Operation and Service Manual

Part No. 900035

Model TF-S-5-AIR

Model 87-D-8-T-AIR

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HARVARD
CORPORATION

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INTRODUCTION

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Features

- ❑Removes contaminants as low as 1-micron
- ❑Removes water from petroleum base fluids
- ❑Filters most synthetic and oil base fluids
- ❑Moves easily from site to site

Applications

Hydraulic fluid in injection molding, presses and power unit

- ❑Air compressors and vacuum pumps
- ❑Quench oils in heat treating
- ❑Cutting oils and coolants in industry
- ❑Industrial fluids
- ❑Engine oils
- ❑Hydraulic and transmission fluids

Increases

- ❑Fluid life
- ❑Machine life
- ❑Equipment life

Decreases

- ❑Downtime
- ❑Hazardous waste generated
- ❑Replacement fluid costs
- ❑Waste disposal costs

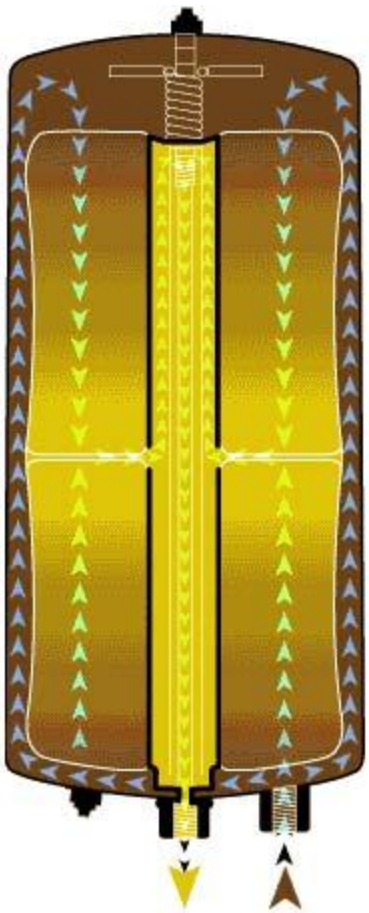
Original equipment manufacturers are incorporating Harvard Corporation's filtration technology into the design of their products. OEMs prefer engineering and building our filter into their products rather than letting the end user put our filter on afterward. Harvard Corporation also provides assistance to OEMs, including extensive engineering and technical support. Harvard builds filters designed for specific OEM equipment applications.

How Our System Works

Contaminants from 1 to 40 microns in size are common even in full-flow, filtered lubricants and coolants. Larger contaminants nest into areas around bearings, rings, pumps, etc. and damage component surfaces. Smaller contaminants that cannot be removed by full-flow filters wear the apparatus by a process called silting.

For many years, partial-flow filtration has been used to supplement full-flow filters to remove larger contaminants and control silting. Harvard Corporation did not invent partial-flow filtration, but we significantly improved it. Our patented, non-channeling seals improve partial-flow filtration by forcing oil through a wound, fiber-filter media so fluids cannot bypass the partial-flow filter.

Independent studies conducted by the Center for Hazardous Materials Research at the University of Pittsburgh demonstrated the effectiveness of Harvard Corporation non-channeling, partial-flow filter. The filter removes virtually all remaining 1 to 40 micron contaminants while also removing the vast majority of silting particles. In addition, the filter absorbs water, antifreeze and other extraneous particles.



This manual will help you get the most out of your system, and provide information for maintaining and servicing. It is recommended that you read the entire manual, and note the illustrations before operating the unit.

Information for models:

TF-S-5-AIR, 87-D-8-T-AIR

Specifications

TF-S-5-AIR:	Dimensions:	20 ¾" w x 44 ½" h x 18 ¼" d
	Weight:	125 lbs
	Capacity:	5 gpm with 150 SUS Oil
87-D-8-T-AIR:	Dimensions:	20 ½" w x 44 ½" h x 18 ¼" d
	Weight:	160 lbs
	Capacity:	5-8 gpm with 150 SUS Oil

Welded Steel Frame, Corrosion-Resistant Powder Coated Finish

Pressure Gauge and Air Regulator to Monitor System Pressure

Quick Priming, Positive Displacement, Rotary Steel Gear Pump

Suction Line "Wye" Strainer

Internal Positive Protection Pressure Relief Valve

Welded Steel Housing (Stainless Steel Extra)

