

GTI SERVICE NOTE

GTI 106

May, 2010

Conversion of Caterpillar C-15 Engine to Bi-Fuel® Operation

Background

Conversion of the Caterpillar C-15 model diesel engine to Bi-Fuel operation requires the installation of additional hardware to allow for optimal performance. This hardware consists of a 24 VDC 3-way solenoid valve assembly and adapters. This material is supplied as part of the "Sensor By-Pass Kit", GTI part number G20024 and must be utilized with all Caterpillar C-15 model engines.

The G20024 kit is comprised of the following parts:

- G11110 – Solenoid Valve
- G11113 – Solenoid Coil
- G11114 – DIN Connector
- G11111 – Adapter, 3/8 MB x 1/8 MP
- G11112 – Adapter, 1/8 MP 4F ORD

Assembly of Solenoid Valve

- Install the male x female threaded adapter fitting (G11112) into port #2 of the solenoid valve body (G11110) using Teflon tape properly installed on the male thread (Figure I).
- Remove the threaded adapter and wave washer from the end of the solenoid valve stem and slide the solenoid coil (G11113) over the valve cartridge stem. The coil will only slide onto the stem in one orientation. DO NOT FORCE (Figure II).
- Place the wave washer back onto the portion of the stem protruding through the coil and thread on the adapter fitting. Note that the coil will remain loose on the cartridge valve stem after the retainer/adapter has been tightened, i.e., the coil will be able to freely rotate on the stem. DO NOT OVERTIGHTEN THE COIL.
- The 3-way solenoid assembly portion of the Sensor By-Pass Kit is now complete (Figure III).

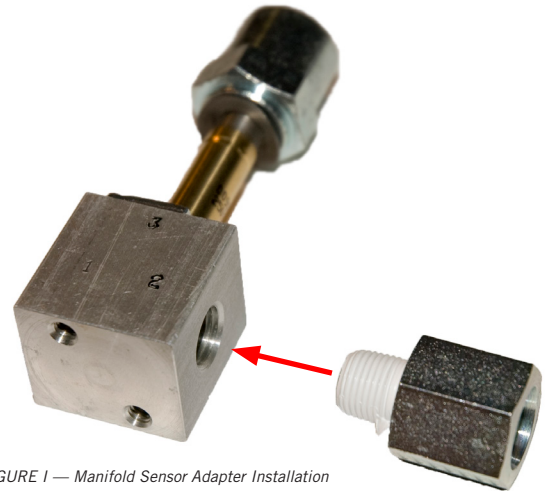


FIGURE I — Manifold Sensor Adapter Installation



FIGURE II
Solenoid Coil Installation

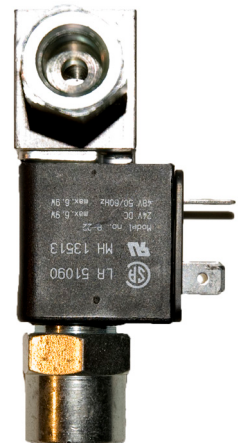


FIGURE III
Completed Solenoid Assembly

Installation

- Prior to installing the Sensor By-Pass Kit, the engine should be shut down and put in safe mode (use E-stop switch if available) to prevent engine start.
- De-power the GPN control panel using the master on-off switch.
- Locate the Caterpillar OEM manifold air pressure sensor located on the left-front corner of the engine (Figure IV).
- Disconnect the OEM wiring harness from the manifold air pressure sensor and carefully remove the sensor from the elbow fitting
- Remove the elbow fitting from the manifold port.
- Install the 1/8 inch male thread of the male x male threaded adapter fitting (G11111) in the manifold port (Figure V).
- Install the Sensor By-Pass kit assembly onto the manifold adapter installed in the manifold port (Figure VI).
- Install the OEM manifold air pressure sensor into port number 2 of the solenoid valve (using the previously installed male to female adapter) assembly and reconnect the OEM wiring harness (Figure VII).

Wiring

- Wiring of the By-Pass assembly requires a user-supplied 2-wire harness (at least 16 AWG) of appropriate length to connect the By-Pass solenoid to the GPN1000 control panel.
- The By-Pass assembly solenoid includes a DIN style adapter (G11114) to allow for easy and secure termination of the power wires. To make the termination within the connector, remove the small mounting screw from the back of the plastic body. From the face of the connector, use a small flat head screwdriver to pry the insert out of the housing (Figure VIII and IX).
- Run the two wires through the gland opening in the back shell and connect the positive (+) to terminal 2, and the negative (-) to terminal 1.
- Press the insert back into the back shell and reinstall the mounting screw. NOTE – Before reinstalling the insert, check that its orientation will be such that the wires will exit away from the engine block when the connector is installed on the solenoid assembly.
- Connect the free end of the wires to the contacts “SOL +” and “SOL -” located on the customer connection strip in the GPN1000 control panel (see customer connections in the GPN1000 OM). The 2-wire harness can be inserted into the existing Engine Harness (part number 693138-1) for ease of installation.
- Note that the ± 24 VDC power supply from SOL + and SOL - is also connected to the gas solenoid valve in the GTI gas train.
- When correctly wired, the By-Pass solenoid should energize and de-energize with the GSV005 gas solenoid valve.

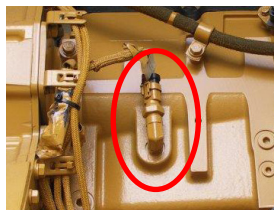


FIGURE IV
Manifold Sensor Location



FIGURE V
Manifold Adapter Installation

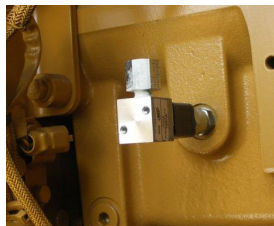


FIGURE VI
Solenoid Assembly Installation



FIGURE VII
Manifold Sensor and Harness installed
on Sensor By-Pass Kit Assembly



FIGURE VIII
Removal of Connector Back Shell

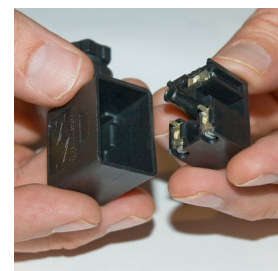


FIGURE IX
Exposed Connector Terminals

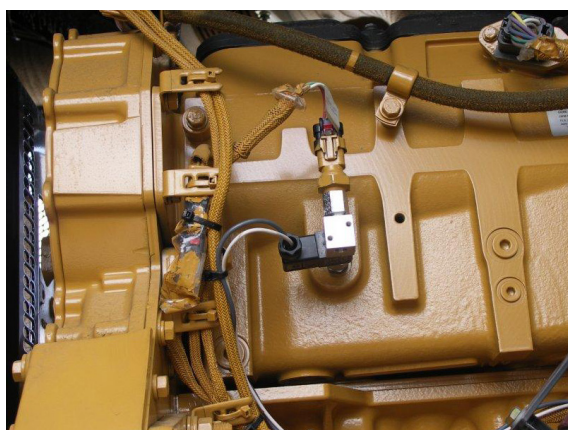


FIGURE X
Completed Sensor By-Pass Kit