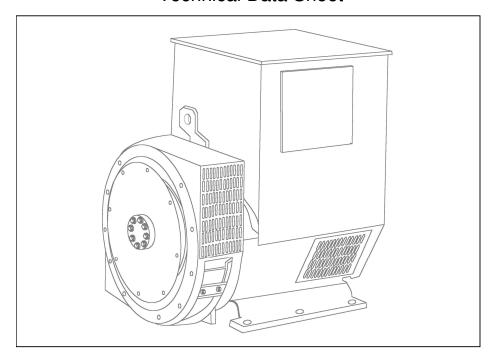
STAMFORD®

UCDI274K - Winding 311

Technical Data Sheet



UCDI274K

STAMFORD

SPECIFICATIONS & OPTIONS

STANDARDS

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 - OBSOLETE

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 - STANDARD

With this self-excited system the main stator provides power via the 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 threephase 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.

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%.

DE RATES

All values tabulated on page 8 are subject to the following reductions

5% when air inlet filters are fitted.

3% for every 500 metres by which the operating altitude exceeds 1000 metres above mean sea level.

3% for every 5°C by which the operational ambient temperature exceeds 40°C.

Note: Requirement for operating in an ambient exceeding 60°C must be referred to the factory.

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.

UCDI274K

WINDING 311

CONTROL SYSTEM	WINDING 311												
VOLTAGE REGULATION	CONTROL SYSTEM	SEPARATELY EXCITED BY P.M.G.											
SUSTAINED SHORT CIRCUIT	A.V.R.	MX321 MX341											
CONTROL SYSTEM A.V.R. SX460 A.V.R. SX460 A.S.440 VOLTAGE REQULATION ± 1.0 % ± 1.0 % With 4% ENGINE GOVERNING SUSTAINED SHORT CIRCUIT SERIES 4 CONTROL DOES NOT SUSTAIN A SHORT CIRCUIT CURRENT INSULATION SYSTEM PROTECTION IP23 RATED POWER FACTOR 0.8 STATOR WINDING DOUBLE LAYER CONCENTRIC WINDING FITCH TWO THIRDS WINDING LEADS 12 STATOR WINDING STORM WINDING LEADS 12 STATOR WINDING LEADS 12 STATOR WINDING STORM ROTOR WOD, RESISTANCE 2.00 Ohms at 22°C EXCITER STATOR RESISTANCE EXCITER STATOR RESISTANCE EXCITER STATOR RESISTANCE 1.1 SUPPRESSION BS EN 61000-8-2 & BS EN 61000-8-4, 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 NON-DOINE END BEALE 6310-2RS (ISO) WEIGHT WOUND ROTOR WEIGHT BURNESS WIND ROTOR WEIGHT WOUND ROTOR WEIGHT W	VOLTAGE REGULATION	± 0.5 %	± 1.0 %	With 4% EN	:NING								
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kVA BASE RATING FOR REACTANCE VALUES 250 250 250 N/A 291 299 312.5 312.5 Xd DIR. AXIS SYNCHRONOUS 2.825 2.550 2.369 - 3.161 2.903 2.776 2.550 X'd DIR. AXIS TRANSIENT 0.132 0.119 0.111 - 0.148 0.136 0.130 0.119 X"d DIR. AXIS SUBTRANSIENT 0.086 0.078 0.072 - 0.097 0.089 0.085 0.078 Xq QUAD. AXIS REACTANCE 1.263 1.140 1.059 - 1.413 1.298 1.241 1.140 X"q QUAD. AXIS SUBTRANSIENT 0.152 0.137 0.127 - 0.170 0.156 0.149 0.137 XL LEAKAGE REACTANCE 0.066 0.060 0.056 - 0.074 0.068 0.065 0.060 X2 NEGATIVE SEQUENCE 0.120 0.108 0.100 - 0.134 0.123 0.118 0.108 X0 ZERO SEQUENCE 0.022 0.020 0.019													
