

YEN SERVICE NEWS

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Subject	Control for cooling water temperature of Engine	Engine Model	All Models

Almost marine generator engines are applied to 380 cSt heavy fuel running with the sulfuric content 4.5 mass % or less, and required 130 to 140 deg C fuel temperature at engine inlet. When this required temperature is not full filled, lower temperature, then the ball of atomization of 380 cSt can be uneven condition. This may cause the longer " Followed Cumbustion Period " at the combustion stroke and makes the higher exhaust temperature. Also it makes the higher dynamic load to the fuel cam in the cam shaft with higher viscosity of 380 cSt fuel.

However what is the control for cooling water temperature.

The marine generator engines are one of important equipments in a closed plant as vessel. So the cooling water temperature of engine inlet is determined under the calculation of heat balancing of plant.

We can refer the cooling water temperature at engine inlet at " Yanmar Final Drawing " as an attached example with red line.

This final drawing shows " HT (High Temperature) F.W. Temp. at Eng. inlet; 80 deg C " that means the cooling water temperature at engine inlet is 80 deg C. This 80 deg C is setted by the thermostat of ships main cooling water cooler, out of Yanmar specification.

If this cooling water temperature is lower than 80 deg C and running longer time, the sulfuric condensation of exhaust gas accumulated in carbon deposit may corrode to engine components like a cylinder head, exhaust valve and cylinder liner etc at the engine is stand by.

It is very important to confirm and maintain the cooling water temperature at engine inlet as same as the description in " Yanmar Final Drawing ".



Corrosion of exhaust gas pass of Cylinder Head



Corrosion of exhaust Valve Stem



Corrsion and Scuffing on the surface of Cylinder

Best Regards

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Approved	Checked	Prepared
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Specific Fuel Oil consumption	194 +3%g/kW·h(143 +3% g/PS·h) with Eng. driven LO Pump and C.W. Pump 1 set) 190 +3%g/kW·h(140 +3%g/PS·h) without Engine driven Pump. •At Eng. Rated Output 800 kW (1088 PS)/ 720 min ⁻¹ Marine Diesel Oil used and Low Calorific Value of 42.7 MJ/kg (10,200 kcal/kg). •Based on the Standard Reference Conditions of ISO 3046/1. •NOx Level to meet IMO Exhaust Gas Regulation (D2 Mode) (Max 12.1 g/kW·h)
Specific Lub. Oil consumption	0.3~1.1 g/kW·h At eng. full load (0.2~0.8 g/PS·h)
Governor Characteristics At Load Variation of 100%→0%→40%→70%→100%	Speed Variation: Momentary ≤ 10% ,Permanent ≤ 5% Time of Stability within 1% of Final steady speed ≤ 5 sec.
Usage Condition	•Ambient Temperature ; 0~45°C •Relative Humidity ; ~85% •L.T.F.W. Temp. at cooler inlet ; ~38°C (Low Temp.) •HT F.W. Temp. at Eng. inlet ; 80°C (High Temp.) •HT F.W. Press. at Eng. jacket inlet ; 0.15~0.30MPa (1.5~3.0kgf/cm ²) •Exh. Gas Back Press. at Full Load ; below 3.43 kPa (below 350mmH ₂ O) Exhaust Gas Volume : 4580 Nm ³ /h at Full Load Exhaust Gas Temp. of T/C Outlet: 435 °C at Full Load •Combustion Air Volume(25°C); 4840 m ³ /h at Full Load
Capacity of Lub. oil & Water	Fresh Water(Eng.jacket & piping): 130 liters System Oil (Common bed tank) : 1000 liters Governor Hydraulic Oil : 1.3 liters

