FOUR STROKE OUTBOARD PETROL ENGINE HOMOLOGATION FILE

International Homologation File Number: 00526A		
Homologation Valid from	**2012**	**Expiry: 2025**
Valid for the following classes:	**CIRCUIT: GT30** **OFFSHORE:**	
Manufacturer:	**Mercury Marine**	
Engine Model:	**F30EFI**	
Number Manufactured:	**1000+**	
At the date:	14 January 2012	
Certified by the National Authority of:	Sweden (SVERA)	
At the date:	14 January 2012	
UIM Homologation Group Inspector	Mikael Lundblad	
At the date:	14 January 2012	
UIM Certification Approval:		
At the date:		
Running Production Changes		
Change Detail	ECU update, Inlet size, Rocker arm weight, inlet valve length	Page No. 8, 11, 12, 14, 8A,
Date Approved for Use	15 July 2015	Approved by 
Change Detail		Page No.
Date Approved for Use		Approved by

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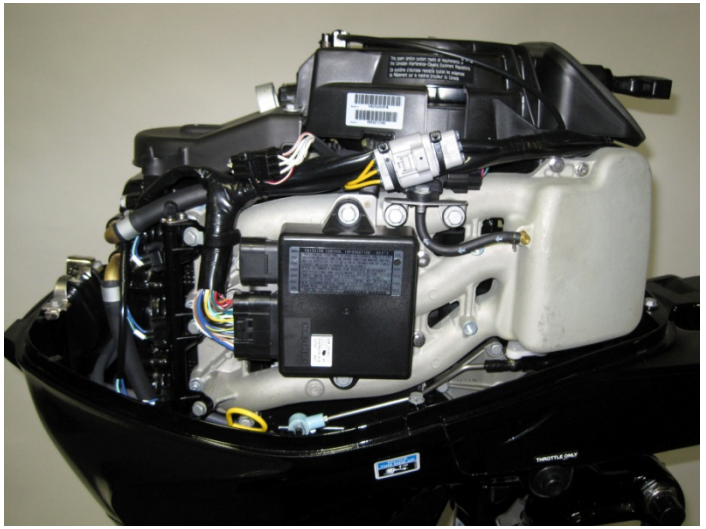
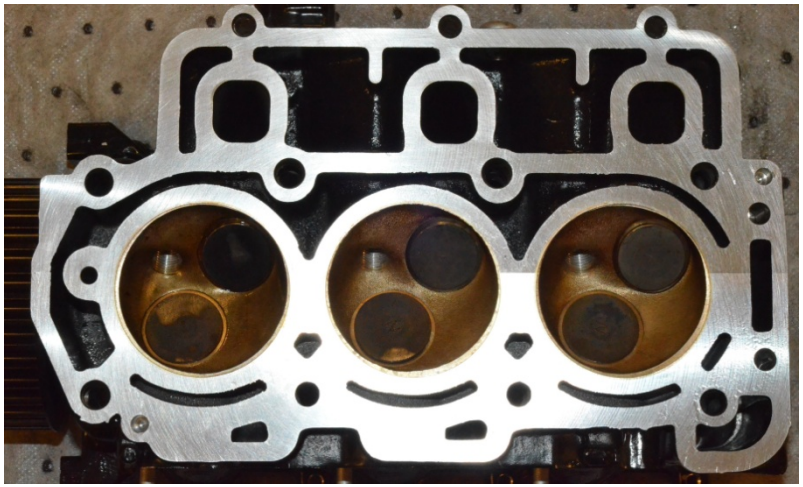
PICTURES

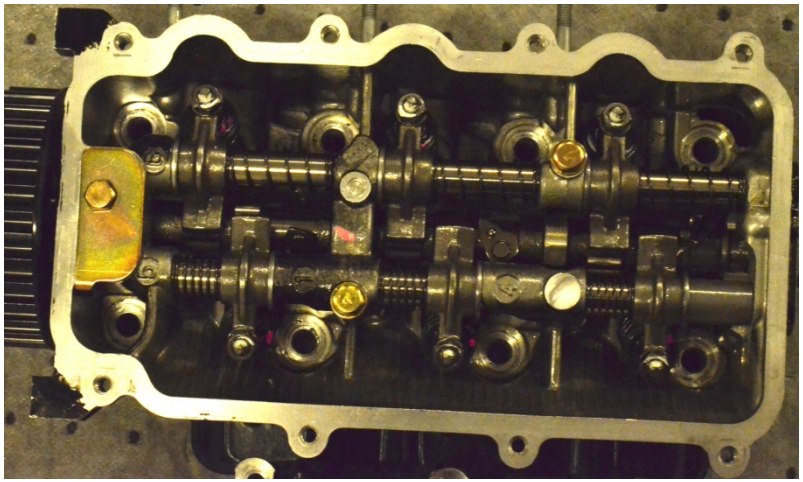
Photo of the complete engine, 45° from the front at the port side.	Photo of the complete engine, 45° from the front at the starboard side.
	
Photo of the complete engine, 45° from the rear at the port side.	Photo of the complete engine, 45° from the rear at the starboard side.
	

Photo without top cover, from the front. 	Photo without top cover, from the rear. 
Photo without top cover, from the port side 	Photo without top cover, from the starboard side. 

