



M-6007-A50NAB
Model 2018 - 2022
5.0L Gen 3 Aluminator NA crate engine

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PRIOR TO INSTALLATION READ THESE INSTRUCTION COMPETELY
For questions, Call the FORD PERFORMANCE Techline 1-800-367-3788

Please visit <https://www.performanceparts.ford.com> for warranty information

Note: Engine is shipped dry with no engine oil; do not start without adding engine oil. Pilot bearing is provided but not installed to allow for an automatic transmission.

1) Technical Specifications M-6007-A50NA Crate Engine:

Engine Assembly Part Number	M-6007-A50NAB
Engine Type	5.0L 4V TiVCT – 2018-2022 Mustang
Engine Weight (auto)	~196kg. (~432 lbs)
Displacement	5.035L, (307 ci)
Cylinder Block	M-6010-M504VC
Bore	93 mm (3.661 in)
Stroke	92.7 mm (3.649 in)
Firing Order	1-5-4-8-6-3-7-2
Compression Ratio	12:1
Maximum rated rpm	7500 rpm
Spark Plug (0.032" Gap)	M-12405-M50A
Crankshaft	Forged Steel, Internal Balance
Vibration Damper	KR3E-6316-EA, Neutral Balance
Connecting Rod	(14042R-8) Manley Forged Steel w/ ARP2000 Bolts
Piston	(part # 0197827162) Mahle Forged, dome
Camshafts	Hydraulic Roller
Cam Timing	Variable
Camshaft Duration	Intake: 260°, Exhaust 263° Total Duration
Camshaft Lift	Intake: 13mm, Exhaust 13mm
Rocker Arm	1.87:1 Ratio
Cylinder Head	Aluminum
Chamber Volume	55.91 cc
Valve Head Diameter	Int./Ex. 37.7mm (1.48 in) / 32mm (1.26 in)
Oil Filter	M-6731-FL820
Oil Pressure	80 psi @ 70° F/ 650 rpm
Max Oil Temperature	280° F
Engine Oil (10.0 qts.)	Motorcraft SAE 5W-50 Full Synthetic XO-5W50-QGT or equivalent
Max Coolant Temperature	240° F

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2) Recommended Ford Racing Parts Not Included:

Supercharger Kit	M-6066-M8
5.0L 4V Control Pack	M-6017-M50B, M50BA, M50BAA
Power Steering Pump Bracket	M-8511-M50BR
Alternator Kit	M-8600-M50ALT
Remote Oil Filter Adapter	M-6881-M50A

