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| TAD1340VE | 21340724 | 02 |

General

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

| | | | |
|---------------------|-------------|---------------------------|--------------|
| Number of cylinders | | | 6 |
| Displacement, total | | liters in ³ | 12.78 780 |
| Firing order | | | 1-5-3-6-2-4 |
| Bore | | mm in | 131 5.16 |
| Stroke | | mm in | 158 6.22 |
| Compression ratio | | | 18.1:1 |
| Wet weight | Engine only | kg lb | |
| | Power pac | kg lb | |

| Performance | | | | rpm | 1500 | 1800 | 2000 | 2100 |
|----------------------------|--------|--------------------|----------|---------------|--------------|-------------|--------------|--------------|
| ICFN Power | 256 kW | without fan | | kW | 256 | 256 | 256 | 256 |
| | | | | hp | 348 | 348 | 348 | 348 |
| | | with fan 890 mm | | kW | 250 | 246 | 242 | 240 |
| | | | | hp | 340 | 335 | 329 | 326 |
| Torque at: | | ICFN Power 256 kW | | Nm | 1630 | 1358 | 1222 | 1164 |
| | | | | lbf ft | 1202 | 1002 | 901 | 859 |
| Max torque at engine speed | | | 1260 rpm | Nm lbf ft | 1770 1305 | | | |
| Mean piston speed | | | | m/s ft/sec | 7.9 25.9 | 9.5 31.1 | 10.5 34.6 | 11.1 36.3 |

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| Performance | | rpm | 1500 | 1800 | 2000 | 2100 |
|--|-------------------|---------------------------------------|--------------|--------------|--------------|--------------|
| Effective mean pressure at: | ICFN Power 256 kW | MPa psi | 1.60 232 | 1.34 194 | 1.20 174 | 1.14 166 |
| Max combustion pressure at: | ICFN Power 256 kW | MPa psi | 14.3 2074 | 14.3 2074 | 14.1 2045 | 13.7 1987 |
| Total mass moment of inertia, J (mR ²) | | kgm ² lbft ² | 3.43 81.4 | | | |
| Friction Power | | kW hp | 30 41 | 43 58 | 54 73 | 60 82 |
| Derating see Technical Diagrams | | | | | | |

Cold start performance

| | | | | |
|--|--|-----------------------------------|----------------------|--|
| *Cold start ambient temperature limit and time from start to no load speed | without starting aid | °C / sec. °F / sec. | 20 68 | 3s |
| | with manifold heater 4 kW | °C / sec. °F / sec. | -5 23 | 4s |
| | with manifold heater 4 kW and block heater | °C / sec. °F / sec. | -15 5 | 4.5s |
| *Specify oil and fuel quality | Mk1 fuel, VDS2 oil. 15w40 above -15°C, 10w30 below -15°C | | | |
| Usage of manifold heater: | Time preheating, minutes | Time post heating, minutes | | |
| | | | | |
| Block heater type | Make | Power kW | Engaged hours | Cooling water temp engine block |
| | Volvo | 2 | 12 | 10°C 50°F |

* See also general section in the Sales Support Tool

Lubrication system

| | | | | |
|--|-------|-------------------|----------|-----------|
| Lubrication system | | | | |
| Lubricating oil consumption at max rpm at: | | ICFN Power 256 kW | liter/h | 0.02 |
| | | | US gal/h | 0.005 |
| | | ICFN Power 256 kW | liter/h | 0.02 |
| | | | US gal/h | 0.005 |
| Oil system capacity including filters | | | liter | 36 |
| | | | US gal | 9.51 |
| Oil sump capacity: | | Max | liter | 30 |
| | | | US gal | 7.93 |
| | | Min | liter | 19 |
| | | | US gal | 5.02 |
| Oil change intervals/specifications | VDS 3 | | h | 600 |
| | VDS 2 | | h | 400 |
| | | | h | |
| Engine angularity limits: | | front up | ° | 11 |
| | | front down | ° | 11 |
| | | side tilt | ° | 11 |
| Oil pressure at rated speed | | | kPa | 300 - 650 |
| | | | psi | 44 - 94 |
| Oil pressure shut down switch setting | | | kPa | N/A |
| | | | psi | |

