ENGINE 3.0L-4V TAU/SAB (D186)
<table>
<thead>
<tr>
<th>LTRS</th>
<th>REVISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>N9</td>
<td>REVISED SECTION A ON FR 22</td>
</tr>
<tr>
<td>N10</td>
<td>REVISED VIEW B ON FR 22</td>
</tr>
<tr>
<td>N11</td>
<td>25X REVISED UPPER INTAKE ON FR 36, 36A, 37, 40, 41, 45, 46, 47A, 47C, 47D, 47E, 48, 48A, 50, 50A, 51, 52, 60, 62, 63, 73, 73A, 73B, 73C &amp; 74A</td>
</tr>
<tr>
<td>N12</td>
<td>REVISED PLUG WIRE NOTE ON FR 47A</td>
</tr>
<tr>
<td>N13</td>
<td>2X REVISED TORQUE NOTE ON FR 55</td>
</tr>
<tr>
<td>N14</td>
<td>WAS 2 BOLTS REQ ON FR 65</td>
</tr>
<tr>
<td>N15</td>
<td>4X REVISED DRIVE BELT ON FR 70, 73, 73B &amp; 74</td>
</tr>
<tr>
<td>N16</td>
<td>ADDED FR 1A</td>
</tr>
<tr>
<td>N17</td>
<td>ADDED STUD ON FR 18</td>
</tr>
<tr>
<td>NE01–110880558–021</td>
<td>000630 CAD: Y</td>
</tr>
<tr>
<td>JBELLOVA</td>
<td>FDUDEK3</td>
</tr>
<tr>
<td>P1</td>
<td>3X FEAD TENSIONER WAS PIA TO FRONT COVER ON FR 16 &amp; 16A &amp; 74</td>
</tr>
<tr>
<td>P2</td>
<td>REVISED WIRING CONNECTION ON FR 64</td>
</tr>
<tr>
<td>P3</td>
<td>3X ADDED FRAME 51A ON FR 1.2A, &amp; 51A</td>
</tr>
<tr>
<td>P4</td>
<td>2X REVISED INDEX ON FR 2A &amp; 2B</td>
</tr>
<tr>
<td>P5</td>
<td>WAS CONTD 52 ON FR 51</td>
</tr>
<tr>
<td>NE01–110880558–022</td>
<td>000823 CAD: Y</td>
</tr>
<tr>
<td>DROWAN</td>
<td>FDUDEK3</td>
</tr>
<tr>
<td>R1</td>
<td>ADDED VEHICLE DESIGNATIONS ON FRAMES 3C</td>
</tr>
<tr>
<td>NE01–E11183277–048</td>
<td>010326 CAD: Y</td>
</tr>
<tr>
<td>RWOLFFIS</td>
<td>FDUDEK3</td>
</tr>
</tbody>
</table>
INDEX

GENERAL SPECIFICATIONS

-ASSEMBLY AID..............................................3
-BALANCING INSTRUCTIONS..........................3B
-DIMENSIONING............................................3
-EMISSION CONTROL EQUIPMENT......................3B
-ENGAGEMENT SPECIFICATIONS FOR ALL VACUUM SYSTEM CONNECTIONS 3A
-ENGINE APPLICATION CODES..........................3C
-ENGINE ELECTRICAL EQUIPMENT......................3A
-ENGINE LUBRICATION REQUIREMENTS................3B
-ENGINE PAINT INSTRUCTIONS........................3B
-NOTES BEFORE STARTING ENGINE.....................3A
-OIL CLEANLINESS........................................3
-PERFORMANCE AND OIL ECONOMY TEST (DYNAMOMETER TEST) 3A
-PRODUCTION HOT TEST....................................3A
-SEALING AND LUBRICATING INDEX......................3
-SHIPPING PLUGS AND DUNNAGE CAPS....................3C
-TORQUE VALUES FOR PARTS AS SUPPLIED...........3

CPSC: INSTALLATION:

030508 ACCESSORY DRIVE PULLEY..............................69
030505 A/C COMPRESSOR BRACE................................65
030505 A/C COMPRESSOR & CLUTCH ASY.....................57
030505 A/C COMPRESSOR MOUNTING BRACKET ASY..........54
030402 AIR INTAKE CHARGE THROTTLE BODY ASY..........51
140301 ALTERNATOR ASY & WIRING BRACKET................64
030901 CAMSHAFT ASY, BEARING CAPS AND VALVE ROCKER ARM ASY 13F,13G
030901 CAMSHAFT ASY PRE-ASSEMBLY TIMING MARK ALIGNMENT 13E
031403 CAMSHAFT TIMING SENSOR ASY........................23
030202 CRANKCASE OIL COOLER ASY AND OIL FILTER ASY 27
030801 CRANKCASE EMISSION VALVE TO INTAKE MANIFOLD HOSE 19,63
030901 CRANKSHAFT, CAMSHAFT ASY AND TIMING CHAIN PRE ASSEMBLY TIMING MARK ALIGNMENT (LH) 15A
030901 CRANKSHAFT, CAMSHAFT ASY AND TIMING CHAIN TIMING MARK ALIGNMENT (LH & RH) 15C
030101 CRANKSHAFT ENDFPLAY................................7
031001 CRANKSHAFT FRONT OIL SEAL ASY....................21
031101 CRANKSHAFT, MAIN BEARING AND THRUST WASHER 5A
030508 CRANKSHAFT PULLEY ASY.............................67
031001 CRANKSHAFT REAR OIL SEAL ASY.....................7A
031403 CRANKSHAFT TIMING SENSOR ASY.....................26
031101 CRANKSHAFT TRANSMISSION SLEEVE....................7B
031101 CRANKSHAFT VIBRATION DAMPER ASY................22
030801 CRANKSHAFT VENT TUBE ASY..........................41
030101 CYLINDER BLOCK DOWELS, CUP PLUGS, PIPE PLUGS AND OIL FILTER INSERT.................................4
030101 CYLINDER BLOCK DOWELS AND PIPE PLUGS.............4A, 55
031004 CYLINDER BLOCK OPENING COVER.......................24
030102 CYLINDER HEAD GASKETS................................13B
030102 CYLINDER HEAD ASY..................................13C,13D
<table>
<thead>
<tr>
<th>ITEM FRAME</th>
<th>INDEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>031004 CYLINDER HEAD ASY PIPE PLUGS AND DOWELS</td>
<td>13</td>
</tr>
<tr>
<td>030904 CYLINDER HEAD ASY VALVES AND SPRINGS</td>
<td>13A</td>
</tr>
<tr>
<td>030507 DRIVE BELT</td>
<td>68</td>
</tr>
<tr>
<td>030804 EGR TRANSUDER ASY</td>
<td>61</td>
</tr>
<tr>
<td>031403 EGR VACUUM REGULATOR CONTROL ASY</td>
<td>46</td>
</tr>
<tr>
<td>030804 EMISSION VACUUM CONTROL MAIN CONNECTOR ASY</td>
<td>50</td>
</tr>
<tr>
<td>030002 ENGINE ASY−LEFT FRONT VIEW</td>
<td>73, 73B</td>
</tr>
<tr>
<td>030002 ENGINE ASY−RIGHT REAR VIEW</td>
<td>73A, 73C</td>
</tr>
<tr>
<td>030101 ENGINE BULKHEAD HOUSING</td>
<td>6C</td>
</tr>
<tr>
<td>030101 ENGINE BULKHEAD HOUSING AND CRANKSHAFT MAIN BEARINGS</td>
<td>6B</td>
</tr>
<tr>
<td>030101 ENGINE BULKHEAD HOUSING TO CYLINDER BLOCK ASY</td>
<td>6, 6A</td>
</tr>
<tr>
<td>000103 ENGINE CODE DECAL</td>
<td>30</td>
</tr>
<tr>
<td>031004 ENGINE FRONT COVER ASY</td>
<td>16A</td>
</tr>
<tr>
<td>031004 ENGINE FRONT COVER ASY AND IGNITION PULSE CRANKSHAFT SENSOR RING</td>
<td>16</td>
</tr>
<tr>
<td>030106 ENGINE LIFTING EYE</td>
<td>43, 56</td>
</tr>
<tr>
<td>030104 EXHAUST MANIFOLD</td>
<td>58</td>
</tr>
<tr>
<td>030104 EXHAUST MANIFOLD (RH) &amp; CONVERTER ASY</td>
<td>59, 59A</td>
</tr>
<tr>
<td>030104 EXHAUST MANIFOLD STUDS</td>
<td>42</td>
</tr>
<tr>
<td>030804 EXHAUST RECIRCULATING VALVE ASY</td>
<td>48</td>
</tr>
<tr>
<td>030804 EXHAUST RECIRCULATING VALVE TO EXHAUST MANIFOLD TUBE ASY</td>
<td>60</td>
</tr>
<tr>
<td>030509 FEAD TENSIONER ASY</td>
<td>51A</td>
</tr>
<tr>
<td>030105 FLYWHEEL ASY</td>
<td>29</td>
</tr>
<tr>
<td>030105 FLYWHEEL HOLE LOCATION FOR SHIPPING</td>
<td>72</td>
</tr>
<tr>
<td>031302 FUEL VAPOR RETURN TUBE ASY</td>
<td>40</td>
</tr>
<tr>
<td>030402 IDLE AIR CONTROL VALVE ASY</td>
<td>37</td>
</tr>
<tr>
<td>030702 IGNITION COIL &amp; BRACKET ASY</td>
<td>47</td>
</tr>
<tr>
<td>030702 IGNITION WIRE ASY</td>
<td>47A, 47B</td>
</tr>
<tr>
<td>030103 INTAKE MANIFOLD ASY (LOWER)</td>
<td>34, 34A</td>
</tr>
<tr>
<td>030103 INTAKE MANIFOLD ASY (UPPER)</td>
<td>36, 36A</td>
</tr>
<tr>
<td>030103 INTAKE MANIFOLD OPENING COVER ASY</td>
<td>48A</td>
</tr>
<tr>
<td>030103 INTAKE MANIFOLD PORT PLUG</td>
<td>50A</td>
</tr>
<tr>
<td>030202 OIL LEVEL INDICATOR ASY</td>
<td>49</td>
</tr>
<tr>
<td>030202 OIL LEVEL INDICATOR TUBE ASY</td>
<td>25</td>
</tr>
<tr>
<td>030203 OIL PAN ASY</td>
<td>20, 20A</td>
</tr>
<tr>
<td>030203 OIL PAN BAFFLE</td>
<td>10, 10A</td>
</tr>
<tr>
<td>130501 OIL PRESSURE SWITCH ASY</td>
<td>53</td>
</tr>
<tr>
<td>030201 OIL PUMP ASY</td>
<td>9</td>
</tr>
<tr>
<td>030201 OIL PUMP SCREEN &amp; COVER ASY</td>
<td>11</td>
</tr>
<tr>
<td>030801 OIL SEPERATOR ASY, WATER INLET TUBE AND CUP PLUG</td>
<td>12</td>
</tr>
<tr>
<td>031102 PISTON ASY, PIN AND CONNECTING ROD ASY</td>
<td>8</td>
</tr>
<tr>
<td>031102 PISTON AND CONNECTING ROD ASY (CLEARANCES)</td>
<td>8C</td>
</tr>
<tr>
<td>031102 PISTON &amp; CONNECTING ROD ASY, BEARINGS AND CAP</td>
<td>8B</td>
</tr>
<tr>
<td>ITEM FRAME</td>
<td>INDEX</td>
</tr>
<tr>
<td>------------</td>
<td>-------</td>
</tr>
<tr>
<td>CPSC: INSTALLATION:</td>
<td></td>
</tr>
<tr>
<td>031102</td>
<td>PISTON ASY, PIN AND RINGS</td>
</tr>
<tr>
<td>030503</td>
<td>POWER STEERING PUMP &amp; PULLEY ASY</td>
</tr>
<tr>
<td>031101</td>
<td>SELECT–FIT MAIN BEARING GRADE CHART</td>
</tr>
<tr>
<td>030704</td>
<td>SPARK PLUG ASY</td>
</tr>
<tr>
<td>030901</td>
<td>TIMING CHAIN, GUIDE, TENSIONER, TENSIONER ARM AND CRANKSHAFT GEAR</td>
</tr>
<tr>
<td>031004</td>
<td>VALVE ROCKE RARM COVER ASY</td>
</tr>
<tr>
<td>031004</td>
<td>VALVE ROCKER ARM COVER ASY &amp; CAMSHAFT SEAL</td>
</tr>
<tr>
<td>030305</td>
<td>WATER BYPASS TUBE ASY</td>
</tr>
<tr>
<td>030305</td>
<td>WATER PUMP ASY</td>
</tr>
<tr>
<td>030507</td>
<td>WATER PUMP DRIVE BELT</td>
</tr>
<tr>
<td>030403</td>
<td>WIRING ASY CONNECTIONS</td>
</tr>
<tr>
<td>030403</td>
<td>WIRING ASY–ENGINE CONTROL SENSOR &amp; FUEL CHARGING</td>
</tr>
</tbody>
</table>
GENERAL SPECIFICATIONS

TORQUE VALUES FOR PARTS AS SUPPLIED

NOTE: REFER TO WERS TO VERIFY TORQUE VALUES.

