COMPONENT IDENTIFICATION

2TNV70, 3TNV70, 3TNV76

Figure 1 shows where major indirect injection engine components are located.

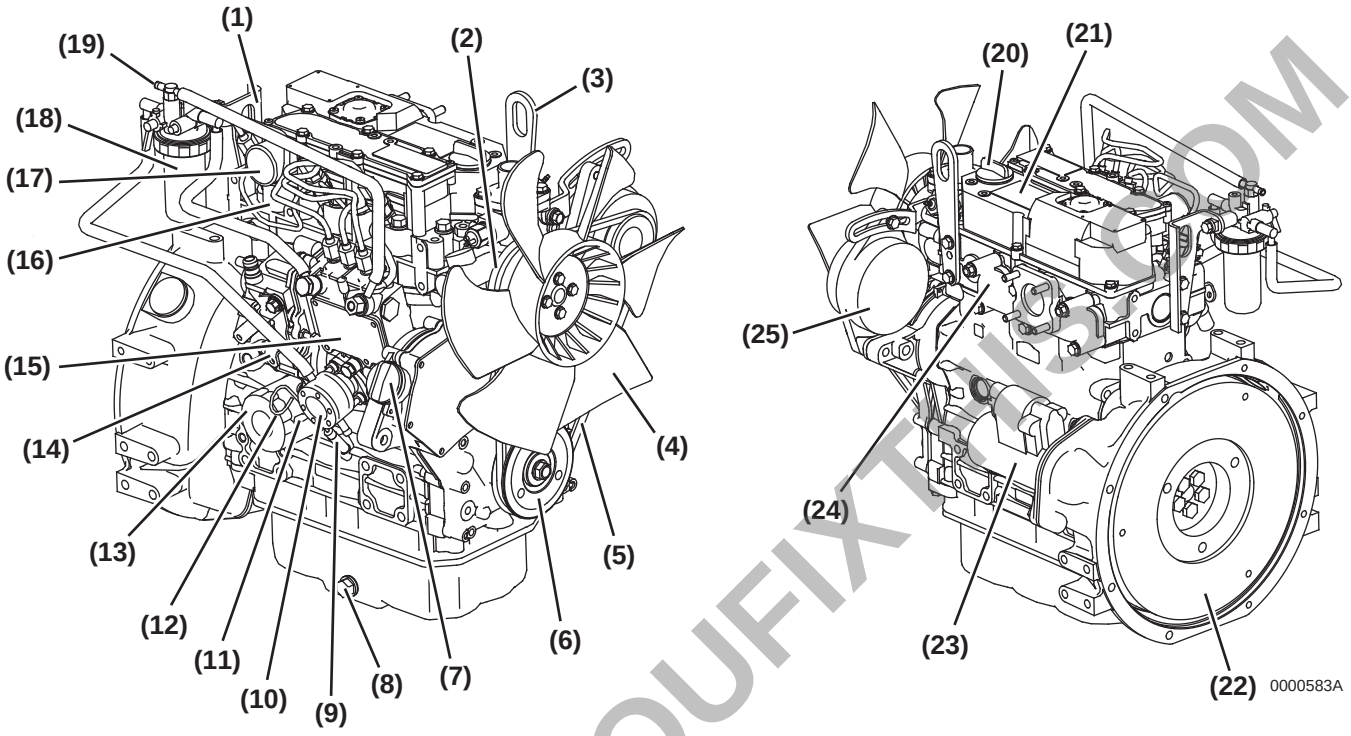


Figure 1

1 – Lifting Eye (Flywheel End)
2 – Engine Coolant Pump
3 – Lifting Eye (Engine Cooling Fan End)
4 – Engine Cooling Fan
5 – V-Belt
6 – Crankshaft V-Pulley
7 – Side Filler Port (Engine Oil)
8 – Drain Plug (Engine Oil)*
9 – Fuel Inlet
10 – Mechanical Fuel Pump
11 – Fuel Priming Lever
12 – Dipstick (Engine Oil)
13 – Engine Oil Filter
14 – Governor Lever
15 – Fuel Injection Pump
16 – Intake Manifold
17 – Air Intake Port (From Air Cleaner)
18 – Fuel Filter
19 – Fuel Return to Fuel Tank
20 – Top Filler Port (Engine Oil)
21 – Rocker Arm Cover
22 – Flywheel
23 – Starter Motor
24 – Exhaust Manifold
25 – Alternator

