



mitsubishi S12R-F1PTAW2

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**MITSUBISHI DIESEL ENGINE
TECHNICAL INFORMATION**

ITEM NO.

T0218-0001E Rev.4 (1/4)

DATE

March, 2013

Specification Sheets of S12R-F1PTAW2 Engine

Specification Sheets of S12R-F1PTAW2 Engine are enclosed herein.

| | | | | |
|----------|----------------------------|--|------------|----------|
| Revision | First Edition : July, 2007 | Engine Engineering Department Engine System Designing Section | | |
| | Rev.1 : Sep., 2008 | | | |
| | Rev.2 : July, 2009 | Approved by | Checked by | Drawn by |
| | Rev.3 : Sep., 2009 | | | |
| | Rev.4 : Mar., 2013 | | | |
| | | | | |

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.) | 170 | (6.69) |
| Stroke mm(in.) | 180 | (7.09) |
| Displacement liter(in ³) | 49.03 | (2992) |
| Compression Ratio | 14.5:1 | |
| Dry Weight - Engine only - kg(lb) | 5270 | (11620) |
| Wet Weight - Engine only - kg(lb) | 5555 | (12249) |

PERFORMANCE DATA

| | | |
|--|-----------------|----------|
| Steady State Speed Stability Band at any Constant Load | | |
| Electric Governor - % | ±0.25 or better | |
| Maximum Overspeed Capacity - rpm | 2100 | |
| Moment of inertia of Rotating Components - kgf·m ² (lbf·ft ²) (Includes Std. Flywheel) | 75.3 | (1787.2) |
| Cyclic Speed Variation with Flywheel at 1500rpm | 1/320 | |

ENGINE MOUNTING

| | | |
|---|-----|----------|
| Maximum Bending Moment at Rear Face of Flywheel Housing - kgf·m(lbf·ft) | 450 | (3255.6) |
|---|-----|----------|

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 (71~93) | |
| Maximum Oil Temperature - °C(°F) | 110 | 230 |
| Oil Capacity of Standard Pan | High - liter (U.S.gal) | 150 (40) |
| | Low - liter (U.S.gal) | 108 (28.5) |
| Total System Capacity (Includes Oil Filter) - liter (U.S.gal) | 180 (47.6) | |
| Maximum Angle of Installation (Std. Pan) (Engine Only) | Front Down | 6.5° |
| | Front Up | 6.5° |
| | Side to Side | 22.5° |

COOLING SYSTEM

| | | |
|--|-----------------|--------|
| Coolant Capacity of Jacket (Engine only) - liter (U.S.gal) | 116 | (30.6) |
| Coolant Capacity of Air cooler (Engine only) - liter (U.S.gal) | 14 | (3.7) |
| Maximum External Friction Head at Engine Outlet - kgf/cm ² (psi) (For Jacket and Air Cooler) | 0.35 | (5.0) |
| Maximum Static Head of Coolant above Crankshaft Center - m(ft) | 10 | (32.8) |
| Standard Thermostat (modulating) Range of Jacket - °C(°F) | 71~85 (160~185) | |
| Standard Thermostat (modulating) Range of Air Cooler - °C(°F) | 42~55 (108~131) | |
| Maximum Coolant Temperature at Engine Outlet of Jacket - °C(°F) | 98 | (208) |
| Minimum Coolant Expansion Space - % of System Capacity (For Jacket and Air Cooler) | 10 | (0.4) |
| Maximum Coolant Temperature at Intercooler Inlet, PTAW type - °C(°F) | 45 | (113) |
| Maximum Air Restriction on Discharge Side of Radiator and Fan - mm H ₂ O(in. H ₂ O) | 10 | (0.4) |

The specifications are subject to change without notice.

