

# VOLVO PENTA INDUSTRIAL DIESEL

# TAD733GE

195 kW (265 hp) at 1500 rpm, 214 kW (292 hp) at 1800 rpm

The TAD733GE is a powerful, reliable and economical Generating Set Diesel Engine built on the dependable in-line six design.

## Durability & low noise

Designed for easiest, fastest and most economical installation. Well-balanced to produce smooth and vibration-free operation with low noise level.

To maintain a controlled working temperature in cylinders and combustion chambers, the engine is equipped with piston cooling. The engine is also fitted with replaceable cylinder liners and valve seats/guides to ensure maximum durability and service life of the engine.

## Low exhaust emission

The state of the art, high-tech injection and charging system with low internal losses contributes to excellent combustion and low fuel consumption.

The TAD733GE complies with EU Stage 2 and TA-Luft exhaust emission regulations.

## Easy service & maintenance

Easily accessible service and maintenance points contribute to the ease of service of the engine.

## Technical description

### Engine and block

- Optimized cast iron cylinder block with optimum distribution of forces
- Piston cooling for low piston temperature and reduced ring temperature
- Drop forged steel connecting rods
- Crankshaft hardened bearing surfaces and fillets for moderate load on main and big-end bearings
- Keystone top compression rings for long service life
- Replaceable valve guides and valve seats
- Three PTO positions at flywheel end
- Lift eyelets
- Flywheel housing with connection acc. to SAE 2
- Flywheel for flexible coupling and friction clutch
- Transport brackets

### Lubrication system

- Full flow disposable spin-on oil filter, for extra high filtration
- Rotary displacement oil pump driven by the crankshaft
- Deep centre oil sump, 30° inclination
- Oil filler on top



## Features

- Electronic governing, EDC 4
- CAN bus communication
- Compact design
- High power to weight ratio
- Emission compliant
- Noise optimized engine design
- A wide selection of optional equipment and power settings

- Oil dipstick, short in front
- Integrated full flow oil cooler, side-mounted

### Fuel system

- Six hole fuel injection nozzles
- Direct injection unit pumps
- Electronic governor with smoke limiter function
- Washable fuel prefilter with water separator
- Rotary low-pressure fuel pump
- Fine fuel filter of disposable type

### Intake and exhaust system

- Connection flange for exhaust line
- Turbo charger, centre low with exhaust flange
- Closed crankcase ventilation
- Two stage air filter
- Heater flange in charge air inlet (without power relay)

### Cooling system

- Belt driven, maintenance-free coolant pump with high degree of efficiency

- Efficient cooling with accurate coolant control through a water distribution duct in the cylinder block
- Reliable thermostat with minimum pressure drop
- Cooling water pipe, inlet and outlet
- Belt driven coolant pump, ratio 1.0:1
- Fan hub
- Fan on separate bracket 292mm above crankshaft
- Pusher fan Ø 600 mm

### Electrical system

- 24V electrical system
- Alternator 1x35A / 24V, low left
- Starter motor, Melco, 5.5kW / 24V, single pole
- ECU (without high altitude sensor) control and monitoring of oil pressure, coolant temperature, coolant level, charge air pressure, engine rpm and fuel temperature compensation
- Engine wiring

**VOLVO  
PENTA**

# TAD733GE

## Technical Data

### General

|  |              |  |
|--|--------------|--|
| Engine designation .....                       | TAD733GE     |  |
| No. of cylinders and configuration.....        | in-line 6    |  |
| Method of operation .....                      | 4-stroke     |  |
| Bore, mm (in.).....                            | 108 (4.25)   |  |
| Stroke, mm (in.).....                          | 130 (5.12)   |  |
| Displacement, l (in <sup>3</sup> ).....        | 7.15 (436.3) |  |
| Compression ratio.....                         | 18.1:1       |  |
| Dry weight, with cooling package, kg (lb)..... | 900 (1984)   |  |
| Wet weight, with cooling package, kg (lb)..... | 968 (2134)   |  |

|                       |                 |                 |
|-----------------------|-----------------|-----------------|
| <b>Performance</b>    | <b>1500 rpm</b> | <b>1800 rpm</b> |
| with fan, kW (hp) at: |                 |                 |
| Prime Power           | 175 (238)       | 192 (260)       |
| Standby Power         | 195 (265)       | 214 (292)       |

