Diesel Powered Generating Sets 580 kW - 888 kW 50 Hz QST30 Series Engines

Typical model with options fitted

Standard Genset Features

Single Source Responsibility
- Design, manufacturer and test of all components and accessories are made by Cummins Power Generation and Cummins companies

International Integrity
- Assurance and strength of a worldwide, world class corporation

Global Backing
- 24-hour spares and service support – in 72 countries

Single Source Warranty
- Complete genset covered by Cummins Power Generation comprehensive warranty

Packaged Self-Contained Units
- Units with built in antivibration systems, control panels, starting systems with provision for base fuel tank and other accessories

Cummins Engine
- Heavy duty 4 cycle water cooled engine
- Electronic governor control

Cooling System
- 40°C cooling package (50°C option)

Ready Filled
- Every set comes filled with lube oil and anti-freeze

Alternator
- Brushless Group made machine
- Close voltage regulation
- Rotor and exciter impregnated with oil and acid resisting resin
- 12 lead reconnectable
- Exceptional short circuit capability
- Low waveform distortion with non linear loads
- Permanent magnet exciter with MX321 AVR fitted as standard

Ratings
All kW Power ratings based on a 40°C ambient temperature reference. No derating necessary up to 40°C

Chassis
Built-in anti-vibration system
Bonded rubber units fitted as standard eliminates need for rubber mats or spring mountings

PCC PowerCommand® Control System
- Microprocessor control
- Integrates governor and voltage regulation systems
- Superior alternator and genset protection systems
- Accurate battery monitoring system
- Totally reliable and proven system

Quality Assurance
Registered Firm Certificate Number FM509 in accordance with: BS EN ISO 9001
Quality Assurance Schedule 3420/1

One Source — Alternator — Controls — Generating Set — One Name

Cummins Power Generation, Cummins Engines and Newage Alternators are all part of the same group

50 Hz Ratings				
Model Prime	Prime kW (kVA)	Model Standby	Standby kW (kVA)	Engine Model
580 DFHA	580 (725)	640 DFHA	640 (800)	QST30G1
640 DFHB	640 (800)	713 DFHB	713 (891)	QST30G2
751 DFHC	751 (939)	833 DFHC	833 (1041)	QST30G3
800 DFHD	800 (1000)	888 DFHD	888 (1110)	QST30G4

A Single Source for *all* Power System Solutions

Power Generation

Specifications

Generator Set Performance

Voltage Regulation
Maintains voltage output to within ±0.5%.
At any power factor between 0.8 lagging and unity.
At any variations from No load to Full load.
At any variations from Cold to Hot.
At speed droop variations up to 4.5%.

Frequency Regulation
Isochronous under varying loads from no load to 100% full load.

Random Frequency Variation
Will not exceed ±0.25% of its mean value for constant loads – no load to full load.

Waveform
Total harmonic distortion open circuit voltage waveform in the order of 1.5%. Three-phase balanced load in the order of 5.0%.

Telephone Influence Factor
TIF better than 50.
THF to BS4999 Part 40 better than 2%.

Alternator Insulation
Class H insulation.

Radio Interference
In compliance with BS800 and VDE levels G and N.

Engine

Cummins QST30G1, G2, G3 and G4, twelve-cylinder vee formation, direct injection, four-cycle diesel engines.

Type
Water cooled, turbocharged and aftercooled.

Construction
Four valves per cylinder, forged steel crankshaft and connecting rods, cast iron pistons and block, with hardened liners.

Starting
24 volt negative earth, battery charging 35 amp alternator. Cranking current 1280 amps at 0°C.

Fuel System
24 volt fail safe solenoid, dual spin-on paper element fuel filters, Cummins electronic fuel injection system with integral electronic governor. Dual flexible fuel lines with connectors. Standard fuel water separator.

Filters
Dry element air filters with restriction indicator and four spin-on paper element full flow and two by-pass lube oil filters. Spin-on corrosion resistor filter.

Cooling
High ambient 40°C radiator as standard with 50°C ambient as option. Oil cooler.

Alternator

Type
Brushless, single bearing, revolving field, 4-pole, drip proof, screen protected.
Class H insulation.
Enclosed to IP22 (NEMA 1) standard.
IC 01 cooling system.
Fully interconnected damper winding.
AC exciter and rotating rectifier unit.
Epoxy coated stator winding.
Rotor and exciter impregnated with tropical grade insulating oil and acid resisting polyester resin. Dynamically balanced rotor to BS5625 grade 2.5.
Sealed for life bearings.
Layer wound mechanically wedged rotor.

Exciter
Permanent magnet exciter.
Triple dipped in moisture, oil and acid resisting polyester varnish and coated with anti-tracking varnish.
Sealed solid state automatic voltage regulator – self-exciting, self-regulating.
Output windings with 2/3 pitch for improved harmonics and parallelling ability.
Close coupled engine/alternator for perfect alignment.

Compliance Standards

To BS4999/5000 pt 99,
VDE 0530, UTE5100,
NEMA MG1-22, CEMA,
IEC 34, CSA A22.2,
AS1359, BS5514,
ISO 3046 and ISO 8528

Skid Base

Fabricated and welded steel chassis
Built-in anti-vibration mountings
Integral lifting points
Optional sub-base fuel tank with eight hour capacity, dual flexible fuel lines, dial type fuel gauge and drain bung

Finish
Etch undercoated and finished in high gloss durable musell jade green

General
Complete set of operating and instruction manuals

Generator Set Options

Engine
- ☐ Heavy duty air cleaner with safety element
- ☐ 120 volt coolant heater (thermostatically controlled)
- ☐ 240 volt coolant heater (thermostatically controlled)
- ☐ Low coolant level – warning or shutdown
- ☐ Sump evacuation pump
- ☐ Exhaust gas temperature monitoring
- ☐ Tool kit
- ☐ Compliance to TA Luft

Alternator
- ☐ Anti-condensation heater
- ☐ 105°C rise alternator

Control Panel
- ☐ Refer to literature option list in Control Panel data sheet

Exhaust System
- ☐ Industrial-grade exhaust silencer
- ☐ Residential-grade exhaust silencer
- ☐ Length of flexible exhaust pipe
- ☐ Bellows

Fuel System
- ☐ 8hr sub-base fuel tank and gauge
- ☐ Free-standing 450, 900 or 1350 litre fuel tanks
- ☐ High/low/shutdowns and warnings
- ☐ Electric fuel transfer
- ☐ Manual transfer pump

Generator Set
- ☐ Main line circuit breaker
- ☐ Auxiliary contacts
- ☐ Shunt trip
- ☐ Disconnect switch
- ☐ Cable entrance box
- ☐ Battery charger, 5 amp and 10 amp
- ☐ Batteries lead acid or ni-cad
- ☐ Audible DC alarm (loose)
- ☐ Export box packaging
- ☐ CE compliance

Enclosures
- ☐ Silenced and Supersilenced

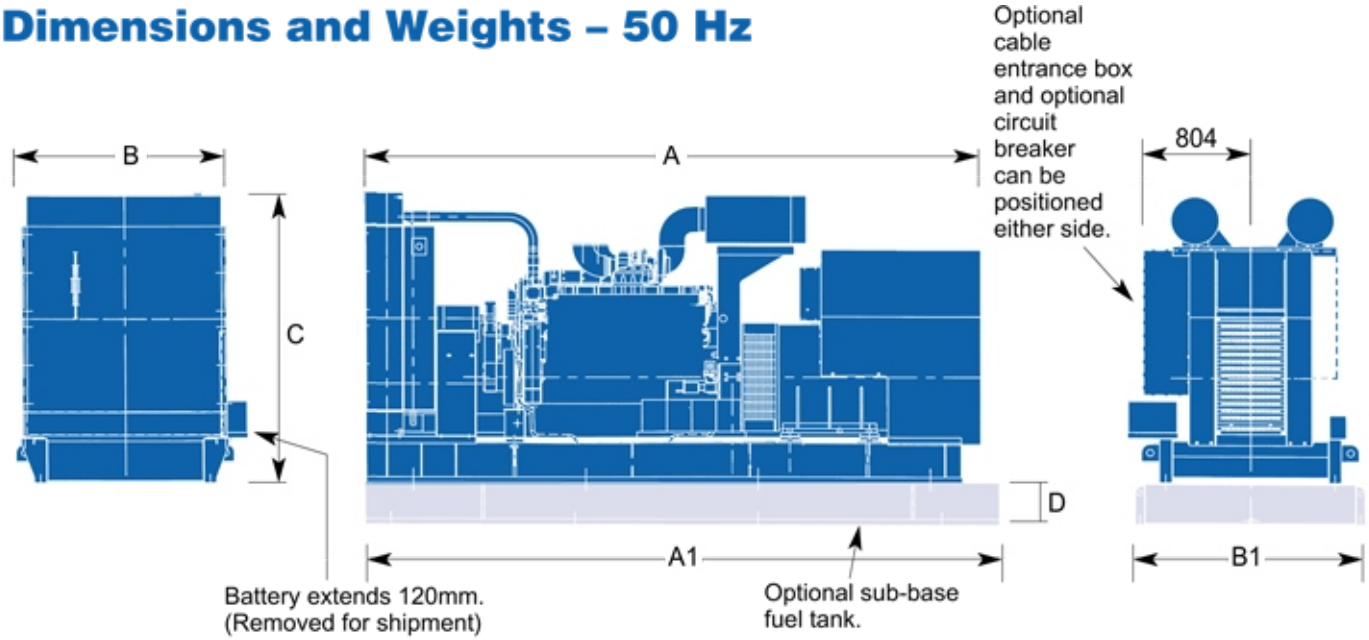
Technical Data

Generating Sets – 50 Hz

Set output	380-440 V 50 Hz	380-440 V 50 Hz	380-440 V 50 Hz	380-440 V 50 Hz
Prime at 40°C ambient	580 kWe 725 kVA	640 kWe 800 kVA	751 kWe 939 kVA	800 kWe 1000 kVA
Model (Prime)	580 DFHA	640 DFHB	751 DFHC	800 DFHD
Standby at 40°C ambient	640 kWe 800 kVA	713 kWe 891 kVA	833 kWe 1041 kVA	888 kWe 1110 kVA
Model (Standby)	640 DFHA	713 DFHB	833 DFHC	888 DFHD
Engine Make	Cummins	Cummins	Cummins	Cummins
Model	QST30G1	QST30G2	QST30G3	QST30G4
Cylinders	Twelve	Twelve	Twelve	Twelve
Engine build	Vee	Vee	Vee	Vee
Governor/Class	Electronic/A1	Electronic/A1	Electronic/A1	Electronic/A1
Aspiration and cooling	Turbo Aftercooled	Turbo Aftercooled	Turbo Aftercooled	Turbo Aftercooled
Bore and stroke	140 mm x 165 mm	140 mm x 165 mm	140 mm x 165 mm	140 mm x 165 mm
Compression ratio	14:1	14:1	14:1	14:1
Cubic capacity	30.48 Litres	30.48 Litres	30.48 Litres	30.48 Litres
Starting/Min °C	Unaided/1°C	Unaided/1°C	Unaided/7°C	Unaided/7°C
Battery capacity	254 A/hr	254 A/hr	254 A/hr	254 A/hr
Engine output – Prime	634 kWm	697 kWm	806 kWm	880 kWm
Engine output – Standby	701 kWm	768 kWm	895 kWm	970 kWm
*Maximum load acceptance – single step	570 kWe	570 kWe	583 kWe	622 kWe
Speed	1500 rpm	1500 rpm	1500 rpm	1500 rpm
Alternator voltage regulation	±0.5%	±0.5%	±0.5%	±0.5%
Alternator insulation class	H	H	H	H
Single load step to NFPAII0	100%	100%	100%	100%
Fuel consumption (Prime) 100% load	153 l/hr	168 l/hr	184 l/hr	202 l/hr
Fuel consumption (Standby) 100% load	169 l/hr	187 l/hr	204 l/hr	224 l/hr
Lubrication oil capacity (inc. filters)	154 Litres	154 Litres	154 Litres	154 Litres
Base fuel tank capacity – open set	1700 Litres	1700 Litres	1700 Litres	1700 Litres
Coolant capacity – radiator and engine (40°C)	169 Litres	169 Litres	169 Litres	302 Litres
Coolant capacity – radiator and engine (50°C)	175 Litres	175 Litres	175 Litres	342 Litres
Exhaust temp – full load prime	527°C	538°C	541°C	565°C
Exhaust gas flow – full load prime	7812 m^3/hr	7977 m^3/hr	8748 m^3/hr	10728 m^3/hr
Exhaust gas back pressure max	76 mm Hg	76 mm Hg	76 mm Hg	51 mm Hg
Air flow – radiator (40°C ambient)**	15.5 m^3/s	15.5 m^3/s	15.5 m^3/s	18 m^3/s
Pusher fan head (duct allowance) 40°C**	13 mm Wg	13 mm Wg	**13 mm Wg	**13 mm Wg
Air intake – engine	2544 m^3/hr	2794 m^3/hr	3114 m^3/hr	3402 m^3/hr
Air flow – radiator (50°C ambient)**	17.6 m^3/s	17.6 m^3/s	18.1 m^3/s	24.8 m^3/s
Pusher fan head (duct allowance) 50°C**	13 mm Wg	13 mm Wg	13 mm Wg	13 mm Wg
Total heat radiated to ambient	126 kW	137 kW	137 kW	152 kW
Engine derating – altitude	RTF	RTF	RTF	RTF
Engine derating – temperature	RTF	RTF	RTF	RTF

*In accordance with ISO 8528, BS5514.
Prime: Continuous running at variable load for unlimited periods with 10% overload available for 1 hour in any 12 hour period.
Standby: Continuous running at variable load for duration of an emergency.
Prime and standby ratings are outputs at 40°C (104°F) ambient temperature.
**Subject to factory verification.
†No temperature derating is applicable to any of these generator sets with a Class H alternator up to 50°C. For Class F alternators refer to factory.
RTF = Refer to factory.

Dimensions and Weights – 50 Hz



Model	Engine Type	Dimensions and Weights (mm/kg)						Set Weight kg Dry	Set Weight kg Wet	Tank Weight kg (dry)	Tank Weight kg (wet)
		A	A1	B	B1	C	D				
580 DFHA	QST30G1	4297	4460	1442	1640	2139	300	5812	5991	850	2210
640 DFHB	QST30G2	4297	4460	1442	1640	2139	300	6117	6296	850	2210
751 DFHC	QST30G3	4297	4460	1442	1640	2092	300	7195	7374	850	2210
800 DFHD	QST30G4	4547	4460	1722	1640	2332	300	6775	7053	850	2210

Weights shown are for the largest alternator frame size.
Set weights are **without** sub-base tank.
Dimensions and weights are for **guidance** only. Do not use for installation design. Ask for certified drawings on your specific application.
Specifications may change without notice.

Power Generation

See your distributor for more information.

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Diesel Powered Generating Sets 1200 kW - 1340 kW 50 Hz KTA50 Series Engines

Standard Genset Features

Single Source Responsibility
- Design, manufacturer and test of all components and accessories are made by Cummins Power Generation and Cummins companies

International Integrity
- Assurance and strength of a worldwide, world class corporation

Global Backing
- 24-hoursparesandservicesupport– in 72 countries

Single Source Warranty
- Complete genset covered by Cummins Power Generation comprehensive warranty

Packaged Self-Contained Units
- Units with built in antivibration systems with provision for base fuel tank and other accessories

Cummins Engine
- Heavy duty 4 cycle water cooled engine
  Electronic governor control

Alternator
- Brushless Group made machine
- Close voltage regulation
- Rotor and exciter impregnated with oil and acid resisting resin
- 6 lead reconnectable
- Exceptional short circuit capability
- Low waveform distortion with non linear loads
- Permanent magnet exciter fitted as standard

Ratings
All kW Power ratings based on a 40°C ambient temperature reference.

Chasis
Built-in anti-vibration system
Bonded rubber units fitted as standard eliminates need for rubber mats or spring mountings

Cooling System
- 40°Ccoolingpackage(50°Coption)

Ready Filled
- Every set comes filled with lube oil and anti-freeze

PCC PowerCommand® Control System
- PCC2100 Controller with bar graph as standard
- Microprocessor control
- Integrates governor and voltage regulation systems
- Superior alternator and genset protection system
- Accurate battery monitoring system
- Totally reliable and proven system

Quality Assurance
Registered Firm Certificate Number FM509 in accordance with:
BS EN ISO 9001
Quality Assurance Schedule 3420/1

One Source – Alternator – Controls – Single Generating Set – One Name

Cummins Power Generation, Cummins Engines and Newage Alternators are all part of the same group

50 Hz Ratings			
Model Prime	Prime kW (kVA)	Standby kW (kVA)	Engine Model
C1675 D5A	1200 (1500)	1340 (1675)	KTA50GS8

A Single Source for *all* Power System Solutions

Specifications May Change Without Notice

Cummins Power Generation

Generator Set Performance

Voltage Regulation
Maintains voltage output to within ±0.5%.
At any power factor between 0.8 lagging and unity.
At any variations from No load to Full load.
At any variations from Cold to Hot.
At speed droop variations up to 4.5%.

Frequency Regulation
Isochronous under varying loads from no load to 100% full load.

Random Frequency Variation
Will not exceed ±0.25% of its mean value for constant loads – no load to full load.

Waveform
Total harmonic distortion open circuit voltage waveform in the order of 1.5%. Three-phase balanced load in the order of 5.0%.

Telephone Influence Factor
TIF better than 50.
THF to BS4999 Part 40 better than 2%.

Alternator Temperature Rise
Class H insulation. Temperature rise up to 125°C permitted for prime ratings.

Radio Interference
In compliance with BS800 and VDE levels G and N.

Engine

Cummins KTA50GS8
sixteen-cylinder vee formation, direct injection, four-cycle diesel engines.

Type
Water cooled, turbocharged and aftercooled.

Construction
Four valves per cylinder, forged steel crankshaft and connecting rods, cast iron block, with replaceable wet liners.

Starting
24 volt negative earth, battery charging 35amp alternator. Cranking current 1800 amps Amps at 0°C.

Fuel System
24 volt fail safe actuator, dual spin-on paper element fuel filters, Cummins PTfuel injection systems with integral electronic governor. Dual flexible fuel lines with connectors. Standard fuel water separator.

Filters
Dry element air filters with restriction indicator and spin-on paper element full flow and by pass lube oil filters. Spin on corrosion resistor filter.

Cooling
High ambient 40°C radiator as standard with 50°C ambient as option. Oil cooler.

Alternator

Type
Brushless, single bearing, revolving field, 4-pole, drip proof, screen protected.
Class H insulation.
Enclosed to IP23 (NEMA1) standard.
IC 01 cooling system.
Fully interconnected damper winding.
AC exciter and rotating rectifier unit.
Epoxy coated stator winding.
Rotor and exciter impregnated with tropical grade insulating oil and acid resisting polyester resin. Dynamically balanced rotor to BS5625 grade 2.5.
Sealed for life bearings.
Layer wound mechanically wedged rotor.

Exciter
Triple dipped in moisture, oil and acid resisting polyester varnish and coated with anti-tracking varnish.
Sealed solid state automatic voltage regulator – self-exciting, self-regulating.
Output windings with 2/3 pitch for improved harmonics and parallelling ability.
Close coupled engine/alternator for perfect alignment.
Permanent magnet exciter fitted as standard.

Compliance Standard

To BS4999/5000 pt 99,
VDE 0530, UTE5100,
NEMAMG1-22, CEMA,
IEC 34, CSAA22.2,
AS1359, BSS5514,
ISO 3046 and ISO 8528

Chasis

Fabricated and welded steel chassis
Built-in anti-vibration mountings
Optional sub-base fuel tank with eight hour capacity, dual flexible fuel lines, dial type fuel gauge and drain bung

Finish
Etch undercoated and finished in high gloss durable green

General
Complete set of operating and instruction manuals

Generator Set Options

Engine
- ☐ Heavy duty air cleaner
- ☐ Coolant heater and thermostat
- ☐ Lead acid batteries, cable and fitted tray
- ☐ Sump drain pump
- ☐ Oil and water drain taps
- ☐ CE Compliance (guarding)
- ☐ Exhaust temperature monitoring - (PCCP3100 only)
- ☐ Tool kit

Cooling
- ☐ 50°C ambient radiator
- ☐ Remote radiator cooling (built to order)
- ☐ Oil temperature indication

Alternator
- ☐ Anti-Condensation heater
- ☐ Thermistors
- ☐ 125/105/80°C rise alternator

Exhaust System
- ☐ Industrial type silencer
- ☐ Residential type silencer
- ☐ Length of flexible exhaust and bellows

Fuel System
- ☐ Sub-base tanks
- ☐ Hand fuel transfer pump
- ☐ Automatic fuel transfer pump
- ☐ Free-standing 450, 900 and 1350 litre
- ☐ fuel tanks with stand
- ☐ Fuel tank level switch
- ☐ High fuel level warning
- ☐ Low fuel level warning
- ☐ Low fuel level shutdown

Generator Set
- ☐ Enclosed - 40 ft container
- ☐ Silenced enclosures

Control Panel
- ☐ See separate list on ControlPanel pages
- ☐ 3 or 4 pole circuit breaker up to 2500A
- ☐ Battery charger 5 amp or 10 amp
- ☐ CE Compliance and PCC systems
- ☐ Cable entrance box
- ☐ PCCP3100 controller

Specifications

Technical Data

Set output	380-440 V - 50 Hz
Prime Rating	1200 kWe 1500 kVA
Model Name	C1675 D5A
Standby Rating	1340 kWe 1675 kVA
Engine Make	Cummins
Model	KTA50GS8
Cylinders	Sixteen
Engine build	60°Vee
Governor / Class	Electronic / A1
Aspiration and cooling	Turbo Aftercooled
Bore and stroke	159 mm x 159 mm
Compression ratio	14.9:1
Cubic capacity	50.3 Litres
Starting / Min °C	Unaided / 7°C
Battery capacity	254 A/hr
Gross Engine output – Prime	1287 kWm
Gross Engine outputl – Standby	1429 kWm
Maximum load acceptance – single step (cold)	744 kWe
Speed	1500 rpm
Alternator voltage regulation	±0.5%
Alternator insulation class	H
Single load step to NFPA110	100%
Fuel consumption (Prime) 100% load	309 l/hr
Fuel consumption (Standby) 100% load	345 l/hr
Lubrication oil system capacity	204 Litres
Base fuel tank capacity – open set (Option)	2000 Litres
Coolant capacity – radiator and engine	315 Litres
Exhaust temp – full load prime	499°C
Exhaust gas flow – full load prime	14537 m3/hr
Exhaust gas back pressure max (standby)	51 mm Hg
Air flow – radiator (40°C ambient)	21.7 m3/s
Pusher fan head (duct allowance) 40°C	13 mm Wg
Air intake – engine (prime)	5692 m3/hr
Air flow – radiator (50°C ambient)	28.4 m3/s
Pusher fan head (duct allowance) 50°C	13 mm Wg
Heat radiated by engine to ambient (Prime)	299 kW
Engine derating – altitude	RTF
Engine derating – temperature	RTF

PRIME POWER RATING

Applicable for supplying power continuously for the duration during the period of the power outage. A 10% overload capability is available for a period of 1 hour within a 12 hour period of operation and for a maximum of 5 hours per year. Variable load should not exceed a 70% average of the Prime Power rating during any 24 hour period. This rating is applicable to installations served by a reliable normal utility source. No sustained utility parallel operation is permitted with this rating.

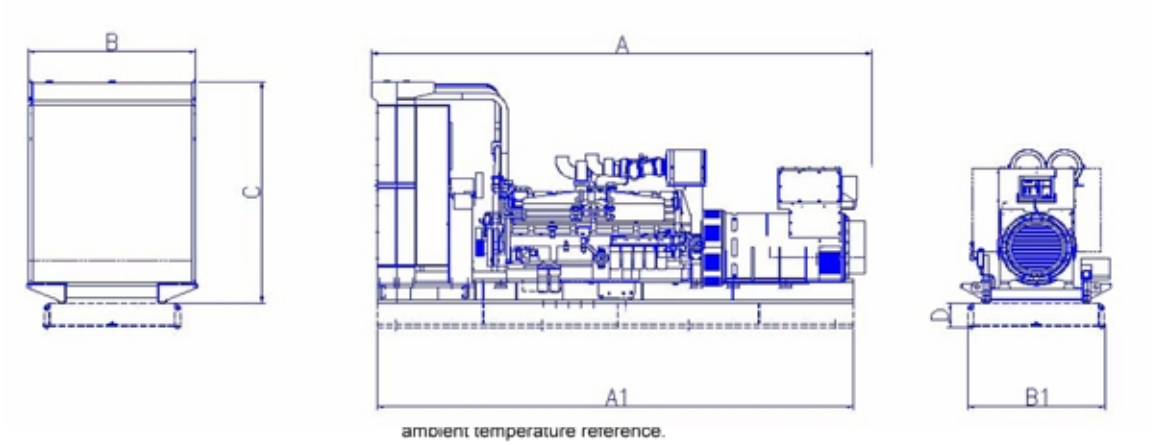
STANDBY POWER RATING (ESP)

The Standby Power Rating is applicable for supplying emergency power for the duration of a utility power interruption. No overload, utility parallel or negotiated outage operation capability is available at this rating. In installations served by unreliable utility sources (where outages last longer or occur more frequently), where operation is likely to exceed 200 hours per year, the prime power rating should be applied. The Standby Power rating is only applicable for emergency and standby applications where the generator set serves as the back up to the normal utility source.

Unless otherwise stated all ratings are based on the following reference conditions:

- Ambient temperature – 27oC
- Altitude above sea level – 150 metres
- Relative humidity – 60%

Dimensions and Weights - 50 Hz



ambient temperature reference.

Model	Engine	and Weights (mm/kg)						Set Weight kg Dry	Set Weight kg Wet
		A	A1	B1	B	C	D		
C1675 D5A	KTA50GS8	5811	5690	1640	1785	2241	300	10324	10626

Set weights are **without** sub-base tank.
Dimensions and weights are for **guidance** only.Do not use for installation design. Ask for certified drawings on your specific application.
Specifications may change without notice.

See your distributor for more information

Power Generation

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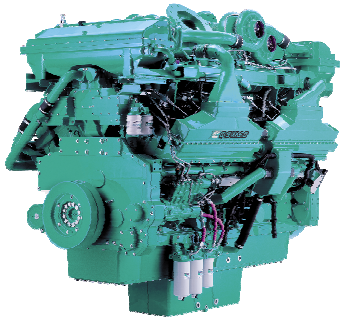
QSK60-G3



> Specification sheet

Our energy working for you.™

Description

The QSK60 is a V 16 cylinder engine with a 60 litre displacement. This Quantum series utilizes sophisticated electronics and premium engineering to provide outstanding performance levels, reliability and versatility for Standby, Prime and Continuous Power applications.

CE — This engine has been built to comply with CE certification.

ISO 9001 — This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO9002.

Features

Cummins High Pressure Injection (HPI) PT full authority electronic fuel system. The HPI PT fuel system is managed by a G-Drive Governor Control System (GCS) controller, which is provided for off-engine mounting in the genset control panel. The Quantum Control has a specific fuel system board to interface with the HPI-PT fuel system and provides an Engine Protection package giving greater customer flexibility and cost effective alternatives in the control design and the benefits of Full Authority electronic control.

CTT (Cummins Turbo Technologies) HX82/HX83 turbo-charging utilizes exhaust energy with greater efficiency for improved emissions and fuel consumption.

Low Temperature After-cooling - Two-pump Two-loop (2P2L)

Ferrous Cast Ductile Iron (FCD) Pistons - High strength design delivers superior durability.

G-Drive Integrated Design - Each component has been specifically developed and rigorously tested for G-Drive products, ensuring high performance, durability and reliability.

Service and Support - G-Drive products are backed by an uncompromising level of technical support and after sales service, delivered through a world class service network.

Coolpac Integrated Design - Products are supplied complete with cooling package and air cleaner kit for a complete power package. Each component has been specifically developed and rigorously tested for G-Drive products, ensuring high performance, durability and reliability.

1500 rpm (50 Hz Ratings)

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
1790/2399	1615/2165	1305/1749	1737/2329	1580/2119	1270/1703	1600	2000	1500	1875	1219	1524

Our energy working for you.™

www.cumminsgdrive.com

(11/09) (GDSS149)

General Engine Data

Type	4 cycle, Turbocharged, After-cooled
Bore mm	159
Stroke mm	190
Displacement Litre	60.2
Cylinder Block	Cast iron, 16 cylinder
Battery Charging Alternator	55A
Starting Voltage	24V
Fuel System	Direct injection Cummins HPI
Fuel Filter	Spin on fuel filters with water separator
Lube Oil Filter Type(s)	Spin on full flow filter
Lube Oil Capacity (l)	280
Flywheel Dimensions	SAE 0

Coolpac Performance Data

Cooling System Design	2 pump - 2 loop
Coolant Ratio	50% ethylene glycol; 50% water
Coolant Capacity (l)	242.0
Limiting Ambient Temp.**	54.1
Fan Power	45.0
Cooling System Air Flow (m^3/s)**	32.3
Air Cleaner Type	Dry replaceable element with restriction indicator

** @ 13 mm $H^2$0

Ratings Definitions

Emergency Standby Power (ESP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Limited-Time Running Power (LTP):
Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):
Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base Load (Continuous) Power (COP):
Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN6271 and BS 5514.

Weight & Dimensions

Length	Width	Height	Weight (dry)
mm	mm	mm	kg
4123	2494	2995	9685

Fuel Consumption 1500 (50 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	1790	2399	408	107.8
Prime Power				
100	1615	2165	371	97.9
75	1211	1624	276	73.0
50	808	1082	196	51.7
25	404	541	114	30.0
Continuous Power				
100	1305	1749	299	78.8

Cummins G-Drive Engines

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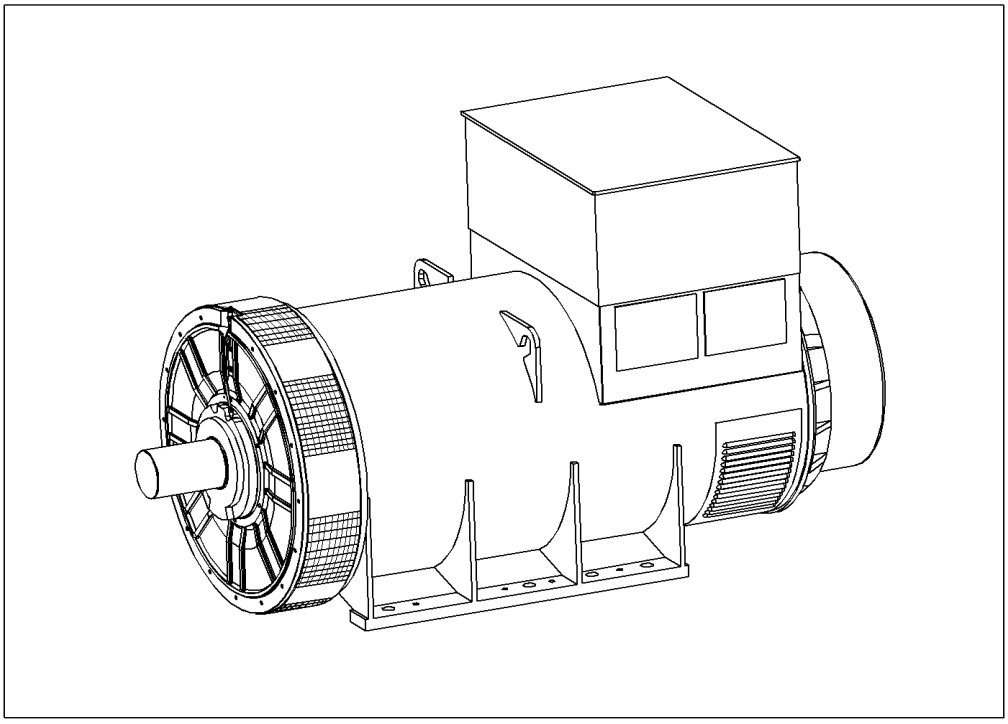
(11/09) (GDSS149)

PI734E - Technical Data Sheet



PI734E
SPECIFICATIONS & OPTIONS

STANDARDS

Newage Stamford industrial generators meet the requirements of BS EN 60034 and the relevant sections of other national and international standards such as BS5000, VDE 0530, NEMA MG1-32, IEC60034, CSA C22.2-100, AS1359.
Other standards and certifications can be considered on request.

DESCRIPTION

The STAMFORD PI range of synchronous ac generators are brushless with a rotating field. They are separately excited by the STAMFORD Permanent Magnet Generator (PMG). This is a shaft mounted, high frequency, pilot exciter which provides a constant supply of clean power via the Automatic Voltage Regulator (AVR) to the main exciter. The main exciter output is fed to the main rotor, through a full wave bridge rectifier, protected by surge suppression.

VOLTAGE REGULATORS

The PI range generators, complete with a PMG, are available with one of two AVRs. Each AVR has soft start voltage build up and built in protection against sustained over-excitation, which will de-excite the generator after a minimum of 8 seconds.
Underspeed protection (UFRO) is also provided on both AVRs. The UFRO will reduce the generator output voltage proportional to the speed of the generator below a pre-settable level.

The **MX341 AVR** is two phase sensed with a voltage regulation of ± 1 %. (see the note on regulation).

The **MX321 AVR** is 3 phase rms sensed with a voltage regulation of 0.5% rms (see the note on regulation). The UFRO circuit has adjustable slope and dwell for controlled recovery from step loads. An over voltage protection circuit will shutdown the output device of the AVR, it can also trip an optional excitation circuit breaker if required. As an option, short circuit current limiting is available with the addition of current transformers.

Both the MX341 and the MX321 need a generator mounted current transformer to provide quadrature droop characteristics for load sharing during parallel operation. Provision is also made for the connection of the STAMFORD power factor controller, for embedded applications, and a remote voltage trimmer.

WINDINGS & ELECTRICAL PERFORMANCE

All generator stators are wound to 2/3 pitch. This eliminates triplen (3rd, 9th, 15th …) harmonics on the voltage waveform and is found to be the optimum design for trouble-free supply of non-linear loads. The 2/3 pitch design avoids excessive neutral currents sometimes seen with higher winding pitches. A fully connected damper winding reduces oscillations during paralleling. This winding, with the 2/3 pitch and carefully selected pole and tooth designs, ensures very low levels of voltage waveform distortion.

TERMINALS & TERMINAL BOX

Standard generators feature a main stator with 6 ends brought out to the terminals, which are mounted on the frame at the non-drive end of the generator. A sheet steel terminal box contains the AVR and provides ample space for the customers' wiring and gland arrangements. It has removable panels for easy access.

SHAFT & KEYS

All generator rotors are dynamically balanced to better than BS6861:Part 1 Grade 2.5 for minimum vibration in operation. Two bearing generators are balanced with a half key.

INSULATION/IMPREGNATION

The insulation system is class 'H', and meets the requirements of UL1446.
All wound components are impregnated with materials and processes designed specifically to provide the high build required for static windings and the high mechanical strength required for rotating components.

QUALITY ASSURANCE

Generators are manufactured using production procedures having a quality assurance level to
BS EN ISO 9001.

NOTE ON REGULATION

The stated voltage regulation may not be maintained in the presence of certain radio transmitted signals. Any change in performance will fall within the limits of Criteria 'B' of EN 61000-6-2:2001. At no time will the steady-state voltage regulation exceed 2%.

Note: Continuous development of our products entitles us to change specification details without notice, therefore they must not be regarded as binding.

Front cover drawing is typical of the product range.

PI734E

WINDING 312

CONTROL SYSTEM	SEPARATELY EXCITED BY P.M.G.		
A.V.R.	MX341	MX321	
VOLTAGE REGULATION	± 1 %	± 0.5 %	With 4% ENGINE GOVERNING
SUSTAINED SHORT CIRCUIT	REFER TO SHORT CIRCUIT DECREMENT CURVES (page 7)		

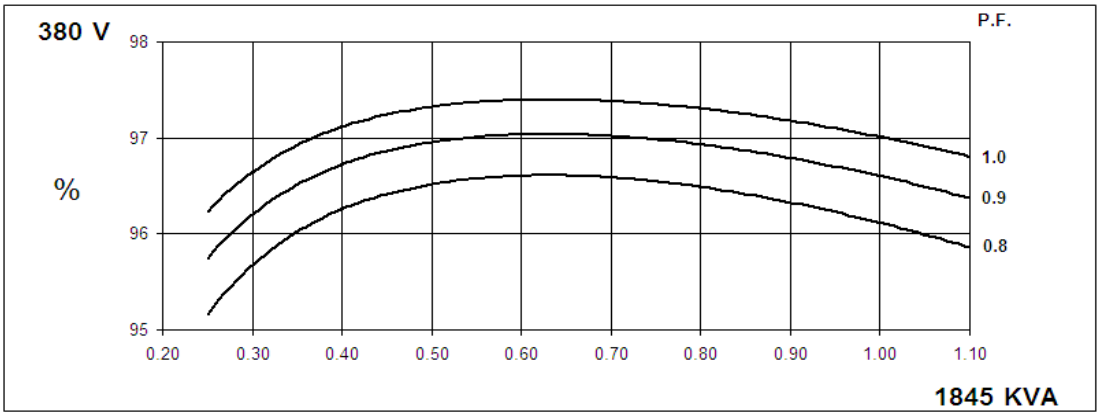
INSULATION SYSTEM	CLASS H							
PROTECTION	IP23							
RATED POWER FACTOR	0.8							
STATOR WINDING	DOUBLE LAYER LAP							
WINDING PITCH	TWO THIRDS							
WINDING LEADS	6							
MAIN STATOR RESISTANCE	0.00093 Ohms PER PHASE AT 22°C STAR CONNECTED							
MAIN ROTOR RESISTANCE	2.17 Ohms at 22°C							
EXCITER STATOR RESISTANCE	17.5 Ohms at 22°C							
EXCITER ROTOR RESISTANCE	0.048 Ohms PER PHASE AT 22°C							
R.F.I. SUPPRESSION	BS EN 61000-6-2 & BS EN 61000-6-4,VDE 0875G, VDE 0875N. refer to factory for others							
WAVEFORM DISTORTION	NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%							
MAXIMUM OVERSPEED	2250 Rev/Min							
BEARING DRIVE END	BALL. 6228 C3							
BEARING NON-DRIVE END	BALL. 6319 C3							
	1 BEARING				2 BEARING			
WEIGHT COMP. GENERATOR	3556 kg				3506 kg			
WEIGHT WOUND STATOR	1747 kg				1747 kg			
WEIGHT WOUND ROTOR	1494 kg				1432 kg			
WR² INERTIA	45.49 kgm^2				44.4891 kgm^2			
SHIPPING WEIGHTS in a crate	3629kg				3575kg			
PACKING CRATE SIZE	216 x 105 x 154(cm)				216 x 105 x 154(cm)			
	50 Hz				60 Hz			
TELEPHONE INTERFERENCE	THF<2%				TIF<50			
COOLING AIR	2.69 m³/sec 5700 cfm				3.45 m³/sec 7300 cfm			
VOLTAGE STAR	380/220	400/231	415/240	440/254	416/240	440/254	460/266	480/277
kVA BASE RATING FOR REACTANCE VALUES	1845	1900	1900	1865	2070	2210	2255	2300
Xd DIR. AXIS SYNCHRONOUS	3.18	2.96	2.75	2.40	3.84	3.67	3.42	3.21
X'd DIR. AXIS TRANSIENT	0.19	0.18	0.17	0.15	0.23	0.22	0.21	0.19
X"d DIR. AXIS SUBTRANSIENT	0.14	0.13	0.12	0.11	0.17	0.16	0.15	0.14
Xq QUAD. AXIS REACTANCE	2.04	1.90	1.76	1.54	2.47	2.36	2.20	2.06
X"q QUAD. AXIS SUBTRANSIENT	0.29	0.27	0.25	0.22	0.35	0.33	0.31	0.29
X_L LEAKAGE REACTANCE	0.04	0.03	0.03	0.03	0.04	0.04	0.04	0.04
X_2 NEGATIVE SEQUENCE	0.20	0.19	0.17	0.15	0.24	0.23	0.22	0.20
X_0 ZERO SEQUENCE	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03
REACTANCES ARE SATURATED	VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED							
T'd TRANSIENT TIME CONST.	0.149s							
T"d SUB-TRANSTIME CONST.	0.02s							
T'do O.C. FIELD TIME CONST.	2.46s							
Ta ARMATURE TIME CONST.	0.02s							
SHORT CIRCUIT RATIO	1/Xd							

