



FOUR STROKE OUTBOARD PETROL ENGINE HOMOLOGATION FILE

International Homologation File Number:		00543
Homologation Valid from		Expiry: 2033 Dec 31
Valid for the following classes:	CIRCUIT: OFFSHORE: 3A, 3B	
Manufacturer:	Tohatsu	
Engine Model:	MFS115A	
Number Manufactured:		
At the date:		
Certified by the National Authority of:		
At the date:		
UIM Homologation Group Inspector	Mikael Lundblad	
At the date:		2023 may 31
UIM Certification Approval:	Mikael Lundblad	
At the date:		2023 may 31
		
Running Production Changes		
Change Detail	Page No.	
Date Approved for Use	Approved by	
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Date Approved for Use	Approved by	

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.



Engine also available in white paint

Photo without top cover, from the front.



Photo without top cover, from the starboard side.



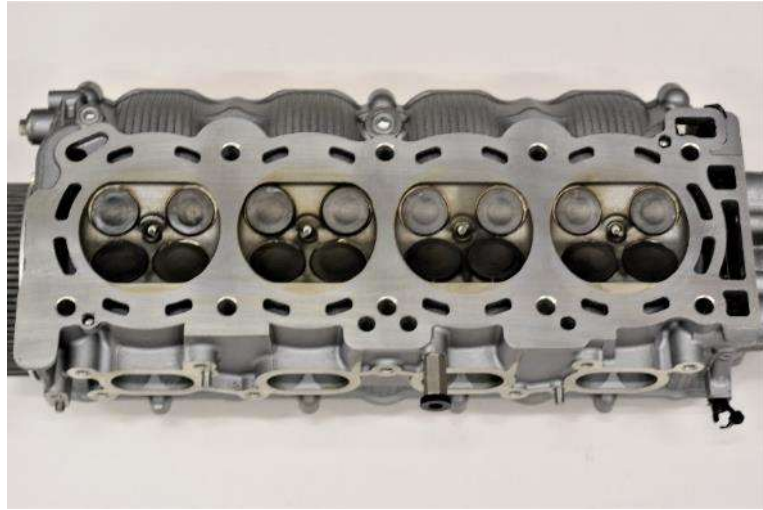
Photo without top cover, from the rear.



Photo without top cover, from the port 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



Valve seats



Close up valve seat



Piston viewed from the top



Piston viewed from the bottom



Piston with rings



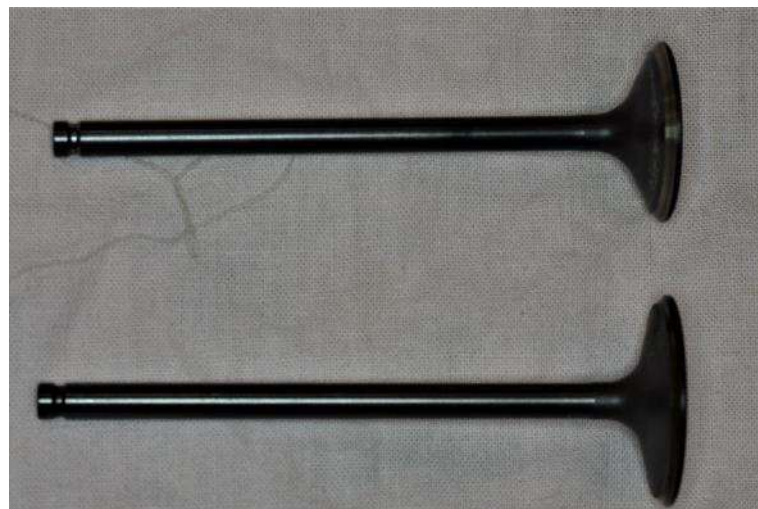
Connecting rod and piston.



Piston, viewed 45° from the wrist pin.



