

# SERVICE MANUAL

## GOV10/50 GAS ENGINE GOVERNOR

FORM GOV SM 8-07

**IMPORTANT  
SAFETY  
NOTICE:**

PROPER INSTALLATION, MAINTENANCE, REPAIR AND OPERATION OF THIS EQUIPMENT IS ESSENTIAL. THE RECOMMENDED PRACTICES CONTAINED HEREIN SHOULD BE FOLLOWED WITHOUT DEVIATION. AN IMPROPERLY INSTALLED OR OPERATING GOVERNOR SYSTEM COULD CAUSE PERSONAL INJURY TO OPERATORS OR OTHER NEARBY PERSONNEL.

**GOV10 SERIES**

GOV10EP-10  
GOV10EP-10A  
GOV10EP-11  
GOV10EP-11A  
GOV10EP-20  
GOV10EP-20A  
GOV10EP-21  
GOV10EP-21A

**GOV50 SERIES**

GOV50EP-10  
GOV50EP-10A  
GOV50EP-11  
GOV50EP-11A



# GOV10/50 GAS ENGINE GOVERNOR

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## **1.0 GOV SERVICE AND REPAIR MANUAL OVERVIEW**

The **GOV10/50 Gas Engine Governor** has been designed to provide reliable operation with a minimum amount of maintenance. To ensure optimum performance, periodic inspection and cleaning is necessary.

Preventative maintenance issues can be integrated into the current maintenance schedule of the engine. Most maintenance requires little effort and no downtime of the **GOV** valve.

Corrective maintenance is to be done when the **GOV Gas Engine Governor** begins to behave erratically. Procedures have been generated to cover most minor issues.

### **EXTERNAL VISUAL INSPECTION**

Inspect the exterior of the Governor for loose connections, frayed wires or major structural damage.

### **CLEANING**

Exterior cleaning will aid in the visual inspection of the external casing and ensure good connections. Ethyl alcohol or mild soapy water can be used as cleaning agents.

### **MAINTENANCE LOG**

To facilitate troubleshooting and to establish service schedules, a maintenance log should be kept on the Governor.

### **CALIBRATION**

Flow calibration of the **GOV** is performed in a controlled environment before shipment. Since calibration of the Governor requires equipment not normally available in the field, it is recommended that the device be returned to the Altronic distributor serving your area.

### **PILOT GAS FILTER**

The internal pilot gas filter, if installed, should be changed every six (6) months or more frequently if necessary.

Throughout this service manual, service parts will be identified by the item number assigned in the parts list in **SECTION 2.0**. For example, **(1a)** and its position inside the **GOV** device can be found by locating that item number on **FIG. 1A ON PAGE 4** or **1B ON PAGE 6** and identified in **SECTION 2.1 OR 2.2**.

### **GOV UPDATES:**

- In addition to the standard procedures, older **GOV10** units below **S/N 852** or **GOV50** units below **S/N 244** will require some items (such as the pressure transducers) to be changed. These items and procedures are identified by specific notes (“**When Updating Units below S/N 852**”) within the appropriate sections of the manual.
- In addition to the repair of malfunctioning units, instructions are given in **SECTION 7** which describe the process of updating an older **GOV** to the current configuration of PCB assembly.

### FIG. 1A PART IDENTIFICATION



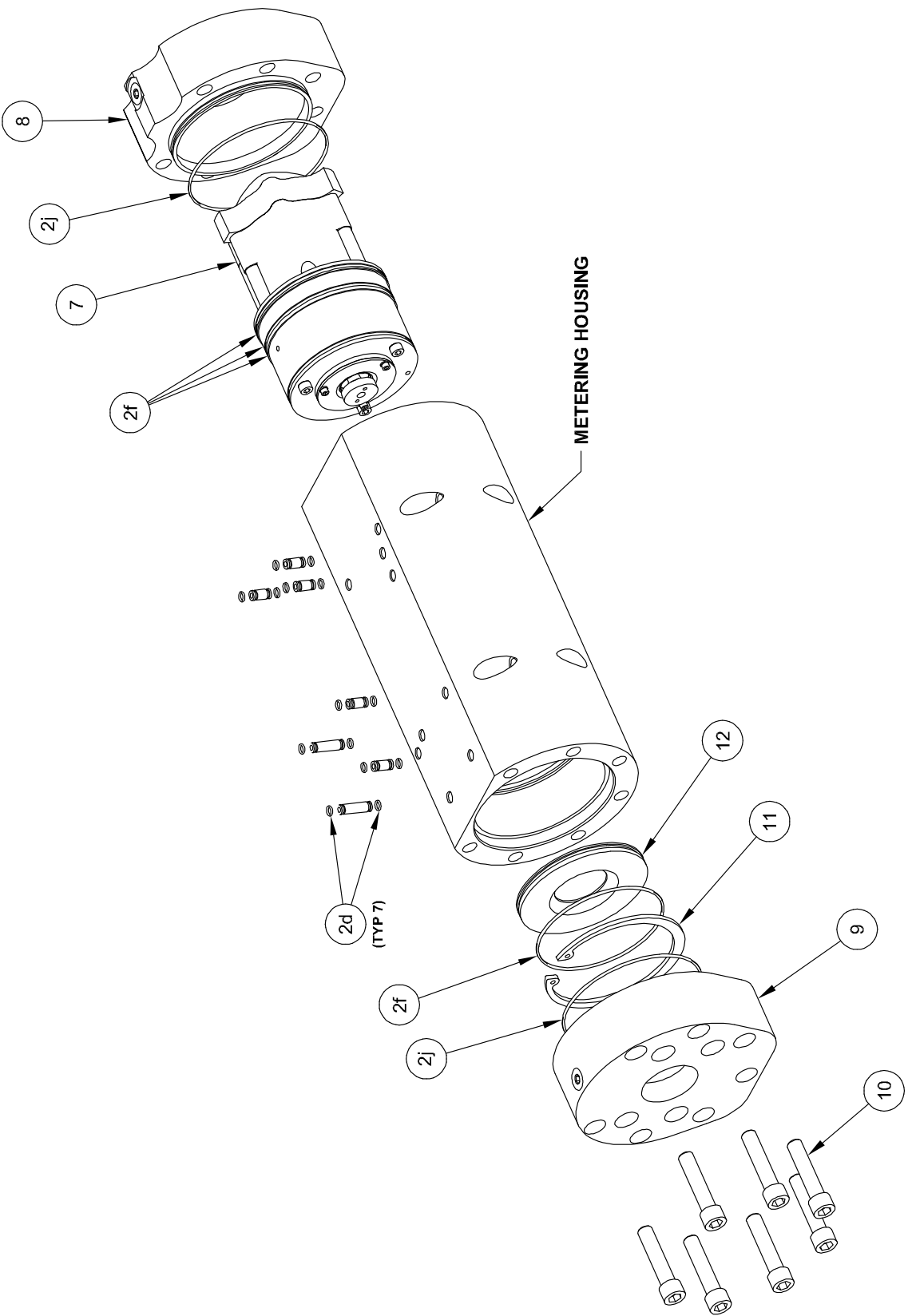
**2.0 PARTS IDENTIFICATION****2.1 PARTS LIST - GOV10** (Reference exploded view at left.)

