1. Specifications and Performance

1-1 2TNE68

* **Output conditions:** Intake back pressure ≤ 250 mmAq, Exhaust back pressure ≤ 550 mmAq, other conditions complying with JIS D 1005–1986. After minimum 30 hour's run-in.

Item	Model / Unit	2TNE68		
Application	—	VM	CH	VH
Type	—	Vertical, 4-cycle water-cooled diesel engine		
Combustion system	—	Special swirl pre-combustion chamber		
No. of cylinders – Bore × Stroke	mm	2 – 68 × 72		

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No.	Instrument name	Purpose of use	Illustration
10	Torque wrench	Used for tightening bolts and nuts to the specified torques.	 
11	Thickness gauge	Measures gaps between the rings and mating ring grooves	

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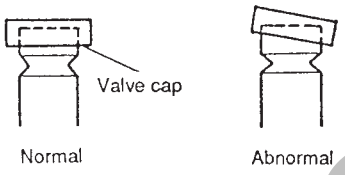
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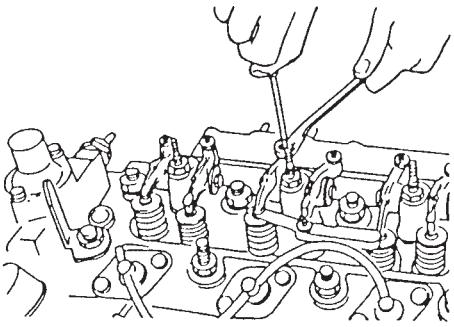
6-2. Adjusting the valve head clearance

(1) Inspect and adjust a valve head clearance while the engine is in cold state.

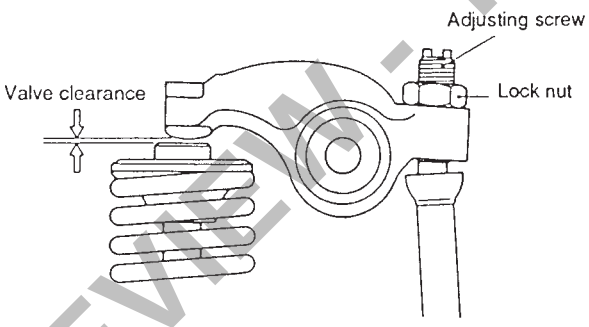
(2) Raise the piston in the cylinder to be measured to the top dead center (TDC) of compression.

(3) Loosen the lock nut and adjusting screw. Make sure that the valve cap is free from inclination or trapped dirt.





(4) Insert a thickness gauge in between the rocker arm and valve cap. Tighten the adjusting screw until the clearance listed below is attained.



(Adjusting the valve head clearance)

(mm)

	All models
Intake/exhaust valve head cleaarance	0.15 ~ 0.25

∗ : *1. If the valve cap is worn or otherwise damaged on the head, replace it with a new one.*

2. Make sure that the valve cap is nested on the head of intake/exhaust valves.

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8. Oversized crankpin metal

(0.25mm, oversized)

	Crankpin metal	
	Part code No.	Metal thickness (mm)
		Standard
2/3TNE68	119260—23350	1.625
3TNE74	119620—23350	1.625
3TNE78A/82A	119810—23350	1.625

3. Measuring the bend of the camshaft

Support the camshaft with V blocks. Using a dial gauge, measure the runout of the journal at the center of the camshaft, while rotating the camshaft.
Take 50% of the measured runout as bend.

(mm)

	All models

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7-7. Crankshaft

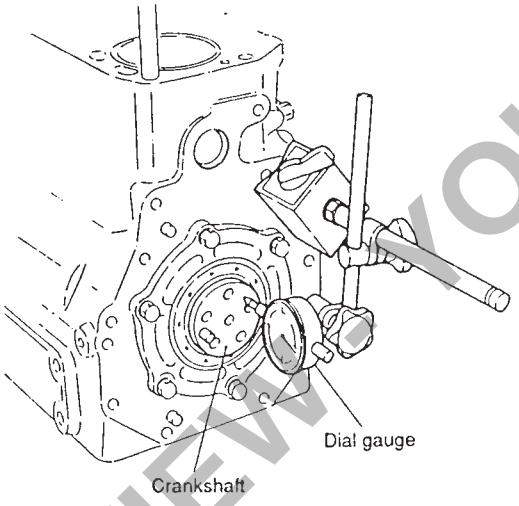
1. Side gap around the crankshaft

Before extracting the crankshaft and when reassembling it, bring a dial gauge into contact to the end of the crankshaft. Force the crankshaft to both sides in the axial direction to measure the thrust gap. Alternatively, insert a thickness gauge directly into a thrust gap between the thrust metal in the standard part and crankshaft to measure the side gap.