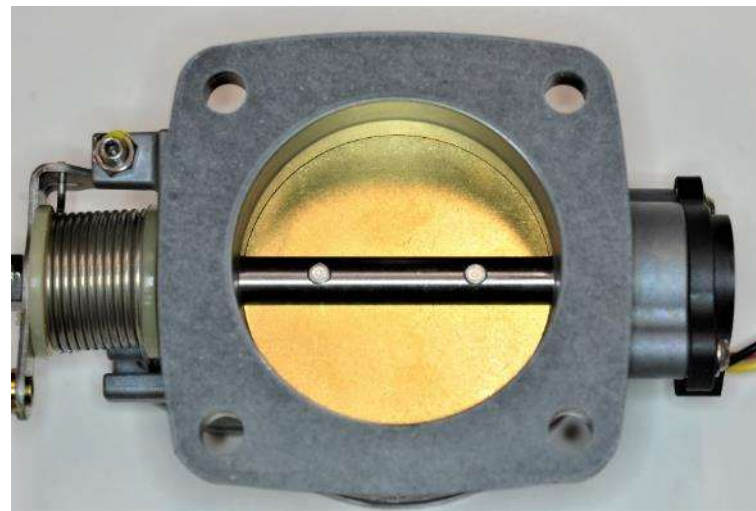
Valves



crankshaft.



Throttle house



Throttle house



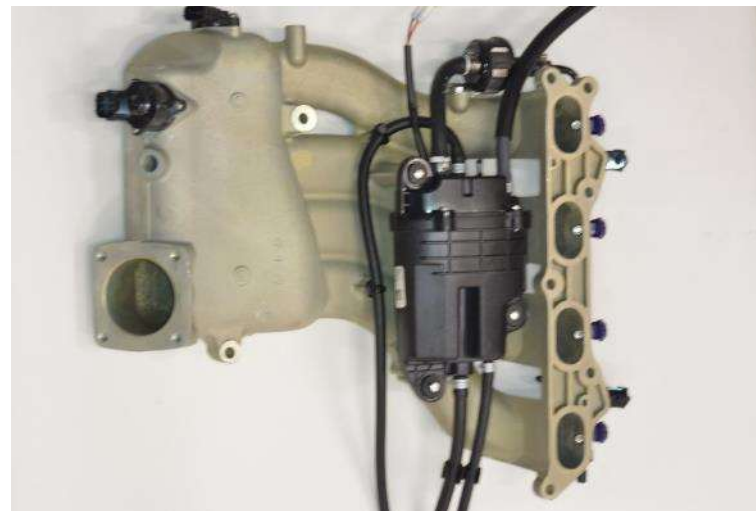
Intake silencer



Intake silencer air intakes



Intake manifold and fuel pump



Intake manifold - Close up



Fuel Injector - Close up



Intake manifold - Close up



Fuel Injector Rail



Fuel pump



ECU box, front



ECU box, backside



ECU box, connectors



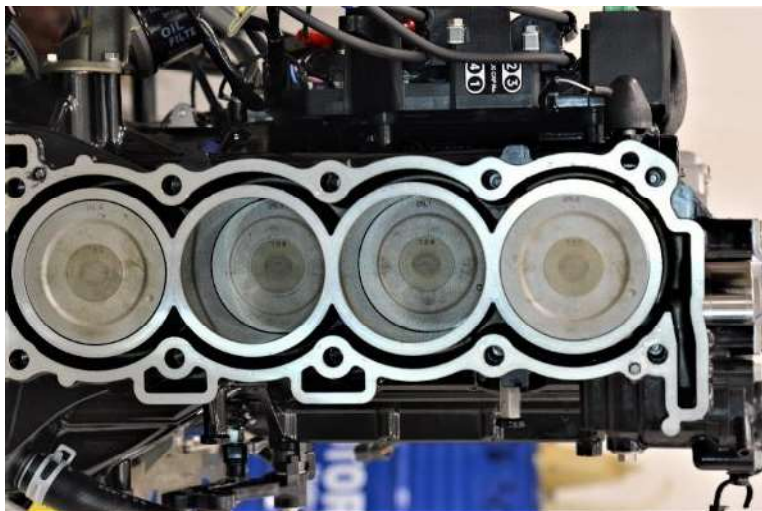
Electric system.



Cylinder block, port side



Engine Block view from top



Crankshaft and bottom of block



Exhaust manifold



Cylinder block, viewed 45° from rear, port side



Cylinder block, viewed 45° from front starboard side.



