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2016.0 DISCOVERY SPORT [LC], 303-01B

ENGINE – INGENIUM I4 2.0L DIESEL

[G 2 0 9 4 3 5 6]

SPECIFICATIONS

Lubricants, Fluids, Sealers and Adhesives

	SPECIFICATIONS
Oil pan to block sealant	Loctite 5970 BM Black
Engine Oil	SAE 0W30 STJLR.03.5007

Capacities

	LITERS
Service fill including filter - High Spec engines	7.02
Service fill including filter - Mid spec engines	6.52

General Specification

ITEM	SPECIFICATION
Type	2.0 litre, inline 4, turbocharged and intercooled diesel engine, twin overhead camshaft, 4 valves per cylinder
Cylinder arrangement	Inline 4
Cylinder numbering	No.1 from the accessory drive end
Bore - nominal	83.0 mm (3.270 in)
Stroke	92.4 mm (3.640 in)
Capacity	1999 cm ³ (121.9 in ³)
Firing order	1 - 3 - 4 - 2
Compression ratio	15.5:1
Direction of rotation	Clockwise viewed at FEAD
Cylinder head maximum permitted warp (flatness specification)	0.2 mm (0.008 in)
Cylinder block maximum permitted warp (flatness specification)	0.15 mm (0.006 in)
Maximum power/torque - Eco spec	

ITEM	SPECIFICATION
Maximum power	110 kW (150 ps) @ 4000rpm
Maximum Torque	380 Nm (280 lb/ft) @ 1750 - 2500rpm
Maximum power/torque - Mid spec	
Maximum power	132 kW (180 ps) @ 4000rpm
Maximum Torque	430 Nm (317 lb/ft) @ 1750 - 2500rpm
Engine oil pressure*:	
Note: For a Mid spec engine running with low load at 80 °C engine oil temp, the minimum oil pressure requirement is:-	
At 1750 rev/min	1.4 bar/140 kPa/20 lb/in ²
At 4000 rev/min	2.9 bar/290 kPa/42 lb/in ²
Crankshaft end play:	
Minimum	0.15 mm
Maximum	0.35 mm
Main bearing clearance:	
Minimum	0.030 mm
Maximum	0.054 mm

Main bearing Selection - Eco spec

BEARING GRADE COLOR	CRANKSHAFT JOURNAL DIAMETER	CYLINDER BLOCK BORE DIAMETER
Green	54.979 to 54.980 mm	59.031 to 59.032 mm
Blue	54.979 to 54.980 mm	59.014 to 59.032 mm
Yellow	54.981 to 54.996 mm	59.031 to 59.032 mm
Red	54.997 to 55.000 mm	59.014 to 59.017 mm

Main bearing Selection - Mid spec

BEARING GRADE COLOR	CRANKSHAFT JOURNAL DIAMETER	CYLINDER BLOCK BORE DIAMETER
Green	58.979 to 58.980 mm	63.031 to 63.032 mm
Blue	58.979 to 58.980 mm	63.014 to 63.032 mm
Yellow	58.981 to 58.996 mm	63.031 to 63.032 mm
Red	58.997 to 59.000 mm	63.014 to 63.017 mm

Cylinder Head Gasket Selection

PISTON PROTRUSION	THICKNESS OF COMPRESSED GASKET	NUMBER OF HOLES/IDENTIFICATION MARKS
0.694 to 0.739 mm	1.30 mm	1
0.740 to 0.861 mm	1.40 mm	2
0.862 to 0.939 mm	1.50 mm	3
0.940 to 1.06 mm	1.60 mm	4
1.061 to 1.106 mm	1.70 mm	5

Torque Specifications

DESCRIPTION	NM	LB-FT
Crankshaft main bearing cap retaining bolts: *		
Stage 1	25	18
Stage 2	58	43
Stage 3	135°	135°
Stage 4	Loosen retaining bolts	Loosen retaining bolts
Stage 5	25	18
Stage 6	37	27
Stage 7	135°	135°
Intermediate gear retaining nut	92	68
Connecting rod cap retaining bolts:		
Stage 1	20	15
Stage 2	125°	125°
Piston cooling jet retaining bolts	12	9
Windage tray retaining bolts	12	9
Oil pump retaining bolts	25	18
Oil pump chain tensioner retaining bolt	12	9
Oil pump pick-up pipe retaining bolts	12	9
Oil pump chain sprocket retaining bolt:		
Stage 1	60	44
Stage 2	90°	90°
Engine oil drain plug	25	18