<table>
<thead>
<tr>
<th>THREAD SIZE</th>
<th>TORQUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8 X 0.8</td>
<td>5−7 Nm</td>
</tr>
<tr>
<td>M6 X 1</td>
<td>8−12 Nm</td>
</tr>
<tr>
<td>M8 X 1.25</td>
<td>20−30 Nm</td>
</tr>
<tr>
<td>M10 X 1.5</td>
<td>40−55 Nm</td>
</tr>
<tr>
<td>M12 X 1.75</td>
<td>70−95 Nm</td>
</tr>
<tr>
<td>M14 X 2</td>
<td>110−155 Nm</td>
</tr>
<tr>
<td>1/4 − 18 PIPE</td>
<td>14 Nm THEN ROTATE 180°</td>
</tr>
<tr>
<td>3/8 − 18 PIPE</td>
<td>20 Nm THEN ROTATE 180°</td>
</tr>
<tr>
<td>1/2 − 14 PIPE</td>
<td>40 Nm THEN ROTATE 180°</td>
</tr>
<tr>
<td>3/4 − 14 PIPE</td>
<td>60−75 Nm</td>
</tr>
<tr>
<td>1 − 11.5 PIPE</td>
<td>90 Nm THEN ROTATE 180°</td>
</tr>
</tbody>
</table>

DIMENSIONING

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.

SEALING AND LUBRICATING INDEX

<table>
<thead>
<tr>
<th>SEALER/ADHESIVE</th>
<th>DESCRIPTION</th>
<th>FRAMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSE−M4G323−A6</td>
<td>SILICONE RUBBER, OXIME SEALANT</td>
<td>6,6A,16,20,22,28</td>
</tr>
<tr>
<td>WSK−M2G349−A7</td>
<td>ANAEROBIC ADHESIVE</td>
<td>12</td>
</tr>
<tr>
<td>WSK−M2G349−A10</td>
<td>ANAEROBIC ADHESIVE</td>
<td>12</td>
</tr>
<tr>
<td>LUBRICANT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESE−M99B176−A</td>
<td>CLEAR DIMETHYL SILOXANE</td>
<td>18</td>
</tr>
<tr>
<td>ESE−M99B144−B</td>
<td>SURFACTANT (MERPOL)</td>
<td>3,17</td>
</tr>
<tr>
<td>OIL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WSE−M2C908−A</td>
<td>SAE 50 ASSEMBLY FLUID</td>
<td>3,6A,7A,8,8B,13A,13F,13G,21,22,25,27</td>
</tr>
<tr>
<td>WSS−M2C914−A</td>
<td>5W−20 GF−3</td>
<td>3,3B</td>
</tr>
<tr>
<td>ESE−M99C103−B1</td>
<td>FLUORESCENT DYE</td>
<td>3B</td>
</tr>
<tr>
<td>FUEL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WSE−M4C112−A</td>
<td>UNLEADED REGULAR</td>
<td>3A</td>
</tr>
<tr>
<td>CLEANER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WSE−M5B392−A</td>
<td>ENGINE DEGREASER</td>
<td>6A</td>
</tr>
</tbody>
</table>

NOTE: ALL GASKETS AND SEALING SURFACES MUST BE CLEAN AND FREE OF ALL FOREIGN MATTER PRIOR TO ASSEMBLY.

ASSEMBLY AID

NOTE: ESE−M99B144−B HOSE ASSEMBLY SURFACTANT ONLY (DO NOT MIX). USE TO FACILITATE HOSE ASSEMBLY. ALL OTHER LUBRICANTS ARE NOT PERMITTED. MAY BE APPLIED TO ID AND OD OF HOSE. SPRAY NOT PERMITTED.

OIL CLEANLINESS

ASSEMBLY OIL (WSE−M2C908−A) BEING APPLIED TO ENGINE COMPONENTS AND THE INITIAL FILL OIL (WSS−M2C914−A) AT THE DELIVERY POINT TO THE ENGINE MUST MEET THE FOLLOWING REQUIREMENTS FOR PARTICLE SIZE AND COUNT:

<table>
<thead>
<tr>
<th>PARTICLE SIZE (MICRONS)</th>
<th>MAX LIMIT (PARTICLES PER MILLILITER)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0−30</td>
<td>NO LIMIT</td>
</tr>
<tr>
<td>31−50</td>
<td>50</td>
</tr>
<tr>
<td>51−70</td>
<td>30</td>
</tr>
<tr>
<td>&gt;71</td>
<td>10</td>
</tr>
</tbody>
</table>

NOTE: REFER TO WERS TO VERIFY TORQUE VALUES.
GENERAL SPECIFICATIONS (Continued)

ENGAGEMENT SPECIFICATIONS FOR ALL VACUUM SYSTEM CONNECTIONS

HOSE/VACUUM CONNECTIONS:
ALL HOSE, VACUUM TUBING CONNECTIONS, CONNECTOR BLOCKS AND CAPS MUST BE BOTTOMED OF WITHIN 2.5mm (.10 INCHES) MAXIMUM OF BEING BOTTOMED ON THE COMPONENT CONNECTION.

ASSEMBLY AID:
WATER MAY BE USED TO FACILITATE THE ASSEMBLY OF ALL CONNECTOR ASSEMBLY COMPONENTS. THE WATER MUST BE APPLIED USING A PLASTIC SPRAY BOTTLE WITH AN ATOMIZER SETTING AT "MIST".

NOTE:
PART NUMBERS LISTED MUST BE VERIFIED WITH LATEST ENGINEERING PARTS LIST OR NOTICE.

PRODUCTION HOT TEST
THE PRODUCTION HOT TEST IS TO BE PERFORMED IN ACCORDANCE WITH SPECIFICATION − ENGINE ASSEMBLY PRODUCTION HOT TESTING ES−F7DE−6007−AA. USE WSE−M4C112−A FUEL.
NOTE: DRAIN COOLANT AFTER TEST AND INSTALL RELEASED PURCHASED ES−F7DE−6007−AA. USE WSE−M4C112−A FUEL.

PERFORMANCE AND OIL ECONOMY TEST (DYNAMOMETER TEST)
THE PERFORMANCE AND OIL ECONOMY TEST MUST BE PERFORMED IN ACCORDANCE WITH SPECIFICATION − ENGINE ASSEMBLY − AS PURCHASED ES−F7DE−6007−AA. USE WSE−M4C112−A FUEL.

NOTES BEFORE STARTING ENGINE
BEFORE STARTING AN ENGINE, CHECK TO SEE THAT VACUUM HOLES ARE PLUGGED OR CONNECTED AS REQUIRED.
FOR INSTALLATION OF OIL LEVEL INDICATOR SEE FRAME 49.
FOR INITIAL OIL FILL SEE FRAME 3B.

ENGINE ELECTRICAL EQUIPMENT
FOR ENGINE ELECTRICAL EQUIPMENT INSTALLATION REFER TO THE MANUAL "ELECTRICAL EQUIPMENT INSTALLATION" FOR THE PARTICULAR MODEL APPLICATION.
GENERAL SPECIFICATIONS (Continued)

EMISSION CONTROL EQUIPMENT

FOR INSTALLATION OF EMISSION CONTROL EQUIPMENT REFER TO MODEL YEAR AFFECTED "ENGINE EQUIPMENT INSTALLATION" MANUAL.

BALANCING INSTRUCTIONS

REFER TO ES−F7DE−6007−AA FOR ENGINE MASS BALANCE REQUIREMENTS.

ENGINE LUBRICATION REQUIREMENTS

ADD THE FOLLOWING AMOUNT OF WSS−M2C914−A OIL (5W−20 GF−3) FOR INITIAL OIL FILL AS SHOWN IN CHART BELOW:

NOTE: 20 ml OF ESE−M99C103−B1 DYE MUST BE ADDED FOR IN PLANT OIL LEAK DETECTION.

INITIAL OIL FILL:

CUSTOMER OIL FILL:

6.0 quarts (5.7 liters)

5.0 qt WITHOUT OIL FILTER.

5.5 qt WITH OIL FILTER.

AFTER INITIAL OIL FILL, AND PRIOR TO HOT TEST, SPIN THE OIL PUMP IN THE NORMAL OPERATING DIRECTION, AT 1000 − 2000 RPM UNTIL 60 PSI IS ACHIEVED, IN ORDER TO FILL THE OILING SYSTEM.

AFTER HOT TEST, WITH ENGINE HORIZONTAL, CHECK OIL LEVEL. READING ON INDICATOR MUST BE WITHIN (Y = 3mm) OF THE FULL MARK.

NOTE: RELEASED ENGINE OIL FILTER MUST BE USED ON FACTORY BREAK−IN RUN.

ENGINE PAINT INSTRUCTIONS

ALL ENGINE COMPONENTS REQUIRING PAINT WILL BE PRE−PAINTED AS COMPONENTS PRIOR TO SHIPPING TO THE ENGINE ASSEMBLY AREA.

FOR SPECIFICATIONS ON COMPONENT PAINT REQUIREMENTS SEE THE RESPECTIVE DETAIL OR ASSEMBLY DRAWING.
GENERAL SPECIFICATIONS (Continued)

ENGINE APPLICATION CODES

<table>
<thead>
<tr>
<th>TRANSMISSION</th>
<th>APPLICATION</th>
<th>CODE</th>
<th>VEHICLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUTO</td>
<td>A/C</td>
<td>1G−850−AA</td>
<td>TAURUS/SABLE</td>
</tr>
</tbody>
</table>

LEADED FUEL

<table>
<thead>
<tr>
<th>TRANSMISSION</th>
<th>APPLICATION</th>
<th>CODE</th>
<th>VEHICLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUTO</td>
<td>A/C</td>
<td>1D−856−AA</td>
<td>TAURUS/SABLE</td>
</tr>
</tbody>
</table>

SHIPPING PLUGS AND DUNNAGE CAPS

All internal engine cavities to be plugged for engine shipment to B & A, specifically as follows:

<table>
<thead>
<tr>
<th>ITEM TO BE PLUGGED</th>
<th>PLUG INSTALLATION POINT</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVR ASY−VLV RKR ARM LH (−6A505−)</td>
<td>FINAL DRESS</td>
</tr>
<tr>
<td>COOL ASY−CRKC OIL (−6A642−) PIA</td>
<td>(LEADED FUEL)−FINAL DRESS</td>
</tr>
<tr>
<td>TUB ASY−CRKC VEN (−6756−) PIA</td>
<td>FINAL DRESS</td>
</tr>
<tr>
<td>PMP &amp; PLY ASY−PWR STNG (−3A696−) PIA</td>
<td>FINAL DRESS</td>
</tr>
<tr>
<td>BDY ASY−AIR INTK CHG THROT (−9E926−) PIA</td>
<td>FINAL DRESS</td>
</tr>
<tr>
<td>HOS−WTR BYP (−8548−)</td>
<td>FINAL DRESS</td>
</tr>
<tr>
<td>HOS−WTR PMP INLT (−8A567−)</td>
<td>FINAL DRESS</td>
</tr>
</tbody>
</table>
CYLINDER BLOCK DOWELS, CUP PLUGS, PIPE PLUGS AND OIL FILTER INSERT (SERVICE AUDIT)

-6890-
INSERT - OIL FLTR
MTNG BOLT
TORQUE 27-40 Nm
FOR -850- ONLY

-6010-
BLK ASY - CYL

SECTION A
TYPICAL (2) PLACES

SECTION B

BLK ASY - CYL

W701516
[3/8–18] PIPE PLUG
TORQUE 20 Nm
THEN ROTATE 180°

(9.5
8.5)

DOWEL
W701546
CUP PLUG
(19.35)

FRONT OF ENGINE

1)
W706860
DOWEL (8 X 18.25)
CVR ASY - ENG FRT
(2) REQ

FOR -850- ONLY

BLK ASY − CYL

MTNG BOLT
TORQUE 27−40 Nm

CVR ASY − ENG FRT
(2) REQ

INSERT − OIL FLTR

CUP PLUG
(19.35)

DOWEL
(8 X 18.25)

(9.5
8.5)

(7.6
5.0)

BLK ASY − CYL

CUP PLUG

(BLK ASY − CYL)

(BLK ASY − CYL)

(BLK ASY − CYL)

(BLK ASY − CYL)
TYPICAL (2) PLACES

(Continued)

1/2–14 PIPE PLUG
TORQUE 40 Nm
THEN ROTATE 180°

W701517

1/2–14 PIPE PLUG
TORQUE 40 Nm
THEN ROTATE 180°

DOWEL
HOLLOW
(16 X 19)
TRANSMISSION

FRONT OF ENGINE

SECTION A

TYPICAL (2) PLACES

(9.5
8.5)

(BLK ASY–CYL)

(DOWEL)

2. LOOK AT THE SELECT−FIT CHART BELOW AND FOR EACH MAIN, MATCH THE BLOCK AND CRANKSHAFT CODE WITH ITS CORRESPONDING COLUMN OR ROW. BY READING ACROSS THE CRANKSHAFT ROW AND DOWN THE BLOCK COLUMN, SELECT THE PROPER GRADE BEARING FOR EACH MAIN.

