

Document Title: Engine characteristic curve (Cummins B5.9-C)	Function Group: 210	Information Type: Service Information	Date: 2014/5/31
Profile:			

Engine characteristic curve (Cummins B5.9-C)

Engine characteristics

Item	Specification
Rated output	145 PS/1900 rpm (143 HP/1900 rpm)
Max. torque (Net)	63 kgf·m/1500 rpm (455 lbf·ft/1500 rpm)
Min. fuel consumption	151g / PS·h
Rated fuel consumption	158g / PS·h

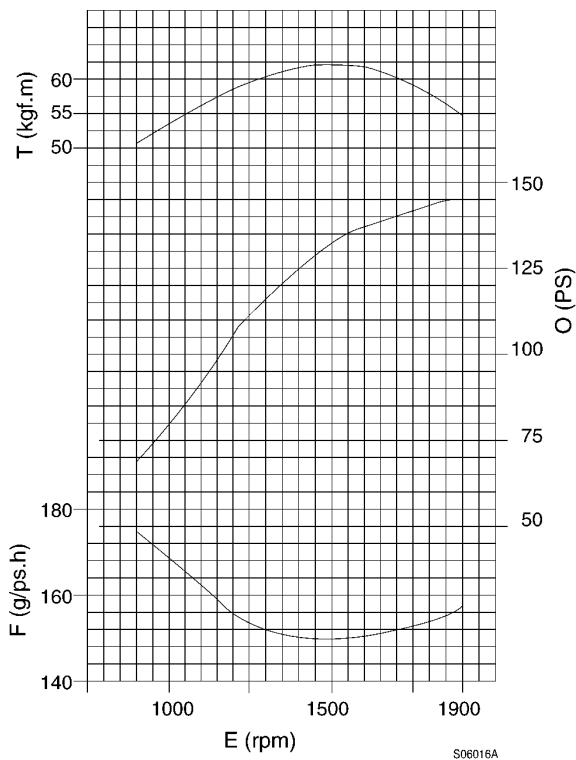


Figure 1
Engine, characteristic curve

- T. Torque
- F. Fuel consumption
- O. Output
- E. Engine speed

Document Title: Engine, description (Cummins B5.9-C)	Function Group: 210	Information Type: Service Information	Date: 2014/5/31
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Engine, description (Cummins B5.9-C)

- The engine is a 6-cylinder, 4-stroke, direct injected, turbocharged, aftercooled, water cooled assembly with a cast iron block and cylinder head.
- Gears in the engine gear case are hardened helical type for strength and reduced noise, arranged to provide quiet, smooth transmission of power.
- The cylinder block and head are designed with internal passages formed as sets for lubrication and cooling. The water pump and oil cooler are integrally mounted.
- The fan belt is a poly type V-belt for improved performance and an auto tension adjuster maintains belt tension.

