

# Webster®

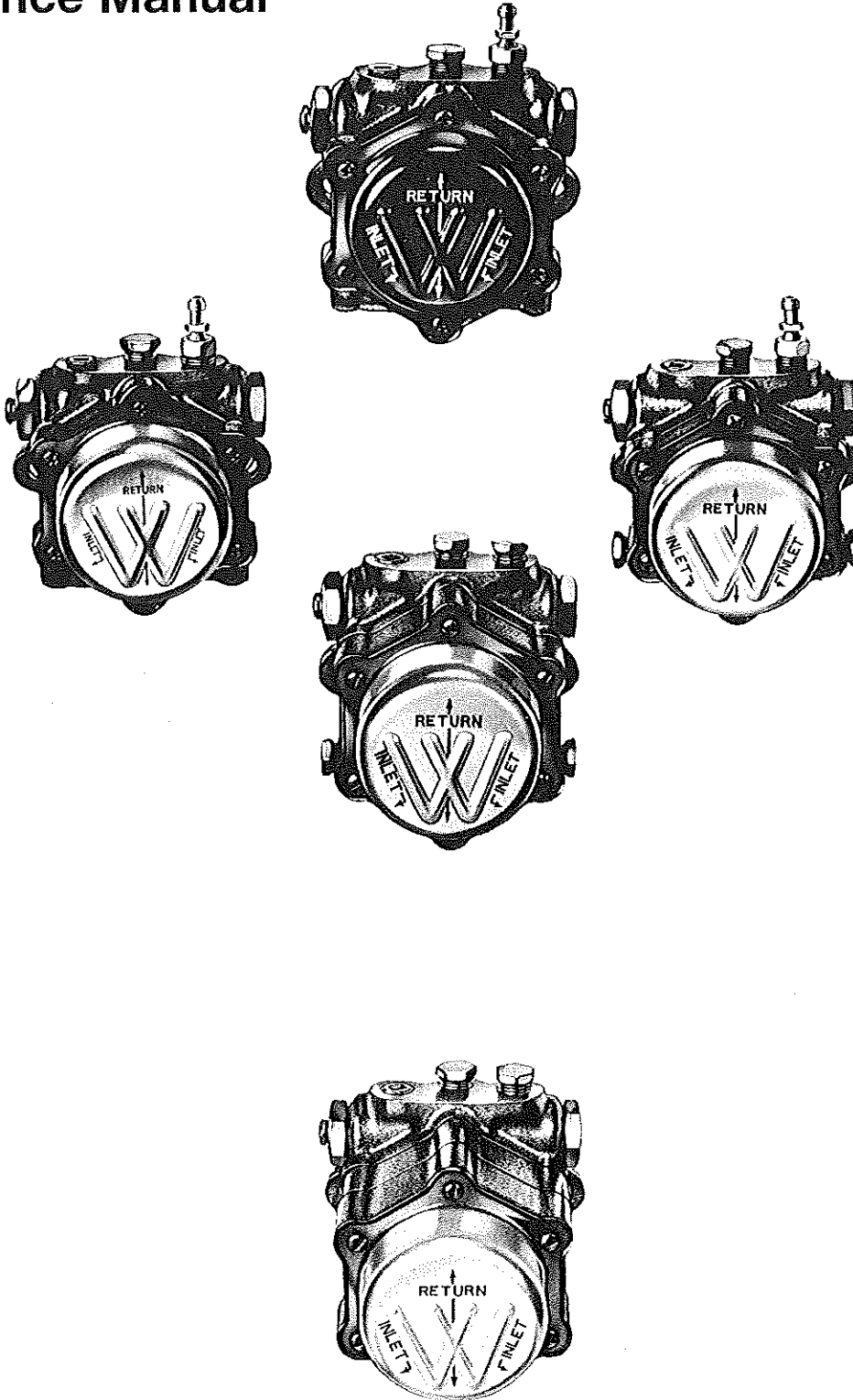
Fuel Pumps & Valves

Bulletin FU60-9

March 2007

Servicesaver®  
Fuel Units

## Installation and Maintenance Manual



# Webster®

Fuel Pumps & Valves

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[www.websterfuelpumps.com](http://www.websterfuelpumps.com)

