S7L1D-J4 Wdg.28 - Technical Data Sheet

Standards

STAMFORD industrial alternators meet the requirements of the relevant parts of the IEC 60034 and the relevant sections of other international standards such as BS5000-3, ISO 8528-3, VDE 0530, NEMA MG1-32, CSA C22.2-100 and AS 60034. 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.

*Image depicts the S7L1D alternator

Excitation and Voltage Regulators

Excitation System					
AVR Type	MX322	DECS100	DECS150		
Voltage Regulation	± 0.5%	± 0.25%	± 0.25%		with 4% Engine Governing
AVR Power	PMG	PMG	PMG		

No Load Excitation Voltage (V)	27
No Load Excitation Current (A)	1.32
Full Load Excitation Voltage (V)	77
Full Load Excitation Current (A)	3.6
Exciter Time Constant (seconds)	0.165

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Electrical Data		
Insulation System	H	
Stator Winding	Double Layer Concentric	
Winding Pitch	2/3	
Winding Leads	6	
Winding Number	28	
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	29.66	
60 Hz		
Telephone Interference	TIF<50	
Cooling Air Flow	3.72 m³/sec	
Voltage Star (V)	660	690
Voltage Parallel Star (V)	-	-
Voltage Delta (V)	-	-
kVA Base Rating (Class H) for Reactance Values (kVA)	2850	2850
Saturated Values in Per Unit at Base Ratings and Voltages		
Xd Dir. Axis Synchronous	1.54	1.41
X'd Dir. Axis Transient	0.14	0.13
X"d Dir. Axis Subtransient	0.10	0.09
Xq Quad. Axis Reactance	1.78	1.63
X"q Quad. Axis Subtransient	0.18	0.16
XL Stator Leakage Reactance	0.05	0.04
X2 Negative Sequence Reactance	0.14	0.13
X0 Zero Sequence Reactance	0.02	0.02
Unsaturated Values in Per Unit at Base Ratings and Voltages		
Xd Dir. Axis Synchronous	1.85	1.69
X'd Dir. Axis Transient	0.16	0.15
X"d Dir. Axis Subtransient	0.12	0.11
Xq Quad. Axis Reactance	1.84	1.68
X"q Quad. Axis Subtransient	0.21	0.19
XL Stator Leakage Reactance	0.05	0.05
Xlr Rotor Leakage Reactance	0.08	0.07
X2 Negative Sequence Reactance	0.17	0.15
X0 Zero Sequence Reactance	0.03	0.02

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Time Constants (Seconds)		
T'd Transient Time Const.	0.159	
T''d Sub-Transient Time Const.	0.013	
T'do O.C. Field Time Const.	5.020	
Ta Armature Time Const.	0.053	
T''q Sub-Transient Time Const.	0.0106	
Resistances in Ohms (Ω) at 22^{0}C		
Stator Winding Resistance (Ra), per phase for series connected	0.00100	
Rotor Winding Resistance (Rf)	1.8487	
Exciter Stator Winding Resistance	20.1	
Exciter Rotor Winding Resistance per phase	0.057	
PMG Phase Resistance (Rpmg) per phase	1.91	
Positive Sequence Resistance (R1)	0.0013	
Negative Sequence Resistance (R2)	0.0014	
Zero Sequence Resistance (R0)	0.0013	
Saturation Factors	690V	
SG1.0	0.853	
SG1.2	6.192	
Mechanical Data		
Shaft and Keys	All alternator rotors are dynamically balanced to better than ISO 21940-11 Grade 2.5 for minimum vibration in operation. Two bearing generators are balanced with a half key.	
	1 Bearing	2 Bearing
SAE Adaptor	SAE0, 00	SAE0, 00
Moment of Inertia	58.15 kgm²	56.76 kgm²
Weight Wound Stator	2131kg	2131kg
Weight Wound Rotor	1826kg	1767kg
Weight Complete Alternator	4515kg	4480kg
Shipping weight in a Crate	4574kg	4539kg
Packing Crate Size	220 X 115 X 155(cm)	220 X 115 X 155(cm)
Maximum Over Speed	2250 RPM for two minutes	
Bearing Drive End	-	BALL. 6232
Bearing Non-Drive End	BALL. 6319	BALL. 6319

