

SPECIFICATIONS

OF

mitsubishi DIESEL ENGINE

MODEL : S6R2-PTA

FOR DIESEL GENERATOR SET

MITSUBISHI HEAVY INDUSTRIES,LTD
SAGAMIHARA MACHINERY WORKS

								APPROVED BY	DRAWN BY
				△	'99-5-31	OEM-A0041	Y.F.		
				DATE		11. Mar. 1998			

1.GENERAL

Object and use	:	Diesel generator
Color of painting	:	Mansel NO. 7.5BG6/1.5
Applicable conditions		
Ambient temperature	:	5°C ~ 40°C
Altitude	:	1500m above sea level
Max,humidity	:	85%
Place of installation	:	In door

Shop test

Diesel engine running tests shall be carried out by the following items.

Starting test

Load test	:	1/4, 2/4, 3/4 Load each	5min
	:	4/4 Load	20min

Governor test : Governor test should be done along with respective governor controller

Safety stop device test

Guarantee

The guarantee shall be valid for the period of either 1 year or 1000Hr (at Hr counter) after installation, whichever the shorter.

The guarantee shall cover against manufacturer defect, materials and workmanship only, and shall not be applicable to damage sustained through mishandling of the equipment.

Standard

All items, unless otherwise specified, are in accordance with JIS and manufacturer's standards.

2.PRINCIPAL PARTICULARS

Model	:	MITSUBISHI S6R2-PTA
Type	:	4cycle stroke, water cooled diesel engine
Combustion chamber	:	Direct injection type
Aspiration	:	Turbocharged with after cooler
Number of cylinders	:	6-L
Bore × stroke	:	170mm × 220mm
Total displacement	:	29.96 liter
Compression ratio	:	14.1 : 1
firing order	:	1 - 5 - 3 - 6 - 2 - 4
Direction of rotation	:	Counter clockwise as viewed from flywheel side
Engine dimensions	:	Length Apx. 1945.5mm (Fan to Flywheel Housing)
	:	width Apx. 1050.5mm (Turbocharger to Gear Case)
	:	Height Apx. 1578mm (Exhaust Pipe to Oil pan)
Dry weight	:	Apx. 2400kg (without accessories)
Fuel oil	:	ASTM D975 NO. 2 - D or BS 2869 class A
Lubricating oil	:	API service CD class or CF class SAE NO. 30 or NO. 40
Output at ISO 3046 standard air conditions (25°C, 750mmHg, 30% Humid)		
Stand - by rating	:	851Hp/1500rpm 697Hp/1200rpm 563Hp/1000rpm
Prime rating	:	771Hp/1500rpm 630Hp/1200rpm 509Hp/1000rpm
Fuel consumption ratio at Prime rating (allowance +5%)	:	153g/Hp-hr at 1500rpm 149g/Hp-hr at 1200rpm 148g/Hp-hr at 1000rpm
Lub, oil consumption ratio at Prime rating	:	within 0.6g/Hp-hr

3. DESIGN FEATURES

Cylinder head	: Individual type, Iron casting, Corrosion resistant inserts for intake and exhaust valves.
Valve mechanism	: Two intake and exhaust valves by each cylinder (with valve rotators).
Cam shaft	: High - tensile strength steel forging.
Crank case (Cylinder block)	: Mono - block hanger type. High - tensile strength iron casting.
Cylinder liners	: Replaceable wet sleeve type.
Main bearings and Con - rod bearings	: Steel - backed tri - metal copper special alloy with thin lead - tin overlay.
Piston	: Aluminium alloy casting. Oiljet cooling with cooling channel. Ni - resist top ring insert. Two compression rings and one oil ring.
Piston pin	: Full floating type. High - tensile strength steel.
Connecting rod	: High - tensile strength steel forging. I beam section stem.
Crankshaft	: High - tensile strength steel forging. Induction hardened bearing journals. Counter weighted web.
Gear train	: Located at rear end of crankcase.
Turbocharger	: Exhaust gas turbine.
Lubricating system	: Forced lubricating by gear pump.
Cooling system	: Forced circulation of jacket water by centrifugal pump.
Fuel injection pump	: Bosch type multiple plunger with fuel feed pump.
Starting system	: Electric starting.
Stopping system	: Fuel cut type.

