

100-002 Engine Diagrams

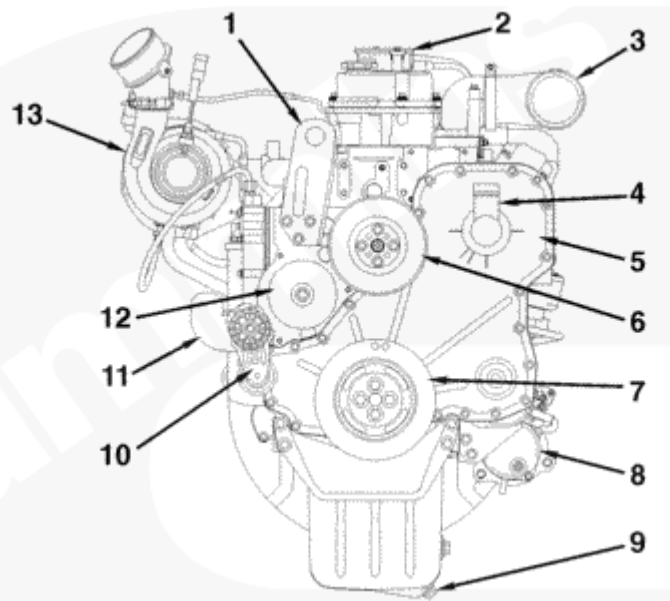
Engine Views

With CM850

The following illustrations provide the locations of the major external engine components, filters, and other service and maintenance points. Some external components will be at different locations for different engine models.

NOTE: The illustrations are only a reference to show a typical engine.

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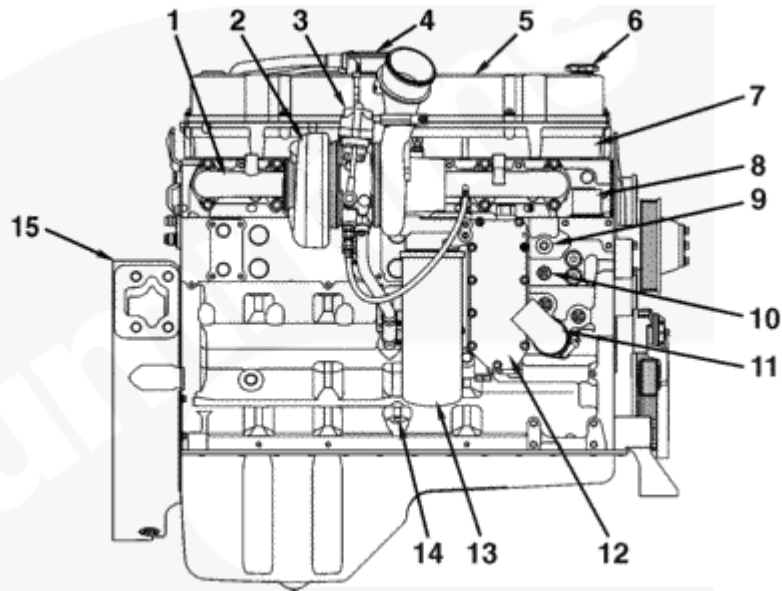
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Front View (ISC, QSC8.3, ISL, and QSL9)

1. Engine lifting bracket
2. Crankcase breather
3. Air intake connection
4. Engine oil fill
5. Front gear cover
6. Fan pulley
7. Vibration Damper
8. Starter
9. Engine oil pan drain plug

10. Automatic belt tensioner
11. Coolant inlet connection
12. Water pump
13. Turbocharger (Variable Geometry Turbocharger shown)

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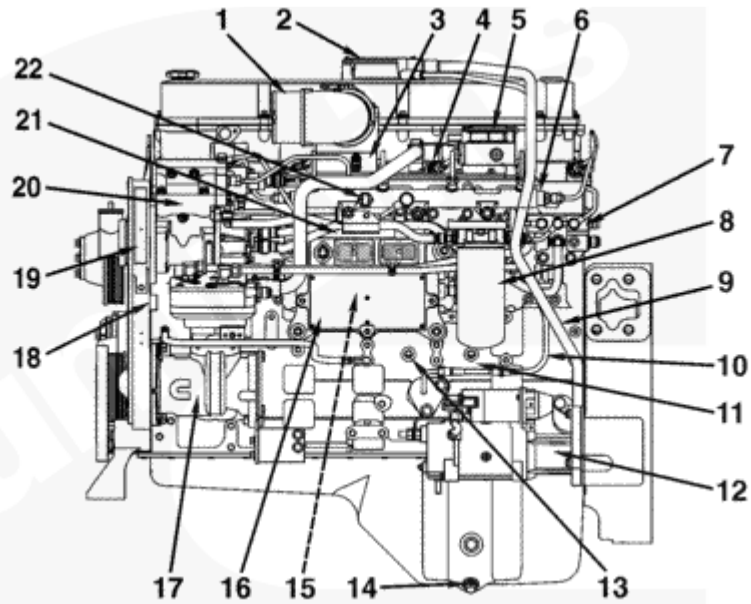


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Exhaust Side View (ISC, QSC8.3, ISL, and QSL9)

1. Exhaust manifold
2. Turbocharger (variable geometry turbocharger shown)
3. Variable geometry turbocharger actuator
4. Crankcase breather
5. Rocker lever cover
6. Engine oil fill
7. Rocker lever housing
8. Coolant outlet connection
9. Coolant heater port
10. Coolant inlet connection
11. Lubricating oil cooler
12. Lubricating oil filter
13. Dipstick location
14. Flywheel housing

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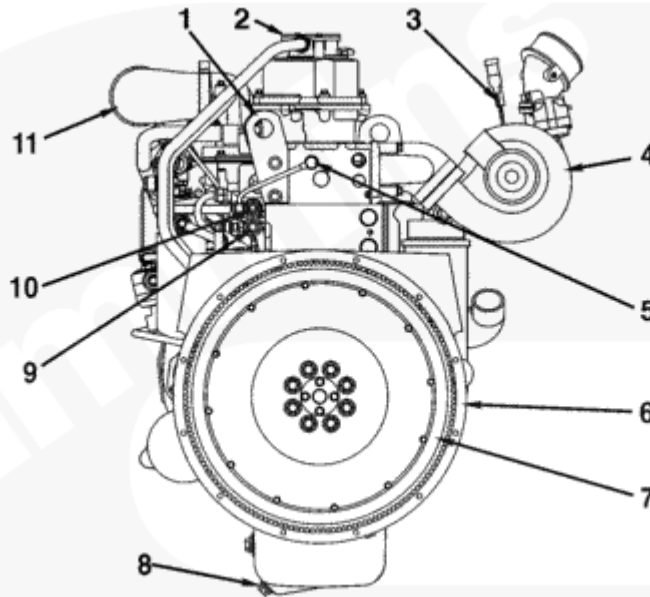


