CUMMINS ENGINE COMPANY, INC., DIESEL DRIVERS FOR FIRE PUMPS

INTRODUCTION

Cummins Engine Co. has been responsive to problems detected with both new and older equipment and has improved many features of its equipment. This document describes the important changes.

CRANK TERMINATE SIGNAL SWITCH (10/95)

Fire pump engine starters have failed to shut off after engine start caused by a malfunction of the engine crank terminate signal switch. Starting the engine is supposed to clear the cranking signal. Minor corrosion of the switch contacts results in the crank terminate signal not being transmitted from the engine to the controller.

Check the condition of the switch. If signs of corrosion are found, repair and retest immediately. If the reliability of the controller or parts availability is in question, replace the controller. This premature shutdown problem usually occurs on older models, since newer models use alternators instead of generators in combination with a centrifugal operated crank terminate switch on the alternator shaft.

FLYWHEEL CRACKS (6/85)

Hairline cracks have occurred in some Cummins diesel engine flywheels during their operation. Aggressively inspect those flywheels which are known to have the potential to experience this problem. The cracking is a result of engine vibration compounded by the flywheel design and manufacturing techniques. The cracks usually start on the inside of the flywheel and slowly migrate to the surface. Early detection of cracks is the easiest way to avert a catastrophic failure.

In June 1985, Cummins announced a new flywheel design for their NH/NT fire pump engines. The new flywheel part number is 3047462, which replaces part number 3453. The new flywheel is made of ductile iron, which is stronger and lighter and incorporates improved machining techniques.

The key to averting problems resulting from cracking is to establish a good program of periodic inspection as specified by Cummins. Replace the flywheel at the first sign of problem.

FUEL VALVE SOLENOID (10/68)

The flow of fuel from the fuel pump and governor assembly to the injectors was controlled by a solenoid operated valve. When the engine was stopped by the closing of this valve, fuel under

pressure was trapped between the valve and the fuel pump. The valve could not be reopened for several minutes until the trapped pressure had relieved itself back through the fuel pump.

Cummins developed a pilot valve arrangement that operates properly even under the pressure of trapped fuel. With the former solenoid valve, the coil was bolted to the valve housing with a 1/32 in. (0.8 mm) spacer. With the new pilot valve, a 1/8 in. (3.2 mm) spacer has been added.

The solenoid coil itself was improved to make it as burnout-proof as possible. It is identified by the designation "196066, 24v-H.D." stamped on the coil housing (visible from the outside).

The Cummins package, "Pilot Valve Kit AR-05592," includes all these improvements. These parts are original equipment on all engines built on or after December 1, 1968 and on many engines built after October 1968. Older engine can be retrofitted with this kit.

POWER FAILURE OVERRIDE OF FUEL VALVE SOLENOID (6/66)

An override screw was incorporated in the fuel solenoid valve housing so that the valve could be opened manually in the event of an electrical power failure. This screw had a 1/2 in. (12.7 mm) diameter knurled head. It was extremely difficult to use the screw because of its location on the governor housing (#148234) between the solenoid valve and the tachometer drive. Another housing (#159018) provided sufficient space to operate the screw and to mount an instruction plate. The diameter of the screw head was also increased to 1 in. (25.4 mm). The new housing and larger screw head have been original equipment on all engines built after mid-1966.

SPEED SWITCH RELOCATION (3/72)

Cummins mounted the speed switch (which initiates overspeed shutdown and, on some models, the engine running circuit) directly to the fuel pump tachometer drive fitting. It subsequently found that engine vibration at this point causes erratic operation of some of the switches. For this reason, Cummins recommends the speed switch be located at a different point on the engine and driven by cable from the fuel pump tachometer drive fitting. This work is described in Cummins Bulletin 72 L13-1.

MAIN BATTERY CONTACTORS (2/71)

The Custom Built Controls Division of Metron Instruments, Inc. of Denver, Colorado, had the only listed manual operator attached to a standard Delco heavy duty magnetic contactor which complied with the NFPA requirement. Thus, AXA XL Risk Consulting actively pursued the installation of the Metron operator on a standard Delco heavy-duty contactor on all existing engines where a "C" (or "C Special") contactor was used alone. The operator is available from either Metron or Cummins.

The only contactor suitable for this purpose was the one made by Master Controls and known as the "C" contactor. To comply with AXA XL Risk Consulting suggestions, Cummins had Master Controls produce a somewhat heavier contactor known as the "C Special." After some of the "C Special" contactors had been put into service in 1969 and 1970, it was found that they could not reliably handle the heavy duty magnetic contactor. Cummins made a conversion kit for this purpose. The kit was described in Bulletin 2217.

FUEL PUMP MODIFICATION

The Cummins PTG fuel pump with the MVS governor is standard with all listed Cummins engines except for the NT-380-IF engine. With the governor housing #159018, Cummins has two valve assemblies that may be used, the #198726 (24 v dc) or the #198727 (12 v dc). These assemblies include the large knob, pilot valve with the 1/8 in. (3.2 mm) spacer, and the special coil. The Cummins PTR fuel pump with the MVS governor is standard on the NT-380-IF engine. To use these above two assemblies, a #146054 adapter must be added. This is now all standard equipment on the NT-380-IF engine.