PLEASE READ THE FOLLOWING INSTRUCTIONS BEFORE INSTALLATION

QUICK START WS-650
INSTALLATION INSTRUCTIONS

> ➢ If any parts are missing, contact the factory immediately. Claims for missing parts must be made within 30 days of shipment.

Documentation CD

Please Note: The documentation CD contains all operation manuals, quick start installation instructions, programming worksheets, a list of popular options and Spin 3000 software.

If an option was ordered such as an Alignment Tool, Foot Switch, Liner, Universal Dispense Valve (UD), Downflow Exhaust, Manual EBR, High Porosity Chuck, Programmable Exhaust, etc… please check this folder for your option(s).

<u>WS-650 SPIN PROCESSOR INCLUDES:</u>

- ➢ 10' (3m) of ⅜" (9.5mm) polyethylene vacuum tubing with spare ⅜" x ¼" (6.35mm) vacuum fitting.
- ➢ 10' of ¼" polyethylene tubing for CDA / N2 Seal Purge
- ➢ 1.75" (45mm) Wafer Chuck for 50 – 150mm substrates (23 and 8NPP/TFM models only)
- ➢ Wafer Fragment Adapter for 10 - 50mm substrate fragments (23 and 8NPP/TFM models only)
  - ➢ Package of spare Viton o-rings for chucks and adapters for acids and toluene
  - ➢ Package of spare EPDM o-rings for chucks and adapters for solvents
- ➢ "Bull's Eye" Level
- ➢ Document CD with Spin 3000 Software
- ➢ Drain reservoir connector and two (2) 250ml polypropylene drain catch cups with 5' (1.5m) of 0.5" (12.7mm) chemically resistant Tygon exhaust tubing.
- ➢ 5' (1.5m)of 1" (25.4mm) FEP Teflon drain tubing & drain connector with 3/16" (4.8mm) Allen wrench to tighten set screw drain connector (optional)

REAR VIEW
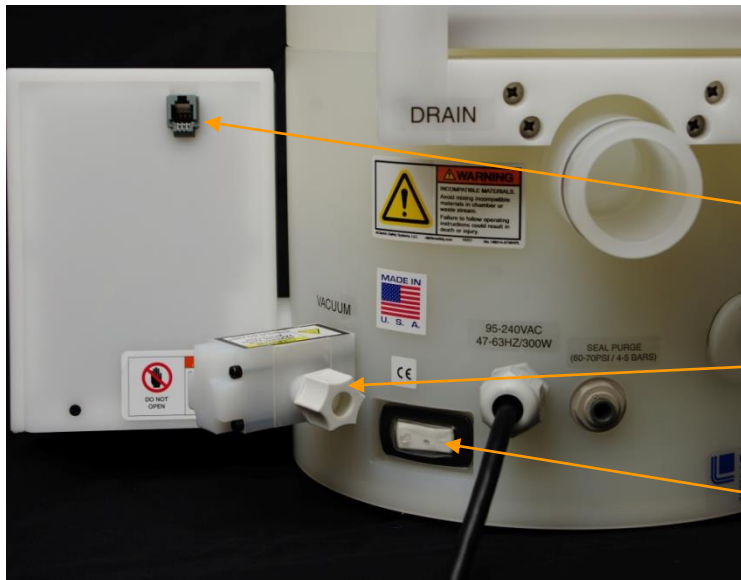
- ➢ Drain Port

- ➢ Seal Purge Gas Pressure – CDA or N2 (60 – 70 psig) (4.1 – 4.9 bar) **REQUIRED FOR OPERATION**

- ➢ Backpack Connector Cover for Future Valve Expansion

- ➢ Power Cord – Plug Cord into the appropriate power source

- ➢ **SEE SECTION 2 IN MANUAL FOR COMPLETE INSTALLATION INSTRUCTIONS**

- ➢ Spin 3000 Cable Connector for non-Blue Tooth processors

- ➢ Pneumatic Vacuum Valve and Compression Fitting Connection

- ➢ Circuit Breaker with On / Off Capability

INSTALL SEAL PURGE TUBING
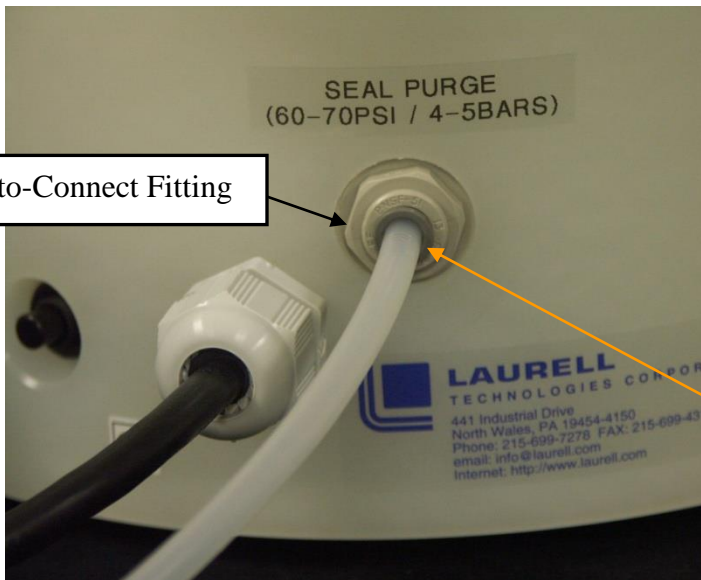
- ➢ Cut the end of tubing squarely, using a razor blade or tube cutter. Install the ¼" O.D. tubing by inserting the tubing into the Seal Purge push-to-connect fitting. Push in until the tubing seats completely.
- ➢ Connect the other end of the tubing to a 60 – 70psig CDA or N2 supply.

- ➢ **THE SEAL PURGE PRESSURE MUST BE PRESENT FOR THE PROCESSOR TO OPERATE.**

- ➢ **DO NOT OVERPRESSURIZE THE PROCESSOR OR INTERNAL DAMAGE MAY OCCUR.**
  Maximum pressure should never exceed 90psig (6.2bar).

- ➢ A "Need CDA" error will appear in the run mode on the 650 controller display if the ~60psig requirement is not met.
- ➢ To remove tubing, turn off the pressure source. With the pressure at 0psig, press in tubing and the *inner collar* at the same time then pull back on the tubing.

Push-to-Connect Fitting

Note: CDA (clean dry air) must be clean and dry.
Particulates and moisture can clog or corrode small internal orifices within the processor.
Air compressors must have output filters to capture particles, moisture and hydrocarbons.
Particle filters should be <100um. A desiccate type filter can be used to remove moisture and hydrocarbons. As a guide SEMI standard F29 for CDA is "air filtered to 0.02um and dried to a dew point of at least -80C".

SEAL PURGE SCHEMATIC

WAFER

PROCESS CHAMBER

DRAIN OUTPUT

CDA/N$_2$ INPUT[2]

DRIVE SHAFT

KEY

GAS

LIQUID
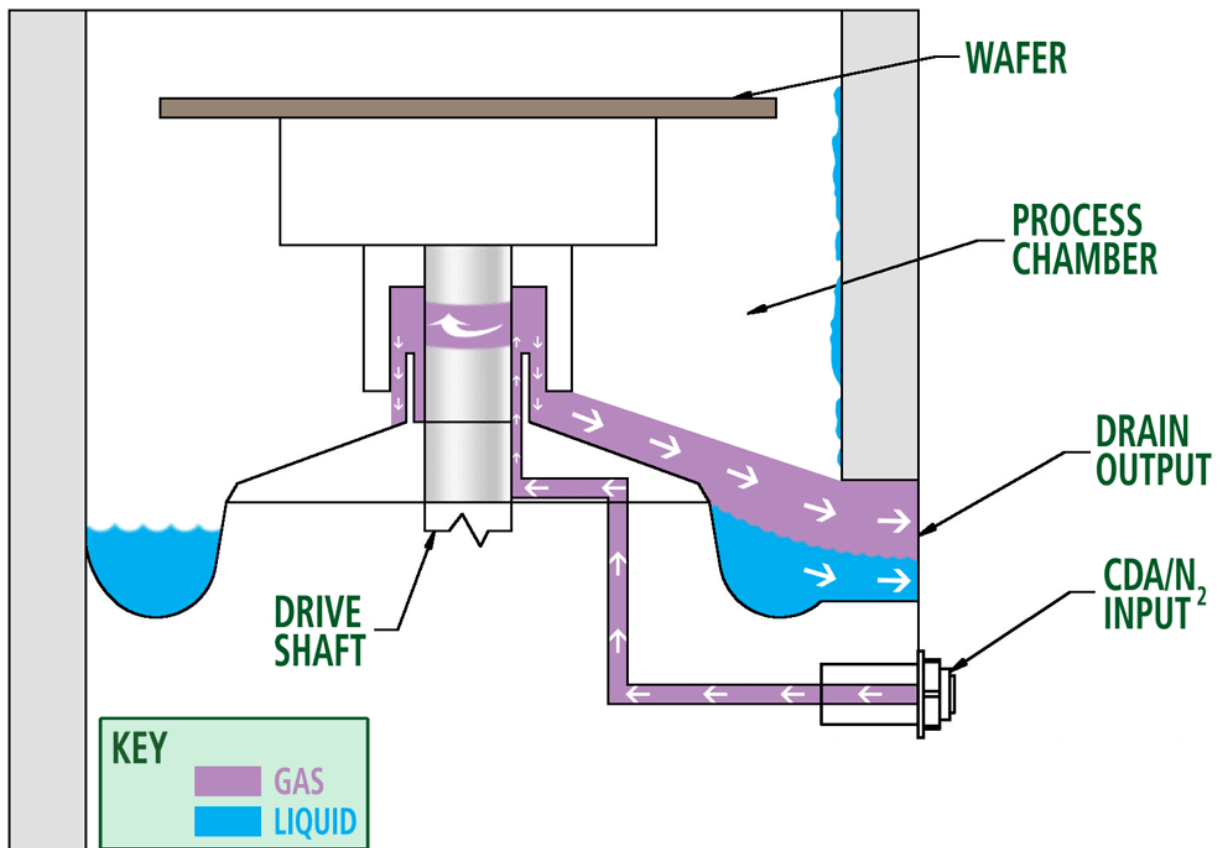
> ➢ This graphic represents the functionality of the seal purge gas pressure. The seal's purpose is to separate the process chamber from the motor and electronics in order to insure long, service-free operation.

