

Section II — Governor Assembly

Introduction

Governor Operating Principal
(Refer to Figure 2-1)

Most Model 100 fuel injection pumps are equipped with a variable speed mechanical governor. This type of governor provides the engine with automatic speed control which will continually adjust fuel delivery between the low and high idle speed range. The governor can be calibrated to produce a wide range of fuel curves with proper selection of key governor components.

The governor flyweights are one of the main components of the mechanical governor. When the flyweights rotate, centrifugal force causes them to open and apply a force to the thrust bearing and governor sleeve through the weight fingers. This force is opposed by the inner and outer governor springs located at the opposite end of the sleeve. With an increase in speed, the centrifugal force of the weights is greater than the opposing spring force so that the sleeve will be moved toward

the rear of the governor housing. A decrease in speed will result in the sleeve moving in the opposite direction.

Movement of the governor sleeve results in a change in position of the fulcrum lever assembly since the fulcrum lever pivot pins engage the slots in the sides of the governor sleeve. Movement of the fulcrum lever will, in turn, change the position of the fuel control rod and will result in an increase or decrease of fuel delivery. Control rod movement toward the hydraulic head increases fuel and movement toward the supply pump decreases fuel.

High Speed Governing

At rated speed and throttle lever position, the cam nose is in contact with the stop plate and the torsion spring on the control shaft has little or no windup. As load on the engine is reduced and speed increases, the governor will reduce fuel until a balance of fuel quantity and engine speed is achieved. This maximum no load engine speed is high idle.

