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Model M4 Operation

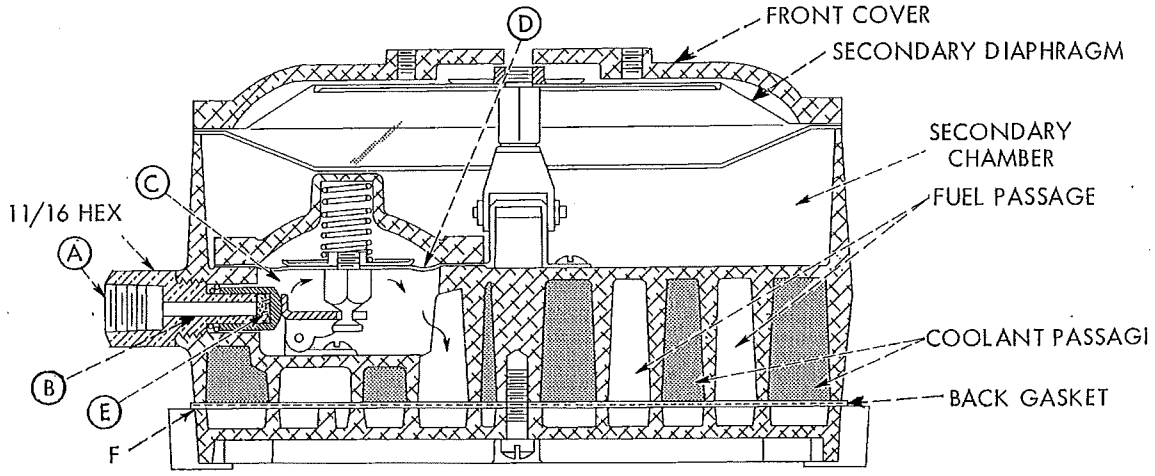


FIGURE 1

1. Primary (High Pressure) Regulator – Figure 1

A conventional valve, diaphragm, and spring regulator controls pressures in primary and heat exchanging cavities as follows:

Liqui ' fuel enters through opening (A) and passage (B) (1/8 diam.) and expands in primary cavity and heat exchanger (C). Area (C) is a continuous passage through the heat exchanging area and terminates at the secondary valve orifice.

Pressure of expanding fuel forces primary diaphragm (D) upward against spring which is overpowered and primary valve (E) is closed when pressure raises to 5-8 pounds.

Primary valve (E) will remain closed until pressure is reduced by engine demand at which time it opens and the cycle is repeated. During engine operation this regulator functions continuously and maintains consistent pressure in the heat exchanging area.