ITEM NO.	QUANTITY	PART NO.	DESCRIPTION
1	1	881001-KT	PCB Field Retrofit Kit
1a	1	872002-1	PCB Assembly, Logic
1b	1	872003-1	PCB Assembly, Terminal
1c	1	802010-1	Label, Terminal Board
1d	5	610228	Standoff
1e	2	810103	Standoff
1f	1	810105	Standoff
1g	6	902598	Screw 6-32
1h	2	902650	Screw, 6-32
1i	1	510698	O-ring
1j	5	615048	Bumper-Adhesive backed
2	1	820002	Valve Repair Kit
2a	1	816000	Wrench
2b	1	810059	Servo Filter
2c	1	803020	O-ring Lube
2d**	16	810027	O-ring
2e	1	50110039	Plug
2f*	4	810042	O-ring
2g	1	810047	O-ring
2h	1	810050	O-ring
2i	1	810051	O-ring
2j*	2	810052	O-ring
2k	1	810082	O-ring
3	1	820004	Pressure Transducer Kit
3a	3	810109	Pressure Transducer
3b	3	810031	O-ring
3c	3	801005	Snap Ring
3d	1	810115	Spacer (req'd on some housings)
3e	1	803020	O-ring Lube
4	1	820005	dP Transducer Kit
4a	1	50102008	dP Transducer Assembly
4b	4	801049	Screw, 10-32
4c	1	803020	O-ring Lube
5	1	50105008	Regulator Assembly - GOV10
6	12	801084	Bolt, 1/4"-20 x 1.5"
7	1	810128	Flapper Shield

\* This item appears in **FIGURE 1B ON PAGE 6.**

\*\* This item appears in **FIGURE 1A ON PAGE 4 AND 1B ON PAGE 6.**

**FIG. 1B PART IDENTIFICATION**



**2.2 PARTS LIST - GOV10**

Reference exploded view at left.

ITEM NO.	QUANTITY	PART NO.	DESCRIPTION
2	1	820002	Valve Repair Kit
2a	1	816000	Wrench
2b*	1	810059	Servo Filter
2c	1	803020	O-ring Lube
2d**	16	810027	O-ring
2e*	3	810031	O-ring
2f	4	810042	O-ring
2g*	1	810047	O-ring
2h*	1	810050	O-ring
2i*	1	810051	O-ring
2j	2	810052	O-ring
2k*	1	810082	O-ring
7	1	880002	Poppet Valve Assembly
8	1	50106079-2	Flange, Inlet (4-bolt flange)
		50106039-2	Flange, Inlet (8-bolt flange)
9	1	50106079-1	Flange, Outlet (4-bolt flange)
		50106039-1	Flange, Outlet (8-bolt flange)
10	14	801028	Bolt, 3/8"-16 x 1.75" (4-bolt flange)
		801082	Bolt, 3/8"-16 x 0.75" (8-bolt flange)
11	1	801030	Snap Ring
12	1	50106029	Metering Orifice