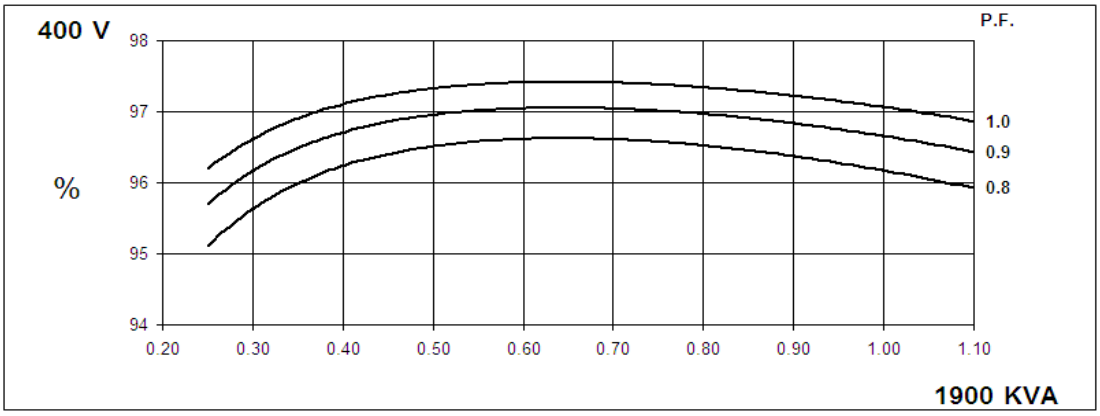
50 Hz

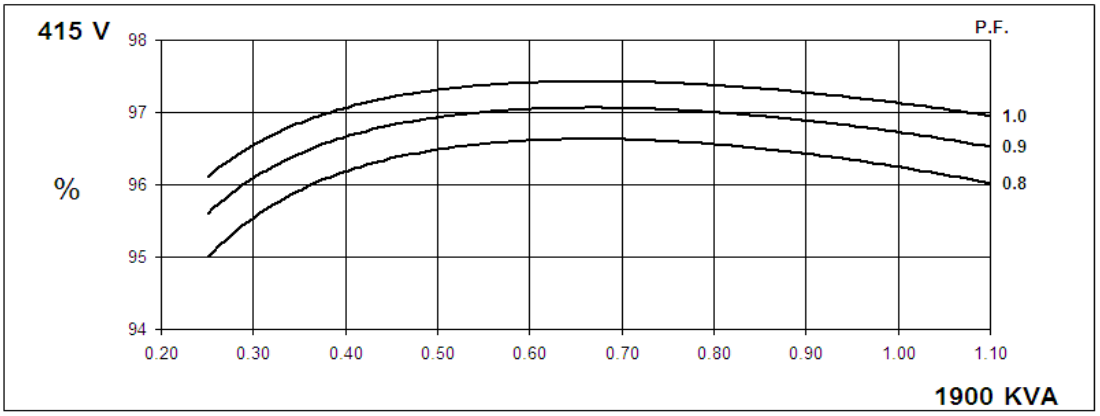
PI734E

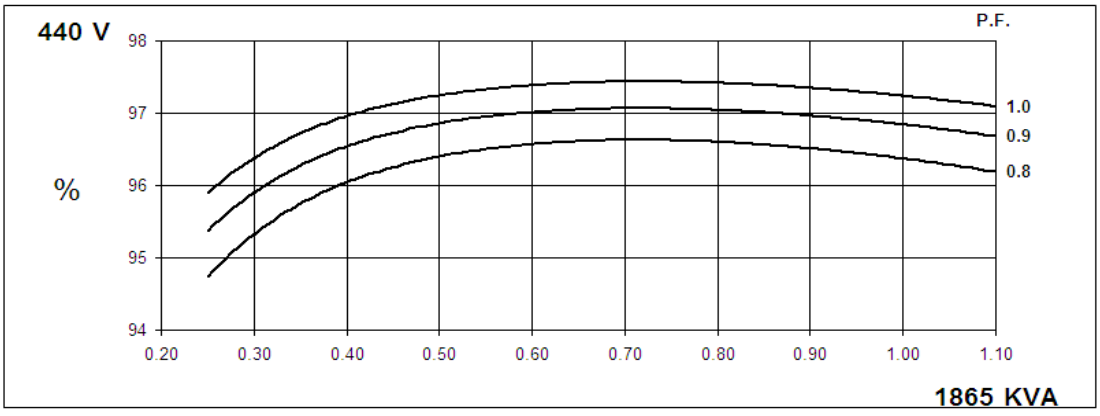
Winding 312

THREE PHASE EFFICIENCY CURVES







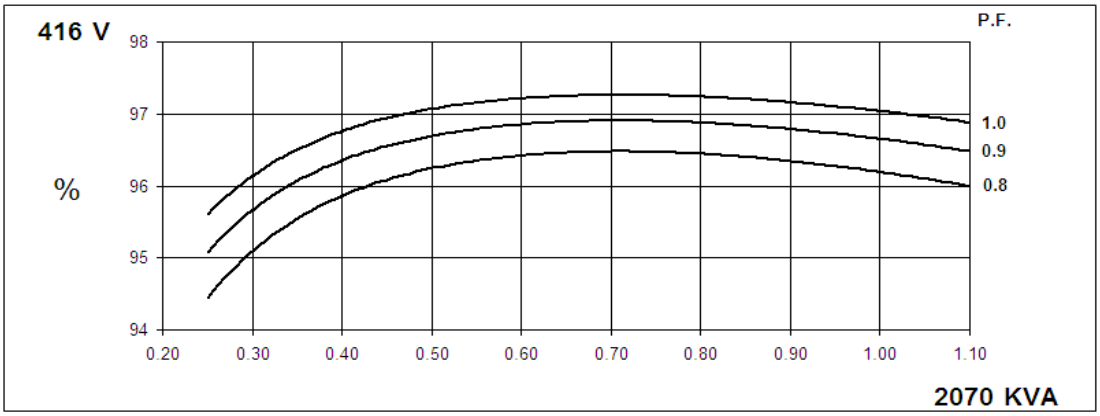


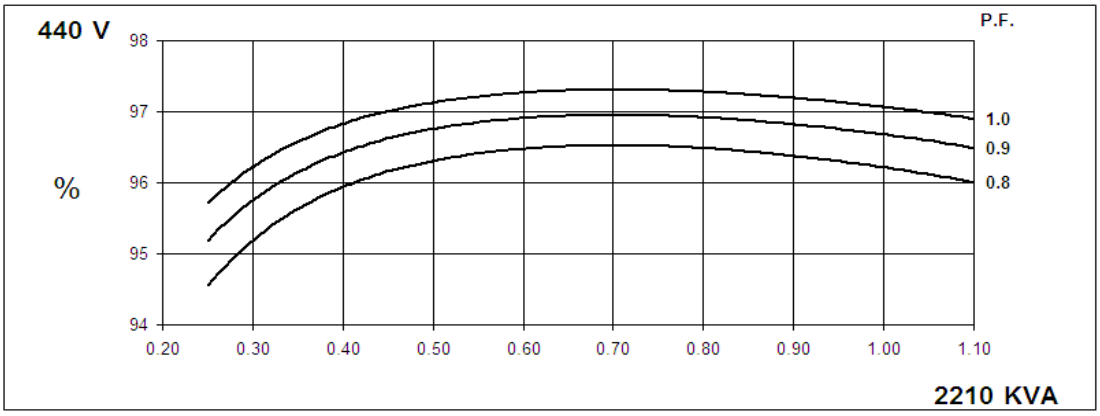
PI734E

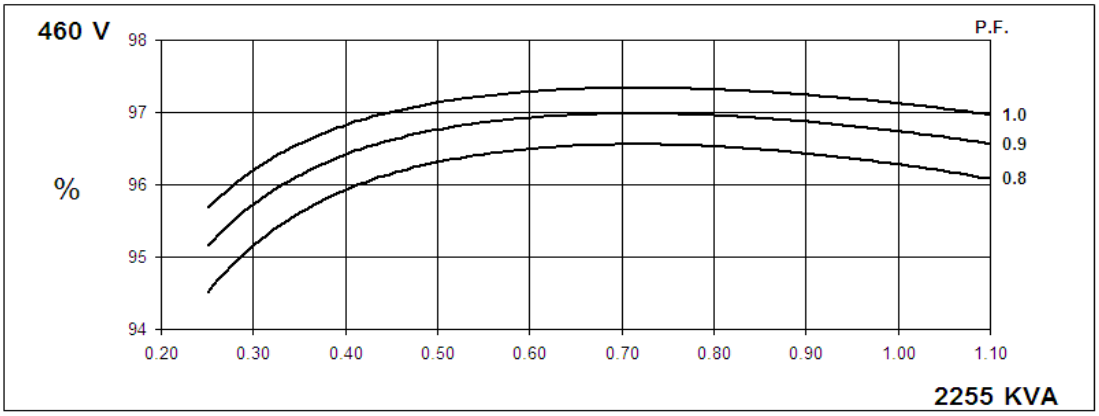
Winding 312

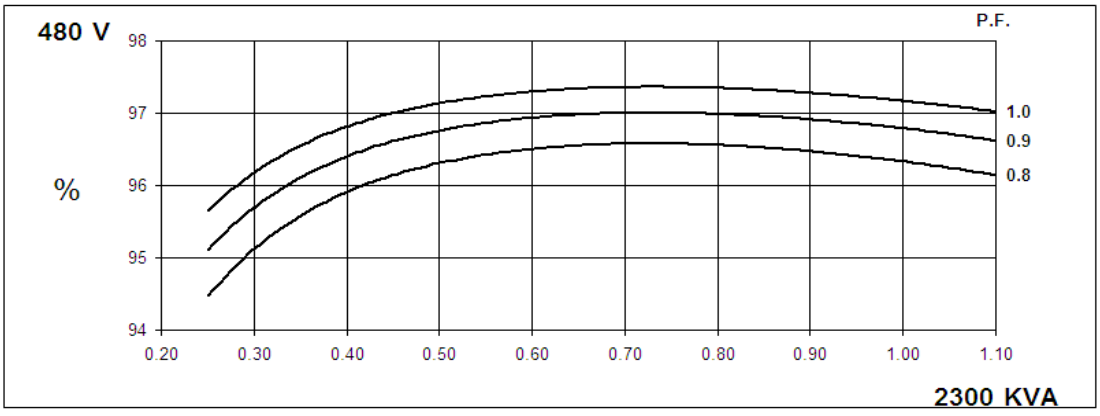
60 Hz

THREE PHASE EFFICIENCY CURVES





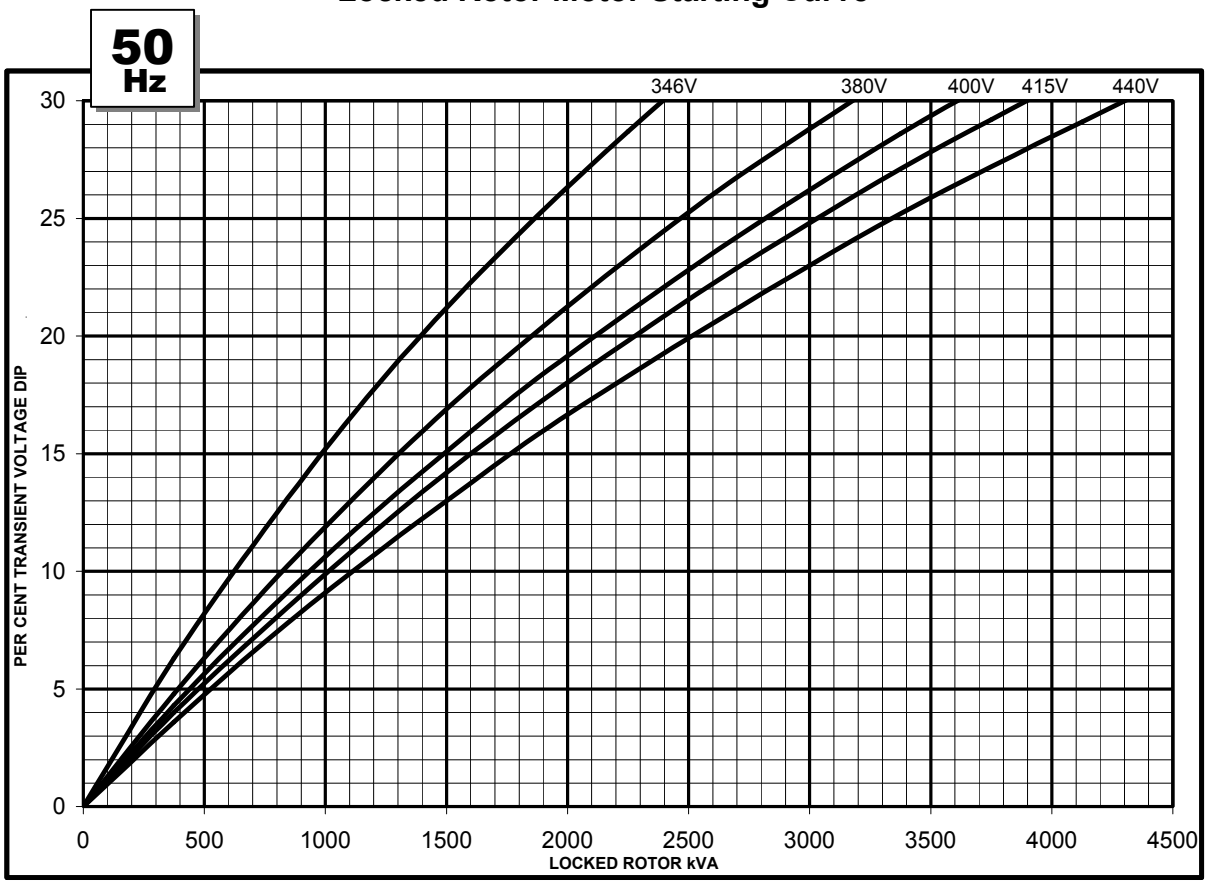


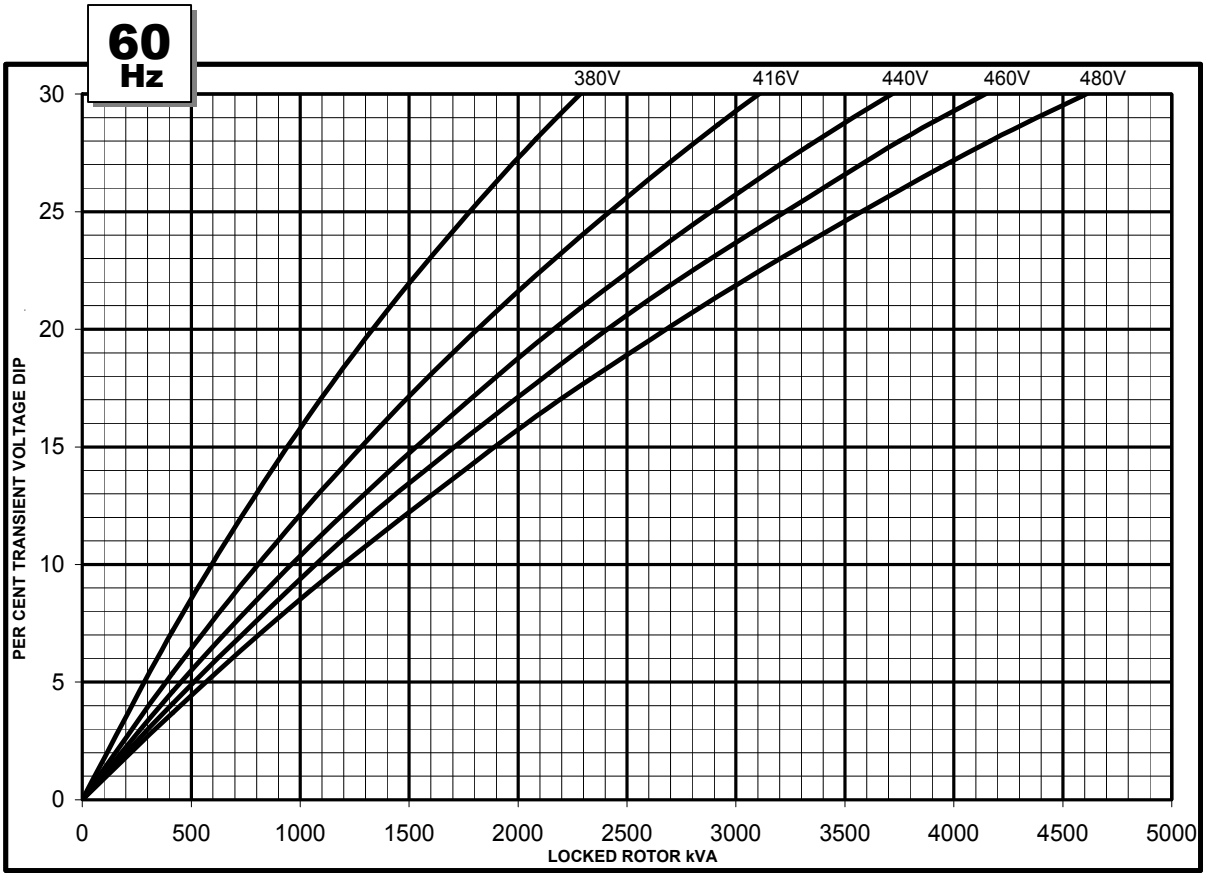


PI734E

Winding 312

Locked Rotor Motor Starting Curve

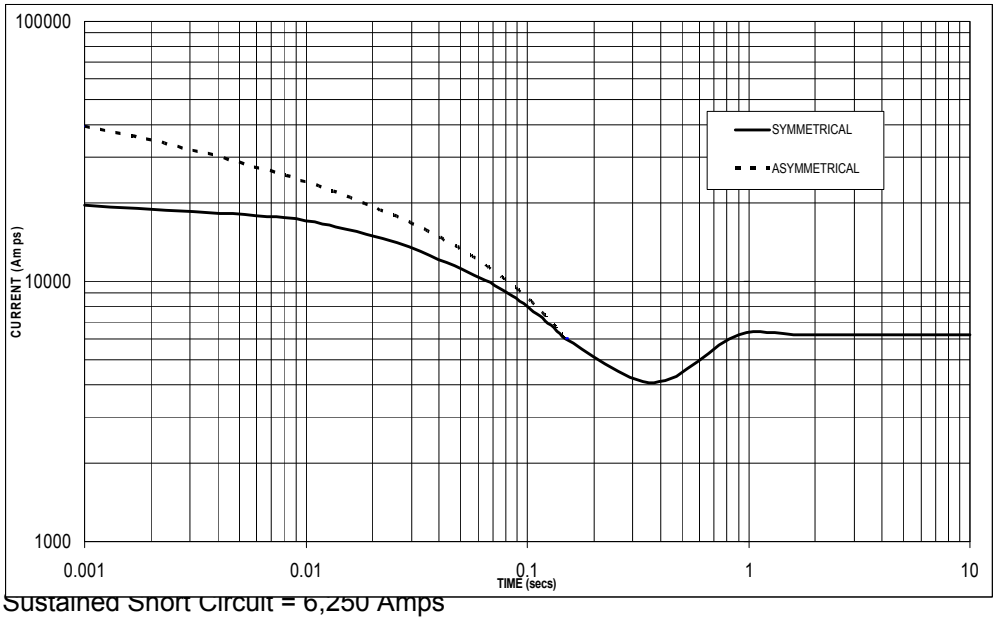




PI734E

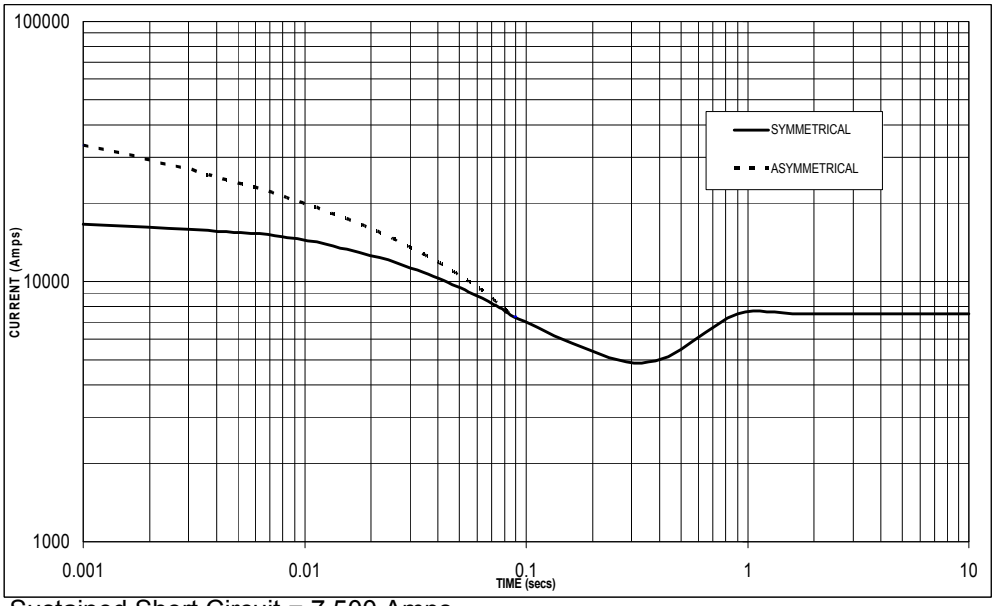
Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed
Based on star (wye) connection.

__ Hz



Sustained Short Circuit = 6,250 Amps

60 Hz



Sustained Short Circuit = 7,500 Amps

Note 1

The following multiplication factors should be used to adjust the values from curve between time 0.001 seconds and the minimum current point in respect of nominal operating voltage :

50Hz		60Hz	
Voltage	Factor	Voltage	Factor
380v	x 1.00	416v	x 1.00
400v	x 1.05	440v	x 1.06
415v	x 1.09	460v	x 1.10
440v	x 1.16	480v	x 1.15

The sustained current value is constant irrespective of voltage level

Note 2

The following multiplication factor should be used to convert the values calculated in accordance with NOTE 1 to those applicable to the various types of short circuit :

	3-phase	2-phase L-L	1-phase L-N
Instantaneous	x 1.00	x 0.87	x 1.30
Minimum	x 1.00	x 1.80	x 3.20
Sustained	x 1.00	x 1.50	x 2.50
Max. sustained duration	10 sec.	5 sec.	2 sec.

All other times are unchanged

Note 3

Curves are drawn for Star (Wye) connected machines.

PI734E

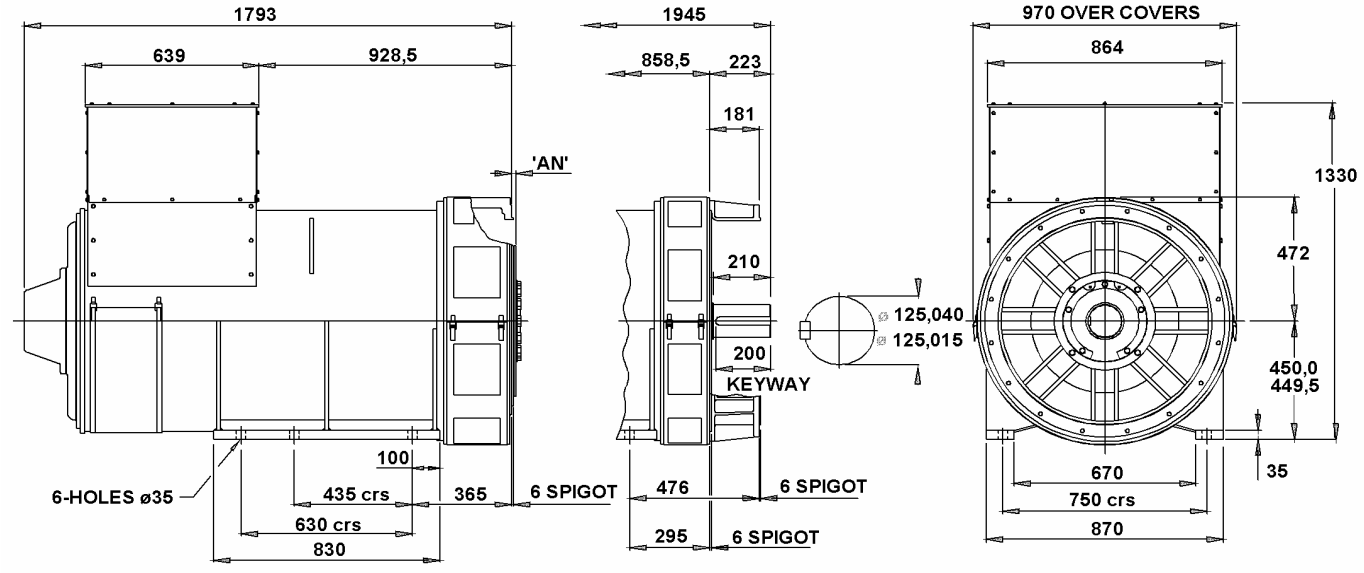
Winding 312 / 0.8 Power Factor

RATINGS

Class - Temp Rise		Cont. F - 105/40°C				Cont. H - 125/40°C				Standby - 150/40°C				Standby - 163/27°C			
50Hz	Star (V)	380	400	415	440	380	400	415	440	380	400	415	440	380	400	415	440
	kVA	1715	1770	1770	1735	1845	1900	1900	1865	1920	1980	1980	1940	1975	2035	2035	1995
	kW	1372	1416	1416	1388	1476	1520	1520	1492	1536	1584	1584	1552	1580	1628	1628	1596
	Efficiency (%)	96.3	96.3	96.4	96.5	96.1	96.2	96.2	96.4	96.0	96.1	96.2	96.3	95.9	96.0	96.1	96.2
	kW Input	1425	1470	1469	1438	1536	1580	1580	1548	1600	1648	1647	1612	1648	1696	1694	1659

60Hz	Star (V)	416	440	460	480	416	440	460	480	416	440	460	480	416	440	460	480
	kVA	1935	2055	2100	2140	2070	2210	2255	2300	2155	2300	2345	2395	2215	2365	2415	2465
	kW	1548	1644	1680	1712	1656	1768	1804	1840	1724	1840	1876	1916	1772	1892	1932	1972
	Efficiency (%)	96.3	96.3	96.4	96.4	96.2	96.2	96.3	96.3	96.1	96.1	96.2	96.3	96.1	96.1	96.1	96.2
	kW Input	1607	1707	1743	1776	1721	1838	1873	1911	1794	1915	1950	1990	1844	1969	2010	2050

DIMENSIONS



COUPLING DISC	'AN'
S.A.E No 18	15,7
S.A.E No 21	0
S.A.E No 24	0

1-BRG ADAPTORS
S.A.E No 0
S.A.E No 00

2-BRG ADAPTORS
S.A.E No 0
S.A.E No 00

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KTA50-G3

> Specification sheet

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Description

The KTA50-Series benefits from years of technical development and improvement to bring customers an innovative and future proof diesel engine that keeps pace with ever changing generator set requirements.

Recognised globally for its performance under even the most severe climatic conditions, the KTA50-Series is widely acknowledged as the most robust and cost-effective diesel engine in its power range for the generator set market.

CE

This engine has been built to comply with CE certification.

ISO 9001

This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO9002.

Features

Coolpac Integrated Design - Products are supplied complete with cooling package and air cleaner kit for a complete power package. Each component has been specifically developed and rigorously tested for G-Drive products, ensuring high performance, durability and reliability.

Aftercooler – Large capacity aftercoolers result in cooler, denser intake air for more efficient combustion and reduced internal stresses for longer life.

Cooling System – Gear driven centrifugal water pump. Large volume water passages provide even flow of coolant around cylinder liners, valves and injectors.

Pistons – Aluminium alloy, cam ground and barrel shaped to compensate for thermal expansion assures precise fit at operating temperatures. Grooved skirt finish provides superior lubrication. Oil cooled for rapid heat dissipation.

Service and Support - G-Drive products are backed by an uncompromising level of technical support and after sales service, delivered through a world class service network.

1500 rpm (50 Hz Ratings)

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
1227/1645	1097/1470	900/1206	1192/1598	1074/1440	877/1176	1120	1400	1020	1275	842	1052

1800 rpm (60 Hz Ratings)

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
1380/1850	1220/1635	1000/1340	1328/1781	1182/1585	962/1290	1250	1610	1135	1418	924	1154

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(07/09) (GDSS144)

General Engine Data

Type	4 cycle, In line, Turbocharged and After-cooled
Bore mm	158.8
Stroke mm	158.8
Displacement Litre	50
Cylinder Block	16-cylinder,direct injection, 4-cycle diesel engine
Battery Charging Alternator	55A
Starting Voltage	24V
Fuel System	Direct injection
Fuel Filter	Dual spin on paper element fuel filters with standard water separator
Lube Oil Filter Type(s)	Spin on full flow filter
Lube Oil Capacity (l)	177
Flywheel Dimensions	SAE 0

Coolpac Performance Data

Cooling System Design	Jacket Water After Cooled	
Coolant Ratio	50% ethylene glycol; 50% water	
Coolant Capacity (l)	152.0	
Limiting Ambient Temp (°C)**	55.6 (50Hz)	51.0 (60Hz)
Fan Power (kWm)	21.0 (50Hz)	36.0 (60Hz)
Cooling System Air Flow (m^3/s)**	30.3 (50Hz)	34.6 (60Hz)
Air Cleaner Type	Dry replaceable element with restriction indicator	

** @ 13 mm H^0

Weight & Dimensions

Length	Width	Height	Weight (dry)
mm	mm	mm	kg
3275	2000	2200	5900

Ratings Definitions

Emergency Standby Power (ESP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Limited-Time Running Power (LTP):
Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):
Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base Load (Continuous) Power (COP):
Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN6271 and BS 5514.

Fuel Consumption 1500 rpm (50 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	1227	1645	293	77.4
Prime Power				
100	1097	1470	261	69.0
75	822	1102	199	52.5
50	548	735	139	36.6
25	275	368	76	20.0
Continuous Power				
100	900	1206	216	57.1

Fuel Consumption 1800 rpm (60 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	1380	1850	330	87.3
Prime Power				
100	1220	1635	291	76.9
75	915	1226	222	58.7
50	610	818	157	41.6
25	305	409	89	23.6
Continuous Power				
100	1000	1340	242	63.8

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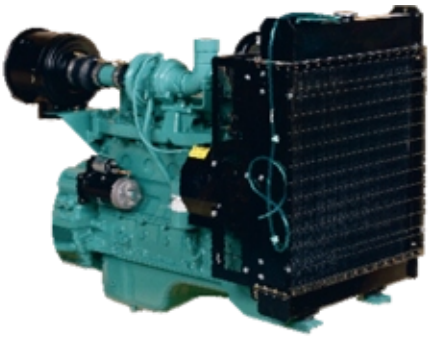

6BTA5.9-G3

> Specification sheet

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Description

The B5.9 engine has established an unrivalled reputation for reliability, incorporating features designed to maximise engine integration within OEM installation.

CE — This engine has been built to comply with CE certification.

ISO 9001 — This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO9002.

Features

Single Poly Vee belt drive for fan, alternator and water pump, with self-tensioning idler for minimum maintenance.

Inline-type Bosch A-Series pump operates at high injection pressures for cleaner combustion and lower emissions.

Spin-on fuel filter and full-flow lubricating oil filter.

Top mounted Holset HX35 turbocharger for increased power, fuel economy, and lower smoke and noise levels.

Coolpac Integrated Design - Products are supplied complete with cooling package and air cleaner kit for a complete power package. Each component has been specifically developed and rigorously tested for G-Drive products, ensuring high performance, durability and reliability.

Service and Support - G-Drive products are backed by an uncompromising level of technical support and after sales service, delivered through a world class service network.

1500 rpm (50 Hz Ratings)

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
135/181	122/164	RTF	132/177	119/160	RTF	120	150	109	136	RTF	RTF

1800 rpm (60 Hz Ratings)

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
154/207	140/188	RTF	151/203	136/183	RTF	125	156	114	143	RTF	RTF

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(02/11) (GDSS106)

General Engine Data

Type	4 cycle, in-line, Turbo Charged
Bore mm	102 mm (4.02 in.)
Stroke mm	120 mm (4.72 in.)
Displacement Litre	5.88 litre (359.0 in.^{3})
Cylinder Block	Cast iron, 6 cylinder
Battery Charging Alternator	65 amps
Starting Voltage	12 volt, 65 Amp negative ground
Fuel System	Direct injection
Fuel Filter	Spin-on fuel filters with water separator
Lube Oil Filter Type(s)	Spin-on full flow filter
Lube Oil Capacity (l)	16.4
Flywheel Dimensions	3/11.5

Coolpac Performance Data

Cooling System Design	Jacket Water After Cooled
Coolant Ratio	50% ethylene glycol; 50% water
Coolant Capacity (l)	27.0
Limiting Ambient Temp.**	54.0
Fan Power	7
Cooling System Air Flow (m^3/s)**	2.7
Air Cleaner Type	Dry replaceable element with restriction indicator

** @ 13 mm H^20

Weight & Dimensions

Length	Width	Height	Weight (dry)
mm	mm	mm	kg
1241	698	1152	500

Ratings Definitions

Emergency Standby Power (ESP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Limited-Time Running Power (LTP):
Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):
Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base Load (Continuous) Power (COP):
Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN6271 and BS 5514.

Fuel Consumption 1500 (50 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	135	181	34	9
Prime Power				
100	122	164	31	8.1
75	92	123	24	6.3
50	61	82	16	4.3
25	31	41	9	2.3
Continuous Power				
100	RTF	RTF	RTF	RTF

Fuel Consumption 1800 (60 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	154	207	40	10.5
Prime Power				
100	140	188	36	9.5
75	105	141	27	7.2
50	70	94	20	5.2
25	35	47	10	2.7
Continuous Power				
100	RTF	RTF	RTF	RTF

Cummins G-Drive Engines

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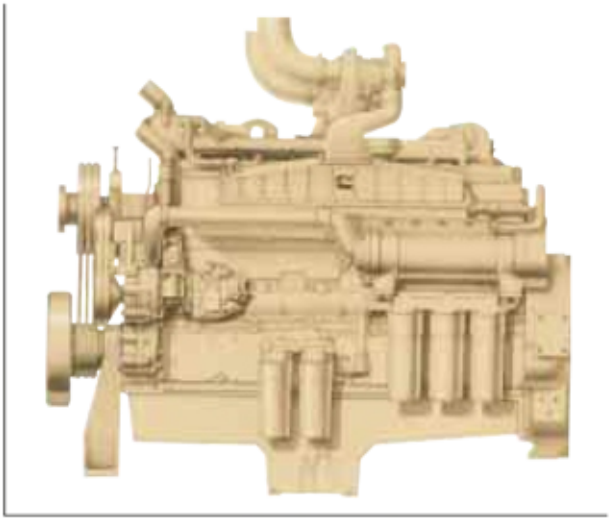
Our energy working for you.™

www.cumminsgdrive.com

(02/11) (GDSS106)

VTA28-G5
GENERATOR DRIVE

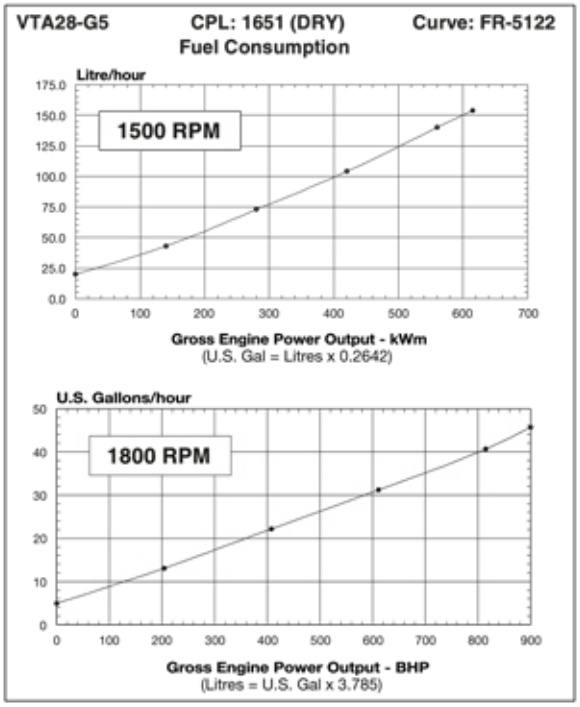


SPECIFICATIONS

4-Stroke Cycle, Turbocharged/Aftercooled,
V-12 Cylinder Diesel Engine.

1800 RPM Engine Output		
Standby Power Rating	**900 BHP**	**[671 kWm*]**
Prime Power Rating	**815 BHP**	**[608 kWm*]**
Continuous Power Rating	**675 BHP**	**[504 kWm*]**
1500 RPM Engine Output		
Standby Power Rating	**825 BHP**	**[615 kWm*]**
Prime Power Rating	**750 BHP**	**[560 kWm*]**
Continuous Power Rating	**660 BHP**	**[492 kWm*]**
* Refers to gross power available from engine, not generator set.		
Bore and Stroke	5.50 x 6.0 in.	[140x152 mm]
Displacement	1710 cu. in.	[28 L]
**Lube System Oil Capacity	21.9 U.S. gal.	[83 L]
Coolant Capacity	21.2 U.S. gal.	[80 L]
Net Weight with Standard Accessories, Dry	6,395 lb.	[2900 kg]
Approx. Overall Dimensions:		
Width	50.5 in.	[1283 mm]
Length	77.2 in.	[1960 mm]
Height	66.4 in.	[1685 mm]

** Bypass filters are included in total.



RATING GUIDELINES:

Standby Power Rating is applicable for supplying emergency electric power for the duration of the utility power outage. No overload capability is available for this rating. Under no condition is an engine allowed to operate in parallel with the public utility at the Standby Power rating.

Prime Power Rating is applicable for supplying electric power in lieu of commercially purchased power. Prime Power is the maximum power available at variable load for an unlimited number of hours. A 10% overload capability is available.

OPERATION at ELEVATED TEMPERATURE and ALTITUDE:

The engine may be operated at:

- 1800 RPM up to:
  4000 ft. (1220 m) and 104 °F (40 °C) without power deration.
- 1500 RPM up to:
  4000 ft. (1220 m) and 104 °F (40 °C) without power deration.

For sustained operation above these conditions derate by:
4% per 1,000 ft. (300 m) and 1% per 10 °F (2% per 11 °C).

PERFORMANCE:

Standard Conditions:

Data Shown Above Are Based On:

- Engine operating with fuel system, water pump, lubricating oil pump, air cleaner and exhaust silencer; not included are battery charging alternator, fan and optional driven components.
- Engine operating with diesel fuel corresponding to grade No. 2D per ASTM D975.
- ISO-3046, Part 1, Standard Reference Conditions of: 29.53 in. Hg. (100 kPa) barometric pressure (361 ft. [110 m] altitude), 77 °F (25 °C) air temperature and a relative humidity of 30%.

NOTES:

- For Continuous Power or Base Power, Interruptible Power (Utility Power Curtailment) and Peak Shaving, contact the local Cummins representative.
- Cummins Engine Company recommends that Cummins engines be operated at a minimum load of 30% of their respective Standby Power rating.

VTA28-G5
GENERATOR DRIVE

Design Features

Aftercooled: Two large capacity aftercoolers result in cooler, denser intake air for more efficient combustion and reduced internal stresses for longer life. Aftercooler is located in engine coolant system, eliminating need for special plumbing.

Bearings: Replaceable, precision type, steel backed inserts. Seven main bearings, 5.75 in. (146 mm) diameter. Connecting rod bearings 3.75 in. (95 mm) diameter.

Camshaft: Dual camshafts precisely control valve and injector timing. Lobes are induction hardened for long life. Fourteen replaceable precision type bushings 2.0 in. (51 mm) diameter.

Connecting Rods: Drop forged, I-beam section 12 in. (305 mm) center-to-center length. Rifle drilled for pressure lubrication of piston pin. Rod is tapered on piston pin end to reduce unit pressures. Rods are removable through cylinders.

Cooling System: Belt driven centrifugal water pump. Large volume water passages provide even flow of coolant around cylinder liners, valves and injectors. Dual modulating bypass thermostats regulate coolant temperature.

Crankshaft: High tensile strength steel forging with induction hardened fillets and journals. Fully counterweighted and dynamically balanced.

Cylinder Block: Alloy cast iron with removable wet liners. Cross bolt support to main bearing cap provides extra strength and stability.

Cylinder Heads: Alloy cast iron. Each head serves three cylinders. Drilled fuel supply and return lines. Valve seats are replaceable corrosion resistant inserts. Valve guides and cross head guides are replaceable inserts.

Cylinder Liners: Replaceable wet liners dissipate heat faster than dry liners and are easily replaced without reboring the block.

Fuel System: Cummins PT™ self-adjusting system. Integral dual flyweight governor provides overspeed protection independent of main governor. Camshaft actuated fuel injectors give accurate metering and timing. Fuel lines are internal drilled passages in cylinder heads. Spin-on fuel filter.

Gear Train: Timing gears and accessory drive gears are induction hardened helical gears driven from crankshaft and located at front of block.

Lubrication: Large capacity gear pump provides pressure lubrication to all bearings and oil supply for piston cooling. All pressure lines are internal drilled passages in block and heads. Oil cooler, full flow filters, and bypass filters maintain oil condition and maximize oil and engine life.

Pistons: Aluminum alloy, designed to compensate for thermal expansion assures precise fit at operating temperatures. Oil cooled for rapid heat dissipation. Two compression and one oil ring.

Piston Pins: Full floating, tubular steel retained by snap rings 2 in. (51 mm) diameter.

Turbocharger: Two Holset turbochargers mounted at top of engine. Turbocharging provides more power, improved fuel economy, altitude compensation, and lower smoke.

Valves: Dual 1.875 in. (48 mm) diameter poppet type intake and exhaust valves. Wear resistant face on exhaust valves.

Vibration Damper: Standard configuration equipped with a rubber member damper, recommended for use with all 1800 RPM ratings. 1500 RPM ratings should use the viscous damper.

Standard Equipment

Cooling System

1. Fan drive for radiator (0.63:1 drive ratio, 19.25 in. [489 mm] center).
2. Remote cooling capability.

Exhaust System:

1. Exhaust manifold, dry only.
2. Exhaust connection, 90° exhaust elbow for adapting flexible 5 in. (127 mm) tubing.

Filters: Fleetguard.

1. Corrosion resistor sized for a 37-69 gallon system.
2. Dual spin-on fuel filters.
3. Spin-on full flow lube filters with option of kit or mounted bypass filter.

Flywheel: To fit SAE-514 (18.375 in. [467mm] diameter) or SAE-518 (22.500 in. [572 mm] diameter) generator flexible drive disk. Complies with SAE standard J620.

Flywheel Housing: SAE No. 0 dry type.

Governors: Electric or hydraulic; for droop or isochronous operation. Cummins EFC (electric fuel control) or others.

Starting System:

1. Electric starter (24 volt positive engagement type).
2. Pre-engagement compressed air starter.
3. Battery charging alternator negative ground (24 volt, 35 ampere).

For other available equipment consult your local Cummins representative.

Agency Certification

Certification: Contact the local Cummins representative.

Cummins has always been a pioneer in product improvement. Thus, specifications may change without notice. Illustrations may include optional equipment.

Cummins Engine Company, Inc.
Box 3005
Columbus, IN 47202-3005
U.S.A.