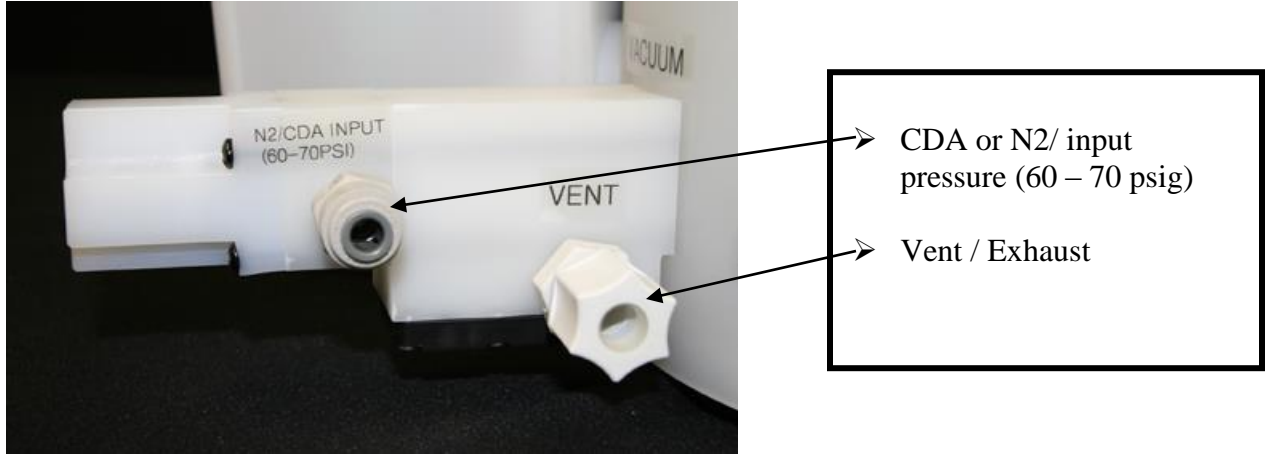# INSTALL THE PNEUMATIC VACUUM GENERATOR (IVPVG) (option)

Figure 1

1.0 OVERVIEW

The Laurell Technologies' IV - pneumatic vacuum generator is capable of generating a variable amount of vacuum depending on input air pressure. It creates a vacuum by venturi action.

2.0 INSTALLATION

1. For best performance use a dedicated CDA or N2 supply regulator for the vacuum generator. The generator's flow rate is approximately 1.67cfm at 60psig. See figure 2.

   Note: It may be possible to "tee" the CDA or N2 supply to both the processor and the IVPVG but there must be a sufficient volume of gas to satisfy both. If there is an insufficient volume, the processor will produce a "Need CDA" error message. Also, there may be a loss of vacuum from its initial level (when the vacuum is first applied).
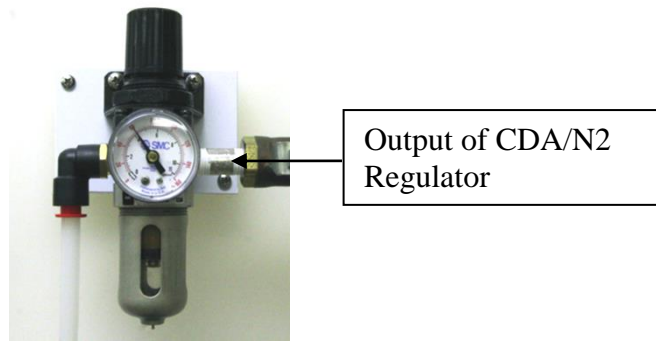

Figure 2

2. Connect the output side of the regulator, using the provided ¼" tubing, to the input on the vacuum transducer box. See figure 3
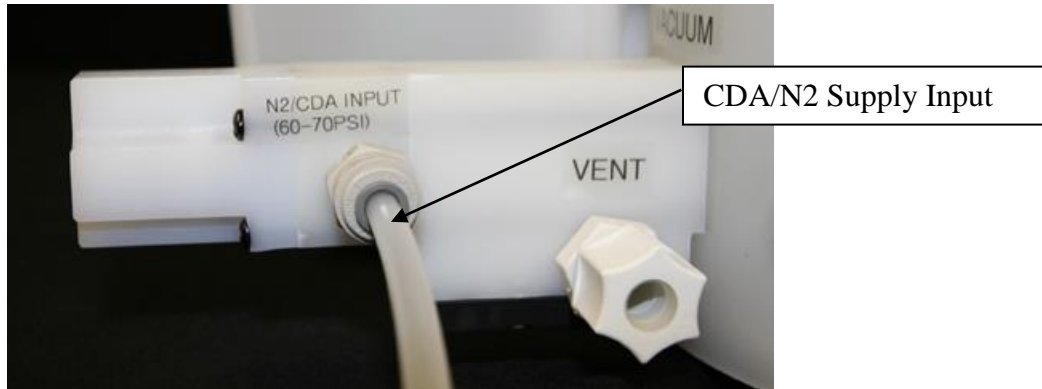

Figure 3

3. 3/8" tubing can be connected to vent port. Adding a length of tubing will act as a muffler thereby lowering its noise level. **The tubing length may affect the maximum achievable vacuum. Do not restrict or block the exhaust output; lower vacuum values may result.**

3.0   OPERATION

1. Set the CDA or N2 pressure to 60psig. Turn on pressure.
2. Place a substrate onto the vacuum chuck. Press the vacuum key to apply vacuum to the substrate.
3. A vacuum will be applied onto the substrate and a vacuum reading will be displayed in the upper right corner of the LCD.
4. When the vacuum key is pressed, a "hissing" sound will be generated from the IV-PVG. This is normal; air flow is vented as it creates a vacuum. (There is no "hissing" sound when vacuum is turned off)

4.0   TROUBLESHOOTING

1. If no vacuum is generated try the following;
    a. Check air supply. Is it 60psig? Is it turned on? Is it at the IV-PVG input?
    b. Check all connections for tightness.

***

**If you need assistance contact support at (215)-699-7278 or email us at support@laurell.com**

Approximate Vacuum Achieved With Different Pressure Settings (3/8" fitting only)

Pressure (psig)	Vacuum in inches of Hg
10	1.3
15	3
20	4.4
25	6.2
30	8.5
35	11.3
40	14.8
45	18
50	24
55	25.3
60	25.3

NOTE: These values are approximations, actual values may vary.

NOTE: The processor has a minimum vacuum setting of 15". This is a factory setting. The processor must have 15" of vacuum to operate. If <15" a "NEED VACUUM" error will be displayed.

INSTALL THE VACUUM TUBING
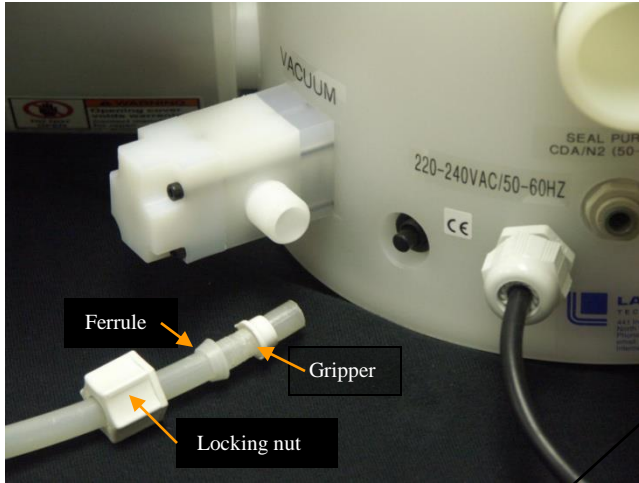
- ➢ Slide the locking nut, the ferrule with the tapered end pointing toward the locking nut and the gripper with the tapered end toward the vacuum valve, onto the 3/8"OD tubing.

- ➢ Push the tubing into the vacuum valve body. Slide the ferrules into the vacuum valve and HAND tighten nut.

- ➢ **Without seal purge pressurization the pneumatic vacuum valve WILL NOT OPERATE.**
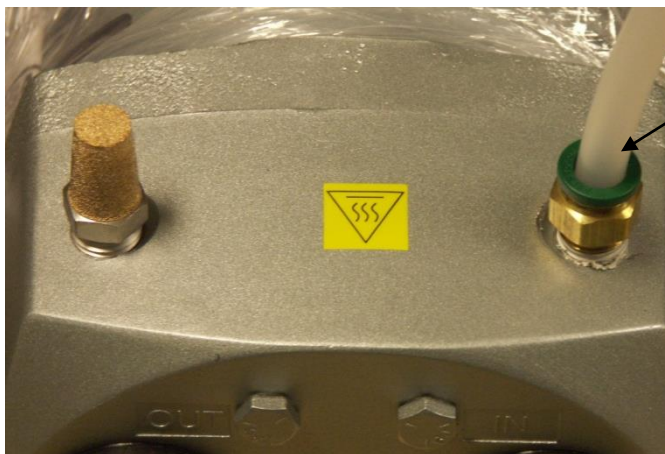
- ➢ Connect the other end of the tubing to a vacuum source. (Pictured – The push –to – connect fitting on optional vacuum pump.)

INSTALL DRAIN CUP CONNECTOR (option)

➤ Install the drain connector onto the Drain Port. Push the connector fully onto the stem.
➤ Attach 0.5" (12.7mm) exhaust tubing to an exhaust source if necessary.

