

Equipment Setup



Welcome to AEROSEAL® training for the SmartSeal equipment. We will now go into an in depth presentation on the equipment, duct seal preparation, sealing and completion.

We have now divided the AeroSeal® training manual into seven segments so that the technician who needs to review a specific area of the training can find it easily. The seven segments are the Introduction, the Equipment, the Equipment Setup, Duct Sealing Process, System Preparation, Running AeroSeal® and Maintaining the Equipment.

Introduction is an overview of the AeroSeal® process. The Equipment segment is information about the pieces of equipment that make up the AeroSeal® system. Equipment Setup shows the way the equipment is powered, connected together and connected to the duct system to be sealed. Ready for sealing describes different applications of duct systems and some of the criteria that needs to be addressed for sealing. Running AeroSeal® describes operation of the computer control with the fan box air intake with the sealant injection rate. Maintaining the Equipment discusses and places emphasis on the injection nozzle, cleaning the nozzle as well as disassembly and replacing the nozzle components.

This segment is the first of the series, the Introduction to the AeroSeal® process.

Set-Up the Equipment



You have just taken inventory of all of our equipment and have even gone over some of the basic functions that the various pieces of equipment perform. So next, you will take all of this equipment and all of the supplies and use them to put together the AEROSEAL® duct sealing system. When you are finished, the system will look something like you see here. We did not say that it would look exactly like this slide because the set-up of this equipment is made to be very versatile and fit different job site requirements and job site conditions. We will talk about them as we show this equipment being used.

Electrical Power Requirements



3
amps



15
amps



2 x 13
amps



11 amps
(combined)

3
amps



We mentioned earlier in this program that a circuit breaker finder would be a necessary tool to carry on your truck. Here is why.

The air compressor draws 15-amps at peak power. The air dryer draws about 2-amps and both of these items will be together on the truck or trailer so you will need a 20-amp electrical service for these two items.

The fan box, because of the fan motor and sealant pump, and the fact that it serves as the power source for the Wand heater, the liquid line heater, and the Computer Control Case will draw up to 11 amps. This power requirement is reduced to 8 amps when the liquid-line heater is not in use (most of the time). Each stage of electric heat in the heater cylinder will draw 13 amps, so there will be a requirement for three (3), 15-amp electrical circuits for the sealing equipment.

The two scrubber fans draw about 3 amps each so they will require an additional 15-amp circuit. They can both be plugged into the same 15-amp circuit.

So in total, five (5) separate electrical circuits will be required, one 20-amp and four (4) 15-amp circuits. Thus, you will need to find the five independent electrical circuits that you will be using during the sealing process.

Check with the building maintenance, building engineer or master electrician on accessing power.

Keep in mind that the amp loss in long extension cord runs. Please insure that you have the correct size wire to deliver amp draw.

Compressed Air Equipment



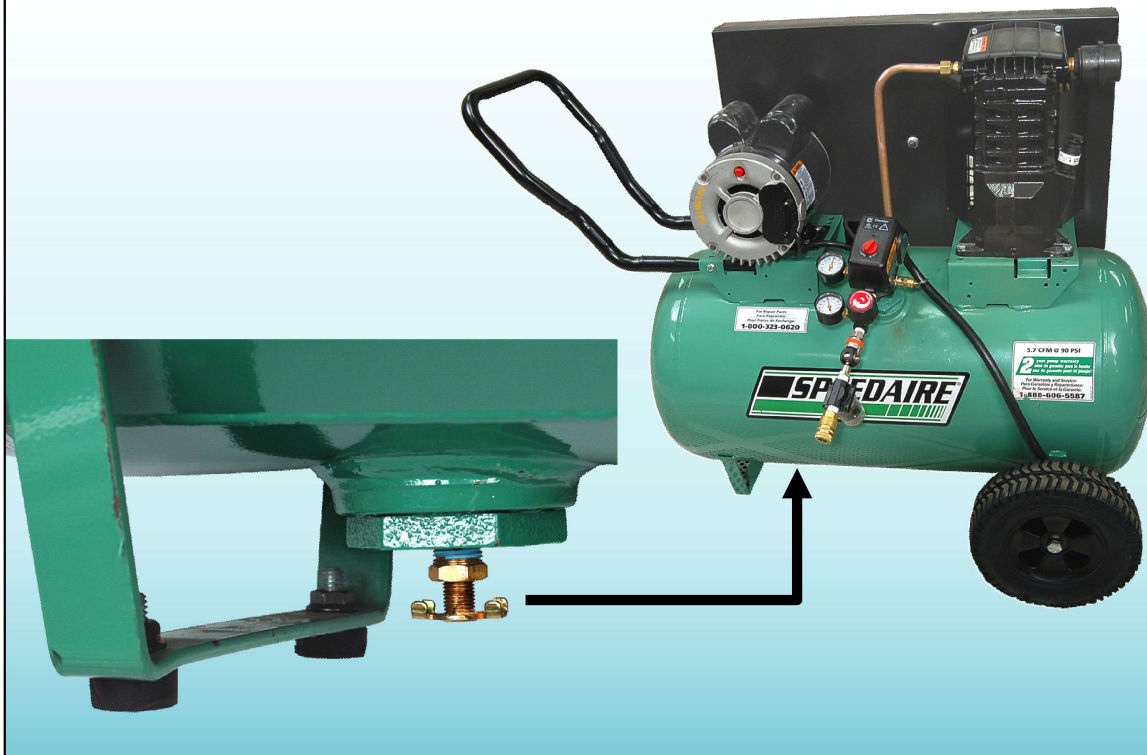
Now we will begin to set the equipment up. We will begin with the air compressor and the compressed air. It is not unusual for the compressor to operate continuously during the sealing process.