VALUES 250 250 250 N/A 291 299 312.5 312.5 Xd DIR. AXIS SYNCHRONOUS 2.825 2.550 2.369 - 3.161 2.903 2.776 2.550 X'd DIR. AXIS TRANSIENT 0.132 0.119 0.111 - 0.148 0.136 0.130 0.119 X"d DIR. AXIS SUBTRANSIENT 0.086 0.078 0.072 - 0.097 0.089 0.085 0.078 Xq QUAD. AXIS REACTANCE 1.263 1.140 1.059 - 1.413 1.298 1.241 1.140 X"q QUAD. AXIS SUBTRANSIENT 0.152 0.137 0.127 - 0.170 0.156 0.149 0.137 XL LEAKAGE REACTANCE 0.066 0.060 0.056 - 0.074 0.068 0.065 0.060 X2 NEGATIVE SEQUENCE 0.120 0.108 0.100 - 0.134 0.123 0.118 0.108 X0 ZERO SEQUENCE 0.022 0.020 0.019 - 0.02		220/110	230/115	240/120	254/127	240/120	254/127	266/133	277/138				
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Xq QUAD. AXIS REACTANCE 1.263 1.140 1.059 - 1.413 1.298 1.241 1.140 X"q QUAD. AXIS SUBTRANSIENT 0.152 0.137 0.127 - 0.170 0.156 0.149 0.137 XL LEAKAGE REACTANCE 0.066 0.060 0.056 - 0.074 0.068 0.065 0.060 X2 NEGATIVE SEQUENCE 0.120 0.108 0.100 - 0.134 0.123 0.118 0.108 X0 ZERO SEQUENCE 0.022 0.020 0.019 - 0.025 0.023 0.022 0.020 REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED T'd TRANSIENT TIME CONST. 0.049 s T'd SUB-TRANSTIME CONST. 0.02 s T'do O.C. FIELD TIME CONST. 1.27 s Ta ARMATURE TIME CONST. 0.018 s	X'd DIR. AXIS TRANSIENT	0.132	0.119	0.111	-	0.148	0.136	0.130	0.119				
X"q QUAD. AXIS SUBTRANSIENT 0.152 0.137 0.127 - 0.170 0.156 0.149 0.137 XL LEAKAGE REACTANCE 0.066 0.060 0.056 - 0.074 0.068 0.065 0.060 X2 NEGATIVE SEQUENCE 0.120 0.108 0.100 - 0.134 0.123 0.118 0.108 X0 ZERO SEQUENCE 0.022 0.020 0.019 - 0.025 0.023 0.022 0.020 REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED T'd TRANSIENT TIME CONST. 0.049 s T''d SUB-TRANSTIME CONST. 0.02 s T''do O.C. FIELD TIME CONST. 1.27 s Ta ARMATURE TIME CONST. 0.018 s	X"d DIR. AXIS SUBTRANSIENT	0.086 0.078 0.072 - 0.097						0.085	0.078				
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Ta ARMATURE TIME CONST. 0.018 s		<u> </u>											
SHORT CIRCUIT RATIO 1/Xd					0.01	8 s							
	SHORT CIRCUIT RATIO	<u></u>			1/>	(d							

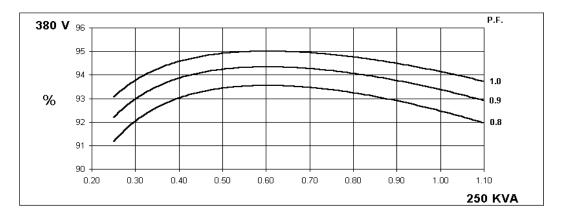
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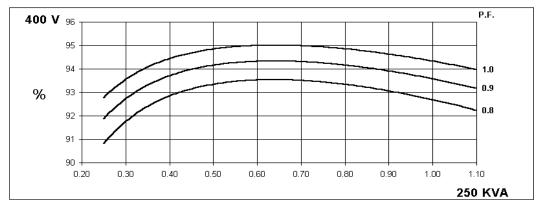
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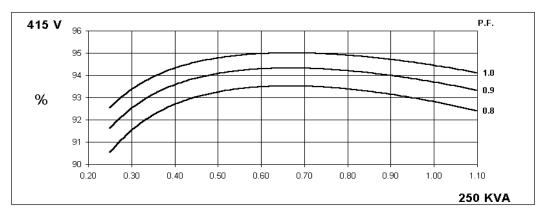
STAMFORD