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Lubrication system

| | | | |
|--------------------------------------|-----|----|-----|
| Lubrication oil temperature in sump: | max | °C | 130 |
| | | °F | 266 |
| Oil filter micron size | | μ | 40 |

Fuel system

| | | rpm | 1500 | 1800 | 2000 | 2100 |
|---|------|--------|---|-------|-------|-------|
| ICFN Power 256 kW Specific fuel consumption at: | 25% | g/kWh | 235 | 272 | 296 | 314 |
| | | lb/hph | 0.381 | 0.441 | 0.480 | 0.509 |
| | 50% | g/kWh | 204 | 220 | 234 | 244 |
| | | lb/hph | 0.331 | 0.357 | 0.379 | 0.396 |
| | 75% | g/kWh | 195 | 206 | 217 | 224 |
| | | lb/hph | 0.316 | 0.334 | 0.352 | 0.363 |
| | 100% | g/kWh | 191 | 202 | 211 | 217 |
| | | lb/hph | 0.310 | 0.327 | 0.342 | 0.352 |
| Fuel to conform to | | | ASTM-D975-No1 and 2D JIS KK 2204, EN 590 | | | |

Fuel system

| | | |
|---|-----------------|------|
| System supply flow at max. speed | liter/h | 100 |
| | US gal/h | 26.4 |
| Fuel supply line max. restriction (Measured at fuel inlet connection) | kPa | 10 |
| | psi | 1.5 |
| Fuel supply line max. pressure, engine stopped | kPa | 0 |
| | psi | |
| System return flow at max. speed | liter/h | 18.0 |
| | US gal/h | 4.8 |
| Fuel return line max. restriction (Measured at fuel return connection) | kPa | 20 |
| | psi | 2.9 |
| Max. allowable inlet fuel temp (Measured at fuel inlet connection) | °C | 60 |
| | °F | 140 |
| Prefilter / Water separator micron size | μ | 10 |
| Fuel filter micron size | μ | 5 |
| Governor type/make, standard | Volvo / EMS 2.2 | |
| Injection pump type/make | Delphi E3 | |

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| Intake and exhaust system | | Inlet air temp | rpm | 1500 | 1800 | 2000 | 2100 |
|---|-------------------|----------------|---|----------------|--------------|--------------|-----------|
| Air consumption at: (+25°C and 100kPa) | ICFN Power 256 kW | 25°C 77°F | m³/min cfm | 21 742 | 25 883 | 27 954 | 27 954 |
| Max allowable air intake restriction including piping | | | kPa psi | 3 0.4 | | | |
| Heat rejection to exhaust at: | ICFN Power 256 kW | kW BTU/min | 170 9668 | 181 10293 | 192 10919 | 200 11374 | |
| Exhaust gas temperature after turbine at: | ICFN Power 256 kW | °C °F | 380 716 | 350 662 | 347 657 | 359 678 | |
| Max allowable back pressure in exhaust line | | | kPa psi | 10 1.5 | 12 1.7 | 14 2.0 | 15 2.2 |
| Exhaust gas flow at: (temp and pressure after turbine at the corresponding power setting) | ICFN Power 256 kW | m³/min cfm | 46 1624 | 50 1766 | 52 1836 | 54 1907 | |
| | | m³/min cfm | | | | | |
| Exhaust gas smoke | ICFN Power 256 kW | *Bosch | 0.1 | 0.2 | 0.2 | 0.3 | |
| Heat rejection radiation from engine at: | ICFN Power 256 kW | kW BTU/min | 13 728 | 13 728 | 12.8 728 | 12.8 728 | |
| Heat rejection to coolant at: | ICFN Power 256 kW | kW BTU/min | 99 5630 | 106 6028 | 117 6654 | 122 6938 | |
| Coolant | | | Volvo Penta coolant "ready mix" or Volvo Penta coolant mixed with clean fresh water 40 / 60 | | | | |
| Radiator cooling system type | | | | Closed circuit | | | |
| Standard radiator core area | | | m² foot² | 0.8 8.61 | | | |
| Fan diameter | 890 mm | | mm in | 890 35.04 | | | |