**NOTE:** Part numbers for items 7-12 apply to GOV10 series only. Contact factory for information for the GOV50 series.

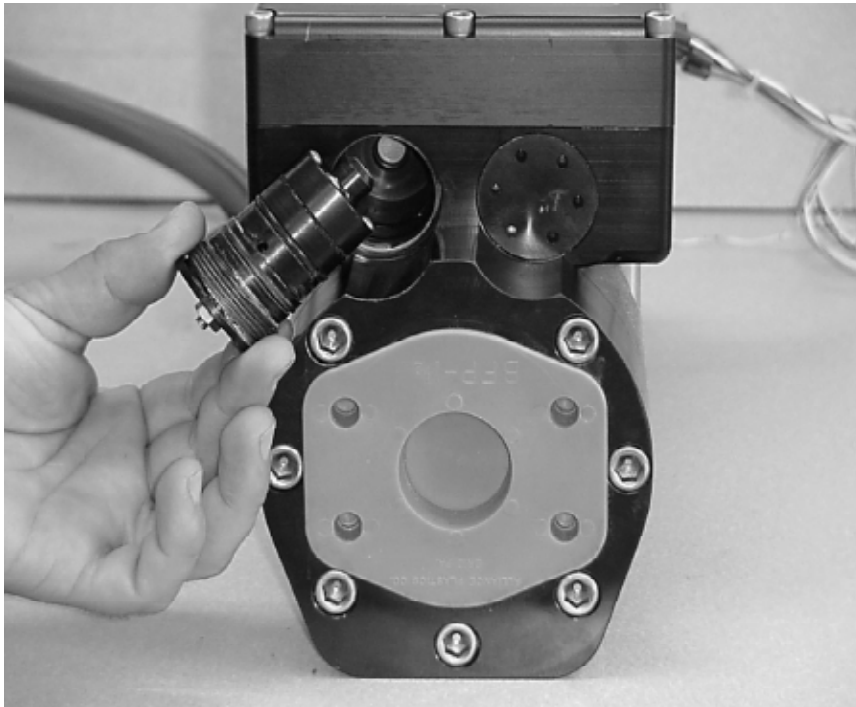
\* This item appears in **FIGURE 1A ON PAGE 4**.

\*\* This item appears in **FIGURE 1A ON PAGE 4 AND 1B ON PAGE 6**.

### 3.0 CLEANING OR REPLACEMENT OF PILOT FILTER

**3.1** The following section covers the replacement or cleaning of the pilot filter (2b). Before starting, it is recommended that a clean flat work surface be prepared and the proper tools be made available. Refer to **SECTION 2** for required parts. It is also recommended that the **Valve Repair Kit P/N 820002 (Item 2)** be purchased which contains all of the required items such as a spanner wrench, replacement O-rings, replacement filter and O-ring lube. **SEE FIG.1A ON PAGE 4** for location of parts. See the photo below for details.

- A. Using the spanner wrench (2a), apply pressure in a counter-clockwise motion and remove the regulator assembly (5).
- B. **DO NOT** remove the regulator adjustment screw and nut. If these are removed, the correct regulator settings (42 psid) cannot be reset without returning the Governor for re-calibration.
- C. Check to see that the regulator does not interfere with the end flanges. If there is no interference, continue to step E. If there is interference, the inlet flanges need to be removed (step D).
- D. Using a 5/16" Allen wrench, remove the 7 cap screws (10) holding the inlet flange (8) to the main body. Remove the flange (8).
- E. The filter O-ring (2k) and filter (2b) should now be visible.
- F. Carefully remove the O-ring (2k) for later use. Inspect the O-ring for cuts and abrasions before reuse. If there is any physical damage to the O-ring, it must be replaced.





- G. If you have a replacement filter (2b) and do NOT want to reuse the current filter, puncture the filter with a sharp object and remove it. Continue to step J.
- H. If the filter (2b) is to be reused, use a dental pick to carefully ease the filter out by its edges.
- I. Backflush the filter (2b) with stoddard solvent or other cleaner.
- J. Place the new or cleaned filter (2b) into the housing filter cavity, coarse side down.



- K. Place the O-ring (2k) in front of the filter to fasten it. When replacing or reusing an O-ring, the proper lubricant (2c) should be used at all times.
- L. Tighten the regulator assembly (5) using the spanner wrench (2a) in conjunction with a torque wrench set for 30 lb-ft of torque.
- M. If the end flange was removed, place a small amount of O-ring lube (2c) on the flange O-ring (2j) and re-install.

### 4.0 REMOVAL OF THE POPPET VALVE ASSEMBLY

REFER TO FIG. 1B ON PAGE 6

**4.1** The following will cover the removal of the poppet valve assembly (7) from the **GOV10 Gas Engine Governor**. The poppet valve assembly should not be removed from the **GOV50**. Since the **GOV10** center section is not serviceable in the field, a replacement assembly must be installed if on-site repairs are desired. If the poppet valve assembly (7) is removed for inspection or replacement, the O-rings (2f) may be damaged. The required O-rings (2f) are included in the Valve Repair Kit (2). The replacement poppet valve assembly (7) is sold separately. For the **GOV50** only, contact the factory with the model number and serial number of the **GOV50** if the poppet valve assembly requires service.

- A. Remove the GOV10 valve from the fuel line.
- B. Remove the outlet flange (9), being careful not to cut the flange O-ring (2j). If needed, tap the flange upward with a rubber mallet to ease removal.
- C. Using a pair of snap ring pliers, remove the steel snap ring (11).



**WARNING:** USE EYE PROTECTION AS THE SNAP RING CAN RELEASE OUT OF THE ASSEMBLY UNEXPECTEDLY.

- D. Using the soft, rubber coated side of the snap ring pliers, pry out the orifice metering plate (12). Do not damage the inner edge in any way.
- E. Remove the inlet flange (8) being careful not to cut the O-ring (2j). Again, tap the flange with a rubber hammer to ease removal.



