



mitsubishi S6R-(Z3)MPTAW

Click on the headlines below to get redirected to the respective sections in this document.

[Technical data](#)
[Elastic drawing](#)
[Measure of overhaul](#)
[Connection details](#)
[Performance curves](#)



Item no.	M0206-0009E
Date	April 2013

Specification sheet of S6R-(Z3)MPTAW marine diesel engine

Specification sheet of:
 - S6R-MPTAW (in compliance with IMO MARPOL 73/78, Annex VI, Regulation 13, Tier 2)
 - S6R-Z3MPTAW (in compliance with EU NRMM Stage IIIA Inland Waterway Vessel engines, category V1:4)

Revision	0	First edition: February 2011	Technology Department Engine Division		
	1	July 2011			
	2	October 2011	Approved by	Checked by	Drawn by
	3	April 2013			

GENERAL ENGINE DATA

Type	-----	4-Cycle, Water Cooled	
Aspiration	-----	Turbo-Charged, Inter Cooler (Fresh water to Cooler)	
Cylinder Arrangement	-----	Inline	
No. of Cylinders	-----	6	
Bore mm(in.)	-----	170	(6.69)
Stroke mm(in.)	-----	180	(7.09)
Displacement Liter(in. ³)	-----	24.51	(1496)
Compression Ratio	-----	14.5 : 1	
Dry Weight - Engine only - kg(lb)	-----	2830	(6240)
Wet Weight - Engine only - kg(lb)	-----	3015	(6648)

PERFORMANCE DATA

Steady State Speed Stability Band at any Constant Load(Generator Use)			
Hydraulic (std.) or Electric Governor - %	-----	±0.25 or better	
Idling Speed -rpm	-----	600~650	
Maximum Overspeed Capacity - rpm	-----	2195	
Moment of Inertia of Rotating Components J - kg · m ² (lbf · ft ²)	-----	10.79	(1024)
(Includes 18 inch Flywheel)			
Cyclic Speed Variation with Flywheel at	1800rpm	-----	1/182
	1500rpm	-----	1/123

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)	-----	0.5~0.64	(71~93)
Maximum Oil Temperature- °C (°F)	-----	110	(230)	
Oil Capacity of Marine Pan	High - liter (U.S.gal)	-----	140	(37.0)
	Low - liter (U.S.gal)	-----	110	(29.1)
Total System Capacity (Includes Oil Filter) - liter (U.S.gal)	-----	160	(42.3)	
Maximum Installation Angle	Front Up	-----	8°	
	Front Down	-----	8°	
	Maximum Instantaneous Operating Angle	Front Up	-----	25°
(Engine Level)	Front Down	-----	15°	
	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)	-----	43	(11.4)
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)	-----	7	(1.8)	
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 prior notice.

FUEL SYSTEM

Fuel Injection Pump	-----	Mitsubishi PS6 Type x 1
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.)	-----	16 (0.63)
Minimum Fuel Oil Leak Pipe Inner Diameter - mm(in.)	-----	16 (0.63)

STARTING SYSTEM

Battery Charging Alternator - V-Ah	-----	24-35
Starting Motor Capacity - V -kW	-----	24-7.5
Maximum Allowable Resistance of Cranking Circuit - m Ω	-----	2.5
Recommended Minimum Battery Capacity		
At 5°C (41°F) and above - Ah	-----	200
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		370 / 500
Momentary Ampere -A		700 / 960

ACCESSORY EQUIPMENT

Air Cleaner	Silencer Type
Exhaust Manifold	Water 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
Lubricating Oil Thermostat	
Cooling Water Pumps (HT, LT)	
Cooling Water Thermostats (HT, LT)	
Starter	Earth Floated Type
Alternator	Earth Floated Type
Stop Solenoid	DC24V-15A
Engine Support	Marine Type
Accessory Drive	Front Drive Pulley

The specifications are subject to change without prior notice.

