1. Specifications

Model	3TN100E		
Application	CL	VM	CH
Type	4 stroke cycle water-cooled vertical diesel engine		
Combustion system	Direct injection		
Aspiration	Natural aspiration		
No. of cylinders	3		
mm			

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5. Maintenance

o Maintenance Schedule

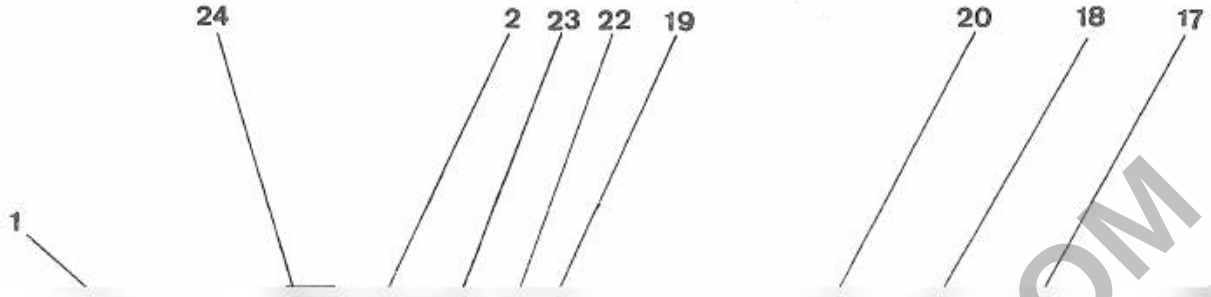
In order to insure maximum, trouble-free engine performance at all times, regular inspection, adjustment and maintenance are vital.

Inspection		Daily	Every 50 hours	Every 100 hours	Every 250 hours	Every 300 hours	Every 500 hours
Fuel System	Check the oil level; fill	○					
	Remove sediment from fuel tank	○					
	Clean and replace the fuel filter element			○ First time		○ Clean	○ Replace
Lubrication system	Check the oil level-crankcase; fill	○					
	Change the lubricating oil		○ First time		○		
	Replace the lubricating oil filter element		○ First time				○
Cooling Water	Fill with cooling water, and check for leakage	○					
	Clean the water jacket line					○ Clean inside	
	Clean the radiator fins			○			
	Adjust V-belt tension		○ First time	○			
Electrical System	Check the battery fluid level; fill	○					
	Check the warning lamps	○					
*Air Cleaner	Clean and replace the element			○ Clean (every 50 hrs. in dusty areas)			○ Replace (every 250 hrs. in dusty areas)
Cylinder Heads, etc.	Retighten all nuts and bolts		○ First time (Retighten every 2 years)				
	Adjust intake/exhaust valve clearances					○	
Fuel Injection System	Check for any abnormal fuel injection sound	○					
	Check the injection nozzles					○	
	Check fuel injection timing						○
Retighten all major nuts and bolts			○ First time (Retighten every 2 years)				

* When cleaning and replacing the element, refer to the Caution Plate placed on the air cleaner.

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3. Cross Sectional Views



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3. Alternator

[A] STANDARD, 12V/20A

The alternator serves to keep the battery constantly charged. It is installed on the cylinder block by a bracket, and is driven from the V-pulley at the end of the crankshaft by a V-belt.

The type of alternator used in this engine is ideal for high speed engines with a wide range of engine speeds. It contains diodes that convert AC to DC, and an IC regulator that keep the generated voltage constant even when the engine speed changes.

3-1 Features

The alternator contains a regulator using an IC, and has the following features.

(1) The IC regulator is self-contained, and has no moving parts (mechanical contact points). It therefore has superior features such as freedom from vibration, no fluctuation of voltage during use, and no need for readjustment.
Also, it is of the over-heating compensation type and can automatically adjust the voltage to the most suitable level depending on the operating temperature.

(2) The regulator is integrated within the alternator to simplify external wiring.