**NOTE:** *The cone of the assembly, which does not have a cap screw, lines up with the control pressure inlet of the assembly.*

- F. Put a 2" diameter PVC pipe over the downstream portion of the center section. Using a rubber mallet, tap the PVC pipe until the center section is removed from the housing. Do not press or turn the poppet itself.
- G. Coat the three O-rings (2f) of the new center section with O-ring lubricant (2c).
- H. Insert the poppet assembly (7) into the valve body with the cone facing in the upstream direction.
- I. Align the control pressure inlet of the poppet assembly with the dowel insert of the control pressure transducer.
- J. Click the center section in place by providing sufficient downward force on the center section cone. In the field, this can be done by **CAREFULLY** standing on the cone portion of the center section when it is oriented vertically.
- K. Replace the inlet flange (8) - it has two ridges. Tighten down the 7 cap screws (10) to 6 lb-ft torque each.
- L. Apply O-ring lubricant (2c) to the orifice O-ring (2f). Firmly press the orifice plate (12) into the valve body at the outlet end. Ensure that the taper faces the downstream side of the Governor valve.
- M. Replace the snap ring (11).
- N. Replace the outlet flange (9). Tighten down the 7 cap screws (10) to 6 lb-ft torque each.
- O. Return the malfunctioning poppet valve assembly (7) to Altronic for repair.

### 5.0 REMOVAL OF DEBRIS FROM THE METERING HOUSING

- 5.1** Occasionally some form of foreign debris will get into the metering housing and become lodged inside. This will cause the GOV to malfunction in such ways as failure to shut-off (leakage) and incorrect transducer readings affecting governor accuracy. Any debris should be removed by using compressed air.
- A. Upon the removal of the poppet assembly (7) from the metering housing of the GOV, inspect the housing for any internal damage that may have occurred.
  - B. Shop air can be used to blow away and clean any loose particles that may have accumulated. DO NOT use any hard-edged instrument to clean the valve housing.
  - C. Holding the center section in hand, apply instrument air to the poppet assembly through the control pressure port (PC).
  - D. The poppet valve will open with 30 to 70 psi air applied. Do not exceed this range.
  - E. Using a soft edged device (i.e. popsicle stick, Q-Tip, etc), hold open the poppet valve. Do NOT use any hard-edged instruments (i.e. screwdrivers) as this will damage the assembly.
  - F. Ensuring that the poppet assembly is clear of debris, release the poppet valve.
  - G. Re-lubricate the O-ring seals (2f) of the poppet assembly (7) and reinstall as instructed.



**CAUTION:** DUE TO THE STRONG NATURE OF THE SHUTOFF SPRING WITHIN THE CENTER SECTION, DO NOT PLACE YOUR FINGERS NEAR THE POPPET VALVE IF IT IS IN AN OPEN POSITION.

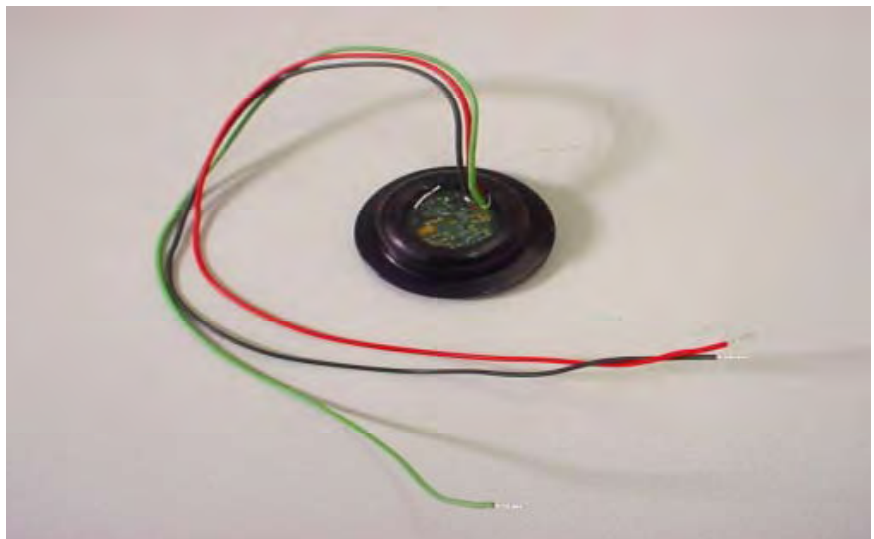
## 6.0 REPLACEMENT OF THE PRESSURE TRANSDUCERS

**6.1** Replacement of the three single point **GOV** pressure transducers (**3a**) can be performed in the field under the direction of the distributor or Altronic personnel. The three transducers (**3a**) are identical. One transducer kit (**3**) contains all necessary parts to change one transducer; if changing all three, three kits are required. The three transducers are identified on **FIG. 2 ON PAGE 15** as:

- Control pressure transducer - Ref. point **P3** on **FIG. 2**
- Outlet pressure transducer - Ref. point **P4** on **FIG. 2**
- Supply pressure transducer - Ref. point **P2** on **FIG. 2**

By replacing a transducer (**3a**) in the field, accuracy of the **GOV FLOW** measurement may be slightly affected due to the small variances in the transducers. To replace a transducer (**3a**), use the following procedure (**REFER TO FIG. 1A ON PAGE 4**):

- Remove the electronics housing cover by removing 12 bolts (6).
- Examine and make notes of the **GOV** electronic board assembly (1a) which show the wire routing and orientations.
- Unclip the affected transducer (**3a**) from the electronics board (1a) and unscrew the board (1a) from the circuitry housing. Do not remove more wires than necessary.
- Using snap ring pliers, remove the snap ring (3c) of the affected transducer (3a).
- With a small pry tool, remove the transducer (3a) from its housing.
- There is an O-ring (3b) placed on the underside of the transducer (3a). If this O-ring (3b) is damaged, it must be replaced.

