

# 1100 Series 1103A-33TG1 Diesel Engine – Electropak

45.6 (61.2 bhp) kWm at 1500 rpm  
53.9 (72.3 bhp) kWm at 1800 rpm

Building upon Perkins proven reputation within the power generation industry, the 1100 Series range of Electropak engines now fit even closer to customers needs.

In the world of power generation success is only gained by providing more for less. With the 1103A-33TG1 Perkins has engineered even higher levels of reliability, yet lowered the cost of ownership.

1100A units are designed for territories that do not require compliance to EPA or EU emissions legislation. These units are able to meet TA luft legislation.



## Compact, efficient power

- 1100 Series is the result of an intensive period of customer research that has guided the development of the range
- The new 3.3 litre cylinder block ensures bore roundness is maintained under the pressures of operation. It also ensures combustion and mechanical noise is lowered
- A new cylinder head has re-established Perkins mastery of air control

## Quality by design

- Product design and Class A manufacturing improvements enhance product reliability while maintaining Perkins legendary reputation for durability

## Cost effective power

- Compact size and low noise
- Lower fuel consumption and oil use
- 500 hour service intervals
- Two-year warranty

## Product support

- Perkins actively pursues product support excellence by ensuring our distribution network invest in their territory – strengthening relationships and providing more value to you, our customer
- Through an experienced global network of distributors and dealers, fully trained engine experts deliver total service support around the clock, 365 days a year. They have a comprehensive suite of web based tools at their fingertips covering technical information, parts identification and ordering systems, all dedicated to maximising the productivity of your engine
- Throughout the entire life of a Perkins engine, we provide access to genuine OE specification parts and service. We give 100% reassurance that you receive the very best in terms of quality for lowest possible cost .. wherever your Perkins powered machine is operating in the world

Discover more

[www.perkins.com](http://www.perkins.com)

[www.perkins.com/esc](http://www.perkins.com/esc)

[www.perkins.com/distributor](http://www.perkins.com/distributor)

To find your local distributor

Engine Speed rpm	Type of Operation	Typical Generator Output (Net)		Engine Power			
				Gross		Net	
		kVA	kWe	kWm	bhp	kWm	bhp
1500	Prime Power	45.0	36.0	42.2	56.6	41.3	55.4
	Standby Power	49.6	39.7	46.5	62.4	45.6	61.2
1800	Prime Power	53.1	42.5	50.5	67.7	48.9	65.6
	Standby Power	58.7	46.9	55.6	74.6	53.9	72.3

The above ratings represent the engine performance capabilities to conditions specified in ISO 8528/1, ISO 3046/1:1986, BS5514/1. Derating may be required for conditions outside these; consult Perkins Engines Company Limited.

Generator powers are typical and are based on an average alternator efficiency and a power factor (cos.  $\theta$ ) of 0.8 Fuel specification: BS 2869: Part 2 1998 Class A2 or DIN EN 590. Lubricating oil: 15W40 to API CG4.

### Rating Definitions

**Prime Power:** Variable load. Unlimited hours usage with an average load factor of 80% of the published prime power over each 24 hour period. A 10% overload is available for 1 hour in every 12 hours of operation. **Standby Power:** Variable load. Limited to 500 hours annual usage, up to 300 hours of which may be continuous running. No overload is permitted.

Photographs are for illustrative purposes only and may not reflect final specification.

All information in this document is substantially correct at time of printing and may be altered subsequently. Publication No. PN1781/04/14 Produced in England ©2014 Perkins Engines Company Limited

