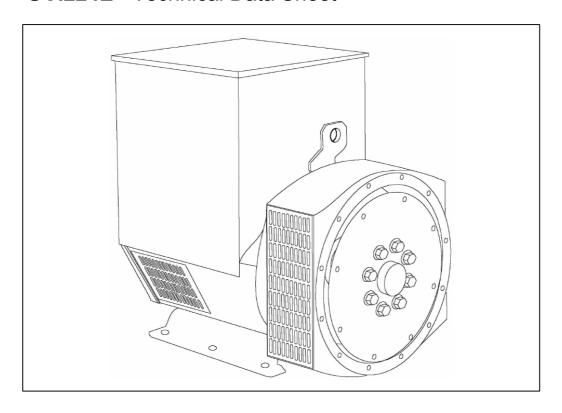


# UCI224E - Technical Data Sheet



## **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.

#### 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.



# **WINDING 311**

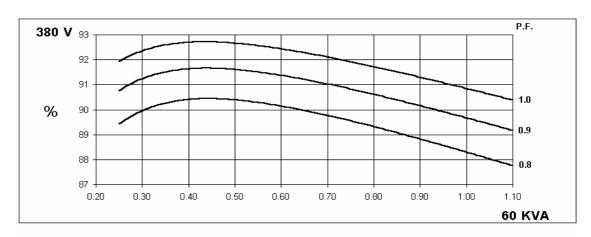
AVR. MX321 MX341  **VOLTAGE REGULATION** **1.0.5 % ± 1.0 % With 4% ENGINE GOVERNING**  \$USTAINES DATOR CIRCLUT**  **REFERT OS SHORT CIRCUT**  **DELTAGE REGULATION**  **SELF EXCITED**  AVR. SX480 SX440 SX421  **VOLTAGE REGULATION**  **SELF EXCITED**  **AVE SX480 SX440 SX421  **VOLTAGE REGULATION**  **SELF EXCITED**  **AVE SX480 SX440 SX421  **VOLTAGE REGULATION**  **SUSTAINES BHORT CIRCUIT**  **SELF EXCITED**  **AVE SX480 SX440 SX421  **VOLTAGE REGULATION**  **SUSTAINES BHORT CIRCUIT**  **SUSTAINES BHORT CIRCU	CONTROL SYSTEM	SEPARATEL	Y FXCITED	BYPMG						
VOLTAGE REGULATION										
SUSTAINED SHORT CIRCUIT   REFER TO SHORT CIRCUIT DECREMENT CURVES (page 7)				\\/ith 49/ ENI	CINE COVE	DNING				
AV.R.   SX460   SX440   SX421										
A.V.R.    SX480	SUSTAINED SHORT CIRCUIT	KEPEK 103	SHOKT CIKC	OII DECKE	VIENT CORVE	ES (page 7)				
VOLTAGE REGULATION	CONTROL SYSTEM	SELF EXCIT	ED							
SUSTAINED SHORT CIRCUIT   SERIES 4 CONTROL DOES NOT SUSTAIN A SHORT CIRCUIT CURRENT	A.V.R.	SX460	SX440	SX421						
NSULATION SYSTEM	VOLTAGE REGULATION	± 1.5 %	± 1.5 % ± 1.0 % ± 0.5 % With 4% ENGINE GOVERNING							
RATED POWER FACTOR  0.8  DOUBLE LAYER CONCENTRIC  WINDING PITCH  TWO THIRDS  WINDING LEADS  TATOR WIND, RESISTANCE  EXCITER STATOR RESISTANCE  EXCITER ROTOR WINDING  BS EN 61000-6-2 & BS EN 61000-6-2 \ BS EN 61000-6-4 \ VDC 0875G, VDC 0875N, refer to factory for others  WAVEFORM DISTORTION  NO LOAD < 1.5% NON-DISTORTING BALLANCED LINEAR LOAD < 5.0%  MAXIMUM OVERSPEED  BEARING DRIVE END  BEARING SHALLE 6312-2RS (ISO)  BEARING NON-DRIVE END  BEARING NON-DRIVE END  BEARING SHALLE 6309-2RS (ISO)  1 BEARING  WEIGHT COMP. GENERATOR  311 kg  103 kg  WEIGHT WOUND STATOR  103 kg  WEIGHT WOUND STATOR  104 kg 9kgm²  104 k82 kgm²  SHIPPING WEIGHTS in a crate  105 k5 7 x 96(cm)	SUSTAINED SHORT CIRCUIT	SERIES 4 C	ONTROL DO	ES NOT SUS	STAIN A SHO	RT CIRCUIT	CURRENT			
RATED POWER FACTOR	INSULATION SYSTEM				CLAS	SS H				
STATOR WINDING	PROTECTION				IP:	23				
WINDING PITCH	RATED POWER FACTOR				0.	8				
### WINDING LEADS   12  STATOR WDG. RESISTANCE   0.101 Ohms PER PHASE AT 22°C SERIES STAR CONNECTED    ### CALL COLOR WDG. RESISTANCE   0.69 Ohms at 22°C    ### EXCITER STATOR RESISTANCE   20 Ohms at 22°C    ### EXCITER STATOR RESISTANCE   20 Ohms at 22°C    ### EXCITER STATOR RESISTANCE   0.078 Ohms PER PHASE AT 22°C    ### EXCITER STATOR RESISTANCE   0.078 Ohms PER PHASE AT 22°C    ### EXCITER STATOR RESISTANCE   0.078 Ohms PER PHASE AT 22°C    ### EXCITER STATOR RESISTANCE   0.078 Ohms PER PHASE AT 22°C    ### EXCITER STATOR RESISTANCE   0.078 Ohms PER PHASE AT 22°C    ### EXCITER STATOR RESISTANCE   0.078 Ohms PER PHASE AT 22°C    ### EXCITER STATOR RESISTANCE   0.078 Ohms PER PHASE AT 22°C    ### EXCITER STATOR RESISTANCE   0.000 Ohms PER PHASE AT 22°C    ### EXCITER STATOR BLANCED LINEAR LOAD < 5.0%    ### EXCITER STATOR NON-DISTORTING BALANCED LINEAR LOAD < 5.0%    ### EXCITER STATOR PHASE AT 22°C    ### EXCITER STATOR PHASE AT 22°C    ### EXCITER STATOR STATOR PHASE STATO	STATOR WINDING			DO	UBLE LAYER	CONCENTE	RIC			
### WINDING LEADS   12  STATOR WDG. RESISTANCE   0.101 Ohms PER PHASE AT 22°C SERIES STAR CONNECTED    ### CALL COLOR WDG. RESISTANCE   0.69 Ohms at 22°C    ### EXCITER STATOR RESISTANCE   20 Ohms at 22°C    ### EXCITER STATOR RESISTANCE   20 Ohms at 22°C    ### EXCITER STATOR RESISTANCE   0.078 Ohms PER PHASE AT 22°C    ### EXCITER STATOR RESISTANCE   0.078 Ohms PER PHASE AT 22°C    ### EXCITER STATOR RESISTANCE   0.078 Ohms PER PHASE AT 22°C    ### EXCITER STATOR RESISTANCE   0.078 Ohms PER PHASE AT 22°C    ### EXCITER STATOR RESISTANCE   0.078 Ohms PER PHASE AT 22°C    ### EXCITER STATOR RESISTANCE   0.078 Ohms PER PHASE AT 22°C    ### EXCITER STATOR RESISTANCE   0.078 Ohms PER PHASE AT 22°C    ### EXCITER STATOR RESISTANCE   0.000 Ohms PER PHASE AT 22°C    ### EXCITER STATOR BLANCED LINEAR LOAD < 5.0%    ### EXCITER STATOR NON-DISTORTING BALANCED LINEAR LOAD < 5.0%    ### EXCITER STATOR PHASE AT 22°C    ### EXCITER STATOR PHASE AT 22°C    ### EXCITER STATOR STATOR PHASE STATO	WINDING PITCH				TWO T	HIRDS				
STATOR WDG. RESISTANCE										