Powder Coated Housings

High Flow Standpipe

All Steel Fittings

Stainless Steel Tubing

Model TF-S-5-AIR

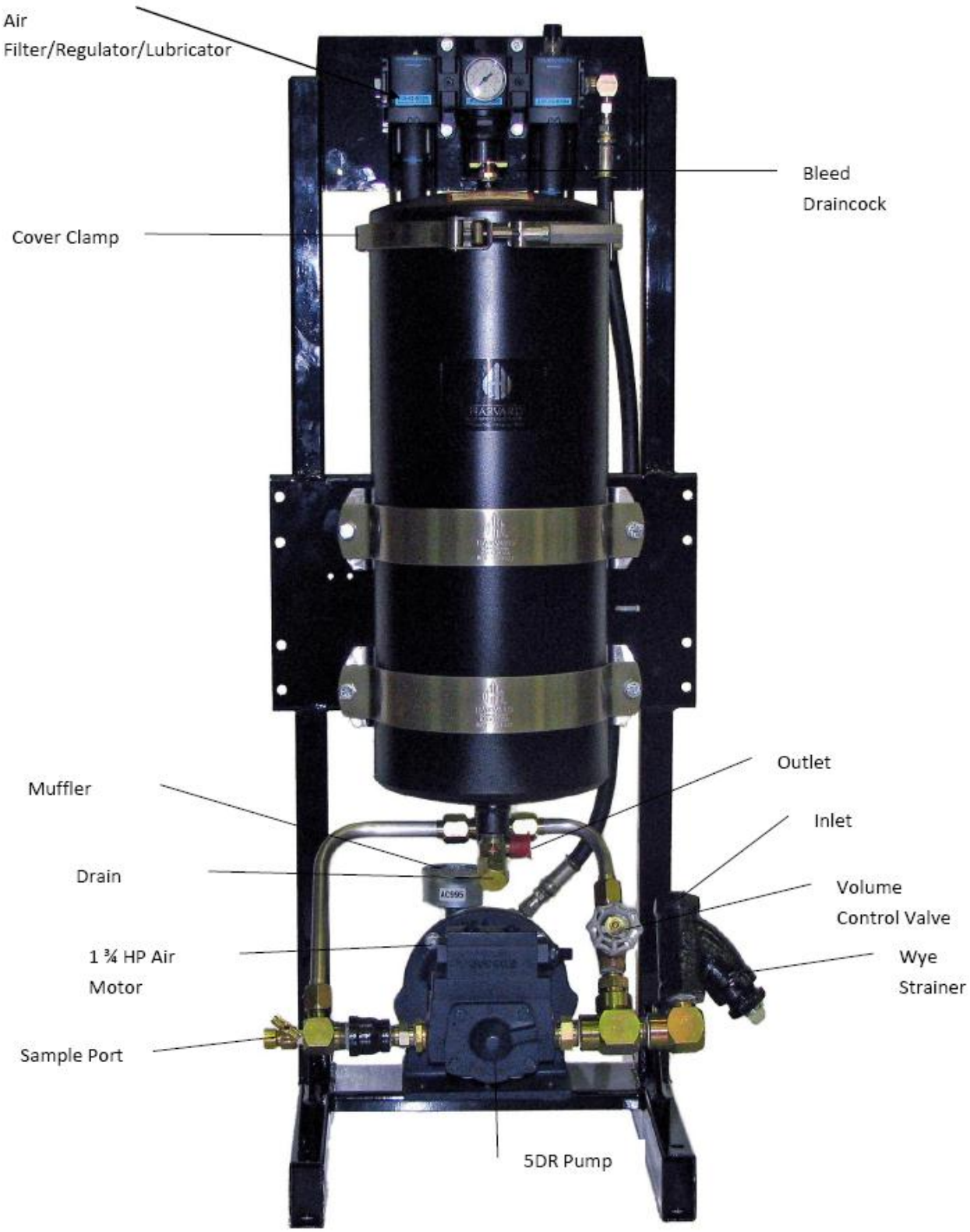


Figure 1

Model 87-D-8-T-AIR

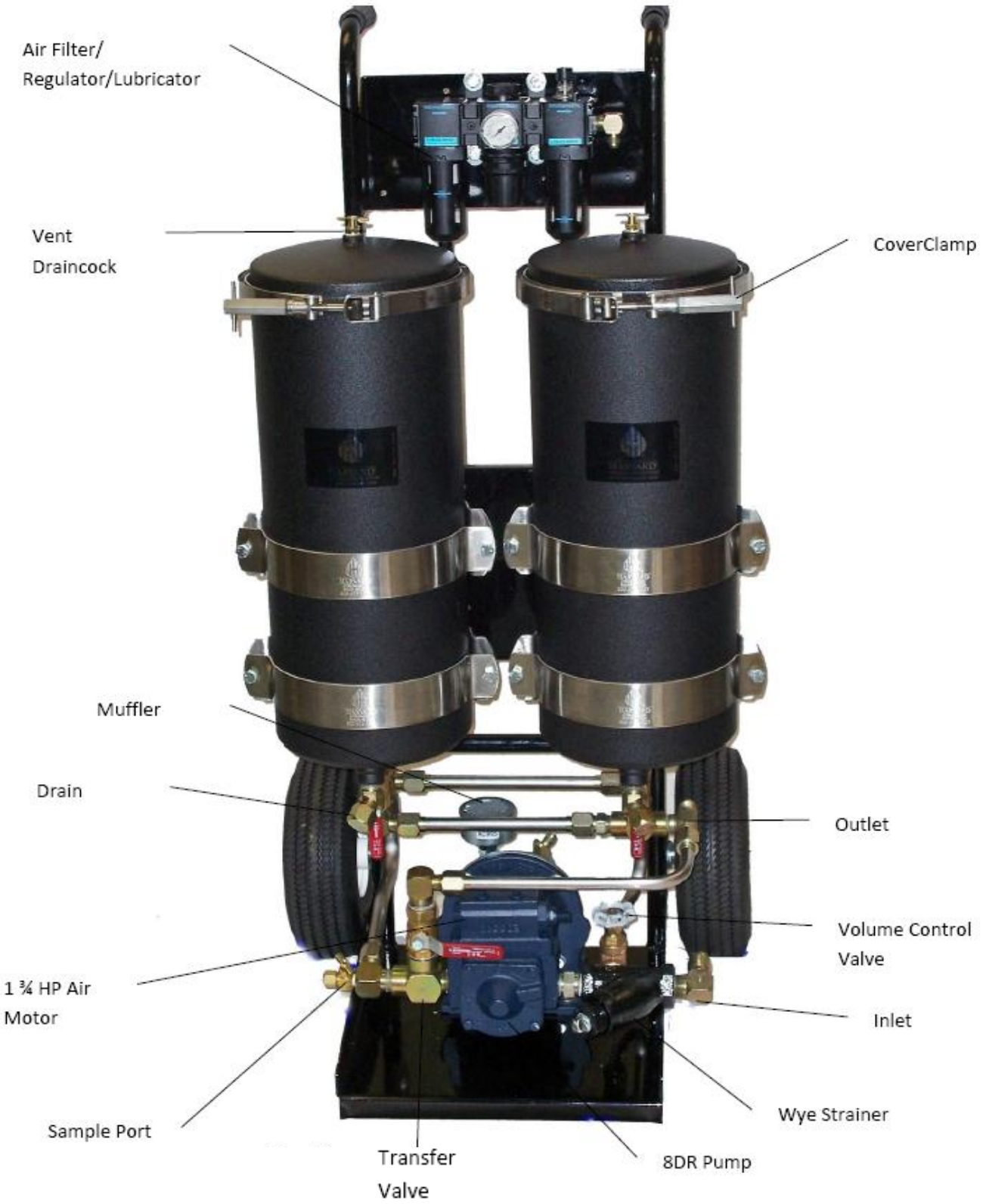


Figure 2

Pre-Operating

1. Connect the inlet and outlet hoses to the inlet and output fittings, respectively.

2. Connect or insert the inlet line to the fluid to be cleaned, and the outlet line to the fluid to be determined. See Note 1.

3. Install the new filter element and seal as per “Element Change Procedures”.

Note 1: Refer to flow diagrams

Operating Instructions

1. Open the inlet and outlet flow valves.
2. Close the transfer valve.
3. Open the volume control valve.

Warning: Never start the motor while the valves are closed. Damage to the motor may result and void the warranty!

4. Connect the air line to the air regulator.
5. Adjust the knob on the air regulator until the regulator gauge indicates a pressure of 50 psi.
6. Slowly open the valves on the housing cover(s) to release air from the housing(s). When oil appears, close the valves.
    - For low-viscosity fluids, the VCV may need to be completely closed at this point.
    - For high-viscosity fluids, the VCV may need to be fully opened at this point. Running high-viscosity fluids back through the pump generates heat, which lowers the viscosity.
7. Close the volume control valve until the pressure gauge on the housing indicates a pressure of 20 psi.