 **Perkins**<sup>®</sup>

THE HEART OF EVERY GREAT MACHINE





# GENERATOR TYPE ECO 32-1L/4

Document : **DS008A/1**

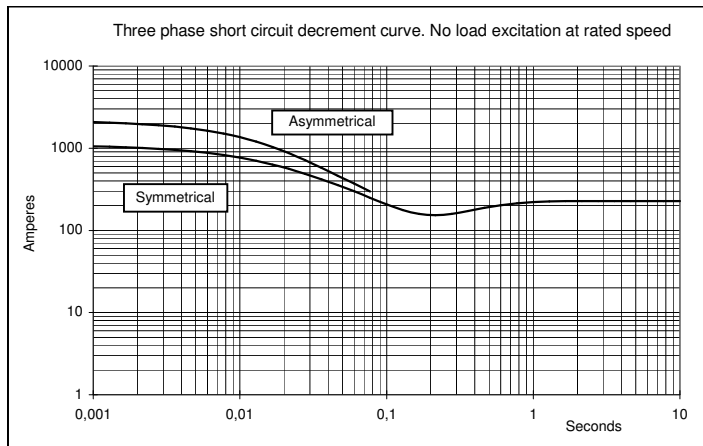
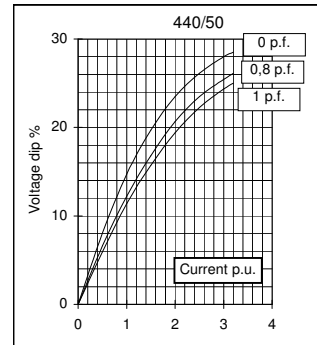
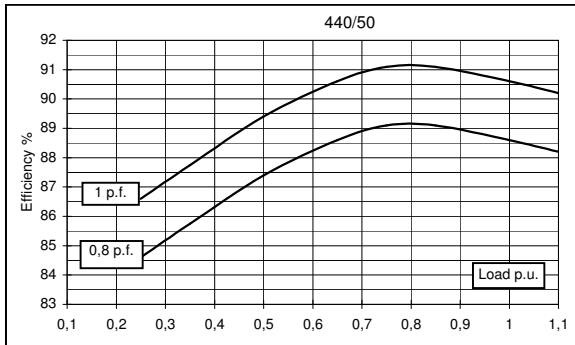
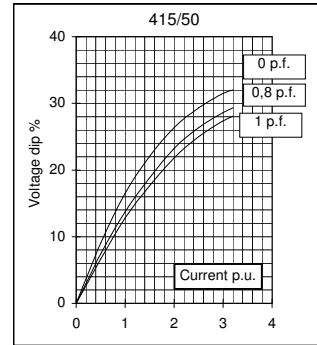
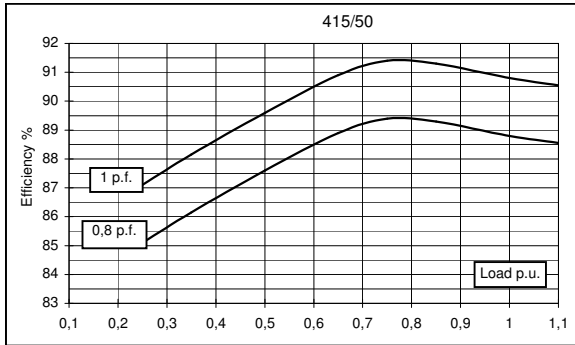
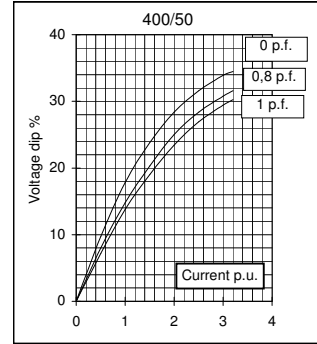
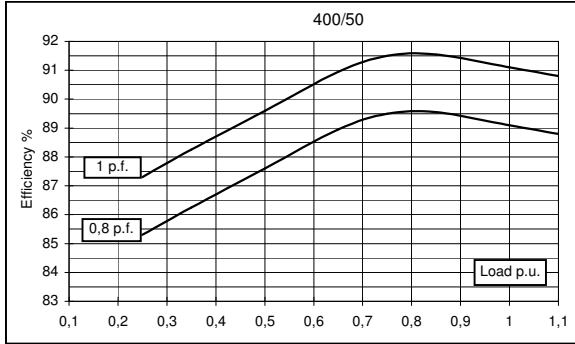
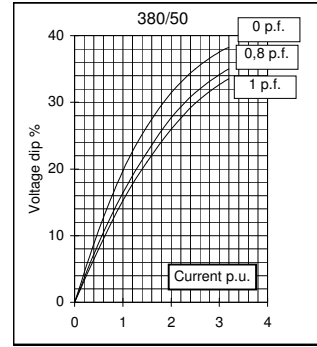
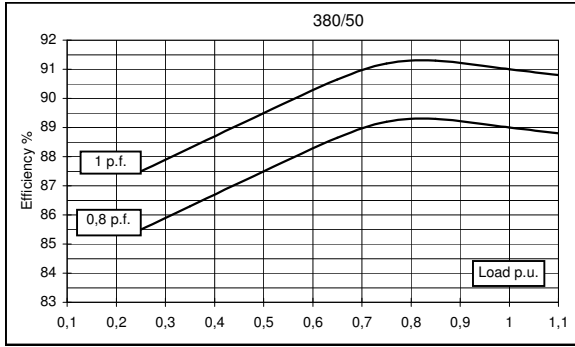
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Electrical Characteristics										
Frequency	Hz	50				60				
Voltage (series star)	V	380	400	415	440	415	440	460	480	
Rated power class H	kVA	50	50	50	40	58	60	60	60	
	kW	40	40	40	32,0	46,4	48	48	48	
Rated power class F	kVA	48	48	48	38	56	58	58	58	
	kW	38,4	38,4	38,4	30,4	44,8	46,4	46,4	46,4	
Regulation with	DSR	±1 % with any power factor and speed variations between -5% +30%								
Insulation class		H								
Execution		Brushless								
Stator winding		12 ends								
Rotor		with damping cage								
Efficiencies class H	4/4	%	89	89,1	88,8	88,6	91,1	91,6	91,7	91,8
(see graph. for details)	3/4	%	89,2	89,5	89,4	89,1	91,5	91,7	91,9	92,1
	2/4	%	87,5	87,6	87,6	87,4	88,8	88,9	89	89,1
	1/4	%	85,5	85,3	85,1	84,6	85,4	85	85,5	85,4
Reactances (f. l.cl. F)	Xd	%	271,5	245	227,6	162,0	316,8	291,6	266,8	245
	Xd'	%	14,96	13,5	12,54	8,93	17,46	16,07	14,70	13,5
	Xd''	%	8,20	7,4	6,87	4,89	9,57	8,81	8,06	7,4
	Xq	%	113,0	102	94,8	67,4	131,9	121,4	111,1	102
	Xq'	%	113,0	102	94,8	67,4	131,9	121,4	111,1	102
	Xq''	%	34,9	31,5	29,3	20,8	40,7	37,5	34,3	31,5
	X <sub>2</sub>	%	23,27	21	19,51	13,88	27,16	24,99	22,87	21
	x <sub>0</sub>	%	3,21	2,9	2,69	1,92	3,75	3,45	3,16	2,9
Short Circuit Ratio	Kcc		0,62	0,71	0,73	1,30	0,40	0,48	0,62	0,71
Time Constants	Td'	sec.	0,059							
	Td''	sec.	0,013							
	Tdo'	sec.	1,40							
	Tα	sec.	0,035							
Short Circuit Current Capacity		%	>300				>350			
Excitation at no load	Amp.		0,6	0,7	0,8	1,2	0,3	0,4	0,5	0,6
Excitation at full load	Amp.		2,2	2,4	2,3	2,7	2,1	1,9	2,1	2,3
Overload (long-term)	%	1 hour in a 6 hours period 110% rated load								
Overload per 20 sec.	%	300								
Stator Winding Resistance (20°C)	Ω	0,061								
Rotor Winding Resistance (20°C)	Ω	2,473								
Exciter Resistance (20 °C)	Ω	Rotor : 0,442				Stator : 11,35				
Heat dissipation at f.l.cl.H	W	4944	4893	5045	4117	4533	4402	4345	4288	
Telephone Interference		THF < 2%				TIF < 45				
Radio interference		EN61000-6-3, EN61000-6-1. For others standards apply to factory								
Waveform Distors.(THD) at f. load	LL/LN %	3,8 / 3,6								
Waveform Distors.(THD) at no load	LL/LN %	3,3 / 3,2								
<b>Mechanical characteristics</b>										
Protection		IP 21 (other protection on request)								
DE bearing		6312-2RS								
NDE bearing		6309-2RS								
Weight of wound stator assembly	kg	78								
Weight of wound rotor assembly	kg	53								
Weight of complete generator	kg	248								
Maximun overspeed	rpm	2250								
Unbalanced magnetic pull at f.l.cl.F	kN/mm	4,1								
Cooling air requirement	m <sup>3</sup> /min	11,8				14,5				
Inertia Constant (H)	sec.	0,105				0,125				
Noise level at 1m/7m	dB(A)	75 / 60				79 / 64				

