RDC 30 Multidip
Dip Coater

Translation of the original instructions

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General

The RDC 30 Multidip is a machine designed for laboratory dip coating. They can be used to apply liquid photoresist to e.g. miniature etching parts or other substrates, to apply liquid solder mask or any other kind of protective or technical coating. Today a more and more popular application is the so called: "sol-gel-application". This machine was developed to meet the demand of a greater variety of speeds, iterations, dipping and dripping times and heavier workpieces. What is more: With the RDC30 dipping sequences with different liquids can be performed in one machine and in endless variations.

Features:

Rotary table with 6 cups for multi-coating!

Each dive individually programmable (diving, drawing speed, dipping and dropping time)

integrated magnetic stirrer with programmatic function and speed (1 - 999 1/min)

Diving and drawing speed between 1 - 9999 mm/min

Save this job and job iterations possible

Of course we try to realize your special demands. Please contact us!

Foil keyboard for easy data entry

Display 20 x 4

Stepper motor operated lift device

Stepper motor operated turning table

Setting of virtual offset position prevents unnecessary travel paths and saves time

Setting of virtual speed change position allows fast travel to overcome longer distances and slow travels for precise coating

The dipping time as well as the drip-off-time (pause time up and down) is separately adjustable from 0 s up to 99 h : 59 min : 59 s. This enables the machine not only to coat but to precisely develop. This is of great importance with certain photo coatings of the miniature etching technology.

Up to 1000 iterations of a dip routine are possible.

Turning table with support for 6 vessels (cup glasses) D80mm, programmable positioning and stirring device on board!

Technical Data

Stroke length:	0- approx. 650 mm
Maximum load:	5 kg (reduced max. speed with maximum load)
Weight:	15 kg
Dimensions (WxDxH):	380 x 470 x 1030mm (H 965mm without Controller)
Distance drive up/down:	1- 9999 mm/min or 0,5 – 4999,5 mm/min
Insertion/drawing drive:	1 - 3000 mm / min or 0,5 - 1500 mm/min
Dipping / Drip off Time:	0 s – 99 h:59 min:59 s
Power supply:	100-240 V, 50-60 Hz, 120 W
Iterations:	Up to 1000 times
Turning Table:	Support for 6 vessels D80mm (other diameters possible)

EG- Declaration of Conformity

CE **EG-Konformitätserklärung/Declaration of Conformity**

Hersteller / Supplier:	Bungard Elektronik GmbH & Co. KG Rilkestraße 1 51570 Windeck Germany
Bevollmächtigte Person für die Zusammenstellung der technischen Unterlagen: Person in charge	Jürgen Bungard, Geschäftsführer /general director Rilkestraße 1 51570 Windeck Germany
Product:	Tauchbeschichter RDC21-k Dip Coater RDC21-k

Hiermit erklären wir, dass die oben beschriebenen Maschinen allen einschlägigen Bestimmungen der Maschinenrichtlinie 2006/42/EG entspricht.

Die oben genannte Maschine erfüllt die Anforderungen der nachfolgend genannten Richtlinien und Normen:

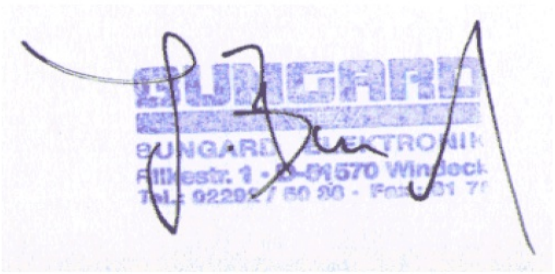
We hereby declare that the machines described above complies with all relevant provisions of the Machinery Directive 2006/42/EC.
The above machine meets the requirements of the following guidelines and standards:

- **Maschinenrichtlinie 2006/42/EG / Machinery Directive 2006/42/EC**
- **EMV-Richtlinie 2014/30/EG / EMC Directive 2014/10830EC**
- **Niederspannungsrichtlinie 2014/35/EG / Low Voltage Directive 2014/35/EC**