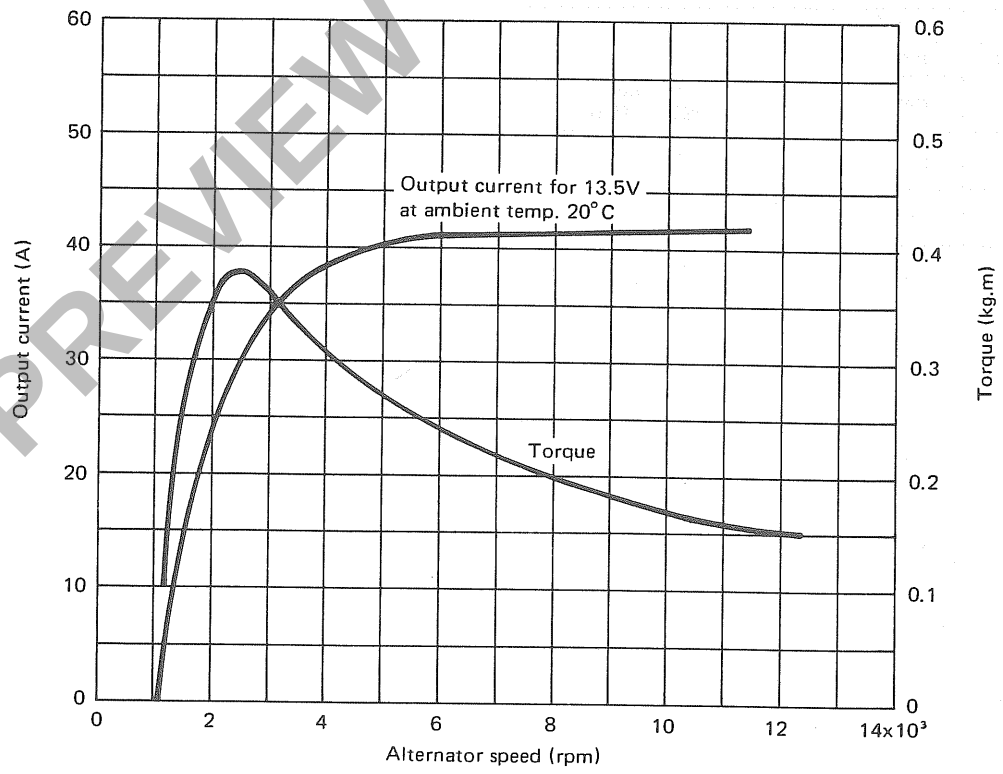
(3) It is an alternator designed for compactness, lightness of weight, and high output.

(4) A newly developed U-shaped diode is used to provide increased reliability and easier checking and maintenance.

3-2 Specifications

Model of alternator	L-X2623
Battery voltage	12V
Nominal output	12V/40A
Earth polarity	Negative earth (-)
Direction of rotation (Viewed from pulley end)	Clockwise
Weight	3.5 kg
Rated speed	5000 rpm
Operating speed	1050 – 12400 rpm
Speed for 13.5 V	1050 or less
Output current at 20°C	Over 40A 13.5V 5000 rpm
Regulated voltage	14.5V ± 0.3V
Permissible ambient	-30°C ∿ +90°C

3-3 Characteristics



Characteristic curve (at hot state)

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(30) Check the fuel injection timing

1) Check injection timing by turning the flywheel and looking through the inspection hole in the flywheel housing.



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(6) Inspection of rack and control sleeve

1) Rack
Inspect for bending of the rack and wear or deformation of its fit with ball on control sleeve.
2) Control sleeve
Inspect for wear or deformation of the ball and fit to the plunger.

NOTE: Rack resistance increases if the fitting or sliding surfaces are not in good working order, and this affects the condition of the engine

3-3 Reassembly of fuel injectio pump

Preparation

After inspection, arrange and clean all parts.
See Inspection of Fuel Pump for inspection procedure.

