



FOUR STROKE OUTBOARD PETROL ENGINE HOMOLOGATION FILE

International Homologation File Number:		00542
Homologation Valid from		Expiry: 2033 Dec 31
Valid for the following classes:	CIRCUIT: GT30 OFFSHORE:	
Manufacturer:	Tohatsu	
Engine Model:	MFS30D	
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 is available in 15" and 20" midsection and also available in white colour

Air intake outside cowling.



Air intake inside cowling.



Photo without top cover, 45° from the front.



Photo without top cover, 45° from the starboard side.



Photo without top cover, 45° from the rear



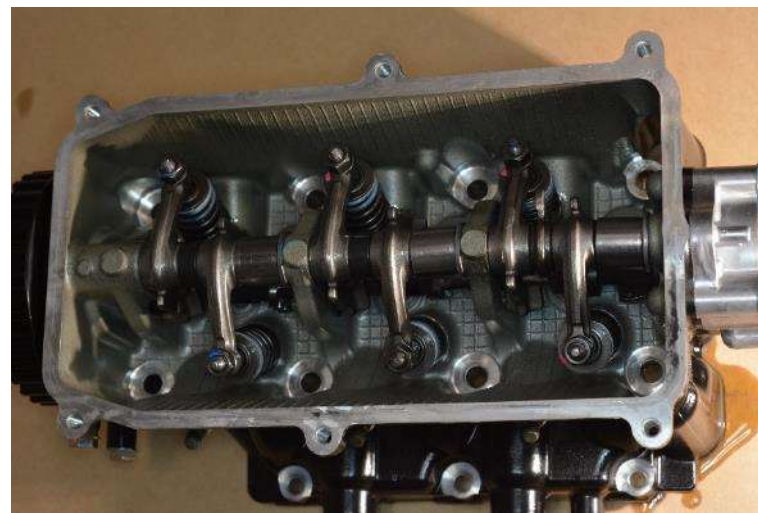
Photo without top cover, 45° from the port side.



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 valve seats.



Cylinder head showing valve seats - detail



Exhaust outlet block



Valves and valve spring



Piston viewed from the top



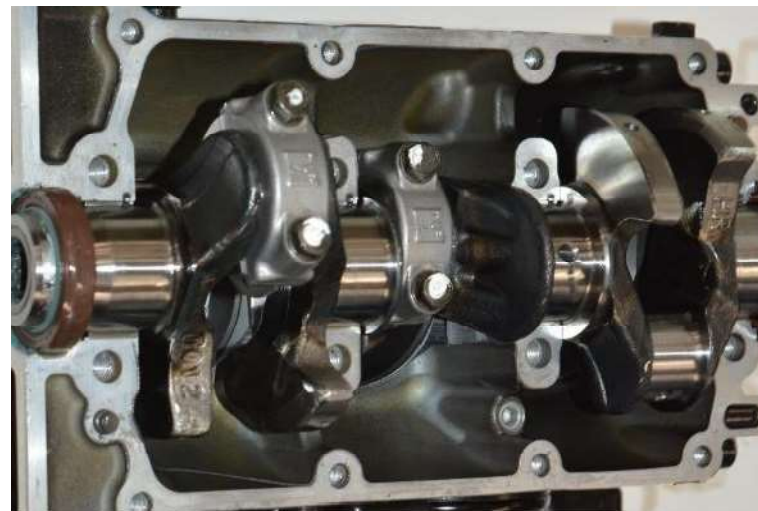
Piston viewed from the bottom



Connecting rod and crankshaft.



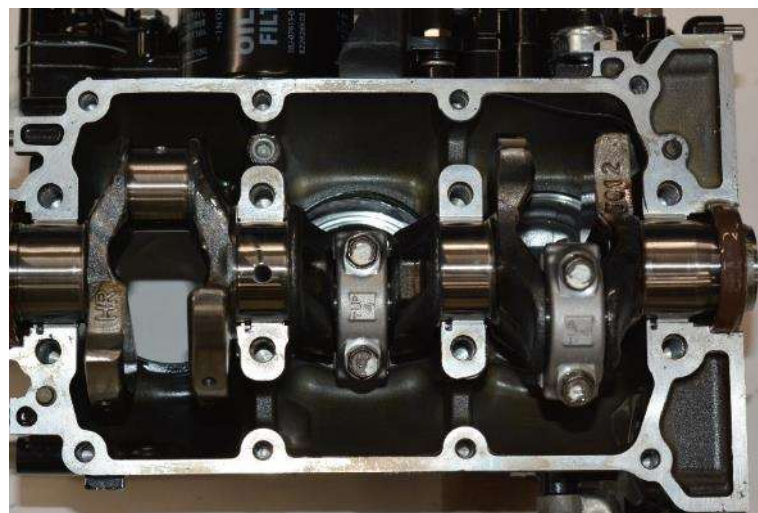
Crankshaft.



