



ITEM NO. M0207-0010E Rev.2

DATE October, 2011

Specification Sheets of S12R-(Z3)MPTAW Engine

Specification sheet of:

- S12R-MPTAW (in compliance with IMO MARPOL 73/78, Annex VI, Regulation 13, Tier 2)
- S12R-Z3MPTAW (in compliance with EU NRMM Stage IIIA Inland Waterway Vessel engines, category V1:4)

Revision	First Edition : February, 2011	Technology Department		
	Rev. 1: September, 2011			
	Rev. 2: October, 2011	Approved by	Checked by	Drawn by
		M. Vermeulen		SC



GENERAL ENGINE DATA

Type	-----	4-Cycle, Water Cooled	
Aspiration	-----	Turbo-Charged, Inter Cooler (Fresh water to Cooler)	
Cylinder Arrangement	-----	60°V	
No.of Cylinders	-----	12	
Bore mm(in.)	-----	170	(6.69)
Stroke mm(in.)	-----	180	(7.09)
Displacement Liter(in. ³)	-----	49.03	(2992)
Compression Ratio	-----	14.5 : 1	
Dry Weight - Engine only - kg(lb)	-----	5320	(11731)
Wet Weight - Engine only - kg(lb)	-----	5600	(12348)

PERFORMANCE DATA

Idling Speed -rpm	-----	600~650	
Maximum Overspeed Capacity - rpm	-----	2100	
Moment of Inertia of Rotating Components J- kg · m ² (lbf · ft ²)	-----	20.22	(1920)
(Includes 21 inch Flywheel)			
Cyclic Speed Variation with Flywheel at			
	1800rpm	-----	1/683
	1500rpm	-----	1/448
	1200 rpm	-----	1/77

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Flywheel Housing - N · m(lbf · ft)	-----	4413	(3256)
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AIR INLET SYSTEM

Maximum Intake Air Restriction (Includes piping)- kPa (in.H ₂ O)	-----	3.92	(15.7)
Maximum Allowable Intake Air Temperature- °C (°F)	-----	45	(113)

EXHAUST SYSTEM

Maximum Allowable Back Pressure - kPa (in.H ₂ O)	-----	4.41	(17.7)
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LUBRICATION SYSTEM

Oil Pressure at Idle - MPa (psi)	-----	0.2~0.3	(29~43)
at Rate Speed - MPa (psi)	-----	0.5~0.6	(71~86)
Maximum Oil Temperature- °C (°F)	-----	110	(230)
Oil Capacity of Marine Pan High - liter (U.S.gal)	-----	200	(52.8)
Low - liter (U.S.gal)	-----	158	(41.7)
Total System Capacity (Includes Oil Filter) - liter (U.S.gal)	-----	230	(60.8)
Maximum Installation Angle	Front Up	-----	12.5°
	Front Down	-----	15°
Maximum Instantaneous Operating Angle	Front Up	-----	30°
(Engine Level)	Front Down	-----	30°
	Side to Side	-----	22.5°

COOLING SYSTEM

Jacket water system

Cooling system: Closed fresh water type High Temperature (HT) system with treated water/glycol mixture

Coolant Capacity of Jacket Water System (Engine only) - liter (U.S.gal)	-----	111	(29.3)
Maximum External Friction Head at Engine Outlet-MPa(psi)	-----	0.034	(5.0)
Jacket Water Standard Thermostat (Modulating) Range- °C (°F)	-----	71~85	(160~185)
Maximum Allowable Coolant Temperature at Engine Outlet- °C (°F)	-----	95	(203)
Recommended Coolant Temperature at Engine outlet- °C (°F)	-----	80	(176)

Charge air cooler cooling system

Cooling system: Closed fresh water type Low Temperature (LT) system with treated water/glycol mixture

Coolant Capacity of Charge Air Cooler (Engine only) - liter (U.S.gal)	-----	14	(3.7)
Maximum External Friction Head at Intercooler Outlet-MPa(psi)	-----	0.035	(5.1)
Charge Air Cooler Standard Thermostat (Modulating) Range- °C (°F)	-----	35~50	(95~122)
Maximum Coolant Temperature at Intercooler Inlet, MPTAW type- °C (°F)	-----	see page 4/4	
Minimum Coolant Expansion Space -% of System Capacity	-----	10	
Recommended Static Head of Coolant above Crankshaft Center - m(ft)			
	MAX.	-----	10 (32.8)
	MIN.	-----	7 (23.0)

The specifications are subject to change without notice.

FUEL SYSTEM

Fuel Injection Pump	-----	Mitsubishi PS6 Type x 2
Maximum Suction Head of Feed Pump - kPa (in. Hg)	-----	14.7 (4.3)
Maximum Level of Fuel Tank - m	-----	5.0
	Continuous Use	-----
	Stand-by Use	-----
		2.0
Minimum Fuel Oil Supply Pipe Inner Diameter - mm(in.)	-----	20 (0.79)
Minimum Fuel Oil Leak Pipe Inner Diameter - mm(in.)	-----	20 (0.79)

STARTING SYSTEM

Battery Charging Alternator - V-Ah	-----	24-35
Starting Motor Capacity - V -kW	-----	24-7.5x2
Maximum Allowable Resistance of Cranking Circuit - m Ω	-----	1.5
Recommended Minimum Battery Capacity		
At 5°C (41°F) and above - Ah	-----	300
Below 5°C (41°F) through -5°C (23°F)	-----	600
Cranking Ampere of Starter at 5°C (41°F) / -5°C (23°F)		
Static Ampere -A		380 × 2 / 480 × 2
Momentary Ampere -A		720 × 2 / 920 × 2

