

INSTRUCTIONS

READ CAREFULLY BEFORE USING THIS MANUAL

This manual was developed to assist Engine Distributors Inc customers in assembling and servicing the WSG-1068 Engine and Production Groups. It is designed to allow these customers an easy step-by-step procedure in completing their assembly task.

This manual is designed to be an assembly and service parts manual.

Assure this manual is made available to your assembly and parts personnel.

The illustrations contained in this manual are typical and are intended for service and installation of Ford supplied base engine and Phase II assembly groups only.

The engineering group worksheet information has been incorporated with the illustration.

Components are identified in the illustration using the service base part number.

Parts contained as well as assembly sequences for a particular group are listed in the corresponding chart.

Observe and employ all critical torque specifications, notes and references.

Note: The descriptions and specifications contained in this manual were in effect at the time the book was released for printing. Ford Motor Company reserves the right to discontinue models at any time, or change specifications or design, without notice and without incurring obligation.

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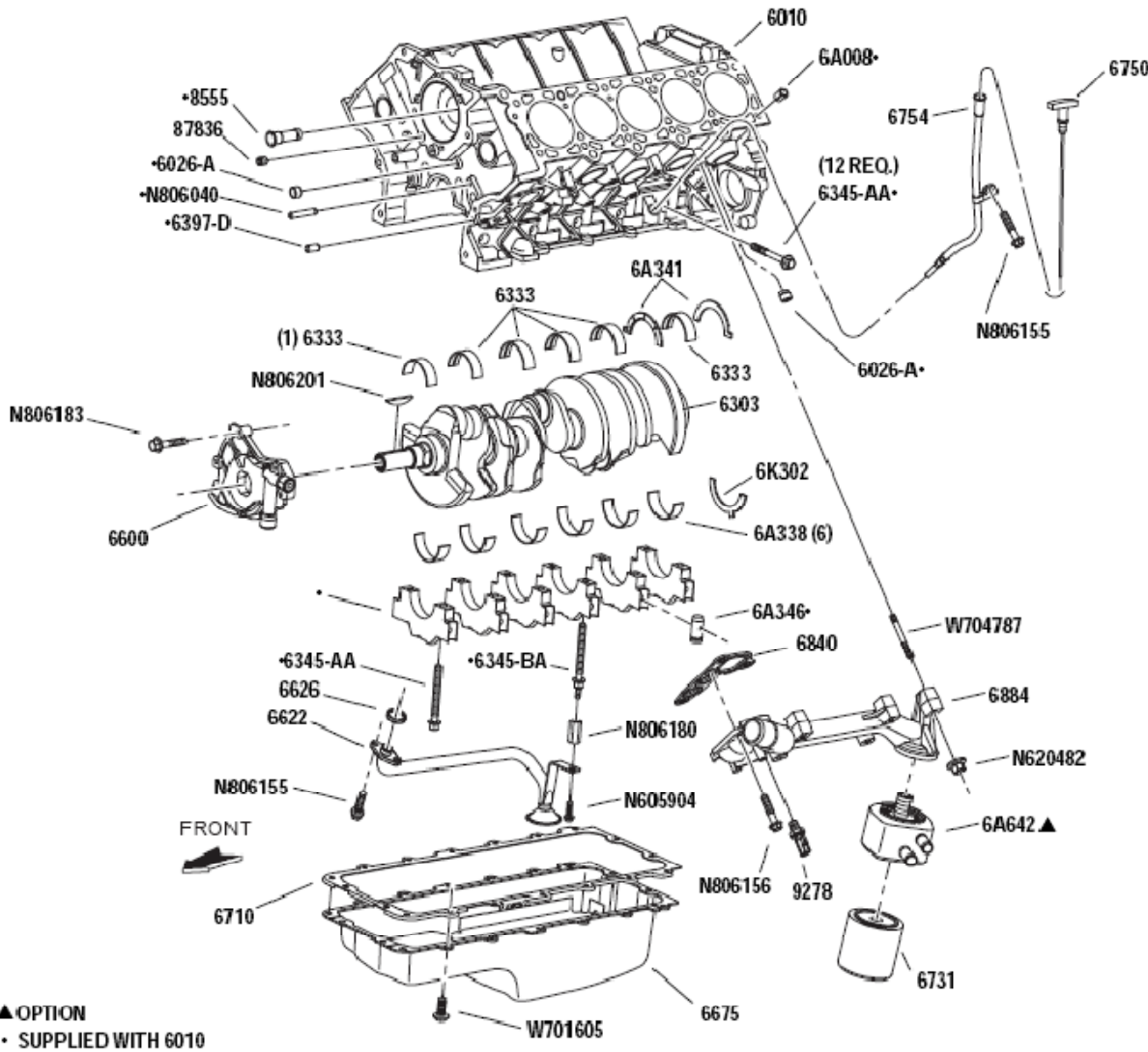
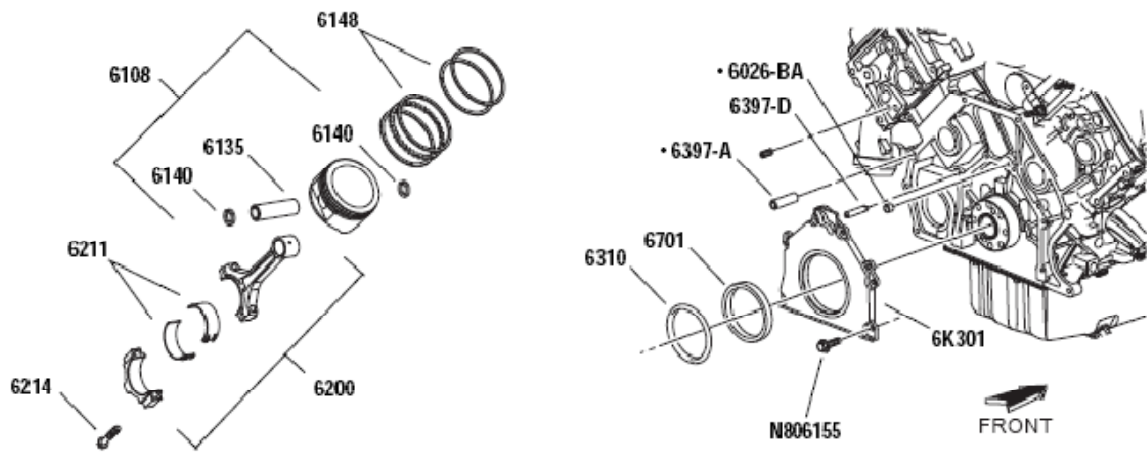


Engine Distributors Inc.
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ENGINE LOWER



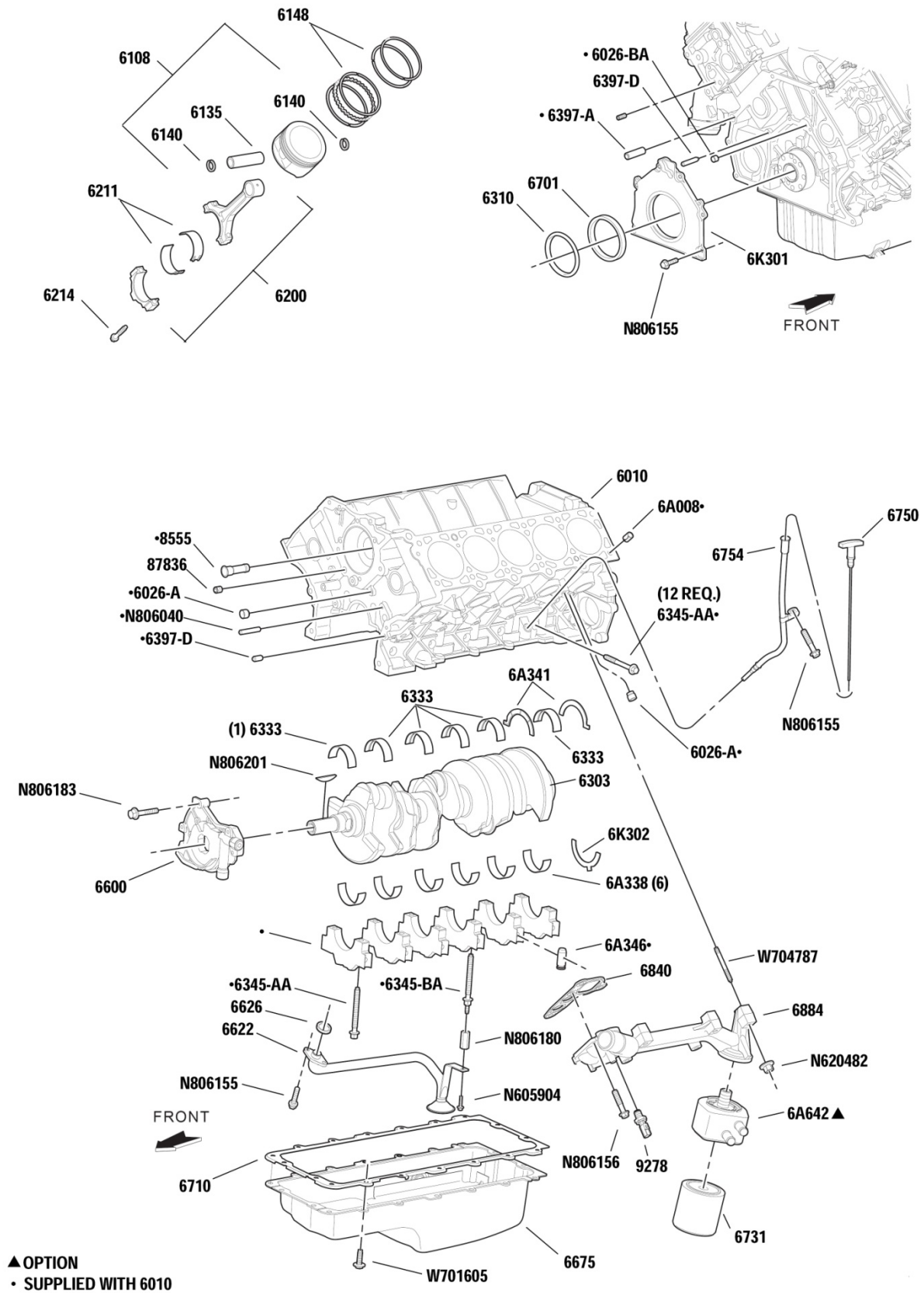
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WSG-1068 Catalog

WSG-1068 415 CID DRY FUEL									
ENGINEERING PART NUMBER			SERVICE PART NUMBER			DESCRIPTION	ENGINE		
							CODE		
REF. NO.			REF. NO.			ENGINE - LOWER CYLINDER BLOCK & RELATED PARTS		OC 680 AA	
									QTY.
F7UE	6010	BE	F7UZ	6010	BA	Cylinder Block Less Crankshaft, Pistons			1
	391556	S	F6AZ	6026	AA	Plug - 1.75" Stainless Steel Cup (4 ea. Left/Right, 2 Rear)			10
	N806435	S	F1AZ	6026	A	Plug - Cylinder Block Front 13.84mm Cup Style			2
	391186	S100	F3AZ	6026	A	Plug - Cylinder Block Rear 3/8-18 X .425 Socket Head			2
	N808315	S	F6AZ	6026	BA	Plug - 38.3 MM Cup Stainless Steel (1 Front, 1 Rear)			2
	W701228	S	F5RZ	6397	D	Pin - Dow el for Timing Cover 8.0 X 18.25			2
F75E	18B402	AA	F75Z	8555	A	Tube Asy. - Heater Water			1
	N806040	S	N806040		S	Pin - Dow el (Solid) for Timing Chain Guides 8.0 X 45.5			2
	W704594	S300	F8AZ	6A008	AA	Pin - Dow el for Cyl. Head 16.0 X 19.0			4
						PISTON & CONNECTING ROD			
XL3E	6108	KA	XL3Z	6108	KA	Piston & Pin Asy. Std.			10
XL3E	6108	DA	XL3Z	6108	DA	Piston & Pin Asy. 0.25mm O/S			AR
XL3E	6108	EA	XL3Z	6108	EA	Piston & Pin Asy. 0.50mm O/S			AR
F2LE	6135	AB	F3LY	6135	A	Pin - Piston			10
F75E	6140	AA	F75Z	6140	AA	Retainer - Piston Pin			20
F7TJ	6148	AA	F7TZ	6148	AA	Piston Ring Set Std. (Set for 2 Pistons)			5
F7TJ	6148	BA	F7TZ	6148	BB	Piston Ring Set .020" / .50mm O/S (Set for 2 Pistons)			5AR
F75E	6200	A1A	F75Z	6200	AA	Rod - Connecting			10
F2LE	6207	AE	F3LY	6207	A	Bushing - Connecting Rod			10
F65E	6211	EB	F65Z	6211	EA	Bearing - Connecting Rod			20
F65E	6211	FB	F65Z	6211	FA	Bearing - Connecting Rod .020" / .50mm U/S			AR
F2LE	6214	BA	F3LY	6214	A	Bolt - Connecting Rod			20
						CRANKSHAFT & RELATED PARTS			
F65E	6K318	AE	F65Z	6K301	AE	Retainer - Crankshaft Oil Seal			1
F7UE	6303	BB	F7UZ	6303	BA	Crankshaft Asy.			1
F65E	6310	AB	F65Z	6310	AB	Slinger - Crankshaft Oil Rear			1
	N806201	S	F1AZ	6B316	A	Key - Woodruff 4.76 X 49			1
	N807198	S	F2AZ	6397	A	Pin - Flyw heel 16.0 X 25.0 Hollow Dow el			2
	W701228	S	F5RZ	6397	D	Pin - Dow el for Retainer 8.0 X 18.25			2
F3AE	6701	AA	F4AZ	6701	A	Seal - Crankshaft Rear			1
	N806155	S309	N806155	S309		Screw & Washer - For 6K301 Retainer M8 X 1.0 X 27.5			6
						BEARINGS - UPPER			
F6TE	6333	DC	F6AZ	6333	DC	Bearing - Crankshaft Main Upper Std. (Grade 2)			5
F6TE	6333	EC	F6AZ	6333	EC	Bearing - Crankshaft Main Upper Std. (Grade 1)			5AR
F6TE	6333	FC	F6AZ	6333	FC	Bearing - Crankshaft Main Upper Std. (Grade 3)			5AR
F6TE	6333	GB	F6AZ	6333	GB	Bearing - Crankshaft Main Upper .25mm U/S I.D.			5AR
						More>			

ENGINE LOWER

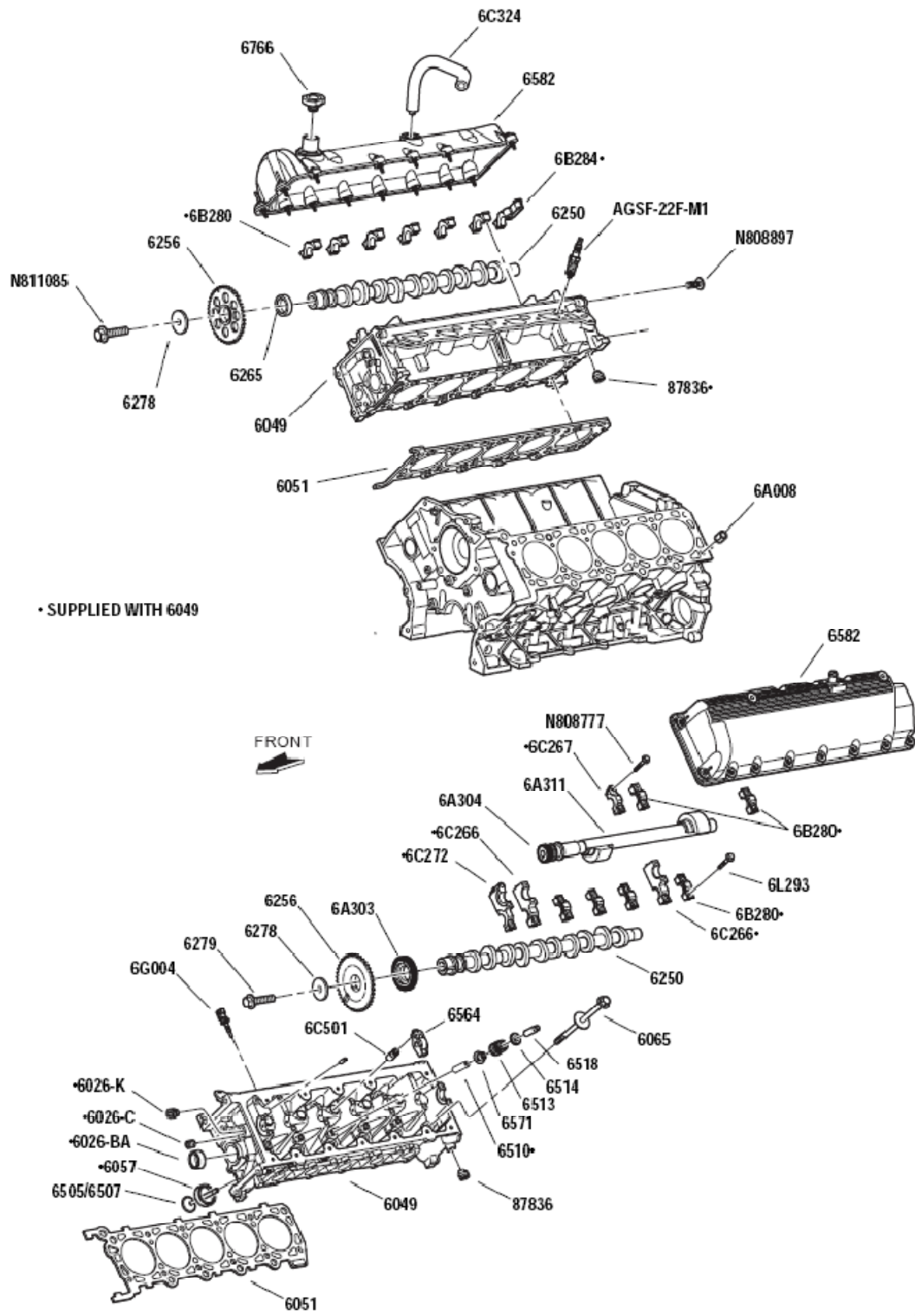


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**WSG-1068
415 CID
DRY FUEL**