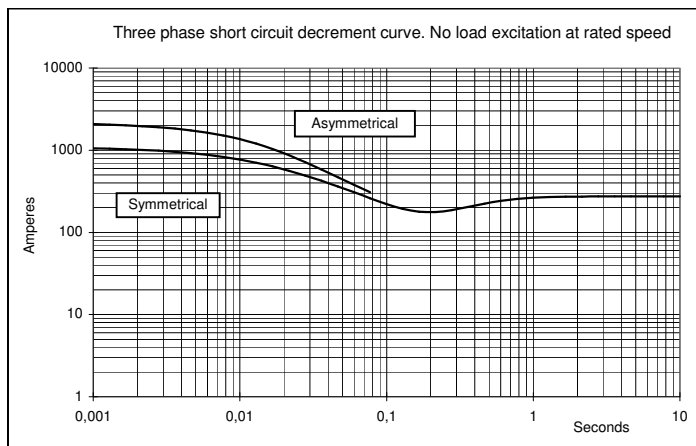
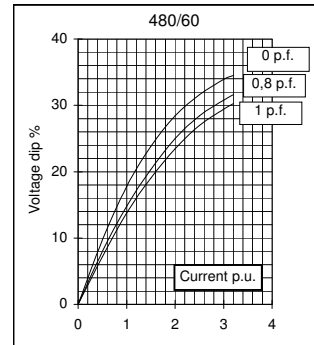
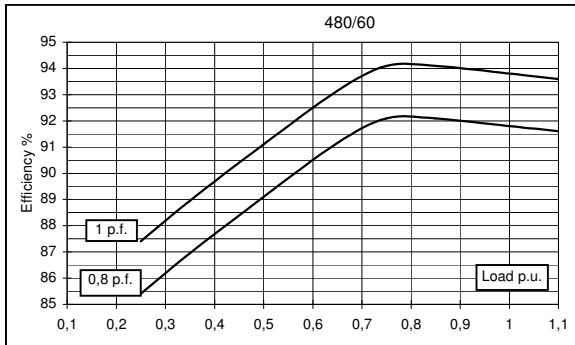
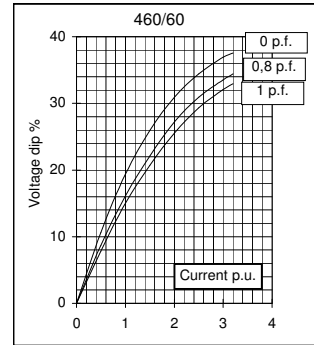
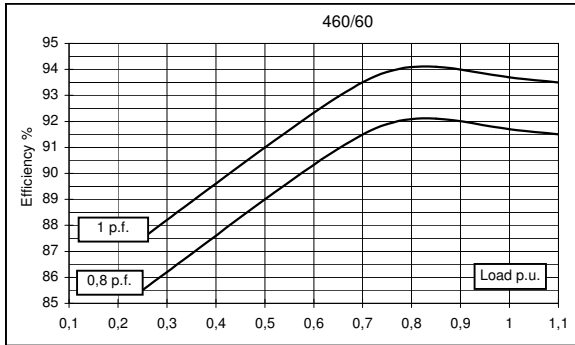
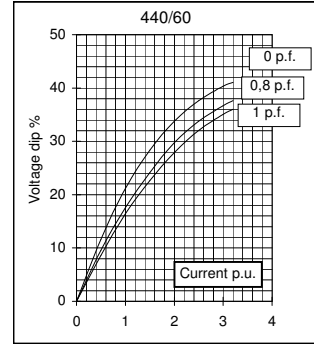
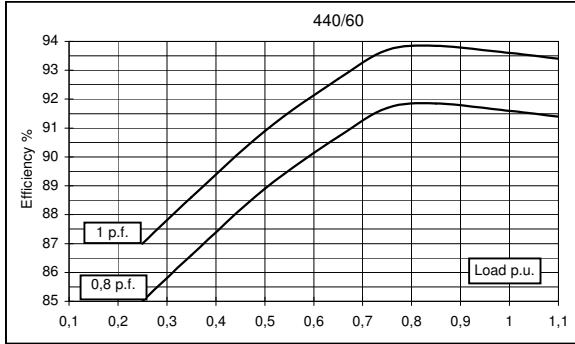
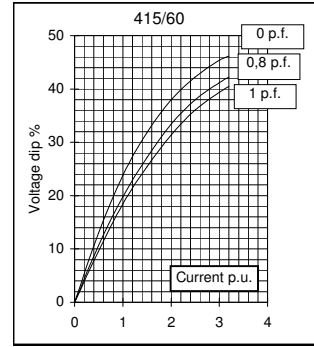
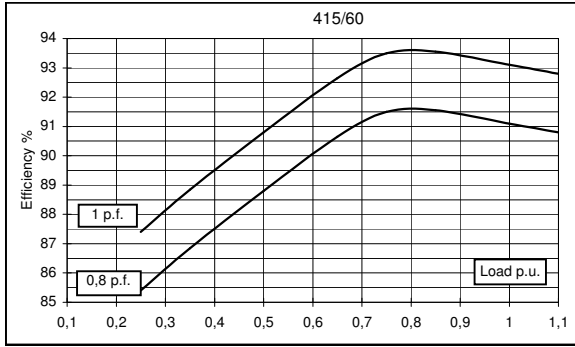
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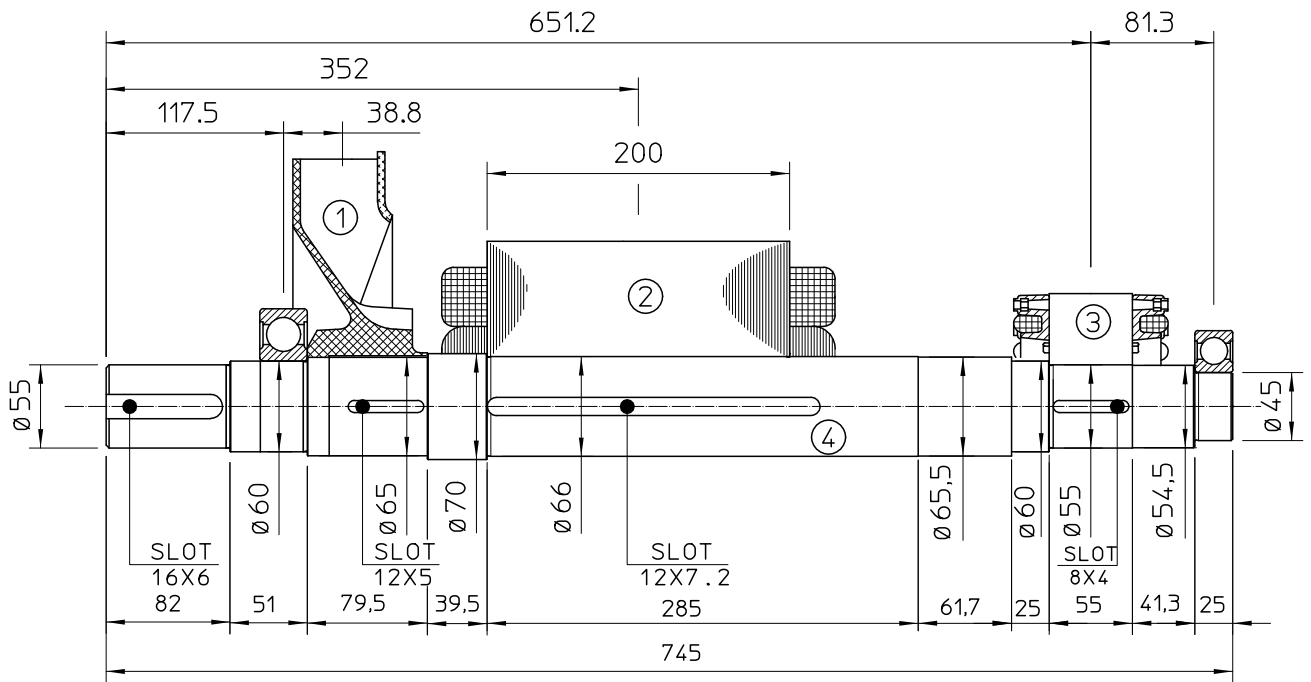
**50 Hz**



