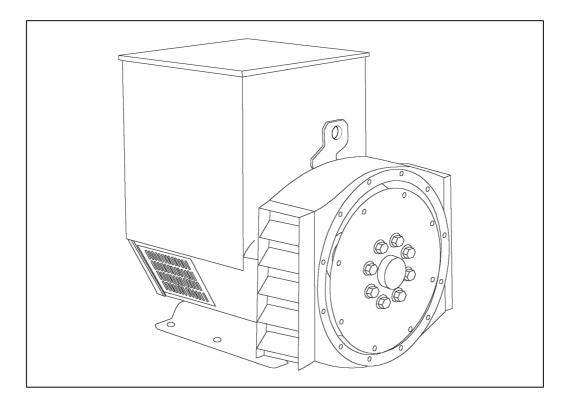


UCM224G - Technical Data Sheet



UCM224G SPECIFICATIONS & OPTIONS



STANDARDS

Marine generators may be certified to Lloyds, DnV, Bureau Veritas, ABS, Germanischer-Lloyd or RINA. Other standards and certifications can be considered on request.

VOLTAGE REGULATORS

MX341 AVR - STANDARD

This sophisticated Automatic Voltage Regulator (AVR) is incorporated into the Stamford Permanent Magnet Generator (PMG) control system, and is standard on marine generators of this type.

The PMG provides power via the AVR to the main exciter, giving a source of constant excitation power independent of generator output. The main exciter output is then fed to the main rotor, through a full wave bridge, protected by a surge suppressor. The AVR has in-built protection against sustained over-excitation, caused by internal or external faults. This de-excites the machine after a minimum of 5 seconds.

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.



UCM224G

WINDING 311

CONTROL SYSTEM	SEPARATE	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	REFER TO SHORT CIRCUIT DECREMENT CURVES (page 7)					

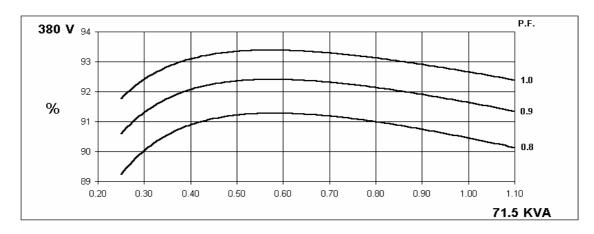
INSULATION SYSTEM	CLASS H									
PROTECTION	IP23									
RATED POWER FACTOR	0.8									
STATOR WINDING	DOUBLE LAYER CONCENTRIC									
WINDING PITCH	TWO THIRDS									
WINDING LEADS		12								
STATOR WDG. RESISTANCE		0.055 Ohms PER PHASE AT 22°C SERIES STAR CONNECTED								
ROTOR WDG. RESISTANCE		0.94 Ohms at 22°C								
EXCITER STATOR RESISTANCE	20 Ohms at 22°C									
EXCITER ROTOR RESISTANCE			0.078	3 Ohms PER	PHASE AT	22°C				
R.F.I. SUPPRESSION	BS EN	61000 <u>-</u> 6-2 &					r to factory fo	or others		
WAVEFORM DISTORTION				•	•		OAD < 5.0%			
MAXIMUM OVERSPEED	'	NO LOAD 1	1.570 11011		Rev/Min	D LINEAR I	-OAD + 0.07	0		
					2-2RS (ISO)					
BEARING DRIVE END					. ,					
BEARING NON-DRIVE END		4 DE /	DINO	BALL. 6309	9-2RS (ISO)	0 DE /	NDINO			
WEIGHT COMP. OF MEDATOR	1 BEARING			2 BEARING						
WEIGHT COMP. GENERATOR			3 kg		400 kg					
WEIGHT WOUND STATOR	139 kg 139 kg									
WEIGHT WOUND ROTOR	126.8 kg 118.4 kg									
WR ² INERTIA	0.7136 kgm ² 0.6818 kgm ²									
SHIPPING WEIGHTS in a crate	404 kg 420 kg									
PACKING CRATE SIZE	105 x 57 x 96(cm) 105 x 57 x 96(cm)									
	50 Hz 60 Hz									
TELEPHONE INTERFERENCE	THF<2% TIF<50									
COOLING AIR		0.216 m³/s	ec 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	71.5	71.5	71.5	62.7	84.5	87	91	92		
Xd DIR. AXIS SYNCHRONOUS	2.04	1.85	1.72	1.48	2.40	2.20	2.11	1.96		
X'd DIR. AXIS TRANSIENT	0.16	0.14	0.13	0.12	0.18	0.17	0.15	0.15		
X"d DIR. AXIS SUBTRANSIENT	0.11	0.10	0.09	0.08	0.13	0.12	0.11	0.11		
Xq QUAD. AXIS REACTANCE	0.94	0.85	0.79	0.68	1.10	1.01	0.96	0.90		
X"q QUAD. AXIS SUBTRANSIENT XL LEAKAGE REACTANCE	0.14 0.06	0.13 0.05	0.12 0.05	0.11 0.04	0.14	0.12 0.06	0.12 0.06	0.11 0.06		
X2 NEGATIVE SEQUENCE	0.00	0.03	0.03	0.04	0.07	0.00	0.00	0.00		
X ₀ ZERO SEQUENCE	0.09	0.08	0.08	0.06	0.10	0.09	0.09	0.08		
REACTANCES ARE SATURAT										
T'd TRANSIENT TIME CONST. 0.03 s						02				
T"d SUB-TRANSTIME CONST.	0.008 s									
T'do O.C. FIELD TIME CONST.	0.75 s									
Ta ARMATURE TIME CONST.	0.007 s									
SHORT CIRCUIT RATIO	1/Xd									
<u> </u>	1									

