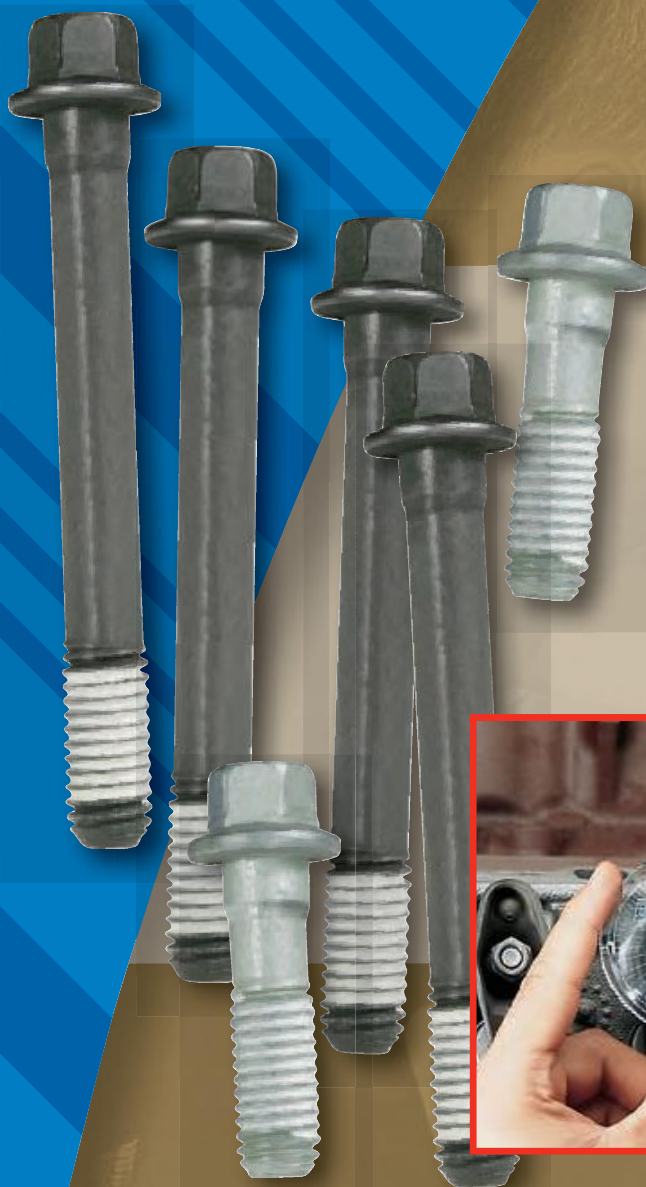
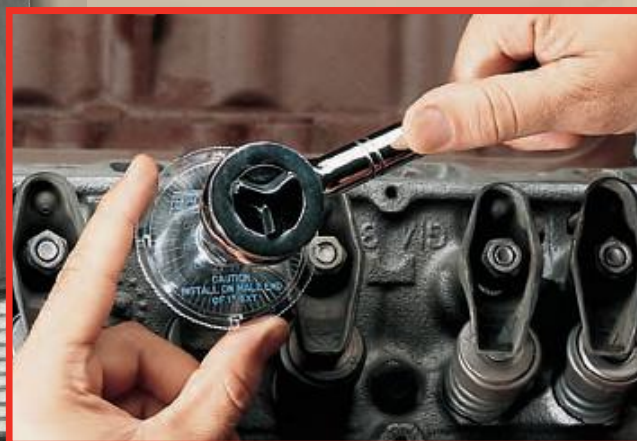


Tablas de Torque™



Tablas Completas de Especificaciones para Culatas de Cilindro de Autos y Camiones Ligeros y Medios Domésticos e Importados.



 **FELPRO®**

Las juntas que los profesionales confían®

100% PORCIENTO

SELLADO DEL AUTO

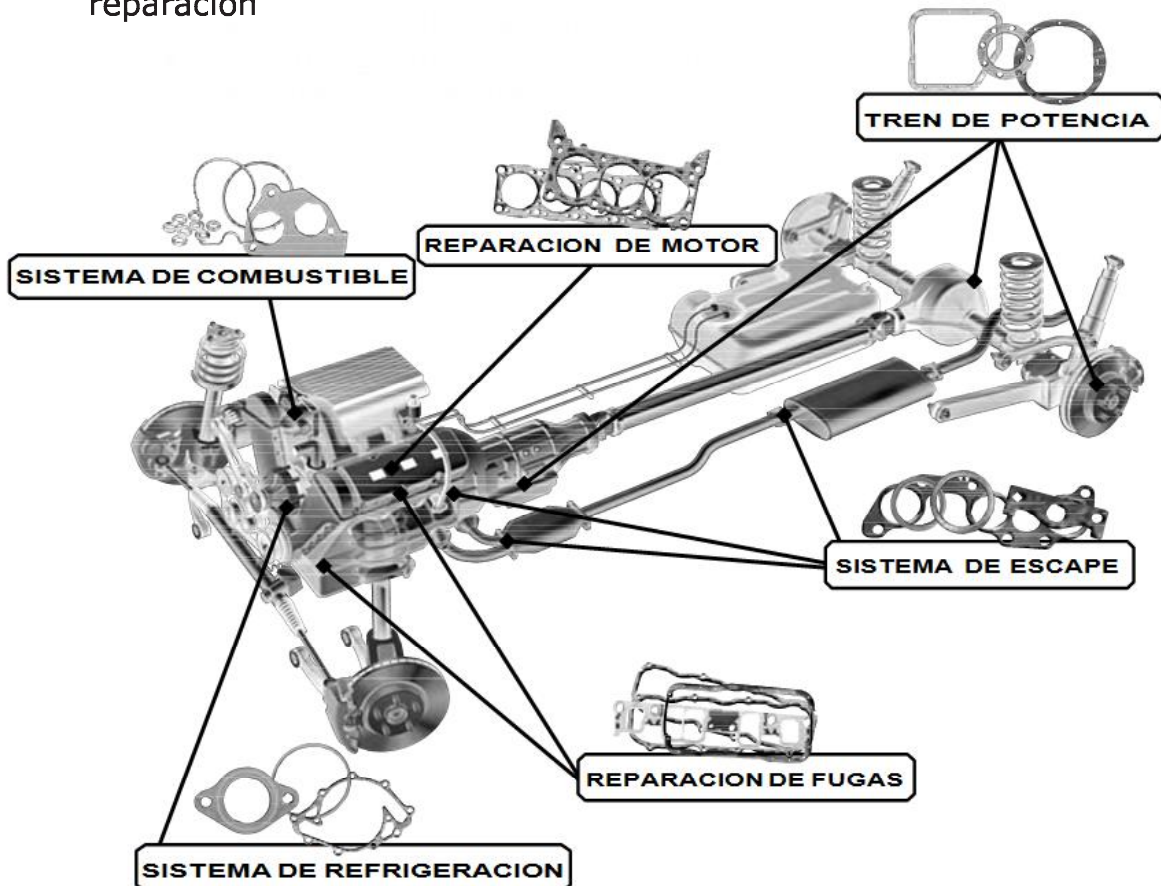
Cuando considera que puede salir mal si falla incluso una "pequeña" junta, entonces se da cuenta de una cosa:

NO HAY JUNTA SIN IMPORTANCIA!

Cada junta, no importa su tamaño, tiene un papel crítico en el sellado de un vehículo. Cada uno debe ser el mejor. Por eso Ud debe estar... 100% Fel-Pro.®

Por qué confiar en las juntas Fel-Pro para TODAS las necesidades de su vehículo?

- Líder indiscutible en la tecnología de sellado
- Diseñado para el ambiente de reparación
- Química de caucho moldeado y experiencia en la manufactura
- Recursos globales de ingeniería
- La tecnología más reciente en cada categoría de juntas para reparación



FEL-PRO®
Las juntas que los profesionales confían®

Reparación de Motor

Fel-Pro® ofrece cobertura completa para virtualmente cada oportunidad de reparación de motor, desde reconstrucciones completas hasta la reposición de una sola junta o sello. Además, Fel-Pro ofrece el mejor material de juntas y diseño en cada aplicación para asegurar un sello seguro desde la primera vez cada vez.



Tecnologías de Reparación de Motor:

- **PermaTorqueMLS®**

Estas juntas de culata brindan el diseño correcto para vehículos equipados con Juntas de Capas Múltiples y con una película única en el mercado que se ajusta a superficies menos que perfectas.

- **PermaTorque®**

El estándar de la industria para juntas de culata de no-retorque, con recubrimientos de primera, cubiertas y contrafuertes de combustión.

- **PermaTorque SD®**

Juntas para culata para trabajo severo diseñados con resistencia adicional bajo condiciones demandantes.



 **FEL-PRO®**

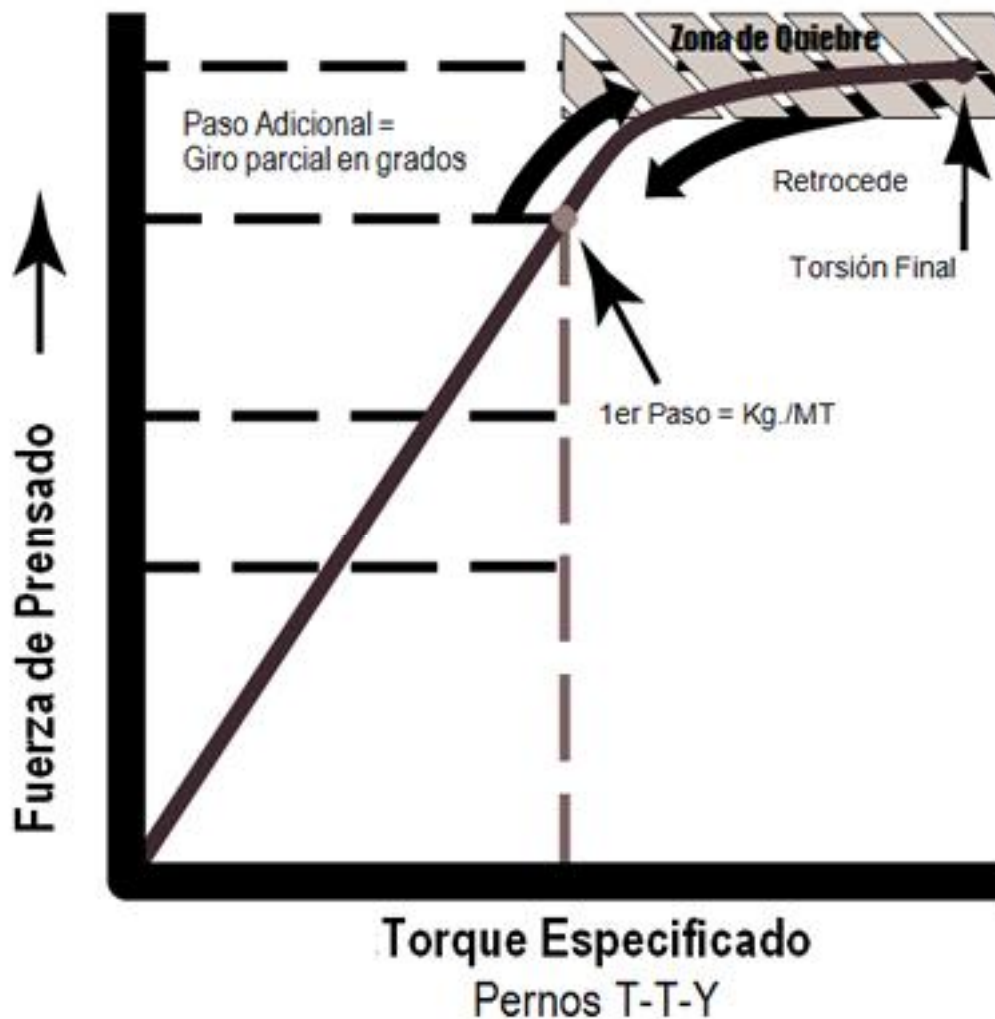
Las juntas que los profesionales confían®

Entendiendo el Torque-al-Punto-de-Quiebre de los pernos de culata

Los pernos para culata T-T-Y son comunes particularmente en motores con culatas de aluminio y/o con juntas de múltiples laminas de acero. Estos pernos están diseñados para estirarse dentro de una zona controlada de "quiebre". Una vez que llegan a esta zona, retroceden tensión para lograr un nivel preciso de fuerza de agarre sobre toda el área de la junta.

Es importante seguir cuidadosamente la especificación de apriete del fabricante. Una vez que los pernos T-T-Y se estiran sobre su punto de quiebre, se vuelven inútiles. Típicamente, los pernos T-T-Y se aprietan a una torsión límite específica, luego de nuevo un giro parcial adicional para lograr el punto de quiebre del perno.

Se recomienda nunca reutilizar un perno T-T-Y. Es muy posible que ya excediera su barrera de elasticidad y no retrocedan para sellar el motor adecuadamente.



FELPRO[®]
Las juntas que los profesionales confían[®]

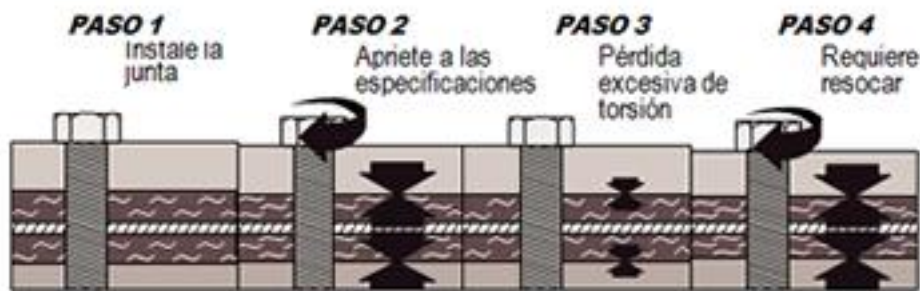
Importancia de un Torque Adecuado

Cuando una junta de culata se instala entre la culata y el bloque de motor, la junta se comprime ligeramente cuando se aprietan los pernos de culata, permitiendo que el material blando de la cubierta de la junta se conforme a las pequeñas irregularidades de las superficies de la culata y el bloque. Esto le permite a la junta "sellar en frío" por lo que no fugará refrigerante antes que el motor de encienda.

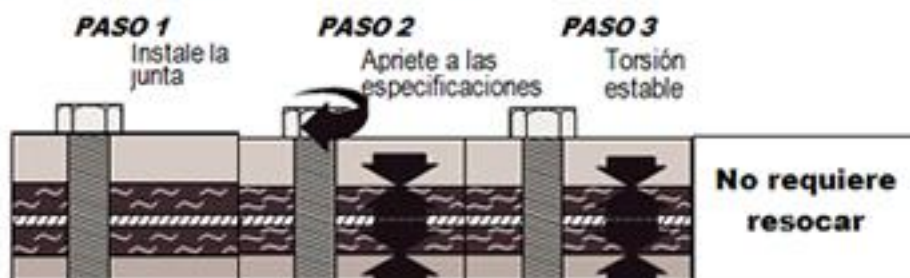
La habilidad de la junta de culata para lograr un sellado en frío positivo, así como para mantener un sello duradero, libre de fugas depende de dos cosas: Su propiedad inherente para mantener la torsión a través del tiempo (lo cual depende del diseño de la junta y los materiales utilizados en su construcción) y de la fuerza de prensado aplicada a los pernos de culata.

Las juntas Permatorque® están hechas con los materiales de la más alta calidad y diseñados para mantenerse invariables por lo que retienen la torsión, por lo que no necesitan resocarse.

Junta de Culata Competitiva



Juntas de Culata PermaTorque®:



FEL-PRO®

Las juntas que los profesionales confían®



Pernos de Culata

Nunca debe reutilizar los pernos de Torsión-al-Límite. Puede causar daños al motor y a la culata de cilindro.

- Los pernos Fel-Pro® brindan la fuerza de prensado más consistente posible
- Apriete adecuadamente para lograr los mejores resultados.



Indicador de Torque-por-Ángulo (Parte Número TRQ-1)

Con los pernos de culata T-T-Y, debe utilizar el Indicador de Torsión-por-Ángulo (Parte Número TRW-1) junto con una llave dinamométrica para lograr la carga correcta sobre el perno. Mientras que los pernos de culata se aprietan al valor especificado, el técnico puede utilizar la herramienta TRQ-1 para medir con exactitud los grados de giro adicionales que requiere. Esto elimina tener que conjeturar y le asegura resultados más consistentes.



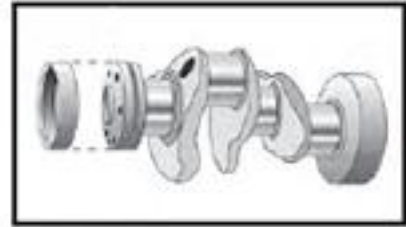
Indicador de Torsión-por-Ángulo
(Parte Número TRQ-1)



FEL-PRO®
Las juntas que los profesionales confían®

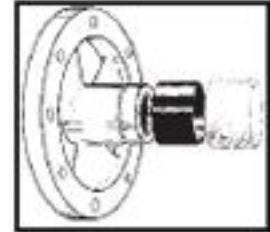
Otros Productos de Fel-Pro® que ayudan en la instalación

Camisas de Reparación de Cigüeñal
Repara las ranuras del cigüeñal en el
área del sello posterior de bancadas



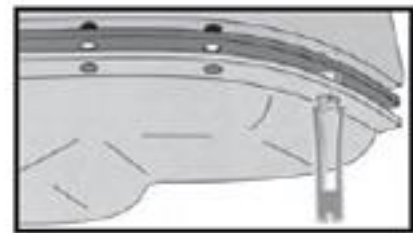
Camisa y Sello

Repara las ranuras del balanceador
armónico para el sello de la cubierta de
válvulas.



Clavos de Cáster (SnapUps®)

Los SnapUps® están diseñados para
apoyar el cárter y las juntas, y permitir
una instalación rápida y conveniente de
los pernos. Los Snap-Ups están incluidos
en los juegos de juntas para cárter
PermaDryPlus®.



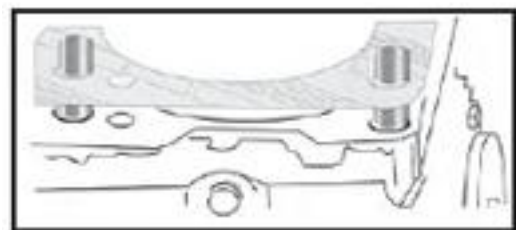
Distribuidores de Carga en las Tapas de Válvulas

Los Distribuidores de Carga distribuyen la
fuerza de prensado más uniformemente
en los acoples de las tapas de válvula.
Esto brinda un mejor sellado entre la
tapa de válvula y el reborde.



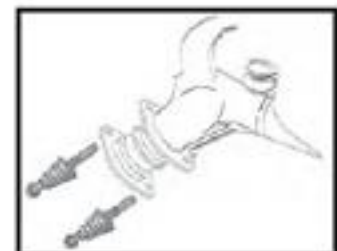
Clavos Guía para Cabezal de Cilindros

Los clavos de alineamiento para cabezal
de cilindros aseguran la ubicación
adecuada de la junta y la fundición
del cabezal para un sellado exacto y
operación del motor libre de problemas.



Pernos / Muelles de Acople de Escape

Los juegos de pernos y muelles de acople
de escape aseguran un sellado firme en
la unión del tubo



 **FEL-PRO**®

Las juntas que los profesionales confían®

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Las secuencias de torsión y las secuencias indicadas en esta publicación se consideran exactas y confiables al momento de la publicación. Sin embargo, debido a que los fabricantes pueden revisar sus especificaciones, los ingenieros de FEL-PRO sugieren al instalador que consulte al fabricante de EO por la última información.

Cómo usar las Tablas de Torsión Fel-Pro®

1. Ubique el nombre del fabricante del vehículo en las tablas de especificaciones. Todos los fabricantes se muestran en orden alfabético. Para ahorrar espacio en los listados, todos los vehículos de Productos Chrysler, todos los vehículos de Productos Ford y todos los vehículos de Productos General Motors están cada uno agrupados juntos en una sola sección. Busque la Tabla de Contenido al inicio del libro para ubicar donde se encuentra cada fabricante de vehículo. Cada sección del fabricante incluye vehículos de pasajeros, mini-furgonetas, vehículos utilitarios y camionetas de trabajo ligero y mediano para esa marca.
2. Dentro de cada sección de fabricante de vehículo, los motores se agrupan por cantidad de cilindros (de menor a mayor), luego por tamaño de motor (CID o CC: de menor a mayor), luego por año de modelo (los años recientes primero). Verifique cuidadosamente los números de identificación de vehículo en los fabricantes americanos, y los códigos de motor en los fabricantes de otro origen, a fin de asegurarse seleccionar la información de torsión correcta.
3. Se incluyen símbolos especiales de pie de página para mostrar si hay disponible una junta para cabezal FEL-PRO PermaTorque® (●) o si un juego de pernos FEL-PRO (□) para esa aplicación de motor.
4. Ubique el motor que desea específicamente. Las especificaciones correctas de torsión se muestran en libra/pie por tipo de perno.

MOTOR	AÑOS		FT.-LBS	TORQ. SEQ.	JGO PERNOS PARTE NÚMERO
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

Las especificaciones de torsión se muestran ya sea en una figura exacta, o en un rango específico. Siga cuidadosamente cualquier instrucción especial o instrucción de pasos múltiples para asegurar la torsión final correcta. Puede haber especificaciones diferentes para varios tamaños de perno, pernos en posiciones distintas, apretado de pernos en varios pasos, o de un motor frío contra un motor caliente. Por ejemplo, en algunos casos los pernos primero se aprietan a la figura para motor frío, y se resocan a la figura para un motor caliente. Recuerde que NO requiere resocar cuando instale una junta para culata FEL-PRO PermaTorque .

Para las aplicaciones de torsión-al-límite, los pernos de la culata deben apretarse en giros adicionales (mostrados en "grados" en las tablas) luego de alcanzar una torsión específica en libras /pie. Por favor, vea los siguientes consejos de instalación para más información sobre pernos de Torsión-al-Límite.

5. La columna de "Secuencia de Torsión" muestra cuál diagrama debe seguir para una secuencia específica de torsión para su motor. Todos los diagramas pueden encontrarse en secuencia numérica al final de esta publicación.

JUNTAS PARA CULATA PermaTorque® DE FEL-PRO®

Las juntas para culata PermaTorque/Blue Stripe® y PermaTorque/Printoseal® de Fel-Pro® no necesitan resocar. Éstos combinan la cantidad adecuada de compresibilidad y materiales retenedores de torsión para un sellado duradero.

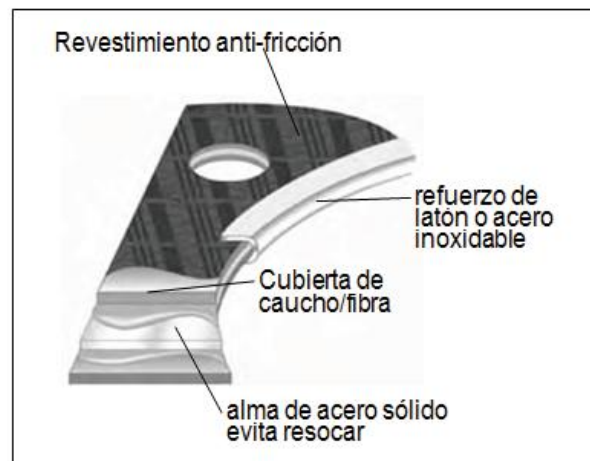
Las juntas para culata FEL-PRO usan de una variedad de construcciones y materiales escogidos cuidadosamente por nuestros ingenieros para cada aplicación específica de motor y son probados intensamente. Todas las juntas PermaTorque de FEL-PRO consisten de cuatro partes básicas – el alma, el material de la cubierta, el revestimiento y el refuerzo. Pueden agregarse otras mejoras especiales, como los rebordes de sello elastomérico para mejorar el sellado aún más .



Los revestimientos pueden ser de caucho PTFE o a base de silicona. Ayudan a sellar imperfecciones menores de las superficies, resisten a adherirse y ayudan a la junta a resistir la acción de jalonado que ocurre en los motores bi-metálicos. Las culatas de aluminio y los bloques de motor de hierro se expanden y contraen a niveles distintos durante los ciclos de calentamiento/enfriamiento del motor. Los revestimientos anti-fricción usados en las juntas PermaTorque le permiten tanto a la culata como al bloque “deslizarse” sobre la superficie de la junta y aún mantener un buen sellado.

Se agregan los refuerzos de metal formado para proteger el cuerpo de la junta en las aberturas de los cilindros. Cada refuerzo se estampa a precisión y luego es conformado al cuerpo de la junta. Los ingenieros especifican diferentes materiales para los refuerzos, que van desde latón hasta acero inoxidable, dependiente de la aplicación de cada motor.

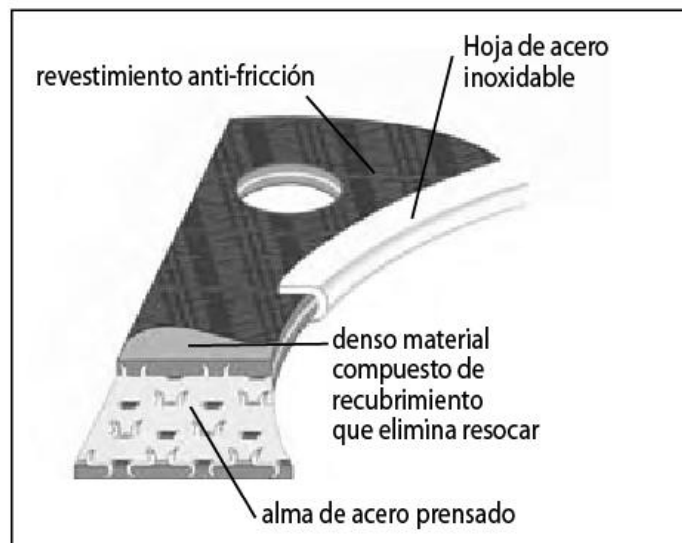
El diseño más común de las juntas PermaTorque/Blue Stripe utiliza un alma sólida de acero con una cubierta de caucho/fibra. El alma sólida de acero minimiza la pérdida de torsión, mientras que la cubierta suave se conforma a las pequeñas irregularidades de la superficie.



Diseño de Alma de PermaTorque/Blue Stripe

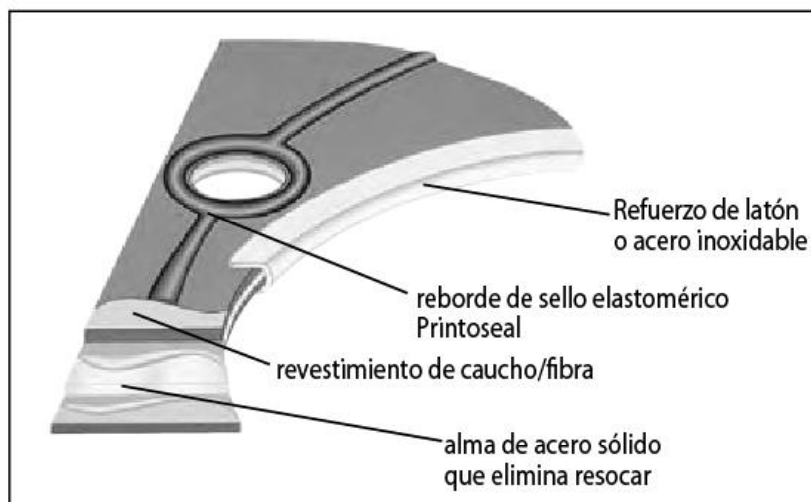
JUNTAS DE CULATA PermaTorque® DE FEL-PRO®

Otro diseño popular PermaTorque/Blue Stripe usa una construcción de alma de acero prensado, combinado ya sea con material de revestimiento de grafito extendido o de compuesto denso. Las protuberancias en forma de "S" del alma prensada, permiten una carga más uniforme sobre la junta respecto a los diseños de la competencia. El grafito extendido de alta densidad se usa cuando se requiere en aplicaciones de alta temperatura. El material compuesto del revestimiento usa el diseño de caucho/fibra que se densifica durante el proceso de producción. Este material es suficientemente denso lo que ayuda a mantener la torsión, y suficientemente comprimible como para conformarse a las pequeñas irregularidades de la superficie..



Diseño de Alma de PermaTorque/Blue Stripe

Cuando el motor requiere sellado adicional, se aplican rebordes de elastómero sellador de Printoseal® alrededor de aberturas críticas tales como los puertos de refrigerante o de aceite, para prevenir las fugas de refrigerante o aceite. En muchos motores ligeros actuales, los rebordes también ayudan a sellar las fundiciones de aluminio que tienen fuerza dispareja de prensado por sobre la superficie de la junta. .