Connect the short air hose from the air compressor to the inlet connection of the compressed air dryer. Connect the longer air hose to the outlet connection of the compressed air dryer. If necessary, additional lengths of air hose can be added in order to reach the location where the sealing equipment (i.e. Fan Box) will be set up. Note; if using extra air line to complete the connections you may lower the overall pressure by the time it reaches the system. Raising the compressor pressure will fix the problem.

Caution: Always connect the air line from the compressor to the dryer before turning on the dryer to avoid freezing the air line in the dryer.

Plug the air compressor into a 10 gauge or 12 gauge, 3-wire extension cord, then plug the extension cord into a circuit that is not being used by any other appliance or equipment. Note that extra long extension cords (e.g. more than 100 feet) can cause a voltage drop that can cause start-up problems for the compressor. Plug the compressed air dryer into a 14-gauge, 3-wire extension cord, then plug it into a different circuit from the air compressor. If the air compressor is plugged into a 20-amp circuit, the compressed air dryer can be plugged into the same circuit.

Air Compressor



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It is recommended to break-in the air compressor prior to use for sealing. To break-in the compressor after the oil is added, the manufacturer recommends to open the drain on the bottom of the air tank and allow the compressor to operate at zero (0) pressure for one half (1/2) hour. This will allow all of the moving parts to coat with oil before being asked to pressurize air.

After the compressor has been allowed to break-in for the one half hour period and while off, close the drain on the bottom of the tank. Next, operate the compressor and allow it to pressurize the tank. The pressure in the tank will increase to about 135 PSI and the compressor will shut off. Right after the compressor shuts off, you should hear a quick audible short release of pressure. This quick audible short release of pressure is an indication that the air compressor is operating correctly. If the short release of air is not heard, check for leaks on the compressor with soapy water. Tiny bubble at the joints are normal. Soapy water that is sprayed away is not acceptable and should be corrected or the air compressor should be replaced.

Air Pressure



Turn on both the air compressor and the compressed air dryer to make sure that they are operating properly and that the breaker of the system does not trip. Let the compressor operate until the tank is pressurized.

The sealing system requires a minimum of 90 psig to perform the sealing so it is recommended that the regulator pressure be set to around 100 psig with a maximum of 140 psig. Re-check this setting after starting the sealing process because it could drop below 100 psig when there is compressed air flow through the lines.

We now have compressed air available for sealing but we have not yet made that connection. That connection will be made shortly, after we have set up the air drier, fan box, heater cylinder, control box and computer case.

Combo Cords



Computer
Combo Cord



Heater Cylinder
Combo Cord

As mentioned earlier in this program, there are two umbilical cords. Both are 10' in length with an option of 25'.

The Green to Yellow Umbilical Cord is connects the computer case (yellow end) to the fan box (green end).

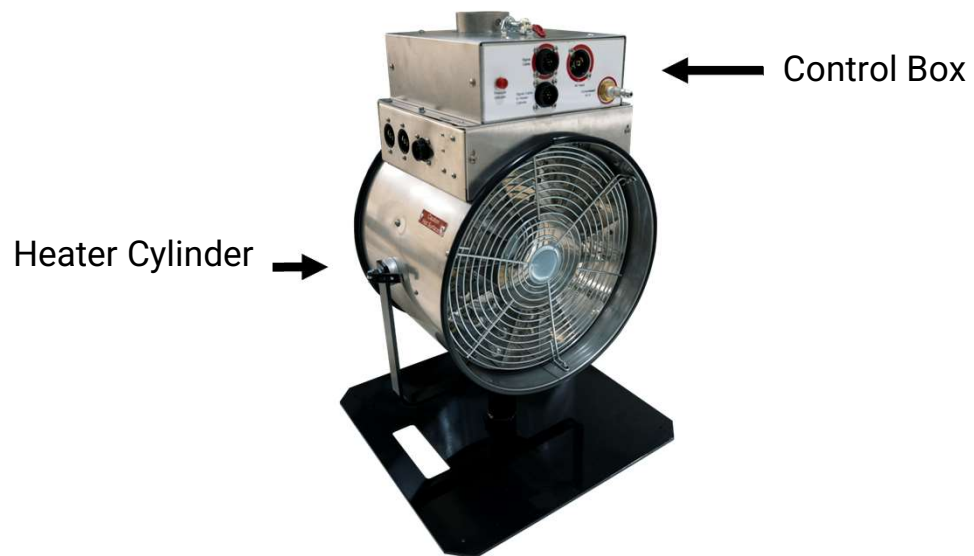
The blue and red color Umbilical Cord connects the Fan Box to the Control Box.

