

Torque Tables™



**Complete Cylinder Head
Torque Specifications
for Domestic and
Imported Passenger
Cars and Light/
Medium Duty Trucks**



FELPRO®
THE GASKETS PROFESSIONALS TRUST™

100% **PERCENT**

VEHICLE SEALING

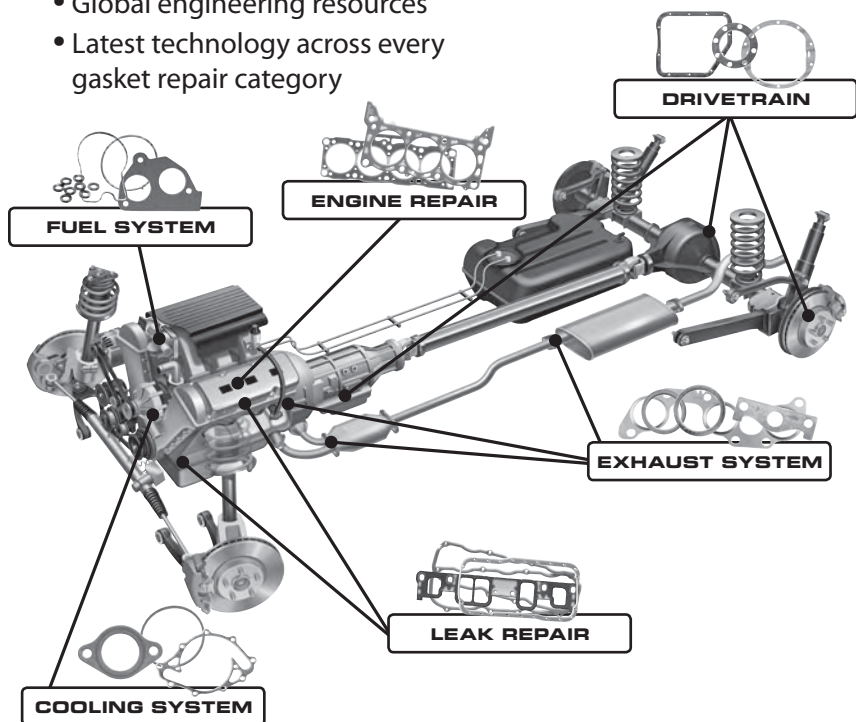
When you consider what can go wrong when even “minor” gaskets fail, you realize one thing:

THERE ARE NO UNIMPORTANT GASKETS!

Each one, no matter how small, plays a critical role in vehicle sealing. Each has to be the best. That's why you should be... **100% Fel-Pro®**

Why trust Fel-Pro gaskets for ALL of your vehicle sealing needs?

- The undisputed sealing technology leader
- Engineered for the repair environment
- Molded rubber chemistry and manufacturing expertise
- Global engineering resources
- Latest technology across every gasket repair category



FEL-PRO[®]
THE GASKETS PROFESSIONALS TRUST[™]

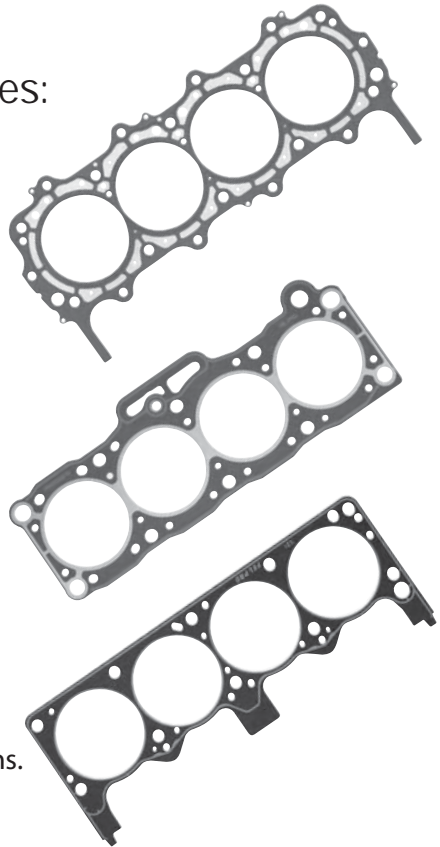
Engine Repair

Fel-Pro® offers comprehensive coverage of virtually every engine repair opportunity, from complete rebuilds to the replacement of a single gasket or seal. In addition, Fel-Pro offers the best gasket material and design for each application to ensure a perfect seal the first time, every time.



Engine Repair Technologies:

- **PermaTorqueMLS®** – These head gaskets provide the correct design for MLS-equipped vehicles and feature a unique aftermarket coating that accommodates less-than-perfect surface finishes.
- **PermaTorque®** – The industry standard for no-retorque head gaskets features premium coatings, facings and combustion armors.
- **PermaTorqueSD®** – Severe-duty head gaskets engineered for extra strength under punishing conditions.

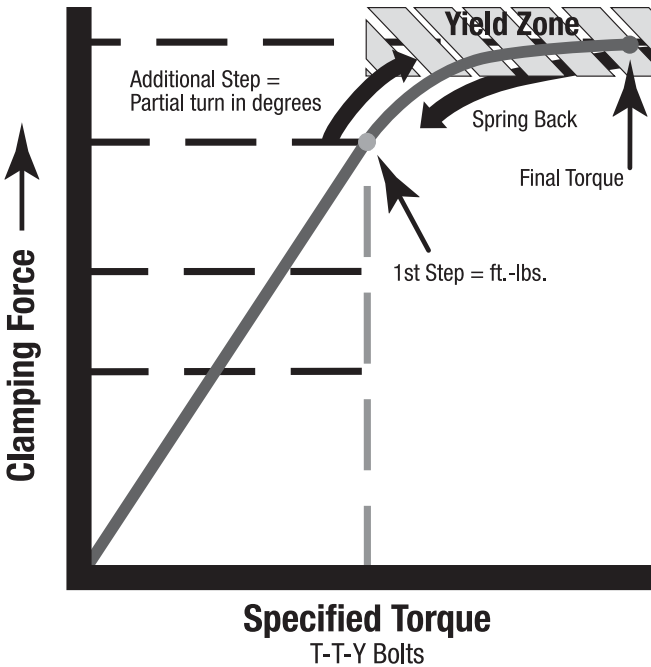


Understanding Torque-to-Yield Head Bolts

T-T-Y head bolts are particularly common on engines using aluminum heads and/or multi-layer steel head gaskets. These bolts are engineered to stretch within a controlled “yield zone”. Once they reach this zone, they spring back to provide a precise level of clamping force over the entire area of the gasket.

It’s important to carefully follow the manufacturer’s tightening specification. Once T-T-Y bolts are stretched beyond their yield zone, they become useless. Typically, T-T-Y bolts are torqued to a specified limit, then again with an additional partial turn to reach the bolt’s yield zone.

It is recommend to never reuse a T-T-Y head bolt. Chances are too great that it has already exceeded its elasticity barrier and won’t spring back to properly seal the engine.

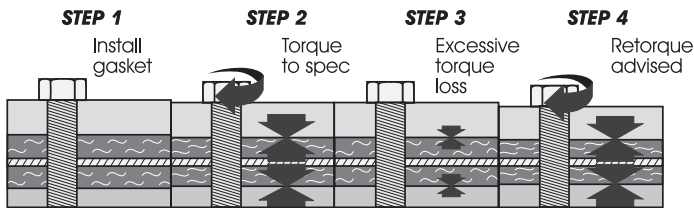


Importance of Proper Torque

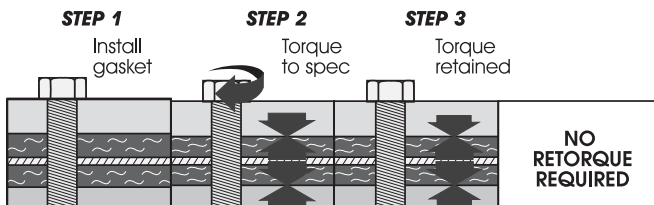
When a head gasket is installed between the cylinder head and engine block, tightening the head bolts compresses the gasket slightly, allowing the soft facing material on the gasket to conform to the small irregularities on the head and block deck surfaces. This allows the gasket to “cold seal” so it won’t leak coolant before the engine is started. The head gasket’s ability to achieve a positive cold seal, as well as to maintain a long-lasting, leak-free seal depends on two things: its own ability to retain torque over time (which depends on the design of the gasket and the materials used in its construction) and the clamping force applied by the head bolts.

PermaTorque® head gaskets are made with top-quality materials and designed to remain resilient so they retain torque, so no retorquing is necessary. (Some competitive head gaskets alleged to be “no retorquing” can lose as much as 50 to 60% of their original torque after only 100 hours of service.)

Competitive Head Gasket:



PermaTorque® Head Gasket:



Head Bolts

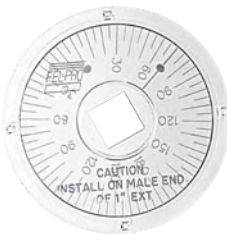
Previously installed Torque-to-Yield head bolts should never be reused. Damage to engine and cylinder heads can occur.

- Fel-Pro® Head Bolts provide the most consistent clamping force possible.
- Properly torque for best results.

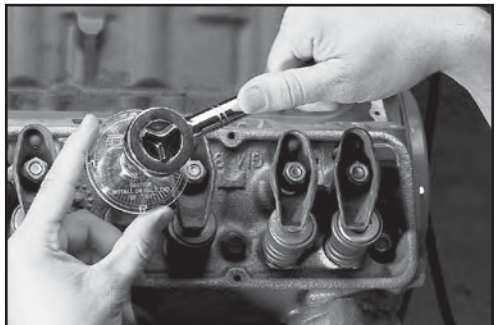


Torque-to-Angle Indicator (Part Number TRQ-1)

With T-T-Y head bolts, the Torque-To-Angle Indicator (Part Number TRQ-1) should be used in conjunction with a torque wrench to achieve proper bolt loading. While the head bolts are being torqued to the specified value, the technician can use the TRQ-1 tool to accurately measure the degrees of additional rotation required. This eliminates guesswork and assures more consistent results.



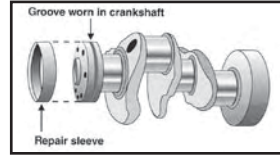
*Torque-To-Angle
Indicator (Part Number TRQ-1)*



Other Products from Fel-Pro® that aid in installation

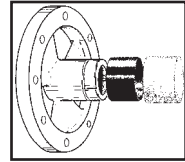
Crankshaft Repair Sleeves

Repairs crankshaft grooves at the rear main bearing seal area.



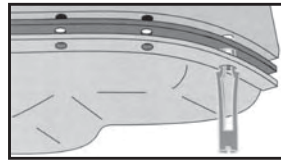
Sleeve 'N' Seal®

Repairs harmonic balancer grooves at the timing cover seal area.



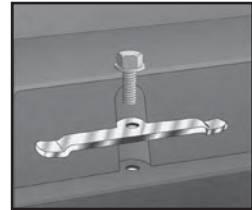
Oil Pan SnapUps®

SnapUps® are designed to hold up the oil pan and gaskets, and allow for quick, convenient bolt installation. SnapUps are included with premium PermaDryPlus® oil pan gasket sets.



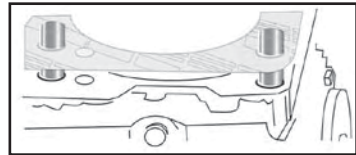
Valve Cover Load Spreaders®

Load Spreaders distribute the clamping force more evenly on the valve cover flange. This results in a better seal between the valve cover and the head.



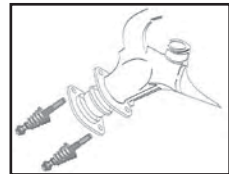
Cylinder Head Dowel Pins

Cylinder head alignment dowel pins assure proper gasket and casting alignment for an accurate seal and trouble-free engine operation.



Exhaust Flange Bolts/Springs

Exhaust Flange Bolt & Spring Kits ensure a tight exhaust flange seal at the pipe joint.



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HOW TO USE THE FEL-PRO® Torque Tables™

1. Locate the vehicle manufacturer listing in the torque specification tables. All manufacturers are listed in alphabetical order. To save space in the listings, all Chrysler Products vehicles, all Ford Products vehicles, and all General Motors Products vehicles are each grouped together in a single section. Check the Table of Contents at the front of the book to find where each vehicle manufacturer is located. Each manufacturer section includes passenger cars, minivans, SUV's, light-duty and medium-duty trucks for that nameplate.
2. Within each vehicle manufacturer section, engines are arranged by number of cylinders (smallest to largest), then by engine size (CID or CC: smallest to largest), then by model years (newest year first). Check VIN codes carefully on domestic manufacturers, and engine codes carefully on imported manufacturers, to assure selecting the correct torquing information.
3. Special footnote symbols are included to show if a FEL-PRO PermaTorque® head gasket (●) or FEL-PRO head bolt set (○) is available for that engine application.
4. Locate the specific engine desired. Correct torque specifications are shown in foot-pounds in bold type.

ENGINE	YEARS		FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
FORD PRODUCTS 6 & V6 (CONT.)					
183 OHV (3.0L) 12 Valve Ford	2008-99 Truck	●○	1st 36-39 , 2nd loosen one turn, 3rd 20-24 , 4th turn 85-95 degrees, 5th turn 85-95 degrees	141	ES 72136 ES 72174
183 OHV (3.0L) 12 Valve Ford	1998-91 Truck	●○	1st 59 , 2nd loosen one turn, 3rd 37 , 4th 68	141	ES 72136 ES 72174
183 OHV (3.0L) 12 Valve Ford	1990-86 Truck	●○	1st 33-41 , 2nd 63-73	141	ES 72136

Torque specifications are shown either as an exact figure, or a specific range. Follow any special instructions or multi-step directions carefully to assure correct final torque. There may be different specifications for different size bolts, bolts in different positions, tightening bolts in several stages, or a cold engine vs. a warm engine. For example, in some cases bolts are first torqued to the figure for a cold engine and retorqued to the figure for a warm/hot engine. Remember that retorquing is NOT required when installing a FEL-PRO PermaTorque head gasket.

For torque-to-yield applications, head bolts are torqued additional partial turns (shown as “degrees” in the tables) after reaching a specified torque in foot-pounds. Please see the following Installation Tips for more information on torque-to-yield bolts.

5. The “Torque Sequence” column shows which diagram to use as the specific bolt torquing sequence for your engine. All diagrams can be found in numerical sequence at the back of this publication.

The torque specifications and sequences listed in this publication are considered accurate and reliable at the time of publication. However, since engine manufacturers may revise their specifications, FEL-PRO engineers suggest the installer consult the O.E. manufacturer for the latest information.

The FEL-PRO PermaTorque/Blue Stripe® and PermaTorque/Printoseal® cylinder head gaskets do not need retorquing. They combine the proper amount of compressibility with torque-retaining materials for a long-lasting seal.

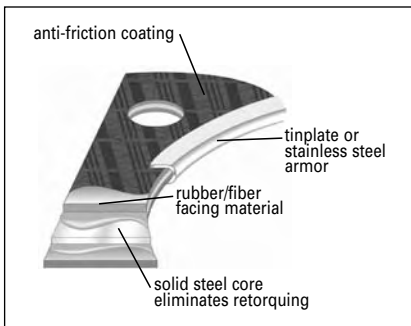
FEL-PRO cylinder head gaskets use a variety of gasket constructions and materials, carefully chosen by our engineers for each specific engine application and thoroughly tested. All FEL-PRO PermaTorque cylinder head gaskets consist of four basic parts – the core, the facing material, the coating, and the armor. Other special enhancements, such as elastomeric sealing beads, may be added to improve sealing even further.



Coatings can be either PTFE rubber or silicone-based. They help seal minor surface imperfections, resist sticking, and help the gasket resist the shearing action that occurs in bi-metal engines. Aluminum cylinder heads and cast iron engine blocks expand and contract at different rates during engine heating/cooling cycles. The anti-friction coatings used on PermaTorque head gaskets allow both the head and block to “slip” over the gasket surface and still maintain a good seal.

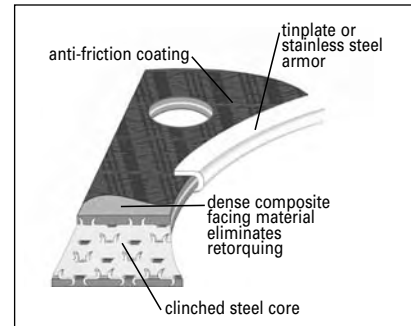
Formed metal armors are added to protect the gasket body at cylinder openings. Each armor is precision stamped and then formed to the gasket body. Engineers specify different armor materials, ranging from tinplate to stainless steel, depending on the specific engine application.

The most common PermaTorque/Blue Stripe design uses a solid steel core with rubber/fiber facing material. The solid steel core minimizes torque loss, while the soft facing conforms to seal minor surface irregularities.



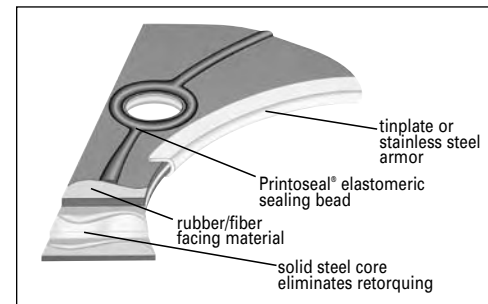
PermaTorque/Blue Stripe Solid Core Design

Another popular PermaTorque/Blue Stripe design uses a clinched steel core construction, combined with either expanded graphite or dense composite facing material. The “S” shaped protrusions of the clinched core allow more uniform loading of the gasket than competitive designs. High-density expanded graphite is used for high-temperature applications where required. The composite facing material uses rubber/fiber design that is densified during the production process. This material is dense enough to help maintain torque, yet compressible enough to conform to minor surface irregularities.



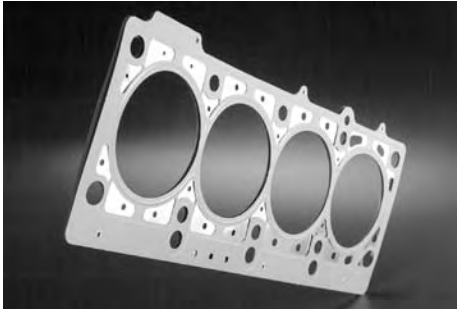
PermaTorque/Blue Stripe Clinched Core Design

When the engine requires additional sealability, Printoseal® elastomeric sealing beads are applied around critical openings such as coolant and oil ports, to prevent oil and coolant leakage. On many current lightweight engines, the beads also help seal aluminum castings that have uneven clamping force across the gasket surface.



PermaTorque/Printoseal Solid Core Design

The latest development in head gasket technology is the multi-layer steel (MLS) design. At first glance, these gaskets look like the old-style embossed steel shim gaskets, but they are radically different. First, a thin rubber coating is bonded to the stainless steel shim and, as required, multiple layers (up to five) of this rubber-coated steel shim are assembled into a single gasket. The high-temperature rubber coating provides excellent fluid sealability across the outer faces and between the individual layers, while also sealing minor head and block surface imperfections. MLS head gaskets provide the ultimate in torque retention and supply extra strength to support current lightweight aluminum casting designs. They are specified on most current domestic and imported engines in production.



Traditional original equipment manufacturer (OEM) type MLS head gaskets don't easily conform to surface irregularities, and require an incredibly smooth surface finish to provide a satisfactory seal. When the castings are new and the finish is fresh, most OEM-style MLS gaskets work quite well. But when the castings are old or resurfaced with a less than perfect finish, leaks usually result.

To seal under these adverse conditions, FEL-PRO® engineers have developed the exclusive PermaTorqueMLS® design. These newly redesigned MLS gaskets have many unique features that allow them to seal better than other MLS gaskets on the market today:

- Full-hard stainless steel maintains its shape despite thermal expansion, and resists the scrubbing action between head and block
- Precision-engineered embossed sealing beads placed at all critical sealing areas to eliminate leak paths
- An exclusive extra-strong "stopper" layer incorporated to provide a superior primary combustion seal
- Special rubber coating specifically formulated for the aftermarket repair environment, which is more forgiving of surface finish requirements

Remember that although PermaTorque MLS head gaskets are more forgiving than other designs, the finish on both the head and block must be flatter and smoother than what has been traditionally required for composite-type gaskets.

FEL-PRO® engineers determine which PermaTorque construction provides the best sealing for each individual engine design. Look for the "PT" suffix on the FEL-PRO part number for PermaTorque head gaskets, the most reliable no-retorque designs available on the market today.

Remove Cylinder Heads Carefully

Loosen the head bolts in stages, in the reverse order of the tightening sequence. On engines with aluminum cylinder heads, remove the head only after the engine has cooled completely and reverse EXACTLY the recommended torquing procedure. Failure to do so may result in head warpage.

Never Reuse Head Gaskets

When a new head gasket is installed, it conforms to the microscopic surface irregularities of the cylinder head and engine block. The gasket material is permanently compressed in that position. If you reuse the gasket, it is impossible to refit it in the exact same position and it will not have the "life" to readjust itself, so gasket failure may result.

Clean Mating Surfaces

Thoroughly clean the cylinder head, engine block, head bolts, and bolt holes. A dirty bolt can alter torque readings by as much as 20 foot-pounds, and can form pockets in the gasket allowing leakage and eventual gasket failure.

Check for Warpage and Distortion

Check for warpage of both head and block sealing surfaces with a straightedge and a feeler gauge. Out-of-flat along the length should not be more than 0.003" for three-cylinder applications, 0.004" for four-cylinder applications, and 0.006" for six-cylinder applications. Across the width should never exceed 0.002" out-of-flat. These are combined measurements for both the head and block together, and should not exceed the maximum amounts shown. There should be no sudden irregularities exceeding .001" and a maximum out-of-flat of ± .001" in any 3" diameter should not be exceeded. When necessary, machine surfaces to return them to flat.

Check Head and Block Finishes

Surface finish is critical for a good seal. FEL-PRO® engineers recommend a micro inch surface finish between 60 to 100 Ra (400 to 800 Rz) for cast iron heads and blocks, 50 to 60 Ra (200 to 600 Rz) for aluminum heads and blocks, and 10 to 30 Ra maximum (500 Rz maximum) for multi-layered steel (MLS) applications. Check the finishes with a profilometer or another type of surface finish comparator. Check for a preferred waviness height of .0004"/.0005" with a waviness peak spacing of .100" (these values are usually associated with milling machines). Always consult your manufacturer's service manual for surface finish requirements.

Use A Non-Hardening Gasket Sealer

Sealers are NOT required on FEL-PRO PermaTorque® head gaskets. However, embossed steel shim, copper-faced, or steel-faced gaskets should be coated with a non-hardening automotive gasket sealer as a supplemental seal.

Lightly coat bolt threads and the underside of the bolt heads with EP grease or similar lubricant. When they enter the water jackets of an engine, bolt threads should be coated with a non-hardening automotive sealer to prevent leakage. Refer to the manufacturer's service manual or examine the engine to determine where the bolt holes lead.

Watch Bolt Lengths and Sizes

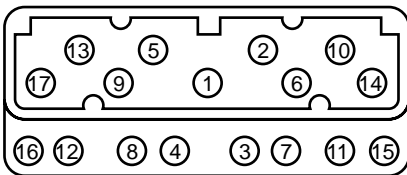
Head bolts on some engines may vary in length and size, and it is important that they be replaced in their original location. Either mark the bolts by position, or place them on a bench in the order you remove them.

Use A Torque Wrench

Uneven torque can cause block distortion and head warpage, resulting in coolant or combustion leaks. Use a good torque wrench, properly calibrated, and follow exact specifications for the proper torque. The basic tightening procedure is to first snug up bolts, then tighten in stages, and then complete with the final torque specified.

Follow Torquing Sequences

Each manufacturer has an approved torquing sequence to follow for each engine, to insure the best possible seal and eliminate chances of distortion and warpage. In general, the sequence starts at the center and spirals out to the ends of the head.



Warm Engine and Retorque Head

Run the engine to normal operating temperature after torquing head bolts. Heat expansion and contraction can radically change the torque readings. Retorque all head bolts to the correct settings while the engine is still warm. If working with aluminum components, let the engine cool completely first. Remember that FEL-PRO® PermaTorque® designs do NOT require retorquing.

Retorque After 300 to 500 Miles

If retorque-type head gaskets are used, retorque after 300 to 500 miles.

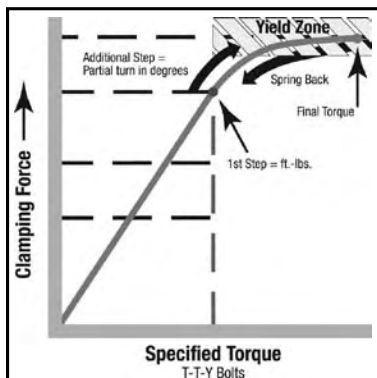
Torque-to-Yield Head Bolts

Torque-to-yield is a method used by most current engine manufacturers to tighten head bolts. The head bolts are torqued to their yield point, which may permanently stretch the bolts. This results in a more even clamping force over the entire area of the gasket. Bolts should first be tightened to a specified torque (measured in foot-pounds), and then tightened an additional partial turn (measured in degrees) to the bolt yield point. The inexpensive FEL-PRO® Torque-to-Angle Indicator (part number TRQ-1) will help you accurately measure the required partial turn in degrees.

Because the head bolts may have stretched, the engine manufacturer may recommend against reusing them. Consult the OEM manual on head bolt reuse. Since you may not know how many times a T-T-Y bolt has been removed and reinstalled, FEL-PRO engineers suggest that it is always a good idea to use new bolts. FEL-PRO head bolt sets are available for many domestic and imported engines. The Torque Tables™ indicate which engines have bolt sets offered in the FEL-PRO product line.

ENGINE	YEARS		TORQ. SET.	HEAD BOLT SET PART NUMBER
FORD PRODUCTS 6 & V6 (CONT.)				
232 OHV (3.8L) 12 Valve Ford	2003-96 Truck	●○	94	ES 72156 ES 72160
			1st 15, 2nd 29, 3rd 37, PERFORM THE NEXT THREE STEPS ON EACH BOLT BEFORE MOVING TO NEXT BOLT IN SEQUENCE: 1) loosen 2-3 turns, 2) Long bolts 29-37; Short bolts 15-22, 3) turn 175-185 degrees	
232 OHV (3.8L) 12 Valve Ford	1995 Truck	●○	94	ES 72131
			1st 15, 2nd 30, 3rd 37, PERFORM THE NEXT THREE STEPS ON EACH BOLT BEFORE MOVING TO NEXT BOLT IN SEQUENCE: 1) loosen 2-3 turns, 2) Long bolts 11-19; Short bolts 7-15, 3) turn 85-95 degrees	
232 OHV (3.8L) 12 Valve Ford	2004-98 Car	●○	94	ES 72160
			1st 15, 2nd 30, 3rd 37, PERFORM THE NEXT THREE STEPS ON EACH BOLT BEFORE MOVING TO NEXT BOLT IN SEQUENCE: 1) loosen 2-3 turns, 2) Long bolts 29-37; Short bolts 15-22, 3) turn 180 degrees	
232 OHV (3.8L) 12 Valve Ford	1997-96 Car	●○	94	ES 72156 ES 72160
			1st 15, 2nd 30, 3rd 37, PERFORM THE NEXT THREE STEPS ON EACH BOLT BEFORE MOVING TO NEXT BOLT IN SEQUENCE: 1) loosen 2-3 turns, 2) Long bolts 30-37; Short bolts 15-22, 3) turn 175-185 degrees	
232 OHV (3.8L) 12 Valve Ford	1995-94 Car	●○	94	ES 72131
			1st 15, 2nd 30, 3rd 37, PERFORM THE NEXT THREE STEPS ON EACH BOLT BEFORE MOVING TO NEXT BOLT IN SEQUENCE: 1) loosen 2-3 turns, 2) Long bolts 11-19; Short bolts 10-15, 3) turn 85-95 degrees	
232 OHV (3.8L) 12 Valve Ford	1993-91 Car	●○	94	ES 72131
			1st 37, 2nd 45, 3rd 52, 4th 59, PERFORM THE NEXT THREE STEPS ON EACH BOLT BEFORE MOVING TO NEXT BOLT IN SEQUENCE: 1) loosen 2-3 turns, 2) 11-18, 3) Long bolts turn 85-105 degrees; Short bolts turn 65-85 degrees	
232 OHV (3.8L) 12 Valve Ford	1990-84 Car	●○	82	ES 72129 ES 72131
			Flanged Hex Head bolts: 1st 37, 2nd 45, 3rd 52, 4th 59, PERFORM THE NEXT THREE STEPS ON EACH BOLT BEFORE MOVING TO NEXT BOLT IN SEQUENCE: 1) loosen 2-3 turns, 2) 11-18, 3) Long bolts turn 85-105 degrees; Short bolts turn 65-85 degrees	

Understanding Torque-to-Yield Head Bolts



Although Torque-to-Yield (T-T-Y) head bolts are becoming more common, some people still don't fully understand how they work.

Bolts on T-T-Y applications are tightened to their yield point, creating a more even clamping force over the entire area of the gasket.

During engine assembly at the factory, precision machines tighten the bolts so they are just in the "yield zone." Technicians making repairs in the field do not have access to this type of equipment. Engineers have found that by tightening head bolts to specified torque and then tightening them an additional partial turn, technicians can reach the yield zone.

Fel-Pro® engineers suggest technicians use a gauge such as the inexpensive Fel-Pro® Torque-to-Angle Indicator (part number TRQ-1). It fits easily on the 1/2" drive of a torque wrench and eliminates uncertainty about the additional torquing required for T-T-Y head bolts.

NOTE: There is no way to visually tell if a bolt is the Torque-to-Yield design – the only way to tell is by its torque specifications.



Are T-T-Y Head Bolts Reusable?

The torque-to-yeild procedure stretches the bolts into their elastic range. On some engines, this stretching approaches the bolts' elastic limit and the bolts are permanently stretched. If these bolts are removed and reused, it is likely that either the head gasket will fail due to false torque readings or that the bolts may break. Each engine manufacturer offers guidelines as to whether torque-to-yeild head bolts are reusable. Some guidelines allow limited reuse, while others recommend you never reuse the bolts. Since technicians may not know how many times a T-T-Y bolt has been removed and reinstalled, we recommend never reusing a T-T-Y head bolt.



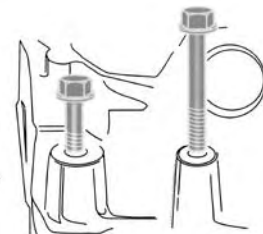
Parts to Help Reduce Repair Costs

The FEL-PRO Engine\$aver Hardware line is a collection of "problem solvers" that provide cost-saving alternatives to engine component replacement. They bring engine components back to proper performance, at a fraction of their replacement cost.

Engine\$aver Hardware Is Cost Efficiency Without Compromise

Cylinder Head Bolts

Help avoid the risks that go with reuse of head bolts on torque-to-yeild applications.



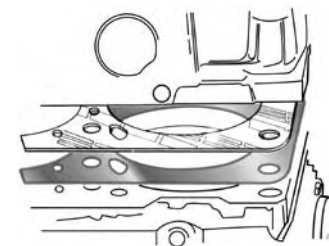
Torque-to-Angle Indicator TRQ-1

Assures that proper installation procedures are followed when using torque-to-angle cylinder head bolts.



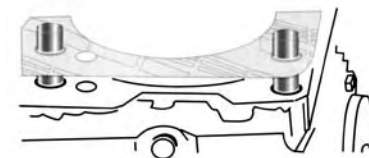
HeadSaver® Spacer Shims

Compensates for excess metal removed during machining operations, so you don't have to replace costly cylinder heads.



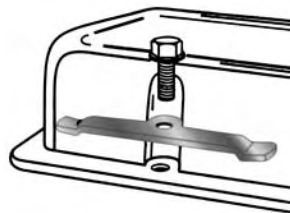
Cylinder Head Dowel Pins

Assure proper gasket and casting alignment for an accurate seal and correct head-to-block assembly.



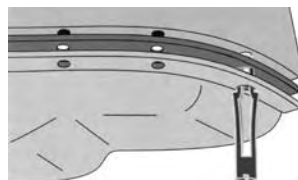
Valve Cover Load Spreaders™

Evenly distribute the clamping force on the valve cover flange and allow a proper seal between the valve cover and the new gasket.



Oil Pan SnapUps™

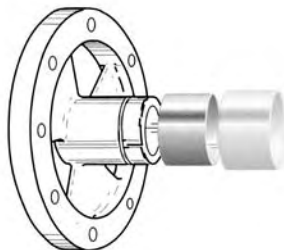
Save time and prevent frustration by holding the pan and the gasket in place for quick convenient bolt installation.



- ES 72863 for 5/16" applications
- ES 72864 for 6mm applications
- ES 72865 for 8mm applications

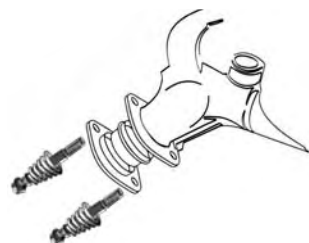
Sleeve 'N' Seal®

Repairs worn sealing surfaces and helps avoid replacement of costly harmonic balancers.



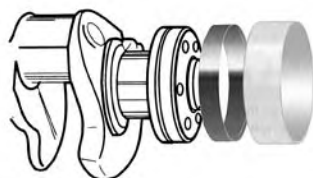
Exhaust Flange Bolt & Spring Kits

Quickly connect the exhaust manifold and exhaust pipe on FWD vehicles and assure correct clamping force.



Crankshaft Repair Sleeves

Repair worn sealing surfaces without costly crankshaft replacement.



EngineSaver Hardware line products also appear in the FEL-PRO® Passenger Car/Light Truck and Heavy Duty master catalogs.

ENGINE	YEARS		FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
AC COBRA V8					
260 Ford	1964-62	●	65-70	70	
289 Ford	1968-63	●	65-70	70	
427 Ford	1967-64	●	100-105	70	
428 Ford	1968-66	●	80-90	70	
ACURA 4					
1590cc DOHC (D16A1) 16 Valve	1989-86	●	1st 22, 2nd 48	106	
1678cc DOHC (B17A1) 16 Valve	1993-92		1st 22, 2nd 61	127	
1797cc DOHC (B18C1, B18C5) 16 Valve	2001-94	●	1st 22, 2nd 63	127	
1834cc DOHC (B18B1) 16 Valve	2001-94	●	1st 22, 2nd 63	128	
1834cc DOHC (B18A1) 16 Valve	1993-92	●	1st 22, 2nd 63	106	
1834cc DOHC (B18A1) 16 Valve	1991-90	●	1st 22, 2nd 61	106	
1998cc DOHC (K20A2, K20A3, K20Z1) 16 Valve	2006-02		1st 29, 2nd turn 90 degrees, 3rd turn 90 degrees NOTE: New bolts turn additional 90 degrees	106	
2156cc SOHC (F22B1) 16 Valve	1997	●	1st 29, 2nd 51, 3rd 72.3	108	
2254cc SOHC (F23A4) 16 Valve	2000-98	●	1st 22, 2nd turn 90 degrees, 3rd turn 90 degrees NOTE: New bolts turn additional 90 degrees	108	
2301cc DOHC Turbo (K23A1) 16 Valve	2008-07		1st 29, 2nd turn 90 degrees, 3rd turn 90 degrees NOTE: New bolts turn additional 90 degrees	106	
2354cc DOHC (K24A2) 16 Valve	2008-04		1st 29, 2nd turn 90 degrees, 3rd turn 90 degrees NOTE: New bolts turn additional 90 degrees	106	
ACURA 5					
2451cc SOHC (G25A4) 20 Valve	1998-95		1st 29, 2nd 51, 3rd 72.3	129	
2451cc SOHC (G25A1) 20 Valve	1994-92		72 in three steps	78	
ACURA V6					
2494cc SOHC (C25A1) 24 Valve	1987-86	●	1st 29, 2nd 56	89	
2675cc SOHC (C27A1) 24 Valve	1990-87	●	1st 29, 2nd 56	107	
2977cc DOHC (C30A1) 24 Valve	2005-91		Automatic trans. 56 in three steps; Manual trans. 71 in three steps	130	
2997cc SOHC (J30A1) 24 Valve	2000-97	●	1st 29, 2nd 51, 3rd 72.3	131	
3165cc SOHC (6VD1) 24 Valve Isuzu	1997-96	●	M11 bolts 1-8 47; M8 bolts 9-11 15	132	
3179cc DOHC (C32B1) 24 Valve	2005-97		Automatic trans. 56 in three steps; Manual trans. 71 in three steps	130	
3206cc SOHC (C32A6) 24 Valve	1998-96	●	56 in three steps	130	
3206cc SOHC (C32A1) 24 Valve	1995-91	●	56 in three steps	130	
3210cc SOHC (J32A3) 24 Valve	2008-04	●	6 point bolts 1st 29, 2nd 29 again, 3rd 51, 4th 51 again, 5th 72.3, 6th 72.3 again	131	
3210cc SOHC (J32A3) 24 Valve	2008-04	●	12 point bolts 1st 22, 2nd turn 90 degrees, 3rd turn 90 degrees NOTE: New bolts turn additional 90 degrees	131	
3210cc SOHC (J32A1, J32A2) 24 Valve	2003-99	●	1st 29, 2nd 51, 3rd 72.3	131	
3471cc SOHC (J35A5, J35A8) 24 Valve	2008-04	●	6 point bolts 1st 29, 2nd 29 again, 3rd 51, 4th 51 again, 5th 72.3, 6th 72.3 again	131	
3471cc SOHC (J35A5, J35A8) 24 Valve	2008-04	●	12 point bolts 1st 22, 2nd turn 90 degrees, 3rd turn 90 degrees NOTE: New bolts turn additional 90 degrees	131	
3471cc SOHC (J35A3, J35A5) 24 Valve	2003-01	●	1st 29, 2nd 29 again, 3rd 51, 4th 51 again, 5th 72.3, 6th 72.3 again	131	



TORQUE TABLES™



TORQUE TABLES™

ENGINE	YEARS		FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
ACURA V6 (CONT.)					
3474cc SOHC (C35A1) 24 Valve	2004-96	●	56 in three steps	133	
3494cc DOHC (6VE1) 24 Valve Isuzu	2000-98	●	1st M11 Bolts 1-8 21 , 2nd M11 Bolts 1-8 47 , 3rd M8 Bolt 9 15	257	
3664cc SOHC (J37A1) 24 Valve	2008-07		1st 22 , 2nd turn 90 degrees, 3rd turn 90 degrees NOTE: New bolts turn additional 90 degrees	131	
AM GENERAL 4					
121 SOHC (2.0L) Audi	1979	●	1st 20 , 2nd 40 , 3rd 65 , 4th warm engine, 5th loosen 45 degrees, 6th 80	60	
134F F-Head Jeep	1971-69		65-70	30	
150 (2.5L) AMC	1984-83	●	Bolts 1-7, 9-10 85 ; Bolt 8 75	72	
151 (2.5L) Pontiac	1983-80	●	92 in three steps	37	
AM GENERAL 6					
232 AMC	1978-73	●	105 in three steps	2	
232 AMC	1972	●	80-85	2	
258 (4.2L) AMC	1979-74	●	105 in three steps	2	
AM GENERAL V8					
350 (5.7L) Chevrolet Truck	1997 VIN D	●○	1st all bolts 22 , 2nd Long bolts turn 75 degrees, 3rd Medium bolts turn 65 degrees, 4th Short bolts turn 55 degrees	7	ES 72856
350 (5.7L) Chevrolet Truck	1996 VIN D	●○	1st 24 , 2nd 45 , 3rd 65	7	ES 72856
350 (5.7L) Chevrolet Truck	1995-94 VIN D	●○	65 in three steps	7	ES 72856
379 Diesel (6.2L) Chevrolet Truck	1994-92 VIN X	●○	1st 20 , 2nd 50 , 3rd turn 90 degrees	77	ES 72724
395 Diesel (6.5L) Chevrolet Truck	2000-94 VIN Y	●○	1st 20 , 2nd 55 , 3rd 55 again, 4th turn 90 degrees	77	ES 72724
395 Turbo Diesel (6.5L) Chevrolet Truck	2001-96 VIN Z	●○	1st 20 , 2nd 55 , 3rd 55 again, 4th turn 90 degrees	77	ES 72724
AMC.....SEE AMERICAN MOTORS					
AMERICAN MOTORS 4					
85.2 OHV (1.4L) Renault	1987-83	●	1st 41-44 , 2nd warm engine & allow to cool, 3rd loosen 180 degrees, 4th 41-44 again	149	
105.1 SOHC (1.7L) Renault	1987-85	●	1st 22 , 2nd 52 , 3rd loosen all bolts, 4th 15 , 5th turn 123 degrees	149	
120 SOHC (2.0L) Renault	1987	●	1st 22 , 2nd 52 , 3rd loosen all bolts, 4th 15 , 5th turn 123 degrees	149	
121 SOHC (2.0L) Audi	1979-77	●	1st 20 , 2nd 40 , 3rd 65 , 4th warm engine, 5th loosen 45 degrees, 6th 80	60	
150 (2.5L) AMC	1988-83	●	Bolts 1-7, 9-10 85 ; Bolt 8 75	72	
151 (2.5L) Pontiac	1983-80	●	92 in three steps	37	
AMERICAN MOTORS 6					
184 L-Head Nash	1955-53	●	60	20	
195.6 L-Head	1965-53	●	60	20	
195.6 OHV Cast Iron	1965-56		60	21	
195.6 OHV Aluminum	1964-61		50	21	
199	1970-65	●	80-85	2	
232	1979-73	●	105 in three steps	2	
232	1972-64	●	80-85	2	
258 (4.2L)	1988-81	●	85 in three steps	2	

ENGINE	YEARS		FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
AMERICAN MOTORS 6 (CONT.)					
258 (4.2L)	1980-73	●	105 in three steps	2	
258 (4.2L)	1972-71	●	80-85	2	
308 L-Head Hudson	1954-51		70	35	
AMERICAN MOTORS V8					
250	1962-56		58-62	22	
287	1966-63		58-62	22	
290	1969-66	●	90-100	1	
304	1979-70	●	1st 80 , 2nd 110	1	
320 Packard	1955		60-65	22	
327	1966-56		58-62	22	
343	1969-67	●	90-100	1	
352 Packard	1956		60-65	22	
360	1978-70	●	1st 80 , 2nd 110	1	
390	1970	●	1st 80 , 2nd 110	1	
390	1969-68	●	90-100	1	
401	1976-71	●	1st 80 , 2nd 110	1	
AMPHICAR 4					
1147cc OHV Triumph	1968-61		42-46	42	
APOLLO V8					
215 Buick	1963-62	●	50-55	24	
300 Buick	1965-64	●	65-70	4	
ARO 4					
140 SOHC (2.3L) Ford	1990	●○	1st 50-60 , 2nd 80-90	17	ES 72137
AUDI 4					
1471cc SOHC (8 Valve)	1974-73		1st 29 , 2nd 43 , 3rd turn 90 degrees, 4th turn 90 degrees	60	
1588cc SOHC (8 Valve)	1980-75	●	12 point bolts 1st 29 , 2nd 43 , 3rd turn 90 degrees, 4th turn 90 degrees	60	
1588cc SOHC (8 Valve)	1980-75	●	6 point bolts 1st 29 , 2nd 43 , 3rd 54 , 4th warm engine, 5th 61 , 6th retorque after 1000 miles	60	
1588cc SOHC Diesel (8 Valve)	1983-82	●○	12 point M12 bolts 1st 29 , 2nd 43 , 3rd turn 90 degrees, 4th turn 90 degrees, 5th warm engine, 6th turn 90 degrees, 7th after 1000 miles turn 90 degrees	60	ES 74028
1588cc SOHC Diesel (8 Valve)	1983-82	●	6 point M11 bolts 1st 35 , 2nd 50 , 3rd 65 , 4th warm engine, 5th 65 again, 6th after 1000 miles turn 90 degrees	60	
1588cc SOHC Turbo Diesel (8 Valve)	1983-82	●○	12 point M12 bolts 1st 29 , 2nd 43 , 3rd turn 90 degrees, 4th turn 90 degrees, 5th warm engine, 6th turn 90 degrees, 7th after 1000 miles turn 90 degrees	60	ES 74028
1715cc SOHC (8 Valve)	1983-81	●	1st 29 , 2nd 43 , 3rd turn 90 degrees, 4th turn 90 degrees	60	
1760cc OHV (8 Valve)	1972-70		1st 29 , 2nd 43.5 , 3rd 58 , 4th 65	12	
1780cc SOHC (8 Valve)	1987-84	●○	1st 29 , 2nd 43 , 3rd turn 90 degrees, 4th turn 90 degrees	60	ES 74029
1780cc DOHC Turbo (20 Valve)	2006-04	●○	1st 29.5 , 2nd turn 90 degrees, 3rd turn 90 degrees	60	ES 71172
1780cc DOHC Turbo (20 Valve)	2003-97	●○	1st 44 , 2nd turn 90 degrees, 3rd turn 90 degrees	60	ES 71172



TORQUE TABLES™



TORQUE TABLES™

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
AUDI 4 (CONT.)				
1871cc OHV (8 Valve)	1977-72	1st 29, 2nd 43.5, 3rd 58, 4th 65	12	
1984cc SOHC (8 Valve)	1990-88 ●	1st 29, 2nd 43, 3rd turn 90 degrees, 4th turn 90 degrees	60	
1984cc DOHC Turbo (20 Valve)	2008-05 ●	1st 29.5, 2nd turn 90 degrees, 3rd turn 90 degrees	60	
AUDI 5				
1986cc SOHC Diesel (10 Valve)	1982-81	12 point M12 bolts 1st 29, 2nd 43, 3rd turn 90 degrees, 4th turn 90 degrees, 5th warm engine, 6th turn 90 degrees, 7th after 1000 miles turn 90 degrees	78	
1986cc SOHC Diesel (10 Valve)	1981-79	6 point M11 bolts 1st 35, 2nd 50, 3rd 65, 4th warm engine, 5th 65 again, 6th after 1000 miles turn 90 degrees	78	
1986cc SOHC Turbo Diesel (10 Valve)	1985-82	12 point M12 bolts 1st 29, 2nd 43, 3rd turn 90 degrees, 4th turn 90 degrees, 5th warm engine, 6th turn 90 degrees, 7th after 1000 miles turn 90 degrees	78	
2144cc SOHC (10 Valve)	1985-78 ●	1st 29, 2nd 43, 3rd turn 90 degrees, 4th turn 90 degrees	78	
2144cc SOHC Turbo (10 Valve)	1985-80 ●	1st 29, 2nd 43, 3rd turn 90 degrees, 4th turn 90 degrees	78	
2226cc SOHC (10 Valve)	1988-84 ●	1st 29, 2nd 43, 3rd turn 90 degrees, 4th turn 90 degrees	78	
2226cc SOHC Turbo (10 Valve)	1991-86 ●	1st 29, 2nd 43, 3rd turn 90 degrees, 4th turn 90 degrees	78	
2226cc DOHC Turbo (20 Valve)	1997-90	1st 29, 2nd 43, 3rd turn 90 degrees, 4th turn 90 degrees	78	
2309cc SOHC (10 Valve)	1992-87 ●	1st 29, 2nd 43, 3rd turn 90 degrees, 4th turn 90 degrees	78	
2309cc DOHC (20 Valve)	1992-89 ●	1st 29, 2nd 43, 3rd turn 90 degrees, 4th turn 90 degrees	78	
AUDI 6				
2671cc DOHC Turbo (30 Valve)	2005-00	1st 44, 2nd turn 90 degrees, 3rd turn 90 degrees	135	
2771cc SOHC (12 Valve)	1998-92	1st 44, 2nd turn 90 degrees, 3rd turn 90 degrees	135	
2771cc DOHC (30 Valve)	2001-97 ●	1st 44, 2nd turn 90 degrees, 3rd turn 90 degrees	135	
2976cc DOHC (30 Valve)	2006-02	1st 30, 2nd turn 90 degrees, 3rd turn 90 degrees	135	
3123cc DOHC (30 Valve)	2008-05	1st 30, 2nd turn 90 degrees, 3rd turn 90 degrees	135	
3189cc DOHC (24 Valve)	2008-04	1st 22, 2nd 37, 3rd turn 90 degrees, 4th turn 90 degrees	168	
3597cc DOHC (24 Valve)	2008-07	1st 22, 2nd 37, 3rd turn 90 degrees, 4th turn 90 degrees	168	
AUDI 8				
3562cc DOHC (32 Valve)	1991-90	1st 30, 2nd 44, 3rd turn 90 degrees, 4th turn 90 degrees	136	
3697cc DOHC (32 Valve)	1999-97	1st 30, 2nd 44, 3rd turn 90 degrees, 4th turn 90 degrees	136	
4163cc DOHC (40 Valve)	2008-04	1st 22, 2nd 44, 3rd turn 90 degrees, 4th turn 90 degrees	136	
4172cc DOHC (32 Valve)	2004-97	1st 30, 2nd 44, 3rd turn 90 degrees, 4th turn 90 degrees	136	
4172cc DOHC (32 Valve)	1994-92	1st 30, 2nd 44, 3rd turn 90 degrees, 4th turn 90 degrees	136	

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
AUDI V8 (CONT.)				
4172cc DOHC (40 Valve)	2005-00	1st 26, 2nd 44, 3rd turn 90 degrees, 4th turn 90 degrees	136	
4172cc DOHC Turbo (40 Valve)	2003	1st 26, 2nd 44, 3rd turn 90 degrees, 4th turn 90 degrees	136	
AUDI V10				
5204cc DOHC (40 Valve)	2008-07	1st 22, 2nd 44, 3rd turn 90 degrees, 4th turn 90 degrees	226	
AUDI V12				
5998cc DOHC (48 Valve)	2008-05	1st 22, 2nd 37, 3rd turn 90 degrees, 4th turn 90 degrees	227	
AURORA V8				
302 (5.0L) Ford	1988-87 ●	Standard Hex Head bolts: Intake Side 80, Exhaust Side 68	70	
AUSTIN 4				
803cc OHV	1956-52	40	54	
848cc OHV	1974-59	40	54	
948cc OHV	1962-56	40	54	
997cc OHV	1969-61	40	54	
998cc OHV	1974-61	40	54	
1098cc OHV	1974-62	46	54	
1198cc OHV	1957-54	45	182	
1275cc OHV	1977-65	46 in three steps	54	
1489cc OHV	1961-54	45	182	
1622cc OHV	1966-61	45	182	
1798cc OHV	1977-68	45-50 in three steps	55	
AUSTIN-HEALEY 4				
948cc OHV	1962-58	40	54	
1098cc OHV	1967-62	46	54	
1275cc OHV	1971-66	46 in three steps	54	
AVANTI II V6				
244 SOHC (4.0L) 12 Valve Ford	2007-06 ●○	1st M12 Bolts 1-8 9, 2nd M12 Bolts 1-8 18, 3rd M8 Bolts 9-10 24, 4th M12 Bolts 1-8 turn 90 degrees, 5th M12 Bolts 1-8 turn 90 degrees	218	ES 72171
AVANTI II V8				
281 SOHC (4.6L) 24 Valve Ford	2007-05 ●○	1st 27-32, 2nd turn 85-95 degrees, 3rd turn 85-95 degrees	144	ES 72798
305 (5.0L) Chevrolet	1991-81 ●○	65 in three steps	7	ES 72856
327 Chevrolet	1969-65 ●○	65	7	ES 72856
346 OHV (5.7L) Chevrolet	2004 2nd Design Bolts ●○	1st M11 Bolts 1-10 22, 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-10 turn 70 degrees, 4th M8 Bolts 11-15 22	159	ES 72220
346 OHV (5.7L) Chevrolet	2004-01 1st Design Bolts ●○	1st M11 Bolts 1-10 22, 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-8 turn 90 degrees, 4th M11 Bolts 9-10 turn 50 degrees, 5th M8 Bolts 11-15 22	159	ES 72173
350 (5.7L) Chevrolet	1980-69 ●○	65 in three steps	7	ES 72856
400 Chevrolet	1978-73 ●○	65 in three steps	7	ES 72856



