

TELEDYNE CONTINENTAL[®] AIRCRAFT ENGINE

CATEGORY 4

SERVICE INFORMATION DIRECTIVE

SID97-3

Compliance Will Enhance Safety, Maintenance or Economy Of Operation

FAA APPROVED
SUPERSEDES M73-22, M89-10
& M92-17

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 for 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 necessitate 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 Holders FAA approved instructions.

Operational verification of the engine fuel system is required any time one of the following circumstances occurs: at engine installation, during 100 hour and annual inspections, whenever a system component is replaced or adjusted, or when environmental changes occur.

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 can not be adjusted to meet the specified values will require repair or replacement of the affected components prior to further engine operation.

CAUTION...

Refer to the torque chart on page 32 (Table 7) for specified values when torquing all hose connections and 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. **An alternative procedure would be to use calibrated gauges.** 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
(313) 946-9000

- a. One (1) calibrated 0-60 PSI gauge, graduated in 1 PSI increments. This gauge will be used for unmetered pressure measurement.
- b. One (1) calibrated 0-30 PSI gauge, graduated in 1 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.
- c. One (1) calibrated differential gauge, 0-50 PSI 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.

2. Two (2) P/N MS51523-B4 swivel tee. These fittings will be used to tee into fuel lines for unmetered and metered pressure reference.
3. Hoses of appropriate diameters and sufficient lengths to keep personnel and equipment away from propeller arc area.
4. 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.
5. 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 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 prior to proceeding.
2. Prior to 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 prior to adjusting the fuel system.



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.

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4. Insure that all fuel system components are of the correct part number and 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 manufacturers 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
13. Locate the IDLE speed stop screw on the throttle body 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.
16. Certain turbocharged engine models incorporate a fuel pressure regulator that must be deactivated during initial setup. Remove the line or hose from the center port fitting and install a cap. Plug the end of the detached line or hose. See Figure 10.

C. SETUP PROCEDURES



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.

1. Loosen and remove the unmetered fuel supply hose from either the fuel pump outlet fitting or the fuel control unit inlet fitting, whichever is most accessible. Some engine models have an unmetered fuel pressure connection you can access at the fuel control screen.
2. 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.



FAILURE TO CORRECTLY INSTALL AND MAINTAIN ENGINE CONTROLS CAN RESULT IN LOSS OF SYSTEM CONTROL AND SUBSEQUENT ENGINE POWER.

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3. Attach the unmetereed fuel supply hose to the straight end of the tee connector and torque.
4. Connect the Unmetereed 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 - 50 PSI 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 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. 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 preclude 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. 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. An Operational Test Form is included at the end of this service bulletin and 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

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temperatures and pressures have stabilized in the operational range. Use the operational test form to record the gauge indications.

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 by-pass, 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 shut down.

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 will require complete adjustment. **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 on page 9 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.

NOTE...

It is desirable to set IDLE RPM unmetered pump pressure to the minimum limit. With properly adjusted fuel/air mixture, this will provide a slight fuel enrichment during part throttle operations.

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

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check fuel/air mixture. A rise of 25 to 50 RPM should be obtained. An RPM change greater than 50 indicates the mixture is too rich and a change that is less than 25 indicates the mixture is too lean. Any mixture conditions that are too rich or too lean will be adjusted 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 is not within limits, repeat Steps 18, 19, 19-a and 19-b before continuing.
20. On all naturally aspirated engines, adjust the FULL POWER fuel flow to the specified value by turning the adjustable orifice screw clockwise to increase fuel flow and counterclockwise to decrease fuel flow. See Figures 1, 2 and 3.
21. On turbocharged engines, adjust the full power fuel flow 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 fuel flow and clockwise to decrease fuel flow.

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 fuel 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 fuel flow and counterclockwise to decrease fuel flow. After final adjustment is completed, torque the lock nut to the specified value.
23. When full power fuel flow has been adjusted to the specified values, recheck the IDLE RPM unmetered fuel pressure and fuel/air mixture. If any values are not within specified limits, repeat the adjustment procedures.
24. With the fuel system set to the specified pressure and flow values, set the IDLE RPM to the specified value by turning the Idle Speed Stop screw clockwise to increase RPM and 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. Remove all test gauges, fittings and hoses that were installed for fuel system setup. Reconnect all fuel hoses to their original locations, support and torque all fittings to the specified value.
3. Perform a complete fuel system leak check in accordance with the aircraft manufacturer's instructions. Correct any discrepancies noted.

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4. Install engine cowling in accordance with the aircraft manufacturer's instructions.
5. 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) holders 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 the 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 every 100 hours or annual inspection and anytime an adjustment is made to the fuel injection system to insure proper operation of the fuel pump auto leaning feature.
2. Table 3 through 6 and Auto Leaning Charts 1 through 4 provide fuel flow vs. pressure altitude specifications for the IO-550- series engines with altitude compensating fuel pump.
3. Insure the accuracy of aircraft fuel flow gauge and tachometer have 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 pre-flight inspection, engine start and ground run up.
6. Set the aircraft altimeter to 29.92 inches Hg.
7. In accordance with the aircraft manufacturer's instructions make a normal take-off.
8. Climb must be accomplished at full throttle, FULL RICH mixture and 2700 RPM at the best rate of climb airspeed or higher for the aircraft.
9. Using the aircraft fuel flow gauge and altimeter record the 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 the specified limits at all pressure altitudes the fuel injection system auto leaning schedule will require 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.

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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 21 - 24. 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 torquing of 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 pig tail for the fuel pump through bolts. It is not necessary to re-safety 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 counter-clockwise 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 2 (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 verses 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. After making any adjustment to the variable 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 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 it's 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 engines fuel injection system meets all published specifications.


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Table 1. 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 be noticed 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


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Table 2. Fuel System Adjustment Values

IDLE AND FULL POWER FUEL PRESSURES AND FLOWS					
ENGINE	Prop. RPM & (MAP)	Unmetered Pump PSI (NOTE 3)	Metered Nozzle PSI	Fuel lbs/hr	Fuel gal/hr
IO-240-A, B	700	5.5 - 7.5	3.0 - 4.0	-	-
	2800	31.5 - 53.0	14.6 - 16.7	66 - 70	11.1 - 12.0
IO-346-A, B	600	7.0 - 7.5	2.0 - 2.5	-	-
	2700	19.0 - 21.0	12.5 - 14.0	78 - 85	13.3 - 14.5
IO-360-A, AB, C CB, D, DB, G, GB, H, HB, J, JB	600	7.0 - 9.0	3.5 - 4.0	-	-
	2800	24.0 - 27.0	15.8 - 18.2	100 - 106	17.0 - 18.1
IO-360-ES	600	7.0 - 9.0	3.5 - 4.0	-	-
	2800	24.0 - 27.0	15.3 - 17.5	100 - 106	17.0 - 18.1
IO-360-K, KB	600	7.0 - 9.0	3.5 - 4.0	-	-
	2600	21.0 - 24.0	14.3 - 16.3	93.5 - 97.5	15.9 - 16.6
TSIO-360-A, AB	600	6.5 - 7.5	3.2 - 3.7	-	-
	2800 (32.0)	27.2 - 31.2	15.8 - 16.7	119 - 124	20.1 - 21.0
TSIO-360-B, BB	600	6.5 - 7.5	3.2 - 3.7	-	-
	2800 (32.0)	27.2 - 31.2	15.8 - 16.7	115 - 124	20.1 - 21.0
TSIO-360-C, CB	600	6.5 - 7.5	3.5 - 4.5	-	-
	2800 (37.0)	34.0 - 37.0	16.7 - 19.3	135 - 145	23.0 - 24.7
TSIO-360-D, DB	600	6.5 - 7.5	3.5 - 4.5	-	-
	2800 (36.0)	34.0 - 37.0	16.7 - 19.3	135 - 145	23.0 - 24.7
TSIO-360-E, EB, L/TSIO-360-E, EB	700	6.25 - 6.75	3.5 - 4.5	-	-
	2575 (40.0)	43.0 - 46.0	15.8 - 18.3	130 - 140	22.1 - 23.8
TSIO-360-F, FB	700	6.25 - 6.75	3.5 - 4.5	-	-
	2575 (41.0)	40.0 - 43.0	15.8 - 18.3	130 - 140	22.1 - 23.8