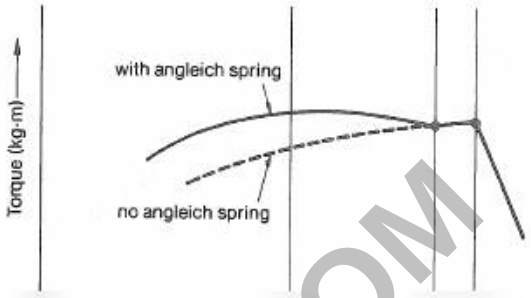
(1) Turn the match mark on the flange of plunger barrel to face left from driving side of the pump, insert the plunger barrel from the top of the pump, adjust it with the match mark on pump body, and tighten the nuts.

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Furthermore, the angleich spring is gradually compressed as the engine speed rises. This is because the increased governor weight thrust load exceeds the angleich load before high speed control is effected. When the governor lever and the bottom of the tension lever come into contact (end of angleich stroke), the injection volume is reduced by that amount, and the rack reaches the rated position (RE).



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CHAPTER 1

GENERAL

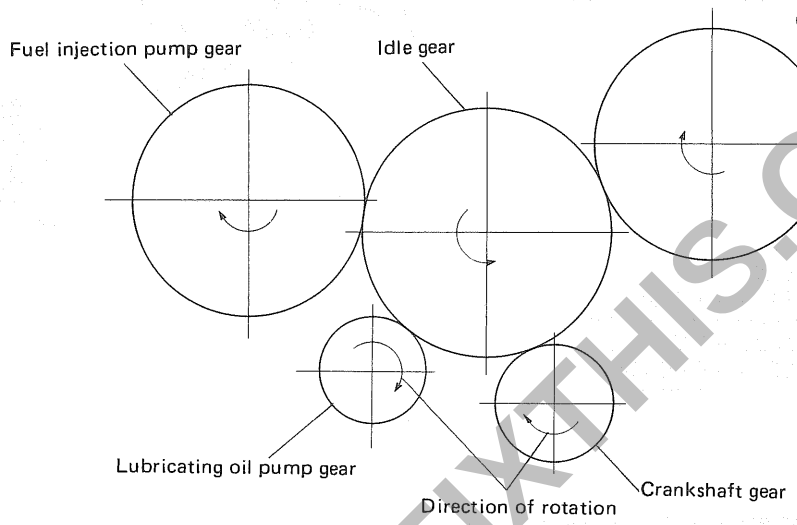
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7. Timing Gear

The timing gear is helical type for minimum noise and specially treated for high durability.



	No. of teeth	Face width	Helical angle	Backlash	Backlash Wear limit
Unit	—	mm (in.)	deg.	mm (in.)	mm (in.)
Camshaft gear	48	22.5	25	0.08 – 0.16 (0.0031 – 0.0063)	0.25 (0.0098)
Idle gear	51	20	25		
Crankshaft gear	24	40	25	0.08 – 0.16 (0.0031 – 0.0063)	0.25 (0.0098)
Lubricating oil pump gear	22	8	25	0.08 – 0.16 (0.0031 – 0.0063)	0.25 (0.0098)
Idle gear	51	20	25		
Fuel injection pump gear	48	15	25	0.08 – 0.16 (0.0031 – 0.0063)	0.25 (0.0098)

7-1 Inspecting the gears

(1) Inspect the gears and replace if the teeth are damaged or worn.
(2) Measure the backlash of all gears that mesh, and replace the meshing gears as a set if wear exceeds the limit.

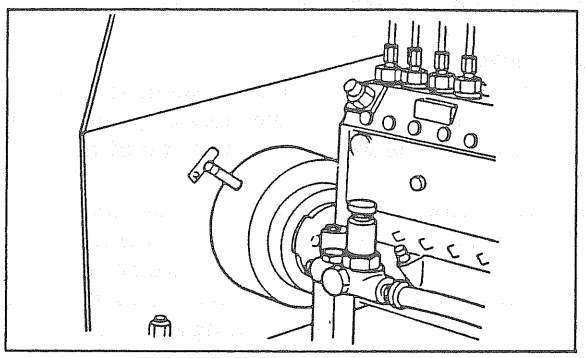
NOTE: If backlash is excessive, it will not only result in excessive noise and gear damage, but also lead to bad valve and fuel injection timing and a decrease in engine performance.