4. STANDARD EQUIPMENTS

(1) Power line system

Flywheel	: DWG.NO.37596-21001 SAE J620C 18in, except screw size
Flywheel housing	: DWG.NO.37596-21001 SAE J617b NO.0, except screw size
Engine mounting	: DWG.NO.37596-14001 4 points mounting, C = 160mm
Torsional vibration damper	: Viscous type

(2) Air intake system

Air cleaner	: Not supply
Turbocharger	: MITSUBISHI TD Type Model : TD15-50B(54) for 1500rpm,1200rpm TD10L-42F(34) for 1000rpm
Air cooler	: Jacket water cooled type plated element type
Air heater	: Not supply

(3) Exhaust system

Exhaust manifold	: Air cooled type without heat insulator
Muffler	: Not supply
Flexible pipe	: Not supply
Companion flange	: Not supply
Breather	: Downside direction type For blow - off to outside of engine room

(4) Lubricating system

Oil pump	:	Gear pump type
Capacity of oil pump	:	1500rpm : 290 liter/min. 1200rpm : 220 liter/min. 1000rpm : 190 liter/min.
Lub. oil pressure at main gallery	:	5.0 ~ 6.5kg/cm ²
Quantity of oil (Approx.)	:	Oil pan full level : 84 liter low level : 52 liter Others (filter etc.) : 10 liter Total : 94 liter
Lub. oil filter (Full flow)	:	Paper element cartridge type × 2pcs filter mesh : 20 μ with by - pass alarm switch
Lub. oil filter (By - pass flow)	:	Paper element cartridge type × 1pc filter mesh : 2 μ
Lub. oil cooler	:	Water cooled corrugated fin type with by - pass valve

(5) Cooling system

Water pump	:	Belt drive centrifugal type
Capacity of water pump	:	1500rpm : 820 liter/min. 1200rpm : 650 liter/min. 1000rpm : 540 liter/min.
Thermostat	:	Wax pellet type × 2pcs Open at 71°C ~ 85°C
Fan	:	Pusher type steel fan 1010 diameter Fan speed ratio i = 0.806
Radiator piping	:	Not supply

(6) Fuel system

- Fuel inlet pipings : DWG.NO.37596-62104
For rubber hose joint (hose dia. ϕ 16mm)
- Fuel return pipings : DWG.NO.37596-61304
For rubber hose Joint (hose dia. ϕ 16mm)
- Fuel overflow of Inj. Pump and fuel leak - off of Nozzle have to return to fuel tank
- Injection pump : Bosch type "PS6" without timer
- Feed pump : Piston type with priming pump
- Injection Nozzle : Hole type 0.325mm \times 10 holes for 1500rpm
0.310mm \times 10 holes for 1200rpm, 1000rpm
- Fuel filter : Paper element cartridge type \times 2pcs
Filter mesh : 5 μ

(7) Control system

- Governor : DWG.NO.37596-63001
Electronic speed governor
Speed droop : 0 ~ 5% adjustable
- Actuator : DWG.NO.S13-1010
Supply voltage : DC24V \pm 20%
Current consumption
At starting : 13A
Normal operation : 1 ~ 5A
Min. Supply voltage : DC16V50%ED
- Controller : DWG.NO.S13-1041 loose supply
Supply voltage : DC24V \pm 20%
Current consumption : 100mA
For rated speed setting
- Connector : DWG.NO.S13-1020 loose supply
From actuator to controller
5000mm length
- Magnetic pick up : DWG.NO.S13-1400
With 2P - connector
- Cable : DWG.NO.S13-1410 loose supply
From magnetic pick up to controller
4000mm length

- (8) Starting system
- Starter switch : Not supply
 - Starting motor : DC24V, 7.5KW
Reduction type with safety relay
with 2 poles connector (DWG. NO.S14-0320)
 - Safety relay : DWG.NO.S10-0052 loose supply
For chattering of starting motor
 - Current of starter : Rush 700A
Cranking 370A
(Ambient temp : 5°C, Lub. oil : SAE NO. 30)
 - Alternator : DWG.NO.S10-0540
DC24V, 30A, with voltage regulator
With 2 poles connector (DWG. NO.S10-0550)
 - Recommended battery capacity : DC24V, 250AH
Not supply
 - Battery switch : Not supply
- (9) Stopping system
- Automatic stop : DWG.NO.37596-87502
Automatically shut - down by stop solenoid and
electronic governor power off simultaneously
 - Stop solenoid : DWG.NO.S13-0280
Energized to run type
DC24V, 31.2A(pull), 0.57A(hold)
 - Manual stop : By stop lever
- (10) Safety device
- Alarm switches : DWG.NO.37596-90223
 - Alarm and trip
 - Low oil press. switch : DWG.NO.S11-0794 (04442-25201)
Diaphragm type : 1.5kg/cm² switch on
 - High water temp. switch : DWG.NO.S11-0551 (04442-34400)
Wax type : 95°C switch on
 - Alarm
 - Oil filter alarm switch : DWG.NO.S11-1350
Piston type : 1.5kg/cm² switch on
 - Oil filter alarm lamp : Not supply
 - Air filter alarm indicator : Not supply