Control Box



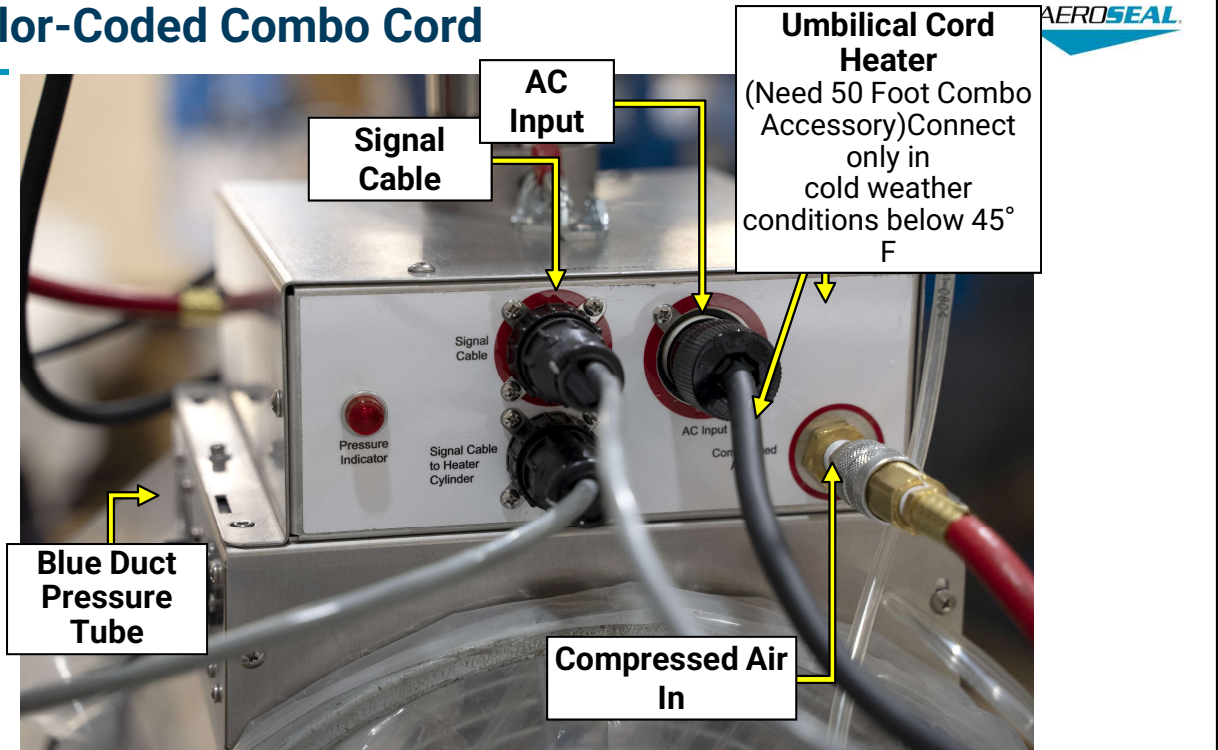
the liquid line in, for sealant injection went through the control box, now it goes directly into the injection wand.) The liquid line through the control box is used for the direct injection method, keeping spills to a minimum.

Heater Cylinder



The Control Box is mounted on top of the Heater Cylinder. Attach the grey signal cable between the Control Box and the Heater Cylinder.

Red Color-Coded Combo Cord



The red color coded end of the second Umbilical Cord connects to the Control Box that was attached to the Heater Cylinder earlier in this program. The clear plastic sealant tube connects to the connection marked Liquid Line In, the 16-pin communication cable connects to the receptacle marked Signal Cable, the power cable connects to the receptacle marked AC Input and the compressed air connection is made to the pressure fitting marked Compressed Air In.