INSTALL DRAIN CONNECTOR (option)
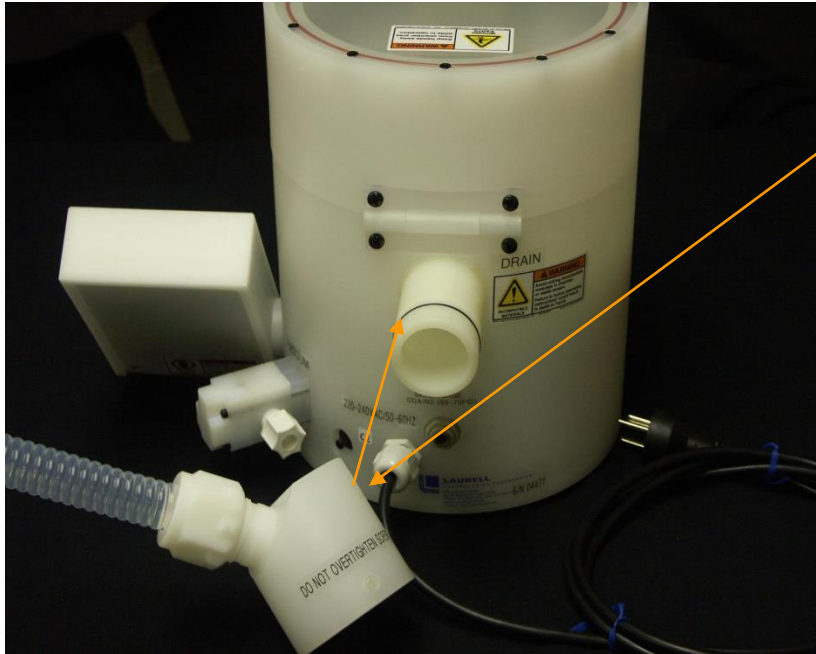
➢ Install the drain connector onto the Drain Port. Push the connector fully onto the stem.

➢ Use a 3/16" (4.8mm) Allen wrench to tighten set screw into the recessed groove.
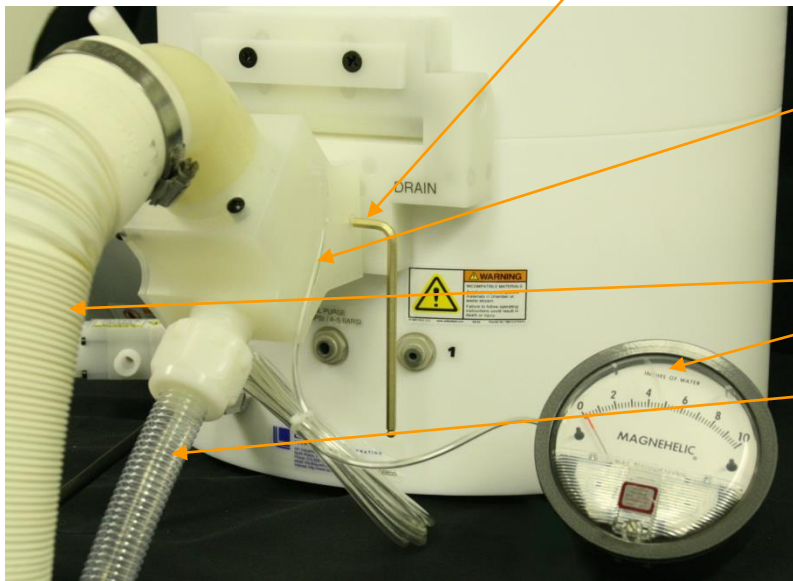
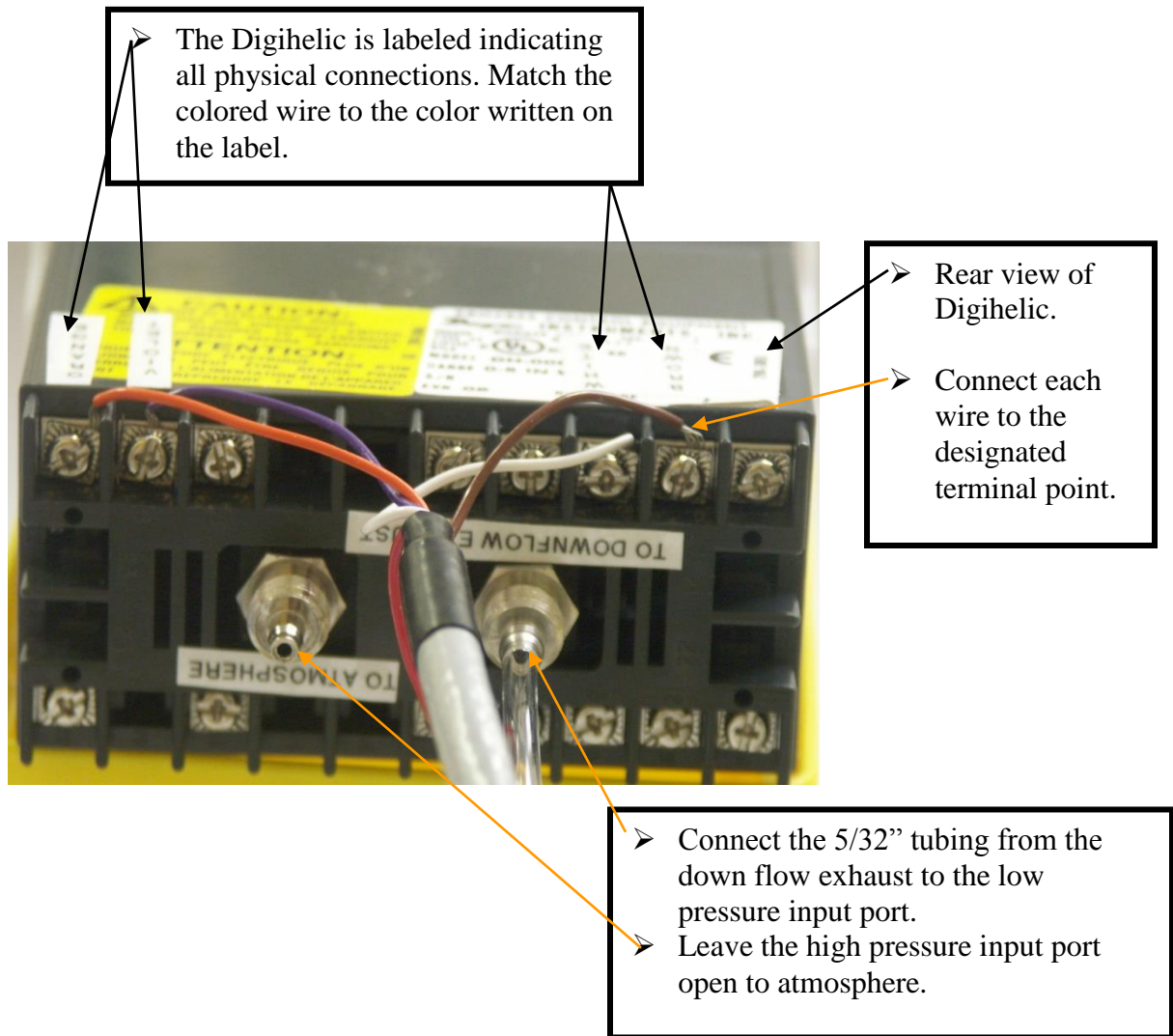**DO NOT OVER TIGHTEN SET SCREW OR IT MAY DEFORM THE PORT AND LEAK!**

INSTALL DOWNFLOW EXHAUST CONNECTOR (option)
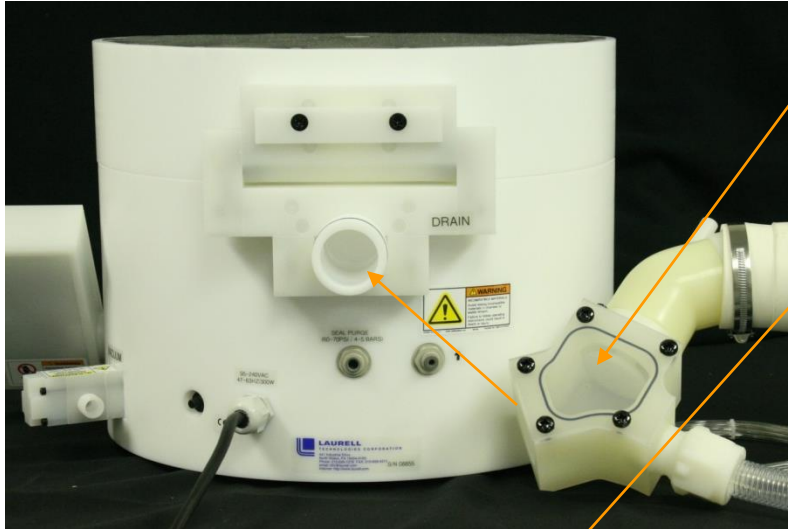
> Install the Down-Flow drain connector onto the Drain/Exhaust Port. Push the connector fully onto the stem.

> Use a 3/16" (4.8mm) Allen wrench to tighten set screw into the recessed groove.

DO NOT OVER TIGHTEN SET SCREW OR IT MAY DEFORM THE PORT AND LEAK!

> 5/32" (3.97mm) tubing from Down-Flow exhaust to Differential Pressure Gauge

> Exhaust Tubing
> Differential Pressure Gauge
> Drain
> **Note**: Additional info is in the "OPTION" folder on the documentation CD

> Optional Digihelic Differential Pressure Gauge – please refer to Digihelic operation manual for instructions. It is located in the large binder or packing box.

DIGHELIC INSTALLATION

> The Digihelic is labeled indicating all physical connections. Match the colored wire to the color written on the label.

> Rear view of Digihelic.

> Connect each wire to the designated terminal point.

