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P734H Winding 12

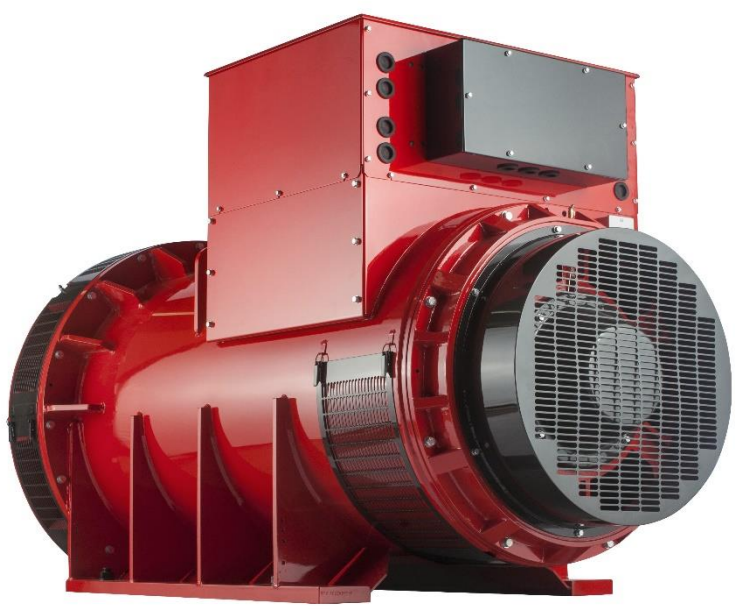
P734H - Technical Data Sheet

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	DECS100	DM110			
Voltage Regulation	± 0.25%	± 0.25%			with 4% Engine Governing
AVR Power	PMG	PMG			

No Load Excitation Voltage (V)	9 - 13
No Load Excitation Current (A)	0.7
Full Load Excitation Voltage (V)	72
Full Load Excitation Current (A)	3.7
Exciter Time Constant (seconds)	0.127

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Electrical Data								
Insulation System	Class H							
Stator Winding	Double Layer Concentric							
Winding Pitch	Two Thirds							
Winding Leads	6							
Winding Number	12							
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	29.5							
	50 Hz				60 Hz			
Telephone Interference	THF<2%				TIF<50			
Cooling Air	2.95 m³/sec				3.55 m³/sec			
Voltage Star	380	400	415	440	416	440	460	480
kVA Base Rating (Class H) for Reactance Values	2250	2325	2325	2325	2500	2570	2640	2800
Saturated Values in Per Unit at Base Ratings and Voltages								
Xd Dir. Axis Synchronous	3.70	3.45	3.21	2.85	4.12	3.78	3.55	3.46
X'd Dir. Axis Transient	0.21	0.20	0.19	0.17	0.24	0.22	0.21	0.20
X''d Dir. Axis Subtransient	0.16	0.15	0.14	0.12	0.18	0.16	0.15	0.15
Xq Quad. Axis Reactance	2.52	2.35	2.18	1.94	2.80	2.58	2.42	2.36
X''q Quad. Axis Subtransient	0.30	0.28	0.26	0.23	0.33	0.31	0.29	0.28
XL Stator Leakage Reactance	0.03	0.03	0.03	0.02	0.04	0.03	0.03	0.03
X2 Negative Sequence Reactance	0.21	0.20	0.19	0.17	0.24	0.22	0.21	0.20
X0 Zero Sequence Reactance	0.05	0.05	0.05	0.04	0.06	0.05	0.05	0.05
Unsaturated Values in Per Unit at Base Ratings and Voltages								
Xd Dir. Axis Synchronous	4.44	4.14	3.85	3.42	4.94	4.54	4.27	4.15
X'd Dir. Axis Transient	0.25	0.23	0.21	0.19	0.27	0.25	0.24	0.23
X''d Dir. Axis Subtransient	0.19	0.18	0.16	0.15	0.21	0.19	0.18	0.18
Xq Quad. Axis Reactance	2.60	2.42	2.25	2.00	2.89	2.65	2.49	2.43
X''q Quad. Axis Subtransient	0.36	0.34	0.31	0.28	0.40	0.37	0.35	0.34
XL Stator Leakage Reactance	0.04	0.03	0.03	0.03	0.04	0.04	0.03	0.03
Xlr Rotor Leakage Reactance	0.19	0.18	0.17	0.15	0.21	0.20	0.19	0.18
X2 Negative Sequence Reactance	0.26	0.24	0.22	0.20	0.29	0.26	0.25	0.24
X0 Zero Sequence Reactance	0.06	0.06	0.05	0.05	0.07	0.06	0.06	0.06