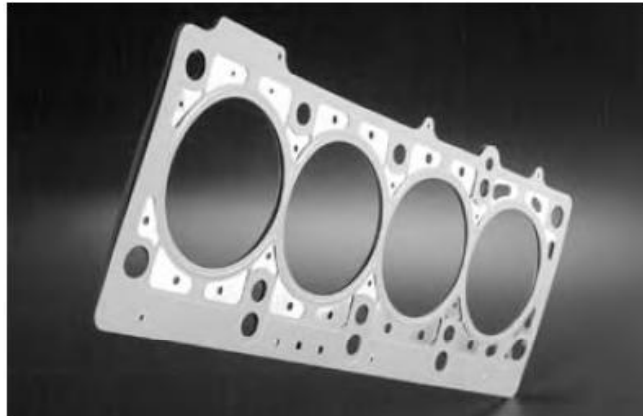


Sólido Diseño de Alma de PermaTorque/Printoseal

JUNTAS PARA CULATA PermaTorque® DE FEL-PRO®

El último desarrollo en tecnología de juntas para culata es el diseño de acero multi-capas (MLS). A primera vista, estas juntas lucen como el antiguo diseño de juntas de lámina de acero enchapado, pero en realidad son radicalmente distintos. Primero, se pega un revestimiento delgado de caucho a una lámina de acero inoxidable y, si se requiere, varias capas (hasta cinco) de esta lámina revestida de caucho y se ensamblan en una sola junta.

El revestimiento de caucho a alta temperatura brinda excelente sellado contra fluidos sobre las caras externas y entre cada lámina individual, mientras que también sellan las pequeñas imperfecciones de las superficies de la culata y el bloque. Las juntas para culata MLS ofrecen lo último en retención de torsión y brindan fortaleza adicional para apoyar los diseños livianos de hoy en fundición de aluminio. Estas se especifican en muchos de los diseños modernos de producción de motores domésticos e importados.



Las juntas tradicionales de equipo original tipo MLS en realidad no se conforman a las irregularidades de las superficies, y requieren un acabado de superficies increíblemente liso para dar un sellado satisfactorio. Cuando las fundiciones son nuevas y el acabado está fresco, muchas juntas MLS de equipo original trabajan bastante bien.

Pero cuando las fundiciones son viejas o están reacondicionadas con un acabado menos que perfecto, usualmente terminan con fugas. Para sellar bajo estas condiciones adversas, los Ingenieros de FEL-PRO® han desarrollado el exclusivo diseño PermaTorqueMLS®. Estas nuevas juntas rediseñadas cuentan con muchas características únicas que les permiten sellar mejor que muchas juntas MLS en el mercado de hoy:

- Acero inoxidable totalmente duro que mantiene su forma a pesar de la expansión térmica, y que resiste la acción de fricción entre la culata y el bloque.
- Rebordes repujados de sellado diseñados a precisión y colocados en áreas críticas de sellado que eliminan el paso a las fugas
- La incorporación de una exclusiva capa de "tope" extra larga que brinda un sello superior a la combustión primaria.
- Un recubrimiento de caucho especial formulado específicamente para el ambiente del mercado de reparación, el cual es más compatible con los requerimientos de acabado de superficies.

Recuerde que aunque las juntas PermaTorque MLS son más tolerantes que otros diseños, las superficies de la culata y el bloque deben ser más planas y suaves de lo que se ha requerido tradicionalmente para las juntas de tipo compuesto.

Los ingenieros de FEL-PRO® determinan cuál construcción PermaTorque ofrece el mejor sellado para cada diseño individual de motor. Busque el sufijo "PT" en los diseños de resocado disponibles en el mercado de hoy.

CONSEJOS DE INSTALACIÓN DE JUNTAS PARA CULATA

Remueva las Culatas de Cilindro Cuidadosamente

Afloje los pernos de la culata de cilindros en etapas, en orden inverso a la secuencia de armado. En motores con culatas de aluminio, remueva la culata solo cuando el motor se ha enfriado completamente y revierta EXACTAMENTE el procedimiento recomendado de torsión. No hacerlo así puede producir deformaciones.

Nunca Reutilice las Juntas de Culata

Cuando se instala una nueva junta de culata, ésta se conforma a las irregularidades microscópicas de la superficie de la culata y el bloque del motor. El material de la junta se comprime permanentemente en esa posición. Si usted reutiliza la junta, es imposible colocarla exactamente en la misma posición y ésta no tendrá la "vida" para reajustarse por sí misma, por lo que resultará en una falla de la junta.

Limpie las Superficies de Contacto

Limpie completamente la culata, el bloque de motor, los pernos de culata, y los orificios de los pernos. Un perno sucio puede alterar las lecturas de torsión hasta en 20 lb/pie, y puede formar bolsillos en la junta, permitiendo fugas y el fallo eventual de la junta.

Busque Deformaciones y Distorsión

Busque deformaciones tanto en las superficies de contacto tanto de la culata como del bloque con una regla recta y un calibrador de lámina. Las holguras en su longitud no deben exceder más de 0 .003" para aplicaciones de tres cilindros, 0 .004" para cuatro cilindros, y 0 .006" para seis cilindros. A lo ancho nunca debe exceder las 0..002" de deformidad. Estas son medidas combinadas para la culata y el bloque juntos, y no deben exceder las cantidades máximas indicadas. No deben haber irregularidades repentinas de + .001" en ningún diámetro de 3". Cuando sea necesario, rectifique las superficies para volverlas totalmente planas.

Verifique los Acabados de la Culata y el Bloque

El acabado de las superficies es crítico para un buen sellado. Los ingenieros de FEL-PRO® recomiendan un acabado de superficie de micro pulgada entre 60 a 100 Ra (400 a 800 Rz) para culatas y bloques de hierro fundido, 50 a 60 Ra (200 a 600 Rz) para culatas y bloques de aluminio, y de 10 a 30 Ra máximo (500 Rz máximo) para aplicaciones de capas múltiples de acero ((MLS). Verifique los acabados con un perfilómetro o cualquier otro comparador de acabado de superficies. Busque una ondulación preferida de altura de 0004"/ .0005" con espacio entre los picos de ondulación de 100" (éstos son valores normalmente asociados con las máquinas de rectificación) . Siempre consulte el manual de servicio de su fabricante para los requerimientos en el acabado de superficies.



Las juntas que los profesionales confían®

CONSEJOS DE INSTALACIÓN DE JUNTAS PARA CULATA

Use sellador para juntas que no endurezca

No se requieren selladores en las juntas para culata FEL-PRO PermaTorque®. Sin embargo, las juntas de láminas de acero repujado, de cubierta de cobre, o de cubierta de acero deben recubrirse con sellador automotriz de juntas que no endurezca como un sello complementario.

Cubra ligeramente las roscas de los pernos y debajo de las cabezas de los pernos con grasa EP o algún lubricante similar. Cuando estos entran en los pasos de agua de un motor, las roscas de los pernos se deben recubrir con un sellador automotriz que no endurezca para prevenir las fugas,. Refiérase al manual de servicio del fabricante o examine el motor para determinar hasta donde llegan los orificios de los pernos.

Fíjese en la longitud y el tamaño de los pernos

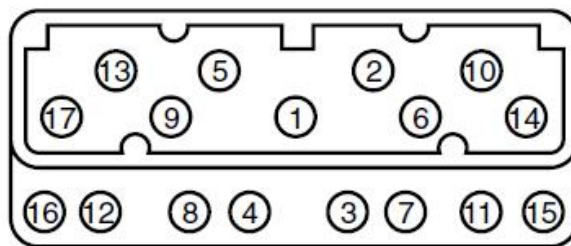
Los pernos de culata en algunos motores varían en longitud y tamaño, y es importante que sean reemplazados en sus ubicaciones originales. Marque la posición de cada perno o colóquelos en orden en un banco cuando los retire.

Use una llave dinamométrica de torsión

La torsión dispereja puede causar distorsiones del bloque y torceduras de la culata, causando fugas de refrigerante o de combustión. Utilice una buena llave de torsión, calibrada correctamente, y siga exactamente las especificaciones apropiadas de torsión. El procedimiento básico de apretado es primero para ajustar los pernos, luego apriete en pasos, y finalmente complete con la torsión específica.

Siga las secuencias de torsión

Cada fabricante cuenta con una secuencia aprobada de torsión que aplica para cada motor, a fin de asegurar el mejor sellado posible y, eliminar la posibilidad de distorsión o torceduras. En general, la secuencia inicia al centro y gira hacia afuera hacia los bordes de la culata .



Caliente el motor y resoque la culata

Encienda y llegue el motor a temperatura normal de operación luego de apretar los pernos de culata. La expansión y contracción por calor puede cambiar radicalmente las lecturas de torsión. Resoque todos los pernos de culata a las medidas correctas mientras el motor todavía está caliente. Si trabaja con componentes de aluminio, primero deje el motor enfriar completamente. Recuerde que los diseños FEL-PRO® PermaTorque® no requieren resoque.

Resoque después de 300 a 500 millas

Si utiliza juntas de culata del tipo de resoque, hágalo luego de 300 a 500 millas.

Pernos para Culata FEL-PRO® de torsión-al-límite

Pernos de torsión-al-límite para culata

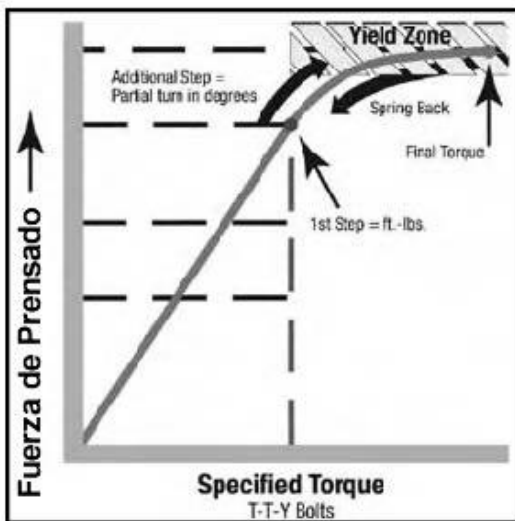
Torsión-al-límite es un método usado hoy por muchos fabricantes de motores para apretar los pernos de culata. Éstos se aprietan a su punto límite, lo cual puede estirarlos permanentemente. Así se da una fuerza de torsión más pareja sobre todo el área de la junta. Los pernos deben apretarse primero a una torsión específica (medida en lbs/pie), y luego darles adicionalmente un giro parcial (medido en grados) para el punto límite del perno. El económico indicador de Torsión al Ángulo de FEL-PRO® (parte número TRQ-1) le ayudará a medir exactamente en grados el giro parcial requerido

Debido a que los pernos de culata pueden haberse estirado, el fabricante del motor puede recomendar no reutilizarlos. Consulta el manual de fabricante sobre reutilizar los pernos de culata. Puede que usted no sepa cuántas veces se han retirado y reinstalado los pernos T-T-Y, por lo que los ingenieros de FEL-PRO sugieren que siempre es buena idea usar pernos nuevos. Hay pernos de culata FEL-PRO disponibles para muchos motores domésticos e importados. Las Tablas de Torsión indican los motores a los que les ofrece la línea de productos FEL-PRO

ENGINE	YEARS		FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
FORD PRODUCTS 6 & V6 (CONT.)					
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

PERNOS T-T-Y FEL-PRO® PARA CULATA

Comprendiendo los pernos de torsión-al-límite



Aunque los pernos de Torsión-al-límite (T-T-Y) se están volviendo más comunes, mucha gente no entiende bien cómo funcionan.

Los pernos en las aplicaciones T-T-Y se aprietan a su punto límite, dando una fuerza de prensado más pareja sobre toda el área de la junta.

Durante el ensamblado en la fábrica, máquinas a presión aprietan los pernos hasta que logran justo su "punto de quiebre". Los técnicos que hacen sus reparaciones en el campo no cuentan con esta clase de equipo. Los ingenieros han visto que apretando los pernos de culata a una torsión específica y luego apretándolos un giro parcial adicional, los técnicos pueden alcanzar su punto de quiebre.

Los ingenieros de Fel-Pro® sugieren que los técnicos utilicen un calibrador como el económico indicador de Torsión-por-Ángulo Fel-Pro® (parte número TRQ-1) Éste calza fácilmente en la espiga de 1/2" de una llave de torsión que se usa para los pernos T-T-Y para culata.

NOTA: No hay manera de decir visualmente si un perno es del tipo de Torsión-al-Límite – la única manera de saberlo es por sus especificaciones de torsión.



Se pueden reutilizar los pernos T-T-Y?

lectura errónea de torsión o que los pernos se quiebren. Cada fabricante de motores ofrece directrices sobre si los pernos de torsión-al-límite se pueden reutilizar. Algunas indicaciones permiten la reutilización limitada, mientras que otros recomiendan que nunca reutilice los pernos. Debido a que los técnicos no pueden saber cuántas veces se a retirado y reinstalado un perno T-T-Y, nosotros recomendamos que nunca reutilice los pernos T-T-Y.



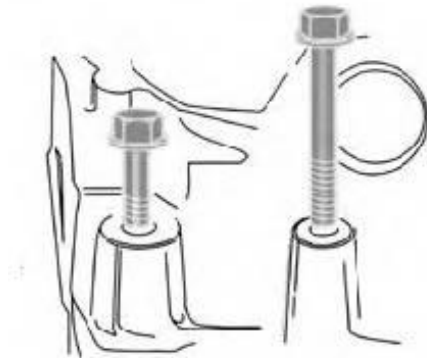
Herramientas Engine\$aver® de FEL-PRO®

Partes Que Ayudan a Reducir los Costos de Reparación

La línea de herramientas Engine\$aver de FEL-PRO es una colección de "solucionadores de problemas" que brindan alternativas de ahorro de costos para el reemplazo de componentes de motor. Estas traen los componentes del motor de vuelta al rendimiento adecuado y a una fracción de su costo de reemplazo. El equipo Engineer\$aver es eficiente al costo sin comprometer nada.

Pernos para Culata de Cilindros

Ayudan a evitar los riesgos de reutilizar los pernos para culata en las aplicaciones de torsión-al-límite



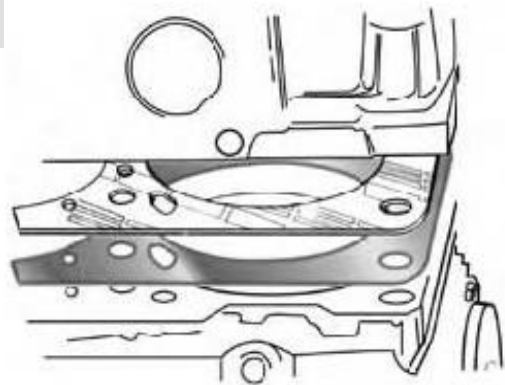
Indicador Torsión-al-ángulo TRQ-1

Asegura que se siguen los procedimientos correctos de instalación cuando se utilizan pernos de torsión-al-límite para culata .



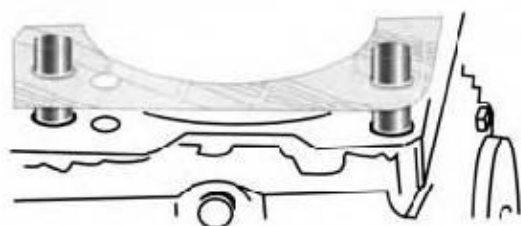
Arandelas espaciadoras Head\$aver

Compensan el exceso de material removido durante las operaciones de maquinado; así no tendrá que reemplazar las costosas culatas de cilindro



Clavos guía para culata de cilindros

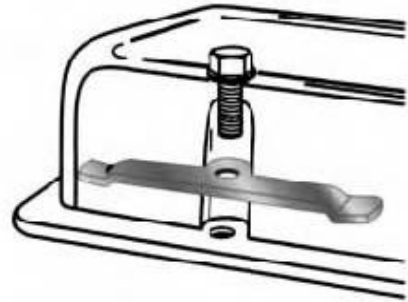
Aseguran el alineamiento correcto de la junta y la fundición para un sello exacto y el ensamble correcto de la culata al bloque.



Herramientas Engine\$aver® de FEL-PRO®

Distribuidores de Carga en la Tapa de Válvula

Distribuyen de forma pareja la fuerza de prensado en el acople de la tapa de válvulas y permiten un sellado correcto entre la tapa de válvulas y la junta nueva.



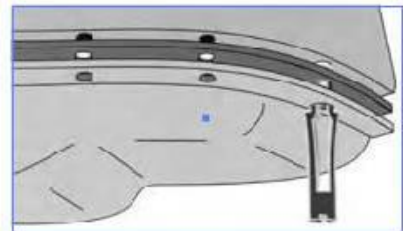
Clavos guía para cárter

Ahorre tiempo y prevenga la frustración teniendo que sostener el cárter y la junta en su lugar para una instalación rápida y conveniente del perno.

ES 72863 para aplicaciones 5/16"

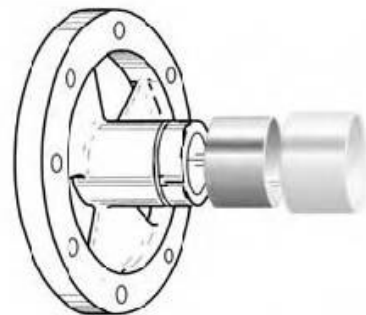
ES 72864 para aplicaciones 6mm

ES 72865 para aplicaciones 8mm



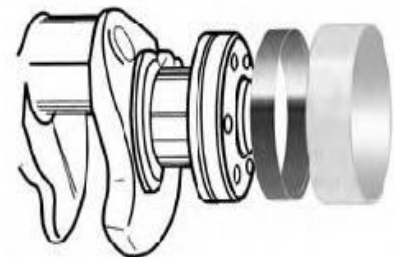
Sleeve'n'Seal®

Repara superficies de sellado desgastadas y ayuda a evitar el reemplazo de los costosos balanceadores armónicos.



Pernos de acople de escape & juegos de muelles

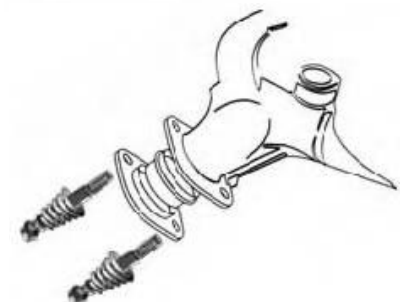
Conecte rápidamente los múltiples de tubo de escape en vehículos de tracción delantera y asegure la fuerza de prensado correcta.



Camisas de reparación de cigüeñal

Repare las superficies de sellado desgastadas sin costosos reemplazos de cigüeñal

La línea de productos Engine\$aver también aparece en los catálogos maestros FEL-PRO® para vehículos de pasajeros/camionetas ligeras y Trabajo Pesado.





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™

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	



TORQUE TABLES™

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™

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 V6					
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 V8					
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	



TORQUE TABLES™

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™

ENGINE

YEARS

FT.-LBS.

TORQ. HEAD BOLT SET
SEQ. 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



TORQUE TABLES™

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™

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
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	1994-85 exc. Medallion	●○	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™

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
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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™

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	



TORQUE TABLES™

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	
1589cc SOHC (HDC, HDE) 16 Valve	1992-90		44-49 in three steps	147	

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
289 Ford	1967	●	65-70	70	
302 Ford	1972-67 exc. Boss	●	Intake Side 80, Exhaust Side 68	70	
302 Ford	1971-69 Boss	●	Upper 80; Lower 70	70	
351 Cleveland Ford	1974-71	●	95-105	70	
351 Windsor (5.8L) Ford	1989-81	●	1st 85, 2nd 95, 3rd 105-112	70	

DODGE SEE CHRYSLER PRODUCTS

EAGLE SEE CHRYSLER PRODUCTS

EDSEL SEE FORD PRODUCTS

ELVA 4

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

EXCALIBUR V8

289 Studebaker	1965		55-65	170	
305 (5.0L) Chevrolet	1990-80	●○	65 in three steps	7	ES 72856
327 Chevrolet	1969-65	●○	65	7	ES 72856
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
350 (5.7L) Chevrolet	1995-93	●○	65 in three steps	7	ES 72856
350 (5.7L) Chevrolet	1990-70	●○	65 in three steps	7	ES 72856
454 Chevrolet	1979-72	●	80 in three steps	8	

FACEL VEGA 4

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

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



TORQUE TABLES™

ENGINE	YEARS		FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
FACEL VEGA V8 (CONT.)					
301 Plymouth	1958	●	85	12	
330 DeSoto	1957-56		85	12	
354 Chrysler	1958	●	85	12	
383 Chrysler	1964-59	●	70	11	
FAIRTHORPE 4					
948cc OHV Austin	1962-58		40	54	
998cc OHV Austin	1962-58		40	54	
FARGO SEE CHRYSLER PRODUCTS					
FIAT 4					
817cc OHV	1971-68		29	41	
843cc OHV	1968-65		29	41	
903cc OHV	1973-67		36 in three steps	41	
1116cc SOHC	1973-71		69 in three steps	41	
1290cc SOHC	1979-72	●	69 in three steps	41	
1438cc OHV	1973-70		56	41	
1438cc DOHC	1971-68		54	41	
1498cc SOHC	1989-79	●	M17 bolts 1st 15, 2nd 29, 3rd turn 90 degrees, 4th turn 90 degrees	41	
1498cc SOHC	1989-79	●	M19 bolts 1st 29, 2nd 69, 3rd loosen 1/2 turn, 4th 29 again, 5th 69	41	
1592cc DOHC	1978-72		61 in three steps	41	
1608cc DOHC	1973-71		58 in three steps	41	
1756cc DOHC	1978-74		61 in three steps	41	
1995cc DOHC	1987-78		61 in three steps	41	
FORD SEE FORD PRODUCTS					
FORD PRODUCTS 4					
80.8 SOHC (1.3L) 8 Valve Mazda	1997-88	●	1st 35-40, 2nd 56-60	150	
97.5 SOHC (1.6L) 8 Valve Mazda	1989-87 Tracer	●	56-60 in three steps	150	
97.5 DOHC (1.6L) 16 Valve Mazda	1994-91 Capri	●	56-60 in three steps	150	
97.5 DOHC Turbo (1.6L) 16 Valve Mazda	1994-91 Capri	●	56-60 in three steps	150	
98 OHV (1.6L) 8 Valve Ford	1980-78	●	65-70	16	
98 OHV (1.6L) 8 Valve Ford	1973-71	●	65-70	16	
98 SOHC (1.6L) 8 Valve Ford	1985-81	●○	1st 44, 2nd turn 90 degrees, 3rd turn 90 degrees	36	ES 72672
98 SOHC Turbo (1.6L) 8 Valve Ford	1985-84	●○	1st 44, 2nd turn 90 degrees, 3rd turn 90 degrees	36	ES 72672
109.6 SOHC (1.8L) 8 Valve Mazda	1978-72 Courier	●	Cold 63-68, Warm 69-73	150	
112.2 DOHC (1.8L) 16 Valve Mazda	1996-91	●	56-60 in three steps	150	
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
119.7 L-Head Ford	1942-41		Stud Nuts 50-55; Bolts 65-70	194	
120.2 SOHC (2.0L) 8 Valve Mazda	1982-79 Courier	●	Cold 59-64, Warm 69-72	150	
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
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



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™

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	



TORQUE TABLES™

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



TORQUE TABLES™

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	



TORQUE TABLES™

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	



TORQUE TABLES™

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	



TORQUE TABLES™

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



TORQUE TABLES™

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	



TORQUE TABLES™

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



TORQUE TABLES™

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



TORQUE TABLES™

ENGINE

YEARS

FT.-LBS.

TORQ. HEAD BOLT SET
SEQ. 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



TORQUE TABLES™

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

GM PRODUCTS 6 & HO6 & 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	



TORQUE TABLES™

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



TORQUE TABLES™

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	



TORQUE TABLES™

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



TORQUE TABLES™

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	



TORQUE TABLES™

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	
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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	
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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	



TORQUE TABLES™

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	



TORQUE TABLES™

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



TORQUE TABLES™

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	



TORQUE TABLES™

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™

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	



TORQUE TABLES™

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	



TORQUE TABLES™

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



TORQUE TABLES™

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
LANCIA.....				SEE FIAT	
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	



TORQUE TABLES™

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 (1URSF) 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 (2URSF) 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	
LINCOLN				SEE 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



TORQUE TABLES™

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



TORQUE TABLES™

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



TORQUE TABLES™

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	



TORQUE TABLES™

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	



TORQUE TABLES™

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



TORQUE TABLES™

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™

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



TORQUE TABLES™

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	
NASHSEE AMERICAN MOTORS					
NAVISTARSEE 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™

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	



TORQUE TABLES™

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	



TORQUE TABLES™

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	
PANOZ 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	



TORQUE TABLES™

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 & H04				
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 H06 & 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 H04				
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™

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, B201I) 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, B201I) 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, B201I) 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 (B202I) 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 (B202I) 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	



TORQUE TABLES™

ENGINE	YEARS		FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
SAAB 4 & HO4 (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	



TORQUE TABLES™

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	



TORQUE TABLES™

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 (G16KC) 8 Valve	1995-89	●	51-54 in three steps	59	



TORQUE TABLES™

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	



TORQUE TABLES™

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 (1CTL) 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 (2CTL) 8 Valve	1986		1st 33, 2nd turn 90 degrees, 3rd turn 90 degrees	46	
1995cc SOHC (2SELC) 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	



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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



TORQUE TABLES™

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 retorque after 1000 miles	60	



TORQUE TABLES™

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™

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	



TORQUE TABLES™

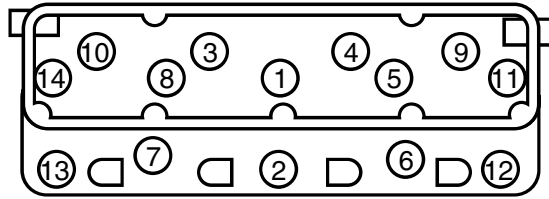
ENGINE	YEARS		FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
VOLVO 5					
2319cc DOHC Turbo (B5234FT, B5234T3) 20 Valve	2008-04		1st 15 , 2nd 44 , 3rd turn 130 degrees	251	
2319cc DOHC Turbo (B5234FT, B5234T, B5234T3) 20 Valve	2003-94		1st 15 , 2nd 44 , 3rd turn 130 degrees	208	
2435cc DOHC (B5244FS, 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 30 , 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	



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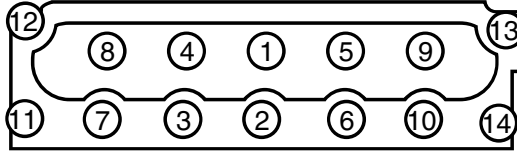
ENGINE	YEARS	FT.-LBS.	TORQ. SEQ.	HEAD BOLT SET PART NUMBER
VOLVO 6 & V6 (CONT.)				
2980cc OHV (B30E, B30F) 12 Valve	1975-71	1st 29 , 2nd 58 , 3rd 65 , 4th warm engine, 5th 65 again	2	
2980cc OHV (B30A) 12 Valve	1972-69	61-69	2	
3192cc DOHC (B6324S) 24 Valve	2008-07	1st 33 , 2nd 33 again, 3rd turn 90 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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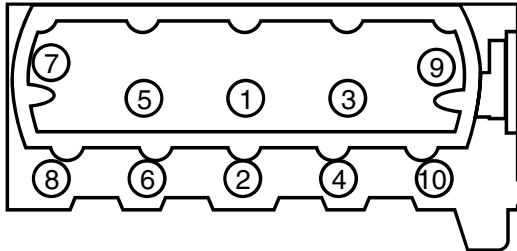


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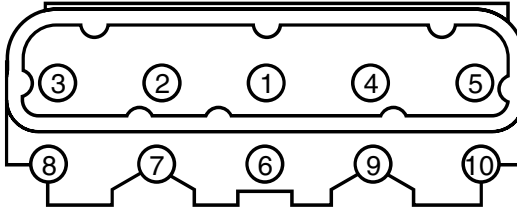
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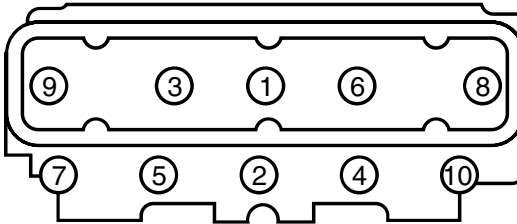
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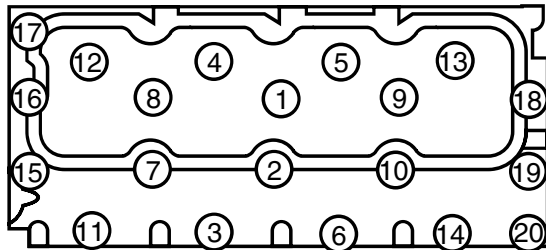