Note: the red end of the second Umbilical Cord has an additional connection to the upper right-hand corner of the Control Box. This is a plug that combines the A/C power to the Optional liquid-line heater with the temperature signal from the liquid-line heater. Connect this only when operating in cold-weather conditions, below 45° F.

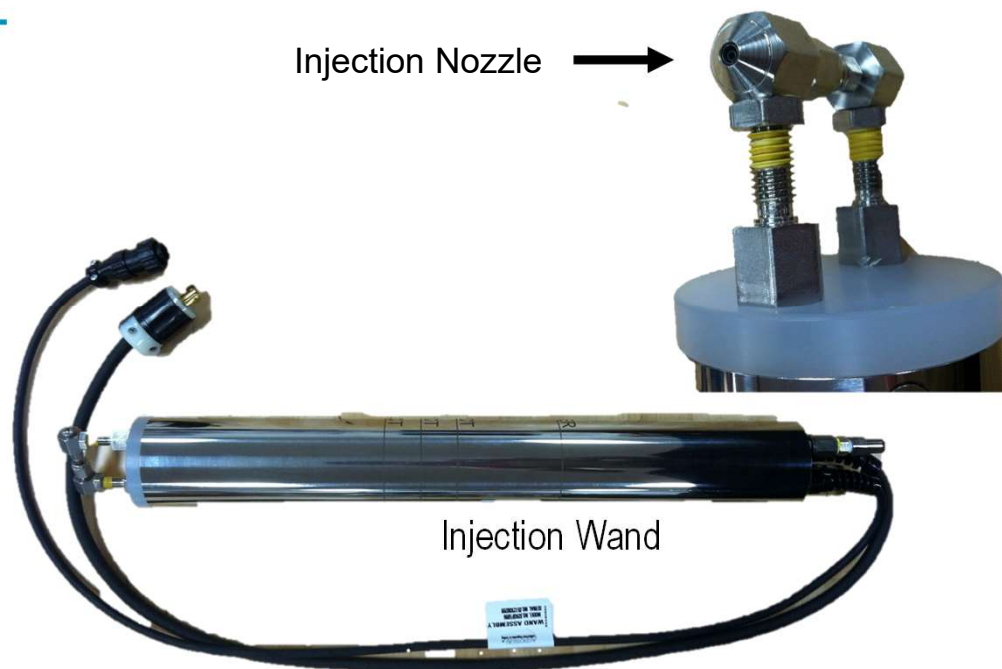
The only connection from the second Umbilical Cord that is not made at the Control Box is the blue duct pressure tube. This blue duct pressure tube should be connected to one of the pressure tubes that were supplied as an accessory, which should in turn be routed to a convenient spot into the duct system that will be sealed. In general, the blue tube is inserted into the corner of one of the foam blocks in a grille. Rarely, a small 1/4-inch hole may have to be drilled into the duct where this duct pressure tube can be inserted and taped into place so it does not fall out or produces an air leak during the sealing process.

Included in the package of accessory parts is a short 16-pin communication cable. Connect one end of this communication cable to the receptacle marked Signal to Heater Cylinder, and the other end into the receptacle on the heater

cylinder.

Make a note that we no longer use the liquid line through the control box. It is connected straight into the Wand.