In transfer mode, fluid bypasses the filter element(s). To operate in transfer mode, close all flow valves and open the transfer valve.

Element Change Procedures

Element Replacement is required when the pressure gauge is at or above 55 psi.

WARNING! UNIT MUST BE OFF WHEN SERVICING

Refer to Figures 1 and 2.

1. Turn the unit off.
2. Remove the drain cap at the bottom of the housing, and open the vent drain cock. See Note 1.
3. Remove the cover clamp and cover.
4. Remove the turndown bolt, turning CCW.
5. Lift out the element, using the element lifter, and allow it to drain on a suitable container.
6. Reinstall the drain cap.
7. Install the new element, orienting it so that the end with the soft gasket faces down.
8. Replace the turndown bolt seal.
9. Reinstall the turndown bolt. Screw it CW until it comes to a definite stop.
10. Reinstall the cover and clamp, and then close the vent. See Note 2.
11. Restart the system, and bleed off any air from the housing(s) using the vent cock located on the housing cover(s).

The filter system is now ready to use.

Note 1: Use a suitable container to catch fluid; the housing can hold up to 5 gallons.
Note 2: Before the cover is installed, the drained fluid can be put back into the housing.

Element Application Guide

Fluid Type	Filter No.
Lube Oil…….	1002* or 1004
Transmission Oil……..	1004* or 1002
Hydraulic Oil (300 SUS max)…….	1004* or 1002
Hydraulic Oil (3000-1000 SUS max)……..	1002 or 1004*
Transformer Oil……	1004* or 1002
Turbine Oil……	1004* or 1002
E.D.M. Oil…….	1002 or 1004*
Cutting Oil……..……..	1002 or 1004*
Synthetic Oil……	1004* or 1002
Quench Oil……	1002 or 1004*

* Use for higher flow rates.

Sampling Procedure

1. Remove the sample valve cap.

2. Clean the outlet port to remove dust and dirt.
3. Place a container beneath the sample valve to catch the oil flow. The container should hold at least one quart (0.95 L).

4. Open the sample valve to allow a steady stream of oil from the outlet.

5. Open the sample bottle and fill it from the stream of oil. Empty and refill it two or three times to clean the bottle with the oil.

   Warning: Opening the sample valve knocks particles into the oil. To avoid contaminating the sample, wait several seconds after opening the valve before filling the sample bottle.

6. Fill the bottle for the last time. Quickly cap the bottle.

7. After the sample bottle is capped, close the sample valve to stop the oil flow.

8. Replace the sample valve cap.

9. Complete the sample information sheet.

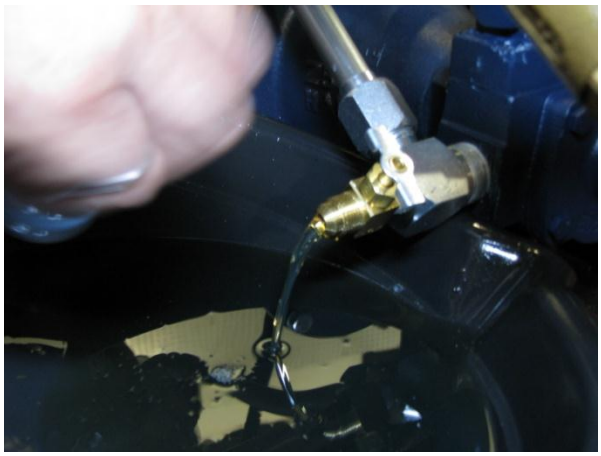


Figure 3: Step 3.

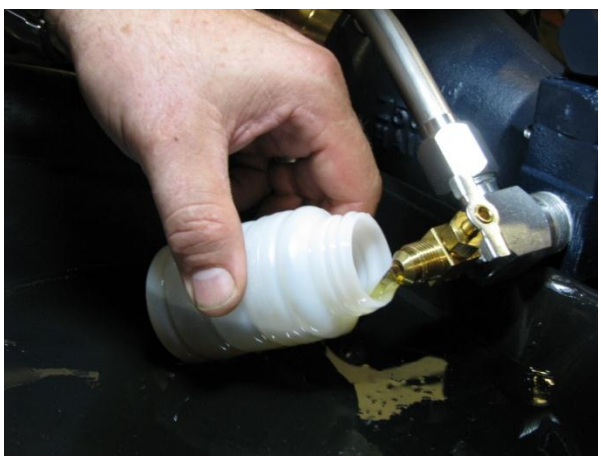


Figure 4: Step 4.