|   |                 |                 |
|---|-----------------|-----------------|
| <b>Lubrication system</b>                             | <b>1500 rpm</b> | <b>1800 rpm</b> |
| Oil consumption, liter/h (US gal/h) at:               |                 |                 |
| Prime Power   | 0.08 (0.021)    | 0.09 (0.024)    |
| Standby Power   | 0.09 (0.024)    | 0.11 (0.029)    |
| Oil system capacity incl filters, liter (US gal)..... | 34 (9.0)        |                 |

|                               |                 |                 |
|-------------------------------|-----------------|-----------------|
| <b>Fuel system</b>            | <b>1500 rpm</b> | <b>1800 rpm</b> |
| Specific fuel consumption at: |                 |                 |
| Prime Power, g/kWh (lb/hph)   |                 |                 |
| 25 %                          | 228 (0.369)     | 245 (0.397)     |
| 50 %                          | 217 (0.352)     | 222 (0.361)     |
| 75 %                          | 214 (0.347)     | 220 (0.357)     |
| 100 %                         | 216 (0.351)     | 222 (0.361)     |
| Standby Power, g/kWh (lb/hph) |                 |                 |
| 25 %                          | 228 (0.370)     | 238 (0.386)     |
| 50 %                          | 216 (0.350)     | 221 (0.359)     |
| 75 %                          | 215 (0.348)     | 220 (0.357)     |
| 100 %                         | 219 (0.355)     | 228 (0.369)     |

|  |                 |                 |
|--|-----------------|-----------------|
| <b>Intake and exhaust system</b>                         | <b>1500 rpm</b> | <b>1800 rpm</b> |
| Air consumption at 27°C, m <sup>3</sup> /min (cfm):      |                 |                 |
| Prime Power  | 11.5 (406)      | 14.2 (501)      |
| Standby Power  | 12.4 (439)      | 15.8 (557)      |
| Max allowable air intake restriction, kPa (In wc)        | 3.5 (14.1)      | 3.5 (14.1)      |
| Heat rejection to exhaust, kW (BTU/min) at:              |                 |                 |
| Prime Power  | 142 (8075)      | 168 (9554)      |
| Standby Power  | 165 (9383)      | 202 (11488)     |
| Exhaust gas temperature after turbine, °C (°F) at:       |                 |                 |
| Prime Power  | 510 (950)       | 509 (948)       |
| Standby Power  | 530 (986)       | 530 (986)       |
| Max allowable back-pressure in exhaust line, kPa (In wc) |                 |                 |
| Prime Power  | 5 (20.1)        | 7.5 (30.1)      |
| Standby Power  | 3 (12.0)        | 5 (20.1)        |
| Exhaust gas flow, m <sup>3</sup> /min (cfm) at:          |                 |                 |
| Prime power  | 31.8 (1123)     | 40.4 (1428)     |
| Standby Power  | 37.2 (1314)     | 44.4 (1569)     |

|  |                 |                 |
|--|-----------------|-----------------|
| <b>Cooling system</b>                              | <b>1500 rpm</b> | <b>1800 rpm</b> |
| Heat rejection radiation from engine, kW (BTU/min) |                 |                 |
| Prime Power  | 19 (1081)       | 22 (1251)       |
| Standby Power                                      | 20 (1137)       | 23 (1308)       |
| Heat rejection to coolant kW (BTU/min)             |                 |                 |
| Prime Power  | 87 (4919)       | 99 (5607)       |
| Standby Power                                      | 96 (5465)       | 110 (6244)      |
| Fan power consumption, kW (hp)                     | 6.1 (8)         | 10.5 (14)       |

## Standard equipment

### Engine

- Automatic belt tensioner •
- Lift eyelets •

### Flywheel

- Flywheel housing with conn. acc. to SAE 2 •
- Flywheel 10" and 11.5" disc •
- Vibration dampers •

### Engine suspension

- Fixed front suspension •

### Lubrication system

- Oil dipstick •
- Full-flow oil filter of spin-on type •
- By-pass oil filter of spin-on type •
- Oil cooler, side mounted •
- Low noise oil sump •

### Fuel system

- Fuel filters of disposable type •
- Electronic unit injectors •
- Pre-filter with water separator •

### Intake and exhaust system

- Two stage air filter with replaceable paper insert •
- Air restriction indicator •
- Air cooled exhaust manifold •
- Connecting flange for exhaust pipe •
- Exhaust flange with v-clamp •
- Turbo charger, low right side •
- Crankcase ventilation, open •

### Cooling system

- Radiator incl intercooler -1)
- Gear driven coolant pump •
- Fan hub •
- Pusher fan -1)
- Fan guard -1)
- Belt guard -1)

### Control system

- Engine Management System (EMS) with CAN-bus interface SAE J1939 and stand alone interface •

