Air Tools - Air Compressor

- Eaton PRS0070003

Clearance: everybody can use the air, but only techs and maintenance crew should touch the machine.

- Manual(s)
- Member Notes
- Resources
- Tool Tutorial

Manual(s)

Manuals and other reference materials from the manufacturer or other sources.

- Model: PRS0070003
- Manual: PDF / Online Browsable / Local PDF: eaton-rotary-screw-manual.pdf
- PLC Manual: PDF / Local PDF: logik-25_s.pdf
- Motor Manual: PDF / Local PDF: HYUNDAI_PARTS_AND_MAINTENANCE_MANUAL.pdf
- Eaton Service: 877.283.7614
- Supply Volume: 29 SCFM @ 100 PSI
- Compressor Max Pressure: 145 psi
- Tank Size: 120 Gallon / 19.26 Cubic ft.
- Tank Pressure: 200 psi max
- Maintenance History

Member Notes

Resources

3d Print file for the air filter cages: Air Comp Filter.step

Tool Tutorial

(Link to PDF Tool Tutorial)

Pressures and Regulators

 Do not adjust pressures of regulators or the air compressor. Start a conversation on Discord or file a maintenance request if you have a need not addressed below.

There is a regulator manifold on the outlet of the tank that has 3 regulators. We found that there are needs that require supplying at 3 different pressures. Also adding this manifold allows us to store higher pressure air in the tank reducing the duty cycle of the compressor and buffering more air to cover high demand bursts.

Below is the current set pressures and flow rates.

Compressor & Tank	139-145 PSI	>20 SCFM
CNC Plasma Torch	135 PSI	10 SCFM
Sand Blaster	125 PSI	15 SCFM
Shop Air	80 PSI	??

The math gets tricky from hare, for example if the Plasma was cutting a long job and the sand blaster was at almost a full duty cycle, and someone was powder coating the consumption would outrun the compressor. But the tank would have a buffer before the tank drained to below 135 PSI starving out the plasma. How long would that take? Calculus knows. I don’t.

Usage

 Do not open the compressor cabinet without following the appropriate power lockout procedures specified below. The machine can turn on automatically and could cause serious injury.

 Do not bypass or ignore Lockout Tagout procedures to energize the equipment.

⚠To avoid fires, keep all flammable, combustible, poisonous and noxious materials away from operating area. Make sure there are no oily rags, trash, leaves, litter or other combustible materials in the operating area. Keep suitable, fully charged fire extinguishers nearby when servicing and operating the compressor.

⚠Wear appropriate eye and hearing protection before using air tools.

Controls

 Members shouldn’t need to adjust any settings on the air compressor, Fill out a maintenance request if you would like to have a change made.

Tank

- 120 Gallon (19.26 cubic feet)
- Max Allowable Working Pressure 200PSI @ 400F
- Not to operate below 20F
- Inspected and certified in 2012

I don’t think there is a regulation that these tanks have to be inspected. They would need to be in NY but not California PA seems to have no rules like those states.

Air Paths and Routing

The Air compressor connects to the storage tank. From the tank there is a ¾” pipe to the regulator manifold. There are 3 regulators. The first one connected to the hard piping shop air. The second goes to the sand blaster, and the third goes to the cnc plasma.

The manifold has a shop air coupler on it. This connected the hose for the woodshop which is hung on a hook by the CNC router.

The hard pipe coupler behind the plasma table has a 4:1 manifold on it. 2 hoses are connected to it. One goes to a hook in the welding area and one to a hook in the machine shop.

The Hard pipe traverses the shop overhead and there are two more couplers connected to hoses on hooks. One in the plastics area and one for the powder coating booth.

The hard pipe has several roughed out runs that are currently incomplete. That can be used to extend hard piping to the woodshop. Metalshop, spray booth, and the studio side of the woodshop.

Troubleshooting

Page 34 of the manual has a troubleshooting guide.

Maintenance

TODO - sort into maintenance log

Maintenance History

⚠ AUTHORIZED MAINTENANCE GROUP ONLY ⚠

- Air Filter Last Changed: Feb 23, 2023
- Oil Filter Last Changed: July 10, 2022
- Separator Filter Last Changed: July 10, 2022
- Belts last changed: November 15, 2022
- Oil Last Changed: Feb 23, 2023

If you are part of the maintenance group please log on to the #maintenance channel of our Discord server to:

- Perform a Maintenance Action
- Request a Maintenance Purchase
- Review complete Maintenance Logs for each machine
- Generally chit-chat about maintenance

Warnings

Do not use the E-Stop for routine stopping of the compressor. Use the control panel to stop the compressor before energizing equipment..

