7.3L DIT POWER STROKE ENGINE

Electronic Engine Control Subsystems (Sample Page)

High Pressure Oil Control Subsystem

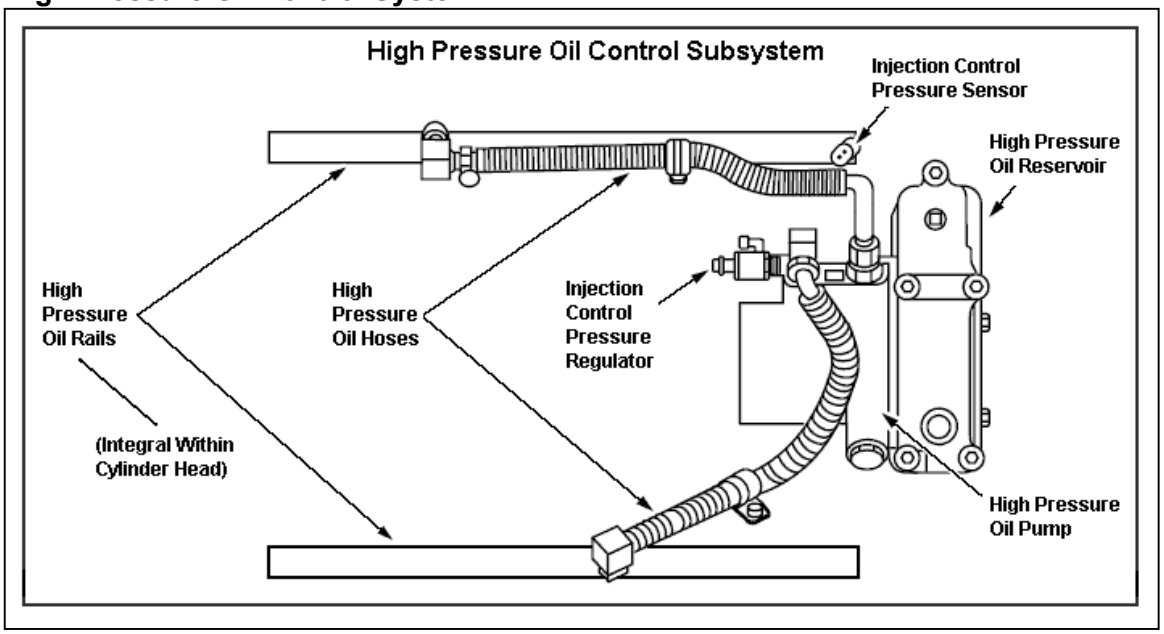
Overview

The High Pressure Oil Control system consists of the high-pressure oil reservoir, high-pressure oil pump, injection control pressure regulator, Injection Control Pressure (ICP) sensor, high-pressure hoses, and oil rails in the cylinder heads.

The High Pressure Oil Control system is used to actuate the HEUI fuel injectors. The PCM controls an electronic pressure regulator to regulate oil pressure to the injectors.

The high-pressure oil flow within the fuel injectors is controlled by a solenoid located on top of the injectors. Oil pressure supplies the force needed to pressurize the fuel in the injector to initiate fuel injection.

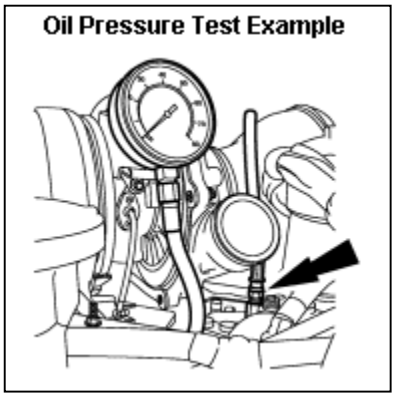
High Pressure Oil Control System



Inspection and Verification

1) Verify the customer concern.
2) Visually inspect for obvious signs of damage.
3) If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4) If the concern is not visually evident, check the base oil pressure.

Note: Install a suitable adapter (e.g., the Aeroquip® 2022-4-4S) in the engine oil pressure sensor hole to perform the base oil pressure test. The engine is shown removed for clarity in this Graphic.



5) Install the tool and check the base oil pressure. The minimum engine oil pressure specifications are 82.7 kPa (12 psi) at 700 rpm, 165.5 kPa (24 psi) at 1,200 rpm and 310.3 kPa (45 psi) at 1,800 rpm with the engine at operating temperature.
6) If the concern is not evident, verify the original symptom (refer to table below).

7.3L DIT ENGINE

Electronic Engine Control Subsystems (Sample Page)

High Pressure Oil Control Subsystem

Description & Operation

The lubrication system is comprised of a low-pressure system and a high-pressure system. The low-pressure system provides primary engine lubrication while the high-pressure system provides the hydraulic pressure required to actuate the fuel injectors.

