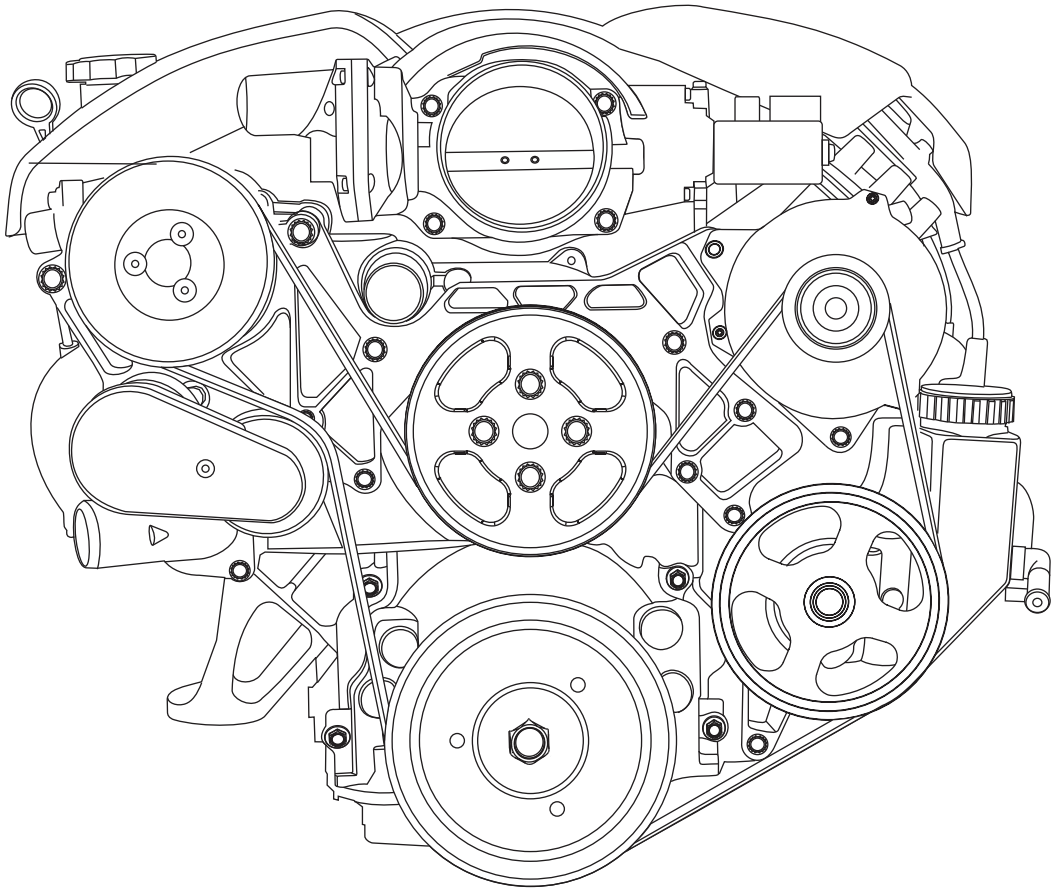
VINTAGE AIR
FRONT RUNNER
ENGINE DRIVE SYSTEMS

an ISO 9001:2008 Registered Company

GM LS SERIES

SERPENTINE DRIVE SYSTEM
WITH & WITHOUT POWER STEERING



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WARNING: ANTI-SEIZE MUST BE USED ON THREADS OF BOLTS OR MECHANICAL LOCKING WILL OCCUR PREVENTING REMOVAL OF NUT FROM BOLT AND DAMAGE TO FASTENERS.

IMPORTANT NOTICE-PLEASE READ

FOR MAXIMUM SYSTEM PERFORMANCE VINTAGE AIR RECOMMENDS THE FOLLOWING:

SERVICE INFO:

EVACUATE THE SYSTEM FOR 35-45 MINUTES WITH SYSTEM COMPONENTS (DRIER, COMPRESSOR, EVAPORATOR AND CONDENSER) AT A TEMPERATURE OF AT LEAST 85° F. ON A COOL DAY THE COMPONENTS CAN BE HEATED WITH A HEAT GUN OR BY RUNNING THE ENGINE WITH THE HEATER ON BEFORE EVACUATING. LEAK CHECK AND CHARGE TO SPECIFICATIONS.

THE PROPER AMOUNT OF REFRIGERANT IS CRITICAL TO PROPER SYSTEM OPERATION. VINTAGE AIR RECOMMENDS OUR SYSTEMS BE CHARGED BY WEIGHT WITH A QUALITY CHARGING STATION OR SCALE.

REFRIGERANT CAPACITIES FOR VINTAGE AIR SYSTEMS

(FOR OTHER SYSTEMS, CONSULT MANUFACTURER GUIDELINES)

134a SYSTEM

CHARGE WITH 1.8 lbs. (1 lb. 12 oz.) OF REFRIGERANT

LUBRICANT CAPACITIES

NEW COMPRESSOR - NO ADDITIONAL OIL NEEDED

ENGINE DAMPER

INSTALLATION REQUIRES SPECIALIZED TOOLS FOR REMOVAL AND INSTALLATION OF DAMPER. IF PROPER TOOLS CANNOT BE ACQUIRED VINTAGE AIR RECOMMENDS INSTALLATION TO BE PERFORMED BY A TRAINED PROFESSIONAL. REFER TO DAMPER INSTRUCTIONS.

REQ. TOOLS:

(GM OEM #)	J 41816	CRANKSHAFT BALANCER REMOVER OR EQUIVALENT
	J 41816-2	CRANKSHAFT END PROTECTOR OR EQUIVALENT
	J 42386	CRANKSHAFT HOLDING TOOL OR EQUIVALENT

FOR DAMPER INSTALLATION PLEASE REFER TO MANUFACTURES INSTRUCTIONS- INCLUDED WITH DAMPER.

MOUNTING PROVISIONS

ALL THREADED HOLES USED AS MOUNTING PROVISIONS IN ENGINE BLOCK SHOULD BE CHECKED FOR THREAD DAMAGE AND CHASED/REPAIRED AS NECESSARY.

THERMOSTAT

WATER PUMP REQUIRES 97-03 LS1 STYLE THERMOSTAT ASSY. WATER PUMP IS NOT COMPATIBLE WITH OTHER THERMOSTAT HOUSINGS.

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READ INSTRUCTIONS COMPLETELY AND THOROUGHLY BEFORE INSTALLING THE VINTAGE AIR FRONTRUNNER SYSTEM

FOLLOW INSTRUCTIONS STEP-BY-STEP FOR PROPER INSTALLATION

REMOVAL OF OEM FRONT BELT SYSTEM (IF SO EQUIPPED)

- ☐ DISCONNECT NEGATIVE BATTERY CABLE
- ☐ DRAIN RADIATOR FLUID
- ☐ REMOVE FAN AND BELTS
- ☐ REMOVE ALTERNATOR AND A/C COMPRESSOR
- ☐ REMOVE HARMONIC DAMPER
- ☐ REMOVE OEM WATER PUMP AND THERMOSTAT ASSY. FROM OEM WATER PUMP (IF REUSING THERMOSTAT)

FRONTRUNNER ENGINE DRIVE SYSTEM

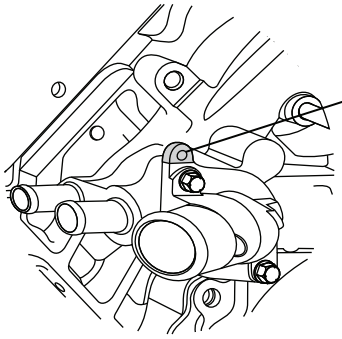
- ☐ CLEAN AND REMOVE ANY DIRT, GREASE OR BURRS ON ALL MATING SURFACES
- ☐ CLEAN DAMPER HUB AND SNOUT
- ☐ WIPE A THIN COAT OF OIL ON CRANK SNOUT

INSTALLING MOUNTING STUDS AND DAMPER

- ☐ INSTALL THE DAMPER AND NEW BOLT AS SHOWN IN FIGURE 1, PAGE 5. ***(REFER TO INSTRUCTIONS INCLUDED WITH DAMPER)***
- ☐ USING A CLEAN MATING SURFACE, INSTALL THE (6) 8mm-1.25 x 130mm SS STUDS AS SHOWN IN FIGURE 1, PAGE 5.
- ☐ INSTALL WATER PUMP GASKETS OVER STUDS AS SHOWN IN FIGURE 2, PAGE 5. ***NOTE: 8mm STUDS SHOULD PROTRUDE APPROX 4.28" FROM FACE OF BLOCK.***

WATER PUMP INSTALLATION

- ☐ INSTALL WATER PUMP OVER 8mm STUDS
- ☐ GASKET SEALER IS NOT REQUIRED ON GASKETS, COMPONENTS SHOULD BE INSTALLED DRY.
- ☐ THERMOSTAT HOUSING MUST BE MODIFIED FOR USE. MOUNTING EAR HOUSING MUST BE REMOVED. GRIND OR CUT EAR AS SHOWN BELOW. INSPECT O-RING SEAL AND REUSE OR REPLACE AS REQUIRED. **NOTE: OEM THERMOSTAT ASSEMBLY CAN BE RE-USED OR ONE CAN BE PURCHASED FROM LOCAL AUTO PARTS RETAILER.**
- ☐ REINSTALL MODIFIED T-STAT HOUSING ASSY ONTO NEW WATER PUMP. TORQUE TO 11 LB FT.



