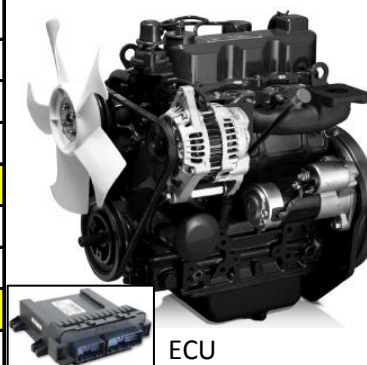




# SP103N

| Type | Rated RPM   | Ratings (kW/PS)     |           |                   |           |
|------|-------------|---------------------|-----------|-------------------|-----------|
|      |             | Gross Engine Output |           | Net Engine Output |           |
|      |             | Standby             | Prime     | Standby           | Prime     |
| -U   | 3600 (60Hz) | 16.4/22.3           | 14.8/20.1 | 15.7/21.3         | 14.1/19.2 |
| -U1  | 1800 (60Hz) | 10.0/13.6           | 9.0/12.2  | 9.3/12.6          | 8.4/11.4  |



ECU

## Ratings Definitions

The power ratings of Emergency Standby and Prime are in accordance with ISO 8528.

Fuel Stop power in accordance with ISO 3046.

Electric power (kWe) must be considered cooling fan loss, alternator efficiency, altitude derating and ambient temperature.

**STANDBY POWER RATING** is applicable for supplying emergency power for the duration of the utility power outage. No overload capability is available for this rating. A standby rated engine should be sized for a maximum of an 80% average load factor and 200 hours of operation per year. This includes less than 25 hours per year at the Standby Power rating.

**PRIME POWER RATING** is available for an unlimited number of hours per year in variable load application. Variable load should not exceed a 70% average of the Prime Power rating during any operating period of 24 hours. The Total operating time at 100% Prime Power shall not exceed 500 hours per year. A 10% overload capability is available for a period of 1 hour within a 12 hour period of operation. Total operating time at the 10% overload power shall not exceed 25 hours per year.

## © GENERAL ENGINE DATA

|                               |   |
|-------------------------------|---|
| ▶ Engine Model                | SP103N                                      |
| ▶ Engine Type                 | 3-Cycle, In-line, Diesel, Water cooled, N/A |
| ▶ Bore x stroke               | Ø75 x 76 mm                                 |
| ▶ Displacement                | 1.007 liters                                |
| ▶ Compression ratio           | 21:1  |
| ▶ Rotation                    | Counter clockwise viewed from Flywheel      |
| ▶ Firing order                | 1-2-3                                       |
| ▶ Injection timing            | E & U & D : 20° BTDC , E1 & U1 : 14° BTDC   |
| ▶ Dry weight                  | 101kg (with Fan)                            |
| ▶ Dimension (L x W x H)       | 513 x 482 x 553 mm                          |
| ▶ Flywheel housing            | SAE No.5                                    |
| ▶ Flywheel                    | Clutch No.7-1/2                             |
| ▶ Number of teeth on flywheel | 98  |

## © ENGINE MOUNTING

- ▶ Max. Bending Moment at Rear Face to Block -

This is normally attained after a running period of about 100 hours and Image shown may not be actual engine.



### ◎ EXHAUST SYSTEM

|                      |        |
|----------------------|--------|
| ▶ Max. Back Pressure | 9.8kPa |
|----------------------|--------|

### ◎ COOLING SYSTEM

Water circulation by centrifugal pump on engine.

|  |   |
|--|---|
| ▶ Cooling method                           | Fresh water forced circulation                                  |
| ▶ Coolant capacity (Engine Only)           | 1.6 liters  |
| ▶ Coolant flow rate                        | liters / min  |
| ▶ Pressure Cap                             | 90kPa   |
| ▶ Water Temperature                        |   |
| - . Maximum for standby and Prime          | 110°C   |
| - . Before start of full load              | 40°C  |
| ▶ Water pump                               | Centrifugal type driven by belt                                 |
| ▶ Thermostat Type and Range                | Wax – pellet type□<br>Opening temp. 82°C , Full open temp. 95°C |
| ▶ Cooling fan                              | Blower type, Polypropylene, Dia : Ø315mm, 6 blade               |
| ▶ Max. external coolant system restriction | Not Available   |