### Alternator

- Alternator 35 A / 24 V •

### Starting system

- Starter motor, 5.5 kW, 24 V •

### Instruments and senders

- Temp.- and oil pressure for automatic stop/alarm •

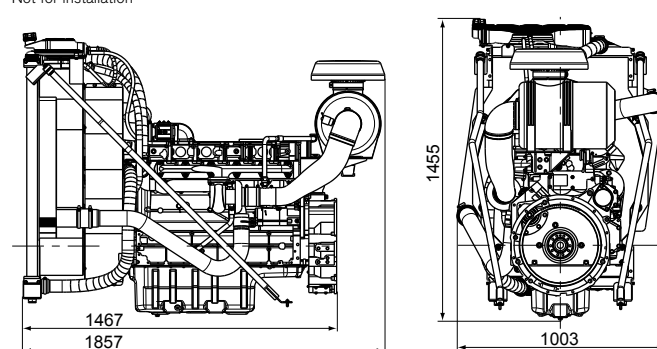
### Engine Packing

- Plastic wrapping •

1) must be ordered, see order specification  
 - optional equipment  
 • included in standard specification

## Dimensions TAD733GE

Not for installation



Note! Not all models, standard equipment and accessories are available in all countries. All specifications are subject to change without notice. The engine illustrated may not be entirely identical to production standard engines.

### Power Standards

The engine performance corresponds to ISO 3046, BS 5514 and DIN 6271. The technical data applies to an engine without cooling fan and operating on a fuel with calorific value of 42.7 MJ/kg (18360 BTU/lb) and a density of 0.84 kg/liter (7.01 lb/US gal), also where this involves a deviation from the standards. Power output guaranteed within 0 to +2% at rated ambient conditions at delivery. Ratings are based on ISO 8528.

Engine speed governing in accordance with ISO 3046/IV, class A1 and ISO 8528-5 class G3

### Exhaust emissions

The engine complies with EU stage 2 and TA-luft exhaust emission regulations.

### Rating Guidelines

PRIME POWER rating corresponds to ISO Standard Power for continuous operation. It is applicable for supplying electrical power at variable load for an unlimited number of hours instead of commercially purchased power. A10 % overload capability for governing purpose is available for this rating.

STANDBY POWER rating corresponds to ISO Standard Fuel Stop Power. It is applicable for supplying standby electrical power at variable load in areas with well established electrical networks in the event of normal utility power failure. No overload capability is available for this rating. 1 hp = 1 kW x 1.36

### Information

For more technical data and information, please look in the Generator Set Engines Sales Guide.



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|                                |                 |             |
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## General

In-line four stroke diesel engine with direct injection. Rotation direction, anti-clockwise viewed towards flywheel.

Turbocharged

|                     |                            |                 |             |
|---------------------|----------------------------|-----------------|-------------|
| Number of cylinders |                            |                 | 6           |
| Displacement, total |                            | litre           | 7.15        |
|                     |                            | in <sup>3</sup> | 436.0       |
| Firing order        |                            |                 | 1-5-3-6-2-4 |
| Bore                |                            | mm              | 108         |
|                     |                            | in              | 4.25        |
| Stroke              |                            | mm              | 130         |
|                     |                            | in              | 5.12        |
| Compression ratio   |                            |                 | 18:1        |
| Dry weight          | Engine only                | kg              | 710         |
|                     |                            | lb              | 1565        |
|                     | Engine and cooling package | kg              | 900         |
|                     |                            | lb              | 1984        |
| Wet weight          | Engine only                | kg              | 751         |
|                     |                            | lb              | 1656        |
|                     | Engine and cooling package | kg              | 968         |
|                     |                            | lb              | 2134        |