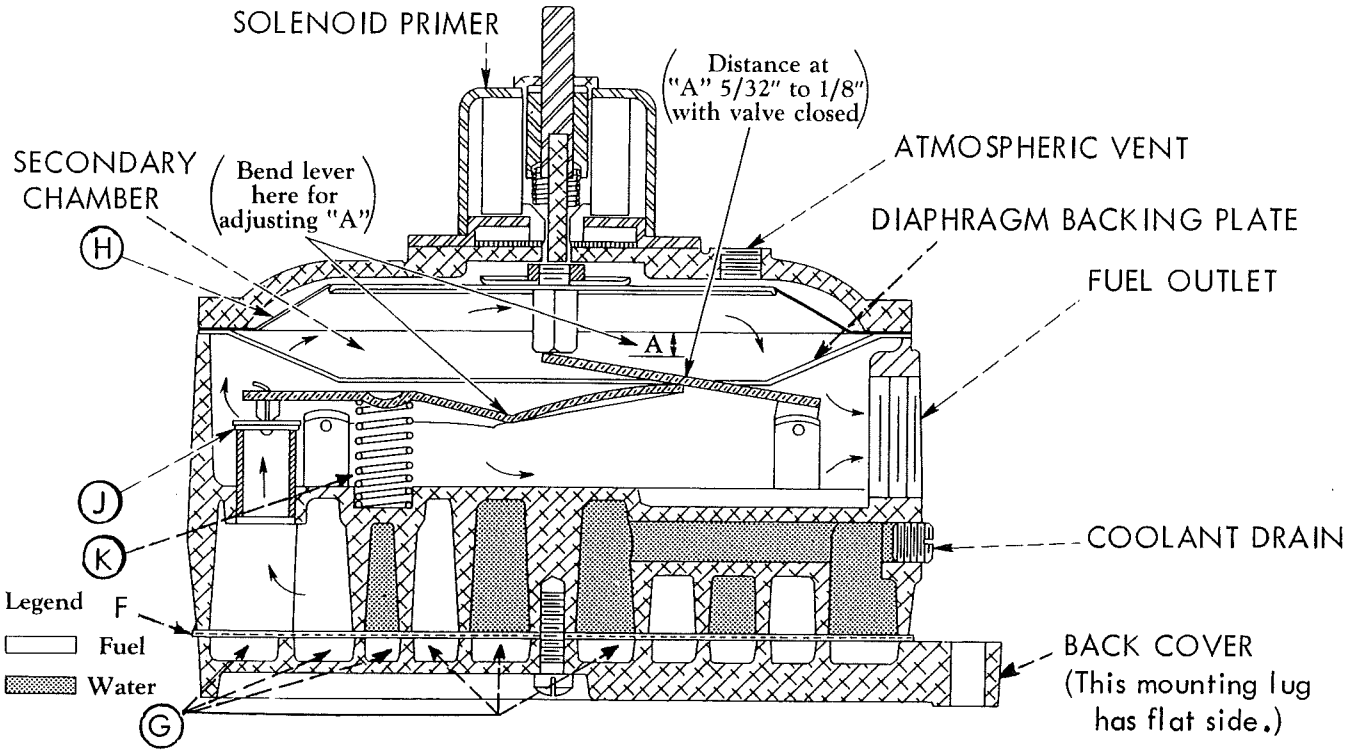


FIGURE 2

2. **Heat Exchanger – Figures 1 & 2**

Engine coolant is circulated through continuous passages (W) and heats adjoining casting walls preventing refrigeration due to expansion of regulated fuel.

Back gasket (F) seals coolant passages and expansion areas (G). In case of freezing coolant, this gasket is displaced into the expansion area and absorbs expansion of the frozen coolant. Damage to vital parts is prevented by this built-in safety feature.

3. **Secondary Regulator – Figure 2**

A reduction of pressure (vacuum) occurs in the secondary body upon engine demand. Atmospheric pressure forces diaphragm (H) downward, depressing valve lever through compounded lever system and opening secondary valve (J). Vaporized fuel flows through secondary valve as long as demand persists and in quantities dictated by carburetor adjustment and engine requirement.

Spring (K) closes or regulates secondary valve as demand varies.

Secondary regulator may be actuated by solenoid primer to fill vapor hose with fuel prior to starting.

MODEL M4

INSTALLATION

Locate converter as near to carburetor as is practical and where water hookup can be readily made. Under no circumstances should it be above the top of the radiator core or in an area exposed to excessive engine manifold heat.

No converter should be installed without being preceded by an efficient filter and fuelock of sufficient size. Century's STF series filter fuelocks are exceptional from these standpoints and are available in various sizes, voltages, and capacities. USE THEM.

Drill three holes for clearance of ¼'' mounting bolts in securely mounted bracket or other vertical surface. Hole pattern is shown in Figure 3. Care must be taken to make sure the mounting surface is flat to avoid damage to mounting ears.

Install approved SAE (Flare) fitting in fuel inlet using thread sealing compound carefully to avoid getting it into the converter inlet. Tighten fitting to point in proper direction for attaching high pressure hose from filter fuelock.

Install water hose fittings in two 3/8'' pipe openings again using sealing compound and positioning fittings to facilitate hose connection. Automotive type 5/8'' heater hose can be used with Century #1S-40 Elbow Fittings or #1S-35 Straight Fittings.

Insert and tighten the vapor outlet fitting. Either 90° or straight hose fittings, ¾'' pipe to 1'' I.D. hose may be used.