TORQUE TABLES™



TORQUE TABLES™

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
BERTONE				SEE FIAT
BIZZARRINI V8				
327 Chevrolet	1969-65	65	7	ES 72856
BMW 4				
1766cc SOHC (M10B18) 8 Valve	1985-84	1st 25-29, 2nd 42-44, 3rd wait 15 minutes, 4th turn 30-36 degrees, 5th warm engine, 6th turn 20-30 degrees	65	
1766cc SOHC (M10B18) 8 Valve	1983-80	1st 25-32, 2nd 49-52, 3rd 56-59, 4th warm engine, 5th 56-59 again, 6th retorque after 600 miles	65	
1796cc DOHC (M42B18) 16 Valve	1995-91	1st 24, 2nd turn 90-95 degrees, 3rd turn 90-95 degrees	137	
1895cc DOHC (M44B19) 16 Valve	1999-96	1st 22.1, 2nd turn 90 degrees, 3rd turn 90 degrees	137	
1990cc SOHC (M10B20, 121) 8 Valve	1979-66	1st 25-32, 2nd 49-52, 3rd 56-59, 4th warm engine, 5th 56-59 again, 6th retorque after 600 miles	65	
1990cc SOHC Turbo (121) 8 Valve	1974-73	1st 25-32, 2nd 49-52, 3rd 56-59, 4th warm engine, 5th 56-59 again, 6th retorque after 600 miles	65	
2302cc DOHC (S14B23) 16 Valve	1991-88	1st 35-37, 2nd 57-59, 3rd wait 15 minutes, 4th 71-73	137	
BMW 6				
2443cc SOHC Turbo Diesel (M21D24) 12 Valve	1986-85	1st 22-29, 2nd 50-60, 3rd wait 15 minutes, 4th 70-76, 5th warm engine, 6th turn 85-95 degrees	90	
2494cc SOHC (M20B25) 12 Valve	1993-87	Hexagon bolts 1st 29-33, 2nd wait 20 minutes, 3rd 43-47, 4th warm engine, 5th turn 25-30 degrees; Torx bolts 1st 22.1, 2nd turn 90 degrees, 3rd turn 90 degrees	84	
2494cc DOHC (M54B25) 24 Valve	2006-01	1st 29.5, 2nd turn 90 degrees, 3rd turn 90 degrees	84	
2494cc DOHC (M52B25) 24 Valve	2000-98 Cast Iron block	1st 22.1, 2nd turn 90 degrees, 3rd turn 90 degrees	84	
2494cc DOHC (M52B25) 24 Valve	2000-98 Aluminum block	1st 29.5, 2nd turn 90 degrees, 3rd turn 90 degrees	84	
2494cc DOHC (M50B25) 24 Valve	1995-91	1st 24, 2nd turn 90-95 degrees, 3rd turn 90-95 degrees	84	
2693cc SOHC (M20B27) 12 Valve	1988-82	1st 29-33, 2nd wait 20 minutes, 3rd 43-47, 4th warm engine, 5th turn 25-30 degrees	84	
2788cc SOHC (M30B28, 128) 12 Valve	1981-79	1st 25-32, 2nd 49-52, 3rd 56-59, 4th warm engine, 5th 56-59 again, 6th retorque after 600 miles	87	
2793cc DOHC (M52B28) 24 Valve	2000-96 Cast Iron block	1st 22.1, 2nd turn 90 degrees, 3rd turn 90 degrees	84	
2793cc DOHC (M52B28) 24 Valve	2000-96 Aluminum block	1st 29.5, 2nd turn 90 degrees, 3rd turn 90 degrees	84	
2979cc DOHC (M54B30) 24 Valve	2006-01	1st 29.5, 2nd turn 90 degrees, 3rd turn 90 degrees	84	
2985cc SOHC (M30B30) 12 Valve	1978-75	1st 25-32, 2nd 49-52, 3rd 56-59, 4th warm engine, 5th 56-59 again, 6th retorque after 600 miles	87	
2990cc DOHC (S50B30) 24 Valve	1995-94	1st 22.1, 2nd turn 90 degrees, 3rd turn 90 degrees	84	

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
BMW 6 (CONT.)				
2996cc DOHC (N52B30) 24 Valve	2008-06	1st Bolts 1-14 22, 2nd Bolts 1-14 turn 90 degrees, 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 1-14 turn 45 degrees, 5th Bolts 15-17 5, 6th Bolts 15-17 turn 90 degrees, 7th Bolt 18 11, 8th Bolt 18 turn 90 degrees	228	
2996cc DOHC Turbo (N54B30) 24 Valve	2008-07	1st Bolts 1-14 22, 2nd Bolts 1-14 turn 90 degrees, 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 1-14 turn 45 degrees, 5th Bolts 15-18 16.2	229	
3152cc DOHC (S52B32) 24 Valve	2000-96	1st 22.1, 2nd turn 90 degrees, 3rd turn 90 degrees	84	
3210cc SOHC (M30B32) 12 Valve	1984-83	1st 25-29, 2nd 42-45, 3rd wait 20 minutes, 4th 56-59, 5th turn 20-30 degrees	87	
3210cc SOHC (M30B32) 12 Valve	1982-78	1st 25-32, 2nd 49-52, 3rd 56-59, 4th warm engine, 5th 56-59 again, 6th retorque after 600 miles	87	
3245cc DOHC (S54B32) 24 Valve	2008-01	1st 22.1, 2nd turn 90 degrees, 3rd turn 90 degrees	84	
3430cc SOHC (M30B34) 12 Valve	1993-85	1st 25-29, 2nd 42-44, 3rd wait 20 minutes, 4th 57-59, 5th warm engine, 6th turn 30-40 degrees	84	
3453cc DOHC (S38B35) 24 Valve	1988-87	1st 35-37, 2nd 57-59, 3rd wait 15 minutes, 4th 71-73	84	
3535cc DOHC (S38B35) 24 Valve	1993-91	1st 43-46, 2nd wait 20 minutes, 3rd 58-60, 4th warm engine, 5th turn 30-40 degrees	84	
BMW V8				
2997cc DOHC (M60B30) 32 Valve	1995-94	1st 22.1, 2nd turn 80 degrees, 3rd turn 80 degrees	137	
3982cc DOHC (M60B40) 32 Valve	1995-93	1st 22.1, 2nd turn 80 degrees, 3rd turn 80 degrees	137	
4398cc DOHC (N62B44) 32 Valve	2007-02	1st 22.1, 2nd turn 80 degrees, 3rd turn 80 degrees	137	
4398cc DOHC (M62B44) 32 Valve	2003-96	1st 22.1, 2nd turn 80 degrees, 3rd turn 80 degrees	137	
4398cc DOHC Supercharged (N62B44S) 32 Valve	2008-07	1st 22.1, 2nd turn 80 degrees, 3rd turn 80 degrees	137	
4619cc DOHC (M62B46) 32 Valve	2003-02	1st 22.1, 2nd turn 80 degrees, 3rd turn 80 degrees	137	
4799cc DOHC (N62B48) 32 Valve	2008-04	1st 22.1, 2nd turn 80 degrees, 3rd turn 80 degrees	137	
4837cc DOHC (S62B48) 32 Valve	2004-03	1st 22.1, 2nd turn 80 degrees, 3rd turn 80 degrees	137	
4941cc DOHC (S62B50) 32 Valve	2003-00	1st 22.1, 2nd turn 80 degrees, 3rd turn 80 degrees	137	
BMW V10				
4999cc DOHC (S85B50) 40 Valve	2008-06	1st 29.5, 2nd turn 90 degrees, 3rd turn 90 degrees	155	
BMW V12				
4988cc SOHC (M70B50) 24 Valve	1994-88	1st 22.1, 2nd wait 15 minutes, 3rd turn 60 degrees, 4th turn 60 degrees	84	
5379cc SOHC (M73B54) 24 Valve	2001-95	1st 22.1, 2nd turn 60 degrees, 3rd turn 60 degrees	84	
5576cc SOHC (S70B56) 24 Valve	1995-94	1st 22.1, 2nd turn 60 degrees, 3rd turn 60 degrees	84	
5972cc DOHC (N73B60) 48 Valve	2008-03	1st 22.1, 2nd turn 80 degrees, 3rd turn 80 degrees	84	



TORQUE TABLES™



TORQUE TABLES™

ENGINE YEARS FT.-LBS. TORQ. SEQ. HEAD BOLT SET PART NUMBER

BRICKLIN V8				
351 Modified Ford	1976-75	●	95-105	70
351 Windsor Ford	1976-75	●	1st 85, 2nd 95, 3rd 105-112	70
360 AMC	1974	●	1st 80, 2nd 110	1

BUICK SEE GM PRODUCTS

CADILLAC SEE GM PRODUCTS

CALLAWAY V8

346 OHV (5.7L) Chevrolet	1999	●○	1st M11 Bolts 1-10 22, 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-8 turn 90 degrees, 4th M11 Bolts 9-10 turn 50 degrees, 5th M8 Bolts 11-15 22	159	ES 72173
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CHECKER 6 & V6

226 OHV Continental	1964-59		70-75	193	
226L L-Head Continental	1964-47		30-35	18	
229 (3.8L) Chevrolet	1982-80	●	65 in three steps	64	
230 Chevrolet	1968-64	●	95	2	
250 Chevrolet	1979-74	●	Bolts 1-10, 12-14 95; Bolt 11 85	2	
250 Chevrolet	1973-69	●	95	2	

CHECKER V8

267 (4.4L) Chevrolet	1982-80	●○	65 in three steps	7	ES 72856
283 Chevrolet	1967-64	●○	65	7	ES 72856
305 (5.0L) Chevrolet	1982-77	●○	65 in three steps	7	ES 72856
307 Chevrolet	1970-68	●○	65	7	ES 72856
318 Chrysler	1966-64	●	95	12	
318 Chrysler	1963-59	●	85	12	
327 Chevrolet	1969-64	●○	65	7	ES 72856
350 (5.7L) Chevrolet	1980-69	●○	65 in three steps	7	ES 72856
350 Diesel (5.7L) Oldsmobile	1982-80	●	1st 100, 2nd 130	3	

CHEVROLET SEE GM PRODUCTS

CHRYSLER SEE CHRYSLER PRODUCTS

CHRYSLER PRODUCTS 4

86 SOHC (1.4L) 8 Valve Mitsubishi	1984-79	●	1st 25, 2nd 51-54	81	
89.5 SOHC (1.5L) 12 Valve Mitsubishi	1996-91	●○	1st 25, 2nd 51-54	71	ES 71206
89.5 SOHC (1.5L) 8 Valve Mitsubishi	1991-85	●	1st 25, 2nd 51-54	81	
97.1 OHV (1.6L) 8 Valve Peugeot	1986-83	●	52 in three steps	37	
97.3 DOHC (1.6L) 16 Valve Mitsubishi	1990-89	●	Cold 65-72, Warm 72-80	81	
97.3 DOHC Turbo (1.6L) 16 Valve Mitsubishi	1990-89	●	Cold 65-72, Warm 72-80	81	
97.5 SOHC (1.6L) 8 Valve Mitsubishi	1984-78	●	1st 25, 2nd 51-54	81	
97.5 SOHC (1.6L) 8 Valve Mitsubishi	1977-71	●	Bolts 1-10 1st 25, 2nd 51-54; Bolts 11 3rd 11-15	38	
97.5 SOHC Turbo (1.6L) 8 Valve Mitsubishi	1990-84	●	1st 25, 2nd 51-54	81	
105 SOHC (1.7L) 8 Valve Volkswagen	1983-78	●	1st 29, 2nd 43, 3rd 54, 4th turn 90 degrees	60	

ENGINE YEARS FT.-LBS. TORQ. SEQ. HEAD BOLT SET PART NUMBER

CHRYSLER PRODUCTS 4 (CONT.)

107.1 SOHC (1.8L) 8 Valve Mitsubishi	1994-89	●○	1st 25, 2nd 51-54	81	ES 71174 ES 71175
109.7 DOHC (1.8L) 16 Valve Chrysler	2008 2nd Design Bolts		1st 25, 2nd 54, 3rd 54 again, 4th turn 90 degrees	71	
109.7 DOHC (1.8L) 16 Valve Chrysler	2008-07 1st Design Bolts		1st 25, 2nd 45, 3rd 45 again, 4th turn 90 degrees	71	
111.8 SOHC (1.8L) 16 Valve Mitsubishi	1996-92	●○	1st 54, 2nd loosen all bolts, 3rd 15, 4th turn 90 degrees, 5th turn 90 degrees	71	ES 71209
121.7 SOHC (2.0L) 8 Valve Mitsubishi	1982-74	●	Bolts 1-10 Cold 65-72, Hot 73-79; Bolts 11 11-15	38	
122 SOHC (2.0L) 16 Valve Chrysler	2005-04	●○	1st Bolts 1-10 25, 2nd Bolts 1-6 50, 3rd Bolts 7-10 35, 4th Bolts 1-6 50 again, 5th Bolts 7-10 35 again, 6th Bolts 1-10 turn 90 degrees	37	ES 72157
122 SOHC (2.0L) 16 Valve Chrysler	2003-95	●○	1st 25, 2nd 50, 3rd 50 again, 4th turn 90 degrees	37	ES 72157
122 SOHC (2.0L) 16 Valve Mitsubishi	1993	●	1st 58, 2nd loosen all bolts, 3rd 15, 4th turn 90 degrees, 5th turn 90 degrees	71	
122 SOHC (2.0L) 8 Valve Mitsubishi	1992-83	●	Cold 65-72, Warm 73-79	71	
122 DOHC (2.0L) 16 Valve Chrysler	2008 2nd Design Bolts		1st 25, 2nd 54, 3rd 54 again, 4th turn 90 degrees	71	
122 DOHC (2.0L) 16 Valve Chrysler	2008-07 1st Design Bolts		1st 25, 2nd 45, 3rd 45 again, 4th turn 90 degrees	71	
122 DOHC (2.0L) 16 Valve Chrysler	2004-02	●○	1st Long bolts 25; Short bolts 20, 2nd Long bolts 50; Short bolts 20, 3rd Long bolts 50; Short bolts 20, 4th all bolts turn 90 degrees	37	ES 72166
122 DOHC (2.0L) 16 Valve Chrysler	1999-95	●○	1st Long bolts 25; Short bolts 20, 2nd Long bolts 50; Short bolts 20, 3rd Long bolts 50; Short bolts 20, 4th all bolts turn 90 degrees	37	ES 72166
122 DOHC (2.0L) 16 Valve Mitsubishi	1994-93	●○	1st 58, 2nd loosen all bolts, 3rd 15, 4th turn 90 degrees, 5th turn 90 degrees	71	ES 71175
122 DOHC (2.0L) 16 Valve Mitsubishi	1992-89	●○	Cold 65-72 in three steps	81	ES 71175
122 DOHC Turbo (2.0L) 16 Valve Mitsubishi	1998-95	●○	1st 58, 2nd loosen all bolts, 3rd 15, 4th turn 90 degrees, 5th turn 90 degrees	71	ES 71177
122 DOHC Turbo (2.0L) 16 Valve Mitsubishi	1994-93	●○	1st 58, 2nd loosen all bolts, 3rd 15, 4th turn 90 degrees, 5th turn 90 degrees	71	ES 71175
122 DOHC Turbo (2.0L) 16 Valve Mitsubishi	1992-89	●○	Cold 65-72 in three steps	81	ES 71175
132 SOHC (2.2L) 8 Valve Renault Medallion	1989-88		1st 37, 2nd 59, 3rd loosen all bolts, 4th 64-72	149	
135 SOHC (2.2L) 8 Valve Chrysler exc. Medallion	1994-85	●○	M11 bolts: 1st 45, 2nd 65, 3rd 65 again, 4th turn 90 degrees	37	ES 72723 ES 72176
135 SOHC (2.2L) 8 Valve Chrysler	1985-81	●○	M10 bolts: 1st 30, 2nd 45, 3rd 45 again, 4th turn 90 degrees	37	ES 72118
135 DOHC (2.2L) 16 Valve Chrysler	1991-88		M11 bolts: 1st 45, 2nd 65, 3rd 65 again, 4th turn 90 degrees	100	
135 SOHC Turbo (2.2L) 8 Valve Chrysler	1990-85	●○	M11 bolts: 1st 45, 2nd 65, 3rd 65 again, 4th turn 90 degrees	37	ES 72723 ES 72176
135 SOHC Turbo (2.2L) 8 Valve Chrysler	1985-84	●○	M10 bolts: 1st 30, 2nd 45, 3rd 45 again, 4th turn 90 degrees	37	ES 72118
135 DOHC Turbo (2.2L) 16 Valve Chrysler	1993-89		M11 bolts: 1st 45, 2nd 65, 3rd 65 again, 4th turn 90 degrees	100	
143 SOHC Turbo Diesel (2.3L) 8 Valve Mitsubishi	1986-83	●	Cold 76-83, Warm 84-90	43	



TORQUE TABLES™



TORQUE TABLES™

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
CHRYSLER PRODUCTS 4 (CONT.)				
143.4 SOHC (2.4L) 16 Valve Mitsubishi	2005-01 Car	●○ 1st 58, 2nd loosen all bolts, 3rd 15, 4th turn 90 degrees, 5th turn 90 degrees	71	ES 71177
143.4 SOHC (2.4L) 16 Valve Mitsubishi	1996-93 Car	● 1st 58, 2nd loosen all bolts, 3rd 15, 4th turn 90 degrees, 5th turn 90 degrees	71	
143.4 SOHC (2.4L) 8 Valve Mitsubishi	1992 Car	● Cold 65-72, Warm 73-79	71	
143.4 SOHC (2.4L) 8 Valve Mitsubishi	1993 Truck	● 1st 58, 2nd loosen all bolts, 3rd 15, 4th turn 90 degrees, 5th turn 90 degrees	71	
143.4 SOHC (2.4L) 8 Valve Mitsubishi	1992-90 Truck	● Cold 65-72, Warm 73-79	71	
144 DOHC (2.4L) 16 Valve Chrysler	2008 2nd Design Bolts	● 1st 25, 2nd 54, 3rd 54 again, 4th turn 90 degrees	71	
144 DOHC (2.4L) 16 Valve Chrysler	2008-07 1st Design Bolts	●○ 1st 25, 2nd 45, 3rd 45 again, 4th turn 90 degrees	71	ES 71028
144 DOHC Turbo (2.4L) 16 Valve Chrysler	2008 2nd Design Bolts	● 1st 25, 2nd 54, 3rd 54 again, 4th turn 90 degrees	71	
144 DOHC Turbo (2.4L) 16 Valve Chrysler	2008 1st Design Bolts	●○ 1st 25, 2nd 45, 3rd 45 again, 4th turn 90 degrees	71	ES 71028
148 DOHC (2.4L) 16 Valve Chrysler	2008-05	●○ 1st 25, 2nd 60, 3rd 60 again, 4th turn 90 degrees	37	ES 71028
148 DOHC (2.4L) 16 Valve Chrysler	2004-95	●○ 1st 25, 2nd 50, 3rd 50 again, 4th turn 90 degrees	37	ES 71028
148 DOHC Turbo (2.4L) 16 Valve Chrysler	2008-05	●○ 1st 25, 2nd 60, 3rd 60 again, 4th turn 90 degrees	37	ES 71028
148 DOHC Turbo (2.4L) 16 Valve Chrysler	2004-03	●○ 1st 25, 2nd 50, 3rd 50 again, 4th turn 90 degrees	37	ES 71028
150 OHV (2.5L) 8 Valve Jeep	2002-97 Truck	●○ 1st 22, 2nd 45, 3rd 45 again, 4th Bolts 1-6, 8-10 110; Bolt 7 100	151	ES 72896
150 OHV (2.5L) 8 Valve Jeep	1996 Truck	● 1st 22, 2nd 45, 3rd 45 again, 4th Bolts 1-6, 8-10 110; Bolt 7 100	151	
150 OHV (2.5L) 8 Valve AMC	1989-88 Premier	● 1st 22, 2nd 45, 3rd Bolts 1-7, 9-10 110; Bolt 8 100	72	
153 SOHC (2.5L) 8 Valve Chrysler	1995-86	●○ 1st 45, 2nd 65, 3rd 65 again, 4th turn 90 degrees	37	ES 72723 ES 72176
153 SOHC Turbo (2.5L) 8 Valve Chrysler	1992-89	●○ 1st 45, 2nd 65, 3rd 65 again, 4th turn 90 degrees	37	ES 72723 ES 72176
156 SOHC (2.6L) 8 Valve Mitsubishi	1989-78	●○ Bolts 1-10 Cold 65-72, Warm 73-79; Bolts 11 11-15	38	ES 72860
156 SOHC Turbo (2.6L) 8 Valve Mitsubishi	1989-84	●○ Bolts 1-10 Cold 65-72, Warm 73-79; Bolts 11 11-15	38	ES 72860
CHRYSLER PRODUCTS 5				
164 DOHC Turbo Diesel (2.7L) 20 Valve Mercedes-Benz	2007-03 Sprinter VIN C, 4	●○ 1st Bolts 1-12 12, 2nd Bolts 13-14 15, 3rd Bolts 1-12 45, 4th Bolts 13-14 15 again, 5th Bolts 1-12 turn 90 degrees, 6th Bolts 1-12 turn 90 degrees	255	ES 71233
CHRYSLER PRODUCTS 6 & V6				
152.2 SOHC (2.5L) 24 Valve Mitsubishi	2000-98	●○ Cold 80 in three steps	154	ES 72859
152.2 SOHC (2.5L) 24 Valve Mitsubishi	1997-95	● Cold 80 in three steps	154	
167 DOHC (2.7L) 24 Valve Chrysler	2008-98	●○ Bolts 1-8 1st 35, 2nd 55, 3rd 55 again, 4th turn 90 degrees; Bolts 9-11 5th 21	138	ES 72897
170 OHV	1971-60	● 65-70	9	
181 SOHC (3.0L) 12 Valve Volvo	1992-90 Monaco, Premier	1st 44, 2nd loosen all bolts, 3rd 30, 4th turn 180 degrees	221	
181 SOHC (3.0L) 12 Valve Volvo	1989-88 Premier	1st 44, 2nd loosen all bolts, 3rd 15, 4th turn 104-108 degrees, 5th warm engine & allow to cool, 6th turn 45 degrees	221	

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
CHRYSLER PRODUCTS 6 & V6 (CONT.)				
181.1 SOHC (3.0L) 12 Valve Mitsubishi	2000-92 exc. Stealth, Monaco, Premier	●○ Cold 80 in three steps	154	ES 72859
181.1 SOHC (3.0L) 12 Valve Mitsubishi	1991-87 exc. Stealth, Monaco, Premier	●○ Cold 70 in three steps	154	ES 72859
181.1 SOHC (3.0L) 12 Valve Mitsubishi	1996-93 Stealth	●○ Cold 80 in three steps	154	ES 72859
181.1 SOHC (3.0L) 12 Valve Mitsubishi	1992-91 Stealth	●○ Cold 70 in three steps	154	ES 72859
181.1 SOHC (3.0L) 24 Valve Mitsubishi	2005-01	●○ 1st 80 in three steps, 2nd loosen all bolts, 3rd 80 in three steps again	154	ES 72859
181.1 DOHC (3.0L) 24 Valve Mitsubishi	1996-91 Stealth	●○ Cold 80 in three steps	154	ES 72859
181.1 DOHC Turbo (3.0L) 24 Valve Mitsubishi	1996-91 Stealth	●○ Cold 90 in three steps	154	ES 72859
182 DOHC Turbo Diesel (3.0L) 24 Valve Mercedes-Benz	2008-07 Sprinter VIN 4, 5	1st Bolts 1-8 44, 2nd Bolts 9-10 15, 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 9-10 15 again, 5th Bolts 1-8 turn 90 degrees	242	
195 SOHC (3.2L) 18 Valve Mercedes-Benz	2008-04 Crossfire	1st Bolts 1-8 7, 2nd Bolts 1-8 22, 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 1-8 turn 90 degrees, 5th Bolts 9-12 15	232	
195 SOHC Supercharged (3.2L) 18 Valve Mercedes-Benz	2006-05 Crossfire	1st Bolts 1-8 7, 2nd Bolts 1-8 22, 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 1-8 turn 90 degrees, 5th Bolts 9-12 15	232	
197 SOHC (3.2L) 24 Valve Chrysler	2001-98	●○ 1st 45, 2nd 65, 3rd 65 again, 4th turn 90 degrees	49	ES 72895
198 OHV	1974-70	● 65-70	9	
201 OHV (3.3L) 12 Valve Chrysler	2008-97	●○ M11 Bolts 1-8 1st 45, 2nd 65, 3rd 65 again, 4th turn 90 degrees; M8 Bolt 9 5th 25 in three steps	215	ES 72163
201 OHV (3.3L) 12 Valve Chrysler	1996-90	●○ M11 Bolts 1-8 1st 45, 2nd 65, 3rd 65 again, 4th turn 90 degrees; M8 Bolt 9 5th 25 in three steps	215	ES 72849 ES 72176-1
201.3 L-Head	1941-34	70	35	
213 DOHC (3.5L) 24 Valve Mercedes-Benz	2008-07 Sprinter VIN 6	1st Bolts 1-8 15, 2nd Bolts 1-8 30, 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 1-8 turn 90 degrees; 5th Bolts 9-12 12, 6th Bolts 9-12 turn 90 degrees	239	
215 SOHC (3.5L) 24 Valve Chrysler	2008-98	●○ 1st 45, 2nd 65, 3rd 65 again, 4th turn 90 degrees	49	ES 72895
215 SOHC (3.5L) 24 Valve Chrysler	1997-93	●○ 1st 45, 2nd 65, 3rd 65 again, 4th turn 90 degrees	49	ES 72138
217.8 L-Head	1954-34	70	35	
225 OHV (3.7L)	1987-60	● 70 in three steps	9	
226 SOHC (3.7L) 12 Valve Dodge Truck	2008-02	●○ 1st M11 Bolts 1-8 20, 2nd M11 Bolts 1-8 20 again, 3rd M8 Bolts 9-12 10, 4th M11 Bolts 1-8 turn 90 degrees, 5th M11 Bolts 1-8 turn 90 degrees, 6th M8 Bolts 9-12 19	204	ES 71129-1
228.1 L-Head	1954-37	70	35	
230 L-Head	1960-42	70	35	
231 OHV (3.8L) 12 Valve Chrysler	2008-97	●○ M11 Bolts 1-8 1st 45, 2nd 65, 3rd 65 again, 4th turn 90 degrees; M8 Bolt 9 5th 25 in three steps	215	ES 72163



TORQUE TABLES™



TORQUE TABLES™

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
CHRYSLER PRODUCTS 6 & V6 (CONT.)				
231 OHV (3.8L) 12 Valve Chrysler	1996-91	●○	M11 Bolts 1-8 1st 45 , 2nd 65 , 3rd 65 again, 4th turn 90 degrees; M8 Bolt 9 5th 25 in three steps	215 ES 72849 ES 72176-1
236.6 L-Head	1953-42		70	35
239 OHV (3.9L) 12 Valve Dodge Truck	2003-94	●○	1st 50 , 2nd 105 , 3rd 105 again	94 ES 71038
239 OHV (3.9L) 12 Valve Dodge Truck	1993-86	●	1st 50 , 2nd 105 , 3rd 105 again	94
241 SOHC (4.0L) 24 Valve Dodge Truck	2008-07		1st 45 , 2nd 65 , 3rd 65 again, 4th turn 90 degrees	154
241.5 L-Head	1941-38		70	35
251 L-Head	1968-42		70	35
265 L-Head	1960-52		70	35
359 OHV Turbo Diesel (5.9L) 24 Valve Cummins	2008-03 VIN C, 6, 7	●○	1st 52 , 2nd loosen one turn, 3rd 77 , 4th 77 again, 5th turn 90 degrees	111 ES 72193
359 OHV Turbo Diesel (5.9L) 24 Valve Cummins	2002-98 VIN C, 6, 7	●○	1st 59 , 2nd 77 , 3rd 77 again, 4th turn 90 degrees	111 ES 72193
359 OHV Turbo Diesel (5.9L) 12 Valve Cummins	1999-91 VIN C, D	●	1st all bolts 66 , 2nd Long bolts 89 , 3rd all bolts turn 90 degrees	111
359 OHV Turbo Diesel (5.9L) 12 Valve Cummins	1991-88 VIN 8	●	1st 29 , 2nd 62 , 3rd 93	111
408 OHV Turbo Diesel (6.7L) 24 Valve Cummins	2008-07 VIN A		1st 52 , 2nd loosen one turn, 3rd 77 , 4th 77 again, 5th turn 90 degrees	111
CHRYSLER PRODUCTS L8 & V8				
241.4 Dodge, Plymouth	1956-53		85	12
259.2 Dodge Truck	1956-55		85	12
260 Plymouth	1955		85	12
270 Dodge, Plymouth	1956-55	●	85	12
273	1969-64	●	85	12
276 DeSoto	1954-52		85	12
277 Plymouth	1957-56	●	85	12
287 SOHC (4.7L) 16 Valve Dodge Truck	2008	●○	1st M11 Bolts 1-10 20 , 2nd M11 Bolts 1-10 20 again, 3rd M8 Bolts 11-14 10 , 4th M11 Bolts 1-10 turn 90 degrees, 5th M11 Bolts 1-10 turn 90 degrees, 6th M8 Bolts 11-14 19	163 ES 71129
287 SOHC (4.7L) 16 Valve Dodge Truck	2007-00	●○	1st M11 Bolts 1-10 15 , 2nd M11 Bolts 1-10 35 , 3rd M8 Bolts 11-14 18 , 4th M11 Bolts 1-10 turn 90 degrees, 5th M8 Bolts 11-14 22	163 ES 71129
291 DeSoto	1955		85	12
301 Plymouth	1957	●	85	12
301 Chrysler	1955	●	85	12
303 Plymouth	1957-56	●	85	12
313 Plymouth	1964-57	●	85	12
315 Dodge	1959-56	●	85	12
318 (5.2L)	2003-94	●○	1st 50 , 2nd 105 , 3rd 105 again	12 ES 71038-1
318 (5.2L)	1993-85	●	1st 50 , 2nd 105 , 3rd 105 again	12
318 (5.2L)	1984-80	●	95	12
318 (5.2L)	1979-78	●	105	12
318 (5.2L)	1977-64	●	95	12
318 (5.2L)	1963-57	●	85	12
323.5 L-Head Chrysler	1950-46		65-70	169
325 Dodge	1958-57	●	85	12
326 Dodge	1959	●	85	12

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
CHRYSLER PRODUCTS L8 & V8 (CONT.)				
330 DeSoto	1956		85	12
331 Chrysler	1956-51	●	85	12
340	1973-68	●	95	12
341 DeSoto	1957-56		85	12
345 Hemi (5.7L) 16 Valve Chrysler	2008-03	●○	1st M12 Bolts 1-10 25 , 2nd M8 Bolts 11-15 15 , 3rd M12 Bolts 1-10 40 , 4th M8 Bolts 11-15 15 again, 5th M12 Bolts 1-10 turn 90 degrees, 6th M8 Bolts 11-15 25	216 ES 72200
345 DeSoto	1957		85	12
350	1958	●	70	11
353 Dodge Truck	1956-55	●	85	12
354 Chrysler	1959-55	●	85	12
360 (5.9L)	2003-94	●○	1st 50 , 2nd 105 , 3rd 105 again	12 ES 71038-1
360 (5.9L)	1993-85	●	1st 50 , 2nd 105 , 3rd 105 again	12
360 (5.9L)	1984-78	●	105	12
360 (5.9L)	1977-71	●	95	12
361	1966-58 Car	●	70	11
361	1977-69 Truck		70	11
361	1968-60 Truck	●	70	11
370 Hemi (6.1L) 16 Valve Chrysler	2008-05		1st M12 Bolts 1-10 25 , 2nd M8 Bolts 11-15 15 , 3rd M12 Bolts 1-10 40 , 4th M8 Bolts 11-15 15 again, 5th M12 Bolts 1-10 turn 90 degrees, 6th M8 Bolts 11-15 25	216
383	1971-59	●	70	11
392 Chrysler	1958-57	●	85	12
400 (6.6L)	1980-71	●	70	11
413	1965-59 Car	●	70	11
413	1977-69 Truck		70	11
413	1968-60 Truck	●	70	11
426	1965-63 exc. Hemi	●	70	11
426	1971-66 Hemi		75	10
426	1965-64 Hemi		70	10
440 (7.2L)	1980-66	●	70	11
CHRYSLER PRODUCTS V10				
488 OHV (8.0L) 20 Valve Chrysler	2002-92 Car		Bolts 1-12 1st 35 , 2nd 90 ; Bolts 13-20 3rd 9	201
488 OHV (8.0L) 20 Valve Chrysler	2004-94 Truck	●○	1st 43 , 2nd 105	155 ES 72894 ES 72904
505 OHV (8.3L) 20 Valve Chrysler	2007-03	●○	Bolts 1-12 1st 35 , 2nd 90 ; Bolts 13-20 3rd 9	201 ES 72209
512 OHV (8.4L) 20 Valve Chrysler	2008		Bolts 1-12 1st 26 , 2nd 35 , 3rd turn 90 degrees; Bolts 13-20 4th 8	201
DAEWOO 4				
1598cc DOHC (A16DMS) 16 Valve Opel	2002-01		1st 18 , 2nd turn 70 degrees, 3rd turn 70 degrees, 4th turn 30 degrees	40
1598cc DOHC (A16DMS) 16 Valve Opel	2000-98		1st 18 , 2nd turn 60 degrees, 3rd turn 60 degrees, 4th turn 60 degrees, 5th turn 10 degrees	40
1998cc DOHC (A20DMS) 16 Valve Opel	2002-98	●	1st 18 , 2nd turn 90 degrees, 3rd turn 90 degrees, 4th turn 90 degrees	100
2198cc DOHC (A22DMS) 16 Valve Opel	2002-98	●	1st 18 , 2nd turn 90 degrees, 3rd turn 90 degrees, 4th turn 90 degrees	100



TORQUE TABLES™

ENGINE YEARS FT.-LBS. TORQ. SEQ. HEAD BOLT SET PART NUMBER

DAIHATSU 3

993cc SOHC (CB) 6 Valve	1992-88	40-47 in three steps	214	
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DAIHATSU 4

1295cc SOHC (HCE) 16 Valve	1992-89	44-49 in three steps	147	
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1589cc SOHC (HDC, HDE) 16 Valve	1992-90	44-49 in three steps	147	
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DATSUN SEE NISSAN

DeLOREAN V6

2849cc SOHC (B3) 12 Valve Volvo	1983-81	1st 7, 2nd 22, 3rd 44, 4th loosen all bolts, 5th 11-14, 6th turn 116-120 degrees, 7th warm engine & allow to cool, 8th loosen all bolts, 9th 11-14 again, 10th turn 113-117 degrees	52	
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DeSOTO SEE CHRYSLER PRODUCTS

DeTOMASO V8

281 DOHC (4.6L) 32 Valve Ford	2002-00	●○ 1st 27-32, 2nd turn 85-95 degrees, 3rd loosen one turn, 4th 27-32 again, 5th turn 85-95 degrees, 6th turn 85-95 degrees	124	ES 72798
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289 Ford	1967	● 65-70	70	
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302 Ford	1972-67 exc. Boss	● Intake Side 80, Exhaust Side 68	70	
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302 Ford	1971-69 Boss	● Upper 80; Lower 70	70	
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351 Cleveland Ford	1974-71	● 95-105	70	
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351 Windsor (5.8L) Ford	1989-81	● 1st 85, 2nd 95, 3rd 105-112	70	
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DODGE SEE CHRYSLER PRODUCTS

EAGLE SEE CHRYSLER PRODUCTS

EDSEL SEE FORD PRODUCTS

ELVA 4

1489cc OHV MG	1961-58	45	182	
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1588cc OHV MG	1961-58	45	182	
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1622cc OHV MG	1966-62	45	182	
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1798cc OHV MG	1966-62	45-50 in three steps	55	
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EXCALIBUR V8

289 Studebaker	1965	55-65	170	
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305 (5.0L) Chevrolet	1990-80	●○ 65 in three steps	7	ES 72856
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327 Chevrolet	1969-65	●○ 65	7	ES 72856
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350 (5.7L) Chevrolet	1996	●○ 1st all bolts 22, 2nd Short bolts turn 67 degrees; 3rd Medium bolts & Long bolts turn 80 degrees	7	ES 72856
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350 (5.7L) Chevrolet	1995-93	●○ 65 in three steps	7	ES 72856
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350 (5.7L) Chevrolet	1990-70	●○ 65 in three steps	7	ES 72856
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454 Chevrolet	1979-72	● 80 in three steps	8	
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FACEL VEGA 4

1780cc OHV (B18D) Volvo	1964-63	61-69	110	
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FACEL VEGA V8

276 DeSoto	1954	85	12	
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277 Plymouth	1958	● 85	12	
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291 DeSoto	1957-55	85	12	
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TORQUE TABLES™

ENGINE YEARS FT.-LBS. TORQ. SEQ. HEAD BOLT SET PART NUMBER

FACEL VEGA V8 (CONT.)

301 Plymouth	1958	● 85	12	
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330 DeSoto	1957-56	85	12	
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354 Chrysler	1958	● 85	12	
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383 Chrysler	1964-59	● 70	11	
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FAIRTHORPE 4

948cc OHV Austin	1962-58	40	54	
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998cc OHV Austin	1962-58	40	54	
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FARGO SEE CHRYSLER PRODUCTS

FIAT 4

817cc OHV	1971-68	29	41	
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843cc OHV	1968-65	29	41	
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903cc OHV	1973-67	36 in three steps	41	
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1116cc SOHC	1973-71	69 in three steps	41	
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1290cc SOHC	1979-72	● 69 in three steps	41	
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1438cc OHV	1973-70	56	41	
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1438cc DOHC	1971-68	54	41	
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1498cc SOHC	1989-79	● M17 bolts 1st 15, 2nd 29, 3rd turn 90 degrees, 4th turn 90 degrees	41	
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1498cc SOHC	1989-79	● M19 bolts 1st 29, 2nd 69, 3rd loosen 1/2 turn, 4th 29 again, 5th 69	41	
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1592cc DOHC	1978-72	61 in three steps	41	
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1608cc DOHC	1973-71	58 in three steps	41	
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1756cc DOHC	1978-74	61 in three steps	41	
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1995cc DOHC	1987-78	61 in three steps	41	
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FORD SEE FORD PRODUCTS

FORD PRODUCTS 4

80.8 SOHC (1.3L) 8 Valve Mazda	1997-88	● 1st 35-40, 2nd 56-60	150	
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97.5 SOHC (1.6L) 8 Valve Mazda	1989-87 Tracer	● 56-60 in three steps	150	
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97.5 DOHC (1.6L) 16 Valve Mazda	1994-91 Capri	● 56-60 in three steps	150	
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97.5 DOHC Turbo (1.6L) 16 Valve Mazda	1994-91 Capri	● 56-60 in three steps	150	
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98 OHV (1.6L) 8 Valve Ford	1980-78	● 65-70	16	
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98 OHV (1.6L) 8 Valve Ford	1973-71	● 65-70	16	
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98 SOHC (1.6L) 8 Valve Ford	1985-81	●○ 1st 44, 2nd turn 90 degrees, 3rd turn 90 degrees	36	ES 72672
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98 SOHC Turbo (1.6L) 8 Valve Ford	1985-84	●○ 1st 44, 2nd turn 90 degrees, 3rd turn 90 degrees	36	ES 72672
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109.6 SOHC (1.8L) 8 Valve Mazda	1978-72 Courier	● Cold 63-68, Warm 69-73	150	
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112.2 DOHC (1.8L) 16 Valve Mazda	1996-91	● 56-60 in three steps	150	
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114 SOHC (1.9L) 8 Valve Ford	1996-85	●○ 1st 30, 2nd 44, 3rd loosen one turn, 4th 30 again, 5th 44, 6th turn 90 degrees, 7th turn 90 degrees	36	ES 72672
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119.7 L-Head Ford	1942-41	Stud Nuts 50-55; Bolts 65-70	194	
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120.2 SOHC (2.0L) 8 Valve Mazda	1982-79 Courier	● Cold 59-64, Warm 69-72	150	
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121 SOHC (2.0L) 8 Valve Ford	2004-00 Focus	●○ 1st 37, 2nd loosen 1/2 turn, 3rd 37 again, 4th turn 90 degrees, 5th turn 90 degrees	36	ES 72672
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121 SOHC (2.0L) 8 Valve Ford	2003-97 Escort, Tracer	●○ 1st 30-44, 2nd loosen 1/2 turn, 3rd 30-44 again, 4th turn 90 degrees, 5th turn 90 degrees	36	ES 72672
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TORQUE TABLES™



TORQUE TABLES™

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
FORD PRODUCTS 4 (CONT.)				
121 DOHC (2.0L) 16 Valve Ford	2004-01 Zetec Escape	●○ 1st 15, 2nd 30, 3rd turn 90 degrees	148	ES 72175
121 DOHC (2.0L) 16 Valve Ford	2004-00 Zetec Focus	●○ 1st 15, 2nd 30, 3rd turn 90 degrees	148	ES 72175
121 DOHC (2.0L) 16 Valve Ford	2003-98 Zetec Escort, ZX2	●○ 1st 12-18, 2nd 26-33, 3rd turn 105 degrees	148	ES 72175
121 DOHC (2.0L) 16 Valve Ford	2002-98 Zetec Contour, Cougar, Mystique	●○ 1st 18, 2nd 33, 3rd turn 105 degrees	148	ES 72175
121 DOHC (2.0L) 16 Valve Ford	1997-95 Zetec	●○ 1st 15-22, 2nd 30-37, 3rd turn 90 degrees	148	ES 72175
121.5 DOHC (2.0L) 16 Valve Mazda	1997-93 Probe	●○ 1st 13-16, 2nd turn 90 degrees, 3rd turn 90 degrees	150	ES 74020
121.7 SOHC (2.0L) 8 Valve Ford	1974-71	● 1st 14-29, 2nd 36-50, 3rd 65-80	17	
122 SOHC (2.0L) 8 Valve Ford	1988-83 Ranger	● 1st 50-60, 2nd 80-90	17	
122 SOHC Diesel (2.0L) 8 Valve Mazda	1987-84	1st 21, 2nd turn 90 degrees, 3rd turn 90 degrees	150	
122 DOHC (2.0L) 16 Valve Ford	2008-05 Duratec	●○ 1st 4, 2nd 11, 3rd 33, 4th turn 90 degrees, 5th turn 90 degrees	150	ES 72207
133 SOHC (2.2L) 12 Valve Mazda	1992-89 Probe	● 1st 29-32, 2nd 59-64	37	
133 SOHC Turbo (2.2L) 12 Valve Mazda	1992-89 Probe	● 1st 29-32, 2nd 59-64	37	
134.8 OHV Diesel (2.2L) 8 Valve Mazda	1984-83	● 1st 25, 2nd 45, 3rd 80-85, 4th warm engine, 5th 80-85 again	6	
138 DOHC (2.3L) 16 Valve Ford	2008-01 Duratec	●○ 1st 4, 2nd 11, 3rd 33, 4th turn 90 degrees, 5th turn 90 degrees	150	ES 72207
138 DOHC (2.3L) 16 Valve Hybrid Ford	2008-05 Duratec	●○ 1st 4, 2nd 11, 3rd 33, 4th turn 90 degrees, 5th turn 90 degrees	150	ES 72207
140 OHV (2.3L) 8 Valve Ford	1994-84 HSC	● 1st 52-59, 2nd 70-76	37	
140 SOHC (2.3L) 8 Valve Ford	1997-93	●○ Bolts with 85mm long threads: 1st 51, 2nd 51 again, 3rd turn 90-100 degrees	17	ES 72137
140 SOHC (2.3L) 8 Valve Ford	1993-91	●○ Bolts with 44mm long threads: 1st 50-60, 2nd 80-90	17	ES 72137
140 SOHC (2.3L) 8 Valve Ford	1990-74	●○ 1st 50-60, 2nd 80-90	17	ES 72137
140 SOHC Turbo (2.3L) 8 Valve Ford	1989-79	●○ 1st 50-60, 2nd 80-90	17	ES 72137
143 SOHC Turbo Diesel (2.3L) 8 Valve Mitsubishi	1987-85	● Cold 76-83, Warm 84-90	43	
153 OHV (2.5L) 8 Valve Ford	1991-86 HSC	● 1st 52-59, 2nd 70-76	37	
153 SOHC (2.5L) 8 Valve Ford	2001-98	●○ 1st 51, 2nd 51 again, 3rd turn 90-100 degrees	17	ES 72137
177 L-Head Ford	1927-09 Model T	1st 50-55, 2nd warm engine, 3rd 60	195	
200 L-Head Ford	1934-28 Models A, B	50	223	
220 OHV Diesel (3.6L) Ford	1966-63 Dagenham	85-90	172	

FORD PRODUCTS 6 & V6

144 OHV	1966-60	● 70-75	13	
149 SOHC Turbo Diesel (2.4L) 12 Valve BMW	1985-84	1st 22-29, 2nd 36-43, 3rd 65-69, 4th warm engine, 5th turn 85-95 degrees	90	
152 DOHC (2.5L) 24 Valve Ford	2002-01 Duratec VIN G	●○ 1st 28-31, 2nd turn 85-90 degrees, 3rd loosen one turn, 4th 28-31 again, 5th turn 85-90 degrees, 6th turn 85-90 degrees	139	ES 72159
152 DOHC (2.5L) 24 Valve Ford	2002-01 Duratec VIN L	●○ 1st 29, 2nd turn 90 degrees, 3rd loosen one turn, 4th 29 again, 5th turn 90 degrees, 6th turn 90 degrees	140	ES 72159

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
FORD PRODUCTS 6 & V6 (CONT.)				
152.4 DOHC (2.5L) 24 Valve Mazda	1997-93 Probe	● 1st 17-19, 2nd turn 90 degrees, 3rd turn 90 degrees	123	
155 DOHC (2.5L) 24 Valve Ford	2000-98 Duratec VIN G	●○ 1st 28-31, 2nd turn 85-90 degrees, 3rd loosen one turn, 4th 28-31 again, 5th turn 85-90 degrees, 6th turn 85-90 degrees	139	ES 72159
155 DOHC (2.5L) 24 Valve Ford	2000-98 Duratec VIN L	●○ 1st 29, 2nd turn 90 degrees, 3rd loosen one turn, 4th 29 again, 5th turn 90 degrees, 6th turn 90 degrees	140	ES 72159
155 DOHC (2.5L) 24 Valve Ford	1997 Duratec VIN L	●○ 1st 28-31, 2nd turn 85-95 degrees, 3rd loosen one turn, 4th 28-31 again, 5th turn 85-95 degrees, 6th turn 85-95 degrees	140	ES 72159
155 DOHC (2.5L) 24 Valve Ford	1996-95 Duratec VIN L	●○ 1st 27-32, 2nd turn 85-95 degrees, 3rd loosen one turn, 4th 27-32 again, 5th turn 85-95 degrees, 6th turn 85-95 degrees	140	ES 72159
155.6 OHV (2.6L)	1973-72	1st 29-40, 2nd 40-51, 3rd 65-80	31	
170 OHV	1972-60	● 70-75	13	
171 OHV (2.8L)	1986-83 Truck	● 1st 29-40, 2nd 40-51, 3rd 70-85	57	
171 OHV (2.8L)	1979-75 Car	● 1st 29-40, 2nd 40-51, 3rd 65-80	57	
171 OHV (2.8L)	1974 Car	● 1st 29-40, 2nd 40-51, 3rd 65-80	31	
177 OHV (2.9L)	1992-86	●○ 1st 22, 2nd 51-55, 3rd turn 90 degrees	97	ES 72794
181 SOHC (3.0L) 12 Valve Nissan	1998-93 Villager	● 1st 22, 2nd 43, 3rd loosen all bolts, 4th 22 again, 5th 40-47; OR turn 60-65 degrees	85	
181 DOHC (3.0L) 24 Valve Ford	2008-01 Duratec VIN 1	●○ 1st 30, 2nd turn 90 degrees, 3rd loosen one turn, 4th 30 again, 5th turn 90 degrees, 6th turn 90 degrees	140	ES 72159
181 DOHC (3.0L) 24 Valve Ford	2005-00 Duratec VIN S Lincoln LS	●○ 1st 22, 2nd turn 90 degrees, 3rd loosen one turn, 4th 22 again, 5th turn 90 degrees, 6th turn 90 degrees	233	ES 72208
181 DOHC (3.0L) 24 Valve Ford	2005-97 Duratec VIN S Taurus, Sable	●○ 1st 28-31, 2nd turn 85-95 degrees, 3rd loosen one turn, 4th 28-31 again, 5th turn 85-95 degrees, 6th turn 85-95 degrees	139	ES 72159
181 DOHC (3.0L) 24 Valve Ford	1996 Duratec VIN S Taurus, Sable	●○ 1st 27-32, 2nd turn 85-95 degrees, 3rd loosen one turn, 4th 27-32 again, 5th turn 85-95 degrees, 6th turn 85-95 degrees	139	ES 72159
183 OHV (3.0L) 12 Valve Ford	2007-99 Car	●○ 1st 36-39, 2nd loosen one turn, 3rd 20-24, 4th turn 85-95 degrees, 5th turn 85-95 degrees	96	ES 72136 ES 72174
183 OHV (3.0L) 12 Valve Ford	1998-91 Car	●○ 1st 59, 2nd loosen one turn, 3rd 37, 4th 68	96	ES 72136 ES 72174
183 OHV (3.0L) 12 Valve Ford	1990-86 Car	●○ 1st 33-41, 2nd 63-73	96	ES 72136
183 OHV (3.0L) 12 Valve Ford	2008-99 Truck	●○ 1st 36-39, 2nd loosen one turn, 3rd 20-24, 4th turn 85-95 degrees, 5th turn 85-95 degrees	141	ES 72136 ES 72174
183 OHV (3.0L) 12 Valve Ford	1998-91 Truck	●○ 1st 59, 2nd loosen one turn, 3rd 37, 4th 68	141	ES 72136 ES 72174
183 OHV (3.0L) 12 Valve Ford	1990-86 Truck	●○ 1st 33-41, 2nd 63-73	141	ES 72136
183 DOHC (3.0L) 24 Valve Yamaha	1995-89 SHO	●○ 1st 37-51, 2nd 62-69	101	ES 74030
195 DOHC (3.2L) 24 Valve Yamaha	1995-93 SHO	●○ 1st 37-51, 2nd 62-69	101	ES 74030
199.8 SOHC (3.3L) 12 Valve Nissan	2002-99 Villager	●○ 1st 22, 2nd 43, 3rd loosen all bolts, 4th 7, 5th 22, 6th 40-47; OR turn 60-65 degrees	162	ES 72194



TORQUE TABLES™



TORQUE TABLES™

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
FORD PRODUCTS 6 & V6 (CONT.)				
200 OHV (3.3L)	1983-78 ●	1st 50-55, 2nd 60-65, 3rd 70-75	51	
200 OHV (3.3L)	1977-63 ●	1st 50-55, 2nd 60-65, 3rd 70-75	13	
213 DOHC (3.5L) 24 Valve Ford	2008-07 Duratec VIN C, T, W ●	1st Bolts 1-8 15, 2nd Bolts 1-8 26, 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 1-8 turn 90 degrees, 5th Bolts 1-8 turn 90 degrees, 6th Bolt 9 7.5	234	
215 OHV	1953-51 ●	65-75	28	
223 OHV	1964-61 ●	105-115	28	
223 OHV	1960-54 ●	65-75	28	
226 L-Head	1951-49 95 HP Series H ●	65-75	15	
226 L-Head	1948-47 95 HP Series H ●	50-60	15	
226 L-Head	1947-41 90 HP Series G, GA ●	50-60	15	
232 OHV (3.8L) 12 Valve Ford	2003-96 Truck ●○	1st 15, 2nd 29, 3rd 37, PERFORM THE NEXT THREE STEPS ON EACH BOLT BEFORE MOVING TO NEXT BOLT IN SEQUENCE: 1) loosen 2-3 turns, 2) Long bolts 29-37; Short bolts 15-22, 3) turn 175-185 degrees	94	ES 72156 ES 72160
232 OHV (3.8L) 12 Valve Ford	1995 Truck ●○	1st 15, 2nd 30, 3rd 37, PERFORM THE NEXT THREE STEPS ON EACH BOLT BEFORE MOVING TO NEXT BOLT IN SEQUENCE: 1) loosen 2-3 turns, 2) Long bolts 11-19; Short bolts 7-15, 3) turn 85-95 degrees	94	ES 72131
232 OHV (3.8L) 12 Valve Ford	2004-98 Car ●○	1st 15, 2nd 30, 3rd 37, PERFORM THE NEXT THREE STEPS ON EACH BOLT BEFORE MOVING TO NEXT BOLT IN SEQUENCE: 1) loosen 2-3 turns, 2) Long bolts 29-37; Short bolts 15-22, 3) turn 180 degrees	94	ES 72160
232 OHV (3.8L) 12 Valve Ford	1997-96 Car ●○	1st 15, 2nd 30, 3rd 37, PERFORM THE NEXT THREE STEPS ON EACH BOLT BEFORE MOVING TO NEXT BOLT IN SEQUENCE: 1) loosen 2-3 turns, 2) Long bolts 30-37; Short bolts 15-22, 3) turn 175-185 degrees	94	ES 72156 ES 72160
232 OHV (3.8L) 12 Valve Ford	1995-94 Car ●○	1st 15, 2nd 30, 3rd 37, PERFORM THE NEXT THREE STEPS ON EACH BOLT BEFORE MOVING TO NEXT BOLT IN SEQUENCE: 1) loosen 2-3 turns, 2) Long bolts 11-19; Short bolts 10-15, 3) turn 85-95 degrees	94	ES 72131
232 OHV (3.8L) 12 Valve Ford	1993-91 Car ●○	1st 37, 2nd 45, 3rd 52, 4th 59, PERFORM THE NEXT THREE STEPS ON EACH BOLT BEFORE MOVING TO NEXT BOLT IN SEQUENCE: 1) loosen 2-3 turns, 2) 11-18, 3) Long bolts turn 85-105 degrees; Short bolts turn 65-85 degrees	94	ES 72131
232 OHV (3.8L) 12 Valve Ford	1990-84 Car ●○	Flanged Hex Head bolts: 1st 37, 2nd 45, 3rd 52, 4th 59, PERFORM THE NEXT THREE STEPS ON EACH BOLT BEFORE MOVING TO NEXT BOLT IN SEQUENCE: 1) loosen 2-3 turns, 2) 11-18, 3) Long bolts turn 85-105 degrees; Short bolts turn 65-85 degrees	82	ES 72129 ES 72131

