

YANMAR®

DIESEL ENGINES

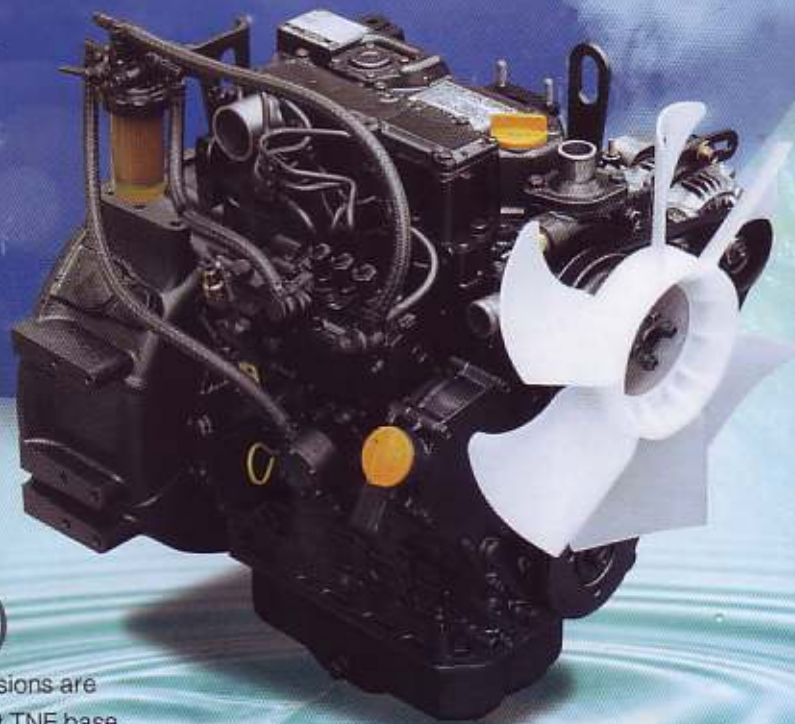
TNVseries

Max. Output
13.4~96.6hp



The TNV series adds a whole range of “goodies” that make this engine a mechanical “Work of art”

The much acclaimed “Clean and Silent” TNE series has just become even better. Its called the TNV, and it stands for Total New Value. Lets take a look.....



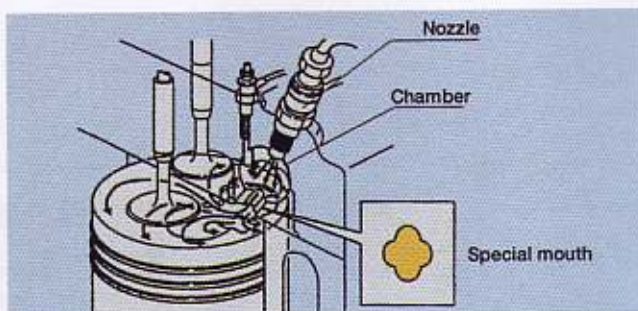
Emission Reduction (ie a Cleaner Engine)

Cleaner engines with even lower exhaust emissions are achieved by improving on the already excellent TNE base. Stricter emission standards are cleared by a wide margin.

IDI engines

1. Combustion Chamber

By investigating flow characteristics using experimental and numerical analysis methods, Yanmar research has achieved improved flow mixing in both the main chamber and the special mouth surrounding the injector. More efficient use of the incoming air charge results in cleaner burn and lower exhaust emissions.



2. Fuel Injection Equipment Mechanical Pump

Instead of a PFR pump, a newly developed in-line pump has been used for the smaller TNV engines. Adjustments are made solely in the Yanmar's own FIE factory ensuring precise compliance with regulations. Also the following features are incorporated:

- Increased force is applied by the governor to quicken the fuel controlling rack response time. Engine revs are more constant. Matching to a wide range of machinery is simplified.
- Emissions have been reduced by controlling fuel injection timing according to engine load.
- Cam profiles are matched to nozzle throttle needs, which give a better controlled injection rate. Emissions are reduced.

