PowerPong 3000-5000

Table Tennis Robot

developed by Csaba Lukács

Operation Manual

Œ certificated!

Important: Please read instructions carefully prior to use!

The chapter **Control Panel (Summary Description)** explains the basic preparations for the operation of the Table Tennis Robot *PowerPong 3000-3001*.

Table Tennis Robot *PowerPong 3000-3001*

from novice to professional, from defender to attacker,
... ideal for every type of player and every level of play

You are now the owner of a Table Tennis Robot by Power Pong, developed by Csaba Lukács (Hungary).
The manufacturer offers a 2 year full warranty and a 5 year service for repairs and replacement parts, starting with the date of purchase. Please keep your receipt!

- World novelty: A unique head with 3 discs
- Discs made of tough foam with a special coating for longevity
- Compact, solid, functional workmanship, built together with a big collecting net (6 kg)
- Well thought-out and easy to use control panel
- Programmed and random throwing of balls with different spin, speed, direction and trajectory
- Computer-controlled adaptation for length (equal length to corners and the centre of the table)
- Memory and AFC (Automatic Frequency Control) functions
- Remote control
- All functions adjustable from the player's side on the control panel
- Adjustable height of the balls

Please note:
- Please read this operation manual carefully before using the machine!
- **WASH THE BALLS IN WARM SOAPY WATER BEFORE USING THEM WITH YOUR ROBOT.**
- The ball machine may only be connected 100-230 V voltage!
- The ball throw discs rotate at high speed. For that reason, avoid touching the discs during operation!
- The Table Robot *PowerPong 3000-3001* should only be used in closed and dry rooms!.

If you take this advice into account, your " *PowerPong 3000-3001* " will always be a great training partner.

1. Assembly

You should assemble the following main parts of the machine:
- Integrated throw mechanism with net   - DC 24V adapter (100-240 V net)
- Control box   - Extension cord
- Control box holder

Other belongings: Allan keys, throw disc, tube for setting distance, reserve rubber for the net, sticker vel-cro for fixing the robot

1. Put the machine on the table with the net closed and with the connectors towards you. **(Fig. 1.)**
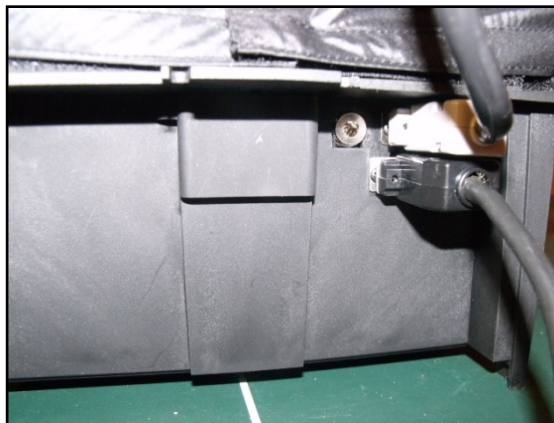

Fig 1.

Fig 2.

2. Connect the cable coming from the throw head to the 15 pole connector found on robot body (the upper one), then connect the coaxial DC plug of the adapter close near the 15 pole connector, finally connect one end (the smaller connector)of the extension cord in the 26 pole connector found under the 15 pole one. **(Fig. 2)**.

Attention: *Connect the cables very carefully, because the pins could get wraped (twisted) very easily.*

---

3. Turn down the net keeping poles until the first collision, then turn out the hanging poles (used for hanging the machine on the table) in the position seen on the photo, and put the adapter and the extension cord on the floor. **(Fig. 3.)**
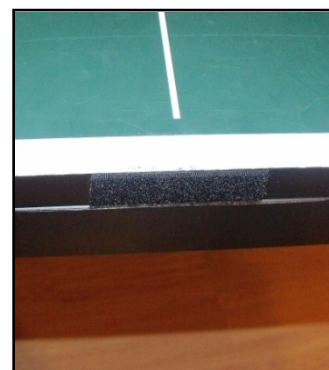

Fig 3.

Fig 4.

Fig. 4a.

