PolAIR High Pressure Fog Cooling System

Important Installation Notes
Please read before starting installation

- Read operational manual for POlAIR Controller before starting.
- Familiarize yourself with the compression fittings, shown in the manual.
- Before pressurization, flush entire system, without nozzle line drain valves for 10 minutes to remove any debris that may have gotten into the mainlines and nozzle lines during the installation. Flush by activating inlet solenoid to manual, then activating pump and operational stages to manual.
- Use tube cutters to make cuts in stainless steel tubing, never use a hack saw to cut the tube. Make sure cut ends have no burrs and that they are smooth.
- Have certified electrician connect power to the PolAIR Controller. See PolAIR 400 HC Manual for wiring information.
- Never over tighten compression fittings. Please read section on "Installing Compression Fittings".
- After installation is complete, set operational pressure by adjusting the brass nut on top of the silver pressure regulator located on the pumping system. Set pressure to 1000 psi, (70Bar). Do not exceed 1000 psi or 70 Bar.
- Change pumps crankcase oil after the first 50 hours of operation, then every 300 hours thereafter.
- Change inlet water supply filters regularly to prevent loss of inlet water supply pressure and flow. The PolAIR System has a water safety circuit, which detects low water pressure or volume and will stop the pump system from operating, until proper flow and pressure are restored. This is why it's important to maintain the filters and only use disposable, 5 micron water filters.
  Note: Do not use wound string type filters, use only solid material filters.

High Pressure Compression Fittings.

Installation / Guidelines

The following guidelines should be used and followed when installing the high - pressure compression fittings that were shipped in your system. All tubing ends should be cleaned prior to assembly. The type of compression fittings used in this system does not require flaring of the tube or welding. All fittings are compression.

Installation on the Tube.

1. **Make sure that to use a tube cutter designed to cut stainless steel for cutting the tube as to prevent burrs on the cut end. Any burrs that are on the tube could cause leakage after tightening the fitting**

on the tube and prevent the tube from going all the way into the fitting.

2. **There is no need to remove the nuts from the brass compression fittings to insert the tube. Just loosen the nuts and insert the tube all the way into the body until you hear the tube hit the bottom on the body.**

   **** Note: It is very important that the tube goes all the way into the fitting body before you tighten the fitting nuts.**

3. **While holding the tube into the fitting, hand tighten the nuts on the fitting.**

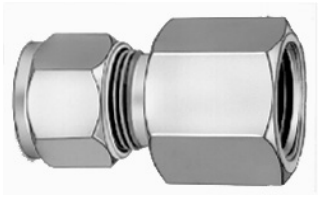
4. **After hand tightened, tighten the nut with a wrench using the following guidelines.**

   - **For straight connectors only, tighten ¾ of a turn after hand tightening. Check for leaks during system operation, if leaking, turn off system and tighten ¼ turn more.**
   - **For all other compression fittings such as tees and 90 degree elbows, after hand tightening, tighten 1 ¼ turns more with a wrench. Check for leaks during system operation, if leaking, turn off system and tighten ¼ turn more.**

5. **Never over tighten the compression fitting if a leak does not stop by using the above procedures. If the fitting continues to leak, remove the fitting and install a new fitting and if needed, replace the ferrules.**

6. **Should you have a fitting that cracks or the splits, this is caused by over tightening the fitting.**

