BY series

OPERATION MANUAL

4BY
6BY

P/N: 0ABY0–G00101

YAMAHA®

MARINE ENGINES

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SAFETY

Yanmar considers safety of great importance and recommends that anyone that comes into close contact with its products, such as those who install, operate, maintain or service Yanmar products exercise care, common sense and comply with the safety information in this manual and on the machine's safety decals. Keep the decals from becoming dirty or torn and replace them if they are lost or damaged. Also, if you need to replace a part that has a decal attached to it, make sure you order the new part and decal at the same time.



This safety alert symbol appears with most safety statements. It means attention, become alert, your safety is involved! Please read and abide by the message that follows the safety alert symbol.

⚠ DANGER

Indicates a hazardous situation which, if not avoided, *will* result in death or serious injury.

⚠ WARNING

Indicates a hazardous situation which, if not avoided, *could* result in death or serious injury.

⚠ CAUTION

Indicates a hazardous situation which, if not avoided, *could* result in minor or moderate injury.

NOTICE

Indicates a situation which can cause damage to the machine, personal property and / or the environment or cause the equipment to operate improperly.

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COMPONENT IDENTIFICATION

Left Side - 4BY

Figure 1, **Figure 2** and **Figure 3** illustrate a typical version of a 4BY engine. Your engine may have different equipment from that illustrated.

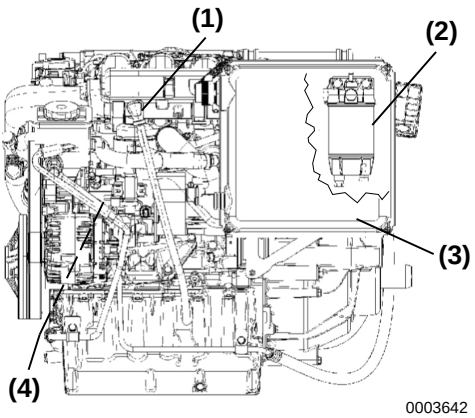


Figure 1

1 – Engine Oil Dipstick
2 – Fuel Filter / Water Separator
3 – E-Box Panel
4 – High Pressure Fuel Pump

Right Side - 4BY

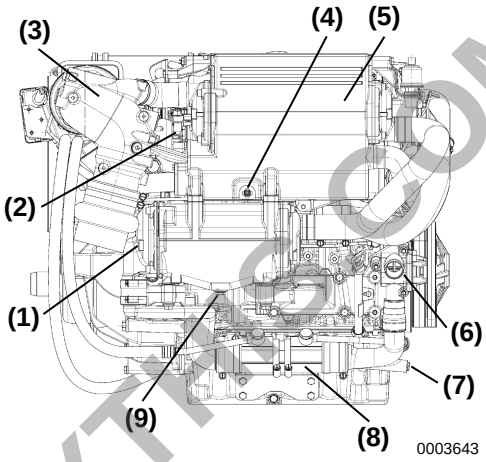


Figure 2

1 – Zinc Anode
2 – Zinc Anode
3 – Exhaust / Water Mixing Elbow
4 – Coolant Drain Cock
5 – Heat Exchanger
6 – Seawater Pump
7 – Seawater Drain Cock
8 – Hydraulic Oil Cooler
9 – Water Drain Plug

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Diagnostic Trouble Code Table

Code	Part or System	Mode	Run Or Condition	Engine Can Start	Check Engine Alarm
No Code	Coolant Temp	Under 0˚C (32˚F)	1000 rpm	yes	no
No Code	Coolant Temp	Over 108˚C (226˚F)	reduce	yes	alarm
No Code	Charge Air Temp	Over 110˚C (230˚F)	reduce	yes	no
No Code	Boost Pressure Reading	4BY - over 1.9 bar (27.5 psi) (relative*) or 2.9 bar (42.0 psi) (absolute**) 6BY - over 2.3 bar (33.3 psi) (relative*) or 3.3 bar (42.9 psi) (absolute**)	reduce	yes	alarm
No Code	Fuel Temperature	Over 90˚C (194˚F)	reduce	yes	no
No Code	Neutral Switch	Only in case of analog throttle or in case of CAN-fault (U0001), wrong configuration - neutral position	no	no	alarm
P0001	Fuel Metering Unit	Not connected	reduce	yes	alarm
P0003	Fuel Metering Unit	Short circuit to Ground	no	no	alarm
P0004	Fuel Metering Unit	Short circuit to B+	reduce	yes	alarm
P0087	Fuel Rail Pressure System Deviation	Fuel rail pressure out of range	reduce or shut off	depends on fault	alarm
P0088	Fuel Rail Pressure System Deviation	Fuel rail pressure out of range	reduce or shut off	depends on fault	alarm
P0089	Fuel Rail Pressure System Deviation	Fuel rail pressure out of range	yes	yes	alarm
P0090	Fuel Pressure Control Valve	Not connected / valve failure	no	no	alarm
	Fuel Rail Pressure System Deviation	Fuel rail pressure out of range	reduce	yes	alarm
P0091	Fuel Pressure Control Valve	Short circuit to Ground	reduce	yes	alarm
P0092	Fuel Pressure Control Valve	Short circuit to B+	no	no	alarm
P0112	Charge Air Temp	Over 125˚C (257˚F)	reduce	yes	alarm
	Charge Air Temp Sensor	Short circuit to B+	reduce	yes	alarm
P0113	Charge Air Temp	Under -20˚C (-4˚F)	reduce	yes	alarm
	Charge Air Temp Sensor	No connection / short circuit to Ground	reduce	yes	alarm
P0117	Coolant Temp Sensor	Short circuit to B+	reduce	yes	alarm
P0118	Coolant Temp Sensor	No connection / short circuit to Ground	reduce	yes	alarm

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TROUBLESHOOTING

If a problem occurs, stop the engine immediately. Refer to the Problem / Symptom column in the Troubleshooting Chart to identify the problem.

TROUBLESHOOTING CHART

Starting Trouble

Problem / Symptom	Cause	Action
Engine Will Not Crank	Discharged battery	Charge / replace battery
	Blown fuse	Replace fuse
	Defective starter motor	See your authorized Yanmar dealer or distributor
	Loose wiring connections	Tighten connections
	Electrical panel power circuit breaker is tripped	Reset circuit breaker
Engine Cranks but Will Not Start	No fuel to engine	Check fuel level in tank
		See your authorized Yanmar dealer or distributor
	No fuel to cylinders	Check fuel filter / water separator
		Clean or replace clogged fuel fine filter
		Bleed air from fuel system
		Replace blown fuse (F3)
		See your authorized Yanmar dealer or distributor
	Low ambient temperature	See your authorized Yanmar dealer or distributor
	Oil high	Replace with correct viscosity oil for operating conditions

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○: Check or Clean ◇: Replace ●: Contact your authorized Yanmar marine dealer or distributor

System	Item	Periodic Maintenance Interval					
		Daily	Every 50 hours or monthly whichever comes first	Every 250 hours or one year whichever comes first	Every 500 hours or 2 years whichever comes first	Every 1000 hours or 4 years whichever comes first	Every 2000 hours or 8 years whichever comes first
Whole	Visual inspection of engine exterior	○ Before starting					
Fuel System	Check for fuel leakage	○ Before starting					
	Check the fuel level and refill if necessary	○ Before starting					
	Drain water and sediment from fuel tank			○			
	Drain the fuel filter / water separator If necessary	○					
	Replace the fuel fine filter			◇			
	Replace fuel filter / water separator element			◇			
	Check the fuel pump and fuel lines				●		
Lubricating System	Check the engine oil level and refill if necessary	○ Before starting					
	Change the engine oil and replace the oil filter element		◇ Initial 50	◇			
Cooling System - Engine Coolant	Visual inspection of cooling system	○ Before starting					
	Check coolant level and check for leaks	○ Before starting					
	Replace coolant				◇		

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SPECIFICATIONS

ENGINE SPECIFICATIONS

Engine Model	4BY150 / 150Z	4BY180 / 180Z	6BY220 / 220Z	6BY260 / 260Z
Application Design	Models numbers with no suffix letter are used in marine gear applications. Models having a “Z” suffix are used with stern drive.			
Number of Cylinders	In-line 4		In-line 6	
Type	15˚ inclined, water-cooled, dual overhead camshaft, 4-cycle diesel			
Combustion System	Direct injection			
Aspiration	Turbocharged with charge air cooler			
Bore x Stroke	84 mm x 90 mm (3.307 in. x 3.543 in.)			
Displacement	1.995 L (122 cu in.)		2.993 L (183 cu in.)	
Firing Order*	1-3-4-2		1-5-3-6-2-4	
Compression Ratio	16.5:1		16.5:1	
Rated Power Output**	4BY150 / 4BY150Z	4BY180 / 4BY180Z	6BY220 / 6BY220Z	6BY260 / 6BY260Z
kW (metric hp) at 4000 rpm	110 kW (150 hp)	132 kW (180 hp)	162 kW (220 hp)	191 kW (260 hp)
Mean Pressure	1.66 MPa (240.76 psi)	1.98 MPa (287.18 psi)	1.62 MPa (234.96 psi)	1.92 MPa (278.47 psi)
Torque	317 N·m (234 ft-lb)	355 N·m (262 ft-lb)	487 N·m (359 ft-lb)	545 N·m (402 ft-lb)
Low Idle Speed (Warm Engine @ 88˚C [190˚F])	750 rpm (ECU-controlled)		670 rpm (ECU-controlled)	
Cold Start Speed @ 20˚C (68˚F)	1200 rpm gradually decreasing to warm engine idle @ 88˚C (190˚F) (ECU-controlled)			
High Idle Speed	4600 rpm			
Rotation Direction	Counterclockwise (viewed from flywheel)			
No. of Valves per Cylinder	4			
Valve Adjustment	Hydraulic self-adjusting			
Turbocharger	MHI with pneumatic wastegate		HOLSET with pneumatic wastegate	
Charge Air Cooler	Seawater cooled			
Electrical System	12 V			
Starter	12 V / 2 kW (2.7 hp)			

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