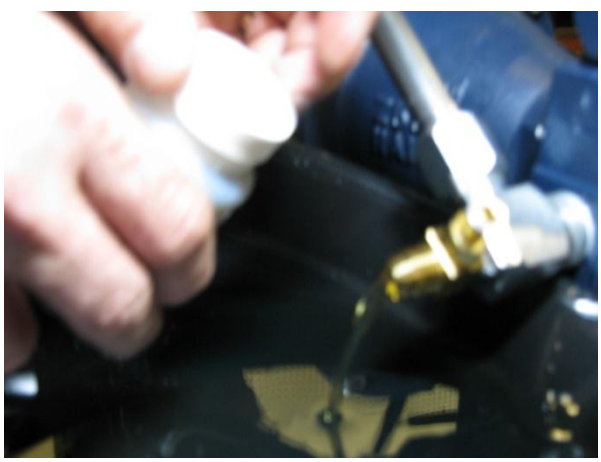


Figure 5: Step 5.

Parts Replacement Procedures

CAUTION! Disconnect the air pressure, and the inlet and outlet hoses before performing any maintenance or repairs, to prevent possible personal injury.

Pump Seal Replacement

1. Disconnect the air.
2. Disconnect the inlet hose.
3. Disconnect the hose(s) to the filter housing(s), at the housing end(s).
4. Loosen the two (2) screws in the Z bracket.
5. Pull the pump out of the Z bracket.
6. Remove the oil cover seals, wiper seals, and shaft
7. Install the new seals from the kit, reassemble the pump, and reinstall it into the Z bracket.
8. Connect the hoses to the filter housings and reconnect the inlet hose
9. Order kit #850012 for 3, 5, and 8 GPM pump replacement seals

Pump Removal and Installation

1. Disconnect the air.
2. Disconnect the plumbing connected to the filter housing.
3. Loosen the two (2) setscrews in the bracket.
4. Pull the pump out. Remove the discharge piping and the Y strainer from the pump.
5. Remove the drive coupling.
6. Remove the Z bracket mounting bolts from the motor end and rotate the bracket so that the opening is up. Screw in the two (2) bolts finger tight.
7. Slide the drive coupling onto the pump shaft with the teeth pointed away from the pump.
8. Slide the new pump into the Z bracket as far as it will go, and tighten one (1) setscrew.
9. Slide the drive coupling toward the motor so that it engages the mating half. The rubber spider must be in place.
10. Tighten the setscrew in the coupling*.
11. Loosen the setscrew in the Z bracket and remove the pump.
12. Remove the two (2) finger- tight mounting bolts on the motor end and rotate the bracket so

that its opening faces down. Reinstall four (4) bracket mounting bolts on motor end and secure tightly.

13. Screw Y strainer into suction side of pump, and discharge piping into discharge side of pump**.
14. Insert the pump back into the Z bracket and tighten the two (2) setscrews securely.
15. Reconnect the plumbing to the filter housing.

***Note:** *Be sure there is 1/16" space between halves*
****Note:** *Piping should be parallel with pump shaft when they are tight.*

Motor Removal

1. Disconnect the air pressure.
2. Remove the Z bracket mounting bolts.
3. Remove the motor mounting bolts.
4. Slide the motor out from the rear of the frame.

Motor Installation

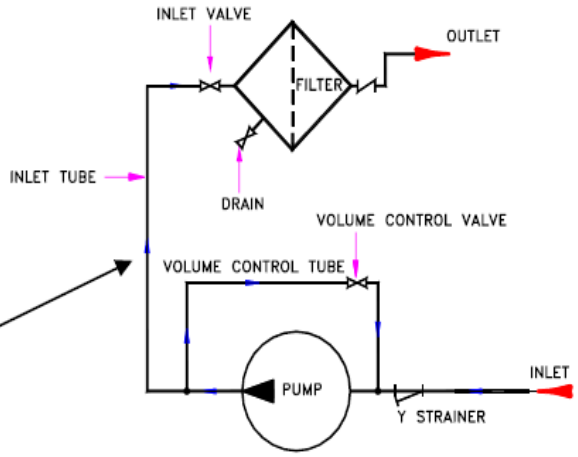
1. Loosen the two (2) setscrews in pump end of the Z bracket.
2. Rotate the Z bracket so that the opening is up, and tighten one setscrew*.
3. Slide the flexible coupling halfway onto the motor shaft, with the teeth pointed away from the motor.
4. Slide the motor into position from the rear of the frame until it contacts the Z bracket.
5. Connect the Z bracket to the motor with one (1) bolt and tighten finger tight.
6. Slide the flex coupling so that it engages the mating half with 1/16" space**.
7. Tighten the setscrew in the coupling.
8. Remove the Z bracket mounting bolt and loosen the pump end setscrew.
9. Rotate the Z bracket so that the opening is down.
10. Reinstall the four (4) Z bracket mounting bolts, and tighten securely.
11. Tighten the two (2) setscrews in the pump end of the bracket*.
12. Reinstall the four (4) motor mounting bolts.
13. Reconnect the air pressure.