ROTOR WDG. RESISTANCE 20 Ohms at 22°C  EXCITER STATOR RESISTANCE 20 Ohms at 22°C  EXCITER STATOR RESISTANCE 20 Ohms at 22°C  EXCITER STATOR RESISTANCE 0.078 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 6312-2RS (ISO)  BEARING NON-DRIVE END BALL 6309-2RS (ISO)  WEIGHT COMP. GENERATOR 311 kg 330 kg 103 kg  WEIGHT WOUND RATOR 103 kg 103 kg  WEIGHT WOUND ROTOR 95.89 kg 87.52 kg  WR² INERTIA 0.4999 kgm² 0.4682 kgm²  SHIPPING WEIGHTS in a crate 334 kg 351 kg  PACKING CRATE SIZE 108 × 57 × 96(cm) 105 × 57 × 96(cm)  TELEPHONE INTERFERENCE THE~2% 105 × 57 × 96(cm)  VOLTAGE SERIES STAR 380/220 400/231 415/240 440/254 416/240 440/254 460/266 480/277  VOLTAGE PARALLEL STAR 190/110 200/115 208/120 220/127 208/120 220/127 208/130 227/138  KVA BASE RATING FOR REACTANCE 60 60 60 65 8 67.5 70 72.5 75  XJ DIR. AXIS SYNCHRONOUS 2.48 2.24 2.08 1.79 3.00 2.78 2.64 2.50  XJ DIR. AXIS SYNCHRONOUS 2.48 2.24 2.08 1.79 3.00 2.78 2.64 2.50  XJ DIR. AXIS SYNCHRONOUS 2.48 2.24 2.08 1.79 3.00 2.78 2.64 2.50  XJ DIR. AXIS SYNCHRONOUS 2.48 2.24 2.08 1.79 3.00 2.78 2.64 2.50  XJ DIR. AXIS SYNCHRONOUS 2.48 2.24 2.08 1.79 3.00 2.78 2.64 2.50  XJ DIR. AXIS SYNCHRONOUS 2.48 2.24 2.08 1.79 3.00 2.78 2.64 2.50  XJ DIR. AXIS SYNCHRONOUS 2.48 2.24 2.08 1.79 3.00 2.78 2.64 2.50  XJ DIR. AXIS SYNCHRONOUS 2.48 2.24 2.08 1.79 3.00 2.78 2.64 2.50  XJ DIR. AXIS SYNCHRONOUS 2.48 2.24 2.08 1.79 3.00 2.78 2.64 2.50  XJ DIR. AXIS SYNCHRONOUS 2.48 2.24 2.08 1.79 3.00 2.78 2.64 2.50  XJ DIR. AXIS SYNCHRONOUS 2.48 2.24 2.08 1.79 3.00 2.78 2.64 2.50  XJ DIR. AXIS SYNCHRONOUS 2.48 2.24 2.08 1.79 3.00 2.78 2.64 2.50  XJ DIR. AXIS SYNCHRONOUS 2.48 2.24 2.08 1.79 3.00 2.78 2.64 2.50  XJ DIR. AXIS SYNCHRONOUS 2.64 2.62 0.11 0.09 0.15 0.14 0.13 0.12 0.12  XZ DIR. AXIS SYNCHRONOUS 2.00 0.08 0.08 0.08 0.08 0.08 0.08			0.101.0	Ohme DED D			TAD CONNE	CTED		
EXCITER STATOR RESISTANCE			0.101	JIIIIS FER FI			TAR CONNE	CIED		
EXCITER ROTOR RESISTANCE  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  BEARING DRIVE END  BEARING NON-DRIVE END  BEARING SIGO)  BEARING 311 kg 330 kg  WEIGHT COMP. GENERATOR  311 kg 330 kg  WEIGHT WOUND STATOR  103 kg 103 kg  WEIGHT WOUND STATOR  103 kg 87.52 kg  WR' INERTIA  0.4999 kgm² 0.4682 kgm²  SHIPPING WEIGHTS in a crate  105 x 57 x 96(cm)  105 x 57 x 96(cm)  TELEPHONE INTERFERENCE  THF-2% TIF-50  COOLING AIR  0.216 m³ysec 458 cfm 0.2216 m³ysec 595 cfm  VOLTAGE SERIES STAR 380/220 400/231 415/240 440/254 416/240 440/254 460/266 480/277  VOLTAGE SERIES DELTA  220/110 230/115 240/120 254/127 240/120 254/127 266/133 277/138  KVA BASE RATING FOR REACTANCE 60 60 60 58 67.5 70 72.5 75  Xd DIR. AXIS SYNCHRONOUS 2.48 2.24 2.08 1.79 3.00 2.78 2.64 2.50  Xd DIR. AXIS SYNCHRONOUS 1.13 1.02 0.95 0.82 1.38 1.28 1.21 1.15  X°q QUAD. AXIS SUBTRANSIENT 0.14 0.13 0.12 0.11  X°q QUAD. AXIS SUBTRANSIENT 0.14 0.13 0.12 0.11  X°q QUAD. AXIS SUBTRANSIENT 0.14 0.13 0.12 0.11  X°q QUAD. AXIS SUBTRANSIENT 0.14 0.13 0.12 0.10  X DAG STANSIENT 0.14 0.13 0.12 0.11  X°q QUAD. AXIS SUBTRANSIENT 0.14 0.13 0.12 0.10  X°q QUAD. AXIS SUBTRANSIENT 0.14 0.13 0.1										
R.F.I. SUPPRESSION  BS EN 61000-6-2 & BS EN 61000-6-4, VDE 0875N, VDE 0875N, refer to factory for others  WAVEFORM DISTORTION  NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%  MAXIMUM OVERSPEED  BALL. 6312-2RS (ISO)  BEARING NON-DRIVE END  BALL. 6312-2RS (ISO)  BALL. 6309-2RS (ISO)  BALL. 6309-2RS (ISO)  BEARING NON-DRIVE END  BALL. 6309-2RS (ISO)  BALL. 6309-2RS (ISO)  BEARING STATOR  11 BEARING  2 BEARING  WEIGHT COMP. GENERATOR  311 kg  330 kg  103 kg  103 kg  103 kg  WEIGHT WOUND STATOR  103 kg  WEIGHT WOUND ROTOR  95.89 kg  87.52 kg  WR' INERTIA  0.4999 kgm²  0.4662 kgm²  SHIPPING WEIGHTS in a crate  334 kg  351 kg  FACKING CRATE SIZE  105 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  380/220 400/231 415/240 440/254 416/240 440/254 460/256 480/277  VOLTAGE SERIES DELTA  220/110 230/115 240/120 220/127 208/120 220/127 230/133 240/138  VOLTAGE SERIES DELTA  220/110 230/115 240/120 254/127 240/120 254/127 266/133 277/138  KVB ABASE RATING FOR REACTANCE  60 60 60 60 58 67.5 70 72.5 75  XD DIR. AXIS SYNCHRONOUS  2.48 2.24 2.08 1.79 3.00 2.78 2.64 2.50  XD DIR. AXIS SYNCHRONOUS  2.48 2.24 2.08 1.79 3.00 2.78 2.64 2.50  XD DIR. AXIS SUBTRANSIENT  0.13 0.12 0.11 0.09 0.15 0.14 0.13 0.13  XT Q DUAD. AXIS REACTANCE  1.13 1.02 0.955 0.82 1.38 1.28 1.21 1.15  XT Q DUAD. AXIS REACTANCE  0.08 0.09 0.08 0.08 0.08  0.08 0.08  X2 NEGATIVE SEQUENCE  0.11 0.10 0.09 0.06 0.09 0.08 0.08 0.08  0.08 0.08  X2 NEGATIVE SEQUENCE  0.11 0.10 0.09 0.08 0.09 0.08 0.08  0.08 0.08  TT GRANSIENT TIME CONST.  0.006 s										