(11) Others

Belt cover	:	DWG.NO.37596-25180
		For water pump and alternator
Service meter	:	Not supply
Tools (loose supply)	:	DWG.NO.37596-91001
Spare parts (loose supply)	:	DWG.NO.37596-94014 for 1500rpm
		DWG.NO.37596-94012 for 1200rpm, 1000rpm

5. ACCESSORIES (Loose supply parts for standard)

No.	PARTS NO.	PARTS NAME	Q' TY	DWG. NO.	
1	04410-33100	CONTROLLER	1	S13-1041	37596-63001
2	04410-32900	CONNECTOR	1	S13-1020	
3	04410-38500	CABLE, PICK UP	1	S13-1410	
4	F8665-02100	CONNECTOR	1	S14-0320	for starter
5	04322-50001	RELAY, CHATTERING	1	S10-0052	
6	32B90-00300	CONNECTOR	1	S10-0550	for alternator

6. TOOLS (Standard)

No.	PARTS NO.	PARTS NAME	Q' TY	NOTE.
	37596-91001	S.T.D. TOOL KIT	1set	Consists of No.1~26
	(32591-00012)	(TOOL ASSY.)	(1set)	Consists of No.1~23
1	MC420-083	BOX. TOOL	1	
2	F9614-17000	SOCKET	1	
3	F9614-22000	SOCKET	1	
4	F9614-24000	SOCKET	1	
5	F9614-27000	SOCKET	1	
6	F9614-30000	SOCKET	1	
7	F9614-32000	SOCKET	1	
8	F9615-25000	BAR, EXTENTION	1	
9	F9617-10000	JOINT, UNIVERSAL	1	
10	F9618-30000	HANDLE, SLIDE	1	
11	F9600-07008	SPANNER, OPEN ENDED	1	
12	F9600-10012	SPANNER, OPEN ENDED	1	
13	F9600-14017	SPANNER, OPEN ENDED	1	
14	F9600-19022	SPANNER, OPEN ENDED	1	
15	F9600-24027	SPANNER, OPEN ENDED	1	
16	F9600-30032	SPANNER, OPEN ENDED	1	
17	F9600-36041	SPANNER, OPEN ENDED	1	
18	91267-00201	SCREW DRIVER	1	
19	F9630-15000	PLIER	1	
20	64309-15300	GUN, GREASE	1	
21	30091-06501	GAGE, THICKNESS	1	
22	33491-03600	ADAPTER	1	
23	33491-13500	SOCKET	1	
24	37191-03300	HANDLE	1	
25	33591-10101	REMOVER	1	
26	32591-22100	WRENCH, FILTER	1	for cartridge filter

7. SPARE PARTS (Standard)

(1) Spare parts for 1500rpm

No.	PARTS NO.	PARTS NAME	Q' TY	NOTE.
	37596-94014	SPARE PARTS KIT	1 set	Consists of No.1~8
1	37561-17500	NOZZLE TIP ASSY.	3	ϕ 0.325
2	37561-16800	PACKING, NOZZLE	6	
3	37504-56200	PACKING, ROCKER COVER	2	
4	37540-01101	ELEMENT, L/O FULL-FLOW	2	
5	37540-02100	ELEMENT, L/O BY-PASS	1	
6	32562-60300	ELEMENT, FUEL OIL	2	
7	37545-03300	V-BELT	1	for water pump
8	37545-03400	V-BELT	1	for alternator

(2) Spare parts for 1200rpm, 1000rpm

No.	PARTS NO.	PARTS NAME	Q' TY	NOTE.
	37596-94012	SPARE PARTS KIT	1 set	Consists of No.1~8
1	37561-27300	NOZZLE TIP ASSY.	3	ϕ 0.310
2	37561-16800	PACKING, NOZZLE	6	
3	37504-56200	PACKING, ROCKER COVER	2	
4	37540-01101	ELEMENT, L/O FULL-FLOW	2	
5	37540-02100	ELEMENT, L/O BY-PASS	1	
6	32562-60300	ELEMENT, FUEL OIL	2	
7	37545-03300	V-BELT	1	for water pump
8	37545-03400	V-BELT	1	for alternator