**60 Hz**

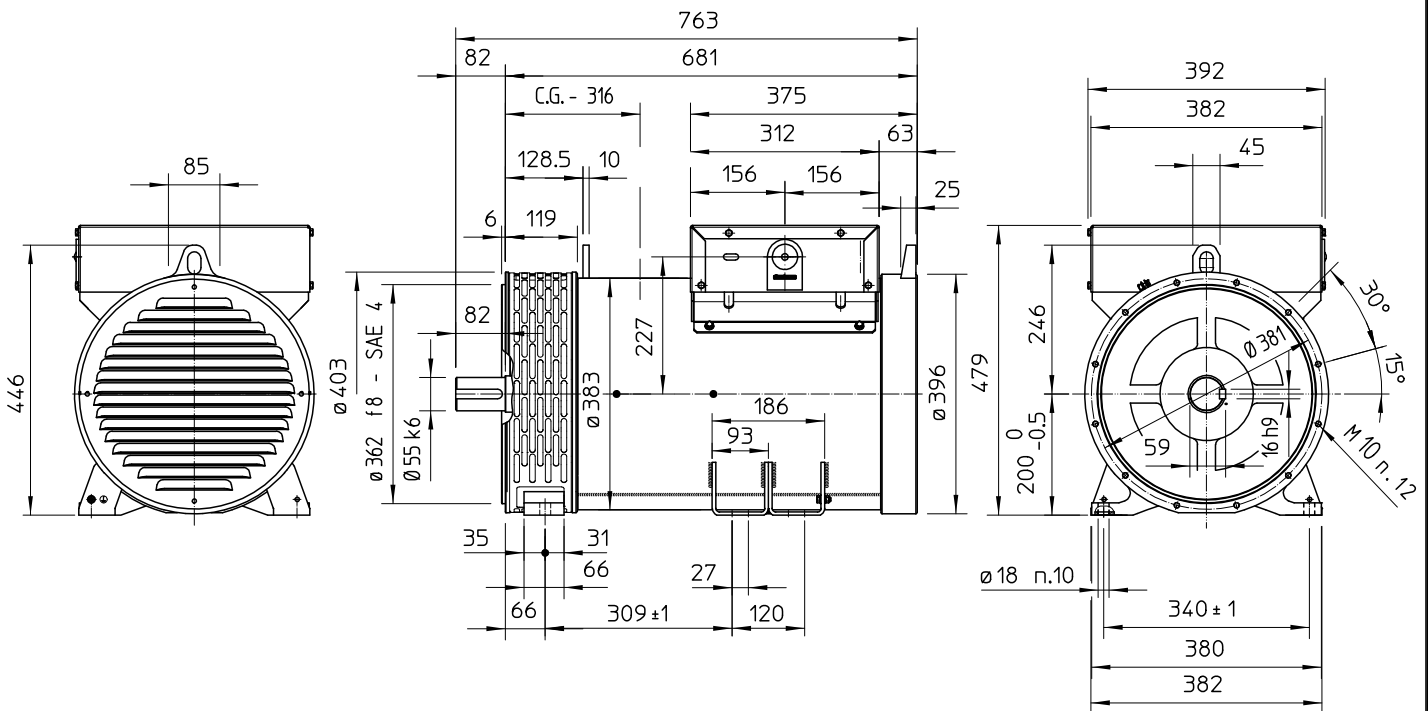


## TWO BEARING MOMENTS OF INERTIA



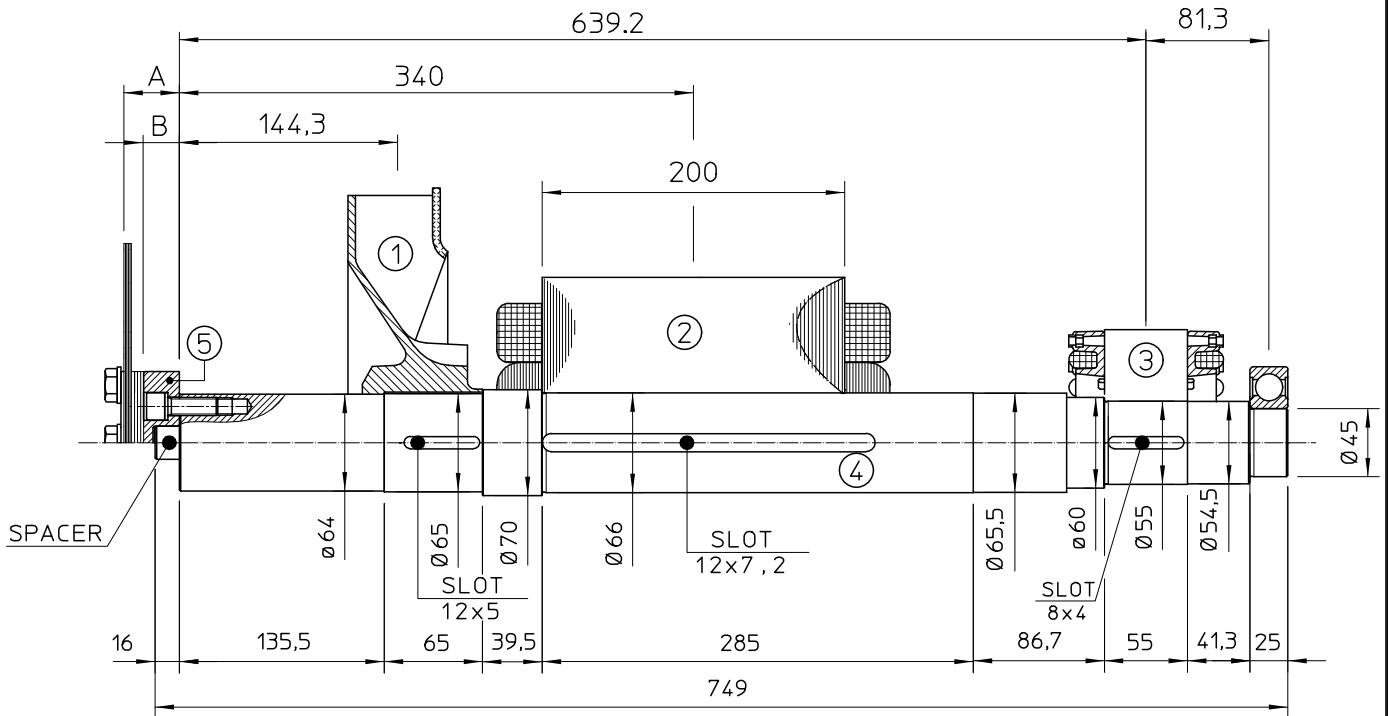
POS.	COMPONENT	WEIGHT (kg)	J (kgm <sup>2</sup> )
1	FAN	2.3	0.0224
2	MAIN ROTOR	53	0.3763
3	EX. ROTOR	7	0.016
4	SHAFT	17.3	0.0067
TOTAL		79.6	0.4214