Injection Wand

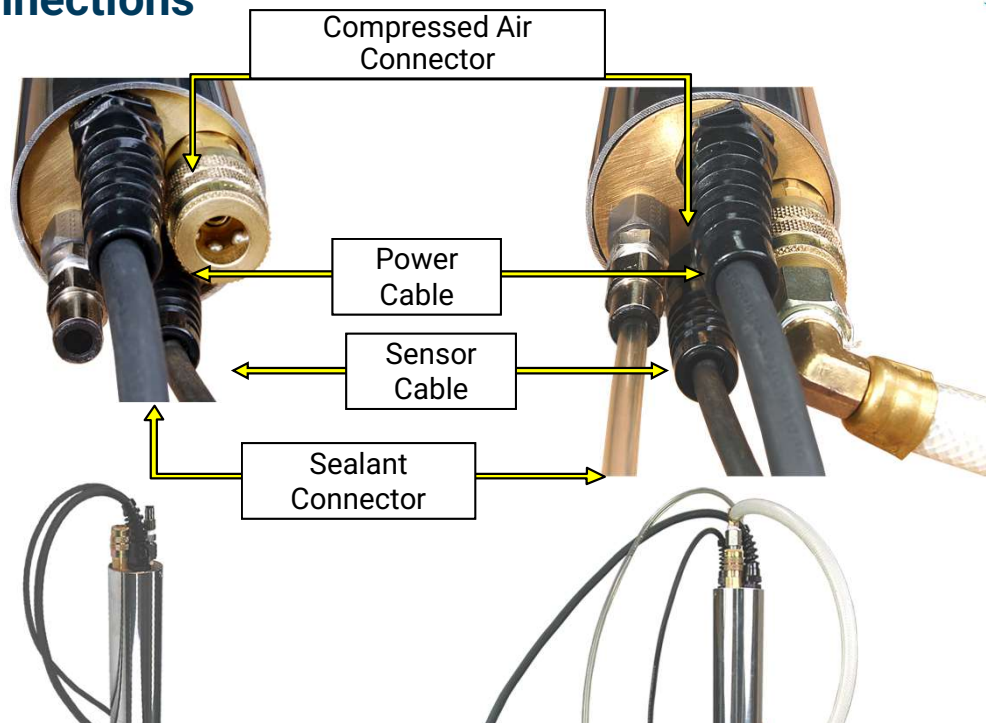


The injection Wand is inserted into the hole in the top of the Control Box and adjusted so that the nozzle is located exactly in the center of the Heater Cylinder. To assist in accommodating this, note that there are several rings etched around the tube of the wand. One of these rings centers the nozzle within the Heater Cylinder. Find this ring and mount the wand with this ring at the top of the control box opening. A longitudinal centering line is also etched on the Wand. Secure the wand using the locking lever on the top of the Control Box.

The nozzle should be positioned so that it is aligned parallel with the sides of the heater cylinder. The first time that you use this equipment, the nozzle and sealant tube will be clean. However, once you start using the equipment, be sure to complete water flushing after stopping sealant injection, and then clean the nozzle with solvent and compressed air. Clogged nozzles can cause overheating and poor sealing performance.

In this document, we will call the Control Box mounted on the Heater Cylinder with the injection Wand installed and adjusted the Injection Assembly.

Wand Connections



The wand contains two cables and two connectors. The thinner cable is the compressed air temperature sensor, while the thicker cable is the AC power for the compressed air heater. Also included in the accessory package are a short clear tube for the sealant material and a short compressed air hose for the compressed air.

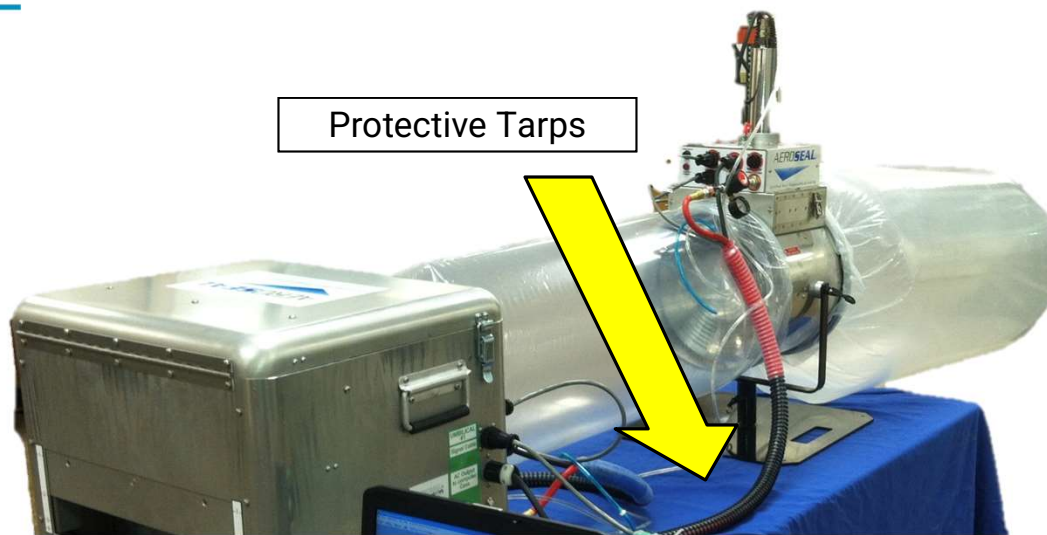
Locating Equipment



Now we want to find a place to set up the Fan Box with the Injection Assembly located close to where you will be injecting into the duct system. Although you can place the Fan Box and Injection Assembly as close together as you would like, you often need to provide room between them for a working area. Here, we have kept about 6-feet between the two pieces of equipment.

It is critical to leave sufficient room between the Injection Assembly and the Injection Flange connection to the duct system being sealed. This is necessary in order to have a long enough straight length of tubing after the Injection Assembly so that the sealant can dry out. A minimum of 8 feet of straight length of tubing is required. After the first 8 feet, you can either have the injection point into the duct, or you can make a turn with the tubing if a straight shot into the duct cannot be made.

Avoid Accidental Spillage



To minimize the possibility of accidental spillage of liquid sealant, protective tarps should be used whenever the sealing equipment is located within the living space. A water proof or water resistant material is preferred. The possibility always remains for a sealant hose connection to come lose or a sealant bottle to be knocked over.