POLAIR COMPRESSION FITTINGS



PMCF 23 ½ COMPRESSION X ½ FEMALE NPT

PMCF 10 ½ COMPRESSION X 3/8 MALE NPT

PMCF 8CPBR

DRAWING SHOWING FRONT AND REAR FERRULE ALIGNMENT

PMCF 27 ½ COMPRESSION TO 3/8 MALE AND PMCF26 ½ COMPRESSION TO ½ MALE NPT

PMCF 21 ½ COMPRESSION X ½ COMPRESSION

PMCF 25 ½ COMPRESSION X ½ COMPRESSION X ½ MALE NPT, TEE

PM8TTM6BR COMPRESSION X ½ COMPRESSION X 3/8 MALE NPT, TEE

PMCF 24 ½ COMPRESSION TO ½ MALE NPT

PMCF22 ½” COMPRESSION TEE

PMCF 20 ½ COMPRESSION UNION

POLAIR 3/8” COMPRESSION FITTINGS

PMCF 2 3/8 COMPRESSION X ½” NPT

PMCF 4 3/8 COMPRESSION X 3/8 NPT

PMCF 1 3/8 COMPRESSION X ½ NPT

PMCF 6 3/8 X 3/8 COMPRESSION ELBOW

PMCF 7 3/8 COMPRESSION X 3/8 COMPRESSION X ¼" FEMALE NPT

PMCF 5 3/8 COMPRESSION X 3/8 COMPRESSION X 3/8 COMPRESSION TEE

PMCF 3 3/8 COMPRESSION X 3/8 COMPRESSION UNION

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January 9, 2004

PolAIR High Pressure Fog System
Suspension Cable Installation

*Note: always install suspension cable with a slope from the pump end of the house to the back. 1.5" of fall per 100 ft is appropriate. This gradual slope will allow for proper drainage of the **ANL** when the pump system ends it's cooling cycle or if the pump is off for any duration.* (***ANL** means atomization nozzle line.)*

1. If wood trusses are 3m apart or less, no vertical cable drop is required if the atomization line (ANL) is mounted on top of the trusses. The ANL will sag if not supported every 3 Mt. If the trusses are further apart then 3 mts, suspension cable will be needed even if the atomization line is mounted on the truss.

2. Suspension cable needs to be installed tight. Uses cable tightners to pull cable tight so suspension system will not sag when the ANL is attached to the cable. Attach cable to the cable tightners using cable sleeves or crimps. See attached drawing.

3. If ANL is to be installed under the truss then ANL needs to be a minimum of 12" from the bottom of the truss in order to prevent condensation on the truss.

4. If ANL is installed under the truss or not on a truss, not only will you need a horizontal cable but a vertical cable drop also. The attached drawing shows the proper way for attaching vertical cable drops. Never wrap the vertical cable drop around the ANL. Attach vertical cable around the horizontal cable and secure with a cable crimp.

5. Check tension of cable after securing the vertical cable drops. Cable must be tight to prevent sagging of the ANL.

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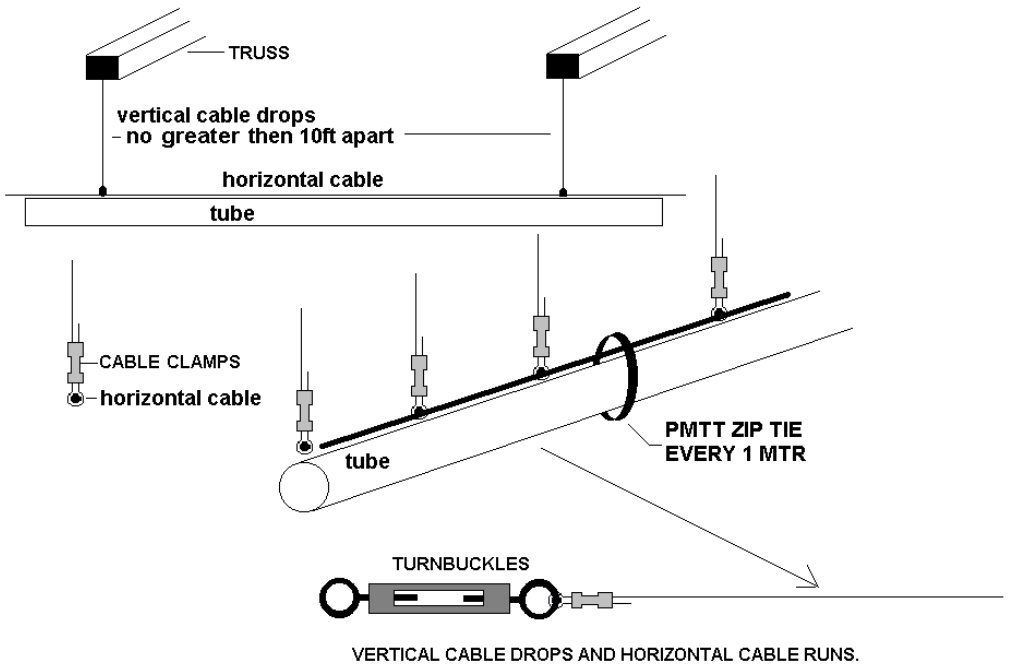


VERTICAL CABLE DROPS AND HORIZONTAL CABLE RUNS.