ENGINEERING PART NUMBER			SERVICE PART NUMBER			DESCRIPTION	ENGINE	
REF. NO.			REF. NO.				CODE	
						ENGINE - LOWER		0C 680 AA
						CYLINDER BLOCK & RELATED PARTS		QTY.
						BEARINGS - UPPER (continued)		
	F65E	6A341	BA	F6AZ	6A341	AA	Bearing - Crankshaft Thrust Upper Std.	2
	F6TE	6W337	AA	F6AZ	6333	MA	Bearing - Crankshaft Main Upper Std. No.1 Location (Grade 2)	1
	F6TE	6W337	BA	F6AZ	6333	NA	Bearing - Crankshaft Main Upper Std. No.1 Location (Grade 1)	1AR
	F6TE	6W337	CA	F6AZ	6333	PA	Bearing - Crankshaft Main Upper Std. No.1 Location (Grade 3)	1AR
	F6TE	6W337	DA	F6AZ	6333	RA	Bearing - Crankshaft Main Upper Std. No.1 Location .25mm U/S I.D.	1AR
						BEARINGS - LOWER		
	F6TE	6A338	DA	F6AZ	6333	HA	Bearing - Crankshaft Main Lower (Grade 2)	6
	F6TE	6A338	EA	F6AZ	6333	JA	Bearing - Crankshaft Main Lower (Grade 1)	6AR
	F6TE	6A338	FA	F6AZ	6333	KA	Bearing - Crankshaft Main Lower (Grade 3)	6AR
	F6TE	6A338	GA	F6AZ	6333	LA	Bearing - Crankshaft Main Lower .25mm U/S I.D.	6AR
	F65E	6K302	BA	F65Z	6K302	BA	Washer - Crankshaft Thrust Low er	1
		N808089			6A340		Bolt - Damper M14X1.5X44.7 Hex Flange Head	
	F65E	6K258	AA	F6AZ	6345	BA	Studbolt - Crankcase Main Bearing Cap M8 X 1.25 + M10 X 1.5 X 126	1
	F65E	6345	AA	F6AZ	6345	AA	Bolt - Crankshaft Main Bearing Cap M10 X 1.5 X 94.5 Hex Head	11
						Note: Do Not Re-Use Removed Bolts When Replacing Bearings!		
	F65E	6C357	AA	F65Z	6345	AA	Bolt - Crankshaft Main Bearing Cap M9 X 1.25 X 53 Hex Head	12
	F6TE	6A346	BB	F6TZ	6A346	BB	Dowel - Main Bearing Cap to Block	12
						OIL PUMP, OIL PAN, INDICATOR & RELATED		
	F8AE	6621	AA	F8AZ	6600	AA	Pump Asy. - Oil	1
	F81E	6622	GB	F81Z	6622	GA	Screen & Cover Asy. - Oil Pump	1
	F1AE	6625	AA	F1AZ	6626	A	Seal - Screen & Cover Asy. (PIA 6622)	1
		6A642			6A642		Contact FPP for possible applications	
	F81E	6675	DE	F81Z	6675	DA	Pan Asy. - Engine Oil	1
	F7UE	6710	AA	F7UZ	6710	AA	Gasket - Oil Pan	1
	F75E	6730	BA	F75Z	6730	BA	Plug - Oil Drain (PIA 6675)	1
	XW4E	6714	BA	F1AZ	6731	BD	Filter Asy. - Oil	1
	F75E	6734	AA	F75Z	6734	AA	Gasket - Oil Drain Plug (PIA 6730)	1
	F81E	6750	JA	F81Z	6750	JA	Indicator Asy. - Oil Level (Non-ONAN applications)	1
	YU1L	6750	AA	YU1L	6750	AA	Tube - Oil Level indicator (ONAN applications. Not supplied w ith engine)	1
	F81D	6K873	FD	F81Z	6754	FA	Tube - Oil Level indicator (Non-ONAN applications)	1
	F75E	6K873	FB	F75Z	6754	FA	Tube - Oil Level indicator (ONAN applications. Not supplied w ith engine)	1
	F65E	6A636	BA	F6AZ	6840	BA	Gasket - Oil Filter Adaptor	1
	F81E	6884	FB	F81Z	6881	FA	Adaptor - Oil Filter	1
	F1AE	6890	AC	F1AZ	6890	A	Insert - Oil Filter Mounting	1
	F8AF	9278	DA	F8AZ	9278	DA	Switch Asy. - Oil Pressure	1
		N620482	S309		N620482	S309	Nut - Adaptor Rear to Engine Stud M10 X 1.5	1
		N806155	S309		N806155	S309	Screw & Washer - For 6622, 6754 M8 X 1.0 X 27.5	3
		N806156	S309		N806156	S309	Bolt - Adaptor to Engine M8 X 1.25 X 41 Hex	4
		N806180	S2		N806180	S2	Spacer- Screen & Cover M8 X 1.25 X 37.9	1
		N806183	S2		N806183	S2	Bolt - Oil Pump M6 X 1.0 X 42.5 Hex	3
		N605904	S		N605904	SA	Bolt - Screen & Cover to Spacer M8 X 1.25 X 19	1
		W701605	S301		W701605	S301	Bolt & Washer - Oil Pan M8 X 30 Hex Flange	18
		W704787	S309		W704787	S309	Stud - Adaptor Rear to Engine	1

