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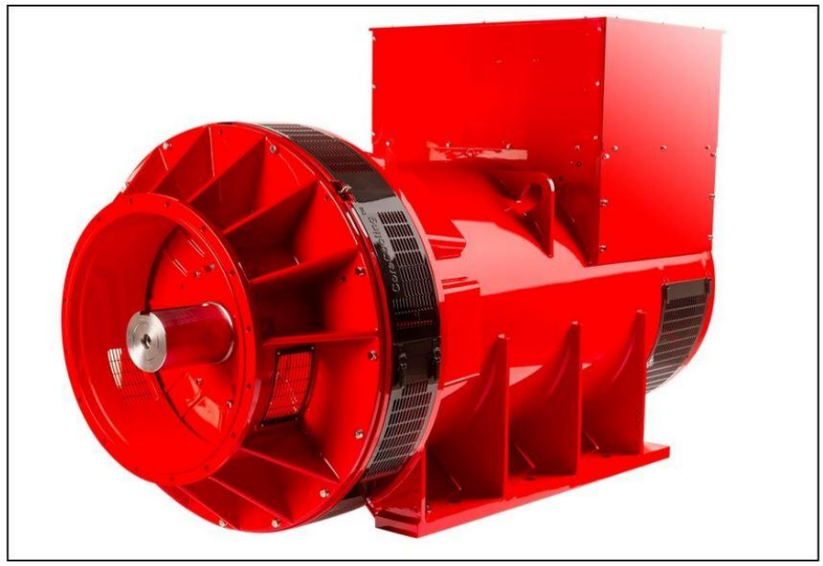
S7L1M-H4 Wdg.28 - Technical Data Sheet

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.



Excitation and Voltage Regulators

Excitation System					
AVR Type	MX341	MX322	DECS100	DECS150	
Voltage Regulation	± 1%	± 0.5%	± 0.25%	± 0.25%	with 4% Engine Governing
AVR Power	PMG	PMG	PMG	PMG	

No Load Excitation Voltage (V)	21
No Load Excitation Current (A)	1.1
Full Load Excitation Voltage (V)	52
Full Load Excitation Current (A)	2.6
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	32.59	
60 Hz		
Telephone Interference	TIF<50	
Cooling Air Flow	2.64 m³/sec	
Voltage Star (V)	660	690
Voltage Parallel Star (V)	-	-
Voltage Delta (V)	-	-
kVA Base Rating (Class H) for Reactance Values (kVA)	2300	2300
Saturated Values in Per Unit at Base Ratings and Voltages		
Xd Dir. Axis Synchronous	2.463	2.253
X'd Dir. Axis Transient	0.191	0.175
X"d Dir. Axis Subtransient	0.110	0.101
Xq Quad. Axis Reactance	2.160	1.976
X"q Quad. Axis Subtransient	0.217	0.199
XL Stator Leakage Reactance	0.060	0.055
X2 Negative Sequence Reactance	0.161	0.147
X0 Zero Sequence Reactance	0.043	0.040
Unsaturated Values in Per Unit at Base Ratings and Voltages		
Xd Dir. Axis Synchronous	2.955	2.704
X'd Dir. Axis Transient	0.220	0.201
X"d Dir. Axis Subtransient	0.129	0.118
Xq Quad. Axis Reactance	2.225	2.035
X"q Quad. Axis Subtransient	0.260	0.238
XL Stator Leakage Reactance	0.068	0.062
Xlr Rotor Leakage Reactance	0.103	0.095
X2 Negative Sequence Reactance	0.193	0.176
X0 Zero Sequence Reactance	0.051	0.047