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Intake Side View (ISC, QSC8.3, ISL, and QSL9)

1. Air intake connection
2. Crankcase breather
3. Intake air heater
4. Turbocharger control valve
5. Fuel rail
6. Fuel drain manifold
7. Fuel filter
8. Crankcase breather draft tube
9. Crankcase breather oil drain tube
10. Starter
11. Engine oil drain plug
12. Fuel lift pump (behind ECM)
13. Electronic control module (ECM)
14. Air compressor
15. Engine data plate
16. High-pressure fuel pump

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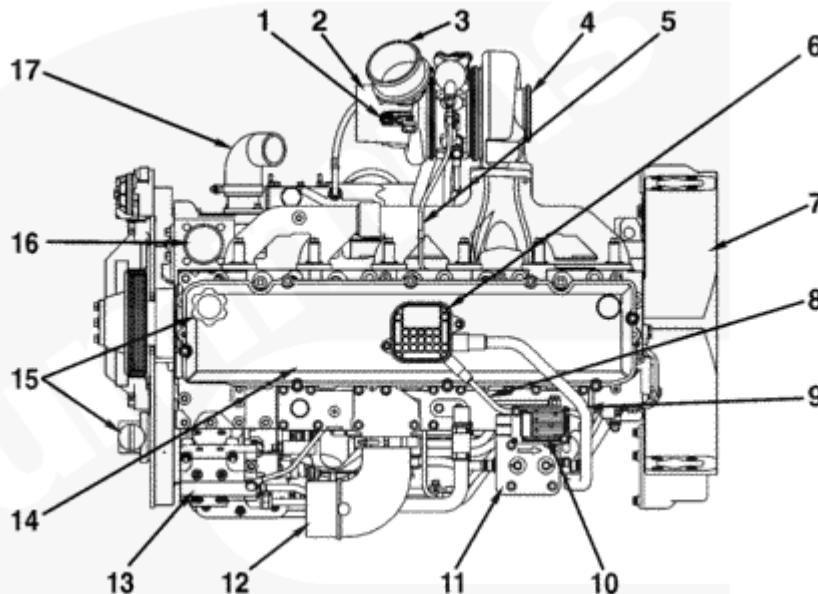


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Rear View (ISC, QSC8.3, ISL, and QSL9)

1. Engine lifting bracket
2. Crankcase breather
3. Turbocharger (variable geometry turbocharger shown)
4. Injector drain line connection
5. Flywheel housing
6. Flywheel
7. Engine oil drain plug
8. OEM fuel supply line connection
9. OEM fuel drain line connection
10. Air intake connection

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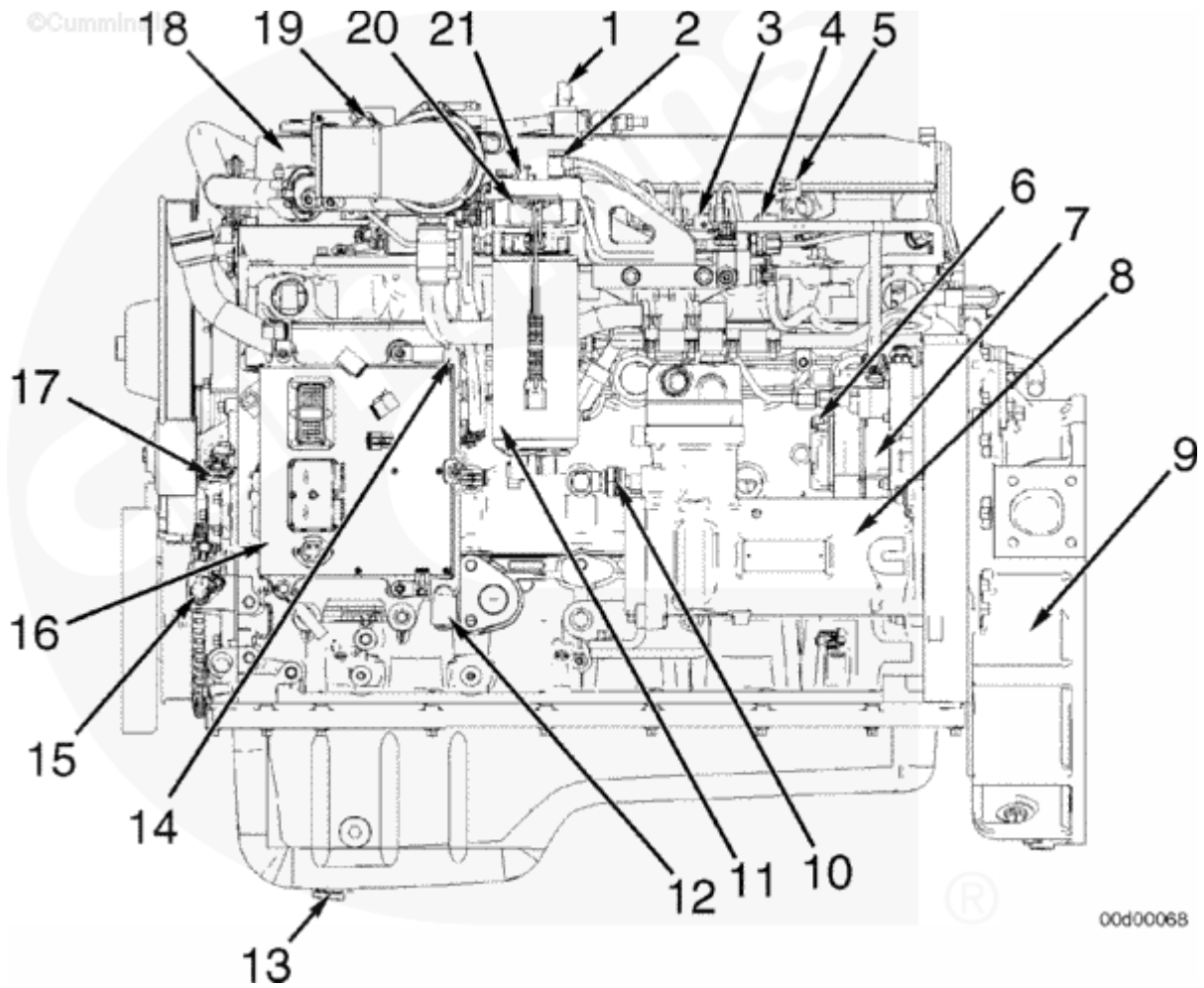


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Top View (ISC, QSC8.3, ISL, and QSL9)

