OVERHAUL
AND
PARTS CATALOG
FOR
FUEL INJECTION SYSTEMS

FORM X30593A

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INTRODUCTION

1-1 SCOPE.

A. This parts catalog is presented in looseleaf form in order that changes may be made to the affected pages only. In this manner the catalog can be kept current at all times with manufacturing and service requirements. All changes to the catalog will be sent to the purchaser upon receipt of the registration card from the front of the catalog.

B. Page ii of this publication depicts the current status of pages as of the date listed. To be current, the date on the page should match the date listed for that page on the Status Page unless original. With each change to the catalog issued, a change to the current Status Page will be issued.

C. In this edition, currently available parts are listed for Teledyne Continental fuel injection systems. If accessories or parts of a Teledyne Continental fuel injection system attached to any engine installed in an aircraft manufactured in the United states under a production model number do not appear in this publication, determine whether they are available from the aircraft manufacturer before placing an order with a Teledyne Continental Authorized Distributor.

D. This publication contains overhaul procedures and parts listings for the fuel injection pumps, control valves, fuel manifold valves and fuel discharge nozzles divided into sections according to engine series. Also contained herein are figures which illustrate, in "exploded" form, each of the major assemblies of the fuel injection system. Each figure has its own set of index numbers to indicate the sub-parts. The list of parts in the assembly appears on the same page with the illustration or on an adjacent page. The first page of each assembly group list contains the figure number (not repeated on all lines) and, following a dash, the index numbers of the sub-parts in numerical order. Do not order parts by index number. Use the part number which appears in the second column. Use the name of the part which appears in the column under the title "DESCRIPTION".

1-2. ORDERING PARTS.

A. Do not order any parts listed herein when "NO NUMBER" appears on the same line in the part number column or when "NOT SOLD" herein abbreviated as "NS" appears in the "QUANTITY" column. These parts are not suitable for installation without factory equipment, or they are major parts of assemblies and are more economically supplied in the assembled condition, or they are assemblies which would have to be disassembled for installation. To replace any detail part "NOT SOLD", order the smallest assembly containing the part (listed above, with name beginning one column to the left). To replace any assembly "NOT SOLD", order whatever sub-assemblies and detail parts (listed below it, with names indented) that are in need of replacement.

1-3. RELATED PUBLICATIONS.

A. Fittings and attaching parts for components of the Fuel Injection Systems covered herein may be found in the appropriate engine parts catalog. Adjustment procedures will be found in the applicable Operator's Manual.

1-4. SERVICE BULLETINS.

A. Important changes and product improvements are covered by factory service bulletins available for study at all Approved Distributors. These bulletins are also available to owners, operators or maintenance personnel on an annual subscription basis.

1-5. SERVICE REPORTS AND INQUIRIES.

A. It is the policy of Teledyne Continental to handle all reports of service difficulties and requests for information through Approved Distributors. Requests for additional copies of this or any other publication should be made through these facilities. There is an Approved Distributor at every major airport.

ABBREVIATIONS AND SYMBOLS

Symbol	Definition
in.	Inches
RF	Reference
NPT	National Pipe Tap (or thread)
No.	Number
P/N	Part Number
NS	Not Sold
* * * *	End of Group of Attaching Parts

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636898-1	FUEL PUMP	73-40-20
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73-00-00
INTRODUCTION

00-01. SCOPE.

A. This publication contains overhaul procedures and illustrated parts breakdown, (except where noted) for fuel pumps, metering units, manifold valves, and nozzles listed. The exploded views herein are to be used for ordering parts for service maintenance, as well as for assisting in the overhaul procedures of the units listed.

00-02. FUEL PUMP ASSEMBLIES COVERED.

ENGINE MODEL	PUMPS
IO-346	630885-1
	646764-1
IO-360 All	638157-2
	646759-2
IO-360D34	639508-14
	646758-14
TSIO-360A, AB	639508-4
	646758-4
TSIO-360C, CB, D, DB	639508-1
	646758-1
TSIO-360E, EB, F, FB, H, HB	639508-2
	646758-2
TSIO-360G, GB, KB, LB	639508-6
	646758-6
TSIO-360JB	639508-11
	646758-11
TSIO-360MB	646758-15
LTSIO-360E, EB	639508-3
	646758-3
LTSIO-360KB	639508-10
	646758-10
O-470G7	638154-9
	646212-9
IO-470 - All except K & V	638154-9
	646212-9
IO-470K	638154-12
	646212-12
IO-470V	638154-3
	646212-3
TSIO-470B	638155
GIO-470	638156-3
IO-520A, D, F, K, J, L	638154-1
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IO-520B, BA, C	638154-2
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IO-520BB, CB,	638154-16
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IO-520E	638154-4
	646212-4
IO-520M	638154-5
	646212-5
IO-520MB	638154-17
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TSIO-520C, G, H	630751-3
	632818-5
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TSIO-520B	632818-1
	646210-1
TSIO-520BB	632818-10
	646210-10
TSIO-520D	632637-1
TSIO-520D	639508-5
	646758-5
TSIO-520DB	639508-8
	646758-8
TSIO-520E, J, K, N	632818-2
	646210-2
TSIO-520EB, JB, KB, NB	632818-11
	646210-11
TSIO-520OL	640643-6
	646765-6
TSIO-520LB	640643-7
	646765-7
TSIO-520M, P, R	632818-7
	646210-7
TSIO-520M, P, R	642650-1
	646768-1
TSIO-520T	632818-9
	646210-9
TSIO-520U	639508-7
	646758-7
TSIO-520UB	639508-9
	646758-9
TSIO-520VB	632818-8
	646210-8
TSIO-520WB	640643-7
	646765-7
TSIO-520AE	639508-12
	646758-12
	649368-12
LTSIO-520AE	639508-13
	646758-13
	649368-13
TSIO-520AF, CE	642650-1
	646768-1
TSIO-520BE	*646571-1
	*649374-1

ENGINE MODEL	PUMPS
GTSIO-520C	632818-4
	646210-4
GTSIO-520C	630751-2
GTSIO-520D	634627-1
GTSIO-520D, H, G	630751-4
GTSIO-520D21, D22, H	642380-1
	646211-1
GTSIO-520F, K	639087
GTSIO-520G	632818-6
	646210-6
GTSIO-520G2B	636898-1
GTSIO-520L, M	632818-3
	646210-3
GTSIO-520N	*643367A2
IO-550B	643535-1
	646766-1
IO-550C	643536-1
	646767-1
6-285B,C	638193-1
6-320B	638193-1

*** NOTE . . . Non field serviceable. New and rebuilt replacement pump available from TCM Distributor.**

00–03. CONTROL VALVES COVERED

625219-	Control Assembly	640564-1	Air Throttle and Fuel Metering Assembly
629703-	Control Assembly		
629904-	Control Assembly	637170	Air Throttle and Fuel Metering Assembly
630255-	Control Assembly		
632916-	Control Assembly	639556-1,2,3,4	Air Throttle and Fuel Metering Assembly
633573-	Control Assembly		
639717-	Control Assembly	646619-2	Control Assembly
643322-1	Control Assembly	643175-1	Air Throttle and Fuel Metering Assembly
646619	Control Assembly		
646740-7	Control Assembly	649096-1	Air Throttle and Fuel Metering Assembly
640563-1,2,3	Air Throttle and Fuel		
4,5,6,7,8	Metering Assembly		

00–04. MANIFOLD VALVES AND NOZZLES COVERED.

MANIFOLD VALVES		NOZZLES
631351	646433	627335
631427	646508	632147
634326	643582	632748
638132		632848
641032		633608
642400		633723
640718		693368
643397		643318

73-00-01
GENERAL DESCRIPTION

01-01. FUEL INJECTION PUMP.

A. The fuel pump assembly utilizes a basic pump to which is added a relief valve assembly, vapor separator and, as required a mixture control and/or an aneroid valve section. The basic pump is of positive displacement, rotary vane design. This means that changes in engine speed affect total pump flow proportionately. The pump, by providing greater capacity than required by the engine, creates a recirculation path. By arranging a calibrated orifice and relief valve in this path, the pump delivery pressure is also maintained in proportion to engine speed.

B. A spring-loaded, diaphragm type relief valve is provided. On turbocharged engines, an aneroid activated orifice is installed in the fuel passage to this relief valve. On naturally aspirated engines a jet plug assembly replaces the aneroid section

C. The relief valve diaphragm chamber is vented to atmospheric pressure or, in the case of a turbocharged engine, to turbocharger compressor discharge pressure. A check valve is provided so that boost pump pressure to the system can by-pass the engine driven pump in starting. This feature is also available to suppress vapor formation of the fuel under high ambient temperatures. In addition, this permits use of an auxiliary pump as a source of fuel pressure in the unlikely event of the failure of the engine driven pump.

01-02. FUEL AIR CONTROL UNIT.

A. This assembly incorporates three control elements: One for air in the air throttle assembly, and two for fuel in the fuel control assembly, which is mounted on the side of the air throttle assembly.

B. The air throttle assembly is an aluminum casting which contains the shaft and butterfly-valve assembly. The casting bore size is tailored to the engine size and no venturi or other restriction is used. The conventional idle speed adjusting screw is provided in the air throttle shaft lever and bears against a stop pin in the casting.

C. The central bore of the fuel control body contains a metering valve at one end and a mixture control valve at the other end.

D. These rotary valves are carried in oil-impregnated bushings, and are sealed against leakage by "O" rings. Loading springs force the valve ends against a fixed plug installed in the middle of the central bore.

E. This bronze plug has one passage that mates with the fuel return port, and one through passage that connects the mixture control valve chamber with the metering valve chamber. "O" rings seal this plug in the body. Each stainless steel rotary valve includes a groove which forms a fuel chamber. A contoured end face of the mixture control valve aligns with the passages in the passages in the metering plug to regulate the fuel flow from the fuel chamber. A control lever is mounted on the mixture control valve shaft for connection to the cockpit mixture control. In the metering valve, a cam shaped cut is made on the outer part of the end face. A control lever mounted on the metering valve shaft connects to the linkage to the air throttle.

F. The fuel return port in the body connects to the return passage of the center plug, and the regulation of the mixture control valve with this passage determines the amount of fuel returned to the fuel pump. The plug at the fuel inlet port includes a filter screen. This serves to remove foreign particles and dirt before the fuel passes into the valves proper.

01-03. AIR THROTTLE FUEL METERING ASSEMBLY.

A. The fuel metering unit is made up of the throttle plate shaft, a metering disc and plug. The idle adjustment is also provided for in the fuel metering cover by use of an internal spring and an adjustment screw. The throttle shaft bearing area in the throttle body is sealed to eliminate air leakage by use of "O" rings on the throttle shaft. The fuel metering cover and disc also are

sealed by use of "O" rings, as is the idle adjusting screw. The fuel metering plug is held in contact to the metering disc by a spring. The inlet fuel from the pump enters the fuel metering cover and is metered through a passage in the metering plug by a contoured disc on the end of the throttle shaft.

01-04. FUEL MANIFOLD VALVE.

A. The fuel manifold valve body contains a fuel inlet, a diaphragm chamber and outlet ports for the lines to the individual nozzles. The spring-loaded diaphragm carries a plunger in the central bore of the body. The diaphragm is enclosed by a cover which retains the diaphragm loading spring. When the plunger is down against the seat of the body, the fuel lines to the cylinders are closed off. The plunger is drilled for passage of fuel from the diaphragm chamber to its base. A needle valve is installed in the plunger bore. A fine screen is installed in the diaphragm chamber requiring all incoming fuel to pass through this screen.

01-05. FUEL DISCHARGE NOZZLES.

A. The nozzle body contains a drilled central passage with a counterbore at each end. The lower end is used as a chamber for fuel-air mixture before the spray leaves the nozzle. The upper bore contains a removable orifice for calibrating the nozzles.

B. Near the top, radial holes connect the upper counterbore with the outside of the nozzle body for air admission. These holes enter the counterbore above the orifice and draw outside air through a cylindrical screen fitted over the nozzle body. This screen prevents dirt and foreign material from entering the nozzle. A press-fit shield is mounted on the nozzle body, extending over the greater part of the filter screen, leaving an opening near the bottom. This provides both mechanical protection and an air path of abrupt change of direction as an aid to the cleanliness.

C. Nozzles used on turbocharged engines are shrouded by a close fitting elbow which is sealed by "O" rings on the nozzle body in place of the screen and shield. The elbows are connected to the air reference lines which deliver filtered air to the nozzles under pressure.

D. Nozzles are calibrated in several ranges, and all nozzles furnished for one engine are of the same range identified by a letter and a number stamped on the hex of the nozzle body.

73-00-02
SPECIAL EQUIPMENT REQUIRED

A. Test Calibration equipment used in conjunction with this publication must be in accordance with the schematics in the Calibration Section (73-70-00). Any deviation in the relationship of details as specified will result in false gauge readings. A gauge accuracy of ± .5% is required.

Although test stand 630045-12 is no longer referenced in this manual, it is still approved for use in calibration of TCM fuel injections systems. It must, of course be set up in accordance with the appropriate schematic, and the gauges maintained within the prescribed limits.

B. The test stand drive unit must be capable of clockwise or counterclockwise rotation.

C. Test fluid used in all calibration tests must be MIL-F-7024, Type II. The temperature range must be 68° F. to 78° F.

73-00-03
OVERHAUL INSTRUCTIONS - GENERAL
FUEL PUMP

03-01. INSPECTION.

A. Discard all seals, gaskets, lockwashers and lockwire.

B. Visually inspect all parts for defects, burrs, nicks, cracks and damaged threads.

C. Check the pump for security of mounting.

D. Check for loose or leaky lines or fittings.

E. Check the outlet pressure, consulting the operator's handbook for the aircraft in which the pump is installed. There should not be noticeable oscillation of the pressure gauge needle when the pump is running smoothly and the fuel is being pumped by the engine driven pump only.

F. Seal Drain Inspection. With the pump running, any leakage through the rotor shaft seal will drop out of the seal drain port. If leakage occurs, the seal must be replaced.

G. Relief Valve Inspection. With fuel flowing into the pump, either by means of the pump itself or through the starting and emergency fuel pump, there should be no leakage through the drilled vent hole of the cap. Leakage indicates a damaged diaphragm of the relief valve assembly.

H. Dimensional Inspection. Areas of running parts and bushings subject to wear should be inspected for serviceable fit with mating part by comparative linear measurements using standard pattern precision instruments. Refer to Table of Limits Section (73-80-00) to determine the acceptable tolerances.

03-02. CLEANING.

A. Clean all parts in Stoddard Solvent equivalent to (PS-661).

03-03. REPAIR AND REPLACEMENT.

A. Fittings, hoses, attaching parts, etc. for the subject fuel pump will be identified in the appropriate parts list. Replace all gaskets, seals, diaphragm, "O" rings, springs and balls at each overhaul. Replace any other parts found to be defective during inspection.

METERING UNIT

03-04. INSPECTION.

A. Inspect all body bosses for cracks and stripped threads. Using a suitable internal measuring device, check the bore for wear.

B. Examine all internal parts for scores and wear.

C. Inspect ball check valve and seat.

03-05. CLEANING.

A. All metal parts can be immersed in a suitable cleaning solution and rinsed with mineral spirits.

B. Dry with filtered air blast.

C. Be sure that all fuel passages are open and clean.

03-06. REPAIR AND REPLACEMENT.

A. Replace all parts found to be defective at inspection.

B. Replace all "100% Replacement Parts" on parts listed as stated.

MANIFOLD VALVES AND NOZZLES

03-07. INSPECTION.

A. MANIFOLD VALVE.

1. Visually inspect for defects, burrs, nicks, cracks and damaged threads.

2. Inspect needle at seat area. If irregular or deep seat ring is found, discard and replace with new needle.

3. Inspect and check all parts for conformance with tolerances listed in Table of Limits.

4. Normally it will not be necessary to remove pipe fittings from any assembly. This should be done only if replacement is required, or if necessary to inspect the part.

B. NOZZLE.

1. Visually inspect for defects such as: nicks, scratches, pits, cracks or deformed threads.

2. Inspect flared area of the jet as assembled to the nozzle.

3. Inspect dimensionally for conformance to limits specified in Table of Limits.

03-08. CLEANING.

A. MANIFOLD VALVE.

1. Clean all parts in solvent equivalent to Stoddard Solvent PS-661.

2. Rinse in mineral spirits.

3. Dry with filtered air.

4. Check all fuel passages to be sure they are open and clean.

B. NOZZLE.

1. Clean all parts in solvent equivalent to Stoddard Solvent PS-661.

2. Rinse in mineral spirits.

CAUTION . . . DO NOT use chemicals which remove metal. DO NOT use wire or metal probe to remove foreign material.

3. Dry with filtered air blast.

03-09. REPAIR AND REPLACEMENT.

A. Replace all parts found to be defective at inspection.

B. Replace all "100% Replacement Parts" on parts list as stated.

73–00–04
IDENTIFYING ROTATIONAL DIRECTION OF FUEL PUMPS

The list below identifies the TCM Fuel Pump Assembly to the basic pump and the direction of rotation for each pump.

PUMP ASSEMBLY	ROTATION **
630885-1	CCW (Counterclockwise)
646764-1	CCW
640643-6-7	CCW
646765-6-7	CCW
638157-2	CW (Clockwise)
646759-2	CW
632637-1	CCW
634263-1	CW
639508-1-2-4-6-11-13-14	CW
646758-1-2-4-6-11-13-14-15	CW
639508-3-5-7-8-9-10-12	CCW
646758-3-5-8-9-10-12	CCW
638154-1-2-3-4-5-16-17	CCW
646212-1-2-3-4-5-16-17	CCW
638154-9-12	CCW
646212-9-12	CCW
638154-10-11-15	CW
632818-1-2-5-7-8-9-10-11	CCW
646210-1-2-8-9-10-11	CCW
632818-3	CW
646210-3	CW
632818-4-6	CW
646210-4	CW
642380-1	CW
646211-1	CW
642650-1-2	CCW
646768-1-2	CCW
638156-3-4-5-6-7-8-9	CCW
638155	CW
630751-2-4*	CW
630751-3*	CCW
638193-1	CW
639087	CW
636898***	CW
634627***	CW
643535-1	CCW
646766-1	CCW
643536-1	CCW
646767-1	CCW
649368-12	CCW
649368-13	CW
646571-1	CCW
649374-1	CCW

* This part not available as a replacement part.
** Rotation as viewed from drive end.
*** Obsolete.

73-00-05
PUMP ROTATION AND PIN LOCATION CHART

The chart below describes the pin location inside the fuel pump body assembly which determines the direction of rotation of the fuel pump.

PUMP ASSY TCM P/N	ROTATION	PIN POSITION	PORT LOCATION	HOUSING ASSY	LINER
628203-1	CW	A	-	643694	643697
628203-2	CCW	B	-	643694	643697
628203-3	CW	A	C	643696	638217-1
628203-4	CCW	B	C	643696	638217-1
628203-5	CW	A	C&D	643695	638217-1
628203-6	CCW	B	C&D	643695	638217-1
642932-1	CW	A	-	646182-1	646178
642932-2	CCW	B	-	646182-1	646178
642932-3	CW	A	-	646182-2	646178
642932-4	CCW	B	-	646182-2	646178
646572-2	CCW	B	-	646574-2	646529 & 646519
646572-3	CCW	B	-	646574-2	646529 & 646519

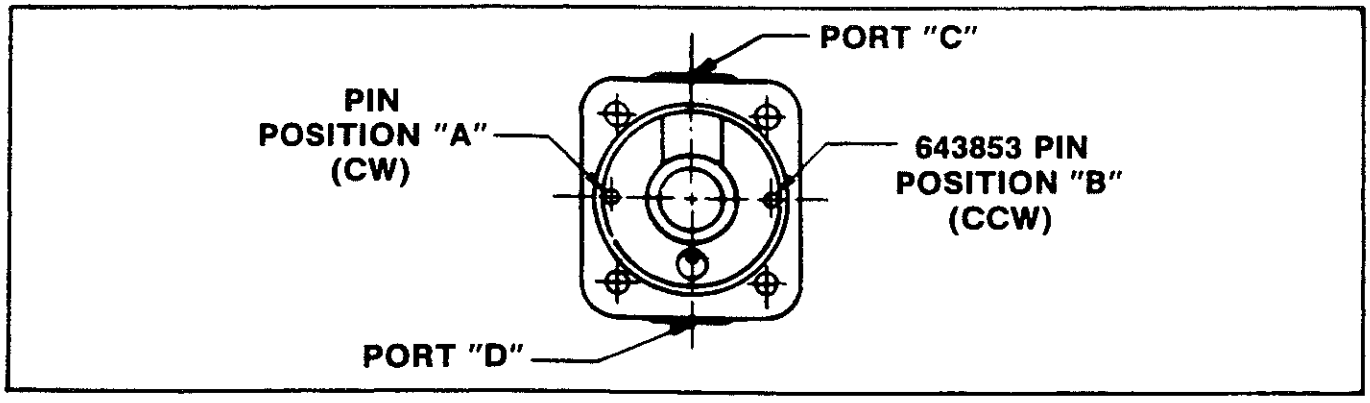

FIGURE 00-01. PIN LOCATION ON PUMP BODY ASSEMBLY.

CAUTION . . . The liner located inside the fuel pump assemblies are marked "C" (clockwise) or "CC" (counterclockwise) to designate which direction the pump blades turn but this in itself does not determine the direction of rotation. A liner marked either "C" or "CC" may have the same part number. The pin location inside the body assembly determines the direction of rotation.

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73–10–00
346 SERIES ENGINES

INTENTIONALLY

LEFT

BLANK

73-10-01
FUEL PUMP ASSEMBLIES P/N 630885-1 & 646764-1

01-01. DISASSEMBLY.

A. Place pump in suitable fixture and remove all lockwire; and fittings if necessary. Refer to exploded view (Figure 10-01) and proceed as follows: Loosen screw (36) to relieve pressure on relief valve spring. Remove four bolts (39) and washers (38). Separate parts (5) through (13), basic pump from (14) through (18), mixture control body and relief valve section. Disassemble relief valve body and related parts (28) through (36).

B. Disassembly of the basic pump should be accomplished in the following manner: Remove the adapter (1) and insulator (3) from the basic pump. Remove seal (2) from adapter (1) and bushing (4) from body (6). Hold pump body firmly in palm of hand, end plate (12) down, and apply pressure to drive end of shaft (10) forcing end plate (12), end plate seal (13), blades (11) and shaft (10) from pump body. Remove seal (5) and discard. It is important to note the liner position relative to the rotation marking found on top surface of the liner. It must be installed with the proper marking (C or CC) in the up position.

CAUTION . . . Do not disassemble liner (9), plate (8) or pin (7) from pump body (6) unless inspection indicates damage or excessive wear. If these parts are to be removed, place the pump body in a dry oven at 400° F. for 10 to 15 minutes to expand the aluminum body. The liner (9), plate (8) and pin (7) may then be removed by carefully bumping body.

C. Separate body (14) from relief valve body (28). Remove gasket (26) from orifice plate (27) or relief valve body. Remove plug (18), spring (17) and ball (16) from body (14). If pump incorporates a mixture control shaft, ball and pin should be removed. Place shaft (19) in a vee block in such a position as to allow pin (21) to be driven outward. Pin (21) is lightly staked and is best removed with a precision ground 1/16 inch punch. Ball (20) may now be removed. Separate "O" ring (22) from shaft. If inspection of collar (24) reveals necessity for removal, pin (25) can be removed by use of a 3/32 inch punch.

01-02. REASSEMBLY.

A. Reassemble basic pump (5 through 13) in reverse order of disassembly. Refer to Figure 10-01 and install new seal (5) in body (6). Install pin (7), plate (8) and liner (9) in body (6). Be sure liner is installed with proper rotation lettering visible. Use light machine oil to lubricate shaft (10) and install in pump. Install blades (11) in position and lubricate lightly. Install plate (12) and seal (13) to complete basic pump assembly. Install new seal (2) in adapter (1). Install bushing (4) and insulator (3) on pump assembly and insert into adapter assembly.

NOTE . . . To assist in assembly of the basic pump, mixture control section and relief valve section, it is suggested that two bolts approximately three inches long to be used as line-up guides. They can be made of used bolts P/N 628321A3.25 with heads removed.

B. After mixture shaft has been disassembled, install new "O" ring (22) and insert shaft in body without ball and pin. Place collar (24) in position and secure with pin (25). Pin (25) must be swaged at both ends. Insert new ball (16) in by-pass opening and peen lightly to seat. Install new spring (17) and plug (18). Locate gasket (26) in proper position and place assembly on basic fuel pump. Where used install orifice plate (27).

C. Inspect body (28) plunger seat. It must be free of nicks and scratches. In order to insure proper seating contact of the plunger (31), check pin for nicks, etc. Place small amount of lapping compound on the plunger (31) seat and lap lightly for 100% contact. Wash parts thoroughly before assembly.

D. Install gasket (26), relief valve body (28) and plunger (31) on mixture control body assembly (14). Install relief valve diaphragm (32), plate (33), spring (34), and plate (33) in this order. Before installing cover assembly (35), turn in adjusting screw (36) sufficiently to extend beyond nut to a distance equal to the depth of the depression in top plate (33). This will insure proper alignment of these parts.

E. Install Belleville washers (38) on bolts (39) and install through stacked parts. Tighten sufficiently to hold parts alignment until four bolts are in place. Torque bolts (39) to 30 ± 1 inch pounds.

CAUTION . . . Belleville washers (38) are special and must be installed with concave surfaces facing each other. Should it be necessary to remove these washers once they have been torqued, they must be replaced. (Refer Installation Figure 10-01).

F. Install fittings as required. Leak test and calibrate according to instructions and calibrations in the Fuel Pump Calibration Section. Lockwire bolts (39) after calibration to complete overhaul.

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
10-01-	630885-1	①	Fuel Pump and Mixture Control Assembly. . .	NS	A
	646764-1	①	Fuel Pump and Mixture Control Assembly. . .	NS	B
-1	631248	②	. Adapter, Fuel Pump.	1	
-2	628178	③	. Seal, Oil	1	
-3	632816	②	. Insulator, Fuel Pump	1	
-4	632741	②	. Bushing	1	
-5	649198	③	. Seal, Shaft	1	A
-5	646181	③	. Seal, Shaft	1	B
-6	643694		. Body Assembly, Fuel Pump	1	A
-6	646182-1		. Body Assembly, Fuel Pump	1	B
-7	643853		. Pin, Liner Location	1	
-8	635548	③④	. Plate, Thrust	1	A
-8	646177	③④	. Plate, Thrust	1	B
-9	643697		. Liner, Fuel Pump	1	A
-9	646178		. Liner, Fuel Pump	1	B
-10	643689		. Shaft, Fuel Pump	1	A
-10	646176		. Shaft, Fuel Pump	1	B
-11	635549		. Blade, Fuel Pump.	2	
-12	643690		. Plate, End	1	A
-12	646180		. Plate, End	1	B
-13	630979-14		. Seal, End Plate	1	
-14	630360A1		. Body, Fuel In, Out and By-Pass	1	
-15	626834		. , Pin, Mixture Control Stop	1	
-16	628249-7	③	. Ball, By-Pass Valve	1	
-17	630167	③	. Spring, By-Pass Valve	1	
-18	629974		. Plug, By-Pass Valve	1	
-19	630785		. Shaft, Mixture Control	1	
-20	628249-3	⑤	. Ball, Mixture Control	1	
-21	626844	⑤	. Roll Pin	1	
-22	630979-9	③	. "O" Ring, Mixture Control Shaft	1	
-23	635009-1		. Pin, Shaft Retaining	1	
-24	630215		. Collar, Mixture Control	1	
-25	626813		. Pin	1	
-26	630853	⑨	. Gasket.	2	
-27	632599		. Orifice Plate	1	
-28	631751		. Body Assembly, Relief Valve	1	
-29	630644		. Name Plate	1	
			ATTACHING PARTS		
-30	24764		. Screw, Drive	2	
			* * * *		
-31	628333		. Plunger, Relief Valve	1	
-32	642644	⑨	. Diaphragm, Relief Valve	1	

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
-33	637784		. Plate, Relief Valve	2	
-34	628311	③	. Spring, Relief Valve	1	
-35	630471		. Cover Assembly, Relief Valve	1	
-36	631883		. Screw, Relief Valve Adjusting	1	
-37	AN121501		. Nut	1	
-38	646448-1	③	. Washer, Belleville	1	
-39	628321A3.25		. Bolt	4	
-40	632555-34		Lever, Mixture Control	1	
-41	632554-1		. Bushing	1	
-42	MS21042-5		Nut, Mixture Control	1	

NOTES:

① This assembly NOT available as replacement part. For correct service part number, see applicable Service Parts Catalog.

② Insulator and busing was one (1) piece construction. Old adapter without counterbore cannot be used with new insulator and bushings.

③ 100% Replacement parts.

④ May be turned over and reused if not worn from previous overhaul.

⑤ Do not reinstall, no longer required.

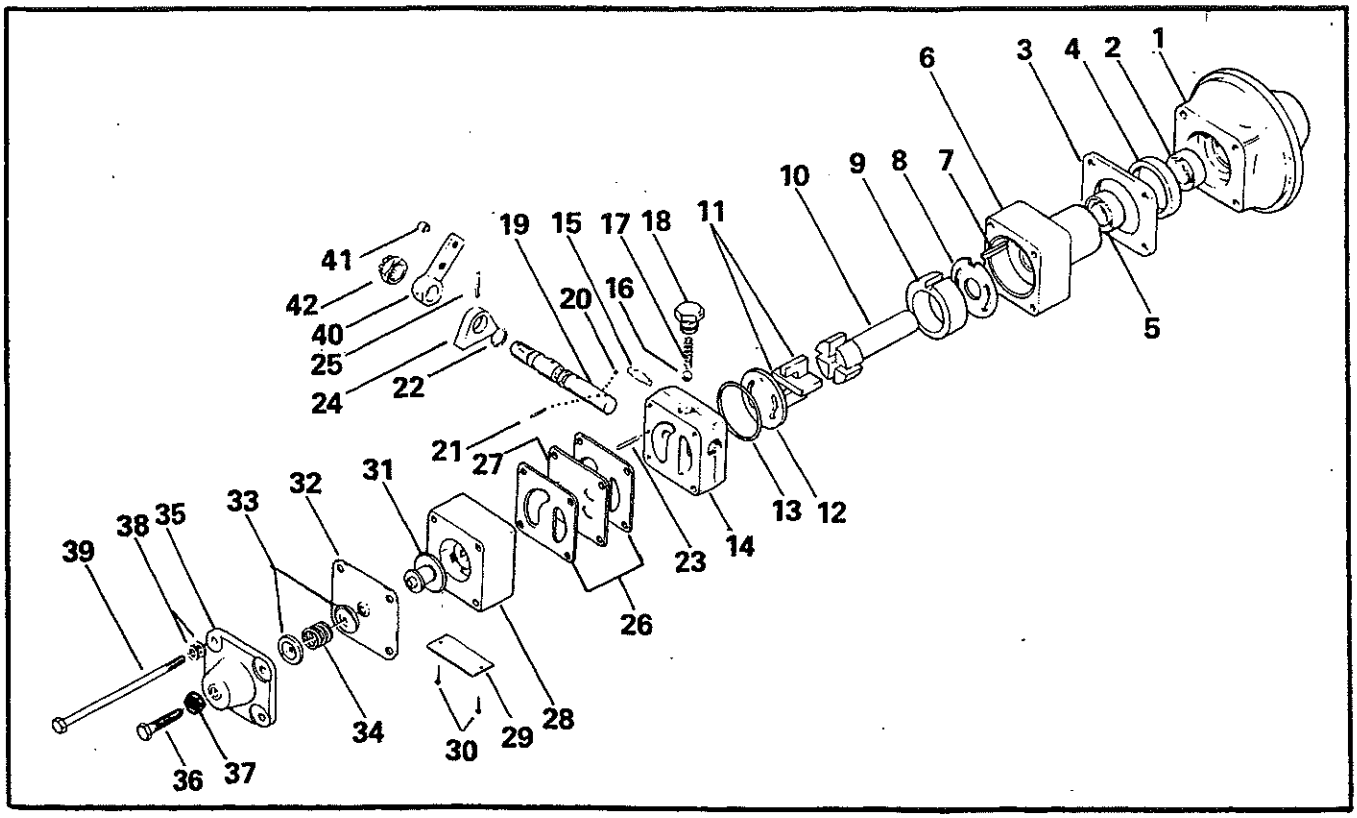

FIGURE 10–01. FUEL PUMP ASSEMBLY.

73-10-02
AIR THROTTLE METERING ASSEMBLY
P/N 640563-1

02-01 DISASSEMBLY.

A. Remove lever (7) from shaft (2) by driving out the pin (10) with a 1/8" punch. Remove screw (11) and spring (12) from lever (7). Remove nut (9) from screw (8) and remove from lever (7).

B. Remove screws (14) and cover (13) from body (1). Remove retaining ring (23), idle adjustment screw (19), "O" ring (20), bushing (21) and spring (22) from cover (13). Remove "O" ring (20) from idle adjustment screw (19). As the idle adjustment screw (19) is loosened, the metering plug (18), "O" ring (17) and spring (16) will be released for removal. Remove "O" ring (15) from cover (13).

C. Remove screws (6) and plate (5) from throttle shaft (2). Remove throttle shaft (2) from body (1). Remove "O" ring (15) and washer (4) from metering cover boss on throttle body (1). Remove "O" rings (3) from throttle shaft (2). This completes the disassembly.

02-02. REASSEMBLY.

A. Use extreme care in reassembly of the unit to insure against damage to the lapped surfaces of the metering plug (18) and the fuel metering shaft and disc assembly.

B. Install new "O" rings (3) and washer (4) on shaft (2) and with a small amount of Parker "O" Lube on "O" rings insert shaft (2) into body (1). Place plate (5) in proper position and install screws (6). After checking plate (5) position, stake screws (6). After determining proper position, install lever (7) on shaft (2). If new shaft-disc assembly is to be installed, place lever (7) on shaft and re-drill .125" through shaft and lever and install pin (10). Swage both ends of pin (10) securely. Place spring (12) on adjustment screw (11) and install in lever (7). Install adjustment screw (8) into lever (7) and install locking nut (9).

NOTE . . . A light coating of Parker "O" Lube on all "O" rings will assist in the assembly of this unit.

C. Install "O" rings (15) on throttle body fuel metering control boss and in metering cover (13). Place "O" ring (20) on idle adjustment screw (19). Install idle adjustment spring (22) and bushing (21) in position in cover (13), holding cover (13) in such a position to allow spring (22) to rest in bottom-most position. Holding cover (13) with metering plug (18) opening upright, install spring (16) in recess in bottom of cover (13). Place "O" ring (17) in plug (18) and carefully align metering plug pin with idle adjustment pin opening in bottom of cover (13) and install metering plug assembly (18). Depress assembly in cover to determine proper alignment of plug in idle adjustment recess.

D. With cover assembly (13) including parts (15, 16, 17, 18 and 4) in position, secure in an upright position, carefully mate to air throttle body assembly (1) being careful to prevent damage to metering plug. Install screw (14). Install idle adjustment screws sufficiently to engage the full width of "O" ring (20). Secure with retaining ring (23). Install any fittings that were removed. This completes assembly and unit is now ready for air pressure check and calibration according to values as outlined in the Fuel Pump Calibration Section. Lockwire screws (14) after calibration to complete overhaul.

NOTE . . . If metering cover (13) has two idle adjustment screws, replace old cover with 642709 cover assembly.

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
10-02-	640563-1		Air Throttle and Fuel Metering Assembly	NS	
-1	631214		. Body, Air Throttle	1	
-1A	626812		. Pin-Stop	1	
-2	634864-1		. Shaft Assembly, Throttle and Metering	1	
-3	630979-9	①	. "O" Ring	2	
-4	635835-2		. Washer	1	
-5	539941		. Plate, Throttle	1	
			ATTACHING PARTS		
-6	539942		. Screw	2	
			* * * *		
-7	639497		. Lever, Throttle Idle Control	1	
-8	AN565E8H16		. Screw	1	
-9	13XX18130		. Nut	1	
-10	626813		. Pin, Tubular	1	
-11	639479		. Screw Adjustment.	1	
-12	626634		. Spring, Adjustment Screw	1	
-13	642709		. Cover, Fuel Metering	1	
			ATTACHING PARTS		
-14	AN500A10-8		. Screw	3	
			* * * *		
-15	630979-10	①	. "O" Ring	2	
-16	630274		. Spring	1	
-17	630979-6	①	. "O" Ring	1	
-18	646017		. Plug Assembly, Fuel Metering	1	
-19	646044		. Screw, Idle Fuel Adjustment	1	
-20	630979-9	①	. "O" Ring	1	
-21	633298		. Bushing, Idle Adjusting Spring	1	
-22	635063		. Spring	1	
-23	521693		. Ring, Retaining	1	
-24	630644		. Name Plate.	1	
			ATTACHING PARTS		
-25	24764		. Screw	2	

NOTES:

① 100% Replacement Parts.

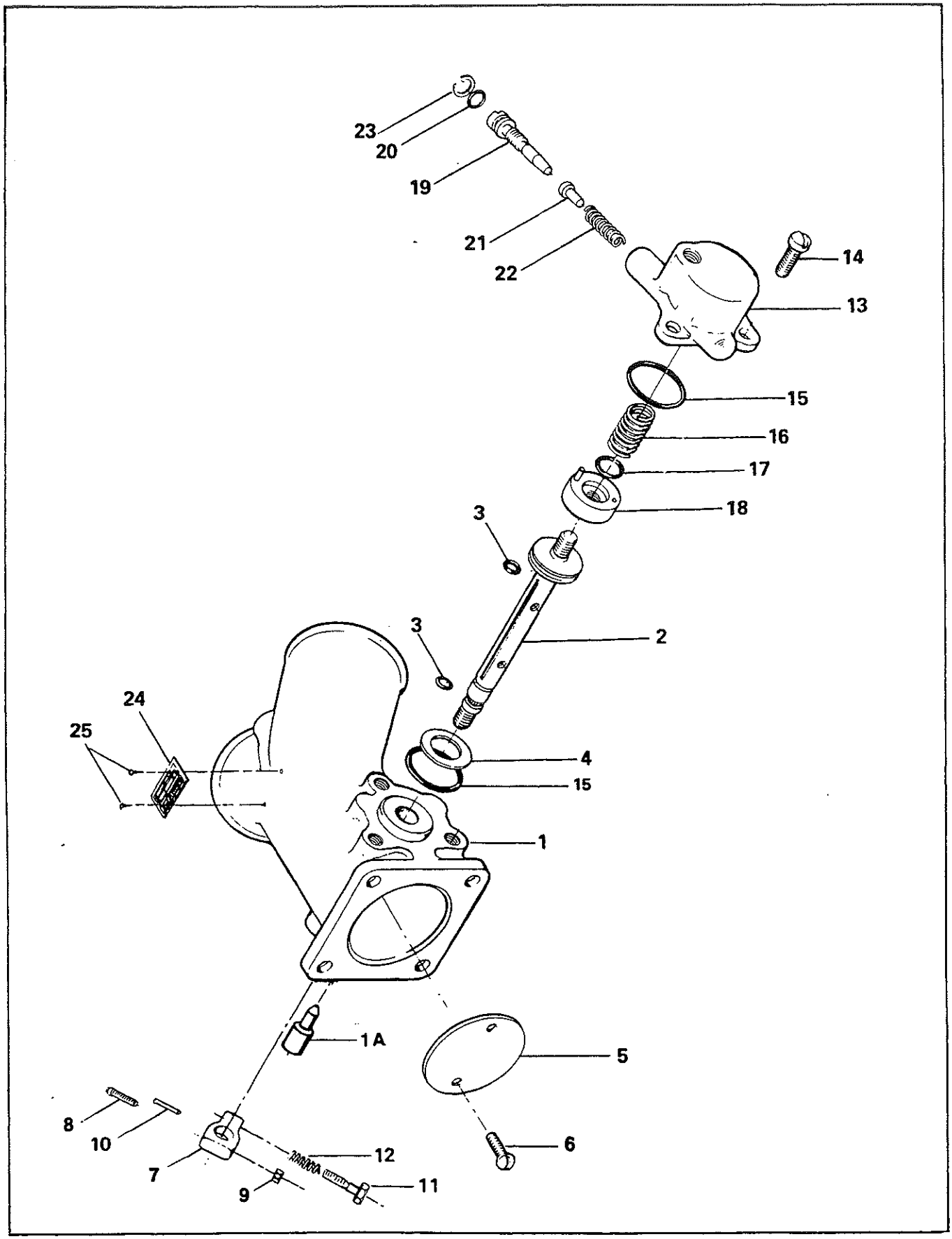

FIGURE 10–02. AIR THROTTLE & FUEL METERING ASSEMBLY.

73-10-03
MANIFOLD VALVE ASSEMBLY
P/N 631427

03-01. DISASSEMBLY.

A. Remove all lockwire. Remove fittings only if they appear damaged. Remove four screws (16) and carefully separate cover (15) from body (1). Use caution to eliminate damage to parting surfaces. Remove spring (14) and lift out diaphragm assembly (4 through 13). Remove screen (2). remove seal (3) and discard.

B. Place diaphragm assembly in shielded vise jaws in a position for disassembly. Remove nut (13), plate (12), diaphragm (11), plate (10) and spacer (8). Remove spring (5) and needle (6) from plunger (7) for inspection.

NOTE . . . Some models may have a gasket (9). Remove and discard this gasket.

03-02. REASSEMBLY.

A. Reassemble diaphragm assembly (4 through 13) by first installing needle (6) in plunger (7) and stake lightly.

CAUTION . . . Be sure needle is free to move before installing spring (5) and retainer (4).

NOTE . . . Apply Loctite 290 between diaphragm assembly parts.

Set retainer flush with bottom of plunger at initial installation. With plunger in shielded vise jaws, install spacer (8), plate (10), diaphragm (11), plate (12).

NOTE . . . If model has a gasket (9), it will not be replaced. Diaphragm parts are bonded together, eliminating the need for gasket (9).

Apply a thin coat of Loctite 290 to first and second threads of plunger (7) before installing nut (13). Torque nut (13) to 30 $\pm$ 1 inch pounds. After diaphragm is positioned with the four through holes at 45° from the through hole in the plunger, install new seal (3) and screen (2) in body (1).

B. Install diaphragm assembly (4 through 13) in bore of body. Install new spring (14) on top of plunger assembly. Place cover (15) on top of spring with vent hole 90° from fore and aft mounting position, as indicated by bracket mounting holes in base of body. Install four screws (16) and tighten to 20 $\pm$ 1 inch pounds. This completes assembly and unit is now ready for air pressure test and calibration according to values as outlined in the Fuel Manifold Calibration. Lockwire screws after calibration to complete overhaul.

NOTE . . . If correct calibration cannot be obtained, reposition retainer in plunger (pressing further in increases pressure; out decreases pressure). Be extremely careful not to allow the retainer to protrude over 0.075" out of the plunger.

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
10-03-	631427	①	Valve Assembly, Fuel Manifold	NS	
-1	631329		. Body, Fuel Manifold Valve	1	
-2	626557		. Screen	1	
-3	631330	②	. Seal	1	
	631526		. Diaphragm Assembly, Fuel Manifold Valve	1	
-4	632394		. . Retainer	1	
-5	631426	②	. . Spring	1	
-6	634619		. . Needle	1	
-7	631282		. . Plunger	1	
-8	631350		. . Spacer	1	
-9	627124		. . Gasket	1	
-10	627123		. . Plate	1	
-11	626536	②	. . Diaphragm	1	
-12	626556		. . Plate	1	
-13	646605	②	. . Nut	1	
-14	627378		. Spring, Compression	1	
-15	634325		. Cover	1	
			ATTACHING PARTS		
-16	AN500A8-10		. Screw	4	

NOTE:

① This assembly not available for service. See applicable Service Parts Catalog for service assembly number.

② 100% Replacement parts.

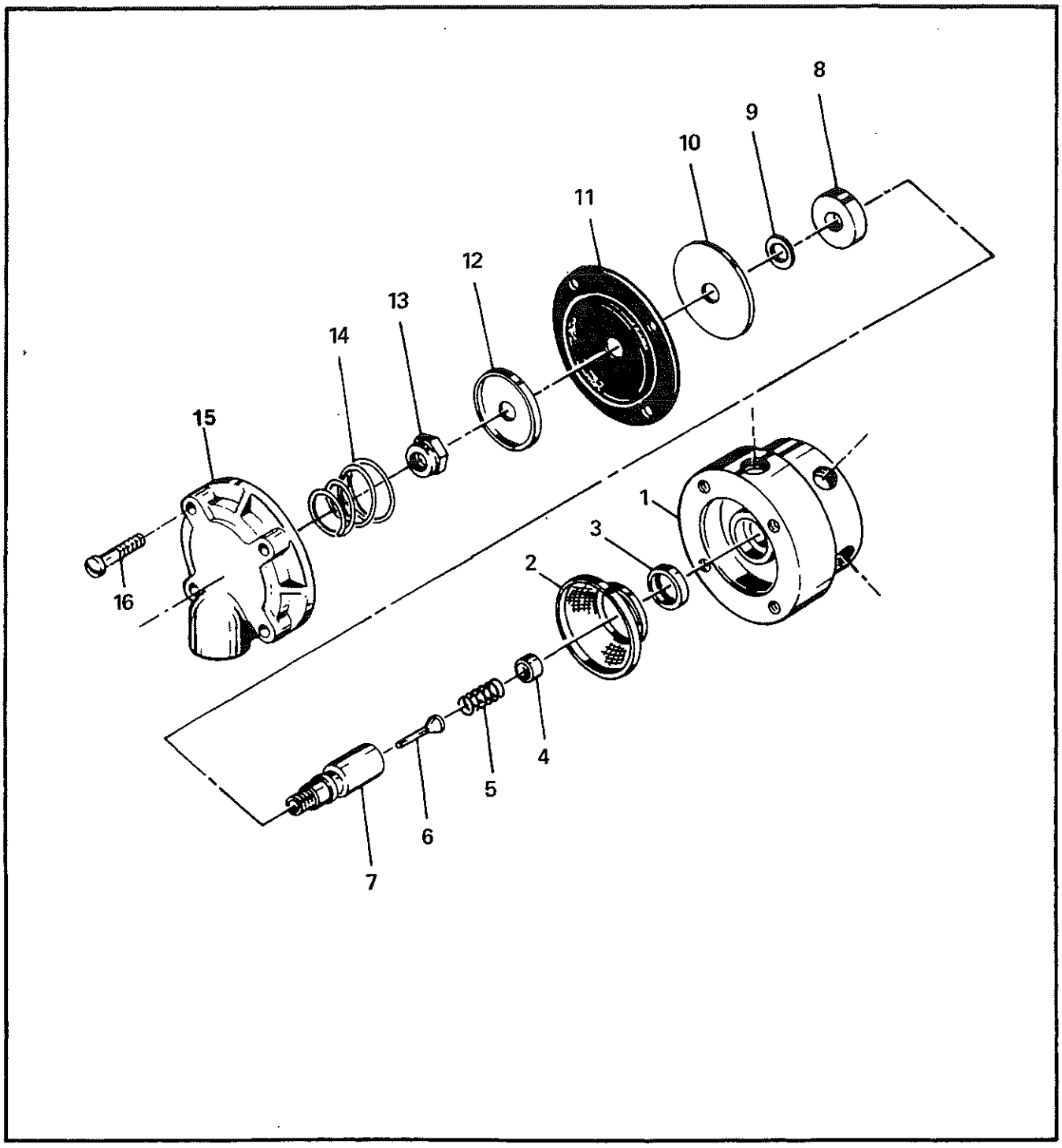

FIGURE 10–03. FUEL MANIFOLD VALVE ASSEMBLY.

73-10-04
NOZZLE ASSEMBLY

04-01. DISASSEMBLY (Figure 10-04).

A. Place nozzle (1) in a suitable fixture. Remove shield (4) and screen (3).

B. If nozzle has a screw-type jet, discard entire assembly and replace with new type.

C. If jet must be replaced, use a suitable type tap and thread into opening in jet. The jet can be removed by pulling the tap straight out.

04-02. REASSEMBLY.

A. If jet (2) was removed, replace by pressing new jet in nozzle shell.

NOTE . . . Apply a thin coat of Loctite 290 to jet before installation.

B. Install new screen (3) and shield (4) on nozzle (1). Press shield flush with top of shoulder.

C. Nozzle should be flow tested at this time. Flow nozzles and calibrate according to instructions in the Fuel Nozzle Calibration Section. If the nozzle flows in the next size range, it may be so stamped. A new jet or a new nozzle assembly can be obtained.

CAUTION . . . All nozzles must be of the same size per engine.

FIG & INDEX	PART NUMBER	1 2 3 4 5 DESCRIPTION	QTY.	USABLE ON CODE
10-04-	627335D12	① Nozzle Assembly	NS	
-1	627334	. Nozzle	1	
-2	627333-12	. Jet	1	
-3	625921	. Screen	1	
-4	625919	. Shield	1	

NOTE:

① Order nozzle size identified on hex of nozzle body.

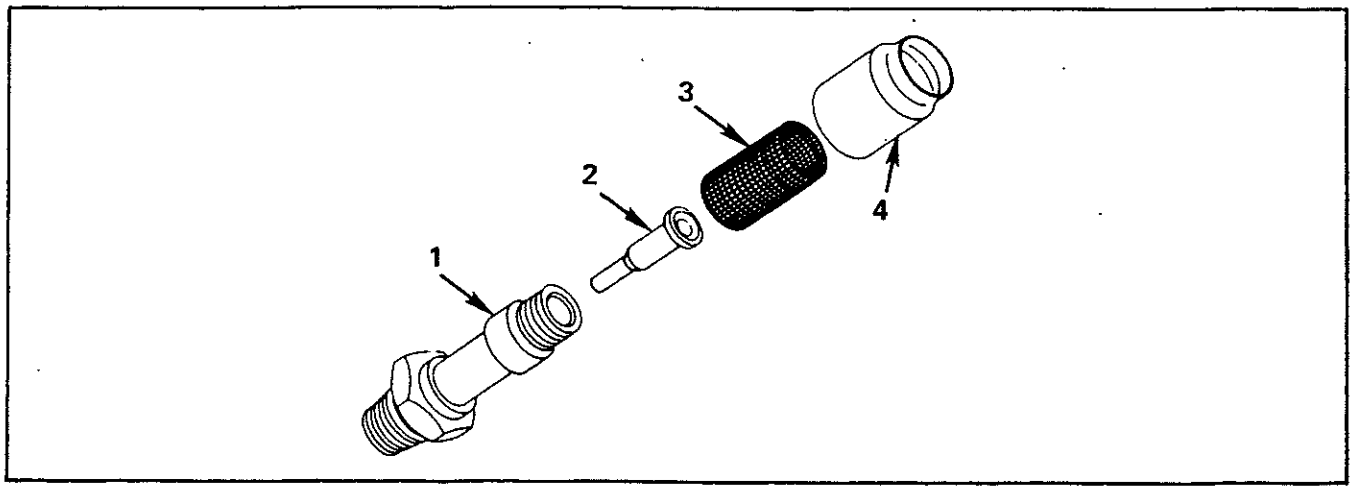

FIGURE 10-04. NOZZLE ASSEMBLY.

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360 SERIES ENGINES

INTENTIONALLY

LEFT

BLANK

73-20-01
FUEL PUMP ASSEMBLIES P/N 638157-2 & 646759-2

01-01. GENERAL.

A. Part number 646759 replaces part numbers 638157, 634541 and 629373. New part number indicates addition of retaining ring to adjustable orifice or replacement of by-pass valve with adjustable orifice.

01-02. DISASSEMBLY.

A. Place pump in suitable fixture and remove all lockwire; and fittings if necessary. Refer to exploded view (Figure 20-01) and proceed as follows: Loosen screw (31) to relieve pressure on relief valve spring (30). Remove four bolts (34), washers (33) and separate parts (1 through 13) from vapor separator body (14).

B. Disassembly of the basic pump should be accomplished in the following manner: Remove the adapter (1) and insulator (3) from the basic pump. Remove seal (2) from adapter (1) and bushing (4) from insulator (3). Hold pump body (6) firmly in palm of hand, end plate (12) down, and apply pressure to drive end of shaft (10) forcing end plate (12), end plate seal (13), blades (11) and shaft (10) from pump body. Remove seal (5) and discard. It is important to note the liner position relative to the rotation marking found on the top surface of the liner. It must be installed with the proper marking (C or CC) in the up position.

CAUTION . . . Do not disassemble liner (9), plate (8) or pin (7) from pump body unless inspection indicates damage or excessive wear. If these parts are to be removed, place the pump body in a dry oven at 400° F. for 10 to 15 minutes to expand the aluminum body. The liner (9), plate (8) and pin (7) may then be removed by carefully bumping body.

C. Separate cover assembly (22) from vapor separator body (14). Remove screw (31) from cover (22), pin (26) and collar (25) and remove collar (25), teflon washer (24) and "O" ring (23) from shaft (18). Remove shaft (18) from cover (22) and "O" ring (21) from shaft. At this point the ball check in the mixture control shaft shall be checked for leakage. If no leakage is observed, further disassembly of the mixture control shaft (18) is not required. If leakage is observed, continue as follows: Ball (19) and pin (20) must be removed from shaft (18). This is best accomplished by placing shaft (18) in a vee block in such a position to allow the ball (19) to be driven against pin (20) bending it and allowing ball (19) to fall through shaft (18). A precision ground 1/16" punch should be used for this operation and care exercised. Very light pressure is required to bend pin (20). It is now possible to lightly drive pin (20) into bore of mixture shaft (18) for removal.

D. Remove diaphragm (28) and plunger (27) from vapor separator relief valve body (14). Now remove screws (47 and 48), cover (46) and gasket (44). Remove ejector (45) from vapor separator cover.

E. Remover plug (41), spring (40), and ball (39) from body (14). Remove retaining ring (38), adjusting needle (36), "O" ring (37) and plug (35) from body. Place (14) in suitable fixture and, with a long reach internal puller, remove insert (16). Remove "O" rings (17) from insert (16). This completes disassembly.

01-03. REASSEMBLY.

A. Reassemble basic pump (5 through 13) in reverse order of disassembly. Refer to Figure 20-01 and install new seal (5) in body (6). Install pin (7), plate (8) and liner (9) in body (6). Be sure liner is installed with proper rotation lettering visible. Use light machine oil to lubricate shaft (10) and install in pump. Install blades (11) in position and lubricate lightly. Install plate (12) and seal (13) to complete basic pump assembly. Install seal (2) in adapter (1). Install bushing (4) and insulator (3) on pump assembly and insert into adapter assembly.

NOTE . . . To assist in assembly of the basic pump and vapor separator and relief valve section, it is suggested that two bolts approximately 3-1/2 inches long to be used as line up guides. They can be made of used bolts P/N 628321A3.72 with heads removed.

B. If insert (16) was removed at disassembly, install new "O" ring (17) on insert (16). Use a small amount of Parker "O" Lube on all "O" rings at assembly to insure ease of assembly and

eliminate rolled rings. Press insert (16) into separator mixture control body (14) being careful to align inlet and outlet openings. Press insert (16) into body flush with surface. If new insert (16) is to be installed, proceed as follows: Install "O" rings (17) on insert (16) and lightly lubricate. Press insert (16) into body (14) until flush with surface. Using a suitable holding fixture and .125" drill bit, center drill in fuel outlet fitting boss and drill through insert (16) and body (14) until drill bit visibly enters relief valve area. Ream insert (16) using a .50" ream to remove any burrs and improve shaft installation. Using a small amount of lapping compound, lap plunger (27) to seat in body (14) for 100% contact. When this has been accomplished wash parts thoroughly.

C. Install jet plug (35), "O" ring (37) and adjusting needle (36) in body (14). Secure with retaining ring (38). Insert new ball (39) in by-pass opening and peen lightly to seat. Install new spring (40) and plug (41). Apply a thin coat of Loctite 242 to threads of vapor separator cover screws (47) and (48). Place gasket (44) and cover (46) on body and secure with screws (47) and (48). Install ejector (45) in cover (46).

D. If mixture shaft (18) has been completely disassembled, install new ball (19) and peen lightly to seat. Install pin (20) and stake sufficiently to eliminate the possibility of the pin backing out and scoring bore of insert (16).

Install "O" ring (21) on mixture shaft (18) and install shaft in cover (22). Install washers (23), (24) and collar (25). Install pin (26) and swage both ends.

E. Install lapped plunger (27) in body (14). Place diaphragm (28), plate (29), spring (30) and plate (29) in this order.

F. Install adjusting screw (31) in cover (22). Turn in sufficiently so screw will protrude, in cover, a distance equal to depression in top plate (29). This will assure proper alignment of these parts.

G. Assemble cover and mixture shaft assembly to body (14). Place Belleville washers (33) on bolts (34) and install through stacked parts. Tighten sufficiently to hold parts alignment until four bolts are in place. Torque bolts (34) to 30 $\pm$ 1 inch pounds.

CAUTION . . . Belleville washers (33) are special and must be installed with concave surfaces facing each other. Should it be necessary to remove these washers once they have been torqued, they must be replaced.

H. Install fittings as required. Leak test and calibrate according to instructions and calibration data in the Fuel Pump Calibration Section. Lockwire after calibration to complete overhaul.

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
20-01-	638157-2	①	Fuel Pump and Vapor Separator Assembly . .	NS	A
	646759-2	①	Fuel Pump and Vapor Separator Assembly . .	NS	B
-1	630166	②	. Adapter, Fuel Pump.	1	
-2	628178	③	. Seal, Fuel Pump	1	
-3	632816	②	. Insulator, Fuel Pump	1	
-4	632741	②	. Bushing	1	
-5	636293	③	. Seal, Shaft	1	A
-5	646181	③	. Seal, Shaft	1	B
-6	643694		. Body Assembly, Fuel Pump	1	A
-6	646182-1		. Body Assembly, Fuel Pump	1	B
-7	643853		. Pin, Liner Locator	1	
-8	635548	③④	. Plate, Thrust	1	A
-8	646177	③④	. Plate, Thrust	1	B
-9	643697		. Liner, Fuel Pump	1	A
-9	646178		. Liner, Fuel Pump	1	B
-10	643689		. Shaft, Fuel Pump	1	A
-10	646176		. Shaft, Fuel Pump	1	B
-11	635549		. Blade, Fuel Pump	2	
-12	643690		. Plate, End	1	A
-12	646180		. Plate, End	1	B
-13	630979-14	③	. Seal, End Plate	1	
-14	634530		. Vapor Separator and Relief Valve Housing .	1	
-15	630383-2		. Pin, Mixture Stop	1	
-16	630213		. Insert, Mixture Control	1	
-17	MS9021-016	③	. "O" Ring, Mixture Insert	2	
	646654-1		. Shaft Assembly	1	
-18	630214		. . Shaft, Mixture Control	1	
-19	628249-3		. . Ball, Mixture Control Shaft	1	
-20	626844		. . Pin, Mixture Control Shaft	1	
-21	630979-11	③	. "O" Ring, Mixture Control	1	
-22	630494		. Cover Assembly, Relief Valve	1	
-23	625457-1	③	. Washer, Mixture Control	1	
-24	635835-1		. Washer, Teflon	2	
-25	630215		. Collar, Mixture Control	1	
-26	626813		. Pin, Mixture Control	1	
-27	628333		. Plunger, Relief Valve	1	
-28	642644	②	. Diaphragm, Relief Valve	1	
-29	637784		. Plate	2	
-30	628311	②	. Spring, Relief Valve	1	
-31	621883	②	. Screw, Relief Valve Adjusting	1	
-32	AN121501		. Nut	1	
-33	646448-1		. Washer, Belleville	8	
-34	628321A3.72		. Bolt	4	
-35	637864		. Plug, Assembly, Jet By-Pass	1	
-36	No Number		. . Needle, Adjusting	NS	
-37	AN123956	②	. . Seal, "O" Ring	1	
-38	637861		. . Ring, Retaining	1	
-39	628249-7	②	. Ball, By-Pass Valve	1	
-40	630167	②	. Spring, By-Pass Valve	1	
-41	629974		. Plug, By-Pass Valve	1	

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
-42	640797	.	Plate, Name	1	
			ATTACHING PARTS		
-43	24764	.	Screw, Drive	2	
			* * * *		
-44	625548	③ .	Gasket, Cover	1	
-45	625901	.	Ejector, Vapor Separator	1	
-46	625900	.	Cover, Vapor Separator	1	
			ATTACHING PARTS		
-47	AN500A8-12	.	Screw, Cover.	2	
-48	AN500A8-7	.	Screw, Cover.	2	

NOTES:

① This assembly NOT available as replacement part. For correct service part number, see appropriate Service Parts Catalog.

② Insulator and bushing was one (1) piece construction. Old adapter without counterbore cannot be used with new insulator and bushing.

③ 100% Replacement parts.

④ May be turned over and reused if not worn from previous overhaul.

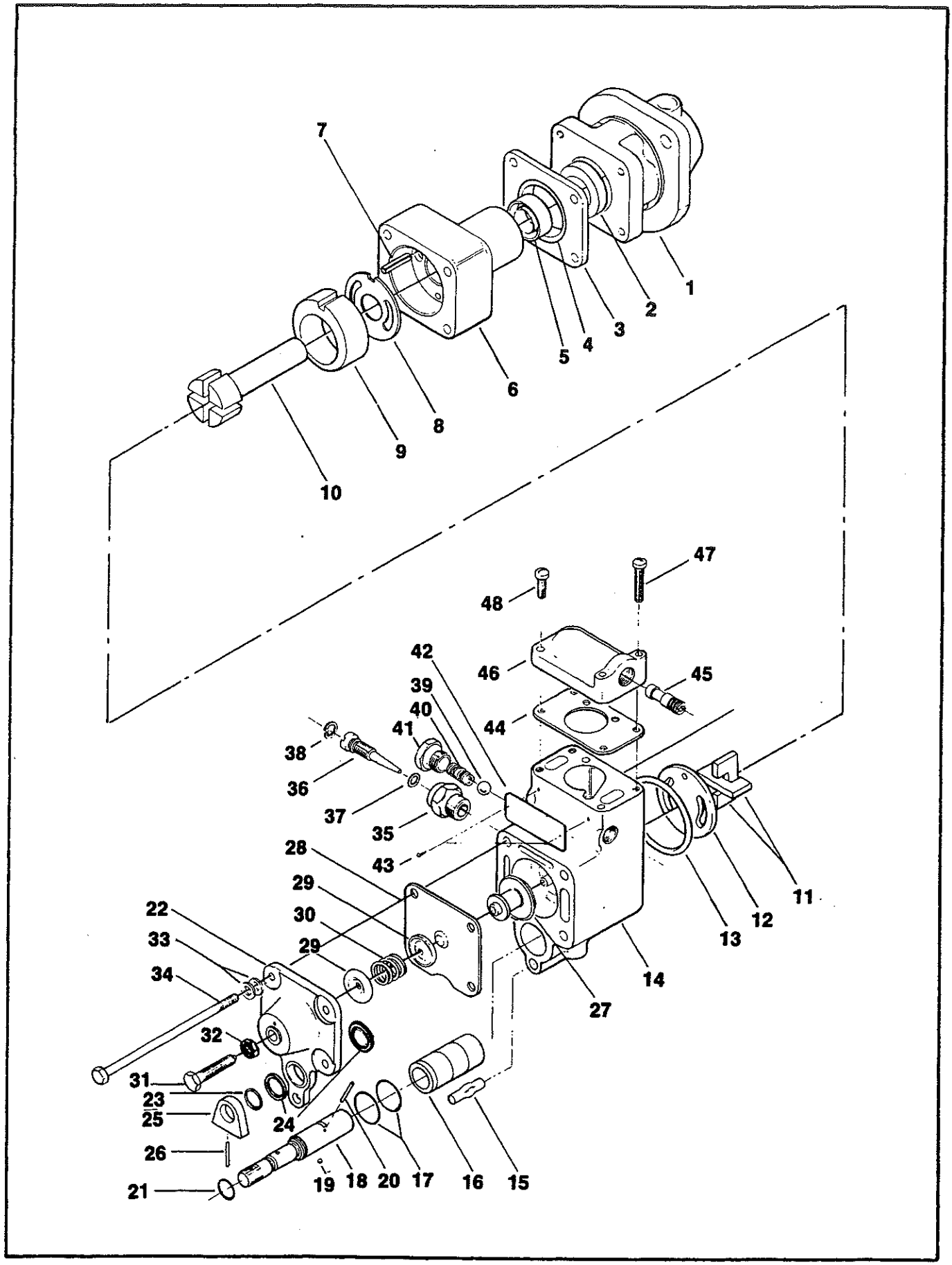


FIGURE 20–01. FUEL PUMP ASSEMBLY

73-20-02
FUEL PUMP ASSEMBLIES
P/N 639508-1,2,3,4,6,10,11,14 &
646758-1,2,3,4,6,10,11,14,15

02-01. DISASSEMBLY.

A. Place pump in a suitable fixture and remove all lockwire; and fittings if necessary. Refer to exploded view (Figure 20-02) and proceed as follows: Loosen screw (54) to relieve pressure on relief valve spring (37). Remove four bolts (41) and washers (40). Separate basic pump parts (1 through 13) from vapor separator and relief valve body (14).

B. Disassembly of the basic pump should be accomplished in the following manner: Remove the adapter (1) and insulator (3) from the basic pump. Remove seal (2) from adapter (1) and bushing (4) from pump body (6). Hold pump body (6) firmly in palm of hand, end plate (12) down, and apply pressure to drive end of shaft (10) forcing end plate (12), end plate seal (13), blades (11) and shaft (10) from pump body. Remove seal (5) and discard. It is important to note the liner position relative to the rotation marking found on the top surface of the liner. It must be installed with the proper marking (C or CC) in the up position.

CAUTION . . . Do not disassemble liner (9), plate (8) or pins (7) from pump body unless inspection indicates damage or excessive wear. If these parts are to be removed, place the pump body in a dry oven at 400° F. for 10 to 15 minutes to expand the aluminum body. The liner (9), plate (8) and pin (7) may then be removed by carefully bumping body.

C. Remove aneroid lock nut (44), plain washer (43) and sealing washer (42), and turn adjusting screw down until it is no longer attached to the relief valve cover (39). Remove pin (52), collar (51) and washer (53). Cover (39) may now be removed. Diaphragm plates (36) and diaphragm spring (37) will fall out when cover (39) is removed. Aneroid (33) and rod (32) need not be disassembled unless replacement of either part is necessary.

D. Remove diaphragm (35), plunger (34) and mixture control shaft (46). At this point the ball check in the mixture control shaft should be checked for leakage. If no leakage is observed, further disassembly of the mixture control shaft (46) is not required. If leakage is observed, ball (47) and pin (48) must be removed from shaft (46). This is best accomplished by placing the shaft in a vee block in such a position as to allow the ball to be driven against the pin. This will bend the pin and allow the ball to fall through the shaft. A precision ground 1/16" punch should be used for this operation and care exercised. Very light pressure is required to bend the pin. It is now possible to lightly drive pin into bore of the mixture shaft for removal.

E. Insert (14A) should be inspected for wear. If the insert is within the specified limits it should not be removed. If necessary, removal can be accomplished by using a 1/2" tap and tapping into the insert and pulling the insert straight out. It may be necessary to put the tap in the vise and tap on the casting with a plastic hammer to remove the insert.

F. Remove screws (27) and (28), variable orifice body (26), gasket (25) and "O" ring (38). Pin (31) must be removed so aneroid and rod can be withdrawn from body. The rod seal (29) and snap ring (30) can be removed for replacement by soaking the variable orifice body (26) in a mixture of 80% Glacial Acetic acid and water, then scrape off the softened epoxy, if epoxy adhesive was used. It should now be possible to remove snap ring and seal. Remove spring (17), ball (16) and plug (15) from vapor separator body. Remove screws (20) and (21), cover (19), gasket (18) and ejector (22).

NOTE . . . Be sure to use latest variable orifice body (26) which incorporates the use of a stop pin (29) at rear of housing. This replaces retaining clip-type.

02-02. REASSEMBLY.

A. Reassemble basic pump (5 through 13) in reverse order of disassembly. Refer to Figure 20-02 and install new seal (5) in body (6). Install pin (7), plate (8) and liner (9) in body (6). Thrust plate (8) may be turned over and reused if not worn from previous overhaul. Be sure liner is

installed with proper rotation lettering visible. Use light machine oil to lubricate shaft (10) and install in pump. Install blades (11) in position and lubricate lightly. Install plate (12) and seal (13) to complete basic pump assembly. Install new seal (2) in adapter (1). Install bushing (4) and insulator (3) on pump assembly and insert into adapter assembly.

NOTE . . . To assist in assembly of the basic pump and vapor separator and relief valve sections, it is suggested that two bolts approximately 3-5/8 inch long be used as line-up guides. They can be made of used bolts P/N 628321-3.72 with heads removed.

B. If insert (14A) was removed at disassembly, install new "O" rings (14B) on insert (14A). Use a small amount of Parker "O" Lube on all "O" rings to eliminate rolled rings. Press insert (14A) into separator mixture control body (14) being careful to align inlet and outlet openings. Press insert (14B) into body flush with surface. If new insert (14A) is to be installed, proceed as follows: Install "O" rings (14B) on insert (14A) and lightly lubricate. Press insert (14A) into body (14) until flush with surface. Using a suitable holding fixture and .125" drill bit, center drill in fuel outlet fitting boss and drill through insert (14A) and body (14) until drill bit visibly enters relief valve area. Ream insert (14A) using a .50" ream to remove any burrs and improve shaft installation.

CAUTION . . . Do not exceed the specified 1.31 inches depth limits. Make sure all chips and shavings have been cleaned out of the casting.

C. Install a new ball (16), spring (17) and plug (15) in vapor separator (14). Peen the ball lightly to seat. Install rod seal (29) in body and put a thin layer of Loctite 290 in the retaining ring groove and install retaining ring (30), being careful to prevent the adhesive from flowing onto the lip of the seal. These parts should be allowed to dry before proceeding with further assembling.

D. Install aneroid (33) on rod (32) if removed, using Loctite 242. Install a new "O" ring (38) on body. Now insert the aneroid rod (32) into the body and install pin (29). With a new gasket (25) in place, install body (26) on vapor separator and attach with screws (27) and (28) using Loctite 242.

E. With a small amount of lapping compound, lap plunger (34) to seat in body (14) for 100% contact. Clean plunger and body thoroughly and install plunger in body.

F. If mixture shaft was completely disassembled, install a new ball (47) and peen lightly to seat. Install a new pin (48) and stake sufficiently to eliminate the possibility of the pin backing out and scoring the bore of the insert (14A). Install a new "O" ring (49), washer (50) and washer (53) on mixture shaft (46) and install in vapor separator.

G. Set diaphragm (35), plates (36) and spring (37) in place. Install adjusting screw (54) in cover (39) and turn screw in so it will protrude in cover a distance equal to the depression in the top plate (36). Assemble cover (39) to body (14). Hold cover in place and back aneroid adjusting screw up into the cover and install seal washer (42), plain washer (43) and lock nut (44). Still holding cover in place, assemble complete fuel pump assembly together with washers (40) and bolts (41). Torque bolts to 30 $\pm$ 1 inch pounds.

CAUTION . . . Washer (40) are special and must be installed with the concave surfaces facing each other. Should it be necessary to remove these washers once they have been torqued, they must be replaced.

H. Install collar (51) and pin (52) on mixture control shaft (46). Be sure to swage both ends of the pin (52). Place a new gasket (18) on vapor separator and install cover (19) with screws (20) and (21) using Loctite 242. Install ejector (22) in cover.

I. Install fittings as required. Leak test and calibrate according to instructions and calibration data in the Fuel Pump Calibration Section. Lockwire after calibration to complete overhaul.

USABLE ON CODE

MODEL	CODE	MODEL	CODE
639508-1	A	646758-2	K
639508-2	B	646758-3	L
639508-3	C	646758-4	M
639508-4	D	646758-6	N
639508-6	E	646758-10	O
639508-10	F	646758-11	P
639508-11	G	646758-14	Q
639508-14	H	646758-15	R
646758-1	J		

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
20-02	No Number	①	Fuel Pump & Pressure Compensator Assembly	NS	ALL
-1	630166		. Adapter, Fuel Pump.	1	ABCDEFGJKLMNOPR
-1	630166-1		. Adapter, Fuel Pump.	1	HQ
-2	628178	④	. Seal, Adapter	1	
-3	632816		. Insulator	1	
-4	632741		. Bushing	1	
-5	649198	②	. Seal, Shaft	1	ABCDEFGH
-5	646181	②	. Seal, Shaft	1	JKLMNOPQR
-6	643694		. Body Assembly.	1	ABCDEFGH
-6	646182-1		. Body Assembly.	1	JKLMNOPQR
-7	643853		. Pin, Liner Locator	1	
-8	635548	②③	. Plate, Thrust	1	ABCDEFGH
-8	646177	②③	. Plate, Thrust	1	JKLMNOPQR
-9	643697		. Liner	1	ABCDEFGH
-9	646178		. Liner	1	JKLMNOPQR
-10	643689		. Shaft, Fuel Pump	1	ABCDEFGH
-10	646176		. Shaft, Fuel Pump	1	JKLMNOPQR
-11	635549		. Blade, Fuel Pump.	2	
-12	643690		. Plate, End	1	ABCDEFGH
-12	646180		. Plate, End	1	JKLMNOPQR
-13	630979-14	②	. Seal, End Plate	1	
-14	643755A1		. Vapor Separator Assembly.	1	
-14A	630213		. . Insert	1	
-14B	MS9021-016	②	. . "O" Ring	2	
-15	632636		. Plug, Fuel Pump By-Pass	1	
-16	628249-7	②	. Ball, Fuel Pump By-Pass	1	
-17	630167	②	. Spring, Ball Return	1	
-18	625548	②	. Gasket, Separator	1	
-19	625900		. Cover Vapor Separator	1	
			ATTACHING PARTS		
-20	AN500-8-12		. Screw	2	
-21	AN500-8-7		. Screw	2	
			* * * *		
-22	633447		. Ejector, Fuel Pump Vapor	1	ABCDGHJKLMPQ
-22	642955		. Ejector, Fuel Pump Vapor	1	EFNOR
-23	640797		. Name Plate.	1	
			ATTACHING PARTS		
-24	24764		. Screw, Drive	2	
			* * * *		
-25	638223	②	. Gasket	1	
-26	634439A1		. Body, Variable Orifice	1	
			ATTACHING PARTS		
-27	AN500-8-20		. Screw	2	
-28	AN500-8-14		. Screw	2	
			* * * *		
-29	639484	②	. . Seal, Rod	1	
-30	521824		. . Ring, Retaining	1	
-31	634441		. Pin, Variable Orifice	1	
-32	634438-12		. Rod, Variable Orifice	1	R
-32	634438-6		. Rod, Variable Orifice	1	DM
-32	634438-7		. Rod, Variable Orifice	1	AJ
-32	634438-2		. Rod, Variable Orifice	1	BCEFHLNOQK

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
-32	634438-1		. Rod, Variable Orifice	1	GP
-33	642810		. Aneroid, Altitude Control	1	
-34	628333		. Plunger, Relief Valve	1	ABCDGHJKLMPQ
-34	628333-1		. Plunger, Relief Valve	1	EFNOR
-35	642644	②	. Diaphragm, Relief Valve	1	
-36	637784		. Plate, Diaphragm	2	
-37	628311	②	. Spring, Diaphragm	1	
-38	630979-12	②	. "O" Ring	1	
-39	632618A1		. Cover Assembly, Relief Valve	1	
-40	646448-1	②	. Washer, Belleville	8	
-41	628321A3.72		. Bolt	4	
-42	538600-3		. Washer, Seal	1	
-43	20522		. Washer, Plain	1	
-44	628298		. Nut, Aneroid Locking	1	
-45	630383-2		. Pin	1	
	646654-1		. Shaft Assembly	1	
-46	630214		. . Shaft, Mixture Control	1	
-47	628249-3		. . Ball	1	
-48	626844		. . Pin	1	
-49	630979-11	②	. "O" Ring	1	
-50	625457-1		. Washer	1	
-51	630215		. Collar	1	
-52	626813		. Pin	1	
-53	635835-1		. Washer, Teflon	2	
-54	631883		. Screw, Relief Valve	1	

NOTES:

① This assembly NOT available as replacement part. For correct service part, see appropriate Service Part Catalog.

② 100% Replacement parts.

③ May be turned over and reused if not worn from previous overhaul.

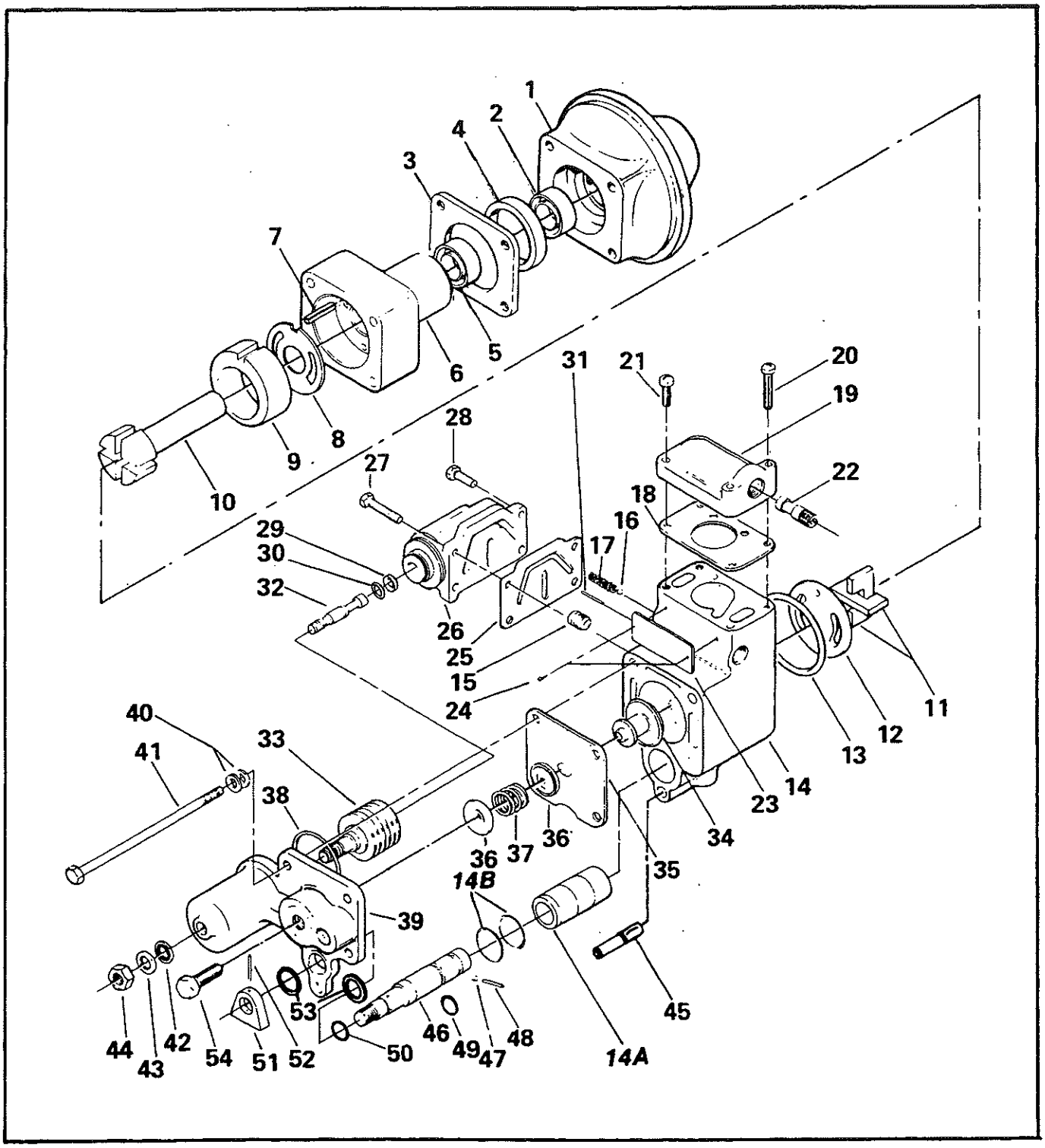


FIGURE 20–02. FUEL PUMP ASSEMBLY

72-20-03
AIR THROTTLE METERING ASSEMBLIES
P/N 640563-4, 6, 7, 8

03-01. DISASSEMBLY.

A. Remove lever (7) from shaft (2) by driving out of the pin (10) with a 1/8" punch. Remove screw (11) and spring (12) from lever (7). Remove nut (9) from screw (8) and remove from lever (7).

B. Remove screws (14) and cover (13) from body (1). Remove retaining ring (23), idle adjustment screw (19), "O" ring (20), bushing (21) and spring (22) from cover (13). Remove "O" ring (20) from idle adjustment screw (19). As the idle adjustment screw (19) is loosened, the metering plug (18), "O" ring (17) and spring (16) will be released for removal. Remove "O" ring (15) from cover (13).

C. Remove screws (6) and plate (5) from throttle shaft (2). Remove throttle shaft (2) from body (1). Remove "O" ring (15) and washer (4) from metering cover boss on throttle body (1). Remove "O" rings (3) from throttle shaft (2). This completes the disassembly.

D. Inspect throttle body bushings (1A, 1B) for damage or wear, inside diameter .3745 / .3760. If replacement is necessary, both holes must be in line within .0005.

03-02. REASSEMBLY.

A. Use extreme care in reassembly of the unit to insure against damage to the lapped surfaces of the metering plug (18) and the fuel metering shaft and disc assembly (2).

B. Install "O" rings (3) and washer (4) on shaft (2) and with a small amount of Parker "O" Lube on "O" rings insert shaft (2) into body (1). Place plate (5) in proper position and install screws (6). After checking plate (5) position, stake screws (6). After determining proper position, install lever (7) on shaft (2). If new shaft-disc assembly is to be installed, place lever (7) on shaft and re-drill .125" through shaft and lever and install pin (10). Swage both ends of pin (10) securely. Place spring (12) on adjustment screw (11) and install in lever (7). Install adjustment screw (8) into lever (7) and install locking nut (9).

NOTE . . . A light coating of Parker "O" Lube on all "O" rings will assist in the assembly of this unit.

C. Install "O" rings (15) on throttle body fuel metering control boss and in metering cover (13). Place "O" ring (20) on idle adjustment screw (19). Install idle adjustment spring (22) and bushing (21) in position in cover (13), holding cover (13) in such a position to allow spring (22) to rest in the bottom-most position. Holding cover (13) with metering plug (18) opening upright, install spring (16) in recess in bottom of cover (13). Place "O" ring (17) in plug (18) and carefully align metering plug pin with idle adjustment pin opening in bottom of cover (13) and install metering plug assembly (18). Depress plug assembly in cover to determine proper alignment of plug pin in idle adjustment recess.