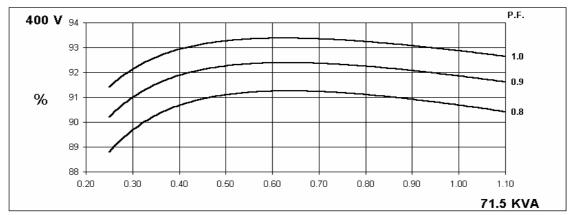
50 Hz

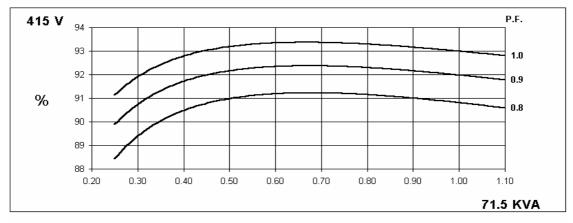
UCM224G Winding 311

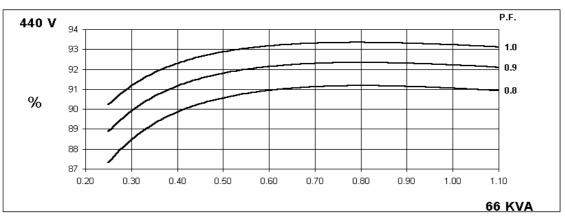


THREE PHASE EFFICIENCY CURVES







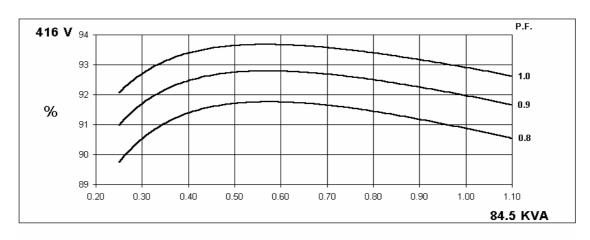


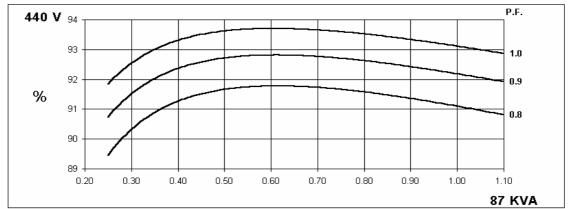


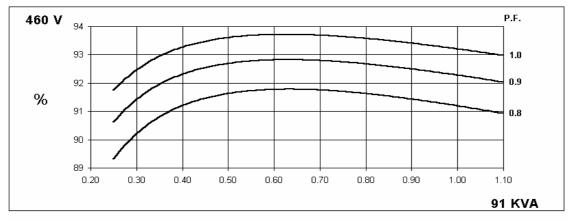
UCM224G Winding 311

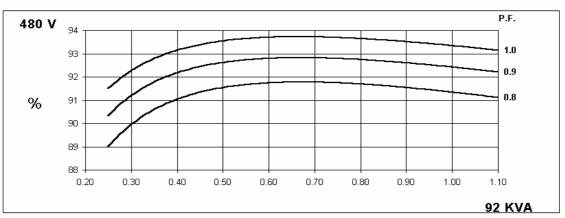