ENGINE RATING¹

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 100 kPa (750 mm Hg) barometric pressure, 298 K (25 °C) 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	50 Hz	60 Hz
Rated engine speed	rpm	1600		1650	1500	1800
Emission Regulation (Test cycle)	EU Stage IIIA category V1:4	E2 (CPP) or E3 (FPP)	-	-	-	-
	IMO Tier 2	E2 (CPP) or E3 (FPP)	E2 (CPP) or E3 (FPP)	E2 (CPP) or E3 (FPP)	D2	D2
No. of Cylinders		6				
Bore	mm	170				
	(in.)	(6.69)				
Stroke	mm	180				
	(in.)	(7.09)				
Displacement	liter	24.51				
	(in. ³)	(1496.00)				
Rated output ¹	kW	470		520	545	635
	(HP)	(630)		(697)	(731)	(851)
Brake Mean Effective Pressure	MPa	1.44		1.54	1.78	1.73
	(psi)	(209)		(223)	(258)	(251)
Mean Piston Speed	m/s	9.6		9.9	9.0	10.8
	(ft/min)	(1890)		(1949)	(1772)	(2126)
Maximum Regenerative Power Absorption Capacity	kW	62		65	56	78
	(HP)	(83)		(87)	(75)	(104)
Intake Air Flow	m ³ /min	43		48	48	59
	(CFM)	(1518)		(1695)	(1695)	(2083)
Exhaust Gas Flow	m ³ /min	114		127	128	157
	(CFM)	(4025)		(4484)	(4520)	(5544)
Coolant Flow	liter/min	880		910	820	990
	(U.S. GPM)	(232)		(240)	(217)	(261)
Coolant(Jacket water) Pressure (water pump outlet)	MPa	0.20		0.21	0.17	0.25
	(psi)	(29)		(30)	(25)	(36)
Coolant Flow to Inter Cooler (Max. Flow: 400L/min)	liter/min	350		350	350	350
	(U.S. GPM)	(92)		(92)	(92)	(92)
Oil Flow	liter/min	320		330	290	360
	(U.S. GPM)	(85)		(87)	(77)	(95)
Radiated Heat to Ambient	kJ/hr	67786		75888	76093	93473
	(BTU/min)	(1071)		(1199)	(1202)	(1477)
Heat Rejection to Coolant (include water cooled manifold)	kJ/hr	949005		1062430	1065299	1308616
	(BTU/min)	(14994)		(16786)	(16832)	(20676)
Heat Rejection to Inter Cooler (PTAW Version)	kJ/hr	542289		607103	608743	747781
	(BTU/min)	(8568)		(9592)	(9618)	(11815)
Heat Rejection to Exhaust	kJ/hr	1268415		1442296	1361127	1796666
	(BTU/min)	(20041)		(22788)	(21506)	(28387)
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		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	1720		1774	1575	1890

¹ the rated output is available up to IACS ambient reference conditions without derating

These specifications are subject to change without prior notice.



**MITSUBISHI DIESEL ENGINE
TECHNICAL INFORMATION**

ITEM NO.

T0307-0026E Rev.2 (1/2)

DATE

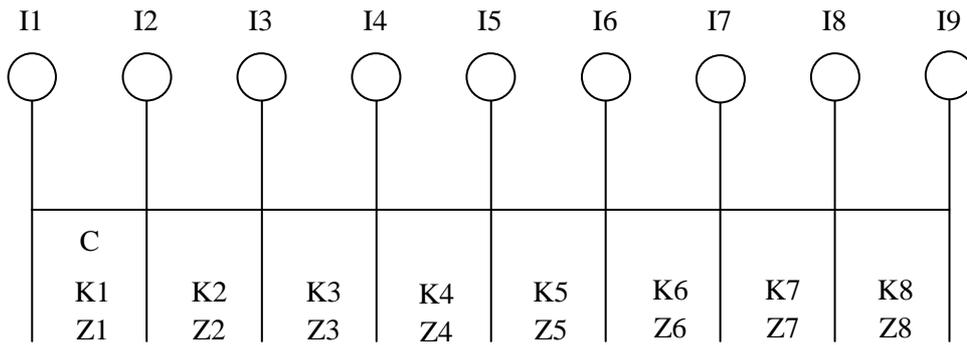
April, 2007

Elastic data of S6R-M Engine

Elastic data of S6R-M Engine are enclosed herein.

Revision	First Edition : April, 2007 (Refer to MTD05-0001)	Engine Engineering Department Large Engine Design Section		
	Rev.1 : April, 2007 (Refer to MTD05-0002)			
	Rev.2 : December, 2007	Approved by	Checked by	Drawn by



S6R-M ELASTIC DATA

(USE:45R89-19007 CONNECTING ROD)

(USE:45R89-20004 CRANKSHAFT)

	Moment of inertia J kg.m ²	Damping coefficient Nm/rad/s	Spring const. x10 ⁷ Nm/rad	Tensile strength N/mm ²	Section modulus cm ³
I1	DAMPER	1.01	C=524.7	K1=0	Z1 =0.0
I2	PULLEY	1.19	—	K2=1.196	Z2 =373.7
I3	No.1 CRANK	0.572	—	K3=0.755	Z3 =373.7
I4	No.2 CRANK	0.342	—	K4=0.755	Z4 =373.7
I5	No.3 CRANK	0.565	—	K5=0.755	Z5 =373.7
I6	No.4 CRANK	0.565	—	K6=0.755	Z6 =373.7
I7	No.5 CRANK	0.342	—	K7=0.755	Z7 =373.7
I8	No.6 CRANK	0.573	—	K8=1.206	Z8 =373.7
I9	FLYWHEEL	5.59	—		

