

# 6BTAA5.9-G5



## > 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-G5 CoolPac is assembled in our new facility at Pirangut, India and utilises the latest Cummins manufacturing processes and Quality Standards.

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 ISO 9002 or TS16949.



### 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
160/215	145/195	101/135	156/209	142/190	98/131	141	176	128	160	80	100

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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. <sup>3</sup> )
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 After Cooled
Coolant Ratio	50% ethylene glycol; 50% water
Coolant Capacity (l)	19.75
Limiting Ambient Temp.**	56.0
Fan Power(hp)	10.7
Cooling System Air Flow (m <sup>3</sup> /s)**	3.59
Air Cleaner Type (Heavy Duty)	Dry replaceable element with restriction indicator

\*\* @ 13 mm H<sub>2</sub>O at 100% Prime

## Weight & Dimensions

	Length mm	Width mm	Height mm	Weight (dry) kg
CoolPac	1726	1045	1254	500

## Fuel Consumption 1500 (50 Hz)

%	kWm	BHP	L/ph	US gal/ph
<b>Standby Power</b>				
100	160	215	41	10.9
<b>Prime Power</b>				
100	145	195	37	9.8
75	109	146	29	7.5
50	73	96	19	5.0
25	36	49	9	2.5
<b>Continuous Power</b>				
100	101	135	26	6.9

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## 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) is in accordance with ISO 8528, ISO 3046, AS 2789, DIN6271 and BS 5514.

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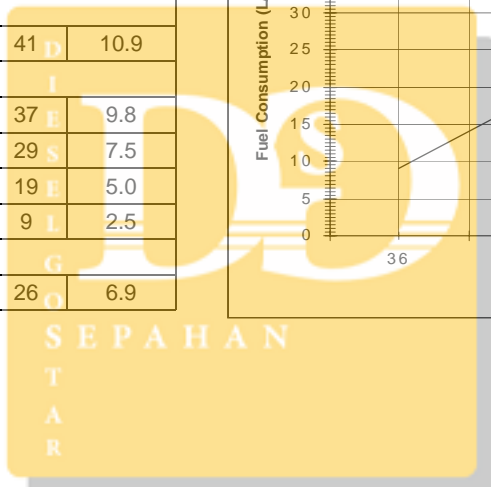
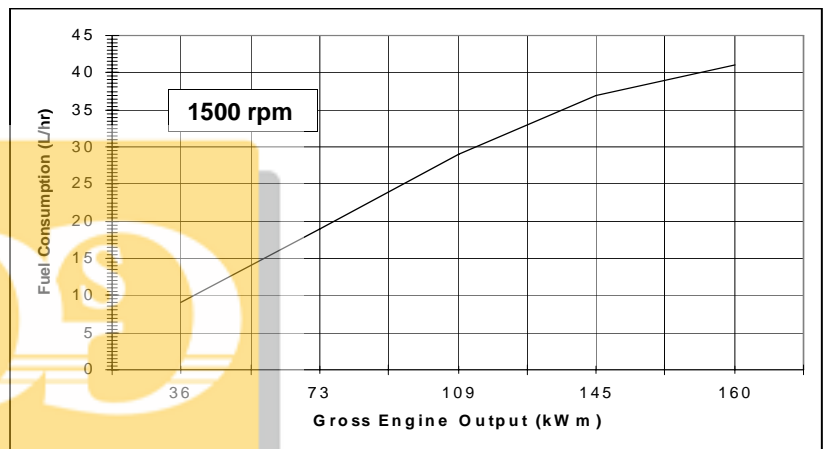
	<b>Cummins Inc.</b> Columbus, Indiana 47202-3005	Basic Engine Model: <b>6BTAA5.9-G5</b>	Curve Number: <b>FR-92891</b>	<b>G-DRIVE B5.9 1</b>
	<b>Engine Data Sheet</b>	Engine Critical Parts List: <b>CPL: 3239</b>	Date: <b>04Mar09</b>	
Displacement : <b>5.9 litre (360 in<sup>3</sup>)</b>		Bore : <b>102mm (4.02 in.)</b> Stroke : <b>120 mm (4.72 in.)</b>		
No. of Cylinders : <b>6</b>		Aspiration : <b>Turbocharged and Air to Air Aftercooled</b>		

Engine Speed rpm	Standby Power		Prime Power		Continuous Power	
	kWm	hp	kWm	hp	kWm	hp
1500	160	215	145	195	101	135

## Engine Performance Data @ 1500 rpm

litre/hour

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	hp	kg/ kWm-h	lb/ hp-h	litre/ hour	US gal/ hour
<b>STANDBY POWER</b>						
100	160	215	0.219	0.360	41	10.9
<b>PRIME POWER</b>						
100	145	195	0.218	0.358	37	9.8
75	109	146	0.222	0.366	29	7.5
50	73	98	0.222	0.365	19	5.0
25	36	49	0.220	0.362	9	2.5
<b>CONTINUOUS POWER</b>						
100	101	135	0.220	0.362	26	6.9



### CONVERSIONS: (litres = US Gal x 3.785) (US Gal = litres x 0.2642)

These guidelines have been formulated to ensure proper application of generator drive engines in A.C. generator set installations. **STANDBY POWER RATING:** Applicable for supplying emergency 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. This rating should be applied where reliable utility power is available. A Standby rated engine should be sized for a maximum of an 80% average load factor and 200 hours of operation per year. This includes less than 25 hours per year at the Standby Power rating. Standby ratings should never be applied except in true emergency power outages. Negotiated power outages contracted with a utility company are not considered an emergency. **PRIME POWER RATING:** Applicable for supplying electric power in lieu of commercially purchased power. Prime Power applications must be in the form of one of the following two categories: **UNLIMITED TIME RUNNING PRIME POWER:** Prime Power is available for an unlimited number of hours per year in a variable load application. Variable load should not exceed a 70% average of the Prime Power rating during any operating period of 250 hours. The total operating time at 100% Prime Power shall not exceed 500 hours per year. A 10% overload capability is available for a period of 1 hour within a 12-hour period of operation. Total operating time at the 10% overload power shall not exceed 25 hours per year. **LIMITED TIME RUNNING PRIME POWER:** Limited Time Prime Power is available for a limited number of hours in a non-variable load application. It is intended for use in situations where power outages are contracted, such as in utility power curtailment. Engines may be operated in parallel to the public utility up to 750 hours per year at power levels never to exceed the Prime Power rating. The customer should be aware, however, that the life of any engine will be reduced by this constant high load operation. Any operation exceeding 750 hours per year at the Prime Power rating should use the Continuous Power rating. **CONTINUOUS POWER RATING:** Applicable for supplying utility power at a constant 100% load for an unlimited number of hours per year. No overload capability is available for this rating.

