

| | | | |
|--------------------------|-------------|----------------------------|------|
| Name | 12V1600G10F | Speed [rpm] | 1500 |
| Application Group | 3B | Nominal power [kW] | 524 |
| Dataset | Ref. 25°C/- | Nominal power [bhp] | 703 |
| | | Frequency [Hz] | 50 |

Exhaust Regulations MoEF India / CPCB Stage II;

Reference conditions

| No. | Description | Index | Value | Unit |
|-----|-------------------------------|-------|-------|------|
| 6 | Intake air temperature | | 25 | °C |
| 8 | Barometric pressure | | 1000 | mbar |
| 9 | Site altitude above sea level | | 100 | m |

0. Data-relevant engine design configuration

| No. | Description | Index | Value | Unit |
|-----|---|-------|-------|------|
| 8 | Engine rated speed switchable (1500/1800 rpm) | | - | - |
| 13 | Engine without sequential turbocharging (turbochargers without cut-in/cut-out control) | | X | - |
| 31 | Engine with air-cooled charge air | | X | - |

1. Power-related data

| No. | Description | Index | Value | Unit |
|-----|--|-------|-------|------|
| 1 | Engine rated speed | A | 1500 | rpm |
| 3 | Mean piston speed | | 7.5 | m/s |
| 4 | Continuous power ISO 3046 (10% overload capability) (design power DIN 6280, ISO 8528) | A | 524 | kW |
| 5 | Fuel stop power ISO 3046 | A | 576 | kW |
| 8 | Mean effective pressure (MEP) (Continuous power ISO 3046) | | 19.96 | bar |
| 9 | Mean effective pressure (MEP) (Fuel stop power ISO 3046) | | 21.92 | bar |

2. General Conditions (for maximum power)

| No. | Description | Index | Value | Unit |
|-----|---|-------|-------|------|
| 1 | Intake air depression (new filter) | A | 25 | mbar |
| 2 | Intake air depression, max. | L | 50 | mbar |
| 3 | Exhaust back pressure | A | 85 | mbar |
| 4 | Exhaust back pressure, max. | L | 85 | mbar |
| 5 | Fuel temperature at fuel feed connection | R | 38 | °C |
| 9 | Fuel temperature at fuel feed connection, max. (w/o power reduction) | L | 60 | °C |
| 10 | Fuel temperature at fuel feed connection, max. | L | 70 | °C |
| 49 | Max. ambient temperature in direct vicinity of vibration damper | L | 55 | °C |

3. Consumption

| No. | Description | Index | Value | Unit |
|-----|--|-------|-------|-------|
| 17 | Specific fuel consumption (be) - 100 % CP (+ 5 %; EN 590; 42.8 MJ/kg) | R | 200 | g/kWh |

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Engine power that can be run continuously under standard conditions

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Dataset Ref. 25°C/-

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Nominal power [bhp] 703
Frequency [Hz] 50

Exhaust Regulations MoEF India / CPCB Stage II;

| | | | | |
|----|--|---|-------|--------|
| 18 | Specific fuel consumption (be) - 75 % CP (+ 5 %; EN 590; 42.8 MJ/kg) | R | 214.7 | g/kWh |
| 19 | Specific fuel consumption (be) - 50 % CP (+ 5 %; EN 590; 42.8 MJ/kg) | R | 240.7 | g/kWh |
| 20 | Specific fuel consumption (be) - 25 % CP (+ 5 %; EN 590; 42.8 MJ/kg) | R | 261.3 | g/kWh |
| 56 | Specific fuel consumption (be) - 100 % FSP (+ 5 %; EN 590; 42.8 MJ/kg) | R | 199.9 | g/kWh |
| 57 | Specific fuel consumption (be) - 75 % FSP (+ 5 %; EN 590; 42.8 MJ/kg) | R | 212.3 | g/kWh |
| 58 | Specific fuel consumption (be) - 50 % FSP (+ 5 %; EN 590; 42.8 MJ/kg) | R | 237.5 | g/kWh |
| 59 | Specific fuel consumption (be) - 25 % FSP (+ 5 %; EN 590; 42.8 MJ/kg) | R | 255.7 | g/kWh |
| 73 | No-load fuel consumption | R | 8.2 | kg/h |
| 61 | Lube oil consumption after 100 h of operation (B = fuel consumption per hour) | R | <0.2 | % of B |
| 62 | Lube oil consumption after 100 h of operation, max. (B = fuel consumption per hour) | L | <0.5 | % of B |

