

Detailing Model Trucks

Detailing Clint Freeman Components' Caterpillar 3406E diesel engine

by KEN SMITH

In last issue's "Detailing Model Trucks," we enhanced the right- and left-side engine electronics of Clint Freeman Components' 1/25 scale cast-resin Caterpillar 3406E diesel engine kit. Now, let's finish detailing the left side of the engine and install the oil lines, air compressor, air lines, fuel pump, fuel filter, and fuel lines.

PRE-ASSEMBLY. Read CFC's instruction sheet, and wash all of the parts with mild soap and lukewarm water to remove any casting residue. Let the parts dry, then sand the mating surfaces to ensure a better glue bond.

LEFT SIDE ENGINE DETAILING AND ASSEMBLY. For this project, we'll add Detail Master braided line (part no. DM 1302), fitting line (part no. DM 1311), compression fittings (part nos. DM 3021 & DM 3022) and adapter fittings (part no. DM 3042) to CFC's 3406E kit.

Figure 1 shows the left-side engine components that will be drilled. **Figure 2** names each left-side engine part and indicates its mounting location. **Figure 3** illustrates the fuel system of the 3406E engine, and **Figure 4** shows the air compressor and its coolant, oil, and air lines.

Begin by using a no. 72 bit (.025-inch diameter) to drill 1/32-inch-deep holes into the fuel distribution block (part no. 20), fuel transfer pump (part no. 10), fuel filter base (part no. 23), and Electronic Control Module (part no. 29) as shown in **Figure 1**. Also drill a .025-inch diameter hole into the flat ledge on the left rear corner of the engine's cylinder head (part no. 4) as shown in **Photo 3**. After drilling the holes in the fuel system

components and ECM, use **Figure 2** as a guide to cement the fuel transfer pump and fuel filter base to the left side of the engine. The fuel distribution block and ECM were attached to the engine in Part 1 of this project.

FUEL LINE ASSEMBLY. **Figure 3** indicates how the fuel lines for the Caterpillar 3406E engine should be installed, and **Photo 3** shows the six fuel lines and one drain line installed on a completed engine. For fuel lines, we'll use the wire leads from three Miniaturics Corporation incandescent lamps (part no. 18-C03-10) with Detail Master's nos. DM 3021 and DM 3022 machined-aluminum compression hose fittings. If you can't find Miniaturics lamps at your local hobby shop, they're available by mail order from Doug's Hobby Shop (see address in source box).

First, cut a 1 1/8-inch-long piece from a miniature lamp's wire lead to represent the fuel line that runs from the fuel transfer pump to the fuel distribution block (**Figure 3**, lower left). Carefully slip one Detail Master no. DM 3022 compression fitting over each end of the 1 1/8-inch wire lead, with the fittings' tapers pointing toward the center of the wire lead. Referring to **Photo 3** and **Figure 3**, cement one end of the 1 1/8-inch wire lead into the hole in the inboard side of the fuel transfer pump and the other end into the front lower corner of the fuel distribution block. Once the cement has dried, carefully snug the compression fittings up against the fuel transfer pump and fuel distribution block and cement them in place.

The next line to be installed runs between the rear upper corner of the fuel distribution block and the fuel filter's base. Cut a piece of miniature lamp wire to a length of 3/16-inch and slide two Detail Master no. DM 3022 compression fittings

onto the wire in the same way as the first fuel line's fittings. Carefully cement this fuel line and its fittings to the fuel distribution block, then to the fuel filter base as shown in **Figure 3** and **Photo 3**.

