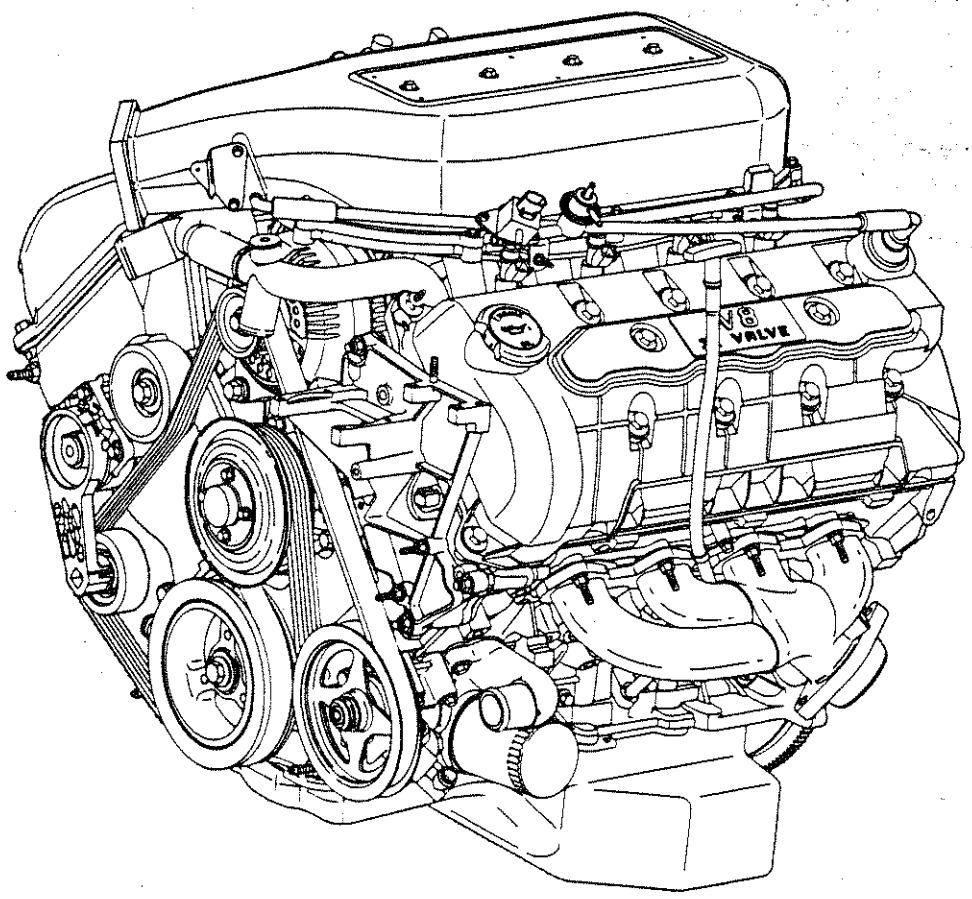
–543– ENGINE ASY CHART

2000

Ford

V–ENGINES MANUFACTURIN & ENGINEERING



ILYR3E–030002–E0543

EMDO 5.4L–4V COBRA "R"

V–ENGINE ILLUSTRATION

ORIGINATOR	CHECKER	ENGR APP	MATL / FSTN
RELEASED FOR NE01-E10956645-000		000918	CAD: Y
DROWAN	FDUDEK3	LWOLOHON	MRILEY2
			DDAY3

ORIGINATOR	CHECKER	ENGR APP	MATL / FSTN

Ford Motor Company

V-ENGINE ILLUSTRATION (-543-)

REFERENCE LARRY WOLOHON
(313) 32-30483

(37)

PART MUST COMPLY WITH MATERIAL SPECIFICATION WSS-M99P9999-A1
TO HELP SAFEGUARD HEALTH, SAFETY AND THE ENVIRONMENT.

DRAFTED IN ACCORDANCE WITH FORD ENGINEERING CAD AND DRAFTING STANDARDS CURRENT AT INITIAL RELEASE

3RD ANGLE PROJ
DIMENSIONS IN MILLIMETERS

CAD TYPE	CAD LOC	CAD FILE	DATA
X-ATROL	EDM	ilyr3e-030002-e0543u-01.dg	IS MASTER

OPER. NO	UNIT	DRAWING
——	N460	▽ILYR3E-030002-E0543U

ILLUSTRATOR	TITLE	FRM
DROWAN	ENGINE ASSEMBLY PROCEDURE AND INSTRUCTION 2000 5.4L-4V COBRA "R"	1 of 41
CHECKED FDUDEK3		RH/LH

SCALE	DATE	DIVISION	PLANT
——	000918	V - ENGINE ENGINEERING	EMDO

Ford

INDEX

ITEM **FRAME**

GENERAL SPECIFICATIONS

INSTALLATION:

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GENERAL SPECIFICATIONS

TORQUE VALUES FOR PARTS AS SUPPLIED

NOTE: REFER TO WERS TO VERIFY **VALUES**

NOTE:
PRIOR TO SERVICE RE-INSTALLATION OR REPLACEMENT OF FASTENERS, ALL THREADS AND CONTACT SURFACES MUST BE LUBRICATED WITH **WSE-M2C908-A** OR **WSS-M2C916-A** OIL.

THREAD SIZE	TORQUE
M6 X 1	8 - 12 Nm
M8 X 1.25	20 - 30 Nm
M10 X 1.5	40 - 55 Nm
M12 X 1.75	70 - 95 Nm
M14 X 2	110 - 155 Nm
1/8 - 27 PIPE	7 - 11 Nm
1/4 - 18 PIPE	11 - 16 Nm
3/8 - 18 PIPE	16 - 24 Nm

NOTE:
PIPE PLUG TORQUES IN ALUMINUM, MUST BE CHECKED WHEN ENGINE IS WARM.

DIMENSIONING

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.

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

SIGNIFICANT CHARACTERISTIC ITEM

THE SIGNIFICANT CHARACTERISTICS DENOTED **SC-1** TO **SC-NN** AND OTHER SIGNIFICANT PROCESS CHARACTERISTICS MUST BE ADDRESSED ON THE CONTROL PLAN - QUALITY ACTIONS MUST BE ADHERED TO IN ACCORDANCE WITH **QS-9000** FOR EACH MANUFACTURING LOCATION.

GENERAL SPECIFICATIONS (Continued)
MATERIAL & LUBRICANT SPECIFICATIONS

SEALING AND LUBRICATING INDEX

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

SEALER/ADHESIVE	DESCRIPTION	FRAMES
WSE-M4G323-A6	SILICONE RUBBER, OXIMER CURED, VERY HIGH VISCOSITY	9,15,15A,21
(1) WSK-M2G349-A10	ADHESIVE, ANAEROBIC RETAINING	3A,14
(1) WSK-M2G350-A2	ANAEROBIC SEALING ADHESIVE	4G,4H,8B,12B
LUBRICANT		
WSD-M1C226-A	PETROLATUM	4E
ESE-M99B144-A **	SURFACTANT (MERPOL)	3A,3B
ESE-M99B176-A	CLEAR DIMETHYL SILOXANE	19
OIL		
WSE-M2C908-A	API SG, SAE 50 ASSEMBLY FLUID	3,3A,4D,7,7D,11,12,12A,13F 13H,17,22,26C
WSS-M2C916-A	GF-2, SAE 15W-50 INITIAL FILL	3,3A,3B,9A
DYE		
ESE-M99C103-B1	FLUORESCENT	3B
CLEANER		
WSE-M5B392-A	D-LIMONENE	9A,9B
FUEL		
ESE-M4C96-A	GASOLINE	3D
WSE-M4C112-A	GASOLINE	3D

(1) **NOTE:**
WSK-M2G351-A7 IS AN OPTIONAL SEALANT FOR CYLINDER HEAD OR ENGINE ASSEMBLY. USAGE ALLOWED **ONLY** WHEN PRIMARY SEALANT IS NOT AVAILABLE. PLANT **MUST** KEEP RECORD OF USAGE.

** **NOTE:**
ESE-M99B144-A SURFACTANT, LUBRICANT
-A CONCENTRATED
-B DILUTED: **1.3 FLUID OZ** OF **ESE-M99B144-A** TO **1 GALLON** OF TAP WATER.

USE OF CONCENTRATED SURFACTANT WILL REQUIRE "▽" TRACKING.

USE OF DILUTED SURFACTANT WILL REQUIRE "SC" TRACKING.

OIL CLEANLINESS

ASSEMBLY OIL **(WSE-M2C908-A)** BEING APPLIED TO ENGINE COMPONENTS AND INITIAL FILL OIL **(WSS-M2C916-A)** AT DELIVERY POINT TO ENGINE MUST BE FILTERED THROUGH, AS A MAXIMUM, A **25 MICRON** NOMINAL FILTER.

APPLY SPECIFIED SEALER TO THE FOLLOWING:

WSK-M2G349-A10 — JOINT - ALL CUP PLUGS TO CYLINDER HEAD OR CYLINDER BLOCK.

COOLANT LINE INSTRUCTIONS 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.

ENGAGEMENT SPECIFICATIONS FOR ALL VACUUM SYSTEM CONNECTIONS

▽ **HOSE/VACUUM CONNECTIONS:**
ALL HOSE, VACUUM TUBING CONNECTIONS, CONNECTOR BLOCKS AND CAPS MUST BE BOTTOMED OR WITHIN **2.5 (.10 INCH)** MAXIMUM OF BEING BOTTOMED ON COMPONENT CONNECTION.

▽ **ASSEMBLY AID:**
ESE-M99B144-A (SURFACTANT) OR WATER MAY BE USED TO FACILITATE ASSEMBLY OF ALL CONNECTOR ASSEMBLY COMPONENTS. SURFACTANT CONCENTRATION "MUST" BE **0.5%** MAX (**200** PARTS WATER TO **1** PART SURFACTANT).

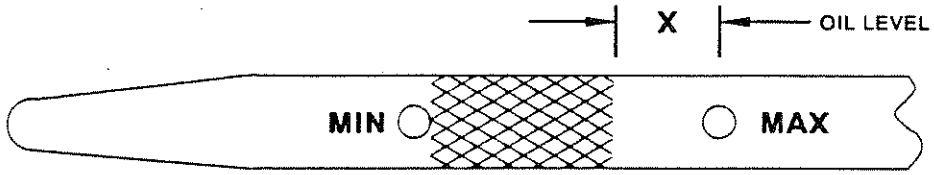
OIL FILL INSTRUCTIONS

PRIOR TO HOT TEST, FILL ENGINE WITH "Z" LITERS/QUARTS OF **WSS-M2C916-A (SAE 15W-50)** OIL.

- BALANCE TO BE ADDED THRU ROCKER ARM COVER OIL FILL TUBE.
- ADD **7.5 TO 15mL** OF FLUORESCENT DYE, **ESE-M99C103-B1**, TO ENGINE OIL.

AFTER HOT TEST, WITHIN 5-10 MINUTES AND WITH FRONT OF ENGINE ELEVATED TO ACHIEVE A **(3°- 5°)** CRANKSHAFT CENTERLINE ANGLE TO HORIZONTAL, OIL LEVEL ON INDICATOR MUST READ WITHIN "X" ZONE.

OPTION: WITH CRANKSHAFT CENTERLINE AND LATERAL PAN RAILS BOTH WITHIN ± 1° OF HORIZONTAL, OIL LEVEL MUST READ WITHIN "X" ZONE OF SPECIAL CALIBRATION INDICATOR.



(INSTALLATION ANGLE)	"X" DIM mm	"X" DIM IN.	"Z" LITERS	"Z" QUARTS (U.S.)
LATERAL 0°	0 TO 13.0	0 TO 0.51	(8.99-9.18)	(9.5-9.7)
LONGITUDINAL 4.5°				

GENERAL SPECIFICATIONS (Continued)
ENGINE AIR TEST REQUIREMENTS

▽ - FUEL RAIL TO INJECTORS:

APPLY **410-430 PSI (283-297 kPa)** AIR PRESSURE TO FUEL SUPPLY MANIFOLD INLET CONNECTION.

VENT INTAKE MANIFOLD PRESSURE TO ATMOSPHERE.

REQUIREMENT - FUEL SEAL INTEGRITY:
FUEL SUPPLY MANIFOLD ASSEMBLY LEAKAGE ATTRIBUTABLE TO INJECTOR INLET SEALS CANNOT EXCEED:
(SEE ES-XL3E-6007-AA)

FRONT AND REAR OIL GALLERY CUP PLUGS:

APPLY **140-160 PSI (97-110 kPa)** AIR PRESSURE TO OIL GALLERY

REQUIREMENT - FRONT AND REAR OIL GALLERY CUP PLUGS:
CUP PLUG AIR LEAKAGE ATTRIBUTABLE TO BLOCK CUP PLUG CANNOT EXCEED MAXIMUM PERMISSIBLE VALUE OF **20cc/MIN**.

REAR SEAL:

APPLY **25-35 PSI (17-24 kPa)** AIR PRESSURE TO REAR SEAL

REQUIREMENT - REAR SEAL ASSEMBLY:
REAR SEAL ASSEMBLY AIR LEAKAGE ATTRIBUTABLE TO REAR SEAL TO BLOCK AND CRANKSHAFT FLANGE O.D. TO REAR SEAL. CANNOT EXCEED THE MAXIMUM PERMISSIBLE VALUE OF **10cc/MIN**.

▽ - ENGINE SEALING SYSTEM - OIL:

APPLY **45-55 PSI (31-38 kPa)** AIR PRESSURE AT ENGINE:

1. PCV VALVE GROMMET
2. DIPSTICK TUBE
3. EXHAUST MANIFOLD (LH & RH)

REQUIREMENT - ENGINE SEALING SYSTEM FOR OIL:
ENGINE SEALING SYSTEM ASSEMBLY AIR LEAKAGE ATTRIBUTABLE TO GASKETS, SEALS, SEALANTS AND COMPONENTS CANNOT EXCEED:
(SEE ES-XL3E-6007-AA)

SC-1 - ENGINE SEALING SYSTEM - COOLANT:

APPLY **190-210 PSI (131-145 kPa)** AIR PRESSURE AT:

1. WATER INLET
2. WATER OUTLET
3. HEATER RETURN TUBE

REQUIREMENT - ENGINE SEALING SYSTEM FOR COOLANT:
ENGINE SEALING SYSTEM ASSEMBLY AIR LEAKAGE ATTRIBUTABLE TO GASKETS, SEALS, SEALANTS AND COMPONENTS CANNOT EXCEED:
(SEE ES-XL3E-6007-AA)

NOTE:
AIR MUST BE CLEAN. MAXIMUM PARTICLE SIZE IS **50** MICRONS. AIR MUST BE DRY **20%** MAXIMUM HUMIDITY.

▽ 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.

BALANCING INSTRUCTIONS

REFER TO **ES-XL3E-6007-AA** FOR ENGINE MASS BALANCE REQUIREMENTS. AUDIT REQUIREMENT ONLY

PRODUCTION HOT TEST

PRODUCTION HOT TEST IS TO BE PERFORMED IN ACCORDANCE WITH SPECIFICATION - ENGINE ASSEMBLY PRODUCTION HOT TESTING **ES-XL3E-6007-AA**. USE **WSE-M4C112-A** FUEL.

NOTE: DRAIN COOLANT AFTER TEST.

NOTES BEFORE STARTING ENGINE

BEFORE STARTING AN ENGINE, CHECK TO SEE THAT VACUUM HOLES ARE PLUGED OR CONNECTED AS REQUIRED.

NOTE: DRAIN COOLANT AFTER PRODUCTION HOT TEST & INSTALL RELEASED DRAIN PLUGS IN BLK ASY-CYL (-6010-).

PERFORMANCE AND OIL ECONOMY TEST (DYNAMOMETER TEST)

PERFORMANCE AND OIL ECONOMY TEST MUST BE PERFORMED IN ACCORDANCE WITH SPECIFICATION - ENGINE ASSEMBLY - AS PURCHASED **ES-XL3E-6007-AA**. USE **ESE-M4C96-A** FUEL **(WSE-M4C112-A OPTIONAL)**.

TORQUE/TURN

SHORT BLOCK (WITHOUT PISTONS)

PEAK BREAKAWAY	6 Nm
AVERAGE RUNNING	5 Nm

SHORT BLOCK (WITH PISTONS)

PEAK BREAKAWAY	30 Nm
AVERAGE RUNNING	25 Nm

CAM DRIVE SYSTEM

PEAK BREAKAWAY	31 Nm
AVERAGE RUNNING	25Nm

COMPRESSION PRESSURE

CYLINDER PRESSURE	500 KPa

COMPLETE ENGINE

CYL-TO-CYL PEAK TO PEAK BALANCE	60% (COMPRESSION PRESSURE)
AVERAGE RUNNING TORQUE	80 Nm

SHIPPING PLUGS AND DUNNAGE CAPS

ALL INTERNAL ENGINE CAVITIES TO BE PLUGGED FOR ENGINE SHIPMENT TO B & A, SPECIFICALLY AS FOLLOWS:

ITEMS TO BE CAPPED	PIA
CRANKCASE VENT TUBE (-6758-)	YES
FUEL RAIL INLET (-9F792-)	YES
THROTTLE BODY ASY (-9E926-)	YES
WATER BYPASS TUBE (-8548-)	NO
HEATER OUTLET TUBE (-18663-)	NO
AIR BYPASS VALVE ASY (-9F715-)	NO
WATER INLET PORTION OF OIL FILTER ADAPTER (-6881-)	NO

SELECT-FIT MAIN BEARING GRADE CHART

SELECT-FIT MAIN BEARING PROCEDURE

1. READ FIRST CHARACTER/LETTER "A" TO "X" (LEFT TO RIGHT) ON CYLINDER BLOCK FACE (SHOWN ON FRAME 4A) AND NOTE IT, THEN READ FIRST CHARACTER ON #7 CRANKSHAFT COUNTERWEIGHT (LEFT TO RIGHT FROM FRONT OF BLOCK) AND NOTE IT.
2. GO TO MAIN BEARING SELECT-FIT CHART (BELOW) AND USING NOTED CHARACTERS TAKEN FROM BLOCK AND CRANKSHAFT, READ ACROSS AND DOWN APPROPRIATE ROW OR COLUMN TO OBTAIN CORRECT BEARING SIZE FOR #1 MAIN JOURNAL.
3. REPEAT STEPS 1 & 2, TO OBTAIN CORRECT BEARING SIZE FOR REMAINING JOURNALS, i.e.: 2nd CHARACTER (LEFT TO RIGHT) ON BLOCK AND CRANKSHAFT FOR #2 JOURNAL, THEN 3rd, 4th, AND 5th RESPECTIVELY).

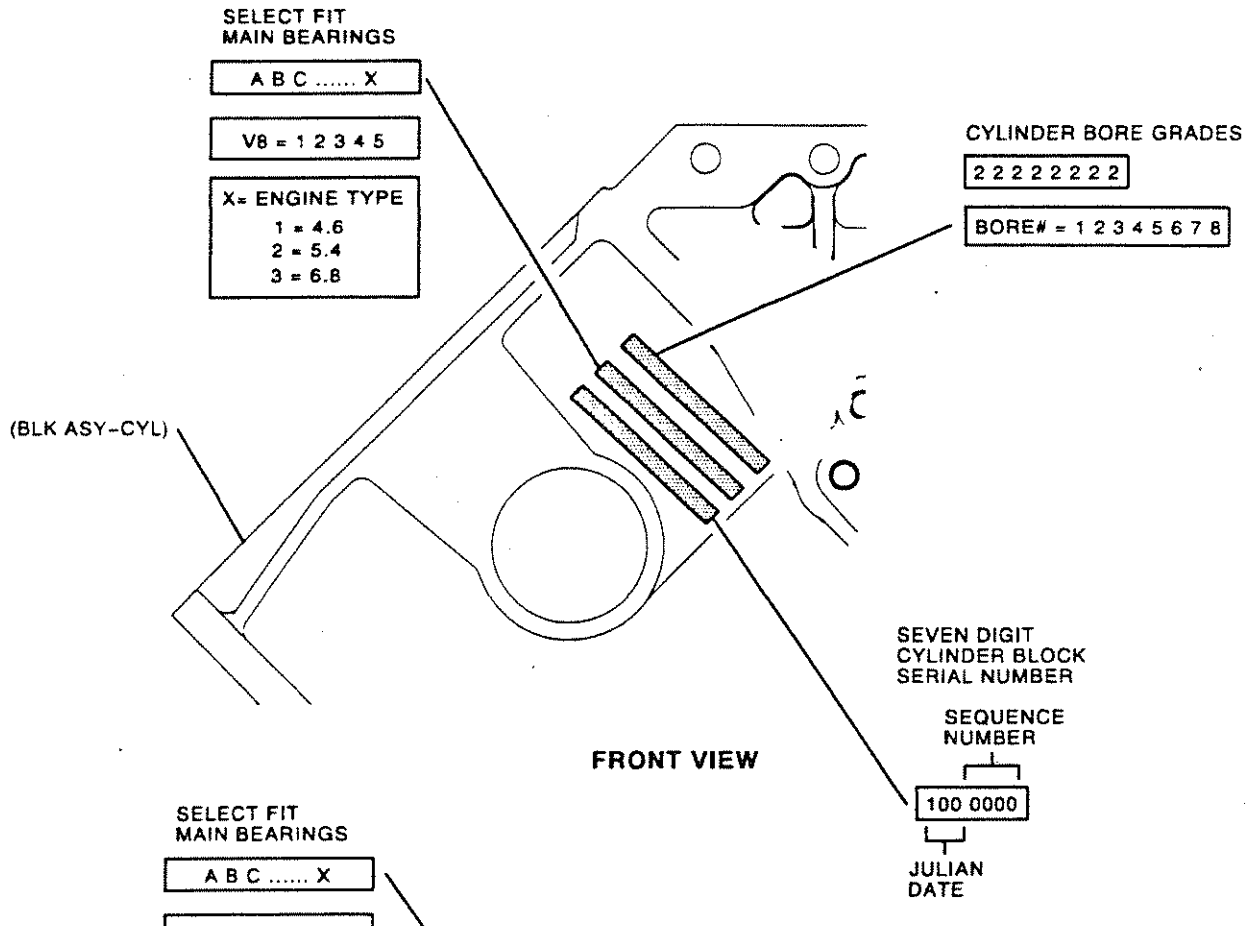
MINIMUM BLOCK DIA

MAXIMUM CRANKSHAFT DIA

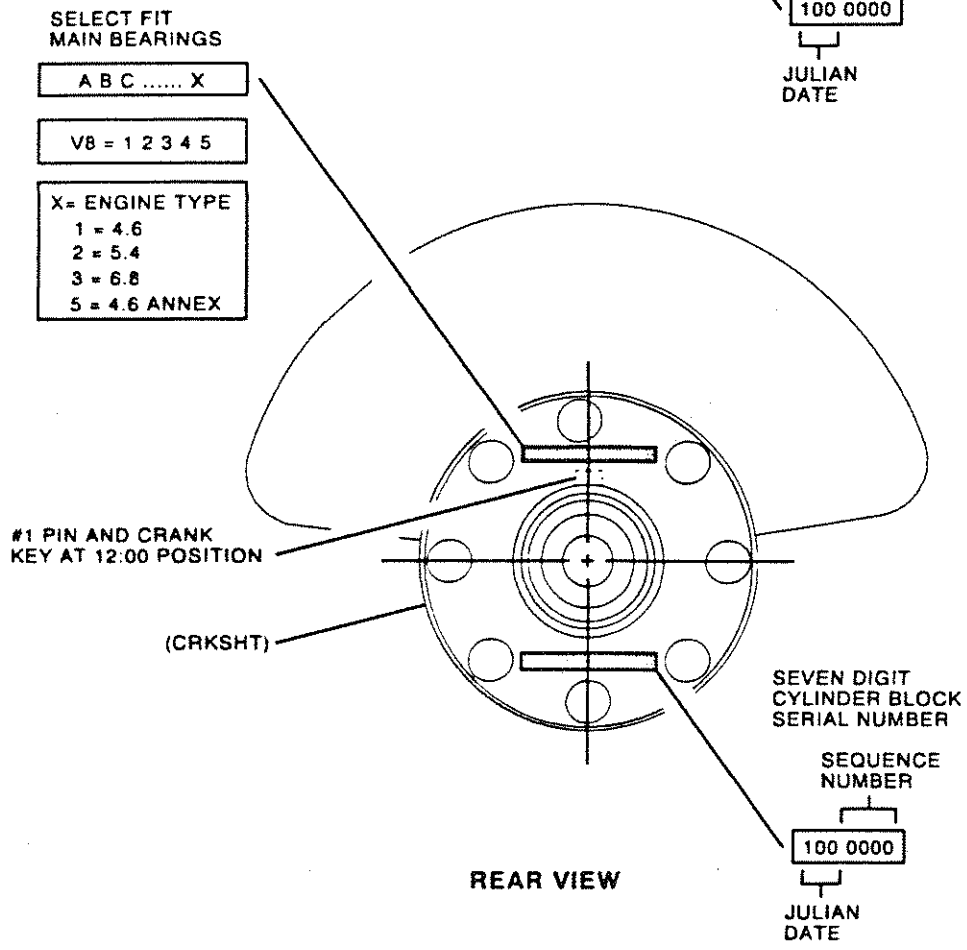
	72.400	A .401	B .402	C .403	D .404	E .405	F .406	G .407	H .408	I .409	J .410	K .411	L .412	M .413	N .414	O .415	P .416	Q .417	R .418	S .419	T .420	U .421	V .422	W .423	X .424
X	67.504	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2
W	67.503	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2
V	67.502	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2
U	67.501	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2
T	67.500	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2
S	67.499	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2
R	67.498	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2
Q	67.497	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	3
P	67.496	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3
O	67.495	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3
N	67.494	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3
M	67.493	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3
L	67.492	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3
K	67.491	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3
J	67.490	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3
I	67.489	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3
H	67.488	1	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3
G	67.487	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3
F	67.486	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3
E	67.485	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3
D	67.484	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
C	67.483	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
B	67.482	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
A	67.481	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

NOTE:
BEARING GRADE IS INK STAMPED ON INSIDE OF BEARING

SELECT-FIT MAIN BEARING GRADE LOCATION

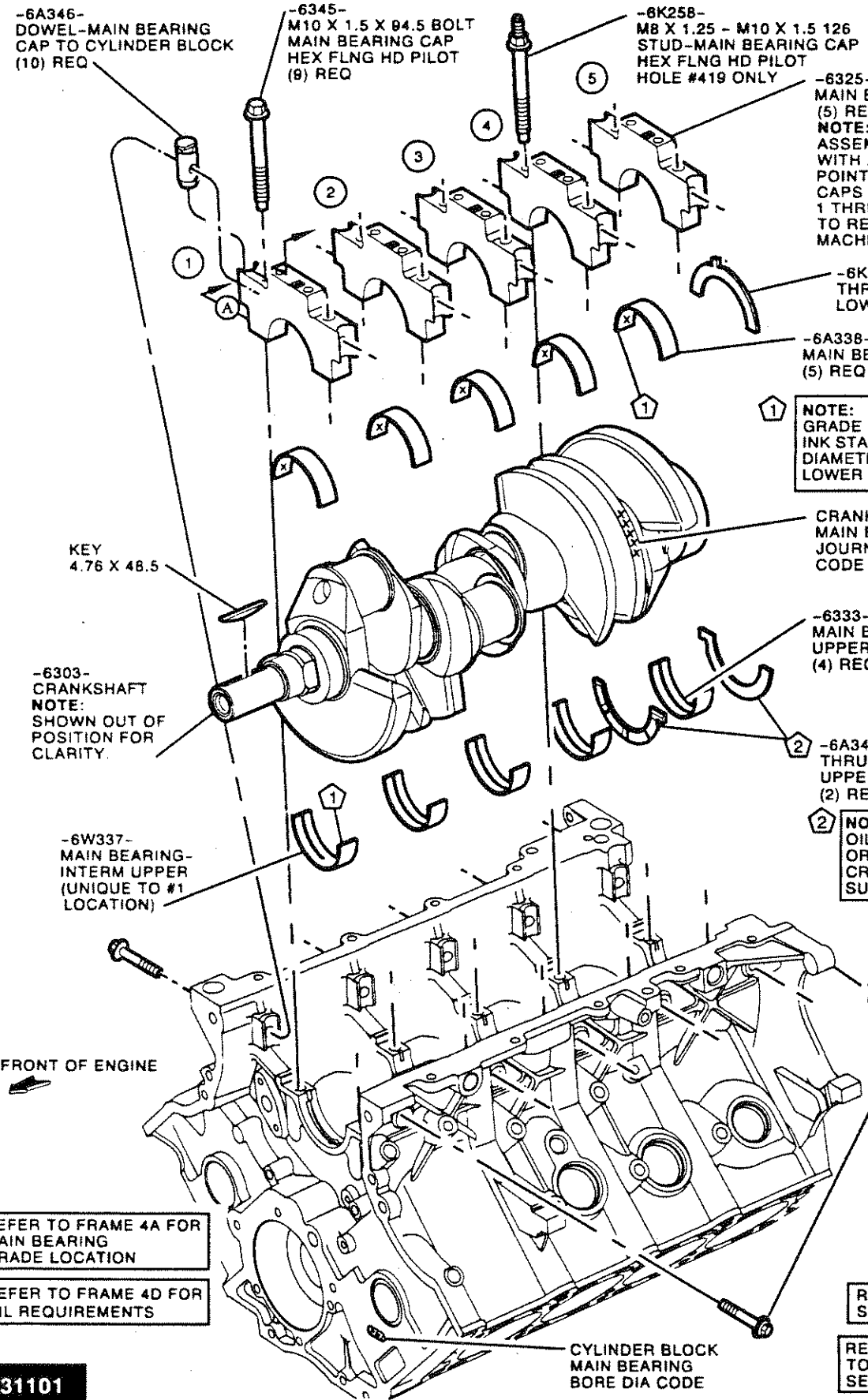


FRONT VIEW



REAR VIEW

CRANKSHAFT, MAIN BEARINGS & CAPS (FRONT VIEW)



REFER TO FRAME 4A FOR MAIN BEARING GRADE LOCATION

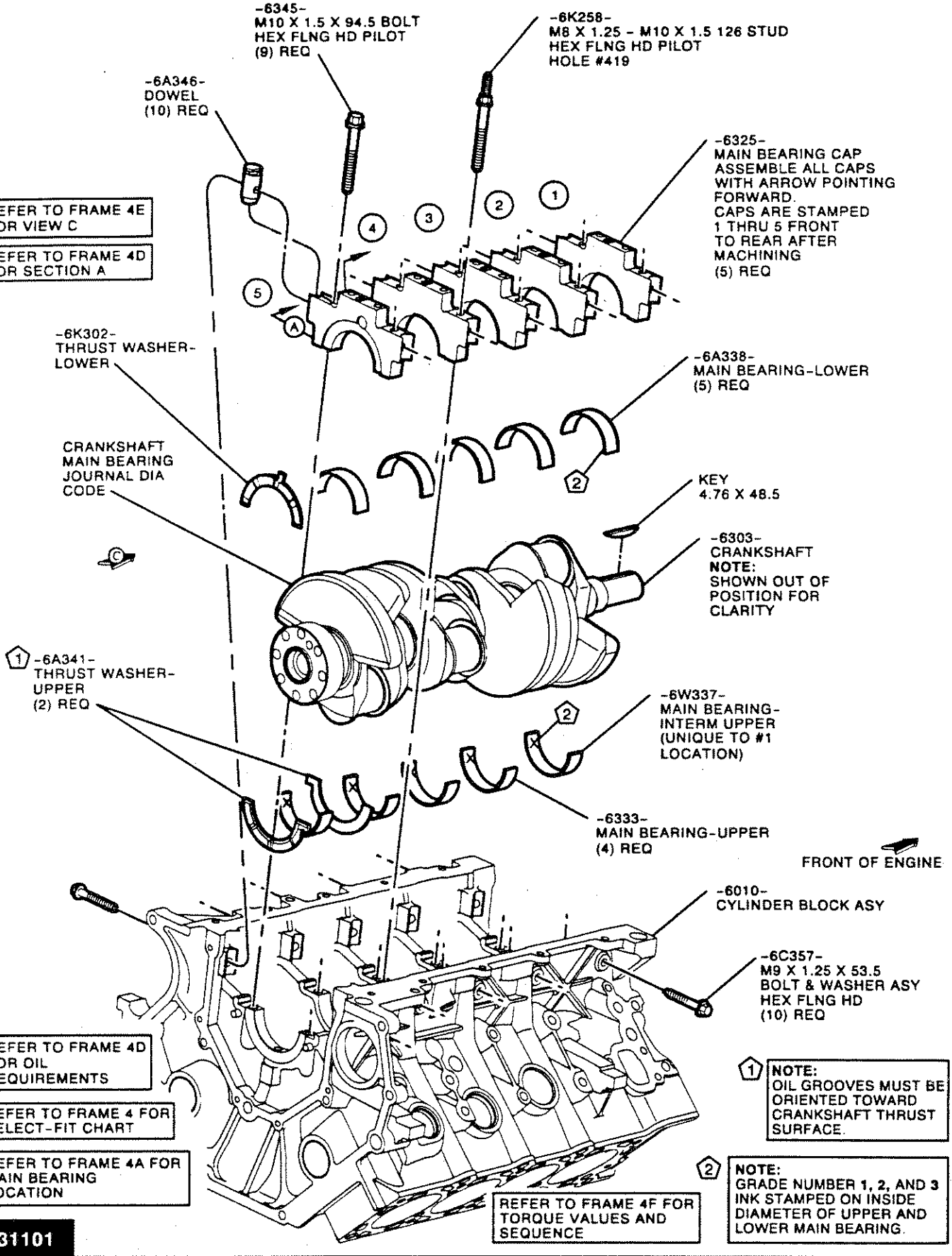
REFER TO FRAME 4D FOR OIL REQUIREMENTS

REFER TO FRAME 4D FOR SECTION A

REFER TO FRAME 4 FOR SELECT-FIT CHART

REFER TO FRAME 4F FOR TORQUE VALUES AND SEQUENCE

CRANKSHAFT, MAIN BEARINGS & CAPS (REAR VIEW)



031101

REL	MODEL	DATE	LAST FRAME
NE01-E10956645-000	2000 5.4L-4V COBRA "R"	000828	41

Ford Motor Company V-ENGINE ILLUSTRATION	NO.	REV	FRAME	CONTD
	▽ ILYR3E-030002-E0543U	---	4C	4D

ASSEMBLY PROCEDURE

1. VERIFY ALL SADDLES IN CYLINDER BLOCK AND MAIN BEARING CAPS ARE CLEAN AND FREE OF CHIPS, DIRT, PAINT AND FOREIGN MATERIAL.

2. INSTALL MAIN BEARINGS IN CYLINDER BLOCK SADDLE AND MAIN BEARING CAPS (MAX. EXTENSION OF BEARINGS ABOVE BLOCK/CAP PARTING LINE MUST NOT EXCEED **2mm**). VISUALLY CHECK SEATING AND SQUARENESS, INSURING ALL OILING HOLES ALIGN WITH CYLINDER BLOCK OIL FEED HOLES AND BEARING LOCATION TANGS ARE ALIGNED IN SLOTS. (REFER TO VIEW B BELOW.)

   NOTE:
   REFER TO "SELECT-FIT MAIN BEARING GRADE CHART" (FRAME 4) TO SELECT APPROPRIATE GRADE MAIN BEARING.

3. APPLY **WSE-M2C908-A** OIL TO ALL UPPER BEARING AND CRANKSHAFT JOURNALS.

4. APPLY **WSE-M2C908-A** OIL TO REAR THRUST FACE OF CRANKSHAFT.

5. INSTALL CRANKSHAFT IN CYLINDER BLOCK WITH CARE NOT TO DAMAGE BEARING SURFACES IN CYLINDER BLOCK.

6. PUSH CRANKSHAFT REARWARD AND INSTALL CRANKSHAFT MAIN CENTER BEARING THRUST WASHER (-6A341-) TO REAR OF #5 BULKHEAD. THEN PUSH CRANKSHAFT FORWARD AND INSTALL FRONT THRUST WASHER TO FRONT OF #5 BULKHEAD. (**NOTE:** ASSEMBLE GROOVED SIDE TOWARD CRANKSHAFT THRUST SURFACE.)

7. SEAT CAPS IN CYLINDER BLOCK MAIN BEARING SADDLES. INSURE ALL CAPS ARE SEATED SQUARELY IN SADDLES. **WSE-M2C908-A** OIL MAY BE APPLIED TO MAIN BEARING CAP BOLT FLANGE.

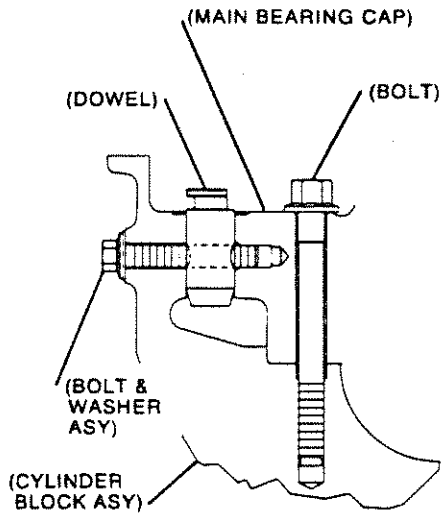
8. INSERT (8) M10 BOLTS, (1) M8 X M10 STUD, AND (10) M9 SIDE BOLTS AS SHOWN, THEN RUNDOWN TWO REVOLUTIONS. DO NOT ROTATE CRANKSHAFT UNTIL ALL MAIN BEARING CAP BOLTS ARE TORQUED TO SPECIFICATIONS (REFER TO FRAME 4F). DO NOT LUBRICATE THREADS.

8A. **BOLTS REJECTED FOR HIGH TORQUE MUST BE REPLACED.**

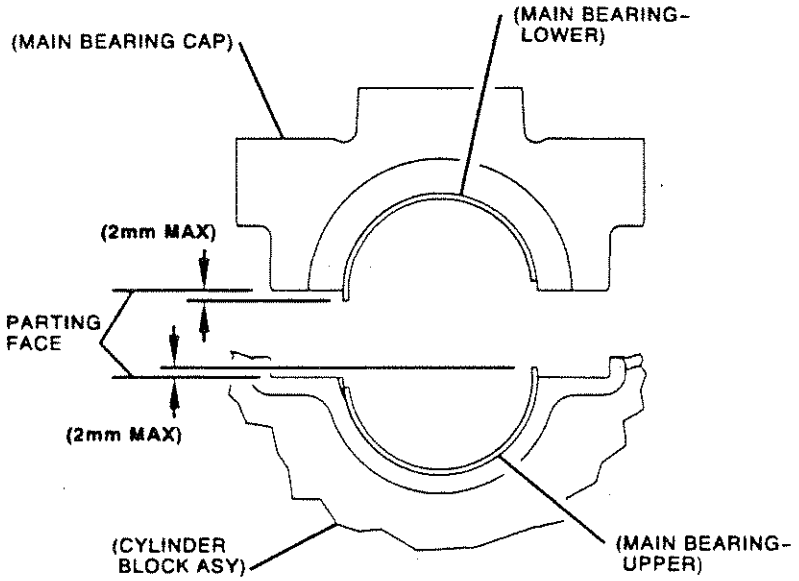
9. CHECK CRANKSHAFT END PLAY (REFER TO FRAME 4F).

10. CHECK CRANKSHAFT TORQUE TO TURN, (REFER TO FRAME 4G).

NOTE:
MAIN BEARING TO CRANKSHAFT JOURNAL ASSEMBLED CLEARANCE – **(0.025-0.044).**

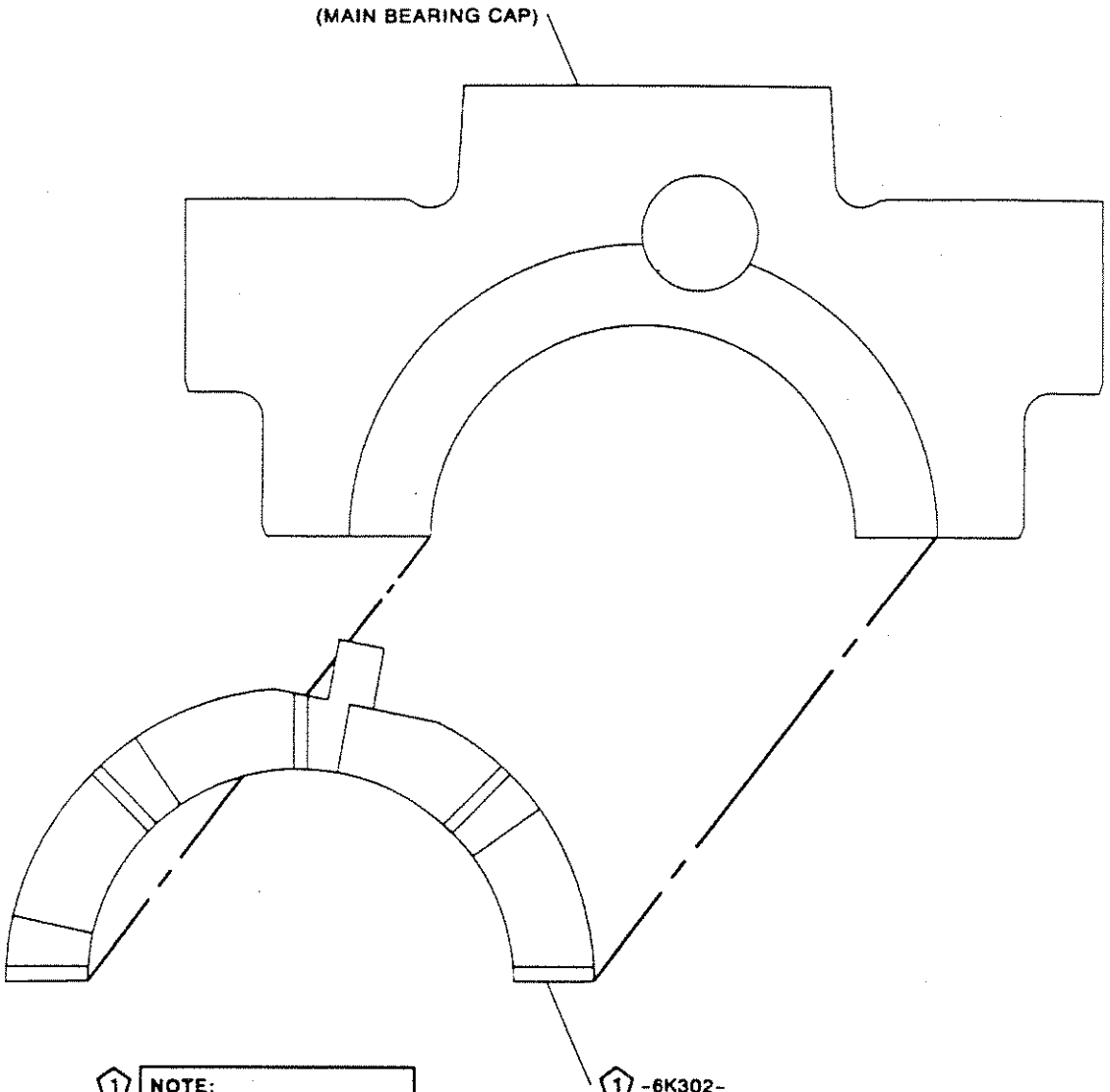


SECTION (A)



VIEW (B)

CRANKSHAFT REAR MAIN BEARING CAP & LOWER CRANKSHAFT THRUST BEARING WASHER ASSEMBLY (REAR VIEW)

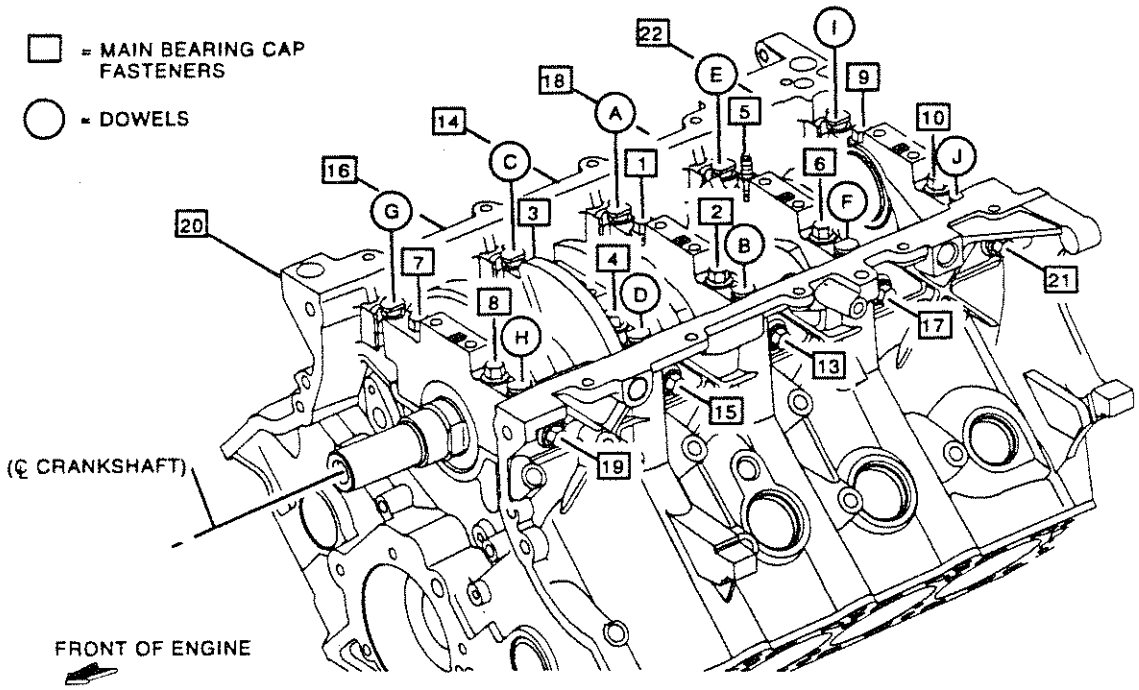


1 **NOTE:**
OIL GROOVES MUST BE POSITIONED TOWARD THRUST SURFACE OF CRANKSHAFT.

VIEW Ⓒ

NOTE:
APPLY **WSD-M1C226-A** LUBRICANT TO RETAIN THRUST WASHER TO BEARING CAP AS AN ASSEMBLY AID.

CRANKSHAFT MAIN BEARING CAP FASTENER/DOWEL PROCEDURE AND CRANKSHAFT END PLAY (LESS PISTONS)



TORQUE PROCEDURE

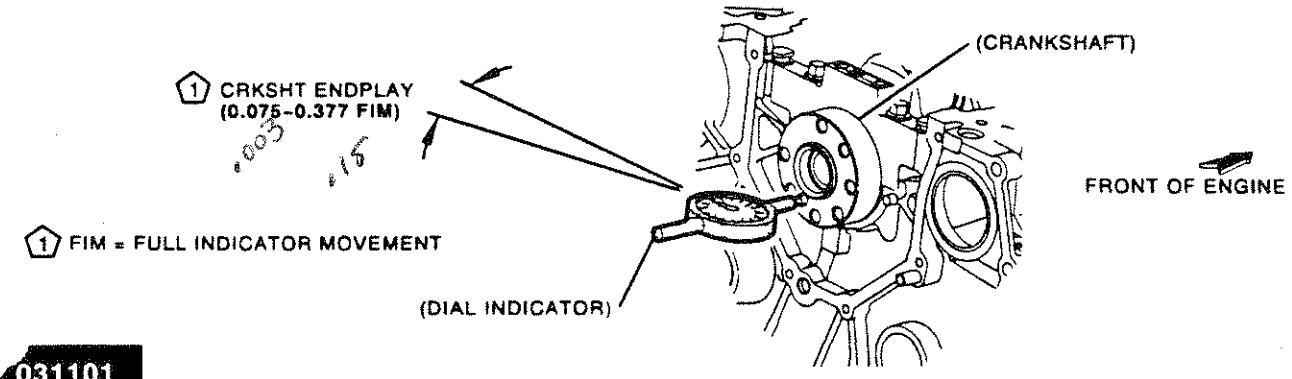
PRODUCTION METHOD

1. ALIGN FLATS ON DOWELS A-J TO RUN PARALLEL TO ℄ OF CRANKSHAFT PRIOR TO SIDE BOLT INSERTION.
2. **TORQUE** FASTENERS #1 THRU #10 TO YIELD. **(37-43 Nm THEN ROTATE 85°-95°).**
3. **TORQUE** FASTENERS #13 THRU #22 TO **(27-33 Nm THEN ROTATE 85°-95°).**

SERVICE AND OPTIONAL PRODUCTION METHOD

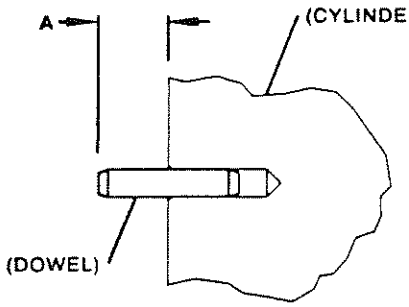
1. ALIGN FLATS ON DOWELS A-J TO RUN PARALLEL TO ℄ OF CRANKSHAFT PRIOR TO SIDE BOLT INSERTION.
2. TIGHTEN FASTENERS IN SEQUENCE AS SHOWN:
   A. **TORQUE** FASTENERS #1 THRU #10 **(37-43 Nm).**
   B. **ROTATE** FASTENERS #1 THRU #10 **(85°-95°).**
3. TIGHTEN FASTENERS IN SEQUENCE AS SHOWN:
   A. **TORQUE** FASTENERS #13 THRU #22 **(37-43 Nm).**
   B. **ROTATE** FASTENERS #13 THRU #22 **(85°-95°).**

NOTE:
MAIN BEARING CAP FASTENERS MAY BE TORQUED TO YIELD A MAXIMUM OF (5) TIMES.



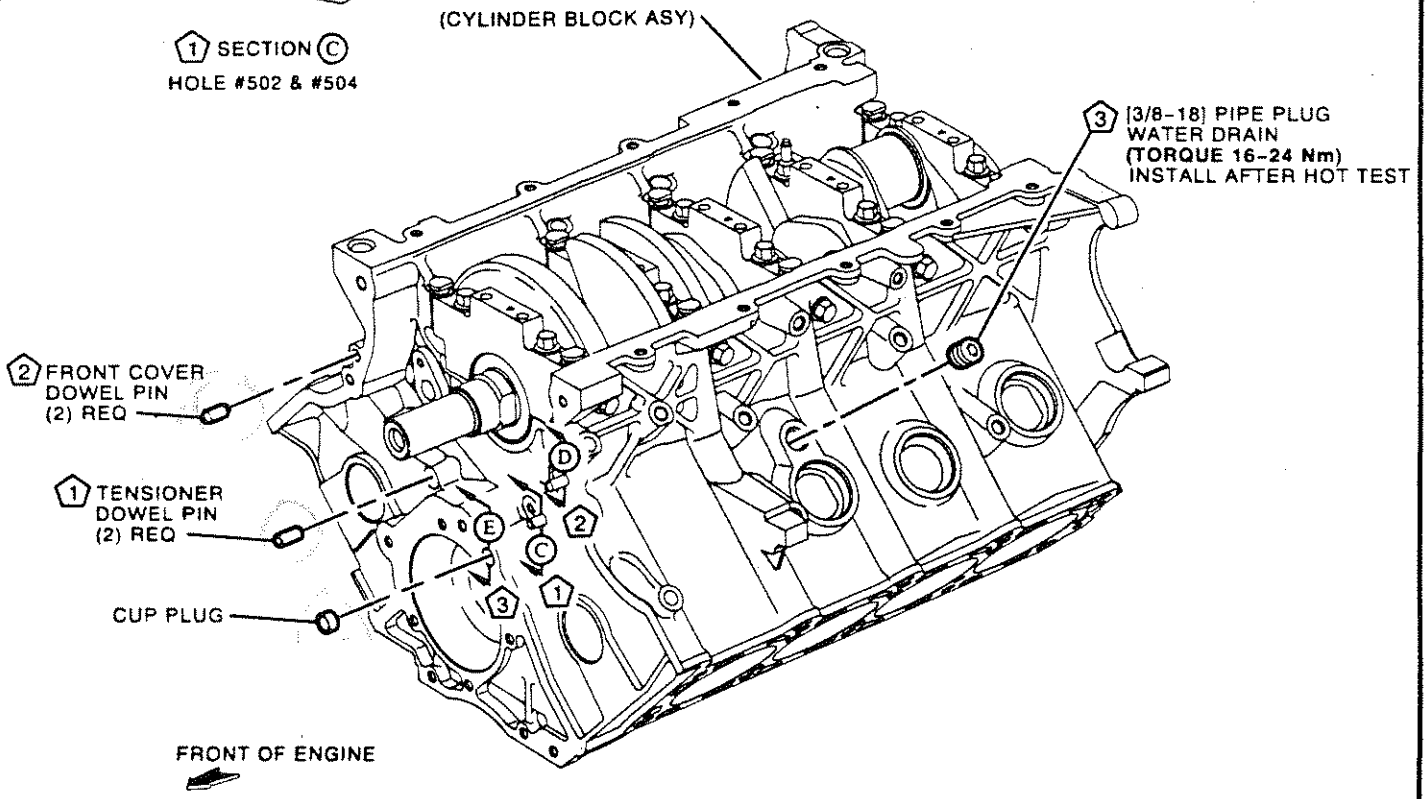
CYLINDER BLOCK FRONT DOWELS, CUP PLUGS & PIPE PLUGS (SERVICE/AUDIT)

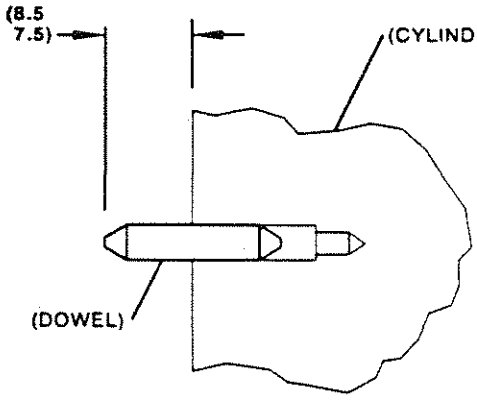
DIMENSION "A"	TENSIONER DOWEL
LEFT SIDE - 502	(29.5-30.5)
RIGHT SIDE - 504	(32.25-32.75)



(1) SECTION (C)
HOLE #502 & #504

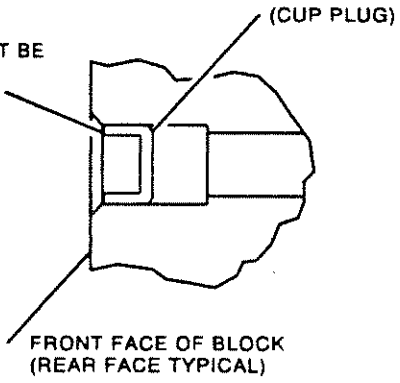
(3) NOTE:
APPLY WSK-M2G350-A2 TO THREADS PRIOR TO INSTALLATION.





