

## General specification

Item	Unit	Model	
		F115TR	LF115TR
<b>Dimension</b>			
Overall length	mm (in)	825 (32.5)	
Overall width	mm (in)	498 (19.6)	
Overall height			
(L)	mm (in)	1,609 (63.3)	—
(X)	mm (in)	1,736 (68.3)	
Boat transom height			
(L)	mm (in)	508 (20.0)	—
(X)	mm (in)	635 (25.0)	
<b>Weight</b>			
(without propeller)			
(L)	kg (lb)	183.0 (403)	—
(X)	kg (lb)	188.0 (414)	
<b>Performance</b>			
Maximum output	kW (HP)	84.6 (115) at 5,500 r/min	
Full throttle operating range	r/min	5,000–6,000	
Maximum fuel consumption	L (US gal, Imp gal)/hr	38.0 (10.0, 8.4) at 6,000 r/min	
Engine idle speed	r/min	700–800	
<b>Power unit</b>			
Type		4-stroke, L	
Cylinder quantity		4	
Total displacement	cm <sup>3</sup> (cu. in)	1,741 (106.2)	
Bore × stroke	mm (in)	79.0 × 88.8 (3.11 × 3.50)	
Compression ratio		9.7	
Control system		Remote control	
Starting system		Electric	
Fuel system		Fuel injection	
Ignition control system		TCI	
Advance type		Micro computer	
Maximum generator output	V, A	12, 25	
Spark plug		LFR6A-11 (NGK)	
Firing order		1-3-4-2 (Normal operation)	
Cooling system		Water	
Exhaust system		Propeller boss	
Lubrication system		Wet sump	

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		F115TR	LF115TR
<b>Fuel and oil</b>			
Fuel type		Regular unleaded gasoline	
Engine oil		4-stroke motor oil	
Engine oil grade <sup>(*1)</sup>	API SAE	SE, SF, SG, SH, SJ, or SL 5W-30, 10W-30, or 10W-40	
Engine oil quantity (without oil filter replacement)	L (US qt, Imp qt)	4.3 (4.55, 3.78)	
(with oil filter replacement)	L (US qt, Imp qt)	4.5 (4.76, 3.96)	
Gear oil type		Hypoid gear oil	
Gear oil grade <sup>(*2)</sup>	API SAE	GL-4 90	
Gear oil quantity	cm <sup>3</sup> (US oz, Imp oz)	760 (25.7, 26.8)	715 (24.2, 25.2)
<b>Bracket unit</b>			
Trim angle (at 12° boat transom)	Degree	-4 to 16	
Tilt-up angle	Degree	70	
Steering angle	Degree	30 + 30	
<b>Drive unit</b>			
Gear shift positions		F-N-R	
Gear ratio		2.15 (28/13)	
Reduction gear type		Spiral bevel gear	
Clutch type		Dog clutch	
Propeller shaft type		Spline	
Propeller direction (rear view)		Clockwise	Counterclockwise
Propeller mark		K	KL
<b>Electrical</b>			
Battery minimum capacity			
Min. cold cranking amps (CCA/SAE)	A	380	
Min. marine cranking amps (MCA/ABYC)	A	502	
Min. reserve capacity (RC/SAE)	Minute	124	
Electrolyte specific gravity at 20 °C (68 °F)		1.280	

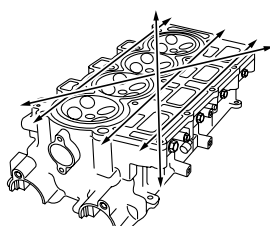
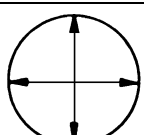
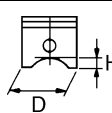
<sup>(\*1)</sup> If the recommended engine oil grades are not available, use engine oil with an SAE classification of 15W-40, 20W-40, or 20W-50 and an API classification of SH, SJ, or SL.

<sup>(\*2)</sup> Meeting both API and SAE requirements

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## Maintenance specification

### Power unit


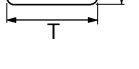

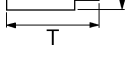
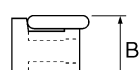
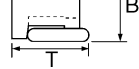