(E.G. IF THE BLOCK CODE IS "0609" AND THE CRANKSHAFT CODE IS "8480", MAIN #1 SHOULD BE BUILT WITH GRADE 1 BEARINGS, AS DETERMINED BY THE INTERSECTION OF THE 06 BLOCK COLUMN AND THE 84 CRANKSHAFT ROW. MAINS 2, 3, AND 4 SHOULD ALL BE GRADE 2.)
CRANKSHAFT, MAIN BEARING AND THRUST WASHER (UPPER)

-6303−CRKSHT

W701528 KEY 4.76 X 53.5

MAXIMUM KEY HEIGHT 2.350 mm ALONG COMPLETE KEY LENGTH WHEN PRESSED ON CRANKSHAFT POST

-6333−BRG−CRKSHT MN UPR (4) REQ

-6A341−WSHR−CRKSHT MN CTR BRG THRS UPR

(BLK ASY−CYL)

FRONT OF ENGINE
ASSEMBLY PROCEDURE

1. THE BLOCK/BULKHEAD MATING SURFACES MUST NOT HAVE ANY RESIDUES THAT REDUCE THE BONDING (OR ADHESION) OF THE WSE-M4G323-A6 SEALANT TO THE SURFACES. THE CONTAMINANTS THAT ARE LIKELY TO OCCUR ARE:

- MACHINING COOLANTS
- WASH OR SOAP RESIDUE
- OIL (BEARING PRELUBE, ETC.)
- WATER (WET)
- DUST, METAL CHIPS
- SEALANT RESIDUE (FROM PREVIOUS ASSEMBLY)

THESE MATERIALS WILL REDUCE SEALER BONDING WHETHER THEY ARE WET OR DRY. THEREFORE, BOTH THE BLOCK AND BULKHEAD MATING SURFACES MUST BE WIPED WITH CLEANER.
ENGINE BULKHEAD HOUSING TO CYLINDER BLOCK ASY
(Continued)

ASSEMBLY PROCEDURE

A) ALL TRACES OF PREVIOUSLY APPLIED SEALANT MUST BE COMPLETELY REMOVED BY SCRAPING THE SURFACES (WITHOUT DAMAGING EITHER SURFACE).

B) BOTH SURFACES MUST BE WIPED WITH A RAG SATURATED WITH WSE−MSB392−A CLEANER. AFTER WIPEING EACH SURFACE WITH THE "WET" RAG, EACH SURFACE MUST BE WIPED WITH A DRY RAG TO REMOVE EXCESS CLEANER. BOTH SURFACES MUST BE ALLOWED TO DRY FOR A MINIMUM OF (2) MINUTES PRIOR TO APPLICATION OF THE WSE−M4G323−A6 SEALANT.

C) THE BULKHEAD SURFACE MUST BE CLEANED BEFORE IT IS PLACED IN THE "SURFACE DOWN" POSITION ON THE ASSEMBLY PALLET. IN ADDITION, WHEN PLACED ON THE ASSEMBLY PALLET THE BULKHEAD SHOULD NOT REST ON THE BLOCK MATING SURFACE.

D) THE BULKHEAD SURFACE MUST BE CLEANED AFTER INSTALLATION OF CRANKSHAFT BEARINGS AND CRANKSHAFT TO REMOVE ANY RUNOFF OF BEARING PRELUBE OIL. BEFORE APPLYING SEALER SEE NOTE BELOW:

2. SELECT CORRECT BEARING GRADES FOR EACH OF THE FOUR MAINS USING THE PROCEDURE ON FRAME 5.

3. VERIFY ALL SADDLES IN BLOCK, BULKHEAD AND BEARINGS ARE CLEAN AND FREE OF CHIPS, DIRT, PAINT AND FOREIGN MATERIAL.

4. INSTALL UPPER MAIN BEARINGS IN CYLINDER BLOCK.

5. VISUALLY CHECK SEATING AND SQUARENESS OF ALL BEARINGS AND INSURE ALL OILING HOLES ALIGN WITH CYLINDER BLOCK OIL FEED HOLES.

6. INSTALL CRANKSHAFT IN CYLINDER BLOCK WITH CARE TO PREVENT DAMAGE TO BEARING FACES OR CORNERS. APPLY WSE−M2C908−A OIL TO CRANKSHAFT JOURNALS PRIOR TO INSTALLATION.

7. PUSH CRANKSHAFT TO ITS MAXIMUM REARWARD POSITION.

8. INSTALL THRUST WASHER BETWEEN CRANKSHAFT REAR THRUST SURFACE AND REAR OF CYLINDER BLOCK. ALIGN ASSEMBLY TAB ON WASHER TO MATCHING SPOTFACE ON CYLINDER BLOCK. APPLY WSE−M2C908−A OIL TO CRANKSHAFT JOURNALS AND WASHER.

9. INSTALL LOWER MAIN BEARINGS AND THRUST BEARING IN BULKHEAD.

BEFORE APPLYING SEALER SEE NOTE BELOW:

NOTE:
INSTALL THE BULKHEAD AND TORQUE ALL BOLTS TO SPECIFICATION WITHIN (4) MINUTES OF APPLYING WSE−M4G323−A6 SEALER. SEE FRAME 6C FOR BOLT TORQUE SEQUENCE AND SPECIFICATIONS. REMOVE THE SQUEEZED−OUT WSE−M4G323−A6 SEALER AT THE FRONT COVER SURFACE.

10. APPLY A BEAD OF WSE−M4G323−A6 SEALER TO THE BLOCK SURFACE AS SHOWN ON FRAME 6.

NOTE: THE SEALANT BEAD MUST TERMINATE 6mm FROM THE REAR CRANKSHAFT SEAL BORE ON BOTH SIDES (SEE ILLUSTRATION ON FRAME 6).

11. INSTALL BULKHEAD/BEARING ASSEMBLY ON CYLINDER BLOCK. APPLY A LOAD OF 110 N ON BULKHEAD TO FULLY ENGAGE WITH INTERFERENCE FIT DOWELS ON CYLINDER BLOCK.

12. INSTALL (7) M10 BOLTS,(5) M8 BOLTS, (1) M10 STUD, AND (4) M8 STUDS (DO NOT LUBRICATE FASTENERS). TORQUE TO 3.5 Nm.

NOTE: DO NOT ROTATE CRANKSHAFT UNTIL ALL BULKHEAD MAIN BEARING BOLTS ARE TORQUED TO SPECIFICATION. INSTALL (5) PERIMETER BOLTS (DO NOT LUBRICATE FASTENERS). TORQUE TO 3−5 Nm.

13. APPLY A REARWARD LOAD OF 1800 N THEN APPLY A FORWARD LOAD OF 1800 N ON CRANKSHAFT TO ALIGN REAR FLANGE OF LOWER THRUST BEARING WITH THRUST WASHER.

14. TORQUE BULKHEAD BOLTS TO SPECIFICATION. (SEE FRAME 6C WITH CRANKSHAFT HELD IN FORWARD POSITION).

15. CHECK CRANKSHAFT END PLAY. TO BE WITHIN 0.135−0.255mm. (SEE FRAME 6D)

16. CHECK CRANKSHAFT TORQUE TO TURN.

NOTE: MAIN BEARING TO CRANKSHAFT JOURNAL SURFACE ASSEMBLED CLEARANCES IS 0.025−0.050mm AT CROWN.
ENGINE BULKHEAD HOUSING AND CRANKSHAFT MAIN BEARINGS (LOWER)

NOTE:
TORQUE ALL BULKHEAD HOUSING TO CYLINDER BLOCK BOLTS/STUDS WITHIN (4) MINUTES OF INSTALLATION

TORQUE ALL BULKHEAD HOUSING TO CYLINDER BLOCK BOLTS/STUDS WITHIN (4) MINUTES OF INSTALLATION

NOTE:

TORQUE ALL BULKHEAD HOUSING TO CYLINDER BLOCK BOLTS/STUDS WITHIN (4) MINUTES OF INSTALLATION

DOWEL-HOLLOW PART OF −6F095− (8 PLACES)

SEE FRAME 6)

−6A338−
BRG−CRKSHT
MN LWR
(3) REQ

−6A339−
BRG−CRKSHT
MN CTR LWR

ENGINE BULKHEAD HOUSING AND CRANKSHAFT MAIN BEARINGS (LOWER)

NOTE:
TORQUE ALL BULKHEAD HOUSING TO CYLINDER BLOCK BOLTS/STUDS WITHIN (4) MINUTES OF INSTALLATION

DOWEL-HOLLOW PART OF −6F095− (8 PLACES)

SEE FRAME 6)

−6A338−
BRG−CRKSHT
MN LWR
(3) REQ

−6A339−
BRG−CRKSHT
MN CTR LWR

FRONT OF ENGINE

ENGINE BULKHEAD HOUSING AND CRANKSHAFT MAIN BEARINGS (LOWER)

NOTE:
TORQUE ALL BULKHEAD HOUSING TO CYLINDER BLOCK BOLTS/STUDS WITHIN (4) MINUTES OF INSTALLATION

DOWEL-HOLLOW PART OF −6F095− (8 PLACES)

SEE FRAME 6)

−6A338−
BRG−CRKSHT
MN LWR
(3) REQ

−6A339−
BRG−CRKSHT
MN CTR LWR

FRONT OF ENGINE

ENGINE BULKHEAD HOUSING AND CRANKSHAFT MAIN BEARINGS (LOWER)

NOTE:
TORQUE ALL BULKHEAD HOUSING TO CYLINDER BLOCK BOLTS/STUDS WITHIN (4) MINUTES OF INSTALLATION

DOWEL-HOLLOW PART OF −6F095− (8 PLACES)

SEE FRAME 6)

−6A338−
BRG−CRKSHT
MN LWR
(3) REQ

−6A339−
BRG−CRKSHT
MN CTR LWR

FRONT OF ENGINE

ENGINE BULKHEAD HOUSING AND CRANKSHAFT MAIN BEARINGS (LOWER)

NOTE:
TORQUE ALL BULKHEAD HOUSING TO CYLINDER BLOCK BOLTS/STUDS WITHIN (4) MINUTES OF INSTALLATION

DOWEL-HOLLOW PART OF −6F095− (8 PLACES)

SEE FRAME 6)

−6A338−
BRG−CRKSHT
MN LWR
(3) REQ

−6A339−
BRG−CRKSHT
MN CTR LWR

FRONT OF ENGINE
ENGINE BULKHEAD HOUSING (FASTENERS & TORQUE SEQUENCE)

**Production Method (Multi-Spindle)**

1. TORQUE FASTENERS 1 THRU 8 TO 25 Nm
2. TORQUE FASTENERS 9 THRU 16 TO 40 Nm
3. ROTATE FASTENERS 1 THRU 16 90°
4. TORQUE FASTENERS 17 THRU 22 TO 20–30 Nm

**Single Wrench Method (Service-Repair)**

1. TORQUE FASTENERS 1 THRU 8 TO 22–28 Nm
2. TORQUE FASTENERS 9 THRU 16 TO 37–43 Nm
3. ROTATE FASTENERS 1 THRU 16 AN ADDITIONAL 85°–95°
4. TORQUE FASTENERS 17 THRU 22 TO 20–30 Nm

(HSG = ENG BLKHD)

**HOLE NO.** | **FASTENER** | **DESCRIPTION**  
--- | --- | ---  
18–19–20 21–22 | M8 X 1.25 X 79.3 BOLT & WASHER PILOT  
| W701554 |  
1–2–3–4–17 | M8 X 1.25 X 95.3 BOLT & WASHER PILOT  
| F43E–6345–CB |  
13–14–15 16 | M10 X 1.5 X 106 BOLT & WASHER PILOT  
| F43E–6345–DC |  
5–6–7–8 | M6 X 1.0 X 19.5/ M8 X 1.25 X 95.3 STUD & WASHER PILOT  
| YL8E–6D311–BA |  
9–10–11–12 | M10 X 1.0 X M8 X 1.25 X 95.3 STUD & WASHER PILOT  
| YL8E–6D311–AA |
CRANKSHAFT ENDPLAY
(LESS PISTON)

REFERENCE:
CHECK CRANKSHAFT END PLAY BY APPLYING A 534–668N (120–150 LB) FORCE FORWARD AND THEN A 89–178N (20–40 LB) FORCE REARWARD.

