

# 6.0 L Engine Performance/Surge



## Diagnostic Guide

STEP 1: VISUAL INSPECTION OF ENGINE COMPARTMENT	OK	NOT OK	COMMENTS
Inspect the cooling hoses and connections			
Inspect the battery cables and connections			
Inspect the wiring harnesses and connections			
Inspect for fluid leaks ( <i>oil/fuel/coolant</i> )			

STEP 2: CHECK FLUID LEVELS	OK	NOT OK	COMMENTS
Engine oil			
Coolant			
Miles or hours on the oil			
Verify oil viscosity ( <i>10W30 recommended for temps below 35°F</i> )			

STEP 3: INTAKE AND EXHAUST RESTRICTION	OK	NOT OK	COMMENTS
Inspect the exhaust system for damage			
Observe the air filter restriction gauge or light			
Inspect the air filter and inlet ducts			

STEP 4: FUEL SUPPLY	OK	NOT OK	COMMENTS
Verify the fuel level			
Check for water in fuel light			
Inspect the fuel filter for contamination			

STEP 5: FUEL SUPPLY PUMP <input checked="" type="checkbox"/> Check for voltage and ground with the key on <input checked="" type="checkbox"/> Check fuel supply pressure		
TOOL	SPECIFICATION	READING
0–160 psi Fuel Gauge	E SERIES 38 psi min. F–SUPER DUTY/EXCURSION 45 psi min.	

## STEP 6: FUEL SUPPLY INLET RESTRICTION

☒ Install a 0–30" Hg vacuum gauge ☒ Measure fuel restriction at the HFCM inlet

TOOL	SPECIFICATION	READING
0–30" Hg Vacuum Gauge	6" Hg max.	

## STEP 7: CHECK FOR HISTORY AND CURRENT FAULTS

☒ Using the IDS Scan Tool, retrieve the CMDTCs ☒ Perform the KOEO On–Demand Test and Injector Test and record the DTCs

FAULT CODE	DESCRIPTION		
DID ALL SPOOL VALVES “CLICK”?	OK	NOT OK	CYL #'S WITH NO CLICK

## STEP 8: PERFORM GLOW PLUG SYSTEM OPERATION

☒ Turn the key on and measure the voltage to the GPCM (glow plug control module) –Green Connector Pin 3 –Black Connector Pin 3 and 9

SPECIFICATION	READING
11.5 volts min.	
<input checked="" type="checkbox"/> Measure each glow plug resistance to battery ground and record	
GLOW PLUG	GPCM CONNECTOR TO GROUND–SPEC 0 TO 5.5 $\Omega$
#1 (Green Connector Pin – 6)	
#3 (Green Connector Pin – 7)	
#5 (Green Connector Pin – 1)	
#7 (Green Connector Pin – 2)	
#2 (Black Connector Pin – 6)	
#4 (Black Connector Pin – 7)	
#6 (Black Connector Pin – 1)	
#8 (Black Connector Pin – 2)	



**ALLIANT  
POWER**

# Diagnostic Guide

## STEP 9: SCAN TOOL DATA MONITORING

☒ Using the IDS Scan Tool, monitor the below parameters with KOEO

PARAMETER	SPECIFICATION	READING
Battery Voltage	11.5 volts min.	
FICM Voltage		
FICM Main	44 volts min.	
VREF	5 volts	
IAT	Ambient	
BARO	14.1 (varies by location)	
EBP_A	Baro	

☒ Monitor the below parameters with the engine at idle

PARAMETER	SPECIFICATION	READING
Battery Voltage	12 volts min.	
FICM Voltage		
FICM Main	44 volts min.	
FICM Sync	YES/NO (should be yes and stay)	
Sync		
ICP Desired	3.5 Mpa min. (500 psi min.)	
ICP Actual		
ICP Volts	.80 volts min.	
IPR %	Range 0–50%	
Fuel Pulse Width	500 uS–2 mS	
EGRVPA	0%	
VREF	5 volts	
IAT	Ambient	
BARO	14.1 (varies by location)	
EBP_A	15–18 psi	
EBP_DSD	1.5–4.5 psi	