4. Hang the machine on the table as you can see on the photo and turn the head in the table's direction with the help of the big screw found on the body. **(Fig. 4.)**

Please note: *A sticker velcro can be found on the inner surface of the hanging unit that is mounted to the table. It is advised to stick the pair of this sticker found in the other belongings on the table, because so the machine stands much more stable on the table. It is important to do that especially when children play arround the table. (Fig.4a.)*

5. Turn down the poles of the net in a way, that standing behind the machine and gripping the top points of the net keeping poles pull those down in the two directions. **(Fig. 5.)** Then the back vertical part of the net mechanism lifts up automatically. Fit the plastic corner elements found on the ends of the net keeping poles exactly to the corners of the table how you can see below.**(Fig. 6.)**

Please note: *There can be found sticker velcros on the inner surfaces of the plastic corner elements. When the companion pieces (found among the other belongings) are put on the corners of the table then the net can be fixed more stable to the table.*

Fig. 5.   **Fig. 6.**

6. Then pull the end of the ball collecting net between the table tenis net and its metal net holder and fix the rubber bands at the fastening screws of the table tenis net **(Fig. 7).** Push the sticker velcro fixed to the side of the ball collecting net to its companoin piece fixed to the plastic corner as it can be seen on **(Fig. 8.)**
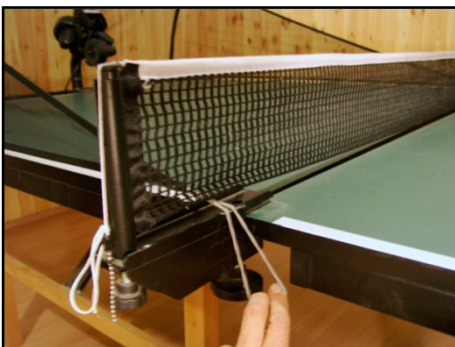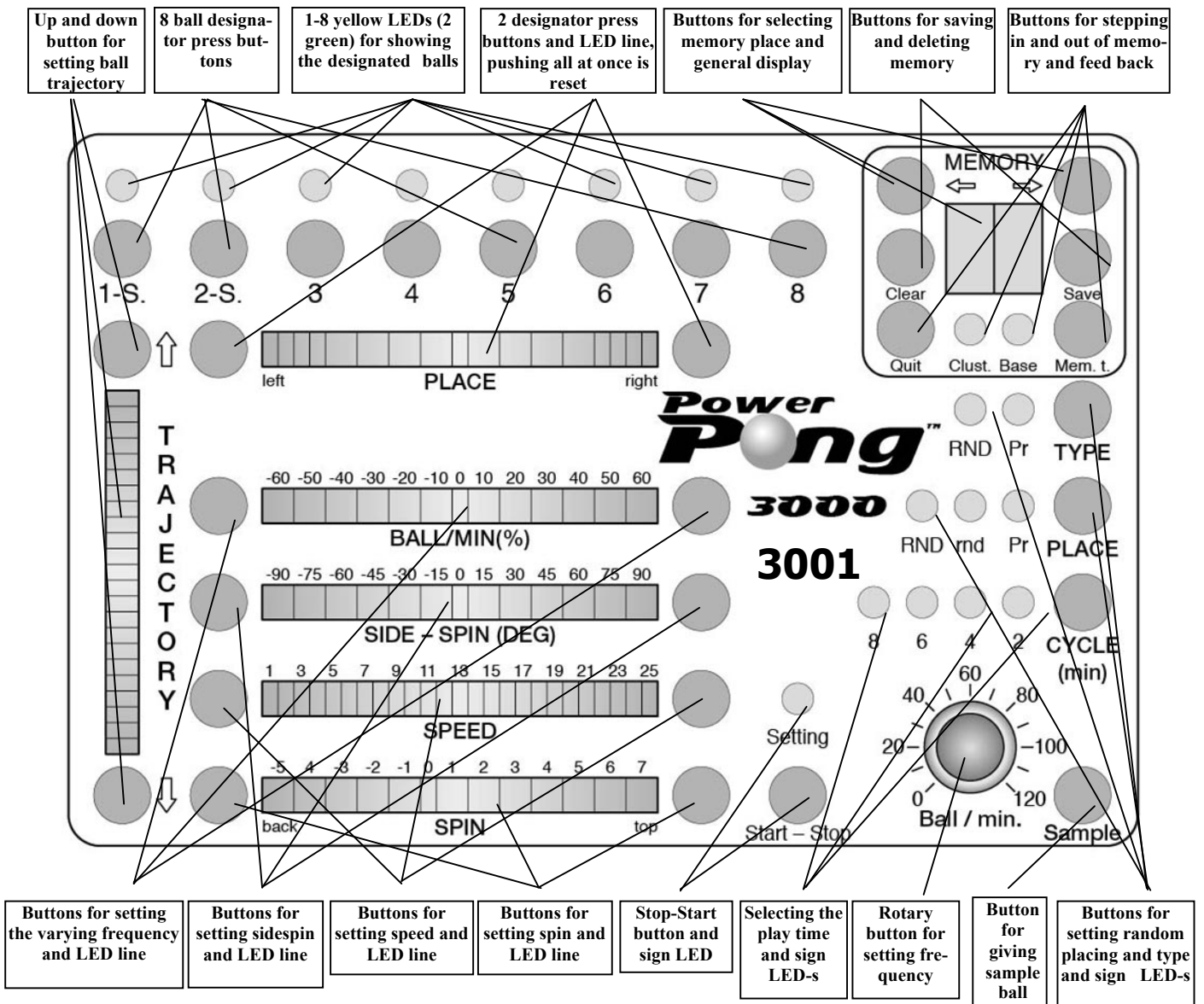
Fig. 8.   **Fig. 10.**