| Performance  |               | r/min             | 1500       | 1800   | 2000 |
|--|---------------|-------------------|------------|--------|------|
| Standby Power  | without fan   | kW                | 201        | 224.9  | 206  |
|  |               | hp                | 273        | 306    | 280  |
|  | with fan      | kW                | 195        | 214    | 192  |
|  |               | hp                | 265        | 292    | 261  |
| Prime Power  | without fan   | kW                | 181        | 202    | 185  |
|  |               | hp                | 246        | 275    | 252  |
|  | with fan      | kW                | 175        | 192    | 171  |
|  |               | hp                | 238        | 260    | 232  |
| Torque at:   | Standby Power | Nm                | 1280       | 1193   | 984  |
|  |               | lbft              | 944        | 880    | 725  |
|  | Prime Power   | Nm                | 1152       | 1072   | 883  |
|  |               | lbft              | 850        | 790    | 651  |
| Mean piston speed                                    |               | m/s               | 6.5        | 7.8    | 8.7  |
|  |               | ft/sec            | 21.4       | 25.7   | 28.5 |
| Effective mean pressure at:                          | Standby Power | MPa               | 2.3        | 2.1    | 1.7  |
|  |               | psi               | 326        | 304    | 251  |
|  | Prime Power   | MPa               | 2.0        | 1.9    | 1.6  |
|  |               | psi               | 294        | 273    | 225  |
| Max combustion pressure at:                          | Standby Power | MPa               | 14.9       | 19.1   | 15.2 |
|  |               | psi               | 2161       | 2770   | 2205 |
|  | Prime Power   | MPa               | 14         | 15.1   | 14   |
|  |               | psi               | 2031       | 2190   | 2031 |
| Total mass moment of inertia, J (mR2)                |               | kgm <sup>2</sup>  | 3.09       |        |      |
|  |               | lbft <sup>2</sup> | 73.3       |        |      |
| Degree of irregularity at:                           | Standby Power |                   | 1:37       | 1:48   |      |
|  | Prime Power   |                   | 1:41       | 1:52   |      |
| Residual speed droop at load increase from 0 to 100% |               | %                 | adjustable |        |      |
| Friction Power                                       |               | kW                | 8.5        | 12.3   |      |
|  |               | hp                | 11.56      | 16.728 |      |

|                                |                 |             |
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**Engine noise emission**

Test Standards: ISO 3744-1981 (E)  
 sound power (without fan, intake and exhaust noise)  
 Tolerans ± 0.75 dB(A)

|                                     |               | r/min | 1500 | 1800 | 2000 |
|-------------------------------------|---------------|-------|------|------|------|
| Measured sound power Lw             | No load       | dB(A) | 103  | 104  |      |
|                                     | Standby Power | dB(A) | 106  | 109  |      |
|                                     | Prime Power   | dB(A) | 106  | 108  |      |
| Calculated sound pressure Lp at 1 m | No load       | dB(A) | 90   | 91   |      |
|                                     | Standby Power | dB(A) | 93   | 95   |      |
|                                     | Prime Power   | dB(A) | 92   | 95   |      |

**Unsilenced exhaust noise**

Data calculated as sound pressure Lp.  
 Assumed microphone distance 1 m

|               |  | r/min | 1500 | 1800 | 2000 |
|---------------|--|-------|------|------|------|
| Standby Power |  | dB(A) | 117  | 118  |      |
| Prime Power   |  | dB(A) | 116  | 117  |      |

**Load acceptance**

Test condition: Warm engine. Load acceptance performance can vary due to actual alternator inertia, voltage regulator, type of load and local ambient conditions.

**Single step load performance at 1500 rpm**

| Load (%) | Speed diff (%) |         | Recovery time (s) |         | Remaining load (%) | Speed diff (%) |         | Recovery time (s) |         |
|----------|----------------|---------|-------------------|---------|--------------------|----------------|---------|-------------------|---------|
|          | Prime          | Standby | Prime             | Standby |                    | Prime          | Standby | Prime             | Standby |
| 0-40     | 6.0            | 6.3     | 1.8               | 2.0     | 40-100             | 11.2           | 13.1    | 4.5               | 9.9     |
| 0-50     | 7.2            | 8.2     | 2.1               | 2.9     | 50-100             | 8.5            | 9.6     | 3.8               | 7.8     |
| 0-60     | 8.7            | 10.2    | 3.0               | 4.3     | 60-100             | 6.8            | 7.8     | 3.5               | 5.0     |
| 0-75     | 13.7           | 17.5    | 3.8               | 4.5     | 75-100             | 4.0            | 4.6     | 3.2               | 3.6     |
| 0-51     | 7.0            |         | 2.8               |         | 0-46               |                | 7.0     |                   | 2.8     |
| 0-100    |                |         |                   |         |                    |                |         |                   |         |
| 100-0    |                |         |                   |         |                    |                |         |                   |         |