The low-pressure lubricating system draws oil from the engine oil pan through the oil pump screen cover and tube into the oil inlet passage in the front cover. The Gerotor oil pump pumps the oil back out through the outlet passage in the front cover.

One oil path sends oil flow to the high-pressure pump reservoir initial fill gallery (integral to the cylinder block) and through the anti-drainback check ball. During cold start the oil feeds in two directions from the anti-drainback check ball. One feed leaves the check ball and enters the front cover. From there it enters the high-pressure oil reservoir. The second feed exits the check ball and enters the left bank valve lifter oil gallery.

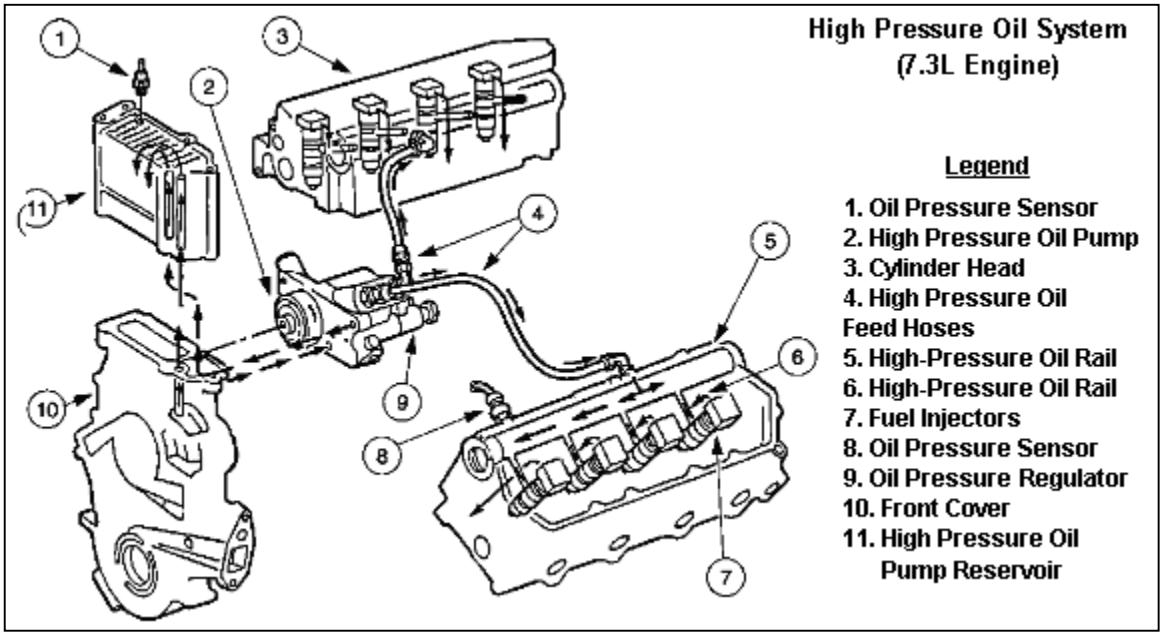
Pressurized oil that enters the turbocharger assembly lubricates the compressor/turbine shaft. The oil drains back through the turbocharger mounting pedestal and back into the oil pan. The valve lifter oil gallery supplies pressurized oil to the valve tappets and to the piston cooling oil jets. Oil from the valve tappets is routed upward to the cylinder head valve train through hollow push rods. Oil drains back to the oil pan through return ports.

High Pressure Oil System Explanation

During initial start or cold start, the high-pressure oil pump receives unfiltered oil from the left side valve lifter oil gallery through the anti-drain back check ball valve. Once the engine starts or during warm engine starts, the check ball closes and the high-pressure oil pump receives filtered oil from the high-pressure oil pump reservoir.

The high-pressure oil pump pumps the oil under extremely high pressures (4,115-20,577 kPa [600-3,000 psi]) through the left and right side high-pressure supply hoses to the high-pressure oil rails (integral to the cylinder heads). Once in the oil rail, oil is fed to the fuel injector bores through oil feed galleries (4) drilled and machined in the cylinder head. The high-pressure oil then actuates the fuel injectors.