## STEP 10: KOER ON-DEMAND TEST

☒ Using the IDS Scan Tool, perform the KOER On-Demand Test and record the DTCs

FAULT CODE	DESCRIPTION

## STEP 11: FICM/PCM CALIBRATION

☒ Using the IDS Scan Tool, check for available FICM and PCM updates

☒ If updates are available, reflash the modules and reconfirm the complaint

WAS A LATER VERSION AVAILABLE?	DID IT CORRECT COMPLAINT?	IF NO, PROCEED TO NEXT STEP

## STEP 12: EXHAUST RESTRICTION

☒ Monitor EP with the EOT above 177°F at 3,800 RPM with no load

PARAMETER	SPECIFICATION	READING
EP/EBP	35 psi max.	

## STEP 13: TURBO BOOST TEST

☒ Inspect the intercooler tubes/connections for leaks    ☒ Inspect the turbocharger for damage

VISUAL INSPECTION	OK	NOT OK

☒ Using the IDS Scan Tool, perform the Powertrain Air Management-Turbo Boost Test

**Note:** There is no Turbo Boost Test on the IDS Scan Tool for an '03

- ☒ Using the Data Logger in the IDS Scan Tool:
- Command EGRDC# to 0% and RPM# to 1,200 RPM
  - Monitor EBP and MAP while actuating VGTDC# from 0% to 85% back to 0%
  - The graph of the EBP and MAP should mimic the command of the VGTDC#

RESULTS	OK	NOT OK

**STEP 14: EGR SYSTEM TEST**

- ☒ Check the EGR actuator connections    ☒ Check the EGR actuator circuitry

VISUAL INSPECTION	OK	NOT OK
<input checked="" type="checkbox"/> Using the IDS Scan Tool, perform the EGR System Test		
RESULTS	OK	NOT OK

**STEP 15: POWER BALANCE TEST**

- ☒ Using the IDS Scan Tool, perform the Power Balance Test  
☒ Disable each cylinder and monitor contribution levels  
☒ If any cylinders fail, run the Relative Compression Test

CYLINDER	PASS	FAIL	COMPRESSION %
#1			
#2			
#3			
#4			
#5			
#6			
#7			
#8			

**STEP 16: OIL RAIL SNUBBER VALVE OPERATION TEST**

- ☒ EOT must be greater than 177°F  
☒ Slowly run the engine RPM up to 2,300, in park or neutral  
☒ If the engine runs rough between 1,200 and 2,300 RPM, verify snubber valve operation:
  - Verify the operation of the bank 2 snubber valve by disconnecting all of the injectors on bank 1
  - Use the IDS Scan Tool, monitor cylinder contribution using the Power Balance Test
  - Erratic contribution indicates the snubber valve on that bank is not seating
  - Reconnect the injectors on bank 1 and repeat the procedure for bank 2

NON-CONTRIBUTING POWER CYLINDERS	BANK 1	BANK 2

## STEP 17: BUBBLE TEST

- ☒ Remove the secondary fuel filter
- ☒ Fill the housing with fuel to cover the stand pipe
- ☒ Crank the engine with the key off using a remote start switch
- ☒ Monitor the fuel in the housing and watch for air bubbles exiting the top of the stand pipe
- ☒ If air bubbles are present, injector removal and inspection is required

AIR BUBBLES PRESENT	YES	NO

## STEP 18: BOOST PRESSURE TEST

- ☒ Using the IDS Scan Tool, monitor MGP and RPM
- ☒ Road test under full load at 3,300 RPM with the engine at normal operating temperature

PARAMETER	SPECIFICATION	RESULTS
MGP	22 psi min. F Series	
	20 psi min. E Series	

## STEP 19: CRANKCASE PRESSURE TEST

- ☒ Measure crankcase pressure at the oil fill tube using the 6.0 L Crankcase Pressure Adapter (OTC 303-758) and a 0-60" H<sub>2</sub>O manometer
- ☒ Take the measurement with EOT above 158°F at 3,000 RPM with no load

TOOL	SPECIFICATION	RESULTS
0-60" H <sub>2</sub> O Manometer	8" H <sub>2</sub> O	