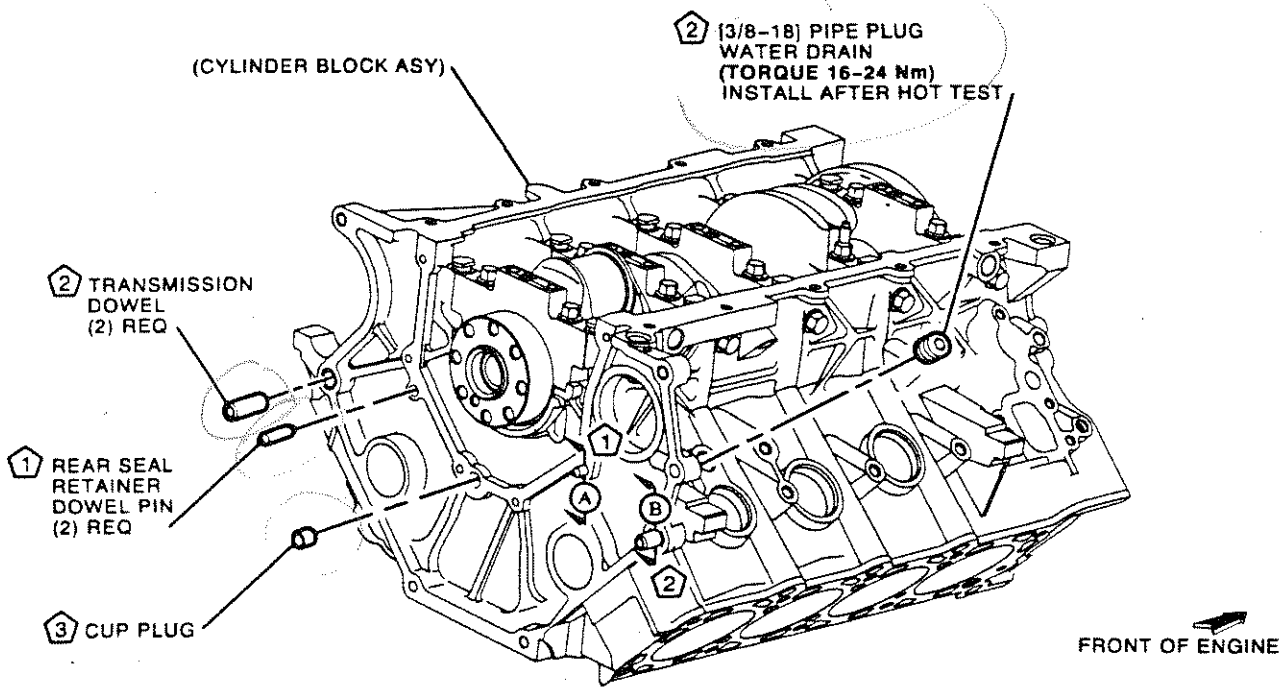
(2) SECTION (D)
TYPICAL (2) PLACES
HOLE #513 & #514

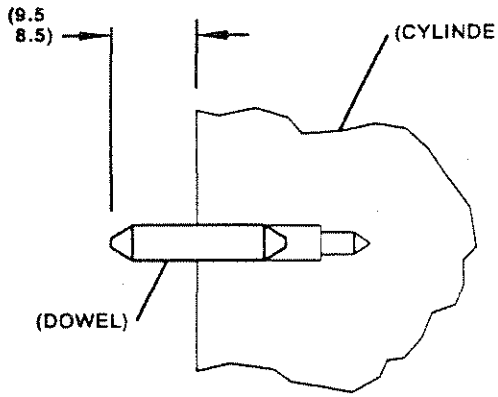
NOTE:
PRESS DEPTH MUST BE "FLUSH TO BELOW" CHAMFER OF HOLE



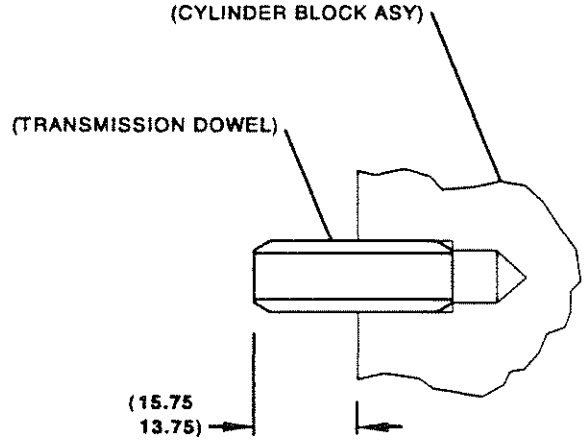
SECTION (E)
HOLE #533
FRONT FACE & REAR FACE

CYLINDER BLOCK REAR DOWELS, CUP PLUGS & PIPE PLUGS (SERVICE/AUDIT)





1 SECTION A
TYPICAL (2) PLACES

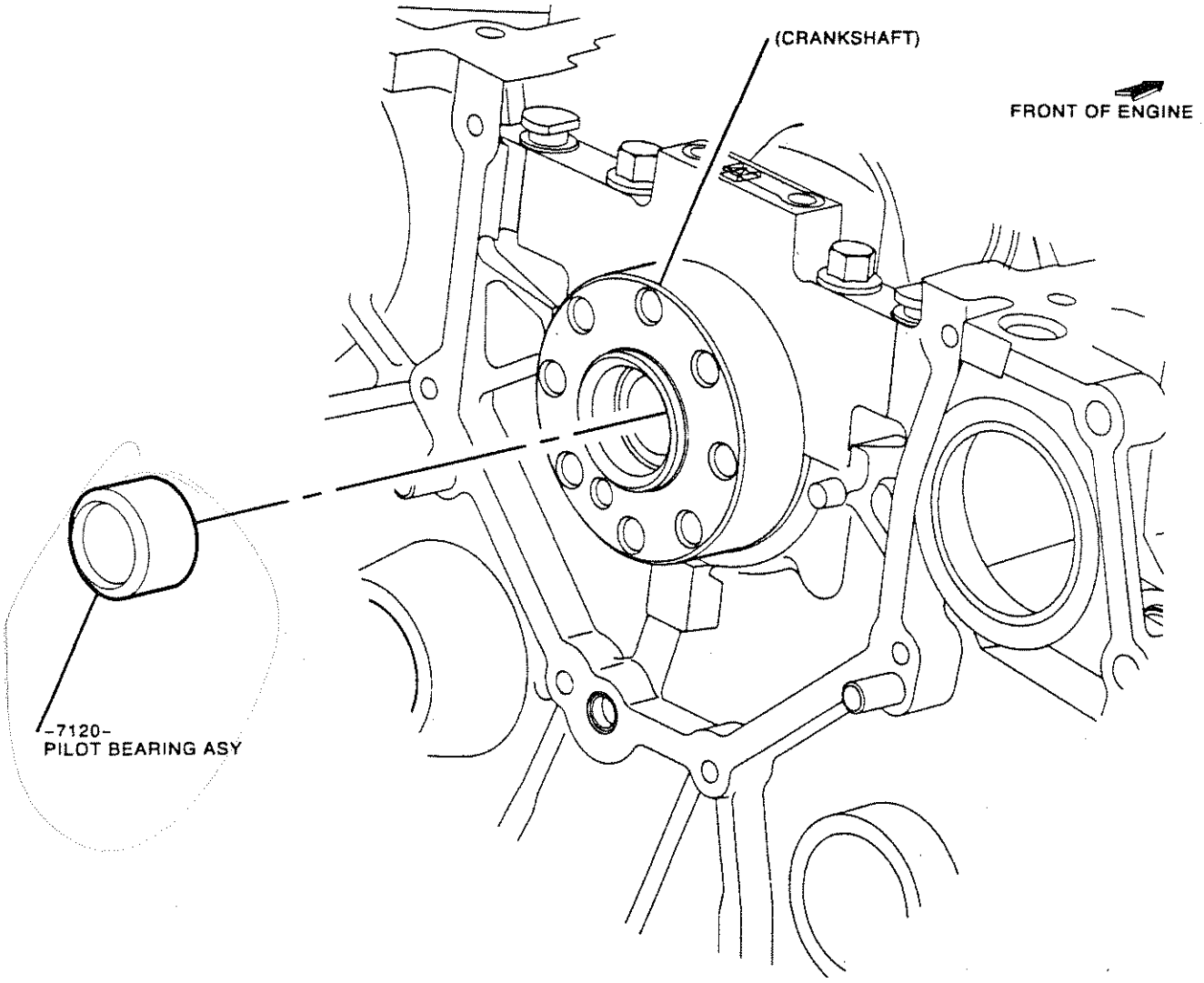


2 SECTION B
TYPICAL (2) PLACES

3 **NOTE:**
REFER TO FRAME 4G FOR SECTION E CUP PLUG INSTALLATION.

2 APPLY **WSK-M2G350-A2** TO THREADS PRIOR TO INSTALLATION.

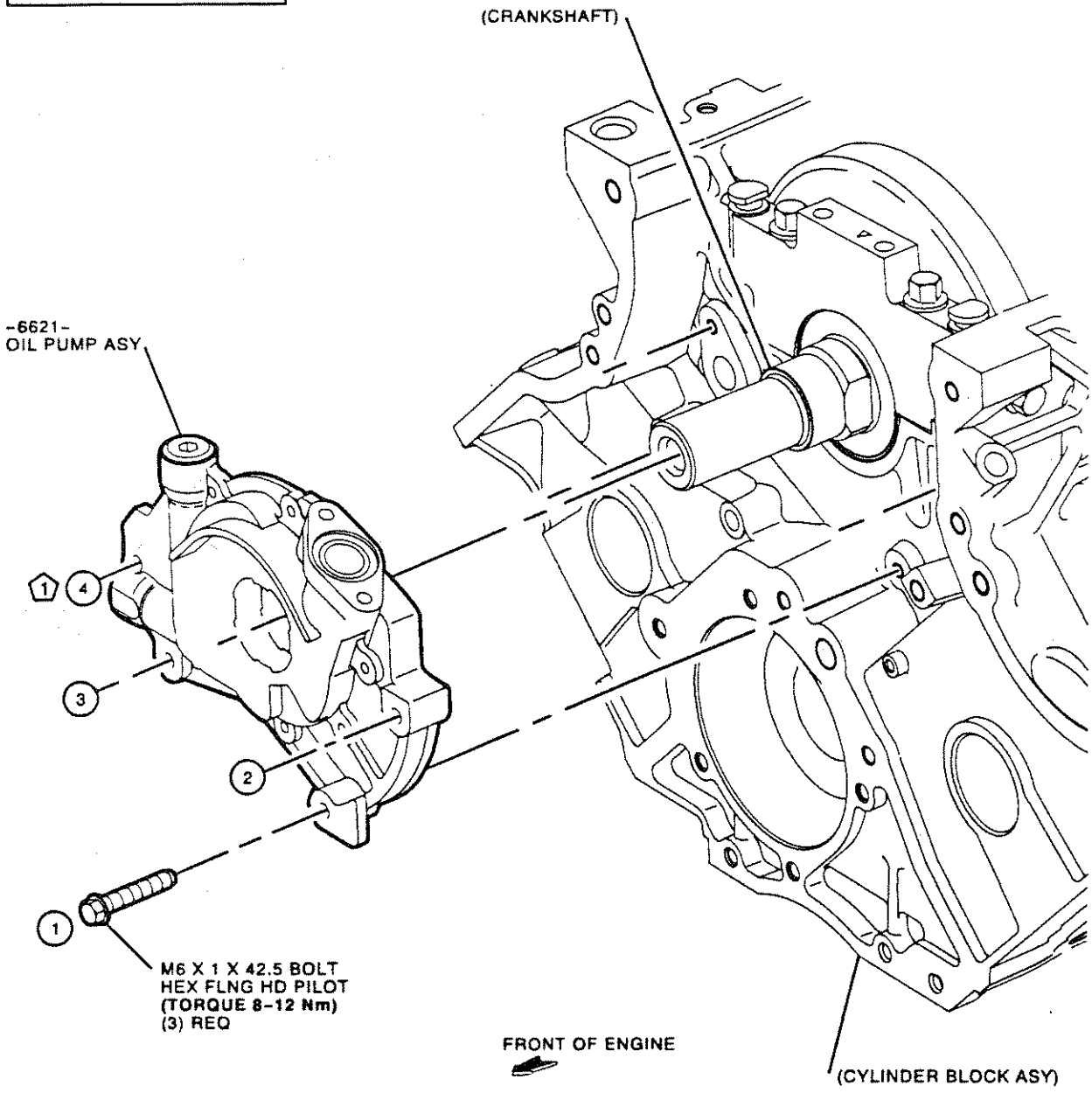
PILOT BEARING



NOTE:
PILOT BEARING SHOULD BE INSTALLED WITH A SMOOTH CONTINUOUS FORCE GUIDED ONTO CRANKSHAFT CENTERLINE UNTIL BEARING IS SEATED FIRMLY ON THE CRANKSHAFT FLANGE. FACE OF PILOT BEARING TO BE SQUARE WITH CENTERLINE OF CRANKSHAFT WITHIN **0.15** FIM AT **30** DIA.

OIL PUMP ASY
(LESS SCREEN & COVER)

(1) **NOTE:**
FASTENER #4 IS SHOWN INSTALLED ON FRAME 13.



ASSEMBLY PROCEDURE

1. ROTATE INNER ROTOR OF OIL PUMP ASY (-6621-) TO ALIGN WITH FLATS ON CRANKSHAFT POST AND SLIP OIL PUMP OVER UNTIL SEATED AGAINST BLOCK.

   NOTE:
   PUMP MUST BE HELD AGAINST BLOCK UNTIL BOLTS ARE TORQUED.

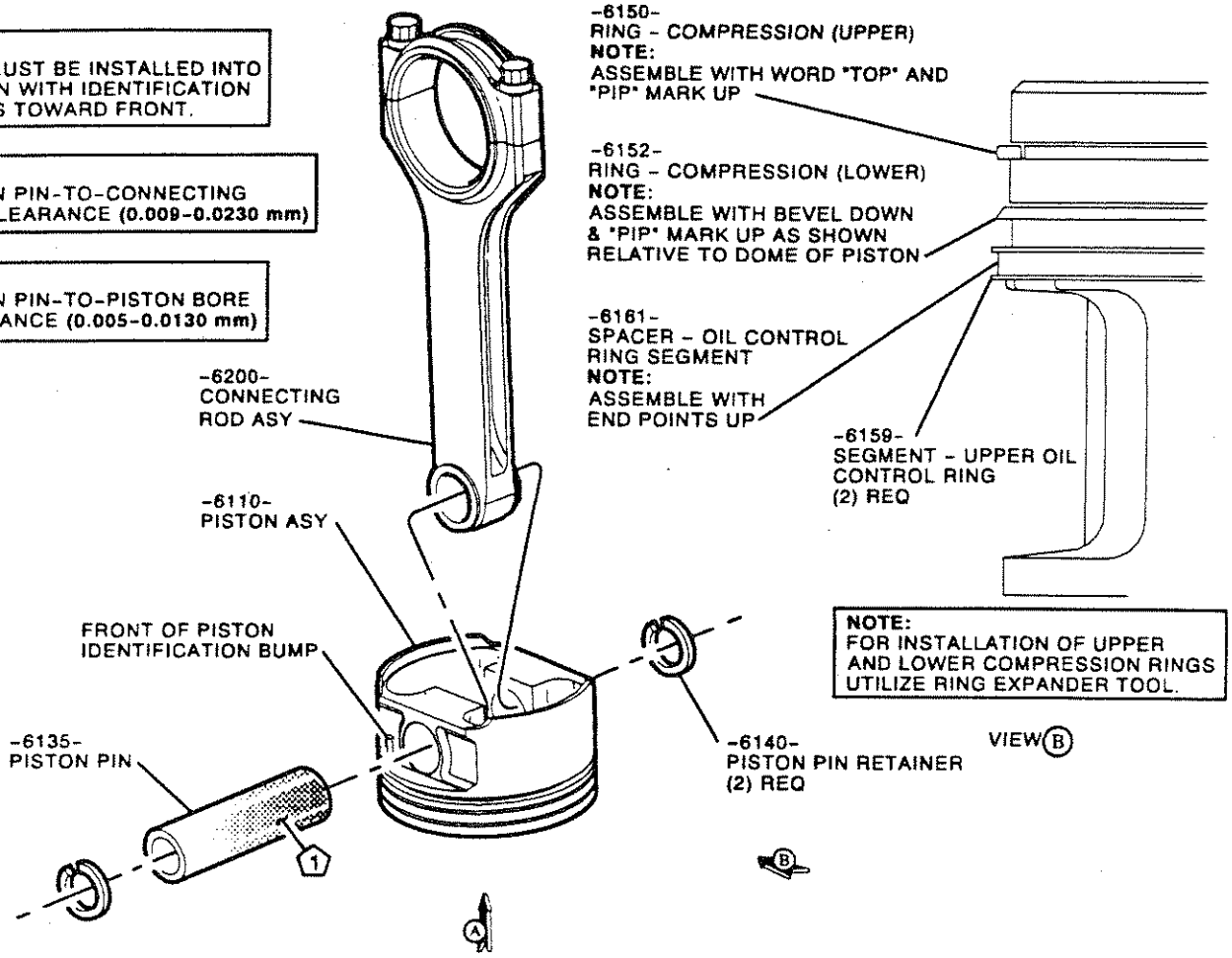
2. ROTATE OIL PUMP ASY (-6621-), ALIGN BOLT HOLES AND INSTALL (3) M6 BOLTS AND TORQUE TO SPECIFICATION.

PISTON ASY, PIN, RINGS AND CONNECTING ROD

NOTE:
ROD MUST BE INSTALLED INTO PISTON WITH IDENTIFICATION BUMPS TOWARD FRONT.

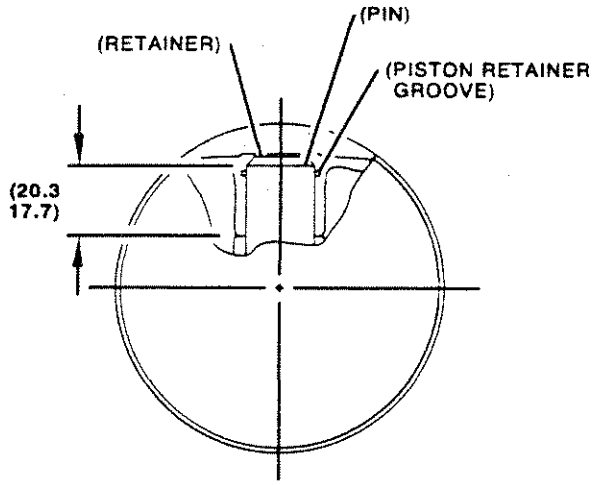
NOTE:
PISTON PIN-TO-CONNECTING ROD CLEARANCE (0.009-0.0230 mm)

NOTE:
PISTON PIN-TO-PISTON BORE CLEARANCE (0.005-0.0130 mm)

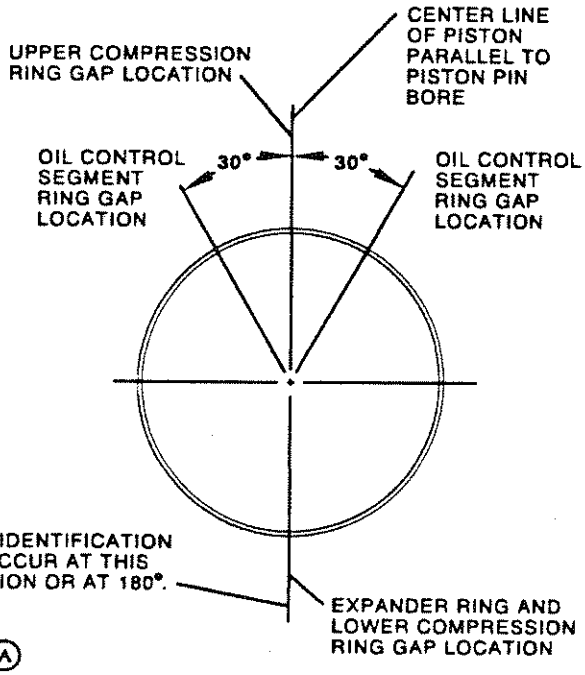


NOTE:
FOR INSTALLATION OF UPPER AND LOWER COMPRESSION RINGS UTILIZE RING EXPANDER TOOL.

(1) **NOTE:**
LUBRICATE PISTON PIN MATING FACE (SHADED AREA) PRIOR TO PIN INSTALLATION WITH **WSE-M2C908-A** OIL. IMMEDIATELY THEREAFTER, ASSEMBLE PIN IN PISTON AND ROD FOLLOWED BY RETAINER RINGS.



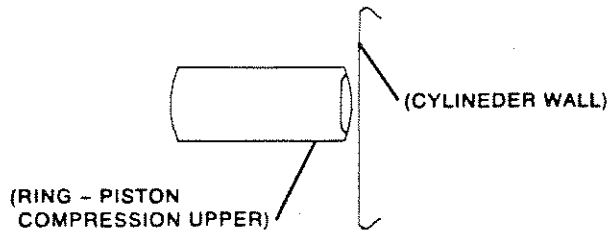
NOTE:
PISTON RINGS ARE TO BE ASSEMBLED TO PISTON WITH GAPS ORIENTATED AS SHOWN.

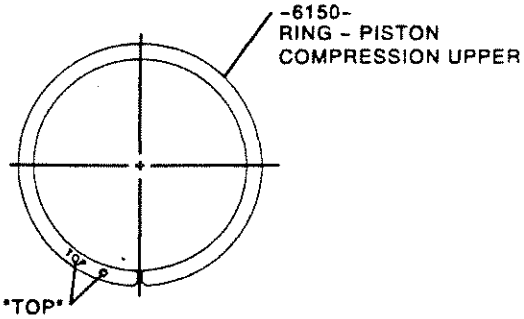


VIEW (A)

PISTON RING (UPPER/LOWER), OIL CONTROL SEGMENT & OIL CONTROL SPACER

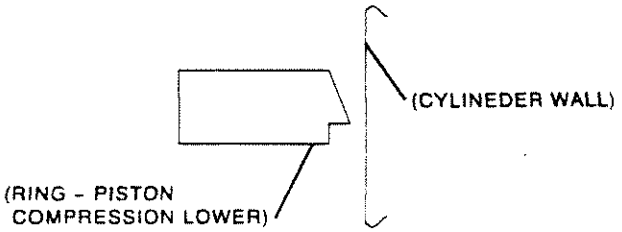
TOP RING
(SIDE PROFILE)

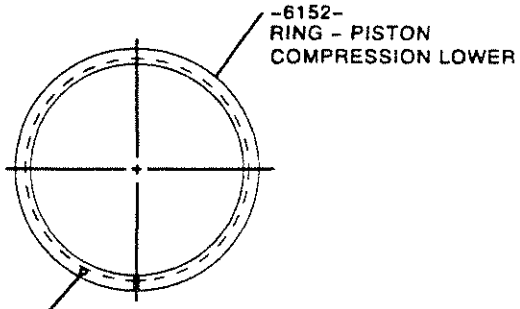




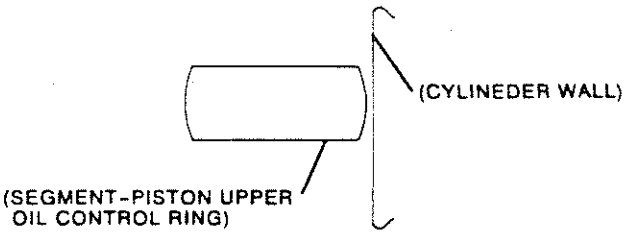
NOTE:
LASER MARK WORD "TOP" AND "PIP" MARK TO BE POSITIONED UP

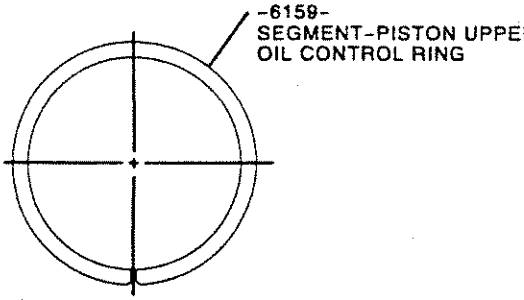
SECOND COMPRESSIONESSION RING
(SIDE PROFILE)





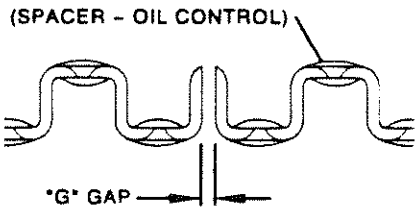
OIL RING RAILS
(SIDE PROFILE)



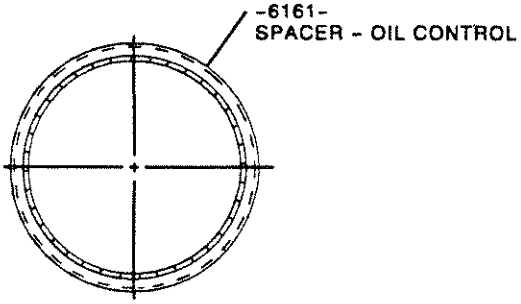


NO IDENTIFYING MARKS

OIL RING SPACER
(TOP/BOTTOM PROFILE)

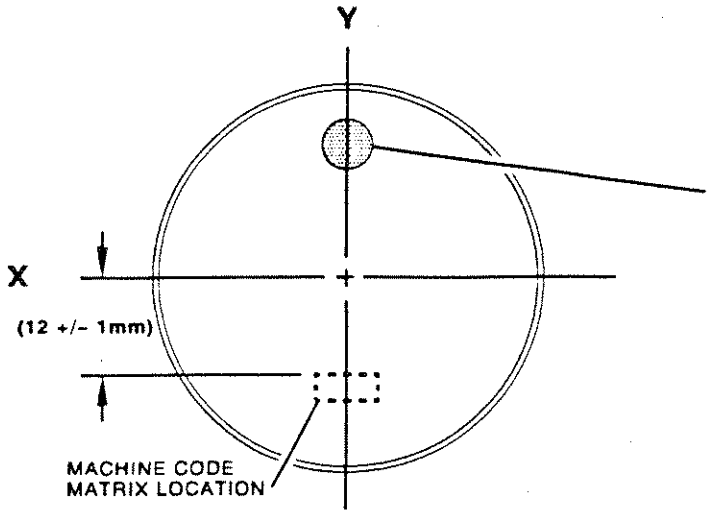


NOTE:
EXPANDER MUST OPEN AND CLOSE FREELY



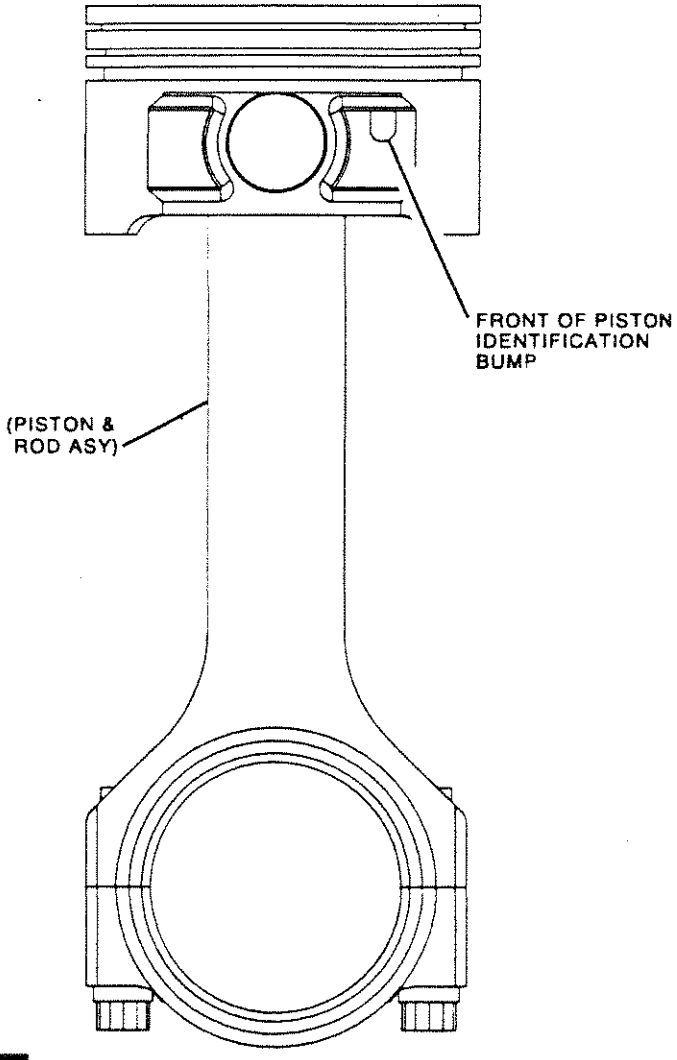
NO IDENTIFYING MARKS

PISTON & CONNECTING ROD ASY (QUALITY AUDIT)

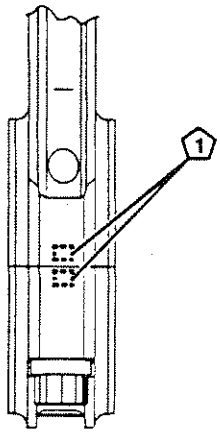


TYPICAL COLOR DOT IN THIS LOCATION CORRESPONDS TO GRADE:
MAGENTA = GRADE 1
BLUE = GRADE 2
YELLOW = GRADE 3

NOTE:
ROD MUST BE INSTALLED INTO PISTON WITH IDENTIFICATION BUMPS TOWARD FRONT.

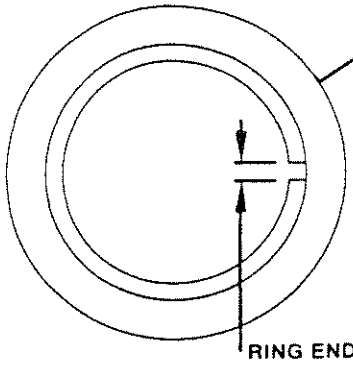


(1) **NOTE:**
PRODUCTION ALLOWED TO USE (1) REPLACEMENT PISTON AND ROD ASY PER BLOCK WITHOUT BORE STAMP ON CONNECTING ROD AND CAP.



(1) STAMP CORRELATION NUMBERS ON CAP AND ROD IN AREAS SHOWN FOR NUMBER SIZE, REFER TO PISTON AND ROD ASY (-6100-).

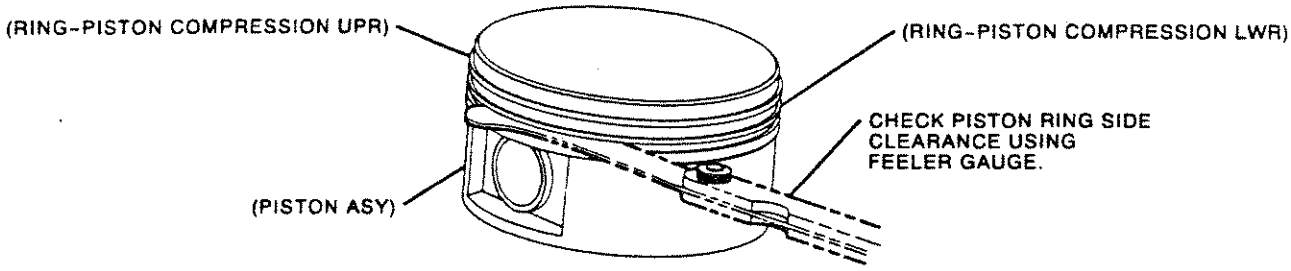
PISTON ASY (QUALITY AUDIT)



PISTON RING END GAP (GAUGE)

1. MAKE SURE PISTON AND RINGS ARE CLEAN AND DRY BEFORE PISTON FIT IS CHECKED. BOTH COMPONENTS MUST BE AT ROOM TEMPERATURE 21°C (70°F).
2. INSERT EACH PISTON RING INTO GAUGE.
3. MEASURE END GAP.

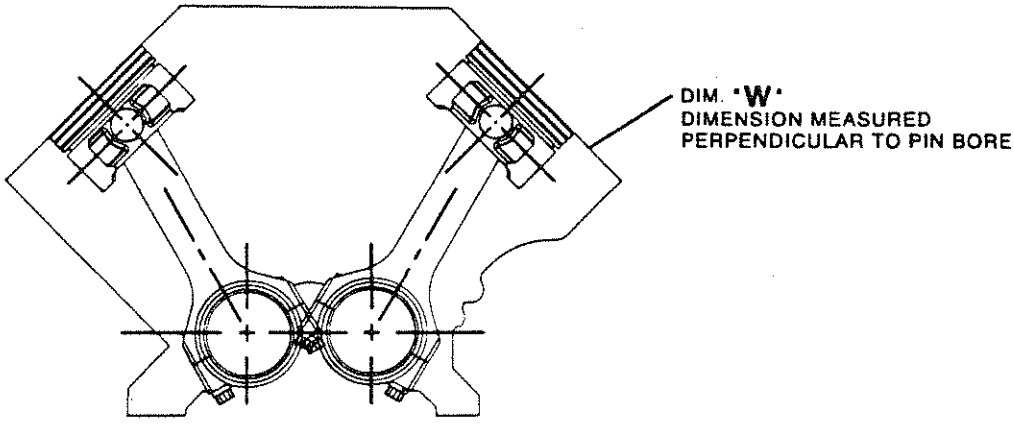
(-6150-) RING-PISTON COMPRESSION UPR (0.150-0.300 mm) .006 - .012
(-6152-) RING-PISTON COMPRESSION LWR (0.250-0.500 mm) .010 - .020
(-6159-) SEGMENT-PISTON UPR OIL CNTRL (0.150-0.650 mm)



PISTON RING SIDE CLEARANCE

1. INSERT GAUGE BETWEEN RING AND ITS LOWER LAND.
2. GAUGE SHOULD SLIDE FREELY AROUND ENTIRE RING CIRCUMFERENCE WITHOUT BINDING.

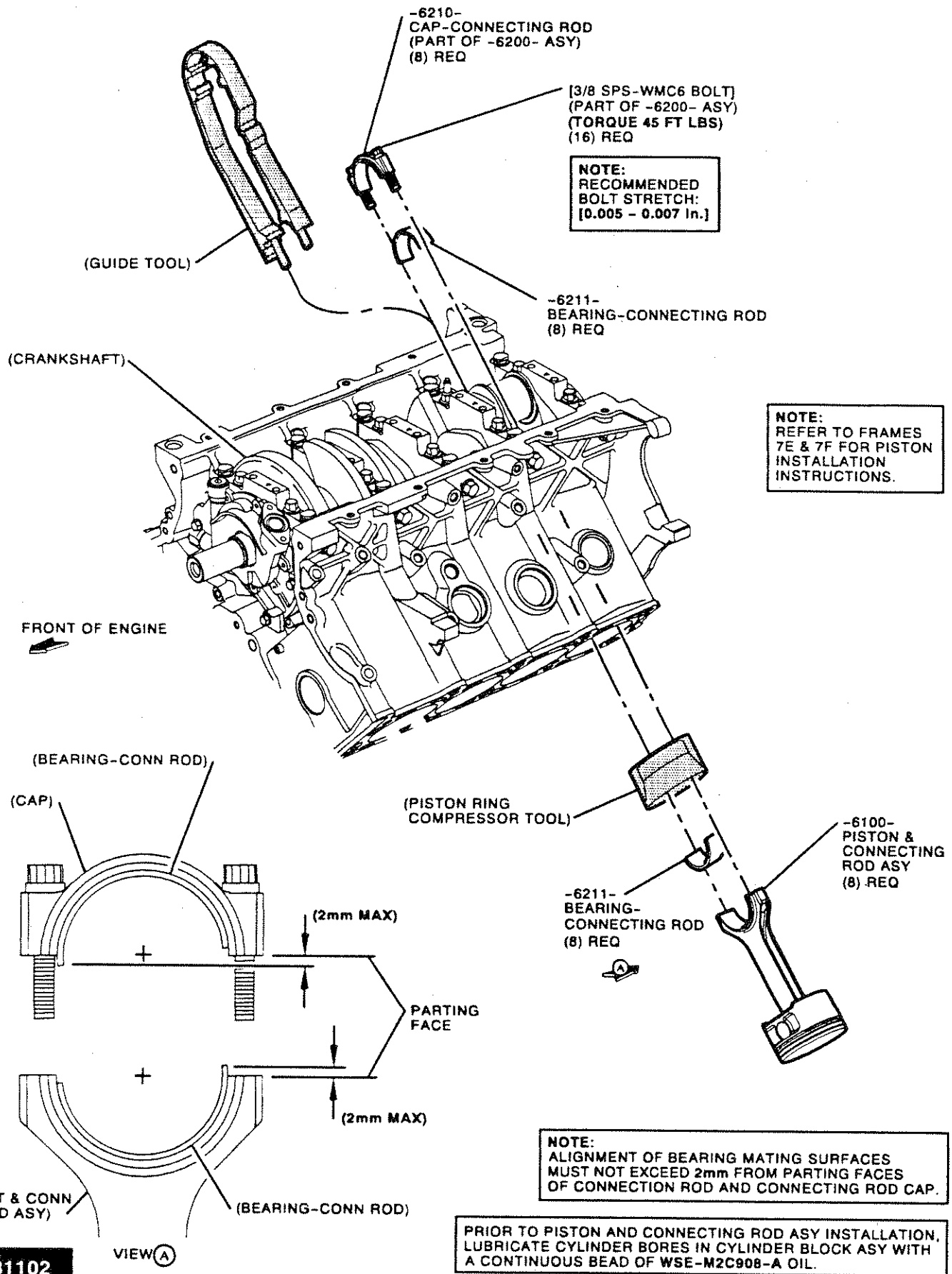
(-6130-) RING-PISTON COMPRESSION UPR (0.030-0.078 mm)
(-6152-) RING-PISTON COMPRESSION LWR (0.030-0.070 mm)



FRONT VIEW

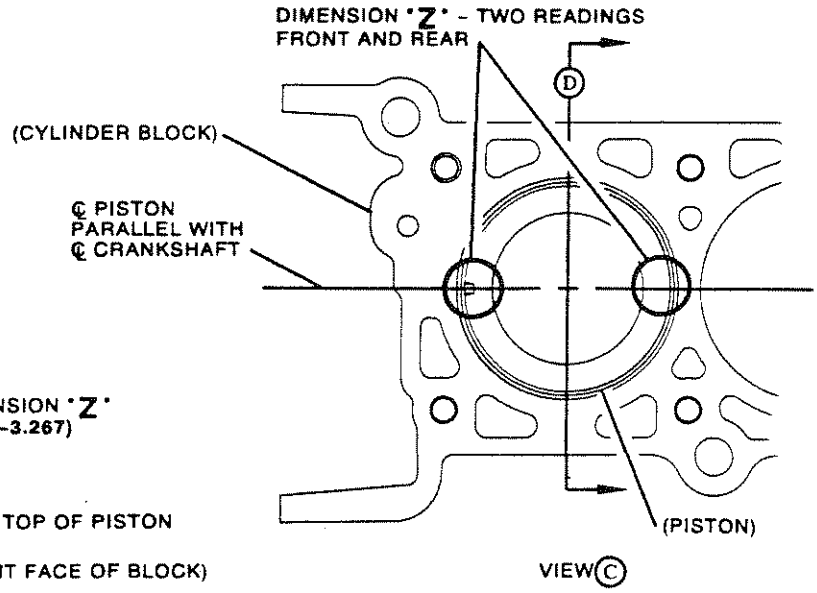
NOTE:
PISTON TO BORE CLEARANCE (-0.005 TO 0.025 mm) AS MEASURED AT DIMENSION "W" = 43 mm FROM TOP OF PST ASY (-6010-) AND LOCATION SPECIFIED ON BLK ASY-CYL (-6010-) USING CORRESPONDING GRADE SIZE PISTON IN RESPECTIVE GRADE SIZE CYLINDER BORE.

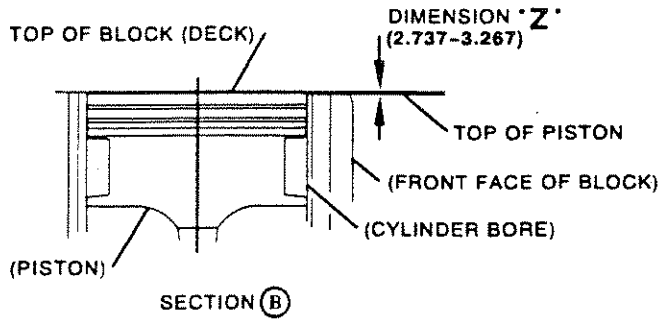
PISTON & CONNECTING ROD ASY, BEARINGS & CAP



PISTON & CONNECTING ROD ASY
(Continued)

GRADE	CYLINDER BLOCK BORE DIAMETER
1	(90.200-90.210)
2	(90.210-90.220)
3	(90.220-90.230)





NOTE: MEASUREMENTS REQUIRED FOR SERVICE ONLY

BEFORE TAKING MEASUREMENTS ("Z" DIMENSION), BE SURE PISTON IS AT TDC.

DIMENSION "Z" - TOP OF PISTON BELOW TOP OF BLOCK (SEE TABLE "Z"). 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 TRUE CENTER OF PISTON.

MEASURE CYLINDER BLOCK BORE DIAMETER AT GAGE LOCATION SHOWN BELOW (SEE TABLE "A") AND MARK OUTSIDE OF BLOCK WITH APPROPRIATE NUMBER TO IDENTIFY BORE GRADE SIZE. PISTON DOMES ARE COLOR CODED. INSTALL PISTON AND ROD ASY TO CYLINDER BORE WITH MATCHING NUMBER.

NOTE:
TO PREVENT DAMAGE TO PISTONS AFTER ASSEMBLY, POSITION CRANKSHAFT SO PISTONS ARE BELOW DECK.

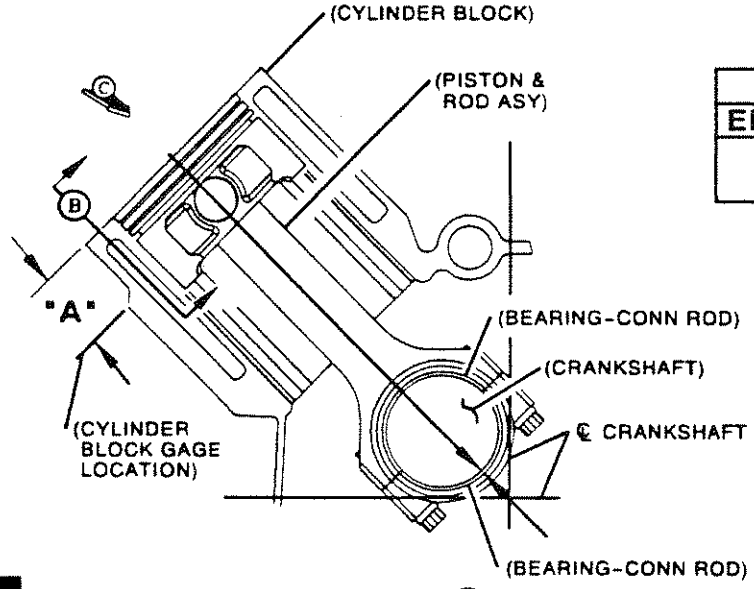
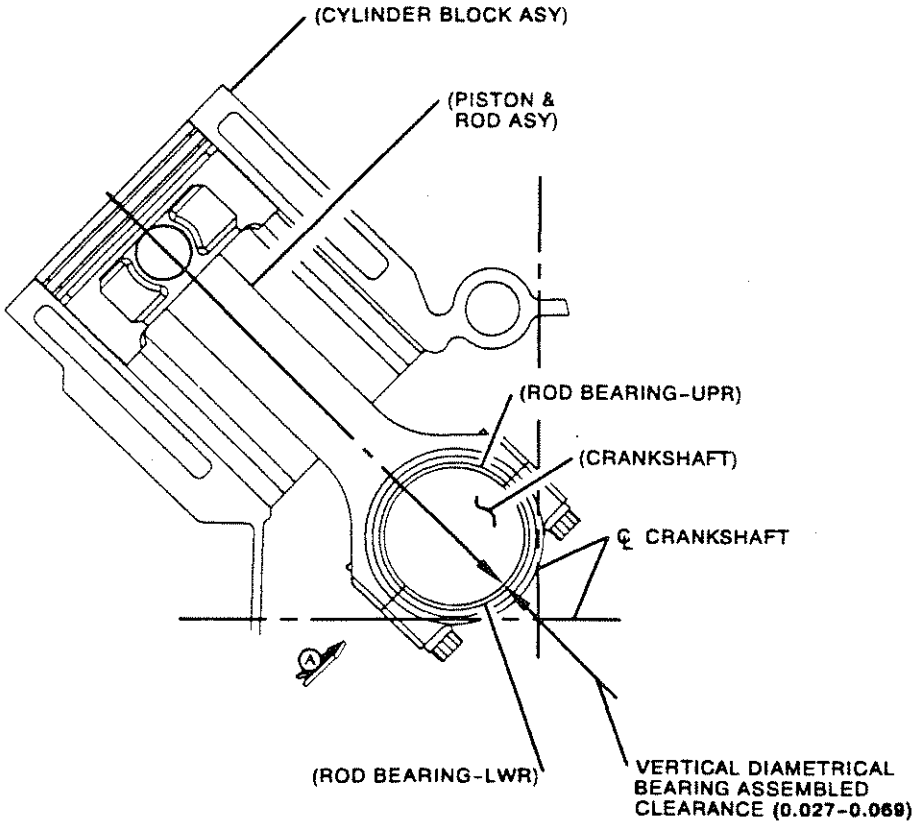
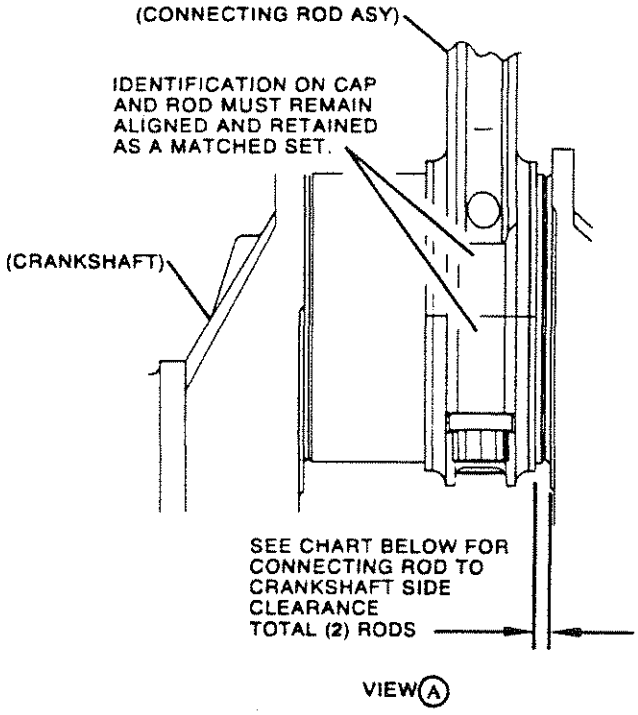


TABLE "A"	
ENGINE	"A" DIMENSION
5.4L	50

PISTON & CONNECTING ROD ASY
(Continued)



NOTE:
IDENTIFY ROD & CAP WITH INDIVIDUAL CYLINDER NUMBER (DO NOT STAMP) ON OPPOSITE SIDE OF ROD LOT LETTER CODE STAMPED ON ROD CAP.



VIEW (A)

CONNECTING ROD TO CRANKSHAFT SIDE CLEARANCE
(0.125-0.475)

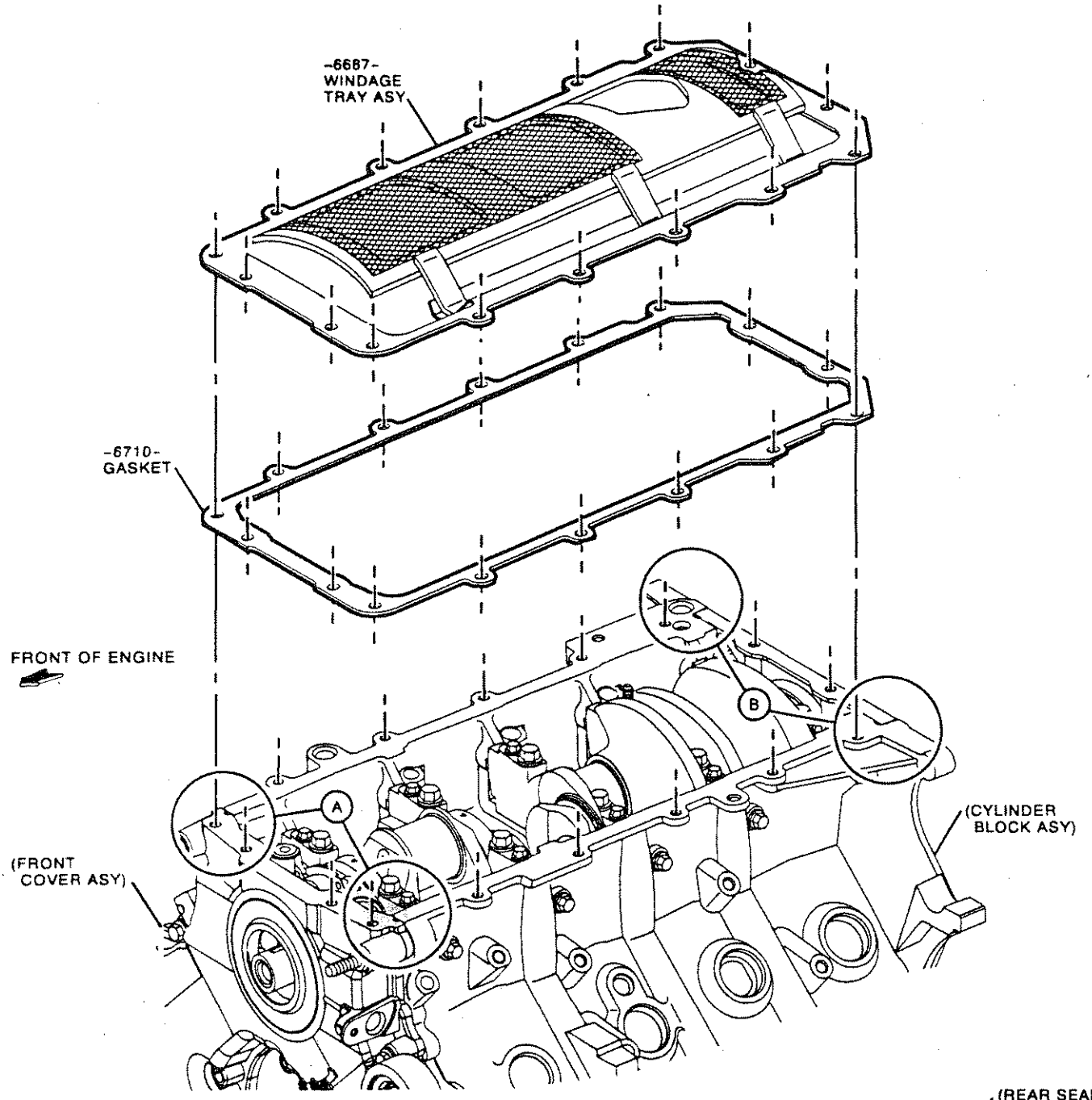
031102

REL	MODEL	DATE	LAST FRAME
NE01-E10956645-000	2000 5.4L-4V COBRA "R"	000828	41

Ford Motor Company V-ENGINE ILLUSTRATION	NO.	REV	FRAME	CONTD
	▽ ILYR3E-030002-E0543U	---	7F	8

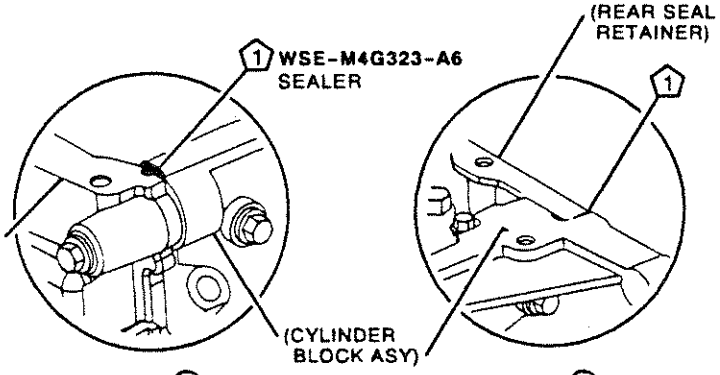
SCALE = .50

WINDAGE TRAY ASY



ASSEMBLY PROCEDURE

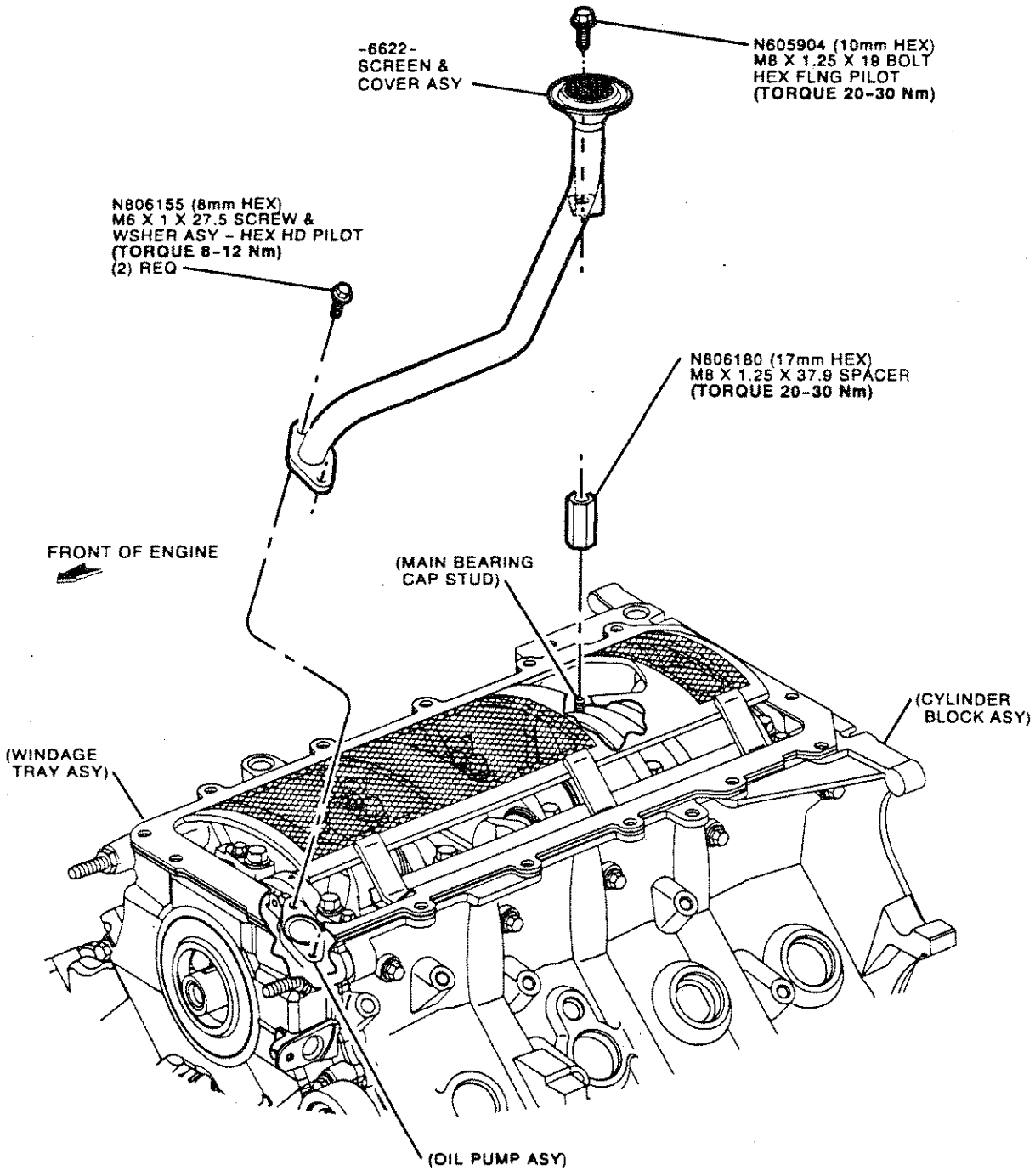
1. ENSURE ALL SEALING SURFACES ARE FREE OF OIL AND DEBRIS.
2. APPLY (4) **3mm** BEADS OF **ESE-M4G323-A6** SEALER AT "T" JOINTS OF CYLINDER BLOCK, FRONT COVER AND REAR SEAL RETAINER AS SHOWN IN VIEWS A AND B.
3. INSTALL GASKET (-6710-) TO CYLINDER BLOCK PAN RAIL WITH "BLOCK SIDE" LETTERING TOWARD BLOCK AND AT FRONT OF ENGINE. ALIGN ALL EDGES AND BOLT HOLES.
4. INSTALL WINDAGE TRAY (-6687-) OVER GASKET.



VIEW (A)
TYPICAL (2) PLACES

VIEW (B)
TYPICAL (2) PLACES

OIL PUMP SCREEN & COVER ASY



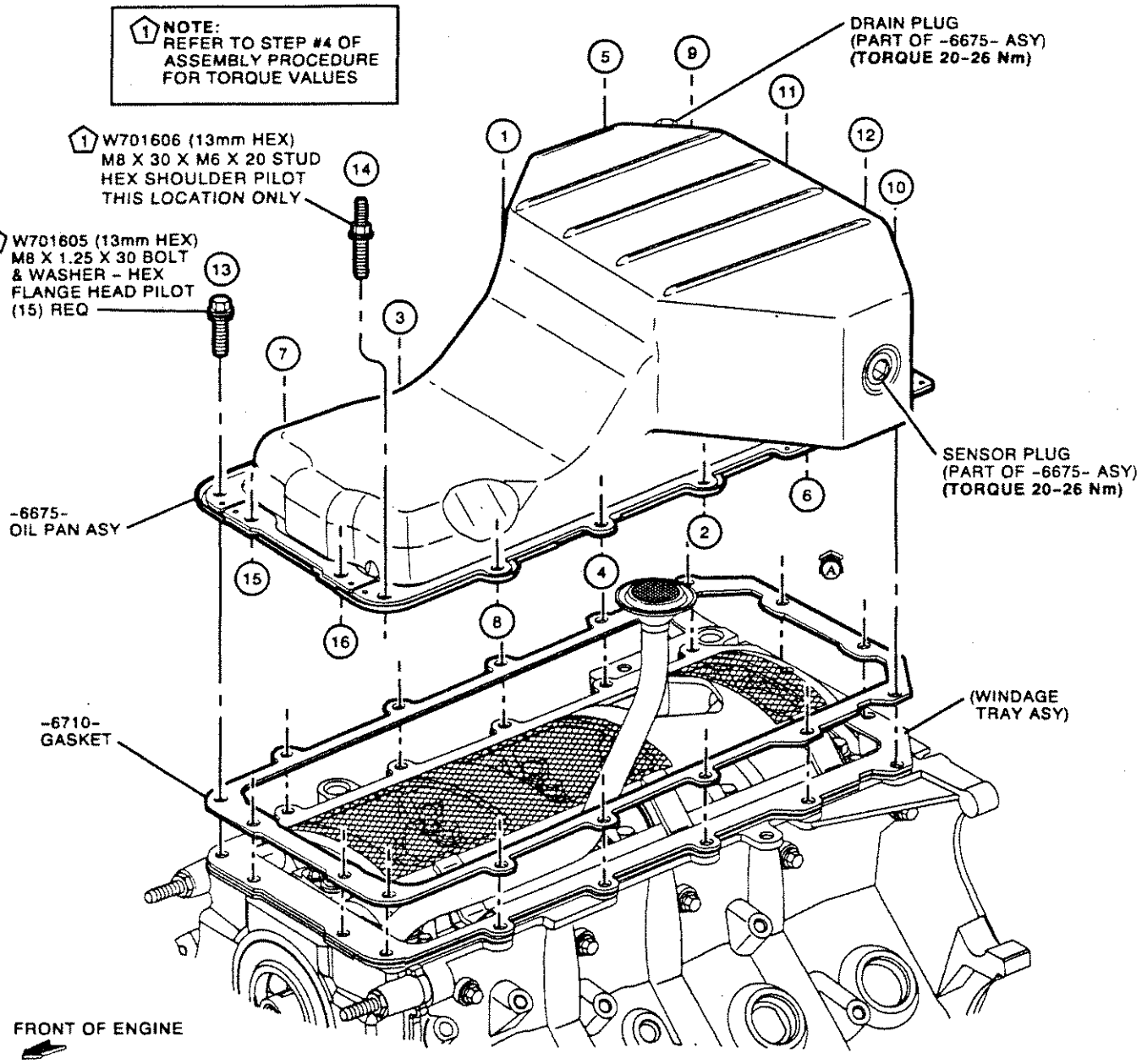
ASSEMBLY PROCEDURE

1. INSTALL SPACER ONTO #4 MAIN BEARING CAP STUD AND **TORQUE** TO SPECIFICATION.

2. ROUTE OIL PUMP END OF SCREEN & COVER ASY (-6622-) THROUGH FRONT OPENING IN WINDAGE TRAY TO MEET OIL PUMP ASY. ALIGN SUPPORT BRACKET TO SPACER.

