

Power Drive Systems

Generator Control Specialists

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ACE175 SERIES ELECTRIC ACTUATOR

INTRODUCTION

The ACE175 Series electric actuator is designed to mount directly on a Bosch "P" size fuel injection pump, with a right hand rack in place of the mechanical governor. When the ACE175 is installed on the fuel pump, an optimum performance, long life fuel control system results. An external fuel shut off lever is provided to manually override the actuator's control. Also provided is an adjustable internal maximum fuel limit.

The ACE175 can control fuel pumps of up to 8 cylinders. The actuator was designed with two isolated chambers. The upper chamber is wet with oil and contains the connection to the fuel rack and an optimal manual shut off mechanism. The sealed lower chamber contains the electromagnetic components.

This design eliminates the possibility of magnetic particles or other oil contaminants interfering with the operation of the electric actuator. Unreliable devices such as bellows and sliding seals are not used so that no maintenance is required. The designed life of the actuator is typically longer than that of the engine.

Available actuator models:

- ACE175-12 (12V w/o manual shut off)
- ACE175-24 (24V w/o manual shut off)
- ACE175A-12 (12V w/manual shut off)
- ACE175A-24 (24V w/manual shut off)

The 175 Series actuator can also be supplied with a position sensor that allows the actuator to be used in a fuel management system.

SPECIFICATIONS

PERFORMANCE

Force....(see Figure 1).....	6.2 lb. (27.5 N)
Operating Stroke	0.80 in. (21 mm)
Response Time (10-90%, 2-19mm).....	35 msec

ELECTRICAL POWER INPUT

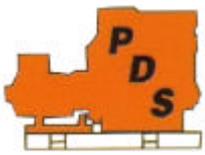
Operating Voltage	12 or 24V DC
Nominal Operating Current	12V DC version.....4.0 A
	24V DC version.....2.0 A
Maximum Current	12V DC version.....5.8 A
	24V DC version.....3.1 A

ENVIRONMENTAL

Operating Temperature.....	-40 to +95°C (-40 to +200°F)
Relative Humidity	up to 100%
Vibration.....	20g, 20-500 Hz
Shock.....	20g @ 11 msec

PHYSICAL

Dimensions	See Figure 2
Weight	4.75lb (2.2kg)
Mounting	Requires camshaft bearing retainer kit
	P3000 pump.....KT275
	P7000 pump.....KT276



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INSTALLATION

Preparing the fuel injection pump

If the fuel injection pump is equipped with a mechanical governor, it must be removed. GAC recommends that this modification be performed by a qualified fuel injection service facility. The following procedure lists the general steps required to remove the mechanical governor.

NOTE: Be prepared to collect the oil that will be released from the mechanical governor.

1. Remove the rear housing from the mechanical governor and disconnect the governor linkage from the fuel rack. Remove the flyweight assembly. A special tool is required.
2. Remove the intermediate governor housing. This leaves only the rack and camshaft protruding from the pump.
3. Install the camshaft bearing retainer plate to provide support to the bearing formerly held by the governor housing. This plate must have countersunk holes for the mounting screws.

Installing the actuator

All hardware needed to attach the actuator to the pump is located in kit KT289 supplied with the actuator.