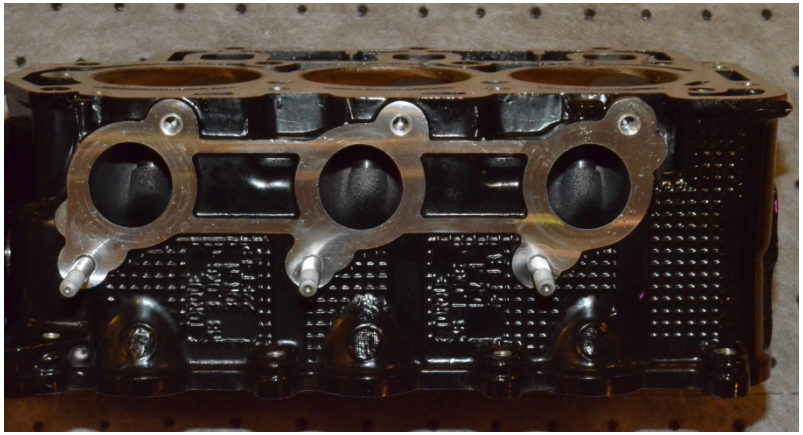
Cylinder head from the combustion chamber side



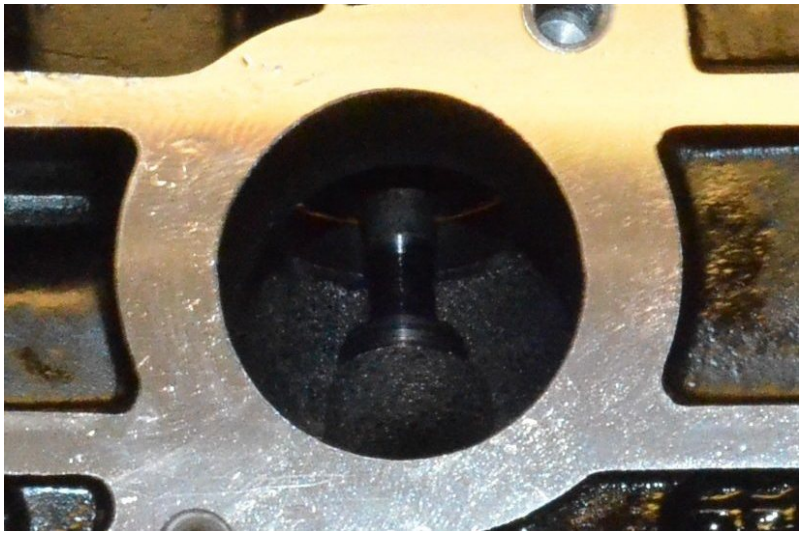
Cylinder head from the valve assembly side.

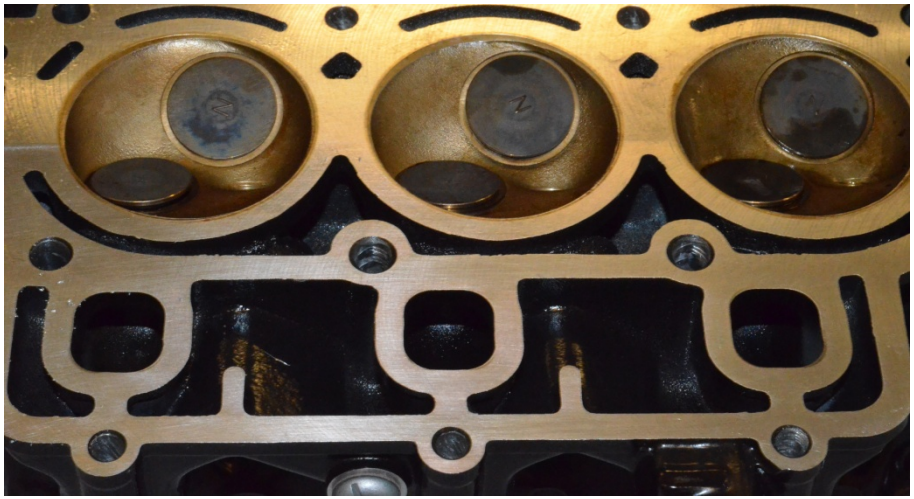
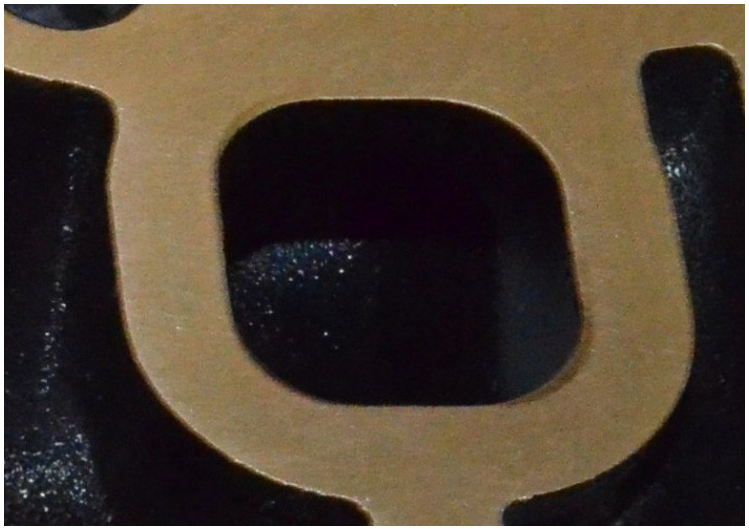
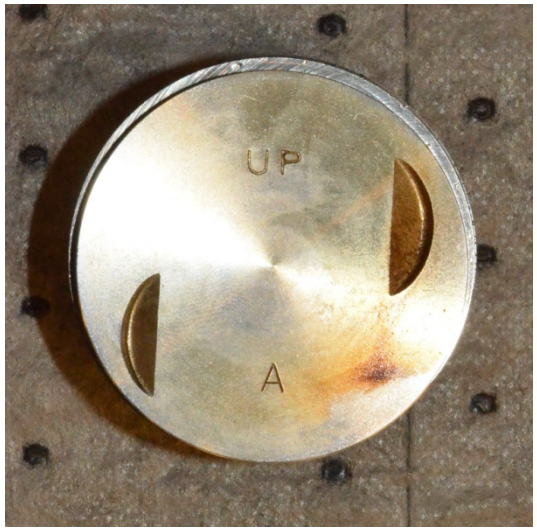
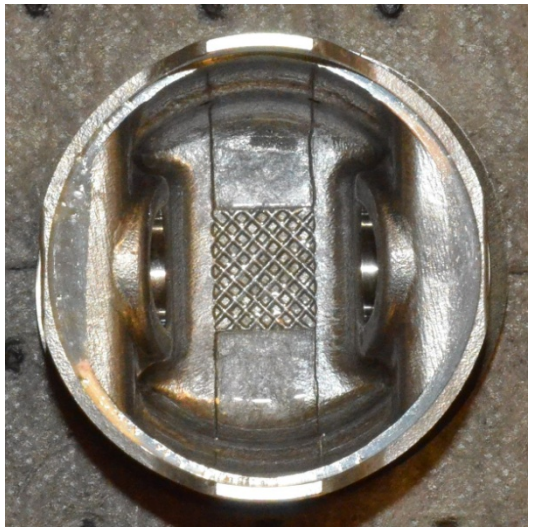