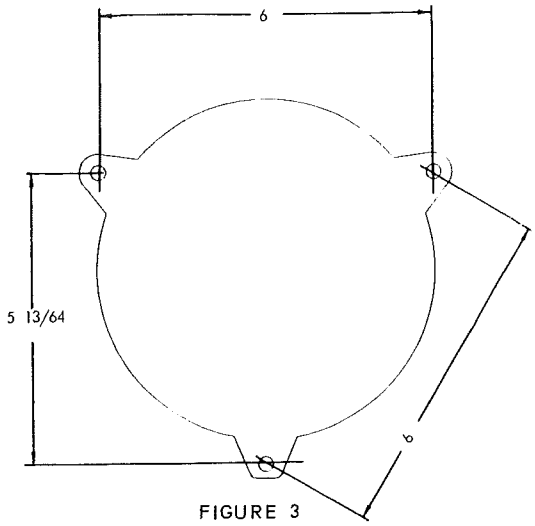


FIGURE 3

NEVER USE CONVENTIONAL PIPE STREET ELLS IN THE VAPOR LINE

Mount converter with three bolts and tighten securely. Install fittings in filter fuelock and carburetor and secure hoses.

Select an opening on suction side of water pump, install fitting, and attach hose from this point to **TOP** outlet in converter. In case no opening in suction side exists, it is necessary to drill and tap a 3/8'' pipe hole in the inlet side of the water pump.

Attach hose from lower water outlet in converter to any available opening on pressure side of water pump. Heater water supply openings are suitably located to provide good water circulation in most cases. DO NOT connect the converter in series with the heater. A parallel connection is usually acceptable, but it is preferable to select a completely independent water source if possible.

REMEMBER: Water circulation is of prime importance. Any frosting of the converter body indicates poor circulation which must be corrected.

Connect a wire from battery, through a push button switch, to the solenoid primer terminal. Primers are furnished for operation on either 6 or 12 volts using the same coil. The primer is to be actuated only to fill the vapor hose prior to starting and is, therefore, energized only a second or two each time it is used.

Fill cooling system with clean water or anti-freeze. Remove top water plug from converter to allow trapped air to escape. Failure to do this may result in freezing since water circulation may not occur until air is bled from the converter body.

When water is used as coolant, it is recommended that the correct amount of quality rust inhibitor be added to the cooling system.

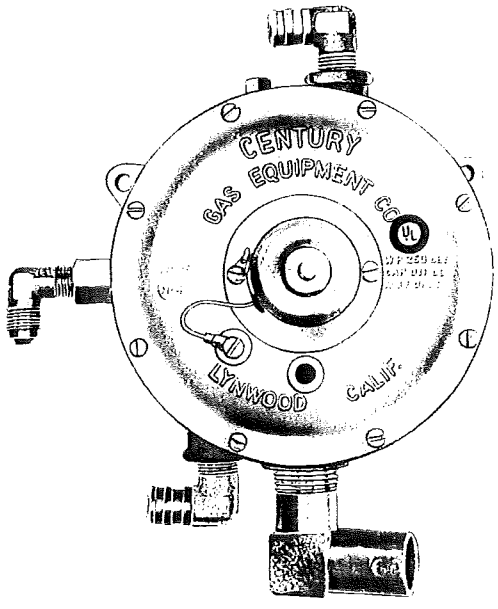


FIGURE 4

REBUILDING

A. Disassembly

1. Remove primer and front cover
2. Remove secondary diaphragm assembly and valve lever assembly (Figures 5 & 6)
3. Use 11/16'' box wrench to loosen inlet fitting. Unscrew it from side of converter body. (Figure 7)

FIGURE 5

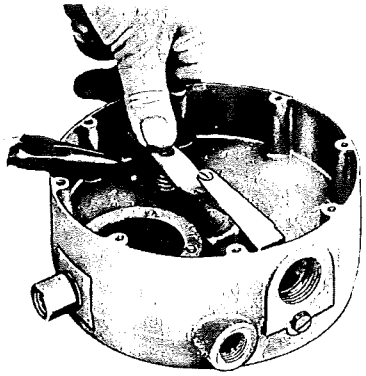


FIGURE 6

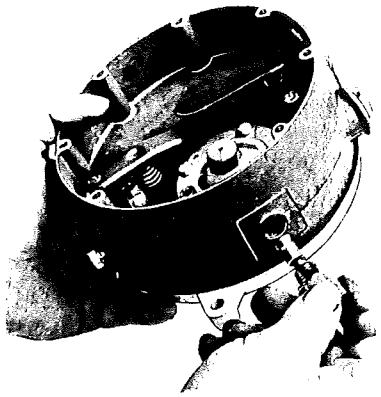


FIGURE 7

4. Remove round primary diaphragm cover and lift primary diaphragm assembly from primary cavity.
5. Remove nine (9) screws from back plate and lift off plate and gasket. Discard gasket.
6. Wash all parts in solvent and dry with compressed air. Although diaphragms and valve seats can normally be reused, it is advisable to discard them and install new parts when the converter is reassembled.
7. Inspect all parts for wear, damage, or distortion. Discard any questionable items.

