



KSV NIMA

User's Manual

KSV NIMA Dip Coaters



Multi Vessel Small



Single Vessel Small



Multi Vessel Medium/Large



Single Vessel Medium/Large

DipCoater

Revision 1.3



Table of Contents

1	INTRODUCTION	1
2	KSV NIMA INTERFACE UNIT	2
2.1	Display	2
2.2	Keypad	2
2.3	Connections	3
3	SOFTWARE INSTALLATION	4
3.1	Computer Requirements	4
3.2	DipCoater software installation	4
3.3	KSV NIMA interface unit Driver Installation	8
4	SOFTWARE	11
4.1	Overview	11
4.2	Main Menu	12
4.3	DipCoater Control Software	14
A)	Speed settings	16
B)	Experiment controls	16
C)	Database	17
D)	Sequence	23
E)	Edit device parameters	28
F)	Dipper Parameters	28
G)	Vessel level	29
5	RUNNING AN EXPERIMENT	30
5.1	Browse experiments	34
6	TECHNICAL SPECIFICATIONS	37
7	CONTACT INFORMATION	38



1 Introduction

The KSV NIMA Dip Coaters are computer controlled and user programmable Dip Coater for automated and unsupervised deposition of self-assembled monolayers, layer-by-layer assemblies, sol-gel coatings etc.

KSV NIMA dip coaters range from compact instruments for coating of small samples in a single vessel to more complex systems enabling horizontal and vertical movement for multi-vessel operations and coating of large samples.

Our dip coater range is divided in two, on one side the dip coaters with no horizontal motion which are preferably used with a single vessel, and on the other side the dip coaters with horizontal motion enabling multi-vessel dipping sequences. The “single vessel” and “multi-vessel” categories both offer Small, Medium and Large systems to be used with samples of different sizes. You can choose from the six dip coater systems in function of your sample weight, sample size, number of samples, dipper movements and number of vessels required. For a full list of the available systems and accessories please see our website at www.ksvnima.com.

The software included with this instrument allows the easy operation of a variety of preprogrammed sequences which can be modified to any needs. The data is stored to the hard drive and can be retrieved and analyzed later.

The hardware is manufactured to the highest quality standards and when used properly should yield a lifetime of trouble-free use.

For any questions or comments on any of KSV NIMA products please contact us at support@ksvnima.com or your local distributor.

Local distributors are listed at our website, www.ksvnima.com.

VERY IMPORTANT

The original mains cables of the instrument and the computer must always be used and connected to a grounded wall socket. Ungrounded wall sockets may cause dangerous voltages between the instrument, the computer and the real ground.



2 KSV NIMA Interface unit

The KSV NIMA interface unit is an interface and nexus point between the computer and the various connected devices. A running PC program is required for the proper operation of the KSV NIMA interface unit.



Image 1.1: *The KSV NIMA interface unit.*

2.1 Display

The display shows relevant measurement data. The top row shows the dipper position and the bottom row shows temperature, except when linear motion is available the bottom row shows the horizontal position. Along the bottom of the display are various status notifications, such as **Limit** for when the dipper has reached a limit switch (only if driven by keypad).

2.2 Keypad

When the **Manual Control Unit** is open, the keypad at the front of the KSV NIMA interface unit can be used to move the dipper. On the right-hand side are the controls for the vertical position. The top-right button lifts the dipper, the bottom-right button lowers the dipper and the button on the right stops the dipper.

On the left-hand side are two sets of similar controls. The top controls are for horizontal motion. The buttons, from left to right, are move left, stop and move right. The lower set of controls can be used to control a stirrer if one is connected (the move controls turn on the stirrer, the stop button turns the stirrer off).

2.3 Connections

Most of the devices used with the Dip Coaters are connected to the KSV NIMA interface unit which in turn is connected to the computer. The vertical dipping arm and the horizontal dipping arm and other devices with 15-pin cables connect to the back of the unit.



Image 1.2: *The back of the KSV NIMA interface unit.*

Connect the 15-pin cables to the ports from right to left to ensure proper operation. Other connections at the back of the unit are the USB-port for connecting to the computer running the experiment and the plug for the power cable.

On the right-hand side of the unit are the connections for various other devices

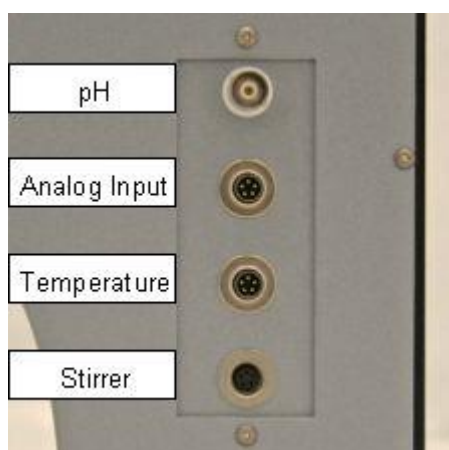


Image 1.3: *The side ports of the KSV NIMA interface unit.*

3 Software Installation

3.1 Computer Requirements

The computer attached to the Dip Coater is required to have

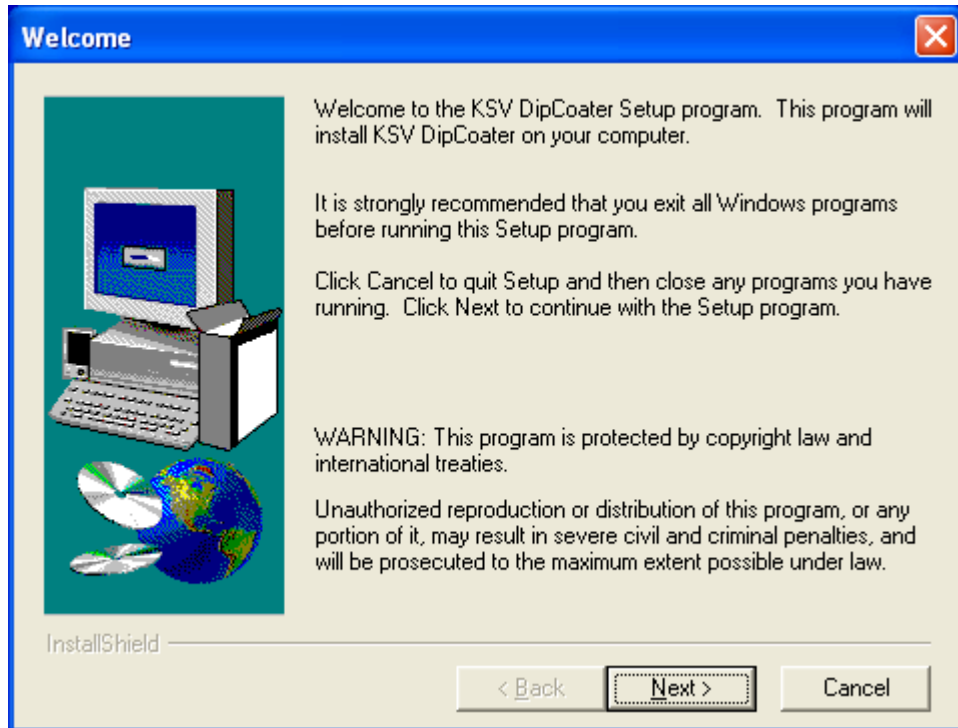
- Minimum system requirements: 1GHz processor, 512 MB RAM, 40 GB hard disk drive (20GB free), 1024x768 resolution, USB Port, RS-232 Port (for water bath option)
- Operating system requirements: Windows xp sp2 (32 bit), Windows Vista Home sp1 and Home premium sp1 (32 bit), Windows Vista Ultimate (32 bit) sp1 and Business sp1 (32 bit) , Windows 7 (32 bit and 64 bit). (NOTE: In Vista and Windows 7 the installer program setupcam.exe has to be run in **XP compatibility mode**, see below).
- During installation and system calibration the user must have **administrative privileges** to the computer.
- USB interface (if motorized stages and/or automatic dispensers are used).

3.2 DipCoater software installation

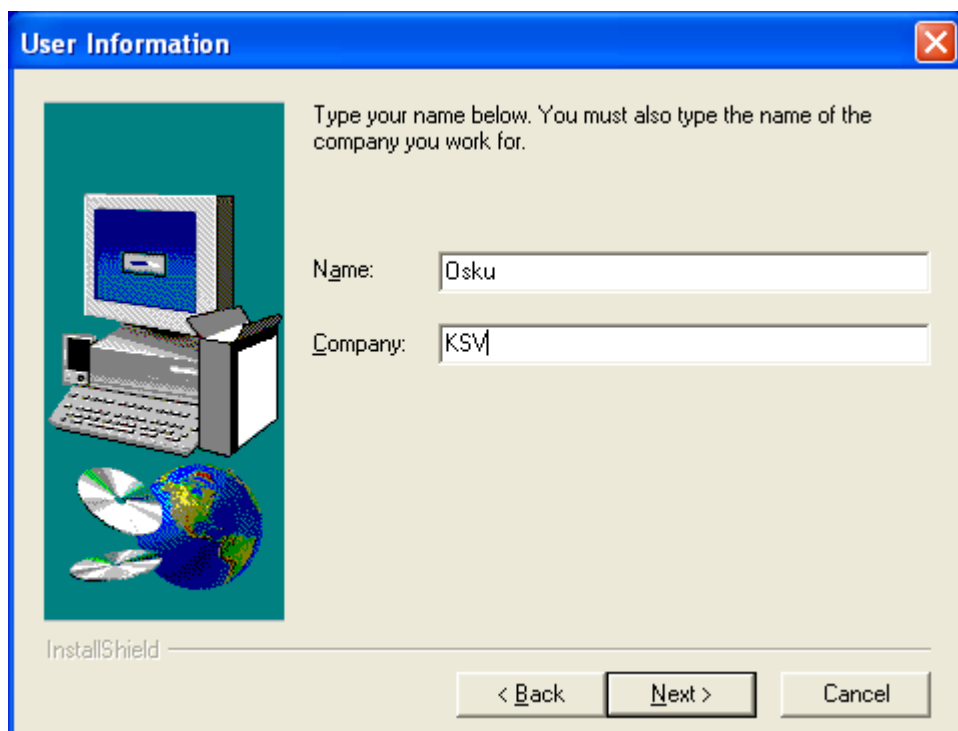
Insert the DipCoater Installation CD into the CD-Rom drive. Open **My Computer** from the desktop, select the CD drive (D:\ by default) and double-click on **setup.exe**.

