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Form No. 102524

Operating & Service Instructions for: 100180

MODEL D

AIR/HYDRAULIC TWO STAGE BOOSTER-PAC®

NOTE: These instructions should be read and carefully followed. Most problems with new equipment are caused by improper operation or installation.

GENERAL INFORMATION

General Features

Before operating or connecting Booster-Pac to clamps, familiarize yourself with the operating controls, line connections and their functions. See figures 1 and 2 for this information.

Toggle Control. Up position activates clamps; down position releases clamps. Toggle control has sub-plate for remote mounting.

Air Pressure Regulator. Regulates clamping system pressure. To increase turn control clockwise, to decrease turn control counterclockwise.

Pressure Gauge "on-off" Valve. Designed to prolong gauge life. When valve is in "off" position, system cycling pressure will bypass gauge

Pressure Gauge (0-5,000 PSI). Provides operator with system operating pressure. *(Gauge is not designed for continuous cycling. Used only to check system pressure as needed.)*

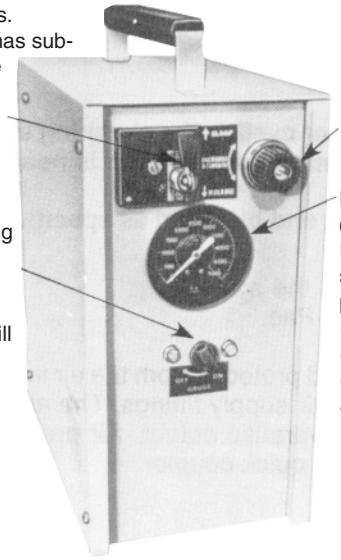

FIGURE 1

Air Coupler (not provided)

Air Filter.

Air Lubricator.

Oil Fill and Vent Port. To properly vent system, back off fill plug two turns.

Air Outlet Port - 1/8" NPT. Used if clamps are the air-return type. Leave sealed if not using air-return clamps.

Oil Advance Port-1/4" NPT. Attach clamps to this port.

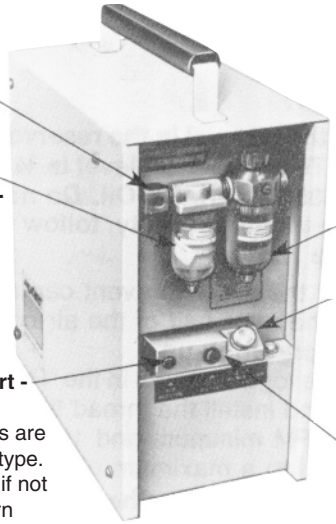

FIGURE 2

SAFETY PRECAUTIONS

⚠ WARNING: To help prevent personal injury,

Hydraulic Hose

- **Before operating the pump, all hose connections must be tighten with the proper tools. Do not overtighten. Connections need only be tightened securely and leak-free. Overtightening may cause premature thread failure or high pressure fittings to split at pressures lower than their rated capacities.**
- **Should a hydraulic hose ever rupture, burst, or need to be disconnected, immediately shut off the pump and shift the control valve twice to release all pressure. Never attempt to grasp a leaking hose under pressure with your hands. The force of escaping hydraulic fluid could cause serious injury.**
- **Do not subject the hose to any potential hazard such as fire, extreme heat or cold, sharp surfaces, heavy impact. Do not allow the hose to kink, twist, curl, or bend so tightly that the oil flow within the hose is blocked or reduced. Periodically inspect the hose for wear because any of these conditions can damage the hose and result in personal injury.**

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- **Do not use the hose to move attached equipment. Stress may damage the hose and cause personal injury.**
- **Hose material and coupler seals must be compatible with the hydraulic fluid used. Hoses also must not come in contact with corrosive materials such as creosote-impregnated objects and some paints. Consult the manufacturer before painting a hose. Never paint the couplers. Hose deterioration due to corrosive materials may result in personal injury.**

