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S4L1S-E4 Wdg.06 - Technical Data Sheet

Standards

STAMFORD industrial alternators meet the requirements of the relevant parts of the BS EN 60034 and the relevant section of other international standards such as BS5000, VDE 0530, NEMA MG1-32, IEC34, CSA C22.2-100 and AS1359. Other standards and certifications can be considered on request.

Quality Assurance

Alternators are manufactured using production procedures having a quality assurance level to BS EN ISO 9001.

Excitation and Voltage Regulators

Excitation System					
AVR Type	AS440	MX341	MX321		
Voltage Regulation	± 1%	± 1%	± 0.5%		with 4% Engine Governing
AVR Power	Self-Excited	PMG	PMG		

No Load Excitation Voltage (V)	10
No Load Excitation Current (A)	0.56
Full Load Excitation Voltage (V)	42
Full Load Excitation Current (A)	2.3
Exciter Time Constant (seconds)	0.105

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Electrical Data			
Insulation System	Class H		
Stator Winding	Single Layer Concentric		
Winding Pitch	Two Thirds		
Winding Leads	4		
Winding Number	06		
Number of Poles	4		
IP Rating	IP23		
RFI 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%		
Short Circuit Ratio	1/Xd		
Steady State X/R Ratio	7.5448		
	60 Hz		
Telephone Interference	TIF<50		
Cooling Air	0.99 m³/sec		
Voltage Star	220	230	240
kVA Base Rating (Class H) for Reactance Values	200	200	200
Saturated Values in Per Unit at Base Ratings and Voltages			
Xd Dir. Axis Synchronous	2.84	2.60	2.39
X'd Dir. Axis Transient	0.18	0.16	0.15
X"d Dir. Axis Subtransient	0.12	0.11	0.10
Xq Quad. Axis Reactance	2.39	2.19	2.01
X"q Quad. Axis Subtransient	0.33	0.30	0.28
XL Stator Leakage Reactance	0.07	0.07	0.06
X2 Negative Sequence Reactance	0.23	0.21	0.19
X0 Zero Sequence Reactance	0.07	0.07	0.06
Unsaturated Values in Per Unit at Base Ratings and Voltages			
Xd Dir. Axis Synchronous	3.41	3.12	2.87
X'd Dir. Axis Transient	0.21	0.19	0.17
X"d Dir. Axis Subtransient	0.14	0.13	0.12
Xq Quad. Axis Reactance	2.46	2.25	2.07
X"q Quad. Axis Subtransient	0.40	0.37	0.34
XL Stator Leakage Reactance	0.08	0.07	0.07
X2 Negative Sequence Reactance	0.27	0.25	0.23
X0 Zero Sequence Reactance	0.08	0.08	0.07

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Time Constants (Seconds)		
T'd TRANSIENT TIME CONST.	0.08	
T''d SUB-TRANSTIME CONST.	0.019	
T'do O.C. FIELD TIME CONST.	1.7	
Ta ARMATURE TIME CONST.	0.018	
T''q SUB-TRANSTIME CONST.	0.03	
Resistances in Ohms (Ω) at 22°C		
Stator Winding Resistance (Ra), per phase for series connected	0.0037	
Rotor Winding Resistance (Rf)	1.19	
Exciter Stator Winding Resistance	18	
Exciter Rotor Winding Resistance per phase	0.068	
PMG Phase Resistance (Rpmg) per phase	1.9	
Positive Sequence Resistance (R1)	0.005	
Negative Sequence Resistance (R2)	0.005	
Zero Sequence Resistance (R0)	0.005	
Saturation Factors	240V	
SG1.0	N/A	
SG1.2	N/A	
Mechanical Data		
Shaft and Keys	All alternator 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.	
	1 Bearing	2 Bearings
Moment of Inertia	4.6331 kgm^2	4.4343 kgm^2
Weight Wound Stator	470kg	470kg
Weight Wound Rotor	400kg	377kg
Weight Complete Alternator	1024kg	1030kg
Shipping weight in a Crate	1095kg	1100kg
Packing Crate Size	155 x 87 x 107 (cm)	155 x 87 x 107 (cm)
Maximum Over Speed	2250 RPM for two minutes	
Bearing Drive End	N/A	Ball 6317
Bearing Non-Drive End	Ball 6314	Ball 6314