4. Model-related data (basic design)

| No. | Description | Index | Value | Unit |
|-----|--|-------|-------|-------------|
| 3 | Engine with exhaust turbocharger (ETC) and intercooler | | X | - |
| 4 | Exhaust piping, non-cooled | | X | - |
| 33 | Working method: four-cycle, diesel, single-acting | | X | - |
| 34 | Combustion method: direct injection | | X | - |
| 36 | Cooling system: conditioned water | | X | - |
| 37 | Direction of rotation: c.c.w. (facing driving end) | | X | - |
| 6 | Number of cylinders | | 12 | - |
| 7 | Cylinder configuration: V angle | | 90 | degrees (°) |
| 10 | Bore | | 122 | mm |
| 11 | Stroke | | 150 | mm |
| 12 | Displacement, cylinder | | 1.75 | liter |
| 13 | Displacement, total | | 21.0 | liter |
| 14 | Compression ratio | | 17.5 | - |
| 41 | Cylinder liners: wet, replaceable | | X | - |
| 24 | Number of inlet valves, per cylinder | | 2 | - |
| 25 | Number of exhaust valves, per cylinder | | 2 | - |
| 15 | Number of turbochargers | | 2 | - |
| 28 | Standard flywheel housing flange (engine main PTO) | | 01 | SAE |
| 43 | Flywheel interface (DISC) | | 14" | - |

5. Combustion air / exhaust gas

| No. | Description | Index | Value | Unit |
|-----|---|-------|-------|------|
| 19 | Charge-air temperature before cylinder | A | 50 | °C |
| 33 | Charge-air flow through external air-to-air intercooler | A | 0.35 | m³/s |

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Exhaust Regulations MoEF India / CPCB Stage II;

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|----|--|---|------|---------|
| 34 | Charge-air temperature before external air-to-air intercooler | A | 179 | °C |
| 35 | Charge-air temperature after external air-to-air intercooler | A | 50 | °C |
| 36 | Charge-air temperature after external air-to-air intercooler, max. | L | 65 | °C |
| 37 | Charge-air temperature after external air-to-air intercooler, min. | L | -15 | °C |
| 39 | Pressure differential in external air-to-air intercooler, max. | L | 130 | mbar |
| 8 | Charge-air pressure before cylinder - CP | R | 2.79 | bar abs |
| 27 | Charge-air pressure before cylinder - FSP | R | 3.06 | bar abs |
| 9 | Combustion air volume flow - CP | R | 0.67 | m³/s |
| 10 | Combustion air volume flow - FSP | R | 0.75 | m³/s |
| 11 | Exhaust volume flow (at exhaust temperature) - CP | R | 1.7 | m³/s |
| 12 | Exhaust volume flow (at exhaust temperature) - FSP | R | 1.85 | m³/s |
| 15 | Exhaust temperature after turbocharger - CP | R | 497 | °C |
| 16 | Exhaust temperature after turbocharger - FSP | R | 491 | °C |

6. Heat dissipation

| No. | Description | Index | Value | Unit |
|-----|--|-------|-------|------|
| 16 | Heat dissipated by engine coolant - FSP with oil heat, without charge-air heat | R | 230 | kW |
| 26 | Charge-air heat dissipation - CP | R | 105 | kW |
| 27 | Charge-air heat dissipation - FSP | R | 125 | kW |
| 31 | Heat dissipated by return fuel flow - CP | R | 3.6 | kW |
| 32 | Heat dissipated by return fuel flow - FSP | R | 3.8 | kW |
| 33 | Radiation and convection heat, engine - CP | R | 24 | kW |