Hysteresis constant:123 No. of Cylinder: 6 Bore:170mm Stroke:180mm

Length of Con-Rod: 340mm Mass of Reciprocating Parts: 12.630 kg

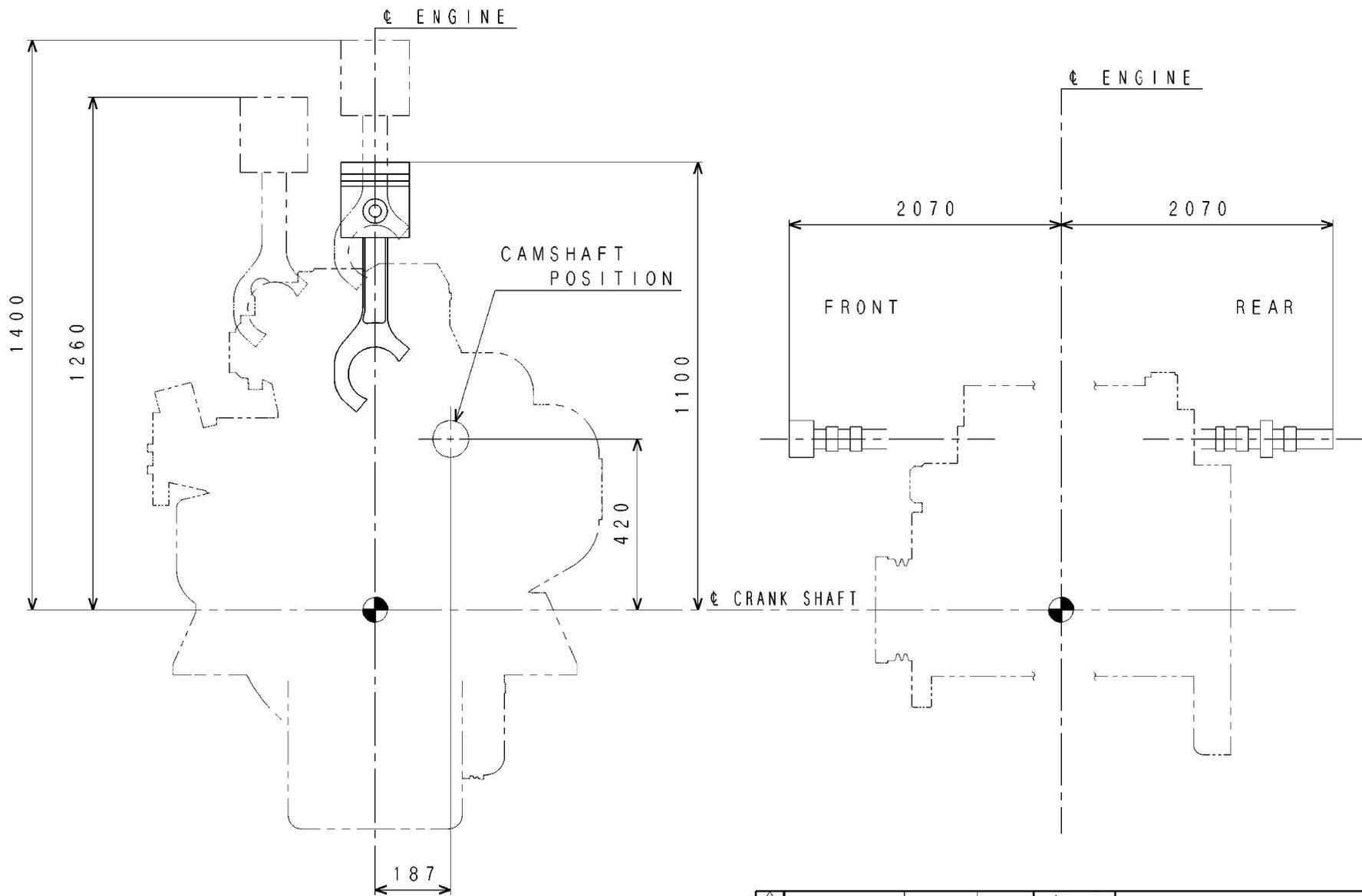
Firing order:1-5-3-6-2-4

Firing interval:0-120-240-360-480-600

APPLICATION : MARINE USE

The data is subject to change without notice.

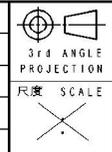

MITSUBISHI HEAVY INDUSTRIES, LTD.
 GENERAL MACHINERY & SPECIAL VEHICLE



出図
 汎特
 2001
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FULL-CAD

CHG	ED-NO	DATE	CHK



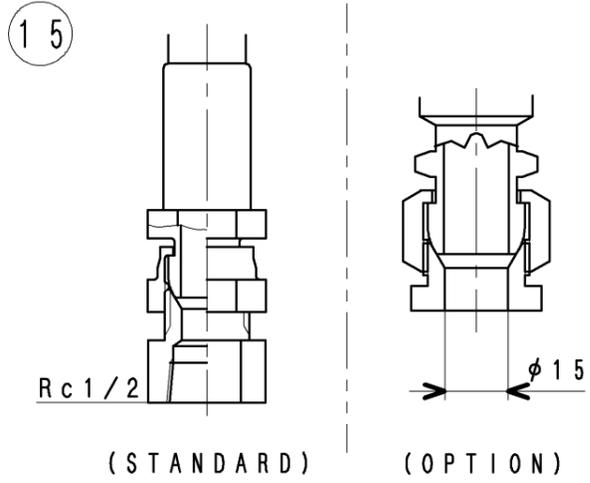
MEASURE OF OVERHAUL FOR S6R

三菱重工業株式会社 汎用機・特車事業本部
 GENERAL MACHINERY & SPECIAL VEHICLE HEADQUARTERS, MITSUBISHI HEAVY INDUSTRIES, LTD.