> Connect the 5/32" tubing from the down flow exhaust to the low pressure input port.
> Leave the high pressure input port open to atmosphere.

DIGIHELIC DIFFERENTIAL PRESSURE SENSOR STATES
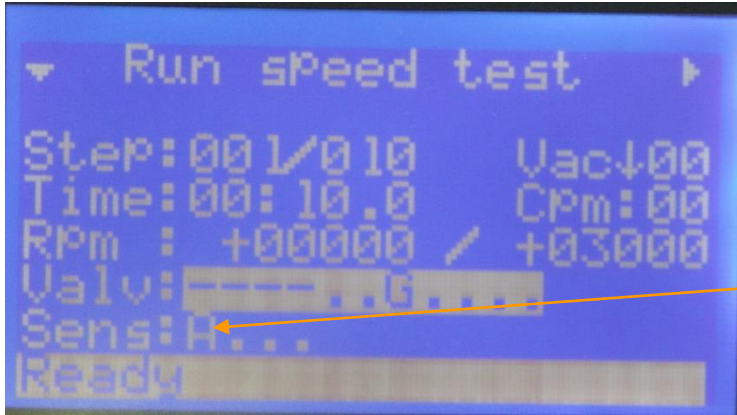
"A" indicates the exhaust flow is lower than the minimum set point. (Low set point is set to 0.50)
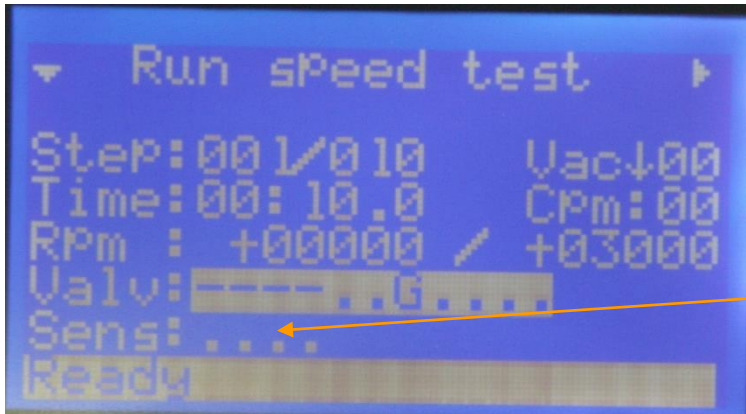
No "A" or "B" indicates the exhaust flow is between the low and high set points.
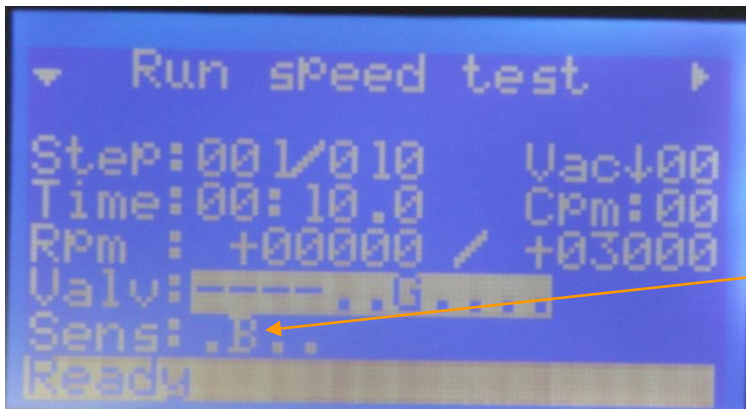
"B" indicates the exhaust flow is higher than the maximum set point. (High set point is set to 3.00)

USING THE "BULL'S EYE" LEVEL

> ➢ It is always a good practice to level the system / wafer chuck before using. A level wafer chuck will help to reduce thickness non-uniformities.
>
> ➢ Use the level either on the chuck itself or on a flat substrate (do not pull vacuum onto to the substrate when leveling).
>
> ➢ Level the system by leveling the bench or table. If this is impractical use shims under the feet of the processor.

INSTALLING THE FRAGMENT ADAPTER
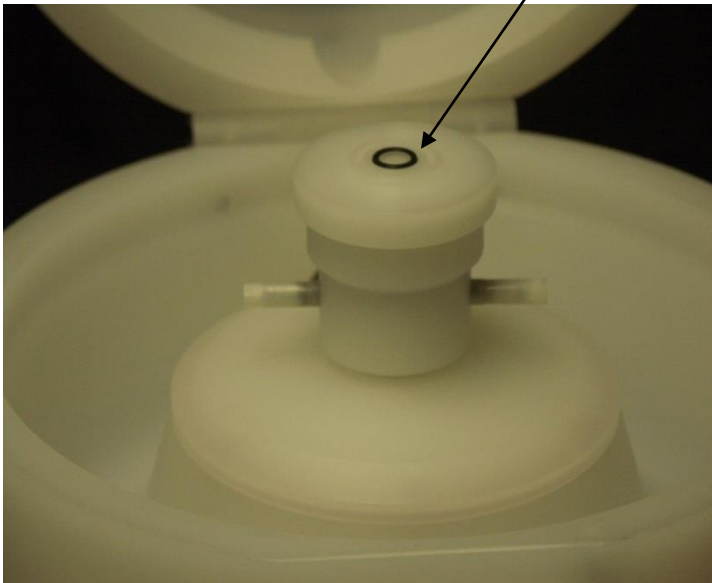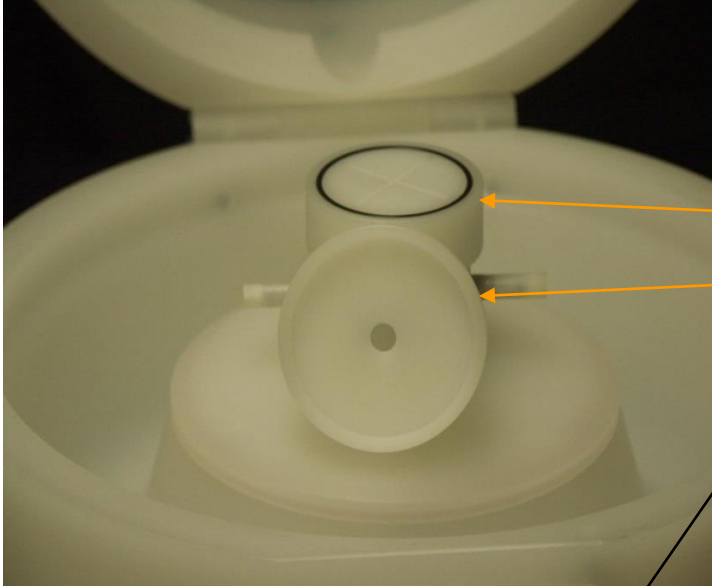
> ➢ **See section 3 in manual for installing and removing chuck**

> ➢ 1.75" (45mm) chuck
> ➢ Bottom view of Fragment Adapter
> ➢ With vacuum off, place fragment adapter onto the vacuum chuck
> ➢ Place fragment on chuck and press the vacuum key on control panel

> ➢ **CAUTION: SUBSTRATE FRAGMENT MUST ALWAYS COVER THE O-RING SEAL TO PREVENT CHEMICAL FROM ENTERING VACUUM PATH AND DAMAGING MOTOR AND SEALS.**

> ➢ **Contact support@laurell.com before running a substrate that doesn't fit on chuck properly.**

> ➢ To remove fragment adapter, turn off vacuum and lift up.
> ➢ Note: As a rule of thumb, always cover the chuck's/adapter's o-ring to prevent possible chemical ingress.

USING BLUETOOTH COMUNICATION FOR SPIN 3000

Spin 3000 software is designed to interface with the 650 controller. Spin 3000 allows the user to create, modify and store programs on a PC. If the 650 controller has been configured to use Bluetooth technology to communicate with a PC or similar device, follow the instructions below for "pairing" up a Bluetooth configured PC. If you are upgrading a 650 controller with a Bluetooth communication board see page 34 for reconfiguration information.

Windows 8.1 Bluetooth Setup

Bluetooth setup consists of pairing the spin processor with your computer and then noting which COM port is being used. The COM port is then used by Spin 3000 to communicate with the spin processor.