D. With cover assembly (13) including parts (15, 16, 17, 18 and 4) in position, secure in an upright position, carefully mate to air throttle body assembly (1) being carefully to prevent damage to metering plug. Install screws (14). Install idle adjustment screw sufficiently to engage the full width of "O" ring (20). Secure with retaining ring (23). Install any fittings that were removed. This completes assembly and unit is now ready for air pressure check and calibration according to values as outlined in the Calibration Section. Lockwire screws (14) after calibration to complete overhaul.

NOTE . . . If metering cover (13) has two idle adjustment screws, replace old cover with 642709 cover assembly.

FIG & INDEX	PART NUMBER	1 2 3 4 5 DESCRIPTION	QTY.	USABLE ON CODE
20-03	640563-4	Air Throttle and Fuel Metering Assembly . .	NS	A
	640563-6	Air Throttle and Fuel Metering Assembly . .	NS	B
	640563-7	Air Throttle and Fuel Metering Assembly . .	NS	C
	640563-8	Air Throttle and Fuel Metering Assembly . .	NS	D
-1	629733	. Body, Air Throttle	1	BC
-1	646110	. Body, Air Throttle	1	AD
-1A	630455	. . Bushing	1	AD
-1B	631183-2	. . Bushing	1	AD
-1C	626812	. Pin - Stop	1	AD
-2	634864-1	. Shaft Assembly, Throttle and Metering . .	1	C
-2	639377-1	. Shaft Assembly, Throttle and Metering . .	1	AD
-2	634864-8	. Shaft Assembly, Throttle and Metering . .	1	B
-3	630979-9	① . "O" Ring	2	
-4	635835-2	. Washer	1	
-5	539941	. Plate, Throttle	1	BC
-5	639206	. Plate, Throttle	1	AD
		ATTACHING PARTS		
-6	539942	. Screw	2	
-7	639497	. Lever, Throttle Idle Control	1	
-8	AN565E8H16	. Screw	1	
-9	13XX18130	. Nut	1	
-10	626813	. Pin, Tubular	1	
-11	639479	. Screw, Adjustment	1	
-12	626634	. Spring, Adjustment Screw	1	
-13	642709	. Cover, Fuel Metering	1	
		ATTACHING PARTS		
-14	AN500A10-8	. Screw	3	
		* * * *		
-15	630979-10	① . "O" Ring	2	
-16	630274	. Spring	1	
-17	630979-6	① . "O" Ring	1	
-18	646017	. Plug Assembly, Fuel Metering	1	
-19	646044	. Screw, Idle Fuel Adjustment	1	
-20	630979-9	. "O" Ring	1	
-21	633298	. Bushing, Idle Adjusting Spring	1	
-22	635063	. Spring	1	
-23	521693	. Ring, Retaining	1	
-24	630644	. Name Plate	1	
		ATTACHING PARTS		
-25	24764	. Screw	2	

NOTE:

① 100% Replacement Parts.

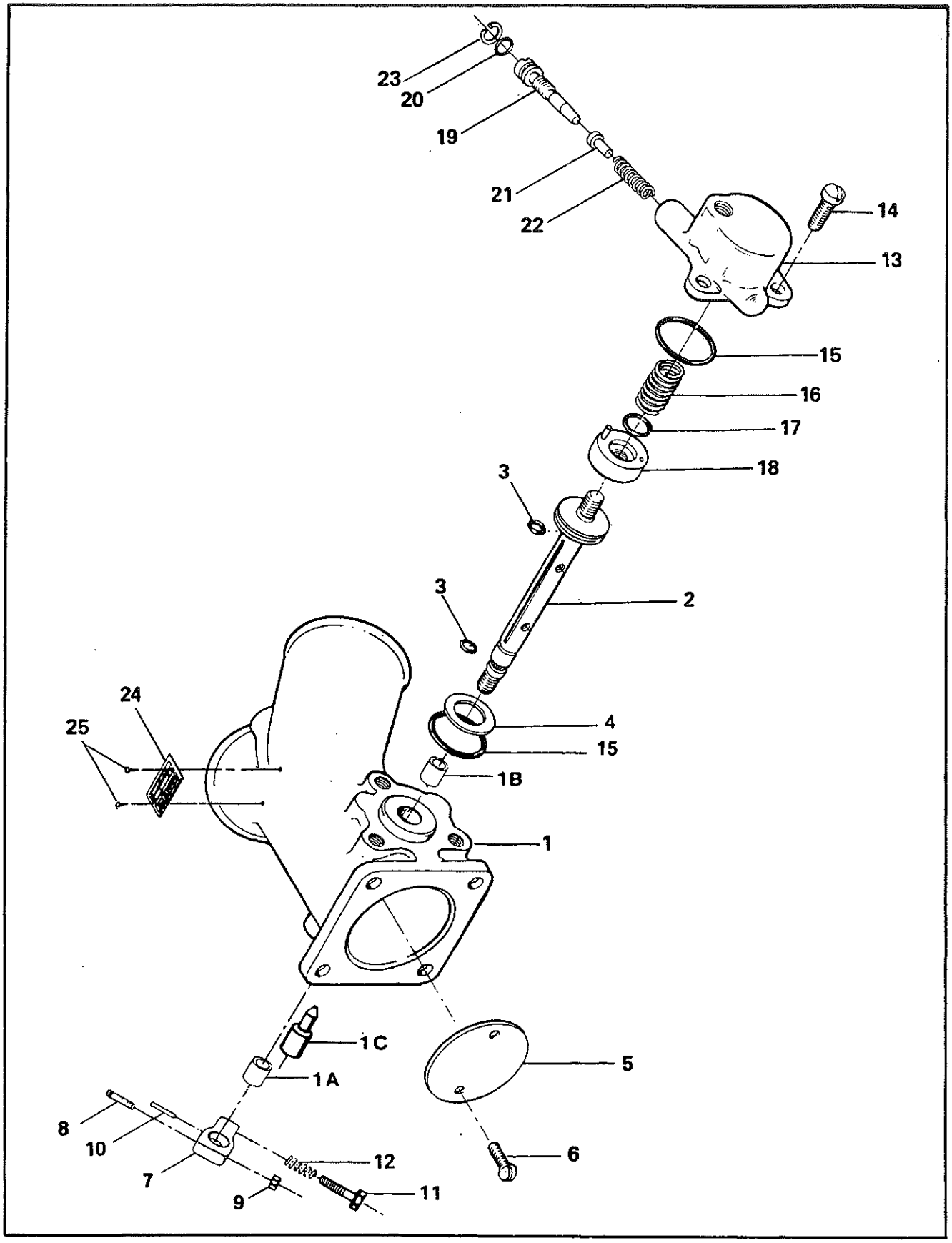


FIGURE 20–03. AIR THROTTLE & FUEL METERING ASSEMBLY.

73-20-04
AIR THROTTLE METERING ASSEMBLY
P/N 649096-1

04-01. DISASSEMBLY.

A. Remove nut (20) and lever (17) from shaft (6). Remove lever (11) from shaft (6) by driving out pin (14) with a 1/8" punch.

NOTE . . . Removal of fittings is not necessary unless damage to the fittings is observed. If the replacement of any fitting is necessary, refer to Figure 20-04A for correct fitting orientation.

B. Remove screws (22) and cover (21) from body (1). Remove retaining ring (32), idle adjustment screw (28), bushing (30) and spring (31) from cover (21). Remove "O" ring (29) from idle adjustment screw (28). As the idle adjustment screw (28) is loosened, the metering plug (27), "O" ring (26) and spring (25) will be released for removal. Remove "O" ring (23) from cover (21).

C. Remove screws (10) and plate (9) from throttle shaft (6). Remove throttle shaft (6) from body (1). Remove plug (24), "O" ring (23), washer (8), and "O" rings (7) from throttle shaft (6). This completes the disassembly.

D. Inspect throttle body bushings (2 & 3) for damage or wear, inside diameter .3770/.3790. If replacement is necessary, both holes must be in line within .0005.

04-02. REASSEMBLY.

A. Use extreme care in reassembly of the unit to insure against damage to the lapped surfaces of the metering plug (27) and the fuel metering shaft and disc assembly (6).

B. Install "O" ring (23) onto plug (24). Install "O" rings (7), washer (8) and plug assembly (24) on shaft (6) and with a lite coating of Parker "O" Lube on "O" rings, insert shaft (6) into body (1). Place plate (9) in the proper position and install screws (10). After checking plate (9) position, stake screws (10). After determining proper position, install lever (11) on shaft (6). If new shaft-disc assembly (6) is to be installed, place lever (11) on shaft and re-drill .125" through shaft and lever and install pin (14). Swage both ends of pin (14) securely. Install lever (17), nut (20) and torque nut (20) to 100-120 inch pounds.

NOTE . . . A light coating of Parker "O" Lube on all "O" rings will assist in the assembly of this unit.

C. Install "O" ring (23) in metering cover (21). Place "O" ring (29) on idle adjustment screw (28). Install idle adjustment spring (31) and bushing (30) in position in cover (21), holding cover (21) in such a position to allow spring (31) to rest in bottom-most position. Holding cover (21) with metering plug (27) opening upright, install spring (25) in recess in bottom of cover (21). Place "O" ring (26) in plug (27) and carefully align metering plug pin with idle adjustment pin opening in bottom of cover (21) and install metering plug assembly (27). Depress plug assembly in cover to determine proper alignment of plug pin in idle adjustment recess.

D. With cover assembly (21) including parts (23, 25, 26 and 27) in position, secure in an upright position, carefully mate to air throttle body assembly (1) being careful to prevent damage to metering plug. Install screws (22). Install idle adjustment screw sufficiently to engage the full width of "O" ring (29). Secure with retaining ring (32). Install any fittings that were removed (refer to Figure 20-04A). This completes assembly and unit is now ready for air pressure check and calibration according to values as outlined in the Calibration Section. Lockwire screws (22) after calibration to complete overhaul.

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
20-04	649096-1		Air Throttle and Fuel Metering Assembly . .	NS	
-1	649095		. Body, Air Throttle	1	
-2	630455-4		. . Bushing	1	
-3	630455		. . Bushing	1	
-4	626812		. . Pin - Stop	1	
-5	MS122160		. . Helicoil 1/4-20	8	
-6	639377-4		. Shaft Assembly, Throttle and Metering . .	1	
-7	630979-9	①	. "O" Ring	2	
-8	635835-2		. Washer	1	
-9	639206		. Plate, Throttle	1	
			ATTACHING PARTS		
-10	539942		. Screw	2	
			* * * *		
-11	639497		. Lever, Throttle Idle Control	1	
-12	AN565E8H16		. Screw	1	
-13	13XX18130		. Nut	1	
-14	626813		. Pin, Tubular	1	
-15	639479		. Screw, Adjustment	1	
-16	626634		. Spring, Adjustment Screw	1	
-17	649039		. Lever Assembly, Throttle	1	
-18	632554-2		. . Bushing	1	
-19	632554-1		. . Bushing	1	
-20	MS21042-5		. Nut	1	
-21	642709		. Cover, Fuel Metering	1	
			ATTACHING PARTS		
-22	AN500A10-8		. Screw	3	
			* * * *		
-23	MS9021-020	①	. "O" Ring	1	
-24	630979-10	①	. "O" Ring	1	
-25	643093		. Plug Assembly	1	
-26	630274		. Spring	1	
-27	630979-6	①	. "O" Ring	1	
-28	646017		. Plug Assembly, Fuel Metering	1	
-29	646044		. Screw, Idle Fuel Adjustment	1	
-30	630979-9	①	. "O" Ring	1	
-31	633298		. Bushing, Idle Adjusting Spring	1	
-32	635063		. Spring	1	
-33	521693		. Ring, Retaining	1	
-34	632119		. Tee, Fitting	2	
-35	639494		. Cap	2	
-36	AN914-2		. Elbow 90°	1	
-37	X12935		. Connector	2	
-38	626900		. Extension	1	
-39	628437		. Elbow, Fuel Outlet	1	
-40	AN840-4		. Adapter	1	
-41	630644		. Name Plate	1	
			ATTACHING PARTS		
-42	24764		. Screw	2	
			* * * *		

NOTES:

① 100% Replacement Parts.

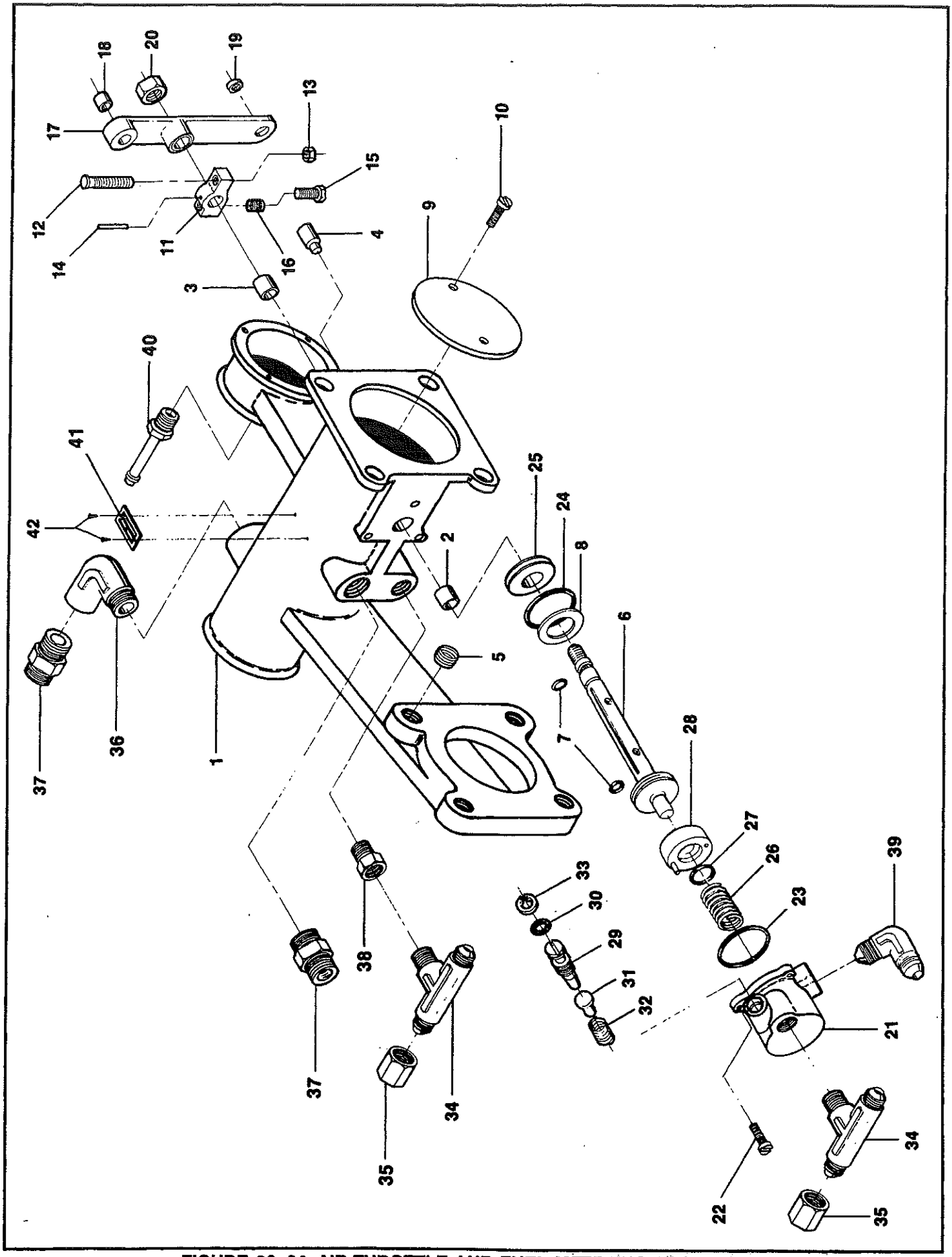


FIGURE 20–04. AIR THROTTLE AND FUEL METERING ASSEMBLY.

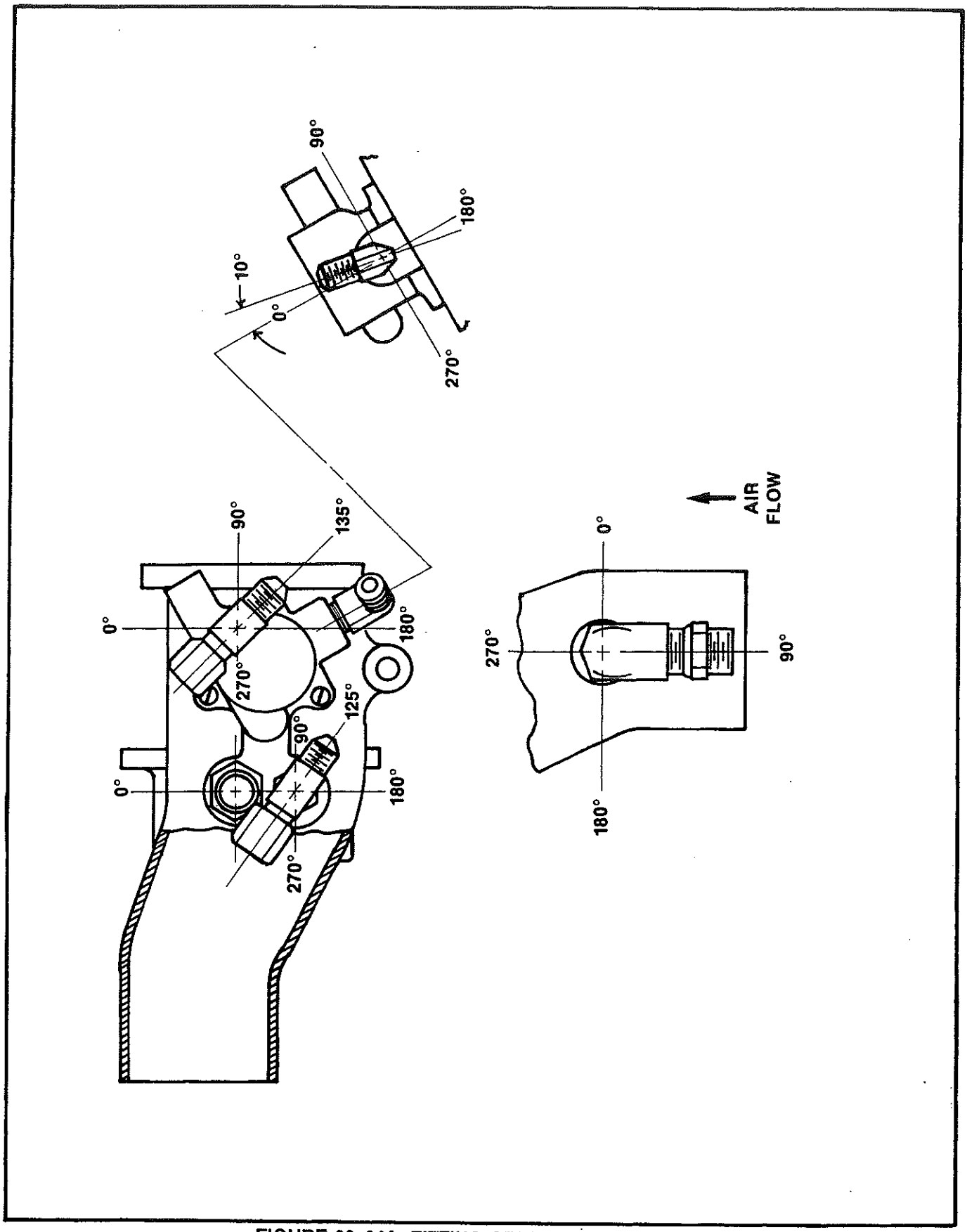


FIGURE 20-04A. FITTING ORIENTATION 649096-1.

73-20-05
MANIFOLD VALVE ASSEMBLIES
P/N 631351, 641032

05-01. DISASSEMBLY.

A. Remove all lockwire. Remove fittings only if they appear damaged. Remove four screws (16) and carefully separate cover (15) from body (1). Use caution to eliminate damage to parting surfaces. Remove spring (14) and lift out diaphragm assembly (4 through 13). Remove screen (2). Remove seal (3) and discard.

B. Place diaphragm assembly in shielded vise jaws in a position for disassembly. Remove nut (13), plate (12), diaphragm (11), plate (10) and spacer (8). Remove retainer (4) from plunger (7) and discard. Remove spring (5) and needle (6) from plunger (7) for inspection.

NOTE . . . Some models may have a gasket (9). Remove and discard this gasket.

05-02. REASSEMBLY.

A. Reassemble diaphragm assembly (4 through 13) by first installing needle (6) in plunger (7) and stake lightly.

CAUTION . . . Be sure needle is free to move before installing spring (5) and retainer (4).

NOTE . . . Apply Loctite 290 between diaphragm assembly parts.

Set retainer flush with bottom of plunger at initial installation. With plunger in shielded vise jaws, install spacer (8), plate (10), diaphragm (11), plate (12).

NOTE . . . If model has a gasket (9), it will not be replaced. Diaphragm parts are bonded together, eliminating the need for gasket (9).

Apply a thin coat of Loctite 290 to first and second threads of plunger (7) before installing nut (13). Torque nut (13) to 30 $\pm$ 1 inch pounds. After diaphragm is positioned with the four through holes at 45° from the through hole in the plunger, install new seal (3) and screen (2) in body (1).

B. Install diaphragm assembly (4 through 13) in bore of body. Install new spring (14) on top of plunger assembly. Place cover (15) on top of spring with vent hole 90° from fore and aft mounting position, as indicated by bracket mounting holes in base of body. Install four screws (16) and tighten to 20 $\pm$ 1 inch pounds. This completes assembly and unit is now ready for air pressure test and calibration according to values as outlined in The Calibration Section. Lockwire screws after calibration to complete overhaul.

NOTE . . . If correct calibration cannot be obtained, reposition retainer in plunger (pressing further in, increases pressure; out decreases pressure). Be extremely careful not to allow the retainer to protrude over 0.075" out of the plunger.

FIG & INDEX	PART NUMBER	1 2 3 4 5 DESCRIPTION	QTY.	USABLE ON CODE
20-05	631351	① Valve Assembly, Fuel Manifold	NS	A
	641032	① Valve Assembly, Fuel Manifold	NS	B
-1	631329	. Body, fuel Manifold Valve	1	A
-1	641030	. Body, fuel Manifold Valve	1	B
-2	626557	. Screen	1	
-3	631330	② . Seal	1	
	632425	. Diaphragm Assembly, Fuel Manifold Valve	1	
-4	632394	. . Retainer	1	
-5	631331	② . . Spring	1	
-6	634619	. . Needle	1	
-7	631282	. . Plunger	1	
-8	631350	. . Spacer	1	
-9	627124	② . . Gasket	1	
-10	627123	. . Plate	1	
-11	626536	② . . Diaphragm	1	
-12	626556	. . Plate	1	
-13	646605	② . . Nut	1	
-14	630184	. Spring, Compression	1	
-15	634325	. Cover	1	
		ATTACHING PARTS		
-16	AN500A8-10	. Screw	4	

NOTES:

① This assembly not available for service. See applicable Service Parts Catalog for service assembly number.

② 100% Replacement parts.

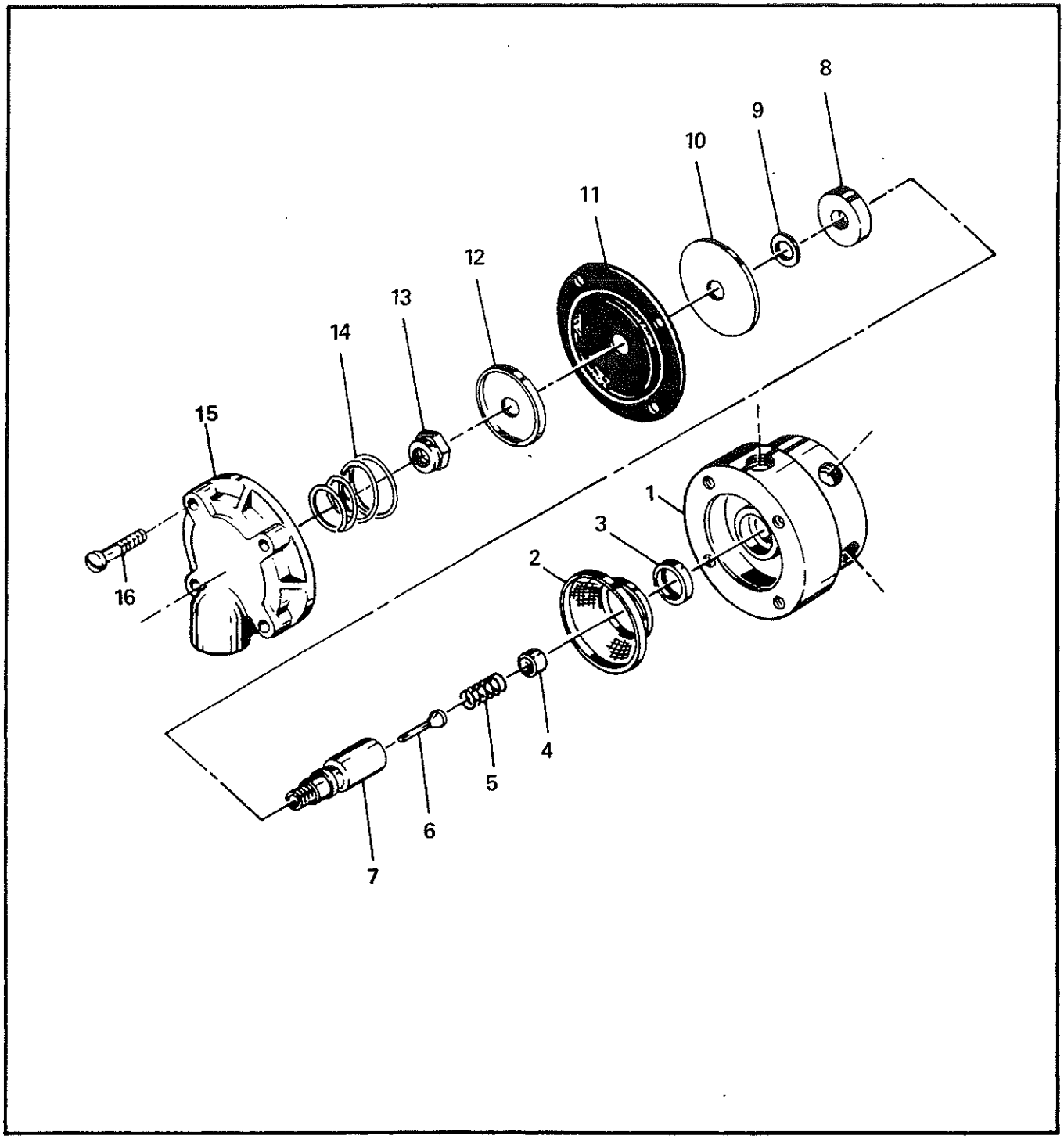


FIGURE 20–05. FUEL MANIFOLD VALVE ASSEMBLY.

73-20-06
MANIFOLD VALVE ASSEMBLY
P/N 646508-4 & 643582-4

06-01. DISASSEMBLY.

A. Remove all lockwire. Remove fittings only if they appear damaged. Remove four screws (16) and carefully separate cover (15) from body (1). Use caution to eliminate damage to parting surfaces. Remove spring (14) and lift out diaphragm and plunger assembly (4 through 13). Remove screen (3).

B. Place diaphragm assembly in shielded vise jaws in a position for disassembly. Remove nut (13) plate (12) diaphragm (11) plate (10) gasket (9) spacer (8). Remove needle (5) spring (6) retainer (7) from plunger (4).

NOTE . . . Remove and discard gasket (9).

06-02. REASSEMBLY.

A. Reassemble diaphragm assembly (4 through 13). With plunger in shielded vise jaws, install spacer (8) plate (10) diaphragm (11) plate (12). Replace needle (5) spring (6) and retainer (7) into plunger (4). Apply a thin coat of Loctite 290 to first and second threads of plunger (4) before installing nut (13). Torque nut (13) to 30 $\pm$ 1 inch pounds.

NOTE . . . Apply Loctite 290 between diaphragm assembly parts.

NOTE . . . If model has a gasket (9), it will not be replaced. Diaphragm parts are bounded together eliminating the need for gasket (9).

B. Install new seal (2) and place screen (3) in body (1). Install diaphragm assembly (4 through 13) in bore of body. Install new spring (14) on top of diaphragm assembly. Place cover (15) on top of spring with vent hole 90° from fore and aft mounting position, as indicated by bracket (18) mounting holes. Install four screws (16) and tighten to 20 $\pm$ 1 inch pounds. This completes assembly and unit is now ready for functional flow test according to values as outlined in the Calibration Section. Lockwire screws after functional flow test to complete overhaul.

NOTE . . . If correct calibration cannot be obtained, reposition retainer in plunger (pressing further in, increases pressure; out decreases pressure). Be extremely careful not to allow the retainer to protrude over 0.075" out of the plunger.

FIG & INDEX	PART NUMBER	1 2 3 4 5 DESCRIPTION	QTY.	USABLE ON CODE
20-06	646508-4	Valve Assembly, Fuel Manifold	NS	A
	643582-4	Valve Assembly, Fuel Manifold	NS	B
-1	641030	. Body Assembly	1	
-2	631330	. Seal, Plunger	1	
-3	626557	. Screen	1	
	632425	. Diaphragm & Plunger Assembly	1	
-4	631282	. . Plunger	1	
-5	634619	. . Needle	1	
-6	631331	. . Spring	1	
-7	632394	. . Retainer	1	
-8	631350	. . Spacer	1	
-9	627124	. . Gasket	1	
-10	627123	. . Plate	1	
-11	626536	. . Diaphragm	1	
-12	626556	. . Plate	1	
-13	646605	. . Nut	1	
-14	630184	. Spring Compression	1	
-15	634325	. Cover	1	A
-15	643581	. Cover	1	B
		ATTACHING PARTS		
-16	AN500A8-12	. Screw	4	
-17	AN960-8	. Washer	4	
-18	646507	. Bracket, Mainfold Valve	1	A
-18	646059	. Bracket, Mainfold Valve	1	B

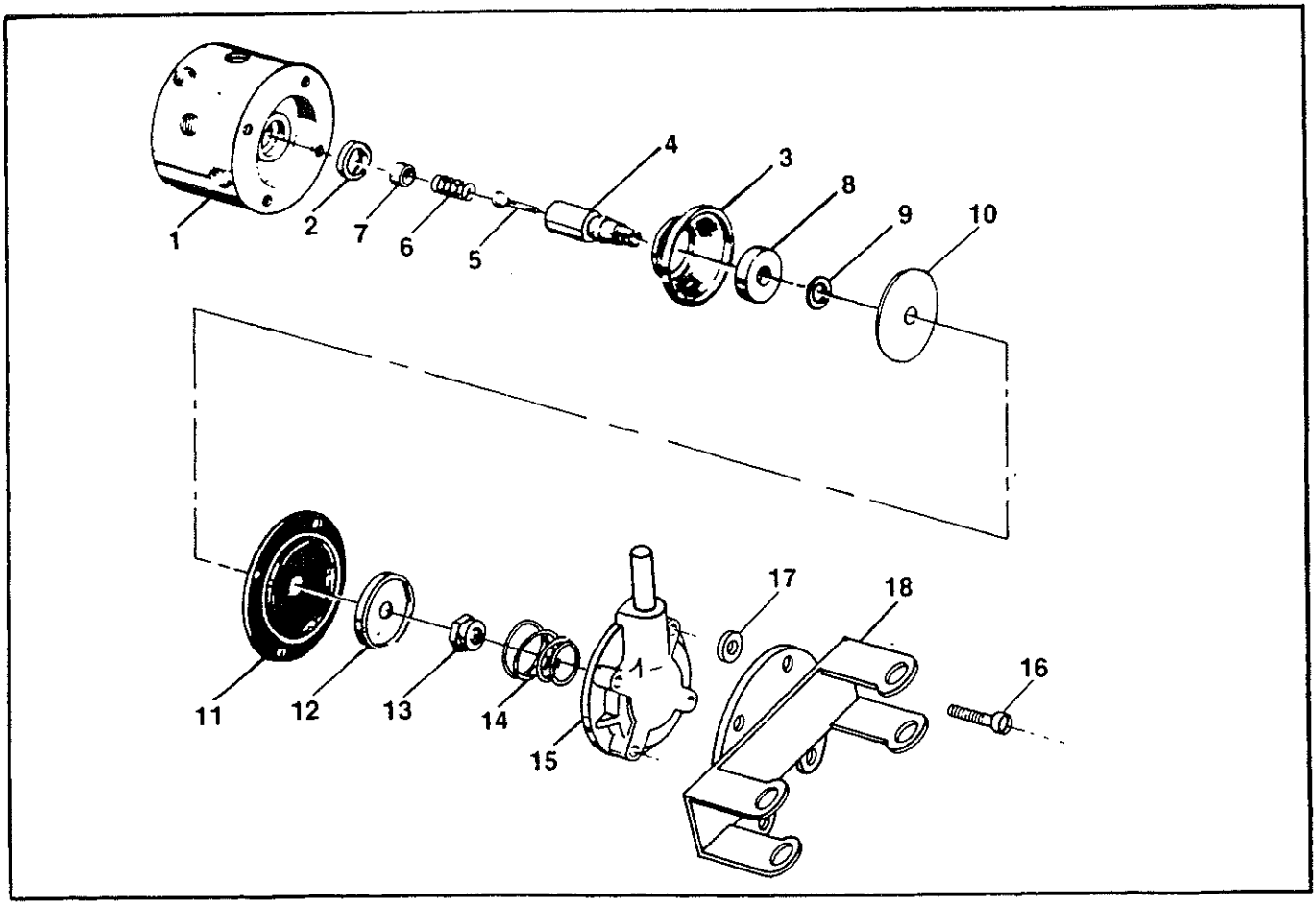


FIGURE 20-05. FUEL MANIFOLD VALVE ASSEMBLY.

73–20–07
NOZZLE ASSEMBLY

07–01. DISASSEMBLY (Figure 20–07).

A. Place nozzle (1) in a suitable fixture. Lift off shield (4) and remove screen (3).

B. If nozzle has a screw-type jet, discard entire assembly and replace with new type.

C. If jet must be replaced, use a suitable type tap and thread into opening in jet. The jet can be removed by pulling the tap straight out.

07–02. REASSEMBLY.

A. If jet (2) was removed, replace by pressing new jet in nozzle shell.

NOTE . . . Apply a thin coat of Loctite 290 to jet before installation.

B. Install new screen (3) and shield (4) on nozzle (1). Press shield flush with top of shoulder.

C. Nozzles should be flow tested at this time. Flow nozzles and calibrate according to instructions and calibration data in the Calibration Section. If the nozzle flows in the next size range, it may be so stamped. A new jet or a new nozzle assembly can be obtained.

CAUTION . . . All nozzles must be of the same size per engine.

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
20-07	632147-10	①	Nozzle Assembly	NS	
-1	631341		. Nozzle	1	
-2	627333-10		. Jet	1	
-3	625921		. Screen	1	
-4	625919		. Shield	1	

NOTE:

① Order nozzle size identified on hex of nozzle body.

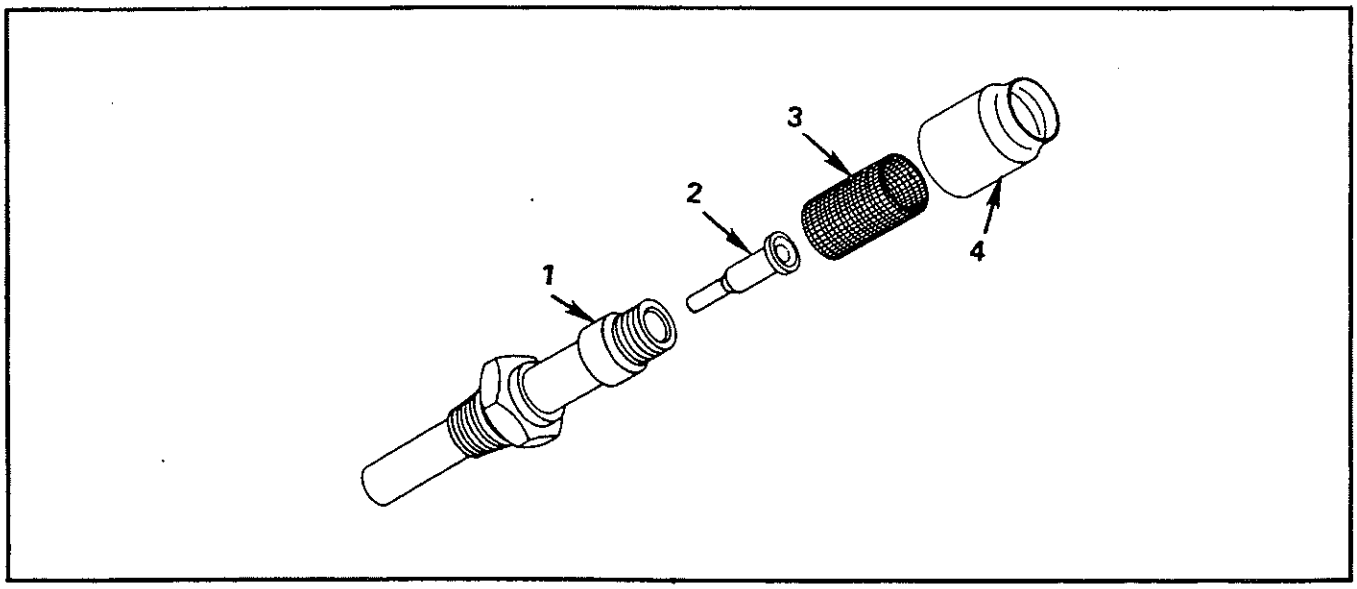


FIGURE 20–07. NOZZLE ASSEMBLY.

73-20-08
NOZZLE ASSEMBLIES

08-01. DISASSEMBLY (Figure 20-08).

A. Remove the "O" rings (2) from the nozzle (1).

B. If jet (3) must be replaced, use a suitable type tap and thread into opening in jet. The jet can be removed by pulling the tap straight out.

08-02. REASSEMBLY.

A. If jet (3) was removed, press a new jet into the nozzle shell and calibrate. Be sure the new jet flows at the same size as the rest of the jets used in the engine.

NOTE . . . Apply a thin coat of Loctite 290 to jet before installation.

B. Install two new "O" rings (2).

C. Nozzles should be flow-tested at this time. Flow nozzles and calibrate according to instructions and calibration data in the Calibration Section. If the nozzle flows in the next size range, it may be so stamped. A new jet or a new nozzle assembly can be obtained.

CAUTION . . . All nozzles must be of the same size per engine.

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
20-08	633608-12	①	Nozzle Assembly	1	
	633608-13	①	Nozzle Assembly	1	
-1	633606		. Nozzle	1	
-2	630979-9	②	. "O" Ring	2	
-3	627333	③	. Jet	1	

NOTES:

① Order nozzle size identified on hex on nozzle body.
② 100% Replacement parts.
③ Dash number of jet will be the same as the dash number of the nozzle assembly.

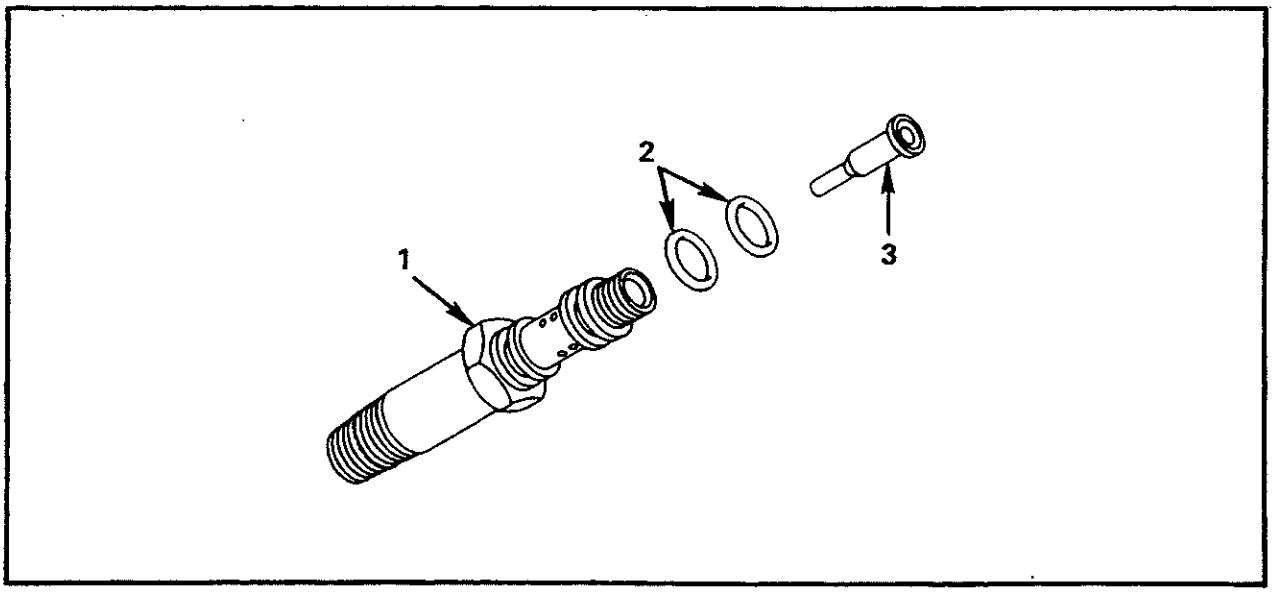


FIGURE 20-08. NOZZLE ASSEMBLY.

INDEX
73–30–00
470 SERIES

INTENTIONALLY

LEFT

BLANK

73-30-01
FUEL PUMP ASSEMBLIES
P/N 638154-3,9,12 & 646212-3,9,12

NOTE: Old style fuel pump, P/N 630947 must be modified, per Figure 30-01A

01-01. DISASSEMBLY.

A. Place pump in suitable fixture and remove all lockwire; and fittings if necessary. Refer to exploded view (Figure 30-01) and proceed as follows: Loosen pressure regulating screw (30) to relieve pressure on relief valve spring. Remove four bolts (33) and washers (32) and carefully separate parts (29 and 14), being careful not to damage parting surfaces. Remove plates (27) and spring (28). Diaphragm (26) should be removed and discarded at this time. Remove plunger (25), being careful not to damage face.

B. Remove plug (17), spring (16) and ball (15) from body (14). Remove plug (20), jet (19) and gasket (18) or adjusting needle (24), "O" ring (22) and plug (21) from body. Remove screws (36) and (37) from vapor separator cover (35) and remove gasket (34). Remove ejector (38) from cover.

NOTE . . . Pump 630947 is to be converted to adjustable orifice pump per instructions in Figure 30-01A. Delete parts (18, 19, and 20).

C. Dissemble of the basic pump should a accomplished in the following manner: Remove the adapter (1) and insulator (3) from the basic pump. Remove seal (2) from adapter (1) and bushing (4) from insulator (3). Hold pump body (5) firmly in palm of hand, end plate (12) down, and apply pressure to drive end of shaft (10) forcing end plate (12), end plate seal (13), blades (11) and shaft (10) from pump body. Remove seal (6) and discard. It is important to note the liner position relative to the rotation marking found on the top surface of the liner. It must be installed with the proper marking (C or CC) in the up position.

CAUTION . . . Do not disassemble liner (9), plate (8) or pin (7) from pump body unless inspection indicates damage or excessive wear. If these parts are to be removed, place the pump body in a dry over at 400° F. for 10 to 15 minutes to expand the aluminum body. The liner (9), plate (8) and pin (7) may then be removed by carefully bumping body.

01-02. REASSEMBLY.

A. Reassemble basic pump (5 through 13) in reverse order of disassembly. Refer to Figure 30-01 and install seal (6) in body (5). Install pin (7), plate (8) and liner (9) in body (5). Plate (8) may be reused by turning over if not worn from previous overhaul. Be sure liner is installed with proper rotation lettering visible. Use light machine oil to lubricate shaft (10) and install in pump. Install blades (11) in position and lubricate lightly. Install plate (12) and seal (13) to complete basic pump assembly. Install seal (2) in adapter (1). Install insulator (3) and bushing (4) on pump assembly and insert into adapter assembly.

NOTE . . . to assist in assembly of the basic pump and vapor separator and relief valve section, it is suggested that two bolts, approximately 3-1/2 inches long, be used as line-up guides. They can be made of used bolts P/N 628321A3.72 with heads removed.

B. Using a small amount of lapping compound, lap plunger (25) to seat in body (14) for 100% contact. When this has been accomplished, wash parts thoroughly.

C. Install jet plug (21), "O" ring (22) and adjusting needle (24) in body (14) and secure with retaining ring (23). Insert valve ball (15) in by-pass opening in body and peen lightly to seat. Install by-pass valve spring (16) and by-pass valve plug (17) in body. Place gasket (34) and vapor separator cover (35) in position on body and apply a thin coat of Loctite 242 to threads and install four screws (36) and (37) securing cover to body. Install vapor separator ejector (38) in cover.

D. Install lapped plunger (25) in body (14). Place diaphragm (26), plate (27), spring (28) and plate (27) in this order.

E. Install adjusting screw (30) in cover (29). Turn in sufficiently so screw will protrude, in cover, a distance equal to depressions in top plate (27). This will assure proper alignment of these parts.

F. Assemble cover (29) to body (14). Place belleville washers (32) on bolts (33) and install through stacked parts. Tighten sufficiently to hold parts alignment until four bolts are in place. Torque bolts (33) to 30 ± 1 inch pounds.

CAUTION . . . Belleville washers (32) are special and must be installed with concave surfaces facing each other. Should it be necessary to remove these washers once they have been torqued, they must be replaced.

G. Install any fittings that were removed. Leak test and calibrate according to instuctions and calibration data in the Calibration Section. Lockwire after calibration to complete overhaul.

USABLE ON CODE

Model	Code
638154-3	A
646212-3	B
638154-9	C
646212-9	D
638154-12	E
646212-12	F

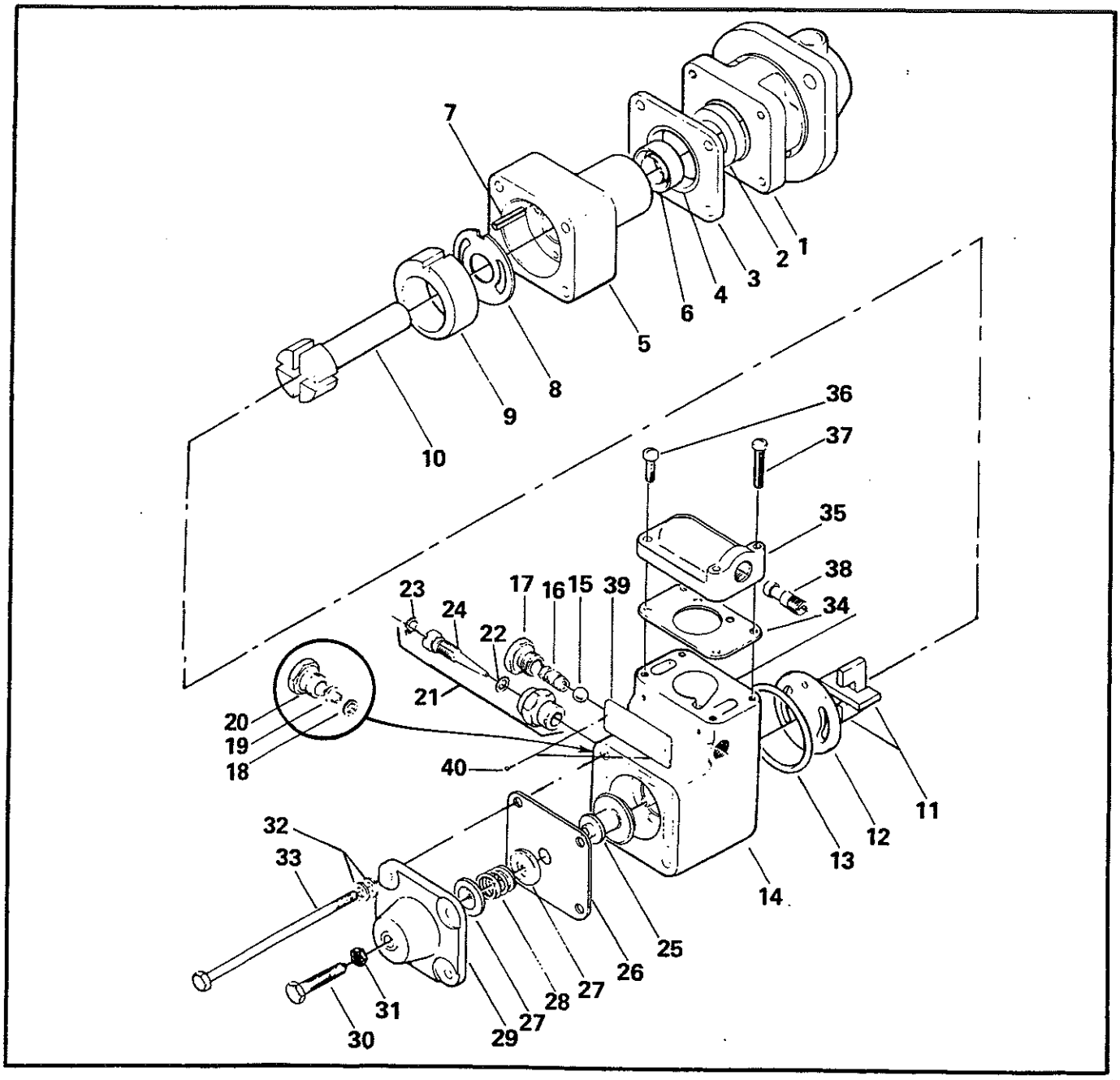


FIGURE 30-01. FUEL PUMP ASSEMBLY.

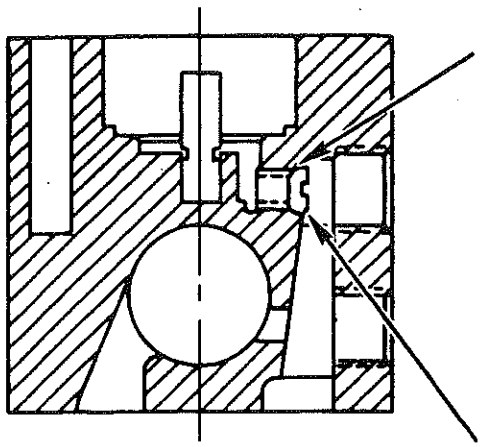
FIG & INDEX	PART NUMBER	1 2 3 4 5 DESCRIPTION	QTY.	USABLE ON CODE
30-01	No Number	① Fuel Pump and Vapor Separtor	1	ALL
-1	631676	. Adapter, Fuel Pump	1	AB
-1	641986	. Adapter, Fuel Pump	1	CDEF
-2	628178	②. Seal, Adapter.	1	
-3	632816	. Insulator, Fuel Pump	1	
-4	632741	. Bushing	1	
-5	643694	. Body Assembly.	1	A
-5	643696	. Body Assembly.	1	CE
-5	646182-1	. Body Assembly.	1	B
-5	646182-2	. Body Assembly.	1	DF
-6	649198	②. Seal, Shaft	1	ACE
-6	646181	②. Seal, Shaft	1	BDF
-7	643853	. Pin, Liner Locator	1	
-8	635548	②③. Plate, Thrust	1	ACE
-8	646177	②③. Plate, Thrust	1	BDF
-9	643697	. Liner, Fuel Pump	1	A
-9	646178	. Liner, Fuel Pump	1	B
-9	638217-1	. Liner, Fuel Pump	1	CE
-9	646186	. Liner, Fuel Pump	1	DF
-10	643689	. Shaft, Fuel Pump	1	ACE
-10	646176	. Shaft, Fuel Pump	1	BDF
-11	635549	. Blade, Fuel Pump	2	
-12	643690	. Plate, End	1	ACE
-12	646180	. Plate, End	1	BDF
-13	630979-14	②. Seal, End Plate	1	
-14	634053	. Vapor Separator	1	
-15	628249-7	②. Ball, By-Pass Valve	1	
-16	630167	②. Spring, By-Pass Valve	1	
-17	629974	. Plug, By-Pass Valve	1	
-18	626055	④. Gasket, Jet By-Pass	1	
-19	626054	④. Jet, By-Pass	1	
-20	629974	④. Plug, Jet	1	
-21	637864	. Plug Assembly, Jet	1	
-22	AN123956	. . Seal, "O" Ring	1	
-23	637861	. . Ring, Retaining	1	
-24	No Number	. . Needle, Adjusting	1	
-25	628333	. Plunger	1	
-26	642644	②. Diaphragm, Relief Valve	1	
-27	637784	. Plate, Spring Retaining	2	
-28	628311	②. Spring, Relief Valve	1	
-29	630471	. Cover Assembly, Relief Valve	1	
-30	631883	. Screw, Adjusting	1	
-31	AN121501	. Nut	1	
-32	646448-1	②. Washer, Belleville	8	
-33	628321A3.72	. Bolt, Hex Head	4	
-34	625548	②. Gasket, Cover-to-Separator	1	
-35	625900	. Cover, Vapor Separator	1	
		ATTACHING PARTS		
-36	AN500-8-7	. Screw	2	
-37	AN500-8-12	. Screw	2	

* * * *

FIG & INDEX	PART NUMBER	1 2 3 4 5 DESCRIPTION	QTY.	USABLE ON CODE
-38	633447	. Ejector	1	AB
-38	625901	. Ejector	1	CDEF
-39	640797	. Name Plate.	1	
		ATTACHING PARTS		
-40	24764	. Screw, Drive	2	
		* * * *		

NOTES:

① This assembly NOT available as replacement part. For correct service part number, see appropriate Service Parts Catalog.
② 100% Replacement Parts.
③ Can be turned over and reused if not worn from previous overhaul.
④ Do not reinstall.



DRILL .130 -.131 DIA.
DEPTH - .81
CTR. DRILL .330 - .336
120° INC ANGLE DRILL PT.
DEPTH .49
AFTER 631979 PLUG IS ASSEMBLED.

NOTE:

ON HOUSINGS WITH 5MM X 75MM PITCH FRENCH THREAD, REWORK AS FOLLOWS BEFORE COMPLYING WITH ABOVE:
DRILL .211 - .217 DEPTH - .81
C/BORE .330 - .336 DEPTH - .50
TAP .25 - .28NF3, P.D. .2268 - .2290
DEPTH .78 FROM FINISHED SURFACE.

JET BY PASS # 631979-63
USE LOCTITE 290 ON THREADS OF PLUG BEFORE ASSEMBLY.

FIGURE 30-01A. REWORK OF NO. 629372 VAPOR SEPARATOR AND RELIEF VALVE HOUSING.

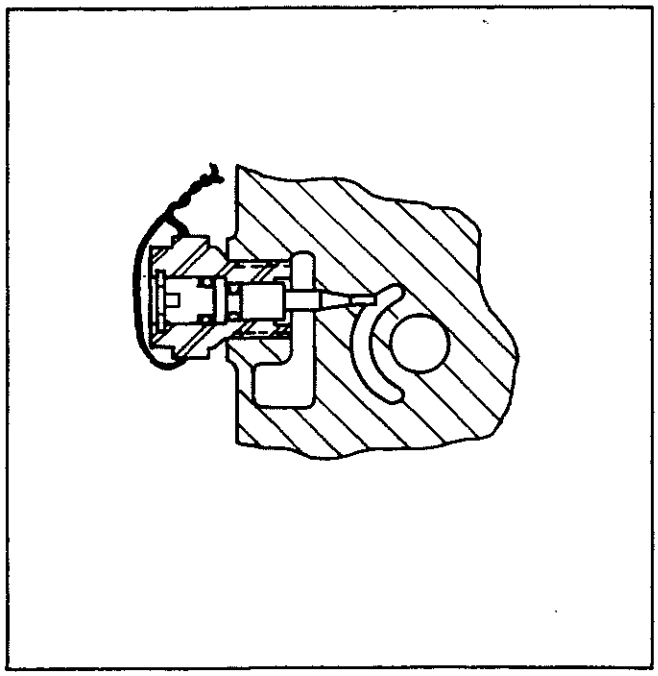


FIGURE 30-01B. ADJUSTING NEEDLE INSTALLED

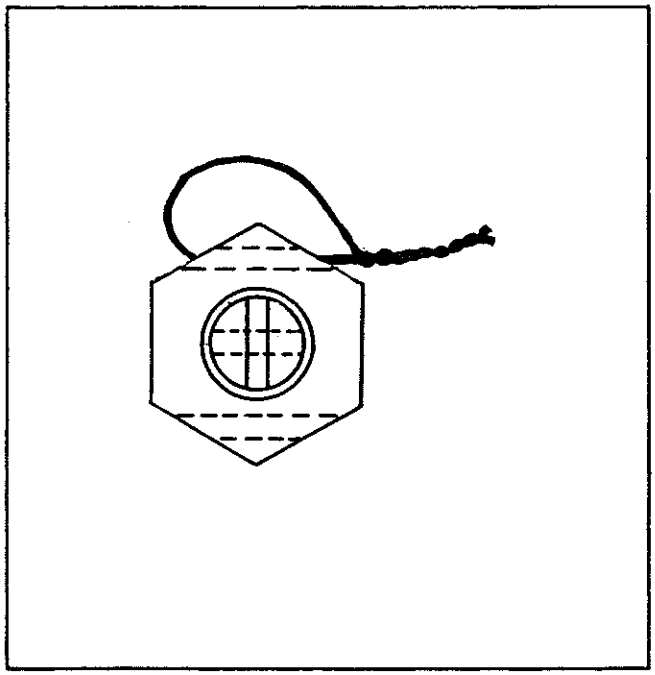


FIGURE 30-01C. ADJUSTING NEEDLE SAFETY WIRED.

73-30-02
FUEL PUMP ASSEMBLY P/N 638156-3 & 638155

02-01. GENERAL.

A. Part numbers 626062 or 635135 and 629086 or 635980 are replace by 638156 and 638155 respectively. New part numbers indicate that a retaining ring has been added to the adjustable orifice replaces the by-pass jet.

02-02. DISASSEMBLY.

A. Place injection pump in suitable fixture. Remove all lockwire; and fittings if necessary. Refer to exploded view (Figure 30-02) and proceed as follows: For TSIO equipment see (C) below. Loosen screw (23) to relieve pressure on relief valve spring. Remove four bolts (1). Separate parts (7, 3 and 49), using care not to damage parting surfaces. Remove relief valve (6), ball (4) and spring (5).

B. Remove from relief valve body (7) the following parts: By-pass plug (40) and "O" ring (41).

NOTE . . . By-pass plug (40) and "O" ring (41) will not be reinstalled.

C. Loosen adjusting screw (23) to relieve pressure on relief valve spring. Remove four bolts (1). Separate part (7) from (49). Separate parts (28) and (22) from parts (7), being careful not to damage parting surfaces. Separate spacer (28) from cover (22). Remove plates (25) and spring (24). Remove diaphragm (26) and disc (27) from spacer (28).

D. Remove screws (45) and (46) from cover (44) and separate cover from separator body (49). Remove ejector (43) from cover (44). Remove by-pass valve assembly (37, 38, & 39) from separator body (49). Use caution not to damage any of these parts. Remove jet (30) and gasket (31) or retaining ring (35) adjusting needle (34), "O" ring (33) and plug (32) from body.

NOTE . . . Jet (30) and gasket (31) will not be reinstalled.

E. Disassembly of the basic pump should be accomplished in the following manner: Hold pump assembly firmly in hand with thrust plate (9) to palm of hand. Remove retaining rings (11) and (14). Remove coupling (12). Apply pressure to drive end of rotor shaft (13) forcing blades (10) and thrust plate (9) from pump body. Remove seal (15) and discard. It is important to note the liner position relative to the rotation marking found on the top surface of the liner. It must be installed with the proper marking (C or CC) in the up position.

CAUTION . . . Do not disassemble liner (18), bearing (20) or pins (19 and 20) from pump body unless inspection indicates damage or excessive wear. If these parts are to be removed place the pump body in a dry oven at 400° F. for 10 to 15 minutes to expand the aluminum body. The liner (18), bearing (20) and pins (19 and 21) may then be removed by carefully bumping body. This completes disassembly.

02-03. REASSEMBLY.

A. Reassemble basic pump in reverse order of disassembly. Refer to exploded view (Figure 30-02) and proceed as follows: Install seal (15) in pump body (17) using seal tool. Install retaining ring (14) at this time. Install rotor shaft (13) in bearing (20) and through liner (21). A light coat of oil on the blades, shaft and seal lip will assist in the installation and assure lubrication for the first few revolutions. Install coupling (12) and retaining ring (11). Before installing blades (10), press rotor shaft down to seat on top of bearing. Install blades in slots of rotor shaft and rotate shaft. Install thrust plate (9). This completes assembly of the basic pump.

NOTE . . . To assist in assembly of the basic pump, vapor separator and relief valve section, it is suggested that two bolts approximately 2-1/2 inches long be used as line-up guides. They can be made of used bolts P/N 628321A2.56 with heads removed.

B. Place vapor separator body (49) in a suitable fixture and install gasket (42) and cover (44) using screws (45) and (46). Apply a thin coat of Loctite 242 to threads of screws. Install ejector (43) at this time.

C. Install valve (39), spring (38) and cage (37) being sure that all spring coils are inside cage.

D. Place basic pump assembly in a suitable fixture with thrust plate (9) in an upright position. All parts except blades and shaft should be dry. Place gasket (29) on basic pump assembly. Install vapor separator (49), gasket (8), relief valve body (7), diaphragm assembly (6), spring (5) and ball (4). For TSIO equipment, see (E) below.

E. For TSIO equipment, spring (5), ball (4) and cover (3) are not needed. Install spacer (28), disc (27), diaphragm (26), plate (25), spring (24) and plate (25).

F. Install jet plug (32), "O" ring (33) and adjusting needle (34) in body (49) and secure with retaining ring (35).

G. Install adjusting screw (23) in cover (22) or (3) approximately one-half of its length. This will assure proper alignment.

H. Assemble cover in place. Assemble belleville washers (2) on bolts (1) and install through stacked parts. Tighten sufficiently to hold parts alignment until four bolts are in place. Toque bolts (1) to 30 ± inch pounds.

CAUTION . . . Belleville washers (2) are special and must be installed with concave surfaces facing each other. Should it be necessary to remove these washers once they have been torqued they must be replaced.

I. Install any fittings that were removed. Leak test and calibrate according to instructions and calibration data in the Calibration Section. Lockwire after calibration to complete overhaul.

USABLE ON CODE

Model	Code
638156-3	A
638155	B

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
30-02	638156-3	①	Fuel Pump and Vapor Separator	NS	A
	638155	①	Fuel Pump and Vapor Separator	NS	B
			ATTACHING PARTS		
-1	628321A2.56	②	. Bolt	4	A
-1	632321A2.88	③	. Bolt	4	B
-2	646448-1	③	. Washer, Belleville	8	
			* * * *		
-3	CRB7423	⑥	. Cap Assembly	1	
-4	628249-7	③	. Ball, Relief Valve	1	
-5	CRA7426	③	. Spring, Relief Valve	1	
-6	CRB15985	③	. Relief Valve Assembly	1	
-7	CRG15982-2		. Body, Relief Valve	1	
-8	635215	③	. Gasket	1	
-9	CRA7438	③④	. Plate, Thrust	1	
-10	CRA7491		. Blade	2	
-11	MS16624-1062		. Ring, Retaining	1	
-12	CRB7779-2		. Coupling, Drive	1	
-13	CRA7791		. Shaft, Fuel Pump	1	
-14	MS16625-1112		. Ring, Retaining	1	
-15	CRA6861		. Seal, Plain	1	
-16	2024		. Plug	1	
-17	CRB16043-1	⑥	. Body Assembly	1	
-18	CRA7493		. . Liner	1	
-19	CRA7762		. . Pin	1	
-20	CRA7754		. . Bearing	1	
-21	CRA7762		. . Pin	1	
-22	630257	②⑥	. Cover Assembly	1	B
-23	631883	②	. Adjusting Screw	1	B
-24	628311	②③	. Spring	1	B
-25	637784	②	. Plate	2	B
-26	642644	②③	. Diaphragm	1	B
-27	629091-1	②③⑦	. Disc	1	B
-28	629090	②⑥	. Spacer	1	B
-29	626176	③	. Gasket	1	
-30	626054	⑤	. Jet	1	B
-31	626055	⑤	. Gasket	1	B
-32	637864		. Plug Assembly, Jet By-Pass	1	
-33	AN123956	③	. . Seal "O" Ring	1	
-34	NO NUMBER		. . Needle, Adjustable	NS	
-35	637861		. . Ring, Retaining	1	
-36	628784		. By-Pass Valve Assembly	1	
-37	628784-3		. . Cage, By-Pass Valve	1	
-38	628784-2		. . Spring, By-Pass Valve	1	
-39	628784-1		. . Valve, By-Pass	1	
-40	629974		. Plug	1	A
-41	AN123957	⑤	. "O" Ring	1	A
-42	625548	③	. Gasket, Cover-to-Separator	1	
-43	625901		. Ejector	1	

FIG & INDEX	PART NUMBER	1 2 3 4 5 DESCRIPTION	QTY.	USABLE ON CODE
-44	625900	. Cover	1	
		ATTACHING PARTS		
-45	AN500A8-7	. Screw	2	
-46	AN500A8-12	. Screw	2	
		* * * *		
-47	640797	. Name Plate.	1	
		ATTACHING PARTS		
-48	27764	. Screw	2	
		* * * *		
-49	625894 -	. Separator	1	
-50	627220	. Plug	1	

NOTES:

① These fuel pumps are superseded and no longer available for service. For new part number, see applicable Service Parts Catalog.

② Discard item's 3, 4 and 5 when these parts are used.

③ 100% Replacement parts.

④ Can be turned over and reused if not worn from previous overhaul.

⑤ Do not reinstall, no longer used.

⑥ Limited quantity of 25 or less available.

⑦ Dash number designation to be identical with dash number of applicable pump assembly.

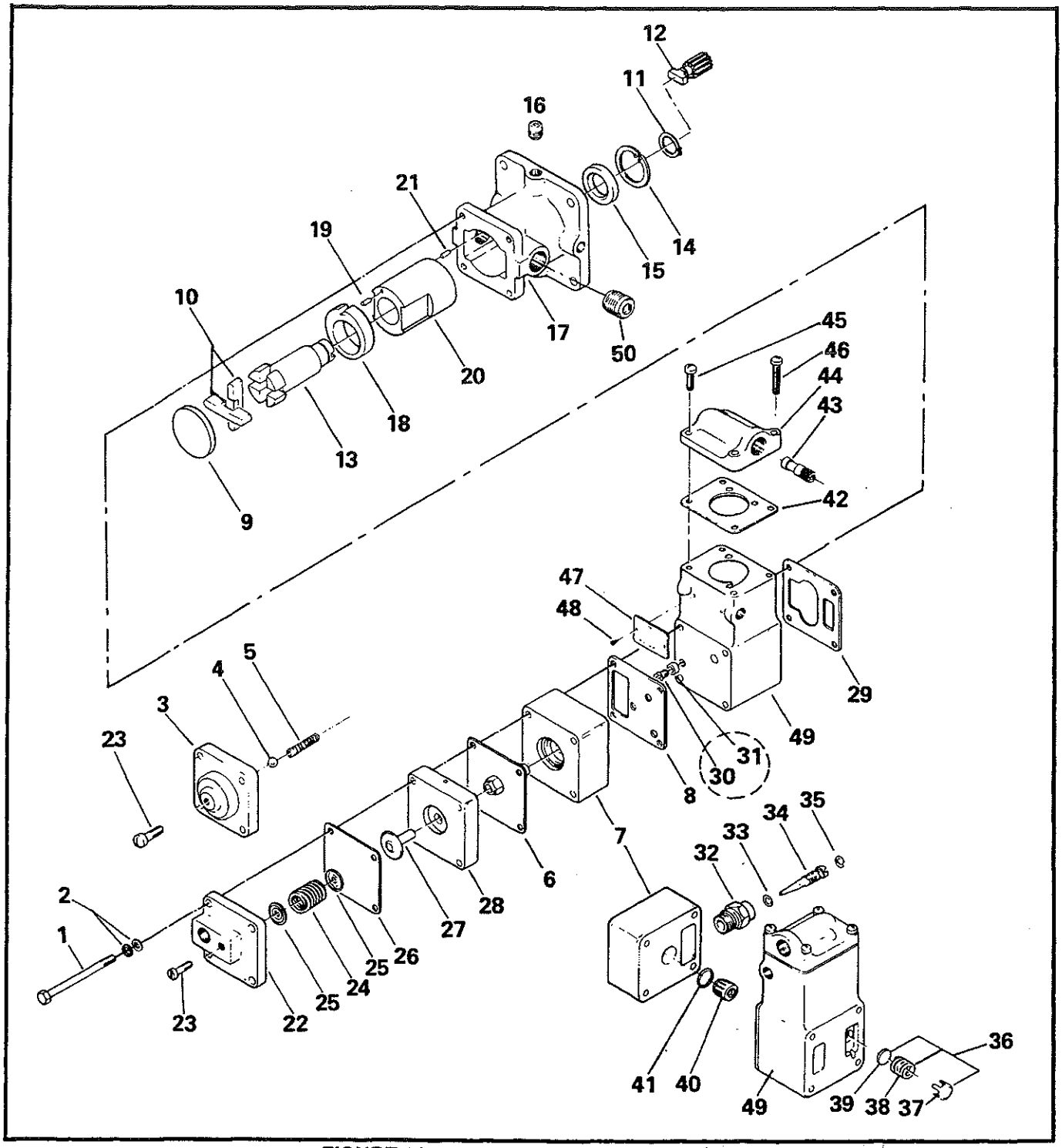


FIGURE 30–02. FUEL PUMP ASSEMBLY.

73-30-03
FUEL CONTROL VALVES
P/N 625219, 629703, 629904, & 632916

03-01. DISASSEMBLY.

NOTE . . . Figure 30-03 does not represent any one model, but refers to all basic types.

A. Remove all safety wire and fittings. Unscrew screen assembly (3) from body (1) and lift off gasket (4). Remove lock screw (23) and washer (22) from outside of name plate (21).

B. Remove the two special screws (24) from name plate (21) and body (1).

CAUTION . . . These screws retain not only the name plate (21), but the entire internal assemblies. Exercise care to keep the internal assemblies from falling out and becoming damaged.

C. Remove name plate (21) and washer (22) from between name plate and body (1). Slide out mixture control shaft (10) and related parts from valve body (1).

D. Note the position of the pin (20) with respect to the mixture control assembly, so it can be re-assembled in the proper position.

E. Hold collar (19) in a suitable vee block and drive out pin (20) from the small end with a 3/32" straight punch. Slide collar (19) from shaft (10). Remove bushing (15), washers (14 & 13) spring (12) and "O" ring (11) from shaft (10). Slide out fuel metering shaft (9) and related parts from valve body (1).

F. Note the position of the lever (16) with respect to the metering shaft (9) so it can be reassembled in the proper position. Hold lever (16) in a suitable vee block and drive out pin (18) with a 3/32" straight punch. Slide lever (16) from shaft (9).

NOTE . . . Some models may have a bushing (17) in the lever. Bushing may be replaced if necessary.

G. Remove bushing (15), washer (14 and 13), spring (12) and "O" ring (11) from shaft (9). Push out metering plug (5A) with a 1/2" fiber rod.

CAUTION . . . DO NOT use a metallic pusher, as damage to the metering plug could result.

H. Remove "O" rings (8) from metering plug (5). Using tweezers through the check valve hole, slide out pin (7) from metering plug (5). Remove ball check valve (6).

NOTE . . . Further disassembly is not required for a normal overhaul, but if necessary, the mixture control stops (2), if damaged, can be pried out with diagonal cutters.

CAUTION . . . Do not break edge of any of the holes in the metering plug. Do not break or damage edge of mixture control or fuel metering shaft contours.

03-02. REASSEMBLY.

NOTE . . . Install new mixture control stops (2), if required.

A. Insert and seat new ball check valve (6) into the metering plug (5) and check for full seat contact. Slide retaining pin (7) into the hole in the annular groove. Be sure that the pin is bottomed to prevent a rise in the annular groove.

B. Apply a thin film of oil to the metering plug (5) and slide it into the valve body (1) making certain that the threaded lock hole lines up with the lock screw (23) hole and the ball check valve (6) faces the mixture control (10) end.

CAUTION . . . DO NOT install new "O" rings (8) on metering plug (5) at this time.

C. Install lock screw (23) to hold the metering plug (5) in position for lapping operation. Install spring (12), washers (13 and 14) and bushing (15) on fuel metering shaft (9).

CAUTION . . . DO NOT install new "O" rings (11) on mixture control shaft (9) at this time.

D. Insert the fuel metering assembly into the valve body (1) in the end opposing the mixture control stops (2). Lap shaft face to metering plug. Install spring (12), washers (13 and 14), and bushing (15) on mixture control shaft (10).

CAUTION . . . DO NOT install new "O" ring (11) on mixture control shaft (10) at this time.

E. Install mixture control assembly into valve body (1) and lap face to metering plug. After this has been accomplished, remove metering shaft (9), mixture control shaft (10), lockscrew (23), and metering plug (5). Thoroughly clean all parts. Assemble all fittings in proper location and position. Install new "O" rings (8) on the metering plug (5) in each annular groove. Install metering plug assembly per paragraph 03-02B.

F. Place a new washer (22) on the valve body (1) and install the name plate (21). Place a new washers (22) on the lockscrew (23) and thread it into place.

G. Install new "O" rings (11) on metering and mixture shafts (9 and 10). Apply Alubco, American Lubricants Co., 1227 Deeds, Dayton, Ohio 45439, or equivalent, to "O" ring grooves and spring cavities and reassemble.

H. Install lever (16) on metering shaft (9) on its proper relative position. Line up the hole on the lever (16) with the hole on the metering shaft (9) and press new tubular pin (18) in place. Flare both ends of the pin (18) to prevent it from coming out. If this model had a bushing (17) in the lever (16), install a new bushing (17).

I. Install collar (19) on mixture control shaft (10) in its proper relative position. Line up the hole in the collar (19) with the hole in the mixture control shaft (10) and press pin (20) into the place with the large diameter end protruding from the proper side of the collar (19).

J. Holding the mixture control assembly in place, install special screw (24) through the name plate (21), body (1) and into the groove on the mixture control shaft (10). Repeat this procedure for the fuel metering end. Check operation of both shafts (9 and 10) for smooth travel through full range without binding.

K. Install a new gasket (4) on the screen assembly (3) and thread it into the body (1). Install any fittings that were removed.

L. This completes assembly and unit is now ready for air pressure check and calibration according to values as outlined in the Calibration Section. Lockwire screws (23 and 24) after calibration to complete overhaul.

FIG & INDEX	PART NUMBER	1 2 3 4 5 DESCRIPTION	QTY.	USABLE ON CODE
30-03	625219	① Control Assembly	NS	A
	629703	① Control Assembly	NS	B
	629904	① Control Assembly	NS	C
	632916	① Control Assembly	NS	D
-1	630570A4	. Body, Assembly	1	
-2	630383-1	. . Pin	2	
-3	539959	. Screen Assembly	1	
-4	646665	② . Gasket	1	
-5	638022	. Plug Assembly, Fuel Metering	1	
-5A	625500	. . Plug, Fuel Metering	1	
-6	628249-3	. . Ball	1	
-7	626844	. . Pin, Ball Retaining	1	
-8	AN123962	② . . "O" Ring	2	
-9	625221	③ . Shaft, Fuel Metering	1	
-10	635608	. Shaft, Mixture Control	1	AB
-10	635607	. Shaft, Mixture Control	1	CD
-11	630979	② . "O" Ring	2	
-12	625492	② . Spring	2	
-13	625457	② . Washer	2	
-14	635835-1	② . Washer	2	

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
-15	625293	②	. Bushing	2	
-16	632555-24		. Lever, Fuel Metering Shaft	1	AC
-16	632555-5		. Lever, Fuel Metering Shaft	1	B
-16	632555-2		. Lever, Fuel Metering Shaft	1	D
-17	632554-2		. . Bushing	1	
-18	626813	②	. Pin, Lever Retaining	1	
-19	625320		. Collar, Mixture Control	1	AB
-19	629782		. Collar, Mixture Control	1	CD
-20	625952	②	. Pin, Collar Retaining	1	
-21	640796		. Name Plate	1	
-22	538600-1	②	. Washer, Seal	2	
-23	AN500A8-7		. Screw	1	
-24	626810		. Screw, Special	2	

NOTES:

① This assembly not available as service part. See applicable parts catalog for correct service part number.

② 100% Replacement Parts.

③ Dash number designation to be identical with dash number of control assembly. Example 625219-1 control assembly requires 625221-1 shaft.

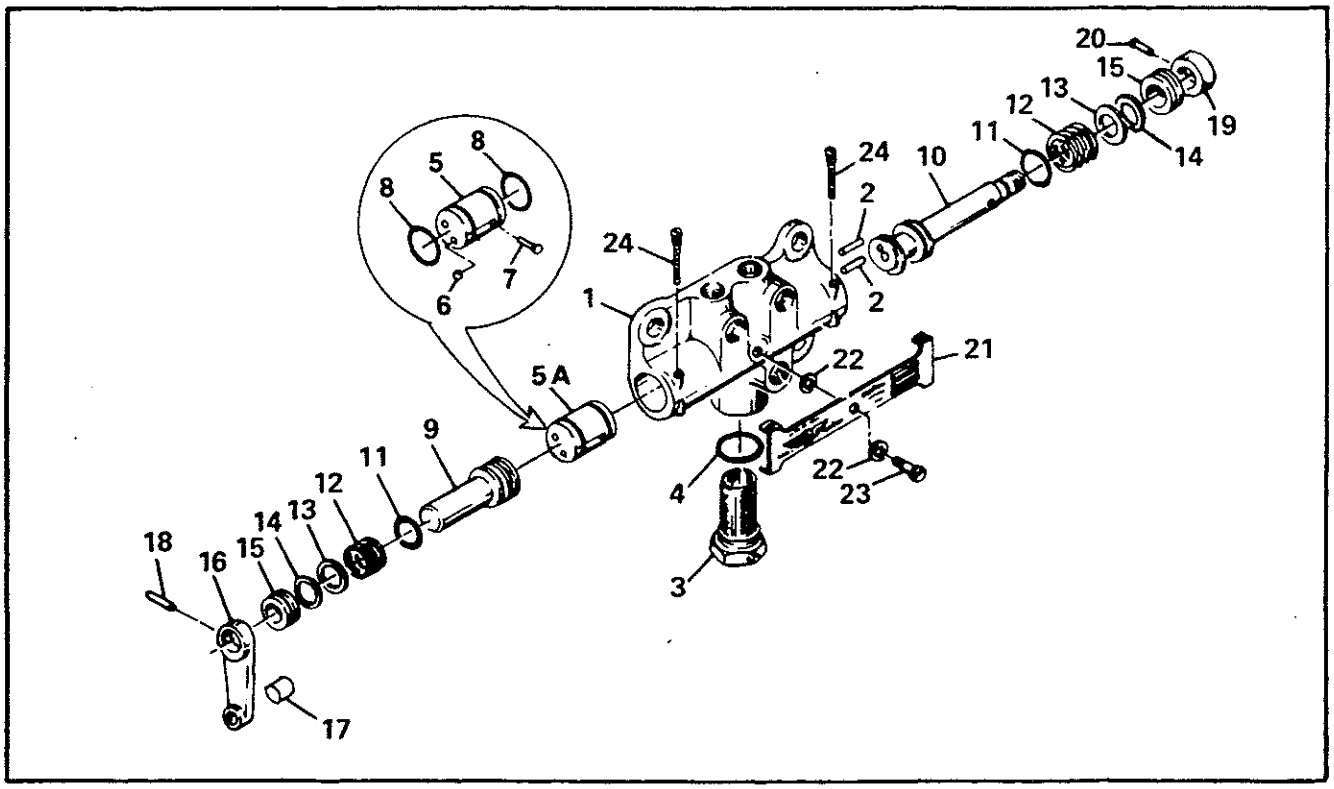


FIGURE 30-03. FUEL CONTROL ASSEMBLY.

73-30-04
MANIFOLD VALVE ASSEMBLIES
P/N 631351 & 631427

04-01. DISASSEMBLY.

A. Remove all lockwire. Remove fittings only if they appear damaged. Remove four screws (16) and carefully separate cover (15) from body (1). Use caution to eliminate damage to parting surfaces. Remove spring (14) and lift out diaphragm assembly (4 through 13). Remove screen (2). Remove seal (3) and discard.

B. Place diaphragm assembly in shielded vise jaws in a position for disassembly. Remove nut (13), plate (12), diaphragm (11), plate (10) and spacer (8). Remove retainer (4) from plunger (7) and discard. Remove spring (5) and needle (6) and plunger (7) for inspection.

NOTE . . . Some models may have a gasket (9). Remove and discard this gasket.

04-02. REASSEMBLY.

A. Reassemble diaphragm assembly (4 through 13 by first installing needle (6) in plunger (7) and stake lightly.

CAUTION . . . Be sure needle is free to move before installing spring (5) and retainer (4).

NOTE . . . Apply Loctite 290 between diaphragm assembly parts.

Set retainer flush with bottom of plunger at initial installation. With plunger in shielded vise jaws install spacer (8), plate (10), diaphragm (11), plate (12).

NOTE . . . If model has a gasket (9), it will not be replaced. Diaphragm parts are bonded together, eliminating the need for gasket (9).

Apply a thin coat of Loctite 290 to first and second threads of plunger (7) before installing nut (13). Torque nut (13) to 30 $\pm$ 1 inch pounds. After diaphragm is positioned with the four through holes at 45° from the through hole in the plunger, install new seal (3) and screen (2) in body (1).

B. Install diaphragm assembly (4 through 13) in bore of body. Install new spring (14) on top of plunger assembly. Place cover (15) on top of spring with vent hole 90° from fore and aft mounting position, as indicated by bracket mounting holes in base of body. Install four screws (16) and tighten to 20 $\pm$ 1 inch pounds. This completes assembly and unit is now ready for air pressure test and calibration according to values as outlined in the Calibration Section. Lockwire screws after calibration to complete overhaul.

NOTE . . . If correct calibration cannot be obtained, reposition retainer in plunger (pressing further in increases pressure; out decreases pressure). Be extremely careful not to allow the retainer to protrude over 0.075" out of the plunger.