*** Engine oil drain plug location may vary based on oil pan options.**

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KIT PARTS LIST FOR B20 (All TNV Engines)

		KIT-V270BGS-BI	KIT-V370BGS-BI	KIT-V382BGS-BI	KIT-V384BGS-BI
		2TNV70	3TNV70,76	3TNV82A	3TNV84(T),88
		D19446-59250	D19746-59250	D29283-59250	D29283-59260
FUEL OIL TANK - / - FUEL OIL TANK	No.	(1)	(1)	(1)	(1)
	Length	2000	2000	2000	2000
	Part No.	129946-59050	129946-59050	129946-59050	129946-59050
	Part Name	FO-T CMP	FO-T CMP	FO-T CMP	FO-T CMP
	Number	2	2	2	2
FUEL FEED PUMP - FUEL OIL FILTER	No.	(2)	(3)	(4)	(4)
	Length	380	450	1000	1000
	Part No.	119546-59030	119546-59020	129946-59040	129946-59040
	Part Name	CW-T CMP	FO-T CMP	FO-T CMP	FO-T CMP
	Number	1	1	1	1
FUEL OIL FILTER - FUEL INJECTION PUMP	No.	(5)	(6)	(6)	(5)
	Length	220	270	270	220
	Part No.	129236-59000	119546-59200	119546-59200	129236-59000
	Part Name	CW-T CMP	FO-T CMP	FO-T CMP	FO-T CMP
	Number	1	1	1	1
FUEL INJECTION PUMP - FUEL OIL FILTER	No.	(8)	(11)	(9)	(7)
	Length	320	450	350	300
	Part No.	119546-59210	119546-59220	119946-59200	129236-59010
	Part Name	FO-T CMP	FO-T CMP	FO-T CMP	FO-T CMP
	Number	1	1	1	1
CAP, FUEL INJECTION NOZZLE	Part No.	NO NEED	NO NEED	119593-59581 124060-77680	119593-59581 124060-77680
	Part Name			CAP CLIP	CAP CLIP
	Number			1 1	1 1
FUEL INJECTION NOZZLE -FUEL INJECTION NOZZLE	No.	NO NEED	NO NEED	(13)	(13)
	Length			115	115
	Part No.			129486-59581	129486-59581
	Part Name			FO-T CMP	FO-T CMP
	Number			2	2
FUEL INJECTION NOZZLE - FUEL INJECTION PUMP	No.	(16)	(16)	(17)	(17)
	Length	150	150	FORMED PIPE	FORMED PIPE
	Part No.	119546-59300	119546-59300	129636-59561	129636-59561
	Part Name	FO-T CMP	FO-T CMP	FO-T CMP	FO-T CMP
	Number	1	1	1	1
FUEL OIL FILTER		NEED TO CHANGE ONLY O-RING. P44: 24316-000440 --> A		NO NEED (BECAUSE OF CARTRIDGE TYPE)	
WATER SEPARATOR		NEED TO CHANGE ONLY O-RING. P44: 24316-000440 --> B		NEED TO CHANGE ONLY O-RING. G75 : 24326-000750 --> C P16 : 24316-000160 --> D P7 : 24316-000070 --> E G65 : 24326-000650 --> C (NEED ONLY FOR TAIYO-GIKEN)	

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Check and Adjust Cooling Fan V-Belt

The V-belt will slip if it does not have the proper tension. This will prevent the alternator from generating sufficient power. Also, the engine will overheat due to the engine coolant pump pulley slipping.

Check and adjust the V-belt tension (deflection) as follows:

1. Press the V-belt down with your thumb with a force of approximately 22 ft-lb (98 N·m, 10 kgf/m) to check the deflection.