ATTENTION, VISTA and WINDOWS 7 USERS: If you're running Windows Vista or Windows 7, the setup program has to be run in **XP compatibility** mode. Prior running setup.exe, copy it to local computer from the CD-ROM. Right-click on the file, choose Properties->Compatibility and check "Run this program in compatibility mode for Windows XP SP2". Additionally, it's advisable to run the installer as administrator by right-clicking setup.exe and selecting "Run as administrator".

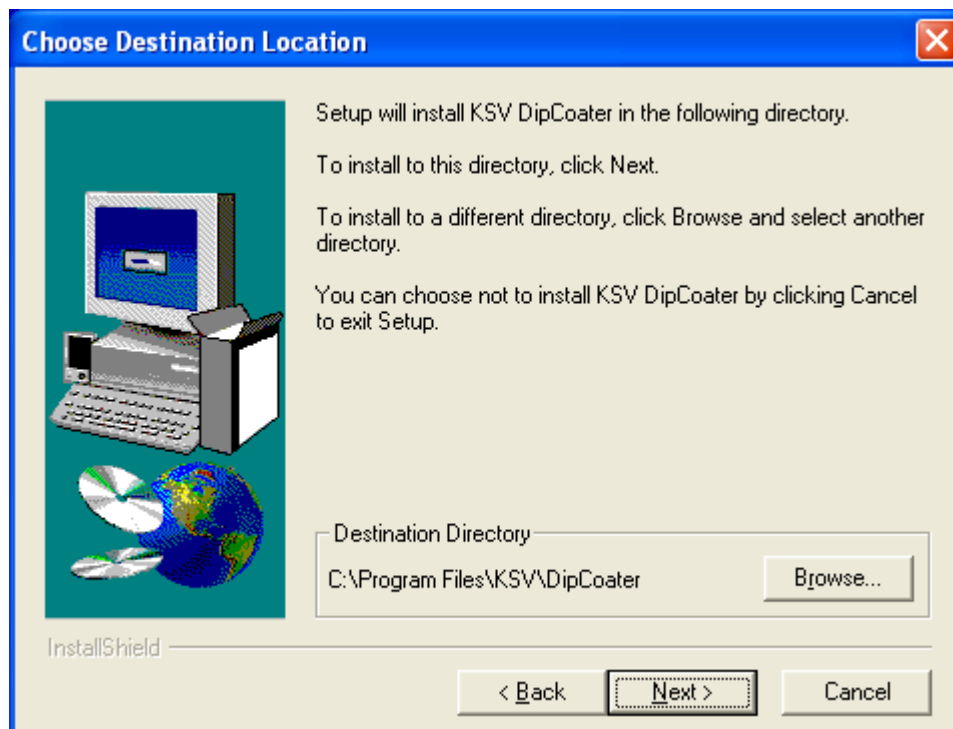
The installation will now begin with the following screen.



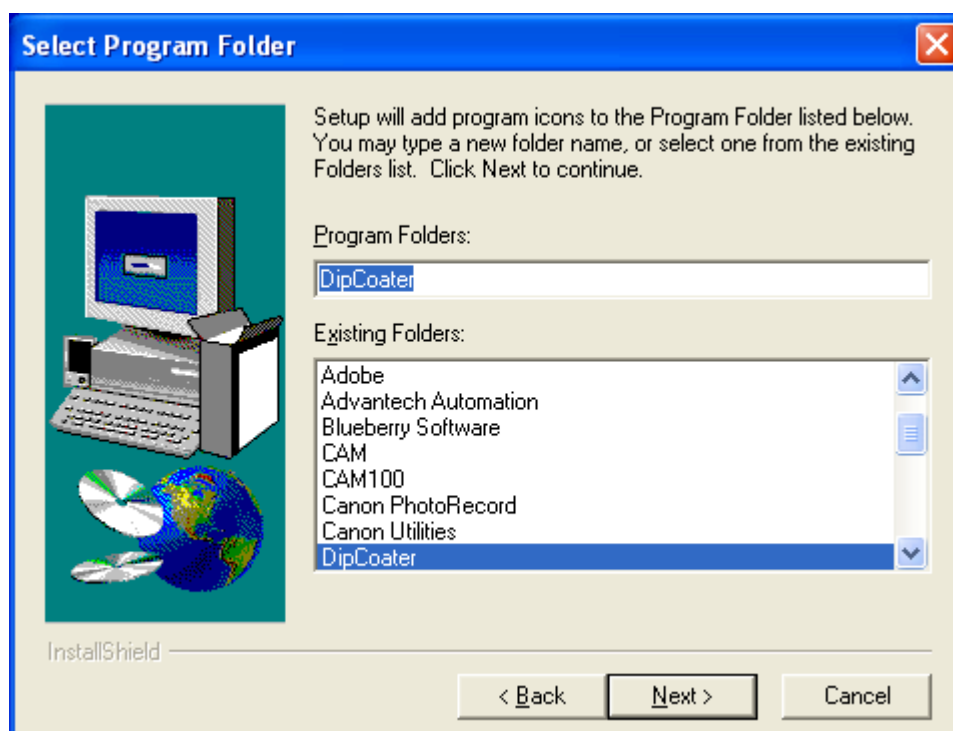
Press **Next** to continue.



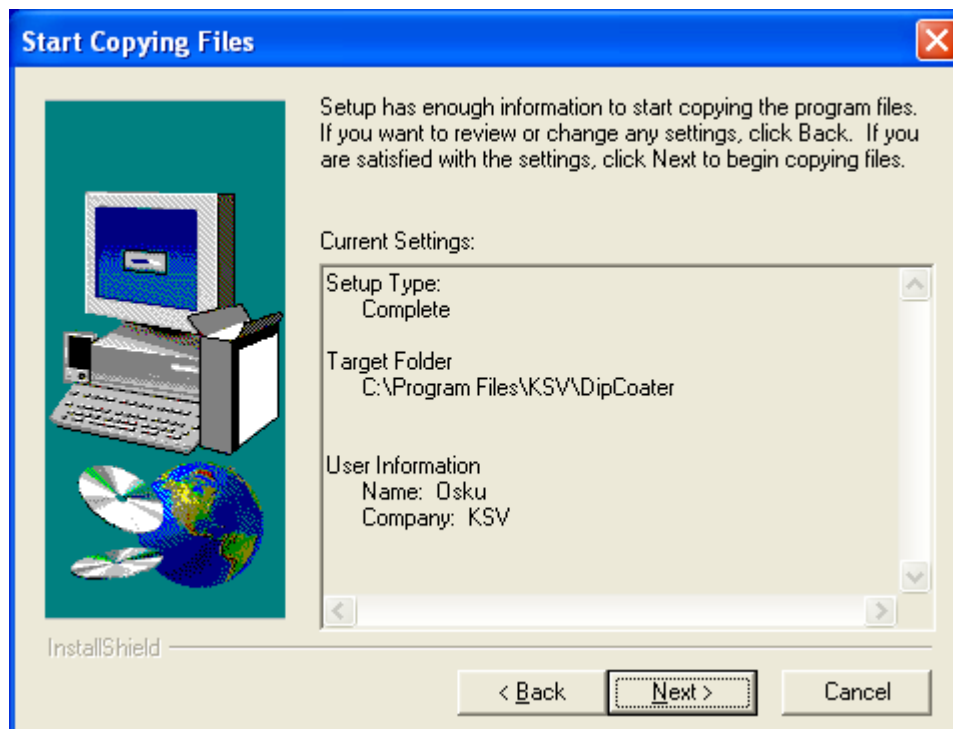
Fill in the details and press **Next** to continue.