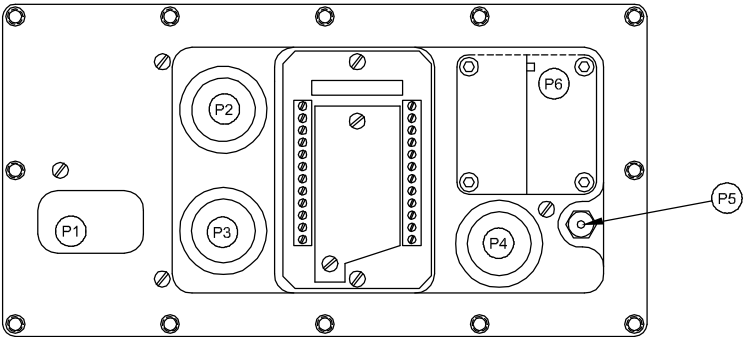
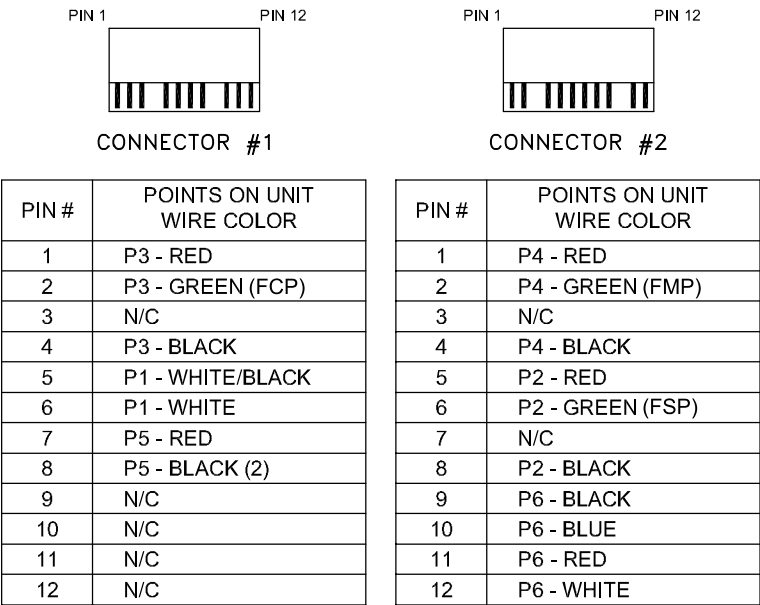


- G. Insert the new transducer (3a) into the appropriate position, taking care to have the O-ring (3b) in place within the cavity. Use the O-ring lubricant (3e) to help hold the O-ring (3b) in place.
- H. Re-insert the snap ring (3c) to hold the transducer in place.
- I. Using a paper clip to hold open the spring clip, insert the three wires coming from the pressure sensor into the plastic connector in proper order as shown in **FIG. 2**.
- J. If the differential pressure transducer (4a) requires replacement, remove it by removing the four mounting screws (4b). After the screws are removed the differential pressure transducer (4a) can be lifted straight up from the control housing. There are two small connecting tubes in the control housing when replacing the transducer (4a); be sure to carefully align these before pressing down on the new differential pressure transducer (4a) to install it.
- K. The differential pressure transducer (4a) connects to the PCB assembly (1a) through a plastic connector as detailed in **FIG.2**. Using a paper clip to hold open the spring clip, insert the four wires coming from the differential pressure sensor (4a) into the plastic connector in proper order as shown in **FIG.2** for Reference point P6.
- L. Attach the wiring to the electronics board (1a) in the proper orientation. **NOTE:** The red wire of the harness is on the downstream side of the Governor valve - see the flow label.
- M. Re-assemble the electronics board (1a) to the electronics housing.
- N. Install the electronics cover to the GOV. Do NOT allow any wires to become pinched when replacing the cover. Re-tighten the cap screws (6) to 40 in.-lb. torque. Maximum clearance between the cover and the housing is 0.0015".

**NOTE:** When updating GOV units with a serial number below S/N 852, the use of a spacer (3d) is required to hold the transducer in place with snap ring (3c). Spacer (3d) is installed on top of the transducer (3a) prior to the installation of the snap ring (3c) to effectively raise the height of the transducer to match the height of the older transducer housing.

FIG. 2 WIRING DIAGRAM FOR REPLACEMENT TRANSDUCERS

CONNECTOR WIRING



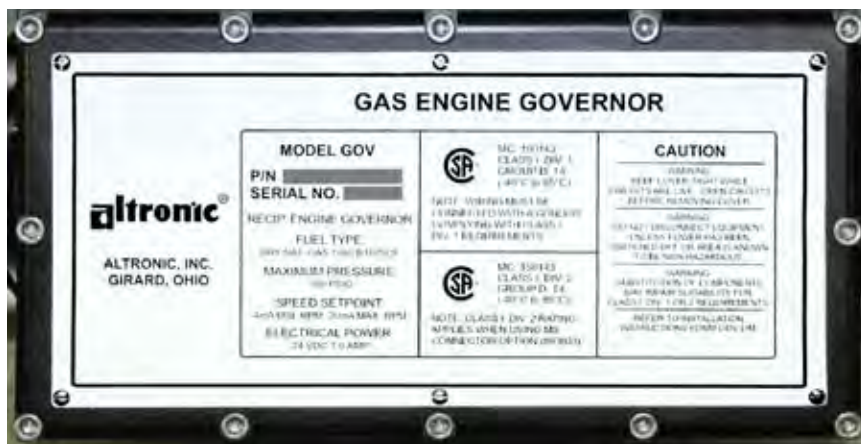
REFERENCE POINTS FOR WIRING CHART

## GOV10/50 GAS ENGINE GOVERNOR

### 7.0 INSTALL UPDATED PRINTED CIRCUIT BOARD ASSEMBLIES USING 881001- KT

- 7.1** Retrofit installation of new PCB assembly (1a) MUST include the replacement of the obsolete TCA-100 display module by the new GOV Display Module P/N 891002-1.
- 7.2** Retain all removed parts in a small plastic bag. These parts should be returned to Altronic, Inc. for exchange credit.
- 7.3** The following tools are required for the removal and installation of the PCB assembly: 3/16" Allen wrench, 1/4" nut driver or wrench, Phillips head screw driver, large sized paper clip, a screw holding screwdriver.
- 7.4** Removing the older style PCB assembly.
- A. Disconnect the power from the GOV system. After power is off, disconnect all field wiring at junction box.
  - B. Remove cover from GOV housing by removing the twelve Allen head cap screws (6) which secure it to the main body.