WAVEFORM DISTORTION	EXCITER ROTOR RESISTANCE			0.07	8 Ohms PER	PHASE AT 2	2°C			
MAXIMUM OVERSPEED 2250 Rev/Min  BEARING DRIVE END BALL. 6312-2RS (ISO)  BEARING NON-DRIVE END BALL. 6309-2RS (ISO)  ### B	R.F.I. SUPPRESSION	BS EI	N 61000-6-2	& BS EN 610	00-6-4,VDE 0	875G, VDE 0	875N. refer to	factory for o	thers	
BEARING DRIVE END  BEARING NON-DRIVE END  BEARING  1 BEARING  2 BEARING  WEIGHT COMP. GENERATOR  311 kg  330 kg  WEIGHT WOUND STATOR  103 kg  103 kg  WEIGHT WOUND STATOR  95.89 kg  87.52 kg  WR² INERTIA  0.4999 kgm²  0.4682 kgm²  SHIPPING WEIGHTS in a crate  105 x 57 x 96(cm)	WAVEFORM DISTORTION		NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%							
BEARING NON-DRIVE END  1 BEARING  1 BEARING  2 BEARING  WEIGHT COMP. GENERATOR  311 kg  330 kg  WEIGHT WOUND STATOR  103 kg  WEIGHT WOUND ROTOR  95.89 kg  87.52 kg  WR³ INERTIA  0.4999 kgm²  0.4682 kgm²  SHIPPING WEIGHTS in a crate  105 x 57 x 96(cm)  105 x 5	MAXIMUM OVERSPEED				2250 R	ev/Min				
BEARING   2 BEARING   330 kg	BEARING DRIVE END				BALL. 6312	-2RS (ISO)				
WEIGHT COMP. GENERATOR         311 kg         330 kg           WEIGHT WOUND STATOR         103 kg         103 kg           WEIGHT WOUND ROTOR         95.89 kg         87.52 kg           WEIGHT WOUND STATOR         95.89 kg         87.52 kg           WEIGHT WOUND ROTOR         95.89 kg         87.52 kg           WEIGHTS IN A CARD ROTOR         95.89 kg         87.52 kg           WEIGHT WOUND STATOR         0.4699 kgm²         0.4682 kgm²           SHIPPING WEIGHTS in a crate         334 kg         351 kg           PACKING CRATE SIZE         105 x 57 x 96(cm)         105 x 57 x 96(cm)           ELEPHONE INTERFERENCE         THF<2%	BEARING NON-DRIVE END				BALL. 6309	-2RS (ISO)				
WEIGHT WOUND STATOR			1 BEA	ARING			2 BEA	RING		
WEIGHT WOUND ROTOR         95.89 kg         87.52 kg           WR² INERTIA         0.4999 kgm²         0.4682 kgm²           SHIPPING WEIGHTS in a crate         334 kg         351 kg           PACKING CRATE SIZE         105 x 57 x 96(cm)         105 x 57 x 96(cm)           TELEPHONE INTERFERENCE         50 Hz         60 Hz           COOLING AIR         0.216 m²/sec 458 cfm         0.281 m²/sec 595 cfm           VOLTAGE SERIES STAR         380/220         400/231         415/240         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         230/133         240/138           VOLTAGE PARALLEL STAR         190/110         200/115         208/120         220/127         230/133         240/138           VOLTAGE SERIES DELTA         220/110         230/115         240/120         254/127         240/120         254/127         260/133         277/138           VALUES         40 B. ALIS SYNCHRONOUS         2.48         2.24         2.08         1.79         3.00<	WEIGHT COMP. GENERATOR						330	kg		
WR² INERTIA         0.4999 kgm²         0.4682 kgm²           SHIPPING WEIGHTS in a crate         334 kg         351 kg           PACKING CRATE SIZE         105 x 57 x 96(cm)         105 x 57 x 96(cm)           TELEPHONE INTERFERENCE         THF<2%										
SHIPPING WEIGHTS in a crate       334 kg       351 kg         PACKING CRATE SIZE       105 x 57 x 96(cm)       105 x 57 x 96(cm)         TELEPHONE INTERFERENCE       THF<2%										
PACKING CRATE SIZE  105 x 57 x 96(cm)  105 x 107 x 96(cm)  105 x 57 x										
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 60 60 60 58 67.5 70 72.5 75  Xd DIR. AXIS SYNCHRONOUS  2.48 2.24 2.08 1.79 3.00 2.78 2.64 2.50  X'd DIR. AXIS SYNCHRONOUS  2.48 2.24 2.08 1.79 3.00 2.78 2.64 2.50  X'd DIR. AXIS SUBTRANSIENT  0.19 0.17 0.16 0.14 0.22 0.20 0.19 0.18  X"d DIR. AXIS SUBTRANSIENT  0.13 0.12 0.11 0.09 0.15 0.14 0.13 0.13  Xq QUAD. AXIS REACTANCE  1.13 1.02 0.95 0.82 1.38 1.28 1.21 1.15  X"q QUAD. AXIS SUBTRANSIENT  0.14 0.13 0.12 0.10 0.14 0.13 0.12  XL LEAKAGE REACTANCE  0.08 0.08 0.08 0.07 0.06 0.09 0.08 0.08 0.08  X2 NEGATIVE SEQUENCE  0.11 0.10 0.09 0.14 0.13 0.12 0.12  XL LEAKAGE REACTANCE 0.11 0.10 0.09 0.08 0.08  REACTANCES ARE SATURATED  VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED  T'd TRANSIENT TIME CONST.  T'd SUB-TRANSTIME CONST.  T'G SUB-TRANSTIME CONST.  T'A ARMATURE TIME CONST.  TO 0.006 s								U		