### ◎ LUBRICATION SYSTEM

Force-feed lubrication by gear pump

|                           |   |
|---------------------------|---|
| ▶ Lub. Method             | Fully forced pressure feed type                             |
| ▶ Oil pump                | Gear type driven by crank-shaft gear                        |
| ▶ Oil filter              | Full flow, cartridge type                                   |
| ▶ Oil capacity            | Max. 3.8 liters   |
| ▶ Lub oil pressure        | Governed Speed : Min 220kPa                                 |
| ▶ Maximum oil temperature | 121°C   |
| ▶ Angularity limit        | Front down 30 deg , Front up 30 deg□<br>Side to side 30 deg |
| ▶ Lubrication oil         | SAE 10W-30 or SAE 15W-40(Above -10°C)                       |

### ◎ FUEL SYSTEM

Bosch type in-line pump

|                                  |  |
|----------------------------------|--|
| ▶ Injection pump                 | K-type mini pump                             |
| ▶ Governor                       | Mechanical centrifugal + Woodward Apecs 4500 |
| ▶ Speed drop                     | G2 Class(ISO 8528)                           |
| ▶ Feed pump                      | Diaphragm type pump                          |
| ▶ Injection nozzle               | Throttle type                                |
| ▶ Opening pressure               | 14.7 ~ 15.7Mpa                               |
| ▶ Fuel filter                    | Full flow, cartridge type                    |
| ▶ Maximum fuel inlet restriction | -  |

This is normally attained after a running period of about 100 hours and Image shown may not be actual engine.



|                                   |                 |
|-----------------------------------|-----------------|
| ▶ Maximum fuel return restriction | -               |
| ▶ Fuel feed pump capacity         | 24 liters / hr  |
| ▶ Used fuel                       | Diesel fuel oil |

### ◎ ELECTRICAL SYSTEM

|                               |                            |
|-------------------------------|----------------------------|
| ▶ Battery Charging Alternator | 12V x 75A alternator       |
| ▶ Voltage regulator           | Built-in type IC regulator |
| ▶ Starting motor              | 12V x 1.7 kW               |
| ▶ Battery Voltage             | 12V                        |
| ▶ Battery Capacity            | 64AH(recommended)          |
| ▶ Starting aid (Option)       | Glow plug                  |

### ◎ VALVE SYSTEM

|                        |                                  |              |
|------------------------|----------------------------------|--------------|
| ▶ Type                 | Overhead valve type              |              |
| ▶ Number of valve      | Intake 1, exhaust 1 per cylinder |              |
| ▶ Valve lashes at cold | Intake 0.15mm , Exhaust 0.15mm   |              |
| ▶ Valve timing         | Open                             | Close        |
| - . Intake valve       | 8 deg. BTDC                      | 38 deg. ABDC |
| - . Exhaust valve      | 44 deg. BBDC                     | 8 deg. ATDC  |

### ◎ PERFORMANCE DATA

|  |       |      |      |
|--|-------|------|------|
| ▶ Governed Engine speed  | rpm   | 3600 | 1800 |
| ▶ Engine Idle Speed  | rpm   |      |      |
| ▶ Over speed limit   | rpm   | 3780 | 1890 |
| ▶ Gross Eng. Power(Stand by)<br>efficiency 90%                               | kWm   | 16.4 | 10.0 |
|  | kWe   | 14.8 | 9.0  |
|  | kVA   | 18.5 | 11.3 |
|  | PS    | 22.3 | 13.6 |
| ▶ BMEP   | Mpa   | 5.54 | 6.75 |
| ▶ Mean Piston Speed  | m/s   | 9.12 | 4.56 |
| ▶ Friction Power   | kW    | -    | -    |
|  | PS    | -    | -    |
| ▶ Specific fuel consumption  | L/hr  | 6.2  | 3.0  |
| ▶ Fan Power  | kW    | -    |      |
| ▶ Sound Pressure at 1m from the each side of Cylinder Block<br>(Without Fan) | dB(A) | -    | -    |

The all data and the specific fuel consumption are based on ISO 3046/1, Standard reference conditions are in accordance with 298 K(25° Celsius) air temperature, 100kPa(1000mbar) air pressure, 60% relative humidity, 110m(361ft) altitude.