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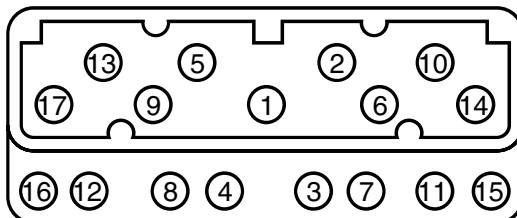


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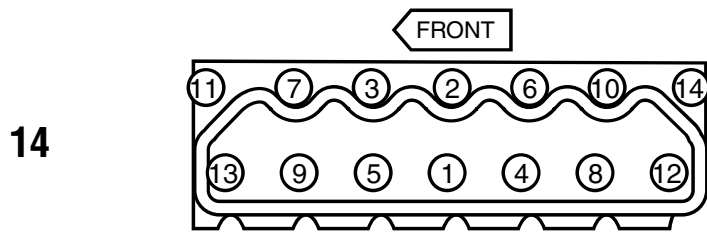
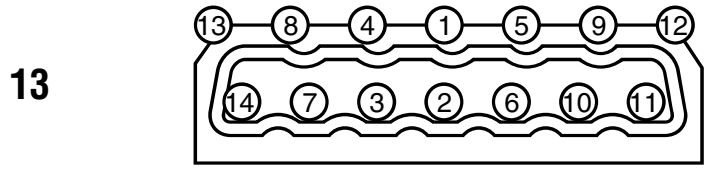
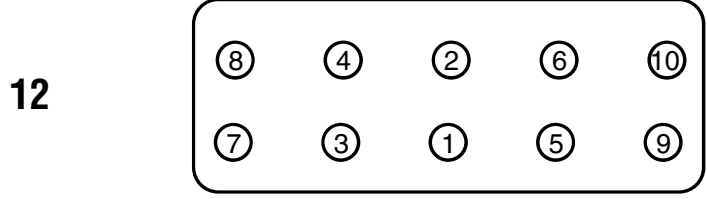
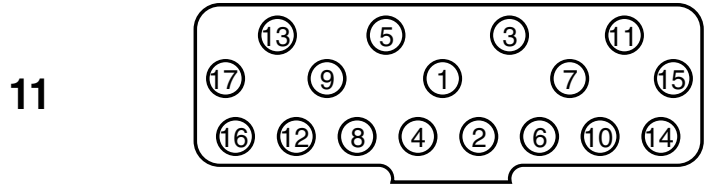
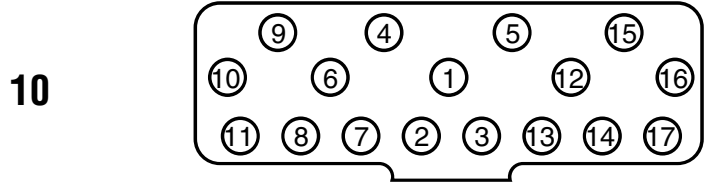
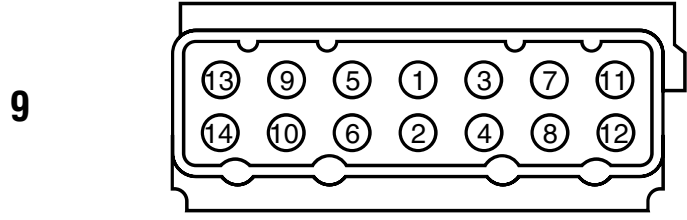
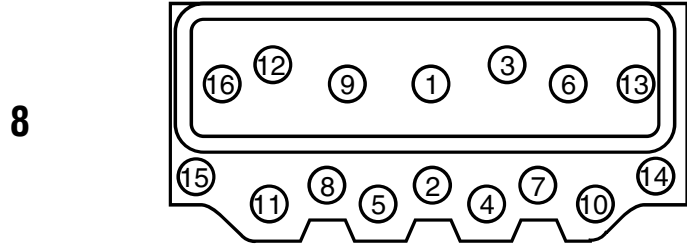


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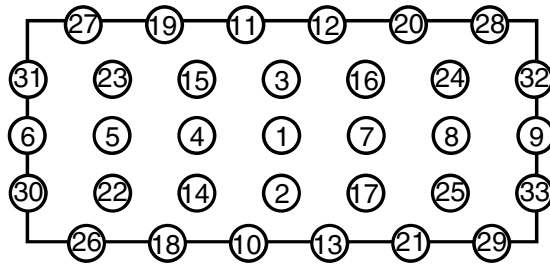


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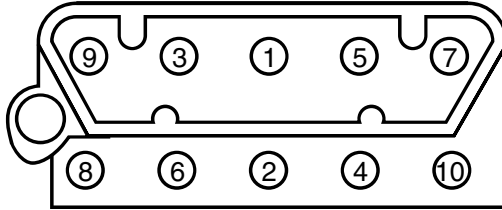
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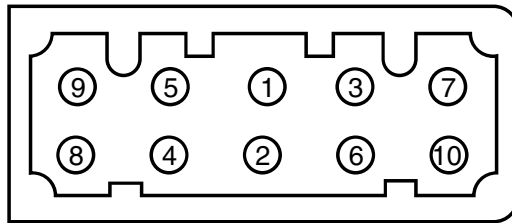


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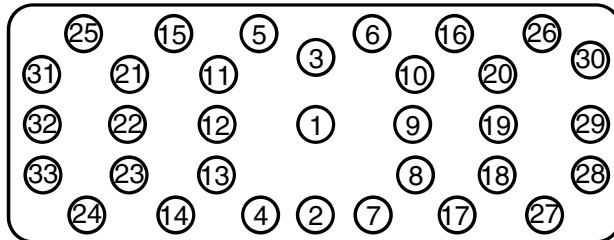


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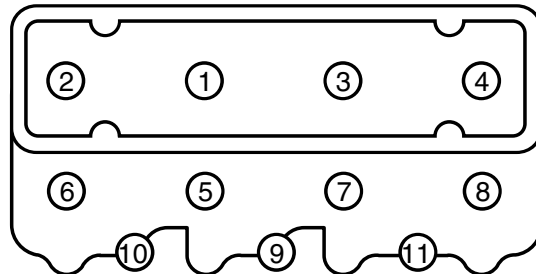
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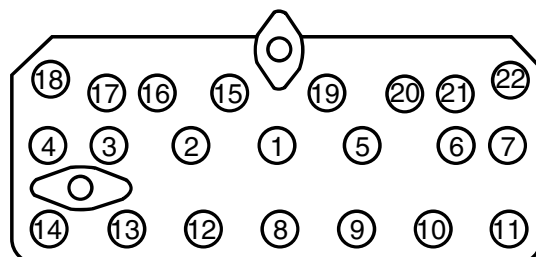
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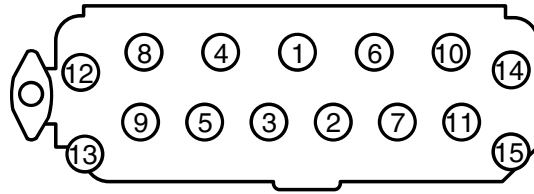
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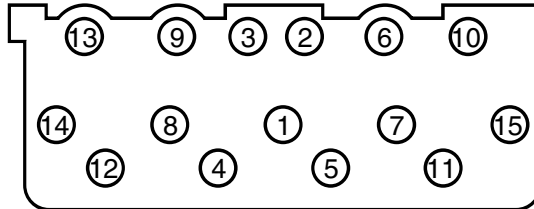
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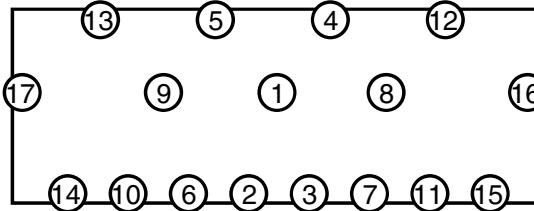
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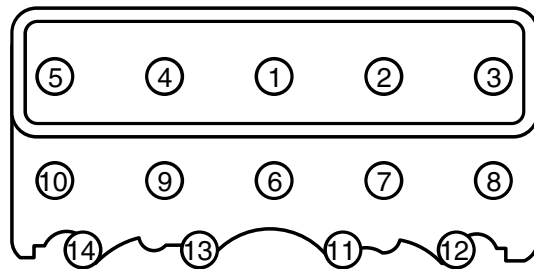
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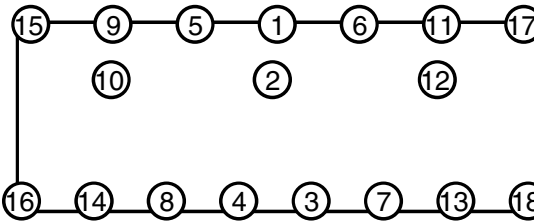
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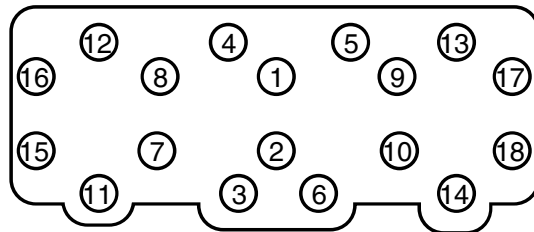
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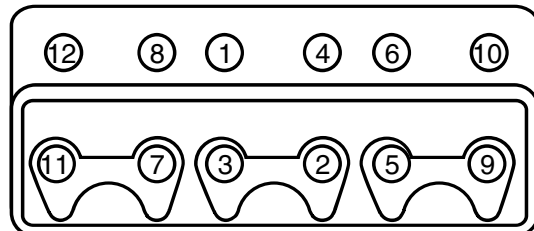
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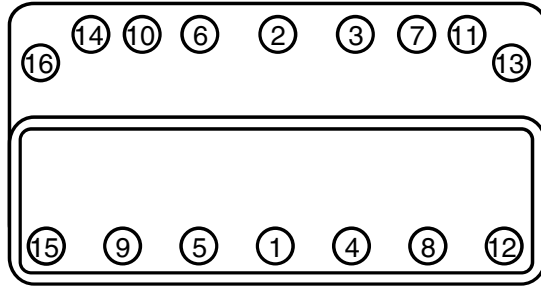
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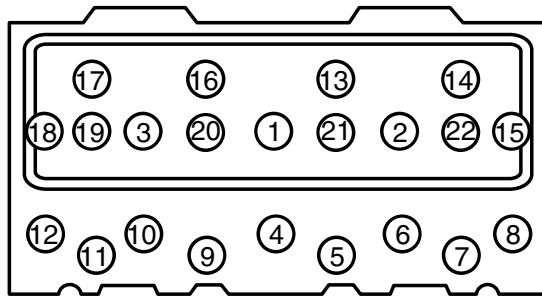
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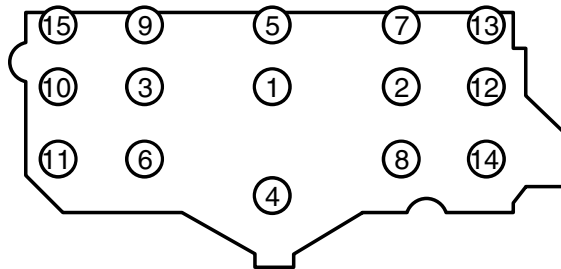
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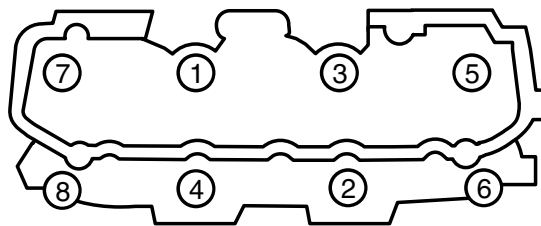
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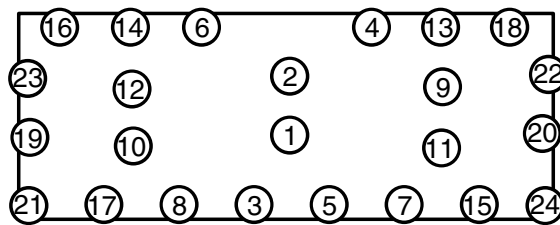
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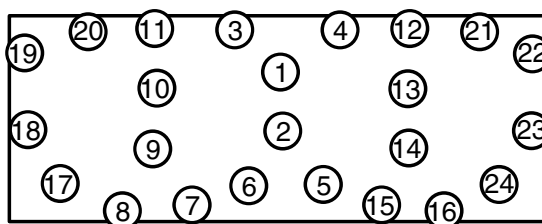
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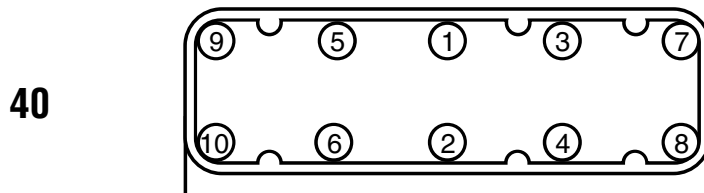
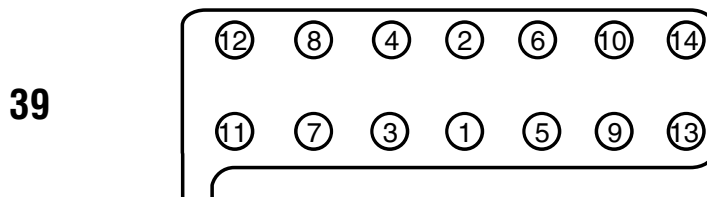
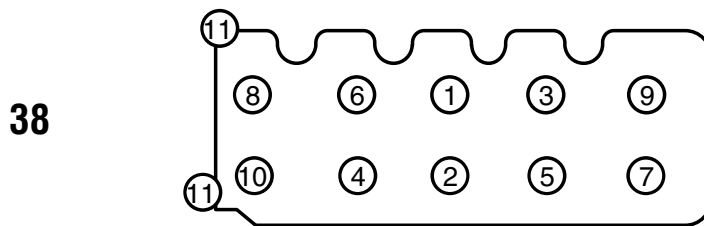
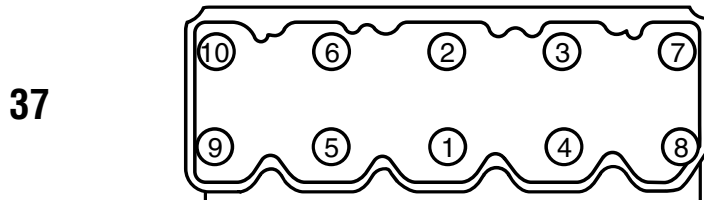
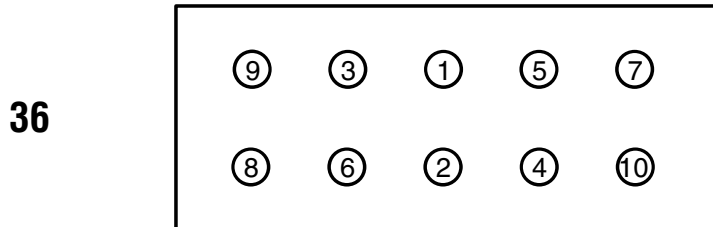
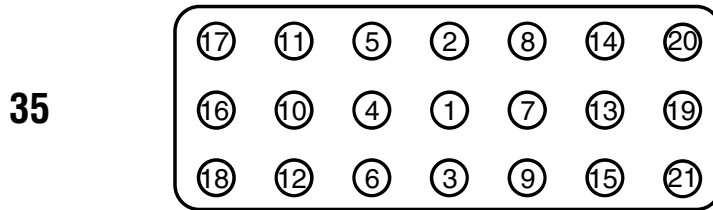
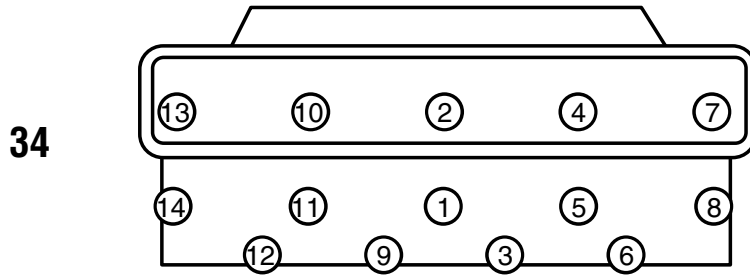


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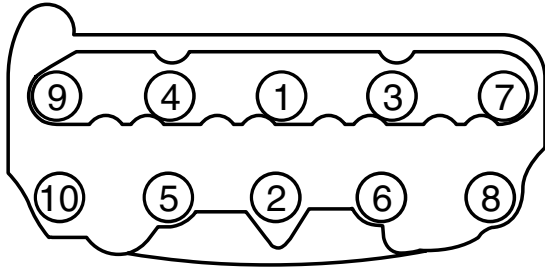


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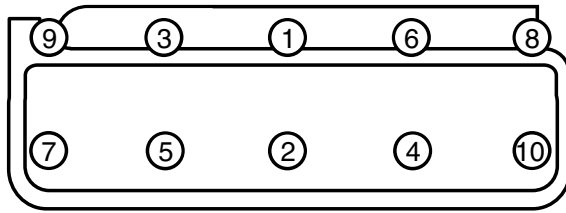
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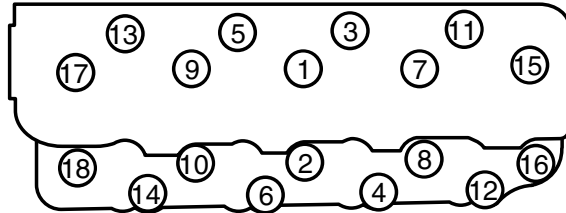
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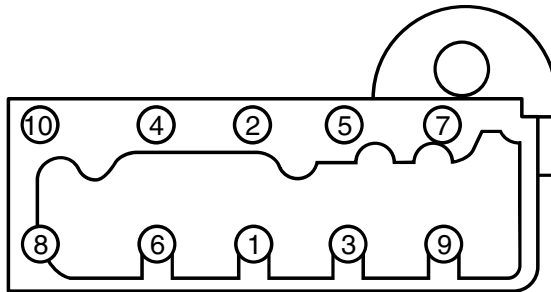
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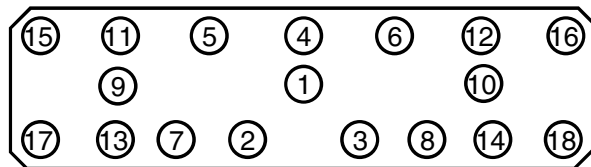
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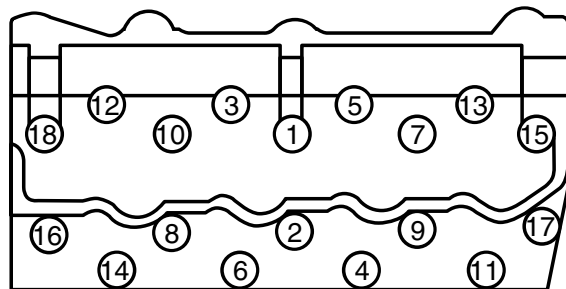
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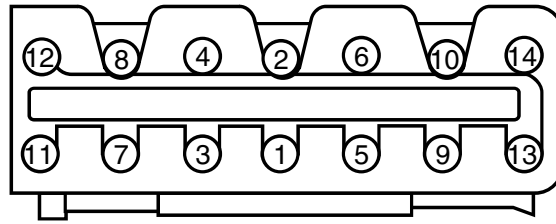
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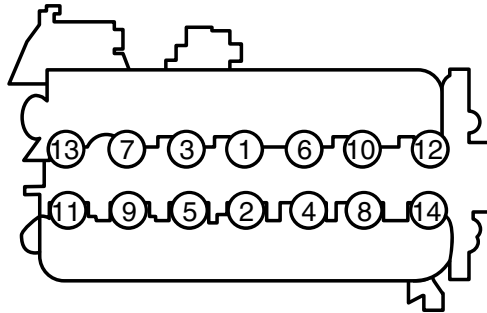
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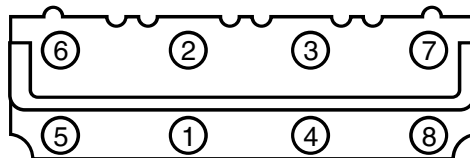
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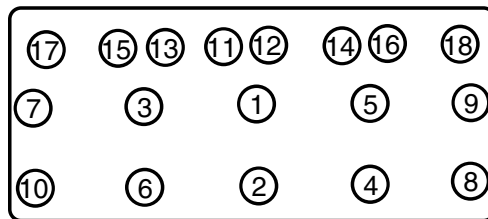
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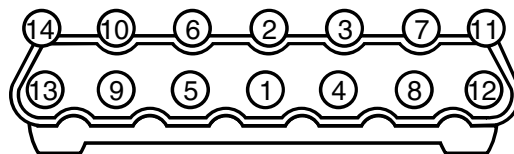
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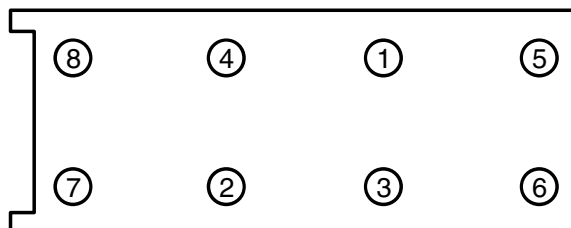
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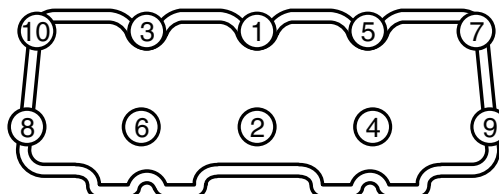
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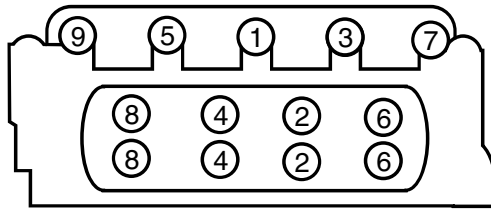
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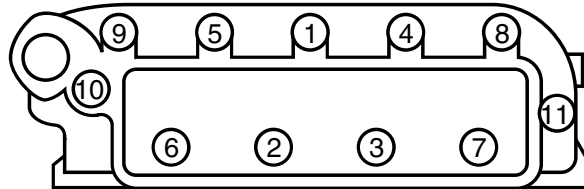
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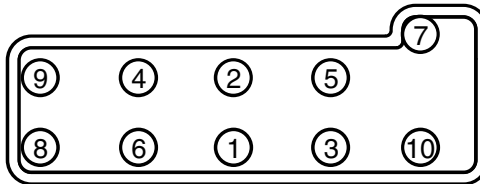
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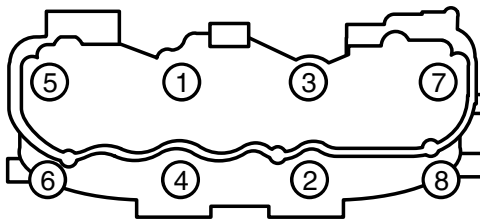
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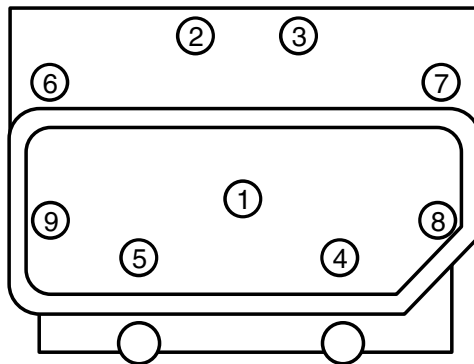
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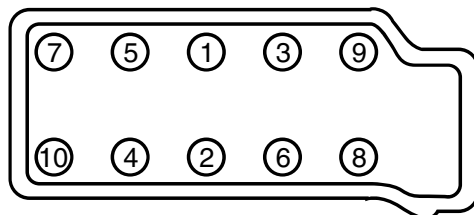
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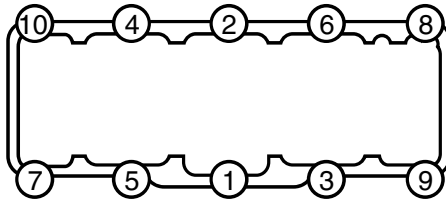
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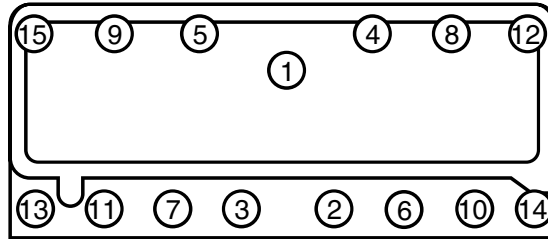
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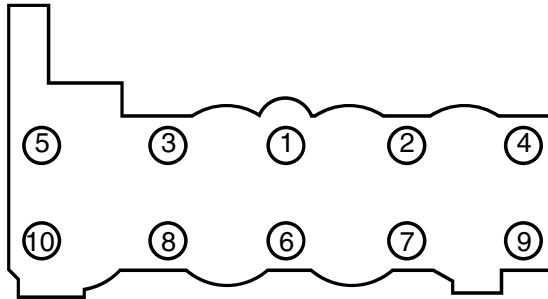
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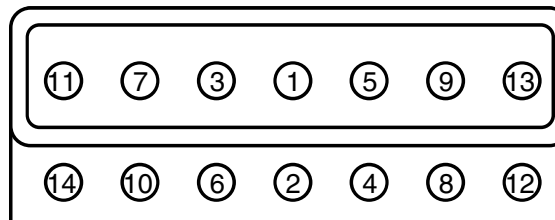
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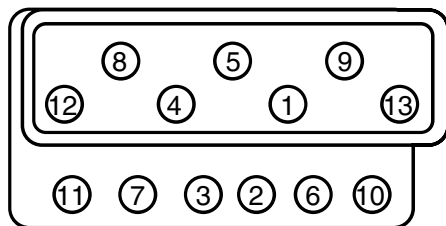
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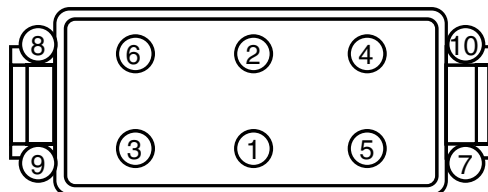
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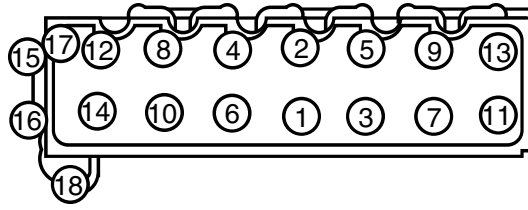
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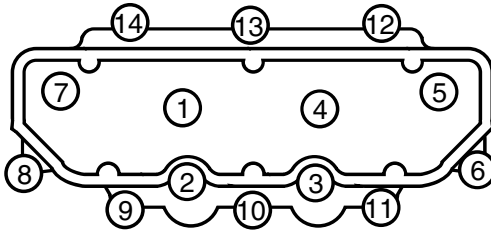
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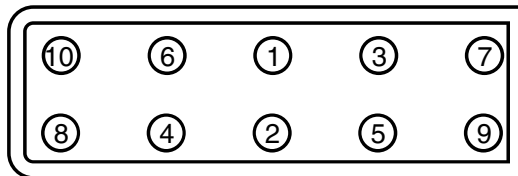
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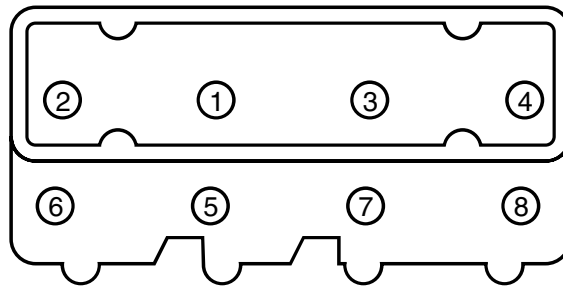
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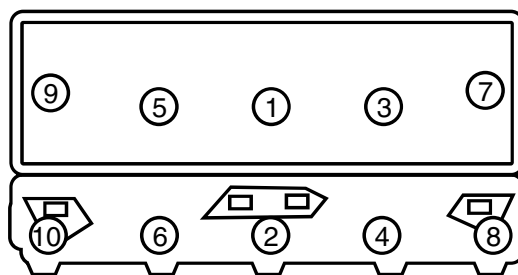
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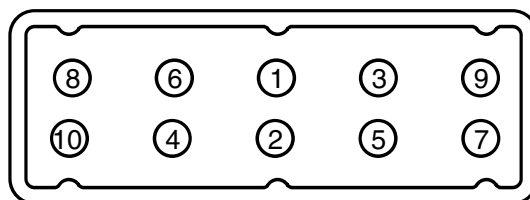
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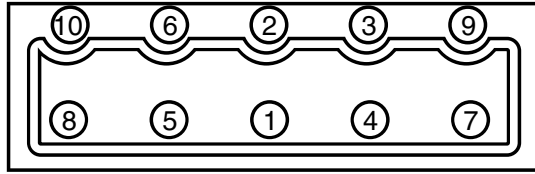
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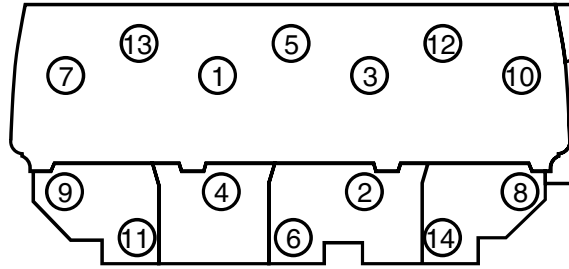
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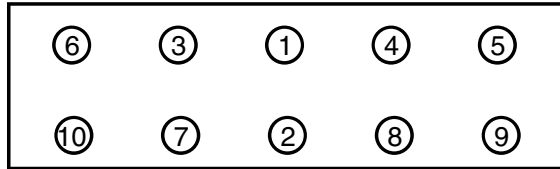
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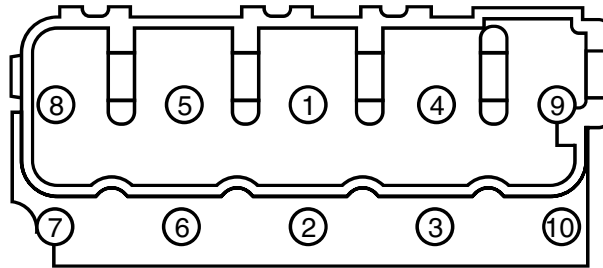
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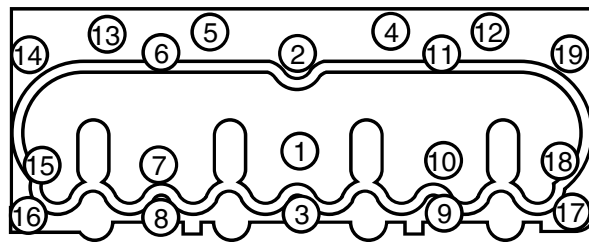
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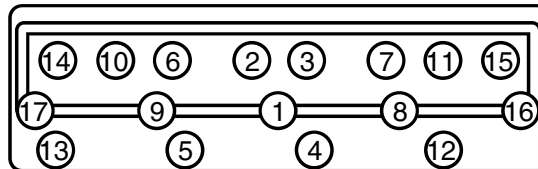
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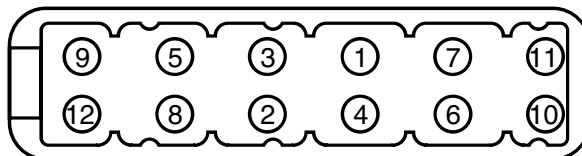
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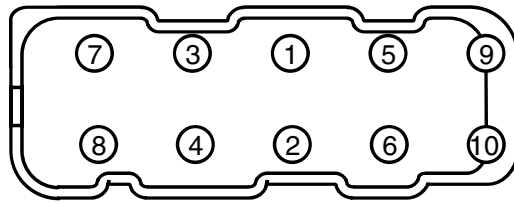
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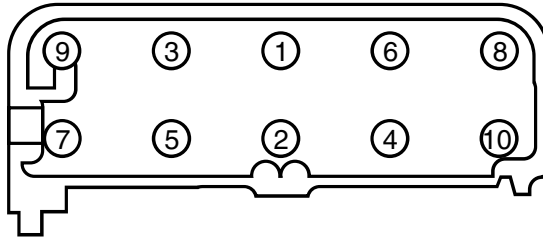
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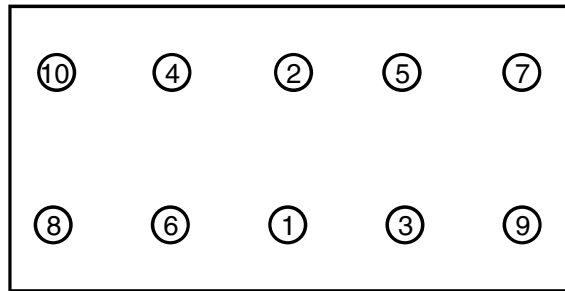
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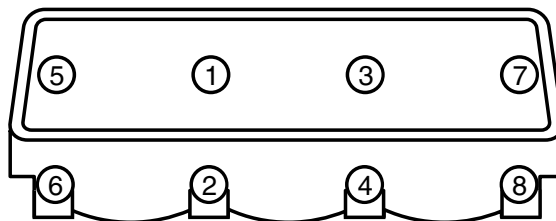
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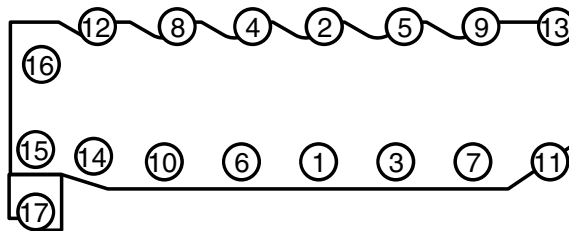
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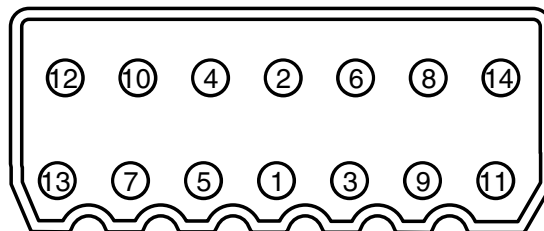
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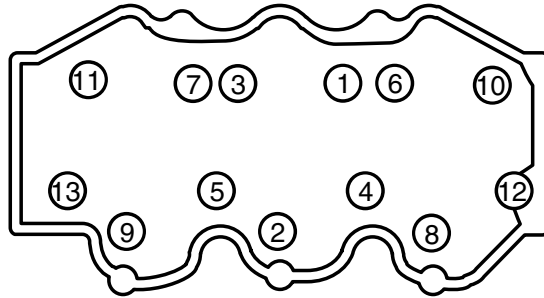
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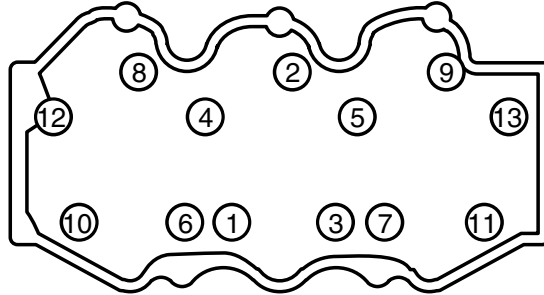
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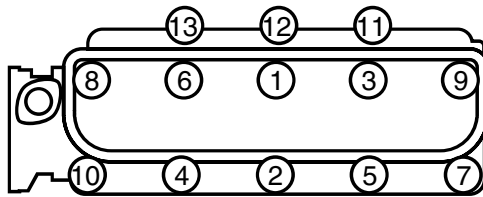