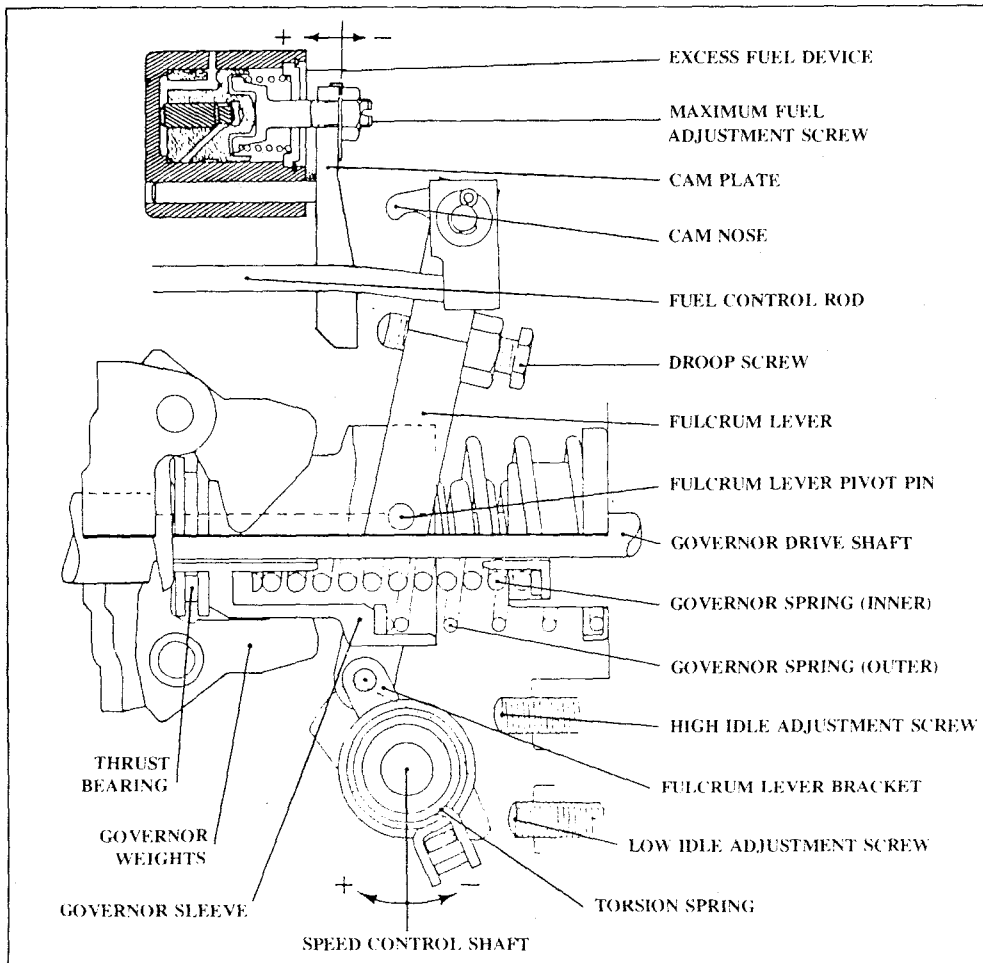


FIGURE 2-1 — Governor Schematic
Model 100 Variable Speed Governor
With Fuel Control

Torque — As load increases on an engine running at rated speed, the engine will decrease in speed. The governor responds to the change in engine speed and adjusts fuel delivery to engine torque requirements.

Droop — As speed continues to decrease below the peak torque point, the droop screw contacts the lower stop plate and becomes the new pivot point for the fulcrum lever assembly. With additional decrease in speed, the control rod is moved toward the rear of the governor thereby cutting back fuel delivery. This limits engine torque to a predetermined maximum.

Low Idle — During low idle operation, only the low rate outer governor spring contacts the governor sleeve since the higher rate inner spring is set to apply force slightly above low idle RPM. This lighter spring force provides the governor with the sensitivity required for rapid fuel adjustment and control.

Min-Max Governor (Refer to Figure 2-2) — Certain applications are equipped with a min-max governor which is designed to only control fuel delivery at low idle speed and at high speed (above cam departure RPM). Engine speeds between low idle and cam departure are controlled externally either by direct operator control or by a separate, remote governor.

The prominent feature of a min-max governor is the pre-loaded spring capsule used in place of the inner spring. During low idle operation, there is no force applied to the capsule so that the governor functions just as a variable speed governor. When speed increases, as during a part load-part throttle condition, the weight force against the sleeve closes the capsule inner spring gap. The capsule holds the sleeve stationary and the fulcrum lever now pivots at the sleeve pins with any additional movement at the operating lever and shaft. Under these conditions, fuel control is effectively outside of the governor as mentioned above.

Under heavy load conditions, in full throttle position, fuel delivery is limited by the stop plate. As load diminishes, the engine speed will increase which will increase the governor weight force. When this force is sufficient to overcome the capsule preload, the cam nose departs from the stop plate and the min-max governor regulates high speed in the same manner as a variable speed governor.