Engine block top view



Engine block bottom view



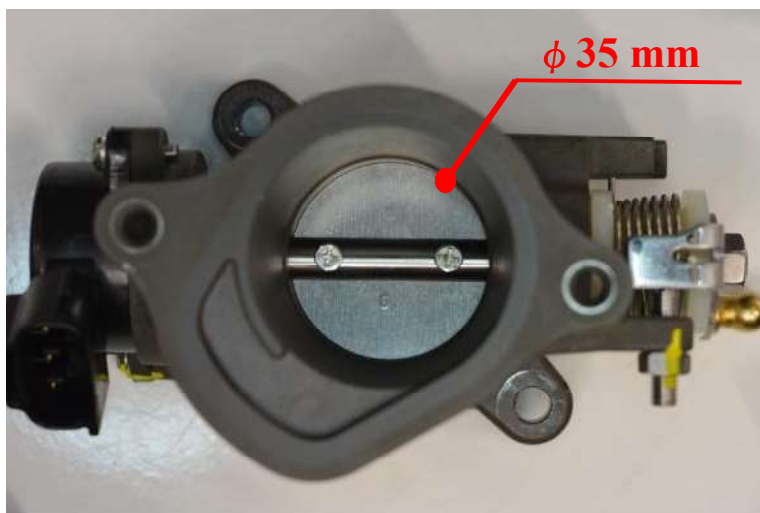
Engine block starboard view



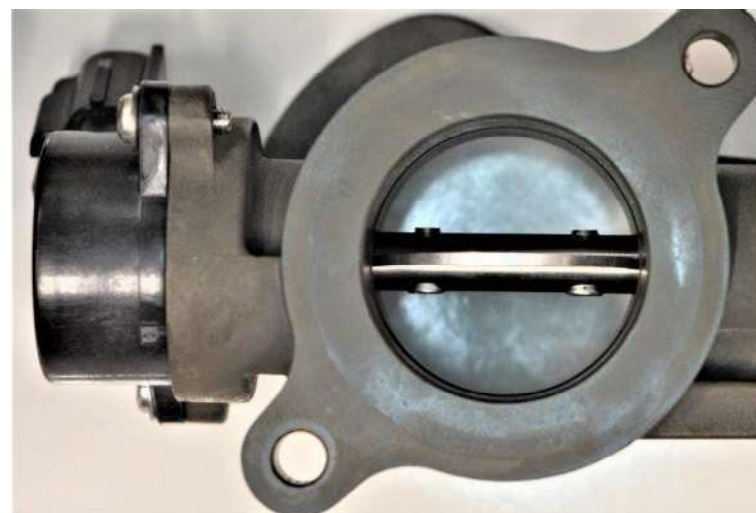
Engine block bottom view



Throttle house



Throttle house



Intake silencer air intakes



Intake manifold -



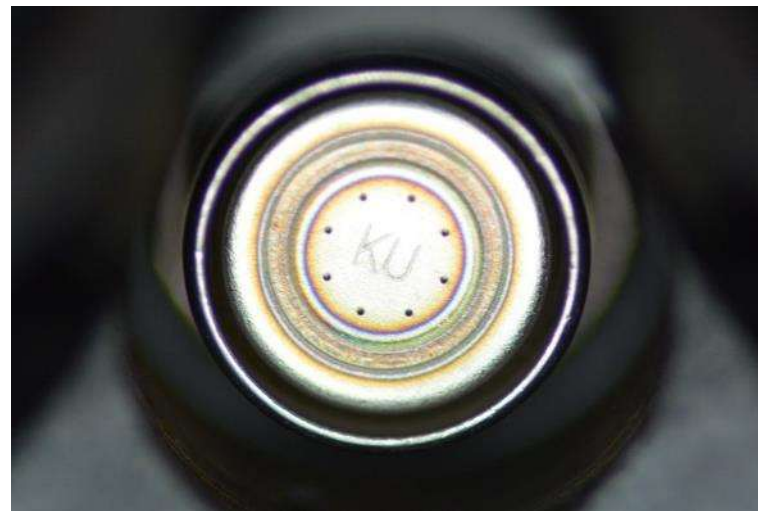
Intake manifold and fuel pump



Intake Manifold – engine side



Fuel Injector - Close up



ECU box front



ECU box back



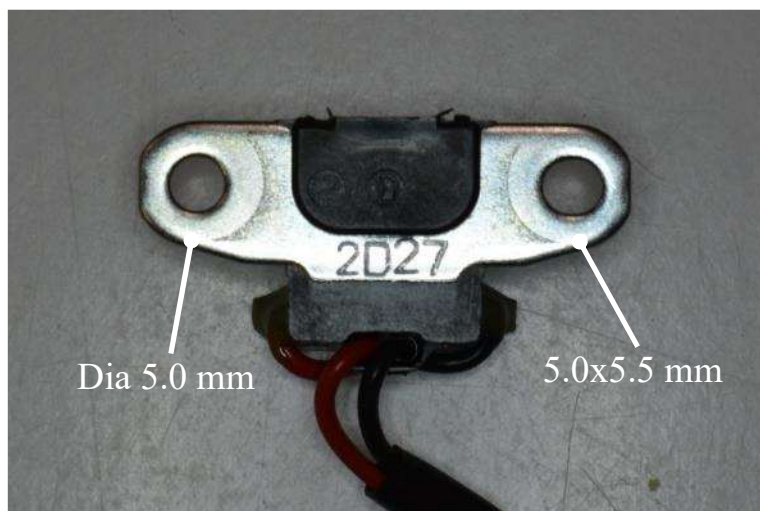
ECU box - connectors.



Trigger ignition



Trigger – close-up



Fuel pump



Fuel rail



Exhaust mid section



Exhaust mid section close up



Flywheel – viewed from bottom side



Flywheel – viewed from top side



Gear House



Gear house - Exhaust cooling



Gear House Exhaust outlet



Gear house - Inside



Gear House - Bearing Carrier



MEASUREMENTS

ENGINE FUEL

Type:	Gasolin
Minimum octane required:	91 RON

ENGINE TYPE

Number of cylinders:	3 Cylinders
Cylinder arrangement:	Inline

ENGINE BLOCK

	Tolerance	Measurement	Unit
Bore	+0.005/-0.010	61.00	mm
Stroke	+/- 0.05	57.00	mm
Capacity per cylinder	nom	166.5	cc
Total Capacity	nom	500.0	cc
Cylinder block material		Aluminium	