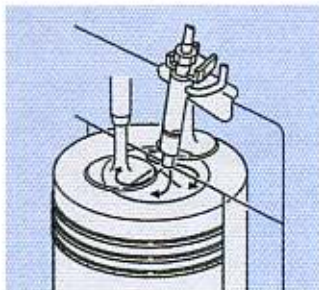


DI engines

1. Nozzle Installation Angle

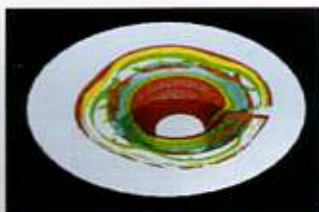
The installation angle of the fuel injection nozzle is greater than that in conventional engines, so that uneven atomization of fuel between injections can be reduced. Excellent matching between intake swirl ratio and the shape of the combustion chamber has resulted in uniform mixing of fuel in the combustion chamber. Therefore, performance including combustion efficiency, startability, noise, and exhaust emission has been improved.

On the 4TN94L, -98 and -98T by using 2 inlet and 2 exhaust valves, air intake and expulsion is markedly improved. Vertically mounted injector nozzle minimizes imbalance of spray pattern.



2. Combustion Chamber

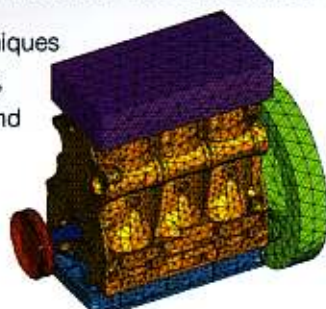
It increases the fluid energy of the air and fuel charge. The swirl effect produced in the chamber continues while combustion occurs, aiding mixing and results in lower exhaust emissions compared to conventional chambers.



Noise Level Reduction (ie a more Silent Engine)

1. Cylinder Block Noise Reduction

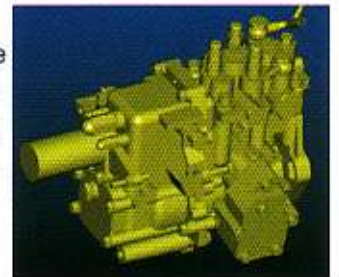
Yanmar's original CAE techniques have optimized the stiffness, minimized transformation, and reduced radiant noise.



3. Fuel Injection Equipment

● MP Pump

A new MP pump has been developed especially for the TNV engine series. Our aim was to make improvements over a wide range of areas to even further reduce emissions.



Features are:

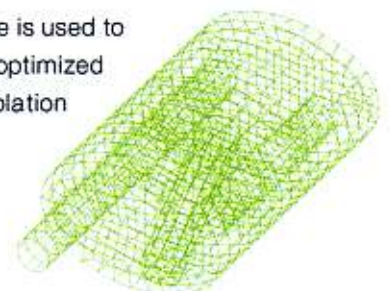
- High injection pressure
- Use of a mono plunger reduces uneven injection between the cylinders.
- Timing Control Device system optimizes injection to take into account speeds, loads and the startup phase.
- New mechanical governor helps to maintain cleaner exhausts.
- Minimal variation from chosen revs at low speed using constant pressure valve.

● Fuel Injection Nozzle

- Multiple numbers of very small holes are used to achieve uniform atomization.
- Holes are not simply drilled, their inside edges are carefully rounded to promote even flow and direction of spray, also to reduce resistance.
- Low sack nozzle profile improves combustion. Double corn shape protects from cavitation.

2. Muffler Noise Reduction

Original CAE technique is used to design a muffler with optimized volumes and sound isolation materials.





Engine Specifications

Engine Model		2TNV70	3TNV70	3TNV76	3TNV82A (-B)	3TNV84T (-B)
Type						
Combustion		Indirect injection (DI)				
Aspiration		Natural Aspiration				Turbocharged
No. of cylinders		2	3			
Cyl. Bore x stroke	mm	70 x 74		76 x 82	82 x 84	84 x 90
Displacement	Litter	0.570	0.854	1.116	1.331	1.496
Direction of rotation						
Governor system						
Cooling System						
Lubrication System						
Starting System						
Dry mass (back plate)	kg	73	87	94	111	150
Dry mass (Bell housing)	kg	84	98	112	128	159
Applicable Emission Regulation	EPA IT4 Compliance	-	-	○ (≥ 19kW)	○ (≥ 19kW, -B)	○ (≥ 19kW, -B)
	EPA Tier4 Compliance	○	○	○ (≤ 19kW)	○ (≤ 19kW, -B)	○ (≤ 19kW, -B)
	EC Stage II A (Generator use)	-	-	○ (≥ 19kW)	-	○ (≥ 19kW, -BG)
	EC Stage III A (Industrial use)	-	-	○ (≥ 19kW)	○ (≥ 19kW)	○ (≥ 19kW)
	China Stage II Compliance	○	○	○	○	○