Pump

- **Do not exceed the PSI hydraulic pressure rating noted on the pump nameplate or tamper with internal high pressure relief valve. Creating pressure beyond rated capacities may result in personal injury.**
- **Before replenishing the oil level, retract the system to prevent overfilling the pump reservoir. An overfill may cause personal injury due to excess reservoir pressure created when cylinders are retracted.**

Cylinder

- **Do not exceed rated capacities of the cylinders. Excess pressure may result in personal injury.**
- **Do not set poorly-balanced or off-center loads on a cylinder. The load may tip and cause personal injury.**

Air Supply

- **Shut off and disconnect the air supply when the pump is not in use or before breaking any connection in the system.**
- **Air pressure must be used to release hydraulic pressure from the system. In the event of loss of operating air pressure, hydraulic clamping pressure may be released by loosening a fitting between the power unit and clamps. IMPORTANT: A protective shield to prevent injury must be placed over the hydraulic fittings before releasing the coupling.**

SETUP AND OPERATION

IMPORTANT:

- **Check the oil level in the reservoir before installation and again after cycling the clamping system several times. The proper oil level is 3/4" below the fill port opening with all cylinders retracted. If oil is needed, use Power Team hydraulic oil. Do not overfill.**
- **If the reservoir is empty, follow the instructions for filling, priming and bleeding as specified in the Maintenance section.**

1. Back-off the filler plug vent cap two complete turns to properly vent the system.
2. Attach the male-half of the air coupler (not provided) to the Booster-Pac.
3. **Air Supply Hook-up**

   Place the toggle control in the RELEASE position and remove the thread protector from the air inlet of the pump. Select and install the thread fittings which are compatible with your air supply fittings. The air supply should be 13 CFM minimum and 100 PSI minimum to obtain the proper hydraulic output. Air pressure should be regulated to a maximum of 125 PSI. Attach your shop air line to air quick-coupler.
4. **Clamping Pressure Check**

   A. Turn the pressure gauge valve counterclockwise.

   B. Move the toggle control to "Clamp" position and slowly turn the air pressure regulator control clockwise until the gauge reads approximately 3500 PSI. A reading of 3500 PSI should be obtained if the shop air pressure is approximately 100 PSI.

   C. If the shop air pressure is adequate but pressure cannot be reached, follow the trouble-shooting procedures outlined in the Trouble-shooting Guide.

   D. Release pressure and turn the pressure gauge valve to the OFF position. The pressure gauge is to be used only when a pressure check is needed.

   E. Disconnect the shop air line.
5. Thread the oil advance half-coupler or hydraulic hose into the Booster-Pac oil outlet port. Wrench tighten. See Figure 3. Leave the 1/8" pipe plug in place if air-return clamps are not being used in this set-up.