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Table 2. Fuel System Adjustment Values (cont'd)

IDLE AND FULL POWER FUEL PRESSURES AND FLOWS					
ENGINE	Prop. RPM & (MAP)	Unmetered Pump PSI (NOTE 3)	Metered Nozzle PSI	Fuel lbs/hr	Fuel gal/hr
TSIO-360-G, GB	700	6.25 - 6.75	3.5 - 4.5	-	-
	2700 (40.0)	45.0 - 49.0	16.7 - 19.3	135 - 145	23.0 - 24.7
TSIO-360-H, HB	600	6.5 - 7.5	3.5 - 4.5	-	-
	2800 (34.5)	29.0 - 33.0	14.9 - 17.3	125 - 135	21.3 - 23.0
TSIO-360-JB	600	6.5 - 7.5	3.5 - 4.5	-	-
	2800 (37.0)	34.5 - 37.5	16.7 - 19.3	134 - 145	22.8 - 24.7
TSIO-360-KB, L/TSIO-360-KB	700	6.5 - 7.5	3.5 - 4.5	-	-
	2800 (40.0)	36.0 - 39.0	17.7 - 21.2	140 - 155	23.8 - 26.4
TSIO-360-LB	700	6.25 - 6.75	3.5 - 4.5	-	-
	2700 (40.0)	34.0 - 38.0	14.7 - 16.7	135 - 145	23.0 - 24.7
TSIO-360-MB	700	6.25 - 6.75	3.5 - 4.5	-	-
	2700 (36.0)	28.0 - 32.0	13.6 - 15.3	125 - 135	21.3 - 23.0
L/TSIO-360-RB SEE NOTE 1	700	25 Minimum	-	-	-
	2600 (38.0)	35.0 - 45.0	-	140 - 150	23.3 - 25.5
TSIO-360-SB	700	6.25 - 6.75	3.5 - 4.5	-	-
	2600 (39.0)	31 - 36	15.1 - 17.8	131 - 151	22.3 - 25.7
O-470-GCI	600	9.0 - 11.0	2.2 - 3.2	-	-
	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	2.2 - 3.2	-	-
	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	2.2 - 3.2	-	-
	2625	25.0 - 28.0	15.0 - 17.5	124 - 131	21.1 - 22.3


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Table 2. Fuel System Adjustment Values (cont'd)

IDLE AND FULL POWER FUEL PRESSURES AND FLOWS					
ENGINE	Prop. RPM & (MAP)	Unmetered Pump PSI (NOTE 3)	Metered Nozzle PSI	Fuel lbs/hr	Fuel gal/hr
IO-470-J, K	600	5.5 - 7.0	2.2 - 3.2	-	-
	2600	24.7 - 27.7	14.8 - 17.3	123 - 130	21.0 - 22.1
IO-470-V	600	6.5 - 7.5	3.5 - 4.0	-	-
	2625	28.3 - 29.8	17.8 - 18.8	123.5 - 131	21.0 - 22.3
IO-470-VO	600	6.5 - 7.5	3.5 - 4.0	-	-
	2625	28.8 - 31.0	17.8 - 18.8	132 - 137.5	22.5 - 23.4
GIO-470-A	450	9.0 - 11.0	2.0 - 2.5	-	-
	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	2.0 - 2.5	-	-
	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	3.9 - 4.5	-	-
	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	2.3 - 3.0	-	-
	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	3.9 - 4.5	-	-
	2850	30.0 - 33.0	17.0 - 19.4	143 - 153	24.4 - 26.1
IO-520-E	600	9.0 - 11.0	2.3 - 3.0	-	-
	2850	29.0 - 32.0	16.1 - 18.3	143 - 153	24.4 - 26.1
IO-520-M, MB	600	6.0 - 7.0	3.4 - 4.0	-	-
	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	4.2 - 4.8	-	-
	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	3.5 - 4.5	-	-
	2400 (32.5)	34.5 - 38.0	15.2 - 16.5	160 - 165	27.3 - 28.1


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Table 2. Fuel System Adjustment Values (cont'd)

IDLE AND FULL POWER FUEL PRESSURES AND FLOWS					
ENGINE	Prop. RPM & (MAP)	Unmetered Pump PSI (NOTE 3)	Metered Nozzle PSI	Fuel lbs/hr	Fuel gal/hr
TSIO-520-AF	600	5.5 - 6.5	3.5 - 4.5	-	-
	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	3.5 - 4.5	-	-
	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	3.5 - 4.5	-	-
	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	3.5 - 4.5	-	-
	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	3.5 - 4.5	-	-
	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	3.5 - 4.5	-	-
	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	3.5 - 4.5	-	-
	2700 (34.5)	31.0 - 34.0	15.6 - 17.7	175 - 185	29.8 - 31.5
TSIO-520-G	600	5.5 - 6.5	3.5 - 4.5	-	-
	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	3.5 - 4.5	-	-
	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	3.5 - 4.5	-	-
	2700 (33.0)	29.0 - 32.0	15.1 - 17.4	163 - 175	27.8 - 29.8


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Table 2. Fuel System Adjustment Values (cont'd)

IDLE AND FULL POWER FUEL PRESSURES AND FLOWS					
ENGINE	Prop. RPM & (MAP)	Unmetered Pump PSI (NOTE 3)	Metered Nozzle PSI	Fuel lbs/hr	Fuel gal/hr
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	3.5 - 4.5	-	-
	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	3.5 - 4.5	-	-
	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	3.5 - 4.5	-	-
	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	3.5 - 4.5	-	-
	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	3.5 - 4.5	-	-
	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	3.5 - 4.0	-	-
	2700 (40.5)	36.0 - 39.5	16.9 - 18.7	200 - 210	34.1 - 35.8
TSIO-520-WB SEE NOTE 1	600	25 - Minimum	-	-	-
	2700 (39.5)	45.0 - 55.0	-	190 - 200	32.4 - 34.1
GTSIO-520-C	525	4.0 - 7.0	3.5 - 4.0	-	-
	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	3.5 - 4.5	-	-
	2267 (39.5)	30.5 - 35.0	15.7 - 17.3	250 - 260	42.6 - 44.3


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Table 2. Fuel System Adjustment Values (cont'd)