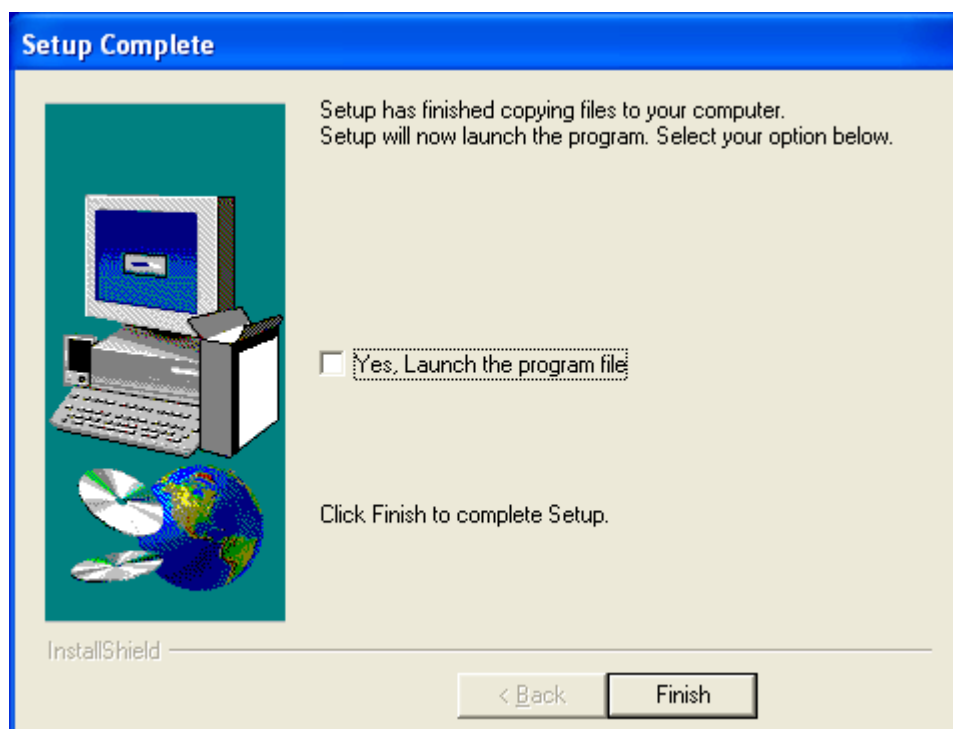
Press **Next** to continue.



Press **Next** to continue.



Press **Next** to continue.



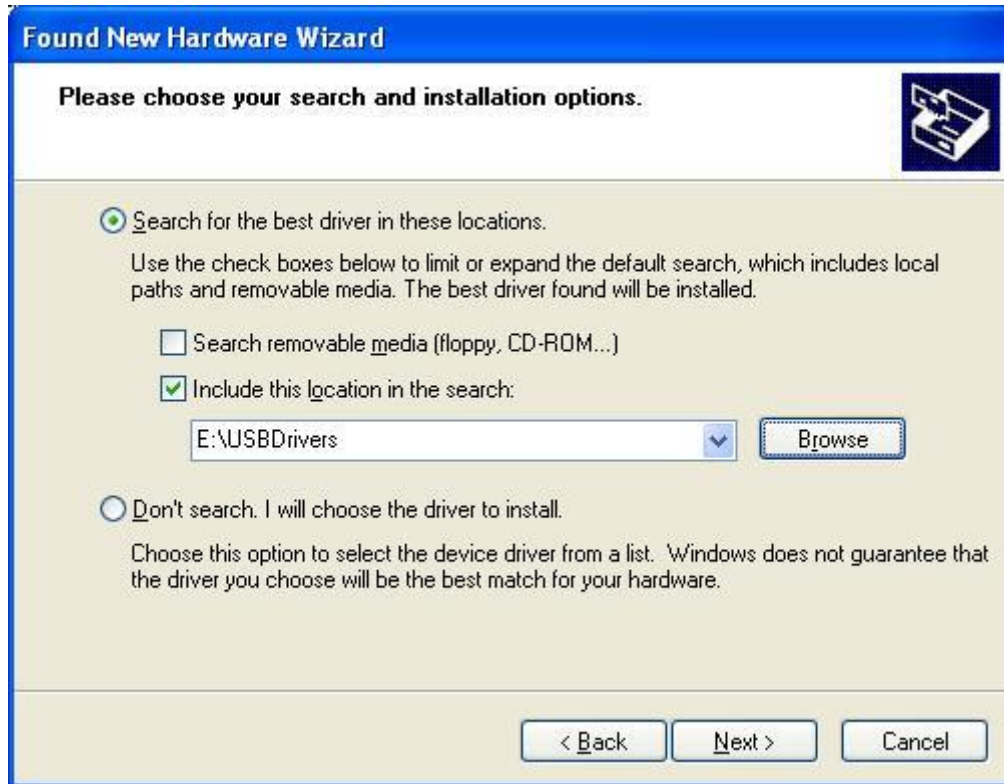


3.3 KSV NIMA interface unit Driver Installation

To begin installing the interface unit drivers, turn on the interface unit and connect it to the computer with the USB cable. Windows will now automatically detect it and start the **New Hardware Wizard**.



Select the **Install from a list or specific location (Advanced)** and then press the **Next** button. At this point insert the software installation CD that was delivered with the instrument in the computer CD-ROM drive. *If the **Install the software automatically** option is selected, Windows may appear to install drivers correctly but they will not allow the proper functioning of the device!*



Check the **Include this location in the search** box, use **Browse** to find the *USBDrivers* folder on the CD and click **Next**.





The wizard will find the appropriate driver and sprout a warning message.



Click **Continue Anyway**. The wizard will now install the USB drivers for the KSV NIMA interface unit. After the drivers are installed press **Finish** to exit the wizard. The interface unit is ready to use.



4 Software

4.1 Overview

The software is a windows based program whose format will easily be learned by most users familiar with windows based software. The point and click format of drop down menus, buttons and icons is probably already a familiar part of your experience. Many users will probably avoid the manual altogether and just start guessing and clicking their way through the software. For those of you who like to explore, let's take a quick tour through the major parts of the software to head you in the right direction.

Main Menu: menu from which all other sections can be accessed.

Dip Coater Control Software: The program is set to perform a series of deposition sequences, which you can modify to suit your particular needs. A special very simple syntax is written for every individual sequence.

Edit Database: Section of software in which menu of choices for parameters filled into Experimental Setup is created and edited. If you are using users, substrate names or liquids which are not available from current menu you may enter into this section to add new choices to database.

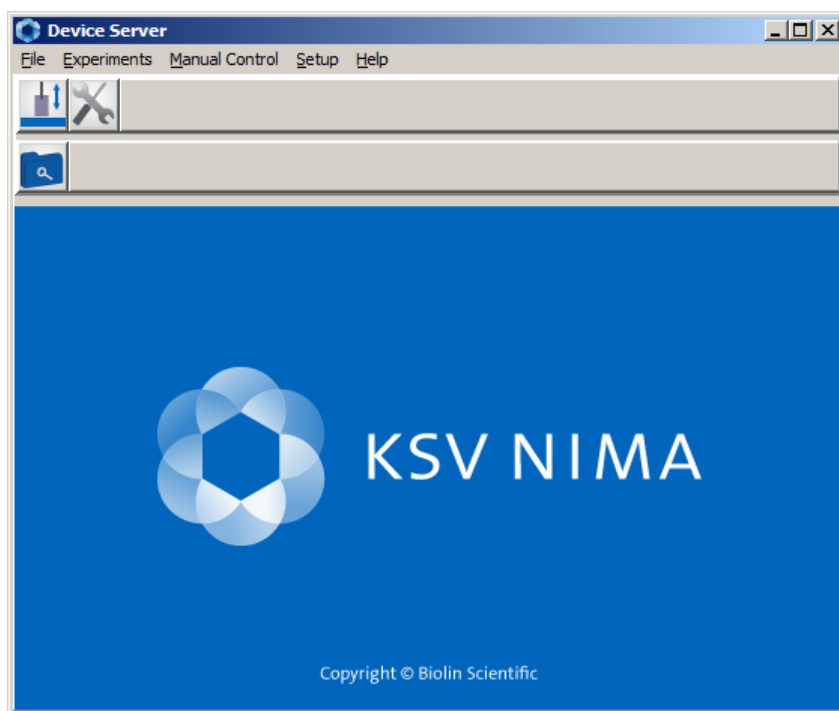
Experimental Setup: Once the experiment has been chosen the computer must be informed of various parameters specific to the current experiment. The values for these parameters are entered here prior to starting the experiment. You may click on field and type in information or select from choices available from Database.

Measurement: The actual performance of the experiment occurs after the Experimental Setup has been filled out and the materials for the experiment are in place. Once the final experimental controls have been chosen the experiment is started. The experiment will then continue unsupervised until completion.

Browse Dip Coater Experiments: After an experiment has been performed you can return to view the data collected. The experiments can be viewed by pressing the Browse Experiment menu icon. The screen that appears will allow you to find the data in which you are interested. After you have selected the experiment you desire the data for that experiment can be exported or printed. After that you have the option of viewing and editing the Experimental setup. This can be very helpful if you wish to check what kind of sequence has been made or modify the data produced based on new information about the materials involved.

4.2 Main Menu

After you have selected Sgserver.exe the Main Menu for your Dip Coater software should appear as follows:

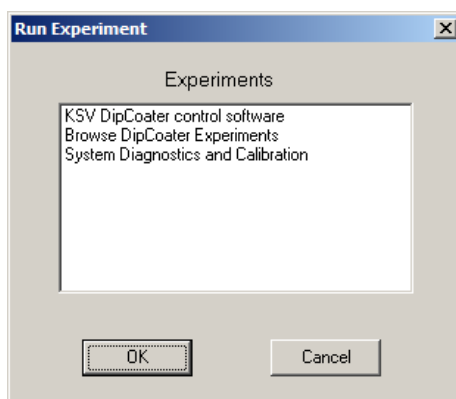


The menu for the top bar is as follows:

File: → **Open:** Opens Run Experiment drop down menu. Menu includes list of all experiments and data analysis software. Should appear as shown below.

File: → **Exit:** Closes Dip Coater software.