APPLICATION : GENERATOR

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FUEL SYSTEM

| | | |
|--|-------|-------------------------|
| Fuel Injector | _____ | Mitsubishi PS6 Type × 2 |
| Maximum Suction Head of Feed Pump - mm Hg (in. Hg) | _____ | 75 (3.0) |
| Maximum Static Head of Return 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 × 2 |
| 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) | _____ | 600 |

Emission Level 100% Load (at STAND-BY POWER)

Values in mg/Nm³, O₂ content 5%

NOx : 2000mg/Nm³

CO : 650mg/Nm³

HC : 150mg/Nm³

PM : 50mg/Nm³

Control method of emission level shall be compliant with EPA regulation.

Test Condition

| | | |
|---|-----------------|--|
| f | 0.98 < f < 1.02 | f: Engine specific parameter considering atmospheric condition which determined according to the following provisions. (See CODE OF FEDERAL REGULATIONS 40 CRF ch.1) |
|---|-----------------|--|

$$f = (99/Ps)^{0.7} (Ta/289)^{1.5}$$

Ps: Dry Atmospheric pressure(kPa)

Ta: Absolute temperature of the intake air(k)

| | |
|------|------------------|
| Fuel | JIS K-2204 Type2 |
|------|------------------|

The specifications are subject to change without notice.

APPLICATION : GENERATOR

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S12R-F1PTAW2**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 100kPa(29.6inHg) barometric pressure, 77°F(25°C) ambient temperature and 30% relative humidity.

| ITEM | UNIT | STAND-BY POWER | PRIME POWER | | |
|--|------------------------------|--------------------|-------------------|--|--|
| | | 50Hz | 50Hz | | |
| Engine Speed | rpm | 1500 | 1500 | | |
| No. of Cylinders | | 12 | | | |
| Bore | mm (in.) | 170 (6.69) | | | |
| Stroke | mm (in.) | 180 (7.09) | | | |
| Displacement | liter (in. ³) | 49.03 (2992) | | | |
| Brake Horse power without Fan | HP (kW) | 1960 (1462) | 1782 (1329) | | |
| Brake Mean Effective Pressure without Fan | kgf/cm ² (psi) | 24.3 (346) | 22.1 (314) | | |
| Mean Piston Speed | m/s (ft/min) | 9.0 (1772) | 9.0 (1772) | | |
| Maximum Regenerative Power Absorption Capacity without Fan | HP (kW) | 141 (105) | 141 (105) | | |
| Intake Air flow | m ³ /min (CFM) | 131 (4626) | 117 (4131) | | |
| Exhaust Gas Flow | m ³ /min (CFM) | 346 (12217) | 308 (10875) | | |
| Coolant Flow | liter/min (U.S. GPM) | 1650 (436) | 1650 (436) | | |
| Coolant Flow to Intercooler (Max.Flow 320L/min) | liter/min (U.S. GPM) | 220 (58) | 220 (58) | | |
| Cooling Air Flow (Std. Fan) | m ³ /min (CFM) | — | — | | |
| Allowable Fan Loss Horse Power | HP (kW) | 40 (30) | 40 (30) | | |
| Radiated Heat to Ambient | kcal/hr (BTU/min) | 98350 (6505) | 87767 (5805) | | |
| Heat Rejection to Coolant | kcal/hr (BTU/min) | 426183 (28187) | 380326 (25154) | | |
| Heat Rejection to Air Cooler (PTAW Version) | kcal/hr (BTU/min) | 360616 (23851) | 321814 (21284) | | |
| Heat Rejection to Exhaust | kcal/hr (BTU/min) | 1136108 (75141) | 992959 (65673) | | |
| Noise Level (1 m height & distance) (excludes, Intake,Exhaust & Fan) | dB(A) | TBD | TBD | | |

The specifications are subject to change without notice.

APPLICATION : GENERATOR

Pub. No. T0218-0001E Rev.4 4/4



**MITSUBISHI DIESEL ENGINE
TECHNICAL INFORMATION**

ITEM NO.