### Data Subject to Change Without Notice

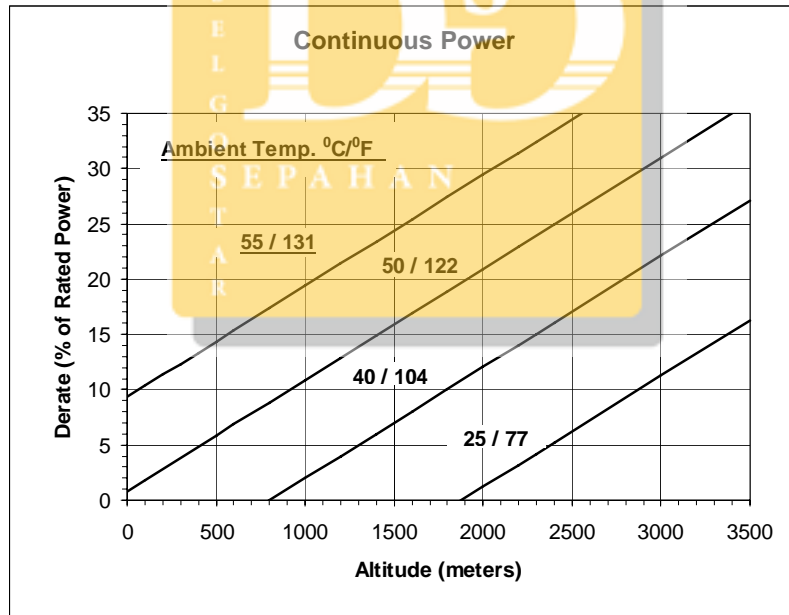
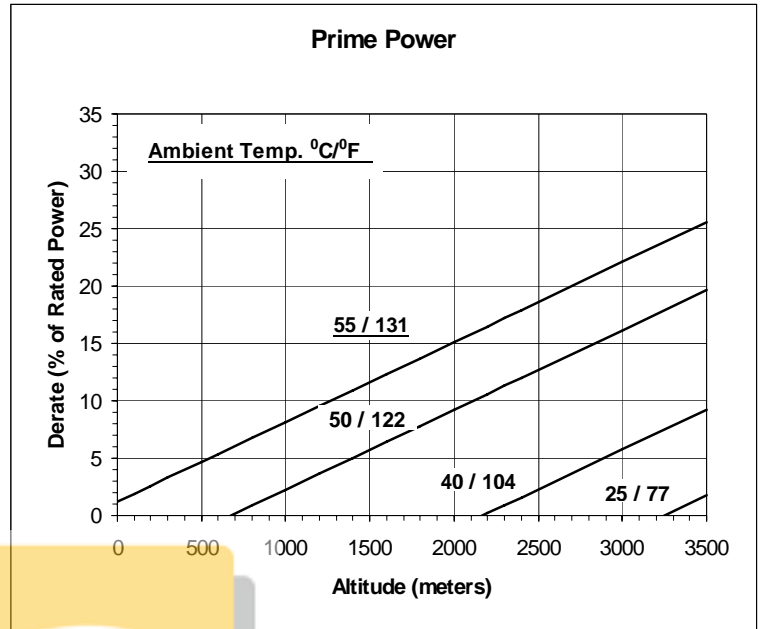
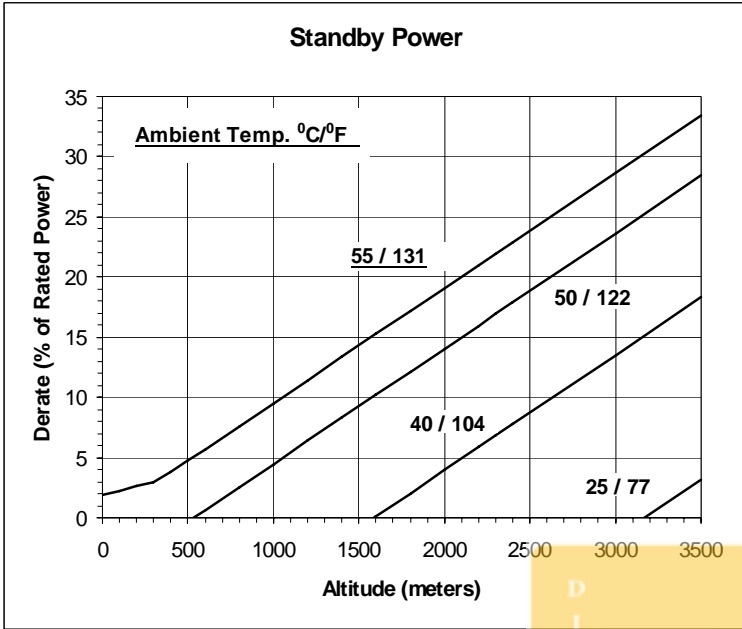
Reference AEB 10.47 for determining Electrical Output.

Data shown above represent gross engine performance capabilities obtained and corrected in accordance with ISO-3046 conditions of 100 kPa (29.53 in Hg) barometric pressure [110 m (361 ft) altitude], 25 °C (77 °F) air inlet temperature, and relative humidity of 30% with No. 2 diesel or a fuel corresponding to ASTM D2. Derates shown are based on 15 in H<sub>2</sub>O air intake restriction and 2 in Hg exhaust back pressure.

The fuel consumption data is based on No. 2 diesel fuel weight at 0.85 kg/litre (7.1 lbs/US gal). Power output curves are based on the engine operating with fuel system, water pump and lubricating oil pump; not included are battery charging alternator, fan, optional equipment and driven components.

Data Status: Limited Production  
 Data Tolerance: ± 5%  
 Chief Engineer: *Chagant*

1500 RPM Power Derate Curves



**Operation At Elevated Temperature And Altitude:**

For **Standby Operation** above these conditions, derate by an additional 3% per 300 m (1000 ft), and 10% per 10 °C (18 °F).

For **Prime Operation** above these conditions, derate by an additional 2% per 300 m (1000 ft), and 12% per 10 °C (18 °F).

For **Continuous Operation** above these conditions, derate by an additional 3% per 300 m (1000 ft), and 17% per 10 °C (18 °F).