- **DIN EN 60204-1** Sicherheit von Maschinen - Elektrische Ausrüstung von Maschinen - Teil 1: Allgemeine Anforderungen / Safety of machinery - Electrical equipment of machines - Part 1: General requirements
- **DIN EN ISO 14121-1** Sicherheit von Maschinen - Risikobeurteilung - Teil 1: Leitsätze / Safety of machinery - Risk assessment - Part 1: Principles
- **DIN EN ISO 12100-1** Sicherheit von Maschinen - Allgemeine Gestaltungsleitsätze, Risikobeurteilung und Risikominderung / Safety of machinery - Basic concepts, risk assessment and risk reduction
- **DIN EN 55014-1 2012-05** Elektromagnetische Verträglichkeit, Anforderungen an Haushaltsgeräte, Elektrowerkzeuge und ähnliche Elektrogeräte, Teil 1: Störaussendung / Electromagnetic compatibility Requirements for household appliances, electric tools and similar electrical appliances Part 1: Emission
- **DIN EN 55014-2-2009-06** Elektromagnetische Verträglichkeit - Anforderungen an Haushaltgeräte, Elektrowerkzeuge und ähnliche Geräte - Teil 2: Störfestigkeit - / Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 2: Immunity
- **Niederspannungsrichtlinie / Low Voltage Directive 2014/35/EG**
- **Maschinenrichtlinie / Machinery Directive 2006/42/EG/37/EG**

Windeck, 10.1.2020

Jürgen Bungard Geschäftsführer



Intended Use

The machines are designed for coating positive and negative photoresists and solder masks as well as other paints or SolGel liquids.

All other applications require our written consent or are at full risk of the user. Bungard GmbH & Co. KG assumes no liability whatsoever for any damage that may result from the use of the machine.

Safety Regulations

Please apply the general safety rules for working with electrical machines.

There are no tools needed to operate the machine. With any intervention on the machine the warranty will void.

Do not run the machine in corroding, humid, dusty, extremely hot or explosive atmosphere. If you do run the machine in an atmosphere as described above be aware that this happens on your own risk and responsibility.

The operator has to provide appropriate safety precautions and equipment. We explicitly exclude any warranty for damages resulting from running the machine in an atmospheres as described above.

Important: the motor holds the lift bar only when the power supply is switched on. Mount items only to the holder with power on. Otherwise the lift bar will move downwards. The maximum load is 2 kg at maximum speed.

Do not remove cabling while the machine is turned on! Turn off the machine and wait for equipotential.

Please take great care when adjusting stroke length and speeds. Consider the height of the liquid container and additional stirring devices. If the value of virtual offset, distance drive and dip drive is higher than the stroke length (normally 575mm), then this will result in step loss during the first drive down.

We do not warrant damages caused by wrong settings.

Do not run the machine unattended.

Be careful not to spill liquid over the turning table. This may effect mechanics and electronics.

Setup

Examine the machine for possible transport damages. If you encounter any problems inform us and the carrier immediately.

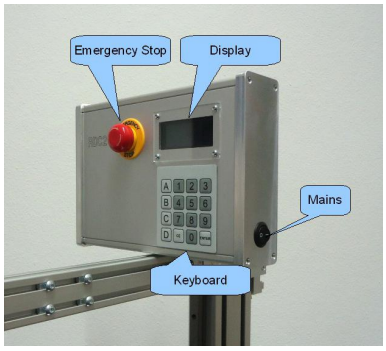
Carefully transport the machine to its operation site. Do not use the motor or other extending parts as a handle.

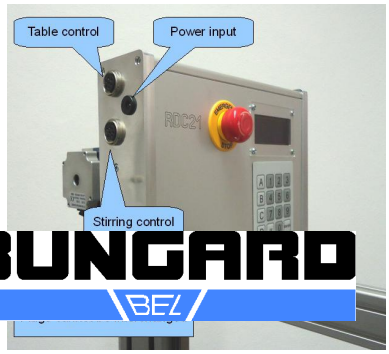
Strip off the packing. Make sure not to damage the belt!

Mount the controller to the machine. Click into the guidance and carefully move down to a secure position.

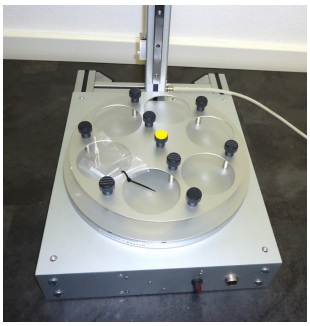
Connect the cables for the turning table and the stirring device. The plugs are made in a way you cannot interchange the cables.

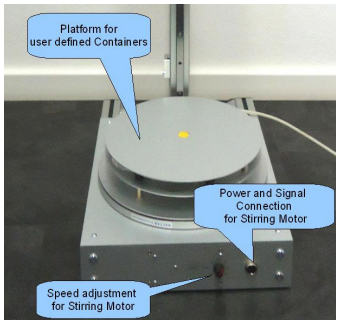
There is a separate cable with a European plug connected to the bottom of the machine. This is designed to realize equipotential for the machine body. Connect this cable to a free plug.