Exhaust downpipe



Internal exhaust pipe mid section



Flywheel – viewed from top side



Flywheel – viewed from bottom side



Gear house



Gear house - Exhaust



Gear House Skeg



MEASUREMENTS

ENGINE FUEL

Type:	Gasoline
Minimum octane required:	91 RON

ENGINE TYPE

Number of cylinders:	4 Cylinders
Cylinder arrangement:	Inline

ENGINE BLOCK

	Tolerance	Measurement	Unit
Bore	+0.015/ - 0	84.00	mm
Stroke	+/- 0.06	90.00	mm
Capacity per cylinder	nom	498.8	cc
Total Capacity	nom	1995	cc
Cylinder block material		Aluminium	
Cylinder liner material		Steel	
Distance from crankshaft cline to cylinder block deck face.	+/- 0.05	212.0	mm
Distance from piston perferi to cylinder block deck face.	nom	0.5	mm

CYLINDER HEAD

	Tolerance	Measurement	Unit
Cylinder head material		Aluminium	
Volume of combustion chamber (without volume of spark plug hole)	+/- 0.70	49.89	cc
Compression ratio	nom	9.9	
Compression Pressure at 400 r/min warm engine, without sparkplugs and with open throttle	+/- 0.145	1.45	MPa
Thickness of cylinder head	+/- 0.15	105.0	mm
Deepth of combustion chamber	nom	15.9	mm

Inlet Port:

Size of port at cylinder head/manifold face	+/- 0.50	28.5x49.0	mm
Internal diameter of valve seat insert at contact with valve	+/- 0.05	φ 31.0	mm
Surface finish of port		Cast	

Exhaust Port:

Size of port at cylinder head/manifold face	+/- 0.50	28.0x45.0	mm
Internal diameter of valve seat insert at contact with valve	+/- 0.05	φ 27.0	mm
Surface finish of port		Cast	

Inlet Valves:

Diameter of stem	-0.10/-0.025	5.50	mm
Diameter of head	+/- 0.1	32.00	mm
Overall length of inlet valve	+/- 0.3	94.1	mm
Valve face angle of valve seat	-,0/-0.25°,-	20,45,70	°
Surface width of valve seat	+/-0.1	1.0	mm
Gauge diameter of valve seat	+/-0	φ 31.0	mm

Exhaust Valves:

Diameter of stem	-0.030/-0.045	5.50	mm
Diameter of head	+/- 0.1	28.0	
Overall length of exhaust valve	+/- 0.3	93.53	mm
Valve face angle valve seat	-,0/-0.25°,-	20,45,70	°
Surface width of valve seat	+/-0.1	1.0	mm
Gauge diameter of valve seat	+/-0	φ 27.0	mm

Valve Springs:

Diameter of wire	nom	3.0	mm
Inside diameter of coil	+0.3/- 0	16.5	mm
Free length	nom	38.8	mm
Number of working turns	nom	5.50	turns

CAMSHAFT/SHAFTS

Tolerance Measurement Unit

Inlet:

Tappet clearance for checking timing	+/- 0.05	0.15	mm
Total valve lift	+/- 0.15	9.15	mm
Total inlet opening angle (measured at flywheel in degrees at 0.1 mm lift at specified valve lash)	+/- 5°	288	degrees
Duration inlet opening angle 3mm under max lift (measured at flywheel in degrees)	+/- 2°	108	degrees
Base circle diameter of lobe	+/- 0.05	φ 30.0	mm
Max diameter at lobe	+/- 0.05	35.40	mm

Exhaust:

Tappet clearance for checking timing	+/- 0.05	0.20 mm
Total valve lift	+/- 0.15	9.15 mm
Total inlet opening angle (measured at flywheel in degrees at 0.1 mm lift at specified valve lash)	+/- 5°	280 degrees
Duration inlet opening angle 3mm under max lift (measured at flywheel in degrees)	+/- 2°	104 degrees
Base circle diameter of lobe	+/- 0.05	φ 30.0 mm
Total lift of lobe	+/- 0.05	35.40 mm

PISTONS

Material of piston	Aluminium		
Type and thickness of rings	Square	1.20	mm
	Square	1.00	mm
	Oil scraper	2.00	mm

CONNECTING ROD	Tolerance	Measurement	Unit
Length of rod from big end to small end (centre to centre)	+/- 0.05	139.38	mm

CRANKSHAFT	Tolerance	Measurement	Unit
Number of main bearing journals		5	
Diameter of main bearing journals	+0/- 0.015	φ 52.00	mm
Diameter of connecting rod journals	+0/- 0.015	φ 45.00	mm
Surface finish of crankshaft		Cast	

TYPE OF BEARINGS

Piston Pin	N/A
Connecting Rod journal	Plain
Main journal	Plain

IGNITION

Idle	nom	ATDC 3°
High motor speed	nom	BTDC 26°

SPARK PLUG

Brand	NGK
Model number.	LKR6E

FUEL INJECTION	Tolerance	Measurement	Unit
Brand		MITSUBISHI	
Type of pump, model no.		Electric,E00AT83871	
Fuel pressure	+/- 12	280	kPa
Total number of injectors		4	Injectors
Type of injectors		Electric	
Diameter of throttle bore	max	φ 60.0	mm