IDLE AND FULL POWER FUEL PRESSURES AND FLOWS					
ENGINE	Prop. RPM & (MAP)	Unmetered Pump PSI (NOTE 3)	Metered Nozzle PSI	Fuel lbs/hr	Fuel gal/hr
GTSIO-520-F, K SEE NOTE 1	600	6.75 - 7.25	3.5 - 4.5	-	-
	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	3.5 - 4.5	-	-
	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	3.5 - 4.5	-	-
	2234 (40.0)	29.5 - 35.0	16.4 - 17.9	255 - 265	43.4 - 45.1
GTSIO-520-N SEE NOTE 1	467	4.0 - 7.0	3.5 - 4.5	-	-
	2234 (39.0)	29.5 - 35.0	16.4 - 17.9	255 - 265	43.4 - 45.1
IO-550-A * SEE NOTE 2	600	8.0 - 10.0	3.9 - 4.5	-	-
	2700	32.0 - 36.0	17.7 - 20.0	142 - 150	24.2 - 25.6
* Sea level Standard Day - See Table 3					
IO-550-B * SEE NOTE 2	600	8.0 - 10.0	3.9 - 4.5	-	-
	2700	29.2 - 36.2	16.5 - 18.4	146 - 156	24.9 - 26.6
* Sea level Standard Day - See Table 4					
IO-550-C * SEE NOTE 2	600	8.0 - 10.0	3.9 - 4.5	-	-
	2700	31.6 - 37.8	17.6 - 19.6	152 - 160	25.9 - 27.3
* Sea level Standard Day - See Table 5					
IO-550-D, E, F, L * SEE NOTE 2	600	8.0 - 10.0	3.9 - 4.5	-	-
	2700	32.0 - 36.0	17.9 - 21.1	143 - 155	24.4 - 26.4
* Sea level Standard Day - See Table 6					
IO-550-G	600	8.0 - 10.0	3.9 - 4.5	-	-
	2500	22.0 - 26.0	14.7 - 16.0	125 - 130	21.3 - 22.1
IO-550-N	600	8 - 10	3.9 - 4.5	-	-
	2700	28 - 32	19 - 21.3	150 - 160	25.6 - 27.3


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Table 2. Fuel System Adjustment Values (cont'd)

IDLE AND FULL POWER FUEL PRESSURES AND FLOWS					
ENGINE	Prop. RPM & (MAP)	Unmetered Pump PSI (NOTE 3)	Metered Nozzle PSI	Fuel lbs/hr	Fuel gal/hr
GIO-550-A See NOTE 1	600	25-Minimum	-	-	-
	2267	45 - 55	-	175 - 185	29.8 - 31.5
TSIO-550-B	600	7.0 - 9.0	3.7 - 4.3	-	-
	2700 (38.0)	32.0 - 36.0	15.3 - 16.9	245 - 255	41.7 - 43.4
TSIO-550-C	600	7.0 - 9.0	-	-	-
	2600 (35.5)	30.0 - 34.0	12.7 - 13.9	214 - 224	36.5 - 38.2
TSIO-550-E See NOTE 4	600	7.0 - 9.0	-	-	-
	2700 (38.5)	32.0 - 36.0	13.1 - 14.2	220 - 230	37.5 - 39.2
TSIOL-550-A	600	5.5 - 6.5	-	-	-
	2700 (38.0)	32.5 - 35.5	17.0 - 19.0	170 - 180	29.0 - 30.7
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
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 curves 1 through 4 for specified values.				
NOTE 3:	FULL POWER unmetered pump pressure limits are provided for reference only. The full power fuel flow must be adjusted within the specified limits.				
NOTE 4:	For Lancair IV and IV-P installations, use the values specified for the TSIO-550-B.				

AFFECTED PUBLICATIONS: Insert a copy of this Service Bulletin into the appropriate section of all TCM Fuel Injected Engine model **OVERHAUL** and **MAINTENANCE** Manuals


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TABLE 3. 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.						


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TABLE 4. 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.						


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TABLE 5. 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.						


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TABLE 6. 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	17.8	19.4
1000	142.5	154.5	24.3	26.3	17.7	19.3
2,000	142	154	24.2	26.2	17.6	19.2
3000	141	153	24.0	26.1	17.5	19.0
4,000	139	151	23.7	25.7	17.1	18.6
5000	136	148	23.2	25.2	16.6	18.1
6,000	133	145	22.6	24.7	16.1	17.5
8,000	124	136	21.1	23.2	14.6	16.0
10,000	114	126	19.4	21.5	13.1	14.3
12,000	107	119	18.2	20.3	12.1	13.2
14,000	102	114	17.4	19.4	11.1	12.5
Gasoline = 5.87 lbs per gallon @ 70° F.						


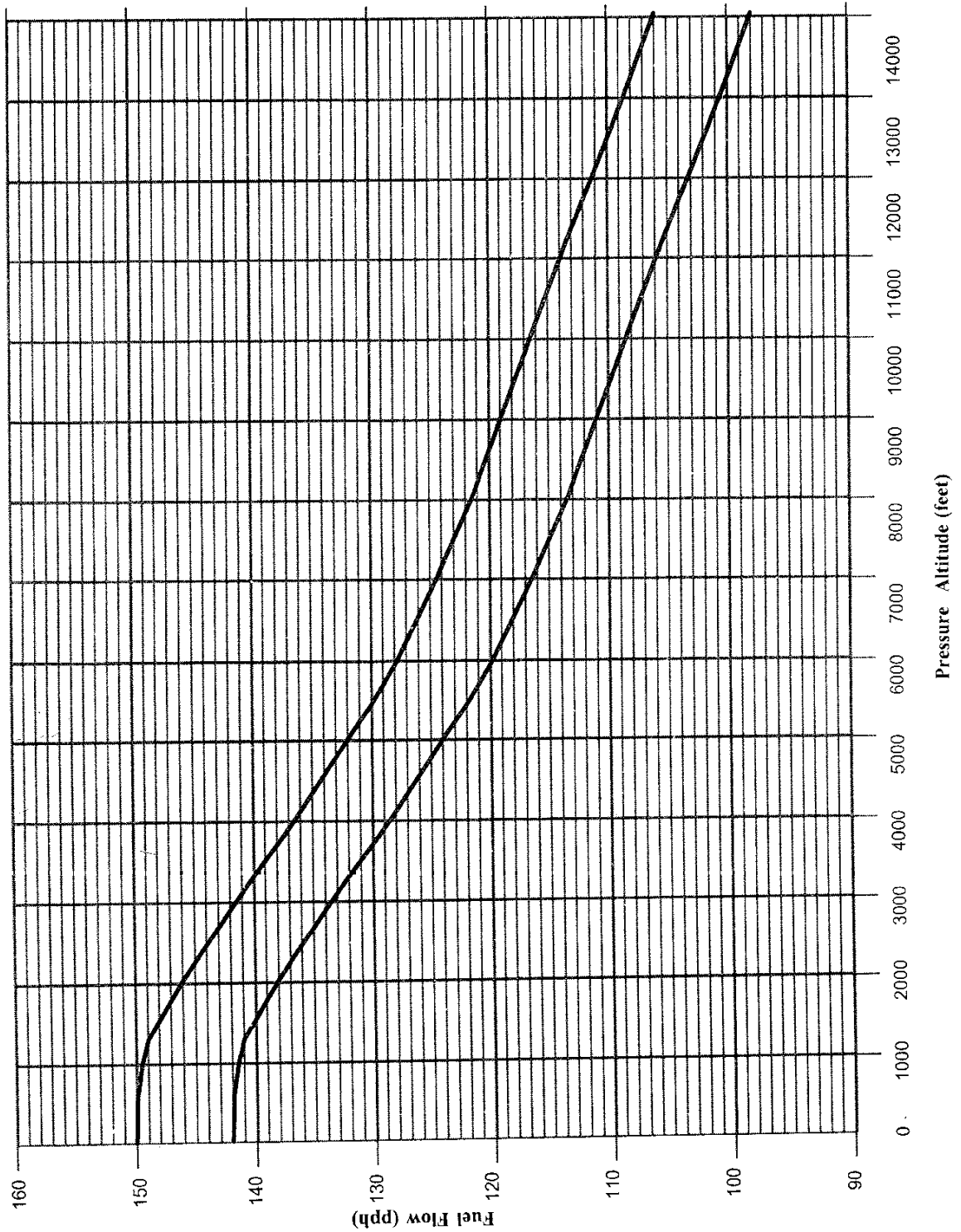
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Chart 1. Altitude Leaning Chart

