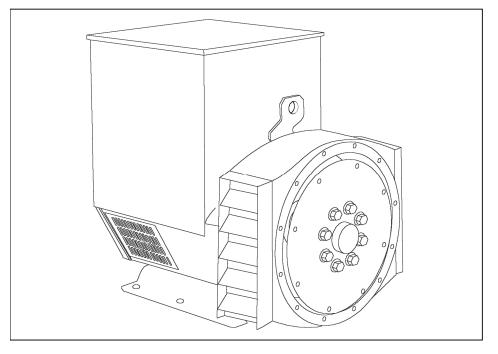


UCM274F - Winding 311

Technical Data Sheet



UCM274F 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 overexcitation, 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, threephase 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%.

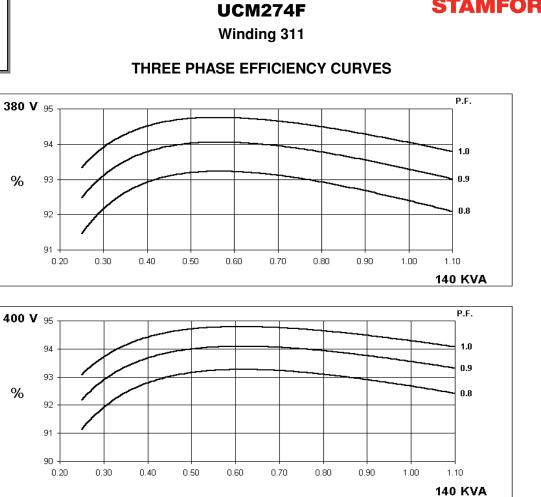
NB Continuous development of our products entitles us to change specification details without notice, therefore they must not be regarded as binding.

Front cover drawing typical of product range.