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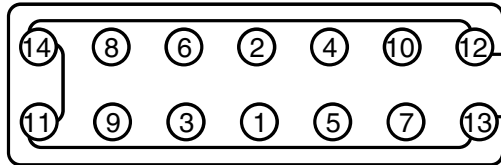
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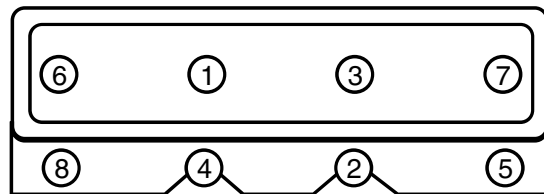
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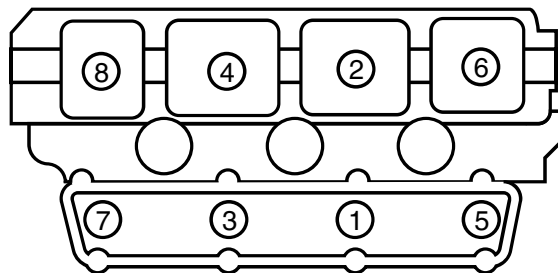
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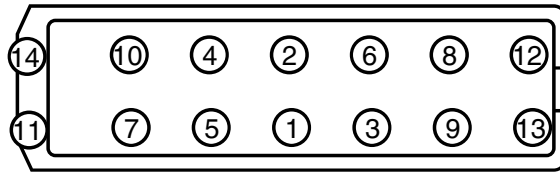
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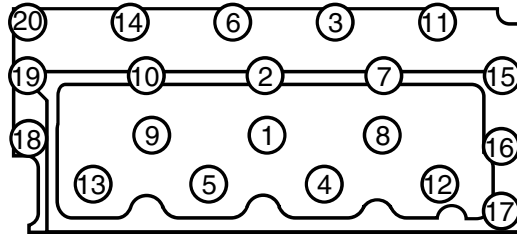
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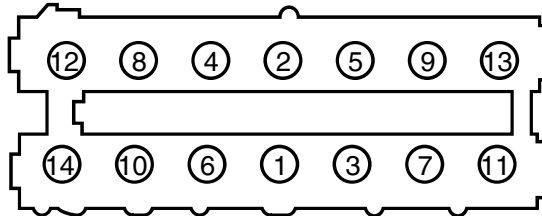
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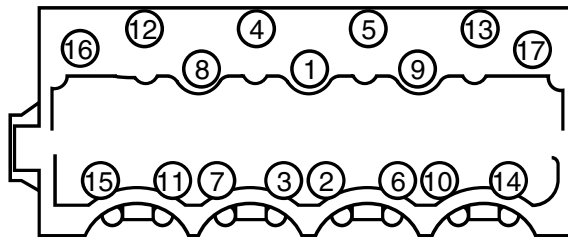
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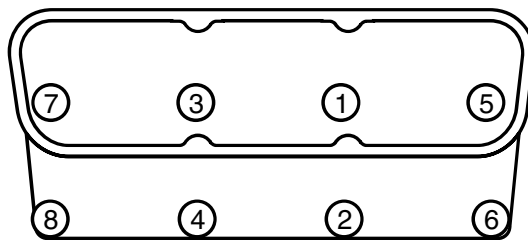
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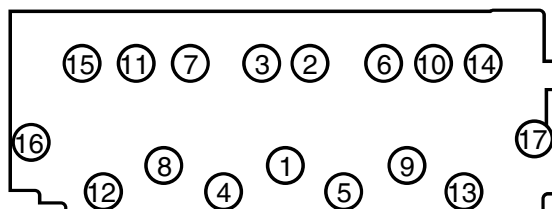
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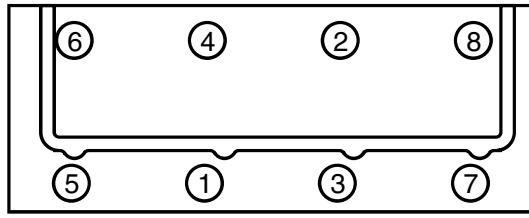


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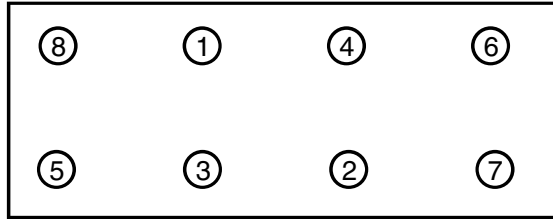


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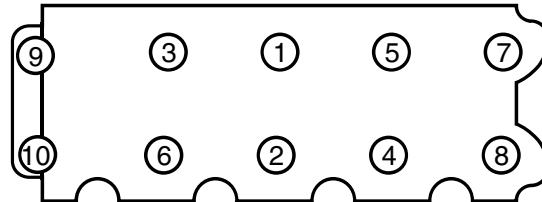
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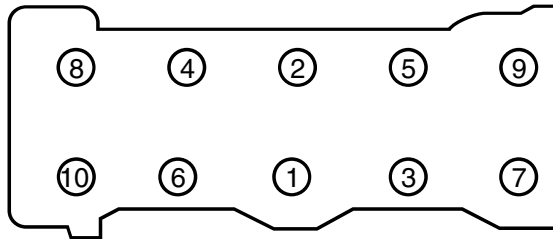
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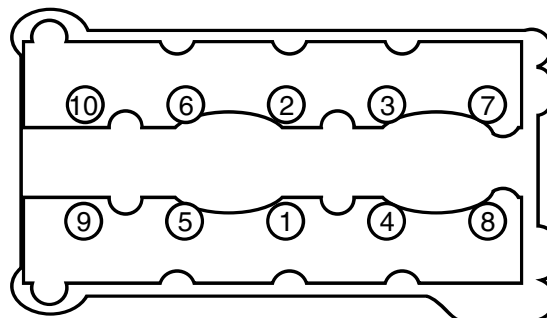
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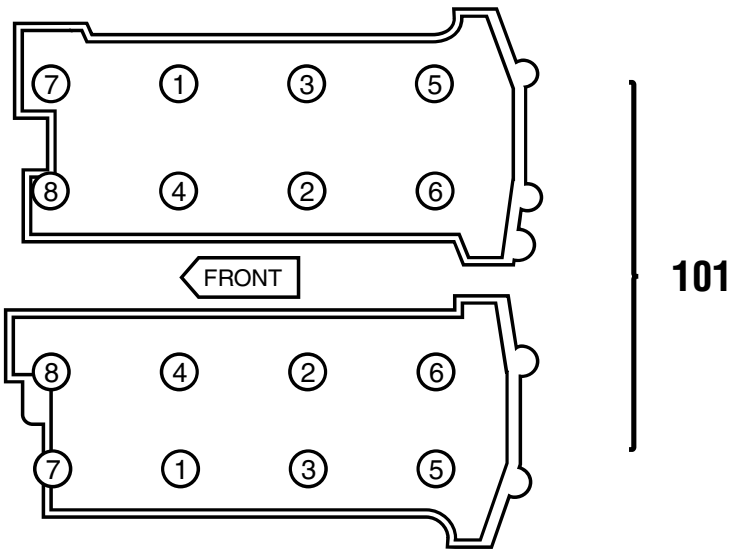


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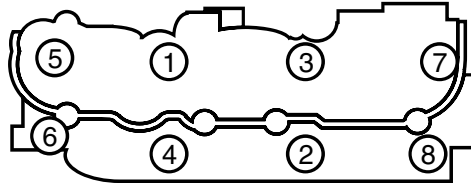


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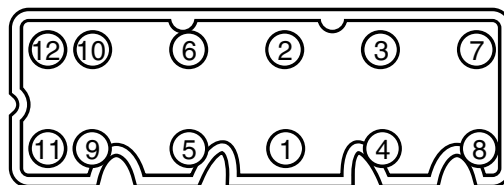
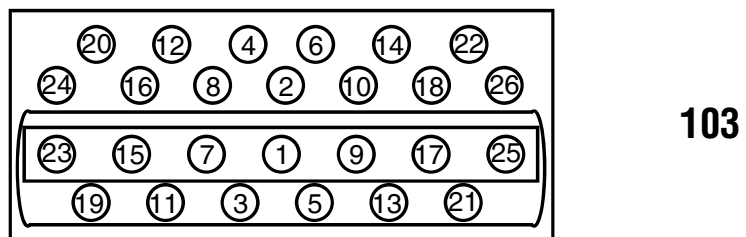
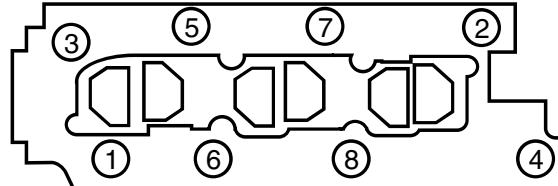




Cylinder Head Bolt Tightening Sequence

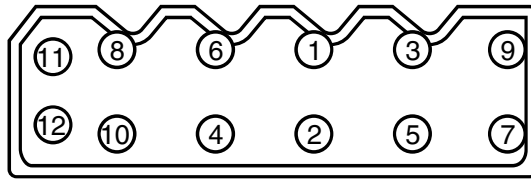


Lower Intake Manifold Bolt Tightening Sequence

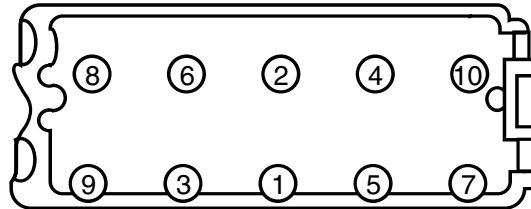


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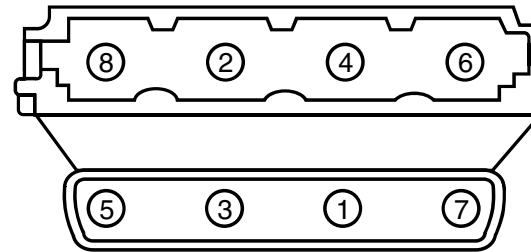
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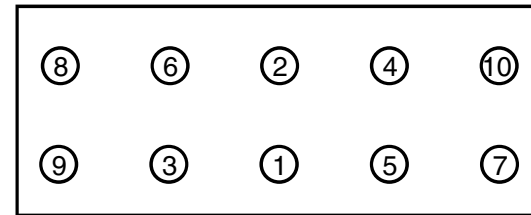
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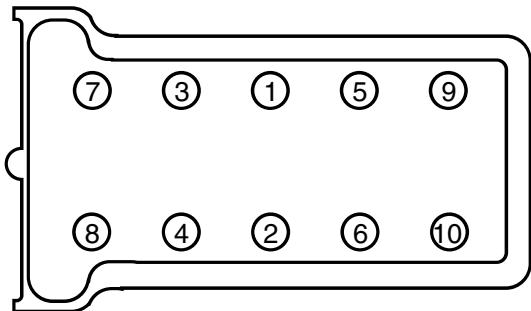
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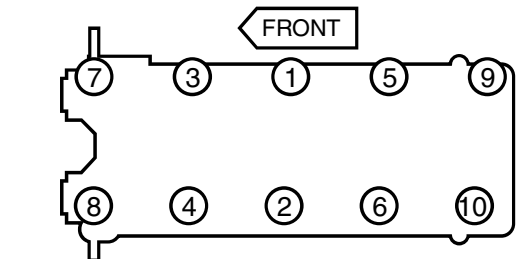
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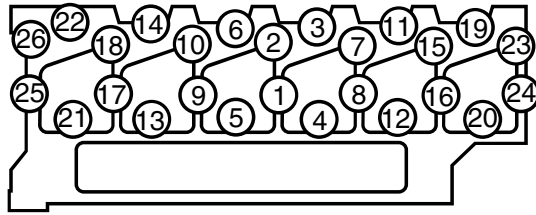
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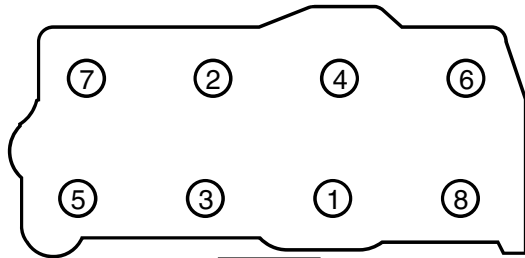
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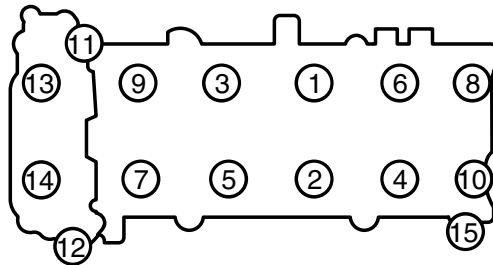
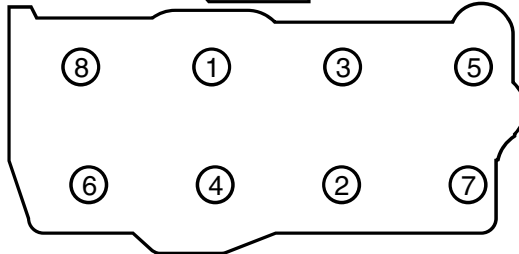
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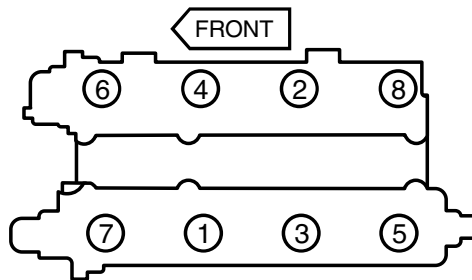
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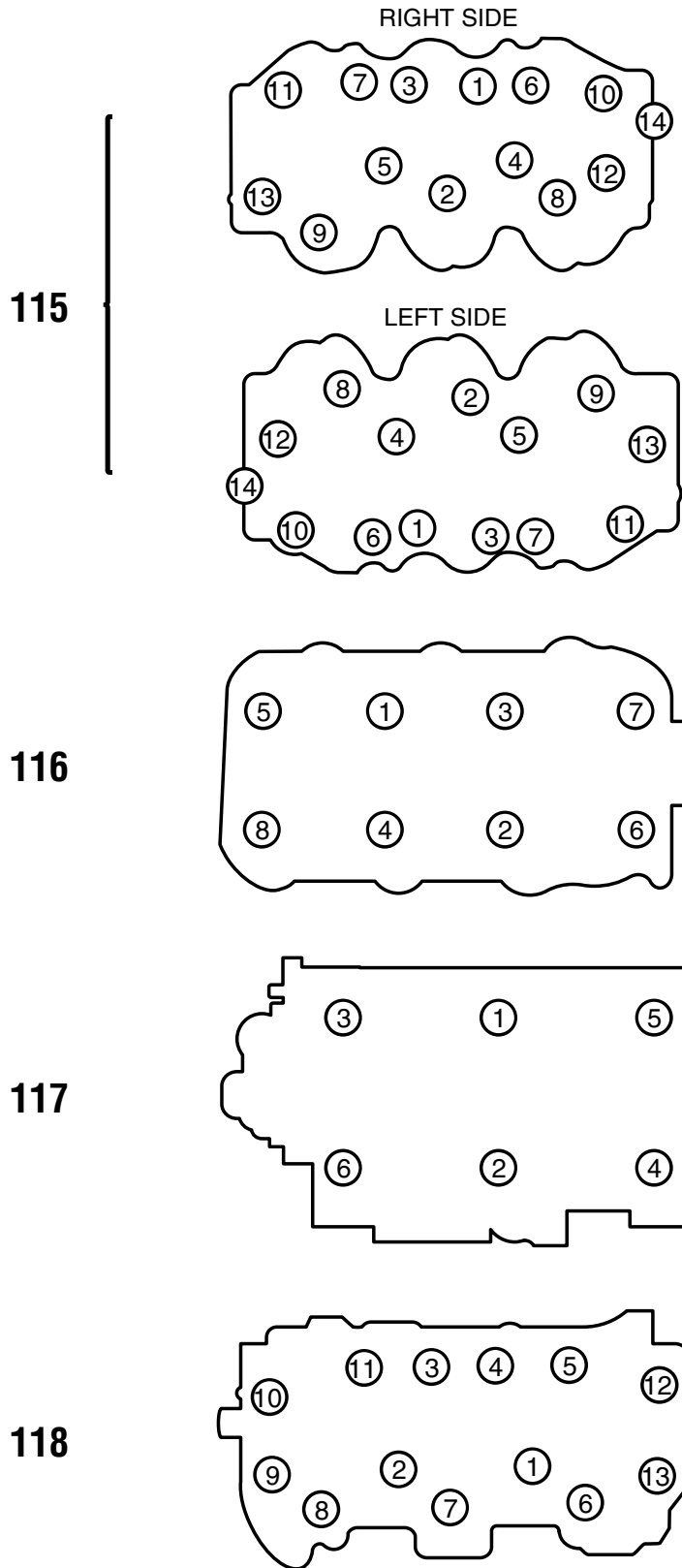


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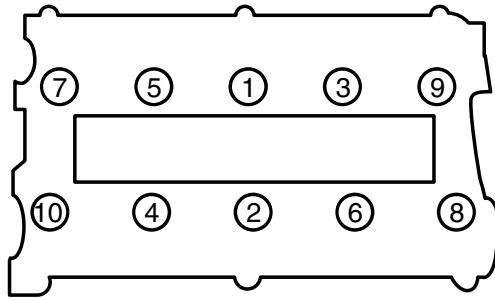


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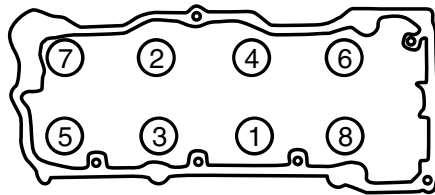
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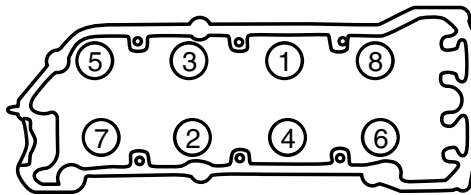
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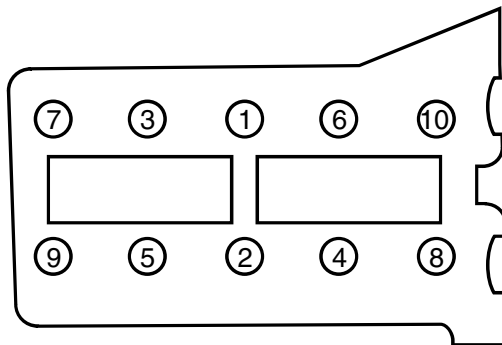
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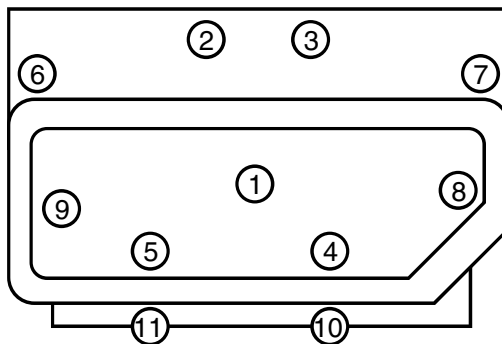
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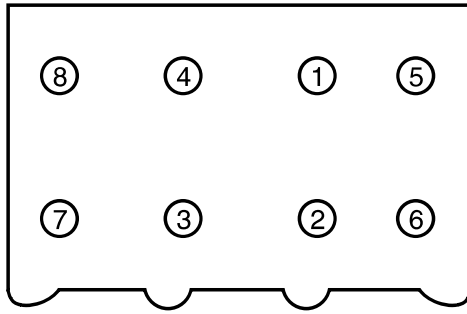


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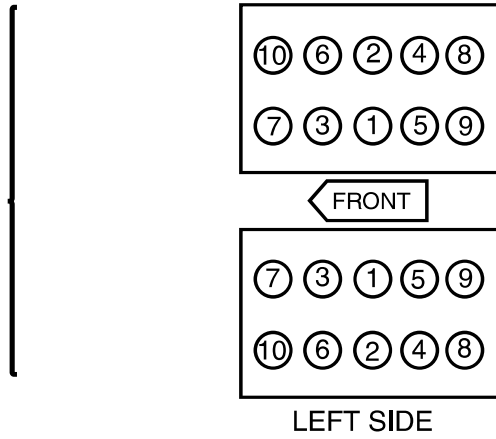