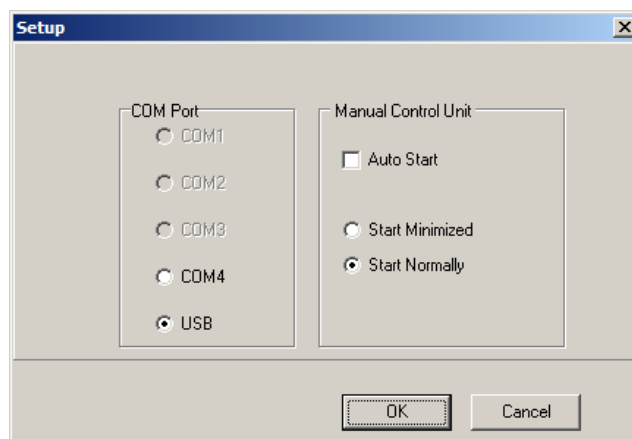
Experiments: Opens Run Experiment drop down menu. Should appear as follows:



Each of the titles listed in Run Experiment refers to a specific section of the software, which will be accessed. Refer to appropriate section of manual for operation of software selected.

Control Panel: No active function in this KSV NIMA application.

Setup: Opens setup window. Screen should appear as follows:



On the left side of the screen the COM port through which your Dip Coater is communicating with your computer is indicated. Select **USB** as COM port. On the right of the screen under the heading **Control Panel** are the following buttons:

Autostart: When active starts Control Panel automatically with Main Menu.

Start Minimized: Control Panel will be minimized when started.

Start Normally: Control Panel will be full sized when started.

Below these drop down menus you will find a selection of icons. The functions of these icons are as follows



Opens Dip Coater control software



Opens Browse Dip Coater Experiments


Open the portion of the software you desire by clicking appropriate icon.

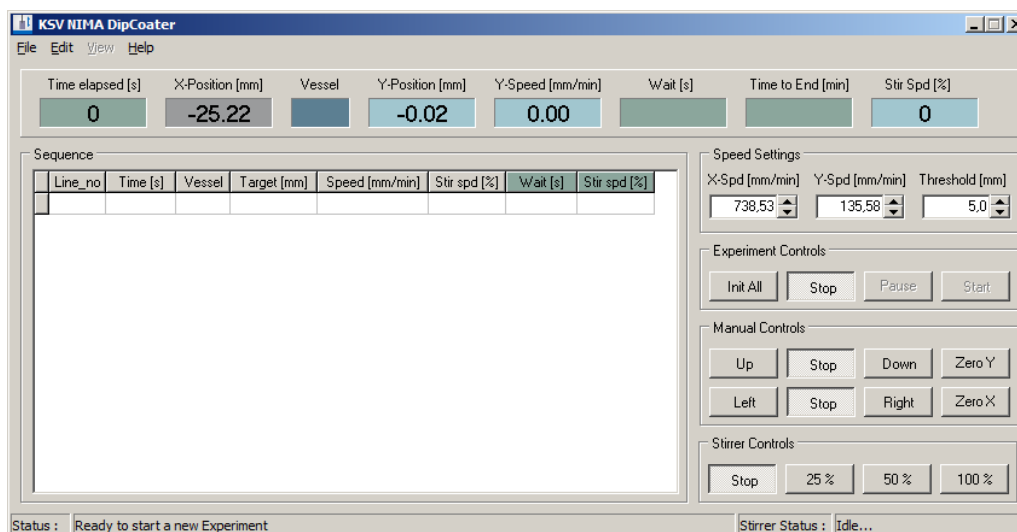
4.3 DipCoater Control Software

IMPORTANT !

If you are making the experiments for the first time you have to make sure that the Instrument Parameters have been set correctly (see Device Parameters section below). If this is not done before the experiment is performed the data from your experiments may not be adequate and your instrument may behave strangely. Once the parameters have been set you do not have to make the changes every time unless you change your configuration, the software will remember the parameters in the future.

The focus of this section is the other central functions of the *Dip Coater control software* than the actual deposition experiment. The actual performance of an experiment is described in a later section. Choose *Dip Coater Control Software* from the *Run Experiment*

menu or press the icon  to start the software. The following screen should appear:



The menu for the top bar is as follows:

File: → **New Experiment**: Starts a new dipping experiment.

File: → **Exit**: Closes the Dip Coater control software.

Edit: → **Database**: Menu where choices for parameters filled into Experimental Setup is created and edited (see section Edit Database below for a more detailed description).



Edit: → **Sequence:** Menu where the syntax for the deposition sequence is programmed (see section Edit Sequence below for a more detailed description)

Edit: → **Device Parameters:** Menu where Instrument Parameters are defined (see section Edit Device Parameters below for a more detailed description)

Below these drop down menus you will find a selection of displays. The functions of these are as follows:

Time elapsed: Shows how long the experiment has been going on in seconds.

X-position: Shows the position of the dipper unit (Window active only with KSV NIMA Multi Vessel systems).

Vessel: Shows the vessel into/from which the immersion/withdrawal is performed (possible to use up to 8 vessels, more on request).

Y-position: Shows the position of the sample substrates lower edge relative to the liquid level in the vessel (see figure on page 29 for more exact definition of parameters).

Y-speed: Shows the speed of the deposition arm during the immersion/withdrawal.

Wait: Shows the time left before the next immersion/withdrawal is starting.

Stir Spd (%): Shows the stirring speed in percentages of the maximum stirring speed.

Time to end: Shows the estimated time in minutes when the experiment is expected to end.

Below these displays you will find a table named Sequence showing the data collected on line from the measurement. The columns for the table are assigned as follows:

Line no: Number assigned to data point.

Time[s]: Time at which data point was taken.

Vessel: Vessel into/from which the current immersion/withdrawal is made.

Target: Target depth of the lower edge of the substrate during the current immersion/withdrawal.

Speed: Speed of the dipper arm during the current immersion/withdrawal.

Stir spd (%): Speed of the stirrer during the dipping. Speed is shown in percentages of the maximum stirring speed.



Wait: Delay in seconds of the substrate at the target position of the current immersion/withdrawal

Stir spd (%): Speed of the stirrer during the waiting period. If a sample is immersed the stirring speed applies during the deposition waiting period. If a sample is withdrawn stirring speed applies during the waiting period in air. The speed is defined in percentages of the maximum stirring speed.

To the right of this table you will find a selection of displays and buttons. The functions of these are as follows:

A) Speed settings

X-spd: User definable value for the speed at which the dipper unit is linearly moved between vessels (Window active only with KSV NIMA Multi Vessel systems).

Y-spd: User definable value for the speed of the dipper arm between the change of vessels (maximum speed as default).

Threshold: User definable value for the height relative to the liquid level at which the deposition speed is changed to the requested value during immersion and withdrawal of the substrate.

B) Experiment controls

Init all: Initiates the instrument to start position before the experiment is performed.

Stop: Stops the experiment or current action.

Pause: Pauses the experiment or current action (active when new experiment has been chosen).

Start: Starts the experiment (active when new experiment has been chosen)

Manual controls: Software control of devices for manipulation outside of experiment.

Up: Moves the dipper arm upwards.

Stop: Stops the movement of the dipper arm.

Down: Moves the dipper arm downwards.

Zero Y: Zeros current dipper position.

(buttons active only with KSV NIMA Multi Vessel systems)

Left: Moves the dipper unit to the left.










Stop: Stops the movement of the dipper unit.

Right: Moves the dipper unit right.

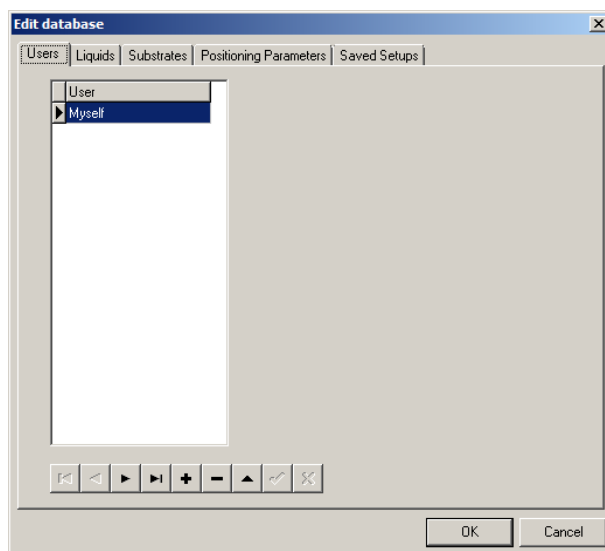
Zero X: Zeros current dipper unit position.

C) Database

The database is the section of the software, which stores the library of information your KSV NIMA Dip Coater has for choices of users, liquids and substrates. When you fill out the ***Experimental Setup*** prior to starting an experiment, your software will reference the information stored in this file to supply choices for your selection. When the selection of choices needs to be added to or altered you need to return to this section to make the desired changes. This section is divided into three pages ***Users***, ***Liquids*** and ***Substrates***. Each page has a row of buttons near the bottom, which can be used for scrolling and editing. The functions of the buttons are as follows:

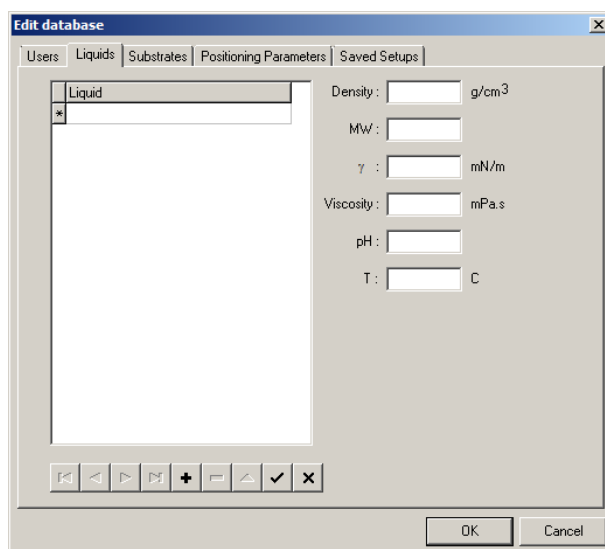
-  Move to top of list.
-  Move one space toward top of list.
-  Move one space toward bottom of list.
-  Move to bottom of list.
-  Add new item to list.
-  Delete item from list.
-  Edit item on list (change field values for current item).
-  Post new item entered.
-  Cancel edit.

