Cummins

Service Manual

V/VT-378, V/VT-504, and V/VT-555 Engines

Service® Manual

CUM-S-V-VT378PLUS

V/VT-378, V/VT-504 and V/VT-555 C.I.D. Engines Shop Manual

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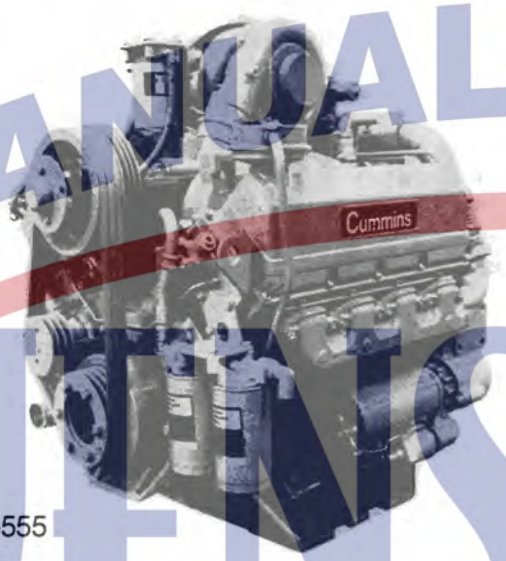
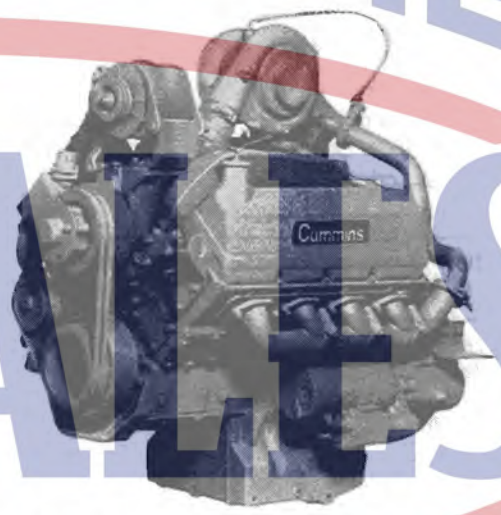
Cummins Diesel V/VT-378, V/VT-504 and V/VT-555 C.I.D. Engines



VT-555



VT-504 "Big Cam"

V-378

V-504

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Fig. 2-10, (V10226). Counterbore for valve seat.

4. Cut the counterbore 0.006 to 0.010 inch [0.15 to 0.25 mm] deeper than the insert thickness to permit staking or peening of the head to hold the insert. Allow the cutter to dwell upon reaching the proper depth to insure a flat seating surface.
5. Install the swirl plate in the intake valve seat counterbores with the locking tang in positioning groove.

Note: On engines certified by the Environmental Protection Agency and the California Air Research Board, the swirl plate is located 180 degrees from standard. See your local distributor for the correct replacement part.

6. Install the valve seat insert and stake the insert in the head using ST-1122 Tool Driver over the shaft of ST-1128 Insert Staking Tool. A 1/4 inch [6.35 mm] diameter round end punch may be used if a staking tool is not available.

Caution: Over staking around the insert may crack the cylinder head.

Grind Valve Seats

1. Use ST-685 Valve Seat Grinder and the correct arbor from ST-804 Valve Guide Arbor Set.
2. Check the valve seat width. It should be 0.063 to 0.125 inch [1.59 to 3.18 mm]. See 1 or 2, Fig. 2-3.
3. If the seating area (1, Fig. 2-3) is wider than 0.125 inch [3.18 mm] maximum, stock can be removed from above and below the valve seating area (1) with specially dressed stones. Narrowing should not extend beyond the chamfer or the valve seat insert. The chamfer provides metal for staking or peening.