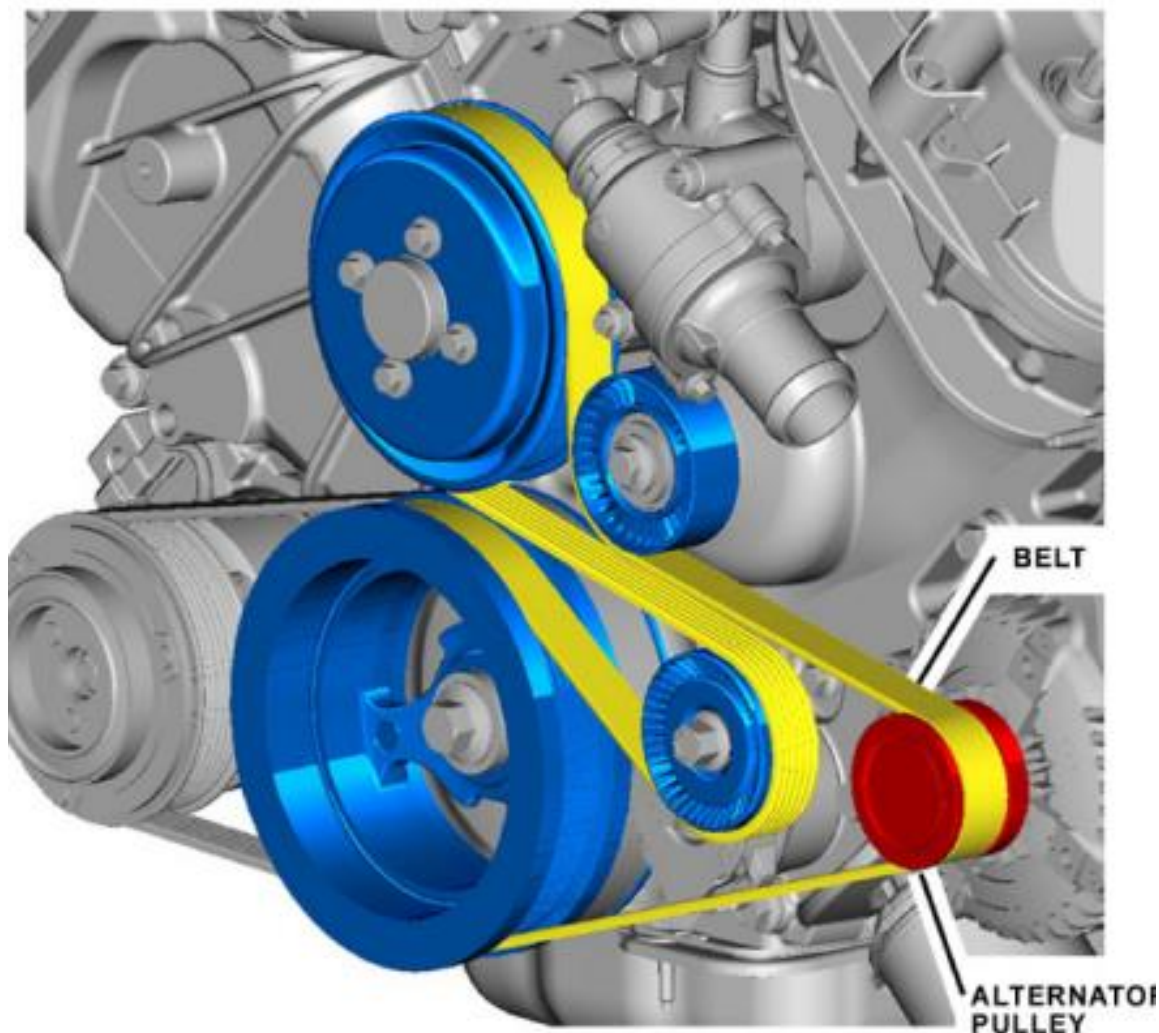
3) Specifications:

Main Bearing Clearance	0.027 - 0.063 mm
Crankshaft End Play	0.085 - 0.425 mm
Connecting Rod Bearing Clearance	0.027 - 0.069 mm
Connecting Rod Side Clearance	0.150 - 0.500 mm
Piston Pin to Connecting Rod Clearance	0.004 - 0.023 mm
Piston Pin to Piston Clearance	0.004 - 0.023 mm
Piston to Bore Clearance	0.015 - 0.039 mm
Piston Ring Gap – Top	0.18 - 0.28 mm
Piston Ring Gap – 2nd	0.60 - 0.85 mm
Piston Ring Gap – Oil Control Segment	0.15 – 0.45 mm
Valve Spring Installed Height	46 mm Intake and Exhaust
Valve Stem to Guide Clearance - Intake	0.019 – 0.069 mm
Valve Stem to Guide Clearance - Exhaust	0.044 – 0.094 mm
Collapsed Lash Adjuster Gap	0.45 – 0.90 mm

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4) Accessory Drive Belt Layout:

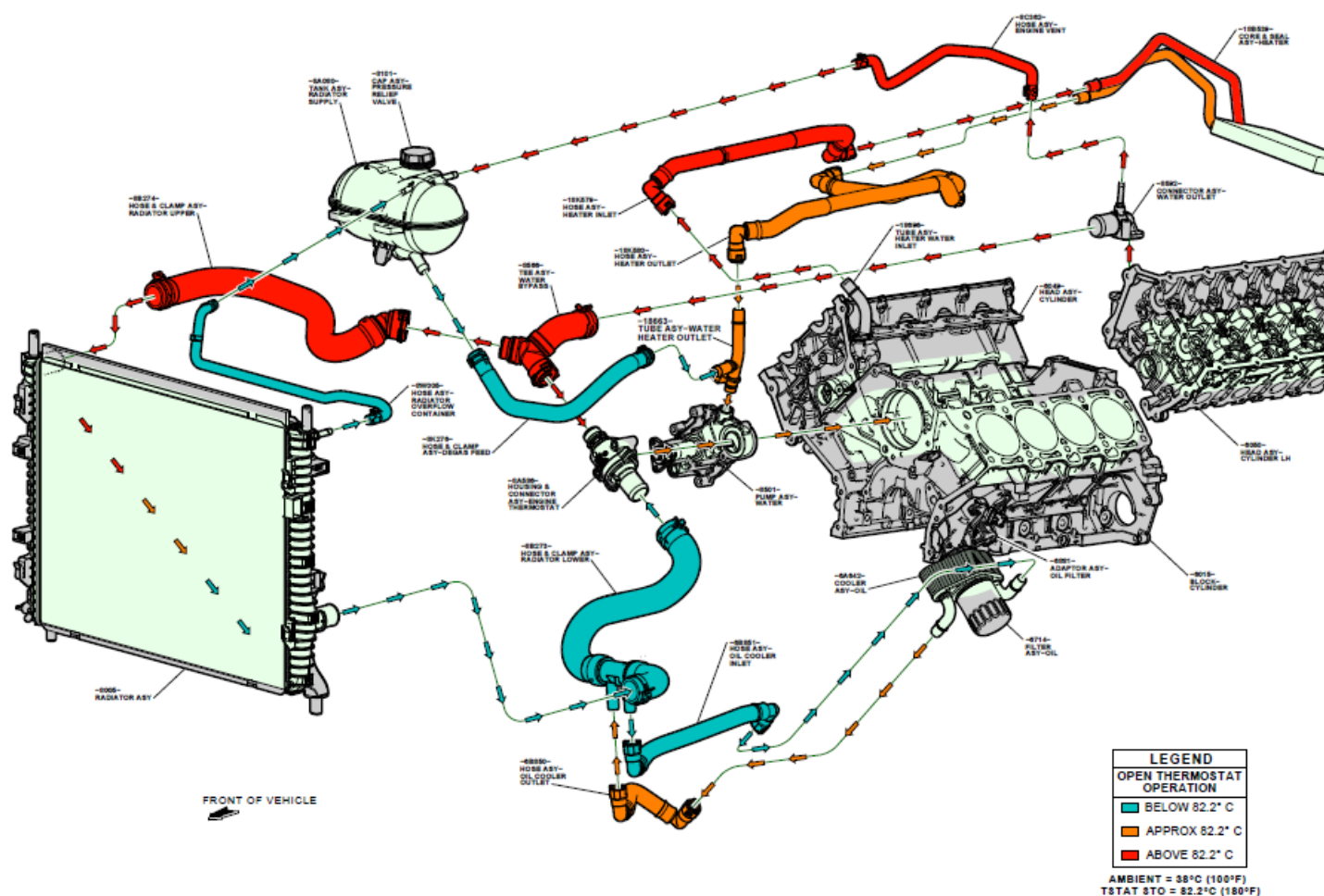


**BELT MUST BE FULLY SEATED ON ALL PULLEYS:
BELT ROUTING OVER **ALTERNATOR**
PULLEY IS CRITICAL TO PREVENT BELT DAMAGE**

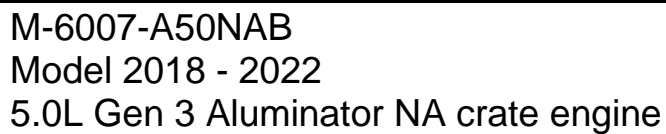
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5) Coolant Flow Diagram:

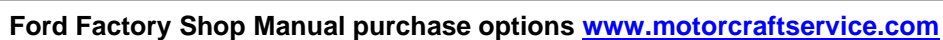
If a heater circuit is not used, then the heater supply must be connected to the heater return to allow air to be purged and provide sufficient coolant flow through, the right hand cylinder head. Install a 5/16" (0.3125) diameter restrictor in this hose.