3. INSERT (2) M6 FASTENERS THROUGH SCREEN & COVER FLANGE INTO OIL PUMP ASY AND **TORQUE** TO SPECIFICATION. INSERT (1) M8 FASTENER THROUGH SUPPORT BRACKET INTO SPACER AND **TORQUE** TO SPECIFICATION.

OIL PAN ASY



PRE-ASSEMBLY PROCEDURE

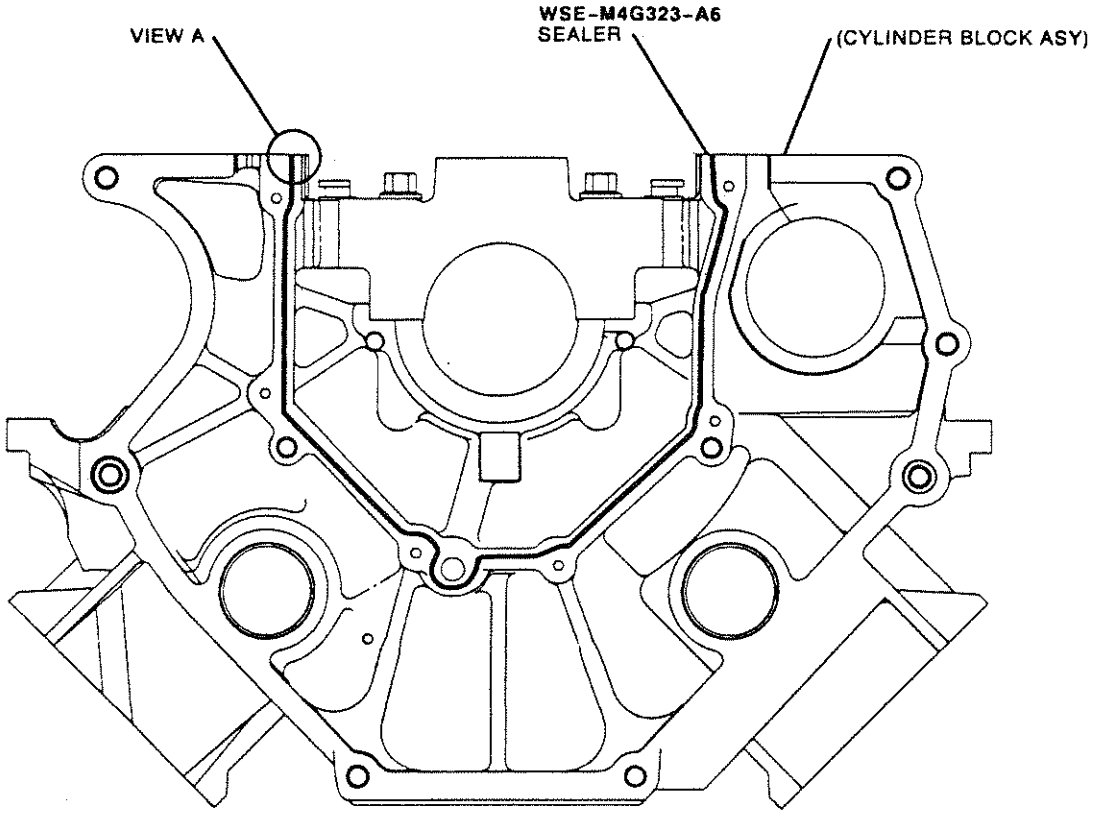
1. REMOVE DRAIN PLUG AND SENSOR PLUG FROM OIL PAN ASY (-6675-).
2. WASH OIL PAN ASY.
3. APPLY **WSK-M2G350-A2** SEALER TO 2ND THRU 6TH THREADS OF BOTH PLUGS.
4. RE-INSTALL BOTH PLUGS AND **TORQUE 20-26 Nm**.
5. ENSURE ALLEN HEAD SCREWS ATTACHING SLOSH BAFFLE ARE SNUG.

ASSEMBLY PROCEDURE

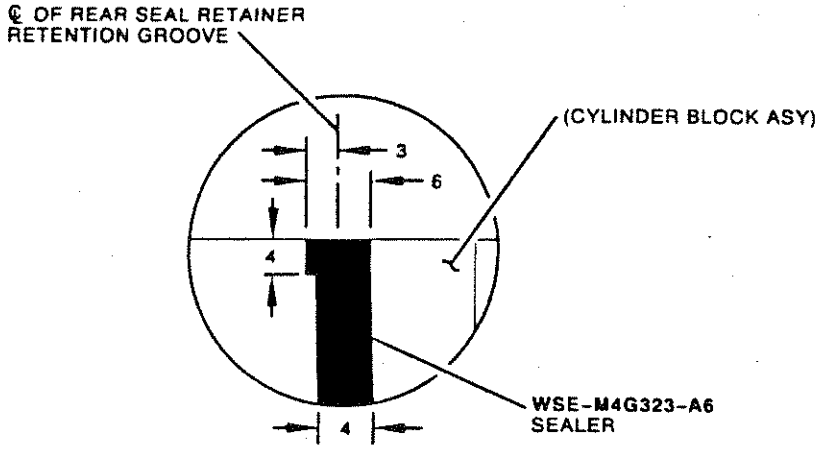
1. ENSURE SEALING SURFACES OF WINDAGE TRAY AND OIL PAN ARE CLEAN.
2. INSTALL GASKET (-6710-) WITH "BLOCK SIDE" LETTERING TOWARD WINDAGE TRAY ASY AND AT FRONT OF ENGINE. ALIGN ALL EDGES AND BOLT HOLES.
3. INSTALL OIL PAN ASY, KEEPING IT ALIGNED WITH BOLT HOLES AND WITH SCREEN & COVER ASY.
4. **TORQUE** ALL FASTENERS **20 Nm, THEN ROTATE 60°**.

REAR OIL SEAL RETAINER SEALER APPLICATION TO CYLINDER BLOCK

NOTE:
REFER TO FRAME 9A STEP 3 FOR APPLICATION METHOD.

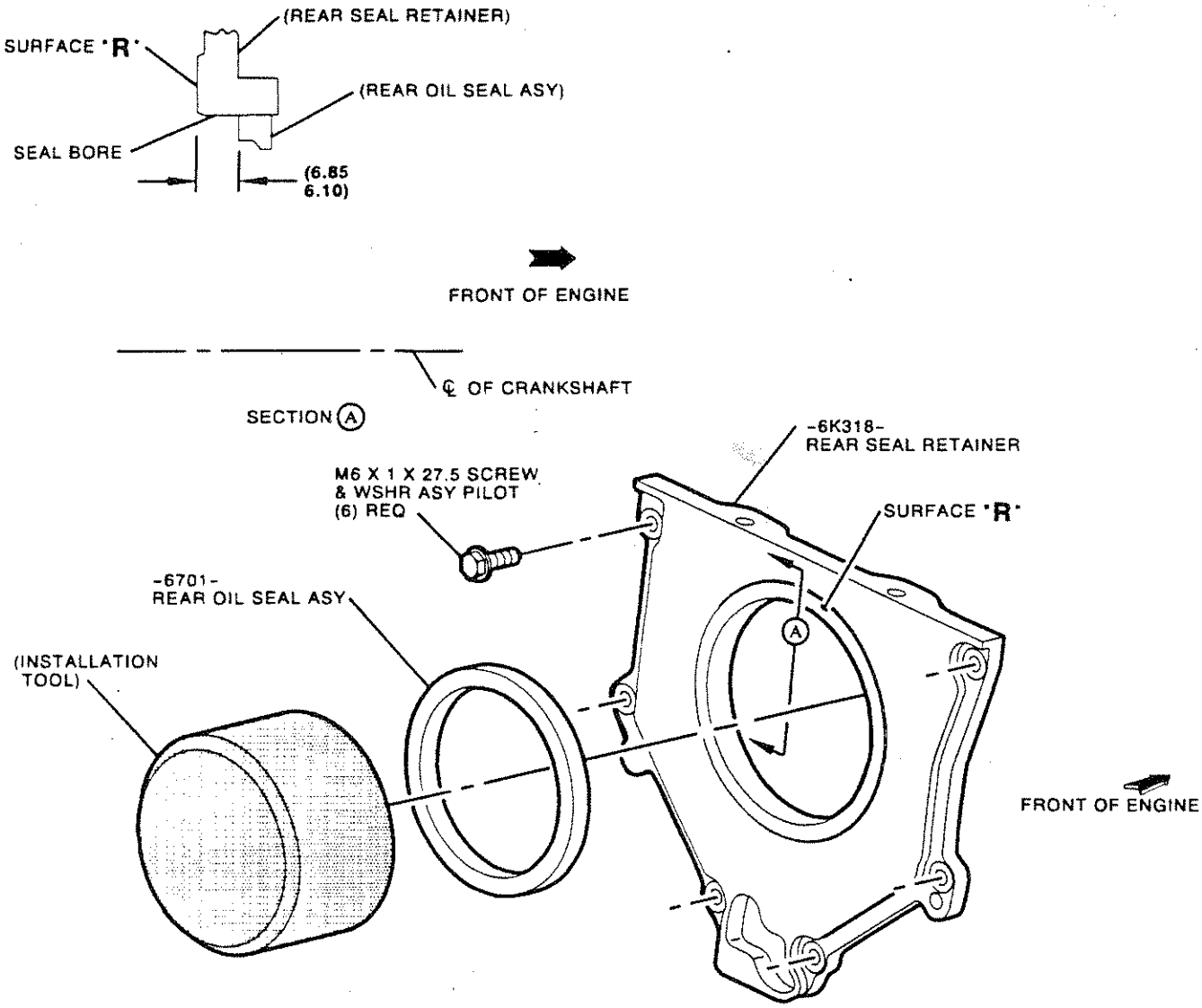


REAR VIEW OF ENGINE



VIEW (A)
TYPICAL (2) PLACES

CRANKSHAFT OIL SEAL RETAINER AND REAR OIL SEAL ASY (SUB-ASSEMBLY)



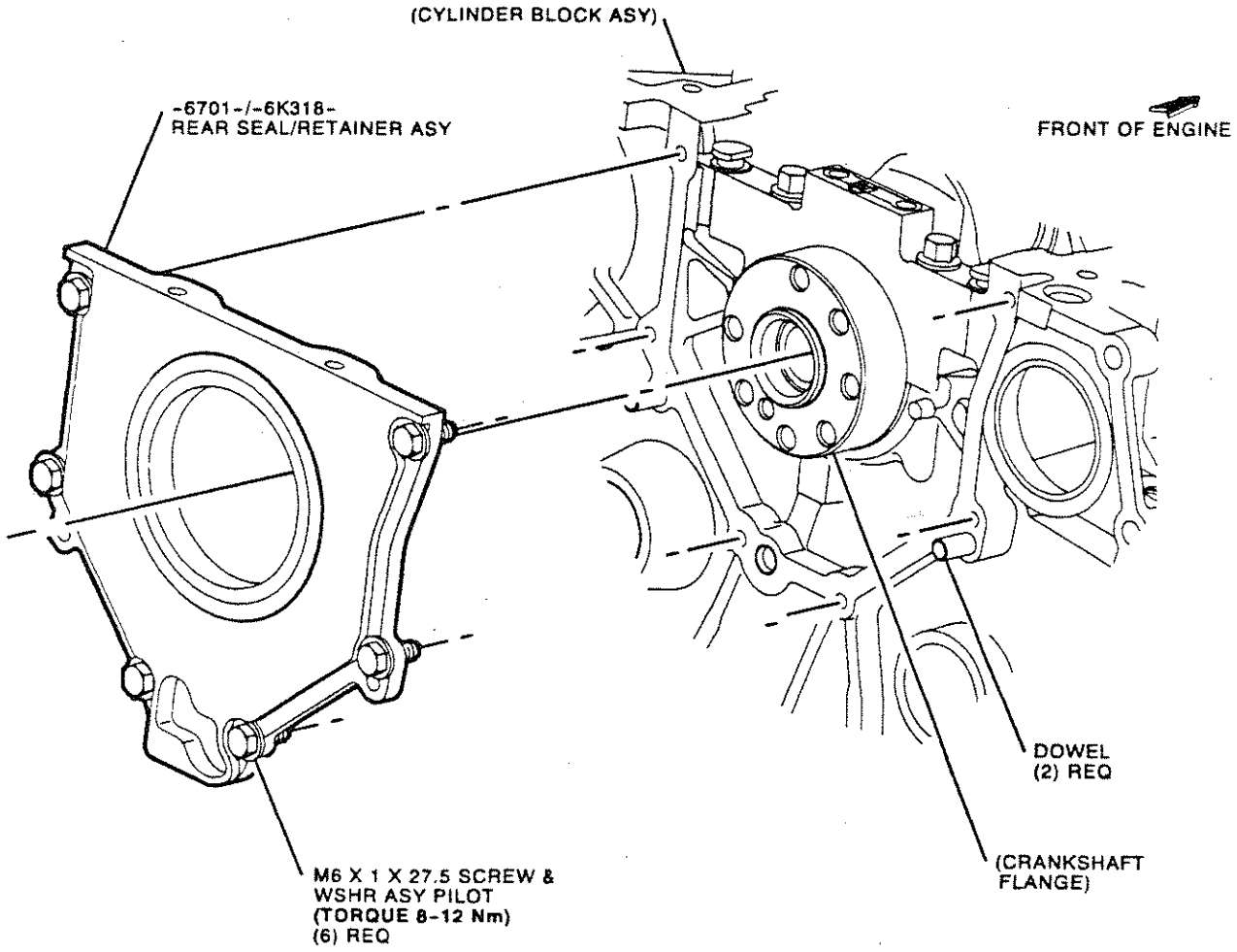
ASSEMBLY PROCEDURE

1. **NOTE: OFF LINE OPERATION**
2. PRESS REAR OIL SEAL ASY (-6701-) INTO REAR SEAL RETAINER (-6K318-) WITH INSTALLATION TOOL TO A DEPTH OF **(6.10-6.85mm)** BELOW SURFACE "**R**".
3. IF THERE ARE ANY CONTAMINANTS (OIL OR OTHER FLUIDS) ON BLOCK RETAINER SEALING SURFACE IT MUST BE WIPED WITH **WSE-M5B392-A** CLEANER AND ALLOWED TO DRY UNTIL THERE IS NO SIGN OF WETNESS, OR (5) MINUTES, WHICHEVER IS LONGER.
4. PLACE (6) M6 SCREW & WASHER ASY'S INTO REAR OIL SEAL RETAINER.

MANUAL/SERVICE INSTALLATION PROCEDURE

1. SERVICE INSTALLATION TOOL KIT (T85P-1000-FH/FLMH) MUST BE USED TO INSTALL REAR SEAL/RETAINER ONTO CRANKSHAFT JOURNAL.
2. INSTALL REAR SEAL RETAINER (-6K318-) ONTO END OF CRANKSHAFT WITH TWO SCREWS PROVIDED.
3. LUBRICATE SEAL MAIN LIP OR SEAL REPLACER WITH **WSS-M2C916-A** OIL
4. POSITION SEAL/RETAINER ON REAR CRANKSHAFT SEAL REPLACER AND ASSEMBLE TO ADAPTOR WITH CENTER DRAW BOLT AND WASHER PROVIDED.
5. DRAW SEAL INTO CRANKSHAFT BORE UNTIL SEAL REPLACER BOTTOMS AGAINST REAR FACE OF SEAL CARRIER PLATE.

CRANKSHAFT OIL SEAL RETAINER AND REAR OIL SEAL ASY



ASSEMBLY PROCEDURE

1. PRELUBE CRANKSHAFT HUB DIAMETER (OD) WITH **WSE-M2C908-A** OIL PRIOR TO REAR SEAL INSTALLATION. INSURE NO OIL IS TRANSFERRED TO CYLINDER BLOCK RETAINER SEALING SURFACE.

2. IF THERE ARE ANY CONTAMINANTS (OIL OR OTHER FLUIDS) ON BLOCK RETAINER SEALING SURFACE IT MUST BE WIPED WITH **WSE-M5B392-A** CLEANER AND ALLOWED TO DRY UNTIL THERE IS NO SIGN OF WETNESS, OR (5) MINUTES, WHICHEVER IS LONGER.

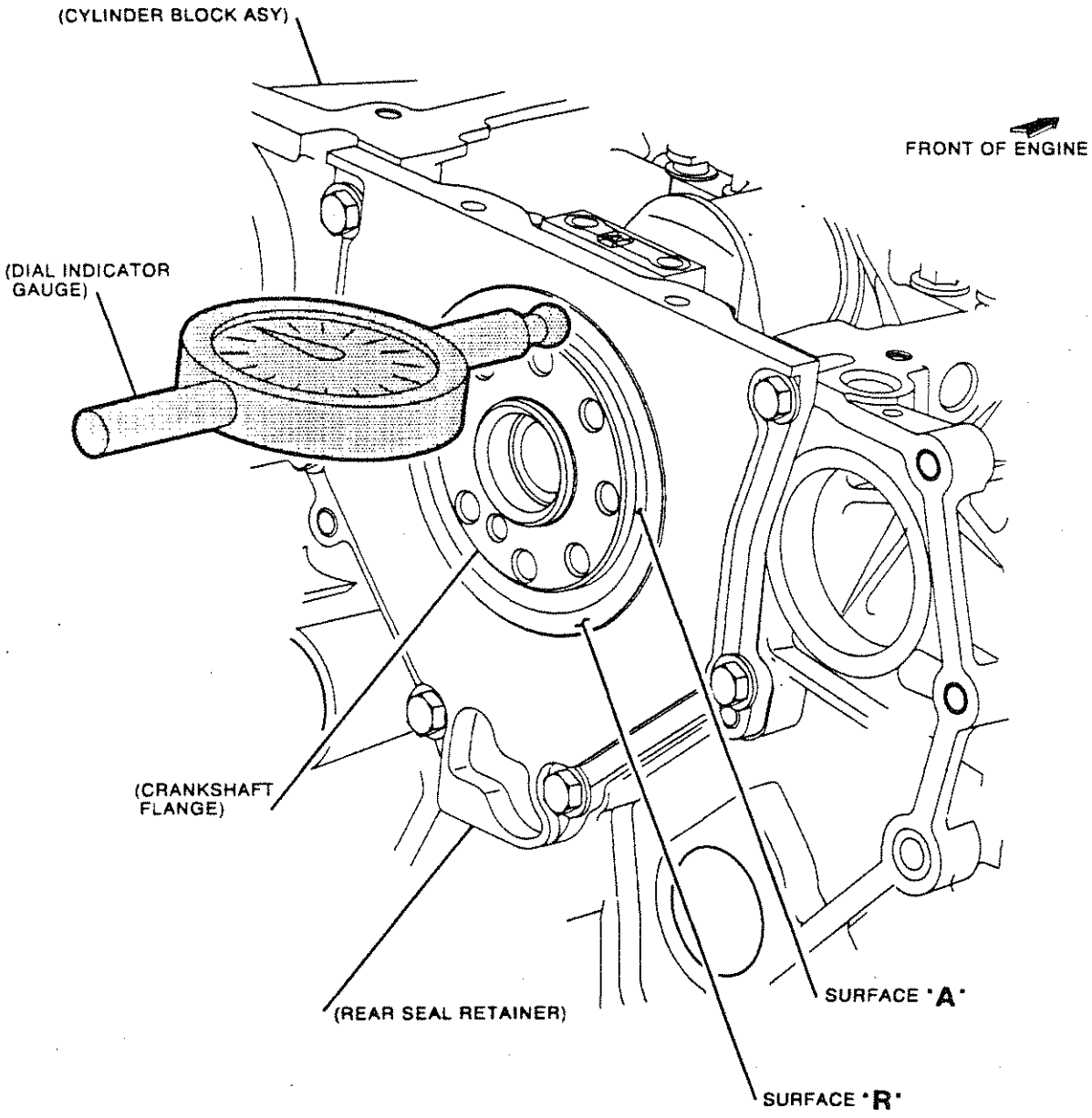
3. APPLY **(4mm)** DIAMETER BEAD OF **WSE-M4G323-A6** SEALER TO CYLINDER BLOCK FOLLOWING SAME PATH AS RETAINER'S SEALER RETENTION GROOVE ℄, WITH EXCEPTION OF A **(4mm X 6mm)** SEALER "PAD" AT BOTH STARTING AND ENDING LOCATIONS OF BEAD (THE TWO LOCATIONS WHERE CYLINDER BLOCK/RETAINER/OIL PAN GASKET MEET). (REFER TO FRAME 8, VIEW A).

4. PICK UP RETAINER/SEAL ASSEMBLY (REAR SEAL, RETAINER AND FASTENERS) AND SLIDE IT OVER CRANKSHAFT AND INSTALL OVER DOWEL PINS ON CYLINDER BLOCK WITHIN **(15)** MINUTES OF SEALER APPLICATION.

5. **TORQUE (6)** M6 SCREW & WASHER ASY'S **(8-12 Nm)**. DURING TIGHTENING PROCESS, SEALER WILL SQUEEZE OUT AT CYLINDER BLOCK/RETAINER/OIL PAN GASKET "T" JOINT. THIS SEALER MUST BE WIPED CLEAN.

6. REFER TO FRAME 8C FOR (SERVICE/AUDIT) SQUARENESS AND CONCENTRICITY CHECK PROCEDURE.

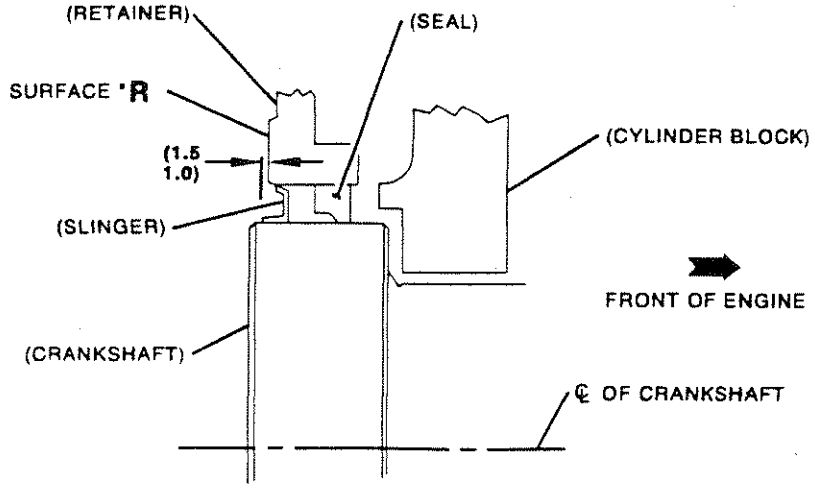
CRANKSHAFT REAR OIL SEAL SQUARENESS & CONCENTRICITY (SERVICE/AUDIT)

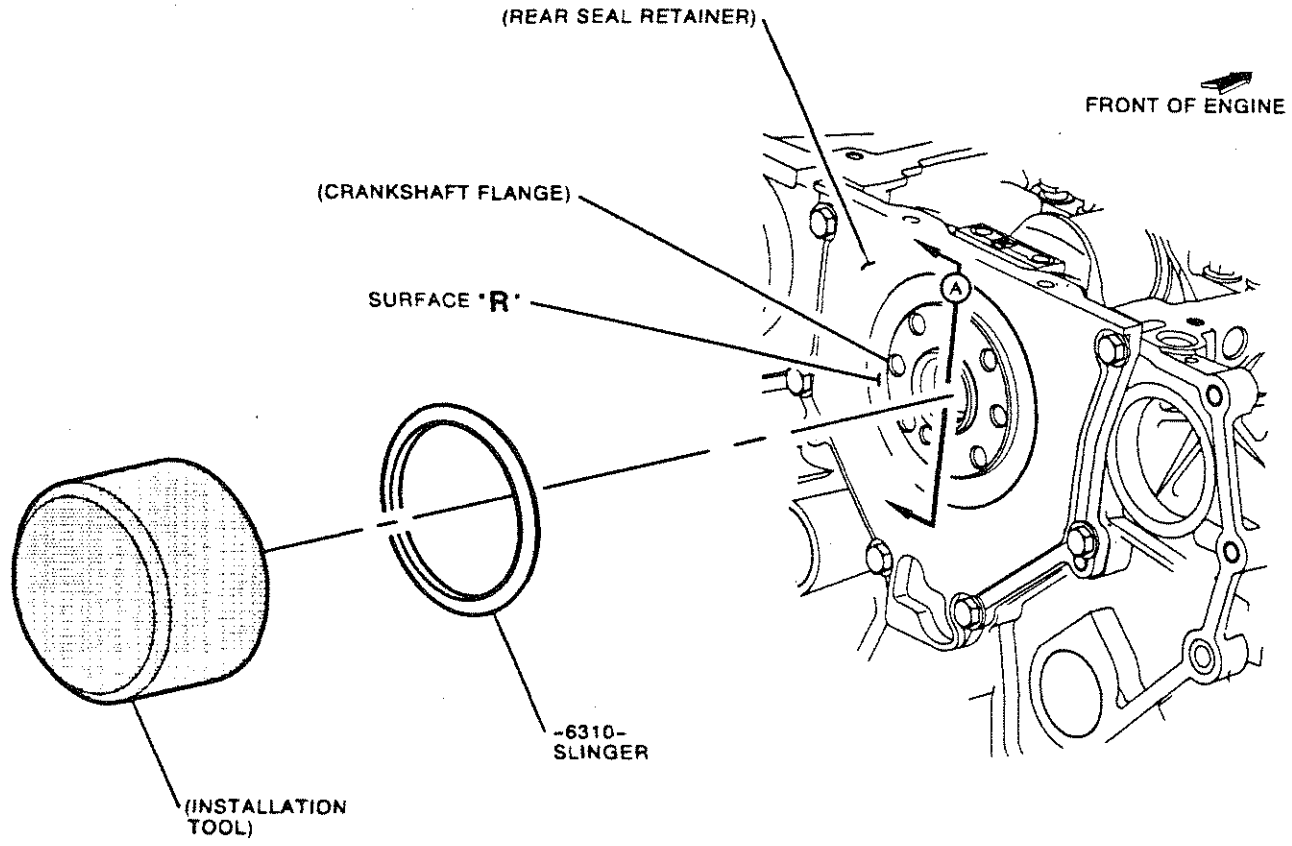


ASSEMBLY PROCEDURE

1. CHECK TORQUE TO TURN (**4 Nm**).
2. AUDIT ONLY - SEAL MUST NOT BE INSTALLED. MAXIMUM (**0.50 FIM**) RETAINER SEAL BORE IN RELATION TO CENTERLINE OF CRANKSHAFT.
3. (**0.50 FIM**) OF SEAL FACE REAR SURFACE "**A**" IN RELATION TO RETAINER SURFACE "**R**".

OIL SEAL SLINGER

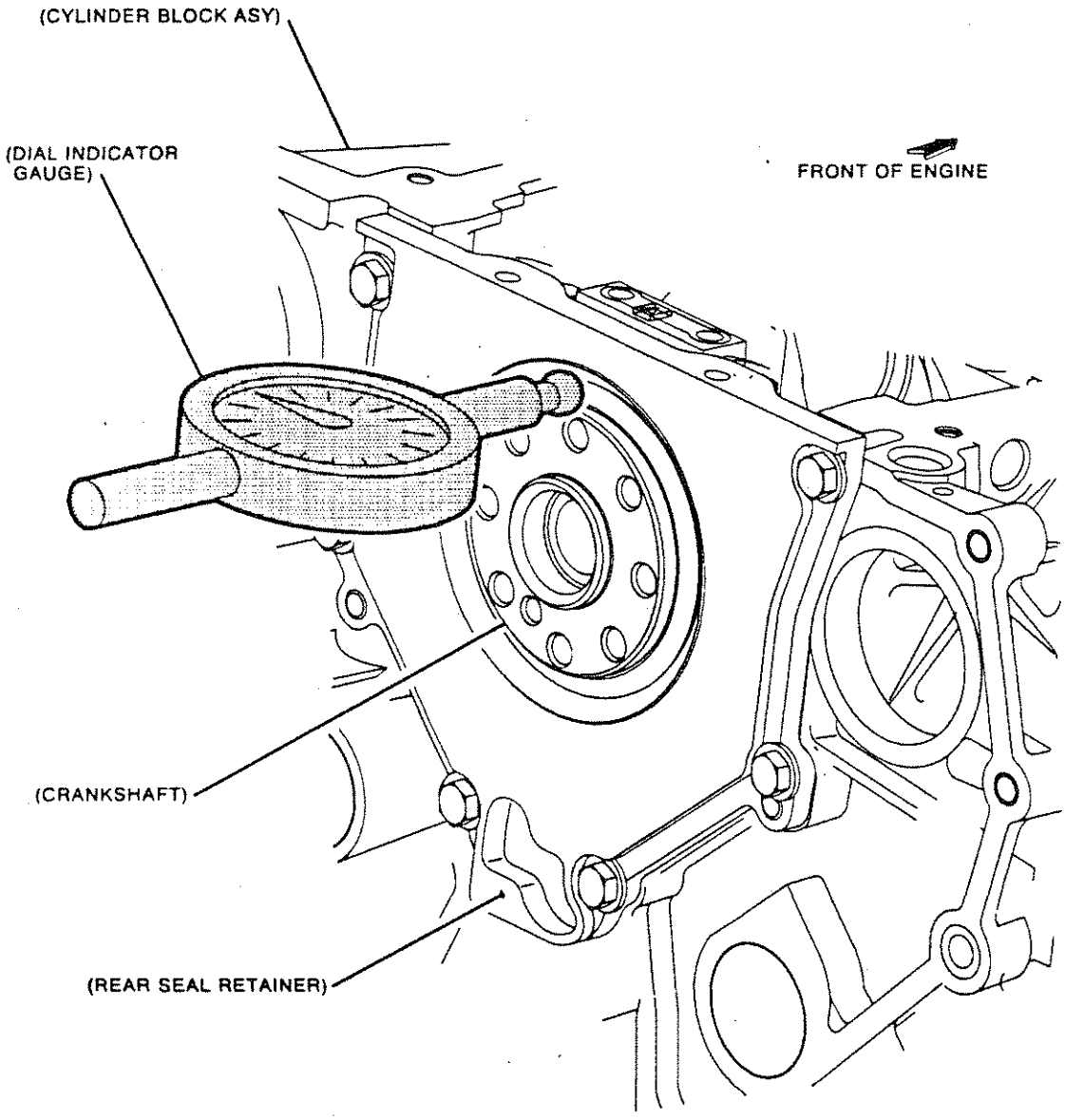




ASSEMBLY PROCEDURE

1. AIR TEST REAR OIL SEAL.
2. INSTALL CRANKSHAFT OIL SEAL SLINGER (-6310-) OVER CRANKSHAFT FLANGE (PART NUMBER TOWARD ENGINE) INTO REAR OIL SEAL RETAINER BORE.
3. INSTALL CRANKSHAFT OIL SEAL SLINGER (-6310-) SUCH THAT REAR SURFACE OF SLINGER IS (1.0-1.5mm) REARWARD (TOWARD TRANSMISSION) OF RETAINER SURFACE "R".

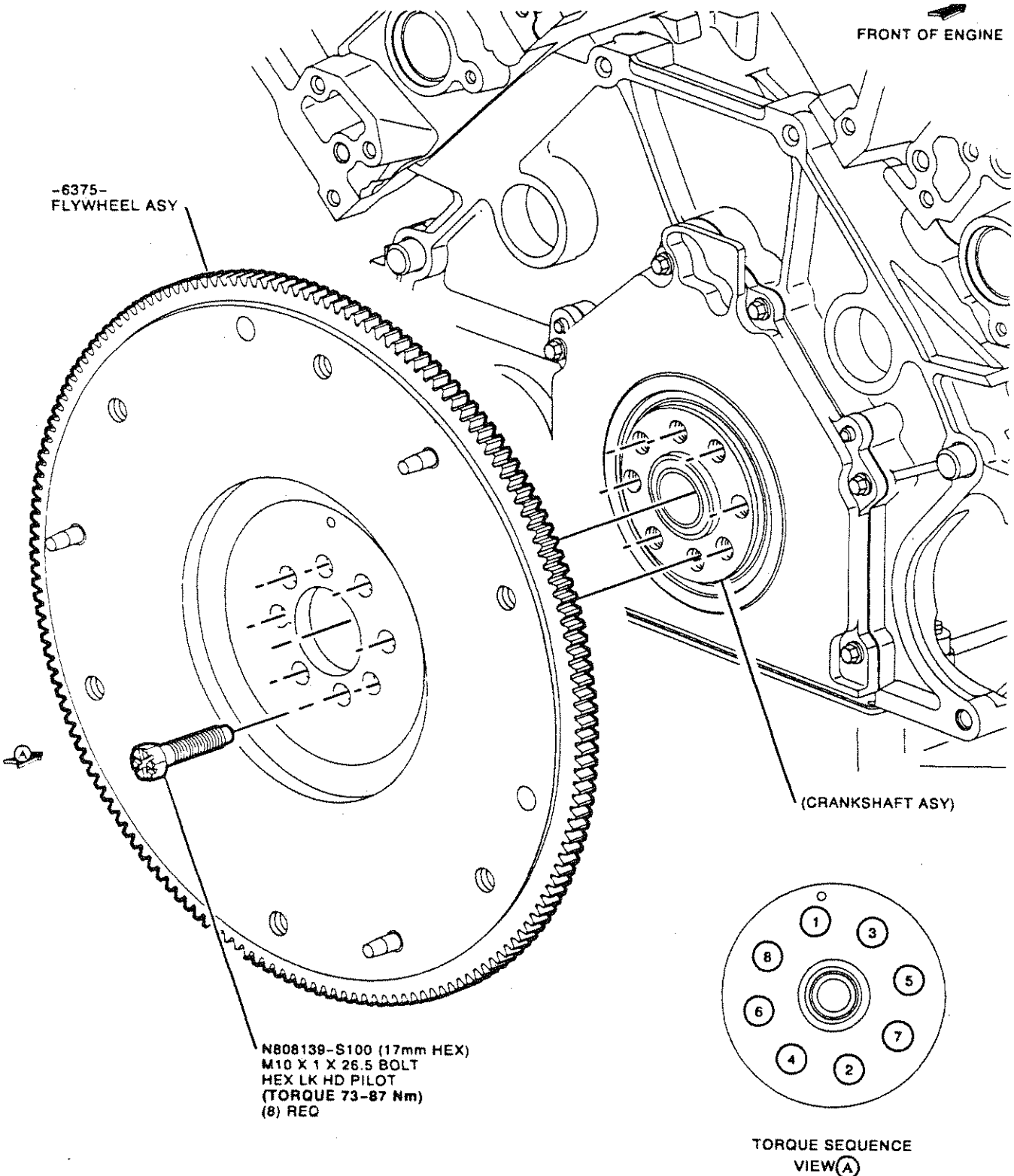
OIL SEAL SLINGER
SQUARENESS & CONCENTRICITY
(SERVICE/AUDIT)



ASSEMBLY PROCEDURE

1. CHECK TORQUE TO TURN (REFER TO FRAME 8C).
2. AUDIT ONLY - SEAL MUST BE INSTALLED. MAXIMUM **(0.50 FIM)** RETAINER SEAL BORE IN RELATION TO CENTERLINE OF CRANKSHAFT.

FLYWHEEL ASY

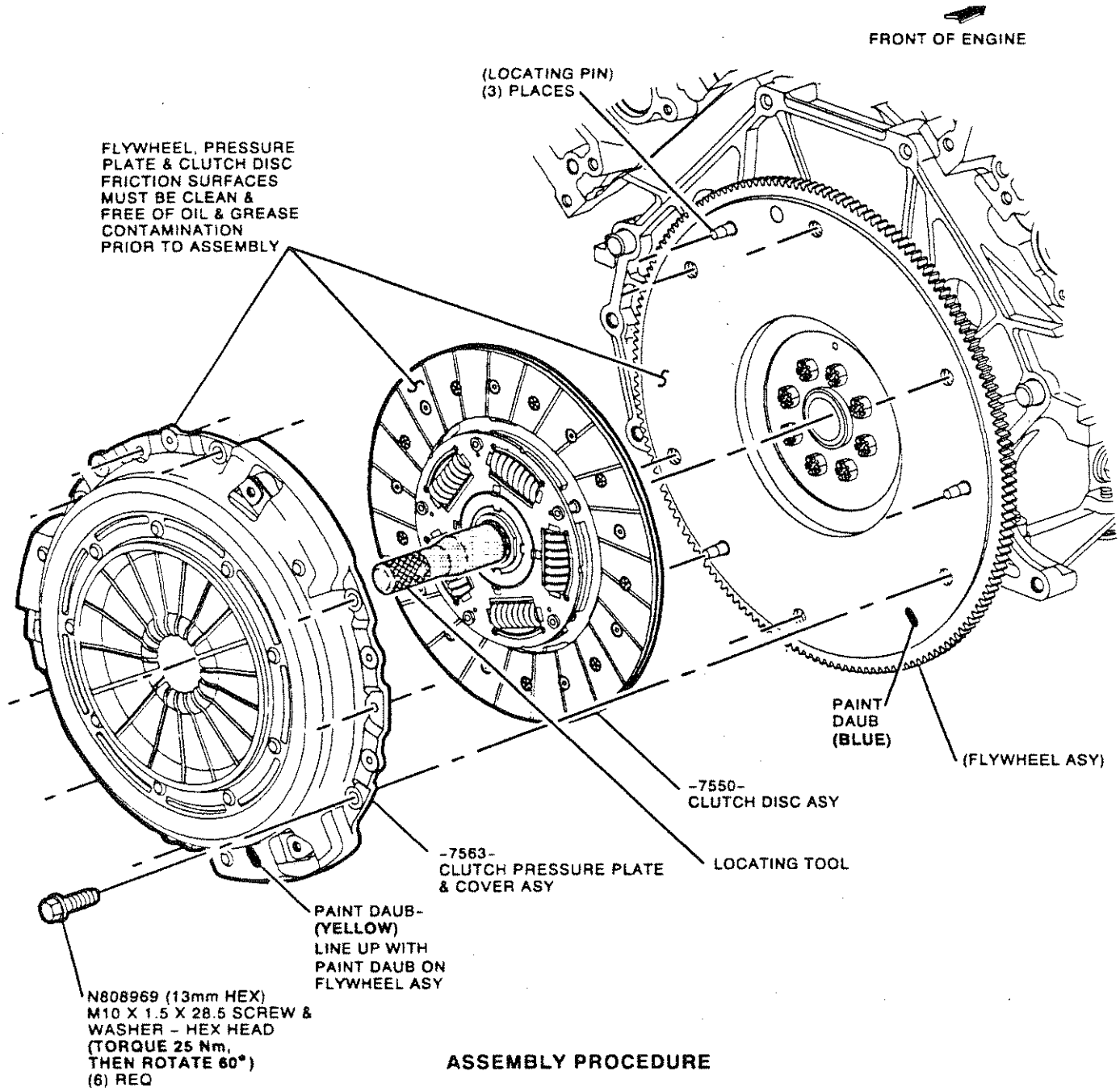


TORQUE SEQUENCE
VIEW (A)

ASSEMBLY PROCEDURE

1. POSITION FLYWHEEL ON CRANKSHAFT AND HAND START (8) BOLTS.
2. RUN DOWN (8) BOLTS ONE TURN AT A TIME, IN SEQUENCE SHOWN, UNTIL FLYWHEEL IS SNUG AGAINST REAR FACE OF CRANKSHAFT.
3. FINAL TORQUE (8) BOLTS IN SEQUENCE SHOWN.

CLUTCH DISC & PRESSURE PLATE ASY



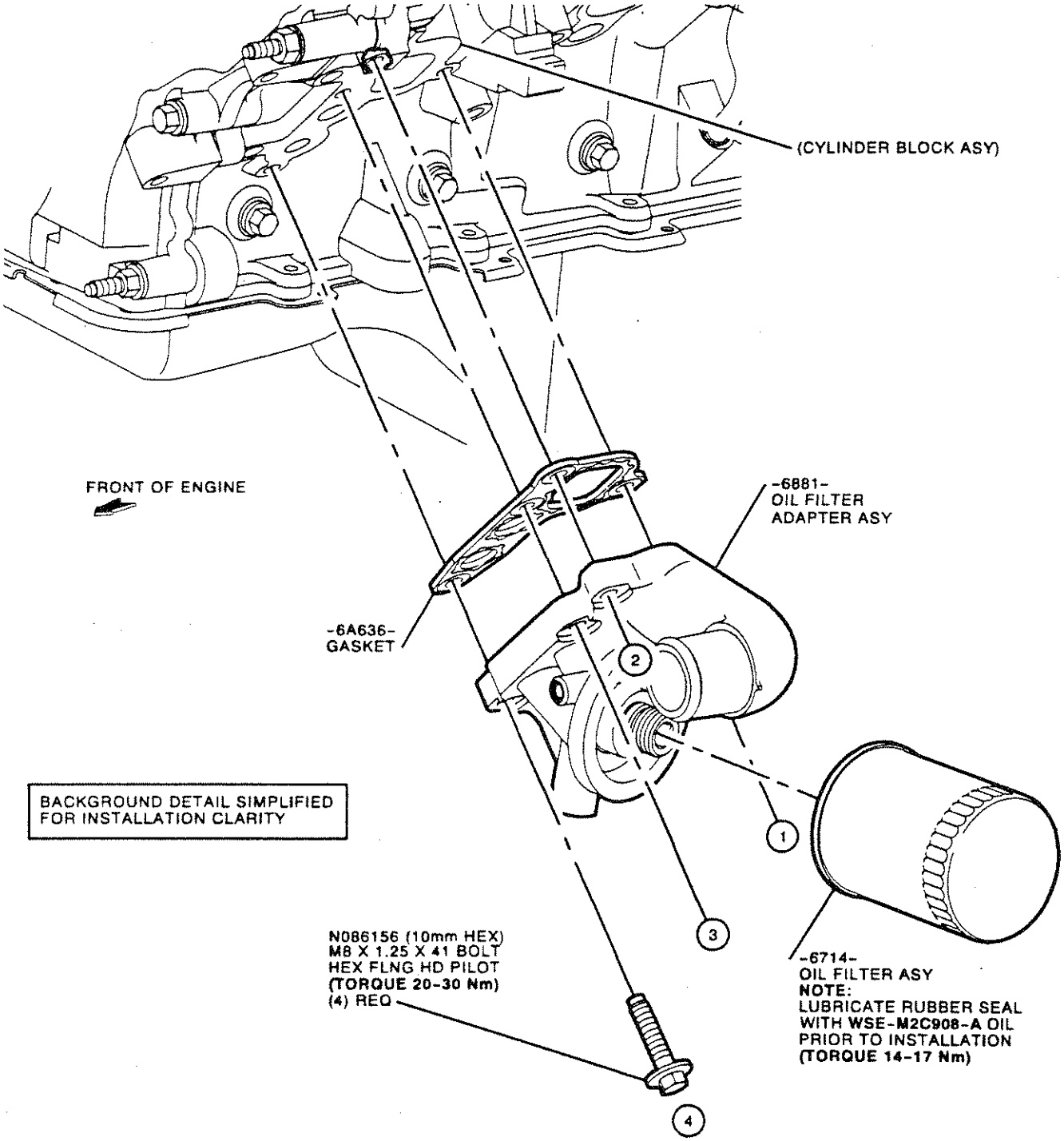
ASSEMBLY PROCEDURE

1. ASSEMBLE CLUTCH DISK TO CRANKSHAFT PILOT BEARING USING THE SPLINED LOCATING TOOL WITH "ENGINE SIDE" STAMPED NOTATION TOWARD ENGINE.
2. INSTALL CLUTCH PRESSURE/COVER ASSEMBLY OVER LOCATING PINS ON FLYWHEEL WITH YELLOW PAINT DAUB ON CLUTCH COVER MATCHED TO BLUE PAINT DAUB ON FLYWHEEL AS CLOSELY AS POSSIBLE.
3. HAND START (6) CLUTCH COVER TO FLYWHEEL FASTENERS.
4. POSITION MULTISPINDLE RUNDOWN AND ZERO TORQUE (6) CLUTCH PRESSURE PLATE FASTENERS.
5. PERFORM FINAL RUNDOWN ON CLUTCH PRESSURE PLATE FASTENERS.

SERVICE PROCEDURE

TIGHTEN FASTENERS USING SINGLE WRENCH STAR PATTERN.

OIL FILTER ADAPTER ASY AND OIL FILTER ASY



ASSEMBLY PROCEDURE

1. POSITION GASKET (-6A636-) AND ADAPTER ASY (-6881-) TO CYLINDER BLOCK ASY.
2. INSTALL AND **TORQUE** (4) FASTENERS TO SPECIFICATION.

CYLINDER HEAD ASY, VALVES & SPRINGS

LEFT SIDE _____ SHOWN
RIGHT SIDE _____ TYPICAL

NOTE:
APPLY **WSE-M2C908-A** OIL TO ENTIRE ID AND OD OF VALVE GUIDES PRIOR TO INSTALLATION.

-6518-
KEY-VALVE SPRING RETAINER
(32) REQ
MUST BE PROPERLY SEATED

-6514-
RETAINER-VALVE SPRING
(16) REQ

-6571-
VALVE STEM SEAL ASY
(16) REQ
MUST BE INSTALLED BEFORE INSERTING VALVE (-6507-) AND BOTTOMED ON VALVE GUIDE
NOTE:
GARTER SPRING MUST BE PRESENT.

-6513-
VALVE SPRING-**INTAKE**
(8) REQ
PAINT STRIPE: **BROWN.**

(GARTER SPRING)

(OIL RESTRICTOR TUBE)

(CYLINDER HEAD ASY)

(17-18)

SECTION (A)

-6F087-
OIL RESTRICTOR ASY

-6513-
VALVE SPRING-**EXHAUST**
(8) REQ
PAINT STRIPE: **BLUE**

NOTE:
EXTERNAL FEATURES ON REAR OF EACH HEAD MACHINED OFF FOR VEHICLE CLEARANCE

-6505-
EXHAUST VALVE
(8) REQ

(INSERT - PART OF CYLINDER HEAD ASY)
(16) PLACES

-6049-(RH)
-6050-(LH)
CYLINDER HEAD ASY

FRONT OF ENGINE

-6507-
INTAKE VALVE
(8) REQ

SERVICE/QUALITY AUDIT ONLY
VALVE STEM TO GUIDE CLEARANCE:
INTAKE: **(0.020-0.069)**
EXHAUST: **(0.020-0.069)**

VALVE SPRING INSTALLED HEIGHT (SERVICE/QUALITY AUDIT)

NOTE:
REFER TO FRAME 12A FOR ASSEMBLY PROCEDURE.

NOTE:
ALL QUANTITIES SHOWN **PER SIDE.**

TOP OF SPRING

INSTALLED SPRING HEIGHT
INTAKE ___ **(42.7 - 43.3)**
EXHAUST ___ **(39.2 - 39.8)**

1.660 - 1.670
1.541 - 1.566

SPRING SEAT

MAINTAIN SPECIFIED VALVE SPRING INSTALLED HEIGHT TO THIS DIMENSION PER AFFECTED CYLINDER HEAD DETAIL DRAWING

GAUGE LINE

030102

REL	MODEL	DATE	LAST FRAME
NE01-E10956645-000	2000 5.4L-4V COBRA "R"	000828	41

Ford Motor Company V-ENGINE ILLUSTRATION	NO	REV	FRAME	CONTD
	▽ ILYR3E-030002-E0543U	---	12	12A

SCALE = .40

ASSEMBLY PROCEDURE

PRODUCTION METHOD

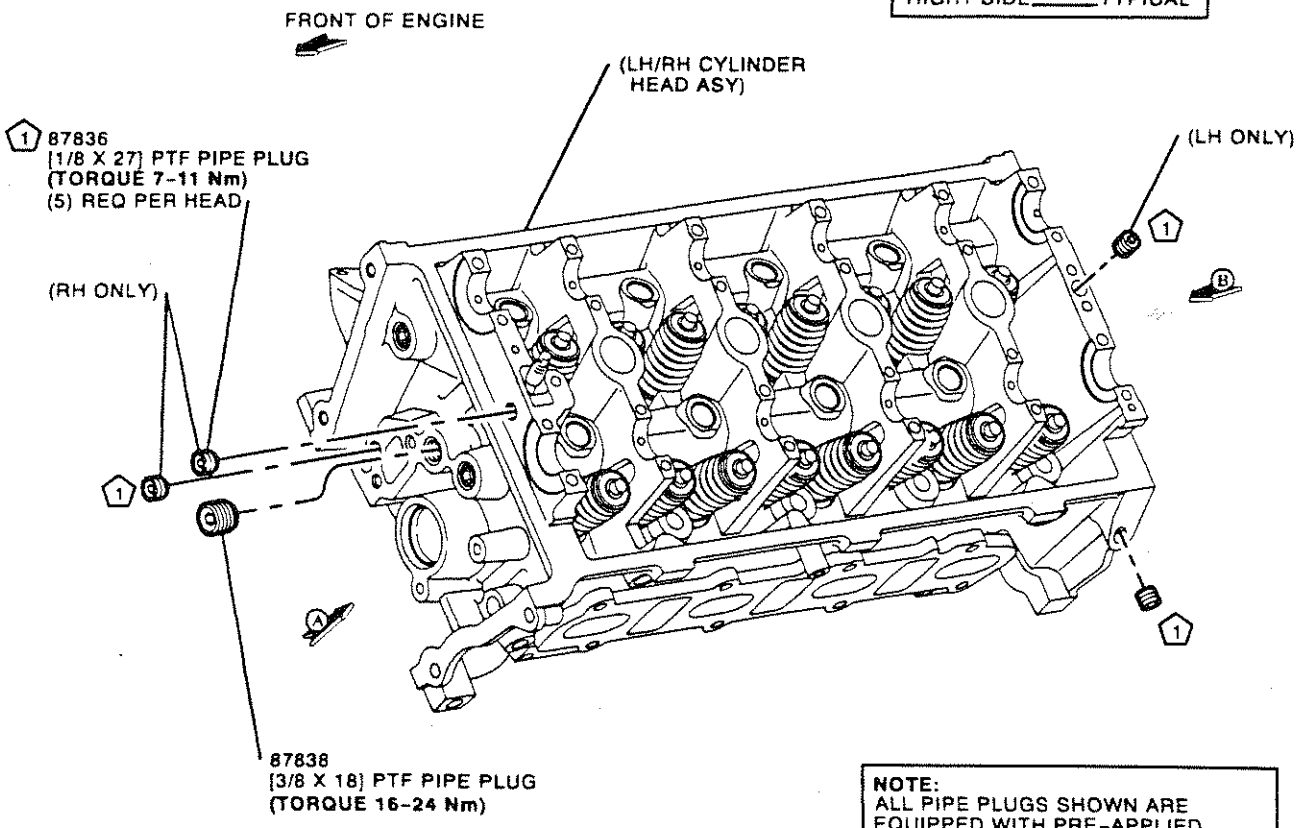
1. REMOVE CAM CAP BOLTS & BEARING CAP.
2. LOAD (16) VALVE STEM SEALS (-6A517-) AND PRESS TO SPRING SEAT.
3. APPLY **WSE-M2C908-A** OIL TO ENTIRE ID OF VALVE GUIDE AND VALVE STEM SEAL.
4. LOAD (8) INTAKE VALVES (-6507-) & (8) EXHAUST VALVES (-6505-).
5. KEY UP ALL VALVES WITH (16) VALVE SPRINGS (-6513-), (16) VALVE SPRING RETAINERS (-6514-) AND (32) VALVE SPRING RETAINER KEYS (-6518-).
6. INSTALL OIL RESTRICTOR ASY (-6F087-) AND PRESS TO DEPTH.
7. PERFORM CYLINDER HEAD LEAK TEST **(0-1000 CC/MIN).**

SERVICE METHOD

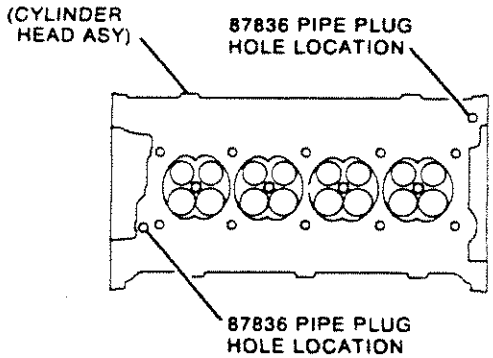
1. SAME AS PRODUCTION METHOD.

CYLINDER HEAD PIPE PLUGS

LEFT SIDE _____ SHOWN
RIGHT SIDE _____ TYPICAL

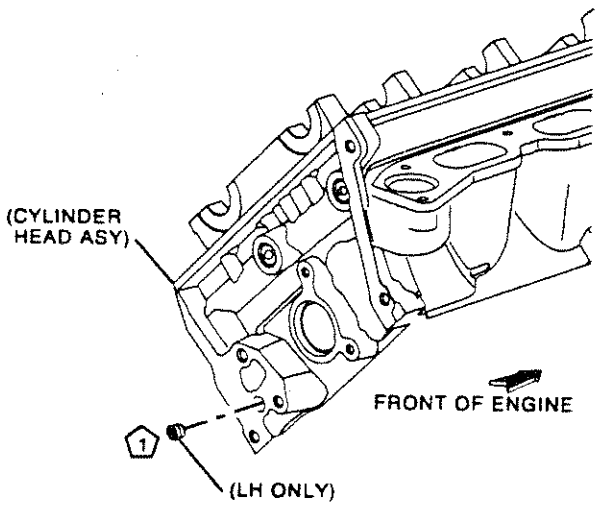


NOTE:
ALL PIPE PLUGS SHOWN ARE EQUIPPED WITH PRE-APPLIED SEALANT. ANY FUNCTIONALLY EQUIVALENT REPLACEMENT PLUGS MUST USE **WSK-M2G350-A2** OR EQUIVALENT AS A SEALANT.