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Time Constants (Seconds)		
T'd TRANSIENT TIME CONST.	0.17	
T''d SUB-TRANSTIME CONST.	0.01	
T'do O.C. FIELD TIME CONST.	2.9	
Ta ARMATURE TIME CONST.	0.03	
T''q SUB-TRANSTIME CONST.	0.01	
Resistances in Ohms (Ω) at 22^{0}C		
Stator Winding Resistance (Ra)	0.00066 per phase for series star connected	
Rotor Winding Resistance (Rf)	2.42	
Exciter Stator Winding Resistance	16	
Exciter Rotor Winding Resistance	0.056 per phase	
PMG Phase Resistance (Rpmg)	1.9 per phase	
Positive Sequence Resistance (R1)	0.00083	
Negative Sequence Resistance (R2)	0.00096	
Zero Sequence Resistance (R0)	0.00083	
Saturation Factors	400V	480V
SG1.0	0.18	0.18
SG1.2	0.74	0.76
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	55.6kgm^2	54.5kgm^2
Weight Wound Stator	2115kg	2115kg
Weight Wound Rotor	1700kg	1680kg
Weight Complete Alternator	4329kg	4395kg
Shipping weight in a Crate	4402kg	4468kg
Packing Crate Size	220 x 115 x 142 (cm)	220 x 115 x 142 (cm)
Maximum Over Speed	2250 RPM for two minutes	
Bearing Drive End	N/A	Ball 6232
Bearing Non-Drive End	Ball 6319	Ball 6319