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5-5 Fuel Feed Pump Adjustment

1. Testing procedures for the fuel feed pump

Set the fuel feed pump on the injection pump, and operate the assembled unit on the pump tester.

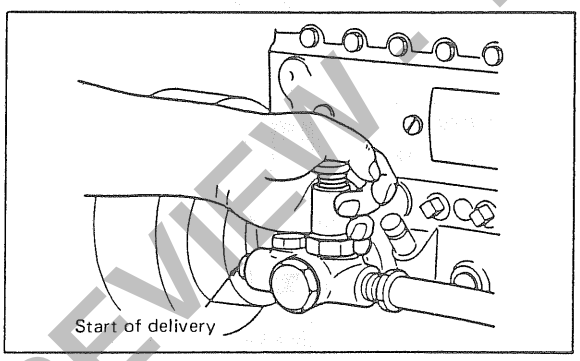


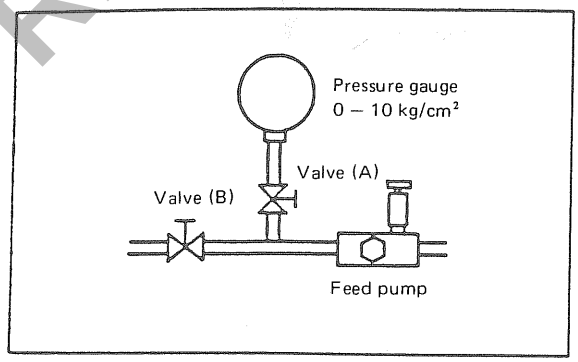
Fuel piping should be provided directly from the tank, not through the delivery pump of the tester.

(1) Suction test for the priming pump

Loosen the handle of the priming pump, and push the handle at 60 – 100 strokes/minute. If fuel comes out of the delivery side of the feed pump after about 30 strokes, the priming pump is normal. If it takes longer, replace the priming pump as a set.

Suction head	1 m	Within 30 strokes
Suction pipe dia.	ϕ8	

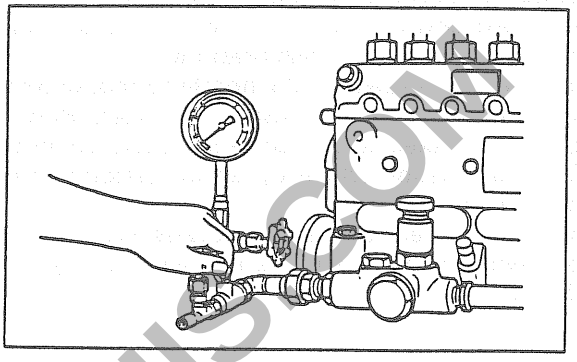




Equipment for feed pump test

(2) Max. delivery feed volume test

You will need the special equipment for conducting max. delivery pressure and delivery volume tests.



Max. delivery pressure test

NOTE: 1. Do not run the equipment for more than 5 minutes since the fuel injection pump may be damaged if operated in non-injection condition.

2. Operate the injection pump at the specified rpm, and read the pressure gauge indicator when valve B is tightened completely. Tighten valve A so that the pressure gauge indicator does not move when the pressure is applied.

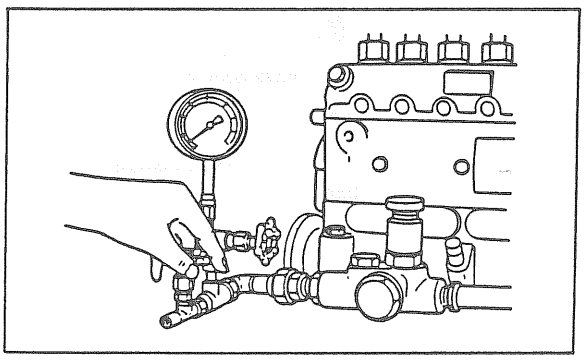
- Volume pressure (kg/cm²): 3.4–4.2
- rpm: 600

Replace the piston spring if it is defective.

(3) Delivery test

Operate the fuel injection pump at the specified rpm, open valve (B) until the pressure gauge indicator shows 1 kg/cm², and measure the delivery rate for one minute.