ATOMIZATION NOZZLE LINE (ANL) and MAINLINE

*Note: leave red caps on the end of the **ANL** to prevent any dirt from entering the anl and potentially fouling the nozzles. Failure to do so can cause severe nozzle blockage. If dirt has entered the tubes, then make sure to flush the system for 10 minutes before attaching drain valve and pressurizing to 70 bar or 1000 psi.*

1. Identify the difference between the anl and just common mainline.

2. Separate the anl from the mainline.

3. Be sure to leave all red caps on the anl and mainline.

4. Once suspension system has been installed, it is now time to begin the hanging / installation of the anl.

5. Anl comes in two angles from the factory. Depending upon your installation, you could have anl that is alternating (nozzles on both sides of the tube, or in-line with nozzles only on one side of the tube, or on the same plane. In both orientations, it is important to note the spacing and to be sure to match the ends of the anl to each other that will carry on the pattern and spacing of the nozzles as you progress down the line.

6. Once you have identified the orientation, angle and spacing and know which ends you need to match to insure that the nozzle spacing remains equal and consistent, then it's time to start from the back of the house / bay and work toward the pump system.

7. Hang a section of anl loosely using the black wire ties. (If your truss spacing is 3mts or less and the anl will mounted on the truss and not on cable, then use tube straps to attach the tube to the truss). Do not pull up the wire ties tight, all the way. The anl needs to remain loose until you have hung several sections.

8. It is important when joining two sections of anl together, that you hold make sure that the angles of the nozzles remain consistent down the length of the suspension cable. Always check for proper nozzle angles when joining the next section of anl.

Installing and tightening the compression coupling PMCF20

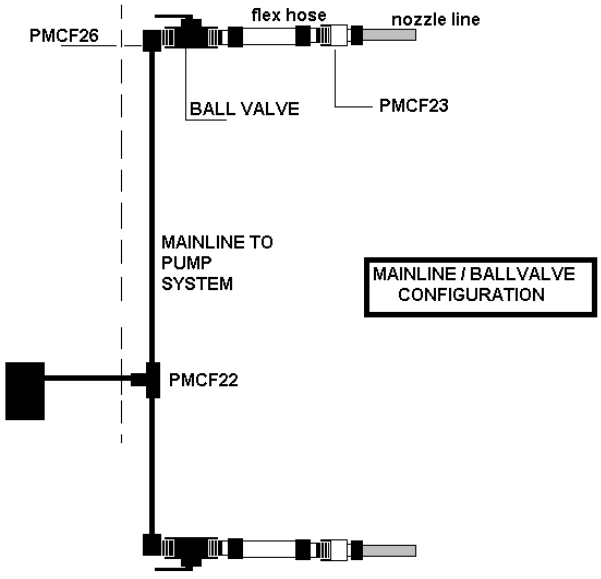
9. Never take off the compression nut of the fitting to insert the anl. If you do and should the front and rear ferrule slide out they must re-installed as per the attached drawing or they will leak when tighten.

10. When installing the anl into the PMCF20, loosen the nuts and slide the end of the tube into the body. ***Make sure that the tube that your inserting into the fitting reaches the bottom of the fitting before you tighten the nuts, failure***

to do so will result in a fitting failure when the system is pressurized. Hold the tube firmly into the compression and hand tighten the nut on the fitting. After reaching hand tight and while continuing to hold the tube into the compression body, tighten the nut with a wrench, 1 ¼ turn after hand tight for all compression fittings except for the compression coupling. For the compression coupling, after hand tight, turn ¾ of a turn. This will seal the fitting.

11. Continue to attach the anl sections together with the PMCF20 and while doing so make sure that you keep the nozzle angle the same for each anl section. After you have attached several sections of anl together, you then can start to securely tighten the black wire ties that you previously loosely tied up to hold the anl to the suspension cable.

12. Continue working your way up to the front of the house until you reach the end of your suspension cable or trusses.



13. Attach a PMCF23 as per the above drawing shows. Install a flexible hose, ball valve and a PMCF26 as shown if your system includes flexible hoses.

14. Continue to install other atomization nozzle lines in the same manner as mentioned above, until all runs of anl have been installed in the structure.

Mainline

15. Install the mainline as the anl was installed, suspending it with either cable or tube straps. In most installations the mainline is installed and attached to the wall using tube straps. Attach a tube strap every 1 to 1.5 mtrs.