## TWO BEARING DIMENSIONS



C.G.= GRAVITY CENTER

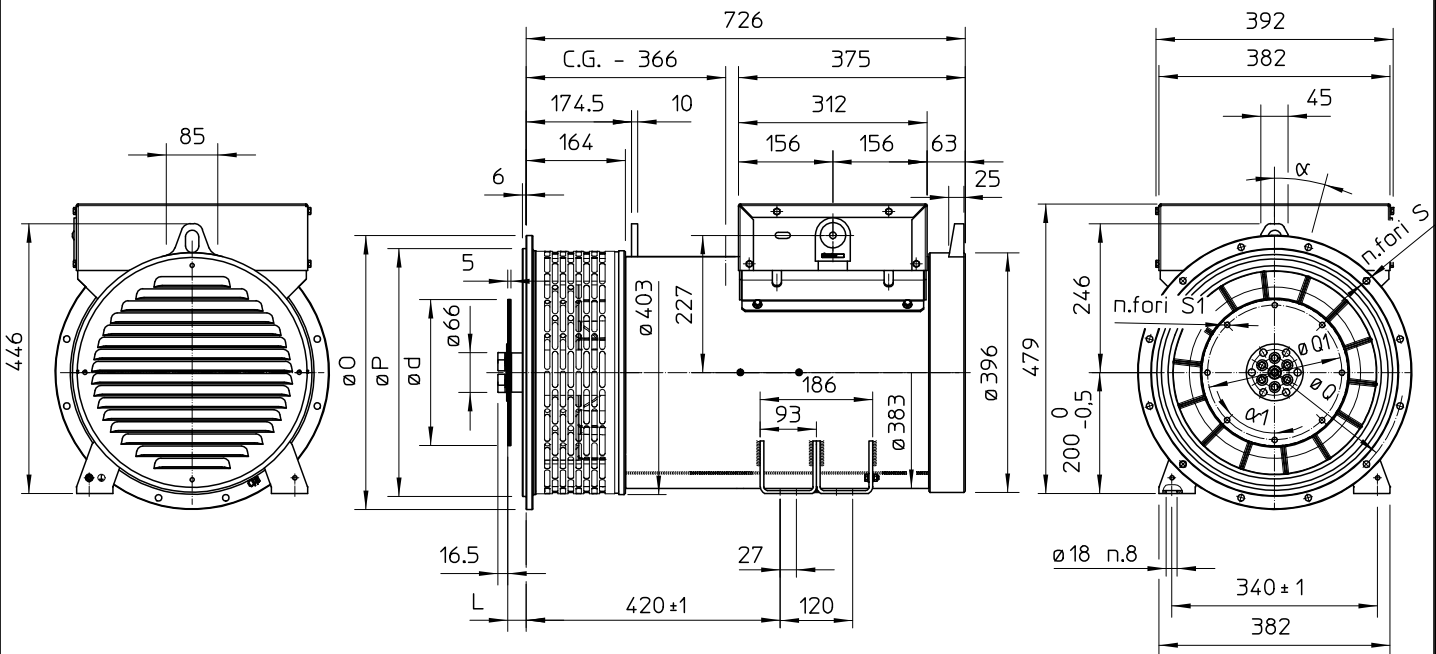
### SINGLE BEARING MOMENTS OF INERTIA



POS.	COMPONENT	WEIGHT (kg)	J (kgm <sup>2</sup> )
1	FAN	2.3	0.0224
2	MAIN ROTOR	53	0.3763
3	EX. ROTOR	7	0.016
4	SHAFT	17.6	0.0090
TOTAL		79.9	0.4237

SAE N°	5		SHAFTS COUPLING FLEX PLATE	
	A	B	WEIGHT kg	J kgm <sup>2</sup>
6.5	5	2.5	1.74	0.0084
7.5	5	2.5	2.1	0.013
8	36.6	28.1	3.9	0.02
10	28.6	21.6	4.47	0.038
11.5	15	11.5	4.51	0.059

### SINGLE BEARING DIMENSIONS



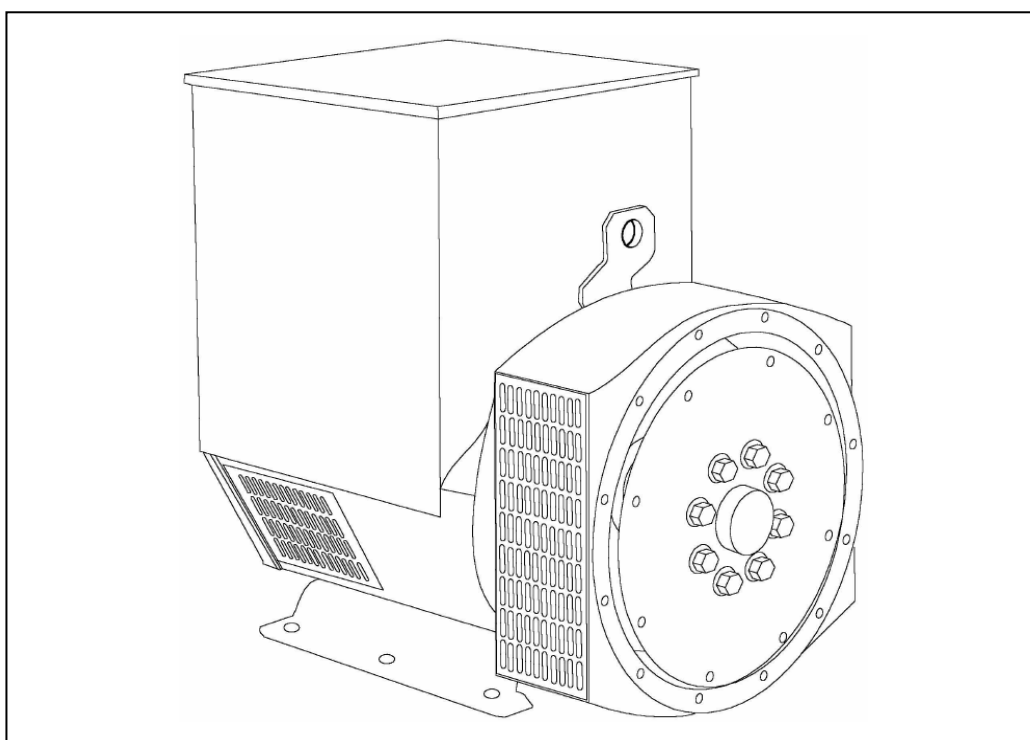
SAE N.	FLANGIA / FLANGE BRIDE / FLANSCH					
	O	P	Q	S	N. FORI HOLES N°	α
5	356	314.3	333.4	11	8	45
4	403	362	381	11	12	30
3	451	409.6	428.6	11	12	30
2	490	447.7	466.7	11	12	30
1	552	511.2	530.2	11	12	30

SAE N.	GIUNTI A DISCHI / DISC COUPLING DISCQUE DE MONOPALIER / SCHEIBENKUPPLUNG						
	d	L	Q1	S1	N. FORI HOLES N°	α1	
6 1/2	215.9	30.2	200	9	6	60	
7 1/2	241.3	30.2	222.25	9	8	45	
8	263.52	62	244.47	11	6	60	
10	314.32	53.8	295.27	11	8	45	
11 1/2	352.42	39.6	333.37	11	8	45	