High Pressure Oil System Component Graphic



7.3L DIT POWER STROKE ENGINE

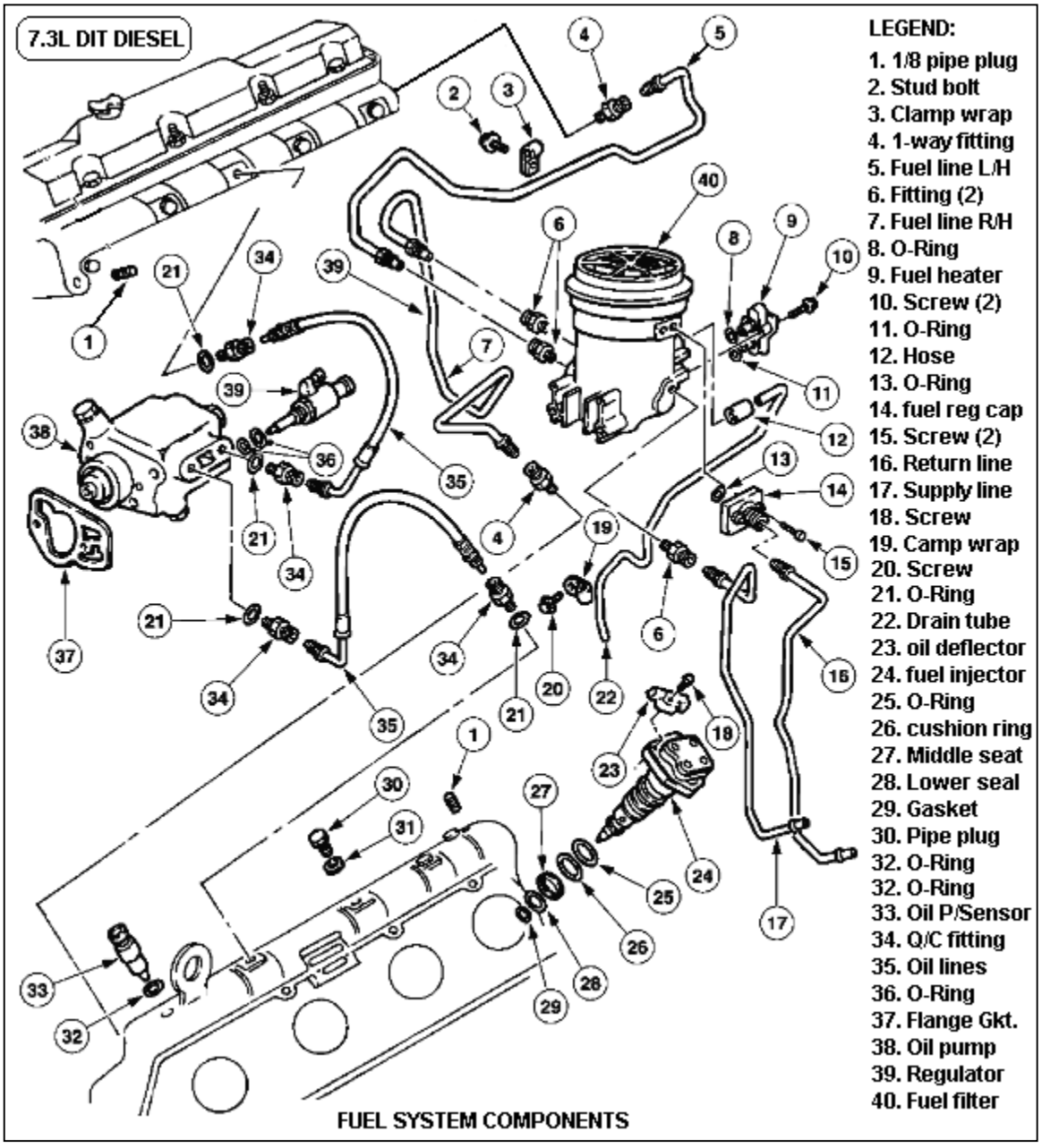
Fuel Charging & Control System (Sample Page)

Fuel Charging & Control

Component List

- Electric inline fuel pump
- High-pressure oil pump
- Oil pressure regulator
- Oil pressure sensor
- Fuel filter & fuel pressure regulator
- High-pressure oil pump reservoir
- Water in fuel switch/fuel heater thermostat

Component List Graphic



FUEL SYSTEM COMPONENTS

7.3L DIT POWER STROKE ENGINE

Related Information (Sample Page)

Parameter Identification Tables

Overview

The information in the Parameter Identification (PID) tables below was captured from a "known good" vehicle with the engine running at hot idle speed unless otherwise noted. This PID information can be used during diagnosis of both Code and No Code problems when you need to compare your "actual" readings to a set of "known good" readings.

