STAMFORD

S9H1D-C4 Wdg.83 - 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	DM110	DECS100	DECS150		
Voltage Regulation	± 0.25%	± 0.25%	± 0.25%		with 4% Engine Governing
AVR Power	PMG	PMG	PMG		

No Load Excitation Voltage (V)	11
No Load Excitation Current (A)	1
Full Load Excitation Voltage (V)	42
Full Load Excitation Current (A)	3.8
Exciter Time Constant (seconds)	0.24

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Electrical Data				
Insulation System	H			
Stator Winding	Double Layer Lap			
Winding Pitch	5/6			
Winding Leads	6			
Winding Number	83			
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	20.10			
50 Hz				
Telephone Interference	THF<2%			
Cooling Air Flow	2.78 m³/sec			
Voltage Star (V)	10000	10500	11000	-
Voltage Parallel Star (V)	-	-	-	-
Voltage Delta (V)	-	-	-	-
kVA Base Rating (Class H) for Reactance Values (kVA)	2286	2515	2515	-
Saturated Values in Per Unit at Base Ratings and Voltages				
Xd Dir. Axis Synchronous	2.695	2.689	2.450	-
X'd Dir. Axis Transient	0.242	0.241	0.220	-
X"d Dir. Axis Subtransient	0.167	0.167	0.152	-
Xq Quad. Axis Reactance	1.338	1.336	1.217	-
X"q Quad. Axis Subtransient	0.329	0.328	0.299	-
XL Stator Leakage Reactance	0.132	0.132	0.120	-
X2 Negative Sequence Reactance	0.250	0.249	0.227	-
X0 Zero Sequence Reactance	0.172	0.171	0.156	-
Unsaturated Values in Per Unit at Base Ratings and Voltages				
Xd Dir. Axis Synchronous	3.233	3.227	2.940	-
X'd Dir. Axis Transient	0.278	0.278	0.253	-
X"d Dir. Axis Subtransient	0.196	0.195	0.178	-
Xq Quad. Axis Reactance	1.379	1.376	1.254	-
X"q Quad. Axis Subtransient	0.395	0.394	0.359	-
XL Stator Leakage Reactance	0.149	0.149	0.136	-
Xlr Rotor Leakage Reactance	0.273	0.272	0.248	-
X2 Negative Sequence Reactance	0.300	0.299	0.272	-
X0 Zero Sequence Reactance	0.201	0.200	0.183	-

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Time Constants (Seconds)		
T'd Transient Time Const.	0.227	
T''d Sub-Transient Time Const.	0.020	
T'do O.C. Field Time Const.	3.24	
Ta Armature Time Const.	0.065	
T''q Sub-Transient Time Const.	0.02	
Resistances in Ohms (Ω) at 22^{0}C		
Stator Winding Resistance (Ra), per phase for series connected	0.5040	
Rotor Winding Resistance (Rf)	0.53	
Exciter Stator Winding Resistance	9.8	
Exciter Rotor Winding Resistance per phase	0.014	
PMG Phase Resistance (Rpmg) per phase	1.91	
Positive Sequence Resistance (R1)	0.6300	
Negative Sequence Resistance (R2)	0.7258	
Zero Sequence Resistance (R0)	0.6300	
Saturation Factors	11000V	
SG1.0	0.155	
SG1.2	0.633	
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	77.1 kgm²	75 kgm²
Weight Wound Stator	1787kg	1787kg
Weight Wound Rotor	1861kg	1791kg
Weight Complete Alternator	5250kg	5250kg
Shipping weight in a Crate	5500kg	5500kg
Packing Crate Size	260 x 200 x 220(cm)	260 x 200 x 220(cm)
Maximum Over Speed	2250 RPM for two minutes	
Bearing Drive End	-	6232
Bearing Non-Drive End	6324	6324