WINDING 311

N.Y.R. MX321 MX341 VOLTAGE REGULATION ± 0.5 % ± 1.0 %, With 4% ENGINE GOVERNING SUSTAINED SHORT CIRCUIT REFER TO SHORT CIRCUIT DECREMENT CURVES (page 7) SUSTAINED SHORT CIRCUIT REFER TO SHORT CIRCUIT DECREMENT CURVES (page 7) SUSTAINED SHORT CIRCUIT IP23 STATOR WINDING IP23 STATOR WINDING IP23 VINDING IEADS 12 STATOR WINDING IP32 VINDING IEADS 12 STATOR WIND, RESISTANCE 20 Ohms at 22 °C SCITER STATOR RESISTANCE 2.0.09 Ohms pER PHASE AT 22 °C SCITER NOTOR RESISTANCE 2.0.09 Ohms at 22 °C RALL SUPRESION BS EN 61000-6.2 & 8 BE EN 61000-6.4 V/DE GOTS, VEE GOTSN. rder to factory for others RALL BISTORTION NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%	CONTROL SYSTEM				••						
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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 VA BASE RATING FOR REACTANCE VALUES 140 140 140 N/A 156.3 162.5 162.5 168.8 Kd DIR. AXIS SYNCHRONOUS 1.96 1.77 1.65 - 2.18 2.03 1.86 1.77 K'd DIR. AXIS SYNCHRONOUS 1.96 1.77 1.65 - 2.18 2.03 1.86 1.77 K'd DIR. AXIS SUBTRANSIENT 0.17 0.15 0.14 - 0.18 0.17 0.15 0.15 K'd DIR. AXIS SUBTRANSIENT 0.11 0.11 0.10 - 0.12 0.11 0.10 0.10 K'q QUAD. AXIS REACTANCE 1.21 1.09 1.02 - 1.32 1.22 1.12 1.07 K'q QUAD. AXIS SUBTRANSIENT 0.15 0.13 0.12 0.17 0.16 0.15 0.14 K_LEAKAGE REACTANCE	COOLING AIR		0.514 m ³ /s	ec 1090 cfm		0.617 m ³ /sec 1308 cfm					
VOLTAGE SERIES DELTA 220/110 230/115 240/120 254/127 240/120 254/127 266/133 277/138 VA BASE RATING FOR REACTANCE VALUES 140 140 140 N/A 156.3 162.5 162.5 168.8 Kd DIR. AXIS SYNCHRONOUS 1.96 1.77 1.65 - 2.18 2.03 1.86 1.77 K'd DIR. AXIS SYNCHRONOUS 1.96 1.77 1.65 - 2.18 2.03 1.86 1.77 K'd DIR. AXIS SUBTRANSIENT 0.17 0.15 0.14 - 0.18 0.17 0.15 0.15 K'd DIR. AXIS SUBTRANSIENT 0.11 0.11 0.10 - 0.12 0.11 0.10 0.10 Kq QUAD. AXIS SUBTRANSIENT 0.15 0.13 0.12 - 1.32 1.22 1.12 1.07 K''q QUAD. AXIS SUBTRANSIENT 0.15 0.13 0.12 - 0.17 0.16 0.15 0.14 KLEAKAGE REACTANCE 0.06 0.05 0.05 -	VOLTAGE SERIES STAR	380/220	400/231	415/240	440/254	416/240	440/254	460/266	480/277		
AVA BASE RATING FOR REACTANCE VALUES 140 140 140 N/A 156.3 162.5 168.8 Xd DIR. AXIS SYNCHRONOUS 1.96 1.77 1.65 - 2.18 2.03 1.86 1.77 X'd DIR. AXIS SYNCHRONOUS 1.96 1.77 1.65 - 2.18 2.03 1.86 1.77 X'd DIR. AXIS SUBTRANSIENT 0.17 0.15 0.14 - 0.18 0.17 0.15 0.15 X'd DIR. AXIS SUBTRANSIENT 0.11 0.11 0.10 - 0.12 0.11 0.10 0.10 X'q QUAD. AXIS SUBTRANSIENT 0.15 0.13 0.12 - 1.32 1.22 1.12 1.07 X'q QUAD. AXIS SUBTRANSIENT 0.15 0.13 0.12 - 0.17 0.16 0.15 0.14 KLEAKAGE REACTANCE 0.06 0.05 0.05 - 0.08 0.07 0.07 Kal LEAKAGE REACTANCE 0.12 0.11 0.11 - 0.14 0.13 0.12 <td>VOLTAGE PARALLEL STAR</td> <td>190/110</td> <td>200/115</td> <td>208/120</td> <td>220/127</td> <td>208/120</td> <td>220/127</td> <td>230/133</td> <td>240/138</td>	VOLTAGE PARALLEL STAR	190/110	200/115	208/120	220/127	208/120	220/127	230/133	240/138		