NOTE: LS1 STYLE THERMOSTAT HOUSING & THERMOSTAT MUST BE USED. LS2, 3, 7 (GEN IV ENGINES) IS NOT COMPATIBLE. USE 97-03 LS1 STYLE THERMOSTAT

WARNING: ANTI-SEIZE MUST BE USED ON THREADS OF BOLTS OR MECHANICAL LOCKING WILL OCCUR PREVENTING REMOVAL OF NUT FROM BOLT AND DAMAGE TO FASTENERS.

MOUNTING STUDS AND HARMONIC BALANCER INSTALLATION

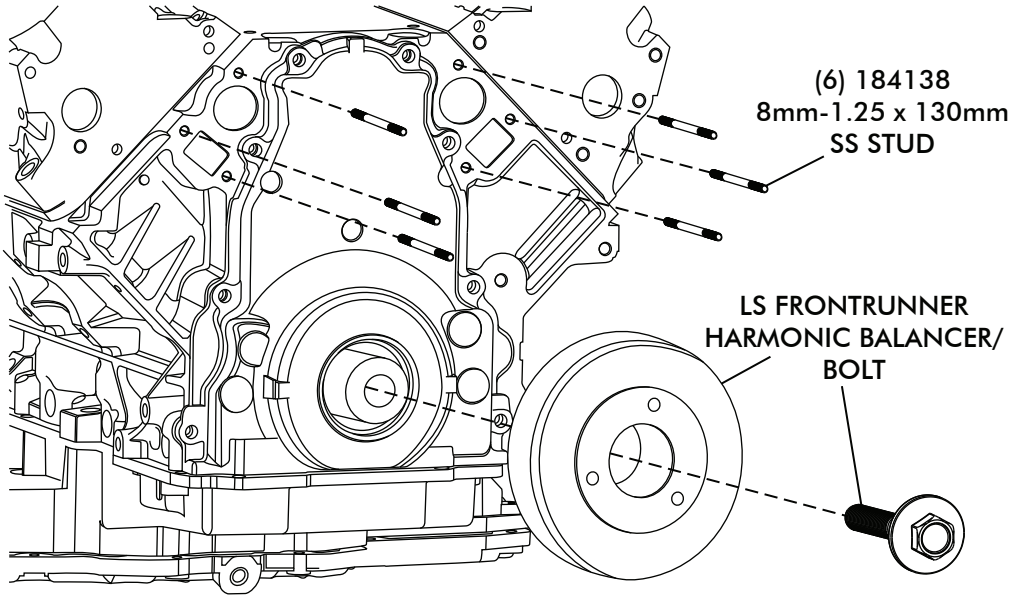


FIGURE 1

WATER PUMP GASKET INSTALLATION

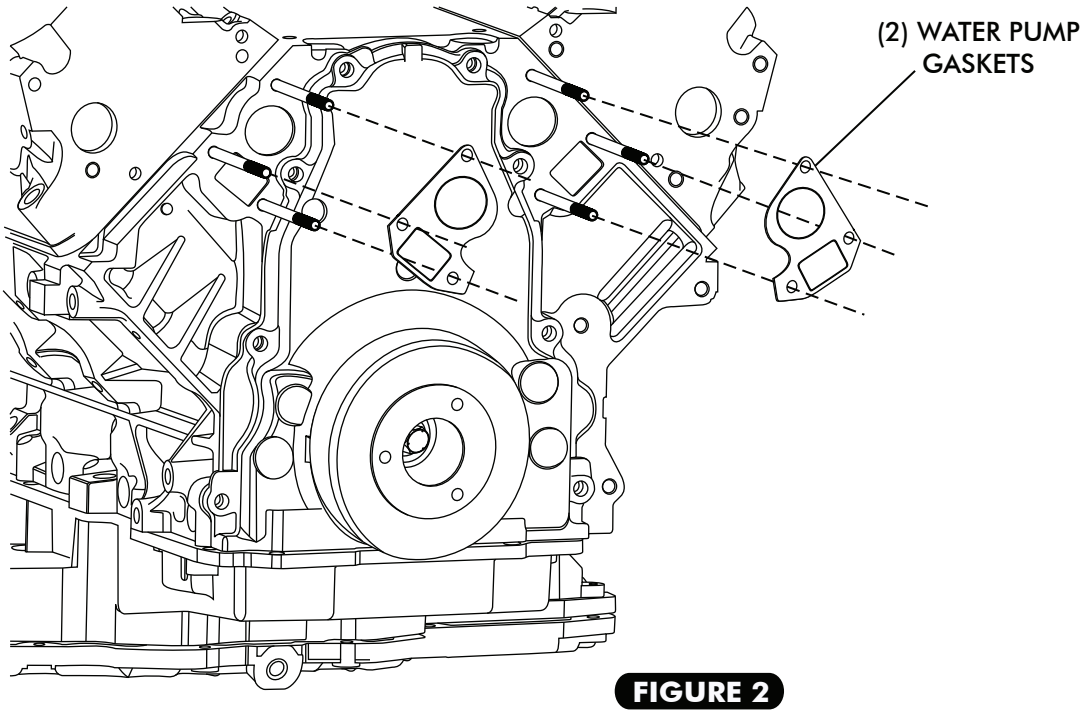


FIGURE 2

WARNING: ANTI-SEIZE MUST BE USED ON THREADS OF BOLTS OR MECHANICAL LOCKING WILL OCCUR PREVENTING REMOVAL OF NUT FROM BOLT AND DAMAGE TO FASTENERS.

