SPECIFICATIONS AND SPECIAL TOOLS

PART 8-5

SPECIFICATIONS

ENGINE — GENERAL

Engine Models and Piston Displacement

	Litre
Six — Central Fuel Injection (E.F.I.)	3.2
Six — Central Fuel Injection (E.F.I.)	3.9
Six — Multi Point Fuel Injection (M.P.E.F.I.)	3.9
Six — Multi Point Fuel Injection (M.P.E.F.I.)	4.0

Compression Ratio

Litre	
All (Except SS, XR6)	88:1
XR6/SS	9.01:1

Power @ Specified RPM (DIN)

Litre	kW @	RPM
3.2 E.F.I.	92	4000
3.9 E.F.I.	120	4250
3.9 M.P.E.F.I.	139	4500
4.0 M.P.E.F.I.	148	4500
4.0 XR6	160	4550

Torque @ Specified RPM (DIN)

Litre	Nm @	RPM
3.2 E.F.I.	242	3250
3.9 E.F.I.	315	3250
3.9 M.P.E.F.I.	339	3500
4.0 M.P.E.F.I.	348	3500
4.0 XR6	365	3650

Engine Idle RPM (in neutral) — Refer Emission Decal on Vehicle

Ground Idle (ISC Disconnected)	RPM
3.2 E.F.I.	550 ± 25
3.9 E.F.I.	550 ± 25
4.0, 3.9 M.P.E.F.I.	600 ± 25

Curb Idle

3.2 E.F.I.	650 ± 25
3.9 E.F.I.	650 ± 25
3.9 M.P.E.F.I.	700 ± 25
4.0 M.P.E.F.I. (Manual)	700 ± 25
4.0 M.P.E.F.I. (Auto)	650 ± 25

Bore and Stroke

Litre	
3.2	91.86 x 79.30
3.9	91.86 x 99.31
4.0	92.25 x 99.31

Taxable Horsepower (RAC)

All (except 4.0 L)	31.4
4.0 L	31.7

Firing Order

All	1-5-3-6-2-4

Compression Pressure at Maximum Cranking Speed

Litre	kPa
3.2 E.F.I.	1040 Minimum
3.9 E.F.I.	1040 Minimum
4.0, 3.9 M.P.E.F.I.	1010 Minimum

Valve Arrangement — Front to Rear

All ..... I-E-I-E-I-E-I-E-I-E-I-E

Ignition Timing

Refer to Group 9.

Engine Idle Manifold Vacuum Minimum mm of Mercury @ Specified Engine Neutral Idle RPM (Sea Level)

Litre	
3.2	470
3.9, 4.0	450

Engine Oil

Type — Specification ESE-M2C-15E SG/CD or SG/CE Grade 15W/40

Capacity ..... 5.5 litre *

* Includes filter

Oil Pressure (Hot)

All ..... 280 kPa min. @ 2000 rpm

CYLINDER HEAD

Gasket Surface Flatness

All ..... 0.075 in any 150 mm or 0.18 mm overall

Valve Guide Bore Diameter

Standard Intake and Exhaust

All (except 4.0 L)	8.72-8.76
4.0L	8.705-8.730

Note: 4.0L XR6 features unique valve guides.

Valve Guide Parent Bore

Standard	13.97-14.01
Service Oversize	14.22-14.26

Valve Seat Width

Intake	1.5-2.0
Exhaust	1.8-2.3

Valve Seat Angle

All ..... 45°

Valve Seat Insert Outer Diameter

3.2	Intake 43.992-44.008
	Exhaust 37.992-38.008
3.9, 4.0	Intake 48.992-49.008
	Exhaust 41.792-41.008

Valve Seat Insert Recess Diameter

3.2	Intake 43.87-43.92
	Exhaust 37.87-37.92
3.9, 4.0	Intake 48.87-48.92
	Exhaust 41.67-41.72

Combustion Chamber Volume

cc	
3.2	57.75-60.25
3.9	60.95-63.45
4.0	62.25-64.75
4.0 XR6/SS	58-60 approx.

Deck Height

All mm	0.0-0.3

VALVE MECHANISM

Valve Clearance — Adjuster Collapsed
All — measured at cam lobe 0.4-1.1

Valve Stem Diameter (Standard)
Intake and Exhaust
All 8.66-8.68

Valve Face Angle —
Intake and Exhaust
All ..... 44°

Valve Stem to Valve Guide Clearance
All 0.025-0.070

Valve Head Diameter
Intake
3.2 ..... 42.03
3.9, 4.0 ..... 47.00

Exhaust
3.2 ..... 35.00
3.9, 4.0 ..... 39.00

Valve Spring Free Length — Approximate
All 55.1
Note: XR6 features unique valve springs.

