

# Site-wide and SDSS Air Supply System

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**Mark Klaene is the on-site expert for the air compressor and dryer systems.**

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## Compressors

A new air system is installed for the SDSS air supply. Located in the pump room of the Operations building are two new compressor pumps, plumbed in parallel, which automatically alternate on a fixed schedule between being "primary" and "backup" compressor. This gives the site a combined capacity of approximately 35 CFM at 100 psi. This is more than twice the airflow required for the site under normal operating conditions.

If either pumps shuts down for any reason, the controls on these pumps are set to automatically transfer the load to the other pump, which is fully capable of maintaining pressure. **The day staff checks these pumps on a regular basis but if a single pump shuts down during the night it should in no way interfere with the operation of the telescopes, or even be noticeable to the operators.**

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## Air Dryers

There are 2 dryers associated with the pumps, plumbed in parallel, which dry the air from the primary reservoir before it is sent out through the lines. Airflow to and from these dryers is controlled by ball valves located before and after the dryers, and the dryer's operation is controlled by a green toggle switch on the control panel of each dryer. **Each dryer is capable of maintaining dry air to the site, but if a dryer is malfunctioning it must be manually shut off and isolated from the system.**

The air dryers can easily be checked to verify that they are operating correctly. To do so, watch the two pressure gauges on each dryer and verify that they are pressurized on an alternating basis. Each gauge is attached to one of the two desiccant cylinders which alternately cycle to first dry the air flowing into the lines, then are back flushed to send the moisture out the dryer's exhaust manifold. If only one gauge of a dryer is repeatedly pressurized then the dryer is malfunctioning.

To turn off a malfunctioning dryer:

1. Shut the ball valves in the airline upstream and downstream of the dryer
2. Turn off the green toggle switch.

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## **PMSS Air System**

The Primary Mirror Support System (PMSS) air system is plumbed to provide redundancy. In addition to the old "closed loop" air support system, a new system has been added to support the primary mirror using site air. The advantages of the new "site air" plumbing includes removing compressor heat from the lower enclosure and providing dryer air for the support system.

**French Leger is the on-site expert for the 2.5m PMSS air system.** The 2.5m system is in the lower level of the enclosure.

**Jon Davis is the on-site expert for the 3.5m PMSS air system.** The 3.5m system is on the mid-level of the 3.5m structure.

Please see either of them for training on these procedures.

**Any time there are problems with the site air system, the "closed loop" system can easily be re-activated (or vice versa), as described below.**

Problems which necessitate contacting help and performing a switchover to closed loop (for both systems) includes:

If the low-pressure alarm goes off in the 3.5m control room

If the air dryers fail to function allowing damp air into the lines.

If there is any indication of a significant leak in the air system. This can be checked by observing the inline flow gauges on the airlines in the pump room. No one of them should read more than 10 CFM for any extended period of time

If it requires the simultaneous operation of both compressors to keep up with the site airflow requirements

If for any reason both new compressors are taken offline and the old compressors are supplying site air

If you notice any other air supply trouble which will limit flow rate below 8 CFM or degrade the quality of air to the PMSS air systems

**Note: If both of the new site air systems fail, but you still have power, you can put the PMSS on its own closed-loop system. It should be able to operate like this for a week or more. As an alternative, using the new system if power goes out on the new storage tanks outside the SDSS 2.5m lower level or in the 3.5m lower level to keep the primary mirrors on air for about a half-hour.**

To switch the 2.5m PMSS to the closed-loop system; directions for the 3.5m switch-over are analagous

1. Go to the downstairs of the 2.5m enclosure
2. Locate the PMSS rack
3. Raise the metal flap on the front panel and turn the power toggle on. This is right above the mirror desiccant systems the operators checking
4. Walk around to the back of the rack and face the valves and motors while listening for three things: 1) The motors starting, 2) a loud solenoid "CLICK", and 3) a softer solenoid "click". Once you hear these (should be no more than 15 seconds), proceed.
5. Turn the three valves from "Site Air" to "GAST Pump" state. It's best to first turn the right most valves (located with one directly above the other) at the same time, then immediately turn the left-most valve; it shouldn't matter much if you do it differently.
6. Unplug the power cord labeled "Venturi Supply" which is plugged into the upper UPS receptacle in the rack above the valves you just turned

This completes the switchover to put the PMSS on the closed-loop system.

**Check the three air pressure gauges. The vertical floating ball one on the left side of the rack should now read around zero. The two round gauges should read around 60 and 40 from left to right. If they don't, contact an expert!**

To go from closed to open loop operation, simply reverse the sequence and actions of the above procedure, skipping step #4.

For the 2.5m, if you find the t-bar is unhappy because the venturi pump is not keeping its pressure, you can switch to the mechanical pump. (you will get critical error on t-

bars for the right most gauge on the imager rack in the lower enclosure showing the pressure to be out of norm)

On the lower enclosure imager rack, there is a silver mechanical pump sitting behind the orange tanks. Switch the pump on using the switch on the side of the pump. Above the t-bar latch handle there is a handle with positions labeled "mech. pump" and "venturi pump". Move the handle from "venturi" to "mech.". You have now put the imager latches to the mechanical pump. The gauge above this handle should show that you have 17psi. You can check if the tbars are in a happy state or not by doing "cc imstat" in your iop session. If the imager is in the doghouse, you should see the following in the normal condition.

**T-BARS LATCHED**

VACUUM PRESSURE 11 # KPA ABSOLUTE

<b>Latch Pressure</b>	<b>PSI Relative to Vacuum Source</b>	<b>PSI Absolute</b>
LATCH_PRESS_DEWAR_1	0	1
LATCH_PRESS_DEWAR_2	0	1
LATCH_PRESS_DEWAR_3	0	1
LATCH_PRESS_DEWAR_4	0	1
LATCH_PRESS_DEWAR_5	0	1
LATCH_PRESS_DEWAR_6	0	1
LATCH_PRESS_DEWAR_7	0	1
LATCH_PRESS_DEWAR_8	0	1