FIM = FULL INDICATOR MOVEMENT
CRANKSHAFT REAR OIL SEAL ASY

ASSEMBLY PROCEDURE

1. APPLY WSE-M2C908-A OIL TO OD OF CRANKSHAFT FLANGE AND TO ID OF CRANKSHAFT SEAL BORE (IN BULKHEAD/BLOCK ASSEMBLY).

2. INSTALL REAR SEAL (−6701−) ON INSTALLATION TOOL WITH FLAT SIDE TOWARD REAR (SPRING TOWARDS ENGINE) AND PRESS SEAL INTO SEAL BORE AND OVER CRANKSHAFT FLANGE.

NOTE:
THE CRANKSHAFT OIL SEAL MUST BE PRESSED INTO THE BLOCK ASSEMBLY WITHIN (2) MINUTES OF BULKHEAD−TO−BLOCK FASTENER RUNDOWN (FRAME 6C).

NOTE:
REAR FACE OF SEAL MUST BE FLUSH TO 2mm BELOW SURFACE "R".

CRANKSHAFT REAR OIL SEAL ASY
(SQUARENESS & CONCENTRICITY–SERVICE AUDIT)

DO NOT EXCEED THE FOLLOWING SPECIFICATIONS WHEN CRANKSHAFT IS HAND ROTATED.

1. 0.50 FIM SEAL BORE IN RELATION TO CENTERLINE OF CRANKSHAFT (SEAL MUST NOT BE INSTALLED).

2. 0.50 FIM OF SEAL FACE REAR SURFACE IN RELATION TO REAR FACE OF CRANKSHAFT.

NOTE:
LUBRICATE SEAL BORE BEFORE INSTALLATION
CRANKSHAFT TRANSMISSION SLEEVE

NOTE:
INSTALL SLEEVE UNTIL BOTTOMED IN CRANKSHAFT PRIOR TO FLEXPLATE INSTALLATION.

SECTION A
NOTE: ROD CAN BE INSTALLED INTO PISTON WITH IDENTIFICATION BUMPS IN EITHER DIRECTION.

NOTE: PISTON & ROD AUTOMATED ASSEMBLY ALWAYS ASSEMBLES BUMPS REARWARD OF ENGINE

NOTE: PRIOR TO PISTON PIN INSTALLATION, COAT BOTH PISTON PIN BORES WITH WSE−M2C908−A OIL. OIL COVERAGE TO BE 360° AROUND BOTH PISTON PIN BORES.

NOTE: PIN TO ROD CLEARANCE .004−.020

NOTE: PIN FIT TO PISTON − .002 CLEARANCE .009 CLEARANCE

NOTE: SEE FRAME 8B FOR ROD CAP INSTALLATION.
PISTON ASY, PIN AND RINGS

NOTE:
PISTON RINGS ARE TO BE ASSEMBLED TO PISTONS WITH GAPS ORIENTATED AS SHOWN.

-6150-
RG−PST COMPR UPR
INSTALL EITHER DIRECTION
NOTE:
- PISTON RING END GAP MEASURED AT 89.000 GAGE DIAMETER
- COMPRESSION RING END GAP
  UPPER 0.10− 0.25
  LOWER 0.27− 0.42
- OIL RING SEGMENT END GAP
  0.15−0.65

-6152−
RG−PST COMPR LWR
ASSEMBLE WITH "0" MARK ON RING SIDE FACE UP TOWARDS TOP OF PISTON

-6161−
SPCR−PST OIL CNTR RG SEG (ORIENT THE GAP SUCH THAT THE CUT ENDS ARE POINTED TOWARDS THE TOP OF PISTON)

-6159−
SEG−PST UPR OIL CNTR RG UPR (2) PLACES

NOTE:
FOR INSTALLATION OF UPPER AND LOWER COMPRESSION RINGS UTILIZE RING EXPANDER TOOL.

VIEW A

VIEW B

CENTER LINE OF PISTON PARALLEL TO WRIST PIN BORE

30° 30°

EXPANDER RING AND RG−PST COMPR LWR GAP LOCATION

SEG−PST UPR OIL CONTR RG UPR GAP LOCATION (LOWER)

SEG−PST UPR OIL CONTR RG UPR GAP LOCATION (UPPER)

(RET−PST PIN)

(PIN−PST)
PISTON & CONNECTING ROD ASY, BEARINGS AND CAP

NOTE:
PRIOR TO PISTON/CONNECTING ROD ASY INSTALLATION, COAT ALL CYLINDER BORE SURFACES, CRANKSHAFT PINS & JOURNALS WITH WSE-M2C908-A OIL.

NOTE:
OPERATOR TO CHECK FOR RINGS PRESENT, GAP ALIGNMENT & RING MOVEMENT PRIOR TO STUFFING.

NOTE:
CONNECTING ROD BOLTS MAY BE TORQUE TO YIELD A MAXIMUM OF (3) TIMES (ONCE AT ROD MACHINING AND TWICE AT ENGINE ASY).

NOTE:
DIAMETRAL ROD BEARING CLEARANCE AT CROWN IS TO BE .028-.066

NOTE:
ALIGNMENT OF BEARING MATING SURFACES MUST NOT EXCEED 2mm FROM PARTING SURFACES.

NOTE:
OPERATOR TO CHECK FOR RINGS PRESENT, GAP ALIGNMENT & RING MOVEMENT PRIOR TO STUFFING.

PRODUCTION RUNDOWN METHOD
PRE-TORQUE BOTH FASTENERS. THEN TORQUE 40 Nm. THEN ROTATE 85° - 95° MONITOR PRETHRESHOLD ANGLE, ELASTIC SLOPE AND POST ELASTIC TORQUE

SINGLE WRENCH METHOD – SERVICE
TORQUE BOTH FASTENERS 20–25 Nm. THEN TORQUE BOTH FASTENERS 40–45 Nm. THEN ROTATE 90°–120°
PISTON & CONNECTING ROD ASY (CLEARANCES)

- Before taking measurements, make sure the piston is at TDC.
- Dimension ‘Z’ top of piston -0.415mm below to 0.115mm above top of block.
- Measure at TDC (average of two readings front and rear shown above).
- Both measurements must be taken parallel to crankshaft axis. A straight line between the (2) readings must pass thru the true center of the piston.
- Measure cylinder block bore diameter at gage location shown below and mark outside of block with appropriate number to identify bore grade size. Piston domes are marked with grade numbers. Install piston and rod assy. to cylinder bore with matching numbers.
- Note: to prevent damage to pistons after assembly, position crankshaft so pistons are below deck.

<table>
<thead>
<tr>
<th>GRADE</th>
<th>CYLINDER BLOCK BORE DIAMETER</th>
<th>PISTON DIAMETER UNCOATED</th>
<th>PISTON DIAMETER COATED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>89.000–89.010</td>
<td>88.970–88.980</td>
<td>88.990–89.010</td>
</tr>
<tr>
<td>2</td>
<td>89.010–89.020</td>
<td>88.978–88.992</td>
<td>88.998–89.022</td>
</tr>
<tr>
<td>3</td>
<td>89.020–89.030</td>
<td>88.990–89.000</td>
<td>89.010–89.030</td>
</tr>
</tbody>
</table>
ASSEMBLY PROCEDURE

1. ROTATE INNER ROTOR OF PMP ASY–OIL LS SCRN & CVR (−6621−) TO ALIGN WITH FLATS ON CRANKSHAFT POST.

2. ALIGN PMP ASY–OIL LS SCRN & CVR WITH CRANKSHAFT AXIALLY AND CAREFULLY INSTALL ONTO CRANKSHAFT UNTIL SEATED AGAINST CYLINDER BLOCK ASY

3. INSTALL (4) M6 BOLTS AND TORQUE TO SPECIFICATION.
OIL PAN BAFFLE

-6687- BAF-OIL PAN

W701542
M6 X 1 NUT
HEX FLANGE
TORQUE 5 Nm
THEN ROTATE 45°
(4) REQ

(HSG-ENG BLKHD STUD (4) PLACES)

FRONT OF ENGINE

IL1F1E-030002-E0543F

REL
NE01-I10880558-019

DATE
991213

LAST FRAME
73C

V-ENGINE ILLUSTRATION

NO.

SCALE = .6

CONTD
10A

FRONT OF ENGINE
OIL PAN BAFFLE

W701582 (13 mm HEX)
M8 X 1.25 NUT
HEX FLANGE
TORQUE 10 Nm
THEN ROTATE 45°
(3) REG

-J14-6687-
BAF-OIL PAN

(HSG-ENG BLKHD
STUD (3) PLACES)

W701582 (13 mm HEX)
M8 X 1.25 NUT
HEX FLANGE
TORQUE 10 Nm
THEN ROTATE 45°
(3) REG

-FRONT OF ENGINE-
ASSEMBLY PROCEDURE

1. INSERT SCRN & CVR ASY–OIL PUMP (~6622–) TUBE END INTO OIL PUMP ASY AND SUPPORT BRACKET ONTO MAIN BEARING STUD.

2. INSTALL (2) M6 BOLTS AND (1) M8 NUT AS SHOWN AND TORQUE TO SPECIFICATION.

INSERT SCRN & CVR ASY–OIL PUMP (~6622–) TUBE END INTO OIL PUMP ASY AND SUPPORT BRACKET ONTO MAIN BEARING STUD.

INSTALL (2) M6 BOLTS AND (1) M8 NUT AS SHOWN AND TORQUE TO SPECIFICATION.
OIL SEPARATOR ASY, WATER INLET TUBE AND CUP PLUG

- 8A505 - TUB - WTR INLT
NOTE: INSTALL TO A HEIGHT OF 37.5 - 38.5

- 6B752 - GSKT - OIL SEP

- 6B763 - SEP ASY - OIL

APPLY 2mm BEAD OF WSK - M2G349 - A7 SEALER

(INSTALLATION TOOL)

W701504
M6 X 1 X 23.25 BOLT & WASHER HEX HD PILOT TORQUE 8 - 12 Nm (2) REQ

W701923
35mm CUP PLUG (APPLY 2mm BEAD OF WSK - M2G349 - A10 SEALER TO CUP PLUG OR BORE)

NOTE:
(BLK ASY - CYL)

WSK - M2G349 - A7 SEALER

FRONT OF ENGINE

INSTALL TO A HEIGHT OF 37.5 - 38.5 (TUB - WTR INLT)

(A) VIEW

(B) SECTION

(CYLINDER BLOCK ASY) J7

(CUP PLUG)

35mm CUP PLUG (APPLY 2mm BEAD OF WSK - M2G349 - A10 SEALER TO CUP PLUG OR BORE)
Cylinder head assembly pipe plugs and dowels

- 2 req 1-11.5 inches pipe plug
  - Torque 90 Nm
  - Then rotate 180°

- 2 req 1/4-18 inches plug
  - Headless socket hex
  - Torque 14 Nm

Typical (2) places

Front of engine

Section A
Typical (2) places

- W701515
  - 1/4-18 inches plug
  - Headless socket hex
  - Torque 14 Nm
  - Then rotate 180°

(2) req
VALVE SPRING INSTALLED HEIGHT

(SERVICE/AUDIT)

NOTE:
ADJ ASY−VLV LSH MUST BE PUMPED UP PRIOR TO INSTALLATION.

NOTE:
ENTIRE ID OF VALVE GUIDE PRIOR TO VALVE INSTALLATION.
VALVE MUST ROTATE FREELY.

VALVE STEM TO GUIDE CLEARANCE:
INTAKE: 0.020−0.069
EXHAUST: 0.046−0.095

NOTE:
ADJ ASY−VLV LSH MUST BE PUMPED UP PRIOR TO INSTALLATION.

