-clean" of the pool.

1. Start to drive along the pool side.
2. After that the cleaner has driven more than 2 meters, then you can instruct a curve with **AUTO** + ➡.
3. Increase or decrease the automatic drive turn using **AUTO** + ⬅➡ to make the cleaner follow the pool side.

Never leave the cleaner unattended with these kind of automatic drive instructions as they may lead to that the cleaner rotates until the floating cable (The umbilical) is damaged!
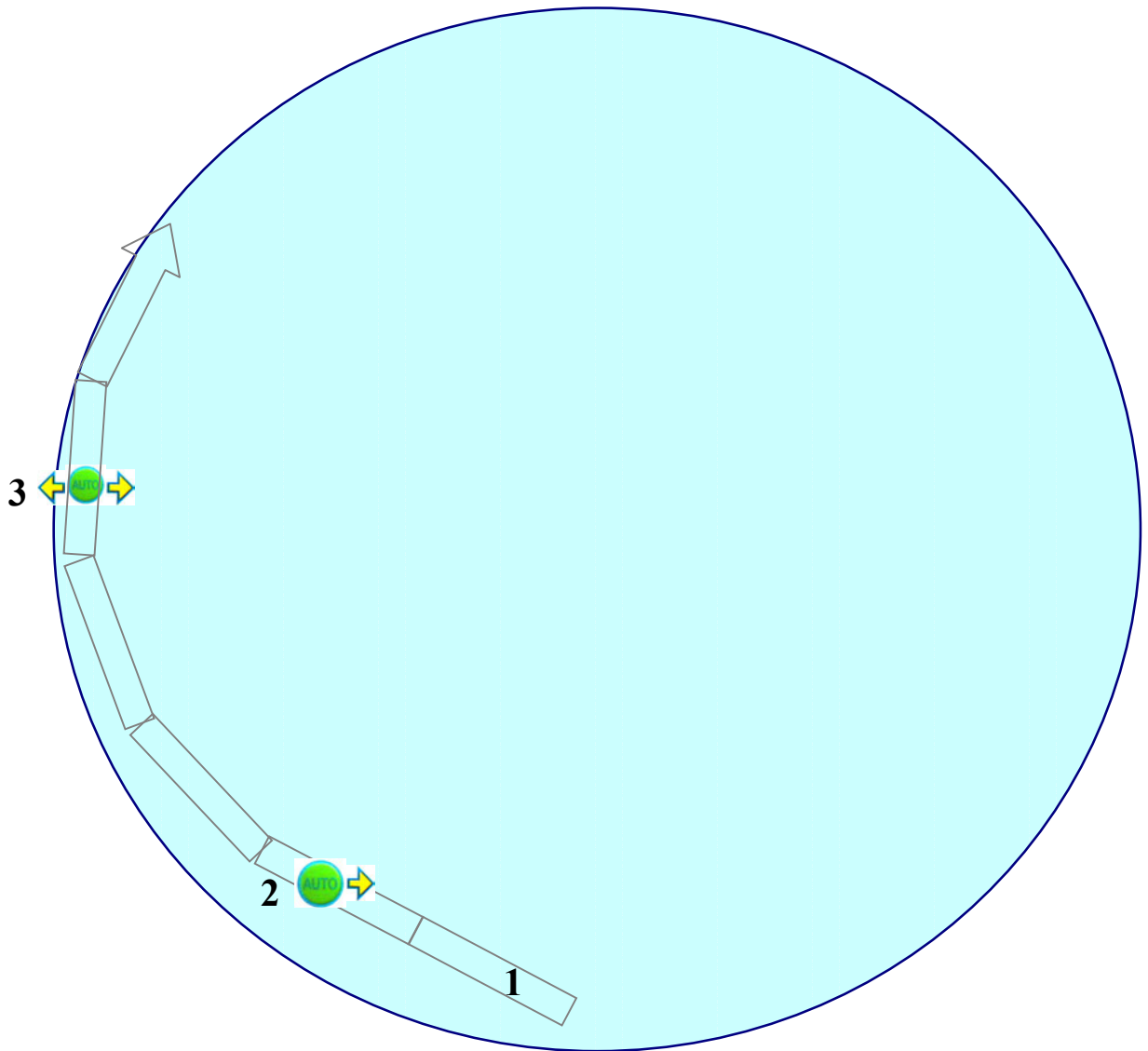
Example of automatic drive, randomizer.

It is possible to use the six different automatic drive instructions to obtain a randomly seeking movement in the following way;

1. Remove possibly old stored instructions with **AUTO** + **STOP** , the display indicates **A 0** .
2. Instruct the driving length forth and back not longer than the short side of the pool.
3. Instruct the first forward turn <u>before</u> 2 meters sharply to the right. Note the turning time on the display.
4. Instruct the following forward turns (curve) as left turns with ¼ of the turn value.
5. Instruct the first reverse turn <u>before</u> 2 meters sharply to the right. Note the turning time on the display.
6. Instruct the following forward turns (curve) as left turns with ¼ of the turn value.