**Single step load performance at 1800 rpm**

| Load (%) | Speed diff % |         | Recovery time (s) |         | Remaining load (%) | Speed diff (%) |         | Recovery time (s) |         |
|----------|--------------|---------|-------------------|---------|--------------------|----------------|---------|-------------------|---------|
|          | Prime        | Standby | Prime             | Standby |                    | Prime          | Standby | Prime             | Standby |
| 0-40     | 3.8          | 4.1     | 1.2               | 1.4     | 40-100             | 5.4            | 6.7     | 2.1               | 7.0     |
| 0-50     | 4.5          | 5.1     | 1.6               | 1.7     | 50-100             | 4.8            | 5.8     | 1.9               | 6.8     |
| 0-60     | 5.6          | 6.2     | 1.8               | 2.2     | 60-100             | 3.6            | 4.4     | 1.8               | 4.1     |
| 0-75     | 7.3          | 7.5     | 2.1               | 2.5     | 75-100             | 2.4            | 3.5     | 1.7               | 3.6     |
| 0-73     | 7.0          |         | 1.9               |         | 0-66               |                | 7.0     |                   | 1.9     |
| 0-100    | 14.3         | 18.3    | 3.5               | 9.1     |                    |                |         |                   |         |
| 100-0    | 5.8          | 5.8     | 2.0               | 2.0     |                    |                |         |                   |         |

**Cold start performance**

1500/1800/2000

|                              |    |      |
|------------------------------|----|------|
| Cold start limit temperature | °C | -15  |
|                              |    | -30* |

\* With manifold heater engaged, lubrication oil 15W/40

|                                |                 |             |
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### Derating

The engine may be operated up to 1000 m altitude and 40°C ambient air temperature without derating. For applications above 1000 m an ECU with automatic derating must be used. For operations with air ambient temperature over 40°C, the power should be derated according to the following factors:

|                                     |        |             |
|-------------------------------------|--------|-------------|
| Altitude derating factor < 3000 m   | % / m  | 4 / 500     |
| Altitude derating factor > 3000 m   | % / m  | 6 / 500     |
| Ambient temperature derating factor | % / °C | 2 / 5°C     |
| Humidity                            | %      | No derating |

| <b>Lubrication system</b>             |  | <b>r/min</b> | <b>1500</b> | <b>1800</b> | <b>2000</b> |
|---------------------------------------|--|--------------|-------------|-------------|-------------|
| Lubricating oil consumption           | Standby Power                                | liter/h      | 0.09        | 0.11        | 0.10        |
|                                       |  | US gal/h     | 0.024       | 0.029       | 0.026       |
|                                       | Prime Power                                  | liter/h      | 0.08        | 0.09        | 0.09        |
|                                       |  | US gal/h     | 0.021       | 0.024       | 0.024       |
| Oil system capacity including filters |  | liter        | 34          |             |             |
|                                       |  | US gal       | 9.0         |             |             |
| Oil sump capacity:                    | max  | liter        | 31          |             |             |
|                                       |  | US gal       | 8.2         |             |             |
|                                       | min  | liter        | 24          |             |             |
|                                       |  | US gal       | 6.3         |             |             |
| Oil change intervals/specifications:  |  |              |             |             |             |
| Closed crankcase ventilation          | ACEA: E4. API: CH-4, CI-4*<br>full synthetic | h            | 500         |             |             |
| Open crankcase ventilation            | VDS-2. ACEA: E3, E5. API: CG-4, CH-4*        | h            | 500         |             |             |
| Open crankcase ventilation            | VDS. ACEA: E2. API: CF, CF-4*                | h            | 250         |             |             |
| Engine angularity limits:             | front up                                     | °            | 10          |             |             |
|                                       | front down                                   | °            | 10          |             |             |
|                                       | side tilt                                    | °            | 10          |             |             |
| Oil pressure at rated speed           |  | kPa          | 480         | 520         | 550         |
|                                       |  | psi          | 70          | 75          | 80          |
| Oil pressure shut down switch setting |  | kPa          | 200         |             |             |
|                                       |  | psi          | 29          |             |             |
| Lubrication oil temperature:          | normal                                       | °C           | 110         |             |             |
|                                       |  | °F           | 230         |             |             |
|                                       | max  | °C           | 125         |             |             |
|                                       |  | °F           | 257         |             |             |
| Oil filter micron size                |  | mm           | 0.012       |             |             |