60 Hz

THREE PHASE EFFICIENCY CURVES





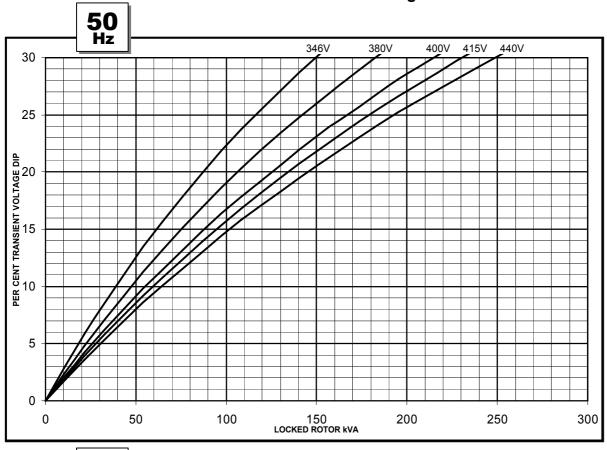


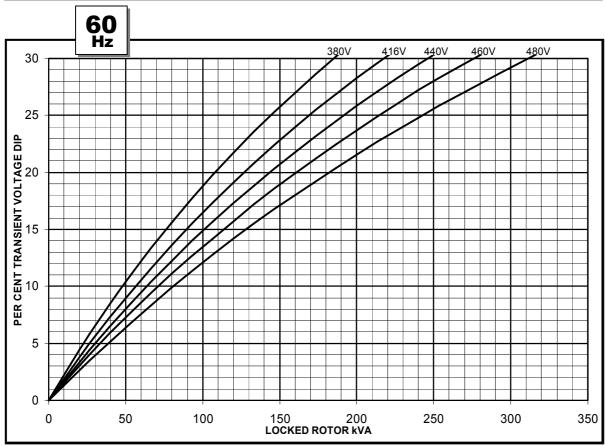


UCM224G Winding 311



Locked Rotor Motor Starting Curve



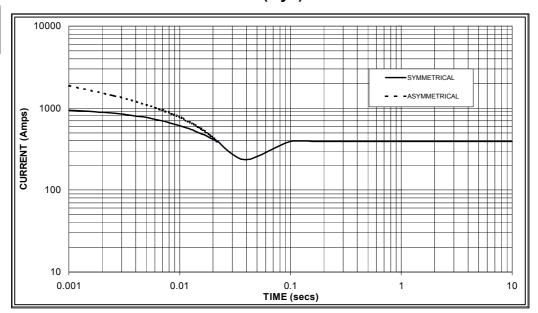




UCM224G

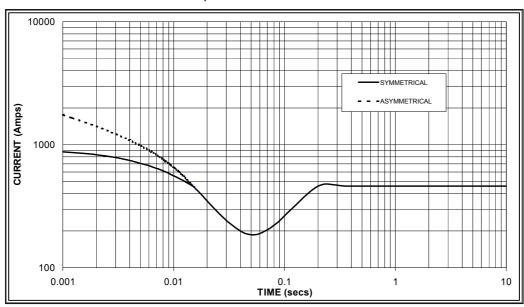
Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed Based on star (wye) connection.