C.G.= GRAVITY CENTER

# STAMFORD®

## UCI224D - Technical Data Sheet





# UCI224D

## SPECIFICATIONS & OPTIONS

**STAMFORD**

### 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.*

# UCI224D



## WINDING 311

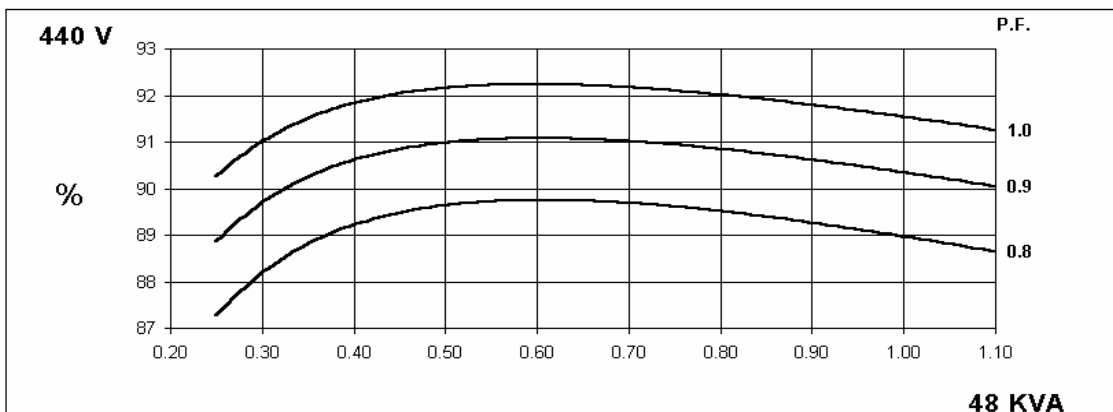
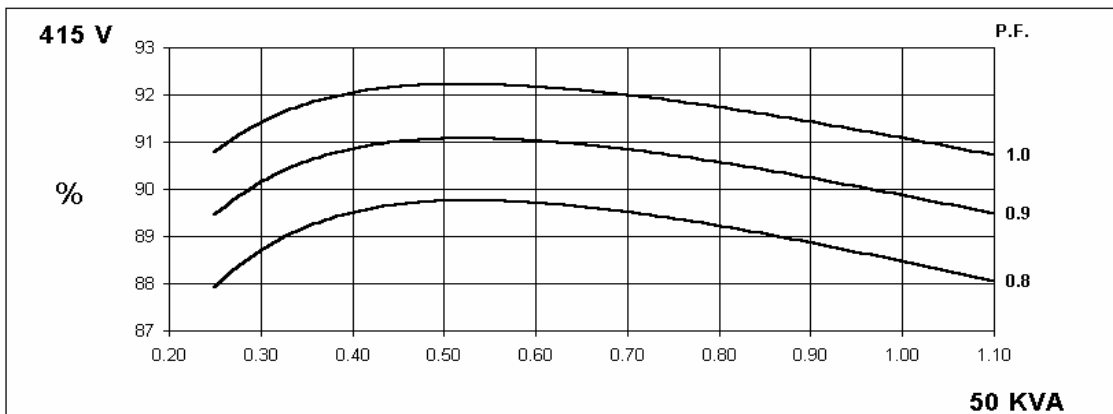
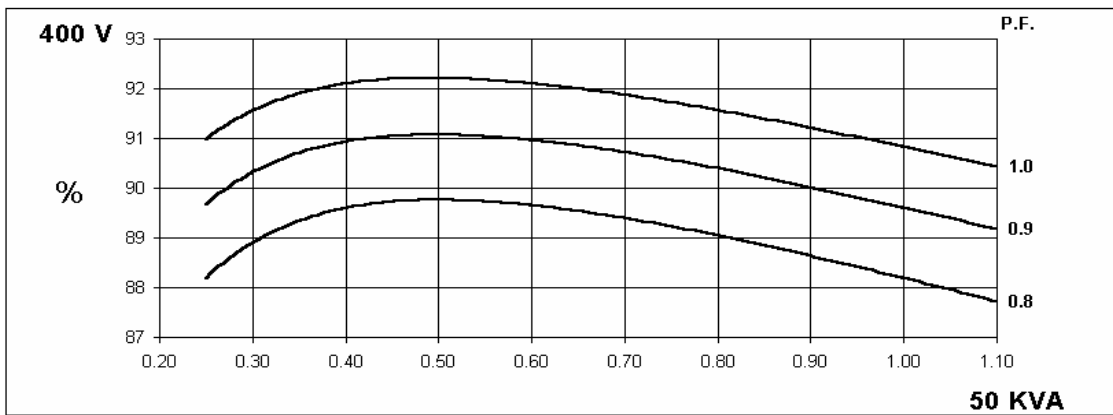
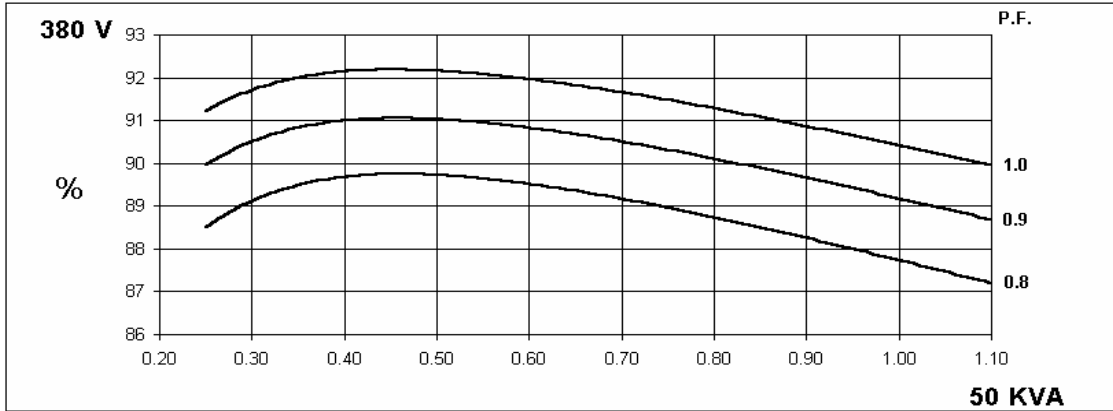
CONTROL SYSTEM		SEPARATELY EXCITED BY P.M.G.							
A.V.R.		MX321	MX341						
VOLTAGE REGULATION		± 0.5 %	± 1.0 %	With 4% ENGINE GOVERNING					
SUSTAINED SHORT CIRCUIT		REFER TO SHORT CIRCUIT DECREMENT CURVES (page 7)							
CONTROL SYSTEM		SELF EXCITED							
A.V.R.		SX460	AS440						
VOLTAGE REGULATION		± 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			
WR <sup>2</sup> INERTIA		0.4216 kgm <sup>2</sup>				0.4198 kgm <sup>2</sup>			
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 m <sup>3</sup> /sec 458 cfm				0.281 m <sup>3</sup> /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
XL LEAKAGE REACTANCE		0.07	0.06	0.06	0.05	0.09	0.08	0.08	0.07
X <sub>2</sub> NEGATIVE SEQUENCE		0.13	0.12	0.11	0.09	0.14	0.13	0.12	0.11
X <sub>0</sub> 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