# Cummins Inc.

## Engine Data Sheet

ENGINE MODEL : 6BTAA5.9-G5

 DATA SHEET : DS-92891  
 CONFIGURATION NUMBER : D403091GX02 DATE :04Mar09  
 PERFORMANCE CURVE : FR-92891
**INSTALLATION DIAGRAM**

- Fan to Flywheel: 0100-4216

**CPL NUMBER**

- Engine Critical Parts List: 3239

**GENERAL ENGINE DATA**

Type .....	Inline 6-Cylinder Diesel
Aspiration .....	Turbocharged and Charge Air Cooled
Bore x Stroke .....	4.02 x 4.72 (102 X 120)
Displacement .....	360 (5.9)
Compression Ratio .....	16.5 :1

Dry Weight (Approximate), Fan to Flywheel Engine .....	— lb (kg)	886	(402)
Wet Weight (Approximate), Fan to Flywheel Engine .....	— lb (kg)	939	(426)

**Moment of Inertia of Rotating Components**

• with FW 9017 Flywheel .....	— lb <sub>m</sub> • ft <sup>2</sup> (kg • m <sup>2</sup> )	5	(0.6)
• with FW 9134 Flywheel .....	— lb <sub>m</sub> • ft <sup>2</sup> (kg • m <sup>2</sup> )	11	(1.2)
Center of Gravity from Rear Face of Block .....	— in (mm)	21.4	(544)
Center of Gravity Above Crankshaft Centerline .....	— in (mm)	6.1	(155)
Maximum Static Loading at Rear Main Bearing .....	— lb (kg)	TBD	TBD

**ENGINE MOUNTING**

Maximum Bending Moment at Rear Face of Block .....	— lb • ft (N • m)	996	(1350)
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**EXHAUST SYSTEM**

Maximum Back Pressure .....	— in Hg (kPa)	3	(10.25)
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**AIR INDUCTION SYSTEM**

Maximum Intake Air Restriction:			
• with Dirty Filter Element .....	— in H <sub>2</sub> O (kPa)	25	(6)
• with Clean Filter Element .....	— in H <sub>2</sub> O (kPa)	15	(4)

**COOLING SYSTEM****Jacket Water Circuit Requirements**

Coolant Capacity — Engine Only .....	— US gal (litre)	2.4	(9.1)
Maximum Static Head of Coolant Above Engine Crank Centerline .....	— ft (m)	46	(14)
Standard Thermostat (Modulating) Range .....	— °F (°C)	183-203	(84-95)
Minimum Pressure Cap .....	— psi (kPa)	7	(48)
Maximum Top Tank Temperature for Standby / Prime Power .....	— °F (°C)	212	(100)
Maximum Coolant Friction Head External to Engine .....	— psi (kPa)	4	(28)

**Charge Air Cooler Requirements**

Maximum Temp. Rise Between Engine Air Intake and Aftercooler Air Outlet- 1500/1800 rpm — °F (°C)		116	(47)
Maximum Air Pressure Drop from Turbo Air outlet to Intake Manifold - 1500/1800 rpm . — in Hg (kPa)		3	(10)
Maximum Intake Manifold Temperature @ 77 °F (25 °C) ambient - 1500/1800 rpm .....	— °F (°C)	122	(50)
Maximum Compressor Outlet Temperature .....	— °F (°C)	404	(207)
Maximum Intake Manifold Temperature for engine protection (Shut Down Threshold) .....	— °F (°C)	207	(97)

**LUBRICATION SYSTEM**

Oil Pressure @ Idle Speed (minimum) .....	— psi (kPa)	10	(69)
@ Governed Speed .....	— psi (kPa)	30-50	(207-345)
Maximum Oil Temperature .....	— °F (°C)	250	(121)
Oil Capacity with OP 9006 Oil Pan : Low - High .....	— US gal (litre)	3-3.8	(11.5 -14.3)
Total System Capacity (With Combo Filters) .....	— US gal (litre)	4.3	(16.4)

**FUEL SYSTEM**

Type Injection System.....	Bosch Mechanical
Maximum Restriction at Lift Pump(clean/dirty filter)..... — in Hg (kPa)	4/8 (13.5/27)
Maximum Allowable Head on Injector Return Line (Consisting of Friction Head and Static Head) — in Hg (kPa)	2.5 (8.4)
Maximum Fuel Flow to Injector Pump ..... — US gph (litre/hr)	11.9 (45)
Maximum Return Fuel Flow ..... — US gph (litre/hr)	TBD (TBD)
Maximum Fuel Inlet Temperature ..... — °F (°C)	160 (71)

**ELECTRICAL SYSTEM**

Cranking Motor (Heavy Duty, Positive Engagement)..... — volt	12
Battery Charging System, Negative Ground..... — ampere	55
Maximum Allowable Resistance of Cranking Circuit..... — ohm	0.002
Minimum Recommended Battery Capacity	
• Cold Soak @ -18 °C to 0 °C (0 °F to 32 °F)..... — °F CCA	950

**COLD START CAPABILITY**

Minimum Ambient Temperature for Cold Start with 1500 watt Coolant Heater to Rated Speed ..... — °F (°C)	5 (-15)
Minimum Ambient Temperature for Unaided Cold Start to Idle Speed..... — °F (°C)	23 (-5)
Minimum Ambient Temperature for NFPA 110 Cold Start (90° F Minimum Coolant Temperature)..... — °F (°C)	TBD TBD

**PERFORMANCE DATA**

- All data is 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 fuel corresponding to grade No. 2-D per ASTM D975.
  - ISO 3046, Part 1, Standard Reference Conditions of:

Barometric Pressure : 100 kPa (29.53 in Hg)	Air Temperature : 25 °C (77 °F)
Altitude : 110 m (361 ft)	Relative Humidity : 30%
Air Intake Restriction : 381 mm H <sub>2</sub> O (15 in H <sub>2</sub> O)	Exhaust Restriction : 6.7 kPa (2 in Hg)

Steady State Stability Band at any Constant Load ..... — %	+/- 0.86
Estimated Free Field Sound Pressure Level of a Typical Generator Set; Excludes Exhaust Noise; at Rated Load and 7.5 m (24.6 ft); @1800 rpm ..... — dBA	TBD
Exhaust Noise at 1 m Horizontally from Centerline of Exhaust Pipe Outlet Upwards at 45° ..... — dBA	TBD