Output

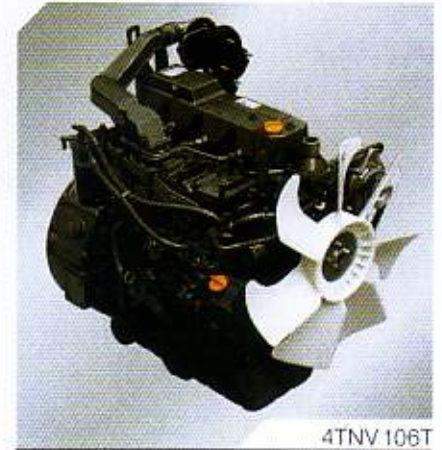
Model		2TNV70	3TNV70	3TNV76	3TNV82A (-B)	3TNV84T (-B)					
Industrial use	NET kW/ NET hp/ Gross kW	min ⁻¹ (rpm)	3600	9.9/13.3/10.5	15.5 / 20.8 / 17.0	20.2/27.1/22.3	-	-			
			3400	9.6 / 12.9 / 10.1	14.7 / 19.7 / 16.1	19.3/25.9/21.2	-	-			
			3200	9.3 / 12.5 / 9.8	14.0 / 18.8 / 15.1	18.2/24.4/19.9	-	-			
			3000	9.1 / 12.2 / 9.5	13.7 / 18.4 / 14.6	17.9/24.0/19.2	21.9/29.4/23.0	-			
			2800	8.5 / 11.4 / 8.8	12.8 / 17.2 / 13.6	16.7/22.4/17.8	20.4/27.4/21.3	29.1/39.0/30.2			
			2700	8.2 / 11.0 / 8.4	12.4/ 16.6 / 13.1	16.1/21.6/17.1	19.7/26.4/20.5	-			
			2600	7.9 / 10.6 / 8.1	11.8 / 15.8 / 12.5	15.5/20.8/16.5	19.0/25.5/19.7	26.8/35.9/27.7			
			2500	7.6 / 10.2 / 7.8	11.4 / 15.3 / 12.0	14.9/20.0/15.8	18.2/24.4/18.9	-			
			2400	7.3 / 9.8 / 7.5	11.0 / 14.8 / 11.5	14.3/19.2/15.1	17.5/23.5/18.1	-			
			2300	7.0 / 9.4 / 7.2	10.5 / 14.1 / 11.0	13.8/18.5/14.4	16.8/22.5/17.3	-			
			2200	6.6 / 8.9 / 6.8	9.9 / 13.3 / 10.3	13.2/17.7/13.8	16.0/21.5/16.5	-			
			2100	6.3 / 8.4 / 6.5	9.5 / 12.7 / 9.9	12.5/16.8/13.0	-	-			
			2000	6.0 / 8.0 / 6.1	9.0 / 12.1 / 9.3	11.8/15.8/12.3	-	-			
			Generator use	NET kW/ NET hp/ Gross kW	Stand-by	3600	10.0 / 13.4 / 10.6	16.0 / 21.5 / 17.6	19.5/26.1/21.7	-	-
						3000	8.5 / 11.4 / 8.8	13.3 / 17.8 / 14.3	16.6/22.3/17.9	-	-
1800	-	8.0 / 10.7 / 8.3				10.7/14.3/11.1	13.2/17.7/13.8	18.3/24.5/18.6 (-B) 18.8/25.5/19.5			
1500	-	6.7 / 9.0 / 6.8				9.0/12.1/9.2	11.0/14.8/11.3	15.3/20.5/15.5 (-B) 15.8/21.5/16.3			
Continuous	3600	9.1 / 12.2 / 9.7				14.5 / 19.4 / 16.1	17.7/23.7/19.9	-	-		
	3000	7.7 / 10.3 / 8.1				12.1 / 16.2 / 13.1	15.1/20.2/16.5	-	-		
	1800	-	7.3 / 9.8 / 7.5	9.8/13.1/10.1	12.0/16.1/12.6	16.6/22.5/17.2 (-B) 16.6/22.5/17.3					
1500	-	6.1 / 8.2 / 6.3	8.2/11.0/8.4	9.9/13.3/10.3	14.1/19.1/14.4 (-B) 14.0/19.0/14.4						