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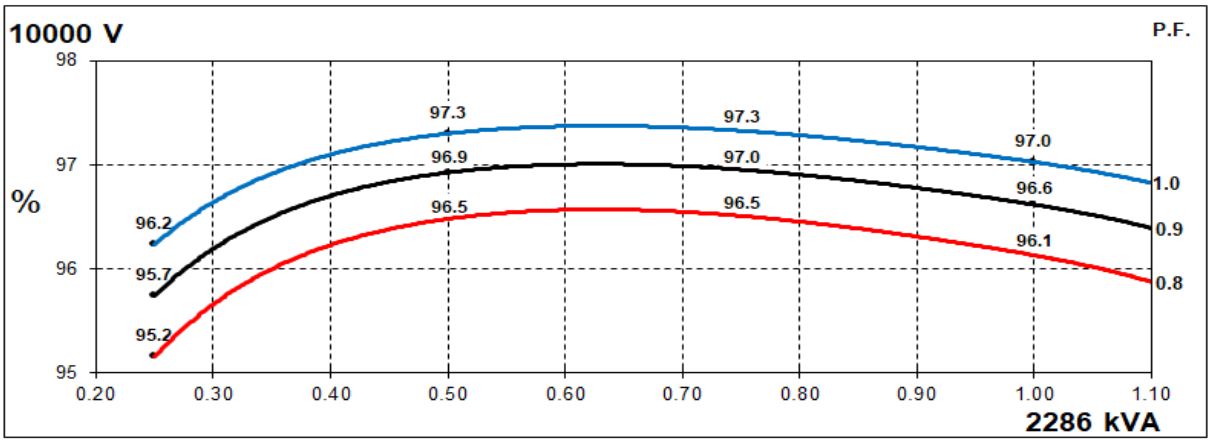
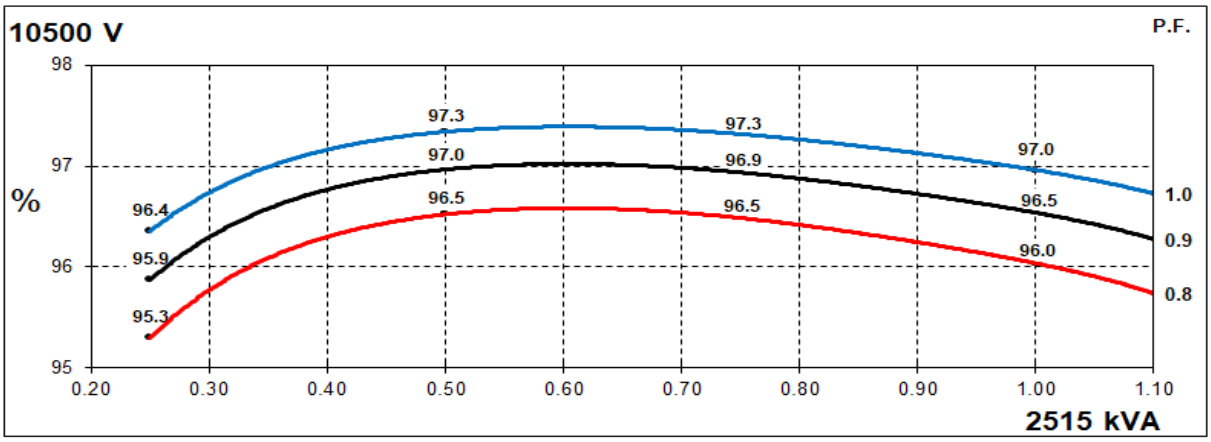
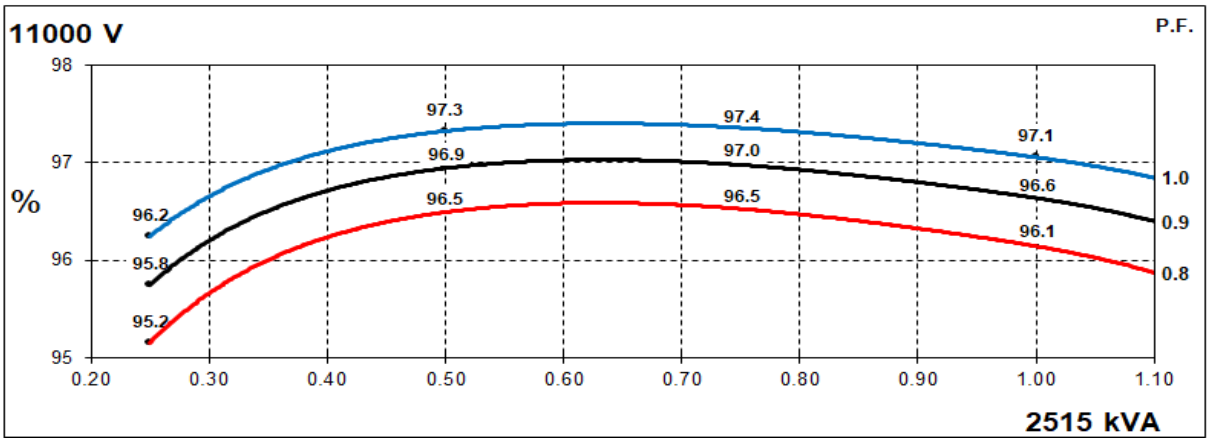
THREE PHASE EFFICIENCY CURVES

