
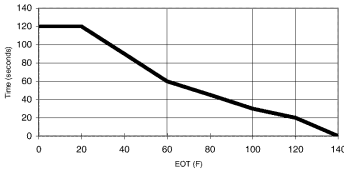


Hard Start/No Start Diagnostic Procedures

E-Series or F-Super Duty/Excursion

|  | | F-Super Duty/Excursion/Econoline 2005 6.0L Power Stroke Diesel Engine Hard Start/No Start Diagnostic Guide | | <small>-NOTE- IF CONCERN IS FOUND, SERVICE AS REQUIRED. IF THIS CORRECTS THE CONDITION, IT IS NOT NECESSARY TO COMPLETE THE REMAINDER OF THE DIAGNOSTIC PROCEDURE.</small> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|----------------------------------|--|------------|--|-----------------|--|-------|---------------|-------|-------------|------------------|----|--|---|----------------------------------|---------------------------------------|-------|-------------|----|--|--|--------------------------|-----------------|--|----------|------------------------|--|-----|-----------|--|-----|---------------|--|-----------|--------|--|----------|----|--|--|--|
| CUSTOMER NAME | | DEALER NAME | | P & A CODE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MODEL YEAR | | VEHICLE SERIAL NO. (VIN) | | ENGINE SERIAL NUMBER | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CHASSIS STYLE | | VEHICLE GVW | | 1983 CLAIM NUMBER | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CUSTOMER CONCERNS (Please list in this box) | | TYPE OF SERVICE | | PERSONAL <input type="checkbox"/> COMMERCIAL <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>NOTE: A hard start/no start concern with EOT Temp. below 60° F perform step 11 first.</p> | | <p>7. Perform KOEO On-Demand Self Test 6005E7 Use scan tool. DTC's set during this test are current faults.</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Diagnostic Trouble Codes</td><td></td></tr> </table> | | Diagnostic Trouble Codes | | <p>11. Glow Plug System Operation 6005E5 GPCM Operation</p> <p>Glow Plug ON time is dependent on oil temperature and altitude. The Glow Plug Control Module (GPCM) comes on between 1 and 120 sec., and does not come on at all if oil temp is above 131° F. Using a scan tool, check Continuous and KOEO DTC's. If codes are present go to Pinpoint Test AF. Verify B+ voltage is being supplied to GPCM. Using the scan tool GPCTM and EOT pids, verify glow plug "on" time. Turn key to run position, measure voltage ("on" time) (Dependent on oil temperature and altitude)</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><th>Relay on time</th><th>Spec.</th><th>Measurement</th></tr> <tr><td>1 to 120 seconds</td><td>B+</td><td></td></tr> </table> <p>Wait to Start Lamp "on" time is independent from gip "on" time Glow Plug Resistance Disconnect the 4-pin connector at front of valve cover. Measure each Glow Plug resistance to Bat. ground. Measure engine harness resistance to GPCM.</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><th>Glow Plug Number</th><th>Glow Plug to Ground .1 to 2 ohms</th><th>Harness to GPCM connector 0 to 1 ohms</th></tr> <tr><td>#1</td><td></td><td></td></tr> <tr><td>#3</td><td></td><td></td></tr> <tr><td>#5</td><td></td><td></td></tr> <tr><td>#7</td><td></td><td></td></tr> <tr><td>#2</td><td></td><td></td></tr> <tr><td>#4</td><td></td><td></td></tr> <tr><td>#6</td><td></td><td></td></tr> <tr><td>#8</td><td></td><td></td></tr> </table>  <p>Add 5 seconds to glow plug on time when above 7000 feet in altitude, but not to exceed 120 seconds.</p> | | Relay on time | Spec. | Measurement | 1 to 120 seconds | B+ | | Glow Plug Number | Glow Plug to Ground .1 to 2 ohms | Harness to GPCM connector 0 to 1 ohms | #1 | | | #3 | | | #5 | | | #7 | | | #2 | | | #4 | | | #6 | | | #8 | | | |
| Diagnostic Trouble Codes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Relay on time | Spec. | Measurement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 to 120 seconds | B+ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Glow Plug Number | Glow Plug to Ground .1 to 2 ohms | Harness to GPCM connector 0 to 1 ohms | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| #1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| #3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| #5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| #7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| #2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| #4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| #6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| #8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>1. Visual Engine/Chassis Inspection 6005E6</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Fuel</td><td>Oil</td><td>Coolant</td><td>Electrical</td><td>Hoses</td><td>Leaks</td></tr> <tr><td>Method</td><td colspan="5">Check</td></tr> <tr><td>Visual</td><td colspan="5"></td></tr> </table> | | Fuel | Oil | Coolant | Electrical | Hoses | Leaks | Method | Check | | | | | Visual | | | | | | <p>8. Retrieve Continuous Trouble Codes 6005E3 Use the scan tool. DTC's retrieved during this test are historical faults.