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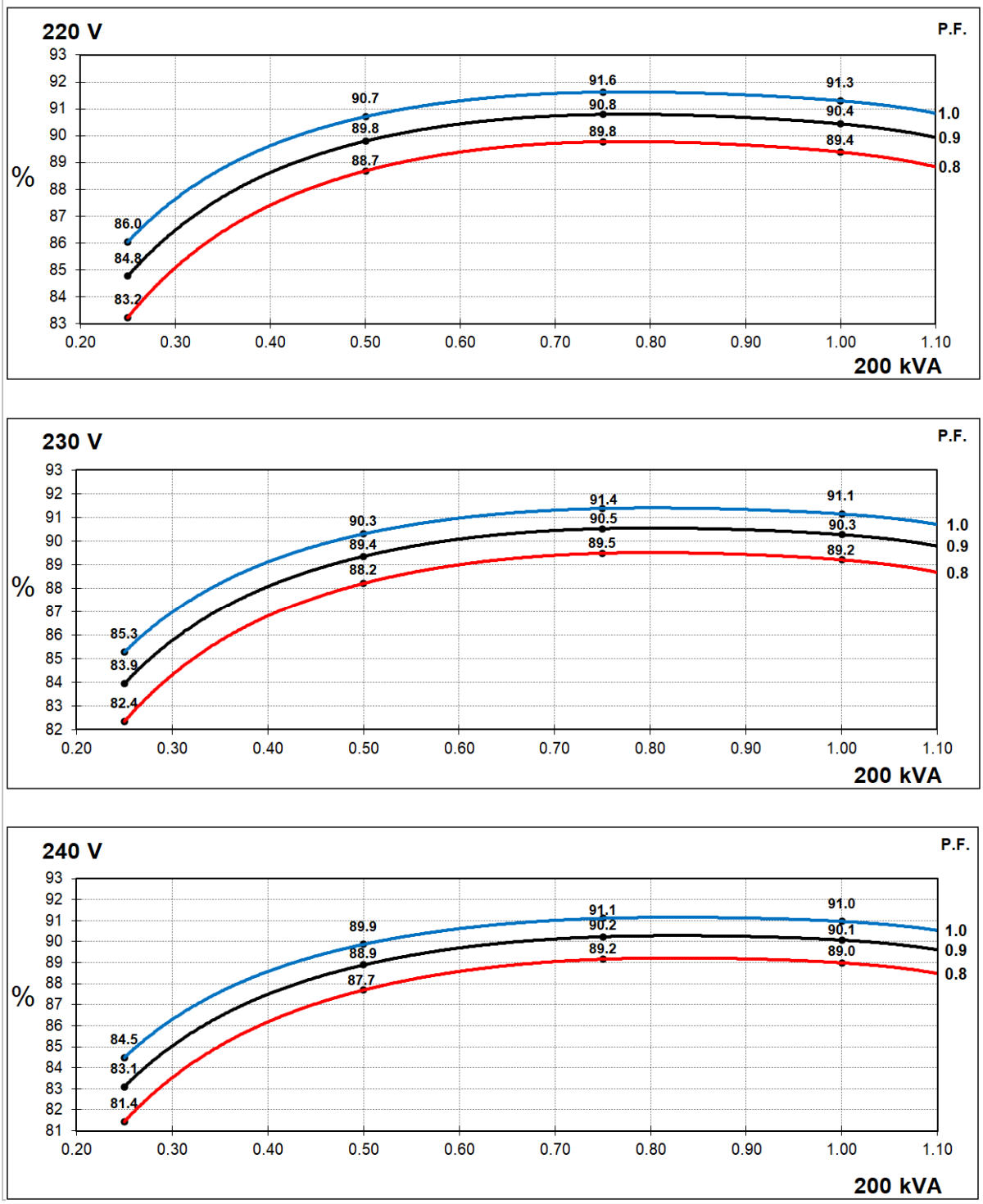
SINGLE PHASE EFFICIENCY CURVES