WATER PUMP INSTALLATION

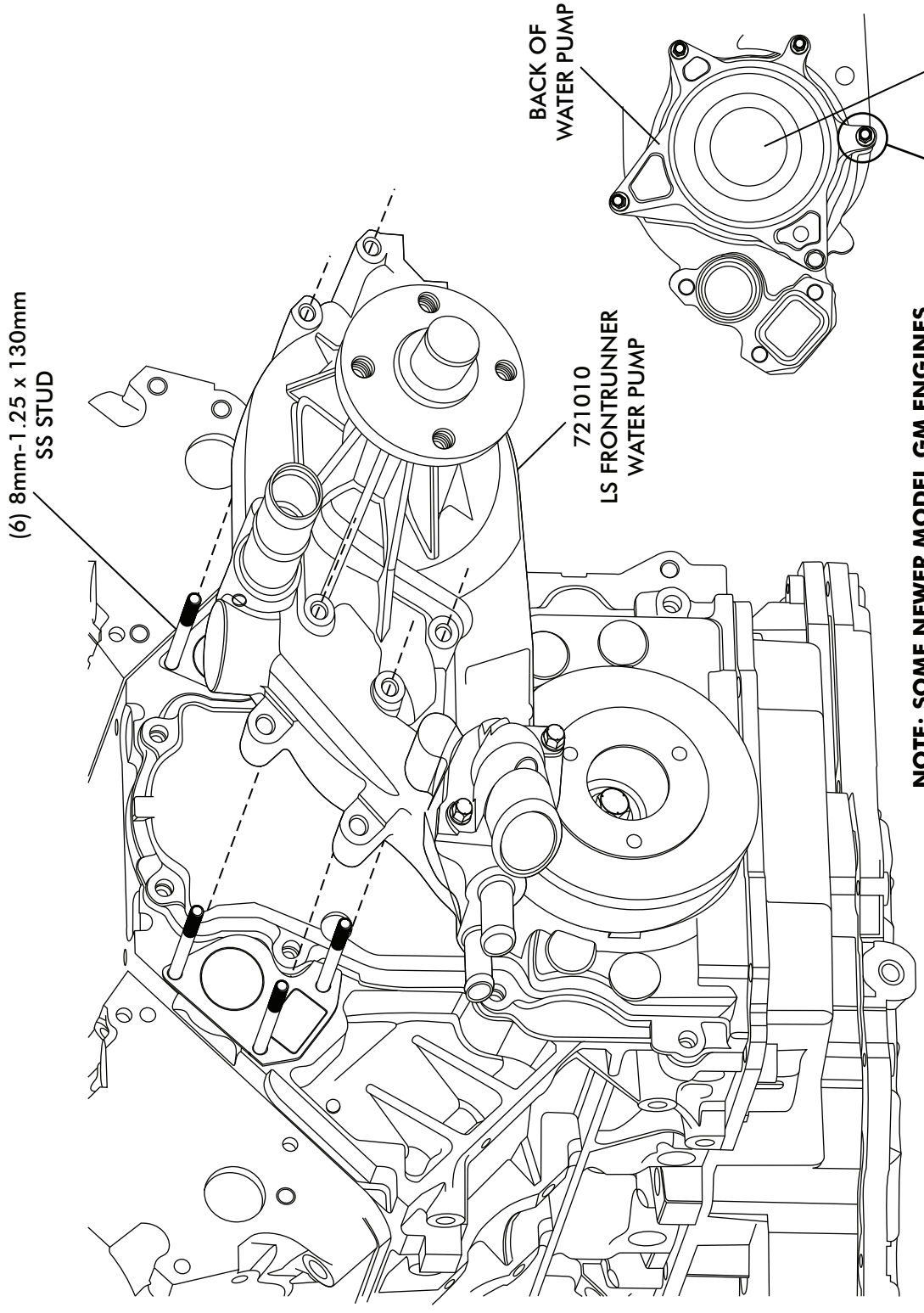


FIGURE 3

WARNING: ANTI-SEIZE MUST BE USED ON THREADS OF BOLTS OR MECHANICAL LOCKING WILL OCCUR PREVENTING REMOVAL OF NUT FROM BOLT AND DAMAGE TO FASTENERS.

SUPPORT BRACKET

☐ INSTALL SUPPORT BRACKET ONTO BLOCK USING (2) 10mm-1.50 x 70mm 12 PT SS BOLTS WITH (2) 3/8" AN FLAT WASHERS AS SHOWN IN FIGURE 4, BELOW. **NOTE: GM BLOCKS VARY IN NUMBER OF MOUNTING PROVISIONS PROVIDED, DEPENDING ON APPLICATION. SUPPORT BRACKET WILL ACCOMMODATE VARIANCE. HAND TIGHTEN FASTENERS ONLY, DO NOT TORQUE. SEE FIGURE 4, BELOW.**

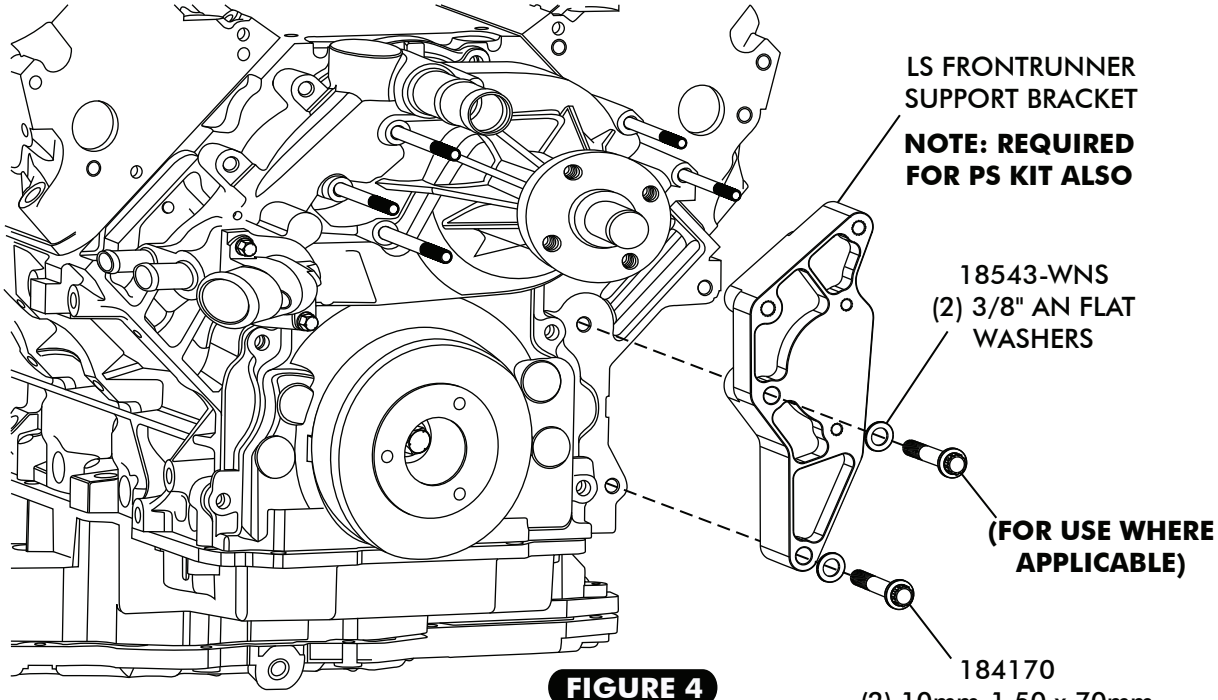
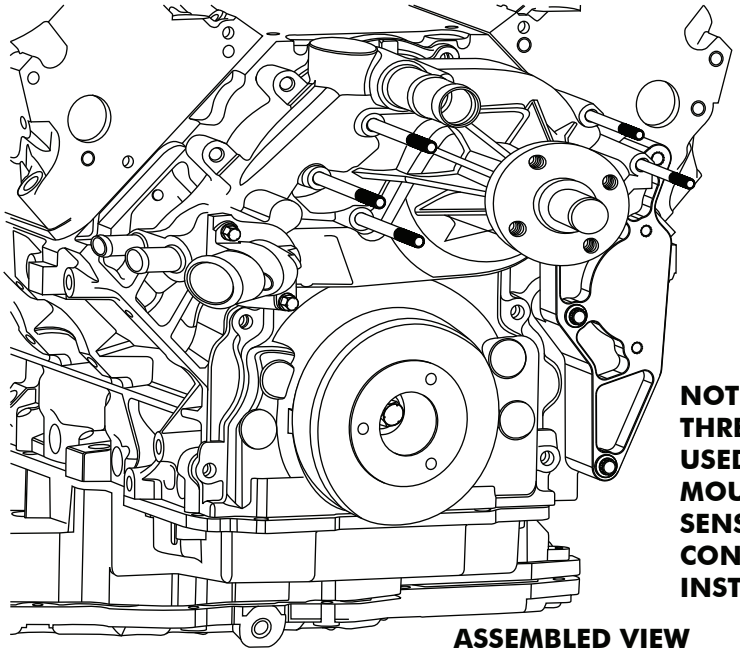
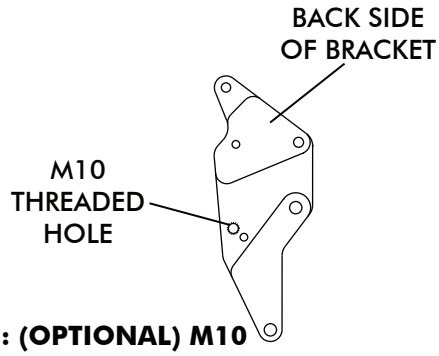


FIGURE 4





NOTE: (OPTIONAL) M10 THREADED HOLE CAN BE USED TO RELOCATE ENGINE MOUNTED CAMSHAFT POSITION SENSOR EXTENSION HARNESS CONNECTOR FOR EASE OF INSTALLATION.

ASSEMBLED VIEW

WARNING: ANTI-SEIZE MUST BE USED ON THREADS OF BOLTS OR MECHANICAL LOCKING WILL OCCUR PREVENTING REMOVAL OF NUT FROM BOLT AND DAMAGE TO FASTENERS.