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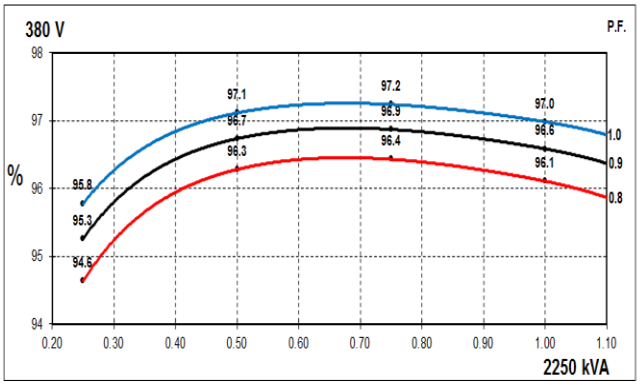
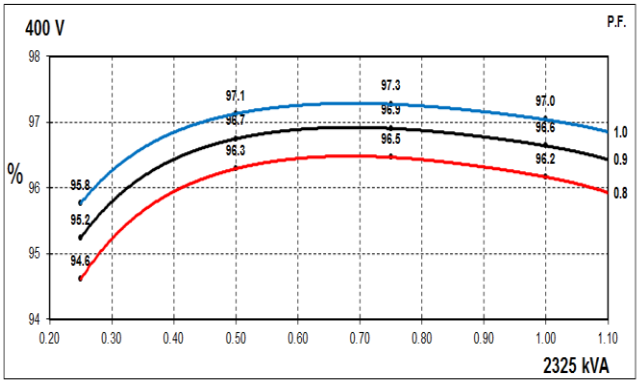
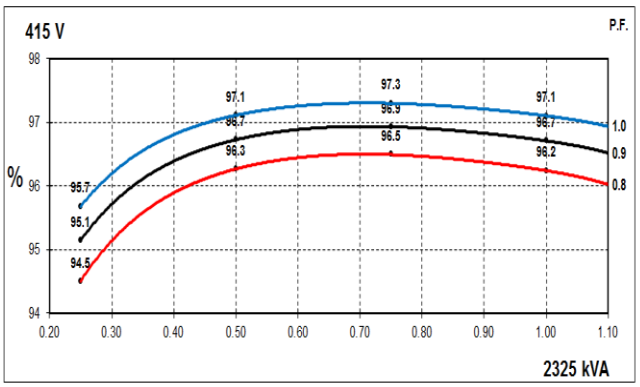
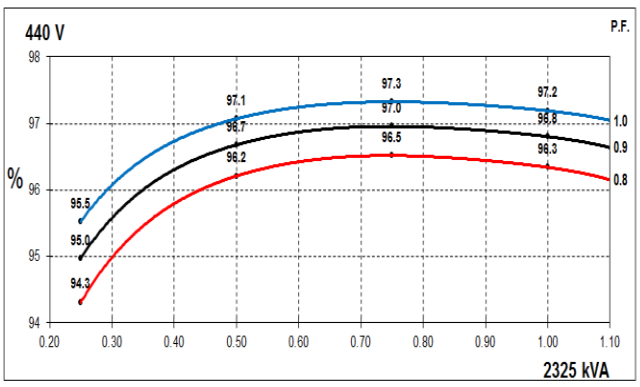
THREE PHASE EFFICIENCY CURVES