Be sure to follow these instructions carefully and also never leave the cleaner unattended as these kind of automatic drive instructions may lead to that the cleaner rotates more in one direction and this can damage the floating cable! (The umbilical)
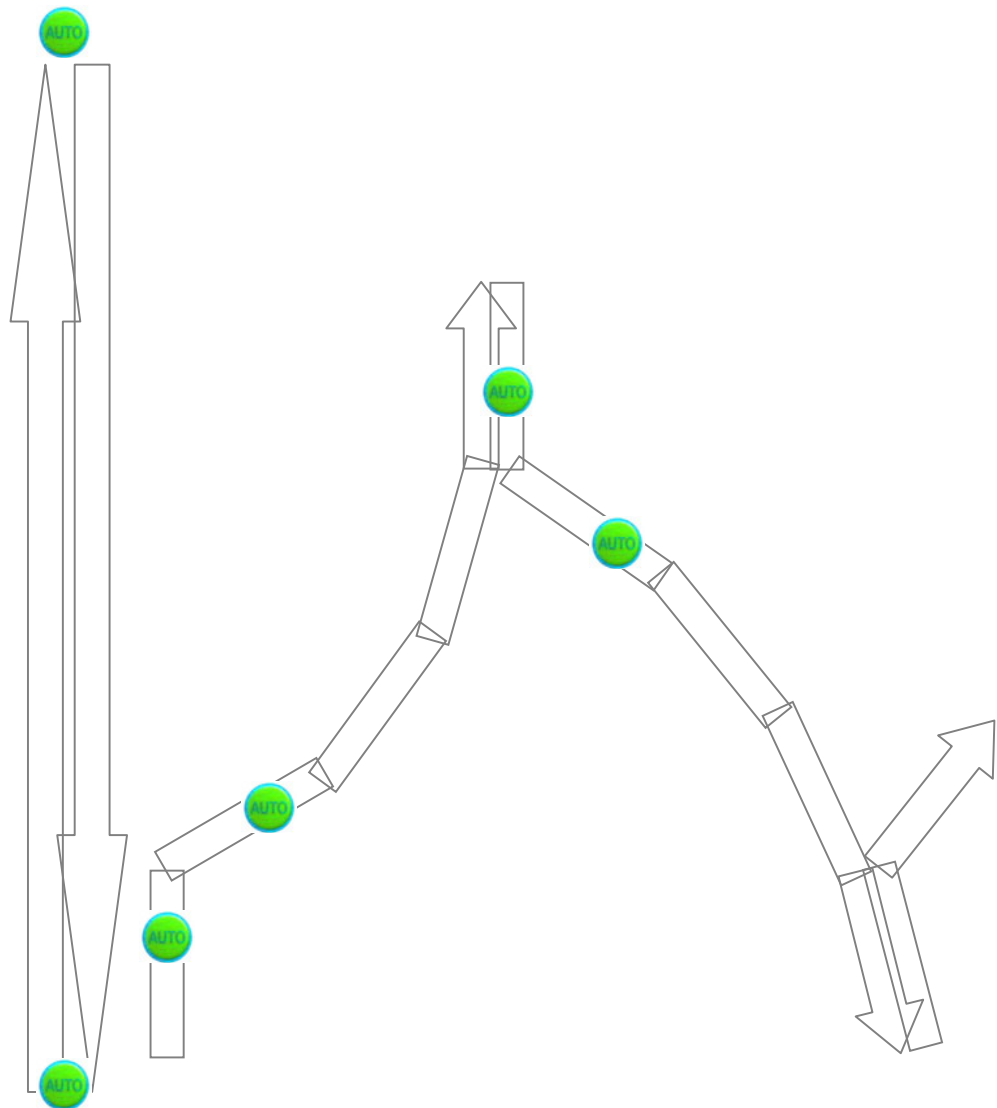
Indications at power-on.

→ When the RadioPLC® is powered, then it displays its settings, running hours, etc. The values are displayed one by one, each during one second.

Cleaner type:	`600`	First the cleaner type is displayed as product type number. Can be B400 or B600.
Running time:	`001` x10h	Then as second value comes the total running hours of the cleaner in tenths of hours. Running hours accumulate during movement. E.g. 1=10 hours, 2=20 hours, etc up toi 9990 hours. (The accumulation is made with a resolution of 0,15 hour)
Version:	`1.16`	Version of the software in the RadioPLC®.

