

TNV series

**ELECTRONIC CONTROL
MANUAL**

YANMAR

FOR EPA TIER3

3TNV84T-Z

4TNV84T-Z

4TNV98T-Z

4TNV98-Z(R80-7A)

4TNV98-E(R55-7A,R55W-7A)

OPTION

3TNV82A-Z

3TNV88-Z, 3TNV88-E

3TNV88-Z, 4TNV88-E

REFERENCE ONLY

- MINI-EXCAVATOR(5~8TON, -7A SERIES)

YANMAR

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Appendix Standard harness

TNV - Series service tool - Operation manual

4TNV98-E(R55-7A,R55W-7A)

Engine model			4TNV98-E							
Engine classification			CL	VM						
1	Type	—	Vertical, 4-cycle water-cooled diesel engine							
2	Combustion system	—	Direct injection (DI)							
3	No. of cylinders - Bore × Stroke	n - mm × mm	4 - 98×110							
4	Displacement	ℓ	3.318							
5	Rated engine speed	min ⁻¹			2100	2200	2300	2400	2500	
	Output (Gross) *1	Cont. rating	kW							
		Rated output	kW			37.4	39.0	40.5	42.4	44.0
	Output (NET)	Cont. rating	kW							
Rated output		kW			36.8	38.2	39.7	41.6	43.0	
6	Maximum idling speed	min ⁻¹ ±25			2290	2400	2510	2590	2700	
7	Specific fuel consumption	g/kWh	≤224					≤231		
8	Exhaust gas temp.	°C (°F)			≤610	≤620	≤630	≤640	≤650	
9	Compression ratio	—	18.5							
10	Diesel fuel injection pressure	MPa (kgf/cm ²)	21.6 ^{+1.0} ₀ (220 ⁺¹⁰ ₀)							
11	Main shaft side	—	Flywheel side							
12	Rotation direction	—	Counterclockwise (Viewed from flywheel side)							
13	Governor	—	Electronic governor (All-speed governor)							
14	Aspiration	—	Natural aspiration							
15	Cooling system	—	Liquid-Cooled With Radiator							
16	Lubricating system	—	Forced lubrication with multi-stage trochoid pump							
17	Starting system	—	Electric starting							
18	Charging system	—	Alternator (12 VDC/40 A)							
19	Starting aid device	—	Air heater (12 VDC/500 W)							
20	Engine oil pressure	Rated speed MPa	0.34±0.05 (3.5±0.5)							
21	Oil pan capacity	Full	ℓ							
		Useful	ℓ							
22	Engine coolant capacity	ℓ	4.2 (Engine only)							
23	Cooling fan type - dia. × No. of blades	mm	Made by resin, Pusher, F Type - φ410(A!)×6							
24	Crank V-pulley dia./ Fan V-pulley dia.	mm/mm	φ130 / φ130							

Note: This table is subject to change for performance improvement.

*1: Gross outputs are theoretical, calculated from cooling fan formula. These are for reference only.

Section 2

CONTROL SYSTEM

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This chapter describes a Yanmar second-generation electronic governor (herein referred to as the "Gen2 Eco-governor") that conforms to the third EPA regulation by controlling Exhaust Gas Recirculation (EGR). The Gen2 Eco-governor is standard equipped on NV3 and supercharged engines. It is also available as an option for other engines. Contact Yanmar for details.

The engine electronic control unit (E-ECU) controls the speed and power of the engine by adjusting the rack position of the fuel injection pump depending on the signal from the accelerator sensor.

The opening of the EGR valve is adjusted depending on the engine speed and load factor so as to ensure conformance to exhaust emission standards.

The Gen2 Eco-governor provides control to the engine depending on the throttle position, coolant temperature, external-switch positions, signals through CAN or other parameters and is superior to a mechanical governor in versatility.

This manual provides overall description of the Gen2 Eco-governor. Optional setting of the E-ECU must be done by Yanmar. Contact Yanmar for details.

PRECAUTIONS ON THE USE OF ELECTRONIC CONTROL COMPONENTS

Engine control unit

Read **Control scheme (P.7)** carefully before designing a engine control system comprising the engine electronic control unit (E-ECU) and other control components in order to ensure correct application of the components.

Observe precautions in **Harness (P.24)** when designing wire harnesses.

Be sure to perform installation assessment as specified by Yanmar to ensure applicability of the E-ECU and other control components to the intended machine.

At the first power-up, the E-ECU is initialized and cannot be used to start the engine. See **Check for initialization of the E-ECU (P.14)** for details.

Be sure to use the E-ECU in conjunction with engines, the type and serial number of which are specified by Yanmar. Failure to do so will result in no assurance that the engine develops the intended performance.

Never use the E-ECU if the failure lamp is flashing. Doing so will result in no assurance that the engine develops the intended performance and may cause serious damage to the engine.

Place the failure lamp and other indicators so that they are readily visible to personnel.

When replacing the E-ECU, be sure to contact Yanmar in advance. The fuel injection quantity data must be transferred from the old E-ECU to the new unit. See **Control software (P.27)** for details. If the fuel injection quantity data is not transferred to the new E-ECU, the engine is not assured to develop the intended performance.

