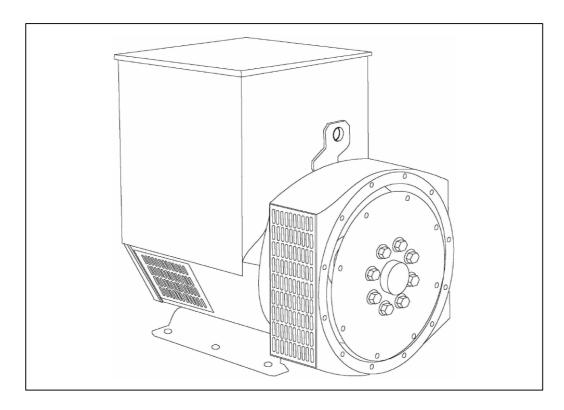




## UCI274D - Technical Data Sheet





## UCI274D

## **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.



## UCI274D WINDING 311



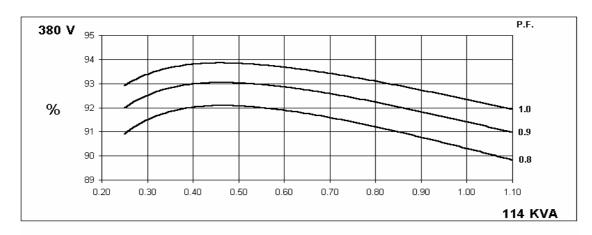
CONTROL SYSTEM	SEPARATEL	Y EXCITED	BY P.M.G.						
A.V.R.	MX321 MX341								
VOLTAGE REGULATION	± 0.5 % ± 1.0 % With 4% ENGINE GOVERNING								
SUSTAINED SHORT CIRCUIT	REFER TO SHORT CIRCUIT DECREMENT CURVES (page 7)								
CONTROL SYSTEM	SELF EXCIT	SELF EXCITED							
A.V.R.	SX460	SX460 SX440 SX421							
VOLTAGE REGULATION	± 1.5 %	± 1.0 %	± 0.5 %	With 4% EN	GINE GOVER	RNING			
SUSTAINED SHORT CIRCUIT	SERIES 4 C	ONTROL DO	ES NOT SUS	STAIN A SHO	RT CIRCUIT	CURRENT			
INSULATION SYSTEM	CLASS H								
PROTECTION				IP2	23				
RATED POWER FACTOR				0.	8				
STATOR WINDING			DO	UBLE LAYER	CONCENTE	RIC			
WINDING PITCH				TWO T					
WINDING LEADS				1170 1					
	<u> </u>	0.000.0	2h DED D	HASE AT 22°		TAD CONNE	OTED		
STATOR WDG. RESISTANCE	-	0.038 (	JNMS PER P			TAR CONNE	CIED		
ROTOR WDG. RESISTANCE				1.26 Ohms					
EXCITER STATOR RESISTANCE				20 Ohms					
EXCITER ROTOR RESISTANCE			0.09	1 Ohms PER	PHASE AT 2	2°C			
R.F.I. SUPPRESSION	BS Ef	N 61000-6-2	& BS EN 610	00-6-4,VDE 0	875G, VDE 0	875N. refer to	factory for o	thers	
WAVEFORM DISTORTION	NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%								
MAXIMUM OVERSPEED				2250 R	ev/Min				
BEARING DRIVE END	BALL. 6315-2RS (ISO)								
BEARING NON-DRIVE END	BALL. 6310-2RS (ISO)								
	1 BEARING 2 BEARING								
WEIGHT COMP. GENERATOR	431 kg 450 kg								
WEIGHT WOUND STATOR		14	1 kg			141	kg		
WEIGHT WOUND ROTOR		149.	37 kg			138.4			
WR <sup>2</sup> INERTIA			2 kgm <sup>2</sup>			1.1455	•		
SHIPPING WEIGHTS in a crate			3 kg			476			
PACKING CRATE SIZE	<b>_</b>		x 103(cm)			105 x 67 x			
TELEPHONE INTERFERENCE			Hz <2%			60			
COOLING AIR			c 1090 cfm		TIF<50 0.617 m³/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	114	120	114	n/a	131.3	137.5	137.5	146.3	
Xd DIR. AXIS SYNCHRONOUS	2.17	2.06	1.82	-	2.52	2.36	2.16	2.11	
X'd DIR. AXIS TRANSIENT	0.18	0.18	0.16	-	0.21	0.20	0.18	0.17	
X"d DIR. AXIS SUBTRANSIENT	0.12	0.11	0.10	-	0.15	0.14	0.13	0.12	
Xq QUAD. AXIS REACTANCE	1.39	1.32	1.17	-	1.49	1.39	1.28	1.25	
X"q QUAD. AXIS SUBTRANSIENT	0.16	0.16	0.14	-	0.21	0.20	0.18	0.17	
XL LEAKAGE REACTANCE	0.07	0.06	0.06	-	0.07	0.07	0.06	0.06	
X <sub>2</sub> NEGATIVE SEQUENCE	0.14	0.13	0.12	-	0.17	0.16	0.15	0.14	
X₀ZERO SEQUENCE	0.09 0.08 0.07 - 0.10 0.09 0.09 0.08								
REACTANCES ARE SATURAT									
T'd TRANSIENT TIME CONST.	0.031 s 0.01 s								
T"d SUB-TRANSTIME CONST. T'do O.C. FIELD TIME CONST.	0.85 s								
Ta ARMATURE TIME CONST.				0.00					
SHORT CIRCUIT RATIO	1/Xd								