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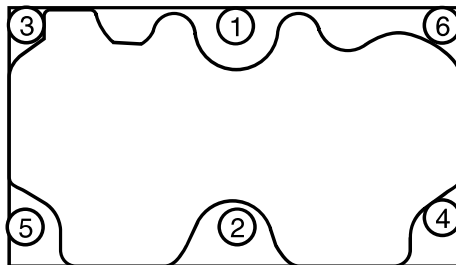
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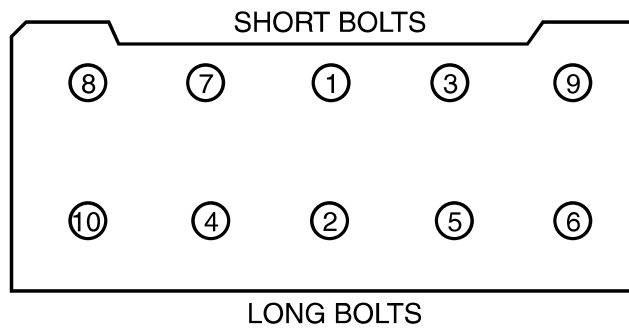
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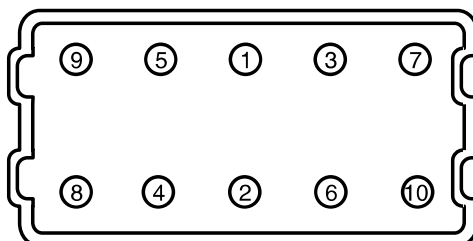
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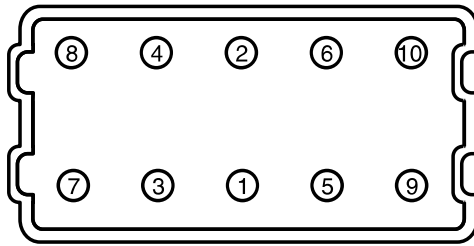
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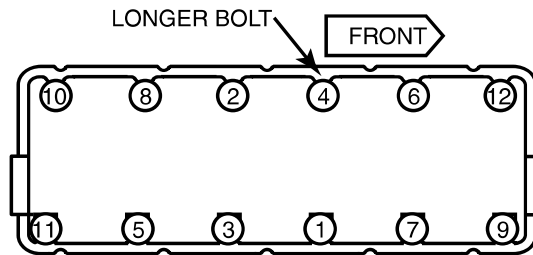
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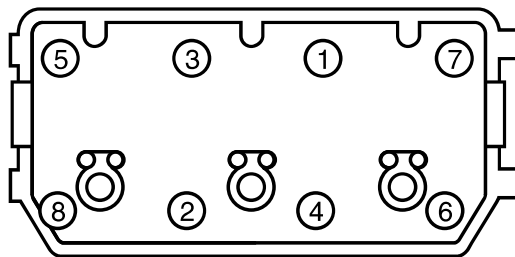
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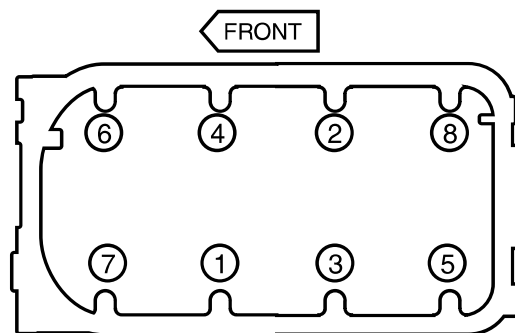
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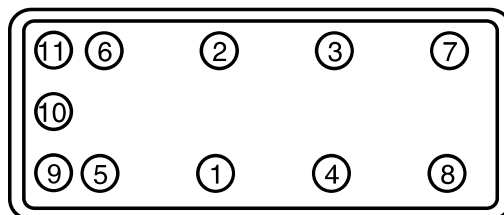
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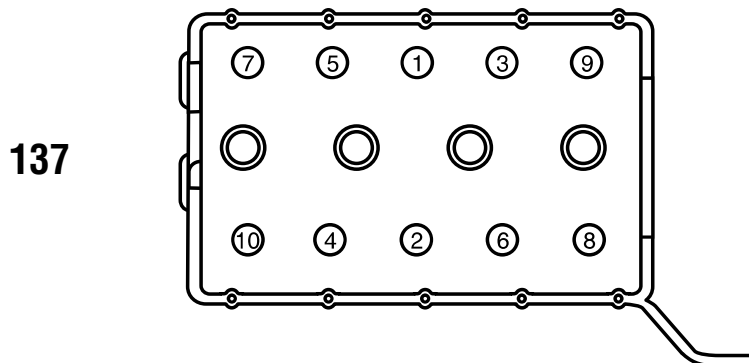
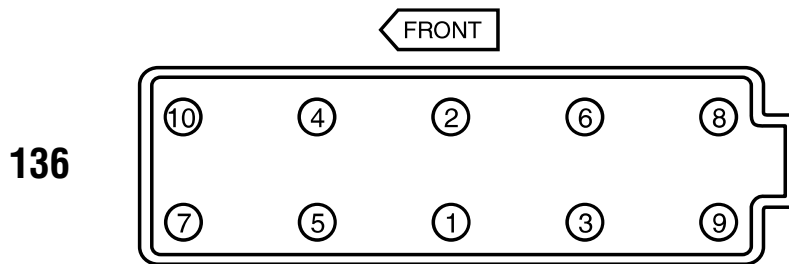
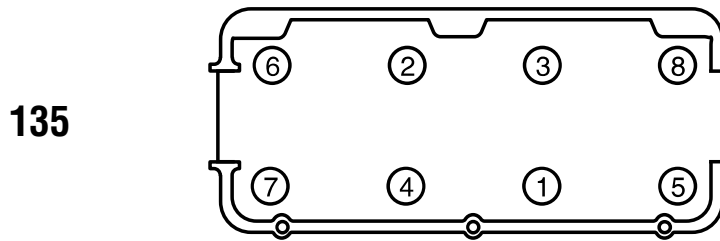
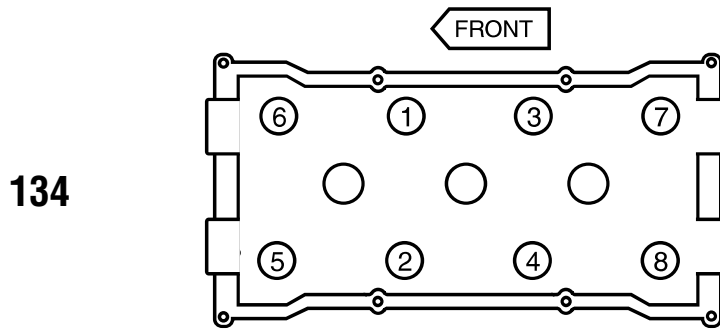
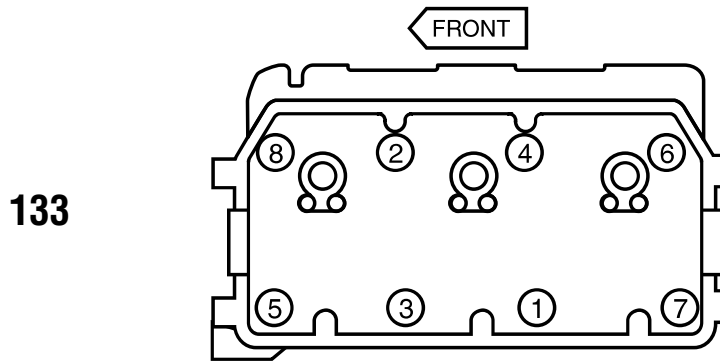
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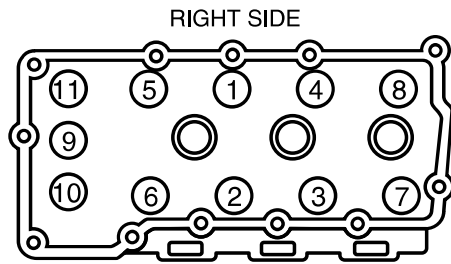


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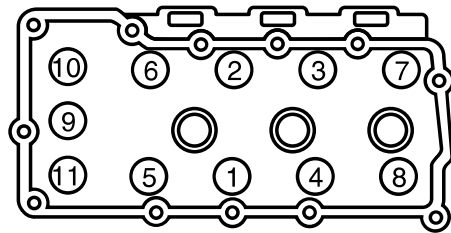


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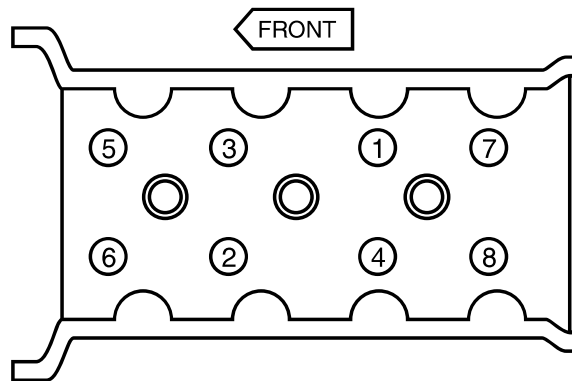


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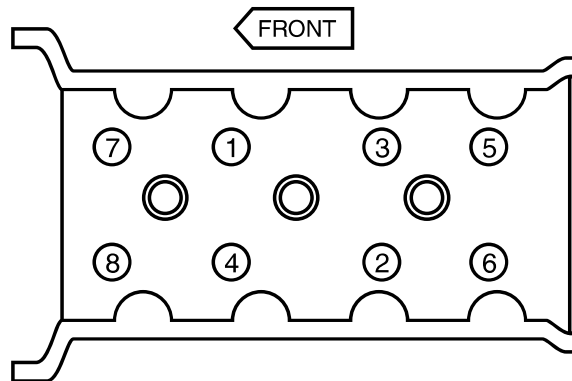


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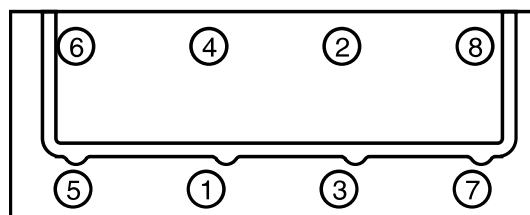
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139



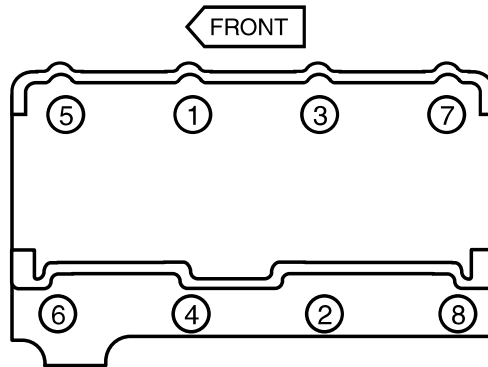
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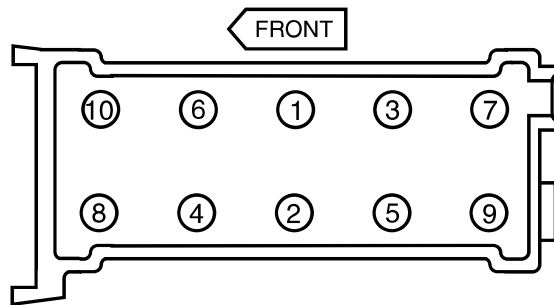
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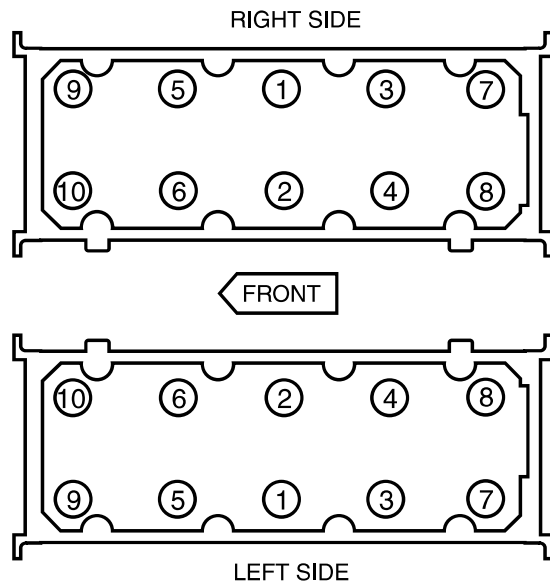
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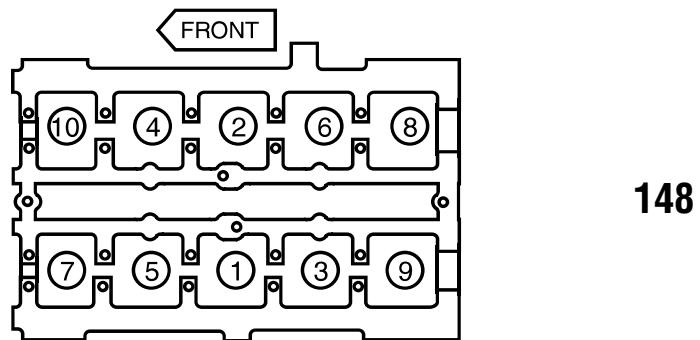
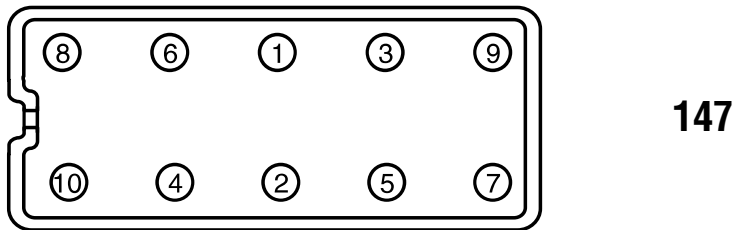
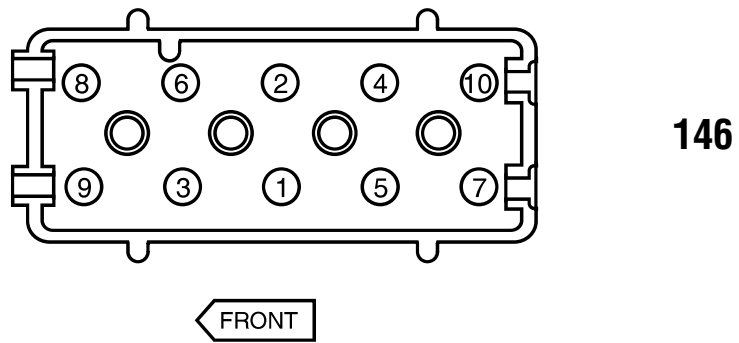
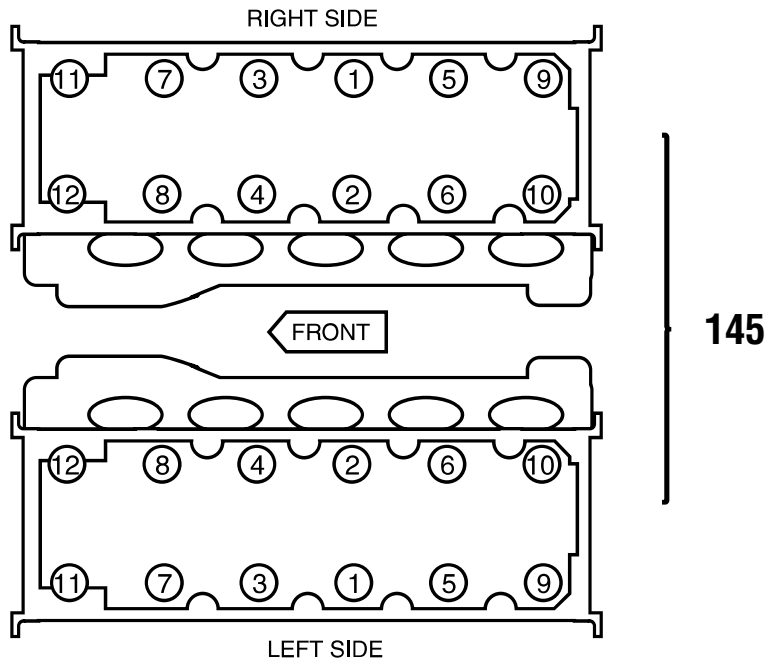
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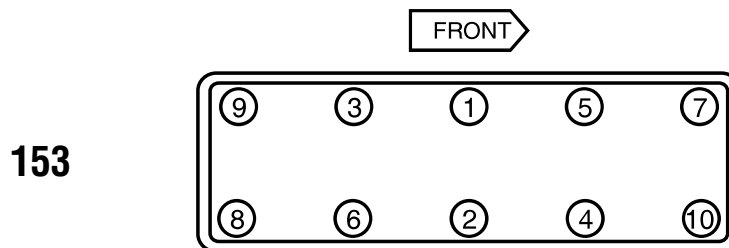
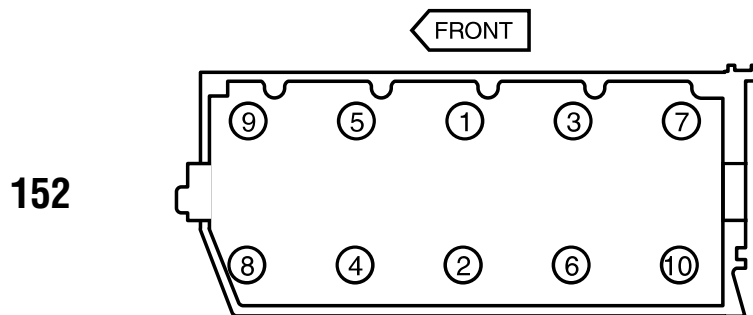
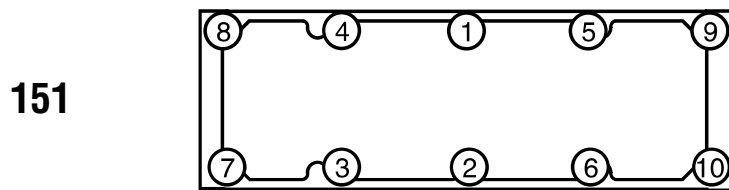
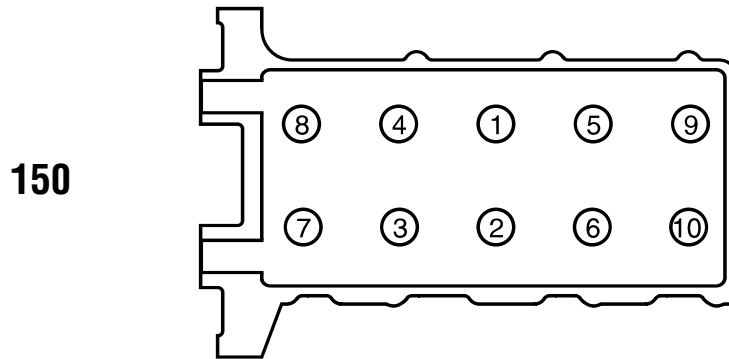
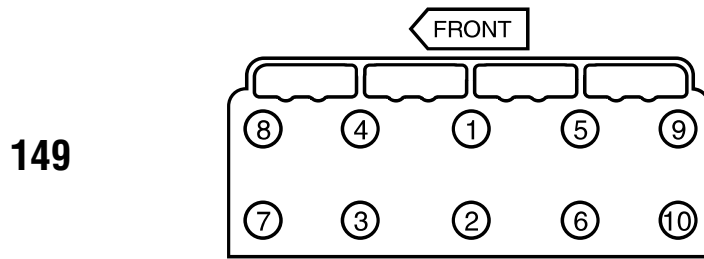
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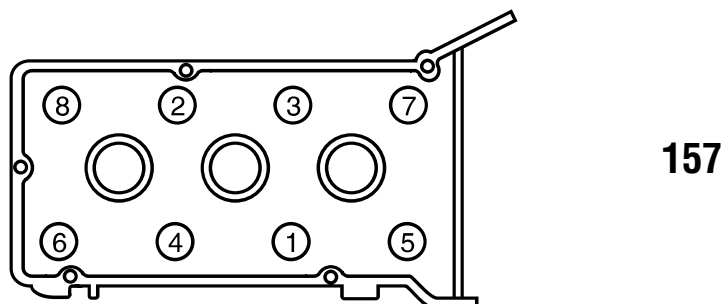
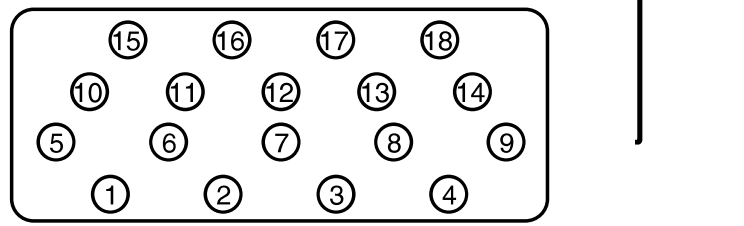
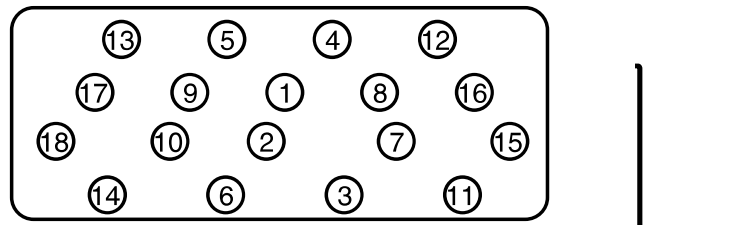
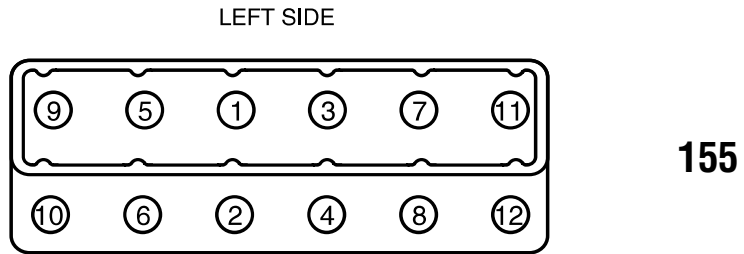
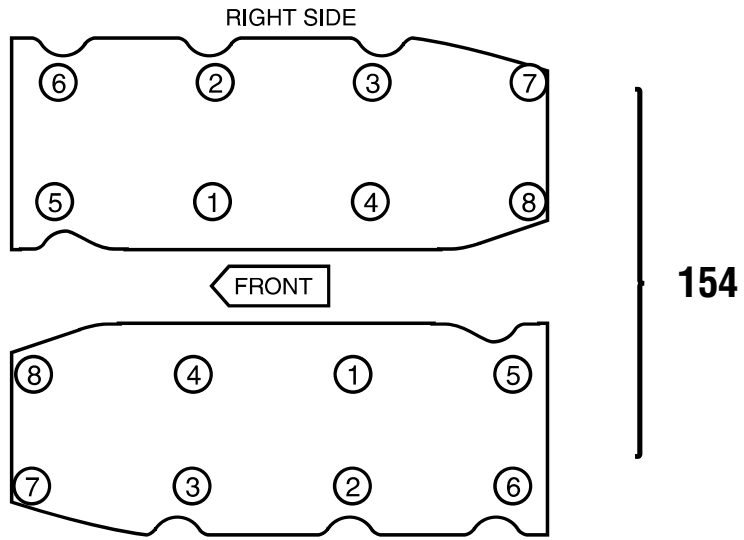
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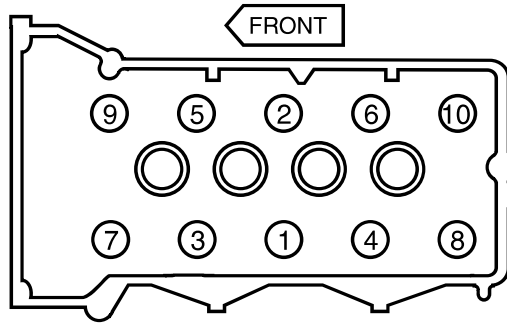


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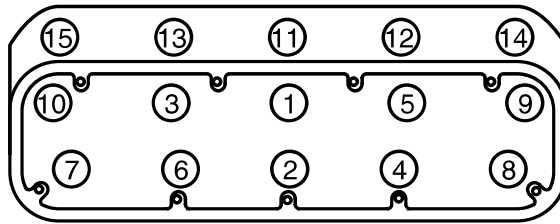


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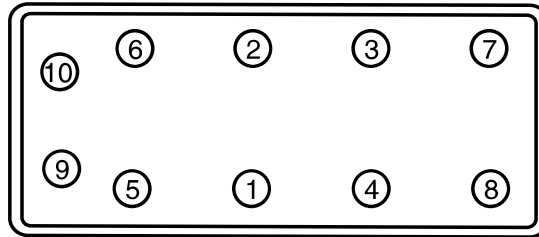
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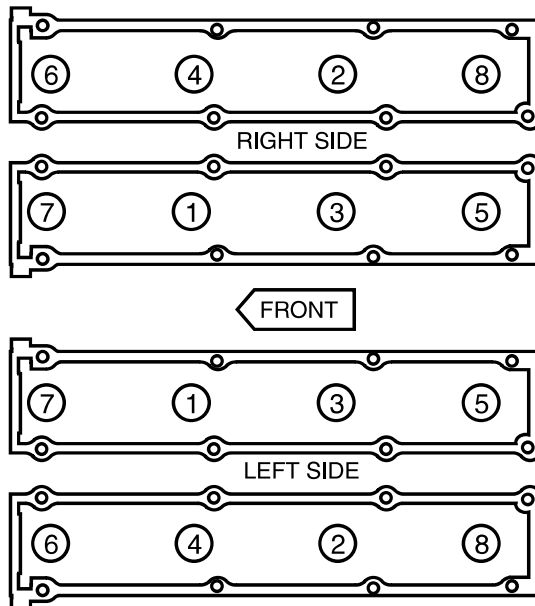
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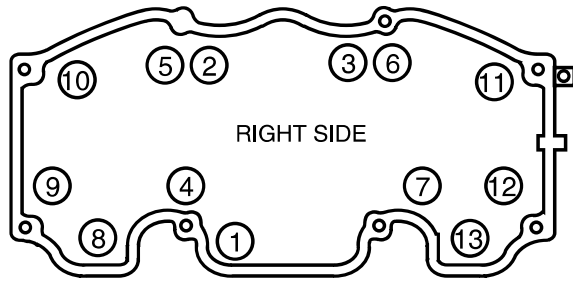
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161



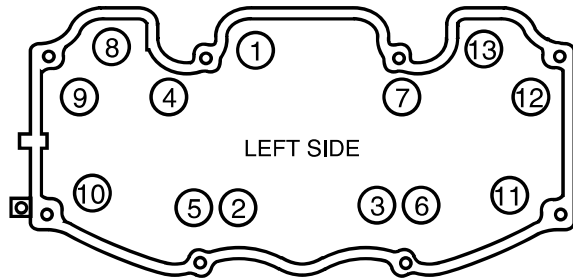
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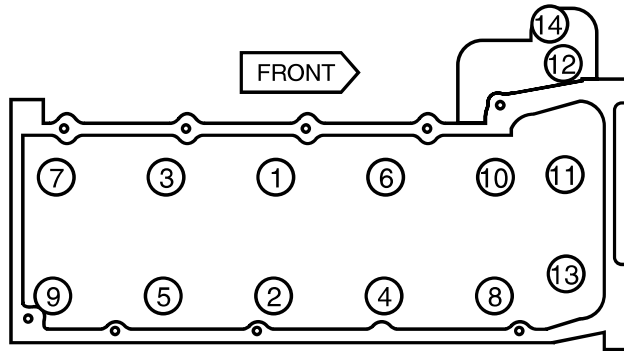
RIGHT SIDE