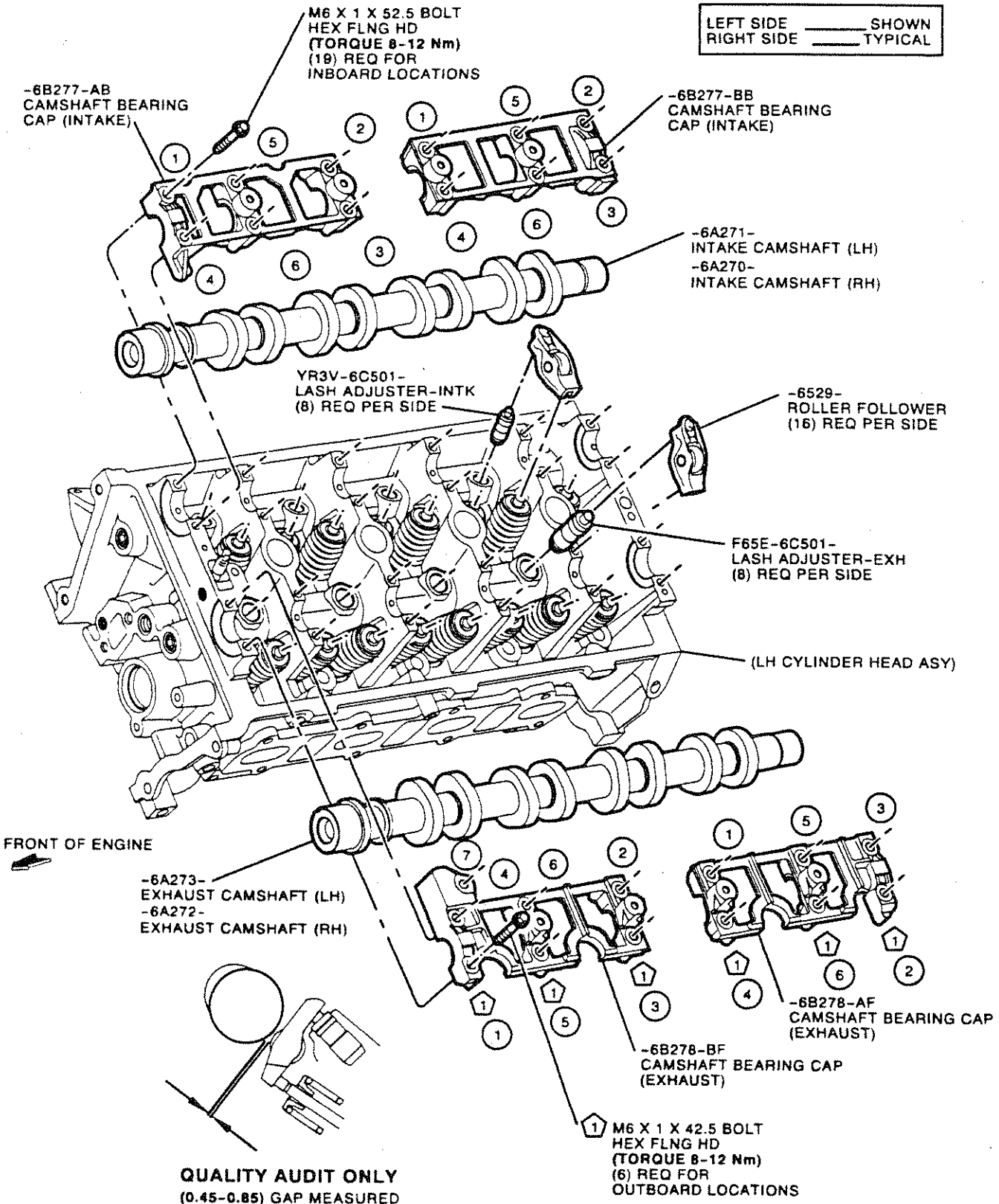
NOTE:
FOR SERVICE ONLY

VIEW (A)
TYPICAL (2) PLACES



VIEW (B)

CAMSHAFTS, BEARING CAPS, LASH ADJUSTERS AND ROLLER FINGER FOLLOWERS



ASSEMBLY PROCEDURE

A. PRODUCTION METHOD

1. LOAD (16) LASH ADJUSTERS (-6C501-) INTO EACH CYLINDER HEAD ASY.
2. APPLY **WSE-M2C908-A** OIL TO CAMSHAFT JOUNRNALS, LOBES, VALVE TIP PADS, ROLLER FOLLOWER SURFACES AND ADJUSTER SOCKETS, PRIOR TO INSTALLATION.
3. LOAD (16) ROLLER FINGER FOLLOWERS (-6529-) AND (2) CAMSHAFTS (-6A271-/-6A273- & -6A270-/-6A272-) INTO EACH RESPECTIVE CYLINDER HEAD. THEN POSITION (4) CAMSHAFT BEARING CAPS (-6B277-/-6B278-) OVER CAMSHAFTS IN EACH HEAD ENGAGING DOWELS IN CAM TOWERS (REFER TO VIEW BELOW).
4. DEPRESS CAMSHAFT AND CAMSHAFT CLUSTER CAPS, (ENSURE ALL COMPONENTS ARE PROPERLY ALIGNED) AND **TORQUE** ALL BOLTS SIMULTANEOUSLY **(8-12 Nm).**

QUALITY AUDIT ONLY

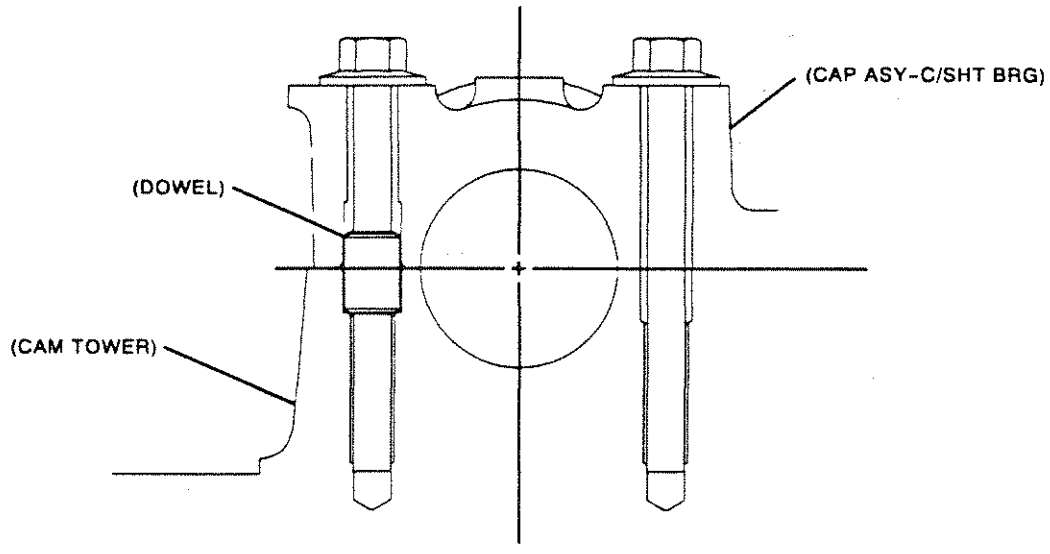
CAMSHAFT END PLAY **(0.05-0.188 FIM)**
TORQUE TO TURN **(12-20 Nm)**

B. SERVICE METHOD

1. APPLY **WSE-M2C908-A** OIL TO CAMSHAFT JOURNALS, LOBES, VALVE TIP PADS, ROLLER FOLLOWER SURFACES AND ADJUSTER SOCKETS, PRIOR TO INSTALLATION.
2. LOAD (16) LASH ADJUSTERS AND CAMSHAFTS INTO EACH CYLINDER HEAD ASY AND POSITION CAM CLUSTER CAPS OVER CAMSHAFTS, ENGAGING DOWELS IN CAM TOWERS (REFER TO ASSEMBLED VIEW BELOW).
3. INSTALL (25) M6 BOLTS AND **(TORQUE 8-9 Nm)** (SEQUENCE SHOWN ON FRAME 12C).
4. DEPRESS VALVE SPRING USING SERVICE TOOL AND INSTALL ROLLER FOLLOWER. RELEASE PRESSURE FROM TOOL.
5. REPEAT STEP 4 (16) TIMES TO COMPLETE CYLINDER HEAD ASY.

QUALITY AUDIT ONLY

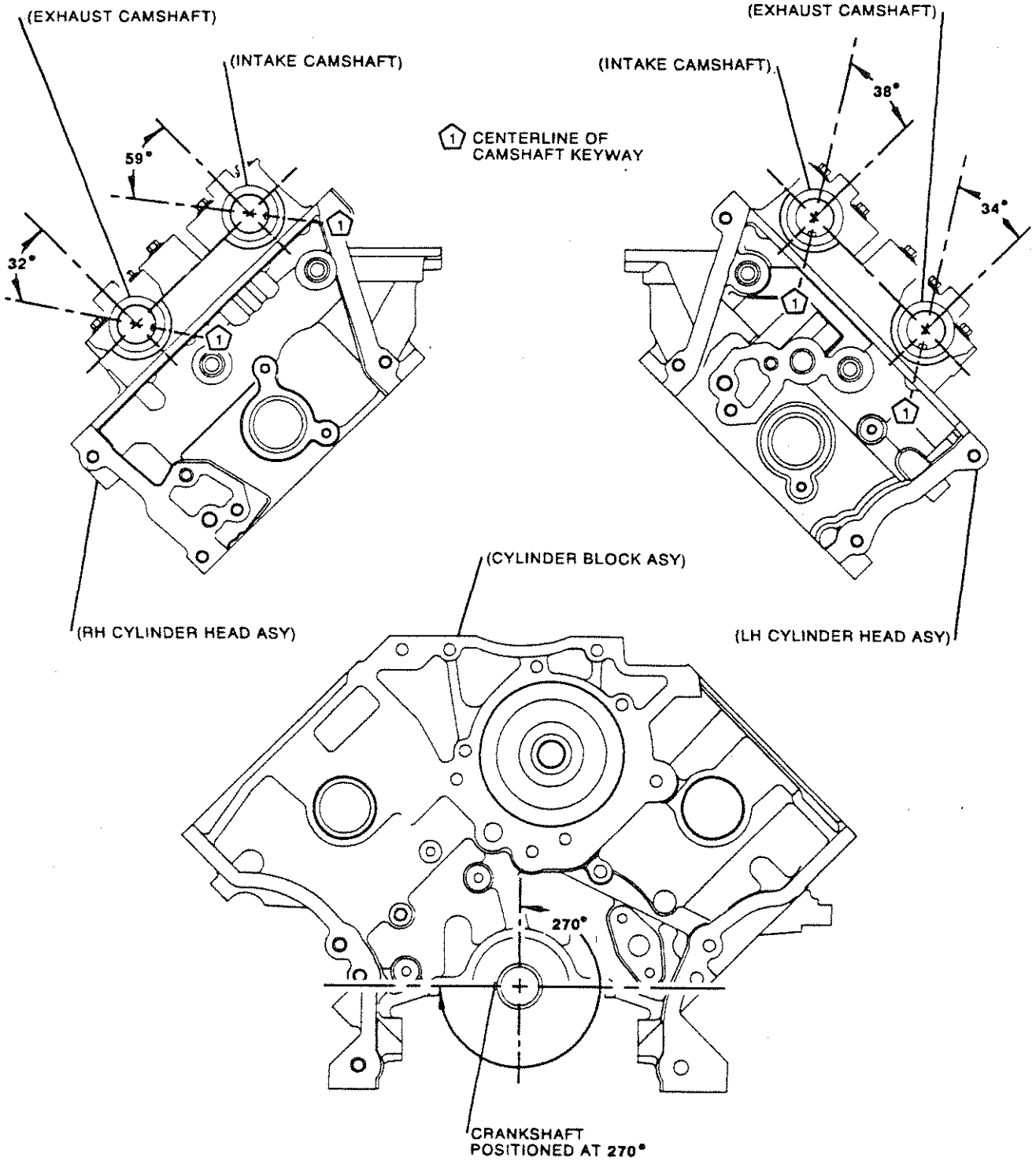
CAMSHAFT END PLAY **(0.05-0.188 FIM)**
TORQUE TO TURN **(12-20 Nm)**



ASSEMBLED VIEW (TYPICAL)

CYLINDER HEAD ASY TO CYLINDER BLOCK (PRE-ASSEMBLY TIMING)

NOTE:
CRANKSHAFT & CAMSHAFTS MUST BE POSITIONED AS SHOWN PRIOR TO INSTALLATION OF CYLINDER HEAD ASY TO CYLINDER BLOCK TO PREVENT PISTON CROWN AND VALVE DAMAGE.



FRONT VIEW

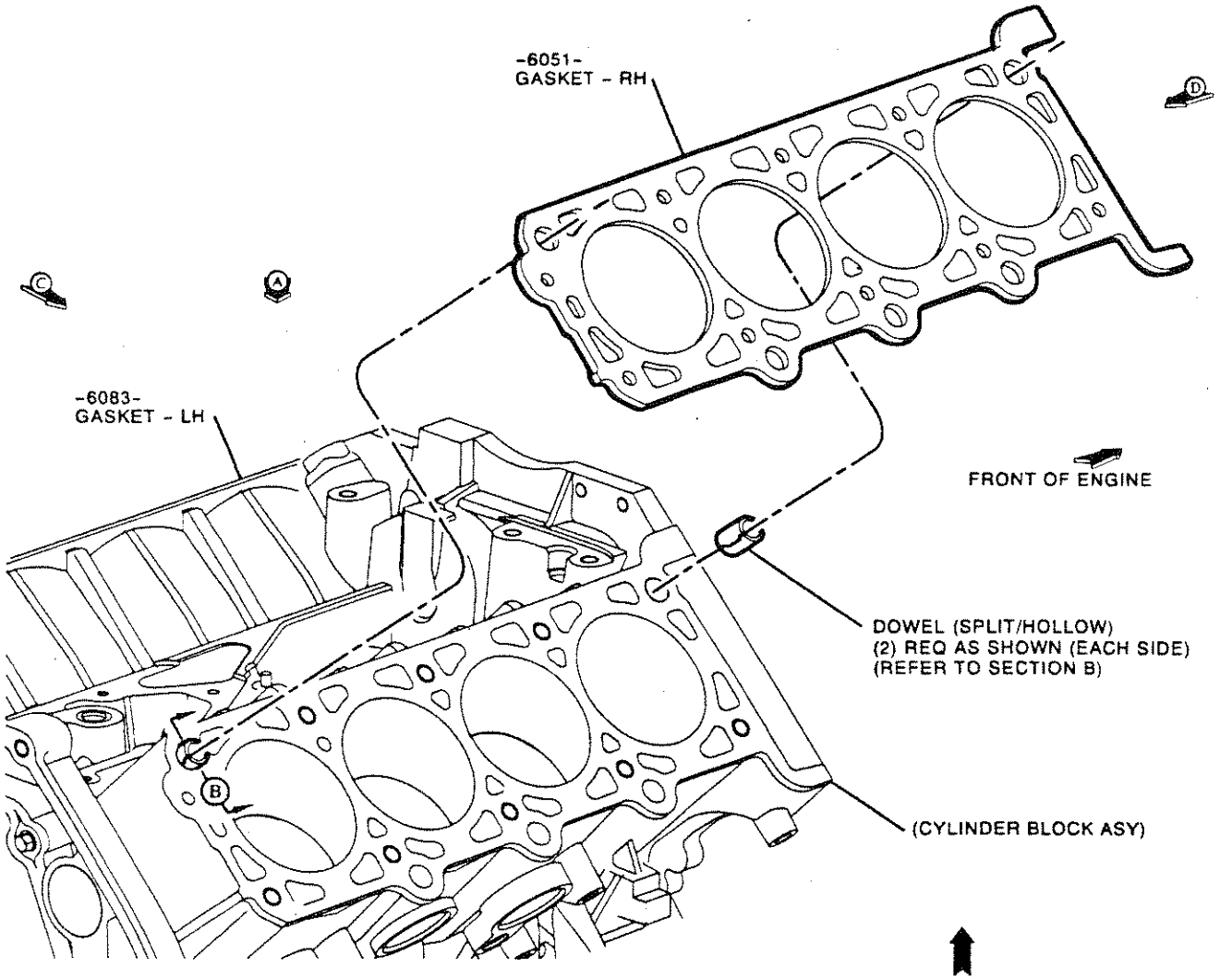
030102

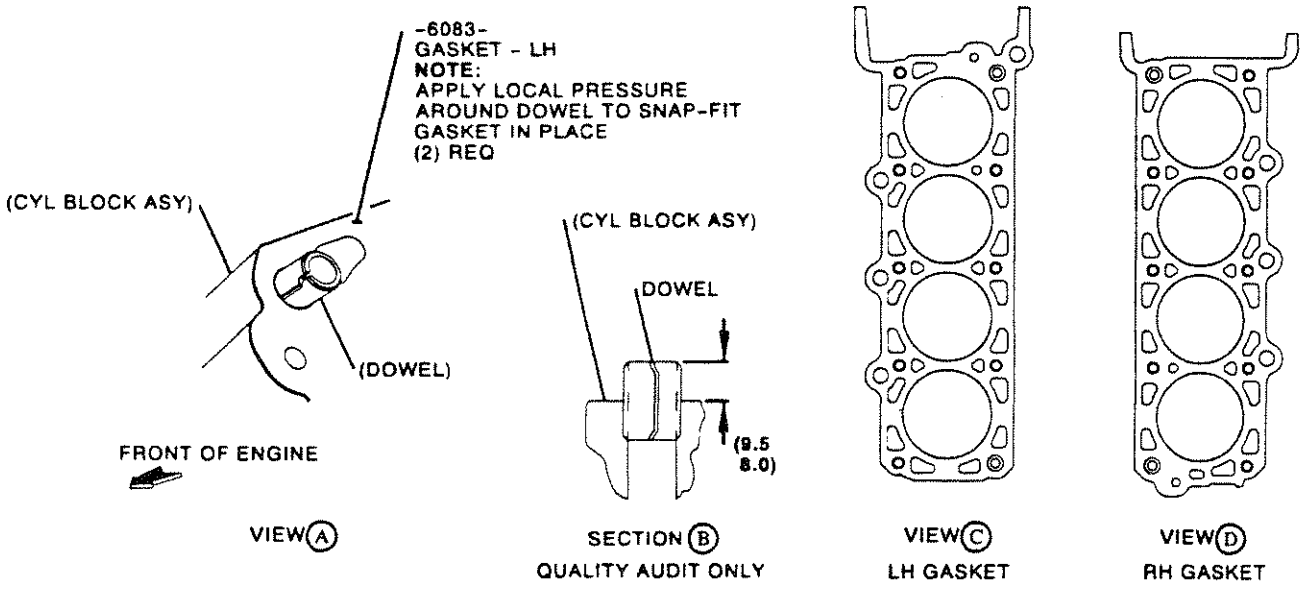
REL	MODEL	DATE	LAST FRAME
NE01-E10956645-000	2000 5.4L-4V COBRA "R"	000828	41

Ford Motor Company V-ENGINE ILLUSTRATION	NO	REV	FRAME	CONTD
	▽ ILYR3E-030002-E0543U	---	12E	12F

SCALE - 25

CYLINDER HEAD GASKETS





030102

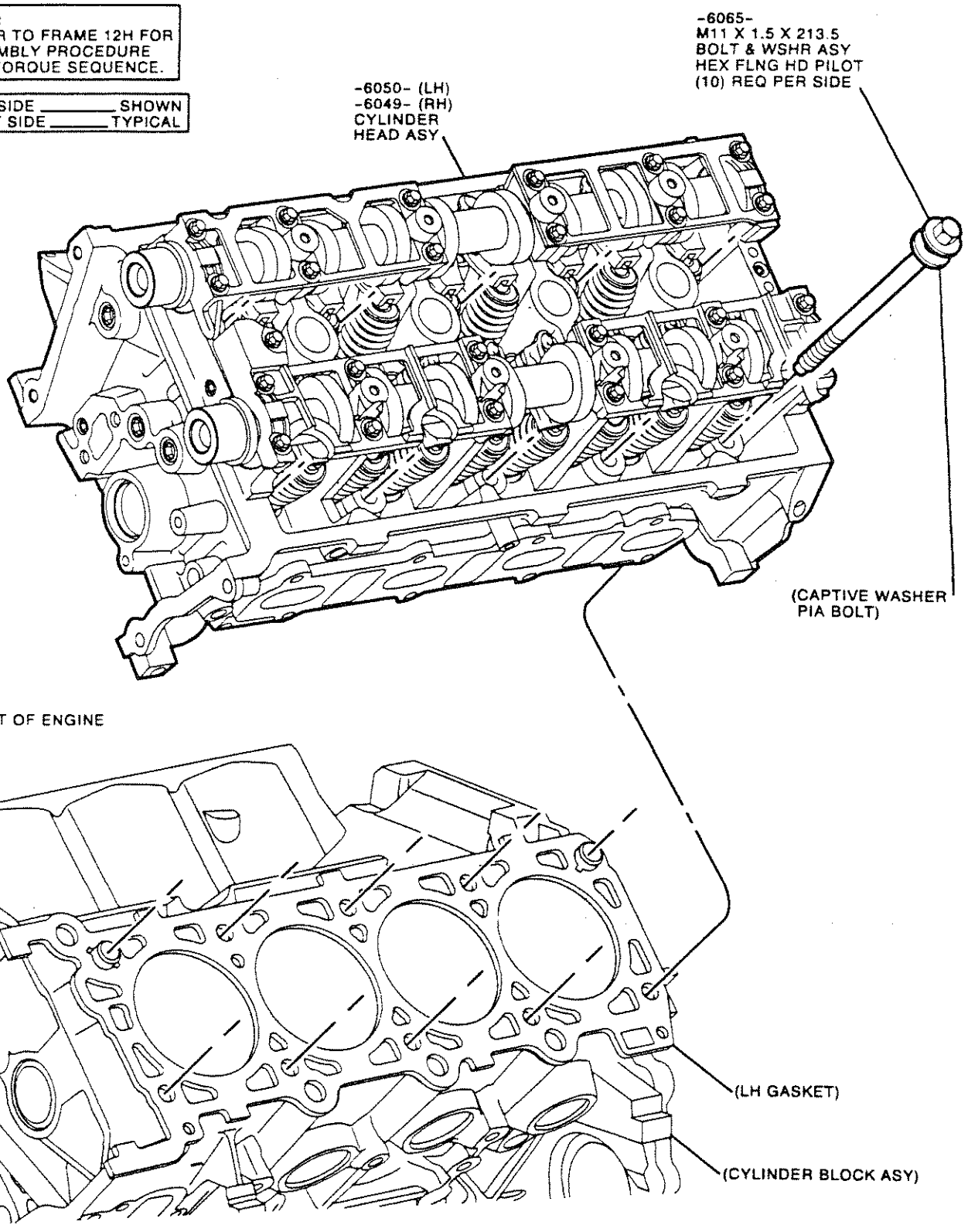
REL	NE01-E10956645-000	MODEL	2000 5.4L-4V COBRA "R"	DATE	000828	LAST FRAME	41
Ford Motor Company V-ENGINE ILLUSTRATION		NO	▽ ILYR3E-030002-E0543U	REV	---	FRAME 12F	CONTD 12G

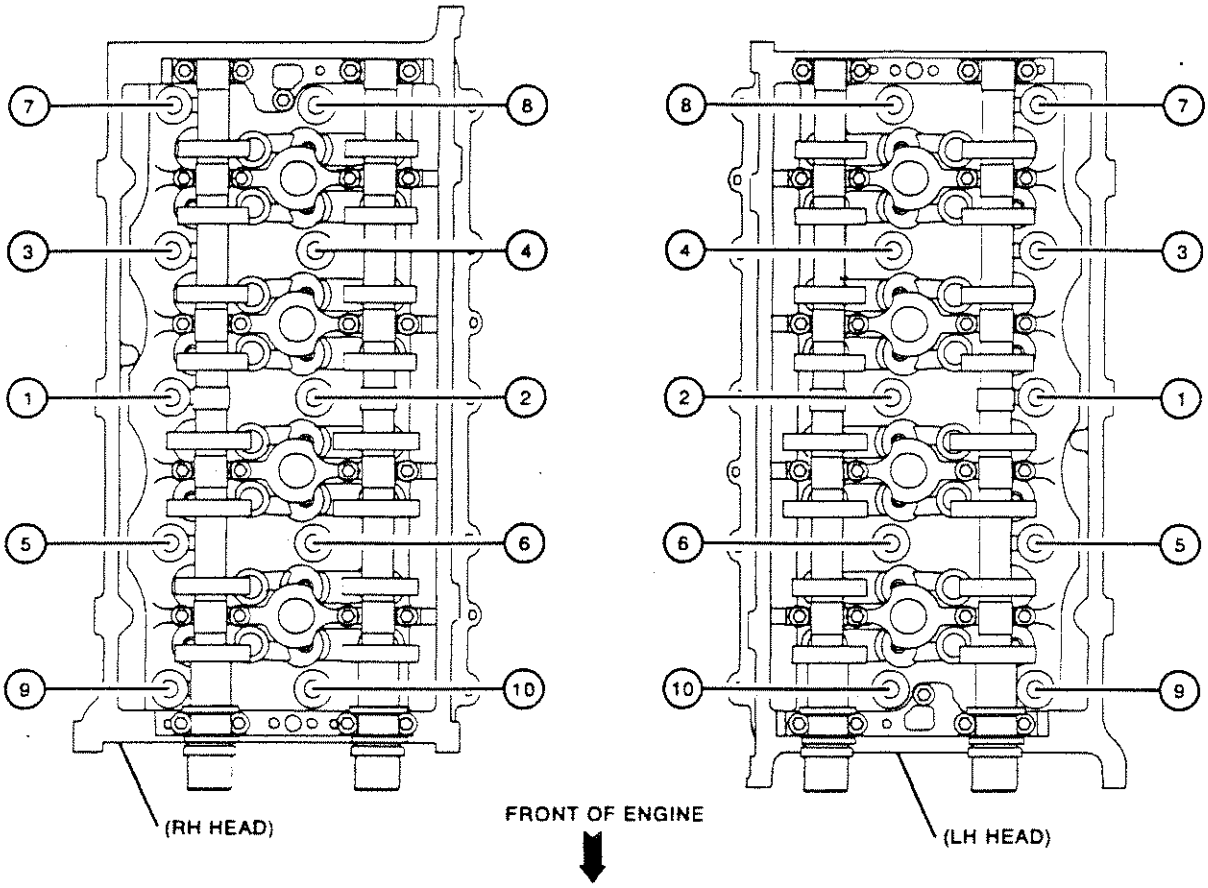
SCALE = .50

CYLINDER HEAD ASY

NOTE:
REFER TO FRAME 12H FOR ASSEMBLY PROCEDURE AND TORQUE SEQUENCE.

LEFT SIDE _____ SHOWN
RIGHT SIDE _____ TYPICAL





BACKGROUND DETAIL SIMPLIFIED
FOR INSTALLATION CLARITY

CYLINDER HEAD TORQUE SEQUENCE

(SINGLE WRENCH METHOD)

ASSEMBLY PROCEDURE

PRODUCTION METHOD (MULTI-SPINDLE)

1. INSTALL CYLINDER HEAD ASY (-6049-/-6050-) OVER DOWELS.
2. INSTALL AND RUN DOWN (10) M11 BOLTS. **(TORQUE 50 Nm, ROTATE 180°)** IN SEQUENCE SHOWN BELOW.

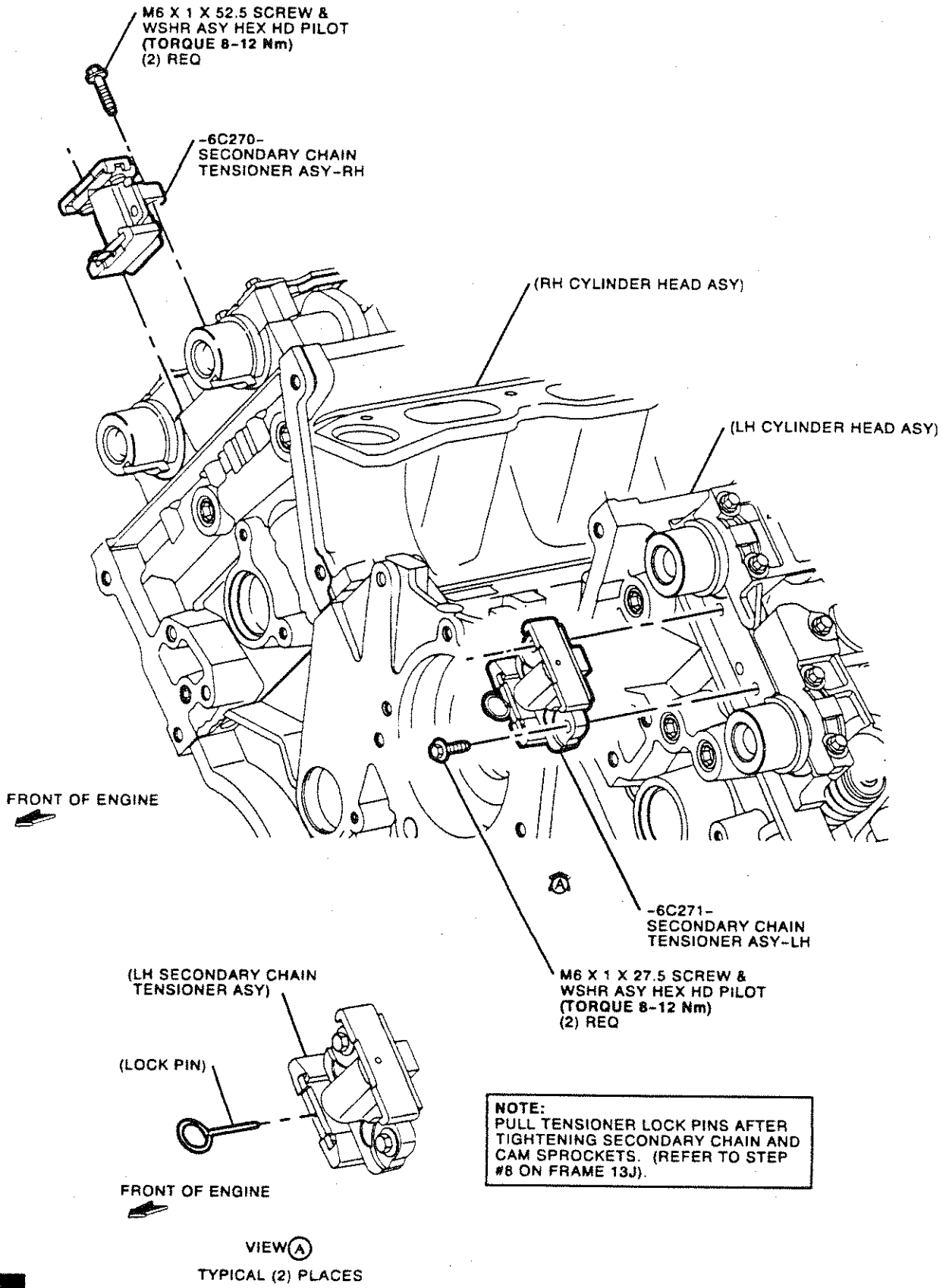
NOTE: **TORQUE** BOLTS TO SPECIFICATION: LOCATIONS 1 & 2 FIRST, LOCATIONS 3,4,5 & 6 SECOND AND LOCATIONS 7,8,9 & 10 LAST.

NOTE:
CYLINDER HEAD BOLTS MAY BE TORQUED TO YIELD A MAXIMUM OF (5) TIMES.

SINGLE WRENCH METHOD (SERVICE AND REPAIR)

1. INSTALL CYLINDER HEAD ASY (-6049-/-6050-) OVER DOWELS.
2. INSTALL (10) M11 BOLTS - HAND START ONLY.
3. **TORQUE** ALL BOLTS IN NUMERICAL SEQUENCE AS SHOWN.
   A. **TORQUE** ALL BOLTS **(67-73 Nm)**.
   B. **ROTATE** BOLTS **(85°-95°)**.
   C. **ROTATE** ALL BOLTS AN ADDITIONAL **(85°-95°)**.

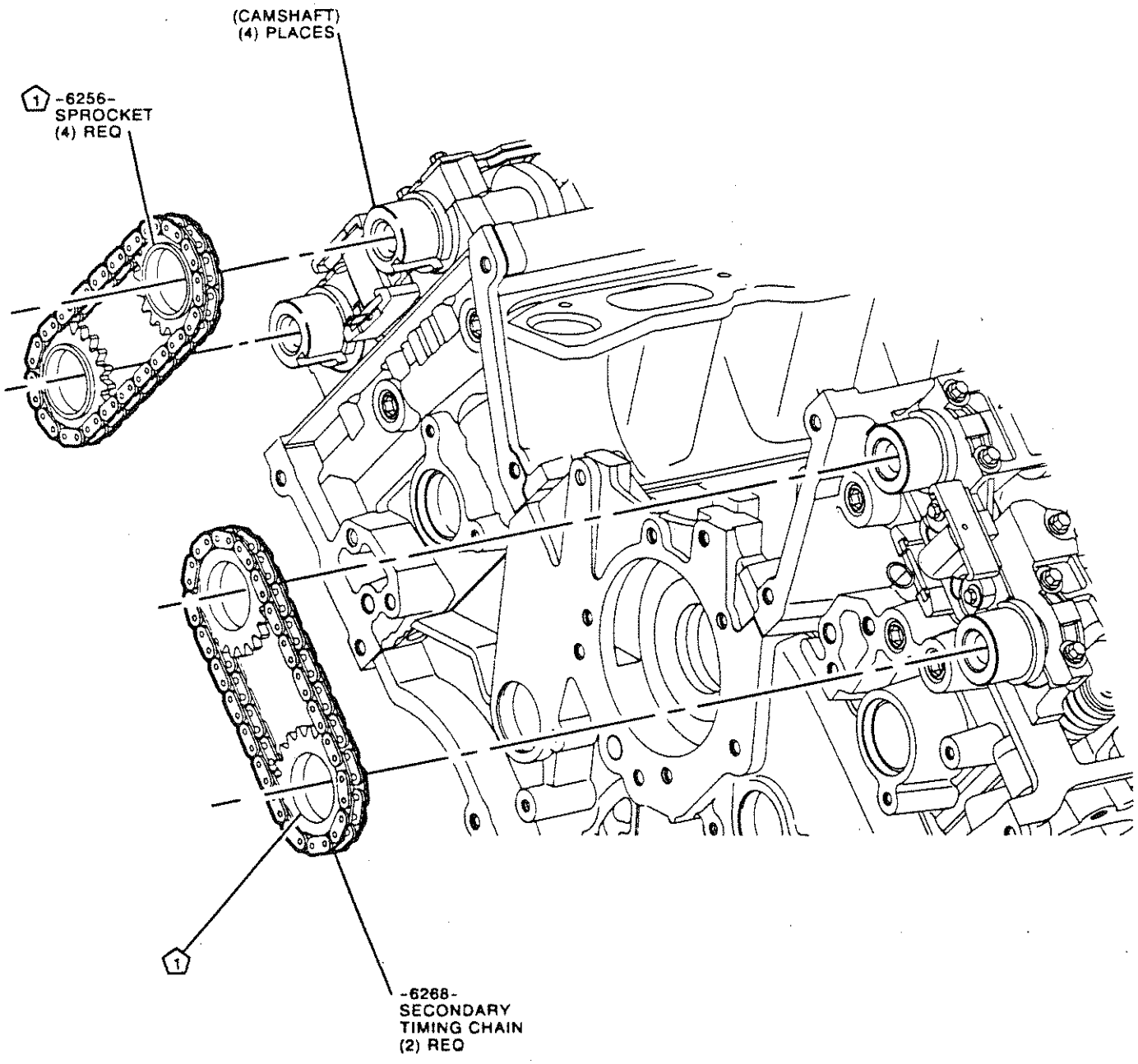
SECONDARY CHAIN TENSIONER ASY



NOTE:
PULL TENSIONER LOCK PINS AFTER TIGHTENING SECONDARY CHAIN AND CAM SPROCKETS. (REFER TO STEP #8 ON FRAME 13J).

VIEW (A)
TYPICAL (2) PLACES

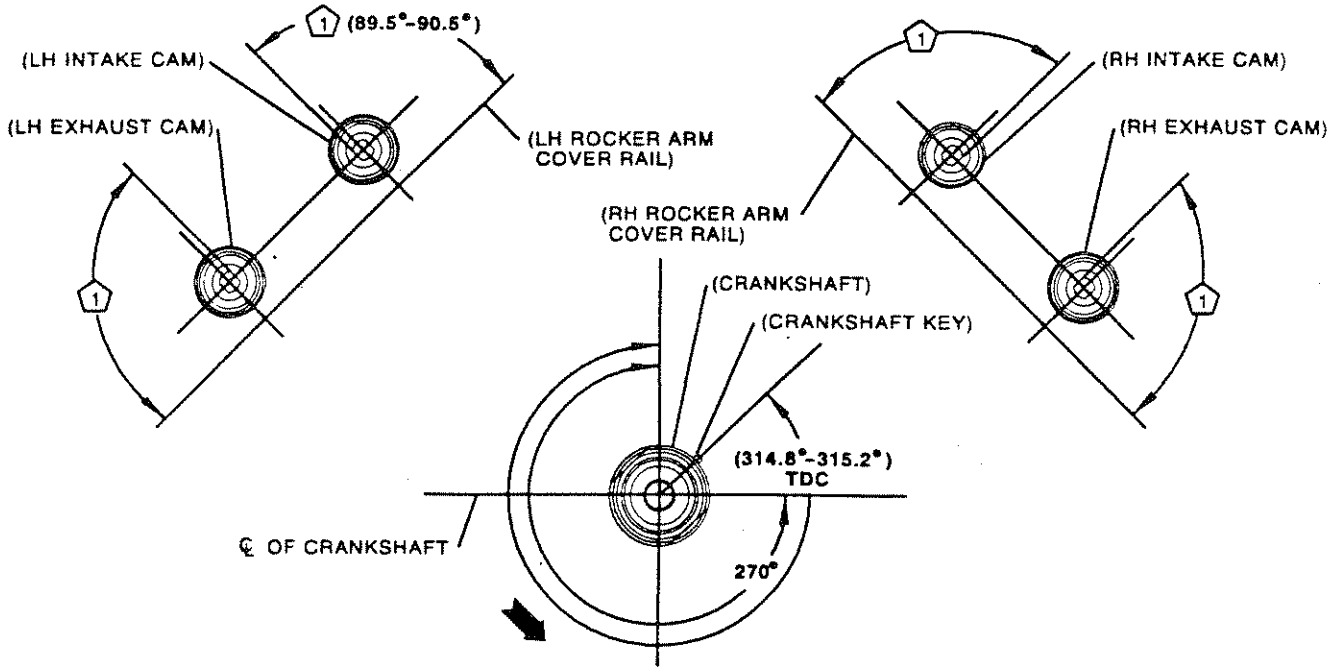
SECONDARY TIMING CHAINS AND SPROCKETS



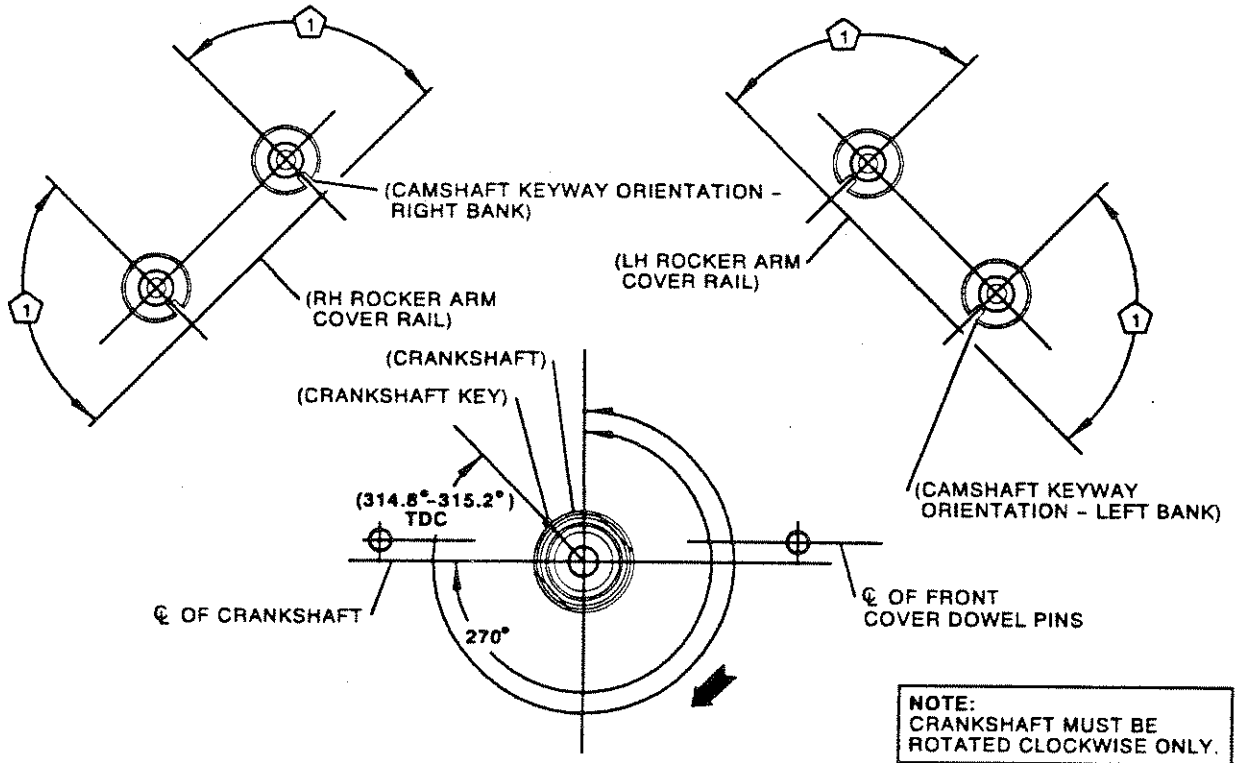
NOTE:
REFER TO FRAME 13J FOR ASSEMBLY PROCEDURE.

1 **NOTE:**
CAMSHAFT SPROCKETS MUST BE INSTALLED AS SHOWN:
RIGHT HEAD (HUB) = OUTBOARD
LEFT HEAD (HUB) = INBOARD

CAMSHAFT AND CRANKSHAFT DRIVE COMPONENTS PRE-TIGHTENING POSITIONS (PRE-KEY ASSEMBLY)



REAR VIEW

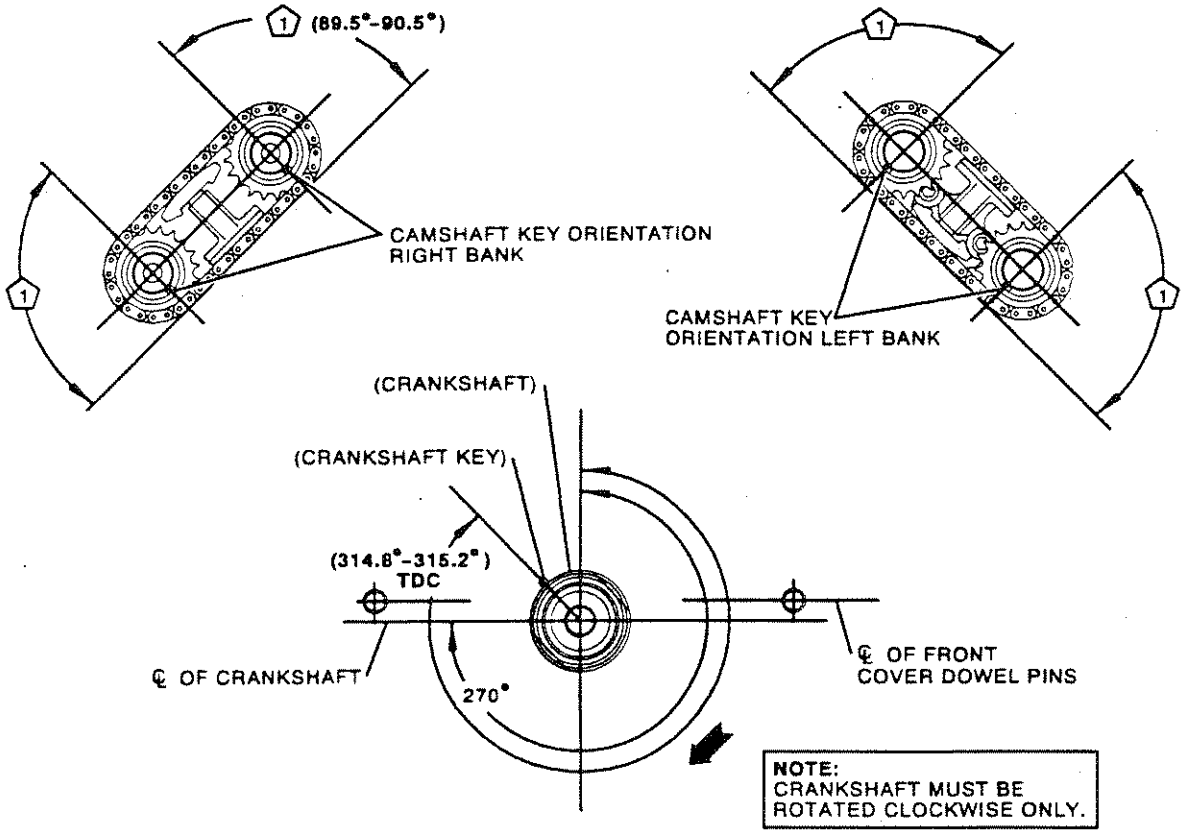


FRONT VIEW

NOTE:
CRANKSHAFT MUST BE ROTATED CLOCKWISE ONLY.

NOTE:
CRANKSHAFT, CAMSHAFTS, PRIMARY SPROCKETS & CHAINS, MUST BE POSITIONED TO SPECIFICATION SHOWN, PRIOR TO FASTENER INSTALLATION AND PRELIMINARY RUNDOWN. (REFER TO FRAME 13J FOR ASSEMBLY PROCEDURE).

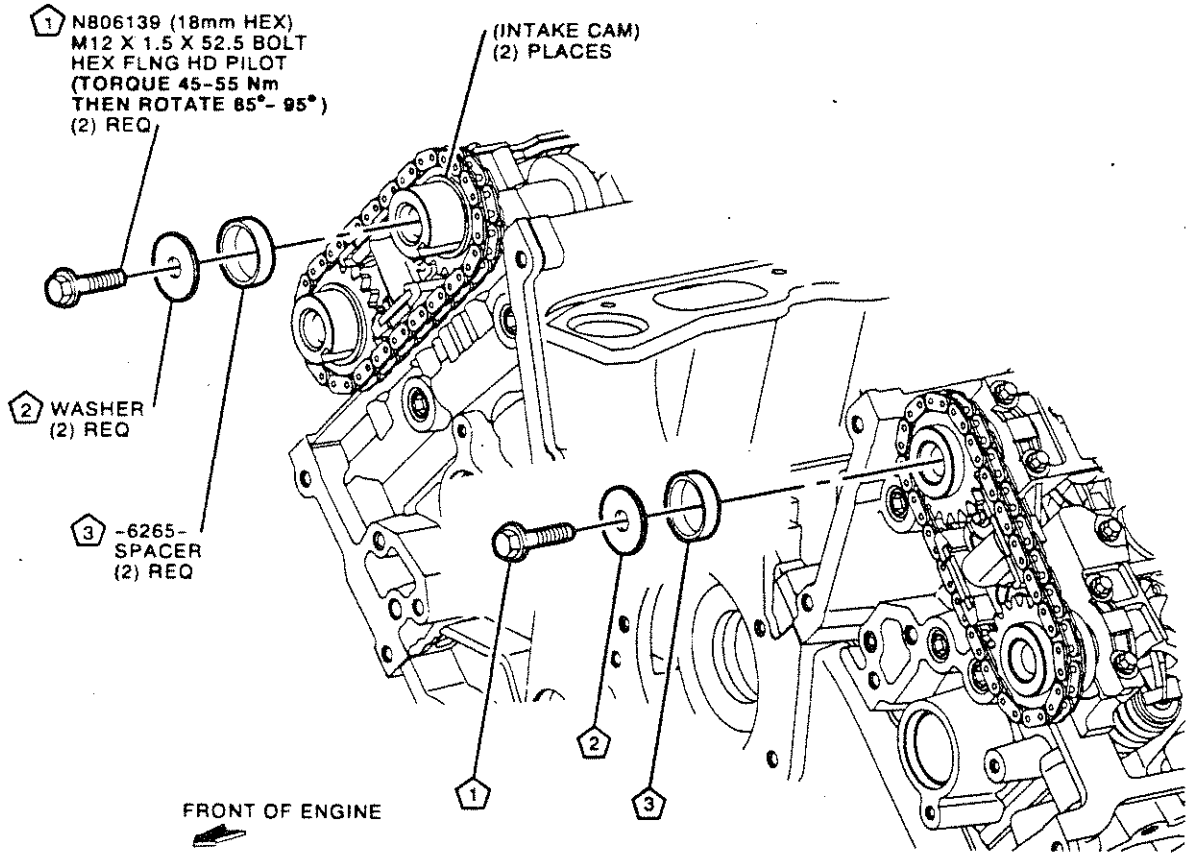
CAMSHAFT KEY



FRONT VIEW

NOTE:
CRANKSHAFT, CAMSHAFTS, PRIMARY SPROCKETS & CHAINS, MUST BE POSITIONED TO SPECIFICATION SHOWN, PRIOR TO FASTENER INSTALLATION AND PRELIMINARY RUNDOWN. (REFER TO FRAME 13J FOR ASSEMBLY PROCEDURE).

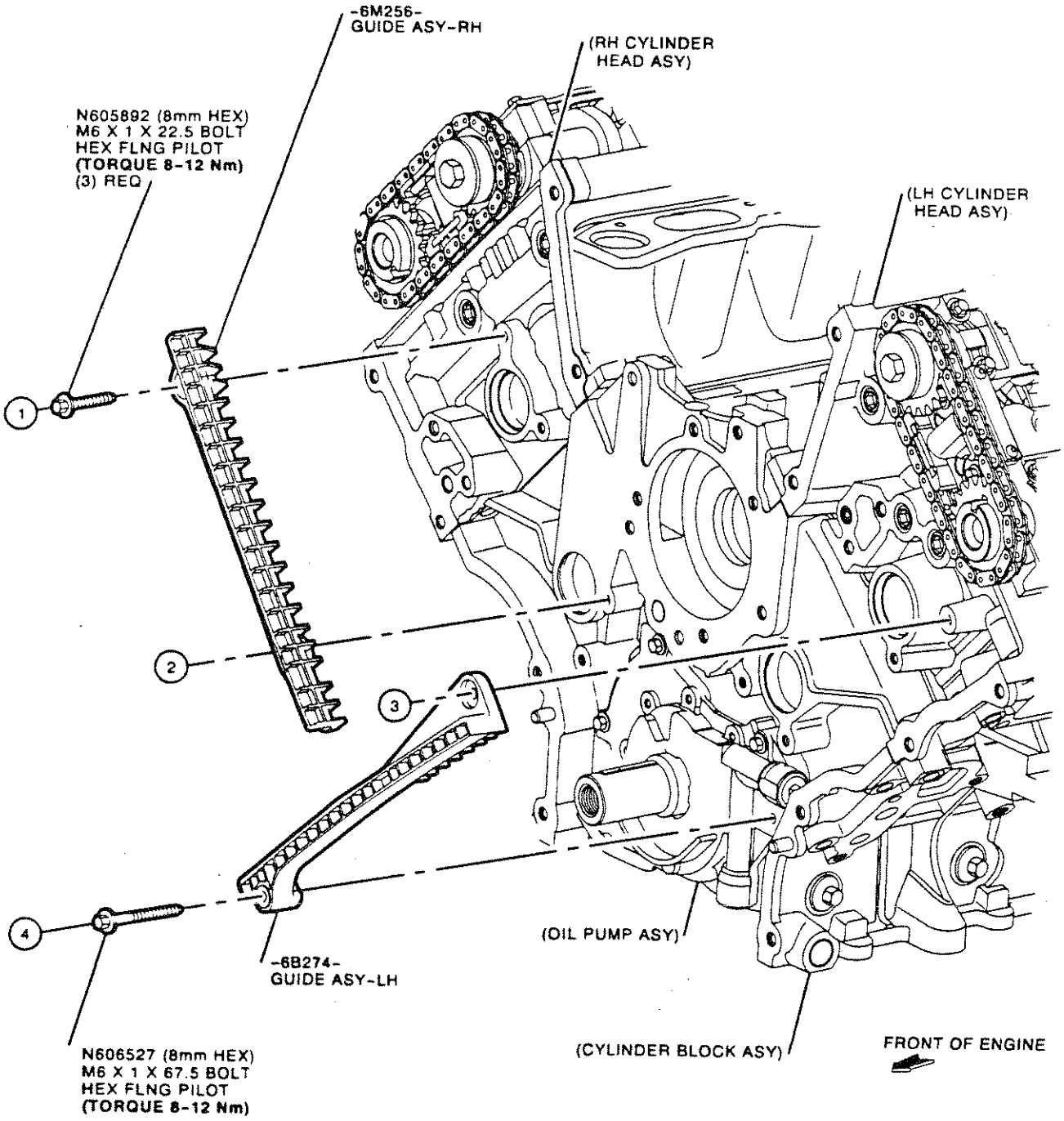
CAMSHAFT GEAR SPACERS



NOTE:
REFER TO FRAME 13J FOR ASSEMBLY PROCEDURE.

NOTE:
CAMSHAFT BOLTS MAY BE TORQUED TO YIELD A MAXIMUM OF (5) TIMES

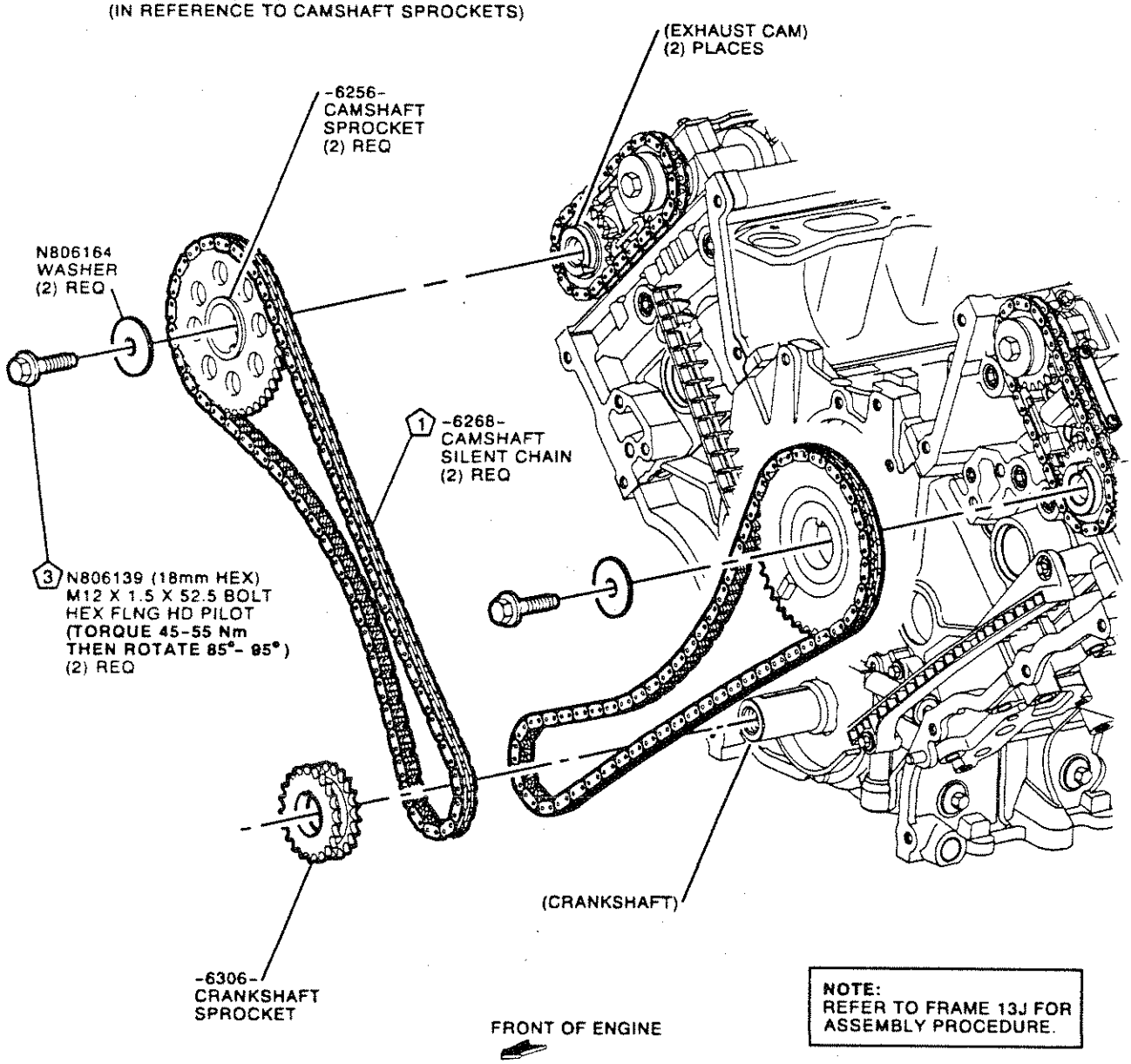
PRIMARY DRIVE CHAIN GUIDES



ASSEMBLY PROCEDURE

1. INSTALL CHAIN GUIDE ASY (-6B274-) WITH (2) M6 BOLTS AND TORQUE TO SPECIFICATION.
2. INSTALL CHAIN GUIDE ASY (-6M256-) WITH (2) M6 BOLTS AND TORQUE TO SPECIFICATION.

PRIMARY CAMSHAFT DRIVE CHAINS AND SPROCKETS



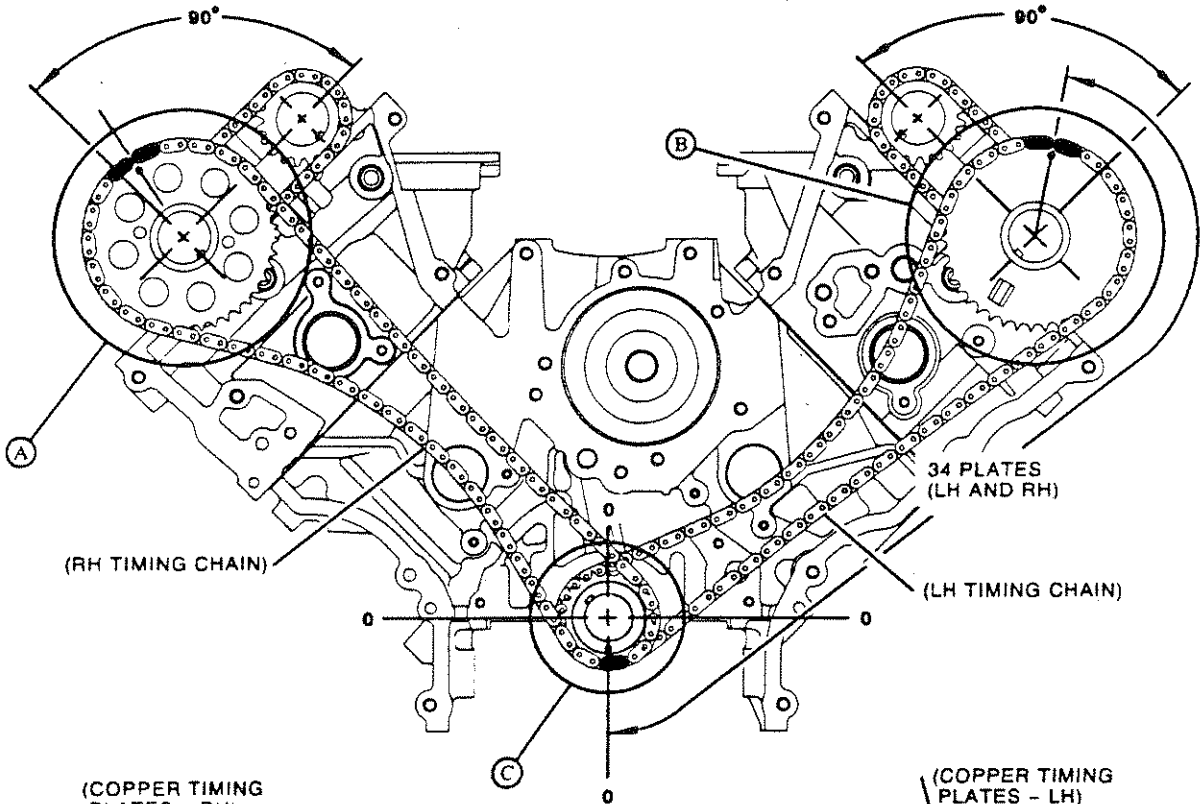
NOTE:
REFER TO FRAME 13J FOR ASSEMBLY PROCEDURE.