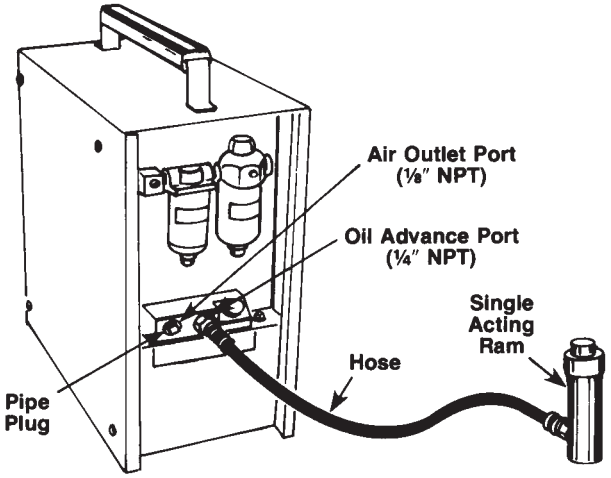


FIGURE 3

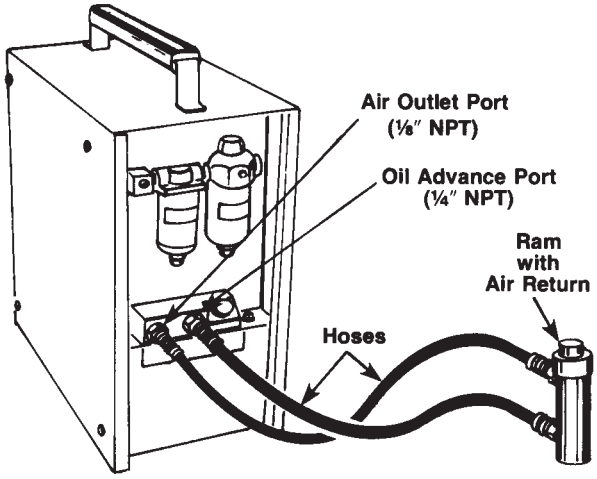


FIGURE 4

Air-Return Clamps

If the clamps to be used are the air-return type, connect an air-return line to the air-return port on the Booster-Pac. See Figure 4. Use tubing or hose with a 125 PSI capacity for the air-return line.

IMPORTANT:

- **The use of quick couplers is recommended to keep air and contamination out of the system.**
- **Clean all the areas around the oil ports of the pump and cylinder. Inspect all threads and fittings for signs of wear or damage and replace as needed. Clean all hose ends, couplers or union ends. Remove the thread protectors from the hydraulic oil outlets.**
- **Seal all hydraulic connections with a high quality, nonhardening thread sealant. Teflon tape may also be used to seal hydraulic connections provided only one layer of tape is used. Apply carefully, two threads back, to prevent the tape from being pinched by the coupler and broken off inside the pipe end. Any loose pieces of tape could travel through the system and obstruct the flow or cause jamming of precision fit parts.**

6. Manually fill the clamps, hose and tubing with Power Team hydraulic oil.

IMPORTANT:

- **If you are not using approved Hytec fittings and hoses, be sure attached hardware is of the proper pressure rating and fully tightened.**
- **Do not overtighten the connections. Connections need only be tightened securely and leak-free. Over-torque may cause premature thread failure or high pressure fittings to split at pressures lower than their rated capacities.**

7. Connect the clamps.
8. Connect the shop air line to the Booster-Pac.

IMPORTANT: The toggle control must be in the RELEASE position when the pressure gauge is turned on or off.

9. Turn the pressure gauge valve to the ON position and check and adjust the system operating pressure if needed.
10. Run the system through several clamp and release cycles. Leave the toggle control in the RELEASE position and turn off the pressure gauge valve.
11. Recheck the unit's oil level (correct level is 3/4" below fill port opening with cylinder retracted).

MAINTENANCE

NOTE: Any repairs or servicing which requires dismantling the pump must be performed in a dirt-free environment by a qualified service technician.

Lubrication

If the pump is operated on a continuous duty cycle or at maximum speeds for extended periods, set the air line oiler to feed 1 drop of oil per minute into the system. Use SAE grade oil (5W to 30W). For servicing the air regulator, lubricator and filter system, see the operating and service instructions provided.

NOTE: Dirty air or not enough lubrication are the two major reasons for failure of air power units.

Hydraulic Fluid Level

- Check the oil level in the reservoir after every 10 hours of use. The oil level should be 3/4" below the fill port opening with all cylinders retracted.
- Drain and replenish the reservoir with Power Team hydraulic oil after one year or when contaminated.
- Keep oil and containers clean, and fill under clean conditions.

Oil Change Procedure

1. Place the toggle control in the RELEASE position and disconnect the air coupler from the air supply. Disconnect the clamps from the Booster-Pac.
2. Remove the oil advance half-coupler or hose from the oil advance port. If the clamps are the air-return type, disconnect the air-return hose from the Booster Pac and tighten a 1/8" NPT plug securely in the air outlet port.
3. Remove the filler plug vent cap from the Booster-Pac. Decrease Booster-Pac pressure by turning the air regulator control counterclockwise as far as possible.

⚠ WARNING: Failure to decrease pressure can cause a high velocity spray of oil to come from the bleed hose.