NOTE:
MUST BE PRESENT

INTAKE AND EXHAUST

VALVES

FOR 95% PRODUCTION 39.69−40.29
FOR 100% PRODUCTION 39.49−40.49

INSTALLED SPRING HEIGHT

FOR 95% PRODUCTION 39.69−40.29
FOR 100% PRODUCTION 39.49−40.49

NOTE:
ADJ ASY−VLV LSH MUST BE PUMPED UP PRIOR TO INSTALLATION.

NOTE:
MUST BE PRESENT

INTAKE AND EXHAUST

VALVES

FOR 95% PRODUCTION 39.69−40.29
FOR 100% PRODUCTION 39.49−40.49

INSTALLED SPRING HEIGHT

FOR 95% PRODUCTION 39.69−40.29
FOR 100% PRODUCTION 39.49−40.49

NOTE:
ADJ ASY−VLV LSH MUST BE PUMPED UP PRIOR TO INSTALLATION.

NOTE:
MUST BE PRESENT

INTAKE AND EXHAUST

VALVES

FOR 95% PRODUCTION 39.69−40.29
FOR 100% PRODUCTION 39.49−40.49

INSTALLED SPRING HEIGHT

FOR 95% PRODUCTION 39.69−40.29
FOR 100% PRODUCTION 39.49−40.49

NOTE:
ADJ ASY−VLV LSH MUST BE PUMPED UP PRIOR TO INSTALLATION.

NOTE:
MUST BE PRESENT
CYLINDER HEAD GASKETS

NOTE:
GASKET MUST BE SNAPPED OVER DOWELS, BOTH HOLES AT ONCE.

RIGHT SIDE _______ SHOWN
LEFT SIDE _______ TYPICAL

W704688
DOWEL HOLLOW (16 X 19)
(2) REQ AS SHOWN
(EACH SIDE)

NOTE:
MUST BE BOTTOMED
(SEE SECTION C)

-6051-
GSK−CYL HD

(9.0
8.0)

FRONT OF ENGINE

DOWEL

(BLK ASY−CYL)

SECTION C

VIEW A
(GSKT−CYL HD)
−6051−

VIEW B
(GSKT−CYL HD LH)
−6083−

FRONT OF ENGINE
NOTE:
SEE FRAME 13D FOR ASSEMBLY PROCEDURE

REMOVE THRUST CAPS, SHIP ON PALLET AND NESTED OVER CAMSHAFTS

RIGHT SIDE _______ SHOWN
LEFT SIDE _______ TYPICAL

-6065- M10 X 1.5 X 154.8 BOLT & WASHER ASY HEX FLANGE HD PILOT (8) REQ PER HEAD

-6049- HD ASY-CYL
-6050- HD ASY-CYL LH

(DOWEL 16 X 19)
(2) PLACES

(REMOVE THRUST CAPS, SHIP ON PALLET AND NESTED OVER CAMSHAFTS)

Front of Engine

RIGHT SIDE _______ SHOWN
LEFT SIDE _______ TYPICAL

-6065- M10 X 1.5 X 154.8 BOLT & WASHER ASY HEX FLANGE HD PILOT (8) REQ PER HEAD

-6049- HD ASY-CYL
-6050- HD ASY-CYL LH

(DOWEL 16 X 19)
(2) PLACES

(REMOVE THRUST CAPS, SHIP ON PALLET AND NESTED OVER CAMSHAFTS)

Front of Engine

RIGHT SIDE _______ SHOWN
LEFT SIDE _______ TYPICAL

-6065- M10 X 1.5 X 154.8 BOLT & WASHER ASY HEX FLANGE HD PILOT (8) REQ PER HEAD

-6049- HD ASY-CYL
-6050- HD ASY-CYL LH

(DOWEL 16 X 19)
(2) PLACES

(REMOVE THRUST CAPS, SHIP ON PALLET AND NESTED OVER CAMSHAFTS)

Front of Engine
CYLINDER HEAD ASY
(TORQUE SEQUENCE)

SINGLE WRENCH METHOD (SERVICE & REPAIR)
1. INSTALL HD ASY–CYL/HD ASY–CLY LH (−6049−/−6050−) OVER DOWELS.
2. INSTALL M10 BOLTS (8) EACH SIDE AND PRETORQUE AS FOLLOWS:
   A. TORQUE ALL BOLTS TO 32−38 Nm IN NUMERICAL SEQUENCE SHOWN.
   B. ROTATE ALL BOLTS 85°−95° IN NUMERICAL SEQUENCE SHOWN.
3. BACK OUT ALL BOLTS (8) EACH SIDE A MINIMUM OF ONE FULL TURN (360°).
4. TIGHTEN ALL BOLTS (8) EACH SIDE TO SPECIFICATION AS FOLLOWS:
   A. TORQUE ALL BOLTS TO 32−38 Nm IN NUMERICAL SEQUENCE SHOWN:
   B. ROTATE ALL BOLTS 85°−95° IN NUMERICAL SEQUENCE SHOWN:
   C. ROTATE ALL BOLTS AN ADDITIONAL 85°−95° IN NUMERICAL SEQUENCE SHOWN.

MULTI−SPINDLE METHOD
1. INSTALL HD ASY–CYL/HD ASY–CLY LH (−6049−/−6050−) OVER DOWELS.
2. INSTALL M10 BOLTS (8) EACH SIDE PRE−TORQUE TO SEAT ALL BOLTS.
   SIMULTANEOUSLY (18−22 Nm)
3. RETORQUE BOLTS 1–4 (35 Nm THEN ROTATE 180°)
4. RETORQUE BOLTS 5–8 (35 Nm THEN ROTATE 180°)
1. SET CRANKSHAFT AT 43°±/− 5° B.T.D.C.
2. INSTALL CAMSHAFTS INTO CYLINDER HEADS WITH TIMING MARKS AS SHOWN.
3. ROTATE CRANKSHAFT TO 5° B.T.D.C.

CRKSHRT KEY AT 35° (5°B.T.D.C.)
CAMSHAFT ASY, BEARING CAPS AND VALVE ROCKER ARM ASY

QUALITY AUDIT ONLY

0.50–1.11 GAP MEASURED ON CAP BASE CIRCLE WITH ADJUSTER FULLY COLLapsed.

NOTE:
SEE FRAME 13G FOR ASSEMBLY PROCEDURE & TORQUE SEQUENCE

NOTE:
DIP ENTIRE FOLLOWER IN WSE–M2C908–A OIL PRIOR TO INSTALLATION.

NOTE:
CAP TO BE INSTALLED LAST & REMOVED FIRST

NOTE:
LUBRICATE CAMSHAFT JOURNALS AND LOBES WITH WSE–M2C908–A OIL PRIOR TO INSTALLATION.

NOTE:
SEE FRAME 13G FOR ASSEMBLY PROCEDURE & TORQUE SEQUENCE

W705391
M6 x 1 x 43.75 BOLT
HEX FLANGE HD PILOT
TORQUE 8–12 Nm
(16) REQ

−6B280−
CAP ASY–C/SHT BRG
(2) REQ

−6A268−
C/SHT ASY–INTK RH
−6A267−
C/SHT ASY–INTK LH

−6A258−
CAP–C/SHT BRG
(6) REQ

−5529−
ARM ASY–VLV RKR
(12) REQ

NOTE:
DIP ENTIRE FOLLOWER IN WSE–M2C908–A OIL PRIOR TO INSTALLATION.

NOTE:
LUBRICATE CAMSHAFT JOURNALS AND LOBES WITH WSE–M2C908–A OIL PRIOR TO INSTALLATION.

NOTE:
SEE FRAME 13G FOR ASSEMBLY PROCEDURE & TORQUE SEQUENCE

NOTE:
DIP ENTIRE FOLLOWER IN WSE–M2C908–A OIL PRIOR TO INSTALLATION.

NOTE:
DIP ENTIRE FOLLOWER IN WSE–M2C908–A OIL PRIOR TO INSTALLATION.

NOTE:
DIP ENTIRE FOLLOWER IN WSE–M2C908–A OIL PRIOR TO INSTALLATION.

NOTE:
DIP ENTIRE FOLLOWER IN WSE–M2C908–A OIL PRIOR TO INSTALLATION.
LOAD (12) ADJ ASY−VLV LSH (−6C501−) IN CYLINDER HEADS.
ROLLER FOLLOWER SURFACES, ADJUSTER SOCKETS AND #1 CAMSHAFT CAP THRUST GROOVE PRIOR TO INSTALLATION.

LOAD (12) ARM ASY−VLV RKR (−6529−), AND C/SHTS (−6A266− INT RH −6A267− INT LH, −6A268− EXH RH & −6A269− EXH LH) INTO CYLINDER HEAD THEN POSITION CAMSHAFT CAPS OVER CAMSHAFT, ENGAGING DOWELS IN CAM TOWERS.

DEPRESS CAMSHAFT AND CAMSHAFT CLUSTER CAPS. (INSURE ALL COMPONENTS LOADED AND THRUST CAPS ON INT RHT.)

LOAD (12) ARM ASY−VLV RKR (−6529−), AND C/SHTS (−6A266− INT RH −6A267− INT LH, −6A268− EXH RH & −6A269− EXH LH) INTO CYLINDER HEADS WITH TIMING MARKS AS SHOWN FRAME 13E.

POSITION CAMSHAFT CAPS OVER CAMSHAFTS, ENGAGING DOWELS IN CAM TOWERS. SNUG DOWN ALL CAPS BOLTS DIAGONALLY FROM THE CENTER OUT. TORQUE ALL BOLTS SIMULTANEOUSLY TO 8−12 Nm.

CAMSHAFT END PLAY (0.025−0.165 FIM) CHECK AT TORQUE 41−68 Nm.

**ASSEMBLY PROCEDURE (SINGLE WRENCH METHOD)**

1. LOAD (12) ADJ ASY−VLV LSH (−6C501−) IN CYLINDER HEADS.
2. APPLY WSE−M2C908−A OIL TO CAMSHAFT JOURNALS, LOBES, VALVE TIP PADS, ROLLER FOLLOWER SURFACES, ADJUSTER SOCKETS AND #1 CAMSHAFT CAP THRUST GROOVE PRIOR TO INSTALLATION.
3. LOAD (12) ARM ASY−VLV RKR (−6529−), AND C/SHTS (−6A266− INT RH −6A267− INT LH, −6A268− EXH RH & −6A269− EXH LH) INTO CYLINDER HEAD THEN POSITION CAMSHAFT CAPS OVER CAMSHAFT, ENGAGING DOWELS IN CAM TOWERS.
4. DEPRESS CAMSHAFT AND CAMSHAFT CLUSTER CAPS. (INSURE ALL COMPONENTS ARE PROPERLY ALIGNED) AND TORQUE ALL BOLTS SIMULTANEOUSLY TO 8−12 Nm.
5. CAMSHAFT END PLAY (0.025−0.165 FIM) CHECK AT TORQUE 41−68 Nm.

**NOTE:** REINSTALL CAMSHAFT BEARING CAPS AT THEIR CORRECT NUMBERED LOCATION
SPARK PLUG ASY

PRODUCTION METHOD (MULTI-SPINDLE)
1. PRETORQUE TO SEAT PLUGS
2. RETORQUE PLUGS TO SPECIFICATION (9–20 Nm)

SINGLE WRENCH METHOD (SERVICE AND REPAIR)
1. INSTALL PLUGS AND SEAT
2. TIGHTEN PLUGS TO SPECIFICATION (9–20 Nm)
NOTE:
ALIGN TIMING LINKS
WITH TIMING MARKS
ON SPROCKETS

COLOR CODE: GOLD
1. **ROTATE CRANKSHAFT 120° CLOCKWISE TO 115° ATDC**
2. **INSTALL RH CAM DRIVE COMPONENTS.**

---

**CRANKSHAFT, CAMSHAFT ASY AND TIMING CHAIN PRE-ASSEMBLY TIMING MARK ALIGNMENT (LH)**

1. **CRKSHT KEY AT 85° (115° ATDC)**
2. **TIMING MARK AT 115°**
TIMING CHAIN, GUIDE, TENSIONER, TENSIONER ARM AND CRANKSHAFT GEAR

NOTE:
ALIGN TIMING LINKS WITH TIMING MARKS ON SPROCKETS

- 6L253 - ARM - TM CHN TENS
- 6L266 - TENS - TM CHN
- 6L297 - GID - TM CHN
- 6L268 - CHN - TM

BOLT & WASHER
W701232
M8 x 1.25 x 36.3
BOLT & WASHER
HEX FLANGE HD PILOT
TORQUE 20–30 Nm
(2) REG

W701524
M8 x 1.25 x 49.3
BOLT & WASHER
HEX FLANGE HD PILOT
TORQUE 20–30 Nm
(2) REG
COLOR CODE: GOLD

NOTE:
ALIGN TIMING LINKS WITH TIMING MARKS ON SPROCKETS

COLOR CODE:
GOLD

FRONT OF ENGINE
CRANKSHAFT, CAMSHAFT ASY AND TIMING CHAIN
TIMING MARK ALIGNMENT (LH & RH)

NOTE:
TYPICAL ALIGNMENT WHEN ROTATED BACK COUNTERCLOCKWISE TO TDC

NOTE:
AT TDC ALL (4) CAMSHAFT SPROCKETS ALIGN WITH ARROWS LOCATED ON THE BACK OF THE SPROCKETS.
ENGINE FRONT COVER ASY AND IGNITION PULSE CRANKSHAFT SENSOR RING

NOTE:
(6) MINUTES OF APPLYING CRKSHFT (HSG−ENG BLKHD) −6C086− CVR ASY−ENG FRT (BLK ASY−CYL)

FOR FASTENER LOCATION AND TORQUE SEQUENCE SEE FRAME 16A.