3TNV76



3TNV88



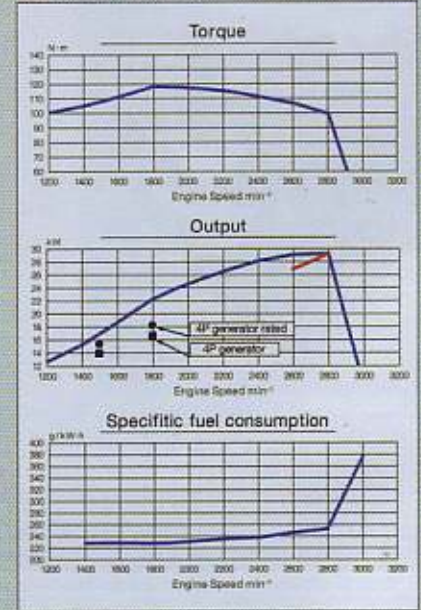
4TNV106T

3TNV88 (-B)	4TNV84T (-B)	4TNV88 (-B)	4TNV94L (-B)	4TNV98	4TNV98T	4TNV106	4TNV106T
Vertical cylinder, 4-cycle water-cooled diesel engine							
Direct injection (DI)							
Natural Aspiration	Turbocharged	Natural Aspiration		Turbocharged		Natural Aspiration	Turbocharged
4							
88 x 90	84 x 90	88 x 90	94 x 110	98 x 110		106 x 125	
1.642	1.995	2.190	3.053	3.319		4.412	
Counterclockwise (viewed from flywheel)							
Mechanical							
Radiator							
Forced lubrication by trochoid pump							
Electric starting							
138	165	155	-	-	-	-	-
148	170	165	235		245	320	340
○ (≥ 19kW, -B)	○ (≤ 37kW, -B)	○ (-B)	○ (≤ 37kW)	-	-	-	-
○ (≤ 19kW, -B)	-	-	-	-	-	-	-
-	○	○	-	○	○	-	-
○	○ (≤ 37kW)	○	○ (≤ 37kW)	-	-	-	-
○	○	○	○	○	○	○	○

3TNV88 (-B)	4TNV84T (-B)	4TNV88 (-B)	4TNV94L (-B)	4TNV98	4TNV98T	4TNV106	4TNV106T
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
27.1/26.3/28.2	41.2/55.2/42.7	35.0/46.9/36.5	-	-	-	-	-
25.2/33.8/26.1	38.6/51.8/39.9	33.7/45.2/35.0	-	-	-	-	-
24.3/32.6/25.1	37.1/49.8/38.3	32.5/43.6/33.7	-	-	-	-	-
23.5/32.5/24.2	35.7/47.9/36.7	31.3/42.0/32.3	-	-	-	-	-
22.6/30.3/23.3	34.5/46.3/35.5	30.1/40.4/31.0	43.0/57.7/44.0	51.1/68.5/52.1	62.5/83.8/63.9	67.7/90.8/70.8	-
21.6/29.0/22.2	33.5/44.9/34.3	28.8/38.6/29.6	41.6/55.8/42.4	49.3/66.1/50.2	60.3/80.9/61.6	65.5/87.8/68.3	-
20.7/27.8/21.2	-	27.7/37.1/28.5	39.9/53.5/40.7	47.4/63.6/48.2	58.0/77.8/59.1	63.4/85.0/65.9	-
19.9/26.7/20.4	-	26.5/35.5/27.2	38.3/51.4/39.0	45.6/61.1/46.3	55.5/74.4/56.5	61.4/82.3/63.6	72.0/96.6/74.2
-	-	-	35.6/47.7/36.2 (-B) 36.8/49.3/37.4	43.8/58.7/44.4	-	59.0/79.1/61.0	70.9/95.1/72.9
18.0/24.1/18.4	-	24.1/32.3/24.6	35.3/47.3/35.9	41.9/56.2/42.5	-	56.6/75.9/58.3	69.9/93.7/71.6
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
16.3/21.9/16.9	26.9/36.1/27.7	21.6/29.0/22.4	-	40.8/54.7/41.6	50.1/67.2/50.9	58.7/78.7/60.5	66.9/89.7/69.4
13.5/18.1/13.9	21.3/28.6/21.8	18.0/24.1/18.5	-	34.4/46.1/34.9	41.7/55.9/42.2	49.4/66.2/50.5	56.0/75.1/57.6
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
14.8/19.8/15.4	24.3/32.6/25.1	19.6/26.3/20.5	-	36.4/48.8/37.2	45.3/60.7/46.1	53.3/71.5/55.1	60.9/81.7/63.4
12.3/16.5/12.7	19.1/25.6/19.6	16.4/22.0/16.9	-	30.7/41.2/31.2	37.7/50.6/38.2	41.2/55.3/42.3	50.9/68.3/52.5