Hang the control box to its holder found on the side of the table.**(Fig. 10.)**

| Up and down button for setting ball trajectory | 8 ball designator press buttons | 1-8 yellow LEDs (2 green) for showing the designated balls | 2 designator press buttons and LED line, pushing all at once is reset | Buttons for selecting memory place and general display | Buttons for saving and deleting memory | Buttons for stepping in and out of memory and feed back |

MEMORY

1-S. 2-S. 3 4 5 6 7 8

Clear

left   PLACE   right

Quit   Clust. Base   Mem. t.

Save

T R A J E C T O R Y

-60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60
BALL/MIN(%)

Power *Pong*™

3000

3001

RND Pr   TYPE

-90 -75 -60 -45 -30 -15 0 15 30 45 60 75 90
SIDE – SPIN (DEG)

RND rnd Pr   PLACE

1 3 5 7 9 11 13 15 17 19 21 23 25
SPEED

8   6   4   2   CYCLE (min)

40   60   80
20   100

Setting

-5 -4 -3 -2 -1 0 1 2 3 4 5 6 7
back   SPIN   top

Start – Stop

0   120
Ball / min.

Sample

| Buttons for setting the varying frequency and LED line | Buttons for setting sidespin and LED line | Buttons for setting speed and LED line | Buttons for setting spin and LED line | Stop-Start button and sign LED | Selecting the play time and sign LED-s | Rotary button for setting frequency | Button for giving sample ball | Buttons for setting random placing and type and sign LED-s |

The current ball is the one which ones LED flashes in the upper line (always only 1 of the 8 LEDs)
A rally of one or more balls is called play.

- **Buttons for setting the ball traject. and LED line:**   Ball trajectory level setting and feedback
- **8 pcs ball designator buttons and LED line**   Giving and setting new balls to the program (first push)
  Making current the already designated ball (short push) or switching off those (long push) or deleting all with pushing together the 1. and 8. buttons
- **Buttons for setting the ball place and LED line**:   Right-left placing of the "actual" ball and display
- **Reset (2 buttons for setting ball place ball pushed at once)**   Setting back of the moved ball placing plate
- **Buttons for selecting memory place**   Selecting the 100 possible memory places
- **Buttons for saving and deleting memory**   Saving and deleting rallies in the memory
- **Stepping in and out of memory and display**   Starting different operations in the memory and display
- **Buttons for setting the varying frequency and LED line**   Setting the frequency separately for each ball and display
- **Buttons for setting the sidespin and LED line:**   Ball sidespin level setting and feedback
- **Buttons for setting the speed and LED line:**   Ball speed level setting and feedback
- **Buttons for setting the spin and LED line:**   Ball spin level setting and feedback
- **Stop-Start button and sign LED (see remote switch**   Pushing it the root gets in stop/setting position.
  (red light is on). The actual ball can be set.
- **Selecting the play time**   It plays as long as many minutes are written to the lighting LEDs then it makes 1 minute break.

- **Rotary button for setting frequency (Ball/min)**   Controlling the frequency of the thrown balls
  (max.120 ball/min)
- **Button for giving sample ball Sample)**   Keeping it pushed the robot throws the actual ball
  (see remote switch)   continuously and that can be also set in the meantime.
- **Buttons for setting random placing and type**   Switching on of the 5 possibly random types and display
  and sign LED-s

3. Setting the features of the balls

The switch on of the machine

Put enough (50-60 pcs) balls in the net and turn the "**Ball/min**" button to 0 position before connecting the adapter to the power.

After this connection the robot starts a short (approx. 10 s long) self positioning procedure.

Then the control box automatically finds its basic position. The 1. yellow LED stats flashing, and the robot is ready for play. If you turn up the "**Ball/min**" button to a higher position, then the throwing motors start to work and the robot gives balls.