1.00 = Manual drive with bumpers, timer, instruction w. Auto. For B600.
1.01 = Running hours accumulation w. display at power on. For B600.
1.02 = 1.12 = Control of both B400 and B600 products introduced.
1.04 = 1.14 = Soft Auto-turns in multiple steps.
    Increased precision of instructed drive length.
    Start of the cleaner at start of running time timer introduced.
1.05 = 1.15 = Zero depth detect, RadioPLC® input #4.
    If water not reached within 5 sec, stop.
    Improved handling and storage of the timers at change of both timers.
1.06 = 1.16 = Separate inputs, #3,#4 for front- and rear bumper.
    Zero depth detect, RadioPLC® input #5.
    Improved radio transmission, reduced BadCRC´s at good signal conditions.
    Auto reversal time to await the stern surge for B600 increased 2,5 → 4,0 sec.
    At zero depth detect, if no water within 5 sec. also stop of the pump.

Serial number:	`22`	Serial number of the cleaner control unit.

For technicians; RadioPLC®, transmitter programming.
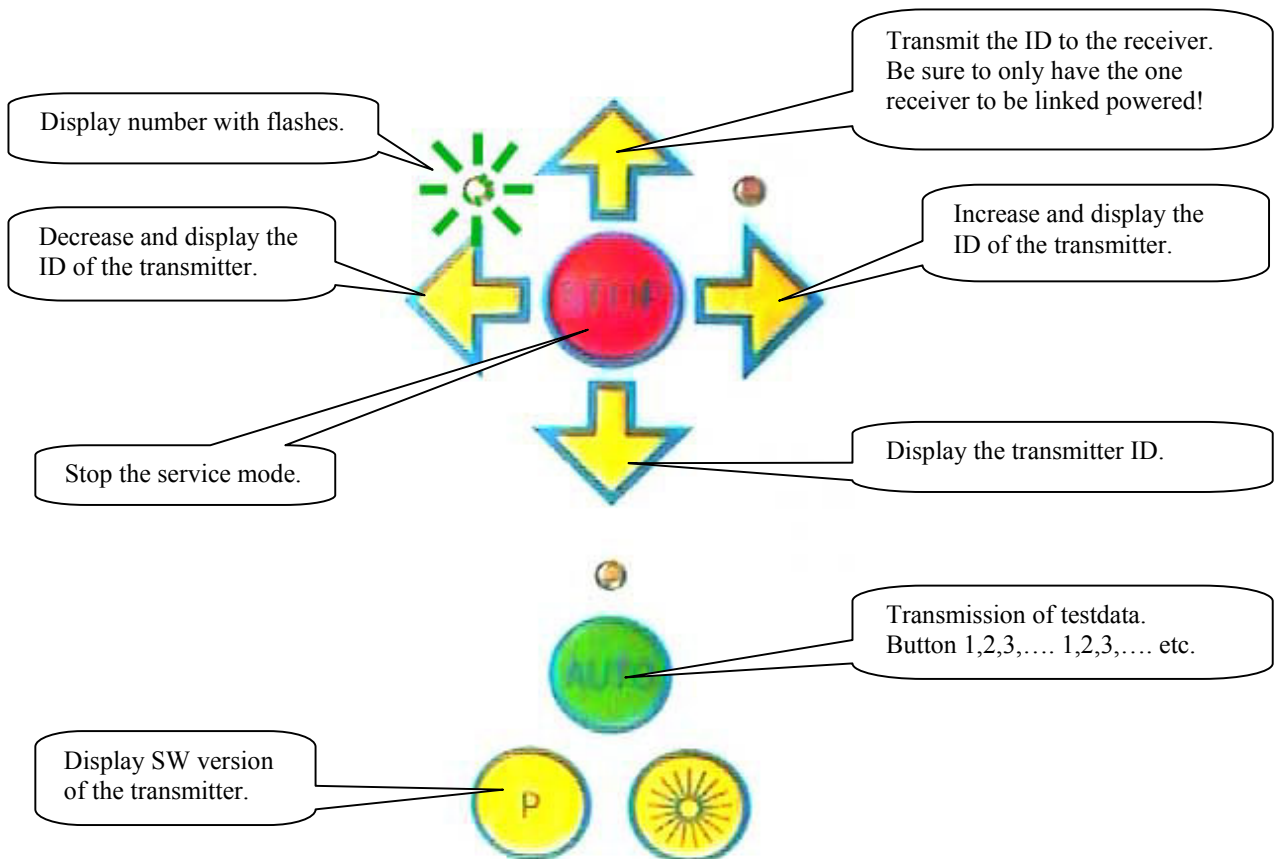
The radio transmitter can be reprogrammed and tested, this information is for service staff only.
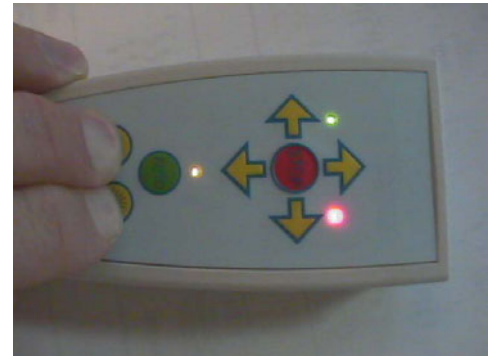
Depress these three buttons simultaneously. When done, all the three LED´s of the transmitter flash simultaneously to indicate that the transmitter service mode has been entered.