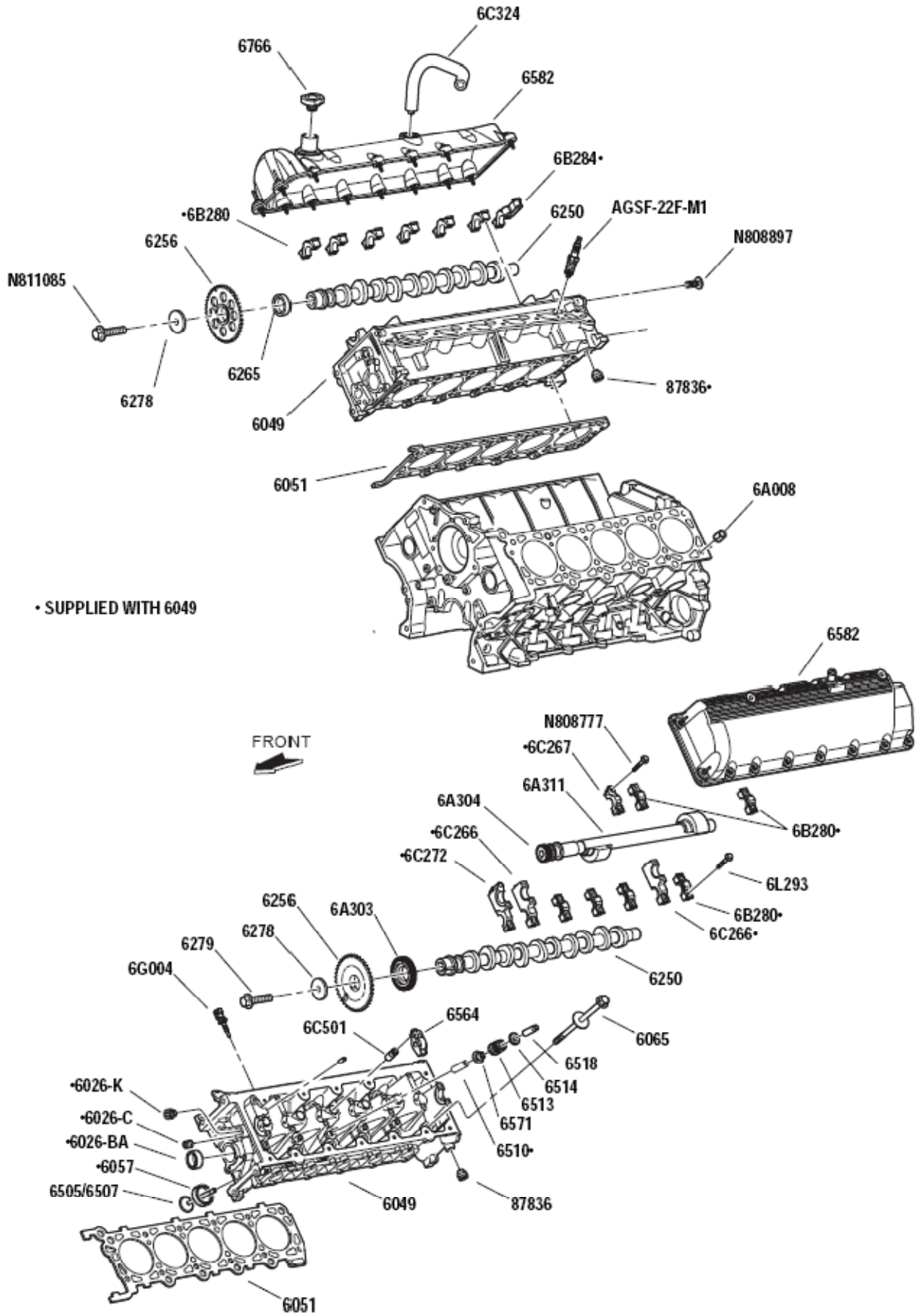
ENGINE UPPER

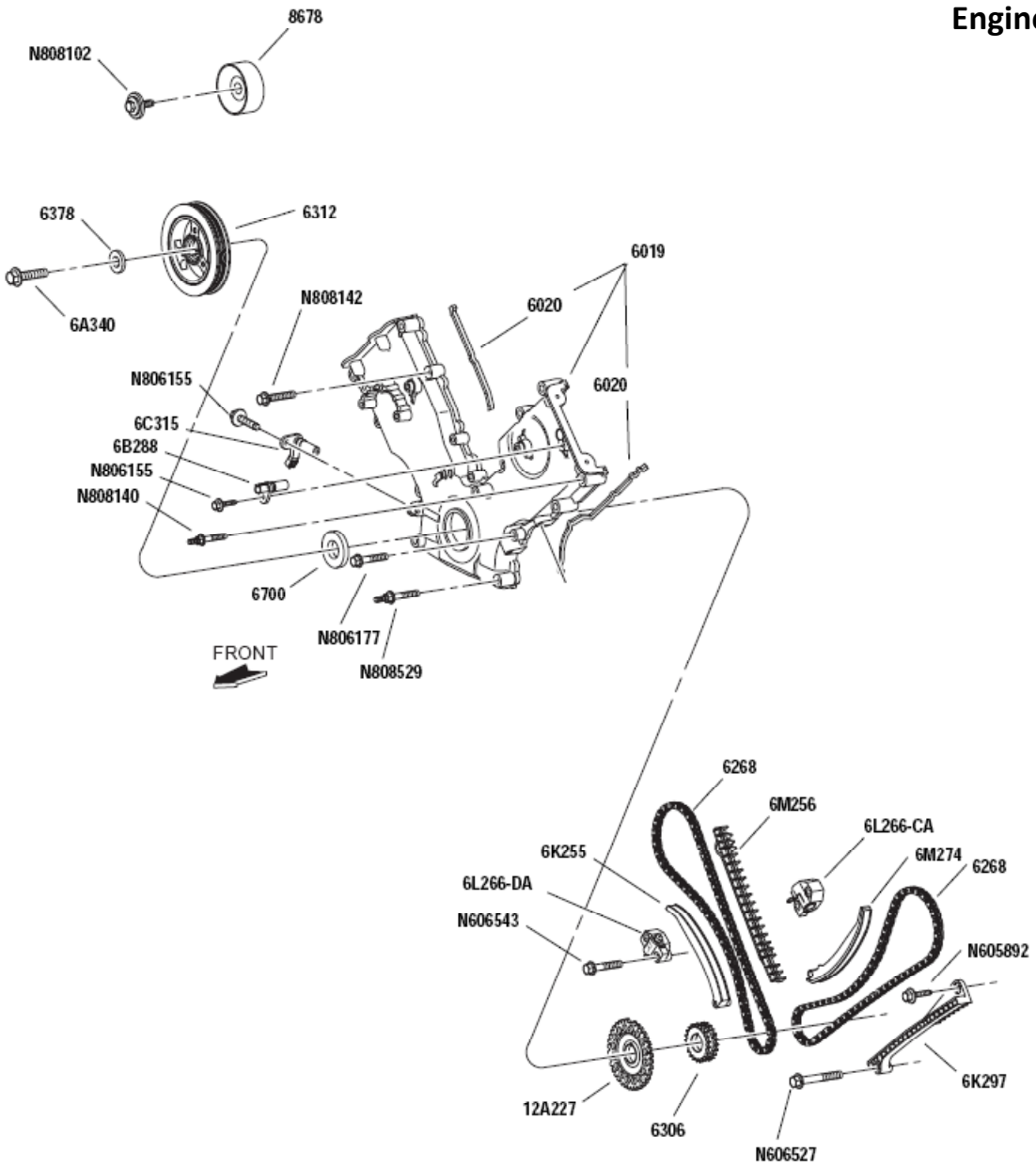


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WSG-1068 415 CID DRY FUEL										
ENGINEERING PART NUMBER			SERVICE PART NUMBER			DESCRIPTION			ENGINE CODE	
	REF. NO.			REF. NO.		ENGINE UPPER CYLINDER HEAD & RELATED PARTS			0C 680 AA	QTY.
F65F	6G004	AB	F65Z	6G004	AB	Sensor Asy. - Cylinder Head Temperature				1
	W704594	S300	F8AZ	6A008	AA	Dow el Pin - Block to Cylinder Head				4
	N806434	S	F1AZ	6026	C	Plug - Cylinder Head Pressure Relief 11.4 MM Cup				4
	N808315	S	F6AZ	6026	BA	Plug - Cylinder Head 38.3 MM Cup Stainless Steel				2
	W701516	S304	F5RZ	6026	K	Plug - Cylinder Head Main Oil Gallery 3/8-18 Pipe				4
YC2E	6049	C27A	YC2Z	6049	CA	Cylinder Head Asy. RH Without Valves / With Inserts & Guides				1
YC2E	6050	C27B	YC2Z	6049	EA	Cylinder Head Asy. LH Without Valves / With Inserts & Guides				1
F7UE	6051	AB	F7UZ	6051	AB	Gasket - Cylinder Head RH				1
F7UE	6083	AB	F7UZ	6051	ABB	Gasket - Cylinder Head LH				1
XL3E	6056	DA	XL3Z	6057	DA	Insert- Valve Seat Intake				10
XL3E	6057	DA	XL3Z	6057	EA	Insert- Valve Seat Exhaust				10
F6TE	6065	BA	F6AZ	6065	BA	Bolt - Cylinder Head M11 X 1.5 X 213.5 Hex Flange Head				24
	N807834	S	F6AZ	6L293	AA	Bolt - Cam Caps M6 X 1.0 X 42.5 Hex Flange				26
	N808777	S		N808777	S2	Bolt - Cap Balance Shaft M6 X 1.0 X 84.5				6
F65E	6C501	AA	F6DZ	6C501	A	Adjuster Asy. - Valve Lash				20
XL3E	6505	BA	XL3Z	6505	BA	Valve - Exhaust				10
XL3E	6507	BA	XL3Z	6507	BA	Valve - Intake				10
F2AE	6510	AA	F5AZ	6510	A	Guide - Intake & Exhaust Valve Std.				20
XL3E	6513	AC	XL3Z	6513	AA	Spring - Valve				20
F6LE	6514	AC	F6AZ	6514	AC	Retainer - Valve Spring				20
F1AE	6518	BA	F1AZ	6518	A	Key - Valve Spring				40
F6TE	6529	AB	F8AZ	6564	AA	Arm - Valve Rocker				20
F65E	6A517	AA	F6AZ	6571	AA	Seal - Valve Stem				20
XL3E	12405	BA	AGSF	22F	M1	Spark Plug (Platinum) .044 Gap				10
	87836	S101		87836	S101	Plug - Pipe 1/8-27 Socket Hex				2
CAMSHAFT, ROCKER ARM COVER & RELATED PARTS										
YC2E	6250	A8B	YC2Z	6250	AA	Camshaft RH				1
YC2E	6A274	A8C	YC2Z	6250	BA	Camshaft LH				1
F8AE	6256	AA	F8AZ	6256	AA	Sprocket - Camshaft RH				1
F8AE	6256	BA	F8AZ	6256	BA	Sprocket - Camshaft LH				1
F4AE	6265	AA	F3AZ	6265	A	Spacer - Camshaft Sprocket RH				1
	N806164	S	F1AZ	6278	A	Washer - Camshaft 13.5 X 48.5 X 5.3 Flat Hardened				2
F7UE	6A303	BD	F7UZ	6A303	BA	Gear - Balance Shaft (On Camshaft)				1
F7UE	6A304	BC	F7UZ	6A304	BC	Gear - Balance Shaft Drive (On Balance Shaft - PIA 6A311)				1
F7UE	6A305	AE	F7UZ	6A311	AE	Shaft & Gear Asy. - Balance				1
F7UE	6C324	PA	F7UZ	6C324	PA	Connector & Hose Asy. - PCV (Includes 6C659, 6A666)				1
F7UE	6C659	AA	F7UZ	6C659	AA	Insulator - PCV Tube (PIA 6C324)				1
F57E	6A666	B2A	F75Z	6A666	BA	Valve Asy. - PCV (PIA 6C324)				1
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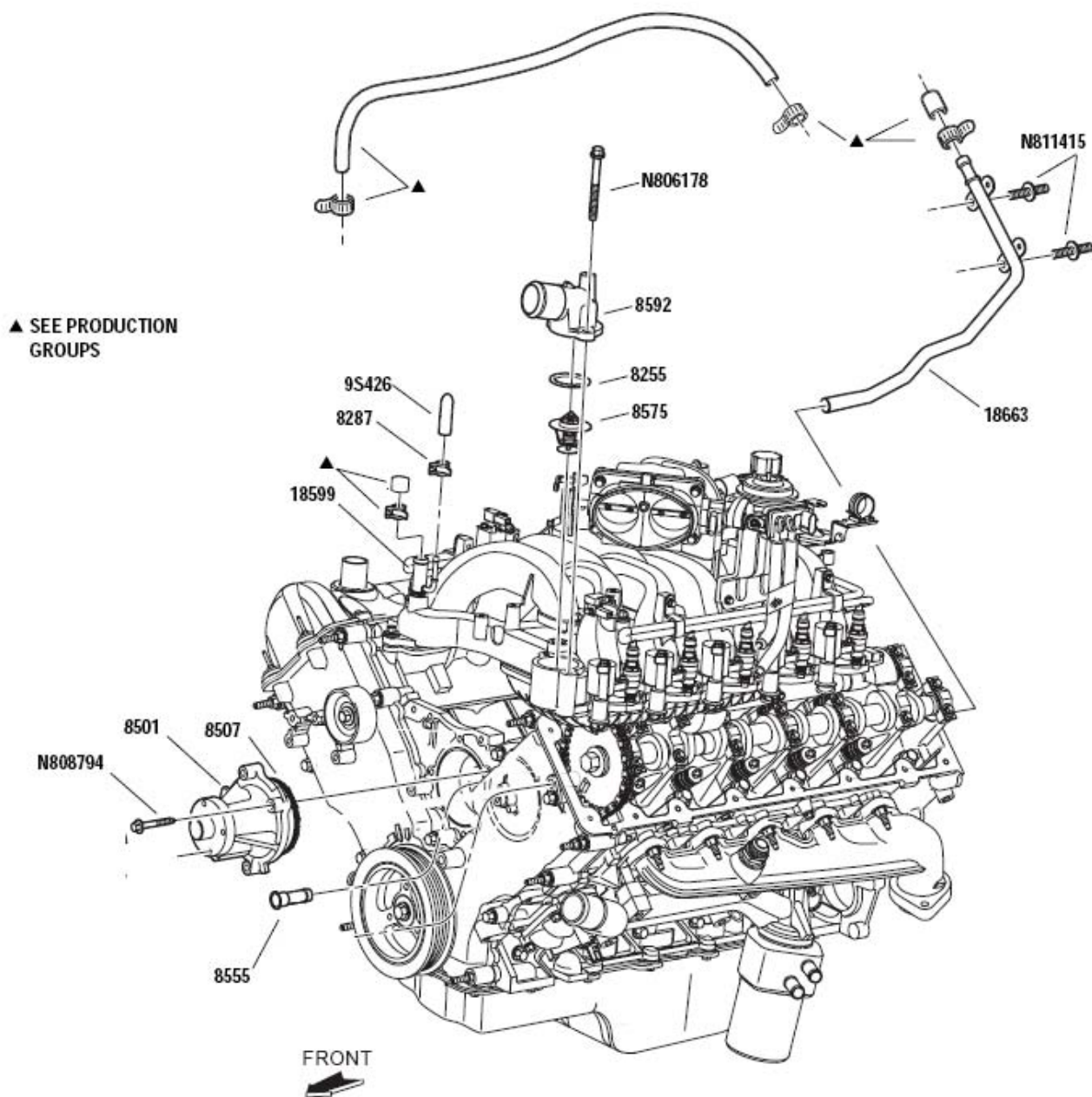




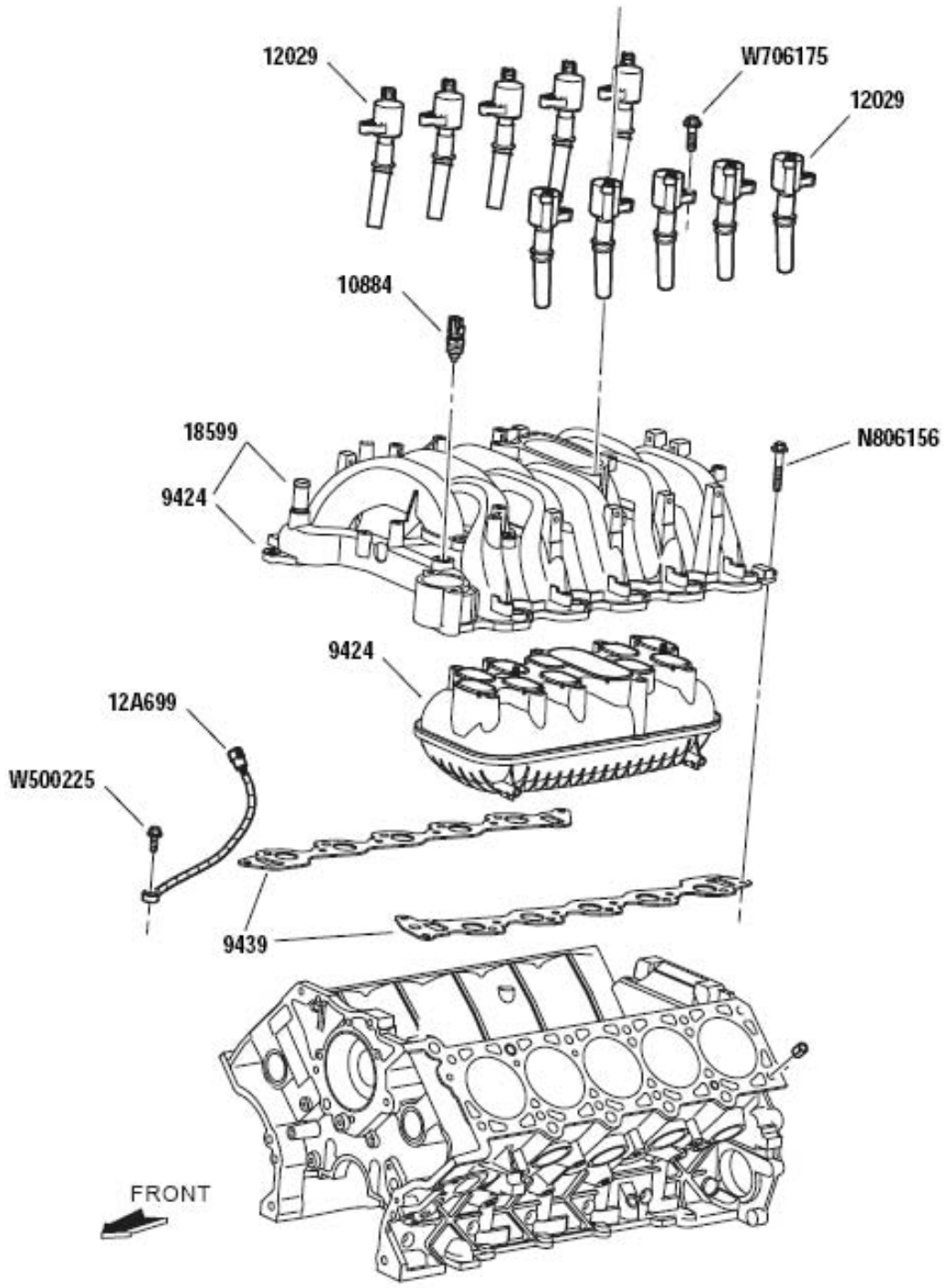
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WSG-1068 415 CID DRY FUEL									
ENGINEERING PART NUMBER			SERVICE PART NUMBER			DESCRIPTION	ENGINE CODE		
REF. NO.			REF. NO.				0C 680 AA	QTY.	
						ENGINE - FRONT			
						FRONT COVER & TIMING CHAIN			
F85E	6C086	AA	F75Z	6019	BA	Cover & Gaskets Asy. - Front		1	
F75E	6D081	AA	F75Z	6020	AA	Gasket - Cover LH		1	
F75E	6D081	BA	F75Z	6020	BA	Gasket - Cover Center		1	
F75E	6D081	CA	F75Z	6020	CA	Gasket - Cover RH		1	
F81E	6K255	AC	F85Z	6K255	AA	Arm - Timing Chain Tensioner RH		1	
F75E	6M256	AA	F7TZ	6M256	AA	Guide - Timing Chain RH		1	
F81E	6M269	AA	F6AZ	6L266	CA	Tensioner - Timing Chain LH		1	
F81E	6L266	AA	F6AZ	6L266	DA	Tensioner - Timing Chain RH		1	
F6TE	6268	AA	F6TZ	6268	AA	Chain - Timing		2	
F81E	6M274	AB	F85Z	6M274	AA	Arm - Timing Chain Tensioner LH		1	
F75E	6B274	AA	F7TZ	6K297	AA	Guide - Timing Chain LH		1	
XL3E	6306	BA	XL3Z	6306	BA	Sprocket - Crankshaft		1	
XW4E	6700	AA	XW4Z	6700	AA	Seal - Crankshaft Front		1	
F7TE	12A227	BA	F7TZ	12A227	BA	Ring - Ignition Pulse Crankshaft Sensor		1	
	N605892	S		N605892	S21	Bolt - Timing Chain Guides (1-LH, 2-RH) M6 X 1.0 X 22.5		3	
	N606527	S2		N606527	S2	Bolt - Timing Chain Guide LH M6 X 1.0 X67.5 Hex		1	
	N606543	S2		N606543	S	Bolt - Timing Chain Tensioners M8 X 1.25 X 53 Hex		4	
	N806177	S309		N806177	S2	Bolt- Front Cover M8 X 1.25 X 53 Hex		5	
	N808140	S309		N808140	S309	Stud & Washer - Front Cover M10 X 1.5 / M8 X 1.25 X107.6 Hex		5	
	N808142	S309		N808142	S309	Screw & Washer - Front Cover M10 X 1.5 X 57.5 Hex		3	
	N808529	S309		N808529	S309	Stud - Front cover M10 X 1.5 X 1.5 X 103.1 Hex		2	
						PULLEYS & TENSIONERS			
YC2E	6316	A4A	YC2Z	6312	AA	Damper Asy. - Crankshaft		1	
	N806139	S301	F1AZ	6A340	A	Bolt - Crankshaft Damper M12 X 1.5 X 52.5 Hex		1	
	N806165	S2	F1AZ	6378	A	Washer - Crankshaft Damper 13.5 X 39.5 X 7.35 Flat Hardened		1	
F65E	19A216	AA	F65Z	8678	AAA	Tensioner - Drive Belt		1	
	N808102	S309		N808102	S309	Bolt & Washer - Tensioner M8 X 1.25 X 28 Hex		1	
						SENSORS			
XR9E	6B288	AA	XC3Z	6B288	AA	Sensor Asy. - Camshaft Position		1	
F1AE	6C315	CB	F1AZ	6C315	A	Sensor Asy. - Crankshaft		1	
	N806155	S309		N806155	S309	Screw & Washer - Sensors M6 X 1.0 X 27.5 Hex		2	

