



YANMAR

DIESEL ENGINE
TNWV
Common Rail Series

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Note: All data is subject to change without notice.



A SUSTAINABLE FUTURE

YANMAR is engaged in the relentless pursuit of high efficiency, low emission diesel engines.

With technology that already meets the next generation of environmental emissions standards,

YANMAR is providing sustainable solutions towards a new era of prosperity.



DIESEL ENGINE
TNMV
Common Rail Series



Perfect Technology for Clean Power

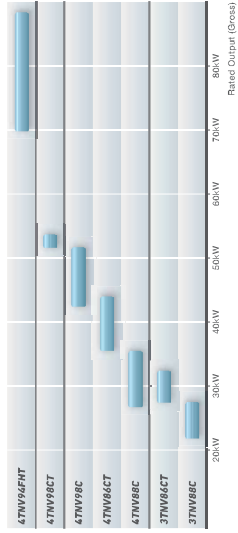
YANMAR smart diesel technology from a future where all devices operate under constant electronic control delivers unparalleled levels of efficient combustion. By monitoring a host of factors from the temperature and oxygen level of the surrounding air to the current engine loading, the engine itself can determine the optimum running conditions to deliver maximum combustion efficiency, in any environment. Through moment by moment feedback and control a powerful and cleanest engine in its category is born, the likes of which the world has never seen.

■ **EU Stage5 Ready**
Cleanest engine in its category

■ **No Scheduled Maintenance DPF* for 6,000 hours**
Seamless operation in the field

■ **Tough and Reliable Power**

■ **Best in Class Fuel Consumption**



* DPF is the first device designed for this particular market. YANMAR reserves the right to change specifications without notice.



COOLED EGR SYSTEM

The cooled Exhaust Gas Recirculation (EGR) system cools a portion of the emission gas, mixing it with intake air and circulating it in the cylinders, to lower the combustion temperature within the cylinders and reduce NOx. The EGR valve makes precise adjustments to the EGR circulation volume to match the air temperature and oxygen concentration depending on altitude of the intake air, enabling stable fuel combustion control in any operating conditions.



COMMON RAIL SYSTEM

The Tier 4 engine uses a fully electronically controlled common rail and fuel injection system. At ignition, the system instantaneously collects and analyzes information such as the outside temperature and altitude, the air's oxygen concentration level, engine load conditions and DPF temperature for precise control of the fuel injection. This allows for accurate control of the engine's combustion, resulting in reduced PM and NOx emissions.



DIRECT INJECTION COMBUSTION

In 1980, YANMAR was one of the first companies to implement direct injection combustion into its small diesel engines. Since then, YANMAR has used its in-house R&D parts manufacturing process to further develop its unique direct injection combustion technology that boasts low emissions, increased fuel economy and high power output. Tier 4 takes this technology to its limit in pursuit of optimal fuel injection for minimal particulate matter (PM) in the exhaust gas.



ECU

The ECU, which provides integrated control of the engine, collects information about the work environment and load via engine sensors and electronic devices, and instantaneously feeds this information back for the reproduction of ideal operating conditions. Furthermore, using CAN communication, the machine also sends a wide variety of information to the ECU to achieve ideal control of the engine and engine machine. Should something happen unexpectedly, the ECU's SMARTASSIST (YANMAR's diagnostic system for faster service).



DIESEL PARTICULATE FILTER (DPF)

The minuscule amount of PM in the emissions gas, which has also been reduced to an absolute minimum, is finally captured by the Diesel Particulate Filter (DPF), preventing its escape into the atmosphere, resulting in unparalleled environmental performance. Moreover, the installation of the DPF allows for consistent power output and response even under rapidly changing loads and low temperatures and under conditions when other might not allow good combustion, all without any added stress to the operator.

Automatic DPF regeneration operates without the operator ever noticing, so there is no need to stop operations. The DPF remains unlogged and no scheduled maintenance for 6,000 hours.