\* See also general section in the sales guide

|                                |                 |             |
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| <b>Fuel system</b>   |             | <b>r/min</b>                                 | <b>1500</b> | <b>1800</b> | <b>2000</b> |
|--|-------------|--|-------------|-------------|-------------|
| <b>Standby Power</b><br>Specific fuel consumption at:                          | 25%         | g/kWh<br>lb/hph                              | 228<br>0.37 | 238<br>0.39 | 249<br>0.40 |
|  | 50%         | g/kWh<br>lb/hph                              | 216<br>0.35 | 221<br>0.36 | 223<br>0.36 |
|  | 75%         | g/kWh<br>lb/hph                              | 215<br>0.35 | 220<br>0.36 | 221<br>0.36 |
|  | 100%        | g/kWh<br>lb/hph                              | 219<br>0.35 | 228<br>0.37 | 226<br>0.37 |
| <b>Prime Power</b><br>Specific fuel consumption at:                            | 25%         | g/kWh<br>lb/hph                              | 228<br>0.37 | 245<br>0.40 | 265<br>0.43 |
|  | 50%         | g/kWh<br>lb/hph                              | 217<br>0.35 | 222<br>0.36 | 227<br>0.37 |
|  | 75%         | g/kWh<br>lb/hph                              | 214<br>0.35 | 220<br>0.36 | 221<br>0.36 |
|  | 100%        | g/kWh<br>lb/hph                              | 216<br>0.35 | 222<br>0.36 | 223<br>0.36 |
| Recommended fuel to conform to   |             | ASTM-D975-No1 and 2-D<br>JIS KK 2204, EN 590 |             |             |             |
| Total fuel flow  |             | liter/h<br>US gal/h                          | 360<br>95   | 450<br>119  | 480<br>127  |
| Max allowed inlet fuel temperature   | continuous  | °C<br>°F                                     | 70<br>158   |             |             |
|  | temporarily | °C<br>°F                                     | 90<br>194   |             |             |
| Feed pump pressure   |             | kPa<br>psi                                   | 500<br>73   |             |             |
| Fuel supply line max. restriction (before fuel feed pump)                      |             | kPa<br>psi                                   | 35<br>5.1   |             |             |
| Fuel supply line max. restriction (before fuel prefilter and manual feed pump) |             | kPa<br>psi                                   | 15<br>2.2   |             |             |
| Fuel supply line max. pressure, (before fuel feed pump)                        |             | kPa<br>psi                                   | 20<br>2.9   |             |             |
| Fuel filter micron size  |             | mm   | 0.005       |             |             |
| Prefilter / Water separator  |             | mm   | 0.063       |             |             |
| Governor type/make, standard   |             | Heinzman / EDC4                              |             |             |             |
| Injection pump type/make   |             | PFM 1 P100 S 2005 / Bosch                    |             |             |             |
| Injection timing std.  |             | °B.T.D.C                                     | 2.5         |             |             |

|                                |                 |             |
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| <b>Intake and exhaust system</b>            |               | <b>r/min</b>               | <b>1500</b>                | <b>1800</b>  | <b>2000</b>  |              |
|---|---------------|----------------------------|----------------------------|--------------|--------------|--------------|
| Air consumption at:                         | Standby Power | 27°C<br>81°F               | m <sup>3</sup> /min<br>cfm | 12.4<br>439  | 15.8<br>557  | 14.4<br>509  |
|   | Prime Power   | 27°C<br>81°F               | m <sup>3</sup> /min<br>cfm | 11.5<br>406  | 14.2<br>501  | 13.1<br>463  |
| Air intake restriction, clean filter(s)     |               |                            | kPa<br>in wc               | 1.5<br>6.0   |              |              |
| Max allowable air intake restriction        |               |                            | kPa<br>in wc               | 3.5<br>14.1  |              |              |
| Air filter type                             |               |                            | Two stage paper cartridge  |              |              |              |
| Air filter cleaning efficiency              |               |                            | %                          | 99.9         |              |              |
| Heat rejection to exhaust at:               | Standby Power |                            | kW<br>BTU/min              | 165<br>9383  | 202<br>11488 |              |
|   | Prime Power   |                            | kW<br>BTU/min              | 142<br>8075  | 168<br>9554  |              |
| Exhaust gas temperature after turbine at:   | Standby Power | °C                         | 530                        | 530          | 501          |              |
|   |               | °F                         | 986                        | 986          | 934          |              |
|   | Prime Power   | °C                         | 510                        | 509          | 479          |              |
|   |               | °F                         | 950                        | 948          | 894          |              |
| Max allowable back pressure in exhaust line | Standby Power | kPa                        | 3                          | 5            | 5            |              |
|   |               | In wc                      | 12.0                       | 20.1         | 20.1         |              |
|   | Prime Power   | kPa                        | 5                          | 7.5          | 7.5          |              |
|   |               | In wc                      | 20.1                       | 30.1         | 30.1         |              |
| Exhaust gas flow at:                        | Standby Power | m <sup>3</sup> /min<br>cfm | 37.2<br>1314               | 44.4<br>1568 | 48.0<br>1695 |              |
|   |               | Prime Power                | m <sup>3</sup> /min<br>cfm | 31.8<br>1123 | 40.4<br>1427 | 43.0<br>1519 |
| Heat rejection to CAC                       | Standby Power | kW<br>BTU/min              | 42<br>2388                 | 51<br>2895   | 43<br>2462   |              |
|   |               | Prime Power                | kW<br>BTU/min              | 38<br>2150   | 46<br>2605   | 39<br>2235   |