B. Assembly

1. Back Cover
   a. Check back plate and gasket surface of converter body with straight edge to determine if surface is flat. Any variation in these surfaces will cause difficulty in preventing leaks around back gasket.
   b. Should an uneven or warped condition exist, lap castings on a surface plate until condition is corrected. (Figure 8) DO NOT PROCEED UNTIL THIS WORK HAS BEEN COMPLETED! Severly warped parts will require machining or replacement.
   c. Lay converter body face down, place new gasket in position, and insert aligning pins to hold it in place. Locate back cover on pins with MOUNTING EAR HAVING FLAT SIDE DIRECTLY OVER VAPOR OUTLET. (Figure 9) THE BACK COVER MUST BE INSTALLED IN THIS POSITION.

      Insert back screws and turn down extremely tight. Start with center screw and then alternate from one side to the other.

      NOTE: Do not use any gasket sealing compound on any gasket or diaphragm surfaces.

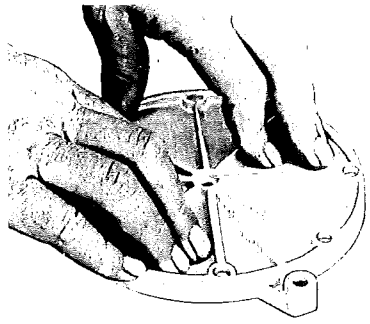


FIGURE 8

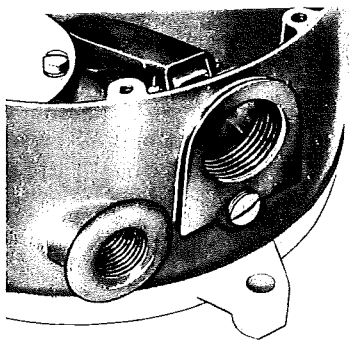


FIGURE 9

2. **Primary Diaphragm Assembly (Figure 10)**

a. Place #2F-07 Diaphragm on #2H-08 Link. Install #2D-01 Plate with flange away from diaphragm. Place #10-34 Washer over threads and screw on #3L-08 Nut. Tighten nut securely.

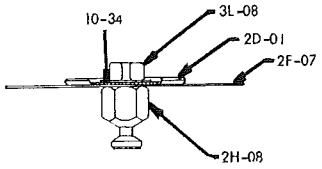


FIGURE 10

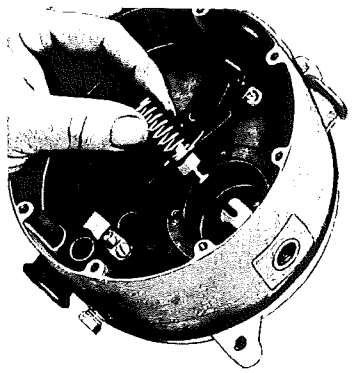


FIGURE 11

b. Place completed diaphragm assembly in primary cavity and attach diaphragm link to primary lever. (Figure 11) Hold in position with four (4) aligning pins. (Figure 12) Install #1M-22 Spring over nut on diaphragm assembly and slide #5A-21 primary cover over aligning pins. Remove any one aligning pin, replacing it with a screw turned lightly down against cover. Remove the opposite aligning pin and turn screw down lightly against cover. Repeat this procedure with remaining two alighing pins. Tighten all four (4) screws alternately and evenly.

CAUTION: Failure to use aligning pins or to follow above procedure may result in wrinkled diaphragm which will not function properly.