REACTANCE VALUES 140 140 140 140 N/A 156.3 162.5 162.5 168.8 Xd DIR. AXIS SYNCHRONOUS 1.96 1.77 1.65 - 2.18 2.03 1.86 1.77 X'd DIR. AXIS SYNCHRONOUS 1.96 1.77 1.65 - 2.18 2.03 1.86 1.77 X'd DIR. AXIS SUBTRANSIENT 0.17 0.15 0.14 - 0.18 0.17 0.15 0.15 X'd DIR. AXIS SUBTRANSIENT 0.11 0.11 0.10 - 0.12 0.11 0.10 0.10 X'q QUAD. AXIS SUBTRANSIENT 0.15 0.13 0.12 - 1.32 1.22 1.12 1.07 X'q QUAD. AXIS SUBTRANSIENT 0.15 0.13 0.12 - 0.17 0.16 0.15 0.14 XL LEAKAGE REACTANCE 0.06 0.05 0.05 - 0.08 0.07 0.07 Xe NEGATIVE SEQUENCE 0.12 0.11 0.11 - 0.14 0.13 0.12 0.11 Xo ZERO SEQUENCE 0.07 0.07 0.	VOLTAGE SERIES DELTA	220/110	230/115	240/120	254/127	240/120	254/127	266/133	277/138		
Xd DIR. AXIS SYNCHRONOUS 1.96 1.77 1.65 - 2.18 2.03 1.86 1.77 X'd DIR. AXIS TRANSIENT 0.17 0.15 0.14 - 0.18 0.17 0.15 0.15 X'd DIR. AXIS SUBTRANSIENT 0.11 0.11 0.10 - 0.12 0.11 0.10 0.10 X'd DIR. AXIS SUBTRANSIENT 0.11 0.11 0.10 - 0.12 0.11 0.10 0.10 X'd QUAD. AXIS REACTANCE 1.21 1.09 1.02 - 1.32 1.22 1.12 1.07 X'q QUAD. AXIS SUBTRANSIENT 0.15 0.13 0.12 - 0.17 0.16 0.15 0.14 XLLEAKAGE REACTANCE 0.06 0.05 0.05 - 0.08 0.07 0.07 Xe NEGATIVE SEQUENCE 0.12 0.11 0.11 - 0.14 0.13 0.12 0.11 Xe NEGATIVE SEQUENCE 0.07 0.07 0.06 - 0.09 0.08 0.08 0.07 Ye NEACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATEU <td>KVA BASE RATING FOR</td> <td>140</td> <td>140</td> <td>140</td> <td>N/A</td> <td>156.3</td> <td>162.5</td> <td>162.5</td> <td>168.8</td>	KVA BASE RATING FOR	140	140	140	N/A	156.3	162.5	162.5	168.8		
K'd DIR. AXIS TRANSIENT 0.17 0.15 0.14 - 0.18 0.17 0.15 0.15 K''d DIR. AXIS SUBTRANSIENT 0.11 0.11 0.10 - 0.12 0.11 0.10 0.10 K''d DIR. AXIS SUBTRANSIENT 0.11 0.11 0.10 - 0.12 0.11 0.10 0.10 K''d QUAD. AXIS REACTANCE 1.21 1.09 1.02 - 1.32 1.22 1.12 1.07 K''q QUAD. AXIS SUBTRANSIENT 0.15 0.13 0.12 - 0.17 0.16 0.15 0.14 KLEAKAGE REACTANCE 0.06 0.05 0.05 - 0.08 0.07 0.07 K2 NEGATIVE SEQUENCE 0.12 0.11 0.11 - 0.14 0.13 0.12 0.11 K0 ZERO SEQUENCE 0.07 0.07 0.06 - 0.09 0.08 0.08 0.07 REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED - - 1.01 s - - 1.01 s - - - 1.02 s - -		1.96	1.77	1.65	-	2.18	2.03	1.86	1.77		