4. Tip the Booster-Pac on its back side and drain the oil out of the reservoir into a waste oil container. Attach a bleed hose to the Booster-Pac oil outlet port and hold the end of the hose in the waste oil container. **NOTE: A bleed line assembly No. 200228 can be purchased from Hytec. However, any flexible tubing 2' long and attached to a 1/4" NPT male connector may be used as a bleed line.**
5. Attach your shop air line to the Booster-Pac. Cycle the toggle control from the CLAMP to RELEASE position several times. The unit should now be completely drained. Disconnect the air supply.

Filling and Priming

1. Fill the reservoir to 3/4" below the fill port opening.
2. Connect a bleed line assembly to the oil outlet port. Place the other end of this hose into a one quart, or larger container. (See bleed line information note in Oil Change section.)
3. Place a valve hooked up to your shop air line, into the reservoir hole. Seal the opening with a clean shop towel and slowly admit 10 to 20 PSI of pressure. Oil should come out of the oil outlet port. When this happens, remove the valve from the reservoir opening.
4. **Bleeding, Delivery and Pressure Buildup.** Turn the air regulator counterclockwise as far as possible. Place the toggle control in the CLAMP position.
5. Attach air line to Booster-Pac.

IMPORTANT: Excess air in the oil system must be removed through a bleed line.

6. Place toggle control in RELEASE position.
7. Pour oil from the container back into reservoir.
8. Cycle toggle control through the CLAMP and RELEASE positions several times, each time pouring any oil in the container back into the reservoir before cycling again.
9. Connect the Booster-Pac to a cylinder or clamp of less than 13 cubic inch capacity. Turn the air pressure regulator clockwise as far as possible. Turn the pressure gauge valve to the ON position.
10. Place toggle control in the CLAMP position. After rapid advance, the reciprocating air motor should begin to operate at between 170-200 PSI and the unit should build approximately 3500 PSI with 100 PSI air pressure. Release the system pressure.
11. Repeat the above procedure about 4 or 5 times at approximately 20 second intervals. Check the unit holding pressure.
12. Recheck oil level and back-off filler plug vent cap two complete turns to property vent the system.

Periodic Cleaning

- A routine must be established to keep the pump as free from dirt as possible.
- All unused couplers must be sealed with thread protectors.
- All hose connections must be free of grit and grime.
- Any equipment hooked up to the pump should also be kept clean.
- Use only Power Team hydraulic oil in this unit and change as recommended (every 300 hours).

Fire-Resistant Hydraulic Fluid

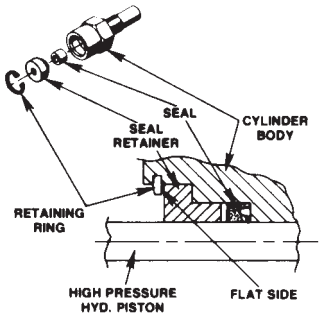
- Flame Out 220™ fire resistant hydraulic fluid is compatible with all Power Team hydraulic equipment.
- The use of this fluid does not require the changing of seals in any Power Team pump or cylinder.
- Flame Out 220™ is available through your local Power Team distributor.

TROUBLE-SHOOTING GUIDE

Refer to Parts List when using this trouble-shooting guide.