7. Coolant system (high-temperature circuit)

| No. | Description | Index | Value | Unit |
|-----|--|-------|-------|------|
| 17 | Coolant temperature (at engine outlet to cooling equipment) | A | 95 | °C |
| 20 | Coolant temperature after engine, limit 1 | L | 105 | °C |
| 21 | Coolant temperature after engine, limit 2 | L | 109 | °C |
| 25 | Coolant antifreeze content, max. | L | 50 | % |
| 30 | Cooling equipment: coolant flow rate | A | 26 | m³/h |
| 35 | Coolant pump: inlet pressure, min. | L | 1.4 | bar |
| 36 | Coolant pump: inlet pressure, max. | L | 3.5 | bar |
| 41 | Pressure loss in off-engine cooling system, max. | L | 1 | bar |
| 47 | Breather valve (expansion tank) opening pressure (excess pressure) | R | 1 | bar |
| 54 | Cooling equipment: height above engine, max. | L | 15 | m |
| 48 | Breather valve (expansion tank) opening pressure (depression) | R | -0.2 | bar |
| 49 | Pressure in cooling system, max. | L | 5.0 | bar |

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10. Lube oil system

| No. | Description | Index | Value | Unit |
|-----|---|-------|-------|------|
| 1 | Lube oil operating temp. before engine, from | R | - | °C |
| 2 | Lube oil operating temp. before engine, to | R | - | °C |
| 8 | Lube oil operating press. bef. engine, from | R | 4.5 | bar |
| 9 | Lube oil operating press. bef. engine, to | R | 5.5 | bar |
| 10 | Lube oil pressure before engine, alarm | L | 2.6 | bar |
| 11 | Lube oil pressure before engine, shutdown | L | 2.4 | bar |
| 19 | Lube oil fine filter (main circuit): number of units | | 1 | - |
| 20 | Lube oil fine filter (main circuit): number of elements per unit | | 4 | - |
| 56 | Lube-oil fine filter (main flow), particle size 1 | | 10 | µm |
| 57 | Lube-oil fine filter (main flow), filtering efficiency re 1 | | 26 | % |
| 58 | Lube-oil fine filter (main flow), particle size 2 | | 15 | µm |
| 59 | Lube-oil fine filter (main flow), filtering efficiency re 2 | | 50 | % |
| 60 | Lube-oil fine filter (main flow), particle size 3 | | 20 | µm |
| 61 | Lube-oil fine filter (main flow), filtering efficiency re 3 | | 75 | % |
| 32 | Lube oil fine filter (main circuit): pressure differential, max. | L | 2 | bar |

11. Fuel system

| No. | Description | Index | Value | Unit |
|------|---|-------|-------|-----------|
| 1 | Fuel pressure at engine fuel feed connection, min. (when engine is starting) | L | -0.5 | bar |
| 2 | Fuel pressure at engine fuel feed connection, max. (when engine is starting) | L | 0.5 | bar |
| 4211 | Max. fuel supply volume Normal mode | A | 4.8 | liter/min |
| 4212 | Max. fuel supply volume Failure mode | A | 5.3 | liter/min |
| 4213 | Max. fuel return volume Normal mode | A | 2.1 | liter/min |
| 4214 | Max. fuel return volume Failure mode | A | 4.1 | liter/min |
| 10 | Fuel pressure at return connection on engine, max. | L | <0.4 | bar |
| 18 | Fuel fine filter (main circuit): number of units | A | 1 | - |
| 19 | Fuel fine filter (main circuit): number of elements per unit | A | 1 | - |
| 68 | Fuel fine filter, particle size 1 | | 4 | µm |
| 69 | Fuel fine filter, filtering efficiency re 1 | | 99.5 | % |
| 70 | Fuel fine filter, particle size 2 | | 6 | µm |
| 71 | Fuel fine filter, filtering efficiency re 2 | | 99.8 | % |
| 72 | Fuel fine filter, particle size 3 | | 14 | µm |
| 73 | Fuel fine filter, filtering efficiency re 3 | | 99.8 | % |
| 21 | Fuel fine filter (main circuit): pressure differential, max. | L | 2 | bar |

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Exhaust Regulations MoEF India / CPCB Stage II;