50Hz

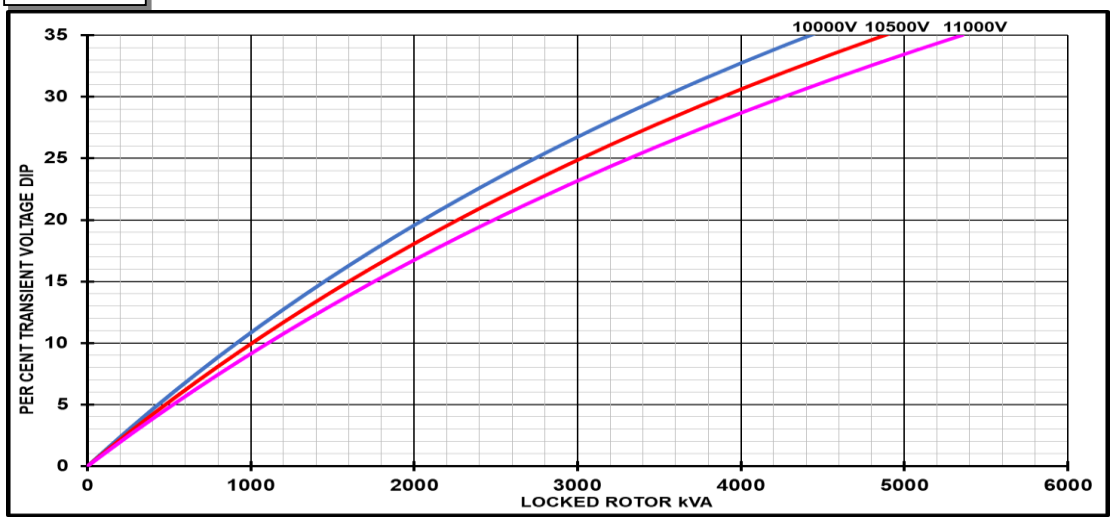






Locked Rotor Motor Starting Curves - Separately Excited

50Hz



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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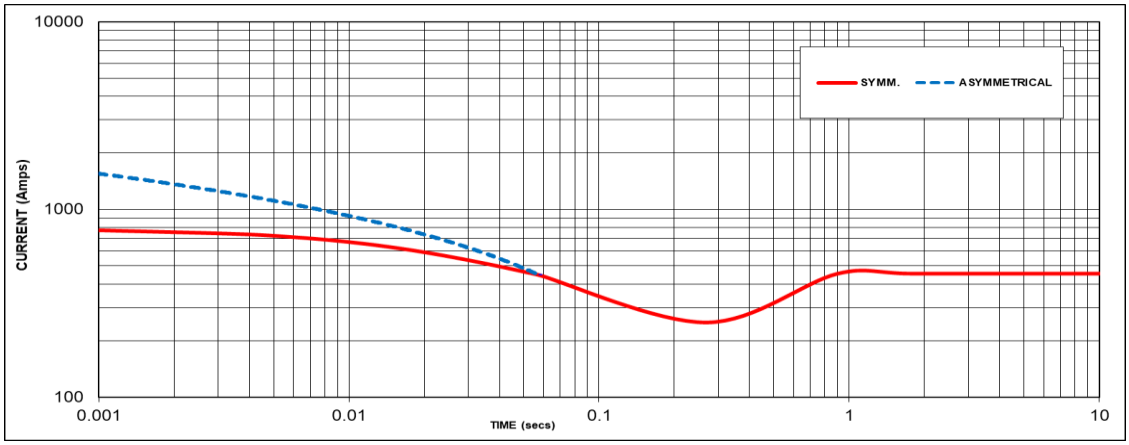
Three-phase Short Circuit Decrement Curve - Separately Excited