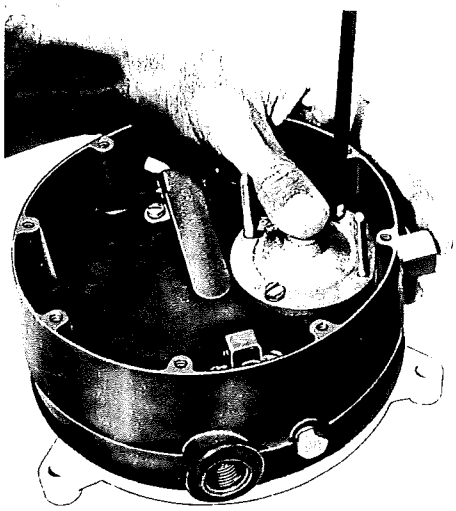


FIGURE 12

3. **Primary Inlet and Valve Assembly (Figure 13)**

a. Install new #1M-21 Primary Valve Spring, #1V-06 Primary Valve, and three (3) #1F-44 Gaskets on #4P-05 Inlet Fitting and jet. Note that small end of spring is placed against shoulder of #4P-05 with large end against valve.

b. Insert primary valve assembly in side of converter body and tighten with 11/16" box wrench.

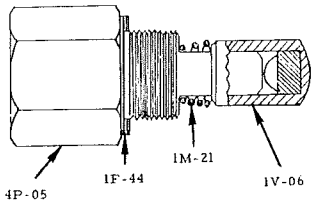


FIGURE 13

4. **Pressure Test (Figure 14)**

Attach compressed air hose to inlet fitting and place #M-508 Gauge over secondary valve orifice. Turn on air supply and proceed as follows:

a. Note pressure gauge reading. It should be 5-8 pounds with inlet pressure of 130-180 PSI. IF HIGH, remove one #1F-44 Gasket from inlet fitting and recheck. A second gasket may be removed if necessary to arrive at correct pressure. AT LEAST ONE GASKET MUST REMAIN ON THE INLET FITTING.

b. If pressure creeps upward, the primary valve is leaking and must be reworked. Inspect valve lever and bracket for any signs of wear or binding. Replace both lever and bracket if problem persists.

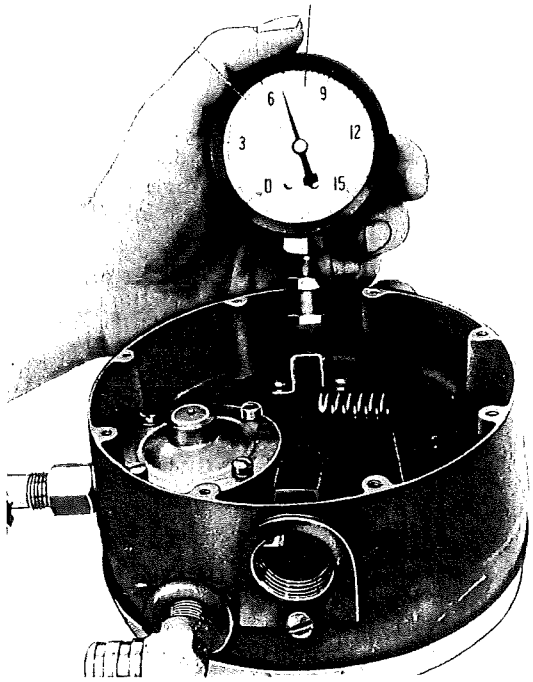


FIGURE 14

c. Check pressure under simulated operating conditions by holding #M-508 Gauge very slightly away from orifice thus allowing air to escape. Pressure will drop slightly and return to original reading upon stopping the leak.

5. **Secondary Valve & Lever Assembly (Figure 15)**

a. Assemble new #1V-08 Valve Seat on valve lever using #1H-15 Pin. Insert pin through valve seat and lever insert. Press valve seat against flat surface and bend pin over sharply. DO NOT HAMMER ON BENT PIN. The seat is self-aligning and may not seal properly if held too rigidly against the valve lever.

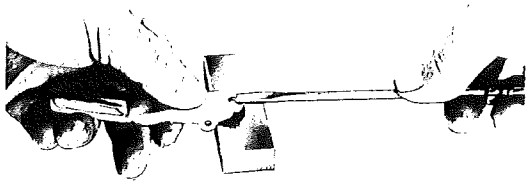


FIGURE 15

b. Place #1M-30 Spring over boss on bottom side of lever. Flanges on side of lever are spaced to hold spring in position once it is pushed up around boss.

c. Place lever assembly in position and insert hinge pin. Be sure that compound lever is on top of valve lever. (Figure 2) Retain hinge pin with two #1H-27 hair pin cotters.

d. Open valve by hand and allow it to snap closed several times to align seat with orifice.

e. Use #2V-01 Gauge to set lever height. (Figure 16) DO NOT BEND COMPOUND LEVER. In case no #2V-01 Gauge is available, measure from a straight edge across face of casting to closest point on tip of compound lever. Distance should be 1/8"-5/32". (See Figure 2) Form valve lever to obtain correct setting.