T0307-0007E Rev.2 (1/2)

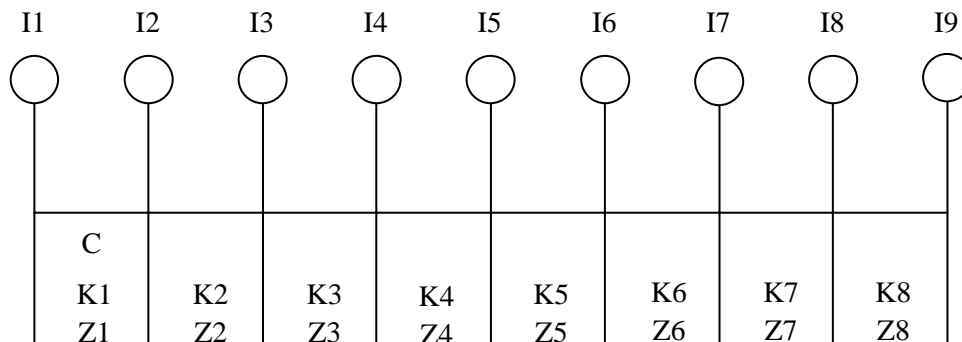
DATE

April, 2009

Elastic data of S12R Engine

Elastic data of S12R Engine are enclosed herein.

| | | | | |
|----------|---|--|------------|----------|
| Revision | First Edition : July, 2006 (Refer to ELASTIC-S12R-PTA Oct.,2003, S12R.0) | Engine Engineering Department Large Engine Design Section | | |
| | Rev.1 : July, 2006 | Approved by | Checked by | Drawn by |
| | Rev.2 : April, 2009 | | | |
| | | | | |

S12R-PTA ELASTIC DATA

(USE:45R89-19502 CONNECTING ROD)

| | 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 ×1pc. ×2pcs. | 1.01 2.02 | C=524.6 C=1049.3 | K1=0.0 | 0.0 | Z1 =0.0 |
| I2 | PULLEY Damper 1pc. Damper 2pcs. | 1.37 2.16 | — | K2=1.089 | 834 | Z2 =373.7 |
| I3 | No.1 CRANK | 0.999 | — | K3=0.735 | 834 | Z3 =373.7 |
| I4 | No.2 CRANK | 0.610 | — | K4=0.735 | 834 | Z4 =373.7 |
| I5 | No.3 CRANK | 0.999 | — | K5=0.735 | 834 | Z5 =373.7 |
| I6 | No.4 CRANK | 0.999 | — | K6=0.735 | 834 | Z6 =373.7 |
| I7 | No.5 CRANK | 0.610 | — | K7=0.735 | 834 | Z7 =373.7 |
| I8 | No.6 CRANK | 0.998 | — | K8=1.304 | 834 | Z8 =373.7 |
| I9 | FLYWHEEL 21in | 11.21 | — | | | |

Hysteresis constant: 92 No. of Cylinder: 12 Bore:170mm Stroke:180mm

Length of Con-Rod: 340mm Weight of Reciprocating Parts: 12.63 kg

Firing order:1-12-5-8-3-10-6-7-2-11-4-9

Firing interval:0-60-120-180-240-300-360-420-480-540-600-660

APPLICATION : LAND USE

The data is subject to change without notice.



**MITSUBISHI DIESEL ENGINE
TECHNICAL INFORMATION**

ITEM NO.

T0404-0009E (1/3)