12. General operating data

| No. | Description | Index | Value | Unit |
|------|--|-------|-------|------------------|
| 1 | Cold start capability: air temperature (w/o starting aid, w/o preheating) - (case A) | R | -20 | °C |
| 2 | Additional condition (to case A): engine coolant temperature | R | -20 | °C |
| 3 | Additional condition (to case A): lube oil temperature | R | -20 | °C |
| 4 | Additional condition (to case A): lube oil viscosity | R | 10W40 | SAE |
| 9 | Cold start capability: air temperature (w/o starting aid, w/ preheating) - (case C) | R | -40 | °C |
| 10 | Additional condition (to case C): engine coolant temperature | R | 32 | °C |
| 11 | Additional condition (to case C): lube oil temperature | R | 32 | °C |
| 12 | Additional condition (to case C): lube oil viscosity | R | 10W40 | SAE |
| 21 | Coolant preheating, heater performance (standard) | R | 3 | kW |
| 22 | Coolant preheating, preheating temperature, min. | L | 32 | °C |
| 3506 | Coolant preheating, preheating temperature, max. | L | 55 | °C |
| 28 | Breakaway torque (without driven machinery) coolant temperature +5°C | R | 750 | Nm |
| 30 | Breakaway torque (without driven machinery) coolant temperature +40°C | R | 450 | Nm |
| 29 | Cranking torque at firing speed (without driven machinery) coolant temperature +5°C | R | 400 | Nm |
| 31 | Cranking torque at firing speed (without driven machinery) coolant temperature +40°C | R | 270 | Nm |
| 96 | Starting is blocked if the engine coolant temperature is below | | -20 | °C |
| 37 | High idling speed, max. (static) | L | 1560 | rpm |
| 38 | Limit speed for overspeed alarm / emergency shutdown | L | 2200 | rpm |
| 42 | Firing speed, from | R | 80 | rpm |
| 43 | Firing speed, to | R | 120 | rpm |
| 44 | Engine coolant temperature before starting full-load operation, recommended min. | R | 60 | °C |
| 48 | Minimum continuous load | R | 20 | % |
| 50 | Engine mass moment of inertia (without flywheel) | R | 1.548 | kgm ² |
| 52 | Standard flywheel mass moment of inertia | R | 1.44 | kgm ² |
| 1981 | Block bending moment - SAE 0 | R | 3 | kNm |
| 1982 | Block bending moment - SAE 1 | R | 3 | kNm |
| 51 | Engine mass moment of inertia (with standard flywheel) | R | 2.988 | kgm ² |
| 109 | Speed droop (with electronic governor) adjustable P1 | R | 4 | % |
| 110 | Speed droop (with electronic governor) adjustable P2 | R | 0 | % |
| 95 | Number of starter ring-gear teeth on engine flywheel | | 157 | - |

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13. Starting (electric)