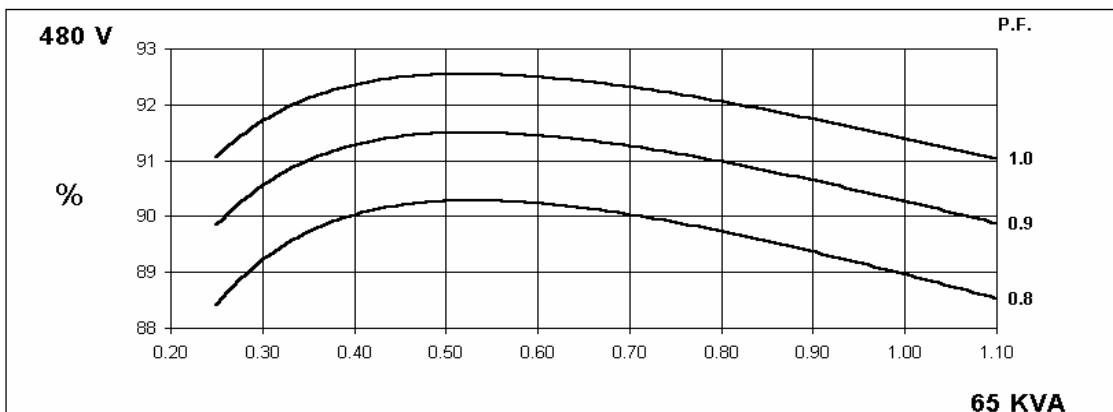
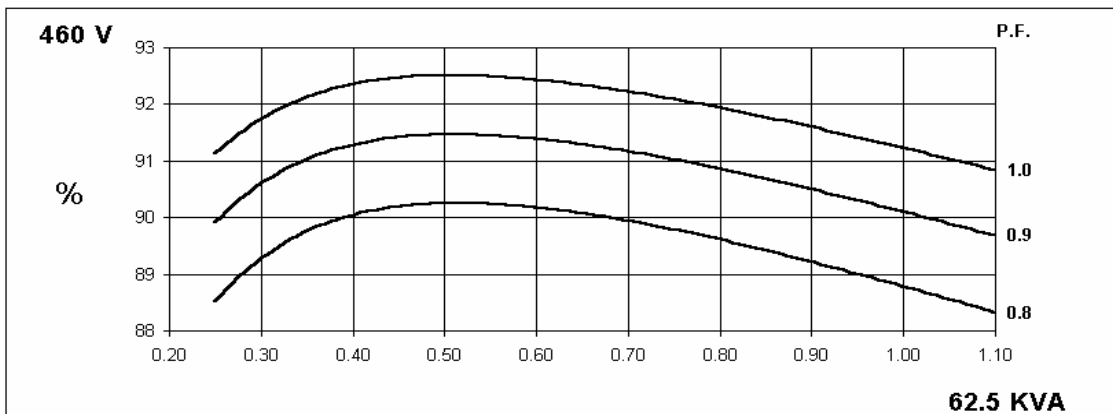
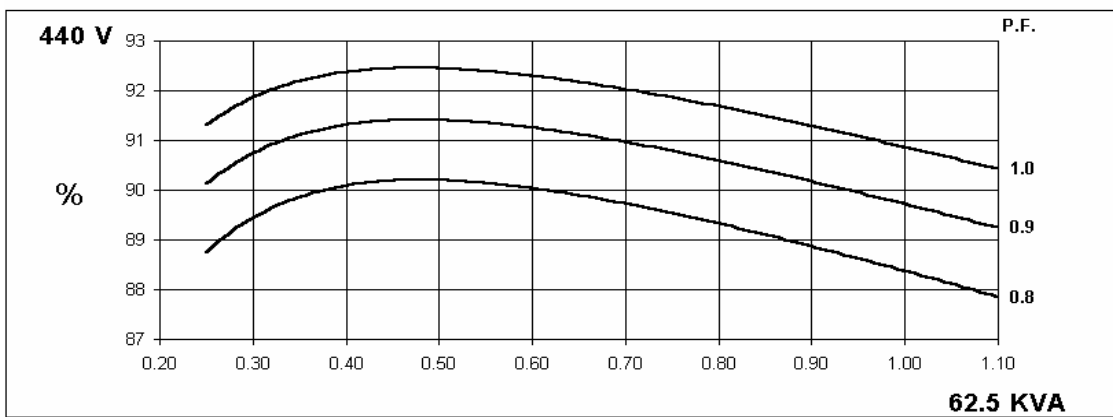
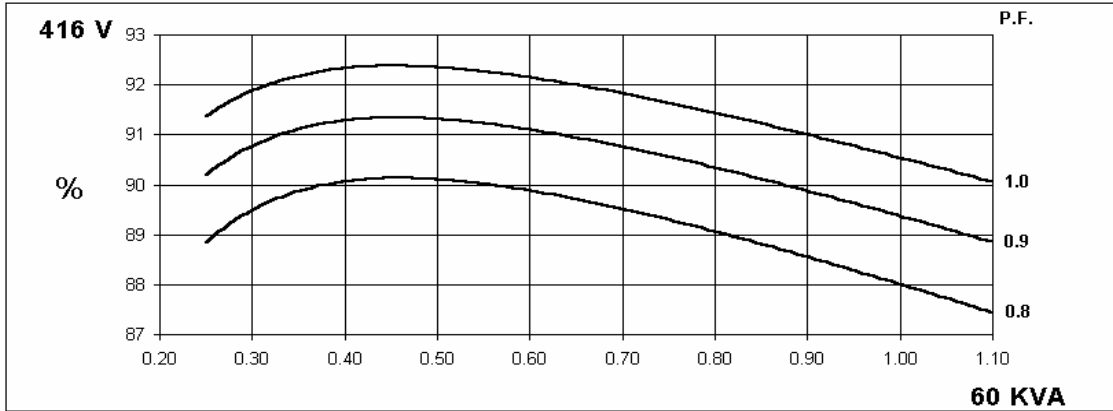


60  
Hz

UCI224D  
Winding 311

STAMFORD

THREE PHASE EFFICIENCY CURVES



UCI224D  
Winding 311

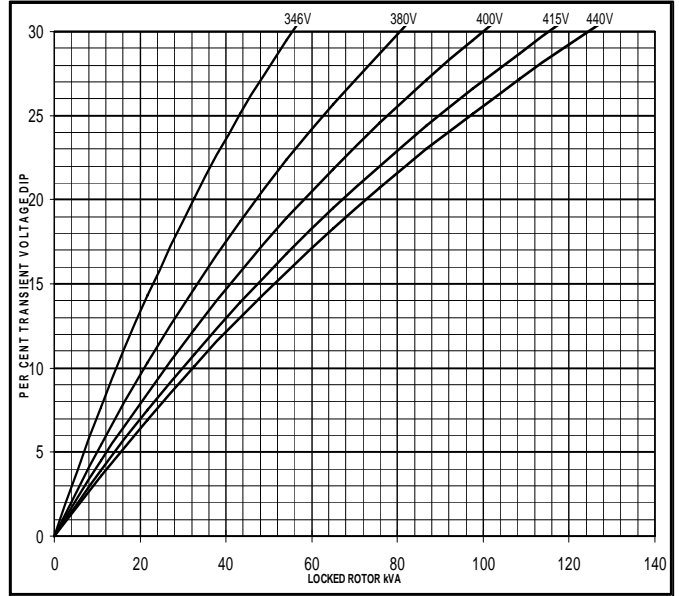
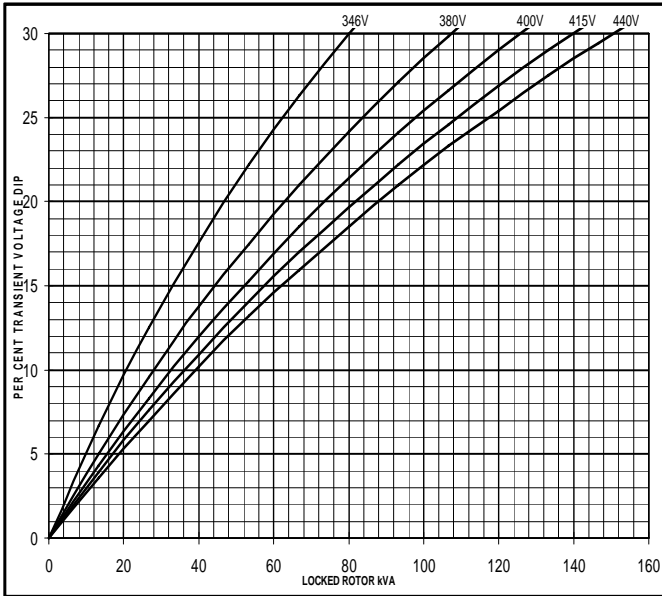
**STAMFORD**

**Locked Rotor Motor Starting Curve**

50  
Hz

MX

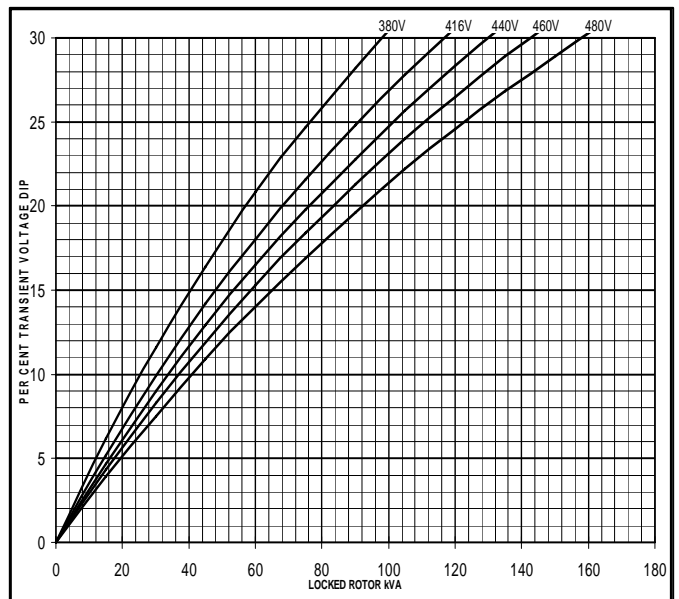
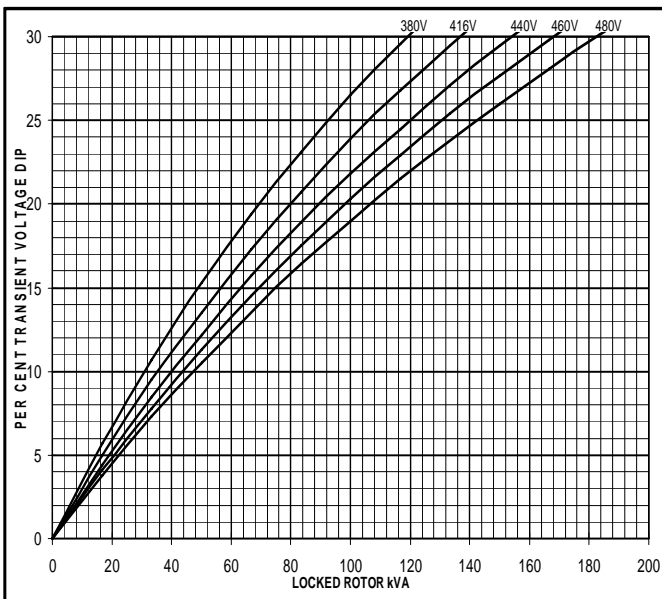
SX