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
FORD PRODUCTS 6 & V6 (CONT.)				
232 OHV (3.8L) 12 Valve Ford	1990-84 Car ●○	Standard Hex Head bolts: 1st 37, 2nd 45, 3rd 52, 4th 59, 5th loosen 2-3 turns, 6th repeat steps 1-4	82	ES 72129 ES 72131
232 OHV (3.8L) 12 Valve Ford	1983-82 Car, Truck ●○	1st 47, 2nd 55, 3rd 63, 4th 74, 5th loosen 2-3 turns, 6th repeat steps 1-4	82	ES 72129
232 OHV Supercharged (3.8L) 12 Valve Ford	1995-94 Car ●○	1st 37, 2nd 45, 3rd 52, 4th 59, PERFORM THE NEXT THREE STEPS ON EACH BOLT BEFORE MOVING TO NEXT BOLT IN SEQUENCE: 1) loosen 2-3 turns, 2) 11-19, 3) turn 175-185 degrees	94	ES 72131
232 OHV Supercharged (3.8L) 12 Valve Ford	1993-89 Car ●○	1st 37, 2nd 45, 3rd 52, 4th 59, PERFORM THE NEXT THREE STEPS ON EACH BOLT BEFORE MOVING TO NEXT BOLT IN SEQUENCE: 1) loosen 2-3 turns, 2) 48-55, 3) turn 90-110 degrees	94	ES 72131
238 OHV (3.9L) 12 Valve Ford	2007-04 Car, Truck ●○	1st 15, 2nd 29, 3rd 37, PERFORM THE NEXT THREE STEPS ON EACH BOLT BEFORE MOVING TO NEXT BOLT IN SEQUENCE: 1) loosen 2-3 turns, 2) Long bolts 29-37; Short bolts 15-22, 3) turn 175-185 degrees	94	ES 72160
240 OHV (3.9L)	1976-65 ●	70-75	14	
244 OHV (4.0L) 12 Valve Ford	2001-95 Truck ●○	1st 23, 2nd 53, 3rd turn 90 degrees	217	ES 72794
244 OHV (4.0L) 12 Valve Ford	1994-90 Truck ●○	INSTALL HEAD BOLTS AND LOWER INTAKE BOLTS TOGETHER (TORQUE ALTERNATELY): Head bolts 1st 44, 2nd 59, 3rd turn 80-85 degrees; Lower intake bolts 1st 3-6, 2nd 6-11, 3rd 11-15, 4th 15-18	102	ES 72794
244 SOHC (4.0L) 12 Valve Ford	2008-05 Car, Truck ●○	1st M12 Bolts 1-8 9, 2nd M12 Bolts 1-8 18, 3rd M8 Bolts 9-10 24, 4th M12 Bolts 1-8 turn 90 degrees, 5th M12 Bolts 1-8 turn 90 degrees	218	ES 72171
244 SOHC (4.0L) 12 Valve Ford	2004-02 Truck ●○	1st M12 Bolts 1-8 24, 2nd M8 Bolts 9-10 24, 3rd M12 Bolts 1-8 turn 80 degrees, 4th M12 Bolts 1-8 turn 80 degrees	218	ES 72171
244 SOHC (4.0L) 12 Valve Ford	2001-00 Truck ●○	1st M12 Bolts 1-8 28, 2nd M8 Bolts 9-10 28, 3rd M12 Bolts 1-8 turn 90 degrees, 4th M12 Bolts 1-8 turn 90 degrees	218	ES 72171
244 SOHC (4.0L) 12 Valve Ford	1999-97 Truck ●○	1st M12 Bolts 1-8 26, 2nd M8 Bolts 9-10 26, 3rd M12 Bolts 1-8 turn 90 degrees, 4th M12 Bolts 1-8 turn 90 degrees	218	ES 72171
250 OHV (4.1L)	1980-78 ●	1st 50-55, 2nd 60-65, 3rd 70-75	51	
250 OHV (4.1L)	1977-69 ●	1st 50-55, 2nd 60-65, 3rd 70-75	13	
254 L-Head	1953-49 ●	65-75	15	
254 L-Head	1948 ●	50-60	15	
256 OHV (4.2L) 12 Valve Ford	2008-97 Truck ●○	1st 14, 2nd 29, 3rd 36, PERFORM THE NEXT THREE STEPS ON EACH BOLT BEFORE MOVING TO NEXT BOLT IN SEQUENCE: 1) loosen 2-3 turns, 2) Long bolts 30-36; Short bolts 15-22, 3) turn 175-185 degrees	94	ES 72160
262 OHV	1964-61 ●	105-115	28	
300 OHV (4.9L)	1997-95 ●	1st 45-55, 2nd turn 90 degrees	14	
300 OHV (4.9L)	1994-75 ●	1st 50-55, 2nd 60-65, 3rd 70-85	14	
300 OHV (4.9L)	1974-65 ●	70-75	14	



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ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
FORD PRODUCTS 6 & V6 (CONT.)				
330 OHV Diesel (5.4L) Ford	1966-62 Dagenham	85-90	173	
359 OHV Turbo Diesel (5.9L) 12 Valve Cummins	1997-92 ●	1st all bolts 66, 2nd Long bolts 89, 3rd all bolts turn 90 degrees	111	
403 OHV Turbo Diesel (6.6L) Ford	1995-86 ●	1st 115, 2nd 140, 3rd 160	103	
476 OHV Turbo Diesel (7.8L) Ford	1995-87 ●	1st 115, 2nd 140, 3rd 160	103	
FORD PRODUCTS V8				
136 L-Head (60 HP 17 Stud head) Ford	1940-37 Cast Iron heads	50-60	32	
136 L-Head (60 HP 17 Stud head) Ford	1940-37 Aluminum heads	35-40	32	
207 DOHC (3.4L) 32 Valve Yamaha	1999-96 SHO	1st 20-23, 2nd turn 85-95 degrees	143	
221 OHV	1963-62	65-70	70	
221 L-Head (85 HP 21 Stud head) Ford	1942-32 Car Cast Iron heads	50-60	32	
221 L-Head (85 HP 21 Stud head) Ford	1942-32 Car Aluminum heads	35-40	32	
221 L-Head (90 HP 24 Stud head) Ford	1947-38 Truck Cast Iron heads	50-60	32	
221 L-Head (90 HP 24 Stud head) Ford	1947-38 Truck Aluminum heads	35-40	32	
221 L-Head (85 HP 21 Stud head) Ford	1937-32 Truck Cast Iron heads	50-60	32	
221 L-Head (85 HP 21 Stud head) Ford	1937-32 Truck Aluminum heads	35-40	32	
239 OHV Ford	1955-54 Truck ●	70	70	
239 OHV Ford	1954 Car	70	70	
239.4 L-Head Ford	1953-48 Truck	65-70	33	
239.4 L-Head Ford	1953-49 Car	65-70	33	
239.4 L-Head (90, 95, 100 HP 24 Stud head) Ford, Mercury	1948-39 Cast Iron heads	50-60	32	
239.4 L-Head (90, 95, 100 HP 24 Stud head) Ford, Mercury	1948-39 Aluminum heads	35-40	32	
241 DOHC (3.9L) 32 Valve Jaguar	2006-00 Lincoln LS, Thunderbird	1st Bolts 1-10 15, 2nd Bolts 1-10 26, 3rd Bolts 1-10 33, 4th Bolts 1-10 turn 90 degrees, 5th Bolts 1-10 turn 90 degrees; 6th Bolts 11-12 15, 7th Bolts 11-12 turn 90 degrees	235	
255 OHV (4.2L)	1982-80 ●	65-72	70	
255.4 L-Head Mercury	1954-48	65-70	33	
256 OHV Mercury	1955-54 ●	75	70	
260	1965-62 ●	65-70	70	
272	1958-55 ●	70-75	70	
279	1955-52 Truck ●	Exc. Bolts marked "FT" 90; Bolts marked "FT" 110	70	
281 SOHC (4.6L) 16 Valve Ford	2008-97 Truck Exc. Explorer, Mountaineer ●○	1st 27-32, 2nd turn 85-95 degrees, 3rd turn 85-95 degrees	144	ES 72798
281 SOHC (4.6L) 16 Valve Ford	2005-02 Truck Explorer, Mountaineer ●○	1st 30, 2nd turn 85-95 degrees, 3rd loosen one turn, 4th 30 again, 5th turn 85-95 degrees, 6th turn 85-95 degrees	144	ES 72798
281 SOHC (4.6L) 16 Valve Ford	2008-96 Car ●○	1st 27-32, 2nd turn 85-95 degrees, 3rd loosen one turn, 4th 27-32 again, 5th turn 85-95 degrees, 6th turn 85-95 degrees	124	ES 72798
281 SOHC (4.6L) 16 Valve Ford	1995-93 Car ●○	1st 25-30, 2nd turn 85-95 degrees, 3rd turn 85-95 degrees	124	ES 72798

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
FORD PRODUCTS V8 (CONT.)				
281 SOHC (4.6L) 16 Valve Ford	1992-91 Car ●○	1st 15-22, 2nd turn 85-95 degrees, 3rd turn 85-95 degrees	124	ES 72798
281 SOHC (4.6L) 24 Valve Ford	2008-05 Car, Truck ●○	1st 27-32, 2nd turn 85-95 degrees, 3rd turn 85-95 degrees	144	ES 72798
281 DOHC (4.6L) 32 Valve Ford	2005-03 Truck ●○	1st 27-32, 2nd turn 85-95 degrees, 3rd loosen one turn, 4th 27-32 again, 5th turn 85-95 degrees, 6th turn 85-95 degrees	124	ES 72798
281 DOHC (4.6L) 32 Valve Ford	2004-96 Car ●○	1st 27-32, 2nd turn 85-95 degrees, 3rd loosen one turn, 4th 27-32 again, 5th turn 85-95 degrees, 6th turn 85-95 degrees	124	ES 72798
281 DOHC (4.6L) 32 Valve Ford	1995-93 Car ●○	1st 25-30, 2nd turn 85-95 degrees, 3rd turn 85-95 degrees	124	ES 72798
281 DOHC Supercharged (4.6L) 32 Valve Ford	2004-03 Car ●○	1st 27-32, 2nd turn 85-95 degrees, 3rd loosen one turn, 4th 27-32 again, 5th turn 85-95 degrees, 6th turn 85-95 degrees	124	ES 71173
289	1968-63 ●	65-70	70	
292	1965-55 ●	70-75	70	
302 (5.0L)	2001-96 Truck VIN P ●○	Flanged Hex Head bolts: 1st 30, 2nd 50, 3rd turn 90 degrees	70	ES 72155
302 (5.0L)	1996-92 Truck VIN N ●○	Flanged Hex Head bolts: 1st 25-35, 2nd 45-55, 3rd turn 85-95 degrees	70	ES 72155
302 (5.0L)	1995-92 Car ●○	Flanged Hex Head bolts: 1st 25-35, 2nd 45-55, 3rd turn 85-95 degrees	70	ES 72155
302 (5.0L)	1992-86 ●	Standard Hex Head bolts: Intake Side 80, Exhaust Side 68	70	
302 (5.0L)	1985-68 exc. Boss ●	Intake Side 80, Exhaust Side 68	70	
302 (5.0L)	1971-69 Boss ●	Upper 80; Lower 70	70	
302	1963-56 Truck ●	100-110	70	
312	1960-56 ●	65-75	70	
312 Supercharged	1957 ●	65-75	70	
317	1955-52 Truck ●	Exc. Bolts marked "FT" 90; Bolts marked "FT" 110	70	
317.5 Lincoln	1954-52 Car ●	80-90	70	
330 OHV (5.4L)	1978-64 Truck ●	80-90	70	
330 SOHC (5.4L) 16 Valve Ford	2008-97 Truck ●○	1st 27-32, 2nd turn 85-95 degrees, 3rd turn 85-95 degrees	144	ES 72798
330 SOHC (5.4L) 24 Valve Ford	2008-04 Truck ●○	1st 27-32, 2nd turn 85-95 degrees, 3rd turn 85-95 degrees	144	ES 72798
330 DOHC (5.4L) 32 Valve Ford	2004-99 Truck ●○	1st 27-32, 2nd turn 85-95 degrees, 3rd turn 85-95 degrees	144	ES 72798
330 DOHC (5.4L) 32 Valve Ford	2001-99 Car ●○	1st 30, 2nd turn 90 degrees, 3rd loosen one turn, 4th 30 again, 5th turn 90 degrees, 6th turn 90 degrees	124	
330 SOHC Supercharged (5.4L) 16 Valve Ford	2004-99 Truck ●	1st 27-32, 2nd turn 85-95 degrees, 3rd turn 85-95 degrees	144	
330 SOHC Supercharged (5.4L) 24 Valve Ford	2008 Truck ●○	1st 27-32, 2nd turn 85-95 degrees, 3rd turn 85-95 degrees	144	ES 72798
330 DOHC Supercharged (5.4L) 32 Valve Ford	2008-07 Car ●○	1st 15, 2nd 37, 3rd 59, 4th turn 90 degrees, 5th turn 90 degrees	124	
330 DOHC Supercharged (5.4L) 32 Valve Ford	2006-05 Car ●○	1st 30, 2nd turn 90 degrees, 3rd loosen one turn, 4th 30 again, 5th turn 90 degrees, 6th turn 90 degrees	124	
332	1966-56 Truck ●	100-110	70	
332	1959-58 Car ●	80-90	70	



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ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
FORD PRODUCTS V8 (CONT.)				
333 Canadian	1966-56 Truck	● 100-110	70	
336.7 L-Head Lincoln	1951-49	Nuts 50-55; Cap screws 65-70	224	
341 Lincoln	1955	80-90	70	
351 Cleveland	1974-70	● 95-105	70	
351 Modified (5.8L)	1982-75	● 95-105	70	
351 Windsor (5.8L)	1998-73	● 1st 85, 2nd 95, 3rd 105-112	70	
351 Windsor (5.8L)	1972-69	● 95-100	70	
352	1967-57	● 80-90	70	
359 (5.9L)	1978-73 Truck	● 90	70	
360 (5.9L)	1977-68 Truck	● 90	70	
361 (5.9L)	1978-64 Truck	● 90	70	
361	1959-58 Car	● 80-90	70	
365 OHV Turbo Diesel (6.0L) 32 Valve DI International	2008-03 PowerStroke	●○ 1st Bolts 1-10 65, 2nd Bolts 1-10 85, 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 1-10 turn 90 degrees, 5th Bolts 1-10 turn 90 degrees, 6th Bolts 11-15 18, 7th Bolts 11-15 23	256	ES 72229 ES 72242
368 Lincoln	1957-56	80-90	70	
370 (6.1L)	1991-79 Truck	● 1st 80-90, 2nd 100-110, 3rd 130-140	70	
383 Mercury	1960-58	● 85-105	70	
389 (6.4L)	1978-73 Truck	● 90	70	
390 (6.4L)	1977-61	● 90	70	
390 OHV Turbo Diesel (6.4L) 32 Valve DI International	2008 PowerStroke	1st Bolts 1-10 70, 2nd loosen Bolts 1-10, 3rd Bolts 1-10 115, 4th Bolts 1-10 turn 90 degrees, 5th Bolts 1-10 turn 90 degrees, 6th Bolts 11-15 18, 7th Bolts 11-15 23	261	
391 (6.4L)	1978-64 Truck	● 90	70	
400 (6.6L)	1982-71	● 95-105	70	
401	1978-64 Truck	● 170-180	70	
401	1963-58 Truck	● 130-150	70	
406	1963-62	● 100-105	70	
410 Mercury	1967-66	● 80-90	70	
410 Edsel	1958	● 85-105	70	
420 OHV Diesel (6.9L) IDI International	1987-85	● 1st 40, 2nd 70, 3rd 80, 4th 87	95	
420 OHV Diesel (6.9L) IDI International	1984-83	● 1st 40, 2nd 70, 3rd 80, 4th 80 again	95	
427	1969-63	● 100-105	70	
428	1970-66	● 80-90	70	
429 (7.0L)	1999-87 Truck	● 1st 80-90, 2nd 100-110, 3rd 130-140	70	
429 (7.0L)	1986-79 Truck	● 130-140	70	
429 (7.0L)	1973-68	● 130-140	70	
430	1965-64	● 125-135	70	
430	1963-58	● 85-105	70	
444 OHV Diesel (7.3L) IDI International	1995-91	● 1st 65, 2nd 90, 3rd 110, 4th 110 again	95	
444 OHV Diesel (7.3L) IDI International	1990-88	● 1st 65, 2nd 90, 3rd 100	95	
444 OHV Turbo Diesel (7.3L) DI International	2003-00 PowerStroke	●○ 1st 65, 2nd 85, 3rd 95, 4th 95 again	156	ES 72161
444 OHV Turbo Diesel (7.3L) DI International	1999-94 PowerStroke	●○ 1st 65, 2nd 85, 3rd 105, 4th 105 again	156	ES 72161
444 OHV Turbo Diesel (7.3L) IDI International	1994-92	● 1st 65, 2nd 90, 3rd 110, 4th 110 again	95	
460 (7.5L)	1998-68	● 1st 80-90, 2nd 100-110, 3rd 130-140	70	

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
FORD PRODUCTS V8 (CONT.)				
462 Lincoln	1968-66	● 135-145	70	
475 (7.8L)	1979-72 Truck	● 170-180	70	
477 (7.8L)	1981-64 Truck	● 170-180	70	
477 (7.8L)	1963-58 Truck	● 130-150	70	
534 (8.8L)	1981-64 Truck	● 170-180	70	
534 (8.8L)	1963-58 Truck	● 130-150	70	
FORD PRODUCTS V10				
415 SOHC (6.8L) 20 Valve Ford	2008-97 Truck	●○ 1st 27-32, 2nd turn 85-95 degrees, 3rd turn 85-95 degrees	145	ES 72798-1
415 SOHC (6.8L) 30 Valve Ford	2008-05 Truck	● 1st 27-32, 2nd turn 85-95 degrees, 3rd turn 85-95 degrees	145	
FORD PRODUCTS V12				
267.3 L-Head Lincoln	1939-36 Cast Iron heads	50	171	
267.3 L-Head Lincoln	1939-36 Aluminum heads	40	171	
292 L-Head Lincoln	1948-40 Cast Iron heads	50	171	
292 L-Head Lincoln	1948-40 Aluminum heads	40	171	
305 L-Head Lincoln	1942 Cast Iron heads	50	171	
305 L-Head Lincoln	1942 Aluminum heads	40	171	
FRAZER SEE KAISER				
FREIGHTLINER SEE MERCEDES-BENZ				
GEO SEE GM PRODUCTS				
GM PRODUCTS 3				
61 SOHC (1.0L) 6 Valve Suzuki	2001-89 Metro, Firefly VIN 6	●○ 54 in three steps	142	ES 74021
61 SOHC (1.0L) 6 Valve Suzuki	1988-85 Sprint, Firefly VIN M, 5	●○ 46-50 in three steps	142	ES 74015
61 SOHC Turbo (1.0L) 6 Valve Suzuki	1991-89 Metro, Firefly VIN 2	●○ 54 in three steps	142	ES 74021
61 SOHC Turbo (1.0L) 6 Valve Suzuki	1988-87 Sprint, Firefly VIN 2	●○ 46-50 in three steps	142	ES 74015
159 OHV Diesel (3-53) Detroit Diesel	1970-65	170-180	225	
GM PRODUCTS 4				
81 SOHC (1.3L) 16 Valve Suzuki	2001-98 Metro, Firefly VIN 2	● 49 in three steps	110	
81 SOHC (1.3L) 8 Valve Suzuki	1997-92 Metro, Firefly VIN 9	● 51-54 in three steps	59	
85 SOHC (1.4L) 8 Valve Chevrolet	1977-76 Chevette, Acadian VIN I	● 75 in three steps	37	
89.7 SOHC (1.5L) 8 Valve Isuzu	1989-85 Spectrum, Sunburst VIN K, 7	● 1st 29, 2nd 58	37	
89.7 SOHC Turbo (1.5L) 8 Valve Isuzu	1989-87 Spectrum, Sunburst VIN 9	● 1st 29, 2nd 58	37	



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ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
GM PRODUCTS 4 (CONT.)				
96.8 SOHC (1.6L) 8 Valve Toyota	1988-85 Nova VIN 4	● 43 in three steps	71	
96.8 DOHC (1.6L) 16 Valve Toyota	1997-93 Prizm VIN 6	● 1st 22, 2nd turn 90 degrees, 3rd turn 90 degrees	71	
96.8 DOHC (1.6L) 16 Valve Toyota	1992-89 Prizm VIN 6	● 44 in three steps	99	
96.8 DOHC (1.6L) 16 Valve Toyota	1992-90 Prizm VIN 5	● 44 in three steps	121	
96.8 DOHC (1.6L) 16 Valve Toyota	1988 Nova VIN 5	● 1st 22, 2nd turn 90 degrees, 3rd turn 90 degrees	121	
96.9 SOHC (1.6L) 12 Valve Isuzu	1993-90 Storm VIN 6	● 1st 29, 2nd 58	37	
96.9 DOHC (1.6L) 16 Valve Isuzu	1991-90 Storm VIN 5	● 1st 29, 2nd 58	100	
97 SOHC (1.6L) 16 Valve Suzuki	2002-99 Tracker VIN 6	● 1st 26, 2nd 41, 3rd loosen all bolts, 4th 26 again, 5th 52	110	
97 SOHC (1.6L) 16 Valve Suzuki	1998-94 Tracker, SunRunner VIN 6	● 1st 26, 2nd 41, 3rd 52	110	
97 SOHC (1.6L) 8 Valve Suzuki	1995-89 Tracker, SunRunner VIN U	● 51-54 in three steps	59	
97.5 SOHC (1.6L) 8 Valve Opel	1993-88 LeMans, Optima VIN 6	● 1st 18, 2nd turn 60 degrees, 3rd turn 60 degrees, 4th turn 30 degrees, 5th warm engine, 6th turn 30-50 degrees	151	
97.5 DOHC (1.6L) 16 Valve Opel	2008-04 Aveo, Optra, Wave VIN D, 6	● 1st 18, 2nd turn 60 degrees, 3rd turn 60 degrees, 4th turn 60 degrees, 5th turn 10 degrees	128	
98 SOHC (1.6L) 8 Valve Chevrolet	1987-76 Chevette, T1000, Acadian	● 75 in three steps	37	
107.5 DOHC (1.8L) 16 Valve Toyota	1997-93 Prizm VIN 8	● 1st 22, 2nd turn 90 degrees, 3rd turn 90 degrees	71	
109.4 DOHC (1.8L) 16 Valve Toyota	2008-03 Vibe VIN 8	●○ 1st 18, 2nd 36, 3rd 36 again, 4th turn 90 degrees	99	ES 71066-1
109.4 DOHC (1.8L) 16 Valve Toyota	2002-98 Prizm VIN 8	●○ 1st 18, 2nd 36, 3rd 36 again, 4th turn 90 degrees	99	ES 71066-1
109.5 SOHC (1.8L) 8 Valve Opel	1986-82 VIN 0	●○ 1st 18, 2nd turn 60 degrees, 3rd turn 60 degrees, 4th turn 60 degrees, 5th warm engine, 6th turn 30-50 degrees	151	ES 72728
109.5 SOHC Turbo (1.8L) 8 Valve Opel	1986-84 VIN J	●○ 1st 18, 2nd turn 60 degrees, 3rd turn 60 degrees, 4th turn 60 degrees, 5th warm engine, 6th turn 30-50 degrees	151	ES 72728
109.5 DOHC (1.8L) 16 Valve Toyota	2006-03 Vibe VIN L	●○ 1st 26, 2nd turn 90 degrees, 3rd turn 90 degrees	99	ES 71066-1
110.3 DOHC (1.8L) 16 Valve Isuzu	1993-92 Storm VIN 8	● 1st 29, 2nd 58	100	
110.8 SOHC (1.8L) 8 Valve Isuzu	1982-76 LUV	● 1st 61, 2nd 72	37	
110.8 SOHC (1.8L) 8 Valve Isuzu	1975-72 LUV	● 1st 43, 2nd loosen all bolts, 3rd Bolts 1, 2, 3, 6 70; Bolts 4, 5, 7, 8, 9, 10 60	44	
110.8 SOHC Diesel (1.8L) 8 Valve Isuzu	1986-81 VIN D	● 1st 21-36, 2nd New bolts 83-98; Used bolts 90-105	75	
112 OHV (1.8L) 8 Valve Chevrolet	1982 VIN G	● 65-75 in three steps	12	
118.9 SOHC (1.9L) 8 Valve Isuzu	1985-82 VIN A	● 72 in three steps	37	
121 OHV (2.0L) 8 Valve Chevrolet	1989-87 VIN 1	●○ Bolts 1, 4, 5, 8, 9 73-83; Bolts 2, 3, 6, 7, 10 62-70	149	ES 72158
121 OHV (2.0L) 8 Valve Chevrolet	1986-85 VIN P	●○ Long bolts 73-85; Short bolts 62-70	12	ES 72162
121 OHV (2.0L) 8 Valve Chevrolet	1984-83 VIN B, P (Car)	●○ 65-75 in three steps	12	ES 72162
121 OHV (2.0L) 8 Valve Chevrolet	1984-83 VIN Y (Truck)	● 65-75 in three steps	12	

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
GM PRODUCTS 4 (CONT.)				
121.7 DOHC (2.0L) 16 Valve Suzuki	2004-99 Tracker VIN C	●○ Bolts 1-10 1st 38.5, 2nd 61, 3rd loosen all bolts, 4th 38.5 again, 5th 76; Bolt 11 6th 8	207	ES 72206
122 SOHC (2.0L) 8 Valve Opel	1994-87 VIN H, K	●○ 1st 18, 2nd turn 60 degrees, 3rd turn 60 degrees, 4th turn 60 degrees, 5th warm engine, 6th turn 30-50 degrees	151	ES 72728
122 SOHC Turbo (2.0L) 8 Valve Opel	1990-87 VIN M	●○ 1st 18, 2nd turn 60 degrees, 3rd turn 60 degrees, 4th turn 60 degrees, 5th warm engine, 6th turn 30-50 degrees	151	ES 72728
122 DOHC (2.0L) 16 Valve Opel	2007-04 Optra VIN Z	● 1st 18, 2nd turn 60 degrees, 3rd turn 60 degrees, 4th turn 60 degrees, 5th turn 10 degrees	128	
122 DOHC Supercharged (2.0L) 16 Valve Opel	2007-05 Ecotec VIN P	● Bolts 1-10 1st 22, 2nd turn 155 degrees; Bolts 11-14 3rd 26	231	
122 DOHC Turbo (2.0L) 16 Valve Opel	2008-07 Ecotec VIN X	● Bolts 1-10 1st 22, 2nd turn 155 degrees; Bolts 11-14 3rd 26	231	
134 OHV (2.2L) 8 Valve Chevrolet	2003-95 VIN 4, 5	●○ 1st Long bolts 46; Short bolts 43, 2nd all bolts turn 90 degrees	149	ES 72170 ES 72172
134 OHV (2.2L) 8 Valve Chevrolet	1994-92 VIN 4	●○ 1st Long bolts 46; Short bolts 43, 2nd all bolts turn 90 degrees	149	ES 72164 ES 74016
134 OHV (2.2L) 8 Valve Chevrolet	1991 VIN G	●○ Bolts 1, 4, 5, 8, 9 73-83; Bolts 2, 3, 6, 7, 10 62-70	149	ES 72164
134 OHV (2.2L) 8 Valve Chevrolet	1990 VIN G	●○ 1st Long bolts 46; Short bolts 43, 2nd all bolts turn 90 degrees	149	ES 72164
134.1 DOHC (2.2L) 16 Valve Opel	2008-02 Ecotec VIN D, F, 6	●○ Bolts 1-10 1st 22, 2nd turn 155 degrees; Bolts 11-14 3rd 26	231	ES 72196
136.5 OHV Diesel (2.2L) 8 Valve Isuzu	1985-81 VIN S	● 1st 40-47, 2nd New bolts 54-61; Used bolts 61-69	76	
138 SOHC (2.3L) 8 Valve Oldsmobile	1994 VIN 3	●○ 1st Long bolts 30; Short bolts 26, 2nd all bolts turn 90 degrees	98	ES 72727
138 SOHC (2.3L) 8 Valve Oldsmobile	1993-92 VIN 3	●○ 1st Long bolts 30; Short bolts 26, 2nd all bolts turn 90 degrees	148	ES 72727
138 DOHC (2.3L) 16 Valve Oldsmobile	1996-94 VIN A, D, G	●○ 1st Long bolts 30; Short bolts 26, 2nd all bolts turn 90 degrees	98	ES 72727
138 DOHC (2.3L) 16 Valve Oldsmobile	1993-92 VIN A, D, G	●○ 1st Long bolts 30; Short bolts 26, 2nd all bolts turn 90 degrees	148	ES 72727
138 DOHC (2.3L) 16 Valve Oldsmobile	1991-90 VIN A, D	●○ 1st Long bolts 1-8 26, 2nd Long bolts 1-8 turn 110 degrees, 3rd Short bolts 9-10 26, 4th Short bolts 9-10 turn 100 degrees	98	ES 72727
138 DOHC (2.3L) 16 Valve Oldsmobile	1989-87 VIN A, D	●○ 1st Long bolts 1-8 26, 2nd Long bolts 1-8 turn 90 degrees, 3rd Short bolts 9-10 26, 4th Short bolts 9-10 turn 80 degrees	98	ES 72727
140 SOHC (2.3L) 8 Valve Chevrolet	1977-71	● 60 in three steps	37	
145 DOHC (2.4L) 16 Valve Opel	2008-06 Ecotec VIN B, P	● Bolts 1-10 1st 22, 2nd turn 155 degrees; Bolts 11-14 3rd 26	231	
145 DOHC (2.4L) 16 Valve Hybrid Opel	2008 Ecotec VIN 5	● Bolts 1-10 1st 22, 2nd turn 155 degrees; Bolts 11-14 3rd 26	231	
146 DOHC (2.4L) 16 Valve Oldsmobile	2002-96 VIN T	●○ 1st Long bolts 1-8 40; Short bolts 9-10 30, 2nd all bolts turn 90 degrees	98	ES 72165
151 OHV (2.5L) Pontiac	1993-88 VIN A, E (Truck)	●○ 1st all bolts 18, 2nd Bolts 1-8, 10 26; Bolt 9 18, 3rd all bolts turn 90 degrees	72	ES 72733
151 OHV (2.5L) Pontiac	1987 VIN E (Truck)	●○ 1st all bolts 18, 2nd Bolts 1-8, 10 26; Bolt 9 30, 3rd Bolts 1-8, 10 turn 120 degrees; Bolt 9 turn 90 degrees	72	ES 72733



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ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
GM PRODUCTS 4 (CONT.)				
151 OHV (2.5L) Pontiac	1986-85 VIN E (Truck)	90 in three steps	72	ES 72733
151 OHV (2.5L) Pontiac	1992-87 VIN R	1st all bolts 18, 2nd Bolts 1-8, 10 26; Bolt 9 18, 3rd all bolts turn 90 degrees	72	ES 72733
151 OHV (2.5L) Pontiac	1986 VIN R, 2	1st all bolts 18, 2nd Bolts 1-8, 10 22; Bolt 9 29, 3rd Bolts 1-8, 10 turn 120 degrees; Bolt 9 turn 90 degrees	72	ES 72733
151 OHV (2.5L) Pontiac	1985 VIN R, 2	92 in three steps	72	ES 72733
151 OHV (2.5L) Pontiac	1991-87 VIN U	1st all bolts 18, 2nd Bolts 1-8, 10 26; Bolt 9 18, 3rd all bolts turn 90 degrees	72	ES 72858
151 OHV (2.5L) Pontiac	1986 VIN U	1st all bolts 18, 2nd Bolts 1-8, 10 22; Bolt 9 29, 3rd Bolts 1-8, 10 turn 120 degrees; Bolt 9 turn 90 degrees	72	ES 72858
151 OHV (2.5L) Pontiac	1985 VIN U	92 in three steps	72	ES 72858
151 OHV (2.5L) Pontiac	1984	92 in three steps	72	
151 OHV (2.5L) Pontiac	1983-80	85 in three steps	72	
151 OHV (2.5L) Pontiac	1979-77	95 in three steps	72	
153 OHV Chevrolet	1970-62	95	37	
169 DOHC (2.8L) 16 Valve Chevrolet Truck	2006-04 VIN 8	Bolts 1-10 1st 22, 2nd turn 90 degrees, 3rd turn 65 degrees; Bolt 11 4th 5.1, 5th turn 120 degrees; Bolts 12-13 6th 5.1, 7th turn 60 degrees	253	ES 72195
178 DOHC (2.9L) 16 Valve Chevrolet Truck	2008-07 VIN 9	Bolts 1-10 1st 22, 2nd turn 90 degrees, 3rd turn 65 degrees; Bolt 11 4th 5.1, 5th turn 120 degrees; Bolts 12-13 6th 5.1, 7th turn 60 degrees	253	
195 OHV Pontiac	1963-61	95	40	
235.3 OHV Diesel (3.9L) 8 Valve Isuzu	1988-87	1st 50, 2nd 65, 3rd turn 60-90 degrees	180	
235.3 OHV Turbo Diesel (3.9L) 8 Valve Isuzu	1998-87	1st 50, 2nd 65, 3rd turn 60-90 degrees	180	
GM PRODUCTS 5				
211 DOHC (3.5L) 20 Valve Chevrolet Truck	2006-04 VIN 6	Bolts 1-12 1st 22, 2nd turn 90 degrees, 3rd turn 65 degrees; Bolt 13 4th 5.1, 5th turn 120 degrees; Bolts 14-15 6th 5.1, 7th turn 60 degrees	254	ES 72195
223 DOHC (3.7L) 20 Valve Chevrolet Truck	2008-07 VIN E	Bolts 1-12 1st 22, 2nd turn 90 degrees, 3rd turn 65 degrees; Bolt 13 4th 5.1, 5th turn 120 degrees; Bolts 14-15 6th 5.1, 7th turn 60 degrees	254	
GM PRODUCTS 6 & H06 & V6				
140 OHV Chevrolet	1961-60 Corvair	27-33	27	
145 OHV Chevrolet	1963-61 Corvair	27-33	27	
145 OHV Turbo Chevrolet	1963-62 Corvair	27-33	27	
152 DOHC (2.5L) 24 Valve Daewoo	2006-04 Epica VIN L	1st 15, 2nd 18, 3rd turn 70 degrees, 4th turn 70 degrees	39	
152 DOHC (2.5L) 24 Valve Suzuki	2004-01 Tracker VIN 4	Bolts 1-8 1st 38.5, 2nd 61, 3rd loosen all bolts, 4th 38.5 again, 5th 61, 6th 76; Bolt 9 7th 8	212	
164 OHV Chevrolet	1969-65 Corvair	40	27	
164 OHV Chevrolet	1964 Corvair	27-33	27	
164 OHV Turbo Chevrolet	1966-65 Corvair	40	27	
164 OHV Turbo Chevrolet	1964 Corvair	27-33	27	

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
GM PRODUCTS 6 & H06 & V6 (CONT.)				
170 DOHC (2.8L) 24 Valve Opel	2007-05 VIN T	Right Head 1st 33, 2nd turn 120 degrees; Left Head 1st Bolts 1-8 33, 2nd Bolts 1-8 turn 120 degrees, 3rd Bolts 9-10 11, 4th Bolts 9-10 turn 60 degrees	230	
173 OHV (2.8L) 12 Valve Chevrolet	1993-88 VIN R (Truck)	1st 40, 2nd turn 90 degrees	49	ES 72857
173 OHV (2.8L) 12 Valve Chevrolet	1987-86 VIN R (Truck)	70	49	ES 72857
173 OHV (2.8L) 12 Valve Chevrolet	1985-82 VIN B (Truck)	65-75	49	ES 72857
173 OHV (2.8L) 12 Valve Chevrolet	1989-87 VIN W (FWD)	1st 33, 2nd turn 90 degrees	49	ES 74017 ES 74018
173 OHV (2.8L) 12 Valve Chevrolet	1989-87 VIN S (RWD)	1st 40, 2nd turn 90 degrees	49	ES 72857
173 OHV (2.8L) 12 Valve Chevrolet	1988-87 VIN 9 (Fiero)	65-75	49	ES 72857
173 OHV (2.8L) 12 Valve Chevrolet	1986-80 Car	65-75	49	ES 72857
181 OHV (3.0L) 12 Valve Buick	1988-86 VIN L	1st 25, 2nd turn 90 degrees, 3rd turn 90 degrees	88	ES 72726
181 OHV (3.0L) 12 Valve Buick	1985 VIN L	1st 25, 2nd turn 90 degrees, 3rd turn 90 degrees	88	ES 72725
181 OHV (3.0L) 12 Valve Buick	1985-84 VIN E	80 in three steps	88	
181 OHV (3.0L) 12 Valve Buick	1983-82 VIN E	80 in three steps	69	
181 DOHC (3.0L) 24 Valve Opel	2002-01 VIN R (Catera)	1st 18.5, 2nd turn 90 degrees, 3rd turn 90 degrees, 4th turn 90 degrees, 5th turn 15 degrees, 6th turn 15 degrees	49	ES 72906
181 DOHC (3.0L) 24 Valve Opel	2000-97 VIN R (Catera)	1st 18.5, 2nd turn 90 degrees, 3rd turn 90 degrees, 4th turn 90 degrees, 5th turn 15 degrees	49	ES 72906
189 OHV (3.1L) 12 Valve Chevrolet	2005-01 VIN J	1st 44, 2nd turn 95 degrees	196	ES 72892 ES 74017
189 OHV (3.1L) 12 Valve Chevrolet	2000-99 VIN J	1st 37, 2nd turn 90 degrees	49	ES 72892 ES 74017
189 OHV (3.1L) 12 Valve Chevrolet	1999-96 VIN M	1st 33, 2nd turn 90 degrees	49	ES 72892 ES 74017
189 OHV (3.1L) 12 Valve Chevrolet	1995-93 VIN M	1st 33, 2nd turn 90 degrees	49	ES 74019
189 OHV (3.1L) 12 Valve Chevrolet	1994-88 VIN T (FWD)	1st 33, 2nd turn 90 degrees	49	ES 74017 ES 74018
189 OHV (3.1L) 12 Valve Chevrolet	1992-90 VIN T (RWD)	1st 40, 2nd turn 90 degrees	49	ES 72857
189 OHV (3.1L) 12 Valve Chevrolet	1993 VIN W (FWD)	1st 33, 2nd turn 90 degrees	49	ES 74018
189 OHV (3.1L) 12 Valve Chevrolet	1995-90 VIN D (Truck)	1st 40, 2nd turn 90 degrees	49	ES 72901
189 OHV Turbo (3.1L) 12 Valve Chevrolet	1990-89 VIN V	1st 33, 2nd turn 90 degrees	49	ES 74018
194 OHV Chevrolet	1967-62	95	2	
194 DOHC (3.2L) 24 Valve Opel	2005-03 VIN N	Right Head 1st 33, 2nd turn 120 degrees; Left Head 1st Bolts 1-8 33, 2nd Bolts 1-8 turn 120 degrees, 3rd Bolts 9-10 11, 4th Bolts 9-10 turn 60 degrees	230	
196 OHV (3.2L) Buick	1979-78 VIN C	80 in three steps	69	
198 OHV Buick	1963-62	65-70	19	
200 OHV (3.3L) Chevrolet	1979-78 VIN M	65 in three steps	64	
204 OHV (3.3L) Buick	1993-89 VIN N	1st 35, 2nd turn 130 degrees, 3rd Bolts 1-4 turn 30 degrees	88	ES 74031
206.8 OHV Chevrolet	1936-35	75-80	61	
207 OHV (3.4L) 12 Valve Chevrolet	2008-04 VIN F, 9	1st 44, 2nd turn 95 degrees	196	ES 72892



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ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
GM PRODUCTS 6 & H06 & V6 (CONT.)				
207 OHV (3.4L) 12 Valve Chevrolet	2005-01 VIN E	●○ 1st 44, 2nd turn 95 degrees	196	ES 72892 ES 74017
207 OHV (3.4L) 12 Valve Chevrolet	2000-96 VIN E	●○ 1st 37, 2nd turn 90 degrees	49	ES 72892 ES 74017
207 OHV (3.4L) 12 Valve Chevrolet	1995-93 VIN S	●○ 1st 41, 2nd turn 90 degrees	49	ES 72857
207 DOHC (3.4L) 24 Valve Chevrolet	1997-93 VIN X	●○ 1st 44, 2nd turn 90 degrees	49	ES 72177
207 DOHC (3.4L) 24 Valve Chevrolet	1992-91 VIN X	●○ 1st 37, 2nd turn 90 degrees	49	ES 72177
208 L-Head Pontiac	1936-35	60	174	
213 OHV (3.5L) 12 Valve Chevrolet	2008-04 VIN L, 8	● 1st 44, 2nd turn 95 degrees	196	
214 OHV (3.5L) 12 Valve Chevrolet	2008 VIN K, N	●○ 1st 44, 2nd turn 140 degrees	196	ES 72230
214 OHV (3.5L) 12 Valve Chevrolet	2007-06 VIN K, N	●○ 1st 44, 2nd turn 95 degrees	196	ES 72230
214 DOHC (3.5L) 24 Valve Oldsmobile	2002-01 VIN H	●○ 1st M11 bolts 30, 2nd M11 bolts turn 100 degrees, 3rd M11 bolts turn 100 degrees, 4th M6 long bolt 8.8, 5th M6 short bolts 8.8	157	ES 72191
214 DOHC (3.5L) 24 Valve Oldsmobile	2000-99 VIN H	●○ 1st M11 bolts 30, 2nd M11 bolts turn 60 degrees, 3rd M11 bolts turn 60 degrees, 4th M11 bolts turn 80 degrees, 5th M6 long bolt 8.8, 6th M6 short bolts 8.8	157	ES 72191
215 OHV Pontiac	1965-64	● 90-95	2	
216.5 OHV Chevrolet	1953-37	75-80	61	
217 DOHC (3.6L) 24 Valve Opel	2008-07 VIN V, 7	Right Head 1st Bolts 1-8 22, 2nd Bolts 1-8 turn 150 degrees, 3rd Bolt 9 11, 4th Bolt 9 turn 75 degrees; Left Head 1st Bolts 1-8 22, 2nd Bolts 1-8 turn 150 degrees, 3rd Bolts 9-10 11, 4th Bolts 9-10 turn 75 degrees	260	
217 DOHC (3.6L) 24 Valve Opel	2006-04 VIN 7	Right Head 1st 33, 2nd turn 120 degrees; Left Head 1st Bolts 1-8 33, 2nd Bolts 1-8 turn 120 degrees, 3rd Bolts 9-10 11, 4th Bolts 9-10 turn 60 degrees	230	
219 L-Head Oldsmobile	1939-37	60-70	177	
222.7 L-Head Pontiac	1940-35	60	174	
225 OHV Buick	1967-64	● 65-70	19	
228 OHV GMC Truck	1953-39	90-100	61	
229 OHV (3.8L) Chevrolet	1984-80 VIN K, 9	● 65 in three steps	64	
229.7 L-Head Oldsmobile	1940-37	60-70	177	
230 OHV Chevrolet	1970-63	● 95	2	
230 SOHC Pontiac	1967-66	● 85-100	2	
231 OHV (3.8L) 12 Valve Buick	2008-01 VIN K, 2 (FWD)	●○ 1st 37, 2nd turn 120 degrees	88	ES 74033
231 OHV (3.8L) 12 Valve Buick	2000-95 VIN K (FWD)	●○ 1st 37, 2nd turn 130 degrees, 3rd Bolts 1-4 turn 30 degrees	88	ES 74033
231 OHV (3.8L) 12 Valve Buick	2002-98 VIN K (RWD)	●○ 1st 37, 2nd turn 120 degrees	88	ES 74033
231 OHV (3.8L) 12 Valve Buick	1997-95 VIN K (RWD)	●○ 1st 37, 2nd turn 130 degrees, 3rd Bolts 1-4 turn 30 degrees	88	ES 74033
231 OHV (3.8L) 12 Valve Buick	1995-90 VIN L	●○ 1st 35, 2nd turn 130 degrees, 3rd Bolts 1-4 turn 30 degrees	88	ES 74031
231 OHV (3.8L) 12 Valve Buick	1991-88 VIN C	●○ 1st 35, 2nd turn 130 degrees, 3rd turn 30 degrees	88	ES 74031
231 OHV (3.8L) 12 Valve Buick	1988-86 VIN A, B, 3	●○ 1st 25, 2nd turn 90 degrees, 3rd turn 90 degrees	88	ES 74022

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
GM PRODUCTS 6 & H06 & V6 (CONT.)				
231 OHV (3.8L) 12 Valve Buick	1985-78	● 80 in three steps	88	
231 OHV (3.8L) 12 Valve Buick	1977-75	● 80 in three steps	69	
231 OHV Supercharged (3.8L) 12 Valve Buick	2007-01 VIN 1, 4	●○ 1st 37, 2nd turn 120 degrees	88	ES 74033
231 OHV Supercharged (3.8L) 12 Valve Buick	2000-96 VIN 1	●○ 1st 37, 2nd turn 130 degrees, 3rd Bolts 1-4 turn 30 degrees	88	ES 74033
231 OHV Supercharged (3.8L) 12 Valve Buick	1995-91 VIN 1	●○ 1st 37, 2nd turn 130 degrees, 3rd Bolts 1-4 turn 30 degrees	88	ES 72167
231 OHV Turbo (3.8L) 12 Valve Buick	1989 VIN 7	●○ 1st 25, 2nd turn 90 degrees, 3rd turn 90 degrees	88	ES 74022
231 OHV Turbo (3.8L) 12 Valve Buick	1987-86 VIN 7	●○ 1st 25, 2nd turn 90 degrees, 3rd turn 90 degrees	88	ES 74022
231 OHV Turbo (3.8L) 12 Valve Buick	1985-84	● 80 in three steps	88	
231 OHV Turbo (3.8L) 12 Valve Buick	1983-78	● 80 in three steps	69	
233 L-Head GMC Truck	1938-35	60	174	
235 OHV Chevrolet	1963-53	90-95	25	
235 OHV Chevrolet	1952-40	75-80	61	
236 OHV GMC Truck	1949-41	90-100	61	
238 L-Head Oldsmobile	1948-41	60-70	177	
239.2 L-Head Pontiac	1954-41	60	174	
242 OHV (3.9L) 12 Valve Chevrolet	2008 VIN R, W, 1, 3	●○ 1st 44, 2nd turn 140 degrees	196	ES 72230
242 OHV (3.9L) 12 Valve Chevrolet	2007-06 VIN R, W, 1, 3	●○ 1st 44, 2nd turn 95 degrees	196	ES 72230
248 OHV GMC Truck	1955-39	90-100	61	
250 OHV (4.1L) Chevrolet	1984-74 VIN D, Q	● Bolts 1-10, 12-14 95; Bolt 11 85	2	
250 OHV (4.1L) Chevrolet	1973-65	● 95	2	
250 SOHC Pontiac	1969-68	● 85-100	2	
252 OHV (4.1L) Buick	1985-84 VIN 4	● 80 in three steps	88	
252 OHV (4.1L) Buick	1983-80 VIN 4	● 80 in three steps	69	
254 DOHC (4.2L) 24 Valve Chevrolet Truck	2008-02 VIN S	●○ Bolts 1-14 1st 22, 2nd turn 90 degrees, 3rd turn 65 degrees; Bolt 15 4th 5.1, 5th turn 120 degrees; Bolts 16-17 6th 5.1, 7th turn 60 degrees	211	ES 72195
261 OHV Chevrolet	1962-54	90-95	45	
262 OHV (4.3L) Chevrolet Truck	2008-02 VIN X	●○ 1st all bolts 22, 2nd Long bolts turn 75 degrees, 3rd Medium bolts turn 65 degrees, 4th Short bolts turn 55 degrees	64	ES 74034
262 OHV (4.3L) Chevrolet Truck	1999-96 VIN X	●○ 1st all bolts 22, 2nd Long bolts turn 75 degrees, 3rd Medium bolts turn 65 degrees, 4th Short bolts turn 55 degrees	64	ES 74034
262 OHV (4.3L) Chevrolet Truck	1996-94 VIN Z	●○ 1st all bolts 22, 2nd Long bolts turn 75 degrees, 3rd Medium bolts turn 65 degrees, 4th Short bolts turn 55 degrees	64	ES 74034
262 OHV (4.3L) Chevrolet Truck	1993-85 VIN B, N, Z	●○ 65 in three steps	64	ES 74034
262 OHV (4.3L) Chevrolet	1993-85 VIN Z	●○ 65 in three steps	64	ES 74034
262 H.O. OHV (4.3L) Chevrolet Truck	2003-96 VIN W	●○ 1st all bolts 22, 2nd Long bolts turn 75 degrees, 3rd Medium bolts turn 65 degrees, 4th Short bolts turn 55 degrees	64	ES 74034
262 H.O. OHV (4.3L) Chevrolet Truck	1995-92 VIN W	●○ 65 in three steps	64	ES 74034



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ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
GM PRODUCTS 6 & H06 & V6 (CONT.)				
262 OHV Turbo (4.3L) Chevrolet Truck	1993-91 VIN Z	65 in three steps	64	
262 OHV Diesel (4.3L) Oldsmobile	1985-82 VIN T, V, 7	Bolts 1, 2, 3, 4, 7, 8, 9, 10 142 ; Bolts 5, 6, 11, 12, 13, 14 59	73	
270 OHV GMC Truck	1962-39	90-100	61	
292 OHV (4.8L) Chevrolet Truck	1989-74 VIN T	Bolts 1-10, 12-14 95 ; Bolt 11 85	2	
292 OHV (4.8L) Chevrolet Truck	1973-63	95	2	
302 OHV GMC Truck	1959-52	90-100	61	
305 OHV GMC Truck	1974-60	65-72	67	
351 OHV GMC Truck	1973-60	65-72	67	
D351 OHV Diesel GMC Truck	1969-64	125-135	67	
353 OHV Turbo Diesel (5.8L) 12 Valve Isuzu	1995-87	1st 50 , 2nd 65 , 3rd turn 60-90 degrees	181	
379 OHV GMC Truck	1974-73	7/16" bolts 60-65 ; 1/2" bolts 90-100	67	
401 OHV GMC Truck	1973-60	65-72	67	
426 OHV GMC Truck	1955-49	80-90	192	
432 OHV GMC Truck	1974-73	7/16" bolts 60-65 ; 1/2" bolts 90-100	67	
478 OHV GMC Truck	1974-62	65-72	67	
D478 OHV Diesel GMC Truck	1975-64	125-135	67	
DH478 OHV Diesel GMC Truck	1975-64	125-135	67	
503 OHV GMC Truck	1959-57	75-80	192	
503 OHV GMC Truck	1956-49	80-90	192	

GM PRODUCTS L8 & V8				
215 Buick, Pontiac	1963-61	50-55	24	
215 Oldsmobile	1963-61	45-55	176	
215 Turbo Oldsmobile	1963-62	45-55	176	
223.4 L-Head Pontiac	1935-33	60	175	
232.3 L-Head Pontiac	1936	60	175	
244 DOHC (4.0L) 32 Valve Oldsmobile	2003-01 VIN C	1st 30 , 2nd turn 70 degrees, 3rd turn 60 degrees, 4th turn 60 degrees, 5th M6 bolts 8.8	198	ES 72187
244 DOHC (4.0L) 32 Valve Oldsmobile	1999-95 VIN C	1st 30 , 2nd turn 70 degrees, 3rd turn 60 degrees, 4th turn 60 degrees, 5th M6 bolts 8.8	198	ES 72186
248 OHV Buick	1950-34	65-70	178	
248.9 L-Head Pontiac	1949-37	60	175	
250 OHV (4.1L) Cadillac	1988-82 VIN 7, 8	1st 38 , 2nd 74 , 3rd Bolts 1, 3, 4 90	74	
260 (4.3L) Oldsmobile	1982-75 VIN F, 8	1st 60 , 2nd 85	3	
260 Diesel (4.3L) Oldsmobile	1979 VIN P	1st 100 , 2nd 130	3	
262 Chevrolet	1976-75 VIN G	65 in three steps	7	ES 72856
263 OHV Buick	1953-50	65-70	178	
264 Buick	1955-54	65-75	34	
265 (4.3L) Chevrolet	1996-95 VIN W	1st all bolts 22 , 2nd Long bolts turn 80 degrees, 3rd Medium bolts turn 65 degrees, 4th Short bolts turn 55 degrees	7	ES 72856
265 (4.3L) Chevrolet	1994 VIN W	65 in three steps	7	ES 72856
265 (4.3L) Pontiac	1981-80 VIN S	95 in three steps	40	
265 Chevrolet	1957-55	65	7	ES 72856
267 OHV (4.4L) Chevrolet	1982-79 VIN J	65 in three steps	7	ES 72856
267 DOHC Supercharged (4.4L) 32 Valve Cadillac	2008-06 VIN D	1st M11 bolts 22 , 2nd turn 60 degrees, 3rd turn 60 degrees, 4th turn 60 degrees, 5th turn 40 degrees, 6th M6 bolts 8.8	198	
268.2 L-Head Pontiac	1954-50	60	175	
273 OHV (4.5L) Cadillac	1992-88 VIN 3, 5, 8	1st 38 , 2nd 68 , 3rd Bolts 1, 3, 4 90	74	