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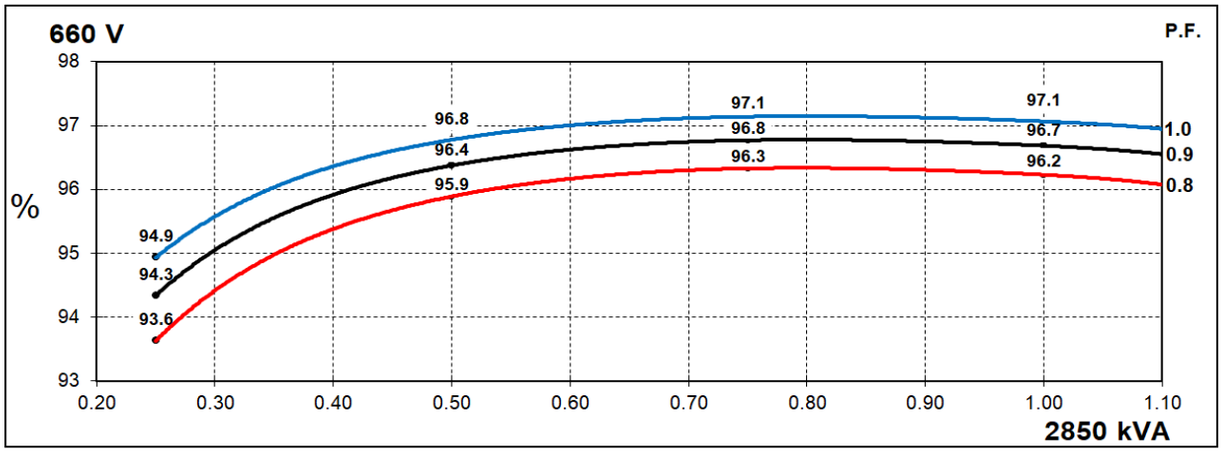
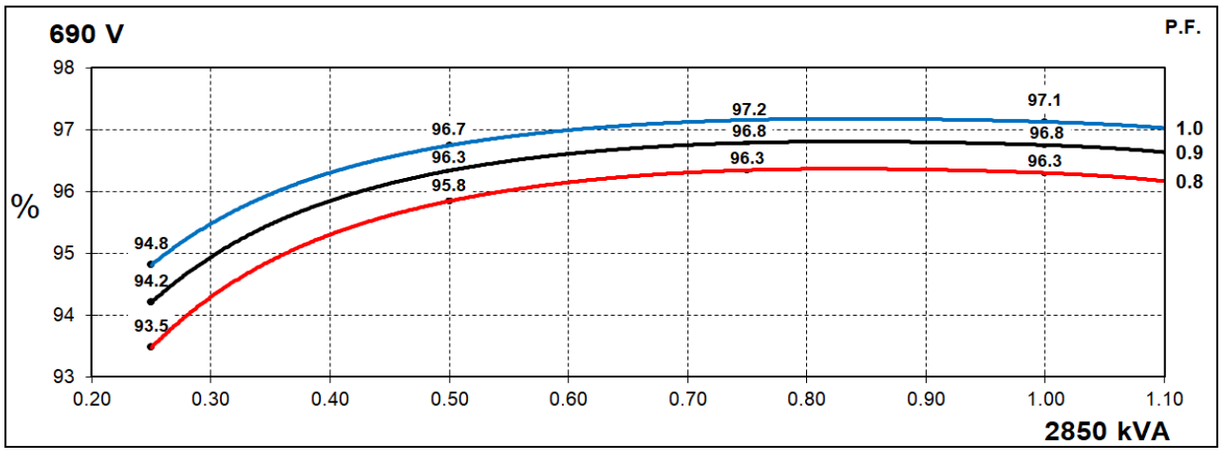
THREE PHASE EFFICIENCY CURVES