   There are three positions to check for V-belt tension **(Figure 4, (A), (B) and (C))**. You can check the tension at whichever position is the most accessible. The proper deflection of a used V-belt at each position is:

Used V-Belt Tension		
A	**B**	**C**
3/8 - 1/2 in. (10 - 14 mm)	1/4 - 3/8 in. (7 - 10 mm)	5/16 - 1/2 in. (9 - 13 mm)

Note: A “Used V-Belt” refers to a V-belt which has been used on a running engine for five minutes or more.

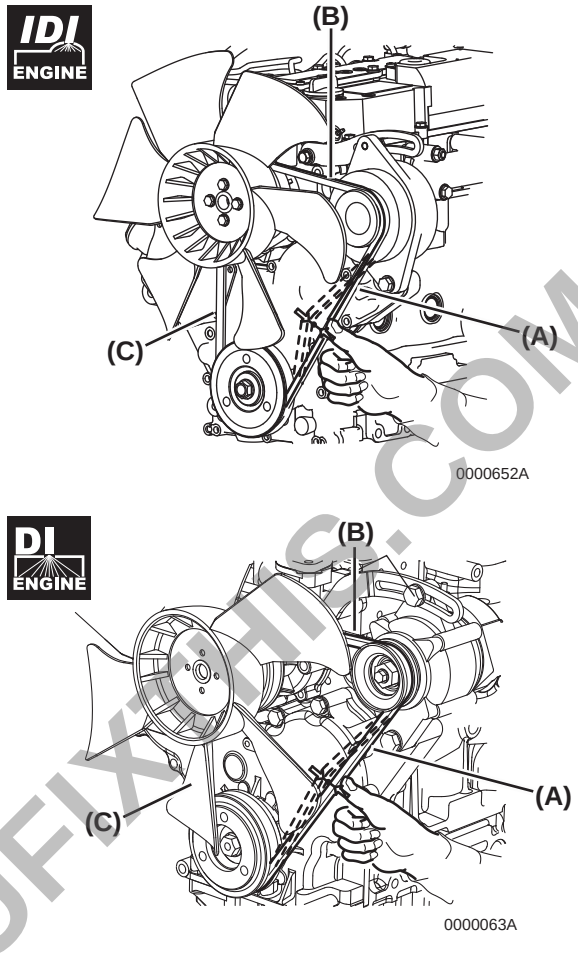


Figure 4

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LIST OF POSSIBLE FAULTS OF ELECTRONICALLY CONTROLLED ENGINES

4TNV84T-Z, 4TNV98-E, 4TNV98-Z, 4TNV98T-Z

No.	Fault (alarm) location	Fault/alarm condition	Engine status	Reset condition	Availability of detection features	No. of flashes/flashing pattern of fault indicator
1	Coolant temperature	Sensor voltage is over 4.8V or	Continues to run at a coolant	Voltage returns to	Standard	4

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14. Prime the fuel system. *See Priming the Fuel System on page 45.*
15. Check for leaks.

Every 1000 Hours of Operation

Perform the following maintenance every 1000 hours of operation.

- **Drain, Flush and Refill Cooling System With New Coolant**
- **Adjust Intake / Exhaust Valve Clearance if required**

Drain, Flush and Refill Cooling System



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Periodic Maintenance Chart

○: Check ◇: Replace ●: Contact your authorized Yanmar industrial engine dealer or distributor

System	Check Item	Daily	Periodic Maintenance Interval						
			Every 50 hours	Every 250 hours	Every 500 hours	Every 1000 hours	Every 1500 hours	Every 2000 hours	Every 3000 hours
Cooling System	Check and Refill Engine Coolant	○							
	Check and Clean Radiator Fins		○						
	Check and Adjust Cooling Fan V-belt		○ 1st time	○ 2nd and after					
	Drain, Flush and Refill Cooling System With New Coolant					◇ or every 1 year which-ever comes first			
Cylinder Head	Adjust Intake / Exhaust Valve Clearance					●			
	Lap Intake / Exhaust Valve Seats (if required)							●	
Electrical Equipment	Check Indicators	○							
	Check Battery		○						
Engine Oil	Check Engine Oil Level	○							
	Drain and Fill Engine Oil		◇ 1st time	◇ 2nd and after					
	Replace Engine Oil Filter								
Engine Speed Control	Check and Adjust Governor Lever and Engine Speed Control	○		○					
Emission Control Warranty	Inspect, Clean And Test Fuel Injectors, if necessary						●		
	DI ENGINE Inspect Turbocharger (Blower Wash as Necessary)								●
	DI ENGINE Inspect, Clean and Test EGR Valve								●
	DI ENGINE Clean EGR Lead Valve								●
	DI ENGINE Clean EGR Cooler (Clean to Blow Water/Air Passages)						●		
	Inspect Crankcase Breather System						●		
Fuel	Check and Refill Fuel Tank Level	○							
	Drain Fuel Tank			○					
	Drain Fuel Filter / Water Separator	○							
	Check Fuel Filter / Water Separator	○							
	Clean Fuel Filter / Water Separator				○				
	Replace Fuel Filter				◇				
Hoses	Replace Fuel System and Cooling System Hoses							◇ or every 2 yrs.	

