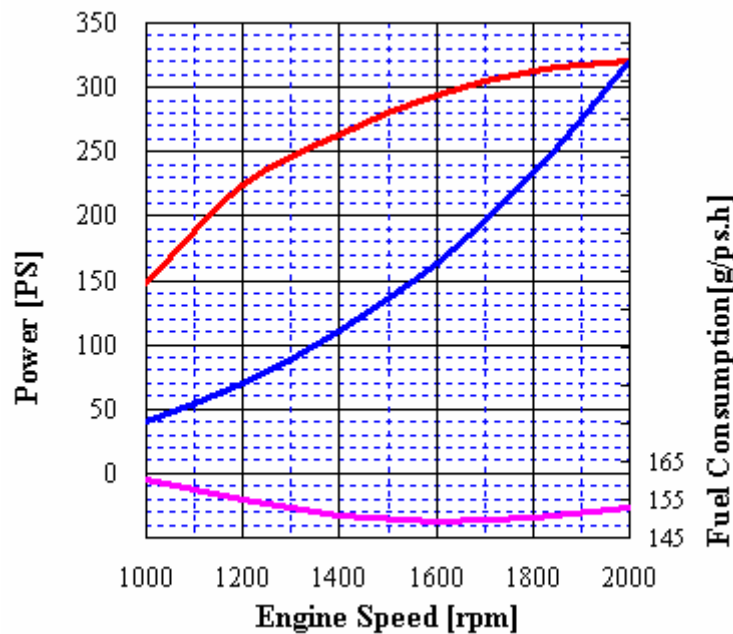
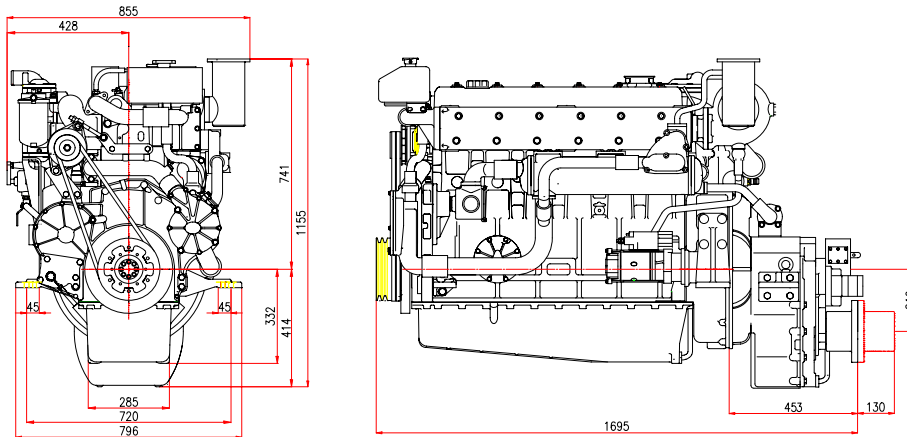


## POWER RATING

Production tolerance :  $\pm 3\%$

MODEL	CONDITIONS	POWER	rpm	Base Engine
MD196TI	HEAVY DUTY	320PS (235kW)	2,000	DE12TI

**Note : 1)** No reduction in rating for intake air temperature is up to 45 °C (318K) and sea water temperature is up to 32 °C (305K) , relative humidity is up to 60 % all data are based on operation to ISO 3046.



- **Heavy Duty** : Operation hours are unlimited per year,  
 At average load application is up to 90 % ,  
 At full load application is up to 80 %  
 Typical gearbox ratio: 2.5 ~ 6  
 (Fishing trawler, Tug boat, Pushing vessel, Cargo boat, Freighter, Ferry)

## Engine Specification

Model	Units	MD196TI	
Engine type		4 cycle, In line, direct- injection, water cooled with wet turbo charger & inter-cooler	
Rating output (B.H.P)	PS(kW)/rpm	320(235)/2,000	
Displacement	cc	11,051	
Cylinder number - bore( $\phi$ ) x stroke	mm	6 - $\phi$ 123 x 155	
Valve clearance at cold	In / Ex	mm	0.3 / 0.3
Low idling rpm	rpm	750+50	
No load max. rpm	rpm	below 2,200	
Mean effective pressure	kg/cm <sup>2</sup>	13.03	
Mean piston speed	m/sec.	10.33	
Compression ratio		16.5 : 1	
Firing order		1 - 5 - 3 - 6 - 2 - 4	
Max. firing pressure of cylinder	kg/cm <sup>2</sup>	105	
Compression pressure	at 200 rpm	kg/cm <sup>2</sup>	28 ( Initial condition )
Governor type of injection pump		Mechanical variable speed (R.Q.V)	
Fuel consumption	g/PS.h	158	
	lit / h	61	
Injection timing (B.T.D.C)	deg	16 $^{\circ}$ $\pm$ 1 $^{\circ}$	
Fuel inj. nozzle opening pressure	kg/cm <sup>2</sup>	1st : 160 , 2nd : 220	
Starting system		Electric Starting by starter motor	
Starter motor capacity	V- kW	24 - 6.0	
Alternator capacity	V- A	24 - 50	
Battery	V- Ah	24 - 150	
Cooling system		Indirect sea water cooling with heat exchanger	
Cooling water capacity	Max. / Min.	lit	24 / 19
Fresh water pump type		Centrifugal type, driven by gear	
Sea water pump type		Rubber impeller type driven by gear	
Lubricating oil (Engine)	Pan capacity	lit	Max : 25, Min : 19 ( Engine total : 27)
	Pressure	kg/cm <sup>2</sup>	Full : 3.5, Idle : 1.2
Marine gear	Model		TK450 (TaePyongYang)
	Gear ratio		1.97 2.53 3.04 3.42
Direction of revolution	Crankshaft		Counter clockwise viewed from stern side
	Propeller		Clockwise viewed from stern side
Engine size (L x W x H)	Without M/G	mm	1,242 x 854 x 1,073
	With M. gear	mm	1,695 x 854 x 1,155
Engine dry weight	Without M/G	kg	1,009
	with M. gear	kg	1,329

psi = kg/cm<sup>2</sup> x 14.22  
 lb/ft. = N.m x 0.737  
 kW = 0.2388 kcal/s

lb= kg x 2.205  
 lb/PS.h = g/kW.h x 0.00162  
 cfm = m<sup>3</sup>/min x 35.3

hp = PS x 0.98635  
 U.S gal. = liter x 0.264

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※ Specifications are subject to change without prior notice.