| <b>Intercooler system</b>                         |       | <b>r/min</b> | <b>1500</b> | <b>1800</b> | <b>2000</b> |
|---|-------|--------------|-------------|-------------|-------------|
| Boost pressure                                    | kPa   | 183          | 205         | 186         |             |
|   | in wc | 733          | 823         | 747         |             |
| Charge air temp after turbo compressor            | °C    | 196          | 201         | 194         |             |
|   | °F    | 385          | 394         | 381         |             |
| Max allowable comb. air temp after CAC            | °C    | 50           |             |             |             |
|   | °F    | 122          |             |             |             |
| Max pressure droop over intercooler, incl. Piping | kPa   | 15           |             |             |             |
|   | In wc | 60           |             |             |             |

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| <b>Cooling system</b>                                       |   | <b>r/min</b> | <b>1500</b> | <b>1800</b> | <b>2000</b> |
|---|---|--------------|-------------|-------------|-------------|
| Heat rejection radiation from engine at:                    | Standby Power   | kW           | 20          | 23          | 21          |
|   |   | BTU/min      | 1137        | 1308        | 1194        |
|   | Prime Power   | kW           | 19          | 22          | 20          |
|   |   | BTU/min      | 1081        | 1251        | 1137        |
| Heat rejection to coolant at:                               | Standby Power   | kW           | 96          | 110         | 101         |
|   |   | BTU/min      | 5465        | 6244        | 5738        |
|   | Prime Power   | kW           | 87          | 99          | 92          |
|   |   | BTU/min      | 4919        | 5607        | 5215        |
| Recommended coolant   | Volvo coolant or Volvo anticorrosion additive together with clean fresh water |              |             |             |             |
| Radiator cooling system type                                | Closed circuit  |              |             |             |             |
| Radiator core area  | m <sup>2</sup>  | 0.65         |             |             |             |
|   | foot <sup>2</sup>   | 7.00         |             |             |             |
| Radiator core thickness                                     | mm  | 55           |             |             |             |
|   | in  | 2.17         |             |             |             |
| Intercooler core area                                       | m <sup>2</sup>  | 0.41         |             |             |             |
|   | foot <sup>2</sup>   | 4.46         |             |             |             |
| Intercooler core thickness                                  | mm  | 50           |             |             |             |
|   | in  | 1.97         |             |             |             |
| Fan diameter  | mm  | 870          |             |             |             |
|   | in  | 34.25        |             |             |             |
| Fan power consumption                                       | kW  | 6.1          | 10.5        | 14.3        |             |
|   | hp  | 8            | 14          | 19          |             |
| Fan drive ratio   | 1:0,8   |              |             |             |             |
| Coolant capacity,   | engine  | liter        | 9.8         |             |             |
|   |   | US gal       | 2.59        |             |             |
|   | radiator with hoses   | liter        | 28.6        |             |             |
|   |   | US gal       | 7.56        |             |             |
| Coolant pump  | drive/ratio   | 1,73:1       |             | 1,36:1      |             |
| Coolant flow with standard cooling system                   | l/s   | 3.0          | 3.6         | 3.2         |             |
|   | US gal/s  | 0.79         | 0.95        | 0.85        |             |
| Maximum external coolant system restriction                 | kPa   | 25           | 35          | 28          |             |
|   | in wc   | 100          | 141         | 112         |             |
| Thermostat,   | start to open   | °C           | 87          |             |             |
|   |   | °F           | 189         |             |             |
|   | fully open  | °C           | 102         |             |             |
|   |   | °F           | 216         |             |             |
| Maximum static pressure head                                | kPa   | 100          |             |             |             |
|   | in wc   | 402          |             |             |             |
| Pressure cap setting on standard cooling system             | kPa   | 90           |             |             |             |
|   | in wc   | 361          |             |             |             |
| Maximum top tank temperature                                | °C  | 105          |             |             |             |
|   | °F  | 221          |             |             |             |
| Max. permissible cooling down of engine coolant by radiator | °C  | 8            |             |             |             |
|   | °F  | 46           |             |             |             |
| Shutdown switch setting                                     | °C  | 113          |             |             |             |
|   | °F  | 235          |             |             |             |
| Recommended draw down capacity                              | 10% of total cooling system capacity  |              |             |             |             |



