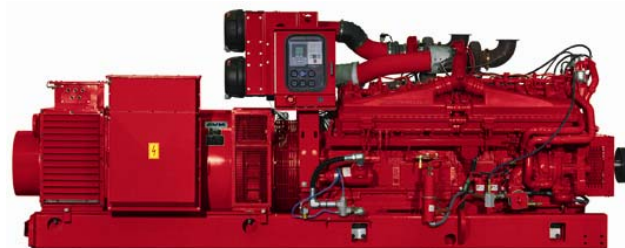


QSK50 Land Based Drilling Power Modules



Description

Cummins® Land Based Drilling Power Modules are designed and tested based on oil field customer requirements to provide optimum performance, reliability, and versatility for oil and gas land drilling applications.

General specifications

V-16, 4 Stroke Diesel

Bore	159 mm
Stroke	159 mm
Displacement	50.3 L
Aspiration	Turbocharged and aftercooled
Governor	Electronic
Cooling system	Vertical or horizontal discharge options
Weight w/o radiator	29,500 lbs (13,385 kg)
Cooling system capacity	Vertical: 117 gallons Horizontal: 110 gallons
Lube oil capacity	72 gal (272 liter)
Base design	Three point mounting
Alternator rotor design	Two bearing
Alternator insulation	Class H
Voltage	600 V
Power factor	0.7

Rating details

Model	Frequency	Voltage	Speed RPM	Engine power HP (kWm)	Alternator rating*
DQGAC	60	347/600	1200	1480 (1104)	1750 kVA (1225 kW @ 0.7 pf)

Rating description

These modules are to be used in continuous operation at varying load land drilling applications where maximum power is needed for short periods of time during initial starting or sudden overload. Refer to engine data sheet for additional information.

Features

Single source supplier - The entire power module is designed and manufactured in facilities certified to ISO9001 or ISO9002.

Cummins heavy-duty engine - Rugged 4-cycle industrial diesel delivers reliable power, low emissions, and fast response to load changes.

Alternator - Form wound stator and rotor; designed, tested and sized for drill rig service; 5/6 pitch windings; low waveform distortion with non-linear loads; fault clearing short-circuit capability.

Control system - Engine monitoring and shutdown functions with easy to read analog gauges for critical parameters and a digital display for alarm and status message display.

Testing and validation - Prototype tested to verify computer aided designs, confirm torsional stability, and system functionality. Every Cummins engine is dynamometer tested to ensure optimal engine performance.

Low exhaust emissions - Engine certified to U.S. EPA Nonroad Source Emissions Standards, 40 CFR 89, Tier 2.

Warranty and service - Backed by a comprehensive warranty and worldwide distributor network.

Web - www.CumminsOilandGas.com

Standard equipment

Air inlet system

Factory installed heavy duty air cleaners
Factory installed air inlet shutoff valve

Control system

Electronic power module monitoring

Cooling system

Base mounted radiator
Corrosion resistant coating for jacket water and aftercooler cores
Dual core
Horizontal and vertical discharge systems available
Ambient capability up to 50 °C at rated power output
Thermostat controlled outlets
Gear driven jacket water pump
Dual outlet
Aftercooler centrifugal pump

Exhaust system

Dry gas-tight exhaust manifolds
Dual turbochargers
Vertical exhaust outlet
Flanged Exhaust fittings

Fuel system

Direct Injection Cummins MCRS system for increased reliability
Skid Mounted Fuel filters
Pre-filtering system available

Instrumentation

Electronic instrument panel - left side
DC Power, warning and shutdown indicators

Analog gauges

Oil pressure
Fuel filter differential
Exhaust temperature (Left and Right Bank)
Jacket Water Temperature
Aftercooler Water Temperature
Engine speed

Digital display

Air cleaner restriction warning
Hours
Warning and shutdown information
Fault history
Fuel consumption

Starting system

Ingersoll Rand - 90 to 150 PSI

Lube oil system

Crankcase breather - top mounted
High capacity structural oil pan
Oil filler and dipstick
Oil filter - spin-on type

Protection system

PowerCommand monitoring system provides warning or engine shutdown strategies to protect against adverse operating conditions.

Safety shutoff protection - electrical

Oil pressure
Water temperature
Overspeed
Aftercooler temperature
Air inlet shutoff activated on overspeed or emergency stop

Alarms - electrical

Oil pressure
Coolant temperature (low and high)
Overspeed
Aftercooler temperature
Low coolant level
Air inlet restriction
Exhaust stack temperature
Fuel filter differential pressure

Emergency stop

Instrument panel mounted - pushbutton type
Remote - capable

Mounting arrangement

Inner rail system
Engine and generator mounting groups
Three-point mounted to sub-base
Vibration isolators at mounting points
Lift provisions on base

Generator

Two-bearing, 600 V, 60 Hz, 3-phase, 0.7 pf, 6 wire,
Wye connected
Brushless type
Standard anti-condensation heater
Standard winding RTDs
Standard bearing RTDs

Flywheels and flywheel housings

Flywheel - SAE 21
Flywheel housing - SAE No. 00
Coupling and generator hub

Power module specification

Governor regulation class	ISO8528 Part 1 Class G3
Voltage regulation, no load to full load	± 0.5%
Random voltage variation	± 0.5%
Frequency regulation	Isochronous
Random frequency variation	± 0.25%