If the limit is exceeded, replace the thrust metal with a new one.

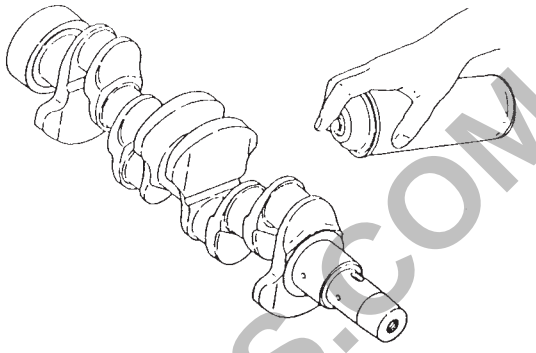
(mm)

	All models
Thrust gap	0.090~0.271



2. Color check of crankshaft

Clean the crankshaft and check it using a color check kit or a magnaflux inspector. Replace the crankshaft if cracked or badly damaged. If the crankshaft is slightly damaged, correct it by re-grinding.



(Color check inspection)

3. Checking the metal

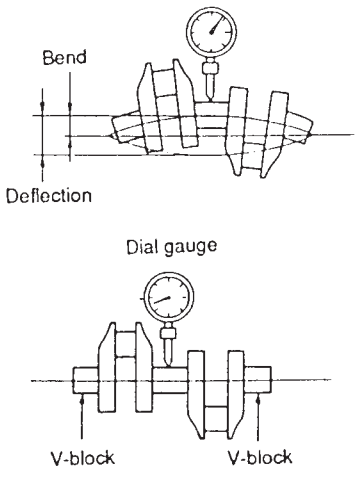
Check the metal for flaking, melting, seizure, and the state of the contact face. Replace the metal if found defective.

4. Bend of the crankshaft

Support the crankshaft with V-blocks at both ends of the journals; measure the runout at the center journal with a dial gauge while rotating the crankshaft to check the extent of crankshaft bend.

(mm)

	All models
	Standard
Bend	0.02 or less



(Measuring the crankshaft bend)

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15-1-2. Location of the label

The locations of the label are three types A, B, and C, where the applicable engine families and engine models are as shown in the table below.

Location of the labels	No.	Engine family name for certification	Engine model in Yanmar
A	[illegible]	[illegible]	[illegible]
B	[illegible]	[illegible]	[illegible]
C	[illegible]	[illegible]	[illegible]

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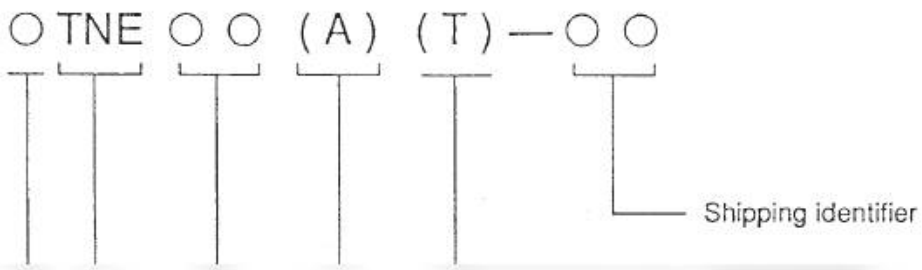
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   - 1-2 3TNE68 1-2
   - 1-3 3TNE74 1-3
   - 1-4 3TNE78A 1-4
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   - 1-6 3TNE82 1-6

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○ Descriptive Breakdown of Model Name