Kq QUAD. AXIS REACTANCE 1.21 1.09 1.02 - 1.32 1.22 1.12 1.07 K"q QUAD. AXIS SUBTRANSIENT 0.15 0.13 0.12 - 0.17 0.16 0.15 0.14 KLEAKAGE REACTANCE 0.06 0.05 0.05 - 0.08 0.07 0.07 0.07 KLEAKAGE REACTANCE 0.12 0.11 0.11 - 0.14 0.13 0.12 0.11 KLEAKAGE REACTANCE 0.06 0.05 0.05 - 0.08 0.07 0.07 K2 NEGATIVE SEQUENCE 0.12 0.11 0.11 - 0.14 0.13 0.12 0.11 K02ERO SEQUENCE 0.07 0.07 0.06 - 0.09 0.08 0.08 0.07 REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED - - 0.035 s - <	X'd DIR. AXIS TRANSIENT				-						
X ⁿ q QUAD. AXIS SUBTRANSIENT 0.15 0.13 0.12 - 0.17 0.16 0.15 0.14 KL LEAKAGE REACTANCE 0.06 0.05 0.05 - 0.08 0.07 0.07 0.07 K2 NEGATIVE SEQUENCE 0.12 0.11 0.11 - 0.14 0.13 0.12 0.11 K0 ZERO SEQUENCE 0.07 0.07 0.06 - 0.09 0.08 0.08 0.07 REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED 0.035 s -	X"d DIR. AXIS SUBTRANSIENT	0.11	0.11	0.10	-	0.12	0.11	0.10	0.10		
KLLEAKAGE REACTANCE 0.06 0.05 0.05 - 0.08 0.07 0.07 0.07 K2 NEGATIVE SEQUENCE 0.12 0.11 0.11 - 0.14 0.13 0.12 0.11 K2 NEGATIVE SEQUENCE 0.07 0.07 0.06 - 0.09 0.08 0.07 K2 NEGATIVE SEQUENCE 0.07 0.07 0.06 - 0.09 0.08 0.07 K2 NEGATIVE SEQUENCE 0.07 0.07 0.06 - 0.09 0.08 0.08 0.07 REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED 0.035 s - <td< td=""><td>Xq QUAD. AXIS REACTANCE</td><td>1.21</td><td>1.09</td><td>1.02</td><td>-</td><td>1.32</td><td>1.22</td><td>1.12</td><td>1.07</td></td<>	Xq QUAD. AXIS REACTANCE	1.21	1.09	1.02	-	1.32	1.22	1.12	1.07		
K2 NEGATIVE SEQUENCE 0.12 0.11 0.11 - 0.14 0.13 0.12 0.11 K0 ZERO SEQUENCE 0.07 0.07 0.06 - 0.09 0.08 0.08 0.07 REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED 0.035 s -	X"q QUAD. AXIS SUBTRANSIENT				-						
X0ZERO SEQUENCE 0.07 0.07 0.06 - 0.09 0.08 0.07 REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED I'd TRANSIENT TIME CONST. 0.035 s I''d SUB-TRANSTIME CONST. 0.011 s I''d O.C. FIELD TIME CONST. 0.9 s I'' d ARMATURE TIME CONST. 0.09 s											
REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED I'd TRANSIENT TIME CONST. 0.035 s I'd SUB-TRANSTIME CONST. 0.011 s I'd O.C. FIELD TIME CONST. 0.9 s Ia ARMATURE TIME CONST. 0.009 s					-						
I'd TRANSIENT TIME CONST. 0.035 s I'd SUB-TRANSTIME CONST. 0.011 s I'd O.C. FIELD TIME CONST. 0.9 s Ia ARMATURE TIME CONST. 0.009 s											
I''d SUB-TRANSTIME CONST. 0.011 s O.C. FIELD TIME CONST. 0.9 s Ta ARMATURE TIME CONST. 0.009 s	T'd TRANSIENT TIME CONST.		•								
I'do O.C. FIELD TIME CONST. 0.9 s Ta ARMATURE TIME CONST. 0.009 s	T"d SUB-TRANSTIME CONST.										
	T'do O.C. FIELD TIME CONST.	1									
SHORT CIRCUIT RATIO 1/Xd	Ta ARMATURE TIME CONST.				0.0	09 s					
	SHORT CIRCUIT RATIO				1/	Xd					