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6) Oil Flow Diagram:



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7) Torque Specifications:

Application	Torque Nm	lb-ft	lb-in	Lubricant
Accessory drive belt tensioner bolt	45	33		
Accessory drive idler pulley	30	20		
A/C compressor bolts	25	22		
Alternator B+ wire terminal nut	17	13		
Alternator bolt and nut	47	35		
Camcover bolts	15	11		
Camcover bolts (around DI fuel pump)	10		89	
Camshaft bearing cap bolts	6 + 45 deg.		53 + 45 deg.	
Camshaft position sensor bolt	8		71	
Catalytic converter to exh. man. nuts	40	30		
Connecting rod cap (.0058 - .0062 stretch)	88	65		Engine oil
Coolant outlet bolts	10		89	
Coolant outlet pipe bolt	10		89	
Coolant pump bolts	20 + 60 deg.	15 + 60 deg.		
Coolant pump pulley bolts	25	18		
Crankshaft main bearing bolts	See illustration			Engine oil
Crankshaft position sensor bolt	10		89	
Crankshaft Damper bolt	See illustration			
Crankshaft rear seal retainer bolts	10 + 30 deg.		89 + 30 deg.	
Cylinder Head bolts	See illustration			Engine oil
Cylinder head temperature sensor	11		97	
Direct Injection fuel pump nuts	10 + 30 deg.		89 + 30 deg.	
Direct Injection fuel rail bolts	28 + 25 deg.	21 + 25 deg.		
Direct Injection fuel lines	10 + 25 deg.		89 + 25 deg.	
NOTE: It is recommended to replace teflon seals on DI fuel injectors whenever injectors are removed.				
NOTE: Torque value should be recorded during the process. If the torque meets or exceeds 50Nm, the fuel lines must be discarded.				
Front cover bolts	25 + 60 deg.	18 + 60 deg.		
Engine mount bracket bolts	62	46		
Engine to transmission bolts	48	35		
Exhaust manifold nuts	33	24		
Exhaust manifold studs	25	18		
Flywheel	38 + 90 deg.	28 + 60 deg.		
Fuel rail bolts	10 + 90 deg.		89 + 90 deg.	
Ignition coil on plug bolts	10		89	
Intake manifold bolts	11.5 + 30 deg.		100 + 30 deg.	
Knock sensors	20	15		

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Application	Torque Nm	lb-ft	lb-in	Lubricant
Oil filter adapter bolts	20 + 60 deg.	15 + 60 deg.		
Oil filter	$\frac{3}{4}$ to 1 turn after contact			
Oil pan bolts	10 + 45 deg.		89 + 45 deg.	
Oil pump bolts	See Illustration			
Oil pressure sensor	15	11		
Piston cooling jets	10 + 45 deg.		89 + 45 deg.	
Primary timing chain tensioner bolts	10 + 25 deg.		89 + 25 deg.	
Spark plugs	15	11		
Thermostat housing bolts	10		89	
Timing chain guide	10 + 25 deg.		89 + 25 deg.	
Throttle Body	10 + 60 deg.		89 + 60 deg.	
VCT phaser assembly bolts	15 + 90 deg.		133 + 90 deg.	
VCT Solenoid bolts	8 + 30 deg.		70 + 30 deg.	