</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Diagnostic Trouble Codes</td><td></td></tr> </table> | | Diagnostic Trouble Codes | | | | | | | | | | | | | | | | | | | |
| Fuel | Oil | Coolant | Electrical | Hoses | Leaks | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Method | Check | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Visual | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Diagnostic Trouble Codes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>2. Check Engine Oil Level 6005E8 Check for contaminants (fuel, coolant). Correct Grade/Viscosity. Miles/Hours on oil, correct level.</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Method</td><td colspan="5">Check</td></tr> <tr><td>Visual</td><td colspan="5"></td></tr> </table> | | Method | Check | | | | | Visual | | | | | | <p>9. KOEO Injector Electrical Self Test (Click Test) Use scan tool. Injector DTC's will be displayed at test end. All injectors will momentarily click, then each injector will click in sequence 1-8. Sequence repeats three times.</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Injector Trouble Codes</td><td></td></tr> </table> <p>* If self test codes are retrieved, go to appropriate PPT test.</p> | | Injector Trouble Codes | | | | | | | | | | | | | | | | | | | | | | | | | |
| Method | Check | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Visual | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Injector Trouble Codes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>3. Intake/Exhaust Restriction 6005E9 Inspect air filter and inlet ducts. Inspect exhaust system. Check if air filter restriction indicator has been illuminated (F-Super Duty/Excursion)</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Method</td><td colspan="5">Check</td></tr> <tr><td>Visual</td><td colspan="5"></td></tr> </table> | | Method | Check | | | | | Visual | | | | | | <p>10. Scan Tool - Data List Monitoring 6005E4 Scan tool may reset below 9.5 volts. Select the parameters indicated from the scan tool parameter list and monitor while cranking engine.</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr><th>Parameter</th><th>Spec.</th><th>Measurement</th></tr> </thead> <tbody> <tr><td>B+</td><td>8 volt min.</td><td></td></tr> <tr><td>FICMLPWR</td><td>100 RPM minimum</td><td></td></tr> <tr><td>FICMVPWR</td><td>3.5 mPa min. (500 PSI)</td><td></td></tr> <tr><td>RPM</td><td>80 V min.</td><td></td></tr> <tr><td>ICP</td><td>500 uS - 2 mS</td><td></td></tr> <tr><td>ICP volts</td><td>Yes/No</td><td></td></tr> <tr><td>FICMSYNC</td><td></td><td></td></tr> </tbody> </table> <p>A - B+ - If low voltage condition is present, check battery, charging system, or power/gnd circuits to the PCM. B - FICMLPWR - No/low voltage indicated could be caused by 12-way connector issue or logic power fuse. Refer to Pinpoint S for detailed 12-way conn. diagnostics C - FICMVPWR - No or low voltage indicated could be caused by 12-way connector issues. D - RPM - Low RPM can be caused by starting/charging system issues. No RPM indicated while cranking could be CMP or CKP faults. E - ICP - A minimum of 500 PSI (3.5 mPa) is required for the injectors to be enabled. No or low oil in the system, system leakage, injector O-Rings, faulty IPR, or high pressure pump could cause low pressure. F - IPR duty cycle defaults to 14% (300 PSI) w/o CKP signal. G - ICP V - Voltage reading below spec indicates low ICP during crank. H - FUEL PW - Pulse width defaults to 0 w/o CKP signal I - FICMSYNC - No sync could be caused CMP or CKP faults. * Refer to PC/ED section 4 for detailed test procedures.</p> | | Parameter | Spec. | Measurement | B+ | 8 volt min. | | FICMLPWR | 100 RPM minimum | | FICMVPWR | 3.5 mPa min. (500 PSI) | | RPM | 80 V min. | | ICP | 500 uS - 2 mS | | ICP volts | Yes/No | | FICMSYNC | | | | |