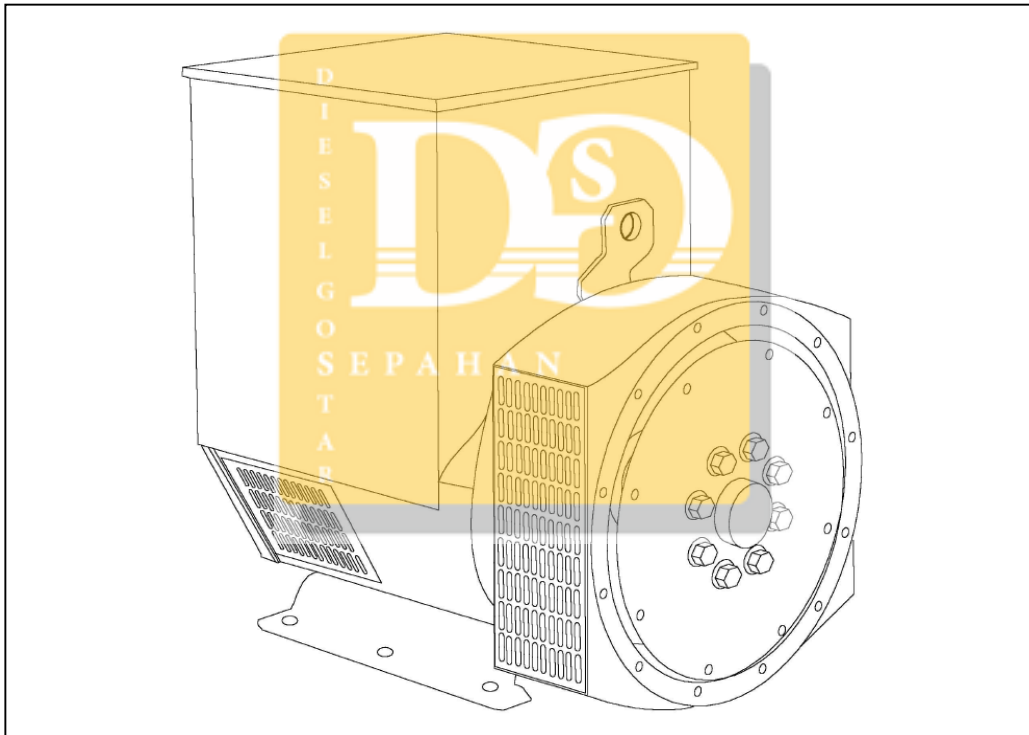
	STANDBY POWER		PRIME POWER	
	60 hz	50 hz	60 hz	50 hz
Governed Engine Speed..... rpm		1500		1500
Engine Idle Speed..... rpm		1494-1507		1494-1507
Gross Engine Power Output..... hp (kW)		215 (160)		195 (145)
Brake Mean Effective Pressure..... psi (kPa)		316 (2178)		288 (1972)
Piston Speed..... ft/min (m/s)		1181 (6)		1181 (6)
Friction Horsepower..... hp (kW)		NA		NA
Engine Water Flow at Stated Friction Head External to Engine:				
• 2.5 psi Friction Head..... US gpm (litre/min)		7.5 (28.6)		7.5 (28.6)
• Maximum Friction Head..... US gpm (litre/min)		NA		NA
<b>Engine Data</b>				
Intake Air Flow..... cfm (litre/s)		439 (207)		417 (197)
Exhaust Gas Temperature ..... °F (°C)		991 (533)		963 (517)
Exhaust Gas Flow..... cfm (litre/s)		1146 (541)		1102 (520)
Air to Fuel Ratio..... air : fuel		24.2 : 1		25.4 : 1
Radiated Heat to Ambient ..... BTU/min (kW)		967 (17)		910 (16)
Heat Rejection to Jacket Coolant..... BTU/min (kW)		3128 (55)		2900 (51)
Heat Rejection to Exhaust..... BTU/min (kW)		15810 (278)		13762 (242)
Heat Rejected to Fuel..... BTU/min (kW)		NA		NA
Charge Air Cooler Heat Rejection..... BTU/min (kW)		2673 (47)		1649 (29)
Turbocharger Compressor Outlet Pressure ..... psi (kPa)		32.6 (225)		30 (207)
Turbocharger Compressor Outlet Temperature ..... °F (°C)		405 (207)		381 (194)

- N.A. - Not Available  
 N/A - Not Applicable to this Engine  
 TBD - To Be Determined

\*This is the maximum heat rejection to fuel, which is at low load.

**ENGINE MODEL : 6BTA5.9-G5**  
**DATA SHEET : DS-92891**  
**DATE : 04Mar 09**  
**CURVE NO. : FR-92891**

## UCI274F - Technical Data Sheet



# UCI274F

## 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.

#### SX440 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 SX440 will support a range of electronic accessories, including a 'droop' Current Transformer (CT) to permit parallel operation with other ac generators.

If 3-phase sensing is required with the self-excited system, the SX421 AVR must be used.

#### SX421AVR

This AVR also operates in a self-excited system. It combines all the features of the SX440 with, additionally, three-phase rms sensing for improved regulation and performance. Over voltage protection is provided via a separate circuit breaker. An engine relief load acceptance feature is built in as standard.