16. Continuing working the mainline to the pump system.

17. Attach the pump to the mainline with another PMCF23 compression fitting.

FLUSHING THE SYSTEM

1. Now that you have the anl and mainline installed and attached to the pump system, it is time to flush the system and remove all the debris from the anl and mainlines as well as the pump system.

2. At the Polair Command Center, switch the LOW PRESSURE INLET CHANNEL (1) to manually on. Let the water flow through the system for a minimum of 15 minutes, this will flush away all debris from the system.

INSTALLING AUTOMATIC DRAIN VALVES ON THE ANL

1. After flushing the system for 15 minutes, turn off channel 1 on the Polair Command Center and install the automatic drain valve assembly on the end of each atomization line.

2. Route the drain hose out of the house as not to have drain water accumulate in the building.

PRESSURIZING THE SYSTEM FOR THE FIRST TIME.

1. After you have installed the drain valves, the systems operational pressure must be set to 70 BAR or 1000 Psi.

2. Turn channel 1 on to manual operation. Water should be flowing through the pump.

3. Now turn on CHANNEL 2, HIGH-PRESSURE PUMP. The pump should pressurize to about 1000 PSI and be visible on the pressure gauge. If the system pressure is 1000 psi, then the system pressure is correct.

4. If the system pressure reads to low or too high then the operational pressure can be set by turning the brass nut on top of the pressure regulator (silver barrel, yellow hose at the top) until the pressure comes in line to 1000 psi. Once you reach 1000 psi then the system pressure is set.

5. You may notice some water coming from the drain solenoid of the pump during operation of the pump. This is normal and is excess pump capacity in the form of water that is being expelled or by-passed out of the pump. This bye pass will keep your amp draw on the motor in check and keep the pump from building excess heat in the head of the pump.

6. While the system is operating, check the mainline and anl for leaks around the fittings.

7. Should the system have trouble coming up to pressure or not come up to pressure, then check the drain valves at the end of the anl's to see if water is coming from them when the pump is running. If so then you need to remove the drain valve and see if any dirt or debris has lodged in the drain valve plunger. If the drain valve continues to leak water and the system fails to come up to pressure, then you will need to install another white drain valve washer into the drain valve body. Extra drain valve washers have been provided.

8. Once you have checked the system for leaks and set the operational pressure then you only need to program the Polair Command Center.

Winterizing The Pump
PolAir High Pressure Fog System

The following instructions should be used for flushing and winterizing the pump system, mainline and atomization lines in the PolAir High Pressure Fog System.

1. Remove the automatic drain valves at the end of the atomization line.

2. Remove the filters from the filter housing and fill filter housings with antifreeze.

3. Re-install the filter housings.

4. Close all the ball valves on the atomization lines except for one.

5. PolAir 400 Controller, (Turn on the low pressure fogging channel to manual), PolAir 400HC Controller, (turn on the inlet channel to manual). Flush without motor until you see antifreeze coming from the open end where the drain valve was. Once you see antifreeze, stop the flush.

6. Close the ball valve on the first atomization line and open another atomization line, repeating the above step.

7. Pay close attention that the filter housings contain antifreeze during the flush cycles.

8. After flushing all atomization lines, remove filter housing and empty contents.

9. Disconnect the high pressure hose from between the pump and mainline and let drain. After draining, reconnect the hose.

10. Disconnect the high pressure hose between the mainline and atomization line. let drain. After draining, reconnect the high pressure hose.

11. For added protection, you can finish the winterizing by blowing the mainlines and atomization lines with air if you have access to an air hose.

Pre Season Startup

We recommend that the filters and pump oil be changed at this point. The pump requires 30 weight non detergent motor oil. The pressure regulator should be oiled in the holes that are found the sides of the regulator. Light machine oil such as 3 in one or WD40 will work. During flushing all drain valves should be off.

1. The system should be flushed out prior to pressurizing. To flush out, close all ball valves on the atomization lines and open one.

2. Activate the pump and flush each line for 5 minutes.

3. After flushing the first atomization line, close the ball valve and flush the second line by opening that ball valve. continue on through all atomization lines.

4. Clean the automatic drain valve that goes on the end of each atomization line.

5. Re-install the drain valves.

6. Pressurize the system and check all atomization lines for leaks.

7. Re-adjust pump pressure if not operating at 1000 psi by adjusting the brass adjusting nut on the top of the pressure regulator, either clockwise or counter clockwise.