DATE

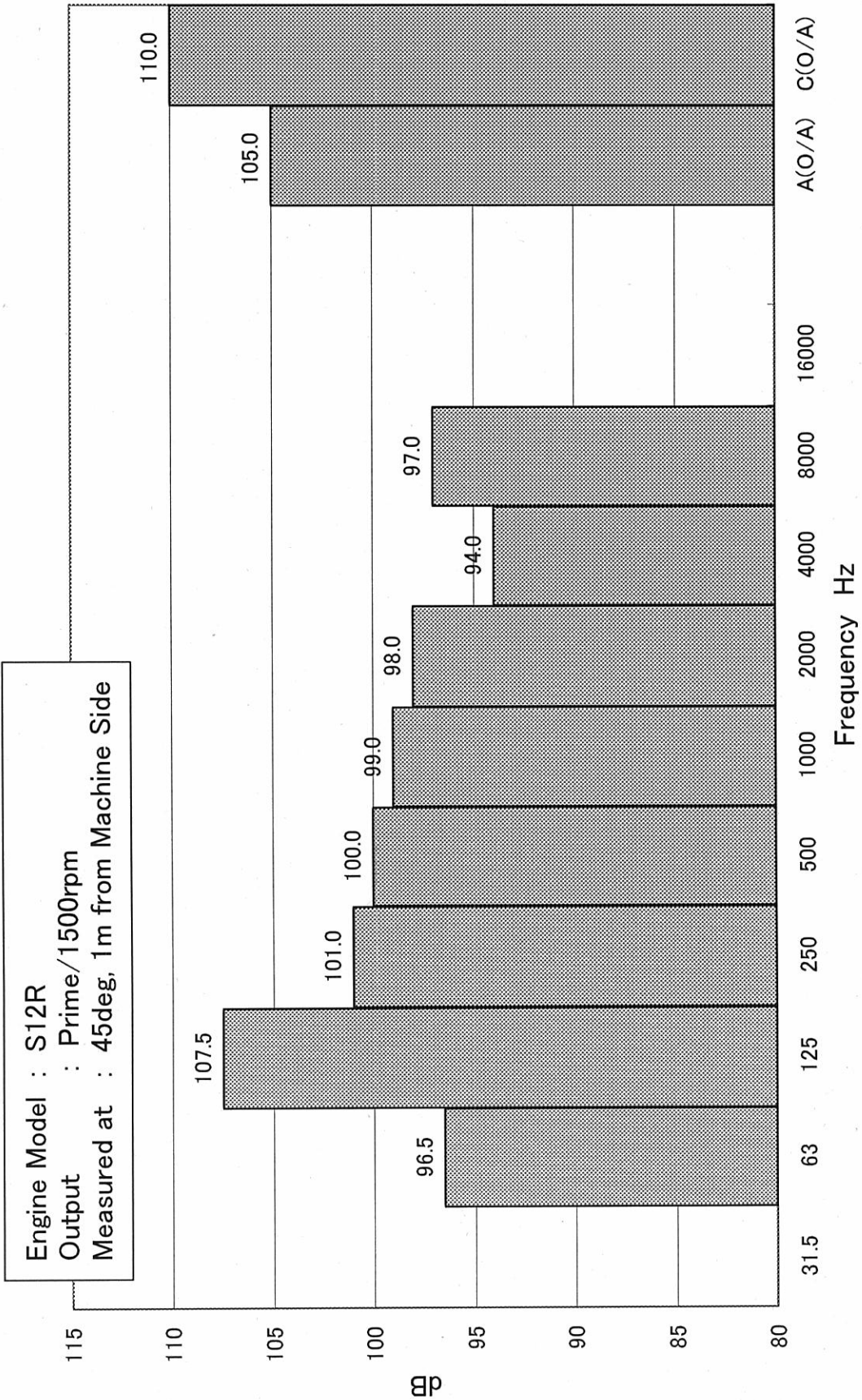
Sep., 2006

Mechanical Noize Data of S12R

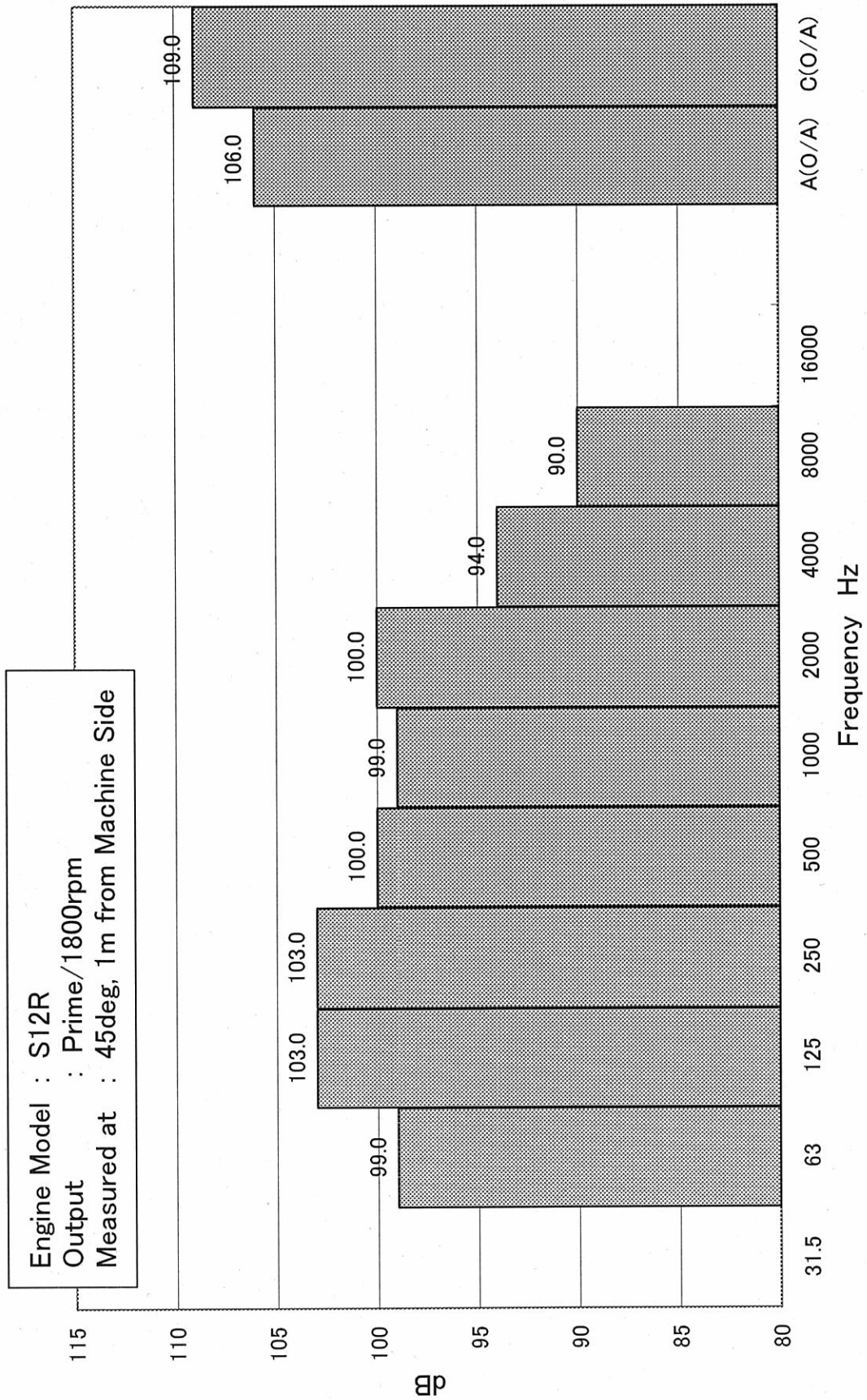
Mechanical Noize Data of S12R is enclosed herein.

| | | | | |
|----------|---------------------------|--|------------|----------|
| Revision | First Edition : Sep.,2006 | Engine Engineering Department Large Engine Design Section | | |
| | | | | |
| | | Approved by | Checked by | Drawn by |
| | | | | |
| | | | | |

Mechanical Noise Analysis



Mechanical Noise Analysis





**MITSUBISHI DIESEL ENGINE
TECHNICAL INFORMATION**

ITEM NO.

