SPR-2 Maintenance Manual

1 Liquid Handling Maintenance

1.1 Background

If the system has been idle for an extended period of time or has been used for crudes sample analysis it is best to fully clean it prior to use. The process consists mainly of flushing and soaking the system with one or more different cleaning solutions. There are two reasons for cleaning the fluidics of the system, get the dirty out (desorb) and to slow the growth of new dirt (sanitize).

A desorb procedure should be run after usage of the system. System sanitizaton is required every couple of month.

Important:

The system <u>must be</u> flushed with water after usage! Ideally a desorb routine should be performed to decontaminate the system's fluidic system.

1.2 Solution descriptions

1. **Desorb solution #1** - 0.5% (w/v) Sodium dodecyl sulphate (SDS) in DI-water
    a. A variety of other detergents would also work
2. **Desorb solution #2** – 50mM Glycine pH 9.5 in DI-water
3. **Sanitize solution** – 1% sodium hypochlorite (bleach) in DI-water
4. **70% Ethanol** – 70% in DI-water

All solution must be clean and/or must be filtered before use.

1.3 Desorb Routine

<u>Schedule: once a week and/or after assay work has been completed</u>

This process is done to remove protein and dirt build up within microfluidics.

1. Prime system with Desorb soln. #1
    a. *Note: **priming** the system means to pass the equivalent of 4x the total liquid volume of the system through the entire system fluidics.*
2. Soak system with Desorb soln. #1
    a. Note: Soaking the system mean to have the soak solution in the entire fluidics system for a period of no less than 10 minutes. In cases where the system is very dirty the soak can be longer
3. Prime system with Desorb Soln. #2
4. Soak system with Desorb Soln. #2
5. Prime system with DI-water or Buffer

***Note**: Use the "**Desorb**" command from the maintenance menu to perform these flushes; (the "Flush" command is a fast version of prime and should not be used for thorough cleaning)*

1.4 Sanitize

Schedule: once a month and/or after bacterial assay work has been performed

This process is performed mainly to kill any bacteria that might be in the instrument. It's role is to minimize dirt build up in the system. This process is recommended if the instrument has sat idle for an extended period of time (weeks).

1. Flush system with Sanitize solution

2. Extended soak of system with Sanitize soln. - let system sit with solution in all fluidic channels for 45 minutes

3. Flush with DI-water

1.5 Alcohol Flush

Schedule: optional on requirement

This process is similar to the desorb cleaning but will work better for certain kinds of dirt build up. It is normally performed in lieu of, or in some cases in addition to the desorb process. It is good to do this routine when air bubble build up is occurring in the microfluidics and flow cell.

1. Flush system with 70% Ethanol solution

2. Soak system with 70% Ethanol solution

3. Flush system with DI-water

1.6 Hot water Flush

Schedule: optional on requirement

If the system has been idle for a long period of time, or was allowed to 'dry out' with buffer or some other high salt content solution in the fluidics, flushing with hot water could be helpful. This process should be done before the desorb process.

1. Flush system with hot water
   a. Note: Hot does not mean boiling – just to the point where you can hold you hand under the faucet for a few second.
2. Flush system with DI-water

2 Sample Pickup Unit

The sample pickup unit is a 3-axis unit:

- Needle arm ("*Needle*")
  Moves the needle up and down

- Carousel angle ("*Carousel*")
  Rotates the carousel

- Carousel position ("*Position*")
  Moves the carousel translational between the various pickup positions and the washing station.

For each of these stepper motors certain configuration settings can be altered to match the physical dimensions of the sample pickup configuration.