FRONT

162

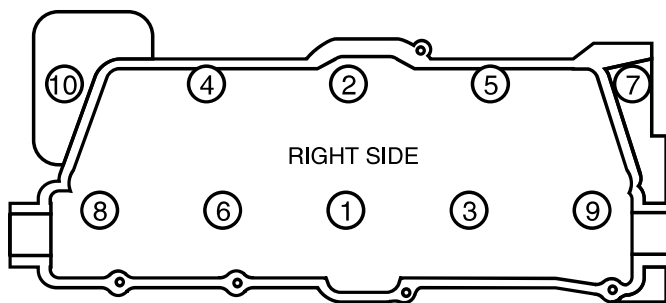


LEFT SIDE



FRONT

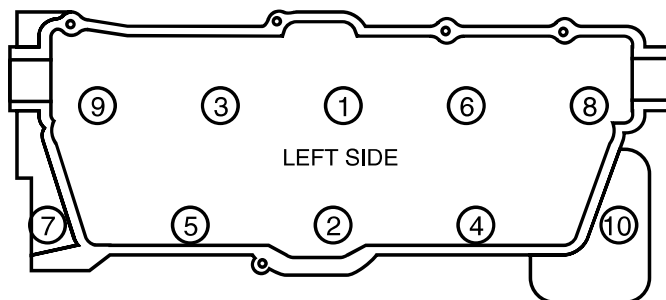
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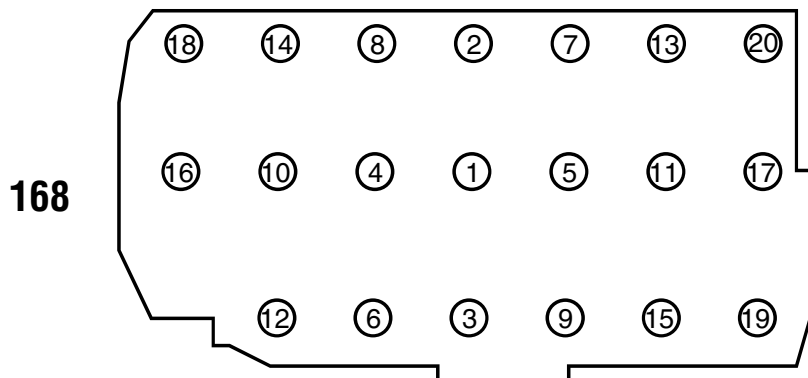
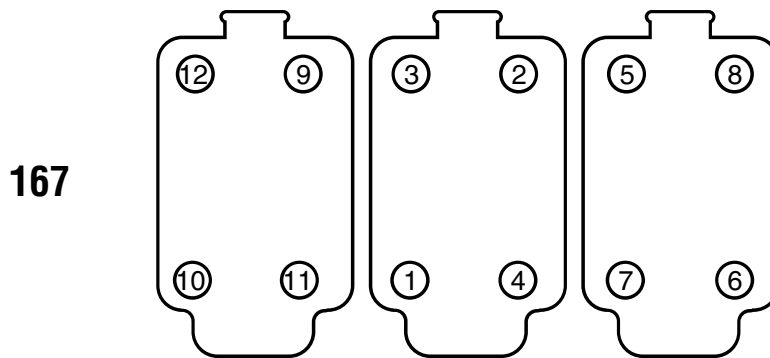
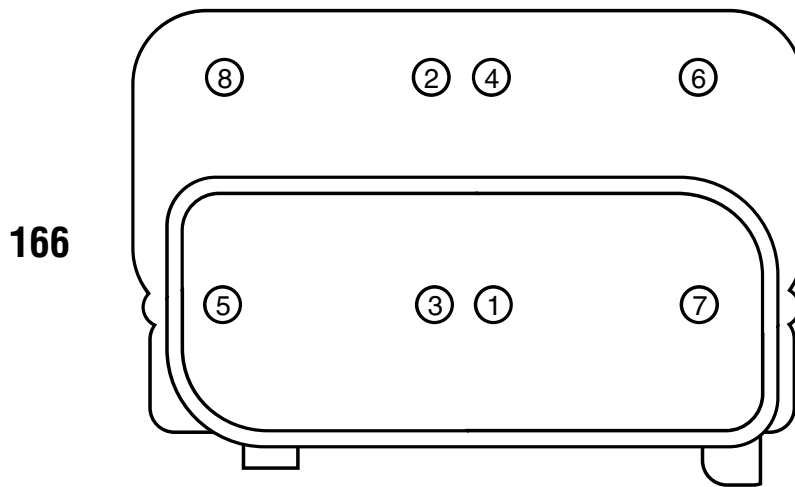
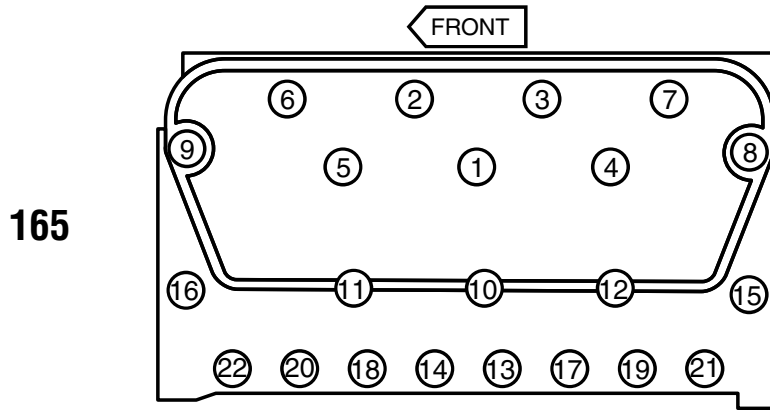
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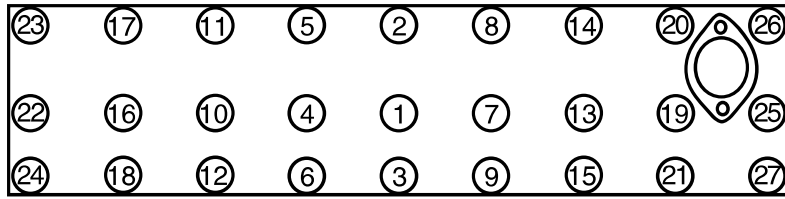
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FELPRO TORQUE TABLES™

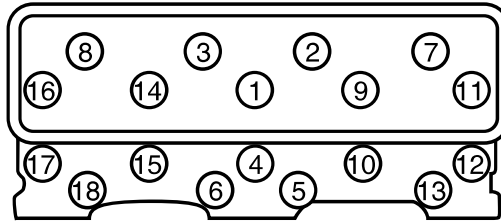




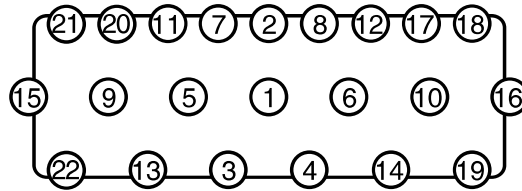
TORQUE TABLES™



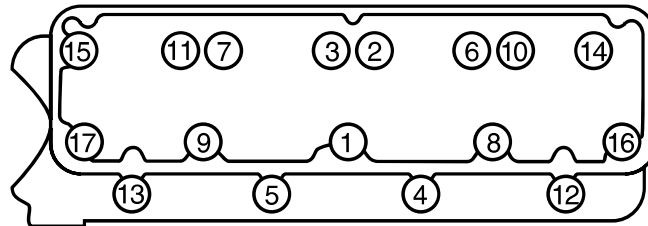
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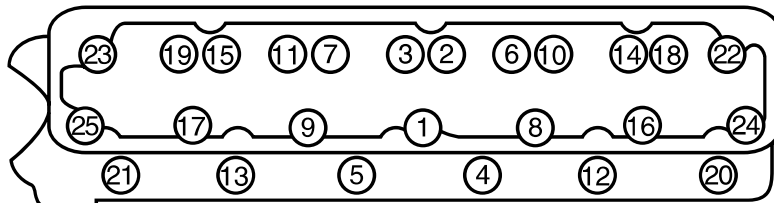
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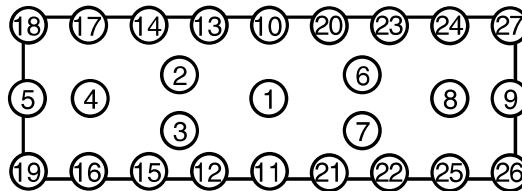
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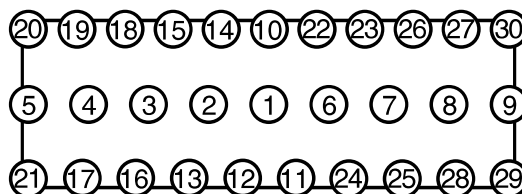
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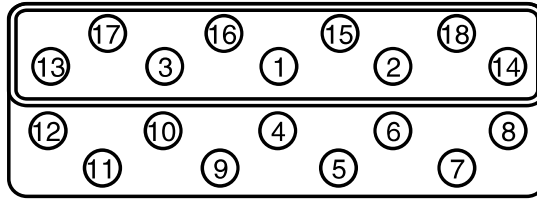
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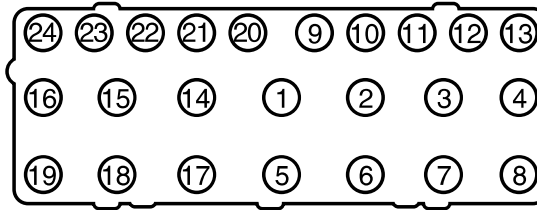
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FELPRO TORQUE TABLES™

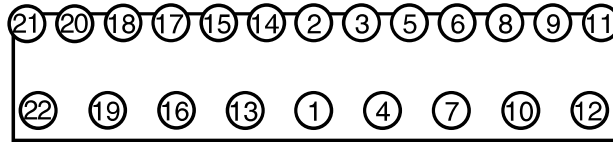
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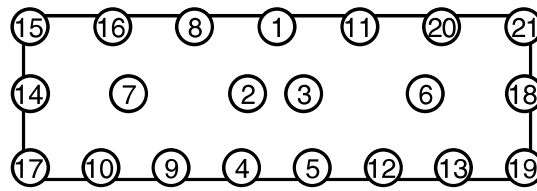
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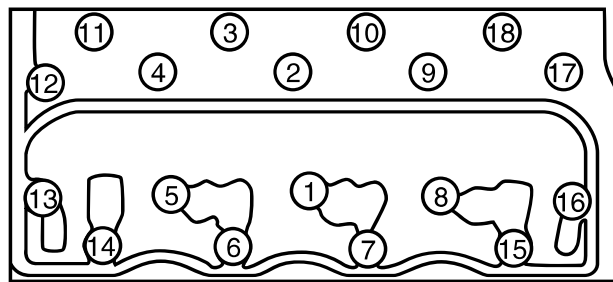
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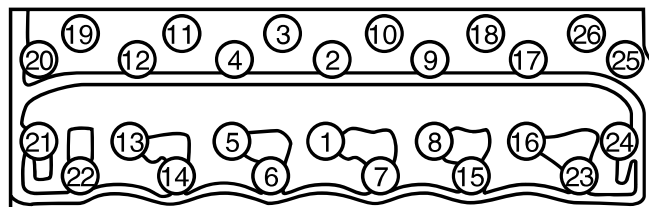
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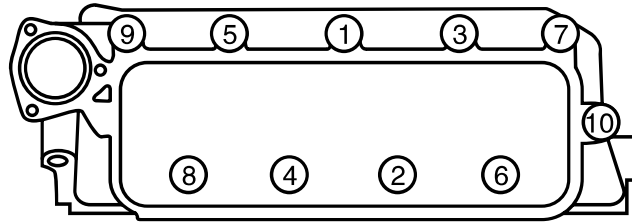
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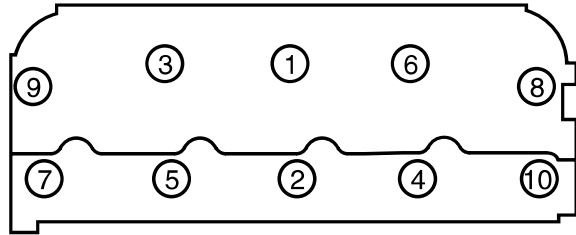
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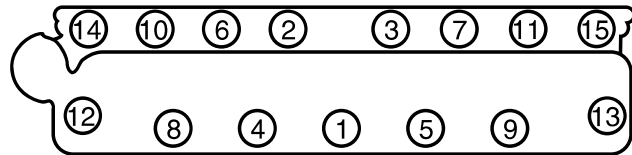
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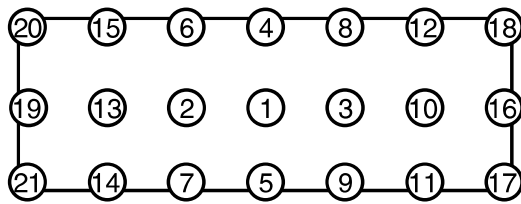
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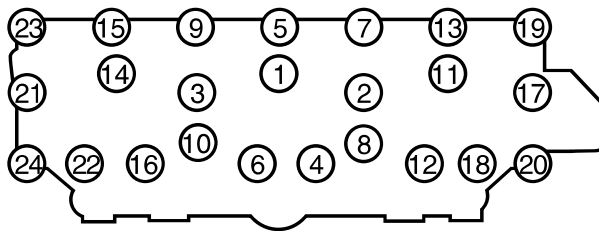
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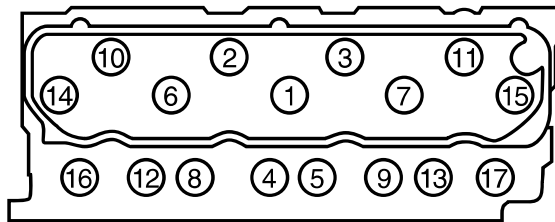
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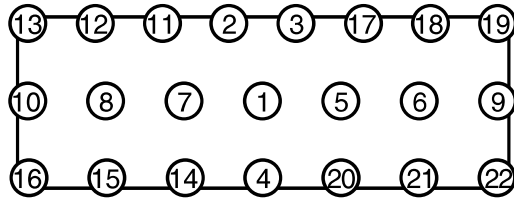
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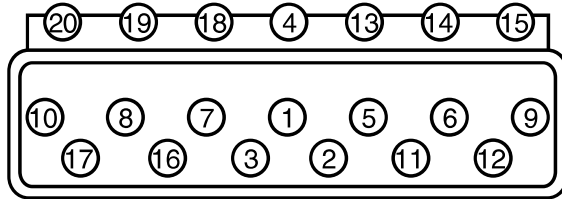
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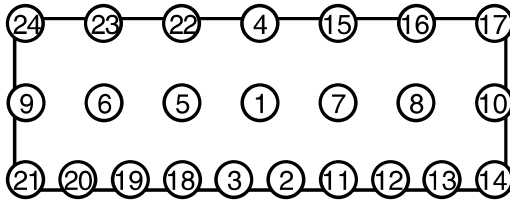
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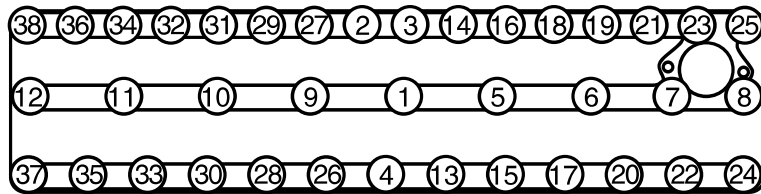
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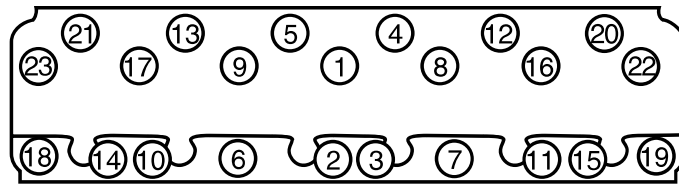
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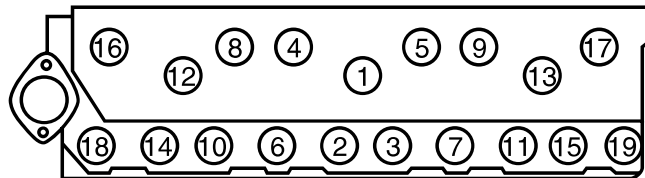
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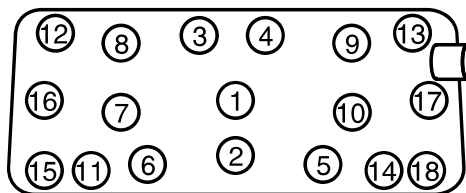
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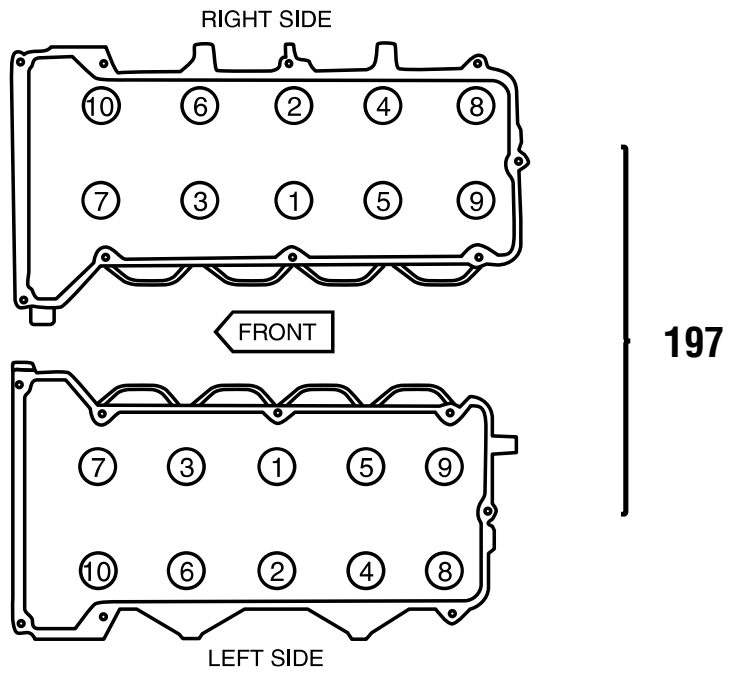
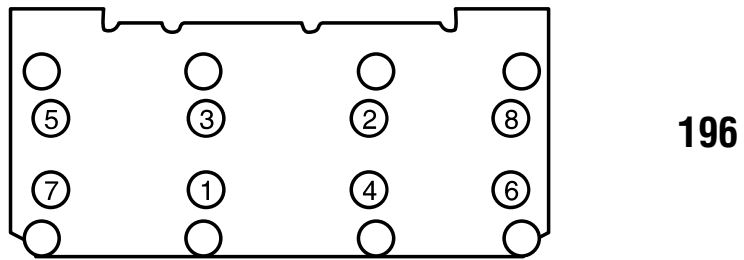
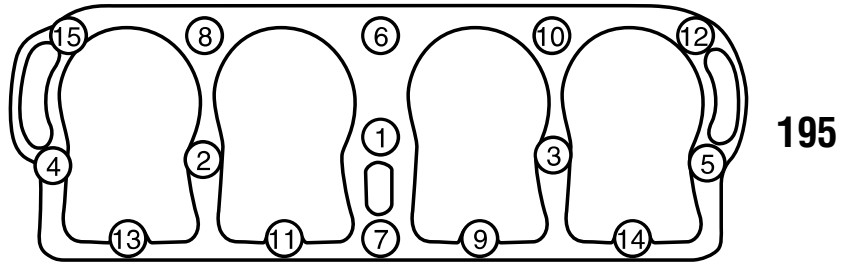
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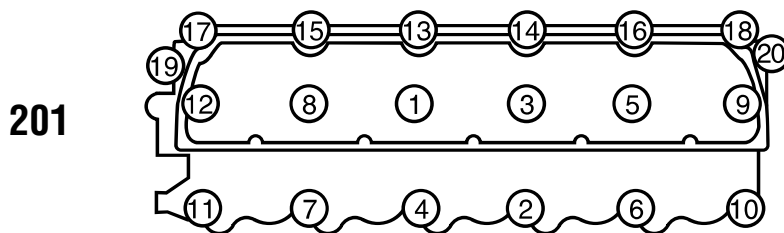
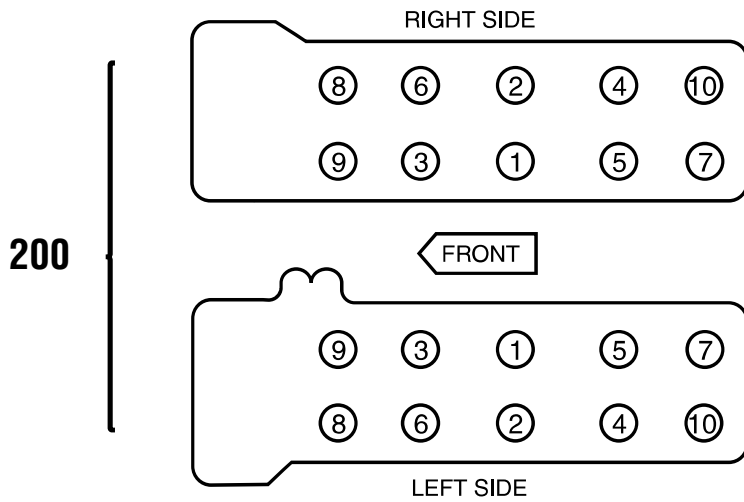
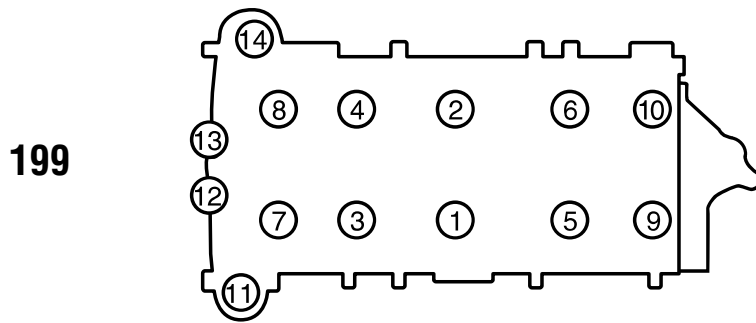
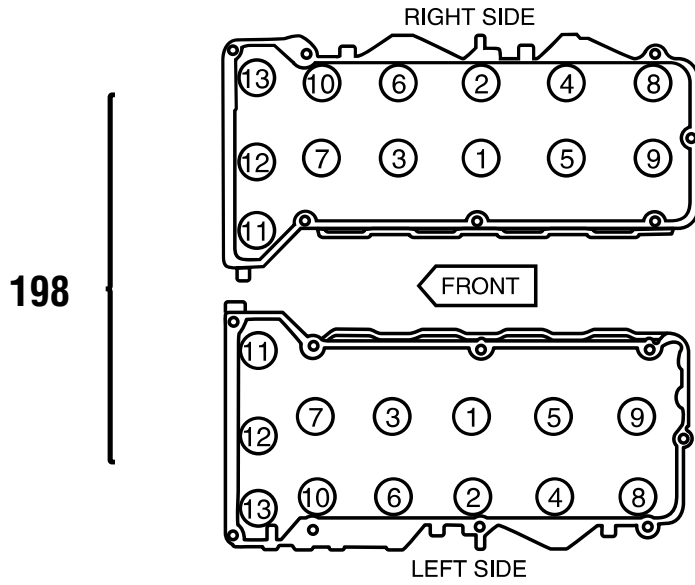
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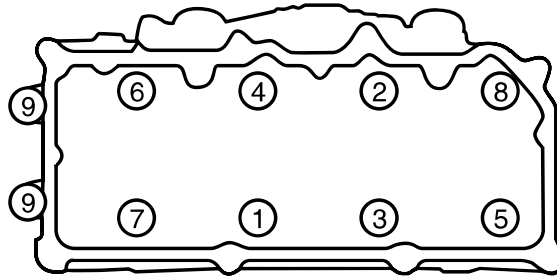
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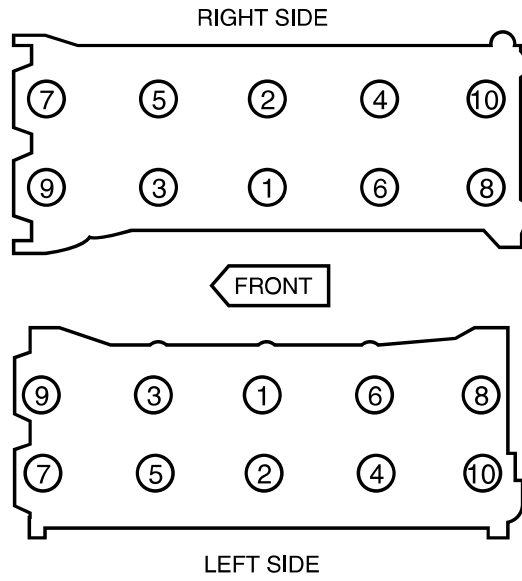
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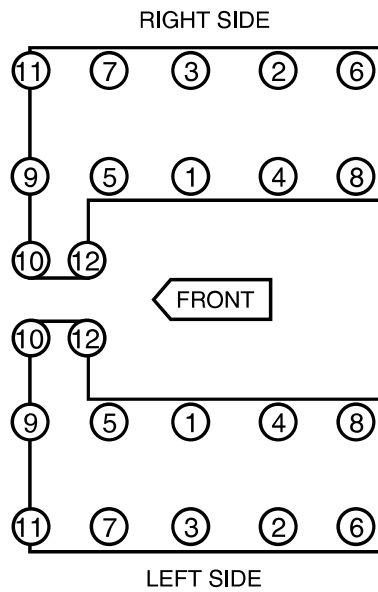
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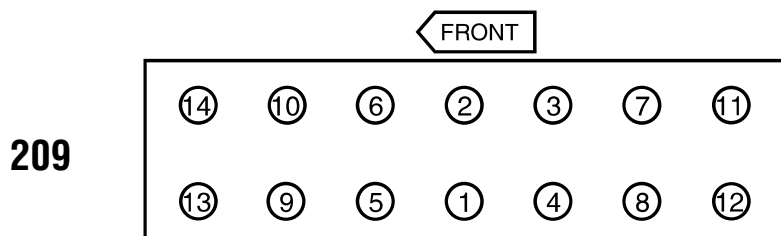
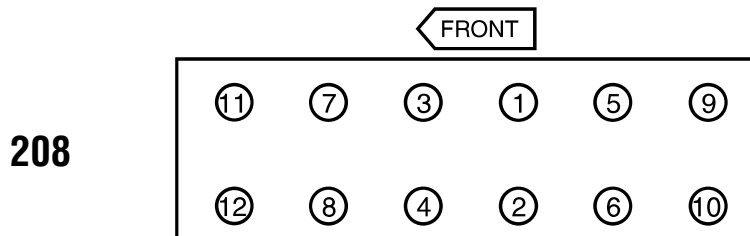
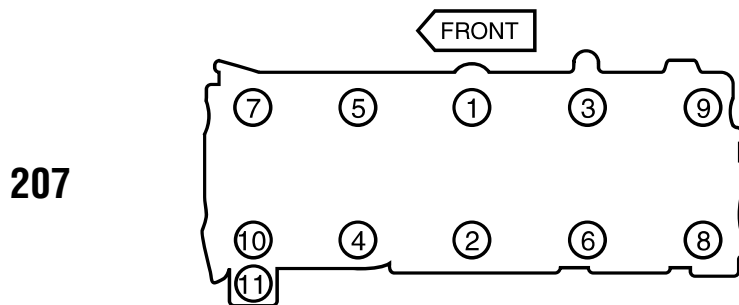
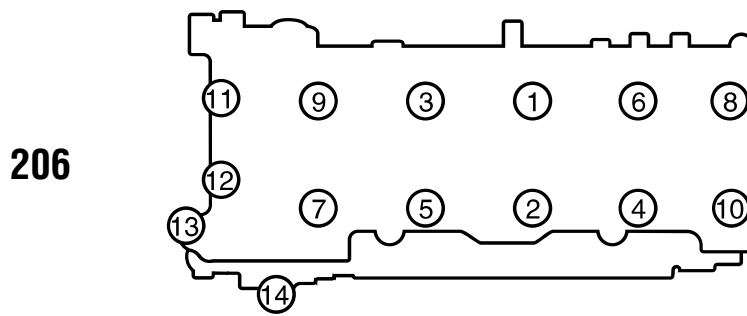
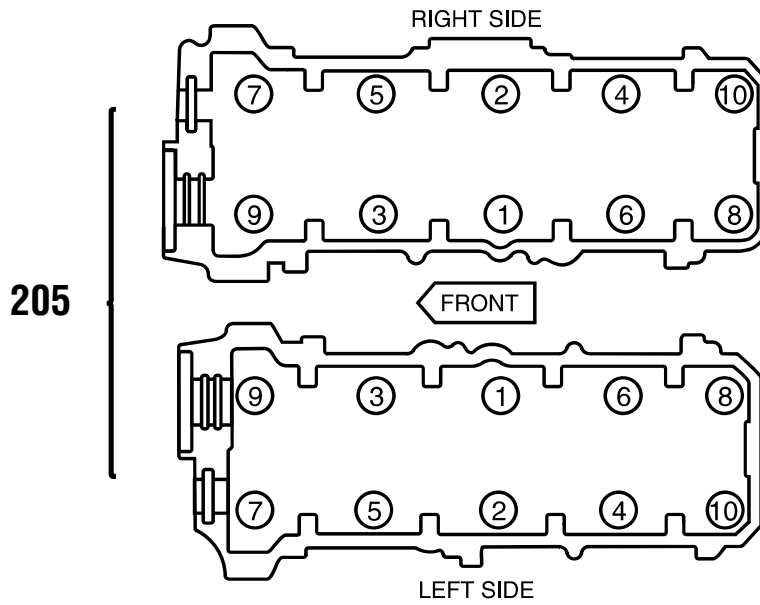
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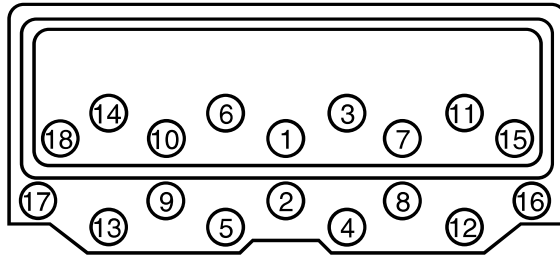
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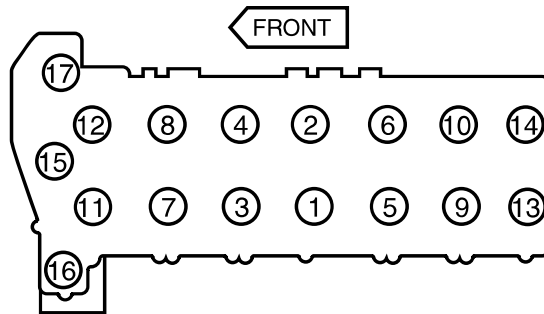
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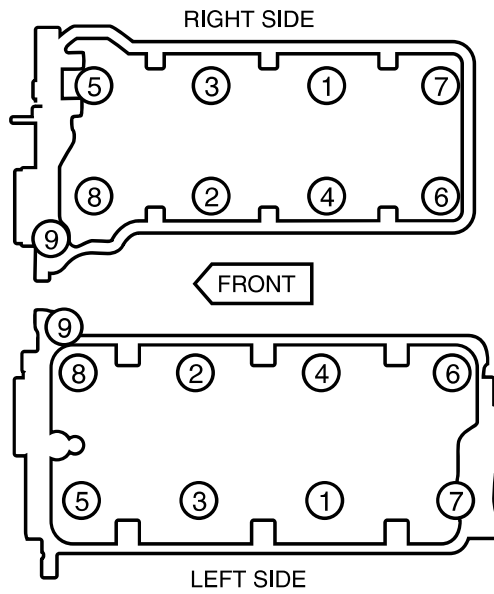
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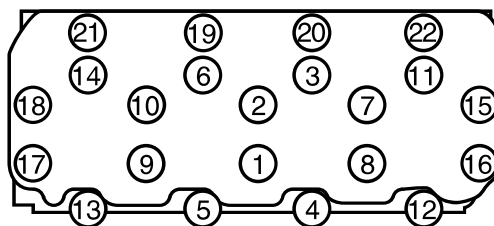
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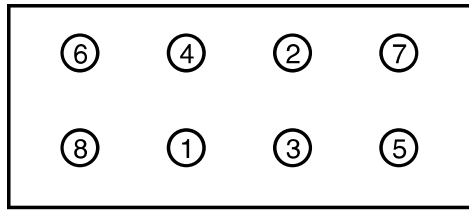