FRONTRUNNER MAIN BRACKET ASSEMBLY INSTALLATION

- ☐ INSTALL FRONTRUNNER MAIN BRACKET ASSEMBLY OVER WATER PUMP AND 8mm MOUNTING STUDS USING 5/16" AN FLAT WASHERS AND 8mm-1.25 12 PT SS NUT. SEE FIGURE 5, BELOW. **NOTE: DO NOT TORQUE FASTENERS AT THIS TIME.**
- ☐ INSTALL .750 x .406 x .332" L ALUM SPACER BETWEEN MAIN BRACKET AND WATER PUMP, USING A 10mm-1.50 x 70mm 12 PT SS BOLT AND 3/8" AN FLAT WASHER AS SHOWN IN FIGURE 5.
- ☐ INSTALL A 10mm-1.50 x 70mm 12 PT SS BOLT AND 3/8" AN FLAT WASHER THROUGH MAIN BRACKET AND SUPPORT BRACKET AS SHOWN IN FIGURE 5a, BELOW.
- ☐ DO NOT TORQUE FASTENERS AT THIS TIME.

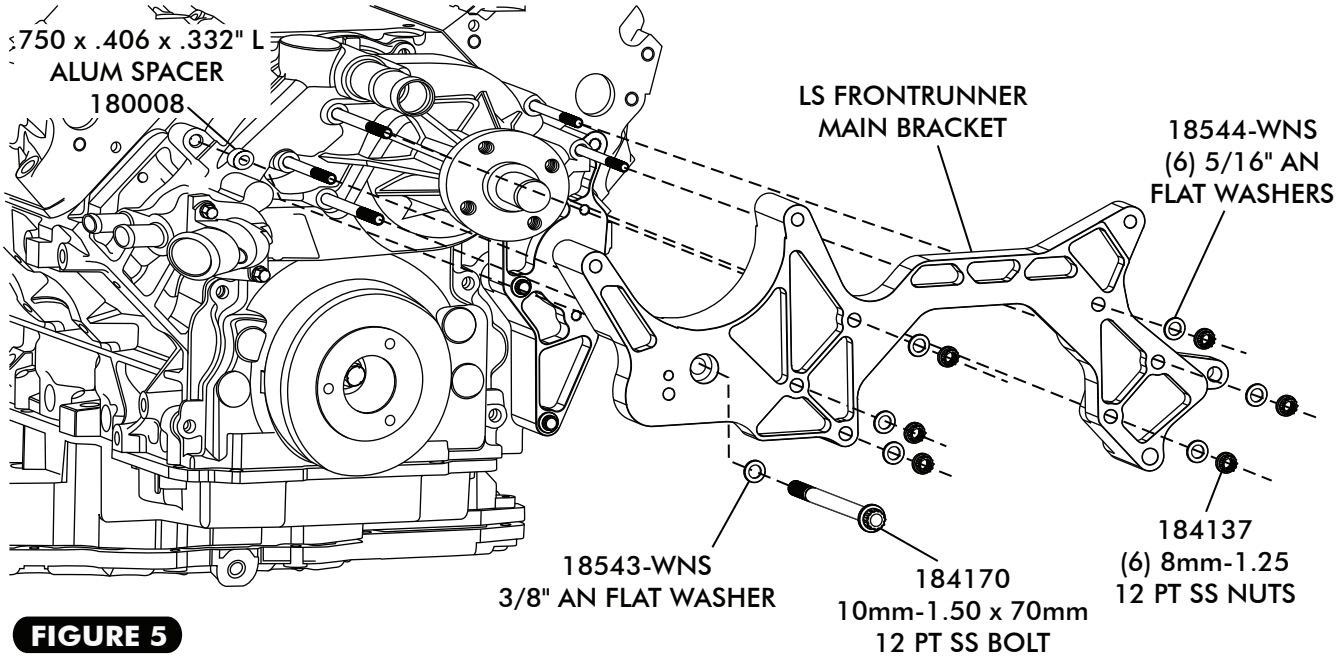


FIGURE 5

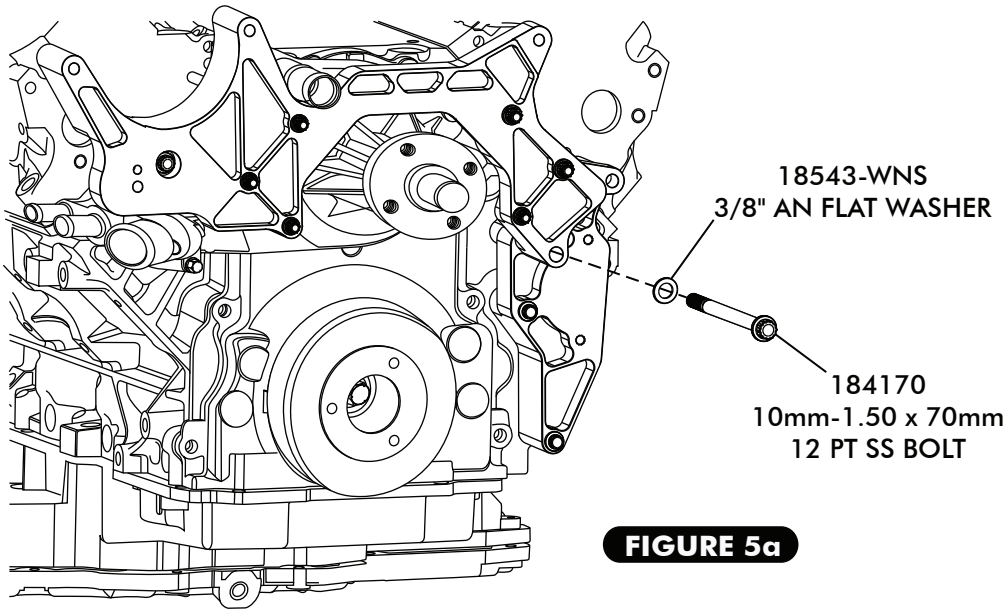


FIGURE 5a

WARNING: ANTI-SEIZE MUST BE USED ON THREADS OF BOLTS OR MECHANICAL LOCKING WILL OCCUR PREVENTING REMOVAL OF NUT FROM BOLT AND DAMAGE TO FASTENERS.

ALTERNATOR INSTALLATION

☐ INSTALL ALTERNATOR ONTO MAIN BRACKET USING A 8mm-1.25 x 40mm 12 PT SS BOLT AND 5/16" AN FLAT WASHER FOR THE TOP MOUNT, AND USE A 3/8-16 x 3 ¼" 12 PT SS BOLT AND 3/8" AN FLAT WASHER FOR THE BOTTOM MOUNT AS SHOWN IN FIGURE 6, BELOW.
NOTE: ONCE ALTERNATOR HAS BEEN INSTALLED, FASTENERS CAN BE TORQUED IN PLACE USING CRISSCROSS PATTERN. TORQUE 5/16" & 8mm BOLTS/STUDS TO 22 LB FT, AND TORQUE 3/8" & M10 BOLTS TO 37 LB FT.

TIP: WITH FASTENERS LEFT LOOSE, BRACKETS CAN BE MOVED TO ALIGN ALTERNATOR WITH BRACKET MOUNTING HOLES.