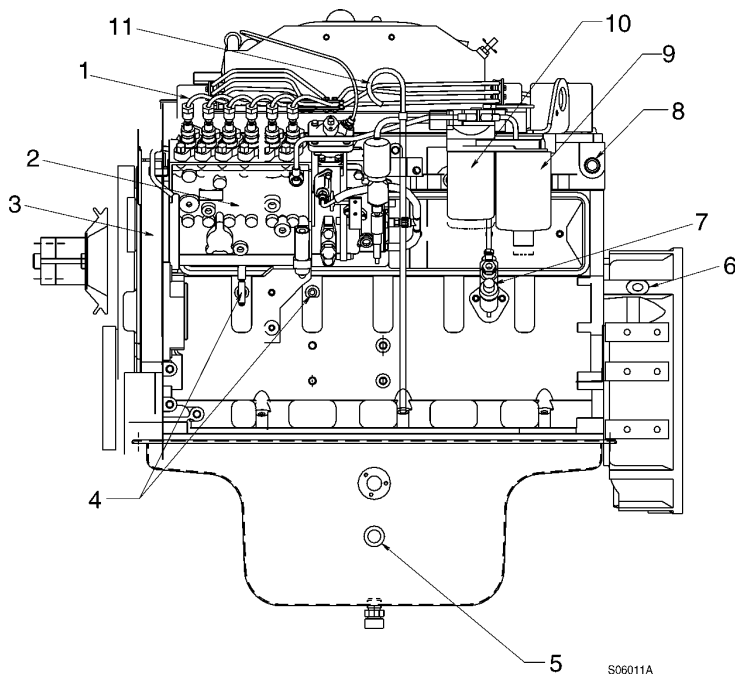


Figure 1
Engine, fuel filter side view

1. High pressure fuel line
2. Fuel injection pump
3. Engine data plate
4. Engine oil pressure sensor port (1/8" NPTF)
5. Engine oil heater port (M22 × 1.5P)
6. Engine speed sensor port (3/4"-16 UNF)
7. Fuel feed pump
8. Water temperature sensor port (3/4" NPTF)
9. Primary fuel filter/water separator
10. Secondary fuel filter
11. Dipstick

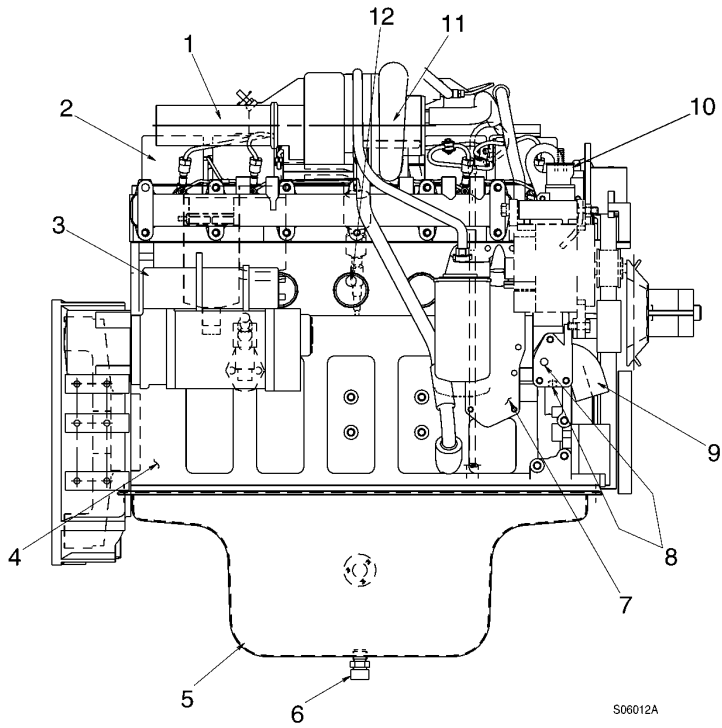


Figure 2
Engine, turbocharger side view

1. Exhaust gas discharge port
2. Valve cover
3. Starter
4. Engine block
5. Oil pan
6. Engine oil drain valve (M22 × 1.5P)
7. Engine oil cooler
8. Water temperature switch port (PT 1/2")
9. Water inlet
10. Thermostat
11. Turbocharger
12. Block heater port

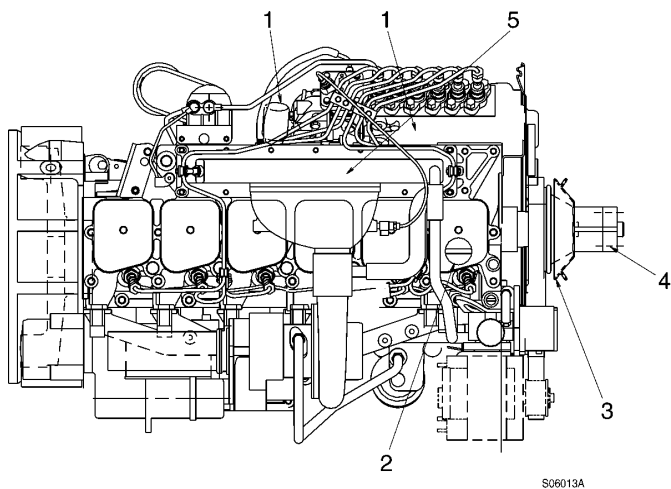
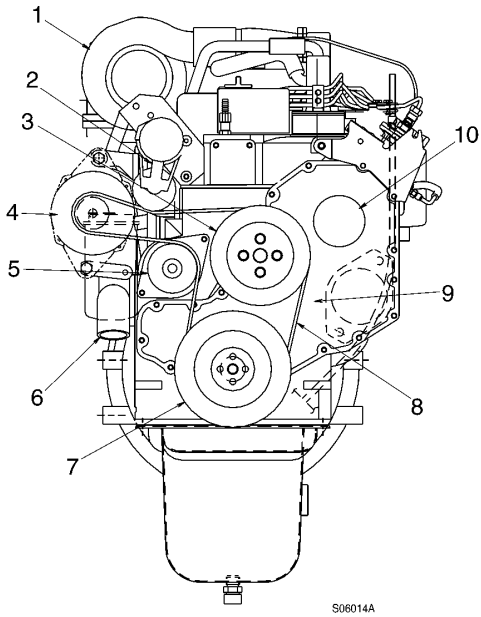