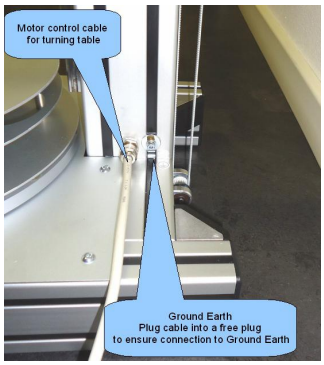




If you do not want to use cup glasses with diameter 80mm, you can set a platform on top of the vessel support (compare picture below).







Cups/Glasses/Vessels are not part of delivery!!

Composition

Maintenance

The Dip Coater RDC 30 Multidip is almost maintenance free. After each working day please clean the guidance tracks with an oil soaked rag (resin and acid free, e.g. sewing machine oil).

Operating

Die RDC30 has a stroke length of 575mm. This is the distance the lever arm can drive between the upper end switch and the lower end switch.

To avoid unnecessary drives, it is possible to set a virtual end switch for the dipping sequence. In addition many customers want to have a fast speed to drive from virtual offset to the point, where the object touches the dipping liquid and a slow speed for the actual dipping movement inside of the liquid. For this reason there are **5** different positions to consider. From Top to Bottom:

1. Home position (mechanical end switch)
2. virtual end switch
3. point of speed change (starting the actual dipping movement)
4. bottom point dip (resting the object in the liquid)
5. mechanical bottom end switch.

From home position to virtual end switch, the machine drives at **maximum** speed. You can set separate speeds for distance drive down (between virtual end switch and point of speed change) and dip drive down (between point of speed change and bottom point dip) and the same with dip drive up (between bottom point dip and point of speed change) and distance drive up (between point of speed change and virtual end switch). With 6 different vessels you can enter up to 24 different speeds.

Please consider that virtual end switch, distance and dip drive together may not exceed the stroke length ! If you establish new settings, we recommend to make a test drive without vessels and dipping object.

Menu structure RDC 30 Multidip

Screen #	Description	Display
1	After switching on, the welcome screen shows up with the software version...	Bungard BEL RDC31 Version 09022014
2	... and then calls for reference drive.	for homeposition (endswitch up) press 1
3	Please confirm with **1**. The machine drives to HOME POSITION (upper limit switch).	Drive to home position up
4	Also the table will move into home position.	Drive to table home position
5	Here you can decide whether you want to install a virtual upper end position or not. If you want to keep the old offset by pressing **1**, screen 6 and 7 will be skipped.	Change offset pos. 1= no 2= yes
6	In this screen you can insert your virtual upper end position, e.g. 100mm. Confirm with **Enter**. This avoids unnecessary drives. You can enter max. 999mm, but be careful! Normal machines have a stroke length of 575mm. Please consider that virtual end switch, distance and dip drive together may not exceed the stroke length ! If you establish new settings, we recommend to make a test drive without vessels and dipping object.	Offset position Virtual endswitch up (in mm/max. 999)
7	Call for confirmation.	For offsetposition (virtual endswitch) press 1
8	The lever arm moves to the virtual end switch.	Drive offsetposition (virtual endswitch)
9	Now you can still correct your virtual offset. If you press **2**, the software calls for another home drive. With **1** you continue with screen **12**	Offsetposition Ok press 1 Not ok press 2
10	If you confirm this screen with 1, the machine moves to home position.	For homeposition (endswitch up) Press 1
11	While moving to home position, this screen is shown.	drive to homeposition up