The page for editing ***Users*** should appear as follows:



A list of current users will appear. To add a new user press the **New Item** button and enter the new name in the field space. If you wish to add more users click **Post New Item**. When you are done adding click **OK**.

The page for editing **Liquids** should appear as follows:



The names of your **Liquids** are edited as above. The additional fields are defined as follows:

Density: Density of liquid.

MW : Molecular weight of liquid.

γ : Surface tension of liquid.

Viscosity: Viscosity of liquid.

pH: pH of liquid.

T: Temperature of liquid.



The page for editing **Substrates** should appear as follows:

The screenshot shows a software window titled "Edit database" with a close button (X) in the top right corner. Below the title bar are five tabs: "Users", "Liquids", "Substrates", "Positioning Parameters", and "Saved Setups". The "Substrates" tab is selected. Inside this tab, there is a list box on the left labeled "Material" with a small arrow icon next to it. To the right of the list box are four input fields: "Density : [] g/cm³", "MW : []", "SFE : [] mN/m", and "Height : [] mm". At the bottom of the window, there are two buttons: "OK" and "Cancel".

The names of your solids are edited as above. The additional fields are defined as follows:

Density: Density of solid.

MW: Molecular weight of solid.

Sfe: Surface free energy of solid.

NB: If you delete an item from data base it will not delete data for that item from stored experimental records.



The page for editing **Positioning Parameters** should appear as follows:

Dipper Parameters [mm]	
Zero level	150.0
Threshold	5.0
Clip height	8.0
Clearance	

Vessel locations	
	X-pos [mm]
Vessel 1 :	4.0
Vessel 2 :	40.0
Vessel 3 :	76.0
Vessel 4 :	112.0
Vessel 5 :	148.0
Vessel 6 :	184.0
Vessel 7 :	220.0
Vessel 8 :	256.0

Vessel levels		
	Top level [mm]	Bottom level [mm]
Vessel 1 :	60.0	15.0
Vessel 2 :	60.0	15.0
Vessel 3 :	60.0	15.0
Vessel 4 :	60.0	15.0
Vessel 5 :	60.0	15.0
Vessel 6 :	60.0	15.0
Vessel 7 :	60.0	15.0
Vessel 8 :	60.0	15.0

The names of your Positioning Parameters are edited as above. The additional fields are defined as follows:

Zero level: Height between the upper edge of the substrate and the table (vessel bottom).

Threshold: User definable value for the height relative to the liquid level at which the deposition speed is changed to the requested value during immersion and withdrawal of the substrate.

Clip height: Height of the part of the sample holder that holds the sample substrate.

Clearance (only used with KSV NIMA Multi Vessel systems): User definable value for the height sample is lifted when the sample is moved from one vessel to another. This defined by the highest vessel edge to prevent the sample from hitting any of the vessel edges.

Vessel locations (only used with KSV NIMA Multi Vessel systems): position of liquid vessel measured from the **X-zero** position of the **Dipper Unit** attached to the **Drive Belt System**. The zero position of the **Dipper Unit** is automatically defined when performing the **Init All** operation. This zero position is when the **Dipper Unit** is at the far left edge of the **Drive Belt System**.

Top level: Height of the liquid surface from the table (vessel bottom).

Bottom level: Height of the vessel bottom from the table.


Zero level: Density of solid.

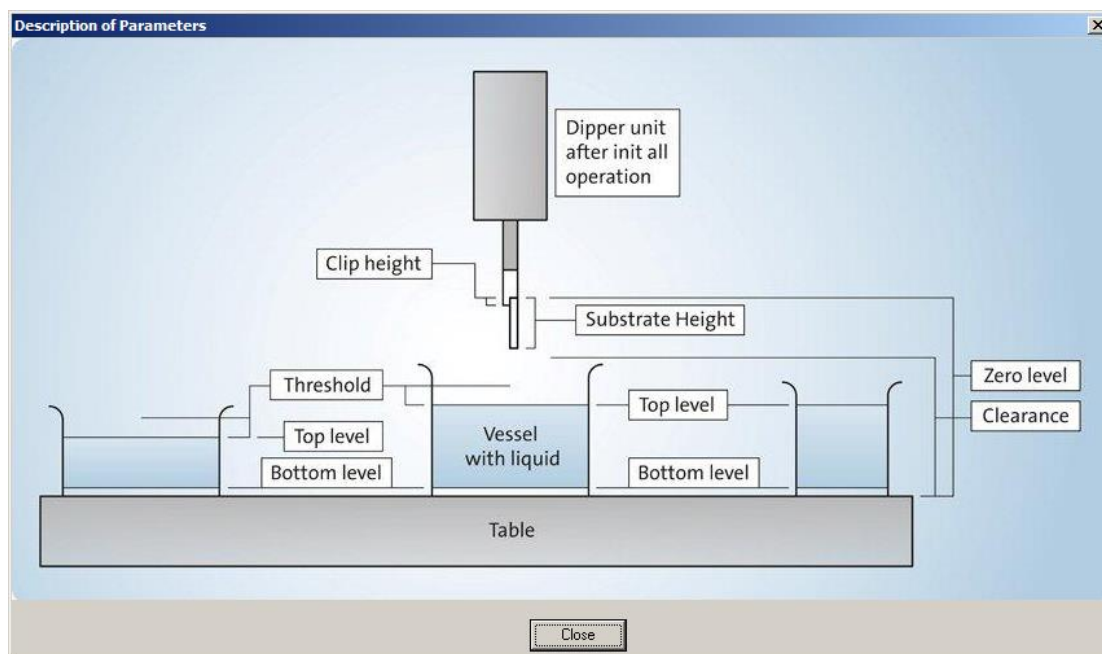


MW: Molecular weight of solid.

Sfe: Surface free energy of solid.

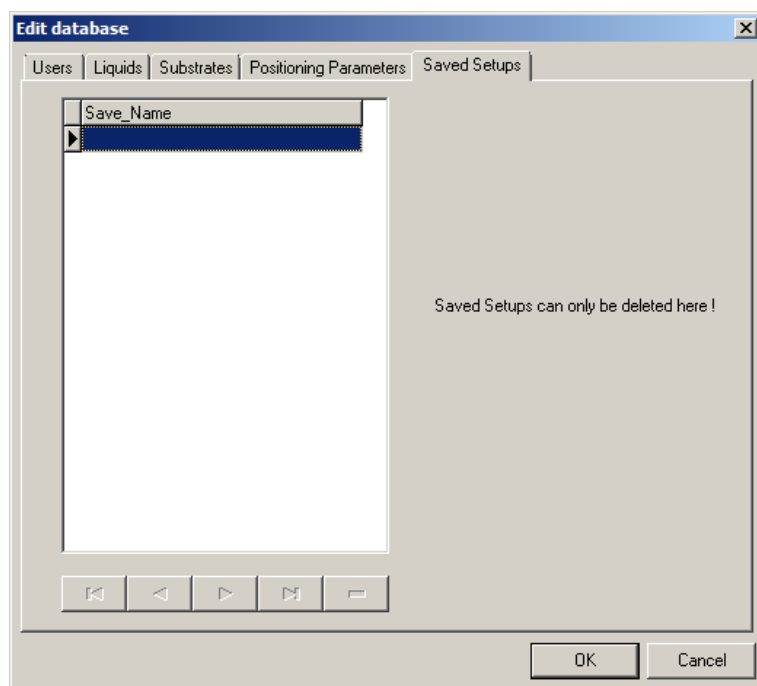
NB: If you delete an item from data base it will not delete data for that item from stored experimental records.

To make the parameter input faster and easier a pop-up window with graphical sketch opens from the question mark icon, . The window is shown below and it illustrates different dimensions required to make dipping experiment.





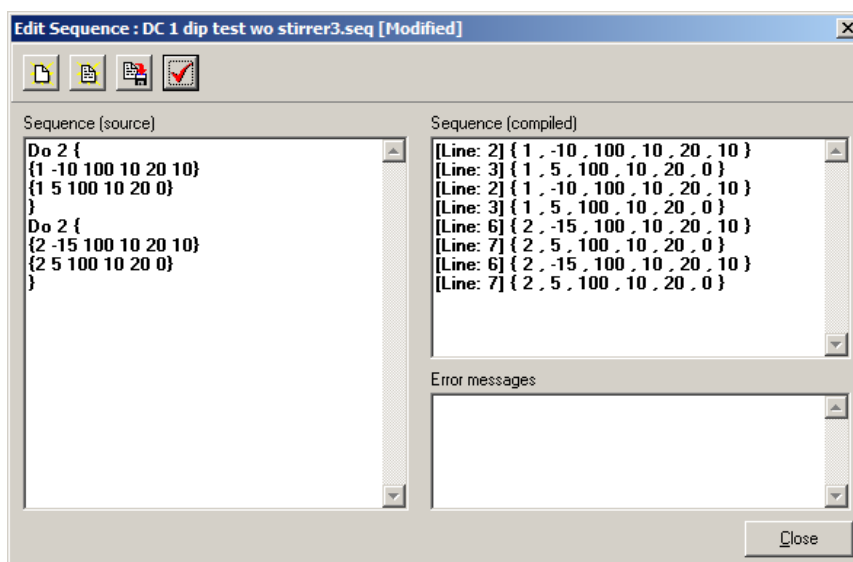
The page for editing **Saved Setups** should appear as follows:



This window allows managing Saved Setups.