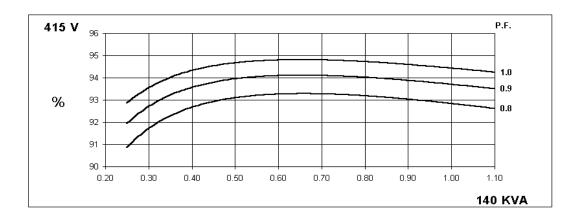


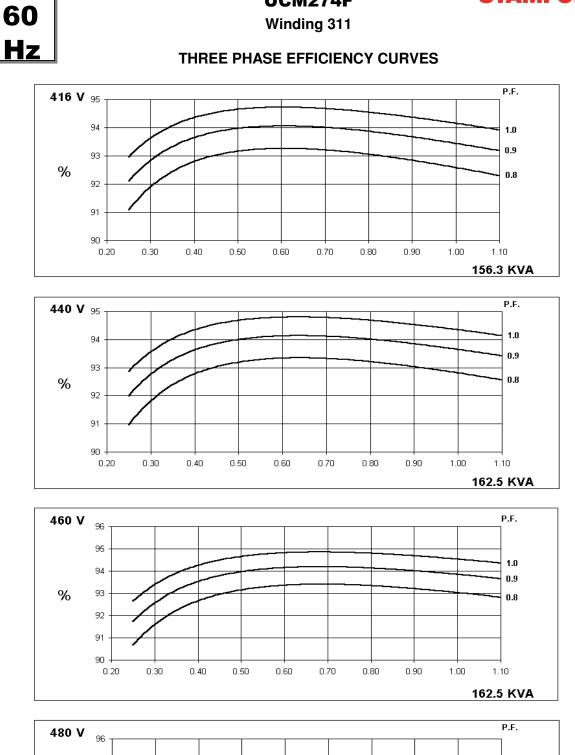
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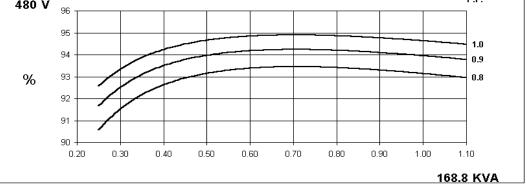
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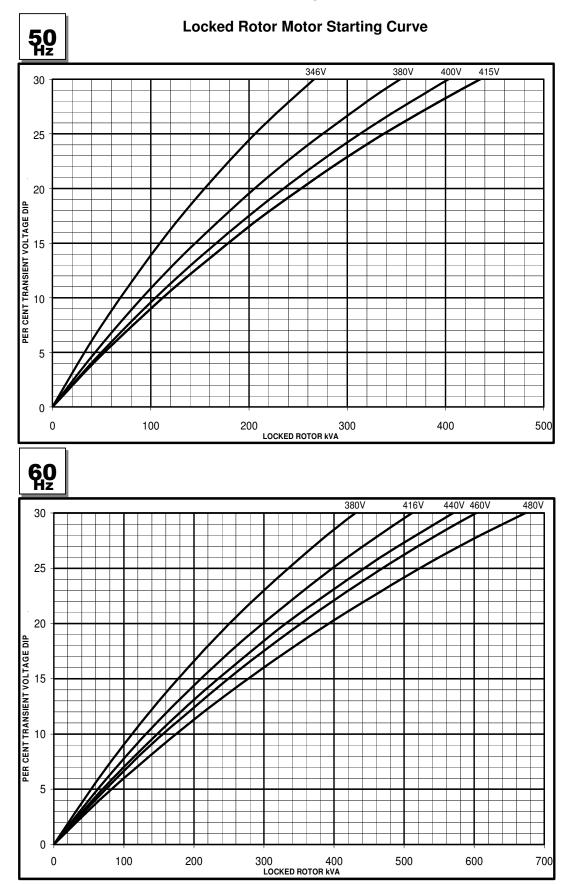


STAMFORD

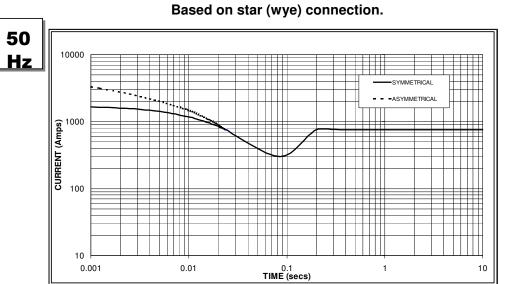




Winding 311

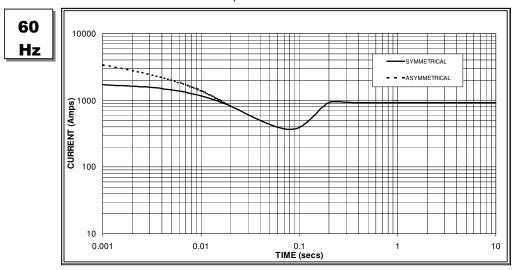






Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed





Sustained Short Circuit = 920 Amps

Note 1

The following multiplication factors should be used to adjust the values from curve between time 0.001 seconds and the minimum current point in respect of nominal operating voltage :

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			
		480v	X 1.17			

The sustained current value is constant irrespective of voltage level

The alternator is capable of delivering 300% shortcircuit current for 10 seconds as per requirements specified by marine agencies.