50Hz

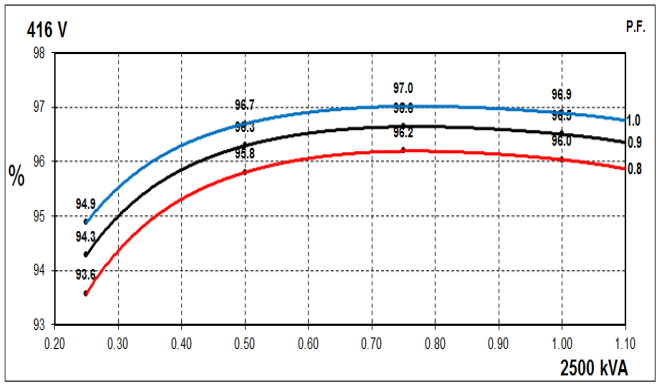


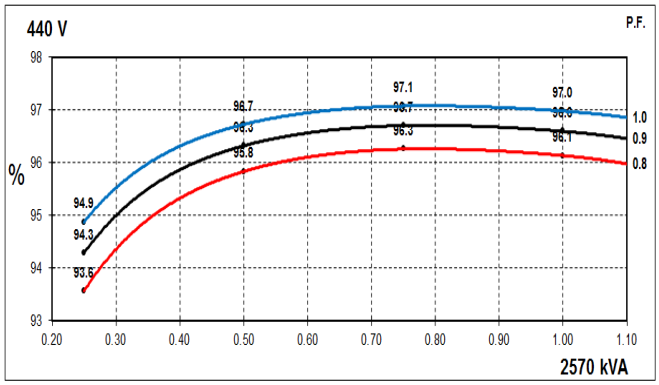


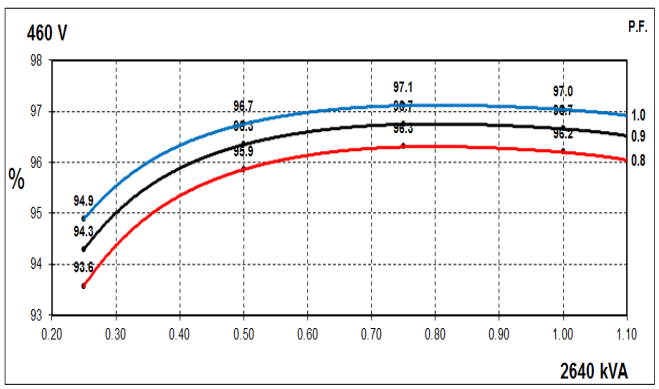


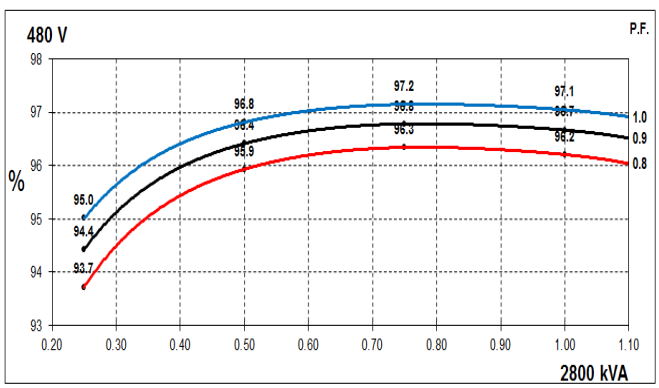


60Hz



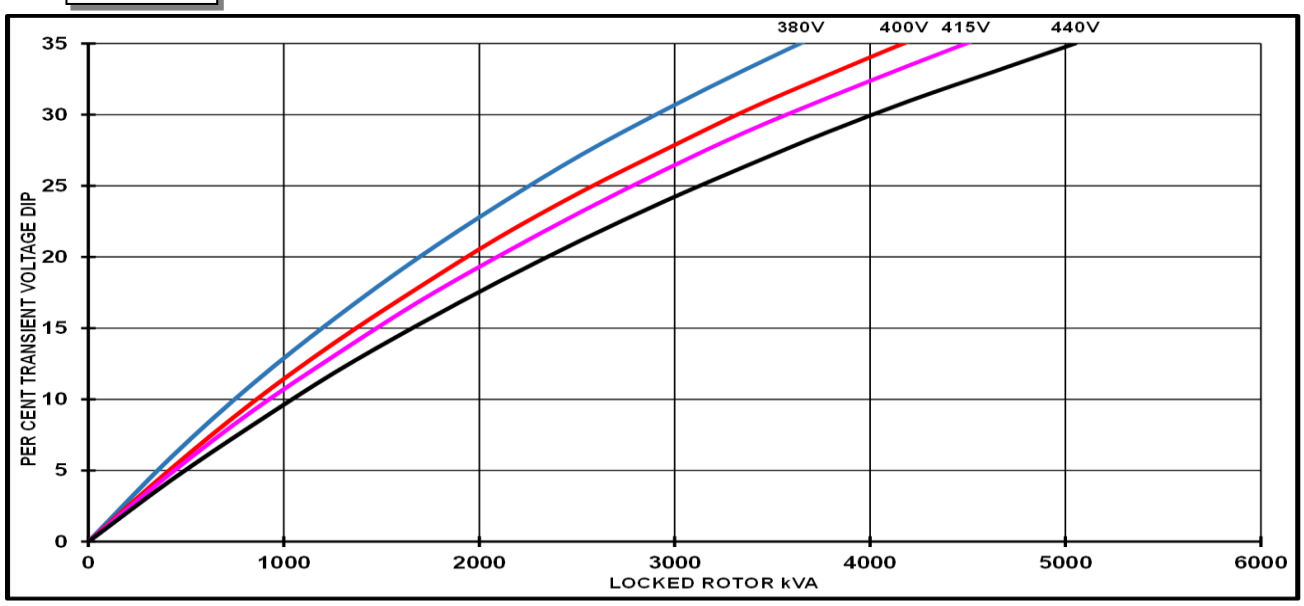




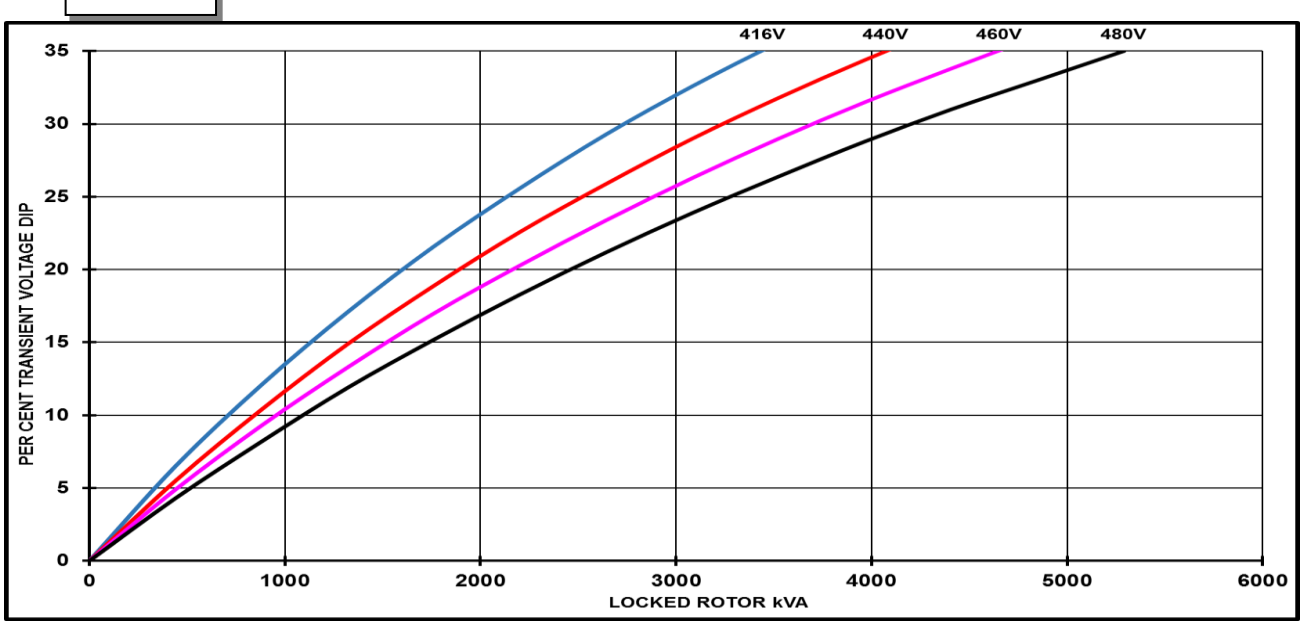