SENSOR TESTS

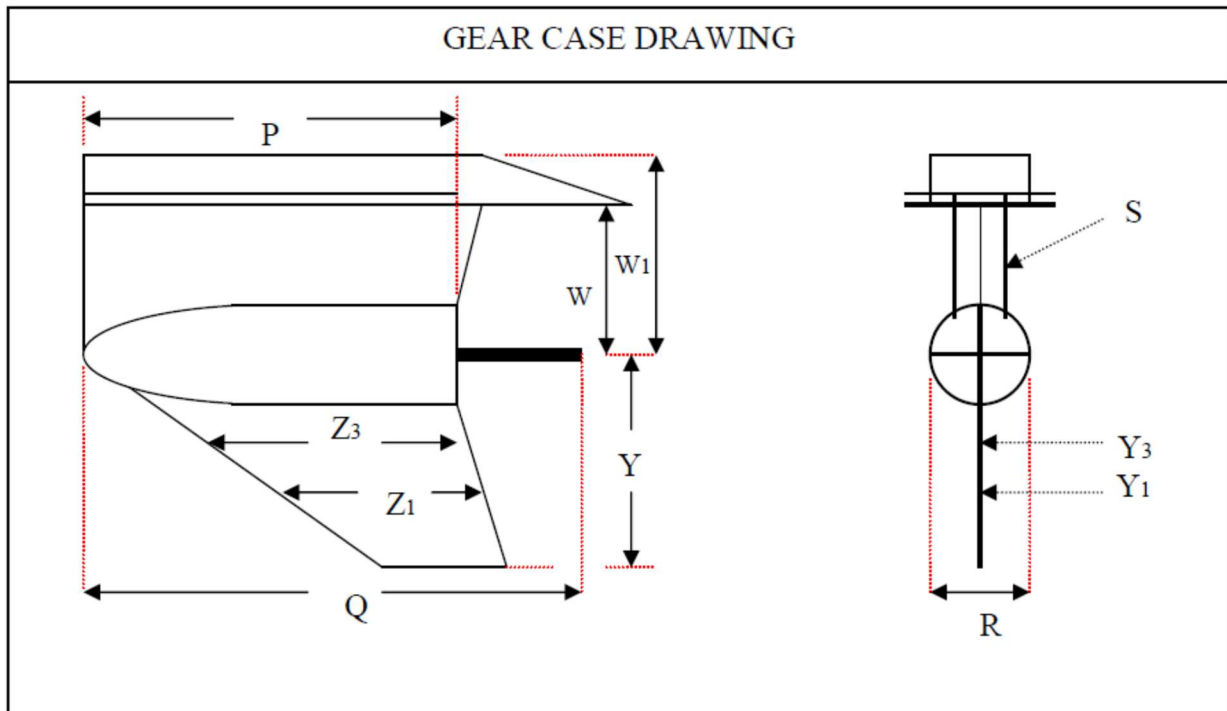
Cylinderblock coolant sensor	(4-6°C) 4.24-4.86 (24-26°C) 1.90-2.10		
Manifold Absolute Pressure and Air Temperature Sensor	(0°C) 5.4-6.6 (80°C) 0.282-0.388	kΩ	

COOLING SYSTEM

Type	Water cooled		
Method	Thermostat controlled		
Pump	Rubber impellerpump		
Number of impeller blades	6		
Thermostat start opening temperature	60	°C	
Thermostat fully opened	75	°C	

WEIGHTS	Tolerance	Measurement	Unit
Inlet valve (bare)	min	33.0	g
Exhaust valve (bare)	min	32.8	g
Inlet rocker arm	min	99.0	g
Exhaust rocker arm	min	101.0	g
Spring and retainer	min	31.0	
Inlet/ Exhaust camshaft	min	2420.0	g
Piston (with rings)	min	270.0	g
Piston Pin	min	77.0	g
Connecting Rod (with bearings)	min	425.0	g
Crankshaft	min	16750.0	g
Flywheel (bare)	min	5700.0	g