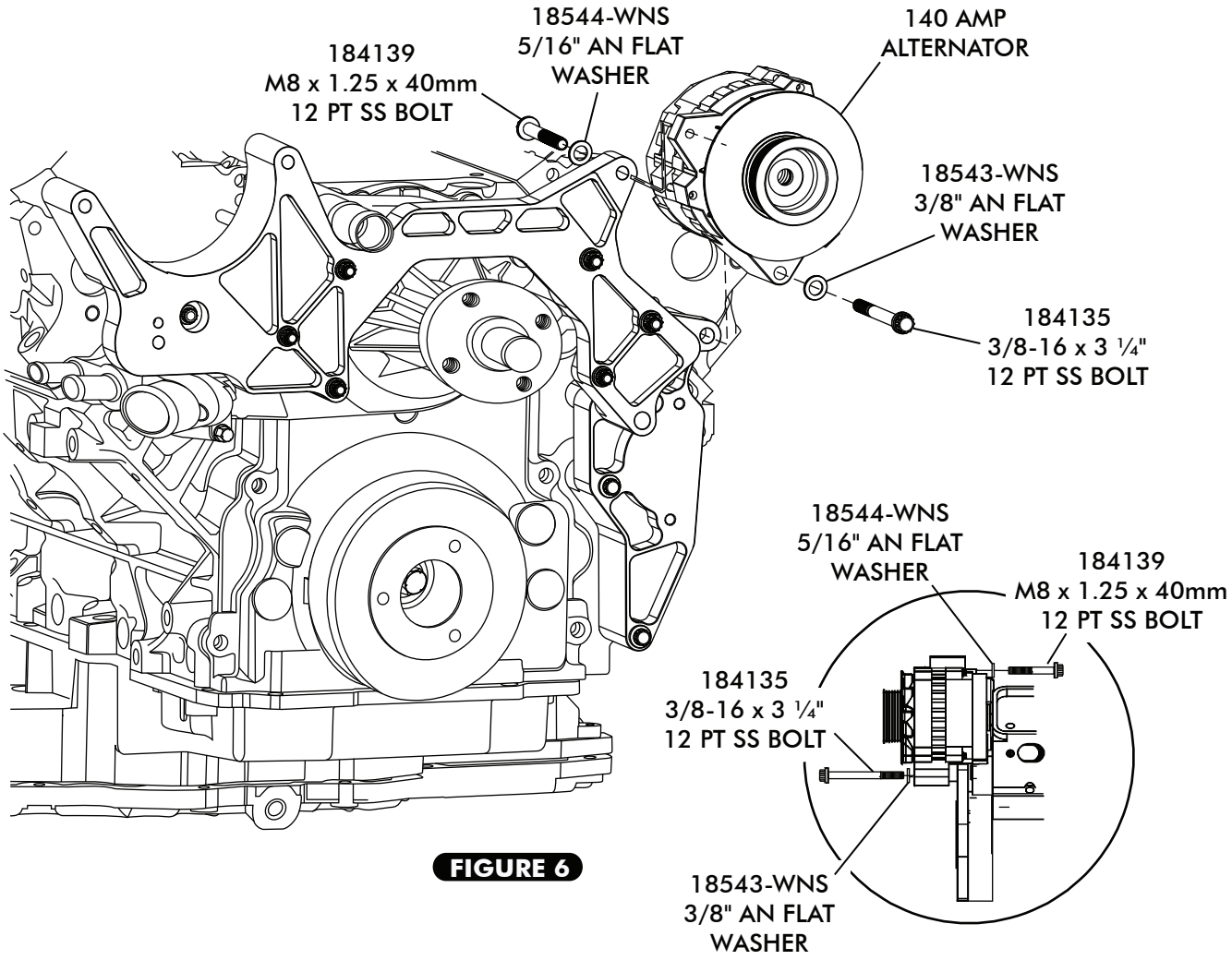


FIGURE 6

WARNING: ANTI-SEIZE MUST BE USED ON THREADS OF BOLTS OR MECHANICAL LOCKING WILL OCCUR PREVENTING REMOVAL OF NUT FROM BOLT AND DAMAGE TO FASTENERS.

A/C COMPRESSOR INSTALLATION

- ☐ INSTALL A/C COMPRESSOR AS SHOWN IN FIGURE 7, BELOW.
- ☐ INSTALL (2) .789 OD x .315 ID x .297" L ALUM SPACER BETWEEN COMPRESSOR AND BRACKET, ALONG WITH (2) 5/16-18 x 4 ¼" 12 PT SS BOLTS, (2) 5/16" AN FLAT WASHERS AND (2) 5/16-18 SS NYLOC NUTS. SEE FIGURE 7.
- ☐ COMPRESSOR MOUNTING EARS CONTAIN SLIDING BUSHINGS THAT ARE DRAWN-IN AND CLAMP TO BRACKET WHEN COMPRESSED.

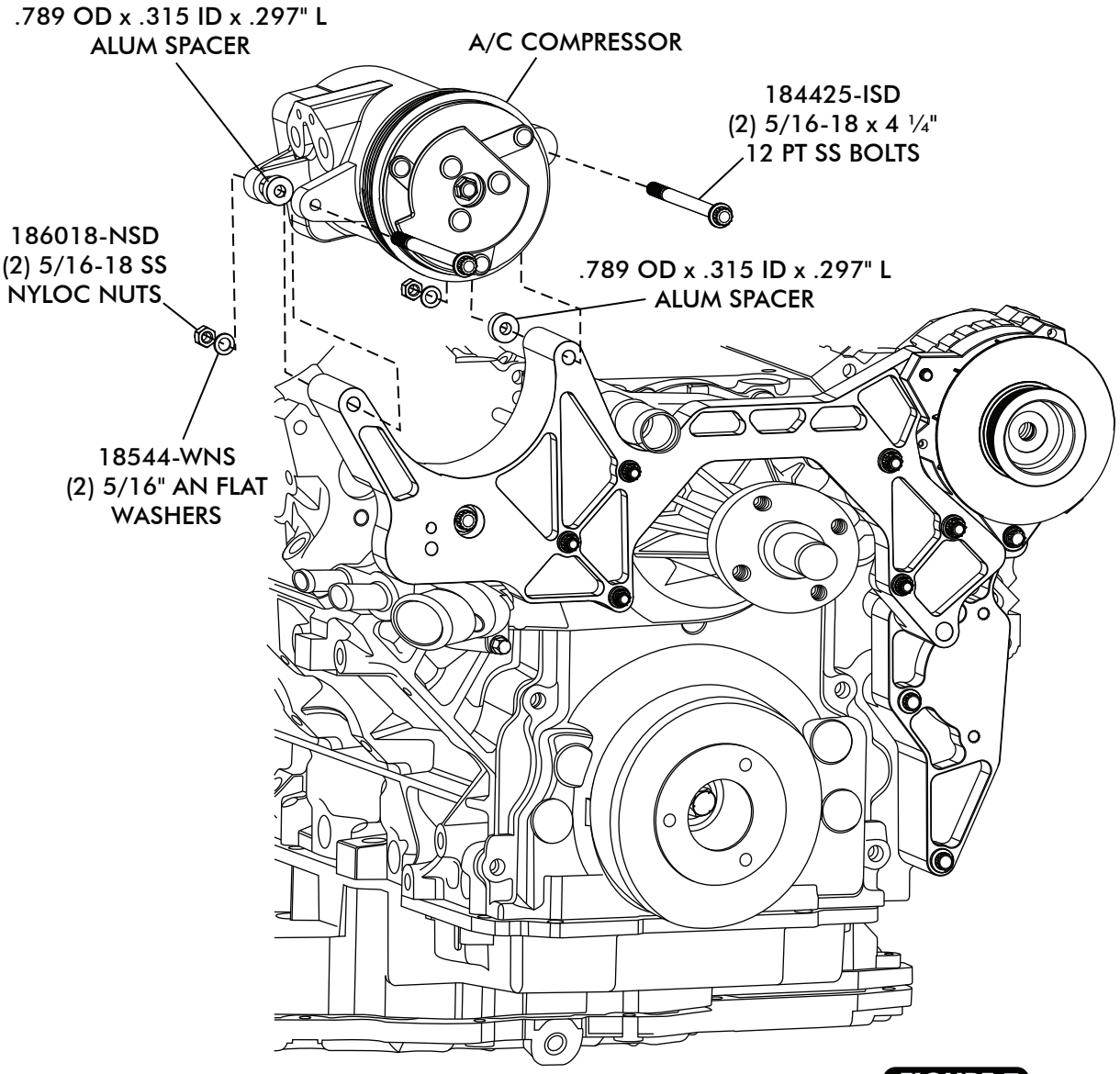


FIGURE 7

WARNING: ANTI-SEIZE MUST BE USED ON THREADS OF BOLTS OR MECHANICAL LOCKING WILL OCCUR PREVENTING REMOVAL OF NUT FROM BOLT AND DAMAGE TO FASTENERS.

POWER STEERING PUMP INSTALLATION (POWER STEERING ONLY)

NOTE: SOME TYPE II GM POWER STEERING PUMPS HAVE THREADED MOUNTING BASES. THESE MUST BE DRILLED OUT TO ALLOW FRONT RUNNER MOUNTING BOLTS TO PASS THROUGH THE HOLES AND THREAD INTO THE BRACKET. SEE FIGURE 8a, BELOW.

☐ USING A POWER STEERING PUMP PULLEY INSTALLER, INSTALL THE POWER STEERING PULLEY ONTO THE POWER STEERING PUMP. SEE FIGURE 8a.

NOTE: PULLEY MUST BE INSTALLED WITH PROPER TOOL. (K-D TOOL #2897 OR EQUIVALENT) DO NOT ATTEMPT TO HAMMER OR PRESS PULLEY ON POWER STEERING PUMP SHAFT!

☐ INSTALL POWER STEERING PUMP USING (2) 5/16-18 x 2 ¾" 12 PT SS BOLTS WITH (2) 5/16" AN WASHERS AS SHOWN IN FIGURE 8, BELOW. TORQUE TO 28 LB FT.

