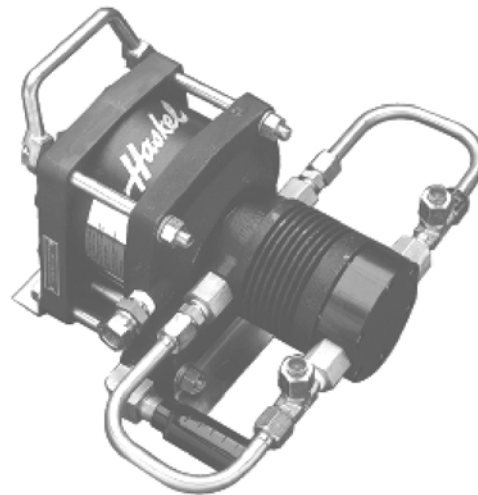




OM-11E

Operating and Maintenance Instructions

Air Driven Air Amplifiers
Models: AAD-5 & AAD-5-C



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Introduction

This operation and maintenance manual has been prepared to assist in the installation, operation and general maintenance of Haskel Air Amplifier model AAD-5 and AAD-5-C. This Haskel amplifier is a double acting pump. It provides a means of boosting plant air to higher pressure and relatively low flow requirements. It is a bootstrap ratio pump that employs the energy of compressed air to raise the pressure of part of the air supply.

The ratio of the air drive piston vs. the pump air piston is 4:1. A model AAD-5 will create an output pressure of 4 times the regulated drive air pressure, plus the unregulated inlet air pressure, automatically stalling when the desired pressure has been reached, and starting up again when the pressure in the output line drops a small amount.

The amplifier is not intended to replace a high pressure compressor where the demand of the high pressure air is of a large constant nature, but is rather a simple expedient means of obtaining high pressure air when the demand is infrequent, and the cost and size of a high pressure air compressor is not warranted. The use of an air volume storage tank at the booster output with air regulator on the tank output may be useful in providing momentary high flow rates of boosted air for pneumatic tools, etc. (See Figure 1, note B.)

Description

The amplifier may be mounted in any position. Both the lower cap and the upper cap have mounting clips drilled to provide for 3/8" bolts. The exhaust muffler has been positioned at assembly to blow cold air across the pump section. Do not change the position of the muffler. The amplifier is an automatic cycling device cycled by a nondetented unbalanced spool that is alternately pressurized and vented by the pilot system. It is not necessary nor desirable to use an air line lubricator. Air valve spool and drive air barrel have been pre-lubricated at the factory.

Air System

The air drive inlet connection is located in the lower cap. This connection is a 1/2" NPS (female straight pipe swivel connector). The exhaust connection is also in the lower cap and on all models includes an exhaust muffler.

Model AAD-5-C includes an air inlet filter, regulator, gauge and speed control valve. These components are pre-plumbed per figure 1 to provide inlet air to the drive inlet and also the pump section inlet. No other plumbing connections are required.

Pump Section

Model AAD-5 has pre-plumbed manifolded inlet and outlet connections to the pump section. These connections are 37° male flare tee for 1/2" O.D. tube. With model AAD-5-C, the air drive port and air inlet port to the pump section are interconnected to 1/2" NPT (air filter).

Operation

With model AAD-5, if the air drive section and the pump section both are fed with unregulated air, the amplifier will automatically stop when outlet pressure reaches an amount equal to 5 times the input pressure. Thus, with an input pressure of 100 psi, the amplifier will automatically stop when outlet pressure reaches approximately 500 psi.

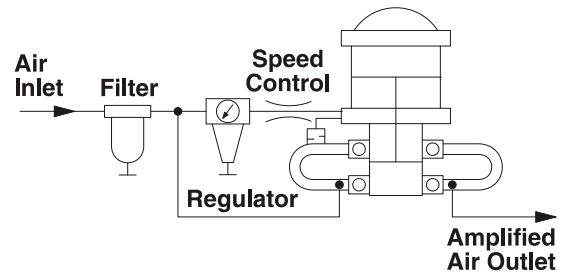
In some applications, it may be more practical to control maximum output pressure with a Haskel result regulator or air pilot switch. Consult distributor or factory.