#### 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.*



## UCI274F WINDING 311

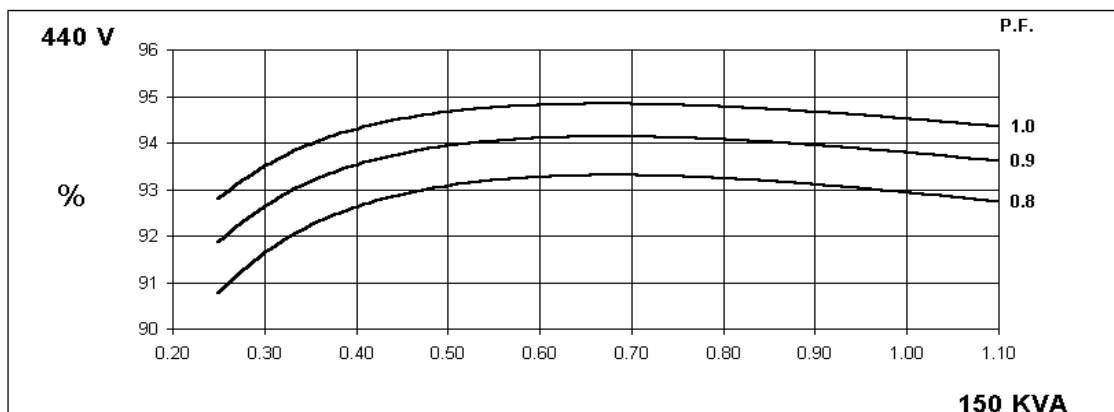
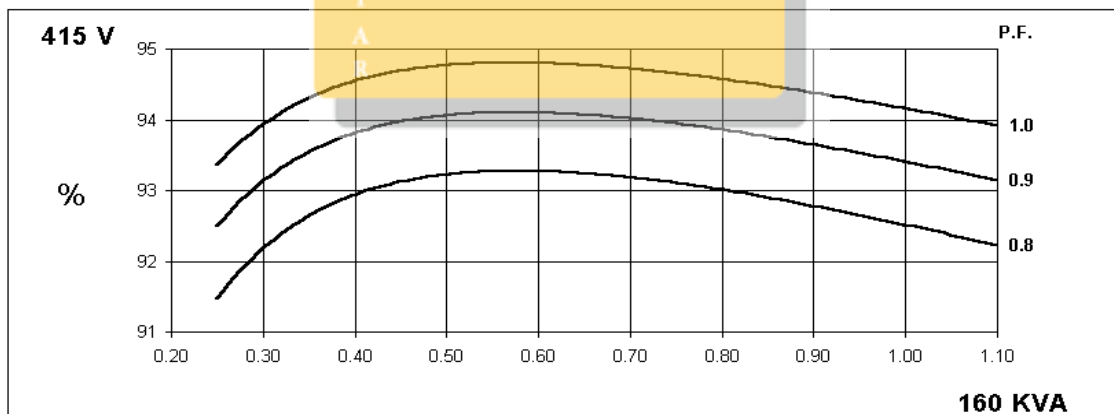
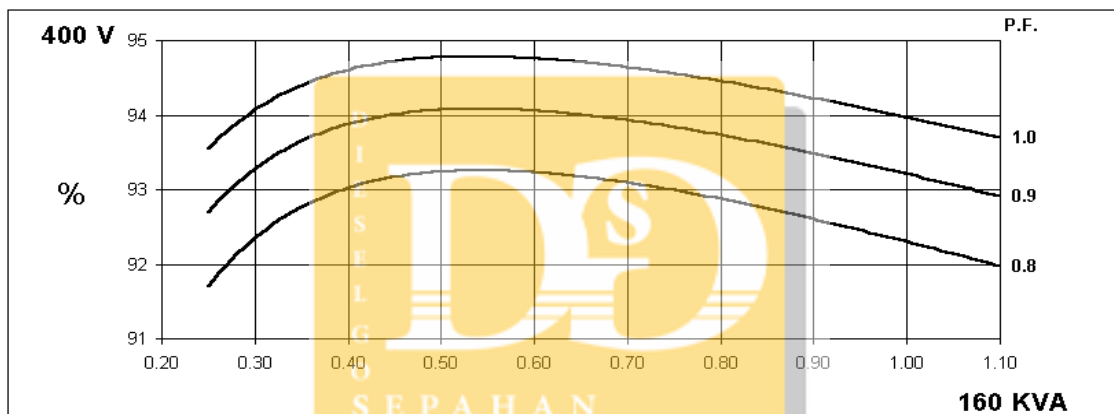
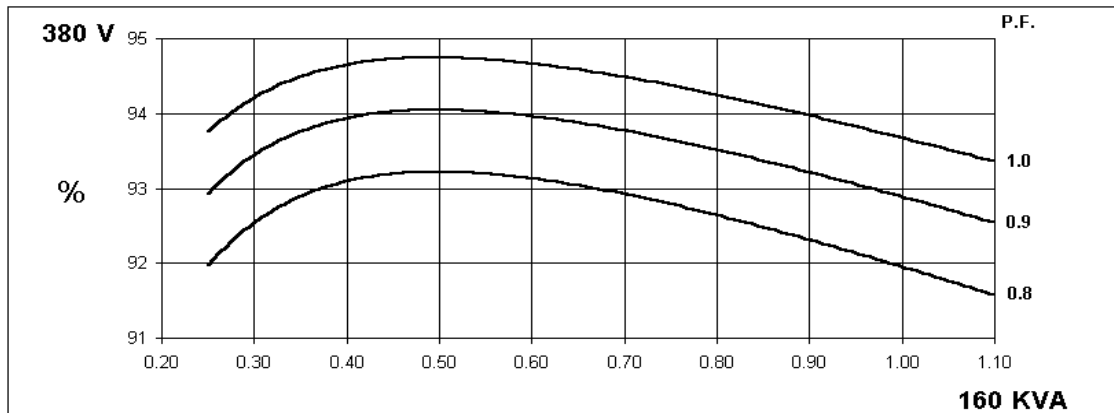
CONTROL SYSTEM		SEPARATELY EXCITED BY P.M.G.							
A.V.R.		MX321	MX341						
VOLTAGE REGULATION		± 0.5 %	± 1.0 %	With 4% ENGINE GOVERNING					
SUSTAINED SHORT CIRCUIT		REFER TO SHORT CIRCUIT DECREMENT CURVES (page 7)							
CONTROL SYSTEM		SELF EXCITED							
A.V.R.		SX460	SX440	SX421					
VOLTAGE REGULATION		± 1.5 %	± 1.0 %	± 0.5 %	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		0.024 Ohms PER PHASE AT 22°C SERIES STAR CONNECTED							
ROTOR WDG. RESISTANCE		1.52 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. 6315-2RS (ISO)							
BEARING NON-DRIVE END		BALL. 6310-2RS (ISO)							
		1 BEARING				2 BEARING			
WEIGHT COMP. GENERATOR		530 kg				545 kg			
WEIGHT WOUND STATOR		200 kg				200 kg			
WEIGHT WOUND ROTOR		188.67 kg				177.71 kg			
WR <sup>2</sup> INERTIA		1.555 kgm <sup>2</sup>				1.5044 kgm <sup>2</sup>			
SHIPPING WEIGHTS in a crate		563 kg				577 kg			
PACKING CRATE SIZE		105 x 67 x 103(cm)				123 x 67 x 103(cm)			
		50 Hz				60 Hz			
TELEPHONE INTERFERENCE		THF<2%				TIF<50			
COOLING AIR		0.514 m <sup>3</sup> /sec 1090 cfm				0.617 m <sup>3</sup> /sec 1308 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		160	160	160	n/a	181.3	190	190	206.3
Xd DIR. AXIS SYNCHRONOUS		2.24	2.02	1.88	-	2.53	2.37	2.17	2.16
X'd DIR. AXIS TRANSIENT		0.19	0.17	0.16	-	0.21	0.20	0.18	0.18
X''d DIR. AXIS SUBTRANSIENT		0.13	0.12	0.11	-	0.14	0.13	0.12	0.12
Xq QUAD. AXIS REACTANCE		1.38	1.25	1.16	-	1.53	1.43	1.31	1.31
X''q QUAD. AXIS SUBTRANSIENT		0.17	0.15	0.14	-	0.20	0.19	0.17	0.17
Xl LEAKAGE REACTANCE		0.07	0.06	0.06	-	0.09	0.08	0.08	0.08
X2 NEGATIVE SEQUENCE		0.14	0.13	0.12	-	0.16	0.15	0.14	0.14
X0 ZERO SEQUENCE		0.08	0.08	0.07	-	0.10	0.09	0.09	0.09
REACTANCES ARE SATURATED				VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED					
T'd TRANSIENT TIME CONST.		0.035 s							
T''d SUB-TRANSTIME CONST.		0.011 s							
T'do O.C. FIELD TIME CONST.		0.9 s							
Ta ARMATURE TIME CONST.		0.009 s							
SHORT CIRCUIT RATIO		1/Xd							