8. DRAWINGS (Standard & Optional)

NO.	DWG. NO.	DWG. NAME	REV.
1	37596-00281	ENGINE OUTLINE	
2	37596-01020	JOINT DETAIL	
3	37596-04028	WIRING DIAGRAM	for reference
4	37596-14001	MOUNTING DETAIL	
5	37596-21001	FLYWHEEL & HOUSING DETAIL	
6	37596-25180	BELT COVER	
7	37596-61304	FUEL RETURN PIPING	
8	37596-62104	FUEL INLET PIPING	
9	37596-63001	GOVERNOR	
10	37596-87502	STOP SYSTEM	
11	37596-90223	ALARM SWITCH	
12	37596-91001	TOOLS	
13	37596-94012	SPARE PARTS	
14	37596-94014	SPARE PARTS	
15	S10-0052	SAFETY RELAY	
16	S10-0540	ALTERNATOR	
17	S10-0550	CONNECTOR	
18	S11-0551	THERMO SWITCH	
19	S11-0794	PRESSURE SWITCH	
20	S11-1350	FILTER ALARM SWITCH	
21	S13-0280	SOLENOID	
22	S13-1010	ACTUATOR	
23	S13-1020	CONNECTOR	
24	S13-1041	CONTROLLER	
25	S13-1400	MAGNETIC PICK UP	
26	S13-1410	PICK UP CABLE	
27	S14-0320	CONNECTOR	

GENERAL ENGINE DATA

Type	4-Cycle, Water Cooled	
Aspiration	Turbo-Charged, After Cooler (Jacket water to Cooler)	
Cylinder Arrangement	Inline	
No. of Cylinders	6	
Bore mm(in.)	170	(6.69)
Stroke mm(in.)	220	(8.66)
Displacement liter(in ³)	29.96	(1828)
Compression Ratio	14.0:1	
Dry Weight - Engine only - kg(lb)	2400	(5292)
Wet Weight - Engine only - kg(lb)	2545	(5612)

PERFORMANCE DATA

Steady State Speed Stability Band at any Constant Load		
Hydraulic (std.) or Electric Governor - %	±0.25 or better	
Maximum Overspeed Capacity - rpm	1750	
Moment of inertia of Rotating Components - kgf·m ² (lbf·ft ²) (Includes Std. Flywheel)	41.74	(991)
Cyclic Speed Variation with Flywheel at	1500rpm	1/103
	1200rpm	1/65
	1000rpm	1/47

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Flywheel Housing - kgf·m(lbf·ft)	200	(1447)
---	-----	--------

AIR INLET SYSTEM

Maximum Intake Air Restriction (Includes piping)		
With Clean Filter Element - mm H ₂ O (in. H ₂ O)	400	(15.7)
With Dirty Filter Element - mm H ₂ O (in. H ₂ O)	635	(25.0)

EXHAUST SYSTEM

Maximum Allowable Back Pressure - mm H ₂ O (in. H ₂ O)	600	(23.6)
--	-----	--------

LUBRICATION SYSTEM

Oil Pressure at Idle - kgf/cm ² (psi)	2~3	(29~43)
	at Rate Speed - kgf/cm ² (psi)	5~6.5
Maximum Oil Temperature - °C (°F)	110	(230)
Oil Capacity of Standard Pan High - liter (U.S.gal)	80	(21.1)
	Low - liter (U.S.gal)	50
Total System Capacity (Includes Oil Filter) - liter (U.S.gal)	100	(26.4)
Maximum Angle of Installation (Std. Pan) (Engine Only)	Front Down	11.5°
	Front Up	10°
	Side to Side	22.5°

COOLING SYSTEM

Coolant Capacity (Engine only) - liter (U.S.gal)	55	(14.5)
Maximum External Friction Head at Engine Outlet - kgf/cm ² (psi)	0.35	(5.0)
Maximum Static Head of Coolant above Crankshaft Center - m(ft)	10	(32.8)
Maximum Outlet Pressure of Engine Water Pump - kgf/cm ² (psi)	2	(28.6)
Standard Thermostat (modulating) Range - °C (°F)	71~85	(160~185)
Maximum Coolant Temperature at Engine Outlet - °C (°F)	98	(208)
Minimum Coolant Expansion Space - % of System Capacity	10	
Maximum Coolant Temperature at Intercooler Inlet, TK type - °C (°F)		
Maximum Air Restriction on Discharge Side of Radiator and Fan - mm H ₂ O (in. H ₂ O)	10	(0.4)

APPLICATION : GENERATOR

Pub. No. T13-0308-E

Jun. '99 Issued in Japan

FUEL SYSTEM

Fuel Injector	Mitsubishi PS6 x 1
Maximum Suction Head of Feed Pump - mm Hg (in. Hg)	75 (3.0)
Maximum Static Head of Return & Leak Pipe - mm Hg (in.Hg)	150 (5.9)

STARTING SYSTEM

Battery Charging Alternator - V-Ah	24-30
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

S6R2-PTA

SPECIFICATION SHEET

MITSUBISHI
DIESEL ENGINES

ENGINE RATING

All data represent net performance with standard accessories such as air cleaner, inlet /exhaust manifolds, fuel oil system, L.O. pump, etc. under the condition of 29.38 in. (746 mm) Hg barometric pressure, 85° F(29.4°C) ambient temperature and 0.38 in.(9.7mm) Hg vapor pressure.