FIG & INDEX	PART NUMBER	1 2 3 4 5 DESCRIPTION	QTY.	USABLE ON CODE
30-04	631351	① Valve Assembly, Fuel Manifold	NS	A
	631427	① Valve Assembly, Fuel Manifold	NS	B
-1	631329	. Body, fuel Manifold Valve	1	
-2	626557	. Screen	1	
-3	631330	② . Seal	1	
	632425	. Diaphragm Assembly, Fuel Manifold Valve	1	A
	631526	. Diaphragm Assembly, Fuel Manifold Valve	1	B
-4	632394	. . Retainer	1	
-5	631331	② . . Spring	1	A
-5	631426	② . . Spring	1	B
-6	634619	. . Needle	1	
-7	631282	. . Plunger	1	
-8	631350	. . Spacer	1	
-9	627124	② . . Gasket	1	
-10	627123	. . Plate	1	
-11	626536	② . . Diaphragm	1	
-12	626556	. . Plate	1	
-13	646605	② . . Nut	1	
-14	630184	. Spring, Compression	1	A
-14	627378	. Spring, Compression	1	B
-15	634325	. Cover	1	
		ATTACHING PARTS		
-16	AN500A8-10	. Screw	4	

* * * *

NOTES:

① This assembly not available for service. See applicable Service Parts Catalog for service assembly number.

② 100% Replacement parts.

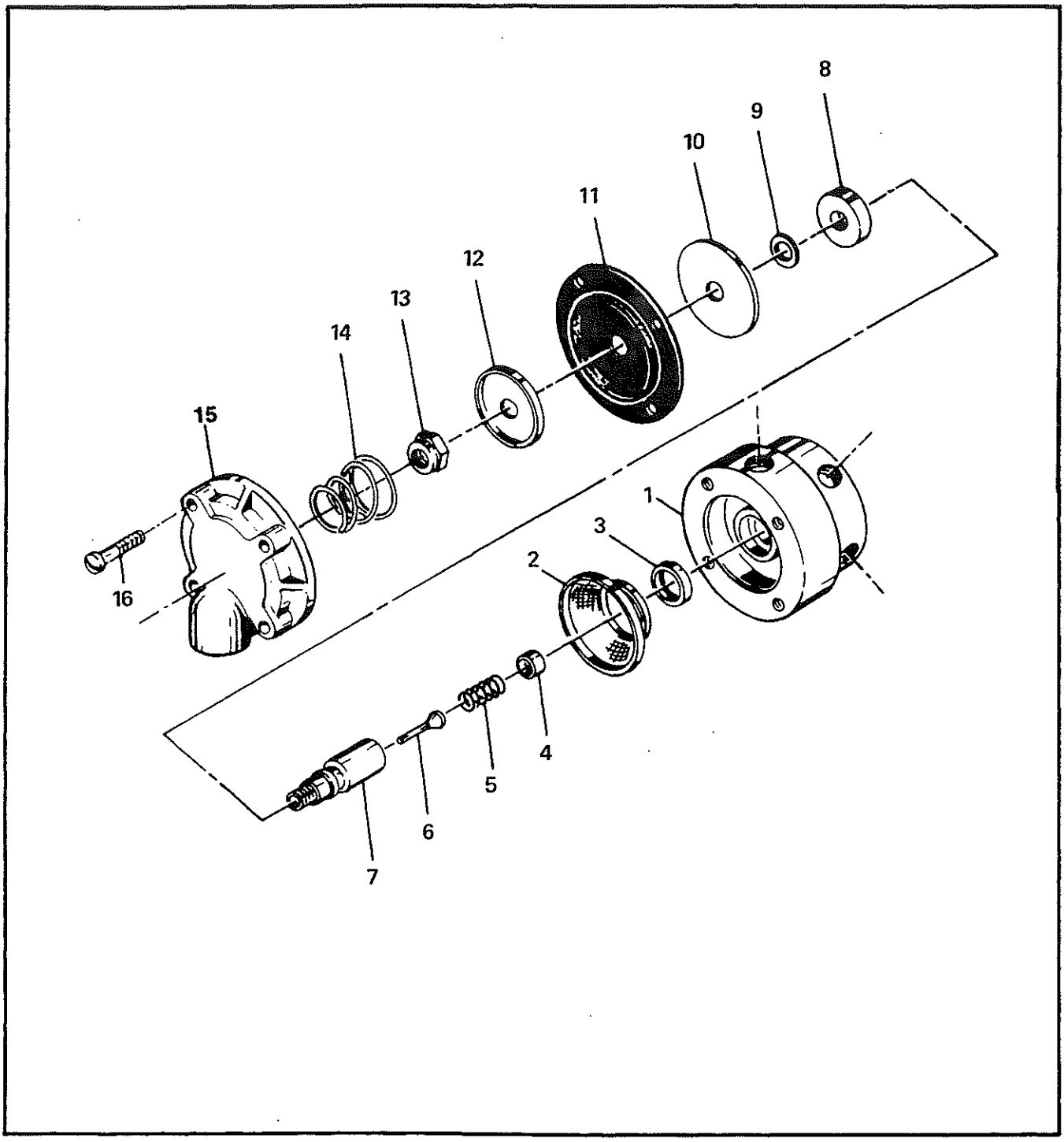


FIGURE 30–04. FUEL MANIFOLD VALVE ASSEMBLY.

73-30-05
NOZZLE ASSEMBLIES

05-01. DISASSEMBLY (Figure 30-05).

A. Place nozzle (1) in a suitable fixture. Lift off shield (4) and remove screen (3).

B. If nozzle has a screw-type jet, discard entire assembly and replace with new type.

C. If jet must be replaced, use a suitable type tap and thread into opening in jet. The jet can be removed by pulling the tap straight out.

05-02. REASSEMBLY.

A. If jet (2) was removed, replace by pressing new jet in nozzle shell.

NOTE . . . Apply a thin coat of Loctite 290 to jet before installation.

B. Install new screen (3) and shield (4) on nozzle (1). Press shield flush with top of shoulder.

C. Nozzles should be flow tested at this time. Flow nozzles and calibrate according to instructions and calibration data in the Calibration Section. If the nozzle flows in the next size range, it may be so stamped. A new jet or a new nozzle assembly can be obtained.

CAUTION . . . All nozzles must be of the same size per engine.

FIG & INDEX	PART NUMBER	1 2 3 4 5 DESCRIPTION	QTY.	USABLE ON CODE
30-05	627335D12	① Nozzle Assembly	NS	A
	627335D13	① Nozzle Assembly	NS	B
-1	627334	. Nozzle	1	
-2	627333-12	. Jet	1	A
-2	627333-13	. Jet	1	B
-3	625921	. Screen	1	
-4	625919	. Shield	1	

NOTE:

① Order nozzle size identified on hex of nozzle body.

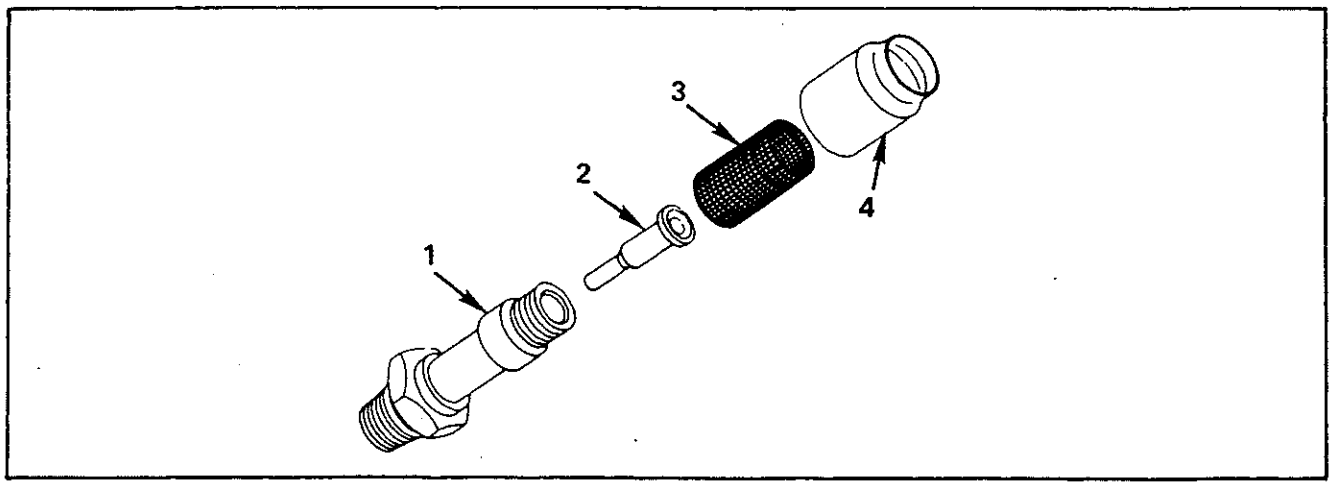


FIGURE 30-05. NOZZLE ASSEMBLY.

73-30-06
NOZZLE ASSEMBLY

06-01. DISASSEMBLY (Figure 30-06).

A. Remove the "O" rings (2) from the nozzle (1).

B. If jet (3) must be replaced, use a suitable type tap and thread into opening in jet. The jet can be removed by pulling the tap straight out.

06-02. REASSEMBLY.

A. If jet (3) was removed, press a new jet into the nozzle shell and calibrate. Be sure the new jet flows at the same size as the rest of the jets used in the engine.

NOTE . . . Apply a thin coat of Loctite 290 to jet before installation.

B. Install two new "O" rings (2).

C. Nozzles should be flow-tested at this time. Flow nozzles and calibrate according to instructions and calibration data in the Calibration Sections. If the nozzle flows in the next size range, it may be so stamped. A new jet or a new nozzle assembly can be obtained.

CAUTION . . . All nozzles must be of the same size per engine.

FIG & INDEX	PART NUMBER	1 2 3 4 5 DESCRIPTION	QTY.	USABLE ON CODE
30-06	632748-13	① Nozzle Assembly	1	
-1	628540	. Nozzle	1	
-2	630979-9	②. "O" Ring	2	
-3	627333	③. Jet	1	

NOTES:

① Order nozzle size identified on hex of nozzle body.
② 100% Replacement parts.
③ Dash number of jet will be the same as the dash number of the nozzle assembly.

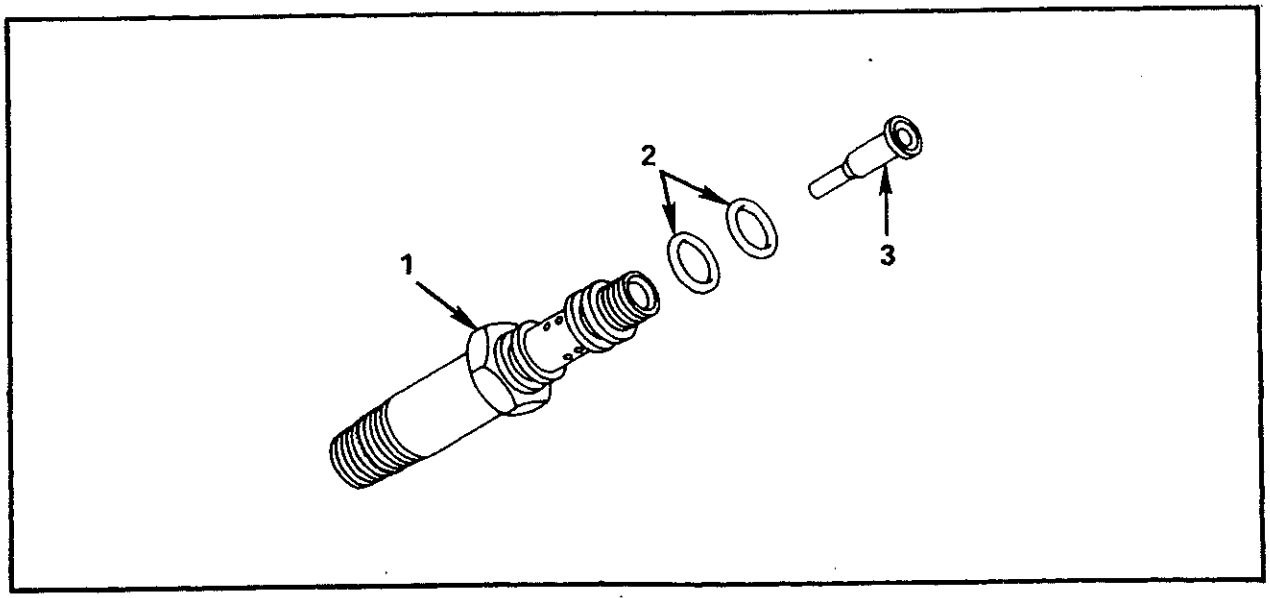


FIGURE 30-06. NOZZLE ASSEMBLY.

INDEX
73–40–00
520 SERIES

INDEX

(Continued)

73-40-01
FUEL PUMP ASSEMBLY
P/N 638154-1,2,4,5,16,17 & 646212-1,2,4,5,16,17

NOTE: Old style fuel pump, P/N 630947 must be modified, per Figure 30-01A.

01-01. DISASSEMBLY.

A. Place pump in suitable fixture and remove all lockwire; and fittings if necessary. Refer to exploded view (Figure 40-01) and proceed as follows: Loosen pressure regulating screw (30) to relieve pressure on relief valve spring. Remove four bolts (33) and washers (32) and carefully separate parts (29 and 14), being careful not to damage parting surfaces. Remove plates (27) and spring (28). Diaphragm (26) should be removed and discarded at this time. Remove plunger (25), being careful not to damage face.

B. Remove plug (17), spring (16) and ball (15) from body (14). Remove plug (20), jet (19) and gasket (18) or adjusting needle (24), "O" ring (22) and plug from body. Remove screws (36) and (37) from vapor separator cover (35) and remove gasket (34). Remove ejector (38) from cover.

NOTE . . . Pump 630947 is to be converted to adjustable orifice pump per instructions in Figure 30-01A. Delete parts (18, 19, and 20).

C. Disassembly of the basic pump should be accomplished in the following manner: Remove the adapter (1) and insulator (3) from the basic pump. Remove seal (2) from adapter (1) and bushing (4) from insulator (3). Hold pump body (5) firmly in palm of hand, end plate (12) down, and apply pressure to drive end of shaft (10) forcing end plate (12), end plate seal (13), blades (11) and shaft (10) from pump body. Remove seal (6) and discard. It is important to note the liner position relative to the rotation marking found on the top surface of the liner. It must be installed with the proper marking (C or CC) in the up position.

CAUTION . . . Do not disassemble liner (9), plate (8) or pin (7) from pump body unless inspection indicates damage or excessive wear. If these parts are to be removed, place the pump body in a dry oven at 400° F. for 10 to 15 minutes to expand the aluminum body. The liner (9), plate (8) and pin (7) may then be removed by carefully bumping body.

01-02. REASSEMBLY.

A. Reassemble basic pump (5 through 13) in reverse order of disassembly. Refer to Figure 40-01 and install seal (6) in body (5). Install pin (7), plate (8) and liner (9) in body (5). Plate (8) may be reused by turning over if not worn from previous overhaul. Be sure liner is installed with proper rotation lettering visible. Use light machine oil to lubricate shaft (10) and install in pump. Install blades (11) in position and lubricate lightly. Install plate (12) and seal (13) to complete basic pump assembly. Install seal (2) in adapter (1). Install insulator (3) and bushing (4) on pump assembly and insert into adapter assembly.

NOTE . . . To assist in assembly of the basic pump and vapor separator and relief valve section, it is suggested that two bolts, approximately 3-1/2 inches long, be used as line-up guides. They can be made of used bolts P/N 628321A3.72 with heads removed.

B. Using a small amount of lapping compound, lap plunger (25) to seat in body (14) for 100% contact. When this has been accomplished, wash parts thoroughly.

C. Install jet plug, "O" ring (22) and adjusting needle (24) in body (14) and secure with retaining ring (23). Insert valve ball (15) in by-pass opening in body and peen lightly to seat. Install by-pass valve spring (16) and by-pass valve plug (17) in body. Place gasket (34) and vapor separator cover (35) in position on body and with a light coat of Loctite 242 on threads, install four screws (36) and (37) securing cover to body. Install vapor separator ejector (38) in cover.

D. Install lapped plunger (25) in body (14). Place diaphragm (26), plate (27), spring (28) and plate (27) in this order.

E. Install adjusting screw (30) in cover (29). Turn in sufficiently so screw will protrude, in cover, a distance equal to depression in top plate (27). This will assure proper alignment of these parts.

F. Assemble cover (29) to body (14). Place belleville washers (32) on bolts (33) and install through stacked parts. Tighten sufficiently to hold parts alinement until four bolts are in place. Torque bolts (33) to 30 ± 1 inch pounds.

CAUTION . . . Belleville washers (32) are special and must be installed with concave surfaces facing each other. Should it be necessary to remove these washers once they have been torqued, they must be replaced.

G. Install any fittings that were removed. Leak test and calibrate according to instructions and calibration data in the Calibration Section. Lockwire after calibration to complete overhaul.

USABLE ON CODE

Model	Code
638154-1	A
646212-1	B
638154-2	C
646212-2	D
638154-4	E
646212-4	F
638154-5	G
646212-5	H
638154-16	J
646212-16	K
638154-17	L
646212-17	M

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
40-01	No Number	①	Fuel Pump and Vapor Separator	1	
-1	631676		. Adapter, Fuel Pump	1	ABEF
-1	631242		. Adapter, Fuel Pump	1	CDGH
-1	642236		. Adapter, Fuel Pump	1	JKLM
-2	628178	②	. Seal, Adapter	1	
-3	632816		. Insulator, Fuel Pump	1	
-4	632741		. Bushing	1	
-5	643694		. Body Assembly	1	ACEGJL
-5	646182-1		. Body Assembly	1	BDFHKM
-6	649198	②	. Seal, Shaft	1	ACEGJL
-6	646181	②	. Seal, Shaft	1	BDFHKM
-7	643853		. Pin, Liner Locator	1	
-8	635548	②③	. Plate, Thrust	1	ACEGJL
-8	646177	②③	. Plate, Thrust	1	BDFHKM
-9	643697		. Liner, Fuel Pump	1	ACEGJL
-9	646178		. Liner, Fuel Pump	1	BDFHKM
-10	643689		. Shaft, Fuel Pump	1	ACEGJL
-10	646176		. Shaft, Fuel Pump	1	
-11	635549		. Blade, Fuel Pump	2	
-12	643690		. Plate, End	1	ACEGJL
-12	646180		. Plate, End	1	BDFHKM
-13	630979-14	②	. Seal, End Plate	1	
-14	634053		. Vapor, Separator	1	
-15	628249-7	②	. Ball, By-Pass Valve	1	
-16	630167	②	. Spring, By-Pass Valve	1	
-17	629974		. Plug, By-Pass Valve	1	
-18	626055	④	. Gasket, Jet By-Pass	1	
-19	626054	④	. Jet, By-Pass	1	
-20	629974	④	. Plug, Jet	1	
-21	637864		.Plug Assembly, Jet	1	
-22	AN123956		. . Seal, "O" Ring	1	
-23	637861		. . Ring, Retaining	1	
-24	No Number		. . Needle, Adjusting	1	
-25	628333		. Plunger	1	

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
-26	642644	②	Diaphragm, Relief Valve	1	
-27	637784		Plate, Spring Retaining	2	
-28	628311	②	Spring, Relief Valve	1	
-29	630471		Cover Assembly, Relief Valve	1	
-30	631883		Screw, Adjusting	1	
-31	AN121501		Nut	1	
-32	646448-1	②	Washer, Belleville	8	
-33	628321A3.72		Bolt, Hex Head	4	
-34	625548	②	Gasket, Cover-to-Separator	1	
-35	625900		Cover, Vapor Separator	1	
			ATTACHING PARTS		
-36	AN500A8-7		Screw	2	
-37	AN500A8-12		Screw	2	
			* * * *		
-38	625901		Ejector	1	ABCDEFJK
-38	633447		Ejector	1	GHLM
-39	640797		Name Plate	1	
			ATTACHING PARTS		
-40	24764		Screw, Drive	2	
			* * * *		

NOTE:

① This assembly NOT available as replacement part. For correct service part number, see appropriate Service Part Catalog.
② 100% Replacement Parts.
③ Can be turned over and reused if not worn from previous overhaul.
④ Do not reinstall.

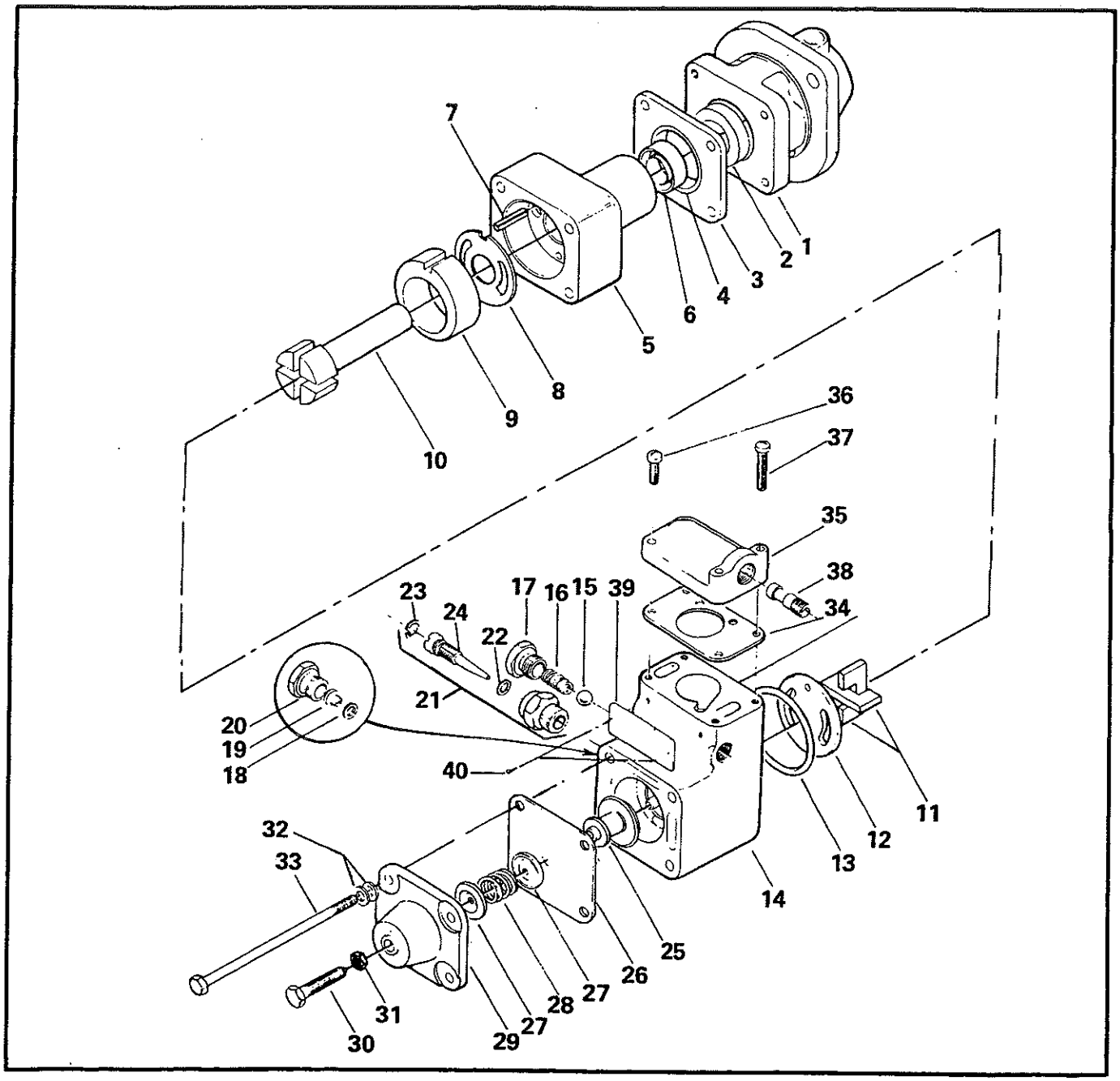


FIGURE 40–01. FUEL PUMP ASSEMBLY.

73-40-02
FUEL PUMP ASSEMBLY
P/N 632818-1,2,3,4,5,6,7,8,9,10,11 & 646210-1,2,3,4,5,6,7,8,9,10,11

02-01. DISASSEMBLY.

A. Place pump assembly in a suitable fixture and remove all lockwire. Refer to Figure 40-02. Remove screw (40) from cover (39) to release spring pressure. Remove nut (43), plain washer (45) and seal washer (44), from aneroid adjusting screw. Remove four bolts (42) from pump assembly and vapor separator relief valve aneroid assembly (14 through 43). Remove this section from basic pump assembly (5 through 13). Separate cover (39) from body (14) and (26) while screwing down on aneroid (32). Use care when removing cover so as not to stretch aneroid (32) or compress it by screwing it too far into cover (38) prior to separation from body (26).

B. Remove screws (29 & 30), variable orifice body (26), gasket (25) and "O" ring (38). Pin (33) must be removed so aneroid (32) and rod (31) can be withdrawn from body. The rod seal (27) and retaining ring (28) can be removed for replacement by soaking the variable orifice body (26) in a mixture 80% Glacial Acetic acid and water, then scrape off the softened epoxy, if epoxy was used. Remove ball (15), and spring (16) from vapor separator body. It is not necessary to remove (17) unless damaged or loose. Remove screws (20 & 21), cover (19), gasket (18) and ejector (22).

NOTE . . . Be sure to use latest variable orifice body (26) which incorporates the use of a stop pin (33) at rear of housing. This replaces retaining clip-type.

C. Disassembly of the basic pump should be accomplished in the following manner. Refer to exploded view (Figure 40-02) and remove the adapter (1) and insulator (3) from the basic pump. Remove seal (2) from adapter (1) and bushing (4) from insulator (3). Hold pump body firmly in palm of hand, end plate (12) down, and apply pressure to drive end of rotor shaft (10) forcing end plate (12), end plate seal (13), blades (11) and shaft (10) from pump body. Remove seal (6) and discard. It is important to note the liner position relative to the rotation marking found on the top surface of the liner. It must be installed with the proper marking (C or CC) in the up position.

CAUTION . . . Do not disassemble liner (9), plate (8) or pin (7) from pump body unless inspection indicates damage or excessive wear. If these parts are to be removed, place the pump body in a dry oven at 400° F. for 10 to 15 minutes to expand the aluminum body. The liner (9), plate (8) and pin (7) may then be removed by carefully bumping body.

02-02. REASSEMBLY.

A. Reassemble basic pump (5 through 13) in reverse order of disassembly. Refer to Figure 40-02, and install seal (6) in body (5). Install pin (7), plate (8) and liner (9) in body (6). Be sure liner is installed with proper rotation lettering visible. Use light machine oil to lubricate shaft (10) and install in pump. Install blades (11) in position and lubricate lightly. Install plate (8) and seal (13) to complete basic pump assembly. Install seal (2) in adapter (1). Install bushing (4) and insulator (3) on pump assembly and insert pump assembly (3 through 13) into adapter assembly (1).

B. Refer to exploded drawing Figure 20-40, and assemble vapor separator, relief valve and aneroid sections as follows:

C. Install seal (27) in body (26) and apply a thin layer of Loctite 290 in the retaining ring groove and install retaining ring (28), being careful to prevent the adhesive from flowing onto the lip of the seal. These parts should be allowed to dry before proceeding with further assembling. Insert aneroid and rod assembly into body (26) and install pin (33).

D. Install to body (14), gasket (18) and cover (19), secure with screws (20) and (21). Install ejector (22) in cover (19).

NOTE . . . Shroud, were used, must now be positioned.

E. Install ball (15) and spring (16). Install rod (31) and pin (33) into body (26). Install gasket (25) and body (26). Secure with screws (29 and 30).

NOTE . . . To assist in the assembly of the relief valve section including the aneroid cover, it is suggested that two bolts approximately 3-1/2 inches long be used as line-up guides. They can be made of use pump bolts P/N 628321A3.72 with heads removed.

F. If name plate has been removed, install plate (23) using drive screws (24).

G. Assemble plunger (34) to body (14). Install diaphragm (35), plate (36), spring (37) and plate (36). Install adjusting screw (40) in cover aneroid assembly sufficiently deep to properly contact center of plate (36). Install "O" ring (38) in land on body (26). Use a very small amount of Parker O Lube on this "O" ring to prevent rolling. With all parts in alignment, insert aneroid rod end into seal (27). Assemble cover (39) to body (14). Hold cover in place and back aneroid adjusting screw up into the cover and install seal washer (44), plain washer (45) and lock nut (43). Expert pressure on cover assembly and install two bolts (42) through aligned parts and tighten enough to hold parts in alignment. Remove adjusting screw (40) and observe position of top plate (36). If not properly aligned to accept lead portion of adjusting screw, realign and scribe and reinstalled adjusting screw to approximately one half of its length.

H. Remove assembly pins and install bolts (42) with Belleville washers (41) and torque to 30 + 1 inch lbs.

CAUTION . . . Belleville washers (41) are special and must be installed with concave surfaces facing each other. Should it be necessary to remove these washers once they have been torqued, they must be replaced.

G. Install supercharger pressure fitting in aneroid relief valve cover (39) at this time. Install to proper position. Pump is now ready for calibration and test procedure. Do not lockwire until pump has met calibration and test specifications outlined the Calibration Section.

USABLE ON CODE

MODEL	CODE
632818-1	A
632818-2	B
632818-3	C
632818-4	D
632818-5	E
632818-7	F
632818-8	G
632818-9	H
632818-10	J
632818-11	K
646210-1	L
646210-2	M
646210-3	N
646210-4	O
646210-8	P
646210-9	Q
646210-10	R
646210-11	S
632818-6	T
646210-6	U

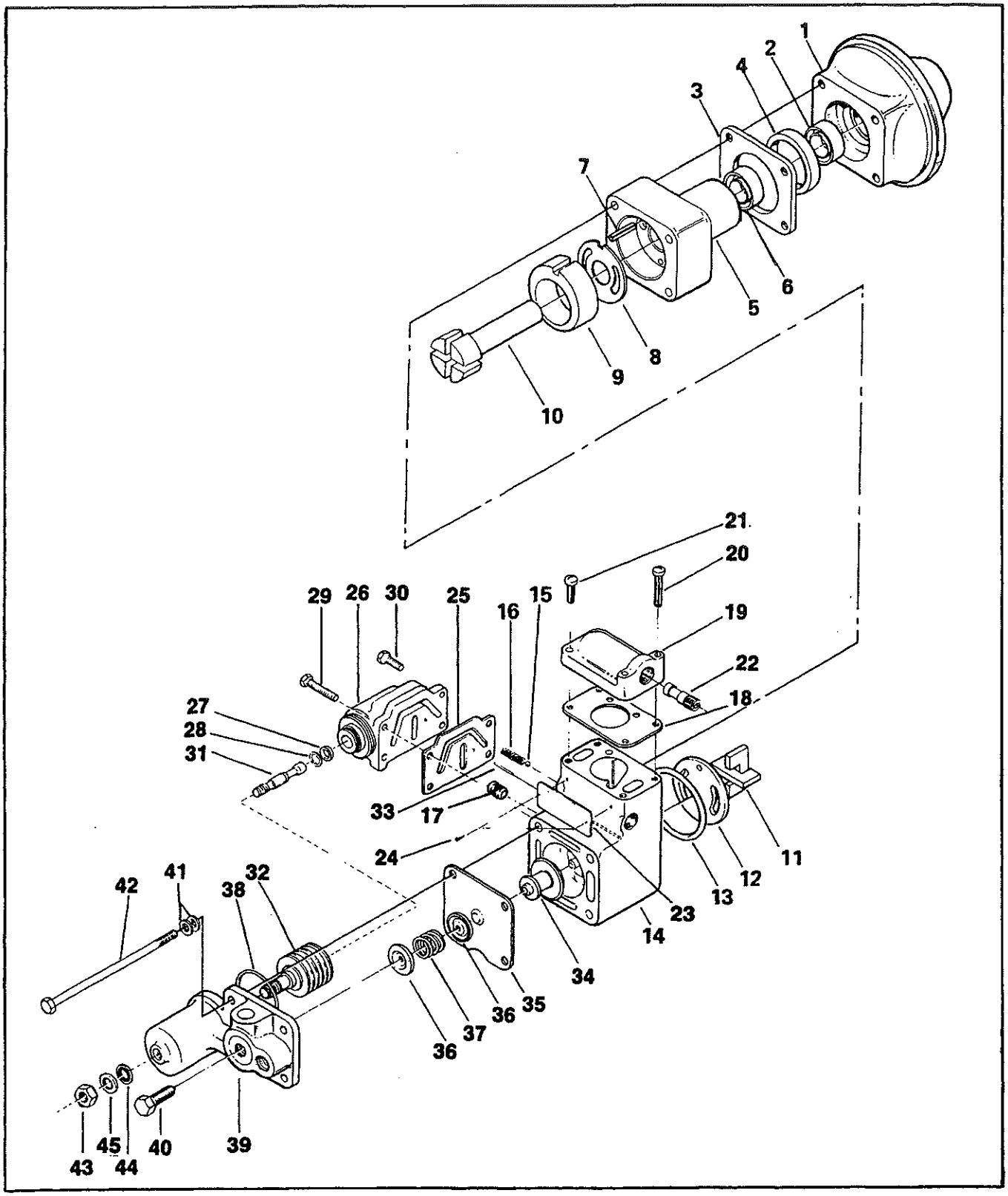


FIGURE 40–02. FUEL PUMP ASSEMBLY.

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
40-02	No Number	①	Fuel Pump and Pressure Compensator Assembly	NS	ALL
-1	631242		Adapter, Fuel Pump	1	ABLM
-1	631676		Adapter, Fuel Pump	1	CFHNQ
-1	641986		Adapter, Fuel Pump	1	DEOTU
-1	642236		Adapter, Fuel Pump	1	GJKPRS
-2	628178	②	Seal Adapter, Fuel Pump	1	
-3	632816		Insulator, Fuel Pump	1	
-4	632741		Bushing, Fuel Pump	1	
-5	643694		Body Assembly, Fuel Pump	1	ABCEFGHJKT
-5	646182-1		Body Assembly, Fuel Pump	1	LMNPQRSU
-5	646182-2		Body Assembly, Fuel Pump	1	O
-5	643696		Body Assembly, Fuel Pump	1	D
-6	649198	②	Seal, Shaft	1	ABCDEFGHJKT
-6	646181	②	Seal, Shaft	1	LMNOPQRSU
-7	643853		Pin, Liner Locator	1	
-8	635548	②③	Plate, Thrust	1	ABCDEFGHJKT
-8	646177	②③	Plate, Thrust	1	LMNOPQRSU
-9	643697		Liner, Fuel Pump	1	ABCEFGHJKT
-9	638217-1		Liner, Fuel Pump	1	D
-9	646178		Liner, Fuel Pump	1	LMNOPQRSU
-10	643689		Shaft, Pump	1	ABCDEFGHJKT
-10	646176		Shaft, Pump	1	LMNOPQRSU
-11	635549		Blade, Fuel Pump	2	
-12	643690		Plate, End	1	ABCDEFGHJKT
-12	646180		Plate, End	1	LMNOPQRSU
-13	630979-14	②	Seal, End Plate	1	
-14	632805		Vapor Separator and Relief Valve	1	
-15	628249-7	②	Ball, Fuel Pump By-Pass	1	
-16	630167	②	Spring, Ball Return	1	
-17	632636		Plug	1	
-18	625548	②	Gasket, Separator	1	
-19	625900		Vapor Separator Cover	1	
			ATTACHING PARTS		
-20	AN500-8-12		Screw	2	
-21	AN500-8-7		Screw	2	
			* * * *		
-22	633447		Ejector, Fuel Pump Vapor	1	
-23	640797		Name Plate	1	
			ATTACHING PARTS		
-24	24764		Screw, Drive	2	
			* * * *		
-25	638223	②	Gasket, Variable Body	1	
-26	634439A1		Body, Variable Orifice	1	
			ATTACHING PARTS		
-27	639484		Seal, Rod	1	
-28	521824		Ring, Retaining	1	
			* * * *		
-29	AN500-8-20		Screw	2	
-30	AN500-8-14		Screw	2	
-31	634438-1		Rod, Variable Orifice	1	AJLR
-31	634438-2		Rod, Variable Orifice	1	TU
-31	634438-5		Rod, Variable Orifice	1	BEFGHKMPQS

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
-31	634438-7		. Rod, Variable Orifice	1	CDNO
-32	642810		. Aneroid, Altitude Control	1	
-33	634441		. Pin, Variable Orifice	1	
-34	628333		. Plunger, Relief Valve	1	ABCDEFJKLMNORSTU
-34	628333-1		. Plunger, Relief Valve	1	GHPQ
-35	642644	②	. Diaphragm, Relief Valve	1	
-36	637784		. Plate, Diaphragm	2	
-37	628311	②	. Spring, Diaphragm	1	
-38	630979-12		. "O" Ring, Variable Orifice	1	
-39	638092		. Cover Assembly, Relief Valve	1	
-40	631883		. Screw, Altitude Control	1	
-41	646448-1	②	. Washer, Belleville	8	
-42	628321A3.72		. Bolt	4	
-43	628298		. Nut, Aneroid Locking	1	
-44	538600-3		. Washer, Seal	1	
-45	20522		. Washer, Plain	1	

NOTES:

① This assembly NOT available as replacement part. For correct service part number, see appropriate Service Parts Catalog.

② 100% Replacement parts.

③ May be turned over and reused if not worn from previous overhaul.

73-40-03
FUEL PUMP ASSEMBLY
P/N 632637-1, 639508-5,7,8,9,12,13, 646758-5,7,8,9,12,13 & 649368-12,13

03-01. DISASSEMBLY.

A. Place pump in a suitable fixture and remove all lockwire; and fittings if necessary. Refer to exploded view (Figure 40-03) and proceed as follows: Loosen screw (54) to relieve pressure on relief valve spring (37). Remove four bolts (41) and washers (40). Separate basic pump parts (1 through 13) from vapor separator and relief valve body (14).

B. Disassembly of the basic pump should be accomplished in the following manner: Remove the adapter (1) and insulator (3) from the basic pump. Remove seal (2) from adapter (1) and bushing (4) from insulator (3). Hold pump body (6) firmly in palm of hand, end plate (12) down, and apply pressure to drive end of shaft (10) forcing end plate (12), end plate seal (13) blades (11) and shaft (10) from pump body. Remove seal (5) and discard. It is important to note the liner position relative to the rotation marking found on the top surface of the liner. It must be installed with the proper marking (C or CC) in the up position.

CAUTION . . . Do not disassemble liner (9), plate (8) or pins (7) from pump body unless inspection indicates damage or excessive wear. If these parts are to be removed, place the pump body in a dry oven at 400° F. for 10 to 15 minutes to expand the aluminum body. The liner (9), plate (8) and pin (7) may then be removed by carefully bumping body.

C. Remove aneroid lock nut (44), plain washer (43) and sealing washer (42), and turn adjusting screw down until it is no longer attached to the relief valve cover (39). Remove pin (52), collar (51) and washers (53). Cover (39) may now be removed. Diaphragm plates (36) and diaphragm spring (37) will fall out when cover (39) is removed. Aneroid (33) and rod (32) need not be disassembled, unless replacement of either part is necessary.

D. Remove diaphragm (35), plunger (34) and mixture control shaft (46). At this point the ball check in the mixture control shaft should be checked for leakage. If no leakage is observed, further disassembly of the mixture control shaft (46) is not required. If leakage is observed, ball (47) and pin (48) must be removed from shaft (47). This will best accomplished by placing the shaft in a vee block in such a position as to allow the ball to be driven against the pin. This will bend the pin and allow the ball to fall through the shaft. A precision ground 1/16" punch should be used for this operation and care exercised. Very light pressure is required to bend the pin. It is now possible to lightly drive pin into bore of the mixture shaft for removal.

E. Insert (14A) should be inspected for wear. If the insert is within the specified limits it should not be removed. If necessary, removal can be accomplished by using a 1/2" tap and tapping into the insert and pulling the insert straight out. It may be necessary to put the tap in the vise and tap on the casting with a plastic hammer to remove the insert.

F. Remove screws (27) and (28), variable orifice body (26), gasket (25) and "O" ring (38). Pin (31) must be removed so aneroid and rod can be withdrawn from body. The rod seal (29) and snap ring (30) can be removed for replacement by soaking the variable orifice body (26) in a mixture of 80% Glacial Acetic acid and water, then scrape off the softened epoxy, if epoxy was used. It should now be possible to remove the snap ring and seal. Remove spring (17), ball (16) and plug (15) from vapor separator body. Remove screws (20) and (21), cover (19), gasket (18) and ejector (22).

NOTE . . . Be sure to use latest variable orifice body (26) which incorporates the use of a stop pin (29) at rear of housing. This replaces retaining clip-type.

03-02. REASSEMBLY.

A. Reassemble basic pump (5 through 13) in reverse order of disassembly. Refer to Figure 40-03 and install new seal (5) in body (6). Install pin (7), plate (8) and liner (9) in body (6). Thrust plate (8) may be turned over and reused if not worn from previous overhaul. Be sure liner is

installed with proper rotation lettering visible. Use light machine oil to lubricate shaft (10) and install in pump. Install blades (11) in position and lubricate lightly. Install plate (12) and seal (13) to complete basic pump assembly. Install new seal (2) in adapter (1). Install bushing (4) and insulator (3) on pump assembly and insert into adapter assembly.

NOTE . . . To assist in assembly of the basic pump and vapor separator and relief valve section it is suggested that two bolts approximately 3-5/8 inches long be used as line-up guides. They can be made of used bolts P/N 628321-3.72 with heads removed.

B. If insert (14A) was removed at disassembly, install new "O" rings (14B) on insert (14A). Use a small amount of Parker "O" Lube on all "O" rings at assembly to insure ease of assembly and eliminate rolled rings. Press insert (14A) into separator mixture control body (14) being careful to align inlet and outlet openings. Press insert (14A) into body flush with surface. If new insert (14A) is to be installed, proceed as follows: Install "O" rings (14B) on insert (14A) and lightly lubricate, press insert (14A) into body (14) until flush with surface. Using a suitable holding fixture and .125" drill bit, center drill in fuel outlet fitting boss and drill through insert (14A) and body (14) until drill bit visibly enters relief valve area. Ream insert (14A) using a .50" ream to remove any burrs and improve shaft installation.

CAUTION . . . Do no exceed the specified 1.31 inches depth limits. Make sure all chips and shavings have been cleaned out of the casting.

C. Install a new ball (16), spring (17) and plug (15) in vapor separator (14). Peen the ball lightly to seat. Install rod seal (29) in body and put a thin layer of Loctite 290 in the retaining ring groove and install retaining ring (30), being careful to prevent the adhesive from flowing onto the lip of the seal. These parts should be allowed to dry before proceeding with further assembling.

D. Install aneroid (33) on rod (32) if removed, using Loctite 242. Install a new "O" ring (38) on body. Now insert the aneroid rod (32) into the body and install pin (31). With a new gasket (25) in place, install body (26) on vapor separator and attach with screws (27) and (28) using Loctite 242.

E. With a small amount of lapping compound, lap plunger (34) to seat in body (14) for 100% contact. Clean plunger and body thoroughly and install plunger in body.

F. If mixture shaft has completely disassembled, install a new ball (47) and peen lightly to seat. Install a new pin (48) and stake sufficiently to eliminate the possibility of the pin backing out and scoring the bore of the insert (14A). Install a new "O" ring (44), washer (50) and washer (53) on mixture shaft (46) and install in vapor separator.

G. Set diaphragm (35), plates (36) and spring (37) in place. Install adjusting screw (54) in cover (39) and turn screw in so it will protrude in cover a distance equal to the depression in the top plate (36). Assemble cover (39) to body (14). Hold cover in place and back aneroid adjusting screw up into the cover and install seal washer (42), plain washers (43) and lock nut (44). Still holding cover in place, assemble complete fuel pump assembly together with washer (40) and bolts (41). Torque bolts to 30 + 1 inch pounds.

CAUTION . . . Washers (40) are special and must be installed with the concave surfaces facing each other. Should it be necessary to remove these washers once they have been torqued, they must be replaced.

H. Install collar (51) and pin (52) on mixture control shaft (46). Be sure to swage both ends of the pin (52). Place a new gasket (18) on vapor separator and install cover (19) with screws (20) and (21) using Loctite 242. Install ejector (22) in cover.

I. Install fittings as required. Leak test and calibrate according to instructions and calibration data in the fuel pump Calibration Section. Lockwire after calibration to complete overhaul.

USABLE ON CODE

MODEL	CODE	MODEL	CODE
632637-1	A	646758-9	J
639508-5	B	646758-12	K
639508-8	C	646758-13	L
639508-9	D	639508-7	M
639508-12	E	646758-7	N
639508-13	F	649368-12	P
646758-5	G	649368-13	R
646758-8	H		

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
40-03	No Number	①	Fuel Pump & Pressure Compensator Assy. . .	NS	ALL
-1	631242		. Adapter, Fuel Pump	1	ABG
-1	631676		. Adapter, Fuel Pump	1	KLMNPR
-1	642236		. Adapter, Fuel Pump	1	CDHJ
-1	643555		. Adapter, Fuel Pump	1	EF
-2	628178	②	. Seal, Adapter	1	
-3	632816		. Insulator	1	
-4	632741		. Bushing	1	
-5	649198	②	. Seal, Shaft	1	ABCDEFMPR
-5	646181	②	. Seal, Shaft	1	GHJKLN
-6	643694		. Body Assembly.	1	ABCDEFMPR
-6	646182-1		. Body Assembly.	1	GHJKLN
-7	643853		. Pin, Liner Locator	1	
-8	635548	②③	. Plate, Thrust	1	ABCDEFMPR
-8	646177	②③	. Plate, Thrust	1	GHJKLN
-9	643697		. Liner	1	ABCDEFM
-9	646178		. Liner	1	GHJKLN
-10	643689		. Shaft, Fuel Pump	1	ABCDEFMPR
-10	646176		. Shaft, Fuel Pump	1	GHJKLN
-11	635549		. Blade, Fuel Pump	2	
-12	643690		. Plate, End	1	ABCDEFMPR
-12	646180		. Plate, End	1	GHJKLN
-13	630979-14	②	. Seal, End Plate	1	
-14	649323-3		. Vapor Separator Assembly	1	PR
-14	643752A1		. Vapor Separator Assembly	1	ABCDGHJMN
-14A	630213		. . Insert	1	
-14B	MS9021-016	②	. . "O" Ring	2	
-14	643755A1		. Vapor Separator Assembly	1	EFKL
-14A	630213		. . Insert	1	
-14B	MS9021-016	②	. . "O" Ring	2	
-15	632636		. Plug, Fuel Pump By-Pass	1	
-16	628249-7	②	. Ball, Fuel Pump By-Pass	1	
-17	630167	②	. Spring, Ball Return	1	
-18	625548	②	. Gasket, Separator	1	
-19	625900		. Cover Vapor Separator	1	
			ATTACHING PARTS		
-20	AN500-8-12		. Screw	2	
-21	AN500-8-7		. Screw	2	
			* * * *		
-22	625901		. Ejector, Fuel Pump Vapor	1	ABCDGHJMN
-22	633447		. Ejector, Fuel Pump Vapor	1	EFKLPR
-23	640797		. Name Plate	1	
			ATTACHING PARTS		
-24	24764		. Screw, Drive	2	
			* * * *		
-25	638223	②	. Gasket	1	
-26	634439A1		. Body, Variable Orifice	1	
			ATTACHING PARTS		
-27	AN500-8-20		. Screw	2	
-28	AN500-8-14		. Screw	2	
			* * * *		

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
-29	639484	②	. . Seal, Rod	1	
-30	521824		. . Ring, Retaining	1	
-31	634441		. Pin, Variable Orifice	1	
-32	634438-5		. Rod, Variable Orifice	1	ABCDGHJMN
-32	634438-2		. Rod, Variable Orifice	1	EFKLPR
-33	642810		. Aneroid, Altitude Control	1	
-34	628333		. Plunger, Relief Valve	1	ABCGH
-34	628333-1		. Plunger, Relief Valve	1	DEFJKLMNPR
-35	642644	②	. Diaphragm, Relief Valve	1	
-36	637784		. Plate, Diaphragm	2	
-37	628311	②	. Spring, Diaphragm	1	
-38	630979-12	②	. "O" Ring	1	
-39	632618A1		. Cover Assembly, Relief Valve	1	
-40	646448-1	②	. Washer, Belleville	8	
-41	628321A3.72		. Bolt	4	
-42	538600-3		. Washer, Seal	1	
-43	20522		. Washer, Plain	1	
-44	628298		. Nut, Aneroid Locking	1	
-45	630383-2		. Pin	1	
-46	649191		. Shaft, Mixture Control	1	PR
-46	643095		. Shaft, Mixture Control	1	ABCDEFGHJKLMN
-47	628249-3		. Ball	1	
-48	626844		. Pin	1	
-49	630979-11	②	. "O" Ring	1	
-50	625457-1		. Washer	1	
-51	630215		. Collar	1	
-52	626813		. Pin	1	
-53	635835-1		. Washer, Teflon	2	
-54	631883		. Screw, Relief Valve	1	

NOTES:

① This assembly NOT available as replacement part. For correct service part, see appropriate Service Parts Catalog.

② 100% Replacement Parts.

③ May be turned over and reused if not worn from previous overhaul.

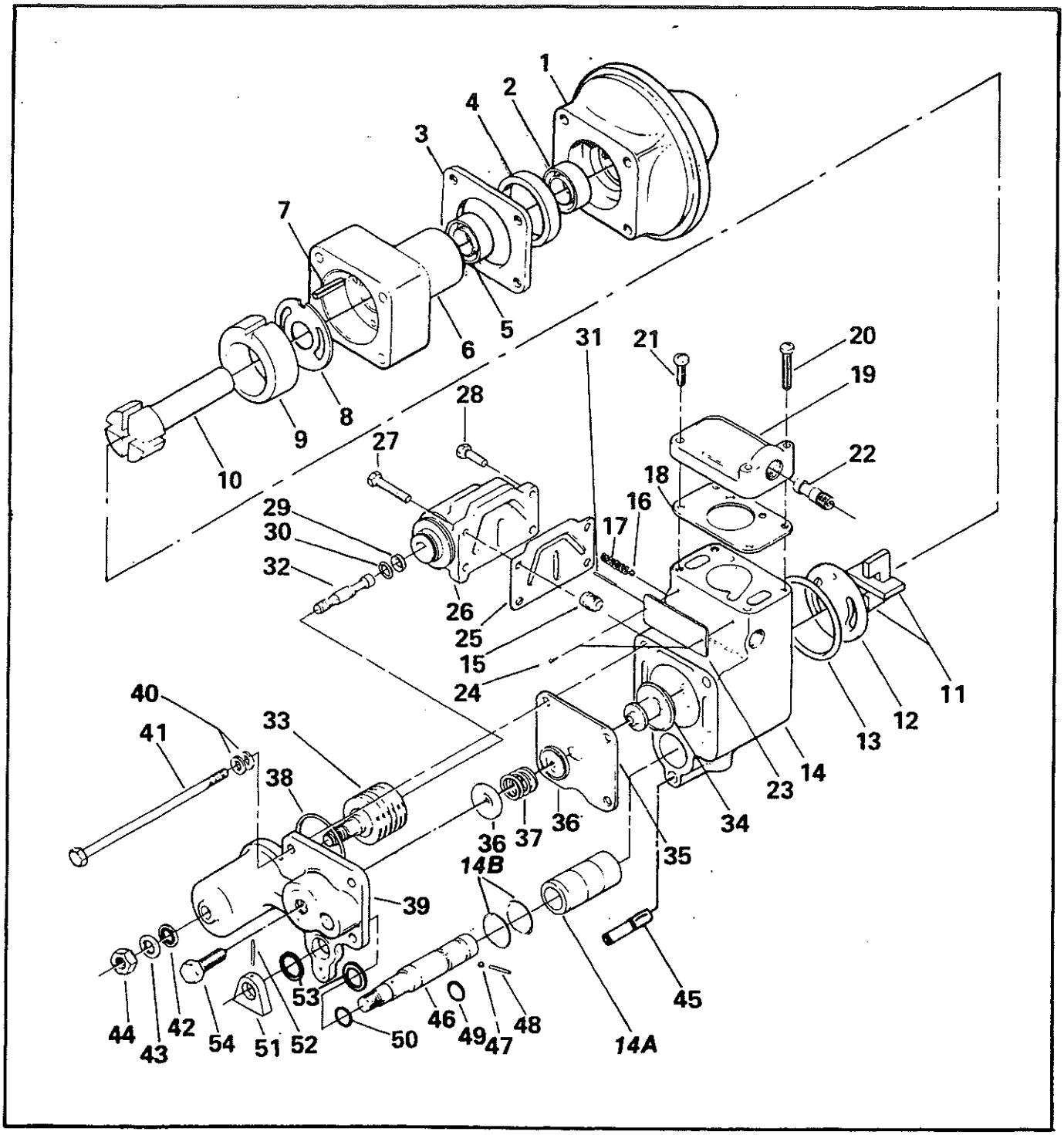


FIGURE 40–03. FUEL PUMP ASSEMBLY

73-40-04
FUEL PUMP ASSEMBLY
P/N 640643-6,7 & 646765-6,7

NOTE: 640643-1 Superceded by 640643-6; 640643-3 Superceded by 640643-7

04-01. DISASSEMBLY.

A. Place pump in suitable fixture and remove all lockwire; and fittings if necessary. Refer to exploded view (Figure 40-04) and proceed as follows: Loosen screw (27) to relieve pressure on relief valve spring. Remove four bolts (30) and washers ((29). Separate parts (5) through (13), basic pump from (14) through (17) mixture control body and relief valve section. Disassemble relief valve body and related parts (19) through (27).

B. Disassembly of the basic pump should be accomplished in the following manner: Remove the adapter (1) and insulator (3) from the basic pump. Remove seal (2) from adapter (1) and bushing (4) from insulator (3). Hold pump body firmly in palm of hand, end plate (12) down, and apply pressure to drive end of shaft (10) forcing end plate (12) end plate seal (13) blades (11) and shaft (10) from pump body. Remove seal (5) and discard. It is important to note the liner position relative to the rotation marking found on the top surface of the liner. It must be installed with the proper marking (C or CC) in the up position.

CAUTION . . . Do not disassemble liner (9), plate (8) or pin (7) from pump body (6) unless inspection indicates damage or excessive wear. If these parts are to be removed, place the pump body in dry oven at 400° F. for 10 to 15 minutes to expand the aluminum body. The liner (9), plate (8) and pin (7) may then be removed by carefully bumping body.

C. Separate body (14) from relief valve body (19). Remove gasket (18) relief valve body. Remove plug (17), spring (16) and ball (15) from body (14).

04-02. REASSEMBLY.

A. Reassemble basic pump (5 through 13) in reverse order of disassembly. Refer to Figure 40-04 and install seal (5) in body (6). Install pin (7), plate (8) and liner (9) in body (6). Be sure liner is installed with proper rotation lettering visible. Use light machine oil to lubricate shaft (10) and install in pump. Install blades (11) in position and lubricate lightly. Install plate (12) and seal (13) to complete basic pump assembly. Install seal (2) in adapter (1). Install bushing (4) and insulator (3) on pump assembly and insert into adapter assembly.

NOTE . . . To assist in assembly of the basic pump, mixture control section and relief valve section, it is suggested that two bolts approximately three inches long be used as line-up guides. They can be made of used bolts P/N 628321A3-25 with heads removed.

B. Inspect body (19) plunger seat. It must be free of nicks and scratches. In order to insure proper seating contact of the plunger (22), check pin for nicks, etc. Place small amount of lapping compound on the plunger (22) seat and lap lightly for 100% contact. Wash parts thoroughly before assembly.

C. Insert new ball (15) in by-pass opening and peen lightly to seat. Install new spring (16) and plug (17). Install gasket (26), relief valve body (19) and plunger (22) on mixture control body assembly (14). Install relief valve diaphragm (23), plate (24) spring (25), and plate (24) in this order. Before installing cover assembly (26), turn in adjusting screw (27) sufficiently to extend beyond nut to a distance equal to the depth of the depression in top plate (24). This will insure proper alignment of these parts.

D. Install Belleville washers (29) on bolts (30) and install through stacked parts. Tighten sufficiently to hold parts alignment until four bolts are in place. Torque bolts (30) to 30^{+} 1 inch pounds.

CAUTION . . . Belleville washers (29) are special and must be installed with concave surfaces facing each other. Should it be necessary to remove these washers once they have been torqued, they must be replaced. (Refer Installation Figure 40-04.)

F. Install fittings as required. Leak test and calibrate according to instructions in the Calibration Section. Lockwire bolts (30) after calibration to complete overhaul.

FIG & INDEX	PART NUMBER	1 2 3 4 5 DESCRIPTION	QTY.	USABLE ON CODE
40-04	640643-6	① Fuel Pump Assembly	NS	A
	646765-6	① Fuel Pump Assembly	NS	B
	640643-7	① Fuel Pump Assembly	NS	C
	646765-7	① Fuel Pump Assembly	NS	D
-1	631248	② . Adapter, Fuel Pump	1	AB
-1	642237	② . Adapter, Fuel Pump	1	CD
-2	628178	③ . Seal, Oil	1	
-3	632816	② . Insulator, Fuel Pump		
-4	632741	② . Bushing	1	
-5	649198	③ . Seal, Shaft	1	AC
-5	646181	③ . Seal, Shaft	1	BD
-6	643694	. Body Assembly, Fuel Pump	1	AC
-6	646182-1	. Body Assembly, Fuel Pump	1	BD
-7	643853	. Pin, Liner Location	1	
-8	635548	③④ . Plate, Thrust	1	AC
-8	646177	③④ . Plate, Thrust	1	BD
-9	643697	. Liner, Fuel Pump	1	AC
-9	646178	. Liner, Fuel Pump	1	BD
-10	643689	. Shaft, Fuel Pump	1	AC
-10	646176	. Shaft, Fuel Pump	1	BD
-11	635549	. Blade, Fuel Pump	2	AC
-12	643690	. Plate, End	1	AC
-12	646180	. Plate, End	1	BD
-13	630979-14	. Seal, End Plate	1	
-14	637825	. Body Assembly, Mixture Control	1	
-15	628249-7	③ . Ball, By-Pass Valve	1	
-16	630167	③ . Spring, By-Pass Valve	1	
-17	629974	. Plug, By-Pass Valve	1	
-18	630853	③ . Gasket	1	
-19	631751	. Body Assembly, Relief Valve	1	
-20	630644	. Name Plate	1	
		ATTACHING PARTS		
-21	24764	. Screw, Drive	2	
		* * * *		
-22	628333	. Plunger, Relief Valve	1	
-23	642644	③ . Diaphragm, Relief Valve	1	
-24	637784	. Plate, Relief Valve	2	
-25	632251	③ . Spring, Relief Valve	1	
-26	643814	. Cover Relief Valve	1	

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
-27	631883	.	Screw, Relief Valve Adjusting	1	
-28	AN121501	.	Nut	1	
-29	646448-1	③ .	Washer, Belleville	8	
-30	628321A3.25	.	Bolt	4	

NOTE:

① This assembly NOT available as replacement part. For correct service part number, see applicable Service Parts Catalog.

② Insulator and bushing was one (1) piece construction. Old adapter without counterbore cannot be used with new insulator and bushing.

③ 100% Replacement parts.

④ May be turned over and reused if not worn from previous overhaul.

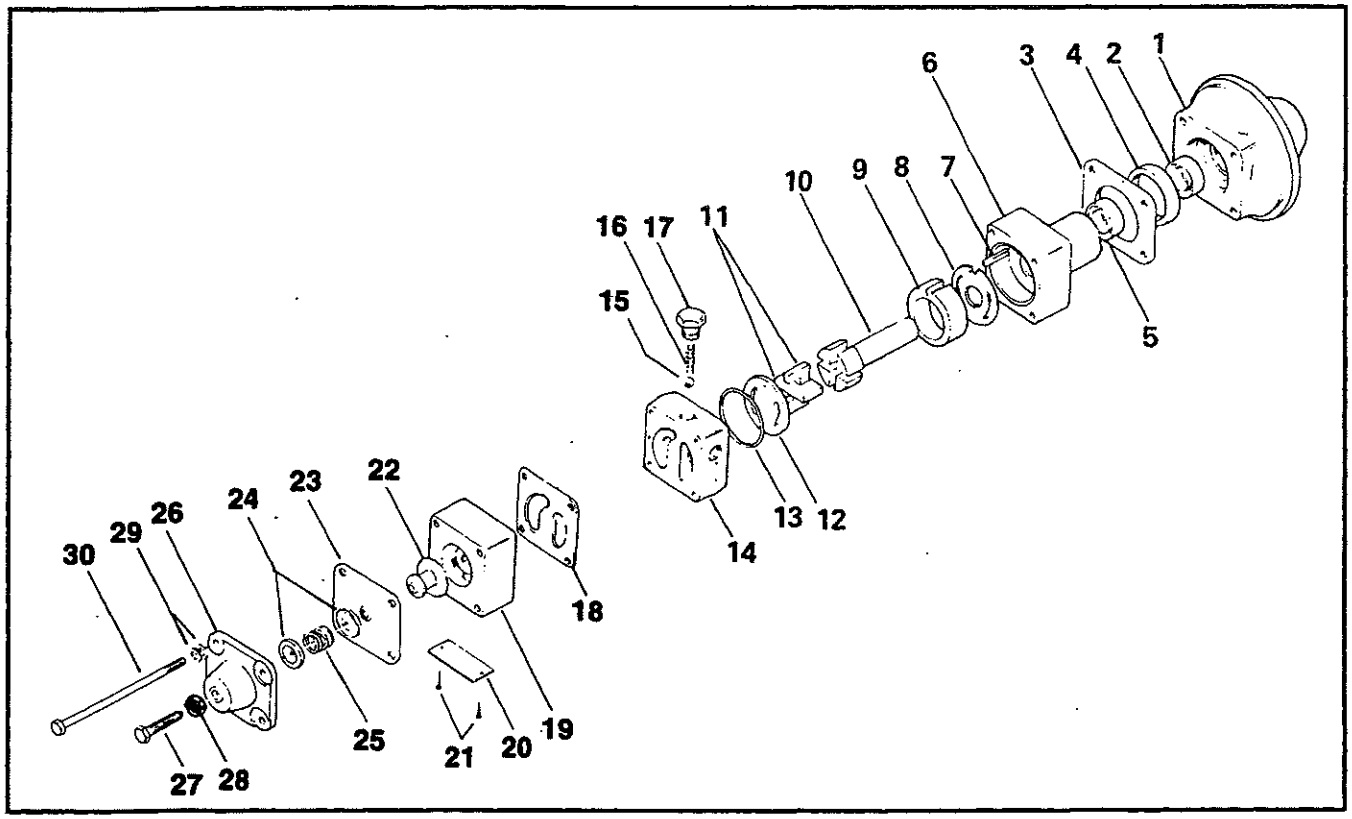


FIGURE 40–04. FUEL PUMP ASSEMBLY

73-40-05
FUEL PUMP ASSEMBLY
P/N 630751-2,3,4 & 636898-1

05-01. DISASSEMBLY.

A. Place pump in a suitable fixture and remove all lockwire; and fittings if necessary. Remove four screws (46) and washers (45) and separate cover assembly (43 and 44), ball (42), spring (41), diaphragm assembly (40), relief valve body (39) and aneroid and cover assembly (26 through 37) from separator (13).

NOTE . . . It may be necessary to tap housings with a fiber mallet to break seal caused by plastic gasket material.

B. Remove screws (34) from altitude control body (26) and separate housing (33) from body (26). Remove nut (35), plain washer (37) and seal washer (36), from aneroid adjusting screw and remove aneroid assembly (28, 30 and 31) by removing retaining ring (29) and seal (27) from altitude control body (26).

C. Remove cage (17), spring (16) and by-pass valve (15) from separator body (13). Remove screws (20 and 21) from cover (19) and separate cover and gasket (18) from separator body (13). Remove ejector (22) from cover (19). Remove gasket (25) from separator body (13).

D. Disassembly of the basic pump should be accomplished in the following manner: Hold pump assembly firmly in hand with thrust plate (11) to palm of hand. Remove retaining ring (6 & 9). Remove coupling (8). Apply pressure to drive end of shaft (7) forcing shaft, blades (10) and thrust plate (11) from pump body (1). Remove seal (5) and discard. It is important to note the liner position relative to the rotation marking found on the top surface of the liner. It must be installed with the proper marking (C or CC) in the up position.

CAUTION . . . Do not disassemble liner (4), bearing (3) or pins (2) from pump body unless inspection indicates damage or excessive wear. If these parts are to be removed, place the pump body in a dry oven at 400° F. 10 to 15 minutes to expand the aluminum body. The liner (4), bearing (3) and pins (2) may then be removed by carefully bumping body.

05-02. REASSEMBLY.

A. Assemble basic pump in reverse order of disassembly. Refer to exploded view (Figure 40-05) and proceed as follows: Install new seal (5) in pump body (1). Install retaining ring (6) at this time. Install shaft (7) in bearing (3) and through liner (4). A light coat of oil on seal lip will assist in the installation and assure lubrication of seal for first few revolutions when pump is tested. Install coupling (8) and retaining ring (9). Before installing blades (10), press rotor shaft down to seat on top of bearing and apply a light coat of oil. Install blades (10) in slots of rotor shaft (7) and rotate shaft. Install thrust plate (11). This completes assembly of basic pump.

NOTE . . . To assist in assembly of the basic pump, vapor separator, altitude control body and relief valve section, it is suggested that two bolts approximately 3-1/4 inches long be used as line-up guides. They can be made of used bolts P/N 628321A3.25 with heads removed.

B. Place vapor separator body (13) in a suitable fixture and install gasket (18) and cover (19) and using a lite coat of Loctite 242 on threads, install screws (20) and (21). Install ejector (22) at this time.

C. Lap valve (15) to valve seat in vapor separator body (13) before installation. Install valve (15), spring (16) and cage (17) being sure that all spring coils are inside cage.

D. Place basic pump assembly (1 through 11) in a suitable fixture with thrust plate (11) in upright position. All parts except blades and shaft should be dry. Place gasket (12) on basic pump assembly. Refer to exploded view and install remaining parts in this order: Vapor separator (13), gasket (25), altitude control body (26), gasket (38), relief valve body (39), diaphragm assembly (40), spring (41), and ball (42).

E. Install adjusting screw (44) in cover (43) approximately one-half of its length. This will assure proper alignment.

F. Assemble cover (43) in place. Assemble belleville washers (45) on bolts (46) and install through stacked parts. tighten sufficiently to hold parts alignment until four bolts are in place. Torque bolts (46) to 30 ± inch pounds.

CAUTION . . . Belleville washers (45) are special and must be in installed with concave surfaces facing each other. Should it be necessary to remove these washers once they have been torqued, they must be replaced.

G. Install seal (27). Apply a thin coat of Loctite 290 to the retaining ring groove and install retaining ring (29). Install aneroid and shaft assembly (28, 30 and 31) in altitude control body (26). Check for ease of shaft movement before installing gasket (32). Install seal washer (36), plain washer (37) and nut (35) on aneroid adjusting screw holding adjusting screw with a small screwdriver. Do not tighten until pump is ready for test.

H. Install any fittings that were removed. Leak test and calibrate according to instructions and calibration data in Calibration Section. Lockwire after calibration to complete overhaul.

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
40-05	630751-2	①	Fuel Pump and Vapor Separator Assembly . .	NS	A
	630751-3	①	Fuel Pump and Vapor Separator Assembly . .	NS	B
	630751-4	①	Fuel Pump and Vapor Separator Assembly . .	NS	C
	636898-1	①	Fuel Pump and Vapor Separator Assembly . .	NS	D
-1	CRB16043-1	④	. Body Assembly, Fuel Pump	1	
-2	CRA7762		. . Pin	2	
-3	CRA7754		. . Bearing	1	
-4	CRA7493		. . Liner	1	
-5	CRA6861	②	. Seal	1	
-6	MS16625-1112		. Ring, Retaining	1	
-7	CRA7791		. Shaft, Rotor	1	
-8	CRB7779-2		. Coupling, Drive	1	
-9	MS16624-1062		. Ring, Retaining	1	
-10	CRA7491		. Blade	2	
-11	CRA7438	②③	. Plate, Thrust	1	
-12	626176	②	. Gasket, Pump to Separator	1	
-13	630781		. Vapor Separator, Fuel Pump	1	
-14	628784		. Valve Assembly, By-Pass	1	
-15	628784-1	②	. . Valve	1	
-16	628784-2	②	. . Spring	1	
-17	628784-3	②	. . Cage	1	
-18	625548	②	. Gasket, Cover-to-Separator	1	
-19	625900		. Cover, Fuel Pump separator	1	
			ATTACHING PARTS		
-20	AN500A8-12		. Screw	2	
-21	AN500A8-7		. Screw	2	
			* * * *		
-22	625901		. Ejector	1	ABD
-22	633447		. Ejector	1	C
-23	640797		. Name Plate	1	
			ATTACHING PARTS		
-24	24764		. Screw, Drive	2	
			* * * *		
-25	630912	②	. Gasket, Alt. Control-to-Vapor Separator .	1	
-26	630348		. Body, Altitude Control	1	
-27	639484	②	. Seal, Variable Orifice	1	

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
-28	630722-1		. Shaft, Variable Orifice	1	
-29	521824		. Ring, Retaining	1	
-30	13XX18130		. Nut, No. 8-32	1	
-31	636897		. Aneroid	1	
-32	639482	②	. Gasket, Aneroid Housing	1	
-33	630518		. Housing, Aneroid	1	
			ATTACHING PARTS		
-34	AN500A10-6		. Screw	1	
			* * * *		
-35	628298	②	. Nut	1	
-36	538600-3		. Washer, Seal	1	
-37	20522		. Washer, Plain	1	
-38	630913	②	. Gasket, Alt. Control-to-Relief Valve . .	1	
-39	630902		. Body, Relief Valve	1	
-40	CRB15985	②	. Diaphragm Assembly	1	
-41	CRA7426	②	. Spring, Relief Valve	1	
-42	628249-7		. Ball	1	
-43	630905		. Cover Assembly, Relief Valve	1	
-44	631883		. Screw, Adjusting Special	1	
			ATTACHING PARTS		
-45	646448-1	②	. Washer, Belleville	8	
-46	628321A3.25		. Bolt, No. 10-24 x 3 1/4 Inch Long . . .	4	
			* * * *		
-47	627220		. Plug	1	
-48	2024		. Plug	2	

NOTE:

① These fuel pumps are superseded and no longer available for service. For new part numbers, see applicable Service Parts Catalog.
② 100% Replacement parts.
③ May be turned over and reused if not worn from previous overhaul.
④ Limited quantity of 25 or less available.

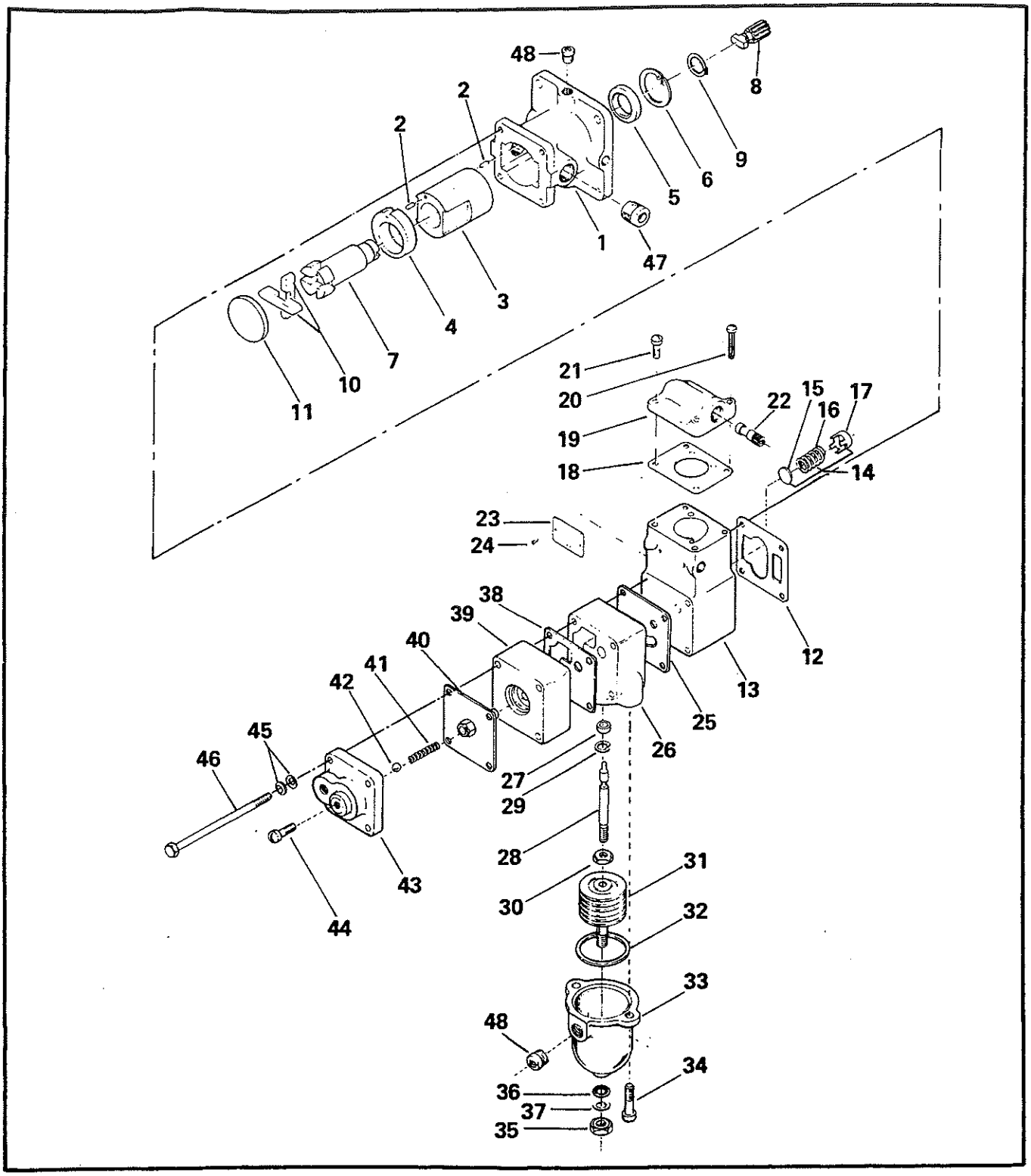


FIGURE 40–05. FUEL PUMP ASSEMBLY.

73-40-06
FUEL PUMP ASSEMBLY
P/N 642650-1,2 & 646768-1,2

06-01. DISASSEMBLY.

A. Place pump assembly in a suitable fixture and remove all lockwire. Refer to Figure 40-06. Remove screw (46) from cover (43) to release spring pressure. Remove nut (47), from aneroid adjusting screw. Remove four bolts (45) from pump assembly and vapor separator relief valve aneroid assembly (14 through 47). Remove this section from basic pump assembly (5 through 13). Separate cover (38) from body (14) and (26) while screwing down on aneroid (31). Use care when removing cover so as not to scratch aneroid (31) or compress it by screwing it too far into cover (38) prior to separation from body (26).

B. Remove screws (27), variable orifice body (26), gasket (25) and gasket (37). Pin (32) must be removed so aneroid (31) and rod (30) can be withdrawn from body. The rod seal (28) and retaining ring (29) can be removed for replacement by soaking the variable orifice body (26) in a mixture of 80% Glacial Acetic acid and water, then scrape off the softened epoxy, if epoxy was used. Remove ball (16), spring (17) and plug (15) from vapor separator body. Remove screws (20 and 21), cover (19), gasket (18) and ejector (22).

NOTE . . . Be sure to use latest variable orifice body (26) which incorporates the use of a stop pin (32) at rear of housing. This replaces retaining clip-type.

C. Disassembly of the basic pump should be accomplished in the following manner. Refer to exploded view (Figure 40-06) and remove the adapter (1) and insulator (3) from the basic pump. Remove seal (2) from adapter (1) and bushing (4) from insulator (3). Hold pump body firmly in palm of hand, end plate (12) down, and apply pressure to drive end of rotor shaft (10) forcing end plate (12), end plate seal (13), blades (11) and shaft (10) from pump body. Remove seal (6) and discard. It is important to note the liner position relative to the rotation marking found on the top surface of the liner. It must be installed with the proper marking (C or CC) in the up position.

CAUTION . . . Do not disassemble liner (9), plate (8) or pin (7) from pump body unless inspection indicates damage or excessive wear. If these parts are to be removed, place the pump body in a dry oven at 400° F. for 10 to 15 minutes to expand the aluminum body. The liner (9), plate (8) and pin (7) may then be removed by carefully bumping body.

06-02. REASSEMBLY.

A. Reassemble basic pump (5 through 13) in reverse order of disassembly. Refer to Figure 40-06, and install new seal (6) in body (5). Install pin (7), plate (8) and liner (9) in body (5). Be sure liner is installed with proper rotation lettering visible. Use light machine oil to lubricate shaft (10) and install in pump. Install blades (11) in position and lubricate lightly. Install plate (12) and seal (13) to complete basic pump assembly. Install new seal (2) in adapter (1). Install bushing (4) and insulator (3) on pump assembly and insert pump assembly (3 through 13) into adapter assembly (1).

B. Refer to exploded drawing Figure 40-06, and assemble vapor separator, relief valve and aneroid sections as follows:

C. Install seal (28) in body (26) and put a thin layer of Loctite 290 in the retaining ring groove and install retaining ring (29). Insert aneroid and rod assembly into body (26) and install pin (32).

D. Install to body (14), gasket (18) and cover (19). Install ejector (22) in cover (19). Apply a thin coat of Loctite 242 to screws (20) and (21) and secure.

NOTE . . . Shroud, where used, must now be positioned.

E. Install ball (16) and peen lightly to seat. Apply a thin coat of Loctite 569 to threads of plug (15) and install spring (17) and plug (15). Install gasket (25) and body (26). Apply a thin coat of Loctite 242 to screws (27) and secure body.

NOTE . . . To assist in the assembly of the relief valve section including the aneroid cover, it is suggested that two bolts approximately 3-1/2 inches long be used as line-up guides. They can be made of used pump bolts P/N 628321A3.72 with heads removed.

F. If name plate has been removed, install plate (23) using drive screws (24).

G. Assemble plunger (33) to body (14). Install diaphragm (34), plate (35), spring (36) and plate (35). Install adjusting screw (46) in cover aneroid assembly sufficiently deep to properly contact center of plate (35). Install gasket (37) on body (26). With all parts in alignment, insert aneroid rod end into seal (28). Apply a thin coat of Loctite 242 to screws (39) and assemble cover (38) to body (14). Hold cover in place and back aneroid adjusting screw up into the cover and install sealing washer (41), washer (42) and lock nut (40). Exert pressure on cover assembly and install two bolts (45) through aligned parts and tighten enough to hold parts in alignment. Remove adjusting screw (46) and observe position of top plate (35). If not properly aligned to accept lead portion of adjusting screw, realign with scribe and reinstall adjusting screw to approximately one half of its length.

H. Remove assembly pins and install bolts (45) with belleville washers (44) torque to 30 ± 1 inch lbs.

CAUTION . . . Belleville washers (44) are special and must be installed with concave surfaces and must be installed with concave surfaces facing each other. Should it be necessary to remove these washers once they have been torqued, they must be replaced.

I. Install supercharger pressure fitting in aneroid relief valve cover (38) at this time. Install to proper position. Pump is now ready for calibration and test procedure. Do not lockwire until pump has met calibration and test specifications outlined in Calibration Table.

USABLE ON CODE

MODEL	CODE
642650-1	A
646768-1	B
642650-2	C
646768-2	D

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
40-06	642650	①	Fuel Pump and Pressure Compensator Assembly	1	
	646768	①	Fuel Pump and Pressure Compensator Assembly	1	
-1	631676		. Adapter, Fuel Pump	1	AB
-1	641986		. Adapter, Fuel Pump	1	CD
-2	628178	②	. Seal, Adapter, Fuel Pump	1	
-3	632816		. Insulator, Fuel Pump	1	
-4	632741		. Bushing, Fuel Pump	1	
-5	643696		. Body Assembly, Fuel Pump	1	AC
-5	646182-2		. Body Assembly, Fuel Pump	1	BD
-6	649198	②	. Seal, Shaft	1	AC
-6	646181	②	. Seal, Shaft	1	BD
-7	643853		. Pin, Liner Locator	1	
-8	638179	②③	. Plate, Thrust	1	AC
-8	646177	②③	. Plate, Thrust	1	BD
-9	638217-1		. Liner, Fuel Pump	1	AC
-9	646186		. Liner, Fuel Pump	1	BD
-10	643689		. Shaft, Pump	1	AC
-10	646176		. Shaft, Pump	1	BD
-11	635549		. Blade, Fuel Pump	2	
-12	643690		. Plate, End	1	AC
-12	646180		. Plate, End	1	BD
-13	630979-14	②	. Seal, End Plate	1	
-14	642372		. Vapor Separator and Relief Valve	1	
-15	629974		. Plug, Fuel Pump By-Pass	1	
-16	628249-7	②	. Ball, Fuel Pump By-Pass	1	
-17	630167	②	. Spring, Ball Return	1	
-18	625548	②	. Gasket, Separator Cover	1	
-19	625900		. Vapor Separator Cover	1	
			ATTACHING PARTS		
-20	AN500-8-12		. Screw	2	
-21	AN500-8-7		. Screw	2	
			* * * *		
-22	633447		. Ejector, Fuel Pump Vapor	1	
-23	640797		. Name Plate	1	
			ATTACHING PARTS		
-24	24764		. Screw Drive	2	
			* * * *		
-25	642643	②	. Gasket, Variable Body	1	
-26	642642		. Body, Variable Orifice	1	
			ATTACHING PARTS		
-27	AN500-8-10		. Screw	4	
			* * * *		
-28	639484		. Seal, Rod	1	
-29	521824		. Ring, Retaining	1	
-30	634438-5		. Rod, Variable Orifice	1	
-31	642810		. Aneroid, Altitude Control	1	
-32	634441-1		. Pin, Variable Orifice	1	
-33	628333-1		. Plunger, Relief Valve	1	
-34	642644	②	. Diaphragm, Relief Valve	1	
-35	637784		. Plate, Diaphragm	2	
-36	628311	②	. Spring, Diaphragm	1	
-37	639482		. Gasket	1	

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
-38	630518		. Housing, Aneroid	1	
			ATTACHING PARTS		
-39	AN500-A10-6		. Screw	2	
			* * * *		
-40	628298		. Nut, Aneroid Locking	1	
-41	538600-3		. Washer, Seal	1	
-42	20522		. Washer, Plain	1	
-43	643950		. Cover, Assembly, Relief Valve	1	
-44	646448-1	②	. Washer, Belleville	8	
-45	628321A3.72		. Bolt	4	
-46	631883		. Screw, Altitude Control	1	
-47	AN121501		. Nut	1	

NOTES:

① This assembly NOT available as replacement part. For correct Serv. part number, see appropriate Service Parts Cat.

