

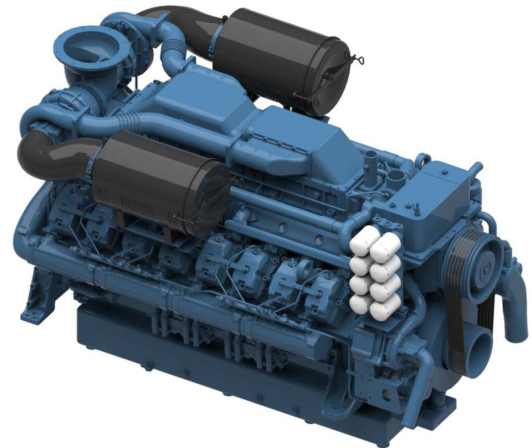
List of Parameters of YC16VTD2270-D30 G-Drive Diesel Engine

Version: 2021V01 Implementation May. 1, 2021

YC16VTD2270-D30

Prime power: 1520 kW @ 1500 r/min

Standby power: 1672 kW @ 1500 r/min



Definitions

Prime Power

It corresponds to the prime rated power (PRP) of GB/T 2820 and ISO 8528, and refers to the maximum power accessible at the variable load for unlimited running hours per year, with the maintenance intervals and procedures being carried out as prescribed by Yuchai. The allowed average output power within 24 h shall not be higher than 70% of the prime power.

Standby Power

It corresponds to the emergency standby power (ESP) of GB/T 2820 and ISO 8528, and refers to the maximum power accessible at a certain variable load series in the event of a utility power outage or under test conditions for limited running hours up to 200h, with the maintenance intervals and procedures being carried out as prescribed by Yuchai. The allowed average output power within 24 h shall not be higher than 70% of the prime power.

Main technical parameters

| | |
|---|---|
| Number of cylinders | 16 |
| Configuration | V, 90° |
| Aspiration | Turbocharged, water-air intercooled |
| Combustion system | Direct injection |
| Compression ratio | 14:1 |
| Bore | 152 mm |
| Stroke | 180 mm |
| Displacement | 52.26 L |
| Rotation | Counterclockwise (viewed from the flywheel end) |
| Firing order: | |
| A1-B6-B4-A6-A4-B7-A3-B8-B2-A8-A2-B5-B3-A5-B1-A7 Viewed from the back end: numbered starting from 1, with A for left side, and B for right side. | |
| Dry weight (excluding radiator) | 5600 kg |
| Wet weight (excluding radiator) | 6050 kg |

Overall dimensions

| | |
|---|----------|
| Length (from the fan to the flywheel housing) | 2,800 mm |
| Width | 1,700 mm |
| Height | 1,950mm |

Gravity center coordinate (dry engine, with the center of the end face of the flywheel shell as the origin)

| | |
|---|--------|
| From the rear end face of the flywheel. | 1043mm |
| Height relative to the center of the crankshaft | 172 mm |
| Centerline deviation relative to the crankshaft center gravity .. | -11mm |

Shafting rotation inertia

| | |
|----------------|-------------------------|
| Engine | 18.63 kg·m ² |
| Flywheel | 11.34 kg·m ² |

Performance rating

| | |
|------------------------------|--------------------|
| Speed drop | 0.3% |
| Speed fluctuation rate | 0.5% |
| Speed governing type | Electronic control |

Test conditions

| | |
|--|---------|
| Ambient temperature | 25℃ |
| Atmospheric pressure | 100 kPa |
| Relative humidity | 30% |
| Max. operating intake resistance | ≤5 kPa |
| Exhaust backpressure limit | ≤10 kPa |
| Fuel temperature (fuel inlet pump) | 38±2℃ |

Note: Unless otherwise specified, the data of this list of parameters are measured under these test conditions. If the engine is used under other test conditions other than those described above, proper adjustment shall be made according to the actual environment. For specific details, please contact Yuchai technical service department.

Matching parameters

| Designation | Unit | Matching parameters | |
|--|---------------------|---------------------|-------|
| | | Standby | Prime |
| | | 50 Hz @ 1500 r/min | |
| Gross engine power | kW | 1672 | 1520 |
| Net engine power | kW | 1597 | 1445 |
| Fan power consumption (belt pulley driven) | kW | 73 | 73 |
| Other power loss | kW | 2 | 2 |
| Mean effective pressure | MPa | 2.56 | 2.33 |
| Intake air flow | m ³ /min | 113 | 102 |
| Exhaust temperature limit (after turbocharger) | °C | 550 | 550 |
| Exhaust flow | m ³ /min | 268.5 | 244.7 |
| Boost pressure ratio | | 3.49 | 3.17 |
| Thermal efficiency | % | 40.0 | 41.0 |
| Mean piston speed | m/s | 9 | 9 |
| Coolant flow (high temperature) | L/min | 1230 | 1230 |
| Coolant flow (low temperature) | L/min | 720 | 720 |
| Cooling fan air flow | m ³ /min | 2888 | 2888 |
| Typical gen-set electrical output (power factor:0.8) | kW | 1500 | 1350 |
| | kVA | 1875 | 1688 |
| Assumed generator efficiency | % | 95.0 | 95.0 |