***Note:** *Make sure the pump and Z bracket are tight together.*

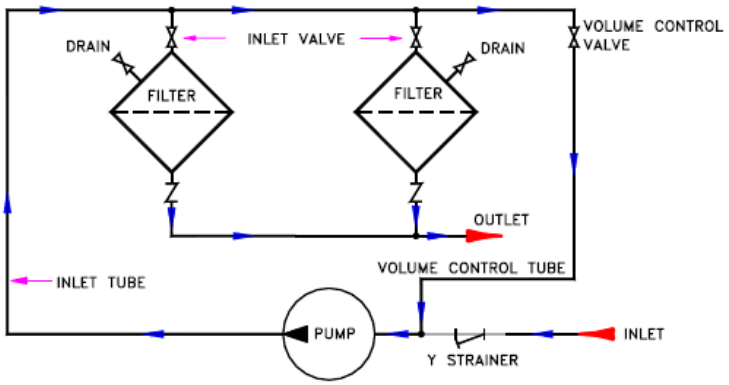
****Note:** *The rubber spider must be in place*.

Flow Diagrams

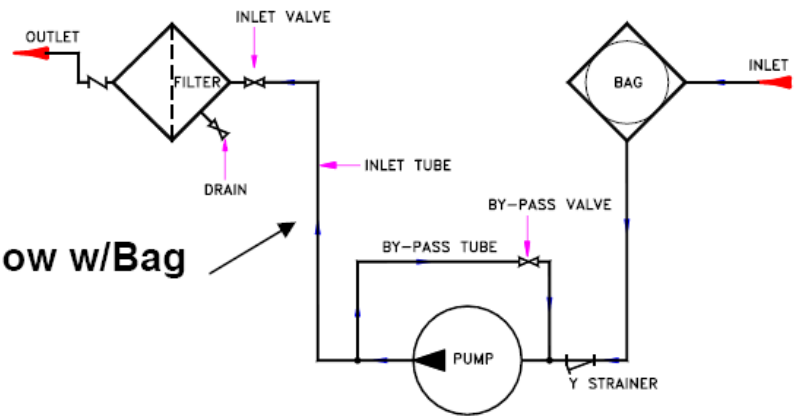
Single Flow



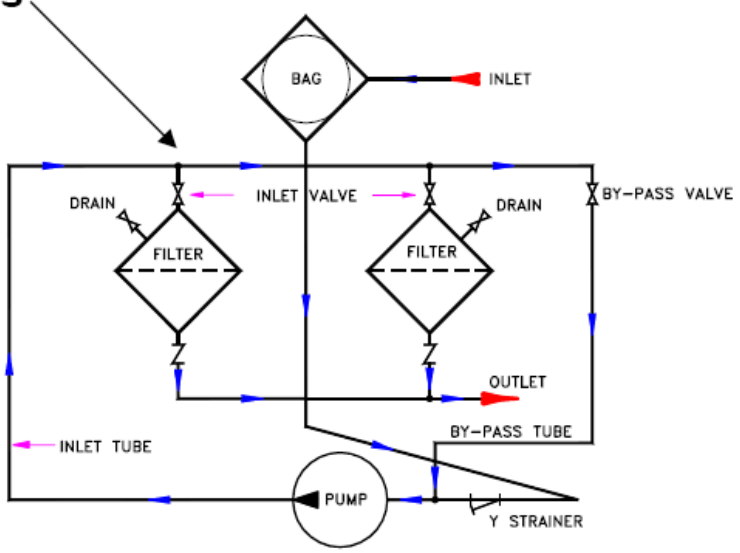
Dual Flow



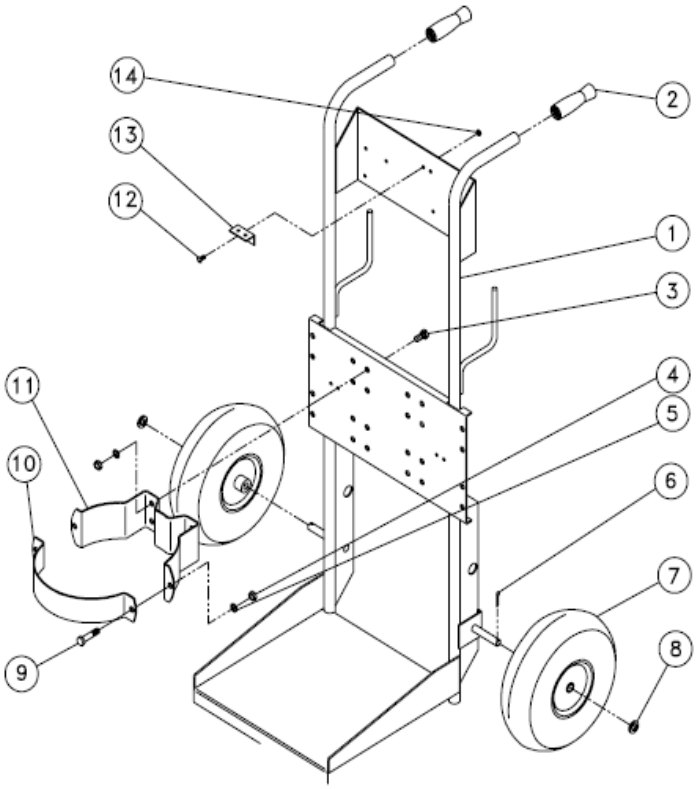
Single Flow w/Bag



Dual Flow w/Bag

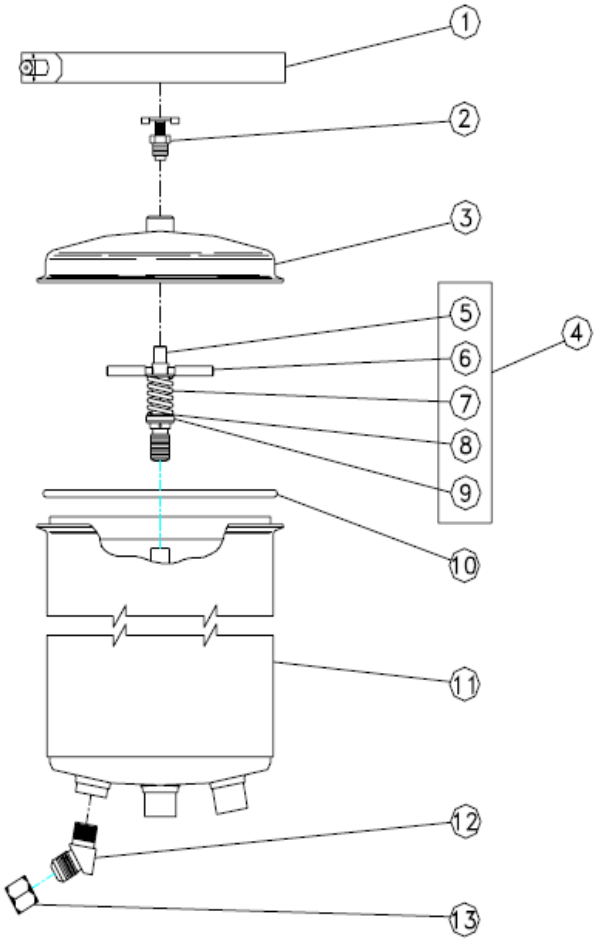


Frame



Item	Description		Qty	P/N
1	Frame		1	2125
2	Grip		2	0806
3	Screw	(S)	8	2616
		(D)	16	
4	Nut, 3/8”-16	(S)	12	1097
		(D)	24	
5	Lock washer, split 3/8”	(S)	12	1597
		(D)	24	
6	Cotter Pin, 1/8”dia. x 1”long		2	0840
7	Wheel		2	5186
8	Washer, flat, 1/2”		2	1136
9	Screw, 3/8-16x 1 3/4” Hex Head . . .	(S)	4	1595
		(D)	8	
10	Bracket, Mounting—front	(S)	2	3359
		(D)	4	
11	Bracket, Mounting—rear	(S)	2	3360
		(D)	4	
12	Screw #10-32 x Round Head		2	2691
13	Bracket—Press, SW Mounting		1	1198
14	Nut—Keps# 10-32		2	2658