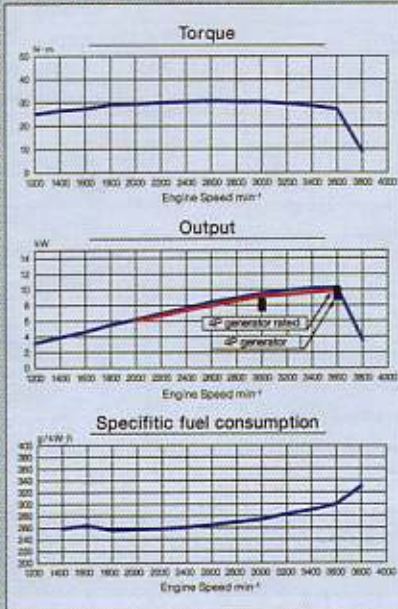


3TNV84T(-B)

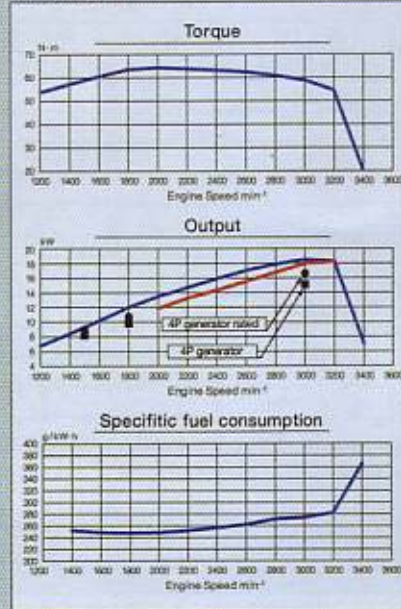


Performance Curves

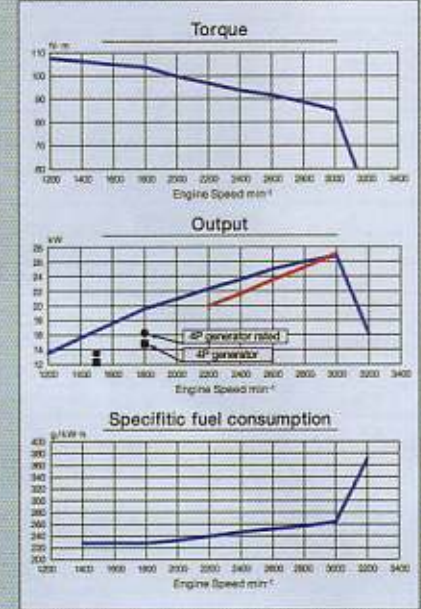
2TNV70



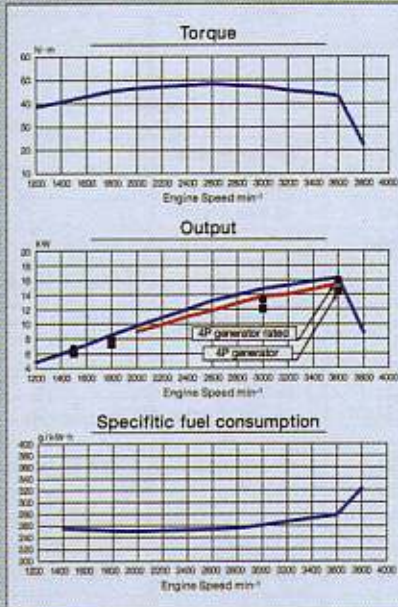
3TNV76



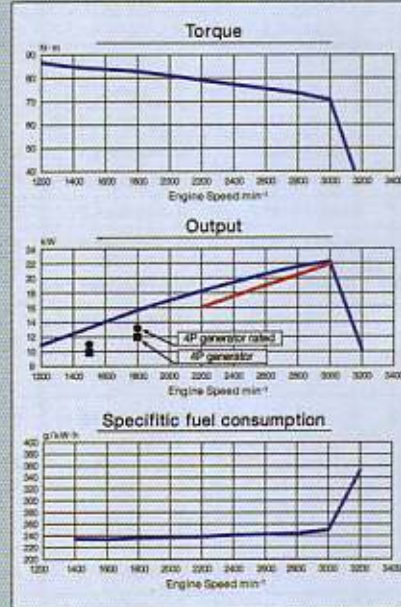