1. Coolant inlet connection
2. Turbocharger air inlet
3. Turbocharger air outlet
4. Turbocharger exhaust outlet
5. Turbocharger actuator air line
6. Crankcase breather
7. Flywheel housing
8. Crankcase breather oil drain tube
9. Crankcase breather draft tube
10. Turbocharger control valve
11. Fuel filter bracket
12. Air inlet connection
13. High-pressure fuel pump
14. Engine oil fill
15. Coolant outlet connection

ISB

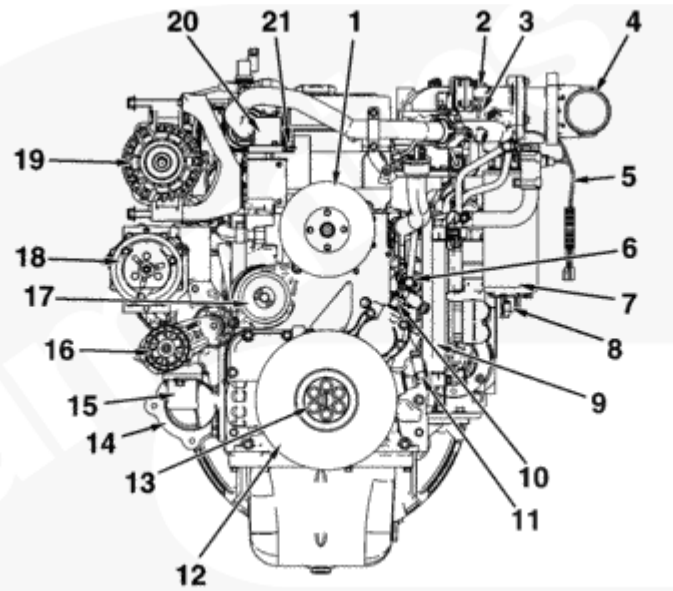


Intake Side View (CM850 Electronic Control Module)

1. Exhaust pressure sensor
2. Fuel rail pressure relief valve
3. Fuel rail
4. Intake manifold pressure sensor
5. Intake temperature sensor
6. Electronic fuel control (EFC) actuator
7. Bosch® fuel pump
8. Air compressor
9. Flywheel housing
10. Oil pressure switch
11. Fuel filter
12. Fuel inlet to cooling plate
13. Oil pan drain plug
14. Barometric pressure sensor
15. Engine speed sensor (crankshaft)
16. Electronic control module
17. Engine speed sensor (camshaft)
18. Air intake inlet

19. EGR temperature sensor
20. Fuel heater
21. Fuel rail pressure sensor.

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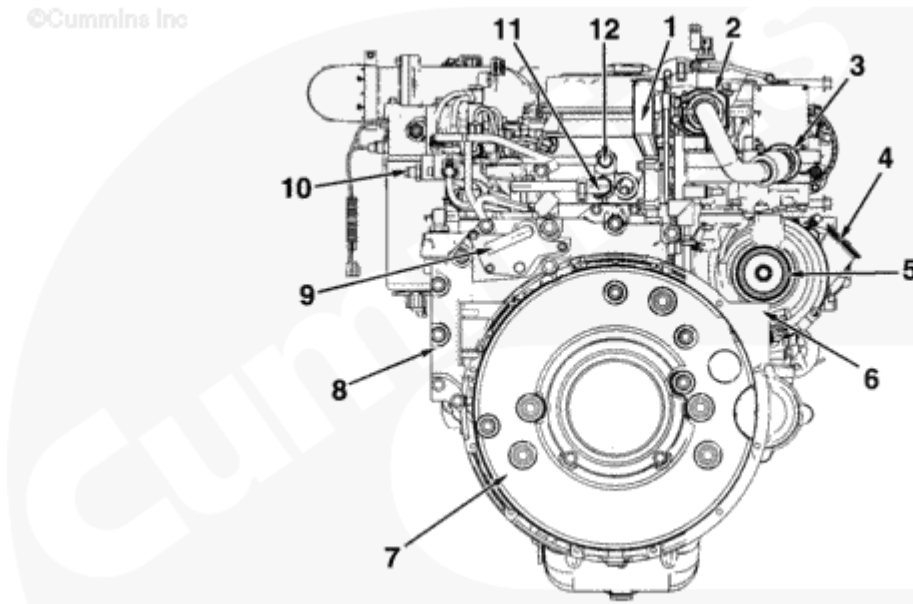


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Front View (CM850 Electronic Control Module)

1. Fan drive
2. EGR differential pressure sensor
3. EGR temperature sensor
4. Air inlet
5. Fuel heater
6. Fuel lift pump
7. Fuel filter
8. Water-in-fuel sensor
9. Electronic control module
10. Engine speed sensor (camshaft)
11. Engine speed sensor (crankshaft)
12. Vibration damper
13. Fan or PTO drive flange mounting
14. Starter
15. Coolant inlet
16. Belt tensioner
17. Water pump
18. Freon compressor
19. Alternator
20. Coolant outlet
21. Coolant temperature sensor.

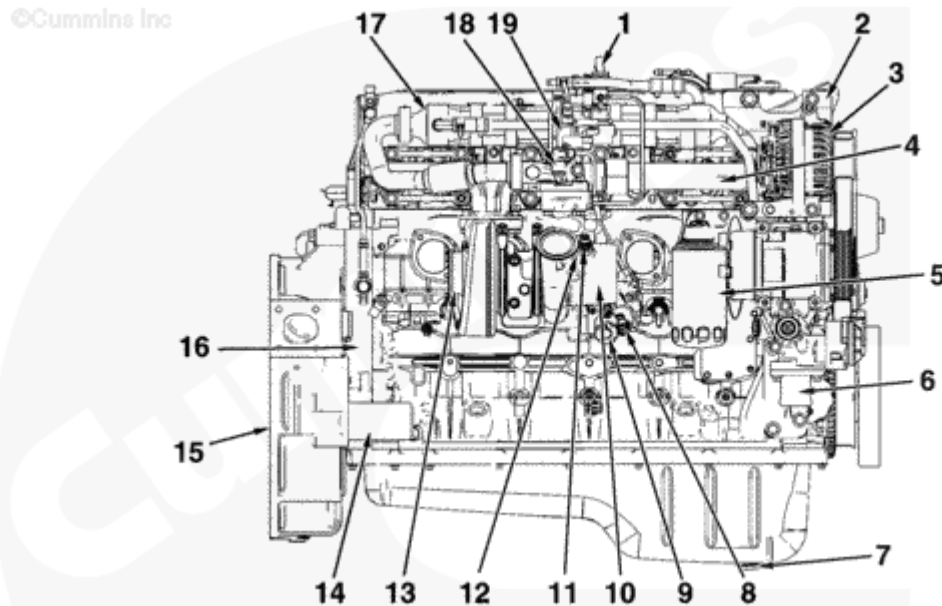
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Rear View (CM850 Electronic Control Module)

1. Breather tube (valve cover to gear housing)
2. EGR cooler
3. EGR valve
4. Air outlet from turbocharger
5. Turbocharger exhaust outlet
6. Flywheel housing
7. Flywheel
8. Gear housing
9. Crankcase breather
10. Fuel out (return to tank)
11. Coolant connection for air compressor
12. Fuel return line.