Cylinder liner material		Steel	
Distance from center of piston to cylinder block deck face.	+/- 0.20	0.56	mm
Distance from crankshaft centreline to cylinder block deck face.	+/- 0.05	139.8	mm

CYLINDER HEAD

	Tolerance	Measurement	Unit
Cylinder head material		Aluminium	
Volume of combustion chamber (without volume of spark plug hole)	+/- 0.2	16.0	cc
Compression ratio	nom	10.2	
Compression pressure (reference value) At 500 rpm	without decompressor with decompressor	1.40 0.50	MPa
Thickness of cylinder head	+/- 0.10	100.7	mm
Depth of combustion chamber	nom	12.7	mm
Inlet Port:			
Size of port at cylinder head/manifold face	+/- 0.5	30.0x22.4	mm
Internal diameter of valve seat insert	+/- 0.10	Ø28.0	mm
Surface finish of port		Cast	
Exhaust Port:			
Size of port at cylinder head/manifold face	+/- 0.5	19.5x22.0	mm
Internal diameter of valve seat insert	+/- 0.10	Ø21.0	mm
Surface finish of port		Cast	

Inlet Valves:

Diameter of stem	-0.008/-0.028	5.50	mm
Diameter of head	+/- 0.10	31.8	mm
Overall length of inlet valve	+/- 0.35	74.15	mm
Valve face angle of valve seat	-, 0/-0.25°, -	20,45,60	°
Surface width of valve seat	+/-0.1	1.0	mm
Gauge diameter of valve seat	+/-0.10	φ 29.5	mm