3TNV88(-B)



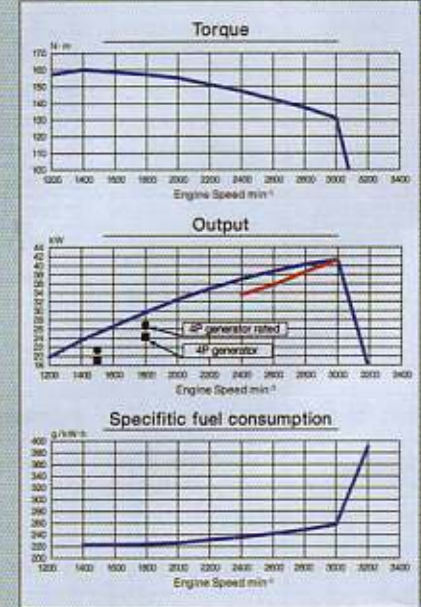
3TNV70



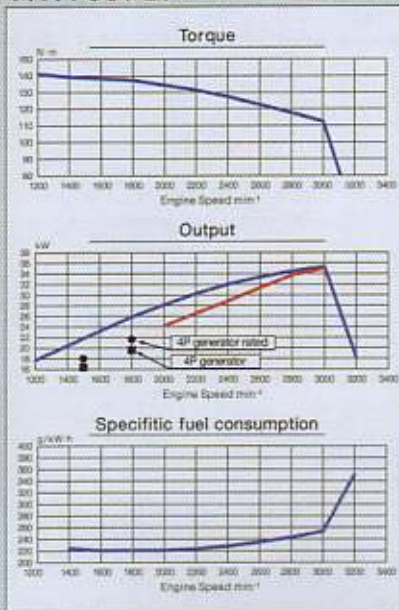
3TNV82A(-B)



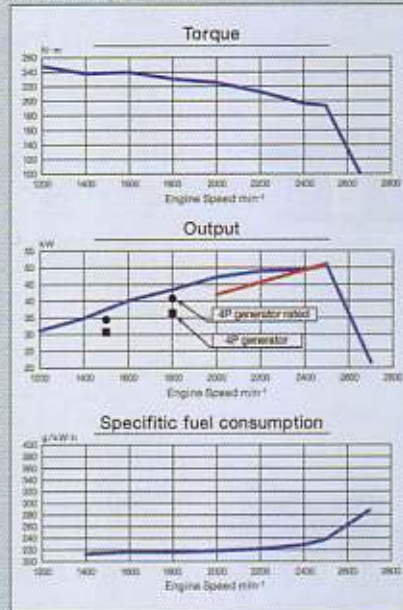
4TNV84T(-B)



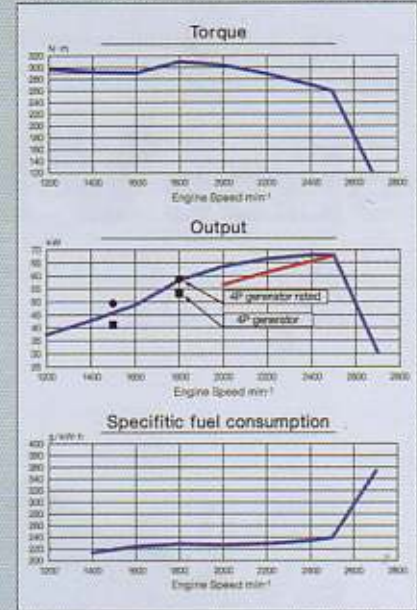
4TNV88(-B)