Valve Spring Out of Square — Maximum
All 2.0

Valve Spring Length at Specified Load
All ..... 39.43 kg 34.0

Valve Spring Assembled Height
All 46.0-46.8

Valve Lash Adjuster Diameter
All 13.93-13.94

Valve Lash Adjuster to Rocker Arm Clearance
All 0.02-0.07
(Wear Limit) 0.1

Hydraulic Lash Adjuster Leak Down Rate
(Time required for plunger to leak down 2.4 mm of travel with a 22 N load and test fluid in adjuster) ..... 5-30 seconds

CAMSHAFT AND TIMING CHAIN

Camshaft Journal Diameter — Standard
All 37.94-37.96
Note: XR6 features unique camshaft.

Camshaft Journal Maximum Out-of Round
All 0.013

Timing Chain Maximum Deflection
All ..... 2.0 mm lift at camshaft sprocket centre

Camshaft Lobe Lift Intake and Exhaust
3.2 ..... Intake 5.46
Exhaust 5.46
3.9 ..... Intake 6.16
Exhaust 5.76
4.0 ..... Intake 6.00
Exhaust 5.76
Allowable lobe lift loss (3.2, 3.9 L) 0.13

Camshaft End Play
All 0.05-0.35
(Wear Limit) 0.6

Auxiliary Shaft End Play
All 0.1-0.2
(Wear Limit) 0.3
Note: Falcon SS features a unique camshaft sprocket.

VALVE TIMING

3.2
Intake Opens at 8.5° BTDC at 0.08 mm Lobe Lift.
Intake Closes at 51.5° ABDC at 0.08 mm Lobe Lift.
Exhaust Opens at 48.5° BBDC at 0.08 mm Lobe Lift.
Exhaust Closes at 11.5° ATDC at 0.08 mm Lobe Lift.

3.9
Intake Opens at 17° BTDC at 0.01 mm Lobe Lift.
Intake Closes at 63° ABDC at 0.07 mm Lobe Lift.
Exhaust Opens at 65° BBDC at 0.07 mm Lobe Lift.
Exhaust Closes at 11° ATDC at 0.10 mm Lobe Lift.

4.0
Intake Opens at 16° BTDC at 0.01 mm Lobe Lift.
Intake Closes at 56° ABDC at 0.07 mm Lobe Lift.
Exhaust Opens at 62° BBDC at 0.07 mm Lobe Lift.
Exhaust Closes at 14° ATDC at 0.10 mm Lobe Lift.

4.0XR6
Intake opens at 14° BTDC at 0.07 mm Lobe Lift.
Intake closes at 66° ABDC at 0.10 mm Lobe Lift
Exhaust opens at 62° BBDC at 0.07 mm Lobe Lift
Exhaust closes at 18° ATDC at 0.10 mm Lobe Lift

Valve Rocker Ratio
All 2.0:1

CRANKSHAFT

Main Bearing Journal Diameter — Standard
All 60.91-60.93

Main Bearing Journal Runout — Maximum
All 0.063
(Max. Wear Limit) 0.09

Main Bearing Journals Maximum Out-of-Round
All 0.010

Connecting Rod Bearing Journals Maximum Taper
All ..... 0.010 per 25

Main Bearing Journals Maximum Taper
All ..... 0.008 per 25

Thrust Bearing Journal Length
All 32.385-32.436

Main Bearing Journal Thrust Face Runout
Maximum 0.025

Connecting Rod Journal Diameter — Standard
All 53.93-53.95

Crankshaft Free End Play
All 0.10-0.20
(Wear Limit) 0.30

Assembled Flywheel Clutch Face — Maximum Runout
All 0.18

Assembled Flywheel Ring Gear
O.D. Max. Runout 0.5
Lateral Max. Runout 0.8

MAIN BEARINGS

Bearing to Crankshaft Clearance

	Desired	Allowable
All	0.02-0.04	0.02-0.06

Wall Thickness
Bearing Wall Thickness for Standard and Undersize Journal
Standard 2.410-2.418 mm wall thickness.
Undersize

	wall thickness
0.051	2.436-2.443
0.254	2.537-2.545
0.508	2.664-2.672
0.762	2.791-2.799
1.016	2.918-2.926

Connecting Rod
Pin Bore Diameter — Standard
All 23.132-23.144

Bearing Bore Diameter — Standard
All 56.871-56.891

Bearing Bore Maximum Out-of-Round
All 0.01

Bearing Bore Maximum Taper
All 0.01

Connecting Rod Length — Centre to Centre
Litre
3.2 ..... 159.36-159.28
3.9, 4.0 ..... 149.38-149.33

Connecting Rod Assembly — Assembled to Crankshaft Side Clearance
All 0.09-0.27
(Wear Limit) 0.36

Connecting Rod
Twist Maximum Total Difference
All 0.20

Bend Maximum Total Difference
All 0.10
*Piston pin bore and crankshaft bearing must be parallel and in the same vertical plane within the specified total difference at ends of 200 mm long bar measured 100 mm on each side of rod.

CONNECTING ROD BEARINGS
Bearing to Crankshaft Clearance.