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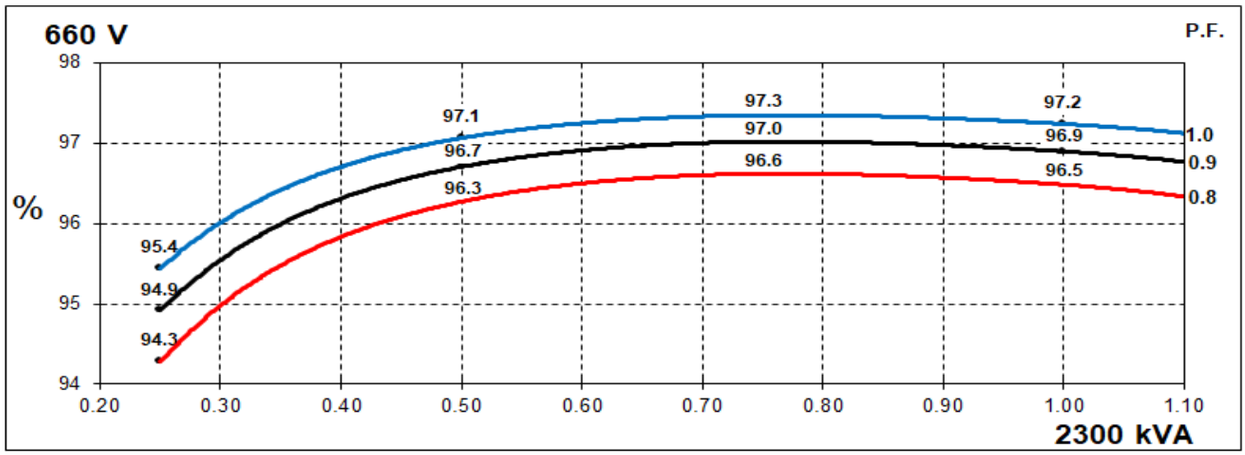
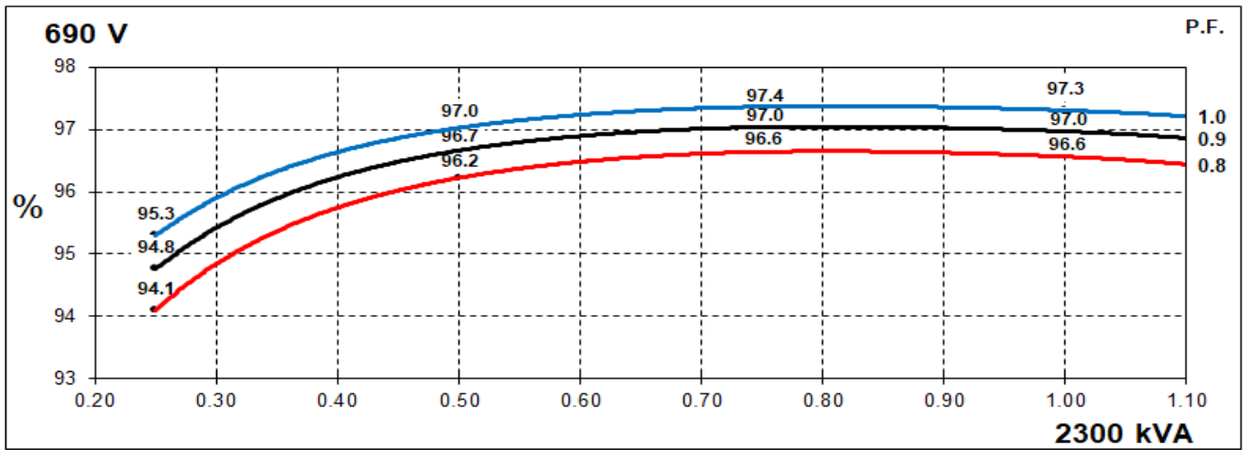
Time Constants (Seconds)		
T'd Transient Time Const.	0.143	
T''d Sub-Transient Time Const.	0.011	
T'do O.C. Field Time Const.	4.47	
Ta Armature Time Const.	0.027	
T''q Sub-Transient Time Const.	0.0098	
Resistances in Ohms (Ω) at 22^{0}C		
Stator Winding Resistance (Ra), per phase for series connected	0.00141	
Rotor Winding Resistance (Rf)	2.38	
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)	0.00176	
Negative Sequence Resistance (R2)	0.00203	
Zero Sequence Resistance (R0)	0.00176	
Saturation Factors	690V	
SG1.0	0.141	
SG1.2	0.986	
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	0, 00	0, 00, None
Moment of Inertia	52.2344 kgm²	51.1796 kgm²
Weight Wound Stator	1979kg	1979kg
Weight Wound Rotor	1692.72kg	1650.757kg
Weight Complete Alternator	4083kg	4054kg
Shipping weight in a Crate	4135kg	4106kg
Packing Crate Size	220 X 105 X 155(cm)	220 X 105 X 155(cm)
Maximum Over Speed	2250 RPM for two minutes	
Bearing Drive End	-	6232
Bearing Non-Drive End	6319	6319