REGENERATION MODES



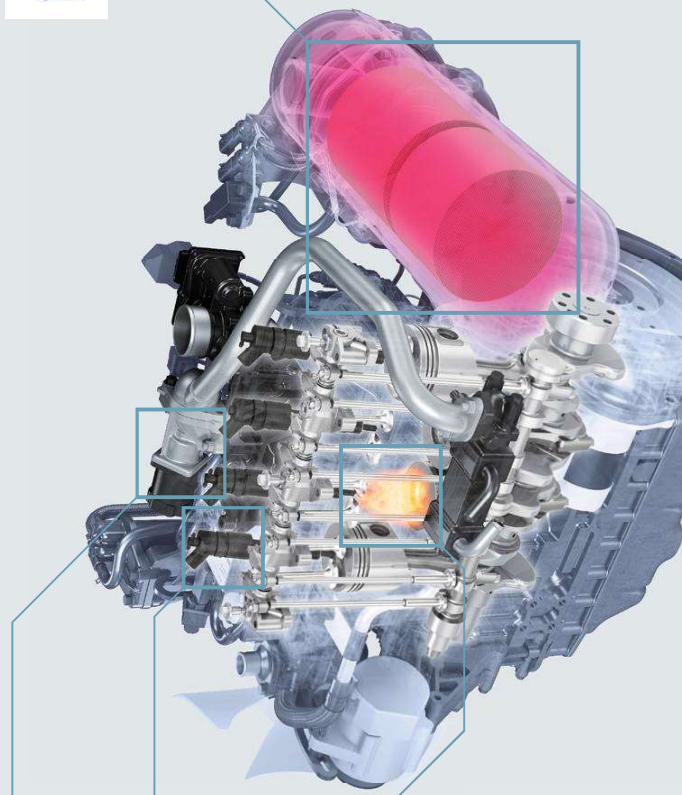
ASSIST REGENERATION

During low load and low temperature operation when it is difficult to obtain the temperature required for DPF regeneration, rather than using oxidation heat via the post fuel injection, YANMAR assist regeneration is able to elevate the DPF temperature via the intake throttle valve and combustion control. Therefore, DPF regeneration is possible without sacrificing high fuel economy.



RESET REGENERATION

The PM accumulated in the DPF is predicted and monitored based on the operating and working conditions of the engine. Assist regeneration is repeated until PM reaches a certain level, then it automatically switches to reset regeneration, completely regenerating and combusting the captured PM in the DPF without causing the engine's operation. Operating efficiency doesn't suffer as the operator continues working without ever noticing the reset regeneration process.



YANMAR T1W CLEAN DIESEL TECHNOLOGIES

3TNV88C

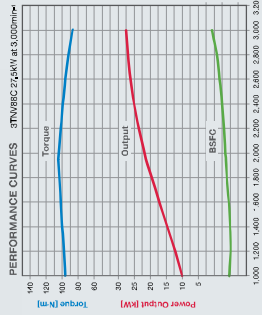
Rated Output (Gross)

21.8-27.5kW

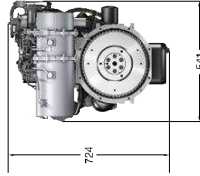


SPECIFICATION		3TNV88C	
Engine Model	EPA Tier1 / EU StageII/ILV / Switzerland FORN / Korea Tier1 / Japan 2013		
Emission Compliance	EPA Tier1 / EU StageII/ILV / Switzerland FORN / Korea Tier1 / Japan 2013		
Fuel Injection	Direct Injection DIH		
Aspiration	NA		
Fuel Injection System	Common Rail		
Intake Valve	Standard		
Compression Ratio	Standard		
Overhaul Interval	DIF		
Number of Cylinders	3		
Bore x Stroke	88 x 90		
Displacement	L	1,842	1,842
Rated Output (Gross)	kW/hp	21.8/29.00	27.5/37.00
Rated Output (Gross)	PS/hp	29.4/29.00	37.0/37.00
Max Torque (Gross)	kg-m/cm	105/1,660	105/1,620
Overall Length x Width x Height *	mm	781 x 541 x 724	781 x 541 x 724
Weight (Dry) *	kg	170	170

*: DIF layout is on flexed housing.



DIMENSIONS (mm)



3TNV86CT

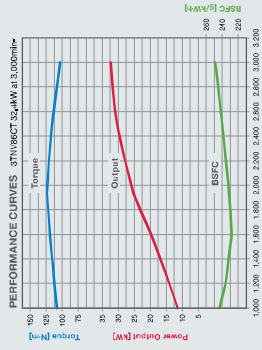
Rated Output (Gross)

27.4-32.4kW

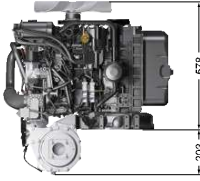
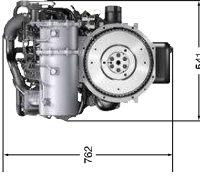


SPECIFICATION		3TNV86CT	
Engine Model	EPA Tier1 / EU StageII/ILV / Switzerland FORN / Korea Tier1 / Japan 2013		
Emission Compliance	EPA Tier1 / EU StageII/ILV / Switzerland FORN / Korea Tier1 / Japan 2013		
Fuel Injection	Direct Injection DIH		
Aspiration	TC		
Fuel Injection System	Common Rail		
Intake Valve	Standard		
Compression Ratio	Standard		
Overhaul Interval	DIF		
Number of Cylinders	3		
Bore x Stroke	88 x 90		
Displacement	L	1,842	1,842
Rated Output (Gross)	kW/hp	27.4/37.00	32.4/44.00
Rated Output (Gross)	PS/hp	37.0/37.00	44.0/44.00
Max Torque (Gross)	kg-m/cm	127/1,620	127/1,620
Overall Length x Width x Height *	mm	781 x 541 x 782	781 x 541 x 782
Weight (Dry) *	kg	175	175

*: DIF layout is on flexed housing.