Making Lay Flat Tubing Connections



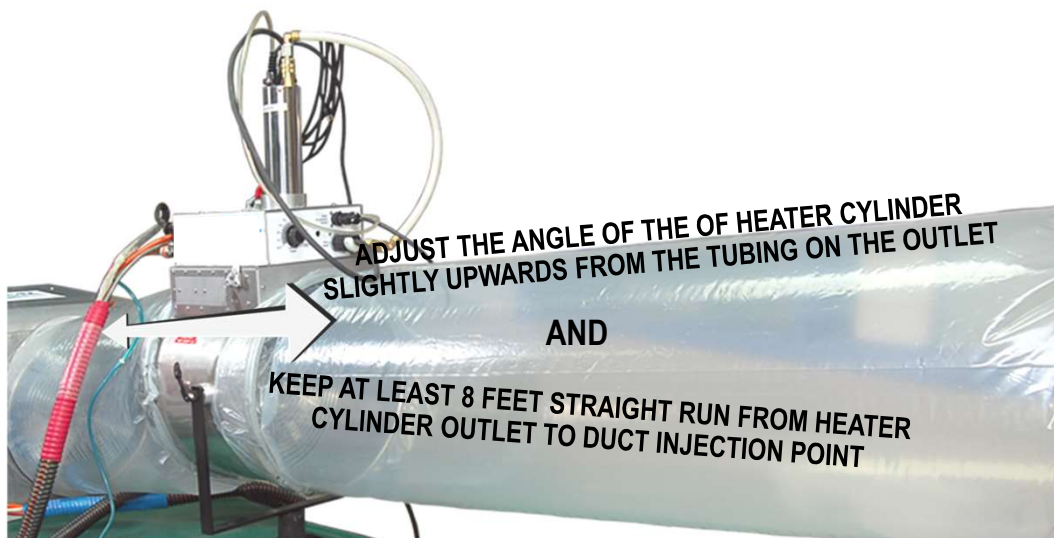
A connection between the equipment components is made easier if the lay flat tubing is connected first. It can be difficult to perform a good job of connecting the tubing once the electrical and pressure Umbilical Cords are in place.

It is recommended to use the 24-inch lay flat tubing between the fan box and the heater cylinder and to use the 36-inch lay flat tubing between the heater cylinder and the duct collar.

Although sealant can be injected into 24-inch lay flat tubing, using the 36-inch lay flat at the injection point improves sealing performance, makes aiming less critical, Using the 24-inch lay flat between the fan box and the heater is recommended to keep the installation more compact and reduce blockage of passageways if the equipment is set up in a hall.

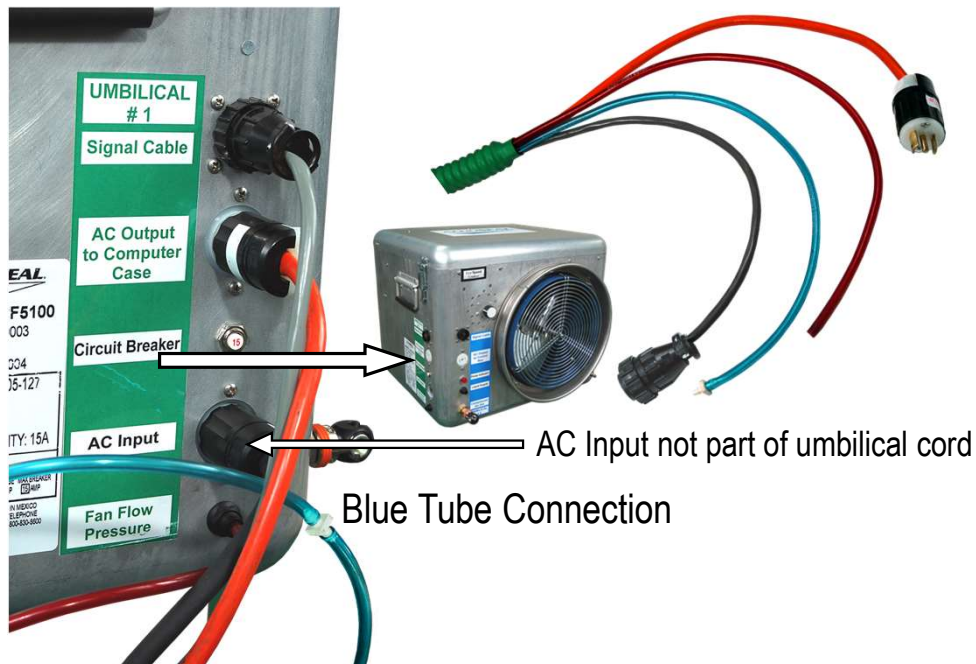
The tubing is attached to the flanges on the Fan Box, the Heater Cylinder and the Injection Flange by means of quick-connect clamps. The tubing should be folded around the clamps prior to connecting the clamps to the flanges on the fan box, the heater cylinder and the Injection Flange. Keep the tubing straight without twists and turns. After the Umbilical Cords are connected and the fan is turned on to medium speed with the manual speed control, the tubing can be straightened by loosening the clamps. Be careful, loosening and re-clamping the tubing at the flange can cause cuts or tears in the tubing that will leak air and possibly sealant. Always check for leaks after clamping by feeling for airflow around the clamps with the fan in operation. Gentle sanding of the edges of the clamps significantly reduces the chances of cutting the tubing.