Type	Nozzle & Slotting Code	Webster Recommended Max. Fire Size (GPH)		Rated Pressure (PSI)	Speed (RPM)	Max. Wattage Requirement @ Rated	Suction Capacity (GPH)	Nozzle Cutoff
		@ Rated PSI	@ 100 PSI					
1R111	1, 2	5	8	150	1725	60	20	Yes
	3	10	12					
1R122	3	12	15	300	1725	140	30	Yes
1R162	5, 6, 15	7	9	125	1725	70	30	Yes
1R213	1	21	23	150	1725	110	50	Yes
21R221	3	21	26	300	3450	195	45	Yes
41R222	4	23	28	300	2850	225	55	Yes
2R121	3	7	12	300	1725	125	35	Yes
2R181	4	15	–	80	1725	55	35	No
2R162	5	7	9	125	1725	85	50	Yes
2R223	3	20	27	300	1725	210	70	Yes
	13, 14	23	30					No
2R233	4	30	–	20	1725	60	70	No
2R283	4	30	–	80	1725	90	70	No
2R343	13	34	–	45	1725	70	70	No
2R626	14	50	66	300	1725	410	125	No

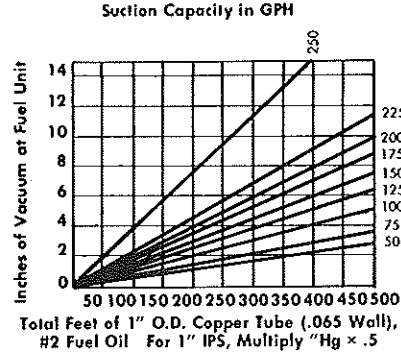
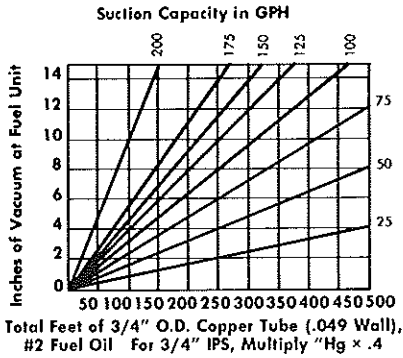
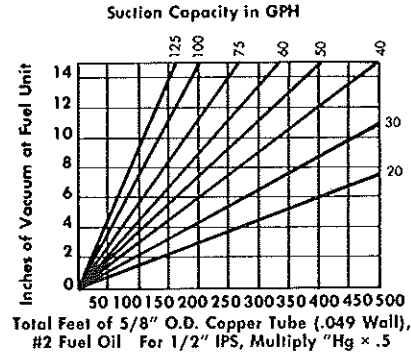
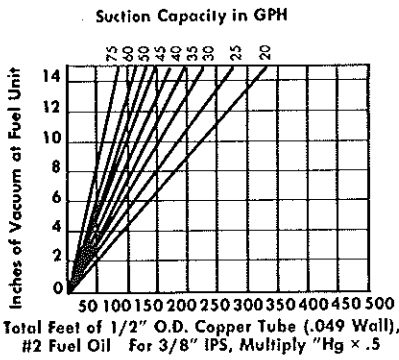
(NOTE) Oil burner nozzles are rated at 100 PSI. Any increase in fuel unit pressure over 100 PSI will increase the fire size above nozzle rating.