Locked Rotor Motor Starting Curves

50Hz



60Hz



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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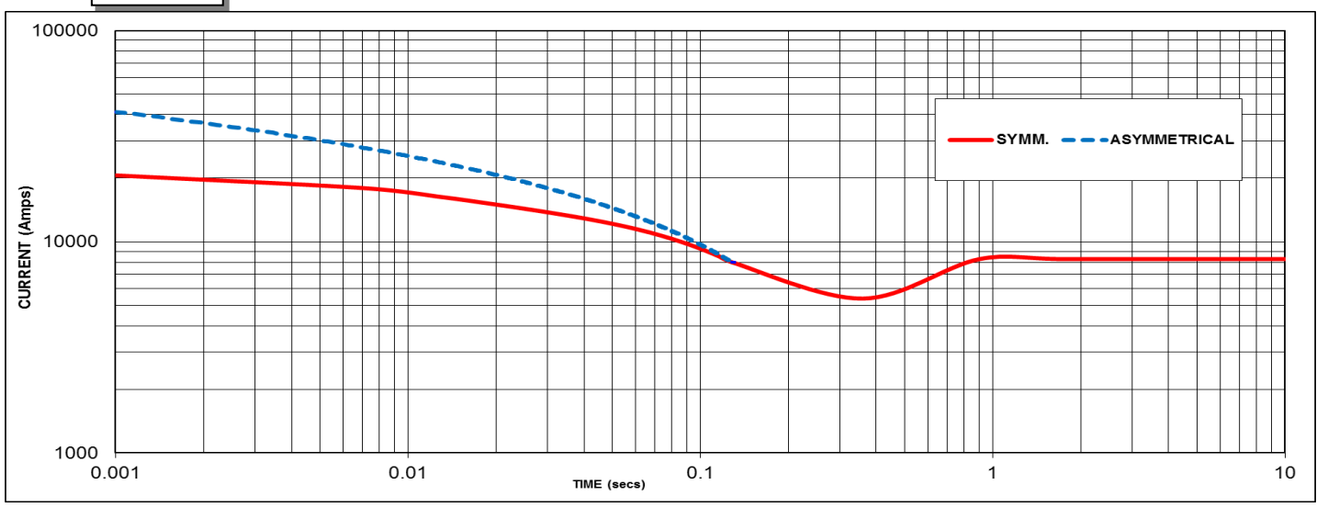
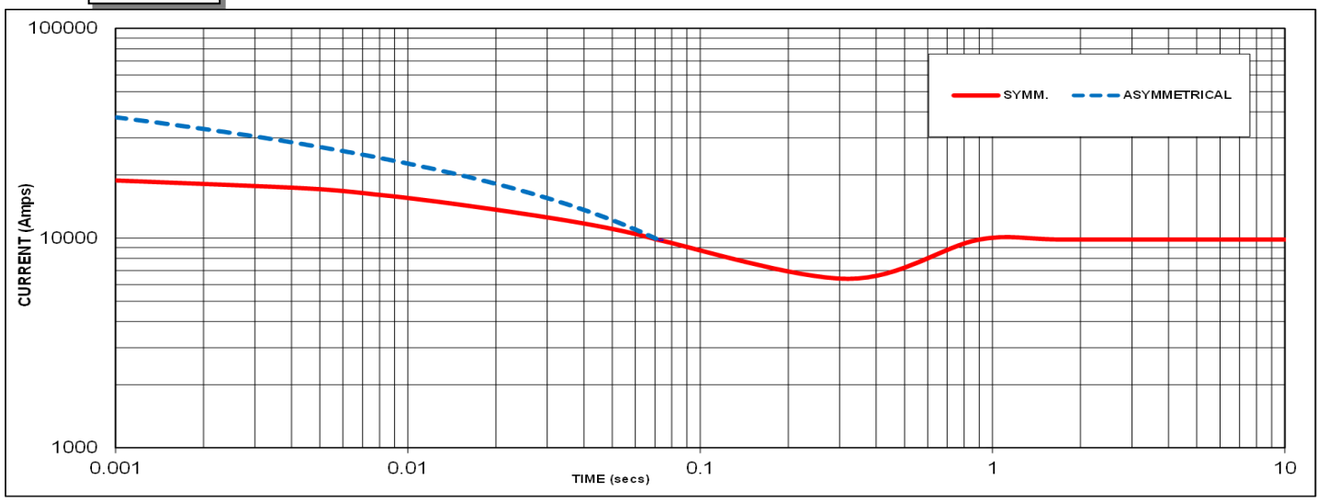
Three-phase Short Circuit Decrement Curve

50Hz



Sustained Short Circuit = 8280 Amps

60Hz



Sustained Short Circuit = 9840 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
380V	X 1.00	416V	X 1.00
400V	X 1.05	440V	X 1.06
415V	X 1.09	460V	X 1.10
440V	X 1.16	480V	X 1.15