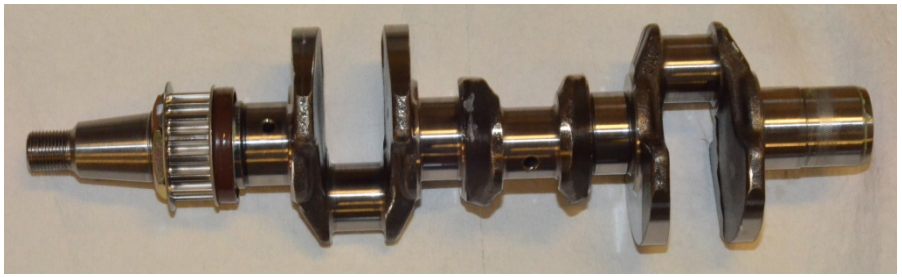
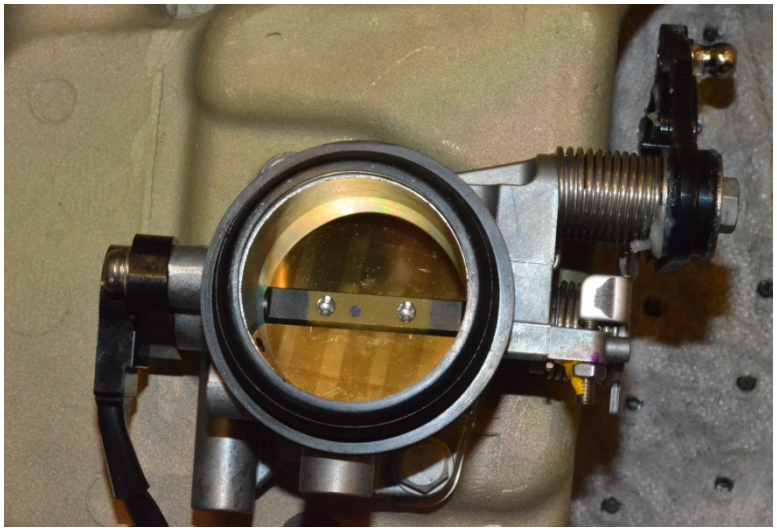
Cylinder head showing intake ports.