50 Hz



Sustained Short Circuit = 390 Amps

60 Hz



Sustained Short Circuit = 460 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

UCM224G

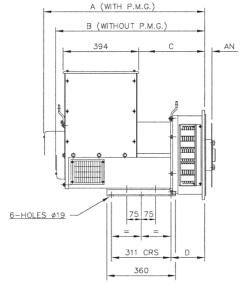


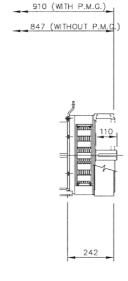
Winding 311 / 0.8 Power Factor

RATINGS

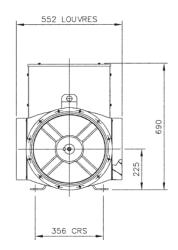
	Class - Temp Rise	C	ont. E -	65/50°	C	C	ont. B -	· 70/50°	C	C	ont. F -	· 90/50°	C	Co	ont. H -	110/50	°C
50	Series Star (V)	380	400	415	440	380	400	415	440	380	400	415	440	380	400	415	440
_	Parallel Star (V)	190	200	208	220	190	200	208	220	190	200	208	220	190	200	208	220
Hz	Series Delta (V)	220	230	240	254	220	230	240	254	220	230	240	254	220	230	240	254
	kVA	54.6	54.6	54.6	47.8	60.0	60.0	60.0	52.2	65.0	65.0	65.0	57.0	71.5	71.5	71.5	62.7
	kW	43.7	43.7	43.7	38.2	48.0	48.0	48.0	41.8	52.0	52.0	52.0	45.6	57.2	57.2	57.2	50.2
	Efficiency (%)	91.1	91.1	91.2	91.2	90.9	91.0	91.1	91.2	90.7	90.9	91.0	91.1	90.5	90.7	90.8	91.1
	kW Input	47.9	47.9	47.9	44.2	52.8	52.7	52.7	48.2	57.3	57.2	57.1	52.7	63.2	63.1	63.0	58.0
6	Series Star (V)	416	440	460	480	416	440	460	480	416	440	460	480	416	440	460	480
H	Parallal Star (\/)	208	220	230	240	208	220	230	240	208	220	230	240	208	220	230	240
' '2	Delta (V)	240	254	266	277	240	254	266	277	240	254	266	277	240	254	266	277
	kVA	60.0	66.0	68.0	68.0	62.5	68.8	75.0	75.0	75.0	78.8	81.3	81.3	84.5	87.0	91.0	92.0
	kW	48.0	52.8	54.4	54.4	50.0	55.0	60.0	60.0	60.0	63.0	65.0	65.0	67.6	69.6	72.8	73.6
	Efficiency (%)	91.6	91.6	91.7	91.7	91.6	91.6	91.6	91.7	91.2	91.3	91.4	91.6	90.9	91.1	91.2	91.3
	kW Input	52.4	57.6	59.3	59.3	54.6	60.1	65.5	65.4	65.8	69.0	71.2	71.0	74.4	76.4	79.8	80.6

DIMENSIONS









SINC	SLE BEARIN	NG ADAP	TORS	
ADAPTOR	A	В	С	D
SAE 1	859,3	796,3	359,3	191,3
SAE 2	845	782	345	177
SAE 3	845	782	345	177
SAE 4	845	782	345	177

COUPLING D	ISCS
DISC	AN
SAE 8	61,90
SAE 10	53,98
SAE 11,5	39,68
SAE 14	25,40



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