D) Sequence

This is the section of the software where you define the sequence how you want the substrate to be immersed and withdrawn into and from one or several vessels. When you fill out the **Experimental Setup** prior to starting an experiment, you have to choose a sequence for every measurement. The last sequence used will be remembered by the software. When a new sequence needs to be added or altered you need to return to this section to make the desired changes. The programming of the syntax is really simple and no previous experience of programming is needed. When choosing **Edit Sequence** the following window should appear.



The functions of the buttons are as follows:



New Sequence: Clears all the fields and enables the preparation of a syntax for a new sequence.



Open a sequence: Opens a sequence that has been previously saved.



Save the sequence: Saves the current sequence to a user defined file.



Syntax check: Checks that the syntax for the sequence is correctly written.



The fields below these buttons have the following meaning.

Sequence (source): The syntax for the deposition sequence is written and edited in this field.

Sequence (compiled): After making a syntax check this field will show all the lines for the syntax that will be performed by the Dip Coater program.

Error messages: If the syntax has incorrect lines these will be displayed here while making the syntax check.

The programming language for making a sequence for deposition is really simple and is only based on a few parameters that have to be defined. In its simplest form the syntax for the deposition sequence is written so that every single line describes one immersion or withdrawal. Every line in the syntax has to begin with "{" and end with "}". The parameters that have to be known are:

- 1.Vessel Number.**
- 2.Depth of Immersion of the Substrate or Height of Withdrawal of the Substrate relative to the liquid surface.**
- 3.Speed of Immersion/Withdrawal of the Substrate.**
- 4.Speed of Stirrer relative to maximum speed during Immersion/Withdrawal.**
- 5.Time for the Substrate to be held Immersed or Withdrawn from the Vessel between the Depositions.**
- 6.Speed of Stirrer relative to maximum speed during the time sample is held still.**

The syntax for every single immersion or withdrawal is then written in the following form:

```
{Vessel_No Depth_of_Immersion/Withdrawal Speed_of_Immersion/Withdrawal  
Stirring_Speed_During_ Immersion/Withdrawal Time_Immersed/Withdrawn  
Stirring_Speed_During_ Time_Immersed/Withdrawn }
```

If the Dip Coater does not include magnetic stirrer the value can be set to 0 for both parameter 4. and for 6. in the sequence command which define the stirring speeds during the dipping.



Example 1. The substrate shall be immersed and withdrawn once into vessel 1. The first line includes parameters for the immersion of the sample. The depth of immersion of the substrate is 15 mm below the liquid surface (Top Level), the speed of immersion is 100 mm, the stirring speed is 30% from maximum speed during immersion, the time to be immersed is 20 seconds and the stirring speed is 10% from the maximum speed during the waiting time.

The second line includes parameters for the withdrawal of the sample. The height the substrate is withdrawn to is 5 mm above the liquid surface (Top Level), the speed of withdrawal is 100 mm/min, the stirring speed is 30% from maximum speed during withdrawal, the time to be kept there before the program stops is 20 seconds and the stirring speed is 0% from the maximum speed during the waiting time.

The resulting syntax should look as follows:

```
{1 -15 100 30 20 10}
```

```
{1 5 100 30 20 0}
```



Example 2. In order to do the deposition sequence in Example 1 multiple times (for example 20 times) you can use a DO command in the following way.

```
Do 20 {  
  
{1 -15 100 30 20 10}  
  
{1 5 100 30 20 10}  
  
}
```

Of course you can also immerse/withdraw the substrate in small portions at a time. It is not necessary to immerse/withdraw the substrate to its full length at once.

Example 3. The substrate shall be immersed in one vessel (vessel 1) quickly (speed: 170 mm/min) without stirring (stirring speed 0 %) in one sequence and kept immersed for 10 minutes without stirring (stirring speed 0 %). Thereafter, the substrate is withdrawn in two different steps of 5 mm to a depth of 10 and 5 mm with a speed of 170 mm/min without stirring (stirring speed 0 %) and the waiting period between each step will be 10 minutes without stirring (stirring speed 0 %). The substrate is then withdrawn with a speed of 170 mm/min to 5 mm above the liquid surface (Top Level) without stirring (stirring speed 0 %) and kept there for 20 seconds without stirring (stirring speed 0 %) before the program stops. The syntax for this operation should look as follows:

```
{1 -15 170 0 600 0}  
  
{1 -10 170 0 600 0}  
  
{1 -5 170 0 600 0}  
  
{1 5 170 0 20 0}
```

You can also immerse/withdraw your substrates into several vessels with all of KSV NIMA's Dip Coaters. Of course, with KSV NIMA Single vessel systems you have to change the vessel by hand, while with the KSV NIMA Multi Vessel systems you have the possibility to immerse/withdraw your substrate automatically into eight different vessels if needed.



Example 4. The substrate is first immersed and withdrawn in a cleaning solution (vessel 1) using for example the syntax in Example 2 with stirring speed of 70% (except at the withdrawal when sample is in air speed is 0%), then the substrate is put in a preparative solution (vessel 2) using for example a similar syntax as in Example 1, thereafter a gradient surface is prepared by using the syntax in Example 3. The whole syntax for this operation should then look as follows:

```
Do 20 {  
  
{1 -15 100 70 20 70}  
  
{1 5 100 70 20 0}  
  
}  
  
{2 -15 100 30 20 10}  
  
{2 5 100 30 20 0}  
  
{3 -15 170 0 600 0}  
  
{3 -10 170 0 600 0}  
  
{3 -5 170 0 600 0}  
  
{3 5 170 0 20 0}
```

This whole operation can then also be repeated for example 5 times by using the DO command in the following way:

```
Do 5 {  
  
Do 20 {  
  
{1 -15 100 70 20 70}  
  
{1 5 100 70 20 0}  
  
}  
  
{2 -15 100 30 20 10}  
  
{2 5 100 30 20 0}  
  
{3 -15 170 0 600 0}  
  
{3 -10 170 0 600 0}  
  
{3 -5 170 0 600 0}  
  
{3 5 170 0 20 0}  
  
}
```



E) Edit device parameters

In order to get the right readings during your experiments and not to drive your substrate in the bottom of the vessel you have to define some height parameters in your system. The parameters needed are defined in the following scheme.

The definitions are done by writing the requested values in the reserved fields in the **Device Parameters** window. By choosing **Edit** → **Device Parameters** under the **Dip Coater Control Software** the **Device Parameters** screen should appear as follows:

The fields and values have the following meaning:

F) Dipper Parameters

Zero level: Height between the upper edge of the substrate and the table (vessel bottom).

Threshold: User definable value for the height relative to the liquid level at which the deposition speed is changed to the requested value during immersion and withdrawal of the substrate.

Clip height: Height of the part of the sample holder that holds the sample substrate.

Clearance (only used with KSV NIMA Multi Vessel systems): User definable value for the height sample is lifted when the sample is moved from one vessel to another. This defined by the highest vessel edge to prevent the sample from hitting any of the vessel edges.




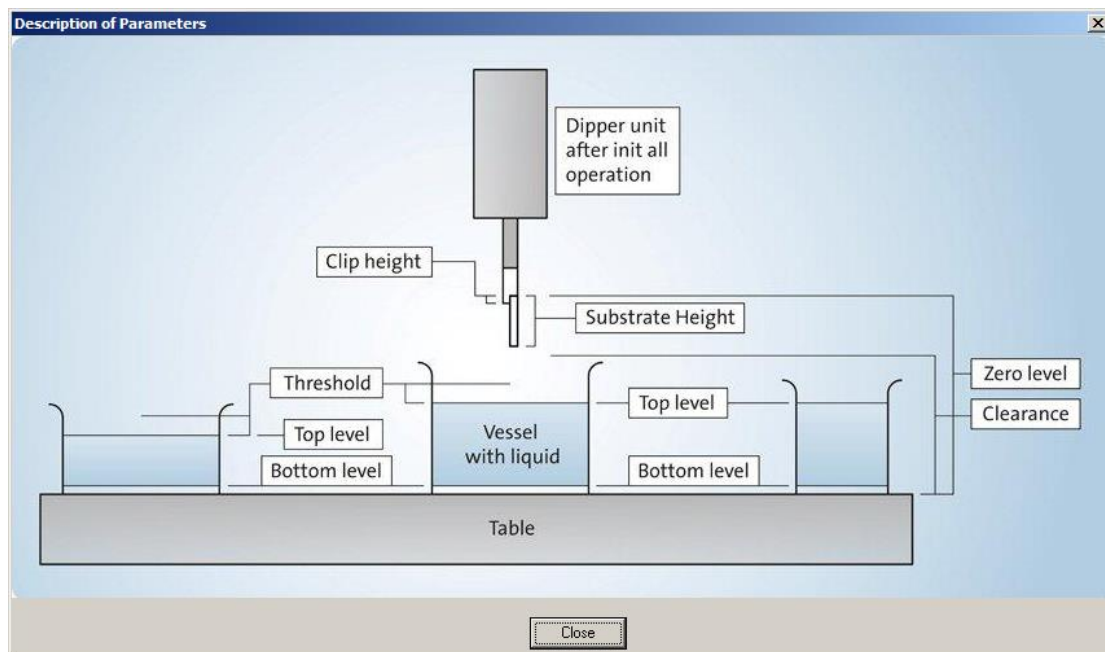
Vessel locations (only used with KSV NIMA Multi Vessel systems): position of liquid vessel measured from the **X-zero** position of the **Dipper Unit** attached to the **Drive Belt System**. The zero position of the **Dipper Unit** is automatically defined when performing the **Init All** operation. This zero position is when the **Dipper Unit** is at the far left edge of the **Drive Belt System**.