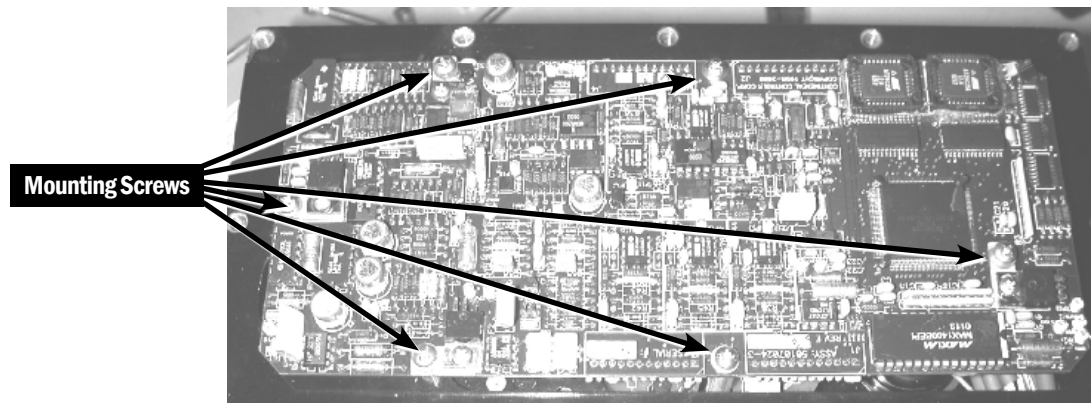
**NOTE:** When updating GOV10 units with S/N 852 or lower, the three obsolete pressure transducers (3a) MUST be replaced. The obsolete pressure transducers are identified by the presence of four wires rather than three. The obsolete transducers have a white wire in addition to the normal black, red and green wires currently used. See Section 5.



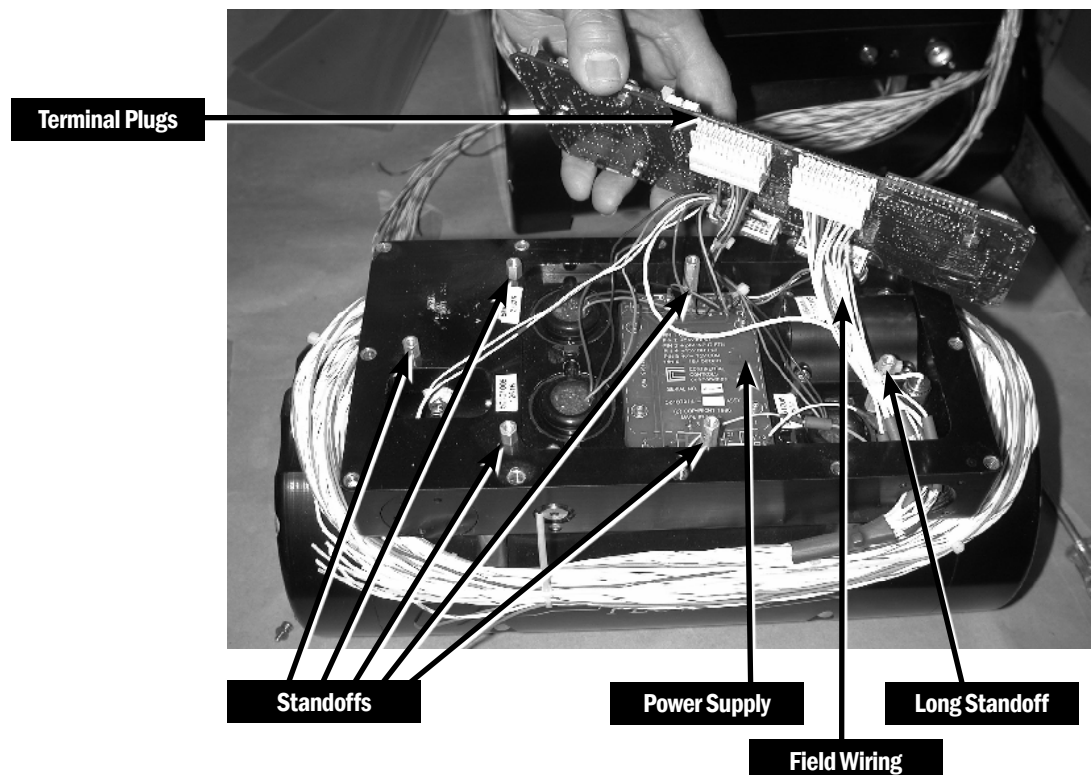
Allen Head Screws



- C. Remove the old PCB assembly by removing the six Phillips head screws which secure it to the control housing base. With the PCB assembly loose, unplug the four 12-position terminal plugs from the underside of the old PCB assembly.