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 connected machines under no-load excitation at rated speeds. 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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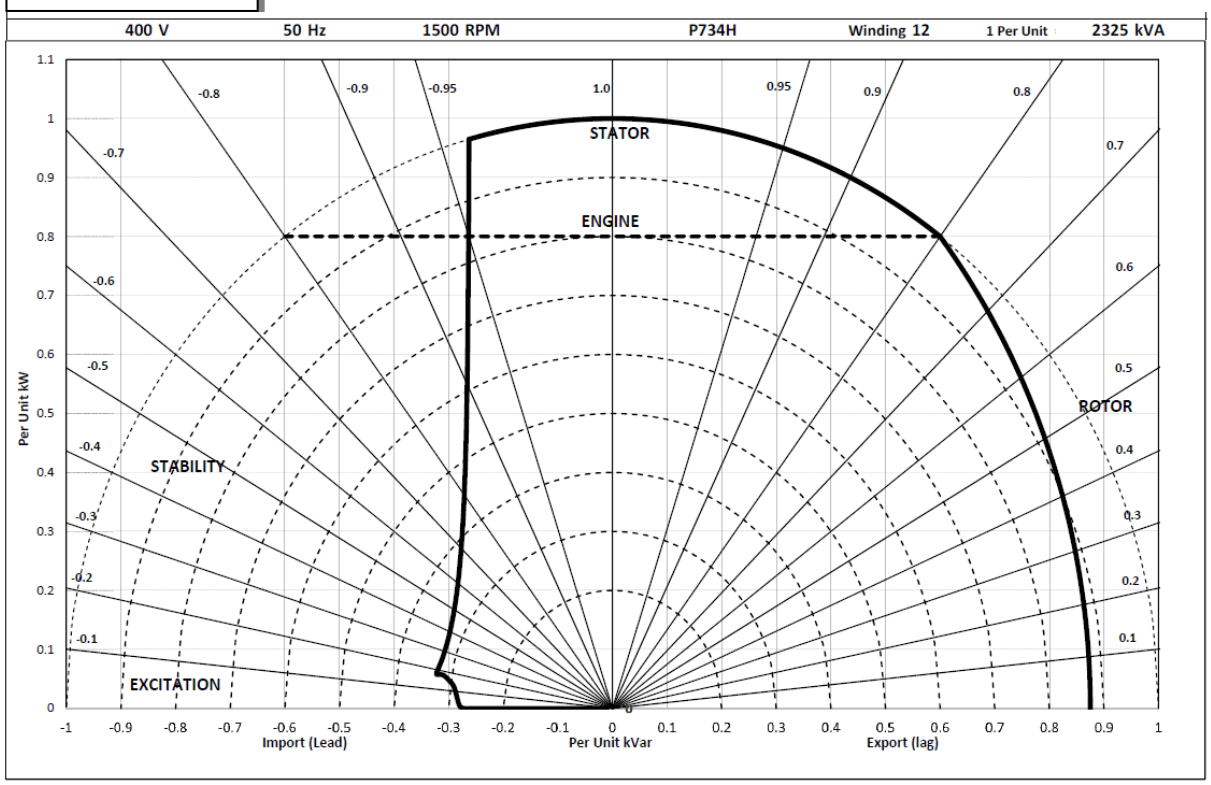
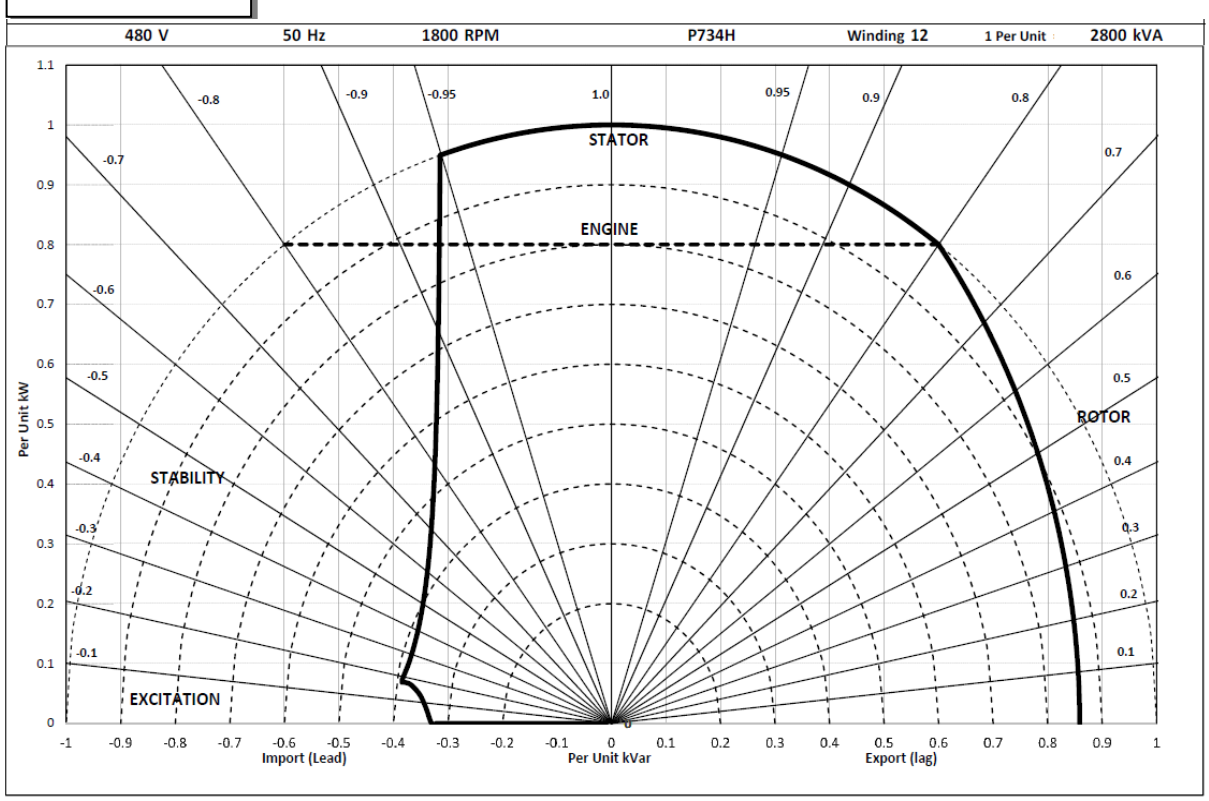
Typical Alternator Operating Charts