**50  
Hz**

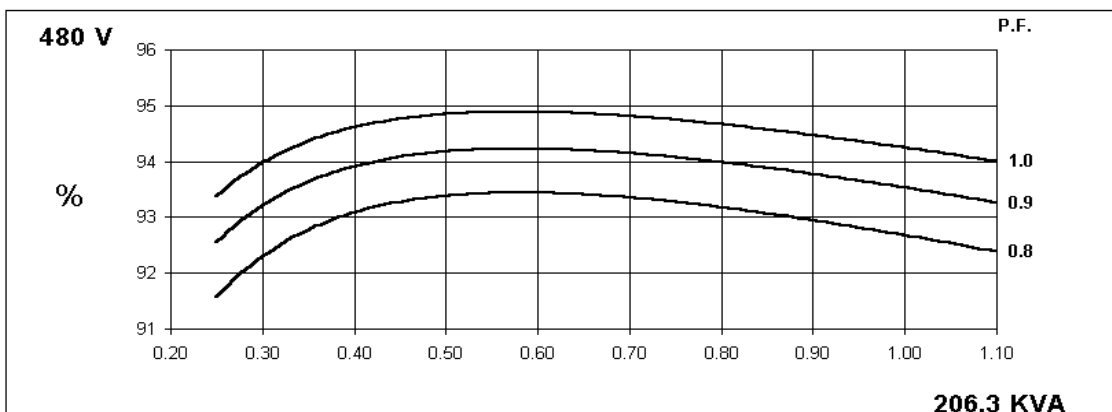
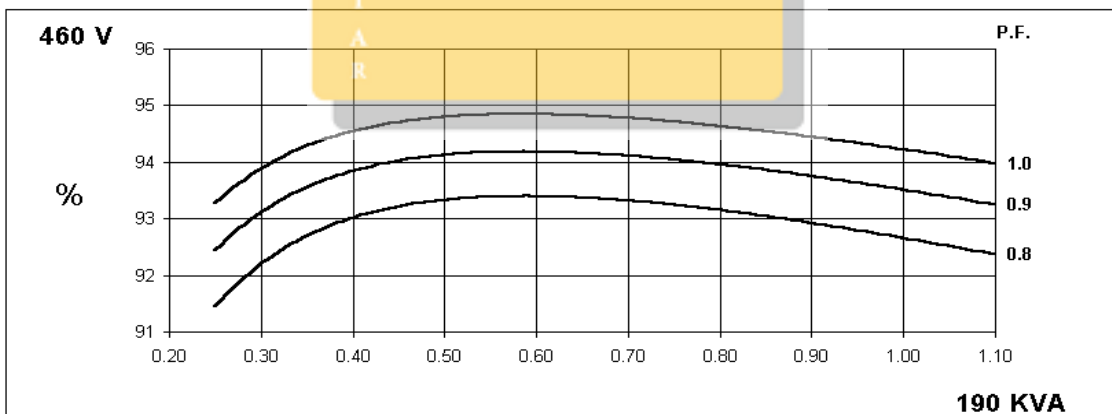
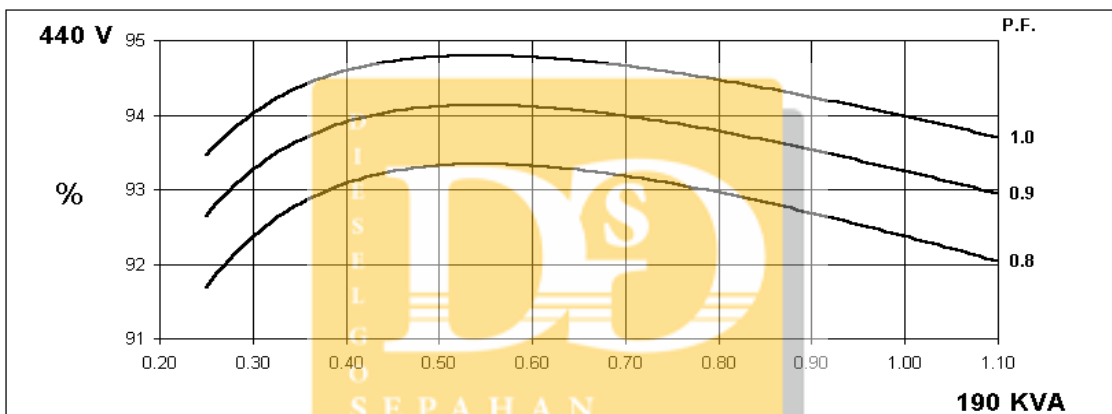
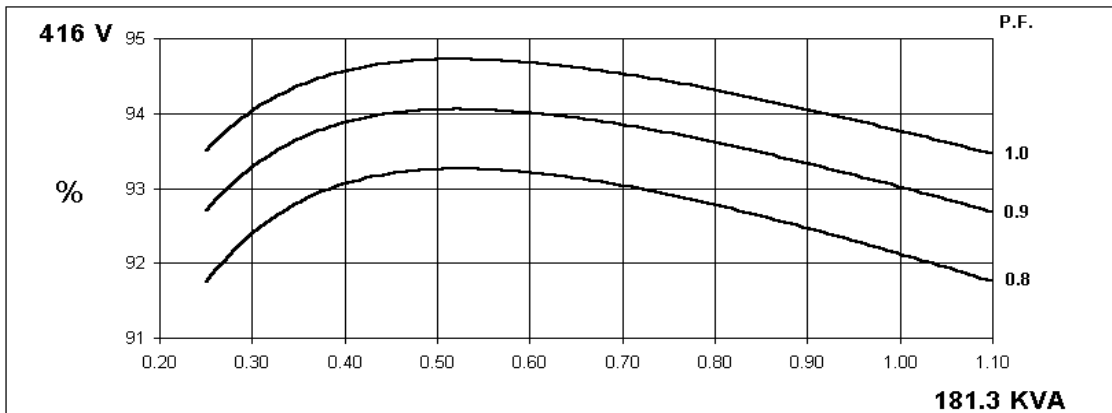
**UCI274F**  
Winding 311