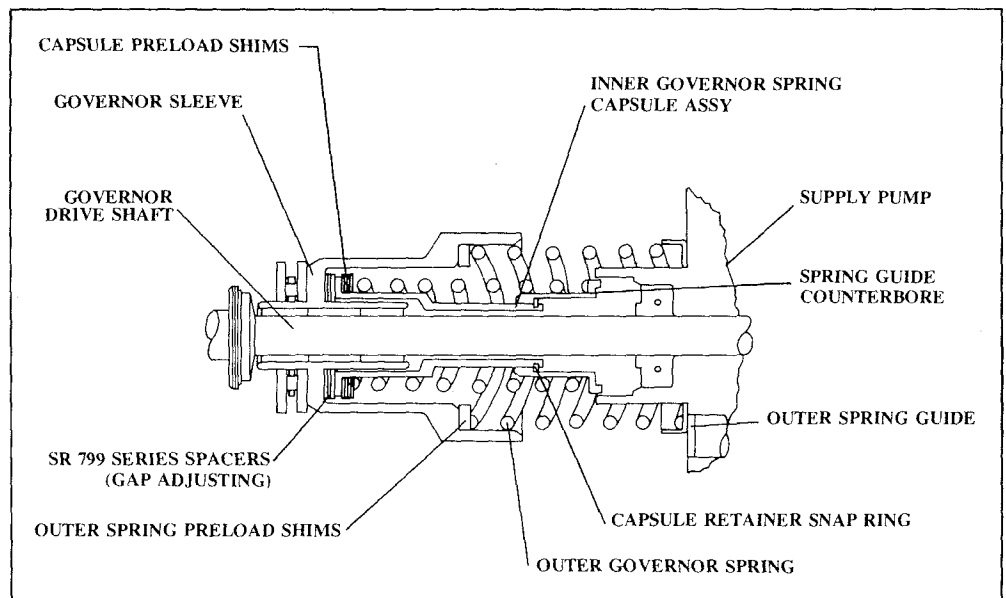


FIGURE 2-2
MIN-MAX GOVERNOR

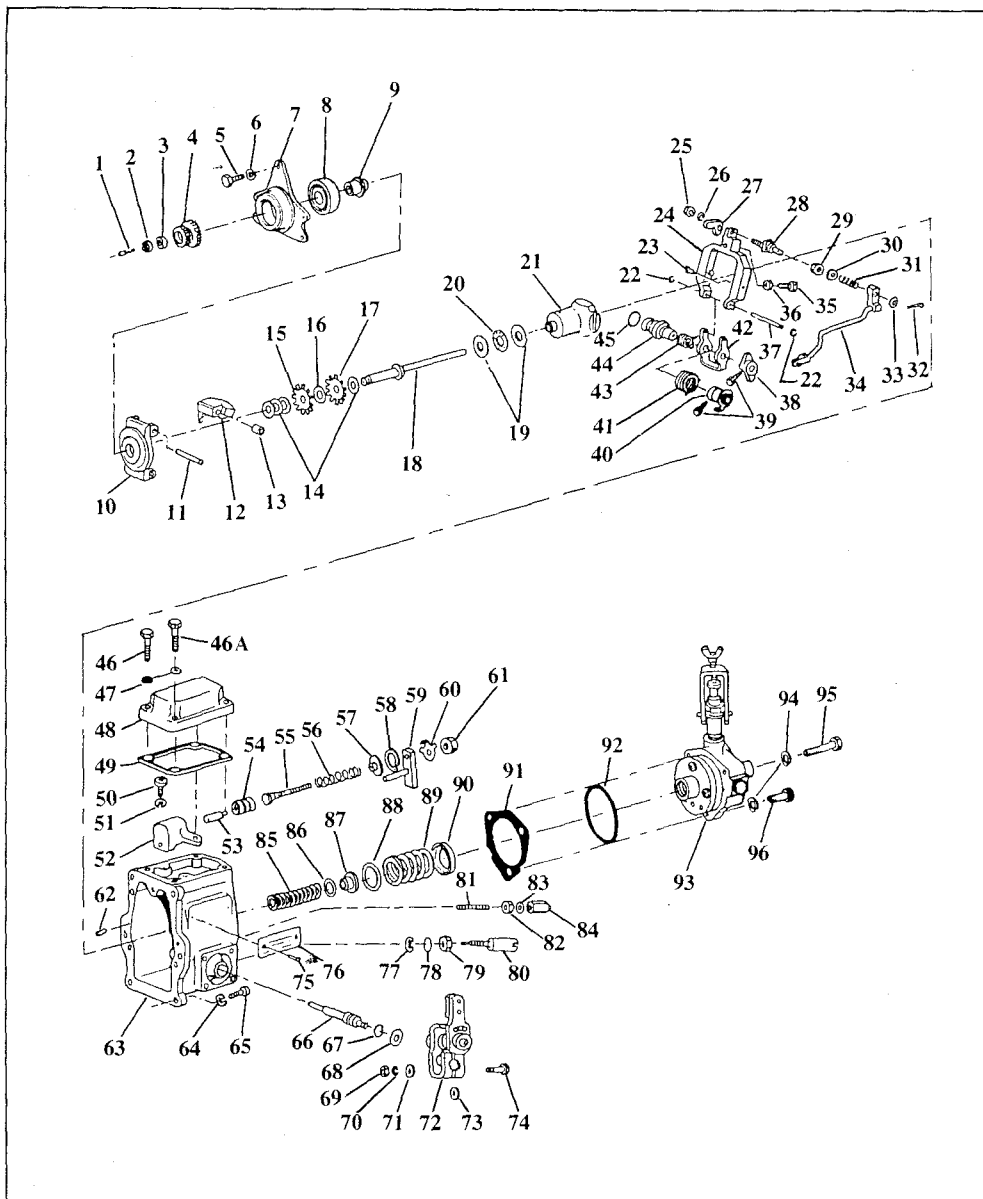


FIGURE 2-3
EXPLODED VIEW OF MODEL 100
GOVERNOR

Governor Parts List

Illus.
No.