COOLING SYSTEM



INTAKE & IGNITION SYSTEM



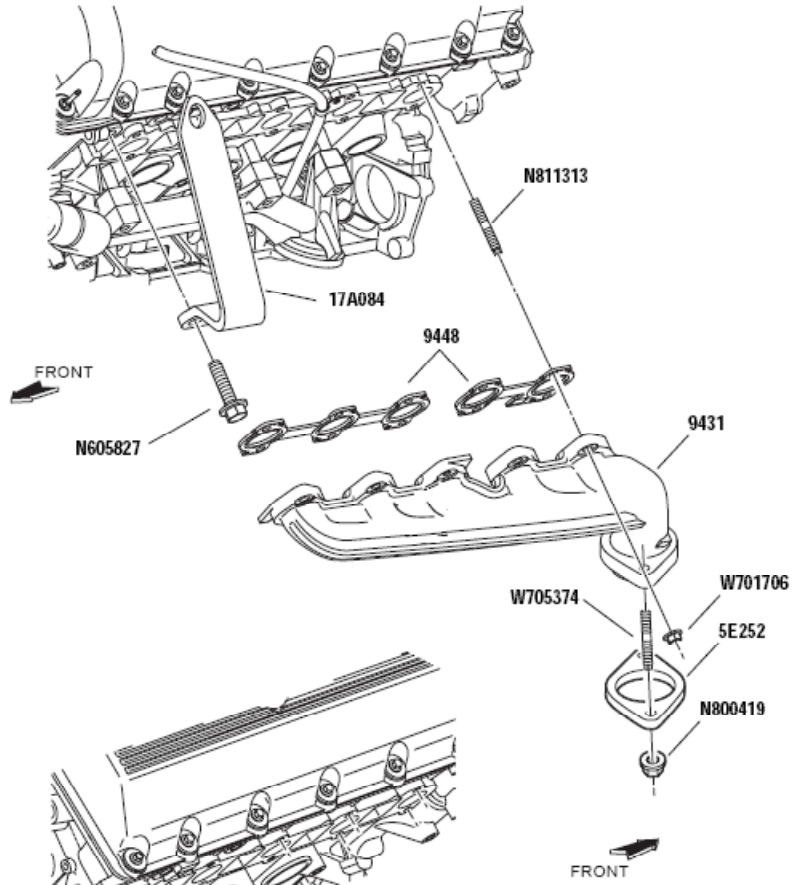
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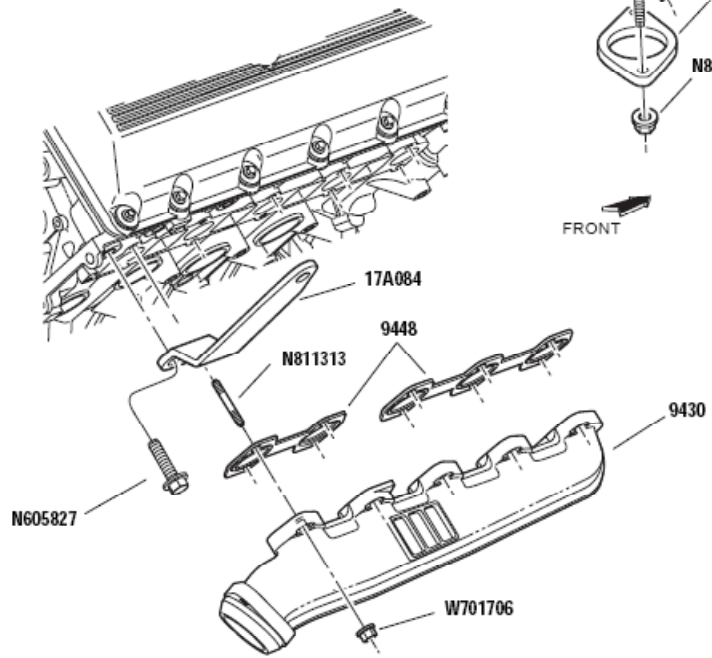
						WSG-1068 415 CID DRY FUEL				
ENGINEERING PART NUMBER			SERVICE PART NUMBER			DESCRIPTION			ENGINE CODE	
						INTAKE & IGNITION SYSTEM MANIFOLD - INTAKE & RELATED PARTS			OC 680 AA	
REF. NO.			REF. NO.						QTY.	
YC2E	9424	FA	YC2Z	9424	BA	Manifold Asy. - Intake Upper			1	
YC2E	9J447	AB	YC2Z	9424	AA	Manifold - Intake Lower			1	
YC2E	9439	AA	YC2Z	9439	AA	Gasket - Intake Manifold to Cyl. Head			2	
YC2E	8A500	AB	YC2Z	9S426	AB	Cap - Tube, 1/4" Intake Manifold Heater Inlet (Front, PIA 9424)			1	
F65F	10884	AA	F65Z	10884	AA	Sender Asy. - Water Temp. Indicator			1	
XL1E	9N438	BA	XL1Z	18599	BA	Tube - Intake Manifold Heater Inlet (PIA 9424)			1	
	N806156	S309		N806156	S309	Bolt - Upper Intake to Cylinder Block M8 X 1.25 X 43mm			11	
						IGNITION (Coil on Plug)				
F7TU	12A366	CD	F7TZ	12029	CC	Coil & Boot Asy. - Ignition			10	
XL3F	12A699	AA	XL3Z	12A699	AA	Sensor - Engine Knock			1	
	W500225	S309		W500225	S309	Screw - Knock Sensor M8 X 30 Hex			1	
	W706175	S309		W706175	S309	Bolt - Coil on Plug M5 X 25 Hex			10	

EXHAUST COMPONENTS & LIFTING EYES

LEFT HAND
VIEW



RIGHT HAND
VIEW

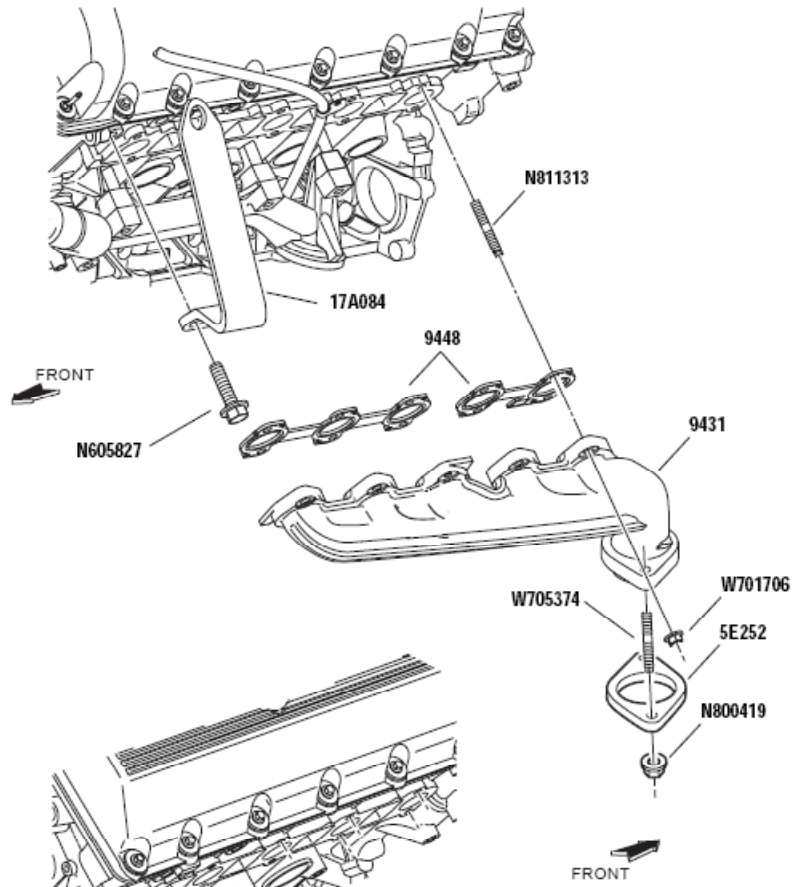


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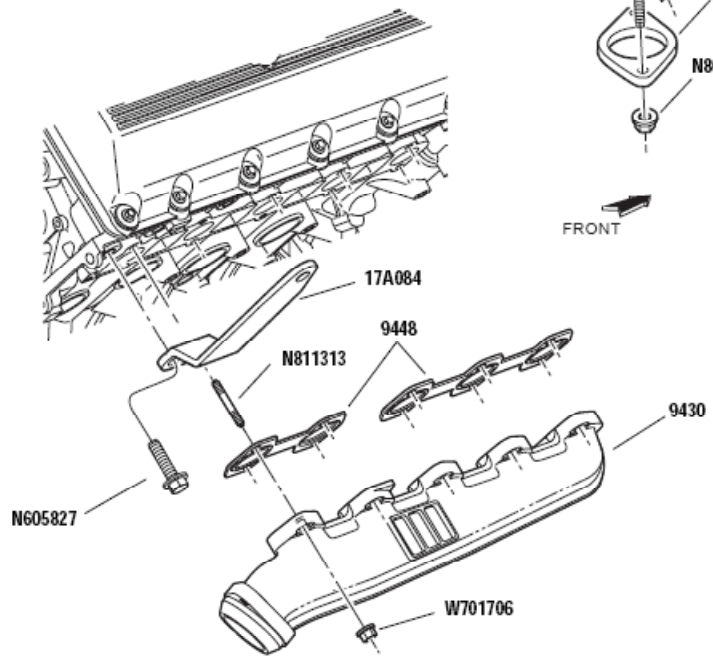
ENGINEERING PART NUMBER			SERVICE PART NUMBER			BUILD SEQ.	DESCRIPTION	ENGINE CODE
REF. NO.			REF. NO.				PRODUCTION GROUPS EXHAUST COMPONENTS & LIFTING EYES	0C 680 AA
							HH-002-001 Exhaust Manifold (Stainless Steel) Rear or Front Discharge	QTY.
	N811313	S431		N811313	S431	10	Stud - M8 X 19 + M8 X 21.7 Hex Point Attach N811313 to Cylinder Head Qty. (10) per side. TORQUE: 10-13 Nm	20
YC2E	9Y430	AA	YC2Z	9448	AA	20	Gasket - Exhaust Manifold (3-Port) Fit 9448-AA over N811313 Studs, Qty.(1) per side.	2
YC2E	9Y431	AA	YC2Z	9448	BA	30	Gasket - Exhaust Manifold (2-Port) Fit 9448-BA over N811313 Studs, Qty.(1) per side.	2
YC2E	9430	A9D	YC2Z	9430	AA	40	Manifold - Exhaust Right Hand (RH) Fit 9430 to RH Cylinder Head 6049	1
YC2E	9431	A9D	YC2E	9431	A9D	50	Manifold - Exhaust Left Hand (LH) Fit 9431 to LH Cylinder Head 6050	1
	W701706	S2		W701706	S2	60	Nut - M8 X 1.25 Hex Flange Attach W701706 to N811313, Qty(10) per side. TORQUE: 23-27 Nm	20
							HH-002-002 Exhaust Manifold (Stainless Steel) Rear Discharge: RH Downward, LH Upward	
	N811313	S431		N811313	S431	10	Stud - M8 X 19 + M8 X 21.7 Hex Point Attach N811313 to Cylinder Head Qty. (10) per side. TORQUE: 10-13 Nm	20
YC2E	9Y430	AA	YC2Z	9448	AA	20	Gasket - Exhaust Manifold (3-Port) Fit 9448-AA over N811313 Studs, Qty.(1) per side.	2
YC2E	9Y431	AA	YC2Z	9448	BA	30	Gasket - Exhaust Manifold (2-Port) Fit 9448-BA over N811313 Studs, Qty.(1) per side.	2
YC2E	9430	A9D	YC2Z	9430	AA	40	Manifold - Exhaust RH & LH Fit 9430 to RH & LH Cylinder Head	2
	W701706	S2		W701706	S2	60	Nut - M8 X 1.25 Hex Flange Attach W701706 to N811313, Qty(10) per side. TORQUE: 23-27 Nm	20
							HH-050-001 Lifting Eyes	
XU1L	17A084	AA	XU1L	17A084	AA	10	Lift Eyes	2
	N605827	S426		N605827	S426	20	Bolt - M14 X 2.0 X 35 Attach 17A084 to Cyl. Head TORQUE: 108-155 Nm	4
							More>	

EXHAUST COMPONENTS & LIFTING EYES

LEFT HAND
VIEW



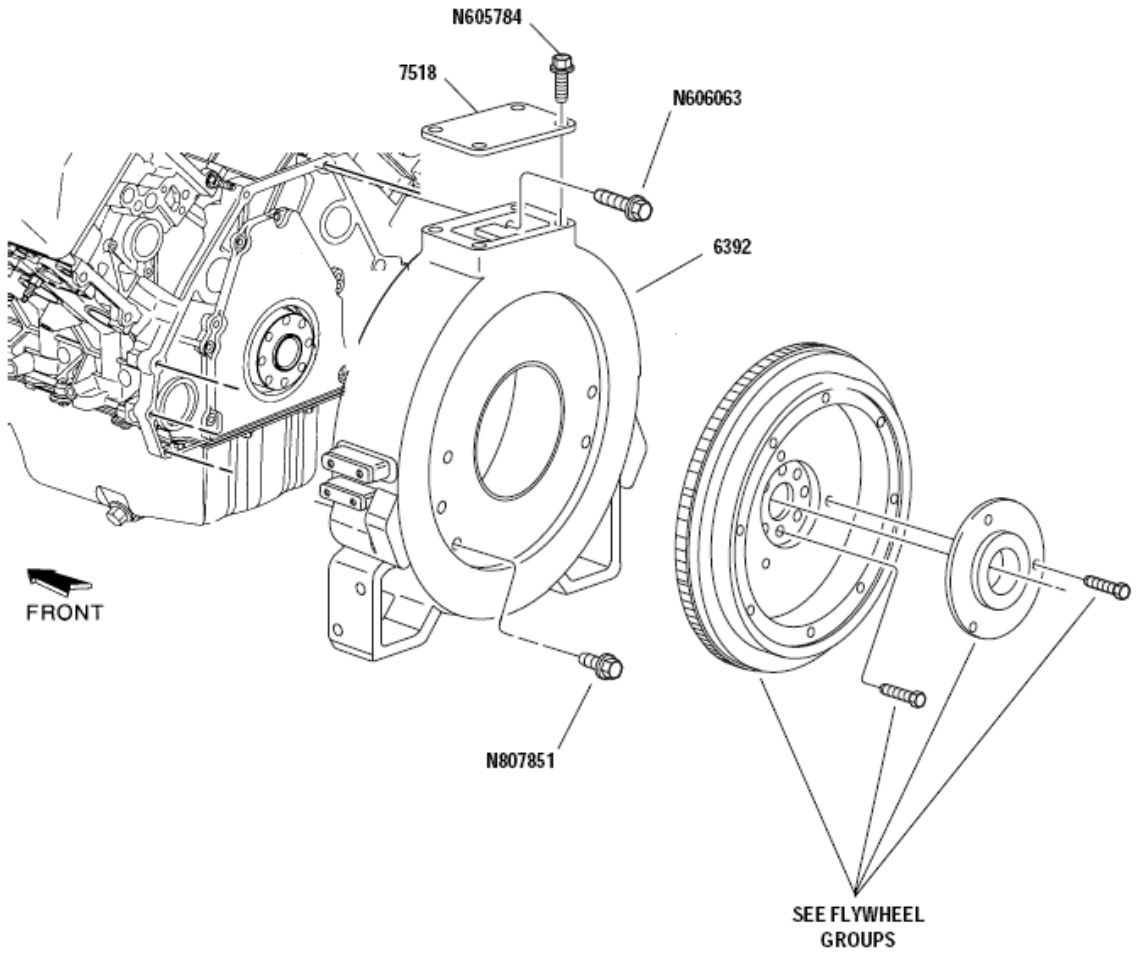
RIGHT HAND
VIEW



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WSG-1068 415 CID DRY FUEL										
ENGINEERING PART NUMBER			SERVICE PART NUMBER			BUILD SEQ.	DESCRIPTION	ENGINE CODE		
REF. NO.			REF. NO.				PRODUCTION GROUPS EXHAUST COMPONENTS & LIFTING EYES		0C 680 AA	
							HH-104-001 Flange - Exhaust Manifold	QTY.		
	W705374	S901		W705374	S901	10	Stud - M10 X 53 + M10 X 15 Thread W705374 into Exhaust manifold casting flange		4	
YU1L	5E252	AA	YU1L	5E252	AA	20	Flange - Exhaust Pipe		2	
	N800419	S301		N800419	S301	30	Nut - M10 X 1.5 Attach 5E252 to Exhaust manifold studs.		4	