NOTE:
USE ORANGE PAINT STRIP

NOTE:
IGNITION PULSE RING
NOTE: THE PULSE RING TEETH MUST FACE FORWARD

NOTE:
TORQUE FASTENERS WITHIN (6) MINUTES OF APPLYING WSE−M4G323−A6 SEALER.
### Engine Front Cover Asy

**Fasteners & Torque Sequence**

**View - Front of Cover**

<table>
<thead>
<tr>
<th>HOLE NO.</th>
<th>FASTENER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>W701712</td>
<td>M8 x 1.25 x 47.5 / M6 x 1 x 20 STUD HEX FLANGE HD PILOT</td>
</tr>
<tr>
<td>2–3–4</td>
<td>W701525</td>
<td>M8 x 1.25 x 51.8 BOLT &amp; WASHER ASY HEX FLANGE HD PILOT</td>
</tr>
<tr>
<td>5–6–10</td>
<td>W701581</td>
<td>M8 x 1.25 x 68 / M8 x 1.25 x 26 STUD HEX SHOULDER PILOT</td>
</tr>
<tr>
<td>14–15–16</td>
<td>W701240</td>
<td>M8 x 1.25 x 34.3 BOLT &amp; WASHER ASY HEX FLANGE HD PILOT</td>
</tr>
</tbody>
</table>

**Note:**

- Torque in this sequence 1–16.
- Torque all fasteners (20–30 Nm)

- [ ] = STUD
- [ ] = BOLT
1. INSTALL PMP ASY–WTR (−8501−) AND POSITION TO REAR FACE OF CYLINDER HEAD ASY (LH)

2. ALIGN HOLES. INSERT M6 BOLTS AND TORQUE TO SPECIFICATION.

3. CLAMP HOSE TO WATER INLET TUBE.

NOTE:
LUBRICATE WATER PUMP ASY HOSE OR WATER INLET TUBE WITH ESE−M99B144−B SURFACTANT PRIOR TO INSTALLATION.

ASSEMBLY PROCEDURE

Clamp must be installed between the two paint stripes on hose unless otherwise stated.

Hose alignment prior to clamp positioning must be positioning straight unless otherwise stated.

NOTE:
ENGAGEMENT SPECIFICATIONS FOR ALL COOLING COMPONENT HOSE ASSEMBLIES. ALL HOSE CONNECTIONS AND COMPONENTS TO BE BOTTOMED OR WITHIN 2.5 MAXIMUM OF BEING BOTTOMED ON THE COMPONENT CONNECTION.
NOTE:
PARTS MARKED "1" ARE PIA TO WATER BYPASS TUBE ASY

VISUALLY INSPECT "O" RINGS AND SURFACES FOR CONTAMINATION PRIOR TO INSTALLATION.

APPLY ESE-M99B176-A LUBRICANT

W701632
M6 X 1 X 32.5 / M5 X 0.8 X 17.5 STUD
HEX FLANGE
TORQUE 8−12 Nm

W701669
M6 X 1 X 32.25 BOLT
HEX FLANGE HD
TORQUE 8−12 Nm
CRANKCASE EMISSION VALVE TO INTAKE MANIFOLD HOSE

NOTE:
REFER TO FRAME 63 FOR INSTALLATION OF THIS END

HOS-CRKC EMS VLV TO INTK MANF
NOTE:
ASSEMBLY AID – SEE FRAME 3

FRONT OF ENGINE

(SEP ASY–OIL)
NOTE:

PARTS MARKED 1 ARE PIA TO OIL PAN ASY

NOTE:

ALIGN TRANSMISSION MOUNTING FACE OF OIL PAN WITH REAR FACE OF CYLINDER BLOCK. IT SHOULD HAVE A MAXIMUM MISMATCH OF 0.25mm UNDERFLUSH.

IF STEP IS GREATER THAN ABOVE IT WILL REQUIRE SHIMMING. (SEE FRAME 20A)

NOTE:

THE GSKT−OIL PAN (−6710−) IN (2) LOCATIONS. SEE VIEW NOTE:

OIL PAN ASY MUST BE INSTALLED AND TORQUED TO SPECIFICATIONS WITHIN (6) MINUTES MAX OF APPLYING SEALER.

NOTE:

ALIGN TRANSMISSION MOUNTING FACE OF OIL PAN WITH REAR FACE OF CYLINDER BLOCK. IT SHOULD HAVE A MAXIMUM MISMATCH OF 0.25mm UNDERFLUSH.

IF STEP IS GREATER THAN ABOVE IT WILL REQUIRE SHIMMING. (SEE FRAME 20A)

NOTE:

OIL PAN ASY MUST BE INSTALLED AND TORQUED TO SPECIFICATIONS WITHIN (6) MINUTES MAX OF APPLYING SEALER.
ASSEMBLY PROCEDURE

1. ENSURE THAT GSKT−OIL PAN (−6710−) IS CORRECTLY ASSEMBLED TO PAN ASY−OIL (−6675−).

2. APPLY SEALER TO OIL PAN GASKET AS INDICATED ON FRAME 20. TORQUE WITHIN (6) MINUTES.

3. INSTALL OIL PAN AND GASKET ASY TO BULKHEAD HOUSING.

4. ALIGN TRANSMISSION FACE OF OIL PAN WITH REAR FACE OF CYLINDER BLOCK TO WITHIN 0.00 TO −0.25mm UNDERFLUSH WITH REAR FACE OF BLOCK.

5. ENGAGE AND RUN DOWN FASTENERS 1–15 SIMULTANEOUSLY TO THE REAR FACE OF BLOCK MAY BE REPAIRED BY USING (1) OR (2) 0.25mm SHIMS (SILVER) ON EACH AFFECTED SIDE OF THE OIL PAN.

6. GAGE STEP BETWEEN REAR FACE OF CYLINDER BLOCK AND TRANSMISSION MOUNTING FACE OF OIL PAN.

7. ACCEPT ALL ASSEMBLIES THAT GAGE 0.00 TO −0.25mm.

8. ASSEMBLIES THAT GAGE BETWEEN −0.26 AND −0.50mm UNDERFLUSH TO THE REAR FACE OF BLOCK MAY BE REPAIRED BY USING (1) OR (2) 0.25mm SHIMS (SILVER) ON EACH AFFECTED SIDE OF THE OIL PAN.

9. ASSEMBLIES THAT GAGE BETWEEN −0.51 AND −0.75mm UNDERFLUSH TO THE REAR FACE OF BLOCK MAY BE REPAIRED BY USING (1) OR (2) 0.50mm SHIMS (GOLD) ON EACH AFFECTED SIDE OF THE OIL PAN.

10. IF THE STEP GAGES GREATER THAN −0.75mm UNDERFLUSH OR IF TRANSMISSION MOUNTING FACE PROTRUDES OVERFLUSH TO REAR FACE OF CYLINDER BLOCK, THEN THE OIL PAN MUST BE REMOVED AND REPLACED AND THE ENTIRE ASSEMBLY PROCEDURE REPEATED.

SERVICE AUDIT

1. INSTALL OIL PAN TO TRANSMISSION RETAINING FASTENERS FINGER TIGHT. THIS WILL ALIGN THE TWO FACES PRIOR TO TORQUING OIL PAN.

2. TIGHTEN OIL PAN FASTENERS TO SPECIFICATION, THEN TIGHTEN TRANSMISSION TO OIL PAN FASTENERS.
CRANKSHAFT FRONT OIL SEAL ASY

ASSEMBLY PROCEDURE

1. CHECK RELATIONSHIP OF SEAL BORE TO CENTERLINE OF CRANKSHAFT.
2. APPLY WSE–M2C908–A OIL TO THE ID OF THE CRANKSHAFT SEAL BORE (IN FRONT COVER ASY).
3. INSTALL SE ASY−CRKSHT FRT OIL (−6700−) IN FRONT COVER ASY (SPRING SIDE TOWARD ENGINE) USING INSTALLATION TOOL.
   NOTE: INSTALLED SEAL DEPTH FLUSH TO 1mm BELOW SURFACE "S". THIS IS NOT A MEASURE OF SEAL SQUARENESS (SEE SERVICE AUDIT).
4. CHECK SEAL SQUARENESS.

CRANKSHAFT FRONT OIL SEAL ASY
(SQUARENESS AND CONCENTRICITY SERVICE AUDIT)

DO NOT EXCEED THE FOLLOWING SPECIFICATIONS:

1. 0.50 FIM OF FRONT COVER SEAL BORE IN RELATION TO FRONT FACE OF CRANKSHAFT (SEAL MUST NOT BE INSTALLED) SEE SECTION A.
2. 0.50 FIM OF SEAL FRONT FACE SURFACE IN RELATION TO SEALING SURFACE OF DAMPER.
**INSTALLATION SEQUENCE**

1. SEAL SURFACE MUST BE FREE OF DIRT AND OIL.
2. APPLY WSE-M4G323-A6 SEALER TO CRANKSHAFT DAMPER. SEE VIEW B.
3. INSTALL DMPR ASY–CRKSHT VIB (−6316−) AS SHOWN.
4. TORQUE M12 BOLT TO SPECIFICATION.

**NOTE:**

- APPLY WSE-M4G323-A6 SEALER TO KEYWAY SLOT PRIOR TO DAMPER AND BOLT INSTALLATION. SEAL SURFACE MUST BE FREE OF DIRT AND OIL.
CAMSHAFT TIMING SENSOR ASY

(CVR ASY—ENG FRT)

-6B288-

SNS ASY—C/SHT TIM

W500214

M6 X 1 X 23.25 BOLT
HEX FLANGE HD PILOT
TORQUE 8-12 Nm

FRONT OF ENGINE
OIL LEVEL INDICATOR TUBE ASY

NOTE:
LUBRICATE "0" RING WITH WSE-M2C908-A OIL PRIOR TO INSTALLATION.
NOTE:
MUST BE BOTTOMED OUT AS SHOWN

W701822
M6 X 1 X 12.35 – M6 X 1 X 20.42
STUD & WASHER
HEX FLANGE HD PILOT
TORQUE 8-12 Nm

SECTION A
FRONT OF ENGINE
(HD ASY-CYL LH)
(TUB ASY-OIL LVL IND)
(HSG-ENG BLKHD)
CRANKSHAFT TIMING SENSOR ASY

(CVR ASY-ENG FRT)

W500214
M6 X 1 X 23.25 BOLT
HEX FLANGE HD. PILOT
TORQUE 8-12 Nm

FRONT OF ENGINE
CRANKCASE OIL COOLER ASY AND OIL FILTER ASY

ASSEMBLY PROCEDURE

1. INSTALL LOCATING PIN ON OIL COOLER INTO CAST SLOT IN CYLINDER BLOCK.
2. ROTATE OIL COOLER CLOCKWISE UNTIL COOLER STOPS.
3. TORQUE AS SPECIFIED.