PROBLEM	CAUSE	SOLUTION
Clamps fail to advance.	1. Inadequate air pressure. 2. Air regulator is not set properly. 3. Filler plug vent is not opened properly. 4. Low oil level in reservoir. 5. Leaky connection or hose. 6. Leak in air lines of connections. 7. Faulty toggle switch or air valve, (Item No. 64).	1. Increase air pressure. 2. Increase or decrease hydraulic pressure by turning regulator clockwise or counterclockwise until desired hydraulic pressure is obtained 3. Open filler vent two full turns. 4. Fill reservoir to recommended oil level. 5. Tighten connections or replace hose. 6. Replace leaky air lines. 7. Repair or replace items as needed.
Clamps advance only part of the desired stroke and unit does not shift into high pressure stage.	1. Clamping system capacity is too large for Booster-Pac. System must not require more than 13 cu. in. to extend clamps to desired stroke.	1. Reduce size of the clamping system.
Clamps advance to desired stroke but unit does not shift into high pressure stage.	1. Sequence valve is malfunctioning.	1. Disassemble valve and clean all parts. Reseat and replace any parts if necessary.
Clamps advance to desired stroke but unit does not build desired hydraulic pressure (air motor running).	1. Filler plug vent is not opened properly. 2. Low oil level in reservoir. 3. Leaky connection or hose. 4. Excess air in oil. 5. Faulty hydraulic pressure gauge. 6. Faulty seat in Filter Adapter (Item No. 38) and Steel Ball (Item No. 28). 7. Loss of prime.	1. Open filler vent two full turns. 2. Fill reservoir to recommended oil level. 3. Tighten connections or replace hose. 4. Bleed Booster-Pac per instructions in Maintenance Section 5. Replace Gauge. 6. Reseat or replace seat and ball. 7. Refer to priming instructions.
Clamps fail to retract or unit does not release pressure.	1. Inadequate air supply. 2. Faulty toggle switch or air valve (Item No. 64).	1. Increase air supply. Check air connections and hoses. 2. Replace items or repair if necessary.

PROBLEM	CAUSE	SOLUTION
Excessive oil blowing from air exhaust valve or air motor muffler.	1. Leaking T-seals (Item No. 34) on high volume piston (36). 2. Air lubricator set too rich. 3. Disogrin U-cup seal (Item No. 44) on high pressure piston is leaking or copper washer (Item No. 42) is leaking. 4. Cut gasket (seal) between air cylinder tube and body.	1. Replace O-ring (Item No. 37) and T-seal (Item No. 34). 2. Turn adjuster clockwise until closed, then open 1/8 turn. 3. Replace seals if necessary. 4. Replace gasket.
Air will leak out of air motor muffler during release cycle.	1. O-ring (Item No. 8) leaking on return piston (Item No. 9).	1. Replace seal.
Air Leaking from air regulator.	1. Cracks in air regulator diaphragm. 2. Dirty seats in air regulator.	1.2. Refer to included air regulator repair instructions.
Oil is dumping into reservoir through low pressure stage safety valve during pressure building cycle.	1. Low pressure stage relief valve steel ball (Item No.17)is not seated properly.	1. Reseat and replace ball and spring if necessary.
Oil flow into reservoir through small hole in cover during clamp cycle.	1. Low pressure stage relief valve steel ball (Item No. 27) not sealed properly.	1. Reseal ball, check parts and replace if necessary.
Oil returns to reservoir through intake tube during clamp cycle.	1. Low pressure stage intake check ball (Item No. 19) not sealed properly.	1. Reseat ball, check parts and replace if necessary.
Oil is returned to reservoir through return hole in Pump Body.	1. Release valve ball (Item No. 22) is not seated properly in the Poppet Retainer (Item No. 24).	1. Reseat ball, check parts and replace if necessary.
Unit will continue to run slowly even after desired pressure is reached.	1. Outlet ball check (Item No. 28) is not holding in pump body. 2. High Pressure Pump intake check ball (Item No. 28) not seating properly. 3. Release Valve Ball (Item No. 22), not seating in Poppet Retainer (Item No. 24).	1. Reseat ball and replace parts if necessary. 2. Reseat and replace parts if necessary. 3. Reseat seat or replace parts if necessary.
Pump does not reciprocate or stops reciprocating during operation (before reaching stall-out pressure).	1. Broken Compression Spring, (Item No. 48) or Retaining Ring (Item No. 46).	1. Replace spring. Replace retaining ring as shown.



NOTE: The Retaining Ring (Part No. 11034) must be installed with the flat side, or sharp edge, placed toward the retainer as shown.