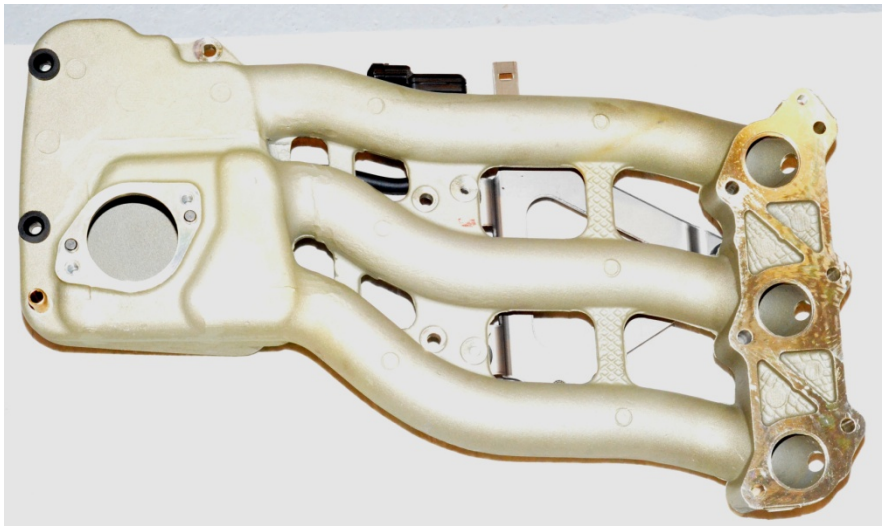


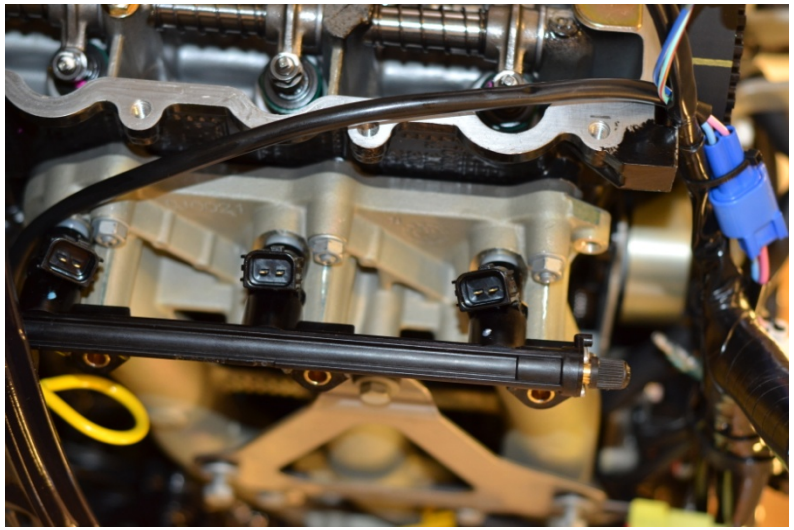
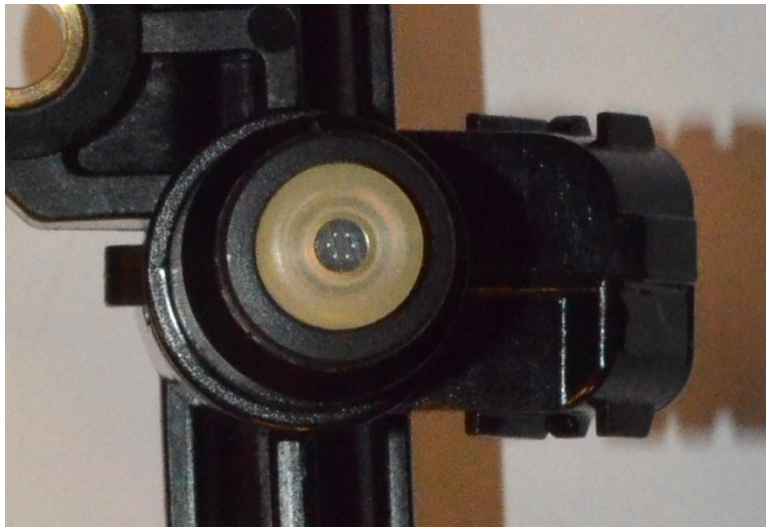
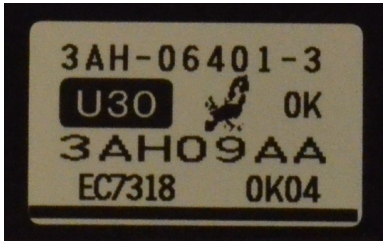
Cylinder head showing intake ports - detail

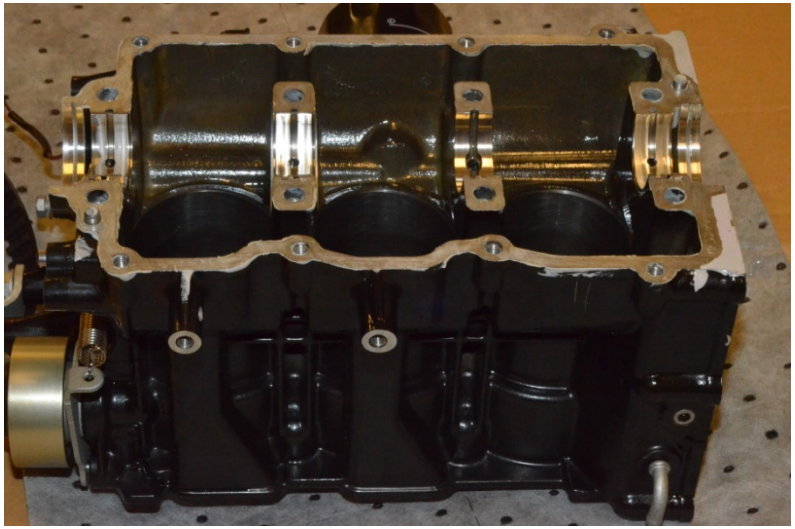
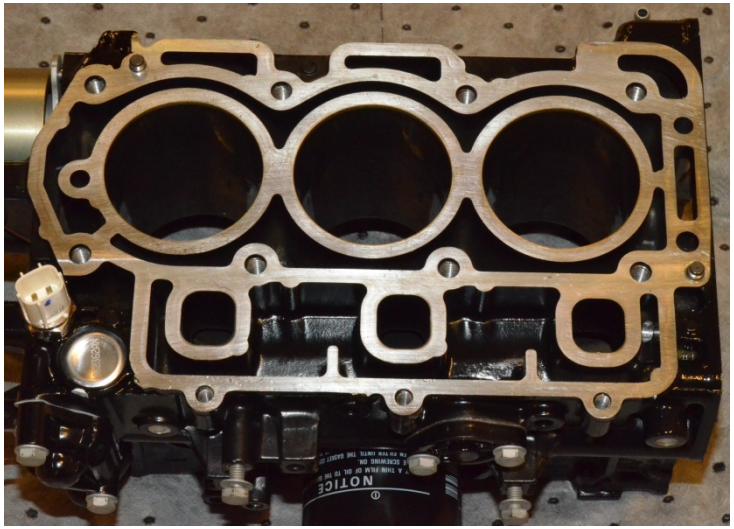
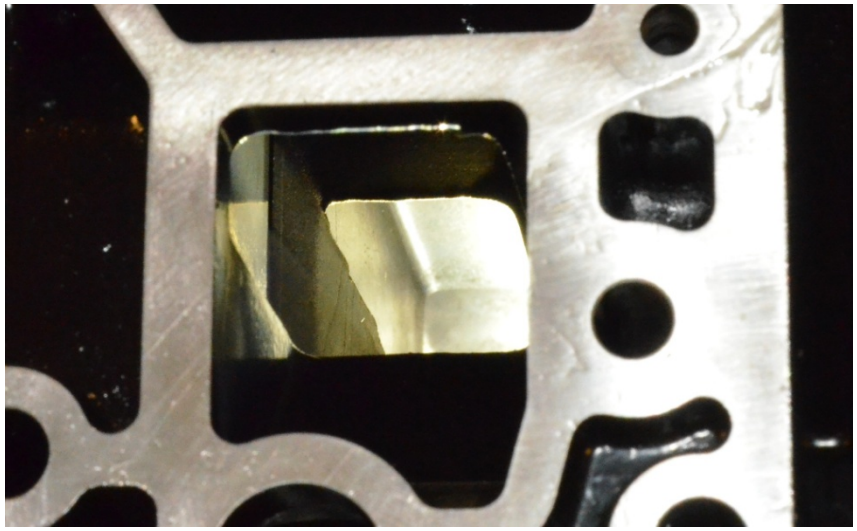