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
GM PRODUCTS L8 & V8 (CONT.)				
281 DOHC (4.6L) 32 Valve Cadillac	2008-06 VIN A, Y, 9	1st M11 bolts 22 , 2nd turn 60 degrees, 3rd turn 60 degrees, 4th turn 60 degrees, 5th M6 bolts 8.8	198	ES 72217
281 DOHC (4.6L) 32 Valve Cadillac	2005-04 VIN A, Y, 9	1st M11 bolts 22 , 2nd turn 60 degrees, 3rd turn 60 degrees, 4th turn 60 degrees, 5th M6 bolts 8.8	198	ES 72187
281 DOHC (4.6L) 32 Valve Cadillac	2003-00 VIN Y, 9	1st M11 bolts 30 , 2nd turn 70 degrees, 3rd turn 60 degrees, 4th turn 45 degrees, 5th M6 bolts 8.8	198	ES 72187
281 DOHC (4.6L) 32 Valve Cadillac	1999-93 VIN Y, 9	1st M11 bolts 30 , 2nd turn 70 degrees, 3rd turn 60 degrees, 4th turn 60 degrees, 5th M6 bolts 8.8	198	ES 72186
283 Chevrolet	1967-57	65	7	ES 72856
287.2 Pontiac	1955	95	40	
288 GMC Truck	1955	95	40	
293 OHV (4.8L) Chevrolet Truck	2008-07 VIN C 2nd Design Bolts	1st M11 Bolts 1-10 22 , 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-10 turn 70 degrees, 4th M8 Bolts 11-15 22	159	ES 72220
293 OHV (4.8L) Chevrolet Truck	2008-04 VIN V 2nd Design Bolts	1st M11 Bolts 1-10 22 , 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-10 turn 70 degrees, 4th M8 Bolts 11-15 22	159	ES 72220
293 OHV (4.8L) Chevrolet Truck	2004-99 VIN V 1st Design Bolts	1st M11 Bolts 1-10 22 , 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-8 turn 90 degrees, 4th M11 Bolts 9-10 turn 50 degrees, 5th M8 Bolts 11-15 22	159	ES 72173
298 OHV (4.5L) Cadillac	1995-91 VIN B	1st 38 , 2nd 68 , 3rd Bolts 1, 3, 4 90	74	
300 Buick	1967-64	65-70	4	
301 (4.9L) Pontiac	1981-77 VIN W, Y	95 in three steps	40	
301 Turbo (4.9L) Pontiac	1981-80 VIN T	95 in three steps	40	
302 Chevrolet	1969-67	65	7	ES 72856
303 Oldsmobile	1953-49	65-70	29	
305 (5.0L) Chevrolet Truck	2002-97 VIN M	1st all bolts 22 , 2nd Long bolts turn 75 degrees, 3rd Medium bolts turn 65 degrees, 4th Short bolts turn 55 degrees	7	ES 72856
305 (5.0L) Chevrolet Truck	1996 VIN M	1st 24 , 2nd 45 , 3rd 65	7	ES 72856
305 (5.0L) Chevrolet	1995-76	65 in three steps	7	ES 72856
307 (5.0L) Oldsmobile	1990-89 VIN Y, 9	1st 40 , 2nd Bolts 1-7, 9 turn 120 degrees, 3rd Bolts 8, 10 turn 95 degrees	3	
307 (5.0L) Oldsmobile	1988-80 VIN Y, 9	130 in three steps	3	
307 Chevrolet	1973-68	65	7	ES 72856
316 Pontiac	1956	95	40	
316 GMC Truck	1956-55	95	40	
320.2 OHV Buick	1952-36	65-70	178	
322 Buick	1956-53	65-75	34	
322 GMC Truck	1959-56	65-75	34	
324 Oldsmobile	1956-54	65-70	29	
324 GMC Truck	1956-55	65-70	29	
325 OHV (5.3L) Chevrolet	2008-05 VIN C 2nd Design Bolts	1st M11 Bolts 1-10 22 , 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-10 turn 70 degrees, 4th M8 Bolts 11-15 22	159	ES 72220
325 OHV (5.3L) Chevrolet Truck	2008-07 VIN J, L, O, 3 2nd Design Bolts	1st M11 Bolts 1-10 22 , 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-10 turn 70 degrees, 4th M8 Bolts 11-15 22	159	ES 72220



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ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
GM PRODUCTS L8 & V8 (CONT.)				
325 OHV (5.3L) Chevrolet Truck	2008-04 VIN B, M, P, T, Z 2nd Design Bolts	●○	1st M11 Bolts 1-10 22, 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-10 turn 70 degrees, 4th M8 Bolts 11-15 22	159 ES 72220
325 OHV (5.3L) Chevrolet Truck	2004-99 VIN P, T, Z 1st Design Bolts	●○	1st M11 Bolts 1-10 22, 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-8 turn 90 degrees, 4th M11 Bolts 9-10 turn 50 degrees, 5th M8 Bolts 11-15 22	159 ES 72173
325 OHV (5.3L) Hybrid Chevrolet Truck	2007-05 VIN T 2nd Design Bolts	●○	1st M11 Bolts 1-10 22, 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-10 turn 70 degrees, 4th M8 Bolts 11-15 22	159 ES 72220
326 Pontiac	1967-63	●	95	40
327 Chevrolet	1969-62	●○	65	7 ES 72856
330 Oldsmobile	1967-64	●	80	3
331 Cadillac	1955-49	●	65-70	23
336.9 GMC Truck	1959-58		95	40
340 Buick	1967-66	●	65-70	4
346 OHV (5.7L) Chevrolet	2005-04 VIN G, S 2nd Design Bolts	●○	1st M11 Bolts 1-10 22, 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-10 turn 70 degrees, 4th M8 Bolts 11-15 22	159 ES 72220
346 OHV (5.7L) Chevrolet	2004-98 VIN G, S 1st Design Bolts	●○	1st M11 Bolts 1-10 22, 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-8 turn 90 degrees, 4th M11 Bolts 9-10 turn 50 degrees, 5th M8 Bolts 11-15 22	159 ES 72173
346 OHV (5.7L) Chevrolet	1997 VIN G 1st Design Bolts	●○	1st M11 Bolts 1-10 22, 2nd M11 Bolts 1-10 turn 76 degrees, 3rd M11 Bolts 1-8 turn 76 degrees, 4th M11 Bolts 9-10 turn 34 degrees, 5th M8 Bolts 11-15 22	159 ES 72173
346 L-Head Cadillac	1948-37		70-75	179
347 Pontiac	1957		95	40
347 GMC Truck	1957		95	40
348 Chevrolet	1965-58	●	65	26
350 (5.7L) Buick	1981-75 VIN B, H, J, X	●	80 in three steps	5
350 (5.7L) Buick	1974-73	●	80 in three steps	5
350 (5.7L) Buick	1972-68	●	65-75	4
350 (5.7L) Cadillac	1980-75 VIN B, R, 8	●	130 in three steps	3
350 (5.7L) Chevrolet Truck	2002-97 VIN R	●○	1st all bolts 22, 2nd Long bolts turn 75 degrees, 3rd Medium bolts turn 65 degrees, 4th Short bolts turn 55 degrees	7 ES 72856
350 (5.7L) Chevrolet Truck	1996 VIN R	●○	1st 24, 2nd 45, 3rd 65	7 ES 72856
350 (5.7L) Chevrolet	1997-96 VIN P, 5	●○	1st all bolts 22, 2nd Short bolts turn 67 degrees, 3rd Medium bolts & Long bolts turn 80 degrees	7 ES 72856
350 (5.7L) Chevrolet	1995-92 VIN P	●○	65 in three steps	7 ES 72856
350 (5.7L) Chevrolet	1995-67 Cast Iron heads exc. VIN P, 5	●○	65 in three steps	7 ES 72856
350 (5.7L) Chevrolet	1991-86 Aluminum heads exc. VIN P	●○	Short Bolts 60; Medium Bolts 65; Long Bolts 65	7 ES 72856
350 (5.7L) Oldsmobile	1980-77 VIN R	●	1st 100, 2nd 130	3
350 (5.7L) Oldsmobile	1976-68	●	1st 60, 2nd 85	3

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
GM PRODUCTS L8 & V8 (CONT.)				
350 (5.7L) Pontiac	1977-76 VIN M, P	●	95 in three steps	40
350 (5.7L) Pontiac	1975-68	●	95 in three steps	40
350 DOHC (5.7L) 32 Valve Chevrolet	1995-90 VIN J		1st 45, 2nd 74, 3rd 118	200
350 Diesel (5.7L) Oldsmobile	1985-78 VIN N, Z	●	1st 100, 2nd 130	3
364 OHV (6.0L) Chevrolet	2008 VIN Y 2nd Design Bolts	●○	1st M11 Bolts 1-10 22, 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-10 turn 70 degrees, 4th M8 Bolts 11-15 22	159 ES 72220
364 OHV (6.0L) Chevrolet	2007-05 VIN H, U 2nd Design Bolts	●○	1st M11 Bolts 1-10 22, 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-10 turn 70 degrees, 4th M8 Bolts 11-15 22	159 ES 72220
364 OHV (6.0L) Chevrolet Truck	2008-07 VIN K, Y 2nd Design Bolts	●○	1st M11 Bolts 1-10 22, 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-10 turn 70 degrees, 4th M8 Bolts 11-15 22	159 ES 72220
364 OHV (6.0L) Chevrolet Truck	2008-04 VIN H, N, U 2nd Design Bolts	●○	1st M11 Bolts 1-10 22, 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-10 turn 70 degrees, 4th M8 Bolts 11-15 22	159 ES 72220
364 OHV (6.0L) Chevrolet Truck	2004-99 VIN N, U 1st Design Bolts	●○	1st M11 Bolts 1-10 22, 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-8 turn 90 degrees, 4th M11 Bolts 9-10 turn 50 degrees, 5th M8 Bolts 11-15 22	159 ES 72173
364 OHV (6.0L) Hybrid Chevrolet Truck	2008 VIN 5 2nd Design Bolts	●○	1st M11 Bolts 1-10 22, 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-10 turn 70 degrees, 4th M8 Bolts 11-15 22	159 ES 72220
364 Buick	1961-57	●	65-75	34
365 Cadillac	1958-56	●	65-70	23
366 (6.0L) Chevrolet Truck	1998-66	●	80	8
368 (6.0L) Cadillac	1984-80 VIN 6, 9	●	95 in three steps	37
370 Pontiac	1958	●	95	40
370 GMC Truck	1959-57		65-70	29
371 Oldsmobile	1960-59		60-80	29
371 Oldsmobile	1958-57		60-70	29
378 OHV (6.2L) Chevrolet	2008 VIN W 2nd Design Bolts	●○	1st M11 Bolts 1-10 22, 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-10 turn 70 degrees, 4th M8 Bolts 11-15 22	159 ES 72220
378 OHV (6.2L) Chevrolet Truck	2008-07 VIN 8 2nd Design Bolts	●○	1st M11 Bolts 1-10 22, 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-10 turn 70 degrees, 4th M8 Bolts 11-15 22	159 ES 72220
379 OHV Diesel (6.2L) Chevrolet Truck	1993-87 VIN C, J	●○	1st 20, 2nd 50, 3rd turn 90 degrees	77 ES 72724
379 OHV Diesel (6.2L) Chevrolet Truck	1986-82 VIN C, J	●○	95-105 in three steps	77 ES 72724
389 Pontiac	1966-59	●	95	40
390 Cadillac	1963	●	75	7
390 Cadillac	1962-61	●	75	23
390 Cadillac	1960-59	●	65-70	23
394 Oldsmobile	1964-59	●	60-80	29
395 OHV Diesel (6.5L) Chevrolet Truck	1999-94 VIN P, Y	●○	1st 20, 2nd 55, 3rd 55 again, 4th turn 90 degrees	77 ES 72724
395 OHV Turbo Diesel (6.5L) Chevrolet Truck	2005-92 VIN F, S, Z	●○	1st 20, 2nd 55, 3rd 55 again, 4th turn 90 degrees	77 ES 72724



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ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
GM PRODUCTS L8 & V8 (CONT.)				
396 Chevrolet	1969-65	80	8	
400 Buick	1969-68	100	4	
400 Buick	1967	100-120	4	
400 Buick	1966-65	65-80	24	
400 (6.6L) Chevrolet	1980-70	65 in three steps	7	ES 72856
400 Oldsmobile	1969-65	80	3	
400 Pontiac	1979-67	95 in three steps	40	
401 Buick	1966-62	65-80	24	
401 Buick	1961-59	65-75	34	
402 Chevrolet	1972-70	80	8	
402 OHV Turbo Diesel (6.6L) 32 Valve Isuzu	2008-05 DuraMax VIN D, 1, 2, 3, 6	1st M12 bolts 37, 2nd M12 bolts 59, 3rd M12 bolts turn 60 degrees, 4th M12 bolts turn 60 degrees, 5th M8 bolts 18	213	ES 72199
402 OHV Turbo Diesel (6.6L) 32 Valve Isuzu	2004-01 DuraMax VIN 1, 2 2nd Design Head Gasket	1st M12 bolts 37, 2nd M12 bolts 59, 3rd M12 bolts turn 60 degrees, 4th M12 bolts turn 60 degrees, 5th M8 bolts 18	213	ES 72199
402 OHV Turbo Diesel (6.6L) 32 Valve Isuzu	2004-01 DuraMax VIN 1, 2 1st Design Head Gasket	1st M12 bolts 37, 2nd M12 bolts 59, 3rd M12 bolts turn 90 degrees, 4th M12 bolts turn 75 degrees, 5th M8 bolts 18	213	ES 72199
403 Oldsmobile	1979-77 VIN K	1st 100, 2nd 130	3	
409 Chevrolet	1965-61	65	26	
421 Pontiac	1966-61	95	40	
425 Buick	1966-63	65-80	24	
425 Cadillac	1979-77 VIN S, T	95 in three steps	37	
425 Oldsmobile	1967-65	80	3	
427 OHV (7.0L) Chevrolet	2008-06 VIN E 2nd Design Bolts	1st M11 Bolts 1-10 22, 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-10 turn 70 degrees, 4th M8 Bolts 11-15 22	159	ES 72220
427 (7.0L) Chevrolet Truck	1998-68	80	8	
427 (7.0L) Chevrolet	1969-66 Cast Iron heads	80	8	
427 (7.0L) Chevrolet	1969-67 Aluminum heads	Short bolts 65; Medium bolts 75; Long bolts 75	8	
428 Pontiac	1969-67	95	40	
429 Cadillac	1967-64	60	7	
430 Buick	1969-68	100	4	
430 Buick	1967	100-120	4	
454 (7.4L) Chevrolet Truck	2000-98 VIN B, J	1st 37, 2nd Bolts 1, 2, 3, 6, 7, 8, 9, 12, 13, 14, 15, 16 turn 150 degrees, 3rd Bolts 4, 5, 10, 11 turn 90 degrees	8	
454 (7.4L) Chevrolet Truck	1997-91 VIN J, N	1st 30, 2nd 60, 3rd 80	8	
454 (7.4L) Chevrolet	1990-70 Cast Iron heads	80 in three steps	8	
454 (7.4L) Chevrolet	1972-70 Aluminum heads	Short bolts 65; Medium bolts 75; Long bolts 75	8	
455 Buick	1976-70	100	5	
455 Oldsmobile	1976-68	85	3	
455 Pontiac	1976-70	95	40	
472 Cadillac	1974-68	115	37	

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
GM PRODUCTS L8 & V8 (CONT.)				
496 OHV (8.1L) Chevrolet Truck	2007-01 VIN G	1st 22, 2nd 22 again, 3rd turn 120 degrees, 4th Bolts 1, 2, 3, 6, 7, 8, 9, 10, 11, 14, 16, 17 turn 60 degrees, 5th Bolts 15, 18 turn 45 degrees, 6th Bolts 4, 5, 12, 13 turn 30 degrees	210	ES 72188
500 Cadillac	1976-70	115 in three steps	37	
GM PRODUCTS V12				
702 OHV GMC Truck	1965-60	65-72	67	
GMC SEE GM PRODUCTS				
GRUMANN 4				
134 OHV (2.2L) Chevrolet	1995 VIN 4	1st Long bolts 46; Short bolts 43, 2nd all bolts turn 90 degrees	149	ES 72172
134 OHV (2.2L) Chevrolet	1994 VIN 4	1st Long bolts 46; Short bolts 43, 2nd all bolts turn 90 degrees	149	ES 74016
151 OHV (2.5L) Pontiac	1993-88 VIN A, E	1st all bolts 18, 2nd Bolts 1-8, 10 26; Bolt 9 18, 3rd all bolts turn 90 degrees	72	ES 72733
151 OHV (2.5L) Pontiac	1987 VIN E	1st all bolts 18, 2nd Bolts 1-8, 10 26; Bolt 9 30, 3rd Bolts 1-8, 10 turn 120 degrees; Bolt 9 turn 90 degrees	72	ES 72733
HENRY J SEE KAISER				
HONDA 3				
995cc SOHC (ECA1) 12 Valve Hybrid	2006-00	Bolts 1-8 1st 29, 2nd turn 90 degrees; Bolts 9 3rd 8.7	202	
HONDA 4				
1169cc SOHC (EB1) 8 Valve	1973	37-42 in two steps	153	
1238cc SOHC (EB2, EB3) 8 Valve	1979-74	37-42 in two steps	153	
1335cc SOHC (EJ1) 8 Valve	1983-80	1st 22, 2nd 43	60	
1335cc SOHC (EN1) 8 Valve	1983-80	37-42 in two steps	153	
1339cc SOHC (LDA1, LDA2) 16 Valve Hybrid	2008-03	1st 22, 2nd turn 130 degrees	60	
1342cc SOHC (D13A1, D13A2) 8 Valve	1987	1st 22, 2nd 43	37	
1342cc SOHC (EV1, EV2) 8 Valve	1986-84	1st 22, 2nd 43	37	
1488cc SOHC (D15A1, D15A2, D15A3) 12 Valve	1987	1st 22, 2nd 43	37	
1488cc SOHC (EW1, EW2) 12 Valve	1986-84	1st 22, 2nd 43	37	
1488cc SOHC (EW3, EW4) 12 Valve	1986-85	1st 22, 2nd 43	37	
1488cc SOHC (D15A2) 8 Valve	1987	1st 22, 2nd 43	37	
1488cc SOHC (EW1) 8 Valve	1986-85	1st 22, 2nd 43	37	
1488cc SOHC (EM1) 8 Valve	1983-80	1st 22, 2nd 43	60	
1488cc SOHC (EC, ED1, ED2, ED3, ED4) 8 Valve	1979-75	44 in two steps	60	
1493cc SOHC (D15B7) 16 Valve	1995-92	1st 14, 2nd 36, 3rd 49, 4th Bolts 1-2 49 again	108	
1493cc SOHC (D15Z1) 16 Valve	1995-92	1st 14, 2nd 36, 3rd 49, 4th Bolts 1-2 49 again	108	
1493cc SOHC (D15B1, D15B2) 16 Valve	1991-88	1st 22, 2nd 43	108	
1493cc SOHC (D15B8) 8 Valve	1995-92	1st 14, 2nd 36, 3rd 49, 4th Bolts 1-2 49 again	108	



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ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
HONDA 4 (CONT.)				
1493cc SOHC (D15B6) 8 Valve	1991-88	1st 22, 2nd 43	●	108
1496cc SOHC (L15A1) 16 Valve	2008-07	1st 22, 2nd turn 130 degrees		153
1590cc SOHC (D16B5) 16 Valve	2000-98	1st 13, 2nd 36, 3rd 49, 4th Bolts 1-2 49 again		152
1590cc SOHC (D16Y5, D16Y7, D16Y8) 16 Valve	2000-96	1st 13, 2nd 36, 3rd 49, 4th Bolts 1-2 49 again	●	36
1590cc SOHC (D16Z6) 16 Valve	1995-92	1st 14, 2nd 36, 3rd 49, 4th Bolts 1-2 49 again	●	108
1590cc SOHC (D16A6) 16 Valve	1991-88	1st 22, 2nd 43	●	108
1595cc DOHC (B16A2, B16A3) 16 Valve	2000-94	1st 22, 2nd 61	●	152
1599cc SOHC (EF1, EF2, EG) 12 Valve	1979-76	44 in two steps	●	60
1601cc SOHC (EZ1) 12 Valve	1985-84	1st 22, 2nd 49	●	60
1601cc SOHC (EL) 12 Valve	1983-79	1st 22, 2nd 43	●	60
1668cc SOHC (D17A1, D17A2, D17A6, D17A7) 16 Valve	2005-01	1st 14, 2nd 36, 3rd 49	●	108
1751cc SOHC (EK1) 12 Valve	1983-79	1st 22, 2nd 43	●	60
1799cc SOHC (R18A1, R18A4) 16 Valve	2008-06	1st 29, 2nd turn 90 degrees, 3rd turn 90 degrees NOTE: New bolts turn additional 60 degrees		106
1829cc SOHC (A18A1, A18A2) 12 Valve	1987	1st 22, 2nd 49	●	60
1829cc SOHC (ET1, ET2) 12 Valve	1986-84	1st 22, 2nd 49	●	60
1829cc SOHC (ES1, ES2, ES3) 12 Valve	1985-83	1st 22, 2nd 49	●	60
1955cc SOHC (A20A1, A20A2, A20A3, A20A4) 12 Valve	1989-87	1st 22, 2nd 49	●	60
1955cc SOHC (BS1, BS2) 12 Valve	1986	1st 22, 2nd 49	●	60
1955cc SOHC (BT1, BT2) 12 Valve	1986-85	1st 22, 2nd 49	●	60
1958cc SOHC (B20A3) 12 Valve	1990-88	1st 22, 2nd 49	●	108
1958cc DOHC (B20A5) 16 Valve	1991-88	1st 22, 2nd 49	●	108
1972cc DOHC (B20Z2) 16 Valve	2001-99	1st 22, 2nd 63	●	146
1972cc DOHC (B20B4) 16 Valve	1998-97	1st 22, 2nd 63	●	146
1997cc DOHC (F20C1) 16 Valve	2003-00	Bolts 1-10 1st 22, 2nd turn 90 degrees, 3rd turn 90 degrees NOTE: New bolts turn additional 90 degrees; Bolts 11 4th 16		222
1998cc DOHC (K20A3, K20Z3) 16 Valve	2008-02	1st 29, 2nd turn 90 degrees, 3rd turn 90 degrees NOTE: New bolts turn additional 90 degrees		106
2056cc DOHC (B21A1) 16 Valve	1991-90	1st 22, 2nd 49	●	108
2156cc SOHC (F22B1, F22B2, F22B6) 16 Valve	1997-94	1st 29, 2nd 51, 3rd 72.3	●	108
2156cc SOHC (F22A1, F22A6) 16 Valve	1996-92	1st 29, 2nd 51, 3rd 72.3	●	108
2156cc SOHC (F22A1, F22A4, F22A6) 16 Valve	1991-90	1st 29, 2nd 51, 3rd 78	●	108
2157cc DOHC (H22A4) 16 Valve	2001-97	1st 29, 2nd 51, 3rd 72.3		152
2157cc DOHC (H22A1) 16 Valve	1996-93	1st 29, 2nd 51, 3rd 78		152
2178cc DOHC (F22C1) 16 Valve	2008-04	Bolts 1-10 1st 22, 2nd turn 90 degrees, 3rd turn 90 degrees NOTE: New bolts turn additional 90 degrees; Bolts 11 4th 16		222
2254cc SOHC (F23A1, F23A4, F23A5, F23A7) 16 Valve	2002-98	1st 22, 2nd turn 90 degrees, 3rd turn 90 degrees NOTE: New bolts turn additional 90 degrees	●	108
2259cc DOHC (H23A1) 16 Valve	1996-92	1st 29, 2nd 51, 3rd 78	●	152

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
HONDA 4 (CONT.)				
2354cc DOHC (K24A1, K24A4, K24A8, K24Z1) 16 Valve	2008-02	1st 29, 2nd turn 90 degrees, 3rd turn 90 degrees NOTE: New bolts turn additional 90 degrees	●	106
2559cc SOHC (4ZE1) 8 Valve Isuzu	1997-94	1st 58, 2nd 72	●	79
HONDA V6				
2675cc SOHC (C27A4) 24 Valve	1997-95	1st 29, 2nd 56	●	107
2997cc SOHC (J30A4, J30A5) 24 Valve	2007-04	6 point bolts 1st 29, 2nd 29 again, 3rd 51, 4th 51 again, 5th 72.3, 6th 72.3 again	●	131
2997cc SOHC (J30A4, J30A5) 24 Valve	2007-04	12 point bolts 1st 22, 2nd turn 90 degrees, 3rd turn 90 degrees NOTE: New bolts turn additional 90 degrees	●	131
2997cc SOHC (J30A1, J30A4) 24 Valve	2003-98	1st 29, 2nd 51, 3rd 72.3	●	131
2997cc SOHC (JNA1) 24 Valve Hybrid	2007-05	6 point bolts 1st 29, 2nd 29 again, 3rd 51, 4th 51 again, 5th 72.3, 6th 72.3 again	●	131
2997cc SOHC (JNA1) 24 Valve Hybrid	2007-05	12 point bolts 1st 22, 2nd turn 90 degrees, 3rd turn 90 degrees NOTE: New bolts turn additional 90 degrees	●	131
3165cc SOHC (6VD1) 24 Valve Isuzu	1997-96	M11 Bolts 1-8 47; M8 Bolts 9-11 15	●	132
3165cc SOHC (6VD1) 24 Valve Isuzu	1995-94	M11 Bolts 1-8 47; M8 Bolts 9-10 15	●	160
3165cc DOHC (6VD2) 24 Valve Isuzu	2002-98	1st 21, 2nd 47	●	134
3471cc SOHC (J35A7, J35A8, J35A9, J35Z1) 24 Valve	2008-05	6 point bolts 1st 29, 2nd 29 again, 3rd 51, 4th 51 again, 5th 72.3, 6th 72.3 again	●	131
3471cc SOHC (J35A7, J35A8, J35A9, J35Z1) 24 Valve	2008-05	12 point bolts 1st 22, 2nd turn 90 degrees, 3rd turn 90 degrees NOTE: New bolts turn additional 90 degrees	●	131
3471cc SOHC (J35A1, J35A4, J35A6) 24 Valve	2008-99	1st 29, 2nd 29 again, 3rd 51, 4th 51 again, 5th 72.3, 6th 72.3 again	●	131
HUDSON..... SEE AMERICAN MOTORS				
HUMMER (1992-2001)..... SEE AM GENERAL				
HUMMER (2002-2008)..... SEE GM PRODUCTS				
HYUNDAI 4				
1439cc SOHC (4G33) 8 Valve Mitsubishi	1987-83	Bolts 1-10 1st 25, 2nd 51-54; Bolts 11 3rd 11-15	●	38
1468cc SOHC (G4AJ, G4DJ, G15B, 4G15) 8 Valve Mitsubishi	1994-86	Cold 51-54, Hot 58-61	●	81
1494cc SOHC (G4EK) 12 Valve	2002-00	1st 17-20, 2nd turn 60-62 degrees, 3rd turn 60-62 degrees	●○	147 ES 71201
1494cc SOHC (G4EK) 12 Valve	1999-93	Cold 51-54, Hot 58-61	●○	147 ES 71201
1494cc DOHC (G4FK) 16 Valve	1998-96	Cold 51-54, Hot 58-61	●○	147 ES 71204
1494cc SOHC Turbo (G4EK-T) 12 Valve	1995-93	Cold 51-54, Hot 58-61	●○	147 ES 71201
1595cc DOHC (G4CR) 16 Valve	1995-92	76-83 in two steps	●	147
1597cc SOHC (G32B, 4G32) 8 Valve Mitsubishi	1987-84	Bolts 1-10 1st 25, 2nd 51-54; Bolts 11 3rd 11-15	●	38
1599cc DOHC (G4EC, G4ED) 16 Valve	2008-01	1st 22, 2nd turn 90 degrees, 3rd loosen all bolts, 4th 22 again, 5th turn 90 degrees	●○	71 ES 71203



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ENGINE	YEARS		FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
HYUNDAI 4 (CONT.)					
1796cc DOHC (G4GM) 16 Valve	1998-96	●	M10 bolts 1st 22 , 2nd turn 60-65 degrees, 3rd turn 60-65 degrees; M12 bolts 1st 26 , 2nd turn 60-65 degrees, 3rd turn 60-65 degrees	121	
1836cc DOHC (G4CN) 16 Valve	1995-93	●	76-83 in two steps	147	
1975cc DOHC (G4GF) 16 Valve	2008-04	●	M10 bolts 1st 18 , 2nd turn 60-65 degrees, 3rd turn 60-65 degrees; M12 bolts 1st 22 , 2nd turn 60-65 degrees, 3rd turn 60-65 degrees	147	
1975cc DOHC (G4GF) 16 Valve	2003-99	●	M10 bolts 1st 22 , 2nd turn 60-65 degrees, 3rd turn 60-65 degrees; M12 bolts 1st 26 , 2nd turn 60-65 degrees, 3rd turn 60-65 degrees	121	
1975cc DOHC (G4GF) 16 Valve	1998-97	●	M10 bolts 1st 22 , 2nd turn 60-65 degrees, 3rd turn 60-65 degrees; M12 bolts 1st 26 , 2nd turn 60-65 degrees, 3rd turn 60-65 degrees	147	
1997cc SOHC (G63B) 8 Valve Mitsubishi	1988-87	●	Cold 65-72 , Warm 73-79	71	
1997cc DOHC (G4CP) 16 Valve	1998-95	●○	Cold 65-72 in two steps	147	ES 71177
1997cc DOHC (G4CP) 16 Valve	1994-92	●○	76-83 in two steps	147	ES 71175
2351cc SOHC (G4CS) 8 Valve Mitsubishi	1991-89	●	Cold 65-72 , Warm 73-79	71	
2351cc DOHC (G4JS) 16 Valve	2006-99	●○	1st 46 , 2nd loosen all bolts, 3rd 14 , 4th turn 90 degrees, 5th turn 90 degrees	147	ES 72211
2359cc DOHC (G4KC) 16 Valve	2008-06	●	1st 25 , 2nd turn 90 degrees, 3rd turn 90 degrees	147	
HYUNDAI V6					
2493cc DOHC (G6BV) 24 Valve	2001-99		Cold 1st 18 , 2nd turn 60-64 degrees, 3rd turn 45-49 degrees, 4th warm engine & allow to cool, 5th loosen all bolts, 6th 18 again, 7th turn 60-64 degrees, 8th turn 45-49 degrees	154	
2656cc DOHC (G6BA) 24 Valve	2008-04	●○	1st 18 , 2nd turn 60 degrees, 3rd turn 45 degrees	154	ES 72205
2656cc DOHC (G6BA) 24 Valve	2003-01	●○	Cold 1st 18 , 2nd turn 58-62 degrees, 3rd turn 43-47 degrees, 4th warm engine & allow to cool, 5th loosen all bolts, 6th 18 again, 7th turn 58-62 degrees, 8th turn 43-47 degrees	154	ES 72205
2972cc SOHC (G6AT) 12 Valve Mitsubishi	1998-93	●○	76-83 in three steps	154	ES 72859
2972cc SOHC (G6AT) 12 Valve Mitsubishi	1992-90	●○	Cold 65-72 , Warm 72-80	154	ES 72859
2972cc DOHC (G6CT) 24 Valve	2001		Cold 1st 75-82 in three steps, 2nd warm engine & allow to cool, 3rd loosen all bolts, 4th 75-82 in three steps again	154	
3342cc DOHC (G6DB) 24 Valve	2008-06		1st 29 , 2nd turn 120 degrees, 3rd turn 90 degrees, 4th single bolt 15	154	
3497cc DOHC (G6CU) 24 Valve	2006-04	●○	76-83 in three steps	154	ES 72859
3497cc DOHC (G6CU) 24 Valve	2003-02	●○	Cold 1st 75-82 in three steps, 2nd warm engine & allow to cool, 3rd loosen all bolts, 4th 75-82 in three steps again	154	ES 72859
3778cc DOHC (G6DA) 24 Valve	2008-06		1st 29 , 2nd turn 120 degrees, 3rd turn 90 degrees, 4th single bolt 15	154	

ENGINE	YEARS		FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
INFINITI 4					
1998cc DOHC (SR20DE) 16 Valve	2002-99	●○	1st 29 , 2nd 58 , 3rd loosen all bolts, 4th 25-33 , 5th turn 90-95 degrees, 6th turn 90-95 degrees	109	ES 72192
1998cc DOHC (SR20DE) 16 Valve	1996-91	●○	1st 29 , 2nd 58 , 3rd loosen all bolts, 4th 25-33 , 5th turn 90-100 degrees, 6th turn 90-100 degrees	109	ES 72192
INFINITI V6					
2960cc SOHC (VG30E) 12 Valve	1992-90	●	1st 22 , 2nd 43 , 3rd loosen all bolts, 4th 22 again, 5th 40-47 ; OR turn 60-65 degrees	85	
2960cc DOHC (VG30DE) 24 Valve	1997-93	●	1st 29 , 2nd 90 , 3rd loosen all bolts, 4th 25-33 , 5th 90 ; OR turn 60-70 degrees	161	
2988cc DOHC (VQ30DE) 24 Valve	2001-96	●○	1st 72 , 2nd loosen all bolts, 3rd 25-33 , 4th turn 90-95 degrees, 5th turn 90-95 degrees	161	ES 72900
3274cc SOHC (VG33E) 12 Valve	2000-97	●○	1st 22 , 2nd 43 , 3rd loosen all bolts, 4th 7 , 5th 22 , 6th 40-47 ; OR turn 60-65 degrees	162	ES 72194
3498cc DOHC (VQ35HR) 24 Valve	2008-07		1st 77 , 2nd loosen all bolts, 3rd 29 , 4th turn 95 degrees, 5th turn 95 degrees	161	
3498cc DOHC (VQ35DE) 24 Valve	2008-01	●○	1st 72 , 2nd loosen all bolts, 3rd 25-33 , 4th turn 90-95 degrees, 5th turn 90-95 degrees	161	ES 72900
3696cc DOHC (VQ37VHR) 24 Valve	2008		1st 77 , 2nd loosen all bolts, 3rd 29 , 4th turn 95 degrees, 5th turn 95 degrees	161	
INFINITI V8					
4130cc DOHC (VH41DE) 32 Valve	2001-97		1st 22 , 2nd 69 , 3rd loosen all bolts, 4th 18-25 , 5th turn 90-95 degrees	110	
4494cc DOHC (VK45DE) 32 Valve	2008-02		1st 72 , 2nd loosen all bolts, 3rd 29-36 , 4th turn 60-65 degrees, 5th turn 60-65 degrees	203	
4494cc DOHC (VH45DE) 32 Valve	1996-90	●	1st 22 , 2nd 69 , 3rd loosen all bolts, 4th 18-25 , 5th 69-72 ; OR turn 90-95 degrees	110	
5552cc DOHC (VK56DE) 32 Valve	2008-04	●	1st 72 , 2nd loosen all bolts, 3rd 33 , 4th turn 60 degrees, 5th turn 60 degrees	203	
INTERNATIONAL 4					
90.8 (A55) Austin	1963-58		45	182	
152	1971-61	●	90-100	183	
152 Turbo	1967-65	●	90-100	183	
196 (3.2L)	1980-66	●	90-100	183	
INTERNATIONAL 6					
220	1968-50		85-95	184	
232 AMC	1972-69	●	80-85	2	
240	1970-56		85-95	184	
258 AMC	1974-73	●	105 in three steps	2	
258 AMC	1972	●	80-85	2	
264	1970-58		85-95	184	
INTERNATIONAL V8					
266	1972-59	●	90-100	183	
304 (5.0L)	1980-60	●	90-100	183	
345 (5.6L)	1985-61	●	90-100	183	
392 (6.4L)	1985-66	●	90-100	183	
401 AMC	1974	●	1st 80 , 2nd 110	1	
420 Diesel (6.9L) IDI	1990-85	●	1st 40 , 2nd 70 , 3rd 80 , 4th 87	95	



TORQUE TABLES™



TORQUE TABLES™

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
INTERNATIONAL V8 (CONT.)				
420 Diesel (6.9L) IDI	1984-80	● 1st 40, 2nd 70, 3rd 80, 4th 80 again	95	
444 Diesel (7.3L) IDI	1993-91	● 1st 65, 2nd 90, 3rd 110, 4th 110 again	95	
444 Diesel (7.3L) IDI	1990-88	● 1st 65, 2nd 90, 3rd 100	95	
444 Turbo Diesel (7.3L) DI	1997-94	●○ 1st 65, 2nd 85, 3rd 105, 4th 105 again	156	ES 72161
444 Turbo Diesel (7.3L) IDI	1994-93	● 1st 65, 2nd 90, 3rd 110, 4th 110 again	95	

ISO V8				
327 Chevrolet	1970-63	●○ 65	7	ES 72856

ISUZU 4				
1471cc SOHC (4XC1) 8 Valve	1989-85	● 1st 29, 2nd 58	37	
1471cc SOHC Turbo (4XC1-T) 8 Valve	1989-87	● 1st 29, 2nd 58	37	
1588cc SOHC (4XE1V) 12 Valve	1993-90	● 1st 29, 2nd 58	37	
1588cc DOHC (4XE1W) 16 Valve	1992-89	● 1st 29, 2nd 58	100	
1588cc DOHC Turbo (4XE1W-T) 16 Valve	1992-90	● 1st 29, 2nd 58	100	
1808cc DOHC (4XF1) 16 Valve	1993-92	● 1st 29, 2nd 58	100	
1817cc SOHC (G180Z) 8 Valve	1985-81	● 72	37	
1817cc SOHC Diesel (4FB1) 8 Valve	1985-81	● New bolts 98; Used bolts 105	75	
1949cc SOHC (G200Z) 8 Valve	1987-83	● 1st 61, 2nd 72	37	
1994cc SOHC Turbo (4ZC1-T) 8 Valve	1989-85	● 1st 62, 2nd 72	12	
2156cc SOHC (F22B6) 16 Valve Honda	1997-96	● 1st 29, 2nd 51, 3rd 72.3	108	
2189cc OHV (LN2) 8 Valve Chevrolet Truck	2001-98	●○ 1st Long bolts 46; Short bolts 43, 2nd all bolts turn 90 degrees	149	ES 72170
2189cc OHV (LN2) 8 Valve Chevrolet Truck	1997-96	●○ 1st Long bolts 46; Short bolts 43, 2nd all bolts turn 90 degrees	149	ES 72172
2198cc DOHC (X22SE) 16 Valve Opel	2003-98	● 1st 18, 2nd turn 90 degrees, 3rd turn 90 degrees, 4th turn 90 degrees	109	
2238cc OHV Diesel (C223) 8 Valve	1987-81	● 1st 40-47, 2nd 54-61	76	
2238cc OHV Turbo Diesel (C223-T) 8 Valve	1987-86	● 1st 30-40, 2nd turn 120-150 degrees	76	
2254cc SOHC (F23A7) 16 Valve Honda	1999-98	● 1st 22, 2nd turn 90 degrees, 3rd turn 90 degrees NOTE: New bolts turn additional 90 degrees	108	
2254cc SOHC (4ZD1) 8 Valve	1995-86	● 1st 58, 2nd 72	79	
2559cc SOHC (4ZE1) 8 Valve	1997-88	● 1st 58, 2nd 72	79	
2770cc DOHC (VIN 8) 16 Valve Chevrolet Truck	2006	●○ Bolts 1-10 1st 22, 2nd turn 90 degrees, 3rd turn 65 degrees; Bolt 11 4th 5.1, 5th turn 120 degrees; Bolts 12-13 6th 5.1, 7th turn 60 degrees	253	ES 72195
2921cc DOHC (VIN 9) 16 Valve Chevrolet Truck	2008-07	● Bolts 1-10 1st 22, 2nd turn 90 degrees, 3rd turn 65 degrees; Bolt 11 4th 5.1, 5th turn 120 degrees; Bolts 12-13 6th 5.1, 7th turn 60 degrees	253	
3856cc OHV Diesel (4BD1-N) 8 Valve	1988-85	● 1st 50, 2nd 65, 3rd turn 60-90 degrees	180	
3856cc OHV Turbo Diesel (4BD1-T, 4BD2-TC) 8 Valve	1998-85	● 1st 50, 2nd 65, 3rd turn 60-90 degrees	180	

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
ISUZU 5				
3460cc DOHC (VIN 6) 20 Valve Chevrolet Truck	2006	●○ Bolts 1-12 1st 22, 2nd turn 90 degrees, 3rd turn 65 degrees; Bolt 13 4th 5.1, 5th turn 120 degrees; Bolts 14-15 6th 5.1, 7th turn 60 degrees	254	ES 72195
3654cc DOHC (VIN E) 20 Valve Chevrolet Truck	2008-07	● Bolts 1-12 1st 22, 2nd turn 90 degrees, 3rd turn 65 degrees; Bolt 13 4th 5.1, 5th turn 120 degrees; Bolts 14-15 6th 5.1, 7th turn 60 degrees	254	

ISUZU 6 & V6				
2835cc OHV (LL2) 12 Valve Chevrolet Truck	1991-89	●○ 1st 40, 2nd turn 90 degrees	49	ES 72857
3136cc OHV (LG6) 12 Valve Chevrolet Truck	1994-91	●○ 1st 40, 2nd turn 90 degrees	49	ES 72901
3165cc SOHC (6VD1) 24 Valve	1997-96	● M11 Bolts 1-8 47; M8 Bolts 9-11 15	132	
3165cc SOHC (6VD1) 24 Valve	1995-92	● M11 Bolts 1-8 47; M8 Bolts 9-10 15	160	
3165cc DOHC (6VD2) 24 Valve	2004-98	● 1st 21, 2nd 47	134	
3165cc DOHC (6VD2) 24 Valve	1995-92	● M11 Bolts 1-8 47; M8 Bolts 9-10 15	160	
3494cc DOHC (6VE1) 24 Valve	2004-98	● 1st M11 Bolts 1-8 21, 2nd M11 Bolts 1-8 47, 3rd M8 Bolt 9 15	257	
4160cc DOHC (VIN S) 24 Valve Chevrolet Truck	2008-03	●○ Bolts 1-14 1st 22, 2nd turn 90 degrees, 3rd turn 65 degrees; Bolt 15 4th 5.1, 5th turn 120 degrees; Bolts 16-17 6th 5.1, 7th turn 60 degrees	211	ES 72195
4293cc OHV (LB4, LF6) 12 Valve Chevrolet Truck	2001-97	●○ 1st all bolts 22, 2nd Long bolts turn 75 degrees, 3rd Medium bolts turn 65 degrees, 4th Short bolts turn 55 degrees	64	ES 74034
5785cc OHV Turbo Diesel (6BD1-T) 12 Valve	1995-87	● 1st 50, 2nd 65, 3rd turn 60-90 degrees	181	

ISUZU V8				
5328cc OHV (VIN M, P) Chevrolet Truck	2007-04 2nd Design Bolts	●○ 1st M11 Bolts 1-10 22, 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-10 turn 70 degrees, 4th M8 Bolts 11-15 22	159	ES 72220
5328cc OHV (VIN P) Chevrolet Truck	2004-03 1st Design Bolts	●○ 1st M11 Bolts 1-10 22, 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-8 turn 90 degrees, 4th M11 Bolts 9-10 turn 50 degrees, 5th M8 Bolts 11-15 22	159	ES 72173
5736cc OHV (CPC) Chevrolet Truck	2000-97	●○ 1st all bolts 22, 2nd Long bolts turn 75 degrees, 3rd Medium bolts turn 65 degrees, 4th Short bolts turn 55 degrees	7	ES 72856
5736cc OHV (CPC) Chevrolet Truck	1996	●○ 1st 24, 2nd 45, 3rd 65	7	ES 72856
5736cc OHV (CPC) Chevrolet Truck	1995-93	●○ 65 in three steps	7	ES 72856

JAGUAR V6				
2495cc DOHC (VIN D) 24 Valve Ford	2005-02 Duratec	●○ 1st 22, 2nd turn 90 degrees, 3rd loosen one turn, 4th 22 again, 5th turn 90 degrees, 6th turn 90 degrees	233	ES 72208
2967cc DOHC (VIN F) 24 Valve Ford	2008-00 Duratec	●○ 1st 22, 2nd turn 90 degrees, 3rd loosen one turn, 4th 22 again, 5th turn 90 degrees, 6th turn 90 degrees	233	ES 72208

JEEP 4				
122 DOHC (2.0L) 16 Valve Chrysler	2008 VIN 0 2nd Design Bolts	●○ 1st 25, 2nd 54, 3rd 54 again, 4th turn 90 degrees	71	
122 DOHC (2.0L) 16 Valve Chrysler	2008-07 VIN 0 1st Design Bolts	●○ 1st 25, 2nd 45, 3rd 45 again, 4th turn 90 degrees	71	



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ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
JEEP 4 (CONT.)				
126 SOHC Turbo Diesel (2.1L) 8 Valve Renault	1990-85	1st 22, 2nd 37, 3rd 73.5	93	
134F F-Head	1973-50 Hurricane	65-70	30	
134L L-Head	1968-38 Lightning	65-70	30	
144 DOHC (2.4L) 16 Valve Chrysler	2008 VIN W 2nd Design Bolts	1st 25, 2nd 54, 3rd 54 again, 4th turn 90 degrees	71	
144 DOHC (2.4L) 16 Valve Chrysler	2008-07 VIN W 1st Design Bolts	1st 25, 2nd 45, 3rd 45 again, 4th turn 90 degrees	71	ES 71028
148 DOHC (2.4L) 16 Valve Dodge Truck	2006-05 VIN 1	1st 25, 2nd 60, 3rd 60 again, 4th turn 90 degrees	37	ES 71028
148 DOHC (2.4L) 16 Valve Dodge Truck	2004-02 VIN 1	1st 25, 2nd 50, 3rd 50 again, 4th turn 90 degrees	37	ES 71028
150 OHV (2.5L) AMC	2002-98	1st 22, 2nd 45, 3rd 45 again, 4th Bolts 1-6, 8-10 110; Bolt 7 100	151	ES 72896
150 OHV (2.5L) AMC	1997	1st 22, 2nd 45, 3rd Bolts 1-6, 8-10 110; Bolt 7 100	151	ES 72896
150 OHV (2.5L) AMC	1996-91	1st 22, 2nd 45, 3rd Bolts 1-6, 8-10 110; Bolt 7 100	151	
150 OHV (2.5L) AMC	1990-89	1st 22, 2nd 45, 3rd Bolts 1-7, 9-10 110; Bolt 8 100	72	
150 OHV (2.5L) AMC	1988-83	Bolts 1-7, 9-10 85; Bolt 8 75	72	
151 OHV (2.5L) Pontiac	1983-80	92 in three steps	37	
169 DOHC Turbo Diesel (2.8L) 16 Valve VM Motori	2006-05 VIN 5	1st Bolts 1-18 22, 2nd Bolts 1-10 turn 75 degrees, 3rd Bolts 11-18 turn 50 degrees, 4th Bolts 1-18 turn 75 degrees	258	
JEEP 6 & V6				
148L L-Head Willys	1951-47	60-65	185	
161F F-Head Willys	1955-52	60-65	186	
161L L-Head Willys	1955-50	60-65	185	
173 OHV (2.8L) 12 Valve Chevrolet Truck	1986-84 VIN W	70 in three steps	49	ES 72857
182 DOHC Turbo Diesel (3.0L) 24 Valve Mercedes-Benz	2008-07 VIN M	1st Bolts 1-8 44, 2nd Bolts 9-10 15, 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 9-10 15 again, 5th Bolts 1-8 turn 90 degrees	242	
225 OHV Buick	1971-66	65-70	19	
226 SOHC (3.7L) 12 Valve Dodge Truck	2008-02	1st M11 Bolts 1-8 20, 2nd M11 Bolts 1-8 20 again, 3rd M8 Bolts 9-12 10, 4th M11 Bolts 1-8 turn 90 degrees, 5th M11 Bolts 1-8 turn 90 degrees, 6th M8 Bolts 9-12 19	204	ES 71129-1
226L L-Head Continental	1966-47	30-35	18	
230 SOHC Continental	1965-62 Tornado	80-95	47	
231 OHV (3.8L) 12 Valve Dodge Truck	2008-07	M11 Bolts 1-8 1st 45, 2nd 65, 3rd 65 again, 4th turn 90 degrees; M8 Bolt 9 5th 25 in three steps	215	ES 72163
232 OHV	1979-73	105 in three steps	9	
232 OHV	1972-65	80-85	2	
242 OHV (4.0L)	2006-96	1st 22, 2nd 45, 3rd 45 again, 4th Bolts 1-10, 12-14 110; Bolt 11 100	2	ES 71102
242 OHV (4.0L)	1995-91	1st 22, 2nd 45, 3rd 45 again, 4th Bolts 1-10, 12-14 110; Bolt 11 100	2	
242 OHV (4.0L)	1990-87	1st 22, 2nd 45, 3rd Bolts 1-13 110; Bolt 14 100	9	
258 OHV (4.2L)	1990-81	85 in three steps	9	

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
JEEP 6 & V6 (CONT.)				
258 OHV (4.2L)	1980-73	105 in three steps	9	
258 OHV (4.2L)	1972-71	80-85	2	
JEEP V8				
287 SOHC (4.7L) 16 Valve Dodge Truck	2008	1st M11 Bolts 1-10 20, 2nd M11 Bolts 1-10 20 again, 3rd M8 Bolts 11-14 10, 4th M11 Bolts 1-10 turn 90 degrees, 5th M11 Bolts 1-10 turn 90 degrees, 6th M8 Bolts 11-14 19	163	ES 71129
287 SOHC (4.7L) 16 Valve Dodge Truck	2007-99	1st M11 Bolts 1-10 15, 2nd M11 Bolts 1-10 35, 3rd M8 Bolts 11-14 18, 4th M11 Bolts 1-10 turn 90 degrees, 5th M8 Bolts 11-14 22	163	ES 71129
304 (5.0L)	1981-71	1st 80, 2nd 110	1	
318 OHV (5.2L) Dodge Truck	1998-94	1st 50, 2nd 105, 3rd 105 again	12	ES 71038-1
318 OHV (5.2L) Dodge Truck	1993	1st 50, 2nd 105, 3rd 105 again	12	
327	1970-65 Vigilante	58-62	22	
345 Hemi (5.7L) 16 Valve Dodge Truck	2008-05	1st M12 Bolts 1-10 25, 2nd M8 Bolts 11-15 15, 3rd M12 Bolts 1-10 40, 4th M8 Bolts 11-15 15 again, 5th M12 Bolts 1-10 turn 90 degrees, 6th M8 Bolts 11-15 25	216	ES 72200
350 Buick	1971-68	65-75	4	
360 OHV (5.9L) Dodge Truck	1998	1st 50, 2nd 105, 3rd 105 again	12	ES 71038-1
360 (5.9L) AMC	1993-70	1st 80, 2nd 110	1	
370 Hemi (6.1L) 16 Valve Chrysler	2008-06	1st M12 Bolts 1-10 25, 2nd M8 Bolts 11-15 15, 3rd M12 Bolts 1-10 40, 4th M8 Bolts 11-15 15 again, 5th M12 Bolts 1-10 turn 90 degrees, 6th M8 Bolts 11-15 25	216	
401	1978-74	1st 80, 2nd 110	1	
JENSEN V8				
383 Chrysler	1972-68	70	11	
440 Chrysler	1976-72	70	11	
KAISER 4				
134L L-Head Jeep	1954-51	65-70	30	
KAISER 6				
161F F-Head Willys	1954	60-65	186	
161L L-Head Willys	1954-51	60-65	185	
226L L-Head Continental	1955-46	30-35	18	
KIA 4				
1493cc DOHC (B5) 16 Valve	2002-01	1st 36.1, 2nd loosen all bolts, 3rd 18, 4th turn 90 degrees, 5th turn 90 degrees	150	ES 72227
1594cc DOHC (B6) 16 Valve	2005-03	1st 36.1, 2nd loosen all bolts, 3rd 18, 4th turn 90 degrees, 5th turn 90 degrees	150	ES 72227
1597cc SOHC (B6) 8 Valve Mazda	1995-93	56-60 in three steps	150	
1597cc SOHC (B6) 16 Valve Mazda	1995	56-60 in three steps	150	
1597cc DOHC (B6-ZE) 16 Valve Mazda	1997-95	56-60 in three steps	150	
1599cc DOHC (G4ED) 16 Valve	2008-06	1st 22, 2nd turn 90 degrees, 3rd loosen all bolts, 4th 22 again, 5th turn 90 degrees	71	ES 71203