Screen #	Description	Display
12	If you pressed **1** in screen 9 the main menu shows up: With **0**, you can call for another reference drive and start from the beginning. **1** opens the menu for each table position. You can adjust different settings for every vessel on the table. Pressing **2** you have the chance to adjust the sequence of the vessel. Pressing **3** you can set iterations for the whole dipping sequence. And **4** will start the dipping procedure.	0.ref. 4.start 1.P.tablepos. 2.table seq. 3.iter seq.
13	Clicking on **0** in screen 12 you need to confirm the home drive.	For homeposition (endswitch up) Press 1
14	Clicking **1** in screen 12, the table position menu opens. Here you can select a table position and insert settings in the next screens. With **7** you go back to main menu (12).	1.pos.1 5.pos.5 2.pos.2 6.pos.6 3.pos.3 7.back 4.pos.4
15	If you selected a table position in screen 14 the table menu for this position will show up. **1** adjusts the dipping depth; **2** adjusts the downward speed, **3** the upward speed, **5** sets the waiting time in bottom position (dipping time) and **6** the waiting time in upper position (drip off time). With **7** you can set iterations for this table position and with **8** you move directly back to the main menu (12). If you click **4**, you get an overview of all settings for this table position. We recommend to check the settings of each table before you are going to use it in your sequence. There is not enough memory to store different dipping sequences, so we recommend to write down the current settings if you want to change to another dipping sequence.	1.dip 5.T.down 2.V.down 6. T.up 3.V.up 7.it.tool 4.View 8.back
16	Having clicked **1** in screen 15 you can adjust the dipping depth. This menu has two screens. One for the distance drive from virtual end switch to point of speed change and one for the dip drive (point of speed change to bottom point dip) First you set the distance drive. Please insert at least 50 mm. The maximum drive is limited to 1000 mm, but keep in mind our remark at the beginning of chapter **Operating**. When you press **C**, the screen changes to edit mode. You can enter your desired distance and confirm with **Enter**. You will automatically go to:	distance distance: ___mm Change=C or OK=Enter Min. 50/max. 1000mm distance distance: ___mm _____ Min. 50/max. 1000mm
17	Set distance dip. The menu has the same structure as the distance drive. Pressing **C** this screen changes into edit mode and you can insert your desired distance. With **Enter** you return to screen 14.	Distance dip distance: ___mm Change=C or OK=Enter Min. 50/max. 1000mm 1.pos.1 5.pos.5 2.pos.2 6.pos.6 3.pos.3 7.back 4.pos.4

Screen #	Description	Display
18	Having clicked **2** in screen 15 you can adjust the descending speed. This menu has also 2 screens. First you can adjust the speed for the distance drive. Press **C** to change screen into edit mode. Insert your desired speed. With **Enter** you go automatically to screen Speed down dip.	Speeddown distance _____ mm/min Change=C or OK=Enter (min.1 / max 9999) Speeddown distance _____ mm/min _____ (min.1 / max 9999)
19	The Speeddown dip mene works the same as the Distance menu before. Press **C** to get into edit mode. Insert your desired speed between 1 mm/min and 3000 mm/min. You can correct your input with **CE**. Confirm with Enter to go back to screen 14.	Speeddown dip ____ mm/min _____ (min.1 / max. 3000)
20	Having clicked 3 in screen 15 you can adjust the ascending speed. This menu works the same as screen18 and 19. With Enter you confirm the values and return to screen 14.	Speedup distance ____ mm/min Change=C or OK=Enter (min.1 / max. 9999) Speedup dip ____ mm/min Change=C or OK=Enter (min.1 / max 3000)
21	Having clicked **4** in screen 15 you get an overview on all settings adjusted to the current table position. In the first screen you can see the settings for the distance drive. If you press **8**, another screen with the settings for the dip drive shows up. With **8** you can switch between the two screens, with **9** you go back to screen 14. Please check carefully, if all settings are correct, before starting the dipping procedure. "**it**" in these screens stands for iterations for this drive, whereas "**Itg**" means the number of iterations for the whole job.	Vdis.u=6000 dist=50 Vdis.d=5000 it=1 Timer up=00:00:09 Itg=1 I->=8 esc=9 Vdip.u=300 dip=10 Vdip.d=200 it=1 Timer d=00:00:05 Itg=1 I->=8 esc=9
22	If you click **5** in menu 15 the screen for adjusting the waiting time at bottom position (dipping time) shows up. You can enter max. 99 hours, 59 minutes and 59 seconds and at least 00:00:00. Press **C** to change to edit mode. Insert your desired dipping time. You can correct your input by pressing **CE** and confirm your input with **Enter**. After pressing **Enter** you can decide whether you want to have your liquid stirred or not. After inserting **1** or **2** you will automatically return to screen 14.	T.down: 00:00:05 change=C or OK=Enter t. down: 00:00:05 00:00:00 Successively enter (E=ok /max9/CE=k) Stir 1.on 2.off
23	If you click **6** in menu 15 the screen for adjusting the waiting time at top position (drip off time at virtual end switch) shows up. You can enter max. 99 hours, 59 minutes and 59 seconds and at least 00:00:00. Press **C** to change to edit mode. Insert your desired drip off time. You can correct your input by pressing **CE** and confirm your input with **Enter**. After pressing **Enter** you can decide whether you want to have your liquid stirred or not. After inserting **1** or **2** you will automatically return to screen 14.	time up: 00:00:09 change=C or OK=Enter t. up: 00:00:05 00:00:00 Successively enter (E=ok /max9/CE=k)