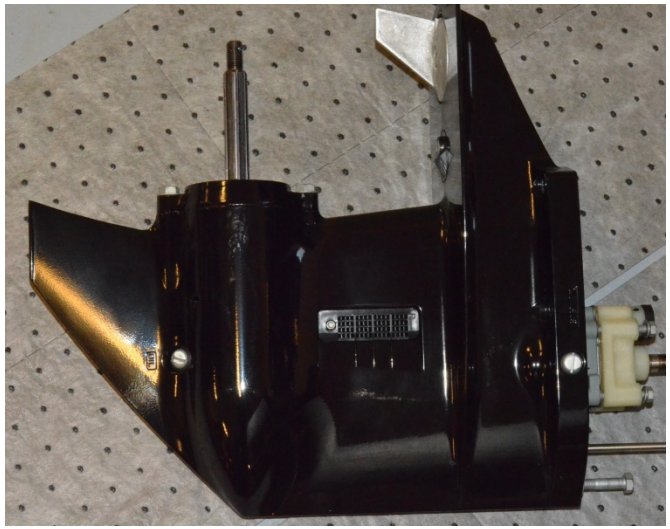
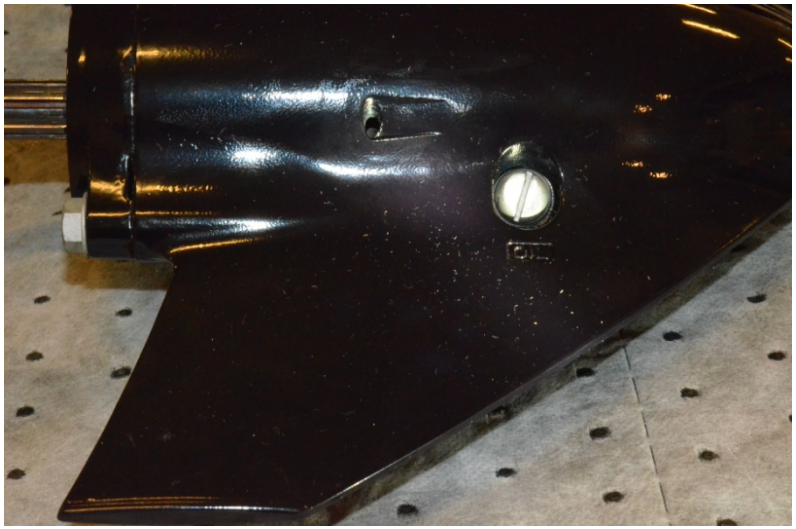
Cylinder head showing exhaust ports.	Cylinder head showing exhaust ports - detail
	
Piston viewed from the top	Piston viewed from the bottom
	

Piston, viewed 45° from the wrist pin.	Crankshaft.
	
Connecting rod and crankshaft.	Throttle house
	

Intake silencer air intakes	Intake manifold
	
Intake manifold - Close up	**Intake manifold - Close up**
	

Fuel Injector Rail	Fuel Injector - Close up
	
ECU box Front (**see also page 8A**)	ECU box back
 	

Cylinder block, viewed 45° from front starboard side. 	Cylinder block, viewed 45° from rear, port side 
Oil pump 	Internal exhaust pipe 

Gear house	Gear house - Exhaust cooling
	
Gear House Skeg	Gear house skeg - Close up from bottom side
	

MEASUREMENTS

ENGINE FUEL

Type:		**Petrol Unleaded**	
Minimum octane required:		**90**	RON

ENGINE TYPE

Number of cylinders:		**3**	Cylinders
Cylinder arrangement:		**In line**	

ENGINE BLOCK	Tolerance	Measurement	Unit
Bore	+/- 0.10	**61.0**	mm
Stroke	+/- 0.10	**60.0**	mm
Capacity per cylinder	max	**176.2**	cc
Total Capacity	max	**528.6**	cc
Cylinder block material		**Aluminium**	
Cylinder liner material		**Steel**	
Distance from crankshaft centreline to cylinder block deck face.	+/- 0.50	**149.5**	mm