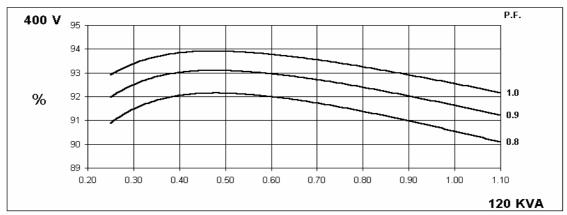
50 Hz

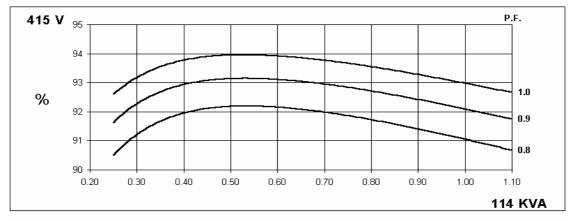
## UCI274D Winding 311

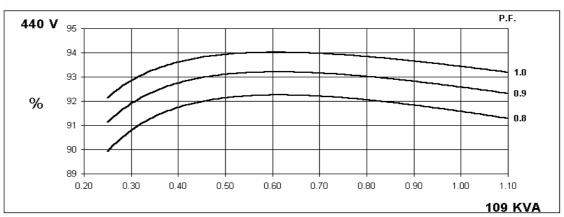


## THREE PHASE EFFICIENCY CURVES







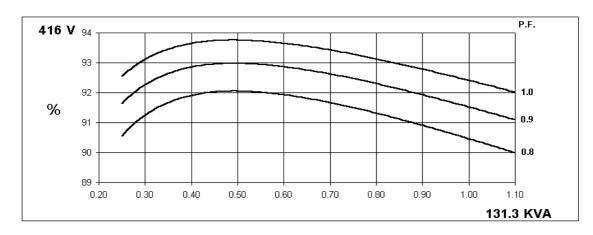


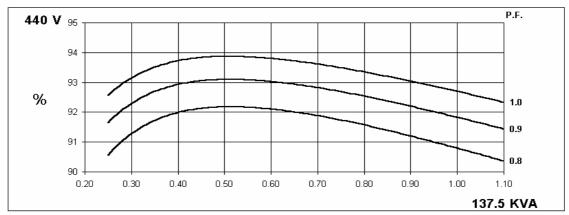


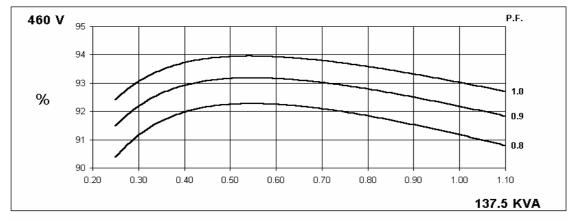
## UCI274D Winding 311

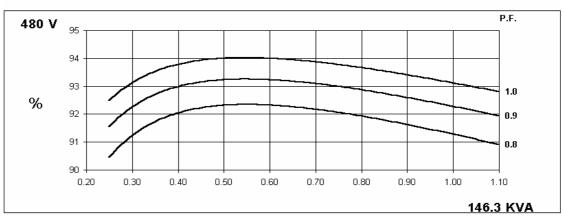
60 Hz

## THREE PHASE EFFICIENCY CURVES





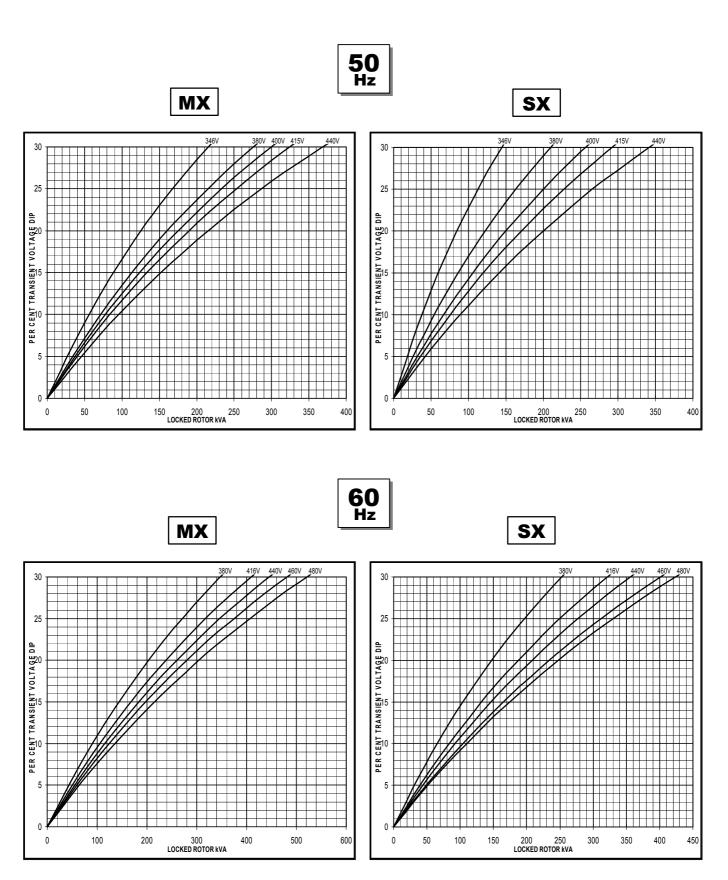




## UCI274D Winding 311



## **Locked Rotor Motor Starting Curve**

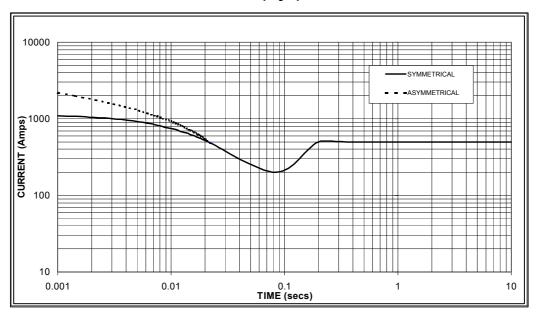




## **UCI274D**

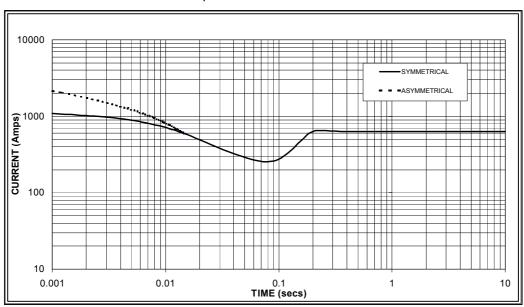
# Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed Based on star (wye) connection.

50 Hz



Sustained Short Circuit = 500 Amps

60 Hz



## Sustained Short Circuit = 630 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

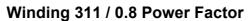
#### Note 3

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

## **UCI274D**

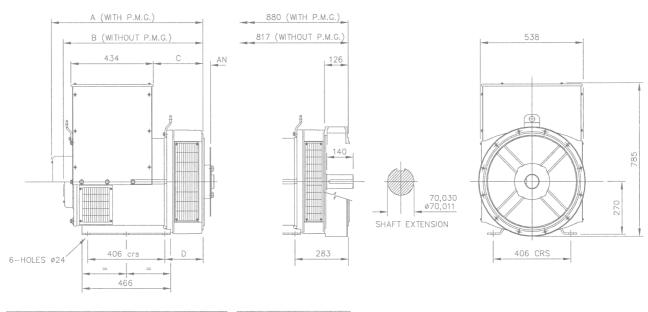