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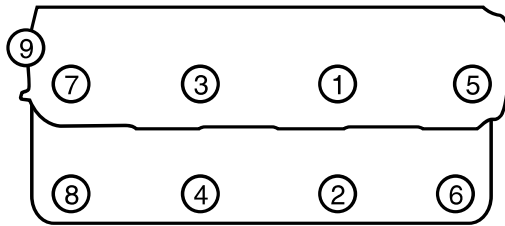
FELPRO TORQUE TABLES™

FRONT

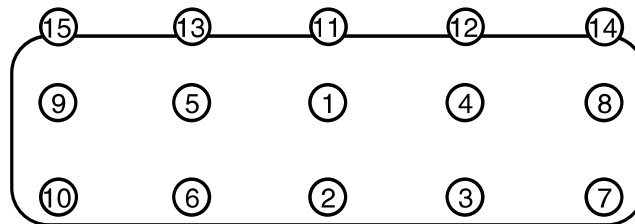
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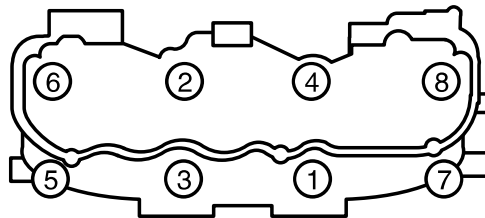
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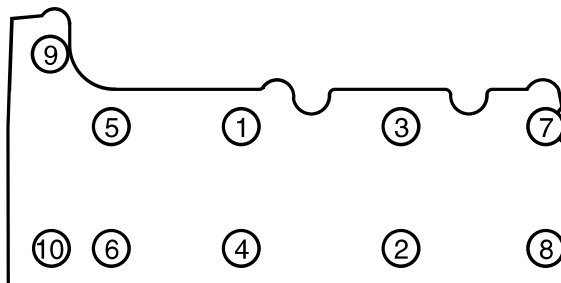
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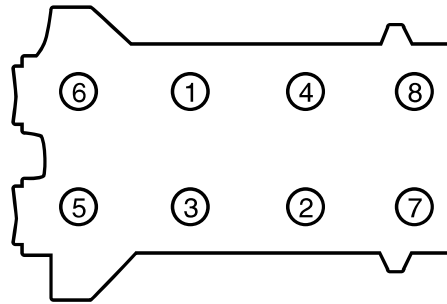
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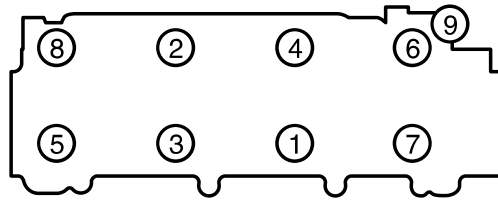
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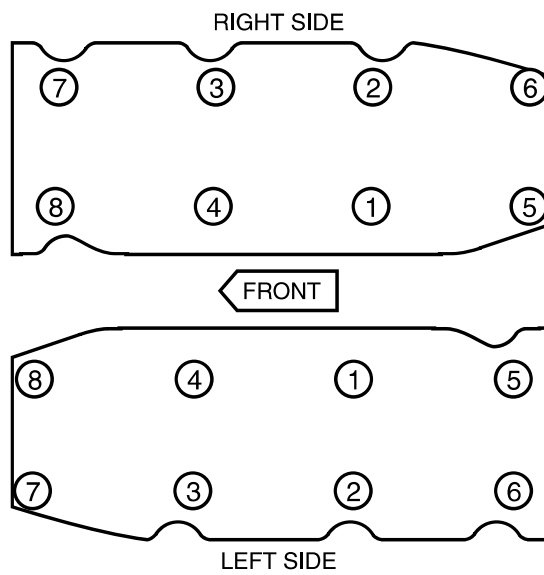
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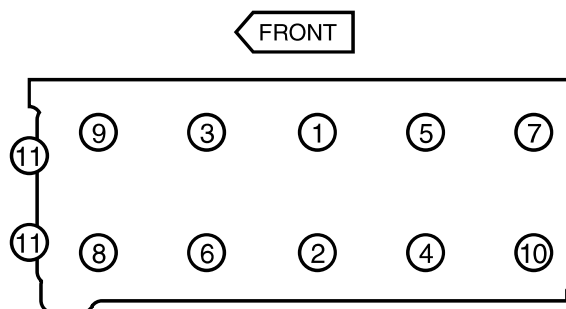
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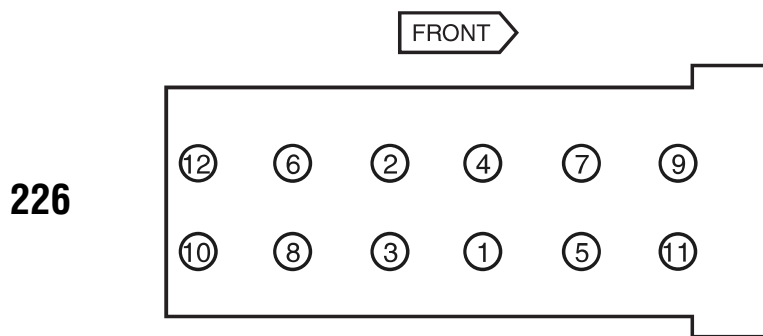
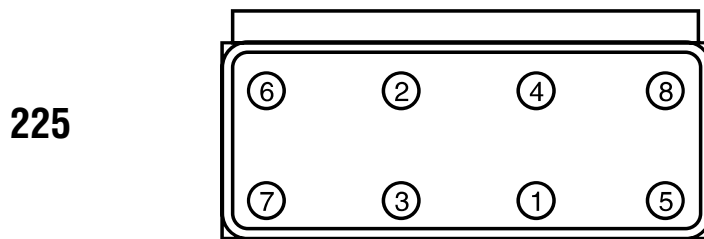
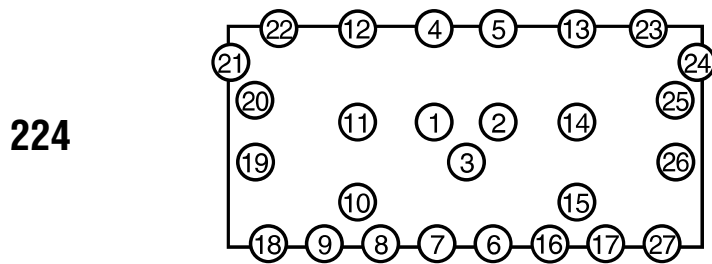
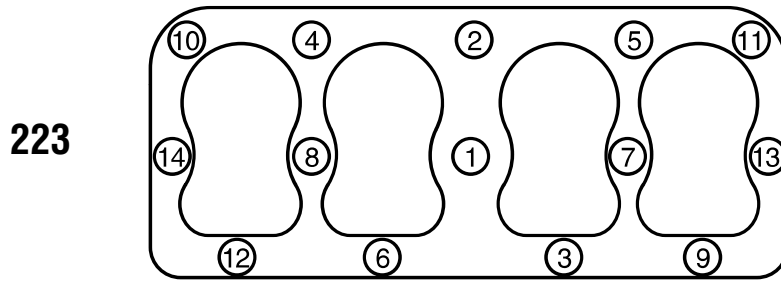


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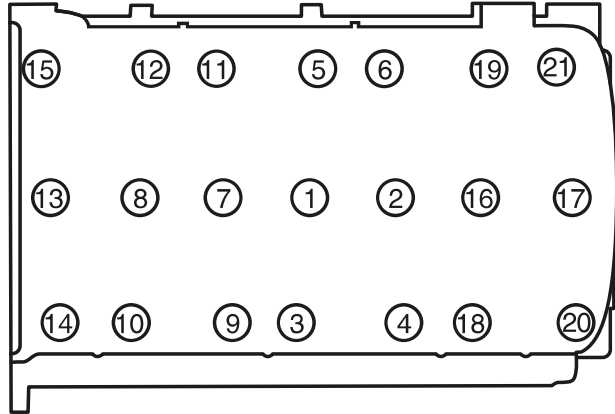
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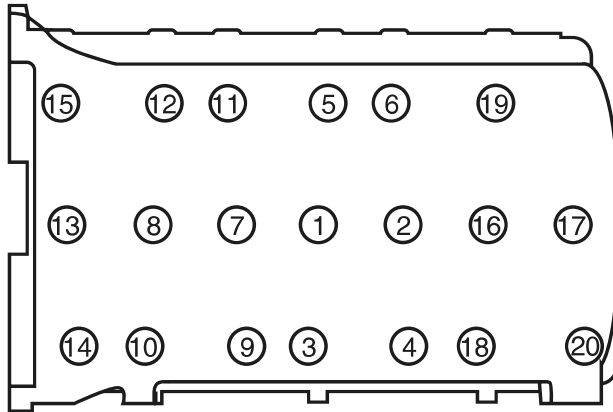
FELPRO TORQUE TABLES™

RIGHT SIDE



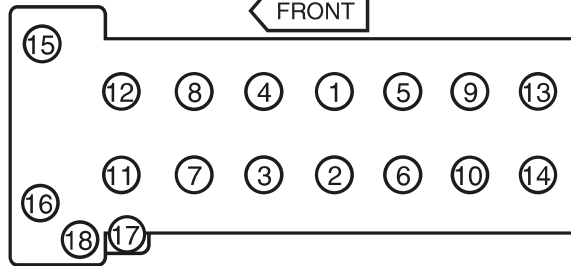
FRONT

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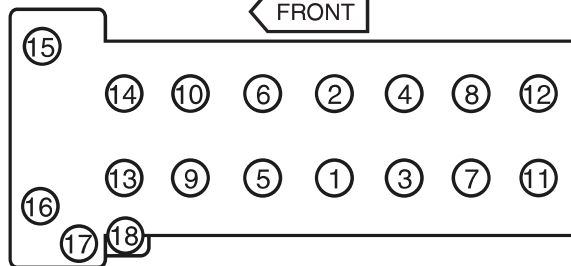
LEFT SIDE

FRONT



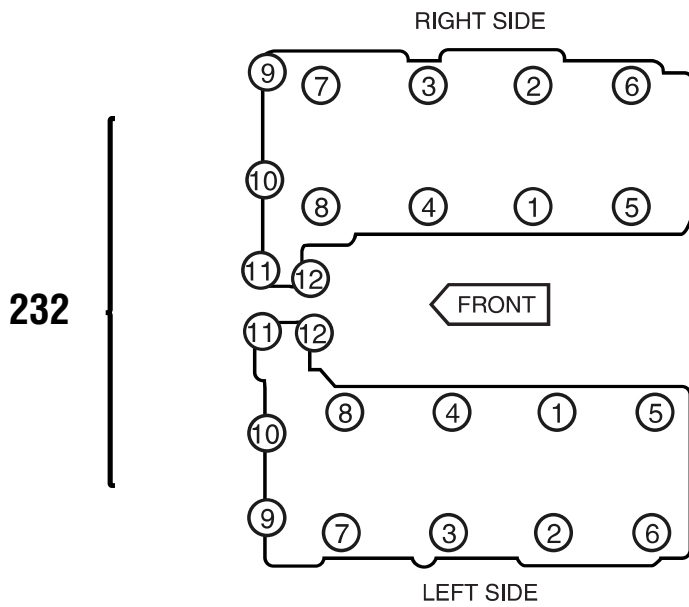
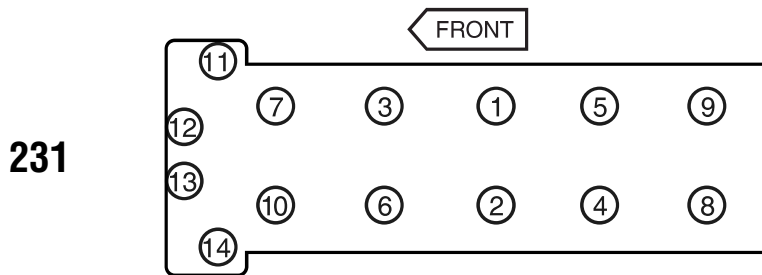
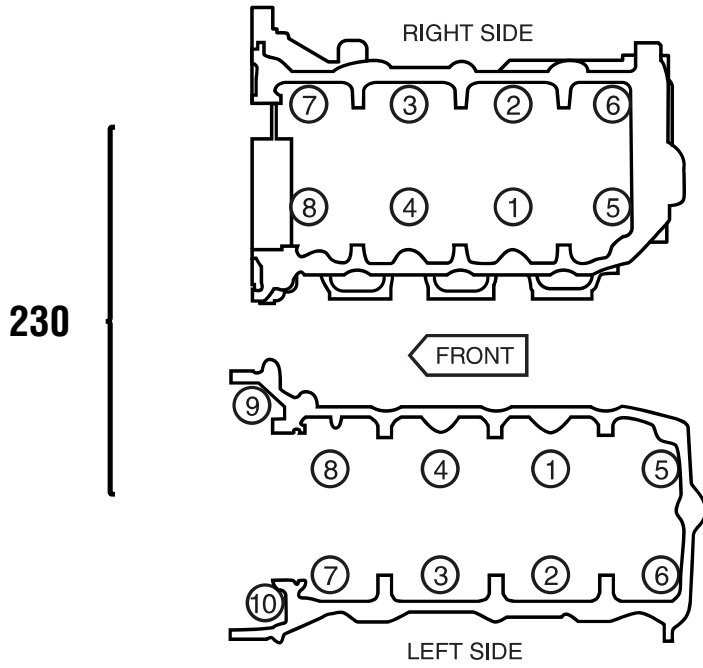
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FRONT

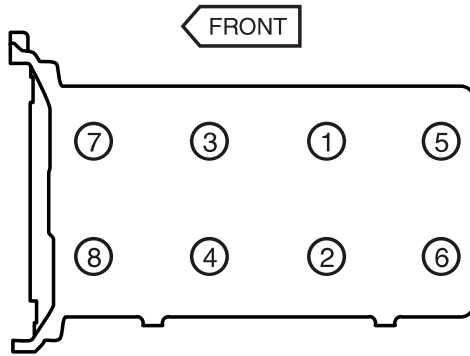


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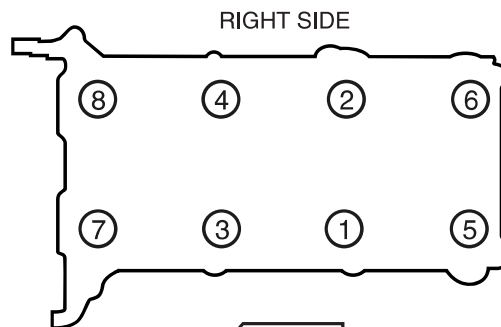
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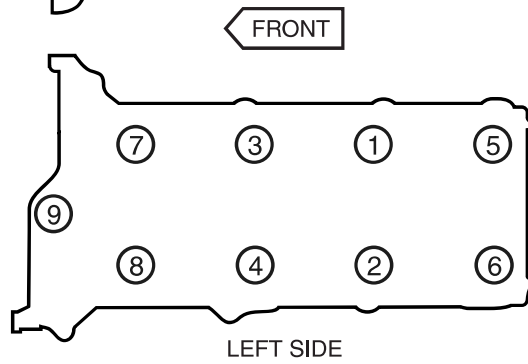
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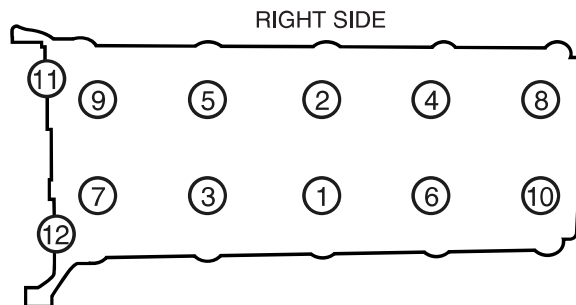
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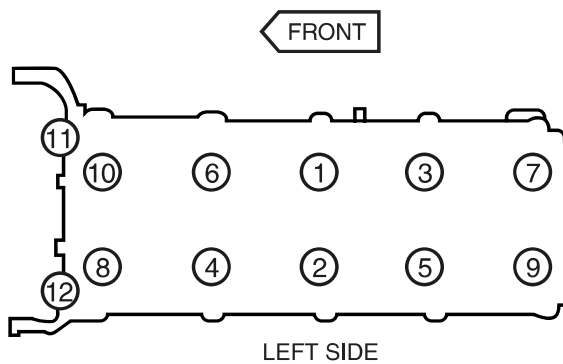
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LEFT SIDE



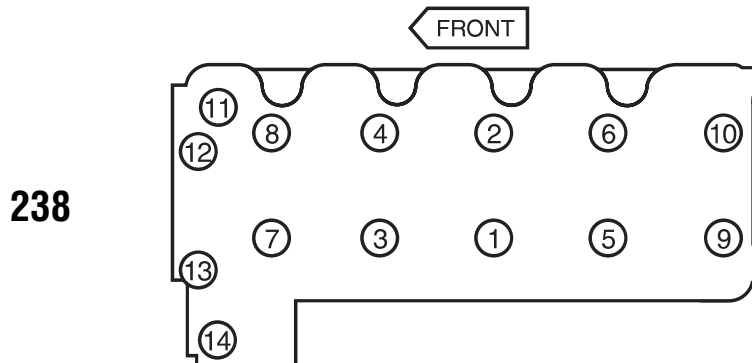
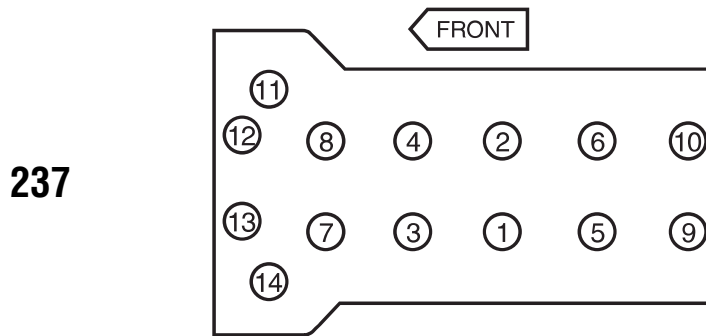
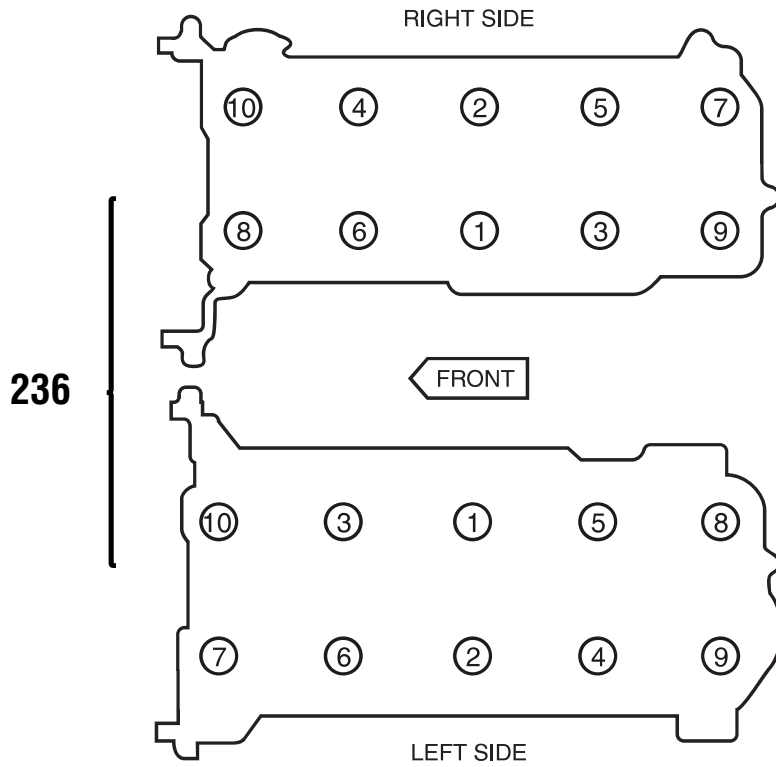
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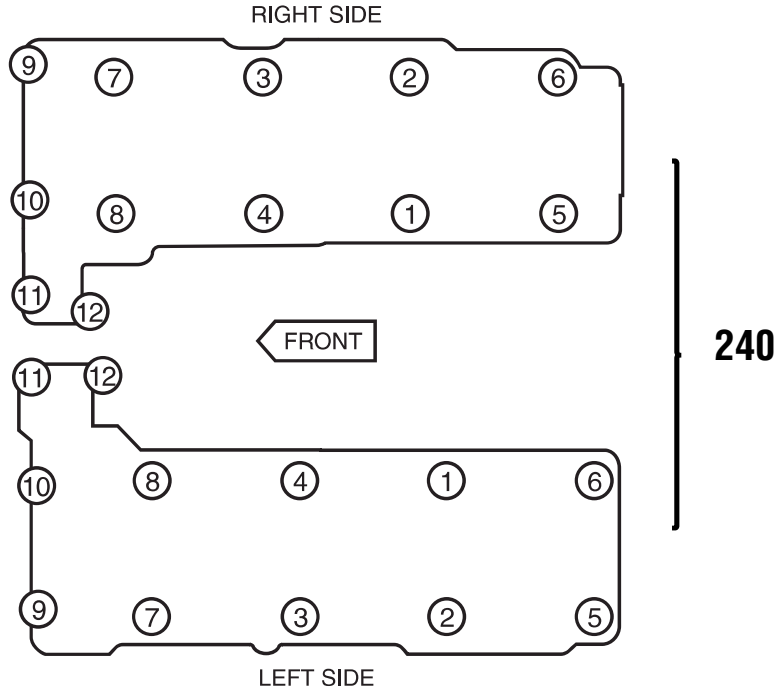
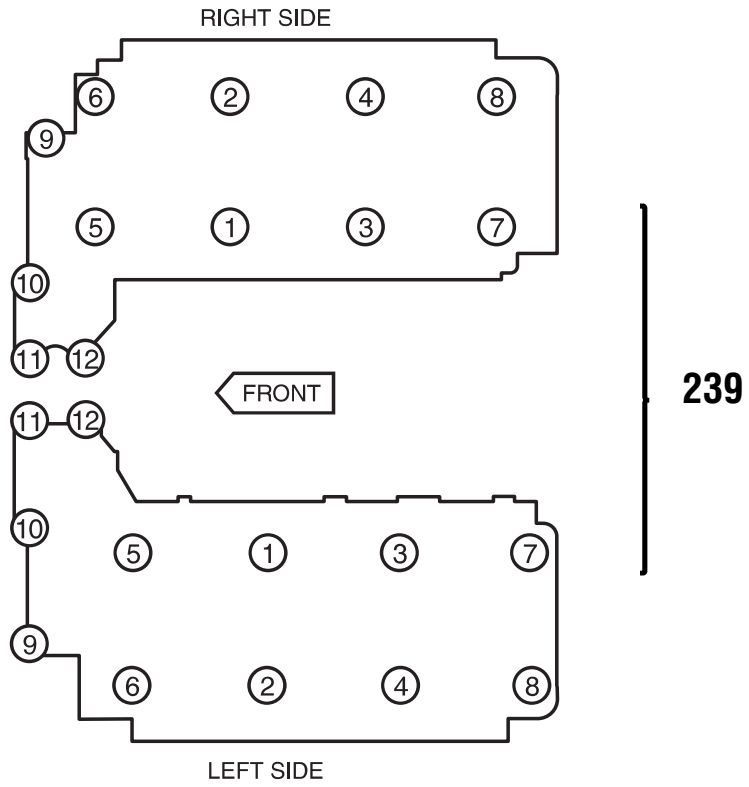
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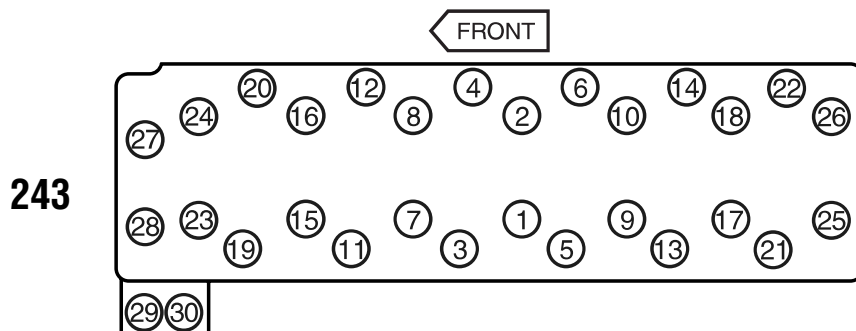
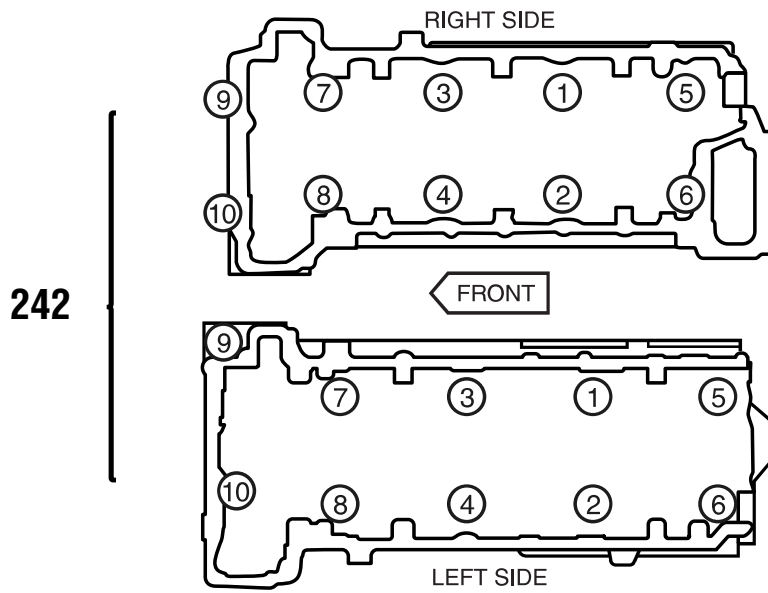
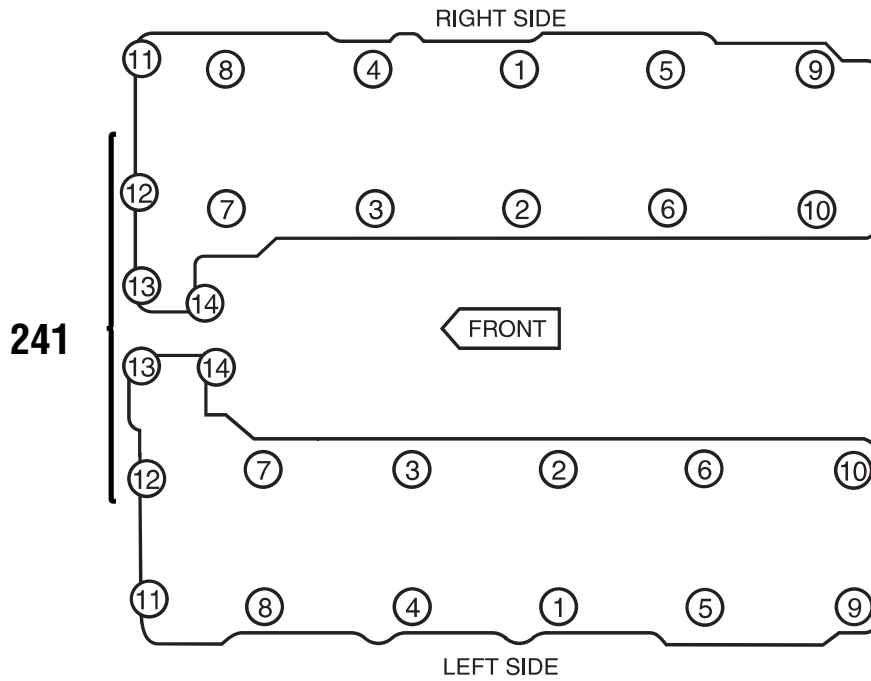
TORQUE TABLES™