60Hz



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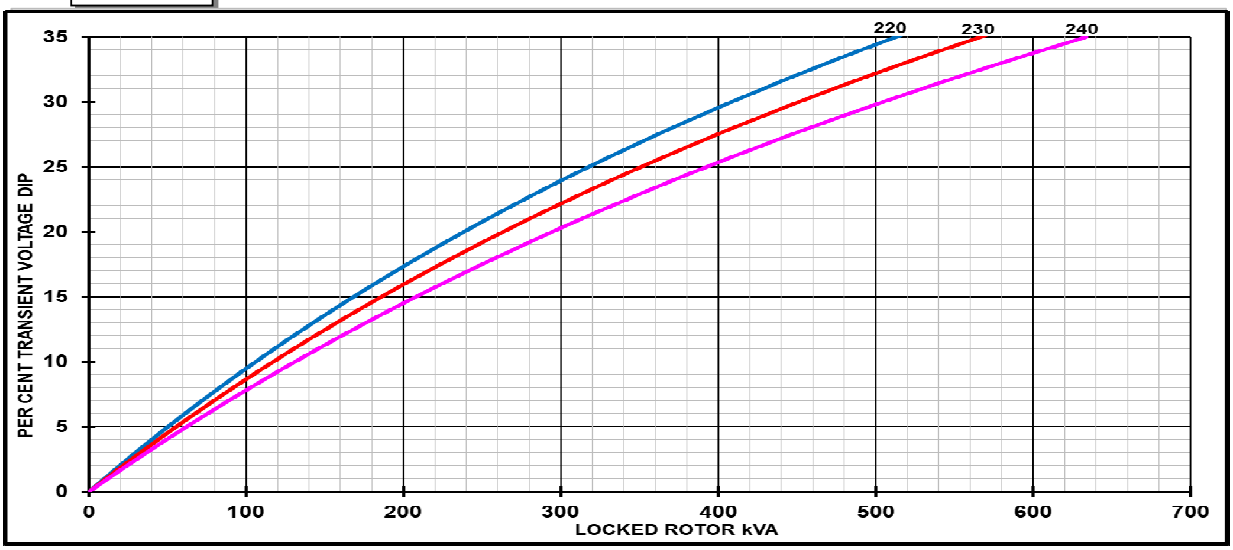
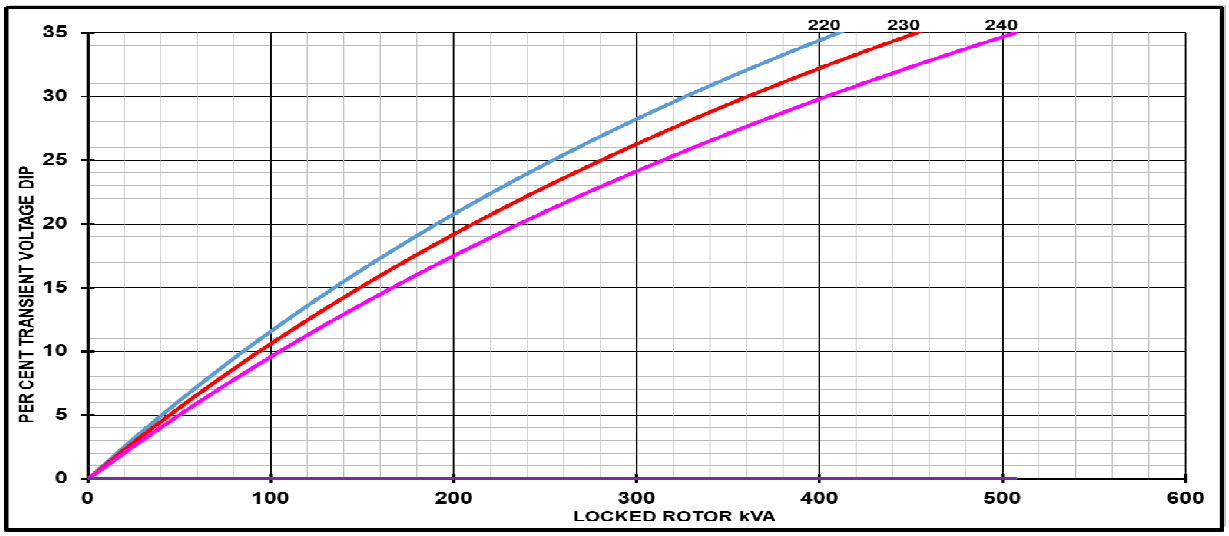
Locked Rotor Motor Starting Curves - Separately Excited