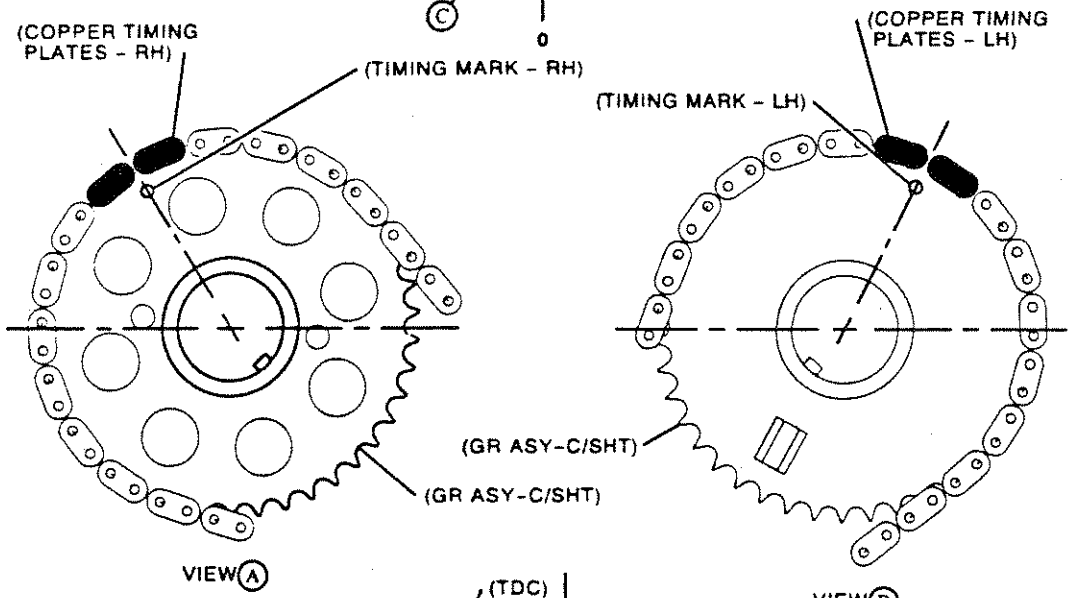
3 **NOTE:**
CAMSHAFT BOLTS MAY BE TORQUED TO YIELD A MAXIMUM OF (5) TIMES

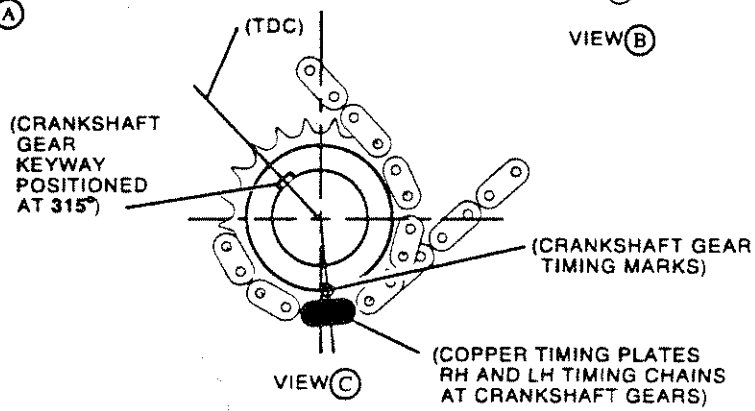
NOTE:

1. APPLY **WSE-M2C908-A** OIL TO CHAIN ASSEMBLIES PROIR TO INSTALLATION UNLESS RECEIVED WITH PRESERVATIVE OIL COATING.
2. TIMING CHAINS MUST BE ROUTED ON WEAR SURFACE OF CHAIN GUIDE.

PRIMARY CAMSHAFT DRIVE CHAINS AND SPROCKETS
(Continued)





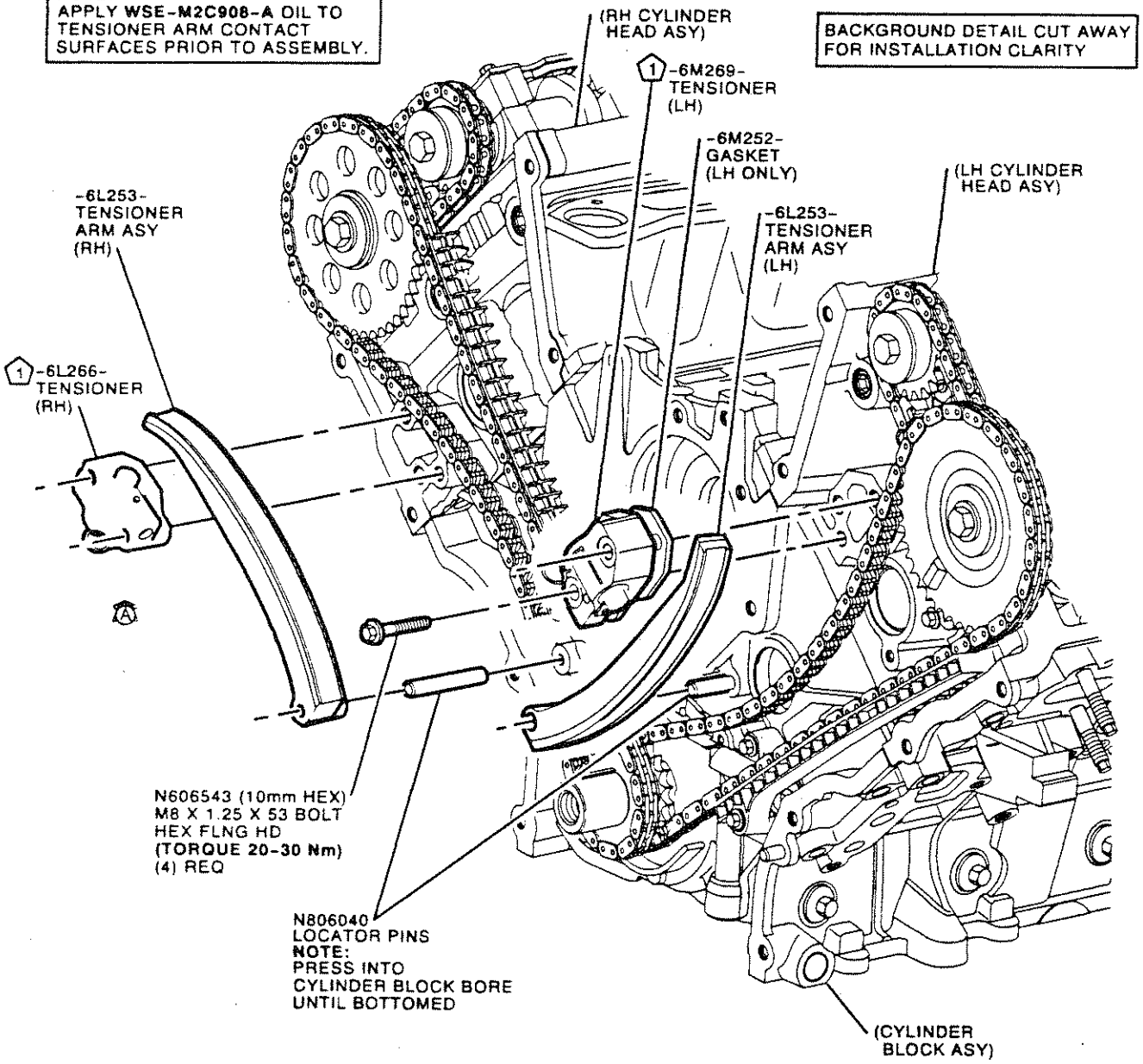


NOTE:
ALIGN CHAINS & GEARS AS SHOWN PRIOR TO TIGHTENING CAM DRIVE ASSEMBLY. (REFER TO FRAME 13F)

DRIVE CHAIN TENSIONERS, ARMS & PINS (PRIMARY) AND TENSIONER PIN REMOVAL

NOTE:
APPLY **WSE-M2C908-A** OIL TO TENSIONER ARM CONTACT SURFACES PRIOR TO ASSEMBLY.

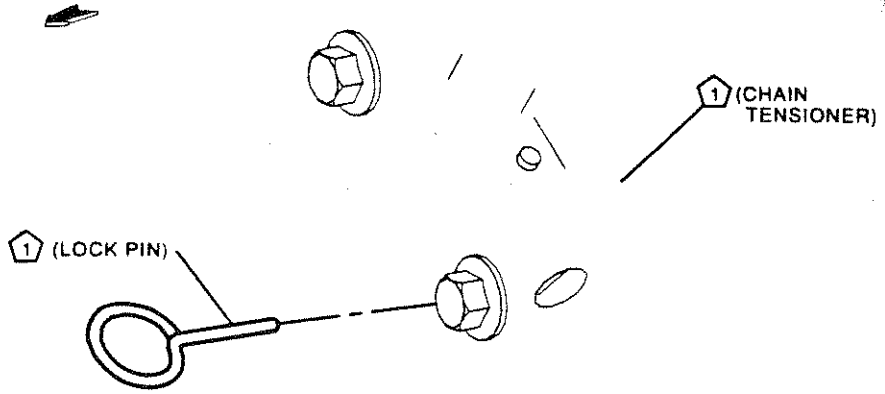
BACKGROUND DETAIL CUT AWAY FOR INSTALLATION CLARITY



NOTE:
REFER TO FRAME 13J FOR ASSEMBLY PROCEDURE.

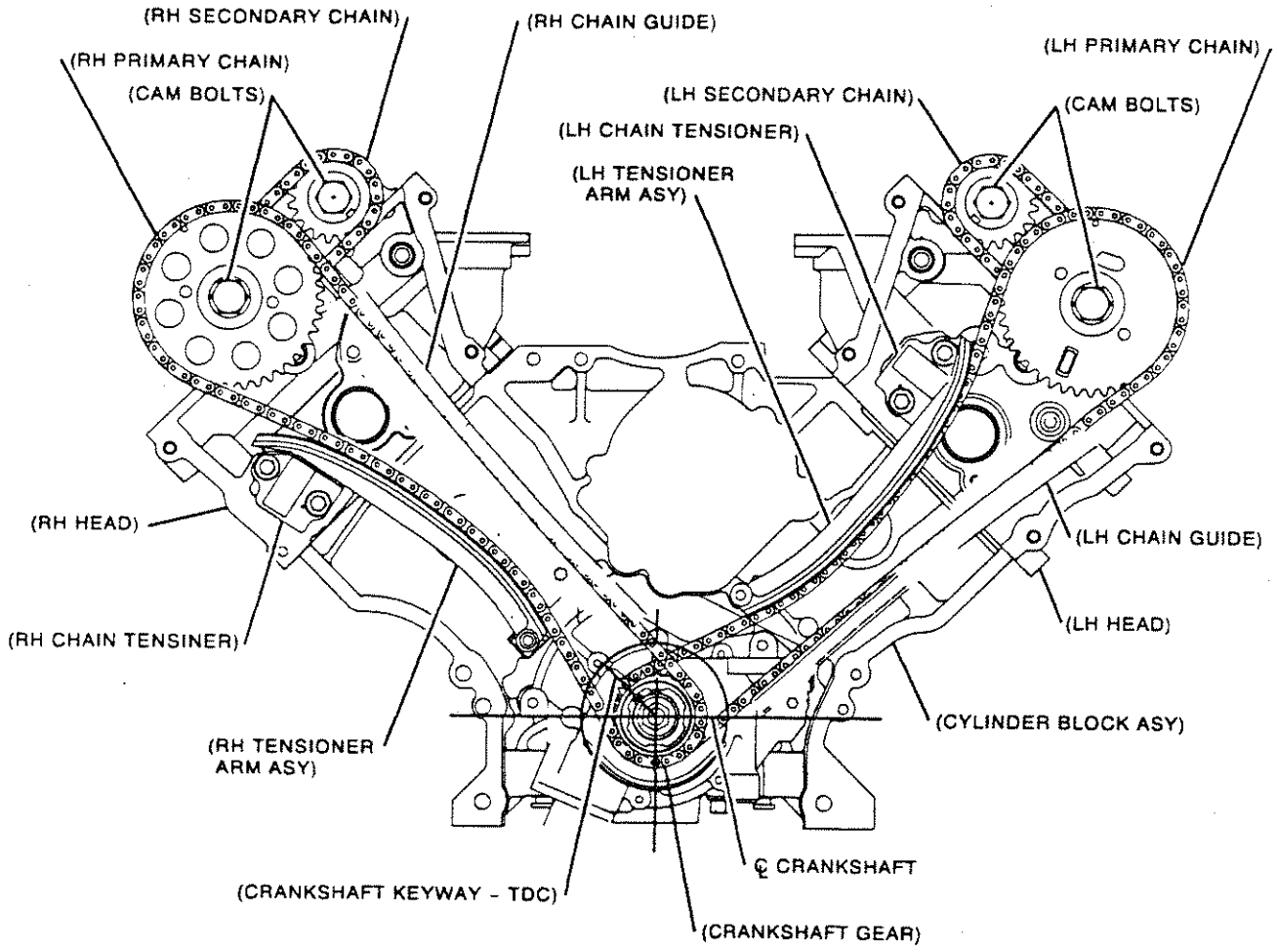
NOTE:
CAMSHAFT BOLTS MAY BE TORQUED TO YIELD A MAXIMUM OF (5) TIMES

1 **NOTE:**
PULL TENSIONER LOCK PINS AFTER TORQUING CAM SPROCKET BOLTS (REFER TO FRAME 13J).



VIEW (A)
TYPICAL (2) PLACES

FRONT END DRIVE COMPONENTS
(AUDIT)



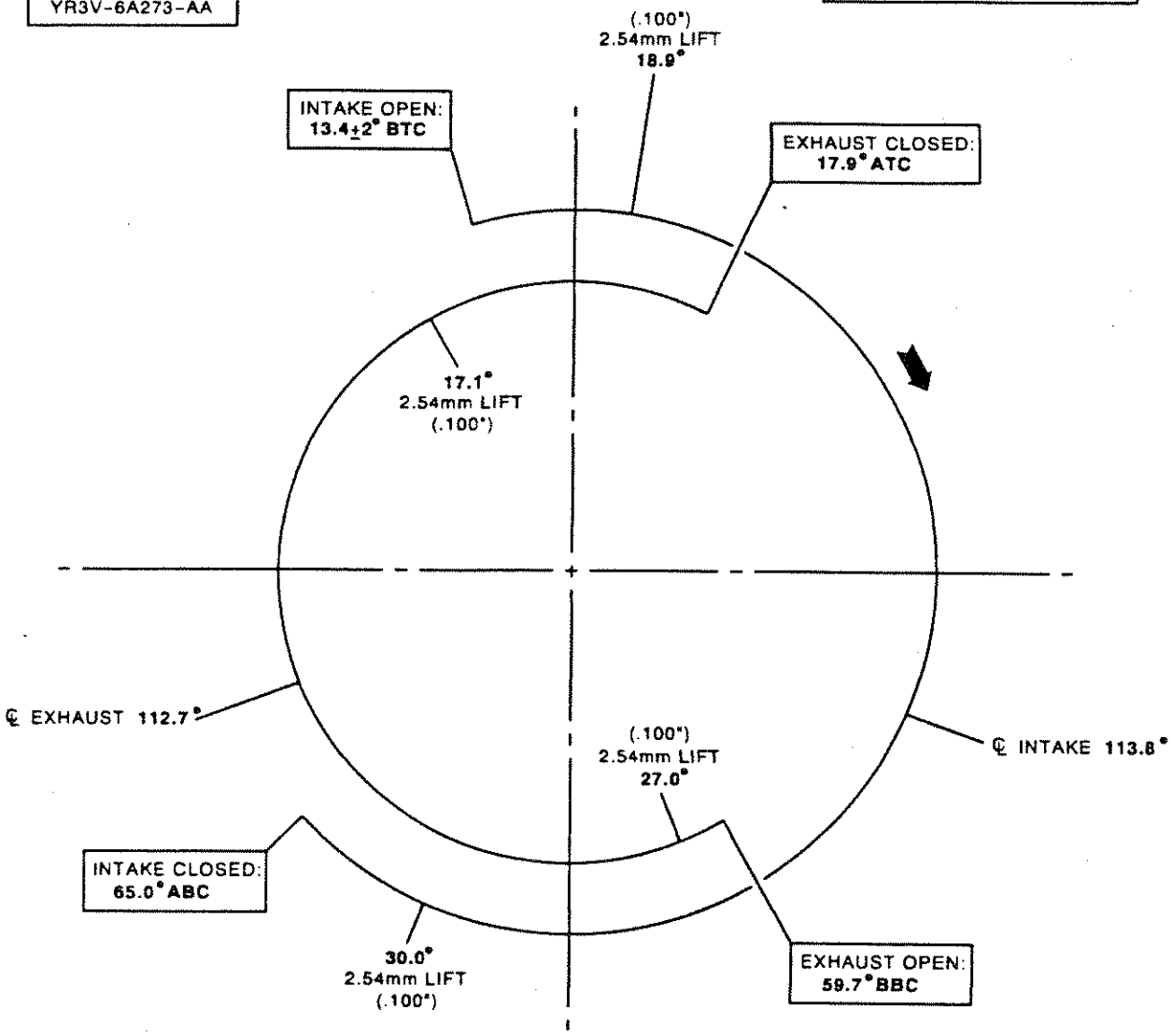
SERVICE/ASSEMBLY PROCEDURE

1. LOAD (1) SECONDARY CHAIN TENSIONER ASY (-6C270- & -6C271-) AND (2) M6 BOLTS TO EACH CYLINDER HEAD, BETWEEN EACH SET OF CAMS AND **TORQUE** BOLTS TO SPECIFICATION (REFER TO FRAME 13).
2. LOAD (1) SECONDARY TIMING CHAIN (-6268-) AROUND (2) CAMSHAFT GEAR ASY (-6256-) AND INSTALL SUB-ASSEMBLY ONTO CAMSHAFT ENDS, ON RIGHT BANK, AS SHOWN ON FRAME 13A. LOAD M10 BOLT, WASHER AND SPACER THRU SPROCKET AND INTO INTAKE CAMSHAFT END. RUNDOWN FASTENERS TO ZERO, AS SHOWN ON FRAME 13A.
3. INSTALL (1) TIMING CHAIN GUIDE (-6M11E6- & -6B274-), (1) M6 X 67.5 AND (3) M6 X 22.5 BOLTS TO EACH CYLINDER BANK AND **TORQUE** BOLTS TO SPECIFICATION AS SHOWN ON FRAME 13E.
4. LOAD (1) TIMING CHAIN (-6268-) OVER (1) CRANKSHAFT GEAR (-6306-) AND (1) CAMSHAFT GEAR ASY (-6256-) AND INSTALL ONTO LEFT CYLINDER BANK (FRAME 13F). THEN LOAD (1) M10 BOLT AND WASHER THRU CAM SPROCKET AND INTO CAMSHAFT. RUNDOWN, BUT DO NOT TIGHTEN FASTENERS TO MORE THAN TORQUE SHOWN ON FRAME 13F.
5. REPEAT STEP #4 FOR RIGHT CYLINDER BANK PRIMARY CAM CHAIN DRIVE.
6. LOAD (1) TIMING CHAIN TENSIONER ARM (-6K255- OR -6M274-) AND (1) TIMING CHAIN TENSIONER (-6L266- OR -6M269-) AND (2) M8 BOLTS TO EACH CYLINDER BANK, AS SHOWN ON FRAME 13H. **TORQUE** TO SPECIFICATIONS.
7. POSITION CRANKSHAFT, CAMS, SPROCKETS AND CHAINS PER SPECIFICATIONS ON FRAME 13G. **TORQUE** (4) M10 BOLTS AT CAMSHAFT SPROCKET LOCATIONS TO SPECIFICATION ON FRAME 13F.
8. PULL TENSIONER LOCK PINS (4) TOTAL, (1) FROM EACH (-6C270- & -6C271-) ON FRAME 13 AND (1) FROM EACH (-6L266- & -6M269-) ON FRAME 13G.

CAMSHAFT TIMING EVENTS

CAMSHAFTS
YR3V-6A270-AA
YR3V-6A271-AA
YR3V-6A272-AA
YR3V-6A273-AA

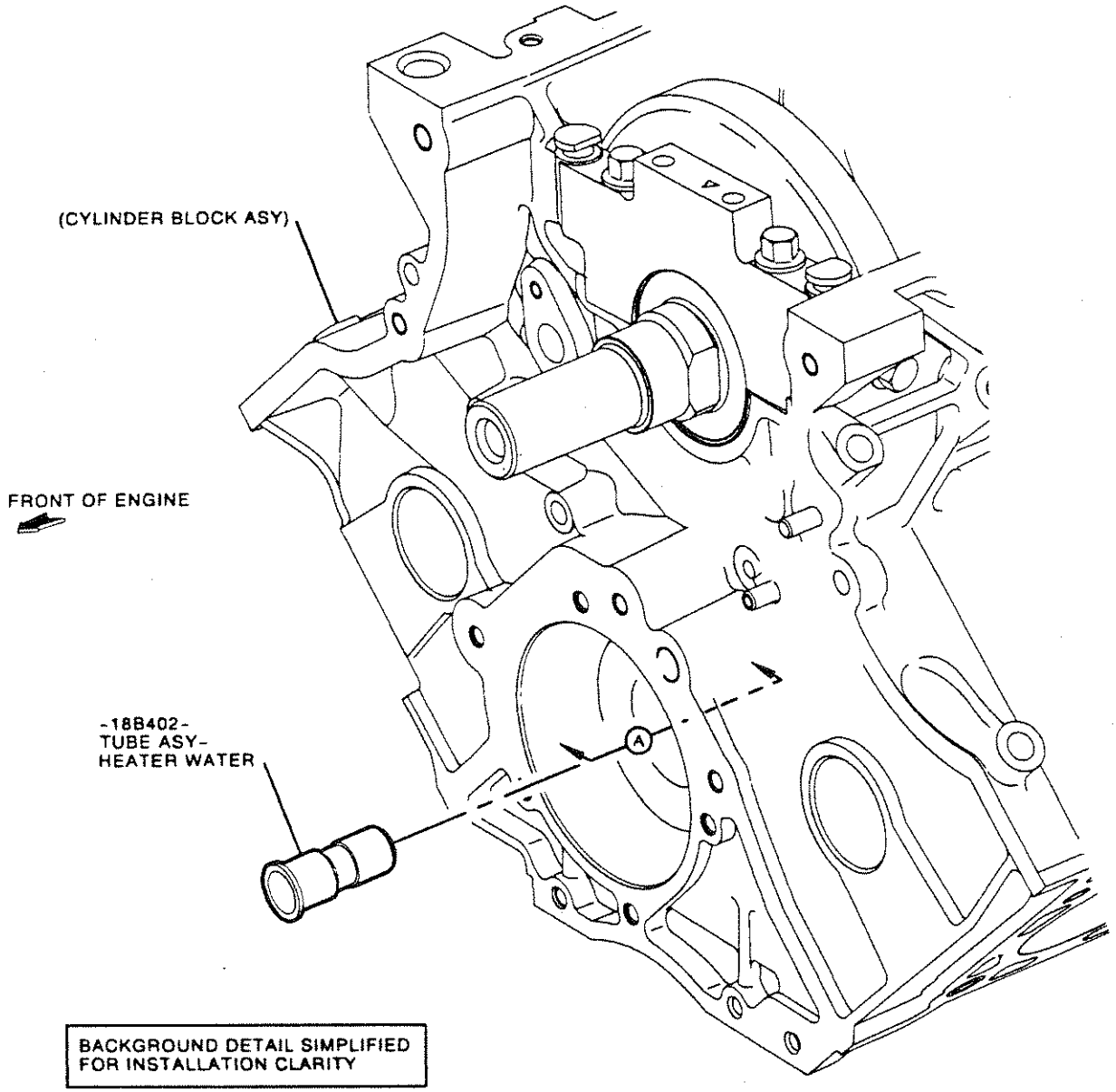
NOTE:
CRANKSHAFT MUST BE ROTATED CLOCKWISE ONLY.



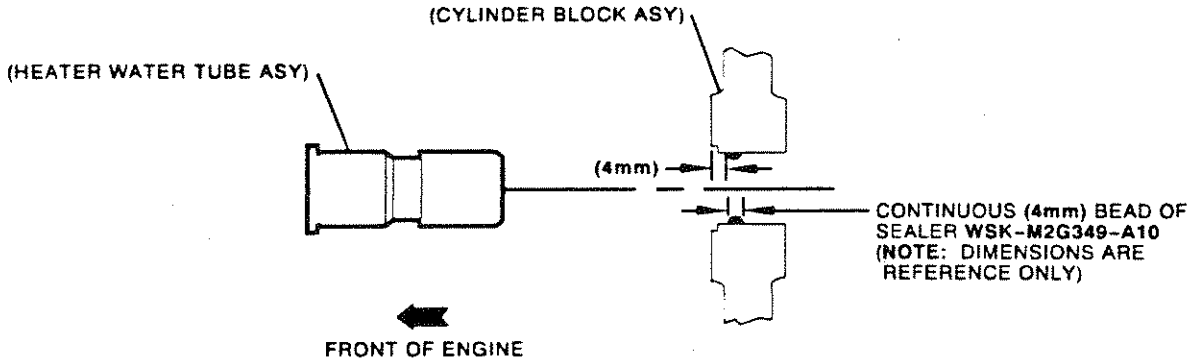
FRONT VIEW

	EVENT	DURATION	FLANKS OPEN CLOSE	LIFT	COLLAPSED GAP (BASE CIRCLE TO ROLLER)
INTAKE	VT1205	258.4°	127.2° 131.2°	13.0mm	.60 ± .2mm
EXHAUST	VT1219	257.6°	127.0° 130.6°	12.0mm	.60 ± .2mm

HEATER WATER TUBE ASY

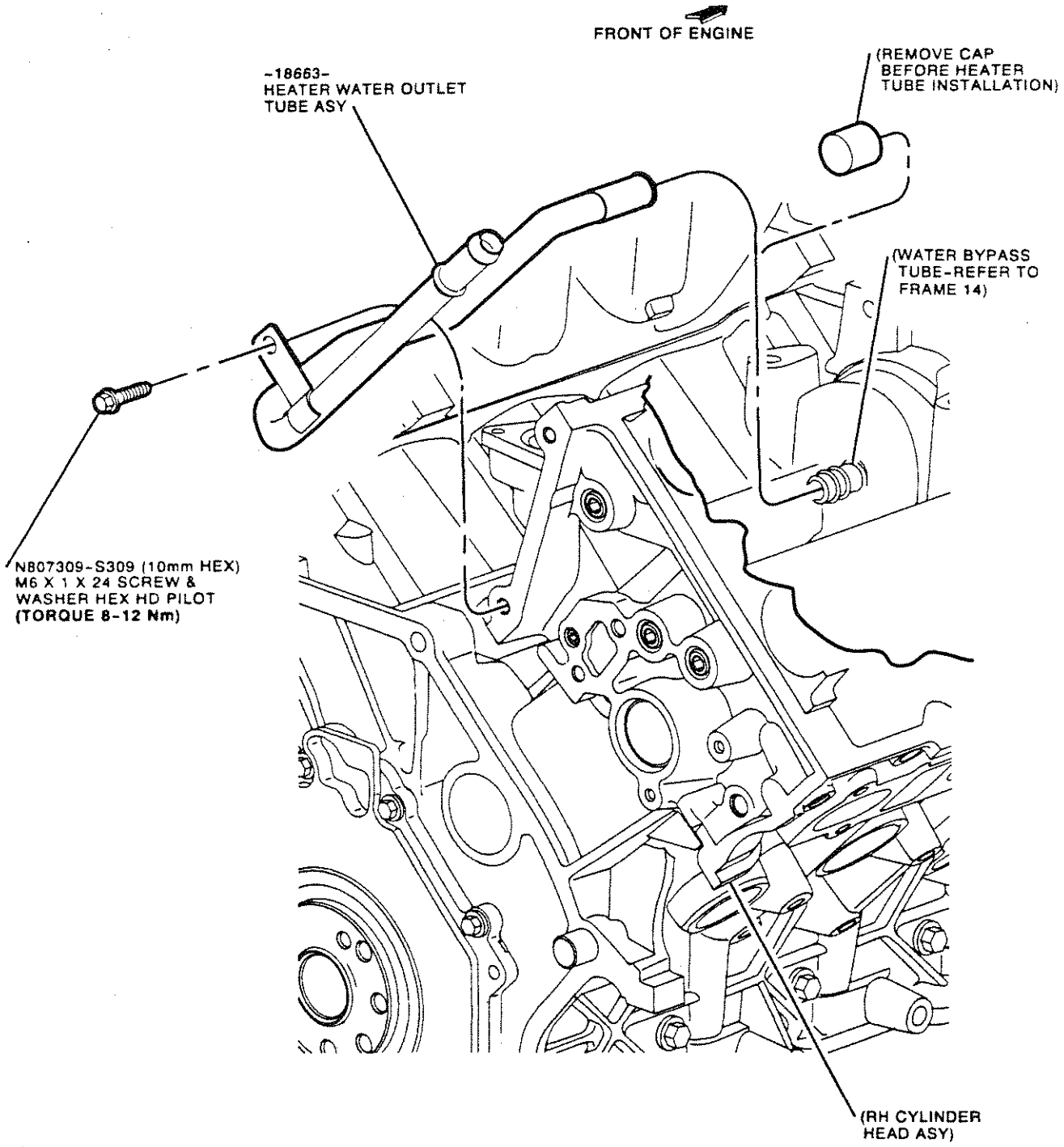


BACKGROUND DETAIL SIMPLIFIED FOR INSTALLATION CLARITY



SECTION (A)

HEATER WATER OUTLET TUBE ASY

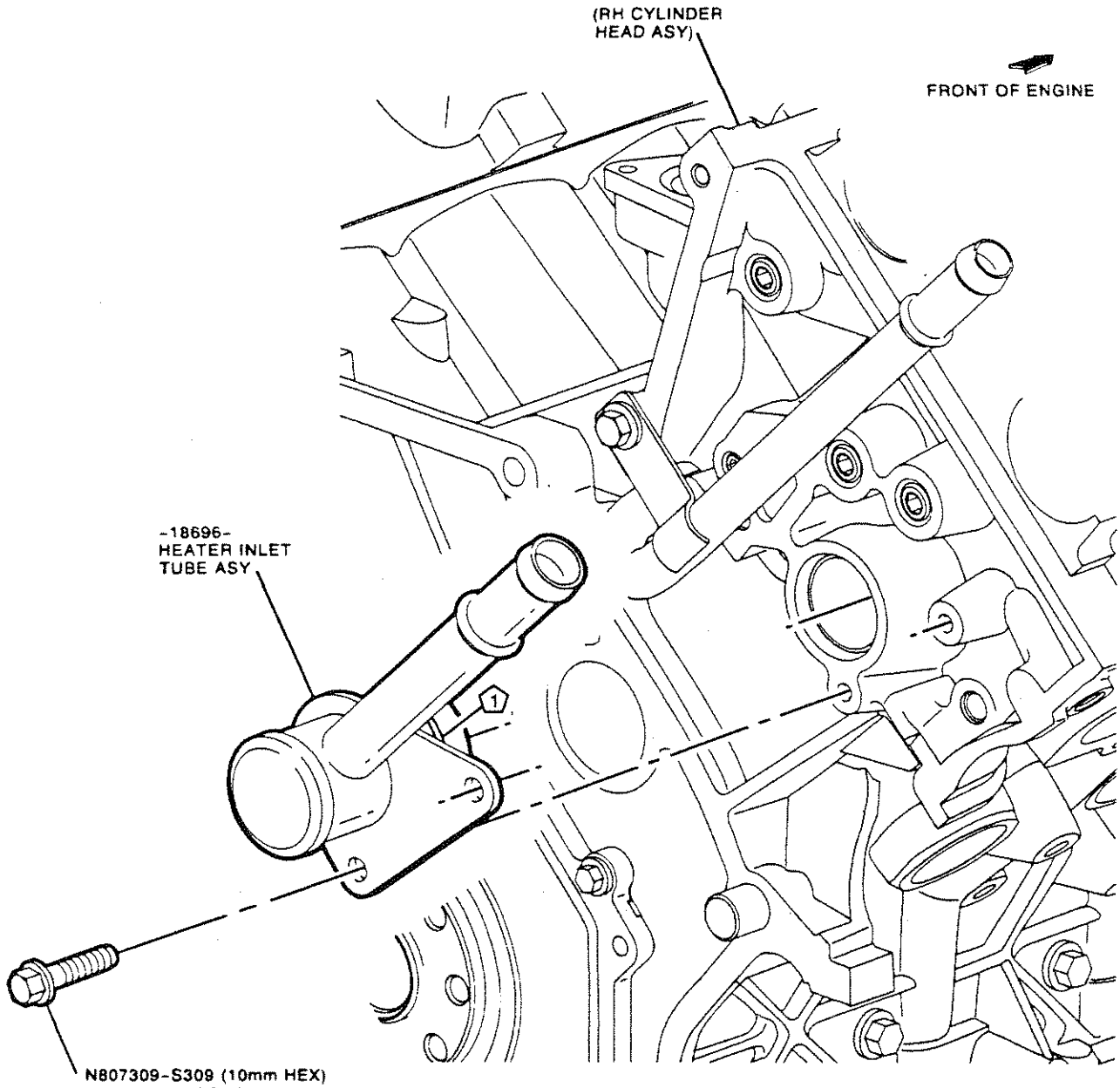


BACKGROUND DETAIL SIMPLIFIED
FOR INSTALLATION CLARITY

ASSEMBLY PROCEDURE

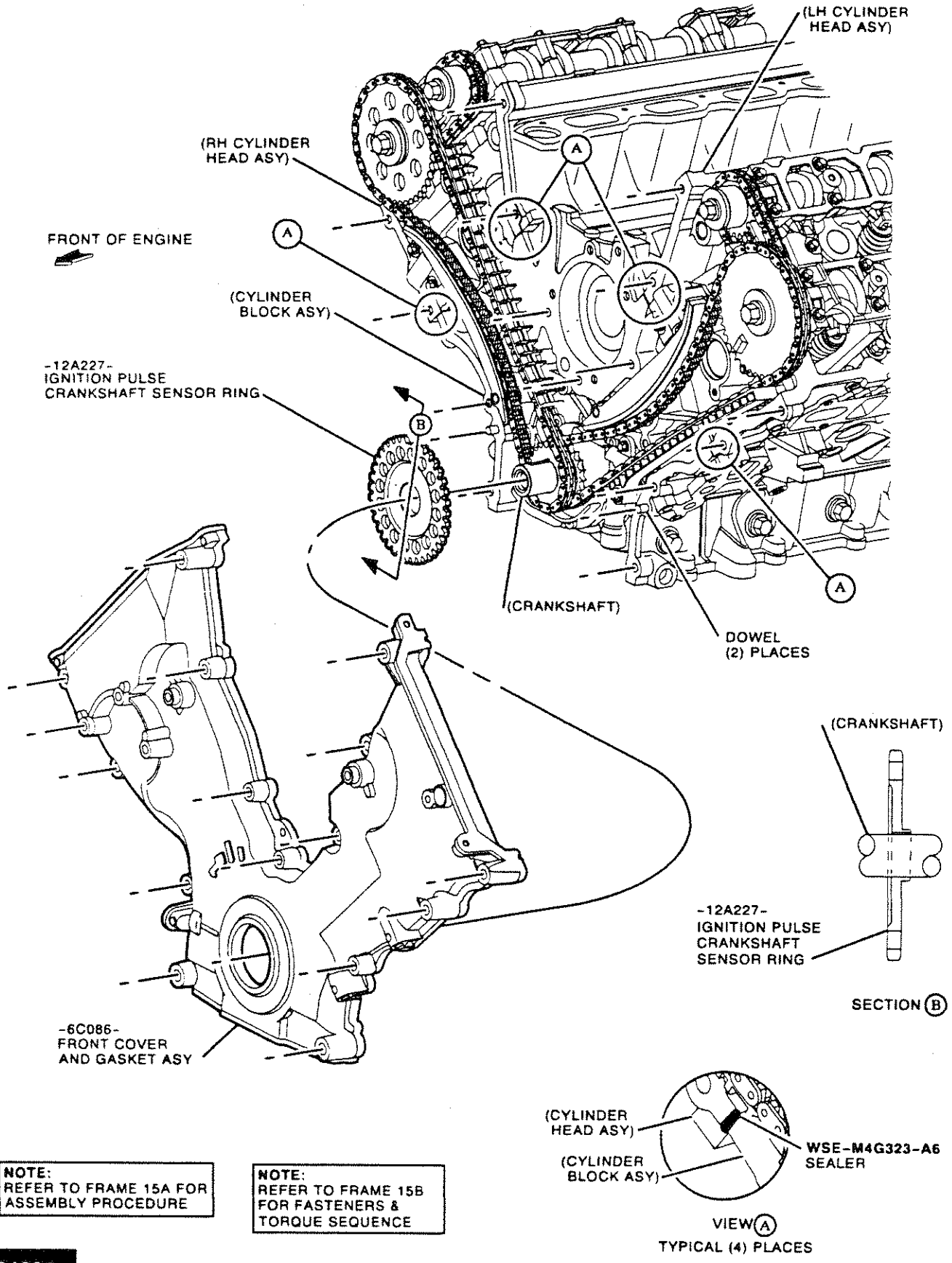
1. INSTALL HEATER WATER OUTLET TUBE ASY (-18663-) TO WATER BYPASS TUBE.
2. HANDSTART FASTENER AND RUNDOWN. TORQUE TO SPECIFICATION.

HEATER INLET TUBE ASY



1 **NOTE:**
LUBRICATE HEATER INLET TUBE ASY O-RING WITH **ESE-M99B176-A** OIL PRIOR TO INSTALLATION.

FRONT COVER ASY AND IGNITION PULSE CRANKSHAFT SENSOR RING



NOTE:
REFER TO FRAME 15A FOR ASSEMBLY PROCEDURE

NOTE:
REFER TO FRAME 15B FOR FASTENERS & TORQUE SEQUENCE

ASSEMBLY PROCEDURE

1. INSTALL IGNITION PULSE CRANKSHAFT SENSOR RING (-12A227-) TO CRANKSHAFT.

2. APPLY A **3mm** DIAMETER BEAD X **12mm** LONG (APPROX) OF **WSE-M4G323-A6** SEALER TO CYLINDER HEAD GASKETS (4) INTERFACE LOCATIONS (REFER TO VIEW "A" FRAME 15).

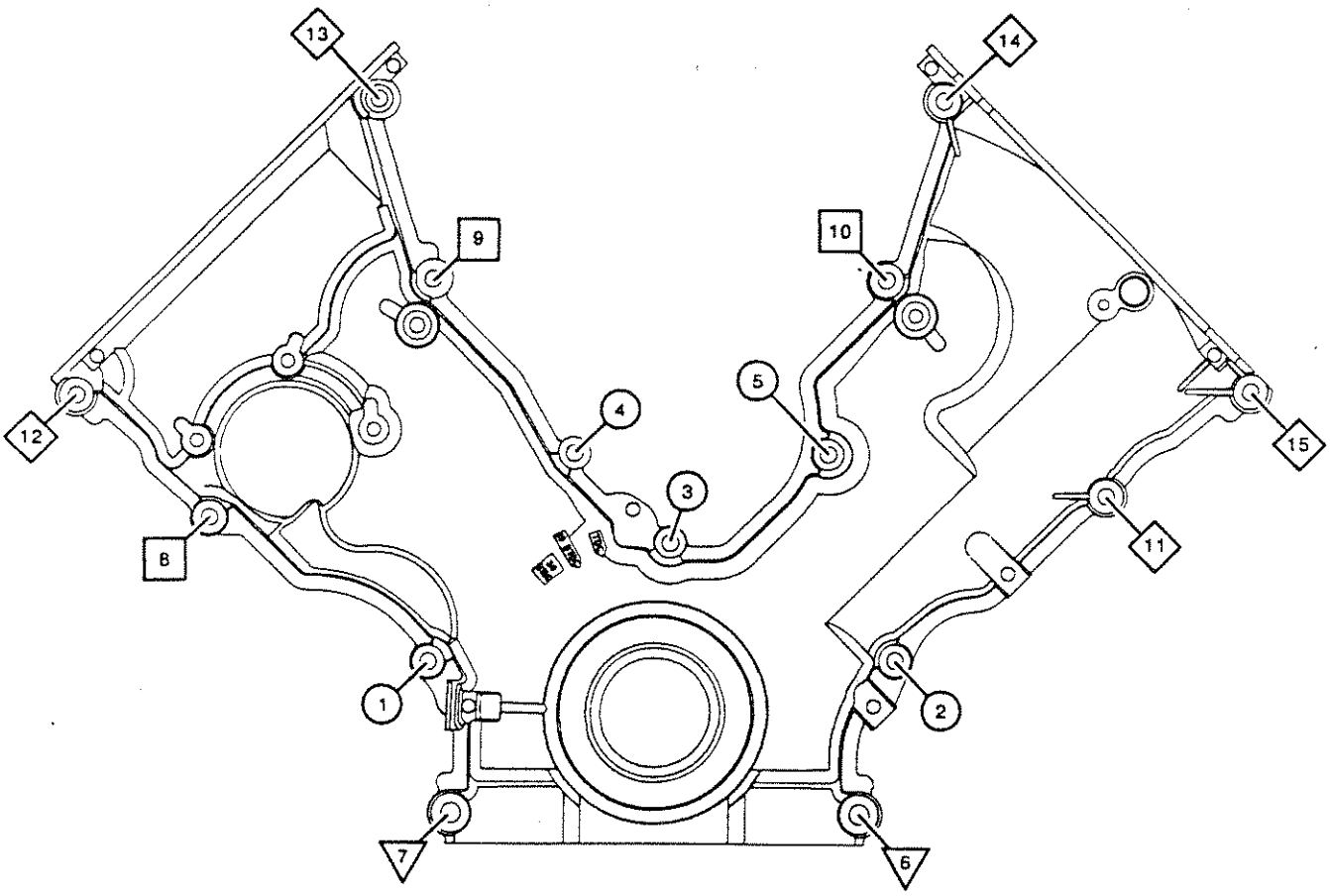
3. INSTALL FRONT COVER ASY (-6C086-) OVER DOWELS (2) PLACES IN FRONT COVER TO CYLINDER BLOCK.

4. INSTALL (15) FASTENERS. **TORQUE** TO SPECIFICATION (REFER TO FRAME 15B)

   NOTE: FRONT COVER ASY MUST BE INSTALLED PER SPECIFICATIONS WITHIN **(15) MINUTES** MAX OF APPLYING SEALER.

   (ALTERNATE PROCEDURE: WHEN **(15) MINUTES** MAX CRITERIA CANNOT BE MET, **PRE-TORQUE** FASTENERS 6,7,8,9,10 & 11 MARKED ON FRAME 15B TO **(3 Nm)** MINIMUM).

FRONT COVER ASY
(FASTENERS & TORQUE SEQUENCE)

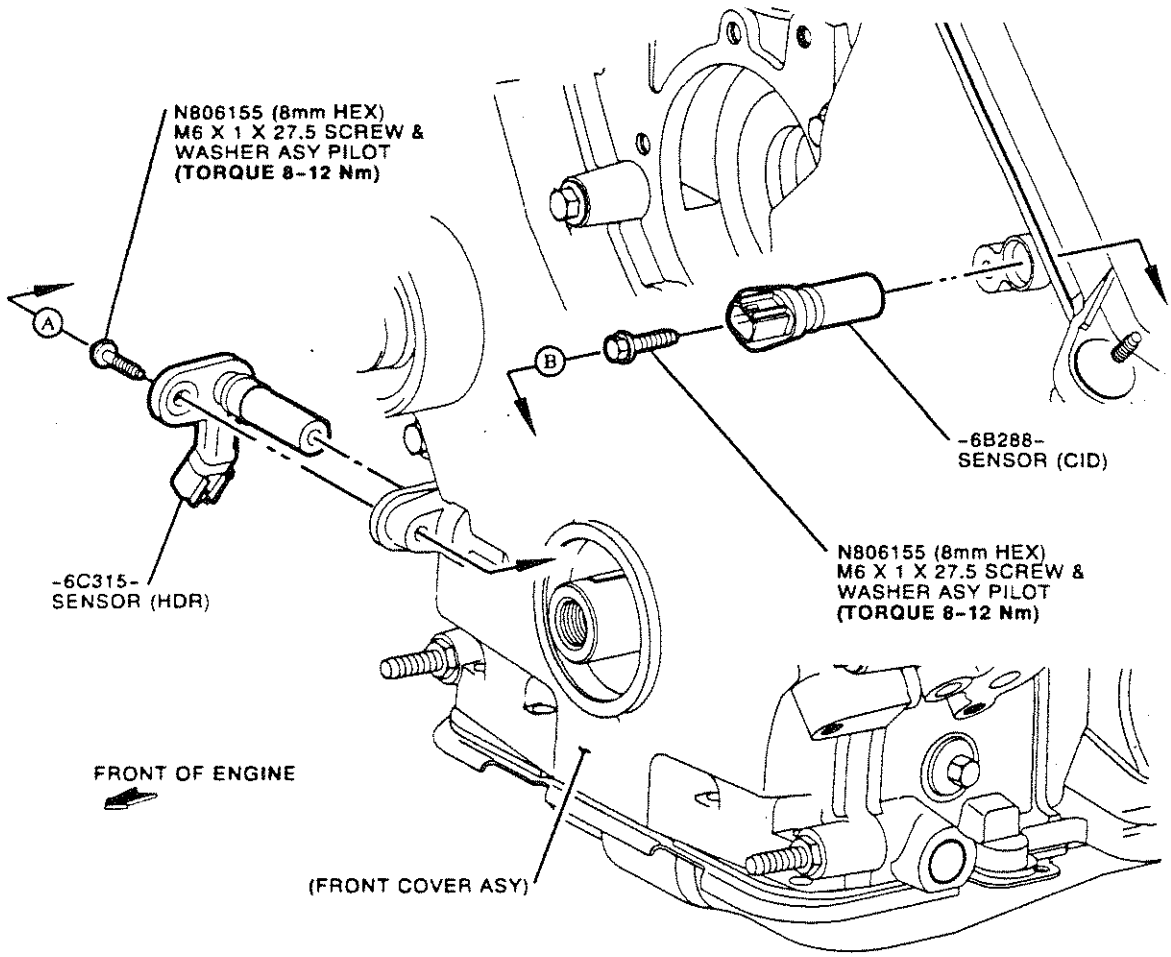


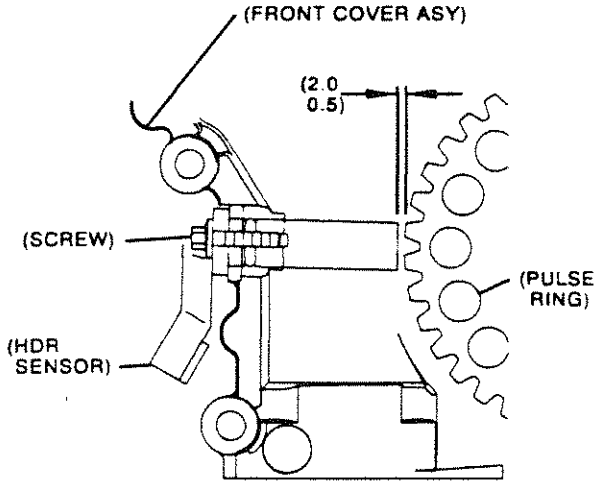
VIEW - FRONT OF ENGINE

INSTALLATION PROCEDURE
FASTENERS #1 THRU #7 "MUST" BE FINAL **TORQUED** FIRST. FASTENERS #8 THRU #15 TO FOLLOW.

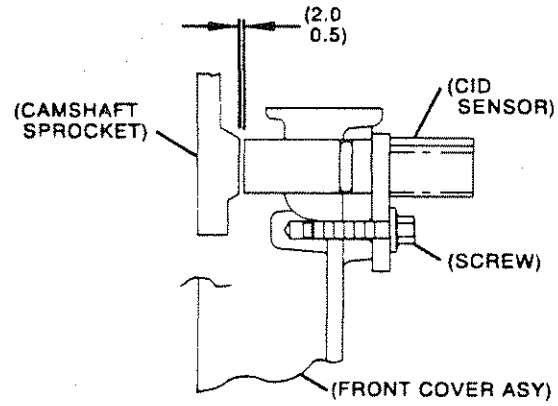
HOLE NO.	FASTENER	DESCRIPTION	TORQUE
1,2,3, 4 & 5	○ N806177	M8 X 1.25 X 50 BOLT HEX FLNG HD PILOT (13mm HEX)	(20-30 Nm)
6 & 7	▽ N808529	M10 X 1.5 X 59 - M10 X 1.5 X 30 STUD HEX HD PILOT (22mm HEX)	(40-55 Nm)
8,9 & 10	□ N806177	M8 X 1.25 X 50 BOLT HEX FLNG HD PILOT (13mm HEX)	(20-30 Nm)
11 THRU 15	◇ N806300	M8 X 1.25 X 65- M8 X 1.25 X 27 STUD HEX SHLD PILOT (18mm HEX)	(20-30 Nm)

CAMSHAFT TIMING SENSOR ASY AND CRANKSHAFT TIMING SENSOR ASY



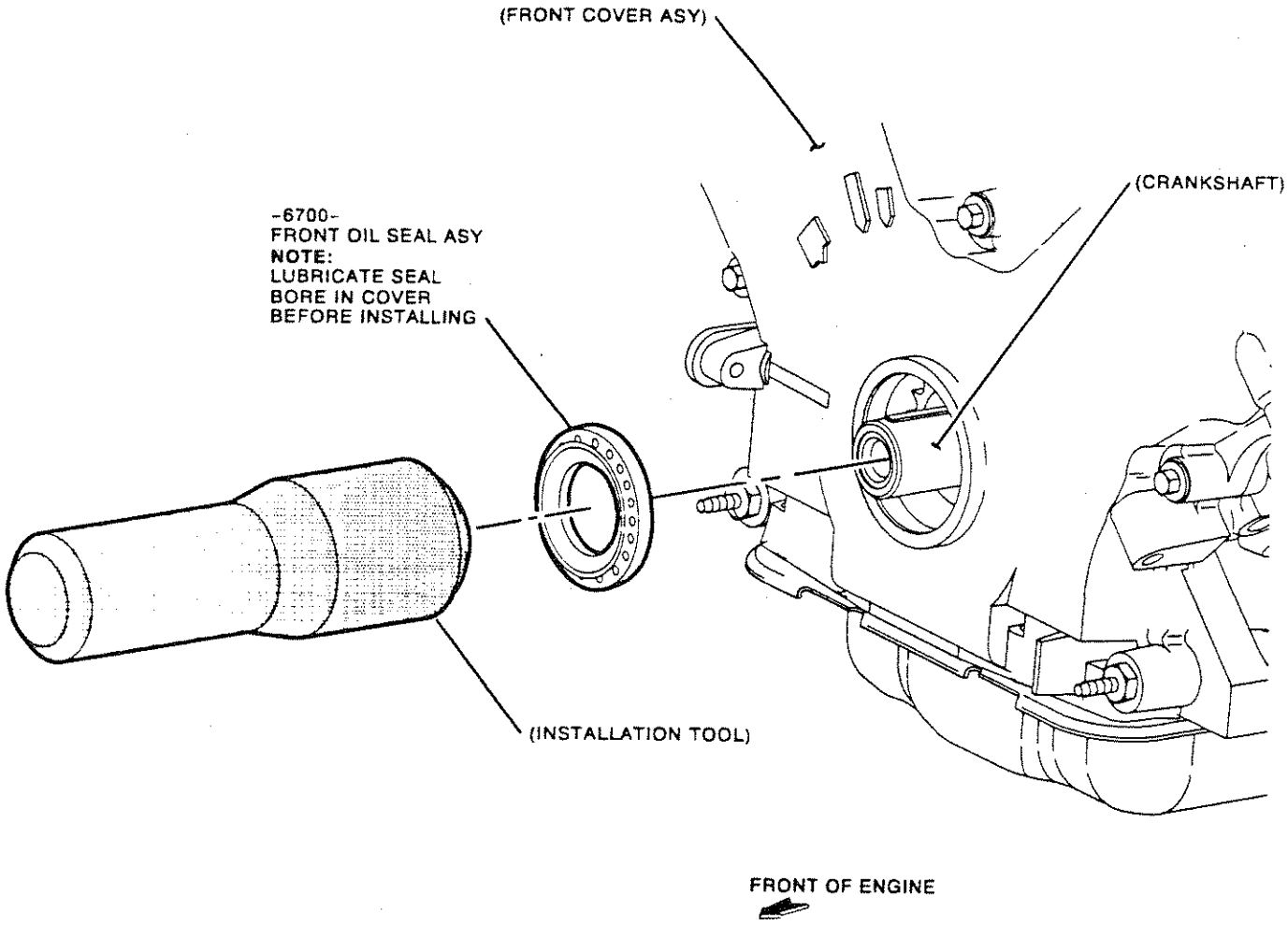


SECTION (A)
SHOWN ASSEMBLED



SECTION (B)
SHOWN ASSEMBLED

CRANKSHAFT FRONT OIL SEAL ASY

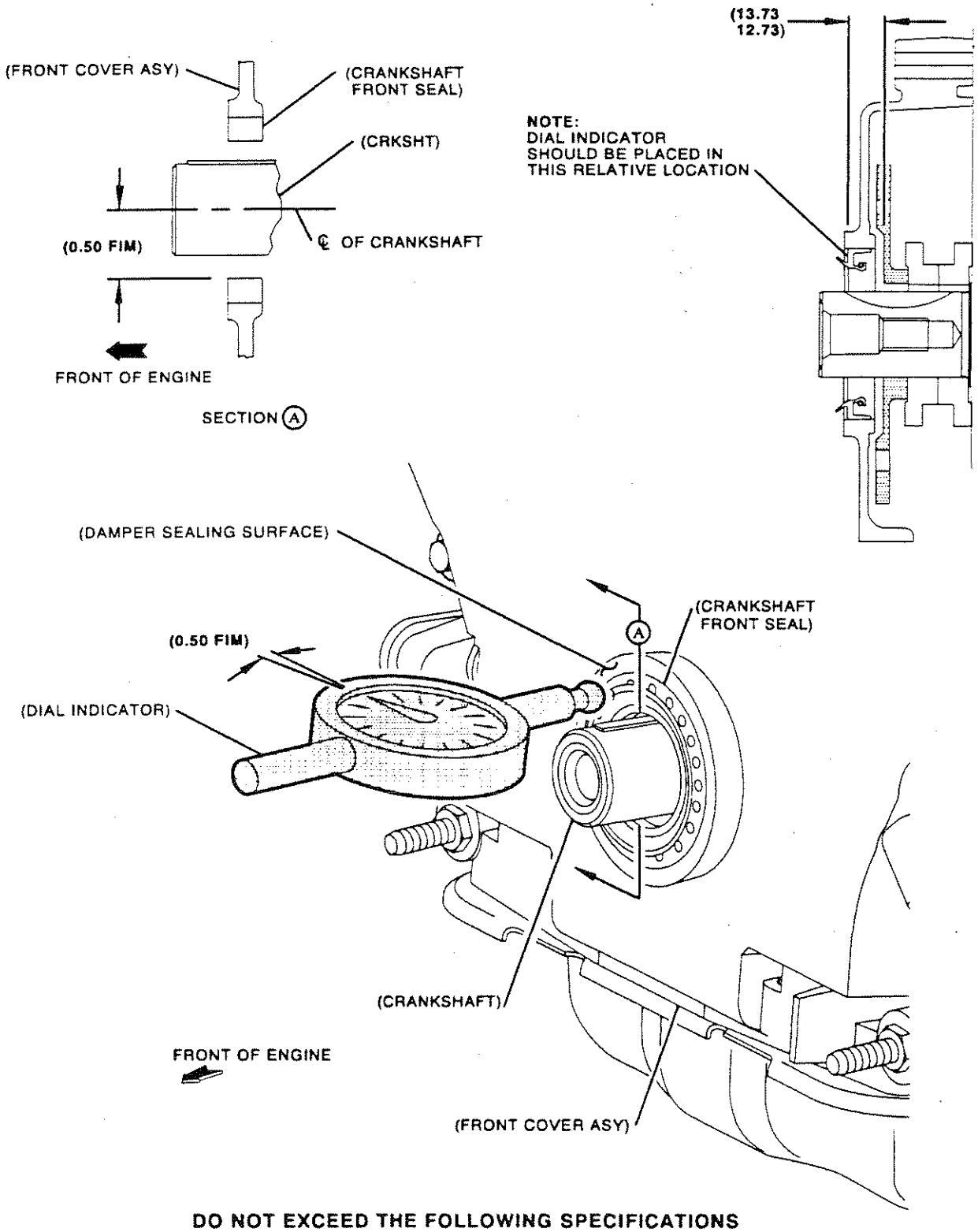


ASSEMBLY PROCEDURE

1. APPLY **WSE-M2C908-A** OIL TO ID OF CRANKSHAFT SEAL BORE (IN FRONT COVER ASY)
2. INSTALL FRONT OIL SEAL ASY (-6700-) INTO FRONT COVER ASY (SPRING SIDE TOWARD ENGINE) USING INSTALLATION TOOL.

   NOTE: REFER TO FRAME 17A FOR INSTALLATION DEPTH
   THIS IS **NOT** A MEASURE OF SEAL SQUARENESS
3. CHECK SEAL SQUARENESS (REFER TO FRAME 17A FOR SPECIFICATION).