Diesel Powered Generating Sets C400 D5

Standard Genset Features

Cummins water cooled Diesel engine,
Oil and fuel filter fitted, water separator,
Lube-oil drain valve fitted
Electric starter & Charge alternator 24 v D.C.
Electronic governor
Normal duty air filter
Single bearing alternator, class H/H , IP23
Standard voltage 400/230 volts 50 Hz
Exciter/Voltage reg - Torque Match as std
PCC2100 without Bargraph
3 pole MCCB
Welded steel base frame with A/V mounting,
Anti Vibration Mounts
Single skin metal fuel tank
Tank capacity of min 12 hours operation at 70% standby load
Loose 9 dB(A) silencer
Set mounted starting battery
Engine & Alternator Munsell Jade Green
Radiator and Guarding black
Packing under shrunk plastic film
Operation & Maintenance manual
Standard set of labels

Generator Set Performance

Voltage Regulation
Maintains voltage output to within ±1.0%.
At any power factor between 0.8 and 1.0
At any variations from No load to Full load.
At any variations from Cold to Hot.
At speed droop variations up to 4.5%.

Frequency Regulation
Isochronous under varying loads from no load to 100% full load when electronic governor is ?tted.

Random Frequency Variation
Will not exceed ±0.25% of its mean value for constant loads – no load to full load.

Waveform
Total harmonic distortion open circuit voltage waveform in the order of 1.8%. Three-phase balanced load in the order of 5.0%.

Telephone In?uence Factor (TIF)
TIF better than 50.
THF to BS 4999 Part 40 better than 2%.

Alternator Temperature Rise
Class H insulation.

Radio Interference
In compliance with BS 800 and VDE levels G and N.

Generator Set Options

Mechanical Options
Compliance - CE Certification (Guarding)

Fuel options
Fuel Tank deletion

Exhaust Options
Exhaust Silencer - Industrial (9 dB), In-Line
Exhaust Bellows
Exhaust Silencer - Residential (25 dB), In-Line
Installation Kit - Industrial Silencer

Warranty
Warranty - 5 Year Extended Standby Appln
Warranty - 2 Year Extended Prime Appln

Voltage Connections
277/480V, 3 Phase
254/440V, 3 Phase
240/416V, 3 Phase
230/400V, 3 Phase
220/380V, 3 Phase
127/220V
115/200V, 3 Phase
110/190V, 3 Phase

Miscellaneous Options
Coolant heater -240V
Battery Charger 240V,5A
PCC2100 with bargraph
Packing - Export Box
Packing - Export Box

Engine Specification

Cummins NTA855G4
In-line direct injection
6-cylinder diesel engine.
Type
Water cooled, four cycle
Turbocharged Aftercooled
Construction
Two valves per cylinder, forged steel crankshaft and connecting rods, cast iron block.
Starting
24 volt negative earth. Battery charging alternator 35 amp on engine. Cranking current 640 amps at 0°C.
Fuel System
24 volt fail safe actuator. Spin-on paper element fuel ?lters with Stanadyne fuel pump injection system with integral Electronic governor. Dual ?exible fuel lines and connectors. Standard fuel water separator.
Filters
Air cleaner with dry element and restriction indicator. Spin-on full ?ow lube oil ?lter.
Cooling
50°C radiator as std
Stone guard. Oil cooler. Drain Tap

Alternator Specification

Type
Brushless single bearing, revolving ?eld, pole, drip proof, screen protected.
Class H Insulation.
IC 01 cooling system.
Fully interconnected damper winding.
AC exciter and rotating recti?er unit.
Epoxy coated stator winding.
Rotor and exciter impregnated with tropical grade insulating oil and acid resisting polyester resin. Dynamically balanced rotor BS 5625 grade 2.5.
Sealed for life bearings.
Layer wound mechanically wedged rotor.

Exciter
Triple dipped in moisture, oil and acid resisting polyester varnish and coated with anti-tracking varnish.

Output windings with 2/3 pitch for improved harmonics and paralleling ability.
Close coupled engine/alternator for perfect alignment.

Compliance Standards

To BS4999/5000 pt 99,
VDE 0530, UTE5100,
NEMA MG1-22, CEMA,
IEC 34, CSA A22.2,
AS1359, BSS 5514,
ISO 3046 and ISO 8528

Model name	kVA		kWe	
	ESP	PRP	ESP	PRP
C400 D5	400	360	320	288

TECHNICAL DATA

Model	C400 D5	**Speed**	1500 rpm
Set output	380-440 V 50 Hz	**Alternator voltage regulation**	±1.0%
Prime Rating	288 kWe 360 kVA	**Alternator insulation class**	H
Standby Rating	320 kWe 400 kVA	**Fuel consumption (Prime)**	76 l/hr
Engine Make	Cummins	**Fuel consumption (Standby)**	84 l/hr
Engine Model	NTA855G4	**Lubrication system oil capacity**	38.6 Litres
Cylinders	Six	**Base fuel tank capacity – open set**	750 or 900 Litres
Engine build	In-line	**Coolant capacity**	65.8 Litres
Standard Governor/Class	Electronic/Class G2	**Exhaust temp – prime**	524°C
Aspiration and cooling	Turbocharged Aftercooled	**Exhaust gas flow – prime**	1128 l/s
Bore and stroke	140 mm x152 mm	**Exhaust gas back pressure max**	76 mm Hg
Compression Ratio	14:1	**Air flow – radiator***	5.99m3/s
Cubic capacity	14 Litres	**Air intake – engine (Prime)**	408 Litre/s
Starting/Min °C	Unaided / -7°C	**Minimum air opening to room**	2.10 sq m
Battery capacity	100 A/hr	**Minimum discharge opening**	1.39 sq m
Gross Engine output – Prime	317 kWm	**Pusher fan head (duct allowance)***	13 mm Wg
Gross Engine output – Standby	351 kWm	**Heat radiated by eng (Prime)**	46 kWm

PRIME POWER (PRP)

Prime power is available for an unlimited number of annual operating hours in variable load applications, in accordance with ISO8528-1.

A 10% overload capability is available for a period of 1 hour within a 12-hour period of operation, in accordance with ISO 3046-1.

STANDBY POWER RATING (ESP)

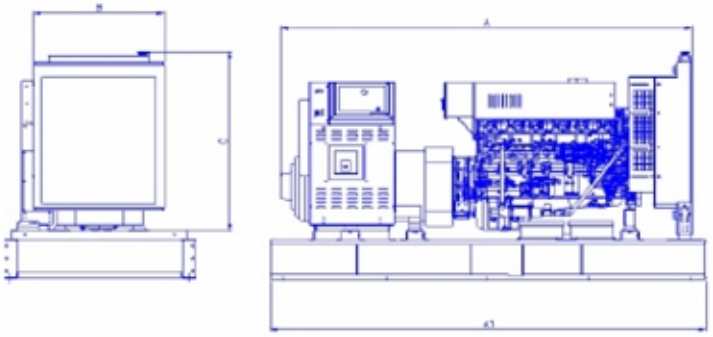
The Standby Power Rating is applicable for supplying emergency power for the duration of a utility power interruption. No overload, utility parallel or negotiated outage operation capability is available at this rating.

In installations served by unreliable utility sources (where outages last longer or occur more frequently), where operation is likely to exceed 200 hours per year, the prime power rating should be applied.

The Standby Power rating is only applicable for emergency and standby applications where the generator set serves as the back up to the normal utility source.

All ratings are based on the following reference conditions:

- Ambient temperature – 27oC - Altitude above sea level – 150 metres - Relative humidity – 60%



Dimensions and Weights

Model	Engine	Length (mm)	Width (mm)	Height (mm)	Set weight wet (Kg)	Set weight dry (Kg)	Enclosed Weight Wet (Kg)
C400 D5	NTA855G4	3549	1100	2028	2078	3643	3453

Specifications may change without notice

See your distributor for more information.

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Fax: +44 (0)1843 255902
Email: cpg.uk@cummins.com
www.cumminspower.com
www.cummins.com

Power Generation

Specification sheet

S3.8-G4

Fuel Optimized

Description

The Cummins ‘S Series‘ engine powered CoolPac sets offer the lowest cost of maintenance thereby proving to be the most economical power solution. With the robust design and integrated technologies, the S Series CoolPac can command an unrivalled reputation for reliability and performance.

The S series Engines have a distinguished reputation and long history for durability.

The rugged and reliable Cummins ‘S Series‘ Engines gives you a compact high performance engine design for your generator application.

This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO9002.

Features

Bosch - Direct injection in-line pump for cleaner, more efficient fuel consumption.

12 volt electrics package as standard, with starter, alternator and fuel solenoid.

SAE ‘3/10’ flywheel.

Low-Maintenance Fuel Filter Assembly – The Fuel filter Incorporates an integral water drain facility and a 500-hour filter life using standard Fleetguard® filters.

Low-Maintenance Lube Oil Filter Assembly – The Lube Oil filter also has a 500-hour filter life using standard Fleetguard® filters.

Integrated Design - CoolPac products are supplied fitted with cooling package and medium duty air cleaner for a complete power package. Each component has been specifically developed and rigorously tested for G-Drive products, ensuring high performance, durability and reliability.

Service and Support - G-Drive products are backed by an uncompromising level of technical support and after sales service, delivered through a world class service network.

1500 rpm (50 Hz ratings)

Gross engine output			Net engine output			Typical generator set output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
43.4/58.2	38.7/51.9	27.1/36.3	41.4/55.5	36.7/49.1	25.1/33.6	35	44	32	40	22.4	28

1800 rpm (60 Hz ratings)

Gross engine output			Net engine output			Typical generator set output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
-	-	-	-	-	-	-	-	-	-	-	-

General engine data

Type	In line, Radiator cooled
Bore mm	97 mm (3.82 in.)
Stroke mm	128 mm (5.0 in.)
Displacement litre	3.8 litre (232 in.^{3})
Cylinder block	Cast iron, 4 cylinder
Battery charging alternator	12V, 35 amps
Starting voltage	12 volt, negative ground
Fuel system	Direct injection
Fuel filter	Spin-on
Lube oil filter type(s)	Spin-on
Lube oil capacity (l)	10
Flywheel dimensions	SAE3/10

Coolpac performance data

Cooling system design	Jacket Water cooled
Coolant ratio	50% ethylene glycol; 50% water
Coolant capacity (l)	11
Limiting ambient temp.** (°C)	50
Fan power (kWm)	2
Cooling system air flow (m^3/s)**	0.84
Air cleaner type	Dry type, replaceable, medium duty

** @ 0.25" H20

Fuel consumption 1500 (50 Hz)

%	kWm	BHP	L/ph	g/kWh
Standby Power				
100	43.4	58.2	11.2	3
Prime Power				
100	38.7	51.9	9.9	2.6
75	28.9	38.9	7.6	2.0
50	21.5	28.8	5.4	1.4
25	9.7	13	3.5	0.9
Continuous Power				
100	27	36	7.2	1.9

Fuel consumption 1800 (60 Hz)

%	kWm	BHP	L/ph	g/kWh
Standby Power				
100	-	-	-	-
Prime Power				
100	-	-	-	-
75	-	-	-	-
50	-	-	-	-
25	-	-	-	-
Continuous Power				
100	-	-	-	-

Weights and dimensions

Length mm	Width mm	Height mm	Weight (dry) kg
1135	740	980	450

Ratings definitions

Emergency Standby Power (ESP):	Limited-Time Running Power (LTP):	Prime Power (PRP):	Base Load (Continuous) Power (COP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.	Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN6271 and BS 5514.

For more information contact your local Cummins distributor or visit cummins.com

Our energy working for you.™

S3.8-G4 (4/19)

6BTAA5.9-G6

> Specification sheet

Our energy working for you.™

Description

The B5.9 engine has established an unrivalled reputation for reliability, incorporating features designed to maximise engine integration within OEM installation. The 6BTAA5.9-G6 CoolPac utilises the latest Cummins manufacturing processes and Quality Standards.

CE — This engine has been built to comply with CE certification.

ISO 9001 — This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO 9002 orTS16949.

Features

Single Poly Vee belt drive for fan, alternator and water pump, with self-tensioning idler for minimum maintenance.

Rotary-type Bosch pump operates at high injection pressures for cleaner combustion and lower emissions.

Spin-on fuel filter and full-flow lubricating oil filter.

Top mounted Holset HX35 turbocharger for increased power, fuel economy, and lower smoke and noise levels.

CoolPac Integrated Design - Products are supplied complete with cooling package and air cleaner kit for a complete power package. Each component has been specifically developed and rigorously tested for G-Drive products, ensuring high performance, durability and reliability.

Service and Support - G-Drive products are backed by an uncompromising level of technical support and after sales service delivered through a world class service network.

1500 rpm (50 Hz Ratings)

Gross Engine Output			Typical Generator Set Output			
Standby	Prime	Base	Standby (ESP)		Prime (PRP)	
kWm/BHP			kWe	kVA	kWe	kVA
145/195	135/180	135/180	120	150	109	136

1800 rpm (60 Hz Ratings)

Gross Engine Output			Typical Generator Set Output			
Standby	Prime	Base	Standby (ESP)		Prime (PRP)	
kWm/BHP			kWe	kVA	kWe	kVA
160/215	150/205	145/195	135	169	123	153

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www.cumminsgdrive.com

EMERS-5815a-EN (11/13)

General Engine Data

Type	4- cycle, In-line, 6- cylinder, Turbocharged and Charge Air Cooled, Diesel
Bore mm	102 mm (4.02 in.)
Stroke mm	120 mm (4.72 in.)
Displacement Litre	5.9 litre (360.0 $in.^3$)
Cylinder Block	Cast iron, 6 cylinder
Battery Charging Alternator	55 amps
Starting Voltage	12 volt, 55 Amp negative ground
Fuel System	Direct injection
Fuel Filter	Venturi Combo Stratapore Filter
Lube Oil Filter Type(s)	Venturi Combo Stratapore Filter
Lube Oil Capacity (l)	16.4
Flywheel Dimensions	SAE3/11.5

Coolpac Performance Data

Cooling System Design	Charged Air Cooled
Coolant Ratio	50% ethylene glycol; 50% water
Total Coolant Capacity (l)	21.4
Limiting Ambient Temp**	50 Degrees
Fan Power (kWm)	10
Cooling System Air Flow (m^3/s)**	3.7 for 60Hz & 2.7 for 50Hz
Air Cleaner Type (heavy duty)	Dry replaceable element with restriction indicator

** @ 13 mm H_20

Ratings Definitions

Emergency Standby Power (ESP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

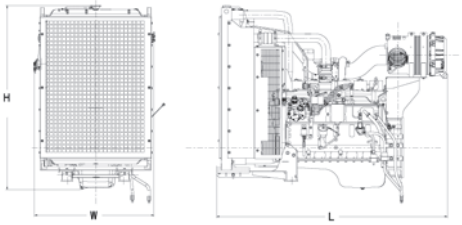
Limited-Time Running Power (LTP):
Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):
Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base Load (Continuous) Power (COP):
Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN6271 and BS 5514.

Weight and Dimensions

	Length	Width	Height	Weight (dry)
	mm	mm	mm	kg
CoolPac	1723	896	1380	718



Fuel Consumption 1500 (50 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	145	195	37.05	9.89
Prime Power				
100	135	180	35.16	9.46
75	101	165	26.58	7.14
50	68	91	17.92	4.80
25	34	46	9.43	2.50
Continuous Power				
100	135	180	35.16	9.46

Fuel Consumption 1800 (60 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	160	215	41.14	10.86
Prime Power				
100	150	205	36.46	10.42
75	113	152	31.47	8.31
50	75	101	20.71	5.46
25	38	51	11.71	3.09
Continuous Power				
100	145	195	36.59	9.66

Cummins G-Drive Engines

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EMERS-5815a-EN (11/13)

Specification sheet

S3.8-G7

Fuel Optimized

Description

The Cummins ‘S Series‘ engine powered CoolPac sets offer the lowest cost of maintenance thereby proving to be the most economical power solution. With the robust design and integrated technologies, the S Series CoolPac can command an unrivalled reputation for reliability and performance.

The S series Engines have a distinguished reputation and long history for durability.

The rugged and reliable Cummins ‘S Series‘ Engines gives you a compact high performance engine design for your generator application.

This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO9002.

Features

Bosch - Direct injection in-line pump for cleaner, more efficient fuel consumption.

12 volt electrics package as standard, with starter, alternator and fuel solenoid.

SAE ‘3/10’ flywheel.

Low-Maintenance Fuel Filter Assembly – The Fuel filter Incorporates an integral water drain facility and a 500-hour filter life using standard Fleetguard® filters.

Low-Maintenance Lube Oil Filter Assembly – The Lube Oil filter also has a 500-hour filter life using standard Fleetguard® filters.

Integrated Design - CoolPac products are supplied fitted with cooling package and medium duty air cleaner for a complete power package. Each component has been specifically developed and rigorously tested for G-Drive products, ensuring high performance, durability and reliability.

Service and Support - G-Drive products are backed by an uncompromising level of technical support and after sales service, delivered through a world class service network.

1500 rpm (50 Hz ratings)

Gross engine output			Net engine output			Typical generator set output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
64.9/87	59.6/79.9	41.7/55.9	62.9/84.2	57.6/77.1	39.7/53.1	53	66	48	60	34	42

1800 rpm (60 Hz ratings)

Gross engine output			Net engine output			Typical generator set output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
-	-	-	-	-	-	-	-	-	-	-	-

General engine data

Type	In line, Radiator cooled
Bore mm	97 mm (3.82 in.)
Stroke mm	128 mm (5.0 in.)
Displacement litre	3.8 litre (232 in.^{3})
Cylinder block	Cast iron, 4 cylinder
Battery charging alternator	12V, 35 amps
Starting voltage	12 volt, negative ground
Fuel system	Direct injection
Fuel filter	Spin-on
Lube oil filter type(s)	Spin-on
Lube oil capacity (l)	11
Flywheel dimensions	SAE3/10

Coolpac performance data

Cooling system design	Charge Air & Jacket Water Cooled
Coolant ratio	50% ethylene glycol; 50% water
Coolant capacity (l)	11
Limiting ambient temp.** (°C)	50
Fan power (kWm)	2
Cooling system air flow (m^3/s)**	0.99
Air cleaner type	Dry type, replaceable, medium duty

** @ 0.25" H20

Fuel consumption 1500 (50 Hz)

%	kWm	BHP	L/ph	g/kWh
Standby Power				
100	64.9	87	16.1	4.3
Prime Power				
100	59.6	79.9	14.7	3.9
75	44.7	59.9	11.0	2.9
50	29.8	40	6.1	1.6
25	14.9	20	4.5	1.2
Continuous Power				
100	41.7	55.9	10.6	2.8

Fuel consumption 1800 (60 Hz)

%	kWm	BHP	L/ph	g/kWh
Standby Power				
100	-	-	-	-
Prime Power				
100	-	-	-	-
75	-	--	-	-
50	-	-	-	-
25	-	-	-	-
Continuous Power				
100	-	-	-	-

Weights and dimensions

Length mm	Width mm	Height mm	Weight (dry) kg
1290	910	1080	500

Ratings definitions

Emergency Standby Power (ESP):	Limited-Time Running Power (LTP):	Prime Power (PRP):	Base Load (Continuous) Power (COP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.	Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN6271 and BS 5514.

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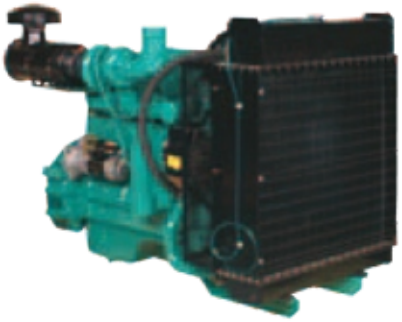
S3.8-G7 (4/19)

6CTA8.3-G2



> Specification sheet

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Description

C-Series engines have established an unrivalled reputation for reliability. Engines in the series incorporate features to reduce maintenance and enhance performance in order to meet the most demanding requirements of generator set operation..

CE	This engine has been built to comply with CE certification.
	This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO9002.

Features

Coolpac Integrated Design - Supplied with cooling package and air cleaner kit for a complete power package.

Single Poly Vee belt drive for fan, alternator and water pump, with self-tensioning idler for minimum maintenance.

Inline-type Bosch P-Series pump operates at high injection pressures for cleaner combustion and lower emissions.

Spin-on fuel filter and full-flow lubricating oil filter.

Top mounted Holset HX40W turbo- charger for increased power, fuel economy, and lower smoke and noise levels.

Service and Support - G-Drive products are backed by an uncompromising level of technical support and after sales service, delivered through a world class service network.

1500 rpm (50 Hz) Ratings

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
180/241	163/219	133/178	175/234	158/211	128/171	160	200	146	182	119	149

1800 rpm (60 Hz) Ratings

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
207/277	188/252	159/213	199/266	180/241	151/202	175	219	160	200	139	173

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(01/08) (GDSS107-RevA)

Power Generation

General Engine Data

Type	4 cycle, in-line, Turbo Charged
Bore mm	114 mm (4.49 in.)
Stroke mm	135 mm (5.32 in.)
Displacement Litre	8.3 litre (505.0 in.^{3})
Cylinder Block	Cast iron, 6 cylinder
Battery Charging Alternator	60 amps
Starting Voltage	24 volt, negative ground
Fuel System	Direct injection
Fuel Filter	Spin-on fuel filters with water separator
Lube Oil Filter Type(s)	Spin-on full flow filter
Lube Oil Capacity (l)	23.8
Flywheel Dimensions	2/11.5

Coolpac Performance Data

Cooling System Design	Jacket Water After Cooled
Coolant Ratio	50% ethlene glycol; 50% water
Coolant Capacity (l)	26.0
Limiting Ambient Temp.**	55.0
Fan Power	1.3
Cooling system air flow (m^3/s)**	3.7
Air Cleaner Type	Dry replaceable element with retriction indicator

** @ 13 mm H^2O

Ratings Definitions

Emergency Standby Power (ESP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

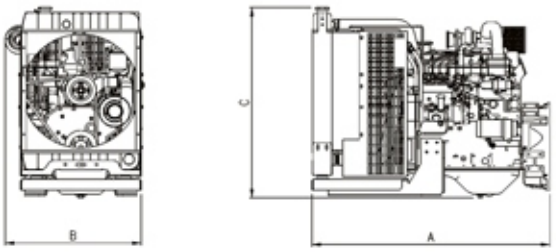
Limited-Time Running Power (LTP):
Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):
Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base Load (Continuous) Power (COP):
Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN6271 and BS 5514.

Weights & Dimension

Length	Width	Height	Weight (dry)
mm	mm	mm	kg
1417	831	1255	769



Fuel Consumption 1500 (50 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	180	241	45	11.9
Prime Power				
100	163	219	40	10.7
75	122	164	30	7.9
50	82	110	20	5.3
25	41	55	11	2.9
Continuous Power				
100	133	178	32	8.5

Fuel Consumption 1800 (60 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	207	277	53	14.1
Prime Power				
100	188	252	48	12.6
75	141	189	35	9.2
50	94	126	24	6.4
25	47	63	14	3.6
Continuous Power				
100	159	213	40	10.5

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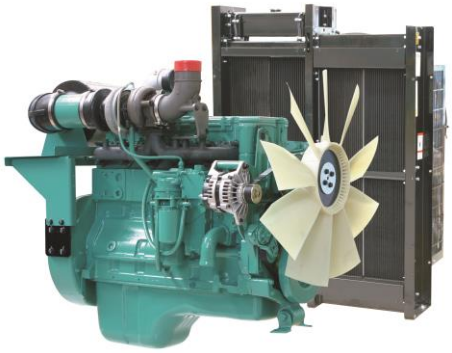
(01/08) (GDSS107-RevA)

Power Generation

Specification sheet

QSL9-G5

TA Luft Compliant



Description

Cummins QSL engines are built to deliver heavy-duty performance in every piece of machinery. Full-authority electronic engine controls combine with the high-pressure fuel system, 24-valve design and centred injectors for one of the highest power-to-weight ratios in its class, with up to 50% torque rise. At the same time, the QSL delivers better fuel economy, has better cold starting capability and is up to 50% quieter in operation than predecessors.

Features

Common Rail Fuel System and Controls - Bosch high pressure common rail (HPCR) - Optimize engine performance to provide seamless integration and advanced diagnostics and programming options.

Holset HX40 Wastegated Turbo - Wastegated design optimizes transient response.

Integrated Block Design - Integrated fluid circuits replace hoses and eliminate potential leaks.

24-Valve Cylinder Head – Four valves per cylinder for increased power with faster response and fuel economy.

Coolpac Integrated Design - Products are supplied complete with cooling package and air cleaner kit for a complete power package. Each component has been specifically developed and rigorously tested for G-Drive products, ensuring high performance, durability and reliability.

Service and Support - G-Drive products are backed by an uncompromising level of technical support and after sales service, delivered through a world class service network.

CE	This equipment is EU RoHS compliant and has been built to comply with CE certification requirement.
Registered To ISO 9001	This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO9002.

1500 rpm (50 Hz ratings)

Gross engine output			Net engine output			Typical generator set output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
310/415	268/359	228/305	297/398	258/345	218/292	264	330	240	300	203	254

1800 rpm (60 Hz ratings)

Gross engine output			Net engine output			Typical generator set output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
355/476	307/412	261/350	337/451	293/392	247/331	300	375	275	344	230	288

General engine data

Type	4 cycle, in-line, Turbo Charged, Air-cooled
Bore mm	114 mm (4.5 in.)
Stroke mm	145 mm (5.7 in.)
Displacement litre	8.8 litre (543 $in.^3$)
Cylinder block	Cast iron, 6 cylinder
Battery charging alternator	70 amps
Starting voltage	24 volt, negative ground
Fuel system	Direct injection
Fuel filter	Spin-on fuel filters with water separator
Lube oil filter type(s)	Spin-on full flow filter
Lube oil capacity (l)	26.5
Flywheel dimensions	SAE 1

Coolpac performance data

Cooling system design	Air-air Charge Cooled
Coolant ratio	50% ethylene glycol; 50% water
Coolant capacity (l)	36
Limiting ambient temp.** (°C)	50 (50Hz); 55 (60Hz)
Fan power (kWm)	11 (50Hz); 18 (60Hz)
Cooling system air flow (m^3/s)**	6.1 (50Hz); 7.8 (60Hz)
Air cleaner type	Light Duty Dry replaceable element with restriction indicator

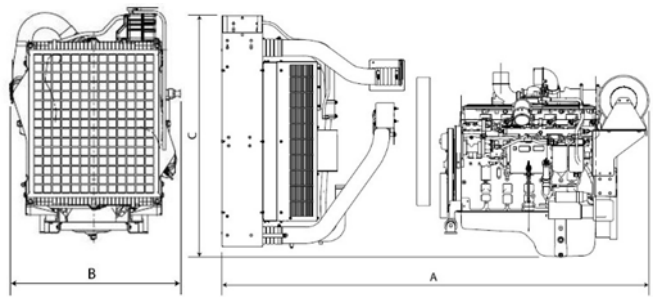
** @ 13mm H2O

Fuel consumption 1500 (50 Hz)

%	kWm	BHP	L/ph	g/kWh
Standby Power				
100	310	415	75	19.8
Prime Power				
100	268	359	63	16.6
75	201	269	46	12.1
50	134	180	31	8.2
25	67	90	17	4.4
Continuous Power				
100	228	305	53	13.9

Fuel Consumption 1800 (60Hz)

%	kWm	BHP	L/ph	g/kWh
Standby Power				
100	355	476	89	23.9
Prime Power				
100	307	412	75	19.9
75	231	309	55	14.4
50	154	206	36	9.6
25	77	103	20	5.3
Continuous Power				
100	261	350	63	16.5



Weights and dimensions

Length mm	Width mm	Height mm	Weight (dry) kg
2157	1126	1562	940

Ratings definitions

Emergency Standby Power (ESP):	Limited-Time Running Power (LTP):	Prime Power (PRP):	Base Load (Continuous) Power (COP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.	Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN6271 and BS 5514.

For more information contact your local Cummins distributor or visit power.cummins.com

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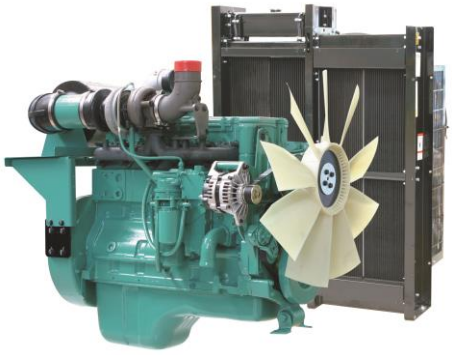
QSL9-G5 (4/19)

Specification sheet

QSL9-G3

EU Stage IIIA / EPA Tier 3 / TA Luft Compliant



Description

Cummins QSL engines are built to deliver heavy-duty performance in every piece of machinery. Full-authority electronic engine controls combine with the high-pressure fuel system, 24-valve design and centred injectors for one of the highest power-to-weight ratios in its class, with up to 50% torque rise. At the same time, the QSL delivers better fuel economy, has better cold starting capability and is up to 50% quieter in operation than predecessors.

Features

Common Rail Fuel System and Controls - Bosch high pressure common rail (HPCR) - Optimize engine performance to provide seamless integration and advanced diagnostics and programming options.

Holset HX40 Wastegated Turbo - Wastegated design optimizes transient response.

Integrated Block Design - Integrated fluid circuits replace hoses and eliminate potential leaks.

24-Valve Cylinder Head – Four valves per cylinder for increased power with faster response and fuel economy.

Coolpac Integrated Design - Products are supplied complete with cooling package and air cleaner kit for a complete power package. Each component has been specifically developed and rigorously tested for G-Drive products, ensuring high performance, durability and reliability.

Service and Support - G-Drive products are backed by an uncompromising level of technical support and after sales service, delivered through a world class service network.

CE	This equipment is EU RoHS compliant and has been built to comply with CE certification requirement.
Registered To ISO 9001	This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO9002.

1500 rpm (50 Hz ratings)

Gross engine output			Net engine output			Typical generator set output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
257/345	227/305	193/259	244/327	217/291	183/245	220	275	200	250	170	213

1800 rpm (60 Hz ratings)

Gross engine output			Net engine output			Typical generator set output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
297/399	262/352	178/238	280/275	248/332	164/219	250	313	227	284	152	190

General engine data

Type	4 cycle, in-line, Turbo Charged, Air-cooled
Bore mm	114 mm (4.5 in.)
Stroke mm	145 mm (5.7 in.)
Displacement litre	8.8 litre (543 $in.^3$)
Cylinder block	Cast iron, 6 cylinder
Battery charging alternator	70 amps
Starting voltage	24 volt, negative ground
Fuel system	Direct injection
Fuel filter	Spin-on fuel filters with water separator
Lube oil filter type(s)	Spin-on full flow filter
Lube oil capacity (l)	26.5
Flywheel dimensions	SAE1/14

Coolpac performance data

Cooling system design	Air-air Charge Cooled
Coolant ratio	50% ethylene glycol; 50% water
Coolant capacity (l)	15.0
Limiting ambient temp.** (°C)	55 (50Hz); 60 (60Hz)
Fan power (kWm)	10 (50Hz); 11 (60Hz)
Cooling system air flow (m^3/s)**	7.9 (50Hz); 8 (60Hz)
Air cleaner type	Light Duty Dry replaceable element with restriction indicator

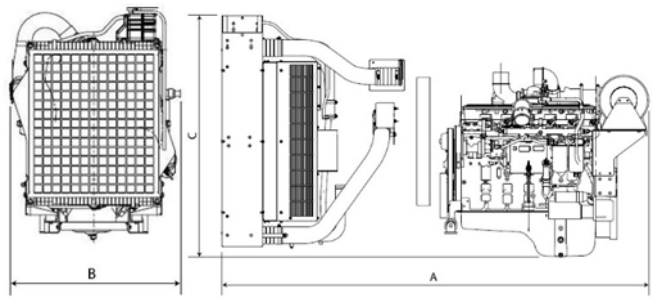
** @ 13mm H2O

Fuel consumption 1500 (50 Hz)

%	kWm	BHP	L/ph	g/kWh
Standby Power				
100	257	345	66	17.3
Prime Power				
100	227	305	59	15.6
75	170	228	49	13.0
50	114	152	34	8.9
25	57	76	18	4.7
Continuous Power				
100	193	259	53	14.1

Fuel Consumption 1800 (60Hz)

%	kWm	BHP	L/ph	g/kWh
Standby Power				
100	297	399	77	20.4
Prime Power				
100	262	352	70	18.5
75	197	264	58	15.2
50	131	176	41	10.8
25	66	88	21	5.6
Continuous Power				
100	178	238	53	14.1



Weights and dimensions

Length mm	Width mm	Height mm	Weight (dry) kg
2157	1126	1562	940

Ratings definitions

Emergency Standby Power (ESP):	Limited-Time Running Power (LTP):	Prime Power (PRP):	Base Load (Continuous) Power (COP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.	Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN6271 and BS 5514.

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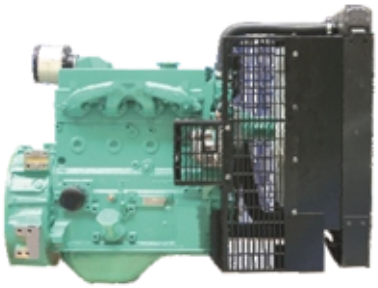
QSL9-G3 (4/19)

4BT3.3-G3

Emissions Compliance:
EU Stage II at 50 Hz
Unregulated Emissions at 60Hz



> Specification sheet

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Description

The B3.3 has all the strength and reliability the genset industry has come to expect from the B Series range but in a smaller, lighter and more economical package. The B3.3 features direct fuel injection, resulting in cleaner, quieter and more fuel efficient performance. With a highly compact 4 cylinder envelope and extremely low heat-rejection, the engine offers a high degree of installation flexibility.

CE — This engine has been built to comply with CE certification.

ISO 9001 — This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO9002.

Features

Bosch-Zexel VE - Direct injection in-line pump for cleaner, more efficient fuel consumption.

Parent Bore Block - Deep, stiff crankcase and optimised rib arrangement to enhance strength and reduce noise.

12 volt electrics package as standard, with starter, alternator and fuel solenoid.

Minimal derate for high altitude or high ambient applications.

Shallow oil pan and single spin-on oil filter.

SAE '4' flywheel housing.

Coolpac Integrated Design - Products are supplied complete with cooling package and air cleaner kit for a complete power package. Each component has been specifically developed and rigorously tested for G-Drive products, ensuring high performance, durability and reliability.

Service and Support - G-Drive products are backed by an uncompromising level of technical support and after sales service, delivered through a world class service network.

1500 rpm (50 Hz Ratings)

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
51/68	46/62	37/50	50/67	46/61	36/48	44	55	40	50	32	40

1800 rpm (60 Hz Ratings)

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
60/80	54/72	43/58	59/79	53/71	42/56	50	63	45	56	36	45

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(09/11) (GDSS159)

General Engine Data

Type	4 cycle, in-line, turbocharged
Bore mm	95 mm (3.74 in.)
Stroke mm	115 mm (4.53 in.)
Displacement Litre	3.3 litre (199 $in.^3$)
Cylinder Block	Cast iron, 4 cylinder
Battery Charging Alternator	45 amps
Starting Voltage	12 volt, negative ground
Fuel System	Direct injection
Fuel Filter	Spin-on fuel filters with water separator
Lube Oil Filter Type(s)	Spin-on full flow filter
Lube Oil Capacity (l)	7.5
Flywheel Dimensions	4/11

Coolpac Performance Data

Cooling System Design	Jacket Water	
Coolant Ratio	50% ethylene glycol; 50% water	
Coolant Capacity (l)	9.1	
	50Hz (1500rpm)	60Hz (1800rpm)
Limiting Ambient Temp (˚C)**	40	50
Fan Power (kWm)**	0.7	1.2
Cooling System Air Flow (m^3/s)**	1.18	1.6
Air Cleaner Type	Dry replaceable element with restriction indicator	

** @ 13 mm H^20

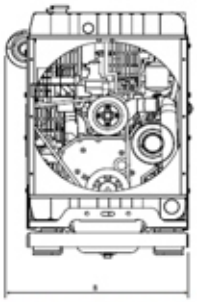
Ratings Definitions

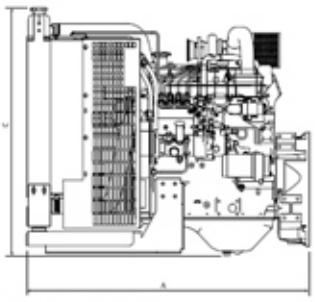
Emergency Standby Power (ESP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Limited-Time Running Power (LTP):
Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):
Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base Load (Continuous) Power (COP):
Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN6271 and BS 5514.





Coolpac Weight & Dimensions

Length	Width	Height	Weight (dry)
mm	mm	mm	kg
1069	625	870	299

Fuel Consumption 1500 (50 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	51	68	13	3.4
Prime Power				
100	46	62	11	3.0

Fuel Consumption 1800 (60 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	60	80	15	40
Prime Power				
100	54	72	13	3.5

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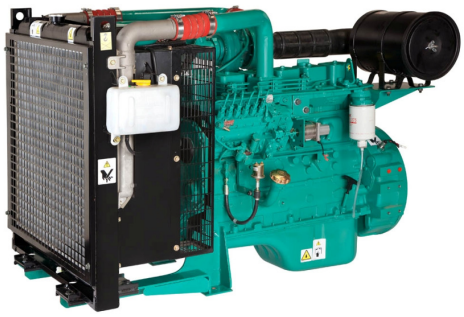
6BTAA5.9-G3



> Specification sheet

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Description

The B5.9 engine has established an unrivalled reputation for reliability, incorporating features designed to maximise engine integration within OEM installation. The 6BTAA5.9-G3 CoolPac is assembled in our new facility at Pirangut, India and utilises the latest Cummins manufacturing processes and Quality Standards.

CE — This engine has been built to comply with CE certification.

ISO 9001 — This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO 9002 orTS16949.

Features

Single Poly Vee belt drive for fan, alternator and water pump, with self-tensioning idler for minimum maintenance.

Inline-type Bosch VE-Series pump operates at high injection pressures for cleaner combustion and lower emissions.

Spin-on fuel filter and full-flow lubricating oil filter.

Top mounted Holset HX35 turbocharger for increased power, fuel economy, and lower smoke and noise levels.

Coolpac Integrated Design - Products are supplied complete with cooling package and air cleaner kit for a complete power package. Each component has been specifically developed and rigorously tested for G-Drive products, ensuring high performance, durability and reliability.

Service and Support - G-Drive products are backed by an uncompromising level of technical support and after sales service, delivered through a world class service network.

1500 rpm (50 Hz Ratings)

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
127/170	116/155	87/116	117/157	107/143	78/105	110	138	100	125	70	88

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General Engine Data

Type	4 cycle, in-line, Turbo Charged
Bore mm	102 mm (4.02 in.)
Stroke mm	120 mm (4.72 in.)
Displacement Litre	5.9 litre (360.0 $in.^3$)
Cylinder Block	Cast iron, 6 cylinder
Battery Charging Alternator	55 amps
Starting Voltage	12 volt, 55 Amp negative ground
Fuel System	Direct injection
Fuel Filter	Spin-on fuel filters with water separator
Lube Oil Filter Type(s)	Spin-on full flow filter
Lube Oil Capacity (l)	16.4
Flywheel Dimensions	3/11.5

Coolpac Performance Data

Cooling System Design	Jacket Water and Charge Air After Cooled
Coolant Ratio	50% ethylene glycol; 50% water
Coolant Capacity (l)	26
Limiting Ambient Temp.**	50DegC
Fan Power(hp)	8
Cooling System Air Flow (m^3/s)**	3.40
Air Cleaner Type (Medium Duty)	Dry replaceable element with restriction indicator

**** @ 13 mm $H^2$0 at 100% Prime**

Ratings Definitions

Emergency Standby Power (ESP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Limited-Time Running Power (LTP):
Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):
Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

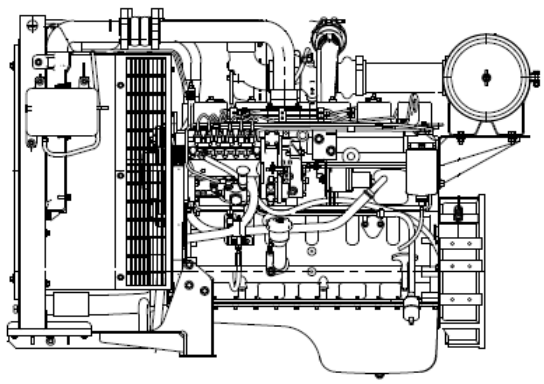
Base Load (Continuous) Power (COP):
Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN6271 and BS 5514.

Shipping Weight & Dimensions

	Length	Width	Height	Weight (dry)
	mm	mm	mm	kg
CoolPac	1862	1162	1551	525

Fuel Consumption 1500 (50 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	127	170	33	8.6
Prime Power				
100	116	155	29	7.7
75	87	116	21	5.6
50	58	78	14	3.7
25	29	39	8	2
Continuous Power				
100	87	116	21	5.6



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KTA38-G5

Typical picture

> Specification sheet

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Description

The KTA38-Series benefits from years of technical development and improvement to bring customers an innovative and future proof diesel engine that keeps pace with ever changing generator set requirements.

Recognized globally for its performance under even the most severe climatic conditions, the KTA38-Series is widely acknowledged as the most robust and cost-effective diesel engine in its power range for the generator set market.

CE — This engine has been built to comply with CE certification.

ISO 9001 — This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO9002.

Features

Aftercooler – Large capacity after cooler results in cooler, denser intake air for more efficient combustion and reduced internal stresses for longer life.

Fuel System – Cummins exclusive low pressure PT™ system with wear compensating pump and integral dual flyweight governor. Camshaft actuated fuel injectors give accurate metering and timing. Fuel lines are internal drilled passages in cylinder heads. Spin-on fuel filter.

Cooling System – Gear driven centrifugal water pump. Large volume water passages provide even flow of coolant around cylinder liners, valves and injectors. Bypass thermostats regulate coolant temperature. Spin-on corrosion resistors check rust and corrosion, control acidity and remove Impurities.