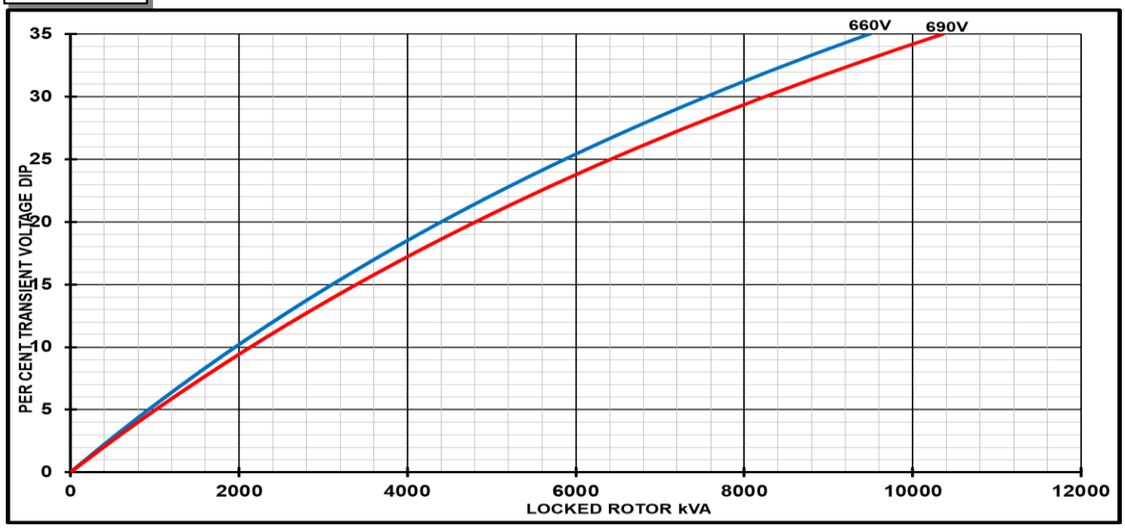
60Hz





Locked Rotor Motor Starting Curves - Separately Excited

60Hz



Transient Voltage Dip Scaling Factor	
Lagging PF	Scaling Factor
<= 0.4	1.00
0.5	0.95
0.6	0.90
0.7	0.86
0.8	0.83
0.9	0.75
0.95	0.70
1	0.65

Transient Voltage Rise Scaling Factor	
Lagging PF	Scaling Factor
<= 0.4	1.25
0.5	1.20
0.6	1.15
0.7	1.10
> 0.7	1.00

Note: To determine % Transient Voltage Dip or Voltage Rise at various PF, multiply the % Voltage Dip from the curve directly by the Scaling Factor.

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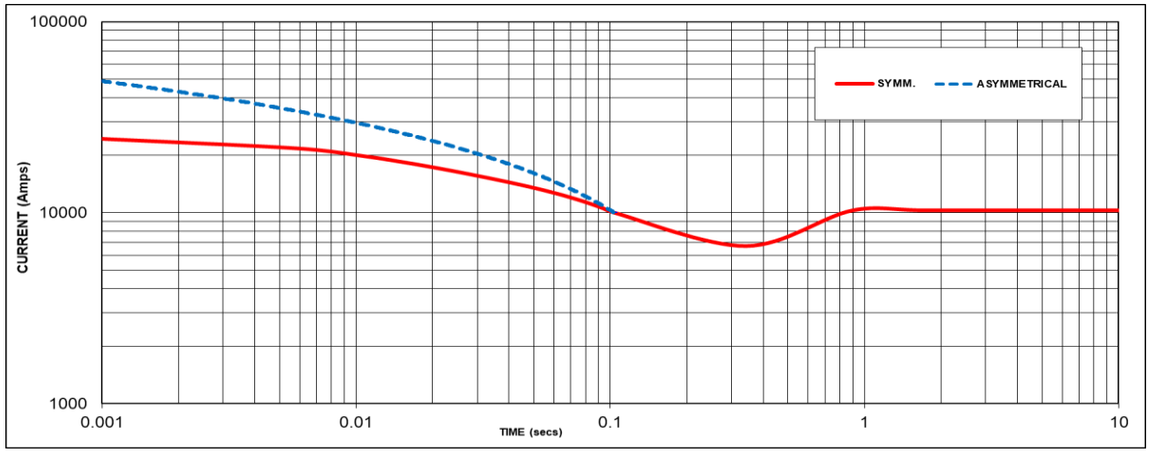
Three-phase Short Circuit Decrement Curve - Separately Excited