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ENGINE	YEARS		FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
KIA 4 (CONT.)					
1793cc DOHC (T8) 16 Valve	2004-98	●○	1st 36.1 , 2nd loosen all bolts, 3rd 28.9 , 4th turn 90 degrees, 5th turn 90 degrees	37	ES 72909
1839cc DOHC (BP-ZE) 16 Valve Mazda	1997-95	●○	56-60 in three steps	150	ES 72909
1975cc DOHC (G4GF) 16 Valve	2008-04	●	M10 bolts 1st 18 , 2nd turn 60-65 degrees, 3rd turn 60-65 degrees; M12 bolts 1st 22 , 2nd turn 60-65 degrees, 3rd turn 60-65 degrees	147	
1998cc SOHC (FE) 8 Valve Mazda	1995	●	59-64	37	
1998cc DOHC (FED) 16 Valve Mazda	2002-95	●	59-64	37	
2351cc DOHC (G4JS) 16 Valve	2006-01	●○	1st 46 , 2nd loosen all bolts, 3rd 14 , 4th turn 90 degrees, 5th turn 90 degrees	147	ES 72211
2359cc DOHC (G4KC) 16 Valve	2008-06	●	1st 25 , 2nd turn 90 degrees, 3rd turn 90 degrees	147	

KIA V6					
2493cc DOHC (G6BV) 24 Valve	2001		1st 18 , 2nd turn 60-64 degrees, 3rd turn 45-49 degrees	154	
2656cc DOHC (G6BA) 24 Valve	2008-02	●○	1st 18 , 2nd turn 60 degrees, 3rd turn 45 degrees	154	ES 72205
3342cc DOHC (G6DB) 24 Valve	2008		1st 29 , 2nd turn 120 degrees, 3rd turn 90 degrees, 4th single bolt 15	154	
3497cc DOHC (G6CU) 24 Valve	2006-04	●○	76-83 in three steps	154	ES 72859
3497cc DOHC (G6CU) 24 Valve	2003-02	●○	Cold 1st 75-82 in three steps, 2nd warm engine & allow to cool, 3rd loosen all bolts, 4th 75-82 in three steps again	154	ES 72859
3778cc DOHC (G6DA) 24 Valve	2008-06		1st 29 , 2nd turn 120 degrees, 3rd turn 90 degrees, 4th single bolt 15	154	

LaFORZA V8					
302 (5.0L) Ford	2001-92	●○	Flanged Hex Head bolts: 1st 25-35 , 2nd 45-55 , 3rd turn 85-95 degrees	70	ES 72155
302 (5.0L) Ford	1992-89	●	Standard Hex Head bolts: Intake Side 80 , Exhaust Side 68	70	
302 Supercharged (5.0L) Ford	2001-98	●○	Flanged Hex Head bolts: 1st 25-35 , 2nd 45-55 , 3rd turn 85-95 degrees	70	ES 72155

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LAND ROVER 6 & V6					
3192cc DOHC (B6324S) 24 Valve Volvo	2008		1st 33 , 2nd 33 again, 3rd turn 90 degrees, 4th turn 180 degrees	252	
4015cc SOHC (F40) 12 Valve Ford Truck	2008-05	●○	1st M12 Bolts 1-8 9 , 2nd M12 Bolts 1-8 18 , 3rd M8 Bolts 9-10 24 , 4th M12 Bolts 1-8 turn 90 degrees, 5th M12 Bolts 1-8 turn 90 degrees	218	ES 72171

LAND ROVER V8					
4398cc DOHC (M62B44) 32 Valve BMW	2005-03		1st 22.1 , 2nd turn 80 degrees, 3rd turn 80 degrees	137	

LEXUS 6 & V6					
2499cc DOHC (4GRFSE) 24 Valve	2008-06		1st Bolts 1-8 27 , 2nd Bolts 1-8 turn 90 degrees, 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 9-10 22	262	
2507cc DOHC (2VZFE) 24 Valve	1991-90	●	1st 12 point bolts 25 , 2nd 12 point bolts turn 90 degrees, 3rd 12 point bolts turn 90 degrees, 4th recessed bolts 13	112	

ENGINE	YEARS		FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
LEXUS 6 & V6 (CONT.)					
2958cc DOHC (3VZFE) 24 Valve	1993-92	●	1st 12 point bolts 25 , 2nd 12 point bolts turn 90 degrees, 3rd 12 point bolts turn 90 degrees, 4th recessed bolts 13	112	
2995cc DOHC (3GRFSE) 24 Valve	2006		1st Bolts 1-8 27 , 2nd Bolts 1-8 turn 90 degrees, 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 9-10 22	262	
2995cc DOHC (1MZFE) 24 Valve	2003-94		1st 12 point bolts 40 , 2nd 12 point bolts turn 90 degrees, 3rd recessed bolts 13	120	ES 71036
2997cc DOHC (2JZGE) 24 Valve	2005-92	●○	1st 26 , 2nd turn 90 degrees, 3rd turn 90 degrees	92	ES 72213
3311cc DOHC (3MZFE) 24 Valve	2006-04	●	1st 12 point bolts 40 , 2nd 12 point bolts turn 90 degrees, 3rd recessed bolts 13	120	
3311cc DOHC (3MZFXE) 24 Valve Hybrid	2008-06	●	1st 12 point bolts 40 , 2nd 12 point bolts turn 90 degrees, 3rd recessed bolts 13	120	
3456cc DOHC (2GRFE) 24 Valve	2008-07	●○	1st Bolts 1-8 27 , 2nd Bolts 1-8 turn 90 degrees, 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 9-10 22	262	ES 72249
3456cc DOHC (2GRFSE) 24 Valve	2008-06	●○	1st Bolts 1-8 27 , 2nd Bolts 1-8 turn 90 degrees, 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 9-10 22	262	ES 72249
3456cc DOHC (2GRFSE) 24 Valve Hybrid	2008-07	●○	1st Bolts 1-8 27 , 2nd Bolts 1-8 turn 90 degrees, 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 9-10 22	262	ES 72249
4476cc DOHC (1FZFE) 24 Valve	1997-96		1st 29 , 2nd turn 90 degrees, 3rd turn 90 degrees	92	

LEXUS V8					
3968cc DOHC (1UZFE) 32 Valve	2000-98	●○	1st 29 , 2nd turn 90 degrees	164	ES 72202
3968cc DOHC (1UZFE) 32 Valve	1997-90	●	1st 29 , 2nd turn 90 degrees	164	
4293cc DOHC (3UZFE) 32 Valve	2008-01	●○	1st 44 , 2nd turn 90 degrees	205	ES 72202
4608cc DOHC (1URSFE) 32 Valve	2008-07		1st 27 , 2nd turn 90 degrees, 3rd turn 90 degrees	236	
4663cc DOHC (2UZFE) 32 Valve	2008-05	●○	1st 30 , 2nd turn 90 degrees, 3rd turn 90 degrees	164	ES 74035
4663cc DOHC (2UZFE) 32 Valve	2004-98	●○	1st 24 , 2nd turn 90 degrees, 3rd turn 90 degrees	164	ES 74035
4968cc DOHC (2URSFE) 32 Valve Hybrid	2008-07		1st Bolts 1-10 27 , 2nd Bolts 1-10 turn 90 degrees, 3rd Bolts 1-10 turn 90 degrees; 4th Bolts 11-12 15	263	
5663cc DOHC (3URFE) 32 Valve	2008		1st Bolts 1-10 27 , 2nd Bolts 1-10 turn 90 degrees, 3rd Bolts 1-10 turn 90 degrees; 4th Bolts 11-12 15	264	

LINCOLNSEE FORD PRODUCTS

LOTUS 4					
948cc OHV Austin	1961-58		40	54	
1588cc DOHC Turbo (4XE1W-T) 16 Valve Isuzu	1993-90	●	1st 29 , 2nd 58	100	
1796cc DOHC (2ZZGE) 16 Valve Toyota	2007-04	●○	1st 26 , 2nd turn 90 degrees, 3rd turn 90 degrees	99	ES 71066



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ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
MARCOS 6				
2980cc OHV (B30A) Volvo	1972-70	61-69	2	
MAZDA 4				
1272cc SOHC (TC) 8 Valve	1978-76	Cold 47-51, Warm 51-54	37	
1415cc SOHC (UC) 8 Valve	1980-79	Cold 47-51, Warm 51-54	149	
1489cc DOHC (Z5-DE) 16 Valve	1998-95	● 1st 13-16, 2nd turn 90 degrees, 3rd turn 90 degrees	150	
1490cc SOHC (D5) 8 Valve	1986-81	56-59	150	
1490cc SOHC (E5) 8 Valve	1986-81	● 56-59	150	
1586cc SOHC (NA) 8 Valve	1977-70	● 1st 20, 2nd 40, 3rd 56-60, 4th warm engine, 5th 69-72	37	
1597cc SOHC (B6) 8 Valve	1995-86	● 56-60 in three steps	150	
1597cc SOHC (B6) 16 Valve	1993-92	● 56-60 in three steps	150	
1597cc DOHC (ZM-DE) 16 Valve	2003-99	1st 13-16, 2nd turn 85-95 degrees, 3rd turn 85-95 degrees	150	
1597cc DOHC (B6-ZE) 16 Valve	1996-90	● 56-60 in three steps	150	
1597cc DOHC Turbo (B6-T) 16 Valve	1989-88	● 56-60 in three steps	150	
1796cc SOHC (VB) 8 Valve	1978-77	● 1st 20, 2nd 40, 3rd 56-60, 4th warm engine, 5th 69-72	150	
1796cc SOHC (VB) 8 Valve	1973-72	● 1st 20, 2nd 40, 3rd 56-60, 4th warm engine, 5th 69-72	37	
1839cc SOHC (BP-ZD) 16 Valve	1996-90	● 56-60 in three steps	150	
1839cc DOHC (BP-Z3, BP-4W) 16 Valve	2005-99	● 56-60 in three steps	150	
1839cc DOHC (FP-ZE) 16 Valve	2001-99	● 1st 13-16, 2nd turn 85-95 degrees, 3rd turn 85-95 degrees	150	
1839cc DOHC (BP-ZE) 16 Valve	1998-90	● 56-60 in three steps	150	
1839cc DOHC Turbo (BP-Z3T) 16 Valve	2005-04	● 56-60 in three steps	150	
1970cc SOHC (MA) 8 Valve	1984-82	● Cold 65-69, Warm 69-72	150	
1970cc SOHC (MA) 8 Valve	1981-79	● Cold 59-64, Warm 69-72	150	
1988cc DOHC (YF) 16 Valve Ford	2004-01 Zetec	●○ 1st 15, 2nd 30, 3rd turn 90 degrees	148	ES 72175
1991cc DOHC (FS-DE) 16 Valve	2003-98	● 1st 13-16, 2nd turn 85-95 degrees, 3rd turn 85-95 degrees	150	
1991cc DOHC (FS-DE) 16 Valve	1997-93	●○ 1st 13-16, 2nd turn 85-95 degrees, 3rd turn 85-95 degrees	150	ES 74020
1991cc DOHC Turbo (FS-DET) 16 Valve	2003	● 1st 13-16, 2nd turn 85-95 degrees, 3rd turn 85-95 degrees	150	
1998cc SOHC (FE, FEH1) 8 Valve	1987-83	● 59-64	37	
1998cc SOHC Turbo (FE-T, FEH5) 8 Valve	1987-86	● 59-64	37	
1998cc SOHC Diesel (RF) 8 Valve	1985-84	1st 21, 2nd turn 90 degrees, 3rd turn 90 degrees	150	
1999cc DOHC (LFD) 16 Valve Ford	2008-04 Duratec	●○ 1st 4, 2nd 11, 3rd 33, 4th turn 90 degrees, 5th turn 90 degrees	150	ES 72207
2184cc SOHC (F2G, F2L) 8 Valve	1993-87 Truck	● 59-64 in three steps	37	
2184cc SOHC (F2) 12 Valve	1992-88 Car	● 59-64 in three steps	37	
2184cc SOHC Turbo (F2-T) 12 Valve	1992-88 Car	● 59-64 in three steps	37	
2209cc OHV Diesel (S2) 8 Valve	1984-82	● 1st 25, 2nd 45, 3rd 80-85, 4th warm engine, 5th 80-85 again	91	
2261cc DOHC (MZR) 16 Valve Ford	2008-01 Duratec	●○ 1st 4, 2nd 11, 3rd 33, 4th turn 90 degrees, 5th turn 90 degrees	150	ES 72207
2261cc DOHC (MZR) 16 Valve Hybrid Ford	2008 Duratec	●○ 1st 4, 2nd 11, 3rd 33, 4th turn 90 degrees, 5th turn 90 degrees	150	ES 72207
2261cc DOHC Turbo (MZR-T) 16 Valve Ford	2008-06 Duratec	●○ 1st 4, 2nd 11, 3rd 33, 4th turn 90 degrees, 5th turn 90 degrees	150	ES 72207

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
MAZDA 4 (CONT.)				
2302cc SOHC (8A) 8 Valve Ford	1997-94	●○ 1st 51, 2nd 51 again, 3rd turn 90-100 degrees	17	ES 72137
2503cc SOHC (VIN C) 8 Valve Ford	2001-98	●○ 1st 51, 2nd 51 again, 3rd turn 90-100 degrees	17	ES 72137
2555cc SOHC (AM1, G54B) 8 Valve Mitsubishi	1988-87	●○ Bolts 1-10 Cold 65-72, Warm 73-79; Bolts 11-12 11-15	105	ES 72860
2606cc SOHC (G6) 12 Valve	1994-89	● Bolts 1-10 59-64; Bolts 11-12 12-17	104	
MAZDA V6				
1844cc DOHC (K8-ZE) 24 Valve	1996-92	1st 17-19, 2nd turn 90 degrees, 3rd turn 90 degrees	123	
2254cc DOHC Supercharged (EJ) 24 Valve	2002-95	1st 17-19, 2nd turn 90 degrees, 3rd turn 90 degrees	154	
2495cc DOHC (GY) 24 Valve Ford	2001-00 Duratec	●○ 1st 28-31, 2nd turn 90 degrees, 3rd loosen one turn, 4th 28-31 again, 5th turn 90 degrees, 6th turn 90 degrees	140	ES 72159
2497cc DOHC (KL-ZE) 24 Valve	2002-93	● 1st 17-19, 2nd turn 90 degrees, 3rd turn 90 degrees	123	
2954cc SOHC (JE, JE-E) 18 Valve	1999-92	● 1st 13-16, 2nd turn 90 degrees, 3rd turn 90 degrees	123	
2954cc SOHC (JE, JE-06, JE-07, JE-39) 18 Valve	1991-88	● 1st 14, 2nd turn 90 degrees, 3rd turn 90 degrees	123	
2954cc DOHC (JE-ZE, JE-48) 24 Valve	1995-92	● 1st 13-16, 2nd turn 90 degrees, 3rd turn 90 degrees	123	
2954cc DOHC (JE-ZE, JE-27) 24 Valve	1991-90	● 1st 14, 2nd turn 90 degrees, 3rd turn 90 degrees	123	
2967cc DOHC (ADJ, AJ, MZI) 24 Valve Ford	2008-01 Duratec	●○ 1st 30, 2nd turn 90 degrees, 3rd loosen one turn, 4th 30 again, 5th turn 90 degrees, 6th turn 90 degrees	140	ES 72159
2982cc OHV (8U) 12 Valve Ford	2008-99	●○ 1st 36-39, 2nd loosen one turn, 3rd 20-24, 4th turn 85-95 degrees, 5th turn 85-95 degrees	141	ES 72136 ES 72174
2982cc OHV (8U) 12 Valve Ford	1998-94	●○ 1st 59, 2nd loosen one turn, 3rd 37, 4th 68	141	ES 72136 ES 72174
3496cc DOHC 24 Valve Ford	2007 Duratec	1st Bolts 1-8 15, 2nd Bolts 1-8 26, 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 1-8 turn 90 degrees, 5th Bolts 1-8 turn 90 degrees, 6th Bolt 9 7.5	234	
3721cc DOHC 24 Valve Ford	2008 Duratec	1st Bolts 1-8 15, 2nd Bolts 1-8 26, 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 1-8 turn 90 degrees, 5th Bolts 1-8 turn 90 degrees, 6th Bolt 9 7.5	234	
4015cc OHV (8X) 12 Valve Ford	2000-95	●○ 1st 23, 2nd 53, 3rd turn 90 degrees	217	ES 72794
4015cc OHV (ZZL, 8X) 12 Valve Ford	1994-91	●○ INSTALL HEAD BOLTS AND LOWER INTAKE BOLTS TOGETHER (TORQUE ALTERNATELY): Head bolts 1st 44, 2nd 59, 3rd turn 80-85 degrees; Lower intake bolts 1st 3-6, 2nd 6-11, 3rd 11-15, 4th 15-18	102	ES 72794
4015cc SOHC (VIN E) 12 Valve Ford	2008-05	●○ 1st M12 Bolts 1-8 9, 2nd M12 Bolts 1-8 18, 3rd M8 Bolts 9-10 24, 4th M12 Bolts 1-8 turn 90 degrees, 5th M12 Bolts 1-8 turn 90 degrees	218	ES 72171
4015cc SOHC (VIN E) 12 Valve Ford	2004-02	●○ 1st M12 Bolts 1-8 24, 2nd M8 Bolts 9-10 24, 3rd M12 Bolts 1-8 turn 80 degrees, 4th M12 Bolts 1-8 turn 80 degrees	218	ES 72171
4015cc SOHC (VIN E) 12 Valve Ford	2001	●○ 1st M12 Bolts 1-8 28, 2nd M8 Bolts 9-10 28, 3rd M12 Bolts 1-8 turn 90 degrees, 4th M12 Bolts 1-8 turn 90 degrees	218	ES 72171



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ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
MERCEDES-BENZ 4				
1796cc DOHC Supercharged (111.983) 16 Valve	2005-03	1st Bolts 1-10 40 , 2nd Bolts 1-10 turn 90 degrees, 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 11-14 13 , 5th Bolts 11-14 turn 90 degrees	237	
2199cc DOHC (111.961) 16 Valve	1996-94	1st Bolts 1-10 40 , 2nd Bolts 1-10 turn 90 degrees, 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 11-14 13 , 5th Bolts 11-14 turn 90 degrees	237	
2295cc DOHC (111.974) 16 Valve	1998-97 ●	1st Bolts 1-10 40 , 2nd Bolts 1-10 turn 90 degrees, 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 11-14 13 , 5th Bolts 11-14 turn 90 degrees	237	
2295cc DOHC Supercharged (111.973, 111.975, 111.983) 16 Valve	2005-98	1st Bolts 1-10 40 , 2nd Bolts 1-10 turn 90 degrees, 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 11-14 13 , 5th Bolts 11-14 turn 90 degrees	237	
2298cc SOHC (102.985) 8 Valve	1993-91	1st Bolts 1-10 40 , 2nd Bolts 1-10 turn 90 degrees, 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 11-14 21	238	
2298cc SOHC (102.961, 102.985) 8 Valve	1988-84 ●	1st Bolts 1-10 40 , 2nd Bolts 1-10 turn 90 degrees, 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 11-14 21	238	
MERCEDES-BENZ 5				
2686cc DOHC Turbo Diesel (602.984) 20 Valve	2007-02 ●○	1st Bolts 1-12 12 , 2nd Bolts 13-14 15 , 3rd Bolts 1-12 45 , 4th Bolts 13-14 15 again, 5th Bolts 1-12 turn 90 degrees, 6th Bolts 1-12 turn 90 degrees	255	ES 71233
MERCEDES-BENZ 6 & V6				
2496cc DOHC (272.920) 24 Valve	2007-06	1st Bolts 1-8 15 , 2nd Bolts 1-8 30 , 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 1-8 turn 90 degrees; 5th Bolts 9-12 12 , 6th Bolts 9-12 turn 90 degrees	239	
2597cc SOHC (112.912, 112.916) 18 Valve	2005-01	1st Bolts 1-8 7.5 , 2nd Bolts 1-8 22 , 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 1-8 turn 90 degrees; 5th Bolts 9-12 15	240	
2599cc SOHC (103.940, 103.942) 12 Valve	1993-87 ●	1st 40 , 2nd turn 90 degrees, 3rd turn 90 degrees	39	
2799cc SOHC (112.920) 18 Valve	2000-98	1st Bolts 1-8 7.5 , 2nd Bolts 1-8 22 , 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 1-8 turn 90 degrees; 5th Bolts 9-12 15	240	
2799cc DOHC (104.941, 104.942, 104.961) 24 Valve	1997-93 ●	1st 40 , 2nd turn 90 degrees, 3rd turn 90 degrees	39	
2962cc SOHC (103.981, 103.983, 103.985) 12 Valve	1993-86 ●	1st 40 , 2nd turn 90 degrees, 3rd turn 90 degrees	39	
2962cc DOHC (104.980, 104.981) 24 Valve	1993-90	1st 40 , 2nd turn 90 degrees, 3rd turn 90 degrees	39	
2987cc DOHC Turbo Diesel (642.920, 642.940) 24 Valve	2008-07 Bluetec	1st Bolts 1-8 44 , 2nd Bolts 9-10 15 , 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 9-10 15 again, 5th Bolts 1-8 turn 90 degrees	242	

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
MERCEDES-BENZ 6 & V6 (CONT.)				
2996cc DOHC (272.940, 272.941, 272.942) 24 Valve	2008-06	1st Bolts 1-8 15 , 2nd Bolts 1-8 30 , 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 1-8 turn 90 degrees; 5th Bolts 9-12 12 , 6th Bolts 9-12 turn 90 degrees	239	
2996cc DOHC Diesel (606.912) 24 Valve	1997-94	1st Bolts 1-26 12 , 2nd Bolts 1-26 26 , 3rd Bolts 1-26 turn 90 degrees, 4th wait 10 minutes, 5th Bolts 1-26 turn 90 degrees; 6th Bolts 27-30 18	243	
2996cc DOHC Turbo Diesel (606.962) 24 Valve	1999-98	1st Bolts 1-26 12 , 2nd Bolts 1-26 26 , 3rd Bolts 1-26 turn 90 degrees, 4th wait 10 minutes, 5th Bolts 1-26 turn 90 degrees; 6th Bolts 27-30 18	243	
3199cc SOHC (112.946, 112.947, 112.953, 112.955) 18 Valve	2005-01	1st Bolts 1-8 7.5 , 2nd Bolts 1-8 22 , 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 1-8 turn 90 degrees; 5th Bolts 9-12 15	240	
3199cc SOHC (112.940, 112.941, 112.942) 18 Valve	2005-98	1st Bolts 1-8 7.5 , 2nd Bolts 1-8 22 , 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 1-8 turn 90 degrees; 5th Bolts 9-12 15	240	
3199cc DOHC (104.991, 104.994, 104.995) 24 Valve	1999-94 ●	1st 40 , 2nd turn 90 degrees, 3rd turn 90 degrees	39	
3199cc DOHC (104.990, 104.992) 24 Valve	1995-92 ●	1st 40 , 2nd turn 90 degrees, 3rd turn 90 degrees	39	
3199cc SOHC Supercharged (112.960) 18 Valve	2004-02	1st Bolts 1-8 7.5 , 2nd Bolts 1-8 22 , 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 1-8 turn 90 degrees; 5th Bolts 9-12 15	240	
3222cc DOHC Turbo Diesel (648.961) 24 Valve	2006-05	1st Bolts 1-14 12 , 2nd Bolts 15-16 15 , 3rd Bolts 1-14 45 , 4th Bolts 15-16 15 again, 5th Bolts 1-14 turn 90 degrees, 6th Bolts 1-14 turn 90 degrees	244	
3498cc DOHC (272.056, 272.087) 24 Valve	2008-06	1st Bolts 1-8 15 , 2nd Bolts 1-8 30 , 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 1-8 turn 90 degrees; 5th Bolts 9-12 12 , 6th Bolts 9-12 turn 90 degrees	239	
3498cc DOHC (272.960) 24 Valve	2008-06	1st Bolts 1-8 15 , 2nd Bolts 1-8 30 , 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 1-8 turn 90 degrees; 5th Bolts 9-12 12 , 6th Bolts 9-12 turn 90 degrees	239	
3498cc DOHC (272.963, 272.964, 272.967, 272.972) 24 Valve	2008-05	1st Bolts 1-8 15 , 2nd Bolts 1-8 30 , 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 1-8 turn 90 degrees; 5th Bolts 9-12 12 , 6th Bolts 9-12 turn 90 degrees	239	
3606cc DOHC (104.941) 24 Valve	1997-95 ●	1st 40 , 2nd turn 90 degrees, 3rd turn 90 degrees	39	
3724cc SOHC (112.M37, 112.972) 18 Valve	2006-03	1st Bolts 1-8 7.5 , 2nd Bolts 1-8 22 , 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 1-8 turn 90 degrees; 5th Bolts 9-12 15	240	



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TORQUE TABLES™

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
MERCEDES-BENZ V8				
4196cc SOHC (116.965) 16 Valve	1991-86	1st Bolts 1-10 40 , 2nd Bolts 1-10 turn 90 degrees, 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 11-13 18.5	245	
4196cc DOHC (119.971, 119.975, 119.981) 32 Valve	1999-92 ●	1st Bolts 1-10 40 , 2nd Bolts 1-10 turn 90 degrees, 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 11-13 18.5	245	
4266cc SOHC (113.941, 113.948) 24 Valve	2006-00	1st Bolts 1-10 7.5 , 2nd Bolts 1-10 22 , 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 1-10 turn 90 degrees; 5th Bolts 11-14 15	241	
4266cc SOHC (113.940, 113.942, 113.943, 113.944) 24 Valve	2003-98	1st Bolts 1-10 7.5 , 2nd Bolts 1-10 22 , 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 1-10 turn 90 degrees; 5th Bolts 11-14 15	241	
4663cc DOHC (273.923) 32 Valve	2008-07	1st Bolts 1-10 15 , 2nd Bolts 1-10 30 , 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 1-10 turn 90 degrees; 5th Bolts 11-14 12 , 6th Bolts 11-14 turn 90 degrees	246	
4966cc SOHC (113.960, 113.961) 24 Valve	2008-99	1st Bolts 1-10 7.5 , 2nd Bolts 1-10 22 , 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 1-10 turn 90 degrees; 5th Bolts 11-14 15	241	
4966cc SOHC (113.965, 113.966, 113.969) 24 Valve	2006-02	1st Bolts 1-10 7.5 , 2nd Bolts 1-10 22 , 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 1-10 turn 90 degrees; 5th Bolts 11-14 15	241	
4973cc DOHC (119.970, 119.980, 119.982) 32 Valve	1999-92 ●	1st Bolts 1-10 40 , 2nd Bolts 1-10 turn 90 degrees, 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 11-13 18.5	245	
4973cc DOHC (119.960, 119.972, 119.974) 32 Valve	1995-90 ●	1st Bolts 1-10 40 , 2nd Bolts 1-10 turn 90 degrees, 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 11-13 18.5	245	
5439cc SOHC (113.982, 113.984, 113.988, 113.989) 24 Valve	2008-01	1st Bolts 1-10 7.5 , 2nd Bolts 1-10 22 , 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 1-10 turn 90 degrees; 5th Bolts 11-14 15	241	
5439cc SOHC (113.980, 113.981) 24 Valve	2003-99	1st Bolts 1-10 7.5 , 2nd Bolts 1-10 22 , 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 1-10 turn 90 degrees; 5th Bolts 11-14 15	241	
5439cc SOHC Supercharged (113.980, 113.982, 113.987, 113.992) 24 Valve	2008-03	1st Bolts 1-10 7.5 , 2nd Bolts 1-10 22 , 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 1-10 turn 90 degrees; 5th Bolts 11-14 15	241	
5439cc SOHC Supercharged (155.980) 24 Valve	2008-03	1st Bolts 1-10 7.5 , 2nd Bolts 1-10 22 , 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 1-10 turn 90 degrees; 5th Bolts 11-14 15	241	
5461cc DOHC (273.960, 273.961, 273.962) 32 Valve	2008-07	1st Bolts 1-10 15 , 2nd Bolts 1-10 30 , 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 1-10 turn 90 degrees; 5th Bolts 11-14 12 , 6th Bolts 11-14 turn 90 degrees	246	

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
MERCEDES-BENZ V8 (CONT.)				
5461cc DOHC (273.965, 273.967) 32 Valve	2008-07	1st Bolts 1-10 15 , 2nd Bolts 1-10 30 , 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 1-10 turn 90 degrees; 5th Bolts 11-14 12 , 6th Bolts 11-14 turn 90 degrees	246	
6208cc DOHC (156.980, 156.982, 156.983, 156.984) 32 Valve	2008-07	1st Bolts 1-10 7.5 , 2nd Bolts 1-10 37 , 3rd Bolts 1-10 turn 90 degrees, 4th Bolts 1-10 turn 90 degrees; 5th Bolts 1-10 turn 90 degrees, 6th Bolts 11-14 15	241	
MERCEDES-BENZ V12				
5987cc DOHC (120.980, 120.981, 120.982, 120.983) 48 Valve	2002-92	1st 40 , 2nd turn 90 degrees, 3rd turn 90 degrees	247	
MERCURYSEE FORD PRODUCTS				
MERKURSEE FORD PRODUCTS				
METROPOLITAN 4				
1198cc OHV	1957-54	45	182	
1489cc OHV	1962-56	45	182	
MG 4				
948cc OHV	1962-61	40	54	
1098cc OHV	1968-62	46	54	
1275cc OHV	1974-67	46 in three steps	54	
1489cc OHV	1961-54	45	182	
1493cc OHV	1979-75	46 in three steps	42	
1588cc OHV	1961-59	45	182	
1622cc OHV	1968-61	45	182	
1798cc OHV	1981-61	45-50 in three steps	55	
MG V8				
3528cc OHV	1977-75 ●	Bolts 1-10 65-70 ; Bolts 11-14 40-45	24	
MINI 4				
1598cc SOHC (W10B16) 16 Valve BMW Tritec	2008-02	1st Bolts 1-10 30 , 2nd Bolts 1-10 turn 90 degrees, 3rd Bolts 11-12 21	248	
1598cc SOHC Supercharged (W11B16) 16 Valve BMW Tritec	2008-02	1st Bolts 1-10 30 , 2nd Bolts 1-10 turn 90 degrees, 3rd Bolts 11-12 21	248	
MITSUBISHI 4				
1468cc SOHC (G4DJ, 4G15) 8 Valve	1994-89 ●	51-54 in three steps	81	
1468cc SOHC (G4AJ, G15B) 8 Valve	1989-85 ●	51-54 in three steps	81	
1468cc SOHC (4G15) 12 Valve	2002-97 ●○	1st 36 , 2nd loosen all bolts, 3rd 15 , 4th turn 90 degrees, 5th turn 90 degrees	71	ES 71206
1468cc SOHC (4G15) 12 Valve	1996-91 ●○	53 in three steps	71	ES 71206
1595cc DOHC (4G61) 16 Valve	1992-90 ●	Cold 65-72 in three steps	81	
1595cc DOHC Turbo (4G61-T) 16 Valve	1989 ●	Cold 65-72 in three steps	81	
1597cc SOHC Turbo (G32B-T) 8 Valve	1988-85 ●	51-54 in three steps	81	
1755cc SOHC (4G37) 8 Valve	1994-89 ●○	53 in three steps	81	ES 71174 ES 71175



TORQUE TABLES™



TORQUE TABLES™

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
MITSUBISHI 4 (CONT.)				
1795cc SOHC (G62B) 8 Valve	1983	Cold 65-72, Warm 73-79	71	
1795cc SOHC Turbo (G62B-T) 8 Valve	1988-84	Cold 65-72, Warm 73-79	71	
1834cc SOHC (4G93) 16 Valve	2002-97	1st 54, 2nd loosen all bolts, 3rd 15, 4th turn 90 degrees, 5th turn 90 degrees	71	ES 71209
1834cc SOHC (4G93) 16 Valve	1996-93	1st 14.5, 2nd turn 90 degrees, 3rd turn 90 degrees	71	ES 71209
1834cc SOHC (4G93) 16 Valve	1992	1st 54, 2nd loosen all bolts, 3rd 15, 4th turn 90 degrees, 5th turn 90 degrees	71	ES 71209
1996cc DOHC (A588, 420A) 16 Valve Chrysler	1999-95	1st Long bolts 25; Short bolts 20, 2nd Long bolts 50; Short bolts 20, 3rd Long bolts 50; Short bolts 20, 4th all bolts turn 90 degrees	37	ES 72166
1997cc SOHC (4G63) 16 Valve	1993	1st 58, 2nd loosen all bolts, 3rd 15, 4th turn 90 degrees, 5th turn 90 degrees	71	
1997cc SOHC (G63B, 4G63) 8 Valve	1992-83	Cold 65-72, Warm 73-79	71	
1997cc DOHC (4G63) 16 Valve	1994-93	1st 58, 2nd loosen all bolts, 3rd 15, 4th turn 90 degrees, 5th turn 90 degrees	71	ES 71175
1997cc DOHC (4G63) 16 Valve	1992-89	Cold 65-72, Warm 73-79	81	ES 71175
1997cc DOHC Turbo (4G63-T) 16 Valve	1999-95	1st 58, 2nd loosen all bolts, 3rd 15, 4th turn 90 degrees, 5th turn 90 degrees	71	ES 71177
1997cc DOHC Turbo (4G63-T) 16 Valve	1994-93	1st 58, 2nd loosen all bolts, 3rd 15, 4th turn 90 degrees, 5th turn 90 degrees	71	ES 71175
1997cc DOHC Turbo (4G63-T) 16 Valve	1992-89	Cold 65-72, Warm 73-79	81	ES 71175
1999cc SOHC (4G94) 16 Valve	2007-02	1st 54, 2nd loosen all bolts, 3rd 15, 4th turn 90 degrees, 5th turn 90 degrees	71	
1999cc DOHC Turbo (4G94-T) 16 Valve	2007-03	1st 54, 2nd loosen all bolts, 3rd 15, 4th turn 90 degrees, 5th turn 90 degrees	71	
2346cc SOHC Turbo Diesel (4D55-T) 8 Valve	1985-83	Cold 76-83, Warm 84-90	43	
2351cc SOHC (4G64) 8 Valve	1996-93	1st 58, 2nd loosen all bolts, 3rd 15, 4th turn 90 degrees, 5th turn 90 degrees	71	
2351cc SOHC (G64B, 4G64) 8 Valve	1992-85	Cold 65-72, Warm 73-79	71	
2351cc SOHC (4G64) 16 Valve	2005-00	1st 58, 2nd loosen all bolts, 3rd 15, 4th turn 90 degrees, 5th turn 90 degrees	71	ES 71177
2351cc SOHC (4G64) 16 Valve	1999-93	1st 58, 2nd loosen all bolts, 3rd 15, 4th turn 90 degrees, 5th turn 90 degrees	71	
2351cc DOHC (4G64) 16 Valve	1997-94	1st 58, 2nd loosen all bolts, 3rd 15, 4th turn 90 degrees, 5th turn 90 degrees	71	
2378cc SOHC (4G69) 16 Valve	2008-04	1st 58, 2nd loosen all bolts, 3rd 15, 4th turn 90 degrees, 5th turn 90 degrees	71	
2555cc SOHC (G54B) 8 Valve	1989-83	Bolts 1-10 Cold 65-72, Warm 73-79; Bolts 11 11-15	38	ES 72860
2555cc SOHC Turbo (G54B-T) 8 Valve	1989-83	Bolts 1-10 Cold 65-72, Warm 73-79; Bolts 11 11-15	38	ES 72860
3907cc OHV Turbo Diesel (4D34-T, 4D34-T3) 8 Valve	1999-92	145	187	
MITSUBISHI V6				
2497cc SOHC (6G73) 24 Valve	1998	Cold 80 in three steps	154	ES 72859
2497cc SOHC (6G73) 24 Valve	1997-95	Cold 80 in three steps	154	
2972cc SOHC (6G72) 12 Valve	1999-93	1st 76-83 in three steps, 2nd loosen all bolts, 3rd 76-83 in three steps again	154	ES 72859
2972cc SOHC (6G72) 12 Valve	1992-88	65-72 in three steps	154	ES 72859

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
MITSUBISHI V6 (CONT.)				
2972cc SOHC (6G72) 24 Valve	2005-95	1st 76-83 in three steps, 2nd loosen all bolts, 3rd 76-83 in three steps again	154	ES 72859
2972cc DOHC (6G72) 24 Valve	1999-93	1st 76-83 in three steps, 2nd loosen all bolts, 3rd 76-83 in three steps again	154	ES 72859
2972cc DOHC (6G72) 24 Valve	1992-91	76-83 in three steps	154	ES 72859
2972cc DOHC Turbo (6G72-T) 24 Valve	1999-93	1st 87-94 in three steps, 2nd loosen all bolts, 3rd 87-94 in three steps again	154	ES 72859
2972cc DOHC Turbo (6G72-T) 24 Valve	1992-91	87-94 in three steps	154	ES 72859
2998cc SOHC (6B31) 24 Valve	2008-07	1st 33, 2nd turn 75 degrees, 3rd turn 75 degrees	154	
3497cc SOHC (6G74) 24 Valve	2005-97	76-83 in three steps	154	ES 72859
3497cc DOHC (6G74) 24 Valve	1996-94	76-83 in three steps	154	
3704cc SOHC (VIN K) 12 Valve Dodge Truck	2008-06	1st M11 Bolts 1-8 20, 2nd M11 Bolts 1-8 20 again, 3rd M8 Bolts 9-12 10, 4th M11 Bolts 1-8 turn 90 degrees, 5th M11 Bolts 1-8 turn 90 degrees, 6th M8 Bolts 9-12 19	204	ES 71129-1
3828cc SOHC (6G75) 24 Valve	2008-03	76-83 in three steps	154	
MITSUBISHI V8				
4703cc SOHC (VIN N) 16 Valve Dodge Truck	2008	1st M11 Bolts 1-10 20, 2nd M11 Bolts 1-10 20 again, 3rd M8 Bolts 11-14 10, 4th M11 Bolts 1-10 turn 90 degrees, 5th M11 Bolts 1-10 turn 90 degrees, 6th M8 Bolts 11-14 19	163	ES 71129
4703cc SOHC (VIN N) 16 Valve Dodge Truck	2007-06	1st M11 Bolts 1-10 15, 2nd M11 Bolts 1-10 35, 3rd M8 Bolts 11-14 18, 4th M11 Bolts 1-10 turn 90 degrees, 5th M8 Bolts 11-14 22	163	ES 71129
MORGAN 4				
1597cc SOHC (8 Valve) Ford	1994-82	1st 44, 2nd turn 90 degrees, 3rd turn 90 degrees	36	ES 72672
MORGAN V8				
3528cc OHV Rover	1971-68	Bolts 1-10 65-70; Bolts 11-14 40-45	24	
MORRIS 4				
803cc OHV	1956-52	40	54	
948cc OHV	1962-56	40	54	
1098cc OHV	1971-62	46	54	
1489cc OHV	1961-54	45	182	
1622cc OHV	1971-61	45	182	
NASH SEE AMERICAN MOTORS				
NAVISTAR SEE INTERNATIONAL				
NISSAN 4				
988cc OHV (A10) 8 Valve	1971-65	35	40	
1171cc OHV (A12) 8 Valve	1973	42	40	
1171cc OHV (A12) 8 Valve	1972-71	35	40	
1237cc OHV (A12A) 8 Valve	1982-79	53	40	



TORQUE TABLES™



TORQUE TABLES™

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
NISSAN 4 (CONT.)				
1288cc OHV (A13) 8 Valve	1974-72	53	40	
1397cc OHV (A14) 8 Valve	1982-75	53	40	
1487cc OHV (A15) 8 Valve	1982-79	53	40	
1487cc SOHC (E15) 8 Valve	1983-82	1st 29-33, 2nd 51-54	42	
1487cc SOHC Turbo (E15ET, E15T) 8 Valve	1984-83	1st 29-33, 2nd 51-54	42	
1595cc SOHC (L16) 8 Valve	1973-68	43	40	
1597cc SOHC (E16I, E16S) 8 Valve	1988-86	1st 22, 2nd 51, 3rd loosen all bolts, 4th 22 again, 5th 51-54	42	ES 74024
1597cc SOHC (E16) 8 Valve	1987-83	1st 22, 2nd 51, 3rd loosen all bolts, 4th 22 again, 5th 51-54	42	
1597cc SOHC (GA16I) 12 Valve	1990-89	1st Bolts 1-10 22, 2nd Bolts 1-10 47, 3rd loosen all bolts, 4th Bolts 1-10 22 again, 5th Bolt 1 turn 80-85 degrees; Bolts 2-10 turn 60-65 degrees, 6th Bolts 11-15 4.6-6.1	113	ES 74025
1597cc DOHC (GA16DE) 16 Valve	1999-91	1st Bolts 1-10 22, 2nd Bolts 1-10 43, 3rd loosen all bolts, 4th Bolts 1-10 22 again, 5th Bolts 1-10 turn 50-55 degrees, 6th Bolts 11-15 4.6-6.1	113	
1598cc DOHC (CA16DE) 16 Valve	1987	1st 22, 2nd 76, 3rd loosen all bolts, 4th 22 again, 5th 76	36	
1680cc SOHC Diesel (CD17) 8 Valve	1987-83	1st 43-51, 2nd 72-80	36	
1769cc DOHC (QG18DE) 16 Valve	2006-00	1st Bolts 1-10 22, 2nd Bolts 1-10 43, 3rd loosen all bolts, 4th Bolts 1-10 22 again, 5th Bolts 1-10 turn 50-55 degrees, 6th Bolts 11-14 4.6-6.1	206	ES 72203
1770cc SOHC (L18) 8 Valve	1974-73	54	40	
1797cc DOHC (MR18DE) 16 Valve	2008-07	1st 30, 2nd turn 100 degrees, 3rd loosen all bolts, 4th 30 again, 5th turn 100 degrees, 6th turn 100 degrees	80	
1809cc DOHC (CA18DE) 16 Valve	1990-88	1st 22, 2nd 76, 3rd loosen all bolts, 4th 22 again, 5th 76	36	
1809cc SOHC Turbo (CA18ET) 8 Valve	1987-84	1st 22, 2nd 58, 3rd loosen all bolts, 4th 22 again, 5th 54-61	79	ES 74023
1952cc SOHC (Z20) 8 Valve	1987-83	1st 22, 2nd 58, 3rd loosen all bolts, 4th 22 again, 5th 54-61	79	
1952cc SOHC (Z20E, Z20S) 8 Valve	1981-80	58	79	
1952cc SOHC (L20B) 8 Valve	1980-74	54	40	
1974cc SOHC (CA20E) 8 Valve	1989-84	1st 22, 2nd 58, 3rd loosen all bolts, 4th 22 again, 5th 54-61	79	
1974cc SOHC (CA20S) 8 Valve	1986-82	1st 22, 2nd 58, 3rd loosen all bolts, 4th 22 again, 5th 54-61	79	
1998cc DOHC (MR20DE) 16 Valve	2008-07	1st 30, 2nd turn 100 degrees, 3rd loosen all bolts, 4th 30 again, 5th turn 100 degrees, 6th turn 100 degrees	80	
1998cc DOHC (SR20DE) 16 Valve	2001-91	1st 29, 2nd 58, 3rd loosen all bolts, 4th 25-33, 5th turn 90-95 degrees, 6th turn 90-95 degrees	109	ES 72192
2164cc OHV Diesel (SD22) 8 Valve	1983-81	Main bolts 87-108; Sub bolts 36-47	50	
2187cc SOHC (Z22E, Z22S) 8 Valve	1983-81	58	79	

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
NISSAN 4 (CONT.)				
2389cc SOHC (Z24, Z24I, Z24S) 8 Valve	1990-83	1st 22, 2nd 58, 3rd loosen all bolts, 4th 22 again, 5th 54-61	79	ES 74026
2389cc SOHC (KA24E) 12 Valve	1997-89	1st 22, 2nd 58, 3rd loosen all bolts, 4th 22 again, 5th 54-61; OR turn 80-85 degrees	80	ES 74026
2389cc DOHC (KA24DE) 16 Valve	2004-98 Truck	1st 22, 2nd 59, 3rd loosen all bolts, 4th 18-25, 5th turn 55-62; OR turn 86-91 degrees	80	ES 72231
2389cc DOHC (KA24DE) 16 Valve	2001-91 Car	1st 22, 2nd 59, 3rd loosen all bolts, 4th 18-25, 5th turn 55-62; OR turn 86-91 degrees	80	
2488cc DOHC (QR25DE) 16 Valve	2008-07 Car	1st 72, 2nd loosen all bolts, 3rd 29, 4th turn 75 degrees, 5th turn 75 degrees	80	
2488cc DOHC (QR25DE) 16 Valve	2006-04 Car	1st 37, 2nd turn 60 degrees, 3rd loosen all bolts, 4th 32, 5th turn 75-80 degrees, 6th turn 75-80 degrees	80	ES 72198
2488cc DOHC (QR25DE) 16 Valve	2003-02 Car	1st 72, 2nd loosen all bolts, 3rd 25-33, 4th turn 75-80 degrees, 5th turn 75-80 degrees	80	ES 72198
2488cc DOHC (QR25DE) 16 Valve	2008-05 Truck	1st 37, 2nd turn 60 degrees, 3rd loosen all bolts, 4th 29, 5th turn 75 degrees, 6th turn 75 degrees	80	ES 72198
2488cc DOHC (QR25DE) 16 Valve Hybrid	2008-07 Car	1st 72, 2nd loosen all bolts, 3rd 29, 4th turn 75 degrees, 5th turn 75 degrees	80	
2488cc OHV Diesel (SD25) 8 Valve	1986-83	Main bolts 87-94; Sub bolts 33-40	50	
NISSAN 6 & V6				
2393cc SOHC (L24E) 12 Valve	1984-83	62	39	
2393cc SOHC (L24E) 12 Valve	1982-77	56	39	
2393cc SOHC (L24) 12 Valve	1973-70	54	39	
2565cc SOHC (L26) 12 Valve	1974	57	39	
2753cc SOHC (L28E) 12 Valve	1983	62	39	
2753cc SOHC (L28E) 12 Valve	1982-75	56	39	
2753cc SOHC Turbo (L28ET) 12 Valve	1983	62	39	
2753cc SOHC Turbo (L28ET) 12 Valve	1982-81	56	39	
2793cc SOHC Diesel (LD28) 12 Valve	1983-81	1st 29, 2nd 43, 3rd 87-94, 4th warm engine, 5th 87-94 again	9	
2960cc SOHC (V30E, VG30, VG30E, VG30I) 12 Valve	1998-84	1st 22, 2nd 43, 3rd loosen all bolts, 4th 22 again, 5th 40-47; OR turn 60-65 degrees	85	
2960cc DOHC (VG30D, VG30DE) 24 Valve	1996-92	1st 29, 2nd 90, 3rd loosen all bolts, 4th 25-33, 5th 90; OR turn 60-70 degrees	161	
2960cc DOHC (VG30D, VG30DE) 24 Valve	1991-90	1st 29, 2nd 90, 3rd loosen all bolts, 4th 25-33, 5th 90; OR turn 60-70 degrees	114	
2960cc DOHC (VE30DE) 24 Valve	1994-92	1st 29, 2nd 90, 3rd loosen all bolts, 4th 25-33, 5th 87-94	161	
2960cc SOHC Turbo (V30ET, VG30T) 12 Valve	1989-84	1st 22, 2nd 43, 3rd loosen all bolts, 4th 22 again, 5th 40-47; OR turn 60-65 degrees	85	
2960cc DOHC Turbo (VG30DETT, VG30DTT) 24 Valve	1996-92	1st 29, 2nd 90, 3rd loosen all bolts, 4th 25-33, 5th 90; OR turn 60-70 degrees	161	
2960cc DOHC Turbo (VG30DETT, VG30DTT) 24 Valve	1991-90	1st 29, 2nd 90, 3rd loosen all bolts, 4th 25-33, 5th 90; OR turn 60-70 degrees	114	



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ENGINE	YEARS		FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
NISSAN 6 & V6 (CONT.)					
2988cc DOHC (VQ30DE) 24 Valve	2001-95	●○	1st 72, 2nd loosen all bolts, 3rd 25-33, 4th turn 90-95 degrees, 5th turn 90-95 degrees	161	ES 72900
3274cc SOHC (VG33E) 12 Valve	2004-96	●○	1st 22, 2nd 43, 3rd loosen all bolts, 4th 7, 5th 22, 6th 40-47; OR turn 60-65 degrees	162	ES 72194
3274cc SOHC Supercharged (VG33ER) 12 Valve	2004-01	●○	1st 22, 2nd 43, 3rd loosen all bolts, 4th 7, 5th 22, 6th 40-47; OR turn 60-65 degrees	162	ES 72194
3498cc DOHC (VQ35HR) 24 Valve	2008-07		1st 77, 2nd loosen all bolts, 3rd 29, 4th turn 95 degrees, 5th turn 95 degrees	161	
3498cc DOHC (VQ35DE) 24 Valve	2008-01	●○	1st 72, 2nd loosen all bolts, 3rd 25-33, 4th turn 90-95 degrees, 5th turn 90-95 degrees	161	ES 72900
3954cc DOHC (VQ40DE) 24 Valve	2008-05	●	1st 72, 2nd loosen all bolts, 3rd 25-33, 4th turn 90-95 degrees, 5th turn 90-95 degrees	161	

NISSAN V8					
5552cc DOHC (VK56DE) 32 Valve	2008-04	●	1st 72, 2nd loosen all bolts, 3rd 33, 4th turn 60 degrees, 5th turn 60 degrees	203	

OLDSMOBILE SEE GM PRODUCTS

OPEL 4					
1817cc SOHC (G180Z) 8 Valve Isuzu	1979-76	●	1st 61, 2nd 72	37	
1897cc SOHC (1.9S) 8 Valve	1975-67	●	72	56	

PACKARD L8 & V8					
288 L-Head	1954-48		63	191	
289 OHV	1958-57		55-65	170	
289 OHV Supercharged	1958-57		55-65	170	
320 OHV	1955		60-65	22	
327 L-Head	1954-48		63	191	
352 OHV	1956-55		60-65	22	
356 L-Head	1950-48		63	191	
359 L-Head	1954-53		63	191	
374 OHV	1956		60-65	22	

PANAZ V8					
281 DOHC (4.6L) 32 Valve Ford	2007-99	●○	1st 27-32, 2nd turn 85-95 degrees, 3rd loosen one turn, 4th 27-32 again, 5th turn 85-95 degrees, 6th turn 85-95 degrees	124	ES 72798
281 DOHC Supercharged (4.6L) 32 Valve Ford	2007-04	●○	1st 27-32, 2nd turn 85-95 degrees, 3rd loosen one turn, 4th 27-32 again, 5th turn 85-95 degrees, 6th turn 85-95 degrees	124	ES 71173

PEUGEOT 4					
1905cc SOHC (XU-9J2) 8 Valve	1992-89		1st 44, 2nd loosen all bolts, 3rd 15, 4th turn 300 degrees	149	
1905cc DOHC (XU-9J4) 16 Valve	1992-89		1st 44, 2nd loosen all bolts, 3rd 15, 4th turn 300 degrees	149	
1971cc OHV (XN-2, XN-6) 8 Valve	1987-80		1st 36, PERFORM THE NEXT THREE STEPS ON EACH BOLT BEFORE MOVING TO NEXT BOLT IN SEQUENCE: 1) loosen completely, 2) 14, 3) turn 90 degrees	37	

ENGINE	YEARS		FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
PEUGEOT 4 (CONT.)					
1971cc OHV (XN-1, XN-6) 8 Valve	1979-71		1st 43, 2nd 60	37	
2155cc SOHC Turbo (N9-T, N9-TE) 8 Valve Renault	1992-85		1st 36, 2nd 62	149	
2165cc SOHC (ZD-JL) 8 Valve Renault	1992-87		1st 37, 2nd 59, 3rd loosen all bolts, 4th 64-72	149	
2304cc OHV Diesel (XD-2) 8 Valve	1983-77		1st 22, 2nd 47, 3rd loosen all bolts 90 degrees, 4th 22 again, 5th 47	165	
2304cc OHV Turbo Diesel (XD-2S) 8 Valve	1986-81		1st 22, 2nd 51, 3rd loosen all bolts 90 degrees, 4th 22 again, 5th 51	165	
2498cc OHV Turbo Diesel (XD-3T) 8 Valve	1988-85		1st 22, 2nd 51, 3rd loosen all bolts 90 degrees, 4th 22 again, 5th 51	165	

PEUGEOT V6					
2664cc SOHC (ZM) 12 Valve	1978-77		1st 7, 2nd 22, 3rd 44, 4th loosen all bolts, 5th 11-14, 6th turn 116-120 degrees, 7th warm engine & allow to cool, 8th loosen all bolts, 9th 11-14 again, 10th turn 113-117 degrees	52	
2849cc SOHC (ZN, ZN-3J) 12 Valve	1990-79		1st 7, 2nd 22, 3rd 44, 4th loosen all bolts, 5th 15, 6th turn 106 degrees, 7th warm engine & allow to cool, 8th turn 45 degrees	52	