② 100% Replacement parts.

③ May be turned over and reused if not worn from previous overhaul.

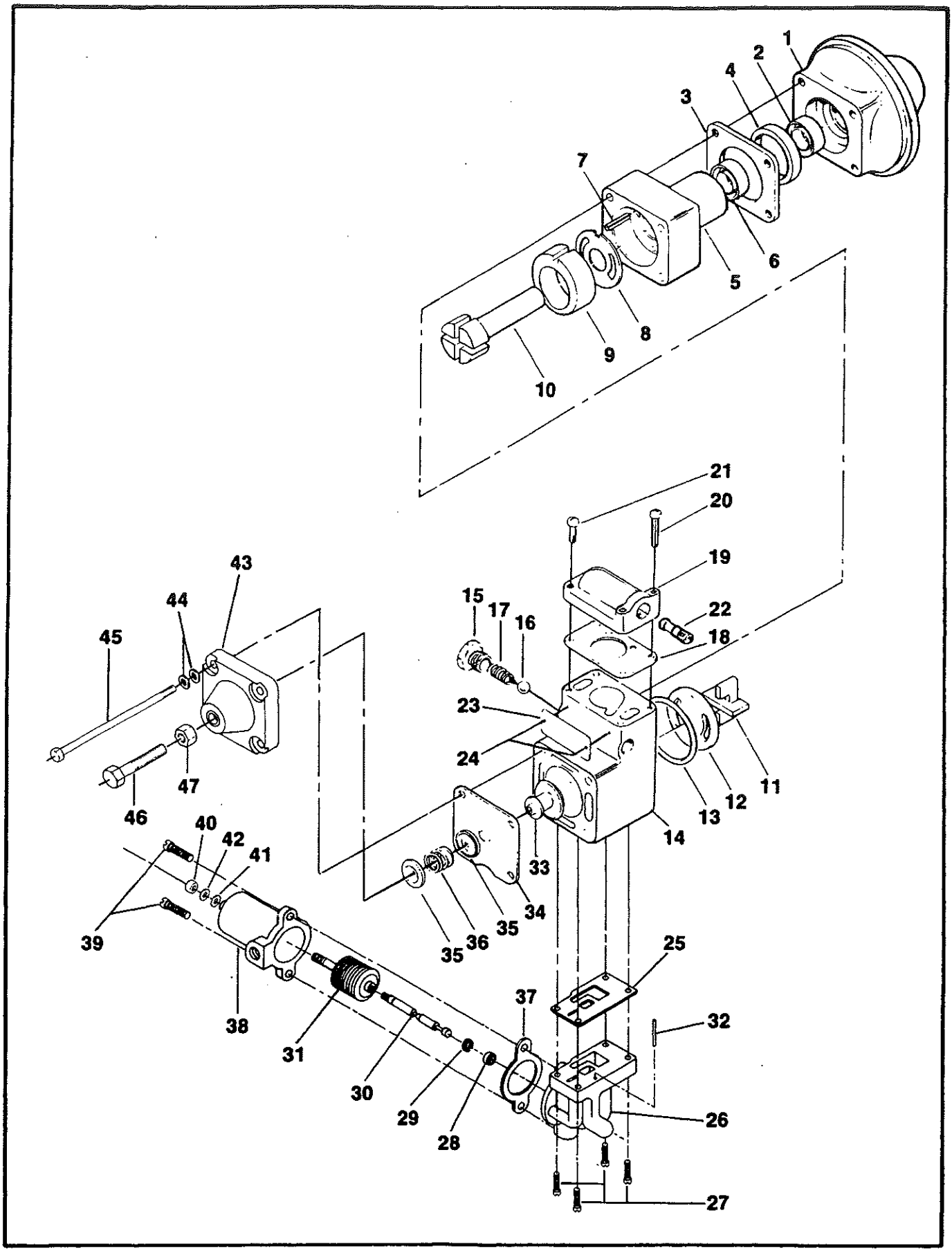


FIGURE 40-06. FUEL PUMP ASSEMBLY.

73-40-07
FUEL PUMP ASSEMBLY P/N 634627

07-01. DISASSEMBLY.

A. Place pump in a suitable fixture and remove all lockwire; and fittings if necessary. Remove four screws (1) and Belleville washers (2) and separate cover assembly (4) and (3), ball (5), spring (6), diaphragm assembly (7), relief valve body (8) and aneroid and cover assembly (10 through 20) from vapor separator (24). Remove screws (19) and separate aneroid parts (11 through 20). Remove cage (26), spring (27) and by-pass valve (28).

B. Remove four screws (22) and washers (23). Separate vapor separator (24) from impeller housing (36).

NOTE . . . It may be necessary to tap these housings with a fiber mallet to break seal caused by plastic gasket material.

C. Hold impeller (35) against rotation and remove nut (32). Retrieve ball (33).

D. Extract retaining ring (38) and lift out drive coupling (39).

E. Remove rotor shaft (41) and blades (40) by applying finger pressure against the drive end of rotor shaft through coupling exit in housing.

F. Knock out liner (42), key (43), bearing (44) and spring tension washers (45) into palm of hand.

G. Extract retaining ring (46) and press out seal (47) by applying pressure through the anti-drive end of pump housing. This completes disassembly.

07-02. REASSEMBLY.

A. Install new seal (47) in housing (48) with open end toward anti-drive end, and secure with snap ring (46). Install spring tension washers (45) with concave faces toward each other. Install bearing (44), liner (42) and key (43). Fit blades (40) into rotor slots and install rotor. Engage tongue of coupling (39) in rotor and secure with snap ring (38).

B. With rotor bottomed toward the drive end, select the fewest number of shims (34) to obtain a running clearance of 0.0005 inch between impeller (35) and housing (36) and pump body (48) with Locktite "Locquic Primer N" or equivalent. Spread a very thin even coating of "Plastic Gasket", manufactured by Locktite Corporation, Newington, Connecticut, on the flange of the pump body and the face of the bearing shoulder (37). Gasket material must not enter internal areas of pump. Cure time is 12 to 24 hours at 72° F. or 5 minutes at 200° to 300° F. after assembly. Apply 2 to 3 drops of locking compound per MIL-S-22473 to threads of screws (31) and secure assembly by tightening to 20 to 25 inch pounds torque. Install ball (33) and impeller (35) on rotor shaft. Apply 2 to 3 drops of "Locktite" Grade AV to threads of rotor shaft extension and secure impeller with nut (32), tightening to 10 to 15 inch pounds torque.

C. Carefully coat both mating surfaces of pump assembly housing and vapor separator (24) as before. Secure with screws (22) and washers (23).

D. Install by-pass valve (28), spring (27) and cage (26). Place new gasket (21) on separator housing (24) and lay aneroid housing (10) in place. Install new gasket (9) on aneroid housing (10) and place relief valve body (8) in position. Install diaphragm (7), spring (6), ball (5) and cover (4). Secure with screws (1) and belleville washers (2).

CAUTION . . . Belleville washers (2) are special and must be installed with concave surfaces facing each other. Should it be necessary to remove these washers once they have been torqued, they must be replaced.

NOTE . . . To assist in the assembly of the relief valve section including the aneroid housing, it is suggested that two screws approximately 2 inches long be used as line-up guides. They can be made of used screws P/N RS26182-78 with heads removed.

E. Install aneroid (15) in housing (18) and install nut (17). Attach assembly to altitude control body (10) with screws (19).

F. Install any fittings that were removed. Leak test and calibrate according to instructions and calibration data in Calibration Section. Lockwire after calibration to complete overhaul.

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
40-07	634627-1	①	Fuel Pump Assembly, Complete	NS	
-1	CRS26182-78	③	Screw, Machine Fillister Head	4	
-2	646448-1	②	Washer, Belleville	8	
-3	CNAS1096-3-12	③	Screw, Adjusting	1	
-4	CRB24586	④	Cover Assembly, Relief Valve	1	
-5	628249-7	②	Ball, relief Valve	1	
-6	CRA7426	②	Spring, Relief Valve	1	
-7	CRB15985	②	Diaphragm, Relief Valve	1	
-8	CRG24594-1	③	Body, Relief Valve	1	
-9	CRB24593	②	Gasket	1	
-10	630348	④	Body, Altitude Control	1	
-11	521824		Ring, Retaining	1	
-12	639484		Seal	1	
-13	630722-1	④	Shaft, Variable Orifice	1	
-14	13XX18130		Nut	1	
-15	636897		Aneroid, Altitude Control	1	
-16	639482	②	Gasket	1	
-17	628298		Nut	1	
-18	630518		Housing, Aneroid	1	
			ATTACHING PARTS		
-19	24456		Screw	2	
			* * * *		
-20	2024	②	Plug	1	
-21	CRB24592-1	②③	Gasket	1	
-22	MS35265-69		Screw	4	
-23	AN960-10L		Washer	4	
-24	CRG24589-1	③	Separator	1	
-25	628784		Valve Assembly By-Pass	1	
-26	628784-3		. Cage	1	
-27	628784-2	②	. Spring	1	
-28	628784-1	②	. Valve-By-Pass	1	
-29	634696		Name Plate	1	
			ATTACHING PARTS		
-30	MS21318-1	②	Screw, Driver	2	
-31	MS35265-62		Screw	4	
-32	MS35691-1	③	Nut	1	
-33	MS9461-03	③	Ball	1	
-34	CRB24597**	④	Shim	AR	
-35	CRB24596	④	Impeller	1	
-36	CRG24591	③	Housing	1	
-37	CRB24595		Bearing	1	
-38	MS16624-1062		Ring, Retaining, External	1	
-39	CRB7779-2		Coupling, Drive	1	
-40	CRS16859-28		. Blade	4	
-41	CRG24587-1	③	Shaft, Rotor	1	
-42	CRS16803-28	④	Liner	1	
-43	CRA16934-5	③	Key	1	
-44	CRS26116-7	③	Bearing	1	
-45	CRS26038-2	③	Washer, Spring Tension	2	

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
-46	MS16625-1112	②	Ring, Retaining	1	
-47	CRB24016	②	Seal	1	
-48	CRB24701	③	Body	1	
-49	MS49005-1	③	Plug, Pipe	3	

NOTE:

① This assembly NOT available as replacement part. For correct service part number, see appropriate Service Parts Catalog.
② 100% Replacement parts.
③ No Longer Available.
④ Limited Availability.

** CRB24597-1 = 0.008 to 0.0002 inch thick
CRB24597-2 = 0.0014 to 0.0006 inch thick
CRB24597-3 = 0.0038 to 0.0022 inch thick
CRB24597-4 = 0.006 to 0.004 inch thick
CRB24597-5 = 0.0113 to 0.0087 inch thick
CRB24597-6 = 0.0215 to 0.0185 inch thick

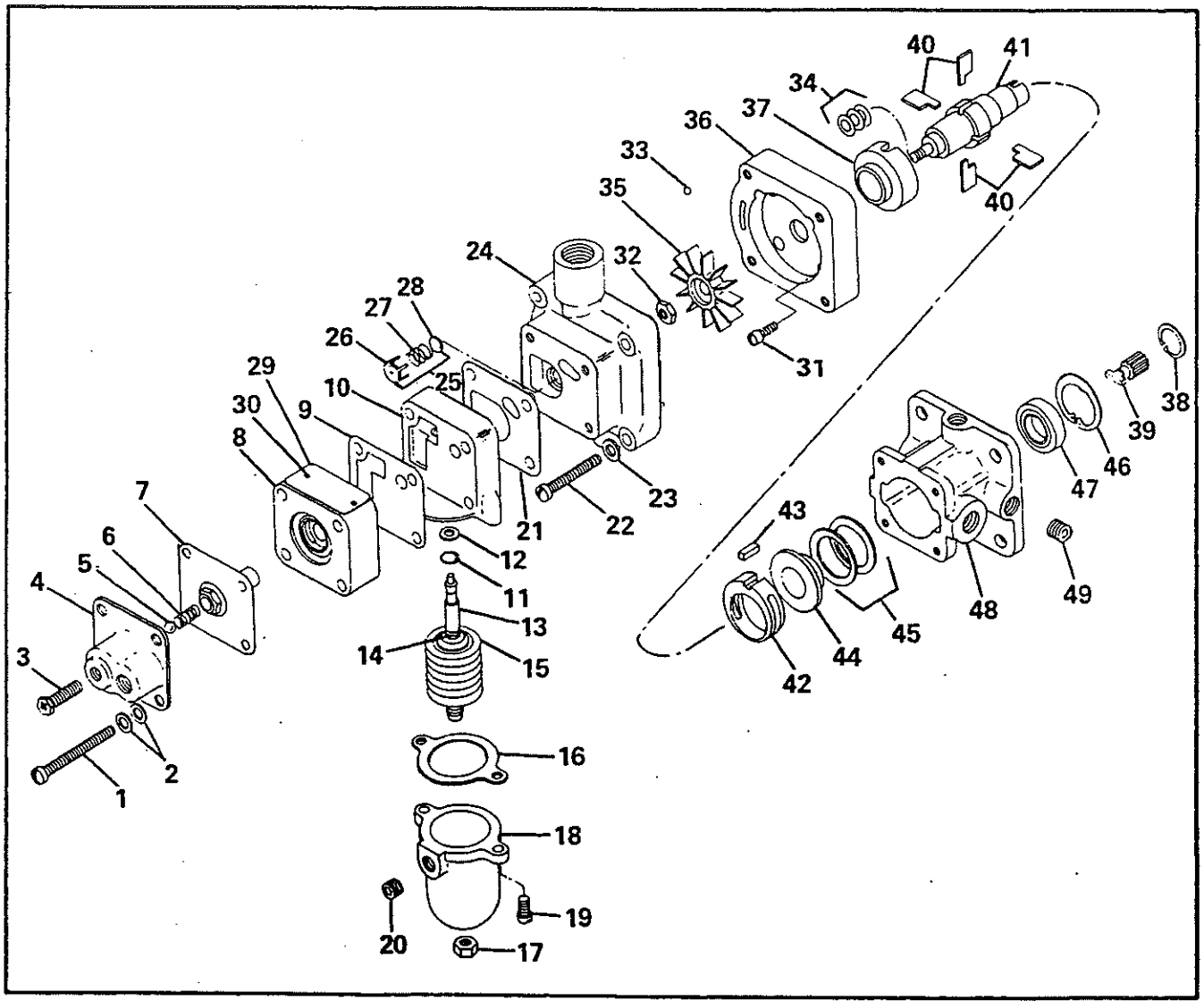


FIGURE 40–07. FUEL PUMP ASSEMBLY.

73-40-08
FUEL PUMP ASSEMBLY
P/N 642380-1 & 646211-1

08-01. DISASSEMBLY.

A. Place pump assembly in a suitable fixture and remove all lockwire. Refer to Figure 40-08. Remove screw (40) from cover (39) to release spring pressure. Remove nut (43), plain washer (45) and seal washer (48), from aneroid adjusting screw. Remove four bolts (42) from pump assembly and vapor separator relief valve aneroid assembly and vapor separator relief valve aneroid assembly (14 through 45). Remove this section from basic pump assembly (5 through 13). Separate cover (39) from body (14) and (26) while screwing down on aneroid (32). Use care when removing cover so as not to stretch aneroid (32) or compress it by screwing it too far into cover (39) prior to separation from body (26).

B. Remove screw (27 and 28), variable orifice body (26), gasket (25) and "O" ring (38). Pin (33) must be removed so aneroid (32) and rod (31) can be withdrawn from body. The rod seal (29) and retaining ring (30) can be removed for replacement by soaking variable orifice body (26) in a mixture of 80% Glacial Acetic acid and water, then scrape off the softened epoxy. Remove ball (16), spring (17) and plug (15) from vapor separator body. Remove screws (20 & 21), cover (19), gasket (18) and ejector (22).

NOTE . . . Be sure to use latest variable orifice body (26) which incorporates the use of a stop in (33) at rear of housing. This replaces retaining clip-type.

C. Disassembly of the basic pump should be accomplished in the following manner. Refer to exploded view in Figure 40-08 and remove the adapter 91) and insulator (3) from the basic pump. Remove seal (2) from adapter (1) and bushing (4) from insulator (3). Hold pump body firmly in palm of hand, end plate (12) down, and apply pressure to drive end of rotor shaft (10) forcing end plate (12), end plate seal (13), blades (11) and shaft (10) (12), end plate seal (13), blades (11) and shaft (10) from pump body. Remove seal (6) and discard. It is important to mote the liner position relative to the rotation marking found on the top surface of the liner. It must be installed with the proper marking (C or CC) in the up position.

CAUTION . . . Do not disassemble liner (9), plate (8) or pin (7) from pump body unless inspection indicates damage or excessive wear. If these parts are to be removed, place the pump body in a dry oven at 400° F. for 10 to 15 minutes to expand the aluminum body. The liner (9), plate (8) and pin (7) may then be removed by carefully bumping body.

08-02. REASSEMBLY.

A. Reassemble basic pump (5 through 13) in reverse order of disassembly. Refer to Figure 40-08, and install seal (6) in body (5). Install pin (7), plate (8) and liner (9) in body (5). Be sure liner is installed with proper rotation lettering visible. Use light machine oil to lubricate shaft (10) and install in pump. Install blades (11) in position and lubricate lightly. Install plate (12) and seal (13) to complete basic pump assembly. Install seal (2) in adapter (1). Install bushing (4) and insulator (3) on pump assembly and insert pump assembly (3 through 13) into adapter assembly (1).

B. Refer to exploded drawing Figure 40-08, and assemble vapor separator, relief valve and aneroid sections as follows:

C. Install seal (29) in body (26) and apply a thin layer of Loctite 290 in the retaining ring groove and install retaining ring (30). Insert aneroid and rod assembly (31 & 32) into body (26) and install pin (33).

D. Install to body (14), gasket (18) and cover (19), secure with screws (20) and (21) using Loctite 242 on threads. Install ejector (22) in cover (19).

NOTE . . . Shroud, where used, must now be positioned.

E. Install plug (15), ball (16) spring (17). Install gasket (25) and body (26). Secure with screws (27 and 28) using Loctite 242 on threads.

NOTE . . . To assist in the assembly of the relief valve section including the aneroid cover, it is

suggested that two bolts approximately 3-1/2 inches long be used as line-up guides. They can be made of used pump bolts P/N 628321A3.72 with heads removed.

F. If name plate has been removed, install plate (23) using drive screws (24).

G. Assemble plunger (34) to body (14). Install diaphragm (35), plate (36), spring (37) and plate (36). Install adjusting screw (40) in cover assembly (39) sufficiently deep to properly contact center of plate (36). Install "O" ring (38) in land on body (26). Use a very small amount of Parker O Lube on this "O" ring to prevent rolling. Assembly cover (39) to body (14). Hold cover in place and back aneroid adjusting screw up into the cover and install seal washer (44), plain washer (45) and lock nut (43). Exert pressure on cover assembly and install two bolts (42) through aligned parts and tighten enough to hold parts in alignment. Remove adjusting screw (40) and observe position of top plate (36). If not properly aligned to accept lead portion of adjusting screw, realign with scribe and reinstall adjusting screw to approximately one half of its length.

H. Remove assembly pins and install bolts (42) with belleville washers (41) torque to 30 $^{+}$ 1 inch lbs.

CAUTION . . . Belleville washers (41) are special and must be installed with concave surfaces facing each other. Should it be necessary to remove these washers once they have been torqued, they must be replaced.

I. Install supercharger pressure fitting in aneroid relief valve cover (39) at this time. Install to proper position. Pump is now ready for calibration and test procedure. Do not lockwire until pump has met calibration and test specifications outlined in Calibration Section.

USABLE ON CODE

MODEL	CODE
642380-1	A
646211-1	B

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
40-08	642380-1	①	Fuel Pump and Pressure Compensator Assembly	1	A
	646211-1	①	Fuel Pump and Pressure Compensator Assembly	1	B
-1	641986		. Adapter, Fuel Pump	1	
-2	628178	④	. Seal	1	
-3	632816		. Insulator	1	
-4	632741		. Bushing	1	
-5	643696		. Body Assembly.	1	A
-5	642182-2		. Body Assembly.	1	B
-6	649198	②	. Seal, Shaft	1	A
-6	646181	②	. Seal, Shaft	1	B
-7	643853		. Pin Liner Locator	1	
-8	635548	②③	. Plate, Thrust	1	A
-8	646177		. Plate, Thrust	1	B
-9	638217-1		. Liner	1	A
-9	646186		. Liner	1	B
-10	643689		. Shaft	1	A
-10	646176		. Shaft	1	B
-11	635549		. Blade	1	
-12	643690		. Plate, Fuel Pump End	1	A
-12	646180		. Plate, Fuel Pump End	1	B
-13	630979-14	②	. "O" Ring	1	
-14	642372		. Vapor Separator and Relief Valve	1	
-15	629974		. Plug, Fuel By Pass	1	
-16	628249-7	②	. Ball, Fuel Pump By Pass	1	
-17	630167	②	. Spring, Ball Return	1	
-18	625548	②	. Gasket, Separator	1	
-19	625900		. Cover, Vapor Separator	1	
			ATTACHING PARTS		
-20	AN500-8-12		. Screw	2	
-21	AN500-8-7		. Screw	2	
			* * * *		
			ATTACHING PARTS		
-22	633447		. Ejector	1	
-23	640797		. Name Plate	1	
			ATTACHING PARTS		
-24	24764		. Screw, Drive	2	
			* * * *		
-25	638223	②	. Gasket, Variable Body	1	
-26	634439		. Body, Variable Orifice	1	
			ATTACHING PARTS		
-27	AN500-8-20		. Screw	2	
-28	AN500-8-14		. Screw	2	
			* * * *		
-29	639484		. Seal, Rod	1	
-30	521824		. Ring, Retaining	1	
-31	634438-2		. Rod, Variable Orifice	1	
-32	642810		. Aneroid Altitude Control	1	
-33	634441		. Pin, Variable Orifice	1	
-34	628333		. Plunger, Relief Valve	1	
-35	642644	⑨	. Diaphragm, Relief Valve	1	
-36	637784		. Plate, Diaphragm	2	

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
-37	628311	②	. Spring, Diaphragm	1	
-38	630979-12		. "O" Ring, Variable Orifice	1	
-39	642656		. Cover Assembly, Relief Valve	1	
-40	631883		. Screw, Altitude Control	1	
-41	646448-1	②	. Washer, Belleville	8	
-42	628321-A3.72		. Bolt	4	
-43	628298		. Nut, Aneroid Locking	1	
-44	538600-3		. Washer, Seal	1	
-45	20522		. Washer, Plain	1	

NOTES:

① This assembly NOT available as replacement part. For correct service part no., see appropriate Service Parts Catalog.
② 100% Replacement parts.
③ May be turned over and reused if not worn from previous overhaul.

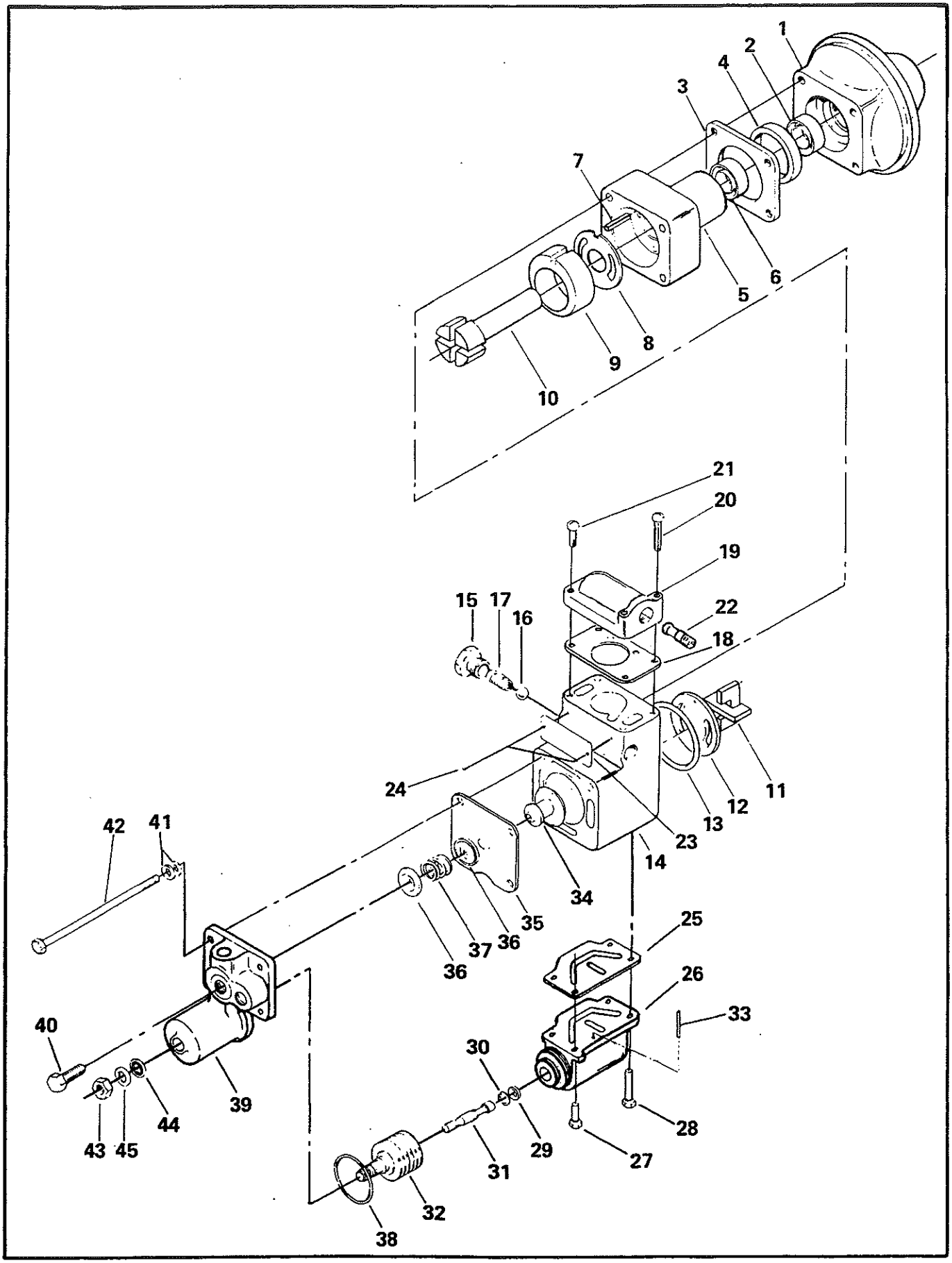


FIGURE 40–08. FUEL PUMP ASSEMBLY.

73-40-09
FUEL PUMP ASSEMBLY
P/N 639087

09-01. DISASSEMBLY.

A. Remove four nuts (1) and eight belleville washers (2) and pull off adapter (3). Remove oil seal (4) from adapter. Remove insulator (5) and bushing (6).

B. Carefully pull basic pump assembly (7 thru 23) from studs (60). Catch spring (25) and ball (24) as the face plate assembly (18) pulls away. Remove gasket (26).

C. Separate body assembly (7) and face plate assembly (18). Remove "O" ring (10,11,12) and seal (8). Remove separator plate (13). If end plate (17) shows wear signs sufficient to warrant replacement, it may be necessary to heat body assembly in a dry oven to expand the aluminum before liner (16) can be bumped out.

D. Remove rotor shaft (20) and blades (21) from face plate (18). Remove liner (22) and end plate (23) as required. Remove roll pin (29) if damaged.

E. Remove bolts (27, 28) and pull adapter assembly (29) from pressure regulator housing (59). Remove screws (33) and separate aneroid housing (35) from adapter. Pull valve (34) from adapter and remove nut (36). Drive pin (30) from adapter and remove adjusting needle (31) and "O" ring (32). Remove nut (36), seal washer (37), washer (46) and unscrew aneroid (39) from housing (35). Remove spacer (38). Remove gasket (40).

F. Pull fuel transfer adapter (42) from housing (59). Remove "O" rings (43).

G. Loosen relief valve screw (52). Remove screws (53) and lift off cover (54). Remove plates (55), spring (56) and diaphragm (57). Pull plunger (58) from housing.

H. Remove screws (33) and pull cap (44) together with aneroid (49) and valve (50) from housing. Remove stud (51) as required. Separate aneroid from cap by removing lock nut (45), flat washer (46) and seal washer (47). Remove gasket (40).

09-02. REASSEMBLY.

A. Install new oil seal (4) in adapter (3).

B. If removed, install new roll pin (9) in body (7). Insert end plate (17) and liner (16) in place. Install new seal (8). Insert rotor shaft (14), install blades (15) in rotor and place separator plate (13) in position. Install bushing (6) and insulator (5) and slide body into adapter (3). Use new "O" rings (10,11,12).

C. Install new roll pin (19) if required, and insert end plate (23) and liner (22). Slide rotor shaft (20) in place and install blades (21).

D. Turn rotor shaft (14) so groove is approximately aligned with driving tang on rotor shaft (20) and join body and face plate assembly. Be careful not to lose "O" rings.

E. If studs (60) must be replaced, install to an extended height of 2.88 inches using Loctite 242 on threads.

F. If removed, install stud (51) in valve (50) using Loctite 242. Install aneroid (49) on stud and spacer (48) on aneroid. Screw aneroid and valve assembly into cap (44). Install gasket (40) and secure cap and aneroid to housing (57) with screws (33). Install seal washer (47), plain washer (46), and nut (45).

G. Insert plunger (58) in housing (59). Install diaphragm (57) so that relief valve orifice is open. Install plates (55), spring (56) and cap assembly (54). Install relief valve screw (52) if removed.

H. Insert ball (24) and spring (25) in face plate assembly (18). Install gasket (26) on studs (60). Slide pressure regulator housing assembly through basic pump assembly.

I. Install basic pump and regulator assembly on adapter (3). Secure with belleville washers (2) and nuts (1). Make certain concave faces of belleville washers are facing each other. Tighten nut to 30 $\pm$ 1 inch pounds torque.

CAUTION . . . Should it be necessary to remove these washer once they have been torqued, they must be replaced.

J. Install "O" rings (43) on adapter (42) and insert in housing (59).

K. Install spacer (38) on aneroid (39) and screw assembly into aneroid housing (35). Secure with seal washer (37) and nut (36). Screw valve (34) into aneroid (39) using a small amount of Loctite 242 on threads. Install valve in adapter assembly (29). Install gasket (40) on adapter and install aneroid housing assembly on adapter. Secure with screws (33).

L. Install "O" ring (32) on adjustable needle (31) and screw into adaptor. Secure with roll pin (30).

M. Install gasket (41) on housing (59). Install adapter and aneroid on housing and secure with attaching screws (27, 28).

N. Install any fittings that were removed. Leak test and calibrate according to instructions and calibration data in the Calibration Section. Lockwire after calibration to complete overhaul.

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
40-09	639087	①	Fuel Pump Assembly	NS	
-1	AN121501		. Nut	4	
-2	646448-1		. Washer, Belleville	8	
-3	637473		. Adapter	1	
-4	628178		. Seal	1	
-5	635471		. Insulator	1	
-6	632741		. Bushing	1	
-7	638177-1		. Body Assembly	1	
-8	636292		. Seal	1	
-9	AN150259		. Roll Pin	1	
-10	MS29513-011	②	. "O" Ring	2	
-11	630979-14	②	. "O" Ring	1	
-12	MS29513-013	②	. "O" Ring	1	
-13	638187		. Plate, Separator	1	
-14	638180		. Shaft, Rotor	1	
-15	635549		. Blade	2	
-16	638217		. Liner	1	
-17	638179		. End Plate	1	
-18	638184-1		. Face Plate Assembly	1	
-19	AN150259		. . Roll Pin	1	
-20	638181-1		. Rotor Shaft	1	
-21	635426		. Blade	2	
-22	638183		. Liner	1	
-23	639075		. End Plate	1	
-24	MS134355		. Ball	1	
-25	630167		. Spring	1	
-26	639082	②	. Gasket	1	
-27	MS20074-03-17		. Screw	1	

FIG & INDEX	PART NUMBER		1 2 3 4 5 DESCRIPTION	QTY.	USABLE ON CODE
-28	MS20074-03-20		. Screw	1	
-29	638218		. Adapter Assembly	1	
-30	625495-11		. . Roll Pin	1	
-31	639299		. . Needle, Adjustable	1	
-32	MS29513-005	②	. . "O" Ring	1	
-33	AN500A10-8		. Screw	4	
-34	637839-2		. Valve	1	
-35	630518		. Housing, Aneroid	1	
-36	628298		. Nut	1	
-37	538600-3		. Washer, Seal	1	
-38	637331-1		. Spacer	1	
-39	642810		. Aneroid	1	
-40	639482	②	. Gasket	2	
-41	637855	②	. Gasket	1	
-42	637854		. Adapter	1	
-43	MS29513-012	②	. "O" Ring	2	
-44	636312		. Cap	1	
-45	628298		. Nut	1	
-46	20522		. Washer, Plain	1	
-47	538600-3		. Washer, Seal	1	
-48	637331		. Spacer	1	
-49	642810		. Aneroid	1	
-50	636291		. Valve	1	
-51	636317		. Stud	1	
-52	631883		. Screw	1	
-53	AN500A-8-7		. Screw	4	
-54	636848		. Cover Assembly	1	
-55	637784		. Plate	2	
-56	628311		. Spring	1	
-57	635671	②	. Diaphragm	1	
-58	635489		. Plunger	1	
-59	639080		. Pressure Regulator Housing Assembly	1	
-60	636298-4		. . Stud	1	
-61	2026		. Plug	1	

NOTES:

① This assembly not available as a spare part. See appropriate parts catalog for correct number.

② 100% Replacement parts.

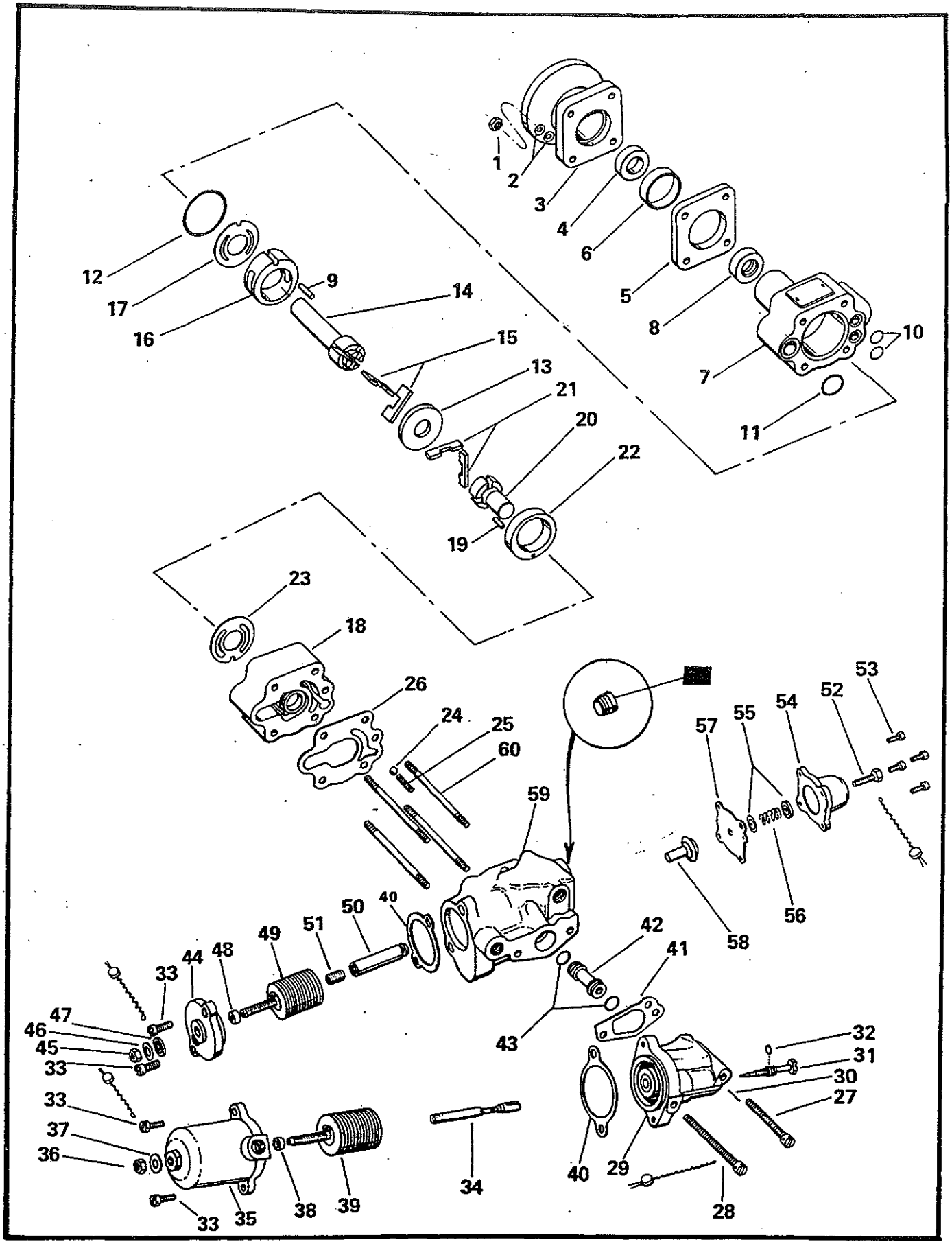


FIGURE 40–09. FUEL PUMP ASSEMBLY.

73–40–10
FUEL CONTROL VALVES
P/N 625219, 629703, 629904, 630255, 632916, 633573, 646740 & 639717

10–1. DISASSEMBLY.

NOTE . . . Figure 40-10 does not represent any one model, but refers to all basic types.

A. Remove all safety wire and fittings. Unscrew screen assembly (3) from body (1) and lift off gasket (4). Remove lock screw (23) and washer (22) from outside of name plate (21).

B. Remove the two special screws (24) from name plate (21) and body (1).

CAUTION . . . These screws retain not only the name plate (21), but the entire internal assemblies. Exercise care to keep the internal assemblies from falling out and becoming damaged.

C. Remove name plate (21) and washer (22) from between name plate and body (1). Slide out mixture control shaft (10) and related parts from valve body (1).

D. Note the position of the pin (20) with respect to the mixture control assembly, so it can be re-assembled in the proper position.

E. Hold collar (19) in a suitable vee block and drive out pin (20) from the small end with a 3/32" straight punch. Slide collar (19) from shaft (10). Remove bushing (15), washer (14 & 13) spring (12) and "O" ring (11) from shaft (10). Slide out fuel metering shaft (9) and related parts from valve body (1).

F. Note the position of the lever (16) with respect to the metering shaft (9) so it can be reassembled in the proper position. Hold lever (16) in a suitable vee block and drive out pin (18) with a 3/32" straight punch. Slide lever (16) from shaft (9).

NOTE . . . Some models may have a busing (17) in the lever. Bushing may be replaced if necessary.

G. Remove bushing (15), washer (14 and 13), spring (12) and "O" ring (11) from shaft (9). Push out metering plug (5A) with a 1/2" fiber rod.

CAUTION . . . DO NOT use a metallic pusher, as damage to the metering plug could result.

H. Remove "O" rings (8) from metering plug (5). Using tweezers through the check valve hole, slide out pin (7) from metering plug (5). Remove ball check valve (6).

NOTE . . . Further disassembly is not required for a normal overhaul, but if necessary, the mixture control stops (2), if damaged, can be pried out with diagonal cutters.

CAUTION . . . Do not break edge of any of the holes in the metering plug. Do not break or damage edge of mixture control or fuel metering shaft contours.

10–02. REASSEMBLY.

NOTE . . . Install new mixture control stops (2), if required.

A. Insert and seat new ball check valve (6) into the metering plug (5) and check for full seat contact. Slide retaining pin (7) into the hole in the annular groove. Be sure that the pin is bottomed to prevent a rise in the annular groove.

B. Apply a thin film of oil to the metering plug (5) and slide it into the valve body (1) making certain that the threaded lock hole lines up with the lock screw (23) hole and the ball check valve (6) faces the mixture control (10) end.

CAUTION . . . DO NOT install new "O" rings (8) on metering plug (5) at this time.

C. Install lock screw (23) to hold the metering plug (5) in position for lapping operation. Install spring (12), washer (13 and 14) and bushing (15) on fuel metering shaft (9).

CAUTION . . . DO NOT install new "O" ring (11) on mixture control shaft (9) at this time.

D. Insert the fuel metering assembly into the valve body (1) in the end opposing the mixture control stops (2). Lap shaft face to metering plug. Install spring (12), washers (13 and 14), and bushing (15) on mixture control shaft (10).

E. Install mixture control assembly into valve body (1) and lap face to metering plug. After this has been accomplished, remove metering shaft (9), mixture control shaft (10), lockscrew (23), and metering plug (5). Thoroughly clean all parts. Assemble all fittings in proper location and position. Install new "O" rings (8) on the metering plug (5) in each annular groove. Install metering plug assembly per 10-02B.

CAUTION . . . DO NOT install new "O" ring (11) on mixture control shaft (10) at this time.

F. Place a new washer (22) on the valve body (1) and install the name plate (21). Place a new washer (22) on the lockscrew (23) and thread it into place. Install new "O" rings (11) on metering and mixture shaft (9 on 10). Apply Alubco, American Lubricants Co., 1227 Deeds, Dayton, Ohio 45439, or equivalent, to "O" rings grooves and spring cavities and reassemble.

H. Install lever (16) on metering shaft (9) its proper relative position. Line up the hole on the lever (16) with the hole on the metering shaft (9) and press new tubular pin (18) in place. Flare both ends of the pin (18) to prevent it from coming out. If this model has a bushing (17) in the lever (16), install a new bushing (17).

I. Install collar (19) on mixture control shaft (10) in its proper relative position. Line up the hole in the collar (19) with the hole in the mixture control shaft (10) and press pin (20) into place with the large diameter end protruding from the proper side of the collar (19).

J. Holding the mixture control assembly in place, install special screw (24) through the name plate (21), body (1) and into the groove on the mixture control shaft (10). Repeat this procedure for the fuel metering end. Check operation of both shafts (9 and 10) for smooth travel through full range without binding.

K. Install a new gasket (4) on the screen assembly (3) and thread it into the body (1). Install any fittings that were removed.

L. This completes assembly and unit is now ready for air pressure check and calibration according to values as outlined in the Calibration Section. Lockwire screws (23 and 24) after calibration to complete overhaul.

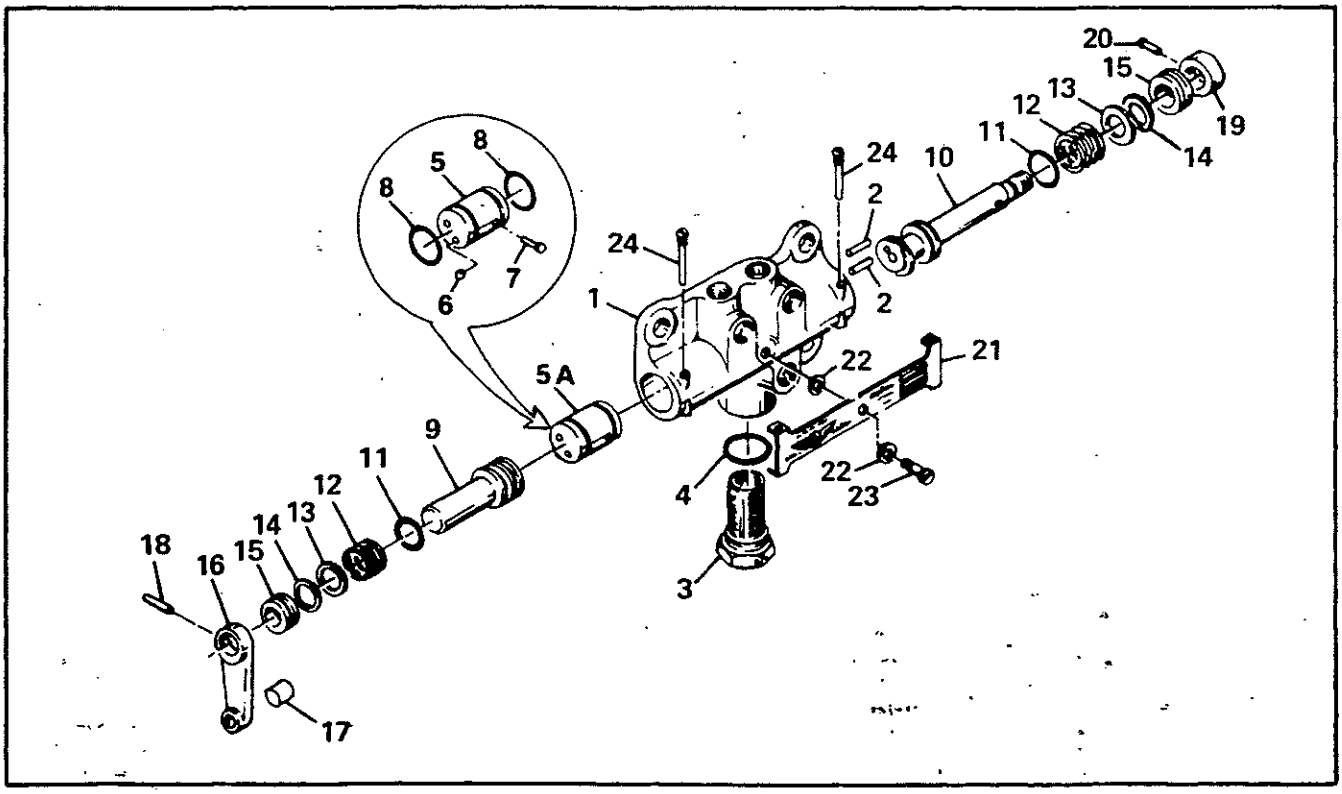


FIGURE 40–10. FUEL CONTROL ASSEMBLY.

FIG & INDEX	PART NUMBER	1 2 3 4 5 DESCRIPTION	QTY.	USABLE ON CODE
40-10	625219	① Control Assembly	NS	A
	629703	① Control Assembly	NS	B
	629904	① Control Assembly	NS	C
	630255	① Control Assembly	NS	D
	632916	① Control Assembly	NS	E
	633573-9	① Control Assembly	NS	F
	633573-12	① Control Assembly	NS	G
	633573-10	① Control Assembly	NS	H
	646740-7	① Control Assembly	NS	J
	639717-2	① Control Assembly	NS	K
-1	630570A4	. Body, Assembly	1	ABCDEFGHK
-1	646231	. Body, Assembly	1	J
-2	630383-1	. . Pin	2	
-3	539959	. Screen Assembly	1	ABCDEFGHJ
-4	646665	② . Gasket	1	
-5	638022	. Plug Assembly, Fuel Metering	1	ABCEK
-5	646735	. Plug Assembly, Fuel Metering	1	DJ
-5	638116	. Plug Assembly, Fuel Metering	1	FGH
-5A	625500	. . Plug, Fuel Metering	1	ABCEK
-5A	630254	. . Plug, Fuel Metering	1	DJ
-5A	633574	. . Plug, Fuel Metering	1	FGH
-6	628249-3	. . Ball	1	
-7	626844	. . Pin, Ball Retaining	1	
-8	AN123962	② . . "O" Ring	2	
-9	625221	③ . Shaft, Fuel Metering	1	
-10	635608	. Shaft, Mixture Control	1	ABJ
-10	635607	. Shaft, Mixture Control	1	CDEFGHK
-11	630979	② . "O" Ring	2	
-12	625492	② . Spring	2	
-13	625457	② . Washer	2	
-14	635835-1	② . Washer	2	
-15	625293	② . Bushing	2	
-16	632555-24	. Lever, Fuel Metering Shaft	1	ACK
-16	632555-5	. Lever, Fuel Metering Shaft	1	B
-16	632555-2	. Lever, Fuel Metering Shaft	1	DE
-16	632555-63	. Lever, Fuel Metering Shaft	1	J
-16	632555-6	. Lever, Fuel Metering Shaft	1	FH
-16	632555-14	. Lever, Fuel Metering Shaft	1	G
-17	632554-2	. . Bushing	1	
-18	626813	② . Pin, Lever Retaining	1	
-19	625320	. Collar, Mixture Control	1	ABJ
-19	629782	. Collar, Mixture Control	1	CDEFGHK
-20	625952	② . Pin, Collar Retaining	1	
-21	640796	. Name Plate	1	
-22	538600-1	② . Washer, Seal	2	
-23	AN500A8-7	. Screw	1	
-24	626810	. Screw, Special	2	

NOTES:

① This assembly not available as service part. See applicable parts catalog for correct service part number. ② 100% Replacement parts. ③ Dash number designation to be identical with dash number of control assembly. Example 625219-1 control assembly requires 625221-1 shaft.

73-40-11
FUEL CONTROL VALVE ASSEMBLY
P/N 643322-1

11-01. DISASSEMBLY.

A. Remove all safety wire and fittings. Loosen relief valve screw (35). Remove screws (33), (34) and lift off cover (32). Remove plates (29) spring (30) and diaphragm (28). Pull plunger (27) from housing (26).

B. Remove screws (46) and separate aneroid housing (42) from relief valve body (26). Remove nut (45) and washers (44 & 43) and separate aneroid (38) from housing (42). Place variable orifice rod (39) in a shielded vise and unscrew aneroid (38). Remove clip (41) and seal (40). Remove and discard gasket (37) from aneroid housing (42). Remove screws (31) from relief valve body (26) and separate from control valve body (1). Remove and discard gasket (25).

C. Unscrew screen assembly (2) from body (1). Remove and discard gasket (3).

D. Remove the two special screws (8) from body (1).

CAUTION . . . These screws retain the entire internal assemblies. Exercise care to prevent the internal assemblies from falling out and being damaged.

E. Slide out mixture control shaft (14) and related parts from valve body.

F. Note the position of the pin (23) with respect to the mixture control assembly, so that it can be reassembled in the proper position.

G. Hold Collar (22) in a suitable vee block and drive out pin (23) from the smaller end with a 3/32" straight punch.

H. Slide collar (22) from shaft (14).

I. Remove bushing (19) washers (18 & 17) spring (16) and "O" ring (15) from shaft (14).

J. Slide out fuel metering shaft (13) and related parts from valve body (1).

K. Note the position of the lever (20) with respect to the metering shaft (13) so it can be reassembled in the proper position.

L. Hold lever (20) in a suitable vee block and drive out pin (21) with a 3/32" straight punch.

M. Slide lever (20) from shaft (13).

N. Remove bushing (19) washers (17) and (18) spring (16) and "O" ring (15) from shaft (13).

O. Remove screw (5), seal washer (4) and push out metering plug (9) with a 1/2" fiber drift.

CAUTION . . . Do not use a metallic drift as damage to the metering plug could result.

P. Remove retaining pin (12) and ball check valve (11).

NOTE . . . Further disassembly is not required for a normal overhaul, but if necessary the mixture control stops (24), if damaged, can be pried out with diagonal cutters.

CAUTION . . . Do not break edge of any of the holes in the metering plug. Do not break or damage edge of mixture control or fuel metering shaft contours.

11-02. REASSEMBLY.

A. Insert and seat a new ball check valve (11) into the metering plug (9) and check for full seat contact. Slide retaining pin (12) into the hole in the annular groove. Be sure that the pin is bottomed to prevent a rise in the annular groove.

B. Apply a thin film of oil to the metering plug (9) and slide it into the valve body (1), making certain that the thread lock hole lines up with the lock screw (5) hole, and the ball check valve (11) faces the mixture control (14) end.

CAUTION . . . Do not install new "O" rings (10) on metering plug (9) at this time.

C. Install lock screw (5) to hold the metering plug (9) in position with old "O" rings installed for lapping operation.

D. Install spring (16) washers (17), (18) and bushing (19) on fuel metering shaft (13).

CAUTION . . . Do not install new "O" ring (15) on fuel metering shaft (13) at this time, leave old "O" rings installed during lapping operation.

E. Insert the fuel metering assembly into the valve body (1) in the end opposing the mixture control stops (24). Lap shaft face to metering plug.

F. Install spring (16) washers (17), (18) and bushing (19) on mixture control shaft (14) at this time.

CAUTION . . . Do not install new "O" ring (15) on mixture control shaft (14) at this time. Leave old "O" rings installed during lapping operation.

G. Install mixture control assembly into valve body (1) and lap face to metering plug (9). After this has been accomplished, remove metering shaft (13) mixture control shaft (14) lockscrew (5) and metering plug (9).

H. Thoroughly clean all parts. Assemble all fittings in proper location and position. Install new "O" rings (10) on metering plug (9) in each annular groove. Install metering plug assembly per paragraph 11-02B.

I. Place a new washer (4) on lock screw (5) and thread it into place.

J. Install new "O" rings (15) on metering and mixture shafts (13 and 14). Apply Alubco, American Lubricants Co., 1227 Deeds, Dayton, Ohio 45439 or equivalent to "O" rings grooves and spring cavities and reassemble.

K. Install lever (20) on metering shaft (13) in its proper relative position.

L. Line up the hole on the lever (20) with the hole on the metering shaft (13) and press new tubular pin (21) in place. Flare both ends of the pin (21) to prevent it from coming out.

M. Install collar (22) on mixture control shaft (14) in its proper relative position.

N. Line up the hole in the collar (22) with the hole in the mixture control shaft (14) and press pin (23) into place with the large diameter end protruding from the proper side of the collar (22).

O. Holding the mixture control assembly in place, install special screw (8) through body (1) and into the groove on the mixture control shaft (14). Repeat this procedure for the fuel metering end. Check operation of both shafts (13 and 14) for smooth travel through full range without binding.

P. Install a new gasket (3) on the screen assembly (2) and thread it into the control body (1).

Q. Place new gasket (25) on control body (1). Install relief valve housing (26) and secure with screws (31).

R. With a small amount of fine lapping compound, lap plunger (27) to its seat. Remove plunger (27) and clean off residue, reinstall plunger (27) in relief valve housing (26). Install diaphragm (28) making sure that the air reference port in diaphragm (28) is lined up with the air reference port in the relief valve housing (26). Install plates (29) and spring (30). Install adjusting screw (35) and lock nut (36), if removed. Install relief valve cover (32) on relief valve housing (26) and secure with screws (33 and 34).

S. Making sure that seal area in housing (26) is clean and free of old sealant, coat outside edge of new seal (40) with a small amount of Loctite 290 and install seal (40) in housing (26). Secure with retaining ring (41). Place variable orifice rod (39) in shielded vise with threaded end facing upward, apply Loctite 242 compound to threads and screw aneroid (38) on to rod (39) snugly. Place aneroid assembly in aneroid housing (42) and secure with washers (43,44) and nut (45). Place new gasket (37) on relief valve housing (26) and install aneroid and housing on relief valve housing (26) and secure with screws (46).

CAUTION . . . Do not overtighten aneroid and variable orifice rod.

T. This completes assembly and unit is now ready for air pressure check and calibration according to the values outlined in Calibration Section. Lockwire screws (8, 31, 34, 46) and screen assembly (2) after calibration to complete overhaul.

FIG & INDEX	PART NUMBER	1 2 3 4 5 DESCRIPTION	QTY.	USABLE ON CODE
40-11				
-1	643322-1	Control Assembly	NS	
-1	643796	. Body Assembly	1	
-2	539959	. Screen Assembly	1	
-3	646665	. Gasket	1	
-4	538600-1	. Washer, Seal	1	
-5	AN500A8-6	. Screw	1	
-6	630644	. Name Plate	1	
-7	24764	. Screw, Drive	2	
-8	626810	. Screw, Special	2	
-9	638116	. Plug Assembly, Fuel Metering	1	
-9A	633574	. . Plug, Fuel Metering	1	
-10	AN123962	. . "O" Ring	2	
-11	628249-3	. . Ball	1	
-12	626844	. . Pin Ball Retaining	1	
-13	625221-10	. Shaft, Fuel Metering	1	
-14	635607	. Shaft, Mixture Control	1	
-15	630979	. "O" Ring	2	
-16	625492	. Spring	2	
-17	625457	. Washer	2	
-18	635835-1	. Washer	2	
-19	625293	. Bushing	2	
-20	632555-6	. Lever, Fuel Metering Shaft	1	
-21	626813	. Pin Lever Retaining	1	
-22	629782	. Collar Mixture Control	1	
-23	625952	. Pin, Collar Retaining	1	
-24	630383-1	. Pin, Control Stop	2	
-25	643646	. Gasket, Control Body	1	
-26	643658	. Body Assembly, Relief Valve	1	
-27	643707	. Plunger, Relief Valve	1	
-28	635671	. Diaphragm, Relief Valve	1	
-29	637784	. Plate, Spring Retaining	2	
-30	628311	. Spring, Compression	1	
-31	NAS1352-3H20P	. Screw	2	
-32	643820	. Cover Assembly, Relief Valve	1	
-33	AN500-8-7	. Screw	3	
-34	NAS1352-3H24P	. Screw	1	
-35	631883	. Screw, Adjustment	1	
-36	AN121501	. Nut	1	
-37	639482	. Gasket	1	
-38	642810	. Aneroid	1	
-39	643681-1	. Rod, Variable Orifice	1	
-40	639484	. Seal, Shaft	1	
-41	521824	. Ring, Retaining	1	
-42	630518	. Housing, Aneroid	1	
-43	538600-3	. Washer, Seal	1	
-44	20522	. Washer, Plain	1	
-45	628298	. Nut, Plain	1	
-46	AN500A10-6	. Screw	2	

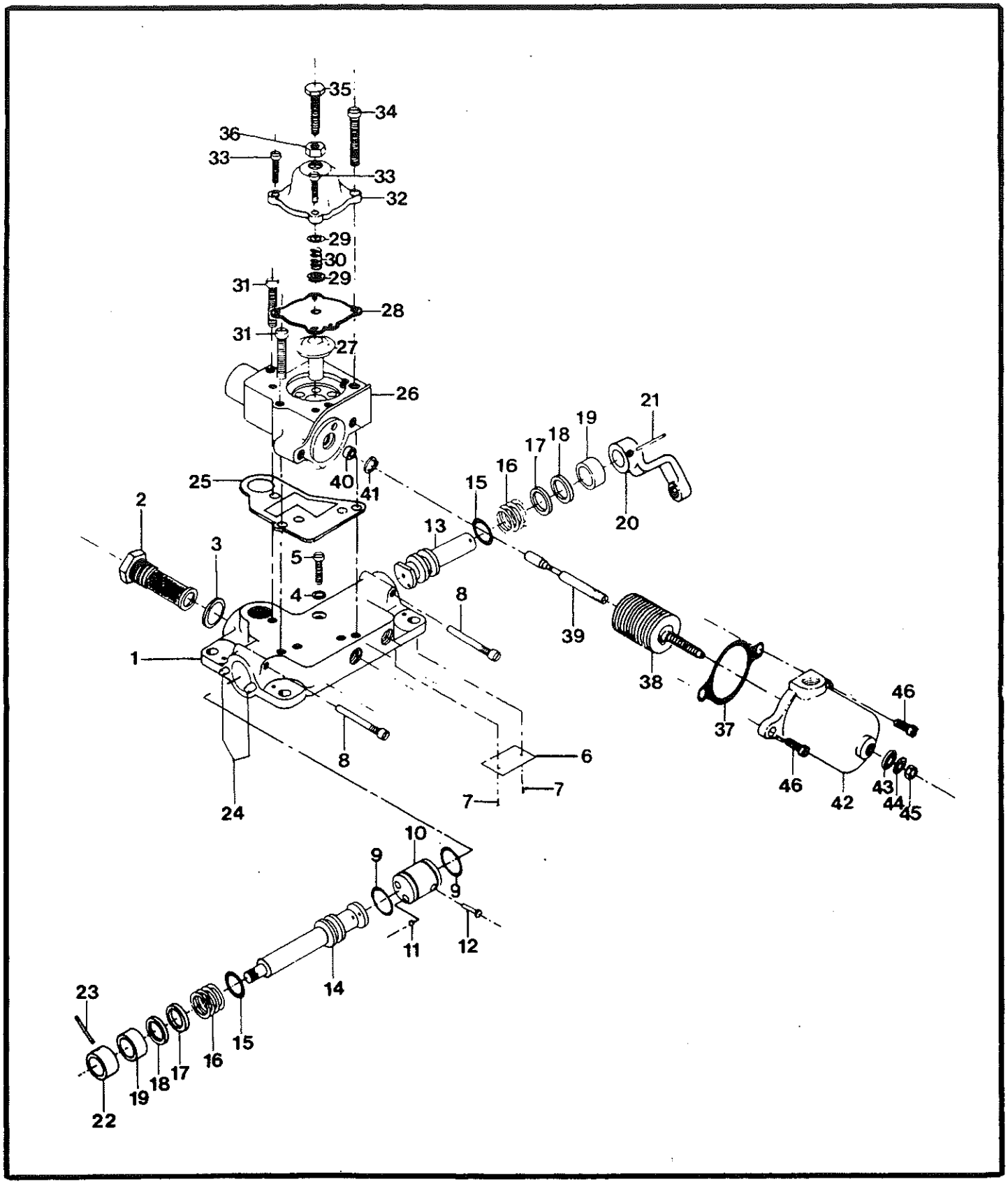


FIGURE 40–11. FUEL CONTROL ASSEMBLY.

73-40-12
AIR THROTTLE FUEL METERING ASSEMBLIES
642703A16 & 640564-1

12-01. DISASSEMBLY.

A. Remove lever (7) from shaft (2) by driving out the pin (10) with a 1/8" punch. Remove screw (11) and spring (12) from lever (7). Remove nut (9A) from screw (9) and remove from lever (7).

B. Remove screws (14) and cover (13) from body (1). Remove retaining ring (23), idle adjustment screw (19), "O" ring (20), bushing (21) and spring (22) from cover (13). Remove "O" ring (20) from idle adjustment screw (19). As the idle adjustment screw (19) is loosened, the metering plug (18), "O" ring (17) and spring (16) will be released for removal. Remove "O" ring (15) from cover (13).

C. Remove screws (6) and plate (5) from throttle shaft (2). Remove throttle shaft (2) from body (1). Remove "O" ring (15) and washer (4) from metering cover boss on throttle body (1). Remove "O" rings (3) from throttle shaft (2). This completes the disassembly.

12-02. REASSEMBLY.

A. Use extreme care in reassembly of the unit to insure against damage to the lapped surfaces of the metering plug (18) and the fuel metering shaft and disc assembly.

B. Install "O" rings (3) and washer (4) on shaft (2) and with a small amount of Parker "O" Lube on rings insert shaft (2) into body (1). Place plate (5) in proper position and install screws (6). After checking plate (5) position, stake screws (6). After determining proper position, install lever (7) on shaft (2) and insert bushing (8). If new shaft-disc assembly is to be installed, place lever (7) on shaft and re-drill .125" through shaft and lever and install pin (10). Swage both ends of pin (10) securely. Place spring (12) on adjustment screw (11) and install in lever (7). Install adjustment screw (9) into lever (7) and install locking nut (9A).

NOTE . . . A light coating of Parker "O" Lube on all "O" rings will assist in the assembly of this unit.

C. Install "O" rings (15) on throttle body fuel metering control boss and in metering cover (13). Place "O" rings (20) on idle adjustment screw (19). Install idle adjustment spring (22) and bushing (21) in position in cover (13), holding cover (13) in such a position to allow spring (22) to rest in bottom-most position. Holding cover (13) with metering plug (18) opening upright, install spring (16) in recess in bottom of cover (13). Place "O" ring (17) in plug (18) and carefully align metering plug pin with idle adjustment pin opening in bottom of cover (13) and install metering plug assembly (18). Depress plug assembly in cover to determine proper alignment of plug pin in idle adjustment recess.

D. With cover assembly (13) including parts (15, 16, 17, 18, and 4) in position, secure in an upright position, carefully mate to air throttle body assembly (1) being careful to prevent damage to metering plug. Install screw (14). Install idle adjustment screws sufficiently to engage the full width of "O" ring (20). Secure with retaining ring (23). Install any fittings that were removed. This completes assembly and unit is now ready for air pressure check and calibration according to values as outlined in the Calibration Section. Lockwire screws (14) after calibration to complete overhaul.

NOTE . . . If metering cover (13) has two idle adjustment screws, replace old cover with 642709 cover assembly.

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
40-12	642703A16		Air Throttle and Fuel Metering Assembly . .	NS	A
	640564-1		Air Throttle and Fuel Metering Assembly . .	NS	B
-1	633286		. Body, Air Throttle	1	
-1A	626812		. Pin - Stop	1	
-2	635076-5		. Shaft Assembly, Throttle and Metering . .	1	A
-2	635076-1		. Shaft Assembly, Throttle and Metering . .	1	B
-3	630979-9	①	. "O" Ring	2	
-4	635835-2		. Washer	1	
-5	625601		. Plate, Throttle	1	
			ATTACHING PARTS		
-6	539942		. Screw	2	
			* * * *		
-7	632556		. Lever Assembly, Throttle Metering Control	1	
-8	632554-2		. . Bushing	1	
-9	AN565E8H16		. Screw	1	
-9A	13XX18130		. Nut	1	
-10	626813		. Pin, Tubular	1	
-11	639479		. Screw, Adjustment	1	
-12	626634		. Spring, Adjustment Screw	1	
-13	642709		. Cover, Fuel Metering	1	
			ATTACHING PARTS		
-14	AN500A10-8		. Screw	3	
-15	630979-10	①	. "O" Ring	2	
-16	630274		. Spring	1	
-17	630979-6	①	. "O" Ring	1	
-18	646017		. Plug Assembly, Fuel Metering	1	
-19	646044		. Screw, Idle Fuel Adjustment	1	
-20	630979-9		. "O" Ring	1	
-21	633298		. Bushing, Idle Adjusting Spring	1	
-22	635063		. Spring	1	
-23	521693		. Ring, Retaining	1	
-24	640797	②	. Name Plate	1	
			ATTACHING PARTS		
-25	24764	②	. Screw	2	

NOTES:

① 100% Replacement parts.
② Not Illustrated.

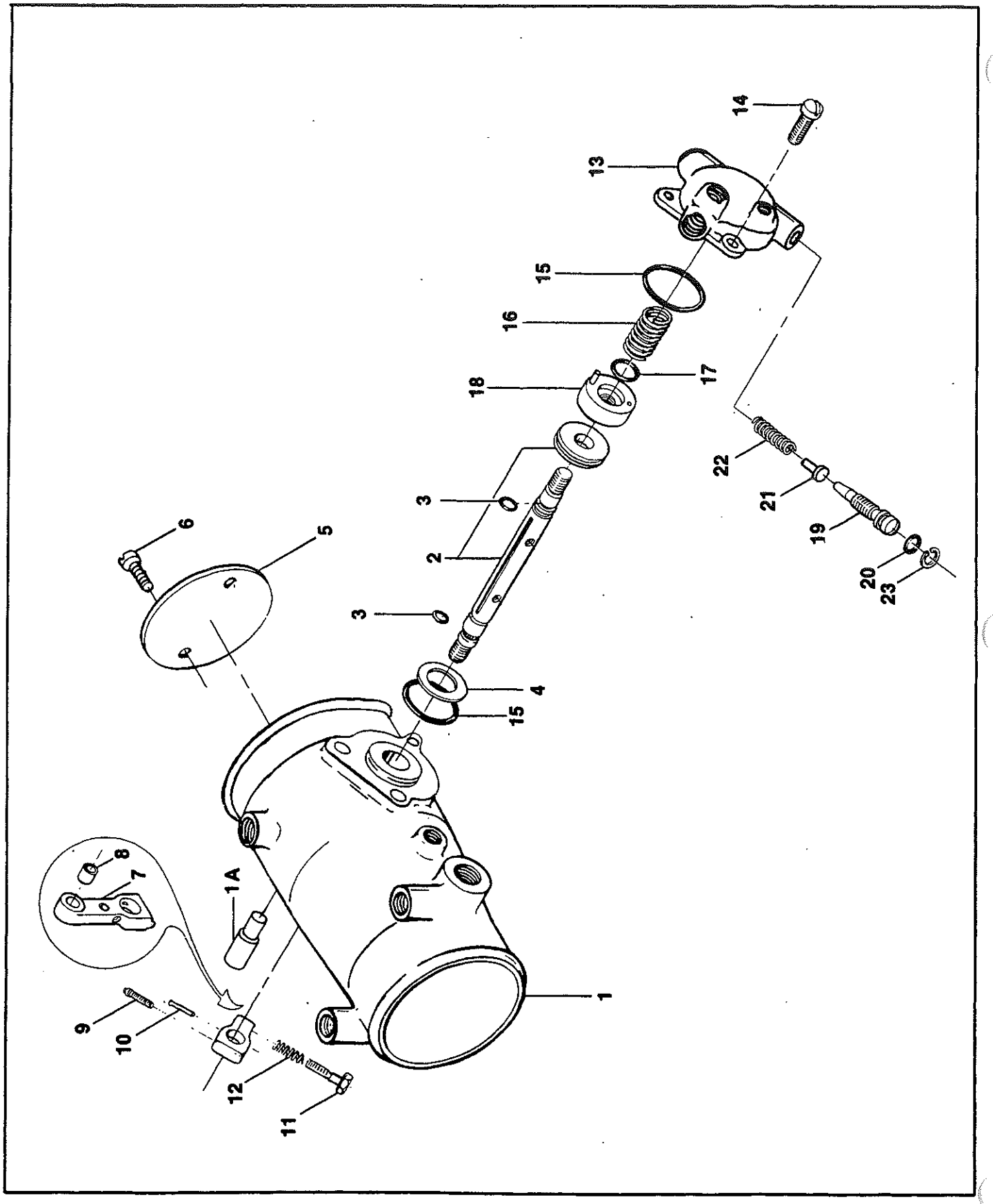


FIGURE 40–12. AIR THROTTLE & FUEL METERING ASSEMBLY.

73-40-13
AIR THROTTLE FUEL METERING ASSEMBLY
P/N 646080

13-01. DISASSEMBLY.

A. Remove all safety wire; and fittings if necessary.

B. Remove lever (15) from shaft (5) by removing nut (16). Remove lever (9) from shaft (5) by driving out the pin (10) with a 1/8" punch. Remove screw (13) and spring (14) from lever (9).

C. Remove screws (25) and cover (17) from body (1). Remove retaining ring (30), idle adjustment screw (28), "O" ring (29), bushing (27) and spring (26) from cover (17). As the idle adjustment screw (28) is loosened, the metering plug (21), "O" ring (24) and spring (22) will be released for removal. Remove "O" ring (23) from cover (17).

D. Remove screws (8) and plate (7) from the throttle shaft (5). Remove throttle shaft (5) from body (1). Remove "O" ring (19), washer (20) and plug (18) from throttle shaft (16). Remove "O" rings (6) from throttle shaft (5). This completes disassembly.

13-02. REASSEMBLY.

A. Use extreme caution in reassembly of the unit to insure against damage to the lapped surfaces of the metering plug (21) and the fuel metering shaft and disc assembly.

B. Install "O" rings (6), washer (20) and plug (18) on shaft (5) and with a small amount of Parker "O" Lube on rings, insert shaft (5) into body (1). Place plate (7) in proper position and install screws (8). After checking plate (7) position, stake screws (8). After determining proper position, install lever (9) on shaft (5) and insert pin (10). Install lever (15) on shaft (5) and secure with nut (16). If new shaft-disc assembly is to be installed, place lever (9) on shaft and re-drill .125" through shaft and lever and install pin (10). Swage both ends of pin (10) securely. Place spring (14) on adjustment screw (13) and install in lever (9).

NOTE . . . A light coating of Parker "O" Lube on all "O" rings will assist in the assembly of this unit.

C. Install "O" rings (19) and (23) on plug (18) and in metering cover (17). Place "O" ring (29) on idle adjustment screw (28). Install idle adjustment spring (26) and bushing (27) in position in cover (17), holding cover (17) with metering plug (21) opening upright, install spring (22) in recess in bottom of cover (17). Place "O" ring (24) in plug (21) and carefully align metering plug pin with idle adjustment pin opening in bottom of cover (17) and install metering plug assembly (21). Depress plug assembly in cover to determine proper alignment of plug pin in idle adjustment recess.

D. With cover assembly (17) including parts (23, 22, 24, and 21) in position, secure in an upright position, carefully mate to air throttle body assembly (1) being careful to prevent damage to metering plug. Install screws (25). Install idle adjustment screw sufficiently to engage the full width of "O" ring (29). Secure with retaining ring (30) and install any fittings that were removed. This completes assembly and unit is now ready for air pressure check and calibration according to values as outlined in the Calibration Section. Lockwire screws (25) after calibration to complete overhaul.

NOTE . . . If metering cover (17) has two idle adjustment screws, replace old cover with 642709 cover assembly.

FIG & INDEX	PART NUMBER	1 2 3 4 5 DESCRIPTION	QTY.	USABLE ON CODE
40-13	646080	Air Throttle and Fuel Metering Assembly	1	
-1	646079	. Body, Air Throttle	1	
-2	630455	. . Bushing	1	
-3	631183-3	. . Bushing	1	
-4	626812	. . Pin, Stop	1	
-5	634864-9	. Shaft Assembly Throttle and Metering	1	
-6	630979-9	. . "O" Ring	2	
-7	625601	. Plate, Throttle	1	
-8	539942	. . Screw, Throttle Plate	2	
		ATTACHING PARTS		
-9	639497	. Lever	1	
-10	626813	. . Pin	2	
-11	AN565E8H16	. . Screw Set	1	
-12	13XX18130	. . Nut	1	
-13	639479	. . Screw	1	
-14	626634	. . Spring	1	
-15	632555-55	Lever	1	
-16	MS21042-5	Nut	1	
		ATTACHING PARTS		
-17	642709	. Cover Assembly, Fuel Metering	1	
-18	643093	. Plug	1	
-19	MS9021-020	. "O" Ring, Packing	1	
-20	635835-2	. Washer	1	
-21	643513	. Plug	1	
-22	630274	. Spring	1	
-23	630979-10	. "O" Ring	1	
-24	630979-6	. "O" Ring	2	
-25	AN500A10-8	. Screw	3	
-26	635063	. Spring	1	
-27	633298	. Bushing	1	
-28	646044	. Screw	1	
-29	630979-9	. "O" Ring	1	
-30	521693	. Ring, Retaining	1	

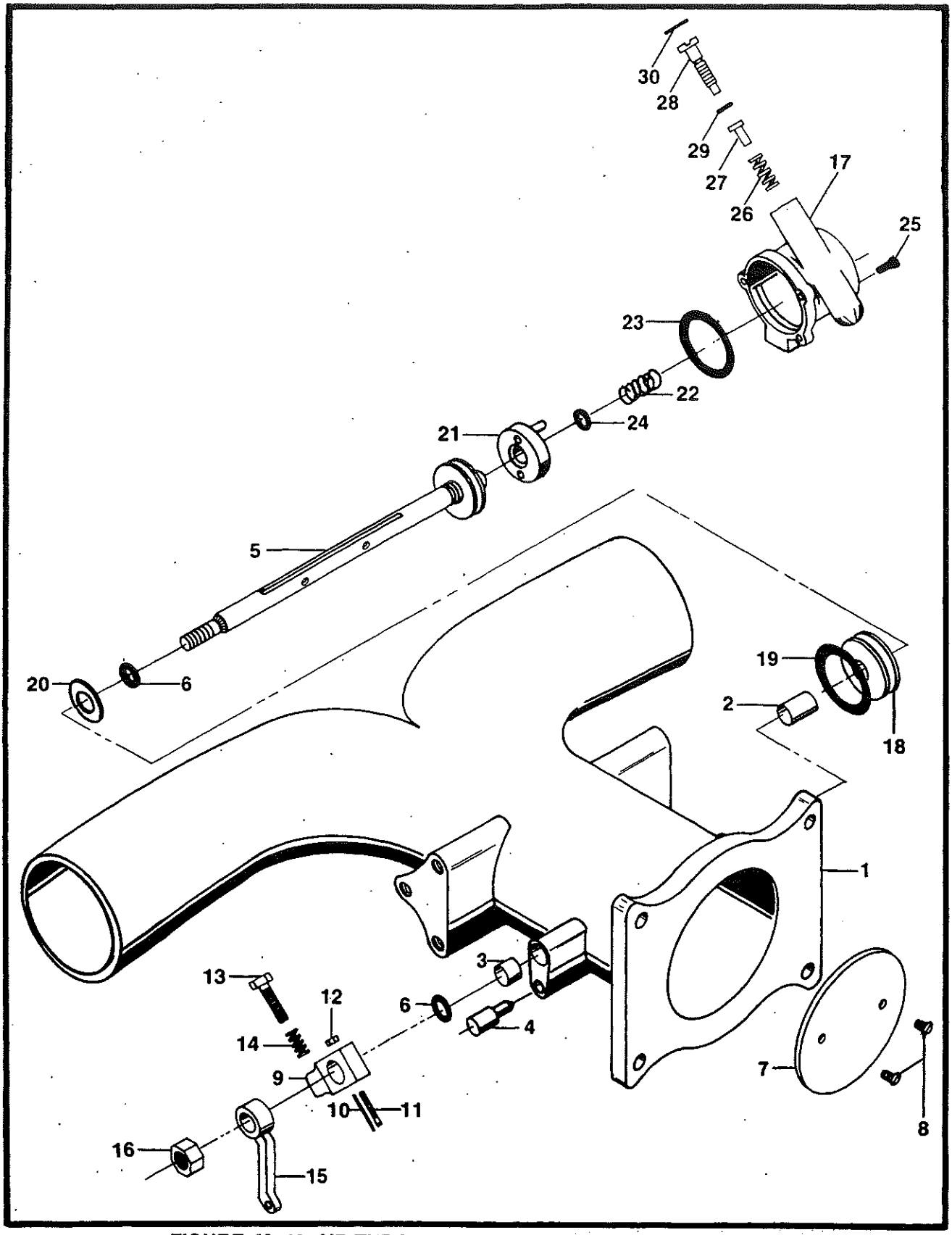


FIGURE 40–13. AIR THROTTLE AND FUEL METERING ASSEMBLY.

73-40-14
AIR THROTTLE FUEL METERING ASSEMBLY
P/N 643175-1

14-01. DISASSEMBLY.

A. Remove all safety wire; and fittings if necessary.

B. Remove lever (15) from shaft (5) by removing nut (16). Remove lever (9) from shaft (5) by driving out the pin (10) with a 1/8" punch. Remove screw (13) and spring (14) from lever (9).

C. Remove screws (25) and cover (17) from body (1). Remove retaining ring (30), idle adjustment screw (28), "O" ring (29), bushing (27) and spring (26) from cover (17). As the idle adjustment screw (28) is loosened, the metering plug (21), "O" ring (24) and spring (22) will be released for removal. Remove "O" ring (23) from cover (17).

D. Remove screws (8) and plate (7) from the throttle shaft (5). Remove throttle shaft (5) from body (1). Remove "O" ring (19), washer (20) and plug (18) from shaft (5). Remove "O" rings (6) from throttle shaft (5). This completes disassembly.

14-02. REASSEMBLY.

A. Use extreme caution in reassembly of the unit to insure against damage to the lapped surfaces of the metering plug (21) and the fuel metering shaft and disc assembly.

B. Install "O" rings (6), washer (20) and plug (18) on shaft (5) and with a small amount of Parker "O" Lube on rings, insert shaft (5) into body (1). Place plate (7) in proper position and install screws (8). After checking plate (7) position, stake screws (8). After determining proper position, install lever (9) on shaft (5) and insert pin (10). Install lever (15) on shaft (5) and secure with nut (16). If new shaft-disc assembly is to be installed, place lever (9) on shaft and redrill .125" through shaft and lever and install pin (10). Swage both ends of pin (10) securely. Place spring (14) on adjustment screw (13) and install in lever (9).

NOTE . . . A light coating of Parker "O" Lube on all "O" rings will assist in the assembly of this unit.

C. Install "O" rings (19) and (23) on plug (18) and in metering cover (17). Place "O" ring (29) on idle adjustment screw (28). Install idle adjustment spring (26) and bushing (27) in position in cover (17), holding cover (17) with metering plug (21) opening upright, install spring (22) in recess in bottom of cover (17). Place "O" ring (24) in plug (21) and carefully align metering plug pin with idle adjustment pin opening in bottom cover (17) and install metering plug assembly (21). Depress plug assembly in cover to determine proper alignment of plug pin in idle adjustment recess.

D. With cover assembly (17) including parts (23, 22, 24, and 21) in position, secure in an upright position, carefully mate to air throttle body assembly (1) being careful to prevent damage to metering plug. Install screws (25). Install idle adjustment screw sufficiently to engage the full width of "O" ring (29). Secure with retaining ring (30) and install any fittings that were removed. This completes assembly and unit is now ready for air pressure check and calibration according to values as outlined in the Calibration Section. Lockwire screws (25) after calibration to complete overhaul.

NOTE . . . If metering cover (17) has two idle adjustment screws, replace old cover with 642709 cover assembly.