50Hz



Sustained Short Circuit = 456 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
10000V	X 1.00	-	-
10500V	X 1.05	-	-
11000V	X 1.10	-	-
-	-	-	-

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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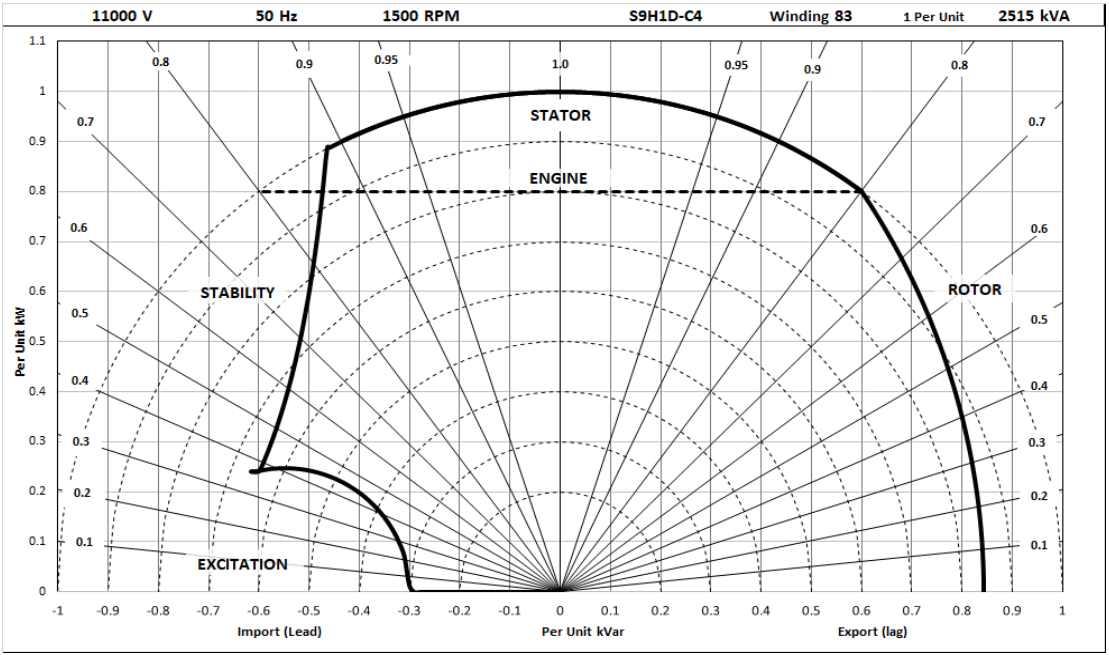
Typical Alternator Operating Charts

11000V/50Hz



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RATINGS AT 0.8 POWER FACTOR

	Class - Temp Rise	Standby - 150/40°C				Cont. H - 125/40°C				Cont. F - 105/40°C				Cont. B - 80/40°C			
50 Hz	Star (V)	10000	10500	11000	N/A	10000	10500	11000	N/A	10000	10500	11000	N/A	10000	10500	11000	N/A
	Parallel Star (V)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	kVA	2446	2691	2691	N/A	2286	2515	2515	N/A	2103	2314	2314	N/A	1829	2012	2012	N/A
	kW	1957	2153	2153	N/A	1829	2012	2012	N/A	1682	1851	1851	N/A	1463	1610	1610	N/A
	Efficiency (%)	96.0	95.9	96.0	N/A	96.1	96.0	96.1	N/A	96.3	96.2	96.3	N/A	96.5	96.4	96.5	N/A
	kW Input	2039	2246	2243	N/A	1902	2095	2093	N/A	1747	1924	1922	N/A	1517	1669	1668	N/A

60 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

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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