Updating the fuel injection quantity data in the E-ECU requires a Yanmar genuine service tool. See the manual for the service tool for the maintenance procedure.

The customer must not perform tasks that are specified to be done by Yanmar, including replacement of the E-ECU, rewriting or modification of data in the E-ECU and removal of sensors or actuators. Such tasks done by the customer may be deemed an infringement of exhaust emission control laws and regulations. Yanmar assumes no responsibility for any loss or damage caused by incompliance with instructions or suggestions in this chapter.

CONTROL SYSTEM

Fuel injection pump

Be sure to perform installation assessment as specified by Yanmar to ensure applicability of the fuel injection pump to the intended machine.

The fuel injection pump should in particular be arranged so that the ambient temperature of the rack position sensor amplifier and the solenoid CSD does not exceed 80°C.

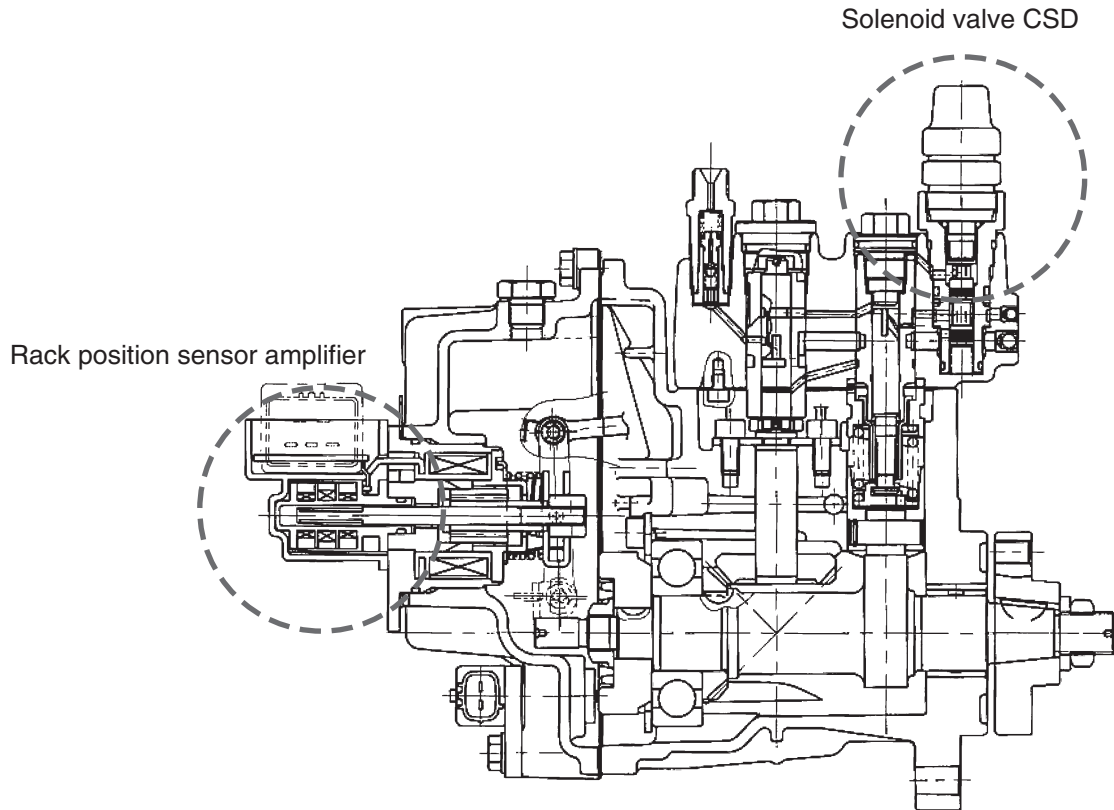


Figure 2-1 Type MP fuel injection pump of the Eco-governor

Supply power to the rack position sensor via terminal AVB (E43) of the E-ECU.

The fuel injection pump requires its specific injection quantity data. When replacing the fuel injection pump, be sure to use the attached fuel injection quantity data to update the memory in the E-ECU. Failure to do so will result in no assurance that the engine develops the intended performance.

Updating the fuel injection quantity data in the E-ECU requires a Yanmar genuine service tool. See the manual for the service tool for the maintenance procedure.

EGR valve

Be sure to perform installation assessment as specified by Yanmar to ensure applicability of the EGR valve to the intended machine.

Do not expose the EGR valve motor to an ambient temperature exceeding 80°C.

Accelerator sensor

Connect the accelerator sensor according the recommended connection diagram. Make sure the accelerator sensor and the E-ECU have a common reference potential (GND potential) as shown in example [A] of **Figure 2-2**. If the E-ECU is connected to a machine controller as shown in example [B] or [C], the difference between the E-ECU and the machine controller in reference potential ($V_1 \neq V_2$) may cause excess voltage to be applied to the APS input of the E-ECU or excess current to flow through GND-A.