CYLINDER HEAD	Tolerance	Measurement	Unit
Cylinder head material		**Aluminium**	
Volume of combustion chamber (without volume of spark plug hole)	min	**18,2**	cc
Compression ratio	max	**9.6**	
Thickness of cylinder head	+/- 0.20	**95.0**	mm
Inlet Port:			
Size of port at cylinder head/manifold face (updated 00526A see page 8A)	+/- 0.50	**∅ 27.2**	mm
Internal diameter of valve seat insert	+/- 0.20	**25.0**	mm
Surface finish of port		**Cast**	
Exhaust Port:			
Size of port at cylinder head/manifold face	+/- 0.50	**20 x 22.0**	mm
Internal diameter of valve seat insert	+/- 0.20	**21.7**	mm
Surface finish of port		**Cast**	

Inlet Valves:			
Diameter of stem	+0.00/-0.02	**5.48**	mm
Diameter of head	max	**27.2**	mm
Overall length of inlet valve (updated 00526A see page 8A)	min	**72.5**	mm
Exhaust Valves:			
Diameter of stem	+0.00/-0.02	**5.46**	mm
Diameter of head	max	**24.2**	
Overall length of exhaust valve	min	**72.5**	mm
Valve Springs:			
Diameter of wire	max	**2.4**	mm
Inside diameter of coil	min	**15.8**	mm
Free length	max	**36.0**	mm
Number of working turns	+/- 0.5	**6.4**	turns

CAMSHAFT/SHAFTS	Tolerance	Measurement	Unit
Inlet:			
Tappet clearance for checking timing	+/- 0.02	**0.15**	mm
Total valve lift	+/- 0.10	**7.21**	mm
Total inlet opening angle (measured at flywheel in degrees at 0,1 mm lift)	+/- 5°	**298**	degrees
Duration inlet opening angle 3mm under max lift (measured at flywheel in degrees)	+/- 2°	**142**	degrees
Base circle diameter of lobe	+/- 0.02	**20.0**	mm
Total lift of lobe	+/- 0.05	**4.28**	mm
Exhaust:			
Tappet clearance for checking timing	+/- 0.02	**0.20**	mm
Total valve lift	+/- 0.10	**7.24**	mm
Total inlet opening angle (measured at flywheel in degrees at 0,1 mm lift)	+/- 5°	**296**	degrees
Duration inlet opening angle 3mm under max lift (measured at flywheel in degrees)	+/- 2°	**140**	degrees
Base circle diameter of lobe	+/- 0.02	**20.0**	mm
Total lift of lobe	+/- 0.05	**4.28**	mm

PISTONS

Material of piston		**Aluminium**	
Type and thickness of rings	Square	**1.25**	mm
	Square	**1.50**	mm
	Oil scraper	**2.50**	mm

CONNECTING ROD

	Tolerance	Measurement	Unit
Length of rod from big end to small end (centre to centre)	+/- 0.10	**95.9**	mm

CRANKSHAFT

	Tolerance	Measurement	Unit
Number of main bearing journals		**2**	
Diameter of main bearing journals	+0.00/-0.02	**35.99**	mm
Diameter of connecting rod journals	+0.00/-0.03	**29.98**	mm
Surface finish of crankshaft		**Cast**	

TYPE OF BEARINGS

Piston Pin	**Plain bearing**	
Connecting Rod journal	**Plain bearing**	
Main journal	**Plain bearing**	

FUEL INJECTION

	Tolerance	Measurement	Unit
Make		**Keihin**	
Type of pump, model no.		**Electric, TFIAA AJT**	
Total number of injectors		**3**	pcs
Type of injectors		**Fuel**	
Diameter of throttle bore	max	**∅ 40.2**	mm

COOLING SYSTEM

Type	**Water**
Method	**Thermostat controlled**
Pump	**Impeller**
Number of impeller blades	**6**