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| Cooling system | | rpm | 1500 | 1800 | 2000 | 2100 |
|---|--------------------------------|-----------------|---------------|------------|------------|------------|
| Fan power consumption | 890 mm | kW hp | 6.0 8 | 10.0 14 | 14.0 19 | 16.0 22 |
| Fan drive ratio | fan Ø890 | | 0,84 : 1 | | | |
| Coolant capacity: | engine | liter US gal | 20 5.3 | | | |
| | std. 0,8m² radiator with hoses | liter US gal | 24 6.3 | | | |
| Coolant pump | | drive/ratio | Belt / 1.43:1 | | | |
| Coolant flow with standard system | | l/s US gal/s | | | | |
| Minimum coolant flow | | l/s US gal/s | 4.7 1.2 | 5.7 1.5 | 6.0 1.6 | 6.2 1.6 |
| Maximum outer circuit restriction incl. piping | | kPa psi | 65.0 9.4 | | | |
| Thermostat: | start to open | °C | 82 | | | |
| | | °F | 180 | | | |
| | fully open | °C | 92 | | | |
| | | °F | 198 | | | |
| Maximum static pressure head (expansion tank height + pressure cap setting) | | kPa psi | 100 14.5 | | | |
| Minimum static pressure head (expansion tank height + pressure cap setting) | | kPa psi | 70 10.2 | | | |
| Standard pressure cap setting | | kPa psi | 70 10.2 | | | |
| Maximum top tank temperature | | °C °F | 107 225 | | | |
| Draw down capacity. The difference between min coolant level in the expansion tank and the lowest level where the engine's coolant system still are functioning | with std. 0,8 m² radiator | liter US gal | 1.8 0.5 | | | |
| | | liter US gal | | | | |
| | | | | | | |

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| Charge air cooler system | | rpm | 1500 | 1800 | 2000 | 2100 |
|--|-------------------|---------|-------|------|------|------|
| Heat rejection to charge air cooler | ICFN Power 256 kW | kW | 48 | 56 | 63 | 68 |
| | | BTU/min | 2730 | 3185 | 3583 | 3867 |
| Charge air mass flow | ICFN Power 256 kW | kg/s | 0.42 | 0.49 | 0.53 | 0.54 |
| | | kg/s | 0.42 | 0.49 | | |
| Charge air inlet temp. (Charge air temp after turbo compressor) | ICFN Power 256 kW | °C | 157 | 163 | 170 | 170 |
| | | °F | 315 | 325 | 338 | 338 |
| Charge air outlet temp. (Charge air temp after charge air cooler) | ICFN Power 256 kW | °C | 40 | 43 | 45 | 45 |
| | | °F | 104 | 109 | 113 | 113 |
| Maximum pressure drop over charge air cooler incl. piping | | kPa | 8 | | | |
| | | psi | 1.16 | | | |
| Charge air pressure (After charge air cooler) | | kPa | 177 | | | |
| | | psi | 25.67 | | | |
| Standard charge air cooler core area | | m² | 0.8 | | | |
| | | foot² | 8.61 | | | |

Cooling performance: 0.8 m² radiator and 890 mm fan

Cooling air flow and maximum additional external restriction at different radiator air temperatures based on 103°C TTT and 40% coolant. Valid at 1 atm.

| | | ICFN Power 256 kW | | | | | |
|----------------|--------------|-------------------|-----|-------------------|--------------------|----------------------|-------|
| Engine speed | Engine power | Air on temp | | Air flow | | External restriction | |
| rpm | kW hp | °C | °F | m ³ /s | ft ³ /s | Pa | psi |
| 2100 (0,84) | 256 | 65 | 149 | 6.4 | 226.0 | 532 | 0.077 |
| | 348 | 68 | 154 | 7.2 | 254.3 | 289 | 0.042 |
| | | 71 | 160 | 7.9 | 279.0 | 0 | |
| 1800 (0,84) | 256 | 65 | 149 | 5.4 | 190.7 | 385 | 0.056 |
| | 348 | 68 | 154 | 6.1 | 215.4 | 180 | 0.026 |
| | | 71 | 160 | 6.7 | 236.6 | 0 | |