FIG & INDEX	PART NUMBER	1 2 3 4 5 DESCRIPTION	QTY.	USABLE ON CODE
40-14				
-1	643175-1	Air Throttle and Metering Assembly	1	
-1	643393	. Body Air Throttle	1	
-2	630455-2	. . Bushing	1	
-3	630455-3	. . Bushing	1	
-4	MS51606-48	. Pin, Stop	1	
-5	634864-6	. Shaft, Throttle	1	
-6	630979-9	. "O" Ring	2	
-7	643153	. Plate, Throttle	1	
-8	643503	. Screw, Throttle Plate	2	
-8A	646448-3	. Washer	2	
-9	639497	. Lever	1	
-10	626813-2	. Pin	1	
-11	AN565E8H16	. Screw, Set	1	
-12	13XX18130	. Nut	1	
-13	639479	. Screw	1	
-14	626634	. Spring	1	
-15	632555-12	Lever	1	
-16	MS21042-5	Nut	1	
-17	642709	. Cover Assembly, Fuel Metering	1	
-18	643093	. Plug	1	
-19	MS9021-020	. "O" Ring, Packing	1	
-20	635835-2	. Washer	1	
-21	646017	. Plug, Assembly	1	
-22	630274	. Spring	1	
-23	630979-10	. "O" Ring	1	
-24	630979-6	. "O" Ring	1	
-25	AN500A10-8	. Screw	3	
-26	635063	. Spring	1	
-27	633298	. Bushing	1	
-28	646044	. Screw	1	
-29	630979-9	. "O" Ring	1	
-30	521693	. Ring, Retaining	1	

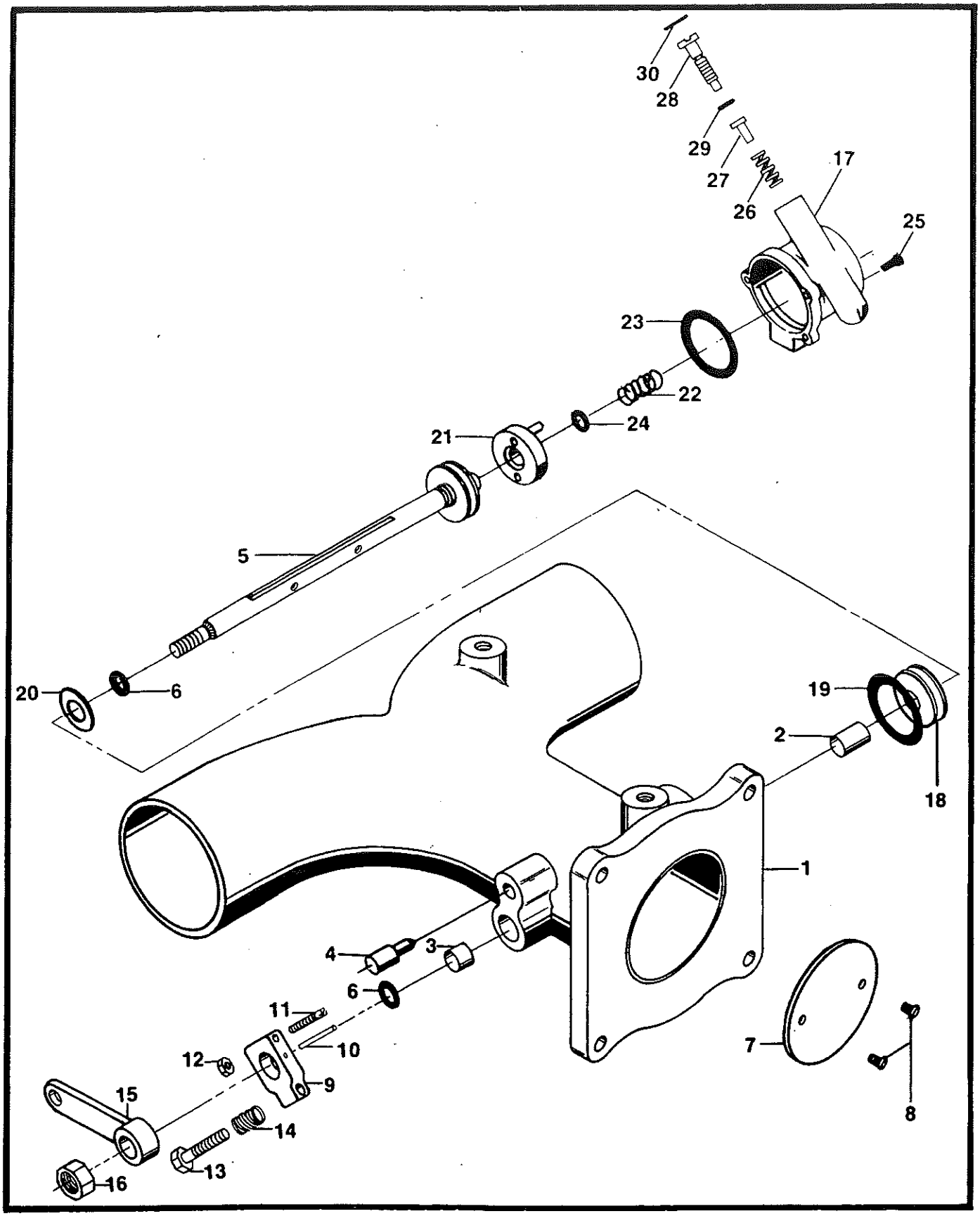


FIGURE 40–14. AIR THROTTLE AND FUEL METERING ASSEMBLY.

73-40-15
AIR THROTTLE FUEL METERING ASSEMBLY
P/N 637170

15-01. DISASSEMBLY.

A. Remove all safety wire; and fittings if necessary.

B. Remove lever (8) from shaft (2) by driving out the pin (10) with a 1/8" punch. Remove screw (11) and spring (12) from lever (8).

C. Remove retaining ring (15) and cover (14) from body (1). Remove retaining rings (23) idle adjustment screw (22* and 24). "O" rings (3), bushing (21) and spring (20) from body (1). As the idle adjustment screw (22) is loosened, the metering plug (19), "O" ring (3) and spring (17) will be released for removal. Remove "O" ring (16) from inside body (1).

D. Remove screws (7) and plate (6) from throttle shaft (2). Remove throttle shaft (2) from body (1). Remove washer (5) from shaft (2). Remove "O" rings (3) and washer (4) from throttle shaft (2).

E. Remove retaining ring (26) from body (1). Remove shaft (25) by driving out the pin (27) with a 1/8" punch. Remove "O" rings (28), pin (30) and ball (29) from shaft (25). This completes the disassembly.

F. Inspect throttle body bushings (1A, 1B) for damage or wear, inside dia 3760/3745. If replacement is necessary, both holes must be in line within .0005.

15-02. REASSEMBLY

A. Use extreme care in reassembly of the unit to insure against damage to the lapped surfaces of the metering plug (19) and the fuel metering shaft and disc assembly.

B. Install "O" rings (3) and washers (4 & 5) on shaft (2) and with a small amount of Parker "O" Lube on rings insert shaft (2) into body (1). Place plate (6) in proper position and install screws (7). After checking plate (6) position, stake screws (7). After determining proper position, install lever (8) on shaft (2) and insert pin (10). If new shaft disc assembly is to be installed, place lever (8) on shaft and redrill .125" through shaft and lever and install pin (10). Swage both ends of pin (10) securely. Place spring (12) on adjustment screw (11) and install in lever (8).

NOTE . . . A light coating of Parker "O" Lube on all "O" rings will assist in the assembly of this unit.

C. Install "O" rings (16) in throttle body (1). Place "O" rings (3) on idle adjustment screws (22 and 24). Install idle adjustment spring (20) and bushing (21) in position in body (1). Place "O" rings (3) in plug (19).

D. Hold the cover (14), spring (17) and plug (19) in a secure upright position. Carefully mate to air throttle body assembly (1) being careful to prevent damage to metering plug. Install retaining ring (15).

E. Install "O" rings (28) on shaft (25). Install ball (29) and pin (30) into shaft (25) and place shaft (25) into throttle body (1). Insert pin (27), retaining ring (26) and any fittings that were removed. This completes assembly and unit is now ready for air pressure check and calibration according to values as outlined in the Calibration Section.

NOTE* . . . If the idle adjustment by-pass screw (24) is sealed with spot seal putty, do not remove or disassemble. If it is not sealed, during reassembly turn the screw full in unit it seats and seal it with spot seal putty. (See M84-6 Rev. 1 or current "Procedures and Values for Adjustment of Fuel Systems on TCM Injected Engines" Service Bulletin).

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
40-15					
-1	637170		Throttle and Fuel Metering Assembly	1	
-1	639118		. Body, Air Throttle	1	
-1A	631183		. . Bushing	1	
-1B	630455		. . Bushing	1	
-2	637155-2		. Shaft Assembly, Throttle and Metering	1	
-3	630979-9	①	. "O" Ring	5	
-4	625327-1		. Washer, Wave	1	
-5	635835-2		. Washer	1	
-6	625601		. Plate, Throttle	1	
			ATTACHING PARTS		
-7	539942		. Screw	2	
			* * * *		
-8	637587		. Lever Assembly, Throttle	1	
-9	632554-2		. . Bushing	1	
-10	626813		. Pin, Tubular	1	
-11	639479		. Screw, Adjustment	1	
-12	626634		. Spring Compression	1	
-13	AN565E1032-9		. Screw, Set	1	
-14	637731		. Cover, Fuel Metering	1	
			ATTACHING PARTS		
-15	502107		. Ring, Retaining	1	
			* * * *		
-16	MS29513-027	①	. "O" Ring	2	
-17	637158		. Spring	1	
-18	626812		. Pin, Throttle Stop	1	
-19	637224		. Plug Assembly, Fuel Metering	1	
-20	637166		. Spring	1	
-21	637167		. Bushing	1	
-22	637164		. Screw	1	
-23	521693		. Ring, Retaining	2	
-24	637168		. Screw, Idle Fuel Metering	1	
-25	637734		. Shaft, Mixture Control	1	
-26	628952-6		. Ring, Retaining	1	
-27	626834		. Pin, Stop	1	
-28	630979-8		. "O" Ring	2	
-29	628249-3		. Ball	1	
-30	626844		. Pin	1	

NOTES:

① 100% Replacement Parts.

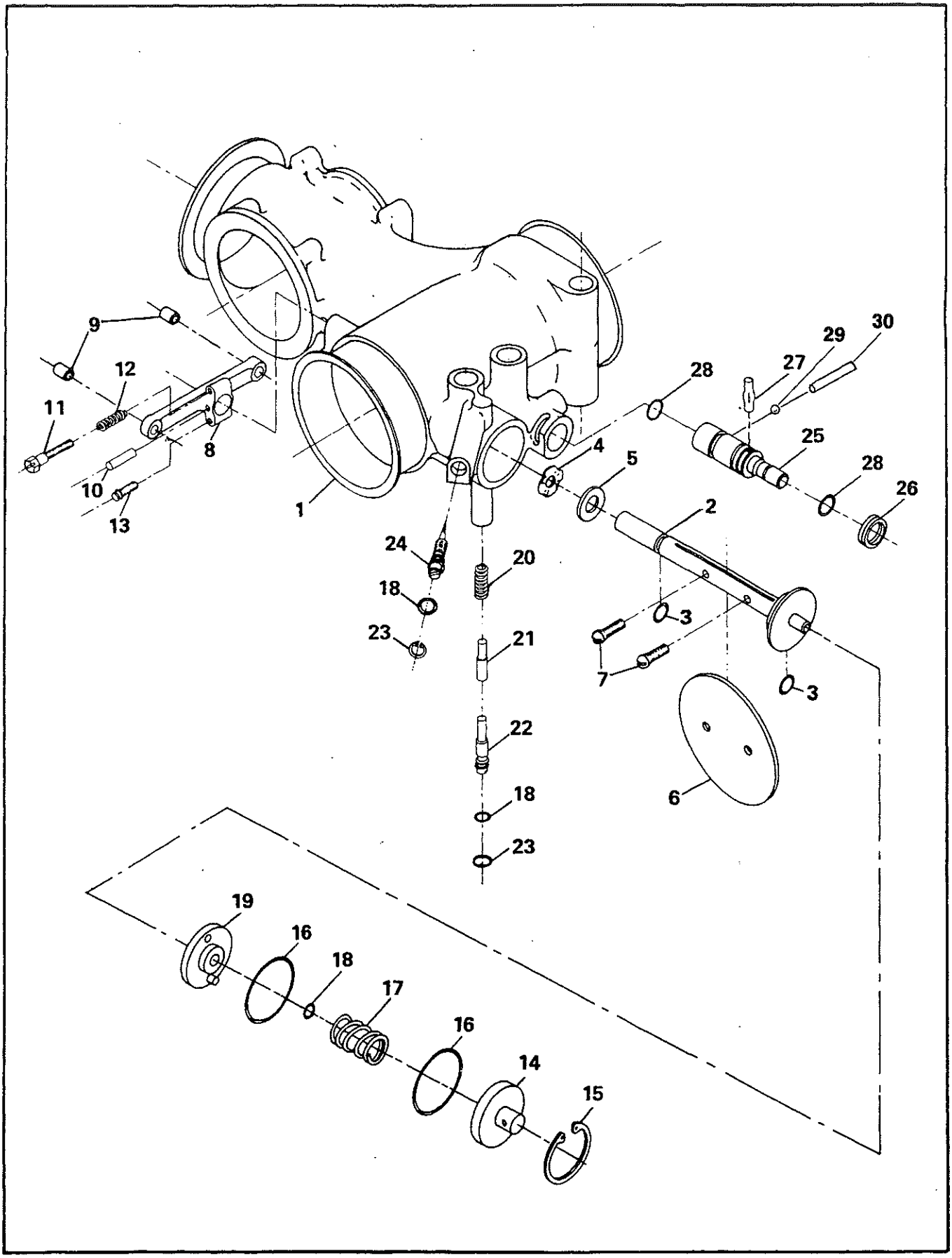


FIGURE 40–15. AIR THROTTLE AND FUEL METERING ASSEMBLY.

73-40-16
FUEL PRESSURE REGULATOR

16-01. DISASSEMBLY. (See Figure 40-16)

A. Scribe matching lines on flanges of upper and lower chambers for proper orientation during reassembly. Cut lockwire and remove two screws and washers (1, 4) and bracket (16). Brackets are oriented for the engine on which they are installed (right and left). Identify the parts accordingly. Remove remaining screws and washers (3, 4) and separate upper and lower chambers (5, 6). Remove diaphragm (7), and spring (8), spring (9) and seat (10) from upper chamber. Remove spring (12) and valve (11) from lower chamber. Remove adjusting screw (15), nut (13) and sealing washer (14).

B. Do not remove valve (17) from lower chamber (6) unless leaking or damaged. If it is necessary to remove and install valve (17), use Loctite compound 569 on threads before installing.

16-02. INSPECTION.

A. Inspect castings for cracks, nicks or rough edges. Smooth nicks or rough edges. Discard any cracked casting. Inspect diaphragm for tears or holes, or other signs of deterioration.

Spring Data - See Figure 40-16

Index No.	P/N	Free Length	Spring Rate
8	636206	0.79-0.81	150 lbs/in ± 15 lbs/in
12	636212	0.69-0.71	6 lbs/in ± 1 lbs/in
9	642101	1.60-1.70	25 lbs/in ± 2.5 lbs/in

16-03. REASSEMBLY.

A. Install spring (12) and valve (11) in lower chamber (6). Place diaphragm in position with small end of retaining rivet up. Install seat (10), spring (8) and spring (9) in upper chamber and install on lower chamber with scribes marks in proper place. Secure loosely with 3 short screws (3) and washers (4). Position of long screws will depend on location of bracket (16). Install bracket and secure with 2 remaining longer screws (1) and washers (4). Secure screws with lockwire after correct testing has been completed.

16-04. TEST.

A. Install fittings for test hookup as shown in the Calibration Section. Test with filtered air at values given.

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
40-16	636915	②	Fuel Pressure Regulator Assembly	1	A
	639401-1	③	Fuel Pressure Regulator Assembly	1	B
	639401-2	④	Fuel Pressure Regulator Assembly	1	C
	642100-1		Fuel Pressure Regulator Assembly	1	D
	642100-2		Fuel Pressure Regulator Assembly	1	E
	642100-3		Fuel Pressure Regulator Assembly	1	F
	642100-4		Fuel Pressure Regulator Assembly	1	G
	642100-5		Fuel Pressure Regulator Assembly	1	H
	642100-6		Fuel Pressure Regulator Assembly	1	J
	642100-8		Fuel Pressure Regulator Assembly	1	K
-1	AN500A8-14		. Screw, No. 8 x 7/8 Inch Long	2	
-2	MS21042-08		. Nut, Self-Locking	2	DEFG
-3	AN500A8-10		. Screw, No. 8 x 5/8 Inch Long	3	
-4	AN960-8		. Washer, Plain	7	
-5	640305		. Chamber, Upper	1	
-6	636203		. Chamber, Lower	1	
-7	636207	①	. Diaphragm	1	
-8	636206		. Spring	1	
-9	642101		. Spring	1	
-10	636213		. Seat	1	
-11	636215		. Valve	1	
-12	636212		. Spring	1	
-13	AN121501		. Nut	1	
-14	538600-2		. Washer, Seal	1	
-15	640560		. Screw, Adjusting	1	
-16	640135		. Bracket, L.H.	1	BD
-16	639400		. Bracket, R.H.	1	CE
-16	646212		. Bracket	1	K
-17	636216		. Seat	1	

NOTE: ① Change 100% at overhaul ② Superceded by 642100-5 ③ Superceded by 642100-1 ④ Superceded by 642100-2

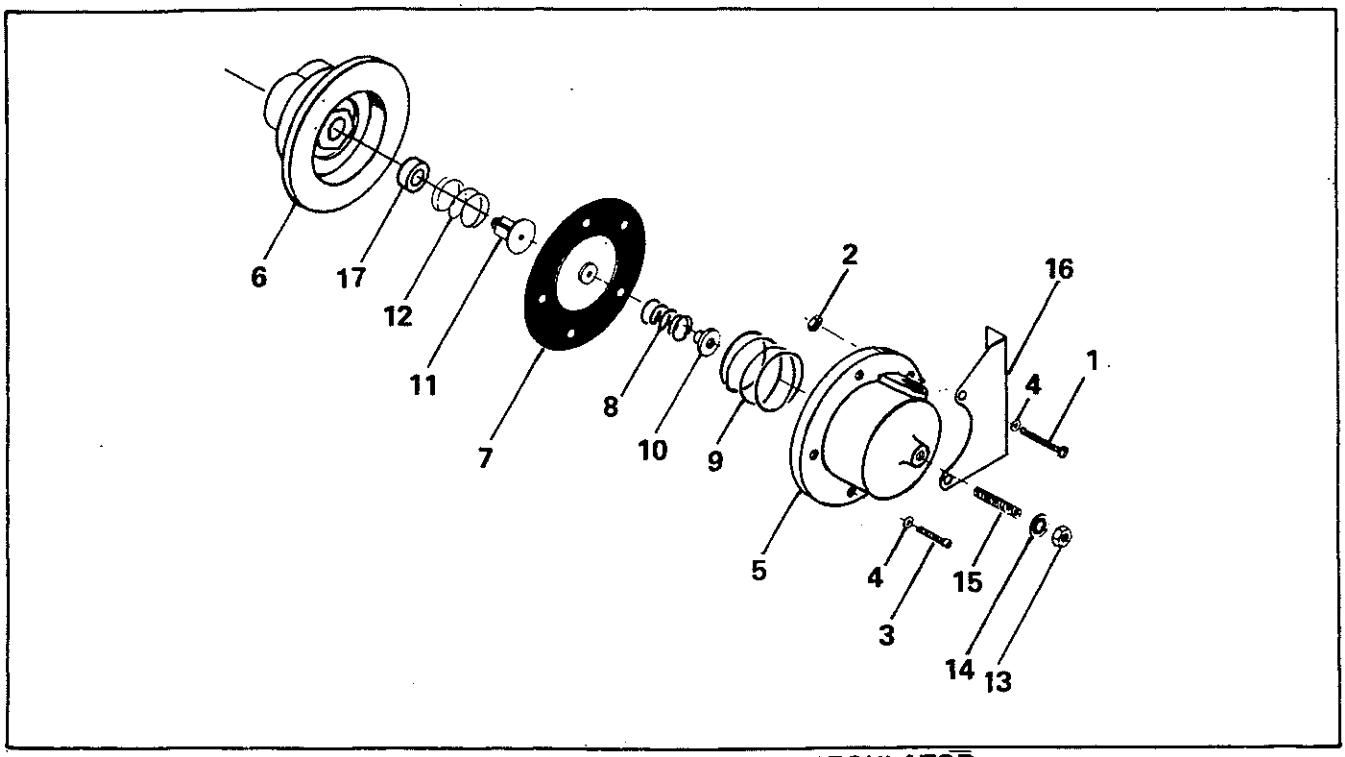


FIGURE 40–16. FUEL PRESSURE REGULATOR.

73-40-17
MANIFOLD VALVE ASSEMBLIES
P/N 631351, 631427, 634326, 641032

17-01. DISASSEMBLY.

A. Remove all lockwire. Remove fittings only if they appear damaged. Remove four screws (16) and carefully separate cover (15) from body (1). Use caution to eliminate damage to parting surfaces. Remove spring (14) and lift out diaphragm (4 through 13). Remove screen (2). Remove seal (3) and discard.

B. Place diaphragm assembly in shielded vise jaws in a position for disassembly. Remove nut (13), plate (12), diaphragm (11), plate (10) and spacer (8). Remove retainer (4) from plunger (7) and discard. Remove spring (5) and needle (6) from plunger (7) for inspection.

NOTE . . . Some models may have a gasket (9). Remove and discard this gasket.

17-02. REASSEMBLY.

A. Reassemble diaphragm assembly (4 through 13) by first installing needle (6) in plunger (7) and stake lightly.

CAUTION . . . Be sure needle is free to move before installing spring (5) and retainer (4).

NOTE . . . Apply Loctite 290 between diaphragm assembly parts.

Set retainer flush with bottom of plunger at initial installation. With plunger in shielded vise jaws, install spacer (8), plate (10), diaphragm (11), plate (12) and nut (13).

NOTE . . . If model has a gasket (9), it will not be replaced. Diaphragm parts are bonded together, eliminating the need for gasket (9).

Apply a thin coat of Loctite 290 to first and second threads of plunger (7) before installing nut (13). Torque nut (13) to 30 $\pm$ 1 inch pounds. After diaphragm is positioned with the four through holes at 45° from the through hole in the plunger, install new seal (3) and screen (2) in body (1).

B. Install diaphragm assembly (4 through 13) in bore of body. Install new spring (14) on top of plunger assembly. Place cover (15) on top of spring with vent hole 90° from fore and aft mounting position, as indicated by bracket mounting holes in base of body. Install four screws (16) and tighten to 20 $\pm$ 1 inch pounds. This completes assembly and unit is now ready for air pressure test and calibration according to values as outlined in Calibration Section. Lockwire screws after calibration to complete overhaul.

NOTE . . . If correct calibration cannot be obtained, reposition retainer in plunger (pressing further in increases pressure; out decreases pressure). Be extremely careful not to allow the retainer to protrude over 0.075" out of the plunger.

FIG & INDEX	PART NUMBER	1 2 3 4 5 DESCRIPTION	QTY.	USABLE ON CODE
40-17				
	631351	① Valve Assembly, Fuel Manifold	NS	A
	631427	① Valve Assembly, Fuel Manifold	NS	B
	634326	① Valve Assembly, Fuel Manifold	NS	C
	641032	① Valve Assembly, Fuel Manifold	NS	D
-1	631329	. Body Fuel Manifold Valve	1	ABC
-1	641030	. Body Fuel Manifold Valve	1	D
-2	626557	. Screen	1	
-3	631330	② . Seal	1	
	632425	. Diaphragm Assembly, Fuel Manifold Valve .	1	ACD
	631526	. Diaphragm Assembly, Fuel Manifold Valve .	1	B
-4	632394	. . Retainer	1	
-5	631331	② . . Spring	1	ACD
-5	631426	② . . Spring	1	B
-6	634619	. . Needle	1	
-7	631282	. . Plunger	1	
-8	631350	. . Spacer	1	
-9	627124	② . . Gasket	1	
-10	627123	. . Plate	1	
-11	626536	② . . Diaphragm	1	
-12	626556	. . Plate	1	
-13	646605	② . . Nut	1	
-14	630184	. Spring, Compression	1	ACD
-14	627378	. Spring, Compression	1	B
-15	634325	. Cover	1	
		ATTACHING PARTS		
-16	AN500A8-10	. Screw	4	

NOTE:

① This assembly not available for service. See applicable Service Parts Catalog for service assembly number.

② 100% Replacement parts.

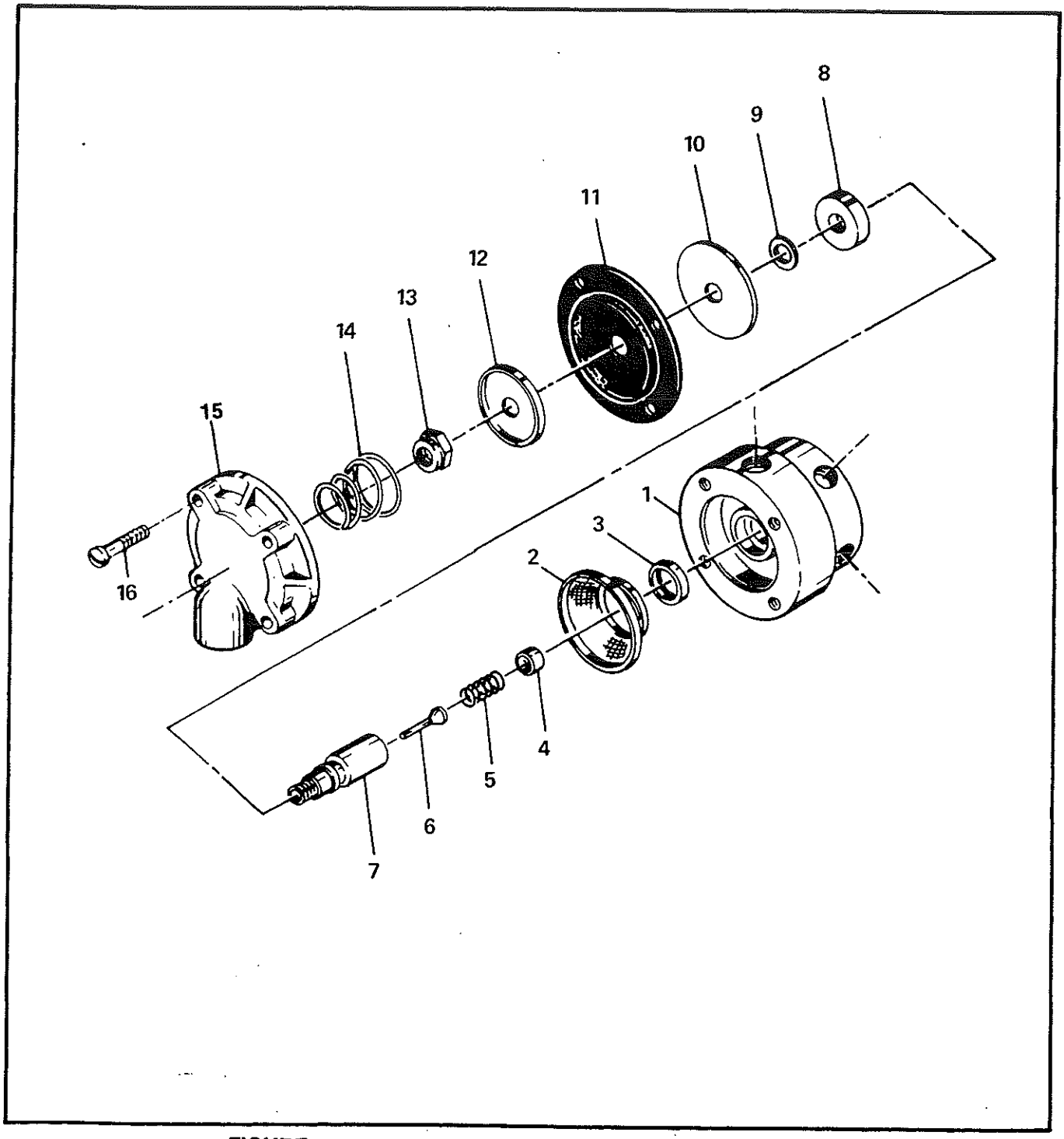


FIGURE 40–17. FUEL MANIFOLD VALVE ASSEMBLY.

73-40-18
MANIFOLD VALVE ASSEMBLY
P/N 643397

18-01. DISASSEMBLY.

A. Remove all lockwire. Remove fittings only if they appear damaged. Remove four screws (9) and carefully separate cover (8) from body (1). Use caution to eliminate damage to parting surfaces. Remove spring (7) and lift out diaphragm assembly (1 through 6).

B. Place diaphragm assembly in shielded vise jaws in a position for disassembly. Remove nut (6), plate (5), diaphragm (4) and plate (3).

NOTE . . . Some models may have a gasket (2). Remove and discard this gasket.

18-02. REASSEMBLY.

A. Reassemble diaphragm assembly (1 through 6) with plunger in shielded vise jaws, install plate (3), diaphragm (4) and plate (5).

NOTE . . . Apply Loctite 290 between diaphragm assembly parts.

NOTE . . . If model has a gasket (2) it will not be replaced. Diaphragm parts are bonded together eliminating the need for gasket (2).

Apply a thin coat of Loctite 290 to first and second threads of plunger before installing nut (6). Torque nut (6) to 30 $\pm$ 1 inch pounds.

B. Install diaphragm assembly (1 through 6) in bore of body. Install new spring (7) on top of diaphragm assembly. Place cover (8) on top of spring with vent hole 90° from fore and aft mounting position, as indicated by bracket mounting holes in base of body. Install four screws (9) and tighten to 20 $\pm$ 1 inch pounds. This completes assembly and unit is now ready for functional flow test according to Calibration Section. Lock wire screws after functional flow test to complete overhaul.

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
40-18					
	643397-1		Valve Assembly, Fuel Manifold	NS	
-1	643632		. Body Assembly	1	
-1	626536A2		. Diaphragm, Assembly	1	
-2	627124		. . Gasket	1	
-3	627123		. . Plate	1	
-4	626536		. . Diaphragm	1	
-5	626556		. . Plate	1	
-6	646605		. . Nut	1	
-7	627378		. Spring, Compression	1	
-8	643581		. Cover	1	
			ATTACHING PARTS		
-9	AN500A8-10		. Screw	4	

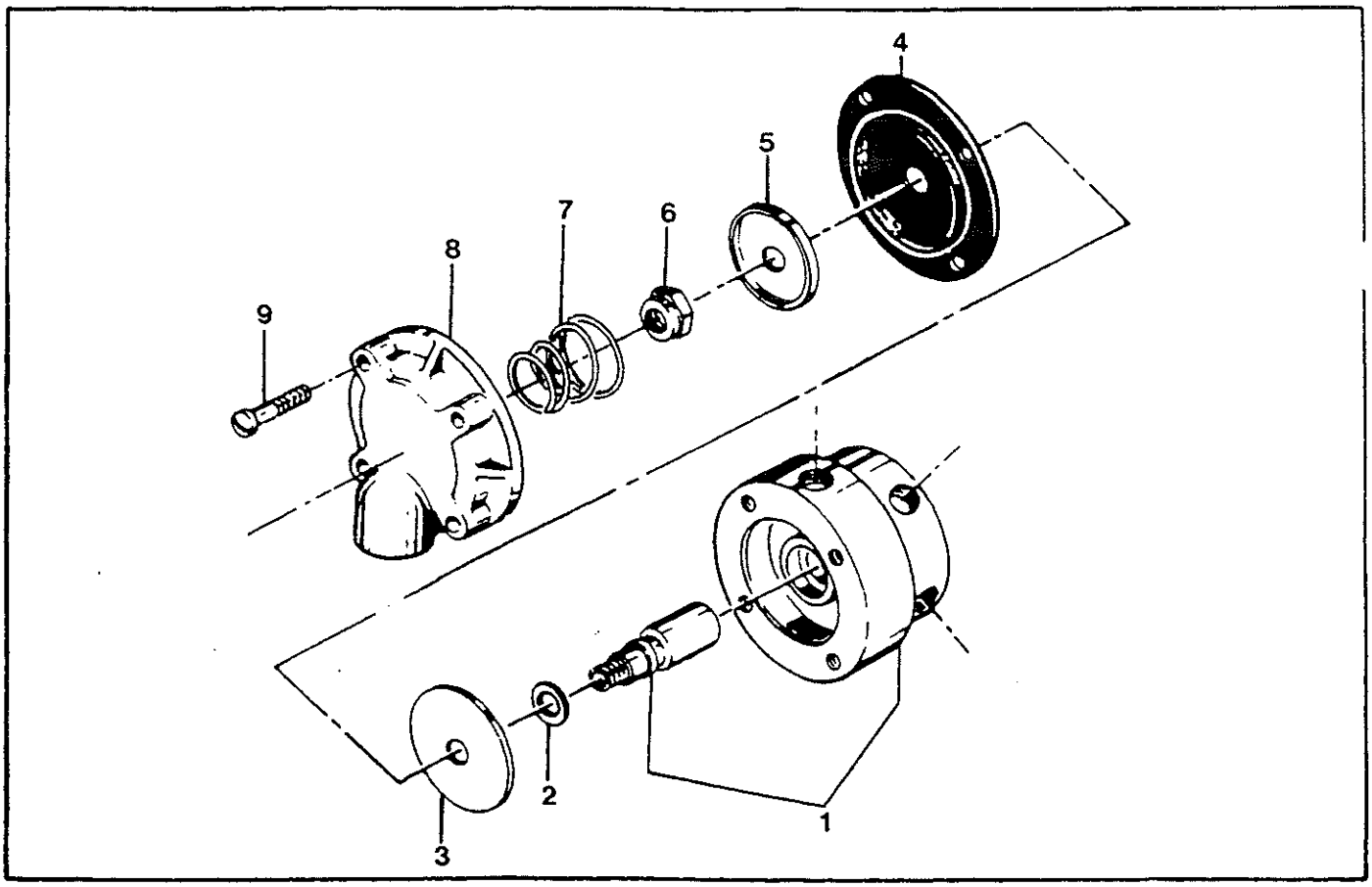


FIGURE 40–18. FUEL MANIFOLD ASSEMBLY.

73-40-19
MANIFOLD VALVE ASSEMBLY
P/N 646433

19-01. DISASSEMBLY.

A. Remove all lockwire, remove fittings only if they appear damaged. Remove four screws (16) and carefully separate cover (15) from body (1). Use caution to eliminate damage to parting surfaces. Remove spring (14) and lift out diaphragm and plunger assembly (4 through 13). Remove screen (3).

B. Place diaphragm assembly in shielded vise jaws in position for disassembly. Remove nut (13), plate (12), diaphragm (11), plate (10), gasket (9) and spacer (8). Remove needle (5), spring (6) and retainer (7) from plunger (4).

NOTE . . . Remove and discard gasket (9).

19-02. REASSEMBLY.

A. Reassemble diaphragm assembly (4 through 13). With plunger in shielded vise jaws, install spacer (8), plate (10), diaphragm (11) and plate (12). Replace needle (5) spring (6) and retainer (7) into plunger (4).

NOTE . . . Apply Loctite 290 between diaphragm assembly parts.

NOTE . . . If model has a gasket (9), it will not be replaced. Diaphragm parts are bonded together eliminating the need for gasket (9).

Apply a thin coat of Loctite 290 to first and second threads of plunger (4) before installing nut (13). Torque nut (13) to 30 $\pm$ 1 inch pounds.

B. Install new seal (2) and place screen (3) in body (1). Install diaphragm assembly (6 thorough 13) in bore of body. Install new spring (14) on top of diaphragm assembly. Place cover (15) on top of spring with vent hole 90° fore and aft mounting position, as indicated by bracket (18) mounting holes. Install four screws (16) and tighten to 20 $\pm$ 1 inch pounds. This completes assembly and unit is now ready for functional flow test according to data in Calibration Section. Lockwire screws after functional flow test to complete overhaul.

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
40-19					
	646433-1	.	Valve Assembly, Fuel Manifold	NS	
-1	641030	.	Body Assembly	1	
-2	631330	.	Seal, Plunger	1	
-3	626557	.	Screen	1	
	632425	.	Diaphragm & Plunger Assembly	1	
-4	631282	. .	Plunger	1	
-5	634619	. .	Needle	1	
-6	631331	. .	Spring	1	
-7	632394	. .	Retainer	1	
-8	631350	. .	Spacer	1	
-9	627124	. .	Gasket	1	
-10	627123	. .	Plate	1	
-11	626536	. .	Diaphragm	1	
-12	626556	. .	Plate	1	
-13	646605	. .	Nut	1	
-14	630184	.	Spring Compression	1	
-15	634325	.	Cover	1	
			ATTACHING PARTS		
-16	AN500A8-12	.	Screw	4	
-17	AN960-8	.	Washer	4	
-18	646299	.	Bracket, Manifold Valve	1	

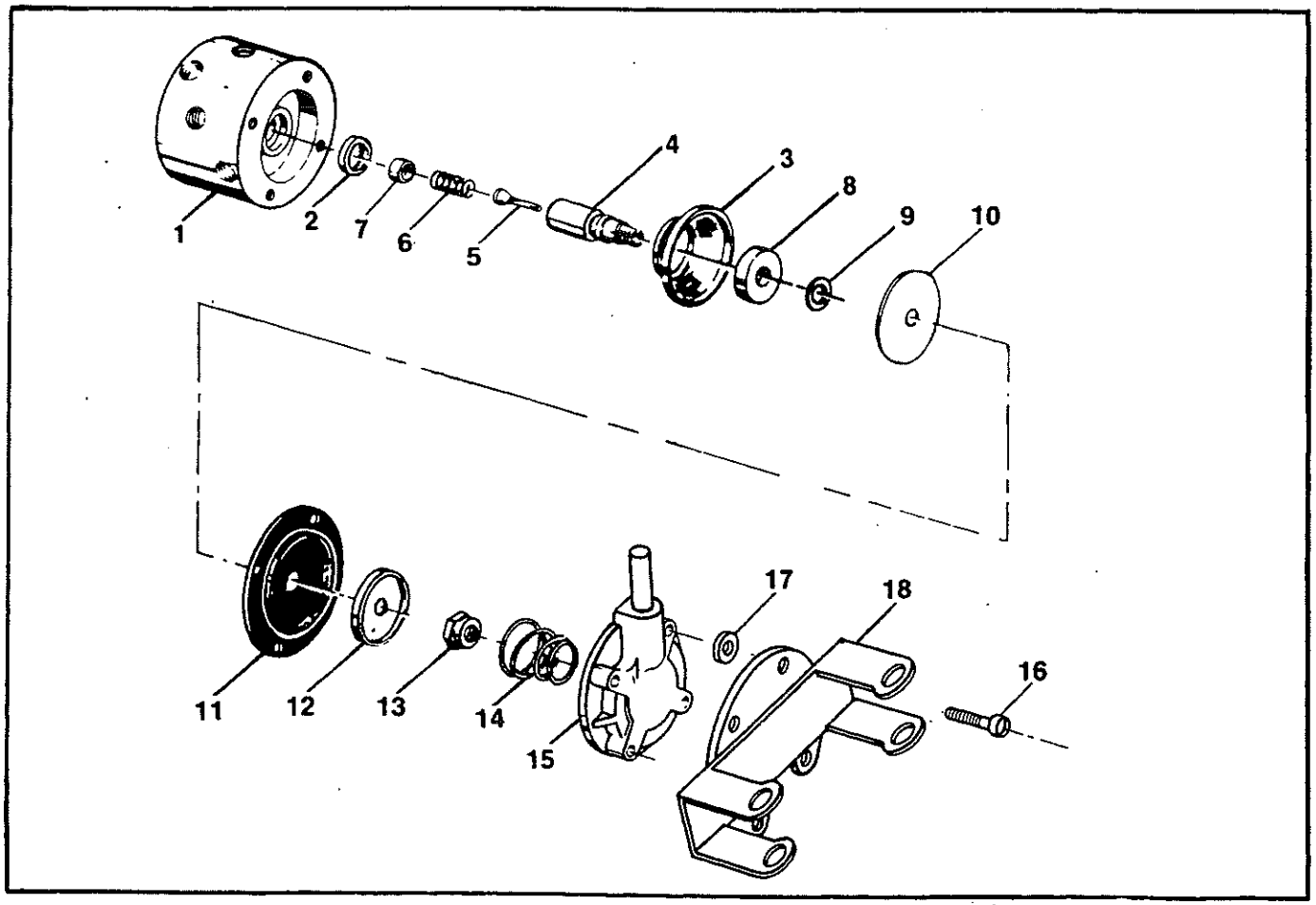


FIGURE 40–19. FUEL MANIFOLD VALVE ASSEMBLY.

73-40-20
MANIFOLD VALVE ASSEMBLY
P/N 640718

20-01. DISASSEMBLY.

A. Remove all lock wire. Remove fittings only if they appear damaged. Remove four screws (19) and carefully separate cover (17) from body (1). Use caution to eliminate damage to parting surfaces. Remove spring (16) and lift out diaphragm and plunger assembly (6 through 15). Remove screen (5).

B. Place diaphragm assembly in shielded vise jaws in a position for disassembly. Remove nut (15), plate (14), diaphragm (13), plate (12), gasket (11) and spacer (10). Remove needle (7), spring (8) and retainer (9) from plunger (6).

NOTE . . . Remove and discard gasket (11).

20-02. REASSEMBLY.

A. Reassemble diaphragm assembly (6 through 15). With plunger in shielded vise jaws, install spacer (10), plate (12), diaphragm (13) and plate (14). Replace needle (7) spring (8) and retainer (9) into plunger (6).

NOTE . . . Apply Loctite 290 between diaphragm assembly parts.

NOTE . . . If model has a gasket (11), it will not be replaced. Diaphragm parts are bonded together eliminating the need for gasket (11).

Apply a thin coat of Loctite 290 to first and second threads of plunger (6) before installing nut (15). Torque nut (15) to 30 $\pm$ 1 inch pounds.

B. Install new seal (4) and place screen (5) in body (1). Install diaphragm assembly (6 through 15) in bore of body. Install new spring (16) on top of diaphragm assembly. Place cover (17) on top of spring with vent hole 90° from fore and aft mounting position, as indicated by bracket mounting holes in base of body. Install eight screws (19) and tighten to 20 $\pm$ 1 inch pounds. This completes assembly and unit is now ready for functional flow test according data in Calibration Section. Lockwire screws after functional flow test to complete overhaul.

FIG & INDEX	PART NUMBER	1 2 3 4 5 DESCRIPTION	QTY.	USABLE ON CODE
40-20				
	640718	Valve Assembly, Fuel Manifold	NS	
-1	640992	. Body Assembly	1	
-2	640993	. Cap Assembly	1	
-3	643851	. Gasket	1	
-4	631330	. Seal, Plunger	1	
-5	626557	. Screen	1	
	632425	. Diaphragm & Plunger Assembly	1	
-6	631282	. . Plunger	1	
-7	634619	. . Needle	1	
-8	631331	. . Spring	1	
-9	632394	. . Retainer	1	
-10	631350	. . Spacer	1	
-11	627124	. . Gasket	1	
-12	627123	. . Plate	1	
-13	626536	. . Diaphragm	1	
-14	626556	. . Plate	1	
-15	646605	. . Nut	1	
-16	630184	. Spring Compression	1	
-17	634325	. Cover	1	
-18	641090	. Nameplate	1	
		ATTACHING PARTS		
-19	AN500A8-10	. Screw	8	
-20	MS35338-42	. Washer	4	
-21	642095	. Bracket, Manifold Valve	1	

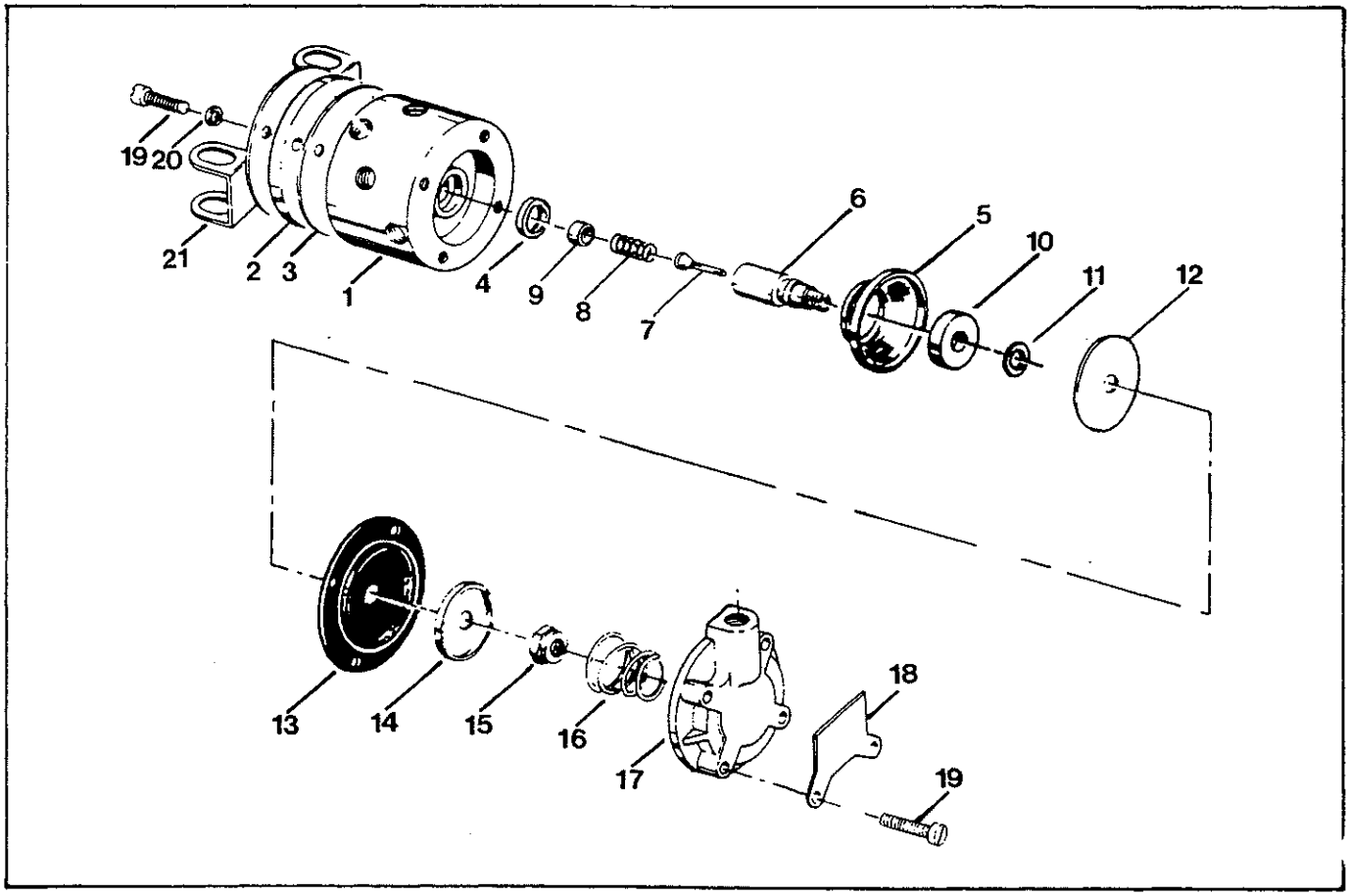


FIGURE 40–20. FUEL MANIFOLD VALVE ASSEMBLY.

73-40-21
NOZZLE ASSEMBLIES

21-01. DISASSEMBLY (Figure 40-21.)

A. Place nozzle (1) in a suitable fixture. Lift off shield (4) and remove screen (3).

B. If nozzle has a screw-type jet, discard entire assembly and replace with new type.

C. If jet must be replaced, use a suitable type tap and thread into opening in jet. The jet can be remove by pulling the tap straight out.

12-02. REASSEMBLY

A. If jet (2) was removed, replace by pressing new jet in nozzle shell.

NOTE . . . Apply a thin coat of Loctite 290 to jet before installation.

B. Install new screen (3) and shield (4) on nozzle (1). Press shield flush with top of shoulder.

C. Nozzles should be flow tested at this time. Flow nozzles and calibrate according to instructions and calibration data in Calibration Section. If the nozzle flows in the next size range, it may be so stamped. A new jet or new nozzle assembly can be obtained.

CAUTION . . . All nozzles must be of the same size per engine.

FIG & INDEX	PART NUMBER	1 2 3 4 5 DESCRIPTION	QTY.	USABLE ON CODE
40-21				
	627335D12	① Nozzle Assembly	NS	A
	627335D13	① Nozzle Assembly	NS	B
-1	627334	. Nozzle	1	
-2	627333-12	. Jet	1	A
-2	627333-13	. Jet	1	B
-3	625921	. Screen	1	
-4	625919	. Shield	1	

NOTE:

① Order nozzle size identified on hex of nozzle body.

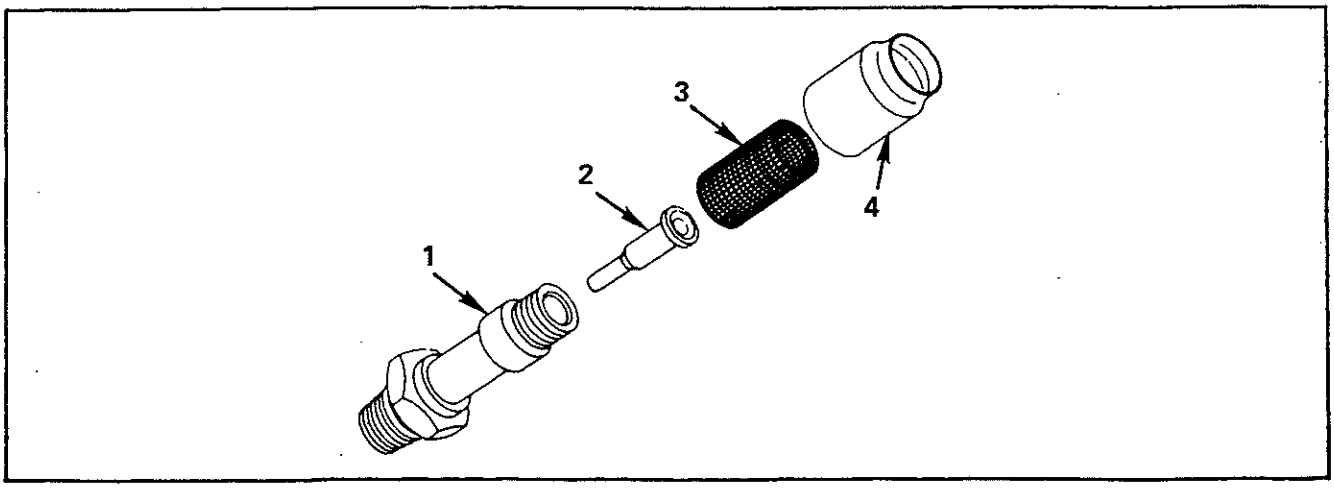


FIGURE 40-21. NOZZLE ASSEMBLY.

73-40-22
NOZZLES ASSEMBLIES

22-01. DISASSEMBLY (Figure 40-22).

A. Remove the "O" rings (2) from the nozzle (1).

B. If jet (3) must be replaced, use a suitable type tap and thread into opening in jet. The jet can be removed by pulling the tap straight out.

22-02. REASSEMBLY.

A. If jet (3) was removed, press a new jet into the nozzle shell and calibrate. Be sure the new jet flows at the same size as the rest of the jets used in the engine.

NOTE . . . Apply a thin coat of Loctite 290 to jet before installation.

B. Install two new "O" rings (2).

C. Nozzles should be flow-tested at this time. Flow nozzles and calibrate according to the instructions and calibrations data in the Calibration Section. If the nozzle flows in the next size range, it may be so stamped. A new jet or a new nozzle assembly can be obtained.

CAUTION . . . All nozzles must be of the same size per engine.

FIG & INDEX	PART NUMBER	1 2 3 4 5 DESCRIPTION	QTY.	USABLE ON CODE
40-22				
	632748-14	① Nozzle Assembly	1	A
	632748-15	① Nozzle Assembly	1	B
	632748-16	① Nozzle Assembly	1	C
	632748-17	① Nozzle Assembly	1	D
	633723D19	① Nozzle Assembly	1	E
	639368-19	① Nozzle Assembly	1	F
	639368-20	① Nozzle Assembly	1	G
	643318-14	① Nozzle Assembly	1	H
	632848-17	① Nozzle Assembly	1	J
-1	628540	. Nozzle	1	ABCD
-1	632847	. Nozzle	1	J
-1	633722	. Nozzle	1	E
-1	639322	. Nozzle	1	FG
-1	628773	. Nozzle	1	H
-2	630979-9	② . "O" Ring	2	
-3	627333	③ . Jet	1	

NOTE:

① Order nozzle size identified on hex of nozzle body. ② 100% Replacement parts.

③ Dash number of jet will be the same as the dash number of the nozzle assembly.

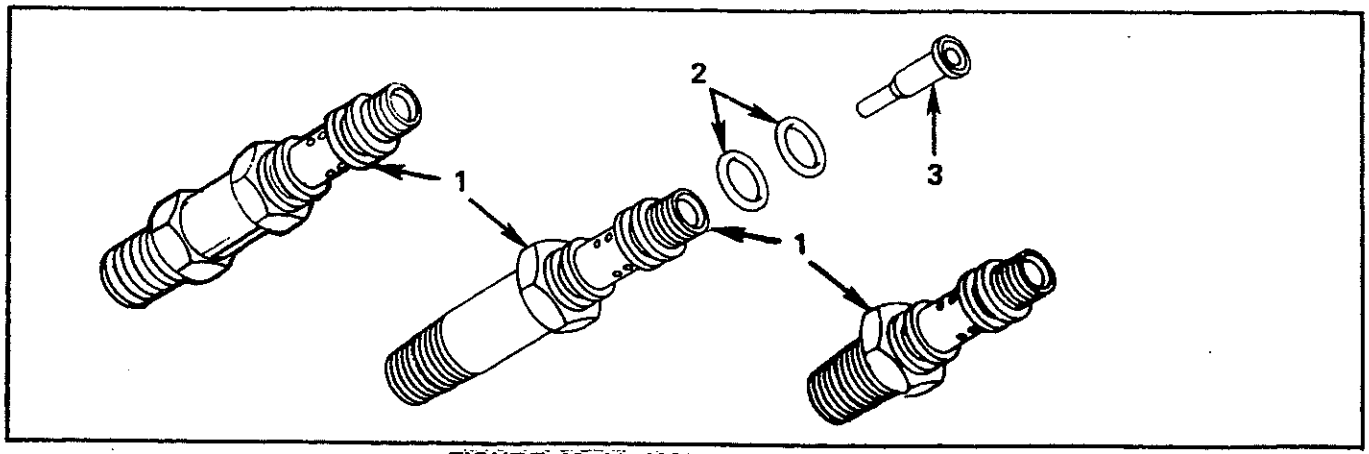


FIGURE 40-22. NOZZLE ASSEMBLY.

INDEX
73-50-00
550 SERIES

INTENTIONALLY

LEFT

BLANK

73-50-01
FUEL PUMP ASSEMBLY
P/N 643535-1, 643536-1, 646766-1 & 646767-1

01-01. DISASSEMBLY.

A. Place pump assembly in suitable fixture and remove all lockwire. Refer to 50-01. Remove screw (43) from cover (42) to release spring pressure. Remove nut (46), plain washer (48) and seal washer (47), from aneroid adjusting screw. Remove four bolts (45) from pump assembly and vapor separator relief valve aneroid assembly (14 through 48). Remove this section from basic pump assembly (5 through 13). Separate cover (42) from body (14) and (26) while screwing down on aneroid (32). Use care when removing cover so as not to stretch aneroid (32) or compress it by screwing it too far into cover (42) prior to separation from body (26).

B. Remove screws (27 and 28), variable orifice body (26), gasket (25) and "O" ring (42). Remove aneroid (32) and rod (31) from body. The rod seal (29) and retaining ring (30) can be removed for replacement by soaking the variable orifice body (26) in a mixture of 80% Glacial Acetic acid and water, then scrape off the softened epoxy, if epoxy was used. Remove ball (16), spring (17) plug (15) and jet assembly (33, 34, 35 & 36) from vapor separator body. Remove screws (20 & 21), cover (19), gasket (18) and ejector (22).

C. Disassembly of the basic pump should be accomplished in the following manner. Refer to exploded view Figure 50-01 and remove the adapter (1) and insulator (3) from the basic pump. Remove seal (2) from adapter (1) and bushing (4) from insulator (3). Hold pump body firmly in palm of hand, end plate (12) down, and apply pressure to drive end of rotor shaft (10) forcing end plate (12), end plate seal (13), blades (11) and shaft (10) from pump body. Remove seal (6) and discard. It is important to note the liner position relative to the rotation marking found on the top surface of the liner. It must be installed with the proper marking (C or CC) in the up position.

CAUTION . . . Do not disassemble liner (9), plate (8) or pin (7) from pump body unless inspection indicates damage or excessive wear. If these parts are to be removed, place the pump body in a dry oven at 400° F. for 10 to 15 minutes to expand the aluminum body. The liner (9), plate (8) and pin (7) may then be removed by carefully bumping body.

01-02. REASSEMBLY.

A. Reassemble basic pump (5 through 13) in reverse order of disassembly. Refer to Figure 50-01, and install new seal (6) in body (5). Install pin (7), plate (8) and liner (9) in body (5). Be sure liner is installed with proper rotation lettering visible. Use light machine oil to lubricate shaft (10) and install in pump. Install blades (11) in position and lubricate lightly. Install plate (12) and seal (13) to complete basic pump assembly. Install new seal (2) in adapter (1). Install bushing (4) and insulator (3) on pump assembly and insert pump assembly (3 through 13) into adapter assembly (1).

B. Refer to exploded drawing Figure 50-01, and assemble vapor separator, relief valve and aneroid sections as follows:

C. Install seal (29) in body (26). Apply a thin layer of Loctite 290 in the retaining ring groove and install retaining ring (30). Insert aneroid and rod assembly into body (26).

D. Install to body (14), gasket (18) and cover (19), secure with screws (20) and (21) using Loctite 242. Install ejector (22) in cover (19).

NOTE . . . Shroud, where used, must now be positioned.

E. Install plug (15), ball (16) spring (17) and jet assembly (33, 34, 35 & 36). Install gasket (25) and body (26). Secure with screws (27 and 28) using Loctite 242.

NOTE . . . To assist in the assembly of the relief valve section including the aneroid cover, it is suggested that two bolts approximately 3-1/2 inches long be used as line-up guides. They can be made of used pump bolts P/N 628321A3.72 with heads removed.

F. If name plate has been removed, install plate (23) using drive screws (24).

G. Assemble plunger (37) to body (14) install diaphragm (38), plate (39), spring (40) and plate (39). Install screw (43) sufficiently deep to properly contact center of plate (39). Install "O" ring (41) in land on body (26). Use a very small amount of Parker O Lube on this "O" ring to prevent rolling. Assemble cover (42) to body (14). Hold cover place and back aneroid adjusting screw up into the cover and install seal washer (48), plain washer (48) and lock nut (46). Exert pressure on cover assembly and install two bolts (45) through aligned parts and tighten enough to hold parts in alignment. Remove adjusting screw (43) and observe position of top plate (39). If not properly aligned to accept lead portion of adjusting screw, realign with scribe and reinstall adjusting screw to approximately one half of its length.

H. Remove assembly pins and install bolts (45) with belleville washers (44) and torque bolts to 30 ± 1 inch pounds.

CAUTION . . . Belleville washers (44) are special and must be installed with concave surfaces facing each other. Should it be necessary to remove these washers once they have been torqued, they must be replaced.

I. Install supercharger pressure fitting in aneroid relief valve cover (42) at this time. Install to proper position. Pump is now ready for calibration and test procedure. Do not lockwire until pump has met calibration and test specifications outlined in the Calibration Section.

USABLE ON CODE

MODEL	CODE
643535-1	A
646766-1	B
643536-1	C
646767-1	D

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
50-01					
	643535-1	①	Fuel Pump and Pressure Compensator Assembly	1	A
	646766-1	①	Fuel Pump and Pressure Compensator Assembly	1	B
	643536-1	①	Fuel Pump and Pressure Compensator Assembly	1	C
	646767-1	①	Fuel Pump and Pressure Compensator Assembly	1	D
-1	646650		. Adapter, Fuel Pump	1	
-2	628178	②	. Seal	1	
-3	632816		. Insulator	1	
-4	632741		. Bushing	1	
-5	643696		. Body Assembly, Fuel Pump	1	A
-5	646182-2		. Body Assembly, Fuel Pump	1	B
-5	643694		. Body Assembly, Fuel Pump	1	C
-5	646182-1		. Body Assembly, Fuel Pump	1	D
-6	649198	②	. Seal, Shaft	1	AC
-6	646181	②	. Seal, Shaft	1	BD
-7	643853		. Pin, Liner Locator	1	
-8	635548	②③	. Plate, Thrust	1	AC
-8	646177		. Plate, Thrust	1	BD
-9	646186		. Liner	1	B
-9	643697		. Liner	1	C
-9	638217-1		. Liner	1	A
-9	646178		. Liner	1	D
-10	643689		. Shaft	1	AC
-10	646176		. Shaft	1	BD

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
-11	635549		. Blade	1	
-12	643690		. Plate, Fuel Pump End	1	AC
-12	646180		. Plate, Fuel Pump End	1	BD
-13	630979-14	②	. "O" Ring	1	
-14	643534		. Vapor Separator and Relief Valve	1	AB
-14	643537		. Vapor Separator and Relief Valve	1	CD
-15	629974		. Plug, Fuel Pump By-Pass	1	AB
-15	632636		. Plug, Fuel Pump By-Pass	1	CD
-16	628249-7	②	. Ball, Fuel Pump By-Pass	1	
-17	630167	②	. Spring Ball Return	1	
-18	625548	②	. Gasket, Separator	1	
-19	625900		. Cover, Vapor Separator	1	
-20	AN500-8-12		. Screw	2	
-21	AN500-8-7		. Screw	2	
-22	633447		. Ejector	1	CD
-22	625901		. Ejector	1	AB
-23	640797		. Name Plate	1	
-24	24764		. Screw, Drive	2	
-25	638223	②	. Gasket, Variable Body	1	
-26	634439		. Body, Variable Orifice	1	
-27	AN500-8-20		. Screw	2	
-28	AN500-8-14		. Screw	2	
-29	639484		. Seal, Rod	1	
-30	521824		. Ring, Retaining	1	
-31	634438-10		. Rod, Variable Orifice	1	AB
-31	634438-11		. Rod, Variable Orifice	1	CD
-32	642810		. Aneroid Altitude Control	1	
-33	637864		. Plug, Assembly Jet	1	AB
-34	646756		. Plug, Assembly Jet	1	CD
-34	AN123956		. . Seal	1	
-35	637861		. . Ring, Retaining	1	
-36	637846		. . Needle, Adjusting	1	AB
-37	646755		. . Needle, Adjusting	1	CD
-37	628333		. Plunger, Relief Valve	1	
-38	642644	②	. Diaphragm, Relief Valve	1	
-39	637784		. Plate, Diaphragm	2	
-40	628311	②	. Spring, Diaphragm	1	
-41	630979-12		. "O" Ring, Variable Orifice	1	
-42	646649		. Cover Assembly, Relief Valve	1	AB
-43	646648		. Cover Assembly, Relief Valve	1	CD
-43	631883		. Screw, Altitude Control	1	
-44	646448-1	②	. Washer, Belleville	8	
-45	628321-A3.72		. Bolt	4	
-46	628298		. Nut, Aneroid Locking	1	
-47	538600-3		. Washer, Seal	1	
-48	20522		. Washer, Plain	1	

NOTES:

① This assembly NOT available as replacement part. For correct service part no., see appropriate Service Bulletin.

② 100% Replacement parts. ③ May be turned over and reused if not worn form previous overhaul.

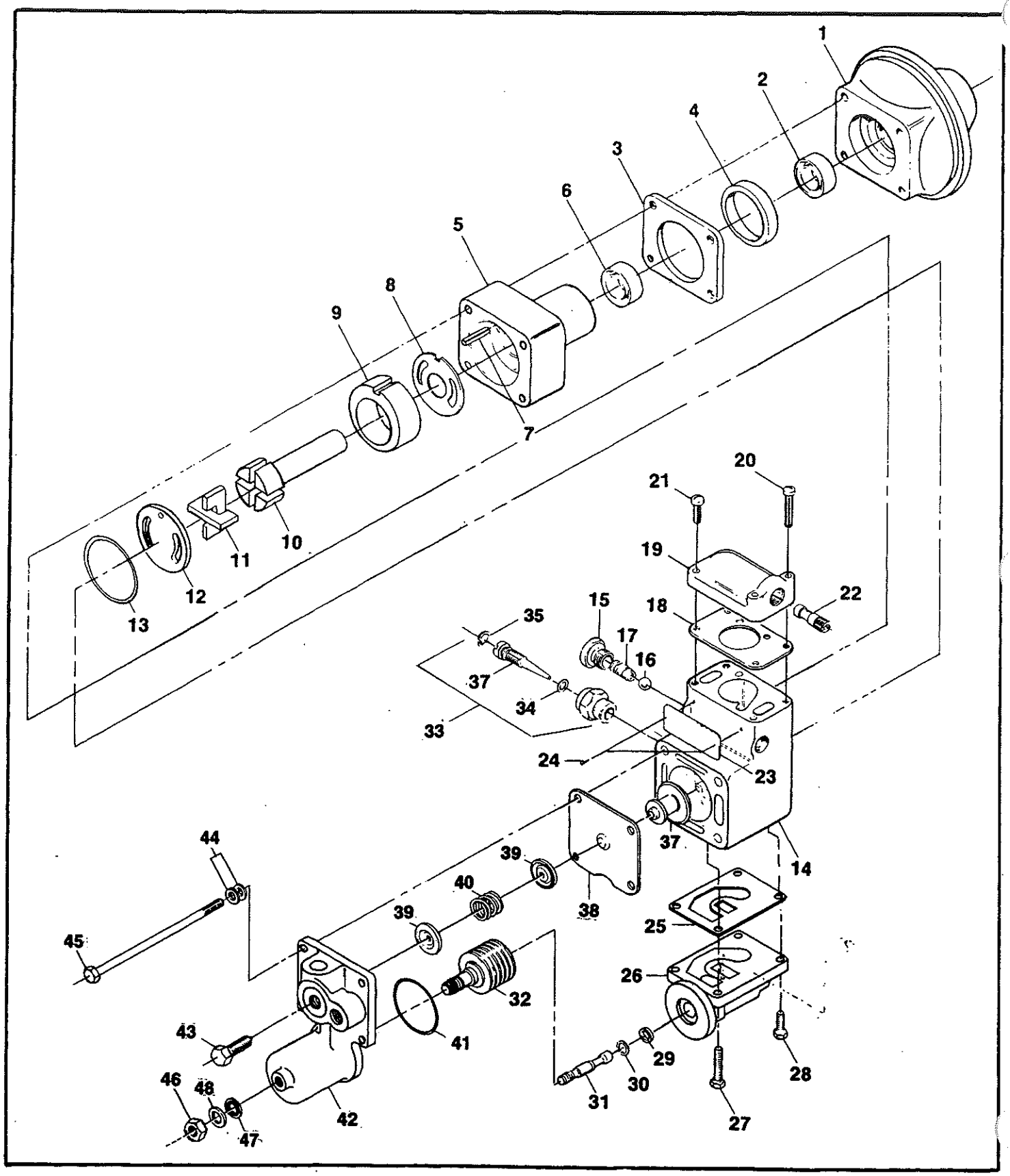


FIGURE 50–01. FUEL PUMP ASSEMBLY.

73-50-02
FUEL CONTROL VALVE
P/N 646619

02-01. DISASSEMBLY.

NOTE . . . Figure 50-02 does not represent any one model, but refers to all basic types.

A. Remove all safety wire and fittings. Unscrew screen assembly (3) from body (1) and lift off gasket (4). Remove lock screw (23) and washer (22) from outside of name plate (21).

B. Remove two special screws (24) from name plate (21) and body (1).

CAUTION . . . These screws retain not only the name plate (21), but the entire internal assemblies. Exercise care to keep the internal assemblies from falling out and becoming damaged.

C. Remove name plate (21) and washer (22) from between name plate and body (1). Slide out mixture control shaft (10) and related parts from valve body (1).

D. Note the position of the pin (20) with respect to the mixture control assembly, so it can be re-assembled in the proper position.

E. Hold collar (19) in a suitable vee block and drive out pin (20) from the small end with a 3/32" straight punch. Slide collar (19) from shaft (10). Remove bushing (15), washer (14 & 13) spring (12) and "O" ring (11) from shaft (10). Slide out fuel metering shaft (9) and related parts from valve body (1).

F. Note the position of the lever (16) with respect to the metering shaft (9) so it can be reassembled in the proper position. Hold lever (16) in a suitable vee block and drive out pin (18) with a 3/32" straight punch.

F. Slide lever (16) from shaft (9).

NOTE . . . Some models may have a bushing (17) in the lever. Bushing may be replaced if necessary.

G. Remove bushing (15), washers (14 and 13), spring (12) and "O" ring (11) from shaft (9). Push out metering plug (5A) with a 1/2" fiber rod.

CAUTION . . . DO NOT use a metallic pusher, as damage to the metering plug could result.

H. Remove "O" rings (8) from metering plug (5). Using tweezers through the check valve hole, slide out pin (7) from metering plug (5). Remove ball check valve (6).

NOTE . . . Further disassembly is not required for a normal overhaul, but if necessary, the mixture control stops (2), if damaged, can be pried out with diagonal cutters.

CAUTION . . . Do not break edge of any of the holes in the metering plug. Do not break or damage edge of mixture control or fuel metering shaft contours.

02-02. REASSEMBLY.

NOTE . . . Install new mixture control stops (2), if required.

A. Insert and seat new ball check valve (6) into the metering plug (5) and check for full seat contact. Slide retaining pin (7) into the hole in the annular groove. Be sure that the pin is bottomed to prevent a rise in the annular groove.

B. Apply a thin film of oil the metering plug (5) and slide it into the valve body (1) making certain that the threaded lock hole lines up with the lock screw (23) hole and the ball check valve (6) faces the mixture control (10) end.

CAUTION . . . DO NOT install new "O" rings (8) on metering plug (5) at this time.

C. Install lock screw (23) to hold the metering plug (5) in position for lapping operation. Install spring (12), washers (13 and 14) and bushing (15) on fuel metering shaft (9).

CAUTION . . . DO NOT install new "O" ring (11) on mixture control shaft (9) at this time.

D. Insert the fuel metering assembly into the

valve body (1) in the end opposing the mixture control stops (2). Lap shaft face to metering plug. Install spring (12), washer (13 and 14), and bushing (15) on mixture control shaft (10).

CAUTION . . . DO NOT install new "O" ring (11) on mixture control shaft (10) at this time.

E. Install mixture control assembly into valve body (1) and lap face to metering plug. After this has been accomplished, remove metering shaft (9), mixture control shaft (10), lockscrew (23), and metering plug (5). Thoroughly clean all parts. Assemble all fittings in proper location position. Install new "O" rings (8) on the metering plug (5) in each annular groove. Install metering plug assembly per paragraph 02-02B.

F. Place a new washer (22) on the valve body (1) and install the name plate (21). Place a new washer (22) on the lockscrew (23) and thread it into place.

G. Install new "O" rings (11) on metering and mixture shafts (9 and 10). Apply Alubco, American Lubricants Co., 1227 Deeds, Dayton, Ohio 45439, or equivalent, to "O" rings grooves and spring cavities and reassemble.

H. Install lever (16) on metering shaft (9) on its proper relative position. Line up the hole on the lever (16) with the hole on the metering shaft (9) and press new tubular pin (18) in place. Flare both ends of the pin (18) to prevent it from coming out. If this model has a bushing (17) in the lever (16), install a new bushing (17).

I. Install collar (19) on mixture control shaft (10) in its proper relative position. Line up the hole in the collar (19) with the hole in the mixture control shaft (10) and press pin (20) into place with the large diameter end protruding from the proper side of the collar (19).

J. Holding the mixture control assembly in place, install special screw (24) through the name plate (21), body (1) and into the groove on the mixture control shaft (10). Repeat this procedure for the fuel metering end. Check operation of both shafts (9 and 10) for smooth travel through full range without binding.

K. Install a new gasket (4) on the screen assembly (3) and thread it into the body (1). Install any fittings that were removed.

L. This completes assembly and unit is now ready for air pressure check and calibration according to values as outlined in the Calibration Section, Lockwire screws (23 and 24) after calibration to complete overhaul.

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
50-02					
	646619	①	Control Assembly	1	
-1	642837		. Body Assembly	1	
-2	630383-1		. . Pin	2	
-3	539959		. Screen Assembly	1	
-4	646665	②	. Gasket	1	
-5	638022		. Plug Assembly, Fuel Metering	1	
-5A	625500		. . Plug, Fuel Metering	1	
-6	628249-3		. . Ball	1	
-7	626844		. . Pin, Ball Retaining	1	
-8	AN123962	②	. . "O" Ring	2	
-9	625221	③	. Shaft, Fuel Metering	1	
-10	635607		. Shaft, Mixture Control	1	
-11	630979	②	. "O" Ring	2	

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
-12	625492	②	. Spring	2	
-13	625457	②	. Washer	2	
-14	635835-1	②	. Washer	3	
-15	625293	②	. Bushing	2	
-16	632555-24		. Lever, Fuel Metering Shaft	1	
-17	632554-2		. . Bushing	1	
-18	626813	②	. Pin, Lever Retaining	1	
-19	629782		. Collar, Mixture Control	1	
-20	625952	②	. Pin, Collar Retaining	1	
-21	640796		. Name Plate	1	
-22	538600-1	②	. Washer, Seal	2	
-23	AN500A8-7		. Screw	1	
-24	626810		. Screw, Special	2	

NOTES:

① This assembly not available as service part. See applicable parts catalog for correct service part number.

② 100% Replacement parts.

③ Dash number designation to be identical with dash number of control assembly. Example 646619-1 control assembly requires 625221-1 shaft.

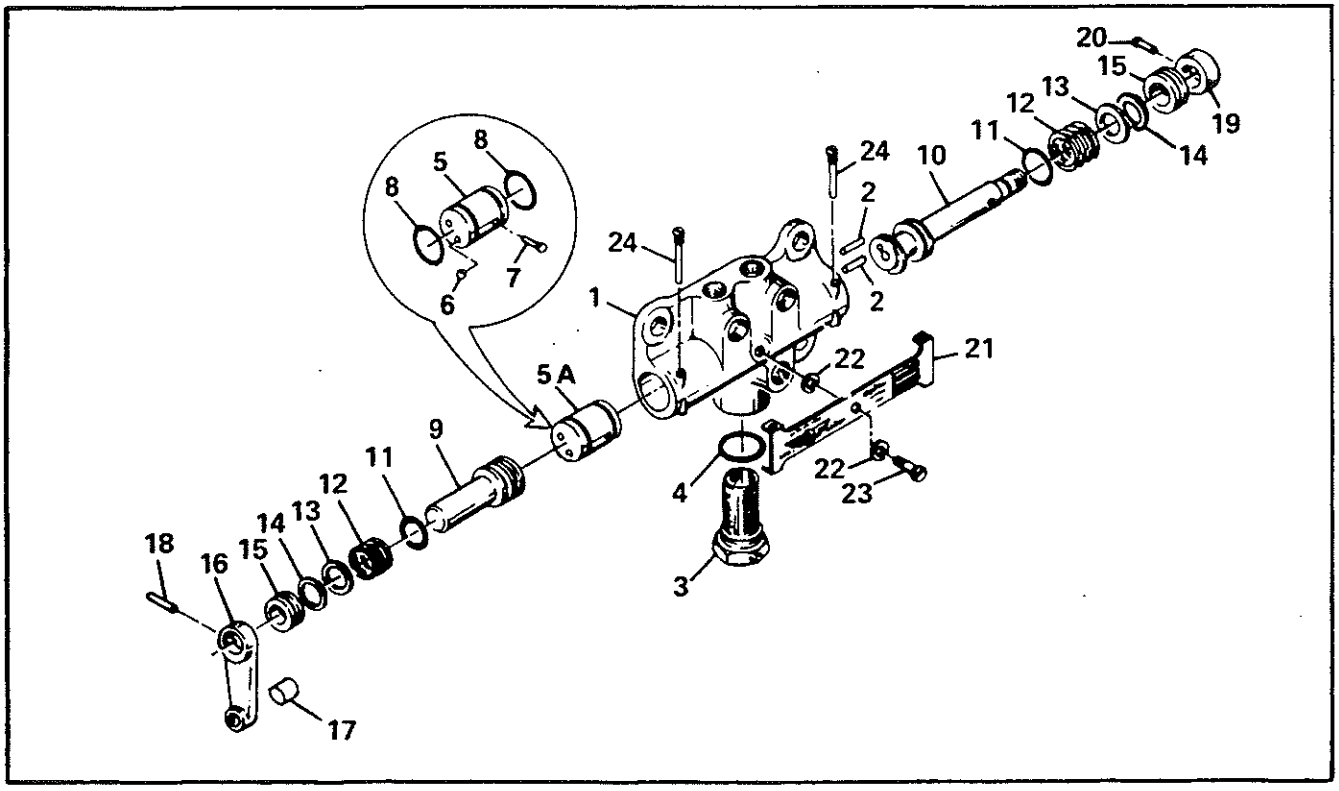


FIGURE 50-02. FUEL CONTROL ASSEMBLY

73-50-03
MANIFOLD VALVE ASSEMBLY
P/N 646508-6

03-01. DISASSEMBLY.

A. Remove all lockwire, remove fittings only if they appear damaged. Remove four screws (16) and carefully separate cover (15) from body (1). Use caution to eliminate damage to parting surfaces. Remove spring (14) and lift out diaphragm and plunger assembly (4 through 13). Remove screen (3).

B. Place diaphragm assembly in shielded vise jaws in a position for disassembly. Remove nut (13), plate (12), diaphragm (11), plate (10), gasket (9) and spacer (8). Remove needle (5), spring (6), retainer (7) and plunger (4).

NOTE . . . Remove and discard gasket (9).

03-02. REASSEMBLY.

A. Reassemble diaphragm assembly (4 through 13). With plunger in shielded vise jaws, install spacer (8), plate (10), diaphragm (11) and plate (12). Replace needle (5) spring (4) and retainer (3) into plunger (6).

NOTE . . . Apply Loctite 290 between diaphragm assembly parts.

NOTE . . . If model has a gasket (9), it will not be replaced. Diaphragm parts are bonded together eliminating the need for gasket (9).

Apply a thin coat of Loctite 290 to first and second threads of plunger (4) before installing nut (13). Torque nut (13) to 30 $\pm$ 1 inch pounds.

B. Install new seal (2) and place screen (7) in body (1). Install diaphragm assembly (4 through 13) in bore of body. Install new spring (14) on top of diaphragm assembly. Place cover (15) on top of spring with vent hole 90° from fore and aft mounting position, as indicated by bracket (18) mounting holes. Install four screws (16) and tighten to 20 $\pm$ 1 inch pounds. This completes assembly and unit is now ready for functional flow test according to the Calibration Section. Lockwire screws after functional flow test to complete overhaul.

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
50-03					
	646508-6	.	Valve Assembly, Fuel Manifold	NS	
-1	641030	.	Body Assembly	1	
-2	631330	.	Seal, Plunger	1	
-3	626557	.	Screen	1	
	632425	.	Diaphragm & Plunger Assembly	1	
-4	631282	. .	Plunger	1	
-5	634619	. .	Needle	1	
-6	631331	. .	Spring	1	
-7	632394	. .	Retainer	1	
-8	631350	. .	Spacer	1	
-9	627124	. .	Gasket	1	
-10	627123	. .	Plate	1	
-11	626536	. .	Diaphragm	1	
-12	626556	. .	Plate	1	
-13	646605	. .	Nut	1	
-14	630184	.	Spring Compression	1	
-15	634325	.	Cover	1	
			ATTACHING PARTS		
-16	AN500A8-12	.	Screw	4	
-17	AN960-8	.	Washer	4	
-18	646109	.	Bracket, Manifold Valve	1	

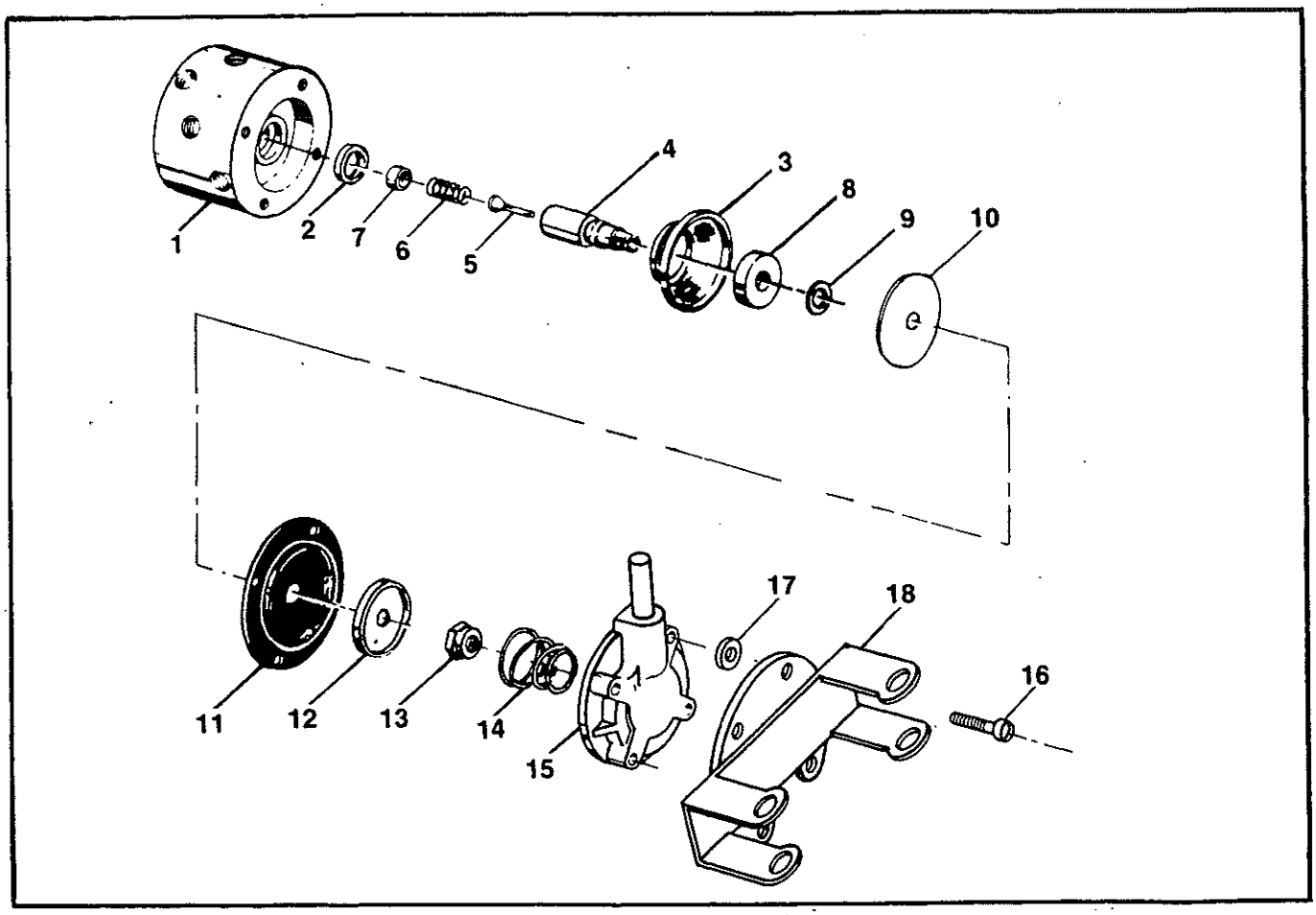


FIGURE 50–03. FUEL MANIFOLD VALVE ASSEMBLY.

73-50-04
NOZZLE ASSEMBLY

04-01. DISASSEMBLY (Figure 50-04.)