Nozzle Angle



When the location for the heater cylinder is chosen, remember to adjust the angle of the heater cylinder slightly upwards from the middle of the tubing. And remember to keep at least 8 feet straight from the outlet of the heater cylinder to the duct injection point or any sharp bend in the tubing.

Green Color-Coded Combo Cord

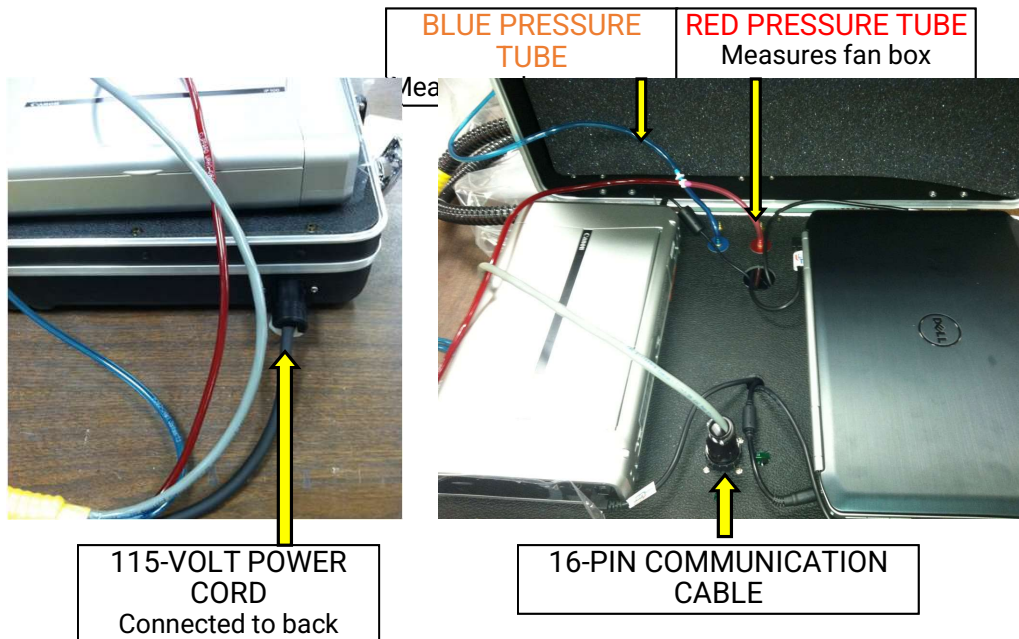


Using a separate power cord, supplied with the equipment, insert and twist the connector to lock it into the connection marked AC Input. The other end of the power cord is connected to a 115-volt circuit in the building. This is our power to the fan box, the computer case as well as the Control Box and the Wand.

Now we will begin to make our Umbilical Cord connections. No two connections are the same on the end of the Umbilical Cord so there will not be any chance of making the wrong connection. Choosing the green color coded end of the Umbilical Cord, make the connections to the green color coded points named Umbilical #1 Signal Cable, AC Output to Computer Case and connect the red pressure tube to the Fan Flow Pressure connection. The fan flow pressure connection is a push on type connector; it is a rubber boot that keeps the tube on the nipple inside. Once pushed in properly, it is locked into position. To remove the pressure connection, push the rubber boot towards the fan box and remove the pressure tube.

Note that the blue pressure tube does not get connected to the Fan Box. It is connected to the Blue Tube inside the second Umbilical Cord, which is in turn connected to a separate blue tube for measuring duct pressure.