Once the transmitter is in its service mode, then all the buttons has the following local function in the transmitter;

Display number with flashes.

Transmit the ID to the receiver. Be sure to only have the one receiver to be linked powered!

Decrease and display the ID of the transmitter.

Increase and display the ID of the transmitter.

Stop the service mode.

Display the transmitter ID.

Transmission of testdata. Button 1,2,3,…. 1,2,3,…. etc.

Display SW version of the transmitter.

The transmitter leaves the service mode on 25 seconds inactivity timeout, or when is depressed. This is indicated with one simultaneous blink of all the three LED´s. Thereafter it functions normally according to the new settings.

For technicians; RadioPLC®, receiver and radio link.

The radio receiver is an integral part of the RadioPLC®. Reception of control messages are indicated with LED´s in the front top right. The display indicates the number of the pushed button.

The receiver is from factory set to only execute commands from a transmitter with ID=1.

If you have multiple cleaners with RadioPLC® , then a radio link can be re-identified in the following way:

1. Perform transmitter programming and give the transmitter the identity 2, 3, or 4.
2. Se to it that <u>only</u> the cleaner to be linked to this transmitter is powered. Send the identity from the transmitter, by pressing the ⬆ button while the transmitter is in the transmitter service mode. (Se the previous page)
3. The identity is received in the powered RadioPLC® and stored. This is indicated with the ID flashing in the display.

Service; Check-up and step-by-step troubleshooting of the radio link.

During normal operation, both the transmission, receive, decoding, and execution is indicated and displayed which simplifies the check-up of the radio link so that it can be done quickly without tools or prior knowledge. Follow the below described step-by-step procedure:

1. Press any button on the transmitter.
   a. Check the transmitter red LED, ✳ if it lights (also dimly) it indicates a low battery level. Replace the transmitter battery.
   b. Check the transmitter green LED, ✳ it is supposed to quickly flash during, and 3 seconds after, a key depression. (It also after 25 seconds with a brief flash indicates that the transmitter goes into "sleep".) If it does not indicate, then the battery is totally exhausted, or possibly the battery connection is loose. Replace the transmitter battery.
2. Receiver. The cleaner, and thus also the RadioPLC® must be powered, this is indicated with the green LED, ✳ **Power** If this is not the case check up 230/400 volt fault protection device, power connections, cabling, fuses, etc. If the cleaner is powered but the RadioPLC® still has no ✳ **Power** , then it has to be serviced.
3. At depression of any button on the transmitter, then transmission is made, watch the two LED´s ✳ **GoodCRC** and ✳ **Bad CRC** on the receiver. Normal operation is a series of fast ✳ flashes. (One per message, 10 messages per second) and once in a while some ✳ **Bad CRC** flashing.
   a. If no flash at all of the ✳ **GoodCRC** , then contact service. (Try/observe also with zero distance)
   b. Many flashes of the ✳ **Bad CRC** indicates a weak radio link or powerful external disturbances. Check-up that the RadioPLC® that contains an integral radio reception antenna is not concealed. Check-up that you have a free line of sight between the transmitter and receiver. Check also that there are no electronics that operate at the same frequency (433,92 MHz), such as Walkie-Talkie, wireless phone, pocket PC, remote control, wireless thermometer, etc. If any of these devices are nearby the receiver, then the radio link of the cleaner may be disturbed. Move the equipment or the receiver and try again to se if the amount of ✳ **GoodCRC** flashes increases.
4. If there is several ✳ **GoodCRC** flashes every second, but still the cleaner does not execute. Then the radio link is ok, but the ID of the transmitter is differing from the ID that the receiving RadioPLC® has been linked to. Thus the received messages are not executed since they are meant for another cleaner. Re-identify the transmitter to be linked to the receiver as described above, thereafter it should operate.

When no transmission is made, it is normal that ✳ **Bad CRC** flashes once in a while, it is an indication of the commonly present radio traffic of different kinds. If the ✳ **Bad CRC** indication is very frequent/strong and the normal operation has problems, especially at longer ranges, then there might be a strong source of radiation nearby. If this cannot be dealt with, then there is always a cable control as an option. The cable control looks exactly the same and is connected to the blue connector at the left top side of the RadioPLC® enclosure.