Now cut one piece of miniature lamp wire to a length of 3/16 inch and another to a length of 7/8 inch. The 3/16-inch-long wire lead will represent the fuel line that connects the rear of the fuel filter base to the lower front corner of the ECM. The 7/8-inch lead will be routed from the upper edge of the ECM to the rear of the cylinder head. Assemble the 3/16-inch-long fuel line in the same way as the previous lines and cement it in place on the engine. Then, assemble the 7/8-inch-long fuel line but cement it *only* to the upper edge of the ECM. Next, cut one 1/16-inch-long piece of Plastruct Finline square plastic strip stock (part no. MS-40) and cement it to the rounded flat plate on the rear of the cylinder head as shown in **Photo 2**. Drill a 1/32-inch-deep hole with a no. 72 bit into the strip stock, and cement the free end of the 7/8-inch-long fuel line into this hole.

Now, we'll turn our attention to the fuel return line that connects the right front corner of the cylinder head to the front upper corner of the fuel distribution block. Detail Master no. DM 1311 fitting line and two no. DM 3021 compression fittings are needed to depict this line. The fuel return line starts at the front corner ledge on the right side of the cylinder head, passes between the cylinder head and front case (part no. 3), and after making a couple bends, attaches to the fuel distribution block. Place a no. DM 3021 compression fitting onto each end of a length of no. DM 1311 fitting line, then cement the line into the .025-inch diameter hole on the right side of the cylinder head. When the cement sets up, carefully bend the fitting line to a slightly rounded shape and route it

FIGURE 1 DRILLING POINTS

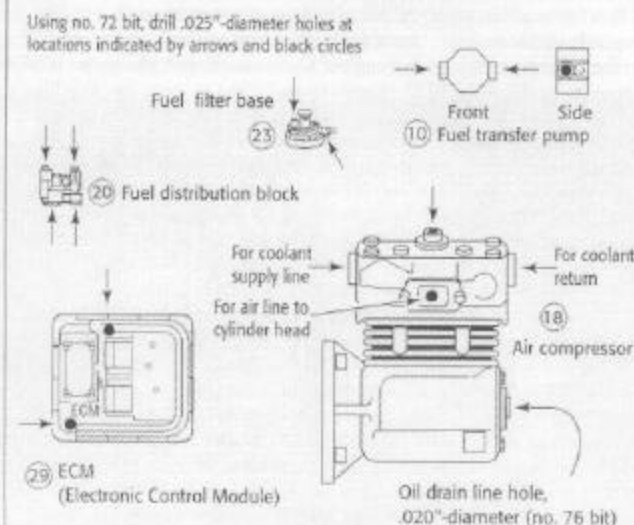
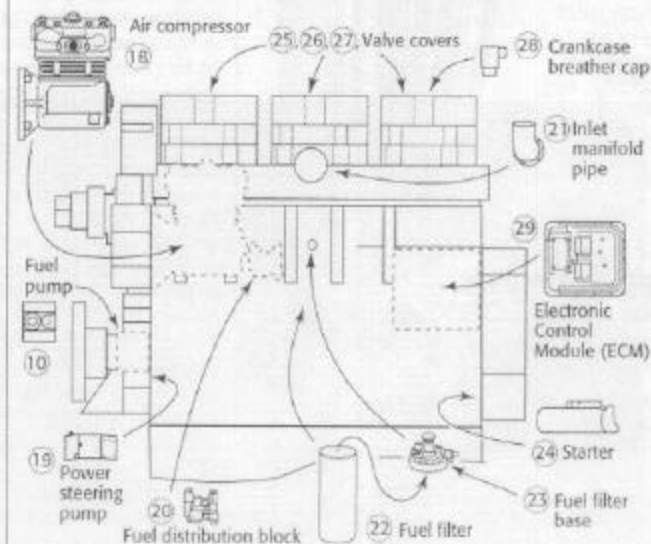
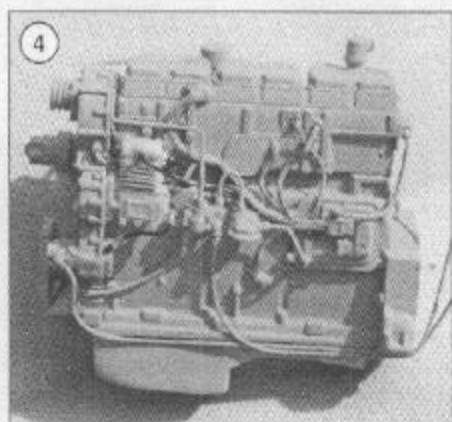
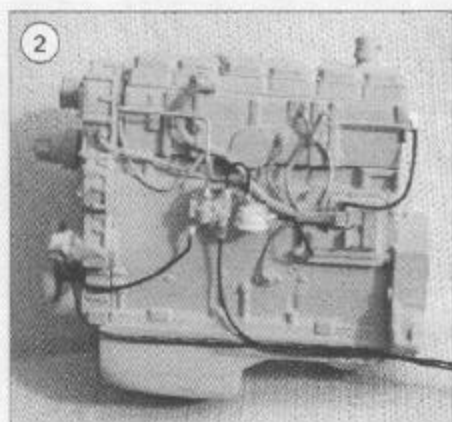
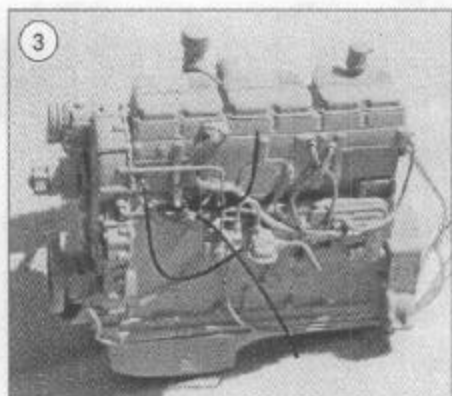
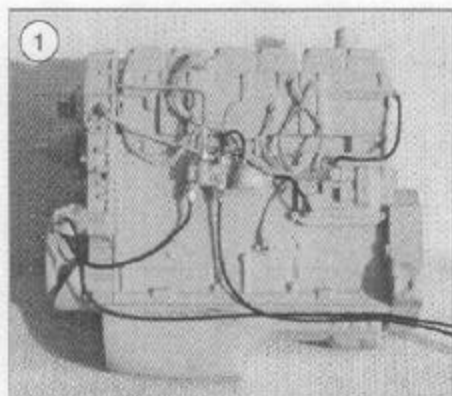