TELEPHONE INTERFERENCE  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 60 60 60 58 67.5 70 72.5 75  Xd DIR. AXIS SYNCHRONOUS  2.48 2.24 2.08 1.79 3.00 2.78 2.64 2.50  X'd DIR. AXIS SUBTRANSIENT  0.19 0.17 0.16 0.14 0.22 0.20 0.19 0.18  X"d DIR. AXIS SUBTRANSIENT  0.13 0.12 0.11 0.09 0.15 0.14 0.13 0.13  Xq QUAD. AXIS REACTANCE  1.13 1.02 0.95 0.82 1.38 1.28 1.21 1.15  X"q QUAD. AXIS SUBTRANSIENT  0.14 0.13 0.12 0.10 0.14 0.13 0.12  XL LEAKAGE REACTANCE  0.08 0.08 0.08 0.07 0.06 0.09 0.08 0.08 0.08  X2 NEGATIVE SEQUENCE  0.11 0.10 0.09 0.15 0.14 0.13 0.12  X1 LEAKAGE REACTANCE 0.13 0.12 0.11 0.09 0.14 0.13 0.12  X2 ERACTANCE 0.13 0.12 0.11 0.09 0.14 0.13 0.12  X2 ERACTANCE 0.13 0.12 0.11 0.09 0.14 0.13 0.12  X2 NEGATIVE SEQUENCE  0.13 0.12 0.11 0.09 0.14 0.13 0.12 0.12  X0 ZERO SEQUENCE  0.11 0.10 0.09 0.08 0.09 0.08 0.08  REACTANCES ARE SATURATED  VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED  T'd TRANSIENT TIME CONST.  T'd SUB-TRANSTIME CONST.  T'd SUB-TRANSTIME CONST.  T'G SUB-TRANSTIME CONST.  T'G SUB-TRANSTIME CONST.  T'A ARMATURE TIME CONST.  TO 0.006 s	PACKING CRATE SIZE			. ,						
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         60 60 60 58 67.5 70 72.5 75           Xd DIR. AXIS SYNCHRONOUS         2.48 2.24 2.08 1.79 3.00 2.78 2.64 2.50           X'd DIR. AXIS TRANSIENT         0.19 0.17 0.16 0.14 0.22 0.20 0.19 0.18           X"d DIR. AXIS SUBTRANSIENT         0.13 0.12 0.11 0.09 0.15 0.14 0.13 0.13           Xq QUAD. AXIS REACTANCE 1.13 1.02 0.95 0.82 1.38 1.28 1.21 1.15         1.21 1.15           X"q QUAD. AXIS SUBTRANSIENT 0.14 0.13 0.12 0.10 0.14 0.13 0.12 0.12         0.12 0.12           XL LEAKAGE REACTANCE 0.08 0.08 0.08 0.07 0.06 0.09 0.08 0.08 0.08         0.08 0.08 0.08           X2 NEGATIVE SEQUENCE 0.11 0.10 0.09 0.14 0.13 0.12 0.11         0.09 0.08 0.09 0.08 0.08 0.08           REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED T'd TRANSIENT TIME CONST.         0.007 s           T"d SUB-TRANSTIME CONST.         0.007 s           T"d SUB-TRANSTIME CONST.         0.008 s	TELEPHONE INTERFERENCE									
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         60         60         60         58         67.5         70         72.5         75           Xd DIR. AXIS SYNCHRONOUS         2.48         2.24         2.08         1.79         3.00         2.78         2.64         2.50           X'd DIR. AXIS TRANSIENT         0.19         0.17         0.16         0.14         0.22         0.20         0.19         0.18           X"d DIR. AXIS SUBTRANSIENT         0.13         0.12         0.11         0.09         0.15         0.14         0.13         0.13           X"q QUAD. AXIS REACTANCE         1.13         1.02         0.95         0.82         1.38         1.28         1.21         1.15           X"q QUAD. AXIS SUBTRANSIENT         0.14         0.13         0.12         0.10         0.14         0.13         0.12         0.12           X"L LEAKAGE REACTANCE         0.08         0.08 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>										
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         60         60         60         60         58         67.5         70         72.5         75           Xd DIR. AXIS SYNCHRONOUS         2.48         2.24         2.08         1.79         3.00         2.78         2.64         2.50           X'd DIR. AXIS TRANSIENT         0.19         0.17         0.16         0.14         0.22         0.20         0.19         0.18           X''d DIR. AXIS SUBTRANSIENT         0.13         0.12         0.11         0.09         0.15         0.14         0.13         0.13           X''q QUAD. AXIS REACTANCE         1.13         1.02         0.95         0.82         1.38         1.28         1.21         1.15           X''q QUAD. AXIS SUBTRANSIENT         0.14         0.13         0.12         0.10         0.14         0.13         0.12         0.12           X'L LEAKAGE REACTANCE         0.08         0.08         0.09         0.06         0.09         0.08         0.08         0.08           X2 NEGATIVE SEQUENCE         0.13         0.12         0	VOLTAGE SERIES STAR	380/220	400/231	415/240	440/254	416/240	440/254	460/266	480/277	