Figure 3
Engine, top view

1. Fuel shut-off solenoid

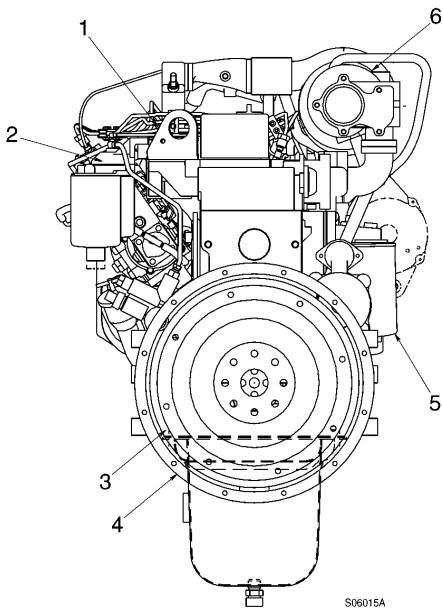
- 2. Engine oil refill plug
- 3. Fan drive and pulley
- 4. Fan spacer
- 5. Aftercooler



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Figure 4
Engine, front view

- 1. Turbocharger
- 2. Automatic belt tensioner
- 3. Fan pulley
- 4. Alternator
- 5. Water pump
- 6. Water inlet
- 7. Vibration damper
- 8. Fan belt
- 9. Gear cover
- 10. Fuel injection pump gear cover



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Figure 5
Engine, rear view

1. Engine lifting eye
2. Fuel filter head
3. Flywheel
4. Flywheel housing
5. Engine oil filter
6. Turbocharger

Document Title: Valve clearance adjustment	Function Group: 214	Information Type: Service Information	Date: 2014/5/12
Profile:			

Valve clearance adjustment

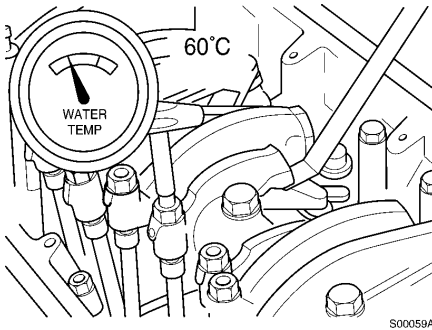
Cummins B5.9-C

Valves must be correctly adjusted for the engine to operate efficiently. Valve adjustment must be performed using the specified values.

Adjust the valves at each 1000 hours or 1 year maintenance interval.

All the valve adjustments must be made when the engine is cold and stabilized coolant temperature is 60°C or below.

- Turn the valve adjustment screws in until touching the push rod sockets, and then loosen them one full turn. Use 1/2" drive, Part No. 3377371 Engine Barring Tool.