On model AAD-5-C, unregulated air pressure is fed to the pump section and regulated air to the air drive section. The amplifier will boost the air pressure by an amount equal to the unregulated air pressure plus 4 times the regulated pressure. Thus, with unregulated air pressure of 100 psi and regulated pressure of 50 psi, the amplifier will automatically stop when the outlet pressure reaches approximately 300 psi. Refer to figure 1.

Pressure Control

- A. On model AAD-5-C, maximum amplifier outlet air pressure can be roughly controlled with the regulator on the drive, (Figure 1, plus starting instructions 1-5 below).
- B. However, precise final pressure regulation is best accomplished from a high pressure regulator installed downstream. (It may also be desirable to tee in a small or large air storage tank or install a length of pipe between the AAD-5 outlet and the final regulator - depending on the application.)

FIGURE 1



Pumping Speed

The pumping speed or cycling speed of the amplifier may be controlled by the speed control valve. This valve is also an on/off valve to stop the amplifier yet allow inlet air to flow straight through the pump section to outlet. This is useful in installations where air inlet pressure by itself is sometimes sufficient for the application downstream without help from the air amplifier.

Starting the Amplifier - (Model AAD-5-C per schematic above)

1. Speed control valve should be closed. (Handle at 90° to valve.)
2. Allow inlet air to equalize pressure through the amplifier and to fill the entire outlet system.
3. Select the approximate (maximum) pressure desired to be added to the equalized pressure. Divide by 4. Set this amount on the gauge of the drive air regulator. (For long range reliability, it should be no less than 30 psi.)
4. Open speed control valve and allow amplifier to pressurize outlet system. It should stall at approximately equalized pressure plus regulated pressure times 4.
5. Readjust regulator if necessary. If more precise, constant control of output pressure is desired, provide downstream regulator per suggestion B above.

MAINTENANCE

(Ref. Dwg. 17711 and Figure 2)

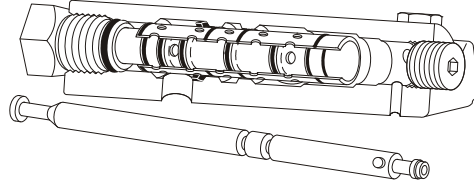
Air Valve Section

Remove spool or sleeve in the following manner:

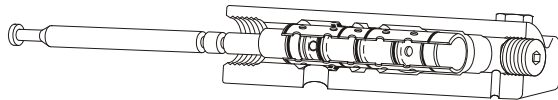
1. Remove air exhaust muffler and fitting located in the lower end cap. Pull out spool; inspect 568017 o-rings. **Relube; reinstall; retest before further disassembly.**
2. If necessary remove sleeve and bumper (rubber faced spacer at inside end of sleeve) with tool P/N 28584 as shown in photos 4 thru 6.
3. Replace any 568020 o-rings or the bumper - spacer if damaged, worn, or swollen.
4. Lubricate o-rings with light coat of Haskel 50866 lubricant.
5. Use lubricant liberally to hold bumper - spacer to sleeve with rubber side facing sleeve.
6. Push lubricated sleeve and bumper into end cap bore, all the way in one quick motion. (If bumper drops off sleeve too soon, remove, re-grease and repeat.)
7. Install spool.
8. Replace fitting and muffler.

FIGURE 2

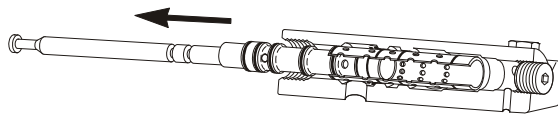
1. 28584 Tool and end cap assembly (cutaway).



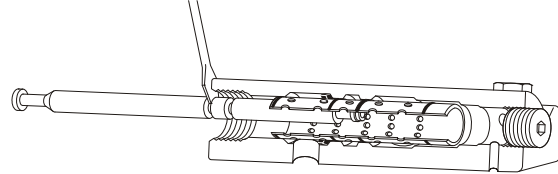
2. Insert tool or small hook in first row of holes in spool.