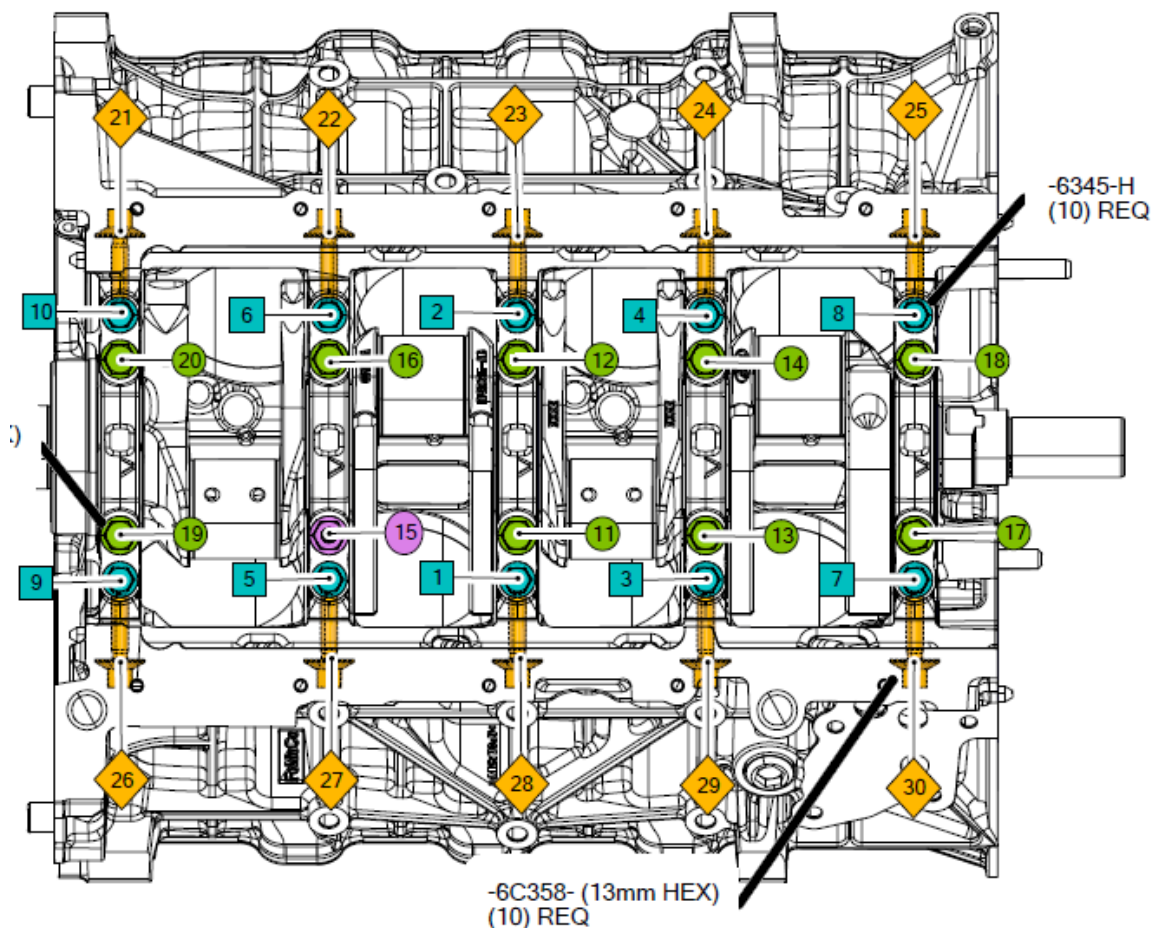
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8) Main Bearing Cap Torque:

SINGLE WRENCH METHOD

1. TORQUE FASTENERS #1 - #20 IN SEQUENCE 20 Nm.
2. TORQUE OUTER FASTENERS #1 - #10 IN SEQUENCE 40 Nm.
3. TORQUE INNER FASTENERS #11 - #20 IN SEQUENCE 65 Nm.
4. ROTATE FASTENERS #1 - #20 IN SEQUENCE CLOCKWISE 90 DEG.
5. TORQUE SIDE BOLTS #21 - #30 IN SEQUENCE 30 Nm + 60 DEG CLOCKWISE.