FIGURE 2 LEFT SIDE ENGINE COMPONENTS





between the cylinder head and the engine's front case. Use **Photo 1** and **Figure 3** as guides to make two 90-degree bends in the fuel return line as it makes its way down to the front corner of the fuel distribution block. Trim the fitting line to length to complete the hookup.

The two remaining fuel lines shown in **Figure 3** and **Photo 1** are included only to show their engine mounting locations. The fuel-supply line from the fuel tanks connects to the outboard side fitting of the fuel transfer pump, while the fuel return line to the fuel tanks hooks up to the lower rear port of the fuel distribution block. **Photo 3** shows how our Cat 3406E looks at this time.

AIR COMPRESSOR COOLANT AND OIL

LINES. Carefully examine the front- and side-view drawings in **Figure 4**. Refer to **Figure 1** and use a no. 72 bit to drill four $\frac{1}{32}$ -inch-deep holes into the air compressor (part no. 18) at the locations shown. Then, drill a $\frac{1}{32}$ -inch-deep hole with a no. 76 bit (.020-inch diameter) into the bottom rear portion of the air compressor for connecting the oil drain line. The 3406E's air compressor has five external lines: the coolant supply line from the cylinder block to the compressor, the coolant return line from the compressor to the cylinder head, the air line from the compressor to the cylinder head, the air supply line from the compressor to the chassis-mounted air tanks, and the air compressor oil drain line that runs to the power steering pump mounting flange.

We'll deal with the hole in the power steering pump mounting flange later. For now, let's turn our attention to **Figure 4** and examine the routing of the two coolant lines and air line shown in the front view of the air compressor. These lines must be cemented to the block and cylinder head before the air compressor can be cemented to the engine.

