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GAC APPLICATION NOTE (all of the components specified are sold separately).

Document Title:	**120 SERIES INSTALLATION INSTRUCTIONS AND PARTS LIST FOR CUMMINS ENGINE WITH CAV/DPA FUEL INJECTION PUMP** (REF. KT101)
Customer / OEM:	**Cummins**
Application(s):	Agricultural and Industrial Equipment (various)
Engine Make / Model / Displacement / Rating:	Cummins 4B (T) and 6B (T) Engines
Equipment Make / Model:	Varies by Application
Fuel System Type & Make / Model:	CAV/DPA Rotary Pumps
Operating Speed(s):	173 HP @ 2500 RPM, B5.9 99 HP @ 2500 RPM. B4.5 124 HP @ 2200 RPM, B3.9
Battery Voltage:	12 or 24V
Recommended Products:	KT101 Parts List Actuator – 120 Series Governor - ESD2210, ESD5111, ESD5500E or EEG6500 (Digital) Magnetic Speed Pickup - MSP6724, MSP6728C or similar by application

Summary The 120 Series installation instructions and parts list provides the necessary brackets and hardware to install a GAC precise Electronic Governor on a Cummins 4B(T) & 6B(T) Engine equipped with a CAV/DPA injection pump.

CUMMINS B SERIES ENGINE

GAC 120 SERIES ACTUATOR

KT101 PARTS LIST

PART NUMBER	DESCRIPTION	QUANTITY
BK110	Actuator Bracket	1
HW05-511	M10 -1.5 x 20 Bolt	3
HW06-602	M10 Lock-Washer	3
HW06-607	M10 Flat Washer	3
HW03-303	¼-20 Hex Nut	2
HW03-301	¼-20 Lock Nut	2
RD102 (cut to fit)	¼-28 x 12” plated linkage rod	1
BR200	¼-28 Bearing End	2
HW01-107	1/4 -20 x 1” Bolt	2
HW02-206	¼ “Lock Washer	2
HW02-207	¼” Flat Washer	2
HW03-300	¼”-28 Nut	2
EC05-02-0007	Solderless Spade Connector	2
EC05-02-0006	Solderless Splice Connector	1
SR103	11/16” Spacer	3
HW01-113	¼-20 x 1.5” Bolt	1
HW01-108	¼-20 x 2.5” Bolt	1
O.E.M. Part	Idling Spring, Mechanical Governor	1
O.E.M. Part	Governor Spring, Mechanical Governor	1

INSTALLATION INSTRUCTIONS

PRE-INSTALLATION (GENERAL)

- Disconnect the engine battery cables (negative connection first) to prevent accidental engine starting.
- The engine should be cool to avoid burns while installing the governor system.

PRE-INSTALLATION CAV/DPA FUEL PUMP MECHANICAL GOVERNOR MODIFICATION

GAC and CAV recommend replacing the idling and governor springs of the DPA fuel injection pump when applying external governors. This modification minimizes the influence of the pump’s mechanical governor on the external electric governor.

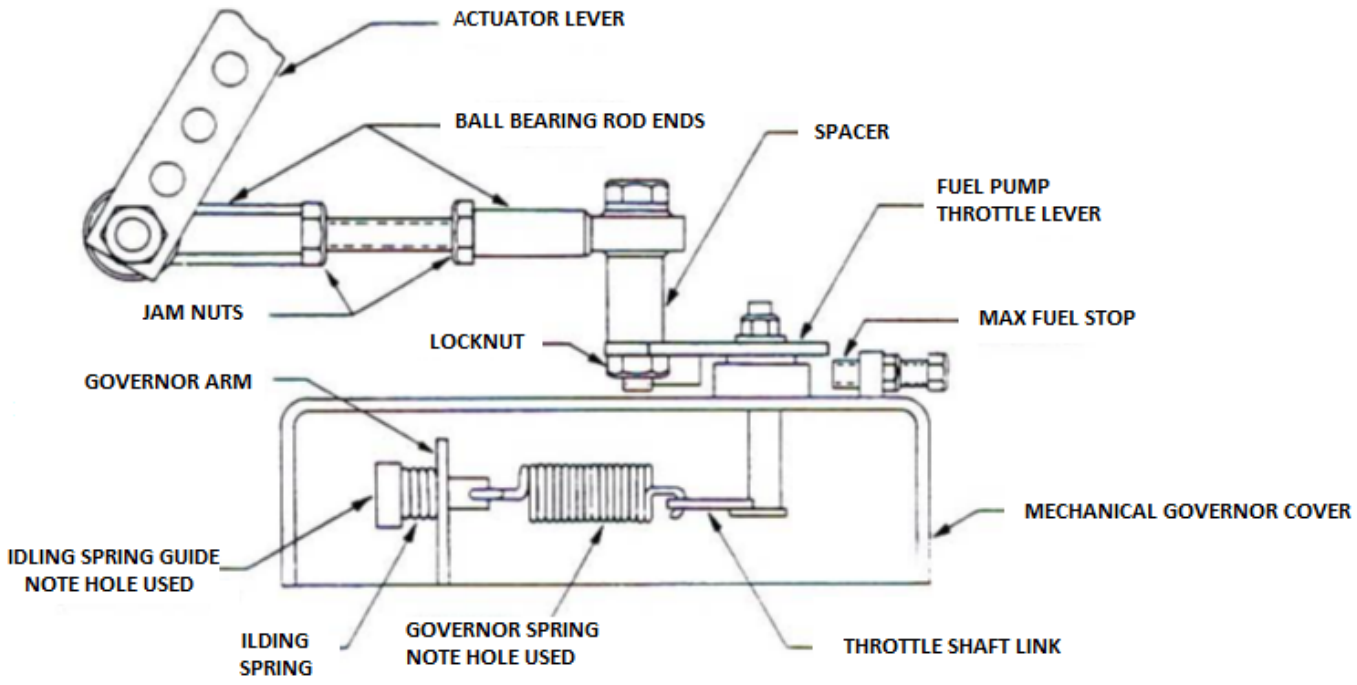
REFERENCING FIGURE 1:

1. Remove the external spring attached to the throttle lever.
2. Break the wire seal and remove the mechanical governor cover.
3. With the cover removed observe and record the connector locations of the Governor Spring. The replacement spring will be installed between those same connector parts. Also observe and record the hole position of the Idling Spring Guide. It will also be reinstalled in its original position on the governor arm.
4. Disconnect the Governor Spring from the Idling Spring Guide. Remove the Idling Spring Guide.
5. Remove the Idling Spring and install the replacement spring. Reinstall the Idling Spring Guide in its original

position on the Governor Arm.

6. Disconnect the other end of the Governor Spring from the Throttle Shaft Link and remove the Governor Spring.
7. Connect one end of the replacement Governor Spring to the original location on the Throttle Shaft Link.
8. The other end of the Governor Spring is connected to the Idling Spring Guide.

FIGURE 1

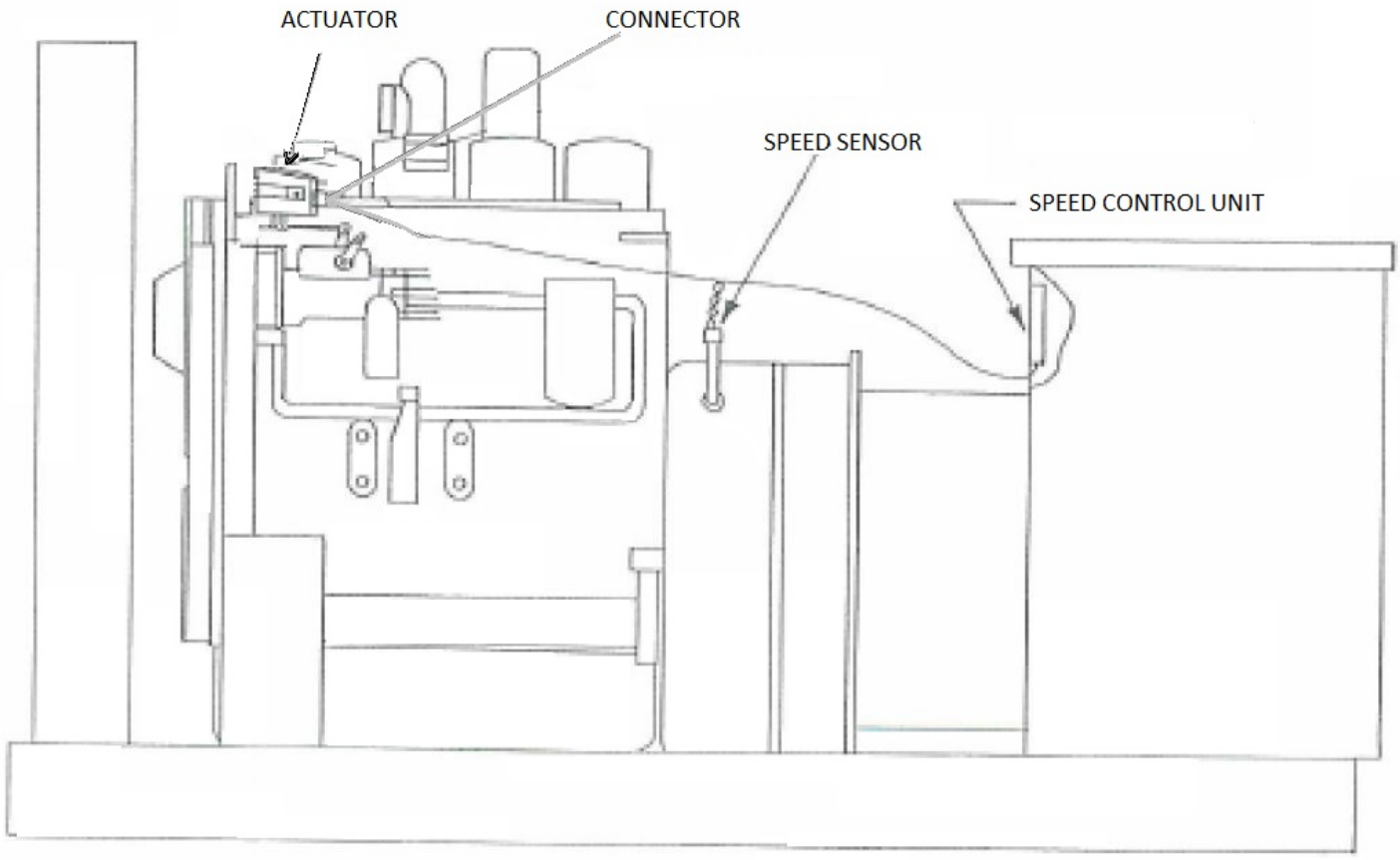


9. Replace the cover and cover parts removed in Step 2. Care should be taken to ensure that proper alignment is achieved between the pump fuels shut off lever “tang” and the cover slot and that the cover gasket is properly seated.

CAUTION:

The tang on the fuel shutoff lever and slot in the linkage must be properly engaged to prevent pump damage.

FIGURE 2



ACTUATOR INSTALLATION:

The Actuator bracket mounts in the vacant area on the forward part of the intake manifold above the fuel injection pump. The actuator must be positioned with its connector facing the rear of the engine and the label facing up. See figure 2.

1. Install the 120 series electric actuator onto the actuator bracket, using two ¼-20 x 1" bolts, flat washers, lock washers and nuts.
2. Mount the electric actuator and bracket on the forward part of the intake manifold, using three M10 x 1.5 x 20mm bolts, flat washers and lock washers. Tighten all bolts securely.

ACTUATOR LINKAGE ASSEMBLY:

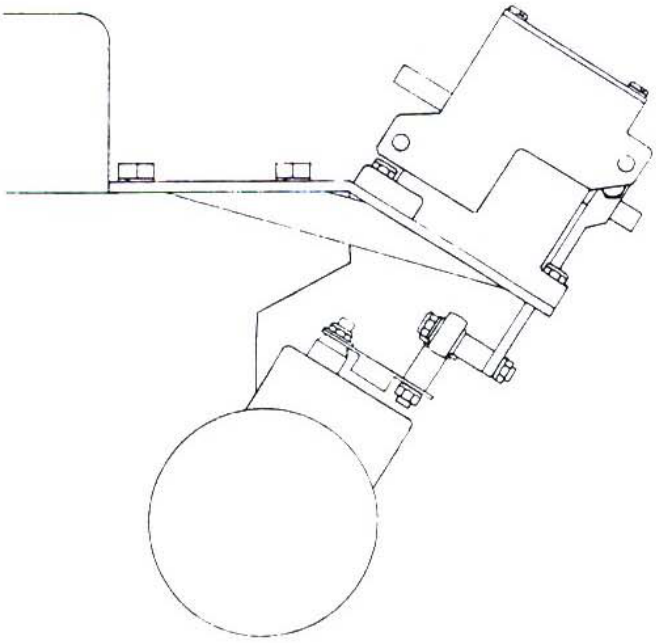
1. Thread a ¼-28 jam nut onto each end of the linkage rod. Thread a Ball Bearing Rod end approximately ½" on to each end of the rod. Adjust the Rod ends so that their hole centers are perpendicular to each other and the distance between them is 4".
2. Attach one end of the linkage rod assembly to the fuel pump shut off lever using a spacer, ¼-20 x 1.5" bolt and locking nut. See figures 1 and 3.
3. Hold the fuel pump throttle lever in the no fuel position (toward front of engine). Slide the actuator lever, flat side away from the actuator, onto the actuator shaft so that the last hole from the shaft is aligned with the ball bearing rod end hole. Push the lever onto the shaft until the lever is flush with the end of the shaft. If necessary, slightly adjust the

length of the linkage. Adjust the lever on the shaft until the linkage is vertical. Attach the linkage to the inboard side of the actuator lever with two spacers, ¼-20 x 2.5" bolt and lock nut.