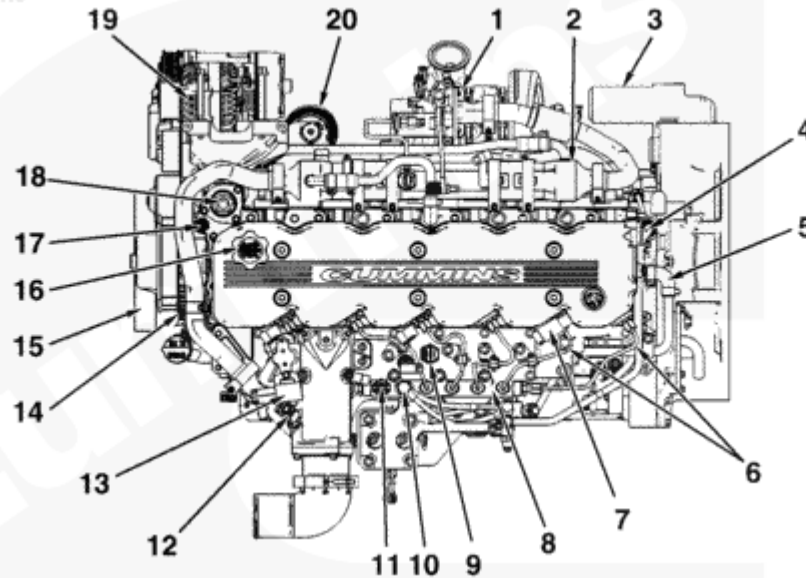


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Exhaust Side View (CM850 Electronic Control Module)

1. Exhaust pressure sensor
2. Coolant outlet
3. Alternator
4. Exhaust manifold
5. Oil filter
6. Coolant inlet
7. Oil pan drain plug
8. Turbocharger position sensor
9. Turbocharger actuator
10. Turbocharger compressor inlet
11. Compressor inlet temperature sensor
12. Turbocharger speed sensor
13. Turbocharger exhaust outlet
14. Starter
15. Flywheel housing
16. Gear housing
17. EGR cooler
18. EGR valve
19. EGR actuator.

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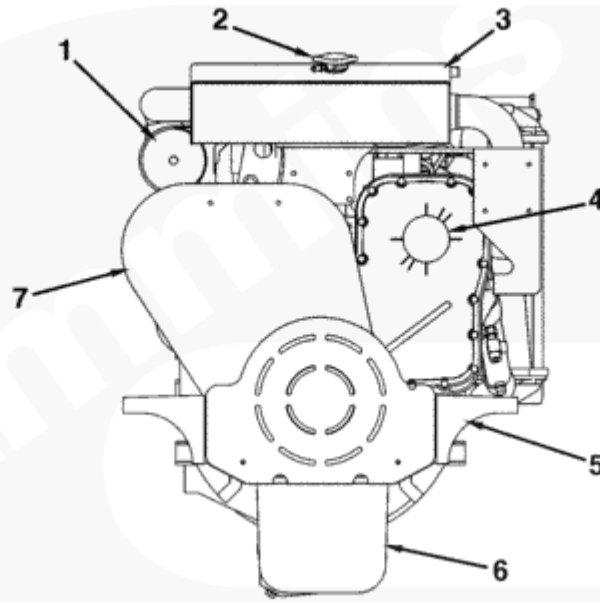
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Top View (CM850 Electronic Control Module)

1. EGR valve
2. EGR cooler
3. Starter
4. Breather tube (valve cover to gear housing)
5. Air compressor cooling connection
6. High-pressure fuel lines
7. Intake temperature sensor
8. Fuel rail
9. Intake manifold pressure sensor
10. Fuel rail pressure relief valve
11. Fuel rail pressure sensor
12. EGR temperature sensor
13. EGR differential pressure sensor
14. Tone wheel
15. Vibration damper
16. Oil fill cap
17. Coolant temperature sensor
18. Coolant outlet
19. Alternator
20. Oil filter.

Marine Applications

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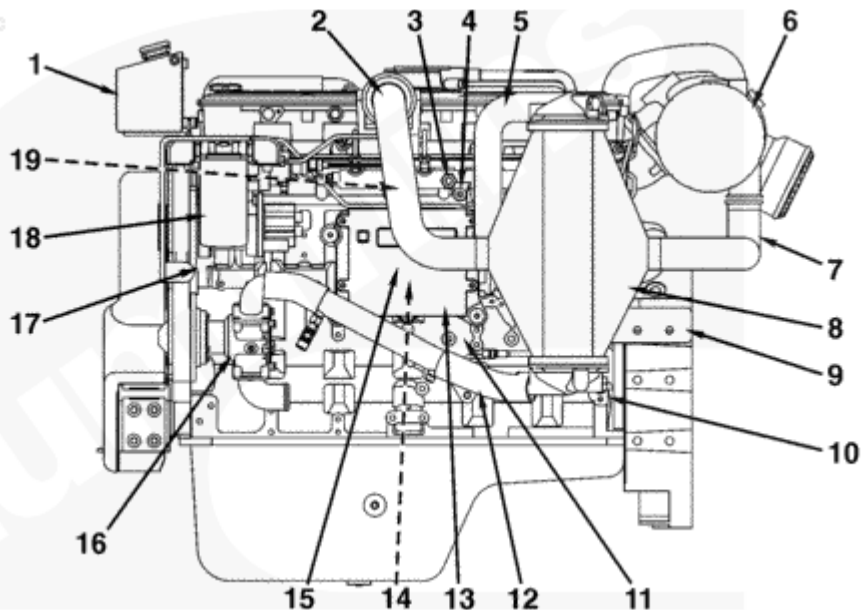


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QSL Front View (CM850 Electronic Control Module)

1. Heat exchanger
2. Coolant fill cap
3. Expansion tank
4. Timing case cover
5. Engine mounting bracket
6. Oil pan
7. Belt and fan guard.