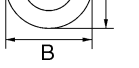






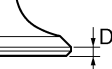
Item	Unit	Model	
		F115TR	LF115TR
<b>Power unit</b> Minimum compression pressure <sup>(*1, *3)</sup> Oil pressure <sup>(*2, *3)</sup>	kPa (kgf/cm <sup>2</sup> , psi) kPa (kgf/cm <sup>2</sup> , psi)	950 (9.5, 137.8) 350 (3.5, 50.8) at 700–800 r/min	
<b>Cylinder head</b> Warpage limit  (lines indicate straightedge position) Camshaft cap inside diameter	mm (in) mm (in)	0.10 (0.0039) 25.000–25.021 (0.9843–0.9851)	
<b>Cylinder</b> Bore size 	mm (in)	79.000–79.020 (3.1102–3.1110)	
<b>Piston</b> Piston diameter (D) Measuring point (H) Piston clearance <sup>(*3)</sup> Piston pin boss bore Piston ring groove Top ring 2nd piston ring Oil ring Oversize piston diameter	 mm (in) mm (in) mm (in) mm (in) mm (in) mm (in) mm (in) mm (in)	78.928–78.949 (3.1074–3.1082) 13.0 (0.51) 0.070–0.080 (0.0028–0.0031) 18.008–18.015 (0.7090–0.7093) 1.23–1.25 (0.048–0.049) 1.52–1.54 (0.060–0.061) 2.51–2.53 (0.099–0.100) 79.25 (3.1201)	
<b>Piston pin</b> Outside diameter	mm (in)	17.997–18.000 (0.7085–0.7087)	

<sup>(\*1)</sup> Measuring conditions:

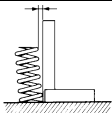
Ambient temperature 20 °C (68 °F), wide open throttle, with spark plugs removed from all cylinders.

<sup>(\*2)</sup> For details of the checking method, see “Checking the oil pressure” (5-1).

<sup>(\*3)</sup> The figures are for reference only.

Item	Unit	Model	
		F115TR	LF115TR
<b>Piston ring</b>			
Top ring			
Dimension B		mm (in)	1.17–1.19 (0.0461–0.0469)
Dimension T		mm (in)	2.80–3.00 (0.1102–0.1181)
End gap <sup>(*)</sup>		mm (in)	0.15–0.30 (0.0059–0.0118)
Side clearance		mm (in)	0.04–0.08 (0.0016–0.0032)
2nd piston ring			
Dimension B		mm (in)	1.47–1.49 (0.0579–0.0587)
Dimension T		mm (in)	3.00–3.20 (0.1181–0.1260)
End gap <sup>(*)</sup>		mm (in)	0.70–0.90 (0.0276–0.0354)
Side clearance		mm (in)	0.03–0.07 (0.0012–0.0028)
Oil ring			
Dimension B		mm (in)	2.38–2.48 (0.0937–0.0976)
Dimension T <sup>(*)</sup>		mm (in)	2.40 (0.0945)
End gap <sup>(*)</sup>		mm (in)	0.20–0.70 (0.0079–0.0276)
Side clearance		mm (in)	0.03–0.15 (0.0012–0.0059)
<b>Camshaft</b>			
Intake (A)		mm (in)	37.220–37.380 (1.4654–1.4717)
Exhaust (A)		mm (in)	36.900–37.060 (1.4528–1.4591)
Intake and exhaust (B)		mm (in)	29.920–30.080 (1.1780–1.1842)
Camshaft journal diameter		mm (in)	24.960–24.980 (0.9827–0.9835)
Camshaft runout limit		mm (in)	0.03 (0.0012)
<b>Valve</b>			
Valve clearance (cold)			
Intake		mm (in)	0.20 ± 0.03 (0.0079 ± 0.0012)
Exhaust		mm (in)	0.34 ± 0.03 (0.0134 ± 0.0012)
Head diameter (A)			
Intake		mm (in)	29.0–29.2 (1.14–1.15)
Exhaust		mm (in)	24.0–24.2 (0.94–0.95)
Face width (B)			
Intake		mm (in)	2.00–2.43 (0.0787–0.0957)
Exhaust		mm (in)	2.28–2.71 (0.0898–0.1067)
Seat contact width (C)			
Intake and exhaust		mm (in)	1.20–1.60 (0.0472–0.0630)
Margin thickness (D)			
Intake		mm (in)	0.80–1.20 (0.0315–0.0472)
Exhaust		mm (in)	1.00–1.40 (0.0394–0.0551)

(\*) The figures are for reference only.

Item	Unit	Model	
		F115TR	LF115TR
<b>Stem diameter</b>			
Intake	mm (in)	5.975–5.990 (0.2352–0.2358)	
Exhaust	mm (in)	5.960–5.975 (0.2346–0.2352)	
<b>Stem runout limit</b>			
Intake and exhaust	mm (in)	0.010 (0.0004)	
<b>Guide inside diameter</b>			
Intake and exhaust	mm (in)	6.000–6.018 (0.2362–0.2369)	
<b>Stem-to-guide clearance<sup>(*1)</sup></b>			
Intake	mm (in)	0.010–0.043 (0.0004–0.0017)	
Exhaust	mm (in)	0.025–0.058 (0.0010–0.0023)	
Guide installation position	mm (in)	11.5 ± 0.2 (0.45 ± 0.01)	
<b>Valve spring</b>			
Free length	mm (in)	53.20 (2.0945)	
Tilt limit	mm (in)	2.6 (0.10)	
			
<b>Valve shim</b>			
Valve shim thickness (in 0.020 mm increments)	mm (in)	2.00–3.30 (0.08–0.13)	
<b>Connecting rod</b>			
Big end inside diameter	mm (in)	45.025–45.045 (1.7726–1.7734)	
Big end side clearance <sup>(*1)</sup>	mm (in)	0.15–0.30 (0.006–0.012)	
Crankpin oil clearance	mm (in)	0.025–0.031 (0.0010–0.0012)	
Big end bearing thickness			
Yellow	mm (in)	1.502–1.508 (0.0591–0.0594)	
Green	mm (in)	1.508–1.514 (0.0594–0.0596)	
Blue	mm (in)	1.514–1.520 (0.0596–0.0598)	
Red	mm (in)	1.520–1.527 (0.0598–0.0601)	
<b>Crankshaft</b>			
Crankshaft journal diameter	mm (in)	47.984–48.000 (1.8891–1.8898)	
Crankpin diameter	mm (in)	41.982–42.000 (1.6528–1.6535)	
Crankpin width	mm (in)	21.50–21.55 (0.8465–0.8484)	
Crankshaft runout limit	mm (in)	0.03 (0.0012)	

(\*1) The figures are for reference only.

## Maintenance specification

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Item	Unit	Model	
		F115TR	LF115TR
<b>Crankcase</b>			
Crankshaft journal oil clearance	mm (in)	0.024–0.044 (0.0009–0.0017)	
Upper crankcase main bearing thickness			
Green	mm (in)	2.992–2.999 (0.1178–0.1181)	
Blue	mm (in)	2.999–3.006 (0.1181–0.1183)	
Red	mm (in)	3.006–3.013 (0.1183–0.1186)	
Lower crankcase main bearing thickness			
Yellow	mm (in)	3.010–3.017 (0.1185–0.1188)	
Green	mm (in)	3.017–3.024 (0.1188–0.1191)	
Blue	mm (in)	3.024–3.031 (0.1191–0.1193)	
Red	mm (in)	3.031–3.038 (0.1193–0.1196)	
Lower crankcase main bearing thickness (J3)			
Green	mm (in)	2.992–2.999 (0.1178–0.1181)	
Blue	mm (in)	2.999–3.006 (0.1181–0.1183)	
Red	mm (in)	3.006–3.013 (0.1183–0.1186)	
<b>Thermostat</b>			
Opening temperature at 0.05 mm (0.0020 in)	°C (°F)	48–52 (118–126)	
Fully open temperature	°C (°F)	60 (140)	
Valve open lower limit	mm (in)	4.3 (0.17)	

### Fuel system

Item	Unit	Model	
		F115TR	LF115TR
<b>Fuel system</b>			
Fuel pressure at engine idle speed <sup>(*1)</sup>	kPa (kgf/cm <sup>2</sup> , psi)	250 (2.5, 36.3)	
Fuel filter assembly holding pressure			
Fuel inlet positive pressure	kPa (kgf/cm <sup>2</sup> , psi)	200 (2.0, 29.0)	
Fuel outlet negative pressure	kPa (kgf/cm <sup>2</sup> , psi)	80 (0.8, 11.6)	
Float height			
Water detection position	mm (in)	43 (1.69)	
Vapor separator float height	mm (in)	56.55–57.55 (2.23–2.27)	

(\*1) The figures are for reference only.

### PTT unit

Item	Unit	Model	
		F115TR	LF115TR
<b>PTT unit</b>		ATF Dexron II	
Fluid type		ATF Dexron II	
Hydraulic pressure		5.90–8.80 (59.0–88.0)	
Down	MPa (kgf/cm <sup>2</sup> )	5.90–8.80 (59.0–88.0)	
Up	MPa (kgf/cm <sup>2</sup> )	7.85–9.81 (78.5–98.1)	

### Lower unit

Item	Unit	Model	
		F115TR	LF115TR
<b>Lower unit</b>		70 (0.7, 10)	
Holding pressure	kPa (kgf/cm <sup>2</sup> , psi)	70 (0.7, 10)	
<b>Gear backlash</b>			
Pinion-to-forward gear	mm (in)	0.18–0.54 (0.0071–0.0213)	0.31–0.66 (0.0122–0.0260)
Pinion-to-reverse gear	mm (in)	0.86–1.26 (0.0339–0.0496)	0.86–1.21 (0.0339–0.0476)
Pinion shims	mm	0.10, 0.12, 0.15, 0.18, 0.30, 0.40, 0.50	
Forward gear shims	mm	0.10, 0.12, 0.15, 0.18, 0.30, 0.40, 0.50	
Reverse gear shims	mm	0.10, 0.12, 0.15, 0.18, 0.30, 0.40, 0.50	
<b>Propeller shaft</b>			
Propeller shaft free play	mm (in)	—	0.25–0.35 (0.0098–0.0138)
Propeller shaft shims	mm	—	0.10, 0.12, 0.15, 0.18, 0.30, 0.40, 0.50
Runout limit	mm (in)	0.02 (0.0008)	
<b>Drive shaft</b>			
Runout limit	mm (in)	0.2 (0.008)	