IO-550-A

Full Rich, 2700 RPM




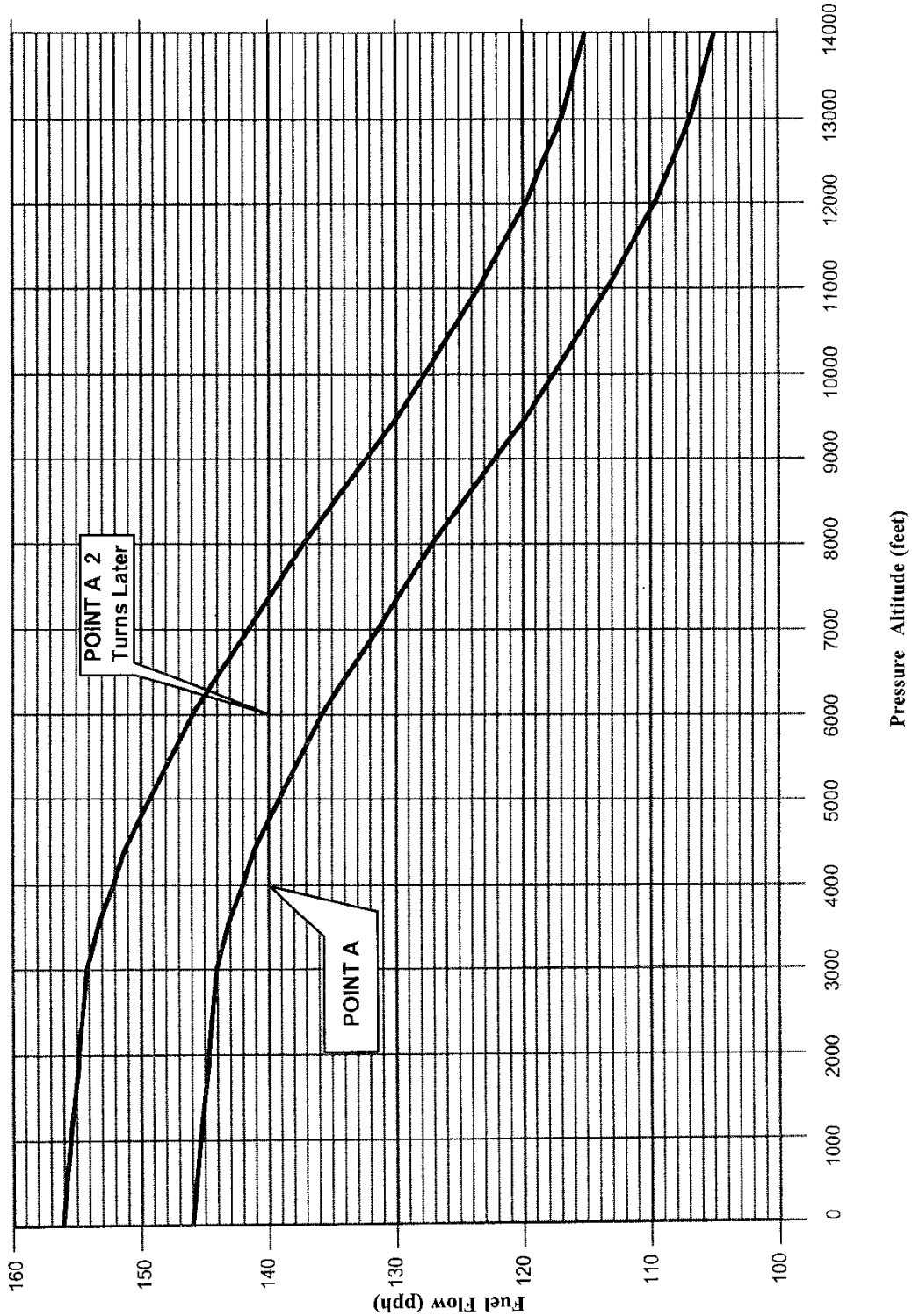
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Chart 2. Altitude Leaning Chart
IO-550-B
Full Rich, 2700 RPM




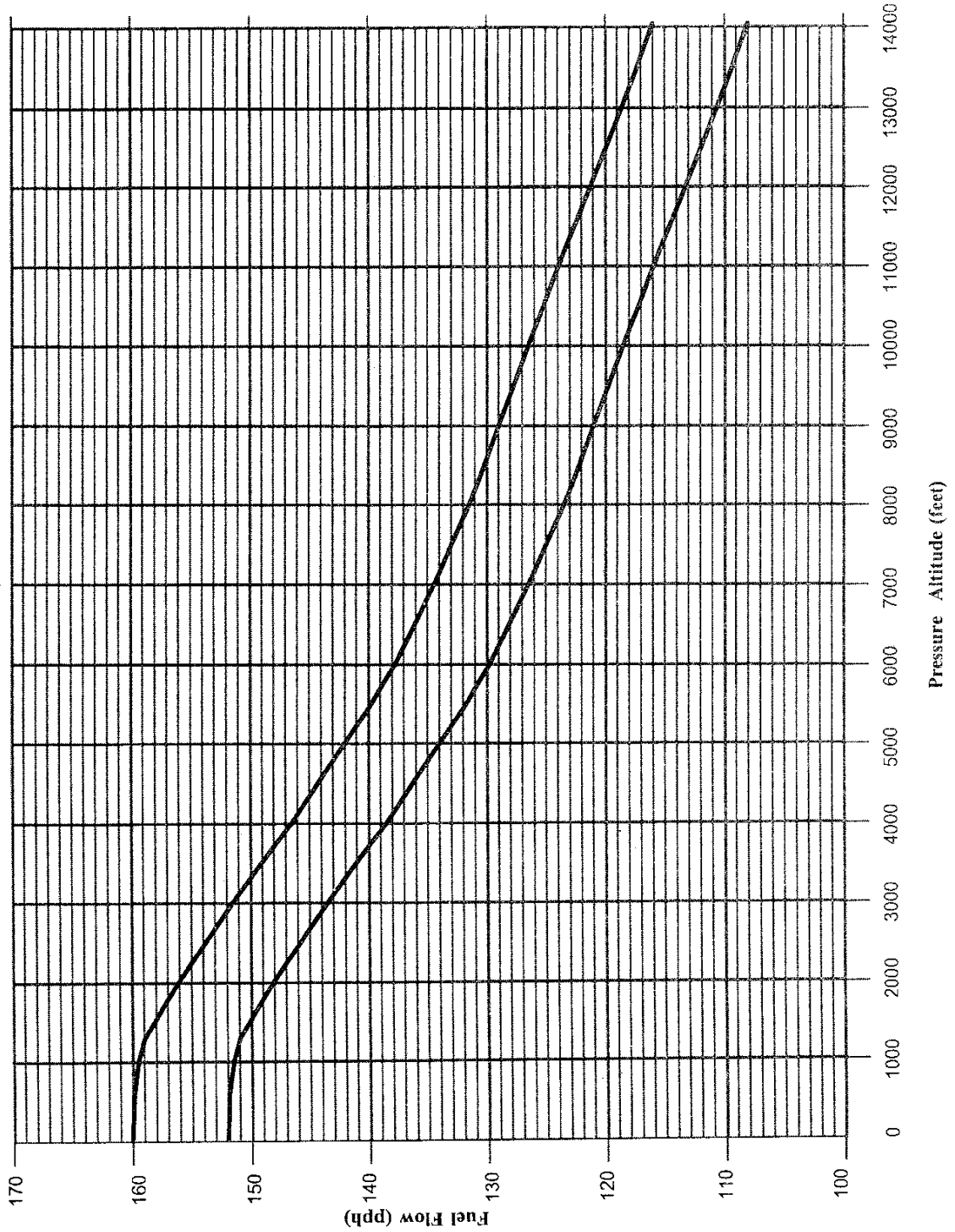
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Chart 3. Altitude Leaning Chart
IO-550-C