Wire leads from Miniaturics Corp. no. 18-C03-10 incandescent lamps, as well as Detail Master no. DM 3022 compression and no. DM

3042 adapter fittings, will depict these components. These three lines must be flexible to fit in the limited space between the air compressor, cylinder head, and engine block. Take the wire leads from one incandescent lamp and cut them into three $\frac{3}{4}$ -inch-long pieces. We'll shorten the wires later, but for now the extra length will aid installation. Refer to **Figure 4** and **Photo 3** to examine the locations of the three inboard air compressor lines (two cooling and one air line). Drill one $\frac{1}{32}$ -inch-deep hole with a no. 72 bit into the cylinder head's lower front corner $\frac{1}{16}$ -inch from its front edge. Drill another $\frac{1}{32}$ -inch-deep hole with the no. 72 bit into the block $\frac{3}{8}$ -inch from the front case directly below the cylinder head's bottom edge. Next, cut one $\frac{1}{16}$ -inch-long piece of Plastruct Fineline square strip stock (part no. MS-40) and drill a $\frac{1}{32}$ -inch-deep hole into one of its ends with the no. 72 bit. Cement this piece to the first vertical rib molded on the cylinder head, as shown in **Photo 3**.

Now, the cooling and air lines can be installed on the engine. Cement a Detail Master no. DM 3022 compression fitting to each $\frac{3}{4}$ -inch-long wire $\frac{1}{32}$ -inch from its end. After referring to **Figure 4**, cement one of these wires to the coolant return line location on the front lower corner of the cylinder head. Then, cement one of the two remaining wires to the coolant supply line outlet on the cylinder block. The third wire will represent the air line to the cylinder head. Before installation, this wire must be bent to a 90-degree angle just past the compression fitting. Refer to **Figure 4** and **Photo 3**, make the bend, then cement the air line up into the bottom of the $\frac{1}{16}$ -inch piece of square strip stock that you previously cemented to the vertical rib on the cylinder head. Once this line is fixed in place, slide another Detail Master no. DM 3022 compression fitting onto the line $\frac{1}{32}$ -inch from the 90-degree bend with its taper facing away from the bend. Now, carefully position the coolant supply, coolant return, and air lines as shown in **Figure 4**. Note that the coolant supply and coolant return

FIGURE 3 FUEL SYSTEM PARTS

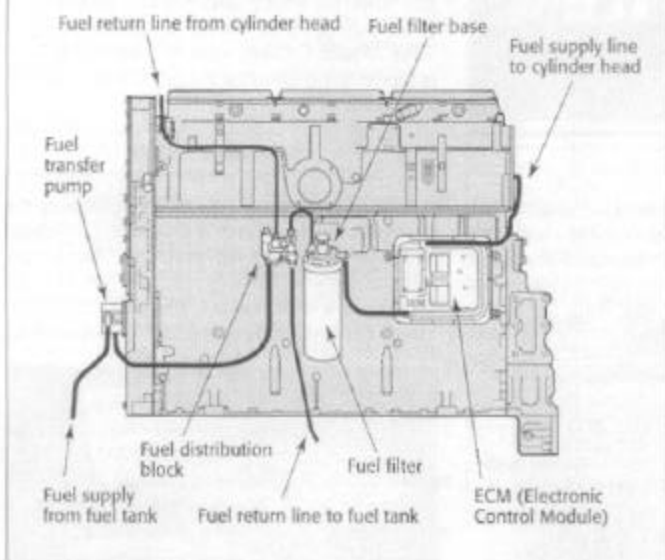
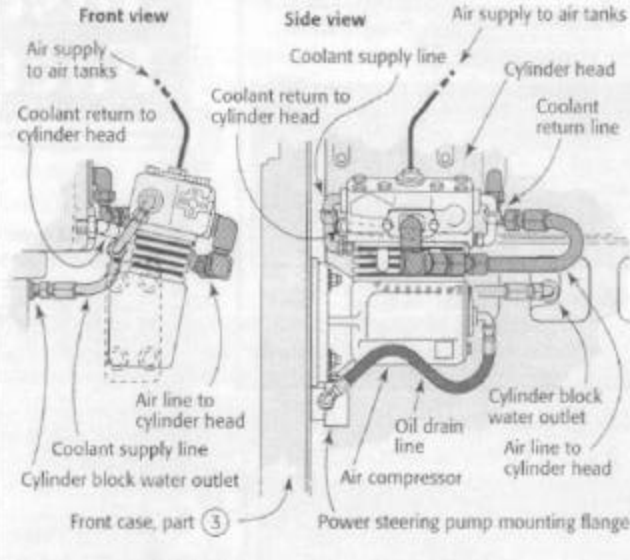


