275 Series
Integrated Pump Mounted Electric Actuator

1 INSTALLATION

⚠WARNING

If the pump is equipped with a mechanical governor, it must be removed. GAC recommends that the modification be done by a qualified fuel injection shop. The following steps are a generalized procedure.

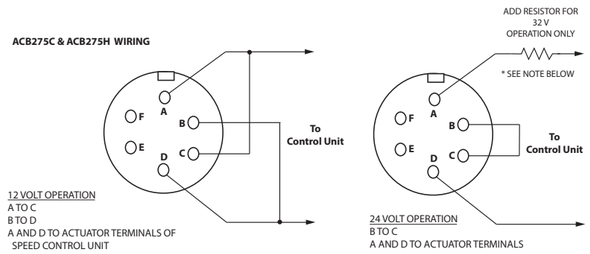
Preparing the Fuel Injection Pump
1. Remove the rear housing of the mechanical governor and disconnect the governor assembly from the fuel rack.
2. Remove the flyweight assembly.
3. Remove the intermediate governor housing, this leaves only the rack and camshaft protruding from the housing.
4. Install the appropriate camshaft bearing retainer kit. This kit includes the correct shims to ensure that the retainer plate rests on the bearing and also prevents oil from leaking out around the camshaft. Camshaft Bearing Retainer Kits Bosch P3000 Pump……..KT275 Bosch RP21 Pump…….KT278 with RB Plate Bosch P7000 Pump……..KT276 Bosch RP21 Pump…….KT278-1 See PIB2031 for retainer kit installation details.
5. Located on the pump between the fuel rack and the camshaft, the oil hex plug may be removed to allow any oil, leaking from the fuel rack, to drain back into the pump.
NOTE: Removal of oil from the mechanical governor is required.

Installing the Actuator	
1.	Remove the four screws that fasten the top cover (with label) to the actuator and expose the linkage used to connect the actuator to the fuel rack.
2.	Remove the screw that attaches the ball bearing rod end to the lever. Do not remove or loosen the lever from the actuator shaft.
3.	The opposite end of the linkage must be attached to the top of the fuel rack with the screw and lock nut provided. Tighten the screw and nut securely to 4.0 – 4.5 Nm. The linkage is preset to a specific length and locked. Any adjustment of rack travel must be made using the slot on the actuator lever.
4.	The gasket supplied in the installation parts kit fits between the actuator and pump. Clean the mounting surfaces of the actuator and the pump on one side of the gasket to the actuator. A small amount of gasket sealant, such as RTV silicone, is recommended for the pump side of the gasket.
5.	Loosen the two M8 hex nuts that hold the lower mounting bar to the actuator.
6.	Place the actuator over the rack and linkage. Fit the lower part of the actuator onto the bearing retainer plate. Attach the actuator to the pump with four M5 22mm screws and washers through the upper mounting holes. Tighten these screws securely to 9 Nm so that the gasket is compressed evenly.
7.	Push the lower mounting bar against the bearing retainer plate and tighten the two M6 nuts onto the studs, which reside in the pump, to 10 Nm.
8.	Tighten the two M8 nuts on the studs that hold the mounting bar onto the actuator to 20 Nm.
9.	The linkage attached to the fuel rack must be free when moved from shut off to full fuel. Pull the linkage fully away from the pump. Push the linkage 1mm toward the pump and attach it to the slot in the actuator lever with the M5 screw, two flat washers and locking nut. Tighten securely to 4 Nm. The fuel rack should be 1mm or less away from its internal physical stop. The zero fuel stop of the system will now be provided by the actuator instead of inside the fuel pump.
10.	Manually move the actuator lever and linkage through its full range of motion. No binding should be noticed. The stop plate on the linkage must not contact the inside of the housing.
11.	A maximum fuel stop adjustment is located on the actuator lever. The set screw and lock nut may be adjusted to limit the travel of the fuel rack.
12.	Push the linkage to the full fuel position and operate the manual shut off to insure that the shut off lever correctly contacts the stop plate and forces the linkage to zero fuel.
13.	After the maximum fuel delivery has been adjusted on an engine or dynamometer, the top cover may be installed. Place the special sealing screw in the lower left hand corner. Lockwire the two covers together to prevent tampering.

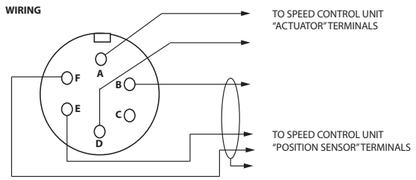
2 WIRING

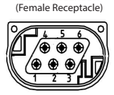
The EC1000 or EC1010 electrical connector that mates with the actuator must be pre-wired in a configuration to match the system voltage. Cable Harnesses CH1203, CH1215, & CH1515 are available from GAC. Refer to MATING HARDWARE in the Specifications Section.

CABLE HARNESS	
Fabricate a cable harness to connect the speed control unit to the actuator. The recommended wire size of the cable harness is:	
#16 Gauge (1.5 mm²)	12 Volt System
#18 Gauge (1.0 mm²)	24 Volt System
NOTE: Larger gauge wire will be necessary for cable lengths greater than 12ft. (4m).	



NOTE: For 32 V operation, wire the connector as shown for 24 V operation and add a 1.5 ohm, 25 V resistor in series with pin A of the actuator connector and the corresponding output terminal of the speed control unit.





The ACB275F-12 & ACE275K version of the actuator includes a rack position sensor. A GAC speed control unit that includes fuel management electronics is required to interface with this sensor. See the appropriate speed control unit literature for wiring information.