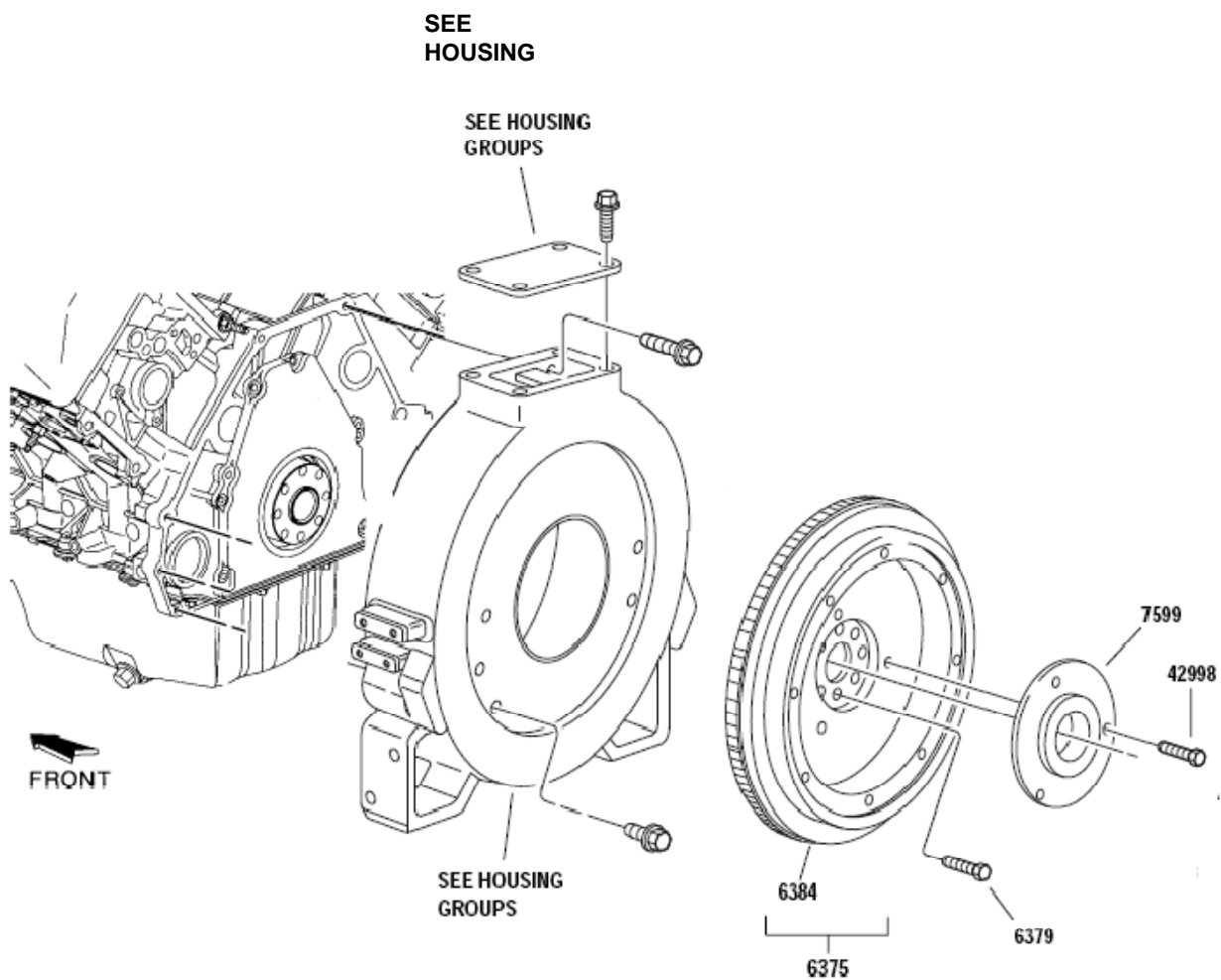
FLYWHEEL HOUSING SAE #3



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415 CID
DRY FUEL

ENGINEERING PART NUMBER			SERVICE PART NUMBER			BUILD SEQ.	DESCRIPTION	ENGINE CODE
REF. NO.			REF. NO.				PRODUCTION GROUPS FLYWHEEL HOUSING SAE #3	OC 680 AA
								QTY.
HH-006-001 With Feet & Side Pads								
F8JL	6392	DF	F8JL	6392	DF	10	Housing - Flywheel SAE#3	1
	N807851	S60		N807851	S60	20	Bolt - Hex Flange Head M10 X 1.5 X 30 Attach 6392 to Cylinder Block Assy. Torque: 47.5 - 7.2 Nm	3
	N606063	S427		N606063	S427	30	Bolt - Hex Flange Head M10 X 1.5 X 55 Attach 6392 to Cylinder Block Assy. Top 2 & 2 Doweled Holes Torque: 47.5 - 7.2 Nm	4
C5JZ	7518	A	C5JZ	7518	A	40	Cover - Inspection Hole	1
	N605784	S309		N605784	S309	50	Bolt - Hex Flange head M8 X 1.25 X 14 Attach 7518 to 6392	4
HH-006-002 Without Feet, With Side Pads								
F8JL	6392	JE	F8JL	6392	JE	10	Housing - Flywheel SAE#3	1
	N807851	S60		N807851	S60	20	Bolt - Hex Flange Head M10 X 1.5 X 30 Attach 6392 to Cylinder Block Assy. Top 2 & 2 Doweled Holes Torque: 47.5 - 7.2 Nm	3
	N606063	S427		N606063	S427	30	Bolt - Hex Flange Head M10 X 1.5 X 55 Attach 6392 to Cylinder Block Assy. Torque: 47.5 - 7.2 Nm	4
C5JZ	7518	A	C5JZ	7518	A	40	Cover - Inspection Hole	1
	N605784	S309		N605784	S309	50	Bolt - Hex Flange head M8 X 1.25 X 14 Attach 7518 to 6392	4
HH-006-003 With Feet, Less Side Pads								
Use for "Rear & Down" Exhaust Manifolds								
F8JL	6392	LA	F8JL	6392	LA	10	Housing - Flywheel SAE#3	1
	N807851	S60		N807851	S60	20	Bolt - Hex Flange Head M10 X 1.5 X 30 Attach 6392 to Cylinder Block Assy. Top 2 & 2 Doweled Holes Torque: 47.5 - 7.2 Nm	3
	N606063	S427		N606063	S427	30	Bolt - Hex Flange Head M10 X 1.5 X 55 Attach 6392 to Cylinder Block Assy. Torque: 47.5 - 7.2 Nm	4
C5JZ	7518	A	C5JZ	7518	A	40	Cover - Inspection Hole	1
	N605784	S309		N605784	S309	50	Bolt - Hex Flange head M8 X 1.25 X 14 Attach 7518 to 6392	4

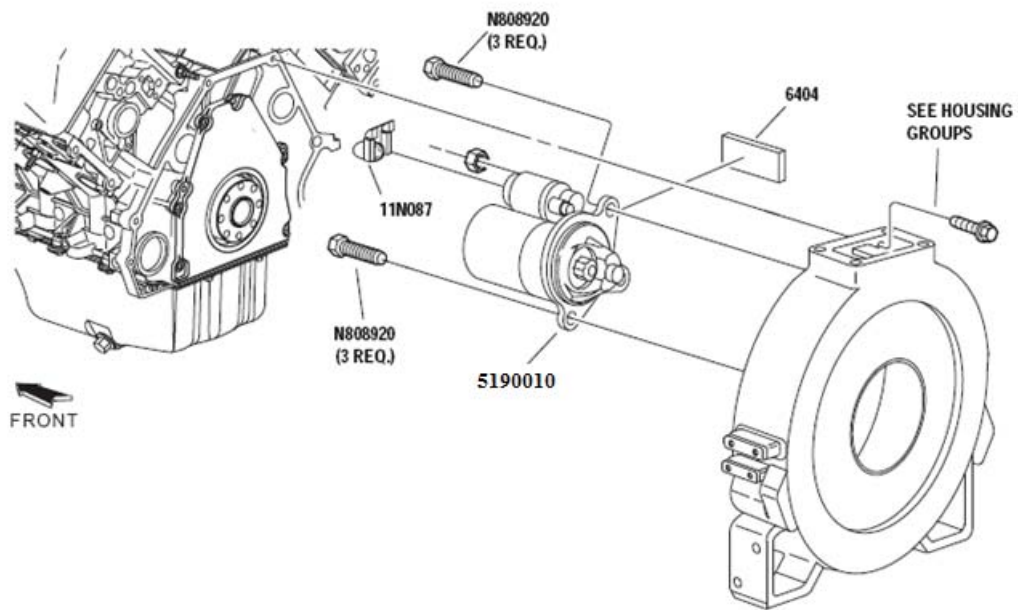


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415 CID
DRY FUEL

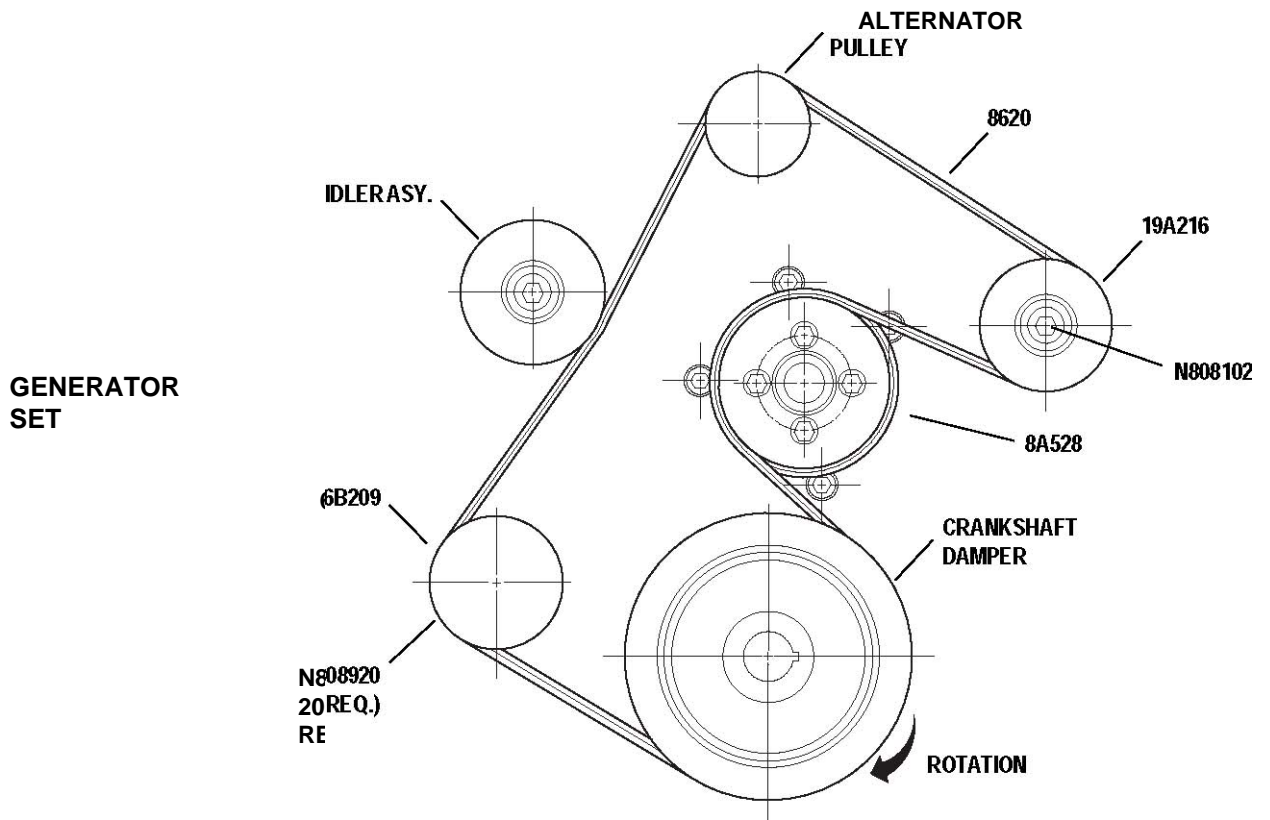
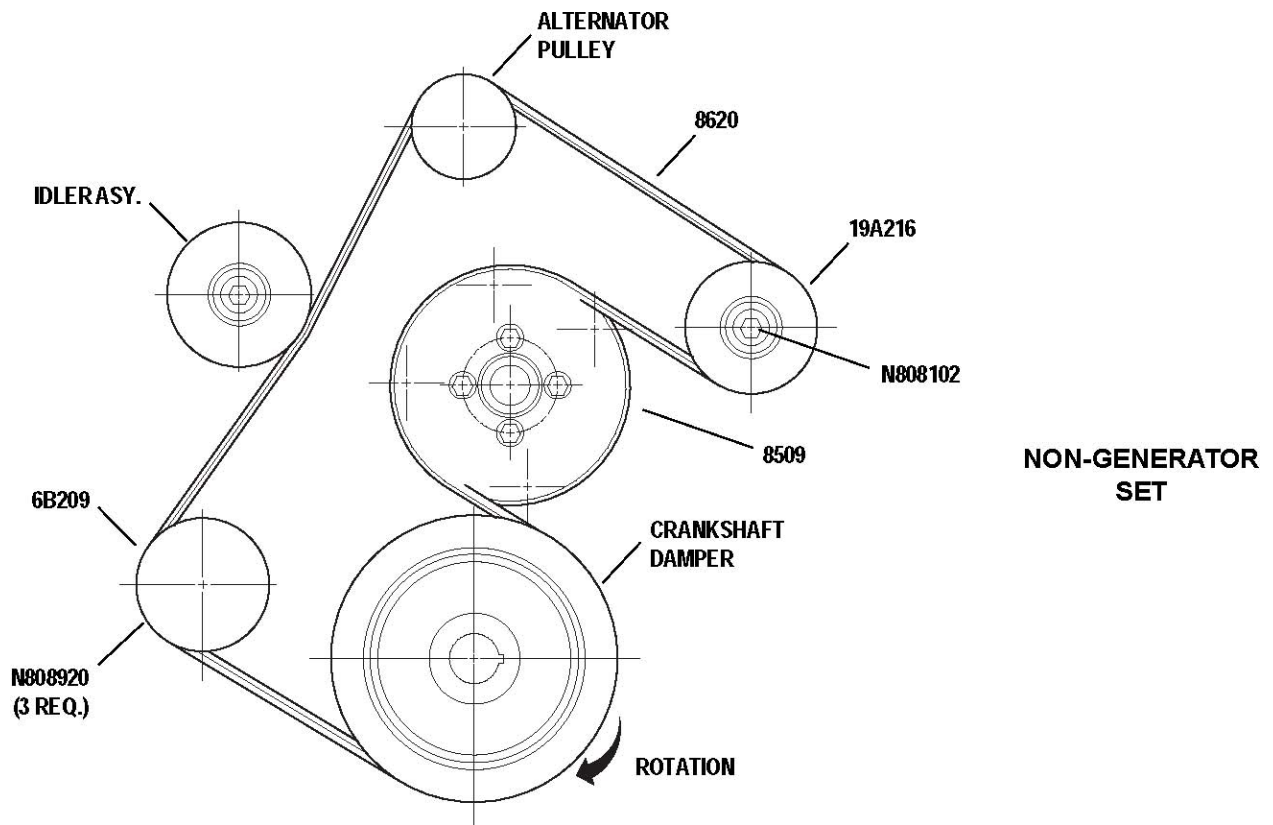
ENGINEERING PART NUMBER			SERVICE PART NUMBER			BUILD SEQ.	DESCRIPTION	ENGINE CODE	
REF. NO.			REF. NO.				PRODUCTION GROUPS FLYWHEEL	0C 680 AA	QTY.
							HH-007-002 Flat Face - 13" Spring-Loaded Clutch		
YU1L	6375	BA	YU1L	6375	BA	10	Flyw heel Asy. & Ring Gear		1
	N808139	S100	F6ZZ	6379	AA	20	Bolt - Locking Hex Head M10 X 1.0 X 26.5 Attach 6375 to 6303 Crankshaft Torque: 50-70 Ft-Lbs.		8
							HH-007-003 For 11.5" Over/Center Clutch		
XU1L	6375	CA	XU1L	6375	CA	10	Flyw heel Asy. & Ring Gear		1
C5JZ	7599	AA	C5JZ	7599	AA	20	Adaptor - Clutch Pilot Bearing		1
	42998	S36		42998	S36	30	Bolt - Hex Lock Head 3/8-16 X 1.0" Attach 6375 to 7599 Torque: 50-60 Ft-Lbs.		3
	N808139	S100	F6ZZ	6379	AA	40	Bolt - Locking Hex Head M10 X 1.0 X 26.5 Attach 6375 to 6303 Crankshaft Torque: 50-70 Ft-Lbs.		8
							ADDITIONAL SERVICE PARTS		
F6ZR	6384	AA	F6ZZ	6384	AA		Ring Gear - Flyw heel		1