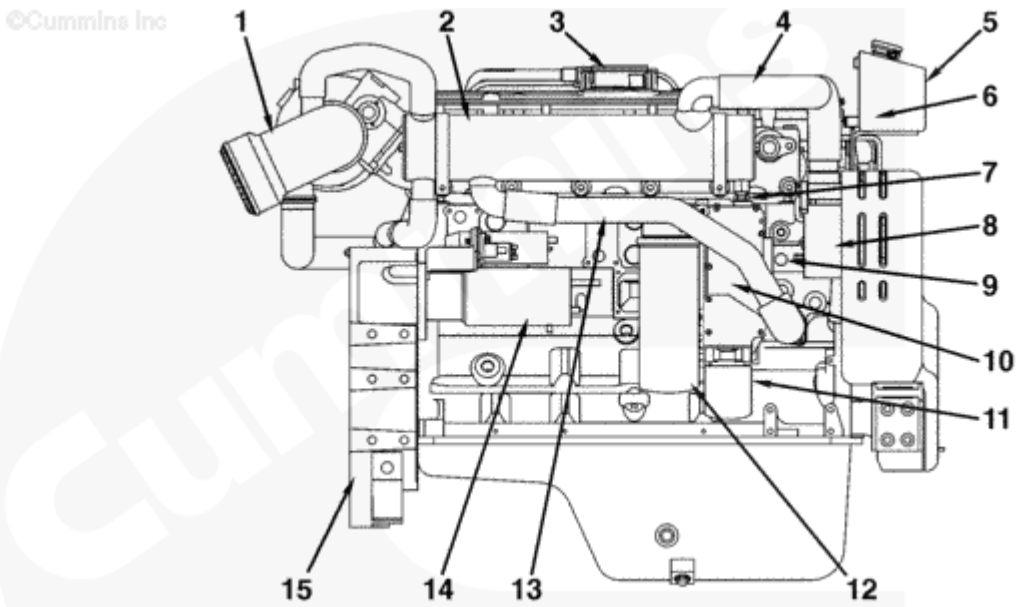
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QSL Port View (CM850 Electronic Control Module)

1. Expansion tank
2. Aftercooler air outlet
3. Intake manifold temperature sensor
4. Intake manifold pressure sensor
5. Aftercooler seawater outlet
6. Air cleaner or filter
7. Aftercooler air inlet
8. Aftercooler housing
9. SAE number 1 flywheel housing
10. Crankshaft speed sensor
11. Oil pressure sensor
12. Aftercooler seawater inlet
13. Engine control module (ECM)
14. Fuel lift pump (behind ECM)
15. SIM module
16. Seawater pump
17. Camshaft position sensor
18. Fuel filter
19. Fuel rail pressure sensor (behind aftercooler air outlet).

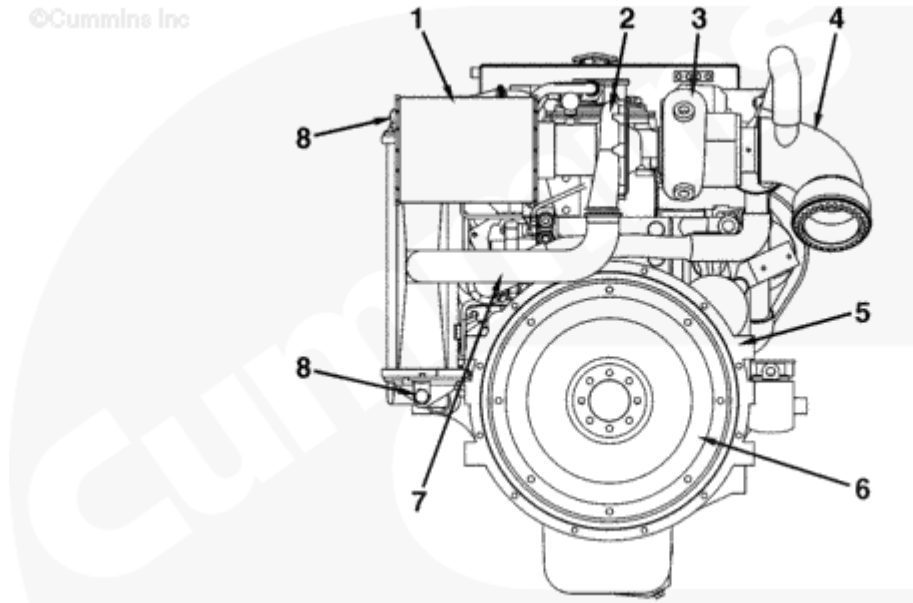


QSL Starboard View (CM850 Electronic Control Module)

1. Water cooled exhaust elbow
2. Heat exchanger
3. Crankcase breather
4. Heat exchanger coolant inlet
5. Expansion tank
6. Coolant level sensor
7. Zinc anode
8. Alternator

9. Coolant temperature sensor
10. Lubricating oil cooler
11. Coolant filter
12. Lubricating oil filter
13. Heat exchanger coolant outlet
14. Starter motor
15. SAE number 1 flywheel housing.

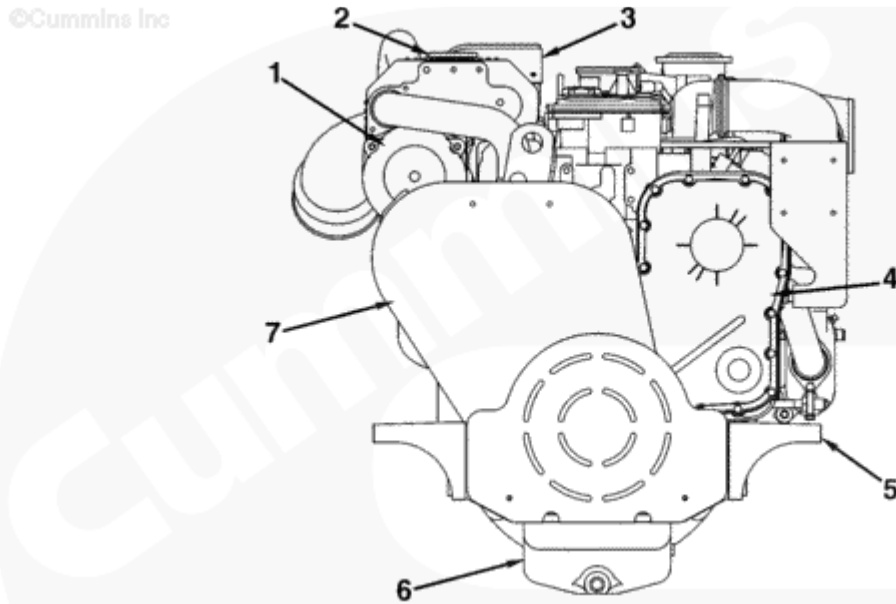
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Rear View QSL (CM850 Electronic Control Module)