PINNINFARINA SEE FIAT

PLYMOUTH SEE CHRYSLER PRODUCTS

PONTIAC SEE GM PRODUCTS

PORSCHE 4 & HO4					
1679cc OHV Volkswagen	1973-70		23 in three steps	166	
1795cc OHV Volkswagen	1975-74		23 in three steps	166	
1970cc OHV Volkswagen	1976-73		23 in three steps	166	
1984cc SOHC (8 Valve)	1982-77	●	1st 47, 2nd turn 90 degrees, 3rd turn 90 degrees	60	
1984cc SOHC Turbo (8 Valve)	1982-80		1st 47, 2nd turn 90 degrees, 3rd turn 90 degrees	60	
2479cc SOHC (8 Valve)	1988-83		1st 14, 2nd 36, 3rd 65	17	
2479cc SOHC Turbo (8 Valve)	1988-86		1st 14, 2nd 36, 3rd 65	17	

PORSCHE HO6 & V6					
3164cc OHV	1989-84		1st 11, 2nd turn 90 degrees	167	
3189cc DOHC (24 Valve) Volkswagen	2007-04		1st 22, 2nd 37, 3rd turn 90 degrees, 4th turn 90 degrees	168	
3597cc DOHC (24 Valve) Volkswagen	2008-07		1st 22, 2nd 37, 3rd turn 90 degrees, 4th turn 90 degrees	168	

PUMA HO4					
1584cc OHV Volkswagen	1982-81		1st 11, 2nd 23	166	

RAMBLER SEE AMERICAN MOTORS

RENAULT 4					
1289cc OHV (810) 8 Valve	1979-68		1st 40, 2nd warm engine & allow to cool, 3rd 45	71	
1397cc OHV (C3J, 847) 8 Valve	1987-80	●	1st 41-44, 2nd warm engine & allow to cool, 3rd loosen 180 degrees, 4th 41-44 again	149	
1565cc OHV Turbo (A7L) 8 Valve	1985-82		1st 30, 2nd 57-61, 3rd warm engine & allow to cool, 4th 57-61 again	149	



TORQUE TABLES™



TORQUE TABLES™

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
RENAULT 4 (CONT.)				
1647cc OHV (841, 843) 8 Valve	1983-72	1st 30, 2nd 57-61, 3rd warm engine & allow to cool, 4th 57-61 again	149	
1721cc SOHC (F3N) 8 Valve	1987-85	● 1st 22, 2nd 52, 3rd loosen all bolts, 4th 15, 5th turn 123 degrees	149	
1965cc SOHC (F3R) 8 Valve	1987	● 1st 22, 2nd 52, 3rd loosen all bolts, 4th 15, 5th turn 123 degrees	149	
2165cc SOHC (J7T) 8 Valve	1989-84	1st 37, 2nd 59, 3rd loosen all bolts, 4th 64-72	149	
RILEY 4				
1489cc OHV	1960-58	45	182	
ROVER V8				
3528cc OHV	1982-68	● Bolts 1-10 65-70; Bolts 11-14 40-45	24	
SAAB 4 & H04				
1985cc SOHC (B201, B2011) 8 Valve	1988-85	● 1st 44, 2nd 66, 3rd warm engine & allow to cool, 4th loosen all bolts, 5th 44 again, 6th 66, 7th turn 90 degrees	151	
1985cc SOHC (B201, B2011) 8 Valve	1984-81	● 1st 45, 2nd 65, 3rd warm engine & allow to cool, 4th loosen all bolts, 5th 45 again, 6th 65, 7th turn 90 degrees	151	
1985cc SOHC (B20, B2011) 8 Valve	1980-79	1st 44, 2nd 70	151	
1985cc SOHC (B20) 8 Valve	1978-72	1st 44, 2nd 17mm bolts 70; 12mm & 15mm bolts 59, 3rd warm engine & allow to cool, 4th loosen all bolts, 5th 17mm bolts 70 again; 12mm & 15mm bolts 59 again, 6th 12mm & 15mm bolts turn 90 degrees	151	
1985cc DOHC (B2021) 16 Valve	1990-86 900 Series	● 1st 45, 2nd 63, 3rd warm engine & allow to cool, 4th loosen all bolts, 5th 45 again, 6th 63, 7th turn 90 degrees	151	
1985cc DOHC (B2021) 16 Valve	1990-87 9000 Series	● 1st 44, 2nd 66, 3rd warm engine & allow to cool, 4th loosen all bolts, 5th 44 again, 6th 66, 7th turn 90 degrees	151	
1985cc SOHC Turbo (B201L) 8 Valve	1984-81	● 1st 45, 2nd 65, 3rd warm engine & allow to cool, 4th loosen all bolts, 5th 45 again, 6th 65, 7th turn 90 degrees	151	
1985cc SOHC Turbo (B201L) 8 Valve	1980-78	1st 44, 2nd 70	151	
1985cc DOHC Turbo (B205L, B205R) 16 Valve	2003-99	1st 30, 2nd 44, 3rd turn 90 degrees	151	
1985cc DOHC Turbo (B204L) 16 Valve	1998-94	1st 44, 2nd 59, 3rd turn 90 degrees	151	
1985cc DOHC Turbo (B202L) 16 Valve	1994-91 900 Series	● 1st 44, 2nd 59, 3rd turn 90 degrees	151	
1985cc DOHC Turbo (B202L) 16 Valve	1990-85 900 Series	● 1st 44, 2nd 66, 3rd warm engine & allow to cool, 4th loosen all bolts, 5th 44 again, 6th 66, 7th turn 90 degrees	151	
1985cc DOHC Turbo (B202L) 16 Valve	1990-86 9000 Series	● 1st 44, 2nd 66, 3rd warm engine & allow to cool, 4th loosen all bolts, 5th 44 again, 6th 66, 7th turn 90 degrees	151	
1994cc DOHC Turbo (EJ20T, EJ205) 16 Valve Subaru	2005	1st 22, 2nd 51, 3rd loosen 180 degrees, 4th loosen 180 degrees, 5th 29, 6th turn 80-90 degrees, 7th turn 40-45 degrees, 8th Bolts 1-2 turn 40-45 degrees	125	
1998cc DOHC Turbo (B207L, B207R) 16 Valve Opel	2008-03	Bolts 1-10 1st 22, 2nd turn 155 degrees; Bolts 11-14 3rd 26	231	

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
SAAB 4 & H04 (CONT.)				
2119cc DOHC (B212I) 16 Valve	1994-91	1st 44, 2nd 59, 3rd turn 90 degrees	151	
2290cc DOHC (B234I) 16 Valve	1998-90	1st 44, 2nd 59, 3rd turn 90 degrees	151	
2290cc DOHC Turbo (B235E, B235L, B235R) 16 Valve	2008-99	1st 30, 2nd 44, 3rd turn 90 degrees	151	
2290cc DOHC Turbo (B234E, B234L, B234R) 16 Valve	1998-91	1st 44, 2nd 59, 3rd turn 90 degrees	151	
2457cc SOHC (EJ251, EJ253) 16 Valve Subaru	2006-05	●○ 1st 22, 2nd 51, 3rd loosen 180 degrees, 4th loosen 180 degrees, 5th 31, 6th turn 80-90 degrees, 7th turn 40-45 degrees, 8th Bolts 1-2 turn 40-45 degrees	125	ES 72212
2457cc DOHC Turbo (EJ25T, EJ255) 16 Valve Subaru	2006	●○ 1st 22, 2nd 51, 3rd loosen 180 degrees, 4th loosen 180 degrees, 5th 36, 6th turn 80-90 degrees, 7th turn 40-45 degrees, 8th Bolts 1-2 turn 40-45 degrees	125	ES 72212
SAAB 6 & V6				
2498cc DOHC (B258I) 24 Valve Opel	1997-94	1st 18.5, 2nd turn 90 degrees, 3rd turn 90 degrees, 4th turn 90 degrees	49	
2792cc DOHC Turbo (B284L) 24 Valve Opel	2008-06	Right Head 1st 33, 2nd turn 120 degrees; Left Head 1st Bolts 1-8 33, 2nd Bolts 1-8 turn 120 degrees, 3rd Bolts 9-10 11, 4th Bolts 9-10 turn 60 degrees	230	
2962cc DOHC (B308I) 24 Valve Opel	2000-95	●○ 1st 18.5, 2nd turn 90 degrees, 3rd turn 90 degrees, 4th turn 90 degrees	49	ES 72906
2962cc DOHC Turbo (B308E) 24 Valve Opel	2004-99	●○ 1st 18.5, 2nd turn 90 degrees, 3rd turn 90 degrees, 4th turn 90 degrees	49	ES 72906
4160cc DOHC (VIN S) 24 Valve Chevrolet Truck	2008-05	●○ Bolts 1-14 1st 22, 2nd turn 90 degrees, 3rd turn 65 degrees; Bolt 15 4th 5.1, 5th turn 120 degrees; Bolts 16-17 6th 5.1, 7th turn 60 degrees	211	ES 72195
SAAB V8				
5328cc OHV (VIN M) 16 Valve Chevrolet Truck	2008-05 2nd Design Bolts	●○ 1st M11 Bolts 1-10 22, 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-10 turn 70 degrees, 4th M8 Bolts 11-15 22	159	ES 72220
5967cc OHV (VIN H) 16 Valve Chevrolet Truck	2008 2nd Design Bolts	●○ 1st M11 Bolts 1-10 22, 2nd M11 Bolts 1-10 turn 90 degrees, 3rd M11 Bolts 1-10 turn 70 degrees, 4th M8 Bolts 11-15 22	159	ES 72220
SATURN 4				
1796cc DOHC (1.8L) 16 Valve Opel	2008 Ecotec VIN 1	1st 18, 2nd turn 90 degrees, 3rd turn 90 degrees, 4th turn 90 degrees, 5th turn 45 degrees	100	
1901cc SOHC (1.9L) 8 Valve	2002-91 VIN 8, 9	●○ 1st 22, 2nd 33, 3rd turn 90 degrees	151	ES 72902
1901cc DOHC (1.9L) 16 Valve	2002-91 VIN 7	●○ 1st 22, 2nd 37, 3rd turn 90 degrees	151	ES 72903
1998cc DOHC Supercharged (2.0L) 16 Valve Opel	2007-04 Ecotec VIN P	Bolts 1-10 1st 22, 2nd turn 155 degrees; Bolts 11-14 3rd 26	231	
1998cc DOHC Turbo (2.0L) 16 Valve Opel	2008-07 Ecotec VIN X	Bolts 1-10 1st 22, 2nd turn 155 degrees; Bolts 11-14 3rd 26	231	
2198cc DOHC (2.2L) 16 Valve Opel	2007-00 Ecotec VIN D, F, 2	●○ Bolts 1-10 1st 22, 2nd turn 155 degrees; Bolts 11-14 3rd 26	199	ES 72196
2384cc DOHC (2.4L) 16 Valve Opel	2008-05 Ecotec VIN B, P	Bolts 1-10 1st 22, 2nd turn 155 degrees; Bolts 11-14 3rd 26	231	
2384cc DOHC (2.4L) 16 Valve Hybrid Opel	2008-07 Ecotec VIN Z, 5	Bolts 1-10 1st 22, 2nd turn 155 degrees; Bolts 11-14 3rd 26	231	



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ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
SATURN V6				
2962cc DOHC (3.0L) 24 Valve Opel	2005-00 VIN B, R ●○	1st 18.5, 2nd turn 90 degrees, 3rd turn 90 degrees, 4th turn 90 degrees, 5th turn 15 degrees	49	ES 72906
3471cc SOHC (3.5L) 24 Valve Honda	2007-06 VIN 4 ●○	12 point bolts 1st 22, 2nd turn 90 degrees, 3rd turn 90 degrees NOTE: New bolts turn additional 90 degrees	131	ES 72221
3471cc SOHC (3.5L) 24 Valve Honda	2005-04 VIN 4 ●○	6 point bolts 1st 29, 2nd 29 again, 3rd 51, 4th 51 again, 5th 72.3, 6th 72.3 again	131	ES 72221
3491cc OHV (3.5L) 12 Valve Chevrolet	2006-05 VIN L ●	1st 44, 2nd turn 95 degrees	196	
3510cc OHV (3.5L) 12 Valve Chevrolet	2008 VIN N ●○	1st 44, 2nd turn 140 degrees	196	ES 72230
3510cc OHV (3.5L) 12 Valve Chevrolet	2007 VIN N ●○	1st 44, 2nd turn 95 degrees	196	ES 72230
3564cc DOHC (3.6L) 24 Valve Opel	2008-07 VIN 7	Right Head 1st Bolts 1-8 22, 2nd Bolts 1-8 turn 150 degrees, 3rd Bolt 9 11, 4th Bolt 9 turn 75 degrees; Left Head 1st Bolts 1-8 22, 2nd Bolts 1-8 turn 150 degrees, 3rd Bolts 9-10 11, 4th Bolts 9-10 turn 75 degrees	260	
3880cc OHV (3.9L) 12 Valve Chevrolet	2007-06 VIN W, 1 ●○	1st 44, 2nd turn 95 degrees	196	ES 72230
SCION 4				
1497cc DOHC (1NZFE) 16 Valve	2007-03 ●○	1st 22, 2nd turn 90 degrees, 3rd turn 90 degrees	99	ES 72197 ES 72184
1798cc DOHC (2ZRFE) 16 Valve	2008	1st 36, 2nd turn 90 degrees, 3rd turn 45 degrees	99	
2362cc DOHC (2AZFE) 16 Valve	2008-05 ●○	1st 58, 2nd turn 90 degrees	71	ES 71183 ES 72899
SHELBY V8				
244 DOHC (4.0L) 32 Valve Oldsmobile	2000 ●○	1st 30, 2nd turn 70 degrees, 3rd turn 60 degrees, 4th turn 60 degrees, 5th M6 bolts 8.8	198	ES 72187
244 DOHC (4.0L) 32 Valve Oldsmobile	1999 ●○	1st 30, 2nd turn 70 degrees, 3rd turn 60 degrees, 4th turn 60 degrees, 5th M6 bolts 8.8	198	ES 72186
244 DOHC Supercharged (4.0L) 32 Valve Oldsmobile	2002-01 ●○	1st 30, 2nd turn 70 degrees, 3rd turn 60 degrees, 4th turn 60 degrees, 5th M6 bolts 8.8	198	ES 72187
STERLING V6				
2494cc SOHC (C25A1) 24 Valve Honda	1988-87 ●	1st 29, 2nd 56	89	
2675cc SOHC (C27A1) 24 Valve Honda	1991-89 ●	1st 29, 2nd 56	107	
STUDEBAKER 6				
164.3 L-Head	1940-39	52	188	
169.6 L-Head	1960-51	46-50	188	
169.6 L-Head	1950-39	52	188	
169.6 OHV	1964-61	46-50	189	
185.6 L-Head	1960-55	46-50	188	
194 OHV Chevrolet	1966-65 ●	95	2	
217.8 L-Head	1937-36	80-85	190	
226.2 L-Head	1948-36	80-85	190	
230 OHV Chevrolet	1966 ●	95	2	

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
STUDEBAKER 6 (CONT.)				
245.6 L-Head	1960-55	55-65	190	
245.6 L-Head	1954-36	80-85	190	
STUDEBAKER V8				
224 OHV	1955 Car	46-50	170	
224 OHV	1956-55 Truck	55-65	170	
232 OHV	1954-51	46-50	170	
259 OHV	1964-56 Car	55-65	170	
259 OHV	1955 Car	46-50	170	
259 OHV	1964-55 Truck	55-65	170	
283 OHV Chevrolet	1966-65 ●○	65	7	ES 72856
289 OHV	1964-56	55-65	170	
289 OHV Supercharged	1964-57	55-65	170	
304 OHV	1964-63	55-65	170	
304 OHV Supercharged	1964-63	55-65	170	
352 OHV Packard	1956	60-65	22	
SUBARU 3				
1189cc SOHC (EF12) 9 Valve	1994-89 ●	1st 29, 2nd 54, 3rd loosen 90 degrees, 4th 54 again	116	
1189cc SOHC (EF12) 9 Valve	1988-87 ●	1st 29, 2nd 43, 3rd 51	116	
SUBARU H04				
1361cc OHV (EA63) 8 Valve	1976-73	Bolts 1-9 1st 14, 2nd 25-29, 3rd 37-43; Bolts 10-11 4th 6.5-8	122	
1595cc OHV (EA71) 8 Valve	1988-82 ●	1st 22, 2nd 43, 3rd 47	58	
1595cc OHV (EA71) 8 Valve	1981-79 ●	Bolts 1-9 1st 22, 2nd 43, 3rd 47; Bolts 10-11 4th 6.5-8	122	
1595cc OHV (EA71) 8 Valve	1978-76 ●	Bolts 1-9 1st 14, 2nd 25-29, 3rd 37-43; Bolts 10-11 4th 6.5-8	122	
1781cc OHV (EA81) 8 Valve	1989-82 ●	1st 22, 2nd 43, 3rd 47	58	
1781cc OHV (EA81) 8 Valve	1981-80 ●	Bolts 1-9 1st 22, 2nd 43, 3rd 47; Bolts 10-11 4th 6.5-8	122	
1781cc SOHC (EA82) 8 Valve	1994-85 ●	1st 22, 2nd 43, 3rd 47	58	
1781cc OHV Turbo (EA81T) 8 Valve	1984-83 ●	1st 22, 2nd 43, 3rd 47	58	
1781cc SOHC Turbo (EA82T) 8 Valve	1990-85 ●	1st 22, 2nd 43, 3rd 47	58	
1820cc SOHC (EJ18E) 16 Valve	1997-93 ●	1st 22, 2nd 51, 3rd loosen 180 degrees, 4th loosen 180 degrees, 5th Bolts 1-2 25, 6th Bolts 3-6 11, 7th all bolts turn 80-90 degrees, 8th all bolts turn 80-90 degrees	117	
1994cc DOHC Turbo (EJ20T, EJ205) 16 Valve	2005-02	1st 22, 2nd 51, 3rd loosen 180 degrees, 4th loosen 180 degrees, 5th 29, 6th turn 80-90 degrees, 7th turn 40-45 degrees, 8th Bolts 1-2 turn 40-45 degrees	125	
2212cc SOHC (EJ22E, EJ22EZ, EJ222) 16 Valve	2001-90 ●	1st 22, 2nd 51, 3rd loosen 180 degrees, 4th loosen 180 degrees, 5th Bolts 1-2 25, 6th Bolts 3-6 11, 7th all bolts turn 80-90 degrees, 8th all bolts turn 80-90 degrees	125	
2212cc SOHC Turbo (EJ22T) 16 Valve	1995-90 ●	1st 22, 2nd 51, 3rd loosen 180 degrees, 4th loosen 180 degrees, 5th Bolts 1-2 27, 6th Bolts 3-6 14, 7th all bolts turn 80-90 degrees, 8th all bolts turn 80-90 degrees	125	



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ENGINE	YEARS		FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
SUBARU H04 (CONT.)					
2457cc SOHC (EJ251, EJ253) 16 Valve	2008-04	●○	1st 22, 2nd 51, 3rd loosen 180 degrees, 4th loosen 180 degrees, 5th 31, 6th turn 80-90 degrees, 7th turn 40-45 degrees, 8th Bolts 1-2 turn 40-45 degrees	125	ES 72212
2457cc SOHC (EJ251, EJ252, EJ253) 16 Valve	2003-99	●○	1st 22, 2nd 51, 3rd loosen 180 degrees, 4th loosen 180 degrees, 5th Bolts 1-2 25, 6th Bolts 3-6 11, 7th all bolts turn 80-90 degrees, 8th all bolts turn 80-90 degrees	125	ES 72212
2457cc DOHC (EJ25D) 16 Valve	1999-96	●○	1st 22, 2nd 51, 3rd loosen 180 degrees, 4th loosen 180 degrees, 5th Bolts 1-2 25, 6th Bolts 3-6 11, 7th all bolts turn 80-90 degrees, 8th all bolts turn 80-90 degrees	125	ES 72905
2457cc DOHC Turbo (EJ25T, EJ255, EJ257) 16 Valve	2008-04	●○	1st 22, 2nd 51, 3rd loosen 180 degrees, 4th loosen 180 degrees, 5th 36, 6th turn 80-90 degrees, 7th turn 40-45 degrees, 8th Bolts 1-2 turn 40-45 degrees	125	ES 72212
SUBARU H06					
2672cc SOHC (ER27) 12 Valve	1991-88	●	1st 29, 2nd 47, 3rd loosen 90 degrees, 4th 47 again	118	
2999cc DOHC (EZ30D) 24 Valve	2008-04		1st 14, 2nd 37, 3rd loosen 180 degrees, 4th loosen 180 degrees, 5th 14, 6th Bolts 1-4 35, 7th Bolts 5-8 33, 8th Bolts 1-8 turn 90 degrees, 9th Bolts 1-4 turn 45 degrees	131	
2999cc DOHC (EZ30D) 24 Valve	2003-01		1st 15, 2nd 37, 3rd loosen 180 degrees, 4th loosen 180 degrees, 5th 18.5, 6th 18.5 again, 7th turn 90 degrees, 8th Bolts 1-4 turn 90 degrees, 9th Bolts 5-8 turn 45 degrees	116	
3318cc DOHC (EG33D) 24 Valve	1997-92		1st 22, 2nd 51, 3rd loosen 180 degrees, 4th loosen 180 degrees, 5th 20, 6th Bolts 1-4 33, 7th Bolts 1-4 turn 80-90 degrees, 8th Bolts 5-8 33, 9th Bolts 5-8 turn 80-90 degrees	219	
3630cc DOHC (EZ36D) 24 Valve	2008		1st 14, 2nd 37, 3rd loosen 180 degrees, 4th loosen 180 degrees, 5th 14, 6th Bolts 1-4 35, 7th Bolts 5-8 33, 8th Bolts 1-8 turn 90 degrees, 9th Bolts 1-4 turn 45 degrees	131	
SUNBEAM V8					
260 Ford	1967-64	●	65-70	70	
289 Ford	1968-64	●	65-70	70	
SUZUKI 3					
993cc SOHC (G10) 6 Valve	1994-92	●○	54 in three steps	142	ES 74021
993cc SOHC (G10) 6 Valve	1988-85	●○	46-50 in three steps	142	ES 74015
993cc SOHC Turbo (G10-T) 6 Valve	1988-85	●○	46-50 in three steps	142	ES 74015
SUZUKI 4					
1298cc DOHC (G13B) 16 Valve	1994-89	●	47-50 in three steps	119	
1324cc SOHC (SW413) 16 Valve	2001-98 Car	●	49 in three steps	110	
1324cc SOHC (G13A) 8 Valve	1997-89 Car	●	51-54 in three steps	59	
1324cc SOHC (G13A) 8 Valve	1995-89 Truck	●	51-54 in three steps	59	
1324cc SOHC (G13A) 8 Valve	1988-85 Truck	●	46-50 in three steps	59	
1590cc SOHC (G16KV) 8 Valve	1995-89	●	51-54 in three steps	59	

ENGINE	YEARS		FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
SUZUKI 4 (CONT.)					
1590cc SOHC (G16KV) 16 Valve	2002-00 Car	●	1st 26, 2nd 41, 3rd loosen all bolts, 4th 26 again, 5th 52	110	
1590cc SOHC (G16KV) 16 Valve	1999-92 Car	●	49 in three steps	110	
1590cc SOHC (G16KV) 16 Valve	2001-99 Truck	●	1st 26, 2nd 41, 3rd loosen all bolts, 4th 26 again, 5th 52	110	
1590cc SOHC (G16KV) 16 Valve	1998-92 Truck	●	1st 26, 2nd 41, 3rd 52	110	
1788cc DOHC (SY418) 16 Valve	2002-99 Car		Bolts 1-10 1st 38.5, 2nd 61, 3rd loosen all bolts, 4th 27, 5th 76; Bolt 11 6th 8	207	
1788cc DOHC (G18KV) 16 Valve	1998-96 Truck		Bolts 1-10 1st 38.5, 2nd 61, 3rd loosen all bolts, 4th 27, 5th 76; Bolt 11 6th 8	207	
1995cc DOHC (J20A) 16 Valve	2008-07		Bolts 1-10 1st 38.5, 2nd 61, 3rd loosen all bolts, 4th 38.5 again, 5th 76; Bolt 11 6th 8	207	
1995cc DOHC (J20A) 16 Valve	2004-99	●○	Bolts 1-10 1st 38.5, 2nd 61, 3rd loosen all bolts, 4th 38.5 again, 5th 76; Bolt 11 6th 8	207	ES 72206
1998cc DOHC (A20DMS) 16 Valve Opel	2008-04	●	1st 18, 2nd turn 90 degrees, 3rd turn 90 degrees, 4th turn 90 degrees	100	
2290cc DOHC (J23A) 16 Valve	2007-04	●○	Bolts 1-10 1st 38.5, 2nd 61, 3rd loosen all bolts, 4th 38.5 again, 5th 76; Bolt 11 6th 8	207	ES 72206
SUZUKI 6 & V6					
2492cc DOHC (RP625) 24 Valve Daewoo	2006-04		1st 15, 2nd 18, 3rd turn 70 degrees, 4th turn 70 degrees	39	
2492cc DOHC (H25A) 24 Valve	2005-99		Bolts 1-8 1st 38.5, 2nd 61, 3rd loosen all bolts, 4th 38.5 again, 5th 76; Bolt 9 6th 8	212	
2736cc DOHC (H27A) 24 Valve	2008-01		Bolts 1-8 1st 38.5, 2nd 61, 3rd loosen all bolts, 4th 38.5 again, 5th 76; Bolt 9 6th 8	212	
3564cc DOHC (N36A) 24 Valve Opel	2008-07		Right Head 1st Bolts 1-8 22, 2nd Bolts 1-8 turn 150 degrees, 3rd Bolt 9 11, 4th Bolt 9 turn 75 degrees; Left Head 1st Bolts 1-8 22, 2nd Bolts 1-8 turn 150 degrees, 3rd Bolts 9-10 11, 4th Bolts 9-10 turn 75 degrees	260	
TOYOTA 4					
1077cc OHV (KC) 8 Valve	1969-68		39-48	71	
1166cc OHV (3KC) 8 Valve	1979-69		39-48	71	
1290cc OHV (4KC, 4KE) 8 Valve	1984-81	●	40-47	71	
1452cc SOHC (1AC, 3AC) 8 Valve	1988-80	●	40-47	71	
1456cc SOHC (3EE) 12 Valve	1994-90	●○	1st 22, 2nd 36, 3rd turn 90 degrees	80	ES 74027
1456cc SOHC (3E) 12 Valve	1990-87	●	1st 22, 2nd 36, 3rd turn 90 degrees	80	
1497cc DOHC (1NZFE) 16 Valve	2008-00	●○	1st 22, 2nd turn 90 degrees, 3rd turn 90 degrees	99	ES 72197 ES 72184
1497cc DOHC (1NZFXE) 16 Valve Hybrid	2008-01	●○	1st 22, 2nd turn 90 degrees, 3rd turn 90 degrees	99	ES 72197 ES 72184
1497cc DOHC (5EFE) 16 Valve	1999-92	●○	1st 33, 2nd turn 90 degrees	71	ES 72181 ES 72184
1587cc SOHC (4AC, 4ALC) 8 Valve	1988-83	●	40-47	71	
1587cc DOHC (4AF) 16 Valve	1989-88	●	40-47	99	
1587cc DOHC (4AFE) 16 Valve	1997-93	●	1st 22, 2nd turn 90 degrees, 3rd turn 90 degrees	71	



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ENGINE	YEARS		FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
TOYOTA 4 (CONT.)					
1587cc DOHC (4AFE) 16 Valve	1992-90	●	44 in three steps	99	
1587cc DOHC (4AFE) 16 Valve	1989-88	●	40-47	99	
1587cc DOHC (4AGE) 16 Valve	1991-88	●	1st 22, 2nd turn 90 degrees, 3rd turn 90 degrees	121	
1587cc DOHC (4AGEC) 16 Valve	1987-85	●	40-47	121	
1587cc DOHC (4AGELC) 16 Valve	1989-85	●	44 in three steps	121	
1587cc DOHC Supercharged (4AGZE) 16 Valve	1989-88	●	1st 22, 2nd turn 90 degrees, 3rd turn 90 degrees	121	
1588cc OHV (2T, 2TC) 8 Valve	1979-71	●	62-68	80	
1762cc DOHC (7AFE) 16 Valve	1997-93	●	1st 22, 2nd turn 90 degrees, 3rd turn 90 degrees	71	
1770cc OHV (3TC) 8 Valve	1982-80	●	62-68	80	
1794cc DOHC (1ZZFE) 16 Valve	2008-98	●○	1st 36, 2nd turn 90 degrees	99	ES 71066
1796cc DOHC (2ZZGE) 16 Valve	2006-00	●○	1st 26, 2nd turn 90 degrees, 3rd turn 90 degrees	99	ES 71066
1839cc SOHC Diesel (1CLC) 8 Valve	1985-84		62 in three steps	46	
1839cc SOHC Turbo Diesel (1CTLC) 8 Valve	1986-84		62 in three steps	46	
1858cc SOHC (8R, 8RC) 8 Valve	1971-69	●	75-85	59	
1968cc SOHC (18RC) 8 Valve	1974-72	●	75-85	59	
1974cc SOHC Turbo Diesel (2CTLC) 8 Valve	1986		1st 33, 2nd turn 90 degrees, 3rd turn 90 degrees	46	
1995cc SOHC (2SEL) 8 Valve	1986-83	●	47 in three steps	71	
1998cc OHV (3YEC) 8 Valve	1985-84	●	14mm bolts 65; 12mm bolts 14	86	
1998cc DOHC (1AZFE) 16 Valve	2003-01	●○	1st 36, 2nd turn 90 degrees, 3rd turn 90 degrees	71	ES 71183 ES 72899
1998cc DOHC (3SFE) 16 Valve	2000-96	●○	1st 36, 2nd turn 90 degrees, 3rd turn 90 degrees	71	ES 72154 ES 72183
1998cc DOHC (3SFE) 16 Valve	1992-90	●○	1st 36, 2nd turn 90 degrees	71	ES 72154 ES 72183
1998cc DOHC (3SFE) 16 Valve	1989-87	●○	47 in three steps	71	ES 74032
1998cc DOHC (3SGELC) 16 Valve	1989-86	●	40 in three steps	71	
1998cc DOHC Turbo (3SGTE) 16 Valve	1995-90	●	1st 36, 2nd turn 90 degrees	71	
1998cc DOHC Turbo (3SGTE) 16 Valve	1989-88	●	40 in three steps	71	
2164cc DOHC (5SFE, 5SNFE) 16 Valve	2001-90	●○	1st 36, 2nd turn 90 degrees	71	ES 72154 ES 72183
2188cc SOHC Diesel (L) 8 Valve	1983-81	●	84-90 in three steps	46	
2189cc SOHC (20R) 8 Valve	1980-75	●	53-63 in three steps	53	
2237cc OHV (4YEC) 8 Valve	1990-86	●	14mm bolts 65; 12mm bolts 14	86	
2362cc DOHC (2AZFE) 16 Valve	2008-07 Camry, Solara	●○	1st 52, 2nd turn 90 degrees	71	ES 71183 ES 72899
2362cc DOHC (2AZFE) 16 Valve	2006-02 Camry, Solara	●○	1st 58, 2nd turn 90 degrees	99	ES 71183 ES 72899
2362cc DOHC (2AZFE) 16 Valve	2008-06 RAV4	●○	1st 52, 2nd turn 90 degrees	71	ES 71183 ES 72899
2362cc DOHC (2AZFE) 16 Valve	2005-04 RAV4	●○	1st 58, 2nd turn 90 degrees	99	ES 71183 ES 72899
2362cc DOHC (2AZFE) 16 Valve	2007-01 Highlander	●○	1st 58, 2nd turn 90 degrees	99	ES 71183 ES 72899
2362cc DOHC (2AZFXE) 16 Valve Hybrid	2008-07	●○	1st 52, 2nd turn 90 degrees	71	ES 71183 ES 72899
2366cc SOHC (22R, 22RE, 22REC) 8 Valve	1995-87	●○	58 in three steps	81	ES 71178
2366cc SOHC (22R, 22REC) 8 Valve	1986-81	●	58 in three steps	81	

ENGINE	YEARS		FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
TOYOTA 4 (CONT.)					
2366cc SOHC Turbo (22RTEC) 8 Valve	1989-87	●○	58 in three steps	81	ES 71178
2366cc SOHC Turbo (22RTEC) 8 Valve	1986-85	●	58 in three steps	81	
2438cc DOHC (2RZFE) 16 Valve	2004-95	●○	1st 29, 2nd turn 90 degrees, 3rd turn 90 degrees	71	ES 72182
2438cc DOHC (2TZFE) 16 Valve	1996-91	●	1st 29, 2nd turn 90 degrees, 3rd turn 90 degrees	71	
2438cc DOHC Supercharged (2TZFE) 16 Valve	1997-94	●	1st 29, 2nd turn 90 degrees, 3rd turn 90 degrees	71	
2446cc SOHC Diesel (2L) 8 Valve	1987-84	●	84-90 in three steps	46	
2446cc SOHC Turbo Diesel (2LT) 8 Valve	1987-84	●	84-90 in three steps	46	
2693cc DOHC (2TRFE) 16 Valve	2008-05		1st 29, 2nd turn 90 degrees, 3rd turn 90 degrees	71	
2693cc DOHC (3RZFE) 16 Valve	2004-94	●○	1st 29, 2nd turn 90 degrees, 3rd turn 90 degrees	71	ES 72182
TOYOTA 6 & V6					
2253cc SOHC (2M) 12 Valve	1972-67		12mm bolts 54-61; 8mm bolts 11-16	83	
2507cc DOHC (2VZFE) 24 Valve	1992-88	●	1st 12 point bolts 25, 2nd 12 point bolts turn 90 degrees, 3rd 12 point bolts turn 90 degrees, 4th recessed bolts 13	112	
2563cc SOHC (4M) 12 Valve	1979-71	●	12mm bolts 54-61; 8mm bolts 11-16	83	
2563cc SOHC (4ME) 12 Valve	1980-79	●	12mm bolts 55-61; 8mm bolts 11-15	66	
2759cc SOHC (5ME) 12 Valve	1982-81	●	12mm bolts 55-61; 8mm bolts 11-15	66	
2759cc DOHC (5MGE) 12 Valve	1988-82	●	58 in three steps	48	
2954cc DOHC (7MGE) 24 Valve	1992-86	●	58 in three steps	92	
2954cc DOHC Turbo (7MGTE) 24 Valve	1992-87	●	58 in three steps	92	
2958cc SOHC (3VZE) 12 Valve	1995-88	●○	1st Bolts 1-8 27, 2nd Bolts 1-8 33, 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 1-8 turn 90 degrees, 5th Bolt 9 27	220	ES 72185
2958cc DOHC (3VZFE) 24 Valve	1993-92	●	1st 12 point bolts 25, 2nd 12 point bolts turn 90 degrees, 3rd 12 point bolts turn 90 degrees, 4th recessed bolts 13	112	
2995cc DOHC (1MZFE) 24 Valve	2006-94	●○	1st 12 point bolts 40, 2nd 12 point bolts turn 90 degrees, 3rd recessed bolts 13	120	ES 71036
2997cc DOHC (2JZGE) 24 Valve	1998-93	●○	1st 25, 2nd turn 90 degrees, 3rd turn 90 degrees	92	ES 72213
2997cc DOHC Turbo (2JZGTE) 24 Valve	1998-93	●○	1st 25, 2nd turn 90 degrees, 3rd turn 90 degrees	92	ES 72213
3311cc DOHC (3MZFE) 24 Valve	2008-04	●	1st 12 point bolts 40, 2nd 12 point bolts turn 90 degrees, 3rd recessed bolts 13	120	
3311cc DOHC (3MZFXE) 24 Valve Hybrid	2008-06	●	1st 12 point bolts 40, 2nd 12 point bolts turn 90 degrees, 3rd recessed bolts 13	120	
3378cc DOHC (5VZFE) 24 Valve	2004-95	●○	1st 12 point bolts 25, 2nd 12 point bolts turn 90 degrees, 3rd 12 point bolts turn 90 degrees, 4th recessed bolts 13	112	ES 72168 ES 72899
3456cc DOHC (2GRFE) 24 Valve	2008-05	●○	1st Bolts 1-8 27, 2nd Bolts 1-8 turn 90 degrees, 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 9-10 22	262	ES 72249



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ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
TOYOTA 6 & V6 (CONT.)				
3878cc OHV (F) 12 Valve	1974-67	83-98 in three steps	61	
3955cc DOHC (1GRFE) 24 Valve	2008-03	●○ 1st Bolts 1-8 27, 2nd Bolts 1-8 turn 90 degrees, 3rd Bolts 1-8 turn 90 degrees, 4th Bolts 9-10 22	262	ES 72249
3956cc OHV (3FE) 12 Valve	1992-88	● 90 in three steps	61	
4230cc OHV (2F) 12 Valve	1987-75	● 83-98 in three steps	61	
4476cc DOHC (1FZFE) 24 Valve	1997-93	1st 29, 2nd turn 90 degrees, 3rd turn 90 degrees	92	

TOYOTA V8				
4663cc DOHC (2UZFE) 32 Valve	2008-05	●○ 1st 30, 2nd turn 90 degrees, 3rd turn 90 degrees	164	ES 74035
4663cc DOHC (2UZFE) 32 Valve	2004-98	●○ 1st 24, 2nd turn 90 degrees, 3rd turn 90 degrees	164	ES 74035
5663cc DOHC (3URFE) 32 Valve	2008-07	1st Bolts 1-10 27, 2nd Bolts 1-10 turn 90 degrees, 3rd Bolts 1-10 turn 90 degrees; 4th Bolts 11-12 15	264	

TRIUMPH 4				
1147cc OHV	1970-61	42-46	42	
1296cc OHV	1972-67	42-46	42	
1493cc OHV	1980-73	46 in three steps	42	
1998cc SOHC	1982-75	55 in three steps	62	

TRIUMPH 6				
1998cc OHV	1973-67	42-46	63	
2498cc OHV	1976-67	80 in three steps	63	

TRIUMPH V8				
3528cc OHV	1982-77	● Bolts 1-10 65-70; Bolts 11-14 40-45	24	

TURNER 4				
948cc OHV Austin	1963-59	40	54	

TVR 6 & V6				
2498cc OHV Triumph	1977-76	80 in three steps	63	
2792cc OHV Ford	1986-82	● 1st 29-40, 2nd 40-51, 3rd 70-85	57	
2935cc OHV Ford	1988-87	●○ 1st 22, 2nd 51-55, 3rd turn 90 degrees	97	ES 72794

VOLKSWAGEN 4 & H04				
1192cc OHV	1966-54	1st 7, 2nd 23	166	
1285cc OHV	1966	1st 7, 2nd 23	166	
1457cc SOHC (8 Valve)	1980-78	● 1st 29, 2nd 43, 3rd turn 90 degrees, 4th turn 90 degrees	60	
1471cc SOHC (8 Valve)	1975-74	1st 29, 2nd 43, 3rd turn 90 degrees, 4th turn 90 degrees	60	
1471cc SOHC Diesel (8 Valve)	1980-77	12 point M12 bolts 1st 29, 2nd 43, 3rd turn 90 degrees, 4th turn 90 degrees, 5th warm engine, 6th turn 90 degrees, 7th after 1000 miles turn 90 degrees	60	
1471cc SOHC Diesel (8 Valve)	1980-77	6 point M11 bolts 1st 35, 2nd 50, 3rd 65, 4th warm engine, 5th 65 again, 6th after 1000 miles turn 90 degrees	60	
1493cc OHV	1969-63	1st 7, 2nd 23	166	
1584cc OHV	1980-66	1st 11, 2nd 23	166	
1588cc SOHC (8 Valve)	1980-75	● 12 point bolts 1st 29, 2nd 43, 3rd turn 90 degrees, 4th turn 90 degrees	60	
1588cc SOHC (8 Valve)	1980-75	● 6 point bolts 1st 29, 2nd 43, 3rd 54, 4th warm engine, 5th 61, 6th retorquer after 1000 miles	60	

ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
VOLKSWAGEN 4 & H04 (CONT.)				
1588cc SOHC Diesel (8 Valve)	1992-82	●○ 12 point M12 bolts 1st 29, 2nd 43, 3rd turn 90 degrees, 4th turn 90 degrees, 5th warm engine, 6th turn 90 degrees, 7th after 1000 miles turn 90 degrees	60	ES 74028
1588cc SOHC Diesel (8 Valve)	1984-81	● 6 point M11 bolts 1st 35, 2nd 50, 3rd 65, 4th warm engine, 5th 65 again, 6th after 1000 miles turn 90 degrees	60	
1588cc SOHC Turbo Diesel (8 Valve)	1992-82	●○ 12 point M12 bolts 1st 29, 2nd 43, 3rd turn 90 degrees, 4th turn 90 degrees, 5th warm engine, 6th turn 90 degrees, 7th after 1000 miles turn 90 degrees	60	ES 74028
1679cc OHV	1974-71	1st 11, 2nd 23	166	
1715cc SOHC (8 Valve)	1984-81	● 1st 29, 2nd 43, 3rd turn 90 degrees, 4th turn 90 degrees	60	
1780cc SOHC (8 Valve)	1993-83	●○ 1st 29, 2nd 43, 3rd turn 90 degrees, 4th turn 90 degrees	60	ES 74029
1780cc DOHC (16 Valve)	1989-86	● 1st 29, 2nd 43, 3rd turn 90 degrees, 4th turn 90 degrees	60	
1780cc SOHC Supercharged (8 Valve)	1994-90	● 1st 29, 2nd 43, 3rd turn 90 degrees, 4th turn 90 degrees	60	
1780cc DOHC Turbo (20 Valve)	2006-04 exc. Passat	●○ 1st 29.5, 2nd turn 90 degrees, 3rd turn 90 degrees	60	ES 71172 ES 71193
1780cc DOHC Turbo (20 Valve)	2005-04 Passat	●○ 1st 29.5, 2nd 44, 3rd turn 90 degrees, 4th turn 90 degrees	60	ES 71172 ES 71193
1780cc DOHC Turbo (20 Valve)	2003-98	●○ 1st 44, 2nd turn 90 degrees, 3rd turn 90 degrees	60	ES 71172 ES 71193
1795cc OHV	1975-74	1st 11, 2nd 23	166	
1896cc SOHC Diesel (8 Valve)	1995-92	1st 30, 2nd 44, 3rd turn 90 degrees, 4th turn 90 degrees	60	
1896cc SOHC Turbo Diesel (BRM) (8 Valve)	2007-05	● 1st 29.5, 2nd turn 90 degrees, 3rd turn 90 degrees	60	
1896cc SOHC Turbo Diesel (AAZ, AHU, ALH, BEW) (8 Valve)	2007-96	● 1st 30, 2nd 44, 3rd turn 90 degrees, 4th turn 90 degrees	60	
1915cc OHV	1985-83	26	166	
1969cc SOHC Turbo Diesel (BHW) (8 Valve)	2007-04	1st 29.5, 2nd 44, 3rd turn 90 degrees, 4th turn 90 degrees	60	
1970cc OHV	1983-80	22	166	
1970cc OHV	1979-76	1st 11, 2nd 23	166	
1984cc SOHC (AEG, AVH, AZG, BBW, BDC, BEV, BGD) (8 Valve)	2006-04	●○ 1st 29.5, 2nd turn 90 degrees, 3rd turn 90 degrees	60	ES 72189
1984cc SOHC (AEG, AVH, AZG, BDC) (8 Valve)	2003-98	●○ 1st 30, 2nd turn 90 degrees, 3rd turn 90 degrees	60	ES 72189
1984cc SOHC (ABA) (8 Valve)	2002-93	●○ 1st 30, 2nd 44, 3rd turn 90 degrees, 4th turn 90 degrees	60	ES 74029
1984cc DOHC (16 Valve)	1994-90	● 1st 29, 2nd 43, 3rd turn 90 degrees, 4th turn 90 degrees	60	
1984cc DOHC Turbo (20 Valve)	2008-06	● 1st 29.5, 2nd turn 90 degrees, 3rd turn 90 degrees	60	
2109cc OHV	1991-86	1st 7, 2nd 30, 3rd 37	166	

VOLKSWAGEN 5				
2144cc SOHC (10 Valve)	1985-83	● 1st 29, 2nd 43, 3rd turn 90 degrees, 4th turn 90 degrees	78	
2226cc SOHC (10 Valve)	1988-85	● 1st 29, 2nd 43, 3rd turn 90 degrees, 4th turn 90 degrees	78	
2461cc SOHC (10 Valve)	1996-92	1st 30, 2nd 44, 3rd turn 90 degrees, 4th turn 90 degrees	78	
2480cc DOHC (20 Valve)	2008-05	1st Bolts 1-12 30, 2nd Bolts 1-12 turn 90 degrees, 3rd Bolts 1-12 turn 90 degrees; 4th Bolts 13-18 7.5	249	



TORQUE TABLES™



TORQUE TABLES™

ENGINE	YEARS		FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
VOLKSWAGEN V6					
2771cc DOHC (30 Valve)	2005-98	●	1st 44 , 2nd turn 90 degrees, 3rd turn 90 degrees	135	
2792cc SOHC (12 Valve)	2002-92 Car	●	1st 30 , 2nd 44 , 3rd turn 90 degrees, 4th turn 90 degrees	168	
2792cc SOHC (12 Valve)	2000-97 Truck	●	1st 30 , 2nd 37 , 3rd turn 90 degrees, 4th turn 90 degrees	168	
2792cc DOHC (24 Valve)	2005-04 Car	●	1st 22 , 2nd 37 , 3rd turn 90 degrees, 4th turn 90 degrees	168	
2792cc DOHC (24 Valve)	2003-01 Car	●	1st 37 , 2nd turn 90 degrees, 3rd turn 90 degrees	168	
2792cc DOHC (24 Valve)	2004-01 Truck	●	1st 22 , 2nd 37 , 3rd turn 90 degrees, 4th turn 90 degrees	168	
3189cc DOHC (24 Valve)	2008-03		1st 22 , 2nd 37 , 3rd turn 90 degrees, 4th turn 90 degrees	168	
3597cc DOHC (24 Valve)	2008-06		1st 22 , 2nd 37 , 3rd turn 90 degrees, 4th turn 90 degrees	168	

VOLKSWAGEN V8					
3998cc DOHC (32 Valve)	2005-02		1st 22 , 2nd 37 , 3rd turn 90 degrees, 4th turn 90 degrees	250	
4163cc DOHC (40 Valve)	2008-07		1st 22 , 2nd 44 , 3rd turn 90 degrees, 4th turn 90 degrees	136	
4172cc DOHC (40 Valve)	2007-03		1st 22 , 2nd 44 , 3rd turn 90 degrees, 4th turn 90 degrees	136	

VOLKSWAGEN V10					
4921cc SOHC Turbo Diesel (20 Valve)	2008-04		1st 22 , 2nd 44 , 3rd turn 180 degrees, 4th turn 180 degrees	259	

VOLKSWAGEN V12					
5998cc DOHC (48 Valve)	2006-04		1st 22 , 2nd 37 , 3rd turn 90 degrees, 4th turn 90 degrees	227	

VOLVO 4					
1580cc OHV (B16A, B16B, B16D) 8 Valve	1961-57		61-69	110	
1780cc OHV (B18A, B18B, B18D) 8 Valve	1968-61		61-69	110	
1948cc DOHC Turbo (B4194T, B4204T2, B4204T3) 16 Valve	2004-00		1st Bolts 1-2 15 , 2nd Bolts 3-10 44 , 3rd turn all bolts 130 degrees	40	
1986cc OHV (B20E, B20F) 8 Valve	1975-70		1st 29 , 2nd 58 , 3rd 65 , 4th warm engine, 5th 65 again	110	
1986cc OHV (B20A, B20B) 8 Valve	1974-69		61-69	110	
2127cc SOHC (B21E, B21F) 8 Valve	1984-76	●	1st 43 , 2nd 76-83 , 3rd warm engine, 4th 76-83 again	110	
2127cc SOHC Turbo (B21FT) 8 Valve	1985-81	●	1st 15 , 2nd 44 , 3rd turn 90 degrees	110	
2316cc SOHC (B230F, B230FD, B230FS) 8 Valve	1995-85	●	1st 14 , 2nd 43 , 3rd turn 90 degrees	110	
2316cc SOHC (B23E, B23F) 8 Valve	1984-81	●	1st 15 , 2nd 44 , 3rd turn 90 degrees	110	
2316cc DOHC (B234F) 16 Valve	1991-89	●	1st 15 , 2nd 30 , 3rd turn 115 degrees	110	
2316cc SOHC Turbo (B234FT, B234T) 8 Valve	1995-89	●	1st 14 , 2nd 43 , 3rd turn 90 degrees	110	
2316cc SOHC Turbo (B230FT) 8 Valve	1995-85	●	1st 14 , 2nd 43 , 3rd turn 90 degrees	110	
2316cc SOHC Turbo (B23FT) 8 Valve	1984	●	1st 15 , 2nd 44 , 3rd turn 90 degrees	110	

ENGINE	YEARS		FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
VOLVO 5					
2319cc DOHC Turbo (B5234FT, B5234T3) 20 Valve	2008-04		1st 15 , 2nd 44 , 3rd turn 130 degrees	251	
2319cc DOHC Turbo (B5234FT, B5234T, B5234T3) 20 Valve	2003-94		1st 15 , 2nd 44 , 3rd turn 130 degrees	208	
2435cc DOHC (B5244FS, B5244S, B5244S4, B5244S5, B5244S6, B5244S7, B5254FS, B5254S) 20 Valve	2008-04	●○	1st 15 , 2nd 44 , 3rd turn 130 degrees	251	ES 72908
2435cc DOHC (B5244FS, B5244S, B5254FS, B5254S) 20 Valve	2003-93	●○	1st 15 , 2nd 44 , 3rd turn 130 degrees	208	ES 72908
2435cc DOHC Turbo (B5244T3, B5254FT, B5254T) 20 Valve	2008-04	●○	1st 15 , 2nd 44 , 3rd turn 130 degrees	251	ES 72908
2435cc DOHC Turbo (B5244T, B5244T2, B5244T3, B5254FT, B5254T) 20 Valve	2003-97	●○	1st 15 , 2nd 44 , 3rd turn 130 degrees	208	ES 72908
2521cc DOHC Turbo (B5254T2, B5254T3, B5254T4) 20 Valve	2008-04		1st 15 , 2nd 44 , 3rd turn 130 degrees	251	
2521cc DOHC Turbo (B5254T2) 20 Valve	2003		1st 15 , 2nd 44 , 3rd turn 130 degrees	208	

VOLVO 6 & V6					
2383cc SOHC Diesel (D24) 12 Valve	1985-81		12 point M12 bolts 1st 30 , 2nd 44 , 3rd 55 , 4th turn 180 degrees, 5th warm engine, 6th turn 90 degrees, 7th after 1000 miles turn 90 degrees	84	
2383cc SOHC Diesel (D24) 12 Valve	1981-80		6 point M11 bolts 1st 35 , 2nd 50 , 3rd 65 , 4th warm engine, 5th 65 again, 6th after 1000 miles turn 90 degrees	84	
2383cc SOHC Turbo Diesel (D24T) 12 Valve	1986-83		12 point M12 bolts 1st 30 , 2nd 44 , 3rd 55 , 4th turn 180 degrees, 5th warm engine, 6th turn 90 degrees, 7th after 1000 miles turn 90 degrees	84	
2664cc SOHC (B27E, B27F) 12 Valve	1979-75		1st 7 , 2nd 22 , 3rd 44 , 4th loosen all bolts, 5th 11-14 , 6th turn 116-120 degrees, 7th warm engine & allow to cool, 8th loosen all bolts, 9th 11-14 again, 10th turn 113-117 degrees	52	
2783cc DOHC Turbo (B6284T) 24 Valve	2004-99		1st 15 , 2nd 44 , 3rd turn 130 degrees	209	
2849cc SOHC (B280F) 12 Valve	1991-90		1st 7 , 2nd 22 , 3rd 44 , 4th loosen all bolts, 5th 15 , 6th turn 160-180 degrees	52	
2849cc SOHC (B280F) 12 Valve	1989-86		1st 7 , 2nd 22 , 3rd 44 , 4th loosen all bolts, 5th 15 , 6th turn 106 degrees, 7th warm engine & allow to cool, 8th turn 45 degrees	52	
2849cc SOHC (B28F) 12 Valve	1986		1st 7 , 2nd 22 , 3rd 44 , 4th loosen all bolts, 5th 15 , 6th turn 106 degrees, 7th warm engine & allow to cool, 8th turn 45 degrees	52	
2849cc SOHC (B28F) 12 Valve	1985-80		1st 7 , 2nd 22 , 3rd 44 , 4th loosen all bolts, 5th 11-14 , 6th turn 116-120 degrees, 7th warm engine & allow to cool, 8th loosen all bolts, 9th 11-14 again, 10th turn 113-117 degrees	52	
2922cc DOHC (B6294S, B6304F, B6304S, B6304S3) 24 Valve	2006-92		1st 15 , 2nd 44 , 3rd turn 130 degrees	209	
2922cc DOHC Turbo (B6294T) 24 Valve	2006-03		1st 15 , 2nd 44 , 3rd turn 130 degrees	209	