Cylinder Block – Alloy cast iron with removable wet liners. Cross bolt support to main bearing cap provides extra strength and stability.

Turbocharger – Cummins Turbo Technologies (CTT) exhaust gas driven turbocharger mounted at top of engine provides more power, improved fuel economy, altitude compensation, and lower smoke and noise levels.

Service and Support - G-Drive products are backed by an uncompromising level of technical support and after sales service, delivered through a world class service network.

1500 rpm (50 Hz Ratings)

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
970/1300	880/1180	656/880	937/1257	857/1149	633/849	880	1100	800	1000	600	750

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EMERS-5819b-EN (11/13)

General Engine Data

Type	4 cycle, Turbocharged and After-cooled
Bore mm	159
Stroke mm	159
Displacement Liter	38
Cylinder Block	12-cylinder,direct injection, 4-cycle diesel engine
Battery Charging Alternator	35A
Starting Voltage	24V
Fuel System	Direct injection, EFC (Electric Fuel control) governor
Fuel Filter	Dual spin on paper element fuel filters with standard water separator
Lube Oil Filter Type(s)	Spin on full flow filter
Lube Oil Capacity (l)	140
Flywheel Dimensions	SAE 0

Coolpac Performance Data

Cooling System Design	JWAC
Coolant Ratio	50% ethylene glycol; 50% water
Total Coolant Capacity (l)	218.5
Limiting Ambient Temp (°C)**	50
Fan Power (kWm)	20
Cooling System Air Flow (m^3/s)**	18.9
Air Cleaner Type	Dry replaceable element with restriction indicator

**** @ 13 mm H_20**

Ratings Definitions

Emergency Standby Power (ESP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

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Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):
Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base Load (Continuous) Power (COP):
Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN6271 and BS 5514.

Weight & Dimensions

Length	Width	Height	Weight (dry)
mm	mm	mm	kg
3172	1752	2004	4990

Note: Weights represent CoolPac with Light Duty Air Cleaner. See Outline drawings for weights and dimensions for Heavy Duty Air Cleaner configuration.

Fuel Consumption 1500 rpm (50 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	970	1300	228	60.3
Prime Power				
100	880	1180	209	55.1
75	660	885	161	42.5
50	440	590	113	29.9
25	220	295	65	17.3
Continuous Power				
100	656	880	158	41.7

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EMERS-5819b-EN (11/13)

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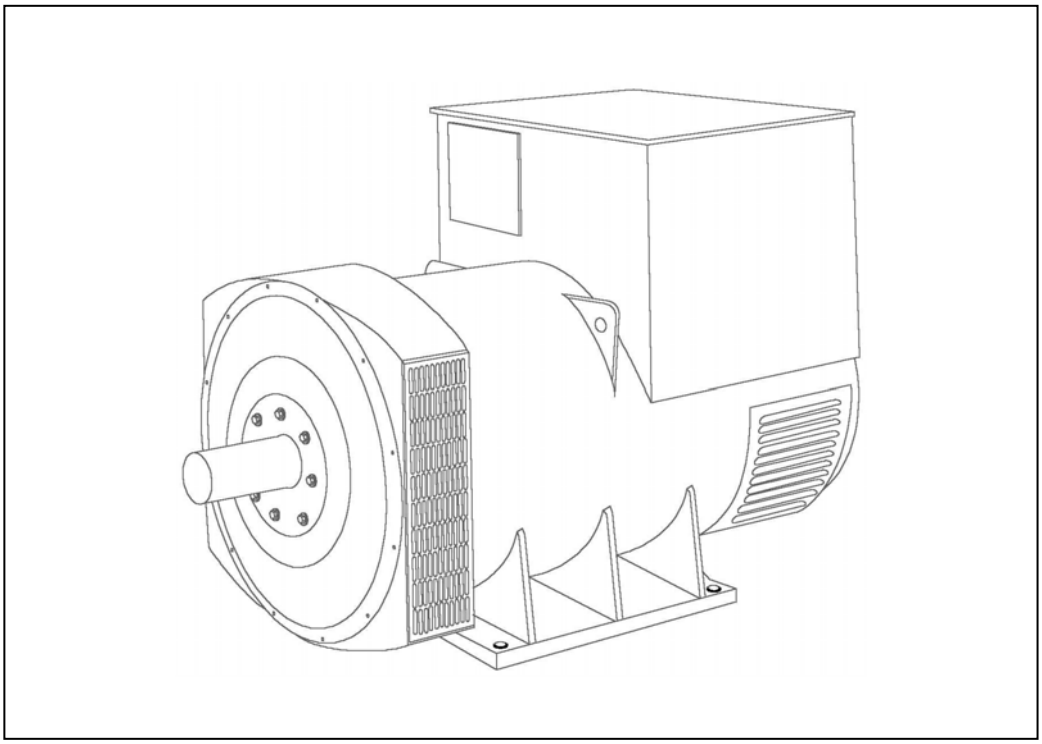
HCI634J - Technical Data Sheet



HCI634J

SPECIFICATIONS & OPTIONS

STANDARDS

Newage Stamford industrial generators meet the requirements of BS EN 60034 and the relevant section of other international standards such as BS5000, VDE 0530, NEMA MG1-32, IEC34, CSA C22.2-100, AS1359.
Other standards and certifications can be considered on request.

VOLTAGE REGULATORS

MX321 AVR - STANDARD

This sophisticated Automatic Voltage Regulator (AVR) is incorporated into the Stamford Permanent Magnet Generator (PMG) system and is fitted as standard to generators of this type.
The PMG provides power via the AVR to the main exciter, giving a source of constant excitation power independent of generator output. The main exciter output is then fed to the main rotor, through a full wave bridge, protected by a surge suppressor. The AVR has in-built protection against sustained over-excitation, caused by internal or external faults. This de-excites the machine after a minimum of 5 seconds.
Over voltage protection is built-in and short circuit current level adjustments is an optional facility.

WINDINGS & ELECTRICAL PERFORMANCE

All generator stators are wound to 2/3 pitch. This eliminates triplen (3rd, 9th, 15th …) harmonics on the voltage waveform and is found to be the optimum design for trouble-free supply of non-linear loads. The 2/3 pitch design avoids excessive neutral currents sometimes seen with higher winding pitches, when in parallel with the mains. A fully connected damper winding reduces oscillations during paralleling. This winding, with the 2/3 pitch and carefully selected pole and tooth designs, ensures very low waveform distortion.

TERMINALS & TERMINAL BOX

Standard generators feature a main stator with 6 ends brought out to the terminals, which are mounted on the frame at the non-drive end of the generator. A sheet steel terminal box contains the AVR and provides ample space for the customers' wiring and gland arrangements. It has removable panels for easy access.

SHAFT & KEYS

All generator rotors are dynamically balanced to better than BS6861:Part 1 Grade 2.5 for minimum vibration in operation. Two bearing generators are balanced with a half key.

INSULATION/IMPREGNATION

The insulation system is class 'H'.
All wound components are impregnated with materials and processes designed specifically to provide the high build required for static windings and the high mechanical strength required for rotating components.

QUALITY ASSURANCE

Generators are manufactured using production procedures having a quality assurance level to BS EN ISO 9001.

The stated voltage regulation may not be maintained in the presence of certain radio transmitted signals. Any change in performance will fall within the limits of Criteria 'B' of EN 61000-6-2:2001. At no time will the steady-state voltage regulation exceed 2%.

NB Continuous development of our products entitles us to change specification details without notice, therefore they must not be regarded as binding.

Front cover drawing typical of product range.

STAMFORD
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HCI634J

WINDING 312

CONTROL SYSTEM	SEPARATELY EXCITED BY P.M.G.	
A.V.R.	MX321	
VOLTAGE REGULATION	± 0.5 %	With 4% ENGINE GOVERNING
SUSTAINED SHORT CIRCUIT	REFER TO SHORT CIRCUIT DECREMENT CURVES (page 7)	

INSULATION SYSTEM	CLASS H							
PROTECTION	IP23							
RATED POWER FACTOR	0.8							
STATOR WINDING	DOUBLE LAYER LAP							
WINDING PITCH	TWO THIRDS							
WINDING LEADS	6							
STATOR WDG. RESISTANCE	0.002 Ohms PER PHASE AT 22°C STAR CONNECTED							
ROTOR WDG. RESISTANCE	2.09 Ohms at 22°C							
R.F.I. SUPPRESSION	BS EN 61000-6-2 & BS EN 61000-6-4,VDE 0875G, VDE 0875N. refer to factory for others							
WAVEFORM DISTORTION	NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%							
MAXIMUM OVERSPEED	2250 Rev/Min							
BEARING DRIVE END	BALL. 6224 (ISO)							
BEARING NON-DRIVE END	BALL. 6317 (ISO)							
	1 BEARING				2 BEARING			
WEIGHT COMP. GENERATOR	2279 kg				2300 kg			
WEIGHT WOUND STATOR	1120 kg				1120 kg			
WEIGHT WOUND ROTOR	962 kg				916 kg			
WR² INERTIA	22.9287 kgm^2				22.3814 kgm^2			
SHIPPING WEIGHTS in a crate	2328kg				2329kg			
PACKING CRATE SIZE	183 x 92 x 140(cm)				183 x 92 x 140(cm)			
	50 Hz				60 Hz			
TELEPHONE INTERFERENCE	THF<2%				TIF<50			
COOLING AIR	1.614 m³/sec 3420 cfm				1.961 m³/sec 4156 cfm			
VOLTAGE STAR	380/220	400/231	415/240	440/254	416/240	440/254	460/266	480/277
VOLTAGE DELTA	220	230	240	254	240	254	266	277
kVA BASE RATING FOR REACTANCE VALUES	1000	1000	1000	1000	1150	1200	1250	1300
Xd DIR. AXIS SYNCHRONOUS	3.02	2.73	2.54	2.26	3.49	3.25	3.10	2.96
X'd DIR. AXIS TRANSIENT	0.24	0.22	0.20	0.18	0.28	0.26	0.25	0.24
X"d DIR. AXIS SUBTRANSIENT	0.17	0.15	0.14	0.12	0.19	0.18	0.17	0.16
Xq QUAD. AXIS REACTANCE	1.78	1.61	1.50	1.33	2.05	1.91	1.82	1.74
X"q QUAD. AXIS SUBTRANSIENT	0.21	0.19	0.18	0.16	0.25	0.23	0.22	0.21
X_L LEAKAGE REACTANCE	0.09	0.08	0.08	0.07	0.10	0.10	0.09	0.09
X_2 NEGATIVE SEQUENCE	0.21	0.19	0.18	0.16	0.25	0.23	0.22	0.21
X_0 ZERO SEQUENCE	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.03
REACTANCES ARE SATURATED	VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED							

T'd TRANSIENT TIME CONST.	0.185
T"d SUB-TRANSTIME CONST.	0.025
T'do O.C. FIELD TIME CONST.	3.03
Ta ARMATURE TIME CONST.	0.046
SHORT CIRCUIT RATIO	1/Xd

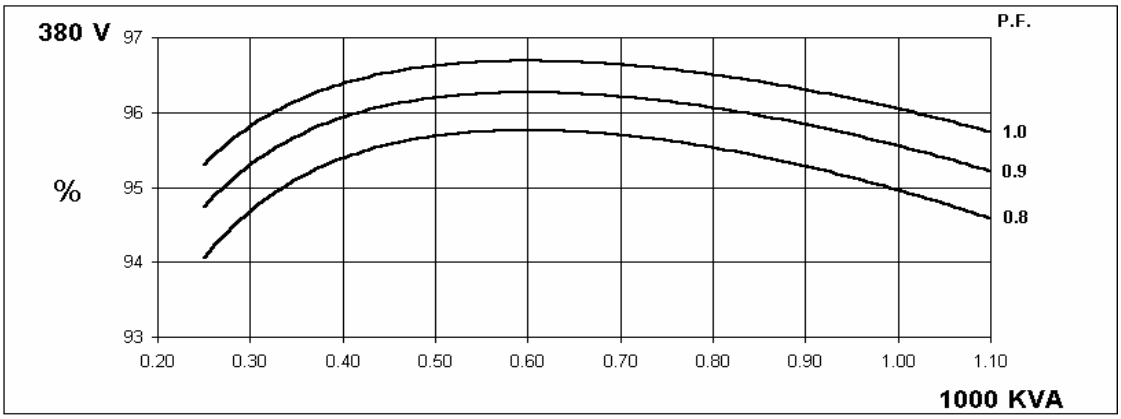
50 Hz

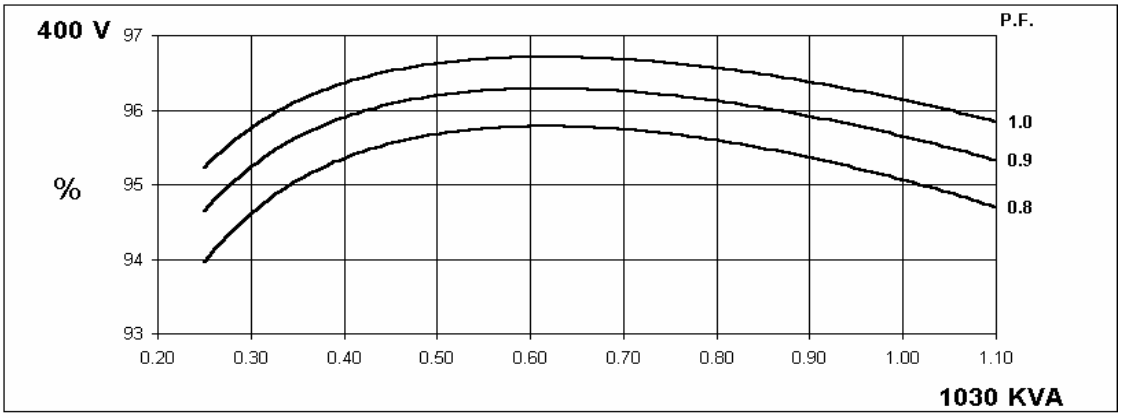
HCI634J

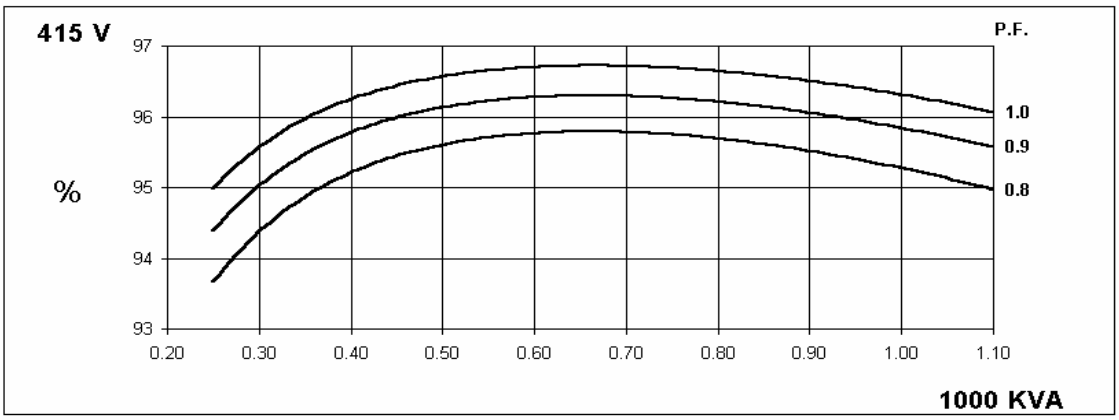
Winding 312

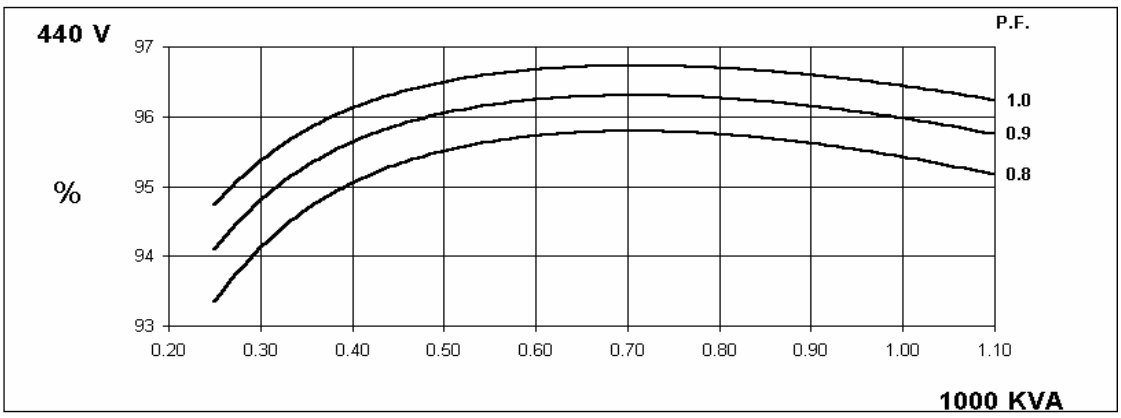
STAMFORD power generation

THREE PHASE EFFICIENCY CURVES









STAMFORD
power generation

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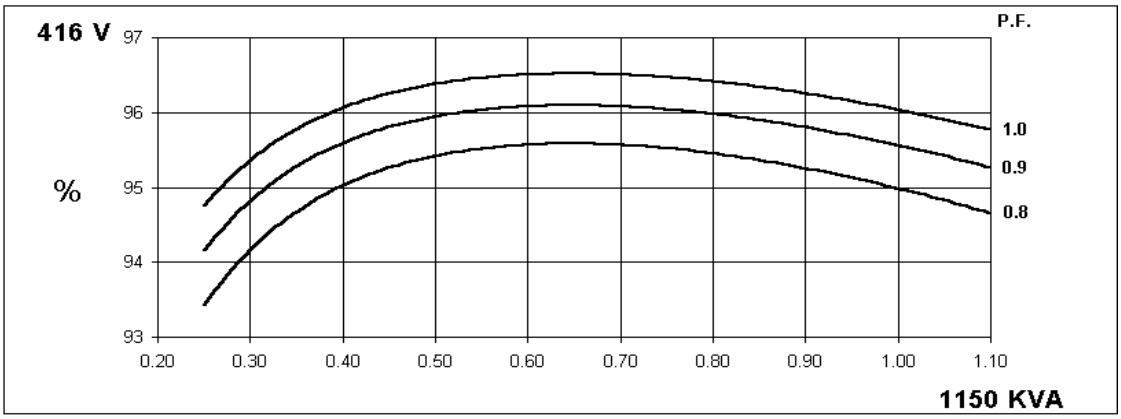
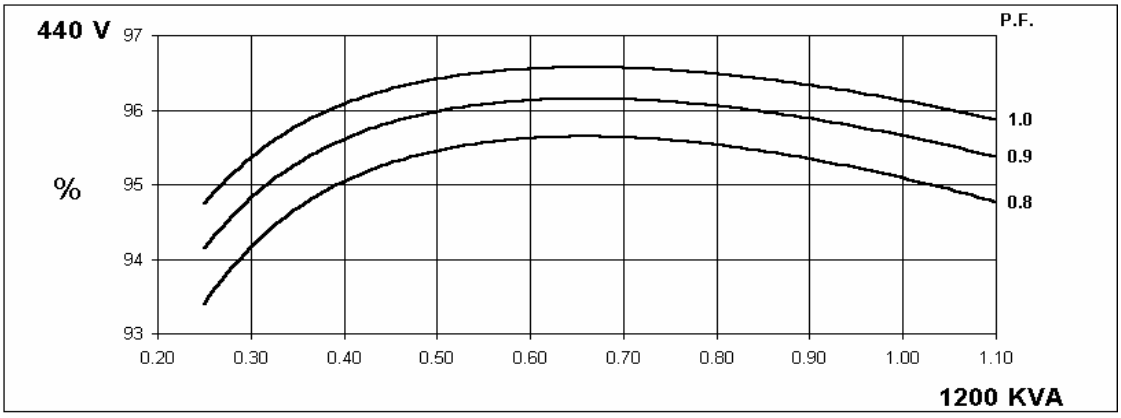
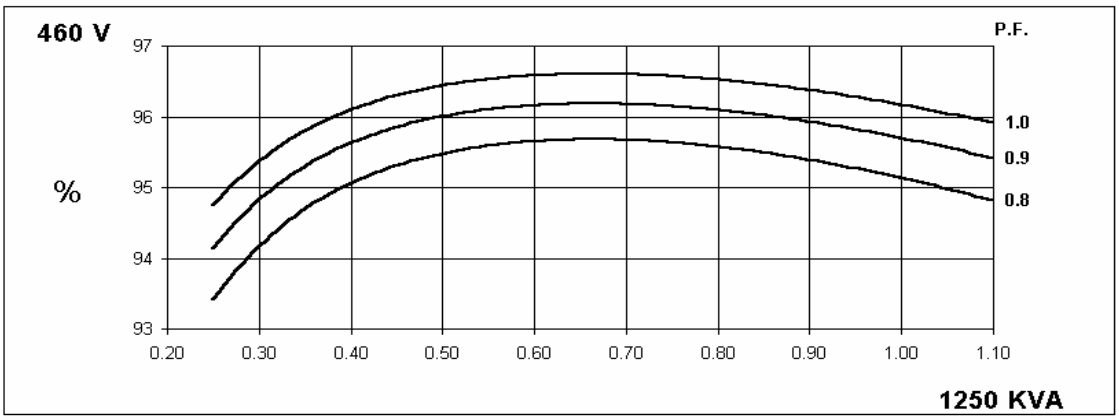
Winding 312

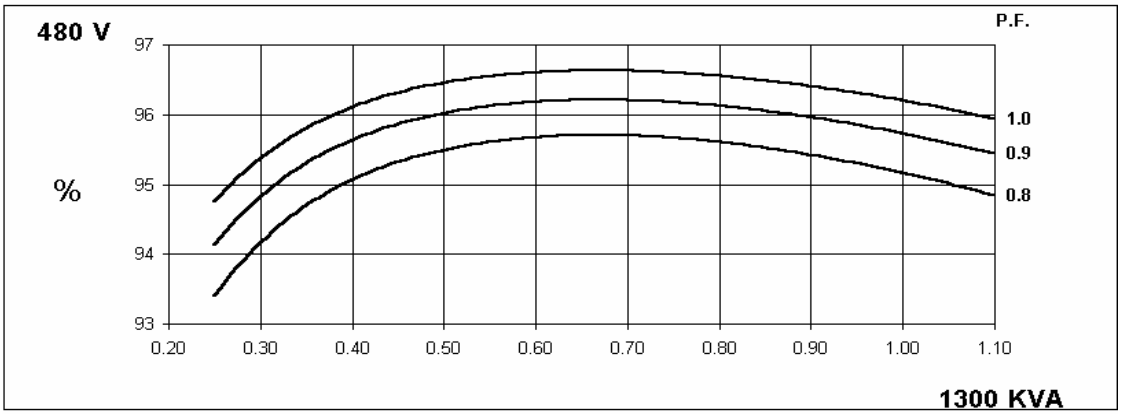
60 Hz

THREE PHASE EFFICIENCY CURVES









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Winding 312

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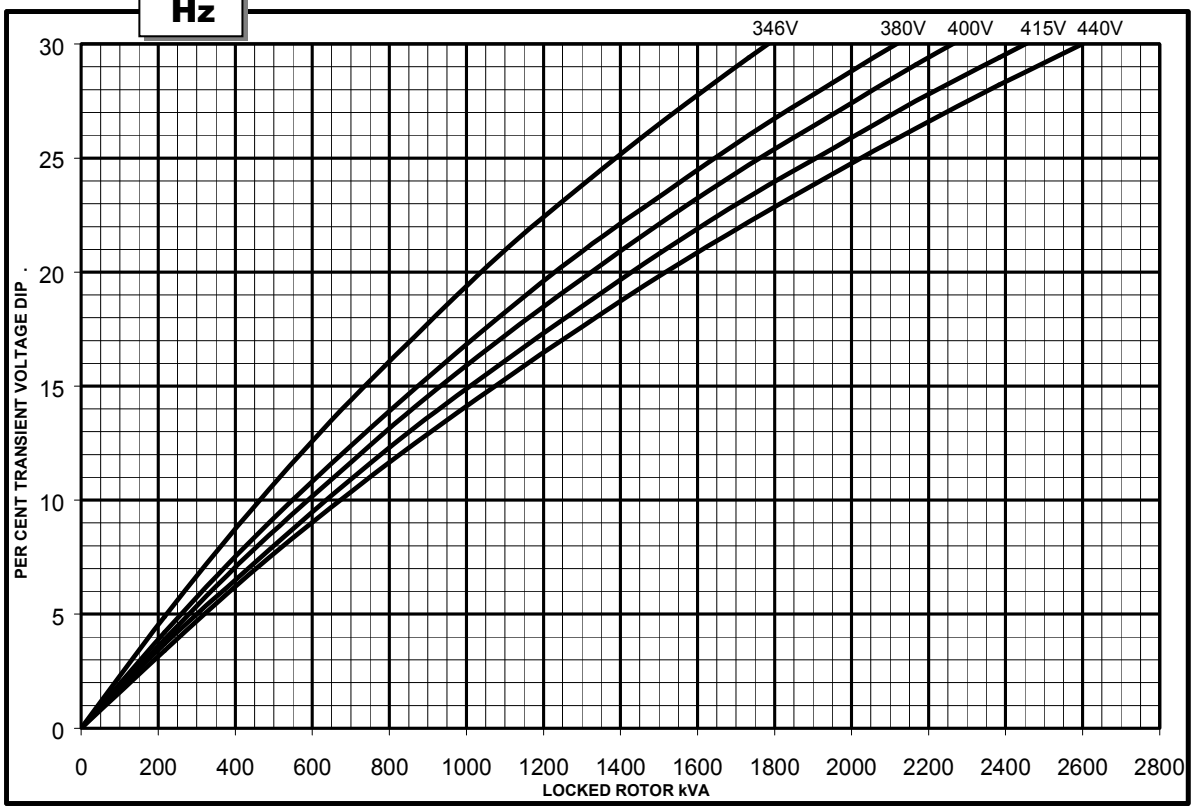
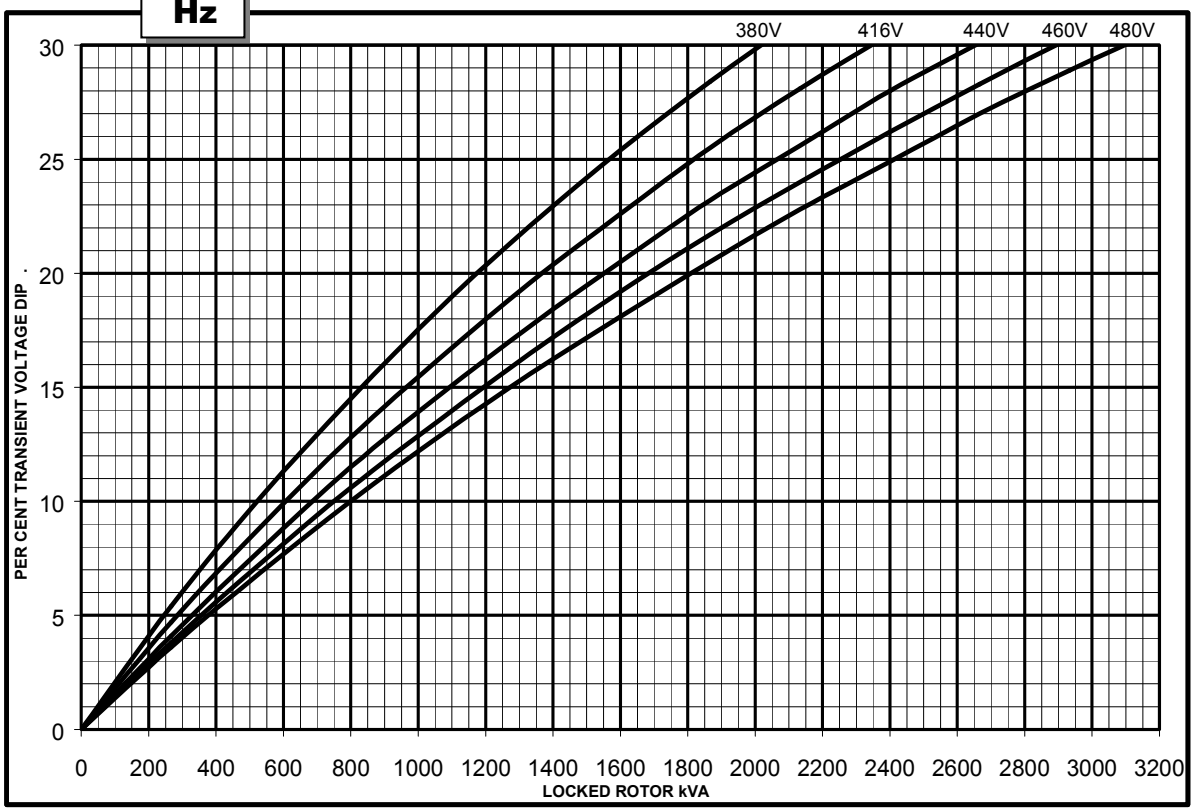
Locked Rotor Motor Starting Curve

50 Hz

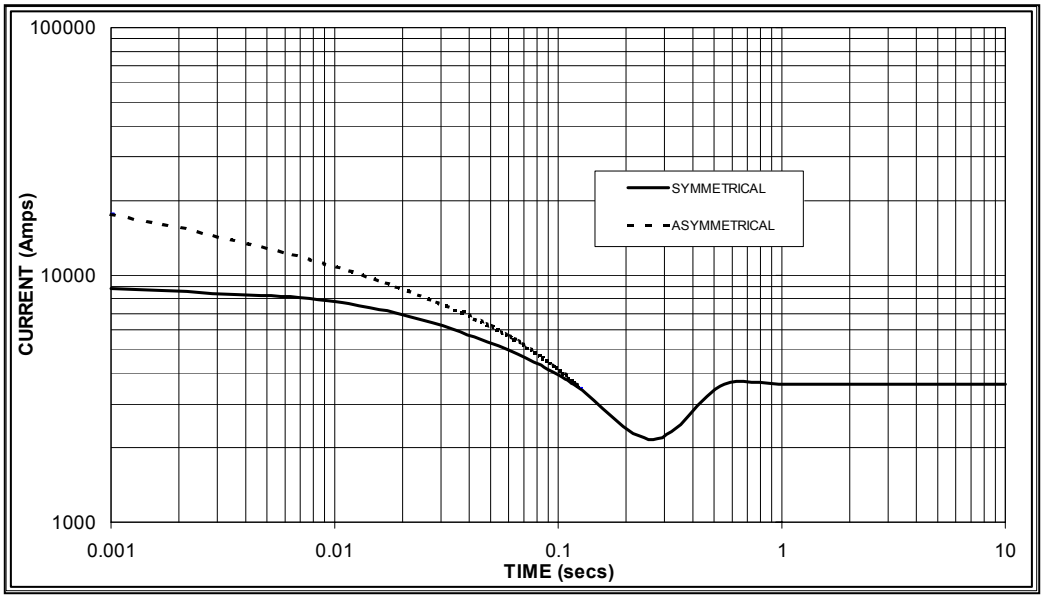


60 Hz



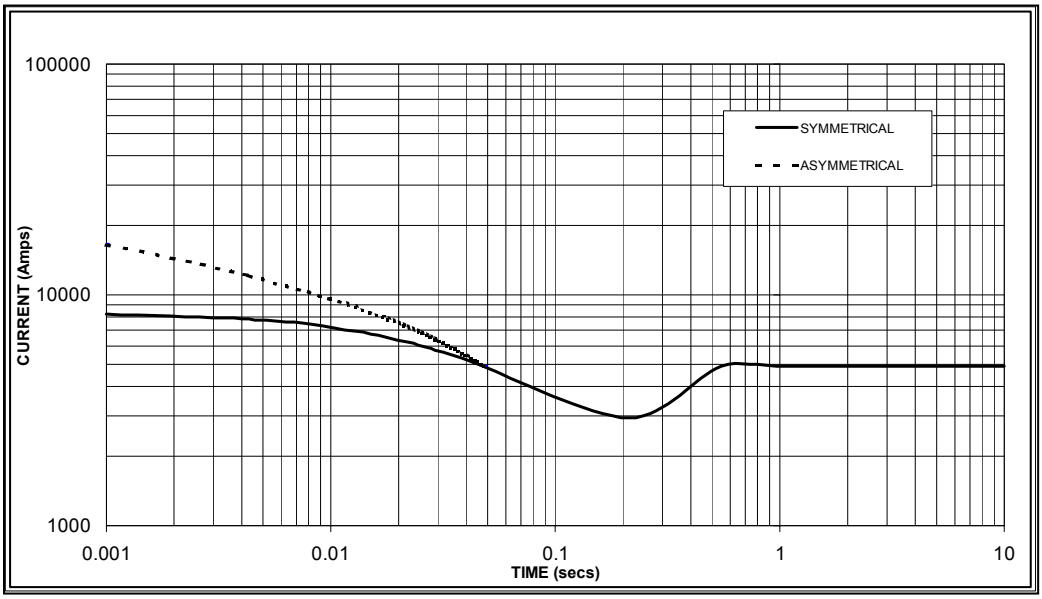
Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed Based on star (wye) connection.

50 Hz



Sustained Short Circuit = 3,600 Amps

60 Hz



Sustained Short Circuit = 4,900 Amps

Note 1

The following multiplication factors should be used to adjust the values from curve between time 0.001 seconds and the minimum current point in respect of nominal operating voltage :

50Hz		60Hz	
Voltage	Factor	Voltage	Factor
380v	X 1.00	416v	x 1.00
400v	X 1.07	440v	x 1.06
415v	X 1.12	460v	x 1.12
440v	X 1.18	480v	x 1.17

The sustained current value is constant irrespective of voltage level

Note 2

The following multiplication factor should be used to convert the values calculated in accordance with NOTE 1 to those applicable to the various types of short circuit :

	3-phase	2-phase L-L	1-phase L-N
Instantaneous	x 1.00	x 0.87	x 1.30
Minimum	x 1.00	x 1.80	x 3.20
Sustained	x 1.00	x 1.50	x 2.50
Max. sustained duration	10 sec.	5 sec.	2 sec.

All other times are unchanged

Note 3

Curves are drawn for Star (Wye) connected machines.
For Delta connection multiply the Curve current value by 1.732

HCI634J

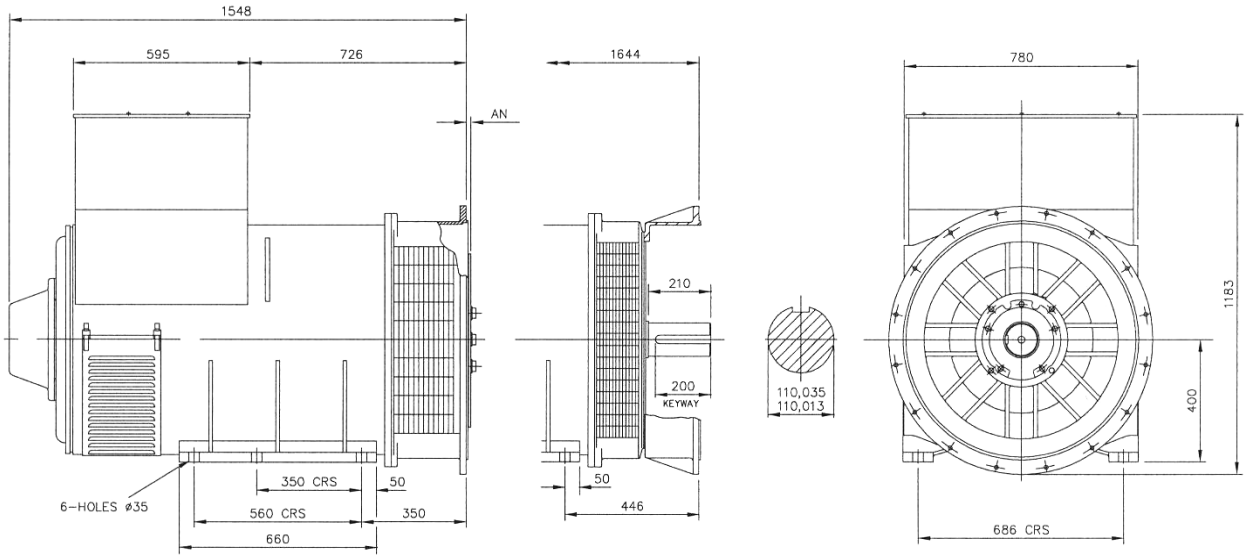
Winding 312 0.8 Power Factor

RATINGS

Class - Temp Rise		Cont. F - 105/40°C				Cont. H - 125/40°C				Standby - 150/40°C				Standby - 163/27°C			
50Hz	Star (V)	380	400	415	440	380	400	415	440	380	400	415	440	380	400	415	440
	Delta (V)	220	230	240	254	220	230	240	254	220	230	240	254	220	230	240	254
	kVA	900	927	900	900	1000	1030	1000	1000	1060	1070	1060	1060	1100	1110	1100	1100
	kW	720	742	720	720	800	824	800	800	848	856	848	848	880	888	880	880
	Efficiency (%)	95.3	95.4	95.5	95.6	95.0	95.1	95.3	95.4	94.7	94.9	95.1	95.3	94.6	94.8	95.0	95.2
	kW Input	756	777	754	753	842	866	839	839	895	902	892	890	930	937	926	924

60Hz	Star (V)	416	440	460	480	416	440	460	480	416	440	460	480	416	440	460	480
	Delta (V)	240	254	266	277	240	254	266	277	240	254	266	277	240	254	266	277
	kVA	1063	1100	1150	1188	1150	1200	1250	1300	1206	1250	1300	1350	1250	1300	1350	1400
	kW	850	880	920	950	920	960	1000	1040	965	1000	1040	1080	1000	1040	1080	1120
	Efficiency (%)	95.2	95.3	95.3	95.4	95.0	95.1	95.1	95.2	94.8	95.0	95.0	95.1	94.7	94.8	94.9	94.9
	kW Input	893	923	965	996	968	1009	1052	1092	1018	1053	1095	1136	1056	1097	1138	1180

DIMENSIONS



SAE	14	18	21	24
AN	25.4	15.87	0	0

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Tel: 00 44 (0)1780 484000 • Fax: 00 44 (0)1780 484100
Website: www.newage-avkseg.com

Generator set data sheet

Model: C38 D5 (X-Series)
Frequency: 50 Hz
Fuel type: Diesel

Spec sheet:	SS23-CPGK
Noise data sheet (open/enclosed):	ND50-OS550/ND50-CS550
Airflow data sheet:	AF50-550
Derate data sheet (open/enclosed):	DD50-OS550/DD50-CS550
Transient data sheet:	TD50-550

Fuel consumption

	Standby				**Prime**			
	kVA (kW)				**kVA (kW)**			
Ratings	38 (30.4)				35 (28)			
Load	**1/4**	**1/2**	**3/4**	**Full**	**1/4**	**1/2**	**3/4**	**Full**
gph	0.8	1.3	1.8	2.9	0.8	1.2	1.7	2.4
L/hr	3.2	4.8	7.0	10.8	3.1	4.5	6.4	9.0

Engine

	Standby rating	**Prime rating**
Engine manufacturer	Cummins	
Engine model	X 3.3 G1	
Configuration	4 cycle; In-line; 4 cylinder diesel	
Aspiration	Naturally aspirated	
Gross engine power output, kWm	36	32
BMEP at set rated load, kPa	863.9	767.9
Bore, mm	91.4	
Stroke, mm	127	
Rated speed, rpm	1500	
Piston speed, m/s	6.35	
Compression ratio	18.5:2	
Lube oil capacity, L	6.8	
Overspeed limit, rpm	1725	
Regenerative power, kW	2	
Governor type	Mechanical	
Starting voltage	12 Volts DC	

Fuel flow

Maximum fuel flow, L/hr	40
Maximum fuel inlet restriction, mm Hg	73.66
Maximum fuel inlet temperature, °C	60

Air	Standby rating	Prime rating
Combustion air, m^3/min	2.06	2.06
Maximum air cleaner restriction, kPa	2.5	

Exhaust

Exhaust gas flow at set rated load, m^3/min	2.29	2.29
Exhaust gas temperature, °C	600	550
Maximum exhaust back pressure, kPa	4.75	

Standard set-mounted radiator cooling

Ambient design, °C	50	
Fan load, kW_m	1.2	
Coolant capacity (with radiator), L	26	
Cooling system air flow, m^3/sec @ 12.7 mm H_2O	106	
Total heat rejection, Btu/min	1651	1537
Maximum cooling air flow static restriction, mm H_2O	TBC	

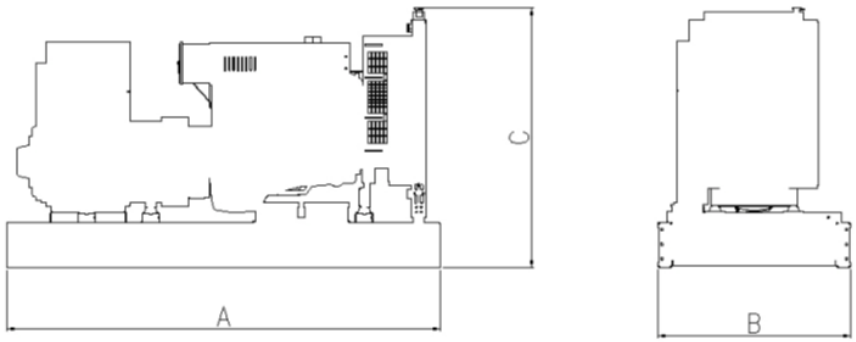
Weights*	Open	Enclosed
Unit dry weight, kgs	697	1057
Unit wet weight, kgs	872	1232

* Weights represent a set with standard features. See outline drawing for weights of other configurations.