“Fuel unit inlet pressures should not exceed 3 psig in order to comply with National Fire Protection Association’s Bulletin 31”

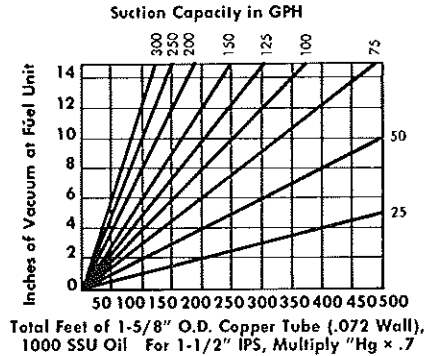
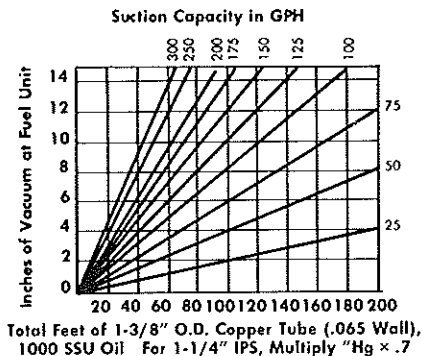
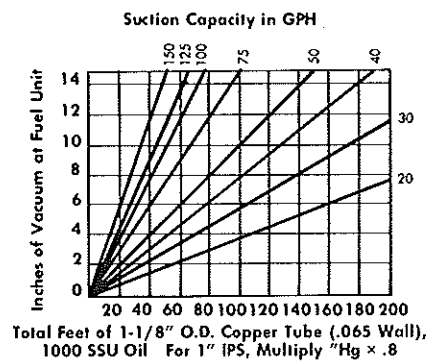
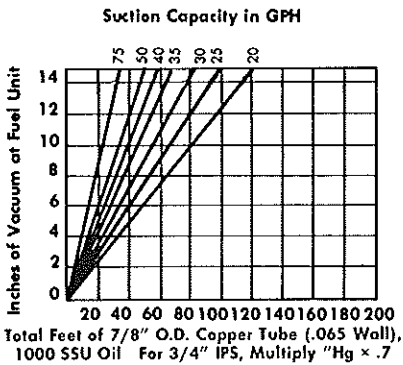
Type	Nozzle & Slotting Code	Webster Recommended Max. Fire Size (GPH)		Rated Pressure (PSI)	Speed (RPM)	Max. Wattage Requirement @ Rated	Suction Capacity (GPH)	Nozzle Cutoff
		@ Rated PSI	@ 100 PSI					
2R636	4	72	-	20	1725	105	125	No
2R656	14	66	-	100	1725	195	125	No
2R686	4	65	-	80	1725	175	125	No
2R628	14	60	80	300	1725	535	125	No
22R220	4	12	16	300	3450	145	45	Yes
	14	14	17					No
22R221	3	21	26	300	3450	220	70	Yes
	14	23	27					No
22R322	14	34	40	300	3450	300	105	No
22R623				300	3450	425	135	Yes
	14	56	65					No
32R626	14	36	51	300	1425	345	105	No

(NOTE) Oil burner nozzles are rated at 100 PSI. Any increase in fuel unit pressure over 100 PSI will increase the fire size above nozzle rating.

## #2 FUEL OIL



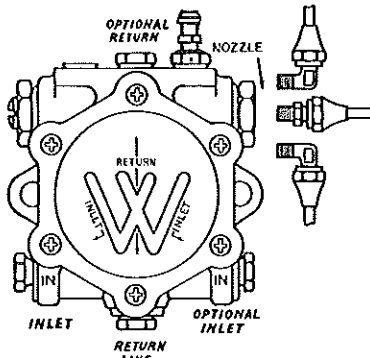
## 1000 SSU OIL



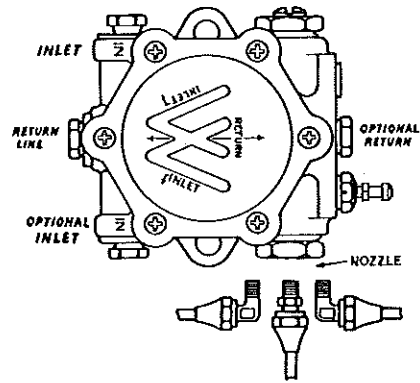
### TO DETERMINE SUCTION LINE SIZE IN INSTALLATIONS USING WEBSTER FUEL - UNITS ON TWO-PIPE SYSTEMS