DIMENSIONS (mm)



4TNV88C

Rated Output (Gross)

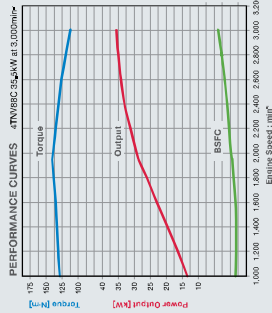
26.7-35.5kW



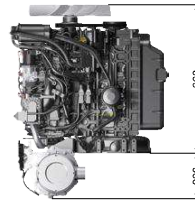
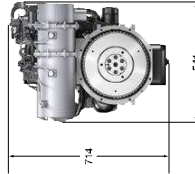
SPECIFICATION

Engine Model	4TNV88C	
Emission Compliance	EPA Tier4 / EU Stage5B / Switzerland FOM / Korea Tier4 / Japan 2013	
Fuel Injection	Direct Injection DIH	
Aspiration	NA	
Fuel Injection System	Common Rail	
Intake Valve	Standard	
Compression Ratio	Standard	
Overhaul Interval	DIF	
Number of Cylinders	4	
Bore x Stroke	88 x 90	
Displacement	L	2,150
Rated Output (Gross)	kW/min	26.7/2,200 28.7/2,400 30.6/2,500 31.7/2,600 34.4/2,800 35.5/3,000
Max Torque (Gross)	PS/min	36.5/2,200 39.6/2,400 43.5/2,500 45.4/2,600 49.4/2,800 51.4/3,000
Overall Length x Width x Height *	mm	1,351 / 530 1,397 / 560 1,451 / 585 1,497 / 610 1,601 / 630 1,651 / 650
Weight (Dry) *	kg	200

*: DIF layout is on fixed housing



DIMENSIONS (mm)



4TNV86CT

Rated Output (Gross)

35.5-44.0kW

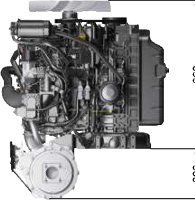
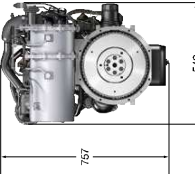


SPECIFICATION

Engine Model	4TNV86CT	
Emission Compliance	EPA Tier4 / EU Stage5B / Switzerland FOM / Korea Tier4 / Japan 2013	
Fuel Injection	Direct Injection DIH	
Aspiration	TC	
Fuel Injection System	Common Rail	
Intake Valve	Standard	
Compression Ratio	Standard	
Overhaul Interval	DIF	
Number of Cylinders	4	
Bore x Stroke	88 x 90	
Displacement	L	2,091
Rated Output (Gross)	kW/min	35.5/2,400 37.4/2,600 41.7/2,800 44.0/3,000
Max Torque (Gross)	PS/min	48.2/2,400 51.5/2,600 56.0/2,800 59.0/3,000
Overall Length x Width x Height *	mm	1,737 / 580 1,881 / 610 1,987 / 630 2,087 / 650
Weight (Dry) *	kg	210

*: DIF layout is on fixed housing

DIMENSIONS (mm)



4TNV98C

Rated Output (Gross)