STARTER MOTOR



N808920

FRONT END ACCESSORY DRIVE



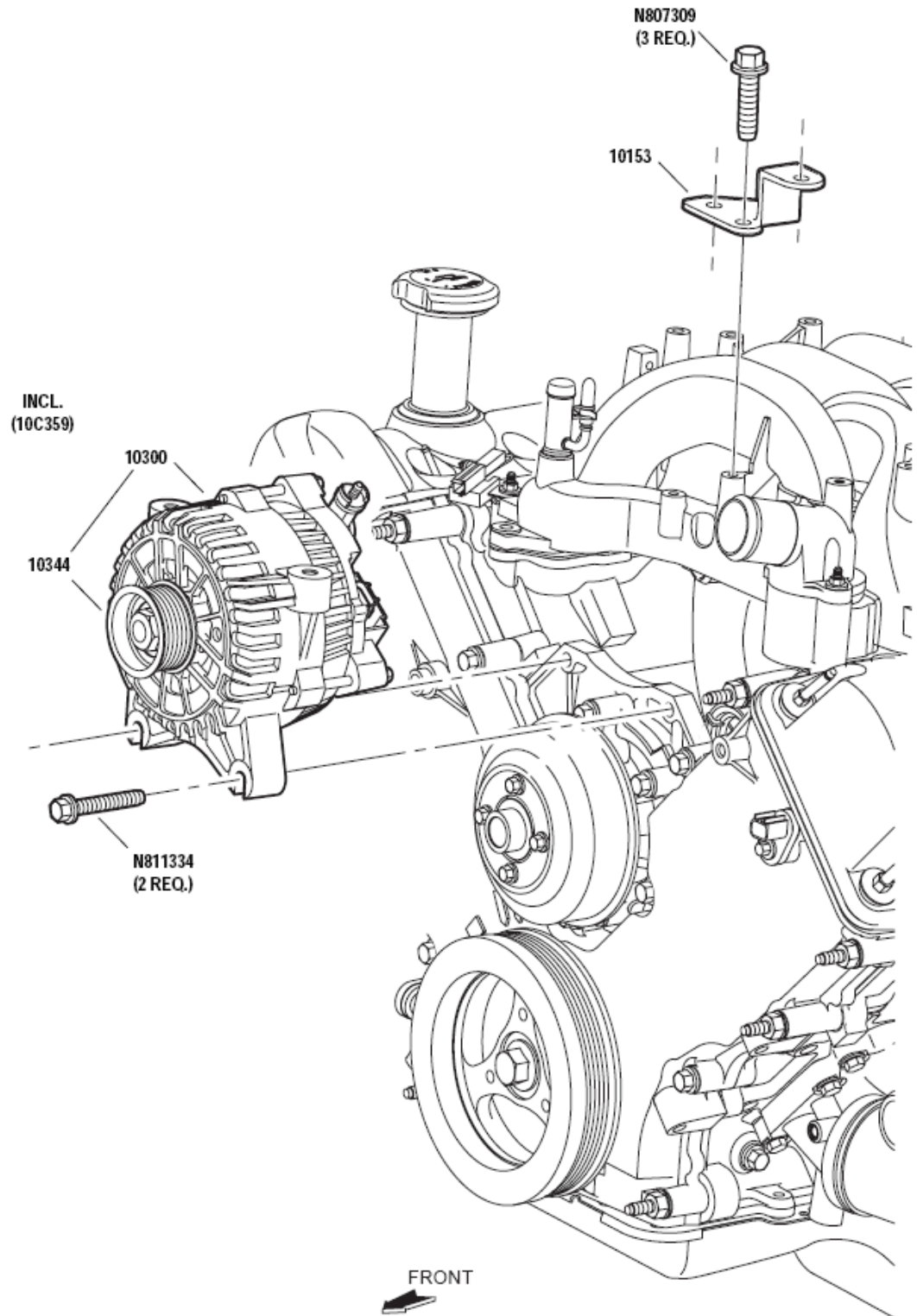
XIN010A

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DRY FUEL

ENGINEERING PART NUMBER			SERVICE PART NUMBER			BUILD SEQ.	DESCRIPTION	ENGINE CODE
REF. NO.			REF. NO.				PRODUCTION GROUPS FRONT END ACCESSORY DRIVE	OC 680 AA
								QTY.
HH-010-001 For Generator Set Applications								
XL3E	6B209	EA	F75Z	6B209	EA	10	Tensioner Asy.	1
	N808920	S309		N808920	S309	20	Bolt - Hex Flange Head M8 X 1.25 X 31 Attach 6B209 to Cylinder Block Torque: 25-6.8 Nm	3
XU1L	19A216	BA	XU1L	19A216	BA	30	Idler Asy.	1
	N808102	S309		N808102	S309	40	Bolt & Washer - Hex Flange Head M8 X 1.25 X 28 Attach 19A216 Idler to Cylinder Block Torque: 20-30 Nm	1
XU1L	8A528	AA	XU1L	8A528	AA	50	Pulley - Water Pump	1
	N806282	S309		N806282	S2	60	Screw & Washer - Water Pump Pulley M8 X 1.25 X 19.0 Attach 8A528 Pulley to Water Pump	4
XU1L	8620	AA	XU1L	8620	AA	70	Drive Belt - PolyVee 8-Groove	
NOTES:								
1. Wrap belt as indicated on all pulleys except water pump.								
2. With a 1/2" Drive, Wrench & leverage raise idler pulley to allow belt to slip over remaining water pump pulley.								
HH-010-002 For Non - Generator Set Applications								
XL3E	6B209	EA	F75Z	6B209	EA	10	Tensioner Asy.	1
	N808920	S309		N808920	S309	20	Bolt - Hex Flange Head M8 X 1.25 X 31 Attach 6B209 to Cylinder Block Torque: 25-6.8 Nm	3
XU1L	19A216	BA	XU1L	19A216	BA	30	Idler Asy.	1
	N808102	S309		N808102	S309	40	Bolt & Washer - Hex Flange Head M8 X 1.25 X 28 Attach 19A216 Idler to Cylinder Block Torque: 20-30 Nm	1
XC2E	8A528	AA	F7UZ	8509	AA	50	Pulley - Water Pump	1
	N806282	S309		N806282	S2	60	Screw & Washer - Water Pump Pulley M8 X 1.25 X 19.0 Attach 8509 Pulley to Water Pump	4
XU1L	8620	BA	XU1L	8620	BA	70	Drive Belt - PolyVee 8-Groove	
NOTES:								
1. Wrap belt as indicated on all pulleys except water pump.								
2. With a 1/2" Drive, Wrench & leverage raise idler pulley to allow belt to slip over remaining water pump pulley.								

ALTERNATOR

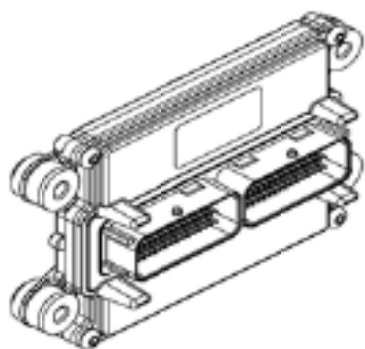


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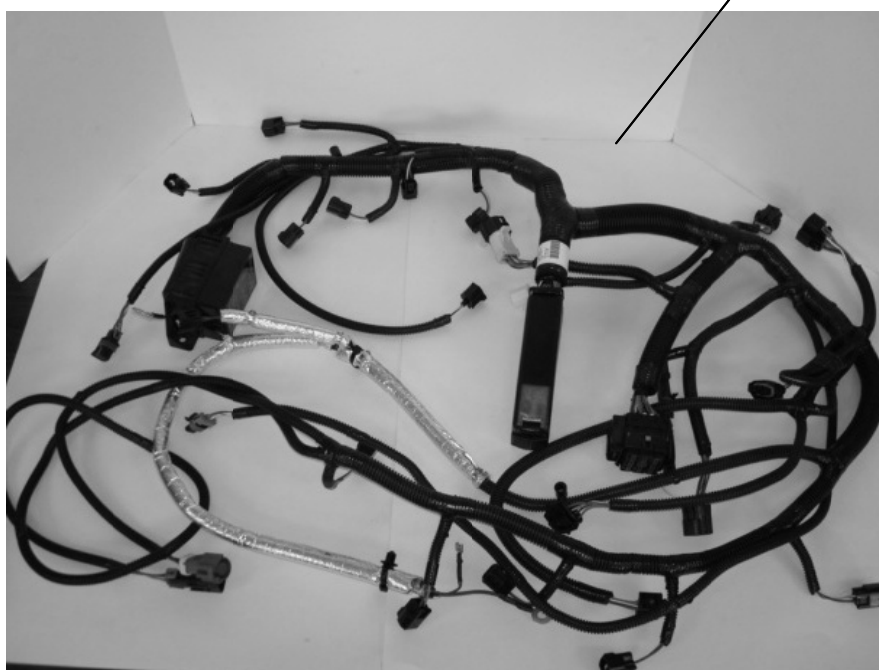
**WSG-1068
415 CID
DRY FUEL**

ENGINEERING PART NUMBER			SERVICE PART NUMBER			BUILD SEQ.	DESCRIPTION	ENGINE CODE
REF. NO.			REF. NO.				PRODUCTION GROUPS ALTERNATOR	0C 680 AA
							HH-011-001 (12V - 110 Amp)	QTY.
F85U	10300	BA	F85U	10300	BA	10	Alternator & Pulley Asy.	1
	N811334	S309		N811334	S309	20	Screw & Washer M8 X 1.25 X 59 Hex Head Attach 10300 to Cylinder block Torque: 25-3.8 Nm	2
F6TE	10153	DC	F6TZ	10153	DC	30	Bracket - Alternator Support	1
	N807309	S309		N807309	S309	40	Screw & Washer M6 X 1.0 X 24 Hex Head Attach 10153 to Cylinder Block Torque: 10.5-1.6 Nm	3
F5JL	10C307	AA	F5JL	10C307	AA	50	Wire Asy. - Alternator Attach 10C307 to Block fastening points & Alternator.	1
	N808585	S309		N808585	S309	60	Nut - Hex M6 X 1.0 Attach 10C307 to Alternator Positive lead.	1
							ADDITIONAL SERVICE PARTS	
F65U	10A352	A2A	F65Z	10344	AA		Pulley	1
F77U	10C359	AA	F77U	10C359	AA		Regulator & Brush Holder	1

GCP (ECU) & Harness



0011



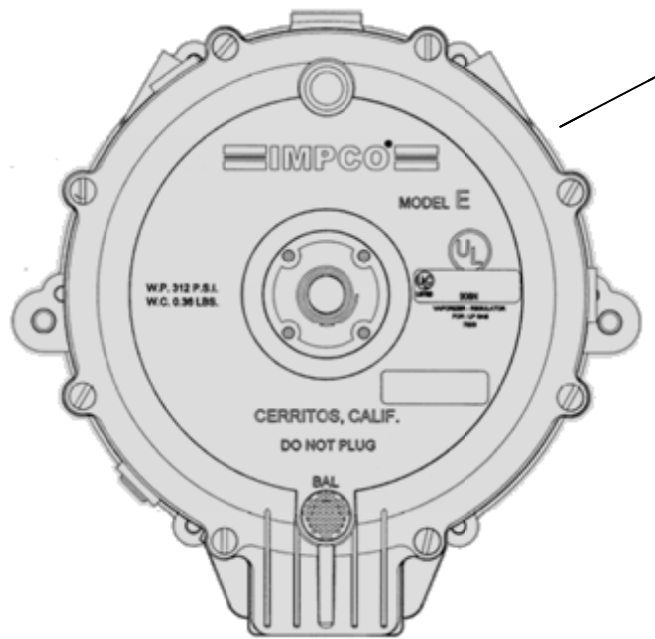
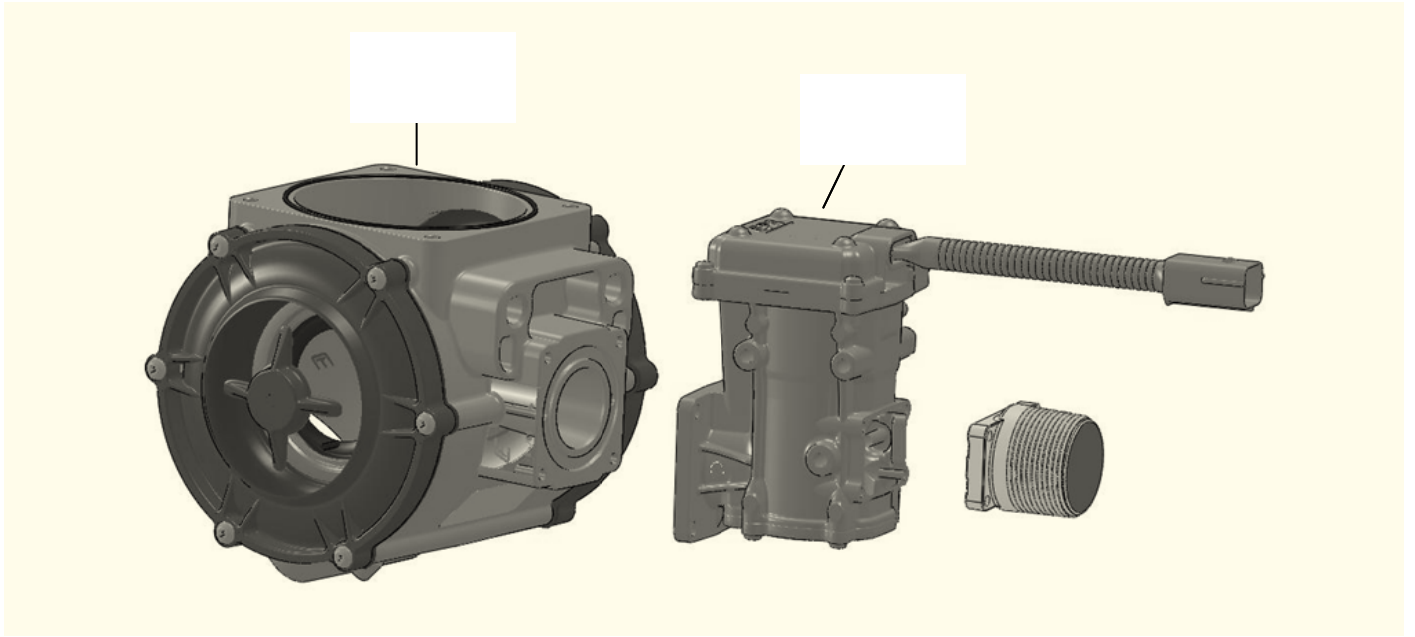
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**WSG-1068
415 CID
DRY FUEL**

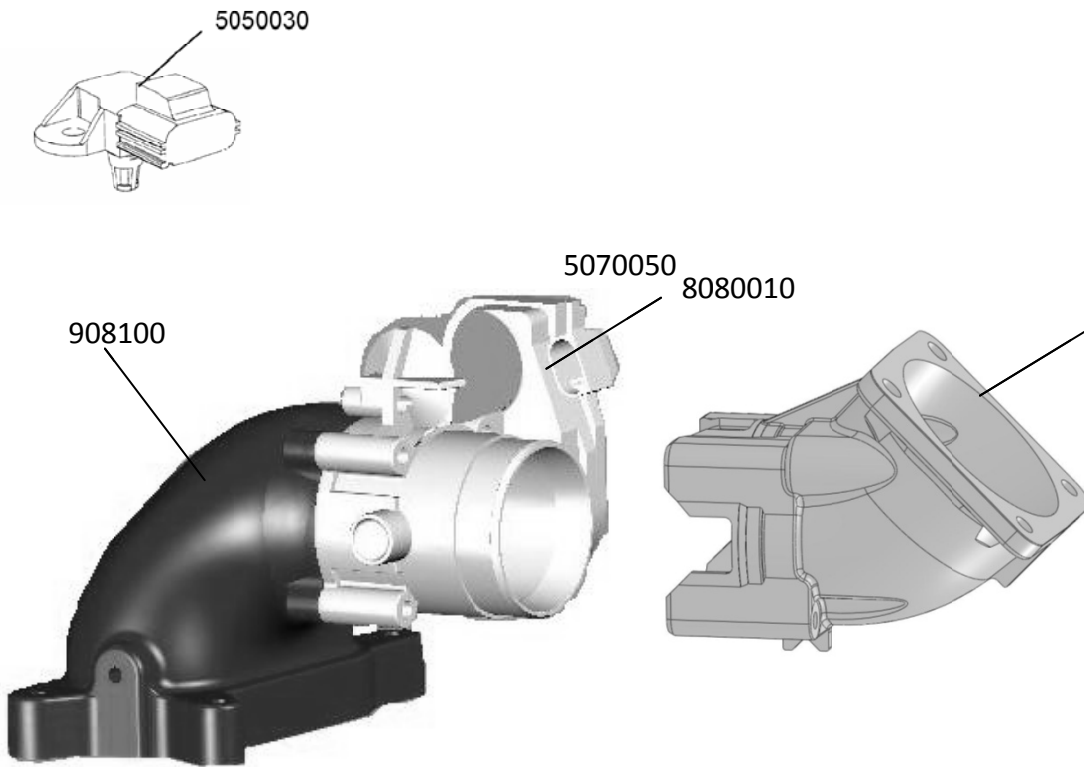
ENGINEERING PART NUMBER			SERVICE PART NUMBER			BUILD SEQ.	DESCRIPTION	ENGINE CODE	
REF. NO.			REF. NO.				PRODUCTION GROUPS IGNITION MODULE & HARNESS OIL LEVEL INDICATOR	0C	AA
						QTY.			
			5050011			10	GCP (ECU)		1
			5270030			20	Wire Harness		1
									1
							HH-026-001 Oil Level Tube		
XU1L	6K873	AA	XU1L	6K873	AA	10	Tube & Bracket Asy. - Oil Level		1
							NOTES: Attach with bolt from removed existing tube. Torque: 8-12 Nm Group required for upward discharge exhaust system.		