1. Check gross gear capacity (see table of pumps).
2. Measure total tube length (horizontal and vertical).
3. Read up from line "total feet of copper tube" to "suction capacity" in G.P.H.
4. Read left to column "inches of vacuum at fuel unit". (This is vacuum required to draw oil through tube listed of given length).
5. If installation has lift add 1" of vacuum for every foot of lift.
6. Total inches of vacuum (frictional tube loss plus lift if any).
7. If total is over 10" when single stage unit is employed on two-pipe system, check on next larger tube size chart for proper tube size.
8. If total is over 15" when two stage unit is employed on a two pipe system, check on next larger tube size chart.
9. The above does not allow for any added restrictions such as line filter, elbows, sharp bends, check valves, etc.

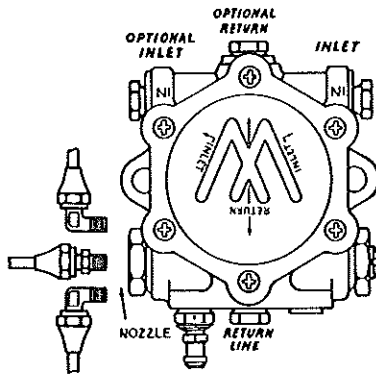
**MOUNTING INSTRUCTIONS**



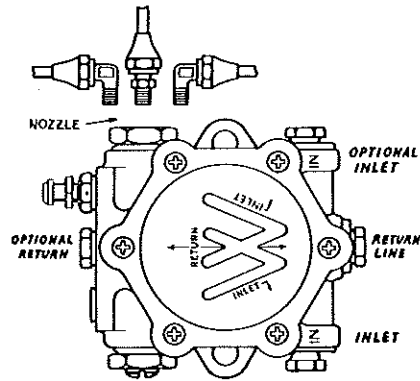
**Position 1**



**Position 2  
Rotated 90°**



**Position 3  
Rotated 180°**



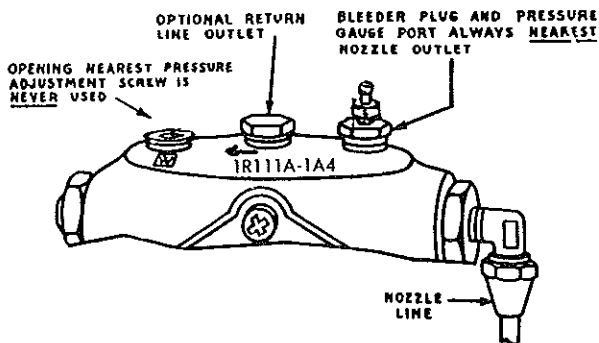
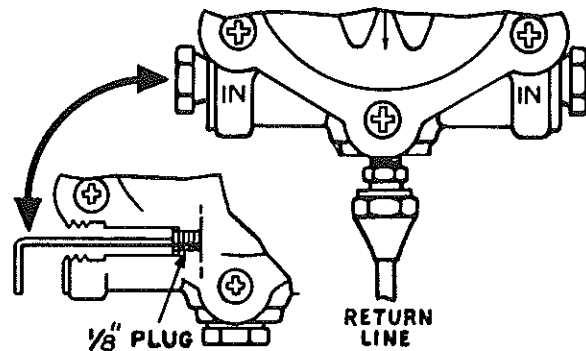
**Position 4  
Rotated 270°**

**Mounting Positions:** Webster Single and Two Stage Servicesaver Fuel Units, when connected for 2 pipe operation, may be mounted in any position including shaft up or shaft down. For 1 pipe operation, only positions 1 and 2 shown above are permissible.