> *__Attention__: In case there wasn't at all enough ball in the robot, then it fills up itself, which takes approx. 10 sec, and it throws the first ball only after this procedure.*

We can define the following elements in order to set the ***PowerPong 3000-3001*** easier.

The features of the thrown balls

When setting the balls it is necessary to set the type and the place of the balls which parameters are defined by the following parameters:

a.) Spin (side spin)
b.) Speed   }   Ball type
c.) Trajectory (the height of the shot)

d.) Right-left placing   }   Ball placing

One type ball given to one point

The „Ball/min" button must be in 0 position!

> *__Attention__: It is possible to set the parameters of that ball (actual ball), which ones yellow light is flashing.*

The first yellow light is flashing after the switch on of the robot. The parameters of this ball can be changed with the help of the buttons for setting the Trajectory, Place, Ball/min%, Side-spin, Speed and Spin.

- **The ball trajectory can be set in the following way:**
  One short push changes 1 unit, approx. 0,5 degree on the curve of the ball which can not be seen on the display because the lights change only after 5 units (fine set).
  In case pushing longer one of the buttons, then after approx. 1 sec it is possible to step quickly (with 5 jumps) the setting of the ball trajectory, which is also shown on the LED line (quick set).
- **Changing the frequency:** It is possible to set to each ball how much more often or rear to be given (in %) compared with the generally set tempo.

In case pushing the "**Sample**" button the machine gives the actual ball (the one where the yellow LED flashes) and now its parameters can be changed. The robot throws such balls until the **"Sample"** button is pushed.

Tip: Exclusively when only the first ball is assigned and the robot plays, its parameters can be also changed! So it is no need to push then the "Sample" button.

After this setting the play can be started with the "Start/stop" button.(*see also remote switch***)**

Random ball placing (rnd,RND)

"rnd" Random ball delivery to various points around a specific point

In case the rnd is switched on with the Button for random function (rnd) then the robot plays the set exercise (described above) but not exactly to the set places, but to 20 cm radius big surrounding of those, which is closer to the real game. Do not set the ball placing to the edge of the table when using the „rnd", because the machine can throw the balls near the table by reason of the ball spread! (It is enough the assigned one ball to this function.)

"RND" Random ball delivery to various points on the table

In case switching on the Rnd (pushing once more the RND button) the machine doesn't throw anymore the set balls in their set order, but in random way, jumping here and there among the assigned balls. Therefore it can not be foreseen where the robot throws the next ball. It is sure only the fact that the balls are thrown to one of the set places. (It needs at least 2 assigned balls to use this function.)

Combining "Trnd" and "rnd"

The "Trnd" and "rnd" functions can be combined by pressing Button RND for a third time. In this case the set points are chosen at random (RND) and the balls will be delivered randomly within a 20cm radius circle of the set points, simulating a real match situation.

Throwing different type of balls (ball rallies)

The Power Pong 3000 robot is suitable to throw different type of balls one after the other to different places <u>with different frequency (Individual Frekvency Control)!!</u>

This time the set described above differs only in the fact that not only the place but any other parameters.

Tip: If we want for example the 5. and 8. balls in the program to have the same parameters like the earlier set 2. ball has, then it is not necessary to set again the desired parameters, but it's advisable to push shortly the button of the 2. ball (making it actual) and then pushing also shortly the buttons of the 5. and 8. balls. Then the parameters of these balls will be the same like 2. ball ones.

TYPE RND function

This function has sense only in this case, regarding that switching it on the robot plays the set places in the programmed way but it chooses randomly from the set ball types.

In case the PLACE rnd or the RND are also switched on together with the TYPE RND, then the robot chooses totally random from the set places and values.

The rallies' balls correction

In case it turns out during the play that the values of a ball should be changed, then the rally can be stopped with the **"Ball/min"** or with the **"Start/stop"** buttons and the values of the ball can be modified.
It is advisable to push the designator button of the subject ball - even during the play – because then the robot stops immediately and this ball will get current (actual). After finishing the set, the play can be started again wit the help of the **"Start/stop"** button. (Use the **"Sample"** during the set.)

**Please note**: At restart („Ball/min", „Start/stop") the robot starts the play always with the first ball of the rally.

In case of the **_PowerPong 3000_** it is possible to set any of the balls of the rally during the play. If you set **during the play**
-   the Trajectory, then the curve **of each ball** can be changed a bit in the same time
-   the „Speed", then the speed **of each ball** can be gently changed together
-   and with the "Ball/min %" the tempo can be changed of course
-   and in case **the spin** of the balls in the rally is **the same for each**, then using the "Spin" button, also the spin of all the balls in the rally can be changed simultaneously. (If the spins of the set balls are different, then this function is not available.)
The buttons for setting the values function during the play only in "one push - one step".