NOTE:
- LUBRICATE GASKETS OR SEALING SURFACES WITH WSE-M2C908-A OIL PRIOR TO INSTALLATION

LOCATING PIN

FOR -850- ONLY

FOR -856- ONLY

(COOL ASY-CRKC OIL)

(INsert−OIL FLTR)

FOR -850- ONLY

FRONT OF ENGINE

(INsert−OIL COOL PART OF -6A642- ASY)
TORQUE 55–60 Nm
FOR -856- ONLY

(GASKET PART OF -6A642- ASY)
NOTE: LUBRICATE GASKETS OR SEALING SURFACES WITH WSE-M2C908-A OIL PRIOR TO INSTALLATION

(GASKET PART OF -6714- ASY)
NOTE: LUBRICATE GASKETS OR SEALING SURFACES WITH WSE-M2C908-A OIL PRIOR TO INSTALLATION

-6714-
FLTR ASY−OIL
TORQUE 14–17 Nm

(COOL ASY-CRKC OIL)

(INsert−OIL COOL PART OF -6A642- ASY)
TORQUE 55–60 Nm
FOR -856- ONLY

(GASKET PART OF -6A642- ASY)
NOTE: LUBRICATE GASKETS OR SEALING SURFACES WITH WSE-M2C908-A OIL PRIOR TO INSTALLATION
VALVE ROCKER ARM COVER ASY &
CAMSHAFT SEAL REAR RETAINER ASY

NOTE: SEE FRAME 28A FOR TORQUE SEQUENCE.

-6766- CAP ASY−OIL FILL
(PART OF −6A505− ASY)

-6A505− CVR ASY−VLV
RKR ARM LH
-6582− CVR ASY−VLV
RKR ARM

LEFT SIDE _____ SHOWN
RIGHT SIDE _____ TYPICAL

W701242 M6 X 1 X 43.25 BOLT & WSHR HEX FLNG HD PILOT TORQUE 8−12 Nm
(2) REQ

M5 X 0.8 X 21 − M6 X 1 X 34 STUD HEX FLNG PILOT TORQUE 8−12 Nm
(8) REQ (LH)
(9) REQ (RH)

M6 X 1 X 34 BOLT HEX FLNG PILOT
TORQUE 8−12 Nm
(3) REQ (LH)
(1) REQ (RH)

NOTE: INSTALL PRIOR TO CAMSHAFT COVER ASY
NOTE: USE A PILOT TOOL TO PROTECT "LIP" FROM DAMAGE.

NOTE: APPLY 8mm DIAMETER DROP OF WSE−M4G323−A6 SEALER, TO FRONT COVER GASKET INTERSECTION (6) PLACES (2 PER RH VALVE COVER ASY). (4 PER LH VALVE COVER ASY).

NOTE: TORQUE ALL VALVE COVER FASTENERS WITHIN (6) MINUTES OF APPLYING WSE−M4G323−A6 SEALER WHEN (6) MINUTE CRITERIA CANNOT BE MET: PRE−TORQUE ALL FASTENERS TO 3 Nm.

NOTE: DO NOT EXCEED 45 MINUTE DURATION BEFORE FINAL TORQUE SPEC IS ACHIEVED.

NOTE: PARTS MARK (2) ARE PIA TO VALVE ROCKER ARM COVER ASY

NOTE: DO NOT EXCEED 45 MINUTE DURATION BEFORE FINAL TORQUE SPEC IS ACHIEVED.
VALVE ROCKER ARM COVER ASY (Continued)
TORQUE SEQUENCE

□ = STUD
⊙ = BOLT

TORQUE SEQUENCE
FRONT OF ENGINE

-6582-
CVR ASY–VLV
RKR ARM

-6A505-
CVR ASY–VLV
RKR ARM LH

FRONT OF ENGINE
FLYWHEEL ASY

FRONT OF ENGINE

W701559
M10 x 1 x 20 BOLT
HEX LOCK HD PILOT
TORQUE 73–87 Nm
(8) REQ

(CRKSHT)

(BLK ASY–CYL)

−6375−
FL/WHL ASY

FLYWHEEL ASY

FRONT OF ENGINE

W701559
M10 x 1 x 20 BOLT
HEX LOCK HD PILOT
TORQUE 73–87 Nm
(8) REQ

(CRKSHT)

(BLK ASY–CYL)

−6375−
FL/WHL ASY
ENGINE CODE DECAL

1. SURFACE MUST BE CLEAN, DRY AND FREE OF OIL. IF OIL HAS CONTAMINATED THE SURFACE IT MUST BE CLEANED WITH SOLVENT.

2. ADHESIVE MUST NOT TOUCH ANY FOREIGN SURFACE PRIOR TO APPLICATION.

3. IF DECAL HAS BEEN POORLY APPLIED (EXCESSIVE WRINKLES OR MIS-POSITIONED) OR IF IT HAS DESTROYED ITSELF IN ANY WAY, IT MUST BE REMOVED AND REPLACED WITH A NEW DECAL.

NOTE: DECAL INSTALLATION PROCEDURES

(CVR ASY—VLV RKR ARM LH)
1. TO E/G/R VAC REG (FR 47C)
2. TO ALT ASY (FR 64)
3. TO SNS ASY–CRKSHT TIM (FR 47C)
4. TO CAP ASY–RADO IGN INTER (FR 47C)
5. TO IGN COIL ASY (FR 47D)
6. TO VLV ASY–IDL AIR CONTR (FR 45)
7. TO BDY ASY–AIR INTK CHG THROT (FR 52)
8. TO TRNSDC ASY–E/G/R (FR 62)
9. TO SNS ASY–ENG ELETR CONTR COOL TEMP (FR 45)
10. TO INJ ASY–FUL (6) PLACES (FR 35)
11. TO SNS ASY–C/SHT TIM (FR 39)

WIRING ASY–ENGINE CONTROL SENSOR & FUEL CHARGING
FOR −850− ONLY

FRONT OF ENGINE

ALL CONNECTORS MARKED ARE B & A INSTALLED
WIRING ASY–ENGINE CONTROL SENSOR & FUEL CHARGING
FOR –856– ONLY

1. TO SNS ASY–C/SHT TIM (FR 39)
2. TO ALT ASY (FR 64)
3. TO SNS ASY–CRKSHT TIM (FR 47C)
4. TO CAP ASY–RADO IGN INFER (FR 47C)
5. TO IGN COIL ASY (FR 47D)
6. TO VLV ASY–IDL AIR CONTR (FR 45)
7. TO BDY ASY–AIR INTK CHG THROT (FR 52)
8. TO SNS ASY–ENG ELETR CONTR COOL TEMP (FR 45)
9. TO INJ ASY–FUL (6) PLACES (FR 35)

FRONT OF ENGINE

---

ALL CONNECTORS MARKED ARE B & A INSTALLED
WIRING ASY–ENGINE CONTROL SENSOR & FUEL CHARGING

W701539
M5 X 1 NUT
(TORQUE 2–3 Nm)

(CVR ASY–VLV RKR ARM)

−12B637−
WIR ASY–ENG CONTR SNS & FUL CHG

(TUB ASY–WTR BYP)

FRONT OF ENGINE
IGNITION COIL & BOOT ASY

W701663
M5 x 26 SCREW & WASHER
HEX FLANGE PILOT
TORQUE 5–7 Nm
(6) REQ

−12A366−
CIL & BT ASY–IGN
(6) REQ

(CVR ASY–VLV
RKR ARM LH)

FRONT OF ENGINE

NOTE:
FOR CONNECTION TO WIRE
HARNESS SEE FRAMES 47 & 47A

2001 3.0L–4V D186
990619
73C
33
34
INTAKE MANIFOLD ASY (LOWER)

W706155
M6 X 1 X 81 BOLT
HEX FLANGE PILOT
(TORQUE 8–12 Nm)
(8) REQ

NOTE:
SEE FRAME 34A FOR
TORQUE SEQUENCE

FRONT OF ENGINE

MANF ASY–INTK LWR

K1 K2 G3

(HD ASY–CYL LH)

(HD ASY–CYL)

NE01–E11029769–000
2001 3.0L–4V D186
DATE 000225
LAST FRAME 73C
REL V–ENGINE
ILLUSTRATION
\n IL1F1E–030002–E0543F
REV K2 FRAME 34
CONT 34A
SCALE = .55
INTAKE MANIFOLD ASY (LOWER)
(TORQUE SEQUENCE)

FRONT OF ENGINE

1 2 3 4 5 6 7 8

-9J447-
MANF ASY-INTK LWR
INTAKE MANIFOLD ASY (UPPER)

(N6 X 1 X 49.5 BOLT HEX FLNG HD PILOT)
TORQUE 8–12 Nm (8) REQ

NOTE:
SEE FRAME 36A FOR
TORQUE SEQUENCE
IDLE AIR CONTROL VALVE ASY

W500214
M6 X 1 X 23.25 SCREW
HEX FLNG HD PILOT
TORQUE 8−12 Nm
(2) REQ

FRONT OF ENGINE

−9F715−
VLV ASY−IDL
AIR CONTR

(MANF ASY−INTK)
RADIO IGNITION INTERFERENCE CAPACITOR ASY

(CVR ASY-ENG FRT STUD)

W701542
M6 X 1 NUT
HEX FLANGE
FREE RUNNER
TORQUE 8-12 Nm

DELETE
WIRING ASY CONNECTIONS
CAMSHAFT TIMING SENSOR ASY

Front of Engine

(SNS ASY–C/SHT TIM)

-12B637-
WIR ASY–ENG CONTR
SNS & FUL CHG

TO SNS ASY–C/SHT TIM

Scale = 1
FUEL VAPOR RETURN TUBE ASY

(MANF ASY−INTK)

−90271−
TUB ASY−
FU/VPR RTN
NOTE:
FOR ASSEMBLY
AID SEE FR 3

W701539
M5 X 0.8 NUT
TORQUE 5−7 Nm
(2) REQ

(CVR ASY−VLV
RKR ARM STUD)
(2) PLACES

FRONT OF ENGINE
CRANKCASE VENT TUBE ASY

TUB ASY–CRKC VEN
NOTE:
FOR ASSEMBLY AID
SEE FRAME 3

(CAMSHAFT COVER ASY RH)

FRONT OF ENGINE
EXHAUST MANIFOLD STUDS

NOTE:
INSTALL SHORT END OF STUD INTO CYLINDER HEAD ASY

W701732
M8 X 1.25 X 58.1 STUD
TORQUE 10−13 Nm (6) REQ

(HD ASY−CYL)

(HD ASY−CYL LH)
ENGINE LIFTING EYE (REAR)

FRONT OF ENGINE

(HD ASY–CYL LH)

–17A084–
EYE–ENG LFT RR

W701627
M12 X 1.75 X 39.3 BOLT
HEX FLNG HD PILOT
TORQUE 100–125 Nm
RADIO IGNITION INTERFERENCE CAPACITOR ASY

W701539
M5 X 0.8 NUT
TORQUE 5−7 Nm

FRONT OF ENGINE

(CVR ASY−VLV
RKR ARM LH STUD)

−18801−
CAP ASY− RADO
IGN INTFER

E12
WIRING ASY CONNECTIONS
ENGINE ELECTRICAL CONTROL TEMP SENSOR ASY,
IDLE AIR CONTROL VALVE AND COOLANT TEMP INDICATOR SENDER ASY

FRONT OF ENGINE

(VLV ASY−IDL AIR CONTR)

TO VLV ASY−IDL AIR CONTR

(SNS ASY−ENG ELETR CONTR COOL TEMP)

(B & A CONNECTION)

−12B637− WIR ASY−ENG CONTR SNS & FUL CHG

TO SNS ASY−ENG ELETR CONTR COOL TEMP

IDLE AIR CONTROL VALVE AND COOLANT TEMP INDICATOR SENDER ASY
EGR VACUUM REGULATOR CONTROL ASY
FOR -850- ONLY

(MANF ASY-INTK)

B2
−9J459−
CONTR ASY-E/G/R
VAC REG

FRONT OF ENGINE

W500204
M5 X 0.8 X 18.75 SCREW
HEX FLANGE HD PILOT
TORQUE 5–7 Nm
(2) REQ

M3

000612

N11

46
IGNITION WIRE ASY (LH) & FIRING ORDER

FIRING ORDER:
1-4-2-5-3-6

NOTE; INSTALLED ON FRAME 47B

NOTE:
SPARK PLUG BOOT MUST BE FULLY SEATED ON SPARK PLUG TO ASSURE UMBRELLA SEAL TO CAM COVER

NOTE:
ASSURE SPARK PLUG WIRES ARE FULLY ENGAGED ON COIL TOWERS.

IGNITION WIRE ASY (RH)
-12280-
IGNITION WIRE ASY (RH)

IGNITION WIRE ASY (LH)
-12281-
IGNITION WIRE ASY (LH)

CAMSHAFT COVER ASY RH

IGNITION COIL & BRACKET ASY

IGNITION COIL ASY

FRONT OF ENGINE

V-ENGINE ILLUSTRATION

NE01-I10880558-021
2001 3.0L-4V D186
000612
73

IL1F1E-030002-E0543F

REV N12
FRAME 47A

SCALE = .6

47B
IGNITION WIRE ASY (RH)

NOTE:
SPARK PLUG BOOT MUST BE FULLY SEATED ON SPARK PLUG TO ASSURE BOOT UMBRELLA SEAL ON CAMSHAFT COVER ASY

IGNITION WIRE ASY (RH)

1. 2. 3.