Full Rich, 2700 RPM




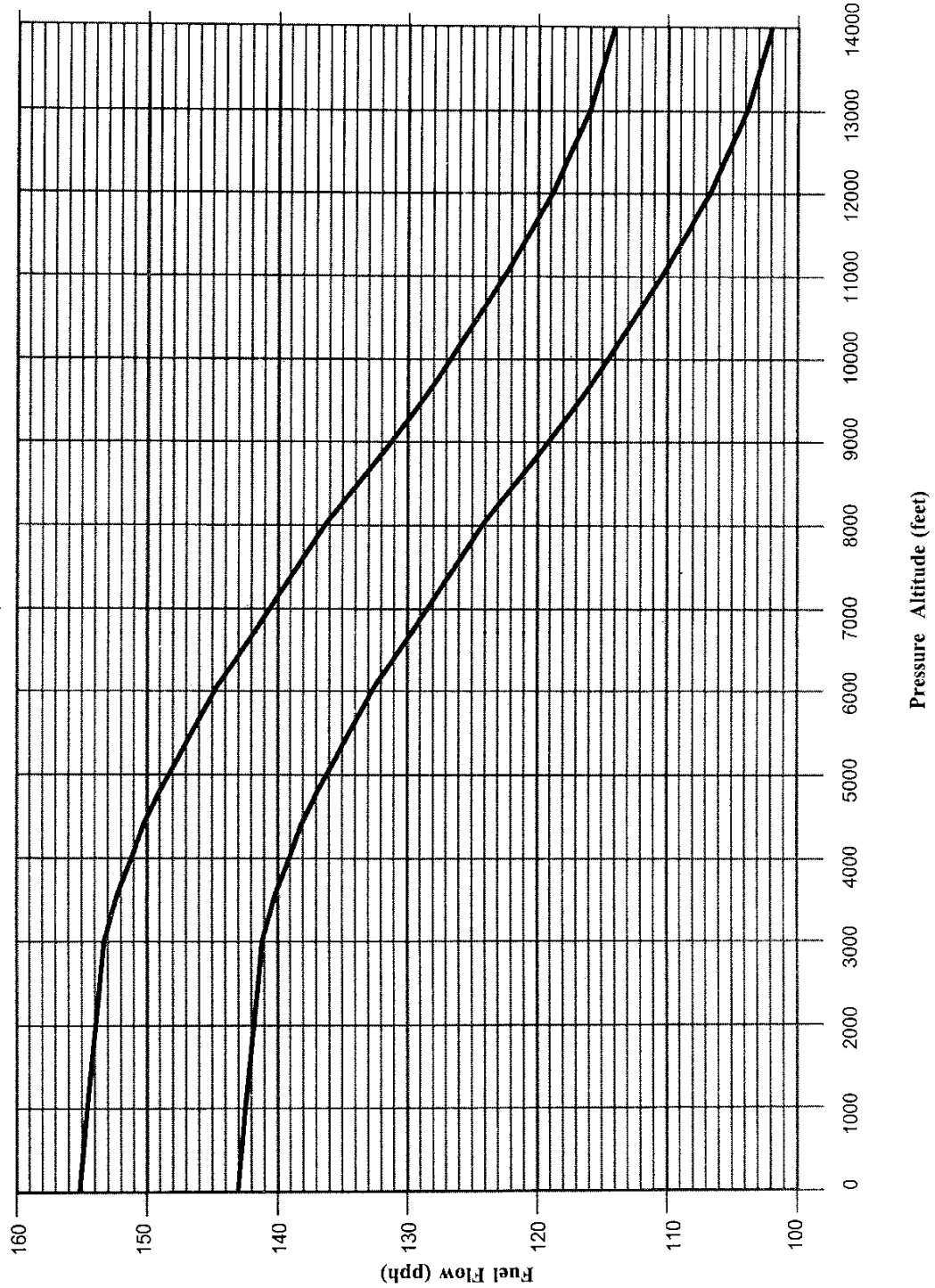

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Chart 4. Altitude Leaning Chart
 IO-550-D, -E, -F, -L
 Full Rich, 2700 RPM



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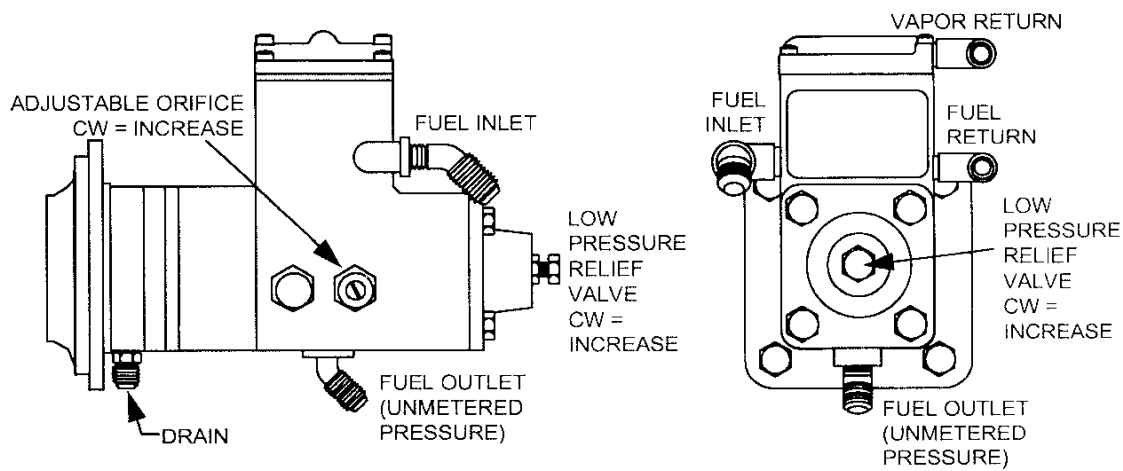