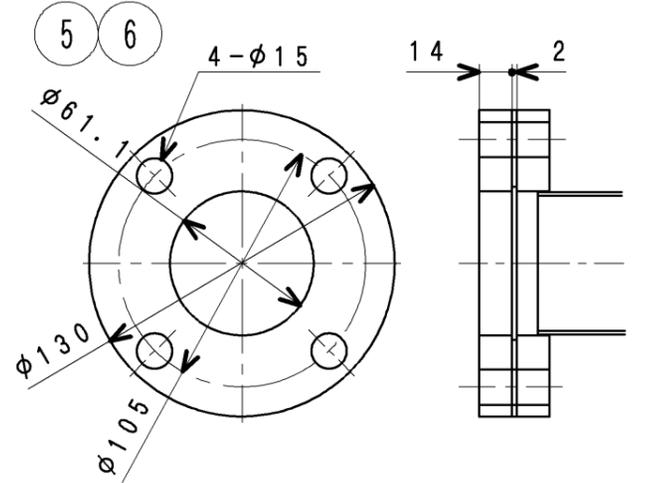
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S6R-090-81A

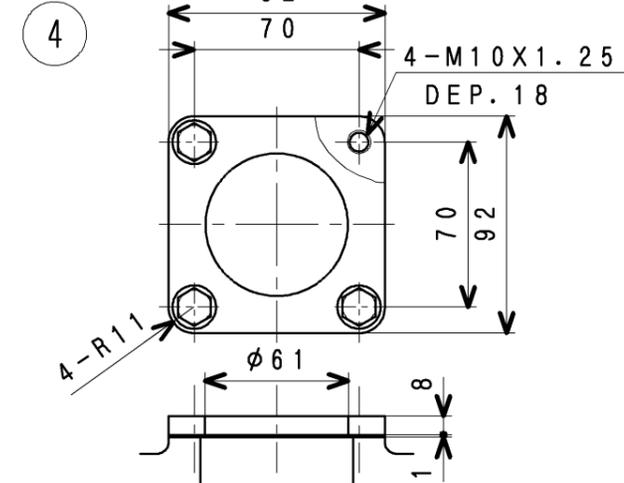
- ① 組立図
- ② 鋳造部品
- ③ 板金溶接品
- ④ 組立品
- ⑤ 切削品
- ⑥ その他(購入品)



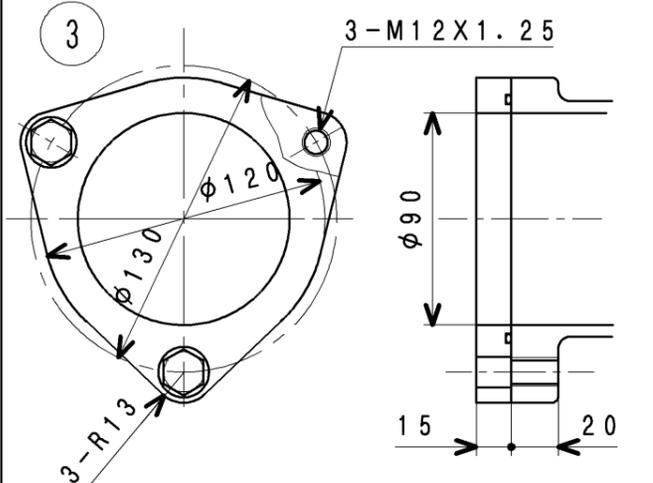
15 (STANDARD) (OPTION)
DETAIL OF FUEL PIPE JOINT



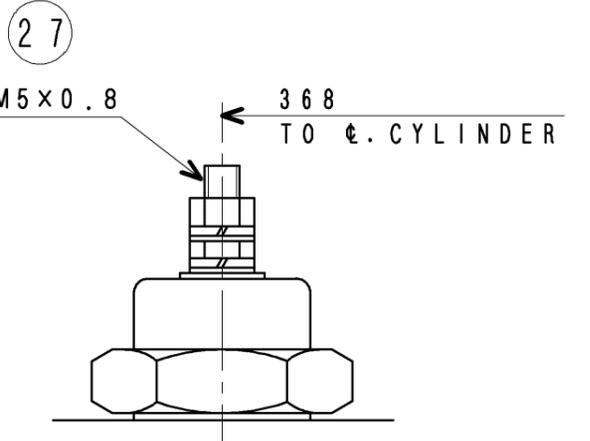
5 6 4-φ15 φ130 φ105 14 φ2
DETAIL OF FRESH WATER IN & OUTLET (AIR COOLER)