Rallies with service

The designation of the 1. and 2. balls (1-S., 2-S.) is possible in to steps.
Normal designation (1): pushing once the designator button (yellow LED light)
Service designation:(S): pushing twice quickly one after the other the designator button (green LED light)
-   If you get the first LED green, and you set a value typical for a service (the ball to go first on the robot's side of the table) and you set any other type of ball to the other places, then the robot makes a short break (1-1,5 s) before the service.
-   If you get the second LED green, the robot plays the here set service only once after the start, which won't be played again until the stop
-   If you get both two LEDs green, then the robot plays in turn one or the other services, and before those always makes a short break.
-   If you switch on the TYPE RND function in this case, the robot will mix the balls like it has done until now, but it makes a short break before the services.

**Tip**: In case of setting slow services it is advisable to use the „Ball/min %" function in minus direction, in order the next ball not to come too quickly while the player is occupied with giving back the service.

Memory

Base (basic) memory

PowerPong 3000 makes possible to save 99 pcs of simple excercises.

Saving excercises in the BASE memory

In Stop or Ball/min=0 position or even during play you can get into the memory with the "Mem.t." button. (Then the robot stops, the "Base" LED lights up and the memory place "00" appears on the display.)
It is possible to go within the memory places with buttons (　　⇨d (　　⇦
That memory place which flashes is empty, which one lights continuously has a program.
In case you are on an empty place then you can see on the sign LED lines the program just set before stepping on this place. If you go to a filled place then the program saved there appears on the sign LED lines.
Stepping on an empty place it is possible to save the set program with pushing for long the **"Save"** button. This time the flashing changes to continuous light.
It is not possible to save program in a full place. First the place must be cleared out with pushing the "Clear" button. Then the program which you want to save appears again on he board, and it will be saved there with pushing the "Save" button.

---

*Please note: **All the set values and characteristics can be saved in the memory, except the random and the cycle functions. These features can be activated during the play without any limit.***

Playing and changing the rallies saved in the BASE memory

It is possible to get into memory function at any time (even during play!) with pushing the "Mem.t." button. Getting to a filled up memory place, the program found there appears immediately on the control panel and it can be played with pushing the "Start" button.

---

*Tip: **It is possible to play the programs saved in different memory places also during the play so only pushing the step buttons (⇦ , ⇨) and stepping so from one memory place to the other the different rallies can be practiced one after the other without stop.***

When the saved program comes up on the control panel, it will behave as it would have been set just then so the parameters of the balls can be changed.
This modified rally can be saved on its place or to another empty memory place.

---

*Attention: **If the modified rally is not saved, then the originally set and saved one will be kept in the memory.***

You can get out from the Base memory with pushing for long the **"Quit"** button.

Cluster memory

The Power Pong 3000 is the only robot on the world which makes possible to save a range of (max. 32 rallies) different rallies and to play those automatically with short break between or in a random way like on a match. The robot can store and play 10 clusters which can contain each max. 32 rallies.

Filling up the Cluster memory

Practically the Cluster makes possible to create groups of the rallies saved in the Basic memory. Therefore if you change such a program saved in the Basic memory which you've put already in the Cluster, then there will be change also in the Cluster.

1. You get in the Base memory with pushing once the **"Mem.t"** button (the "Base" lamp lights, and there is "00" on the display)
2. You have to choose with the help of the step (⇐ , ⇒ ")buttons that program from the Base memory which one you want to "copy" into the Cluster
3. Pushing second time the "**Mem.t.**" button you can get into the Cluster memory (the "Clust." LED starts lighting and the C0 sign appears on the display.) C0 is the first from the 10 pcs
4. (C0 – C9) Cluster memories.
5. With buttons ⇐ ⇒ you have to choose in which Cluster you want to put the rallies chosen in the 2. point.
6. Pushing third time the "**Mem.t.**" button, both memory LED-s light up. This shows that you want to make an operation between the two memories. With the steps you can choose the cluster place where you want to save the base program chosen in the 2. point. Now you can save with button "Save", and the flashing of the cell will become continuous. (In order that the cells of the cluster to be distinguished from the ones of the cells of the Base memory. (The cluster cells are signed with number-dot-number-dot, for example: the 23. cell is signed with 2.3.).