T0409-0002E (1/2)

DATE

February, 2014

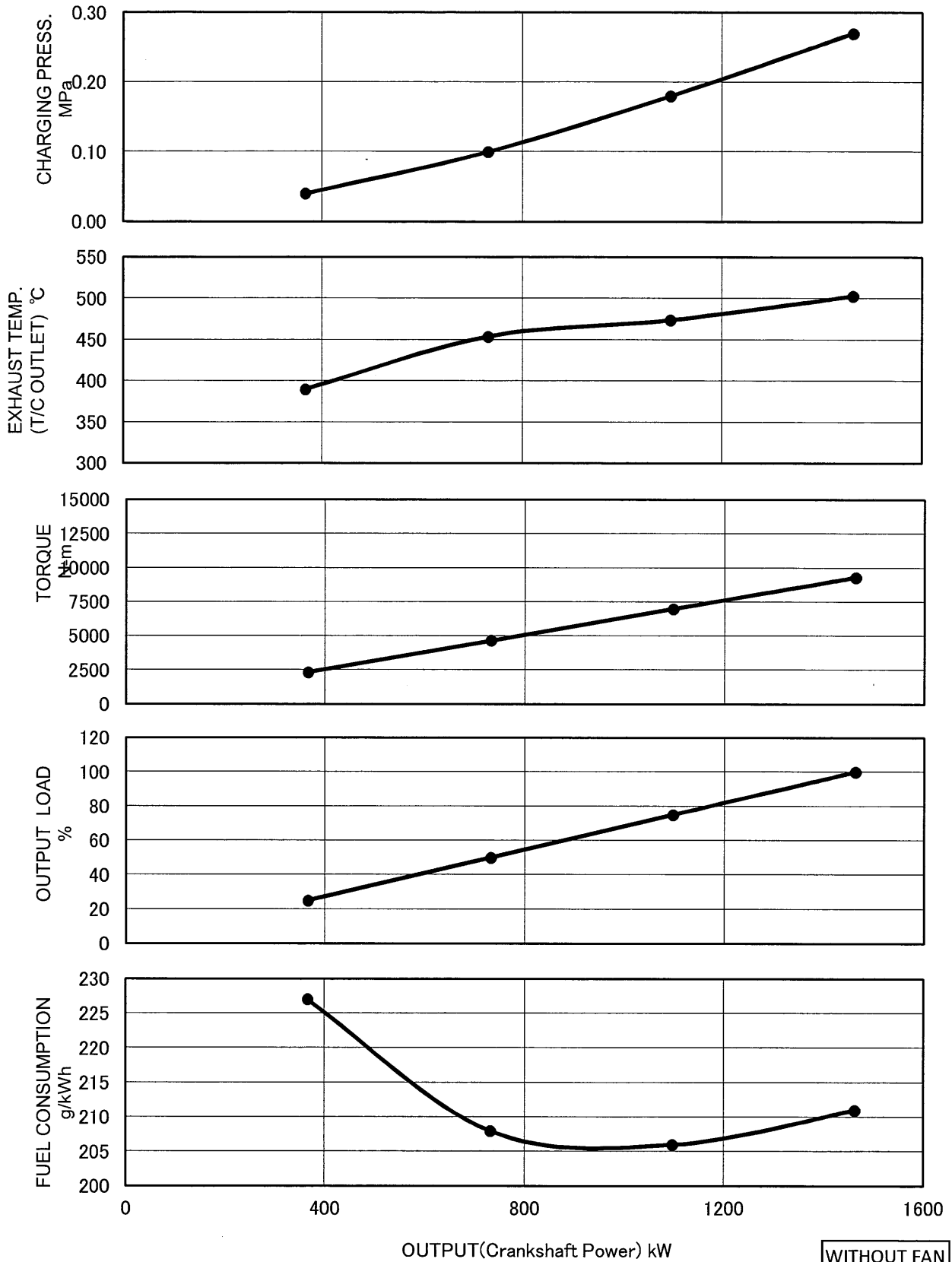
Performance Curves of S12R-F1PTAW2-1

Performance Curves of S12R-F1PTAW2-1 Engine are enclosed herein. The data are test bench data and not a guaranteed performance.

