

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 1year 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 S12A2-PTA
Type	:	4cycle stroke, water cooled diesel engine
Combustion chamber	:	Direct injection type
Aspiration	:	Turbocharged with after cooler
Number of cylinders	:	12-V
Bore × stroke	:	150mm × 160mm
Total displacement	:	33.93 liter
Compression ratio	:	14.5 : 1
firing order	:	1 - 12 - 5 - 8 - 3 - 10 - 6 - 7 - 2 - 11 - 4 - 9
Direction of rotation	:	Counter clockwise as viewed from flywheel side
Engine dimensions	:	Length Apx. 2060mm (Fan to Flywheel Housing)
	:	width Apx. 1382mm (Left end to right end of inlet manifold)
	:	Height Apx. 1541.5mm (Exhaust Pipe to Oil pan)
Dry weight	:	Apx. 2950kg (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	:	1100Hp/1800rpm 970Hp/1500rpm
Prime rating	:	980Hp/1800rpm 880Hp/1500rpm
Fuel consumption ratio at Prime rating (allowance +5%)	:	165g/Hp-hr at 980Hp/1800rpm 160g/Hp-hr at 880Hp/1500rpm
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.32696-21001 SAE J620C 18in, except screw size
Flywheel housing	:	DWG.NO.32696-21001 SAE J617b NO.0, except screw size
Engine mounting	:	DWG.NO.32696-14001 4 points mounting, C = 185mm
Torsional vibration damper	:	Viscous type

(2) Air intake system

Air cleaner	:	Not supply
Turbocharger	:	MITSUBISHI TD10 Type Model : TD10L-45VRC(43)
Air cooler	:	Jacket water cooled type plate 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	:	1800rpm : 370 liter/min. 1500rpm : 310 liter/min.
Lub. oil pressure at main gallery	:	5.0 ~ 6.5kg/cm ²
Oil filler	:	DWG.NO.32696-42001 Short neck type
Oil level gage	:	DWG.NO.32696-42501 Full ~ Low : 20 liter
Quantity of oil (Approx.)	:	Oil pan full level : 100 liter low level : 80 liter Others (filter etc.) : 20 liter Total : 120 liter
Lub. oil filter (Full flow)	:	Paper element cartridge type × 4pcs filter mesh : 20 μ with by - pass alarm switch
Lub. oil filter (By - pass flow)	:	Paper element cartridge type × 1pcs 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	:	1800rpm : 1100 liter/min. 1500rpm : 1000 liter/min.
Thermostat	:	Wax pellet type × 4pcs Open at 71°C ~ 85°C
Fan	:	Pusher type steel fan 1250 diameter Fan speed ratio $i = 0.738$
Radiator piping	:	Not supply

(6) Fuel system

Fuel inlet pipings	: DWG.NO.32696-62006 For rubber hose joint
Fuel return pipings	: DWG.NO.32696-61304 For rubber hose joint
Fuel overflow of Inj. Pump and fuel leak - off of Nozzle have to return to fuel tank	
Injection pump	: Bosch type "P" without timer
Feed pump	: Piston type with priming pump
Injection Nozzle	: Hole type 0.27mm × 8 holes for 1800rpm
Primary fuel filter	: Knotted wire element type Filter mesh : 75 μ
Secondary fuel filter	: Paper element cartridge type × 2pcs Filter mesh : 5 μ

(7) Control system

Governor	: DWG.NO.32696-63001 Electronic speed governor Speed droop : 0 ~ 5% adjustable
Actuator	: DWG.NO.S13-1010 Supply voltage : DC24V ± 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 ± 20% Current consumption : 100mA
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 × 2pcs
Reduction type with safety relay
with 2 poles connector (DWG. NO.S14-0320)
 - Safety relay : DWG.NO.S10-0150 loose supply
For parallel running of starter motor
 - Current of starter : Rush 720A
Cranking 380A
(Ambient temp : 5°C, Lub. oil : SAE NO. 30)
 - Alternator : DC24V, 30A, with voltage regulator
With 2 poles connector (DWG. NO.S14-0320)
 - Recommended battery capacity : DC24V, 300AH
Not supply
 - Battery switch : Not supply
- (9) Stopping system : DWG.NO.32696-87502
- Automatic stop : 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.32696-90221
 - 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.32696-25104
		For water pump, alternator and fan drive
Service meter	:	Not supply
Tools	:	DWG.NO.32696-91001 loose supply
Spare parts	:	DWG.NO.32696-94020 loose supply

5. ACCESSORIES (Loose supply parts for standard)

No.	PARTS NO.	PARTS NAME	Q' TY	DWG. NO.	
1	04410-33100	CONTROLLER	1	S13-1041	32696-63001
2	04410-32900	CONNECTOR	1	S13-1020	
3	04410-38500	CABLE, PICK UP	1	S13-1410	
4	F8665-02100	CONNECTOR	2	S14-0320	for starter
5	04322-40100	RELAY, SAFETY	1	S10-0150	
6	F8665-02100	CONNECTOR	1	S14-0320	for alternator

6. TOOLS (Standard)

No.	PARTS NO.	PARTS NAME	Q' TY	NOTE.
	32696-91001	S.T.D. TOOL KIT	1set	Consists of No.1~27
	(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	37191-03100	BAR	1	
25	36291-00900	REMOVER	1	
26	32591-22100	WRENCH, FILTER	1	for cartridge filter
27	58309-73100	SOCKET	1	for fan drive

8. DRAWINGS (Standard & Optional)

NO.	DWG. NO.	DWG. NAME	REV.
1	32696-00220	ENGINE OUTLINE	
2	32696-01020	JOINT DETAIL	
3	32696-04028	WIRING DIAGRAM	for reference
4	32696-14001	MOUNTING DETAIL	
5	32696-21001	FLYWHEEL & HOUSING DETAIL	
6	32696-25104	BELT COVER	
7	32696-42001	OIL FILLER	
8	32696-42501	OIL LEVEL GAGE	
9	32696-61304	FUEL RETURN PIPING	
10	32696-62006	FUEL INLET PIPING	
11	32696-63001	GOVERNOR	
12	32696-87502	STOP SYSTEM	
13	32696-90221	ALARM SWITCH	
14	32696-91001	TOOLS	
15	32696-94020	SPARE PARTS	
16	S10-0150	SAFETY RELAY	
17	S11-0551	THERMO SWITCH	
18	S11-0794	PRESSURE SWITCH	
19	S11-1350	FILTER ALARM SWITCH	
20	S13-0280	SOLENOID	
21	S13-1010	ACTUATOR	
22	S13-1020	CONNECTOR	
23	S13-1041	CONTROLLER	
24	S13-1400	MAGNETIC PICK UP	
25	S13-1410	PICK UP CABLE	
26	S14-0320	CONNECTOR	