FIGURE 1 - NATURALLY ASPIRATED ENGINE FUEL PUMP

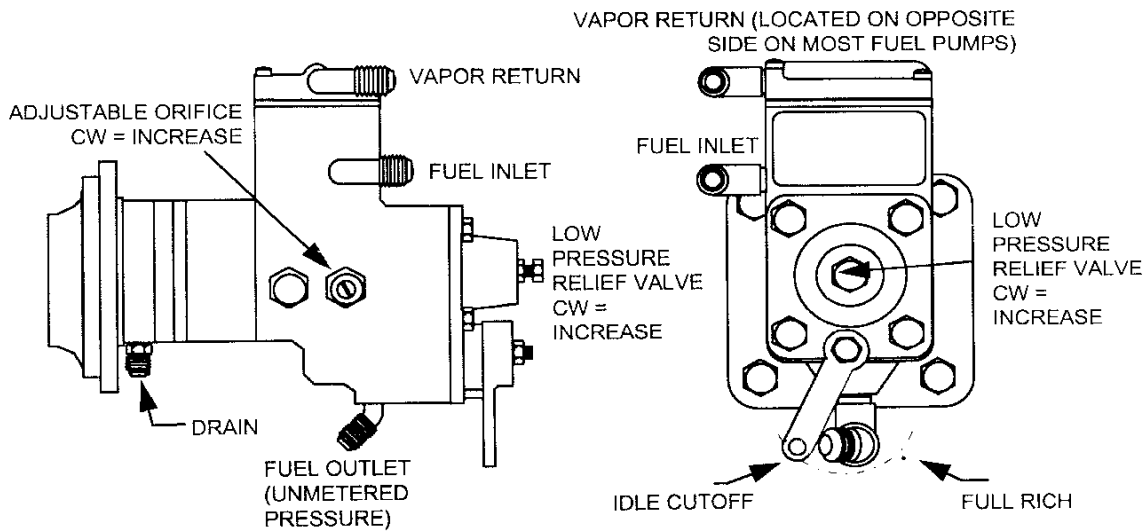



FIGURE 2 - NATURALLY ASPIRATED ENGINE (MIXTURE CONTROL EQUIPPED) FUEL PUMP

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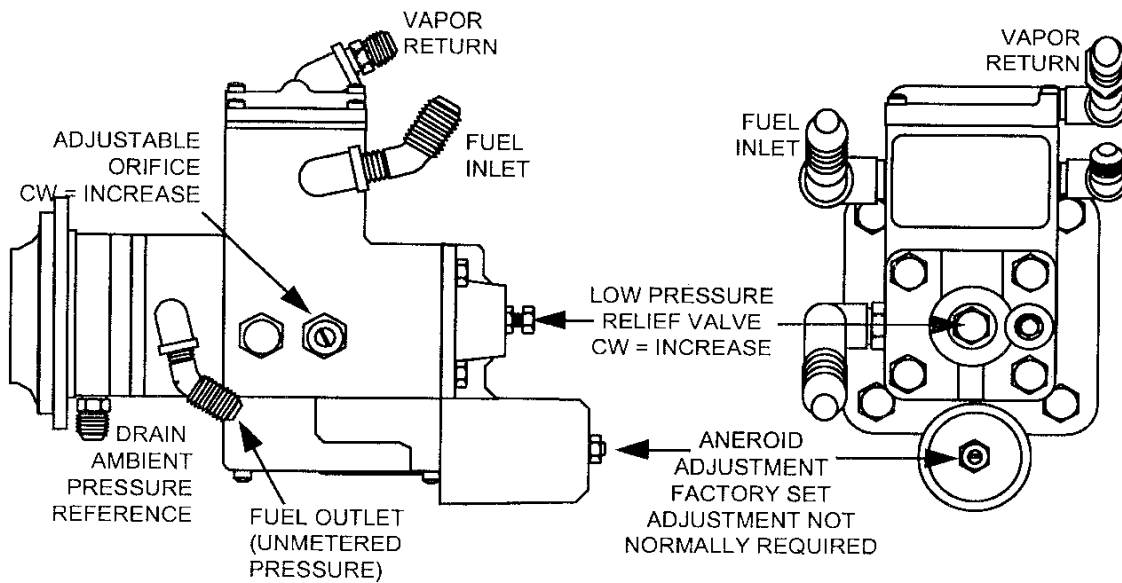