| No. | Description | Index | Value | Unit |
|------|---|-------|------------|------|
| 2309 | Manufacturer | | Prestolite | - |
| 2310 | Number of starter | | 1 | - |
| 2312 | Starter electrically redundant | | - | - |
| 2313 | Rated power per starter | R | 7.5 | kW |
| 2314 | Starter, rated voltage | R | 24 | VDC |
| 2315 | Rated short-circuit current per starter | L | 1730 | A |
| 3000 | Power consumption per starter (at an engine speed of 100 rpm, SAE0) | R | 400 | A |
| 3002 | Power consumption per starter (at an engine speed of 100 rpm, SAE1) | R | 540 | A |
| 2317 | Internal resistance of power supply + line resistance per starter | A | 0.008 | Ω |
| 2318 | Manufacturer | | Prestolite | - |
| 2319 | Number of starter | | 1 | - |
| 2320 | Starter electrically redundant | | X | - |
| 2321 | Rated power per starter | R | 7.5 | kW |
| 2322 | Starter, rated voltage | R | 24 | VDC |
| 2323 | Rated short-circuit current per starter | L | 1730 | A |
| 3001 | Power consumption per starter (at an engine speed of 100 rpm, SAE0) | R | 400 | A |
| 3003 | Power consumption per starter (at an engine speed of 100 rpm, SAE1) | R | 540 | A |
| 2325 | Internal resistance of power supply + line resistance per starter | A | 0.008 | Ω |
| 2326 | Manufacturer | | Prestolite | - |
| 2327 | Number of starter | | 2 | - |
| 2328 | Starter electrically redundant | | - | - |
| 2329 | Rated power per starter | R | 7.5 | kW |
| 2330 | Starter, rated voltage | R | 24 | VDC |
| 2331 | Rated short-circuit current per starter | L | 1730 | A |
| 3251 | Power consumption per starter (at an engine speed of 100 rpm, SAE0) | R | 400 | A |
| 3252 | Power consumption per starter (at an engine speed of 100 rpm, SAE1) | R | 540 | A |
| 2333 | Internal resistance of power supply + line resistance per starter | A | 0.008 | Ω |
| 2347 | Generally valid data for starter | | X | - |
| 2342 | Rated starting-attempt Duration (at +20°C ambient temperature with battery) | R | 3 | s |
| 2343 | Interval between starts (at rated starting-attempt duration), min. | L | 5 | s |
| 2345 | Maximum acceptable starting-attempt duration | L | 15 | s |
| 2344 | Interval between starts (when starting-attempt duration > rated starting-attempt duration) | R | 60 | s |
| 2346 | Starting attempts within 30 minutes (at +20°C ambient temperature with battery full), max. | L | 6 | - |

16. Inclinations - standard oil system (ref.: waterline)

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|-----|-------------|-------|-------|------|

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|----|---|---|----|-------------|
| 15 | Longitudinal inclination, continuous max. driving end down (Option: max. operating inclinations) | L | 15 | degrees (°) |
| 17 | Longitudinal inclination, continuous max. driving end up (Option: max. operating inclinations) | L | 15 | degrees (°) |
| 19 | Transverse inclination, continuous max. (Option: max. operating inclinations) | L | 15 | degrees (°) |

18. Capacities

| No. | Description | Index | Value | Unit |
|-----|--|-------|-------|-------|
| 1 | Engine coolant capacity (without cooling equipment) | R | 65 | liter |
| 11 | On-engine fuel capacity | R | 3 * | liter |
| 14 | Engine oil capacity, initial filling (standard oil system) (Option: max. operating inclinations) | R | 72.5 | liter |
| 20 | Oil change quantity, max. (standard oil system) (Option: max. operating inclinations) | R | 64 | liter |
| 28 | Oil pan capacity, dipstick mark min. (standard oil system) (Option: max. operating inclinations) | L | 56 | liter |
| 29 | Oil pan capacity, dipstick mark max. (standard oil system) (Option: max. operating inclinations) | L | 64 | liter |

19. Masses / dimensions

| No. | Description | Index | Value | Unit |
|-----|--|-------|--------|------|
| 7 | Engine dry mass (with engine-mounted standard accessories, without coupling) | R | 1855 * | kg |
| 12 | Engine mass, wet (with engine-mounted standard accessories, without coupling) | R | 1918 | kg |

20. Fan / fan cooler

| No. | Description | Index | Value | Unit |
|-----|--|-------|-------|------|
| 3 | Fan, pusher-type | | X | - |
| 18 | Fan arrangement: vertical above crankshaft | | X | - |
| 9 | Fan drive: mechanical via V-belt | | X | - |
| 13 | Fan: speed | R | 1500 | rpm |

21. Exhaust emissions

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| | | | | |
|------|---|--|-------------|---|
| 1947 | Emissions data sheet: "TA-Luft" - CP | | EDS16000100 | - |
|------|---|--|-------------|---|