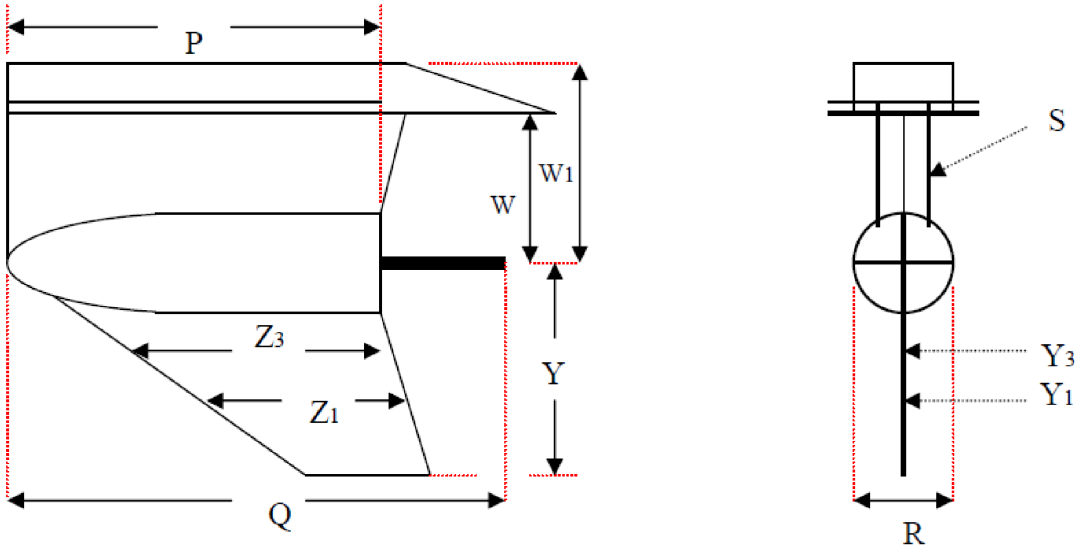
SPARK PLUG

Brand	**Champion**
Model	**RA8HC**

WEIGHTS	Tolerance	Measurement	Unit
Inlet valve (bare)	min	**27.5**	g
Exhaust valve (bare)	min	**23.5**	g
Inlet rocker arm (updated 00526A see page 8A)	min	**47.0**	g
Exhaust rocker arm (updated 00526A see page 8A)	min	**47.0**	g
Inlet/ Exhaust camshaft	min	**620.0**	g
Piston (with rings)	min	**140.0**	g
Piston Pin	min	**38.0**	g
Connecting Rod (with bearings)	min	**164.0**	g
Crankshaft	min	**4300.0**	g
Flywheel (bare)	min	**2900.0**	g

UNDERWATER UNIT	Tolerance	Measurement	Unit
Gear Ratio		**12:23 (1.92)**	
P Longtitudinal length of gearcase torpedo	+/- 5.0	**230.0**	mm
Q Longtitudinal dimension of gearcase including propeller shaft	max	**355.0**	mm
R Transverse dimension of gearcase	min	**80.5**	mm
S Thickness of strut	min	**36.0**	mm
Z1 Skeg chord length, 25mm above bottom	+/- 5.0	**82.0**	mm
Z3 Skeg chord length, 75mm abobe bottom	+/- 5.0	**130.0**	mm
W1 Distance from propeller shaft to upper flange	+/- 5.0	**237.0**	mm
W Distance from propeller shaft to anti-ventilation plate	+/- 5.0	**148.0**	mm
Y1 Thickness of skeg, 25mm above bottom	min	**6.0**	mm
Y3 Thickness of skeg, 75mm above bottom	min	**9.0**	mm
Y Skeg depth from propeller shaft	+/- 5.0	**144.0**	mm