THREE PHASE EFFICIENCY CURVES

60Hz





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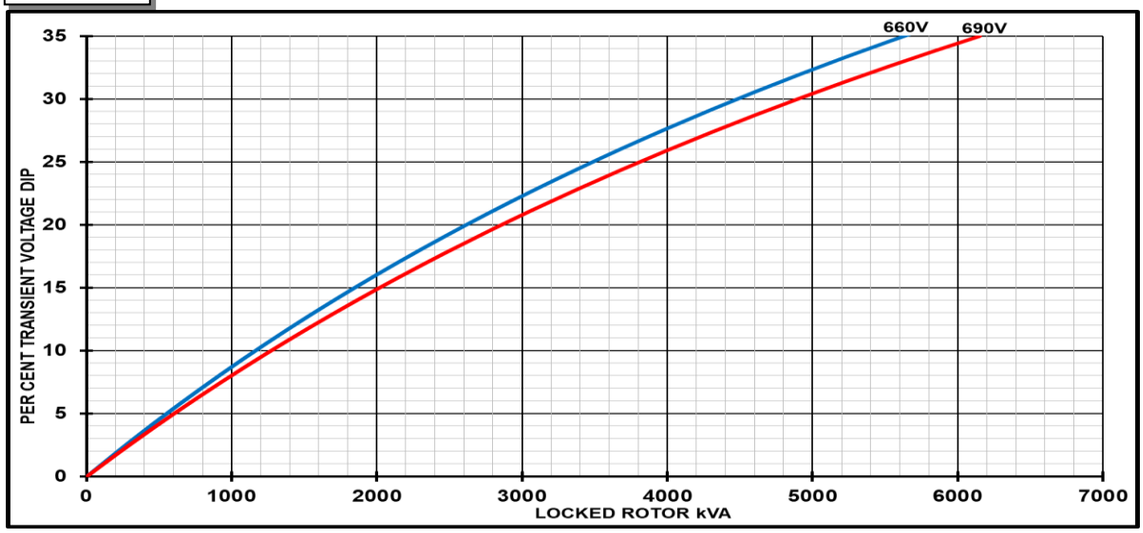
Locked Rotor Motor Starting Curves - Separately Excited

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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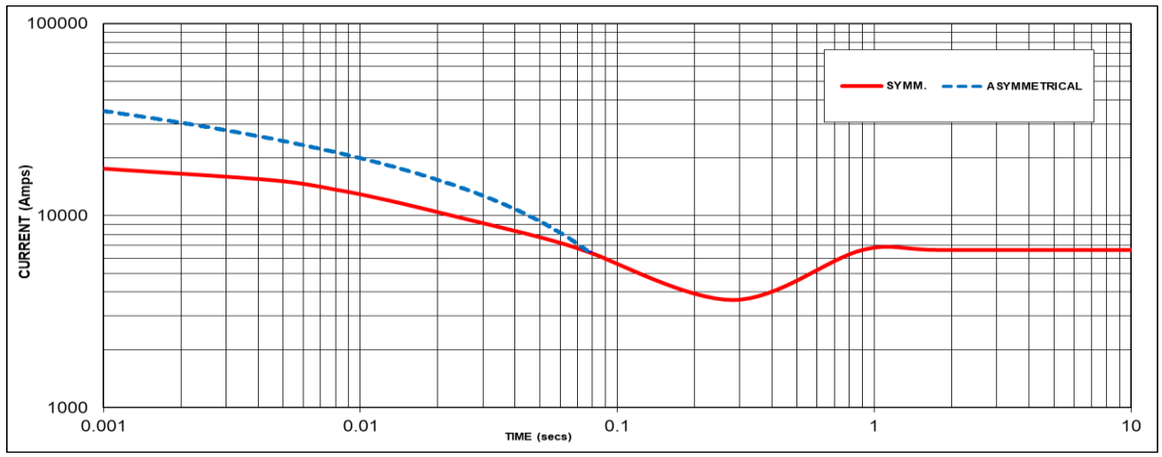
Three-phase Short Circuit Decrement Curve - Separately Excited