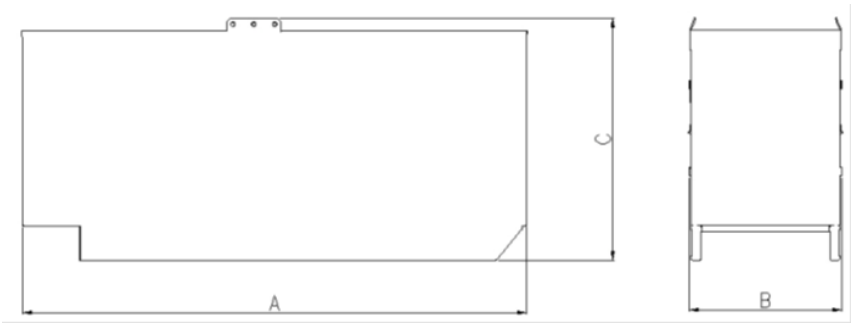
Dimensions	Length	Width	Height
Standard open set dimensions, mm	1753	930	1238
Enclosed set standard dimensions, mm	2253	969	1616

Genset outline

Open set



Enclosed set



Outlines are for illustrative purposes only. Please refer to the genset outline drawing for an exact representation of this model.

Alternator data

Connection	Temp rise ºC	Duty	Alternator	Voltage
Wye, 3-phase	163/125	S/P	PI144H	380-416 V
Wye, 3-phase	125/105	S/P	PI144J	380-440 V
Wye, 1-phase	163/125	S/P	PI144J	220-240 V

Ratings definitions

Emergency Standby Power (ESP):	Limited-Time running Power (LTP):	Prime Power (PRP):	Base load (Continuous) Power (COP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789 and DIN 6271.	Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.	Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789 and DIN 6271.	Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) is in accordance with ISO 8528, ISO 3046, AS 2789 and DIN 6271.

Formulas for calculating full load currents:

Three phase output

$$\frac{\text{kW} \times 1000}{\text{Voltage} \times 1.73 \times 0.8}$$

Single phase output

$$\frac{\text{kW} \times \text{SinglePhaseFactor} \times 1000}{\text{Voltage}}$$

For more information contact your local Cummins distributor or visit power.cummins.com

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DS94-CPGK (10/17)

QSK23-G3

> Specification sheet

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Description

The QSK23 is an in-line 6 cylinder engine with a 23 litre displacement. This Quantum series utilizes sophisticated electronics and premium engineering to provide outstanding performance levels, reliability and versatility for Standby, Prime and Continuous Power applications.

CE — This engine has been built to comply with CE certification.

ISO 9001 — This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO9002.

Features

The QSK23 uses the Cummins High Pressure Injection (HPI) PT full authority electronic fuel system. The HPI PT fuel system is managed by a G-Drive Governor Control System (GCS) controller, which is provided for off-engine mounting in the genset control panel. The Quantum Control has a specific fuel system board to interface with the HPI-PT fuel system and provides an Engine Protection package giving greater customer flexibility and cost effective alternatives in the control design and the benefits of Full Authority electronic control

CTT (Cummins Turbo Technologies) HX82 turbo-charging utilizes exhaust energy with greater efficiency for improved emissions and fuel consumption.

Charge Air Cooling - QSK23 engine requires the use of an Air-to-Air heat exchanger or Charge-Air-Cooler (CAC) to reduce intake manifold temperature and to meet the lower emissions requirements

CoolPac Integrated Design - Products are supplied complete with cooling package and air cleaner kit for a complete power package. Each component has been specifically developed and rigorously tested for G-Drive products, ensuring high performance, durability and reliability.

Service and Support - G-Drive products are backed by an uncompromising level of technical support and after sales service, delivered through a world class service network

1500 rpm (50 Hz Ratings)

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
768/1030	701/940	537/720	739/991	682/915	517/693	720	900	648	810	491	614

1800 rpm (60 Hz Ratings)

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
895/1200	809/1085	652/875	857/1149	776/1041	621/833	800	1000	727	909	583	729

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(04/09) (GDSS133)

General Engine Data

Type	4 cycle, Turbocharged
Bore mm	170
Stroke mm	170
Displacement Litre	23.1
Cylinder Block	Cast iron, 6 cylinder
Battery Charging Alternator	35A
Starting Voltage	24V
Fuel System	Direct injection Cummins HPI
Fuel Filter	Spin on fuel filters with water separator
Lube Oil Filter Type(s)	Spin on full flow filter
Lube Oil Capacity (l)	103
Flywheel Dimensions	SAE 0

Coolpac Performance Data

Cooling System Design	Air-air charge cooled	
Coolant Ratio	50% ethylene glycol; 50% water	
Coolant Capacity (l)	57	
Limiting Ambient Temp (°C)**	46.0 (50Hz)	50.5 (60Hz)
Fan Power (kWm)	17.3 (50Hz)	26.1 (60Hz)
Cooling System Air Flow (m^3/s)**	14.7 (50Hz)	23.6 (60Hz)
Air Cleaner Type	Dry replaceable element with restriction indicator	

** @ 13 mm H^20

Weight & Dimensions

Length	Width	Height	Weight (dry)
mm	mm	mm	kg
2885	1656	2029	3185

Ratings Definitions

Emergency Standby Power (ESP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Limited-Time Running Power (LTP):
Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):
Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base Load (Continuous) Power (COP):
Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN6271 and BS 5514.

Fuel Consumption 1500 (50 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	768	1030	178	46.9
Prime Power				
100	701	940	161	42.5
75	526	705	121	32.0
50	351	470	85	22.4
25	175	235	46	12.2
Continuous Power				
100	537	720	125	33.1

Fuel Consumption 1800 (60 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	895	1200	212	56.1
Prime Power				
100	809	1085	189	49.8
75	607	814	139	36.7
50	405	543	97	25.7
25	202	271	56	14.7
Continuous Power				
100	653	875	149	39.4

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(04/09) (GDSS133)

4BTA3.9-G3

> Specification sheet

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Description

The B3.9 has all the strength and reliability the genset industry has come to expect from the B Series range. The B3.9 features direct fuel injection, resulting in cleaner quieter and more fuel efficient performance.

CE	This engine has been built to comply with CE certification.
ISO 9001	This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO9002.

Features

Coolpac Integrated Design - Supplied with cooling package and air cleaner kit for a complete power package.

Single Poly Vee belt drive for fan, alternator and water pump, with self-tensioning idler for minimum maintenance.

Stanadyne DB4 injection pump features advance mechanism for reliable cold starting.

Spin-on fuel filter and full-flow lubricating oil filter.

Top mounted Holset HX30 turbocharger for increased power, fuel economy and lower smoke and noise levels.

Service and Support - G-Drive products are backed by an uncompromising level of technical support and after sales service, delivered through a world class service network.

1500 rpm (50 Hz) Ratings

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
81/108	73/97	RTF	78/105	70/94	RTF	30	38	28	35	RTF	RTF

1800 rpm (60 Hz) Ratings

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
97/130	87/117	RTF	93/125	84/113	RTF	80	100	73	91	RTF	RTF

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Power Generation

General Engine Data

Type	4 cycle, in-line, Turbo Charged
Bore mm	102 mm (4.02 in.)
Stroke mm	120 mm (4.72 in.)
Displacement Litre	3.9 litre (293.3 in.^{3})
Cylinder Block	Cast iron, 4 cylinder
Battery Charging Alternator	65 amps
Starting Voltage	12 volt, 65 Amp negative ground
Fuel System	Direct injection
Fuel Filter	Spin-on fuel filters with water separator
Lube Oil Filter Type(s)	Spin-on full flow filter
Lube Oil Capacity (l)	10.9
Flywheel Dimensions	3/11.5

Coolpac Performance Data

Cooling System Design	Jacket Water After Cooled
Coolant Ratio	50% ethlene glycol; 50% water
Coolant Capacity (l)	15.0
Limiting Ambient Temp.**	50.0
Fan Power	0.6
Cooling system air flow (m^3/s)**	48.0
Air Cleaner Type	Dry replaceable element with retriction indicator

** @ 13 mm H^2O

Ratings Definitions

Emergency Standby Power (ESP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

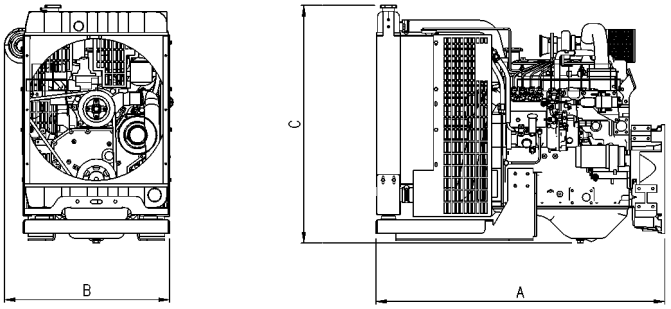
Limited-Time Running Power (LTP):
Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):
Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base Load (Continuous) Power (COP):
Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN6271 and BS 5514.

Weights & Dimension

Length	Width	Height	Weight (dry)
mm	mm	mm	kg
1110	630	870	350



Fuel Consumption 1500 (50 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	81	108	21	5.5
Prime Power				
100	73	97	18	4.9
75	61	82	14	3.7
50	41	55	9	2.5
25	20	27	5	1.4
Continuous Power				
100	RTF	RTF	RTF	RTF

Fuel Consumption 1800 (60 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	97	130	25	6.5
Prime Power				
100	87	117	22	5.9
75	65	87	17	4.5
50	44	59	12	3.3
25	22	29	7	1.9
Continuous Power				
100	RTF	RTF	RTF	RTF

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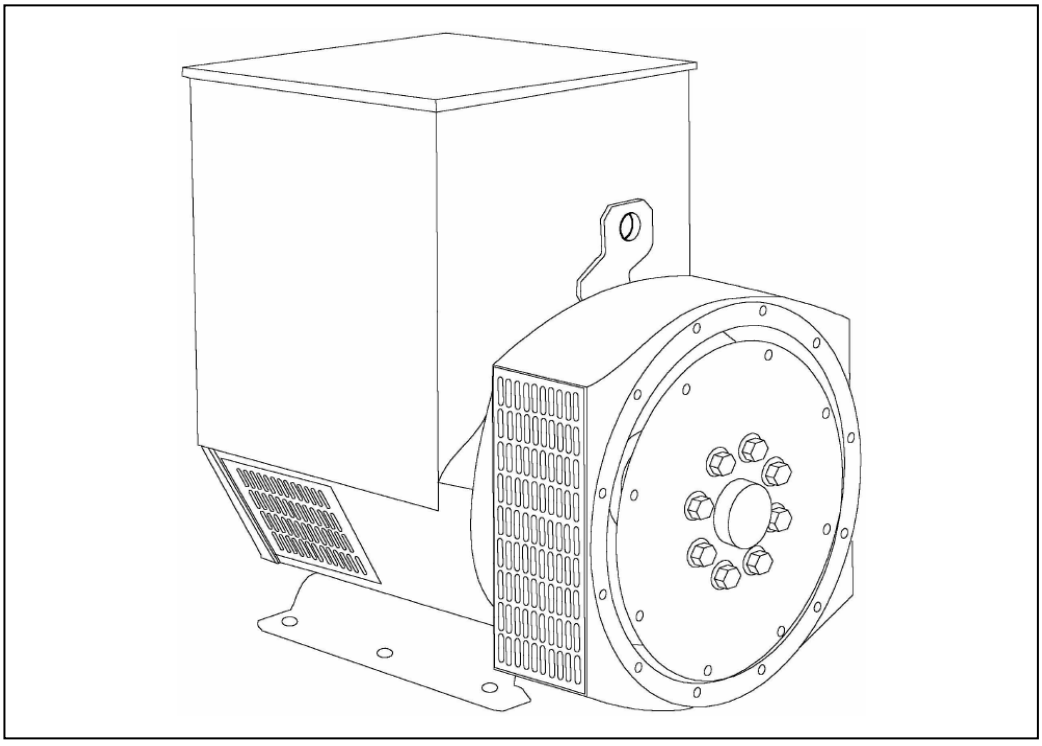
(01/08) (GDSS103-RevA)

Power Generation

STAMFORD®

UCI224C - Technical Data Sheet



SPECIFICATIONS & OPTIONS

STANDARDS
Newage Stamford industrial generators meet the requirements of BS EN 60034 and the relevant section of other international standards such as BS5000, VDE 0530, NEMA MG1-32, IEC34, CSA C22.2-100, AS1359.
Other standards and certifications can be considered on request.

VOLTAGE REGULATORS

SX460 AVR - STANDARD
With this self excited control system the main stator supplies power via the Automatic Voltage Regulator (AVR) to the exciter stator. The high efficiency semiconductors of the AVR ensure positive build-up from initial low levels of residual voltage.
The exciter rotor output is fed to the main rotor through a three phase full wave bridge rectifier. This rectifier is protected by a surge suppressor against surges caused, for example, by short circuit.

AS440 AVR
With this self-excited system the main stator provides power via the AVR to the exciter stator. The high efficiency semi-conductors of the AVR ensure positive build-up from initial low levels of residual voltage.
The exciter rotor output is fed to the main rotor through a three-phase full-wave bridge rectifier. The rectifier is protected by a surge suppressor against surges caused, for example, by short circuit or out-of-phase paralleling.
The AS440 will support a range of electronic accessories, including a 'droop' Current Transformer (CT) to permit parallel operation with other ac generators.

MX341 AVR
This sophisticated AVR is incorporated into the Stamford Permanent Magnet Generator (PMG) control system.
The PMG provides power via the AVR to the main exciter, giving a source of constant excitation power independent of generator output. The main exciter output is then fed to the main rotor, through a full wave bridge, protected by a surge suppressor. The AVR has in-built protection against sustained over-excitation, caused by internal or external faults. This de-excites the machine after a minimum of 5 seconds.
An engine relief load acceptance feature can enable full load to be applied to the generator in a single step.
If three-phase sensing is required with the PMG system the MX321 AVR must be used.
We recommend three-phase sensing for applications with greatly unbalanced or highly non-linear loads.

MX321 AVR
The most sophisticated of all our AVRs combines all the features of the MX341 with, additionally, three-phase rms sensing, for improved regulation and performance.
Over voltage protection is built-in and short circuit current level adjustments is an optional facility.

WINDINGS & ELECTRICAL PERFORMANCE
All generator stators are wound to 2/3 pitch. This eliminates triplen (3rd, 9th, 15th …) harmonics on the voltage waveform and is found to be the optimum design for trouble-free supply of non-linear loads. The 2/3 pitch design avoids excessive neutral currents sometimes seen with higher winding pitches, when in parallel with the mains. A fully connected damper winding reduces oscillations during paralleling. This winding, with the 2/3 pitch and carefully selected pole and tooth designs, ensures very low waveform distortion.

TERMINALS & TERMINAL BOX
Standard generators are 3-phase reconnectable with 12 ends brought out to the terminals, which are mounted on a cover at the non-drive end of the generator. A sheet steel terminal box contains the AVR and provides ample space for the customers' wiring and gland arrangements. It has removable panels for easy access.

SHAFT & KEYS
All generator rotors are dynamically balanced to better than BS6861:Part 1 Grade 2.5 for minimum vibration in operation. Two bearing generators are balanced with a half key.

INSULATION/IMPREGNATION
The insulation system is class 'H'.
All wound components are impregnated with materials and processes designed specifically to provide the high build required for static windings and the high mechanical strength required for rotating components.

QUALITY ASSURANCE
Generators are manufactured using production procedures having a quality assurance level to BS EN ISO 9001.

The stated voltage regulation may not be maintained in the presence of certain radio transmitted signals. Any change in performance will fall within the limits of Criteria 'B' of EN 61000-6-2:2001. At no time will the steady-state voltage regulation exceed 2%.

NB Continuous development of our products entitles us to change specification details without notice, therefore they must not be regarded as binding.

Front cover drawing typical of product range.

WINDING 311

CONTROL SYSTEM	SEPARATELY EXCITED BY P.M.G.		
A.V.R.	MX321	MX341	
VOLTAGE REGULATION	± 0.5 %	± 1.0 %	With 4% ENGINE GOVERNING
SUSTAINED SHORT CIRCUIT	REFER TO SHORT CIRCUIT DECREMENT CURVES (page 7)		

CONTROL SYSTEM	SELF EXCITED		
A.V.R.	SX460	AS440	
VOLTAGE REGULATION	± 1.0 %	± 1.0 %	With 4% ENGINE GOVERNING
SUSTAINED SHORT CIRCUIT	SERIES 4 CONTROL DOES NOT SUSTAIN A SHORT CIRCUIT CURRENT		

INSULATION SYSTEM	CLASS H						
PROTECTION	IP23						
RATED POWER FACTOR	0.8						
STATOR WINDING	DOUBLE LAYER CONCENTRIC						
WINDING PITCH	TWO THIRDS						
WINDING LEADS	12						
STATOR WDG. RESISTANCE	0.181 Ohms PER PHASE AT 22°C SERIES STAR CONNECTED						
ROTOR WDG. RESISTANCE	0.59 Ohms at 22°C						
EXCITER STATOR RESISTANCE	21 Ohms at 22°C						
EXCITER ROTOR RESISTANCE	0.071 Ohms PER PHASE AT 22°C						
R.F.I. SUPPRESSION	BS EN 61000-6-2 & BS EN 61000-6-4,VDE 0875G, VDE 0875N. refer to factory for others						
WAVEFORM DISTORTION	NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%						
MAXIMUM OVERSPEED	2250 Rev/Min						
BEARING DRIVE END	BALL. 6312-2RS (ISO)						
BEARING NON-DRIVE END	BALL. 6309-2RS (ISO)						
	1 BEARING				2 BEARING		
WEIGHT COMP. GENERATOR	271 kg				280 kg		
WEIGHT WOUND STATOR	75 kg				75 kg		
WEIGHT WOUND ROTOR	78.95 kg				70.58 kg		
WR² INERTIA	0.3987 kgm²				0.3667 kgm²		
SHIPPING WEIGHTS in a crate	294 kg				301 kg		
PACKING CRATE SIZE	97 x 57 x 96(cm)				97 x 57 x 96(cm)		
	50 Hz				60 Hz		
TELEPHONE INTERFERENCE	THF<2%				TIF<50		
COOLING AIR	0.216 m³/sec 458 cfm				0.281 m³/sec 595 cfm		
VOLTAGE SERIES STAR	380/220	400/231	415/240	440/254	416/240	440/254	460/266	480/277
VOLTAGE PARALLEL STAR	190/110	200/115	208/120	220/127	208/120	220/127	230/133	240/138
VOLTAGE SERIES DELTA	220/110	230/115	240/120	254/127	240/120	254/127	266/133	277/138
kVA BASE RATING FOR REACTANCE VALUES	42.5	42.5	42.5	40	50	52.5	52.5	55
Xd DIR. AXIS SYNCHRONOUS	2.42	2.19	2.03	1.70	3.03	2.84	2.60	2.50
X'd DIR. AXIS TRANSIENT	0.19	0.17	0.16	0.13	0.22	0.21	0.19	0.18
X"d DIR. AXIS SUBTRANSIENT	0.12	0.11	0.10	0.08	0.15	0.14	0.13	0.12
Xq QUAD. AXIS REACTANCE	1.12	1.01	0.94	0.79	1.40	1.31	1.20	1.16
X"q QUAD. AXIS SUBTRANSIENT	0.16	0.14	0.13	0.11	0.14	0.13	0.12	0.12
X_L LEAKAGE REACTANCE	0.08	0.08	0.07	0.06	0.10	0.09	0.09	0.08
X_2 NEGATIVE SEQUENCE	0.14	0.13	0.12	0.10	0.14	0.13	0.12	0.12
X_0 ZERO SEQUENCE	0.10	0.09	0.08	0.07	0.10	0.09	0.09	0.08
REACTANCES ARE SATURATED	VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED						
T'd TRANSIENT TIME CONST.	0.025 s						
T"d SUB-TRANSTIME CONST.	0.006 s						
T'do O.C. FIELD TIME CONST.	0.65 s						
Ta ARMATURE TIME CONST.	0.005 s						
SHORT CIRCUIT RATIO	1/Xd						

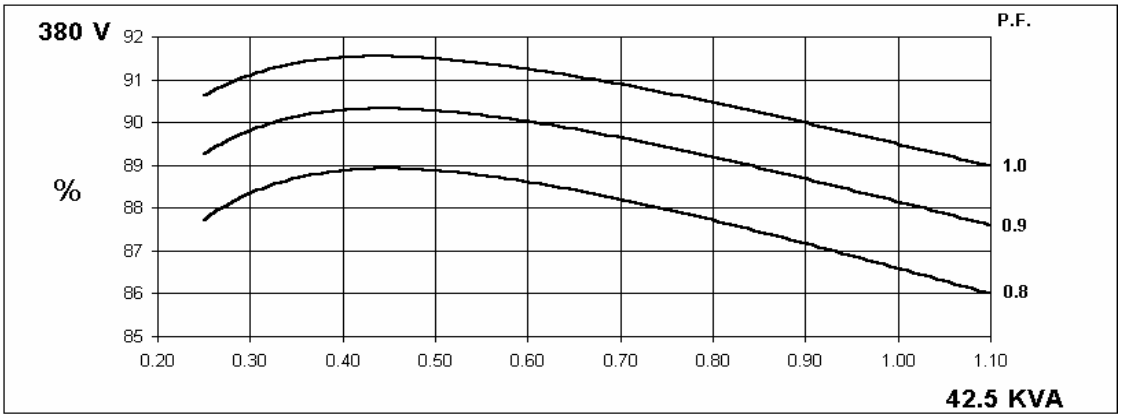
50 Hz

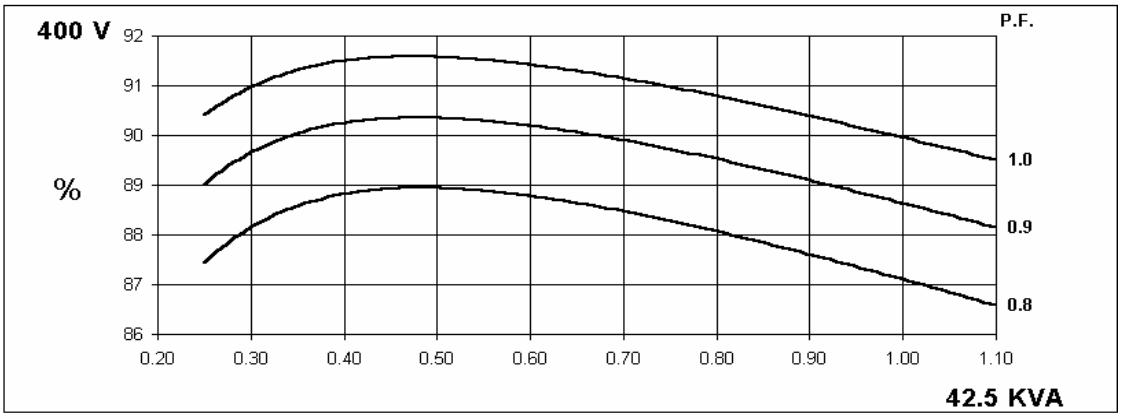
UCI224C

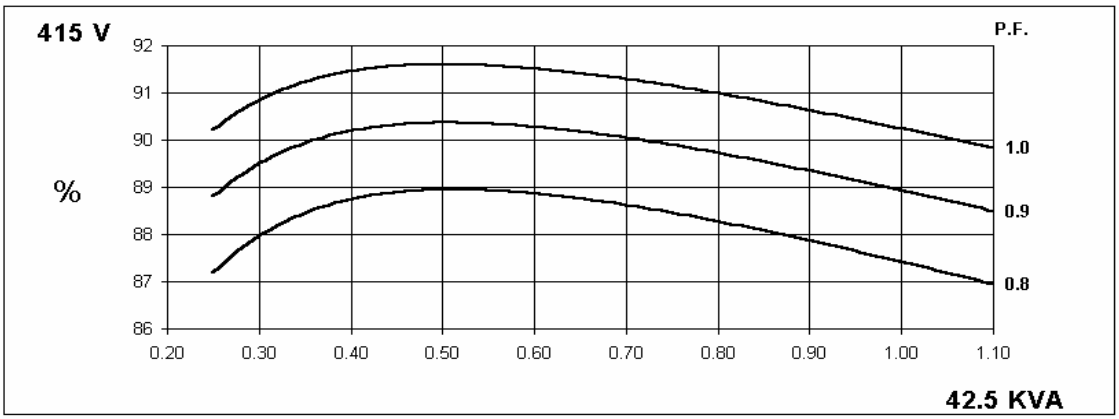
Winding 311

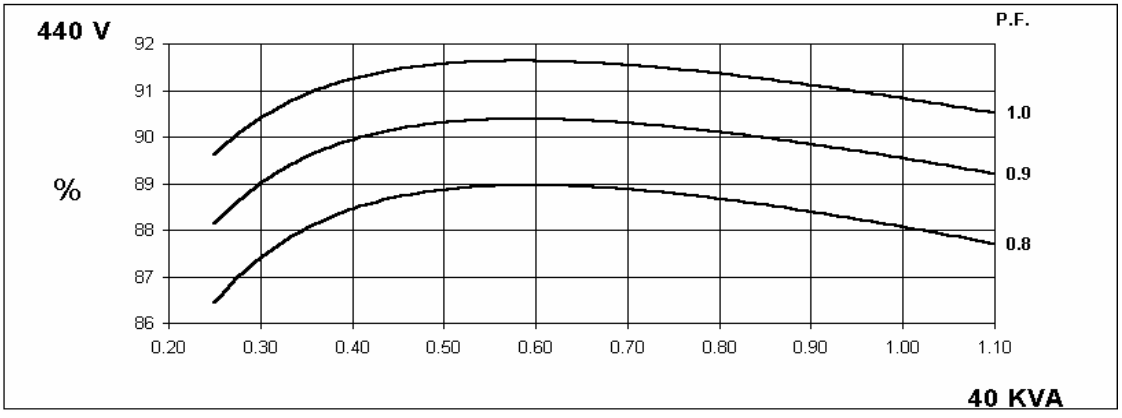
STAMFORD

THREE PHASE EFFICIENCY CURVES









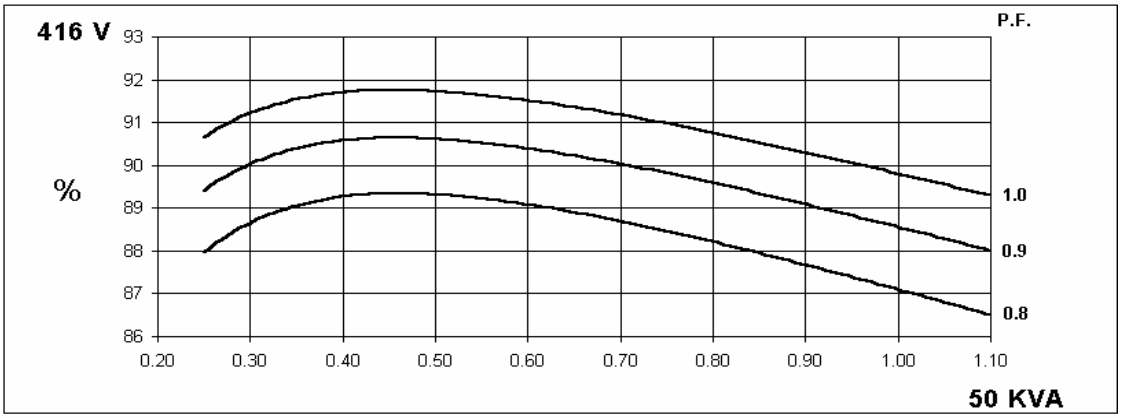
60 Hz

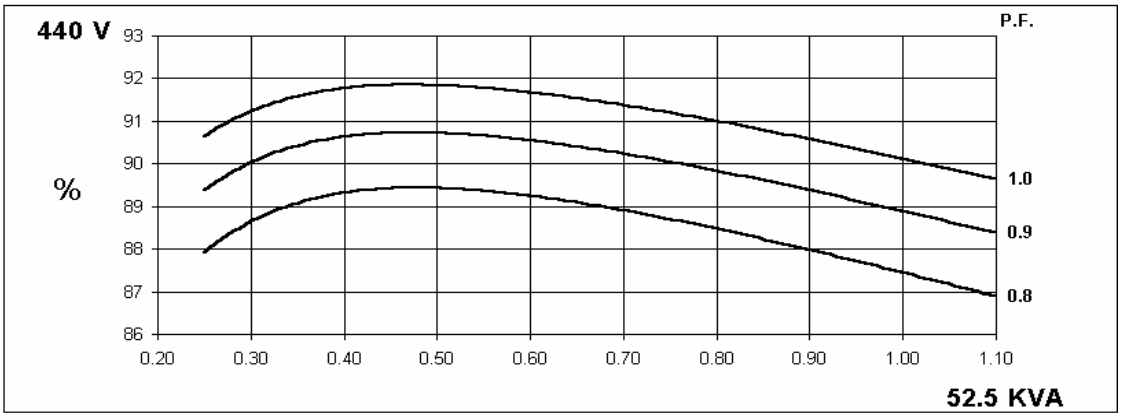
UCI224C

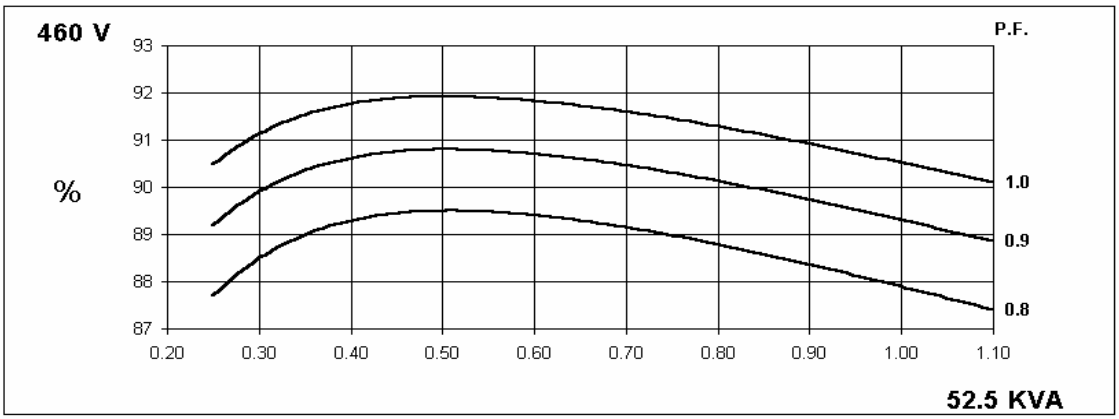
Winding 311

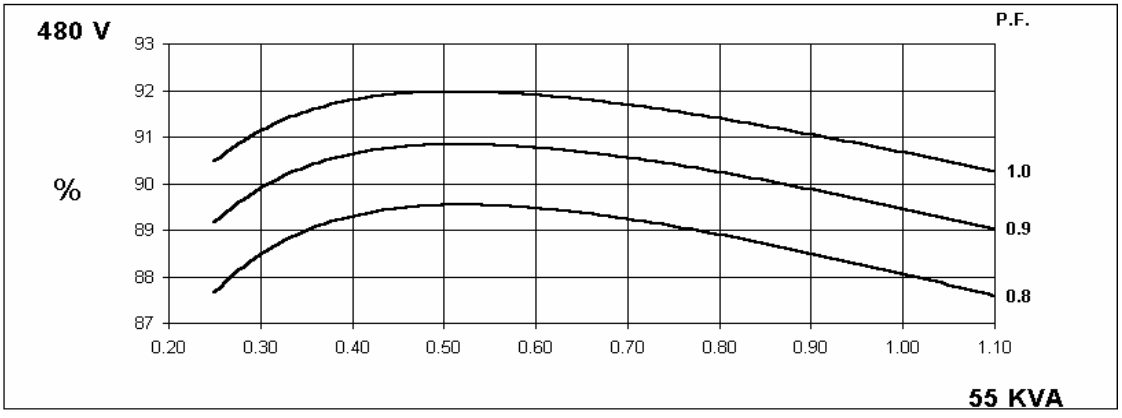
STAMFORD

THREE PHASE EFFICIENCY CURVES





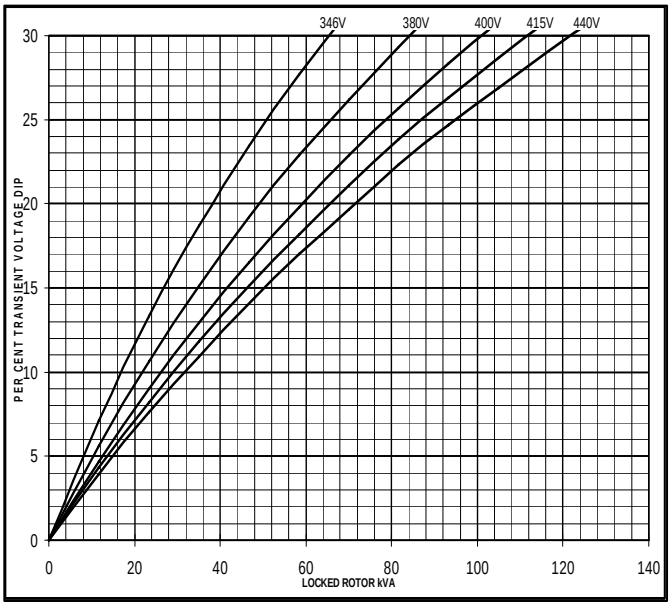




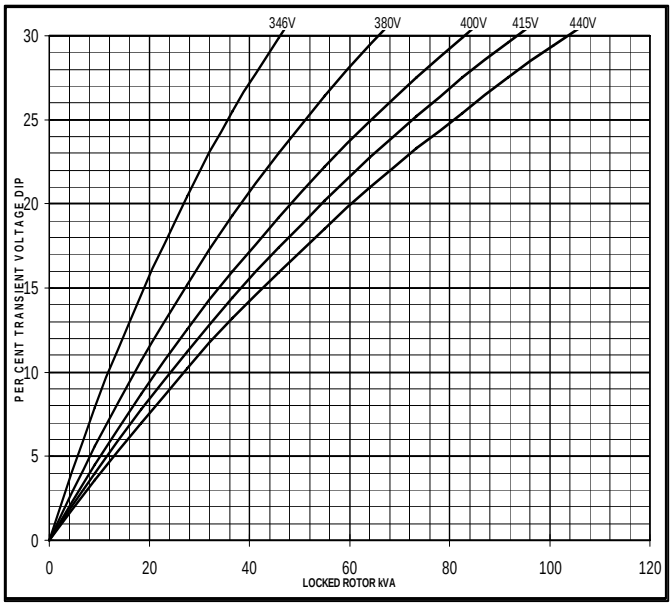
Locked Rotor Motor Starting Curve

50 Hz

MX

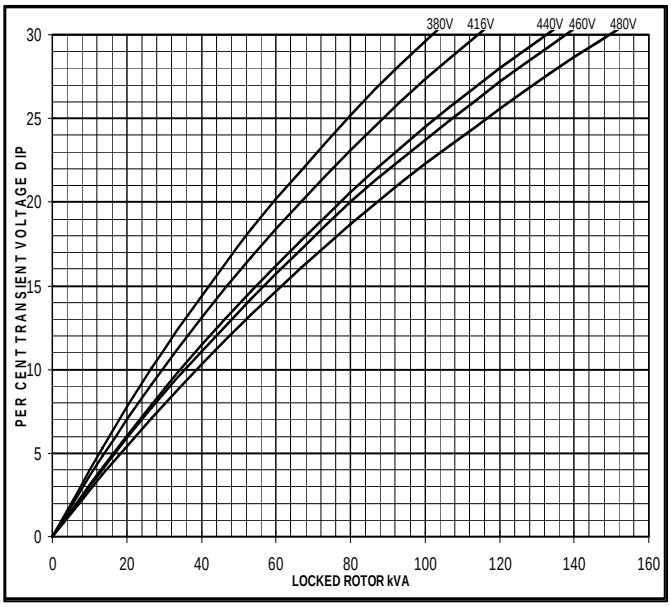


SX



60 Hz

MX



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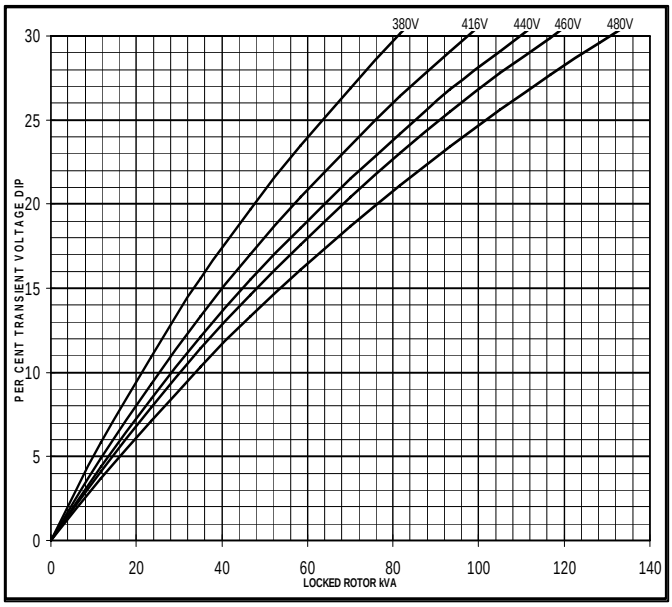
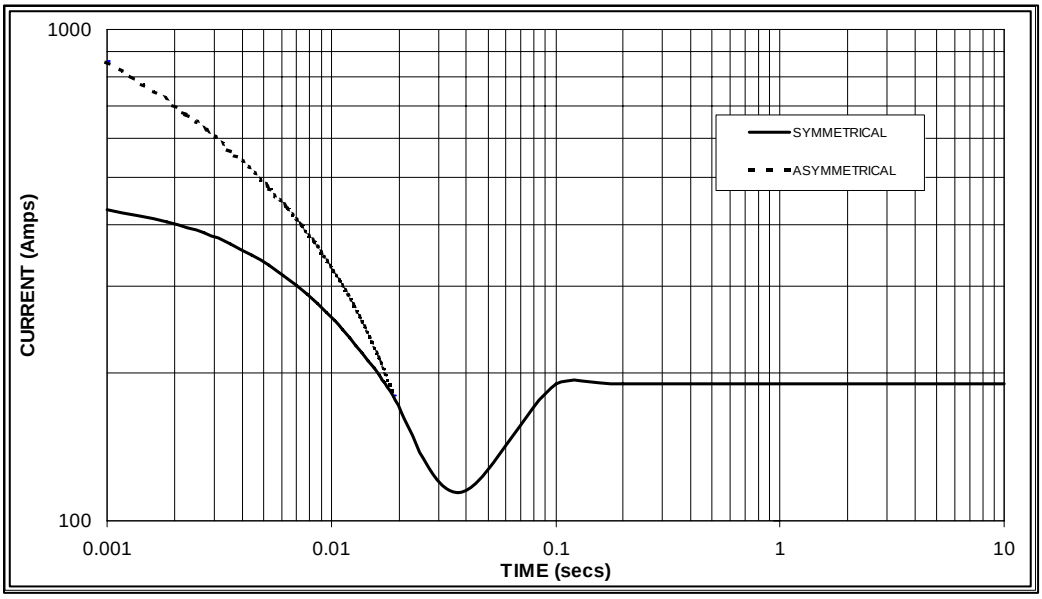


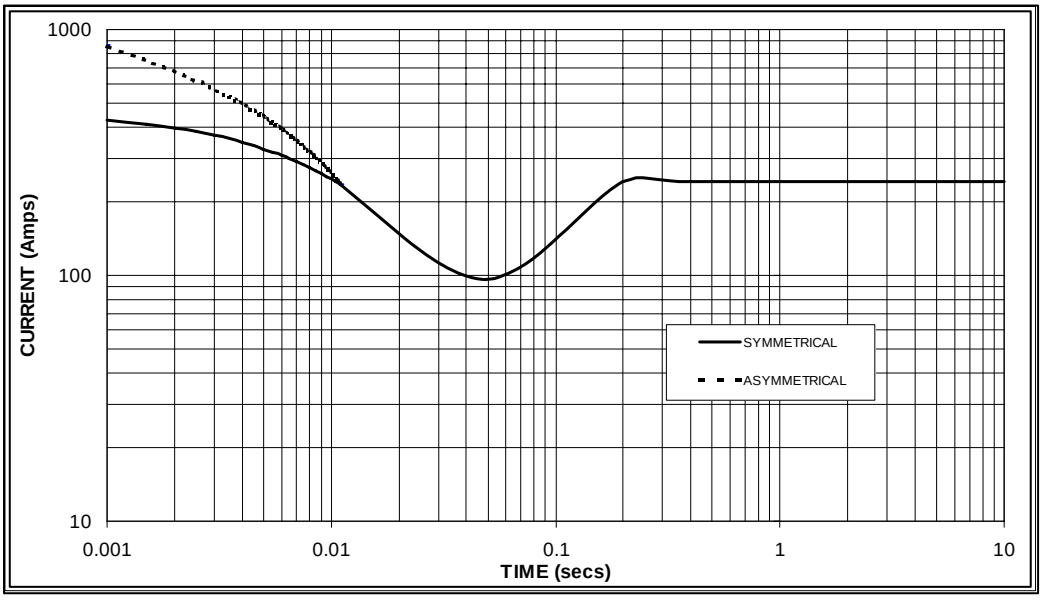
Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed Based on star (wye) connection.

50 Hz



Sustained Short Circuit = 190 Amps

60 Hz



Sustained Short Circuit = 240 Amps

Note 1

The following multiplication factors should be used to adjust the values from curve between time 0.001 seconds and the minimum current point in respect of nominal operating voltage :

50Hz		60Hz	
Voltage	Factor	Voltage	Factor
380v	X 1.00	416v	X 1.00
400v	X 1.07	440v	X 1.06
415v	X 1.12	460v	X 1.12
440v	X 1.18	480v	X 1.17

The sustained current value is constant irrespective of voltage level

Note 2

The following multiplication factor should be used to convert the values calculated in accordance with NOTE 1 to those applicable to the various types of short circuit :

	3-phase	2-phase L-L	1-phase L-N
Instantaneous	x 1.00	x 0.87	x 1.30
Minimum	x 1.00	x 1.80	x 3.20
Sustained	x 1.00	x 1.50	x 2.50
Max. sustained duration	10 sec.	5 sec.	2 sec.