1. Turn on the spin processor. Press the *Info* button and scroll down to *About*. Press F1 and note the serial number.
2. Then on the computer drag from the right-hand side of the screen and select *Settings*.
3. On the *Settings* menu, select *Change PC settings*.
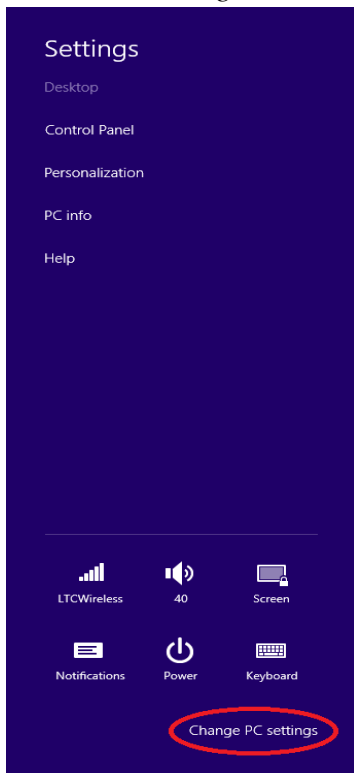
4. On the *PC settings* menu, select *PC and devices*.
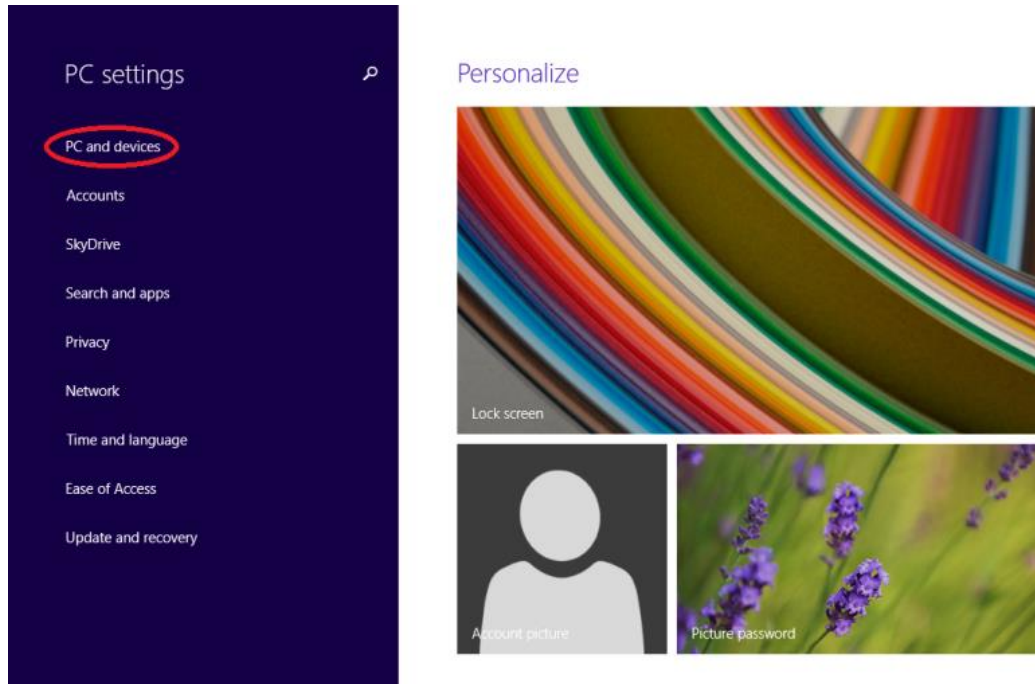
5. On the *PC and devices* menu, select *Bluetooth*. Laurell Technologies spin processors should display as Laurell followed by the serial number (e.g., *Laurell 11482*). Available spin processors should say *Ready to Pair*. Choose the spin processor you want to connect to and press *Pair*.
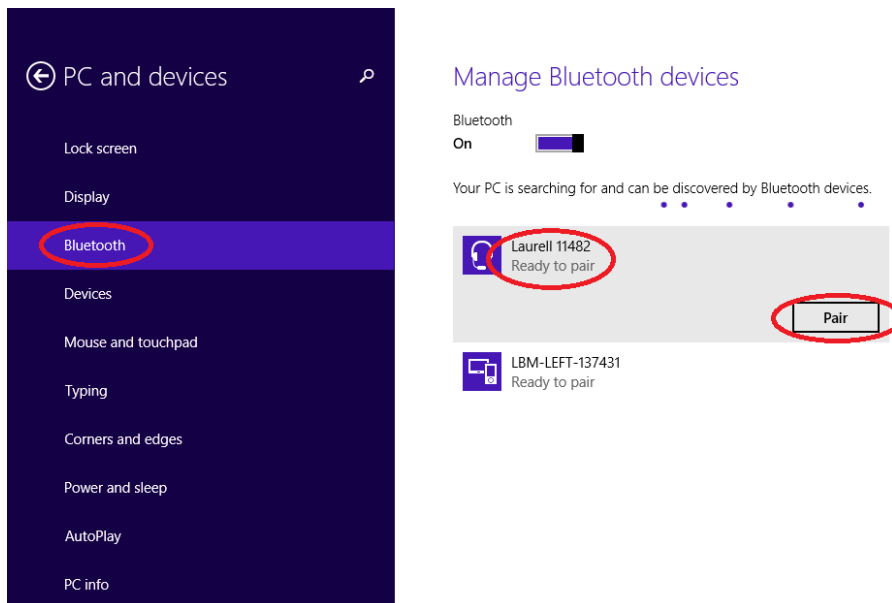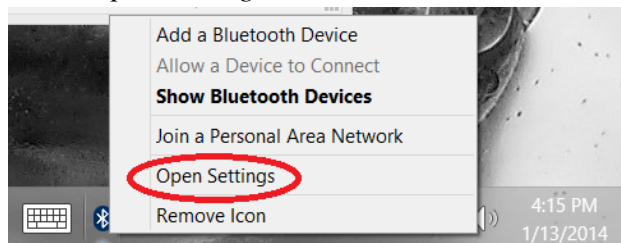
6. Windows will ask if the shown passcode matches the spin processor's passcode. <mark>Just press yes.</mark>
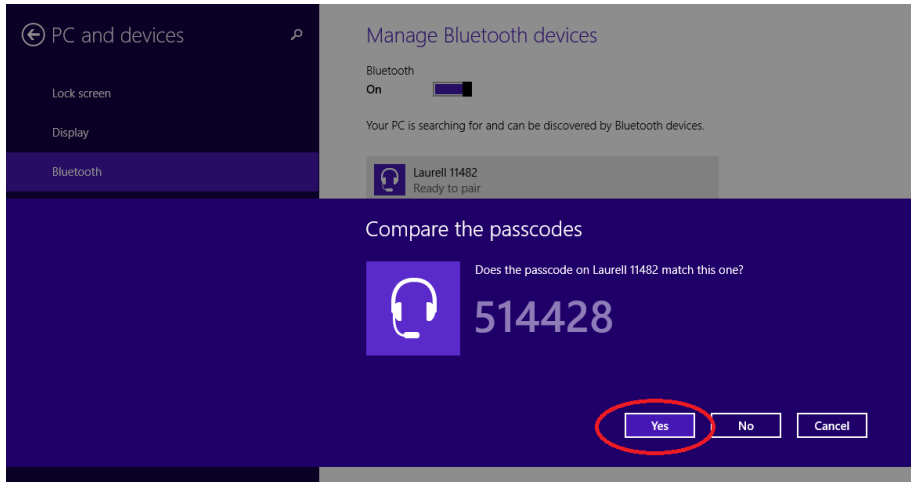
7. When done, the spin processor status should change to either *Connected* or *Not connected*.

8. Now, go to the desktop and on the menu bar and press the Bluetooth icon. The Bluetooth menu will appear.
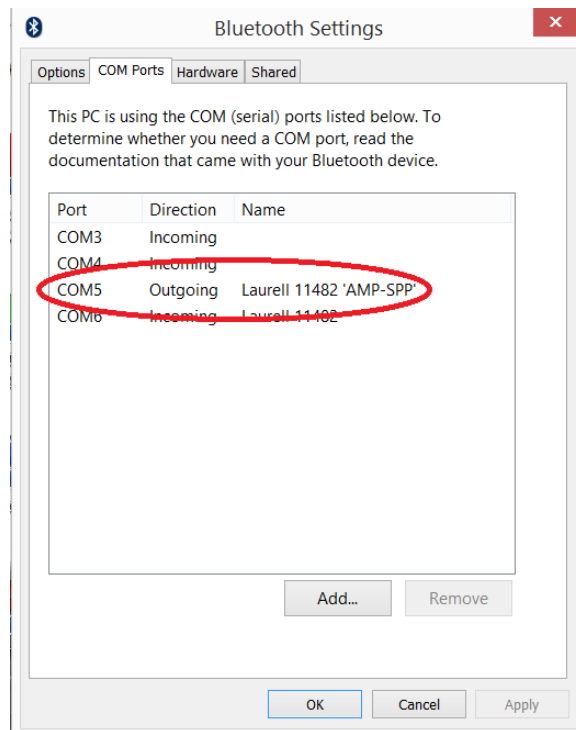

9. Select *Open Settings*.

10. The *Bluetooth Settings* dialog appears; select the *COM Ports* tab.
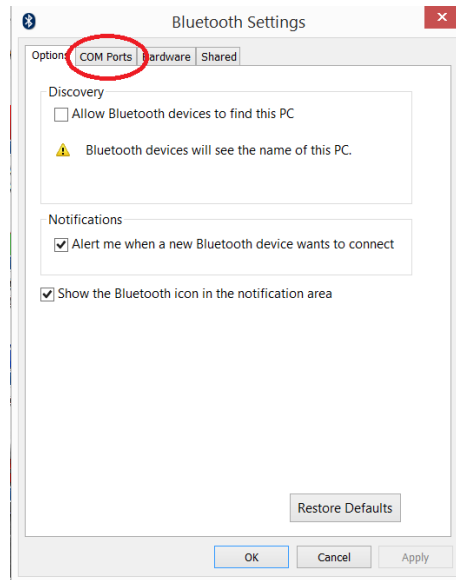
11. On the *COM Ports* tab note the *Outgoing* COM Port associated with the paired spin processor. You will use this COM port to configure Spin 3000 so Spin 3000 can communicate with the paired spin processor.

12. Congratulations, you are done.

Spin 3000 Com Port

1. Install Spin 3000 from the Documentation CD onto the PC. (see page 22)
2. Login using the "administrator_1" password.
3. Select *EDIT* on the menu bar.
4. Select *RS-232 Interface.*
5. Open the *Port* dialog box and select the Com Port that is the same as Bluetooth.
6. Click OK.
   The PC/Spin 3000 using Bluetooth will now communicate with the 650 controller.

Windows XP Bluetooth Setup

Bluetooth setup consists of pairing the spin processor with your computer and then noting which COM port is being used. The COM port is then used by Spin 3000 to communicate with the spin processor.

1. Turn on the spin processor. Press the *Info* button and scroll down to *About.* Press F1 and note the serial number.
2. Then on the computer, on the menu bar left-click the Bluetooth icon.

3. When the Bluetooth selections appear select *Add a Bluetooth Device.*
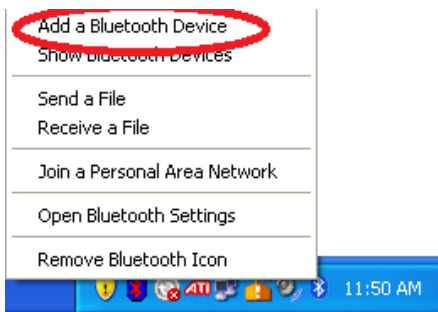
4. On the *Add Bluetooth Device Wizard* dialog select *My device is set up and ready to be found* and press *Next*.