A. Place nozzle (1) in a suitable fixture. Lift off shield (4) and remove screen (3).

B. If nozzle has a screw-type jet, discard entire assembly and replace with new type.

C. If jet must be replaced, use suitable type tap and thread into opening in jet. The jet can be removed by pulling the tap straight out.

04-01. REASSEMBLY

A. If jet (2) was removed, replace by pressing new jet in a nozzle shell.

NOTE . . . Apply a thin coat of Loctite 290 to jet before installation.

B. Install new screen (3) and shield (4) on nozzle (1). Press shield flush with top of shoulder.

C. Nozzles should be flow tested at this time. Flow nozzles and calibrate according to instructions and calibration data in the Calibration Section. If the nozzle flows in the next size range, it may be so stamped. A new jet or a new nozzle assembly can be obtained.

CAUTION . . . All nozzles must be of the same size per engine.

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
50-04	627335D13	①	Nozzle Assembly	NS	
-1	627334		. Nozzle	1	
-2	627333-13		. Jet	1	
-3	625921		. Screen	1	
-4	625919		. Shield	1	

NOTES:

① Order nozzle size identified on hex nozzle body.

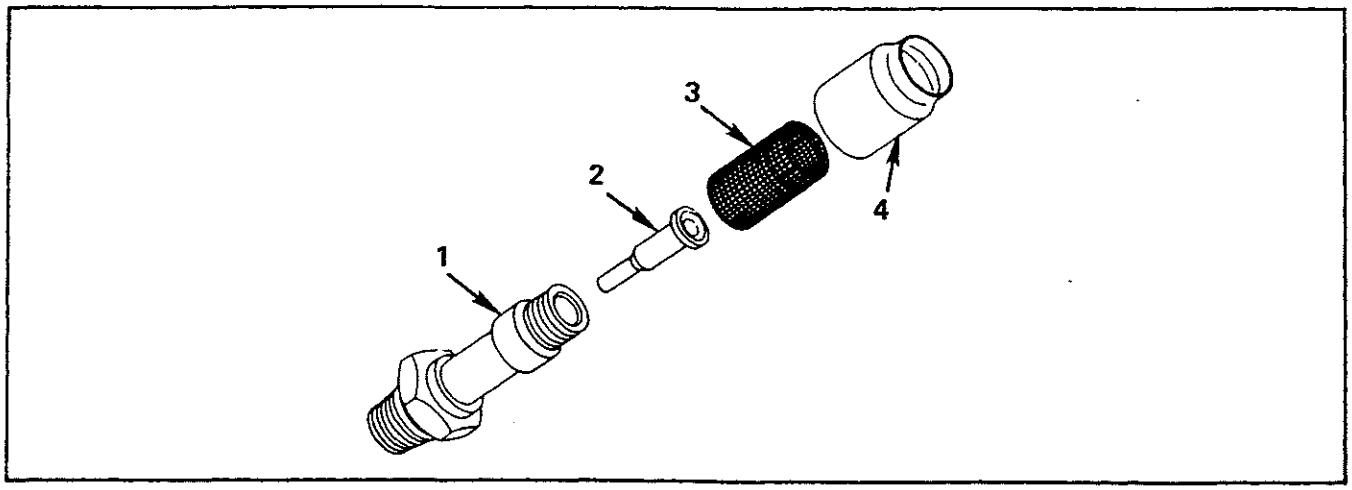


FIGURE 50-04. NOZZLE ASSEMBLY.

INDEX
73–60–00
TIARA SERIES

INTENTIONALLY

LEFT

BLANK

73-60-01
FUEL PUMP ASSEMBLY
P/N 638193-1

01-01. DISASSEMBLY.

A. Remove four nuts (1) and eight belleville washers (2) and pull off adapter (3). Remove oil seal (4) from adapter. Remove insulator (5) and bushing (6).

B. Carefully pull basic pump assembly (7 thru 23) from studs (60). Catch spring (25) and ball (24) as the face plate assembly (18) pulls away. Remove gasket (26).

C. Separate body assembly (7) and face plate assembly (18). Remove "O" rings (10, 11, 12) and seal (8). Remove separator plate (13). If end plate (17) shows wear signs sufficient to warranty replacement, it may be necessary to heat body assembly in a dry oven to expand the aluminum before liner (16) can be bumped out.

D. Remove rotor shaft (20) and blades (21) from face plate (18). Remove liner (22) and end plate (23) as required. Remove roll pin (19) if damaged.

E. Remove bolts (27, 28) and pull adapter assembly (29) from pressure regulator housing (59). Remove screws (33) and separate aneroid housing (35) from adapter. Pull valve (34) from adapter (29). Drive pin (30) from adapter and remove a adjusting needle (31) and "O" ring (32). Remove nut (36), seal washer (37), washer (46) and unscrew aneroid (39) from housing (35). Remove spacer (38). Remove gasket (40).

F. Pull fuel transfer adapter (42) from housing (59). Remove "O" rings (43).

G. Loosen relief valve screw (52). Remove screws (53) and lift off cover (54). Remove plates (55), spring (56) and diaphragm (57). Pull plunger (58) from housing.

H. Remove screws (33) and pull cap (44) together with aneroid (49) and valve (50) from housing. Remove stud (51) as required. Separate aneroid from cap by removing lock nut (45), flat washer (46) and seal washer (47). Remove gasket (40).

I. When applicable, remove retaining rings (61) and withdraw mixture control shaft assembly (63). Check shaft for stains which would indicate that the ball check in the shaft has been leaking. If no evidence of leaking is present, do not disassemble further. If a leak is evident, place shaft in a vee block and drive out pin (64). Ball (65) will then drop out.

01-02. REASSEMBLY.

A. Install new oil seal (4) in adapter (3).

B. If removed, install new roll pin (9) in body (7). Insert end plate (17) and liner (16) in place. Install new seal (8). Insert rotor shaft (14), install blades (15) in rotor and place separator plate (13) in position. Install bushing (6) and insulator (5) and slide body into adapter (3). Use new "O" rings (10, 11, 12).

C. Install new roll pin (19) if required, and insert end plate (23) and liner (22). Slide rotor shaft (20) in place and install blades (21).

D. Turn rotor shaft (14) so groove is approximately aligned with driving tang on rotor shaft (20) and join body and face plate assembly. Be careful not to lose "O" rings.

E. If studs (60) must be replaced, install to an extended height of 2.88 inches using Loctite 242 on threads.

F. If removed, install stud (51) in valve (50) using Loctite 242. Install aneroid (49) on stud and spacer (48) on aneroid. Screw aneroid and valve assembly into cap (44). Install gasket (40) and secure cap and aneroid to housing (57) with screws (33). Install seal washer (47), plain washer (46), and nut (45).

G. Insert plunger (58) in housing (59). Install diaphragm (57) so that relief valve orifice is open. Install plates (55), spring (56) and cap assembly (54). Install relief valve screw (52) if removed.

H. Install new ball (65) in shaft (63) and secure with pin (64). Install "O" rings (62) on shaft assembly. Insert shaft in cavity below relief valve and secure with retaining ring (61).

I. Insert ball (24) and spring (25) in face plate assembly (18). Install gasket (26) on studs (60). Slide pressure regulator housing assembly through basic pump assembly.

J. Install basic pump and regulator assembly on adapter assembly (3). Secure with belleville washers (2) and nuts (1). Make certain concave faces of belleville washers are facing each other. Tighten nuts to 30 ± 1 inch pounds torque.

CAUTION . . . Should it be necessary to remove these washers once they have been torqued, they must be replaced.

K. Install "O" rings (43) on adapter (42) and insert in housing (59).

L. Install spacer (38) on aneroid (39) and screw assembly into aneroid housing (35). Secure with seal washer (37) and nut (36). Screw valve (34) on retainer and install valve in adapter assembly (29). Install gasket (40) on adapter and install aneroid housing assembly on adapter. Secure with screws (33).

M. Install "O" ring (32) on adjustable needle (31) and screw into adapter. Secure with roll pin (30).

N. Install gasket (41) on housing (59). Install adapter and aneroid on housing and secure with attaching screws (27, 28).

O. Install any fittings that were removed. Leak test and calibrate according to instructions in the Calibration Section. Lockwire after calibration to complete overhaul.

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
60-01					
	638193-1	①	Fuel Pump Assembly	NS	
-1	AN121501		. Nut	4	
-2	646448-1		. Washer, Belleville	8	
-3	638176		. Adapter	1	
-4	628178		. Seal	1	
-5	635471		. Insulator	1	
-6	632741		. Bushing	1	
-7	638177-2		. Body Assembly	1	
-8	636292		. Seal	1	
-9	AN150259		. Roll Pin	1	
-10	MS29513-011	②	. "O" Ring	2	
-11	630979-14	②	. "O" Ring	1	
-12	MS29513-013	②	. "O" Ring	1	
-13	638187		. Plate, Separator	1	
-14	638180		. Shaft, Rotor	1	
-15	635549		. Blade	2	
-16	638217		. Liner	1	
-17	638179		. End Plate	1	
-18	638184-2		. Face Place Assembly	1	
-19	AN150259		. . Roll Pin	1	
-20	638181-1		. Rotor Shaft	1	
-21	635426		. Blade	2	
-22	638183		. Liner	1	
-23	639075		. End Plate	1	
-24	MS134355		. Ball	1	
-25	630167		. Spring	1	
-26	639082	②	. Gasket	1	
-27	MS20074-03-17		. Screw	1	

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
-28	MS20074-03-20		. Screw	1	
-29	638218		. Adapter	1	
-30	625495-11		. . Roll Pin	1	
-31	639299		. . Needle, Adjustable	1	
-32	MS29513-005	②	. . "O" Ring	1	
-33	AN500A10-8		. Screw	4	
-34	637839-6		. Valve	1	
-35	639083		. Housing, Aneroid	1	
-35	630518		. Housing, Aneroid	1	
-36	628298		. Nut	1	
-37	538600-3		. Washer, Seal	1	
-38	637331-1		. Spacer	1	
-39	642810		. Aneroid	1	
-40	639482	②	. Gasket	2	
-41	637855	②	. Gasket	1	
-42	637854		. Adapter	1	
-43	MS29513-012	②	. "O" Ring	2	
-44	636312		. Cap	1	
-45	628298		. Nut	1	
-46	20522		. Washer, Plain	1	
-47	538600-3		. Washer, Seal	1	
-48	637331-1		. Spacer	1	
-49	642810		. Aneroid	1	
-50	636291		. Valve	1	
-51	636317		. Stud	1	
-52	631883		. Screw, Relief Valve	1	
-53	AN500A8-7		. Screw	4	
-54	637654		. Cover	1	
-55	637784		. Plate	2	
-56	628311		. Spring	1	
-57	635671	②	. Diaphragm	1	
-58	635489		. Plunger	1	
-59	638195		. Pressure Regulator Housing Assembly	1	
-60	636298-4		. . Stud	4	
-61	628952-5		. Retaining Ring	1	
-62	630979-11	②	. "O" Ring	2	
-63	640607		. Shaft Assembly	1	
-64	626844-1		. Pin	1	
-65	MS134378		. Ball	1	
-66	626834		. Pin Stop	1	

NOTES:

① This assembly not available as a spare part. See appropriate parts catalog for correct assembly number.

② 100% Replacement parts.

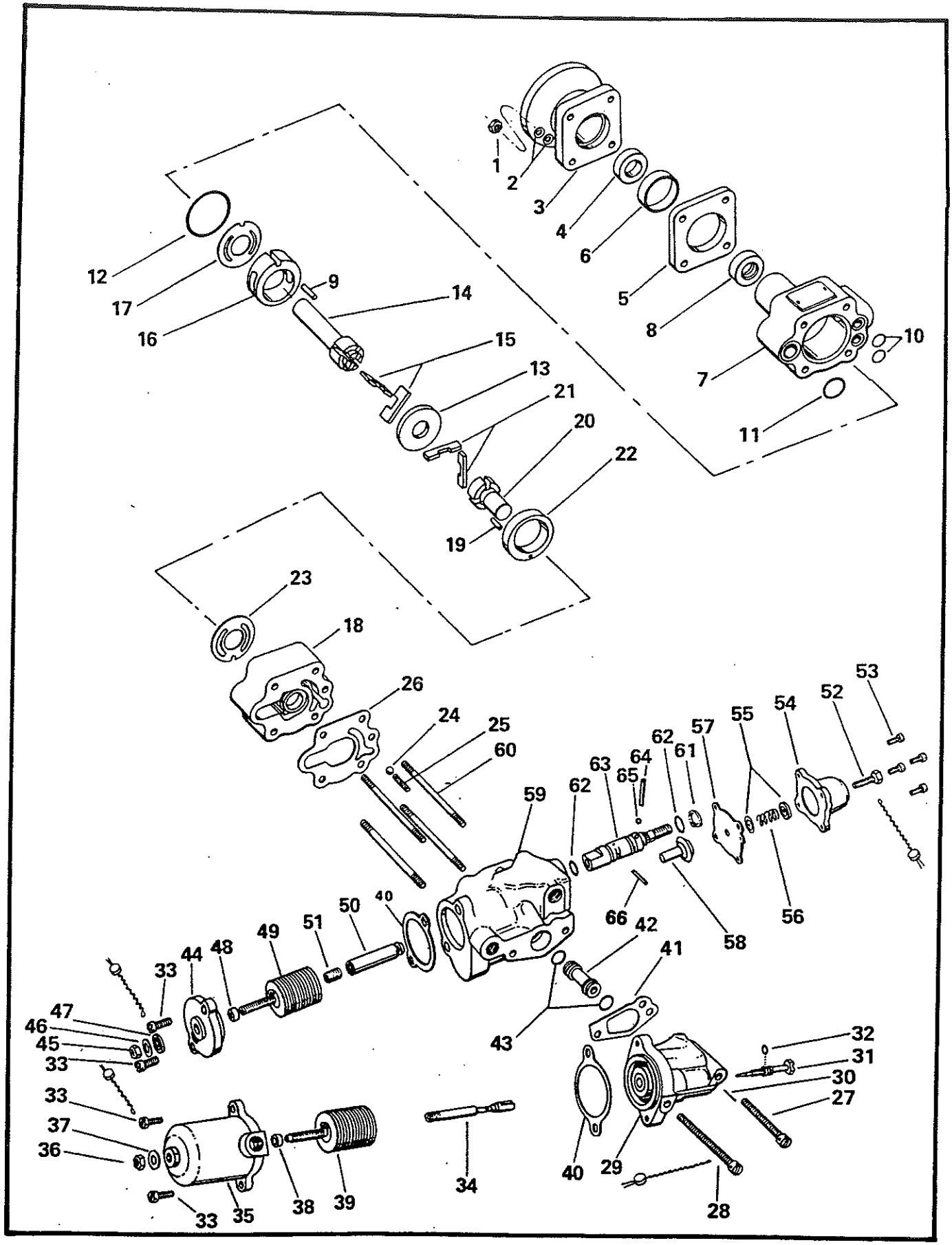


FIGURE 60–01. FUEL PUMP ASSEMBLY.

73-60-02
AIR THROTTLE FUEL METERING ASSEMBLY
P/N 639556-1 THRU -4

02-01. DISASSEMBLY.

A. Remove all safety wire; and fittings if necessary.

B. Remove lever (7) from shaft (2) by driving out the pin (8) with a 1/8" punch. Remove screw (9) and spring (10) from lever (7).

C. Remove screws (14) and cover (13) from body (1). Remove retaining ring (23), idle adjustment screw (19), "O" ring (20), bushing (21) and spring (22) from cover (13). As the idle adjustment screw (19) is loosened, the metering plug (18), "O" ring (17) and spring (16) will be released for removal. Remove "O" ring (15) from cover (13).

D. Remove screws (6) and plate (5) from throttle shaft (2). Remove throttle shaft (2) from body (1). Remove "O" ring (15) and washer (4) from metering cover boss on throttle body (1). Remove "O" rings (3) from throttle shaft (2). This completes disassembly.

02-02. REASSEMBLY.

A. Use extreme care in reassembly of the unit to insure against damage to the lapped surfaces of the metering plug (18) and the fuel metering shaft and disc assembly.

B. Install "O" rings (3) and washer (4) on shaft (2) and with a small amount of Parker "O" Lube on rings insert shaft (2) into body (1). Place plate (5) in proper position and install screws (6). After checking plate (5) position, stake screws (6). After determining proper position, install lever (7) on shaft (2) and insert pin (8). If new shaft-disc assembly is to be installed, place lever (7) on shaft and re-drill .125" through shaft and lever and install pin (8). Swage both ends of pin (8) securely.

NOTE . . . A light coating of Parker "O" Lube on all "O" rings will assist in the assembly of this unit.

C. Install "O" rings (15) on throttle body fuel metering control boss and in metering cover (13). Place "O" ring (20) on idle adjustment screw (19). Install idle adjustment spring (22) and bushing (21) in position in cover (13), holding cover (13) in such a position to allow spring (22) to rest in bottom-most position. Holding cover (13) with metering plug (18) opening upright, install spring (16) in recess in bottom of cover (13). Place "O" ring (17) in plug (18) and carefully align metering plug pin with idle adjustment pin opening in bottom of cover (13) and install metering plug assembly (18). Depress plug assembly in cover to determine proper alignment of plug pin in idle adjustment recess.

D. With cover assembly (13) including parts (15, 16, 17, 18 and 4) in position, secure in an upright position, carefully mate to air throttle body assembly (1) being careful to prevent damage to metering plug. Install screw (14). Install idle adjustment screw sufficiently to engage the full width of "O" ring (20). Secure with retaining ring (23) and install any fittings that were removed. This completes assembly and unit is now ready for air pressure check and calibration according to values as outlined in the Calibration Section. Lockwire screws (14) after calibration to complete overhaul.

NOTE . . . If metering cover (13) has two idle adjustment screws, replace old cover with 642709 cover assembly.

FIG & INDEX	PART NUMBER	1 2 3 4 5	DESCRIPTION	QTY.	USABLE ON CODE
60-02					
	639556-1		Air Throttle and Fuel Metering Assembly . .	1	A
	639556-2		Air Throttle and Fuel Metering Assembly . .	1	B
	639556-3		Air Throttle and Fuel Metering Assembly . .	1	C
	639556-4		Air Throttle and Fuel Metering Assembly . .	1	D
-1	639370		. Body, Air Throttle	1	A
-1	639370-1		. Body, Air Throttle	1	BCD
-1A	626812		. Pin, Throttle Stop	1	
-2	640001		. Shaft Assembly, Throttle and Metering . .	1	A
-2	640240-2		. Shaft Assembly, Throttle and Metering . .	1	BCD
-3	630979-9	①	. "O" Ring	2	
-4	635835-2		. Washer	1	
-5	636961		. Plate, Throttle	1	A
-5	637306		. Plate, Throttle	1	BCD
			ATTACHING PARTS		
-6	539942		. Screw	2	
			* * * *		
-7	639497		. Lever, Throttle Idle Control	1	
-8	626813		. Pin, Tubular	1	
-9	639479		. Screw, Adjustment	1	
-10	626634		. Spring, Adjustment Screw	1	
-11	AN565E8H16		. Screw	1	
-12	13XX18130		. Jam Nut	1	
-13	642709		. Cover, Fuel Metering	1	
			ATTACHING PARTS		
-14	AN500A10-8		. Screw	3	
			* * * *		
-15	630979-10	①	. "O" Ring	2	
-16	630274		. Spring	1	
-17	630979-6	①	. "O" Ring	1	
-18	634861		. Plug Assembly, Fuel Metering	1	
-19	639450		. Screw, Idle Fuel Adjustment	1	
-20	630979-9	①	. "O" Ring	1	
-21	633298		. Bushing, Idle Adjusting Spring	1	
-22	635063		. Spring	1	
-23	521693		. Ring, Retaining	2	
			* * * *		
-24	639105-1		. Nozzle Assembly, Primer	1	A
-24	639105-2		. Nozzle Assembly, Primer	1	BCD
-25	640040		. Check Valve Assembly	1	ABC

NOTES:

① 100% Replacement parts.

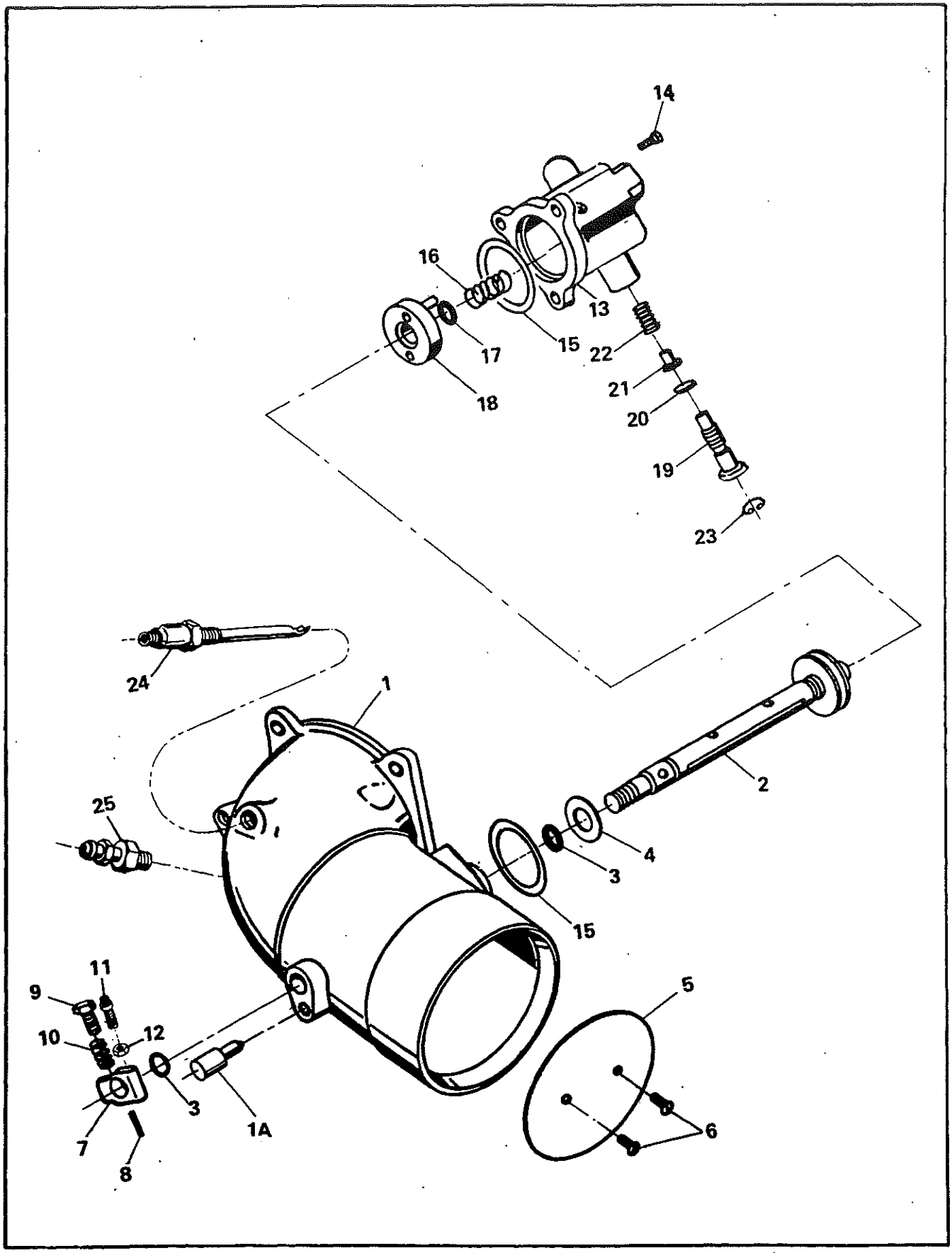


FIGURE 60–02. AIR THROTTLE AND FUEL METERING ASSEMBLY.

73-60-03
MANIFOLD VALVE ASSEMBLY
P/N 638132

03-01. DISASSEMBLY.

A. Remove all lockwire. Remove fittings only if they appear damaged. Remove four screws (16) and carefully separate cover (15) from body (1). Use caution to eliminate damage to parting surfaces. Remove spring (14) and lift out diaphragm assembly (4 through 13). Remove screen (2). Remove seal (3) and discard.

B. Place diaphragm assembly in shielded vise jaws in a position for disassembly. Remove nut (13), plate (12), diaphragm (11), plate (10) and spacer (8). Remove retainer (4) from plunger (7) and discard. Remove spring (5) and needle (6) from plunger (7) for inspection.

NOTE . . . Some models may have a gasket (9). Remove and discard this gasket.

03-02. REASSEMBLY.

A. Reassemble diaphragm assembly (4 through 13) by first installing needle (6) in plunger (7) and stake lightly.

CAUTION . . . Be sure needle is free to move before installing spring (5) and retainer (4).

NOTE . . . Apply Loctite 290 between diaphragm assembly parts.

Set retainer flush with bottom of plunger at initial installation. With plunger in shielded vise jaws, install spacer (8), plate (10), diaphragm (11) and plate (12).

NOTE . . . If model has a gasket (9), it will not be replaced. Diaphragm parts are bonded together, eliminating the need for gasket (9).

Apply a thin coat of Loctite 290 to first and second threads of plunger (7) before installing nut (13). Torque nut (13) to 30 $\pm$ 1 inch pounds. After diaphragm is positioned with the four through holes at 45° from the through hole in the plunger, install new seal (3) and screen (2) in body (1).

B. Install diaphragm assembly (4 through 13) in bore of body. Install new spring (14) on top of plunger assembly. Place cover (15) on top of spring with vent hole 90° from fore and aft mounting position, as indicated by bracket mounting holes in base of body. Install four screws (16) and tighten to 20 $\pm$ 1 inch pounds. This completes assembly and unit is now ready for air pressure test and calibration according to values as outlined in the Calibration Section. Lockwire screws after calibration to complete overhaul.

NOTE . . . If correct calibration cannot be obtained, reposition retainer in plunger (pressing further in increases pressure; out decreases pressure). Be extremely careful not to allow the retainer to protrude over 0.075" out of the plunger.

FIG & INDEX	PART NUMBER	1 2 3 4 5 DESCRIPTION	QTY.	USABLE ON CODE
60-03	638132	① Valve Assembly, Fuel Manifold	NS	
-1	638129	. Body, Fuel Manifold Valve	1	
-2	626557	. Screen	1	
-3	631330	②. Seal	1	
	638131	. Diaphragm Assembly, Fuel Manifold Valve	1	
-4	632394	. . Retainer	1	
-5	631331	②. . Spring	1	
-6	634619	. . Needle	1	
-7	631282	. . Plunger	1	
-8	631350	. . Spacer	1	
-9	627124	②. . Gasket	1	
-10	627123	. . Plate	1	
-11	638128	②. . Diaphragm	1	
-12	626556	. . Plate	1	
-13	646605	②. . Nut	1	
-14	630184	. Spring, Compression	1	
-15	638055	. Cover	1	
		ATTACHING PARTS		
-16	AN500-8-22	. Screw	4	

NOTES:

① This assembly not available for service. See applicable Service Parts Catalog for service assembly number.

② 100% Replacement parts.

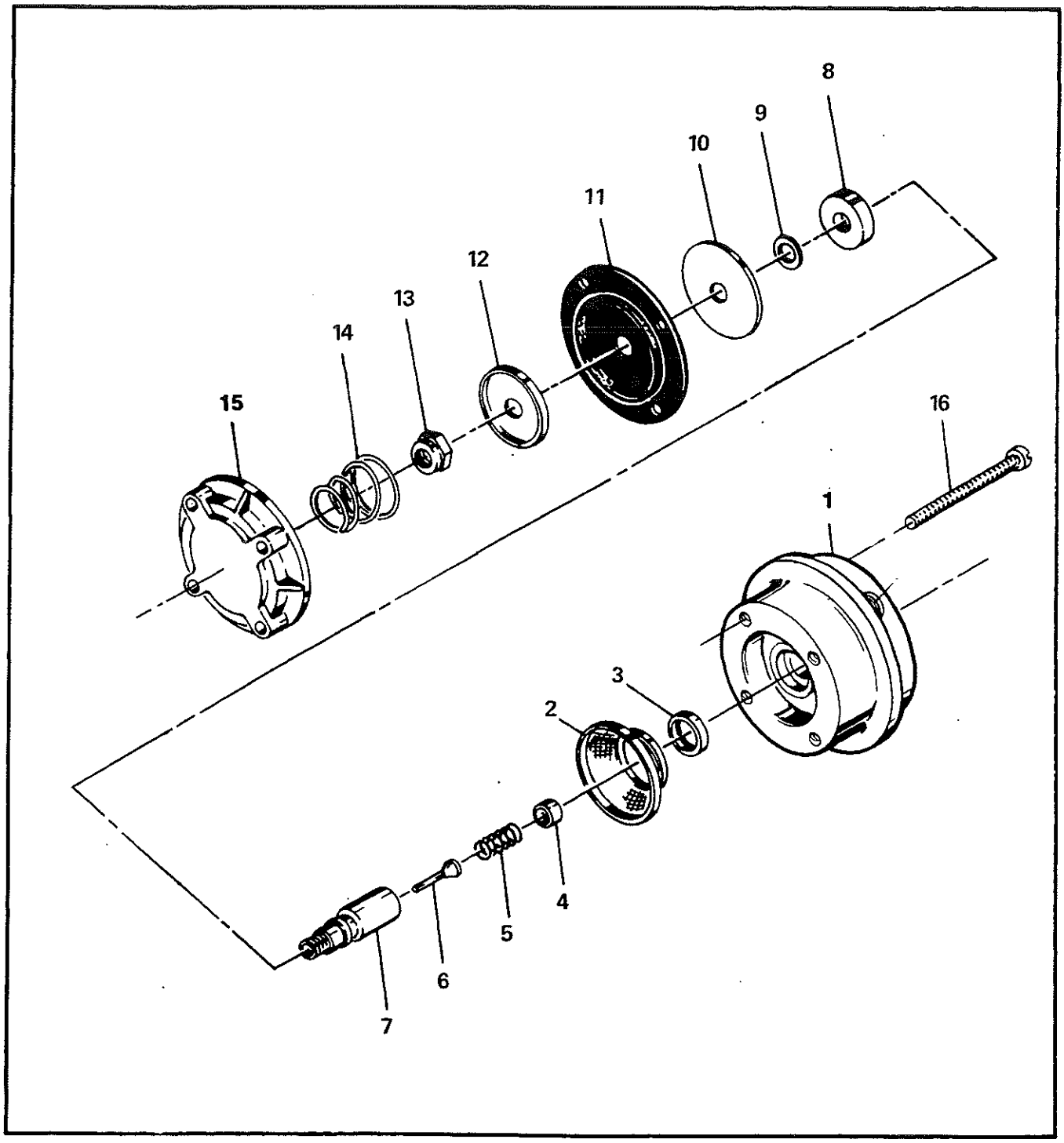


FIGURE 60–03. FUEL MANIFOLD VALVE ASSEMBLY.

73-60-04
NOZZLE ASSEMBLIES

04-01. DISASSEMBLY (Figure 10-1.)

A. Place nozzle (1) in a suitable fixture. Lift off shield (4) and remove screen (3).

B. If nozzle has a screw-type jet, discard entire assembly and replace with new type.

C. If jet must be replaced, use a suitable type tap and thread into opening in jet. The jet can be removed by pulling the tap straight out.

04-02. REASSEMBLY.

A. If jet (2) was removed, replace by pressing new jet in nozzle shell.

NOTE . . . Apply a thin coat of Loctite 290 to jet before installation.

B. Install new screen (3) and shield (4) on nozzle (1). Press shield flush with top of shoulder.

C. Nozzles should be flow tested at this time. Flow nozzles and calibrate according to instructions and calibration data in the Calibration Section. If the nozzle flows in the next size range, it may be so stamped. A new jet or a new nozzle assembly can be obtained.

CAUTION . . . All nozzles must be of the same size per engine.

FIG & INDEX	PART NUMBER	1 2 3 4 5 DESCRIPTION	QTY.	USABLE ON CODE
60-04	627335D13	① Nozzle Assembly	NS	A
	627335D17	① Nozzle Assembly	NS	B
	632147-10	① Nozzle Assembly	NS	C
-1	627334	. Nozzle	NS	AB
-1	631341	. Nozzle	NS	C
-2	627333-13	. Jet	1	A
-2	627333-17	. Jet	1	B
-2	627333-10	. Jet	1	C
-3	625921	. Screen	1	
-4	625919	. Shield	1	

NOTE:

① Order nozzle size identified on hex of nozzle body.

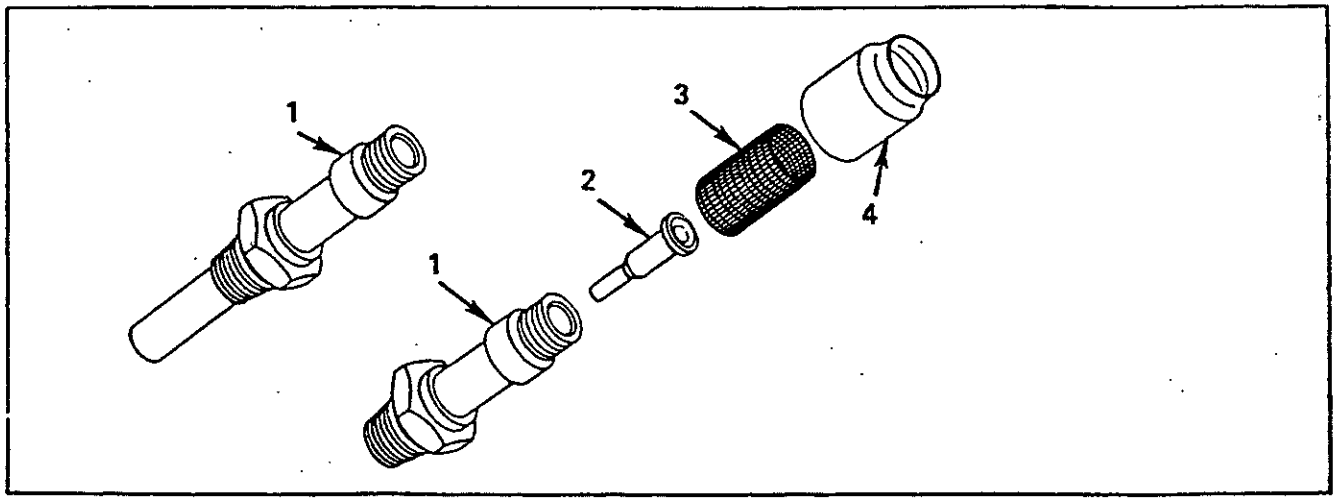


FIGURE 60-04. NOZZLE ASSEMBLY.

INTENTIONALLY

LEFT

BLANK

INDEX
73–70–00
CALIBRATION SECTION

INTENTIONALLY

LEFT

BLANK

73-70-01
CALIBRATION PROCEDURES
FUEL PUMP

01-01. FUEL PUMP AIR PRESSURE TEST.

A. Cap all fittings except the inlet.

B. Connect 20 psi air pressure line to pump inlet.

C. Submerge pump assembly in test well.

D. Rotate drive shaft at least one full revolution.

E. No leakage (bubbles) permissible.

F. Remove caps and lines.

G. Pump is now acceptable for test and calibration.

01-02. FUEL PUMP CALIBRATION TEST.

A. Install pump to be tested on flow bench in accordance with the schematic shown in Figure 70-01.

B. Notes 1, 2, and 3 apply except when otherwise specified.

NOTE 1 . . . Hose assemblies to be used at flow bench tests unless otherwise specified are:

635158S6S28.00	Fuel Pump Inlet
635158S4S26.75	Fuel Pump Outlet

NOTE 2 . . . Vapor Separator Cover Assembly.

A. With a supply pressure of 25 ± 0.1 inch Hg differential pressure with static suction must be 7.8 - 10.5 inch Hg differential pressure with a supply flow of 28.0 - 34.0 lbs/hr.

B. With 25 ± 0.1 inch Hg differential supply pressure, the suction flow must be 18.0 - 24.5 lbs/hr. and the supply flow must be 26.0 -33.0 lbs/hr.

NOTE 3 . . .Pump Assembly Flow Test. Calibrate fuel pump by-pass jet and relief valve to obtain specified fuel pressures at the RPM and fuel flow shown on the calibration chart. The vapor vent return must be open and flowing. Mixture control must be in full rich position (if applicable).

C. Notes 4 through 11 apply only when specified.

NOTE 4 . . . With 600 RPM, mixture control in idle cut-off position, flow must not exceed 2 lbs/hr. (If applicable)

NOTE 5 . . . Pump Assembly Flow Test (No Vapor Separator). Calibrate fuel pump relief valve to obtain specified fuel pressure at the RPM and fuel flow shown. The mixture control must be in full rich position.

NOTE 6 . . . Hose assemblies to be used at flow bench test:

MS28741-8-0280	Fuel Pump Inlet
635158S4S26.75	Fuel Pump Outlet

NOTE 7 . . . Hose assemblies to be used at flow bench test.

MS28741-8-0280	Fuel Pump Inlet
635158S6S28.00	Fuel Pump Outlet

NOTE 8 . . . Vapor Separator Cover Assembly.

A. With a supply pressure of 25 ± 1 inch Hg differential pressure the static suction must be 9.0 - 11.8 inch Hg differential pressure with a supply flow of 40.5 -46.5 lbs/hr.

B. With 25 ± inch Hg differential supply pressure, the suction flow must be 20.0 - 26.0 lbs/hr. and the supply flow must be 35.0 - 42.0 lbs.hr.

NOTE 9 . . . Pump Assembly Flow Test. Calibrate fuel pump pressure adjustment screw first stage regulator and relief valve to obtain specified pressures at the RPM and fuel flow shown. Mixture control must be in full rich position (if applicable).

NOTE 10 . . . At maximum flow setting on fuel pumps equipped with an aneroid controlled variable orifice, allowable hysteresis to be minus 5% of outlet flow and pressure.

NOTE 11 . . . Vapor Separator Cover Assembly.

A. With a supply pressure of 40.7 ± 0.1 inch Hg. differential pressure the static suction must be 9.0 - 11.8 inch Hg. differential pressure with a supply flow of 29-34 lbs/hr.

B. With 40.7 inch Hg. differential pressure the suction flow must be 26 - 32 lbs/hr and the supply flow must be 26-32 lbs/hr.

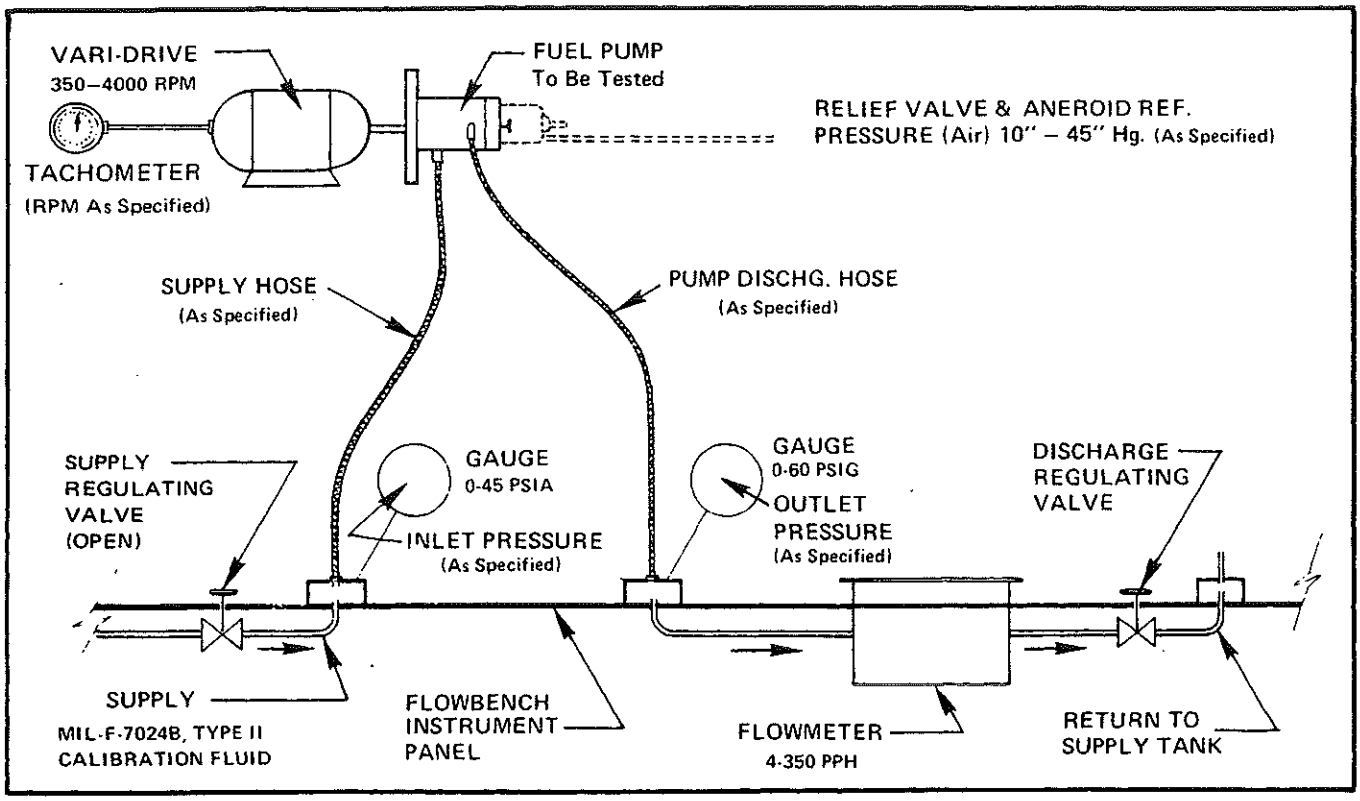


FIGURE 70–01. FUEL PUMP TEST SCHEMATIC.

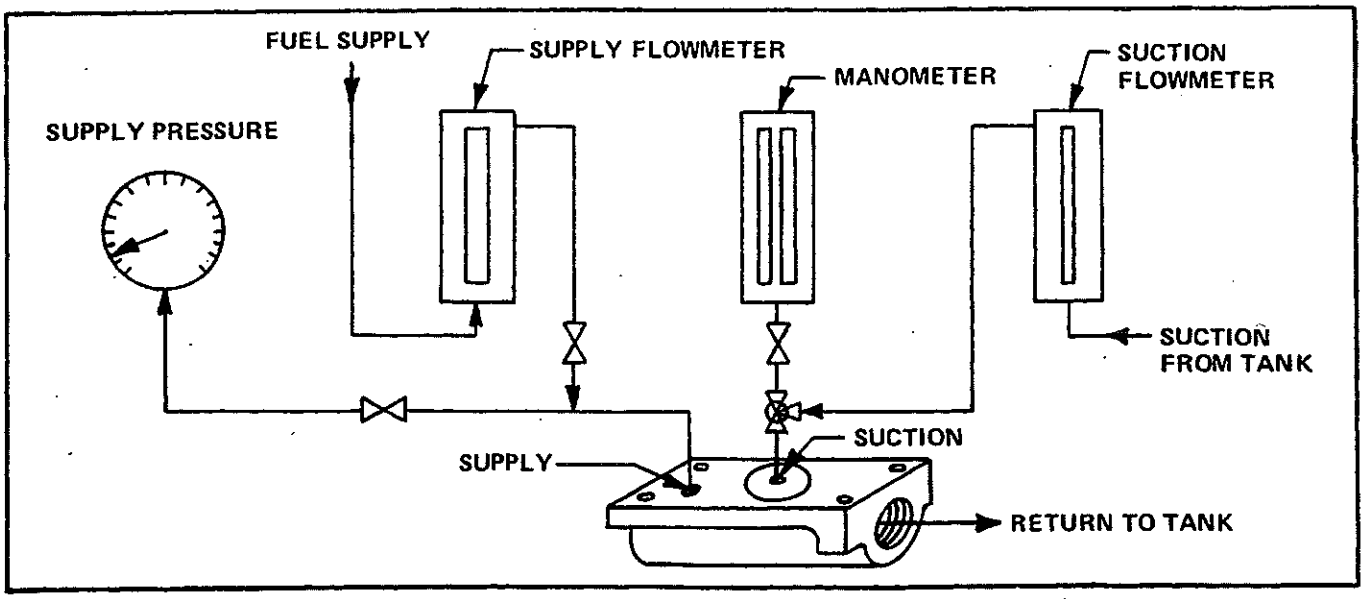


FIGURE 70–01A. VAPOR SEPARATOR COVER FLOW TEST SCHEMATIC.

Chart	Engine Application	Chart	Engine Application
- 1	IO-470- all except K & V O-470G7	- 19	L/TSIO-360E, EB, F, FB, H, HB
- 2	TSIO-470		L/TSIO-520AE
- 3	TSIO-470B, C, D	- 20	TSIO-360C, CB, D, DB
- 4	IO-360-All	- 21	TSIO-520L, LB, WB
- 5	GIO-470A	- 22	GTSIO-520D, G, L, M, H
- 6	IO-346A	- 24	L/TSIO-360G, GB, KB, LB
- 7	IO-520A, D, F, J, K, L	- 25	Basic O-470M, O-470G
- 8	IO-520B,BA, BB, C, CB, E	- 26	TSIO-360JB
- 10	GTSIO-520C	- 27	IO-360D34
- 11	TSIO-520C, G, H	- 28	IO-550B
- 12	TSIO-520B, BB	- 29	IO-550C
- 13	IO-470K	- 30	TSIO-360 MB
- 14	IO-470V, VO IO-520M, MB		TWO STAGE PUMP
- 15	GTSIO-520D, H, G	- 101	GTSIO-520F, K
- 16	TSIO-520D, DB	- 102	6-285/320
- 17	TSIO-520E, EB, J, JB, K, KB, N, NB	- 103	GTSIO-520N
	M, P, R, T, VB, AF, C, CE, H, G, UB	- 104	TSIO-520BE
- 18	TSIO-360A, AB, B, BB		

FUEL PUMP CALIBRATION CHART

PART NUMBER		RPM	FLOW PPH	DISCHARGE PRESSURE PSI	TURBO DISCHG PRESSURE "HG.
-1	638156-3	600	6.5-7.0	10.5-12.0	
	638154-9	1600	37.0-38.0	18.5-21.5	
	646212-9	2600	149.0-151.0	29.0	
		600	6.5-7.0	10.5-12.0	
		350	5.0-7.0	8.0 Min.	
-2	638155-1	900	6.5-7.0	10.5-12.0	
		1600	37.0-38.0	19.0-20.0	
		2600	149.0-151.0	29.0	
		900	6.5-7.0	10.5-12.0	
		600	5.0-7.0	8.0 Min.	

FUEL PUMP CALIBRATION CHART (Continued)

PART NUMBER		RPM	FLOW PPH	DISCHARGE PRESSURE PSI	TURBO DISCHG PRESSURE "HG.
- 3	629086-2	600	7.0	5.75-6.25	
		1600	37.0-38.0	18.5-19.5	
		2600	150.0	29.5-30.0	
		600	7.0	5.75-6.25	
		350	5.0-7.0	4.0 Min.	
		Secondary Diaphragm Effect Flow Test			
		2600	160.0-162.0	33.0	36.0
- 4	638157-2	600	6.5-7.0	7.0-8.0	
	646759-2	1600	37.0-38.0	15.0-16.5	
		2600	148.0-152.0	23.5-24.5	
		600	6.5-7.0	7.0-8.0	
		350	5.0-7.0	4.0 Min.	
	See Note 4				
- 5	638156-6	600	6.5-7.0	10.5-12.0	
	638154-10	1600	37.0-38.0	17.0-18.0	
	646212-10	2600	149.0-151.0	23.5	
		600	6.5-7.0	10.5-12.0	
		350	5.0-7.0	8.0 Min	
- 6	630885-1	2600	149.0-151.0	18.5-20.0	
	646764-1	1600	37.0-38.0	13.0-14.0	
		600	6.5-7.0	7.0-8.0	
		350	5.0-7.0	5.0 Min	
	Notes 2 and 3 do not apply. See instead Notes 4 and 5.				
- 7	638154-1	600	6.5-7.0	10.5-11.5	
	646212-1	1600	37.0-38.0	19.0-22.0	
		2600	149.0-151.0	34.0	
		600	6.5-7.0	10.5-11.5	
		350	5.0-7.0	6.0 Min.	
	Note 1 does not apply. See instead Note 6.				
- 8	638154-2 626212-16	600	6.5-7.0	10.5-11.5	
	638154-4	1600	37.0-38.0	18.5-21.5	
	638154-16	2600	149.0-151.0	33.0	
	646212-2	600	6.5-7.0	10.5-11.5	
	646212-4	350	5.0-7.0	6.0 Min.	

FUEL PUMP CALIBRATION CHART (Continued)

PART NUMBER		RPM	FLOW PPH	DISCHARGE PRESSURE PSI	TURBO DISCHG PRESSURE "HG.
- 10	630751-2	600	10.0	6.5-7.0	
	632818-4	3200	200.0	18.0-20.0	
	646210-4	600	10.0	6.5-7.0	
		350	8.0 Min.	5.0 Min.	
		Variable Orifice Effect Flow Test. See Note 10.			
		3200	250.0	33.0	36.0
	Note 1 does not apply. See instead Note 7. Note 2 does not apply. See instead Note 8.				
- 11	630751-3	1600	37.5	13.5-14.0	
	632818-5	600	7.0	6.5-7.0	
	646210-5				
		Variable Orifice Effect Flow Test. See Note 10.			
		2700	160	30	33.0
	Note 2 does not apply. See instead Note 8.				
- 12	632818-1	2700	200	26.0-28.0	
	632818-10	1600	37.0-38.0	15.0-16.0	
	646210-1	600	6.5-7.0	6.0-7.0	
	646210-10	350	5.0-7.0	5.0 Min.	
		Variable Orifice Effect Flow Test. See Note 10.			
		2700	200	31.5	33.0
	Note 2 does not apply. See instead Note 8.				
- 13	638156-9	600	6.5-7.0	6.5-7.5	
	638154-12	1600	37.0-38.0	15.0-18.0	
	646212-12	2600	149.0-151.0	29.0	
		600	6.5-7.0	6.5-7.5	
		350	5.0-7.0	5.0 Min.	
- 14	638154-3 646212-17	600	6.5-7.0	7.0-8.0	
	638154-5	1600	37.0-38.0	16.0-19.0	
	638154-17	2600	149.0-150.0	34.0	
	646212-3	600	6.5-7.0	7.0-8.0	
	646212-5	350	5.0-7.0	5.0 Min.	
	Note 2 does not apply. See instead Note 8.				

FUEL PUMP CALIBRATION CHART (Continued)

PART NUMBER		RPM	FLOW PPH	DISCHARGE PRESSURE PSI	TURBO DISCHG PRESSURE "HG.
- 15	636898-1	600	9.5-10.0	6.5-7.0	
	630751-4	3200	249.0-251.0	12.5-14.0	
	634627-1	600	9.5-10.0	6.5-7.0	
		350	8.0 Min.	5.0 Min.	
	Variable Orifice Effect Flow Test. See Note 7 and 10.				
		3200	249-251	19.5-20.0	36.0
	Note 2 does not apply. See instead Note 8.				
- 16	632637-1	600	6.5-7.0	6.5-7.0	
	639508-5	2700	200.0	19.5-21.0	
	639508-8	600	6.5-7.0	6.5-7.0	
	646758-5	350	5.0-7.0	4.0 Min.	
	646758-8				
	Variable Orifice Effect Flow Test. See Note 10.				
		2700	200.0	28.0	33.0
	See Note 4.				
- 17	632818-2 642650-2	600	6.5-7.0	6.5-7.0	
	632818-7 646210-2				
	632818-8 646210-7	2700	200	19.0-22.0	
	632818-9 646210-8				
	632818-11 646210-9	600	6.5-7.0	6.5-7.0	
	639508-7 646210-11				
	639508-9 646768-7	350	5.0-7.0	5.0 Min.	
	642650-1 646768-9				
	Variable Orifice Effect Flow Test. See Note 10.				
		2700	200.0	32.5	36.0
	Note 2 does not apply. See instead Note 8.				
- 18	634263-1	600	6.5-7.0	7.5-8.0	
	639508-4	2800	100.0	25.0-28.0	
	646758-4	600	6.5-7.0	7.5-8.0	
		350	5.0-7.0	4.0 Min.	
	Variable Orifice Effect Flow Test. See Note 10.				
		2800	125	32.0	33.0
	See Note 4. Note 2 does not apply. See instead Note 8.				

FUEL PUMP CALIBRATION CHART (Continued)

PART NUMBER			RPM	FLOW PPH	DISCHARGE PRESSURE PSI	TURBO DISCHG PRESSURE "HG.
- 19			700	6.0-7.0	6.5±.25	
			2575	130-140	54±.1	44
	639508-2	646758-12	700	6.0-7.0	6.5±.25	
	639508-3	646758-13	2575	140 (Set)	54±.1	44-45
	639508-12	649368-12				
	639508-13	649368-13	Variable Orifice Effect Flow Test. See Note 10.			
	646758-2		2575	100-110	-	38
	646758-3		2575	67-80	-	32
	See Note 4. Note 2 does not apply. See instead Note 8.					
- 20	639508-1		600	8.0-9.0	6.5-7.0	
	646758-1		2800	199.0-201.0	15.0-17.0	
			600	8.0-9.0	6.5-7.0	
			350	5.0-7.0	4.0 Min.	
		Variable Orifice Effect Flow Test. See Note 10.				
			2800	199.0-201.0	36.0-36.5	39.0
	See Note 4. Note 2 does not apply. See instead Note 8.					
- 21	640643-1	640643-6	2700	199.0-201.0	45.0-55.0	43.0
	640643-3	640643-7	600	9.0-10.0	25.0	30.0
	646765-6	646765-7				
	646765-1					
	646765-3					
	See Note 5.					
- 22	642380-1		700	9.5-10.0	6.5-7.5	
	See Note 10.					
	632818-3		3200	259.0-261.0	35.0-36.0	42.0
	632818-6		3200	259.0-261.0	16.0-18.0	
	646210-3		700	9.5-10.0	6.5-7.5	
	646211-1		350	8.0 Min.	5.0 Min.	
	646210-6					
		Note 2 does not apply. See instead Note 8.				
- 23	640643-2		2700	260	60-65	
	646765-2		600	46	20-30	

FUEL PUMP CALIBRATION CHART (Continued)

PART NUMBER		RPM	FLOW PPH	DISCHARGE PRESSURE PSI	TURBO DISCHG PRESSURE "HG.
- 24	639508-6	700	6.0-7.0	6.5±.25	
	639508-10	2575	130-140	54.0±.1	44
	646758-6	700	6.0-7.0	6.5±.25	
	646758-10	2575	140.0 (Set)	54.0±.1	44-45
		Variable Orifice Effect Flow Test. See Note 10.			
		2575	100-110	-	38
		2575	67-80	-	32
	See Note 4. Note 2 does not apply. See instead Note 11.				
- 25	640643-5	2500	130	13-15	
	646765-5				
	See Note 5.				
- 26		700	6-7	6.5±.25	
		2520	144-146	31-32	39.5-40.0
	639508-11		6-7	6.5±.25	
	646758-11	700	144-146	31-32	39.5-40.0
		2500			
		Orifice Effect Flow Test			
		2500	60-70	21-23	30.0
- 27	639508-14	600	6-7	6.5-7.0	30.0
	646758-14	2200	72-74 (Set)	12.0-13.0	23.5
		2200	56-64	*	20.0
		2200	78-88	*	26.0
		2200	98-110	*	30.0
	* Pressure to be determined by orifice setting at 12.0-13.0 Set-up (Do Not Change)				
- 28	643535-1	600	7.0-7.5	7.4-7.6	30.0
	646766-1	2700	142 (Set)	32-33	27.8
		2700	122-130	*	24.0
		2700	102-108	*	20.6
		600	7.0-7.5	7.4-7.6	30.0
	* Orifice setting same as set-up.				

FUEL PUMP CALIBRATION CHART (Continued)

PART NUMBER		RPM	FLOW PPH	DISCHARGE PRESSURE PSI	TURBO DISCHG PRESSURE "HG.
- 29	643536-1	600	7.0-7.5	7.4-7.6	30.0
		2700	150 (Set)	35-36	27.8
	646767-1	2700	132-140	*	24.0
		2700	118-128	*	20.6
		600	7.0-7.5	7.4-7.6	30.0
	* Orifice setting same as set-up.				
- 30	646758-15	600	6.0-7.0	6.5-7.0	30
		2700	125 (Set)	30	36
		2700	95-104	*	33
		2700	84-93	*	30
	* Orifice setting same as set-up.				
- 101	639087	810	10.5 (Set)	7.0 (Set)	28.9
		2790	225-245	24.0	37.1
		2970	292-308	34.0	41.9
		3050	310 (Set)	42.0	45.7
		3050	200 Max.	15.0	20.0
	See Note 9.				
- 102	638193-1	530	15-16 (Set)	6.5-7.0	11.0
		2125	187-188 (Set)	30	30.0
		2125	183-185	*	29.0
		2125	174-178	*	28.0
		2125	148-153	*	24.0
		2125	130-136	*	20.0
		1910	50-51	14 Max.	10.0
	See Note 9.				
	Set interstage pressure at 5.0 PSI ± .25 at 530 RPM.				
- 103	643367A2	3350	334.0-342.0	35.0	
	NOTE . . . Non field serviceable. New and rebuilt pump available from TCM Distributor.				

FUEL PUMP CALIBRATION CHART (Continued)

PART NUMBER		RPM	FLOW PPH	DISCHARGE PRESSURE PSI	TURBO DISCHG PRESSURE "HG.
- 104	649374-1	600	12.0-13.0	7.0-7.5	30
	646571-1	2600	218-222 (Set)	25.5-26.0	38
		2600	204-214	*	36
		2600	188-198	*	34
		2600	160-170		30
	See Note 10.				
	Set interstage pressure at 5.0 PSI ± .25 at 600 RPM.				

* Pressure to be determined by orifice setting at 30 PSI (Do Not Change).

73-70-02
FUEL METERING UNIT
CALIBRATION INSTRUCTIONS

02-01. FUEL CONTROL VALVE AIR PRESSURE TEST. (Applicable to all fuel handling assemblies.)

A. Cap all fittings except the inlet.

B. Connect 20 psi air pressure line to inlet.

C. Submerge assembly in test well.

D. No leakage (bubbles) permissible.

E. Remove caps and lines.

F. Assembly is now ready for test and calibration.

02-02. CONTROL UNIT CALIBRATION INSTRUCTIONS.

A. Install the control unit to be tested on the flow bench in accordance with the schematic shown in Figure 70-02.

NOTE . . . All pressure setting tolerances to be ± .25 PSI, all throttle angle setting tolerances to be ± .25 degrees.

B. A manually controlled valve can be used as an alternative to the master manifold valve, lines and nozzles. This valve must be controlled to a pressure equivalent to the master manifold valve, lines and nozzles at each respective fuel flow check point.

C. Mixture Control Leakage. With a supply pressure of 10 PSI, the leakage must not exceed twenty (20) drops per minute in the idle cut-off position.

D. Note 1 applies except when otherwise specified.

E. **NOTE** 1 . . . Hose assemblies to be used at flow bench tests unless otherwise specified are:

635158S4S30.00	Metering Unit Inlet
635158S4S30.00	Metering Unit Outlet

F. **NOTE** 2 . . . Hose assemblies to be used at flow bench tests when specified are:

MS28741-6-0320	Metering Unit Inlet
MS28741-6-0320	Metering Unit Outlet

G. **NOTE** 3 . . . Close Idle By-pass During Calibration.

H. 0 is 2° of throttle angle.

Chart	Engine Application	Chart	Engine Application
- 1	IO470-K,J 0-470G,CI	- 11	TSIO-520-J,JB,K,KB,M,N,NB,P,R,AF,T
- 2	IO-470-All except J & K	- 21	IO-346-A, IO-360-All TSIO-520AE
- 2	IO-520-All, IO550B,C	- 21	(L) TSIO-360-A,B-E,EB,F,FB,G,GB,H,HB
- 4	TSIO-470-B	- 22	TSIO-520-D,DB,UB
- 5	GIO-470-A	- 24	TSIO-360-C,CB,D,DB,LB,MB
- 6	TSIO-470-B,C,D	- 25	6-285-B,C
- 7	GTSIO-520-C	- 26	GTSIO-520-F,K
- 8	TSIO-520,B,BB,C,E,EB,G,H	- 27	6-320
- 9	GTSIO-520-D,H,L	- 28	TSIO-360-KB LTSIO-360-KB
- 10	GTSIO-520-M	- 29	TSIO-520CE
		- 30	TSIO-520BE

FUEL METERING UNIT CALIBRATION CHART

SETTINGS			LIMITS	
PART NUMBER	THROTTLE ANGLE	INLET PRESS PSI ± .25	FUEL FLOW LBS./HR.	OUTLET PRESS PSI ± .25
- 1 625219-1	0	10.0	7.1-7.3	1.8-2.2
	10	17.0	33.2-37.2	3.0-3.6
	19	20.5	54.7-58.7	4.7-5.4
	27	23.0	72.8-77.8	5.9-7.0
	32	25.0	87.2-92.2	7.7-8.7
	41	25.8	107.5-112.5	10.4-11.4
	69-72	25.5	127.5-132.0	14.4-15.7
- 2 625219-2	0	10	6.6-7.1	1.8-2.2
629703-2	8	17	30.6-34.6	3.0-3.6
629904-2	16	20.5	57.3-61.3	4.9-5.7
632916-2	21	23.0	72.8-77.8	6.5-7.5
639717-2	28	25.0	94.0-99.0	8.8-9.9
646619-2	36	25.5	106.2-111.2	11.4-12.6
	70-76	25.5	130.0-134.5	14.5-15.7
- 4 625219-4	0	10.0	7.5-8.0	2.1-2.5
	12	17.0	41.5-45.5	3.3-3.9
	23	20.5	63.8-67.8	5.7-6.5
	32	24.5	80.8-85.8	7.7-8.6
	47	28.5	107.9-112.9	13.0-14.1
	69	34.0	143.0-148.0	20.6-21.8
	78-80	34.0	148.0-153.0	19.3-20.5
- 5 625219-5	0	10.0	7.1-7.6	1.9-2.3
	8	18.5	34.1-38.1	2.7-3.3
	16	23.0	60.0-64.0	5.1-5.9
	22	25.5	74.3-79.3	7.4-8.3
	31	27.5	100.8-105.8	10.0-11.1
	38	28.0	122.0-127.0	11.6-12.8
	70-76	27.5	167.5-176.5	16.2-17.5
- 6 629904-6	0	10.0	10.0-10.5	2.0-2.3
	9.5	15.5	30.4-34.4	3.0-3.5
	18.0	23.0	54.7-58.7	5.0-5.8
	23.5	30.0	71.3-76.3	7.9-8.8
	31.5	31.0	98.0-104.0	10.8-11.9
	70-76	30.0	148.5-153.0	20.1-21.4

FUEL METERING UNIT CALIBRATION CHART (Con't)

SETTINGS			LIMITS	
PART NUMBER	THROTTLE ANGLE	INLET PRESS PSI ± .25	FUEL FLOW LBS./HR.	OUTLET PRESS PSI ± .25
- 7 630255-7	0	18.7	10.5-11.5	11.0
	20	18.7	50.0-54.5	11.0
	30	18.7	80.0-86.0	11.0
	40	18.7	123.0-131.0	11.0
	50	18.7	170.0-180.0	11.0
	60	18.7	201.0-212.0	11.0
	Full Throttle	18.7	213.0-226.0	11.0
Note 1 does not apply - see instead Note 2.				
- 8 629703-8	0	7.0	13.8-14.3	0.0 (Ambient)
632916-8	9	9.5	42.0-47.0	0.0
	17	13.5	80.0-85.0	0.0
	24	16.0	110.0-116.0	0.0
	28	19.0	130.0-136.0	0.0
	31	18.0	138.0-144.0	0.0
	Full Throttle	13.5	186.0-194.0	0.0
- 9 633573-9	0	10.0±.1	12.5-13.5	2.5±.1
	16	18.0±.1	79.0-85.0	6.1±.1
	19	23.0±.1	105.0-111.0	8.2±.1
	22	26.0±.1	126.0-133.5	8.5±.1
	28	29.5±.1	163.5-171.5	12.1±.1
	36	29.0±.1	190.5-200.0	15.8±.1
	Full Throttle	29.0±.1	227.0-244.0	23.0±.1
Note 1 does not apply - see instead Note 2.				
- 10 633573-10	0	7.5	12.0-14.0	0.0 (Ambient)
	16	11.9	63.0-69.0	0.0
	19	14.8	82.0-88.0	0.0
	22	17.5	102.0-110.00	0.0
	28	17.4	129.0-137.0	0.0
	36	13.2	157.0-168.0	0.0
	Full Throttle	6.0	225.0-240.00	0.0
Note 1 does not apply - see instead Note 2.				
- 11 632916-11	0	6.0	9.7	3.5-4.0
629703-11	11	10.0	35.4-39.4	4.6-4.8
629904-11	18	13.0	61.0-65.0	6.0-6.2
646230-11	23	15.0	80.0-84.0	7.5-7.7
	33	18.0	108.0-113.0	9.9-10.1
	48	20.0	129.5-134.5	11.0-11.2
	Full Throttle	35.0	192.5-197.5	19.6-19.8

FUEL METERING UNIT CALIBRATION CHART (Con't)

SETTINGS			LIMITS		
PART NUMBER		THROTTLE ANGLE	INLET PRESS PSI ± .25	FUEL FLOW LBS./HR.	OUTLET PRESS PSI ± .25
- 21	640563-1	0	10.0	7.3-7.1	4.0
	640563-2	8	15.0	20.0-23.0	4.5
	640563-3	24	24.0	57.0-62.0	9.0
	643175-1	48	28.0	103.0-109.0	15.0
	640563-7	Full Throttle	28.0	119.0-126.0	18.0
Note 3 applies.					
- 22	640564-1	0	8.0	7.4-7.9	3.5-3.7
	642703	9	13.0	29.7-33.7	4.2-4.7
		18	15.5	51.5-55.5	5.9-6.7
		30	18.0	85.0-90.0	8.0-8.5
		47	20.5	124.3-129.3	10.8-11.4
		55	24.0	148.3-153.3	13.1-13.7
		Full Throttle	33.0	194.0-202.0	19.1-20.5
- 24	640563-4	0	18.7	7.0-8.0	11.0
	640563-8	20	18.7	49.0-53.0	11.0
	649096-1	40	18.7	78.0-83.0	11.0
		60	18.7	100.0-105.0	11.0
		Full Throttle	18.7	105.0-111.0	11.0
Note 3 applies.					
- 25	639556-1	0	5.0	6.0-7.0	4.0
		12	7.5	21.0-24.0	5.0
		29	13.0	65.0-69.0	10.0
		47	25.0	121.0-126.0	16.0
		Full Throttle	28.5	144.0-150.0	20.5
- 26	637179A2	0	20	28.0-29.0	4.1
	637179A5	15	20	72.0-78.0	5.2
		25	20	112.0-118.0	6.4
		37	20	158.0-166.0	8.6
		47	20	190.0-198.0	10.3
		57	20	212.0-222.0	11.8
		65	20	228.0-238.0	12.7
		Full Throttle	20	238.0-248.0	13.5

FUEL METERING UNIT CALIBRATION CHART (Con't)

SETTINGS			LIMITS	
PART NUMBER	THROTTLE ANGLE	INLET PRESS PSI ± .25	FUEL FLOW LBS./HR.	OUTLET PRESS PSI ± .25
- 27 639556-2	0	7.5	4.0-5.0	4.0
639556-3	10	11.0	45.0-50.0	4.5
639556-4	17	13.5	84.0-89.0	6.0
	24	17.0	115.0-121.0	8.0
	33	22.5	152.0-159.0	10.5
	40	26.5	174.0-181.0	12.5
	Full Throttle	30.5	202.0-210.0	16.5
Note 3 applies.				
- 28 640563-6	0	5.0	Set 10.5	0.0 (Ambient)
	8	10.5	25.0-29.0	0.0
	15	15.0	43.0-49.0	0.0
	48	10.0	119.0-126.0	0.0
	55	10.0	119.0-126.0	0.0
	60	10.0	119.0-126.0	0.0
	Full Throttle	10.0	119.0-126.0	0.0
- 29 646740-7	0	4.0	20.0-21.0	0.0 (Ambient)
	20	6.0	62.0-68.0	0.0
	30	8.0	112.00-120.00	0.0
	40	10.0	165.0-175.0	0.0
	60	13.0	230.0-240.0	0.0
	Full Throttle	16.0	255.0-270.0	0.0
- 30 646081	0	5.6	Set 13.0	0.0 (Ambient)
	9	6.0	28.0-32.0	0.0
	18	8.6	63.0-68.0	0.0
	30	9.1	110.0-118.0	0.0
	47	7.0	158.0-168.0	0.0
	55	7.0	188.0-198.0	0.0
	Full Throttle	5.8	210.0-220.0	0.0

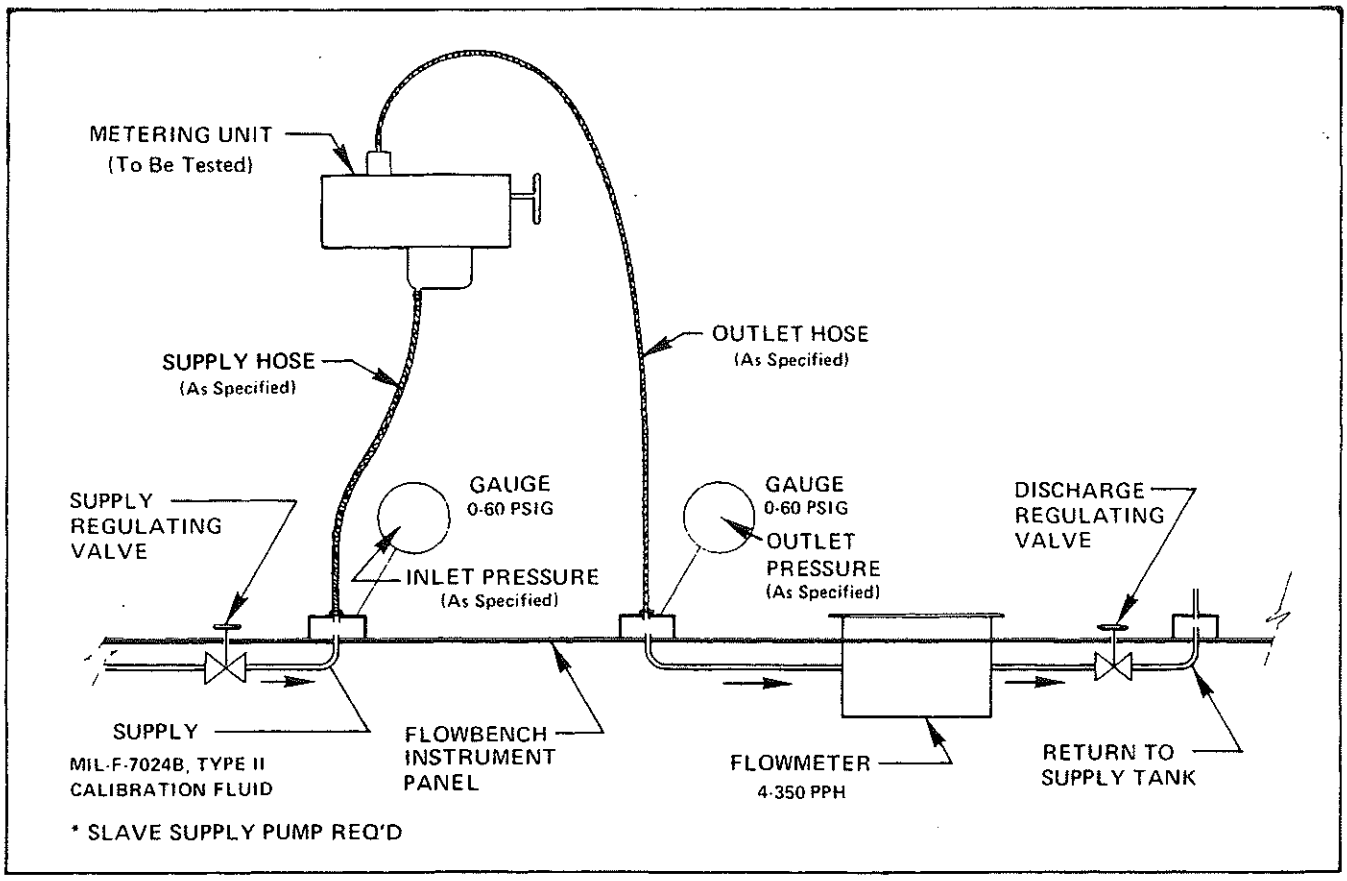


FIGURE 70–02. METERING UNIT TEST SCHEMATIC.

73-70-03
CALIBRATION CHART
FUEL CONTROL VALVE ASSEMBLY P/N 643322-1

THROTTLE ANGLE	INLET PRESS PSI	OUTLET PRESS PSI	FUEL FLOW #/HR	TCDP
IDLE	6.0 - 6.5	0	12	30.0
F.T.	32.0	25.5	255 - 265	41.2
IDLE	6.0 - 6.5	0	12	30.0
F.T.	32.0	25.5	255 - 265	41.2
F.T.	-	-	251 - 260	38.0
F.T.	-	-	233 - 242	34.0
F.T.	-	-	205 - 212	30.0

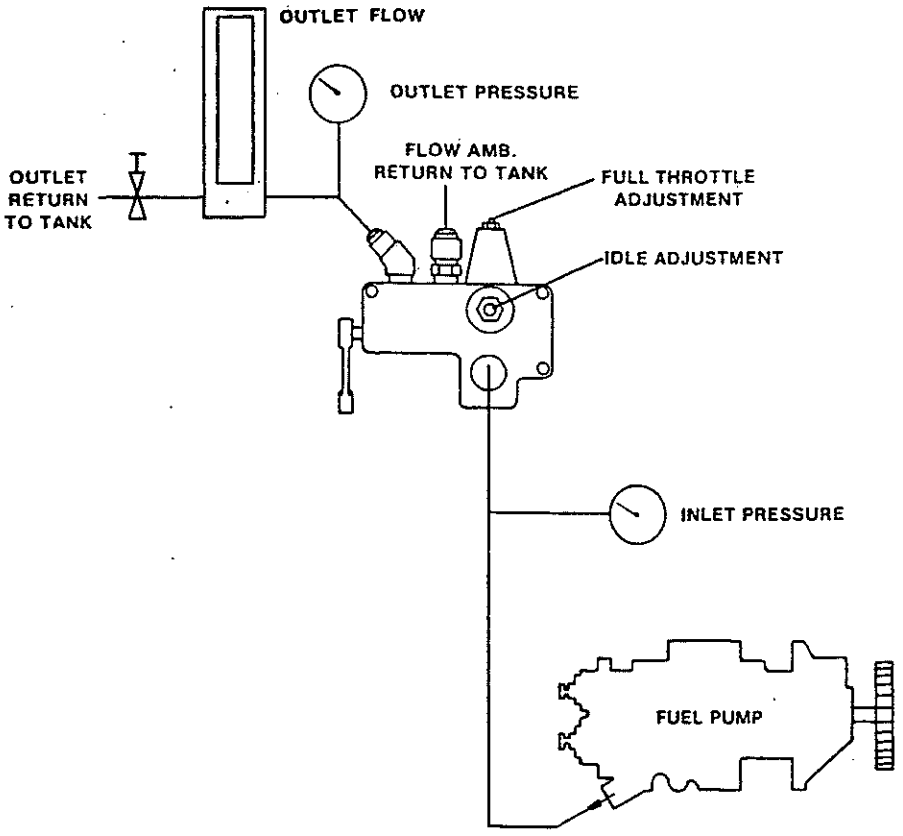


FIGURE 70-03. CALIBRATION SCHEMATIC.

INTENTIONALLY

LEFT

BLANK

73-70-04
FUEL PRESSURE REGULATOR CALIBRATION

No air leaks permissible with 20 psi air pressure on inlet, outlet capped and assembly submerged.

Adjust valve to open with 24.5 psi air pressure on inlet fitting.

Airflow to be 2 CFM air with 24.5 - 25.5 psig air supply.

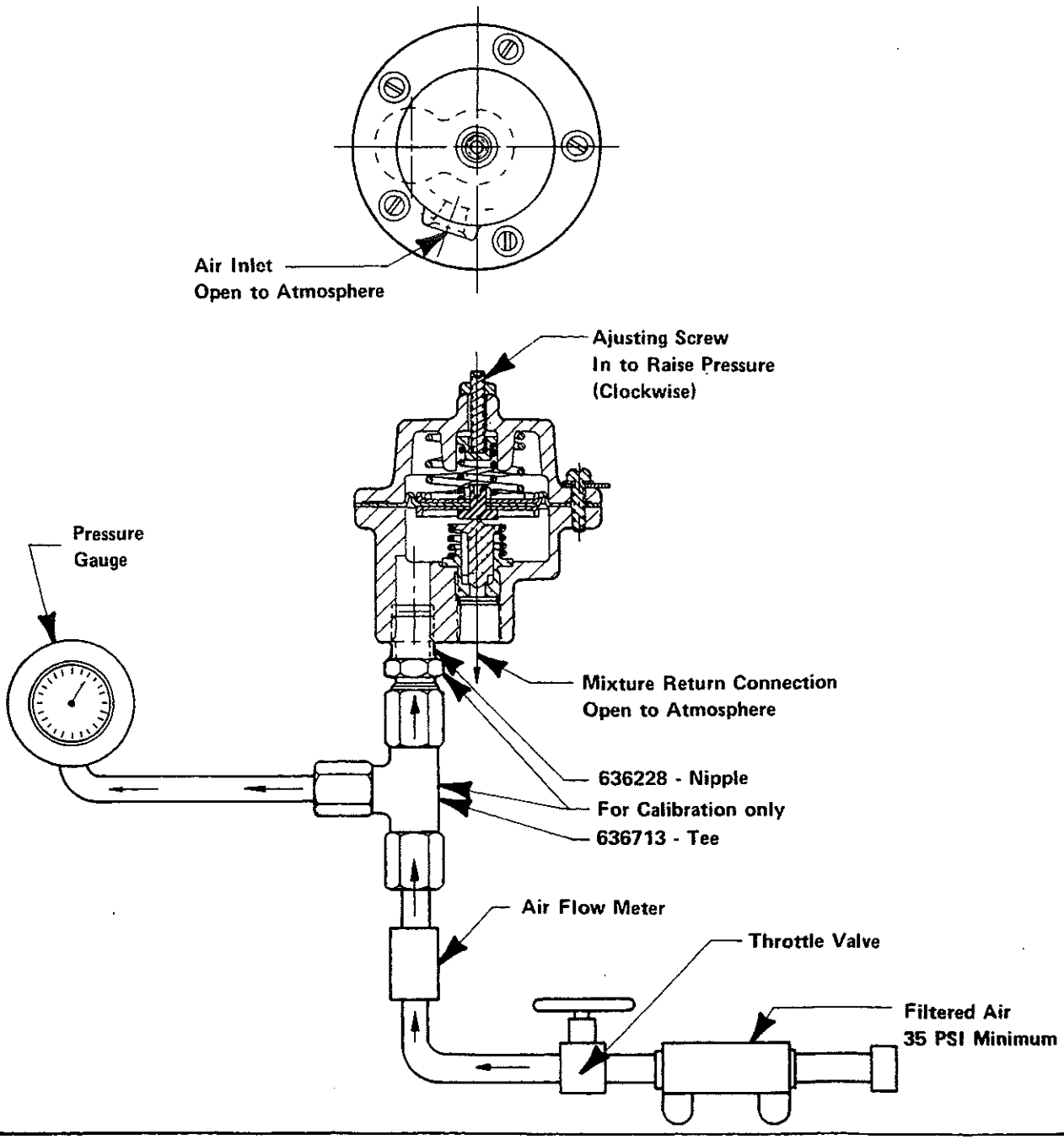


FIGURE 70-04. TEST HOOK-UP.

INTENTIONALLY

LEFT

BLANK

73-70-05
MANIFOLD VALVE AND NOZZLE CALIBRATION

05-01. MANIFOLD VALVE AIR PRESSURE TEST.

A. Cap all fittings except inlet.

B. Connect 20 PSI air hose to inlet fitting.

C. Submerge assembly in test well.

D. No leakage (bubbles) allowed.

05-02. MANIFOLD VALVE CALIBRATION INSTRUCTIONS.

A. Install the control unit to be tested on the flow bench in accordance with the schematic shown in Figure 70-05.

NOTE . . . With valve assembly flowing with 3.0-4.0 PSIG, close and seal inlet. Valve must maintain minimum 1.0 PSIG for two minutes.

B. Calibrate to values given in the appropriate table.

05-03. NOZZLE ASSEMBLY FLOW TEST PROCEDURE (Figure 70-05).

NOTE . . . The test inlet pressure to be used in determining the flow rate of nozzles in any one dash number category is to be established by a master ident letter classification nozzle.

A. Install pump on stand.

B. Install master nozzle in fitting in accordance with schematic shown in Figure 70-06.

C. Establish flow from master nozzle and record pressure. This will be the pressure setting to be used in the flow check of the nozzle to be tested to the specifications of the appropriate table.