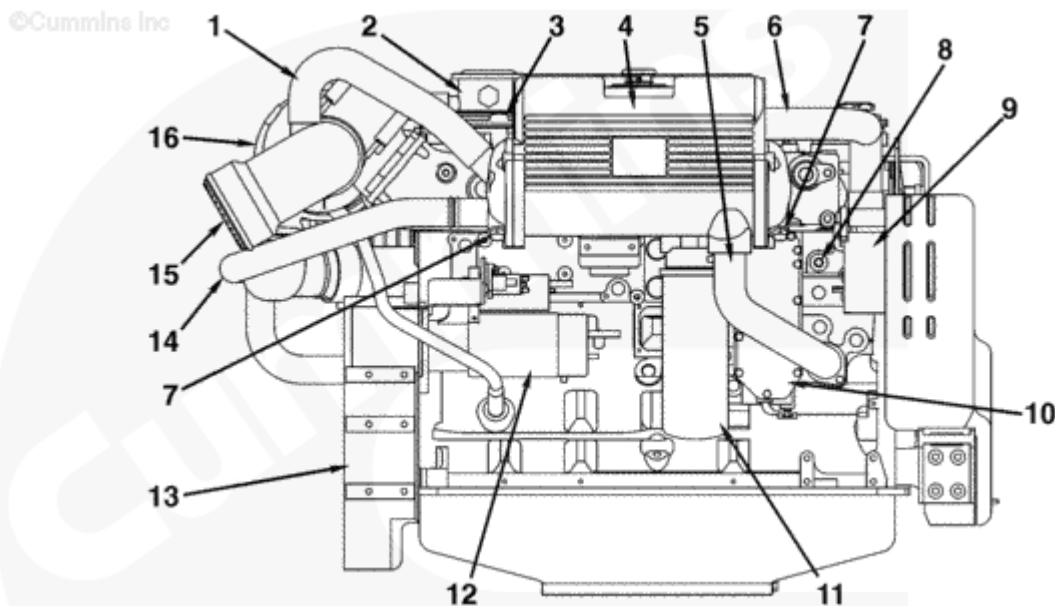
1. Air cleaner and filter
2. Turbocharger compressor side
3. Turbocharger exhaust turbine side
4. Water cooled exhaust elbow
5. SAE number 1 flywheel housing
6. Flywheel
7. Aftercooler air inlet
8. Aftercooler zinc anode.



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Front View (QSC) (CM850 Electronic Control Module)

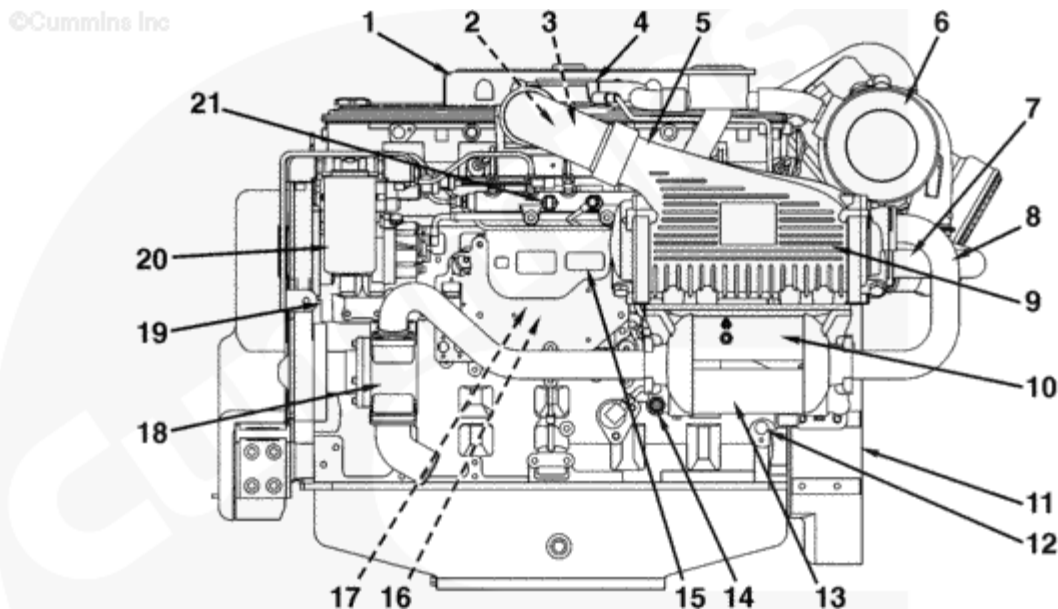
- 1. Heat exchanger
- 2. Coolant fill cap
- 3. Expansion tank
- 4. Timing case cover
- 5. Engine mounting bracket
- 6. Oil pan
- 7. Belt and pulley guard.



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QSC Starboard View (CM850 Electronic Control Module)

1. Seawater outlet from heat exchanger
2. Vacuum regulator for air filter
3. Coolant level sensor
4. Expansion tank
5. Coolant outlet from heat exchanger
6. Coolant inlet to heat exchanger
7. Zinc anodes
8. Coolant temperature sensor
9. Alternator
10. Lubricating oil cooler
11. Lubricating oil filter
12. Starter motor
13. SAE number 1 flywheel housing
14. Seawater inlet to heat exchanger
15. Exhaust Elbow
16. Turbocharger.

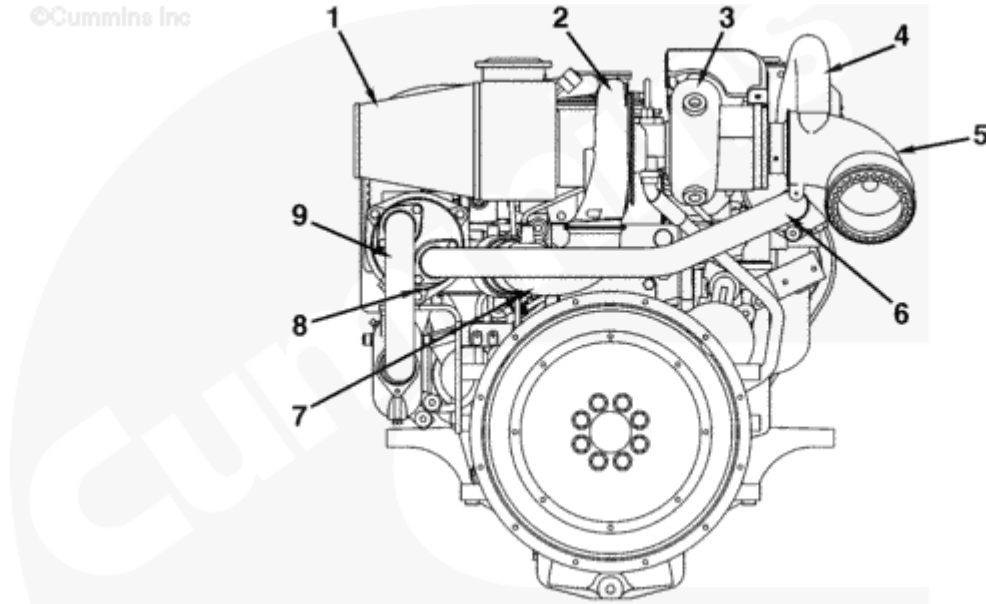


QSC Port View (CM850 Electronic Control Module)

1. Expansion tank
2. Intake manifold temperature sensor (behind aftercooler air outlet)
3. Intake manifold pressure sensor (behind aftercooler air outlet)
4. Crankcase breather
5. Aftercooler air outlet
6. Air cleaner or filter
7. Aftercooler seawater outlet
8. Aftercooler seawater inlet
9. Aftercooler housing
10. Fuel cooler
11. SAE number 1 flywheel housing

12. Crankshaft speed sensor
13. Gear cooler
14. Oil pressure sensor
15. Engine control module (ECM)
16. Fuel lift pump (behind ECM)
17. SIM module
18. Seawater Pump
19. Camshaft position sensor
20. Fuel filter
21. Fuel rail pressure sensor.