2. PRINCIPAL DATA OF A. C. GENERATOR

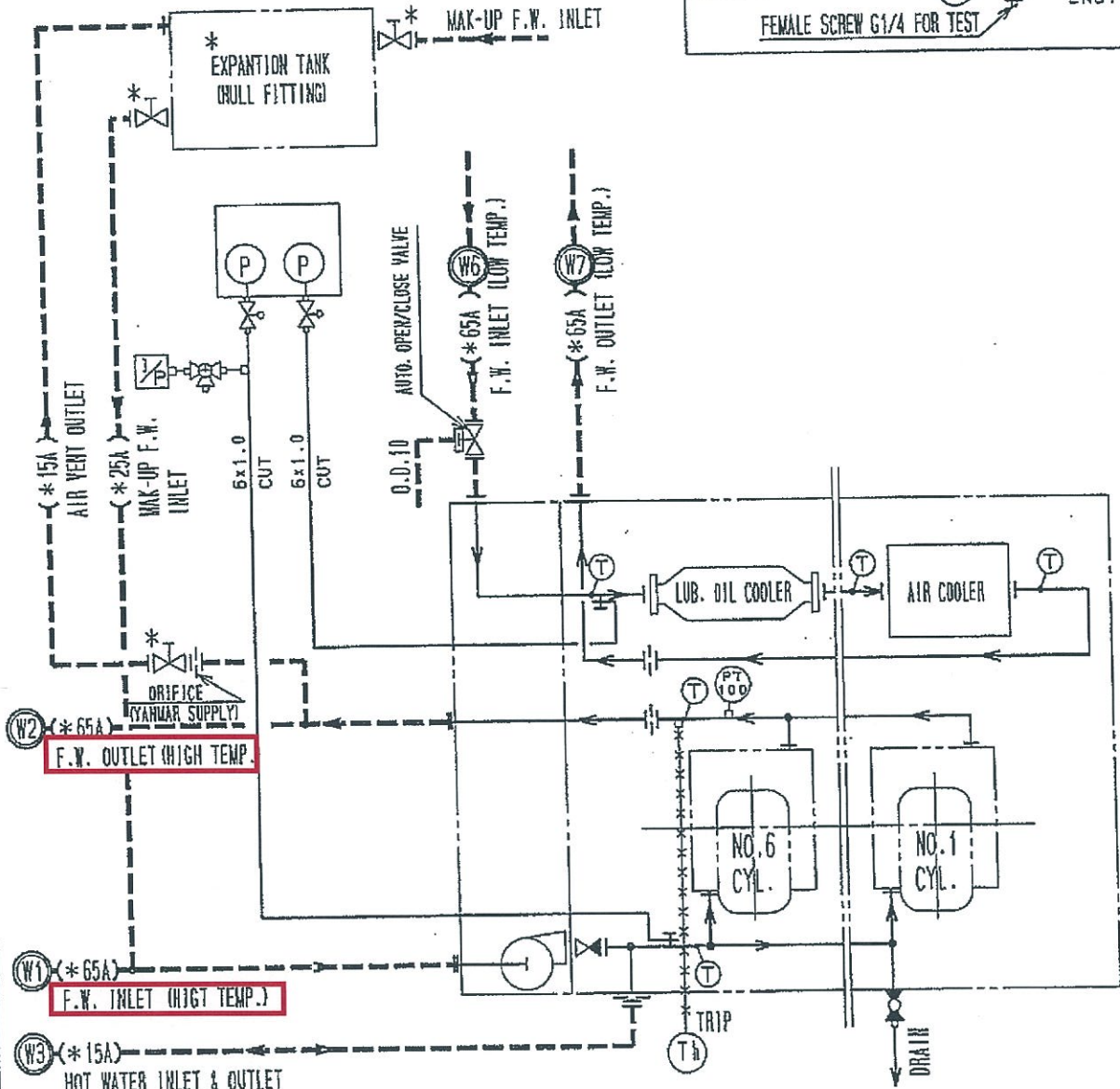
Rated Output / Revolution	740kW / 720 min ⁻¹
Rated Voltage / Current	450 V / 1187 A
No. of Phase / Frequency	φ 3 / 60 Hz
Power Factor	0.8
Insulation	Class F
Enclosure / Cooling	Drip-Proof / Self-ventilating
Type of Bearing / Lubrication	Single / Self-Lubrication
Coupling of Eng. and Gen.	Rigid
Manufacture	HYUNDAI ELECTRICAL ENGINEERING CO., LTD.
Remark : 1. This AC Generator is supplied by shipyard. 2. Please refer to document of gen. maker.	

3. MATERIAL & STRUCTURE OF ENGINE

Parts Name	Material	Structure
Cylinder Block	Cast iron	Monoblock casting and having underslung main bearing cap. The air duct, cooling water and lub. oil passages are integrated in block.
Cylinder Liner	Special cast iron	Wet type
Cylinder Head	Cast iron	Fuel injection valve in center, indicator valve on head cover. 4-valve type consisting of 2 suction valves and 2 exh.valves Exh. valve seat rings and nozzle sleeve are cooled by F.W. Exhaust valves are made of Nimonic
Piston	Special cast iron	Monoblock casting and forced oil cooling. Top and second ring grooves are treated with laser hardening. Ring's arrangement is three compression rings and one oil ring.
Piston Pin	Special steel	Floating type

	CENTRIFUGAL PUMP		FLANGED GLOBE VALVE		FLANGED JOINT		FLEXIBLE JOINT		THERMOMETER
	ELECTRIC MOTOR		SCREWED NEEDLE VALVE		BLANK FLANGE		LOOP PIPING		PRESSURE GAUGE
			SWING CHECK VALVE		SPECTACLE FLANGE	O.D.	OUT DIA. OF PIPE		COMPOUND GAUGE
	BUILT-IN CHECK VALVE		THERMOSTATIC VALVE		UNION TYPE JOINT	STPG	STEEL PIPE		PRESSURE SWITCH
	THREE-WAY COCK		SAFETY VALVE		BALL TYPE JOINT	CUT	COPPER TUBES		TEMPERATURE SWITCH
	BUTTERFLY VALVE		PISTON VALVE		BOSS	****	CAPILLARY TUBE		FLOAT SWITCH
	SCREWED COCK		THREE-WAY PISTON VALVE		DRIFICE		GLASS LEVEL GAUGE		PRESSURE SENSOR
	SCREWED BALL VALVE		FLOW REGULAT. VALVE		FLEX-MASTER		REDUCER		THERMO SENSOR

CONNECTION FOR SWITCH TEST (PS) FROM ENG.
FEMALE SCREW G1/4 FOR TEST



MODEL: 6N21L PIPING LAYOUT
COOLING WATER SYSTEM

ヤンマー株式会社 YANMAR CO., LTD.	DWG. No.	P3-47673-422B
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REMARKS
 1) PIPES AND FITINGS MARKED * IN THIS DRAWING ARE NOT SUPPLIED BY YANMAR.
 2) CHARACTERS IN ARE SAME AS ONES OF PIPE CONNECTION IN OUTLINE DRAWING.