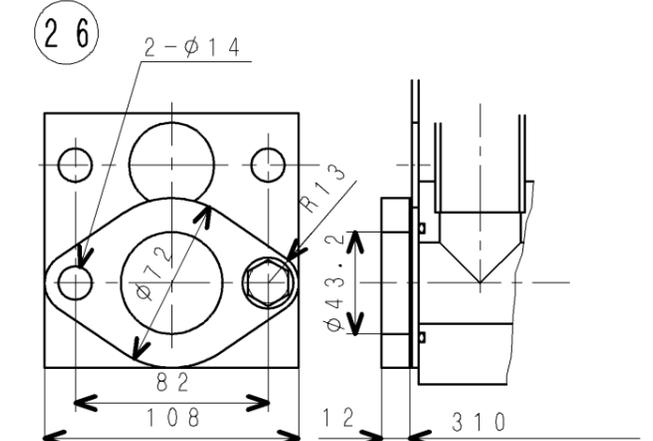
4 92 70 4-M10X1.25 DEP. 18 φ61 8 70 92
DETAIL OF FRESH WATER OUTLET



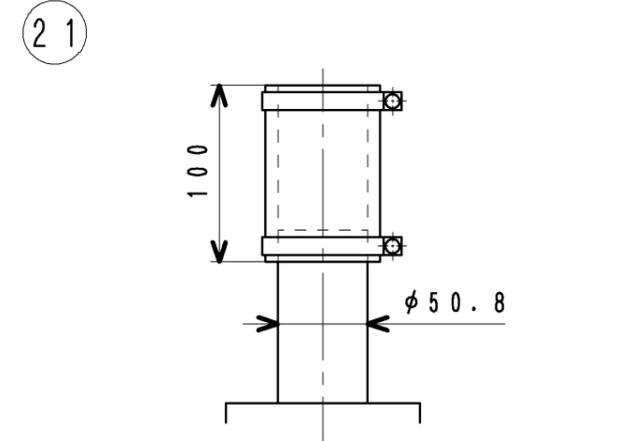
3 3-M12X1.25 φ120 φ130 φ90 φ15
DETAIL OF FRESH WATER INLET



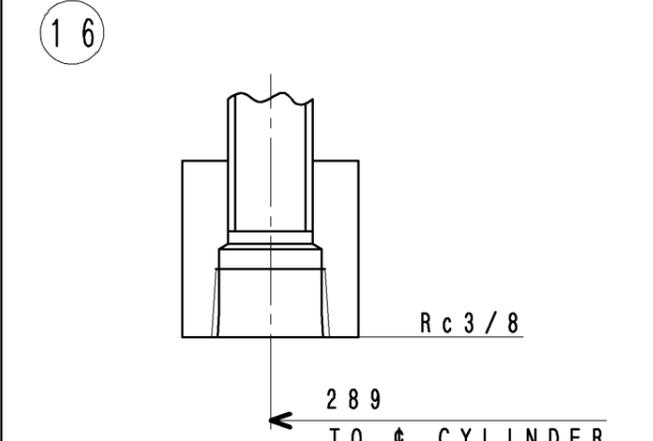
27 M5X0.8 368 TO €. CYLINDER
DETAIL OF FILTER ALARM



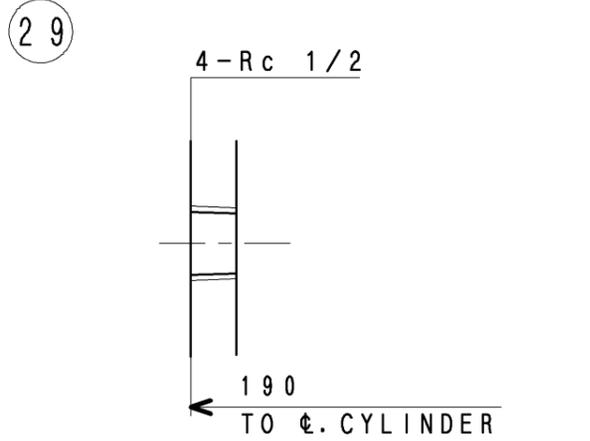
26 2-φ14 φ72 R13 φ43.2 12 310 TO €. CYLINDER
DETAIL OF OIL INLET (FOR EMERGENCY)