Energy balance parameters

Note: The calorific value of diesel is 42,770 kJ/kg

| Designation | Unit | Energy balance parameters | |
|--|------|---------------------------|-------|
| | | Standby | Prime |
| | | 50 Hz @ 1500 r/min | |
| Total fuel chemical energy | kW | 4072 | 3702 |
| Output power (gross) | kW | 1672 | 1520 |
| Output power (net) | kW | 1597 | 1445 |
| Fan power consumption | kW | 73 | 73 |
| Other power loss | kW | 2 | 2 |
| Heat dissipation capacity(coolant circulation) | kW | 792 | 721 |
| Heat dissipation capacity(intake intercooled system) | kW | 373 | 336 |
| Heat dissipation of exhaust | kW | 1103 | 1006 |
| Heat dissipation of thermal radiation | kW | 132 | 119 |

The heat dissipations of Yuchai engine at an ambient temperature of 40°C are shown below: (softened water bench test data)

| Designation | Unit | Energy balance parameters | |
|--|------|---------------------------|-------|
| | | Standby | Prime |
| | | 50 Hz @ 1500 r/min | |
| Total fuel chemical energy | kW | 4131 | 3738 |
| Output power (gross) | kW | 1672 | 1520 |
| Output power (net) | kW | 1597 | 1445 |
| Fan power consumption | kW | 73 | 73 |
| Other power loss | kW | 2 | 2 |
| Heat dissipation capacity(coolant circulation) | kW | 798 | 732 |
| Heat dissipation capacity(intake intercooled system) | kW | 386 | 343 |
| Heat dissipation of exhaust | kW | 1137 | 1021 |
| Heat dissipation of thermal radiation | kW | 138 | 122 |

Cooling system

| | |
|---|---------|
| Total coolant capacity | 547 L |
| Engine coolant capacity.High temperature: 140 L, low temperature: 30 L | |
| Radiator coolant capacityHigh temperature: 182 L, low temperature: 162 L | |
| Pipeline coolant capacity | 40 L |
| Max. water outlet temperature of engine (high temperature water passage)..... | ≤97°C |
| Max. outlet temperature of engine (low temperature water passage)..... | ≤65°C |
| Pressure difference between inlet and outlet of water pump (max. hydrostatic head)..... | 150 kPa |
| Thermostat operation temperature | |
| Initial opening temperature (75±2)°C, full opening temperature (85±2)°C | |
| Max. water temperature rise: | |
| - Standby power | 13°C |
| - Prime power | 12°C |

High temperature radiator

| | |
|---------------------------------------|--------------------|
| Cooling area | 665 m ² |
| Dry weight | 920 kg |
| Material..... | Aluminum |
| Number of lines | /line |
| Density of core | cooling fins/inch |
| Width of core | 2220 mm |
| Height of core | 2200 mm |
| Min. pressure of pressure cover | (90±5) kPa |
| Resistance limit | 25 kPa |

Low temperature radiator

| | |
|------------------------|-------------------|
| Cooling area | 616m ² |
| Material..... | Aluminum |
| Number of lines | .Line |
| Density of core | cooling fins/inch |
| Width of core | 2220mm |
| Height of core | 2200 mm |
| Resistance limit | 15 kPa |

Water pump

| | |
|----------------------|------------|
| Rotation speed. | 2,813 r/in |
| Drive mode..... | Gear drive |

Fan

| | |
|------------------|----------|
| Diameter..... | 1,700 mm |
| Gear ratio | 1:0.73 |

| | |
|------------------------|--------------|
| Material | Nylon |
| Number of blades | 8 |
| Blowing/suction | Blowing type |

Intake system

Air cleaner

| | |
|---------------------------|-------------------|
| Max. intake resistance: | |
| - Clean air cleaner | 3.5 kPa |
| - Dirty air cleaner | 5 kPa |
| - Air cleaner type | Dry paper element |

Inclination

| | |
|---|-------|
| Transverse inclination/longitudinal inclination (oil sump capacity: 280 L)..... | 5°/5° |
|---|-------|

Fuel system

| | |
|-----------------------|---------------------------|
| Injection system..... | High pressure common rail |
|-----------------------|---------------------------|

Fuel injector

| | |
|--------------------------------------|--|
| Type | Electronically-controlled injector, multi-hole injection |
| Fuel injector opening pressure | Electronically-controlled |

Fuel pump

| | |
|---|------------|
| Drive mode..... | Gear drive |
| Fuel delivery pump flow @ 1,500 rpm | 8.5 L/min |
| Max. fuel inlet temperature limit..... | 70°C |

| | |
|--|--------------|
| Allowed fuel inlet pressure (absolute pressure) at the front end of fuel delivery pump | (50~100) kPa |
|--|--------------|

| | |
|---|--------|
| Max. fuel return pressure of fuel pump..... | 30 kPa |
|---|--------|