60  
Hz

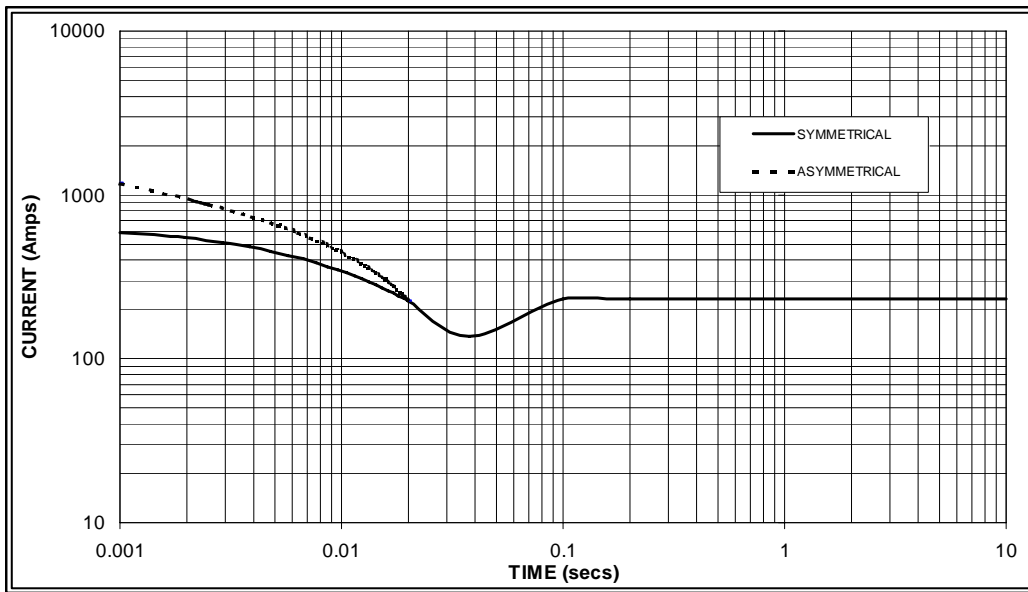
MX

SX



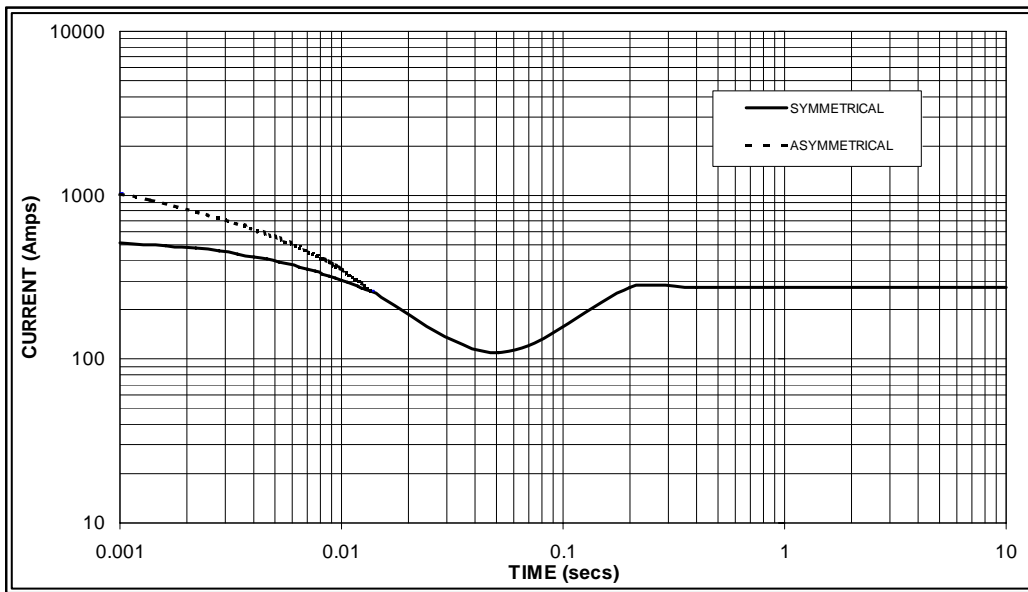
**Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed  
Based on star (wye) connection.**

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

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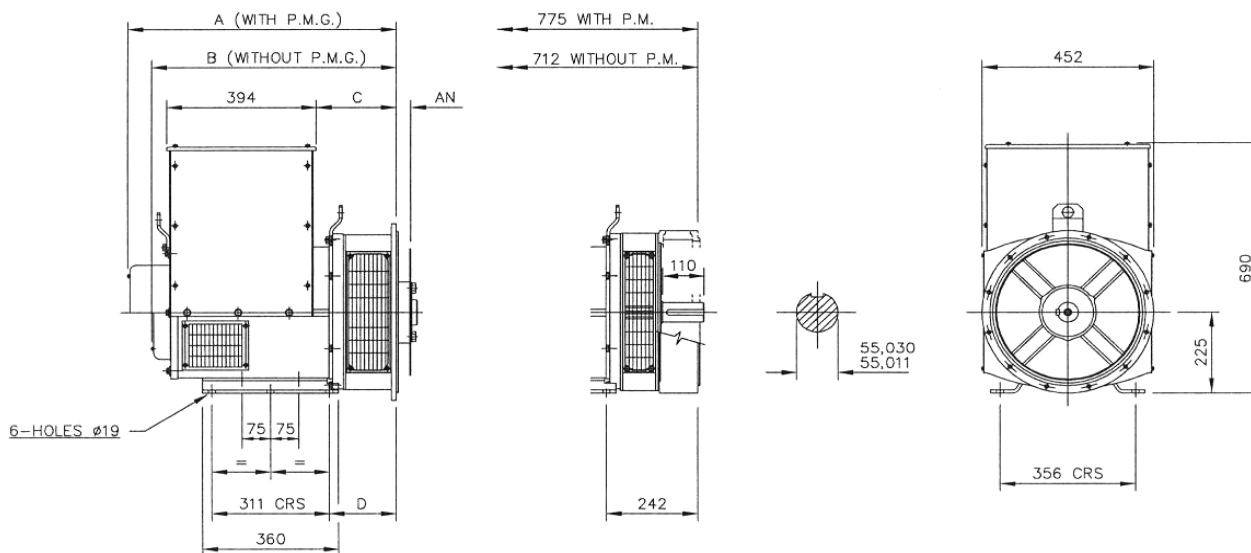
## Winding 311 / 0.8 Power Factor

### 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	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	

<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
	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

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