⚠This unit can automatically start! Before attempting any repairs or adjustments, disconnect, lock out and verify all power is off to all circuits to minimize the possibility of accidental startup or operation. This is especially important for remotely controlled compressors. Serious injury could result.

⚠ *When cleaning, use air pressure less than 30 psig (2.1bar)*. Also use effective chip guarding and personal protective equipment per OSHA standard 29 CFR 1910.242 (b) Tools The following should be in a Maintenance tool kit for the printer

- Cabinet Key
- Oil Funnel

- ShopVac
- Air Hose
- Crescent Wrench for oil fill port

Replacement Parts List

- Compressor Oil: Oil003 Our compressor has a 1.3 gallon capacity
- There is almost 2 gallons in the Machine Shop Cabinet
- Air Intake Filter: Filter006
- Separator Filter: Filter009
- Oil Filter Filter070
- Belts: Gates Metric XPZ1120

Circuit and Breaker Information

The Air Compressor is plugged into a receptacle on the left side of the air tank. The plug can be unplugged when you need to de-energize the air compressor. The circuit for the air compressor is in the shop electric panel which is located behind the plasma table. The circuit breaker is a 3 phase 30A circuit in sports 10,12,14

Lockout Tagout Procedure

In order to have safe maintenance please follow these steps when opening the access panels on the air compressor.

1. Stop the compressor with the red button on the control panel. Don’t use the e-stop.
2. Unplug compressor from wall receptacle.
3. Put a lockout tag on the power plug.

Checking and Filling Oil

There is a window on the back right side of the machine, with a light you will be able to observe the oil level in a sight glass. The machine needs to be stopped for at least 10 minutes before checking the oil level.

If the oil is below halfway it needs to be topped off. Turn off the machine with the above approved lockout procedure. Use the cabinet key to take off the right side panel.

When the machine is stopped it has a valve to automatically unload pressure from this part of the system. You don't have to worry about pressure in the sump if the machine is stopped and the unload valve is working properly

On the oil sump you will see a 1" hex nut fill cap. Use a crescent wrench to remove this cap. Use the funnel so that oil is more than half but not more than ¾ full in the sight glass. Put the cap back on, attach the side of the cabinet and turn the compressor back on.

Checking and Draining Moisture

- Use hearing protection it can be very loud.
- There is a drain valve on the pipe manifold below the regulators. Open the valve and purge any water that has accumulated.
- On the bottom of the tank there is a second valve, purge any water that has accumulated in the bottom of the tank.
- If there is more than a small mist of moisture file a tool report that the air compressor dryer may not be working.

Maintenance Schedule

TODO - sort into maintenance books

- Daily
  - Check that the compressor area is free of all flammable, combustible, poisonous and noxious materials in the operating area.
  - Check for proper oil level
  - Drain any condensate from manifold, tank, receiver and traps
  - Check for any unusual noise or vibration
  - Check that the fire extinguisher is nearby and charged.
- Weekly
  - Clean air filter
  - Clean all external parts of compressor and dryer
  - Check for unusual noises or vibration
- Monthly
  - Inspect the entire air system for leaks.
  - Inspect dust accumulation on radiator fan and clean if necessary.
  - Inspect oil for contamination and change if necessary
  - Check belt tension and wear
  - Belt tension on each individual belt in the center of each pulley, and should have ¼"deflection up and ¼" deflection down, for ½" total.
- 6 Months

    - Inspect all Piping
    - Clean Sight Glass
    - Check and Tighten all electrical connections
- Yearly
    - Change oil separator filter every 4000 hours
    - Changes oil filter every 4000 hours
    - Change oil
    - Clean Suction Valve

Appendix

Calculating Consumption SCFM for any operating pressure

https://www.youtube.com/watch?v=Ky_5SDoKkgc

Protohaven is 915 ft above Sea Level with a resulting atmospheric pressure of 14.2 PSI

Operating SCFM = Rated SCFM Operating Pressure + 14.2Rated Pressure + 14.2

For Supply SCFM flip the division problem putting rated pressure as the numerator.

- PSI on copper pipes
- Compressed Air Tanks Explained - Sizing, Ratings, Portable Vs Stationary - About Air Compressors.com (about-air-compressors.com)

t = V (p1-p2)/C pa

Where:

- V = volume of the receiver tank (cubic feet)
- t = time for the receiver tank to go from upper to lower pressure limits (sec/min)
- C = free air needed (scfm)
- pa = atmospheric pressure (14.696 psia)
- p1 = maximum tank pressure (psia)
- p2 = minimum tank pressure (psia)

This formula can then be rearranged to give you an approximate ideal volume of your receiver tank:

V = t C Pa/(p1-p2)

t=19.26 (133/100)/25 14.2