5. The wizard will search for and display available devices. Select the one whose serial number matches your spin processor and press *Next*.
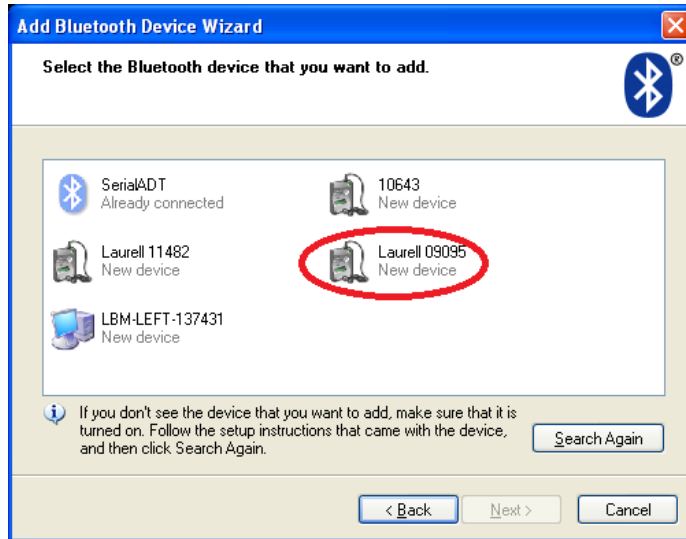
6. The wizard will query about a passcode. Select *Use the passkey found in the documentation,* enter *1234* and press *Next*.
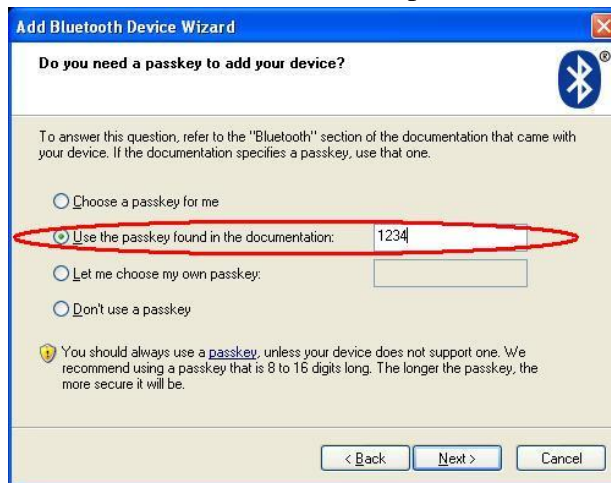
7. Note the *Outgoing* COM Port associated with the paired spin processor. You will use this COM port to configure Spin 3000 so Spin 3000 can communicate with the paired spin processor. Press *Finish*.
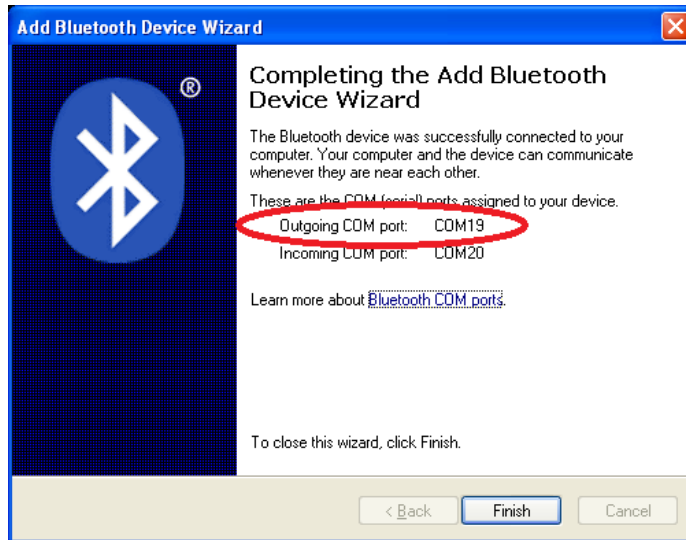
8. Congratulations, you are done.

Spin 3000 Com Port

7. Install Spin 3000 from the Documentation CD onto the PC. (see page 22)

8. Login using the "administrator_1" password.

9. Select *EDIT* on the menu bar.

10. Select *RS-232 Interface.*

11. Open the *Port* dialog box and select the Com Port that is the same as Bluetooth.

12. Click OK.

13. The PC/Spin 3000 using Bluetooth will now communicate with the 650 controller.

Windows 7 Bluetooth Setup

Bluetooth setup consists of pairing the spin processor with your computer and then noting which COM port is being used. The COM port is then used by Spin 3000 to communicate with the spin processor.
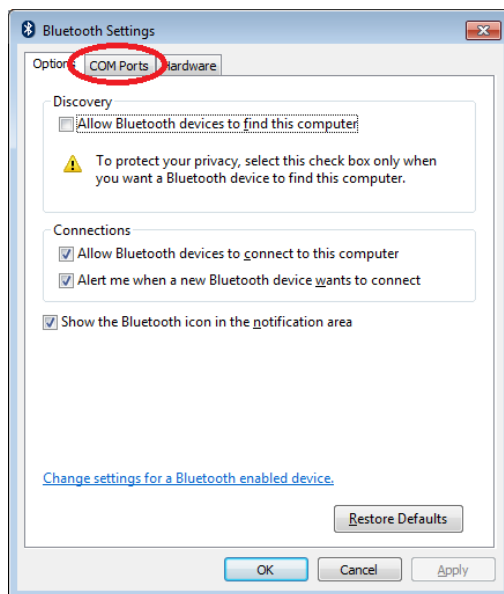
1. Turn on the spin processor. Press the *Info* button and scroll down to *About.* Press F1 and note the serial number.
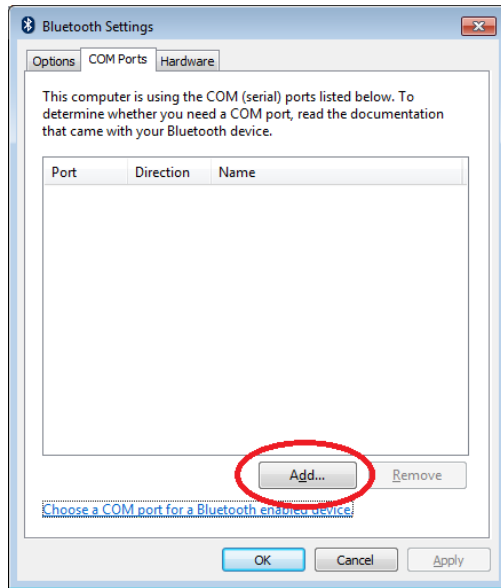2. Then on the computer, on the menu bar left-click the Bluetooth icon.
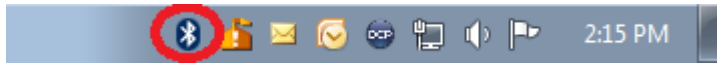
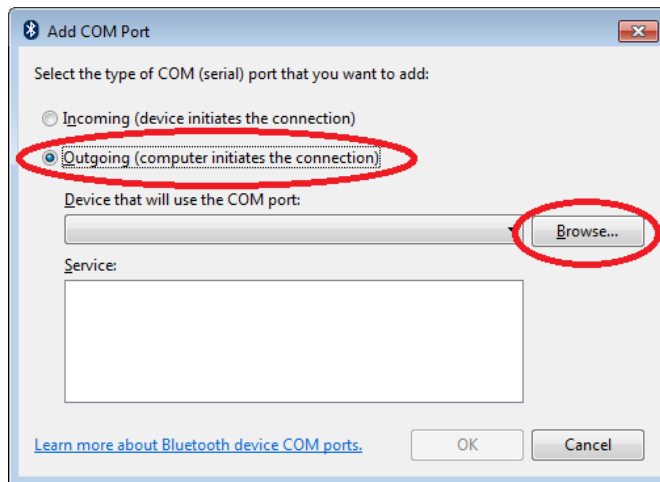3. When the Bluetooth selections appear select *Open Settings*.
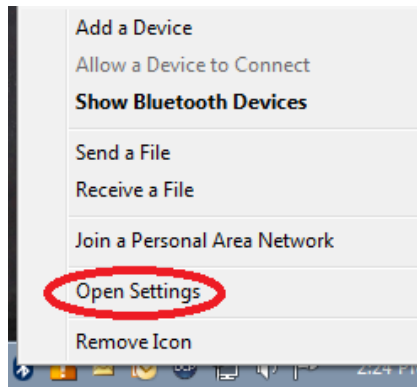
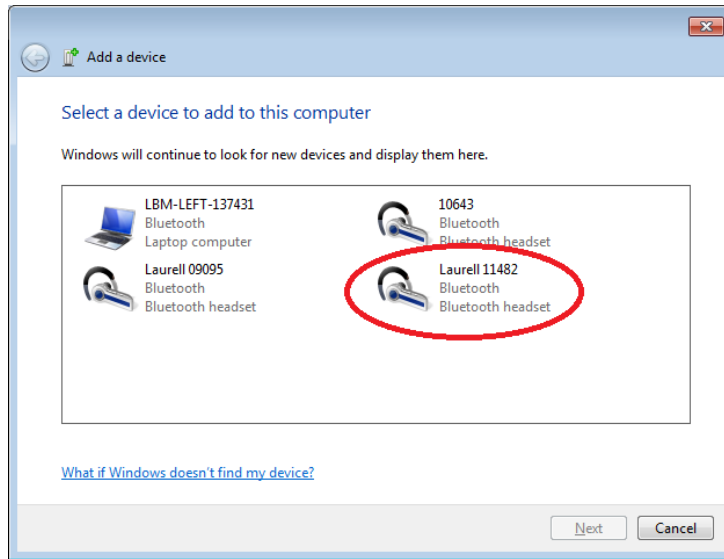4. The *Bluetooth Settings* dialog appears; select the *COM Ports* tab.
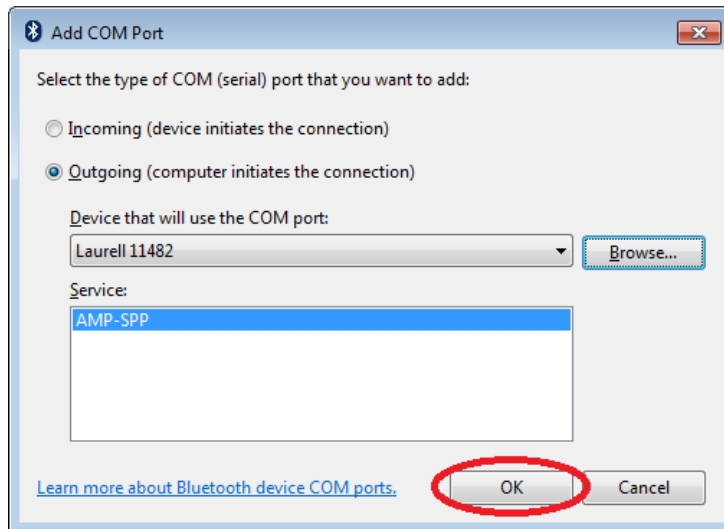