Exhaust Valves:

Diameter of stem	-0.025/-0.045	5.50	mm
Diameter of head	+/- 0.10	24.7	mm
Overall length of exhaust valve	+/- 0.35	75.45	mm
Valve face angle of valve seat	-, 0/-0.25°, -	20,45,60	°
Surface width of valve seat	+/-0.1	1.0	mm
Gauge diameter of valve seat	+/-0.10	φ 22.7	mm

Valve Springs:

Diameter of wire	nom	2.4	mm
Inside diameter of coil	+/- 0.20	16.0	mm
Free length	nom	32.85	mm
Number of working turns	nom	4.85	turns

CAMSHAFT/SHAFTS

	Tolerance	Measurement	Unit
Inlet:			
Tappet clearance for checking timing	+/- 0.025	0.125	mm
Total valve lift	+/- 0.15	6.75	mm
Total inlet opening angle (measured at flywheel in degrees at 0.1 mm lift at specified valve lash)	+/- 5°	262	degrees
Duration inlet opening angle 3mm under max lift (measured at flywheel in degrees)	+/- 2°	138	degrees
Base circle diameter of lobe	+/- 0.05	Ø20.0	mm
Total lift of lobe	+/- 0.05	3.63	mm
Exhaust:			
Tappet clearance for checking timing	+/- 0.02	0.22	mm
Total valve lift	+/- 0.15	6.96	mm

Total inlet opening angle (measured at flywheel in degrees at 0.1 mm lift at specified valve lash)	+/- 5°	276	degrees
Duration inlet opening angle 3mm under max lift (measured at flywheel in degrees)	+/- 2°	142	degrees
Base circle diameter of lobe	+/- 0.05	Ø20.0	mm
Total lift of lobe	+/- 0.05	3.80	mm

PISTONS

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

CONNECTING ROD

	Tolerance	Measurement	Unit
Length of rod from big end to small end (centre to centre)	+/- 0.02	88.8	mm

CRANKSHAFT

	Tolerance	Measurement	Unit
Number of main bearing journals		4	
Diameter of main bearing journals	-0.004/-0.012	Ø34.0	mm
Diameter of connecting rod journals	-0.015/-0.028	Ø29.0	mm
Surface finish of crankshaft		Cast	

TYPE OF BEARINGS

Piston Pin	N/A (integrated)
Connecting Rod journal	N/A (integrated)
Main journal	Plain

IGNITION

Idle	+/- 3°	ATDC 3°
High motor speed	max	BTDC 28°

SPARK PLUG

Brand	NGK
Model number.	DCPR6E

FUEL INJECTION

	Tolerance	Measurement	Unit
Brand		TK	
Type of pump, model no.		Electric,E00AT35471	

Fuel pressure	+/- 5	250	kPa
Total number of injectors		3	Injectors
Type of injectors		Electric	
Diameter of throttle bore	max	Ø35.0	mm