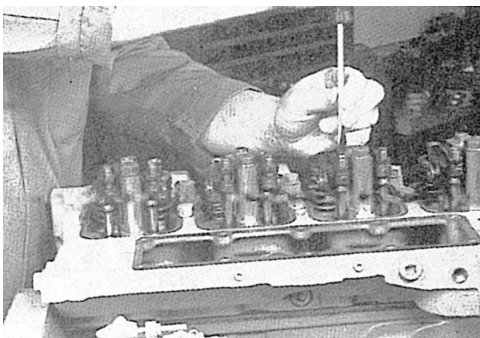


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Figure 1

Valve clearance adjustment condition

- Locate top dead center for cylinder No.1 by rotating the crankshaft slowly while pressing on the engine timing pin. When the pin engages the hole in the camshaft gear, cylinder No.1 is at top dead center on the compression stroke.



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Figure 2

Valve clearance

Inlet valve	0.25 mm	0.010 in
Exhaust valve	0.51 mm	0.020 in

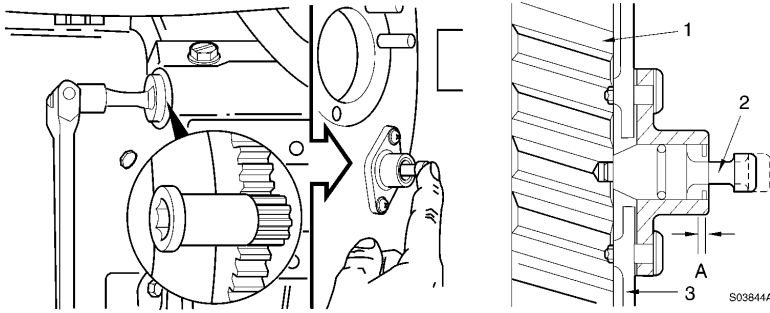


Figure 3
Rotation, camshaft gear

1. Camshaft gear
 2. Timing pin
 3. Gear housing
- A. Compression stroke

CAUTION

Disengage the timing pin. Engine components may be damaged if the engine is rotated with the timing pin engaged.

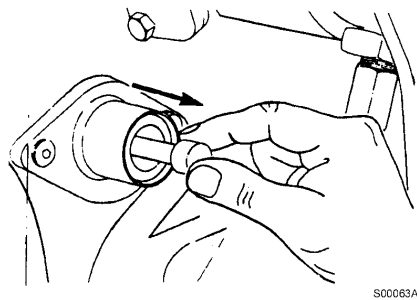


Figure 4
Removal, timing pin

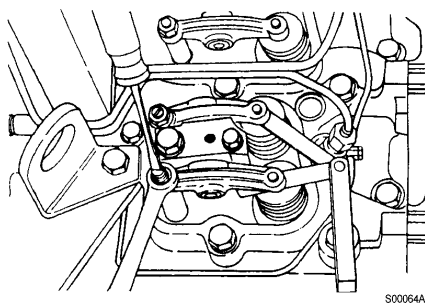


Figure 5
Adjustment, clearance between the valve stem and rocker lever

Tools : 14 mm spanner, "—" screwdriver, feeler gauge.

- The clearance is correct when slight resistance is felt as the feeler gauge is moved between the valve stem and rocker lever. At that point, tighten the lock nut. (Tightening torque : 24 N·m)
- Adjust the valves indicated (*) in the table below.
- After tightening the lock nut, check the valve clearance again. If the clearance is not correct, readjust.

Valves to be adjusted (*)

Cylinder	1	2	3	4	5	6
Inlet (I)	*	*		*		
Exhaust (E)	*		*		*	

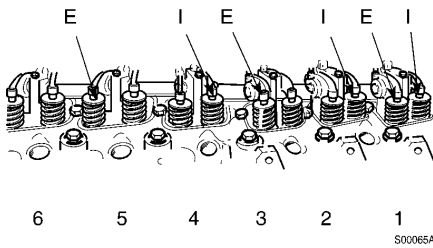


Figure 6
Valves to be adjusted

CAUTION

Be sure the timing pin is disengaged.

NOTE!

Mark the crankpulley and cover.

NOTE!

Rotate the crankshaft 360°.