42.4-51.7kW

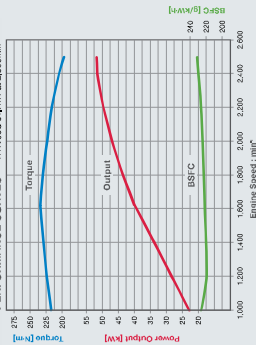


SPECIFICATION

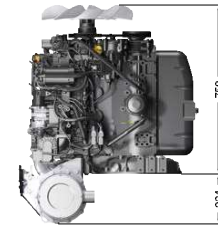
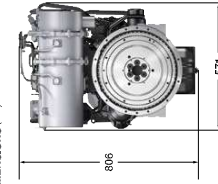
Engine Model	4TNV98C	
Emission Compliance	EPA Tier4 / EU Stage5B / Switzerland F0EN / Korea Tier4 / Japan 2013	
Fuel Injection	Direct Injection DIH	
Aspiration	NA	
Fuel Injection System	Common Rail	
Intake Valve	Standard	
Exhaust Valve	Standard	
Aftertreatment	DPF	
No. of Cylinders	4	
Bore x Stroke	98 x 110	
Displacement	L 3,419	
Rated Output (Gross)	kW/min	42.4/2,000 44.2/2,100 46.4/2,200 48.4/2,300 49.9/2,400 51.7/2,500
	PS/min	57.4/2,000 60.2/2,100 62.8/2,200 65.4/2,300 67.4/2,400 70.4/2,500
Max Torque (Gross)	Non-torque	235/1,300 235/1,365 235/1,430 235/1,495 235/1,560 235/1,625
Overall Length x Width x Height *	mm	863 x 571 x 806
Weight (Dry) *	kg	270

*: DPF layout is on flexed housing.

PERFORMANCE CURVES 4TNV98C 51.7kW at 2,500rpm



DIMENSIONS (mm)



4TNV98CT

Rated Output (Gross)

51.6-53.7kW

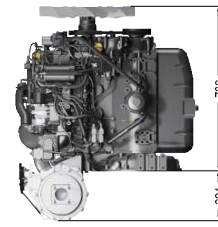
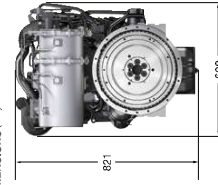


SPECIFICATION

Engine Model	4TNV98CT	
Emission Compliance	EPA Tier4 / EU Stage5B / Switzerland F0EN / Korea Tier4 / Japan 2013	
Fuel Injection	Direct Injection DIH	
Aspiration	T/C	
Fuel Injection System	Common Rail	
Intake Valve	Standard	
Exhaust Valve	Standard	
Aftertreatment	DPF	
No. of Cylinders	4	
Bore x Stroke	98 x 110	
Displacement	L 3,419	
Rated Output (Gross)	kW/min	51.6/2,000 53.7/2,100 54.7/2,400 55.7/2,500
	PS/min	70.0/2,000 73.0/2,100 74.0/2,400 75.4/2,500
Max Torque (Gross)	Non-torque	296/1,300 296/1,365 296/1,430 296/1,560
Overall Length x Width x Height *	mm	963 x 600 x 851
Weight (Dry) *	kg	275

*: DPF layout is on flexed housing.

DIMENSIONS (mm)



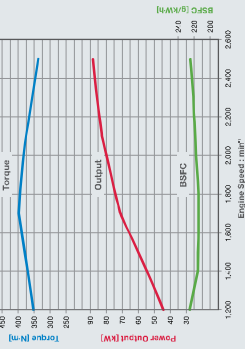
4TNV94FHT

Rated Output (Gross)

69.8-88.4kW



PERFORMANCE CURVES (TNV94FHT 69.8kW at 2350rpm)

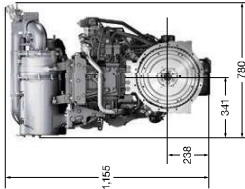


SPECIFICATION

Engine Model	4TNV94FHT	
Emission Compliance	EPA Final Tier4 / EU Stage4 / Swiss/UK/EU POE	
Fuel Injection	Direct Injection DIH	
Aspiration	TIC with Inverter	
Fuel Injection System	Common Rail	
Injection Timing Valve	Standard	
Coolant Type	Standard	
Aftertreatment	DPF-SCR	
Number of Cylinders	4	
Bore x Stroke	94 x 110	
Displacement	3.054	
Rated Output (Gross)	69.8/2.000	76.2/2.200
	88.4/2.600	
Max Torque (Gross)	PS/kW*	106/2.200
	116/2.600	
Max Torque (Gross)	378-410/1.450	
Max Torque (Gross)	378-410/1.450	
Valve	V	
DPF/SCR Layout	1524 (Dry)	
Overall Length x Width x Height *	759 x 789 x 1,155	
Weight (Dry) *	370	

* 1: DPF/SCR Layer is on top of the engine

DIMENSIONS (mm)



Wide Range Application



Construction



Agriculture



Material Handling

SMARTASSIST-Direct

SMARTASSIST-Direct is YANMAR's standard service tool for all Tier 4 Final engines. It allows the engine operator to view real-time engine history, information and control system operation status to be easily checked.



Research & Development

YANMAR operates a diverse R&D program as we seek to create new technologies to improve cleaner-burning diesel engines. Using our own unique technology as a starting-point, we add in the latest in advanced technology to comply with EPA Tier 4 / EU Stage 4B non-road diesel engine emissions regulations.



Simulation Analysis



Yanmar Hattori

YANMAR - To conserve fuel is to serve mankind