The long flat shaft that is standard on all Service Saver units is specially constructed with a hardened bearing surface by with softer metal on the drive portion. This permits shortening the shaft to any desired length with a hacksaw.

Pump rotation is always determined when looking at the shaft end of the unit and is indicated by an arrow stamped on the top of the casting, as shown below. Styles A and D Service Saver units are for clockwise rotation; Styles B and C, for counter-clockwise rotation.

**Two-pipe System:** Some Servicesaver Fuel-Units, are shipped from the factory set for one pipe operation. To change to a two-pipe system, refer to the coding stamped on the top of the unit to determine location

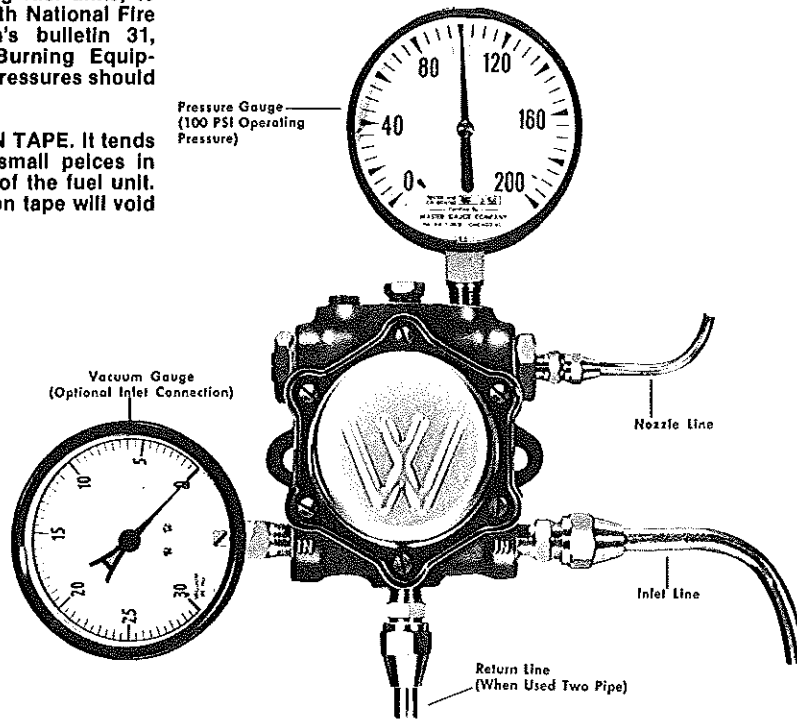


for the bypass plug. When an asterisk (\*) appears in the code number (Example: 1R111A\*), the bypass plug should be inserted in the inlet on the right side of the unit. When a dash (-) at the left of the code number (Example: 1R111A-), the bypass plug should be inserted in the inlet on the left side of the unit as shown above.

To accomplish the changeover, insert the 1/8" pipe plug furnished with each Servicesaver Fuel-Unit into the correct inlet opening, tighten securely with a 3/16" Allen wrench and attach the return line, as shown.

**NOTE:** When installing fuel units, to assure compliance with National Fire Protection Association's bulletin 31, "Installation of Oil Burning Equipment", fuel unit inlet pressures should not exceed 3 psig.

**DO NOT USE TEFLON TAPE.** It tends to break, depositing small pieces in critical internal areas of the fuel unit. Therefore, use of teflon tape will void all warranties.



**Vacuum Data:** Before removing a fuel-unit from an oil burner, a check should be made with vacuum and pressure gauges if you suspect fuel-unit trouble.

The vacuum gauge should be applied to the inlet port ("IN") opposite the inlet port being used, or inserted in the inlet line with a "TEE".

On installations where the oil tank is below the fuel-unit, the gauge reading should show the amount of vacuum (approximately 1" vacuum per 12" of vertical lift, plus the tube loss of total run). (See chart, Page 4).