7. You can get back to the Base memory with pushing again the "**Mem.t.**" and the procedure is repeated from point 2.

8. If you want to check what is in the Cluster, then you simply start the play when both memory LED-s light, but in such case those start to flash (the play is going on) (you can see on the display the cluster cell that is played, and on the control panel is shown the program.)

Tip: *(Simplified filling up of the Cluster)* *If you have chosen the wanted group as it is described in point 4., and you push the „Save" button , then the robot saves the rally on the first empty place of the chosen cluster, and the filling can be continued with pushing the "Mem.t." button as it stands in the 1. point.*

Play from CLUSTER memory

You can get into Cluster memory with pushing two times the "**Mem.t.**" button (the Clust. LED lights, and "C0" appears on the display). You search the wanted cluster with the right-left step buttons and you can start the play. (Clust. LED starts to flash, the played cluster cell can be seen on the display, and the excercise appears on the control panel.)

The robot plays from the beginning the rallies found in the Cluster (in the growing order of the numbers of the there saved rallies). The robot leaves out those cells - if there exist such - where it is no program. (Maybe the user has left out cells in order to fill up those later.) The robot plays the rallies continuously, so this way you can create very long rallies containing different type balls.

If you turn on the Type RND function at switching on the robot or during play, then the machine plays in random order the rallies saved in cluster. Always the first rally is played after start.

> *Tip: If you put such rallies in the cluster which start with service, then the machine makes among these excercises always a 2 sec long break. So the robot plays like being on a match.*

Editing the Cluster memory   (It is possible only in Stop function!)

The exercises saved in the Cluster can be edited (modified) only on there original place, so in the Base memory.

Playing an exercise in the Cluster on the control panel can be seen the set values of the just played rally, and on the display its Cluster cell number. If this time you stop the rally, everything stays like it has been before. If now you step with the "**Mem.t.**" button in the Base memory, then it appears on the display the number of that base memory cell from where the rally has been saved in the Cluster.
The changes described in the Base memory can be made in this cell, and the changed rally can be the re-saved to the same place.
Then you can go back to the Cluster memory with pushing the "**Mem.t.**" button, and the play can be started.

> *Attention: It will be change now on all those Cluster memory places where this Base program has been applied.*

Deleting the Cluster memory
Deleting the whole Cluster:
With pushing two times the "**Mem.t.**" button, the Clust. LED lights and the C0 cluster number appears on the display. You can choose the cluster that you want to delete and you can delete all the cells of the cluster at the same time with pushing the **"Clear"** button for long.

Deleting rallies from the Cluster:
You step in the Cluster memory. You choose that group (C0 ....C9) from where you want to delete a rally or rallies. You go into the cluster with the "**Mem.t.**" button (both red LED-s light) and you chose the rally that you want to delete. In this case it is possible to start - then to stop - the chosen rally with the Start/stop button in order to be sure that you delete the correct one. Then this rally can be deleted with pushing for long the **"Clear"** button. The number of the cell flashes on the display regarding that it becomes empty.
   You can get out from the Cluster memory with pushing for long the **"Quit"** button.

> *Please note: In case of deleting from the cluster there will be no change in the Base memory.*

Calibration
It is worthy to harmonize the mechanics and the electronics of the robot - especially at the control panel's replace – regarding that the throwing motors are not exactly the same and the quality of the throwing discs continuously changes during the play.

When pushing together and for long the two buttons of the **"Trajectory",** then the robot goes to the calibration function and it goes to the basic ball. The "CA" sign appears on the display and the robot starts to throw the balls with a middle tempo.

Please note: The robot stand to the so called basic ball also when switching it on, therefore this set can be also checked after switch on and without going in the Calibration function, and it is necessary to go to the Calibration only happening any deviation.

Ideally the ball has no spin, no side-spin, and it must arrive 25-30 cm further from the middle of the table with middle speed and middle height. If the values differ from these, for example the ball bends because of side-spin, the robot gives backspin or topspin balls, or throws the balls too long or too short then the set has to be made with the related buttons (Spin, Speed, Side-spin, Trajectory) in order to obtain the above described ideal basic ball.

Being in CA function, the buttons used for setting work only in one push-one step mode.

These above set values can be seen on the LED lines on the control panel.
When you are ready with the set then you can get out of the CA function with pushing the "Start/stop" button while the machine saves the set values of the basic ball.

The remote switch

The small wireless remote switch of the machine has 4 functions.