kVA BASE RATING FOR REACTANCE VALUES         60         60         60         58         67.5         70         72.5         75           Xd DIR. AXIS SYNCHRONOUS         2.48         2.24         2.08         1.79         3.00         2.78         2.64         2.50           X'd DIR. AXIS TRANSIENT         0.19         0.17         0.16         0.14         0.22         0.20         0.19         0.18           X''d DIR. AXIS SUBTRANSIENT         0.13         0.12         0.11         0.09         0.15         0.14         0.13         0.13           X''q QUAD. AXIS REACTANCE         1.13         1.02         0.95         0.82         1.38         1.28         1.21         1.15           X''q QUAD. AXIS SUBTRANSIENT         0.14         0.13         0.12         0.10         0.14         0.13         0.12         0.12           X''L LEAKAGE REACTANCE         0.08         0.08         0.07         0.06         0.09         0.08         0.08         0.08           X2 NEGATIVE SEQUENCE         0.13         0.12         0.11         0.09         0.14         0.13         0.12         0.12           X0ZERO SEQUENCE         0.11         0.10         0.09         0.08         0.09<	VOLTAGE PARALLEL STAR	190/110	200/115	208/120	220/127	208/120	220/127	230/133	240/138	
VALUES         60         60         60         58         67.5         70         72.5         75           Xd DIR. AXIS SYNCHRONOUS         2.48         2.24         2.08         1.79         3.00         2.78         2.64         2.50           X'd DIR. AXIS TRANSIENT         0.19         0.17         0.16         0.14         0.22         0.20         0.19         0.18           X"d DIR. AXIS SUBTRANSIENT         0.13         0.12         0.11         0.09         0.15         0.14         0.13         0.13           Xq QUAD. AXIS REACTANCE         1.13         1.02         0.95         0.82         1.38         1.28         1.21         1.15           X"q QUAD. AXIS SUBTRANSIENT         0.14         0.13         0.12         0.10         0.14         0.13         0.12         0.10         0.14         0.13         0.12         0.12           XL LEAKAGE REACTANCE         0.08         0.08         0.08         0.07         0.06         0.09         0.08         0.08           X2 NEGATIVE SEQUENCE         0.13         0.12         0.11         0.09         0.08         0.09         0.08         0.08           X0 ZERO SEQUENCE         0.11         0.10		220/110	230/115	240/120	254/127	240/120	254/127	266/133	277/138	
X'd DIR. AXIS TRANSIENT       0.19       0.17       0.16       0.14       0.22       0.20       0.19       0.18         X"d DIR. AXIS SUBTRANSIENT       0.13       0.12       0.11       0.09       0.15       0.14       0.13       0.13         Xq QUAD. AXIS REACTANCE       1.13       1.02       0.95       0.82       1.38       1.28       1.21       1.15         X"q QUAD. AXIS SUBTRANSIENT       0.14       0.13       0.12       0.10       0.14       0.13       0.12       0.10         XL LEAKAGE REACTANCE       0.08       0.08       0.07       0.06       0.09       0.08       0.08       0.08         X2 PEGATIVE SEQUENCE       0.13       0.12       0.11       0.09       0.14       0.13       0.12       0.12         X0 ZERO SEQUENCE       0.11       0.10       0.09       0.08       0.09       0.08       0.08       0.08         REACTANCES ARE SATURATED       VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED       0.028 s       0.007 s       0.006 s       0.007 s       <		60	60	60	58	67.5	70	72.5	75	
X"d DIR. AXIS SUBTRANSIENT       0.13       0.12       0.11       0.09       0.15       0.14       0.13       0.13         Xq QUAD. AXIS REACTANCE       1.13       1.02       0.95       0.82       1.38       1.28       1.21       1.15         X"q QUAD. AXIS SUBTRANSIENT       0.14       0.13       0.12       0.10       0.14       0.13       0.12       0.12         XL LEAKAGE REACTANCE       0.08       0.08       0.07       0.06       0.09       0.08       0.08       0.08         X2 NEGATIVE SEQUENCE       0.13       0.12       0.11       0.09       0.14       0.13       0.12       0.12         XoZERO SEQUENCE       0.11       0.10       0.09       0.08       0.09       0.08       0.08       0.08         REACTANCES ARE SATURATED       VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED         T'd TRANSIENT TIME CONST.       0.028 s         T'do O.C. FIELD TIME CONST.       0.7 s         Ta ARMATURE TIME CONST.       0.006 s	Xd DIR. AXIS SYNCHRONOUS	2.48	2.24	2.08	1.79	3.00	2.78	2.64	2.50	
