SciLog®

The Smart Pump Company

Start-up: "Dispensing by Weight"

Equipment: You will need the following items to get started:

SciLog P/N	***Description***	***Quantity***
400-480 or 490	10 or 20 liter ADS Carboy	1 pc
Or	Appropriate Solution Reservoir	1 pc
100-1682	LabTec CP-200 w/1082 Head	1 pc
100-2100B	Ohaus Balance	1 pc
400-420	Stand and Clamps	1 set
400-124	Silicone #24 Tubing "Masterflex"	25 ft (1 pkg)
400-491A	Dispensing Tips	1 pkg
Or		
400-450	Sartobran 300 Filter & Bell (needs a larger clamp)	1 pkg

Hardware Setup:

1. Unpack all the components, visually identify and inspect for damage.

2. At the dispensing station, place the ADS carboy (ADS = Automated Dispensing Station) to the far left, the LabTec to its right and the balance with the stand and clamps to the right of the LabTec. Position the dispensing tip over the appropriately sized container.

3. Connect the interface cable between the LabTec and the balance paying close attention to the labels on the cable and those on the rear of the LabTec. The "**Pump**" end of the cable is plugged into the connector on the LabTec labeled "**Balance**". The "**Balance**" end of the cable plugs into the connector on the rear of the balance. (The cable may ship attached to the balance already, and if so, simply attach it to the LabTec.)

4. Plug in and power up both units, preferably the balance first.

5. Cut approximately 10 feet of the #24 tubing and install the dispensing tip or filter on one end. Mount that end of the tubing in the clamp stand and position it so that it is just above the container. Fasten the tubing to the upright of the clamp stand with a cable tie or twist tie to stabilize it.

6. Route the tubing to the LabTec, open the head by rotating the lever 180 degrees counter clockwise, and place the tubing over the upper set of rollers. Confirm that the tubing is under the centering springs and close the head by rotating the lever back to its original position.

7. Route the remaining tubing to the ADS carboy and attach it to the appropriate connector.

NOTE: If you purchased the LabTec with your aliquot sizes preprogrammed by SciLog, there will be a sticker on the unit explaining which Exec (1-5) program has been assigned to the aliquots. If you purchased both the LabTec and the balance from SciLog, all the settings for both units have been configured. If the display shows "Scale Error, Press any key" after trying to initialize the scale, check Setup: Scale: Scale Manuf., and confirm the proper choice for the balance you have purchased. If the scale was not purchased from SciLog, refer to the LabTec Manual, Section 7.10 or the addendum for instructions for setting up your scale.

Program Editing and Execution:

1. At this point, you need to consider the parameters of the dispensing that you are going to do. The following is a list of the various parameters available, and their defaults. Adjust these parameters based on the weight that you are dispensing. Consult Section 3.0, Pages B14 & B15 of the LabTec Manual to edit your weight dispensing parameters.

   DISP. WEIGHT: Defines the weight to be dispensed in grams. For example, if you want to dispense 50.00 grams, use the "**Incr**" and "**Decr**" keys to scroll to 50.00 and press "**Select**". (The default Disp. Weght =100.00gm)

   SNIFFLE: The sniffle function consists of a brief pump reversal at the end of the dispensing cycle to suck in the droplet that typically hangs at the end of the dispensing tip. It also will relieve the pressure on a filter if you are using one so that it does not drip. Select Sniffle=0.3 (The default Sniffle = 0.0)

   SLOW FACTOR: Defines the solution weight that is dispensed slowly at the end of the dispensing cycle to allow for stabilization of the scale. This should be 10-15% of the total weight if the aliquot is less than 50 gm. For aliquots larger that 50 gm, the default of 25 gm will usually work well. This can be adjusted based on the pump rate and the tubing size to avoid overshooting the target weight. (The default Slow Factor=25gm)

   PUMP DIRECTION: Defines the rotation of the pump head, this parameter can be changed from clock-wise (CW) to counter clock-wise (CCW). (Default = CW)

   PUMP RATE: Defines the relative pump speed (0% to 100%) with which the solution is being dispensed. The default Pump Rate = 80%. This may be adjusted as needed, Slower pump rates may be desirable to increase accuracy and minimize back-splashing.

   TIME DELAY: Defines the time interval, in seconds, between dispensing cycles. (Default = 00.01)

   COUNT: Defines how often the dispensing cycle will be repeated. For example, when COUNT = 10, then the selected Dispense Weight will be dispensed 10 times. (Default = 1)

1. For this example, set a dispense weight of 200.00 gm. From the Mode Select screen, use "**A**" or "**B**" to go up or down to the "**Weight**" mode, and Press "**C**" to select it. The Weight mode will give you the following display:

- WEIGHT DISPENSE -		
Exec	**Edit**	**Prime**
A	**B**	**C**

2. Press "**C**" momentarily to prime the tubing and remove all the air from the system. Then press "**B**" to enter the Edit Menu, and "**C**" to select Edit 1.

- EDIT 1 -		
Up	**Down**	**Select**
A	**B**	**C**

3. Press "**C**" again to select "**DISP WEIGHT**". Use the "**A**" key to increase the selected weight to 200.00 ml. Then press "**C**" to select.