The red "Start/stop" button has 2 functions:
1. If the "Ball/min" button is in "0" position, then the rally set on the control panel can be played with pushing this Start/stop button in a way that with each push the robot throws one ball.
2. In case the **"Ball/min"** button is not in "0" position, then it works as the **"Start/stop"** button works on the control panel. (Pushing it once the rally starts, and it is played until the remote switch is pushed again.)
3. The round grey **"Sample"** button works like the sample button found on the control panel, with the difference that pushing it once – in middle tempo - starts to throw the actual ball, pushing it again stops to throw it. (In the meantime the thrown ball can be adjusted.)
4. With the two smaller grey buttons („-„ and „+") it is possible to make smaller or bigger the tempo just like using the "Ball/min" button found on he control panel.

Please note: We've destined the remote switch basically to the player who is just playing with the robot, therefore its effective range is not bigger than 4-5 m.

Teaching the remote switch

The remote switch given to the robot is manufactured with being keyed to the robot. In case you buy more remote switches or a new one then these pieces have to be taught to communicate with the control panel which can be done as follows:

- after switch on the robot you have to push together for long the " ⟸ , ⟹ " buttons and the
 "L _" appears on the display. Now you have to push any of the buttons of the remote switch when the display changes to "L –". After approx. 15 seconds the robot automatically steps out from learning function and it goes to basic position.

Attention: In case you want to teach more (max. 4) switches to the robot that is possible only to make within one teaching procedure, so all have to be taught at the same time one after the other!

Please note: The remote switch works with a small 12 V, 27 A type battery which can go dead time to time, so has to be replaced.

The height of the release head

Most table tennis robots do not have this possibility; however, with the **PowerPong 3000** the ball is returned at different heights in a realistic match play manner.

In case of the **PowerPong 3000** the release height is adjusted in the following way: it is quite easy to push down the net thanks to its spring holding mechanism **(Fig. 11.)** The curved tube which holds the release throw head can be pulled up and down in the ball tube found under it when the hand screw is loosened **(Fig. 12.)**. Finally adjust the desired height in a way that one of the silver signs found on the thinner internal tube to the top margin of external thicker tube, then tighten the hand screw.

Fig. 11.

Fig. 12.

Turning the *PowerPong 3000* off and Putting out of Service

1. Pull the adapter from current when going out from the place where the machine works. Do not let the robot switched on without control.
2. If the robot is taken temporarily from the table, then put the adapter, the control box and the extension cord in the ball holder part, fold the net in middle stage and get down the robot from the table. The robot can be put away so easily and quickly until the next practice.

Transport

When the robot is to be transported to another place, also the net keeping poles have to be turned until the first collision. **(Fig. 3)**
Turn the hanging poles and the head in the direction of the robot and turn the net keeping poles in totally upper position.
Transport the robot in such position.
Do not forget to pack the adapter, the control box and the extension cord.

4. Maintenance and Repair

Important: **Before executing maintenance and repair works, always first unplug from the mains!**

– **During the operation of the ball machine, make sure that no small parts (for example hairs, indented balls, etc.) get into the collection net and thus into the machine, because they can lead to ball jams.**

– The ball shooting discs are very durable (at least 500 hours). Nevertheless, these discs will finally wear off after intense use. One sign for a worn disc is that the machine releases the balls at irregular lengths at high speed. This means that the surface of the discs does not have enough grip on the balls. For that reason, the distance of the discs has to be adjusted.

Put the plastic adjusting tube in the release hole found between the discs **(Fig. 13.)**. Loosen first, for example, the black imbus "adjusting" screw near the cover- with the bigger allan key found among the accessories - of he lower motor **(Fig. 14.)** and turn up the motor (gripping its cover) towards the adjusting tube until the disc touches it. **(Fig. 15.)** Do all this also with the other two motors.

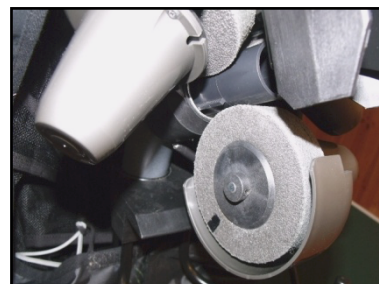|		
Fig. 13.	**Fig. 14.**	**Fig. 15.**

Please note: *The correct distance is 35-36 mm. This is the diameter of the adjusting tube. The release mechanism functions perfectly up to a distance of 37-38 mm.*

– When the distance cannot be adjusted anymore, the ball throw discs have to be replaced. Therefore loosen the screws **(Fig.16.)** found in the plastic disc holders – with the smaller allan key found among the accessories - (regarding all 3 discs), then remove the "adjusting screws" found at the two upper motors (it is not enough only to loosen those) **(Fig. 17.)** Then totally turn up the two upper motors gripping their casings and turning those away from the throwing hole in order to make possible the pull down of the throw discs from the shafts of the motors. **(Fig. 18.)**

Fig. 16.	**Fig. 17.**	**Fig. 18.**

Then the ball throw disc is pulled off the motor shaft. **(Fig. 19.a,b,)** Take away the plastic discs from the ball throw foam (it is held together by three screws) and insert those onto the new foam disc. Fix this set again with the three screws.