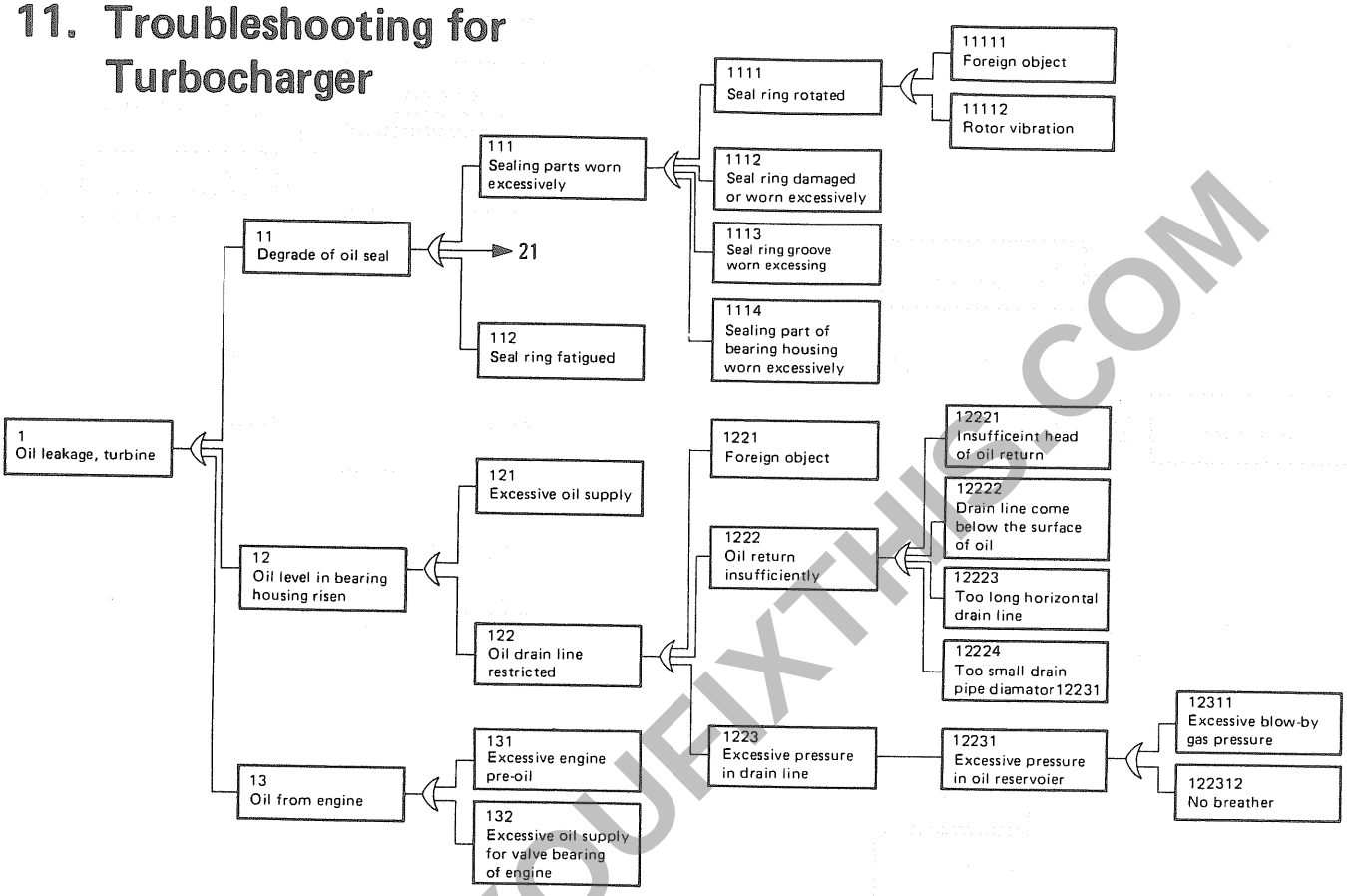
- Volume (ℓ/min.): over 1.8
- Back pressure (kg/cm²): 1
- rpm: 1000