WEIGHT		**200.00gm**
Inc	**Decr**	**Select**
A	**B**	**C**

4. Next, use the "**A**" and "**B**" keys again to scroll to "**SNIFFLE**" and press "**C**" to select. Use the "**A**" key to increase this to 0.3, and press "**C**" to select.

SNIFFLE:		**0.3**
Inc	**Decr**	**Select**
A	**B**	**C**

5. All other parameters will be left at their defaults. Press the "**EXIT**" key to return to the "**Weight**" screen and Press the "**Exec**" key, this will show the Exec program that matches the Edit program you were just in. Continuing with this example, press "**C**" to select, and the LabTec will initialize the balance and show the following display:

WEIGHT SET:	**200.00G**
Press RUN when Ready	

Press the "**RUN**" key, or the Foot Switch if you are using one, and the LabTec will Tare the balance, dispense 200.00 gm, and show the following screen:

DW=199.95gm	**FINISH**
CW= 199.9gm	**ID=001**

Where **DW**=Dispensed Weight, **CW**=Cumulative Weight, and **ID**=Sample # for the weight dispensed, which will increment by one for each occurrence. The display will then alternate between this screen and the one before it. Continue pressing the "**RUN**" key until you have finished dispensing the needed number of aliquots.

Documentation:

The LabTec will output data to a printer or a PC at periodic intervals for archival purposes. The following is an example of that data, and an explanation of the abbreviations used.

LabTec: EXEC 17: WEIGHT SET=100.00; COUNT= 1; RATE=100.0%; DATE_____
ID= 1; DW= 100.02; CW= 100; ST=FINISH;
ID= 2; DW= 100.00; CW= 200; ST=FINISH;

ID= 3;	DW= 100.09;	CW= 300;	ST=FINISH;
ID= 4;	DW= 100.07;	CW= 400;	ST=FINISH;
ID= 5'	DW= 55.00;	CW= 455;	ST= STOP:

ID=Sample #, DW=Dispensed Weight, CW=Cumulative Weight, ST=STATUS
NOTE: The LabTec will print at the end of each dispense, and immediately if the STOP key is pressed during a run.

The following chart shows tubing dimensions and the available flow rates based on tubing, pump head and motor size choices:

MasterFlex Tubing	**13**	**14**	**16**	**25**	**17**	**18**	**15**	**24**	**35**
Tubing ID*: in	0.030	0.060	0.125	0.190	0.250	0.310	0.190	0.250	0.310
Tubing OD*: in	0.157	0.189	0.251	0.314	0.376	0.439	0.376	0.439	0.500
Tubing Wall*: in	0.063	0.063	0.063	0.063	0.063	0.063	0.093	0.093	0.093
Pump Rate Range*:	ml/min	ml/min	ml/min	ml/min	ml/min	ml/min	ml/min	ml/min	ml/min
CP-8 8RPM	0.03 - 0.45	0.10 -1.63	0.43-6.38	0.9 - 12.6	1.14 -18.3	1.7 - 24.3	0.45 – 13	0.65 – 20	0.8 - 32
CP-120 160RPM	0.5 - 10	1.7 - 35.2	6.3 - 129	12.5 - 283	18.5 - 405	24.7 - 554	9 – 260	13 – 435	16 – 650
CP-200 600RPM	2 - 34	8.6- 132	29 - 533	49 -974	70 - 1048	103 - 1515	59-993	85-1348	111 - 2258
* Nominal Values									
Pump Head Model:	**TANDEM 1081**						**TANDEM 1082**		

CAUTION: The following may affect your accuracy, and should be considered:

1) SciLog suggests you use #15 or 24 tubing, and move the portion inside the pump 3-4 inches toward the discharge side of the pump periodically to avoid excessive wear. #35 tubing will allow you to pump at higher flow rates, but a larger slow factor should be implemented.
2) **Sniffle Factor**. This is a parameter that can be adjusted to minimize the drips that occur after dispensing, thereby eliminating overruns. These procedures suggest an initial factor of 0.3. If you are using a filter, this may need to be increased as the filter becomes plugged.
3) **Slow Factor and Pump Rate**. These parameters can be optimized further depending upon your specific application. The Slow Factor should be set to 25gm for most aliquots, and adjusted up or down based on aliquot size and scale response time. Increasing it beyond 40gm will just slow down your dispense times without a corresponding increase in accuracy. Decreasing the Pump Rate will help if the default of 80% is causing too much backsplash that can't be eliminated in some other manner, or if the dispense weight is small.
4) When executing the "**Weight Dispense**" cycle, the pump begins at the specified pump rate. The LabTec will slow down during the last 25 gm (as defined by the "**Slow Factor**") to avoid overshooting the target weight. After dispensing 98% of the target weight, the LabTec stops momentarily. At this point, the balance will reach a steady state, and the LabTec will calculate the precise amount needed to reach the target weight. If the LabTec does not stop at the 98% of target weight point, it will have overshot the target weight. Either increase the "**Slow Factor**", or decrease the chosen "**Pump Rate**" so that the pump performs in this manner.

SciLog recommends a factory cleaning, testing and recalibration be done to your Smart Pump at least once a year, to maintain the accuracy of the unit and reduce your downtime. SciLog also has loaner units available you can rent if you need to keep production running while SciLog is performing maintenance on your pump. Call us at 800-955-1993 for an RGA and arrange for a loaner if needed. If you have a large number of units, call us, and we can design a preventative maintenance program specifically for your company.