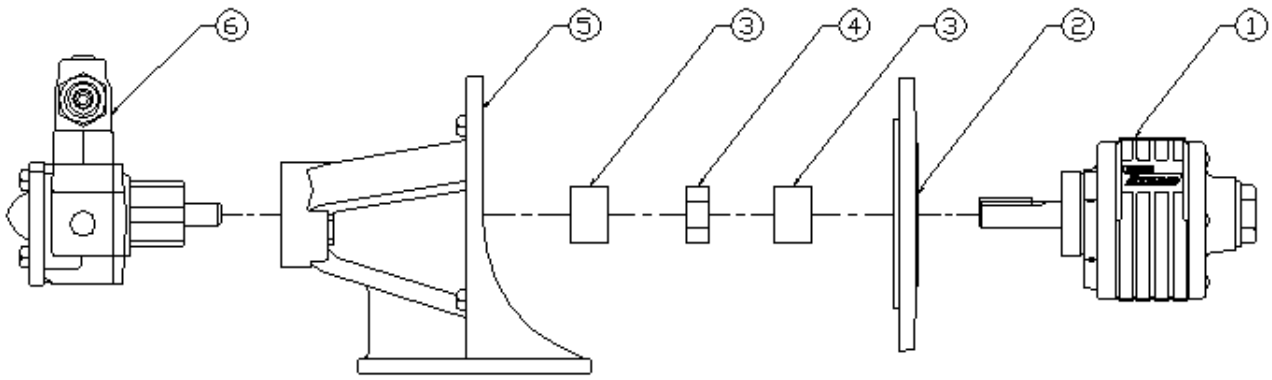
Housing



Item	Description	Qty	P/N
1	Clamp–Cover Assy.	1	3922
2	Valve—Vent.	1	1839
3	Cover—Black	1	2102
4	Turn Down Bolt Assy (Hyd)	1	0593
5	Turn Down Bolt (Hyd)	1	0453
6	Handle — Turn Down Bolt	1	0446
7	Spring — Turn Down Bolt	1	0447
8	Washer — Turn Down Bolt	3	0449
9*	Seal — Turn Down Bolt (Included with Filter) .	1	0448
10	O-Ring	1	0433
11	Housing — Black	1	3284
12	Elbow ½” NPT x 45º Street	1	5052
13	Cap	1	5580

Note* standard Material is Buna N. Available in Viton and Epr

Pump and Motor Assembly



Item	Description		Qty	P/N
1	Motor–1 ¾ HP, 75 cfm, 3000 max rpm . . .		1	3956
2	NEMA 56C Flange Mount.		1	3957
3	Coupling (Motor) Lovejoy 5/8” LO70. . . .		1	2193
	Coupling (Pump) Lovejoy 1/2” LO70. . . .		1	1560
4	Spider		1	2387
5	Foot Bracket		1	3958
6	Pump 5GPM	(S)	1	2204
	Pump 8GPM	(D)	1	2712

Troubleshooting Guide

Problem	Probable Cause	Corrective Action
Motor will not start	No air pressure	Check air compressor Check airline connections Adjust knob on air regulator
Motor will not stay running	Motor will not start	
Pump does not Pump	Flexible coupling loose	Tighten Coupling (Refer to Pump Installation)
Pump stops while running	Suction lost or blocked “Wye” Strainer Plugged Element Loaded up	Check supply source Clean Strainer Replace Element

MODEL NO.# _____

SERIAL NO.#_____

MOTOR S/N NO.#_____

PUMP S/N NO#_____

DISTRIBUTOR_____

LIMITED WARRANTY

The Harvard Corporation warrants its filter elements to be free from defects in material and workmanship under normal use and service. All other products manufactured by Harvard Corporation are warranted for one year from the date of purchase by Distributor. IT IS EXPRESSLY UNDERSTOOD THAT THIS WARRANTY IS IN LIEU OF TORT LIABILITY AND ALL OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR USE, AND THAT HARVARD CORPORATION'S SOLE OBLIGATION UNDER THIS WARRANTY SHALL BE, AT HARVARD'S OPTION, TO EITHER REPLACE THE DEFECTIVE PRODUCT OR REFUND OF PURCHASE PRICE

Newest Patents approved: Pat: 5,486,290; Pat. 6,270,668 B1; Pat: 6,319,416 B2; and other patents pending.

Have a question or need further information?
Contact the Distributor in your area, call or email us a question or request for information. We will respond as quickly as we can. Thank you for your interest in Harvard Corporation.

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