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Engine management system

| Functionality | Alternatives | Default setting |
|---------------------|----------------------------------|-----------------|
| Governor mode | Isochronous / Droop | |
| Governor droop | 0-8 % | |
| Governor response | Adjustable PID-constants (VODIA) | Standard |
| Idle speed | 600-1200 | |
| Stop function | Energized to Run / Stop | |
| Preheating function | On / Off | |
| Lamp test | On / Off | |
| | | |
| | | |

| Engine sensors and switch settings | | | Alarm level | | Engine protection | |
|--------------------------------------|-------------|------|------------------------------|------------------------|-------------------|---|
| Parameter | | Unit | Setting range | Default setting | Level | Action. Default/Alternative |
| Oil temp | | °C | 120 - 130 | 125 | Setting +5 | Shut down. ON/OFF* |
| Oil pressure | Low idle | kPa | - | 150 | -20 | Shut down. ON/OFF* |
| | Rated speed | kPa | - | 250 | -20 | Shut down. ON/OFF* |
| Oil level | | | - | Min level | - | - |
| Piston cooling pressure >1000 rpm | | kPa | - | 150 | 150 | Shut down. ON/OFF* |
| Coolant temp | | °C | 95 - 102 | 102 | Setting +5 | Shut down. ON/OFF* |
| Coolant level | | | See cooling system | On | Low level | Shut down. ON/OFF* |
| Fuel feed pressure | Low idle | kPa | - | 100 | - | - |
| | >1300 rpm | | - | 300 | - | - |
| Water in fuel | | | - | High level | - | - |
| Crank case pressure | | kPa | - | - | Rapid pres inc | Shut down. ON/OFF* |
| Air filter pressure drop | | kPa | - | 5 | - | - |
| Altitude, above sea | | m | - | - | - | Automatic derating, see section derating |
| Charge air temp | | °C | - | 80 | 85 | Shut down. ON/OFF* |
| Charge air pressure** | | kPa | - | 310 | +10 | Shut down. ON/OFF* |
| Engine speed | | rpm | 100 - 120% of rated speed | 120% of rated speed | Alarm level | |
| | | | | | | |

* Off means no shut down, alarm only

** Pabs, 2100 rpm at sea level.

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Electrical system

| | | | |
|-------------------------------------|---------------|--------------------|----------------------------|
| Voltage and type | | | 24V / insulated from earth |
| Alternator: | make | | Bosch |
| | output | A | 80 |
| | tacho output | Hz/alternator rev. | 6 |
| | drive ratio | | 5,3:1 |
| Starter motor: | make | | Melco |
| | type | | 105P70 |
| | output | kW | 7 |
| | | hp | 9.5 |
| Number of teeth on: | flywheel | | 153 |
| | starter motor | | 12 |
| Max wiring resistance main circuit | | mΩ | 2 |
| Cranking current at +20°C | | A | 180 |
| Crank engine speed at 20°C | | rpm | 155 |
| Starter motor battery capacity | max | Ah/A | 2x225 |
| | min at +5°C | Ah/A | - |
| Inlet manifold heater (at 20 V) | | kW | 4 |
| Power relay for the manifold heater | | A | 1 |

Power take off

| | | |
|---|--------|------------------|
| Timing gear at compressor PTO max: | Nm | 160 |
| | lbf ft | 118 |
| Speed ratio direction of rotation viewed from flywheel side | | 0,91:1/clockwise |
| Timing gear at servo pump PTO max: | Nm | 100 |
| | lbf ft | 74 |
| Speed ratio direction of rotation viewed from flywheel side | | 1,58:1/clockwise |
| Max allowed bending moment in flywheel housing | Nm | 15000 |
| | lbf ft | 11063 |
| Max. rear main bearing load | N | 4000 |
| | lbf | 899.2 |