**THREE PHASE EFFICIENCY CURVES**



**THREE PHASE EFFICIENCY CURVES**



# UCI274F

## Winding 311

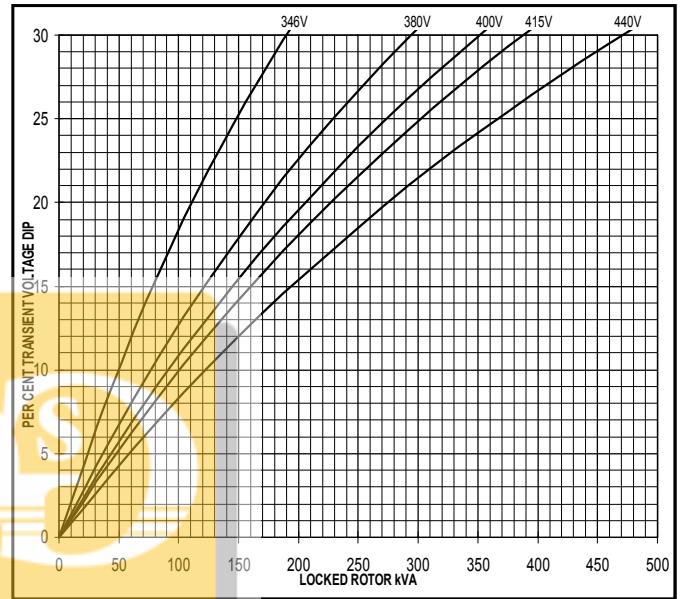
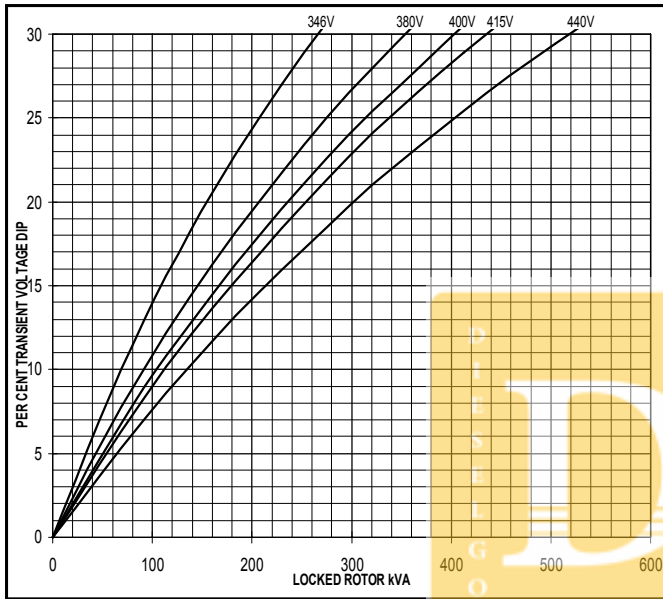


### Locked Rotor Motor Starting Curve

**50  
Hz**

**MX**

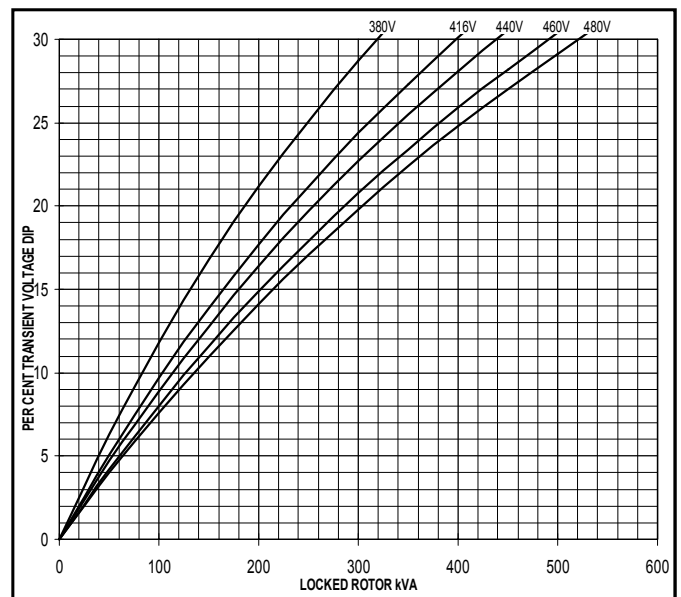
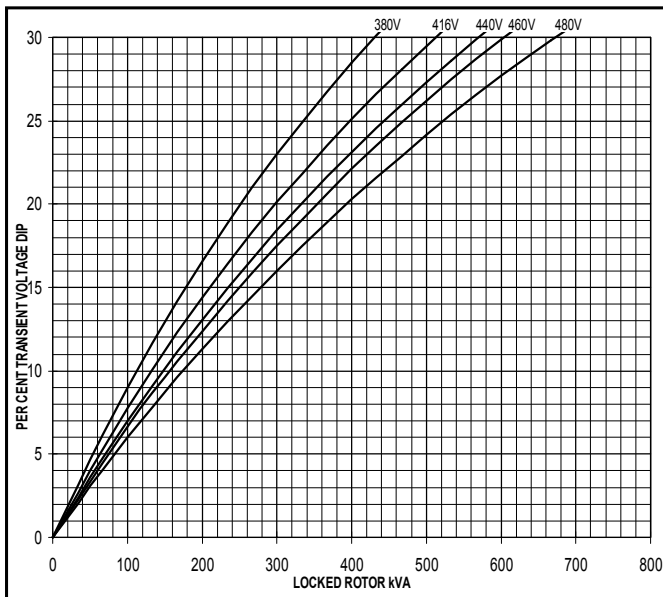
**SX**