ACCESSORY EQUIPMENT

Air Cleaner	Silencer Type
Exhaust Manifold	Air Cooled
Turbocharger	Air Cooled
Air Cooler	Fresh Water Cooled
Breather	Conduction Type
Governor	Hydraulic PSG Type or electronic (optional)
Fuel Injection Pump	
Fuel Feed Pump	
Fuel Injection Pipe	Double walled Type
Fuel Injection Nozzle	
Fuel Filter	Paper Element Type
Lubricating Oil Pump	
Lubricating Oil Cooler	
Lubricating Oil Filter(Full-Flow)	Paper Element Type
Lubricating Oil Filter(By-Pass Flow)	Paper Element Type
Oil Pan	Large Capacity,steel
Cooling Water Pumps (HT, LT)	
Cooling Water Thermostats (HT, LT)	
Starter	Earth Float Type
Alternator	Earth Float Type
Stop Solenoid	DC24V-15A
Engine Support	Marine Type
Accessory Drive	Front Drive Pulley

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APPLICATION : MARINE

ENGINE RATING

All data represent net performance according to ISO 3046 with standard accessories such as fuel injection pump, water pump L.O. pump and charging alternator under the condition of 100kPa(750 mm Hg) barometric pressure, 298K (25degC) ambient temperature and 30% relative humidity.

ITEM Engine model	UNIT	Propulsion use			Auxiliary generator		
		-Z3MPTAW-3	-MPTAW-3	-MPTAW-2	-MPTAW-9	-MPTAW-5	-MPTAW-4
Rating		Heavy Duty		Medium Duty	60Hz	50Hz	60Hz
Rated engine speed		1600		1650	1200	1500	1800
Emission Regulation (Test cycle)	EU Stage IIIA category V1:4	E2 (CPP) E3 (FPP)	-	-	-	-	-
	IMO Tier 2	E2 (CPP) E3 (FPP)	E2 (CPP) E3 (FPP)	E2 (CPP) E3 (FPP)	D2	D2	D2
Number of cylinders		12					
Bore	mm	170					
	(in.)	(6.69)					
Stroke	mm	180					
	(in.)	(7.09)					
Displacement	liter	49.03					
	(in. ³)	(2992)					
Rated output	kW	940		1040	840	1120	1270
	HP	(1260)		(1394)	(1126)	(1501)	(1702)
Brake Mean Effective Pressure	MPa	1.44		1.54	1.71	1.83	1.73
	(psi)	(209)		(223)	(248)	(265)	(251)
Mean Piston Speed	m/s	9.6		9.9	7.2	9	10.8
	(ft/min)	(1890)		(1949)	(1417)	(1772)	(2126)
Maximum Regenerative Power Absorption Capacity	kW	128		140	69	109	178
	(HP)	(172)		(187)	(93)	(146)	(239)
Intake Air Flow	m ³ /min	86		97	70	100	119
	(CFM)	(3037)		(3425)	(2472)	(3531)	(4202)
Exhaust Gas Flow	m ³ /min	228		258	185	265	315
	(CFM)	(8051)		(9110)	(6532)	(9357)	(11123)
Coolant Flow	liter/min	1720		1750	1300	1650	1850
	(U.S. GPM)	(454)		(462)	(343)	(436)	(489)
Coolant(Jacket water) Pressure (water pump outlet)	MPa	0.15		0.15	0.09	0.14	0.17
	(psi)	(22)		(22)	(13)	(20)	(25)
Coolant Flow to Inter Cooler (Max. Flow: 320L/min)	liter/min	300		300	300	300	300
	(U.S. GPM)	(80)		(80)	(80)	(80)	(80)
Oil Flow	liter/min	510		530	380	480	580
	(U.S. GPM)	(135)		(140)	(100)	(127)	(153)
Radiated Heat to Ambient	kJ/hr	271144		307123	220574	315315	374980
	(BTU/min)	(4284)		(4853)	(3485)	(4982)	(5925)
Heat Rejection to Coolant	kJ/hr	1355721		1535613	1102869	1576577	1874902
	(BTU/min)	(21420)		(24263)	(17425)	(24910)	(29623)
Heat Rejection to Inter Cooler	kJ/hr	1084577		1228491	882295	1261262	1499922
	(BTU/min)	(17136)		(19410)	(13940)	(19928)	(23699)
Heat Rejection to Exhaust	kJ/hr	2943547		3423247	2123349	3327111	4179603
	(BTU/min)	(46508)		(54087)	(33549)	(52568)	(66038)
Cooling system	Direct Sea Water Cooling	°C	N/A				
	Max. sea water temp. at intercooler inlet						
	Intermediate Fresh Water Cooling	°C	Max. 38°C				
	Max. fresh water temp. at intercooler inlet		(When sea water temp. 32°C)				
Radiator Cooling*		°C	N/A			Max. 45°C	
	Max. coolant temp. at intercooler inlet					(When Air Temp. 25°C)	
Noise Level (1 m height & distance) (excludes, Intake,Exhaust)	dB(A)	-		-	-	-	-
Maximum No Load Governed Speed	rpm	1720		1774	1260	1575	1890

*In case of radiator cooling method at IACS standard reference conditions, 15% output de-rating has to be applied.

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APPLICATION : MARINE