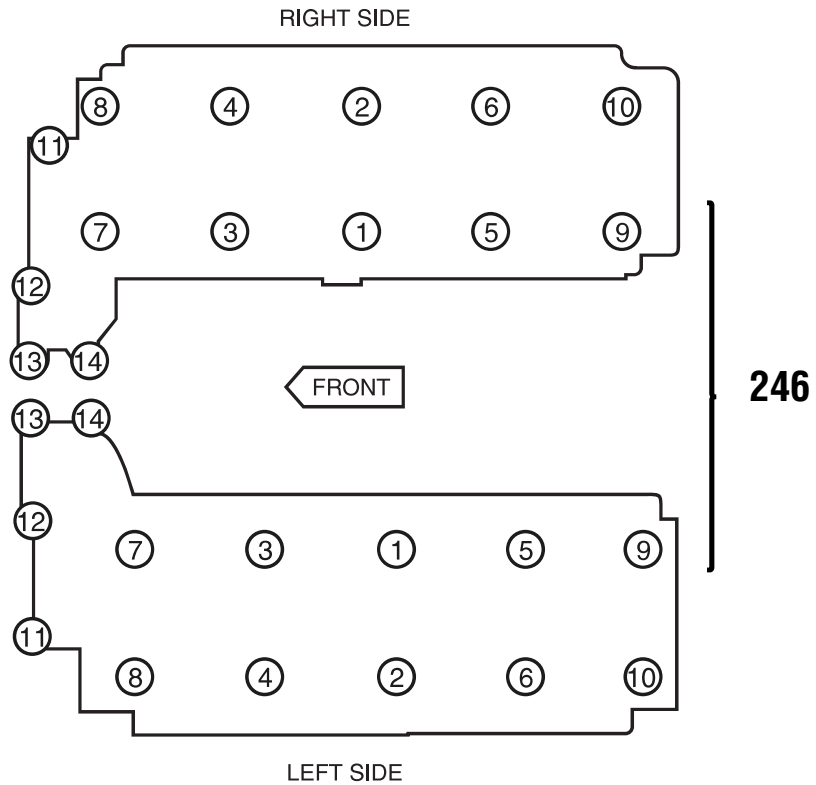
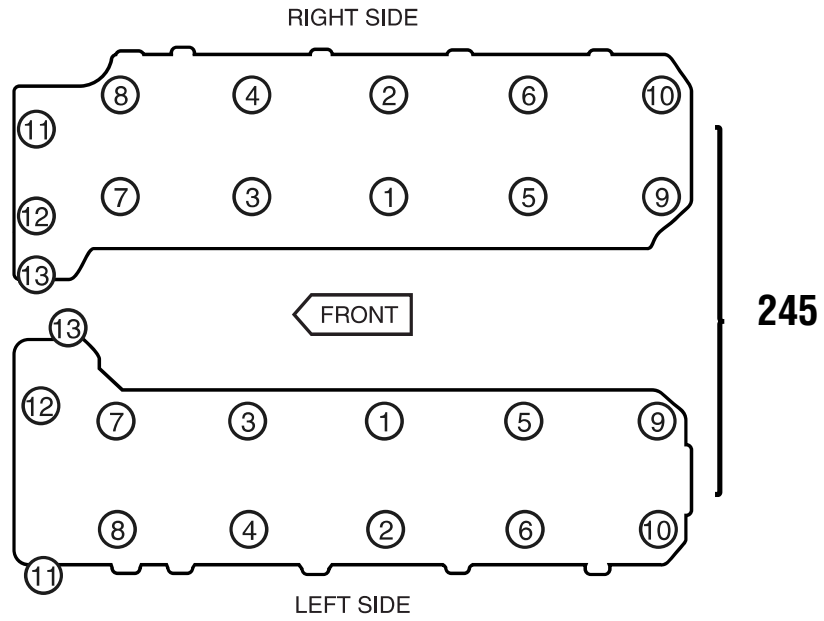
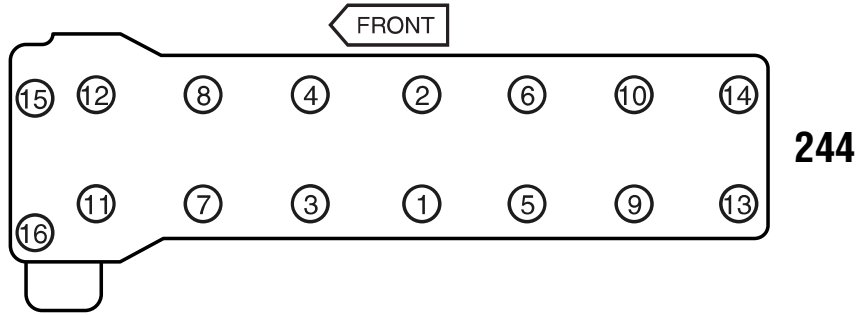
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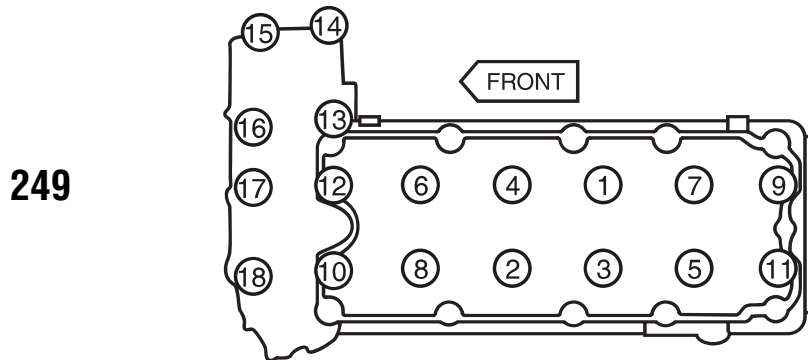
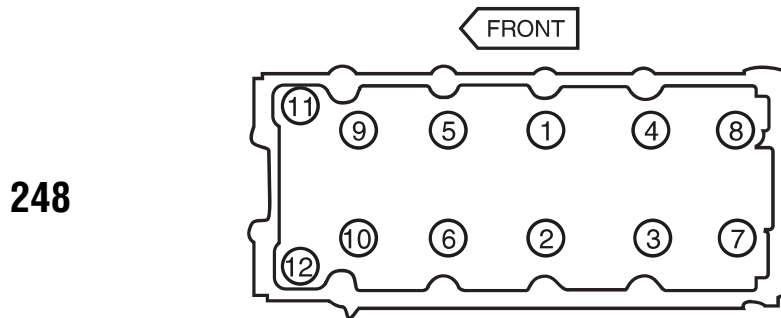
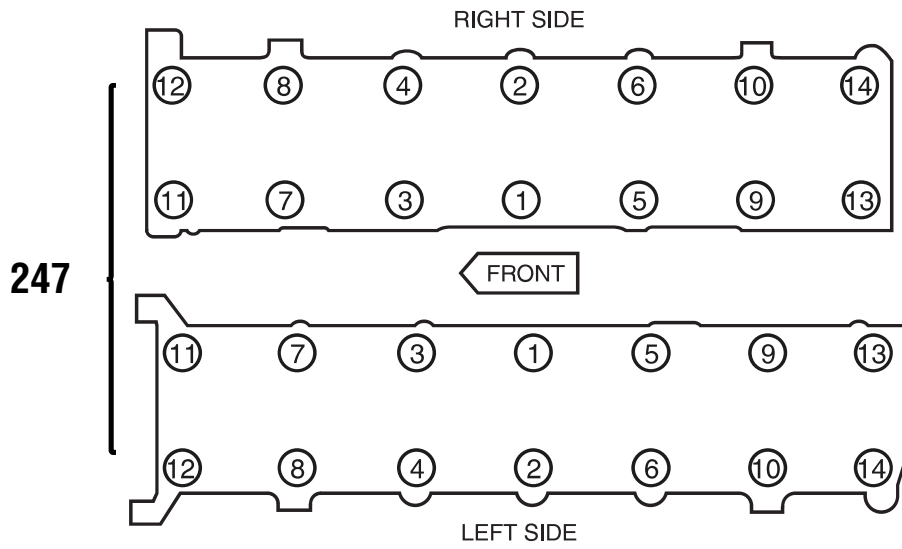
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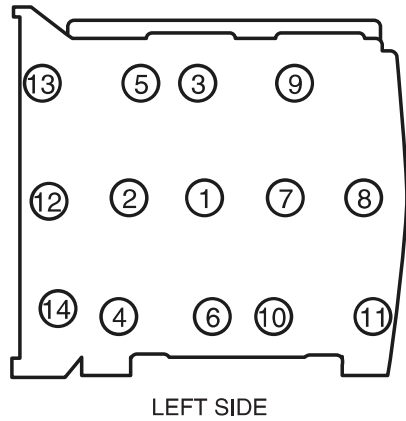
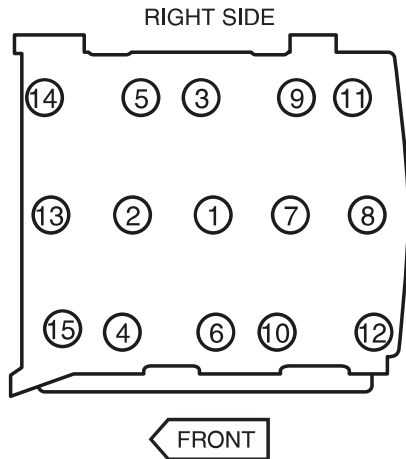
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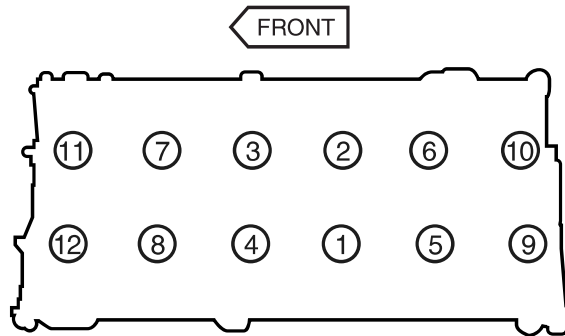
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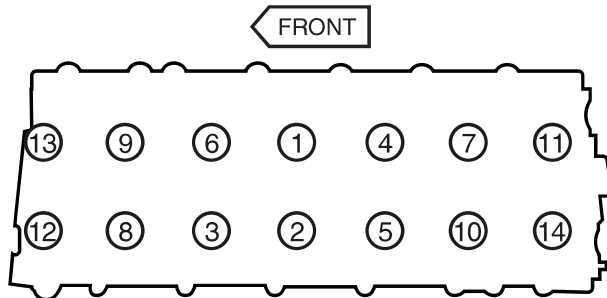
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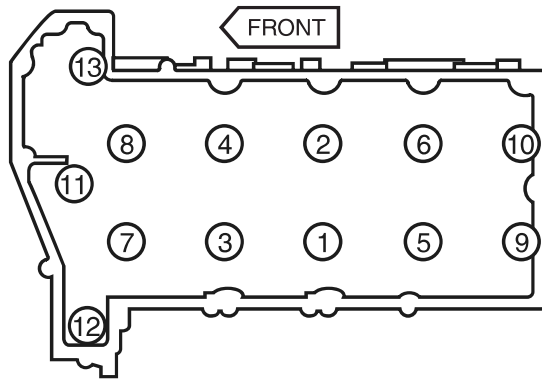
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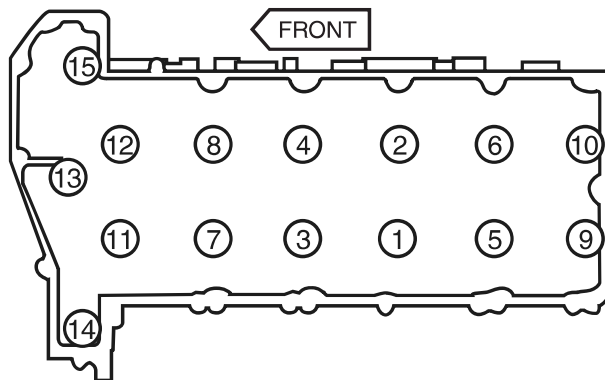
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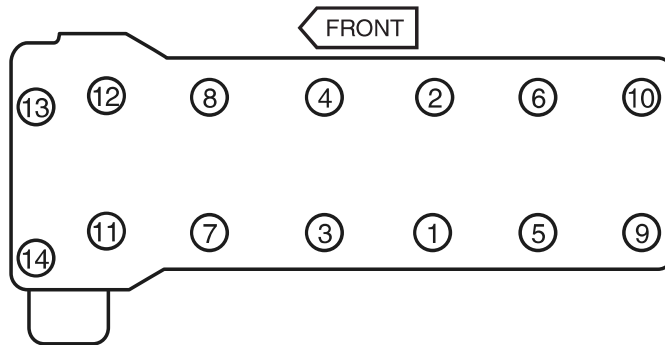
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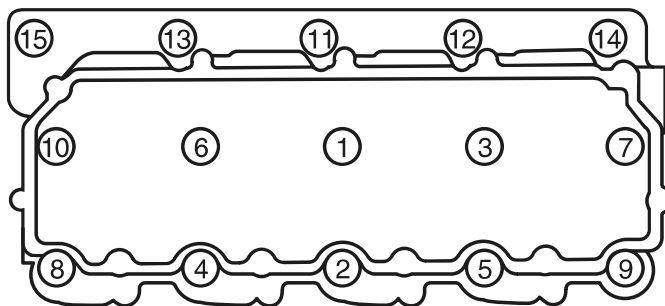
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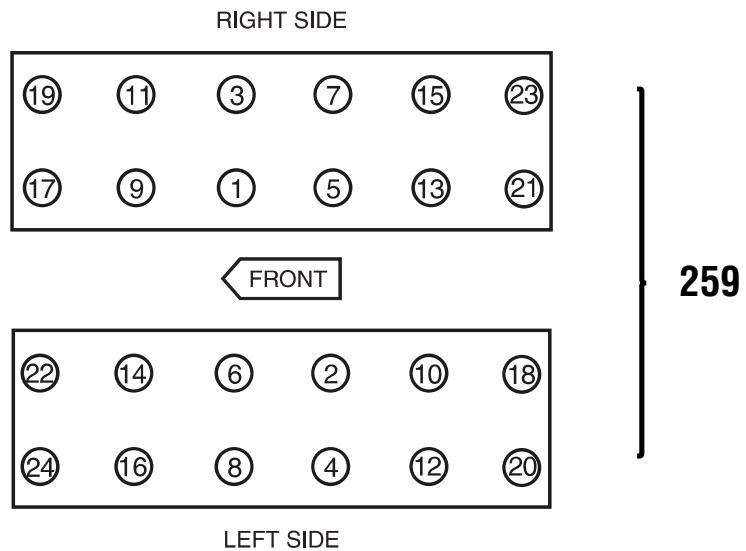
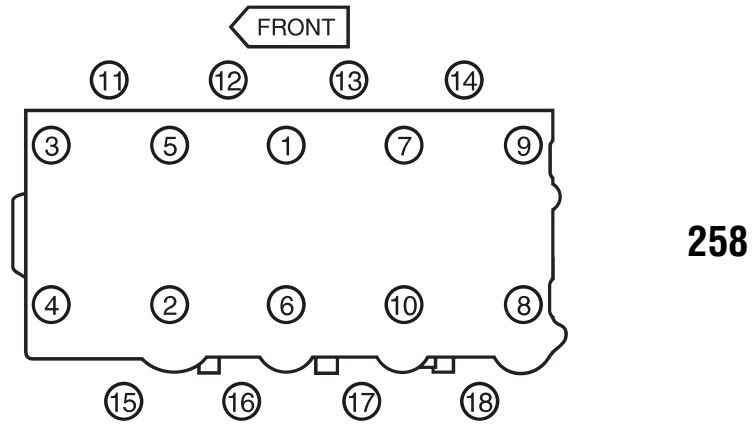
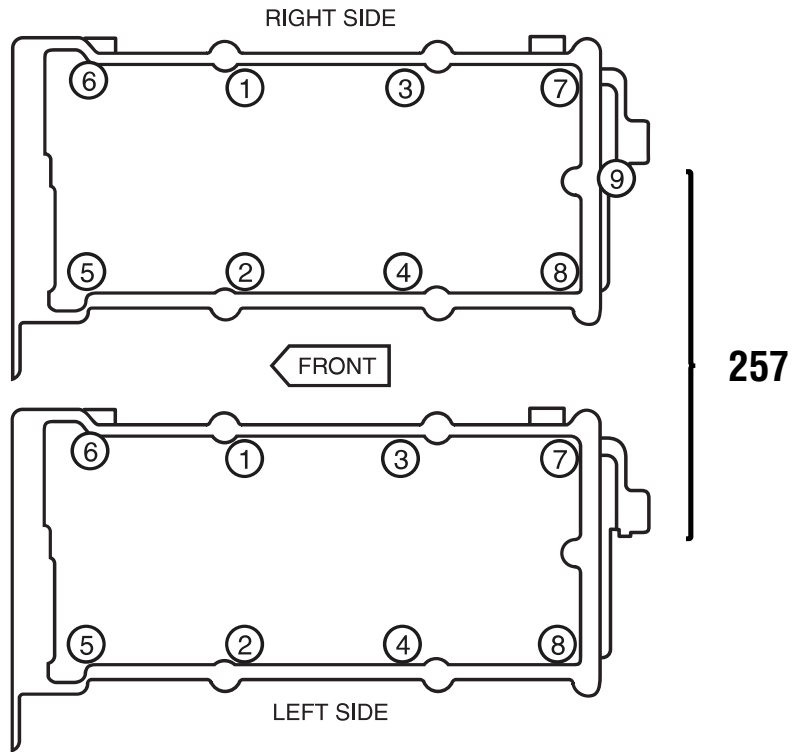
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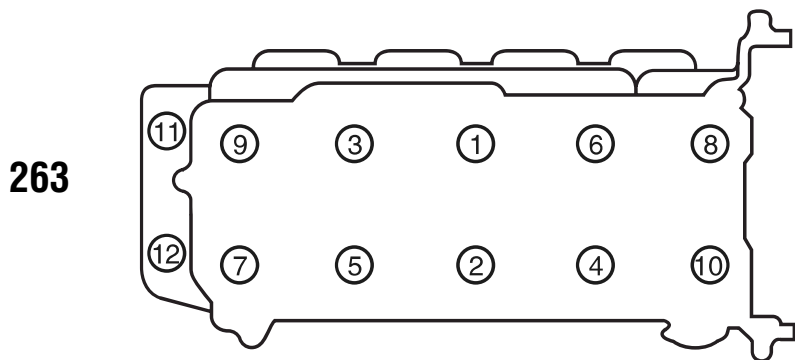
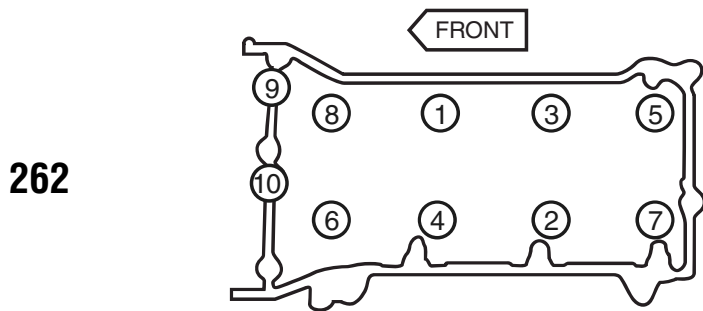
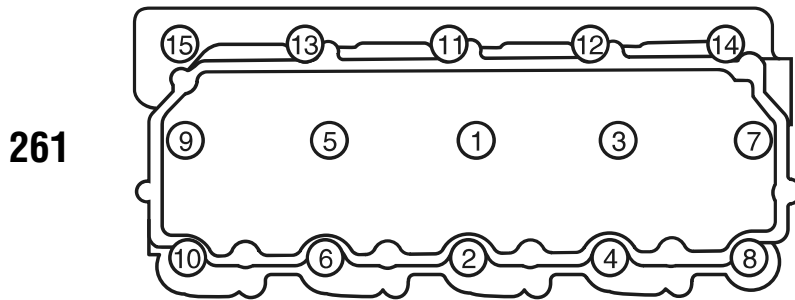
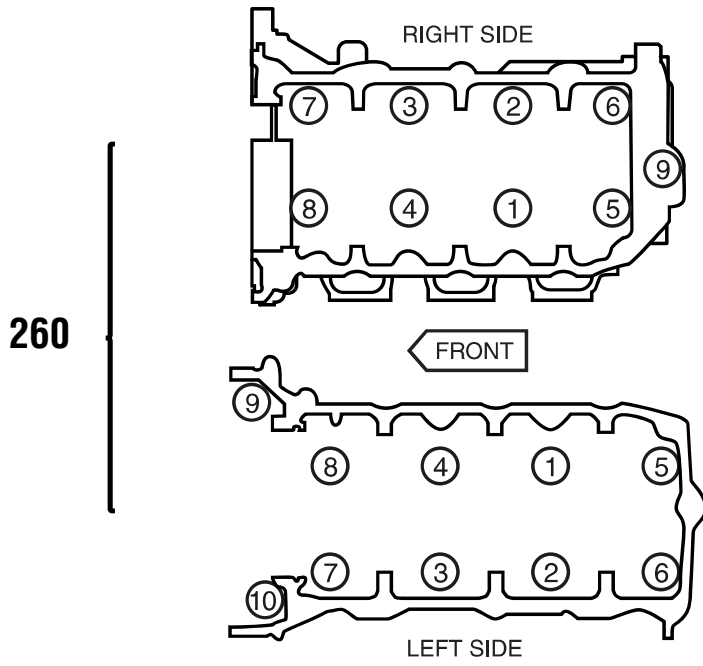
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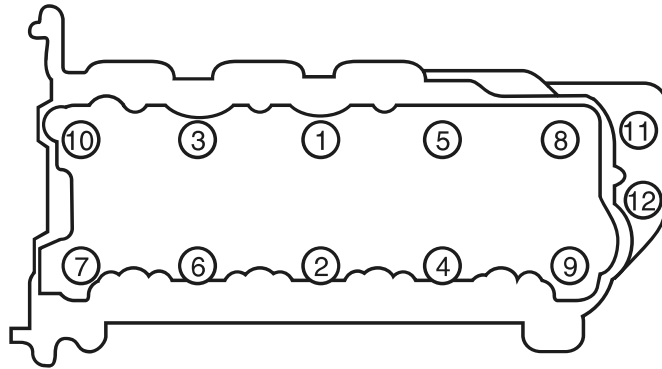
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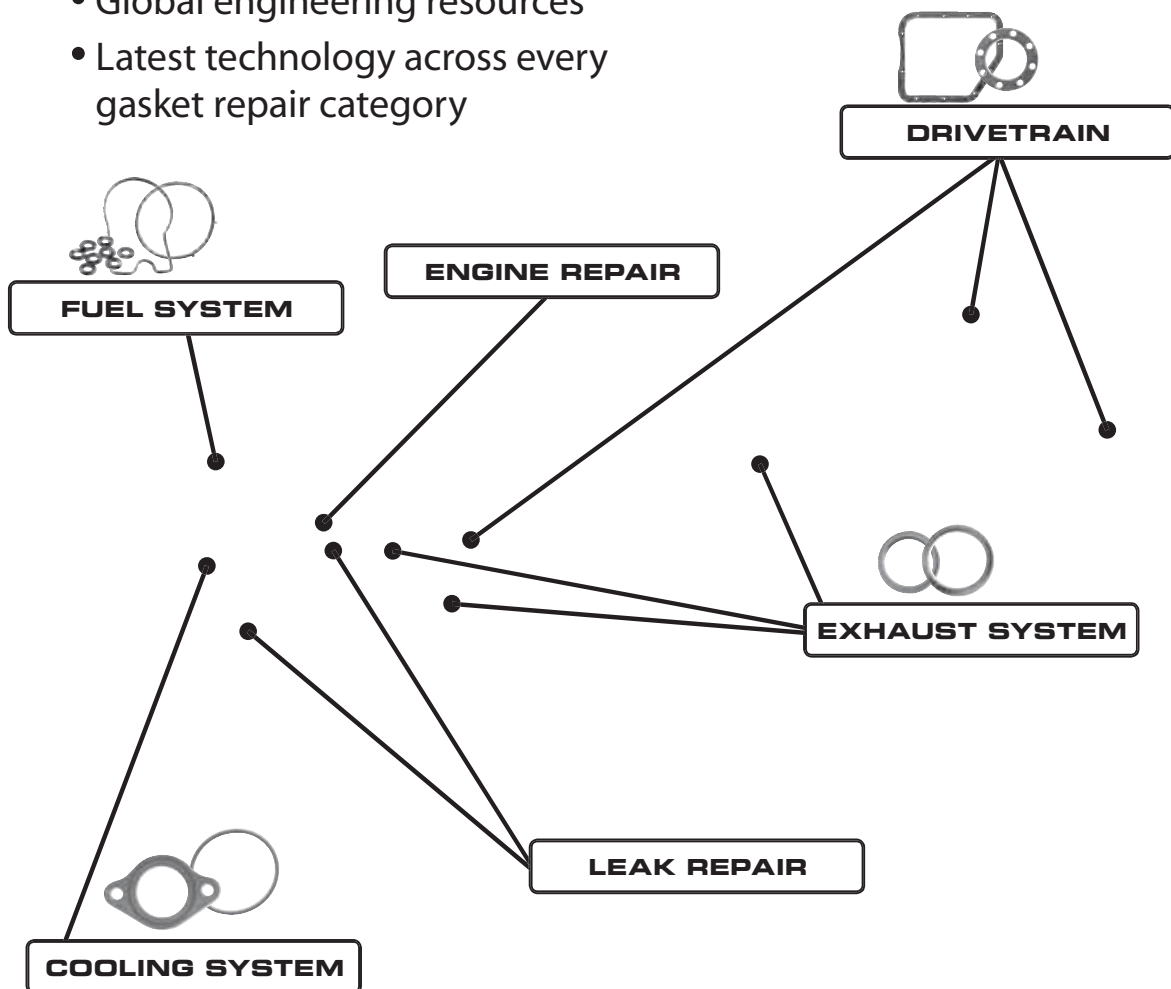
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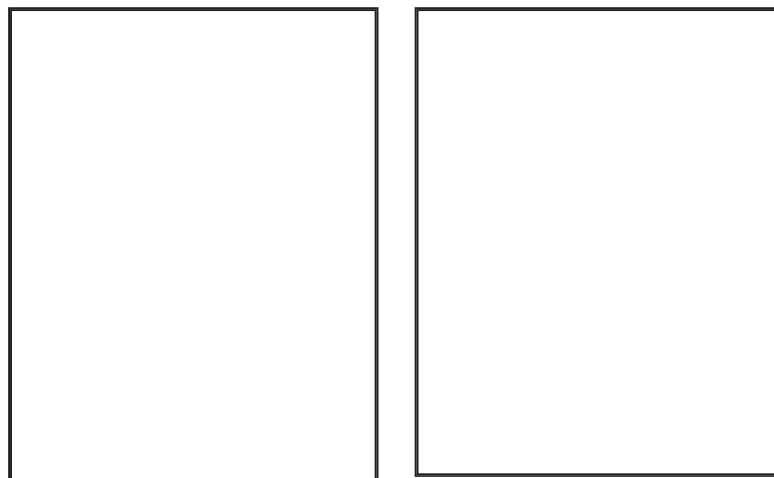
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