CRANKSHAFT FRONT SEAL SQUARENESS AND CONCENTRICITY (SERVICE/AUDIT)

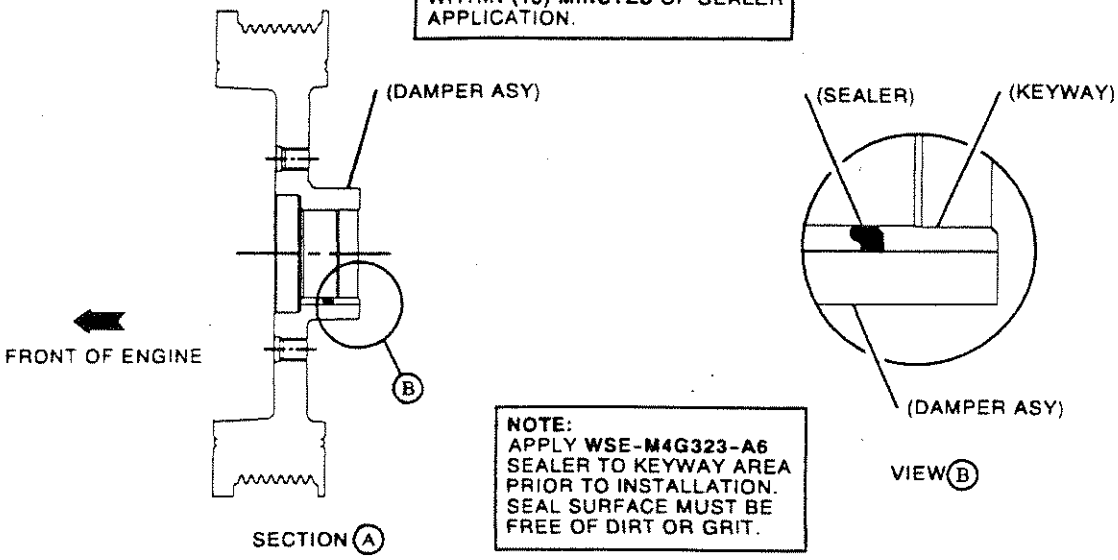


DO NOT EXCEED THE FOLLOWING SPECIFICATIONS

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

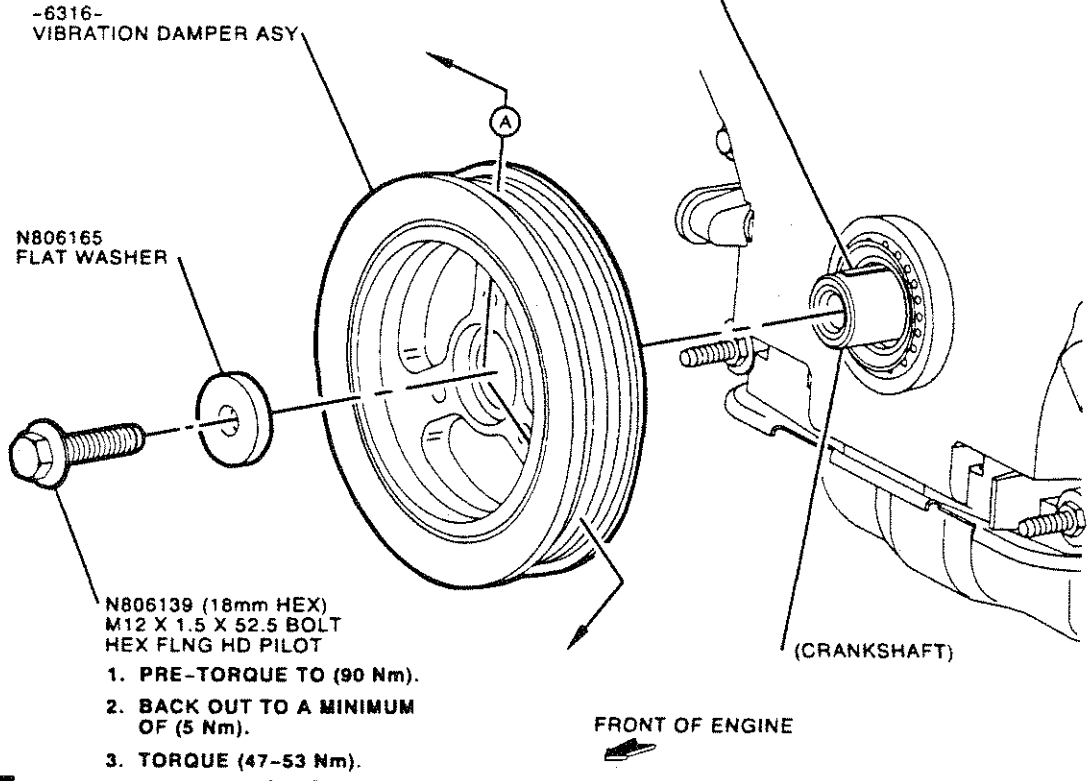
CRANKSHAFT VIBRATION DAMPER ASY

NOTE:
DAMPER MUST BE INSTALLED WITHIN (15) MINUTES OF SEALER APPLICATION.



NOTE:
APPLY **WSE-M4G323-A6** SEALER TO KEYWAY AREA PRIOR TO INSTALLATION. SEAL SURFACE MUST BE FREE OF DIRT OR GRIT.

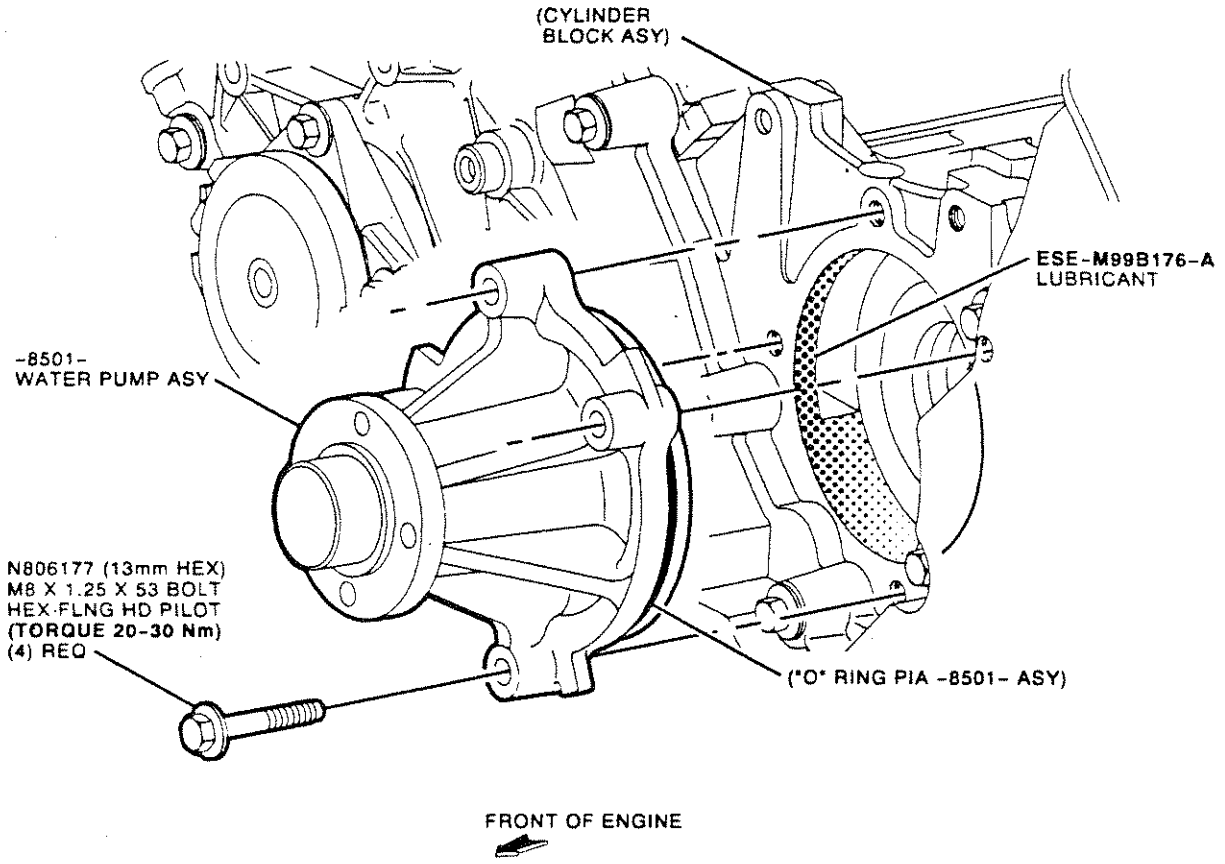
NOTE:
INSTALL CRANKSHAFT DAMPER ASY AT A MAXIMUM PRESS FORCE OF **(19,125 N.)**



1. **PRE-TORQUE TO (90 Nm).**
2. **BACK OUT TO A MINIMUM OF (5 Nm).**
3. **TORQUE (47-53 Nm).**
4. **ROTATE (85°-95°).**

030508

WATER PUMP ASY



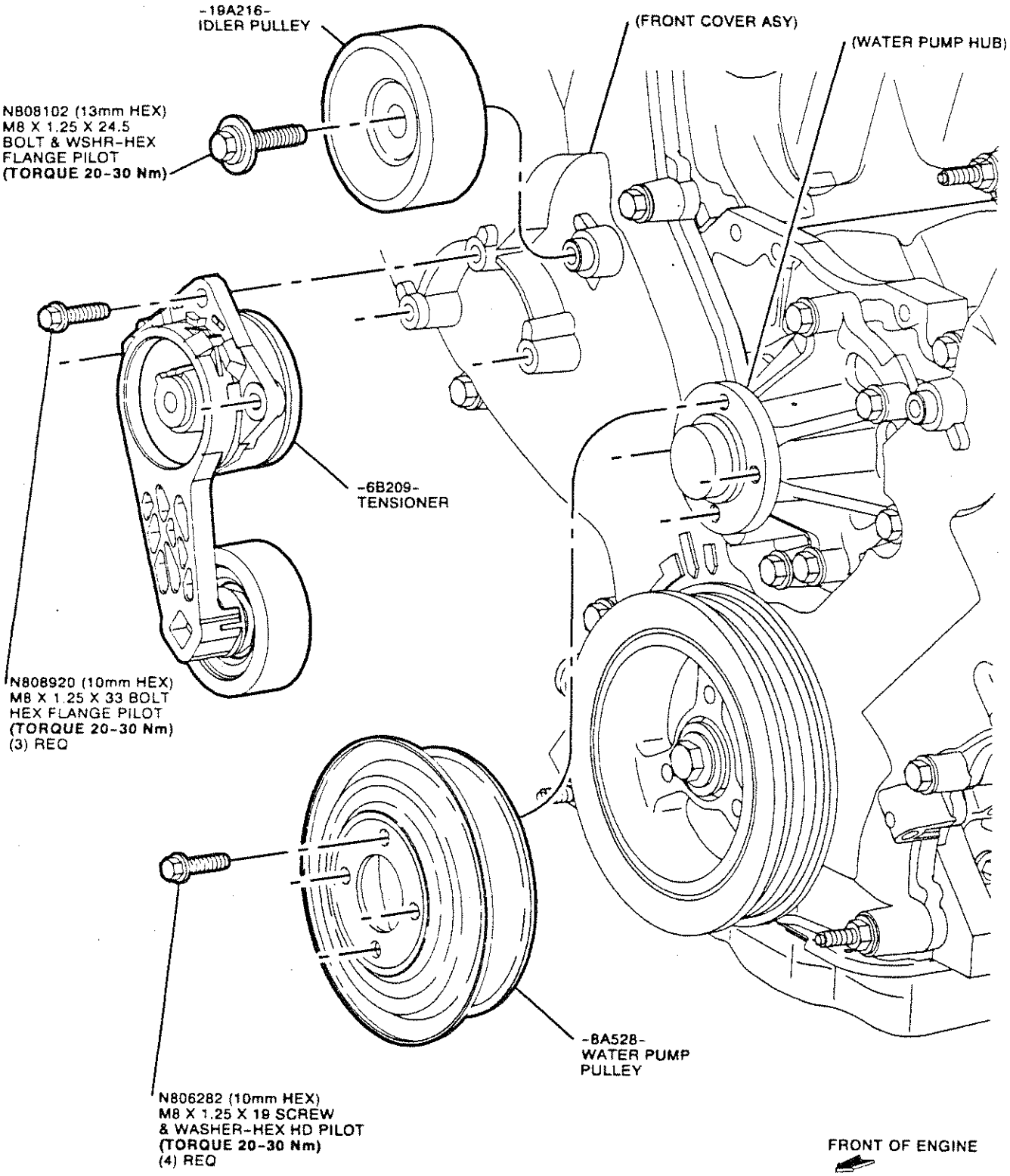
ASSEMBLY PROCEDURE

1. APPLY **ESE-M99B176-A** LUBRICANT TO WATER PUMP BORE
2. INSTALL WATER PUMP ASY (-8501-) AND POSITION TO FRONT FACE OF CYLINDER BLOCK ASY
3. ALIGN HOLES, INSERT (4) M8 BOLTS AND **TORQUE** TO SPECIFICATION.

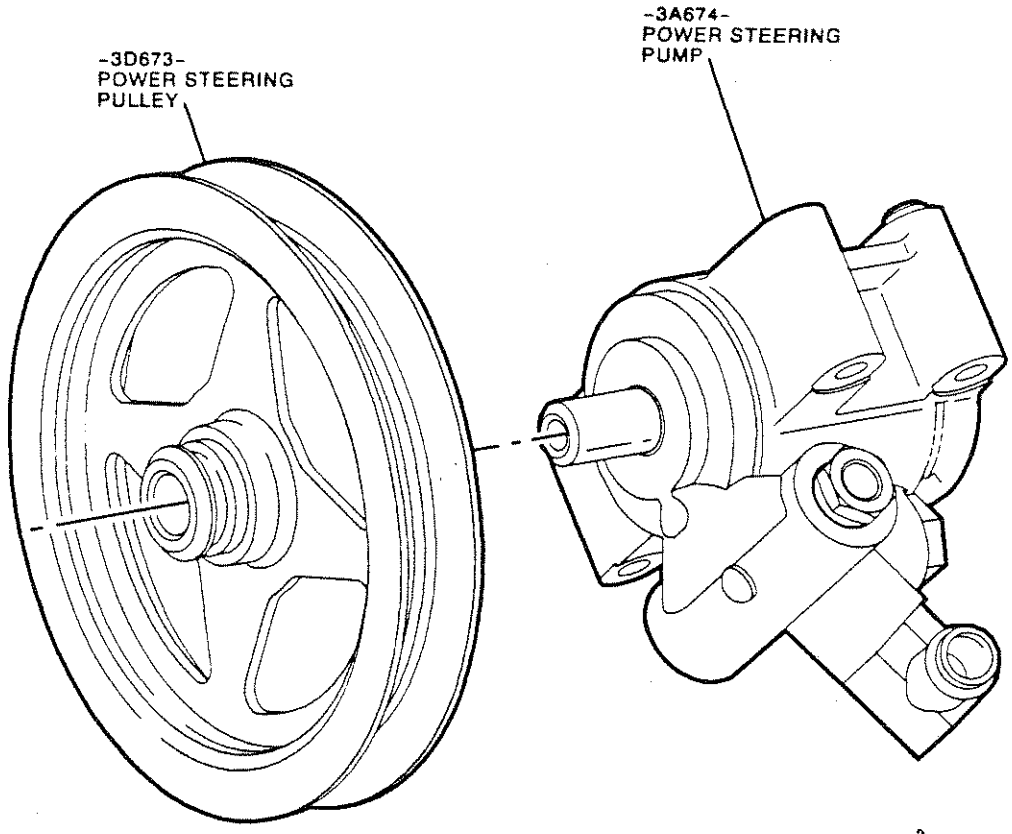
NOTE:
VISUALLY INSPECT "O" RING AND MATING SURFACE FOR DIRT OR CONTAMINANTS PRIOR TO INSTALLATION.

NOTE:
DO NOT APPLY PRESSURE TO PULLEY MOUNTING FLANGE AREA WHEN INSTALLING.

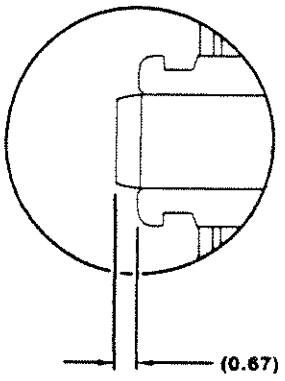
DRIVE BELT TENSIONER, IDLER PULLEY AND WATER PUMP PULLEY



POWER STEERING PULLEY TO POWER STEERING PUMP

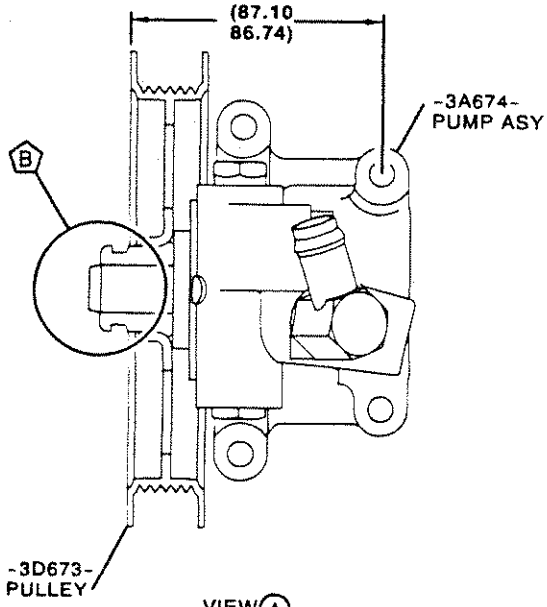


NOTE:
PULL PUMP SHAFT FORWARD WITH **(14 LB)** FORCE AND LOCK IN PLACE DURING INSTALLATION OF PULLEY ONTO SHAFT.
MIN PRESS FORCE = **1500 LBf**
MAX PRESS FORCE = **6500 LBf**



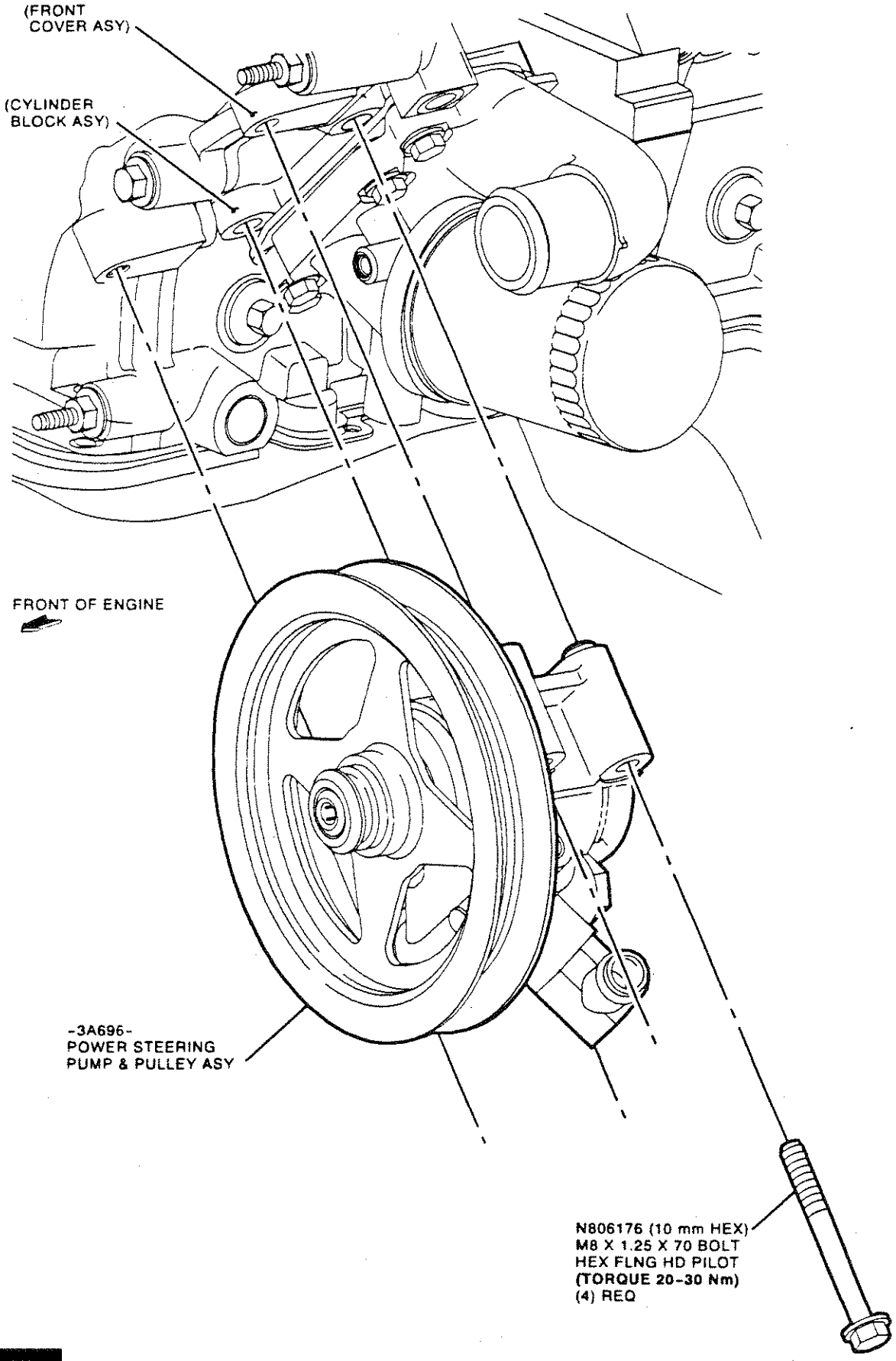
NOTE:
FOR SERVICE AND MANUAL PRESS ONLY:
PRESS PULLEY **(0.67 mm)** PAST END OF SHAFT.

VIEW (B)

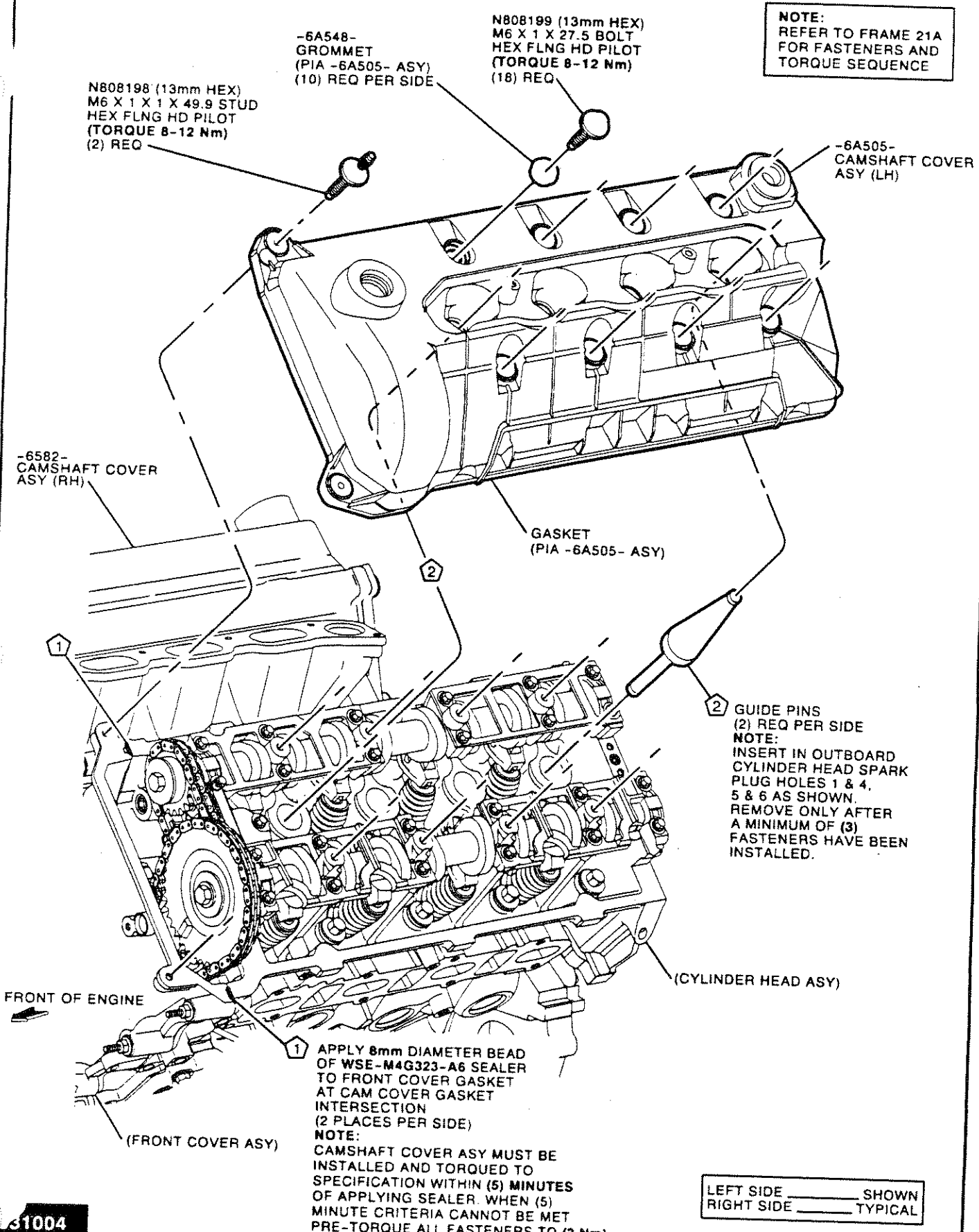


VIEW (A)

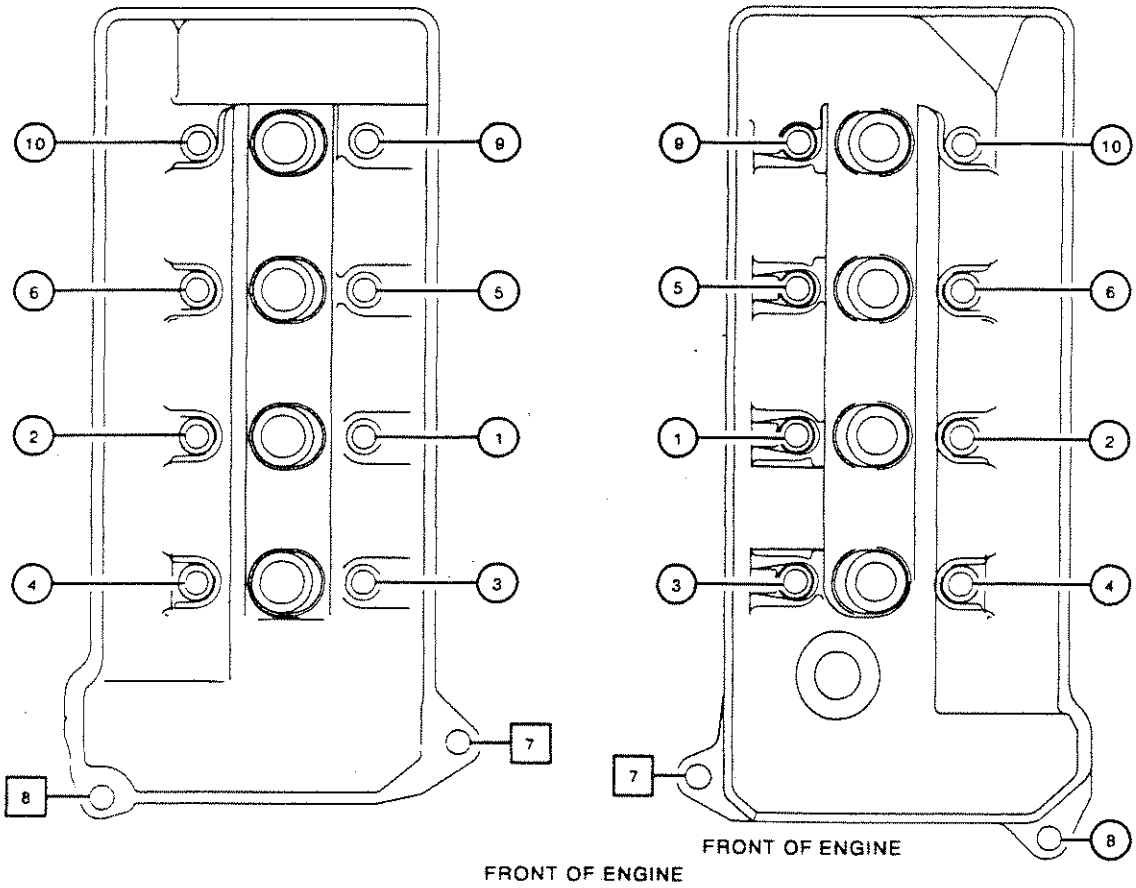
POWER STEERING PUMP AND PULLEY ASY



CAMSHAFT COVER ASY

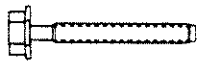
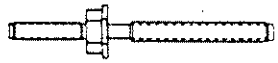


CAMSHAFT COVER STUD AND BOLT APPLICATION

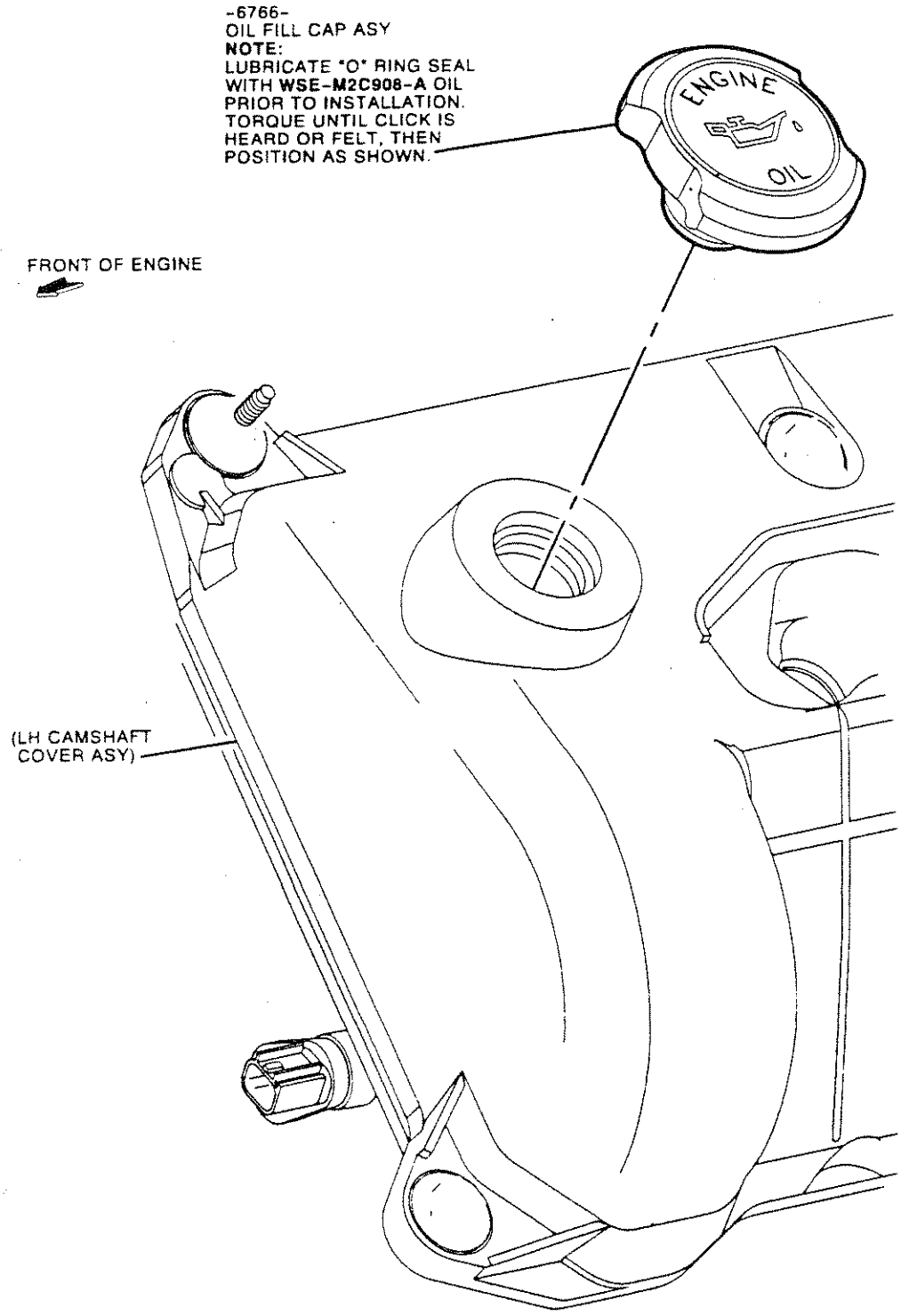


RH CAMSHAFT COVER ASY

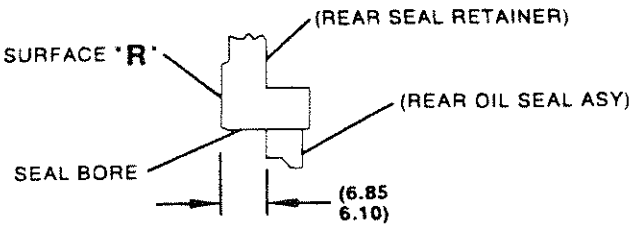
LH CAMSHAFT COVER ASY

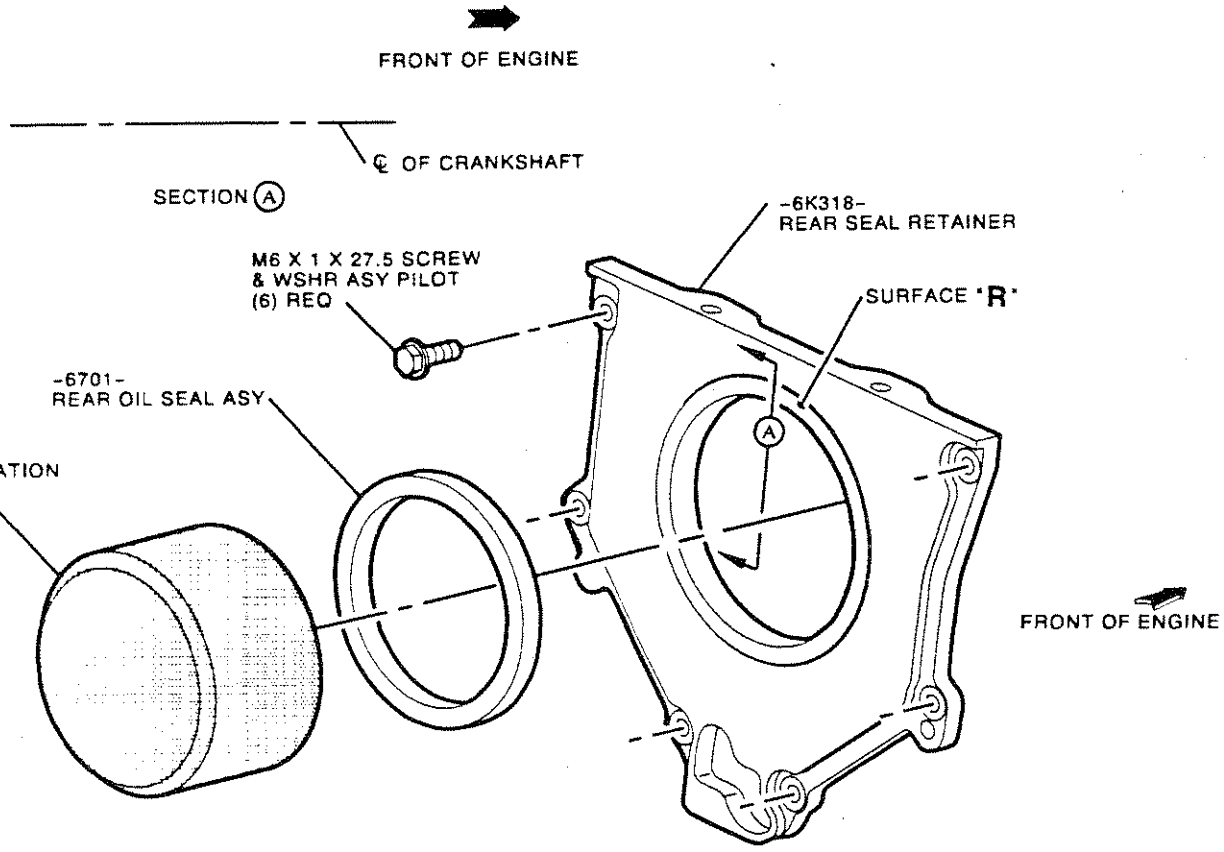
HOLE #	FASTENER	DESCRIPTION	TORQUE
○ 1-6, 8-10 (LH) 1-6, 9&10 (RH)		N808199 (13mm HEX) M6 X 1 X 28.5 BOLT HEX FLNG HD PILOT	(8-12 Nm)
□ 7 (LH) 7&8 (RH)		N808198 (13mm HEX) M6 X 1 X 1 X 50.9 STUD & WASHER HEX FLNG HD PILOT	(8-12 Nm)

OIL FILL CAP ASY



CRANKSHAFT OIL SEAL RETAINER AND REAR OIL SEAL ASY (SUB-ASSEMBLY)





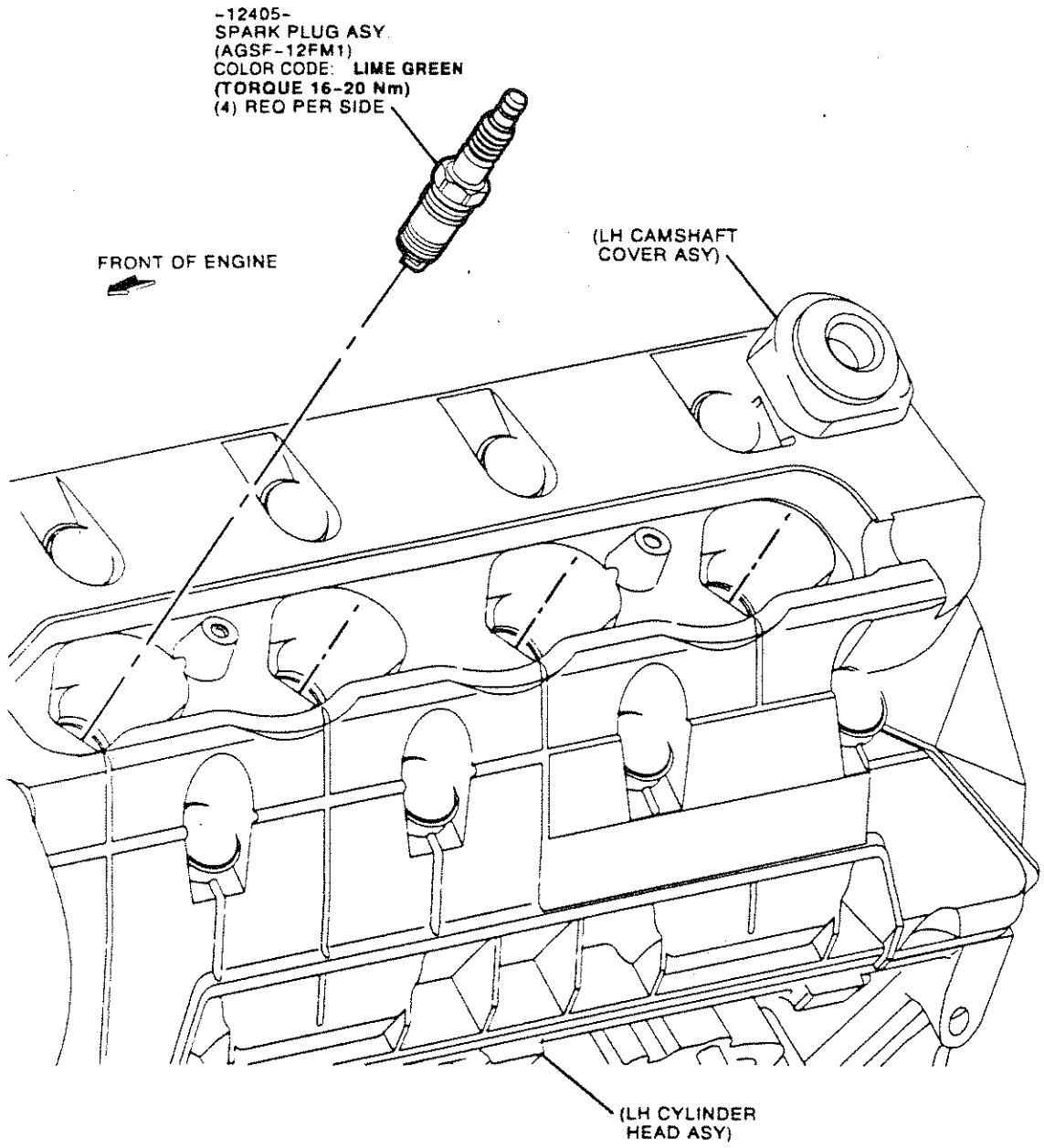
ASSEMBLY PROCEDURE

1. **NOTE: OFF LINE OPERATION**
2. PRESS REAR OIL SEAL ASY (-6701-) INTO REAR SEAL RETAINER (-6K318-) WITH INSTALLATION TOOL TO A DEPTH OF **(6.10-6.85mm)** BELOW SURFACE "**R**".
3. IF THERE ARE ANY CONTAMINANTS (OIL OR OTHER FLUIDS) ON BLOCK RETAINER SEALING SURFACE IT MUST BE WIPED WITH **WSE-M5B392-A** CLEANER AND ALLOWED TO DRY UNTIL THERE IS NO SIGN OF WETNESS, OR (5) MINUTES, WHICHEVER IS LONGER.
4. PLACE (6) M6 SCREW & WASHER ASY'S INTO REAR OIL SEAL RETAINER.

MANUAL/SERVICE INSTALLATION PROCEDURE

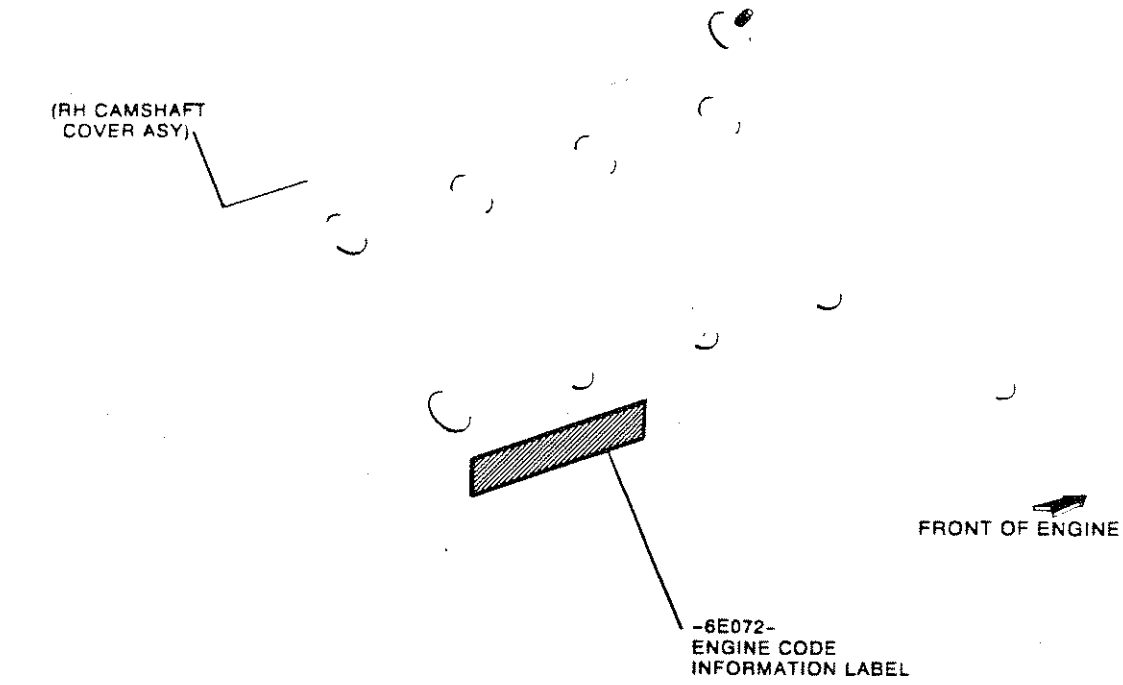
1. SERVICE INSTALLATION TOOL KIT (T95P-1000-FH/FLMH) MUST BE USED TO INSTALL REAR SEAL/RETAINER ONTO CRANKSHAFT JOURNAL.
2. INSTALL REAR SEAL RETAINER (-6K318-) ONTO END OF CRANKSHAFT WITH TWO SCREWS PROVIDED.
3. LUBRICATE SEAL MAIN LIP OR SEAL REPLACER WITH **WSS-M2C916-A** OIL
4. POSITION SEAL/RETAINER ON REAR CRANKSHAFT SEAL REPLACER AND ASSEMBLE TO ADAPTOR WITH CENTER DRAW BOLT AND WASHER PROVIDED.
5. DRAW SEAL INTO CRANKSHAFT BORE UNTIL SEAL REPLACER BOTTOMS AGAINST REAR FACE OF SEAL CARRIER PLATE.

SPARK PLUG ASY



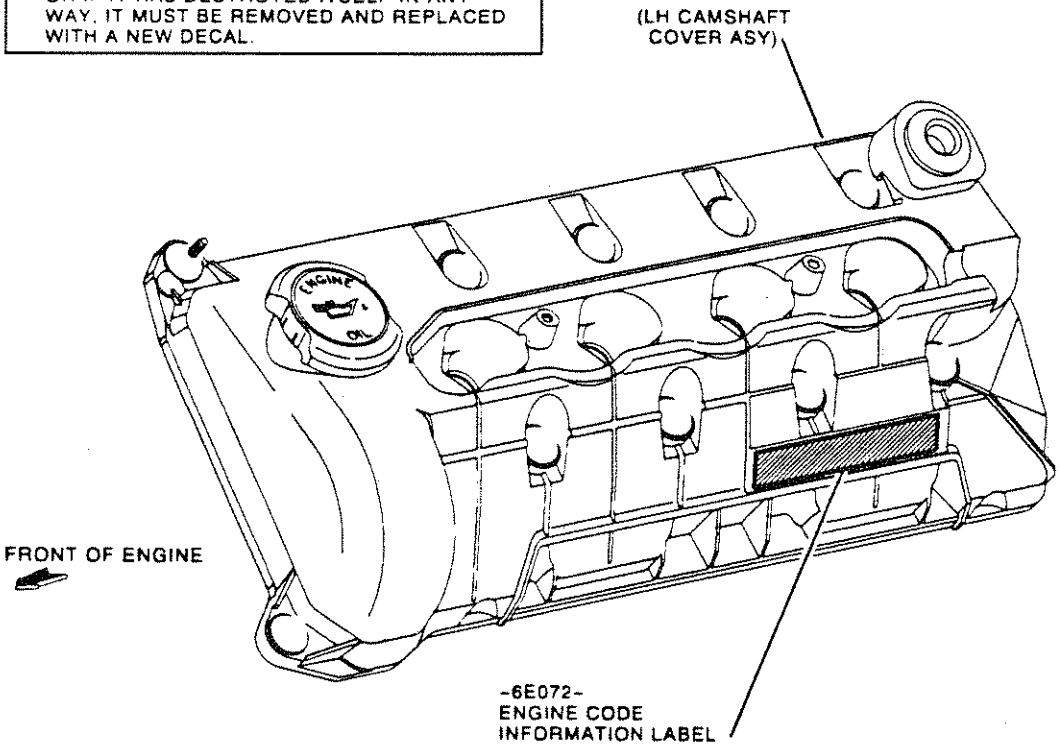
LEFT SIDE ___ SHOWN
RIGHT SIDE __ TYPICAL

ENGINE CODE INFORMATION LABEL



NOTE: DECAL INSTALLATION PROCEDURES
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.

BACKGROUND DETAIL SIMPLIFIED FOR INSTALLATION CLARITY

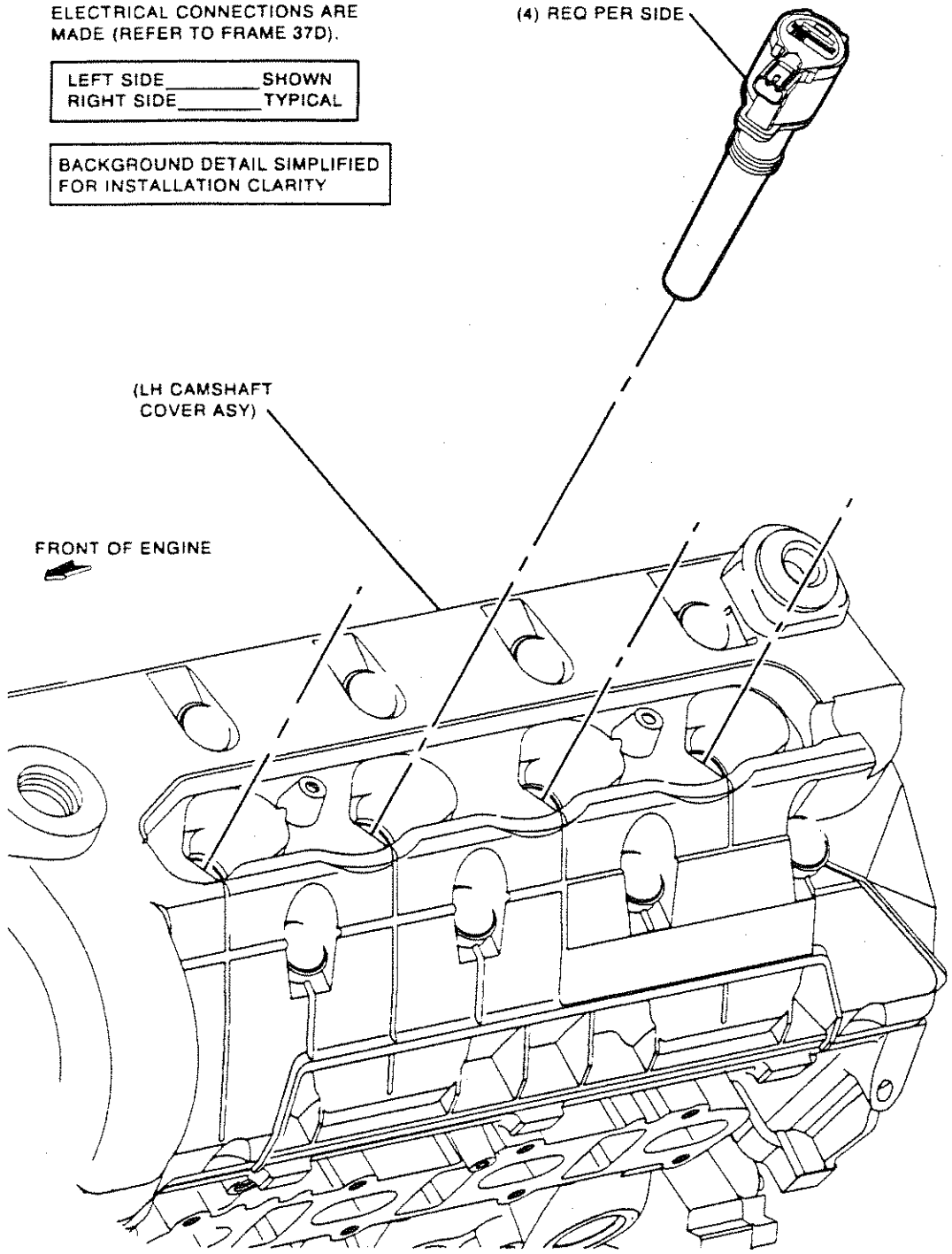


IGNITION COIL ON PLUG ASY

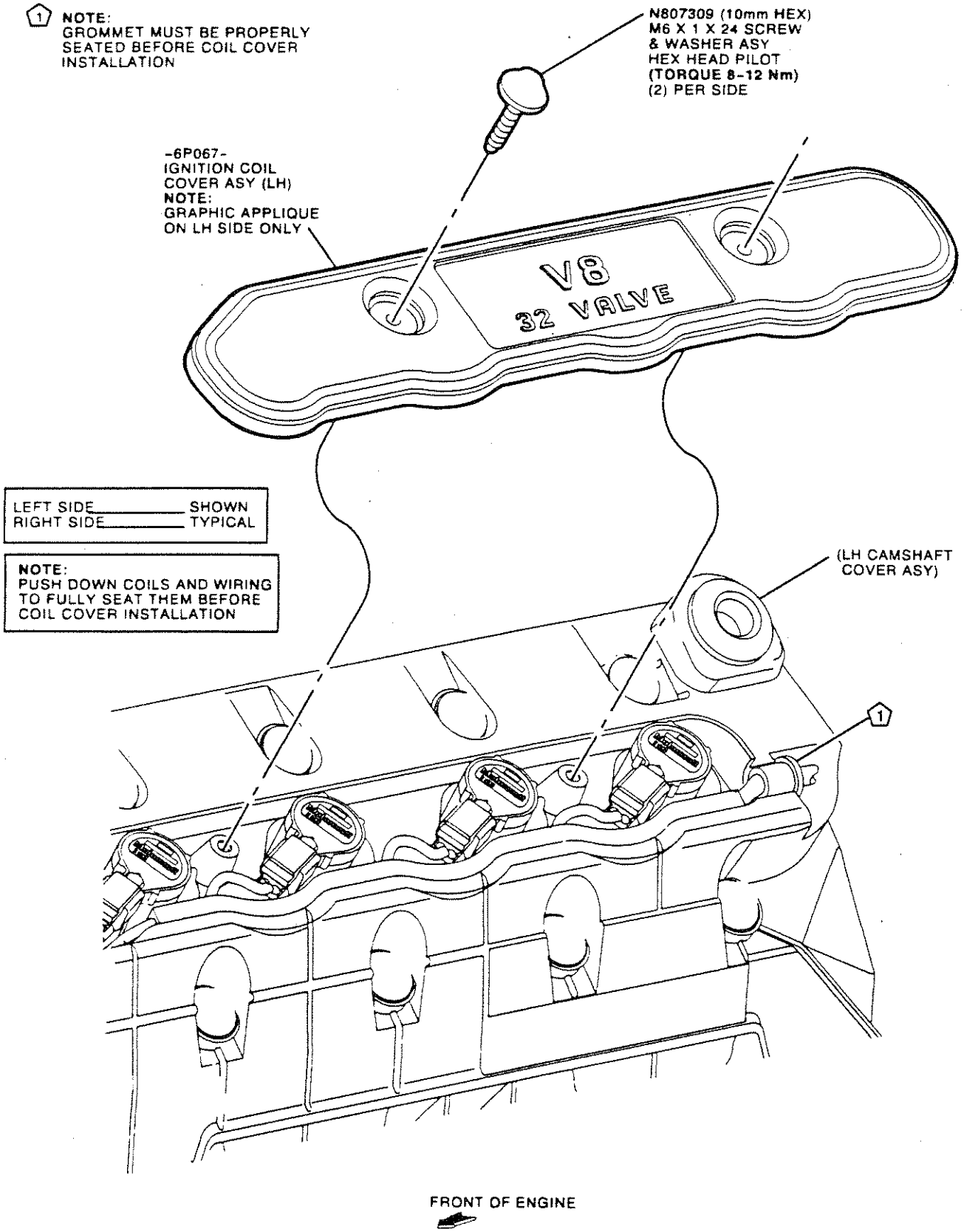
(1) NOTE:
LEAVE COILS UNSEATED UNTIL ELECTRICAL CONNECTIONS ARE MADE (REFER TO FRAME 37D).