All other times are unchanged

Note 3

Curves are drawn for Star (Wye) connected machines. For other connection the following multipliers should be applied to current values as shown :

Parallel Star = Curve current value X 2

Series Delta = Curve current value X 1.732

UCI224C

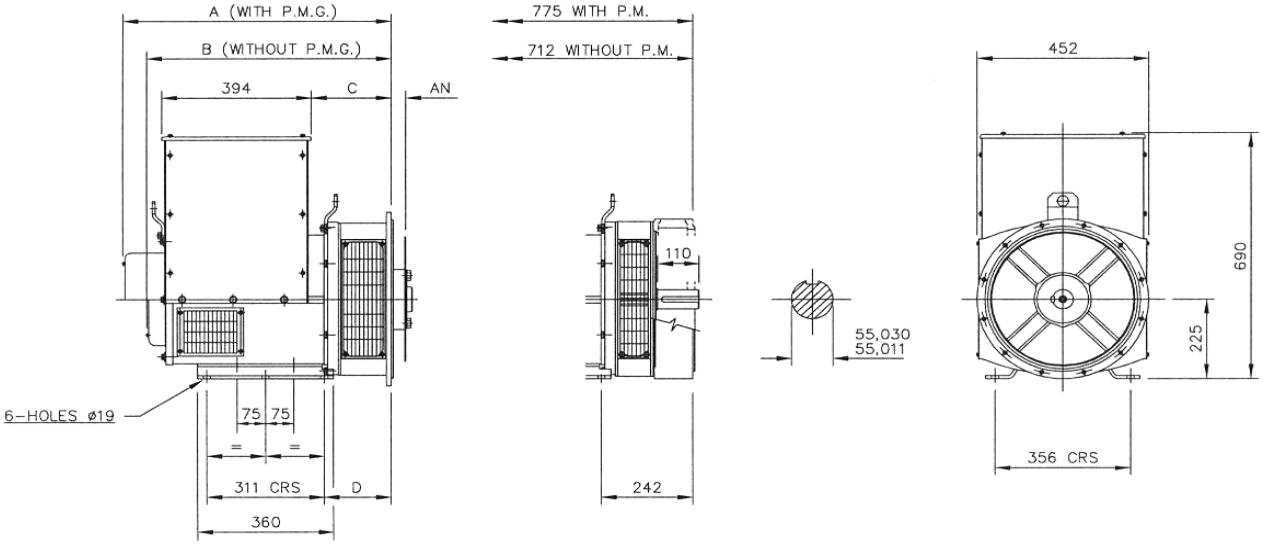
Winding 311 / 0.8 Power Factor

RATINGS

	Class - Temp Rise	Cont. F - 105/40°C				Cont. H - 125/40°C				Standby - 150/40°C				Standby - 163/27°C			
50 Hz	Series Star (V)	380	400	415	440	380	400	415	440	380	400	415	440	380	400	415	440
	Parallel Star (V)	190	200	208	220	190	200	208	220	190	200	208	220	190	200	208	220
	Series Delta (V)	220	230	240	254	220	230	240	254	220	230	240	254	220	230	240	254
	kVA	37.5	37.5	37.5	27.0	42.5	42.5	42.5	30.0	45.0	45.0	45.0	31.7	46.8	46.8	46.8	33.0
	kW	30.0	30.0	30.0	21.6	34.0	34.0	34.0	24.0	36.0	36.0	36.0	.5.4	37.4	37.4	37.4	26.4
	Efficiency (%)	87.3	87.7	88.0	88.4	86.6	87.1	87.4	88.1	86.2	86.8	87.1	87.9	86.0	86.6	86.9	87.7
	kW Input	34.4	34.2	34.1	32.6	39.3	39.0	38.9	36.3	41.8	41.5	41.3	38.4	43.5	43.2	43.1	40.1

60 Hz	Series Star (V)	416	440	460	480	416	440	460	480	416	440	460	480	416	440	460	480
	Parallel Star (V)	208	220	230	240	208	220	230	240	208	220	230	240	208	220	230	240
	Delta (V)	240	254	266	277	240	254	266	277	240	254	266	277	240	254	266	277
	kVA	45.0	46.3	46.3	48.0	50.0	52.5	52.5	55.0	53.1	55.0	55.0	58.1	55.0	56.3	56.3	60.0
	kW	36.0	37.0	37.0	38.4	40.0	42.0	42.0	44.0	42.5	44.0	44.0	46.5	44.0	45.0	45.0	48.0
	Efficiency (%)	87.7	88.1	88.4	88.6	87.1	87.5	87.9	88.1	86.7	87.2	87.7	87.8	86.5	87.1	87.5	87.6
	kW Input	41.0	42.0	41.9	43.3	45.9	48.0	47.8	49.9	49.0	50.5	50.2	52.9	50.9	51.7	51.5	54.8

DIMENSIONS



SINGLE BEARING MACHINES ONLY						
ADAPTOR	A	B	C	D	COUPLING DISCS	AN
SAE 1	724,3	661,3	224,3	191,3	SAE 8	61,90
SAE 2	710	647	210	177	SAE 10	53,98
SAE 3	710	647	210	177	SAE 11,5	39,68
SAE 4	710	647	210	177	SAE 14	25,40

Barnack Road • Stamford • Lincolnshire • PE9 2NB
Tel: 00 44 (0)1780 484000 • Fax: 00 44 (0)1780 484100

Diesel generator set
QSK60 series engine

> Specification sheet
1450 kW - 2250 kW 60 Hz
1200 kW - 2000 kW 50 Hz

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Cummins Power Generation

Description

Cummins Power Generation commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary standby, prime power and continuous duty power applications. Codes or standards compliance may not be available with all model configurations – consult factory for availability.

ISO 9001	This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9002.
PTS	The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins Power Generation products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.
CSA	All low voltage models are CSA certified to product class 4215-01.
UL	The generator set is available listed to UL 2200, Stationary Engine Generator Assemblies for all 60 Hz low voltage models. The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage. Circuit breaker assemblies are UL 489 Listed for 100% continuous operation and also UL 869A Listed Service Equipment.
International Building Code	The generator set package is available certified for seismic application in accordance with the following International Building Code: IBC2000, IBC2003, IBC2006 and IBC2009.

Features

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

Alternator - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

Permanent magnet generator (PMG) - Offers enhanced motor starting and fault clearing short-circuit capability.

Control system - The PowerCommand® electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

Cooling system - Standard integral set-mounted radiator system, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.

NFPA - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

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

	Standby rating		Prime rating		Continuous rating		Data sheets	
Model	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz	50 Hz
DQKB	1750 (2188)	1500 (1875)	1600 (2000)	1350 (1688)	1450 (1813)	1200 (1500)	D-3220/3224	D-3221
DQKC	2000 (2500)	1650 (2063)	1825 (2281)	1500 (1875)	1600 (2000)	1200 (1500)	D-3222/3225	D-3223
DQKD		1800 (2250)		1600 (2000)		1320 (1650)		D-3250
DQKH	2250 (2813)	2000 (2500)					D-3235	D-3236

S-1383s (6/11)

Generator set specifications

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%
Radio frequency emissions compliance	IEC 801.2 through IEC 801.5; MIL STD 461C, Part 9

Engine specifications

Bore	158.8 mm (6.25 in)
Stroke	190.0 mm (7.48 in)
Displacement	60.2 litres (3673 in^3)
Configuration	Cast iron, V, 16 cylinder
Battery capacity	2200 amps minimum at ambient temperature of -18 °C to 0 °C (0 °F to 32 °F)
Battery charging alternator	40 amps
Starting voltage	24 volt, negative ground
Fuel system	Direct injection: number 2 diesel fuel, fuel filter, automatic electric fuel shutoff
Fuel filter	Triple element, 10 micron filtration, spin-on fuel filters with water separator
Air cleaner type	Dry replaceable element
Lube oil filter type(s)	Four spin-on, combination full flow filter and bypass filters
Standard cooling system	104 °F (40 °C) ambient radiator

Alternator specifications

Design	Brushless, 4 pole, drip proof revolving field
Stator	2/3 pitch
Rotor	Single bearing, flexible discs
Insulation system	Class H on low and medium voltage, Class F on high voltage
Standard temperature rise	150 °C standby at 40 °C ambient
Exciter type	PMG (permanent magnet generator)
Phase rotation	A (U), B (V), C (W)
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

Available voltages

60 Hz line-neutral/line-line				**50 Hz line-neutral/line-line**			
• 219/380	• 277/480	• 2400/4160	• 7620/13200	• 220/380	• 240/415	• 1905/3300	• 3810/6600
• 254/440	• 347/600	• 7200/12470	• 7970/13800	• 230/400	• 254/440	• 3640/6300	• 6350/11000

* Note: Consult factory for other voltages.

Generator set options and accessories

Engine
- ☐ Low exhaust emission configuration DQKB 60 Hz, 5.5 g/hp-hr NO_x data sheet D-3224
- ☐ DQKC 60 Hz, 5.5 g/hp-hr NO_x data sheet D-3225
- ☐ 208/240/480 V coolant heater for ambient above 4.5 °C (40 °F)
- ☐ 208/240/480 V coolant heater for ambient below 4.5 °C (40 °F)
- ☐ High capacity oil pan

Cooling system
- ☐ 50 °C ambient
- ☐ Heat exchanger
- ☐ Remote radiator

Control panel
- ☐ 120/240 V 100 W control anti-condensation heater
- ☐ Paralleling configuration
- ☐ Remote fault signal package
- ☐ Run relay package

Exhaust system
- ☐ Industrial grade exhaust silencer
- ☐ Residential grade exhaust silencer
- ☐ Critical grade exhaust silencer

Alternator
- ☐ 80 °C rise
- ☐ 105 °C rise
- ☐ 125 °C rise
- ☐ 120/240 V 300 W anti-condensation heater
- ☐ Temperature sensor - RTDs, 2/phase
- ☐ Temperature sensor - alternator bearing RTD
- ☐ Differential current transformers

Generator set
- ☐ Battery
- ☐ Battery Rack with hold-down - floor standing
- ☐ Circuit breaker - set mounted
- ☐ Disconnect switch - set mounted
- ☐ PowerCommand Network
- ☐ Remote annunciator panel
- ☐ Spring isolators
- ☐ 2 year warranty
- ☐ 5 year warranty
- ☐ 10 year major components warranty

* Note: Some options may not be available on all models - consult factory for availability.

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S-1383s (6/11)

Power Generation

Control system PCC 3201

PowerCommand control is an integrated generator set control system providing governing, voltage regulation, engine protection and operator interface functions. Major features include:

- Integral AmpSentry™ Protective Relay providing a full range of alternator protection functions that are matched to the alternator provided.
- Battery monitoring and testing features and smart starting control system.
- Three phase sensing, full wave rectified voltage regulation system, with a PWM output for stable operation with all load types.
- Control suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F) and altitudes to 5000 meters (13,000 feet).
- Prototype tested; UL, CSA, and CE compliant.
- InPower™ PC-based service tool available for detailed diagnostics.
- Optional Echelon® LONWORKS® network interface.

Operator/display panel

- Off/manual/auto mode switch
- Manual run/stop switch
- Panel lamp test switch
- Emergency stop switch
- Exercise switch
- Alpha-numeric display with pushbutton access for viewing engine and alternator data and providing setup, controls and adjustments
- LED lamps indicating not in auto, common warning, common shutdown, remote start
- Configurable for local language

Engine protection

- Overspeed shut down
- Low oil pressure warning and shut down
- High coolant temperature warning and shut down
- High oil temperature warning
- Low coolant level warning or shut down
- Low coolant temperature warning
- High and low battery voltage warning
- Weak battery warning
- Dead battery shut down
- Fail to start (overcrank) shut down
- Fail to crank shut down
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication

Engine data

- DC voltage
- Lube oil pressure
- Coolant temperature
- Lube oil temperature
- Engine speed
- Engine ECM data

AmpSentry AC protection

- Over current and short-circuit shut down
- Over current warning
- Single and three phase fault regulation
- Over and under voltage shut down
- Over and under frequency shut down
- Overload warning with alarm contact
- Reverse power and reverse Var shut down

Alternator data

- Line-to-line and line-to-neutral AC volts
- Three phase AC current
- Frequency
- Total and individual phase power factor, kW and kVA
- Bus voltage and frequency (with paralleling options)

Other data

- Genset model data
- Start attempts, starts, running hours
- kW hours (total and since reset)
- Fault history
- Load profile (accessible with InPower)

Governing

- Digital electronic isochronous governor
- Temperature dynamic governing
- Smart idle speed mode

Voltage regulation

- Digital PWM electronic voltage regulation
- Three phase line-to-neutral sensing
- Single and three phase fault regulation
- Configurable torque matching

Control functions

- Data logging on faults
- Fault simulation (requires InPower)
- Time delay start and cooldown
- Cycle cranking
- Configurable customer outputs (4)
- Configurable network inputs (8) and outputs (16) (with optional network)
- Remote emergency stop

Paralleling (Option)

- Active digital phase lock loop synchronizer
- Isochronous kW and kVar load sharing controls
- kW import/export and kVar/PF control for utility (mains) paralleling

Options

- ☐ Thermostatically controlled space heater
- ☐ Key-type mode switch
- ☐ Ground fault module
- ☐ Auxiliary relays (3)
- ☐ Echelon LONWORKS interface
- ☐ Modion Gateway to convert to Modbus (loose)
- ☐ PowerCommand iWatch web server for remote monitoring and alarm notification (loose)
- ☐ Digital input and output module(s) (loose)
- ☐ Remote annunciator (loose)
- ☐ Paralleling
- ☐ Power transfer control

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For further detail see document S-1444.

S-1383s (6/11)

Power Generation

Ratings definitions

Emergency standby power (ESP):

Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Limited-time running power (LTP):

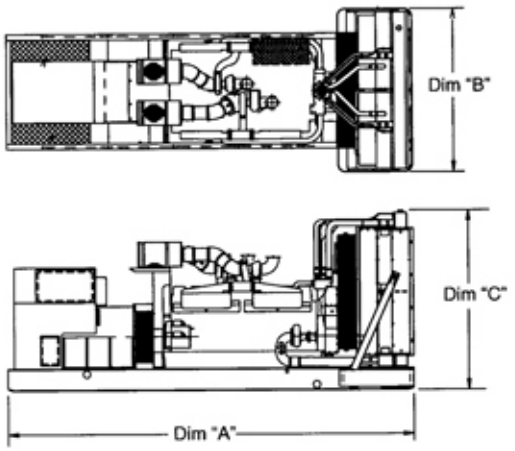
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

Prime power (PRP):

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base load (continuous) power (COP):

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing is for reference only, See respective model data sheet for specific model outline drawing number.

Do not use for installation design

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* dry kg (lbs)	Set Weight* wet kg (lbs)
DQKB	6175 (243)	2286 (90)	2537 (100)	14365 (31669)	14868 (32779)
DQKC	6175 (243)	2286 (90)	2537 (100)	14649 (32296)	15152 (33405)
DQKD	6175 (243)	2286 (90)	2537 (100)	14863 (32767)	15366 (33876)
DQKH	6175 (243)	2494 (98)	3116 (123)	15254 (33629)	15781 (34790)

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

Cummins Power Generation
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Minneapolis, MN 55432 USA
Telephone: 763 574 5000
Fax: 763 574 5298

Warning: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

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www.cumminspower.com

S-1383s (6/11)

Power Generation

Specification sheet

VTA28-G6

Description

The product of years of technical development and improvement, the VTA28-Series is recognised globally for its performance under even the most severe climatic conditions, and widely acknowledged as the most robust and cost-effective diesel engine in its power range.

Key design features include two large capacity aftercoolers for more efficient combustion, dual camshafts for precise control, valve and injector timing, a cooling system boasting a more even flow of coolant around the cylinder liners, valves and injectors, and Cummins PT self-adjusting fuel system for overspeed protection independent of the main governor.

Features

Aftercooled—Two large capacity aftercoolers result in cooler, denser intake air for more efficient combustion and reduced internal stresses for longer life. Aftercooler is located in engine coolant system, eliminating need for special plumbing.

Camshaft—Dual camshafts precisely control valve and injector timing. Lobes are induction hardened for long life. Fourteen replaceable precision type bushings 2.0 in. (51 mm) diameter.

Cooling System—Belt driven centrifugal water pump. Large volume water passages provide even flow of coolant around cylinder liners, valves and injectors. Dual modulating bypass thermostats regulate coolant temperature.

Cylinder Block—Alloy cast iron with removable wet liners. Cross bolt support to main bearing cap provides extra strength and stability.

Fuel System—Cummins PT™ self-adjusting system. Integral dual flyweight governor provides overspeed protection independent of main governor. Camshaft actuated fuel injectors give accurate metering and timing. Fuel lines are internal drilled passages in cylinder heads. Spin-on fuel filter.

Lubrication—Large capacity gear pump provides pressure lubrication to all bearings and oil supply for piston cooling. All pressure lines are internal drilled passages in block and heads. Oil cooler, full flow filters, and bypass filters maintain oil condition and maximize oil and engine life.

Turbocharger—Two Holset turbochargers mounted at top of engine. Turbocharging provides more power, improved fuel economy, altitude compensation, and lower smoke.

Coolpac integrated design - Products are supplied complete with cooling package and air cleaner kit for a complete power package. Each component has been specifically developed and rigorously tested for G-Drive products, ensuring high performance, durability and reliability.

Service and support - G-Drive products are backed by an uncompromising level of technical support and after sales service, delivered through a world class service network.

CE	This equipment has been built to comply with CE certification requirement subject to EU RoHS exclusion per EU 2011/65.
Registered To ISO 9001	This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO9002.

1500 rpm (50 Hz ratings)

Gross engine output			Net engine output			Typical generator set output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
733/983	-	-	705/945	-	-	660	825	-	-	-	-

General engine data

Type	4-cycle, 40 degree vee, 12-Cylinder Diesel
Bore mm	140 mm (5.50 in.)
Stroke mm	152 mm (6.00 in.)
Displacement litre	28.0 litre (1710 $in.^3$)
Cylinder block	Alloy cast iron, 12 cylinder
Battery charging alternator	35 amps
Starting voltage	24 volt, negative ground
Fuel system	Cummins PT™ self-adjusting system
Fuel filter	Dual, Fleetguard spin-on fuel filters
Lube oil filter type(s)	Spin-on full flow filters with option of kit or mounted bypass filter
Lube oil capacity (l)	83.0
Flywheel dimensions	SAE 0

Coolpac performance data

Cooling system design	1 pump – 1 loop
Coolant ratio	50% ethylene glycol; 50% water
Coolant capacity (l)	182
Limiting ambient temp.** (°C)	40
Fan power (kWm)	19.6
Cooling system air flow (m^3/s)**	17.2
Air cleaner type	Dry replaceable element with restriction indicator

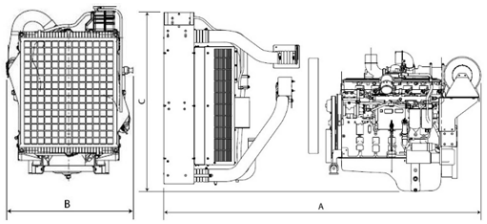
** @ 13 mm H_20

Fuel consumption 1500 (50 Hz)

%	kWm	BHP	L/ph	g/kWh
Standby Power				
100	733	982	195	51.3
75	550	737	140	36.7
50	367	491	91	23.9
25	183	246	50	13.2

Weights and dimensions

Length mm	Width mm	Height mm	Weight (dry) kg
2754	1422	1963	2900



Ratings definitions

Emergency Standby Power (ESP):	Limited-Time Running Power (LTP):	Prime Power (PRP):	Base Load (Continuous) Power (COP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.	Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN6271 and BS 5514.

For more information contact your local Cummins distributor or visit power.cummins.com

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VTA28-G6

Diesel Powered Generating Sets

C350 D5

Standard Genset Features

Cummins water cooled Diesel engine,
Oil and fuel filter fitted, water separator,
Lube-oil drain valve fitted
Electric starter & Charge alternator 24 v D.C.
Electronic governor
Normal duty air filter
Single bearing alternator, class H/H , IP23
Standard voltage 400/230 volts 50 Hz
Exciter/Voltage reg - Torque Match as std
PCC2100 without Bargraph
3 pole MCCB
Welded steel base frame with A/V mounting,
Anti Vibration Mounts
Single skin metal fuel tank
Tank capacity of min 8 hours operation at
70% standby load
Loose 9 dB(A) silencer
Set mounted starting battery
Engine Tractor Blue & Alternator Munsell Jade Green
Radiator and Guarding black
Packing under shrunk plastic film
Operation & Maintenance manual
Standard set of labels

Generator Set Performance

Voltage Regulation
Maintains voltage output to within ±1.0%.
At any power factor between 0.8 and 1.0
At any variations from No load to Full load.
At any variations from Cold to Hot.
At speed droop variations up to 4.5%.
Frequency Regulation
Isochronous under varying loads from no load to 100% full load when electronic governor is ?tted.

Random Frequency Variation
Will not exceed ±0.25% of its mean value for constant loads – no load to full load.
Waveform
Total harmonic distortion open circuit voltage waveform in the order of 1.8%. Three-phase balanced load in the order of 5.0%.
Telephone In?uence Factor (TIF)
TIF better than 50.
THF to BS 4999 Part 40 better than 2%.
Alternator Temperature Rise
Class H insulation.

Radio Interference
In compliance with BS 800 and VDE levels G and N.

Generator Set Options

Mechanical Options
Compliance - CE Certification (Guarding)

Fuel options
Fuel Tank deletion

Exhaust Options
Exhaust Silencer - Industrial (9 dB), In-Line
Exhaust Bellows
Exhaust Silencer - Residential (25 dB), In-Line
Installation Kit - Industrial Silencer

Warranty
Warranty - 5 Year Extended Standby Appln
Warranty - 2 Year Extended Prime Appln

Voltage Connections
277/480V, 3 Phase
254/440V, 3 Phase
240/416V, 3 Phase
230/400V, 3 Phase
220/380V, 3 Phase
127/220V
115/200V, 3 Phase
110/190V, 3 Phase
Miscellaneous Options
Coolant heater -240V
Battery Charger 240V,5A
PCC2100 with bargraph
Packing - Export Box
Packing - Export Box

Engine Specification

Cummins NT855G6
In-line direct injection
6-cylinder diesel engine.
Type
Water cooled, four cycle
Turbocharged
Construction
Two valves per cylinder, forged steel crankshaft and connecting rods, cast iron block.
Starting
24 volt negative earth. Battery charging alternator 35 amp on engine. Cranking current 640 amps at 0°C.
Fuel System
24 volt fail safe actuator. Spin-on paper element fuel ?lters with Bosch fuel pump injection system with integral Electronic governor. Dual ?exible fuel lines and connectors. Standard fuel water separator.
Filters
Air cleaner with dry element and restriction indicator. Spin-on full ?ow lube oil ?lter.
Cooling
50°C radiator as std
Stone guard. Oil cooler. Drain Tap

Alternator Specification

Type
Brushless single bearing, revolving ?eld, pole, drip proof, screen protected.
Class H Insulation.
IC 01 cooling system.
Fully interconnected damper winding.
AC exciter and rotating recti?er unit.
Epoxy coated stator winding.
Rotor and exciter impregnated with tropical grade insulating oil and acid resisting polyester resin. Dynamically balanced rotor BS 5625 grade 2.5.
Sealed for life bearings.
Layer wound mechanically wedged rotor.

Exciter
Triple dipped in moisture, oil and acid resisting polyester varnish and coated with anti-tracking varnish.

Output windings with 2/3 pitch for improved harmonics and paralleling ability.
Close coupled engine/alternator for perfect alignment.

Compliance Standards

To BS4999/5000 pt 99,
VDE 0530, UTE5100,
NEMA MG1-22, CEMA,
IEC 34, CSA A22.2,
AS1359, BSS 5514,
ISO 3046 and ISO 8528

Model name	kVA		kWe	
	ESP	PRP	ESP	PRP
C350 D5	350	320	280	256

Specifications may change without notice

Power Generation

TECHNICAL DATA

Model	C350 D5	**Speed**	1500 rpm
Set output	380-440 V 50 Hz	**Alternator voltage regulation**	±1.0%
Prime Rating	256 kWe 320 kVA	**Alternator insulation class**	H
Standby Rating	280 kWe 350 kVA	**Fuel consumption (Prime)**	69 l/hr
Engine Make	Cummins	**Fuel consumption (Standby)**	76 l/hr
Engine Model	NT855G6	**Lubrication system oil capacity**	38.6 Litres
Cylinders	Six	**Base fuel tank capacity – open set**	750 or 900 Litres
Engine build	In-line	**Coolant capacity**	63.9 Litres
Standard Governor/Class	Electronic/Class G2	**Exhaust temp – prime**	574°C
Aspiration and cooling	Turbocharged	**Exhaust gas flow – prime**	1071 l/s
Bore and stroke	140 mm x152 mm	**Exhaust gas back pressure max**	76 mm Hg
Compression Ratio	14:1	**Air flow – radiator***	4.92m3/s
Cubic capacity	14 Litres	**Air intake – engine (Prime)**	361 Litre/s
Starting/Min °C	Unaided / 4°C	**Minimum air opening to room**	2.10 sq m
Battery capacity	100 A/hr	**Minimum discharge opening**	1.39 sq m
Gross Engine output – Prime	280 kWm	**Pusher fan head (duct allowance)***	13 mm Wg
Gross Engine output – Standby	310 kWm	**Heat radiated by eng (Prime)**	50 kW/m

PRIME POWER (PRP)

Prime power is available for an unlimited number of annual operating hours in variable load applications, in accordance with ISO8528-1.

A 10% overload capability is available for a period of 1 hour within a 12-hour period of operation, in accordance with ISO 3046-1.

STANDBY POWER RATING (ESP)

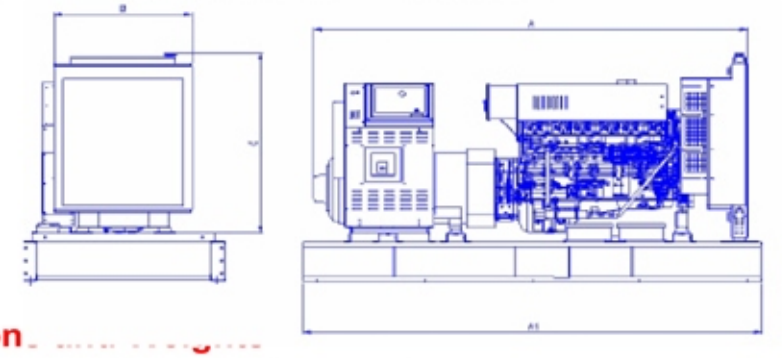
The Standby Power Rating is applicable for supplying emergency power for the duration of a utility power interruption. No overload, utility parallel or negotiated outage operation capability is available at this rating.

In installations served by unreliable utility sources (where outages last longer or occur more frequently), where operation is likely to exceed 200 hours per year, the prime power rating should be applied.

The Standby Power rating is only applicable for emergency and standby applications where the generator set serves as the back up to the normal utility source.

All ratings are based on the following reference conditions:

- Ambient temperature – 27oC - Altitude above sea level – 150 metres - Relative humidity – 60%



Dimension

Model	Engine	Length (mm)	Width (mm)	Height (mm)	Set weight wet (Kg)	Set weight dry (Kg)	Enclosed Weight Wet (Kg)
C350 D5	NT855G6	3549	1100	2028	2078	3448	3258

Specifications may change without notice

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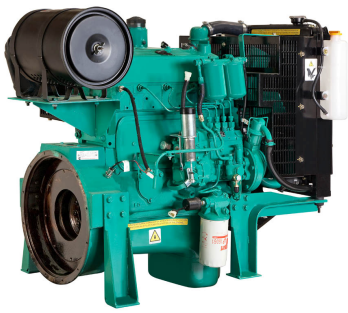
www.cummins.com

See your distributor for more information.

Power Generation

S3.8 G6 CoolPac



> Specification sheet

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Description

The Cummins 'S Series' engine powered CoolPac sets offer the lowest cost of maintenance thereby proving to be the most economical power solution. With the robust design and integrated technologies, the 'S Series' CoolPac can command an unrivalled reputation for reliability and performance.

The Cummins 'S Series' engine powered CoolPac sets give you the advantage of optimising your valuable space. All elements of the CoolPac sets are designed from the start to work together to maximize efficiency, even at part loads, thus offering you the advantage of lowest operating costs.

The rugged and reliable Cummins 'S Series' CoolPac sets are unique, because all the major components – the engine and cooling system are manufactured by Cummins India. This integral approach means each element of a CoolPac set is designed to work in harmony from the start.

Features

Engine : Cummins^{R} 'S Series ' CoolPac sets, powered by Cummins^{R} 'S Series ' engine, are rated at 1500 RPM and conform to ISO 8528 specifications. The engines are radiator cooled, four stroke and multi-cylinder, conforming to BS 55514/ISO 3046.

The scope of Supply includes :

- Battery Charging Alternator
- Bosch In-line fuel system with mechanical governor
- Dual spin-on fuel filter
- Lube oil filter
- Turbocharger
- Dry type Air Cleaner
- Coolant recovery bottle
- Fuel pump shut-off coil with safeties (LLOP, HWT)
- Flywheel and flywheel housing
- CE compliant guarding
- Oil drainage valve

CE — This engine has been built to comply with CE certification.

ISO 9001 — This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO9002.

Integrated Design - CoolPac products are supplied fitted with cooling package and medium duty air cleaner for a complete power package. Each component has been has been specifically developed and rigorously tested for G-Drive products, ensuring high performance, durability and reliability.

Service and Support - G-Drive products are backed by an uncompromising level of technical support and after sales service, delivered through a world class service network.

1500 rpm (50 Hz Ratings)

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
53.6/71.9	48.7/65.3	34.1/45.7	51.6/69.1	46.7/62.6	32.1/43	44	55	40	50	28	35

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General Engine Data

Type	In line, Radiator cooled
Bore mm	97
Stroke mm	128
Displacement Litre	3.8
Cylinder Block	Cast Iron, 4 Cylinder
Battery Charging Alternator	12V, 35 Amps
Starting Voltage	12V
Fuel System	Direct Injection
Fuel Filter	Spin on
Lube Oil Filter Type(s)	Spin on
Lube Oil Capacity (l)	11
Flywheel Dimensions	SAE3/10

1782

CoolPac Performance Data

Cooling System Design	Jacket Water Cooled
Coolant Ratio	50:50
Coolant Capacity (l)	11
Limiting Ambient Temp. (degC)**	45
Fan Power (Kw)	2
Cooling System Air Flow (m^3/s)**	0.99
Air Cleaner Type	Dry Type, Replaceable, medium duty

** @ ¼" H^20

Ratings Definitions

Emergency Standby Power (ESP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Limited-Time Running Power (LTP):
Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):
Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base Load (Continuous) Power (COP):
Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN6271 and BS 5514.

Weight & Dimensions

Length	Width	Height	Weight (dry)
mm	mm	mm	kg
1135	740	980	450

Fuel Consumption 1500 (50 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	53.6	71.9	14.3	3.8
Prime Power				
100	48.7	65.3	12.8	3.4
75	36.5	48.9	9.5	2.5
50	24.3	32.6	6.5	1.7
25	12.2	16.4	4.0	1.1
Continuous Power				
100	34.1	45.7	9.1	2.4

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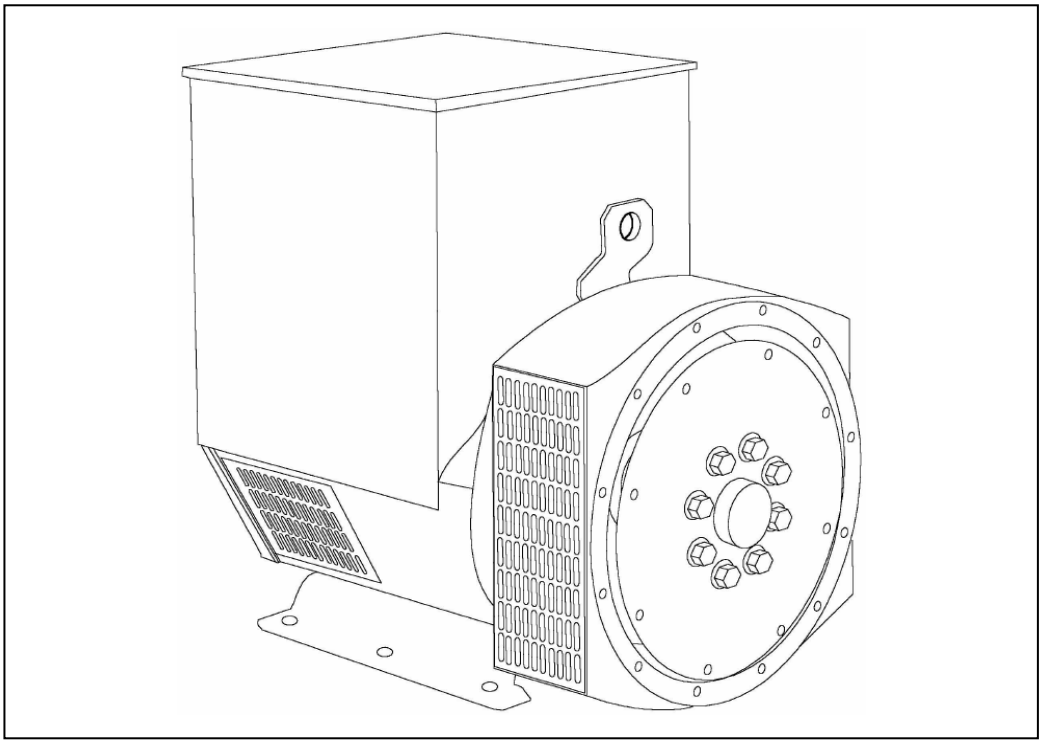
STAMFORD®

UCI224D - Technical Data Sheet



SPECIFICATIONS & OPTIONS

STANDARDS
Newage Stamford industrial generators meet the requirements of BS EN 60034 and the relevant section of other international standards such as BS5000, VDE 0530, NEMA MG1-32, IEC34, CSA C22.2-100, AS1359.
Other standards and certifications can be considered on request.

VOLTAGE REGULATORS

SX460 AVR - STANDARD
With this self excited control system the main stator supplies power via the Automatic Voltage Regulator (AVR) to the exciter stator. The high efficiency semiconductors of the AVR ensure positive build-up from initial low levels of residual voltage.
The exciter rotor output is fed to the main rotor through a three phase full wave bridge rectifier. This rectifier is protected by a surge suppressor against surges caused, for example, by short circuit.

AS440 AVR
With this self-excited system the main stator provides power via the AVR to the exciter stator. The high efficiency semi-conductors of the AVR ensure positive build-up from initial low levels of residual voltage.
The exciter rotor output is fed to the main rotor through a three-phase full-wave bridge rectifier. The rectifier is protected by a surge suppressor against surges caused, for example, by short circuit or out-of-phase paralleling.
The AS440 will support a range of electronic accessories, including a 'droop' Current Transformer (CT) to permit parallel operation with other ac generators.

MX341 AVR
This sophisticated AVR is incorporated into the Stamford Permanent Magnet Generator (PMG) control system.
The PMG provides power via the AVR to the main exciter, giving a source of constant excitation power independent of generator output. The main exciter output is then fed to the main rotor, through a full wave bridge, protected by a surge suppressor. The AVR has in-built protection against sustained over-excitation, caused by internal or external faults. This de-excites the machine after a minimum of 5 seconds.
An engine relief load acceptance feature can enable full load to be applied to the generator in a single step.
If three-phase sensing is required with the PMG system the MX321 AVR must be used.
We recommend three-phase sensing for applications with greatly unbalanced or highly non-linear loads.

MX321 AVR
The most sophisticated of all our AVRs combines all the features of the MX341 with, additionally, three-phase rms sensing, for improved regulation and performance.
Over voltage protection is built-in and short circuit current level adjustments is an optional facility.

WINDINGS & ELECTRICAL PERFORMANCE
All generator stators are wound to 2/3 pitch. This eliminates triplen (3rd, 9th, 15th …) harmonics on the voltage waveform and is found to be the optimum design for trouble-free supply of non-linear loads. The 2/3 pitch design avoids excessive neutral currents sometimes seen with higher winding pitches, when in parallel with the mains. A fully connected damper winding reduces oscillations during paralleling. This winding, with the 2/3 pitch and carefully selected pole and tooth designs, ensures very low waveform distortion.

TERMINALS & TERMINAL BOX
Standard generators are 3-phase reconnectable with 12 ends brought out to the terminals, which are mounted on a cover at the non-drive end of the generator. A sheet steel terminal box contains the AVR and provides ample space for the customers' wiring and gland arrangements. It has removable panels for easy access.

SHAFT & KEYS
All generator rotors are dynamically balanced to better than BS6861:Part 1 Grade 2.5 for minimum vibration in operation. Two bearing generators are balanced with a half key.

INSULATION/IMPREGNATION
The insulation system is class 'H'.
All wound components are impregnated with materials and processes designed specifically to provide the high build required for static windings and the high mechanical strength required for rotating components.

QUALITY ASSURANCE
Generators are manufactured using production procedures having a quality assurance level to BS EN ISO 9001.

The stated voltage regulation may not be maintained in the presence of certain radio transmitted signals. Any change in performance will fall within the limits of Criteria 'B' of EN 61000-6-2:2001. At no time will the steady-state voltage regulation exceed 2%.

NB Continuous development of our products entitles us to change specification details without notice, therefore they must not be regarded as binding.

Front cover drawing typical of product range.