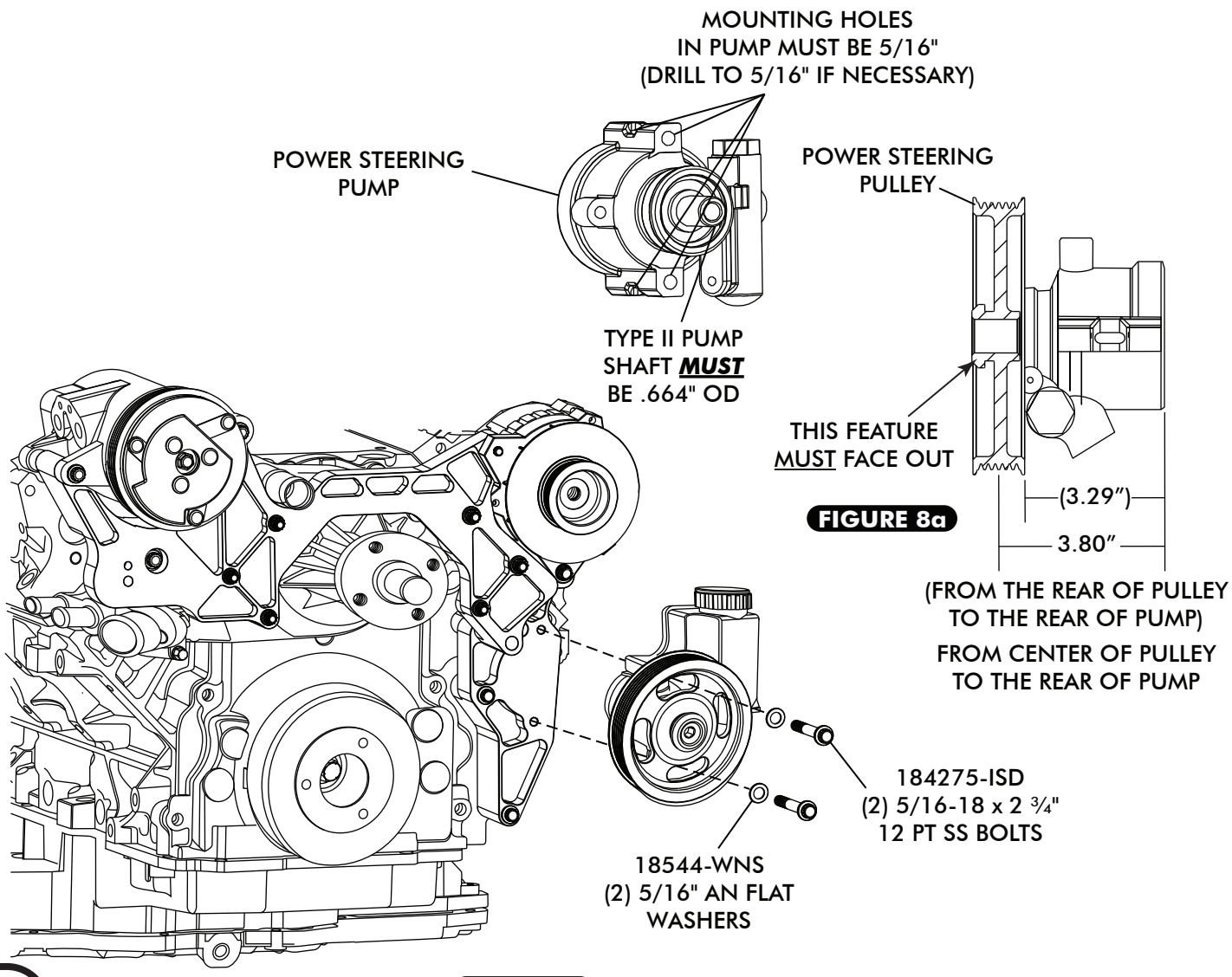


FIGURE 8a

FIGURE 8

WARNING: ANTI-SEIZE MUST BE USED ON THREADS OF BOLTS OR MECHANICAL LOCKING WILL OCCUR PREVENTING REMOVAL OF NUT FROM BOLT AND DAMAGE TO FASTENERS.

WATER PUMP PULLEY INSTALLATION

☐ INSTALL WATER PUMP PULLEY ONTO WATER PUMP USING (4) 5/16-24 x 3/4" BOLTS AND (4) 5/16" AN FLAT WASHERS AS SHOWN IN FIGURE 9, BELOW. TORQUE TO 22 LB FT.

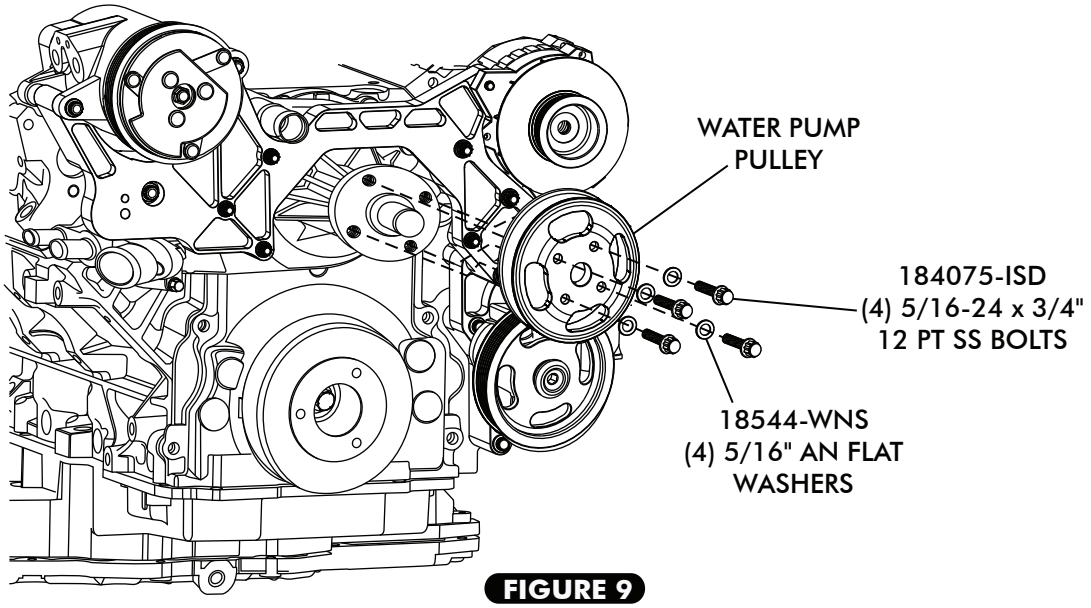


FIGURE 9

CRANKSHAFT PULLEY INSTALLATION

☐ INSTALL CRANKSHAFT PULLEY ONTO DAMPER USING (3) 3/8-16 x 1 ¼" BOLTS AND (3) 3/8" AN FLAT WASHERS AS SHOWN IN FIGURE 10, BELOW. TORQUE TO 25 LB FT.

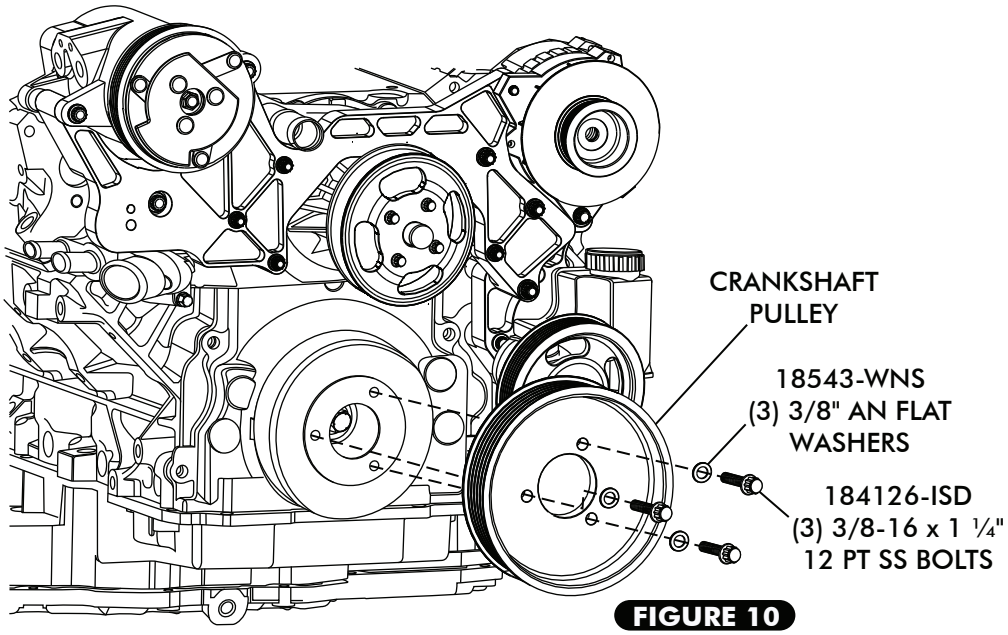


FIGURE 10

WARNING: ANTI-SEIZE MUST BE USED ON THREADS OF BOLTS OR MECHANICAL LOCKING WILL OCCUR PREVENTING REMOVAL OF NUT FROM BOLT AND DAMAGE TO FASTENERS.