PROBLEM	CAUSE	SOLUTION
Pump does not reciprocate or stops reciprocating during operation (before reaching stall-out pressure). Cont.	2. Loose air piston screws (Item No. 5). 3. Sticky shuttle valve (A) Swollen O-ring (Item No. 10). (B) Swollen Piston Poppet (Item No. 4). (C) Broken Compression Spring (Item No. 11). (D) Excess oil in shuttle chamber. 4. Tight air piston (A) Swollen O-ring (Item No. 14). 5. Air leakage (A) Check O-rings that seal air piston (Items No. 10 and 14) and Gasket (Item No. 15). (B) Check Piston Poppet (Item No. 4) sealing surface.	2. Apply Loctite and torque to 50-55 in. lbs. 3. (A) Replace (B) Replace (C) Replace (D) Drain off excess oil. 4. (A) Replace O-rings to reduce friction 5. (A) Replace if defective.
Pump reciprocates but no oil delivery (Cylinder will not extend).	1. Low oil level. 2. Pump not primed. (A) Check oil filter for contamination. (B) Outlet Compression Spring (Item No. 27) too strong. (C) If the pump will not prime or repeatedly loses prime after attempting all of the preceding suggestions, check the travel of the inlet Check Ball (Item No. 28) located in the Filter Adapter (Item No. 38).	1. See Filling and Priming Instructions in the Maintenance section. 2. (A) Remove filter and clean. (B) Replace. (C) Ball must be flush with or below surface of Filter Adapter (Item No. 38). If necessary, add extra Copper Washer (Item No. 37).
Low oil delivery (Cylinder extends slowly).	1. Reservoir not vented. 2. Inadequate air supply. (A) Check air input supply. (B) Contamination, check air side of pump. Thoroughly inspect the slot in the Air Cylinder Tube (Item No. 3). 3. Hydraulic failure. (A) Check the oil Filter (Item 39) for contamination. (B) Air in hydraulic system. (C) Check the travel of the inlet Check Ball (Item No. 28) located in the Filter Adapter (Item No. 38).	1. Vent reservoir. 2. (A) Should be 13 C.F.M. minimum. (B) Clean and reassemble. 3. (A) Clean and reinstall. (B) Bleed the system as described in "PREVENTIVE MAINTENANCE" section. (C) Ball must be flush with or below surface of Filter Adapter (Item No. 38). If necessary, add extra Copper Washer (item No. 37).

PROBLEM	CAUSE	SOLUTION
Pump will not build to maximum pressure. (No visible leakage).	1. Check the air supply.	1. 100 PSI is required to obtain maximum pressure.
	2. Internal Leakage. (A) Inlet Check Ball (Item No. 28) located in filter Adapter (Item No. 38) not sealing properly. (B) Defective Copper Washer (Item No. 37).	2. (A) Reseat or replace Filter Adapter (Item No. 38) and inlet Check Ball (Item No. 28). (B) Replace.
	3. Outlet Check Ball (Item No. 28) not seating.	3. Reseat seat in Pump Body (Item No. 41) and replace Check Ball (Item No. 28) if needed.)
	4. Defective seals.	4. Inspect O-ring (Item No. 25) and Copper Washer (Item No. 34) and replace if necessary.
Pump builds pressure but will not hold system pressure.	1. Check hydraulic connections.	1. Refit as needed.
	2. Outlet Check Ball (Item No. 28) not seating properly	2. Reseat seat in Pump Body (Item No. 41) and replace Check Ball (Item No. 28).
	3. Defective seals.	3. Inspect O-ring (Item No. 25) and Copper Washer (Item No. 34) and replace if necessary.
	4. Leakage in hydraulic cylinders attached to pump.	4. Repair as needed.
Air motor cycles during fast approach first stage.	1. Worn sealing surfaces in the bore of the Sequence Valve Body (Item No. 50) and/or worn seals. (Item Nos. 51, 52, 54, 6, 57).	1. Disassemble and clean. Check over all parts and replace any that are damaged or worn.

NOTE:

- **Air pressure must be used to release hydraulic pressure from the system. In the event of loss of operating air pressure, hydraulic clamping pressure may be released by loosening a fitting between "Booster-Pac" and clamps. IMPORTANT: A protective shield to prevent injury must be placed over the hydraulic fittings before releasing the coupling.**
- **If system fails to function after completing the above checks, contact your nearest Hytec Authorized Hydraulic Repair Station.**