








# INSTRUCTION MANUAL

## 3.9L DODGE CUMMINS 4BT HEAD STUD KIT

PART NUMBER CP896 | 1983-1998



### KIT INCLUDES

-  **18 X** HEAD STUDS  
10X M12-146 MM  
4X M12-199.7 MM  
4X M12-96.5 MM
-  **18 X** NUTS
-  **18 X** HARDENED PARALLEL WASHERS
-  **4 X** M8 ROCKER ARM PEDESTAL BOLTS
-  **1 X** FASTENER ASSEMBLY LUBRICANT
-  **2X** SOCKETS
-  **1X** ALLEN WRENCH

In certain vehicles, there are high cylinder pressures that can damage head gaskets. Factory OEM head bolts are torque to yield, meaning you torque the bolt to a specific torque with a final 90 degree rotation that will place the bolt at its' maximum stretch point.

Our observation through years of inspecting and repairing vehicles is that when you add parts that increase horsepower (turbocharger, injectors, chips etc.), you risk creating higher cylinder pressures lower than your RPM range, consequently leading to a blown head gasket.

In contrast to head bolts, head studs are engineered to resist stretching. XOTIC PERFORMANCE head studs are created using premium steel alloys (XOTIC 7200) that are superior in tensile strength in comparison to a bolt. We take real pride in manufacturing fasteners that will last you a lifetime.

To ensure optimal head stud installation, accurate preload must be achieved. Preload is the tensile force generated when a fastener is tightened, creating a compressive force in the bolted joint—known as clamp force.

Head gasket failures occur when the clamping forces securing the gasket, head, and engine block are

insufficient to withstand high cylinder pressures. By choosing head studs over head bolts, these failures can be avoided.

To ensure accurate preload, it is necessary to clean and lubricate every component in the joint. While torqueing each head stud, the same torque must be applied on every head stud - or else you risk unequal distribution of preload and possibly joint failure.

### A COMMON MISTAKE TO AVOID

When torquing a fastener, do not stop short of the recommended torque value before reaching the desired torque (i.e., continue torquing in one motion until the specified torque is achieved). If by accident, you stop short of the recommended torque, loosen the fastener and retorquing.

### VERIFY FIRST

Before installing any components, verify that this part number is compatible with the vehicle applications listed above. Inspect all package components, and clean as necessary to ensure accurate installation. Any obvious defects or shipping damages should be reported to us.

# GET TO ACTION!

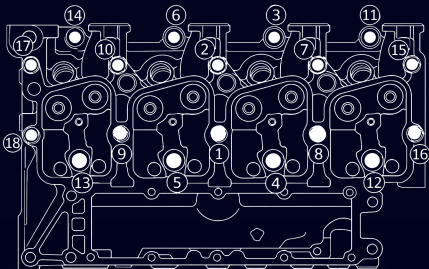
1. Clean threads in the block prior to installing the head studs to ensure accurate fitment and precise torque readings. You may purchase a thread chaser separately by searching **CS304 and CS317** in our catalog.
2. Thread the head studs into the block by hand until snug. Do not apply torque.
3. Use a straightedge ruler to measure the distance from the mating surface (deck or main cap) to the top of each installed stud. Ensure all studs of the same length group sit level with each other (within 1 mm / 0.040"). Uneven height may indicate debris or incorrect thread engagement. Properly installed studs will bottom out smoothly and show uniform height across all positions. If a stud appears higher or lower than the others, remove it, re-clean the hole, and reinstall by hand. Do not use tools to force studs deeper. Incorrect stud seating can cause off-angle stress, uneven preload, or stud fracture during engine operation.
4. Install the head gasket and cylinder head, ensuring proper alignment.
5. Install the pushrods and confirm each one is properly seated in the tappets.
6. Install your rocker arms and pedestals. If using OEM pedestals, ensure they are machined per required specs shown in the next page. Alternatively, you can use our pre-machined rocker arm kit, available separately under Part # **CP204** (searchable in our catalog). Align the dowels on each pedestal with the corresponding holes in the cylinder head. Valve lash adjusters should be completely backed off at this stage.
7. Place the washers onto the head studs. Using the assembly lubricant provided, apply a thin coat to the threads of the head studs, the underside of the nuts, the top side of the washers, and the threads of the M8 rocker arm pedestal bolts.
8. Thread the nuts onto the studs and hand-tighten until they make contact with the washers.
9. Thread the secondary M8 rocker pedestal bolts into the cylinder head and snug them by hand. Do not apply torque.
10. Follow the torque recommendations using the sequence below.

## M12 HEAD STUDS

Torque each nut to **45 ft-lbs**, then to **90 ft-lbs**, and finally to **125 ft-lbs**.

## M8 ROCKER BOLTS

Torque bolts to **10 ft-lbs**, then to **18 ft-lbs** and finally to **25 ft-lbs**.



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## NEED HELP?

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[tech@xotic-performance.com](mailto:tech@xotic-performance.com)



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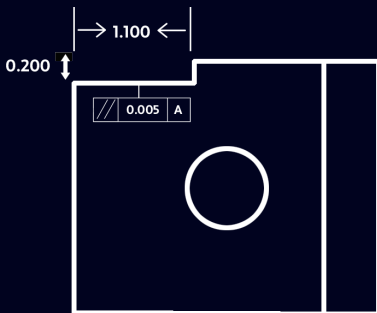
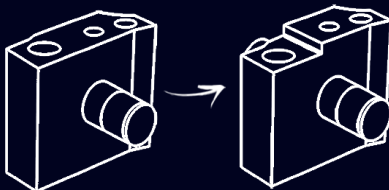
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# ROCKER ARM PEDESTAL MODIFICATION SPECS:

OEM ROCKER ARM PEDESTAL

MACHINED ROCKER ARM PEDESTAL



Machine a step that is 0.200 inches deep and 1.100 inches wide across the top surface of each rocker arm pedestal, as illustrated. Ensure that the machined surface is precisely parallel to the bottom mounting face of the pedestal.



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