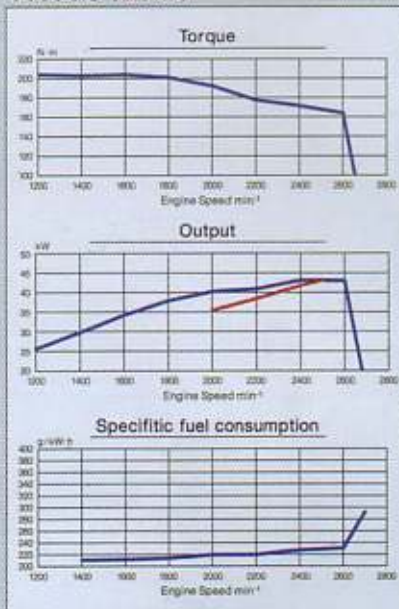
4TNV98



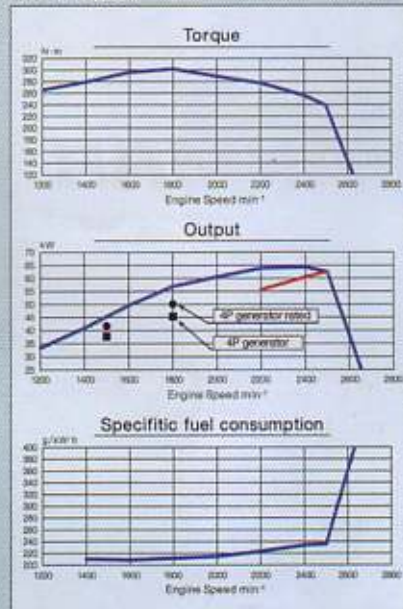
4TNV106



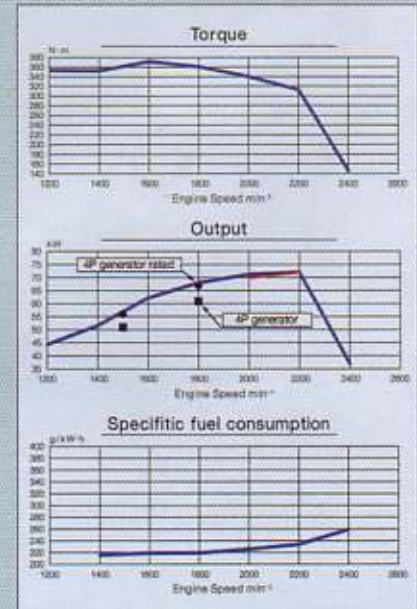
4TNV94L(-B)



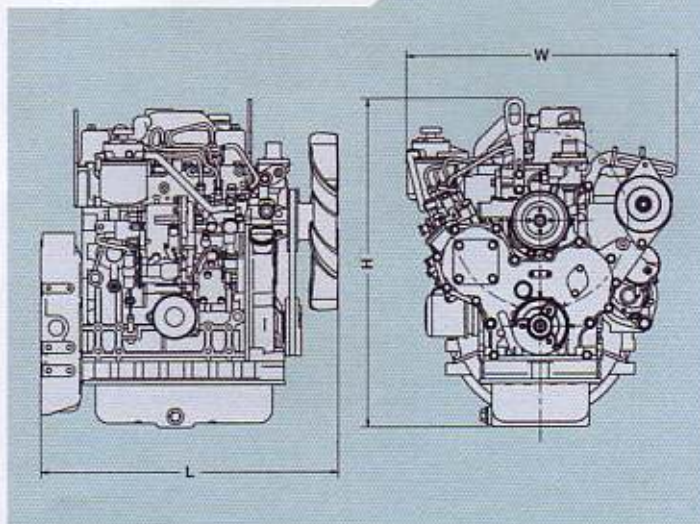
4TNV98T



4TNV106T



Engine Dimensions



Unit: mm

Model	2TNV70	3TNV70	3TNV76
L	415	504	524
W	427	427	427
H	521	549	572

Model	3TNV82A	3TNV84T	3TNV88	4TNV84T	4TNV88
L	528.5	615.7	564.5	655	655
W	498.5	517.5	517.5	517.5	517.5
H	561	652	622	685	622

Model	4TNV94L	4TNV98	4TNV98T
L	719	719	719
W	496	496	574
H	717	717	784

Model	4TNV106	4TNV106T
L	890	890
W	628	628
H	620	869