5. Now select *Add.*

6. The Add COM Port dialog will appear. Select *Outgoing* and press *Browse*.

7. The dialog will search for and display available devices. Select the one whose serial number matches your spin processor and press *OK*.

8. The dialog will redisplay *Add a COM Port*. Press *Ok.*

9. Note the *Outgoing* COM Port associated with the paired spin processor. You will use this COM port to configure Spin 3000 so Spin 3000 can communicate with the paired spin processor. Press *Ok.*
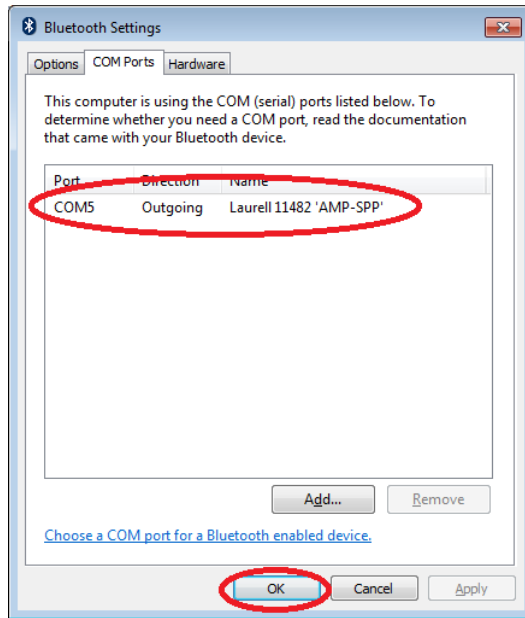
10. When you use Spin 3000 for the first time with this COM port, if the OS asks for a pairing code, enter *1234*.

11. Congratulations, you are done.

Spin 3000 Com Port

14. Install Spin 3000 from the Documentation CD onto the PC. (see page 22)

15. Login using the "administrator_1" password.

16. Select *EDIT* on the menu bar.

17. Select *RS-232 Interface.*

18. Open the *Port* dialog box and select the Com Port that is the same as Bluetooth.

19. Click OK.

20. The PC/Spin 3000 using Bluetooth will now communicate with the 650 controller.
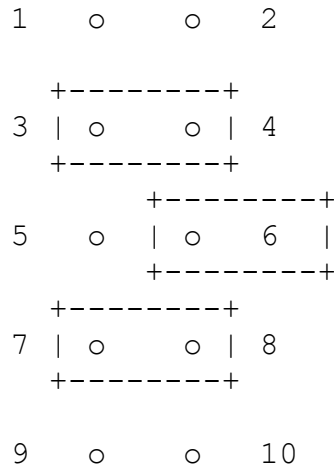
HOW TO CONFIGURE BLUETOOTH - 03/03/2014

Bluetooth capable processors, which were not configured to use Bluetooth, can be reconfigured to enable this feature. A Bluetooth capable processor can be identified by the Bluetooth sticker affixed to the back of the 650 controller and /or by the model designation "WS…B".
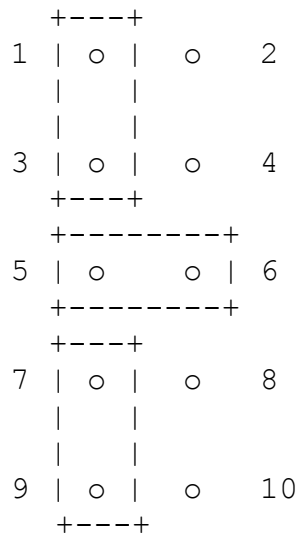
To reconfigure a process board follow the instructions below.

1 – Turn off power to the processor.
2 – Remove the back cover from the 650 controller

The 650 control board for RS232 wired communications is configured with JP4 jumpered (3) as shown below:

```
1     o      o    2


      +--------+
3 | o      o | 4
      +--------+
              +--------+
5     o  | o    6    |
              +--------+
      +--------+
7 | o      o | 8
      +--------+


9     o      o    10
```

For Bluetooth connectivity, reconfigure JP4 jumpers as shown below:

```
      +---+
1 | o |    o    2
    |   |
    |   |
3 | o |    o    4
      +---+
      +--------+
5 | o      o | 6
      +--------+
      +---+
7 | o |    o    8
    |   |
    |   |
9 | o |    o    10
      +---+
```

CONNECTING TO THE 650 CONTROLLER USING A RS-232 CABLE (OPTION)

➢ Connect the RS-232C cable to the RJ-11 port (looks like a phone jack) on the 650 controller.

➢ Connect the RS-232C cable to an unused RS-232C port on the PC.
➢ For more information, see sections 1 and 2 in the Spin 3000 user manual.
➢ *The document CD paper sleeve has the required spin 3000 installation serial number and higher level password attached to it.*

➢ If the computer does not have a 9 pin RS-232 serial port, use a USB port to communicate to the controller.
➢ Use the enclosed USB adapter to connect to the RS-232C cable. See picture below.
➢ Use the following instructions to install the USB software.

USB INSTALLATION INSTRUCTIONS

Keyspan USA-19HS USB-Serial Adapter

*Before installing the Keyspan USB-Serial Adapter, make sure the adapter is **unplugged** from your system, as with most USB device installations.*

Windows (32-bit) Instructions

1. Disable any anti-virus software you may have running

2. Insert & browse to the Driver Installation CD on your computer

3. Launch the driver installation main menu (if not automatically started): *launch.exe*
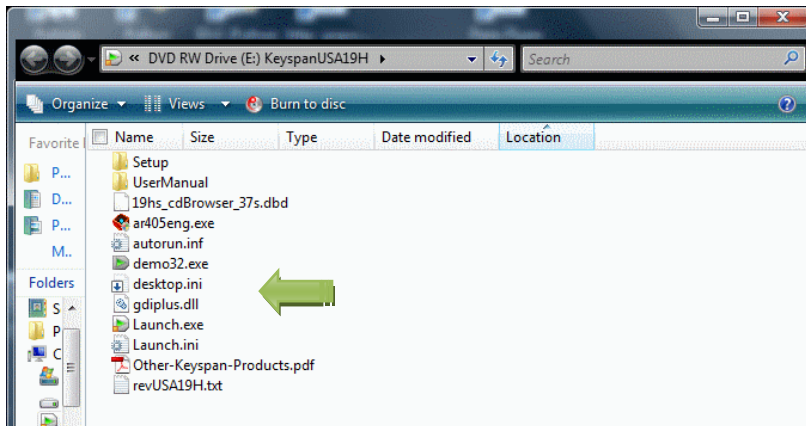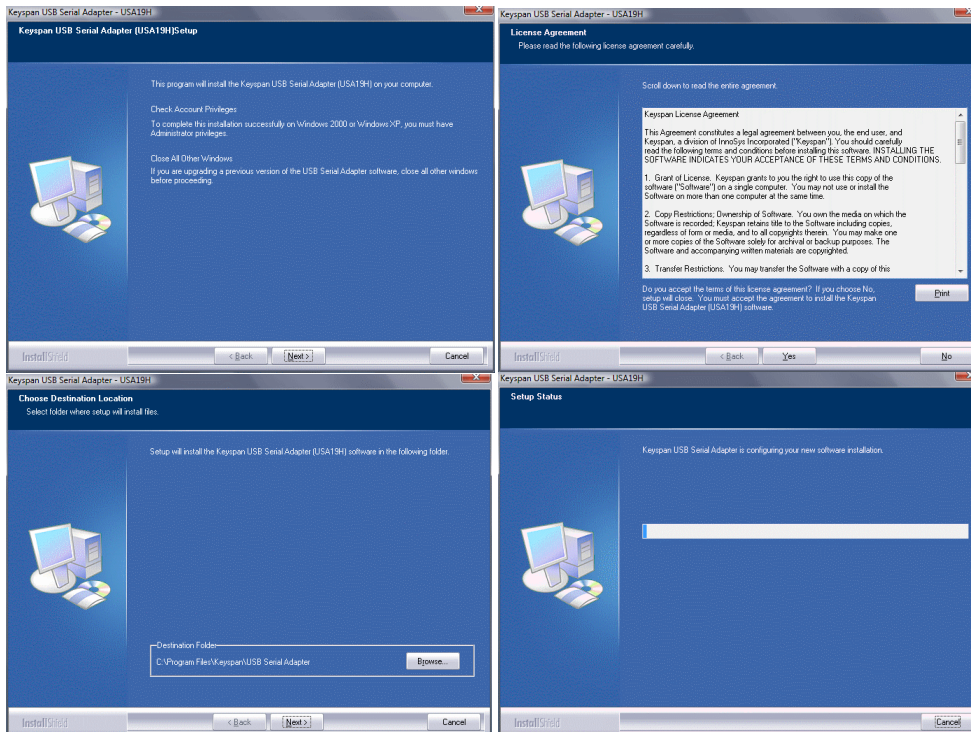