G) Vessel level

Top level: Height of the liquid surface from the table (vessel bottom).

Bottom level: Height of the vessel bottom from the table.

To make the parameter input faster and easier a pop-up window with graphical sketch opens from the question mark icon, . The window is shown below and it illustrates different dimensions required to make dipping experiment.

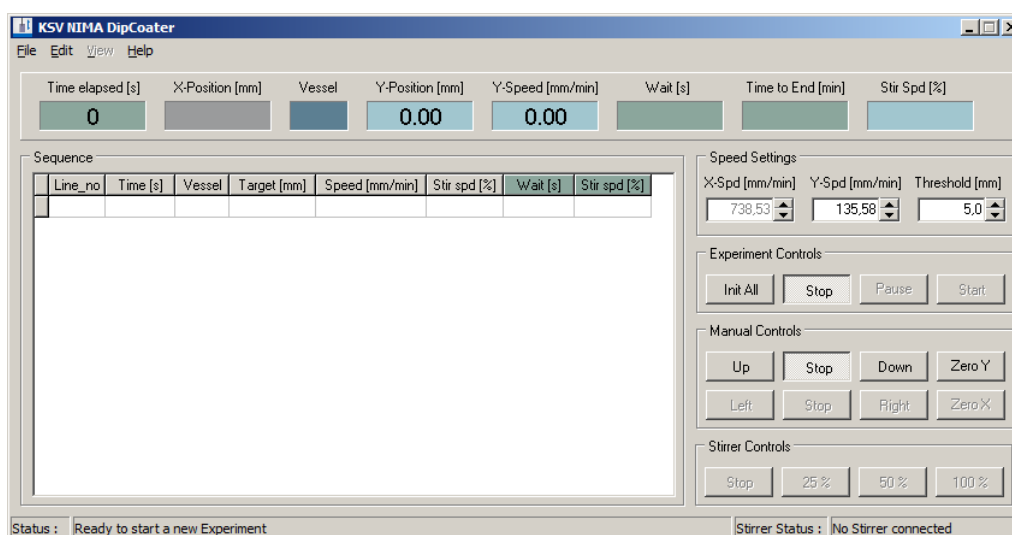


5 Running an Experiment

This section describes the procedure of performing an experiment with the **KSV NIMA Dip Coater** instrument.

To perform an experiment with your **KSV NIMA Dip Coater** instrument you must first prepare your physical setup and software as described previously. Then choose **Start** → **Programs** → **Dip Coater** → **sgserver.exe** to start the main program. Choose **Experiment** →

Dip Coater Control Software of press . A similar window as below should appear.



Press the **Init All** button under **Experiment Controls** and wait until the **Dipper** (and **Drive Belt System** with **KSV NIMA Multi Vessel systems**) stops moving. Fill in wanted values in the **Y-spd** and **Threshold** fields. The **Start** button under **Experimental controls** becomes active after the **Experimental setup** has been filled.

Choose **File** → **New Experiment**. Fill in the **Experimental Setup** and press **Start**.

Experimental setup: For each new experiment you will fill in appropriate field values. Some of the fields are required for proper performance of the experiment. Other fields are required for the calculation of values subsequent to the experiment. Other fields are not required for performance or calculations but may be included as part of the record of the experiment. You do not need to fill all fields. If you try to start an experiment but have not filled in a necessary field, the software will not allow you to start and will prompt you to fill in required data.

There are two ways to enter information in the fields. You can use information stored in Data Base by using drop down menu beside each field. If you would like to use values, which are not available from drop down menu then you should click on Edit Data Base and enter data. This data will now become part of drop down menu selections.



Alternately you may simply click on the field and enter new data. These data will be used for your experiment but not stored as selections in your Data Base.

The Experimental setup screen should appear as follows:

Experimental Setup

Select Saved Experimental Setup
Selection :

Name : User : Date : 27/02/2012 09:29:33

Substrate
Name :
Height : mm MW :
Density : g/cm³ Sfe : mN/m

Comments


Positioning Parameters [mm]
Name : Zero level Threshold Clip height Clearance

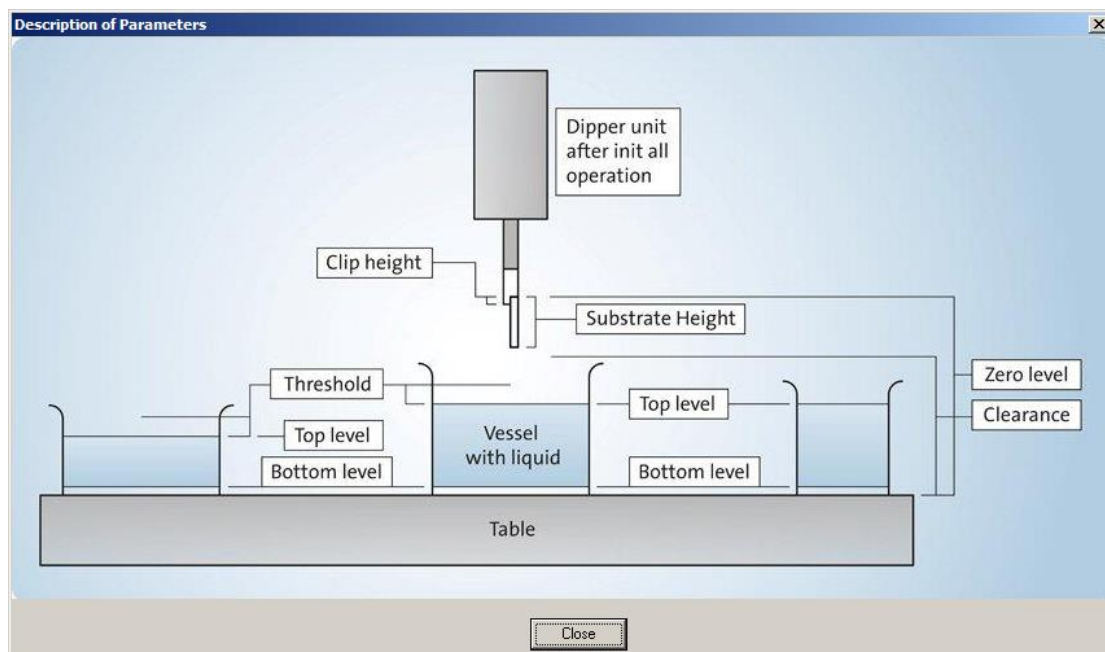
Liquids

Name :	T [C]	pH	Top [mm]	Bottom [mm]
Vessel 1 : <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Vessel 2 : <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Vessel 3 : <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Vessel 4 : <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Vessel 5 : <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Vessel 6 : <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Vessel 7 : <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Vessel 8 : <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Sequence ? Start Cancel Edit Data Base Save

To make the parameter input faster and easier a pop-up window with graphical sketch

opens from the question mark icon, . The window is shown below and it illustrates different dimensions required to make dipping experiment.



The definitions of the fields are as follows:

Name: Title of experiment.

User: Name of user.

Date: Date of experiment.

Substrates: The fields under this heading refer to the substrate used for deposition. See ***Edit Data Base*** for details on field definitions.

Comments: Space reserved for any additional notes to be added to the record.

Liquids*: The fields under this heading refer to the liquid(s) used in the vessel(s). See ***Edit Data Base*** for details on field definitions.

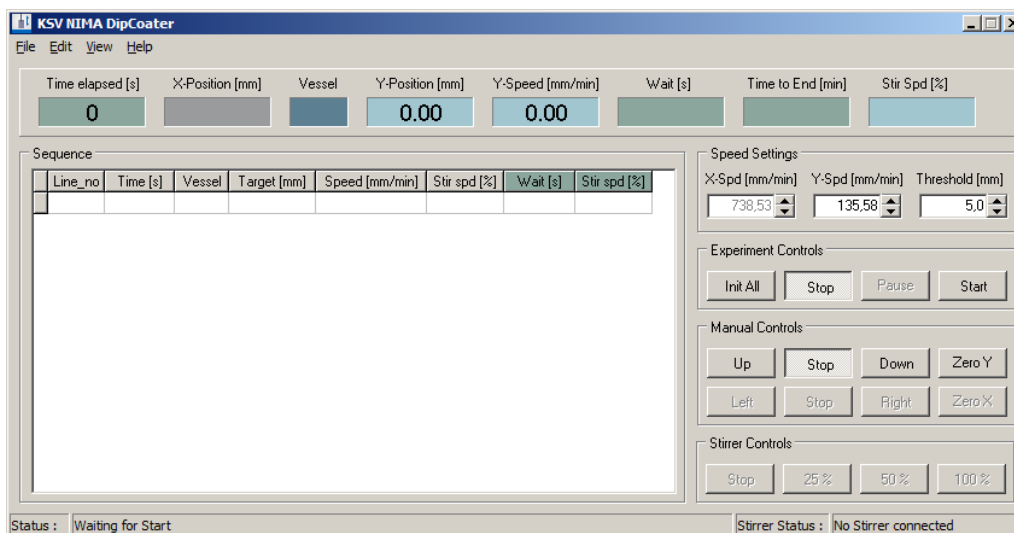
Sequence: Syntax used for performing the experiment.