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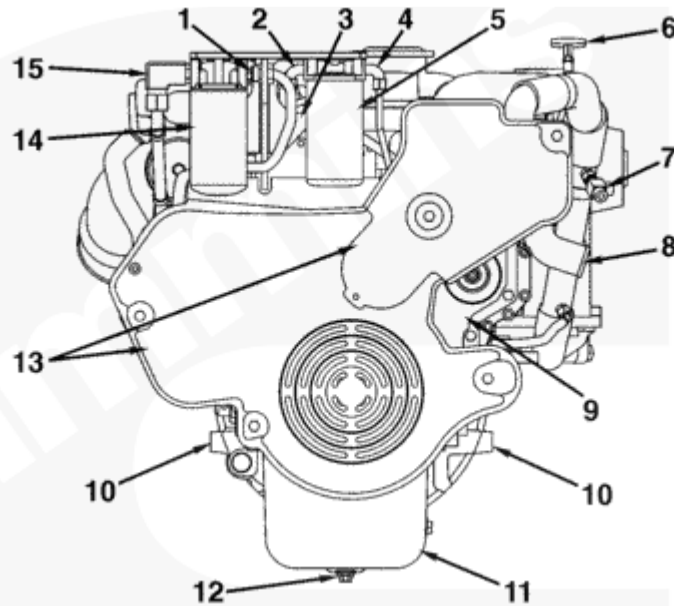


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QSC Rear View (CM850 Electronic Control Module)

1. Air cleaner or filter
2. Turbocharger compressor side
3. Turbocharger exhaust side
4. Heat exchanger seawater outlet
5. Seawater cooled exhaust elbow
6. Heat exchanger seawater inlet
7. Aftercooler air inlet
8. Aftercooler drain valve.
9. Aftercooler seawater inlet

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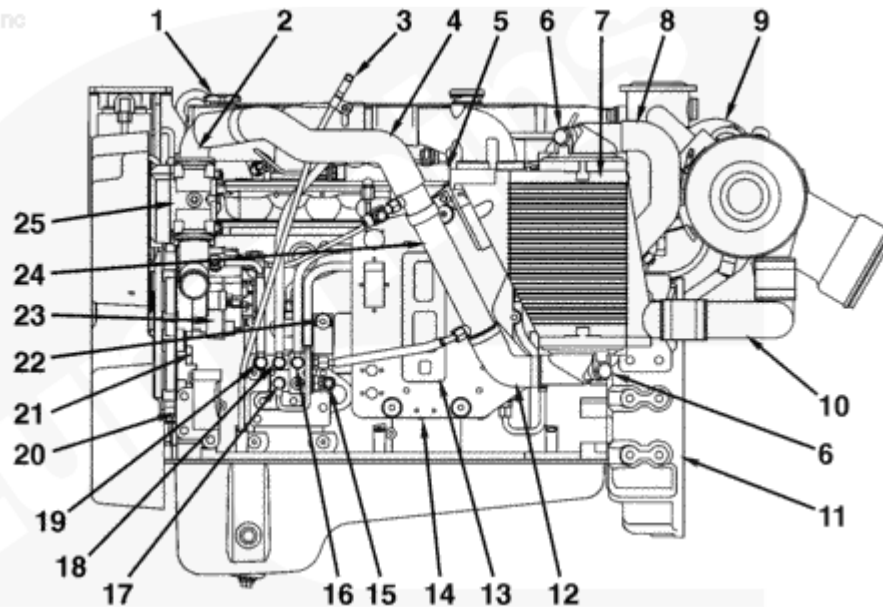


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QSB Front View (CM850 Electronic Control Module)

1. Lubricating oil filter head outlet
2. Fuel filter head outlet to high pressure fuel pump
3. Coolant temperature sensor
4. Fuel filter head inlet from lift pump
5. Fuel filter
6. Lubricating oil dipstick
7. Fuel return from fuel cooler to tank
8. Sea water pump inlet
9. Timing case cover
10. Mounting brackets
11. Oil pan
12. Lubricating oil drain
13. Belt and pulley guards
14. Lubricating oil filter
15. Lubricating oil filter head inlet.

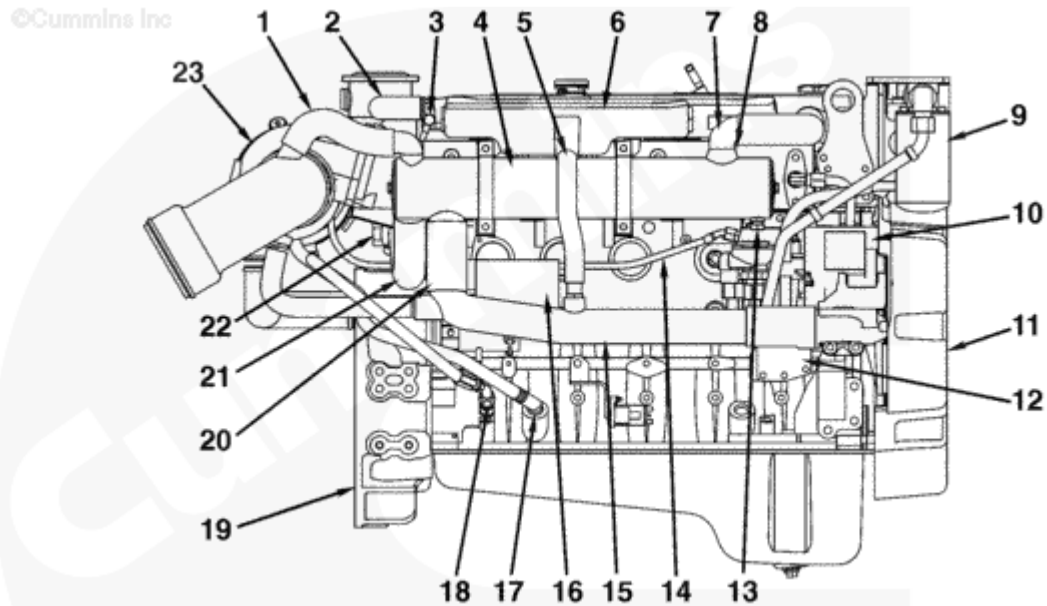
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QSB Port View (CM850 Electronic Control Module)