## **RATINGS**

	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	100.0	100.0	100.0	n/a	114.0	120.0	114.0	n/a	121.0	127.0	121.0	n/a	125.0	130.0	125.0	n/a
	kW	80.0	80.0	80.0	n/a	91.2	96.0	91.2	n/a	96.8	101.6	96.8	n/a	100.0	104.0	100.0	n/a
	Efficiency (%)	90.9	91.3	91.5	n/a	90.3	90.6	91.1	n/a	90.0	90.3	90.8	n/a	89.8	90.2	90.7	n/a
	kW Input	88.0	87.6	87.4	n/a	101.0	106.0	100.1	n/a	107.6	112.5	106.6	n/a	111.4	115.3	110.3	n/a
						•				•				•			
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
1 12	Series Delta (V)	240	254	266	277	240	254	266	277	240	254	266	277	240	254	266	277
	kVA	120.0	125.0	125.0	131.3	131.3	137.5	137.5	146.3	137.5	145.0	145.0	156.3	142.5	150.0	150.0	158.8
	kW	96.0	100.0	100.0	105.0	105.0	110.0	110.0	117.0	110.0	116.0	116.0	125.0	114.0	120.0	120.0	127.0
	Efficiency (%)	90.9	91.2	91.5	91.6	90.5	90.8	91.2	91.3	90.2	90.6	91.0	91.0	90.1	90.4	90.8	91.0
	kW Input	105.6	109.6	109.3	114.7	116.1	121.1	120.6	128.2	122.0	128.0	127.5	137.4	126.5	132.7	132.2	139.6

## **DIMENSIONS**



SING	SINGLE BEARING ADAPTORS						
ADAPTOR	А	В	С	D			
SAE 1	813,3	750,3	274,3	216,3			
SAE 2	799	736	260	202			
SAE 3	799	736	260	202			

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