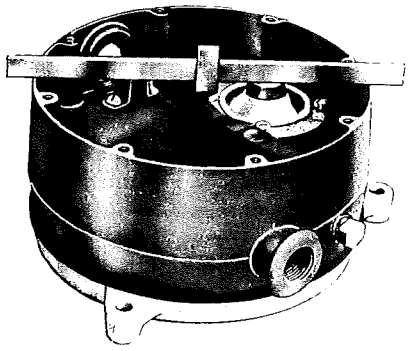


FIGURE 16

6. **Final Testing – Semi-assembled Converter**

a. Reconnect air supply to converter inlet. Plug one water fitting opening and apply soap bubble to the remaining water outlet. Any continuous growth of the soap bubble indicates leakage through the back gasket and will require rework of its installation.

b. Test ALL gasket surfaces, edges, openings, etc. for leaks with soap solution or by immersing the entire unit in water. Any leaks must be corrected before proceeding further. Pay particular attention to secondary seat. If correctly installed, it will not leak.

7. **Secondary Diaphragm Assembly (Figure 17)**

a. Place #2D-03 Large Diaphragm Plate on #2H-09 Diaphragm Button with flange of diaphragm plate facing unthreaded end of button. Place diaphragm over threaded end of button with concave or dished side toward large diaphragm plate. Set #2D-01 Small Diaphragm Plate against diaphragm with flange away from diaphragm. Install #3L-05 Nut and tighten securely.

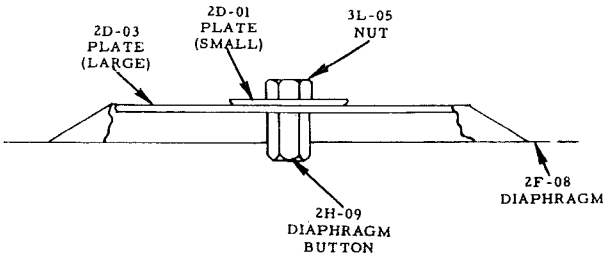


FIGURE 17

b. Insert four aligning pins in primary body screw holes, using every other hole. Slide #1F-45 Gasket over pins followed by #2D-09 Backing Plate (See Figure 5) and secondary diaphragm assembly with button toward converter levers.

CAUTION: Backing plate must be installed with lowest surface toward converter body.

c. Locate cover on aligning pins and install four front cover screws. Remove aligning pins and insert remaining screws. DO NOT TIGHTEN. (The front cover may be installed in any position, however, it should be placed so it will be right side up when converter is mounted.)

d. Lift diaphragm up against cover by pulling with pliers through center hole in cover. Tighten all screws while lifting diaphragm.

e. Install primer and check for operation with 6 or 12 volt power source. Check for clearance between diaphragm assembly and primer plunger tip. If no clearance exists, recheck lever setting.

f. Apply air pressure to inlet fitting and check for secondary valve leakage with soap bubble over vapor outlet. Depress primer manually or electrically to check for fuel flow. Volume need not be great but should be audible.

TROUBLE SHOOTING

I. GENERAL

Simple hand tools and common sense are all that is required. Your knowledge of converter operating principles will allow prompt diagnosing of any problem if you just slow down and think it over. A pressure gauge (0-15 lbs.) will be helpful but is not absolutely necessary.

Look for the obvious things first. Don't try to make something which is easy into a hard job. If malfunctioning, a converter is either giving too much fuel, not enough fuel, or is freezing. All you have to do is determine what it is or is not doing and why.