22. Acoustics

| No. | Description | Index | Value | Unit |
|-----|---|-------|---------|-------|
| 101 | Exhaust noise, unsilenced - CP (free-field sound-pressure level Lp, 1m distance, ISO 6798, +3dB(A) tolerance) | R | 109 | dB(A) |
| 201 | Exhaust noise, unsilenced - CP (sound power level LW, ISO 6798, +3dB(A) tolerance) | R | 121 | dB(A) |
| 102 | Exhaust noise, unsilenced - FSP (free-field sound-pressure level Lp, 1m distance, ISO 6798, +3dB(A) tolerance) | R | 109 | dB(A) |
| 202 | Exhaust noise, unsilenced - FSP (sound power level LW, ISO 6798, +3dB(A) tolerance) | R | 122 | dB(A) |
| 103 | Exhaust noise, unsilenced - CP (free-field sound-pressure level Lp, 1m distance, ISO 6798) Spectrum No. | R | 735163e | - |
| 203 | Exhaust noise,unsilenced - CP (sound power level LW, ISO 6798) Spectrum No. | R | - | - |
| 109 | Engine surface noise with attenuated intake noise (filter) - CP (free-field sound-pressure level Lp, 1m distance, ISO 6798, +2dB(A) tolerance) | R | 102 | dB(A) |
| 209 | Engine surface noise with attenuated intake noise (filter) - CP (sound power level LW, ISO 6798, +2dB(A) tolerance) | R | 120 | dB(A) |
| 111 | Engine surface noise with attenuated intake noise (filter) - CP (free-field sound-pressure level Lp, 1m distance, ISO 6798) Spectrum No. | R | 735156e | - |
| 211 | Engine surface noise with attenuated intake noise (filter) - CP (sound power level LW, ISO 6798) Spectrum No. | R | - | - |
| 113 | Engine surface noise with attenuated intake noise (intake silencer) - CP (free-field sound-pressure level Lp, 1m distance, ISO 6798, +2dB(A) tolerance) | R | 100 | dB(A) |
| 114 | Engine surface noise with attenuated intake noise (intake silencer) - FSP (free-field sound-pressure level Lp, 1m distance, ISO 6798, +2dB(A) tolerance) | R | 101 | dB(A) |

[BL] Reference value: fuel stop power
Maximum engine power that cannot be run continuously on
some applications (stabilization reserve)

[DL] Reference value: continuous power
Engine power that can be run continuously under standard
conditions

[>] Actual value must be greater than specified value
[<] Actual value must be less than specified value

[X] Applicable
The module is valid for this product type

[] Non-applicable
The module is not valid for this product type

[N] Value not named
The value has not yet been named or will not be named

[] Adequate verification not yet available (tolerance +/- 10%)
[] Adequate verification not yet available (tolerance +/- 5%)

[A] Design value
Value required for the design of an external system
(plant)

[R] Guideline value
Typical average value as information – only suitable
for design purposes to a limited extent

[L] Limit value
A value representing the lower limit/minimum value or
upper limit/maximum value that may not be
exceeded. Not suitable for design purposes

Name 12V1600G10F
Application Group 3B
Dataset Ref. 25°C/-

Speed [rpm] 1500
Nominal power [kW] 524
Nominal power [bhp] 703
Frequency [Hz] 50

Exhaust Regulations MoEF India / CPCB Stage II;

| | | | | |
|-----|--|---|---------|---|
| 125 | Structure borne noise at engine mounting brackets in vertical direction above resilient engine mounts - CP Spectrum No. | R | 735249e | - |
| 126 | Structure borne noise at engine mounting brackets in vertical direction above resilient engine mounts - FSP Spectrum No. | R | 735248e | - |

[BL] Reference value: fuel stop power
Maximum engine power that cannot be run continuously on some applications (stabilization reserve)
[DL] Reference value: continuous power
Engine power that can be run continuously under standard conditions
[>] Actual value must be greater than specified value
[<] Actual value must be less than specified value

[X] Applicable
The module is valid for this product type
[] Non-applicable
The module is not valid for this product type
[N] Value not named
The value has not yet been named or will not be named
[] Adequate verification not yet available (tolerance +/- 10%)
[]** Adequate verification not yet available (tolerance +/- 5%)

[A] Design value
Value required for the design of an external system (plant)
[R] Guideline value
Typical average value as information – only suitable for design purposes to a limited extent
[L] Limit value
A value representing the lower limit/minimum value or upper limit/maximum value that may not be exceeded. Not suitable for design purposes