60Hz



Locked Rotor Motor Starting Curves - Self Excited



Transient Voltage Dip Scaling Factor		Transient Voltage Rise Scaling Factor
PF	Factor	For voltage rise multiply voltage dip by 1.25
< 0.5	1	
0.5	0.97	
0.6	0.93	
0.7	0.9	
0.8	0.85	
0.9	0.83	

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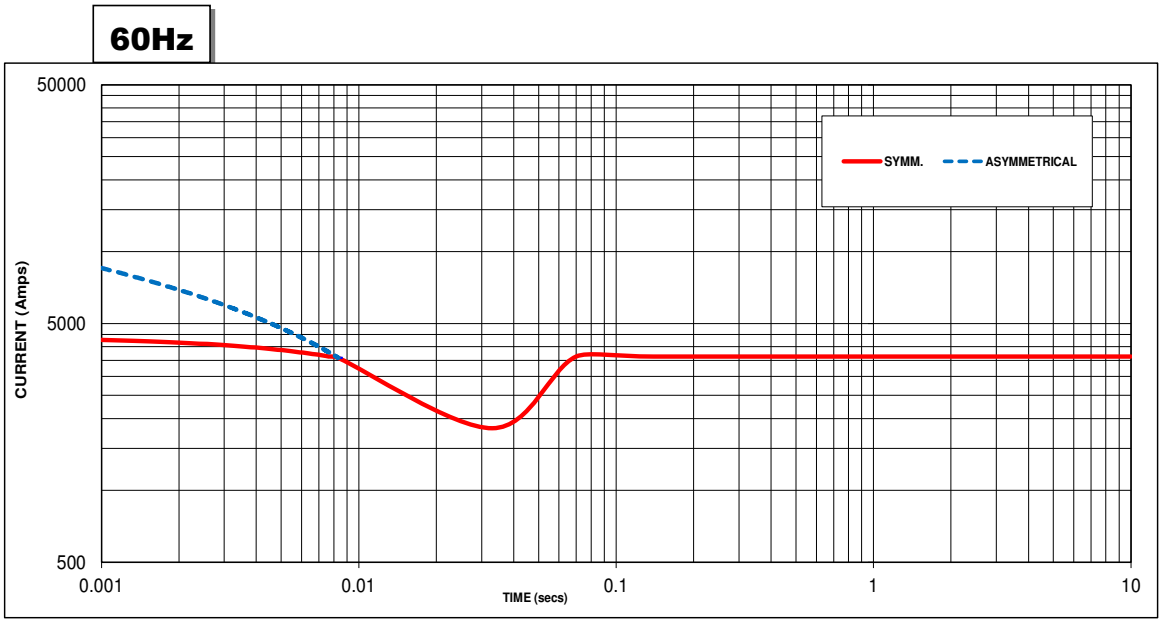
Three-phase Short Circuit Decrement Curve



Sustained Short Circuit = 3640 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 :