Operation At Elevated Temperature And Altitude: The engine may be operated at :  
1800 rpm & 1500rpm up to 750~ 1000m and 30°C without power deration.

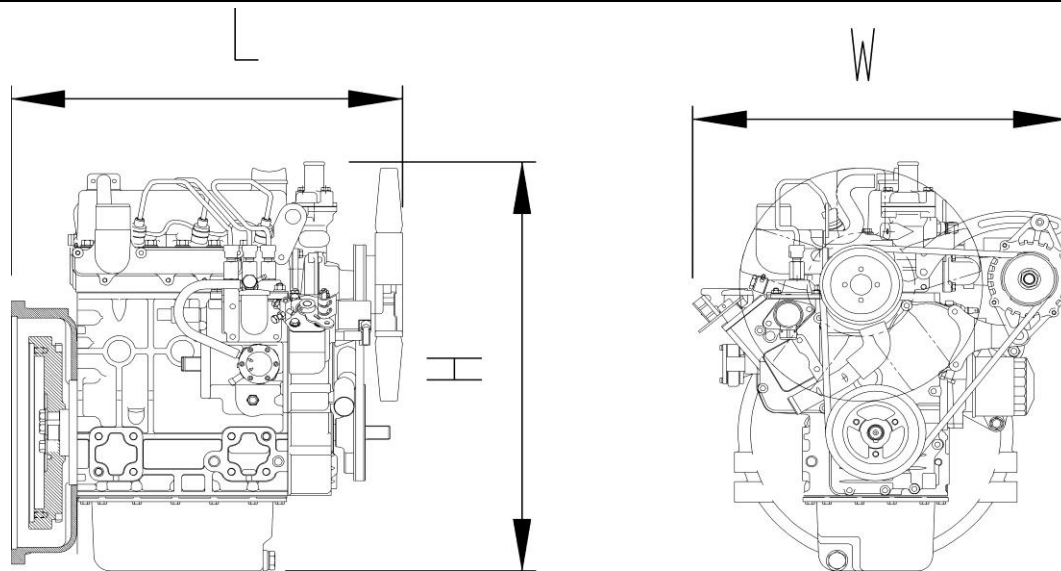
For sustained operation above these conditions, derate by 3% per 304m , and 2% per 11 °C



### Engine Data with Dry Type Exhaust Manifold

|   |                     |      |      |   |
|---|---------------------|------|------|---|
| ▶ Intake Air Flow   | m <sup>3</sup> /min | 1.62 | 0.74 |   |
| This is normally attained after a running period of about 100 hours and Image shown may not be actual engine. |                     |      |      |   |
| ▶ Exh. gas temp. after turbo.   | °C                  | 545  | 400  |   |
| ▶ Exhaust Gas Flow  | m <sup>3</sup> /r   | 1.69 | 0.77 |   |
| ▶ Heat Rejection to Exhaust   | kW                  | -    | -    | - |
| ▶ Heat Rejection to Coolant   | kW                  | -    | -    | - |
| ▶ Heat Rejection to Intercooler   | kW                  | -    | -    | - |
| ▶ Radiated Heat to Ambient  | kW                  | -    | -    | - |
| ▶ Cooling water circulation   | L/m                 | -    | -    | - |
| ▶ Cooling fan air flow  | m <sup>3</sup> /r   | -    | -    | - |

### ◆ ENGINE DIMENSION



| Designation | Length(L) | Width(W) | Height(H) | Dry weight |
|-------------|-----------|----------|-----------|------------|
| Value       | 513mm     | 482mm    | 553mm     | 101kg      |

### ◆ CONVERSION TABLE

in. = mm x 0.0394

PS = kW x 1.3596

psi = kg/cm<sup>2</sup> x 14.2233

in<sup>3</sup> = lit. x 61.02

hp = PS x 0.98635

lb = kg x 2.20462

kW = Kcal/sec x 0.239

lb/ft = N.m x 0.737

U.S. gal = lit. x 0.264

kW = 0.2388 kcal/s

lb/PS.h = g/kW.h x 0.00162

cfm = m<sup>3</sup> /min x 35.336

Mpa = Pa x 1000 = bar x 10

This is normally attained after a running period of about 100 hours and Image shown may not be actual engine.