SENSOR TESTS

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

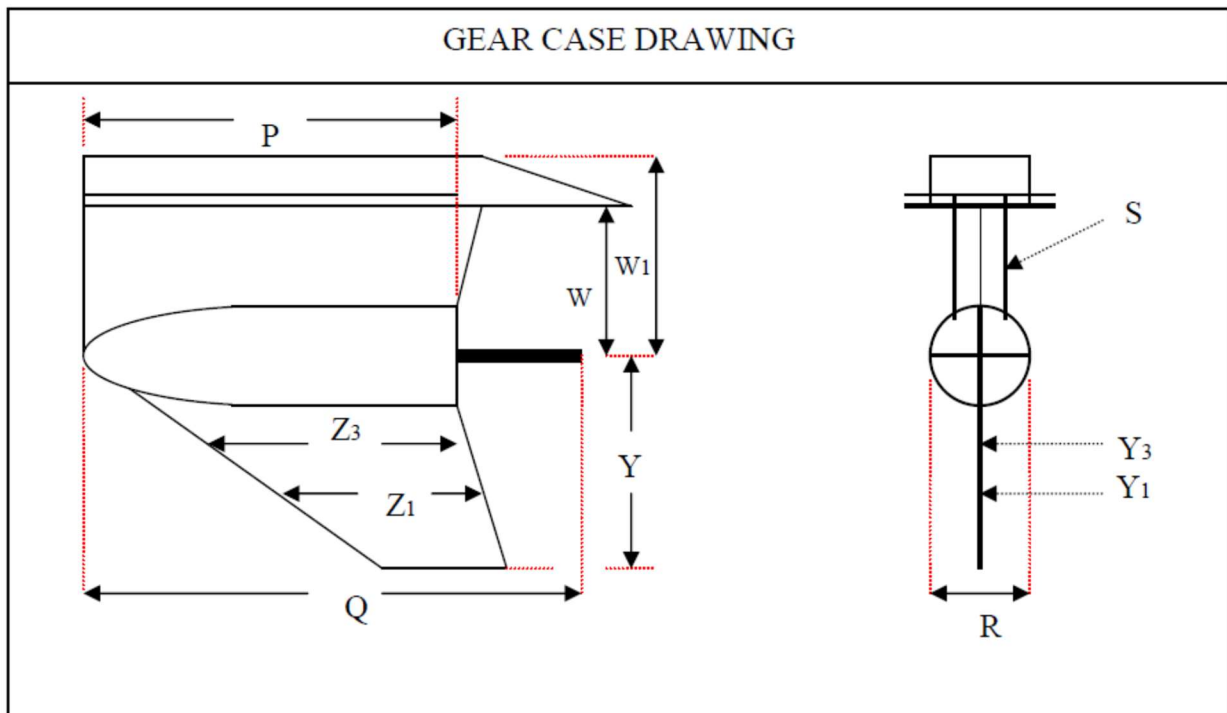
COOLING SYSTEM

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

WEIGHTS

	Tolerance	Measurement	Unit
Inlet valve (bare)	min	28.0	g
Exhaust valve (bare)	min	24.0	g
Inlet rocker arm (with decompressor)	min	49.0	g
Exhaust rocker arm (with decompressor)	min	49.0	g
Valve spring and retainer	min	17.5	g
Piston (with rings)	min	111.0	g
Piston Pin	min	35.0	g
Connecting Rod (with bearings)	min	121.0	g
Piston, rings, connecting rod	min	270.0	
Crankshaft	min	2560.0	g
Flywheel (bare)	min	2640.0	g

UNDERWATER UNIT	Tolerance	Measurement	Unit
Gear Ratio		26:12 (2.17)	
P Longitudinal length of gearcase torpedo (without bearing carrier)	+0.55/- 0.50	184	mm
(Q Longitudinal dimension of gearcase including propeller shaft	+/- 5.0	305.5	mm
R Transverse dimension of gearcase	+/- 0.7	Ø81.2	mm
S Thickness of strut	+/- 1.0	37.0	mm
Z1 Skeg chord length, 25mm above bottom	+/- 5.0	86.0	mm
Z3 Skeg chord length, 75mm above bottom	+/- 5.0	122.1	mm
W1 Distance from propeller shaft to upper flange	+0.05/0	235.0	mm
W Distance from propeller shaft to anti-ventilation plate	+/- 0.5	149.5	mm
Y1 Thickness of skeg, 25mm above bottom	min	6.0	mm
Y3 Thickness of skeg, 75mm above bottom	min	8.0	mm
Y Skeg depth from propeller shaft	+/- 0.5	146	mm
Diameter Exhaust outlet at propeller resess (5 mm in)	+/- 0.6	Ø69.8	mm