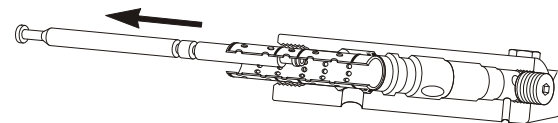
3. Pull straight out. Inspect o-rings. (Do not proceed with steps 4, 5, 6 unless required).



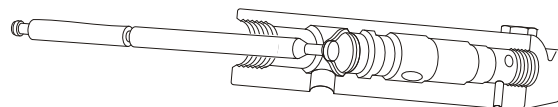
4. Insert tool in second row of holes in sleeve and if necessary, pry out with screwdriver.



5. Pull straight out.



6. Insert bumper hook thru center bumper and pull straight out.



Pilot System

1. Remove hex o-ring sealed plug.
2. Remove spring and 27375 pilot stem (figure 3).
3. Inspect pilot stem and seat for foreign material. Replace stem if shank is bent or scratched.
4. Replace stem if molded seat is damaged.
5. Reassemble in the reverse manner.

NOTE: Unless excessive leakage occurs, it is not advisable to replace the o-ring seal for the shank of the stem. This requires disassembly of the air section. If replacement is required, care must be taken in installing the Tru-Arc retainer concentrically as shown in figure 4. Use the 27375 pilot stem valve as a seating tool. Place the rubber valve face against the retainer and tap the top of the valve lightly with a light hammer to **evenly** bend the legs of the retainer.

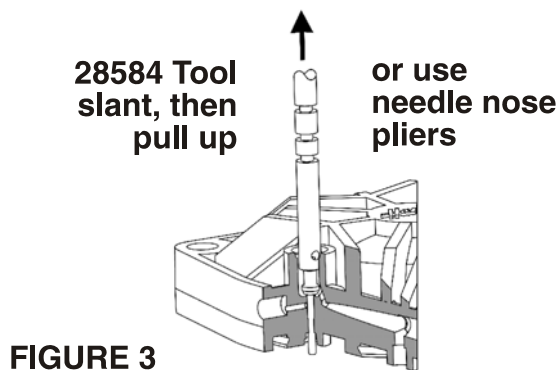
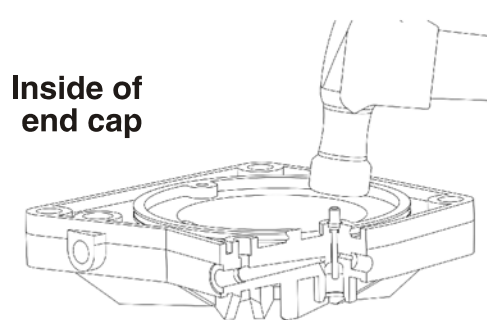


FIGURE 3



Seating the Retainer

FIGURE 4

Test procedure for pilot control valve:

After reassembly, if the pump will not cycle, the following test procedure will determine which of the pilot valves is faulty.

1. Remove the 17658-2 1/8" pipe plug in upper end cap.
2. Install 0-160 psi pressure gauge.
3. Apply air pressure to the air drive inlet. Gauge will read zero pressure if **lower** pilot valve has not been actuated. Gauge will read full drive pressure if **upper** pilot valve has not been actuated. Correct pilot valve action will cause gauge to immediately rise or fall from zero to drive pressure. A slow increase in gauge reading indicates leakage in lower pilot valve or 568017 o-ring on inside end of spool or 568020 o-ring on inside end of sleeve. A slow decrease in pressure indicates upper valve or pilot tube end seals are faulty and repair is necessary. Check also for external air leaks at plugs.

For disassembly and repair of:

Air Drive Section and Air Piston

1. Remove (4) tie bolts. Then remove upper cap.
2. Remove air barrel and static seal o-rings.
3. Remove seal on air piston.

Pump Section and Pump Piston Repair

4. Remove (6) socket head cap screws in end cap. Then remove end cap.
5. Remove retainer ring, pin and nut on pump piston.
6. Remove pump piston spacer, piston ring and o-ring.
7. * Remove air piston and rod assembly in air drive section.