	Desired	Allowable
All	0.02-0.04	0.02-0.06

Bearing Wall Thickness for Standard and Undersize Journal
Standard 1.445-1.458
Undersize

	wall thickness
0.051	1.471-1.483
0.254	1.572-1.585
0.508	1.699-1.712
0.762	1.826-1.839
1.016	1.953-1.966

PISTON

Piston Diameter — At Right Angle to Pin Centreline and 50 mm from crown
All (except 4.0 L) 91.81-91.82
4.0 L 92.23-92.29

Piston to Cylinder Bore Clearance
All (except 4.0 L) 0.028-0.043
4.0 L 0.010-0.030

Piston Pin Bore Diameter
All 23.172-23.185

Ring Groove Width — Upper and Lower Compression Ring
All 1.52-1.54

Oil Ring
All (except 4.0 L) 4.02-4.04
4.0 L 3.03-3.06

PISTON PIN
Piston Pin Diameter — Standard
All 23.162-23.175

Piston Pin Length
All (except 4.0 L) 76.45-77.22
4.0 L 64.50-65.00

Piston Pin to Piston Clearance
All 0.008-0.013
(Wear Limit) 0.020

PISTON RINGS
Ring Width — Compression Ring
Upper and Lower 1.465-1.490

Side Clearance — Compression Ring
Upper and Lower 0.05-0.10
(Wear Limit) 0.15

Oil Ring Assembly
All ..... Snug

Ring Gap Width
Compression Ring — Standard Bore
Upper and Lower 0.25-0.50

Oil Ring* — Standard Bore
All 0.38-1.40
*Steel Rail

CYLINDER BLOCK
Cylinder Bore Diameter
All (except 4.0 L) 91.84-91.90
4.0 L 92.25-92.31

Cylinder Bore Maximum Out-of-Round
All 0.025
(Wear Limit) 0.127

Cylinder Bore Taper
All 0.025
(Wear Limit) 0.254

Head Gasket Surface Flatness
0.076 mm in any 152 mm or 0.18 mm overall.

Main Bearing Bore Diameter
All 65.81-65.79

OIL PUMP
Relief Valve Spring Tension @ Specified Length

	Newton	mm
All	92-100 @	63.2

Relief Valve Clearance
All 0.04-0.07

Drive Shaft to Housing Bearing Clearance
All 0.04-0.07

Rotor Assembly End Clearance — Pump Assembled
All 0.03-0.10

Outer Race to Housing — Radial Clearance
All 0.15-0.33

ENGINE WEIGHTS — with Oil
(No ancillary equipment or flywheel fitted)

Litre	Kg
3.2	174
3.9	180
4.0	182

TORQUE LIMITS

Oil threads with lightweight engine oil. Do not oil threads that require oil-resistant or water-resistant sealer. All torques quoted in Newton metres.

Main Bearing Cap Bolts Nm
All 85

Cylinder Head Bolts
Step 1 40
Step 2 ..... Rotate 90° in tightening direction

Oil Pan to Cylinder Block
All 8

Manifolds to Cylinder Head
Intake 25
Exhaust 30
Exhaust Manifold Slip Joint ..... Stud 30
Nut 25

Flywheel to Crankshaft
Bolt grade 11.9 110
Bolt grade 10.9 70-80

Pressure Plate to Flywheel
All 25

Oil Pump to Cylinder Block
All 20

Oil Pump Inlet to Pump
All 20

Oil Pump Cover Plate
All 20

Oil Filter Adaptor to Cylinder Block
All 20

Oil Filter to Adaptor of Cylinder Block
With oil on the gasket surface, hand tighten until gasket contacts block face. Then tighten ¾ turn more.

Timing Cover Nm
All 20

Thermostat Housing
All 20

Water Outlet Connector
All 10

Oil Pan Drain Plug
All 25

Auxiliary Shaft Thrust Plate to Cylinder Block
All 10

Water Pump to Cylinder Block
All 20

Camshaft Sprocket
All 50

Auxiliary Shaft Sprocket
All 50

Valve Rocker Arm Cover
Nut 6
Stud 20

Rocker Arm Cover Wiring Clips
All 4

Rocker Arm Shaft Support
All 25

Timing Chain
Lower Damper Pivot Bolt 24
Upper Damper Anchor Bolt 30
Tensioner Retainer 15
Tensioner Retainer Plug 10

Heater Tube Bracket 15
ECT Sensor 20
Coolant Temp. Indicator Sensor 10
Thermostat Housing Plug 12

Connecting Rod Nuts
All 35

Vibration Damper to Crankshaft
All 125

Engine Rear Support — Nuts or Bolts
Insulator to Rear Support 50
Rear Support to Body 50
Insulator to Transmission 50

Engine Front Support — Nuts or Bolts
Insulator Assembly to Engine Support Brackets 50
Support Bracket to Body 50
Insulator Bracket to Engine 50
Insulator to Body Insulator Bracket 50