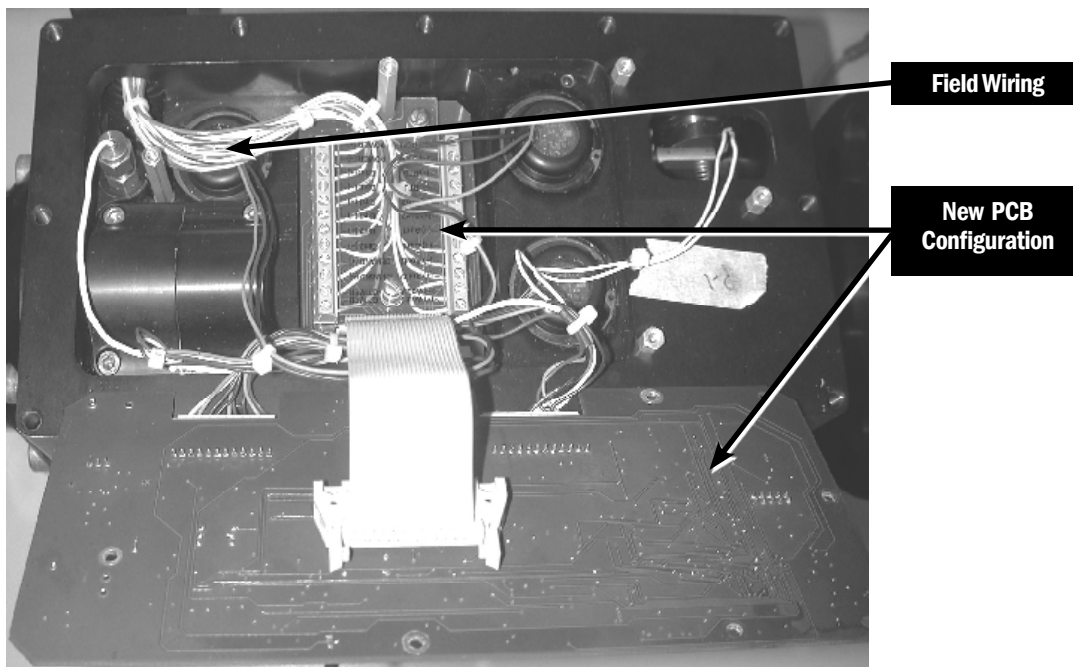
- D. Locate the three wires connecting the PCB assembly to the old power supply assembly colored solid orange, solid purple and solid blue. Remove these wires from the terminal plug they connect to. To remove these wires, insert a large sized paper clip into the hole above each wire. Slip these three wires out of the tied wire bundles. These wires will not be used with the new PCB assembly.



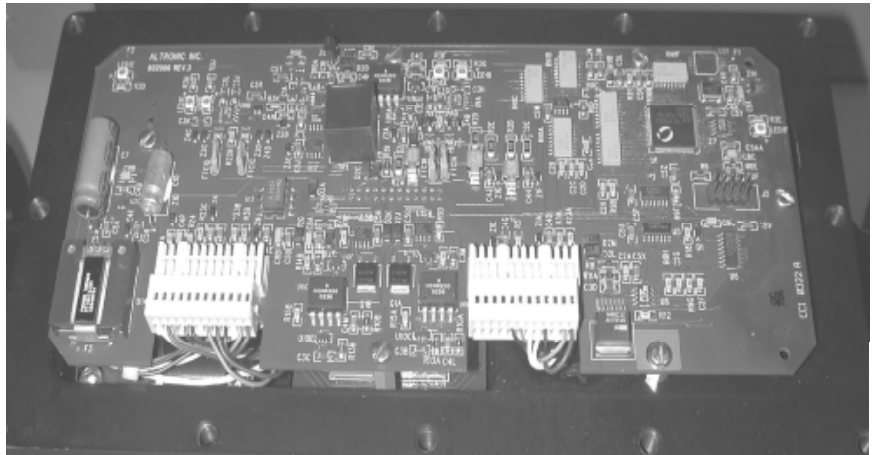
## GOV10/50 GAS ENGINE GOVERNOR

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- E. Remove the two standoffs next to the power supply. Remove the four small cap screws which hold the power supply to the valve housing. At this point, the power supply PCB and field wiring can be removed from the unit. To remove these items, pull the wiring back through the conduit opening. Bag these parts. The remaining two terminal plugs will be used to connect to the new PCB assembly (1a).
- F. Remove the remaining four standoffs and bag these parts. All of the standoffs will be replaced by new parts supplied with the PCB replacement kit, P/N 881001-KT (1).
- G. To install the new PCB assembly (1a), replace the older standoffs which were removed with the new standoffs supplied in 881001-KT (1). These standoffs are not the same length as the older parts. Install the 1.25" length standoff (1f) from the kit where shown. Install five of the short 0.25" length standoffs (1d) into the remaining standoff locations.
- H. Place the terminal PCB assembly (1b) into the cavity where the power supply was removed with the ribbon cable oriented as shown. Secure the terminal PCB assembly (1b) to the unit as shown with the two medium length standoffs (1e) which are 1.215" long. The male end of these standoffs goes through the terminal PCB (1b) and screws into the two smaller standoffs (1d) in the cavity where the old power supply board was removed.
- I. Reconnect the field wiring from the junction box to the terminal strip on the terminal PCB assembly (1b). See the attached wiring table and the GOV Operating Manual for details.
- J. After wiring is verified, secure the terminal board label (1c) with the screws (1h) provided in the kit.



