

CUMMINS ENGINE COMPANY, INC.

PRELIMINARY

Engine Data Sheet

Number: DS-4423

Date: August, 1986

ENGINE MODEL(S): KTA38-C
MAXIMUM RATING: 1200 HP at 1900RPM
 895 kW at 1900RPM
CONTINUOUS RATING: 855 HP at 1800RPM
 638 kW at 1800RPM

REFERENCE INFORMATION:
CONFIGURATION NUMBER(S) D233026CX02
CPL NUMBER (DRY MANIFOLD) 0859
CPL NUMBER (WET MANIFOLD)
PERFORMANCE CURVE NUMBER P-4423
INSTALLATION DIAGRAM NUMBERS:
 FAN TO FLYWHEEL
 RADIATOR COOLED

GENERAL ENGINE DATA

Type	4 Cycle, 60° Vee, 12 Cylinder
Aspiration	Turbocharged & Aftercooled
Bore — in. (mm) × stroke — in. (mm)	6.25 × 6.25 (159 × 159)
Displacement — in ³ (litre)	2300 (37.8)
Compression Ratio	13.8:1
Dry Weight	
Fan Hub to Flywheel Engine (Ref. Installation Diagram No.) — lb. (kg)	8200 (3723)
Radiator Cooled Engine (Ref. Installation Diagram No.) — lb. (kg)	9625 (4370)
Wet Weight	
Fan Hub to Flywheel Engine (Ref. Installation Diagram No.) — lb. (kg)	8700 (3950)
Radiator Cooled Engine (Ref. Installation Diagram No.) — lb. (kg)	11030 (5008)
C.G. Distance From Front Face of Block (Engine Only) — in. (mm)	32 (813)
C.G. Distance Above Crank Centerline (Engine Only) — in. (mm)	11 (279)
Moment of Inertia of Rotating Components (Excluding Flywheel) — lb-ft ² (kg•m ²)	94 (3.95)
Firing Order	1R-6L-5R-2L-3R-4L 6R-1L-2R-5L-4R-3L

ENGINE MOUNTING

Maximum Allowable Bending Moment at Rear Face of Block — lb-ft (N•m)	4500 (6100)
Moment of Inertia About Roll Axis — lb-ft ² (kg•m ²)	

EXHAUST SYSTEM

Maximum Allowable Back Pressure — in. Hg (mm Hg)	3.0 (75)
Exhaust Pipe Size Normally Acceptable — in. (mm)	6.0 (152)

AIR INDUCTION SYSTEM

Maximum Allowable Intake Air Restriction With Heavy Duty Air Cleaner	
Clean Element — in. H ₂ O (mm H ₂ O)	15 (380)
Dirty Element — in. H ₂ O (mm H ₂ O)	25 (635)
Minimum Allowable Dirt Holding Capacity With Heavy Duty Air Cleaner — gm/CFM (gm-L/s)	25 (53)

COOLING SYSTEM

Coolant Capacity — Engine only — U.S. quart (litre)	125 (118)
— With 100 °F (Option) — U.S. quart (litre)	344 (325)
Maximum Coolant Friction Head External to Engine — PSI (kPa)	5.0 (35)
Maximum Static Head of Coolant Above Engine Crank Centerline — ft (m)	25 (7.6)
Maximum Air Restriction Across Radiator — in. H ₂ O (mm H ₂ O)5 (12.7)
Minimum Raw Water Flow @ 90 °F (32 °C) to Heat Exchanger — U.S. GPM (L/min)	120 (454)
Maximum Raw Water Inlet Pressure at Heat Exchanger — PSI (kPa)	100 (689)
Standard Thermostat (modulating) — Range — °F (°C)	175-195 (80-90)
Maximum Coolant Pressure (Exclusive of Pressure Cap) — PSI (kPa)	35 (241)
Minimum Allowable Pressure Cap — PSI (kPa)	7 (50)
Maximum Allowable Top Tank Temperature — °F (°C)	203 (95)
Minimum Recommended Top Tank Temperature — °F (°C)	160 (70)
Minimum Allowable Fill Rate — U.S. GPM (L/min)	5 (20)
Maximum Allowable Initial Fill Time — min.	5
Minimum Allowable Coolant Expansion Space — % of System Capacity	5
Maximum Allowable Deaeration Time — min.	25
Minimum Allowable Drawdown — U.S. quart (litre)	
(Drawdown Must Exceed the Volume Not Filled at Initial Fill & Must Not Include Expansion Space)	

LUBRICATION SYSTEM

Oil Pressure @ Idle — PSI (kPa)	20 (138) Minimum
@ Rated Speed — PSI (kPa)	45-65 (310-448)
Oil Flow at Rated Speed — U.S. GPM (L/min)	124 (469)
Maximum Allowable Oil Temperature — °F (°C)	250 (120)
Maximum Oil Consumption — U.S. qt/hr (L/hr)	
By-Pass Filter Capacity — Spin-on Cartridge Type — U.S. gal (litre)	2 × 0.7 (2 × 2.6)
— Replaceable Element Type — U.S. gal (litre)	2 × 2.9 (2 × 11.0)
Oil Pan Capacity (Option) High/Low — U.S. gal (litre)	30-23 (114-87)
Total System Capacity (Excluding By-Pass Filter) — U.S. gal (litre)	34.2 (129)
Angularity of Standard Oil Pan (Option) — Front Down	30°
— Front Up	30°

FUEL SYSTEM

Maximum Fuel Consumption at Maximum Rated Output and Speed — lb/hr (kg/hr)	437 (198)
Maximum Fuel Flow to Pump at Maximum Rated Output and Speed — lb/hr (kg/hr).....	1300 (590)
Maximum Allowable Restriction to PT Fuel Pump — With Clean Fuel Filter — in. Hg (mm Hg)	4 (100)
— With Dirty Fuel Filter — in. Hg (mm Hg)	8 (200)
Maximum Allowable Injector Return Line Restriction — With Check Valves — in. Hg (mm Hg)	6.5 (165)
— Less Check Valves — in. Hg (mm Hg)	2.5 (64)
Minimum Allowable Fuel Tank Vent Capability — ft ³ /hr (L/hr)	15 (425)
(With 2.5 in. Hg (63 mm Hg) or Less Back Pressure)	

ELECTRICAL SYSTEM

Minimum Recommended Battery Capacity — Cold Soak at 0°F (-18°C) or Above	<u>12 Volt</u>	<u>24 Volt</u>
Engine Only (De-clutched Load) — Cold Cranking Amperes — CCA	Not Recommended	1800
— Reserve Capacity — min	Not Recommended	640
Engine With Connected Drive Train — Cold Cranking Amperes — CCA	Not Recommended	
— Reserve Capacity — min	Not Recommended	
Maximum Allowable Resistance of Starting Circuit — with 12 volt Starter — Ohms		0.00075
— with 24 volt Starter — Ohms		0.002

PERFORMANCE DATA

Minimum Low Idle Speed — RPM	725
Maximum No-Load Governed Speed — RPM	2400
Maximum Overspeed Capability — RPM	2625
Breakaway Torque at Minimum Unaided Start Temperature — lb-ft (N•m)	
Cranking Torque at Minimum Unaided Start Temperature — lb-ft (N•m)	
Torque Available at Clutch Engagement (800 RPM) — lb-ft (N•m)	2500 (3390)
Minimum Recommended Combined Converter and Hydraulic Stall Speed — RPM	1500
Crankshaft Thrust Bearing Load Limit — Maximum Intermittent — lb (N)	2000 (8896)
— Maximum Continuous — lb (N)	1000 (4448)
Maximum Allowable Power From Front of Crankshaft — HP (kW)	
Maximum Allowable Power From Accessory Drive — HP (kW)	
Estimated Free Field Sound Pressure Level	Right Side — dBA
At 50 ft (15 m) and Full Load Governed Speed	Left Side — dBA
(Excludes Noise From Intake, Exhaust,	Front — dBA
Cooling System and Driven Components)	Rear — dBA
Minimum Ambient Temperature For Unaided Cold Start — °F (°C)	40 (4)
Minimum Cranking Speed Required For Unaided Cold Start — RPM	150

All data is based on the engine operating with fuel system, water pump, lubricating oil pump, air cleaner, and muffler; not included are alternator, compressor, fan, optional equipment and driven components. Data represents gross engine performance capabilities obtained and corrected in accordance with SAE J1349 conditions of 29.61 in Hg (100 kPa) barometric pressure [300 ft. (90 m) altitude], 77 °F (25 °C) inlet air temperature, and 0.30 in. Hg (1 kPa) water vapor pressure with No. 2 diesel fuel or a fuel corresponding to ASTM D2. All data is subject to change without notice.

	MAXIMUM		CONTINUOUS	
	FULL POWER	PEAK TORQUE	FULL POWER	PEAK TORQUE
Engine Speed — RPM	1900	1300	1800	1300
Gross Power Output — BHP (kW)	1200 (895)	863 (644)	960 (716)	725 (541)
Torque — lb-ft (N•m)	3317 (4498)	3485 (4726)	2800 (3797)	2930 (3973)
Fan Power with 100°F (38°C) Radiator — HP (kW)	34 (25)	11 (8.2)	32 (24)	10 (7.5)
with 125°F (52°C) Radiator — HP (kW)	34 (25)	11 (8.2)	32 (24)	10 (7.5)
Nominal Rail Pressure — PSI (kPa)	125 (862)	81 (558)	95 (655)	60 (414)
Intake Manifold Pressure — in. Hg (mm Hg)	43 (1092)	31 (787)	34 (864)	23 (584)
Brake Mean Effective Pressure — PSI (kPa)	217 (1496)	228 (1572)	184 (1268)	192 (1324)
Piston Speed — ft/min (m/s)	1979 (10)	1354 (6.9)	1875 (9.5)	1354 (6.9)
Friction Horsepower — HP (kW)	190 (142)	80 (60)	170 (127)	80 (60)
Intake Air Flow — CFM (L/s)	2350 (1109)	1400 (661)	1855 (876)	1270 (599)
Exhaust Gas Flow — Dry Manifold — CFM (L/s)	6250 (2950)	4080 (1926)	4920 (2322)	3580 (1690)
— Wet Manifold — CFM (L/s)				
Exhaust Gas Temperature — Dry Manifold — °F (°C)	990 (532)	1130 (610)	985 (529)	1080 (582)
— Wet Manifold — °F (°C)				
Heat Rejection to Ambient — Dry Manifold — BTU/min. (kW) ...	11490 (202)	9100 (160)	9000 (158)	7400 (130)
— Wet Manifold — BTU/min. (kW) ...				
Heat Rejection to Coolant — Dry Manifold — BTU/min. (kW) ...	21350 (375)	14400 (253)	20300 (357)	12500 (220)
— Wet Manifold — BTU/min. (kW) ...				
Engine Water Flow — U.S. GPM (L/s)	434 (27)	290 (18)	411 (26)	290 (18)
Cooling Fan Air Flow with 100°F (38°C) Radiator — CFM (L/s) ...	71900 (33937)	43000 (20296)	70150 (33111)	36425 (17193)
with 125°F (52°C) Radiator — CFM (L/s) ...	67100 (31671)	40100 (18927)	65450 (30892)	34000 (16048)

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