WINDING 311

CONTROL SYSTEM	SEPARATELY EXCITED BY P.M.G.		
A.V.R.	MX321	MX341	
VOLTAGE REGULATION	± 0.5 %	± 1.0 %	With 4% ENGINE GOVERNING
SUSTAINED SHORT CIRCUIT	REFER TO SHORT CIRCUIT DECREMENT CURVES (page 7)		

CONTROL SYSTEM	SELF EXCITED		
A.V.R.	SX460	AS440	
VOLTAGE REGULATION	± 1.0 %	± 1.0 %	With 4% ENGINE GOVERNING
SUSTAINED SHORT CIRCUIT	SERIES 4 CONTROL DOES NOT SUSTAIN A SHORT CIRCUIT CURRENT		

INSULATION SYSTEM	CLASS H							
PROTECTION	IP23							
RATED POWER FACTOR	0.8							
STATOR WINDING	DOUBLE LAYER CONCENTRIC							
WINDING PITCH	TWO THIRDS							
WINDING LEADS	12							
STATOR WDG. RESISTANCE	0.129 Ohms PER PHASE AT 22°C SERIES STAR CONNECTED							
ROTOR WDG. RESISTANCE	0.64 Ohms at 22°C							
EXCITER STATOR RESISTANCE	21 Ohms at 22°C							
EXCITER ROTOR RESISTANCE	0.071 Ohms PER PHASE AT 22°C							
R.F.I. SUPPRESSION	BS EN 61000-6-2 & BS EN 61000-6-4,VDE 0875G, VDE 0875N. refer to factory for others							
WAVEFORM DISTORTION	NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%							
MAXIMUM OVERSPEED	2250 Rev/Min							
BEARING DRIVE END	BALL. 6312-2RS (ISO)							
BEARING NON-DRIVE END	BALL. 6309-2RS (ISO)							
	1 BEARING				2 BEARING			
WEIGHT COMP. GENERATOR	285 kg				290 kg			
WEIGHT WOUND STATOR	86 kg				86 kg			
WEIGHT WOUND ROTOR	86.28 kg				77.9 kg			
WR² INERTIA	0.4216 kgm^2				0.4198 kgm^2			
SHIPPING WEIGHTS in a crate	307 kg				311 kg			
PACKING CRATE SIZE	97 x 57 x 96(cm)				97 x 57 x 96(cm)			
	50 Hz				60 Hz			
TELEPHONE INTERFERENCE	THF<2%				TIF<50			
COOLING AIR	0.216 m³/sec 458 cfm				0.281 m³/sec 595 cfm			
VOLTAGE SERIES STAR	380/220	400/231	415/240	440/254	416/240	440/254	460/266	480/277
VOLTAGE PARALLEL STAR	190/110	200/115	208/120	220/127	208/120	220/127	230/133	240/138
VOLTAGE SERIES DELTA	220/110	230/115	240/120	254/127	240/120	254/127	266/133	277/138
kVA BASE RATING FOR REACTANCE VALUES	50	50	50	48	60	62.5	62.5	65
Xd DIR. AXIS SYNCHRONOUS	2.33	2.10	1.95	1.67	3.04	2.83	2.59	2.47
X'd DIR. AXIS TRANSIENT	0.18	0.16	0.15	0.13	0.22	0.20	0.19	0.18
X"d DIR. AXIS SUBTRANSIENT	0.12	0.11	0.10	0.09	0.15	0.14	0.13	0.12
Xq QUAD. AXIS REACTANCE	1.07	0.97	0.90	0.77	1.40	1.30	1.19	1.14
X"q QUAD. AXIS SUBTRANSIENT	0.14	0.13	0.12	0.10	0.14	0.13	0.12	0.11
X_L LEAKAGE REACTANCE	0.07	0.06	0.06	0.05	0.09	0.08	0.08	0.07
X_2 NEGATIVE SEQUENCE	0.13	0.12	0.11	0.09	0.14	0.13	0.12	0.11
X_0 ZERO SEQUENCE	0.08	0.08	0.07	0.06	0.09	0.08	0.08	0.07
REACTANCES ARE SATURATED	VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED							
T'd TRANSIENT TIME CONST.	0.027 s							
T"d SUB-TRANSTIME CONST.	0.006 s							
T'do O.C. FIELD TIME CONST.	0.7 s							
Ta ARMATURE TIME CONST.	0.0055 s							
SHORT CIRCUIT RATIO	1/Xd							

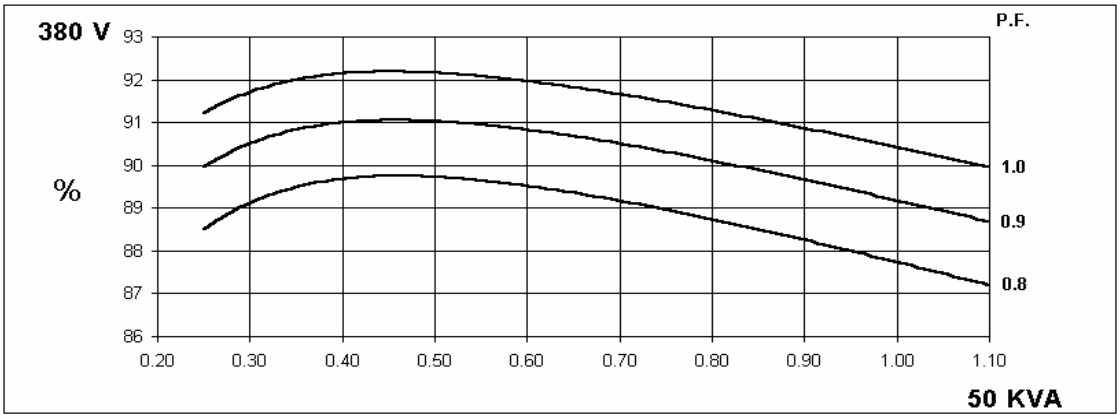
50 Hz

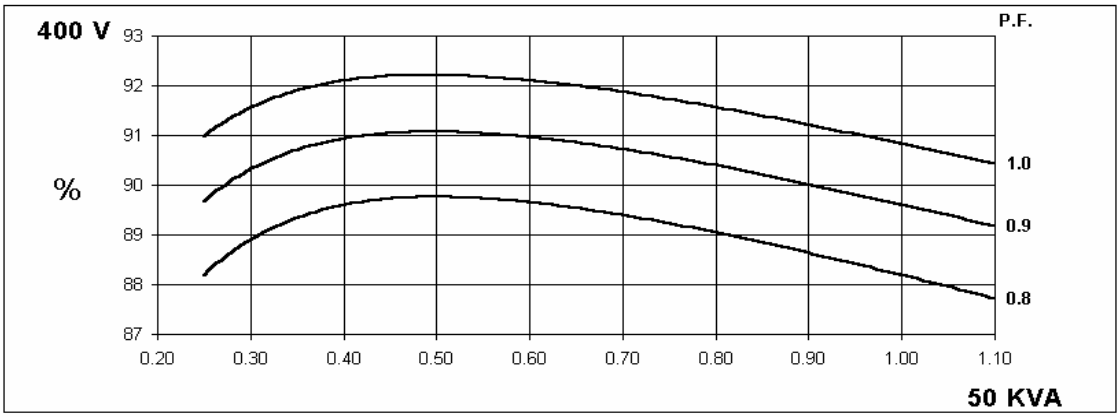
UCI224D

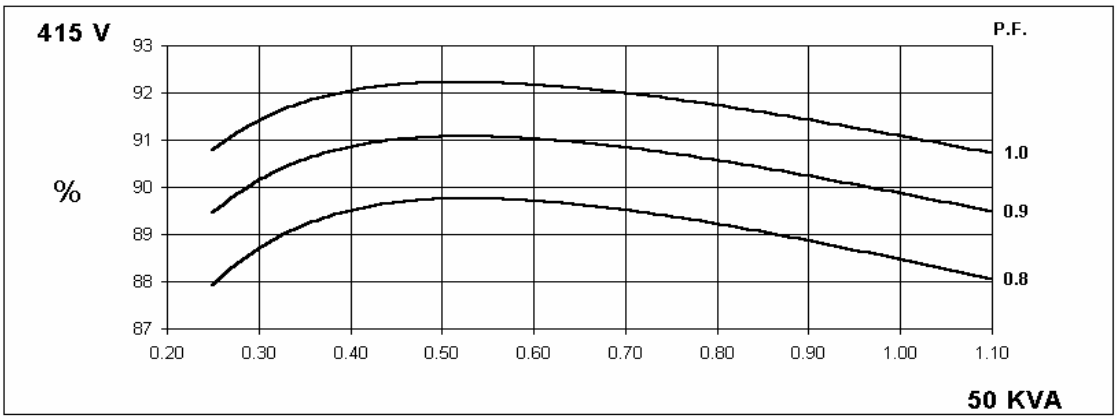
Winding 311

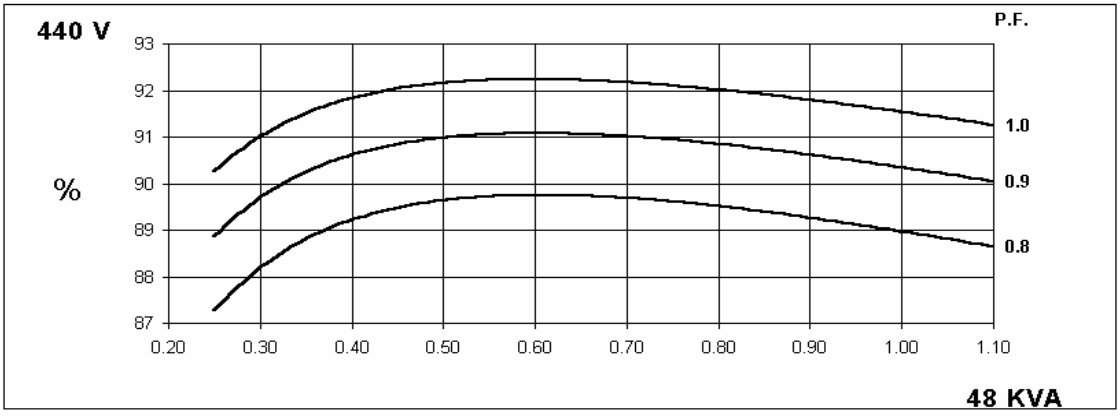
STAMFORD

THREE PHASE EFFICIENCY CURVES







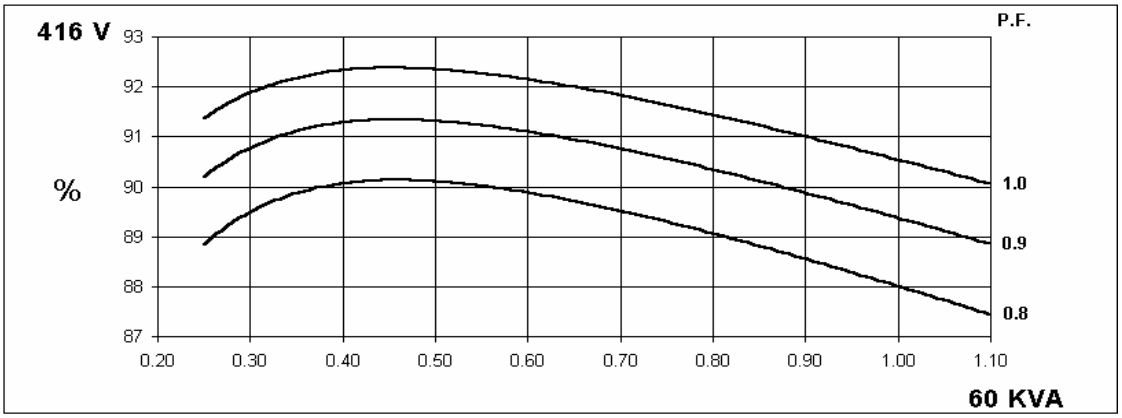


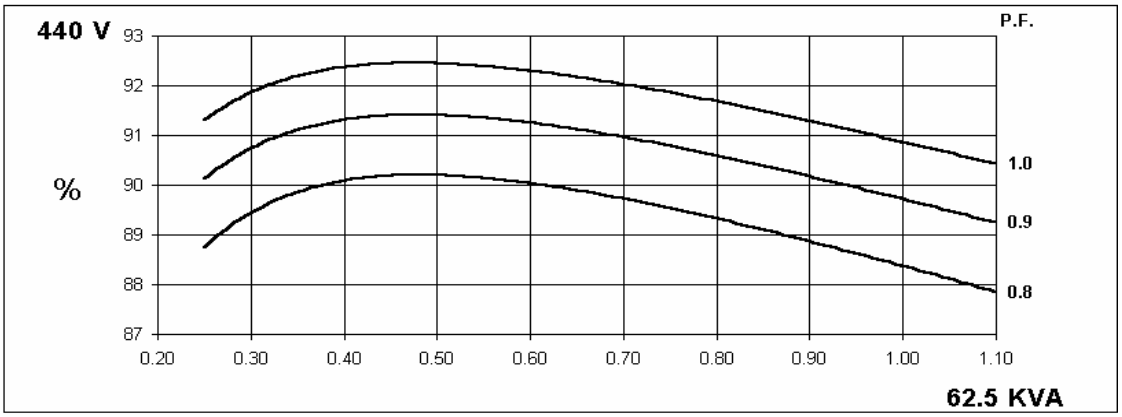
60 Hz

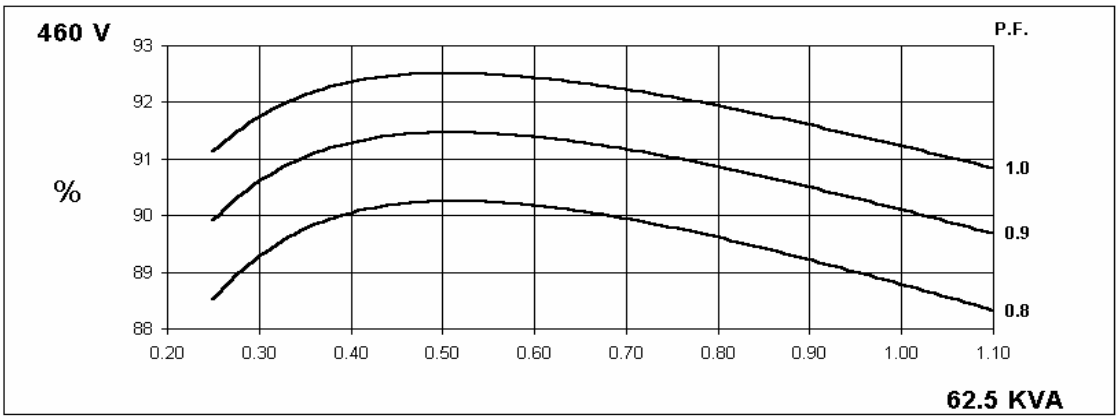
UCI224D

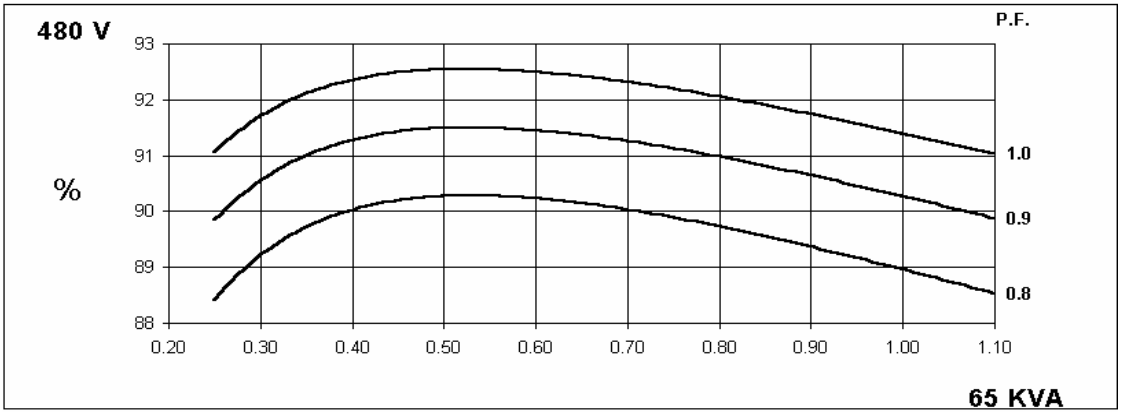
Winding 311

THREE PHASE EFFICIENCY CURVES





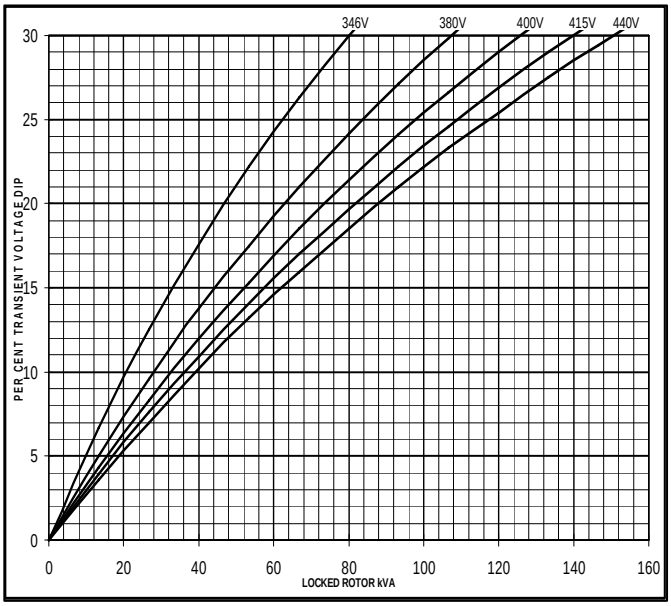




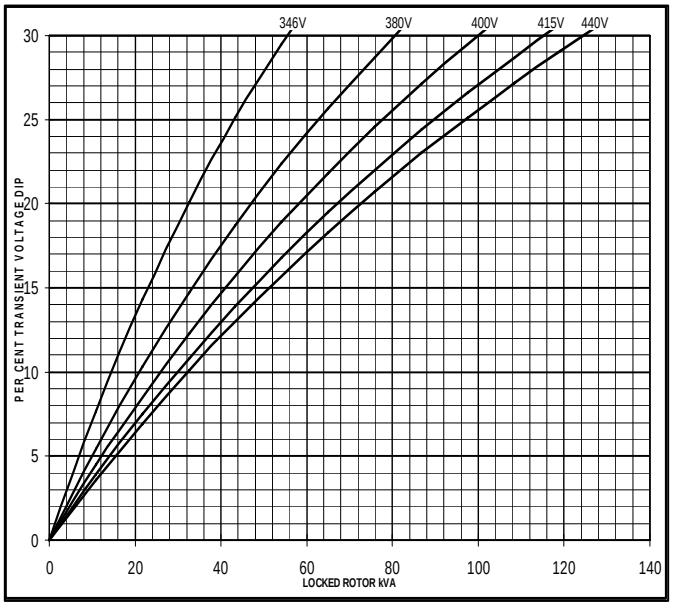
Locked Rotor Motor Starting Curve

50 Hz

MX

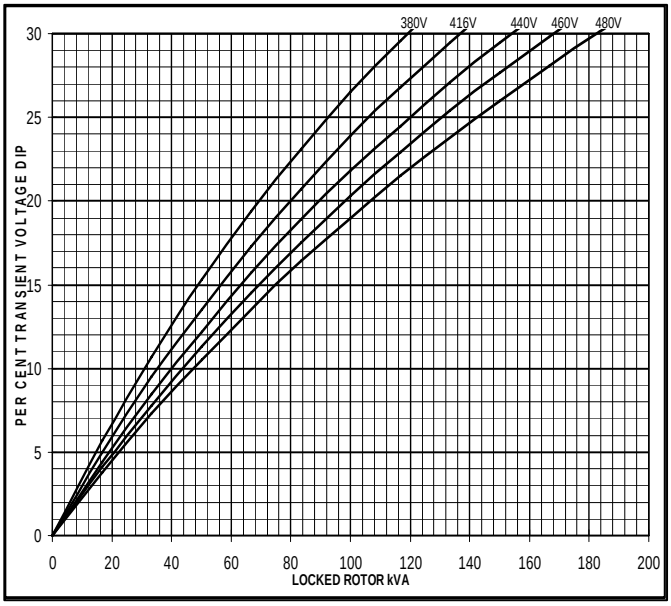


SX

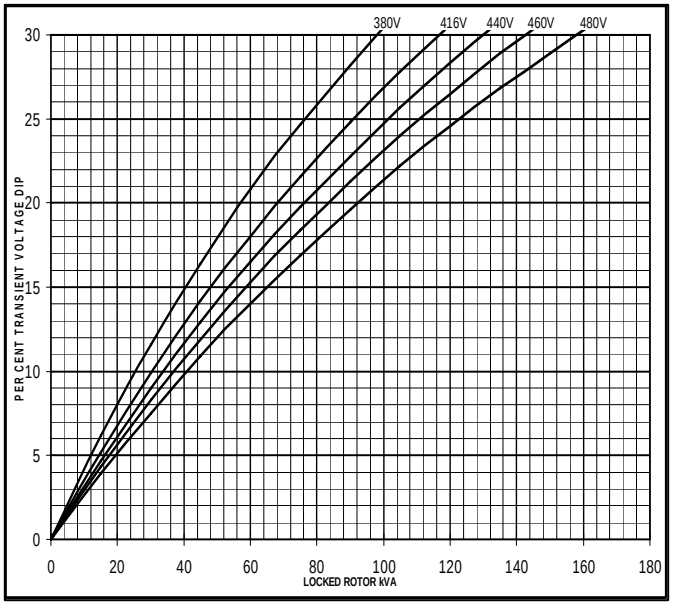


60 Hz

MX

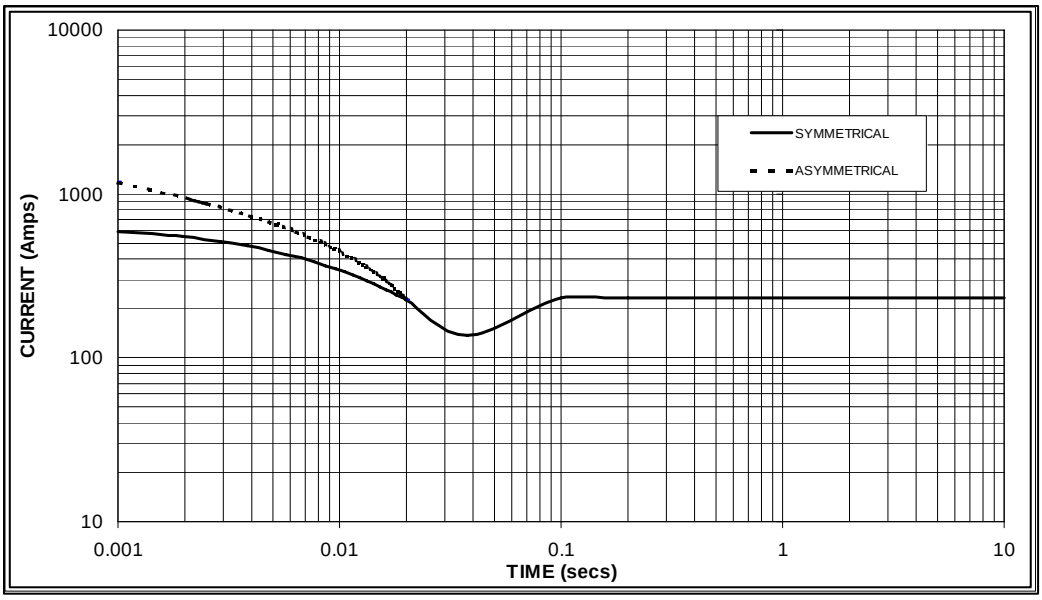


SX



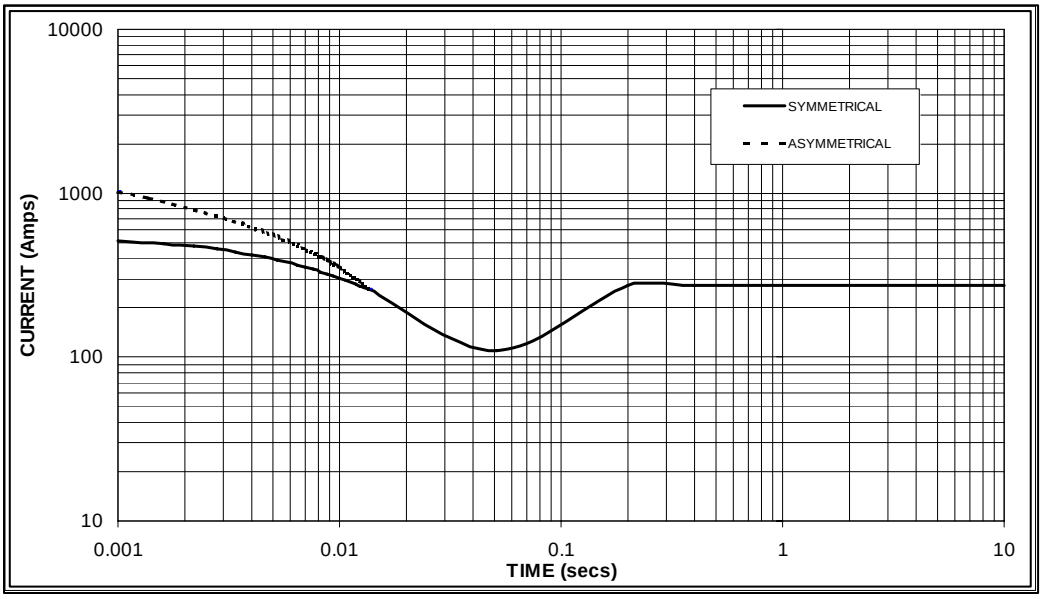
Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed Based on star (wye) connection.

50 Hz



Sustained Short Circuit = 230 Amps

60 Hz



Sustained Short Circuit = 275 Amps

Note 1

The following multiplication factors should be used to adjust the values from curve between time 0.001 seconds and the minimum current point in respect of nominal operating voltage :

50Hz		60Hz	
Voltage	Factor	Voltage	Factor
380v	X 1.00	416v	X 1.00
400v	X 1.07	440v	X 1.06
415v	X 1.12	460v	X 1.12
440v	X 1.18	480v	X 1.17

The sustained current value is constant irrespective of voltage level

Note 2

The following multiplication factor should be used to convert the values calculated in accordance with NOTE 1 to those applicable to the various types of short circuit :

	3-phase	2-phase L-L	1-phase L-N
Instantaneous	x 1.00	x 0.87	x 1.30
Minimum	x 1.00	x 1.80	x 3.20
Sustained	x 1.00	x 1.50	x 2.50
Max. sustained duration	10 sec.	5 sec.	2 sec.

All other times are unchanged

Note 3

Curves are drawn for Star (Wye) connected machines. For other connection the following multipliers should be applied to current values as shown :

Parallel Star = Curve current value X 2

Series Delta = Curve current value X 1.732

UCI224D

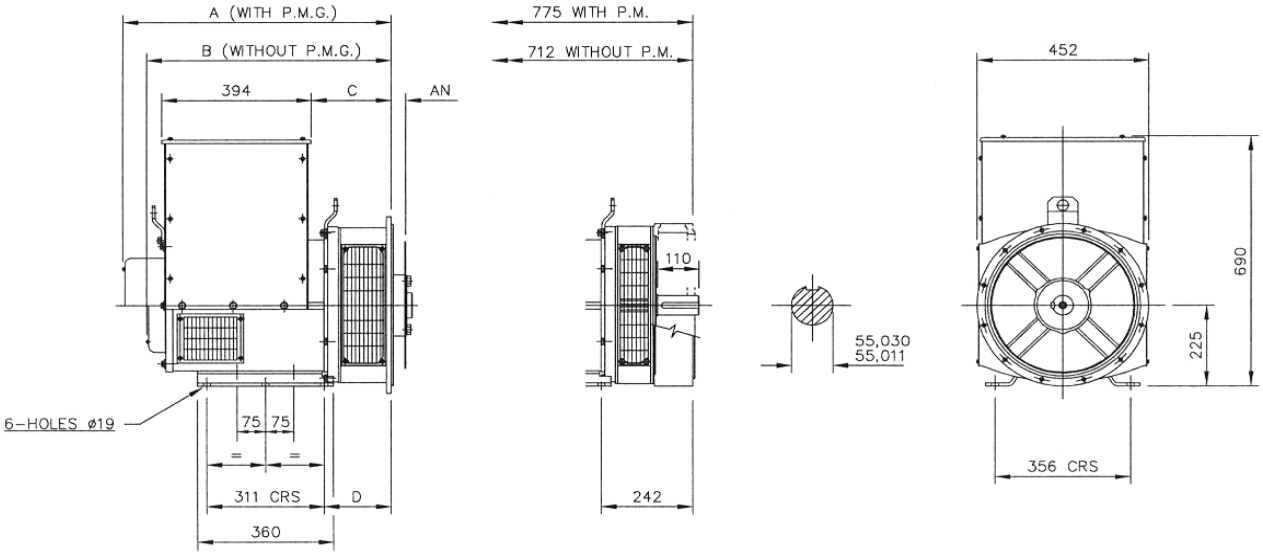
Winding 311 / 0.8 Power Factor

RATINGS

	Class - Temp Rise	Cont. F - 105/40°C				Cont. H - 125/40°C				Standby - 150/40°C				Standby - 163/27°C			
50 Hz	Series Star (V)	380	400	415	440	380	400	415	440	380	400	415	440	380	400	415	440
	Parallel Star (V)	190	200	208	220	190	200	208	220	190	200	208	220	190	200	208	220
	Series Delta (V)	220	230	240	254	220	230	240	254	220	230	240	254	220	230	240	254
	kVA	45.0	45.0	45.0	33.6	50.0	50.0	50.0	37.5	53.0	53.0	53.0	39.1	55.0	55.0	55.0	41.2
	kW	36.0	36.0	36.0	26.9	40.0	40.0	40.0	30.0	42.4	42.4	42.4	31.3	44.0	44.0	44.0	33.0
	Efficiency (%)	88.3	88.6	88.9	89.3	87.7	88.2	88.5	89.0	87.4	87.9	88.2	88.8	87.2	87.7	88.0	88.6
	kW Input	40.8	40.6	40.5	38.5	45.6	45.4	45.2	43.1	48.5	48.2	48.1	45.0	50.5	50.2	50.0	47.6

60 Hz	Series Star (V)	416	440	460	480	416	440	460	480	416	440	460	480	416	440	460	480
	Parallel Star (V)	208	220	230	240	208	220	230	240	208	220	230	240	208	220	230	240
	Delta (V)	240	254	266	277	240	254	266	277	240	254	266	277	240	254	266	277
	kVA	52.5	55.0	56.0	58.0	60.0	62.5	62.5	65.0	62.5	65.0	65.0	68.8	65.0	66.3	66.3	71.3
	kW	42.0	44.0	44.8	46.4	48.0	50.0	50.0	52.0	50.0	52.0	52.0	55.0	52.0	53.0	53.0	57.0
	Efficiency (%)	88.7	89.0	89.2	89.4	88.0	88.4	88.8	89.0	87.8	88.2	88.6	88.7	87.5	88.1	88.5	88.5
	kW Input	47.4	49.4	50.2	51.9	54.5	56.6	56.3	58.4	56.9	59.0	58.7	62.1	59.4	60.2	59.9	64.5

DIMENSIONS



SINGLE BEARING MACHINES ONLY						
ADAPTOR	A	B	C	D	COUPLING DISCS	AN
SAE 1	724,3	661,3	224,3	191,3	SAE 8	61,90
SAE 2	710	647	210	177	SAE 10	53,98
SAE 3	710	647	210	177	SAE 11,5	39,68
SAE 4	710	647	210	177	SAE 14	25,40

STAMFORD

Barnack Road • Stamford • Lincolnshire • PE9 2NB

Tel: 00 44 (0)1780 484000 • Fax: 00 44 (0)1780 484100

6BTAA5.9-G7

> Specification sheet

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Description

The B5.9 engine has established an unrivalled reputation for reliability, incorporating features designed to maximise engine integration within OEM installation. The 6BTAA5.9-G7 CoolPac utilises the latest Cummins manufacturing processes and Quality Standards.

CE — This engine has been built to comply with CE certification.

ISO 9001 — This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO 9002 orTS16949.

Features

Single Poly Vee belt drive for fan, alternator and water pump, with self-tensioning idler for minimum maintenance.

Rotary-type Bosch pump operates at high injection pressures for cleaner combustion and lower emissions.

Spin-on fuel filter and full-flow lubricating oil filter.

Top mounted Holset HX35 turbocharger for increased power, fuel economy, and lower smoke and noise levels.

CoolPac Integrated Design - Products are supplied complete with cooling package and air cleaner kit for a complete power package. Each component has been specifically developed and rigorously tested for G-Drive products, ensuring high performance, durability and reliability.

Service and Support - G-Drive products are backed by an uncompromising level of technical support and after sales service delivered through a world class service network.

1500 rpm (50 Hz Ratings)

Gross Engine Output			Typical Generator Set Output			
Standby	Prime	Base	Standby (ESP)		Prime (PRP)	
kWm/BHP			kWe	kVA	kWe	kVA
160/215	145/195	101/135	136	170	124	155

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EMERS-5816a-EN (12/13)

General Engine Data

Type	4- cycle, In-line, 6- cylinder, Turbocharged and Charge Air Cooled, Diesel
Bore mm	102 mm (4.02 in.)
Stroke mm	120 mm (4.72 in.)
Displacement Litre	5.9 litre (360.0 $in.^3$)
Cylinder Block	Cast iron, 6 cylinder
Battery Charging Alternator	55 amps
Starting Voltage	12 volt, 55 Amp negative ground
Fuel System	Direct injection
Fuel Filter	Venturi Combo Stratapore Filter
Lube Oil Filter Type(s)	Venturi Combo Stratapore Filter
Lube Oil Capacity (l)	16.4
Flywheel Dimensions	SAE3/11.5

Coolpac Performance Data

Cooling System Design	Charged Air Cooled
Coolant Ratio	50% ethylene glycol; 50% water
Total Coolant Capacity (l)	21.4
Limiting Ambient Temp**	50 Degrees
Fan Power (kWm)	10
Cooling System Air Flow (m^3/s)**	3.7
Air Cleaner Type (heavy duty)	Dry replaceable element with restriction indicator

** @ 13 mm H_20

Ratings Definitions

Emergency Standby Power (ESP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

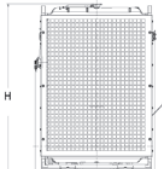
Limited-Time Running Power (LTP):
Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):
Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base Load (Continuous) Power (COP):
Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN6271 and BS 5514.

Weight and Dimensions

	Length	Width	Height	Weight (dry)
	mm	mm	mm	kg
CoolPac	1723	896	1380	718



Fuel Consumption 1500 (50 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	160	215	41	10.9
Prime Power				
100	145	195	37	9.8
75	109	146	29	7.5
50	73	98	19	5.0
25	36	49	9	2.5
Continuous Power				
100	101	135	26	6.9

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Guarulhos, SP 07180-900
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Fax 1 763 574 5298

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EMERS-5816a-EN (12/13)

X2.5 G2

> Specification sheet

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Description

The X2.5 has all the strength and reliability the industry has come to expect from Cummins Inc., but in a smaller, lighter and more economical package. The X2.5 features direct fuel injection, resulting in cleaner quieter and more fuel efficient performance. The CoolPac system offers a cost effective, fully warranted, high ambient, integrated system solution capable of meeting our customer's application requirements.

CE	This engine has been built to comply with CE certification.
ISO 9001	This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO9002.

Features

The X2.5 is built to last, with a cast-iron block designed for durability and reliability. Design elements include:

- Bosch direct injection in-line pump for cleaner, more efficient fuel consumption.
- Parent bore block with deep, stiff crankcase and optimised rib arrangement to enhance strength and reduce noise.
- 12 volt electrical package as standard, with starter, alternator and fuel solenoid.
- Single spin-on oil filter and Fuel Filter
- SAE 3/11.5 flywheel housing

Integrated Design - CoolPac products are supplied complete and factory fitted with cooling package and air cleaner for a complete power package. Each component has been specifically developed and rigorously tested for G-Drive products, ensuring high performance, durability and reliability.

Service and Support - G-Drive products are backed by an uncompromising level of technical support and after sales service, delivered through a world class service network.

1500 rpm (50 Hz Ratings)

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
27/36.3	24.37/32.67	18.96/25.41	26/35	23/31	21/28	22	27.5	20	25	18	22

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General Engine Data

Type	4- cycle, In-line, 3- cylinder, Naturally Aspirated, Diesel,
Bore mm	91.4mm (3.59 in.)
Stroke mm	127mm (5 in.)
Displacement	2.5 litre (153in.^{3})
Cylinder Block	Cast iron, 3 cylinder
Battery Charging Alternator	36 amps
Starting Voltage	12 volt, negative ground
Fuel System	Direct injection
Fuel Filter	Spin on fuel filters with Water Drain Facility
Lube Oil Filter Type(s)	Spin on full flow filter
Lube Oil Capacity (liters)	6.5
Flywheel Dimensions	3/11.5

Coolpac Performance Data

Cooling System Design	Jacket Water cooled
Coolant Ratio	50% ethylene glycol; 50% water
Coolant Capacity (liters)	5.5
Limiting Ambient Temp.**	50degC
Fan Power kw	0.9
Cooling System Air Flow (m^3/s)**	1.6
Air Cleaner Type	Heavy Duty Dry replaceable element with restriction indicator

**** @ 13 mm H_20 Prime power**

Ratings Definitions

Emergency Standby Power (ESP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

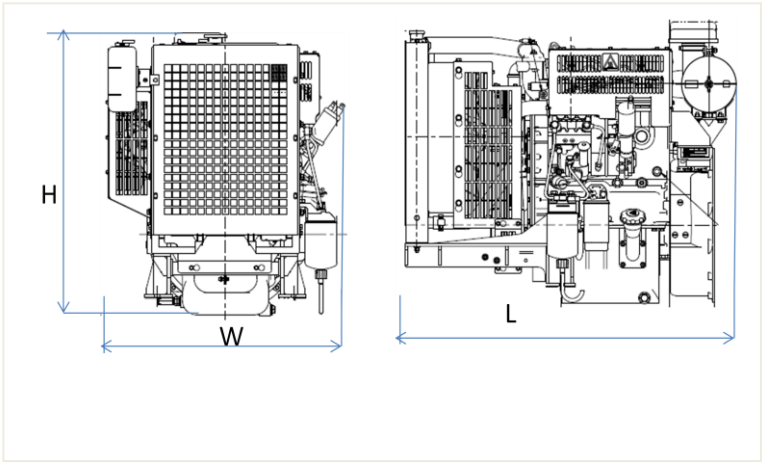
Limited-Time Running Power (LTP):
Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):
Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base Load (Continuous) Power (COP):
Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN6271 and BS 5514.

Weight & Dimensions

	Length	Width	Height	Weight (dry)
	mm	mm	mm	kg
CoolPac	1004	675	803	283
Shipping	1125	780	1000	350



Fuel Consumption 1500 (50 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	27	36.3	6.5	1.7
Prime Power				
100	24.37	32.67	6.0	1.6
75	18.28	24.50	4.8	1.3
50	12.19	16.34	3.5	0.7
25	6.10	8.17	2.5	0.4
Continuous Power				
100	18.96	25.41	4.9	1.3

Cummins G-Drive Engines

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(10/12) (GDSS173)

QSX15-G8

Emissions Compliance:

Non-Certified or "Flex" program for EU Mobile applications.
Formerly EU Stage2 @ 50Hz.

> Specification sheet

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Description

The QSX15-Series is the first heavy-duty diesel with 24-valve dual overhead camshaft technology. Yet it has an impressive 30% fewer parts than comparable diesels and a utilised design, which eliminates external lube, coolant and fuel lines, leading to higher reliability for such a high power output.

The 15 litre, six-cylinder QSX15 engine is ideally suited to both open and containerised applications in static or portable genset equipment. It can be matched to meet specific duty cycle and operating conditions of any genset.

CE	This engine has been built to comply with CE certification.
ISO 9001	This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO9002.

Features

Holset HX82 Turbocharging - Wastegated design optimizes operation. Improved transient response and low fuel consumption.

Integrated Block Design - Integrated fluid circuits replace hoses and eliminate potential leaks.

High-Pressure Fuel Injection - Capable of over 1,900 bar (28,000 psi) for cleaner, more fuel-efficient combustion.

24-Valve Cylinder Head – Four valves per cylinder for increased power with faster response at every rpm.

Coolpac Integrated Design - Products are supplied complete with cooling package and air cleaner kit for a complete power package. Each component has been specifically developed and rigorously tested for G-Drive products, ensuring high performance, durability and reliability.

Controls - Fitted with Power Generation Interface (PGI) to improve emissions.

Service and Support - G-Drive products are backed by an uncompromising level of technical support and after sales service, delivered through a world class service network.

1500 rpm (50 Hz Ratings)

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
500/670	444/595	317/425	477/639	426/571	299/400	440	550	400	500	281	351

1800 rpm (60 Hz Ratings)

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
455/610	414/555	295/395	419/561	383/513	264/354	400	500	360	450	248	310

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General Engine Data

Type	4 Cycle, In-line, Turbo Charged, Air Cooled
Bore mm	137 mm (5.39 in.)
Stroke mm	169 mm (6.65 in.)
Displacement Litre	15 litre (912 in.³)
Cylinder Block	Cast iron, 6 cylinder
Battery Charging Alternator	35 amps
Starting Voltage	24 volt
Fuel System	Direct injection
Fuel Filter	Spin-on fuel filters with water separator
Lube Oil Filter Type(s)	Spin-on full flow filter
Lube Oil Capacity (l)	91.0
Flywheel Dimensions	SAE1

Coolpac Performance Data

Cooling System Design	Air-Air Charge Cooled
Coolant Ratio	50% ethylene glycol; 50% water
Coolant Capacity (l)	42.0
Limiting Ambient Temp.** (°C)	55
Fan Power (kWm)	16
Cooling System Air Flow (m^3/s)**	11.8
Air Cleaner Type	Light duty dry replaceable element with restriction indicator

** @ 13 mm H°0 Duct Restriction

Ratings Definitions

Emergency Standby Power (ESP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

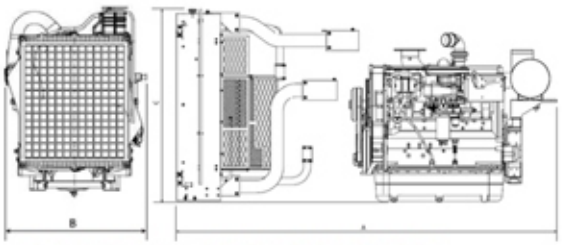
Limited-Time Running Power (LTP):
Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):
Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base Load (Continuous) Power (COP):
Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN6271 and BS 5514.

Weight & Dimensions

Length mm	Width mm	Height mm	Weight (dry) kg
2269	1332	1669	1658



Fuel Consumption 1500 (50 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	500	670	123.0	32..4
Prime Power				
100	444	595	103.0	27.3
75	333	447	78.7	20.8
50	222	298	54.7	14.5
25	111	149	30.3	8
Continuous Power				
100	317	425	75.7	20

Fuel Consumption 1800 (60 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	455	610	107.0	28.4
Prime Power				
100	414	555	97.6	25.8
75	311	416	75.2	19.9
50	207	278	53.4	14.1
25	104	139	31.8	8.4
Continuous Power				
100	295	395	72.7	19.1

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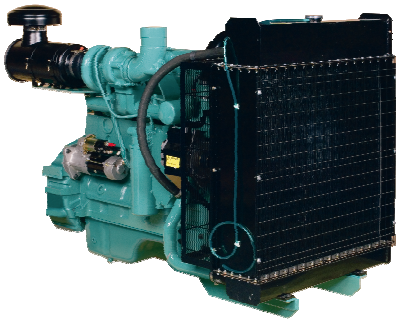

> Specification sheet

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Description

C-Series engines have established an unrivalled reputation for reliability. Engines in the series incorporate features to reduce maintenance and enhance performance in order to meet the most demanding requirements of generator set operation.

CE — This engine has been built to comply with CE certification.

ISO 9001 — This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO9002.

Features

Single Poly Vee belt drive for fan, alternator and water pump, with self-tensioning idler for minimum maintenance.

Inline-type Bosch P-Series pump operates at high injection pressures for cleaner combustion and lower emissions.

Spin-on fuel filter and full-flow lubricating oil filter.

Top mounted Holset HX40W turbo-charger for increased power, fuel economy, and lower smoke and noise levels.

Coolpac Integrated Design - Products are supplied complete with cooling package and air cleaner kit for a complete power package. Each component has been specifically developed and rigorously tested for G-Drive products, ensuring high performance, durability and reliability.

Service and Support - G-Drive products are backed by an uncompromising level of technical support and after sales service, delivered through a world class service network.

1500 rpm (50 Hz Ratings)

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
203/272	183/245	149/200	191/256	173/232	139/232	176	220	160	200	120	150

1800 rpm (60 Hz Ratings)

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
237/316	213/285	175/235	221/296	200/268	162/217	200	250	182	228	144	180

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(01/08) (GDSS108)

General Engine Data

Type	4 cycle, in-line, Turbo Charged
Bore mm	114 mm (4.49 in.)
Stroke mm	135 mm (5.32 in.)
Displacement Litre	8.3 litre (505.0 $in.^3$)
Cylinder Block	Cast iron, 6 cylinder
Battery Charging Alternator	60 amps
Starting Voltage	24 volt, negative ground
Fuel System	Direct injection
Fuel Filter	Spin-on fuel filters with water separator
Lube Oil Filter Type(s)	Spin-on full flow filter
Lube Oil Capacity (l)	23.8
Flywheel Dimensions	2/11.5

Coolpac Performance Data

Cooling System Design	Air-Air Charge Cooled
Coolant Ratio	50% ethylene glycol; 50% water
Coolant Capacity (l)	12.0
Limiting Ambient Temp.**	48.0
Fan Power	1.3
Cooling System Air Flow (m^3/s)**	48.0
Air Cleaner Type	Dry replaceable element with restriction indicator

** @ 13 mm $H^2$0

Ratings Definitions

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Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):
Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base Load (Continuous) Power (COP):
Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN6271 and BS 5514.