**Cooling performance**

Cooling air flow and maximum additional external restriction at different radiator air temperatures based on 105°C TTT and 50% antifreeze (radiator and cooling fan, see optional equipment)

| Engine speed<br>rpm | Air on<br>temp<br>°C | PRIME POWER                   |                         | STANDBY POWER                 |                            |
|---------------------|----------------------|-------------------------------|-------------------------|-------------------------------|----------------------------|
|                     |                      | Air flow<br>m <sup>3</sup> /s | External restriction Pa | Air flow<br>m <sup>3</sup> /s | External restriction<br>Pa |
| 1500                | 63                   | 3.9                           | 0                       |                               |                            |
|                     | 57                   | 3.3                           | 150                     |                               |                            |
|                     | 55                   | 3.1                           | 200                     |                               |                            |
|                     | 50                   | 2.7                           | 300                     |                               |                            |
|                     | 43                   | 2.4                           | 400                     |                               |                            |
|                     | 66                   |                               |                         | 3.9                           | 0                          |
|                     | 61                   |                               |                         | 3.3                           | 150                        |
|                     | 59                   |                               |                         | 3.1                           | 200                        |
|                     | 54                   |                               |                         | 2.7                           | 300                        |
|                     | 48                   |                               |                         | 2.4                           | 400                        |
| 1800                | 65                   | 4.9                           | 0                       |                               |                            |
|                     | 61                   | 4.3                           | 150                     |                               |                            |
|                     | 60                   | 4.1                           | 200                     |                               |                            |
|                     | 56                   | 3.7                           | 300                     |                               |                            |
|                     | 53                   | 3.4                           | 400                     |                               |                            |
|                     | 68                   |                               |                         | 4.9                           | 0                          |
|                     | 64                   |                               |                         | 4.3                           | 150                        |
|                     | 63                   |                               |                         | 4.1                           | 200                        |
|                     | 60                   |                               |                         | 3.7                           | 300                        |
|                     | 57                   |                               |                         | 3.4                           | 400                        |
| 2000                | 71                   | 5.7                           | 0                       |                               |                            |
|                     | 69                   | 5.1                           | 150                     |                               |                            |
|                     | 68                   | 5.0                           | 200                     |                               |                            |
|                     | 67                   | 4.6                           | 300                     |                               |                            |
|                     | 64                   | 4.3                           | 400                     |                               |                            |
|                     | 73                   |                               |                         | 5.7                           | 0                          |
|                     | 72                   |                               |                         | 5.1                           | 150                        |
|                     | 71                   |                               |                         | 5.0                           | 200                        |
|                     | 70                   |                               |                         | 4.6                           | 300                        |
|                     | 67                   |                               |                         | 4.3                           | 400                        |

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| <b>Electrical system</b>                         |               | <b>r/min</b>        | <b>1500</b> | <b>1800</b> | <b>2000</b> |
|--|---------------|---------------------|-------------|-------------|-------------|
| Voltage and type                                 |               | 24V / 1 pole system |             |             |             |
| Alternator:                                      | make/output   | Amp                 | Iskra/35    |             |             |
|  | tacho output  | Hz/alt. Rev         | 6           |             |             |
|  | drive ratio   |                     | 4,07:1      |             |             |
| Starter motor                                    | make          | Melco               |             |             |             |
|  | type          | M008T62471          |             |             |             |
|  | kW            | 5.0                 |             |             |             |
| Starter motor solenoid,                          | pull current  | Amp                 | 2           |             |             |
|  | hold current  | Amp                 | 2           |             |             |
| Number of teeth on:                              | flywheel      |                     | 129         |             |             |
|  | cam wheel     |                     | 96          |             |             |
|  | starter motor |                     | 10          |             |             |
| Inrush current at +20°C                          |               | Amp                 | 1200        |             |             |
| Cranking current at +20°C                        |               | Amp                 | 400         |             |             |
| Crank engine speed at 20°C                       |               | rpm                 | 200         |             |             |
| Starter motor battery capacity:                  | max           | Ah                  | 135         |             |             |
|  | min at +5°C   | Ah                  | 110         |             |             |
| Inlet manifold heater (at 12V/24V)               |               | kW                  | 2 / 3,6     |             |             |
| Power relay for the manifold heater (at 12V/24V) |               | Amp                 | 150 / 120   |             |             |