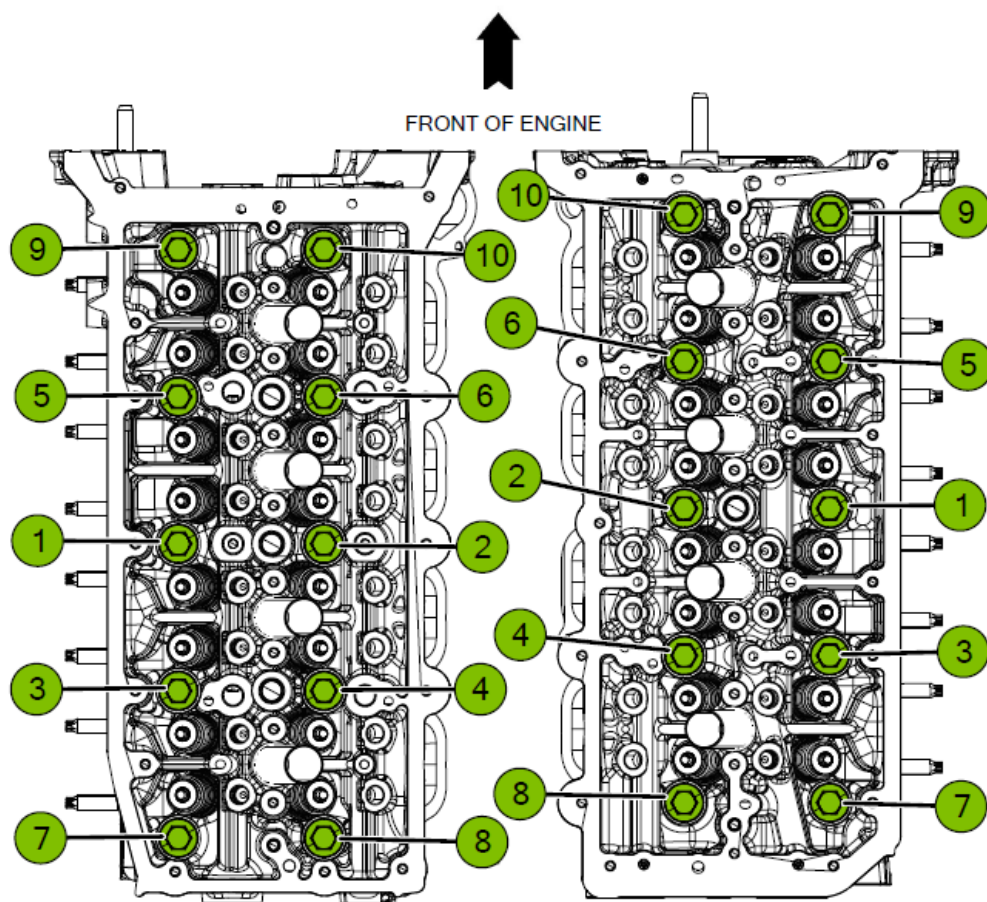
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9) Cylinder Head Torque:

SINGLE WRENCH METHOD

1. INSTALL CYLINDER HEAD & FUEL CHARGE ASSEMBLIES (-6H088-/-6H089-) OVER DOWELS.
2. INSTALL AND HAND START (10) M12 HEAD BOLTS INTO EACH CYLINDER HEAD & FUEL CHARGE ASY.
3. TORQUE ALL FASTENERS #1 THRU #10 IN SEQUENCE TO 25 Nm.
4. TORQUE ALL FASTENERS #1 THRU #10 IN SEQUENCE TO 75 Nm.
5. LOOSEN BOLT #1, ROTATING 180 DEG. COUNTERCLOCKWISE, THEN RETIGHTEN THIS BOLT TO 50 Nm AND THEN ROTATE THIS BOLT CLOCKWISE AN ADDITIONAL 235-245 DEG.(TORQUE + ANGLE).
6. REPEAT STEP 5 ON BOLT #2. LOOSENING 180 DEG. AND RETIGHTENING TO 50 Nm + 240 DEG. REPEAT THIS PROCESS ON BOLT #3. CONTINUE WITH THIS PROCESS UNTIL ALL BOLTS HAVE BEEN LOOSENEED AND RETIGHTENED IN SEQUENCE.



CYLINDER HEAD TORQUE SEQUENCE
(SINGLE WRENCH METHOD)

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10) Crankshaft Damper Torque:

