Valve Spring

Inspection Item		Standard	Limit	Reference Page
L48N	Free Length	1.102 in. (28.0 mm)	1.043 in. (26.5 mm)	*See Valve Springs on page 6-28.*
	Inclination	Less than: 0.295 in. (0.75 mm)	-	
	Spring Tension / mm	2.5 - 3.1 lbf (11.2 - 13.7 N, 1.14 - 1.40 kgf)	-	
L70N	Free Length	1.299 in. (33.0 mm)	1.240 in. (31.5 mm)	
	Inclination	Less tan: 0.0236 (1.16 mm)	-	

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Precautions and concerns regarding the use of bio-fuels:

1. Free methanol in FAME may result in corrosion of aluminum and zinc FIE components.
2. Free water in FAME may result in plugging of fuel filters and increased bacterial growth.
3. High viscosity at low temperatures may result in fuel delivery problems, injection pump seizures, and poor injection nozzle spray atomization.
4. FAME may have adverse effects on some elastomers (seal materials) and may result in fuel leakage and dilution of the engine lubricating oil.
5. Even bio-diesel fuels that comply with a suitable standard as delivered, will require additional care and attention to maintain the quality of the fuel in the equipment or other fuel tanks. It is important to maintain a supply of clean, fresh fuel. Regular flushing of the fuel system, and / or fuel storage containers, may be necessary.
6. The use of bio-diesel fuels that do not comply with the standards as agreed to by the diesel engine manufacturers and the diesel fuel injection equipment manufacturers, or bio-diesel fuels that have degraded as per the precautions and concerns above, may affect the warranty coverage of your engine. *See Yanmar Limited Warranty on page 2-3.*

Filling the Fuel Tank

⚠ DANGER



FIRE AND EXPLOSION HAZARD!

- **Diesel fuel is flammable and explosive under certain conditions.**
- **ALWAYS fill the fuel tank only with specified diesel fuel. Filling the fuel tank with gasoline may result in a fire and will damage the engine.**
- **NEVER refuel with the engine running.**
- **ALWAYS wipe up all spills immediately.**
- **ALWAYS keep sparks, open flames or any other form of ignition (match, cigarette, static electric source) well away when refueling.**
- **NEVER overfill the fuel tank.**
- **Store any containers containing fuel in a well-ventilated area, away from any combustibles or sources of ignition.**
- **Failure to comply will result in death or serious injury.**

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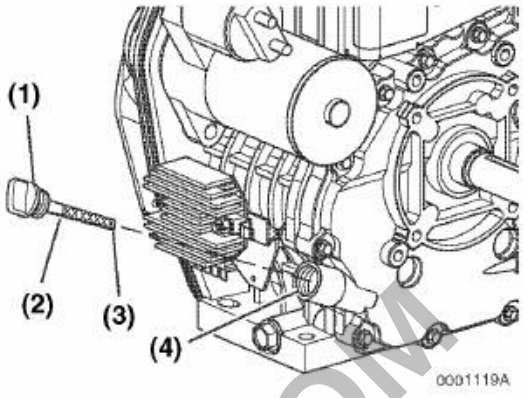
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Engine Oil Capacity (Typical)

Note: Oil capacity will vary depending upon which optional oil pan is used. Refer to the operation manual provided by the driven machine manufacturer for the actual engine oil capacity of your machine.

The following are the engine oil capacities for various Yanmar LN Series engines.



Engine Model	Dipstick Upper Limit/ Lower Limit

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ABBREVIATIONS AND SYMBOLS

Abbreviations

A	ampere
AC	alternating current
ACEA	Association des Constructeurs Européens d'Automobilies
Ah	ampere-hour
API	American Petroleum Institute
ARB	Air Resources Board
ATDC	after top dead center
JASO	Japanese Automobile Standards Organization
k	kelvin
kg	kilogram
kgf/cm²	kilogram force per square centimeter
kgf·m	kilogram force per meter
km	kilometers
kPa	kilopascal
kW	kilowatt
L	liter
L/hr	liter per hour
lb	pound
lb-ft	pound foot
lb-in.	pound inch

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Gravity-Fed Fuel System

1. Place the engine speed control lever in the HIGH-IDLE position.
2. Open all fuel supply valves. Allow 20 - 30 seconds for fuel to reach the fuel injection pump.
3. Loosen the high pressure fuel injection line nut at the fuel injector fitting approximately 1/2 turn.
4. Set and hold the compression release lever in the RELEASE position.
5. Using the recoil starter, crank the engine until the fuel coming out of the fuel injector fitting is free of bubbles.

IMPORTANT

NEVER use the starter motor to crank the engine in order to prime the fuel system. This may cause the starter motor to overheat and damage the coils, pinion and / or ring gear.

6. Tighten the high pressure fuel injection line nut. *See Special Torque Specifications on page 7-4.*

Electric Pump Pressurized Fuel System

IMPORTANT

NEVER use the starter motor to crank the engine in order to prime the fuel system. This may cause the starter motor to overheat and damage the coils, pinion and / or ring gear.

1. Place the engine speed control lever in the HIGH-IDLE position.
2. Open all fuel supply valves.
3. Turn the key switch to the “ON” position for 10 - 15 seconds to allow the electric fuel pump to prime the fuel system to the fuel injection pump.
4. Loosen the high pressure fuel injection line nut at the fuel injector fitting approximately 1/2 turn.
5. Set and hold the compression release lever in the RELEASE position.

IMPORTANT

NEVER use the starter motor to crank the engine in order to prime the fuel system. This may cause the starter motor to overheat and damage the coils, pinion and / or ring gear.

6. Using the recoil starter, crank the engine until the fuel coming out of the fuel injector fitting is free of bubbles.
7. Tighten the high pressure fuel injection line nut. *See Special Torque Specifications on page 7-4.*

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Special Torque Specifications

Component	Model	Thread Diameter and Pitch	Torque	Lubricating Oil Application (Thread Portion and Seat Surface)
Crankcase Cover Bolt	L48N	14-M6 x 1.0 mm	96 - 114 lb-in. (10.8 - 12.8 N·m, 1.1 - 1.3 kgf·m)	Not Applied
	L70N, L100N	13-M8 x 1.25 mm	225 - 243 lb-in. (25.5 - 27.5 N·m, 2.6 - 2.8 kgf·m)	
Stiffener Bolts			225 - 242 lb-in.	

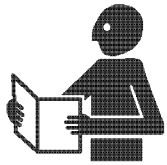
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BEFORE YOU BEGIN SERVICING

CAUTION



NEVER permit anyone to operate the engine or driven machine without proper training.

- Read and understand this Service Manual before you operate or service the machine to ensure that you follow safe operating practices and maintenance procedures.
- Machine safety signs and labels are additional reminders for safe operating and maintenance techniques.
- See your authorized Yanmar industrial engine dealer or distributor for additional training.

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SAFETY PRECAUTIONS

⚠ DANGER



FIRE AND EXPLOSION HAZARD!

- Diesel fuel is flammable and explosive under certain conditions.
- ALWAYS put an approved container under any opening to catch the fuel when removing any fuel system component to perform maintenance (such as changing the fuel filter).
- NEVER use a shop rag to catch the fuel. Vapors from the rag are flammable and explosive.
- ALWAYS wipe up any spills immediately.
- ALWAYS wear eye protection. The fuel system is under pressure and fuel could spray out when you remove any fuel system component.
- Failure to comply will result in death or serious injury.

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LN series

SERVICE MANUAL

L48N
L70N
L100N

P/N: 0BLN0-G00100

YANMAR®

INDUSTRIAL ENGINES

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CAUTION

Make sure the engine is installed on a level surface. If a continuously running engine is installed at an angle greater than 20° (in any direction) or if an engine runs for short periods of time (less than three minutes) at an angle greater than 25° in any direction, engine oil may enter the combustion chamber causing excessive engine speed and generate white smoke. This may cause serious engine damage.

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CAUTION

It is important to perform daily checks.

Periodic maintenance prevents unexpected downtime, reduces the number of accidents due to poor machine performance and helps extend the life of the engine.

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CAUTION

NEVER engage the starter motor while the engine is running. This may damage the starter motor pinion and / or ring gear.

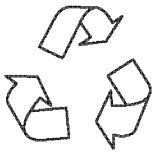
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CAUTION

- When the engine is operated in dusty conditions, clean the air cleaner element more frequently.
- NEVER operate the engine with the air cleaner element(s) removed. This may allow foreign material to enter the engine and damage it.

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CAUTION



- ALWAYS be environmentally responsible.
- Follow the guidelines of the governmental agencies for the proper disposal of hazardous materials such as engine oil, diesel fuel and engine coolant. Consult the local authorities or reclamation facility.
- NEVER dispose of hazardous materials irresponsibly by dumping them into a sewer, on the ground, or into ground water or waterways.
- Failure to follow these procedures may seriously harm the environment.

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6. Rotate the flywheel to position the existing TDC mark at approximately 90°BTDC **(Figure 6-29)**.

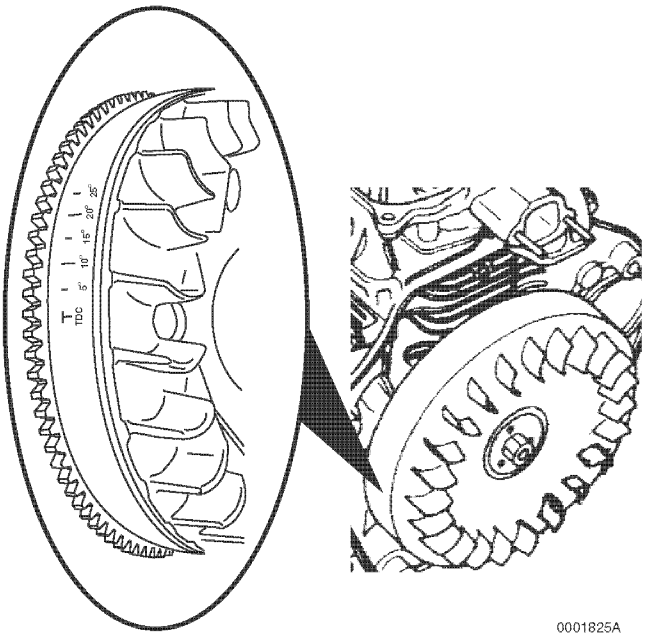


Figure 6-29

7. Turn the valve adjustment screw in against the bridge tool to open the intake valve into the cylinder to act as a piston stop.
8. Carefully rotate the flywheel in a clockwise **(Figure 6-30, (5))** direction to allow the piston to contact the intake valve. Measure the distance from the existing TDC mark **(Figure 6-30, (1))** on the cooling fin to the TDC mark on the flywheel **(Figure 6-30, (3))** (where the flywheel stopped).

The valve should contact the piston approximately 30 - 40 mm BTDC.

9. If the valve does not contact the piston within the range, carefully rotate the flywheel counterclockwise away from the valve, readjust the screw to bring the contact distance into range and rotate the flywheel clockwise again to stop the piston at the valve. Recheck the measurement and repeat as necessary to bring the measurement within the range.
10. With the piston in contact with the intake valve, use a straightedge **(Figure 6-30, (4))** and scribe or fine point marker to transfer the position of the flywheel TDC mark **(Figure 6-30, (2))** to the cooling fin.

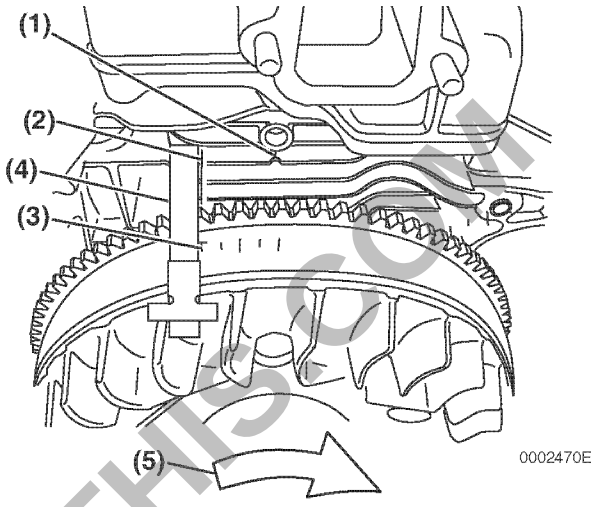


Figure 6-30

11. Carefully rotate the flywheel counterclockwise **(Figure 6-31, (1))** completely around to allow the piston to contact the valve from the other side.
12. With the piston in contact with the intake valve, use a straightedge **(Figure 6-31, (4))** and scribe or fine point marker to transfer the position of the flywheel TDC mark **(Figure 6-31, (3))** to the cooling fin **(Figure 6-31, (2))**.

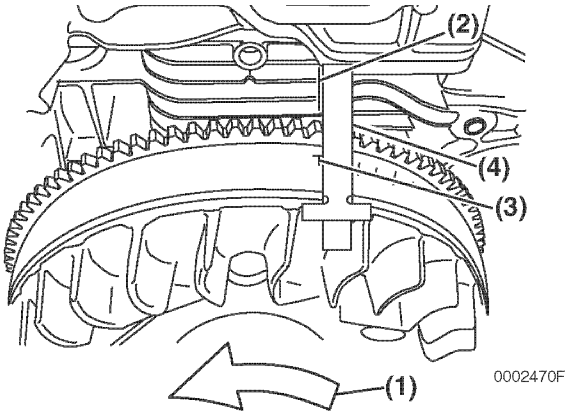


Figure 6-31

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Constant Speed Type

The constant speed control device is used in applications where a constant engine rpm is wanted, such as generators. When moved to the full throttle position, the speed control lever “locks” at full throttle.

Engine	L48N		L70N		L100N	
RPM Rating	3600 rpm	3000 rpm	3600 rpm	3000 rpm	3600 rpm	3000 rpm
Position of Regulator Spring	1-B	2-C	0-B	0-C	0-A	1-C



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