DESCRIPTION	NM	LB-FT
Oil pan retaining bolts	25	18
Fuel pump retaining bolts	25	18
Fuel pump sprocket retaining nut *	80	59
Lower timing chain sprocket retaining bolt	35	26
Lower timing chain guide retaining bolts	25	18
Lower timing chain lever retaining nut	12	9
Lower timing chain tensioner retaining bolts	12	9
Lower timing chain cover retaining bolts	25	18
Piston cooling jet solenoid	12	9
Oil cooler retaining bolts	25	18
Engine mount bracket retaining bolts	63	46
Vacuum hose connection retaining bolt	5	4
Cylinder head retaining bolts	A	A
Camshaft cap retaining bolts	12	9
Camshaft carrier retaining bolts:		
Stage 1	7	5
Stage 2 (M8x40)	15	11
Stage 3 (M8x80)	25	18
Upper timing chain guide retaining bolt	25	18
Upper timing chain tensioner	55	41
Intake camshaft sprocket retaining bolt:		
Stage 1	10	7
Stage 2	Loosen ¼ of a turn	Loosen ¼ of a turn
Stage 3	80	59
Stage 4	90°	90°
Variable camshaft unit retaining bolt: *		
Stage 1	10	7
Stage 2	Loosen ¼ of a turn	Loosen ¼ of a turn
Stage 3	25	18
Stage 4	40°	40°
Engine front cover retaining bolts	12	9

DESCRIPTION	NM	LB-FT
Idler pulley retaining bolt	25	18
Coolant pump retaining bolts	12	9
Crankshaft pulley bolts:		
Stage 1	37	27
Stage 2	90°	90°
Camshaft position (CMP) sensor retaining bolt	8	6
Upper timing chain cover retaining bolts	12	9
Variable camshaft timing solenoid retaining bolts	9	7
Glow plug	18	13
Fuel injector clamp retaining bolts:		
Stage 1	11	8
Stage 2	162°	162°
Fuel rail retaining bolts	25	18
Fuel rail high-pressure fuel line unions:		
Stage 1	10	7
Stage 2	62°	62°
Valve cover retaining bolts	12	9
oil filter housing retaining bolts	12	9
Cylinder head temperature (CHT) sensor	11	8
Intake manifold retaining bolts	12	9
Intake manifold support retaining bolts	12	9
Fuel pump to fuel rail fuel line bracket retaining bolt	10	7
Fuel pump high-pressure fuel line union:		
Stage 1	15	11
Stage 2	62°	62°
Cylinder block temperature sensor	11	8
Thermostat retaining bolts	12	9
Coolant pump intake elbow retaining bolts	25	18
Lower pressure exhaust gas recirculation (EGR) cooler retaining bracket bolts	12	9
Exhaust manifold retaining bolts	18	13
Exhaust manifold heatshield retaining bolts	9	7

DESCRIPTION	NM	LB-FT
Turbocharger to exhaust manifold retaining nuts	27	20
Turbocharger heatshield retaining bolts	9	7
Turbocharger support bracket retaining bolts:		
Stage 1 (M8x20)	7	5
Stage 2 (M8x20)	25	18
Stage 3 (M8x25)	25	18
Stage 4 (M6x14)	9	7
Turbocharger oil feed pipe unions	18	13
Turbocharger oil drain tube retaining bolt	12	9
High pressure EGR valve retaining bolts	12	9
EGR crossover pipe retaining bolts:		
Stage 1	12	9
Stage 2	Loosen ¼ of a turn	Loosen ¼ of a turn
Stage 3	12	9
High pressure EGR pipe to intake manifold retaining bolts:		
Stage 1	7	5
Stage 2	Loosen ¼ of a turn	Loosen ¼ of a turn
Stage 3	7	5
High pressure EGR pipe to high pressure EGR valve retaining bolts:		
Stage 1	12	9
Stage 2	Loosen ¼ of a turn	Loosen ¼ of a turn
Stage 3	12	9
High pressure EGR cooler clamp	4	3
High pressure EGR cooler upper retaining bolt:		
Stage 1	12	9
Stage 2	Loosen ¼ of a turn	Loosen ¼ of a turn
Stage 3	12	9
High pressure EGR cooler to high pressure EGR valve retaining bolts:		
Stage 1	12	9
Stage 2	Loosen ¼ of a turn	Loosen ¼ of a turn
Stage 3	12	9

DESCRIPTION	NM	LB-FT
High pressure EGR cooler lower retaining bolt:		
Stage 1	7	5
Stage 2	Loosen ¼ of a turn	Loosen ¼ of a turn
Stage 3	7	5
Low pressure EGR cooler retaining bolt:		
Stage 1	25	18
Stage 2	Loosen ¼ of a turn	Loosen ¼ of a turn
Stage 3	25	18
Low pressure EGR valve retaining bolts	25	18
Turbocharger support bracket retaining bolts	25	18
Turbocharger intake pipe retaining bolts	25	18
Coolant pump inlet elbow retaining bolts	25	18
Low pressure EGR temperature sensor	3	2.2
High pressure EGR temperature sensor	3	2.2
EGR pressure sensor retaining bolt	12	9
Turbocharger outlet temperature sensor	3	2.2
Throttle body retaining screws	12	9
Exhaust temperature sensor	35	26
Breather hose retaining bolts	12	9
Oil level indicator retaining bolt	7	5
Oil filler neck retaining bolt	12	9
Vacuum pipe assembly retaining bolt	40	30
Coolant pump pulley retaining bolts	25	18
Flywheel/flexplate retaining bolts:		
Stage 1	30	22
Stage 2	120°	120°
Crankshaft position (CKP) sensor retaining bolt	12	9

*** New nuts/bolts must be installed**

A = refer to procedure for correct torque sequence

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