60Hz



Sustained Short Circuit = 10277 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 :

50Hz		60Hz	
Voltage	Factor	Voltage	Factor
-	-	660V	X 1.00
-	-	690V	X 1.05
-	-	-	-
-	-	-	-

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 connections under no-load excitation at rated speeds. For other connection (where applicable) 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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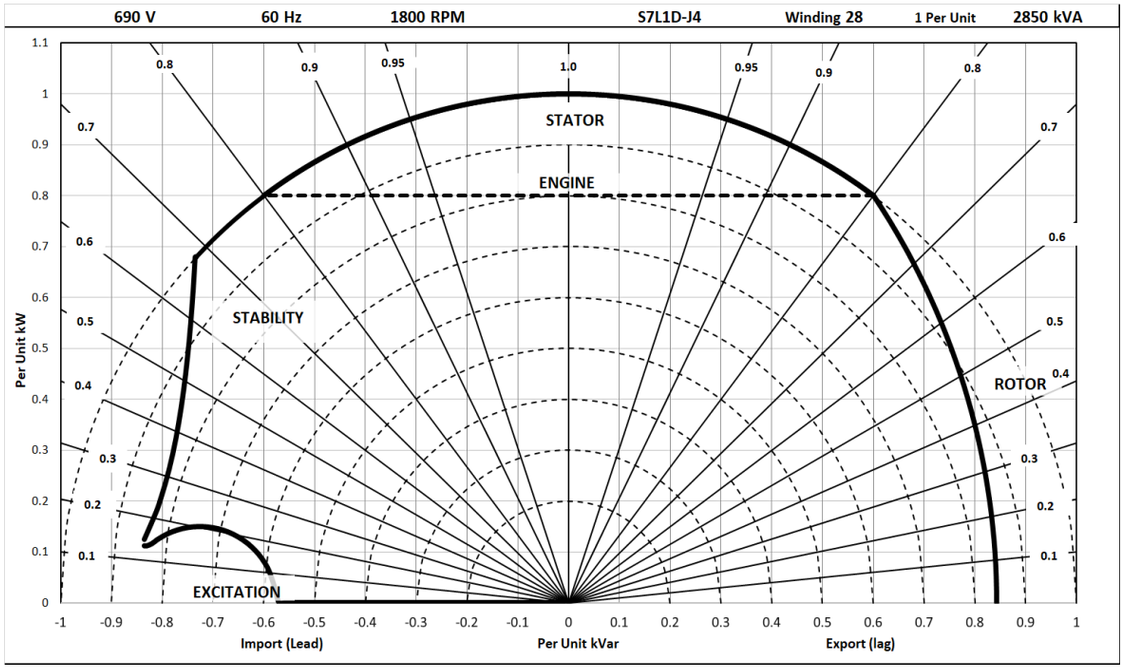
Typical Alternator Operating Charts

690V/60Hz



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RATINGS AT 0.8 POWER FACTOR

	Class - Temp Rise	Standby - 163/27°C	Standby - 150/40°C	Cont. H - 125/40°C	Cont. F - 105/40°C
50 Hz	Star (V)	N/A	N/A	N/A	N/A
	Parallel Star (V)	N/A	N/A	N/A	N/A
	Delta (V)	N/A	N/A	N/A	N/A
	kVA	N/A	N/A	N/A	N/A
	kW	N/A	N/A	N/A	N/A
	Efficiency (%)	N/A	N/A	N/A	N/A
	kW Input	N/A	N/A	N/A	N/A

60 Hz	Star (V)	660	690	660	690	660	690	660	690
	Parallel Star (V)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Delta (V)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	kVA	3050	3050	2965	2965	2850	2850	2655	2655
	kW	2440	2440	2372	2372	2280	2280	2124	2124
	Efficiency (%)	96.1	96.2	96.2	96.3	96.2	96.3	96.3	96.4
	kW Input	2538	2536	2466	2464	2369	2368	2206	2204

De-rates

- 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 @ Class H temperature rise
- For marine alternators (IP23), 3% for every 5°C by which the operational ambient temperature exceeds 50°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 (for <690V) or 1500 meters (for >690V) 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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