II. NO FUEL

A. Loosen fuel line at converter inlet. Fuel escaping indicates problem is in converter. If no fuel is present, check as follows:

1. Filter Fuelock
   a. Not Opening
      (1) No electricity to coil
      (2) Coil defective
   b. Filter Plugged
2. Tank & Fuel line
   a. Empty tank
   b. Excess flow valve closed
   c. Tank valve closed
   d. Crushed fuel line

B. Fuel to converter – No fuel to carburetor upon pushing primer switch.

1. Primary Regulator
   a. Pipe dope or protective dust plug in primary orifice
   b. Primary spring missing (Fuel will flow, however, low primary pressure will result in insufficient fuel quantity.)
2. Secondary Regulator
   a. Valve seat stuck to orifice
   b. Levers far out of adjustment
   c. Primer plunger too short to open valve
   d. Primer inoperative
      (1) Push button switch defective
      (2) Coil defective
      (3) Wiring incorrect

III. FUEL LEAKING THROUGH

A. Primary Regulator (Check primary pressure. If abnormally high, problem is one of the four following.)

1. Valve seat defective or dirty
2. Diaphragm broken
3. Valve lever distorted
4. Spring or washers installed incorrectly

B. Secondary Regulator (Only responsible if primary pressure is normal.)

1. Dirt on valve seat
2. Spring missing
3. Levers incorrectly set
4. Primer plunger too long
5. Primer actuated

IV. FREEZING (Repeated freezing can loosen back screws or distort back cover. The cause must be found and eliminated.)

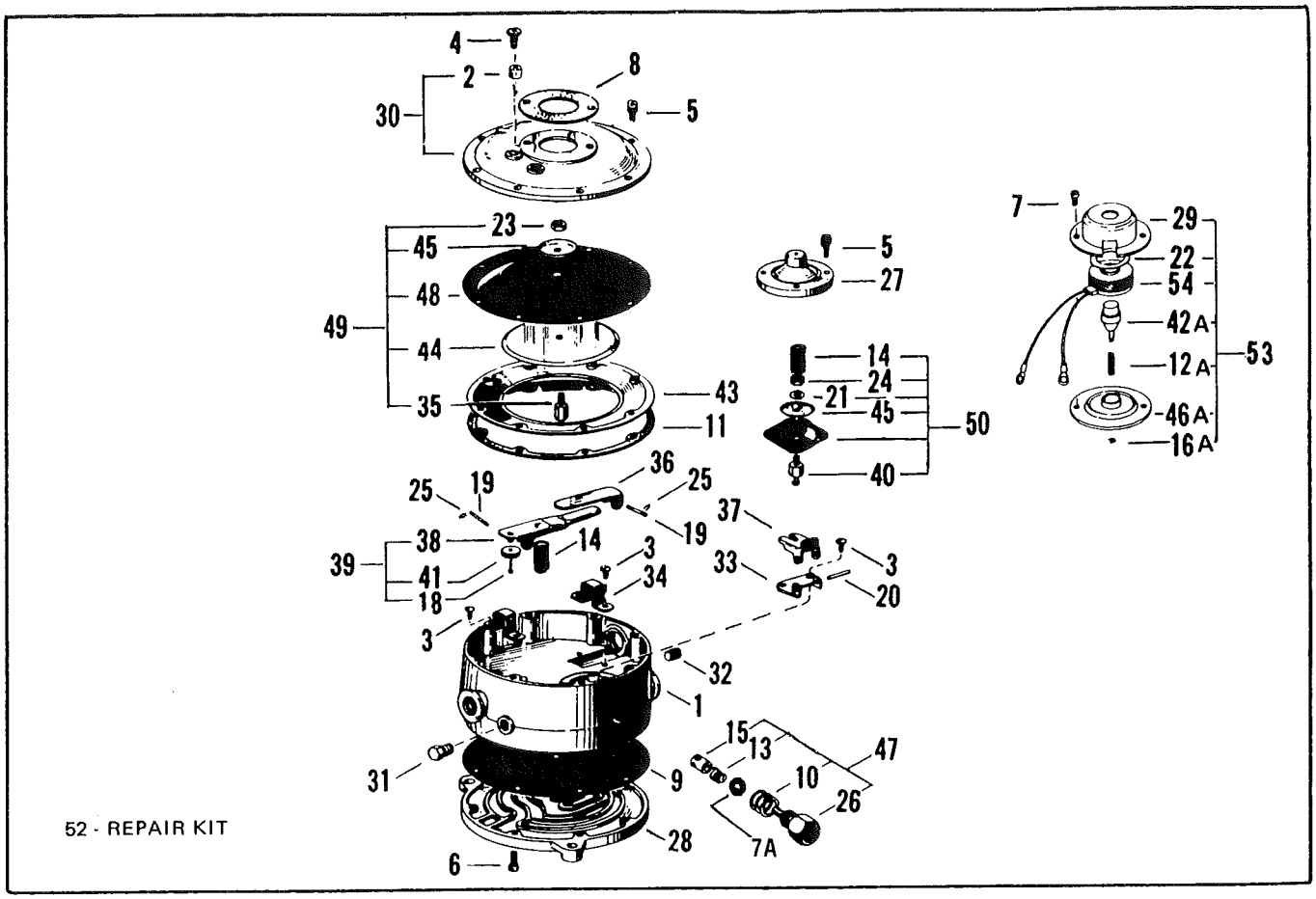
A. Converter

1. Mounted too high
2. Hose fittings too small or restricted by corrosion
3. Internal fuel leak.
4. Piped in series with heater

CONVERTER PARTS DATA

PART NO. 2066

MODEL M4



This illustration does not depict a specific Converter but is a Composite view.

Ref. No.	M-S Part No.	Qty.	Description	Ref. No.	M-S Part No.	Qty.	Description
1	6-761	1	Body Assy.	28	91-297	1	Cover - Back
2	11-66	1	Insert - Terminal	29	91-470	1	Cover - Primer (Flanged)
