AMBAC INTERNATIONAL

Quality System Certification

Model AR3200 Electric Actuator for Bosch PEP Pumps

INTRODUCTION

The AR3200 electric actuator is designed to mount directly on a Bosch "P" size fuel injection pump in place of the mechanical governor.
An external fuel shut off is provided to manually override the actuator's control of the fuel rack. Also provided is an adjustable internal maximum fuel limit.

The actuator was designed with two isolated chambers. The upper chamber is wet with oil and contains the actuator linkage. The lower chamber contains the electro-magnetic components. The design eliminates the possibility of any magnetic particles collecting and jamming the actuator.

INSTALLATION

Preparing the Fuel Injection Pump

If the pump is equipped with a mechanical governor, it must be removed. It is recommended that a qualified fuel injection shop do the modification. The following procedure is only intended to be a guide for a technician. Several types of mechanical governors are made for the "P" size pump. These steps are a generalized procedure.

NOTE: Be prepared to collect the oil that is in the mechanical governor.

1. disconnect the governor assembly from the fuel rack.
2. Remove the flyweight assembly with a tool like the one shown in diagram 1.
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 insure that the retainer plate rests on the bearing and also prevents oil from leaking out around the camshaft.

   Camshaft Bearing Retainer Kits
   3000-pump.....KT413882
   7000-pump.....KT413883
5. The oil drain hex plug located on the pump between the fuel rack and the camshaft must be removed to allow any oil, which leaks from the fuel rack to drain back into the pump.

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 pump. One side of the gasket is coated with adhesive. Peel off the backing and attach 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 securely to 9Nm so that the gasket is compressed evenly.
7. Push the lower mounting bar against the bearing retainer plate and tighten the two M5 nuts onto the studs that are in the pump to 10Nm.
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 form 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 4Nm. 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 the fuel pump.

1 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.
2 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.
3 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.

WIRING

The EC1245-2 electrical connector that mates with the actuator must be prewired in a configuration to match the system voltage.
Fabricate a cable harness to connect the speed control unit to the actuator.
The recommended wire size of the cable harness is at least #16 gauge (1.5 mm^2) for 12 volts systems and #18 gauge (1.0mm^2) for 24 V systems. Larger gauge wire will be necessary for cable lengths greater than 12 ft. (4m).

For 32 V operation, wire the connector as shown for 24 V operation and add a 1.5 ohm, 25 W resistor in series with pin A of the actuator connector and the corresponding output terminal of the speed control unit.
Connect pin A and D to the speed control unit. Refer to applicable speed control unit publication for specific wiring information.

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

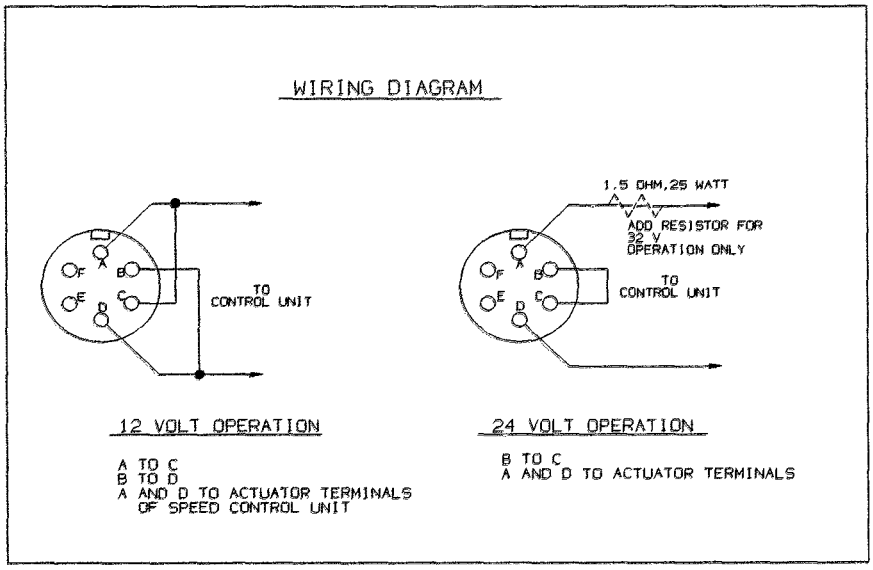
TROUBLESHOOTING

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

Measure the Resistance
AR3200

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

Energize the actuator for 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 these tests, the problem is elsewhere in the system. Refer to the control unit troubleshooting publication.



AR3200 OUTLINE