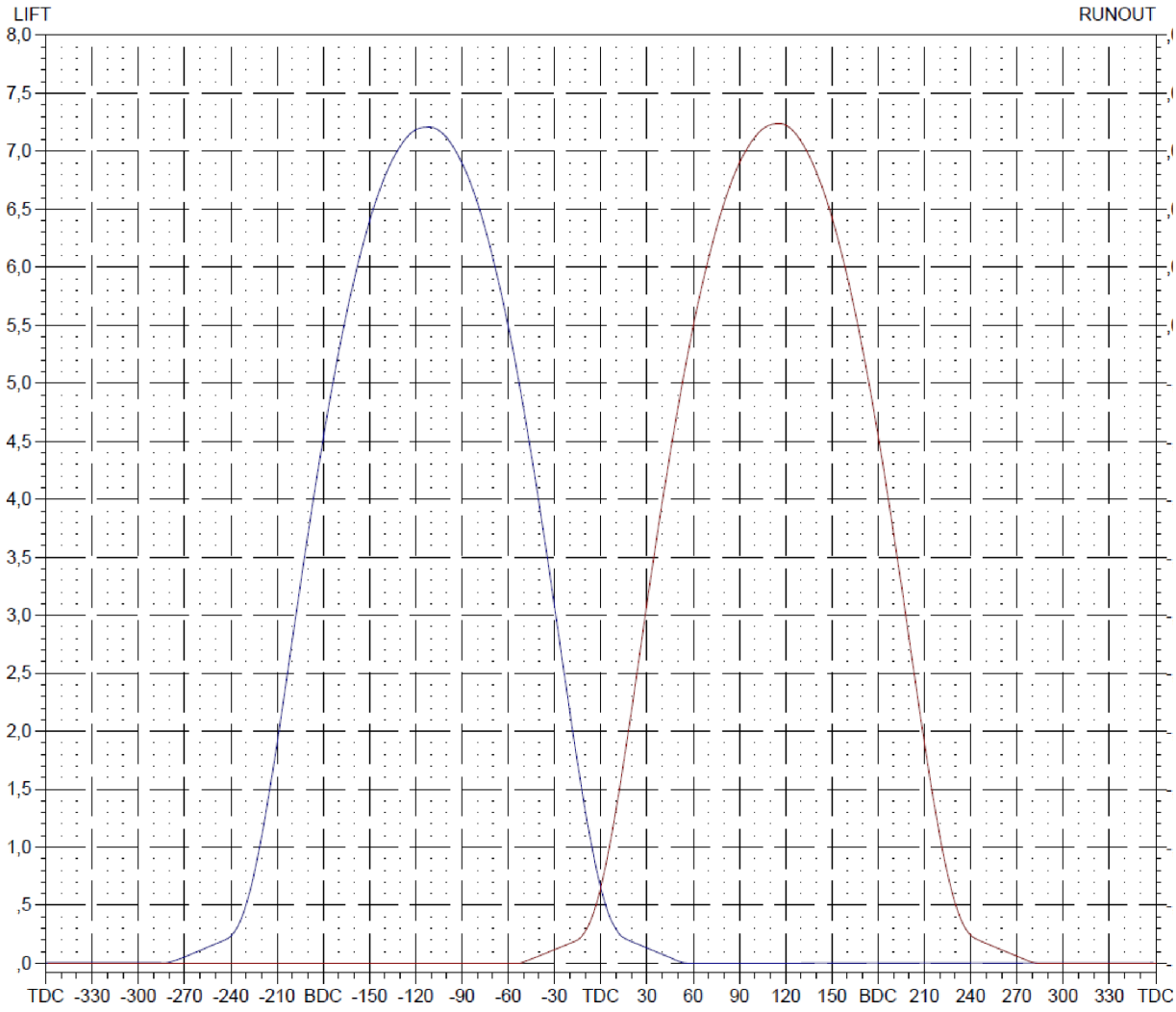
GEAR CASE DRAWING



FOUR STROKE OUTBOARD
PETROL ENGINE

NOTES

Attachment 1 - Camlift measurement



Intake

		LIFT	DUR.	OPEN	CLOSE	AREA
Lobe	I1					
Centerline	113,49 BTDC	0,50	233,41	50,18 BBDC	3,23 ATDC	540,4
.050 Lift C/L	113,48 BTDC	1,00	215,57	41,27 BBDC	5,70 BTDC	532,8
Runout	0,0025	1,27	208,13	37,55 BBDC	9,42 BTDC	529,7
Peak Open Acc.	0,01325	2,54	178,71	22,82 BBDC	24,10 BTDC	501,9
Peak Nose Acc.	-0,00725	3,81	150,46	8,66 BBDC	38,20 BTDC	456,9
Peak Close Acc.	0,01400	5,08	118,62	7,35 ABDC	54,03 BTDC	385,9
Lift @ TDC	0,653	6,35	75,76	28,94 ABDC	75,30 BTDC	262,4
		7,2074	--- PEAK CAM LIFT ---			
		7,2074	--- PEAK VALVE LIFT ---			

Exhaust

		LIFT	DUR.	OPEN	CLOSE	AREA
Lobe	E1					
Centerline	113,49 ATDC	0,50	233,56	3,13 BTDC	50,43 ABDC	541,6
.050 Lift C/L	113,46 ATDC	1,00	215,84	5,56 ATDC	41,40 ABDC	534,5
Runout	0,0025	1,27	208,43	9,24 ATDC	37,68 ABDC	531,4
Peak Open Acc.	0,01375	2,54	178,88	23,97 ATDC	22,85 ABDC	500,9
Peak Nose Acc.	-0,00700	3,81	150,83	38,02 ATDC	8,86 ABDC	455,0
Peak Close Acc.	0,01275	5,08	118,92	54,02 ATDC	7,06 BBDC	382,5
Lift @ TDC	0,654	6,35	76,27	75,45 ATDC	28,28 BBDC	264,8
		7,2364	--- PEAK CAM LIFT ---			
		7,2364	--- PEAK VALVE LIFT ---			

Spec.	Value			
File	h:\My Documents\Pro-Service\CAM\New Folder\			
Lobes	I1, E1			
Lobe Separation	113,5	Cam Deg.		
Checking Height	0,10	mm		
Valve Overlap	524,6	Crank Deg.		
	Intake		Exhaust	
Centerline	113,49	BTDC	113,49	ATDC
Open	81,74	BBDC	33,22	BTDC
Close	35,77	ATDC	82,88	ABDC
Duration	297,5	Crank Deg.	296,1	Crank De
Area	547,4	mm Deg.	548,8	mm Deg.
Lash	0,000	mm	0,000	mm
Rocker Ratio	1,00		1,00	
Peak Cam Lift	7,2074	mm	7,2364	mm
Peak Valve Lift	7,2074	mm	7,2364	mm
Lift @ TDC	0,653	mm	0,654	mm

Spec.	Value			
Checking Height	1,00	mm		
Valve Overlap	442,7	Crank Deg.		
	Intake		Exhaust	
Centerline	113,49	BTDC	113,49	ATDC
Open	41,27	BBDC	5,56	ATDC
Close	5,70	BTDC	41,40	ABDC
Duration	215,6	Crank Deg.	215,8	Crank De
Area	532,8	mm Deg.	534,5	mm Deg.
Lash	0,000	mm	0,000	mm
Rocker Ratio	1,00		1,00	
Peak Cam Lift	7,2074	mm	7,2364	mm
Peak Valve Lift	7,2074	mm	7,2364	mm
Lift @ TDC	0,653	mm	0,654	mm

Spec.	Value			
Checking Height	1,27	mm		
Valve Overlap	435,2	Crank Deg.		
	Intake		Exhaust	
Centerline	113,49	BTDC	113,49	ATDC
Open	37,55	BBDC	9,24	ATDC
Close	9,42	BTDC	37,68	ABDC
Duration	208,1	Crank Deg.	208,4	Crank De
Area	529,7	mm Deg.	531,4	mm Deg.
Lash	0,000	mm	0,000	mm
Rocker Ratio	1,00		1,00	
Peak Cam Lift	7,2074	mm	7,2364	mm
Peak Valve Lift	7,2074	mm	7,2364	mm
Lift @ TDC	0,653	mm	0,654	mm

Updates for Homologation file 00526A

Updated ECU for EU markets

ECU box Front


Marks number to check **Inlet Port:**			
Size of port at cylinder head/manifold face	+/- 1.00	∅ **26.7**	mm

Inlet Valves:

Overall length of inlet valve	min	**72.1**	mm

WEIGHTS	Tolerance	Measurement	Unit
Inlet rocker arm	min	**46.0**	g
Exhaust rocker arm	min	**46.0**	g