Xq QUAD. AXIS REACTANCE       1.13       1.02       0.95       0.82       1.38       1.28       1.21       1.15         X"q QUAD. AXIS SUBTRANSIENT       0.14       0.13       0.12       0.10       0.14       0.13       0.12       0.12         XL LEAKAGE REACTANCE       0.08       0.08       0.07       0.06       0.09       0.08       0.08       0.08         X2 NEGATIVE SEQUENCE       0.13       0.12       0.11       0.09       0.14       0.13       0.12       0.12         XoZERO SEQUENCE       0.11       0.10       0.09       0.08       0.09       0.08       0.08       0.08         REACTANCES ARE SATURATED       VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED         T'd TRANSIENT TIME CONST.       0.028 s         T'do O.C. FIELD TIME CONST.       0.7 s         Ta ARMATURE TIME CONST.       0.006 s	X'd DIR. AXIS TRANSIENT	0.19	0.17	0.16	0.14	0.22	0.20	0.19	0.18	
X"q QUAD. AXIS SUBTRANSIENT         0.14         0.13         0.12         0.10         0.14         0.13         0.12         0.12           XL LEAKAGE REACTANCE         0.08         0.08         0.07         0.06         0.09         0.08         0.08         0.08           X2 NEGATIVE SEQUENCE         0.13         0.12         0.11         0.09         0.14         0.13         0.12         0.12           X0 ZERO SEQUENCE         0.11         0.10         0.09         0.08         0.09         0.08         0.08         0.08           REACTANCES ARE SATURATED         VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED           T'd TRANSIENT TIME CONST.         0.028 s         0.007 s           T'd SUB-TRANSTIME CONST.         0.007 s           T'do O.C. FIELD TIME CONST.         0.7 s           Ta ARMATURE TIME CONST.         0.006 s	X"d DIR. AXIS SUBTRANSIENT	0.13	0.12	0.11	0.09	0.15	0.14	0.13	0.13	
XL LEAKAGE REACTANCE         0.08         0.08         0.07         0.06         0.09         0.08         0.08         0.08           X2 NEGATIVE SEQUENCE         0.13         0.12         0.11         0.09         0.14         0.13         0.12         0.12           X0 ZERO SEQUENCE         0.11         0.10         0.09         0.08         0.09         0.08         0.08         0.08           REACTANCES ARE SATURATED         VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED           T'd TRANSIENT TIME CONST.         0.028 s         0.007 s           T'd SUB-TRANSTIME CONST.         0.007 s         0.7 s           T'do O.C. FIELD TIME CONST.         0.7 s         0.006 s	Xq QUAD. AXIS REACTANCE	1.13	1.02	0.95	0.82	1.38	1.28	1.21	1.15	
X2 NEGATIVE SEQUENCE       0.13       0.12       0.11       0.09       0.14       0.13       0.12       0.12         XoZERO SEQUENCE       0.11       0.10       0.09       0.08       0.09       0.08       0.08       0.08         REACTANCES ARE SATURATED       VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED         T'd TRANSIENT TIME CONST.       0.028 s         T'd SUB-TRANSTIME CONST.       0.007 s         T'do O.C. FIELD TIME CONST.       0.7 s         Ta ARMATURE TIME CONST.       0.006 s	X"q QUAD. AXIS SUBTRANSIENT	0.14	0.13	0.12	0.10	0.14	0.13	0.12	0.12	
XoZERO SEQUENCE         0.11         0.10         0.09         0.08         0.09         0.08         0.08         0.08           REACTANCES ARE SATURATED         VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED           T'd TRANSIENT TIME CONST.         0.028 s           T'd SUB-TRANSTIME CONST.         0.007 s           T'do O.C. FIELD TIME CONST.         0.7 s           Ta ARMATURE TIME CONST.         0.006 s	XL LEAKAGE REACTANCE	0.08	0.08	0.07	0.06	0.09	0.08	0.08	0.08	
REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED T'd TRANSIENT TIME CONST. 0.028 s T"d SUB-TRANSTIME CONST. 0.007 s T'do O.C. FIELD TIME CONST. 0.7 s Ta ARMATURE TIME CONST. 0.006 s	X2 NEGATIVE SEQUENCE	0.13	0.12	0.11	0.09	0.14	0.13	0.12	0.12	
T'd TRANSIENT TIME CONST.       0.028 s         T"d SUB-TRANSTIME CONST.       0.007 s         T'do O.C. FIELD TIME CONST.       0.7 s         Ta ARMATURE TIME CONST.       0.006 s										
T"d SUB-TRANSTIME CONST.         0.007 s           T'do O.C. FIELD TIME CONST.         0.7 s           Ta ARMATURE TIME CONST.         0.006 s		ED	\	/ALUES ARE			ND VOLTAGE	INDICATED	)	
T'do O.C. FIELD TIME CONST. 0.7 s Ta ARMATURE TIME CONST. 0.006 s		-								
Ta ARMATURE TIME CONST. 0.006 s		-								
SHORT CIRCUIT RATIO 1/Xd										
	SHORT CIRCUIT RATIO				1/2	Kd				