FIGURE 3 - ALTITUDE COMPENSATING FUEL PUMP

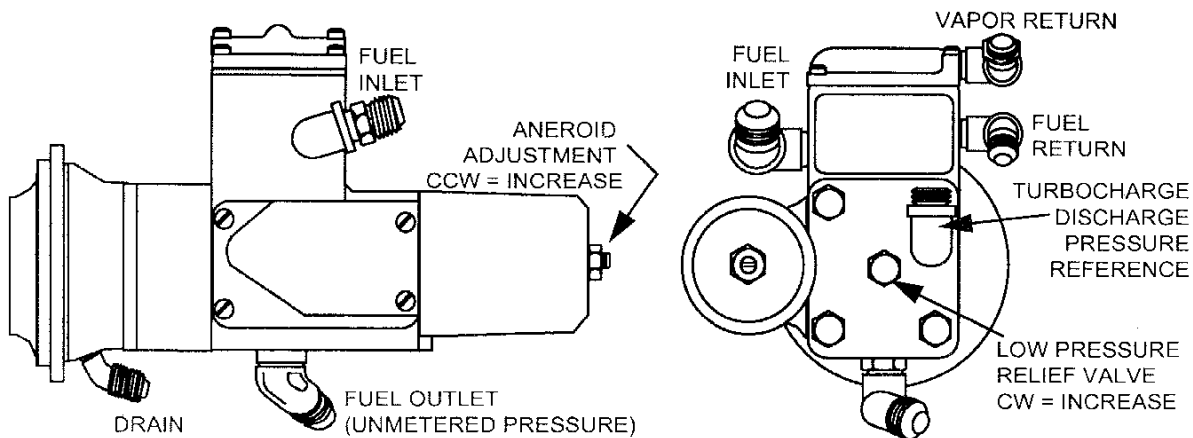



FIGURE 4 - ANEROID EQUIPPED FUEL PUMP TURBOCHARGED ENGINE

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03	24	97						

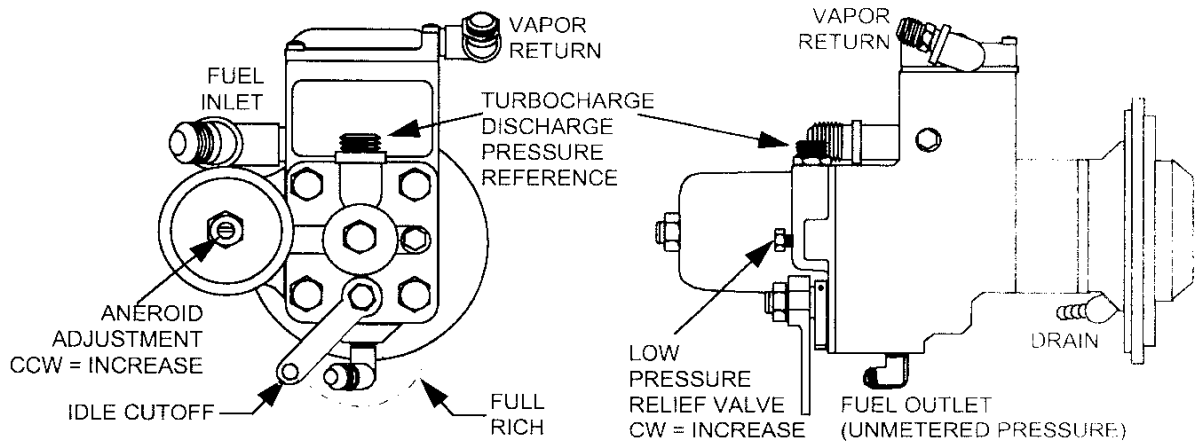


FIGURE 5 - ANEROID & MIXTURE CONTROL EQUIPPED FUEL PUMP TURBOCHARGED ENGINE

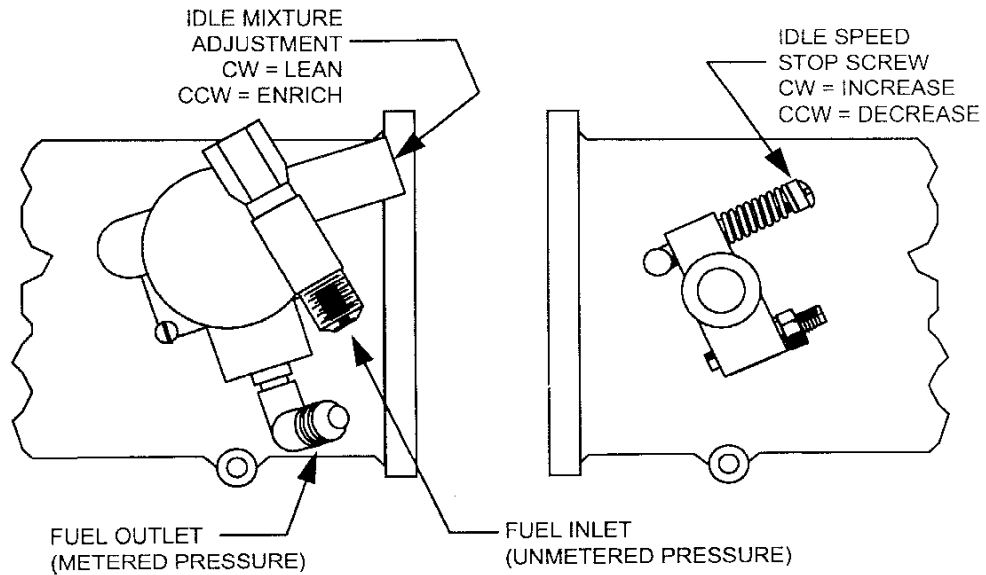


FIGURE 6 - THROTTLE & METERING ASSEMBLY

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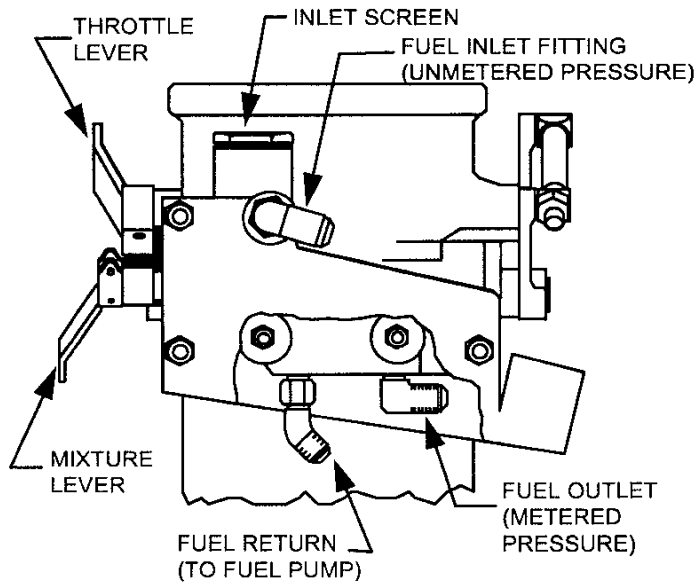


FIGURE 7 - THROTTLE & CONTROL ASSEMBLY - FRONT VIEW (EXCEPT GTS10-520-D, F, H,, K, L, M, N)

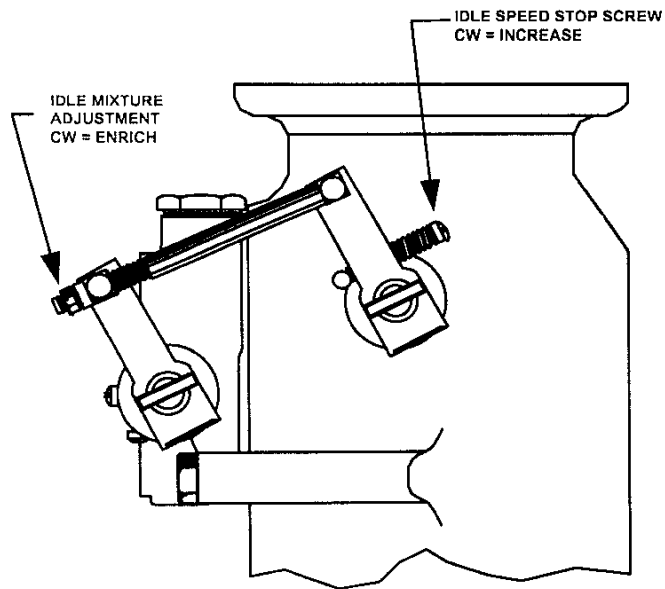

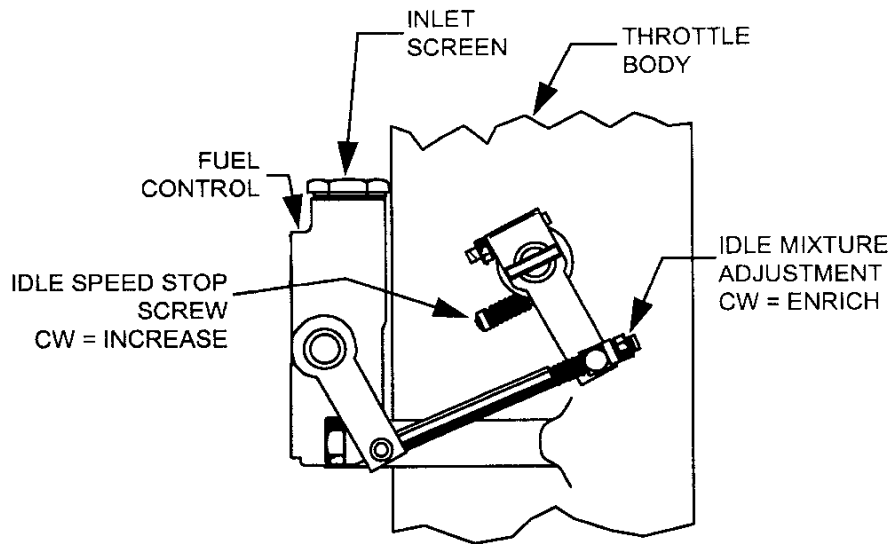
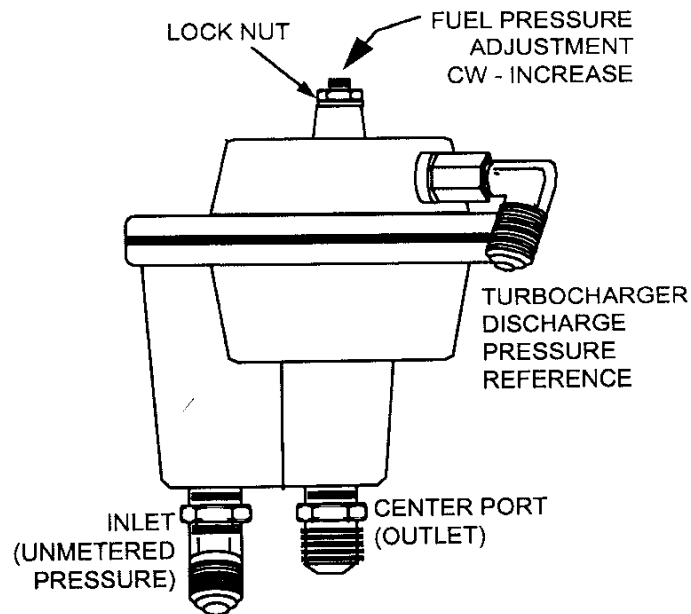


FIGURE 8 - THROTTLE & CONTROL ASSEMBLY - SIDE VIEW (EXCEPT GTS10-520-D, F, H,, K, L, M, N)


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MO	DAY	YEAR	MO	DAY	YEAR		28 of 32 SID97-3	
03	24	97						