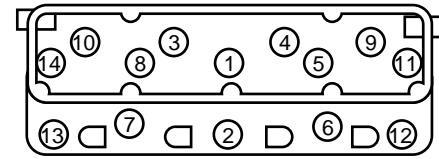


TORQUE TABLES™

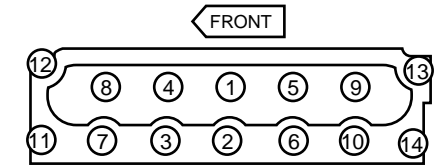


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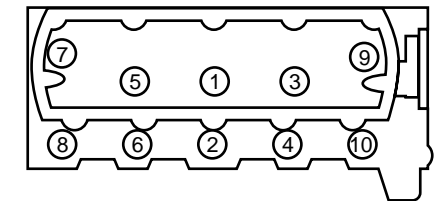
ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
VOLVO 6 & V6 (CONT.)				
2980cc OHV (B30E, B30F) 12 Valve	1975-71	1st 29 , 2nd 58 , 3rd 65 , 4th warm engine, 5th 65 again	2	
2980cc OHV (B30A) 12 Valve	1972-69	61-69	2	
3192cc DOHC (B6324S) 24 Valve	2008-07	1st 33 , 2nd 33 again, 3rd turn 90 degrees, 4th turn 180 degrees	252	
VOLVO V8				
4414cc DOHC (B8444S) 32 Valve Yamaha	2008-05	1st 29.5 , 2nd turn 90 degrees	68	
WILLYS..... SEE JEEP				
WORKHORSE V8				
350 OHV (5.7L) Chevrolet Truck	2002-01 VIN R ●○	1st all bolts 22 , 2nd Long bolts turn 75 degrees, 3rd Medium bolts turn 65 degrees, 4th Short bolts turn 55 degrees	7	ES 72856
395 OHV Turbo Diesel (6.5L) Chevrolet Truck	2003-99 VIN F ●○	1st 20 , 2nd 55 , 3rd 55 again, 4th turn 90 degrees	77	ES 72724
454 OHV (7.4L) Chevrolet Truck	2000-99 VIN J ●	1st 37 , 2nd Bolts 1, 2, 3, 6, 7, 8, 9, 12, 13, 14, 15, 16 turn 150 degrees, 3rd Bolts 4, 5, 10, 11 turn 90 degrees	8	
496 OHV (8.1L) Chevrolet Truck	2006-01 VIN G ●○	1st 22 , 2nd 22 again, 3rd turn 120 degrees, 4th Bolts 1, 2, 3, 6, 7, 8, 9, 10, 11, 14, 16, 17 turn 60 degrees, 5th Bolts 15, 18 turn 45 degrees, 6th Bolts 4, 5, 12, 13 turn 30 degrees	210	ES 72188
YUGO 4				
1116cc SOHC (128A) 8 Valve	1989-86	1st 15 , 2nd 30 , 3rd 69	41	
1290cc SOHC (128A.064) 8 Valve	1992-87	1st 15 , 2nd 30 , 3rd 69	41	



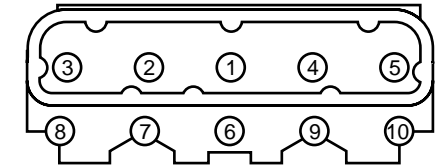
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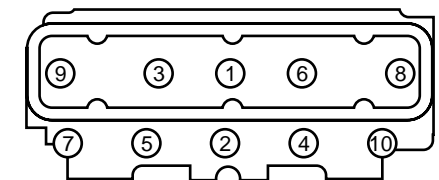
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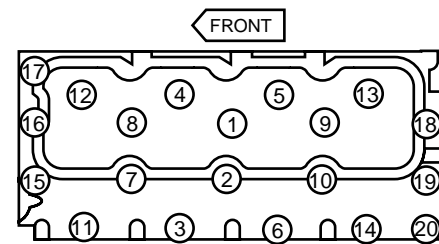
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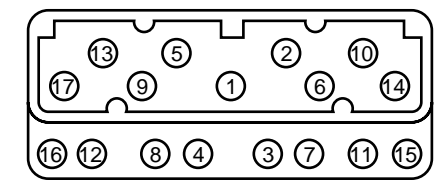
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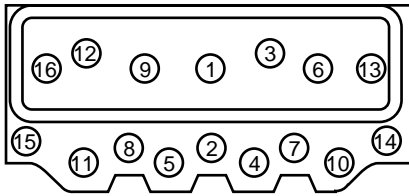


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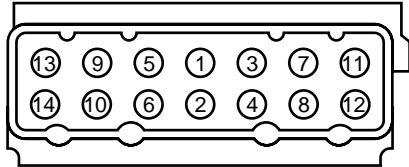


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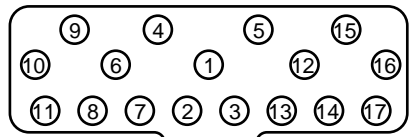
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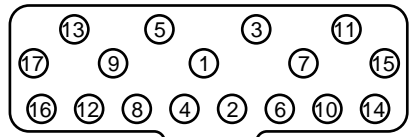
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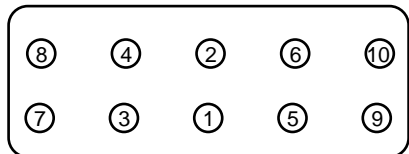
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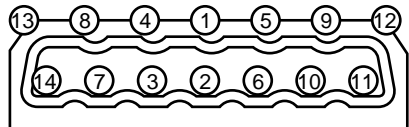
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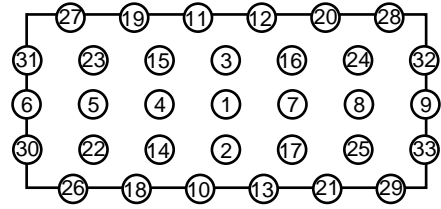
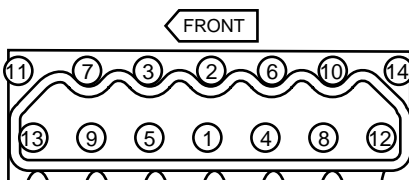
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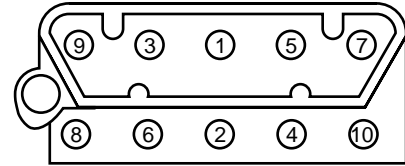


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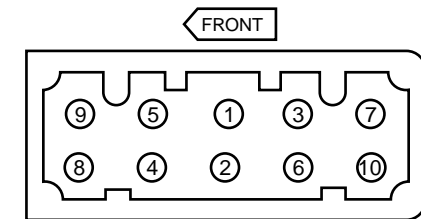


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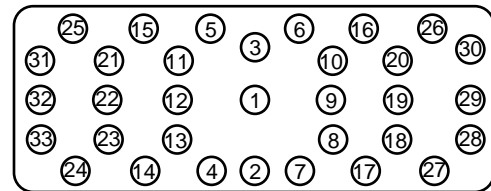
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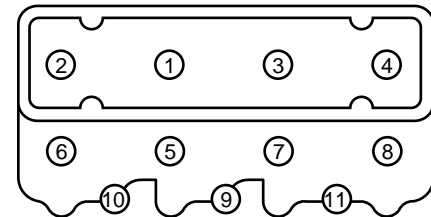
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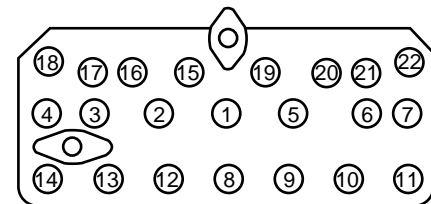
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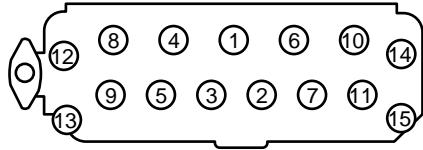
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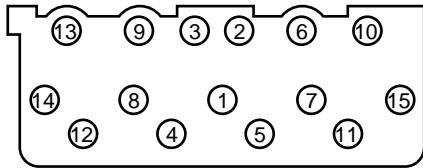
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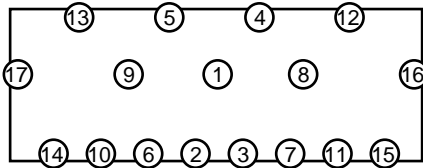
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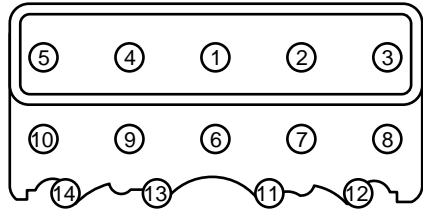
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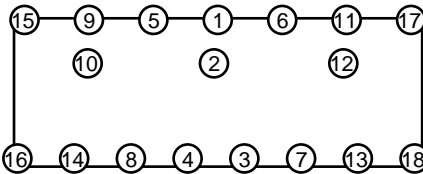
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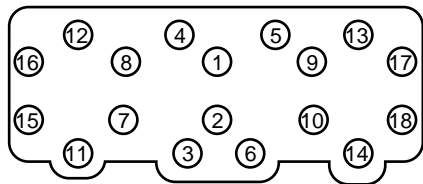
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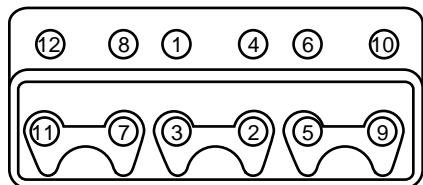
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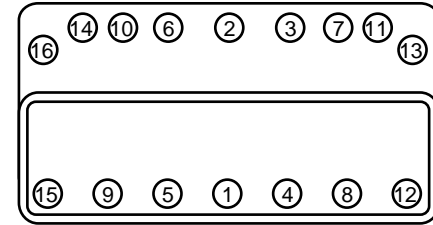
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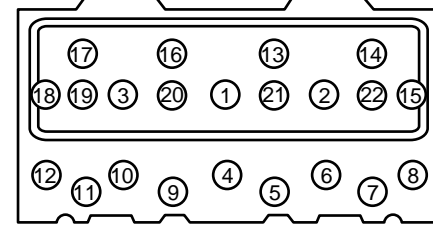
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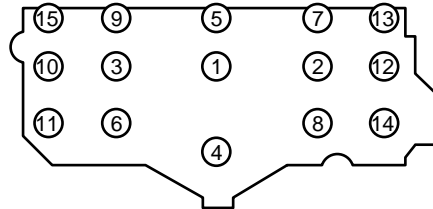
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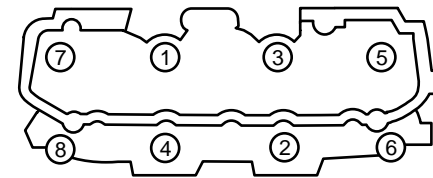
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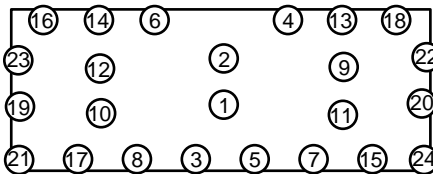
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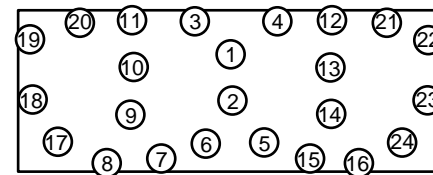
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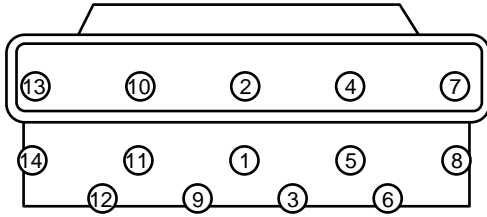
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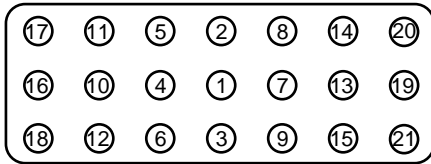
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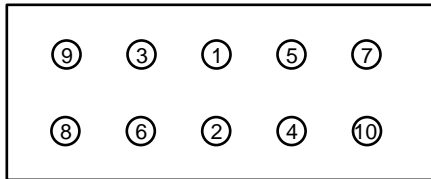
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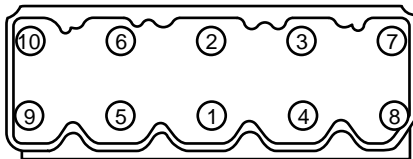
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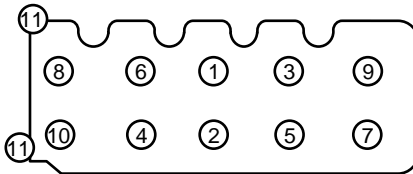
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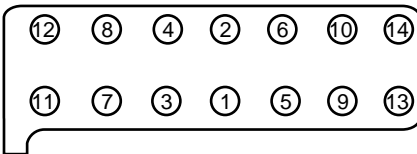
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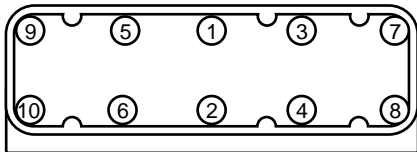
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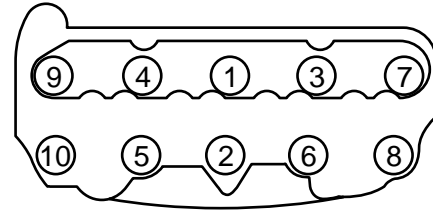
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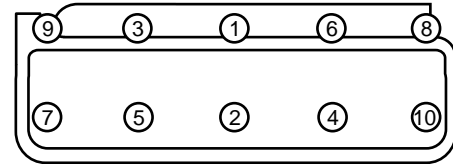
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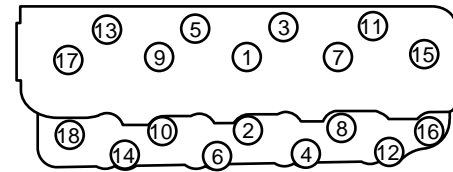
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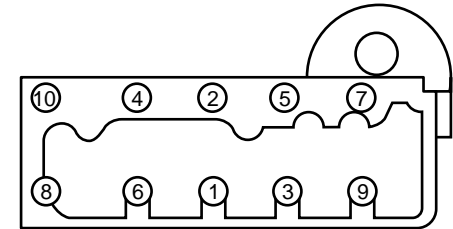
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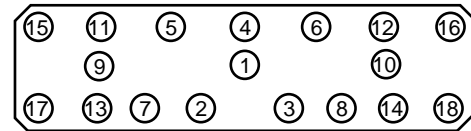
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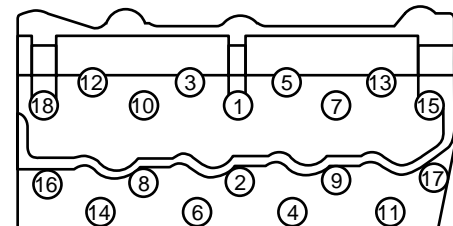
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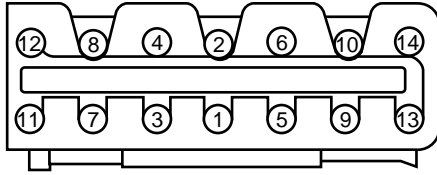
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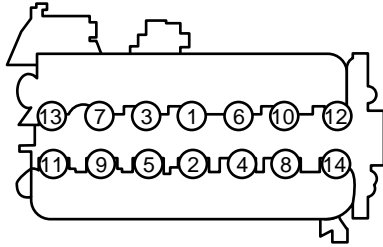
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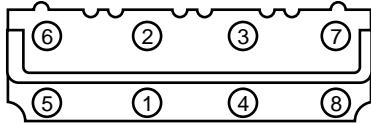
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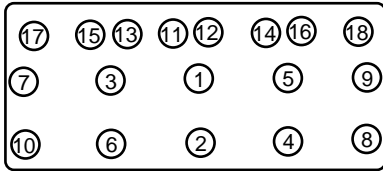
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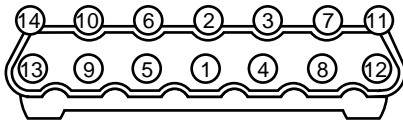
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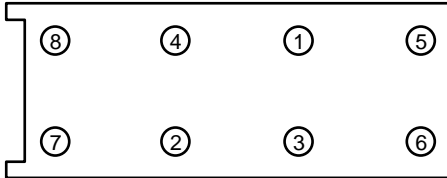
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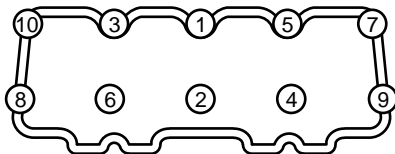
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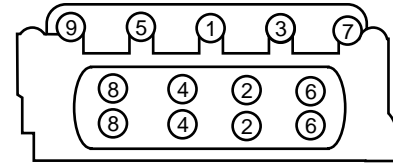
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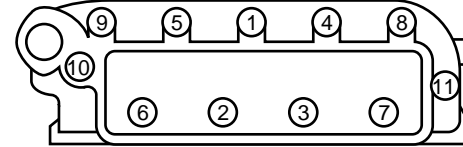
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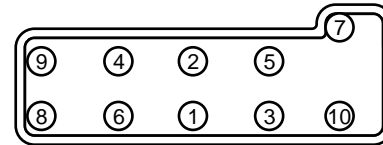
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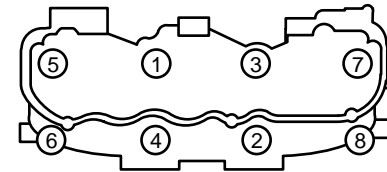
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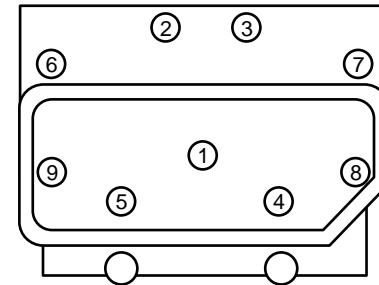
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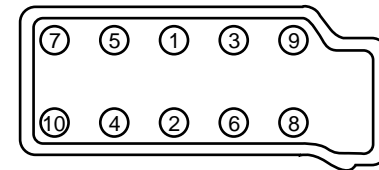
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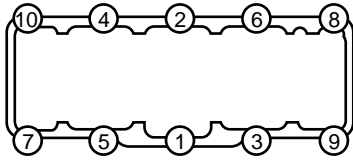
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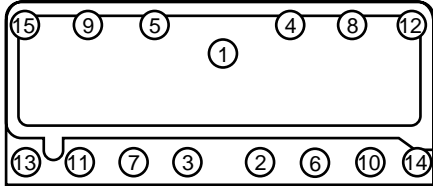
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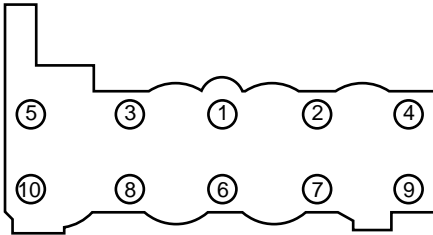
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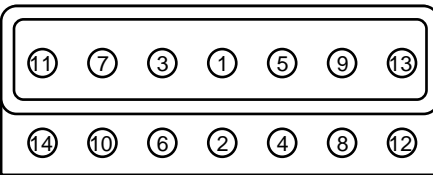
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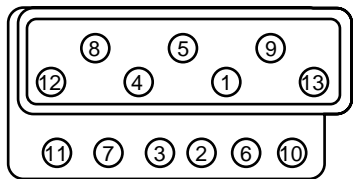
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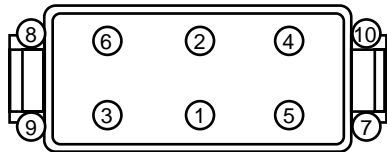
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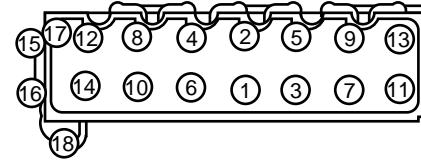
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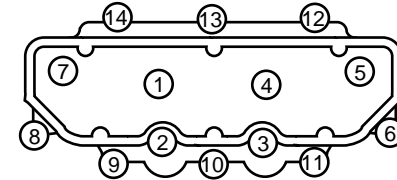
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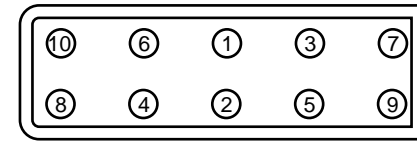
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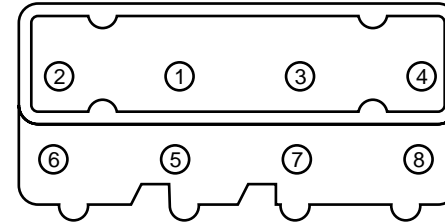
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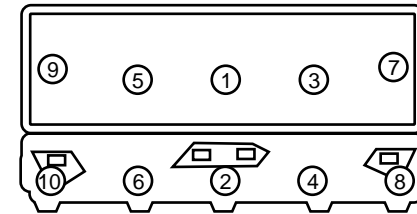
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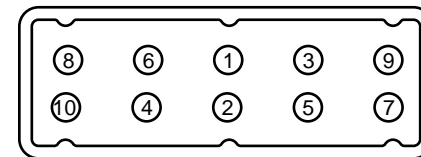
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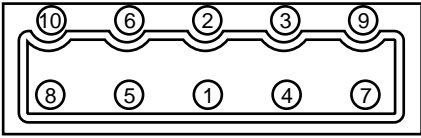
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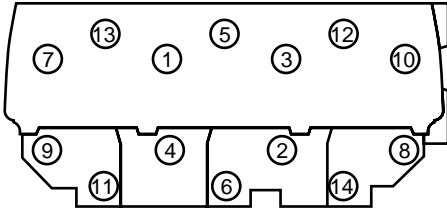
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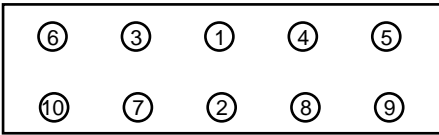
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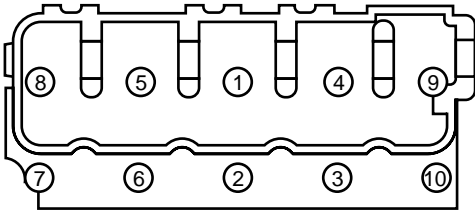
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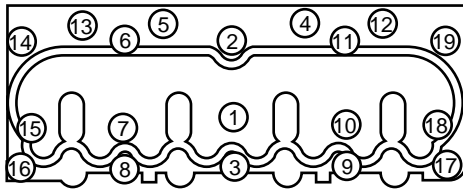
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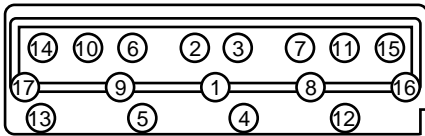
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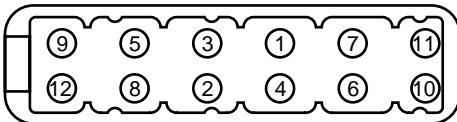
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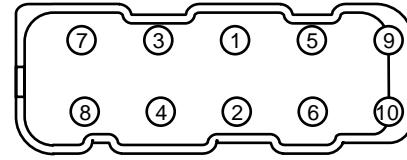
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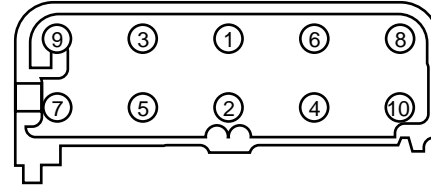
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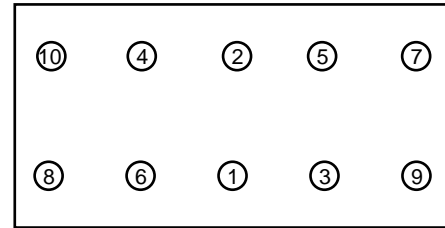
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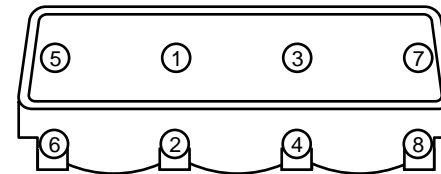
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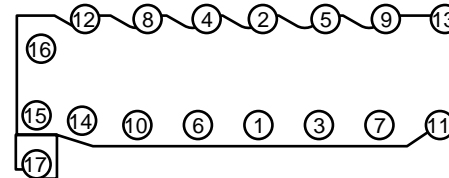
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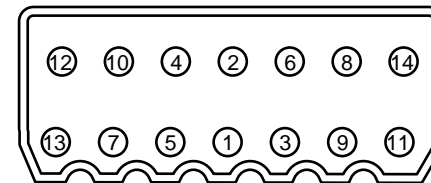
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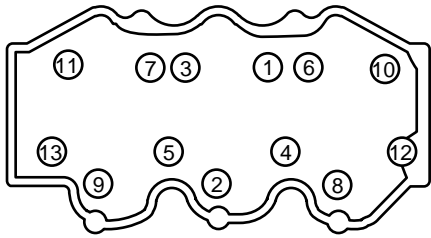
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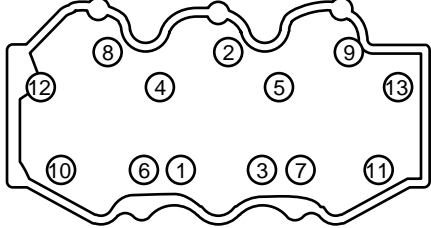
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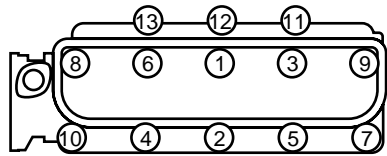
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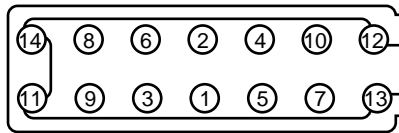
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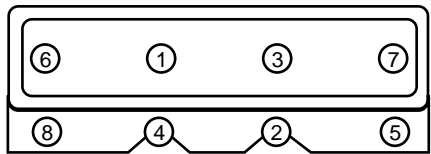
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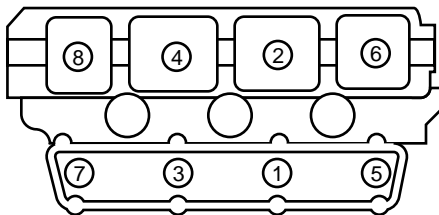
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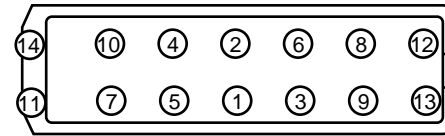
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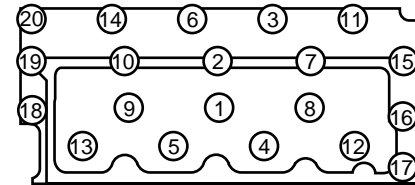
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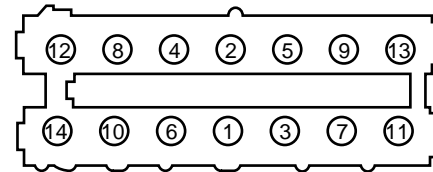
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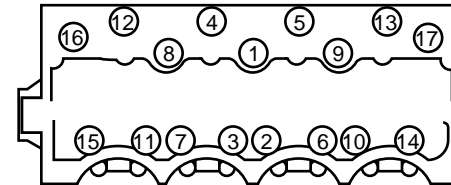
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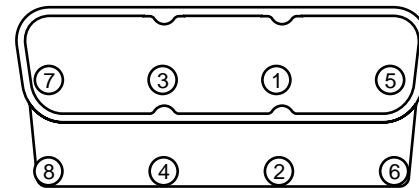
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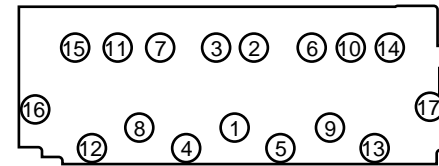
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93

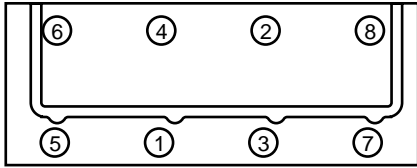


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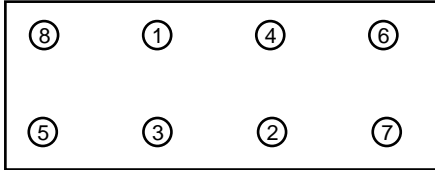


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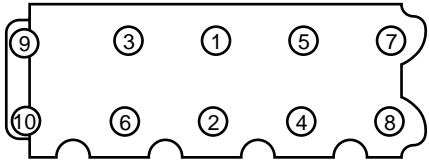
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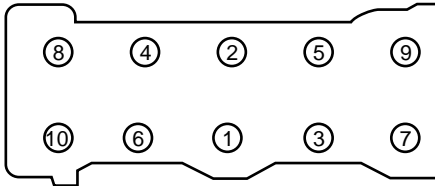
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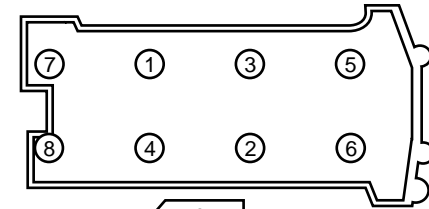
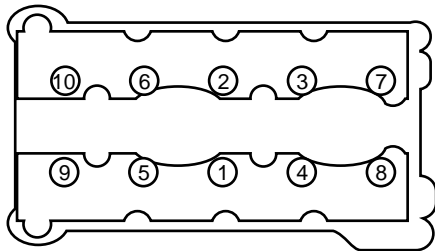
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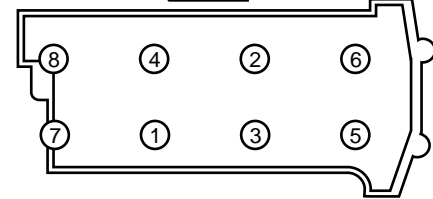
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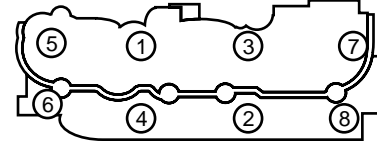
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101

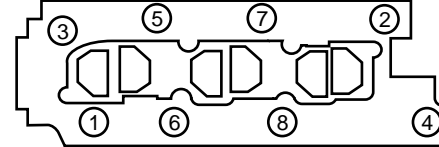


Cylinder Head Bolt Tightening Sequence

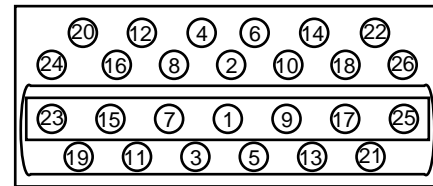


102

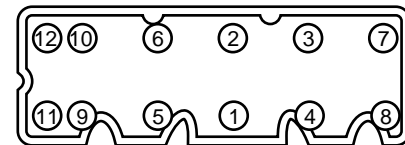
Lower Intake Manifold Bolt Tightening Sequence



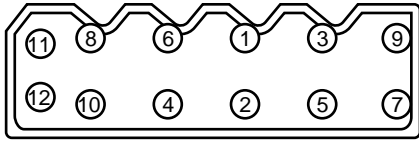
103



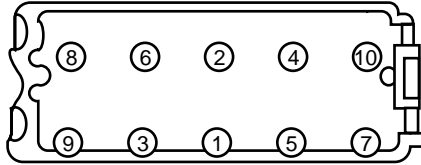
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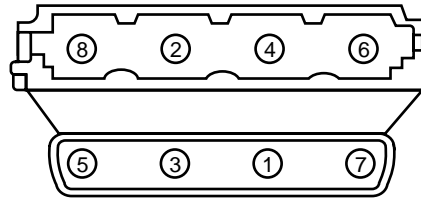
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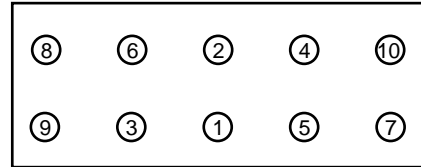
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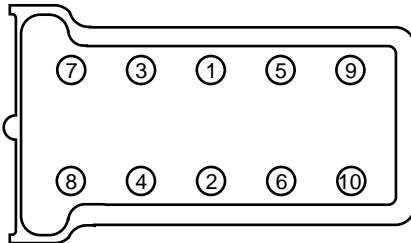
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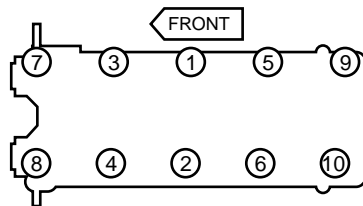
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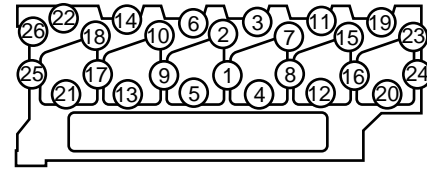
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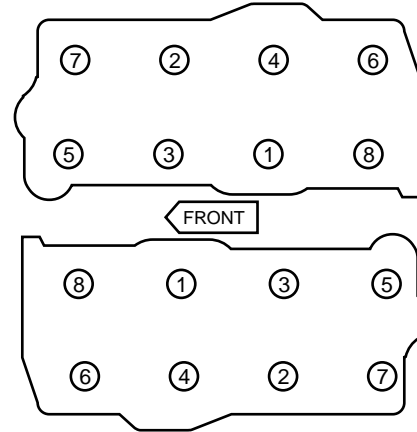
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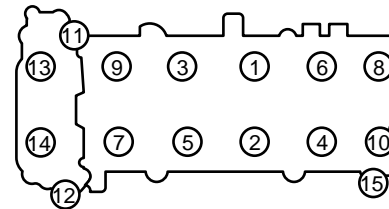
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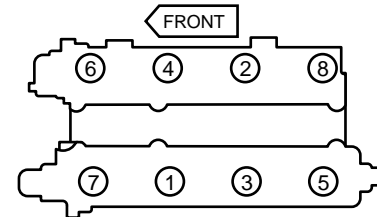
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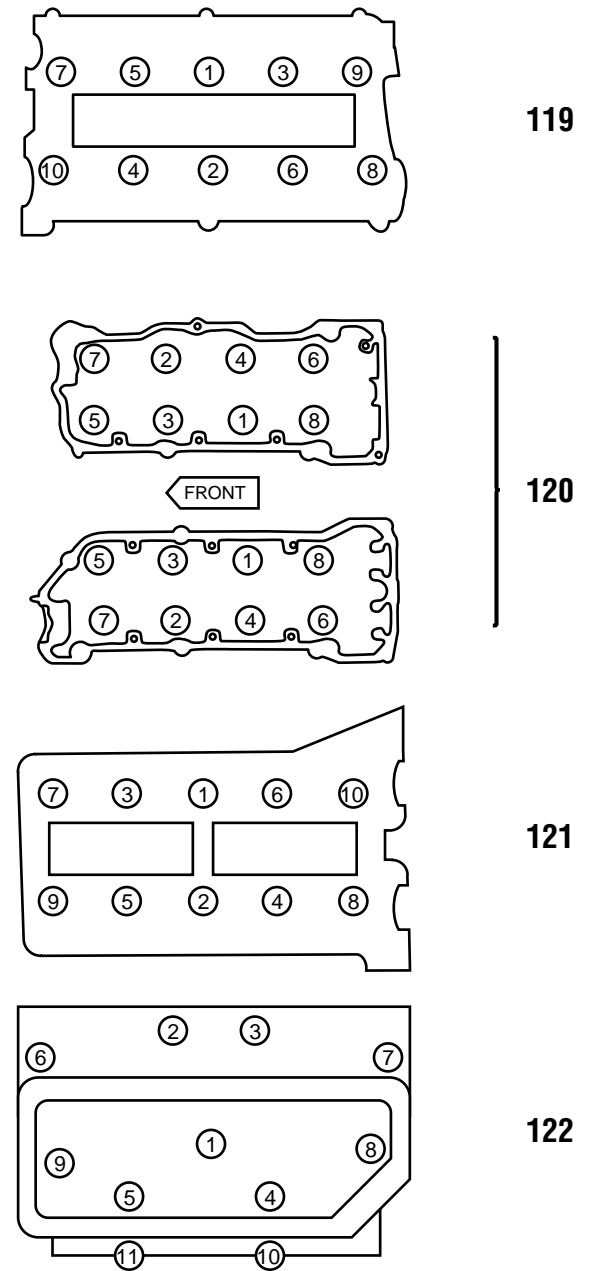
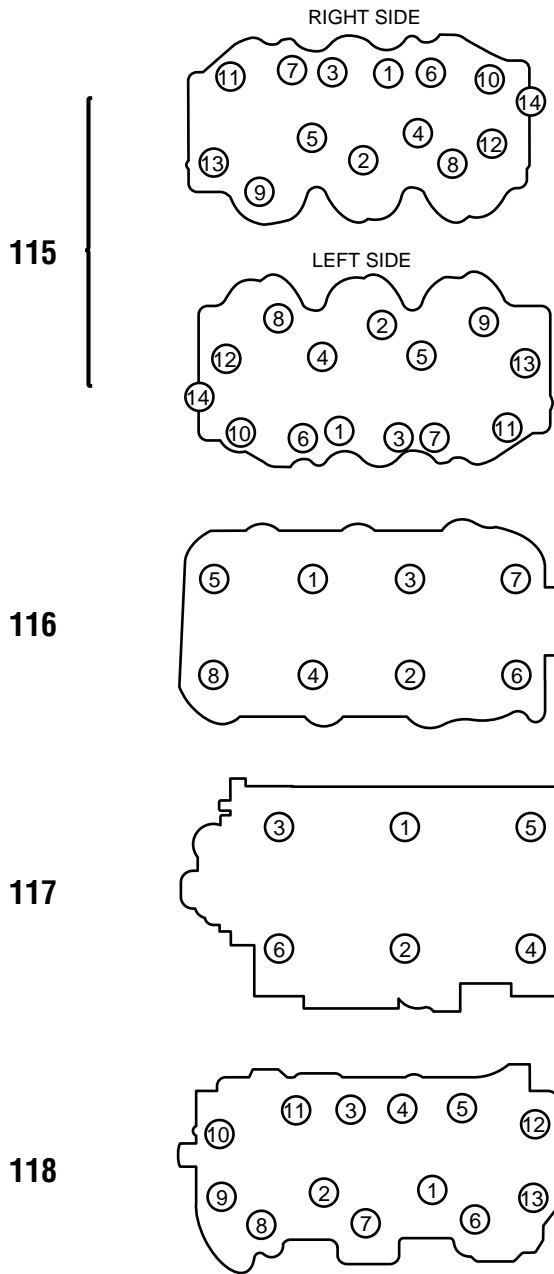


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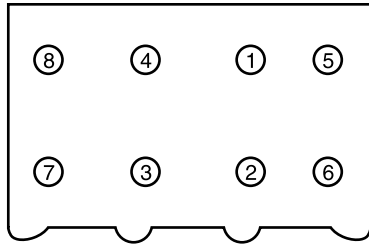


114

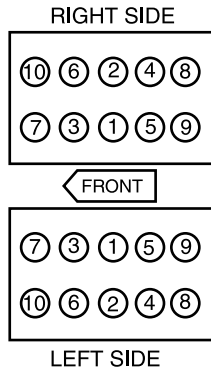




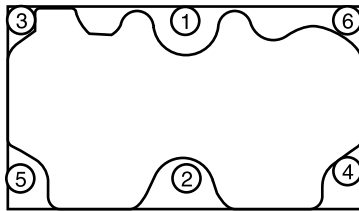
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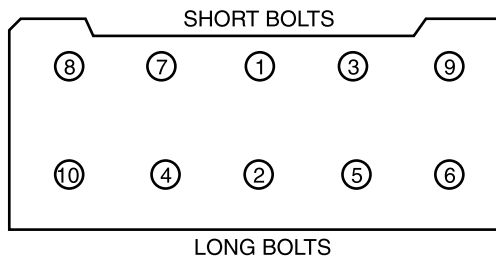
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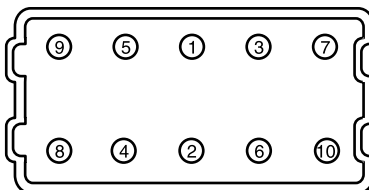
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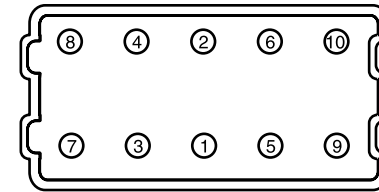
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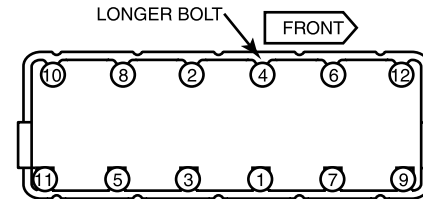
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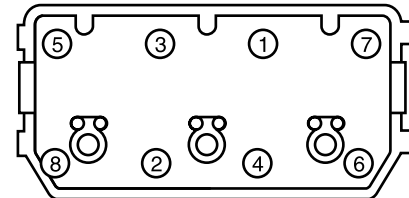
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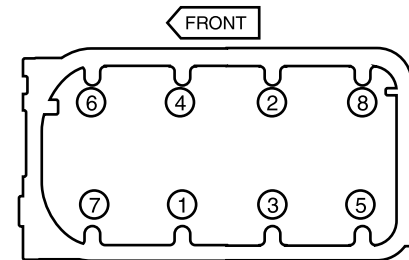
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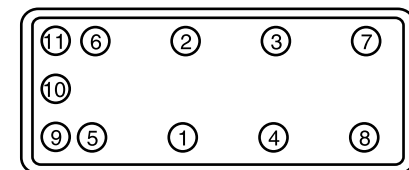
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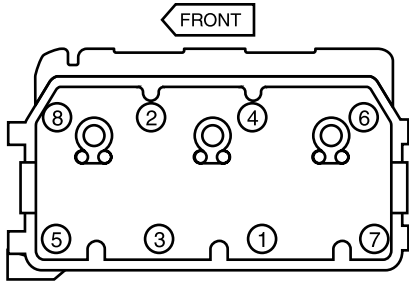
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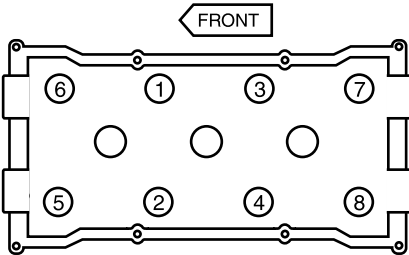
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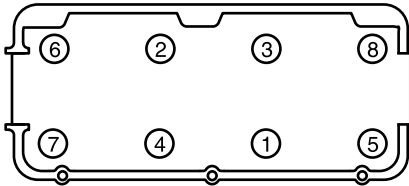
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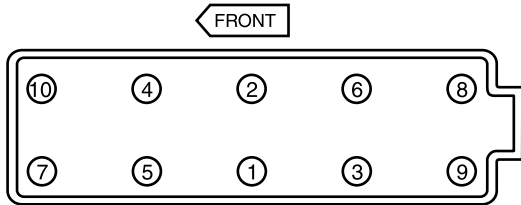
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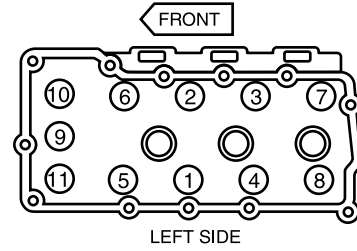
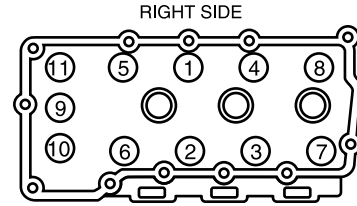
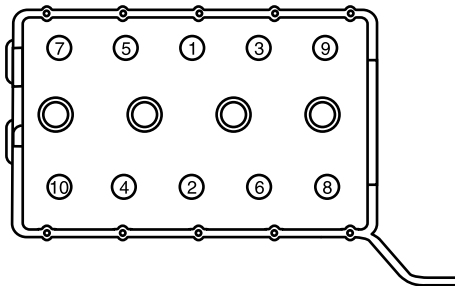
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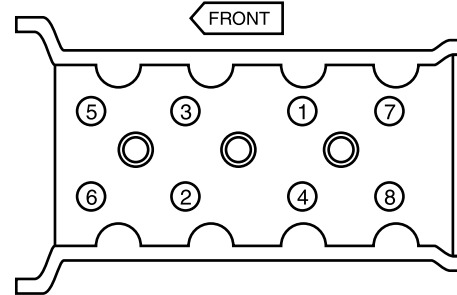


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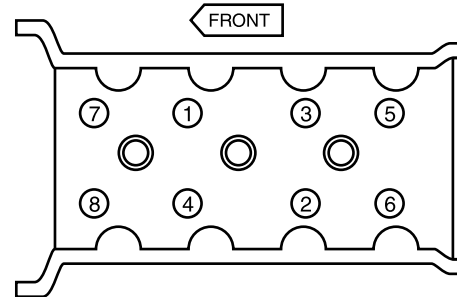


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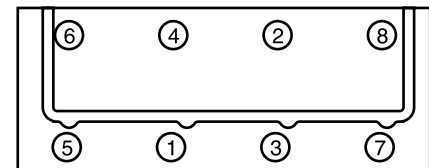
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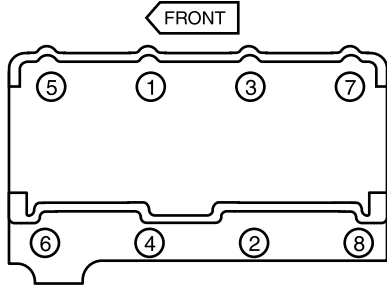
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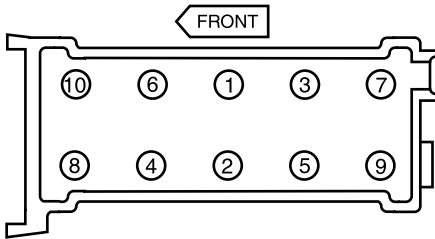
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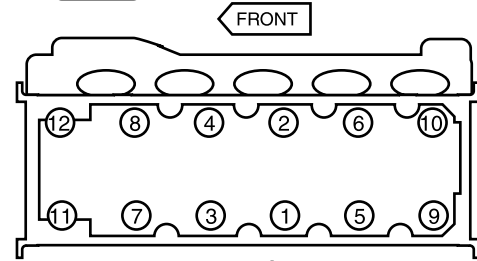
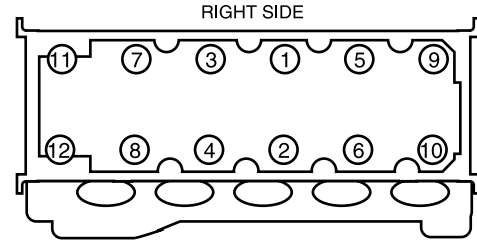
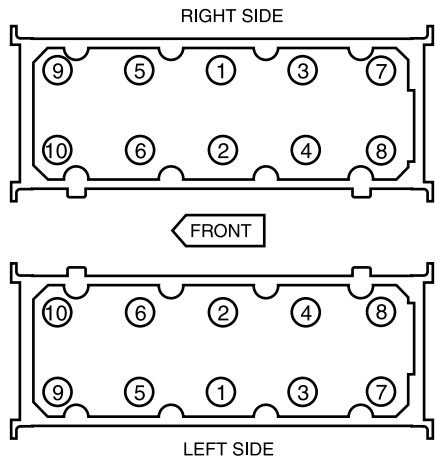
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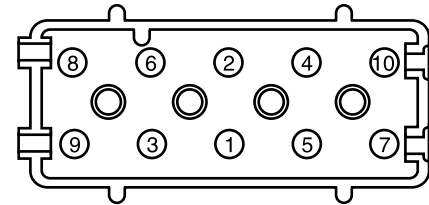


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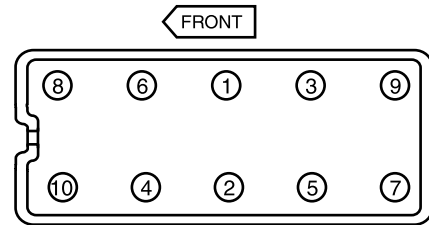