FIGURE 4 AIR COMPRESSOR DETAIL



lines cross over each other behind the air compressor. Also note that the air supply line must be bent to a "U" shape. Once these lines are arranged as indicated in Figure 4, cement the air compressor to the front engine case as shown in Figure 2 and Photo 4.

Using Photo 4 and Figure 4 as guides, slide one Detail Master no. DM 3042 adapter fitting onto each of the three newly installed lines. Shorten and bend the free end of each line to form a 90-degree angle and cement the lines to the air compressor as illustrated in Figure 4 and Photo 4. Attach the coolant supply line from the cylinder block to the front upper inlet of the air compressor, and attach the coolant return line from the cylinder head to the air compressor's rear upper outlet. Cement the air line from the cylinder head to the outboard center outlet of the compressor as shown in Photo 4.

Next, use a no. 72 bit to drill a 1/32-inch-deep hole into the outboard side of the power steering pump mounting flange that's molded to the engine's front case just below the air compressor. Then, cut one 5/8-inch-long piece of Miniatronics lead wire to depict the air compressor oil drain line. Slide one Detail Master no. DM 3022 compression fitting and a no. 3042 adapter fitting onto each end of this line, with the compression fittings going on before the adapter fittings. Position the tapers of the compression fittings so they point toward the ends of

CHART A: Caterpillar 3406E engine colors

part or assembly	paint color
Alternator and A/C compressor	Testors no. 1146 Silver
Inlet manifold pipe	Testors Model Master no. 1781 Aluminum
Fuel and oil filters	Testors no. 1145 White
Power steering pump	Testors no. 1138 Gray
Exhaust manifold and rear turbo hell	Floquil no. 110073
Engine block, cylinder head, and all other parts	Floquil no. 130031 Reefor Yellow followed by Floquil no. 130004 Crystal Coat

the wire and butt against the adapter fittings. Carefully bend each end of the wire to form a 90-degree angle and cement one end of the finished line to the oil drain line outlet on the rear of the air compressor. Cement the other end of the line to the power steering pump mounting flange. Then, slide the adapter fittings and their corresponding compression fittings down to the 90-degree bend at each end of the oil drain line and cement them in place. Refer to Photo 4 for this step.

The fifth line from the air compressor is illustrated in Figure 4 and leads from the compressor to the chassis-mounted air tanks. Attach the fifth line when the engine is placed in a model truck's chassis. Photo 4 shows how the 3406E should look at this point.

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Doug's Hobby Shop
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Waldorf, MD 20601
phone: (888) 368-4472

Plastruc, Inc.
1020 Wallace Pl., Dept. CM
City of Industry, CA 91748
\$2 for catalog

Complete the engine by referring to Figure 2 and cementing the starter (part no. 24), inlet manifold pipe (part no. 21), power steering pump (part no. 19), and the fuel filter (part no. 22) onto the engine as shown. Photos 5 and 6 show the completed engine after it has been painted with the colors listed in Chart A.

Next time, we'll tackle a "B-Train" trailer conversion using Italeri no. 769 platform trailer kits.

Correction: Photo 7 in last issue's "Detailing Model Trucks" article was printed backwards.

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