**FIGURE 9 - THROTTLE & CONTROL ASSEMBLY
(ALL GTS10-520 EXCEPT GTS10-520-C)**



**FIGURE 10 - FUEL PRESSURE REGULATOR
FOR TURBOCHARGED ENGINES**

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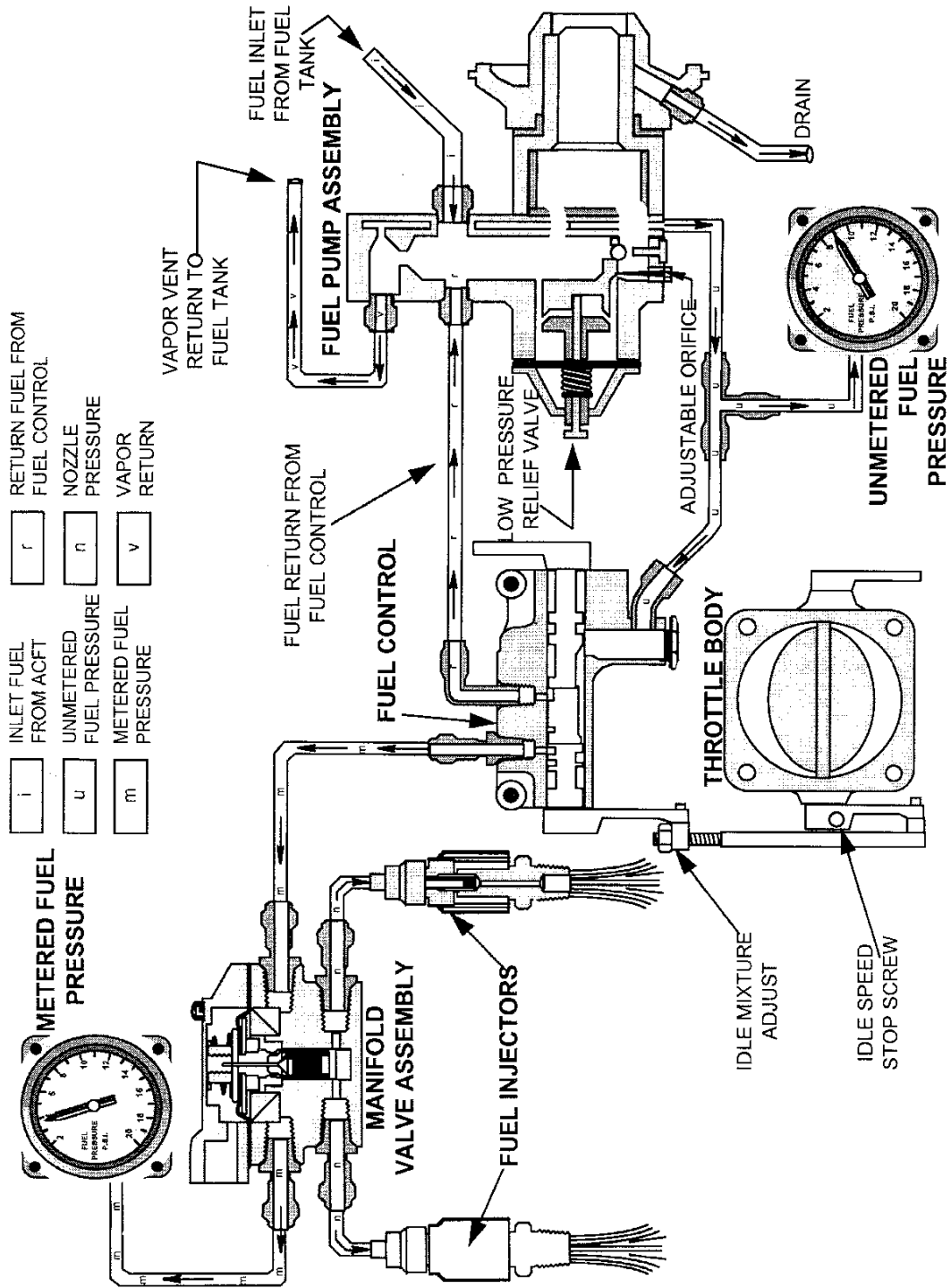


FIGURE 11 - TYPICAL NATURALLY ASPIRATED FUEL SYSTEM SCHEMATIC

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MO	DAY	YEAR	MO	DAY	YEAR		30 of 32 SID97-3	
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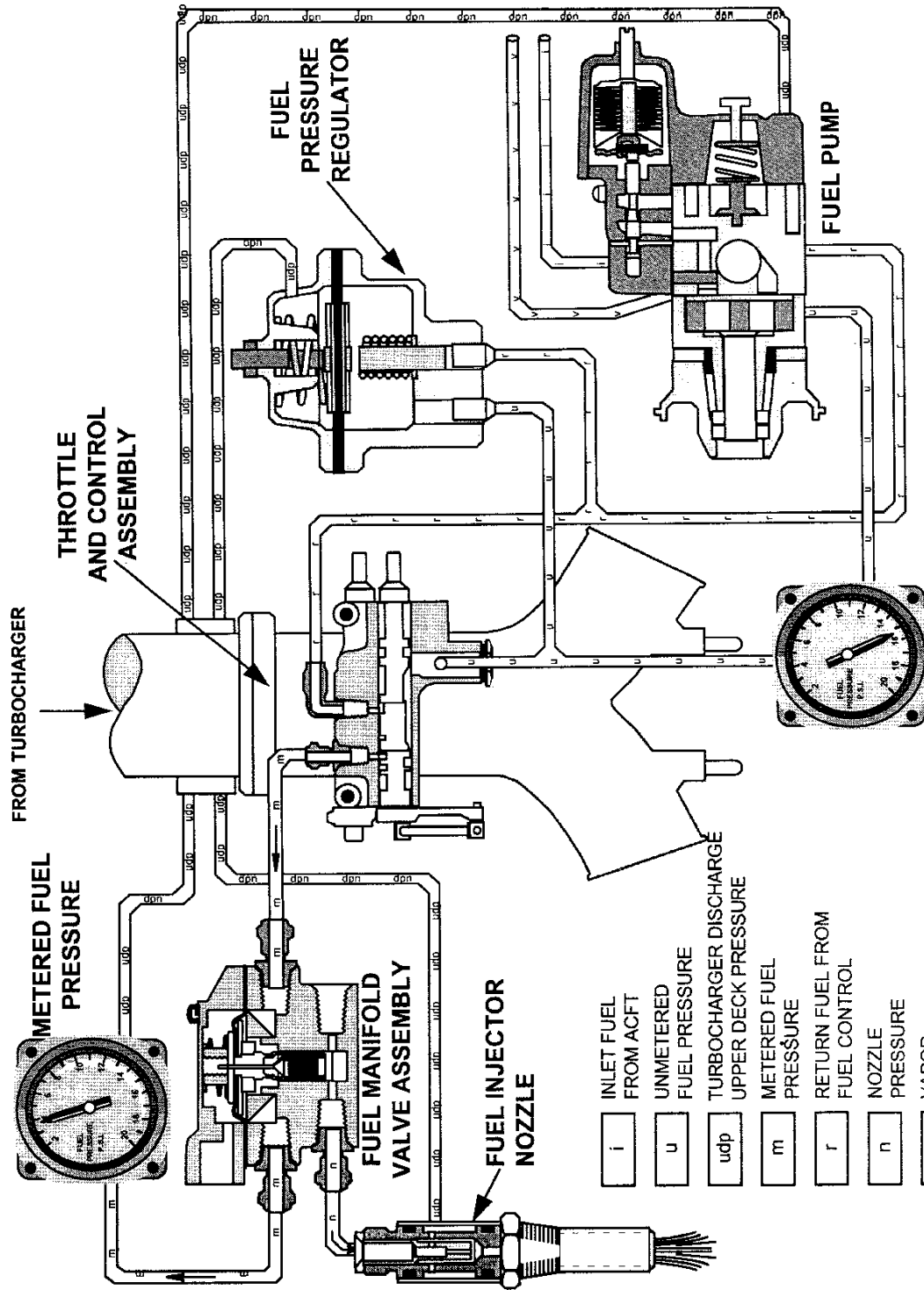


FIGURE 12 - TYPICAL TURBO-CHARGED FUEL SYSTEM SCHEMATIC (WITH REGULATOR)

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MO	DAY	YEAR	MO	DAY	YEAR			
03	24	97				An Allegheny Teledyne Company P. O. Box 90 Mobile Alabama 36601	31 of 32 SID97-3	