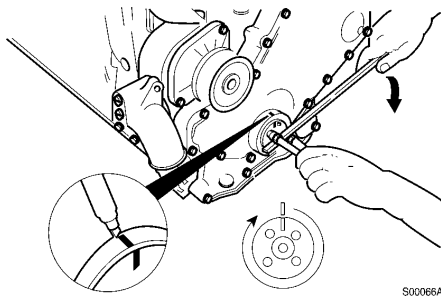


Figure 7
Marking, crankpulley

- Adjust the valves indicated (*) in the table below. After tightening the lock nut, check the valve clearance again. If the clearance is not correct, readjust.

Valves to be adjusted (*)

Cylinder	1	2	3	4	5	6
Inlet (I)			*		*	*
Exhaust (E)		*		*		*

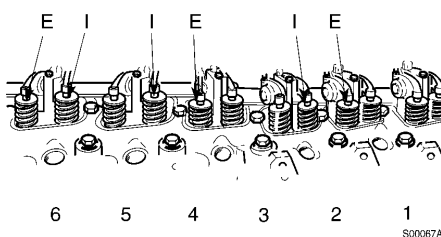


Figure 8
Valves to be adjusted

- Assemble the gaskets, valve covers, o-rings and special screws.

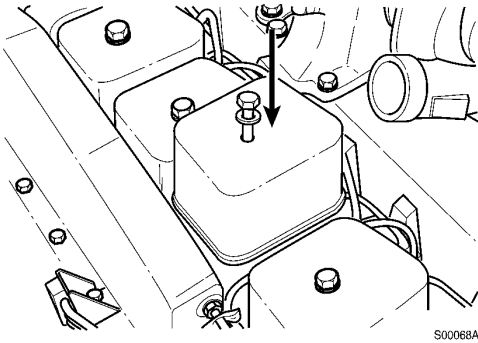


Figure 9
Assembly, valve covers

Tools : 16 mm spanner
Tightening torque : 24 N·m (18 lbf·ft)

NOTE!
Check valve covers and o-rings. If damaged, replace with a new one.

Injection nozzles installation

- Assemble a sealing washer on each injection nozzle. Use only one sealing washer.

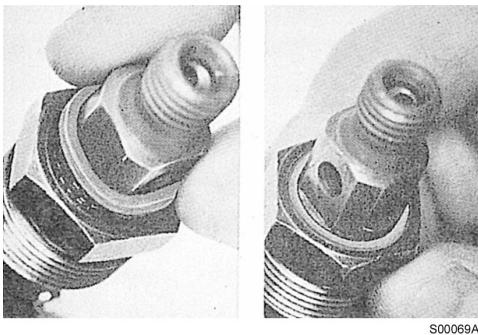


Figure 10
Assembly, injection nozzles

- Apply anti-seize compound to the threads of the injector hold-down nut and between the top of the nut and injector body.



Figure 11
Apply, anti-seize compound

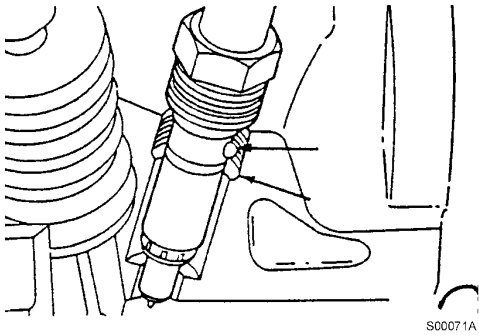


Figure 12
Installation, injection nozzle

Tools : 16 mm spanner, 24 mm Deep socket
Tightening torque : 60 N·m (44 lbf·ft)

NOTE!

Install the injection nozzle. The protrusion on the injector body fits into a notch in the cylinder head to position the injector. Tighten the injection nozzle nuts.

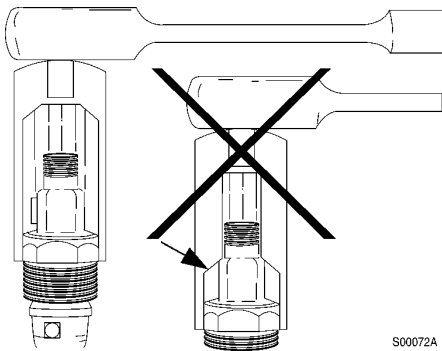


Figure 13
Tightening, injection nozzle

NOTE!