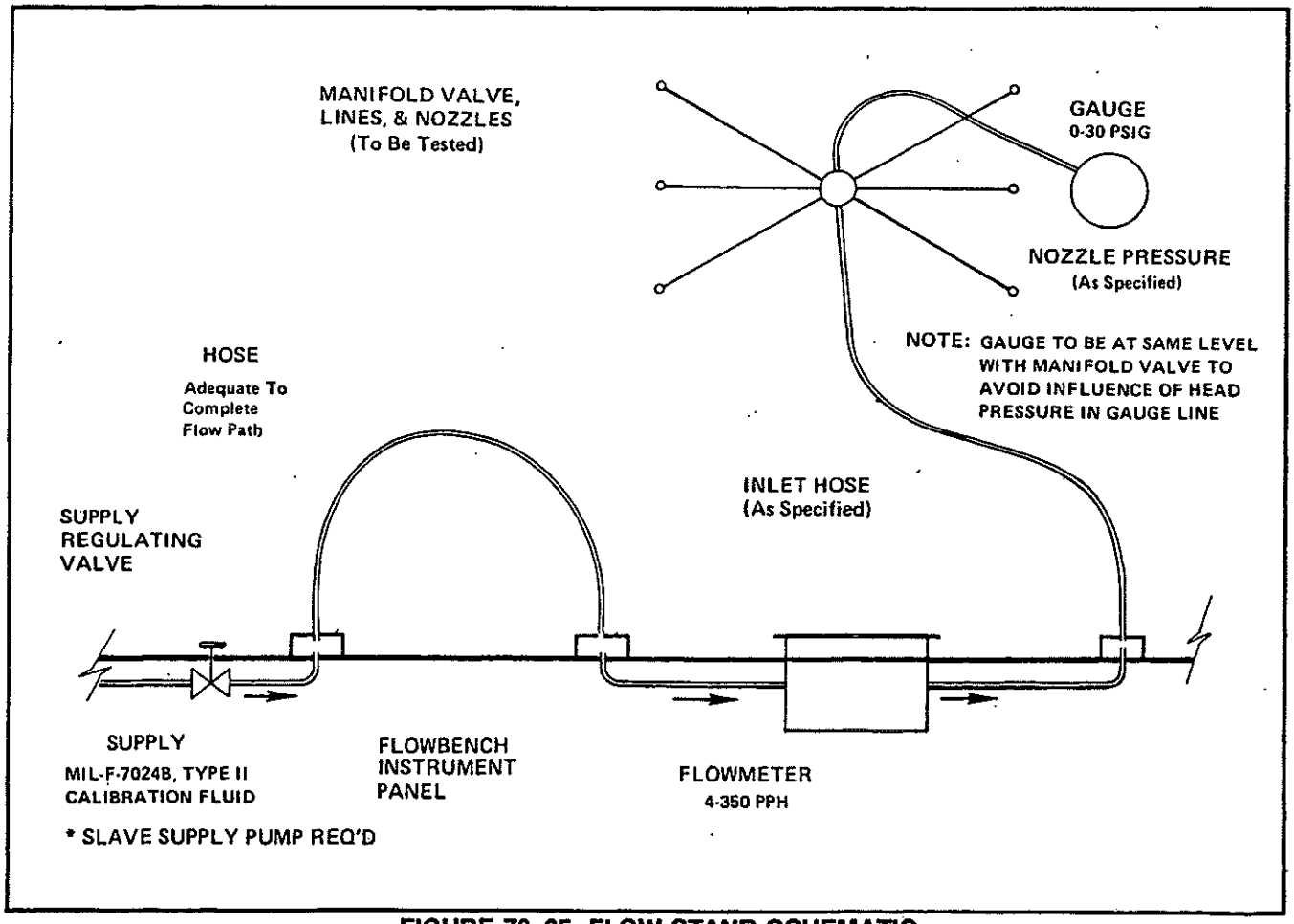


FIGURE 70-05. FLOW STAND SCHEMATIC.

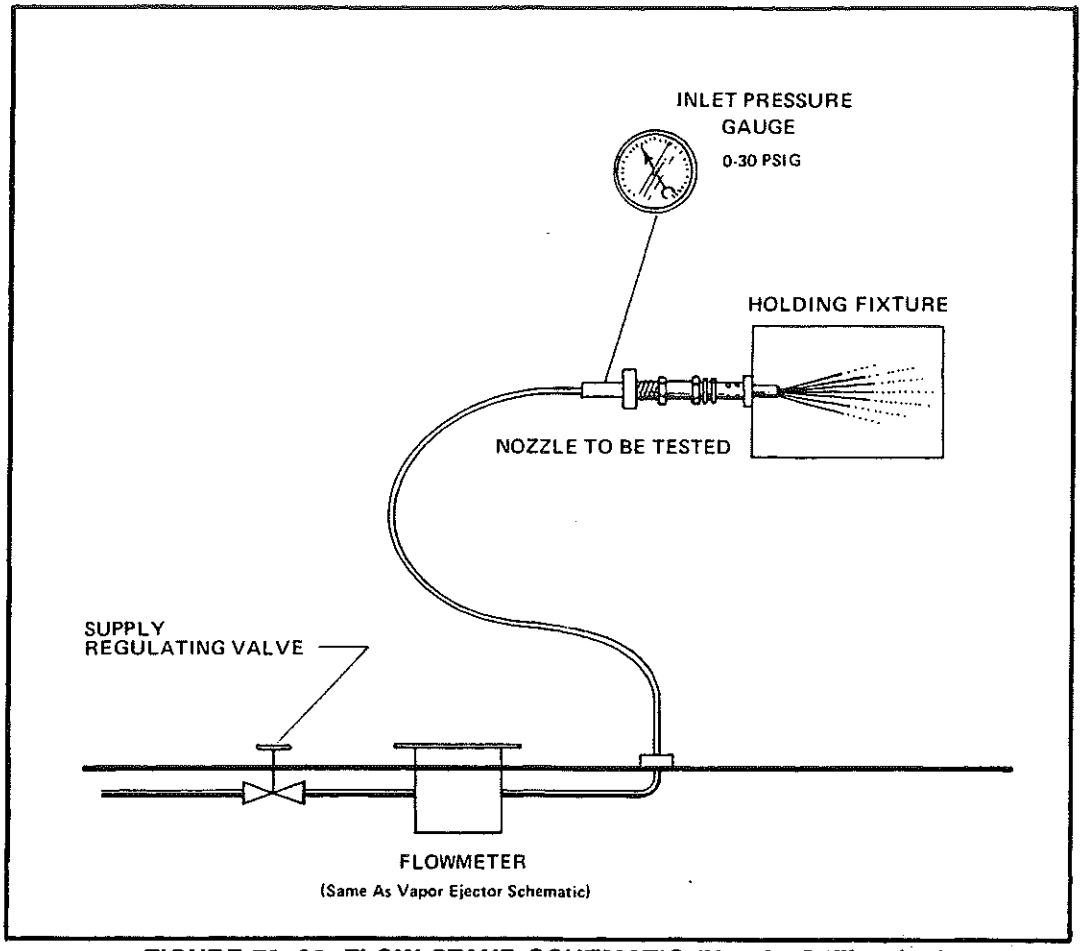


FIGURE 70–06. FLOW STAND SCHEMATIC (Nozzle Calibration)

Chart	Engine Application	Chart	Engine Application
- 1	TSIO-360A	- 17	TSIO-360C,D
- 2	GTSIO-520C	- 18	IO-470C,D,E,F,K,N,S,U
- 3	IO-520D		IO-346A TSIO470B,C
- 4	TSIO-520D,G	- 19	6-285B,C
- 5	IO-520A,F,J,K,L	- 20	6-320B
- 6	TSIO-520E	- 21	TSIO-520L,WB
- 7	TSIO-520B	- 23	IO-520BA,C,E
- 8	IO-470V	- 24	IO-470L
- 9	IO-360 ALL	- 25	TSIO-520OU
- 10	TSIO-520J,M,N,P,R,AF	- 26	TSIO-520T
- 11	TSIO-520K	- 27	TSIO-520VB
- 12	GTSIO-520H,D TSIO-520BE	- 30	TSIO-520AE
- 13	GTSIO-520F,K	- 34	IO-520A,D,F,J,K,L
- 14	GTSIO-520L,M,N,R	- 35	IO-550B,C
- 15	L/TSIO-360 ALL EXCEPT A,C & D	- 36	TSIO-520CE
- 16	IO-520M	- 37	TSIO-520C,H

NOTE: All engines having "B" designation, have same manifold valve as standard spec. (e.g. IO-520BB = IO-520B.)

FUEL MANIFOLD VALVE CALIBRATION CHART

PART NUMBER		INLET PRESSURE	FLOW PPH	NOZZLES AND LINES
-1	631351-1	3.5-4.5 7.1-7.5 15.6-16.0	10 50 100	Use 6 each 10J nozzles, 6 each part number 628305 lines.
-2	631351-2	3.5-4.5 4.4-4.8 6.5-6.9 9.6-10.0 13.6-14.0 18.5-19.1	10 50 100 150 200 250	Use 6 each 17D nozzles, 6 each P/N 629625-1 lines.
-3	631351-3	3.5-4.5 6.4-6.8 12.2-12.6 21.0-21.5	10 50 100 150	Use 6 each 12C nozzles, 6 each P/N 628305 lines.
-4	631351-4	3.5-4.5 5.0-5.4 8.4-8.8 13.6-14.0 20.6-21.2	10 50 100 150 200	Use 15C nozzles and 6 each nozzle lines - 628305.
-5	631351-5	3.5-4.5 5.3-5.7 8.6-9.0 13.6-14.0	10 50 100 150	Use 6 each 15B master nozzles, 6 each P/N 628305 lines.
-6	631351-7	3.5-4.5 4.8-5.2 7.5-7.9 11.8-12.2	10 50 100 150	Use 15B or 15C nozzles and 2 each nozzle lines - 636035-1, 636036-1, 636037-1.
-6	634326-10	3.5-4.5 4.8-5.2 7.5-7.9 11.8-12.2	10 50 100 150	Use 15B or 15C nozzles and 2 each nozzle lines - 636035, 636036, 636037.
-7	631351-9	3.5-4.5 5.4-5.8 8.9 (Set) 13.4-14.0 18.8-20.6	10 50 100 150 200	Use 15B or 15C nozzles and 2 each nozzle lines - 636035, 636036, 636037.
-8	631351-10	3.5-4.5 6.2-6.6 12.0-12.4 21.1-21.7	10 50 100 150	Use 12B or 12C nozzles and 2 each nozzle lines - 628154, 628153, 628152.

FUEL MANIFOLD VALVE CALIBRATION CHART (continued)

PART NUMBER		INLET PRESSURE	FLOW PPH	NOZZLES AND LINES
-9	631351-11	3.5-4.5 7.1-7.5 15.6-16.0	10 50 100	Use 10J or 10K nozzles and 1 each nozzle lines - 630657, 630658, 630659, 630660, 630661, 630662.
-10	634326-4 643582-5	3.5-4.5 5.5-5.9 8.9 (Set) 14.2-14.6 21.0-21.5	10 50 100 150 200	Use 63748-14B or 14C nozzles and 2 each lines - 636037-1, 636036-1, 636035-1.
-10	640718-2	3.5-4.5 5.5-5.9 8.9 (Set) 14.2-14.6 21.0-21.5	10 50 100 150 200	Use 632748-14B or 14C nozzles and 1 each fuel lines - 642724, 642725, 642726, 642727, 642728, 642729.
-11	634326-6 640718-4	3.0-4.0 4.4-4.8 7.6-8.0 12.5-12.9 19.0-19.7	10 50 100 150 200	Use 632748-14C or 14D nozzles and 2 each nozzle lines - 636037-1, 636035-1, and 1 each of nozzle lines - 636036-1, 641516. On 640718-4 use 6 each nozzles part number 632748-14B or 14C.
-12	634326-7	3.5-4.5 4.3-4.8 5.6-6.3 8.5 (Set) 11.4-11.9 15.0-15.7	10 50 100 150 200 250	Use 633723D19B or 19C nozzles and 1 each nozzle lines - 636113, 636114, 636115, 634116, 634117, 634118.
-12	646433-1 647718-3	3.5-4.5 4.3-4.8 5.6-6.3 8.5 (Set) 11.4-11.9 15.0-15.7	10 50 100 150 200 250	Use 639368-19B or 19C nozzles and 1 each fuel lines - 646421, 646422, 646423, 646424, 646425, 646426.
-13	634326-8	3.0-4.0 - 5.4-5.8 7.6 (Set) 10.0-10.5 13.0-13.6 16.5-17.2	10 50 100 150 200 250 300	Use 639368-20E and 1 each fuel lines - 636113, 636114, 636115, 634116, 634117, 634118.

FUEL MANIFOLD VALVE CALIBRATION CHART (continued)

PART NUMBER	INLET PRESSURE	FLOW PPH	NOZZLES AND LINES
-14 640718-1 641032-1	3.5-4.5 4.7-5.2 6.3-6.7 8.8 (Set) 11.5-12.0 15.0-15.6	10 50 100 150 200 250	Use 639368-19B or 19C nozzles and 1 each each nozzle lines - 641479, 641480, 641481, 641482, 641485, 641486.
-15 641032-11	3.5-4.5 5.6-6.0 10.9 (Set) 18.4-19.0	10 50 100 150	Use 633608-12D or 12E nozzles and 1 each nozzle lines - 641093, 641094, 641095, 641096, 641097, 641098.
-15 643582-4	3.5-4.5 5.6-6.0 10.9 (Set) 18.4-19.0	10 50 100 150	Use 633608-12D or 12E nozzles and 1 each nozzle lines - 641093, 641094, 646060, 641096, 641097, 641098.
-15 646508-4	3.5-4.5 5.6-6.0 10.9 (Set) 18.4-19.0	10 50 100 150	Use 633608-13B or 13C nozzles and 1 each nozzle lines - 646241, 646242, 646243, 646244, 646245, 646246.
-16 641032-12	3.0-4.0 5.0-5.4 10.4 (Set) 18.0-18.6	10 50 100 150	Use 627335D12D or 12E nozzles and 1 each nozzle lines - 641153, 641154, 641155, 641156, 641157, 641158.
-17 641032-13	3.4-4.2 5.6-6.0 10.9 (Set) 18.9-19.5	10 50 100 150	Use 633608-12C or 12D nozzles and 1 each nozzle lines - 641411, 641412, 641095, 641413, 641414, 641415.
-18 631427-1	2.0-3.0 4.8-5.2 10.5-10.9 18.9-19.5	10 50 100 150	Use 12C nozzles and 6 each nozzle lines - 628305.
-19 638132-1	3.5-4.5 5.9-6.3 10.7-11.1 17.9-18.3	10 50 100 150	Use 627335D13C or 13D nozzles and 1 each nozzles lines - 638162, 638164, 638166, 638168, 638170, 638173.
-20 638132-2	3.0-4.0 5.4-5.8 8.2-8.6 12.4-12.8 18.0-18.8	10 50 100 150 200	Use 627335D13C or 13D nozzles and 1 each nozzles lines - 638162, 638164, 638166, 638168, 638170, 638173.

FUEL MANIFOLD VALVE CALIBRATION CHART (continued)

PART NUMBER	INLET PRESSURE	FLOW PPH	NOZZLES AND LINES
-21 643397-1			Use 632748-14B or 14C nozzles and 1 each nozzle lines - 641516, 636036-1, and 2 each 636037-1, 636035-1.
With the outlet fitting vented to atmosphere gradually increase inlet fuel pressure until a fuel flow of 300 lbs/hr. is observed. Inlet pressure shall not exceed 4.0 PSI. Decrease fuel pressure to zero PSI then gradually increase until a fuel flow of 6 lb/hr. is observed. Fuel must be discharging uniformly from each outlet fitting.			
-23 631427-2	2.0-3.0 4.3-4.7 9.7 (Set) 16.0-16.6	10 50 100 150	Use 13AA or 13A nozzles and 6 each nozzle lines - 628305.
-24 631427-3	2.0-3.0 4.6-5.0 10.3 (Set) 18.8-19.4	10 50 100 150	Use 12C or 12D nozzles and 6 each nozzle lines - 628305.
-25 641032-15	3.5-4.5 4.7-5.1 7.0 (Set) 10.2-10.6 14.0-14.6 19.0-19.7	10 50 100 150 200 250	Use 632748-17A or 17B nozzles and 1 each nozzle lines - 642724, 642725, 642726, 642727, 642728, 642729.
-26 641032-16	3.5-4.5 5.0-5.4 7.9 (Set) 11.6-12.0 17.2-17.8	10 50 100 150 200	Use 632748-15C or 15D nozzles and 1 each nozzle lines - 642724, 642725, 642726, 642727, 642728, 642729.
-27 641032-17	3.5-4.5 5.0-5.4 7.6 (Set) 11.3-11.7 16.1-16.7 22.2-23.0	10 50 100 150 200 250	Use 632748-16A or 16B nozzles and 1 each nozzle lines - 642724, 642725, 642726, 642727, 642728, 672729.
-30 641032-19	3.5-4.5 4.9-5.3 7.9-8.3 13.4-13.8 20.7-21.0	10 50 100 150 200	Use 643318-14A or 14B nozzles and 1 each nozzle lines - 643539, 643538, 643981, 643540, 643543, 643542.
-34 631351-15	3.5-4.5 6.1-6.5 10.7 (Set) 17.5-18.1	10 50 100 150	Use D13B or D13C nozzles and 2 each nozzle lines - 628152, 628153, 628154.

FUEL MANIFOLD VALVE CALIBRATION CHART (continued)

PART NUMBER	INLET PRESSURE	FLOW PPH	NOZZLES AND LINES
-35 646508-6	3.5-4.5 5.7-6.1 9.8 (Set) 16.2-16.8	10 50 100 150	Use 627335D13B or D13C nozzles and 2 each nozzle lines - 643617, 643616, 643997.
-36 640718-5	3.5-4.5 4.4-4.8 6.5-6.9 9.6-10.0 13.6-14.0 18.5-19.1	10 50 150 200 250 300	Use 632748-17B or 17C nozzles and 2 each nozzle lines - 646726, 646727, 646728.
-37 631351-16	3.5-4.5 5.6-6.0 9.0 (Set) 14.0-14.4	10 50 100 150	Use 14C or 14D nozzles and 2 each nozzle lines - 636037-1, 636036-1, 636035-1.

FUEL MAINFOLD VALVE CALIBRATION CHART ("A" Series Manifolds)

PART NUMBER	INLET PRESSURE	FLOW PPH	NOZZLES AND LINES
-1 631351A7,A34	3.5-4.5 7.1-7.5 15.6-16.0	10 50 100	Use 10J master nozzles and 6 each nozzle lines - 628305.
-2 631351A1,A15, A27	3.5-4.5 4.4-4.8 6.5-6.9 9.6-10.0 13.6-14.0 18.5-19.1	10 50 100 150 200 250	Use 17C or 17D nozzles and 6 each nozzle lines - 629625-1.
-3 631351A6,A17, A22, A25	3.5-4.5 6.4-6.8 12.2-12.6 21.0-21.5	10 50 100 150	Use D12C master nozzles and 6 each nozzle lines - 628305.
-4 631351A3,A8, A12, A14, A16, A21, A26, A28, A29, A33	3.5-4.5 5.0-5.4 8.4-8.8 13.6-14.0 20.6-21.2	10 50 100 150 200	Use 15C master nozzles and 6 each nozzle lines - 628305.

FUEL MAINFOLD VALVE CALIBRATION CHART
("A" Series Manifolds) continued

PART NUMBER		INLET PRESSURE	FLOW PPH	NOZZLES AND LINES
-5	631351A9,A10	3.5-4.5	10	Use 15B master nozzles and 6 each nozzle lines - 628305.
	A11, A18, A19,	5.3-5.7	50	
	A20, A23, A24	8.6-9.0	100	
		13.6-14.0	150	
-9	631351A5	3.5-4.5	10	Use 10J or 10K nozzles and 1 each nozzle lines - 630657, 630658, 630659, 630660, 630661, 630662.
		7.1-7.5	50	
		15.6-16.0	100	

NOZZLE CALIBRATION CHART

SUPPLY PRESSURE	NOZZLE	FLOW PPH	NOZZLE	FLOW PPH
12.5 PSI (Approximately)	10A	15.5-15.8	15A	30.5-31.0
	10B	15.8-16.1	15B	31.0-31.5
	10C	16.1-16.4	15C	31.5-32.0
	10D	16.4-16.7	15D	32.0-32.5
	10J	17.8-18.3		
	10K	18.3-18.8	16A	34.0-34.5
			16B	34.5-35.0
	12AA	21.5-22.0	16C	35.0-35.5
	12A	22.0-22.5		
	12B	22.5-23.0	17A	39.0-39.5
	12C	23.0-23.5	17B	39.5-40.0
	12D	23.5-24.0	17C	40.0-40.5
	12E	24.0-24.5	17D	40.5-41.0
	13A	25.0-25.5	19A	47.0-48.0
	13B	26.5.5-26.5	19B	48.0-49.0
	13C	26.5-27.0	19C	49.0-50.0
	13D	27.0-27.5		
	13E	27.5-28.0	20A	56.0-57.0
			20B	57.0-58.0
	14A	28.0-28.5	20C	58.0-59.0
	14B	28.5-29.0	20D	59.0-60.0
	14C	29.0-29.5	20E	60.0-61.0
	14D	29.5-30.0		
	14E	30.0-30.5		

642796 Assy Rev B

TELEDYNE CONTINENTAL ® AIRCRAFT ENGINE

CATEGORY 4

SERVICE INFORMATION DIRECTIVE

Compliance Will Enhance Safety, Maintenance or Economy Of Operation

SID97-3E

Technical Portions
FAA APPROVED
SUPERSEDES M73-22, M89-10, M92-17, SID98-10A, SID97-3, SID97-3A, SID97-3B, SID97-3C and SID97-3D,

SUBJECT: PROCEDURES AND SPECIFICATIONS FOR ADJUSTMENT OF TELEDYNE CONTINENTAL MOTORS (TCM) CONTINUOUS FLOW FUEL INJECTION SYSTEMS.

PURPOSE: Provide procedures and specifications for the adjustment of Teledyne Continental Motors (TCM) fuel injection systems.

COMPLIANCE: At Engine Installation, 100 hour/Annual Inspection, fuel system component replacement or as required if operation is not within specifications.

MODELS AFFECTED: All TCM continuous flow fuel injected engine models except IO-240-B w/ Bypass Fuel System; L/TSIO-360-RB; TSIO-520-L, LB, WB; GTSIO-520-F, K, N and GIO-550-A Engine Models.

WARNING

THE PROCEDURES AND VALUES PROVIDED IN THIS SERVICE BULLETIN APPLY TO TCM FUEL INJECTED ENGINES THAT HAVE NOT BEEN MODIFIED FROM THEIR ORIGINAL TYPE DESIGN. REFER TO SUPPLEMENTAL TYPE CERTIFICATE (STC) HOLDER INFORMATION AND INSTRUCTIONS FOR AIRCRAFT AND ENGINES THAT HAVE BEEN MODIFIED FROM THEIR ORIGINAL TYPE DESIGN.

GENERAL INFORMATION

Fuel injection system components manufactured by TCM are adjusted and calibrated to meet engineering specifications. This insures operation within those specifications throughout the full range of operation. Fuel injection system components installed on factory new and rebuilt engines are further adjusted to meet design specifications during operation in the production engine test facility. These tests and adjustments are carried out in an environment of controlled fuel supply pressures and calibrated test equipment.

When engines are installed in aircraft, they are subjected to a different induction system, fuel supply system and operating environment. These differences require checking and adjusting the fuel injection system to meet operational specifications before flight.

Aircraft and engines that have been modified from their original type design must have the fuel injection system maintained in accordance with the Supplemental Type Certificate Holder's FAA approved instructions.

Operational verification of the engine fuel system is required any time one of the following circumstances occurs: (1) at engine installation, (2) during 100 hour and annual inspections, (3) whenever a fuel system component is replaced or adjusted, (4) when changes occur in the operating environment.

CAUTION: Engine performance, service life and reliability will be compromised if the engine's fuel injection system is neglected.

The following adjustment procedures are presented in a sequential format that must be followed to insure proper fuel system adjustment. Reference the applicable Aircraft Maintenance Manual for detailed fuel system adjustment and maintenance procedures.

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Any fuel system that cannot be adjusted to meet the specified values will require repair or replacement of the affected components prior to further engine operation.

The adjustment procedures provided in this SID also apply to engine fuel systems equipped with TCM Position Tuned Fuel Nozzles. Refer to Form X306474, Position Tuned Fuel Nozzle Installation and Maintenance Manual for more detailed information and installation instructions.

CAUTION: Refer to the torque specifications, Table 1, page 10 for specified values when torquing hose end fittings.

A. ADJUSTMENT TOOLS AND EQUIPMENT REQUIRED

A complete set of tools and test equipment is essential for correct setup of TCM fuel injection systems. Various combinations of these tools and equipment will be used, depending on the engine model. A proper inventory of tools and equipment for fuel system adjustment will include the following:

1. TCM recommends the Model 20 ATM-C Porta Test Unit P/N 630045-20 ATM-C or equivalent to insure the fuel injection system meets all pressure and flow specifications. You may acquire a Model 20 ATM-C Porta Test Unit by contacting the following company:

   AERO TEST, Inc.
   29300 Goddard Road
   Romulus, Michigan 48174
   (734) 946-7777

An alternative procedure would be to use calibrated gauges.

1. One (1) calibrated 0-60 PSI gauge, graduated in 1 PSI increments. This gauge will be used for unmetered pressure measurement.
2. One (1) calibrated 0-30 PSI gauge, graduated in .2 PSI (maximum) increments. This gauge will be used for metered pressure measurements and verification of aircraft fuel flow gauge indications on normally aspirated engines only.
3. One (1) calibrated differential gauge, 0-30 PSID maximum, graduated in .2 PSI (maximum) increments. This gauge will be used for metered pressure measurements and verification of aircraft fuel flow gauge on turbocharged engines only.

   NOTE: Pressure gauges must be accurate within ±1 %. Pressure gauges must be checked for accuracy and, if necessary, calibrated at least once each calendar year. Calibrated pressure gauges may be purchased from various suppliers such as:

   Davis Instruments
   4701 Mount Hope Drive
   Baltimore, MD 21215
   Phone: 410-358-3900 or
   1-800-368-2516

4. Two (2) P/N MS51523-B4 swivel tee. These fittings will be used to tee into fuel lines for unmetered and metered pressure reference.
5. Hoses of appropriate diameters and sufficient lengths to allow personnel and equipment to be located away from propeller arc and blast area.
6. Common hand tools including: 7/8", 11/16", 9/16", 1/2", 3/8", 7/16", 11/32", and 5/16" wrenches. A 1/4" drive ratchet and sockets, universal swivel, extension, and a 5/32" allen wrench common screw driver, a calibrated torque wrench, an oil can, mirror and flashlight. Safety equipment including hearing and eye protection must be used.
7. Tachometer verification instrument - various types are available. Verify aircraft tachometer accuracy prior to fuel system adjustment.

B. PRE-SETUP PROCEDURES

1. During engine installation, or if any fuel system component has been replaced, flush the aircraft fuel system by first removing the engine-driven fuel pump inlet hose and terminating the end into a large, clean container. Operate the aircraft boost pump and allow a minimum of one gallon of fuel to flow through the system. Take necessary precautions to prevent a fire hazard. If contamination is present, locate and correct the source, and repeat this step before proceeding.

2. For all IO-240-B engines the following procedure must be used for fuel system flush whenever any fuel system component has been replaced:

   (a) Utilizing the airframe boost pump, flush a minimum of 1 quart of fuel from the fuel pump inlet hose into a clean, dry container. Inspect the flushed fuel. If free from contamination connect to the engine driven fuel pump using the appropriate maintenance instructions. If contamination issue before proceeding further.

   (b) Using the airframe boost pump, flush a minimum of 1 quart of fuel through the engine driven fuel pump into a clean, dry container while working the mixture control through it's full range of operation. Inspect the flushed fuel. If free from contamination, connect to the throttle and control unit using the appropriate maintenance instructions. If contamination is found, correct the issue before proceeding further.

   (c) Using the airframe boost pump, flush a minimum of 1 quart of fuel through the throttle and control unit into a clean, dry container while working the throttle control through it's full range of operation. Inspect the flushed fuel. If free from contamination connect to the manifold valve using the appropriate maintenance instructions. If contamination is found, correct the issue before proceeding further.

   (d) Using the airframe boost pump, flush a minimum of 1 quart of fuel through the fuel transducer hose into a clean dry container. Inspect the flushed fuel. If free from contamination, install the fuel transducer in accordance with the Diamond maintenance instructions. If contamination is found, correct the issue before proceeding further.

   (e) Using the airframe boost pump, flush the 4 fuel injector lines into 4 appropriate, clean, dry containers. If the flushed fuel is free from contamination, connect to the fuel injectors using the appropriate maintenance instructions. If contamination is found, correct the issue before proceeding further.

3. Before making any checks or adjustments, verify the accuracy of the aircraft tachometer, manifold pressure gauge and fuel flow gauge. Any gauge found to be inaccurate must be repaired or replaced before adjusting the fuel system.

WARNING

USE OF INACCURATE GAUGES WILL RESULT IN INCORRECT ADJUSTMENT OF THE ENGINE FUEL SYSTEM, POSSIBLE CYLINDER WEAR DUE TO LEAN OPERATION, PRE-IGNITION, DETONATION, LOSS OF POWER AND SEVERE ENGINE DAMAGE.

3. Remove the engine cowling in accordance with the aircraft manufacturer's instructions.

4. Insure that all fuel system components are of the correct part number and are installed properly. Correct any discrepancies noted.

5. Remove, inspect, clean and reinstall the aircraft and engine fuel screens in accordance with the aircraft manufacturer's instructions.

6. Inspect the aircraft induction air filter and alternate air system for condition, operation and cleanliness. Repair or replace any component that is not airworthy in accordance with the aircraft manufacturer's instructions.

7. Inspect the aircraft vapor return system for proper operation in accordance with the aircraft manufacturer's instructions. Correct any discrepancies noted.

8. Insure the fuel manifold valve vent and fuel pump drain lines are properly installed, open and free of obstruction. Correct any discrepancies noted.

9. Inspect all engine control rod ends for wear, freedom of movement, proper installation and security in accordance with the aircraft manufacturer's instructions. Correct any discrepancies noted.

10. Inspect the throttle and control assembly link rods (where used) for correct installation, security and wear at the attach points. Correct any discrepancies noted.

11. Insure all engine controls operate freely throughout their full range of travel and are properly adjusted in accordance with the aircraft manufacturer's instructions.

12. Lubricate all control rod ends and fuel system components in accordance with the latest revision of TCM Service Bulletin SB95-2 and the Aircraft Maintenance Manual.

WARNING

FAILURE TO CORRECTLY INSTALL AND MAINTAIN ENGINE CONTROLS CAN RESULT IN LOSS OF SYSTEM CONTROL AND SUBSEQUENT LOSS OF ENGINE POWER.

13. Locate the IDLE speed stop screw on the throttlebody and turn it counter-clockwise two complete turns. See Figures 6, through 9. During fuel system adjustment, IDLE RPM will be controlled manually using the cockpit throttle control.

14. Inspect the exhaust and induction systems for proper installation, security and leaks. Correct any discrepancies noted.

15. Inspect all lines, hoses and wire bundles for chafing, loose connections, leaks and stains. Correct any discrepancies noted.

Turbocharged engine models incorporating a fuel pressure regulator must have the regulator deactivated during initial fuel system adjustment. To deactivate the fuel pressure regulator, loosen and remove the fuel line or hose from the "center" port fitting at the pressure regulator. Refer to Figure 10. Install and torque, to the specified value, a cap on the "center" port fitting. Install and torque, to the value specified, a plug onto the removed line. Pressure test these areas for fuel leaks prior to proceeding with the fuel system adjustments.

C. SETUP PROCEDURES

WARNING

DURING REMOVAL AND INSTALLATION OF FUEL LINES AND HOSES, FAILURE TO PROPERLY SUPPORT COMPONENT FITTINGS CAN RESULT IN FITTING AND/OR COMPONENT DAMAGE AND LOSS OF SYSTEM PRESSURE. REFERENCE THE LATEST REVISION OF TCM SERVICE BULLETIN SIL95-5.

NOTE: Adjustments to any component of the fuel injection system can affect other system settings. Always verify the performance of the entire fuel injection system whenever any fuel injection system component is adjusted.

1. Loosen and remove the unmetered fuel supply hose from the fuel pump outlet fitting, the fuel control unit inlet fitting, or the throttle body/metering unit inlet Tee whichever is most accessible. Some engine models have a fuel pressure connection fitting in the fuel control inlet screen that may be utilized for unmetered pressure gauge attachment.

2. For engine models with integral throttle body/metering units, remove and set aside the 639494 cap fitting from the inlet Tee. This cap will be reinstalled after setup is complete.

3. Install and torque the MS51523-B4 swivel tee directly to the fuel pump outlet fitting or to the fuel control inlet fitting as applicable.

NOTE: Some installations may require combinations of different fittings and hoses to facilitate installation of unmetered and metered test equipment connections.

3. Attach the unmetered fuel supply hose to the straight end of the tee connector and torque.

4. Connect the Unmetered test hose from the *Porta Test Unit* to the tee fitting and torque. If using the alternative procedure, connect the 0-60 PSI gauge to the swivel tee using a length of hose which will provide proper clearance from the engine cowling and propeller arc. Torque all connections.

5. Loosen and remove the metered fuel supply hose from the manifold valve inlet fitting.

6. Install and torque the second MS51523-B4 swivel tee directly to the fuel manifold valve inlet fitting.

7. Attach the metered fuel supply hose to the straight end of the tee connector and torque.

8. Connect the metered pressure test hose from the *Porta Test Unit* to this second tee connector and torque. If using the alternative procedure, connect the 0-30 PSI gauge to the swivel tee using a hose long enough to provide proper clearance from the engine cowling and propeller arc. Torque all connections.

9. On turbocharged engines, connect the Porta-Test Manifold Pressure and Upper Deck Pressure hose to the engine following the instructions provided with the Porta Test Unit. If using the alternative procedure, connect the 0 - 30 PSID differential gauge pressure fitting to the metered pressure swivel tee using a hose of sufficient length to provide clearance from the aircraft and propeller arc. Connect an equal length of hose to the "suction" side of the gauge and connect the other end to a location to reference turbocharger compressor discharge (upper deck) pressure. See Figure 12. Torque all connections.

10. Position the throttle control in the FULL OPEN position and the mixture control to FULL RICH. Operate the aircraft boost pump in accordance with the aircraft manufacturer's instructions. Following the instructions provided with the Porta Test Unit, bleed all air from the test unit and hoses. If using the alternative calibrated test gauges, loosen the test connections at each gauge to bleed the lines of any air. Hold the gauge at or slightly above the height of the fuel system component during the bleeding operation. Operate the boost pump only long enough to allow purging of air from the installed test equipment. Verify that all fuel lines, hoses and fittings are secured and torqued and that no fuel leaks exist before proceeding. Insure test hoses have been routed clear of the exhaust system and are supported their entire length to avoid inaccurate gauge readings.

WARNING

MAKE CERTAIN ALL FUEL HAS DRAINED FROM THE INDUCTION SYSTEM PRIOR TO ATTEMPTING ENGINE START. FAILURE TO DO SO COULD CAUSE HYDRAULIC LOCK AND SUBSEQUENT ENGINE FAILURE.

11. Install the engine cowling or cooling shroud during ground operation.

12. Refer to TABLE 3, beginning on page 11, for specific data applicable to your engine. Record the applicable IDLE and FULL POWER adjustment points: RPM, fuel pressure, fuel flows, manifold pressure and fuel/air mixture rise provided in this Service Bulletin and Aircraft Maintenance Manual on the operational test form included at the end of this service bulletin. The Operational Test Form may be reproduced for use in recording adjustments and test indications.

NOTE: To insure optimum cooling during FULL POWER operations, the FULL POWER fuel flow should be set to the maximum specification limit.

WARNING

BEFORE STARTING THE ENGINE INSURE THAT THE AIRCRAFT WHEELS ARE CHOCKED AND BRAKES ARE SET.

13. Prepare the aircraft for ground run and start the engine in accordance with the aircraft manufacturer's instructions. Advance the throttle to 1500 to 1800 RPM. While monitoring all engine gauges, operate the engine at this speed until the engine temperatures and pressures have stabilized in the operational range. Use the operational test form to record the gauge indications.

NOTE: Test gauge readings must be taken with the gauges held at the same height above the ground as the fuel system component it is attached to.

14. With the mixture control in the FULL RICH position, reduce the throttle to the specified IDLE RPM. Record the unmetered pressure indicated on the gauge. Slowly move the mixture control toward the IDLE CUT-OFF position and record the maximum RPM rise. Return the mixture control to FULL RICH.

15. Monitoring all engine gauges, slowly advance the throttle control to full rated power for the engine and allow the engine to stabilize for 15 seconds. Record all engine and test gauge indications. DO NOT ALLOW ENGINE TEMPERATURES TO EXCEED 420°F CHT AND 210°F OIL TEMP. Retard throttle control to 800 to 1000 RPM.

NOTE: L/TSIO-360 and TSIO-520 model engines with a fixed (ground adjustable) exhaust bypass, verify that the wastegate is adjusted in accordance with the aircraft manufacturer's instructions. Failure to do so can result in an improperly adjusted fuel system and possible engine damage.

CAUTION: After FULL POWER operation - turbocharged engines must be operated at 800 to 1000 RPM for a minimum of five (5) minutes to allow engine temperatures to stabilize prior to engine shutdown.

16. Compare the recorded IDLE fuel pressure, IDLE RPM fuel/air mixture rise and full power RPM, manifold pressure (as applicable), unmetered fuel pressure, metered fuel pressure and fuel flow indications with the specified values. If all recorded values are within specifications, proceed to paragraph 24.

NOTE: Turbocharged engines equipped with fuel pressure regulators should indicate a full power metered pressure and fuel flow five (5) percent higher than specified. This is required to insure adequate part-throttle fuel flow.

17. If any of the recorded readings are not within specifications, the fuel system must be completely adjusted. ALL READINGS MUST BE TAKEN WITH MIXTURE CONTROL IN THE FULL RICH POSITION. Install the engine cowling or cooling shroud during all ground operation.

NOTE: Engine driven fuel pump output pressures vary with engine RPM. During ground operation FULL POWER RPM may not be obtained. Use the Fuel Flow Compensation Table 2 on page 10 to correct the specified metered pressures if FULL POWER RPM cannot be achieved. On turbocharged engines insure that the manifold pressure is adjusted in accordance with the aircraft manufacturer's instructions. Engine driven fuel pumps installed on turbocharged engines are referenced to turbocharger compressor discharge pressure (upper deck pressure) to achieve FULL POWER engine driven fuel pump pressure.

WARNING

MAKE ALL ADJUSTMENTS WITH THE ENGINE STOPPED AND THE IGNITION AND MASTER SWITCHES IN THE OFF POSITION.

18. To adjust the IDLE RPM unmetered pump pressure, loosen the lock nut on the low pressure relief valve. See Figures 1 through 5. Turning the adjustment clockwise (CW) will increase pressure and counterclockwise (CCW) will decrease pressure. Operate the engine at 1500-1800 RPM for 15 seconds after each adjustment, then retard the throttle to the specified IDLE RPM. Repeat this step until pressure is within specified limits.

CAUTION: All adjustments on the IO-240-B engine must be made with the boost pump on.

NOTE: **Maximum part throttle full rich fuel flow will be achieved by setting the idle rpm (low) unmetered fuel pump pressure to the minimum value specified.** With the idle rpm fuel/air mixture properly adjusted (step 19) the fuel control metering plate orifices are indexed to the maximum open position.

19. With engine operating at the specified IDLE RPM and unmetered fuel pressure, slowly move the mixture control from the FULL RICH position toward IDLE CUT-OFF to check fuel/air mixture. A rise of 25 to 50 RPM should be obtained. (For the IO-240-B equipped with the standard fuel system mixture rise must be 50-75 RPM) An RPM change greater than 50 (75 for the IO-240-B equipped with the standard fuel system) indicates the mixture is too rich and a change that is less than 25 (50 for the IO-240-B equipped with the standard fuel system) indicates the mixture is too lean. Adjust

mixture conditions that are too rich or too lean as follows:

a) Identify the type of throttle and control assembly that is to be adjusted. See Figures 6, 8 and 9.

b) Perform an IDLE fuel/air mixture check and observe RPM rise. If the RPM rise is not within specifications, advance the throttle control to 1500 - 1800 RPM for 15 seconds after each adjustment to clear the engine. Retard the throttle control to IDLE RPM and repeat mixture check. Make the necessary adjustment. Repeat this procedure until the specified RPM rise is achieved.

c) Recheck IDLE RPM unmetered pump pressure. If pressure in not within limits, repeat Steps 18, 19, 19-a and 19-b before continuing.

20. On all naturally aspirated engines, adjust the FULL POWER metered fuel pressure to the specified value by turning the adjustable orifice screw clockwise to increase fuel pressure and counterclockwise to decrease fuel pressure. See Figures 1, 2 and 3.

21. On turbocharged engines, adjust the full power metered fuel pressure to the specified value as follows:

NOTE: On turbocharged engines equipped with a fuel pressure regulator, the full power metered fuel pressure and fuel flow must be adjusted to five (5) percent higher than the maximum specified limit.

a. Loosen the aneroid adjustment screw lock nut. See Figures 4 and 5.

b. Turn the aneroid adjustment screw counterclockwise to increase metered fuel pressure and clockwise to decrease metered fuel pressure.

c. After final adjustment is accomplished, torque lock nut to 25-30 inch pounds. DO NOT EXCEED LOCK NUT TORQUE LIMITS. OVER-TORQUING OF LOCK NUT WILL RESULT IN DAMAGE TO ANEROID HOUSING THREADS AND SUBSEQUENT LOSS OF ADJUSTMENT.

22. For engines equipped with a fuel pressure regulator, the full power metered fuel pressure and fuel flow flow must now be set to the specified limit by adjustment of the regulator as follows. See Figure 10. Reconnect the regulator and torque all connections to the specified value. Loosen the lock nut on the regulator adjustment. Turn the regulator adjusting screw clockwise to increase metered fuel pressure and fuel flow and counterclockwise to decrease metered fuel pressure and fuel flow. After final adjustment is completed, torque the lock nut to the specified value.

23. When full power metered fuel pressure has been adjusted to the specified values, recheck: (a) IDLE RPM, (b) unmetered fuel pressure, (c) fuel/air mixture. If any values are not within specified limits, repeat the adjustment procedures.

24. With the fuel system set to the specified metered fuel pressure, set the IDLE RPM to the aircraft manufacturer's specified value by turning the Idle Speed Stop screw clockwise to increase RPM or counterclockwise to decrease RPM. See Figures 6, 8 and 9.

D. POST SETUP PROCEDURES

1. Insure that the master switch, ignition switch and fuel selector are in the OFF position.

2. Remove the engine cowling or cooling shroud in accordance with the aircraft manufacturer's instructions. (a) remove all test gauges, fittings and hoses that were installed for fuel system setup, (b) reconnect all fuel hoses and cap fittings to their original locations, (c) support and torque all fittings to the specified value, see TABLE 1.

3. ASSURE CAP ASSEMBLY 639494 IS CORRECTLY INSTALLED ON INLET TEE FITTING OF COMBINATION THROTTLE BODY/METERING UNITS. TORQUE TO

135-190 INCH POUNDS PER TABLE 1 SPECS. UNDER NO CIRCUMSTANCE ALLOW ANY CAP FITTING OTHER THAN 639494 TO BE INSTALLED DURING ENGINE OPERATION.

4. Perform a complete fuel system leak check in accordance with the aircraft manufacturer's instructions. Correct any discrepancies noted.
   - Turn aircraft master switch to ON position
   - Adjust mixture control to full rich
   - Adjust throttle control to 1/4 inch open
   - Activate the aircraft boost pump (ON)
   - Inspect entire fuel system for fuel leakage
   - Return mixture and throttle to idle/closed position
   - Turn aircraft boost pump OFF
   - Turn the aircraft master switch OFF
5. Install engine cowling in accordance with the aircraft manufacturer's instructions.
6. Perform a complete operational ground run-up and verify that all fuel system performance specifications are achieved.

E. FLIGHT TEST:
Except naturally aspirated engines with altitude compensating fuel pump

1. Refer to the aircraft manufacturer's or Supplemental Type Certificate (STC) holder's POH/AFM for specific operational information.
2. A flight test is required whenever an adjustment is made that may affect engine operational characteristics or performance.
3. If FULL POWER RPM was not obtained during fuel injection system setup and adjustment, a flight test is required to insure that the fuel injection system is performing within specified limits for the engine and aircraft.
4. Repeat the setup and adjustments as required until the fuel injection system is performing within the published specification for the aircraft and engine.

F. FLIGHT TEST:
Naturally Aspirated engines with altitude compensating fuel pumps (AUTO LEAN)

1. All naturally aspirated engines utilizing an altitude compensating fuel pump require a flight test at: (a) Initial installation, (b) Every 12 months (Scheduled to coincide with annual or 100 HR inspection), (c) each time adjustments are made due to a fuel system component replacement and (d) at any indication of improper auto-leaning feature operation.
2. Table 5 and Chart 1 provide fuel flow vs. pressure altitude specifications for the IO-240-B series engine with altitude compensating fuel pumps. Table 6 and Auto Leaning Chart 3 provide fuel flow vs. pressure altitude specifications for the IO-360-DB engine with altitude compensating fuel pump. Tables 7 & 8 and Auto Leaning Charts 4 & 5 provide fuel flow vs. pressure altitude specifications for the IO-360-ES engine with altitude compensating fuel pump. Tables 9 through 12 and Auto Leaning Charts 6 through 9 provide fuel flow vs. pressure altitude specifications for the IO-550- series engine with altitude compensating fuel pumps.
3. Insure the accuracy of aircraft fuel flow gauge and tachometer has been verified. These gauges must be accurate or the data recorded during flight test will not be valid.
4. Locate the correct table and auto leaning chart for the aircraft and engine. On the operational test form provided in this Service Information Directive, record all pressure altitudes and corresponding minimum and maximum fuel flows as specified.
5. In accordance with the aircraft manufacturer's instructions, perform a complete preflight inspection, engine start and ground runup.

6. Set the aircraft altimeter to 29.92 inches Hg.

7. In accordance with the aircraft manufacturer's instructions, conduct a normal take-off.

8. Climb must be accomplished using full throttle, FULL RICH mixture and maximum rated full power RPM.

9. Using the aircraft fuel flow gauge and altimeter, record fuel flows at all pressure altitudes specified.

10. Compare the recorded fuel flows with the specified fuel flows for all pressure altitudes. If fuel flows are within the minimum and maximum limits at all altitudes, no adjustments are required.

11. If the fuel flows are not within specified limits at all pressure altitudes, the fuel injection system auto leaning schedule requires adjustment.

G. ADJUSTMENT PROCEDURES:

Fuel Pump Auto Leaning Schedule

NOTE: On IO-550-A and C model engines do not attempt to adjust the auto leaning schedule if the aircraft is at a field with a pressure altitude greater than 1000 feet.

On IO-550-B, D, E, F and L model engines, do not attempt to adjust the auto leaning schedule if the aircraft is at a field with a pressure altitude greater than 3000 feet.

Refer to Part C of this Service Information Directive for installation of the required test equipment.

1. If not previously accomplished, adjust the engine fuel injection system in accordance with Part C of this Service Information Directive using the appropriate table for the engine and aircraft.

2. Adjustments to the engine-driven fuel pump variable orifice (aneroid) will result in a change to the auto leaning schedule. One complete revolution of the aneroid adjustment will increase or decrease the auto leaning schedule approximately 1000 feet.

3. Refer to the charts on pages 19 to 25. The variable orifice (aneroid) adjustment will move you horizontally across the chart. The adjustable orifice will move you vertically.

4. Adjustments to the variable orifice (aneroid) will affect the FULL POWER unmetered fuel pressures (adjustable orifice), metered pressures and fuel flows. It is important to maintain the balance between these adjustments in order to achieve the specified fuel system parameters.

CAUTION: Exercise caution when adjustments to the aneroid are accomplished. The aneroid stem has an extra fine thread and over-torqueing the lock nut will damage either the stem or housing threads.

NOTE...
It will be necessary to cut and remove the safety wire and manufacturer's seal from the variable orifice adjustment. Cut the safety wire as close to the variable orifice stem as possible. This will provide a pigtail for the fuel pump through bolts. It is not necessary to resafety the aneroid after adjustments have been completed.

5. By reviewing the data recorded on the operational test flight form, we can determine if the auto leaning schedule is above or below the specified limits at the various pressure altitudes.

6. Adjustment of the variable orifice (aneroid) clockwise will decrease the altitude (move horizontally to the left on the chart) while counterclockwise adjustments will increase the altitude (move horizontally to the right on the chart) at a given pressure altitude.

7. As an example, looking at chart number 5 (IO-550-B engine) at a pressure altitude of 4000 feet the recorded fuel flow was 140 PPH (point A). The fuel flow specified for this pressure altitude is 142 PPH to 152 PPH. The recorded fuel flow of 140 PPH would be correct if we were between 5000 feet and 7000 feet. To achieve the specified fuel flow versus pressure altitude we must adjust the variable orifice out. Adjustment of the variable orifice (aneroid) two complete revolutions will move point A two thousand feet to the right to 6000 feet.

8. orifice, torque the lock nut to 25-30 inch pounds.

9. Perform a complete ground run-up and verify that unmetered and metered pressures and fuel flows are within the limits specified in the appropriate table for the pressure altitude. If these parameters are not within the limits specified make adjustments in accordance with PART C to achieve the specified values.

NOTE...

The adjustable orifice tapered needle may be damaged if forced against its seat. The adjustment should move freely. Do not continue adjustments if rotational resistance increases suddenly.

10. Once the adjustments are completed, remove the test equipment in accordance with part D (Post Setup Procedures).

11. Perform a flight test in accordance with part F (Flight Test: Naturally Aspirated engines with Auto Lean).

12. Repeat these procedures until the engine's fuel injection system meets all published specifications.

TABLE 1

Torque Specifications for Hose End and Cap Fittings

BRASS or ALUMINUM END FITTINGS/CAPS

Hose Size	Fitting Material	Torque (inch lbs.)
#2 (.31x24)	Hose end fitting Brass/Aluminum	50 – 80
#3 (.38x24)	Hose end fitting Brass/Aluminum	70 – 105
#4 (.4375x20)	Hose end fitting Brass/Aluminum	100 – 140
#5 (.500x20)	Hose end fitting Brass/Aluminum	130 – 180
#6 (.5625x18)	Hose end fitting Brass/Aluminum	150 – 195
#8 (.750x16)	Hose end fitting Brass/Aluminum	270 – 350
#10 (.875x14)	Hose end fitting Brass/Aluminum	360 – 430
#12 (1.063x12)	Hose end fitting Brass/Aluminum	460 – 550

STEEL HOSE END FITTINGS/CAPS

Hose Size	Fitting Material	Torque (inch lbs.)
#2 (.31x24)	Steel End Fitting	75 – 120
#3 (.38x24)	Steel End Fitting	95 – 140
#4 (.4375x20)	Steel End Fitting	135 – 190
#5 (.500x20)	Steel End Fitting	170 – 240
#6 (.5625x18)	Steel End Fitting	215 – 280
#8 (.750x16)	Steel End Fitting	470 – 550
#10 (.875x14)	Steel End Fitting	620 – 745
#12 (1.063x12)	Steel End Fitting	855 – 1055

Table 2.
Compensation Table For Static Ground Setup

Metered Pressure vs. RPM @ 70°F Fuel Temperature		
Static Engine RPM	Correction Factor	Corrected Metered Pressure (Metered Pressure x Correction Factor)
Rated RPM	1	
-20	.991	
-40	.982	
-60	.973	
-80	.964	
-100	.955	
-120	.946	

NOTE: All values are approximate. Variations may occur due to engine and installation specific influences.

Example: IO-520-BB, Maximum Rated RPM = 2700
Metered Fuel Pressure Limits = 14.9 - 17.2

If maximum static engine RPM = 2640, (-60 RPM) use Correction Factor .973
Metered Fuel Pressure Limits x Correction Factor = Corrected Metered Pressure Limits

14.9 x .973 = 14.5 (Minimum Metered Pressure Limit) @ 2640 RPM
17.2 x .973 = 16.7 (Maximum Metered Pressure Limit) @ 2640 RPM

TABLE 3. Fuel System Adjustment Values

IDLE AND FULL POWER FUEL PRESSURES AND FLOWS					
ENGINE SEE NOTE 7	Prop. RPM & (MAP)	Unmetered Pump PSI (NOTE 3)	Metered Nozzle PSI (NOTE 4)	Fuel lbs/hr (NOTE 5)	Fuel gal/hr (NOTE6)
IO-240-A, B **(a)(c)**	1000	9.4 - 9.8	TABLE 4	-	-
IO-240-A, B **(b) (c)**	Full Throttle	See **(b)** and **(c)**	See **(b)** and **(c)**	-	-
(a) For IO-240-A, B with standard fuel pump installed. Boost pump "ON", idle mixture rise to be 50-75. **(b)**For IO-240-B series with optional Altitude Compensating Pump and Standard Fuel Manifold Valve, see Chart 1 and Table 5 for instructions. See Note 2 page 18 of 38. **(c) For IO-240-B engines, which are equipped with the Altitude Compensating Bypass Fuel System, see the latest revision of TCM bulletin SID07-3.**					
IO-346-A, B	600 2700	7.0 - 7.5 19.0 - 21.0	12.5 - 14.0	- 78 - 85	- 13.3 - 14.5
IO-360-A, AB, C CB, D, DB**(d)**, G, GB, H, HB, J, JB	600 2800	7.0 - 9.0 24.0 - 27.0	15.8 - 18.2	- 100 - 106	- 17.0 - 18.1
IO-360-ES **(d)** SEE NOTE 2	600 2800	7.0 - 9.0 23.0 –26.0	14.3 – 16.5	- 100 - 107	- 17.0 - 18.1
IO-360-ES (CIRRUS) **(d)** SEE NOTE 2&6 Sea Level	600 2700	7.0 - 9.0 21.0 - 24.0	13.8 – 15.5	- 96 - 102	- 16.4 – 17.4
IO-360-ES (CIRRUS) **(d)** SEE NOTE 2&6 1,500 Press Alt	600 2700	7.0 - 9.0 19.0 – 22.0	13.3 – 14.6	- 94 - 98	- 16.0 – 16.6
(d) Engines with Altitude Compensating fuel pumps See Note 2 page 18 of 38.					
IO-360-K, KB	600 2600	7.0 - 9.0 21.0 - 24.0	14.3 - 16.3	- 93.5 - 97.5	- 15.9 - 16.6
TSIO-360-A, AB	600 2800 (32.0)	6.5 - 7.5 27.2 - 31.2	15.8 - 16.7	- 119 - 124	- 20.1 - 21.0
TSIO-360-B, BB	600 2800 (32.0)	6.5 - 7.5 27.2 - 31.2	15.8 - 16.7	- 115 - 124	- 20.1 - 21.0
TSIO-360-C, CB	600 2800 (37.0)	6.5 - 7.5 34.0 - 37.0	16.7 - 19.3	- 135 - 145	- 23.0 - 24.7

TABLE 3. Fuel System Adjustment Values (cont'd)

IDLE AND FULL POWER FUEL PRESSURES AND FLOWS					
ENGINE SEE NOTE 7	Prop. RPM & (MAP)	Unmetered Pump PSI (NOTE 3)	Metered Nozzle PSI (NOTE 4)	Fuel lbs/hr (NOTE 5)	Fuel gal/hr (NOTE 6)
TSIO-360-D, DB	600 2800 (36.0)	6.5 - 7.5 34.0 - 37.0	16.7 - 19.3	- 135 - 145	- 23.0 - 24.7
TSIO-360-E, EB, L/TSIO-360-E, EB	700 2575 (40.0)	6.25 - 6.75 43.0 - 46.0	15.8 - 18.3	- 130 - 140	- 22.1 - 23.8
TSIO-360-F, FB	700 2575 (41.0)	6.25 - 6.75 40.0 - 43.0	15.8 - 18.3	- 130 - 140	- 22.1 - 23.8
TSIO-360-G, GB	700 2700 (40.0)	6.25 - 6.75 45.0 - 49.0	16.7 - 19.3	- 135 - 145	- 23.0 - 24.7
TSIO-360-H, HB	600 2800 (34.5)	6.5 - 7.5 29.0 - 33.0	14.9 - 17.3	- 125 - 135	- 21.3 - 23.0
TSIO-360-JB	600 2800 (37.0)	6.5 - 7.5 34.5 - 37.5	16.7 - 19.3	- 134 - 145	- 22.8 - 24.7
TSIO-360-KB, L/TSIO-360-KB	700 2800 (40.0)	6.5 - 7.5 36.0 - 39.0	17.7 - 21.2	- 140 - 155	- 23.8 - 26.4
TSIO-360-LB	700 2700 (40.0)	6.25 - 6.75 34.0 - 38.0	14.7 - 16.7	- 135 - 145	- 23.0 - 24.7
TSIO-360-MB	700 2700 (36.0)	6.25 - 6.75 28.0 - 32.0	13.6 - 15.3	- 125 - 135	- 21.3 - 23.0
L/TSIO-360-RB	700	25 Minimum	-	-	-
See Note 1	2600 (38.0)	35.0 - 45.0	-	140 - 150	23.3 - 25.5

TABLE 3. Fuel System Adjustment Values (cont'd)

IDLE AND FULL POWER FUEL PRESSURES AND FLOWS					
ENGINE SEE NOTE 7	Prop. RPM & (MAP)	Unmetered Pump PSI (NOTE 3)	Metered Nozzle PSI (NOTE 4)	Fuel lbs/hr (NOTE 5)	Fuel gal/hr (NOTE 6)
TSIO-360-SB	700	6.25 - 6.75		-	-
	2600 (39.0)	31 - 36	15.1 - 17.8	131 - 151	22.3 - 25.7
O-470-GCI	600	9.0 - 11.0		-	-
	2600	23.8 - 25.3	14.7 - 16.9	122 - 129	20.8 - 22.0
IO-470-C, G, P, R	600	9.0 - 11.0		-	-
	2600	24.7 - 27.7	14.8 - 17.3	123 - 130	21.0 - 22.1
IO-470-D, E, F, H L, M, N, S, U	600	9.0 - 11.0		-	-
	2625	25.0 - 28.0	15.0 - 17.5	124 - 131	21.1 - 22.3
IO-470-J, K	600	5.5 - 7.0		-	-
	2600	24.7 - 27.7	14.8 - 17.3	123 - 130	21.0 - 22.1
IO-470-V	600	6.5 - 7.5		-	-
	2625	28.3 - 29.8	17.8 - 18.8	123.5 - 131	21.0 - 22.3
IO-470-VO	600	6.5 - 7.5		-	-
	2625	28.8 - 31.0	17.8 - 18.8	132 - 137.5	22.5 - 23.4
GIO-470-A	450	9.0 - 11.0		-	-
	2400	26.0 - 28.0	15.5 - 16.5	145 - 155	24.7 - 26.4
TSIO-470-B, C, D	600	5.5 - 6.0		-	-
	2600 (35.0)	28.0 - 30.0	15.0 - 17.0	145 - 155	24.7 - 26.4
IO-520-A, J	600	9.0 - 11.0		-	-
	2700	29.0 - 32.0	15.9 - 18.2	136 - 146	23.2 - 24.9
IO-520-B, BA, BB C, CB	600	9.0 - 11.0		-	-
	2700	28.0 - 31.0	14.9 - 17.2	136 - 146	23.2 - 24.9
IO-520-D, F, K, L	600	9.0 - 11.0		-	-
	2850	30.0 - 33.0	17.0 - 19.4	143 - 153	24.4 - 26.1
IO-520-E	600	9.0 - 11.0		-	-
	2850	29.0 - 32.0	16.1 - 18.3	143 - 153	24.4 - 26.1

TABLE 3. Fuel System Adjustment Values (cont'd)

IDLE AND FULL POWER FUEL PRESSURES AND FLOWS					
ENGINE SEE NOTE 7	Prop. RPM & (MAP)	Unmetered Pump PSI (NOTE 3)	Metered Nozzle PSI (NOTE 4)	Fuel lbs/hr (NOTE 5)	Fuel gal/hr (NOTE 6)
IO-520-M, MB	600	6.0 - 7.0		-	-
	2700	29.0 - 32.0	16.7 - 19.3	136 - 146	23.2 - 24.9
IO-520-P LIO-520-P	600	6.0 - 7.0		-	-
	2500	26.2 - 26.9	14.3 - 16.2	130 - 140	22.1 - 23.9
TSIO-520-AE, L/TSIO-520-AE	600	7.5 - 8.5		-	-
	2400 (32.5)	34.5 - 38.0	15.2 - 16.5	160 - 165	27.3 - 28.1
TSIO-520-AF	600	5.5 - 6.5		-	-
	2700 (35.5)	35.0 - 39.0	18.4 - 19.9	180 - 186	30.7 - 31.7
TSIO-520-B, BB	600	5.5 - 7.0		-	-
	2700 (32.0)	29.0 - 32.0	16.0 - 17.9	165 - 175	28.1 - 29.8
TSIO-520-BE	600	5.5 - 7.0		-	-
	2600 (38.0)	25.0 - 28.0	12.7 - 14.1	214 - 224	36.5 - 38.2
TSIO-520-C, H	600	5.5 - 7.0		-	-
	2700 (32.5)	29.0 - 32.0	15.3 - 17.2	160 - 170	27.3 - 29.0
TSIO-520-CE	600	5.5 - 6.5		-	-
	2700 (37.0)	33.0 - 36.0	16.2 - 18.0	215 - 225	36.6 - 38.3
TSIO-520-D, DB	600	5.5 - 7.0		-	-
	2700 (32.5)	29.0 - 32.0	13.3 - 15.1	160 - 170	27.3 - 29.0
TSIO-520-E, EB	600	5.5 - 6.5		-	-
	2700 (34.5)	31.0 - 34.0	15.6 - 17.7	175 - 185	29.8 - 31.5

TABLE 3. Fuel System Adjustment Values (cont'd)

IDLE AND FULL POWER FUEL PRESSURES AND FLOWS					
ENGINE SEE NOTE 7	Prop. RPM & (MAP)	Unmetered Pump PSI (NOTE 3)	Metered Nozzle PSI (NOTE 4)	Fuel lbs/hr (NOTE 5)	Fuel gal/hr (NOTE 6)
TSIO-520-G	600	5.5 - 6.5		-	-
	2700 (35.0)	31.0 - 34.0	15.8 - 17.6	181 - 191	30.8 - 32.5
TSIO-520-J, JB	600	5.5 - 6.5		-	-
	2700 (36.0)	31.0 - 34.0	16.9 - 18.7	170 - 178	29.0 - 30.3
TSIO-520-K, KB	600	5.5 - 7.0		-	-
	2700 (33.0)	29.0 - 32.0	15.1 - 17.4	163 - 175	27.8 - 29.8
TSIO-520-L, LB SEE NOTE 1	600	25 - Minimum	-	-	-
	2700 (38.0)	45.0 - 55.0	-	180 - 190	30.7 - 32.4
TSIO-520-M, R	600	5.5 - 6.5		-	-
	2700 (36.5)	33.0 - 37.0	16.9 - 19.9	170 - 186	29.0 - 31.7
TSIO-520-N, NB	600	5.5 - 6.5		-	-
	2700 (38.0)	32.0 - 35.0	16.9 - 19.9	170 - 186	28.9 - 31.7
TSIO-520-P	600	5.5 - 6.5		-	-
	2700 (36.5)	33.0 - 37.0	18.4 - 19.9	180 - 186	30.7 - 31.7
TSIO-520-T	600	5.5 - 6.5		-	-
	2700 (39.5)	33.0 - 37.0	16.3 - 18.1	185 - 195	31.5 - 33.2
TSIO-520-UB	600	5.5 - 6.5		-	-
	2700 (36.0)	33.0 - 37.0	14.4 - 16.0	195 - 205	33.2 - 34.9
TSIO-520-VB	600	5.6 - 6.5		-	-
	2700 (40.5)	36.0 - 39.5	16.9 - 18.7	200 - 210	34.1- 35.8

TABLE 3. Fuel System Adjustment Values (cont'd)

IDLE AND FULL POWER FUEL PRESSURES AND FLOWS					
ENGINE SEE NOTE 7	Prop. RPM & (MAP)	Unmetered Pump PSI (NOTE 3)	Metered Nozzle PSI (NOTE 4)	Fuel lbs/hr (NOTE 5)	Fuel gal/hr (NOTE 6)
TSIO-520-WB	600	25 - Minimum	-	-	-
SEE NOTE 1	2700 (39.5)	45.0 - 55.0	-	190 - 200	32.4 - 34.1
GTSIO-520-C	525	4.0 - 7.0		-	-
	2400 (34.5)	30.0 - 33.0	16.5 - 17.5	215 - 225	36.6 - 38.3
GTSIO-520-D, H	467	4.0 - 7.0		-	-
	2267 (39.5)	30.5 - 35.0	15.7 - 17.3	250 - 260	42.6 - 44.3
GTSIO-520-F, K	600	6.75 - 7.25		-	-
SEE NOTE 1	2267 (44.5)	38.0 - 41.0	17.4 - 18.8	300 - 310	51.1 - 52.8
GTSIO-520-L	467	4.0 - 7.0		-	-
	2234 (39.0)	29.5 - 35.0	16.4 - 17.9	255 - 265	43.4 - 45.1
GTSIO-520-M	467	4.0 - 7.0		-	-
	2234 (40.0)	29.5 - 35.0	16.4 - 17.9	255 - 265	43.4 - 45.1
GTSIO-520-N	467	4.0 - 7.0		-	-
SEE NOTE 1	2234 (39.0)	29.5 - 35.0	16.4 - 17.9	255 - 265	43.4 - 45.1
IO-550-A →	600	8.0 - 10.0		-	-
	2700	32.0 - 36.0	17.7 - 20.0	142 - 150	24.2 - 25.6
→ Engines with Altitude Compensating fuel pumps See Note 2 page 18 of 38.					
IO-550-B ↓	600	8.0 - 10.0		-	-
SEE NOTE 2	2700	29.2 - 36.2	16.5 - 18.4	146 - 156	24.9 - 26.6
↓ Engines with Altitude Compensating fuel pumps See Note 2 page 18 of 38.					
IO-550-C °	600	8.0 - 10.0		-	-
SEE NOTE 2	2700	31.6 - 37.8	17.6 - 19.6	152 - 160	25.9 - 27.3
° Engines with Altitude Compensating fuel pumps See Note 2 page 18 of 38.					

TABLE 3. Fuel System Adjustment Values (cont'd)

IDLE AND FULL POWER FUEL PRESSURES AND FLOWS					
ENGINE SEE NOTE 7	Prop. RPM & (MAP)	Unmetered Pump PSI (NOTE 3)	Metered Nozzle PSI (NOTE 4)	Fuel lbs/hr (NOTE 5)	Fuel gal/hr (NOTE 6)
IO-550-D, E, F,	600	8.0 - 10.0		-	-
L ± SEE NOTE 2	2700	32.0 - 36.0	17.2 - 20.0	143 - 155	24.4 - 26.4
± Engines with Altitude Compensating fuel pumps See Note 2 page 18 of 38.					
IO-550-G	600	8.0 - 10.0		-	-
	2500	22.0 - 26.0	14.7 - 16.0	125 - 130	21.3 - 22.1
IO-550-N	600	8 - 10		-	-
	2700	28 - 32	19 - 21.3	150 - 160	25.6 - 27.3
IO-550-P	600	8 - 10		-	-
	2700	28 - 32	19 - 21.3	150 - 160	25.6 - 27.3
IO-550-R	600	8 - 10		-	-
	2700	28 - 32	19 - 21.3	150 - 160	25.6 - 27.3
GIO-550-A	600	25-Minimum	-	-	-
See NOTE 1	2267	45 - 55	-	175 - 185	29.8 - 31.5
TSIO-550-B	SEE	Maintenance	Manual	M-18	
TSIO-550-C	SEE	Maintenance	Manual	M-18	
TSIO-550-E	SEE	Maintenance	Manual	M-18	
TSIO-550-G	SEE	Maintenance	Manual	M-18	
TSIO-550-G	600	7.0-9.0			
MOONEY	2500	20.0-23.0	10.4-11.6	177-180	30.0-30.7
	(33.5)				
Consult current Mooney Aircraft Maintenance Manual for any changes to fuel setup procedures or values					
TSIOL-550-A	600	5.5 - 6.5			
	2600	32.5 - 35.5	17.0 - 19.0	170 - 180	29.0 - 30.7
	(35.0)				

TABLE 3. Fuel System Adjustment Values (cont'd)

IDLE AND FULL POWER FUEL PRESSURES AND FLOWS					
ENGINE SEE NOTE 7	Prop. RPM & (MAP)	Unmetered Pump PSI (NOTE 3)	Metered Nozzle PSI (NOTE 4)	Fuel lbs/hr (NOTE 5)	Fuel gal/hr (NOTE 6)
TSIOL-550-B	600	6.0 - 8.0	-	-	-
	2700 (35.0)	36.0 - 40.0	20.0 - 22.5	175 - 185	29.8 - 31.5
TSIOL-550-C	600	6.0 - 8.0	-	-	-
	2600 (39.5)	37.0 - 40.0	15.0 – 16.5	204 - 216	34.8 – 36.8
6-285 (TIARA)	See latest revision of Teledyne Continental Motors Service Bulletin M79-4.				

NOTE 1: Refer to the aircraft manufacturer's instructions for adjustment procedures.

NOTE 2: Flight test required to verify fuel flow vs. pressure altitude values are within the limits specified. See applicable Tables 5 through 12 and Charts 2 through 9 for specified values by engine model.

NOTE 3: FULL POWER unmetered fuel pump pressure limits are provided for reference only. Use metered fuel pressure specifications for adjustments at full power.

NOTE 4: Use for full power, maximum RPM adjustment only. All other parameters for reference only, see note → above.

NOTE 5: May be determined using a calibrated in-line flow measuring device. Otherwise use metered fuel pressure specifications. Refer to Aircraft Manufacturer's Maintenance Manual for method of verifying accuracy of fuel flow indicator.

NOTE 6: This engine installed in Cirrus SR20 aircraft. IO-360-ES (6) B engine has been de-rated by Cirrus from original 210 HP at 2800 RPM to 200 HP at 2700 RPM. Engine data plate reflects original TC and PC data of 210 HP at 2800 RPM. Refer to Cirrus SR20 Maintenance Manual and Pilots Operating Handbook.

NOTE 7: The setup procedures contained in this bulletin are only for use on engines that have not been modified from their original configuration as shipped from the factory by Teledyne Continental Motors. Engines which have been modified by the installation of aftermarket components such as turbo-normalizing systems, turbocharging systems, intercoolers, after-coolers, fuel nozzles, etc, whether by STC or field approval, must use the instructions provided by the STC holder or installer. TCM will not accept any responsibility or liability for any modified engine set up in accordance with procedures contained in this Service Information Directive.

TABLE 4
IO-240-A,B Without Altitude Compensating (Aneroid Equipped) Pump

FULL THROTTLE STATIC RPM METERED FUEL PRESSURE SPECIFICATIONS

FULL THROTTLE STATIC ENGINE RPM	NOMINAL METERED FUEL PRESSURE	ALLOWED VARIATION
1800 RPM	7.8	± 0.3
1850 RPM	8.1	± 0.3
1900 RPM	8.3	± 0.3
1950 RPM	8.6	± 0.3
2000 RPM	8.8	± 0.3
2050 RPM	9.1	± 0.3
2100 RPM	9.4	± 0.3
2150 RPM	9.6	± 0.3
2200 RPM	9.9	± 0.3
2250 RPM	10.2	± 0.3
2300 RPM	10.5	± 0.3
2350 RPM	10.8	± 0.3
2400 RPM	11.2	± 0.3

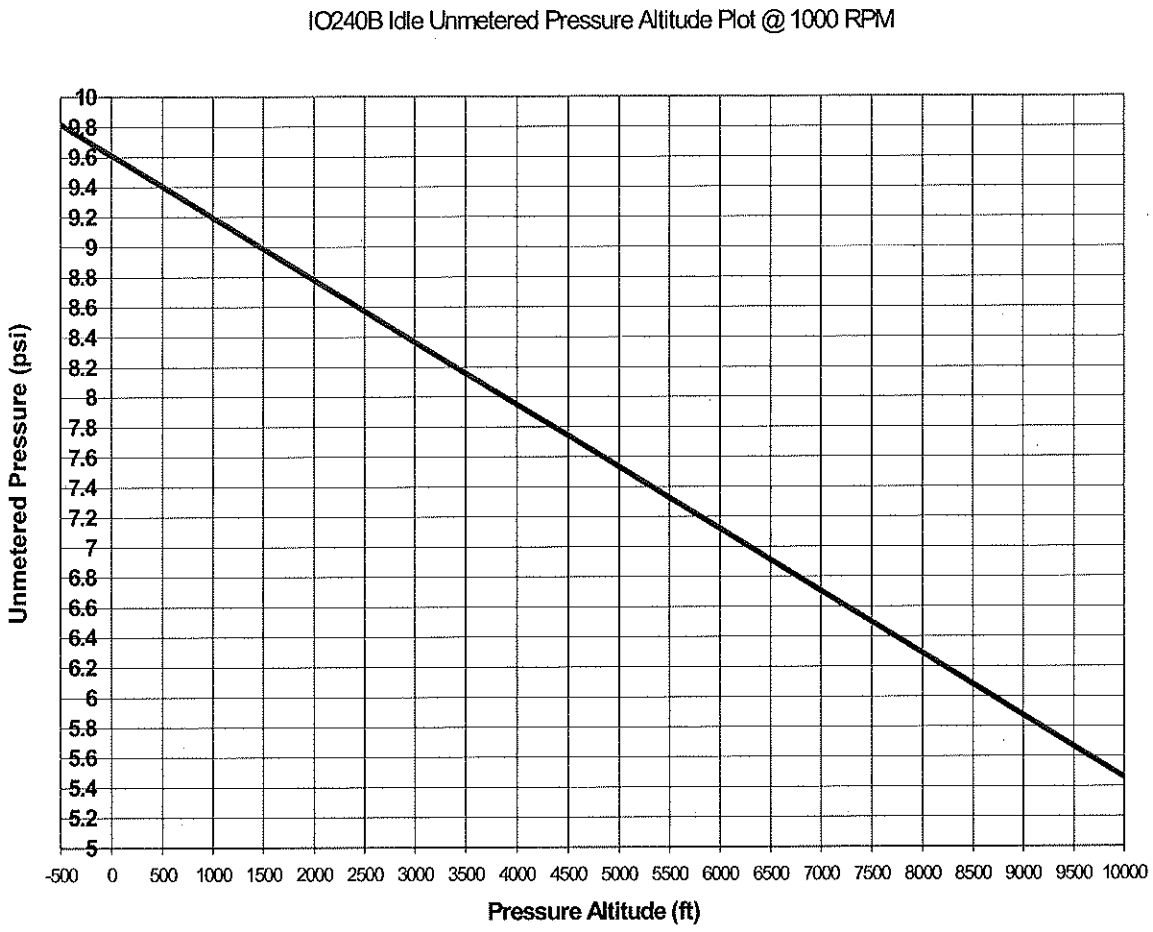
CHART 1

IO-240-B with Altitude Compensating (Aneroid Equipped) Fuel Pump and Standard Fuel Manifold Valve

Idle (Step 1)

Set Unmetered pump pressure and RPM rise at 1000 +/- 25 rpm to 9.6 +/- 0.2 psi (sea level / standard day). If pressure altitude is different from sea level, determine required unmetered pressure setting from the plot below (Reference Figure 15)

NOTE: Pressure altitude must be used for the figures below when determining fuel system set-up values. To determine pressure altitude, set your altimeter to 29.92 in hg, and the altimeter will indicate your pressure altitude.

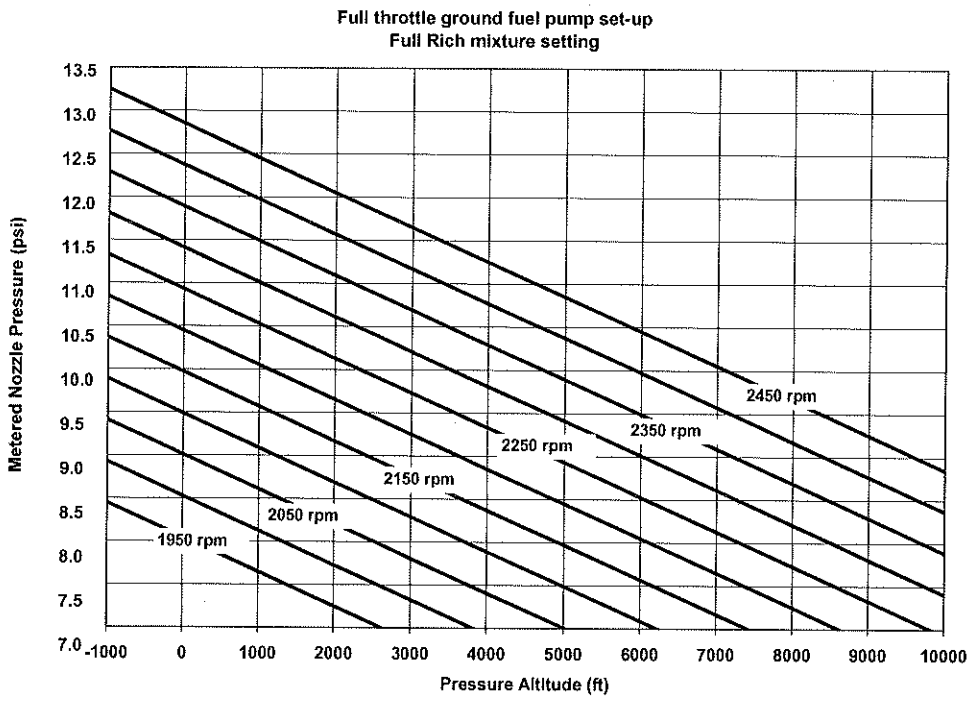


Adjust idle mixture screw to set RPM rise during mixture check at 1000 rpm to 20 - 50 rpm.

CHART 1 (Con't)

Full Throttle (Step 2)

Adjust the aneroid rod to obtain the metered nozzle pressure (+/- 0.3 psi) at pressure altitude and RPM per the chart above. Turn clockwise to decrease pressure and counter-clockwise to increase pressure. After adjustment, recheck idle unmetered pressure setting using the instructions in step 1 of this chart. (Reference Figure 15)



NOTE: At conclusion of setup, reset the idle speed to 850 RPM (+/- 25 RPM) and verify idle cutoff mixture rise, acceleration / deceleration without excessive idle speed dip, and idle stability.

Table 5

Flight Test Verification, IO-240-B equipped with Altitude Compensating Pump and Standard Fuel Manifold Valve

This test is for reference only, actual RPM may vary due to the fixed pitch prop.

NOTE: Pressure altitude must be used for the table and chart below when determining fuel system set-up values. To determine pressure altitude, prior to take-off set your altimeter to 29.92 in hg, and the altimeter will indicate your pressure altitude.

IO-240-B Engine with Aneroid Fuel Pump, Full Throttle, Full Rich Mixtu @ 2450 RPM						
Pressure Altitude (Set Altimeter at 29.92 in. Hg)	Fuel Flow (lbs/hr)		Fuel Flow (gals/hr)		Metered Fuel Pressure PSID	
(feet)	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Sea Level	53.5	60	9.1	10.2	10.8	14.8
1,000	50.2	56.7	8.5	9.7	9.5	13.3
2,000	46.7	53.2	7.9	9.1	8.7	12.3
3,000	43.9	50.4	7.5	8.6	8.1	11.5
4,000	40.8	47.3	6.9	8.0	7.6	10.8
5,000	38.4	44.9	6.5	7.6	7.2	10.2
6,000	36.9	43.4	6.3	7.4	6.8	9.6
8,000	34.0	40.5	5.8	6.9	6.5	9.1
10,000	32.1	38.6	5.5	6.6	6.3	8.7
12,000	31.1	37.6	5.3	6.4	6.2	8.4
14,000	30.4	36.9	5.2	6.3	6.2	8.2

CHART 2

Typical IO240B (with altitude compensating fuel pump) fuel flow leaning curve during flight test.

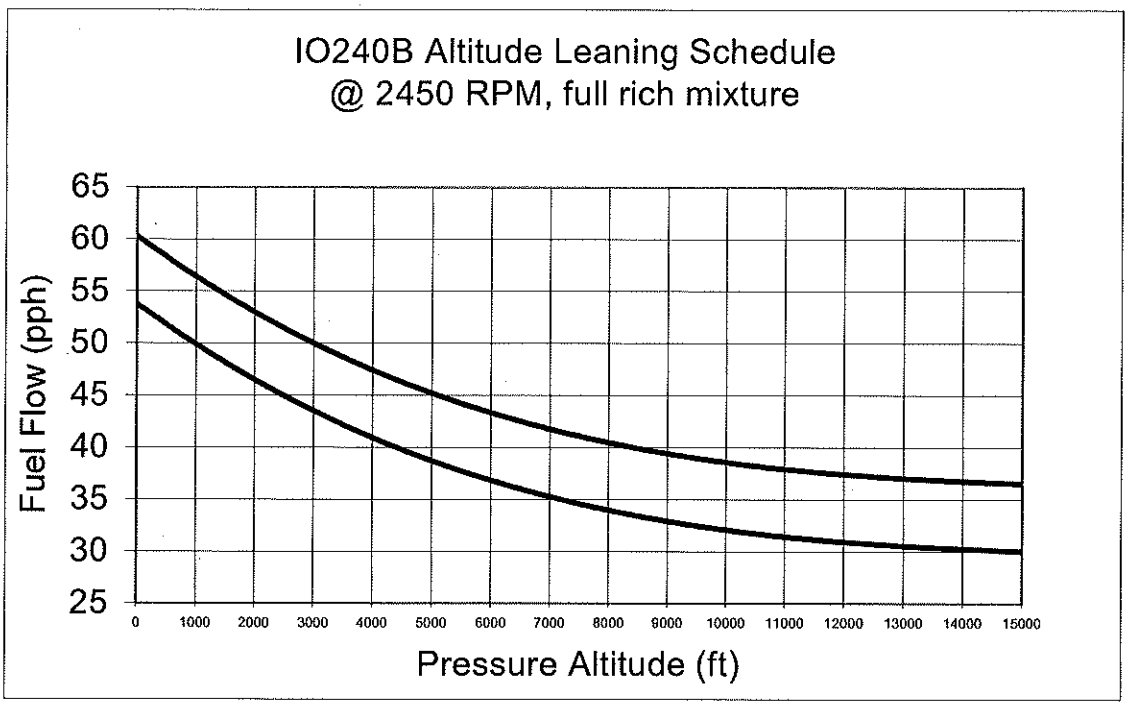


TABLE 6. ALTITUDE FUEL SCHEDULE

IO-360-DB ENGINE FULL OPEN THROTTLE, FULL RICH MIXTURE BHP @ 2800 RPM						
Pressure Altitude (Set Altimeter at 29.92 in. Hg.)	Fuel Flow (lbs/hr)		Fuel Flow (gals/hr)		Metered Fuel Pressure PSID	
	Min.	Max.	Min.	Max.	Min.	Max.
Sea Level	102.9	112.9	17.5	19.2	16.0	18.8
1,000	98.4	108.4	16.8	18.5	15.0	17.8
2,000	94.1	104.1	16.0	17.7	14.1	16.8
3,000	90.0	100.0	15.3	17.0	13.3	15.9
4,000	86.1	96.1	14.7	16.4	12.6	15.1
5,000	82.3	92.3	14.0	15.7	11.9	14.4
6,000	78.8	88.8	13.4	15.1	11.3	13.7
8,000	72.2	82.2	12.3	14.0	10.2	12.5
10,000	66.4	76.4	11.3	13.0	9.3	11.5
12,000	61.3	71.3	10.4	12.1	8.6	10.7
14,000	56.9	66.9	9.7	11.4	8.0	10.0
16,000	53.3	63.3	9.1	10.8	7.5	9.5
Gasoline = 5.87 lbs per gallon @ 70° F. IO-360-DB Installed in T-41 ACFT Refer to Cessna SL 81-2 date 28 July 1981 for amplified instructions.						