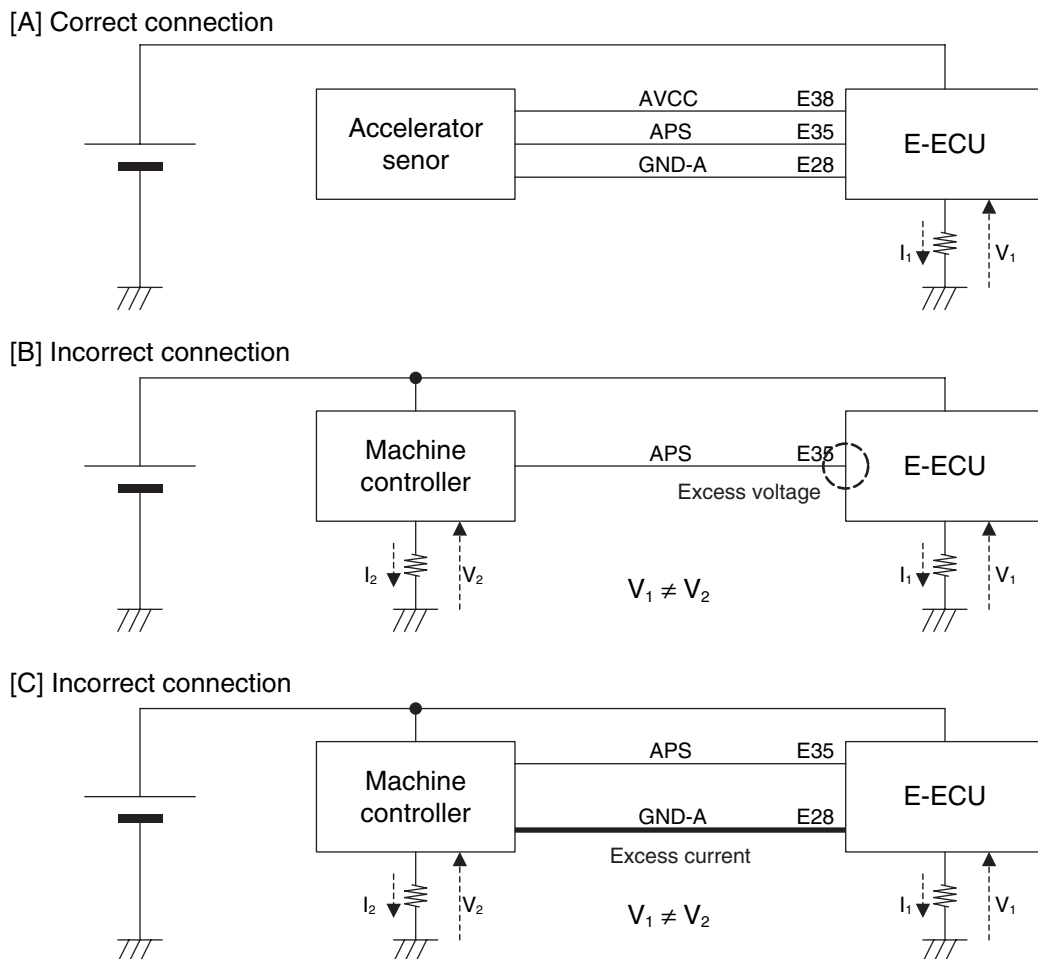


Figure 2-2 Accelerator sensor connection examples

Read **Accelerator sensor (P.68)** carefully before utilizing a Yanmar genuine accelerator sensor in order to ensure correct use of the sensor.

Be sure to perform installation assessment as specified by Yanmar to ensure applicability of the accelerator sensor to the intended machine.

CONTROL SYSTEM

Relay

Be sure to perform installation assessment as specified by Yanmar to ensure applicability of the relay to the intended machine.

Service tool

Install the connector shown in **Figure 2-3** at a convenient position on the intended machine in order to permit connection of the Yanmar genuine service tool.

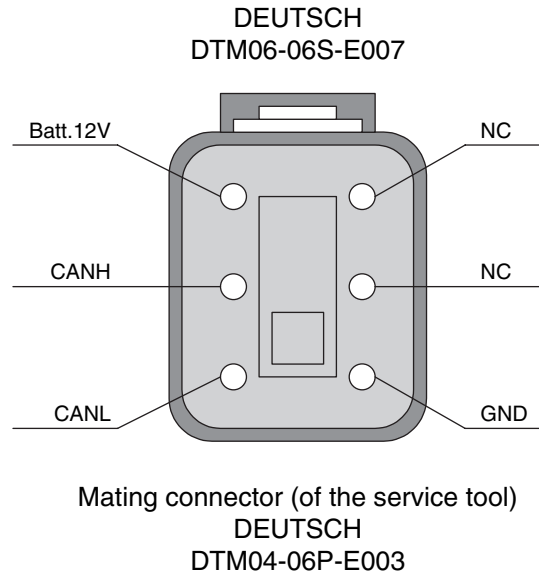


Figure 2-3 Service tool connector