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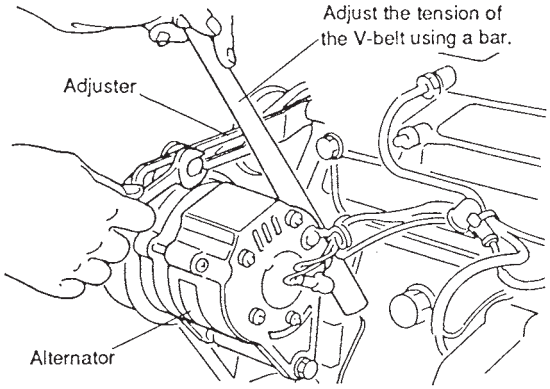
Attached Drawing 1. Exploded Views of Engine Components **A-1**
Attached Drawing 2. Exploded Views of Engine Components **A-2**

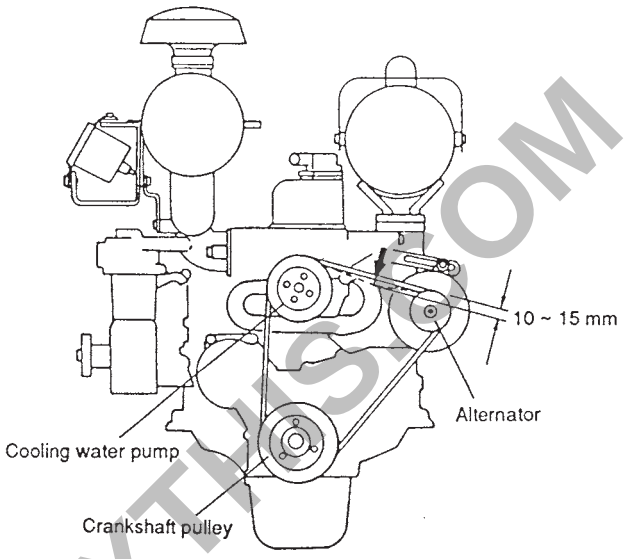
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6-3. Checking the V-belt tension

Push the center of the V-belt between the alternator and cooling water pump with a finger. If the deflection is 10–15 mm, the V-belt tension is acceptable. If not, adjust the V-belt tension using the adjuster at the alternator.





(Adjustment of the V-belt tension)

6-4. Measuring and checking the injection pressure and spray patterns of the fuel injection valve

1. Measuring the injection pressure

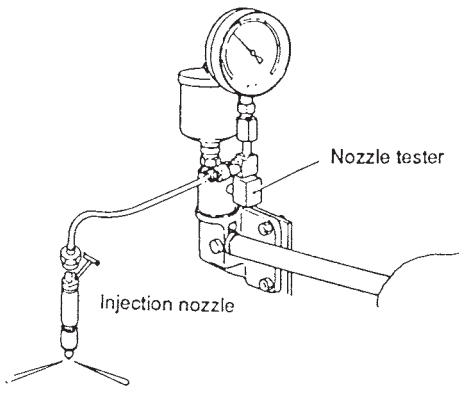
✻ : *Thoroughly remove carbon deposits from the injection nozzle before making measurement.*

(1) Connect the fuel injection valve to the high pressure pipe of the nozzle tester.

(2) While pumping the lever of the nozzle tester slowly, read the pressure gauge on the nozzle tester the moment the nozzle starts fuel injection.

✻ : *For injection pressure of each engine, refer to Chapter 1, "Specifications and Performance".*

(3) If the measured injection pressure is lower than the specified value, replace the pressure adjusting shim with a thicker one.



(Measuring the injection pressure with a nozzle tester)

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(mm)

		2/3TNE68		3TNE74		3TNE78A/82A, 3/4TNE82, 3/4TNE84(T), 3/4TNE88	
		Standard	Wear limit	Standard	Wear limit	Standard	Wear limit
Cam height	Intake cam	29.970 ~30.030	29.75	33.950 ~34.050	33.75	38.635 ~38.765	38.40
		29.970		33.950		38.635	

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(12) By using the handle of a hammer, etc., push up the plunger guide from the bottom of the pump and take out the tappet holders (special service tool).

* *Use particular care to remove the tappet holder. Carefully prevent the plunger guide, plunger, etc., from jumping out. This is because the plunger spring is powerful enough to force them out.*

(14) Take out the plunger, plunger spring and plunger spring lower reteiner from the lower part of the fuel injection pump.

* *Separate these parts for each cylinder.*



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