3	15-248	6	Screw - 8 - 32 x 1/4"	30	91-535	1	Secondary Cover Assy.
4	15-285	1	Screw - 8 - 32 x 5/16"	31	99-7	1	Plug - 1/8" Pipe
5	15-A114	12	Screw - 10 - 24 x 9/16"	32	99-4	1	Plug - 1/8" Pipe
6	15-A147	9	Screw - 10 - 24 x 5/8"	33	136-117	1	Bracket - Primary Lever
7	15-16	2	Screw - 10 - 24 x 3/8"	34	136-118	2	Bracket - Secondary Lever
7A	*16-14	1	Gasket - High Pressure Jet	35	147-15	1	Button - Diaphragm
8	16-A353	1	Gasket - Primer to Cover	36	155-390	1	Lever - Compound
9	*16-A355	1	Gasket - Back Cover	37	155-392	1	Lever - Primary Valve
10	*16-A356	3	Gasket - Primary Jet	38	155-622	1	Secondary Lever & Insert Assy.
11	*16-A357	1	Gasket - Diaphragm Backing Plate	39	155-623	1	Secondary Lever & Valve Assy.
12A	24-B78	1	Spring - Primer Plunger (use w/Flanged Cover)	40	168-304	1	Link - Primary Diaphragm
				41	*171-585	1	Secondary Valve Assy.
13	*24-A388	1	Spring - Valve Jet	42A	194-701	1	Primer Plunger Assy. (use w/Flanged Cover)
14	24-A389	2	Spring - Lever				
15	*36-576	1	Primary Valve Assy.	43	198-141	1	Plate - Diaphragm Backing
16A	44-211	1	O Ring - Primer Plunger (use w/Flanged Cover)	44	198-142	1	Plate - Diaphragm 3-3/4 x 1/4"
				45	198-143	2	Plate - Diaphragm 1-1/4 x 1/4"
18	*62-346	1	Pin - Secondary Seat	46A	198-523	1	Primer Base Plate Assy. (use w/Flanged Cover)
19	62-349	2	Pin - Secondary Pivot				
20	62-350	1	Pin - Primary Pivot	47	233-599	1	Primary Valve Assy.
21	78-A65	1	Washer	48	*237-59	1	Diaphragm - Secondary
22	78-A137	1	Washer - Wave, Primer Plunger (use w/Flanged Cover)	49	237-529	1	Secondary Diaphragm Assy.
				50	237-544	1	Primary Diaphragm Assy.
23	81-85	1	Nut - Secondary Diaphragm	52	286-1234	1	Repair Kit
24	81-238	1	Nut - Primary Diaphragm	53	317-529	1	Solenoid Primer Assy.
25	*82-22	4	Pin - Cotter, Haripin	54	323-516	1	Primer Coil Assy. (use w/Flanged Cover)
26	84-115	1	Jet - Fuel Inlet				
27	91-296	1	Cover - Primary Diaphragm				

* Included in Repair Kit