60Hz	
Voltage	Factor
220V	X 1.00
230V	X 1.05
240V	X 1.09
0	

The sustained current value is constant irrespective of voltage level

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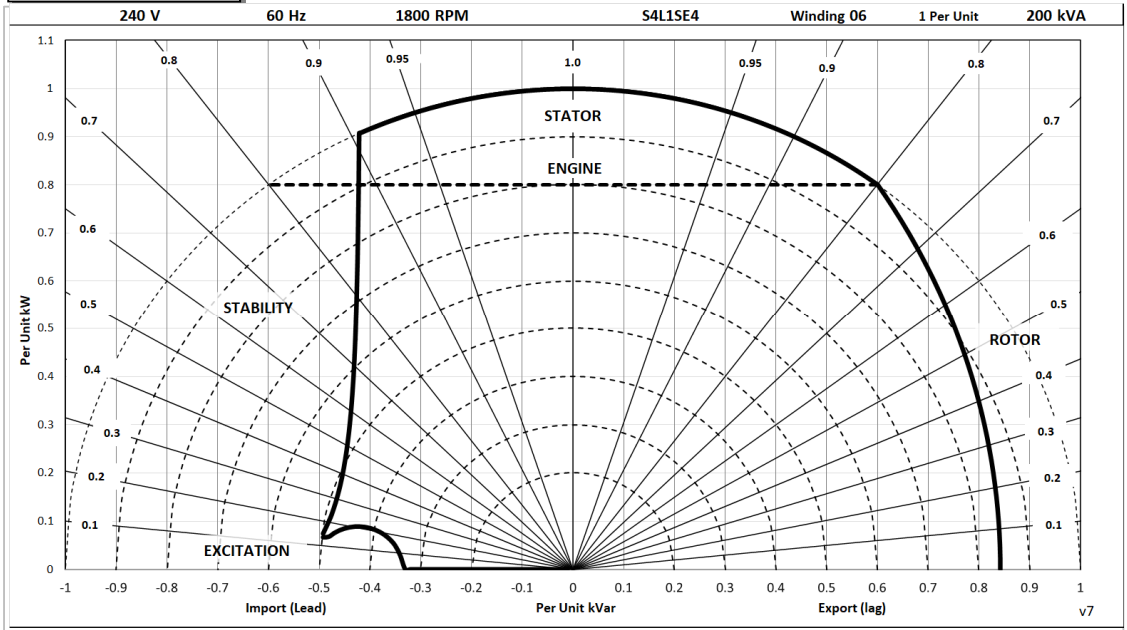
Typical Alternator Operating Chart

240V/60Hz



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RATINGS AT 0.8 POWER FACTOR

	Class - Temp Rise	Cont. H - 125/40°C (0.8 PF)			Cont. F - 105/40°C (0.8 PF)			Cont. H - 125/40°C (1.0 PF)			Cont. F - 105/40°C (1.0 PF)		
60 Hz	Series Star (V)	220	230	240	220	230	240	220	230	240	220	230	240
	kVA	200	200	200	183	183	183	200	200	200	183	183	183
	kW	160	160	160	146	146	146	200	200	200	183	183	183
	Efficiency (%)	89.4	89.2	89.0	89.7	89.4	89.1	91.3	91.1	91.0	91.4	91.3	91.0
	kW Input	179	179	180	163	163	164	219	220	220	200	200	201

De-Rates

All values tabulated above are subject to the following reductions:

- 5% when air inlet filters are fitted
- 3% for every 500 meters by which the operating altitude exceeds 1000 meters above mean sea level
- 3% for every 5°C by which the operational ambient temperature exceeds 40°C
- For any other operating conditions impacting the cooling circuit please refer to applications

Note: Requirement for operating in an ambient exceeding 60°C and altitude exceeding 4000 meters must be referred to applications.

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/)

Note: Continuous development of our products means that the information contained in our data sheets can change without notice, and specifications should always be confirmed with Cummins Generator Technologies prior to purchase.

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