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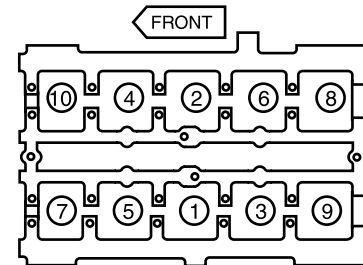
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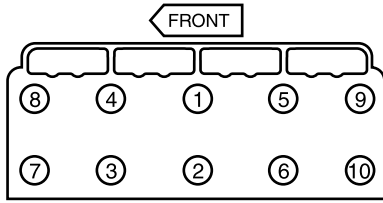
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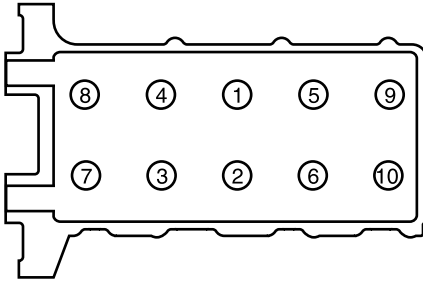
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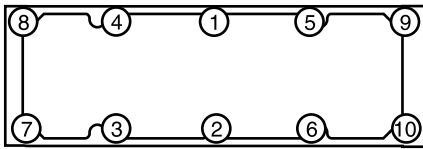
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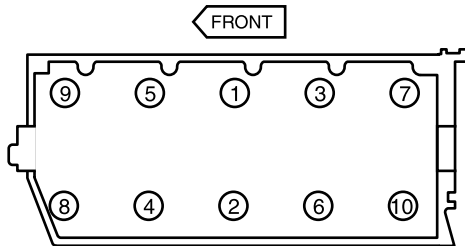
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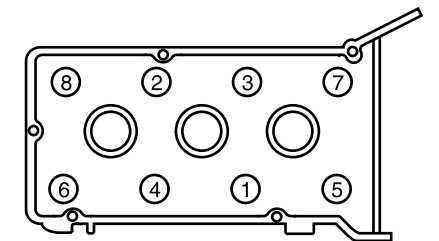
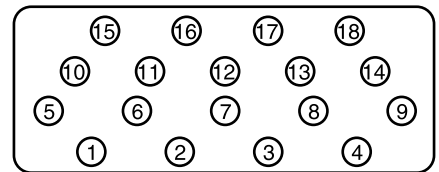
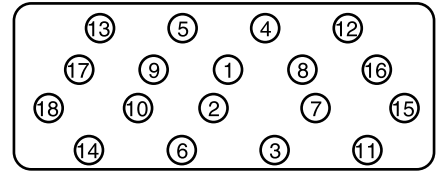
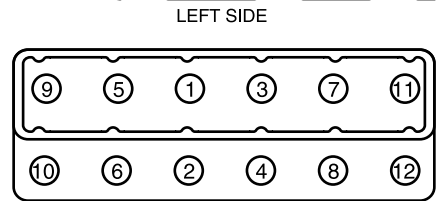
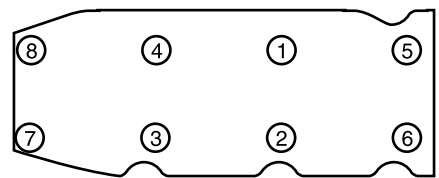
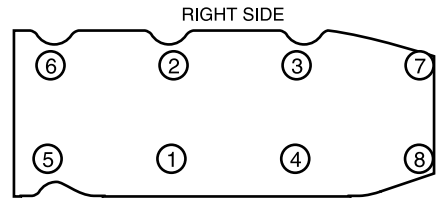
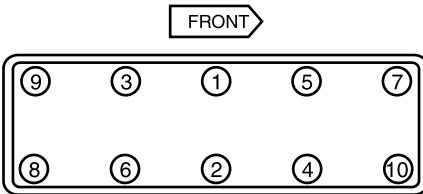
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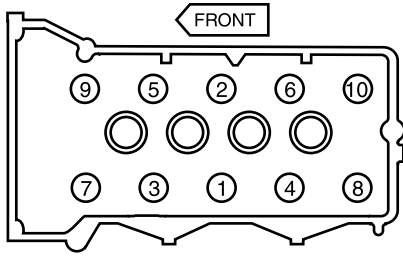
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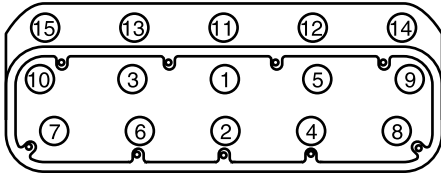
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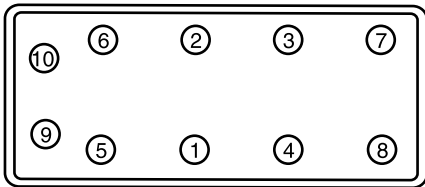
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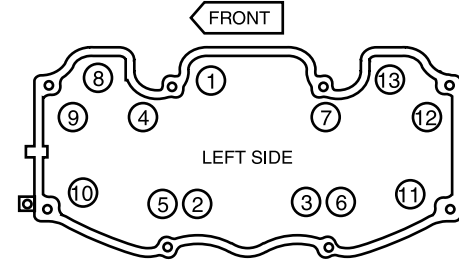
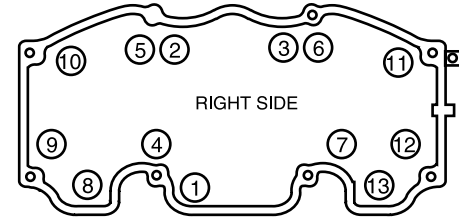
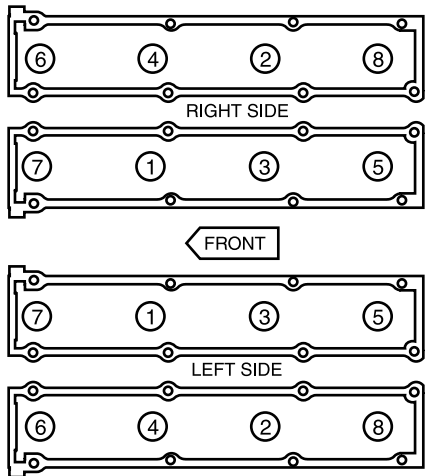
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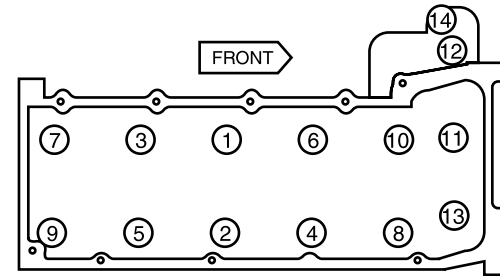
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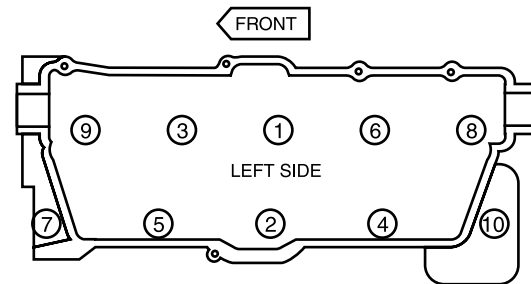
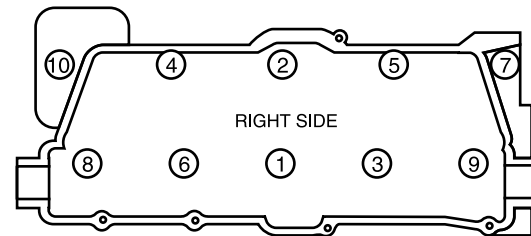
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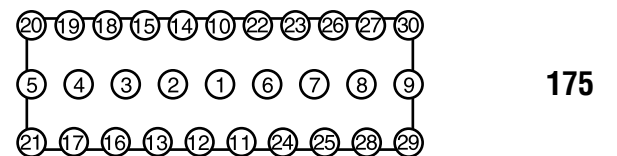
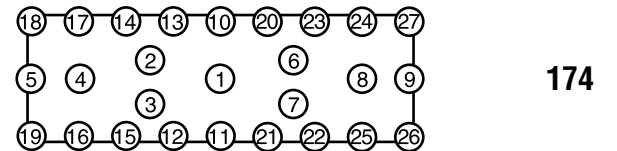
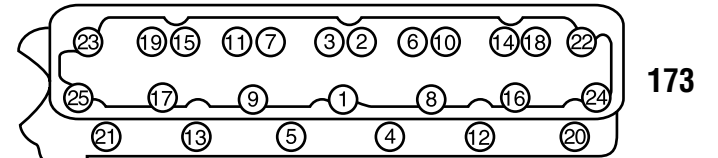
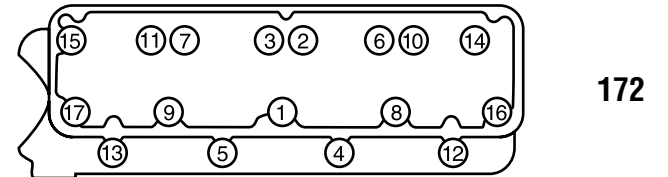
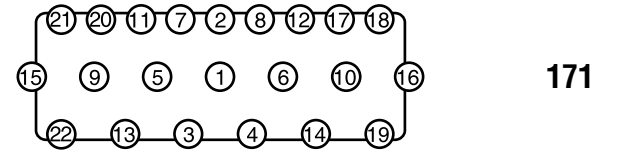
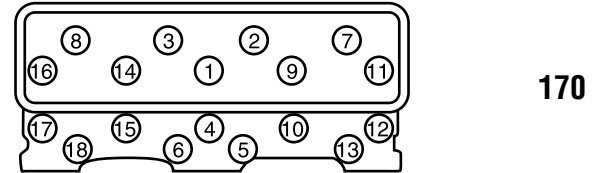
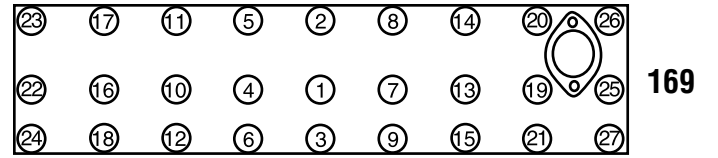
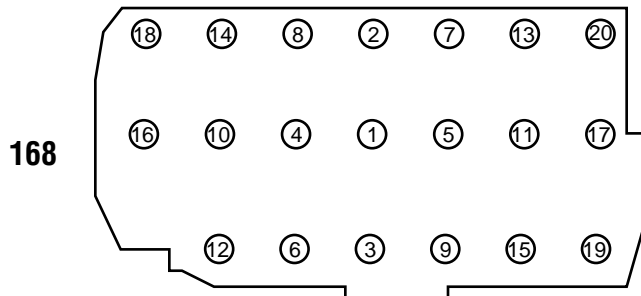
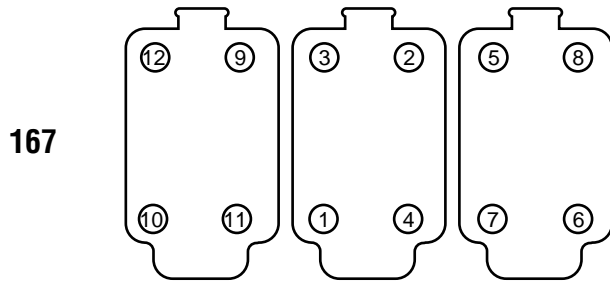
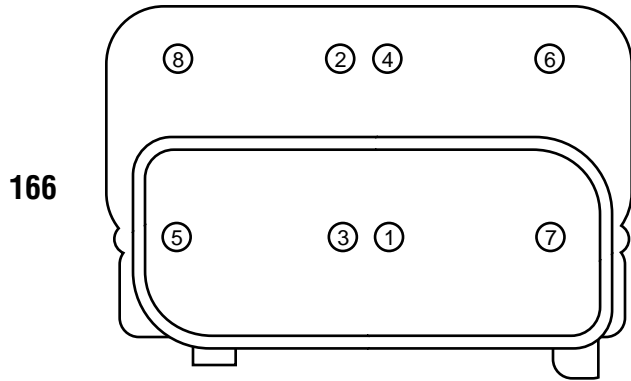
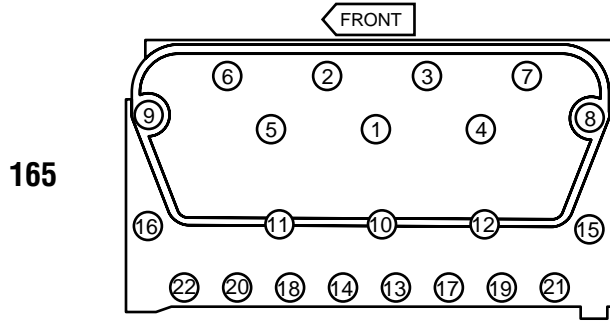
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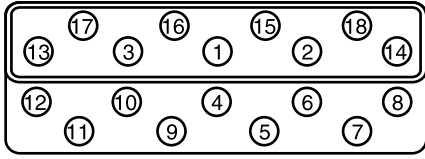
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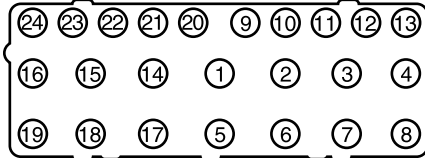
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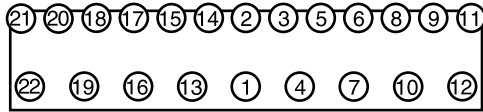
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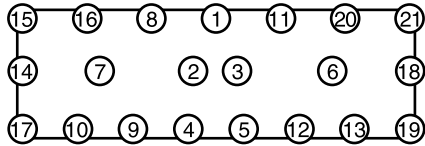
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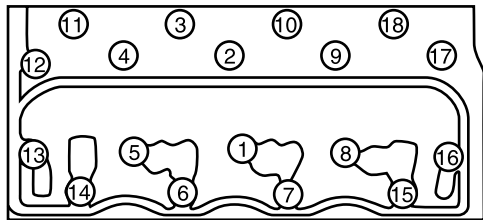
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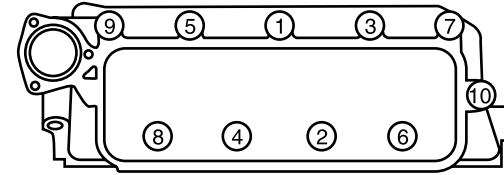
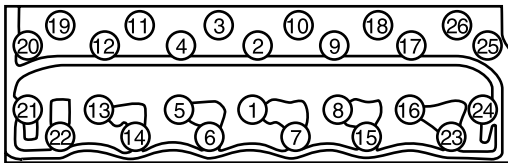
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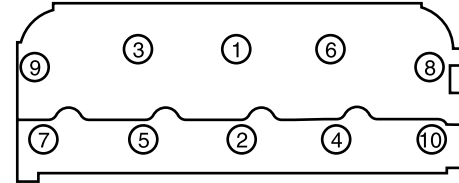
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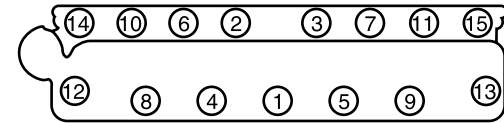
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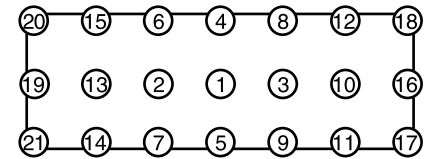
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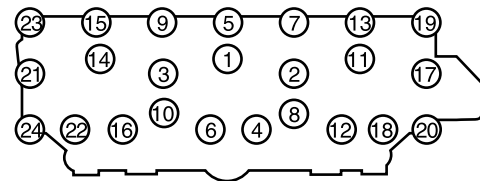
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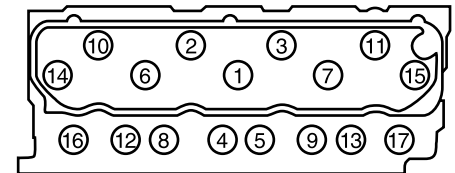
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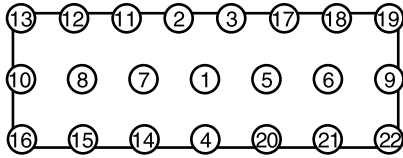


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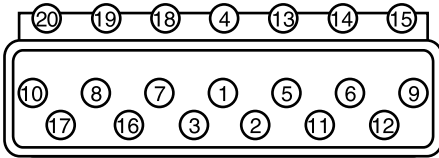


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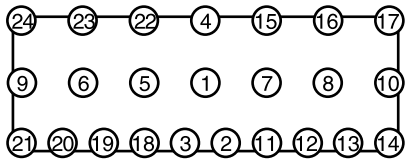
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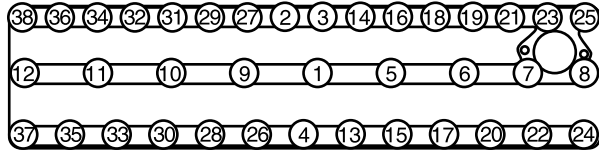
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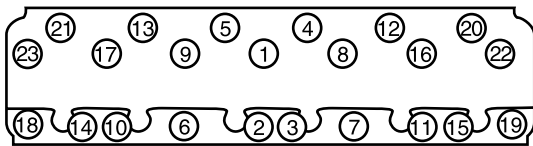
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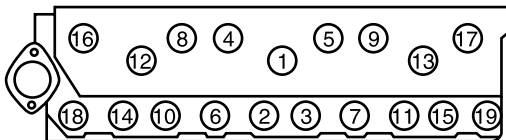
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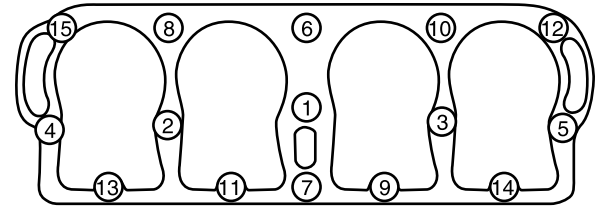
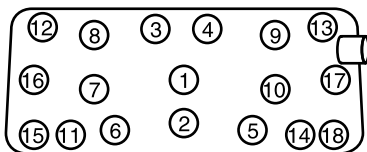
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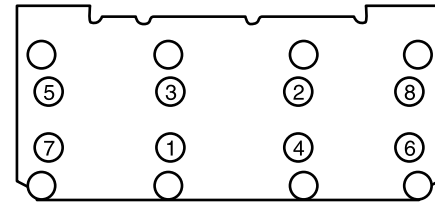
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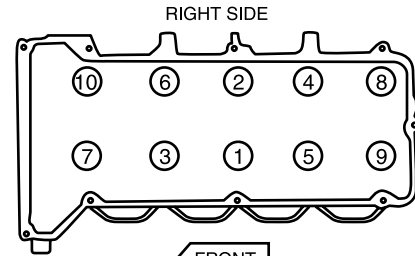
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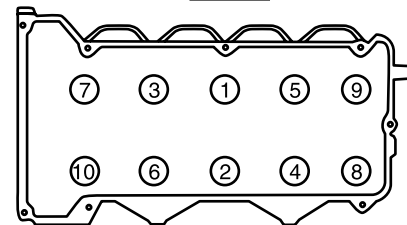


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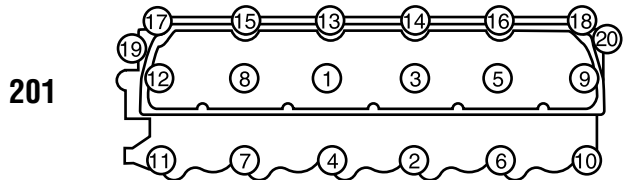
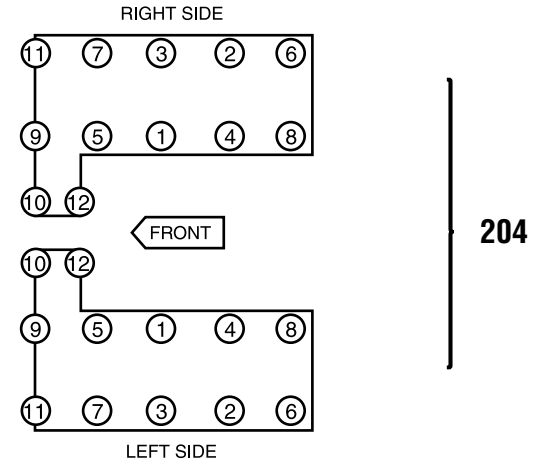
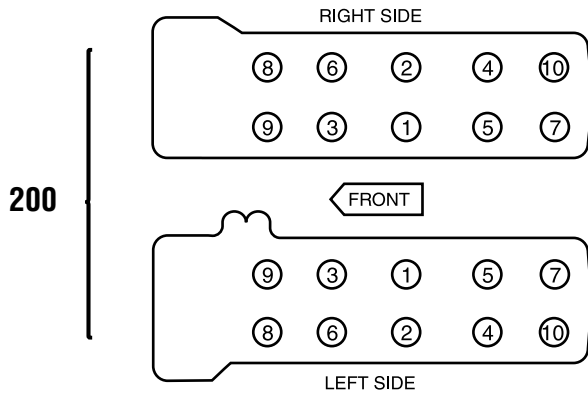
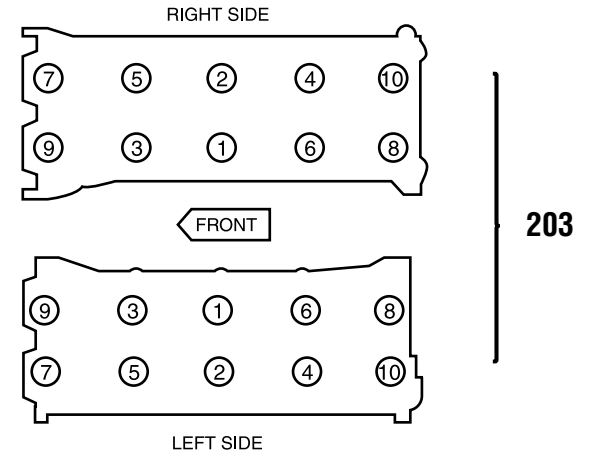
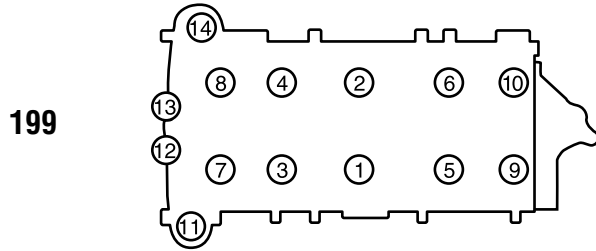
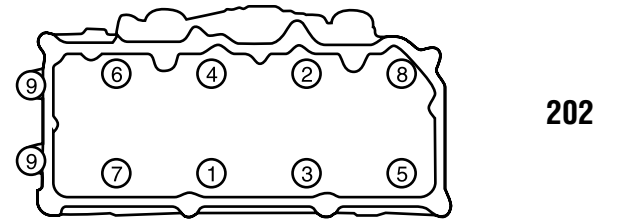
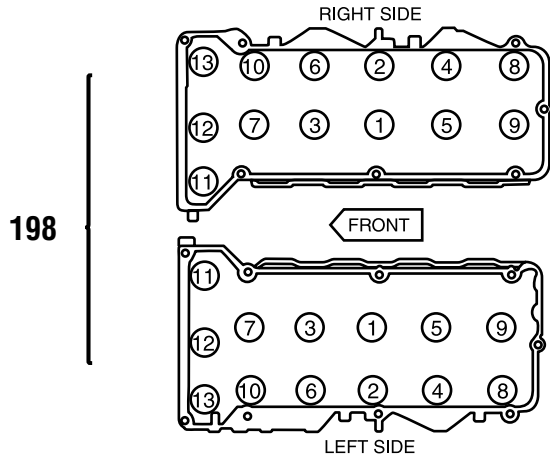
RIGHT SIDE

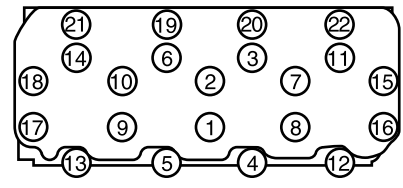
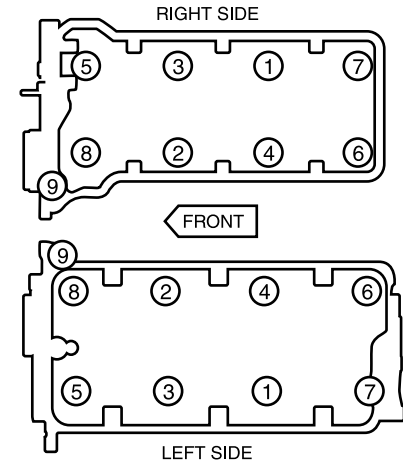
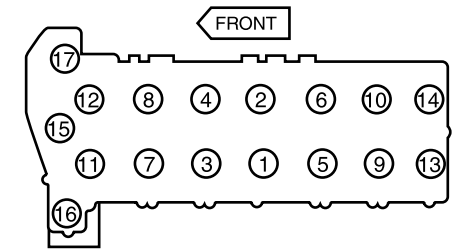
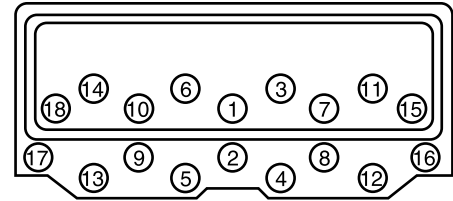
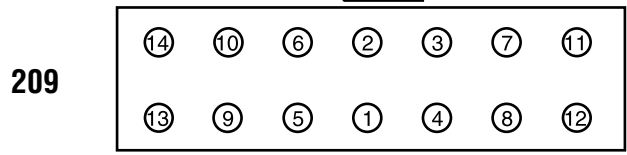
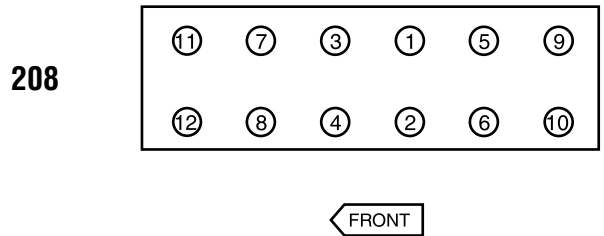
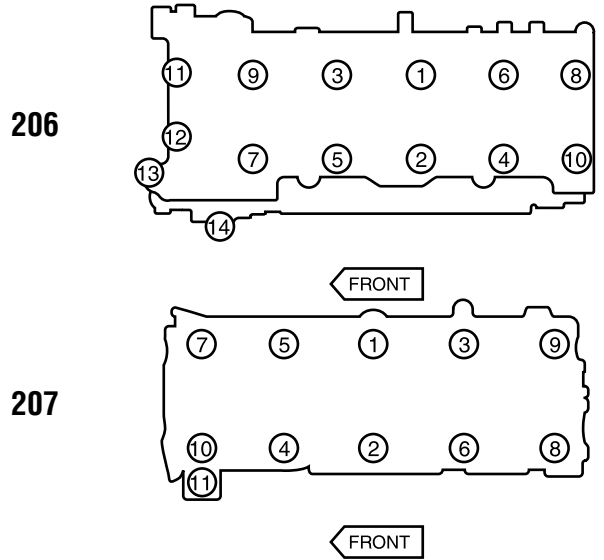
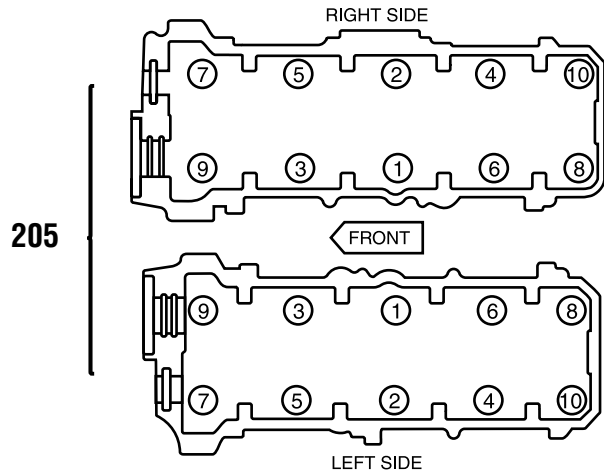
FRONT



LEFT SIDE

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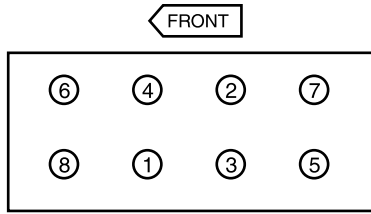
210

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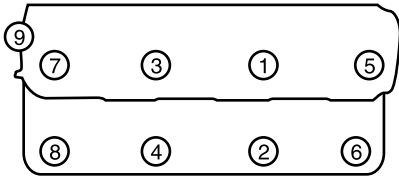
212

213

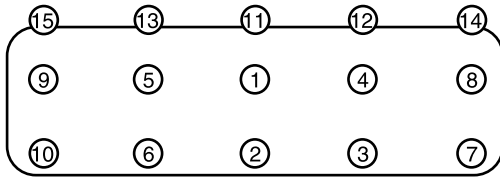
214



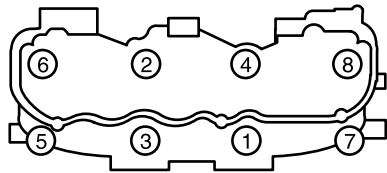
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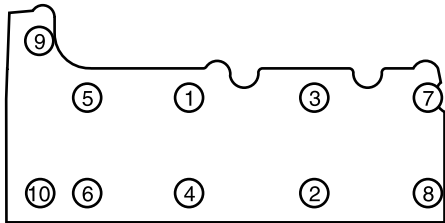
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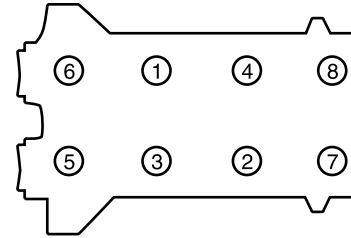
217



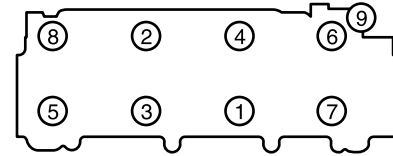
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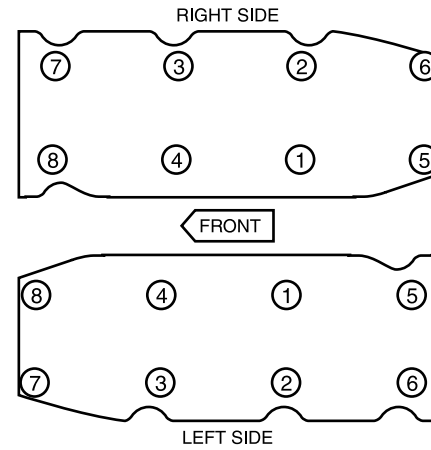
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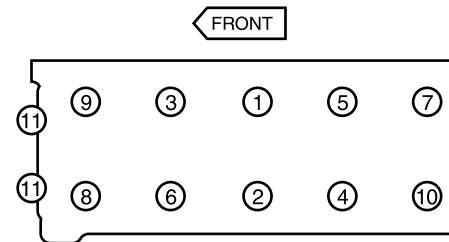
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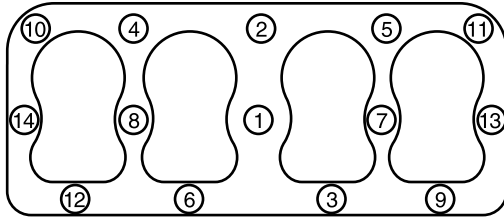
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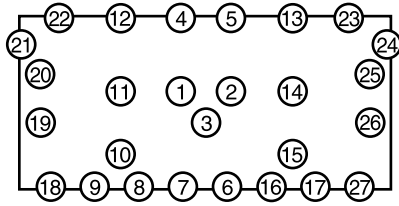
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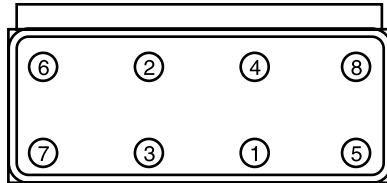
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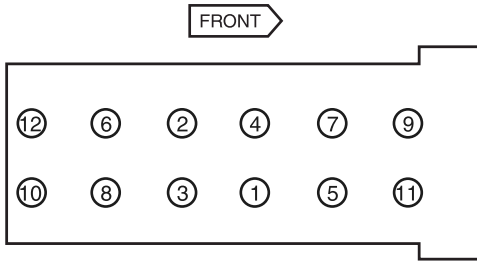
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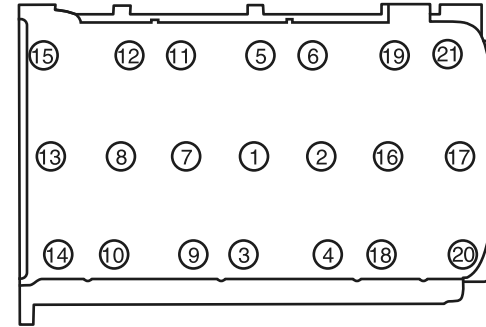
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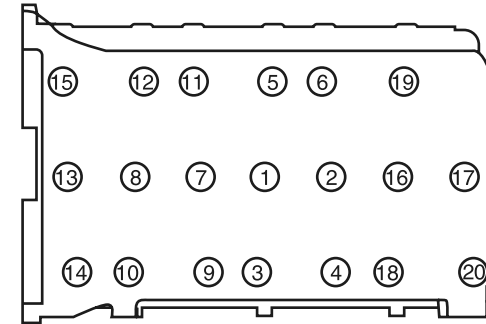


RIGHT SIDE

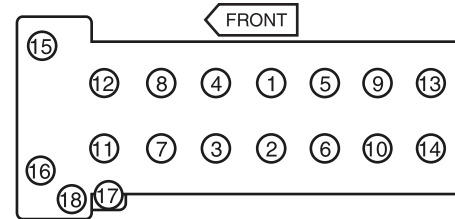


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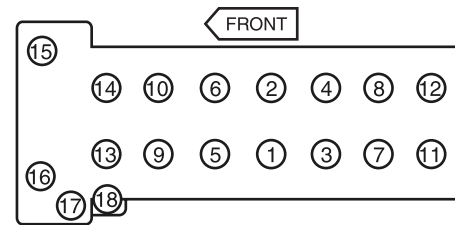
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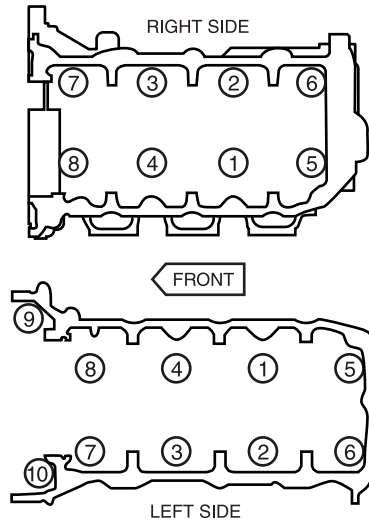


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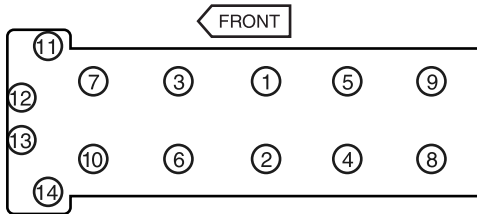


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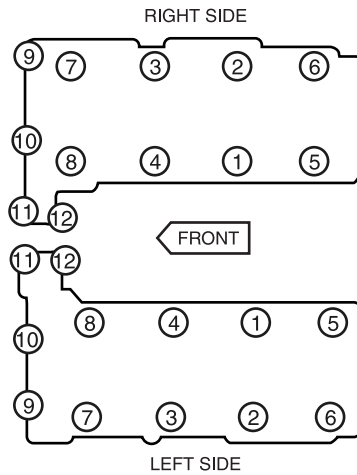
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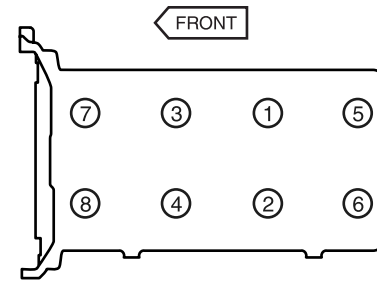
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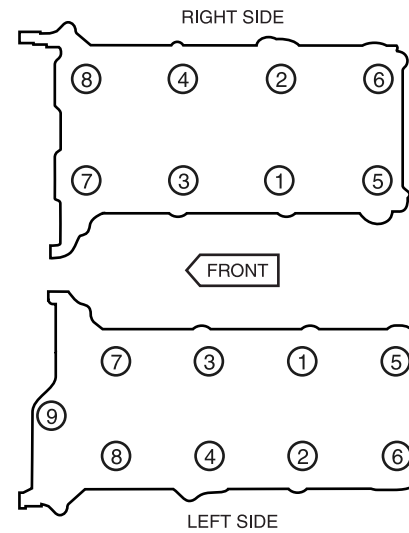
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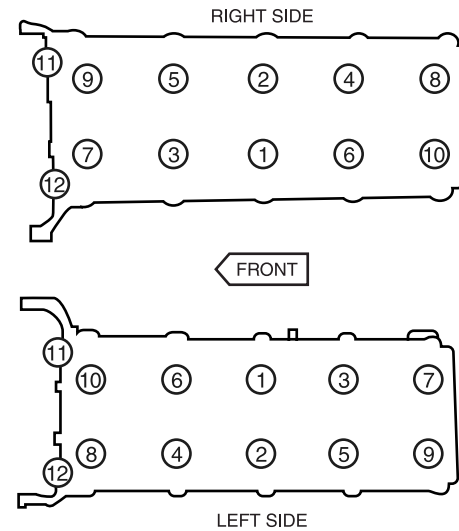
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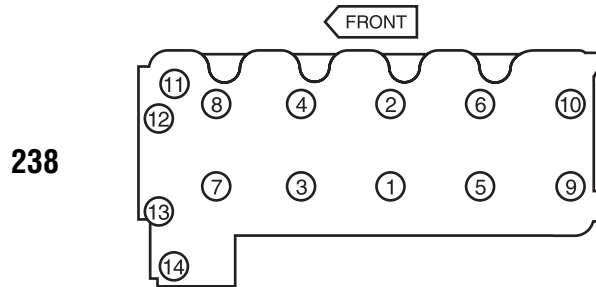
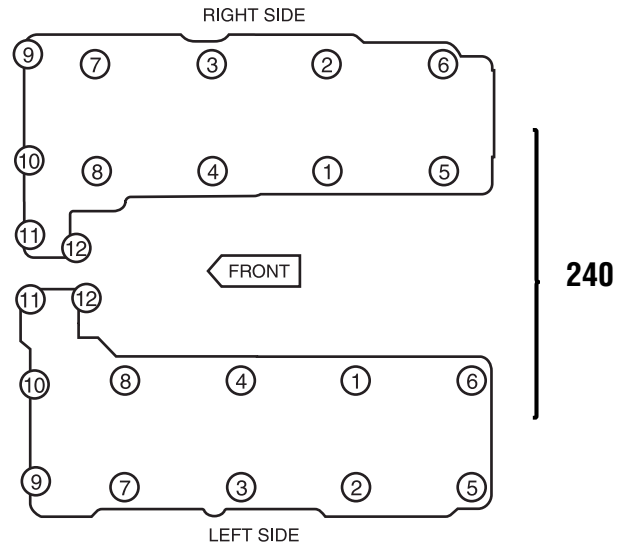
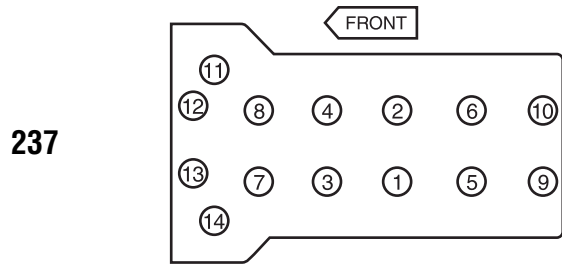
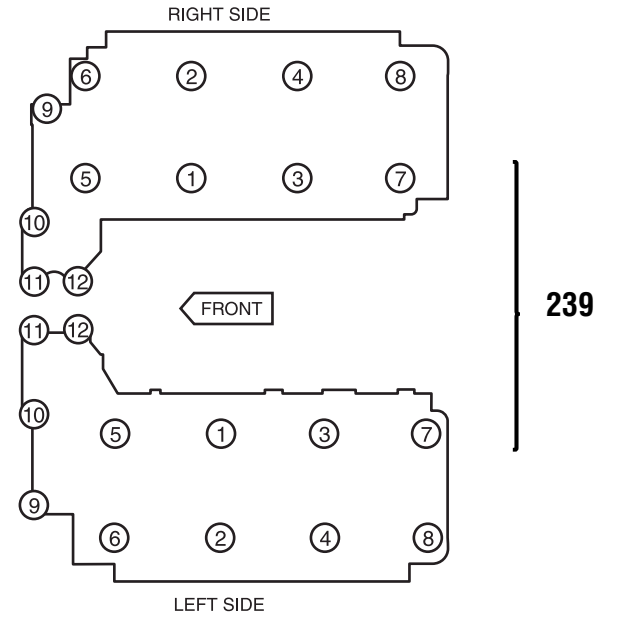
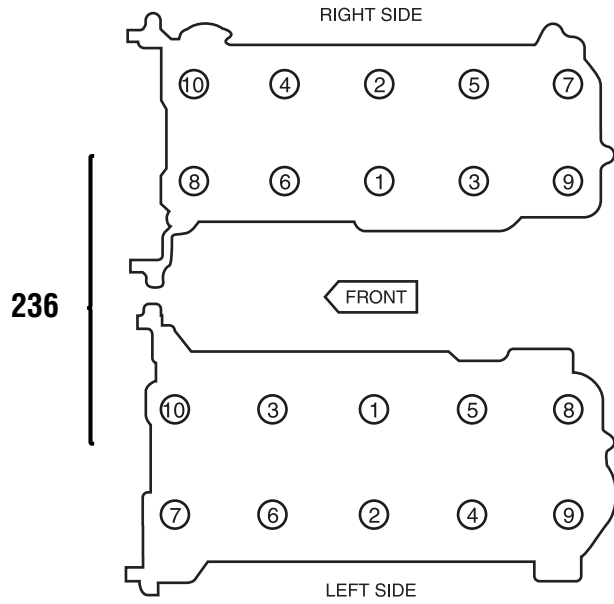


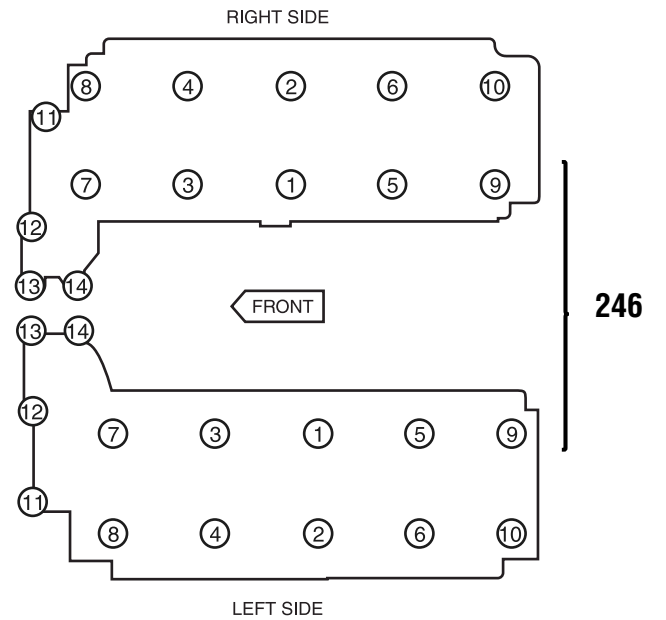
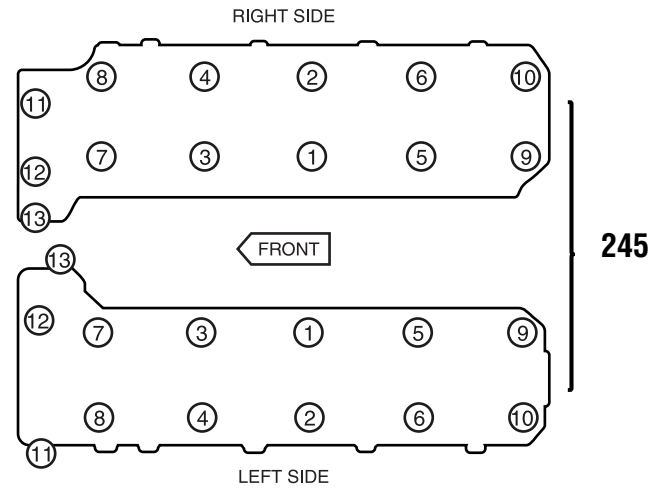
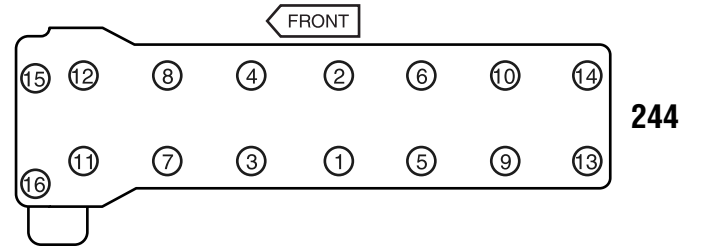
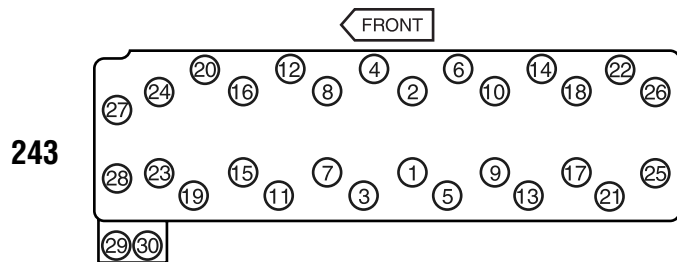
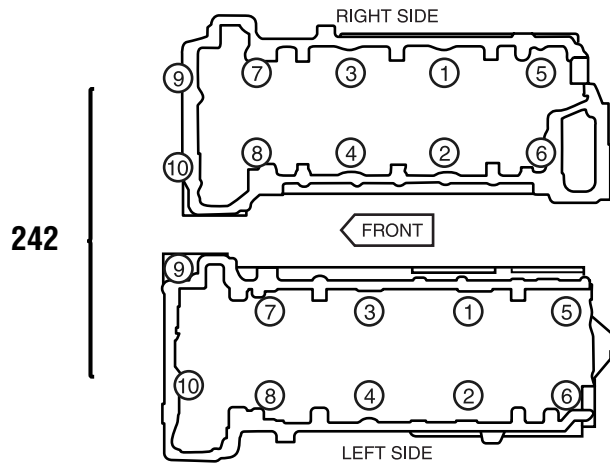
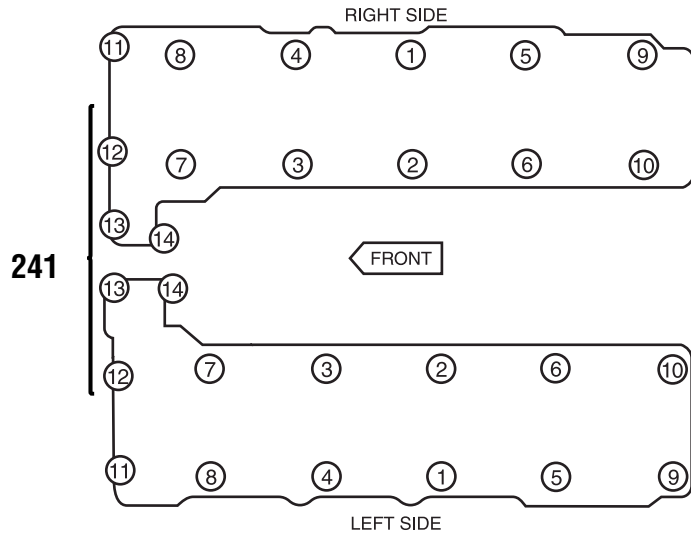
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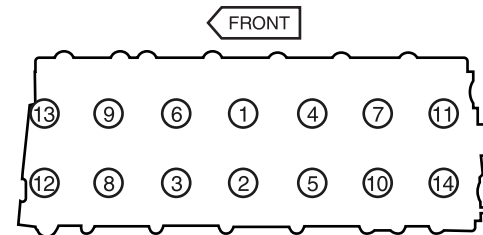
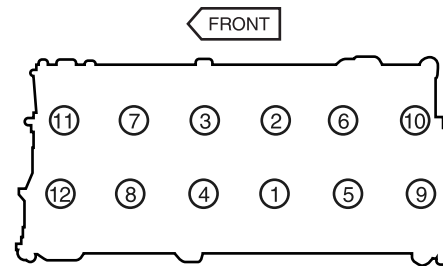
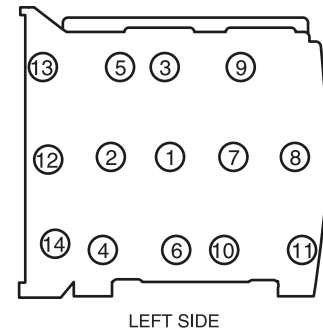
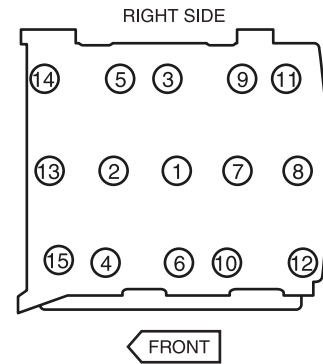
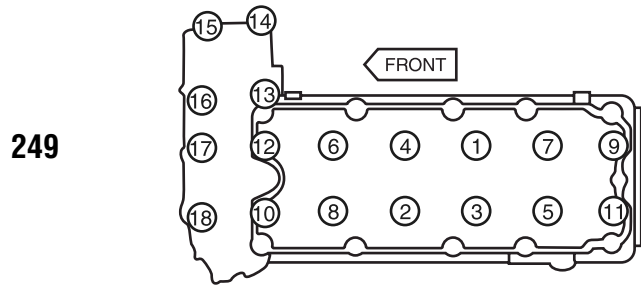
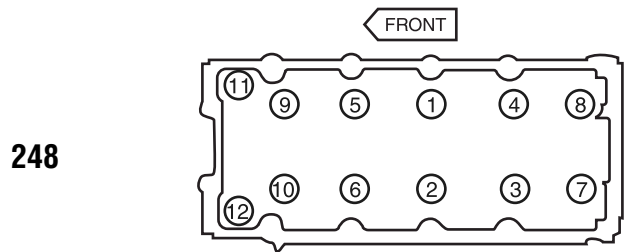
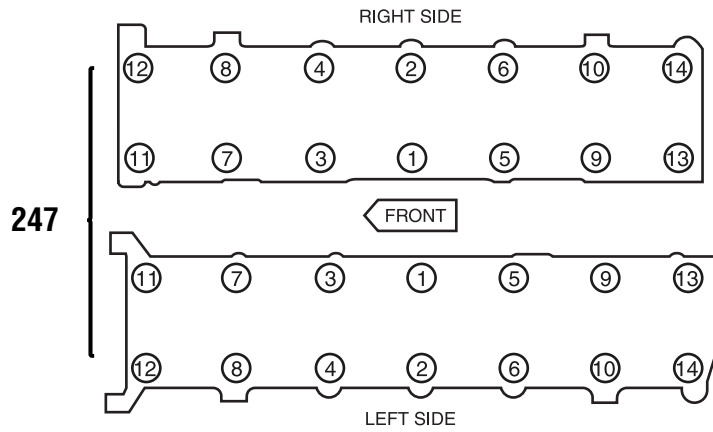


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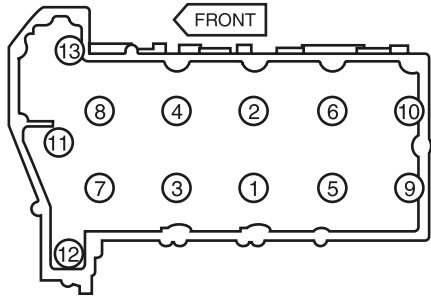


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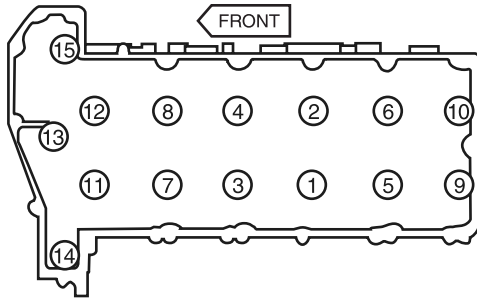
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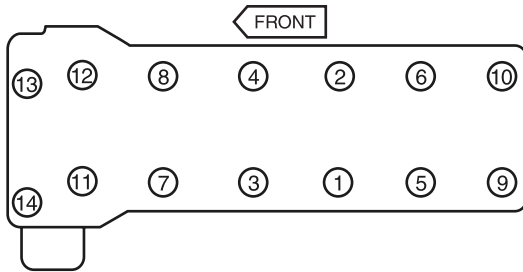
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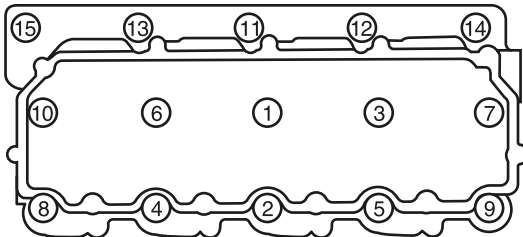
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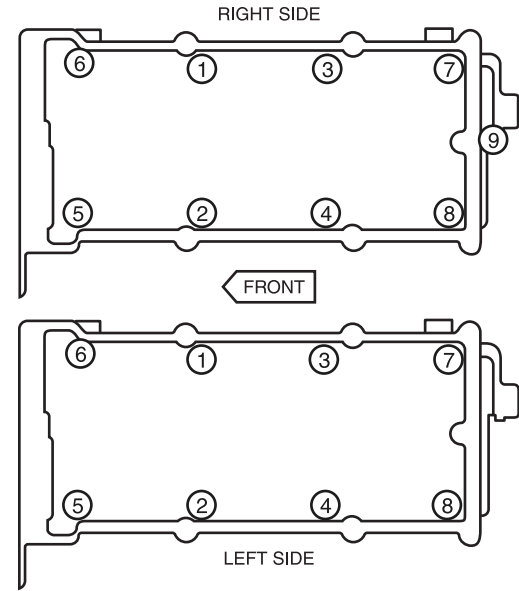
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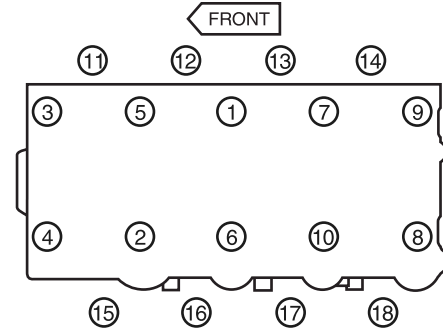
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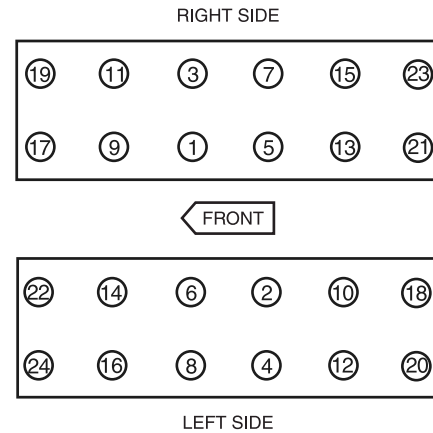
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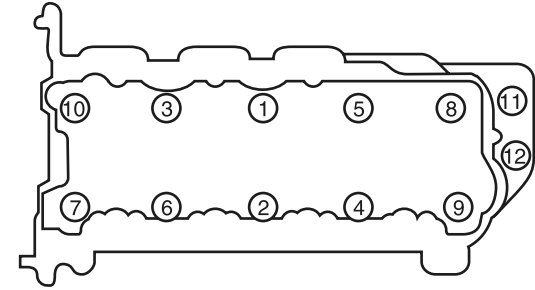
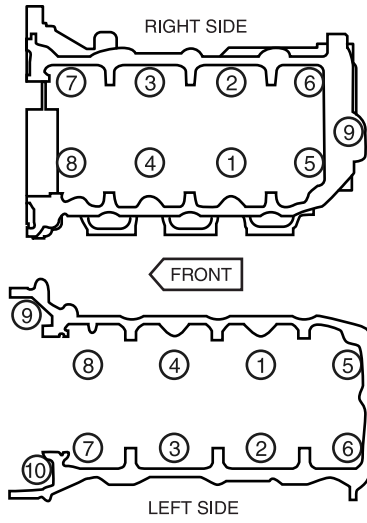
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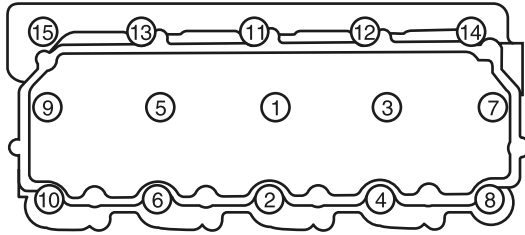


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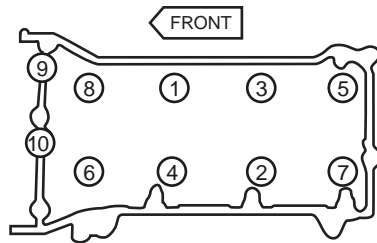


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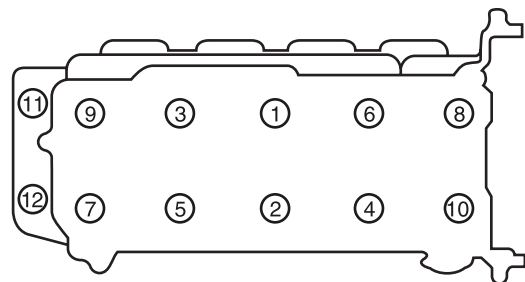
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