Weight & Dimensions

Length	Width	Height	Weight (dry)
mm	mm	mm	kg
1440	910	1240	794

Fuel Consumption 1500 (50 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	203	272	51	13.5
Prime Power				
100	183	245	46	12
75	137	184	34	9
50	91	123	23	6
25	46	61	12	3.3
Continuous Power				
100	149	200	36	9.6

Fuel Consumption 1800 (60 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	237	317	64	16.8
Prime Power				
100	213	285	56	14.8
75	160	214	41	10.9
50	106	143	28	7.3
25	53	71	15	4
Continuous Power				
100	175	235	44	11.6

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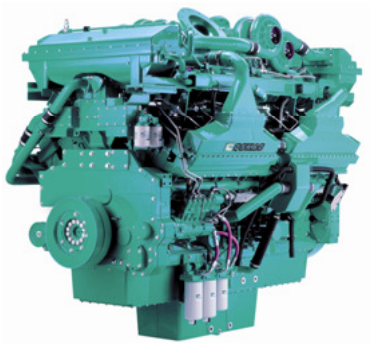
(01/08) (GDSS108)

QSK60-G13



> Specification sheet

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Description

The QSK60 is a V 16 cylinder engine with a 60 litre displacement. This Quantum series utilizes sophisticated electronics and premium engineering to provide outstanding performance levels, reliability and versatility for Standby, Prime and Continuous Power applications.

CE	This engine has been built to comply with CE certification.
ISO 9001	This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO9002.

Features

High pressure fuel pump, Modular Common Rail fuel System (MCRS) and state of the art integrated electronic control system provide superior performance, efficiency and diagnostics. The electronic fuel pumps deliver up to 1600 bar injection pressure and eliminate mechanical linkage adjustments. The new MCRS utilizes an electric priming pump which is integrated with the off-engine stage-1 fuel filter head and is controlled and powered by the engine ECM. The stage-2 fuel filters are mounted on-engine

CTT (Cummins Turbo Technologies) HX82/HX83 turbo-charging utilizes exhaust energy with greater efficiency for improved emissions and fuel consumption.

Low Temperature After-cooling - Two-pump Two-loop (2P2L)

Ferrous Cast Ductile Iron (FCD) Pistons - High strength design delivers superior durability.

G-Drive Integrated Design - Each component has been specifically developed and rigorously tested for G-Drive products, ensuring high performance, durability and reliability.

Service and Support - G-Drive products are backed by an uncompromising level of technical support and after sales service, delivered through a world class service network.

1500 rpm (50 Hz Ratings)

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
2164/2901	1727/2315	N/A	2108/2826	1692/2269	N/A	2000	2500	1600	2000	N/A	N/A

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(05/09) (GDSS156)

General Engine Data

Type	4 cycle, Turbocharged, After-cooled
Bore mm	159
Stroke mm	190
Displacement Litre	60.2
Cylinder Block	Cast iron, 16 cylinder
Battery Charging Alternator	55A
Starting Voltage	24V
Fuel System	Direct injection Cummins MCRS
Fuel Filter	Spin on fuel filters with water separator
Lube Oil Filter Type(s)	Spin on full flow filter
Lube Oil Capacity (l)	280
Flywheel Dimensions	SAE 0

Coolpac Performance Data

Cooling System Design	2 pump – 2 loop
Coolant Ratio	50% ethylene glycol; 50% water
Coolant Capacity (l)	Engine only – not applicable
Limiting Ambient Temp.**	
Fan Power	
Cooling System Air Flow (m^3/s)**	
Air Cleaner Type	Dry replaceable element with restriction indicator

** @ 13 mm H^20

Ratings Definitions

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Base Load (Continuous) Power (COP):
Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN6271 and BS 5514.

Weight & Dimensions

Length	Width	Height	Weight (dry)
mm	mm	mm	kg
2781	1794	2155	7185

Fuel Consumption 1500 (50 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	2164	2901	523	138.1
Prime Power				
100	1727	2315	399	105.4
75	1295	1736	302	79.7
50	863	1158	210	55.5
25	432	579	119	31.4
Continuous Power				
100	N/A	N/A	N/A	N/A

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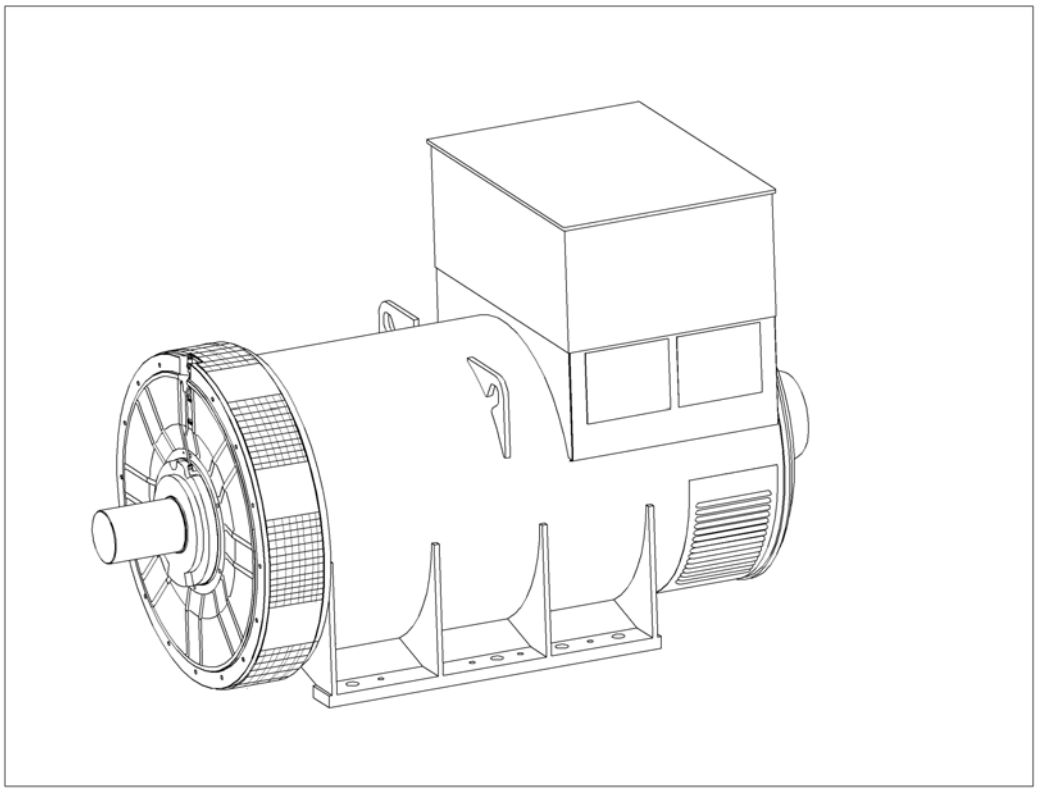
(05/09) (GDSS156)

STAMFORD®

PI734F - Technical Data Sheet



SPECIFICATIONS & OPTIONS

STANDARDS

Newage Stamford industrial generators meet the requirements of BS EN 60034 and the relevant sections of other national and international standards such as BS5000, VDE 0530, NEMA MG1-32, IEC60034, CSA C22.2-100, AS1359.
Other standards and certifications can be considered on request.

DESCRIPTION

The STAMFORD PI range of synchronous ac generators are brushless with a rotating field. They are separately excited by the STAMFORD Permanent Magnet Generator (PMG). This is a shaft mounted, high frequency, pilot exciter which provides a constant supply of clean power via the Automatic Voltage Regulator (AVR) to the main exciter. The main exciter output is fed to the main rotor, through a full wave bridge rectifier, protected by surge suppression.

VOLTAGE REGULATORS

The PI range generators, complete with a PMG, are available with one of two AVRs. Each AVR has soft start voltage build up and built in protection against sustained over-excitation, which will de-excite the generator after a minimum of 8 seconds.
Underspeed protection (UFRO) is also provided on both AVRs. The UFRO will reduce the generator output voltage proportional to the speed of the generator below a pre-settable level.

The **MX341 AVR** is two phase sensed with a voltage regulation of ± 1 %. (see the note on regulation).

The **MX321 AVR** is 3 phase rms sensed with a voltage regulation of 0.5% rms (see the note on regulation). The UFRO circuit has adjustable slope and dwell for controlled recovery from step loads. An over voltage protection circuit will shutdown the output device of the AVR, it can also trip an optional excitation circuit breaker if required. As an option, short circuit current limiting is available with the addition of current transformers.

Both the MX341 and the MX321 need a generator mounted current transformer to provide quadrature droop characteristics for load sharing during parallel operation. Provision is also made for the connection of the STAMFORD power factor controller, for embedded applications, and a remote voltage trimmer.

WINDINGS & ELECTRICAL PERFORMANCE

All generator stators are wound to 2/3 pitch. This eliminates triplen (3rd, 9th, 15th …) harmonics on the voltage waveform and is found to be the optimum design for trouble-free supply of non-linear loads. The 2/3 pitch design avoids excessive neutral currents sometimes seen with higher winding pitches. A fully connected damper winding reduces oscillations during paralleling. This winding, with the 2/3 pitch and carefully selected pole and tooth designs, ensures very low levels of voltage waveform distortion.

TERMINALS & TERMINAL BOX

Standard generators feature a main stator with 6 ends brought out to the terminals, which are mounted on the frame at the non-drive end of the generator. A sheet steel terminal box contains the AVR and provides ample space for the customers' wiring and gland arrangements. It has removable panels for easy access.

SHAFT & KEYS

All generator rotors are dynamically balanced to better than BS6861:Part 1 Grade 2.5 for minimum vibration in operation. Two bearing generators are balanced with a half key.

INSULATION/IMPREGNATION

The insulation system is class 'H', and meets the requirements of UL1446.
All wound components are impregnated with materials and processes designed specifically to provide the high build required for static windings and the high mechanical strength required for rotating components.

QUALITY ASSURANCE

Generators are manufactured using production procedures having a quality assurance level to
BS EN ISO 9001.

NOTE ON REGULATION

The stated voltage regulation may not be maintained in the presence of certain radio transmitted signals. Any change in performance will fall within the limits of Criteria 'B' of EN 61000-6-2:2001. At no time will the steady-state voltage regulation exceed 2%.

Note: Continuous development of our products entitles us to change specification details without notice, therefore they must not be regarded as binding.

Front cover drawing is typical of the product range.

WINDING 312

CONTROL SYSTEM	SEPARATELY EXCITED BY P.M.G.		
A.V.R.	MX341	MX321	
VOLTAGE REGULATION	± 1%	± 0.5 %	With 4% ENGINE GOVERNING
SUSTAINED SHORT CIRCUIT	REFER TO SHORT CIRCUIT DECREMENT CURVES (page 7)		

INSULATION SYSTEM	CLASS H							
PROTECTION	IP23							
RATED POWER FACTOR	0.8							
STATOR WINDING	DOUBLE LAYER LAP							
WINDING PITCH	TWO THIRDS							
WINDING LEADS	6							
MAIN STATOR RESISTANCE	0.00076 Ohms PER PHASE AT 22°C STAR CONNECTED							
MAIN ROTOR RESISTANCE	2.31 Ohms at 22°C							
EXCITER STATOR RESISTANCE	17.5 Ohms at 22°C							
EXCITER ROTOR RESISTANCE	0.063 Ohms PER PHASE AT 22°C							
R.F.I. SUPPRESSION	BS EN 61000-6-2 & BS EN 61000-6-4,VDE 0875G, VDE 0875N. refer to factory for others							
WAVEFORM DISTORTION	NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%							
MAXIMUM OVERSPEED	2250 Rev/Min							
BEARING DRIVE END	BALL. 6232 C3							
BEARING NON-DRIVE END	BALL. 6319 C3							
	1 BEARING				2 BEARING			
WEIGHT COMP. GENERATOR	3840 kg				3807 kg			
WEIGHT WOUND STATOR	1908 kg				1908 kg			
WEIGHT WOUND ROTOR	1609 kg				1565 kg			
WR² INERTIA	49.3409 kgm^2				48.424 kgm^2			
SHIPPING WEIGHTS in a crate	3913kg				3876kg			
PACKING CRATE SIZE	216 x 105 x 154(cm)				216 x 105 x 154(cm)			
	50 Hz				60 Hz			
TELEPHONE INTERFERENCE	THF<2%				TIF<50			
COOLING AIR	2.69 m³/sec 5700 cfm				3.45 m³/sec 7300 cfm			
VOLTAGE STAR	380/220	400/231	415/240	440/254	416/240	440/254	460/266	480/277
kVA BASE RATING FOR REACTANCE VALUES	2020	2080	2080	2040	2340	2500	2550	2600
Xd DIR. AXIS SYNCHRONOUS	2.93	2.73	2.53	2.21	3.54	3.38	3.16	2.96
X'd DIR. AXIS TRANSIENT	0.18	0.17	0.15	0.13	0.21	0.20	0.19	0.18
X"d DIR. AXIS SUBTRANSIENT	0.13	0.12	0.11	0.10	0.16	0.15	0.14	0.13
Xq QUAD. AXIS REACTANCE	1.89	1.75	1.63	1.42	2.28	2.18	2.03	1.90
X"q QUAD. AXIS SUBTRANSIENT	0.26	0.25	0.23	0.20	0.32	0.31	0.29	0.27
X_L LEAKAGE REACTANCE	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.03
X_2 NEGATIVE SEQUENCE	0.19	0.17	0.16	0.14	0.23	0.22	0.20	0.19
X_0 ZERO SEQUENCE	0.02	0.02	0.02	0.02	0.03	0.03	0.02	0.02
REACTANCES ARE SATURATED	VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED							
T'd TRANSIENT TIME CONST.	0.154s							
T"d SUB-TRANSTIME CONST.	0.02s							
T'do O.C. FIELD TIME CONST.	2.54s							
Ta ARMATURE TIME CONST.	0.02s							
SHORT CIRCUIT RATIO	1/Xd							

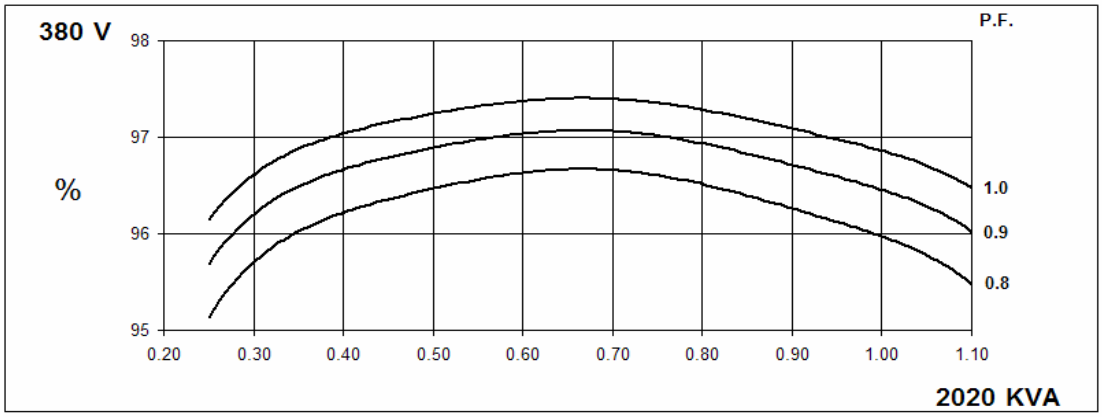
50 Hz

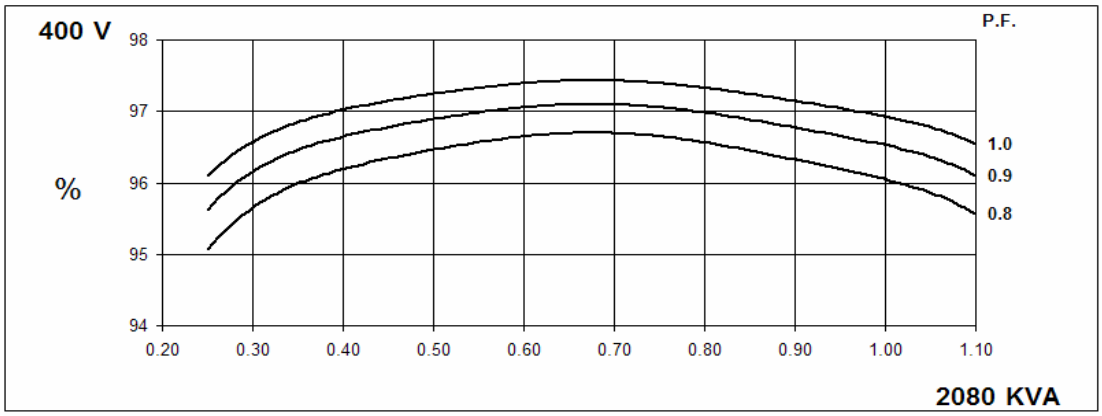
PI734F

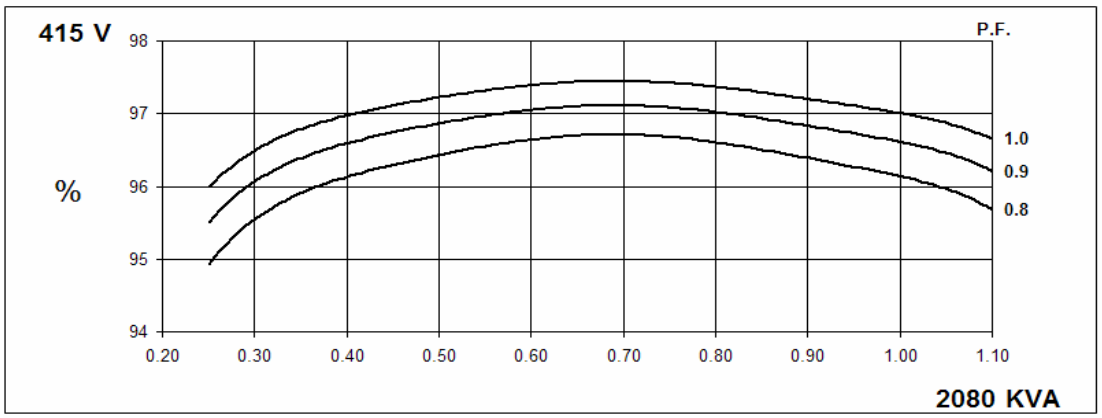
Winding 312

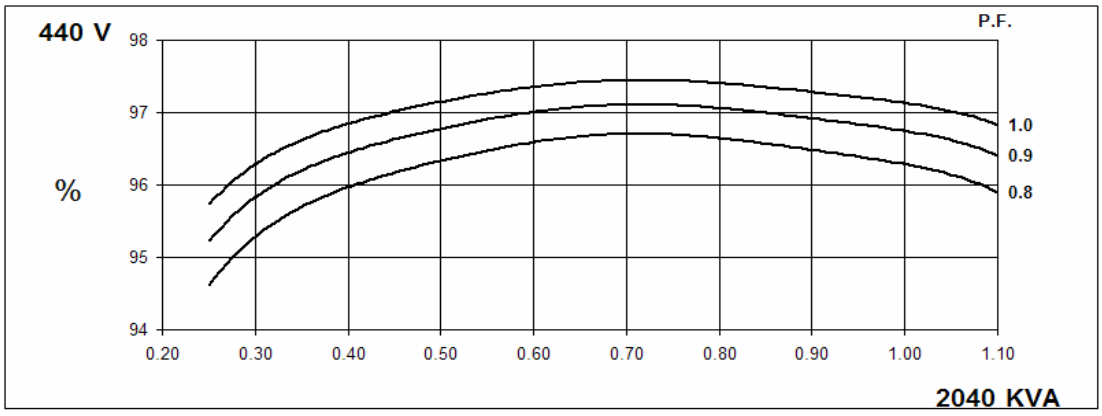
STAMFORD

THREE PHASE EFFICIENCY CURVES







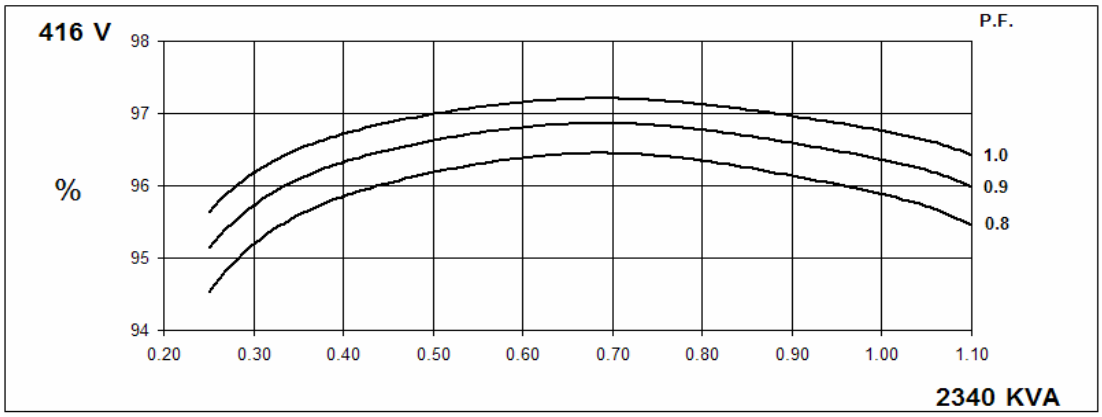


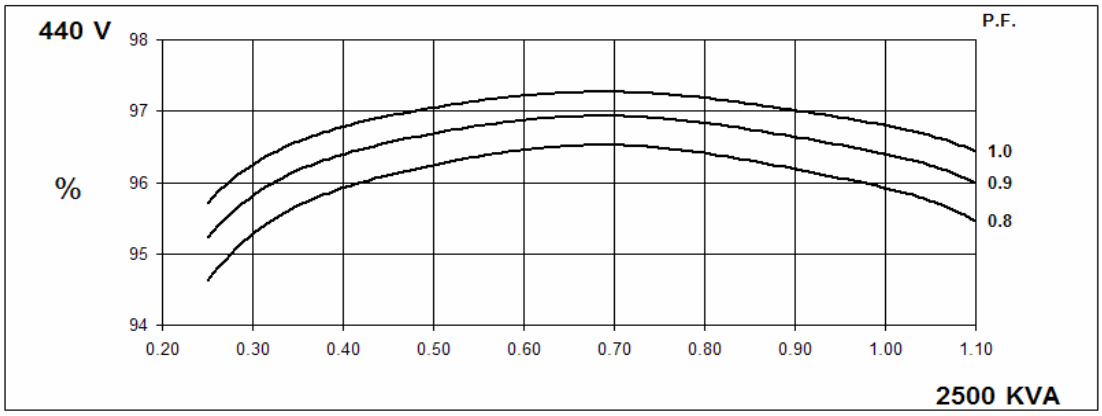
60 Hz

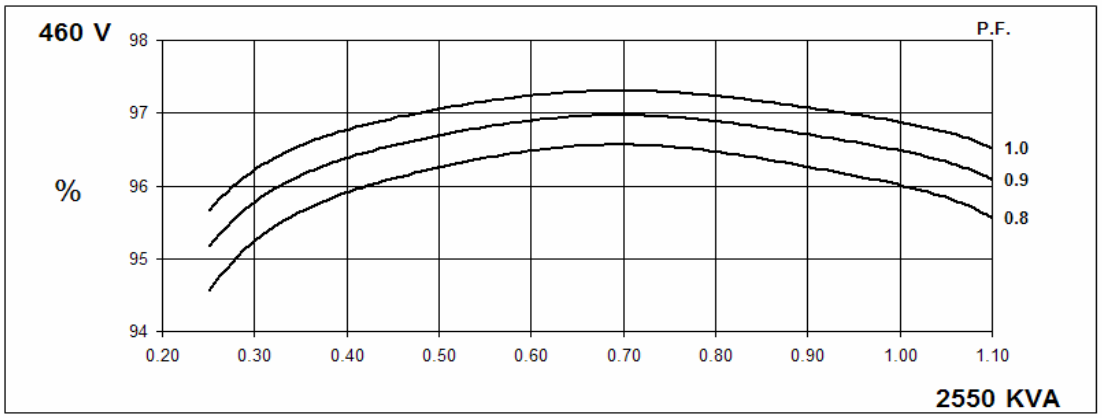
PI734F

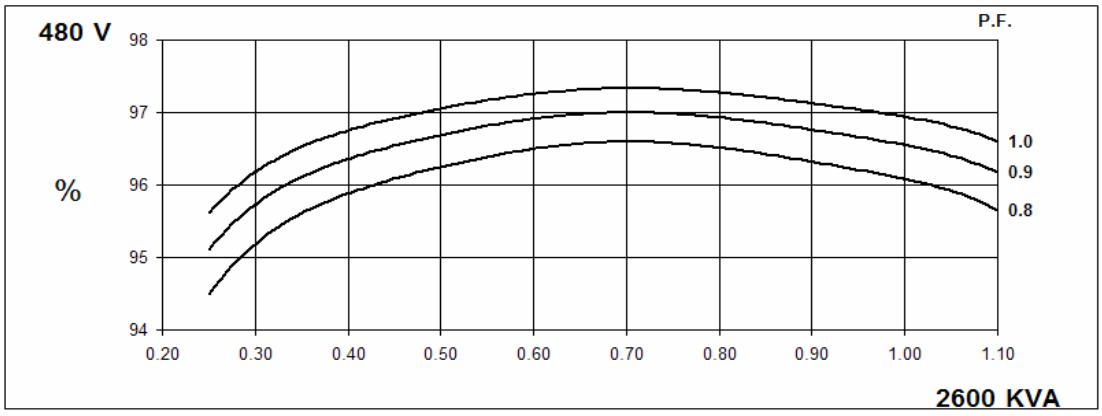
Winding 312

THREE PHASE EFFICIENCY CURVES





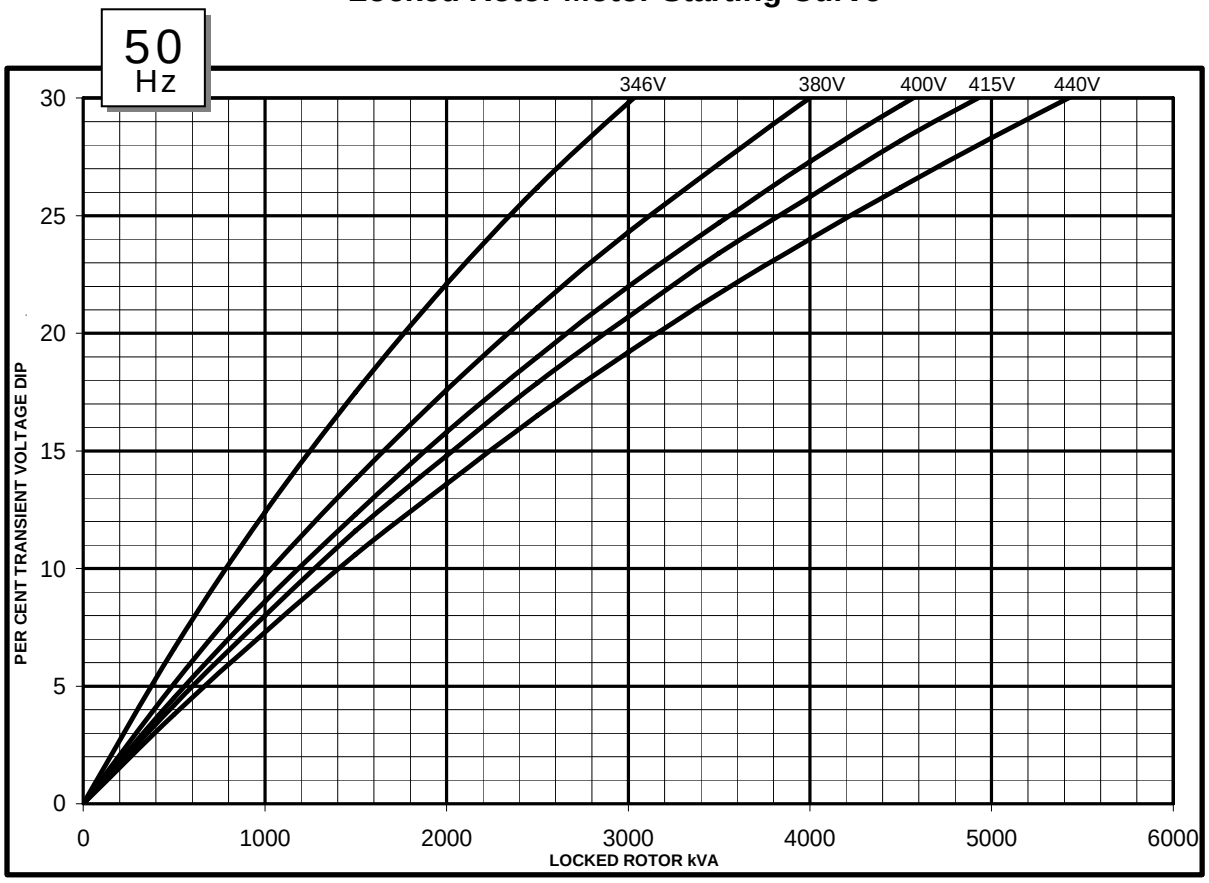


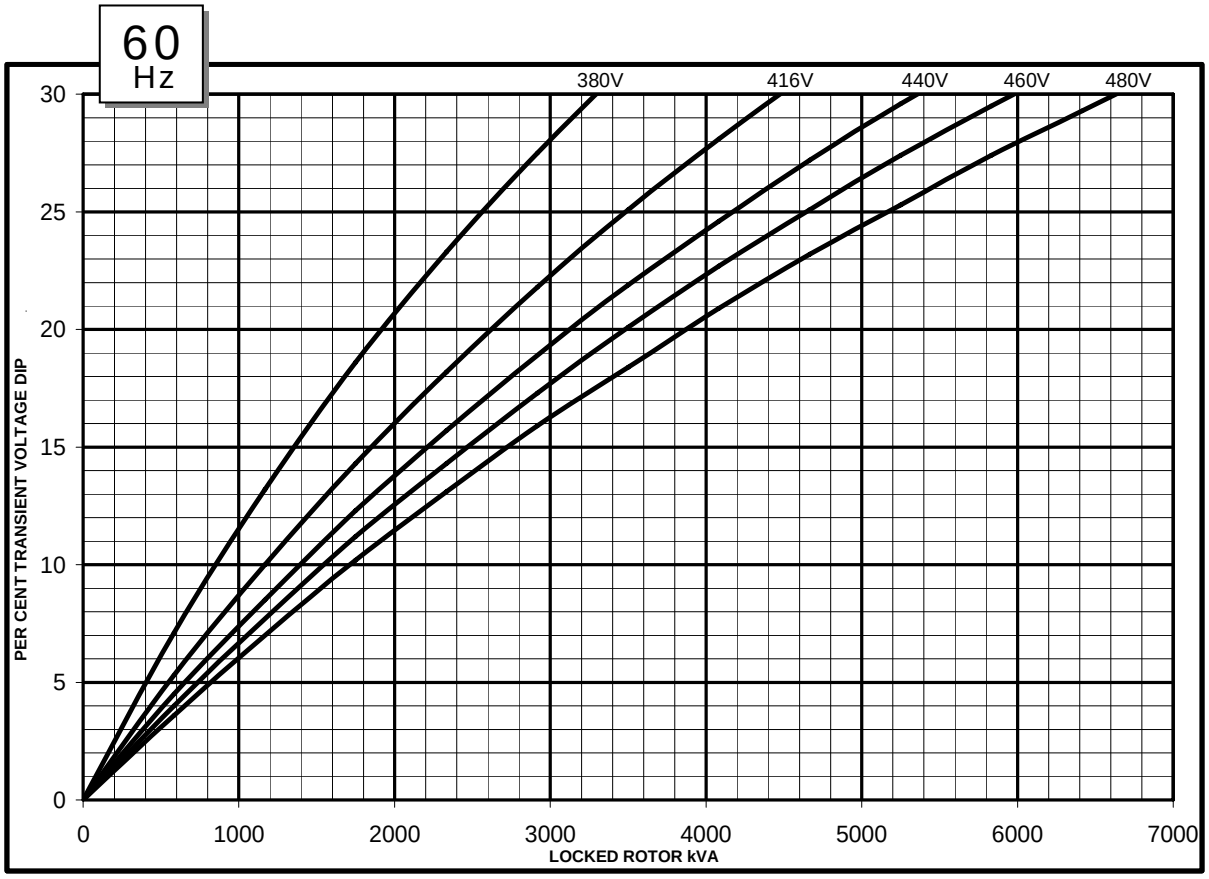


PI734F

Winding 312

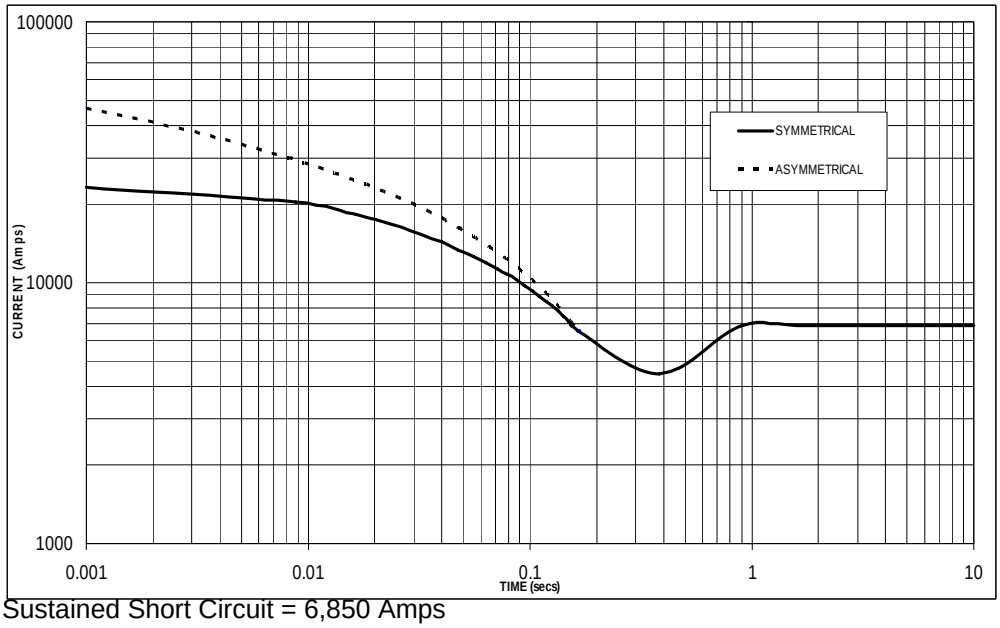
Locked Rotor Motor Starting Curve





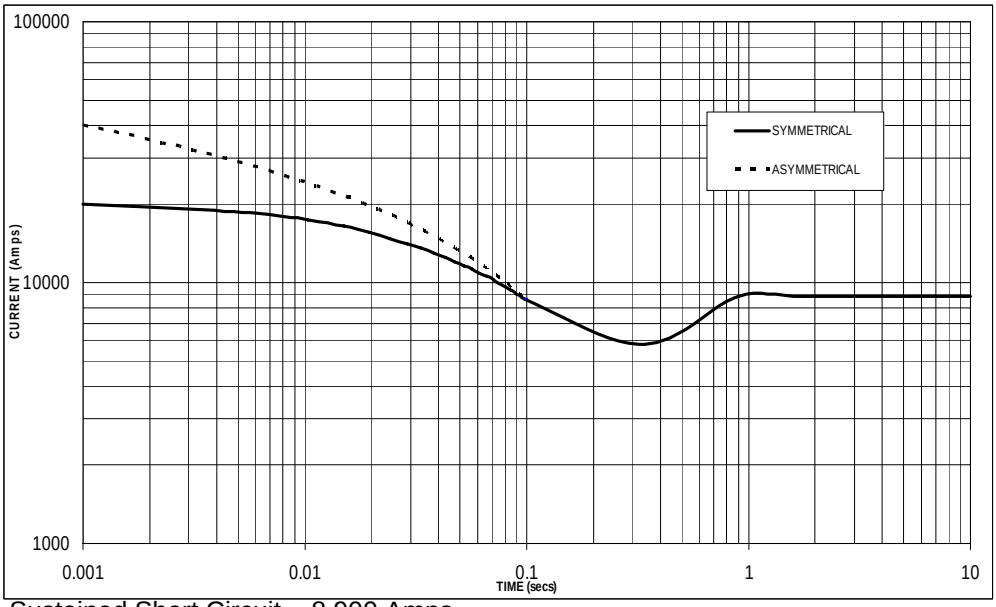
Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed Based on star (wye) connection.

Hz



Sustained Short Circuit = 6,850 Amps

60 Hz



Sustained Short Circuit = 8,900 Amps

Note 1

The following multiplication factors should be used to adjust the values from curve between time 0.001 seconds and the minimum current point in respect of nominal operating voltage :

50Hz		60Hz	
Voltage	Factor	Voltage	Factor
380v	x 1.00	416v	x 1.00
400v	x 1.05	440v	x 1.06
415v	x 1.09	460v	x 1.10
440v	x 1.16	480v	x 1.15

The sustained current value is constant irrespective of voltage level

Note 2

The following multiplication factor should be used to convert the values calculated in accordance with NOTE 1 to those applicable to the various types of short circuit :

	3-phase	2-phase L-L	1-phase L-N
Instantaneous	x 1.00	x 0.87	x 1.30
Minimum	x 1.00	x 1.80	x 3.20
Sustained	x 1.00	x 1.50	x 2.50
Max. sustained duration	10 sec.	5 sec.	2 sec.

All other times are unchanged

Note 3

Curves are drawn for Star (Wye) connected machines.

PI734F

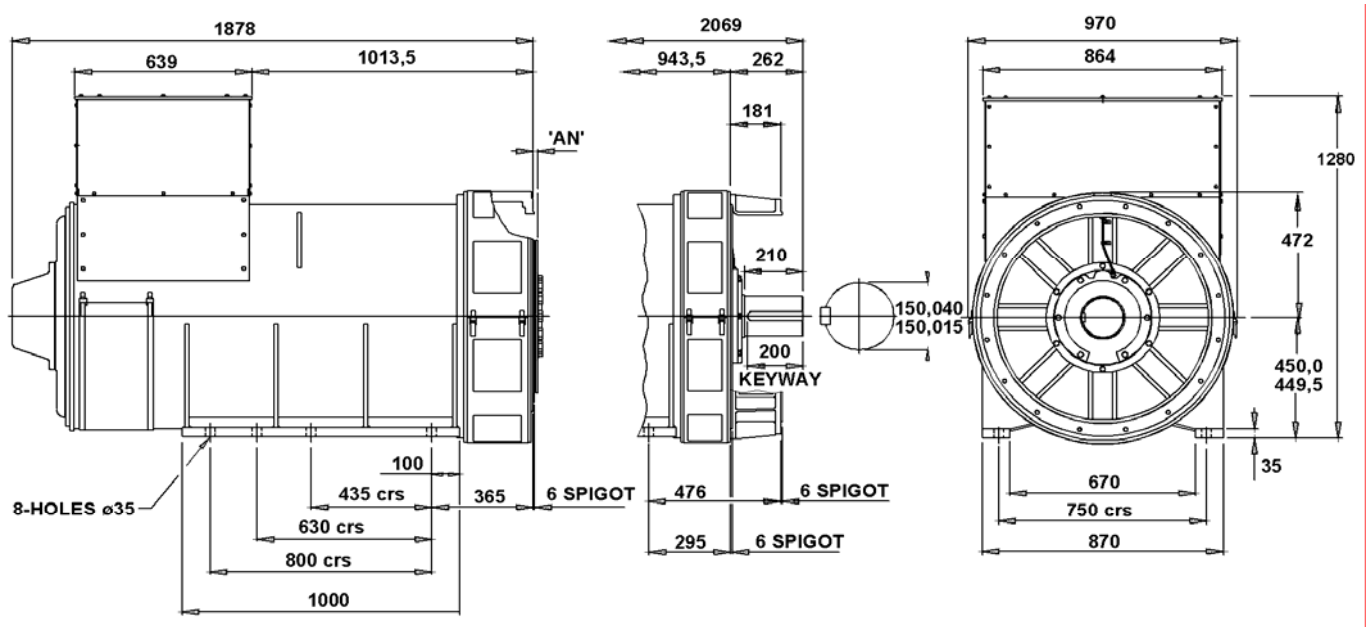
Winding 312 / 0.8 Power Factor

RATINGS

Class - Temp Rise		Cont. F - 105/40°C				Cont. H - 125/40°C				Standby - 150/40°C				Standby - 163/27°C			
50Hz	Star (V)	380	400	415	440	380	400	415	440	380	400	415	440	380	400	415	440
	kVA	1880	1935	1935	1900	2020	2080	2080	2040	2105	2170	2170	2125	2165	2230	2230	2185
	kW	1504	1548	1548	1520	1616	1664	1664	1632	1684	1736	1736	1700	1732	1784	1784	1748
	Efficiency (%)	96.1	96.2	96.3	96.4	96.0	96.0	96.1	96.3	95.9	95.9	96.0	96.2	95.8	95.9	96.0	96.2
	kW Input	1565	1609	1607	1577	1683	1733	1732	1695	1756	1810	1808	1767	1808	1860	1858	1817

60Hz	Star (V)	416	440	460	480	416	440	460	480	416	440	460	480	416	440	460	480
	kVA	2180	2325	2370	2420	2340	2500	2550	2600	2435	2600	2650	2705	2505	2675	2730	2785
	kW	1744	1860	1896	1936	1872	2000	2040	2080	1948	2080	2120	2164	2004	2140	2184	2228
	Efficiency (%)	96.0	96.1	96.1	96.2	95.9	95.9	96.0	96.1	95.8	95.8	95.9	96.0	95.7	95.8	95.9	95.9
	kW Input	1817	1935	1973	2012	1952	2086	2125	2164	2033	2171	2211	2254	2094	2234	2277	2323

DIMENSIONS



COUPLING DISC	'AN'
S.A.E No 18	15,7
S.A.E No 21	0
S.A.E No 24	0

1-BRG ADAPTORS
S.A.E No 0
S.A.E No 00

2-BRG ADAPTORS
S.A.E No 0
S.A.E No 00

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