Screen #	Description	Display
		Stir 1.on 2.off
24	Clicking **7** in menu 15 you can enter iterations for the selected table position. You can enter between 1 and 1000 iterations. Press **C** to change to edit mode. Insert your desired iterations and confirm with **Enter**. Now we have completed all settings for one table position. Now we need to do the same with the all other table positions you want to use in this sequence. After having finished we go back to the main menu (screen 12).	Iteration: ___ change=C or OK=Enter (min.:1 / max.: 1000) Iteration: ___ OK=Enter (min.:1 / max.: 1000)
25	If you press **2** in the main menu (screen 12) you can arrange the sequence of the vessels you want to dip your object in. Insert the desired vessel position you want to start the sequence with and confirm with **Enter**. You can assign up to 9 sequences (s1 – s9). For each sequence you need to assign a vessel. If you want to make e.g. only 3 sequences, you insert a **0** for sequence 4 (s4) and confirm with **Enter**. After that the menu returns to screen 12.	sequenz of tools s1=tp__ 1-6 // 0=not used
26	Selecting **3** in main menu (12) you can enter iterations for the whole dipping sequence. You need to enter at least one and at most 1000 iterations.	Iteration=_ change=C or OK=Enter (min. 1 / max. 1000) Iteration=1 OK=Enter (min. 1 / max. 1000)
27	Now we have entered all settings and can continue with the actual dipping process. We recommend to run the machine first without the liquid in the vessels to check speed and end positions. When you click **4** in the main menu, the machine will start the dipping sequence. First it will drive to the correct table position and then start the drip-off-time.	wait stir on Timer 00:00:00
28	Then it will begin the descend. The display for distance drive and dip drive is the same, but you will notice that a different speed will be displayed. If you have set e.g 3 iterations for this vessel, the display starts with iteration 3. The same is valid for iterations of the whole sequence (Iteration g)	Drive down Iteration 1 Speed down: 5200 Iteration g.: 2 Drive down Iteration 1 Speed down: 950 Iteration g.: 2
29	If you adjusted a dipping time, the screen on the right shows up and counts down the time. If you haven't adjusted a time, the screen will just flash...	wait stir on Timer 00:00:00 Iteration g: 2
30	... and the machine continues with the drive up to the end or to the virtual end position. Again the display for distance drive and dip drive is the same, but you will notice that a different speed is displayed. If you have set e.g 3 iterations for this vessel, the display starts with iteration 3. The same is valid for iterations of the whole sequence (Iteration g). After having completed the vessel for this sequence.....	Drive up Iteration 1 Speed up: 950 Iteration g.: 2 Drive up Iteration 1 Speed up: 4000 Iteration g.: 2

Screen #	Description	Display
31	..... the machine drives to the next table position...	Drive to table position
32	If you adjusted a drip off time the screen on the right shows up and counts down the time. If you haven't adjusted a time, the screen will just flash...	wait stir on Timer 00:00:00
33	..... and continues with the next descend. The screens 28 till 32 will continue till the whole job is finished.	Drive down Iteration 1 Speed down: 5200 Iteration g.: 2
34	At the end of the job the lever arm will rest at the virtual end position and the table will turn to home position.	Drive to Table home position
35	You are asked to confirm with 1 and then screen 12 (main menu) shows up again.	Job completed Ok press 1

Selected parameters are stored and can be used next time the machine is switched on.

Limit switches prevent drives that exceed the maximum possible way.