IGNITION COIL & BRACKET ASY

(CVR ASY–VLV RKR ARM)

FRONT OF ENGINE
EXHAUST RECIRCULATING VALVE ASY
FOR -850- ONLY

(TUB ASY−E/G/R OLET)

W701625
M8 X 1.25 X 39 BOLT & WASHER HEX FLANGE HD PILOT (PART OF -9D460− ASY)
TORQUE 20−30 Nm
(2) REQ

(−9D476− GSKT−E/G/R VLV PART OF -9D460− ASY)

-9D460− VLV ASY−EXH RECU

FRONT OF ENGINE
INTAKE MANIFOLD OPENING COVER ASY
FOR −856− ONLY

FRONT OF ENGINE

(TUB ASY−E/G/R OLET)

W701625
M8 X 1.25 X 39 BOLT & WASHER HEX FLANGE HD PILOT (PART OF −9D440− ASY)
TORQUE 20−30 Nm (2) REQ

−9D440− CVR ASY−INTK MANF OPG

(−9D476− GSKT−CVR ASY PART OF −9D440− ASY)
EMISSION VACUUM CONTROL MAIN CONNECTOR ASY
FOR –850– ONLY

NOTE:
CRANKCASE VENT TUBE ASY
MUST BE OUTBOARD OF
VACUUM CONNECTOR ASY

NOTE:
FOR ASSEMBLY AID
SEE FRAME 3A

NOTE:
CRANKCASE VENT TUBE ASY
MUST BE OUTBOARD OF
VACUUM CONNECTOR ASY

CONTROL ITEM – THE
ALSO IDENTIFIES
CRITICAL CHARACTERISTICS DESIGNATED BY
THE CROSS FUNCTIONAL TEAMS DEVELOPING
THE PRODUCT. THESE, AND ADDITIONAL
CRITICAL CHARACTERISTICS IDENTIFIED BY
PROCESS REVIEWS, MUST APPEAR ON THE
CONTROL PLANS ACCORDING TO QS 9000.
THESE CONTROL PLANS REQUIRE PRODUCT
ENGINEERING APPROVAL.
INTAKE MANIFOLD PORT PLUG
FOR -856- ONLY

(MANF ASY−INTK)

PLUG

FRONT OF ENGINE
FEAD TENSIONER ASY

FRONT OF ENGINE

(CVR ASY-ENG FRT)

(8mm HEX) HEX FLANGE HD PIA TO TENSIONER (TORQUE 20-30 Nm)

-6B209-TENS-FEAD
WIRING ASY CONNECTIONS
AIR INTAKE CHARGE THROTTLE BODY ASY

TO BDY ASY–AIR INTK CHG THROT

–12B637–
WIR ASY–ENG CONTR SNS & FUL CHG

(BDY ASY–AIR INTK CHG THROT)
OIL PRESSURE SWITCH ASY

-9278- SW ASY - OIL PRESS
TORQUE 12-16 Nm

FRONT OF ENGINE

(BLK ASY - CYL)
A/C COMPRESSOR MOUNTING BRACKET ASY

FRONT OF ENGINE

(HD ASY–CYL LH)

W701524
M8 X 1.25 X 49.3 BOLT
HEX FLANGE HD PILOT
TORQUE 25 Nm
THEN ROTATE 90°

(3) REQ

W701526
M8 X 1.25 X 74.3 BOLT
HEX FLANGE HD PILOT
TORQUE 25 Nm
THEN ROTATE 90°
(3) REQ

(BLK ASY–CYL)

-19N586
BRKT ASY–A/C
COMP MTG

2001 3.0L–4V D186
990622
73C
55
CYLINDER BLOCK ASY PIPE PLUGS

FRONT OF ENGINE

W701548
[3/4-14] PIPE PLUG
TORQUE 60−75 Nm
OR 10 Nm THEN ROTATE
CLOCKWISE 720°

W701548
[3/4-14] PIPE PLUG
TORQUE 60−75 Nm
OR 10 Nm THEN ROTATE
CLOCKWISE 720°
ENGINE LIFTING EYE (FRONT)

-17A084- EYE-ENG LFT FRT

W701627
M12 X 1.75 X 39.3 BOLT
HEX FLANGE HD PILOT
TORQUE 100-125 Nm

FRONT OF ENGINE
NOTE:
TORQUE ALL BOLTS SIMULTANEOUSLY OR FOR
SINGLE WRENCH TORQUE IN SEQUENCE AS SHOWN.
EXHAUST MANIFOLD (LH)

-9431- MANF ASY-EXH LH

W701706 M8 X 1.25 NUT HEX FLANGE HD TORQUE 18-22 Nm (6) REQ

−9448− GSKT−EXH MANF

SINGLE WRENCH METHOD
TORQUE SEQUENCE 1-6
PERFORM TORQUE SEQUENCE TWICE

FONT OF ENGINE

VIEW A

REL NE01-I10880558-021 2001 3.0L-4V D186 DATE 000612 Last FRAME 73C
V-ENGINE ILLUSTRATION NO. IL1F1E-030002-E0543F REV N4 FRAME 58 CONTG 59
SCALE = .55
EXHAUST MANIFOLD (RH) & CONVERTER ASY
FOR −856− ONLY

SINGLE WRENCH METHOD
TORQUE SEQUENCE 1−6
PERFORM TORQUE SEQUENCE TWICE

-9448− GSKT−EXH MANF
TORQUE 40−45 Nm

-(9G458− PLG ASY−EXH MANF
PART OF −5G236−)
TORQUE 50−60 Nm

(N807040
CAP
M22 X 1.5 HEX
PART OF −5G236−)
TORQUE 40−45 Nm

W701706
M8 X 1.25 NUT
HEX FLANGE HD
TORQUE 18−22 Nm
(6) REQ

-5G236− MANF & CONV
ASY−EXH RH

-5G236− MANF & CONV
ASY−EXH RH

(6) REQ

FRONT OF ENGINE

FRONT OF ENGINE

VIEW A

A2

E8

1

4

2

3

6

990629

73C

60

.7
EXHAUST RECIRCULATING VALVE TO EXHAUST MANIFOLD TUBE ASY FOR -850- ONLY

W701542
M6 X 1 NUT
HEX FLANGE HD
TORQUE 10 Nm AND
ROTATE AN ADDITIONAL 90°
(2) REQ

FINAL TORQUE PROCEDURE

PRODUCTION METHOD (MULTI-SPINDLE)
TORQUE TO 10 Nm AND ROTATE AND ADDITIONAL 90°

SINGLE WRENCH METHOD (SERVICE-REPAIR)
SNUG LOWER NUT TO 5 Nm
RUN NUT TO 10 Nm AND ROTATE AND ADDITIONAL 90°

FRONT OF ENGINE
EGR TRANSDUCER ASY
FOR −850− ONLY

-EGR TUBE ASY-

FRONT OF ENGINE
WIRING ASY CONNECTIONS
EGR TRANSDUCER ASY
FOR -850- ONLY

TO TRNSDCR ASY-E/G/R

(E8)

(TRANSDR ASY-E/G/R)

-12B637-
WIR ASY-ENG CONTR
SNS & FUL CHG

N11

FRONT OF ENGINE
CRANKCASE EMISSION VALVE TO INTAKE MANIFOLD HOSE

NOTE:
FOR ASSEMBLY AID
SEE FRAME 3

(MANF ASY−INTK)

(HOS−CRKC EMS VLV TO INTK MANF)
ALTERNATOR ASY & WIRING BRACKET

-128637- WIR ASY-ENG CONTR SNS & FUL CHG

(HD ASY-CYL)

(WIR ASY-ENG CONTR SNS & FUL CHG)

(BLK ASY-CYL)

(CVR ASY-ENG FRT)

M8 X 1.25 X 23 − M8 X 1.25 X 65 STUD HEX SHLDR HD PILOT (TORQUE 20−30 Nm)

M8 X 1.25 X 23 − M8 X 1.25 X 135 STUD HEX SHLDR PILOT (TORQUE 20−30 Nm)

W705707 M8 X 1.25 X 23 − M8 X 1.25 X 135 STUD HEX SHLDR PILOT (TORQUE 20−30 Nm)

W701581 M8 X 1.25 X 23 − M8 X 1.25 X 65 STUD HEX SHLDR HD PILOT (TORQUE 20−30 Nm)

TO CMS SENSOR (B & A RESP)

TO ALT ASY

TO ALT ASY

FOR −850− ONLY

FRONT OF ENGINE

FRONT OF ENGINE

(A)

E8

J12

NE01−I10880558−022

2001 3.0L-4V D186

000823

73C

V-ENGINE ILLUSTRATION

V11F1−030002−E0543F

P2

64

65

SCALE = .7
A/C COMPRESSOR BRACE

IL1E030002−E0543F

2001 3.0L−4V D186

M8 X 1 X 26.3 BOLT HEX FLANGE HD TORQUE 20−30 Nm (3) REQ

(BRKT ASY−A/C COMP MTG)

FRONT OF ENGINE

N14

W701759
POWER STEERING PUMP & PULLEY ASY

(CVR ASY–ENG FRT)

FRONT OF ENGINE

(PLY ASY–PWR STG
NOTE:
PART OF −3A696− ASY SHOWN EXPLODED FOR INSTALLATION CLARITY

W5000319−S309
M8 X 1.25 X 80 BOLT HEX FLANGE PILOT 10 TORQUE 20–30 Nm (3) REQ

−3A696− PMP & PLY ASY− PWR STG

PULLEY ALIGNMENT FOR FASTENERS LOCATIONS
VIEW A

W5000319−S309
M8 X 1.25 X 80 BOLT HEX FLANGE PILOT 10 TORQUE 20–30 Nm (3) REQ

−3A696− PMP & PLY ASY− PWR STG

PULLEY ALIGNMENT FOR FASTENERS LOCATIONS
VIEW A

FRONT OF ENGINE

(PLY ASY–PWR STG
NOTE:
PART OF −3A696− ASY SHOWN EXPLODED FOR INSTALLATION CLARITY

W5000319−S309
M8 X 1.25 X 80 BOLT HEX FLANGE PILOT 10 TORQUE 20–30 Nm (3) REQ

−3A696− PMP & PLY ASY− PWR STG
ASSEMBLY PROCEDURE

1. ROTATE CRANKSHAFT PULLEY ASY (−6312−) COUNTER CLOCKWISE.
2. TORQUE 95–105 Nm.

NOTE: CRANKSHAFT PULLEY HAS LEFT-HAND THREADS
NOTE:
PULL DOWN ON BELT BETWEEN C/S AND A/C TO RELEASE THE SPRING CLIP. BELT WILL BE NOMINAL POSITION.
ACCESSORY DRIVE PULLEY

NOTE:
MAX PRESS 15 KN

(C/SHT ASY–INTK LH)

FRONT OF ENGINE

E25

IL1F1E–030002–E0543F
WATER PUMP DRIVE BELT

FRONT OF ENGINE

(PLY-ACC DRV)

-8K543-
BEL-WTR PMP DRV

(N15)

(PMP ASY-WTR)

(VIEW A)

ACC

TENS

W/P

(BEL-WTR PMP DRV)
WATER PUMP PULLEY SHIELD

W701539
M5 X 0.8 NUT
TORQUE 5–7 Nm
(2) REQ

-8A590--
SHLD--WTR PMP PLY

FRONT OF ENGINE

D2

8A590--
WATER PUMP PULLEY SHIELD

(2) REQ

(2) PLACES

(STUD--VLV RKR ARM
CVR ASY LH)

990305

73C

IL1F1E--030002--E0543F

D2

72

SCALE = 1
FLYWHEEL HOLE LOCATION FOR SHIPPING

NOTE:
FLYWHEEL HOLE TO BE LOCATED AT BDC ± 12°
THIS ALLOWS THE HOLE AT BDC ± ONE INCH.

POSITION ONE OF THE FOUR HOLES AT BOTTOM DEAD CENTER
ENGINE ASY – RIGHT REAR VIEW (VEHICLE)
FOR –856– ONLY

FRONT OF ENGINE
2001 3.0L-4V D186

[Diagram of engine components]

- NE01-110880558-022
- MODEL: 2001 3.0L-4V D186
- MFG:
- ILLUSTRATION: IL1F1E-030002-E0543F
- PLT: P1
- ASY FRM: 74
- EFF FRM: 74A