Table 2-1: Valve Seat Insert

Part No.	ST-Cutter	Oversize Diameter	Oversize Thickness	Insert Outside Diameter	Cylinder Head Inside Diameter	Insert Thickness	Counterbore Depth In Head Intake	Counterbore Depth In Head Exhaust
195001	ST-258-1	0.010 [0.25]	Std.	1.700/1.701 [43.18/43.21]	1.697/1.698 [43.10/43.13]	0.176/0.181 [4.47/4.60]	0.351/0.361 [8.92/9.17]	0.329/0.339 [8.36/8.61]
195002	ST-258-2	0.020 [0.51]	0.005 [0.13]	1.710/1.711 [43.43/43.46]	1.707/1.708 43.36/43.38]	0.181/0.186 [4.60/4.72]	0.356/0.366 [9.04/9.30]	0.334/0.344 [8.48/8.74]
195003	ST-258-3	0.030 [0.76]	0.010 [0.25]	1.720/1.721 [43.69/43.71]	1.717/1.718 [43.61/43.64]	0.186/0.191 [4.72/4.85]	0.361/0.371 [9.17/9.42]	0.339/0.349 [8.61/8.86]
195004	ST-258-4	0.040 [1.02]	0.015 [0.38]	1.730/1.731 [43.94/43.97]	1.727/1.728 [43.87/43.89]	0.191/0.196 [4.85/4.98]	0.366/0.376 [9.30/9.55]	0.344/0.354 [8.74/8.99]
154391	ST-258-1	0.010 [0.25]	Std.	1.700/1.701 [43.18/43.21]	1.697/1.698 [43.10/43.13]	0.196/0.201 [4.98/5.11]	0.351/0.361 [8.92/9.17]	
154392	ST-258-2	0.020 [0.51]	0.005 [0.13]	1.710/1.711 [43.43/43.46]	1.707/1.708 [43.36/43.38]	0.201/0.206 [5.11/5.23]	0.356/0.366 [9.04/9.30]	
154393	ST-258-3	0.030 [0.76]	0.010 [0.25]	1.720/1.721 [43.69/43.71]	1.717/1.718 [43.61/43.64]	0.206/0.211 [5.23/6.36]	0.361/0.371 [9.17/9.42]	
154394	ST-258-4	0.040 [1.02]	0.015 [0.38]	1.730/1.731 [43.94/43.97]	1.727/1.728 [43.87/43.89]	0.211/0.216 [5.36/5.49]	0.366/0.376 [9.30/9.55]	

Be sure to measure insert **before** machining head or installing insert in head.

Crankshaft Pulley/Vibration Damper

V/VT-378 and V/VT-504

1. Clean the crankshaft and vibration damper mating faces thoroughly with a wire brush or abrasive cloth. Install the pulley/vibration damper combination to the crankshaft. Torque the capscrews alternately in 30 to 35 ft-lb [41 to 47 N•m] increments to a final torque of 110 to 120 ft-lb [149 to 162 N•m].
2. With a dial gauge mounted to the front cover check the vibration damper eccentricity and wobble as shown in Fig. 14-22 and Fig. 14-23. Wobble must not exceed 0.006 inch per 1 inch of radius [0.15 mm per 25 mm]. Eccentricity must not exceed 0.004 inch per 1 inch of diameter [0.10 mm per 25 mm].

Fig. 14-22, (V114161). Check eccentricity.

Fig. 14-23, (V114162). Check wobble.

3. When an accessory drive pulley is mounted in front of the vibration damper the pulley must also be checked. Readings taken with an indicator gauge mounted to the gear case cover must not exceed the values given above.
4. On Marine engines secure the sea water pump drive pulley to the vibration damper. Torque the capscrews to 30 to 32 ft-lb [41 to 43 N•m].

V/VT-555

1. Clean the crankshaft and vibration damper mounting surface. Position the vibration damper to the crankshaft and secure it with hardened washers and capscrews. Tighten alternately in 30 to 35 ft-lb [41 to 47 N•m] increments to a final torque of 135 to 140 ft-lb [183 to 190 N•m].
2. With a dial gauge mounted to the front cover check the vibration damper eccentricity and wobble as shown in Fig. 14-22 and Fig. 14-23. The run-out must not exceed values given for V-378 and V-504.
3. Install the drive pulley (if removed) to the vibration damper. The pulley must also be checked. Readings taken with an indicator gauge mounted to gear cover must not exceed the values above. Torque the capscrews in 20 ft-lb [27 N•m] increments to a final torque of 90 to 100 ft-lb [122 to 136 N•m].

Cylinder Heads

1. Make sure the breather vent tube assemblies on the naturally aspirated cylinder heads are in place. On turbocharged engines check to see that the vent holes are plugged.

Note: Resurfaced blocks require thicker head gaskets than new blocks. They are available in 0.010 inch [25 mm] and 0.020 inch [0.51 mm] oversize. Oversize head gaskets still have grommets and O-rings.

2. Install the head gasket over the oil ring dowels so the word "Top" on the gasket is visible. Install the guide studs in the block.

Caution: When assembling the new style cylinder head gasket to the engine make sure the two (2) end cap gaskets are properly located. The block and head surfaces must be clean and dry and oil or adhesive must never be used.

3. Use an ST-862 Head Lifting Bracket to lift the cylinder head with a hoist and lower it into place over the ring dowels.

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