60Hz



Sustained Short Circuit = 6629 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. The alternator is capable of delivering 300% short-circuit current for 10 seconds as per requirements specified by marine agencies.

If MX322 or digital AVR is used, the sustained short-circuit current value is to be multiplied by a factor of 1.2.

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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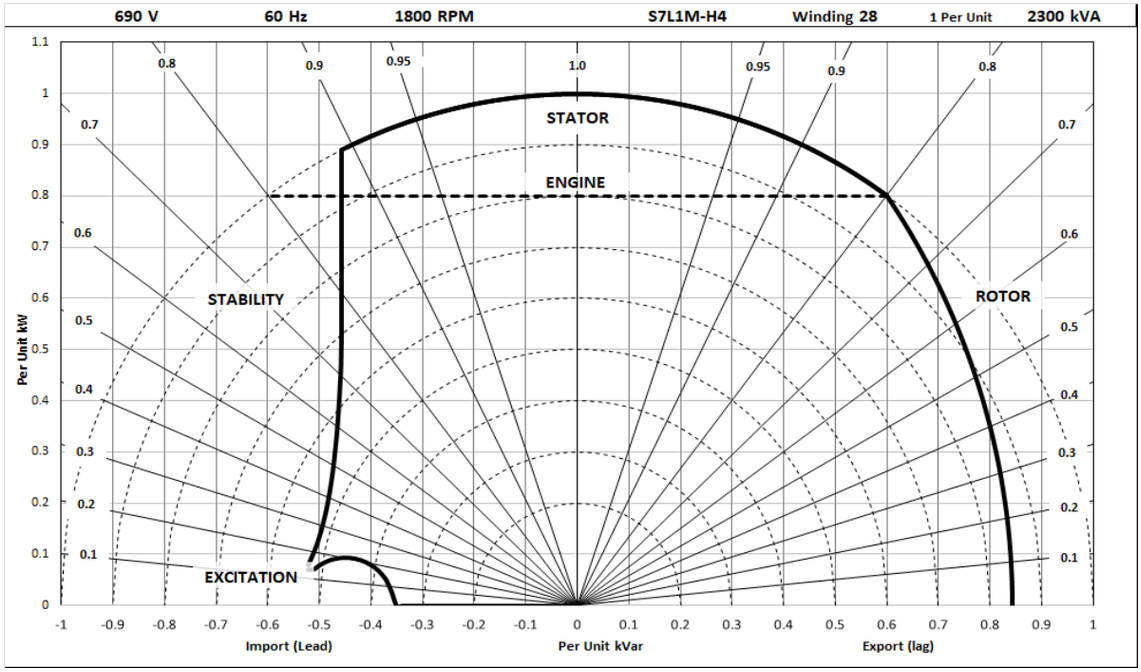
Typical Alternator Operating Charts

690V/60Hz



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RATINGS AT 0.8 POWER FACTOR

	Class - Temp Rise	Standby	Cont. H - 110/50°C	Cont. F - 90/50°C	Cont. B - 70/50°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	N/A	N/A	2300	2300	2088	2088	1856	1856
	kW	N/A	N/A	1840	1840	1670	1670	1485	1485
	Efficiency (%)	N/A	N/A	96.5	96.6	96.6	96.6	96.6	96.7
	kW Input	N/A	N/A	1907	1906	1730	1729	1537	1536

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 @ Class H temperature rise (please refer to applications for ambient temperature de-rates at other temperature rise classes)
- For marine alternators, 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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