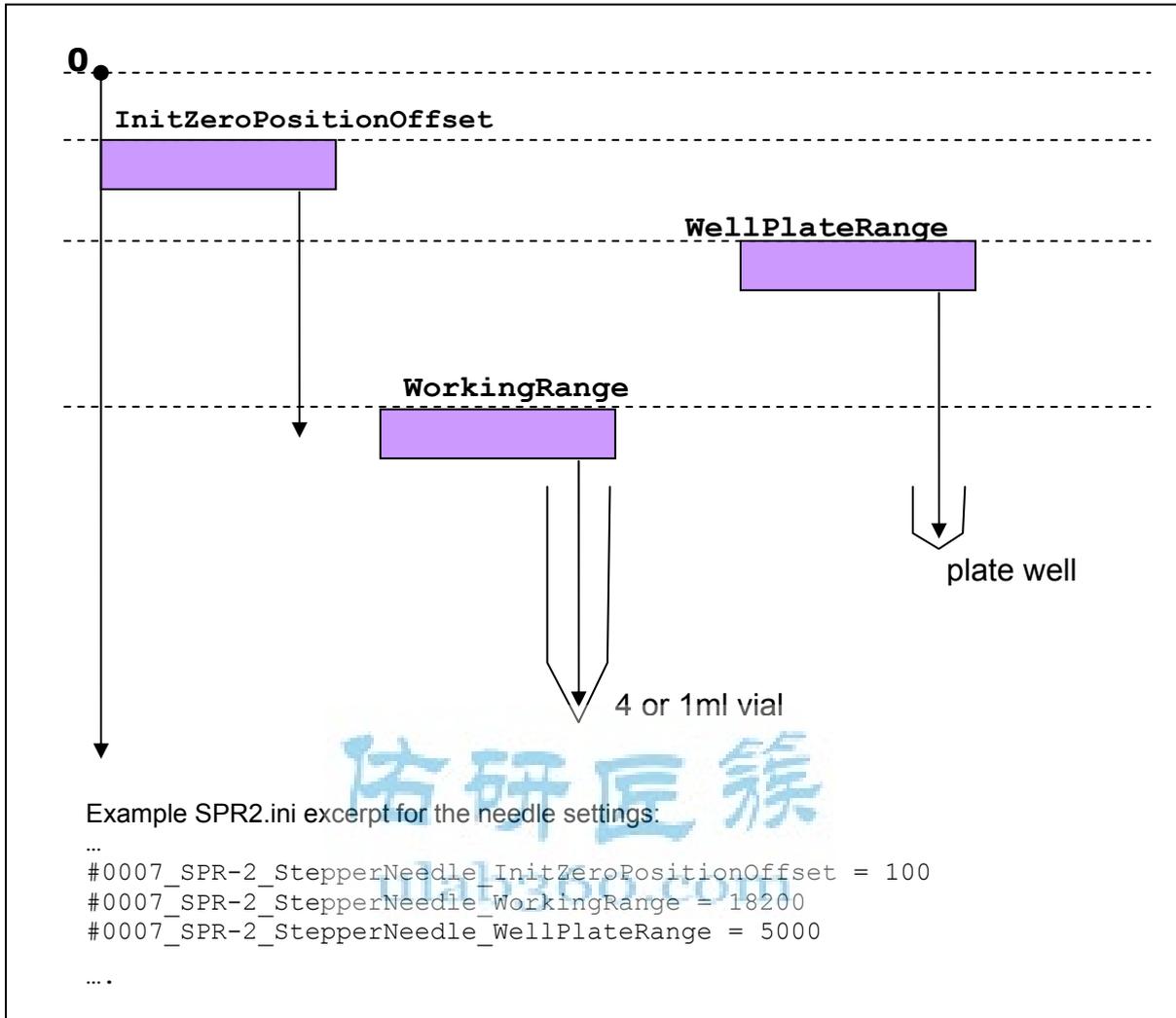Each stepper motor is configured through 2 main parameters:

1. **InitZeroPositionOffset**
   Defines the reset "0" position is stepper motor steps.

2. **WorkingRange**
   Defines the working range for that motor; as an example this parameter defines the distance in stepper motor units the needle need to travel from the reset position to the bottom of the well

3. **WellPlateRange** (only for the needle unit)
   Same as above, but for the well plate depth

All parameters can be changed in the SPR2.ini file. The software needs to be restarted to enable the new settings. Certain parameters can be calculated when running the stepper unit individually through he debug interface.

2.1 Needle Height Adjustment

The most likely adjustment is for the needle after maintenance or needle replacement.
Figure 1 illustrates the needle parameters which are defined in the SPR2.ini file.


```
Example SPR2.ini excerpt for the needle settings:
…
#0007_SPR-2_StepperNeedle_InitZeroPositionOffset = 100
#0007_SPR-2_StepperNeedle_WorkingRange = 18200
#0007_SPR-2_StepperNeedle_WellPlateRange = 5000
….
```

**Figure 1: Pickup needle unit; the main stepper motor parameters illustrated; an
example SPR2.ini excerpt is shown at the bottom**

To find out the right parameters the needle postion could be set manually through the
low level scripting interface which is accessible in the advance user mode. Start with a
clear script and add the "Stepper Position" command from the command selection. Then
choose "Needle" for the "Name".

Notes:

   **Always make sure, the needle is in
   the top position when done!**

   **1mm needle movement correspond
   to ~350 steps**
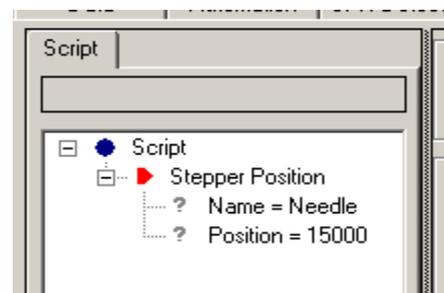
**Figure 2: Scripting snippet to
control the needle position**

3   Revision History:

Ver. 1-99	Issue [A-Z]	Description of Change	Date	Author
1		Core System Cleaning Routines	15/1/08	CW
2		SPR-2 update	18/3/10	KW
3		Stepper config added	20/6/10	KW