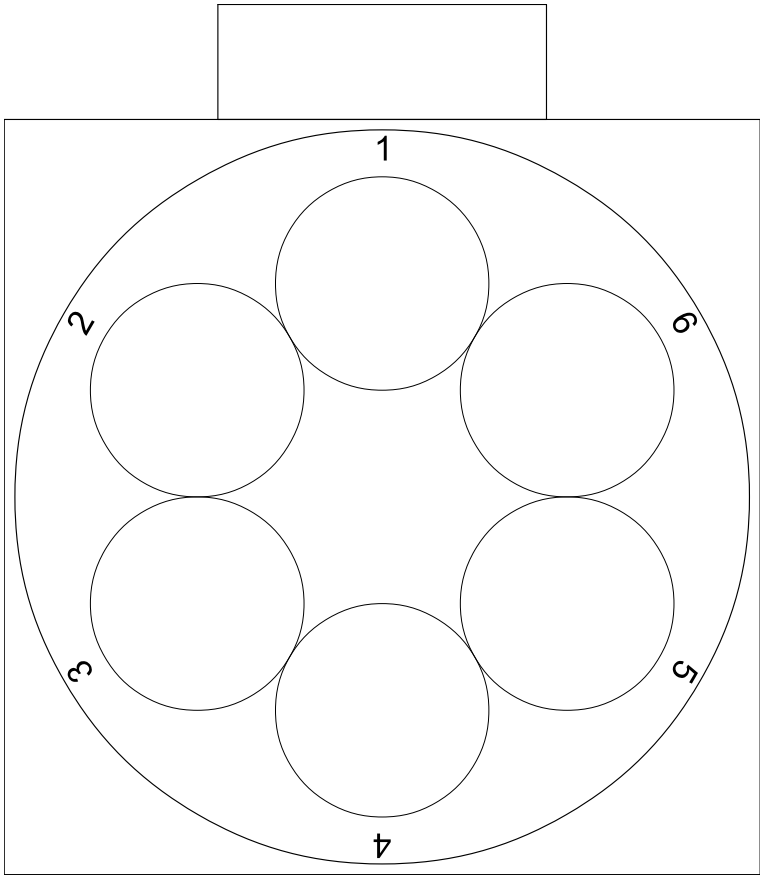
Please take great care when adjusting stroke length and speeds. Consider the height of the liquid container and additional stirring devices.

We do not warrant damages caused by wrong settings.

Loading of machine

The machine is equipped with a universal carrier. In addition there are two M5 threads in the slay, so you can insert a holder device fitting your special application.

Cup Position



Order of dipping positions

Guarantee

All machines are submitted before distribution to examination on function and continuous operation firmness. On the machine we grant a work warranty of 12 months to our customers starting from purchase date on accuracy in material and processing. We warrant at our choice by exchange of incorrect parts or by repair of the machine in our house. Old parts change into our possession.

Disclaimer of Warranty

All parts subjected to wear are excluded from this warranty. Non-observance of this manual shall void all warranty claims.

We cannot accept subsequent claims from damage or destruction of workpieces worked on in the machine, because we have no knowledge or control over the operating conditions at your site. This is valid in a general manner also for requirements from damage to articles, buildings and persons as well as the environment.

We do not warrant that the function of the machine will meet the customer's requirements or that the operation of the machine will to this regard be error free.

In no event will we be liable to the customer for any incidental, consequential, or indirect damages of any kind, including loss of profit and prosecution for environmental pollution, even if we could have been aware of the possibility of such damages.

All information was arranged with great care. We reserve ourselves however mistake and technical changes without previous announcement.

Running the machine in corroding, humid, dusty, extremely hot or explosive atmosphere happens at the operator's own risk and responsibility.

We explicitly exclude any warranty for damages resulting from running the machine in in corroding, humid, dusty, extremely hot or explosive atmosphere.

Copyright

Sample sheet for parameter documentation

Cup 1	
Distance:	
Distance dip:	
Speeddown distance:	
Speeddown	
Speedup distance:	
Speedup dip:	
Speedup distance:	
T.down:	
Stirr down:	
T.up:	
Stirr up:	
Iterations:	

Cup 2	
Distance:	
Distance dip:	
Speeddown distance:	
Speeddown	
Speedup distance:	
Speedup dip:	
Speedup distance:	
T.down:	
Stirr down:	
T.up:	
Stirr up:	
Iterations:	

Cup 3	
Distance:	
Distance dip:	
Speeddown distance:	
Speeddown	
Speedup distance:	
Speedup dip:	
Speedup distance:	
T.down:	
Stirr down:	
T.up:	
Stirr up:	
Iterations:	

Cup 4	
Distance:	
Distance dip:	
Speeddown distance:	
Speeddown	
Speedup distance:	
Speedup dip:	
Speedup distance:	
T.down:	
Stirr down:	
T.up:	
Stirr up:	
Iterations:	

Cup 5	
Distance:	
Distance dip:	
Speeddown distance:	
Speeddown	
Speedup distance:	
Speedup dip:	
Speedup distance:	
T.down:	
Stirr down:	
T.up:	
Stirr up:	
Iterations:	

Cup 6	
Distance:	
Distance dip:	
Speeddown distance:	
Speeddown	
Speedup distance:	
Speedup dip:	
Speedup distance:	
T.down:	
Stirr down:	
T.up:	
Stirr up:	
Iterations:	