HARNESS	
PIN	SIGNAL
1	+5V
2	GND
4	OUT

3 TROUBLESHOOTING

⚠CAUTION

The engine should be equipped with an independent shut down device to prevent overspeed which can cause equipment damage or personal injury.

If the governor system fails to operate, make the following tests at the actuator mounted connector while moving the actuator through its stroke.

TROUBLESHOOTING TEST
Energize the actuator to full fuel (follow steps in control unit publication and manually move the actuator through its range using the stop lever. No binding or sticking should occur. If the actuator passes three tests, the problem is elsewhere in the system. Refer to the troubleshooting section the speed control unit's literature.

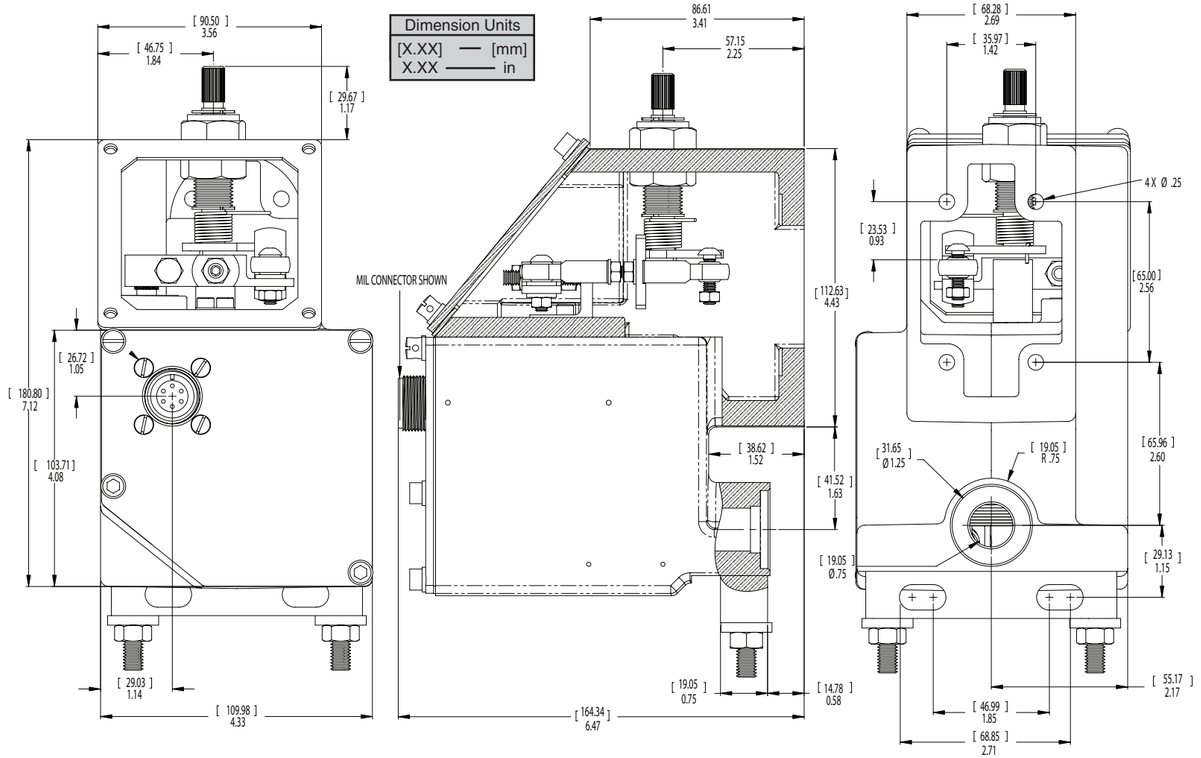
MEASURING THE RESISTANCE	
TERMINALS	RESISTANCE
A to B	2.5 Ohms
C to D	2.5 Ohms
A to C	Infinity
A to Housing	Infinity
C to Housing	Infinity
E to F	Infinity

4 SPECIFICATIONS

PERFORMANCE	
Force	13.2 ft-lb max (58.7 N)
Operating Stroke	0.79 in max (20 mm)
POWER INPUT	
Operating Voltage	12 or 24 VDC
Normal Operating Current	3.0 Amps @ 12 VDC 1.5 Amps @ 24 VDC
Maximum Current Continuously Rated	9.0 Amps @ 12 VDC 4.5 Amps @ 24 VDC
ENVIRONMENT	
Operating Temperature Range	-40°F to +185°F (-40°C to +85°C)
Relative Humidity	up to 100%
All Surface Finishes	Fungus Proof and Corrosion Resistant

PHYSICAL	
Dimensions	See Below
Weight	11 lb (4.9 kg)
Mounting	Directly on 'RP', 'P' 3000 and 'P' 7000 Bosch fuel injection pumps in place of the mechanical governor. Requires camshaft bearing retainer kit.
MATING HARDWARE	
Connector - ACB	EC1000 or EC1010
Shut-Off Lever - ACB, ACE	LE1400-4
Wiring Harness - ACB	CH1203, 12 ft (4 m)
Wiring Harness - ACE275K	CH1515 and CH1215
Wiring Harness - ACE275	CH1215

5 OUTLINE & DIMENSIONS



6 OPTIONS

ESD 5330
Analog Speed Control

- Dual Gain
- Soft Coupling
- Adjustable PID
- Speed Ramping

The all electronic ESD 5300 Series speed control delivers a quick and precise response to transient load changes. When coupled with a proportional electric actuator and a magnetic speed sensor, the ESD will control a wide variety of engines operating in an isochronous or droop mode. Armed with high quality components, the ruggedly designed ESD will endure the harshness of any industrial engine environment.