LEFT SIDE_____SHOWN
RIGHT SIDE_____TYPICAL

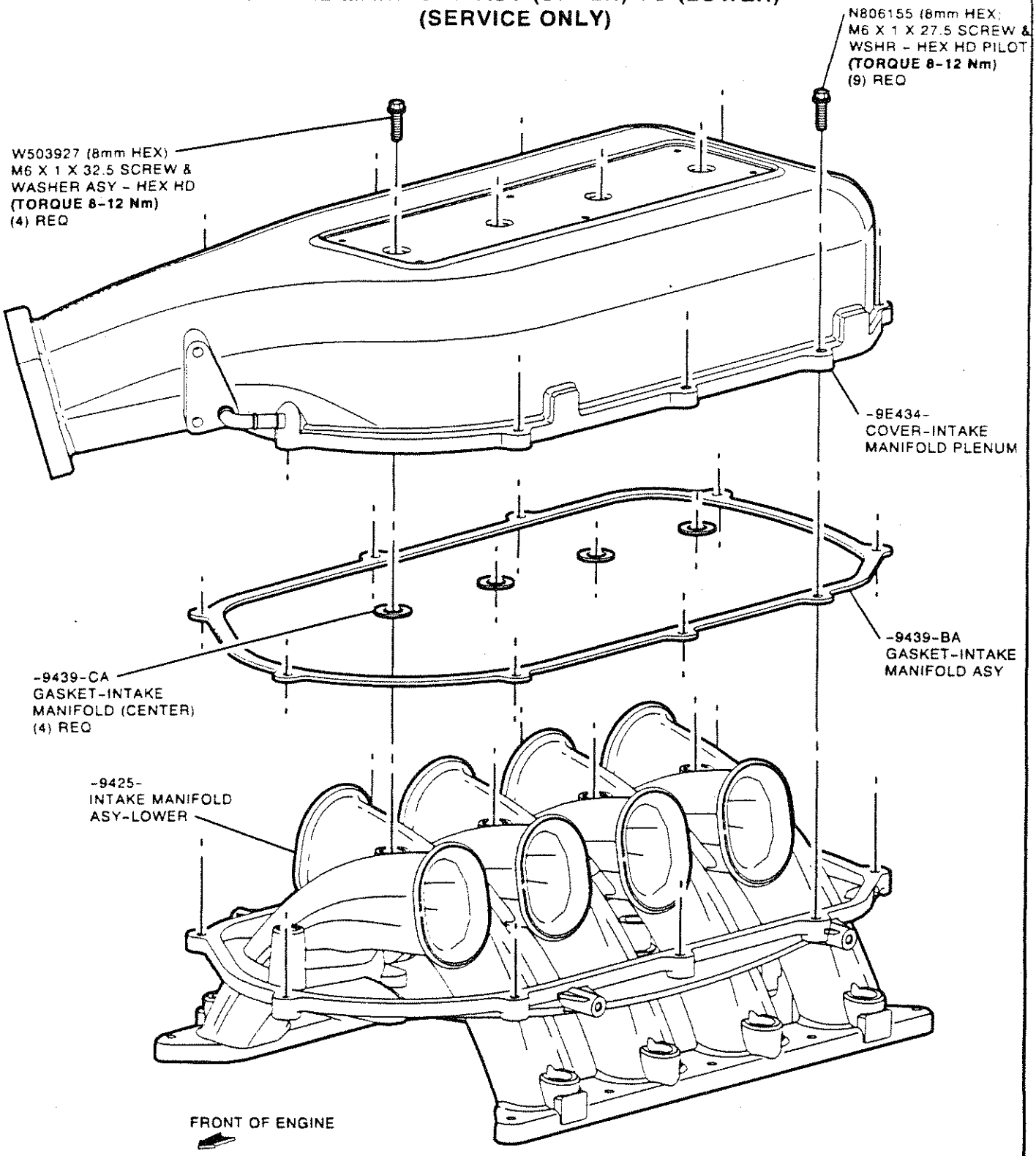
BACKGROUND DETAIL SIMPLIFIED FOR INSTALLATION CLARITY



IGNITION COIL COVER ASY

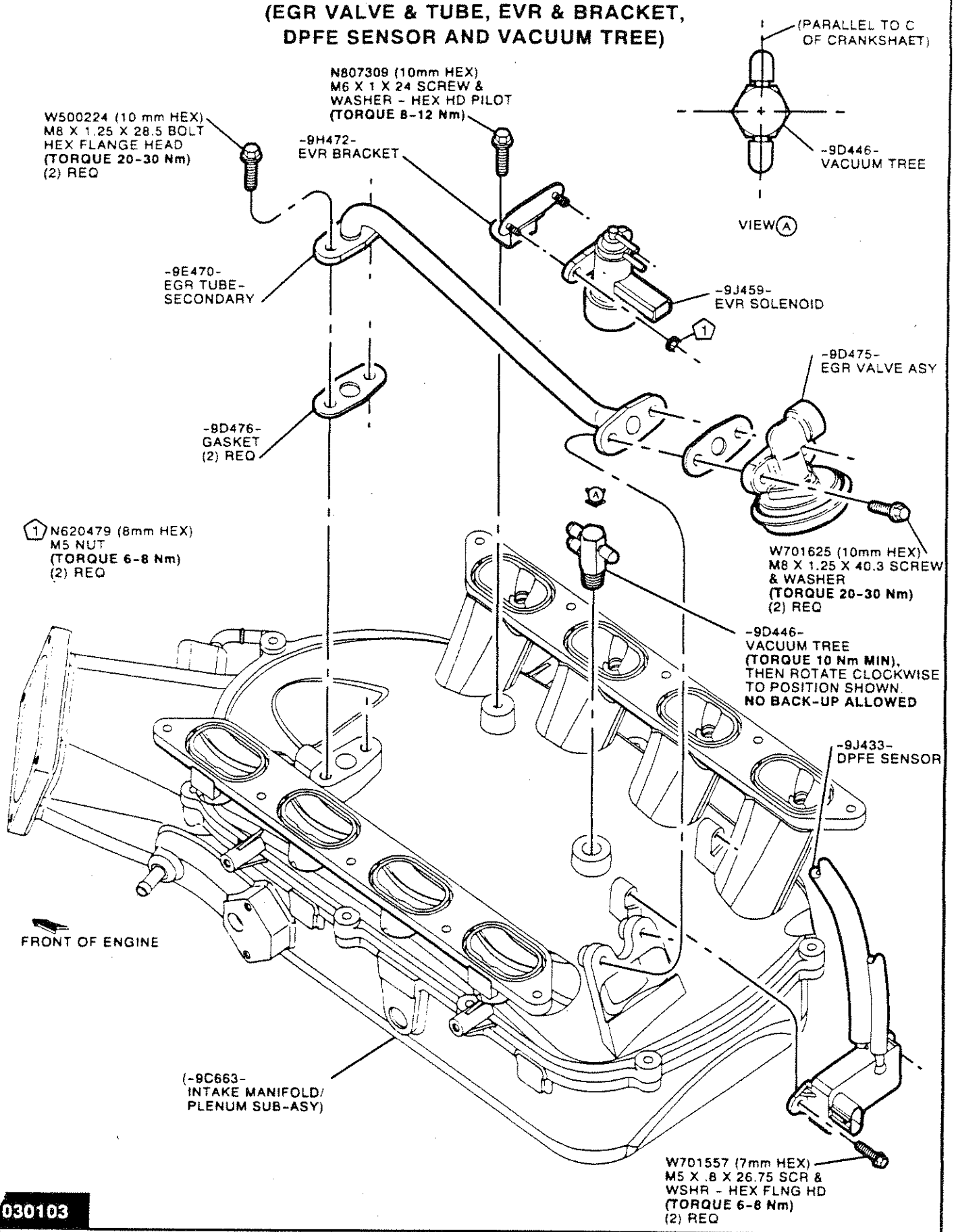


INTAKE MANIFOLD ASY (UPPER) TO (LOWER) (SERVICE ONLY)



NOTE:
SHOWN FOR SERVICE ONLY. PARTS SHOWN ON THIS FRAME ARE SHIPPED TO EMDO AS -9C663- INTAKE MANIFOLD ASY.

INTAKE MANIFOLD ASY (UPPER/LOWER) COMPONENTS (EGR VALVE & TUBE, EVR & BRACKET, DPFE SENSOR AND VACUUM TREE)

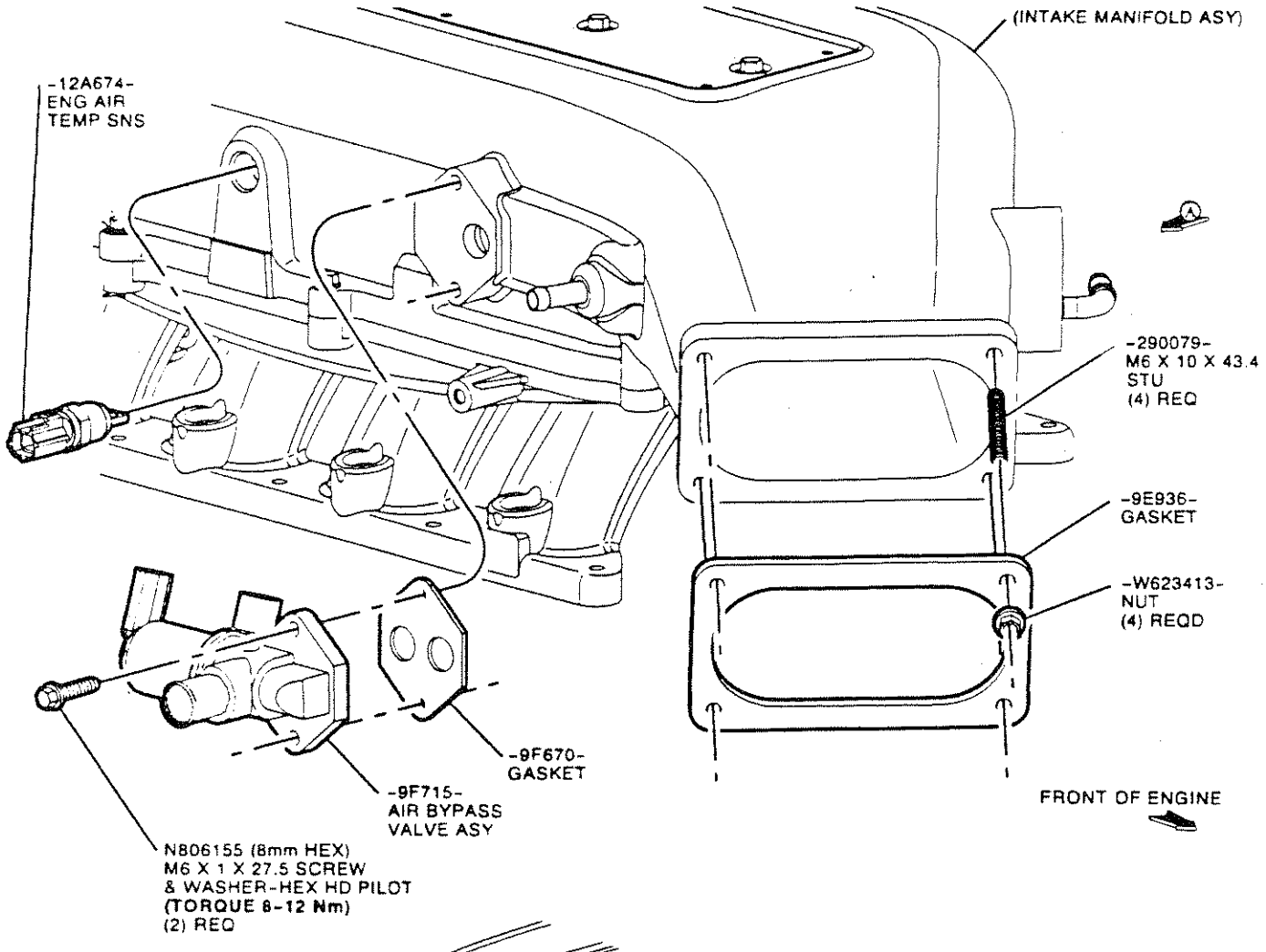


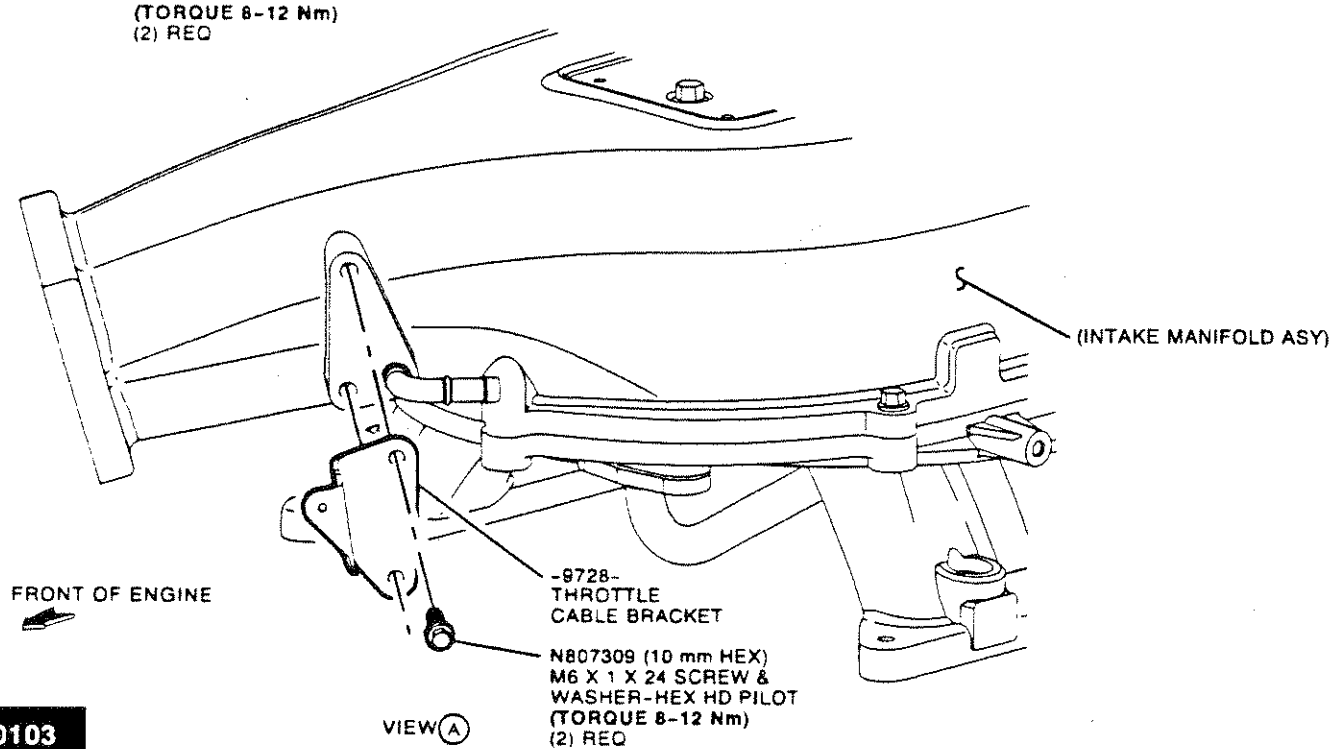
030103

REL	NE01-E10956645-000	MODEL	2000 5.4L-4V COBRA "R"	DATE	000828	LAST FRAME	41
Ford Motor Company V-ENGINE ILLUSTRATION		NC	▽ ILYR3E-030002-E0543U	REV	---	FRAME 26A	CONTD 26B

SCALE = .40

INTAKE MANIFOLD ASY (UPPER/LOWER) COMPONENTS (Continued)
(AIR BYPASS VALVE ASY, THROTTLE CABLE BRACKET AND ENGINE AIR TEMPERATURE SENSOR)





030103

REL	NE01-E10956645-000	MODEL	2000 5.4L-4V COBRA "R"	DATE	000828	LAST FRAME	41
Ford Motor Company V-ENGINE ILLUSTRATION		NC	▽ ILYR3E-030002-E0543U	REV	---	FRAME 26B	CONTD 26C

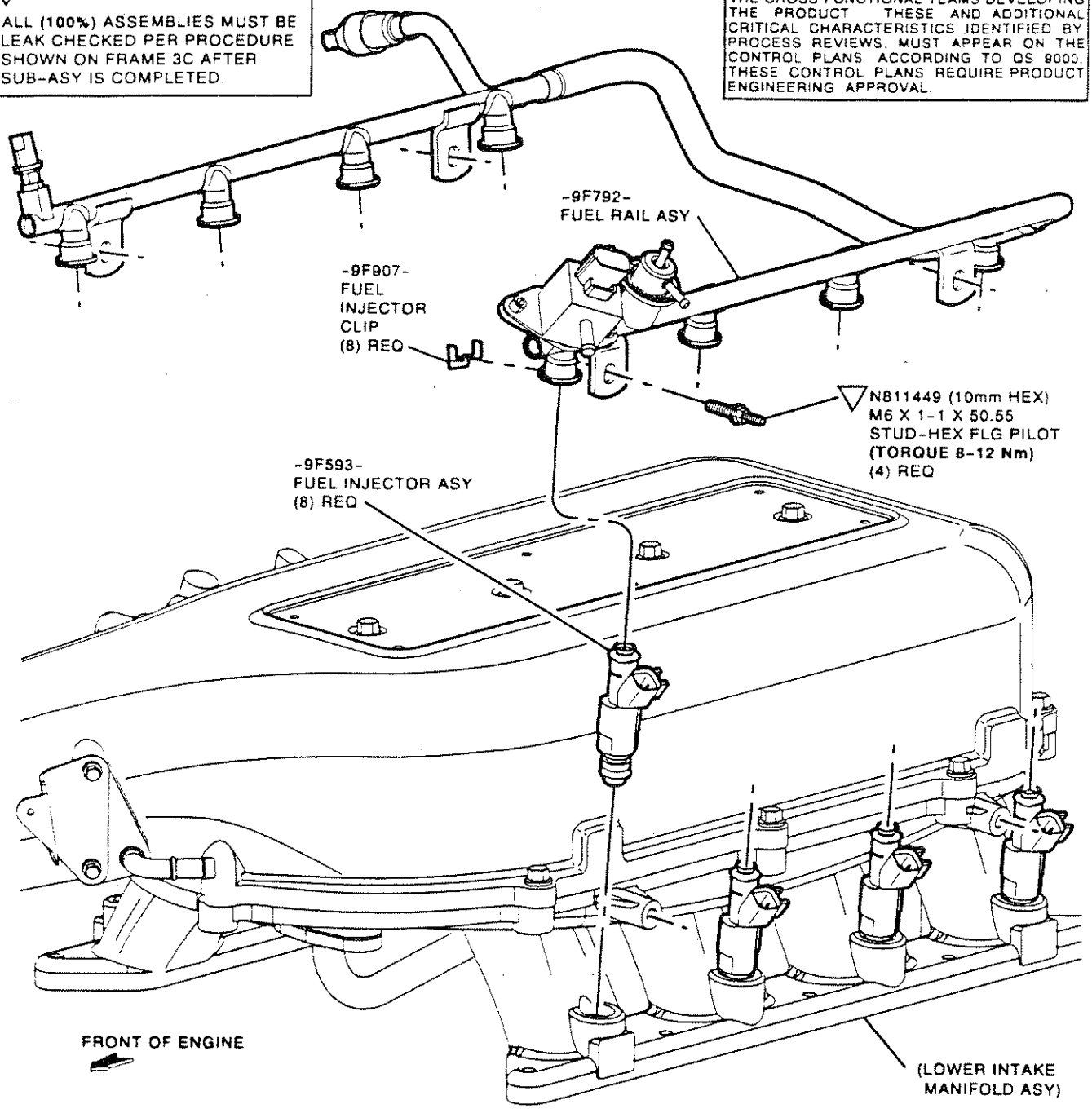
SCALE = .50

INTAKE MANIFOLD ASY (UPPER/LOWER) COMPONENTS (Continued)
(FUEL RAILS AND INJECTORS)

▽LEAK CHECK PROCEDURE

ALL (100%) ASSEMBLIES MUST BE LEAK CHECKED PER PROCEDURE SHOWN ON FRAME 3C AFTER SUB-ASY IS COMPLETED.

▽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.



ASSEMBLY PROCEDURE

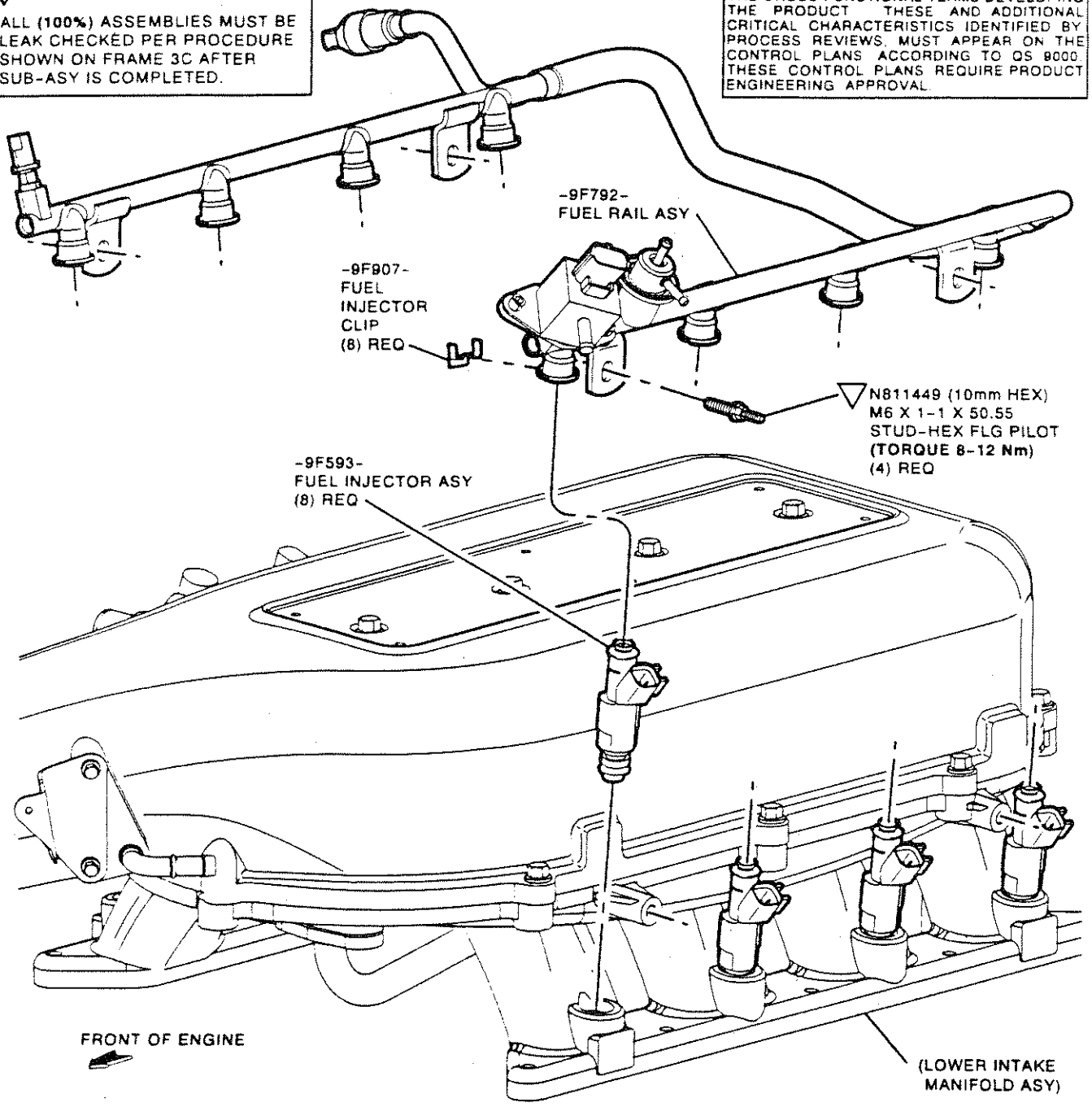
1. APPLY **WSE-M2C908-A** OIL TO INJECTOR BORES IN LOWER INTAKE MANIFOLD ASY (-9424-) AND TO INJECTOR "CUPS" IN FUEL RAIL ASY (-9F792-)
2. INJECTORS WILL BE SUPPLIED PRE-SORTED (RICH, MEAN, LEAN) IDENTIFIED BY A COLOR DOT ON FLAT SURFACE AND MUST BE INSTALLED WITHOUT MIXING AND WITH ELECTRICAL CONNECTORS FACING OUTWARD, PERPENDICULAR TO ℄ OF CRANKSHAFT.
3. PRESS FUEL RAIL ASY (-9F792-) ONTO INJECTORS AND LOWER INTAKE MANIFOLD ASY.
4. INSTALL (8) FUEL INJECTOR CLIPS (-9F907-) TO INJECTORS/FUEL RAILS FOR ANTI-ROTATION.
5. INSTALL (2) M6 STUDS PER SIDE AND TORQUE TO SPECIFICATION.

INTAKE MANIFOLD ASY (UPPER/LOWER) COMPONENTS (Continued)
(FUEL RAILS AND INJECTORS)

▽LEAK CHECK PROCEDURE

ALL **(100%)** ASSEMBLIES MUST BE LEAK CHECKED PER PROCEDURE SHOWN ON FRAME 3C AFTER SUB-ASY IS COMPLETED.

▽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.

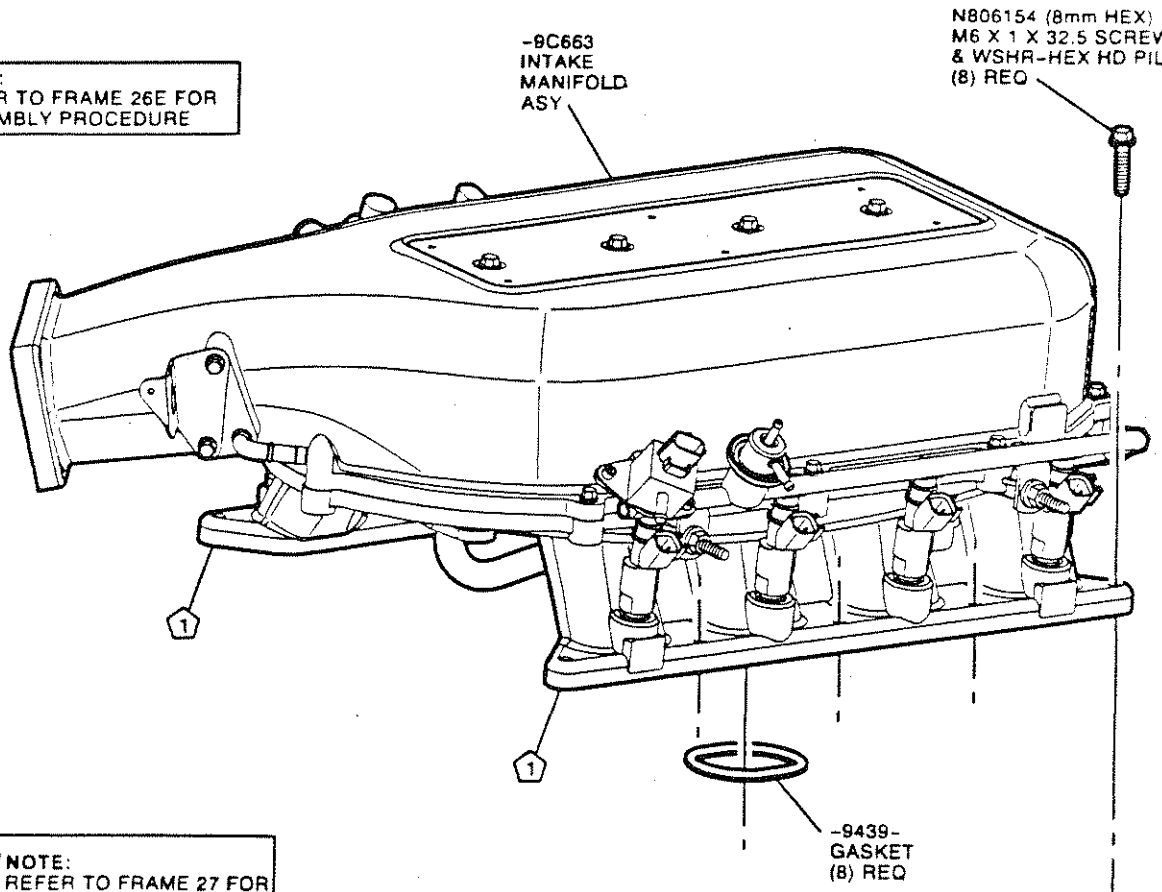


ASSEMBLY PROCEDURE

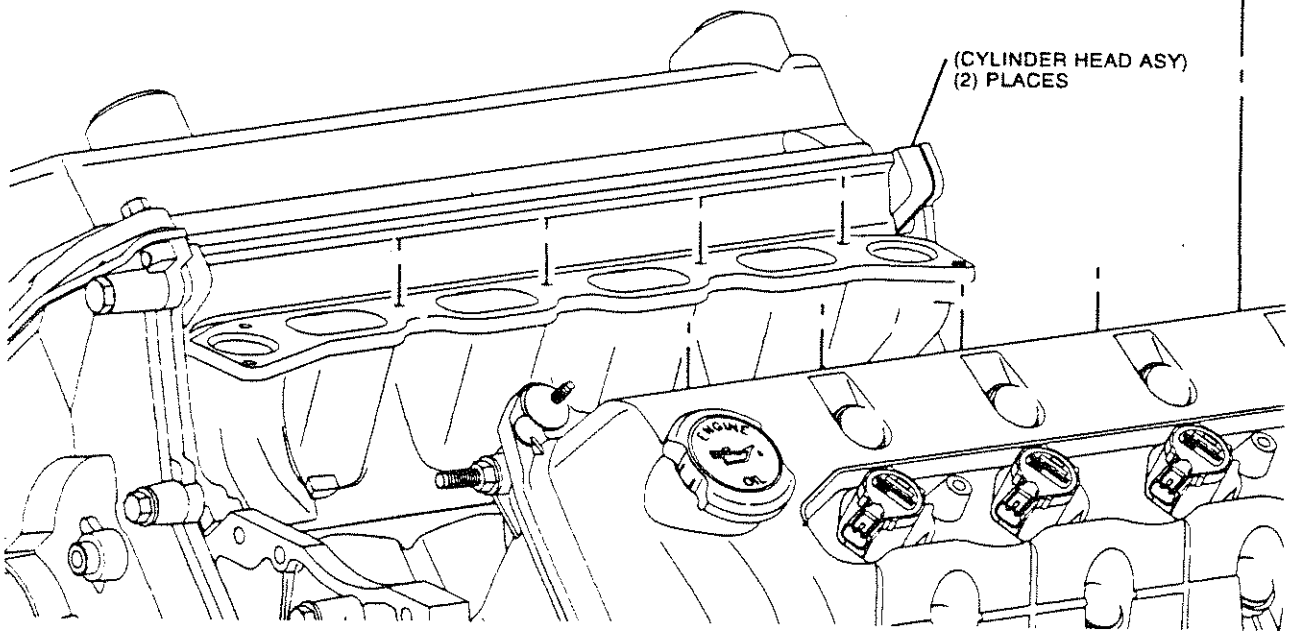
1. APPLY **WSE-M2C908-A** OIL TO INJECTOR BORES IN LOWER INTAKE MANIFOLD ASY (-9424-) AND TO INJECTOR "CUPS" IN FUEL RAIL ASY (-9F792-)
2. INJECTORS WILL BE SUPPLIED PRE-SORTED (RICH, MEAN, LEAN) IDENTIFIED BY A COLOR DOT ON FLAT SURFACE AND MUST BE INSTALLED WITHOUT MIXING AND WITH ELECTRICAL CONNECTORS FACING OUTWARD, PERPENDICULAR TO ℄ OF CRANKSHAFT.
3. PRESS FUEL RAIL ASY (-9F792-) ONTO INJECTORS AND LOWER INTAKE MANIFOLD ASY.
4. INSTALL (8) FUEL INJECTOR CLIPS (-9F907-) TO INJECTORS/FUEL RAILS FOR ANTI-ROTATION.
5. INSTALL (2) M6 STUDS PER SIDE AND TORQUE TO SPECIFICATION.

INTAKE MANIFOLD ASY (UPPER/LOWER) TO CYLINDER HEADS

NOTE:
REFER TO FRAME 26E FOR ASSEMBLY PROCEDURE

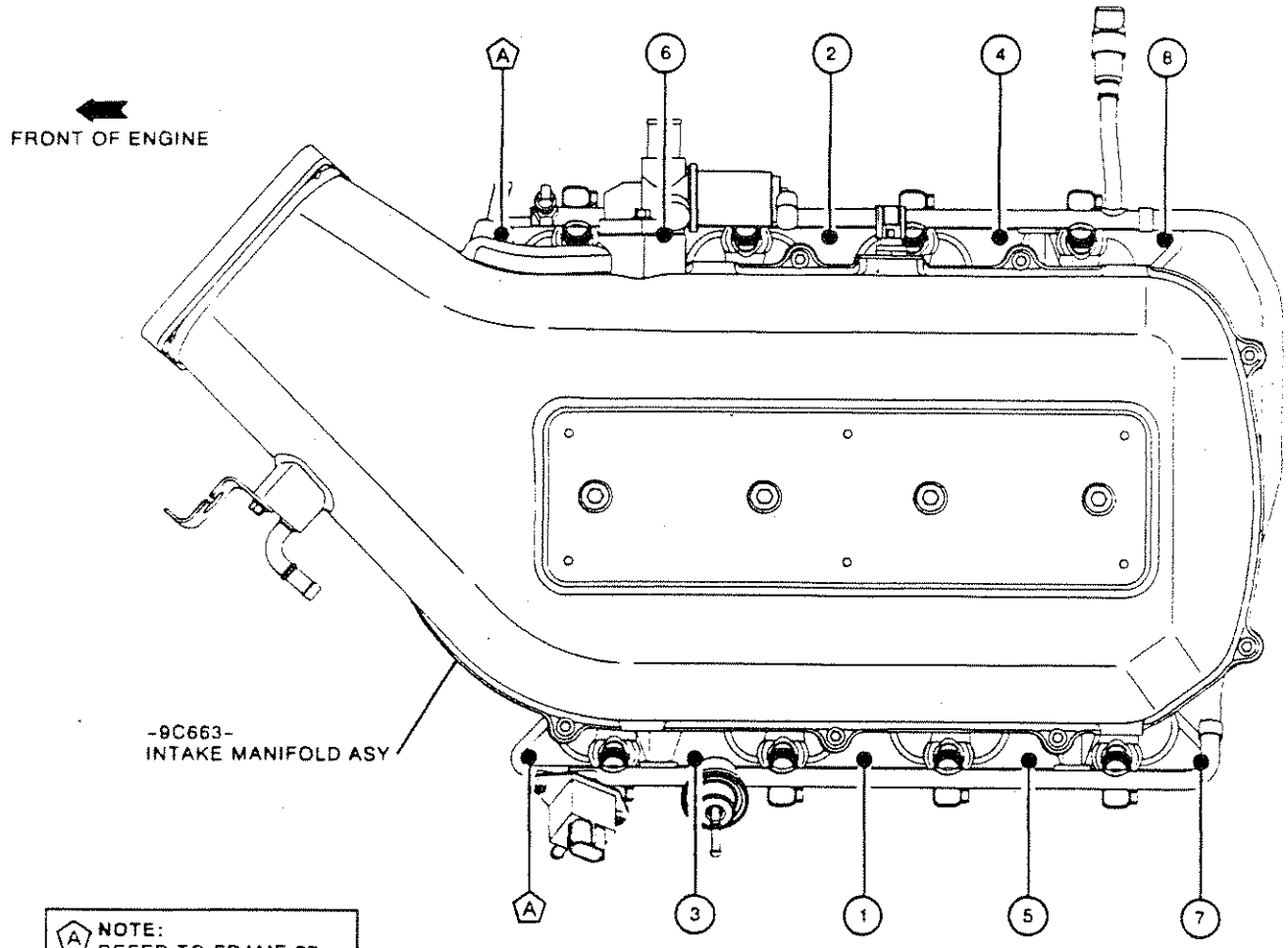


(1) NOTE:
REFER TO FRAME 27 FOR INSTALLATION OF FRONT (2) FASTENERS



FRONT OF ENGINE

INTAKE MANIFOLD ASY
TORQUE PROCEDURE & SEQUENCING



(A) NOTE:
REFER TO FRAME 27 FOR INSTALLATION OF FRONT (2) FASTENERS

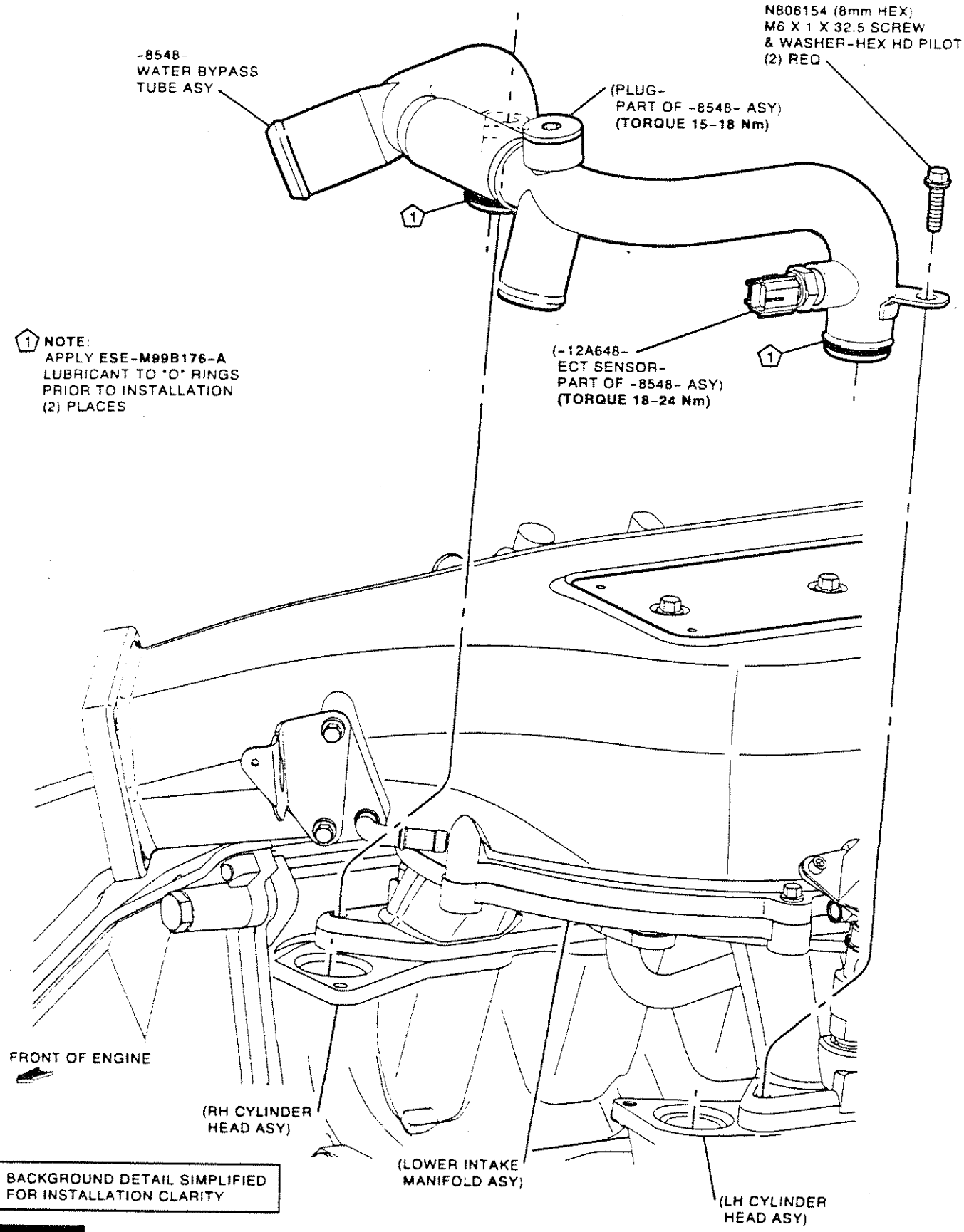
FASTENER CHART

SYMBOL	FASTENER	DESCRIPTION	TORQUE
○	N806154 (8mm HEX)	M6 X 1 X 32.5 SCREW & WSHR-HEX FLNG PILOT	SEE BELOW

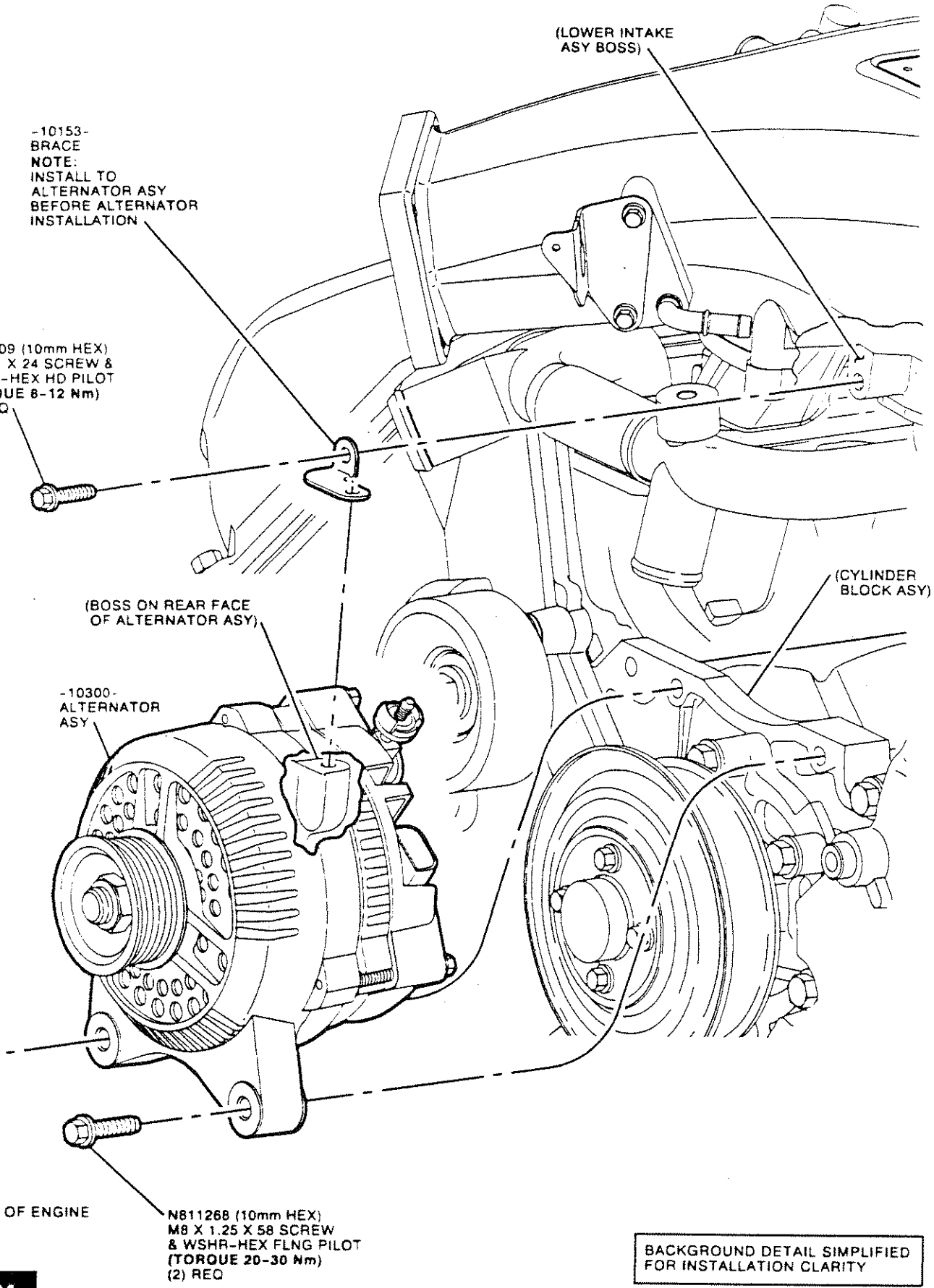
ASSEMBLY PROCEDURE

1. INSTALL (8) GASKETS (-9439-) BY PRESSING INTO GROOVE OF EACH RUNNER ON UNDERSIDE OF INTAKE MANIFOLD ASY.
2. INSTALL INTAKE MANIFOLD ASY (-9C663-) ONTO CYLINDER HEAD FLANGES.
3. INSTALL AND HAND START FASTENERS IN LOCATIONS #1 THRU #8 FRONT (2) FASTENERS ARE USED TO RETAIN WATER BYPASS TUBE ASY (FRAME 27).
4. **TORQUE** ALL FASTENERS IN NUMERICAL SEQUENCE TO **(10 Nm)**.
5. **THEN ROTATE** IN NUMERICAL SEQUENCE AN ADDITIONAL **90°**.

WATER BYPASS TUBE ASY



ALTERNATOR ASY AND BRACE



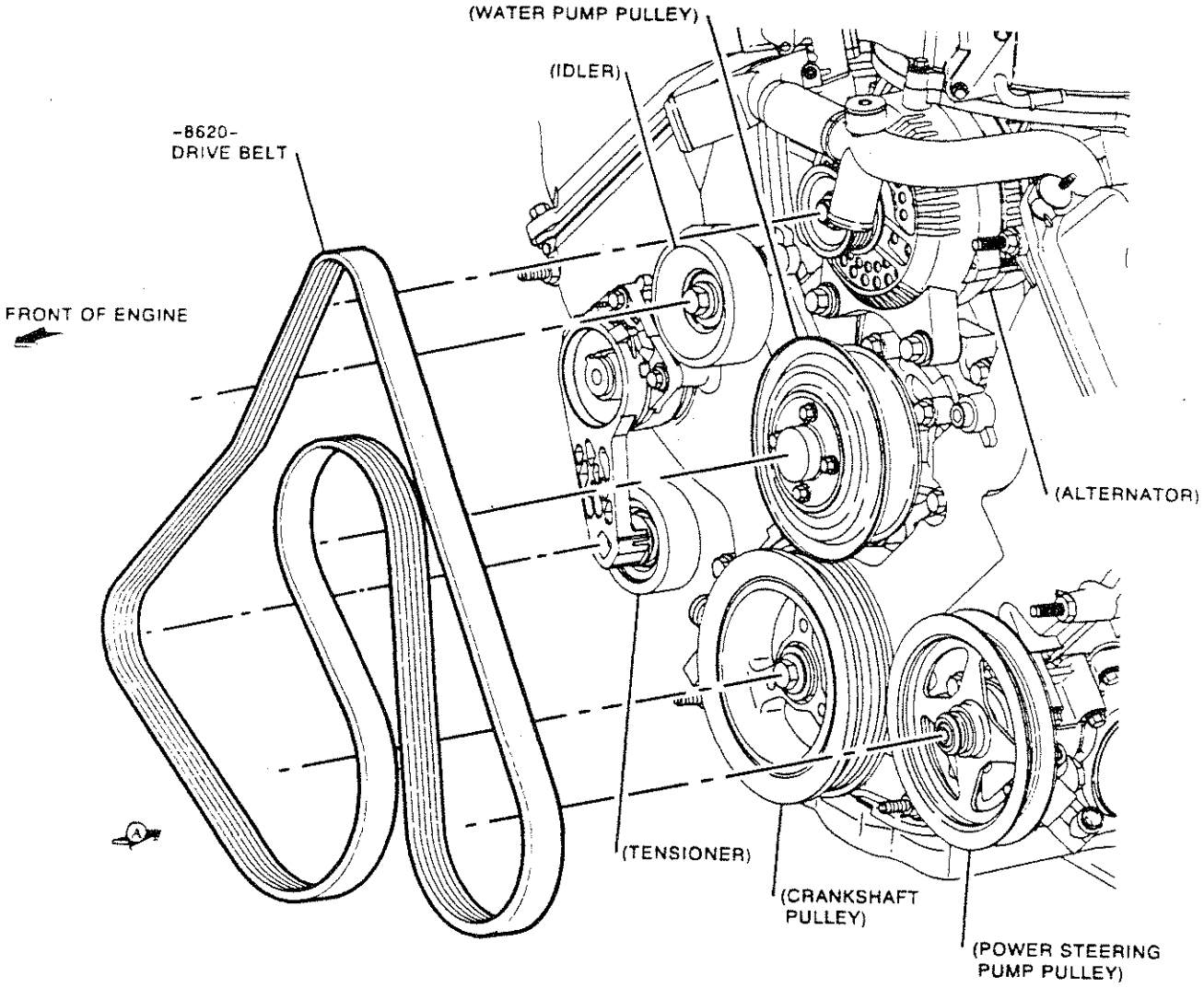
BACKGROUND DETAIL SIMPLIFIED FOR INSTALLATION CLARITY

030504

REL	NE01-E10956645-000	MODEL	2000 5.4L-4V COBRA "R"	DATE	000828	LAST FRAME	41
Ford Motor Company V-ENGINE ILLUSTRATION		NC	▽ ILYR3E-030002-E0543U	REV	---	FRAME 28	CONTD 29

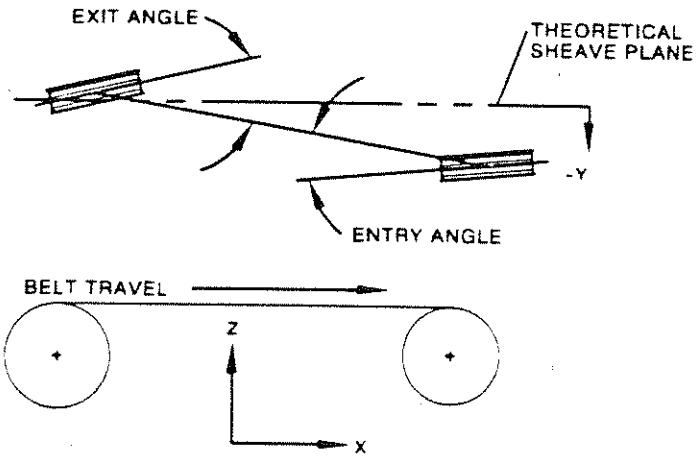
SCALE = .75

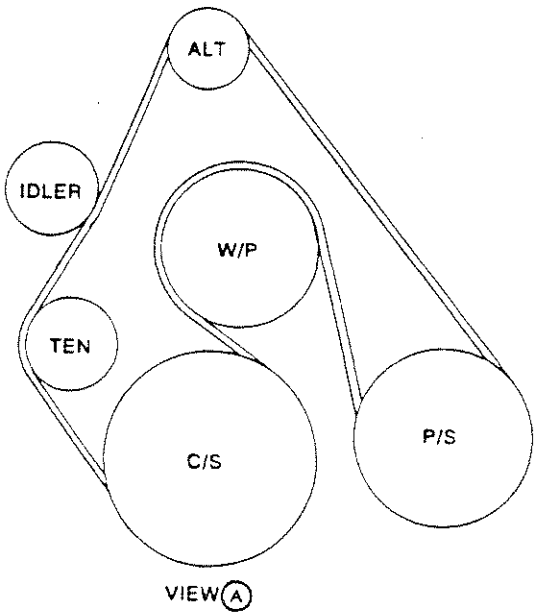
ACCESSORY DRIVE BELT



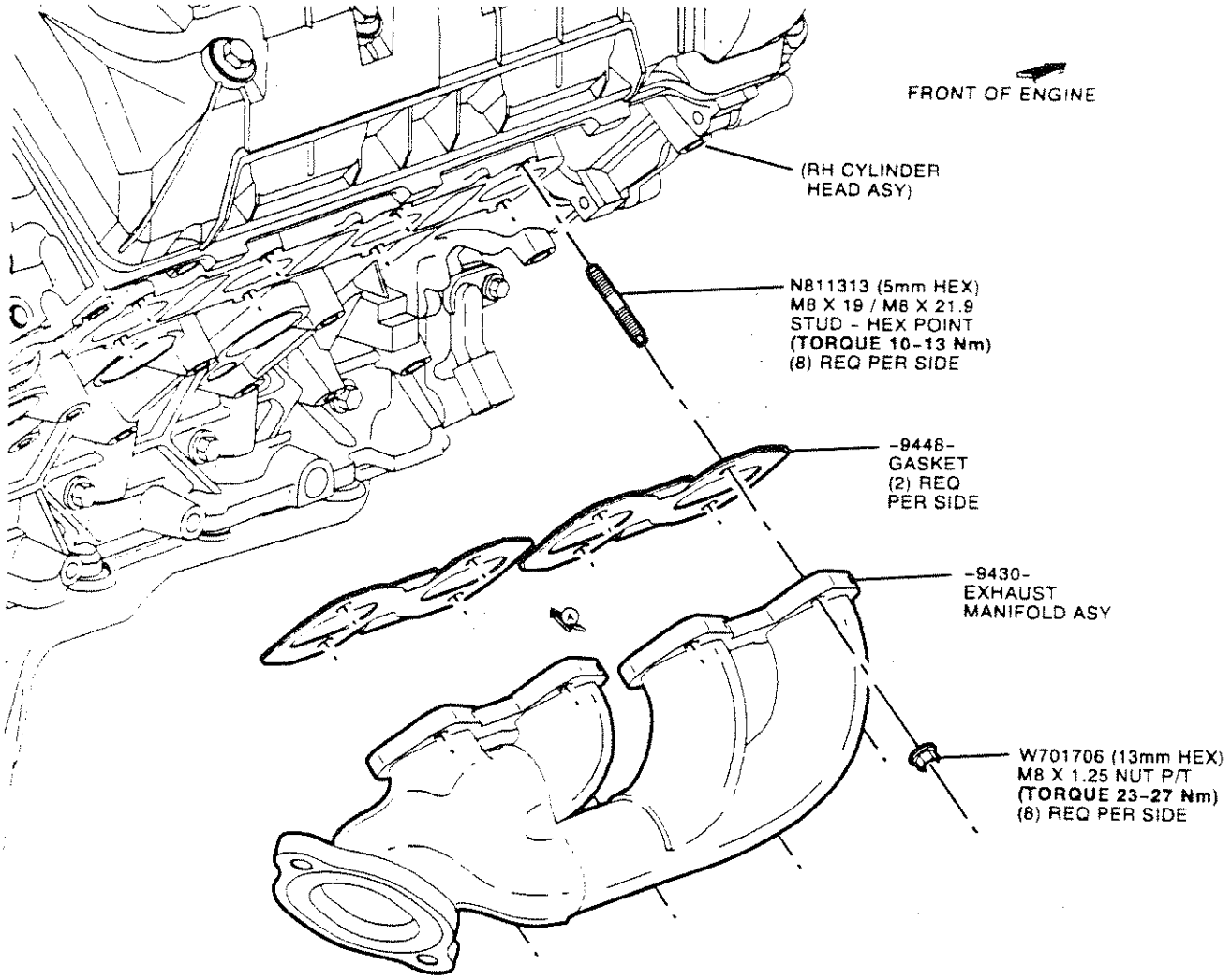
FEAD DRIVE BELT MIS-ALIGNMENT ANGLES

ANGULAR MISALIGNMENT SPECIFICATIONS ENTRY OR EXIT ANGLE NOT TO EXCEED +/- 0.33° AS INSPECTED USING FEAD ASSEMBLY GAGE



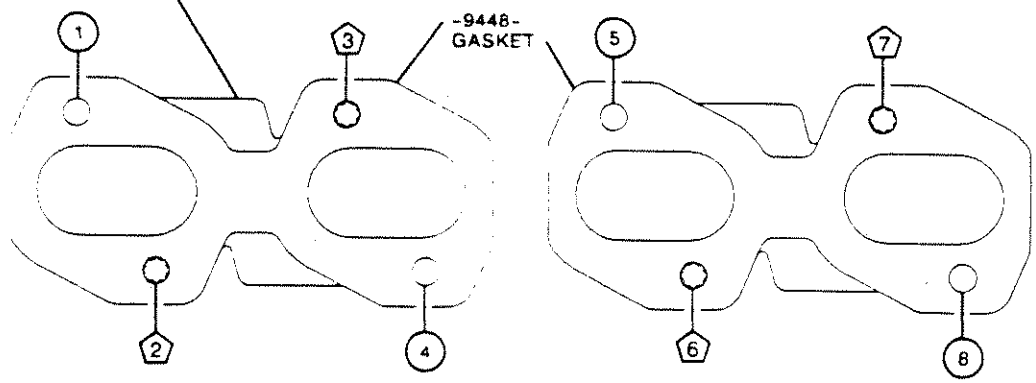


EXHAUST MANIFOLD ASY (RH)



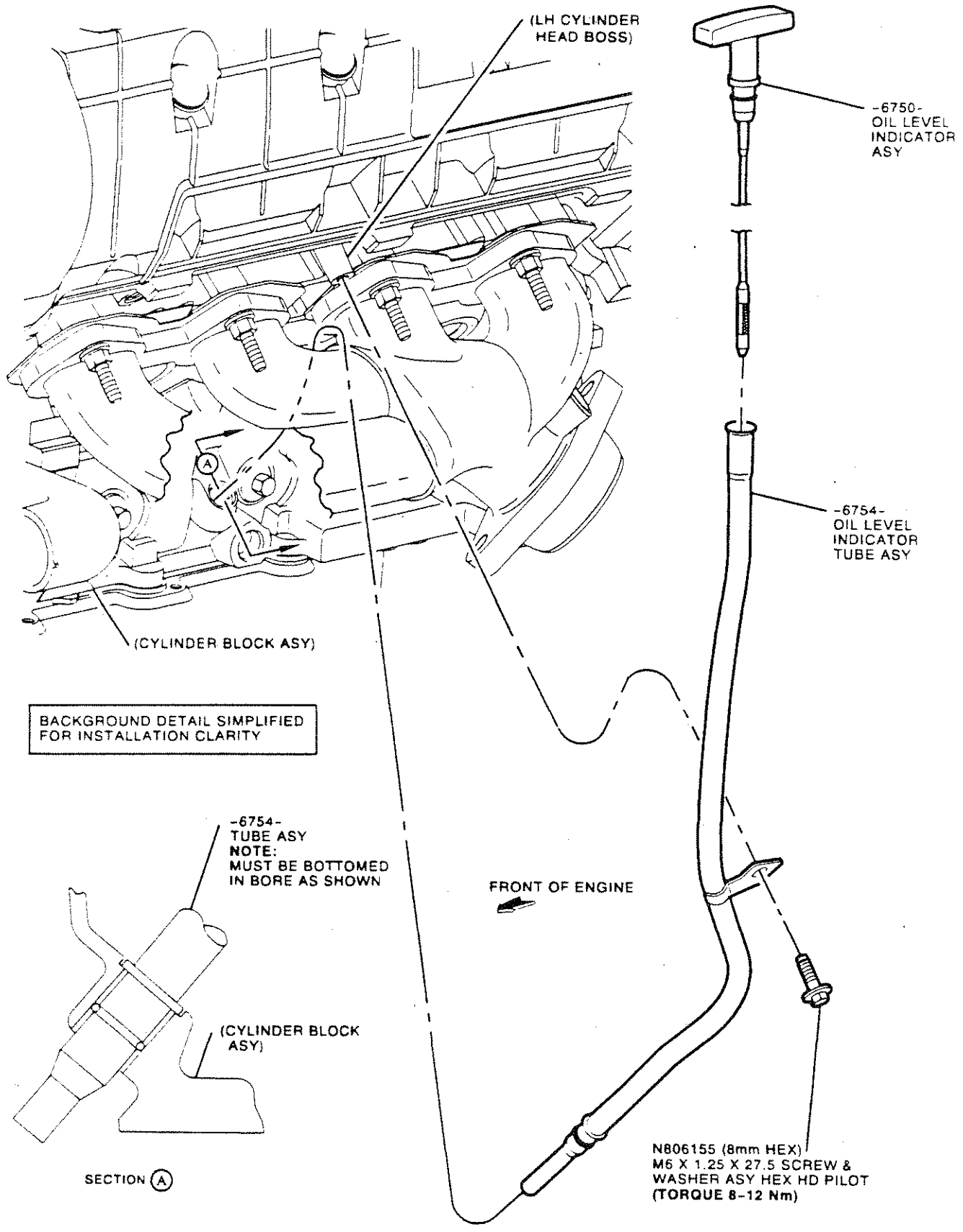
NOTE:
THIS SYMBOL DESIGNATES HOLES THAT HOLD GASKETS IN PLACE WHEN PUSHED ONTO STUDS.