Winding 311

THREE PHASE EFFICIENCY CURVES





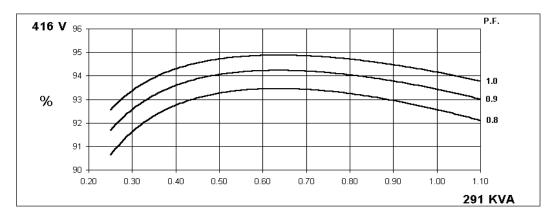


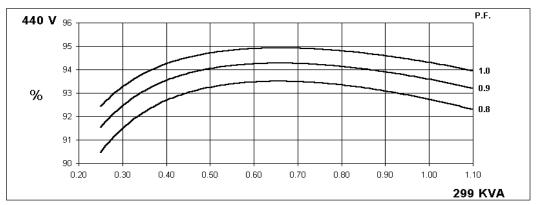
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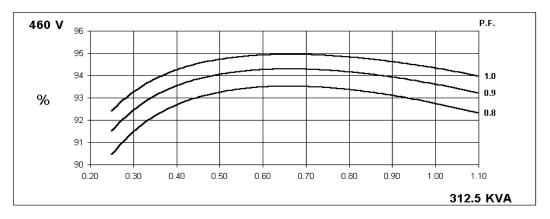
UCDI274K Winding 311

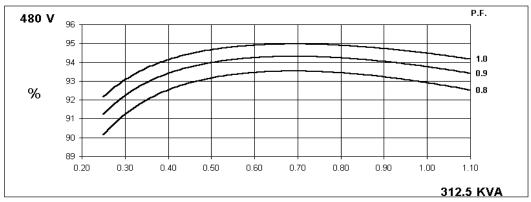
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THREE PHASE EFFICIENCY CURVES