DOWEL PIN AND TENSIONER SPACER INSTALLATION

- ☐ INSTALL .250 x 1.00 SS DOWEL PIN INTO MAIN BRACKET AS SHOWN IN FIGURE 11, BELOW.
  NOTE: DOWEL PIN IS A PRESS FIT. USE A HAMMER AND CAREFULLY TAP DOWEL PIN INTO LOCATING HOLE.
- ☐ INSTALL TENSIONER SPACER ON BACK SIDE OF BELT TENSIONER. SEE FIGURE 11b, BELOW.
  NOTE: BE SURE TO INSERT DOWEL PIN INTO CORRECT LOCATING HOLE OF THE TENSIONER SPACER. SEE FIGURE 11a, BELOW. TAP SPACER ONTO BRACKET IF NECESSARY.
- ☐ ALIGN TENSIONER AND TENSIONER SPACER TO MAIN BRACKET USING A 3/8-16 x 3 ¼" 12 PT SS BOLT AS SHOWN IN FIGURE 11b, BELOW. TORQUE TO 37 LB FT.

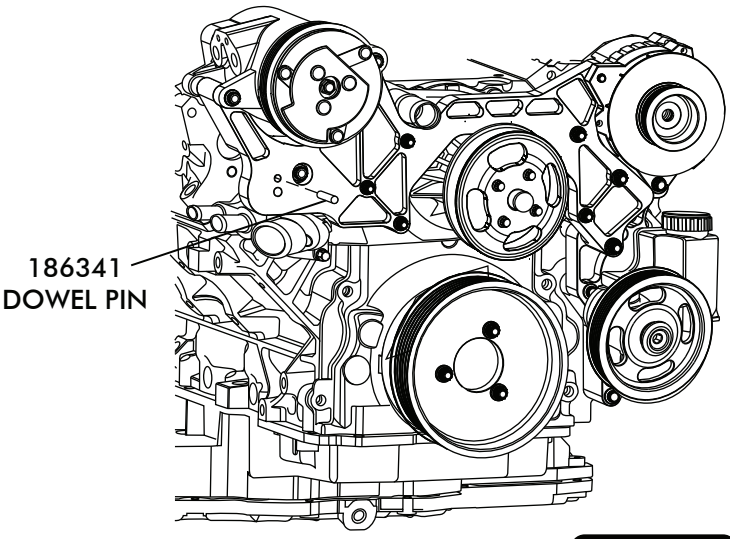


FIGURE 11

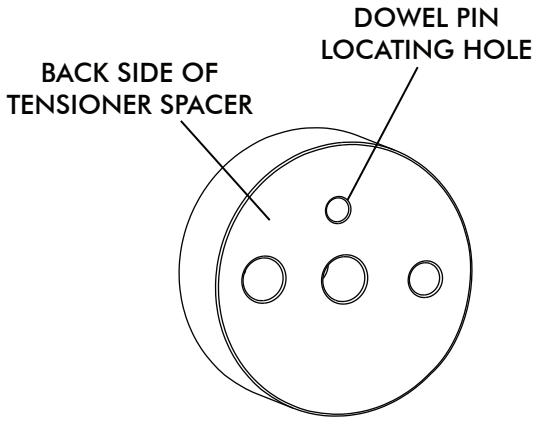


FIGURE 11a

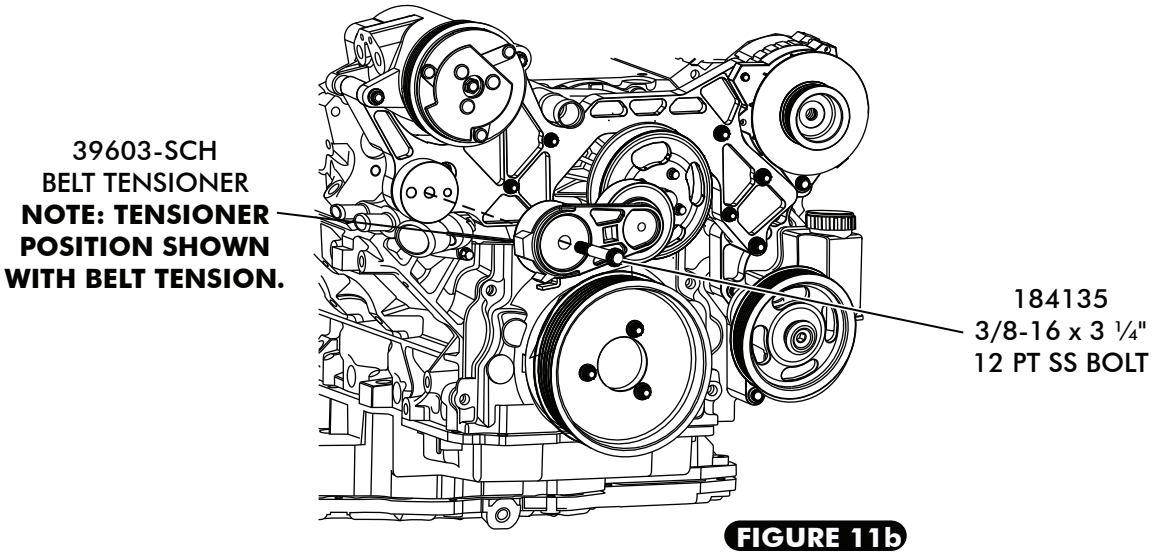
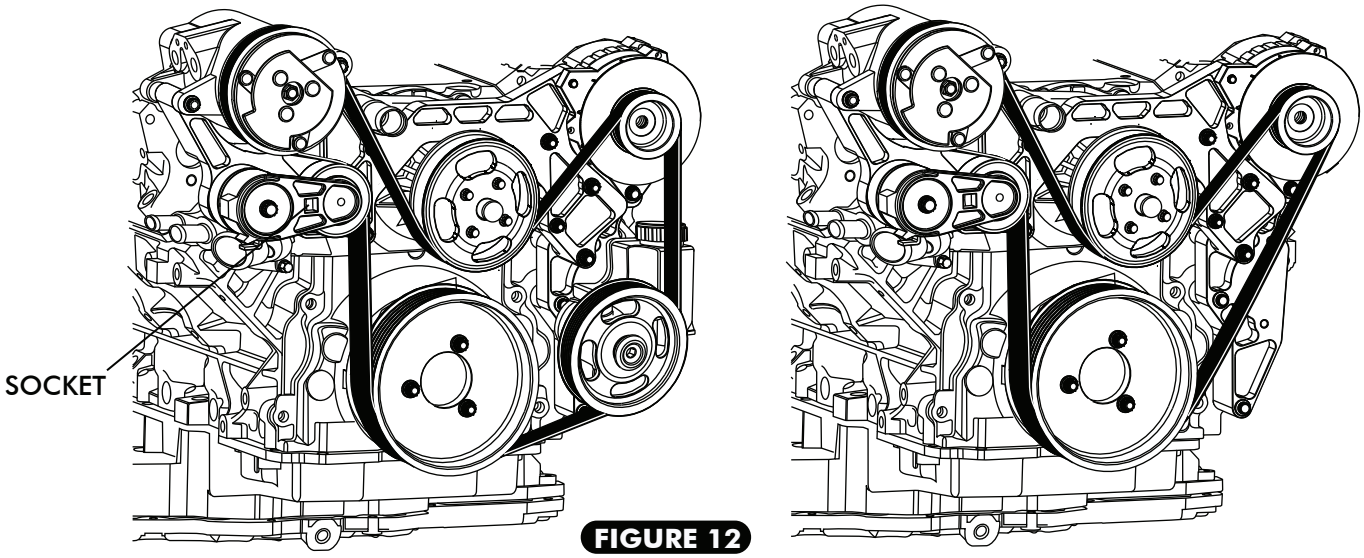


FIGURE 11b

WARNING: ANTI-SEIZE MUST BE USED ON THREADS OF BOLTS OR MECHANICAL LOCKING WILL OCCUR PREVENTING REMOVAL OF NUT FROM BOLT AND DAMAGE TO FASTENERS.