Altitude Leaning Schedule
IO-360-DB-(34)

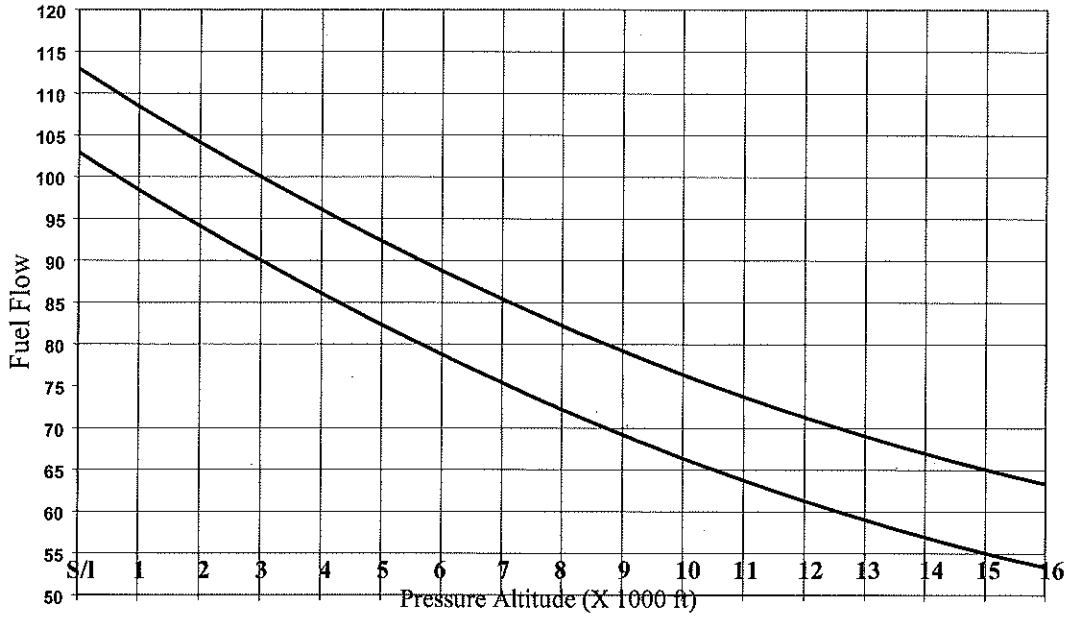


CHART 3

TABLE 7. ALTITUDE FUEL SCHEDULE

IO-360 ES ENGINE FULL OPEN THROTTLE, FULL RICH MIXTURE BHP @ 2800 RPM						
Pressure Altitude (Set Altimeter at 29.92 in. Hg.)	Fuel Flow (lbs/hr)		Fuel Flow (gals/hr)		Metered Fuel Pressure PSID	
	Min.	Max.	Min.	Max.	Min.	Max.
Sea Level	100.0	107.0	17.0	18.1	14.3	16.5
1,000	97.7	103.7	16.6	17.7	13.9	15.8
2,000	93.7	99.7	16.0	17.0	13.1	14.9
3,000	90.3	96.3	15.4	16.4	12.3	14.1
4,000	87.3	93.3	14.9	15.9	11.7	13.6
5,000	85.0	91.0	14.5	15.5	11.5	13.2
6,000	83.3	89.3	14.2	15.2	11.1	12.8
8,000	80.0	86.0	13.6	14.7	10.6	12.2
10,000	77.3	83.3	13.2	14.2	10.1	11.8
12,000	74.4	80.4	12.7	13.7	9.6	11.2
14,000	71.3	77.3	12.1	13.2	9.2	10.7
16,000	69.3	75.3	11.8	12.8	8.9	10.3
Gasoline = 5.87 lbs per gallon @ 70° F.						

ALTITUDE LEANING SCHEDULE

IO-360-ES

2800 R.P.M. and FULL RICH MIXTURE

FULL OPEN THROTTLE

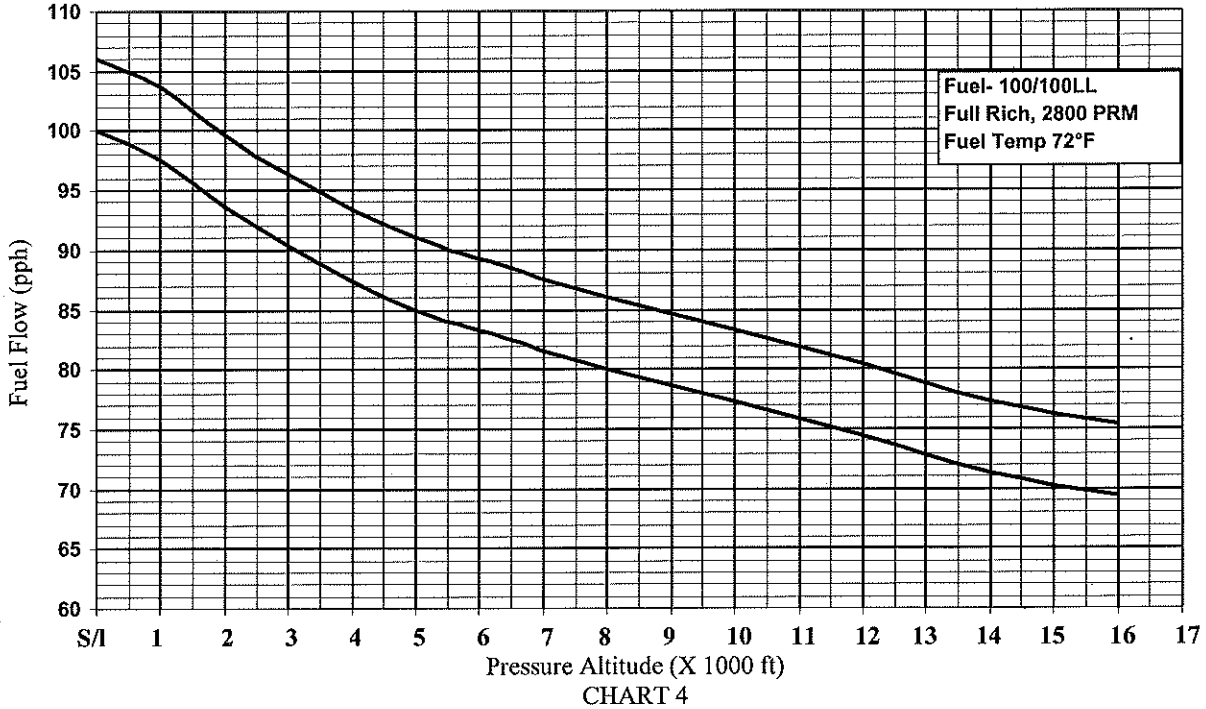


CHART 4

TABLE 8. ALTITUDE FUEL SCHEDULE

IO-360 ES ENGINE FULL OPEN THROTTLE, FULL RICH MIXTURE BHP @ 2700 RPM						
Pressure Altitude (Set Altimeter at 29.92 in. Hg.)	Fuel Flow (lbs/hr)		Fuel Flow (gals/hr)		Metered Fuel Pressure PSID	
	Min.	Max.	Min.	Max.	Min.	Max.
Sea Level	96.0	102.0	16.4	17.4	13.4	15.1
1,000	94.5	99.7	16.0	17.0	13.1	15.0
2,000	89.5	95.7	15.3	16.3	12.2	14.3
3,000	86.3	92.3	14.7	15.7	12.0	13.5
4,000	83.3	89.3	14.2	15.2	11.5	13.0
5,000	81.0	87.0	13.8	14.8	11.0	12.5
6,000	79.3	85.3	13.5	14.5	10.8	12.3
8,000	76.0	82.0	12.9	14.0	10.3	11.8
10,000	73.3	79.3	12.5	13.5	9.8	11.3
12,000	70.4	76.4	12.0	13.0	9.3	10.8
14,000	67.3	73.3	11.5	12.5	8.8	10.3
16,000	65.3	71.3	11.1	12.1	8.5	10.0
Gasoline = 5.87 lbs. per gallon @ 70° F.						

ALTITUDE LEANING SCHEDULE

IO-360-ES (6) AT 2700 RPM

FULL RICH MIXTURE & FULL OPEN THROTTLE

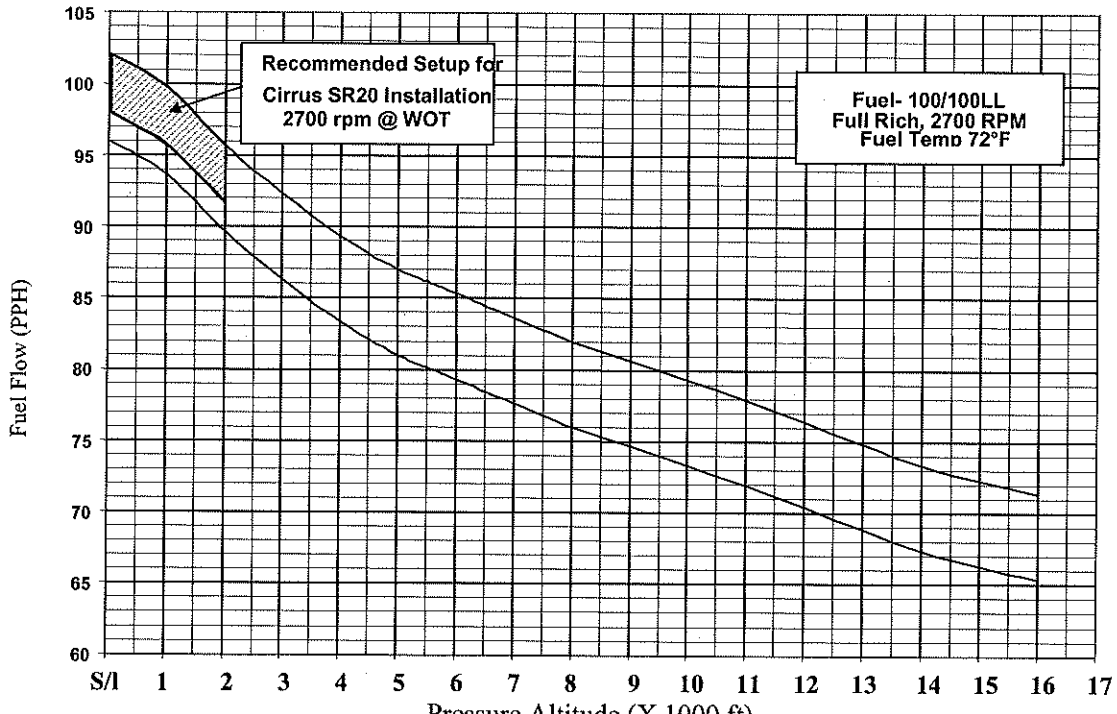


CHART 5

TABLE 9. ALTITUDE FUEL SCHEDULE

IO-550-A ENGINE FULL OPEN THROTTLE, FULL RICH MIXTURE 300 BHP @ 2700 RPM						
Pressure Altitude (Set Altimeter at 29.92 in. Hg.)	Fuel Flow (lbs/hr)		Fuel Flow (gals/hr)		Metered Fuel Pressure PSID	
	Min.	Max.	Min.	Max.	Min.	Max.
Sea Level	142	150	24.2	25.6	16.5	17.2
1000	141	149	24.0	25.4	16.3	17.1
2,000	138	146	23.5	24.9	15.9	16.6
3000	133	141	22.6	24.0	15.1	15.7
4,000	128	136	21.8	23.2	14.3	14.9
5000	123	131	21.0	22.3	13.6	14.1
6,000	120	128	20.4	21.8	13.2	13.7
8,000	113	121	19.2	20.6	12.3	12.7
10,000	108	116	18.4	19.8	11.6	12.1
12,000	103	111	17.5	18.9	11.0	11.4
14,000	98	106	16.7	18.1	10.4	10.7
Gasoline = 5.87 lbs per gallon @ 70° F						

Altitude Leaning Schedule
IO-550-A
Full Rich, 2700 RPM

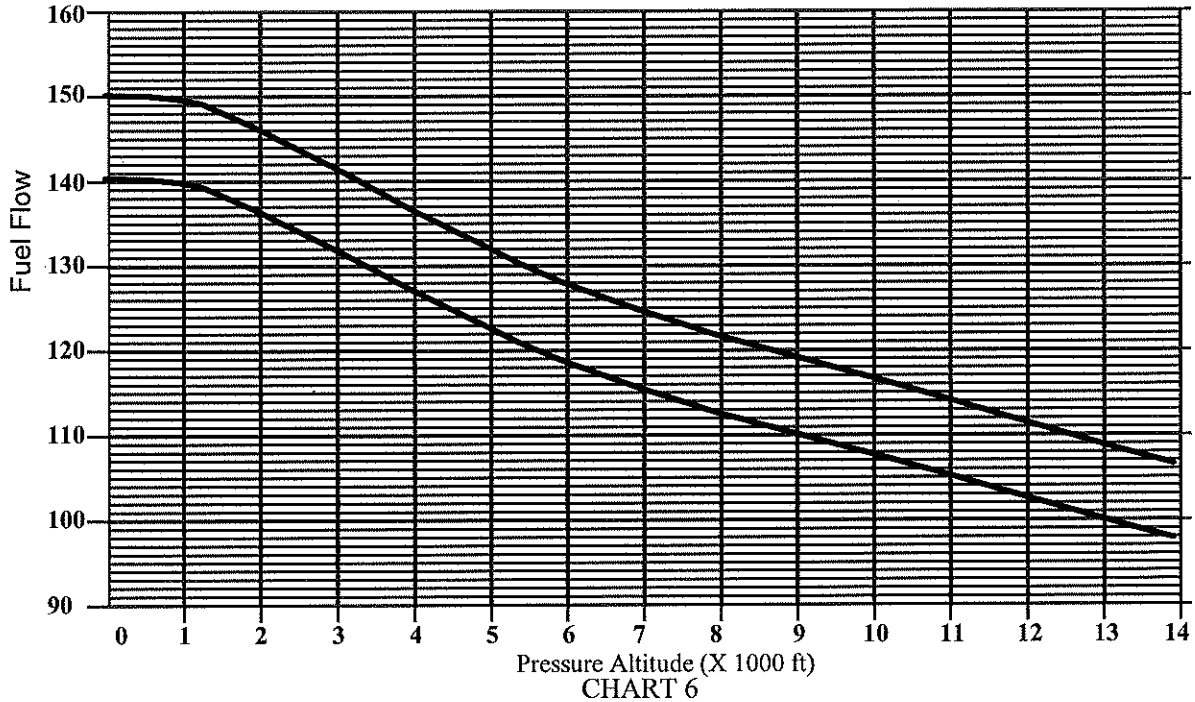


CHART 6

TABLE 10. ALTITUDE FUEL SCHEDULE

IO-550-B ENGINE FULL OPEN THROTTLE, FULL RICH MIXTURE 300 BHP @ 2700 RPM						
Pressure Altitude (Set Altimeter at 29.92 in. Hg.)	Fuel Flow (lbs/hr)		Fuel Flow (gals/hr)		Metered Fuel Pressure PSID	
	Min.	Max.	Min.	Max.	Min.	Max.
Sea Level	146	156	24.9	26.6	17.2	18.3
1000	145.5	155.5	24.8	26.5	17.1	18.2
2,000	145	155	24.7	26.4	17.0	18.1
3000	144	154	24.5	26.3	16.9	17.9
4,000	142	152	24.2	25.9	16.5	17.5
5000	139	149	23.7	25.4	16.1	17.0
6,000	135.5	145.5	23.1	24.8	15.5	16.5
8,000	127	137	21.6	23.3	14.2	15.1
10,000	117	127	19.9	21.6	12.8	13.6
12,000	110	120	18.7	20.4	11.9	12.6
14,000	105	115	17.9	19.6	11.3	11.9
Gasoline = 5.87 lbs per gallon @ 70° F.						

Altitude Leaning Schedule
IO-550-B
Full Rich, 2700 RPM

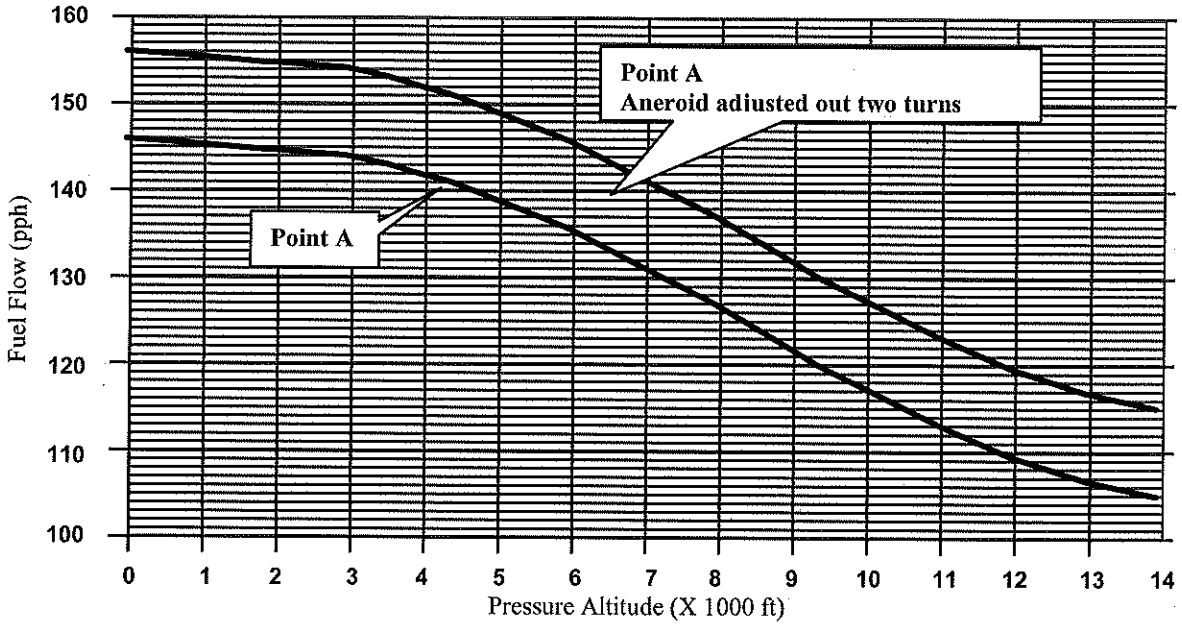


CHART 7

TABLE 11. ALTITUDE FUEL SCHEDULE

IO-550-C ENGINE FULL OPEN THROTTLE, FULL RICH MIXTURE 300 BHP @ 2700 RPM						
Pressure Altitude (Set Altimeter at 29.92 in. Hg.)	Fuel Flow (lbs/hr)		Fuel Flow (gals/hr)		Metered Fuel Pressure PSID	
	Min.	Max.	Min.	Max.	Min.	Max.
Sea Level	152	160	25.9	27.2	18.2	18.9
1000	151	159	25.7	27.1	18.0	18.7
2,000	148	156	25.2	26.6	17.5	18.2
3000	143	151	24.4	25.7	16.7	17.4
4,000	138	146	23.5	24.9	15.9	16.5
5000	134	142	22.8	24.2	15.3	15.9
6,000	130	138	22.1	23.5	14.7	15.3
8,000	123	131	21.0	22.3	13.6	14.1
10,000	118	126	20.1	21.5	12.9	13.4
12,000	113	121	19.3	20.6	12.3	12.7
14,000	108	116	18.4	19.8	11.7	12.1
Gasoline = 5.87 lbs per gallon @ 70° F.						

Altitude Leaning Schedule
IO-550-C
Full Rich, 2700 RPM

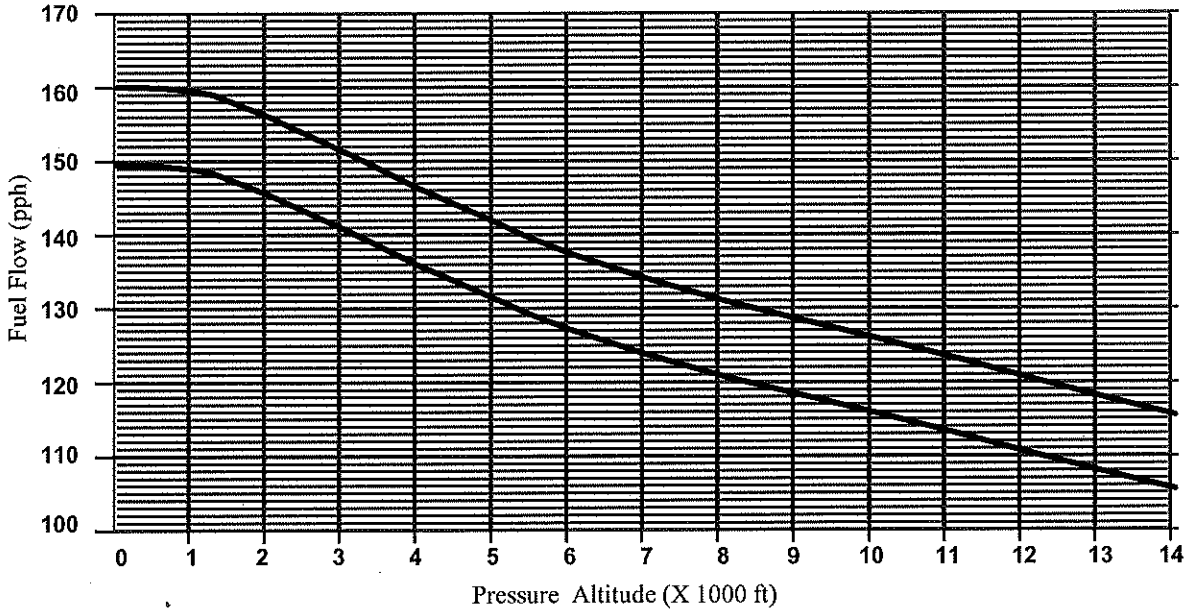


CHART 8

TABLE 12. ALTITUDE FUEL SCHEDULE

IO-550-D,-E, F, L ENGINE FULL OPEN THROTTLE, FULL RICH MIXTURE 300 BHP @ 2700 RPM						
Pressure Altitude (Set Altimeter at 29.92 in. Hg.)	Fuel Flow (lbs/hr)		Fuel Flow (gals/hr)		Metered Fuel Pressure PSID	
	Min.	Max.	Min.	Max.	Min.	Max.
Sea Level	143	155	24.4	26.4	17.2	20.0
1000	142.5	154.5	24.3	26.3	17.1	19.9
2,000	142	154	24.2	26.2	17.0	19.8
3000	141	153	24.0	26.1	16.9	19.6
4,000	139	151	23.7	25.7	16.5	19.2
5000	136	148	23.2	25.2	16.0	18.7
6,000	133	145	22.6	24.7	15.5	18.2
8,000	124	136	21.1	23.2	14.0	16.6
10,000	114	126	19.4	21.5	12.5	15.0
12,000	107	119	18.2	20.3	11.5	13.9
14,000	102	114	17.4	19.4	10.8	13.1
Gasoline = 5.87 lbs per gallon @ 70° F.						

Altitude Leaning Schedule
IO-550-D, -E, -F, -L
Full Rich, 2700 RPM

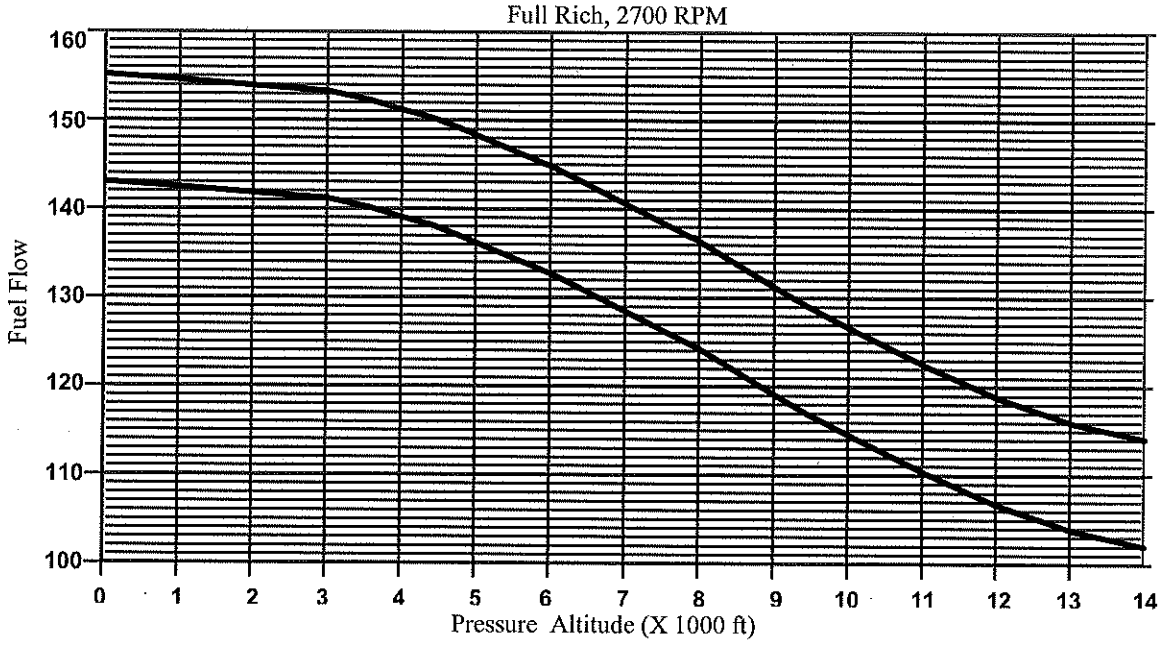


CHART 9

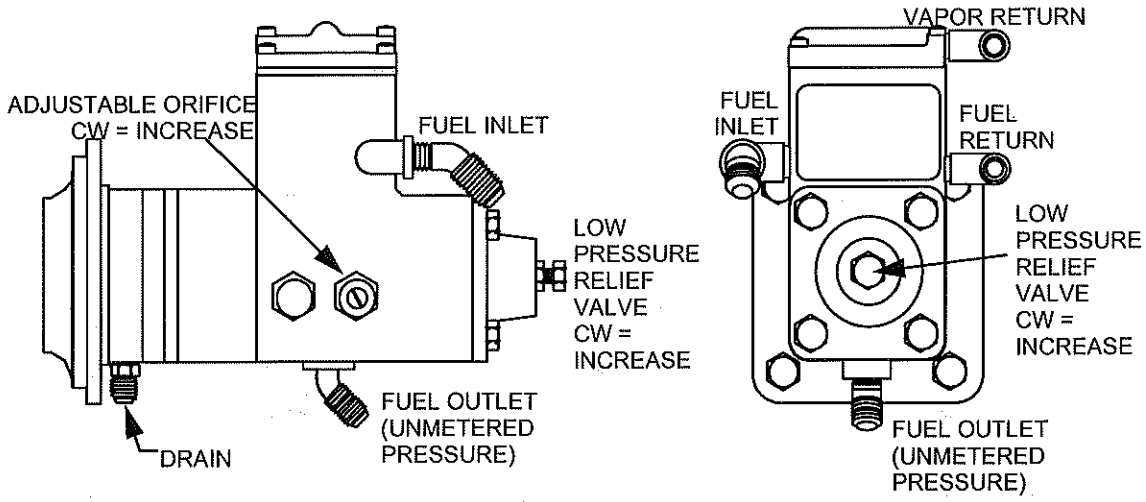


FIGURE 1 - NATURALLY ASPIRATED ENGINE FUEL PUMP

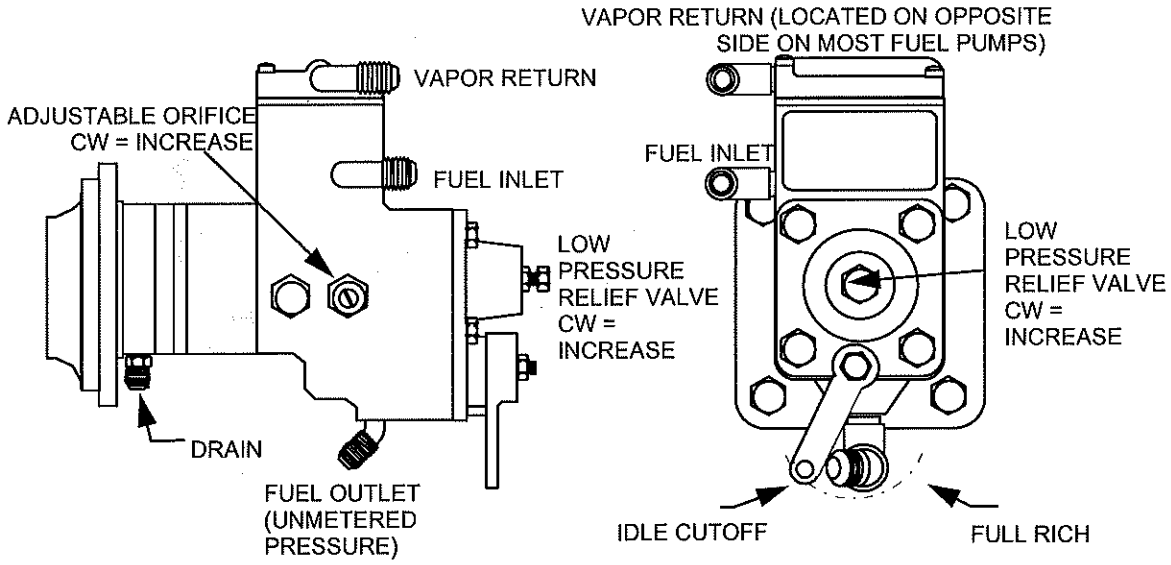


FIGURE 2 - NATURALLY ASPIRATED ENGINE (MIXTURE CONTROL EQUIPPED) FUEL PUMP

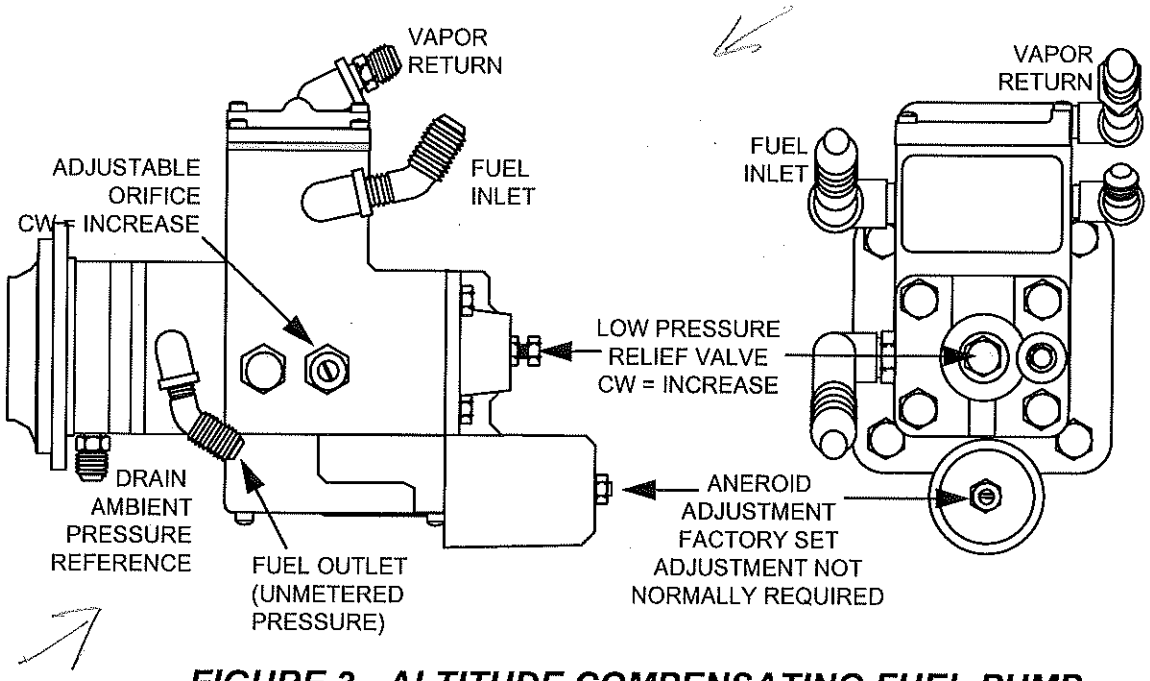


FIGURE 3 - ALTITUDE COMPENSATING FUEL PUMP

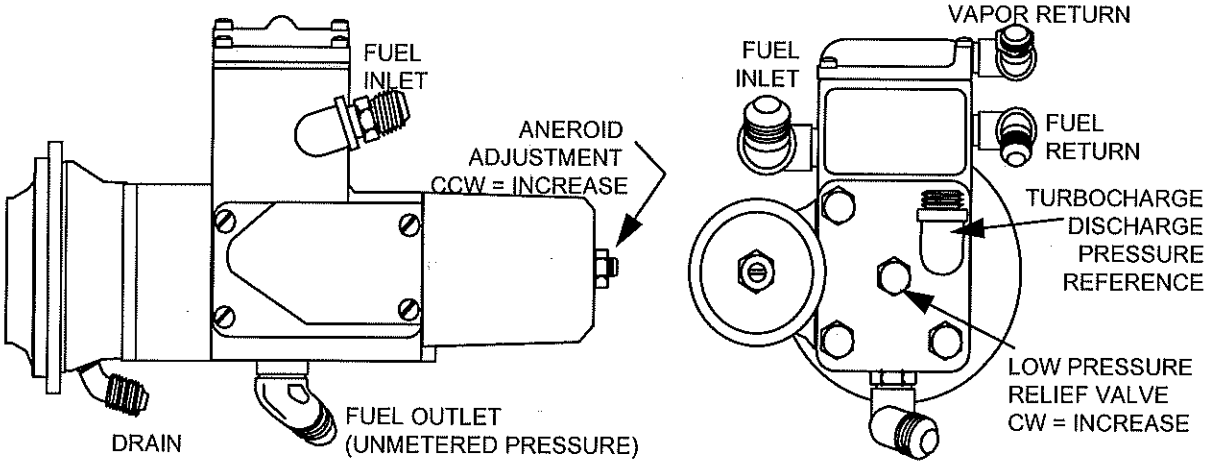


FIGURE 4 - ANEROID EQUIPPED FUEL PUMP TURBOCHARGED ENGINE

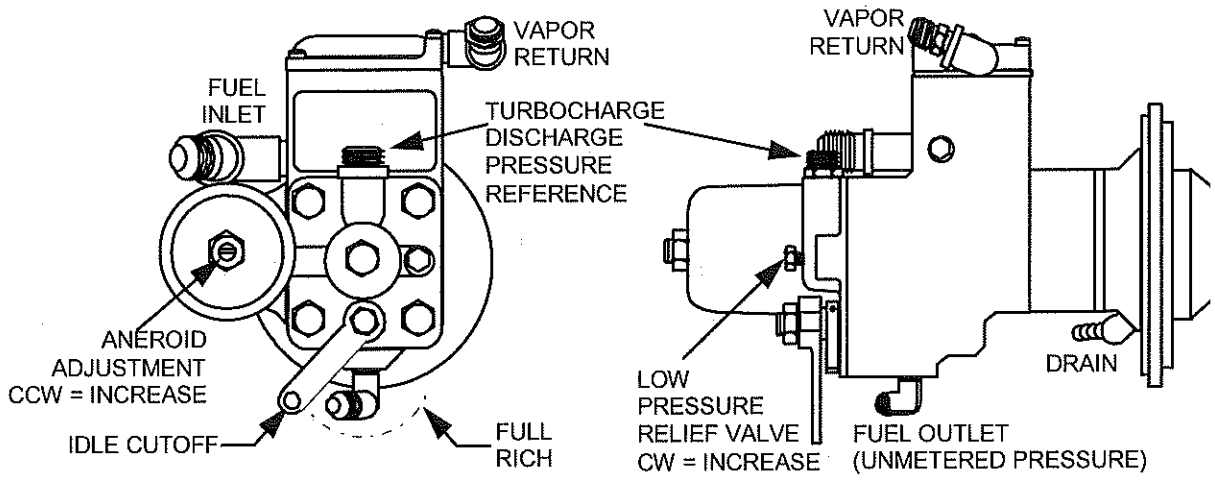


FIGURE 5 - ANEROID & MIXTURE CONTROL EQUIPPED FUEL PUMP TURBOCHARGED ENGINE

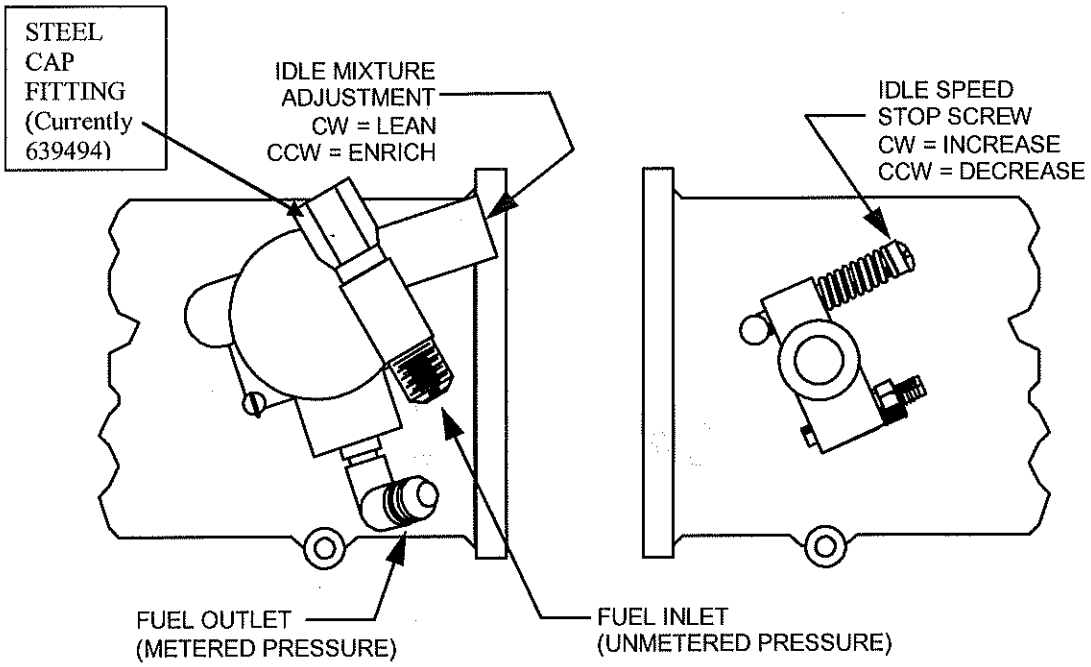


FIGURE 6 - THROTTLE & METERING ASSEMBLY

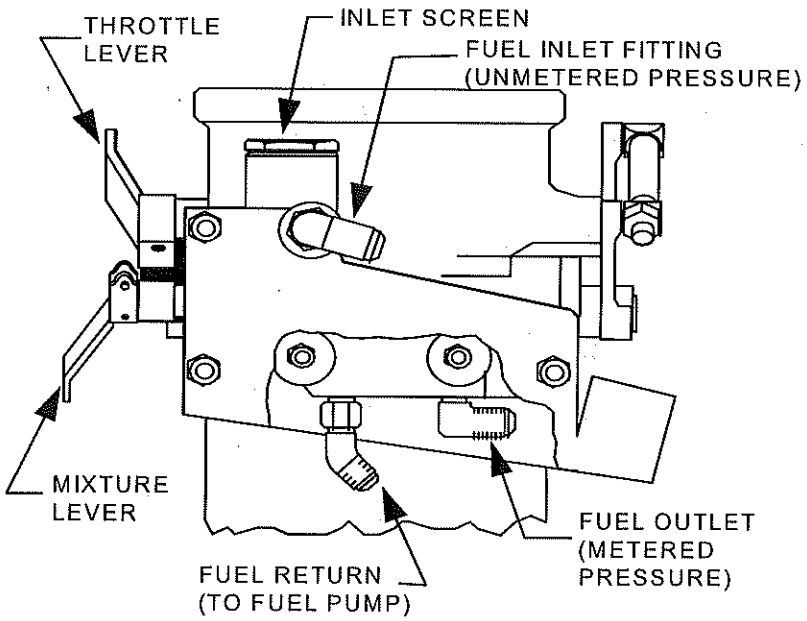


FIGURE 7 - THROTTLE & CONTROL ASSEMBLY - FRONT VIEW (EXCEPT GTSIO-520-D,F,H,K,L,M,N)

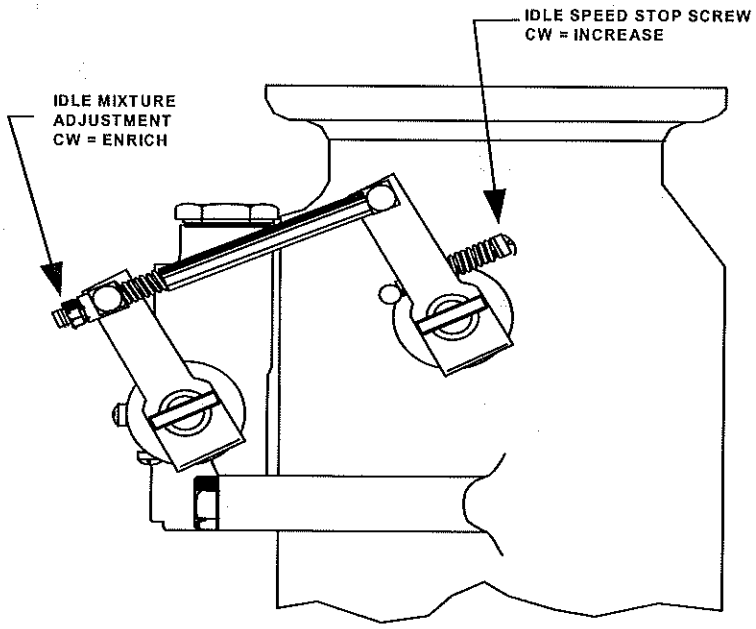


FIGURE 8 - THROTTLE & CONTROL ASSEMBLY SIDE VIEW (EXCEPT GTSIO-520-D, F, H,, K, L, M, N)

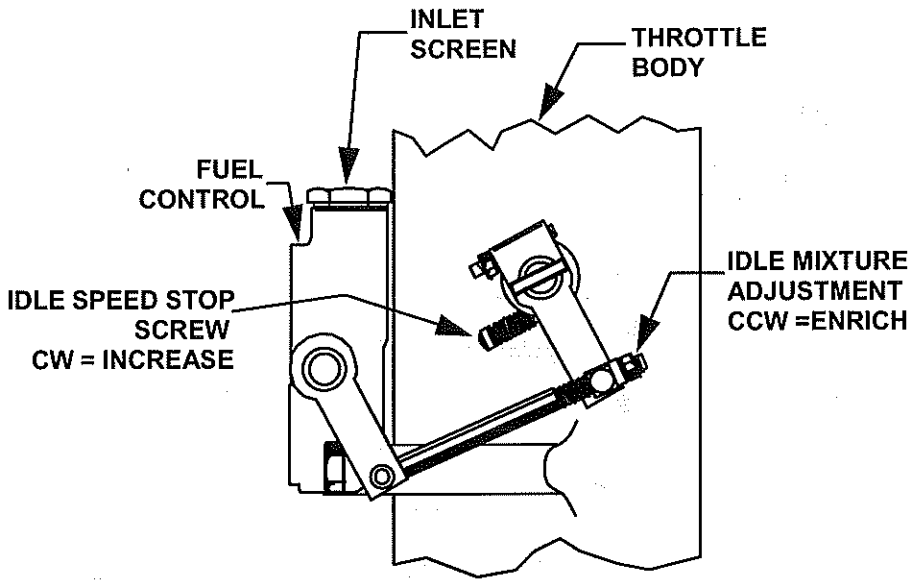


FIGURE 9 - THROTTLE & CONTROL ASSEMBLY
(ALL GTSIO-520 EXCEPT GTSIO-520-C, F & K)

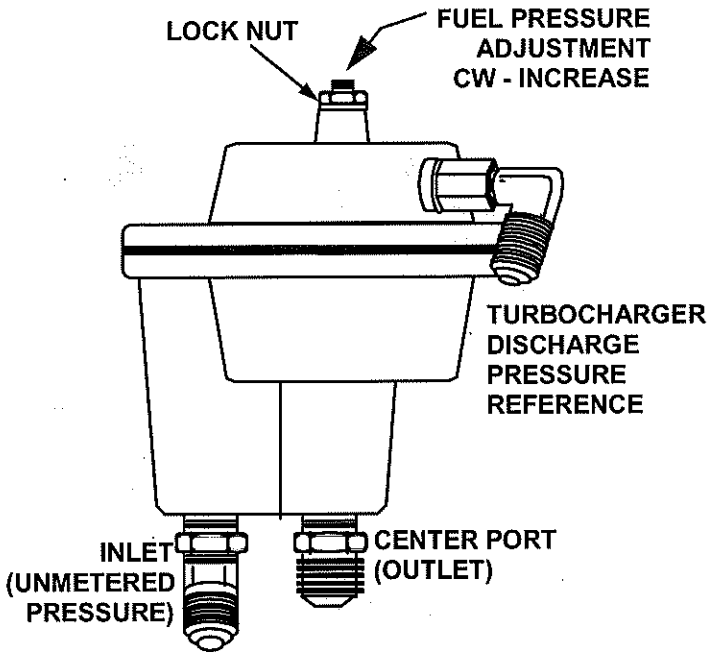


FIGURE 10 - FUEL PRESSURE REGULATOR
FOR TURBOCHARGED ENGINES

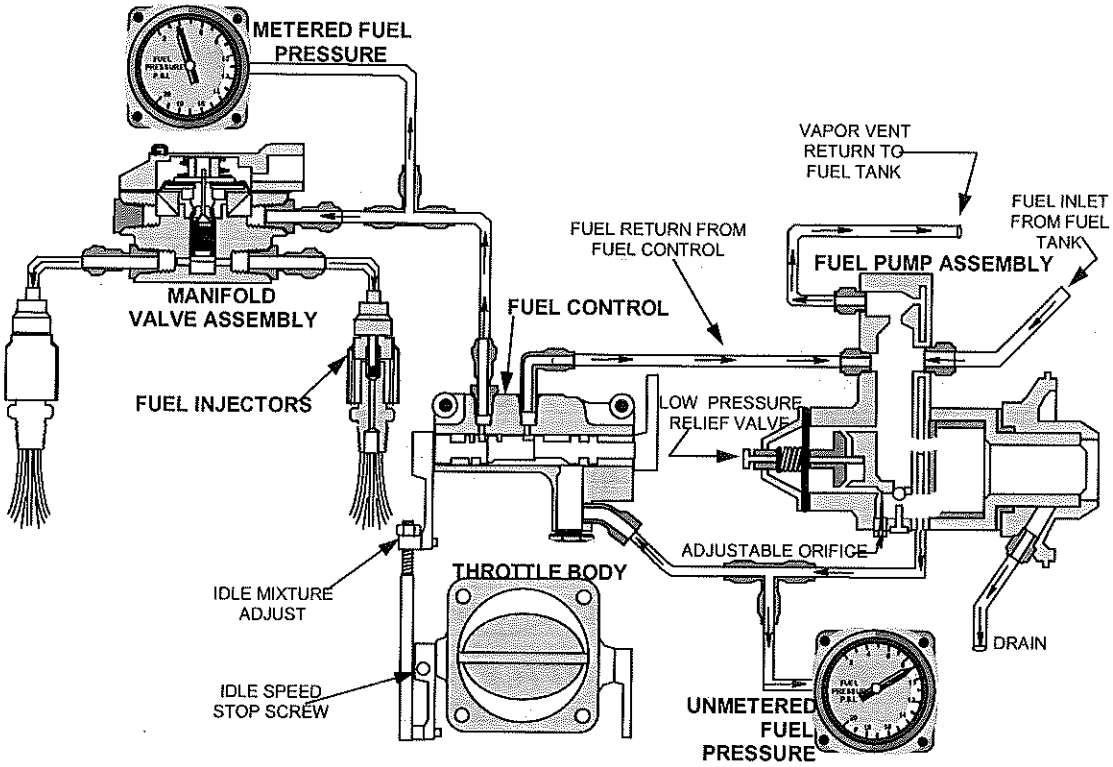


FIGURE 11-Typical Naturally Aspirated Fuel System Schematic

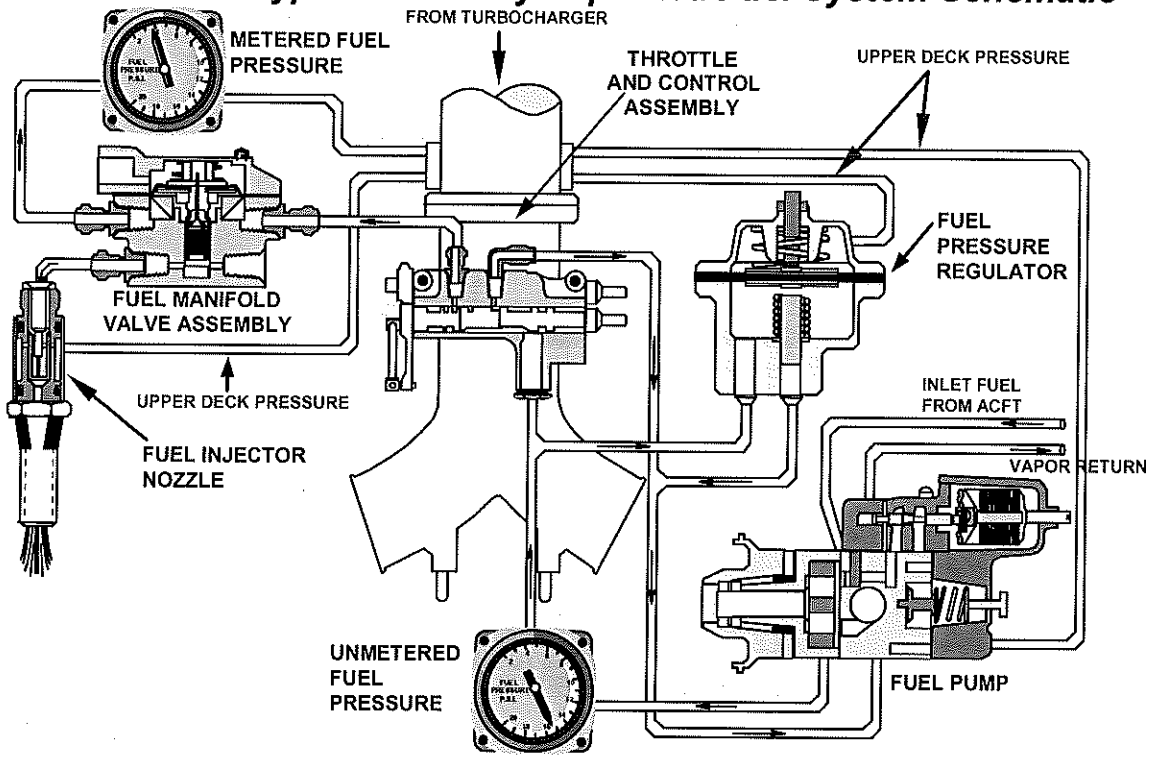


FIGURE 12-Typical Turbo-Charged Fuel System Schematic (With Regulator)

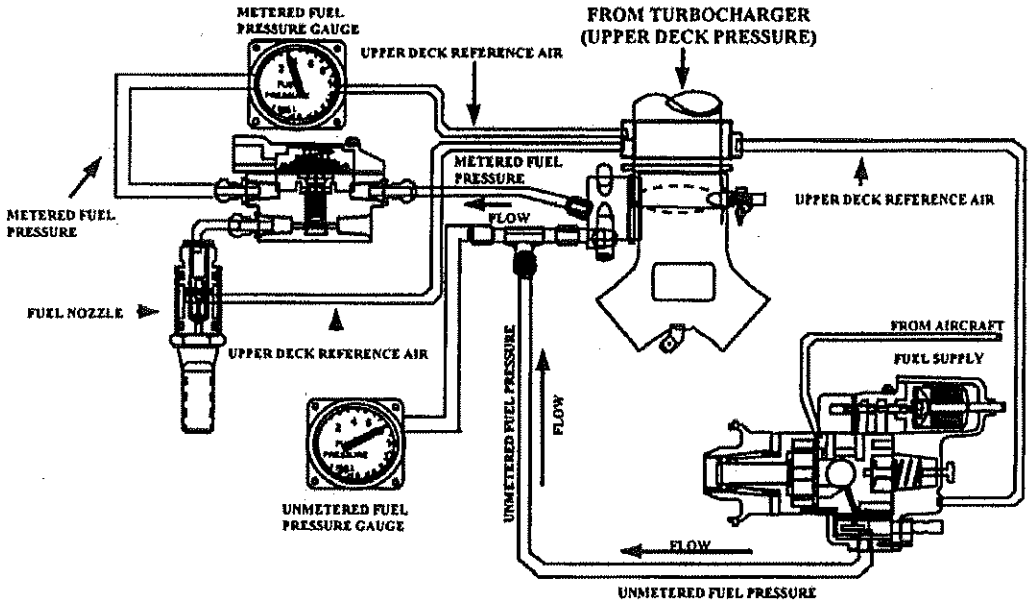


FIGURE 13
TURBOCHARGED ENGINE FUEL SYSTEMS
WITH FUEL PUMP HAVING INTEGRAL MIXTURE CONTROL

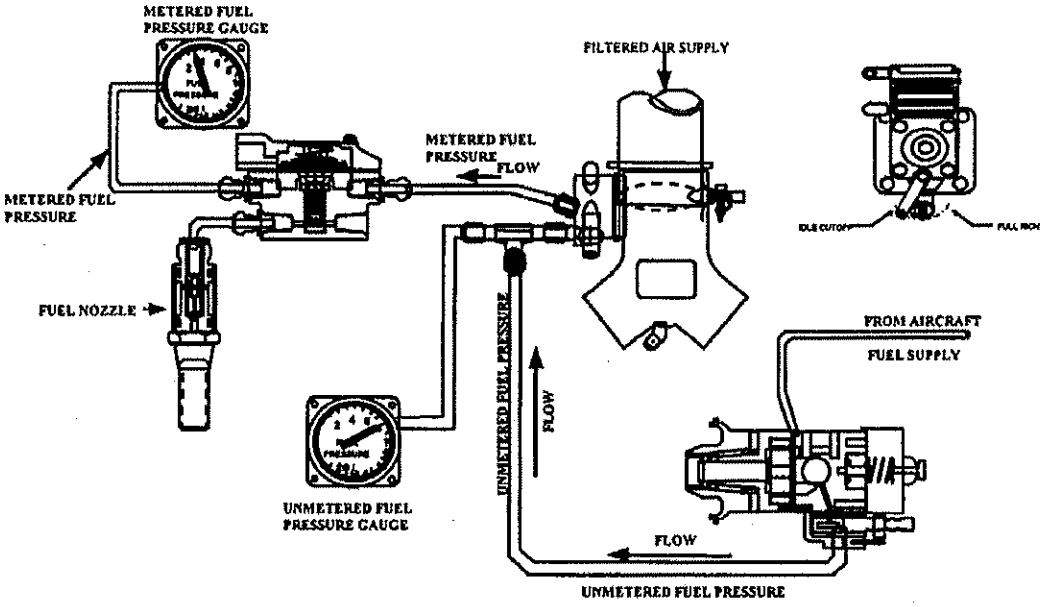


FIGURE 14
Naturally Aspirated Engine Fuel System
With Fuel Pump Having Integral Mixture Control

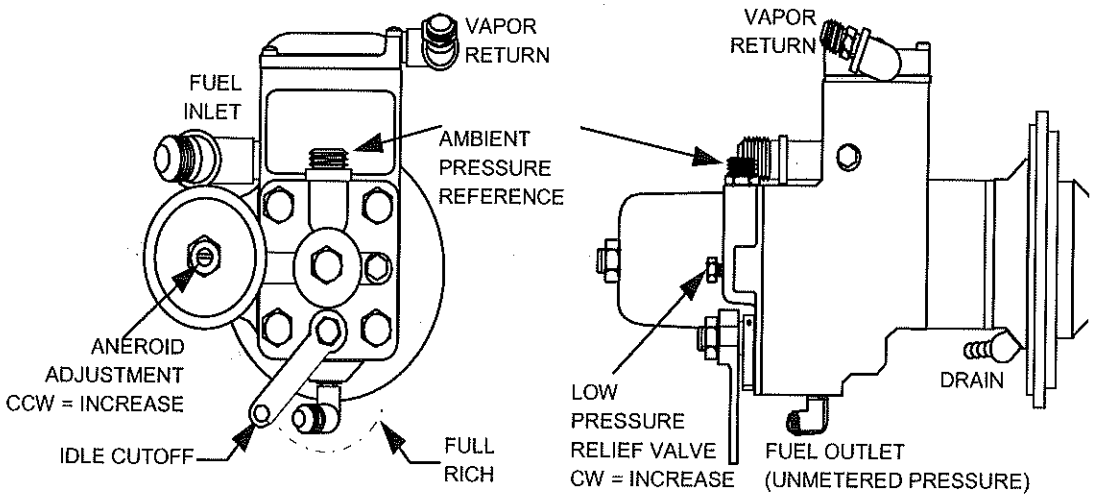


FIGURE 15 - ANEROID & MIXTURE CONTROL EQUIPPED FUEL PUMP

Date:	Location:	Elevation:	OAT:	Field "Hg:
Aircraft Make & Model:		Aircraft Registration #:		
Engine Model:		Engine Position: Left Right Front Rear		
Engine Serial Number:		Engine Total Time - New - Overhaul		

Fuel System Adjustment - Record engine specifications and actual guage indications.

				Fuel Pressure																Adjustment	
R.P.M.		M.A.P.		**Unmetered**		**Metered**		Fuel Flow		EGT	TIT	Cylinder Head Temp. - F						Oil		# of turns	
Spec	**Actual**	**Spec**	**Actual**	**Spec**	**Actual**	**Spec**	**Actual**	**Spec**	**Actual**	° F	° F	1	2	3	4	5	6	PSI	° F	CW	CCW

Flight Test Data - Record gauge indications

R.P.M.		M.A.P.		Pressure Altitude - (Set altimeter to 29.92" Hg)	Fuel Flow		EGT ° F		TIT ° F		CHT ° F		Oil PSI		Oil Temp. ° F		I.A.S. knots	
Spec	**Actual**	**Spec**	**Actual**		**Spec**	**Actual**	**Spec**	**Actual**	**Spec**	**Actual**	**Spec**	**Actual**	**Spec**	**Actual**	**Spec**	**Actual**		

Remarks: **(Idle RPM mixture rise, magneto drop, etc.)**

Signature:

INDEX
73–80–00
NEW PARTS AND SERVICE LIMITS

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73-80-01
NEW PARTS & SERVICE LIMITS
FUEL PUMP

TABLE I. FUEL PUMP AND PRESSURE COMPENSATOR (See Figure 80-01)

INDEX NO.	DESCRIPTION	NEW PARTS MIN.	NEW PARTS MAX.
1.	Seal in Adapter . . . . . diameter:	0.003 T	0.009 T
2.	Fuel Pump in Adapter . . . . . diameter:	0.0005 L	0.0045 L
3.	Liner in Basic Pump . . . . . diameter:	0.001 L	0.004 L
4.	Blades in rotor Shaft Slot . . . . . diameter:	0.0001 L	0.0041 L
	Blades in Liner . . . . . side clearance:	0.0002 L	0.0019 L
5.	Rotor Shaft in Bearing . . . . . diameter:	0.0003 L	0.0008
6.	Pin in Plunger . . . . . diameter:	0.0003 L	0.0008
7.	Variable Orifice Rod in Body . . . . diameter:	0.0010 L	0.0025 L
8.	Seal in Variable Orifice Body . . . . diameter:	0.002 T	0.007 T
9.	Mixture Control Shaft in Insert . . . . diameter:	0.0001 L	0.0015 L
10.	Spring (630167) Compressed to 0.41 Inch . load:	0.015 lbs	0.031 lbs.
11.	Spring (628311) Compressed to 0.38 Inch . load:	2 lbs	2 lbs

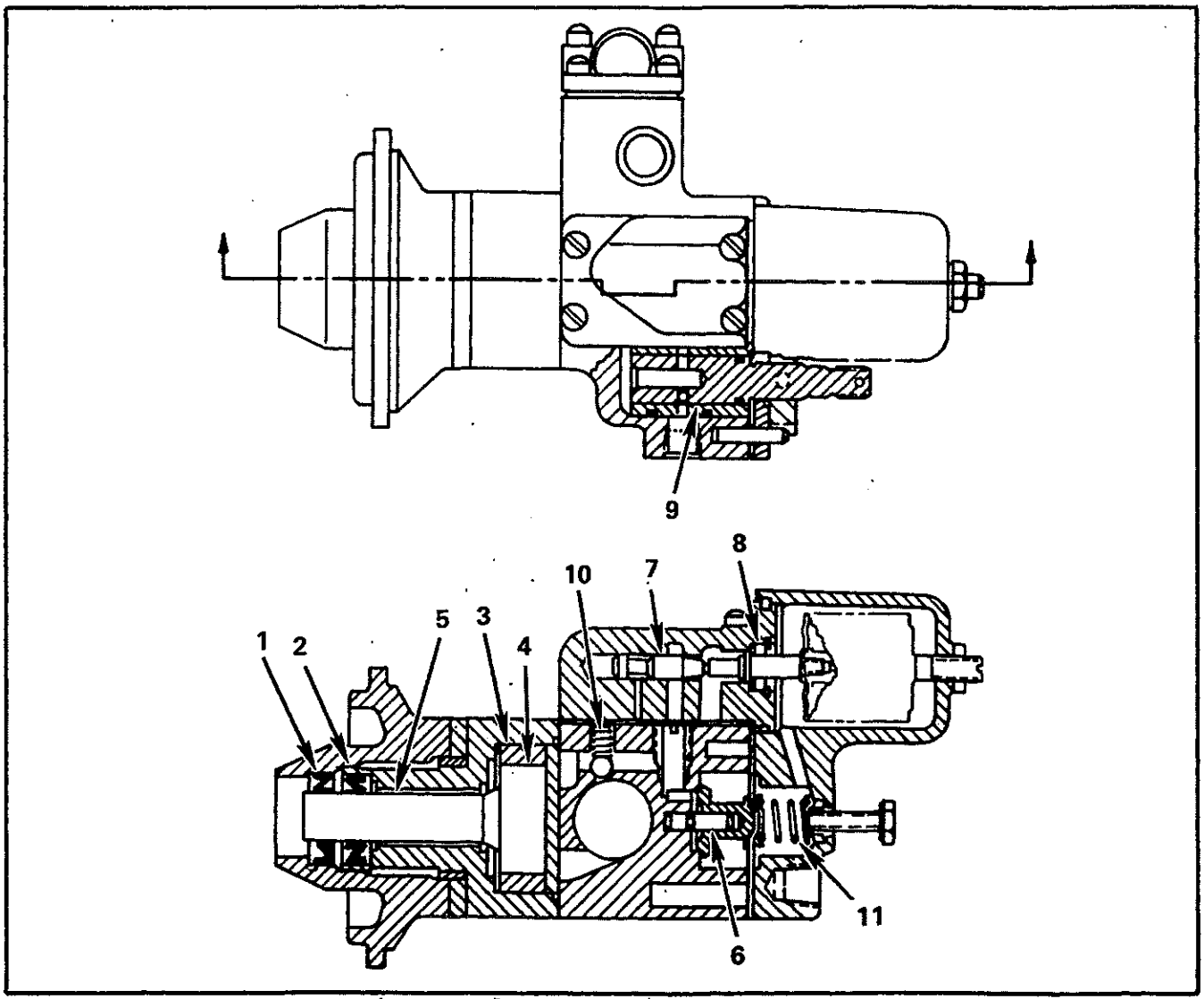

FIGURE 80-01. SERVICE LIMITS FOR FUEL PUMP ASSEMBLY.

TABLE II. FUEL PUMP AND PRESSURE COMPENSATOR (See Figure 80-02)

INDEX NO.	DESCRIPTION		NEW PARTS MIN.		MAX.		SERVICE
1.	Seal in Adapter	diameter:	0.003	T	0.009	T	
2.	Fuel Pump In Adapter	diameter:	0.0005	L	0.0045	L	
3.	Liner in Basic Pump	diameter:	0.001	L	0.004	L	
4.	Blades in Liner	diameter:	0.0002	L	0.0032	L	0.0039
	Blades in Rotor Shaft Slot	diameter:	0.0001	L	0.0041	L	
5.	Rotor Shaft in Bearing	diameter:	0.0003	L	0.0008	L	0.0008L Max.
6.	Variable Orifice Rod In Body	diameter:	0.0010	L	0.0025	L	
7.	Seal in Variable Orifice Body	diameter:	0.002	T	0.007	T	
8.	Spring (Compressed to 0.399") (CRA7426) . .	load:		4.6 lbs			
	Spring, By-Pass Valve (Compressed to 0.070") 628784-2 . . . . . (This spring not shown)	diameter:		0.050 lbs			

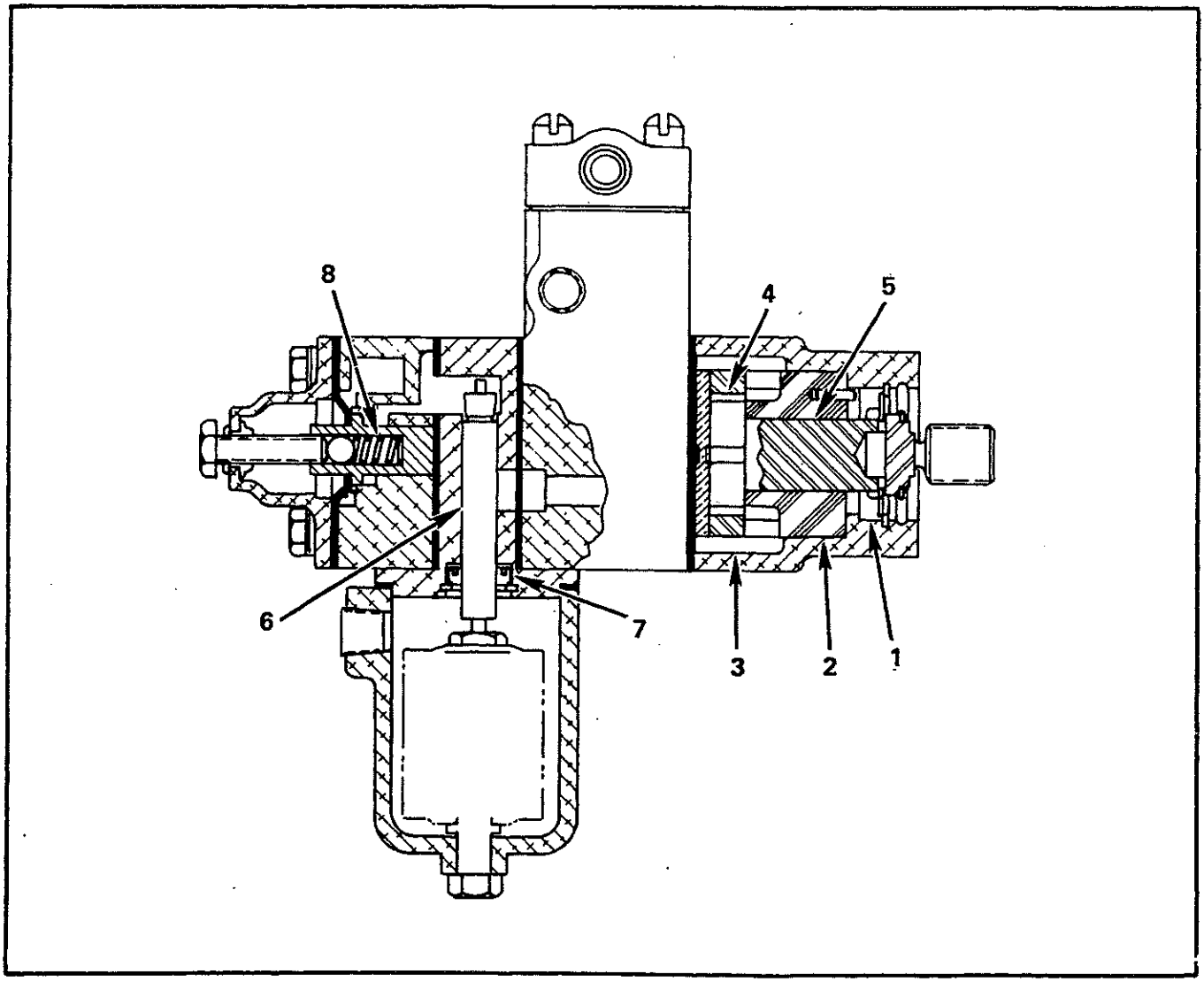

FIGURE 80-02. SERVICE LIMITS FOR FUEL PUMP ASSEMBLY

TABLE III. NEW PARTS DIMENSIONS
(P/N 630885, 630947, 632818, 638154, 639508, & 640643
646764, 646210, 646212, 646758, 646765)

PART NUMBER	FEATURE	NEW PARTS MIN.	MAX.
Basic Fuel Pump	Shaft Bore	0.5000	0.5002
Basic Fuel Pump	Rotor Shaft O.D.	0.4994	0.4997
Basic Fuel Pump	Rotor Shaft Slot Width	0.1235	0.1255
Basic Fuel Pump	Blade Length	1.0925	1.0935
Basic Fuel Pump	Blade Height	0.4988	0.4993
Basic Fuel Pump	Blade Thickness	0.1224	0.1234
Basic Fuel Pump	Thrust Plate Thickness	.033	.037
Basic Fuel Pump	End Plate Thickness	.109	.116

73-80-02
METERING UNIT

TABLE I. SERVICE LIMITS

CONTROL VALVE (See Figure 80-03)	NEW PARTS MIN.	NEW PARTS MAX.	SERVICE
1. Bushing in Body Bore	0.0000	0.0015 L	
2. Metering Shaft Land in Bore	0.0000	0.0015 L	
3. Fuel Metering Plug in Bore	0.0001 L	0.0015 L	
4. Mixture Control Shaft land in Bore	0.0000	0.0015 L	
5. Shaft in Bushing	0.0002 L	0.0012 L	
AIR THROTTLE ASSEMBLY (See Figure 80-04)			
1. Shaft in Body Bore	0.0005 L	0.0025 L	
2. Shaft End in Fuel Metering Plug	0.0005 L	0.0015 L	
3. Fuel Metering Plug in Bore	0.0020 L	0.0055 L	

TABLE II. NEW PARTS LIMITS

CONTROL VALVE		NEW PARTS MIN.	NEW PARTS MAX.	SERVICE
Shaft Bore in Body	id:	06245	0.6255	
Fuel Metering Plug	od:	0.6240	0.6244	
Mixture Control Shaft	land od:	0.6240	0.6245	
Mixture Control Shaft	od:	0.3745	0.3750	
Fuel Metering Shaft	land od:	0.6240	0.6245	
Fuel Metering Shaft	od:	0.3745	0.3750	
Bushing	od:	0.6240	0.6245	
Bushing	id:	.3752	.3757	
Spring (625492) Compressed to 0.375 Inch	load:	10.8 lbs.	13.2 lbs.	
AIR THROTTLE ASSEMBLY				
Shaft Bore in Body	id:	0.3745	0.3760	
Shaft Diameter	od:	0.3735	0.3740	
Shaft End Diameter	od:	0.2495	0.2500	
Plug Metering Shaft Hole	id:	0.2505	0.2510	
Fuel Metering Plug Bore	id:	1.0005	1.0015	
Fuel Metering Plug	od:	0.996	0.998	
Spring (630274) Compressed to 0.4375 Inch	load:	10.8 lbs	13.2 lbs	
"O" Ring (Shaft)	id:	0.234	0.24	

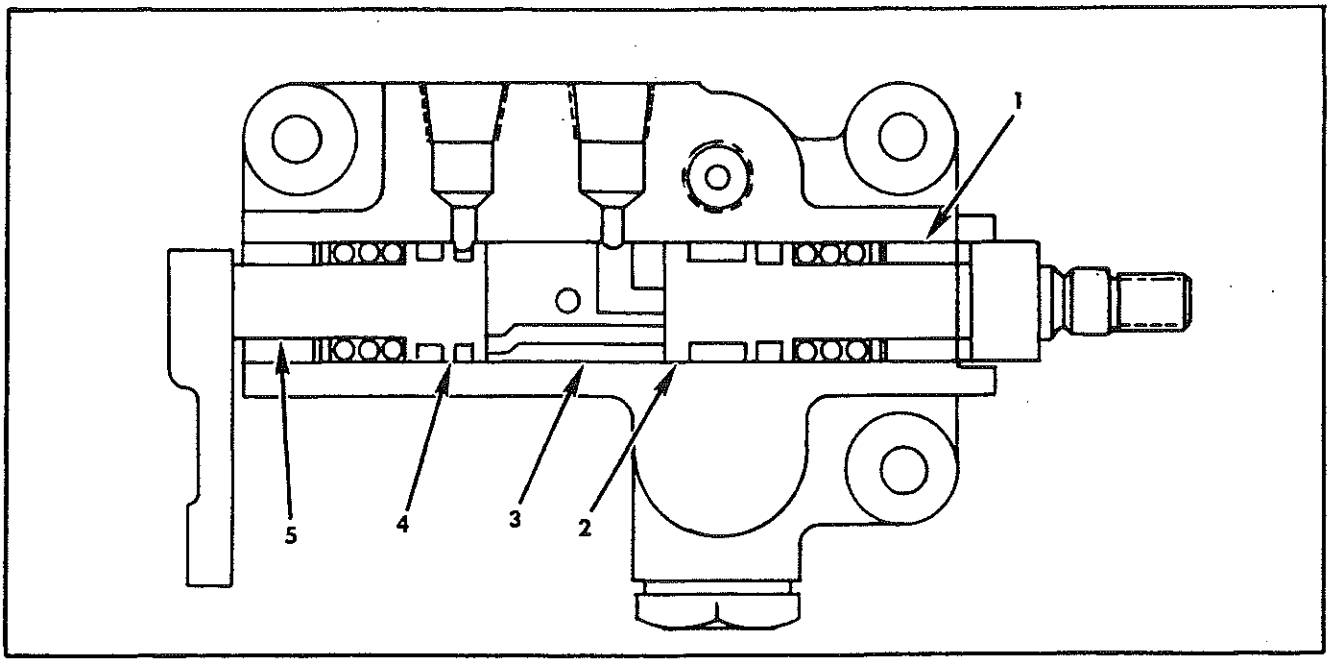

FIGURE 80–03. CONTROL VALVE

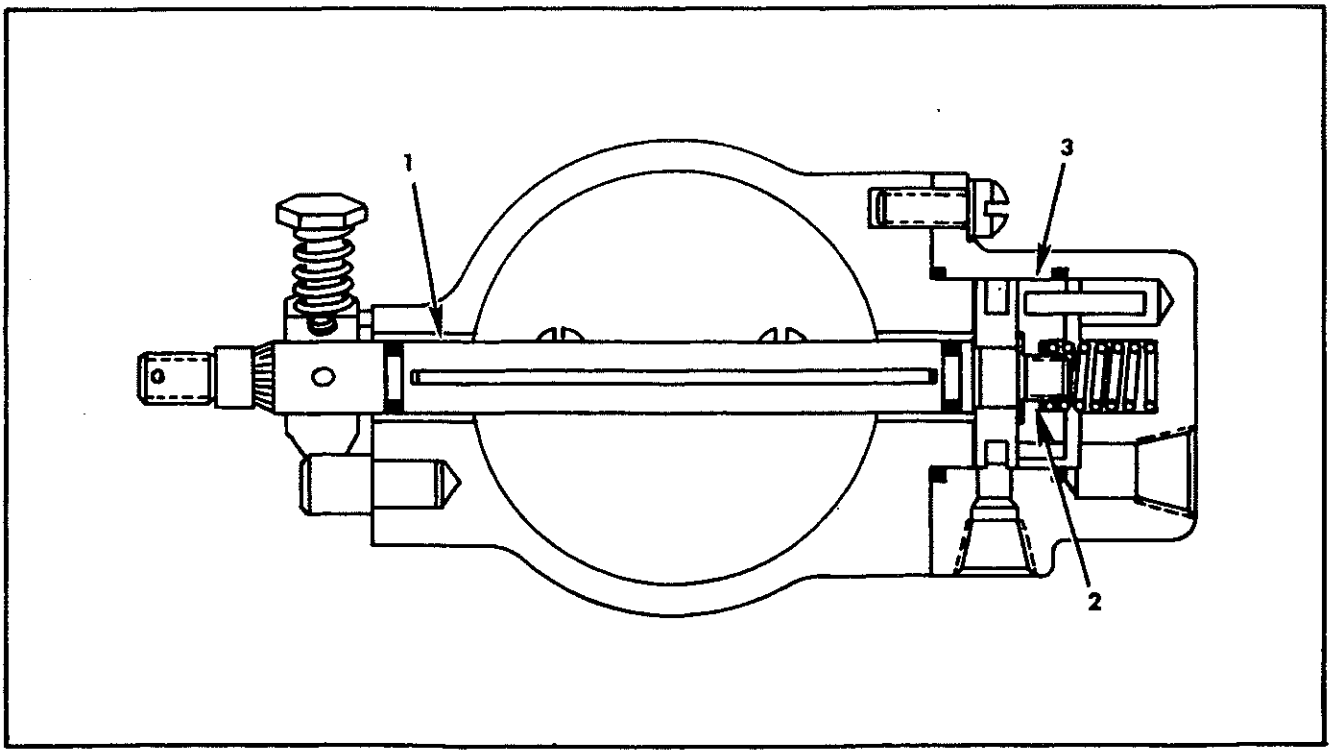

FIGURE 80–04. AIR THROTTLE ASSEMBLY

73-80-03
MANIFOLD VALVE

TABLE I NEW PARTS LIMITS

FUEL MANIFOLD VALVE		NEW PARTS MIN.	NEW PARTS MAX	SERVICE
Plunger Bore in Body	id:	0.375	0.376	
Plunger	od:	0.3740	0.3745	
Spring (631331) Compressed to 0.29 inch	load:	0.097 lbs.	0.101 lbs.	
Spring (630184) Compressed to 0.25 inch	load:	3.4 lbs.	3.5 lbs.	
Spring (631426) Compressed to 0.29 inch	load:	0.048 lbs.	0.058 lbs.	
Spring (627378) Compressed to 0.25 inch	load:	1.90 lbs.	2.10 lbs.	

TABLE II. SERVICE LIMITS
(See Figure 80-05)

	FUEL MANIFOLD VALVE		NEW PARTS MIN.	NEW PARTS MAX	SERVICE
1.	Plunger in Body	dia:	0.00156	0.0030 L	
2.	Needle Valve in Plunger	dia:	0.0015 L	0.0085 L	
3.	Retainer in Plunger	dia:	0.003 T	0.001 T	

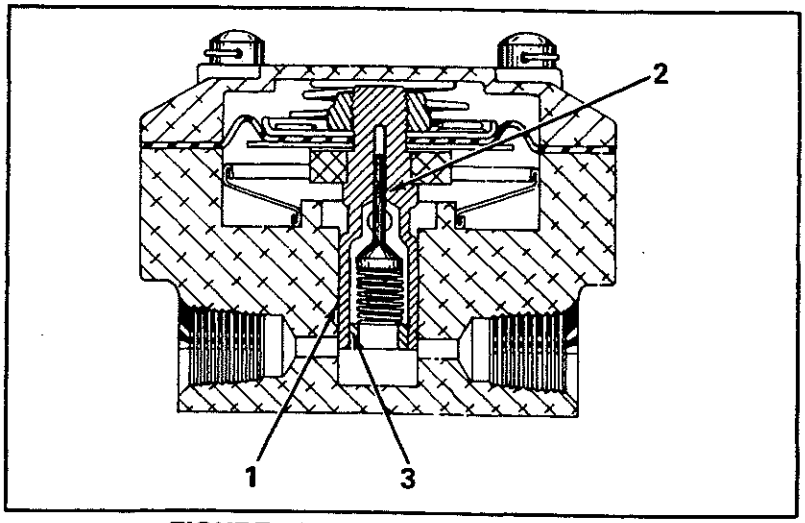

FIGURE 80-05. MANIFOLD VALVE

INDEX
73-90-00
TROUBLE SHOOTING

INTENTIONALLY

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73-90-01
TROUBLE SHOOTING

These trouble shooting charts are provided as a guide. Review all probable causes given. Check other listings with similar symptoms. Items are presented in sequence of the approximate ease of checking, not necessarily in order of probability.

FUEL PUMP

TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION
High or Low Pressure @ 2600 RPM	Improper calibration	Check adjustable orifice or variable orifice setting.
Low Pressure @ 600 RPM	Improper calibration Relief valve improper operation.	Check relief valve adjustment. Check relief valve seat, stem and bore finish (relap). Check relief valve spring and ball for smooth operation. Check relief valve seat for foreign material.
High Pressure @ 600 RPM	Restriction in return passage.	Adjust relief valve. Check vapor return ejector for foreign material.
Fluctuating Pressure	Relief valve improper calibration.	Check relief valve plunger stem and bore for finish and size.

73-90-02
METERING UNIT

TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION
Excessive leakage through mixture control	Mixture shaft face leaking	Loosen metering plug attachment screw and realign plug and shaft. Check mixture shaft face for finish (relap).
	Metering plug ball check leaking	Check ball check seat (re-seat).
Low Flow	Restriction	Observe flow from nozzles for uniform and steady flow. If check indicates restriction, clean nozzles and check manifold valve for full open position.
	Improper assembly	Check assembly for full travel of linkage. Check connections.
	Improper calibration	Check throttle plate angle and flow at idle. Check supply pressure. Check metering shaft contour for finish (nicks and burrs). Check all passages for foreign material.
High Flow	Leakage	Check all connections for leakage.
	Improper calibration	Check throttle plate angle and flow at idle. Check metering shaft face for finish (relap). Replace shaft.

73-90-03
MANIFOLD VALVE AND NOZZLE

TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION
Nozzle Assembly Low Fuel	Restricted	Check jet for foreign material, clean.
High Fuel	Improper Calibration	Check supply pressure and connections. Change jet.
Fuel Manifold Valve Assembly High Flow	Leakage	Check all connections. Check cover attaching screw torque. Check plunger assembly. Observe needle for a wide seat or annular groove on needle seat.
	Improper Calibration	Change needle valve spring. Check needle seat.
Low Flow	Restriction	Observe flow from nozzles for uniform and steady flow. Clean nozzles if check indicates restriction. Check plunger to full open position and smooth operation. Check all passages for foreign material.
	Improper Calibration	Change needle valve spring. Check needle seat.

INTENTIONALLY

LEFT

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