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NOTES

Inspection of ECU

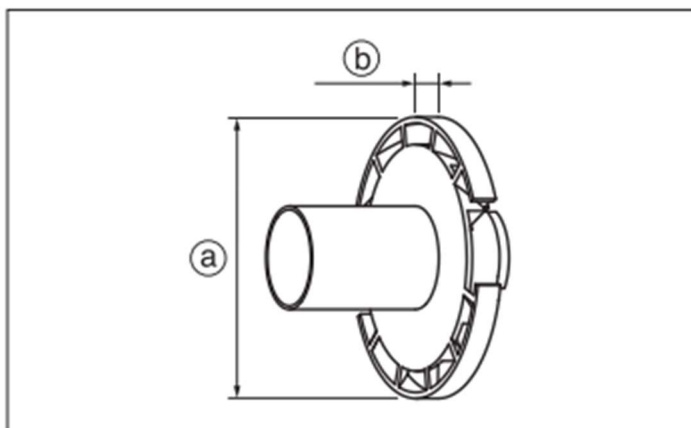
Brand: Kokusandenki

Model: 3VS-06401-0 / Y30 22D / 3VS22AA / EC7322A 22D15

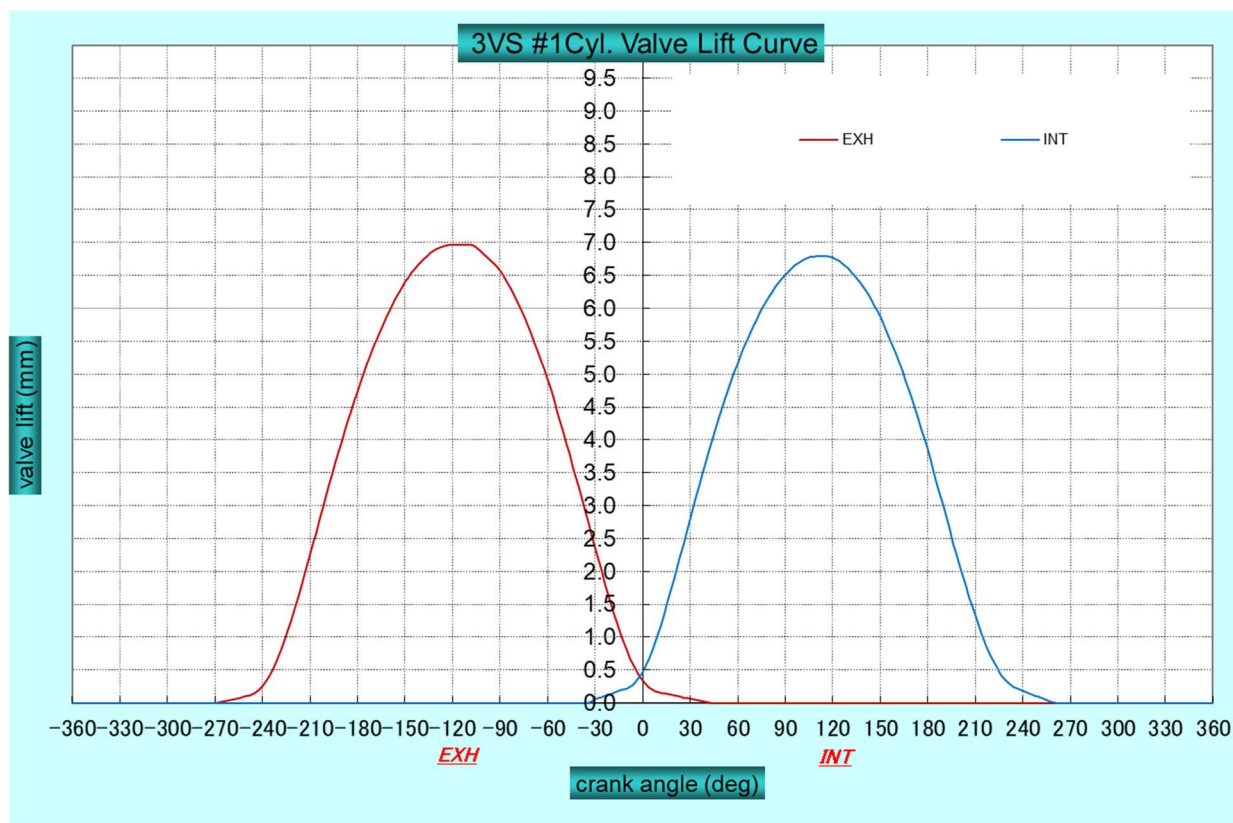
Maximal Engine Speed: 6700rpm (ECU stops feeding fuel)

Test Propeller

	MFS25	MFS30
Part No.	3VS-64110-0	3VS-64110-0
Outer Diameter (a)	223 mm (8.78 in)	223 mm (8.78 in)
Width (b)	16 mm (0.63 in)	16 mm (0.63 in)
Fully Open Revolution Speed	5500 min ⁻¹ (rpm)	6000 min ⁻¹ (rpm)



Attachment 1 - Camlift Curve/measurement



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