4. Click *Install Software*
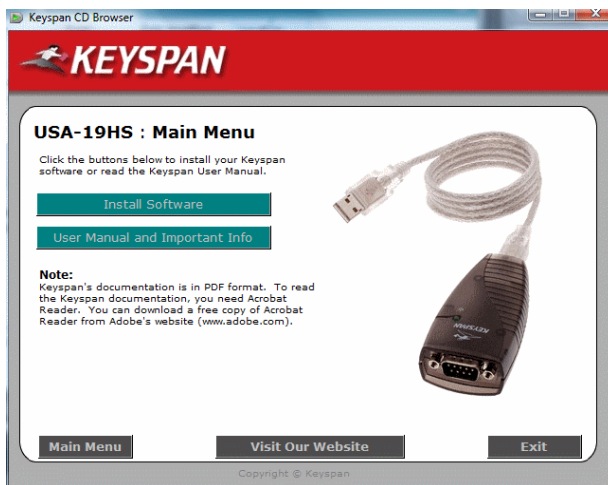
5. Click the button that launches the installer that matches your computer's operating system. Ensure that the USB-Serial adapter is **unplugged** from your system until **after** you have installed the drivers.
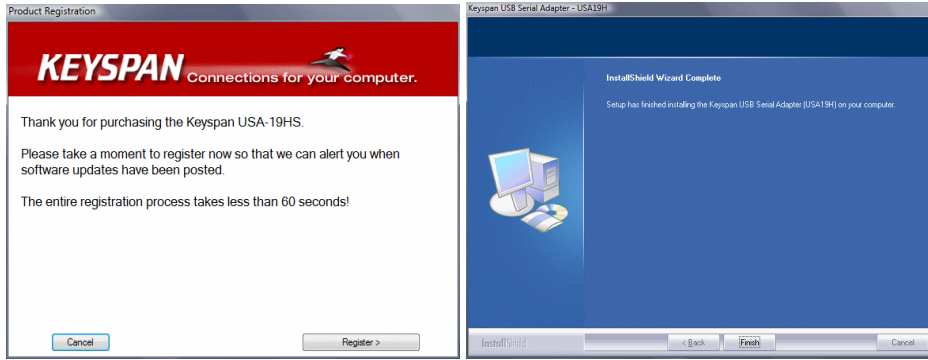

6. Follow the default instructions to install the drivers on your computer
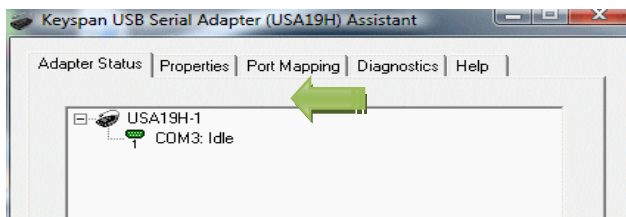

After installing the drivers, you may register the adapter (optional). Click *Finish* to complete installation. You may now re-enable anti-virus protection.
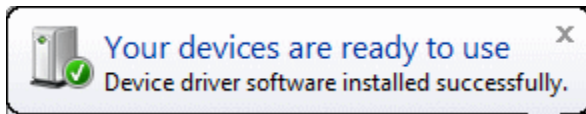
7. From your Start menu, find & launch the *Keyspan USB Serial Adapter Assistant*

8. Plug in the Keyspan adapter to a free USB port on your computer (connecting to a USB hub is not recommended). After a minute or so, you should see a tray notification indicating that your adapter is installed.

Note: If the above tray does not appear, do the following.
   a. Make note of the COM port that is idle. (See above, "COM 3 Idle")
   b. Open up the Spin 3000 application
   c. Login into Spin 3000 using the password located on the front of the CD sleeve.
   d. Click on "EDIT"
   e. Click on "RS-232 Interface"
   f. Change the COM port to the idle COM port
   g. When communication is established, a data stream will appear in the lower "From Spin Processor" data window

Your computer should now be set up to interface with Laurell Technologies® *Spin 3000* software.

Note: Spin 3000 software is in the "SOFTWARE" folder on the documentation CD.

# SPIN 3000 SOFTWARE INSTALLATION INSTRUCTIONS

Note: To minimize potential installation problems, please follow these best practices installation instructions for this (or any) software.

1. Close all currently running applications
2. **Verify computer's color setting is set to 32 bit. Use medium to maximum resolution.**
3. Disable any running anti-virus software
4. Complete software installation (*see pages 6-11 in Spin 3000 manual*)
5. Re-enable anti-virus software
6. Restart the system & run application on subsequent startup

Note: Refer to sections 1 and 2 in the Spin 3000 Operation Manual for additional information.

If you experience difficulties, support is available from the factory at:
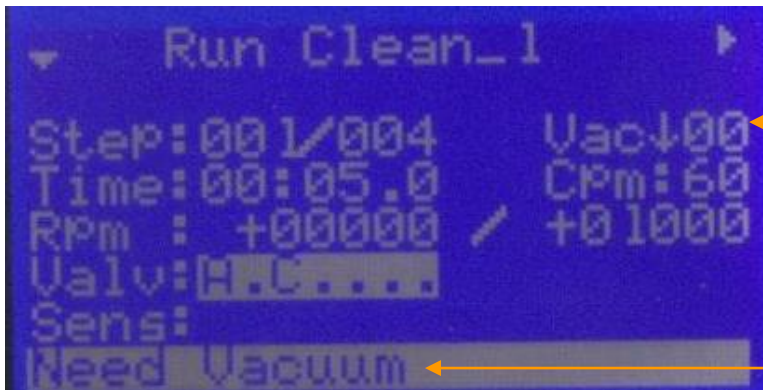**support@laurell.com**

STARTUP ERRORS
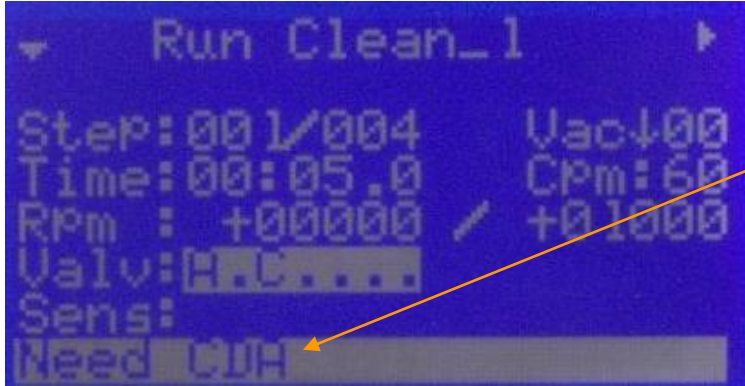
- "LID OPEN" message, close lid

- If system is installed but there is insufficient CDA or N2 gas pressure, a "NEED CDA" message will appear. **CDA/N2 must be set to ~60psig/4bar.**

- **See section 3 in manual for programming**

- **See section 4 in manual for maintenance and errors**

- If there is insufficient vacuum <15"Hg (factory set point) the "NEED VACUUM" message will appear. **Vacuum must be >15"Hg.**

- **A wafer chuck without a substrate on it will not allow the vacuum level to be sensed and "Need Vacuum" error message will be displayed.**
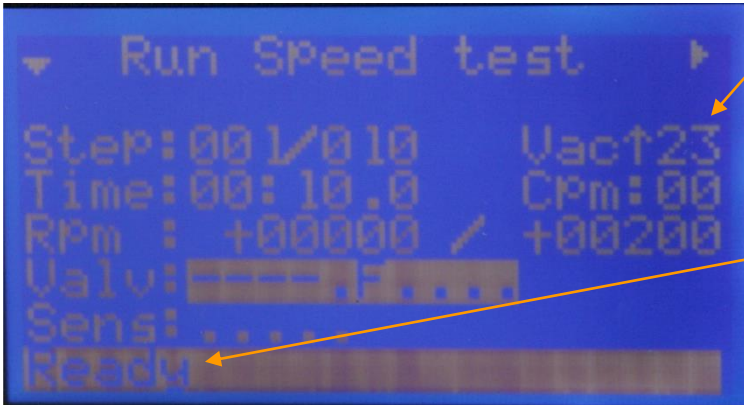
- Press the vacuum key on keypad to enable the vacuum valve to hold a substrate,

INSTALLATION COMPLETE AND READY FOR PROGRAMMING AND OPERATION

➢ Drain attached

➢ Vacuum tubing installed - vacuum source "ON"

➢ Seal Purge tubing installed – "pressure set to ~60psig"

➢ Power Cord plugged in – power "ON"

➢ With a substrate on the chuck and the vacuum button enabled, the amount of vacuum present will be indicated.

➢ If CDA and vacuum are present at the required pressures, the processor is "READY" to operate.

➢ **TIPS:**
➢ **ALWAYS USE LAURELL CHUCKS**
➢ **ALWAYS PREVENT CHEMICALS FROM ENTERING THE VACUUM PATH**
➢ **FOR SUPPORT CONTACT:**
SUPPORT@LAURELL.COM

NEVER DO THIS !!

➢ For extended use, clean, rinse, then dry your spin processor after each use, taking care to prevent any chemicals from entering the vacuum path. Do not fill up or overflow the process chamber or bowl – fluids must not be permitted to flow under the substrate. If the chuck face shows signs of chemical residue, remove and clean immediately. Cleaning the o-ring surface will improve the seal. See Section 4 in manual "VACUUM CHUCK WET TEST". Examine and adjust your process to prevent such occurrences.

➢ Do not at any time force fluids or pressuring gas in the center of the vacuum chuck. Cleaning the vacuum path in this manner is dangerous and can cause significant damage to your spin processor.