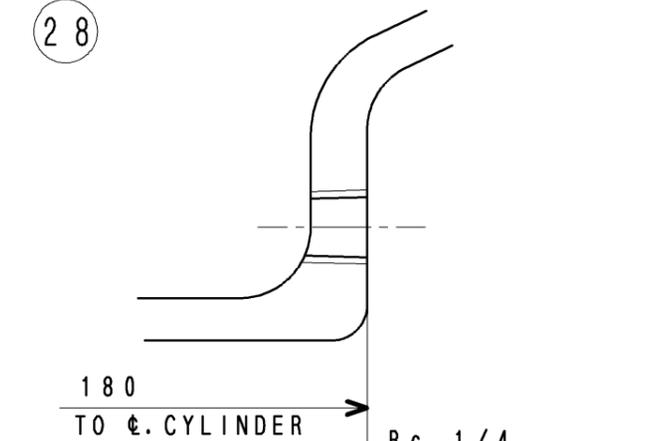
21 100 φ50.8
DETAIL OF MIST GAS OUTLET



16 Rc 3/8 289 TO €. CYLINDER
DETAIL OF FUEL RETURN PIPE ADAPTER



29 4-Rc 1/2 190 TO €. CYLINDER
DETAIL OF THERMOMETER & THERMOSWITCH ADAPTER



28 180 TO €. CYLINDER Rc 1/4
DETAIL OF AIR PRESS. GAUGE ADAPTER

MHI CONFIDENTIAL

MODEL
S6R-(Z3)MPTAW

S6R
JOINT DETAIL
三菱重工業株式会社 汎用機・特車事業本部
MITSUBISHI HEAVY INDUSTRIES, LTD. GENERAL MACHINERY & SPECIAL VEHICLES.

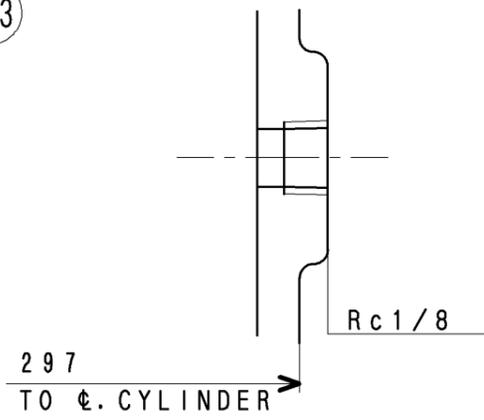
図面番号 45R96-01012
DRAWING No. 1/2

注記 (1) 本図は、S6R-(Z3)MPTAW仕様である。

旧引
汎特
2013
7.5

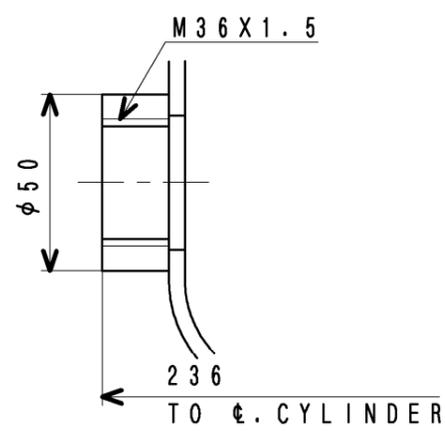
M/C

33



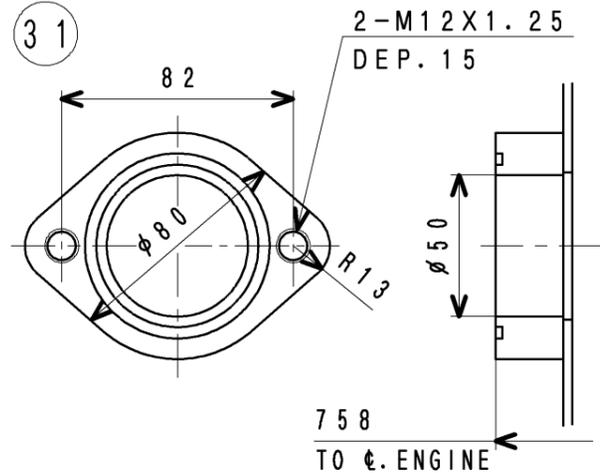
DETAIL OF OIL PRESS. GAUGE & PRESS. SWITCH ADAPTER

32



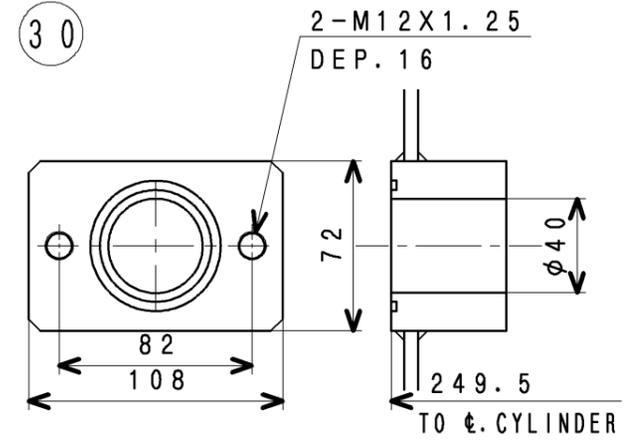
DETAIL OF OIL PAN ADAPTER (C)

31



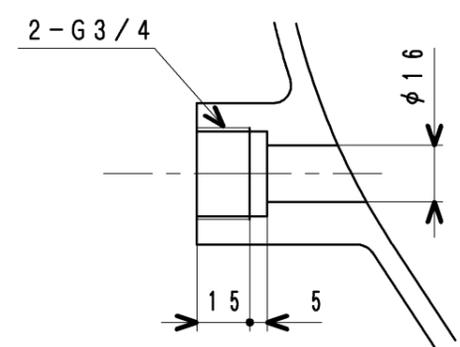
DETAIL OF OIL PAN ADAPTER (B)