Engine

Engine manufacturer	Cummins Inc.
Model	QSK50 - DR1480
Design	4 cycle, V-block, turbocharged and after-cooled
Cylinder block configuration	Cast iron, 60°V, 16 cylinder
Aspiration	Turbocharged and low temperature aftercooled
Gross engine power output	1480 hp (1104 kW _m)
Displacement	50.3 liter (3087 in ³)
Fuel system	Direct injection: number 2 diesel fuel
Fuel filter	Triple element, 10 micron filtration, spin on fuel filters with water separator
Standard cooling system	50 °C high ambient radiator with vertical or horizontal airflow discharge
Engine speed	1200 rpm
Brake mean effective pressure	2193 kPa (318 psi)
Compression ratio	15.0:1
Piston speed	6.3 m/s (1250 ft/min)

Fuel system

Injection system	Cummins MCERS
Maximum fuel inlet restriction	Clean filter - 5.0 in Hg (16.9 kPa)
Maximum fuel flow to injection pump	150 gal/hr (568 liter/hr)
Maximum return restriction	10 in Hg (33.8 kPa)

Air

Intake combustion airflow	88.5 m ³ /min (3125 scfm)
Maximum air cleaner restriction	15 in H ₂ O (3.7 kPa)

Exhaust

Exhaust gas flow	163 m ³ /min (5760 scfm)
Exhaust gas temperature	920 °F (495 °C)
Max exhaust backpressure	6.7 kPa (27 in. H ₂ O)

Radiated heat performance

Radiated heat to ambient	115 kWm (6340 BTU/min)
Exhaust heat rejection	905 kWm (51250 BTU/min)
Aftercooler heat rejection	260 kWm (14710 BTU/min)
Jacket water (JW) heat rejection	425 kWm (24015 BTU/min)

Cooling

Ambient design	50 °C (122 °F)
Fan load	Vertical: 50 HP, horizontal: 49 HP
Coolant capacity with radiator	Vertical: 117 gallons, horizontal: 110 gallons
Cooling system air flow	Vertical: 47458 CFM, horizontal: 58367 CFM
Maximum air flow static restriction	Vertical: no additional external restriction allowed, horizontal: 0.75 inches of Water
Jacket water (JW) flow at max friction head	300 gpm (18.9 liter/sec)
Maximum friction head (JW)	10 psi (67 kPa)
Aftercooler water flow at max friction head	90 gpm (5.7 liter/sec)
Maximum friction head (aftercooler)	5 psi (34.4 kPa)

Alternator specifications

Alternator manufacturer	Cummins Generator Technologies
Design	Brushless, 6 pole, revolving field
Stator	5/6 pitch
Rotor	2-bearing
Insulation system	Class H
Temperature rise	80 °C over 50 °C
Alternator cooling	Direct drive centrifugal blower fan
AC waveform total harmonic distortion	< 5% no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 50 per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3

Technical data

Rating	1750 kVA (1225 kWe)
Power factor	0.70
Voltage (line-neutral/line-line)	347/600 V
Current	1605 A
Frequency	60 Hz
Poles	6
Speed	1200 rpm
Overspeed limit (60 seconds)	125%
Enclosure	IP23 with air inlet filter

Efficiencies

Power factor	25% Load PU	50% Load PU	75% Load PU	100% Load PU
0.7	92.42	94.54	95.35	95.36
0.8	92.56	94.77	95.67	95.77
0.9	92.71	95.00	95.99	96.18
1.0	92.85	95.23	96.31	96.59

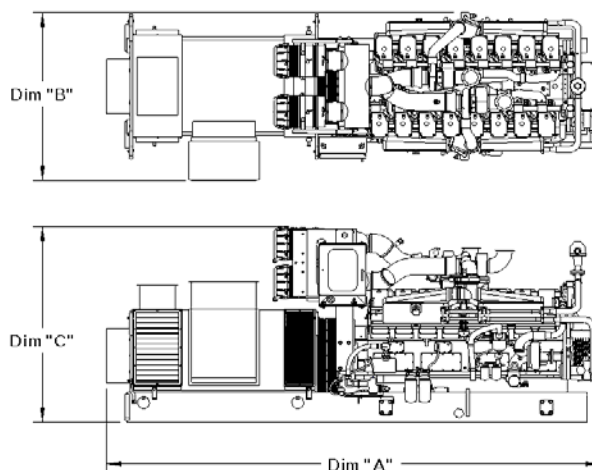
Time constraints (seconds)

OC Transient — direct axis	T'DO	2.35
SC Transient — direct axis	T'D	0.31
SC Subtransient — direct axis	T"D	0.015

Reactances (per unit)

	Saturated	Unsaturated
Subtransient direct axis	X"D 0.140	0.154
Subtransient quadrature axis	X"Q 0.154	0.154
Transient direct axis	X'D 0.230	0.230
Transient quadrature axis	X'Q 0.85	0.88
Synchronous direct axis	XD 1.59	1.77
Synchronous quadrature axis	XQ 0.85	0.88
Negative sequence	X2 0.148	0.162
Zero sequence	X0 0.042	0.046

This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number. Do not use for installation design



Dimensions and weights (without cooling system)

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set dry weight* kg (lbs)	Set wet weight* kg (lbs)
DQGAC	5159(203.1)	2040(80.3)	1756(69.1)	13154 (29000)	14061 (31000)

Note: Weights represent a set with standard features. See outline drawings for weights of other configurations.

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