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|----------|--------------------------------|--|------------|----------|
| Revision | First Edition : February, 2014 | Engine Engineering Department High Speed Engine Designing | | |
| | | Approved by | Checked by | Drawn by |
| | | | | |
| | | | | |
| | | | | |

Engine speed: 1500min⁻¹



WITHOUT FAN

MHI CONFIDENTIAL

Fuel Consumption is based on ISO3046/1 with +5% tolerance at rated power.
The specifications are subject to change without notice.

APPLICATION : GENERATOR

Engineering Bulletin

Subject: Fuel consumption S12R-F1PTAW2 & S16R-F1PTAW2

This document is issued to give information about fuel consumption.

Conditions:

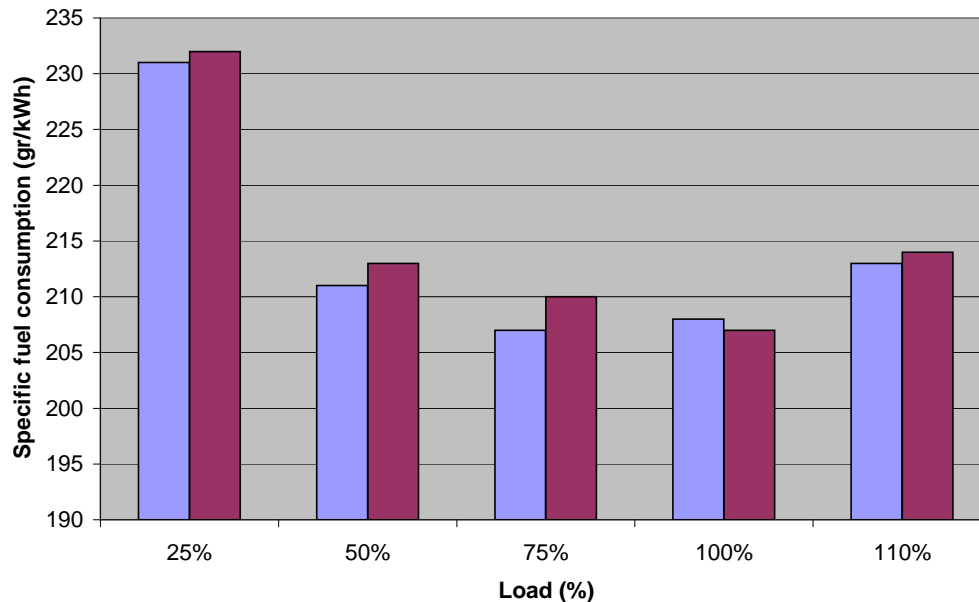
Fuel specification according JIS K-2204 Type 2

Output correction according: 100kPa barometric pressure, 25°C ambient temperature and 30% humidity.

| Load | S12R-F1PTAW2 | | S16R-F1PTAW2 | |
|------|--------------|------------------|--------------|------------------|
| | Output kW | Fuel cons gr/kwh | Output kW | Fuel cons gr/kwh |
| 25% | 366 | 231 | 487 | 232 |
| 50% | 731 | 211 | 974 | 213 |
| 75% | 1097 | 207 | 1460 | 210 |
| 100% | 1329 | 208 | 1777 | 207 |
| 110% | 1462 | 213 | 1947 | 214 |

Fuel consumption

■ S12R-F1PTAW2
■ S16R-F1PTAW2



Note: The specifications are subject to change without any notice.

| | | | |
|----------|--|-------------|------------|
| Revision | Technology Department Engine Division | | |
| | | Approved by | Checked by |
| | | | |
| | | | |
| | | | Drawn |