| Method | Check | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Visual | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Parameter | Spec. | Measurement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B+ | 8 volt min. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FICMLPWR | 100 RPM minimum | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FICMVPWR | 3.5 mPa min. (500 PSI) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RPM | 80 V min. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ICP | 500 uS - 2 mS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ICP volts | Yes/No | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FICMSYNC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>4. Sufficient Clean Fuel 6005E6 Check if the WATER IN FUEL lamp has been illuminated. After verifying that there is fuel in the tank, drain a sample from fuel control module. Cetane rating between 40-50 is recommended for optimum start.</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Method</td><td colspan="5">Check</td></tr> <tr><td>Visual</td><td colspan="5"></td></tr> </table> | | Method | Check | | | | | Visual | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Method | Check | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Visual | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>5. Electric Fuel Pump Pressure 6005E7 Verify that the fuel pump has voltage and gnd. at key on. Measure fuel pressure at engine fuel filter housing test port with a (0-160 PSI) gauge at key on. Fuel pump runs for 20 sec. at key on and pressure falls after key off.</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><th>Instrument</th><th>Spec.</th><th>Measurement</th></tr> <tr><td>0-160 PSI Gauge</td><td>45 PSI min.</td><td></td></tr> </table> <p>If pressure falls low go to next step to verify no restriction</p> | | Instrument | Spec. | Measurement | 0-160 PSI Gauge | 45 PSI min. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Instrument | Spec. | Measurement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0-160 PSI Gauge | 45 PSI min. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>6. Electric Fuel Pump Inlet Restriction 6005E8 Measure restriction at fuel pump inlet.</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><th>Instrument</th><th>Spec.</th><th>Measurement</th></tr> <tr><td>0-30" Hg vacuum</td><td>6" Hg MAX</td><td></td></tr> </table> <p>* If > 6" Hg restriction, check lines between pump and fuel tank. * If < 6" Hg, inspect both fuel filters. If filters are OK, check fuel regulator. If regulator and filters are OK, replace fuel pump.</p> | | Instrument | Spec. | Measurement | 0-30" Hg vacuum | 6" Hg MAX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Instrument | Spec. | Measurement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0-30" Hg vacuum | 6" Hg MAX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>See PC/ED manual, Section 4 for more detail on all of the above test steps.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>When troubleshooting a Hard Start/No Start or Performance concern, this form must be filled out to the point of repair and returned, to receive warranty credit for diagnostic time for the parts listed below.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Fuel Injectors (9E527), regulator-injection control pressure (9C968), pump assembly-high pressure oil (9A543), turbo charger assembly (6K682), fuel control module (9G262), FICM (12B599), PCM (12A650), EGR valve (9P452), CKP sensor (6C315), CMP sensor (12K073), GPCM (12B533), and Glow Plugs (12A342).</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Some labor operations are listed in more than one test step. Those operations include time for all occurrences and can be claimed only once</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| What problems were found and what repairs were performed? | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| List Part Name, Number and Serial Number of parts replaced. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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