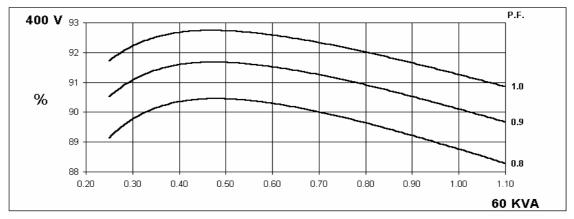
50 Hz

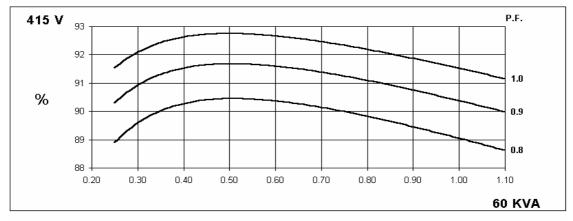
# UCI224E Winding 311

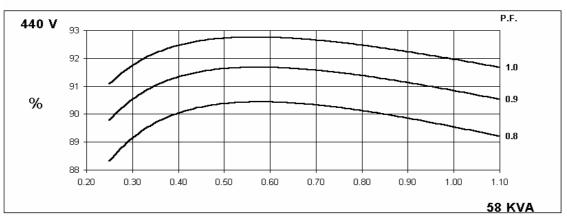


## THREE PHASE EFFICIENCY CURVES







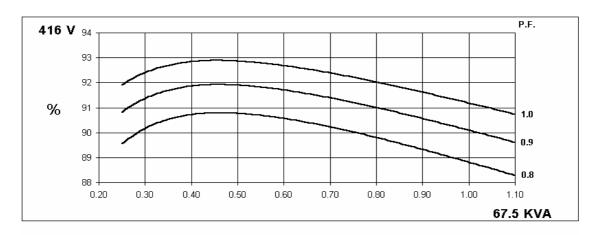


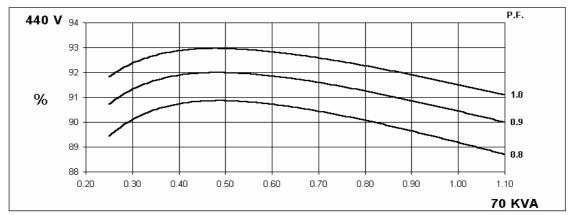


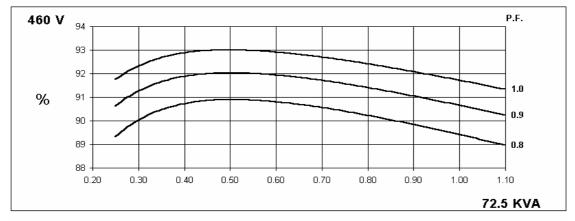
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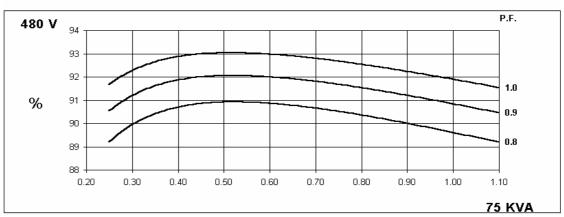
60 Hz