Some sockets can damage the sealing surface of the fuel drain outlet.

Document Title: Engine mounting	Function Group: 218	Information Type: Service Information	Date: 2014/5/12
Profile:			

Engine mounting

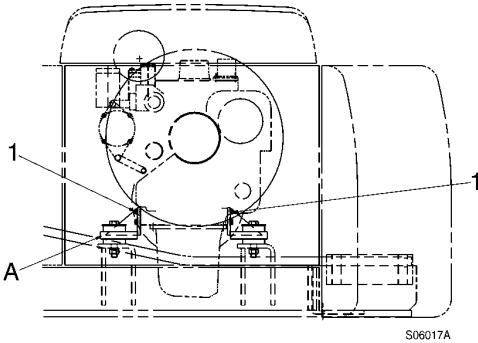


Figure 1
Engine mounting, front-fan side view

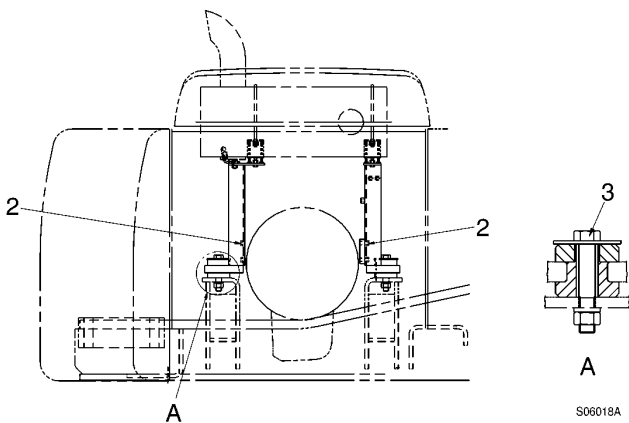


Figure 2
Engine mounting, rear-flywheel side view

A. A-details (cushion)

NOTE!

Check the color markings for cushion installation.

Cushion (A-details)

Front (fan side) - Yellow and white

Rear (flywheel side) - Blue and white

Tightening torque, unit : kgf·m (lbf·ft)

No.	Mounting position	Tightening torque
1	Engine mounting bracket (front) * Apply loctite # 243	M12 × 1.75 × 35L (4)
		M12 × 1.75 × 65L (2)
		11 ~ 12 (80 ~ 87)
2	Engine mounting bracket (rear)	M12 × 1.75 × 50L

	* Apply loctite # 243	7.2 ~ 8.4 (52 ~ 61)
3	Engine mounting cushion	M22 × 2.5 × 130L
		69.4 ± 6.9 (501 ± 50)

Document Title: Lubricating description	system, 220	Function Group: 220	Information Type: Service Information	Date: 2014/5/31
Profile:				

Lubricating system, description

- Engine lubricating oil is supplied to the contact faces of rotating components such as turbocharger, crankshaft, camshaft, piston, inlet/exhaust valve, rocker arm and timing gear by means of forced lubrication from the oil pump.