**NOTE:**

1. The viscosity chosen for the above figures is 50 SSU. The above losses will be reduced at lower viscosities.
2. The gravity chosen is 40° API (60° F.) at 68°F, which gives a specific gravity of 0.822. Gravity of No. 2 oils varies from 30° to 45° API.
3. Even though a fuel-unit is capable of a very high vacuum, this has very little to do with the maxi-

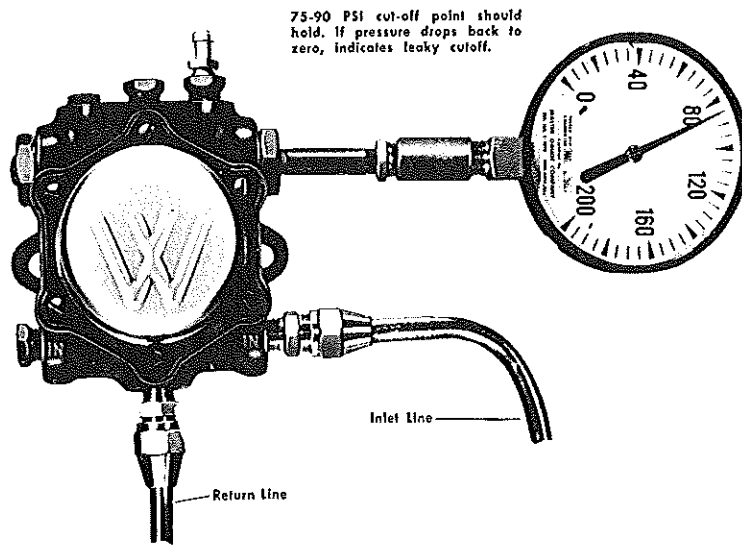
imum advisable lift because of the volatility of the oil under vacuum, which varies with different oils. Under certain conditions, installations as high as 28 feet have operated satisfactorily with a two-stage unit, but generally high lifts should be avoided on any liquid having volatile fractions. When the combined vertical lift and the equivalent losses through the tubing add up to 15" vacuum or more, use of a Webster booster unit is advisable.

If the vacuum gauge reads higher than the calculated vacuum, look for restriction in the suction line . . . a closed tank valve, kinked copper tubing, plugged filter, sticking foot or check valve, frozen oil line, undersized oil line, or excessive oil lift. On the other hand, if the gauge reading is below the calculated vacuum look for air leaks in the lines, valve, fittings, or fuel-unit.

On gravity fed jobs where the oil tank is above the fuel-unit, vacuum should read zero except when restrictions are apparent such as closed shut-off valve, clogged filter, kinked line, etc. Any of these restrictions should be eliminated.

Relation between vacuum and vertical lift 40° API all at 68° F.

Ins. of Vacuum	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
lift	1'4"	2'9"	4'1"	5'6"	6'10"	8'3"	9'7"	11'0"	12'4"	13'9"	15'1"	16'6"	17'10"	19'3"	20'7"	22'0"	23'4"	24'9"	26'1"	27'6"