30



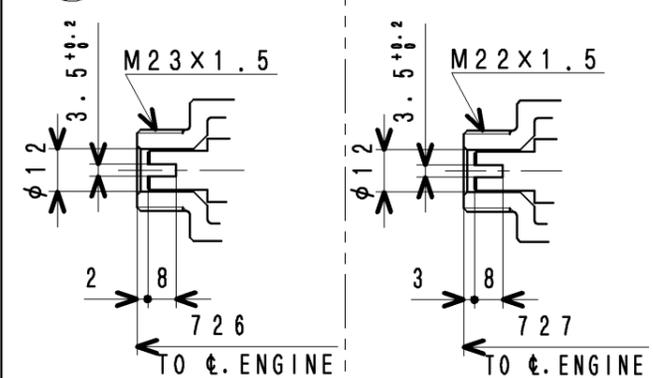
DETAIL OF OIL PAN ADAPTER (A)

35



DETAIL OF THERMOMETER ADAPTER

34



DETAIL OF TACHOMETER ADAPTER

MHI CONFIDENTIAL

S6R
 JOINT DETAIL
 三菱重工業株式会社 汎用機・特車事業本部
 MITSUBISHI HEAVY INDUSTRIES, LTD. GENERAL MACHINERY & SPECIAL VEHICLES.
 図面番号 45R96-01012
 DRAWING No. 1/2

- 3 新図 サイズ
- ④ 旧引図 A 3 ① 組立図 2 鋳鍛歯車品 3 板金溶接品 4 組立品
- 5 切削品 6 その他(購入品)

旧引
 汎特
 2013
 7.5

M/C



**MITSUBISHI DIESEL ENGINE
TECHNICAL INFORMATION**

ITEM NO.

T0406-0004E (1/3)

DATE

August, 2010

**Performance Curve of S6R-(Z3)MPTAW Engine
(EUstage IIIA & IMO- II Certified Engine)**

Performance Curve of S6R-(Z3)MPTAW Engine that is satisfied with EUstage IIIA & IMO- II are enclosed herein.

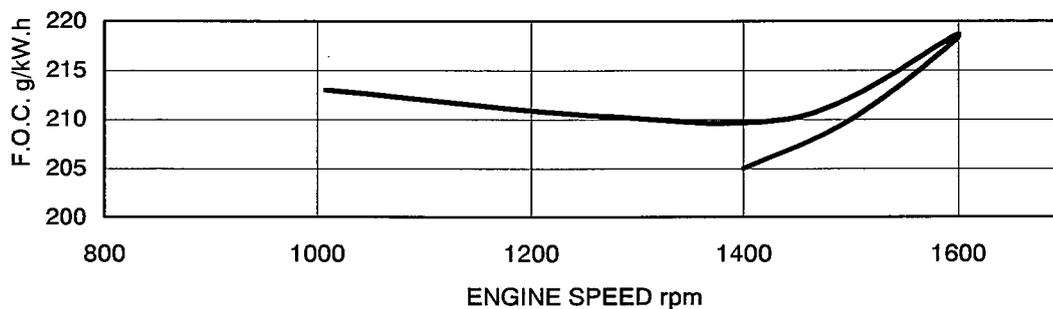
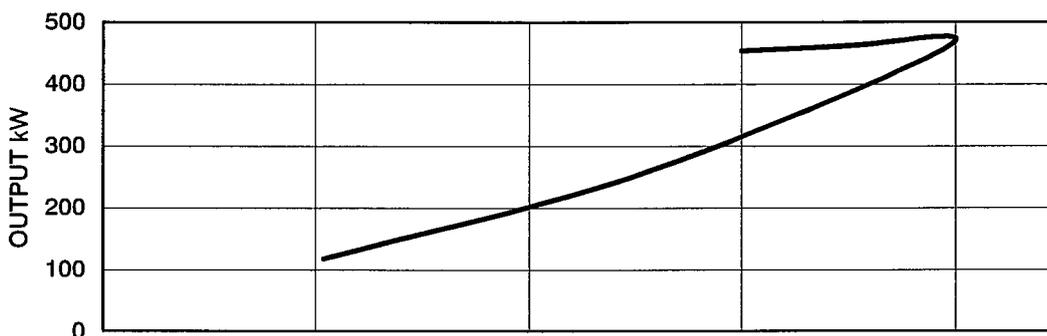
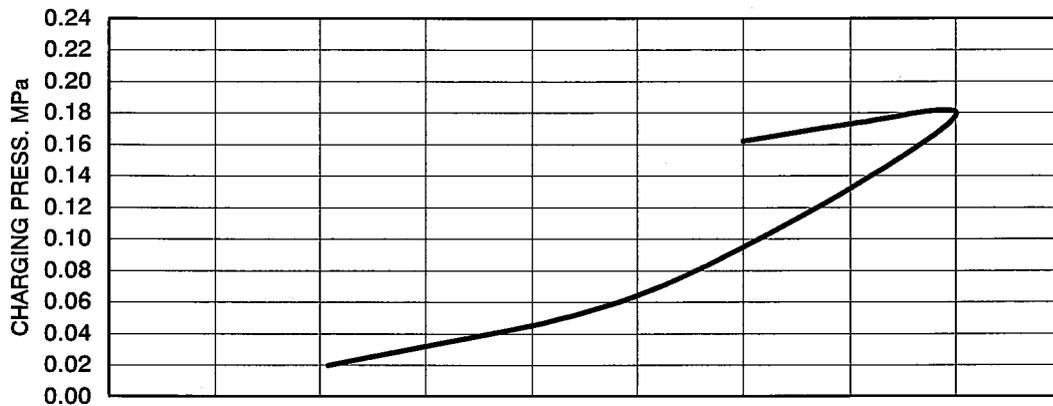
First Edition : August, 2010