1. The mounting surface of the pump must be clean and ready to accept the electric actuator.
2. Place the spring seat (1) over the fuel rack and slide it down to the body of the fuel pump. Slide the rack return spring (2) over the fuel rack and against the spring. Attach the rack connection link assembly (4,5,6,29) to the fuel rack with 2 M5 X 10 retaining screws (3) that include patches of locking adhesive. Tighten the screws to 3-4 NM.
3. Remove both actuator covers (25,28) and swing the armature out of the actuator so that the lever (7) is out of the way. Place two M6 X 16 screws (22) and two spring washers (24) in the two lower mounting holes inside the actuator. Remove the adhesive protector from the gasket (23) and place it over the screws and adhere it to the mating surface of the actuator. Carefully slip the actuator over the fuel rack assembly until the two lower screws just start to meet the fuel pump mounting holes. With a ball end Allen screw wrench, tighten the two lower mounting screws (22) each a few turns. Once these two screws are fully threaded (do not tighten at this time) into the housing, thread two more M6 X 16 screws (22) and spring washers (24) into the two top mounting screws of the actuator. Tighten the four mounting screws to 5-6 NM.
4. Verify that the fuel rack is as far out of the pump as possible. Replace the lower actuator cover (28) and tighten the screws (27) to 4-6 NM. Carefully loosen the screw (14) and nut (18) holding the bearing (17) onto the lever so that the bearing can slide in the lever's slot. While pulling back on the lever, slide the bearing forward until it just contacts the fuel rack connector, then push the bearing slightly forward, about 1mm. Tighten the bearing mounting screw (14) to 4-6 NM.
5. Inspect the assembly to make sure all screws are tight and the fuel rack moves smoothly without any binding. Push in the fuel rack manually to full fuel and move the fuel shut off lever to minimum fuel to confirm that the shutoff fuel lever contacts the metal plate (29) on the fuel rack connector assembly and forces the fuel rack to minimum position.
6. The lever has a maximum fuel adjustment set screw (8). This screw is used to restrict the fuel rack from 1 to 14.5mm.

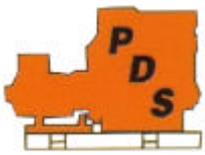
CAUTION: setting the fuel levels above 14.5mm can cause the screw to hit the back cover, which can restrict minimum fuel. This can lead to a dangerous condition. Do not operate the engine this way. Fuel levels above 14.5mm require a shorter stop screw, M6 X 25mm.

With the fuel pump operating on the engine, the maximum fuel setting can be set to provide specific horsepower.

Once this setting is made tighten the lock nut (9) on the stop screw to 5-6 NM.

7. Move the manual shut off lever to the stop position and insure that the fuel is completely shutoff and the engine stops.
8. With the engine shut down, install the upper chamber cover (25) with the four screws (19,27) and lock washers. Note that when installed, the cover must not hit the internal lever or its stop screw. Tighten the screws to 2-3 NM. Check for any oil leaks. Lock wire the screws for tamper resistance.