Description

- 1 PIN & SPRING ASSY, lube
- 2 NUT, drive gear
- 3 CUP, lock-drive gear
- 4 GEAR, drive-gov.
- 5 SCREW, bearing support plate (3)
- 6 WASHER, lock (3)
- 7 PLATE, support-bearing
- 8 BEARING, ball
- 9 BUSHING, bearing
- 10 SPIDER, friction drive
- 11 PIN, weight (2)
- 12 WEIGHT, governor (2)
- 13 BUSHING, weight (4)
- 14 SPACER, shaft (AR)

- 15 DISC, spring-inner
- 16 SPACER, spring-disc
- 17 DISC, spring-outer
- 18 SHAFT, drive-gov
- 19 WASHER, thrust (2)
- 20 BEARING, thrust
- 21 SLEEVE ASSY, gov
- 22 RING, retaining (2)
- 23 PIN, pivot (2)
- 24 LEVER, fulcrum
- 25 NUT, cam
- 26 WASHER, lock-cam
- 27 CAM, torque
- 28 SCREW, square head
- 29 NUT, adjusting-spring
- 30 WASHER, plain-adjusting nut
- 31 SPRING, control rod
- 32 PIN, cotter
- 33 WASHER, cotter pin
- 34 ROD ASSEMBLY, control
- 35 SCREW, droop
- 36 NUT, droop screw
- 37 PIN, fulcrum lever bracket
- 38 LEVER, stop-gov
- 39 SCREW, set (2)
- 40 PLATE ASSY, spring
- 41 SPRING, operating shaft
- 42 BRACKET, fulcrum lever
- 43 SPRING, idle return
- 44 SHAFT, gov
- 45 GASKET, "O" ring-gov shaft
- 46 SCREW, gov top cover (3)
- 46A SCREW, gov top cover-lockwire (1)
- 47 GASKET, top cover screw (4)
- 48 COVER, top-gov
- 49 GASKET, top cover
- 50 SCREW, bridge (2)
- 51 WASHER, lock (2)
- 52 HOUSING, excess fuel
- 53 PISTON, inner
- 54 PISTON, excess fuel
- 55 SCREW, adjusting
- 56 SPRING
- 57 DISC, stop
- 58 RING, retaining
- 59 PLATE ASSY, stop
- 60 WASHER, tab
- 61 NUT, stop plate
- 62 PIN, locating-gov housing (2)
- 63 HOUSING, gov
- 64 WASHER, lock (6)
- 65 SCREW, fastening-gov (6)
- 66 SHAFT, operating-gov (6)
- 67 GASKET, "O" ring-operating shaft
- 68 WASHER, spacing-operating lever.
- 69 NUT, operating lever
- 70 WASHER, lock
- 71 WASHER, plain
- 72 LEVER ASSY, operating
- 73 WASHER, spacing
- 74 SCREW, operating lever
- 75 SCREW, drive-nameplate (2)
- 76 NAMEPLATE
- 77 RING, retaining-low idle screw
- 78 GASKET, "O" ring
- 79 NUT, securing-low idle screw
- 80 CAPSULE, low idle
- 81 SCREW, high idle
- 82 NUT, lock-high idle screw
- 83 GASKET, high idle screw
- 84 NUT, cap-high idle screw
- 85 SPRING, gov-inner (high idle)
- 86 SPACER, inner spring (AR)
- 87 GUIDE, spring-inner
- 88 SPACER, outer spring (AR)
- 89 SPRING, gov.-outer (low idle)
- 90 GUIDE, outer spring
- 91 GASKET — supply pump
- 92 GASKET, "O" ring
- 93 SUPPLY PUMP & HAND PRIMER ASSY
- 94 WASHER, lock (3)
- 95 SCREW, long
- 96 SCREW, short-lockwire (2)