UNDERWATER UNIT	Tolerance	Measurement	Unit
Gear Ratio		25:12 (2.08)	
P Longitudinal length of gearcase torpedo (without bearing carrier)	+0.5/-0.55	316	mm
Q Longitudinal dimension of gearcase including propeller shaft	+/- 5.0	477.25	mm
R Transverse dimension of gearcase	+/-0.5	φ 113	mm
S Thickness of strut	+/- 2.0	52	mm
Z1 Skeg chord length, 25mm above bottom	+/- 5.0	124.7	mm
Z3 Skeg chord length, 75mm above bottom	+/- 5.0	170.1	mm
W1 Distance from propeller shaft to upper flange	+0.25/-0.2	280.0	mm
W Distance from propeller shaft to anti-ventilation plate	+/- 0.6	198.0	mm
Y1 Thickness of skeg, 25mm above bottom	min	7.0	mm
Y3 Thickness of skeg, 75mm above bottom	min	9.5	mm
Y Skeg depth from propeller shaft	+/- 0.8	223.5	mm
Diameter Exhaust outlet at propeller resess (5 mm in)	+/- 0.45	φ 101,9	mm



**FOUR STROKE OUTBOARD
PETROL ENGINE****NOTES**

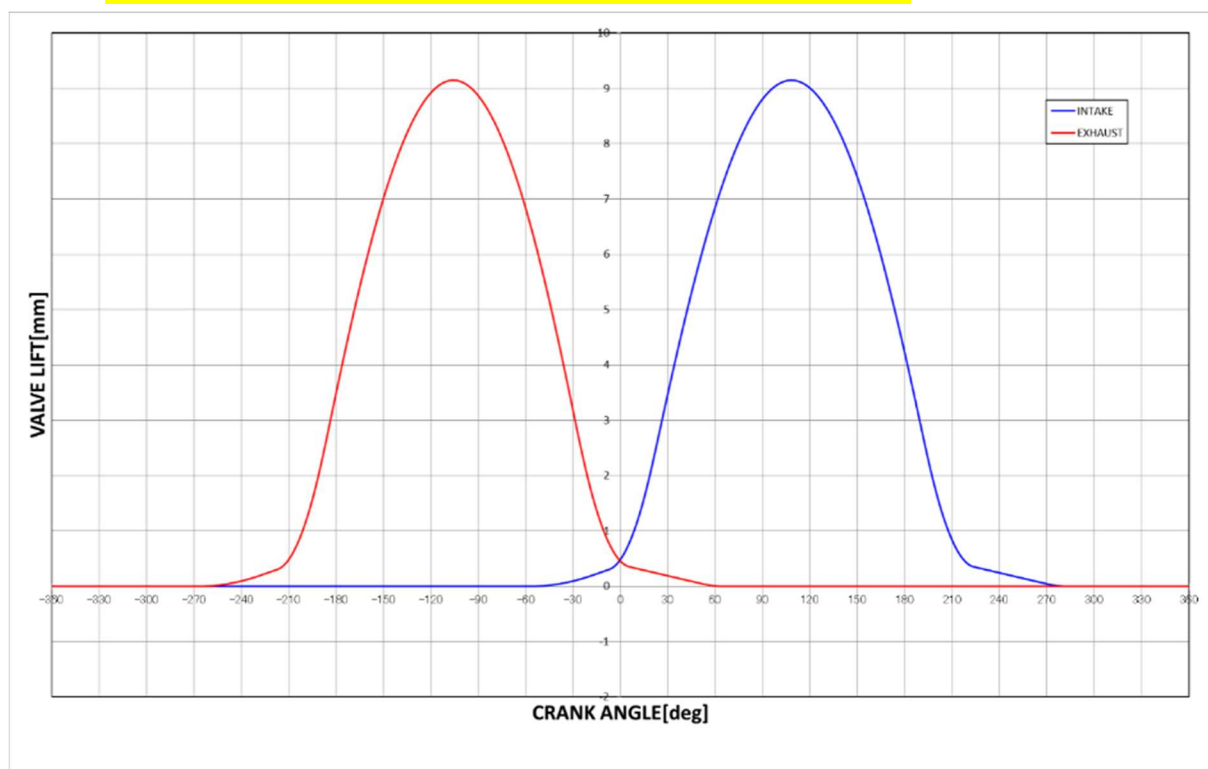
Inspection of ECU

Brand Mistubishi

Model F8TJ0671

Tohatsu part no 3YT-06401-0 / U115 7 3YT21AA

Maximal engine speed: 6000 rpm (fuel is cut off)

Attachment 1 - Camlift Curve/measurement

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