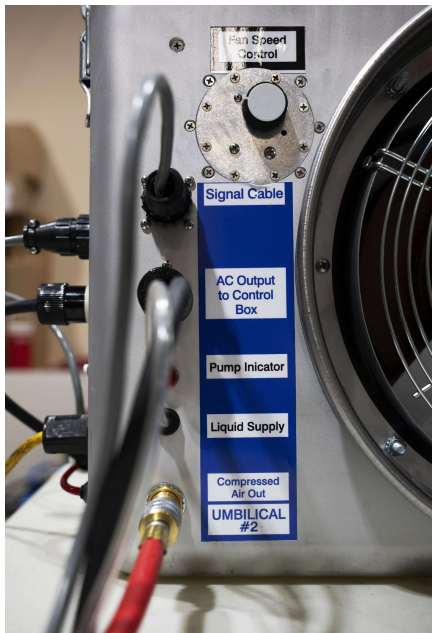
Yellow Color-Coded Combo Cord



Here we can start by connecting the red and blue pressure tubes to the red and blue hose barbs on the computer case. The red pressure tube will be used to determine fan box air flow. The blue pressure tube ultimately gets routed to the duct system and measures duct pressure during testing and sealing.

The 16-pin communication signal cable gets connected to the top of 16-pin receptacle on the top of the Computer Case. The 115-volt power cord gets connected to the back of the computer case to power the computer and printer.

Blue Color-Coded Combo Cord



Now using the second Umbilical Cord, we will make connections to the blue color coded connections on the Fan Box using the blue color coded end of this Umbilical Cord. The signal cable gets connected to the connection marked Signal Cable, the 115-volt power cord gets connected to the connection marked AC Output to Control Box, and the clear plastic sealant tube gets connected to the rubber boot marked Liquid Supply.

The high pressure air connection is at the bottom of the fan box and is a little different than most high pressure connections. To make the connection insert the ball fitting at a 90° angle in the socket and then rotate the fitting to be straight. This locks the fitting into position.

To release the air hose from this fitting, pull back on the orange ring on the connection and pivot the connection into a 90° elbow. The air will be released and the hose will be free from the connection.

This Umbilical Cord has the blue duct pressure tube with the double hose barb fitting. Connect the blue duct pressure tube from the first Umbilical Cord to the end of the double hose barb fitting of the second Umbilical Cord.

Caution: One of the supplied blue pressure tubing assemblies contains a “Tee” for measuring the supply and return simultaneously. If you accidentally use this tube for a single duct, an air leak will exist and false duct pressure readings will be read.

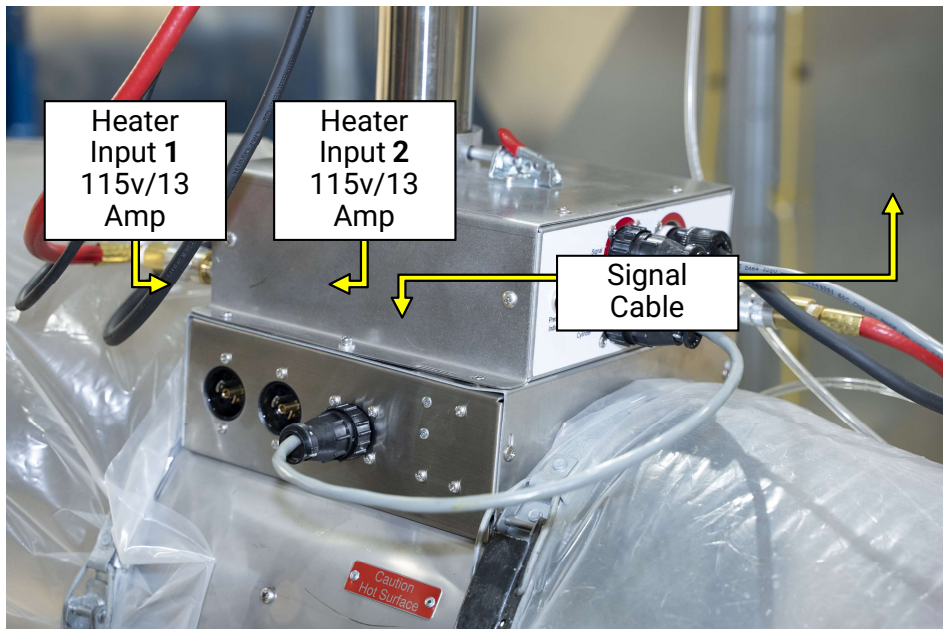
Compressed Air Connection



On the same side of the Fan Box as the blue coded connections, but on the opposite side of the fan exit, is the compressed air input connection. This is the compressed air coming from the air dryer and air compressor.

This completes all of the connections to the fan box. If it is more convenient you can take the compressed air line directly to the control box.

Heater Cylinder Connections



We will now connect the other end of the short 16-pin communication cable to the receptacle on the Heater Cylinder marked Signal Cable.

Here we also connect the two power cords supplied as accessories to the receptacles marked Heater Input, 1 on the left and 2 on the right. The label also indicates that these heaters draw about 13 amps each, which means **separate individual electrical circuits MUST** be used to provide power to these heaters.

Questions?

This is the end of this slide module. Do you have any questions?