BELT INSTALLATION

☐ INSERT A 1/2" DRIVE RATCHET OR BREAKER BAR INTO SOCKET ON TENSIONER, ROTATE CLOCKWISE UNTIL TENSIONER STOPS. ROUTE BELT AROUND CRANKSHAFT PULLEY, POWER STEERING PULLEY, ALTERNATOR AND OVER COMPRESSOR. PULL BELT DOWN AND SLIDE UNDER WATER PUMP PULLEY LAST. SEE FIGURE 12.



WITH PS 66" BELT **WITHOUT PS 63" BELT**

FIGURE 12

A/C COMPRESSOR FITTING INSTALLATION

☐ INSTALL THE #8 AND #10 A/C COMPRESSOR FITTINGS ON COMPRESSOR USING (2) 8mm-1.25 x 25mm 12 PT SS BOLTS AS SHOWN IN FIGURE 13, BELOW. KEEP PORTS SEALED WITH CAPS UNTIL A/C CIRCUIT HAS BEEN COMPLETED.

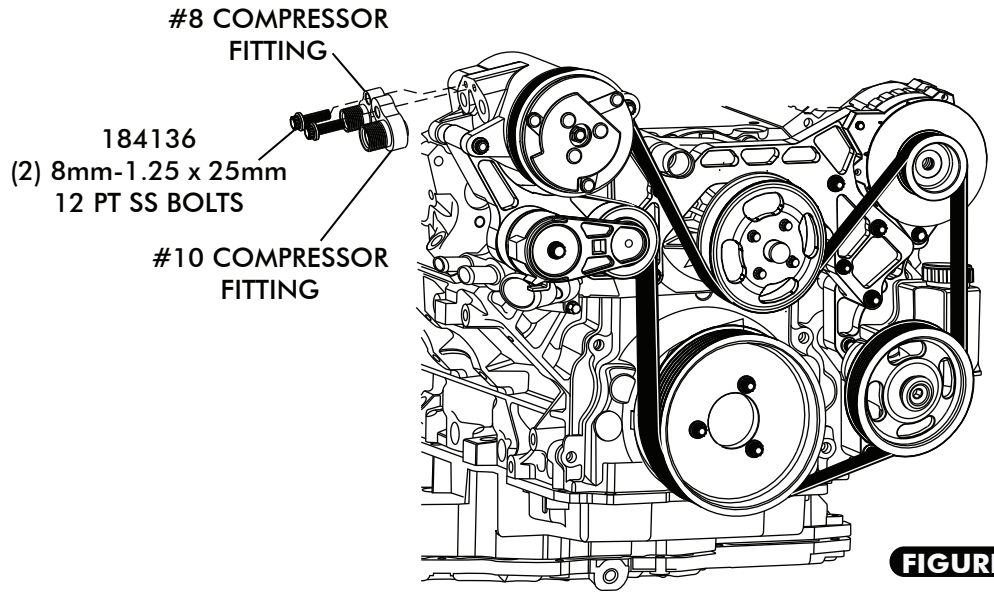


FIGURE 13

WARNING: ANTI-SEIZE MUST BE USED ON THREADS OF BOLTS OR MECHANICAL LOCKING WILL OCCUR PREVENTING REMOVAL OF NUT FROM BOLT AND DAMAGE TO FASTENERS.

HEATER HOSE & RADIATOR HOSE INSTALLATION

- ☐ INSTALL THE (2) HEATER HOSES ONTO THE WATER PUMP. **NOTE: HOSE CLAMP LOCATION AND POSITION AS SHOWN IN FIGURE 14, BELOW.**
- ☐ INSTALL THE (2) RADIATOR HOSES ONTO THE WATER PUMP. **NOTE: HOSE CLAMP LOCATION AND POSITION AS SHOWN IN FIGURE 14, BELOW.**

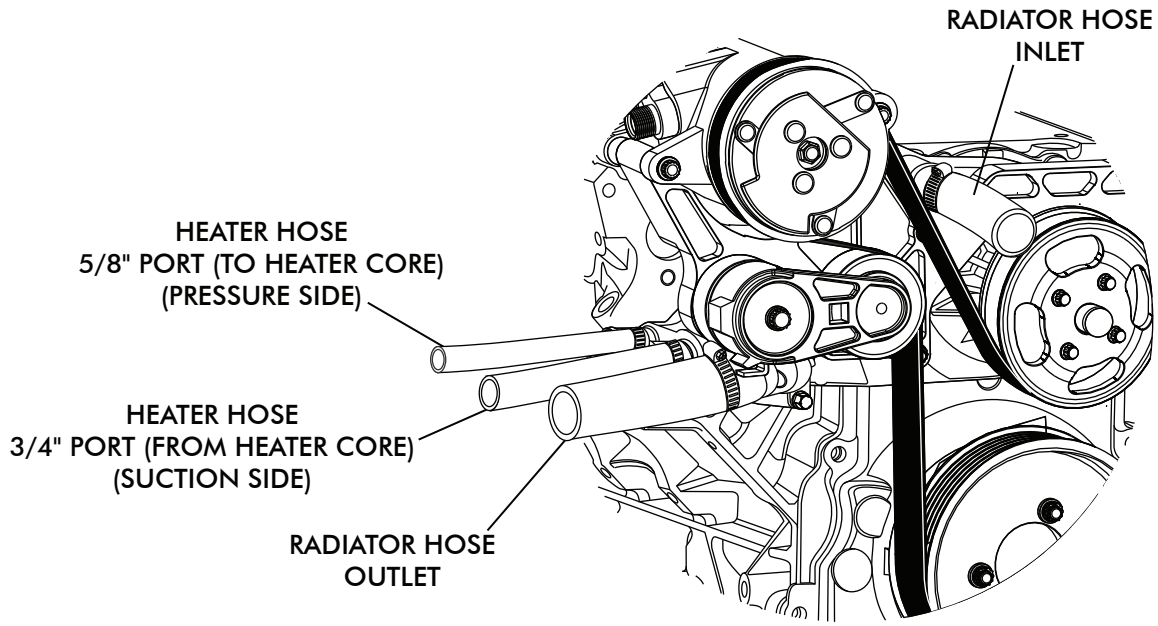


FIGURE 14

FINAL STEPS

- ☐ REINSTALL ALL PREVIOUSLY REMOVED ITEMS (RADIATOR, FAN BLADE, RADIATOR HOSES ETC.)
- ☐ RECONNECT ALL ELECTRICAL CONNECTORS.
  NOTE: CHARGING SYSTEM MUST BE PROPERLY WIRED TO ACCEPT ONE-WIRE INTERNALLY REGULATED ALTERNATOR.
- ☐ CONNECT NEGATIVE BATTERY CABLE.
- ☐ FILL RADIATOR WITH AT LEAST A 50/50 MIXTURE OF APPROVED ANTIFREEZE AND DISTILLED WATER.
  IT IS THE OWNER'S RESPONSIBILITY TO KEEP THE FREEZE PROTECTION AT THE PROPER LEVEL FOR THE CLIMATE IN WHICH THE VEHICLE IS OPERATED. FAILURE TO FOLLOW ANTIFREEZE RECOMMENDATIONS WILL CAUSE HEATER CORE TO CORRODE PREMATURELY AND POSSIBLY BURST IN A/C MODE AND/OR FREEZING WEATHER, VOIDING YOUR WARRANTY.
- ☐ DOUBLE CHECK ALL FITTINGS, BRACKETS AND BELTS FOR TIGHTNESS.
- ☐ VINTAGE AIR RECOMMENDS THAT ALL A/C SYSTEMS BE SERVICED BY A CERTIFIED AUTOMOTIVE AIR CONDITIONING TECHNICIAN.
- ☐ EVACUATE THE SYSTEM FOR A MINIMUM OF 45 MINUTES PRIOR TO CHARGING AND LEAK CHECK PRIOR TO SERVICING. CHARGE THE SYSTEM TO THE CAPACITIES STATED ON THE INFORMATION PAGE (PAGE 3) OF THIS INSTRUCTION MANUAL.