Mixer, DEPR and Vapor Regulator

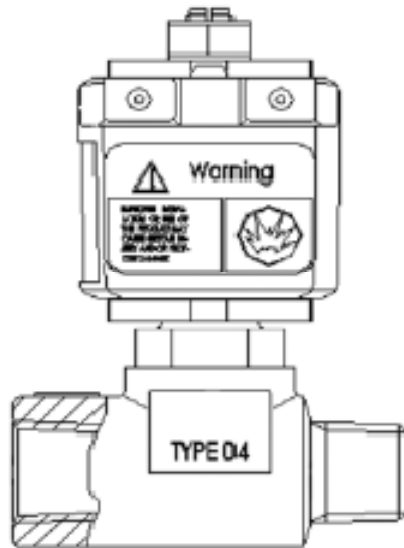


ENGINEERING PART NUMBER	SERVICE PART NUMBER	DESCRIPTION	QTY.
BASE NO.	BASE NO.		
	6680060	Mixer	1
	6680050	DEPR	1
	6680100	Fuel Inlet Adapter LPG	1
	6680110	Fuel Inlet Adapter NG	1
	6680030	Vapor Regulator(LPG)	1

Governor and Intake Adapters



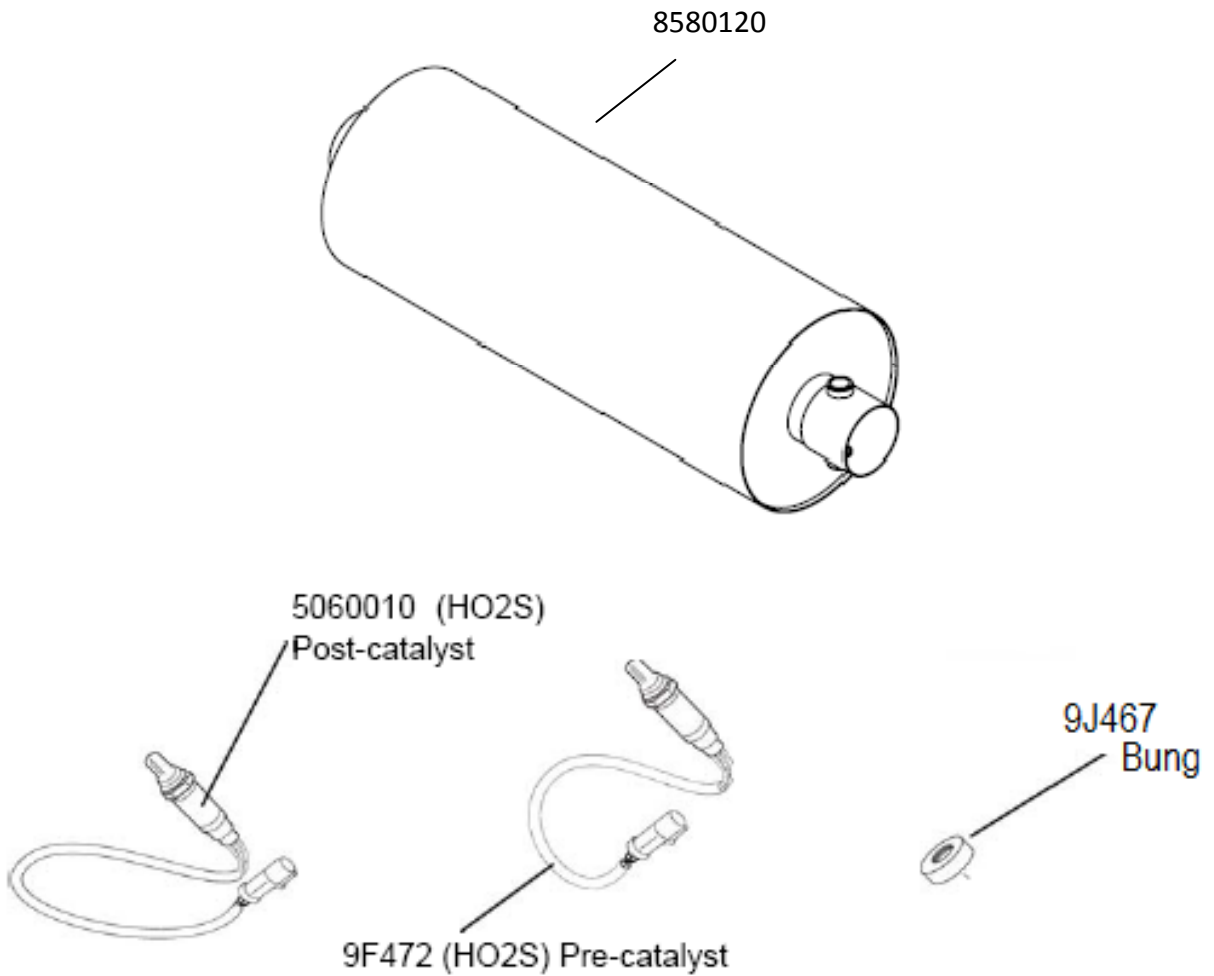
ENGINEERING PART NUMBER	SERVICE PART NUMBER	DESCRIPTION	QTY.
BASE NO.	BASE NO.		
	908100	90 degree Manifold / Governor Adapter	1
	5070050	Governor	1
	8080010	Governor / Mixer Adapter	1
	5050030	TMAP Sensor (Temperature Manifold Absolute Pressure)	1



Different models available, refer to table below.

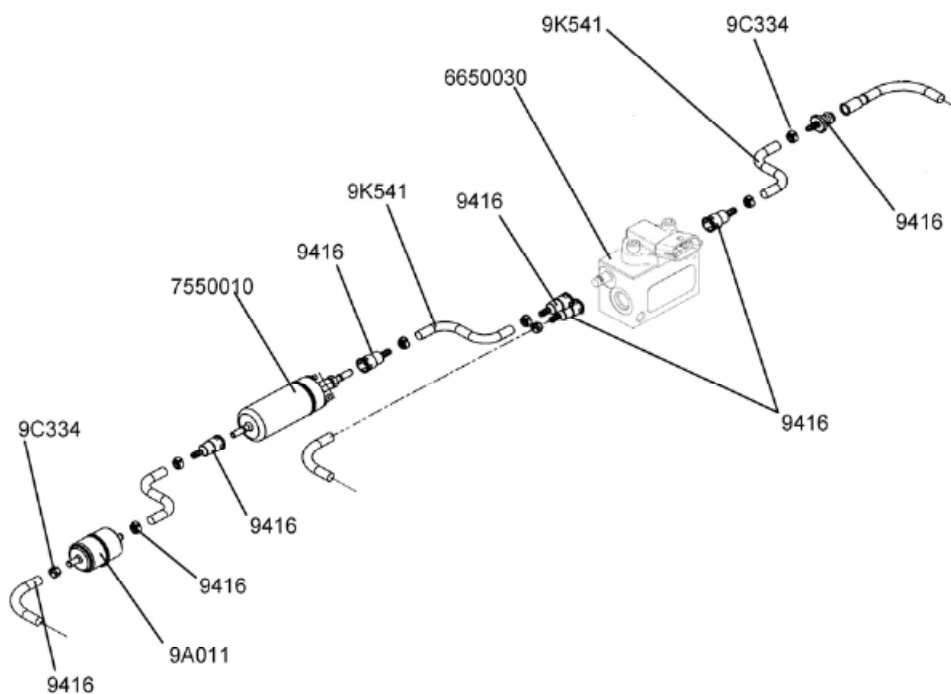
ENGINEERING PART NUMBER	SERVICE PART NUMBER	DESCRIPTION	QTY.
BASE NO.	BASE NO.		
	L-204	IMPCO 12V DC lockoff, no-filter	1
	FL-219	IMPCO 12V DC lockoff, filter	1
	N3-0343	NOLFF'S 12V DC lockoff, filter	1
	N3-01652	Woodward 12V DC lockoff	1
	8215B060	ASCO NG low pressure lockoff	1

Catalyst Muffler and Oxygen Sensors



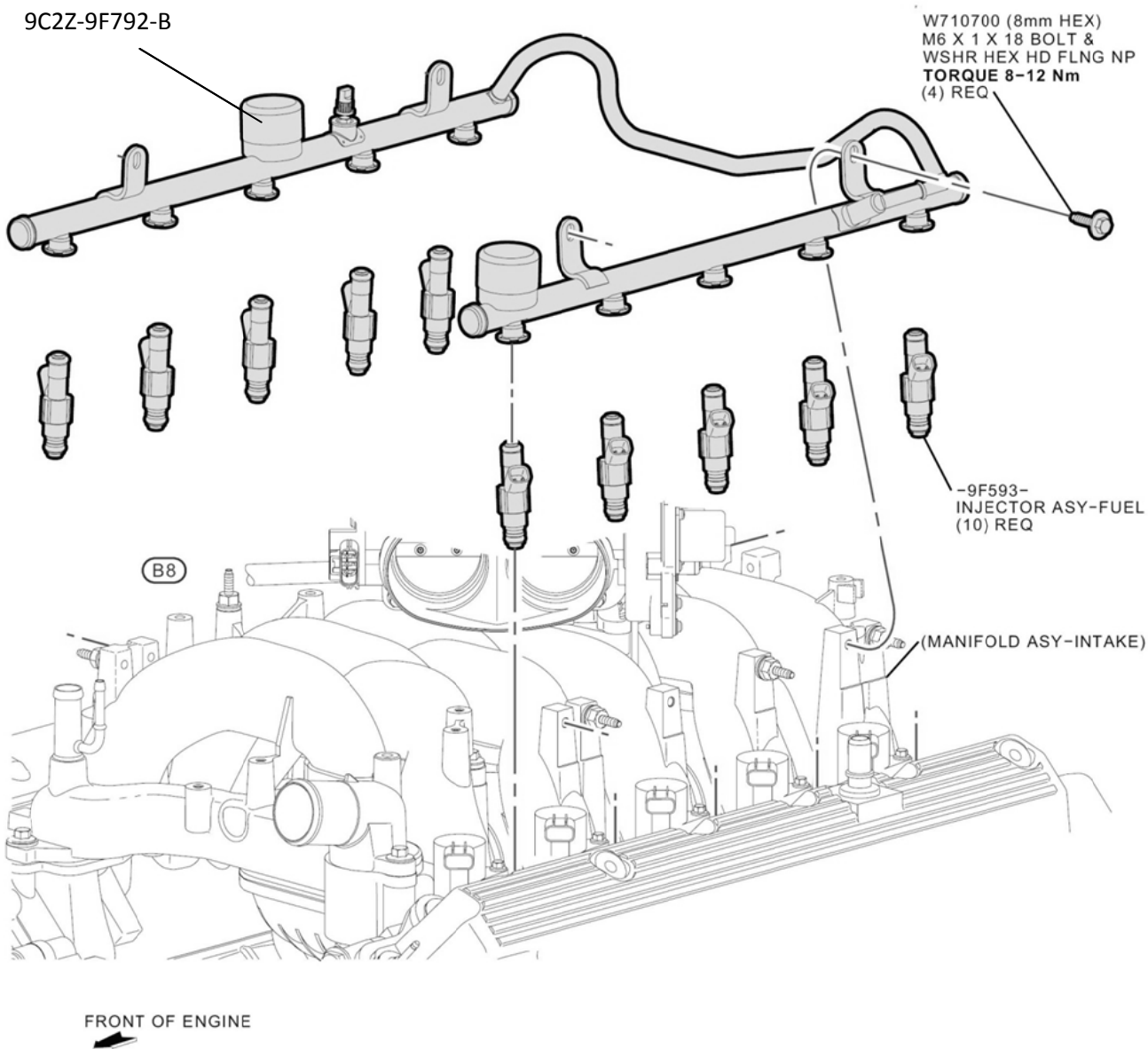
ENGINEERING PART NUMBER	SERVICE PART NUMBER	DESCRIPTION	QTY.
BASE NO.	BASE NO.	Exhaust Components	
	8580120	Catalyst Muffler	1
	F88Z-9F472-EA	HO2S Pre-Cat Sensor	1
	5060010	HO2S Post-Cat Sensor	1
	9J467	Cat-Muffler Bung	1

Fuel Pump, Block, and Lines



ENGINEERING PART NUMBER			SERVICE PART NUMBER			DESCRIPTION	QTY.
BASE NO.			BASE NO.			Fuel Pump - Electric	
	7550010			7550010			
	6650030			6650030		FUEL SENSOR ASSEMBLY	1
			205	0040		FUEL SENSOR FITTINGS	2
			205	0050		FUEL SENSOR FITTINGS	1
			526	0010		FUEL SENSOR HARNESS	1
			F89Z	9155	A	FILTER - FUEL TANK - 2007 AND LATER	1
F8JL	9A011	AA	F8JL	9A011	AA	FILTER - FUEL TANK - PRE 2007	1
F8JL	9K541	AA	F8JL	9K541	AA	TUBE - FUEL SUPPLY (cut to required length)	1
	N806207	S190		N806207	S190	CONNECTOR BODY 6.35HOSE X 14.1	1
	N806188	S190		N806188	S190	CONNECTOR ASY 9.52TUBEXB.35HOSE	2
F68A	9416	BA	F68A	9416	BA	ADAPTOR FUEL PUMP	8
F8JL	9C334	AA	F8JL	9C334	AA	CLAMP - FUEL TUBE	8
XU1L	9288	AA	XU1L	9288	AA	HOSE - LOW PRESSURE FUEL	1
E3FZ	9155	F	E3EE	9155	F4A	FILTER ASSY - FUEL	1

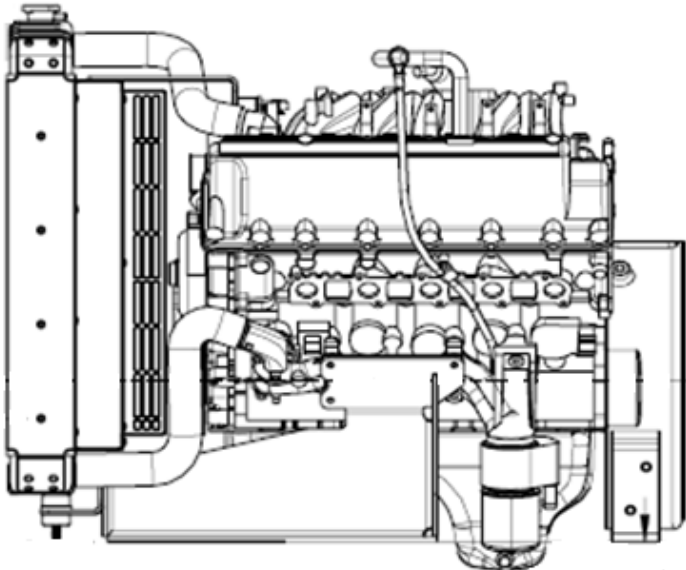
Fuel Rail and Injectors



ENGINEERING PART NUMBER	SERVICE PART NUMBER			DESCRIPTION	QTY.
BASE NO.	BASE NO.				
	9C2Z	9F792	B	Fuel Rail Assembly	1
	5W7Z	9F593	AA	Fuel Injectors	10
		5290010		Fuel Injector Harness	1