Lubricating oil flow diagram

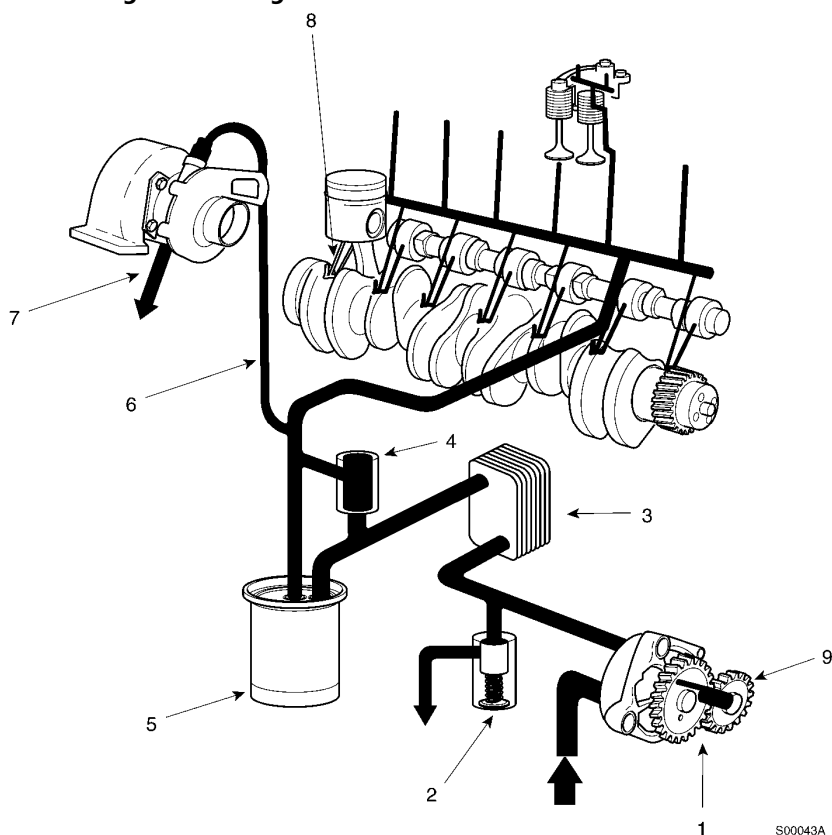


Figure 1
Lubrication oil flow

1. Oil pump
2. Pressure regulating valve
3. Oil cooler
4. Filter bypass valve
5. Oil filter
6. Turbocharger oil supply
7. Turbocharger to oil pan
8. Piston cooling nozzle
9. Oil pump idler gear

Document Title: Fuel injection system (Cummins B5.9-C)	Function Group: 230	Information Type: Service Information	Date: 2014/5/31
Profile:			

Fuel injection system (Cummins B5.9-C)

- Highly pressurized fuel compressed by the fuel pump is direct injected through the injection nozzle into the combustion chamber.
- Remaining fuel after injection is returned to tank automatically.
- A water separator installed to protect the fuel system components provides a means to drain off the water and contaminants collected from the system.

Fuel flow system diagram

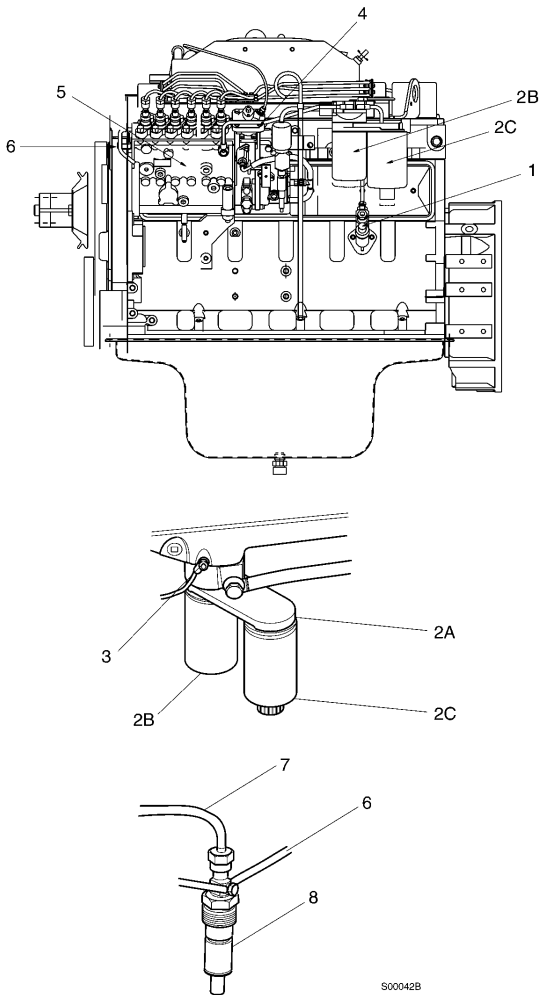


Figure 1
Diagram, fuel system

1. Fuel feed pump
2. Fuel filter
 - 2A. Filter bracket
 - 2B. Secondary fuel filter

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