



ITEM NO. M0205-0009E Rev.2

DATE October 2011

Specification Sheets of S12A2-(Z3)MPTAW Engine

Specification sheet of:

- S12A2-MPTAW (in compliance with IMO MARPOL 73/78, Annex VI, Regulation 13, Tier 2)
- S12A2-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.)	-----	150	(5.91)
Stroke mm(in.)	-----	160	(6.30)
Displacement Liter(in. ³)	-----	33.93	(2071)
Compression Ratio	-----	15.3 : 1	
Dry Weight - Engine only - kg(lb)	-----	3380	(7453)
Wet Weight - Engine only - kg(lb)	-----	3606	(7951)

PERFORMANCE DATA

Idling Speed -rpm	-----	600~650	
Maximum Overspeed Capacity - rpm	-----	2400	
Moment of Inertia of Rotating Components J- kg · m ² (lbf · ft ²)	-----	10.65	(1011)
Cyclic Speed Variation with Flywheel at			
	1800rpm	-----	1/552
	1500rpm	-----	1/373

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Flywheel Housing - N · m(lbf · ft)	-----	1961	(1447)
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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)	-----	120	(31.7)
	Low - liter (U.S.gal)	-----	92	(24.3)
Total System Capacity (Includes Oil Filter) - liter (U.S.gal)	-----	140	(37.0)	
Maximum Installation Angle	Front Up	-----	11°	
	Front Down	-----	9.5°	
Maximum Instantaneous Operating Angle	Front Up	-----	45°	
(Engine Level)	Front Down	-----	24°	
	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)	-----	84	(22.2)
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	-----	Bosch P Type x 2
Maximum Suction Head of Feed Pump - kPa (in. Hg)	-----	14.7 (4.3)
Maximum Level of Fuel Tank - m	Continuous Use -----	5.0
	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)	-----	500
Cranking Ampere of Starter at 5°C (41°F) / -5°C (23°F)		
Static Ampere -A		380 × 2 / 480 × 2
Momentary Ampere -A		680 × 2 / 900 × 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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ENGINE RATING

All data represent net performance according to ISO3046 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-5	-MPTAW-4	
Rating		Heavy Duty		Medium Duty	50Hz	60Hz	
Rated engine speed	rpm	1940			2000	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	
Number of cylinders		12					
Bore	mm (in.)	150 (5.91)					
Stroke	mm (in.)	160 (6.30)					
Rated output	kW	701		776	709	828	
Brake Mean Effective Pressure	MPa (psi)	1.28 (186)		1.37 (199)	1.67 (242)	1.63 (236)	
Mean Piston Speed	m/s (ft/min)	10.3 (2028)		10.7 (2106)	8 (1575)	10 (1890)	
Maximum Regenerative Power	kW	109		116	68	93	
Absorption Capacity	(HP)	(146)		(155)	(91)	(125)	
Intake Air Flow	m ³ /min (CFM)	65 (2295)		72 (2542)	62 (2189)	77 (2719)	
Exhaust Gas Flow	m ³ /min (CFM)	173 (6109)		192 (6780)	163 (5756)	205 (7239)	
Coolant Flow	liter/min (U.S. GPM)	1160 (306)		1180 (312)	1000 (264)	1120 (296)	
Coolant(Jacket water) Pressure (water pump outlet)	MPa (psi)	0.19 (27)		0.20 (28)	0.113 (16)	0.167 (24)	
Coolant Flow to Inter Cooler (Max. Flow: 600L/min)	liter/min (U.S. GPM)	500 (132)		500 (132)	500 (132)	500 (132)	
Oil Flow	liter/min (U.S. GPM)	400 (106)		410 (108)	310 (82)	370 (98)	
Radiated Heat to Ambient	kJ/hr (BTU/min)	206496 (3263)		228464 (3610)	194699 (3076)	243842 (3853)	
Heat Rejection to Coolant	kJ/hr (BTU/min)	1066898 (16857)		1180398 (18650)	1005946 (15894)	1259848 (19906)	
Heat Rejection to Inter Cooler	kJ/hr (BTU/min)	619489 (9788)		685393 (10829)	584098 (9229)	731525 (11558)	
Heat Rejection to Exhaust	kJ/hr (BTU/min)	2466392 (38969)		2728774 (43115)	2154441 (34040)	2912441 (46016)	
Cooling system	Direct Sea Water Cooling Max. sea water temp. at intercooler inlet	°C	N/A				
	Intermediate Fresh Water Cooling Max. fresh water temp. at intercooler inlet	°C	Max. 38°C (When sea water temp. 32°C)				
	Radiator Cooling* Max. coolant temp. at intercooler inlet	°C	N/A	N/A	Max. 45°C (When Air Temp. 25°C)		
Noise Level (1 m height & distance) (excludes, Intake,Exhaust)	dB(A)	-		-	-	-	
Maximum No Load Governed Speed	rpm	2086		2150	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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