Radiator and Bell Housing

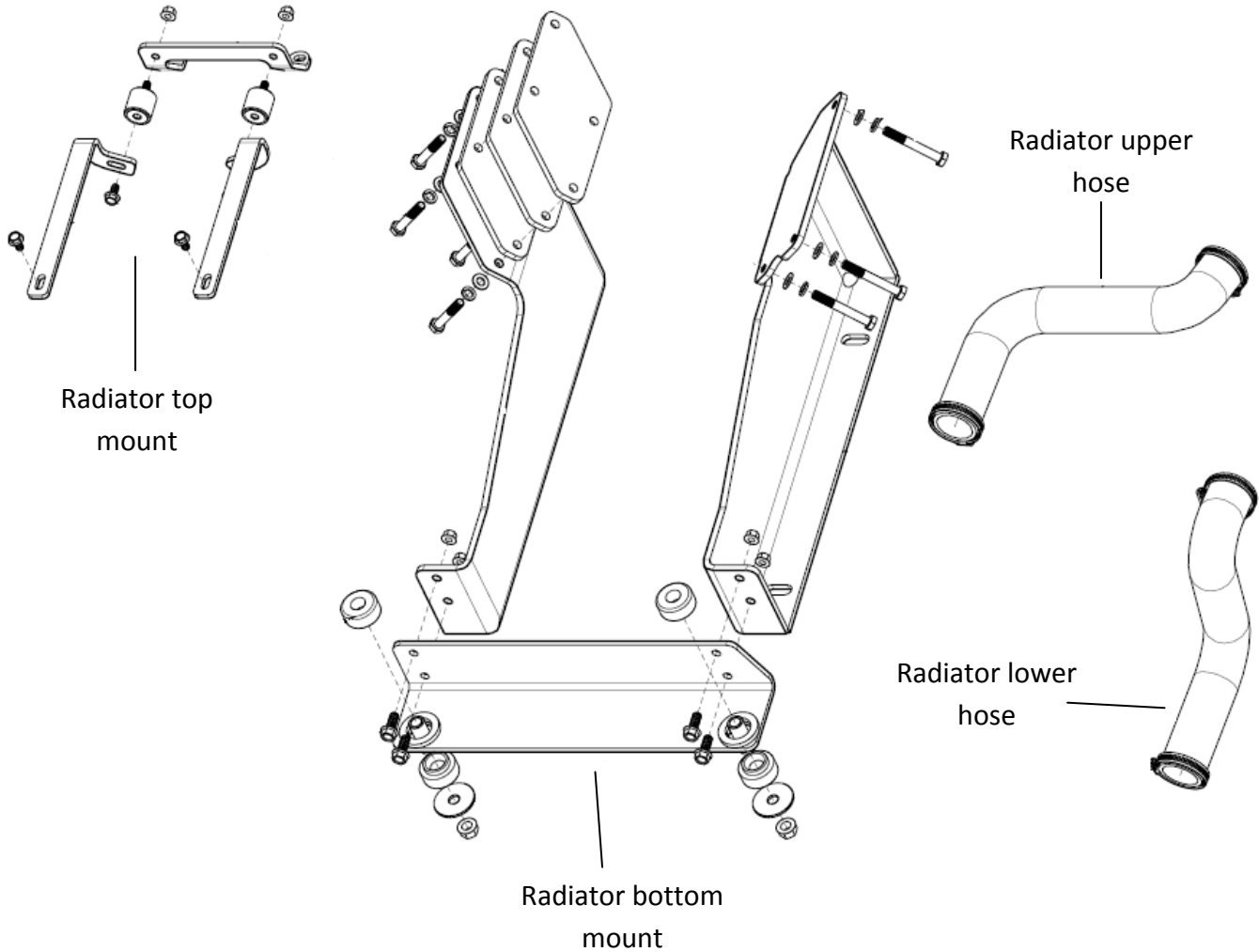
79000494



F8JL-6392-MA

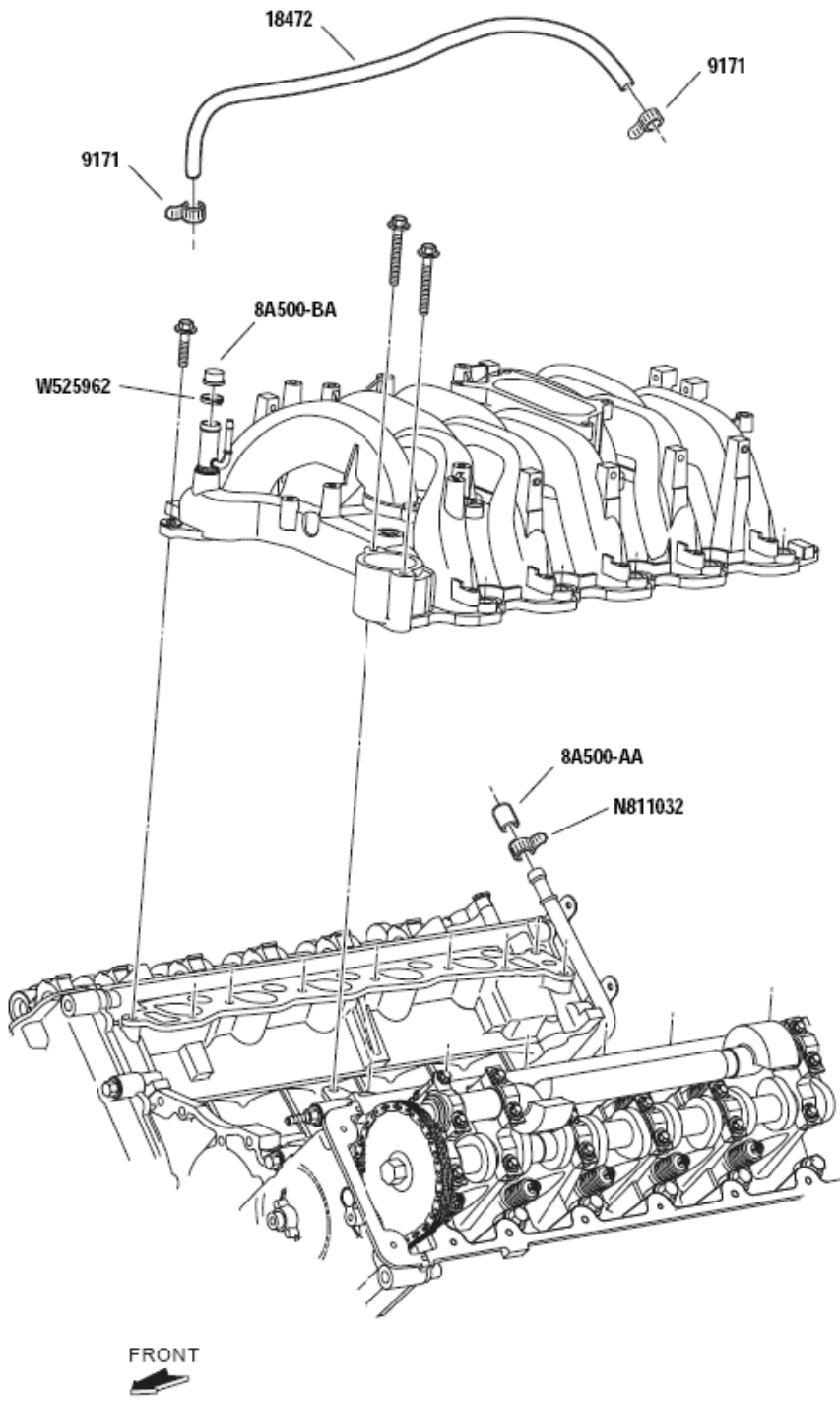
ENGINEERING PART NUMBER	SERVICE PART NUMBER	DESCRIPTION	QTY.
BASE NO.	BASE NO.		
	F8JL-6392-MA	Bell Housing	1
	79000494	Radiator	1

Radiator Bracket Kit



ENGINEERING PART NUMBER	SERVICE PART NUMBER	DESCRIPTION	QTY.
BASE NO.	BASE NO.	Radiator Kit	
	23000140	Complete Radiator Bracket Kit	1

COOLANT BYPASS COMPONENTS



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ENGINEERING PART NUMBER			SERVICE PART NUMBER			BUILD SEQ.	DESCRIPTION	ENGINE CODE	
REF. NO.			REF. NO.				PRODUCTION GROUPS COOLANT BYPASS COMPONENTS	OC 680 AA	QTY.
							HH-038-001 Coolant Bypass Hose (External)		
F8JL	18472	AA	F8JL	18472	AA	10	Hose - Heater 5/8 X 3/4 X 61		1
	383522	S	E6TZ	9171	C	20	Clamp - Hose 1.12 Round Worm Type		2
	386537	S		386537	S	30	Cap - 3/16 Rubber		1
	385766	S32		385766	S32	40	Clamp - 3/8 Hose 1.12 Round Worm type		1
							NOTE Recommended for all non-standby applications.		
							HH-038-002 Coolant Bypass (Internal) Caps		
F8JL	8A500	AA	F8JL	8A500	AA	10	Cap - Rubber 5/8" Install 5/8 cap over black tube end-nipple from water pump, in rear of engine (Heater connection)		1
	N811032	S100		N811032	S100	20	Clamp - Hose 24 Round (5/8) Install 5/8 clamp N811032 over 5/8 Cap 8A500-AA		1
F8JL	8A500	BA	F8JL	8A500	BA	30	Cap - Hose 3/4" Install 3/4 cap 8A500-BA over nipple in intake manifold		1
	W525962	S301		W525962	S301	40	Clamp - Hose 27 Round Spring Band Install 3/4 clamp W525962 over 3/4 Cap 8A500-BA		1
	386537	S		386537	S	50	Cap - 3/16 Rubber		1
	385766	S32		385766	S32	60	Clamp - 3/8 Hose 1.12 Round Worm Type		1
							NOTE Adequate for most standby applications.		

SAE J1701 (Issued 7/96)
Torque – Tension Relationships for SAE Grades 2, 5 and 8

Diameter x Threads/In.	Stress Area in ²	Grade 2			Grade 5			Grade 8		
		Clamp load lb	Torque Dry k = 0.2	Torque Lub k = 0.15	Clamp load lb	Torque Dry k = 0.2	Torque Lub k = 0.15	Clamp load lb	Torque Dry k = 0.2	Torque Lub k = 0.15
1/4-28	0.03736	1500	75 in-lb	56 in-lb	2319	116 in-lb	87 in-lb	3273	164 in-lb	123 in-lb
1/4-20	0.03182	1313	66 in-lb	49 in-lb	2029	101 in-lb	76 in-lb	2864	143 in-lb	107 in-lb
5/16-24	0.05806	2395	150 in-lb	112 in-lb	3700	230 in-lb	173 in-lb	5225	327 in-lb	245 in-lb
5/16-18	0.05243	2163	135 in-lb	101 in-lb	3342	209 in-lb	157 in-lb	4719	295 in-lb	221 in-lb
3/8-24	0.08783	3623	272 in-lb	204 in-lb	5600	420 in-lb	315 in-lb	7905	593 in-lb	445 in-lb
3/8-16	0.07749	3196	240 in-lb	180 in-lb	4940	370 in-lb	278 in-lb	6974	523 in-lb	392 in-lb
7/16-20	0.11870	4896	428 in-lb	321 in-lb	7567	662 in-lb	496 in-lb	10683	935 in-lb	700 in-lb
7/16-14	0.10630	4385	384 in-lb	288 in-lb	6777	593 in-lb	445 in-lb	9567	837 in-lb	628 in-lb
1/2-20	0.15995	6598	660 in-lb	495 in-lb	10197	1020 in-lb	764 in-lb	14396	1440 in-lb	1080 in-lb
1/2-13	0.14190	5853	585 in-lb	439 in-lb	9046	904 in-lb	678 in-lb	12771	1277 in-lb	958 in-lb
9/16-18	0.20298	8373	78 ft-lb	59 ft-lb	12940	121 ft-lb	91 ft-lb	18268	171 ft-lb	128 ft-lb
9/16-12	0.18195	7505	70 ft-lb	53 ft-lb	11600	109 ft-lb	82 ft-lb	16376	154 ft-lb	115 ft-lb
5/8-18	0.25595	10558	110 ft-lb	82 ft-lb	16317	170 ft-lb	127 ft-lb	23036	240 ft-lb	180 ft-lb
5/8-11	0.22600	9322	97 ft-lb	73 ft-lb	14407	150 ft-lb	113 ft-lb	20340	212 ft-lb	159 ft-lb
3/4-16	0.37296	15385	192 ft-lb	144 ft-lb	23776	297 ft-lb	223 ft-lb	33566	420 ft-lb	315 ft-lb
3/4-10	0.33446	13796	172 ft-lb	129 ft-lb	21532	269 ft-lb	201 ft-lb	30101	376 ft-lb	282 ft-lb
1-12	0.66304				42289	704 ft-lb	528 ft-lb	59674	995 ft-lb	746 ft-lb
1-8	0.60574				38616	644 ft-lb	483 ft-lb	54517	909 ft-lb	681 ft-lb
Tensile Strength		74,000 psi			12,000 psi			150,000 psi		
Proof Load Stress		55,000 psi			85,000 psi			120,000 psi		

CAUTION: The previously listed torque and resulting tension are provided as an advisory guide. Individual application discretion is recommended. The content has been presented as accurately as possible but responsibility for its application lies with the user. NOTE: The stress area of threaded senes not included may be computed from the equation $A_s = 0.7854 (D - 0.9743/n)^2$ Where: A_s = Stress area in inches²
D = Diameter in inches P = Threads per inch

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Torque – Tension Relationships for Metric Property Classes

Diameter x Pitch	Stress Area mm ²	Grade 4.6			Grade 4.8			Grade 5.8		
		Clamp load kN	Torque Dry k = 0.2 Nm	Torque Lub k = 0.15 Nm	Clamp load kN	Torque Dry k = 0.2 Nm	Torque Lub k = 0.15 Nm	Clamp load kN	Torque Dry k = 0.2 Nm	Torque Lub k = 0.15 Nm
3.0 x 0.5	5.03	0.85	0.50	0.40	117	0.70	0.50			
3.5 x 0.6	6.78	1.14	0.80	0.60	1.58	1.10	0.80			
4.0 x 0.7	8.78	1.48	1.20	0.90	2.04	1.60	1.20			
5.0 x 0.8	14.20	2.40	2.40	1.80	3.30	3.30	2.50	4.05	4.00	3.00
6.0 x 1.0	20.10	3.40	4.00	3.00	4.67	5.66	4.20	5.73	6.90	5.20
8.0 x 1.25	36.6	6.18	9.90	7.40	8.51	13.60	10.20	10.40	16.70	12.50
10.0 x 1.50	58.0	9.79	19.60	14.70	13.48	27.00	20.00	16.50	33.10	24.80
12.0 x 1.75	84.3	14.22	34.10	25.60	19.60	47.00	35.00	24.00	58.00	43.00
14.0 x 2.00	115.0	19.41	54.30	40.80	26.74	75.00	56.00	32.80	92.00	69.00
16.0 x 2.00	157.0									
20.0 x 2.50	245.0									
24.0 x 3.00	353.0									
30.0 x 3.50	561.0									
36.0 x 4.00	817.0									
Tensile Strength		400 MPa			420 MPa			520 MPa		
Proof Load Stress		225 MPa			310 MPa			380 MPa		

Diameter x Pitch	Stress Area mm ²	Grade 8.8			Grade 9.8			Grade 10.9		
		Clamp load kN	Torque Dry k = 0.2 Nm	Torque Lub k = 0.15 Nm	Clamp load kN	Torque Dry k = 0.2 Nm	Torque Lub k = 0.15 Nm	Clamp load kN	Torque Dry k = 0.2 Nm	Torque Lub k = 0.15 Nm
3.0 x 0.5	5.03									
3.5 x 0.6	6.78									
4.0 x 0.7	6.78									
5.0 x 0.8	14.20									
6.0 x 1.0	20.10									
8.0 x 1.25	36.6	16.50	26.40	19.80	17.80	28.50	21.40	22.80	36.50	27.30
10.0 x 1.50	58.0	26.10	52.20	39.20	28.30	56.60	42.40	36.10	72.20	54.20
12.0 x 1.75	84.3	37.90	91.00	68.00	41.10	99.00	74.00	52.50	126.00	94.00
14.0 x 2.00	115.0	51.80	145.00	109.00	56.10	157.00	118.00	71.60	200.00	150.00
16.0 x 2.00	157.0	70.60	226.00	170.00	76.50	245.00	184.00	97.70	313.00	235.00
20.0 x 2.50	245.0	110.20	441.00	331.00	119.40	478.00	358.00	152.50	610.00	458.00
24.0 x 3.00	353.0	158.90	762.00	572.00	172.10	826.00	620.00	220.00	1055.00	791.00
30.0 x 3.50	561.0	252.40	1515.00	1136.00	273.50	1641.00	1231.00	349.00	2095.00	1572.00
36.0 x 4.00	817.0	367.60	2647.00	1985.00	398.30	2868.00	2151.00	409.00	3662.00	2746.00
Tensile Strength		830 MPa			900 MPa			1040 MPa		
Proof Load Stress		600 MPa			650 MPa			830 MPa		

CAUTION: The previously listed torque and resulting tension are provided as an advisory guide. Individual application discretion is recommended. The content has been presented as accurately as possible but responsibility for its application lies with the user. NOTE: The stress area of threaded senes not included may be computed from the equation $A_s = 0.7854 (D - 0.9382 P)^2$ Where: A_s = Stress area in mm² D = Diameter in mm P = Pitch in mm