Engine Engineering Department
Large Engine Design Section

Revision

Approved by | Checked by | Drawn by

Rating: HEAVY DUTY-E3

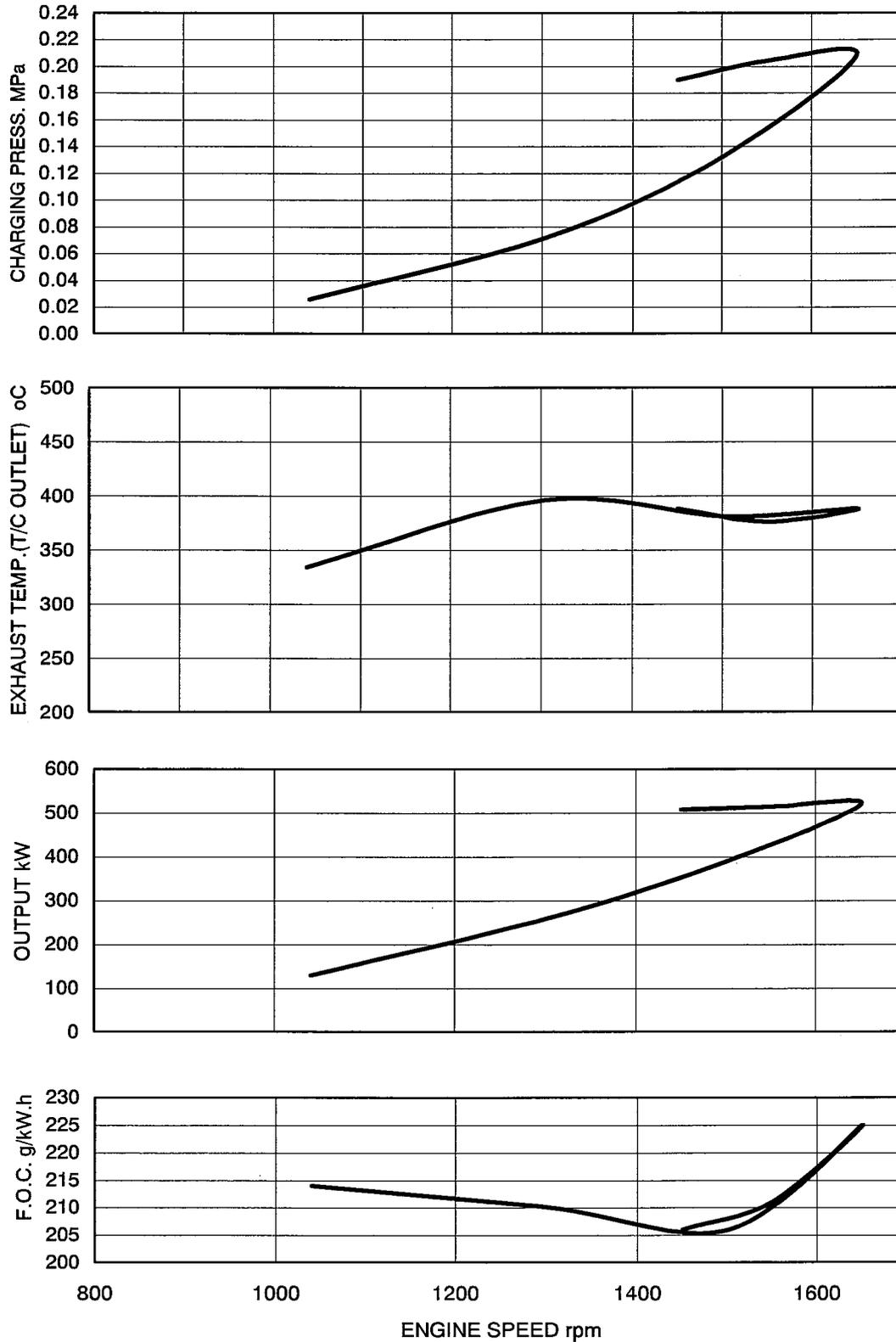


The specifications are subject to change without notice.

APPLICATION : MARINE PROPULSION

Pub. No.T0406-0004E 2/3

Rating: MEDIUM DUTY-E3



The specifications are subject to change without notice.

APPLICATION : MARINE PROPULSION

Pub. No.T0406-0004E 3/3