ITEM	UNIT	STAND-BY POWER			PRIME POWER			CONTINUOUS C		CONTINUOUS D	
		50Hz	60Hz	50Hz	50Hz	60Hz	50Hz	50Hz	60Hz	50Hz	60Hz
Engine Speed	rpm	1500	1200	1000	1500	1200	1000	1500	1200	1500	1200
No. of Cylinders		6									
Bore	mm (in.)	170 (6.69)									
Stroke	mm (in.)	220 (8.66)									
Displacement	liter (in. ³)	29.96 (1828)									
Brake Horse power without Fan	HP (kW)	878 (655)	717 (535)	576 (430)	798 (595)	650 (485)	523 (390)	690 (515)	570 (425)	610 (455)	503 (375)
Brake Mean Effective Pressure without Fan	kgf/cm ² (psi)	17.8 (253)	18.2 (259)	17.5 (249)	16.2 (230)	16.5 (235)	15.9 (226)	14.0 (199)	14.5 (206)	12.4 (176)	12.8 (182)
Mean Piston Speed	m/s (ft/min)	11.0 (2165)	8.8 (1732)	7.3 (1437)	11.0 (2165)	8.8 (1732)	7.3 (1437)	11.0 (2165)	8.8 (1732)	11.0 (2165)	8.8 (1732)
Maximum Regenerative Power Absorption Capacity without Fan	HP (kW)	86 (64)	59 (44)	44 (33)	86 (64)	59 (44)	44 (33)	86 (64)	59 (44)	86 (64)	59 (44)
Intake Air flow	m ³ /min (CFM)	52 (1836)	41 (1448)	34 (1201)	47 (1660)	37 (1306)	31 (1095)	41 (1448)	33 (1165)	37 (1306)	30 (1059)
Exhaust Gas Flow	m ³ /min (CFM)	137 (4837)	109 (3849)	90 (3178)	125 (4414)	99 (3496)	82 (2895)	110 (3884)	88 (3107)	98 (3460)	78 (2754)
Coolant Flow	liter/min (U.S. GPM)	670 (177)	540 (143)	450 (119)	670 (177)	540 (143)	450 (119)	670 (177)	540 (143)	670 (177)	540 (143)
Coolant Flow to Intercooler (TK only)	liter/min (U.S. GPM)	—	—	—	—	—	—	—	—	—	—
Cooling Air Flow (Std. Fan)	m ³ /min (CFM)	720 (25423)	582 (20550)	444 (15678)	720 (25423)	582 (20550)	444 (15678)	720 (25423)	582 (20550)	720 (25423)	582 (20550)
Fan Loss Horse Power (Std. Fan)	HP (kW)	27 (20)	20 (15)	14 (10)	27 (20)	20 (15)	14 (10)	27 (20)	20 (15)	27 (20)	20 (15)
Radiated Heat to Ambient	kcal/hr (BTU/min)	38957 (2577)	31155 (2061)	25557 (1690)	35651 (2358)	28244 (1868)	23206 (1535)	31249 (2067)	25116 (1661)	27999 (1852)	22318 (1476)
Heat Rejection to Coolant	kcal/hr (BTU/min)	324641 (21471)	259626 (17171)	212976 (14086)	297095 (19649)	235365 (15567)	193379 (12790)	260406 (17223)	209304 (13843)	233325 (15432)	185984 (12301)
Heat Rejection to Inter Cooler (TK Version)	kcal/hr (BTU/min)	—	—	—	—	—	—	—	—	—	—
Heat Rejection to Exhaust	kcal/hr (BTU/min)	371786 (24589)	287814 (19036)	243905 (16132)	343771 (22737)	260919 (17257)	221462 (14647)	307380 (20330)	237178 (15687)	280701 (18565)	212993 (14087)
Noise Level (1 m height & distance) (excludes, Intake, Exhaust & Fan)	dB(A)	106	104	102	104	102	100	103	101	102	100

The specifications are subject to change without notice.

APPLICATION : GENERATOR

Pub. No. T13-0308-E

Jun. '99 Issued in Japan