NOTE:
ASSEMBLE WITH TABS ORIENTED AS SHOWN

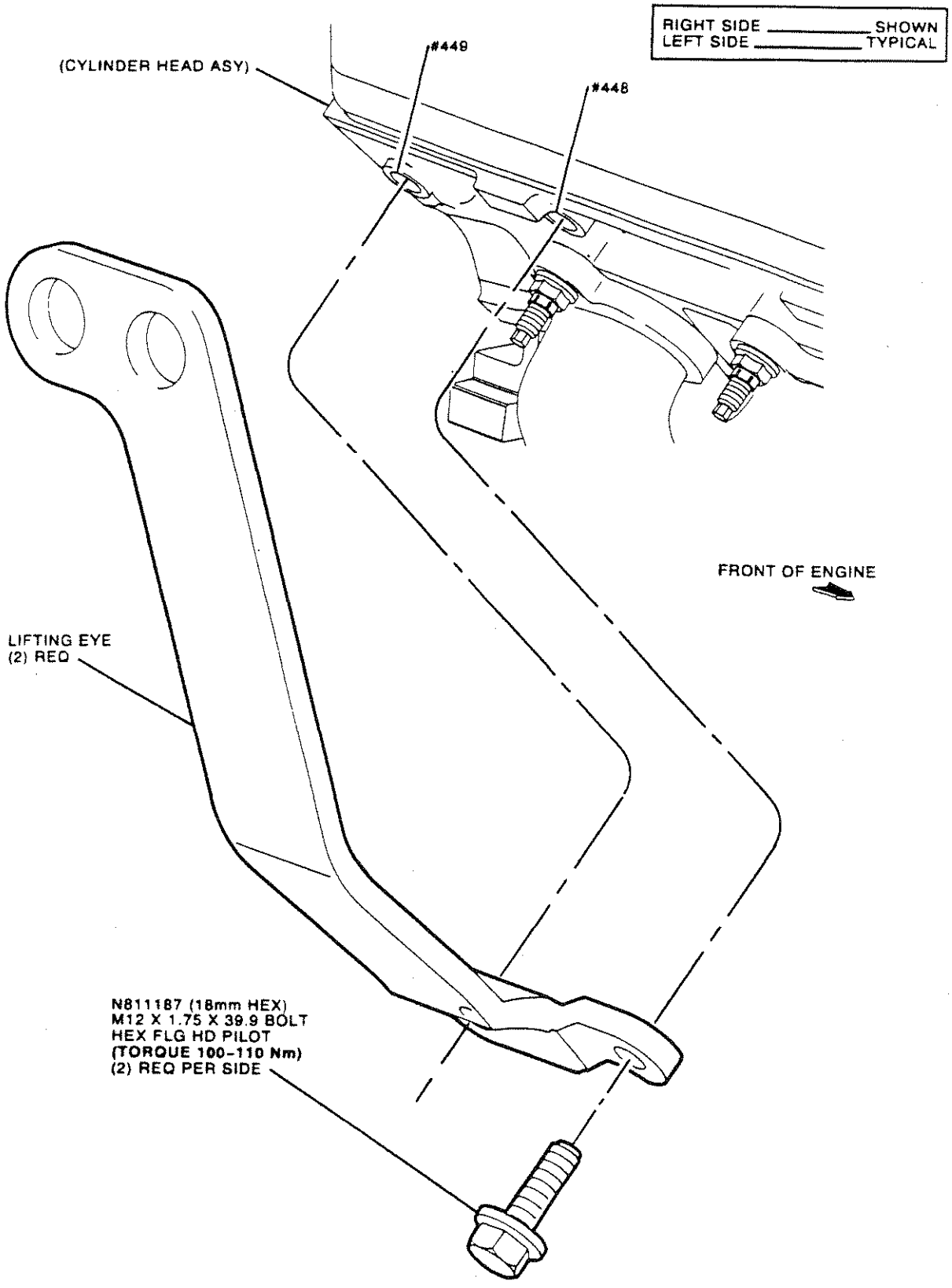


VIEW (A)
TORQUE SEQUENCE

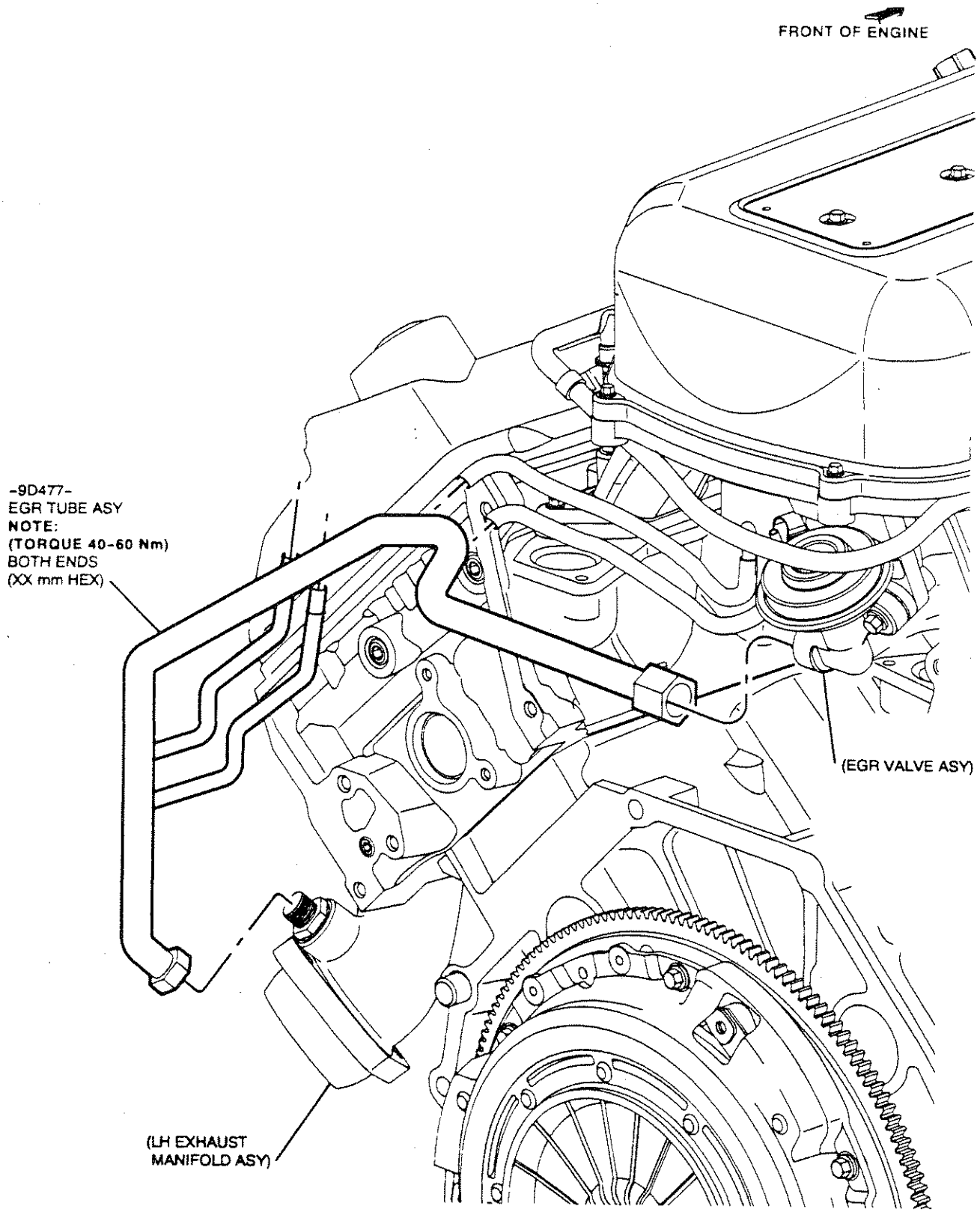
OIL LEVEL INDICATOR & TUBE ASY



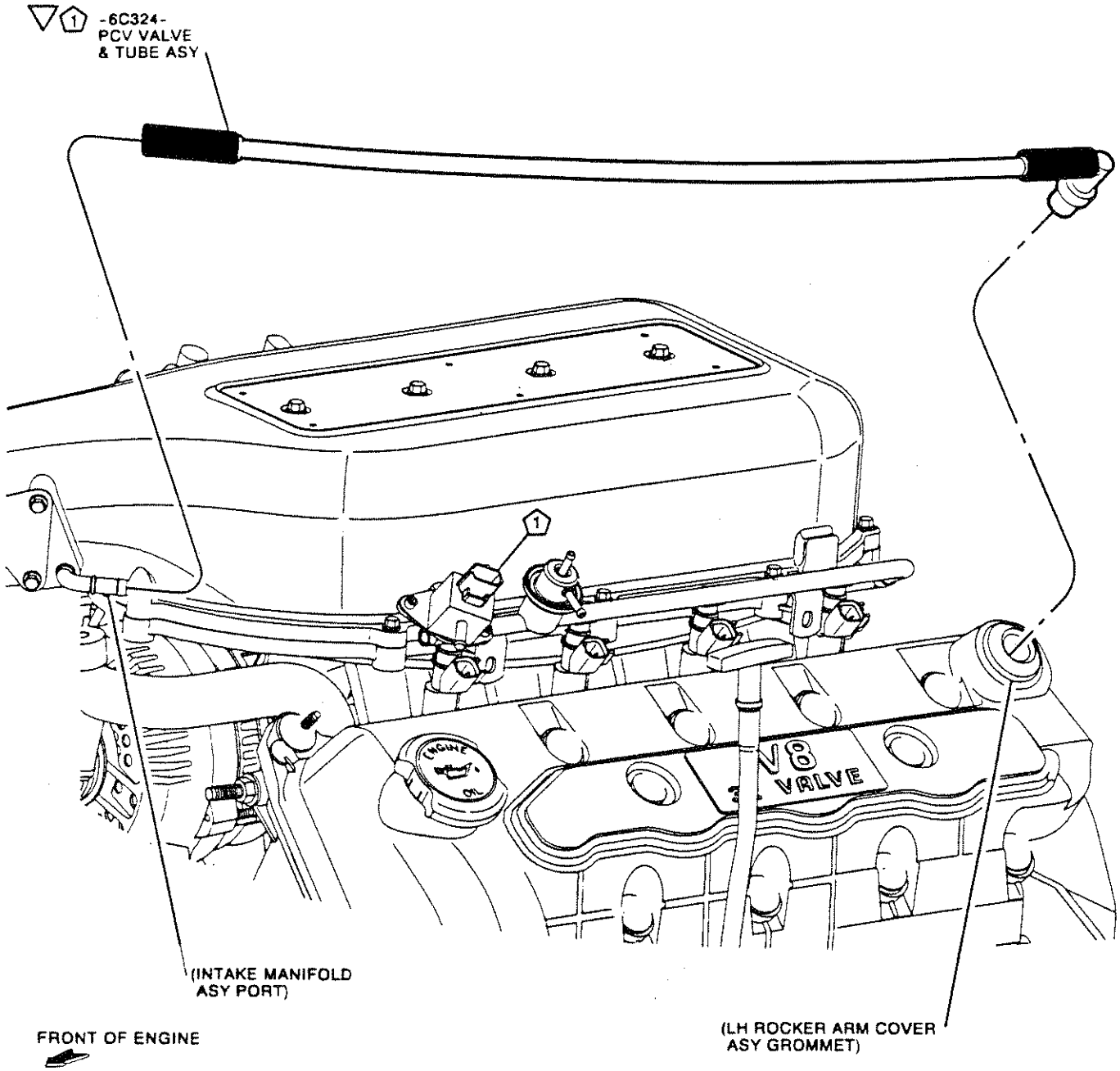
LIFTING EYE


RIGHT SIDE _____ SHOWN
LEFT SIDE _____ TYPICAL
(CYLINDER HEAD ASY)
#449
#448
FRONT OF ENGINE
LIFTING EYE
(2) REQ
N811187 (18mm HEX)
M12 X 1.75 X 39.9 BOLT
HEX FLG HD PILOT
(TORQUE 100-110 Nm)
(2) REQ PER SIDE

EGR TUBE ASY


FRONT OF ENGINE
-9D477-
EGR TUBE ASY
NOTE:
(TORQUE 40-60 Nm)
BOTH ENDS
(XX mm HEX)
(EGR VALVE ASY)
(LH EXHAUST
MANIFOLD ASY)

PCV VALVE & TUBE ASY

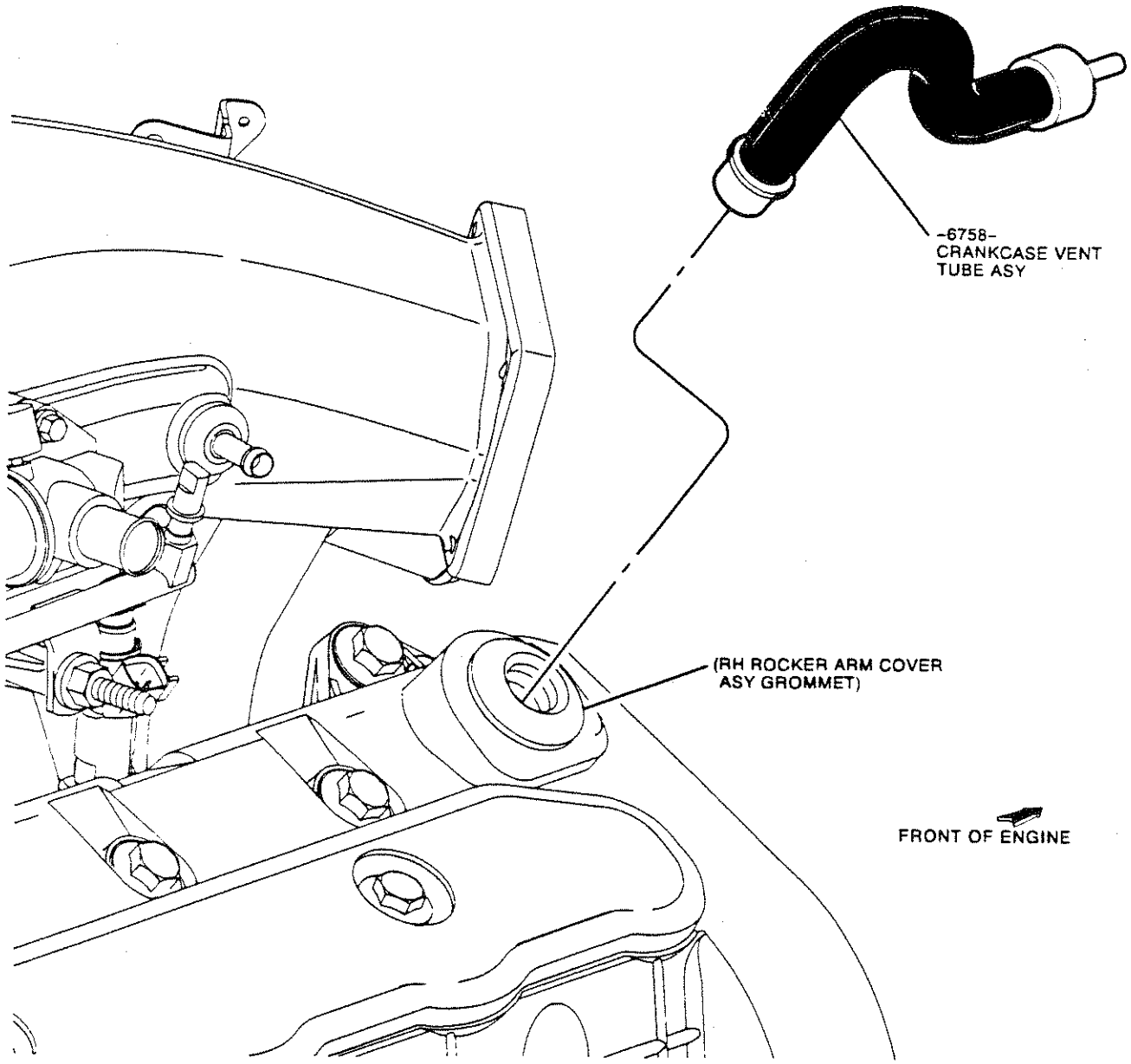


▽ **NOTE:**
REFER TO FRAME 3B FOR HOSE/VACUUM CONNECTION SPECIFICATIONS

① **NOTE:**
ROUTE TUBE INBOARD OF
FUEL PRESSURE REGULATOR
AND PULSE DAMPER

▽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

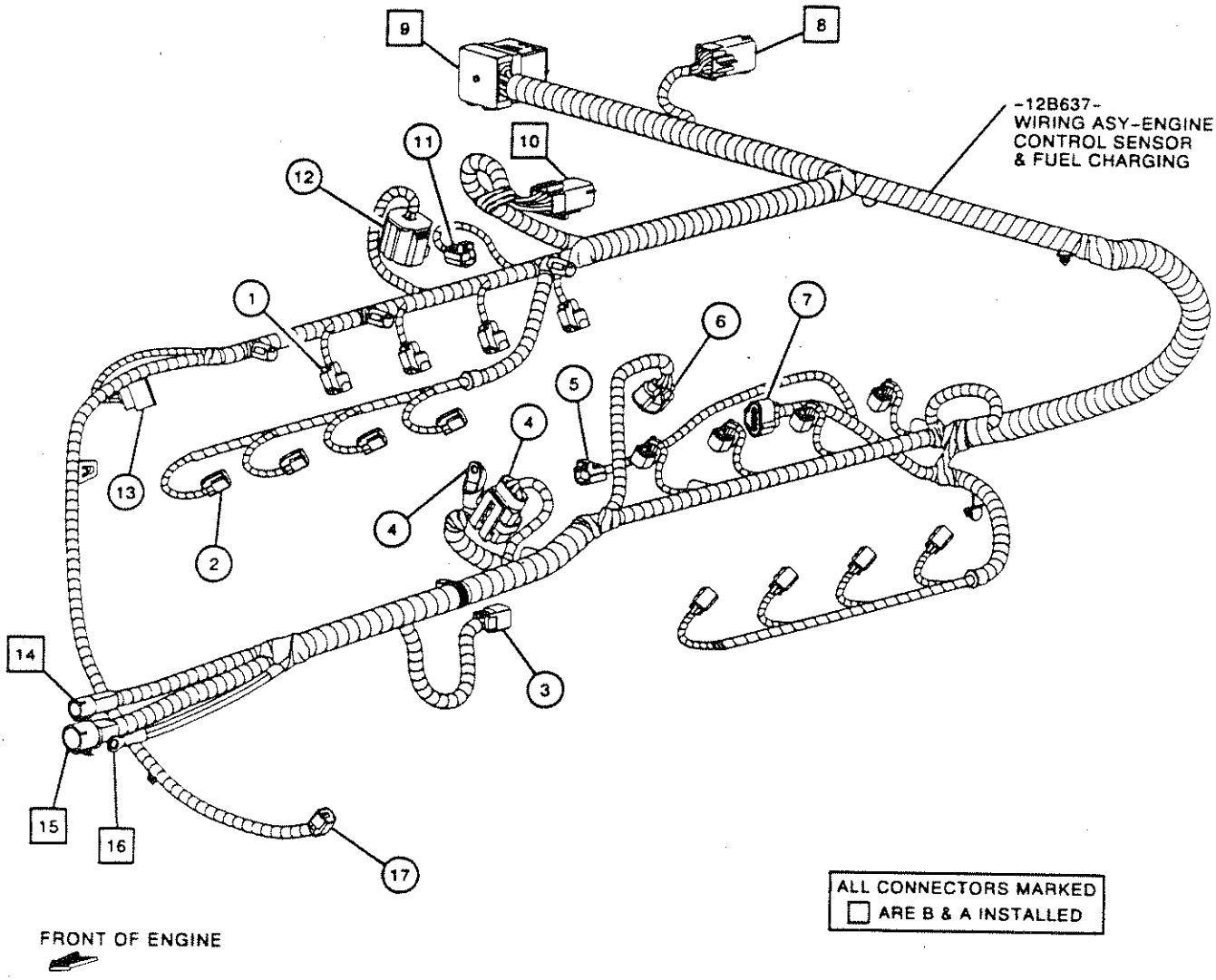
CRANKCASE VENT TUBE ASY



▽ **NOTE:**
REFER TO FRAME 3B FOR HOSE/VACUUM CONNECTOR SPECIFICATIONS

▽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

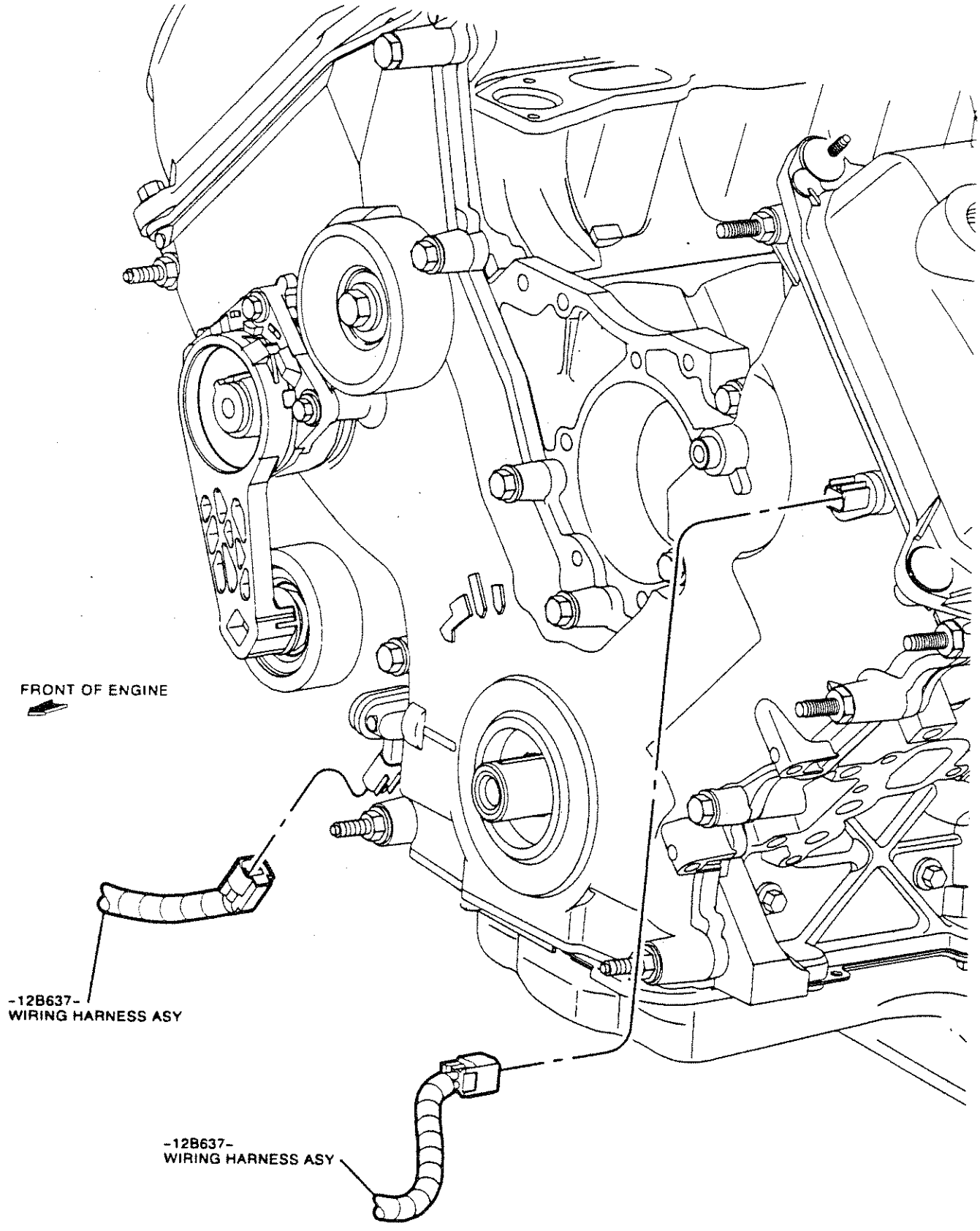
WIRING ASY-ENGINE CONTROL SENSOR & FUEL CHARGING

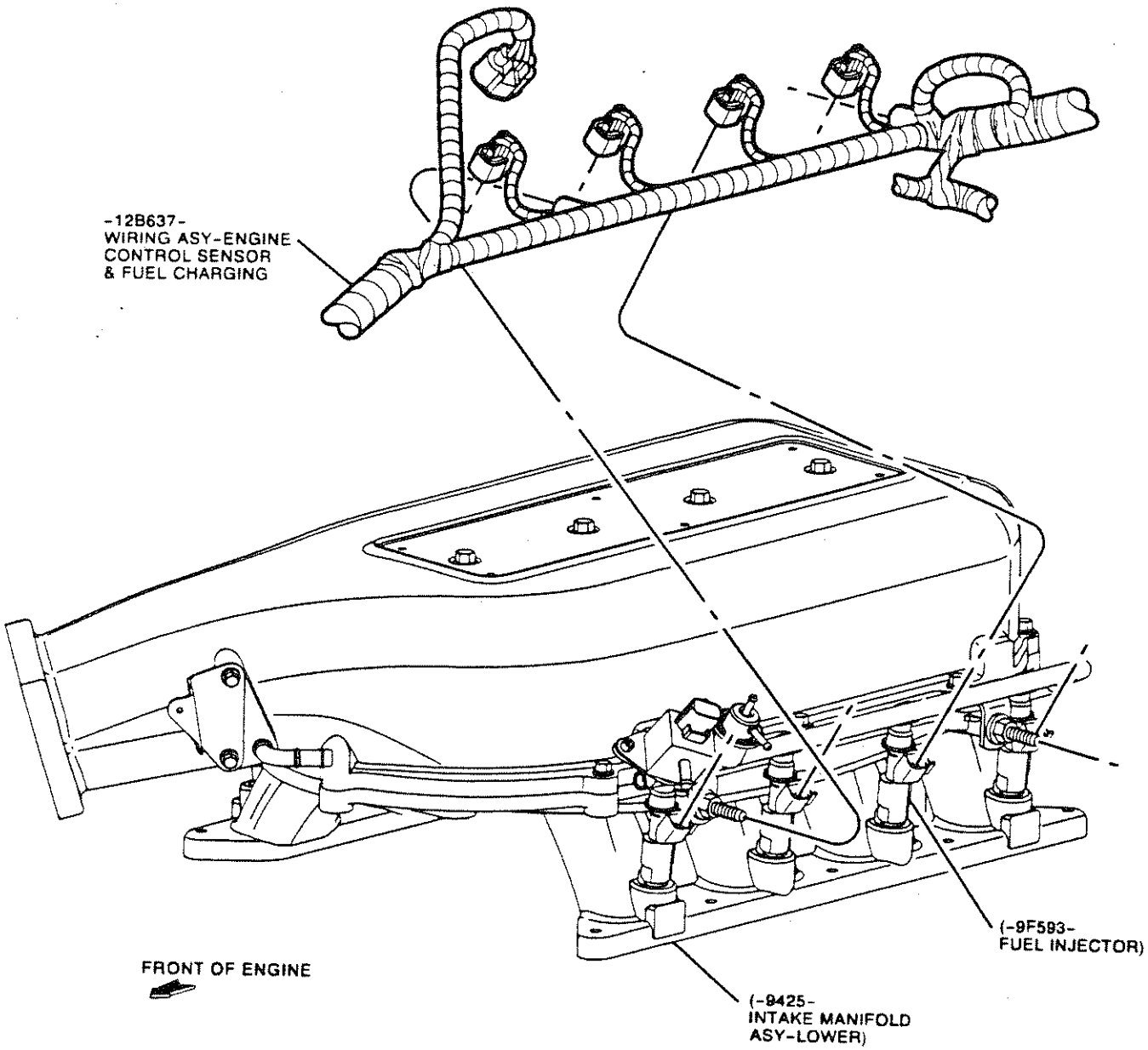


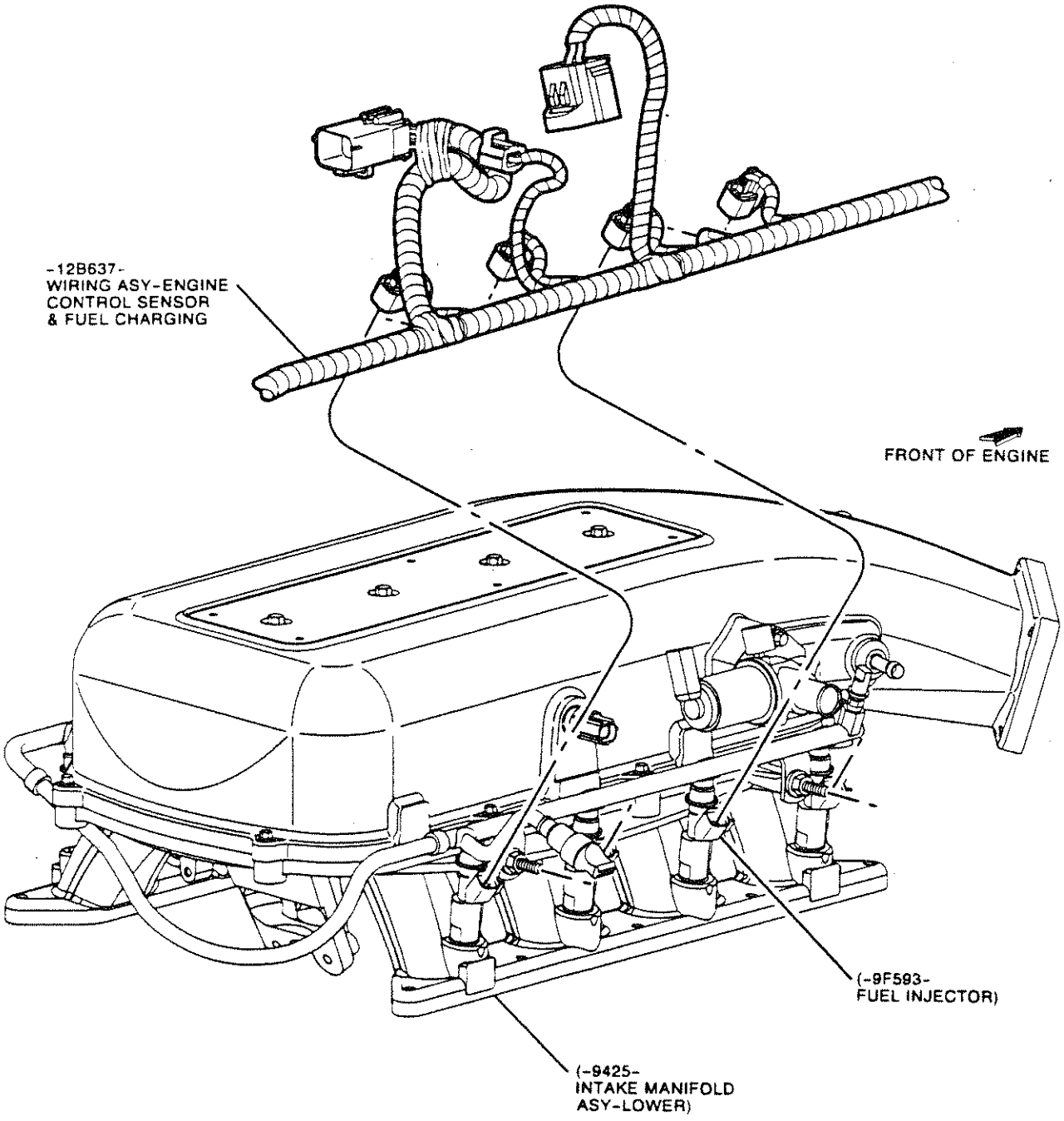
WIRING HARNESS CONNECTOR INDEX

1. (8) INJECTOR ASY-FUEL REFER TO FR #30A & 30B
2. (8) COIL & BOOT ASY-IGNITION REFER TO FR #30C
3. TO SENSOR ASY-CAMSHAFT TIMING REFER TO FR #15
4. (2) ALTERNATOR ASY REFER TO FR #29C
5. TO EGR VACUUM REGULATOR REFER TO FR #24A
6. TO FUEL PRESSURE REGULATOR REFER TO FR #24C
7. TO TRANSDUCER ASY-EGR REFER TO FR #24A
8. TO IMRC
9. TO -12A581-
10. TO KNOCK SENSOR
11. TO ENGINE AIR TEMPERATURE SENSOR
12. TO IDLE AIR CONTROL SENSOR
13. TO BODY ASY-AIR INTAKE CHARGE THROTTLE
14. TO -14290- WIRING ASY
15. TO -12A690- WIRING ASY
16. TO POWER DISTRIBUTION BOX
17. TO SENSOR ASY-CAMSHAFT TIMING REFER TO FR #15

WIRING ASY CONNECTIONS



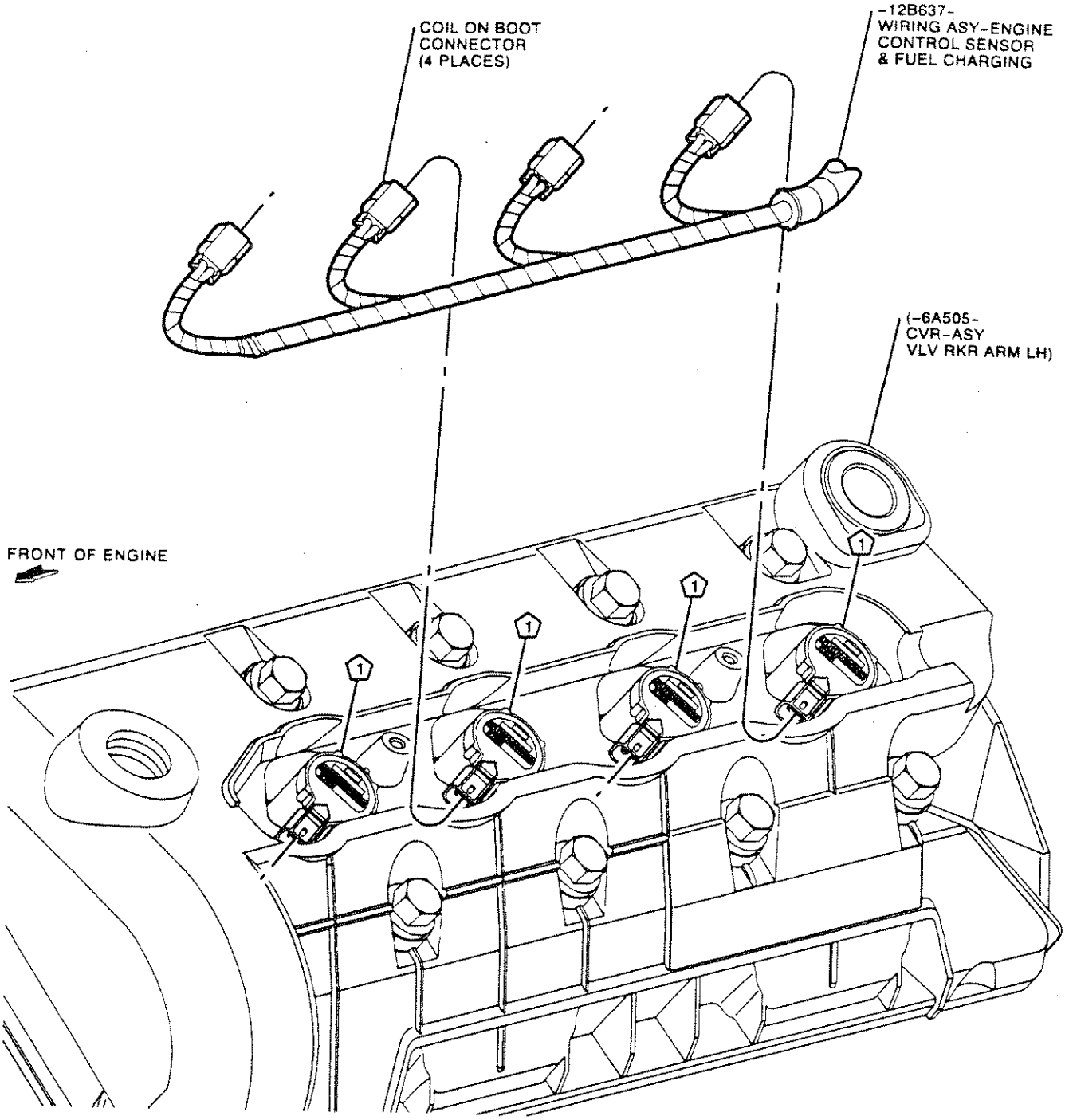

-12B637-
WIRING ASY-ENGINE
CONTROL SENSOR
& FUEL CHARGING
(-9F593-
FUEL INJECTOR)
FRONT OF ENGINE
(-9425-
INTAKE MANIFOLD
ASY-LOWER)


-12B637-
WIRING ASY-ENGINE
CONTROL SENSOR
& FUEL CHARGING
FRONT OF ENGINE
(-9F593-
FUEL INJECTOR)
(-9425-
INTAKE MANIFOLD
ASY-LOWER)

WIRING ASY CONNECTIONS (Continued)

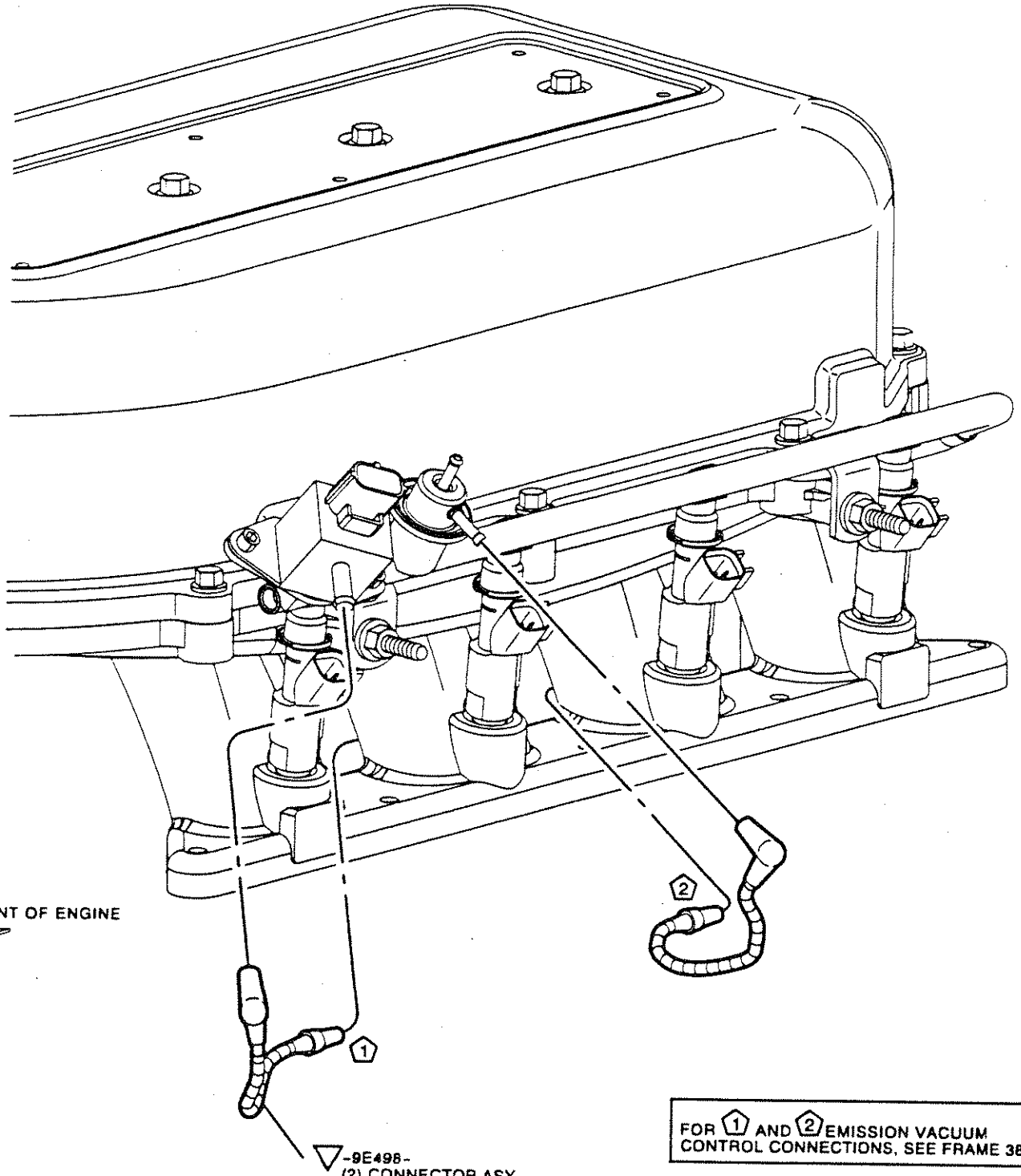
LEFT SIDE _____ SHOWN
RIGHT SIDE _____ TYPICAL

(1) NOTE:
SEAT IGNITION COILS
AFTER CONNECTIONS
ARE MADE



REL	NE01-E10956645-000	MODEL	2000 5.4L-4V COBRA "R"	DATE	000828	LAST FRAME	41
Ford Motor Company V-ENGINE ILLUSTRATION		NO	▽ ILYR3E-030002-E0543U	REV	---	FRAME	37D
						CONTD	38

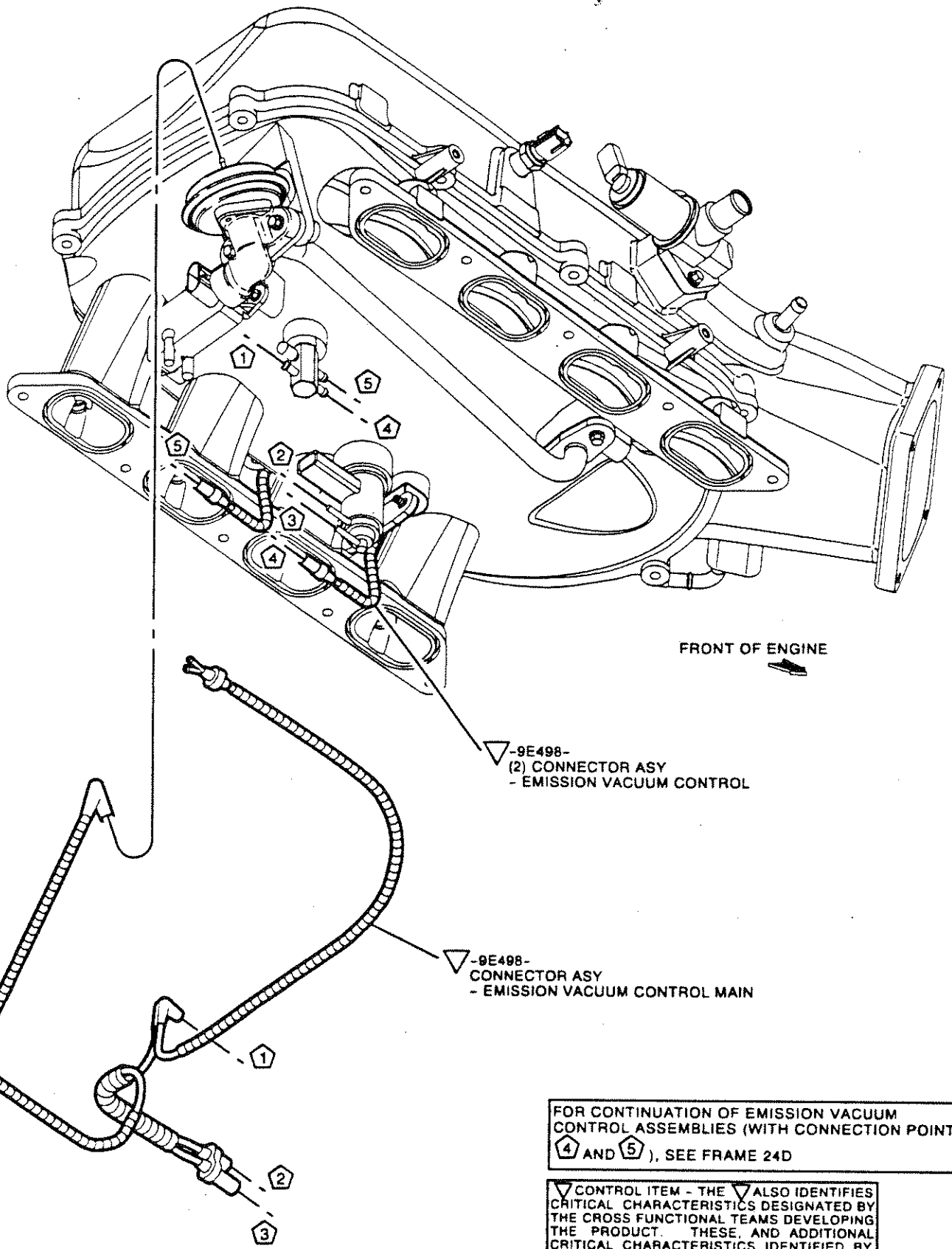
EMISSION VACUUM CONTROL CONNECTIONS



FOR (1) AND (2) EMISSION VACUUM CONTROL CONNECTIONS, SEE FRAME 38A

▽ 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.

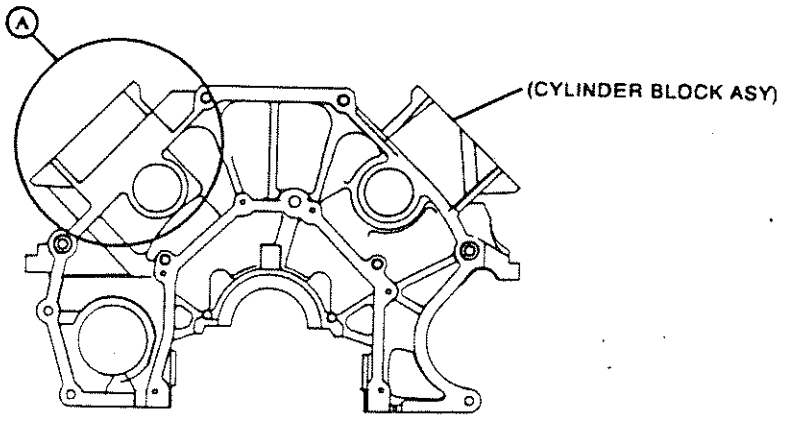
EMISSION VACUUM CONTROL MAIN CONNECTOR ASY

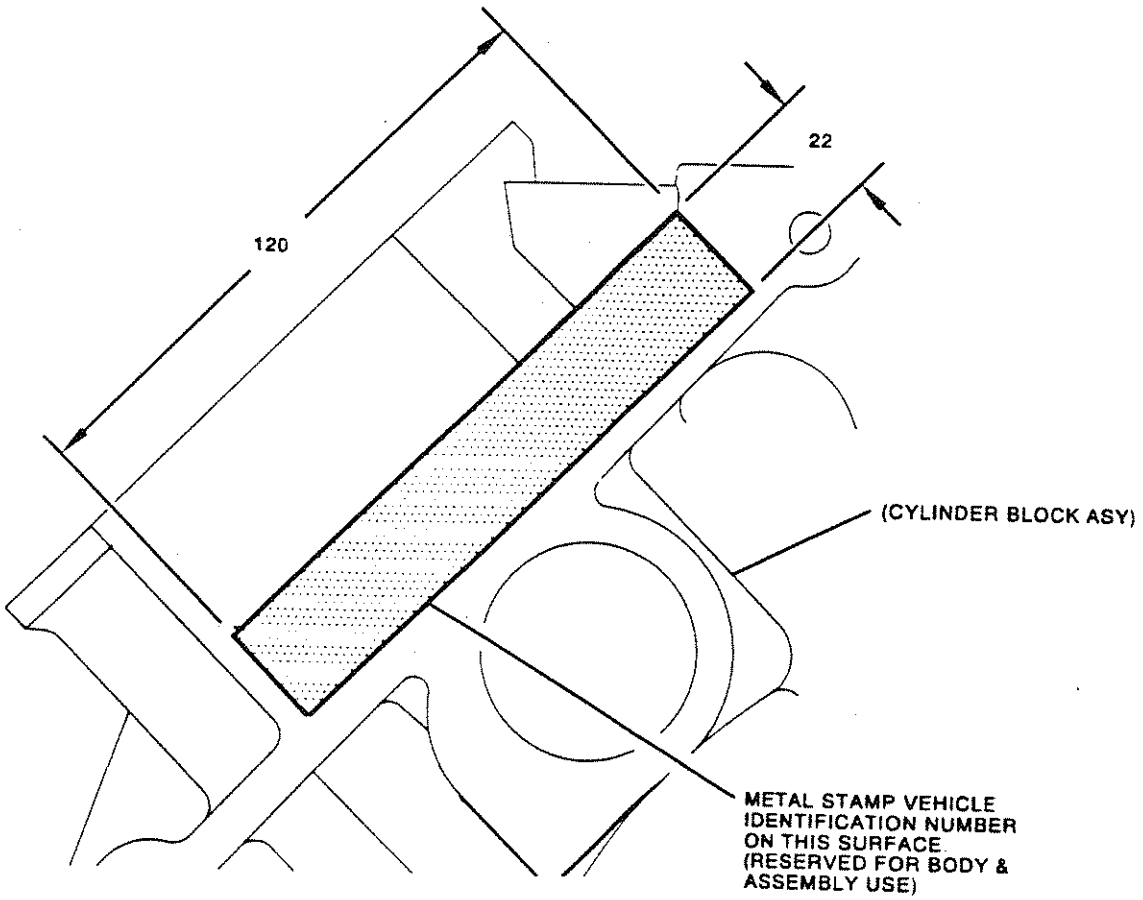


FOR CONTINUATION OF EMISSION VACUUM CONTROL ASSEMBLIES (WITH CONNECTION POINTS 4 AND 5), SEE FRAME 24D

▽ 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.

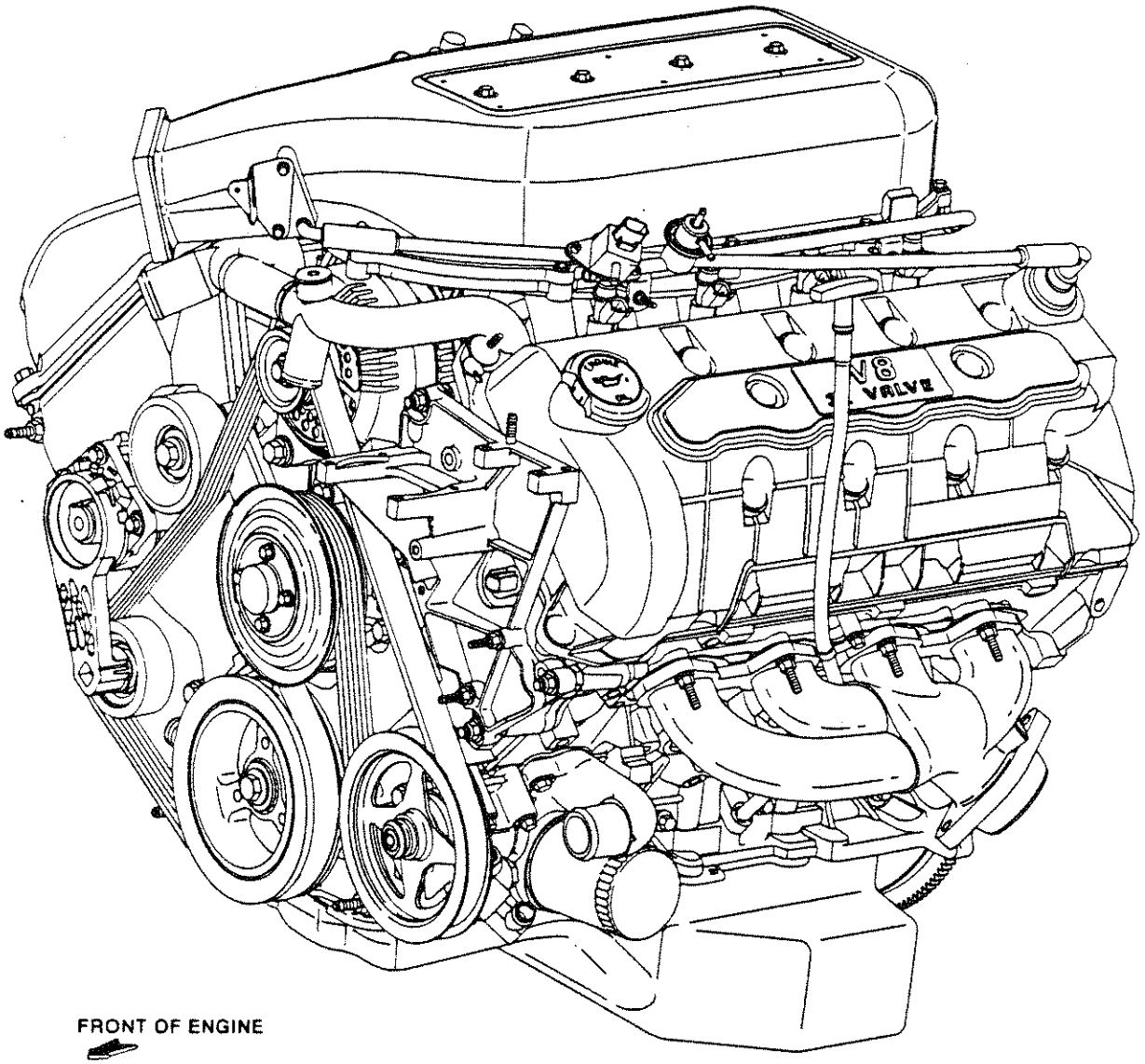
VIN NUMBER STAMP LOCATION





VIEW (A)
REAR VIEW OF ENGINE

ENGINE ASY - LEFT FRONT VEHICLE
2000 5.4L-4V COBRA "R"



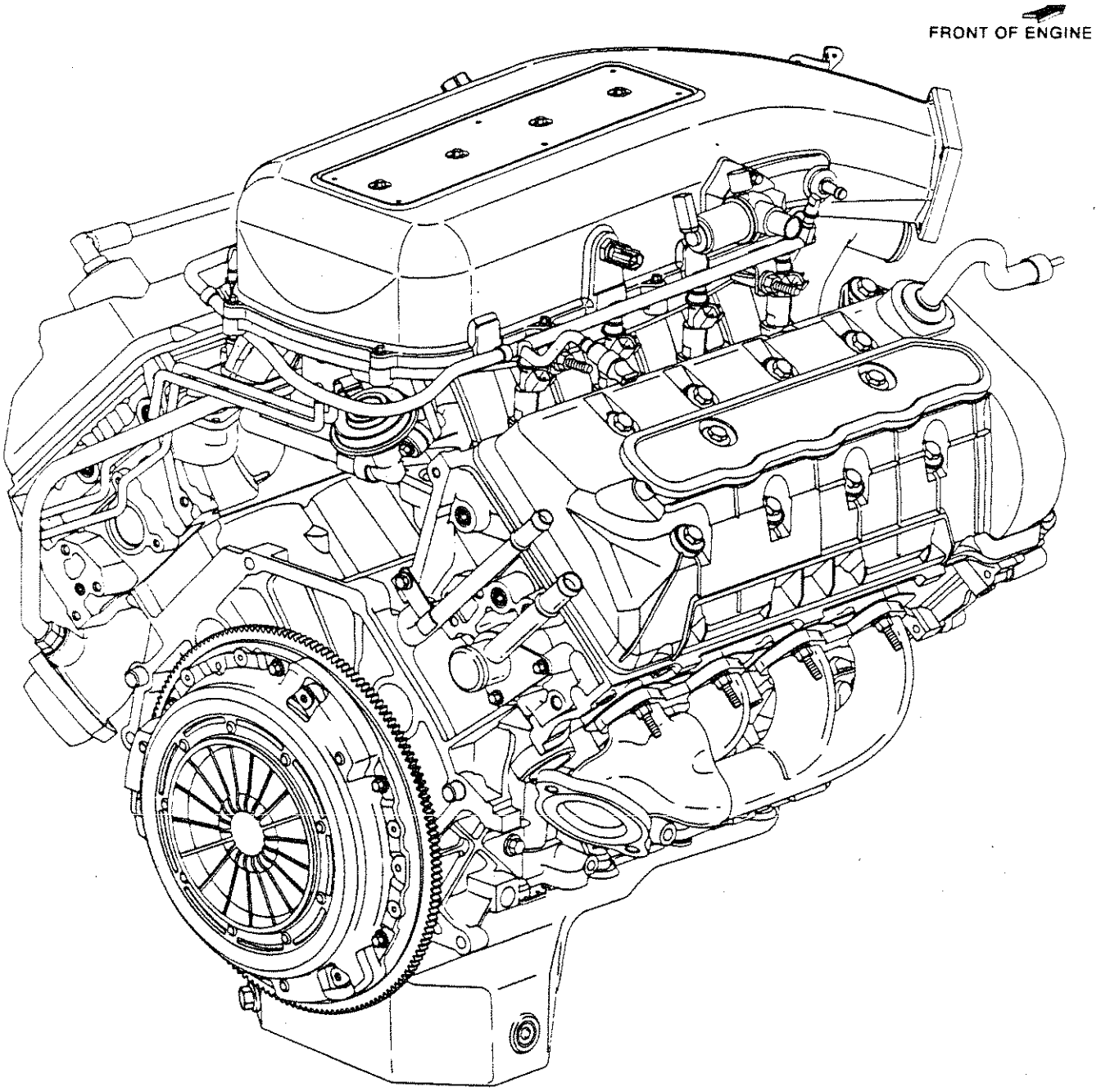
FRONT OF ENGINE

030002

REL	MODEL	DATE	LAST FRAME
NE01-E10956645-000	2000 5.4L-4V COBRA "R"	000919	41

Ford Motor Company V-ENGINE ILLUSTRATION	NO	REV	FRAME	CONTD
	▽ ILYR3E-030002-E0543U	---	40	40A

ENGINE ASY - RIGHT REAR VEHICLE
2000 5.4L-4V COBRA "R"



030002

REL	MODEL	DATE	LAST FRAME
NE01-E10956645-000	2000 5.4L-4V COBRA "R"	000919	41

Ford Motor Company V-ENGINE ILLUSTRATION	NO	REV	FRAME	CONTD
	▽ ILYR3E-030002-E0543U	---	40A	41