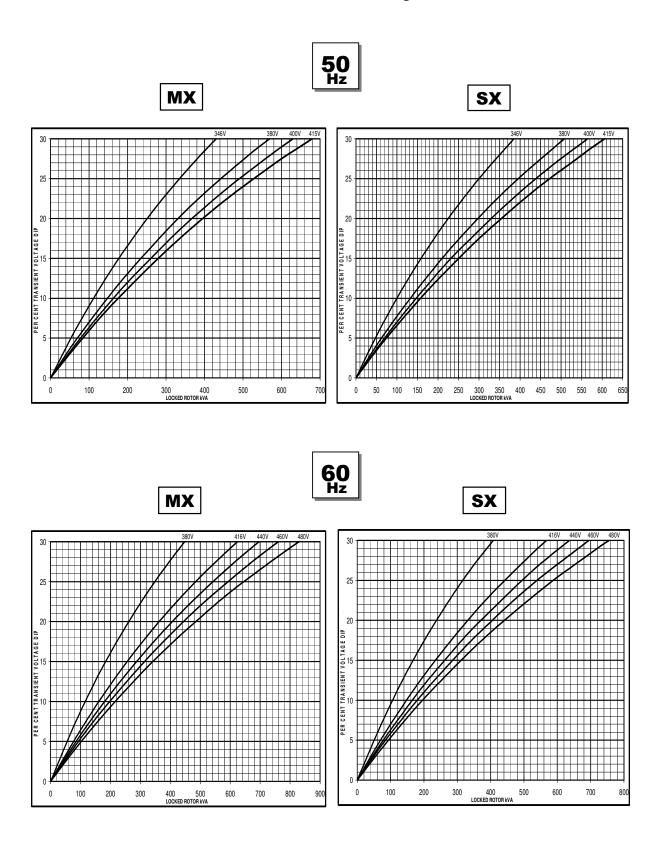




UCDI274K

Winding 311

Locked Rotor Motor Starting Curve

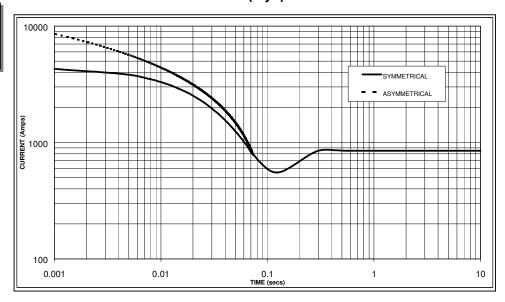




Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed Based on star (wye) connection.

50

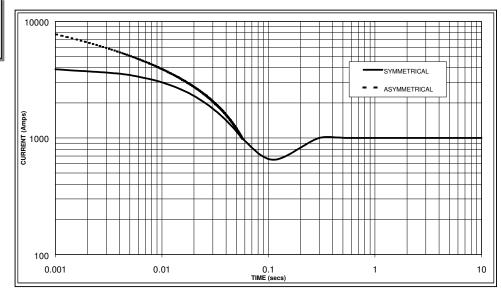
Hz



Sustained Short Circuit = 850 Amps



Hz



Sustained Short Circuit = 1,000 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 1.05	440v	X 1.07					
415v	X 1.10	460v	X 1.12					
		480v	X 1.16					

The sustained current value is constant irrespective of voltage level

This alternator is capable of achieving a balanced 300% sustained short circuit for up to 10 seconds.

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

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UCDI274K

Winding 311 / 0.8 Power Factor

RATINGS

	Class - Temp Rise	Cont. F - 105/40℃			Cont. H - 125/40 ℃			Standby - 150/40 ℃				Standby - 163/27℃					
50	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
1 12	Series Delta (V)	220	230	240	254	220	230	240	254	220	230	240	254	220	230	240	254
	kVA	229.0	229.0	229.0	N/A	250.0	250.0	250.0	N/A	265.0	265.0	265.0	N/A	275.0	275.0	275.0	N/A
	kW	183.2	183.2	183.2	N/A	200.0	200.0	200.0	N/A	212.0	212.0	212.0	N/A	220.0	220.0	220.0	N/A
	Efficiency (%)	92.8	93.0	93.1	N/A	92.5	92.7	92.8	N/A	92.2	92.4	92.6	N/A	92.0	92.2	92.4	N/A
	kW Input	197.4	197.0	196.8	N/A	216.2	215.7	215.5	N/A	229.9	229.4	228.9	N/A	239.1	238.6	238.1	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
	Series Delta (V)	240	254	266	277	240	254	266	277	240	254	266	277	240	254	266	277
	kVA	267.0	275.0	286.5	288.0	291.0	299.0	312.5	312.5	304.0	312.5	331.3	331.3	312.0	320.0	343.8	343.8
	kW	213.6	220.0	229.2	230.4	232.8	239.2	250.0	250.0	243.2	250.0	265.0	265.0	249.6	256.0	275.0	275.0
	Efficiency (%)	92.9	93.0	93.1	93.2	92.6	92.7	92.8	92.9	92.4	92.6	92.5	92.7	92.2	92.4	92.3	92.5
	kW Input	229.9	236.6	246.2	247.3	251.4	258.0	269.4	269.1	263.2	270.0	286.5	285.9	270.7	277.1	298.0	297.3

Dimensional and Torsional Drawing

For dimensional and torsional information please refer to the alternator General Arrangement and rotor drawings available on our website (http://stamford-avk.com/)

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