Parameter Identification Table (7.3L Power Stroke)

PCM PID Acronym	Parameter Identification	PID Range	PID Value at low idle	PID Value at high idle
4x4L	4x4 Low Switch Input	ON / OFF	ON	OFF
ACCS	A/C Switch Signal	ON / OFF	ON	OFF
AP	Accelerator Pedal Sensor	0-5.1v	0.5-1.6	0.5-4.5
ASMM	A/T Shift Modulator (M)	0v / 12	12	12
BAROV	BARO Sensor (sea level)	0-5.1v	4.75	4.75
BPP	Brake Pedal Position Switch Signal	ON / OFF	OFF	OFF
BPA	Brake Pressure Applied	0v / 12	12	0v
CCS	Coast Clutch Solenoid Control	ON / OFF	OFF	ON
C/S (TCS)	Cancel Switch & TCS On/Off Status (depressed is "on")	0v/ VBAT	Off: 0v	Off: 0v
CPP (M/T)	Clutch Pedal Position Switch Signal	0v / 5v	0v (In)	5v
CRUISE	Cruise Control Module	---	---	---
DTC CNT	DTC Count	0-256	0	0
EBP V	Exhaust Back Pressure Actual	0-5.1v	0.8-0.95	0.9-3.0
EOT	Engine Oil Temperature	0-5.1v	0.35-4.7	0.35-4.7
EPC	Electronic Pressure Control	---	---	---
EPC V	EPC Solenoid - Actual	0-25.5v	7.5	12
EPR	Exhaust Back Pressure Regulator Control	ON / OFF	OFF	ON
FDCS	Fuel Delivery Control Signal	0-999 Hz	49	40-240
GEAR	Gear Position	1-2-3-4	1	4
GPC	Glow Plug Control Duty Cycle	---	---	---
GPMH	Glow Plug Monitor (high side)	ON / OFF	OFF	OFF
GPML	Glow Plug Monitor (left side)	ON / OFF	OFF	OFF
GPMR	Glow Plug Monitor (right side)	ON / OFF	OFF	OFF
GPL	Glow Plug Lamp	ON / OFF	OFF	OFF
IAT	IAT Sensor	0-5.1v	1.5-3.5	1.5-3.5
IAT V	IAT Sensor	-40-304ºF	50-120	50-120
ICP	Injector Control Pressure Sensor (startup is 0.83v)	0-5.1v	0.25-0.40	0.25-0.40
ICP	Injector Control Pressure Actual	0-5.1v	0.25-0.40	0.25-0.40
IPR	Injector Control Pressure Regulator	0-100%	35	40-100
IVS	Idle Validation Switch	ON / OFF	ON	OFF

7.3L DIT POWER STROKE ENGINE

Related Information (Sample Page)

Pin Voltage Tables - Part 1 (Footnotes for Column 1 are located on Page 1-64)

Pin #	Name	Circuit #	Wire Color	Key Off	Key On	Low Idle	High Idle	Operating Range	Comments (2002 F-Series)
2 [f]	Service Engine Soon	658	PK/LG	0v	0v/B+	0v/B+	0v/B+	0v/B+	0v = Light On, B+ = Light Off
3 [a] [b]	MIAHM	3996	RD/YE	0v	0v-B+	0v-B+	0v-B+	0v-B+	Manifold Intake Air Heater Monitor — B+ When Heater is Commanded On
5	PBA	162	LG/RD	7v	0v/B+	0v/B+	0v/B+	0v/B+	Parking Brake Applied Switch; B+ = Brake Off, 0v = Brake On
6 [b] [c]	SS1	237	OG/YE	0.9v	0v	0v	0v	0v/B+	Shift Solenoid #1 0v = "On," B+ = "Off"
8	GPCOMM	1277	WH/LG	0v	0v/B+	0v/B+	0v/B+	0v/B+	GPCM Communication Circuit, Digital 12V Frequency
10	IVS [d], ETC	308, 1285	RD/OG, RD/LG	0v	0v	0v	B+	0v/B+	Idle Validation Signal Circuit; 0v = At Idle, B+ = Off Idle
11 [b] [c]	SS2	315	VT/OG	0.9v	B+	B+	B+	0v/B+	Shift Solenoid #2 0v = "On," B+ = "Off"
12 [b] [c]	TCIL	911	WH/LG	0.9v	0v/B+	0v/B+	0v/B+	0v/B+	Trans Control Indicator Light; 0v = Light "On," B+ = Light "Off"
13	FEPS	107	VT	N/A	N/A	N/A	N/A	N/A	Flash EPROM Power Supply
15	BUS (-)	915	PK/LB	N/A	N/A	N/A	N/A	N/A	Data Link Connector
16	BUS (+)	914	TN/OG	N/A	N/A	N/A	N/A	N/A	Data Link Connector
17 [b] [c]	TR1	1012 [d], 1144	OG/BK, YE/BK	0v	Varies with gear			0v/10.7v	P = 0v, R = 0v, N = 0v, D = 10.7v, MAN2 = 10.7v, MAN1 = 10.7v
18 [j]	ACCR	331	PK/YE	0v	0v/B+	0v/B+	0v/B+	0v/B+	B+ = A/C Relay Command "Off" 0v = A/C Relay Command "On"