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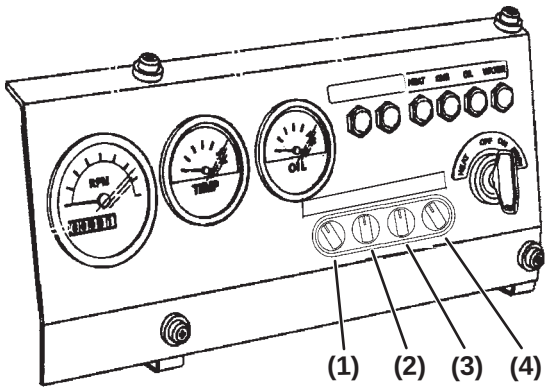


Figure 21

Figure 21 Typical Operator's Console and Switch Arrangement

Low-idling Speed Up

This feature increases the low-idling speed to some extent depending on the engine coolant temperature. When the coolant temperature reaches a predetermined value, this feature returns the engine speed to the normal low idle setting, thus reducing the warm-up time.

Auto Deceleration (optional)

This feature brings the running engine in low idle mode automatically when the accelerator pedal is not operated for a predetermined period of time. When the pedal is operated, i.e., the accelerator sensor is activated, the low idle mode is cancelled.

A certain ON/OFF combination of switches **(1) - (4)** on the operator's console **Figure 21** will implement this optional feature. For details, see the operation manual for the driven machine.

High-idling Speed Down (optional)

This feature decreases the high-idling speed depending on the engine coolant temperature. When the coolant temperature falls to a predetermined value, this feature returns the engine speed to the normal high idle setting, thus minimizing the emission of white smoke at low temperatures.

A certain ON/OFF combination of switches **(1) - (4)** on the operator's console **Figure 21** will implement this optional feature. For details, see the operation manual for the driven machine.

Others

Other optional features can be provided by selecting certain ON/OFF combinations of switches **(1) - (4)** on the operator's console **Figure 21** will implement this optional feature. For details, see the operation manual for the driven machine.

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NOTICE

- Only use the engine coolant specified. Other engine coolants may affect warranty coverage, cause an internal buildup of rust and scale and / or shorten engine life.
- Prevent dirt and debris from contaminating the engine coolant. Carefully clean the radiator cap and the surrounding area before you remove the cap.
- NEVER mix different types of engine coolants. This may adversely affect the properties of the engine coolant.

NOTICE

- NEVER overfill the engine with engine oil.
- ALWAYS keep the oil level between the upper and lower lines on the oil cap / dipstick.

NOTICE

For maximum engine life, Yanmar recommends that when shutting the engine down, you allow the engine to idle, without load, for five minutes. This will allow the engine components that operate at high temperatures, such as the turbocharger (if equipped) and exhaust system, to cool slightly before the engine itself is shut down.