Start: Starts experiment.

Cancel: Cancels experiment.

Edit Database: Allows user to edit menu of choices available to fill in fields in the ***Experimental setup***.

After pressing **Start** in the ***Experimental Setup*** the ***Dip Coater Screen*** should appear as below:

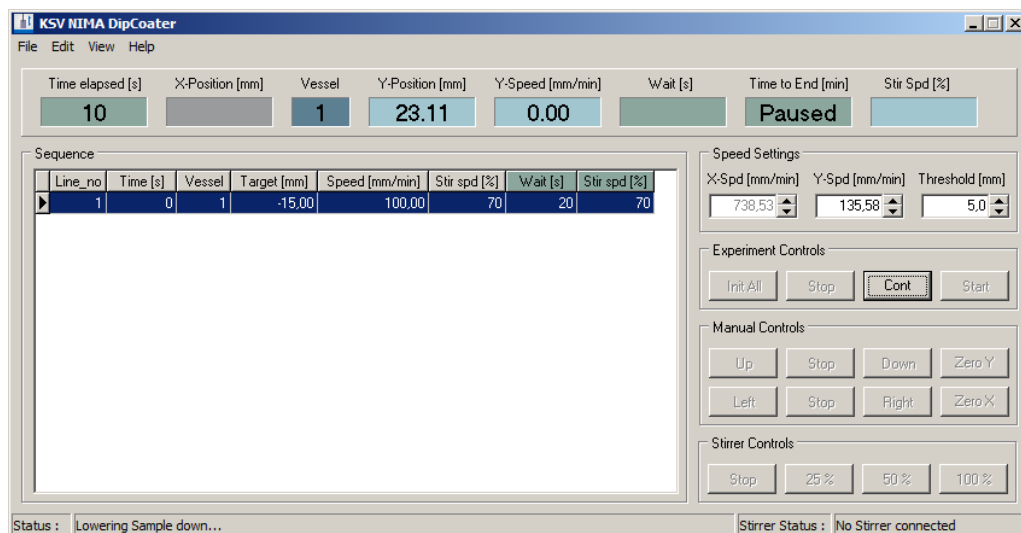


Line_no	Time [s]	Vessel	Target [mm]	Speed [mm/min]	Stir spd [%]	Wait [s]	Stir spd [%]

Press **Start** under Experiment controls. The deposition experiment is now performed automatically to completion



In order to pause the experiment press **Pause** under **Experiment controls**, to continue press the same button again (**Cont**).



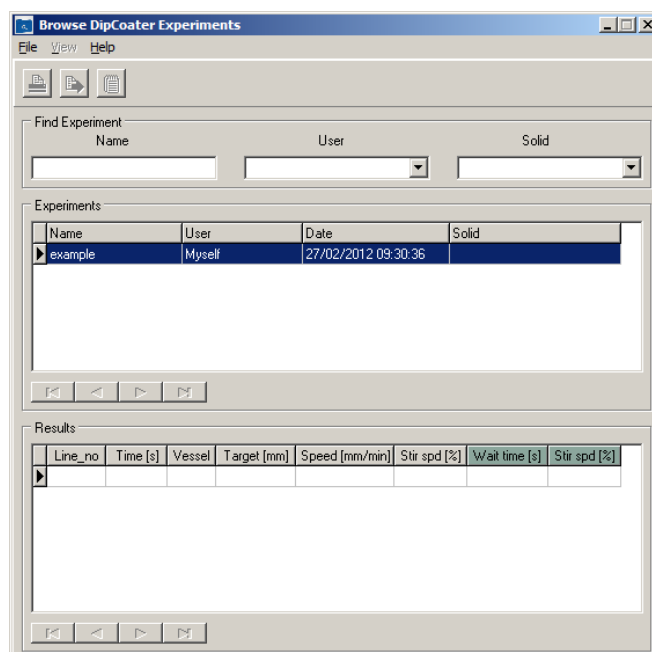
The experiment can be stopped if wanted by pressing the **Stop** button under **Experiment controls**.

To quit the Dip Coater Control Software choose **File** → **Exit**.

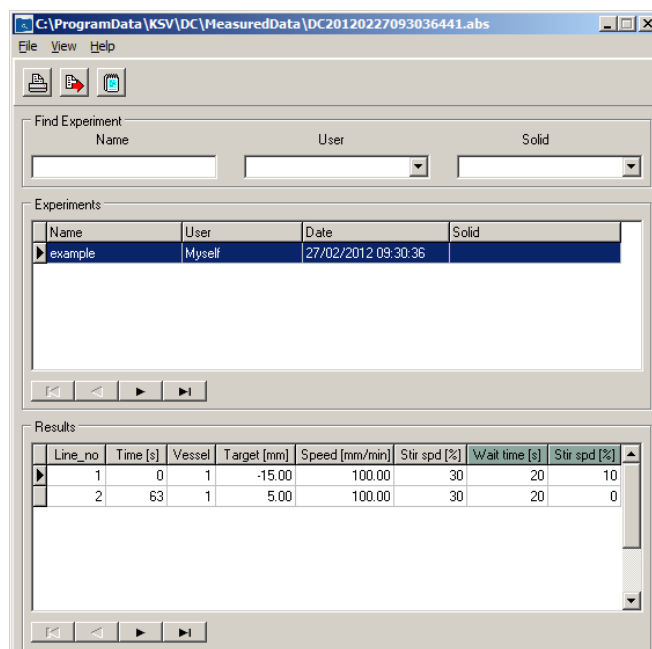
5.1 Browse experiments

This is the section of the software where you will find stored data from the experiments. Experiments are selected for viewing based on input search parameters. After the desired experiment is selected, the data is shown. You can view and edit the **Experimental setup**, **Print reports**, and **Copy the data to the Windows clipboard**.

The **Browse Dip Coater Experiments Screen** should appear as follows:



After double clicking with left mouse button the measurement line highlighted in dark blue the measurement data appears and icons become active.



The Menu across the top bar includes:

File: → **Delete Experiment**: Deletes experiment from files.

File: → **Delete record**: Deletes data point selected.

File: → **Copy Data to Clipboard**: Copies data to the Windows clipboard for export.

File: → **Print**: Prints report of experiment.

File: → **Exit**: Closes window.

View: → **Experimental Setup**: View experimental setup.

The following icons are found at the top of the screen:



Print Icon: Print report of selected data.



Copy Data Icon: Copies data to the Windows clipboard for export.



Experimental Setup Icon: View/Edit Experimental Setup.



Directly below these icons you will find:

The image shows a search interface titled "Find Experiment". It contains three input fields: "Name", "User", and "Solid". Each field has a text input area and a dropdown arrow on the right side. The "Name" field is a simple text box. The "User" and "Solid" fields have dropdown arrows, indicating they are used to select from a list of options.

Find Experiment: This is the search engine for your data files, it can be used to find any experiment recorded. The search responds by finding all files, which meet the entered parameters. Searches may be as broad or narrow as desired. For example, you may search for all experiments performed by a certain user, or more specifically for all experiments using Mica as a solid substrate.

Search fields: **Name**, **User**, **Solid**. The list of experiments which fit the search parameters will appear below.

1. Use the scroll buttons to find the desired experiment from the results of the search.
2. Highlight the desired experiment by left clicking mouse. The results will appear in the table directly below.

The table represents the results for the experiment. The columns for the table are assigned as follows:

Line no: Number assigned to data point.

Time[s]: Time at which data point was taken.

Vessel: Vessel into/from which the current immersion/withdrawal is made.

Target: Target depth of the lower edge of the substrate during the current immersion/withdrawal.

Speed: Speed of the dipper arm during the current immersion/withdrawal.

Wait: Delay in seconds of the substrate at the target position of the current immersion/withdrawal.

6 Technical specifications

Input voltage	100 - 240 VAC (Single Vessel Dip Coater Small)
	85 - 264 VAC / 120 - 300 VDC (all others)
Input frequency	47 – 440 Hz
Input current	1A (max) @ 115 VAC
Maximum power consumption	20 W (Single Vessel Small)
	40 W (all others)
Dimensions	275 x 154 x 420 mm (Single Vessel Small)
	490 x 410 x 1200 mm (Single Vessel Medium)
	490 x 410 x 1800 mm (Single Vessel Large)
	690 x 606 x 2650 mm (Single Vessel Extra Large)
	330 x 330 x 341 mm (Multi Vessel Small)
	1210 x 510 x 1200 mm (Multi Vessel Medium)
Weights	1210 x 510 x 1800 mm (Multi Vessel Large)
	4 kg (Single Vessel Small)
	11 kg (Single Vessel Medium) + 3 kg (Interface Unit)
Cleaning and maintenance	7 kg (Multi Vessel Small) + 3 kg (Interface Unit)
	No special procedures required



7 Contact Information

If any problems arise please feel free to contact a local distributor or KSV NIMA directly.

KSV NIMA can be contacted from this address:

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Local distributors are listed at our website, **www.ksvnima.com**.