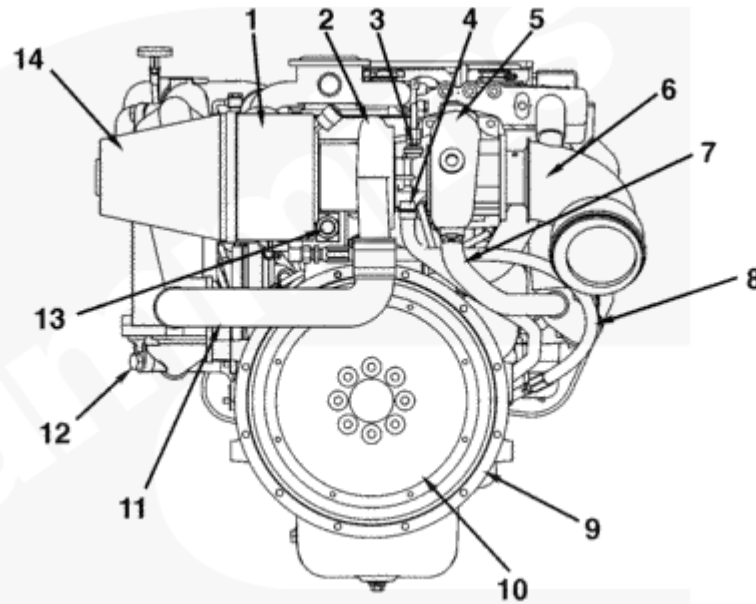
1. Engine oil fill
2. Sea water pump outlet
3. Lubricating oil level gauge
4. Sea water supply to fuel cooler
5. Intake manifold pressure and air temperature sensor
6. Aftercooler zinc anode (2)
7. Aftercooler housing
8. Aftercooler sea water outlet
9. Turbocharger
10. Aftercooler air inlet
11. Flywheel housing
12. Aftercooler sea water inlet
13. Electronic control module (ECM)
14. Fuel lift pump (behind ECM cooling plate)
15. Fuel inlet connection
16. Fuel return from injector
17. Fuel supply to lift pump
18. Fuel return from fuel rail pressure relief valve
19. Fuel return from high pressure fuel pump
20. Crankshaft speed sensor
21. Camshaft speed sensor
22. Oil pressure sensor
23. Fuel pump
24. Fuel cooler
25. Sea water pump.



QSB Starboard View (CM850 Electronic Control Module)

1. Sea water outlet
2. Closed crankcase breather system hose
3. Crankcase breather tube banjo connection
4. Heat exchanger
5. Engine coolant fill line
6. Expansion tank
7. Coolant level sensor
8. Heat exchanger engine coolant inlet
9. Lubricating oil filter
10. Alternator
11. Belt and pulley guard
12. Lubricating oil cooler
13. Zinc anode
14. Turbocharger oil supply line
15. Coolant return junction tube
16. Starting motor
17. Turbocharger oil drain line
18. Closed crankcase breather oil drain line
19. Flywheel housing
20. Heat exchanger engine coolant outlet
21. Heat exchanger sea water inlet
22. Marine gear oil cooler
23. Turbocharger

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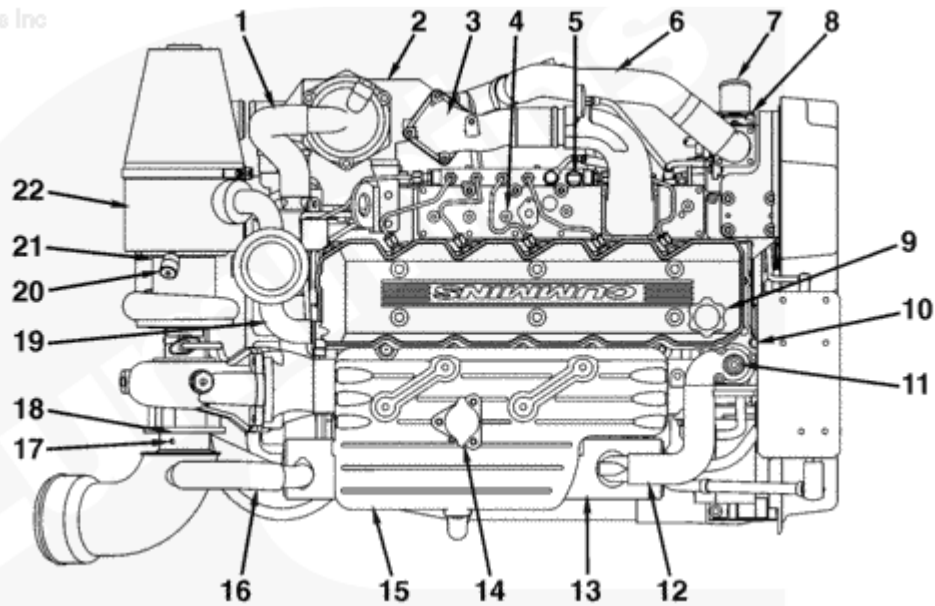


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QSB Rear View (CM850 Electronic Control Module)

1. Closed crankcase breather system
2. Turbocharger, compressor side
3. Turbocharger oil supply
4. Turbocharger oil drain
5. Turbocharger, turbine side
6. Heat exchanger (behind exhaust outlet)
7. Turbocharger coolant outlet
8. Closed crankcase breather oil drain tube
9. Flywheel housing
10. Flywheel
11. Aftercooler air inlet
12. Aftercooler zinc anode
13. Marine gear oil cooler
14. Air cleaner and filter.

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QSB Top View (CM850 Electronic Control Module)

1. Aftercooler seawater outlet
2. Aftercooler housing
3. Intake air connection from aftercooler to intake manifold
4. Intake manifold pressure and temperature port
5. Fuel rail pressure sensor
6. Sea water supply to fuel cooler
7. Sea water pump inlet
8. Sea water pump
9. Engine oil fill
10. Coolant temperature sensor
11. Coolant pressure side vent petcock
12. Heat exchanger engine coolant inlet
13. Heat exchanger
14. Coolant fill neck
15. Expansion tank
16. Sea water outlet from heat exchanger
17. Exhaust temperature and back pressure port
18. Exhaust outlet connection
19. Closed crankcase breather blow-by connection
20. Air inlet restriction indicator
21. Air cleaner connection
22. Closed crankcase breather/air cleaner assembly

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