NOTICE

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

NOTICE



- ALWAYS be environmentally responsible.
- Follow the guidelines of the EPA or other 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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MAIN ELECTRONIC CONTROL COMPONENTS AND FEATURES

4TNV84T-Z, 4TNV98-E, 4TNV98-Z, 4TNV98T-Z

Component/Feature		Description
Engine controller (E-ECU)		Adjusts the rack position of the fuel injection pump depending on the speed command signal from the accelerator sensor, thus regulating the engine speed and power. The engine controller also regulates the opening of the EGR valve depending on the engine speed and power. It serves as the master station for the following components/control features.
Electronic governor (Eco-governor)		Consists of the engine speed sensor, rack actuator, etc., and is directly connected to the fuel injection pump in order to regulate the rack position of the fuel injection pump depending on the signals communicated with the E-ECU.
Fuel injection pump (for Eco-governor)		Is of single plunger type and equipped with a CSD solenoid valve that allows the fuel injection timing to advance and the injection quantity to increase, thereby improving the cold start performance of the engine.
EGR valve		Controls the exhaust gas recirculation flow rate depending on the engine speed/load signals from the E-ECU. It is installed on the top of the exhaust manifold.
Accelerator sensor		Unlike mechanical governors, the Eco-governor has no governor lever. The accelerator sensor serves as the governor lever to provide the speed command signal (voltage signal) to the E-ECU for engine speed control. It is installed in the operator cabin of the driven machine. Constant speed engines for e.g. generator use do not require accelerator sensors because the engine speed can be shifted via a switch on the operator's console.
	Optional	CAN communication capability is available as an option.
Fault indicator		Is installed on the operator's console. If a fault occurs in the E-ECU or Eco-governor, the fault indicator flashes alerting the operator to a fault. The number of flashes and/or the flashing pattern vary depending on the type or source of the fault, enabling quick-fix.
	Optional	

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SAFETY

SAFETY STATEMENTS

Yanmar is concerned for your safety and your machine's condition. Safety statements are one of the primary ways to call your attention to the potential hazards associated with Yanmar TNV engine operation. Follow the precautions listed throughout the manual before operation, during operation and during periodic maintenance procedures for your safety, the safety of others and to protect the performance of your engine. Keep the labels 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 label attached to it, make sure you order the new part and label 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

Danger (the word "DANGER" is in white letters with a red rectangle behind it) - indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. Danger is limited to the most extreme situations.

⚠ WARNING

Warning (the word "WARNING" is in black letters with an orange rectangle behind it) – indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Caution (the word "CAUTION" is in black letters with a yellow rectangle behind it) - indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE

Caution without the safety alert symbol indicates a potentially hazardous situation that can cause damage to the machine, personal property and / or the environment or cause the machine to operate improperly.

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Yanmar Limited Warranty - Continued

What the Engine Owner Must Do:

If you believe your Yanmar engine has experienced a failure due to a defect in material and / or workmanship, you must contact an authorized Yanmar industrial engine dealer or distributor within thirty (30) days of discovering the failure. You must provide proof of ownership of the engine, proof of the date of the engine purchase and delivery, and documentation of the engine operation hours. Acceptable forms of proof of delivery date include, but are not limited to: the original warranty registration or sales receipts or other documents maintained in the ordinary course of business by Yanmar dealers and / or distributors, indicating the date of delivery of the Yanmar product to the original retail purchaser. This information is necessary to establish whether the Yanmar product is still within the warranty period. Thus, Yanmar strongly recommends you register your engine as soon as possible after purchase in order to facilitate any future warranty matters.

You are responsible for the transportation of the engine to and from the repair location as designated by Yanmar.

To Locate an Authorized Yanmar Industrial Engine Dealer or Distributor:

You can locate your nearest authorized Yanmar industrial engine dealer or distributor by visiting the Yanmar Corp., LTD. website at:

http://www.yanmar.co.jp (The Japanese language page will be displayed.) For English language “click” on “English Page.”)

- “Click” on “Network” in the website heading to view the “Yanmar Worldwide Network.”
- Choose and “Click” on the desired product group.
- “Click” on the Icon closest to your region.
- “Click” on the desired country or Associate company to locate your nearest authorized Yanmar industrial engine dealer or distributor.

You may also contact Yanmar by clicking on “Inquiry” in the website heading and typing in your question or comment.

What Yanmar Will Do:

Yanmar warrants to the original retail purchaser of a new Yanmar engine that Yanmar will make such repairs and / or replacements at Yanmar’s option, of any part(s) of the Yanmar product covered by this Warranty found to be defective in material and / or workmanship. Such repairs and / or replacements will be made at a location designated by Yanmar at no cost to the purchaser for parts or labor.

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