- K. Insert the ribbon cable connector from the terminal board (1b) into the header on the bottom of the new logic board (1a). Plug the two remaining original 12-position plugs into the corresponding headers on the new logic board (1a). These plugs and headers are keyed and will only fit together properly with their assigned mating part.
- L. Dress the wires appropriately, taking care to not stress any connections or wires.



GOV with new PCB assembly

- M. Mount the new logic PCB assembly (1a) to the standoffs using the screws (1g) provided in the kit. Install and tighten all six screws.
- N. Replace cover and secure with the original twelve Allen head screws (6).

### 8.0 GOV PRESSURE SENSOR TROUBLESHOOTING

**8.1** The **FMP**, **FSP**, and **FCP** transducers are all the same part number and are interchangeable. If a transducer is suspected to be bad, the transducer output voltage can be measured with a digital voltmeter. The **RED** and **BLACK** wires are a **10vdc** power source, and the **GREEN** wire is the sensor output (sensor output voltage is measured on **GREEN +** with respect to **BLACK -**). The transducer output is **0 - 2.5 volts** from **0 to 260psi**. Since this is an absolute pressure transducer, it is normal for the unit to have a positive voltage output at **Opsig** (typically **0.10 - 0.15Vdc**). **FIG.2 ON PAGE 15** shows a pinout for the connectors for use in measuring and verifying the stability of these voltages. Be sure to zero the transducers using the display menu under **Sensor Configuration**, as well as using the **AutoZero** function when **V2.0** firmware is being used. Please refer to **SECTION 16.0** of the **GOV Operating Manual**, **FORM GOV OM 04-06** for details on **AutoZero (AZ)** functions.

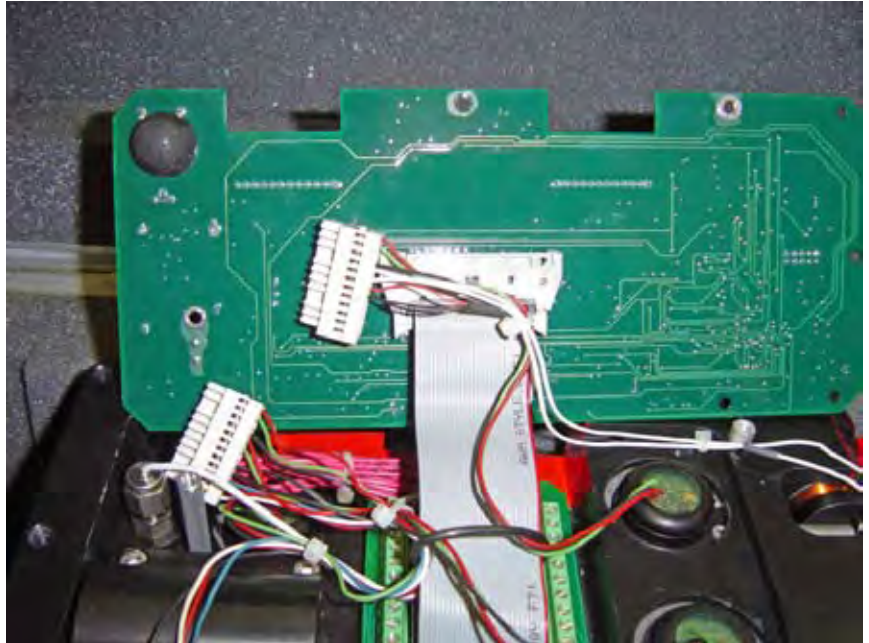
### 9.0 GOV-10/50 FIELD APPLICATIONS

**9.1** **GOV10/50 Gas Engine Governors** have proven their reliability and service on **Cooper**, **Clark**, **Ingersoll-Rand**, and other integral compressor engines. In recent years, many **GOVs** have been applied to a number of fuel-admitted engines in field compression applications, including a number of **Superior** models. These latter applications are more difficult because they are often subject to higher vibration and temperatures levels, as well as liquids and corrosives resident in the fuel gas. Operational problems encountered are sometimes seen as a pressure sensor offset or error (fuel supply, control, or manifold pressure). In areas of vibration, and the normal outdoor environment which is vented into the unit (the control housing has a flameproof vent to atmosphere and is certified for explosion-proof enclosures), a condition known as “thin film resistance” can occur on the pins of the plug in the PCB connector. This resistance acts as an insulator to the low voltage and low current sensor signals and is seen in operation as an error in the reported pressure. To improve the operation of these connections, a liquid solution known as **Stabilant 22** has made a remarkable improvement where these issues have been reported. **Stabilant 22** has been used in the aerospace, automotive, and computer industry for many years, and has been used on many sensor applications similar to those used in the **GOV**. Typically this product is used as **Stabilant 22A**, which is **4/5** isopropyl alcohol, allowing it to penetrate the connector and evaporate, leaving behind the connection enhancer. Any **GOV** which exhibits these issues can be easily improved by applying this product to these connectors. For more information on **Stabilant 22** go to [www.stabilant.com](http://www.stabilant.com). This product can be purchased in a **15mL** bottle (enough for hundreds of connectors) by ordering it at your local **NAPA** or auto parts store that sells **Standard Motor Products** (Niehoff). The **NAPA-Echlin** part number is **CE 1**, and the **Standard Motor Products** part number is **SL 5**. Both retail for about \$60. This product may have other applications where intermittent connectors have caused havoc in control and sensor systems.



## **10.0 BUMPER LOCATIONS FOR GOV**

**10.1** There is one bumper on the bottom of the PCB. **Stabilant** is added to both halves of the white connectors.



There are four bumpers inside the lid. Two of these align with the connectors. If the lid is flipped, the other two bumpers align with the connectors.