### Electrical

Item	Unit	Model	
		F115TR	LF115TR
<b>Ignition and ignition control system</b>			
Spark plug gap	mm (in)	1.0–1.1 (0.039–0.043)	
ECM output peak voltage (B/R – Ground, B/W – Ground)			
at cranking (loaded)	V	122	
at 1,500 r/min (loaded)	V	242	
at 3,500 r/min (loaded)	V	245	

Item	Unit	Model	
		F115TR	LF115TR
Pulser coil output peak voltage (W/R – B, W/B – B)			
at cranking (unloaded)	V		3.5
at cranking (loaded)	V		3.0
at 1,500 r/min (loaded)	V		17
at 3,500 r/min (loaded)	V		31
Pulser coil resistance <sup>(*)</sup> (W/R – B, W/B – B)			
at 20 °C (68 °F)	Ω		459.0–561.0
Ignition coil resistance <sup>(*)</sup> at 20 °C (68 °F)			
Primary (R – B/W)	Ω		1.87–2.53
Secondary (Spark plug wire – Spark plug wire)			
Cylinders #1 and #4	kΩ		18.97–35.23
Cylinders #2 and #3	kΩ		18.55–34.45
Spark plug wire resistance <sup>(*)</sup> at 20 °C (68 °F)	kΩ		3.8–10.3
Engine electric control system TPS output voltage (P – B)	V		0.732 ± 0.020
TPS resistance <sup>(*)</sup> at 20 °C (68 °F)			
(O – B)	kΩ		4.60–5.20
(P – B)	kΩ		0.31–5.30
Intake air temperature sensor resistance (B/Y – B)			
at 0 °C (32 °F)	kΩ		5.40–6.60
at 80 °C (176 °F)	kΩ		0.29–0.39
Cooling water temperature sensor resistance (B/Y – B)			
at 0 °C (32 °F)	kΩ		5.21–6.37
at 20 °C (68 °F)	kΩ		2.45
at 80 °C (176 °F)	kΩ		0.29–0.35
<b>Fuel control system</b>			
Fuel injector resistance <sup>(*)</sup> at 20 °C (68 °F)	Ω		14.0–15.0
High-pressure fuel pump resistance <sup>(*)</sup> at 20 °C (68 °F)	Ω		0.9–2.3

<sup>(\*)</sup> The figures are for reference only.



Item	Unit	Model	
		F115TR	LF115TR
<b>Starter motor</b>			
Type		Sliding gear	
Output	kW	1.40	
Cranking time limit	Second	30	
Brushes			
Standard length	mm (in)	15.5 (0.61)	
Wear limit	mm (in)	9.5 (0.37)	
Commutator			
Standard diameter	mm (in)	29.0 (1.14)	
Wear limit	mm (in)	28.0 (1.10)	
Standard undercut	mm (in)	0.8 (0.03)	
Wear limit	mm (in)	0.2 (0.01)	
<b>Charging system</b>			
Fuse 1	V, A	12, 20	
Fuse 2	V, A	12, 30	
Stator assembly output peak voltage (W – W)			
at cranking (unloaded)	V	9.3	
at 1,500 r/min (unloaded)	V	37	
at 3,500 r/min (unloaded)	V	90	
Stator assembly resistance <sup>(*)</sup> (W – W)			
at 20 °C (68 °F)	Ω	0.24–0.36	
Rectifier Regulator output peak voltage (R – Ground)			
at 1,500 r/min (unloaded)	V	13.0	
at 3,500 r/min (unloaded)	V	13.0	
<b>PTT system</b>			
Trim sensor (P – B)			
Setting resistance at 20 °C (68 °F)	Ω	9–11	
Resistance at 20 °C (68 °F)	Ω	9–378.8	
<b>PTT motor</b>			
Output	kW	0.4	
Brushes			
Standard length	mm (in)	9.8 (0.39)	
Wear limit	mm (in)	4.8 (0.19)	
Commutator			
Standard diameter	mm (in)	22.0 (0.87)	
Wear limit	mm (in)	21.0 (0.83)	
Standard undercut	mm (in)	1.35 (0.053)	
Wear limit	mm (in)	0.85 (0.033)	

(\*) The figures are for reference only.