8. With screwdriver, gently remove both o-rings and rod bearings in pump section.
9. Inspect, replace and install all internal parts in air drive section and pump section per drawing 17711.
10. Relubricate air barrel with 50866 Haskel lubricant.
11. Reassemble pump in reverse order of disassembly instructions. Care must be taken in disassembly and assembly that the flow and pilot tube o-rings be on the flow and pilot tubes prior to assembly. Alternately (cross-wise) torque tie rods to a maximum torque of 16-18 foot pounds.

*NOTE: Eliminate steps 7 and 8 if no leakage through purge/vent port has occurred. Inspection and replacement of o-ring and rod bearings should not be necessary.

Check Valves

Remove and inspect parts (Ref. dwg. 17711). Replace 28119 seats if damaged.

Troubleshooting Guide

Symptom	Cause	Remedy
1. Will not run at low air drive pressures (10 - 15 psi)	1. Excess friction of spool o-rings 568017.	1. Necessitates relubrication or replacement of spool o-rings. (See instruction for removing spool in Figure 2, steps 1, 2, 3.)
2. Pump will not cycle, or slow cycling.	1. Leakage of flow and/or pilot tubes. 2. "Iced up" exhaust vent. 3. Indication that one or both pilot valves are malfunctioning. 4. Build-up of residue in muffler.	1. Replace o-rings on flow pilot tubes. 2. Remove ice. 3. Remove pilot valves, inspect and repair per instructions in maintenance section. 4. Remove muffler, disassemble and clean.
3. "False" or double cycling or continuous exhaust bleeding.	1. Small inlet air supply piping magnifies any internal leakage.	1. Increase air inlet piping and replace o-rings in the following order (test each step): a. No. 568015 o-ring inside hex exhaust port fitting. b. Spool o-rings No. 568017. c. Sleeve o-rings No. 568020. (See instructions for removing and replacing o-rings.)
4. Amplifier will not dead head (stall)	1. Check valves contaminated or damaged.	1. Remove, inspect, clean or replace check valve parts as necessary.
5. Excessive moisture or liquid outside of muffler.	1. Air filter full of water.	1. Drain air filter.
6. Excessive leakage out vent hole on top of pump section.	1. Piston rod seal leakage.	1. Replace rod seals. (Ref. dwg. 17711.

Operating and Maintenance Instructions

CE Compliance Supplement

SAFETY ISSUES

- A. Please refer to the main section of this instruction manual for general handling, assembly and disassembly instructions.
- B. Storage temperatures are 25°F - 130°F (-3.9°C - 53.1°C).
- C. Lockout/tagout is the responsibility of the end user.
- D. If the machine weighs more than 39 lbs (18 kg), use a hoist or get assistance for lifting.
- E. Safety labels on the machines and meanings are as follows:



General Danger



Read Operator's Manual

- F. In an emergency, turn off the air supply.
- G. Warning: If the pump(s) were not approved to ATEX, it must NOT be used in a potentially explosive atmosphere.
- H. Pressure relief devices must be installed as close as practical to the system.
- I. Before maintenance, liquid section(s) should be purged if hazard liquid was transferred.
- J. The end user must provide pressure indicators at the inlet and final outlet of the pump.
- K. Please refer to the drawings in the main instruction manual for spare parts list and recommended spare parts list.

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LIMITED WARRANTY

Haskel manufactured products are warranted free of original defects in material and workmanship for a period of one year from the date of shipment to first user. This warranty does not include packings, seals, or failures caused by lack of proper maintenance, incompatible fluids, foreign materials in the driving media, in the pumped media, or application of pressures beyond catalog ratings. Products believed to be originally defective may be returned, freight prepaid, for repair and/or replacement to the distributor, authorized service representative, or to the factory. If upon inspection by the factory or authorized service representative, the problem is found to be originally defective material or workmanship, repair or replacement will be made at no charge for labor or materials, F.O.B. the point of repair or replacement. Permission to return under warranty should be requested before shipment and include the following: The original purchase date, purchase order number, serial number, model number, or other pertinent data to establish warranty claim, and to expedite the return of replacement to the owner.

If unit has been disassembled or reassembled in a facility other than Haskel, warranty is void if it has been improperly reassembled or substitute parts have been used in place of factory manufactured parts.

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