Note 2

Note 3

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								

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

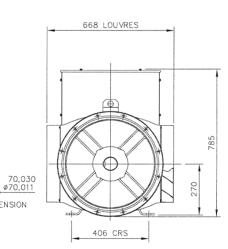
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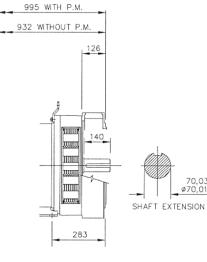
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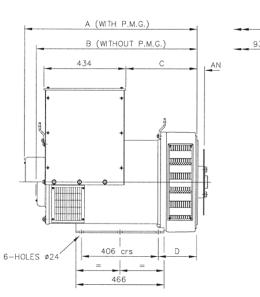
Winding 311 / 0.8 Power Factor

RATINGS

				05/500	•			70/500	0			00/500	~	0		110/50	
	Class - Temp Rise	C	Cont. E -	65/50 ⁹	C	C	ont. B -	· 70/50°	C	C	Cont. F -	90/50%	U	C	ont. H -	110/50	Ű
5(Series Star (V)	380	400	415	440	380	400	415	440	380	400	415	440	380	400	415	440
Hz	Parallel Star (V)	190	200	208	220	190	200	208	220	190	200	208	220	190	200	208	220
2	Series Delta (V)	220	230	240	254	220	230	240	254	220	230	240	254	220	230	240	254
	kVA	110.0	110.0	110.0	N/A	112.5	112.5	112.5	N/A	135.0	135.0	135.0	N/A	140.0	140.0	140.0	N/A
	kW	88.0	88.0	88.0	N/A	90.0	90.0	90.0	N/A	108.0	108.0	108.0	N/A	112.0	112.0	112.0	N/A
	Efficiency (%)	93.0	93.1	93.2	N/A	92.9	93.1	93.2	N/A	92.5	92.8	92.9	N/A	92.4	92.7	92.8	N/A
	kW Input	94.6	94.5	94.4	N/A	96.9	96.7	96.6	N/A	116.8	116.4	116.3	N/A	121.2	120.8	120.7	N/A
						1											
60	Series Star (V)	416	440	460	480	416	440	460	480	416	440	460	480	416	440	460	480
Hz	Parallal Star (\/)	208	220	230	240	208	220	230	240	208	220	230	240	208	220	230	240
	- Series Delta (V)	240	254	266	277	240	254	266	277	240	254	266	277	240	254	266	277
	kVA	125.0	131.3	137.5	137.5	131.3	137.5	143.8	143.8	150.0	156.0	163.0	163.0	156.3	162.5	167.5	168.8
	kW	100.0	105.0	110.0	110.0	105.0	110.0	115.0	115.0	120.0	124.8	130.4	130.4	125.0	130.0	134.0	135.0
	Efficiency (%)	93.0	93.2	93.3	93.4	93.0	93.1	93.2	93.4	92.7	92.9	93.0	93.2	92.6	92.8	93.0	93.1
	kW Input	107.5	112.7	117.9	117.8	112.9	118.2	123.4	123.2	129.4	134.3	140.2	139.9	135.0	140.1	144.1	145.0







[SING	LE BEARI	COUPLING DISCS				
	ADAPTOR	A	В	С	D	DISC	AN
	SAE 1	928,3	865,3	389,3	216,3	SAE 10 5	3,98
	SAE 2	914	851	375	202	SAE 11,5 3	9,68
ſ	SAE 3	914	851	375	202	SAE 14 2	5,40

DIMENSIONS



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