## THREE PHASE EFFICIENCY CURVES





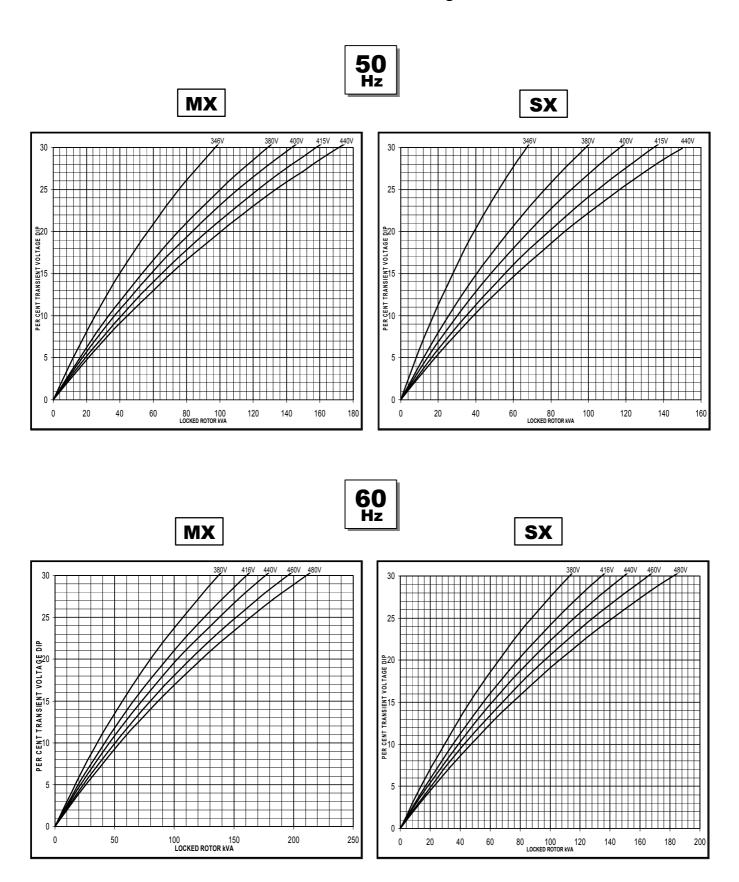




# UCI224E Winding 311



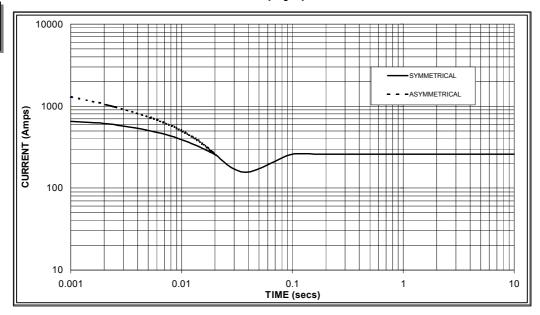
# **Locked Rotor Motor Starting Curve**





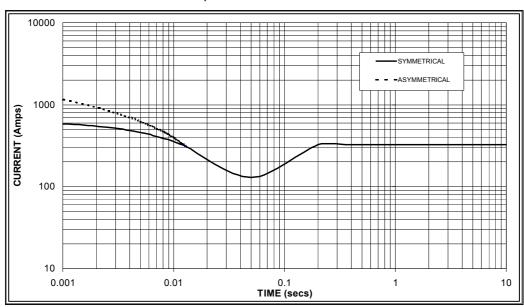
# Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed Based on star (wye) connection.





## Sustained Short Circuit = 260 Amps





## Sustained Short Circuit = 325 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:

50	Hz	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

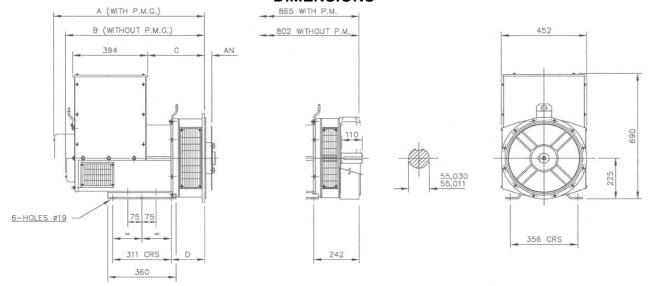


# Winding 311 / 0.8 Power Factor

## **RATINGS**

	Class - Temp Rise	C	ont. F -	105/40	°C	Co	ont. H -	125/40	°C	St	andby -	150/40	)°C	St	andby -	163/27	°C
50	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
Hz	Series Delta (V)	220	230	240	254	220	230	240	254	220	230	240	254	220	230	240	254
	kVA	53.0	53.0	53.0	40.3	60.0	60.0	60.0	45.0	61.0	61.0	61.0	45.8	63.0	63.0	63.0	47.3
	kW	42.4	42.4	42.4	32.2	48.0	48.0	48.0	36.0	48.8	48.8	48.8	36.6	50.4	50.4	50.4	37.8
	Efficiency (%)	88.9	89.3	89.5	89.9	88.3	88.8	89.1	89.5	88.2	88.7	89.0	89.5	88.0	88.5	88.8	89.4
	kW Input	47.7	47.5	47.4	46.3	54.4	54.1	53.9	51.8	55.3	55.0	54.8	52.7	57.3	56.9	56.8	54.6
										l				l			
60	Series Star (V)	416	440	460	480	416	440	460	480	416	440	460	480	416	440	460	480
Hz	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	62.5	65.0	65.0	68.0	67.5	70.0	72.5	75.0	70.0	73.8	73.8	78.8	72.5	75.0	75.0	80.0
	kW	50.0	52.0	52.0	54.4	54.0	56.0	58.0	60.0	56.0	59.0	59.0	63.0	58.0	60.0	60.0	64.0
	Efficiency (%)	89.2	89.5	89.9	90.0	88.8	89.2	89.4	89.6	88.6	88.9	89.3	89.4	88.4	88.8	89.3	89.3
	kW Input	56.1	58.1	57.8	60.4	60.8	62.8	64.9	67.0	63.2	66.4	66.1	70.5	65.6	67.6	67.2	71.7

## **DIMENSIONS**



	211/1	OLE DEAR	ING MACH	HINES ON		
ADAPTOR	A	В	C	D	COUPLING DISCS	AN
SAE 1	814,3	751,3	314,3	191,3	SAE 8	61,90
SAE 2	800	737	300	177	SAE 10	53,98
SAE 3	800	737	300	177	SAE 11,5	39,68
SAF 4	800	7.37	300	177	SAF 14	25.40



Barnack Road • Stamford • Lincolnshire • PE9 2NB Tel: 00 44 (0)1780 484000 • Fax: 00 44 (0)1780 484100 Website: www.newage-avkseg.com