400V/50Hz



480V/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	Series Star (V)	380	400	415	440	380	400	415	440	380	400	415	440	380	400	415	440
	kVA	2500	2600	2600	2600	2410	2500	2500	2500	2250	2325	2325	2325	2100	2150	2150	2150
	kW	2000	2080	2080	2080	1928	2000	2000	2000	1800	1860	1860	1860	1680	1720	1720	1720
	Efficiency (%)	95.9	95.9	96.0	96.1	96.0	96.0	96.1	96.2	96.1	96.2	96.2	96.3	96.2	96.3	96.4	96.4
	kW Input	2086	2169	2167	2164	2009	2083	2081	2079	1873	1934	1933	1931	1746	1786	1785	1784

60 Hz	Series Star (V)	416	440	460	480	416	440	460	480	416	440	460	480	416	440	460	480
	kVA	2740	2855	2935	3120	2640	2750	2850	3000	2500	2570	2640	2800	2320	2385	2450	2600
	kW	2192	2284	2348	2496	2112	2200	2280	2400	2000	2056	2112	2240	1856	1908	1960	2080
	Efficiency (%)	95.9	96.0	96.0	96.0	96.0	96.0	96.1	96.1	96.0	96.1	96.2	96.2	96.1	96.2	96.3	96.3
	kW Input	2286	2380	2445	2599	2201	2291	2373	2497	2083	2139	2195	2328	1931	1983	2036	2160

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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