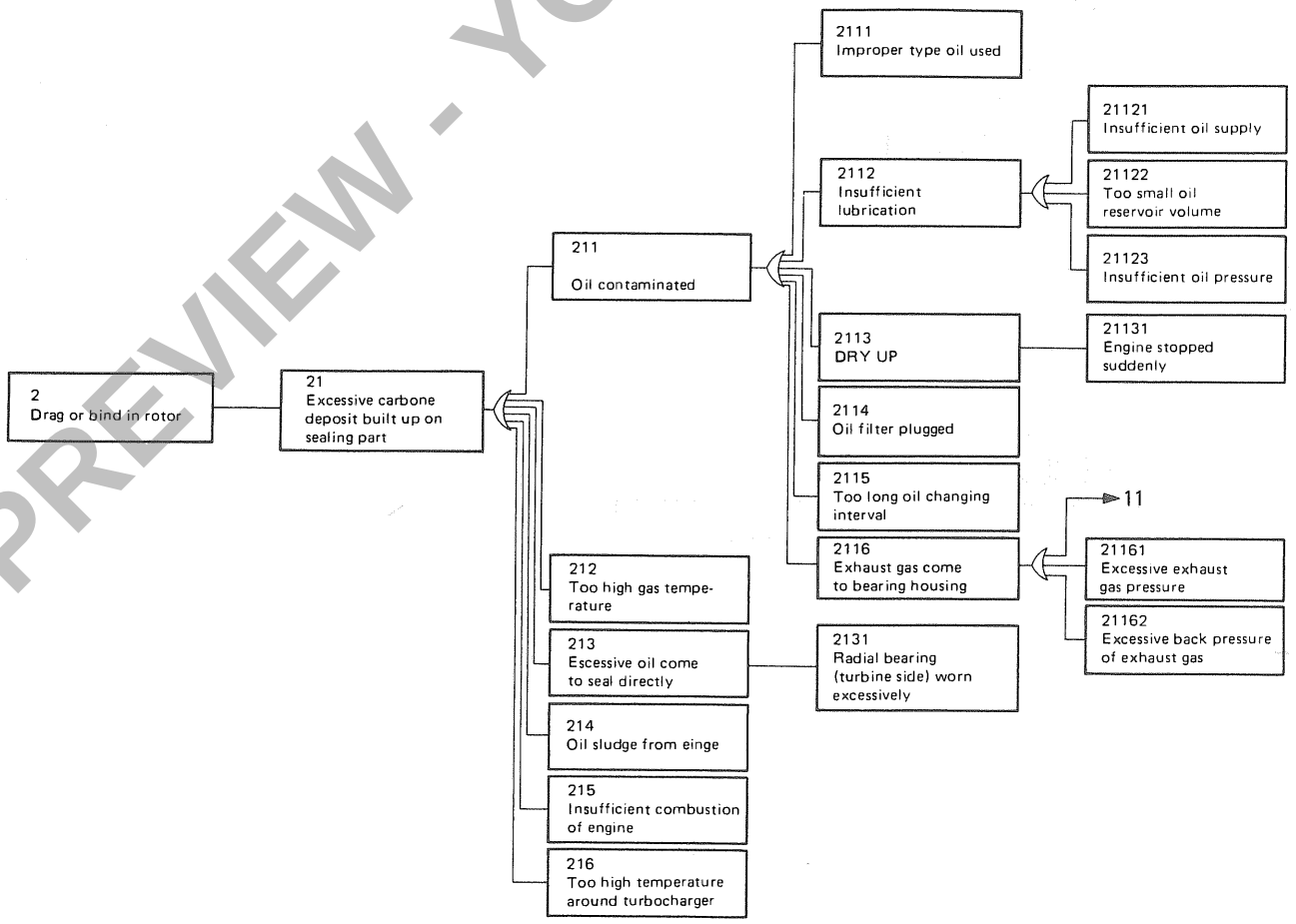


Delivery test

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11. Troubleshooting for Turbocharger





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