**60  
Hz**

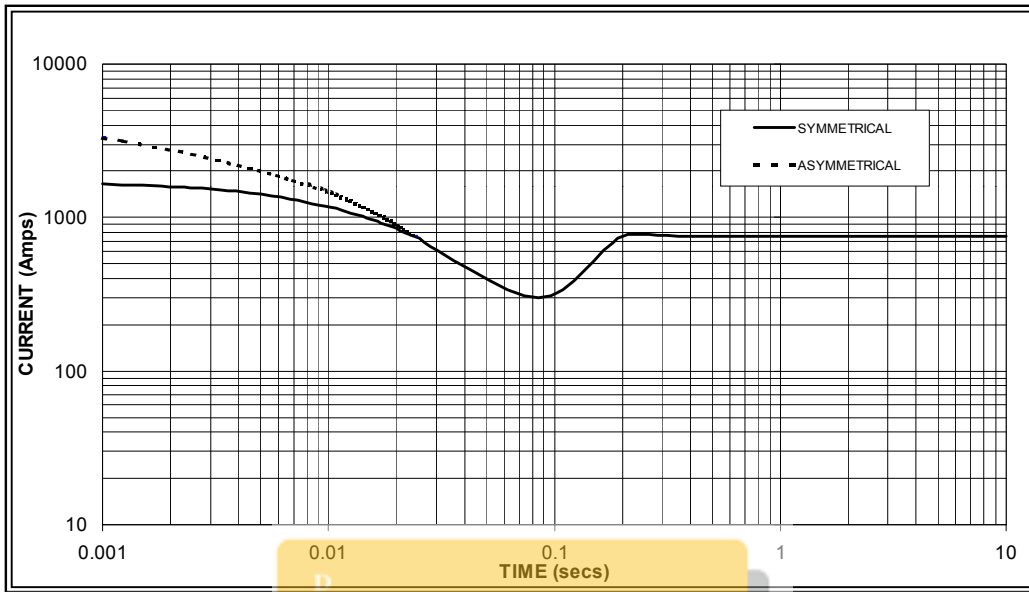
**MX**

**SX**



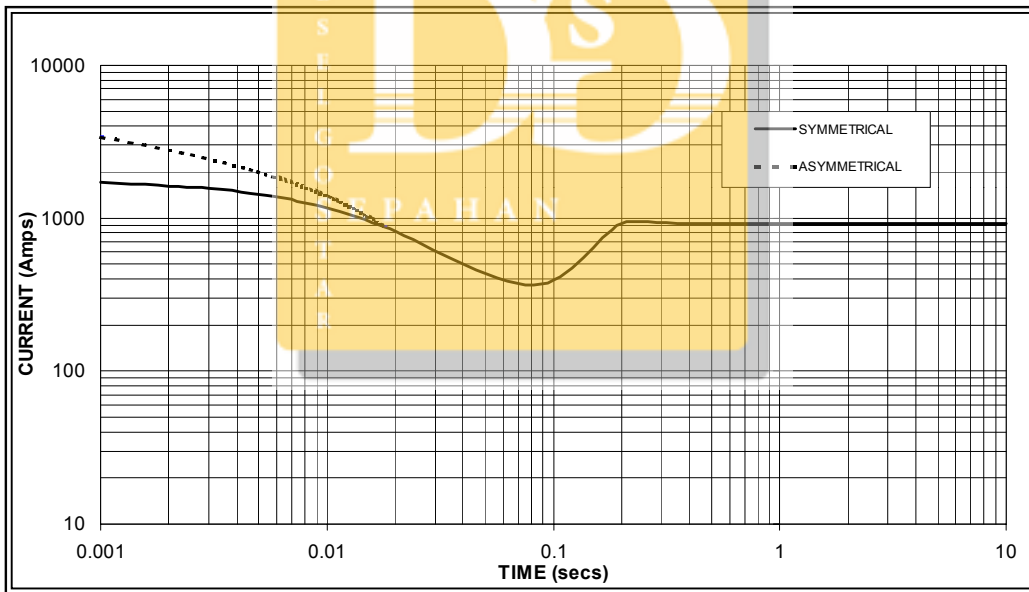
**Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed  
Based on star (wye) connection.**

**50  
Hz**



Sustained Short Circuit = 750 Amps

**60  
Hz**



Sustained Short Circuit = 920 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

# UCI274F

## Winding 311 / 0.8 Power Factor

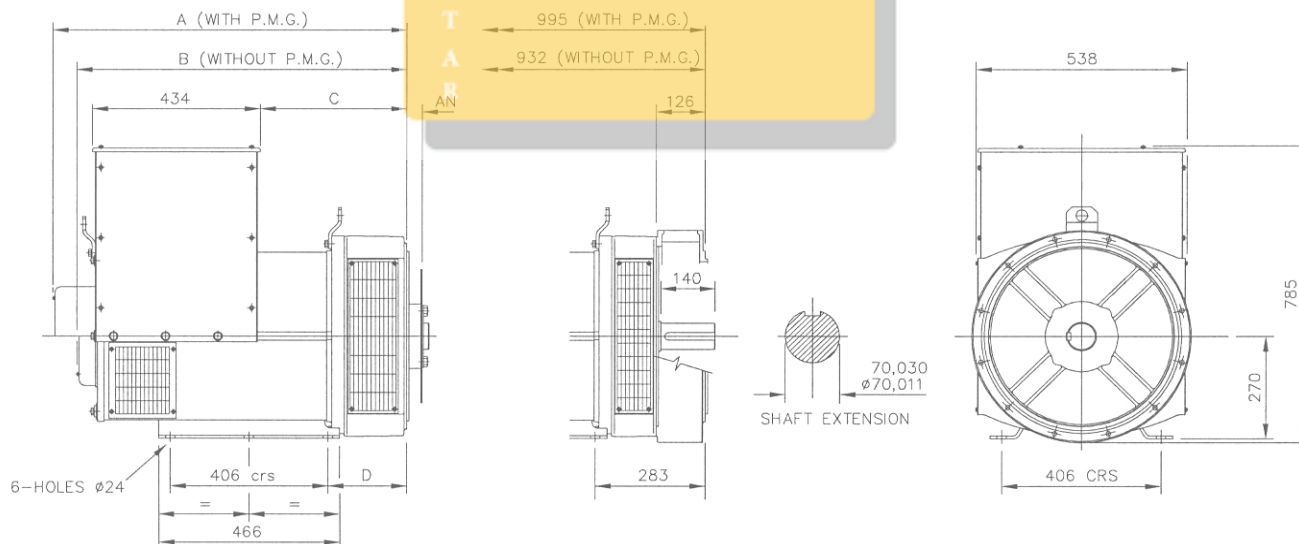


### RATINGS

Class - Temp Rise	Cont. F - 105/40°C				Cont. H - 125/40°C				Standby - 150/40°C				Standby - 163/27°C				
<b>50 Hz</b>	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	145.0	145.0	145.0	n/a	160.0	160.0	160.0	n/a	170.0	170.0	170.0	n/a	175.0	175.0	175.0	n/a	
kW	116.0	116.0	116.0	n/a	128.0	128.0	128.0	n/a	136.0	136.0	136.0	n/a	140.0	140.0	140.0	n/a	
Efficiency (%)	92.3	92.6	92.8	n/a	92.0	92.3	92.5	n/a	91.7	92.1	92.3	n/a	91.6	92.0	92.2	n/a	
kW Input	125.7	125.3	125.0	n/a	139.1	138.7	138.4	n/a	148.3	147.7	147.3	n/a	152.8	152.2	151.8	n/a	

<b>60 Hz</b>	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
	Series Delta (V)	240	254	266	277	240	254	266	277	240	254	266	277	240	254	266	277
kVA	162.5	172.5	172.5	187.5	181.3	190.0	190.0	206.3	187.5	200.0	200.0	212.5	192.5	206.3	206.3	218.8	
kW	130.0	138.0	138.0	150.0	145.0	152.0	152.0	165.0	150.0	160.0	160.0	170.0	154.0	165.0	165.0	175.0	
Efficiency (%)	92.5	92.7	92.9	92.9	92.1	92.4	92.7	92.7	92.0	92.2	92.5	92.6	91.9	92.1	92.4	92.5	
kW Input	140.5	148.9	148.5	161.5	157.5	164.5	164.0	178.0	163.0	173.5	173.0	183.6	167.6	179.2	178.6	189.2	

### DIMENSIONS



SINGLE BEARING ADAPTORS				
ADAPTOR	A	B	C	D
SAE 1	928,3	865,3	389,3	216,3
SAE 2	914	851	375	202
SAE 3	914	851	375	202

COUPLING DISCS	
DISC	AN
SAE 10	53,98
SAE 11,5	39,68
SAE 14	25,40



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