Fuel filter

Primary filter

| | |
|--|----------|
| Rated flow | 30 L/min |
| Max. original resistance..... | 7 kPa |
| Water separation efficiency under rated flow | ≥95% |

Filtration efficiency:

| | |
|-----------------------------|------|
| For particles of 25 µm..... | 99% |
| For particles of 10 µm..... | 85 % |

Secondary filter

| | |
|-------------------------------|----------|
| Rated flow | 60 L/min |
| Max. original resistance..... | 10 kPa |

Filtration efficiency:

| | |
|-----------------------------|-------|
| For particles of 10 µm..... | 99.6% |
| For particles of 3 µm..... | 98.5% |

Fuel consumption

Note: The diesel density is 0.835 kg/L.

| Conditions | 1500 r/min | |
|--------------------|------------|-------|
| | g/ (kW·h) | L/h |
| Standby power | 211.1 | 422.7 |
| Prime power | 205.7 | 374.4 |
| 75% of prime power | 207.2 | 282.9 |
| 50% of prime power | 216.7 | 197.2 |

Lubricating system

Total oil capacity (dry engine) 310 L
 Total oil capacity (oil change) 280 L
 Oil sump capacity - low level/high level 176/280 L
 Max. oil temperature (oil sump)..... 120°C
 Operating oil temperature (oil sump)..... (90~115)°C
 Oil pressure at idle speed..... ≥120 kPa
 Oil pressure at rated speed (250~500) kPa
 Engine oil-fuel consumption ratio ≤0.3 %

Oil filter

The filtering efficiency at the rated flow of 60 L/min and the assembly initial resistance ≤25 kPa:

15 μm ≤ Particle size < 20 μm >75%;
 20 μm ≤ Particle size < 30 μm >95 %;
 30 μm ≤ Particle size < 40 μm >99 %;
 Particle size ≥ 40 μm >99.9999%;

Electric system

Type Negative grounding

Charging alternator 24 V

Voltage 28 V
 Output current 55 A

Starter (24 V/12 V)

Type Electric start, 2

Voltage 24 V
 Power 8.5 kW
 Number of flywheel teeth 141
 Number of starter teeth 10

Cold start (test data, for reference only)

| 24V | | | | | |
|--|-------|-----|-----|-----|-----|
| Battery specification × quantity 12 V/195 Ah×4 | | | | | |
| Starting temperature | °C | -15 | -20 | -25 | -30 |
| Starting speed | r/min | / | / | / | / |
| Starting current | A | / | / | / | / |
| Starting voltage | V | / | / | / | / |
| Starting time | s | / | / | / | / |
| Preheating time | s | / | / | / | / |

Auxiliary intake heater

Type N/A
 Specification N/A

Water preheater

Recommended specification 2×5 kW/220 V
 Engine preheater water outlet interface..... 2×Φ20
 Engine preheater water inlet interface..... 2×NPT 1

Oil heater

Recommended specification 500W/220V
 Interface (oil sump, 2)..... M22×1.5

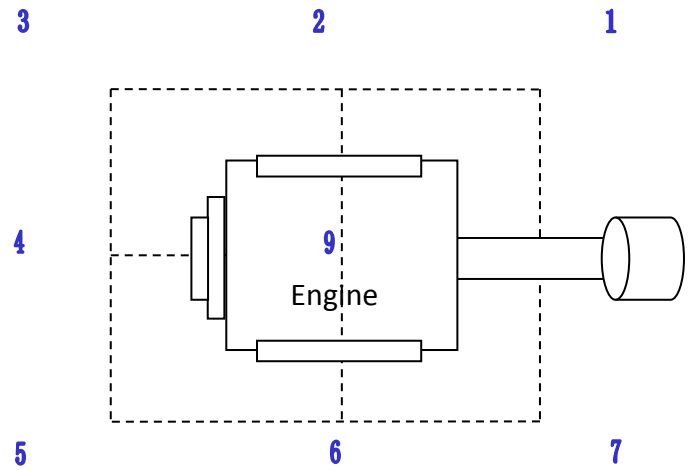
Exhaust system

Max. exhaust backpressure..... 10 kPa
 Inner diameter of exhaust port..... Φ300 mm

Noise

Noise data (1520 kW @ 1,500 r/min)

| Position | Sound pressure level Lp, dB(A) |
|----------|--------------------------------|
| 1 | 101.4 |
| 2 | 103.2 |
| 3 | 102.3 |
| 4 | 104.1 |
| 5 | 102.0 |
| 6 | 104.3 |
| 7 | 101.0 |
| 8 | 102.8 |
| 9 | 104.4 |



Noise spectrum (1520 kW @ 1,500 r/min)

| Frequency, Hz | Noise, dB(A) |
|---------------|--------------|
| 63 | 69.3 |
| 125 | 71.5 |
| 250 | 82.0 |
| 500 | 88.2 |
| 1K | 91.3 |
| 2K | 91.7 |
| 4K | 91.5 |
| 8K | 97.0 |