Fig. 19a.

Fig. 19b.

Slide the new disc onto the shaft in a way that the end of the shaft to be 0,5-1 mm out **(Fig. 18.),** and tighten the warm screw. Then adjust the correct distance of the discs with the help of the adjusting tube as it is described above.

– If a **ball jam** should occur, the machine tries automatically to remove the jam by turning the motor and the throw discs forwards and backwards (7-8 times). In case the feeding motor and the three throwing motors jam for any reason the machine stops in self-defence. Then the fault signal is the following: all the 6 yellow lights start to flash on the control box. You have no other choice than, to take out the head from the machine, and take out the offending balls from the bottom part of the robot with the help of a pencil or screwdriver, etc. through the cleaning hole found there**. (Fig. 20.)**

Fig. 20.

– Once every 4-6 months, the stop pin, which is needed to adjust the ball throw length, needs a really slight application of silicon oil (just enough to cover the end of the match-stick). The pin is easily accessible in the release head. The rest of the machine needs no maintenance. However, it is recommended to remove dirt and dust from the surface of the robot with a moist cloth and a mild cleansing agent from time to time.

5. Error Management

Problem	Solution
The robot does not function after mounting it.	Check the correct connection of the extension cord on the body and the control box.
	When the small green control light found on the adapter (put under current) is not on, this means that the adapter is damaged, it has to replaced.
	If the rotary switch V. for ball frequency ("Ball/min") is set on "zero" then it has to be turned on a bigger value.
Ball released with irregular lengths	Check distance of ball throw discs, discs worn (see page 11.)
The robot sometimes releases balls irregularly: two balls quickly one after the other then misses to throw a ball.	The silver sign found on the tube of the robot head was not put exactly to the tp margin of the body tube. Put of the signs exactly to the top margin of the tube! (page 8.)
Ball jam; the yellow lights flash on the control unit	Foreign body or defect ball obstructs ball transport ⇒ remove (see page 11.) and switch on the robot again.
Random function (RND) on the control panel cannot be activated, green indicator light cannot be switched on	At least two balls must be activated, at least two yellow indicator lights must glow (see page 7.)
Ball gets stuck between ball throw discs. The yellow light flash on the control unit.	Pull out the adapter from current, remove ball from it between the shooting discs, adjust the Ball/min button to "0" position, then start the play again.

Attention: **If you are not able to solve the problems with the help of this check list, a specialist must be consulted! Please contact your specialist supplier or the Power Pong service address (page 16.). Always sign the problem when the power cable is defect. It has to be changed immediately because it can cause death.**

6. List of Replacement Parts

List of Replacement Parts

mobil -100   Body with net

mobil -101   Robot head

PowerPong 3000 -102 Control unit

mobil -103   Holder for control unit

mobil -104   DC adapter (28V; 2,8A)

mobil -105   Extension cord

mobil -106   Throwing motor

mobil -107   Feeding motor

mobil -108   Oscillating head motor

mobil -109   Motor for height adjustment

mobil -110   Ball throw disc

mobil -111   Shaft for ball throw disc

mobil -112 Ball placement mechanism

mobil -113 Motor casing (3 pieces)

Further replacement parts on demand!

7. Technical Data

Supply current: 100-230 V, 50-60 Hz alternating current, approximately 40 W
The ball machine can be operated in a temperature range of 0 - 40 °C.
Weight: 6 kg (with net)
Overall dimensions (with net): Height 0,75 m; Width 0.28 m; Depth 0.25 m

A type examination test was done for the electrical adpter device

of conformity a Low Voltage directive 73/23/EEC
as last amended by EEC Directive 93/68/EEC
Registration No.: AN 50091861 0001
Report No.:   17004848 001

as is apparent from Test Report No. NTEK-2010NT1115351E
                                                      and NTEK-2010NT1115353SS

The robot **PowerPong 3000** is permitted to bear the **CE trademark**.

Manufacturer : LCS Kft., Hungary- 2100 Gödöllő, Ibolya u. 50.
e-mail: lcs@amicusrobots.com
www.lcs-sport.hu
Tel. + 36 20 9459 229 (Lukács Csaba)