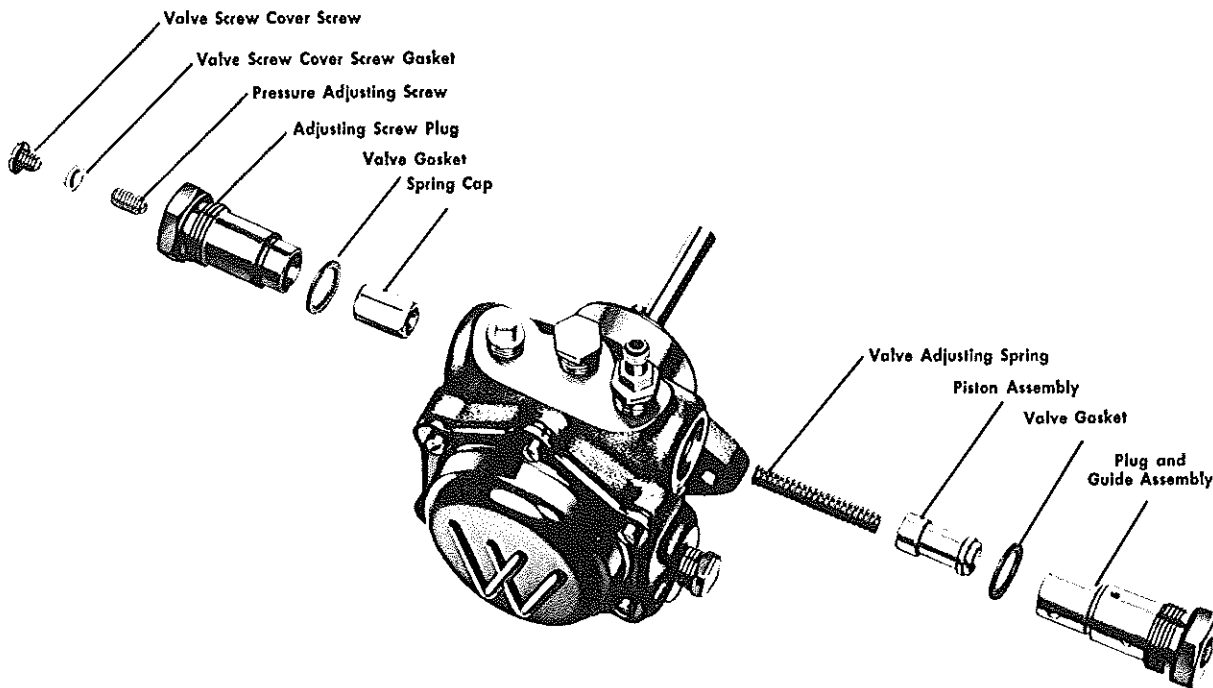


## PRESSURE DATA

A pressure gauge applied to the pressure gauge port reveals the pressure to which the fuel-unit has been regulated. An adjustment can be made to suit the firing conditions (usually 100 psi). Also the pressure gauge, when applied to the pressure gauge port, can be used to check fuel-unit efficiency. A unit in satisfactory operating condition should be able to support a nozzle at full spray, up to several psi above the rated burner pressure. Fuel-unit manufacturers rate units for maximum burning rate at 100 psi. Collapse of nozzle spray below specified limits indicates either excess by-pass, missing or damaged valve gasket, worn valve piston

or sleeve, worn gear set, or pump RFS is less than nozzle rating. Pumping capacity also decreases under correspondingly higher lift (or vacuum).

A pressure gauge applied directly to nozzle outlet port for cut-off check should hold differential pressure on shut-down. For example, with operating pressure of 100 psi, the cut-off should be approximately 85 psi. If the pressure gauge drops below the cut-off point, this would indicate a leak at cut-off, therefore the valve assembly should be dis-assembled, cleaned or replaced if necessary.



## VALVE ASSEMBLY

To check pressure regulating valve assembly, remove the valve screw cover screw and cover screw gasket, insert a 1/8" Allen wrench and back off the adjusting screw until the valve spring guide hits the stop for minimum pressure. This relieves the spring pressure against the piston and seat. Then use a 1 inch box wrench and remove plug and guide assembly with care

so as not to damage the valve gasket which seals off the pressure chamber.

The plug and guide assembly and valve piston and adjusting spring will come out together. Inspect the valve seat and piston, clean if necessary and/or replace.

## FILTER ASSEMBLY

For checking, remove cover by taking out size 10-24 screws with screw driver. Wipe out cover if necessary and replace. (This operation should not be necessary

until 5 or 6 years after unit is in operation because of effective self-cleaning of the rotary filter.)