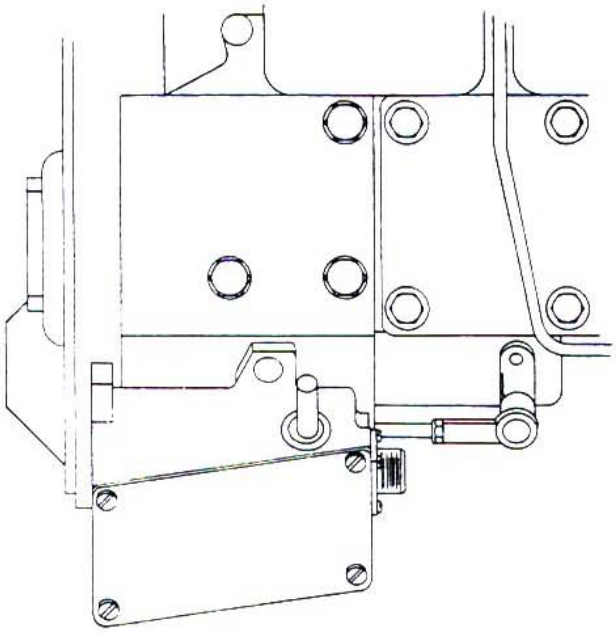
4. Move the linkage assembly thru its full travel. There should be no friction or binding in any position. Pull the actuator lever and linkage to its full fuel position (up) and release. The assembly should snap back to the no fuel position without binding.
5. Recheck all fasteners.

FIGURE 3

FRONT VIEW



TOP VIEW



SPEED CONTROL UNIT INSTALLATION GUIDELINES:

1. Mount the Speed Control Unit in the engine control cabinet or engine mounted enclosure.
2. If water, mist or condensation can come into contact with the controller, it should be mounted vertically.
3. Extreme heat should be avoided!
4. Site selection should allow access to the speed control unit adjustments.
5. The speed control unit case mounting holes can be used as a template for drilling holes.

MAGNETIC SPEED SENSOR INSTALLATION:

1. Remove the plastic plug from the tapped hole in the engine bell housing.
2. If there is no hole, drill and tap the engine bell housing. The hole must be located perpendicular to the crankshaft centerline and centered over the flywheel.

3. Rotate the engine ring gear until a tooth crown is in the center of the tapped hole.
4. Thread the Magnetic Speed Sensor into the tapped hole until it bottoms on the ring gear tooth. Back the sensor out ½ turn and secure the lock nut.

GOVERNOR SYSTEM WIRING:

See specific Speed Control Unit publication for connection information.

1. Connect the electric actuator harness to the actuator. Cut the harness to length. Attach the solderless spade connectors and attach to the ACTUATOR terminals of the Speed Control Unit.
2. Take and cut the Magnetic Speed Sensor harness to length and connect it to the Speed Control Unit with 2 solderless connectors at the Pick-up terminals.
3. Install wire leads from the battery (-) and (+) to the BATTERY input terminals of the Speed Control Unit using solderless spade connectors. Battery polarity must be observed. Fuse protection on the battery (+) of 15 amps is recommended.

OPTIONAL SPEED CONTROL:

Panel mount and wire the speed trim potentiometer available from GAC. Connect the terminals of the potentiometer to the Speed Control Unit.

SPEED CONTROL UNIT ADJUSTMENT

1. Remove the protective covers over the adjustments on the Speed Control Unit.
2. Check to ensure that the GAIN and STABILITY adjustments are in their mid-positions.
3. If used, set the optional external speed trim control to its mid position
4. Start the engine and rotate the engine SPEED adjustment to the desired engine speed (this is a 25 turn potentiometer). Clockwise adjustment increases engine speed.

GOVERNOR PERFORMANCE ADJUSTMENTS:

1. Rotate the Gain adjustment clockwise until instability develops. Gradually move the adjustment counter-clockwise until stability returns. Move the adjustment 1/8 of a turn further counter-clockwise to ensure stable performance.
2. Rotate the STABILITY adjustment clockwise until instability develops. Gradually move the adjustment counter clockwise until stability returns. Move the adjustment 1/8 of a turn further counter-clockwise to ensure stable performance.
3. Gain and stability adjustments may require minor changes after engine load is applied. Normally adjustments made under no load conditions achieve satisfactory performance. If instability cannot be eliminated, or further performance improvements are required, refer to the Trouble Shooting Sections of the Speed Control Unit or Actuator publications.
4. Apply full load to the generator set. If it will not carry full load, stop the engine and shorten the linkage rod by turning the ball bearing rod ends in. Repeat the load test. It may be necessary to back out the maximum fuel stop screw on the operating and/or the shut off levers until full load is reached.

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Parts for Complete Installation		
ITEM	**DESCRIPTION**	**QUANTITY**
KT101	Installation Kit	1
ADC120S-12 or 24	Electronic Actuator	1
ESD5111 or ESD5500E	Analog Speed Controller	1
MSP6718 or MSP6724	Mag-Pick-up	1
	OPTIONS	
TP501	5K-1 Turn Potentiometer	1
EEG6500	Optional Digital Speed Controller	1