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

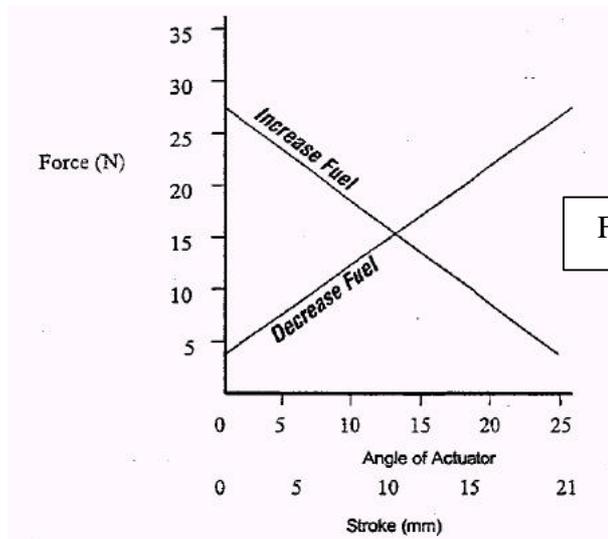
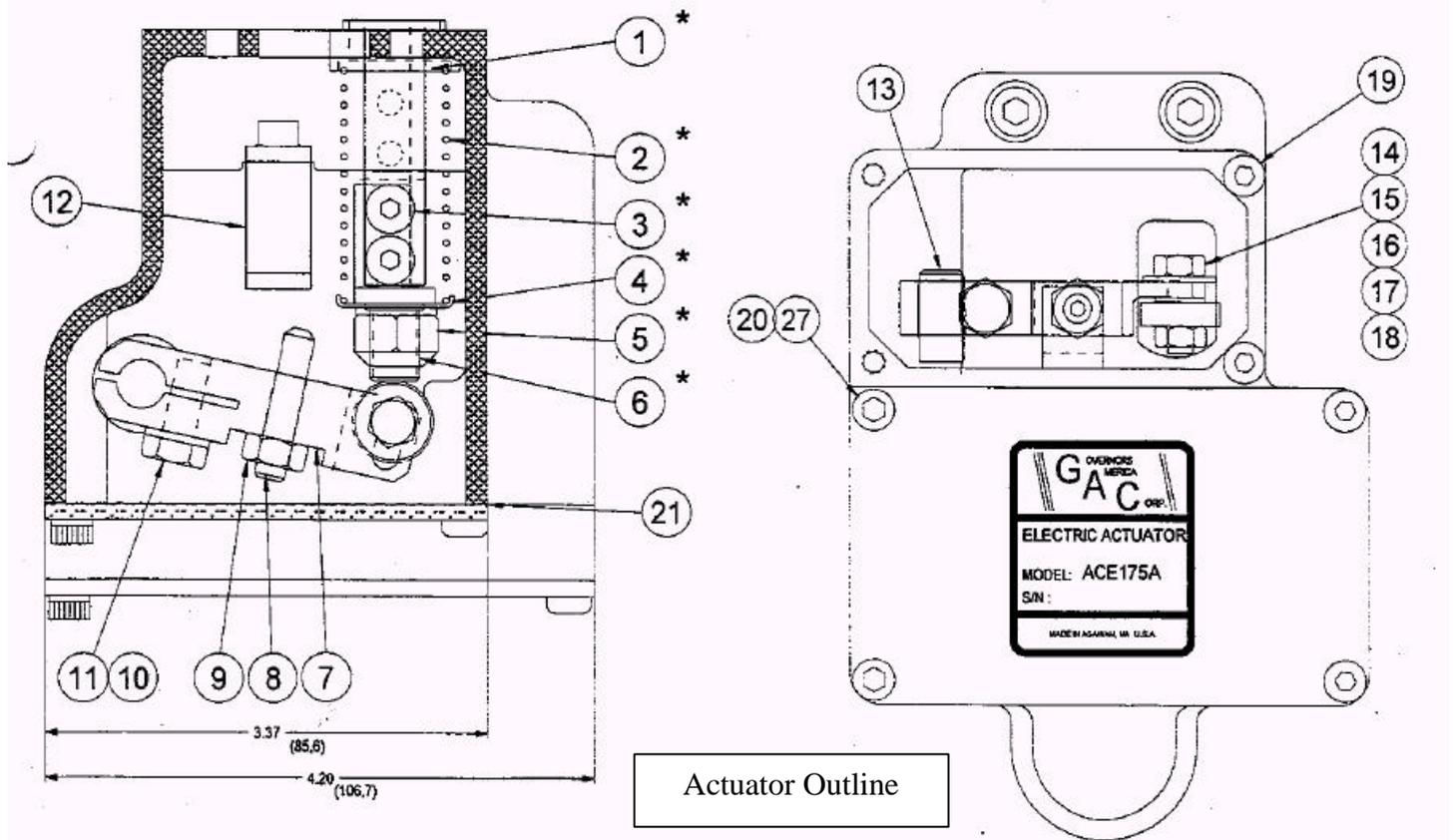


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WIRING

The ACE175 actuator is pre-wired for 12 or 24V DC operation. Use the included cable harness to connect the actuator to the speed control unit. The cable may be lengthened as necessary to fit the specific application. Use a comparable size wire to extend the cable harness. **DO NOT** use an ACE175 on a 32V system, contact supplier for assistance.



Fuel Rack Force vs Stroke

