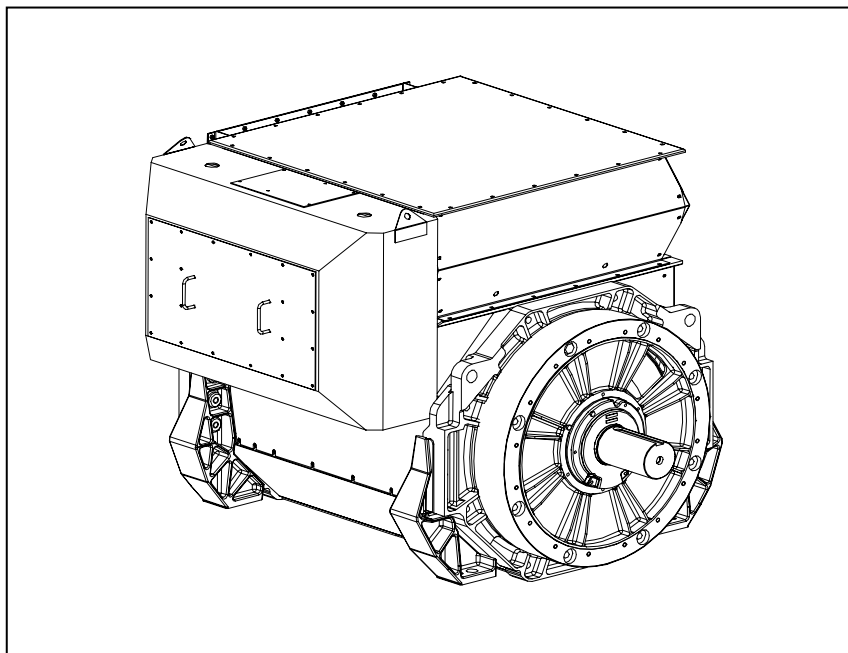


# STAMFORD® | AvK®

## LV 804 T WDG 12 - Technical Data Sheet



# FRAME LV 804 T

## SPECIFICATIONS & OPTIONS

**STAMFORD | AvK**

### STANDARDS

Cummins Generator Technologies industrial generators meet the requirements of BS EN 60034 and the relevant sections of other national and international standards such as BS5000, VDE 0530, NEMA MG1-32, IEC60034, CSA C22.2-100, AS1359.

Other standards and certifications can be considered on request.

### DESCRIPTION

The STAMFORD PI range of synchronous ac generators are brushless with a rotating field. They are separately excited by the STAMFORD Permanent Magnet Generator (PMG). This is a shaft mounted, high frequency, pilot exciter which provides a constant supply of clean power via the Automatic Voltage Regulator (AVR) to the main exciter. The main exciter output is fed to the main rotor, through a full wave bridge rectifier, protected by surge suppression.

### VOLTAGE REGULATORS

The P range generators complete with a PMG are available with an analogue AVR as standard. The AVR has soft start voltage build up and built in protection against sustained over-excitation, which will de-excite the generator after a minimum of 8 seconds. Underspeed protection (UFRO) is also provided on both AVRs. The UFRO will reduce the generator output voltage proportional to the speed of the generator below a pre-settable level.

The **MA330 AVR** is full wave rectified, 3 phase rms sensed with a voltage regulation of 0.5% rms (see the note on regulation). The UFRO circuit has adjustable slope and dwell for controlled recovery from step loads. An over voltage protection circuit will shutdown the output device of the AVR, it can also trip an optional excitation circuit breaker if required. As an option, short circuit current limiting is available with the addition of current transformers.

The MA330 AVR needs a generator mounted current transformer to provide quadrature droop characteristics for load sharing during parallel operation. Provision is also made for the connection of the STAMFORD power factor controller, for embedded applications, and a remote voltage trimmer.

### WINDINGS & ELECTRICAL PERFORMANCE

All generator stators are wound to 2/3 pitch. This eliminates triplen (3rd, 9th, 15th ...) harmonics on the voltage waveform and is found to be the optimum design for trouble-free supply of non-linear loads. The 2/3 pitch design avoids excessive neutral currents sometimes seen with higher winding pitches. A fully connected damper winding reduces oscillations during paralleling. This winding, with the 2/3 pitch and carefully selected pole and tooth designs, ensures very low levels of voltage waveform distortion.

### TERMINALS & TERMINAL BOX

Standard generators feature a main stator with 6 ends brought out to the terminals, which are mounted on the frame at the non-drive end of the generator. A sheet steel terminal box contains the AVR and provides ample space for the customers' wiring and gland arrangements. It has removable panels for easy access.

### SHAFT & KEYS

All generator 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.

### INSULATION/IMPREGNATION

The insulation system is class 'H'. All wound components are impregnated with materials and processes designed specifically to provide the high build required for static windings and the high mechanical strength required for rotating components.

### QUALITY ASSURANCE

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

### NOTE ON REGULATION

The stated voltage regulation may not be maintained in the presence of certain radio transmitted signals. Any change in performance will fall within the limits of Criteria 'B' of EN 61000-6-2:2001. At no time will the steady-state voltage regulation exceed 2%.

NB Continuous development of our products entitles us to change specification details without notice, therefore they must not be regarded as binding.

Front cover drawing is typical of the product range.

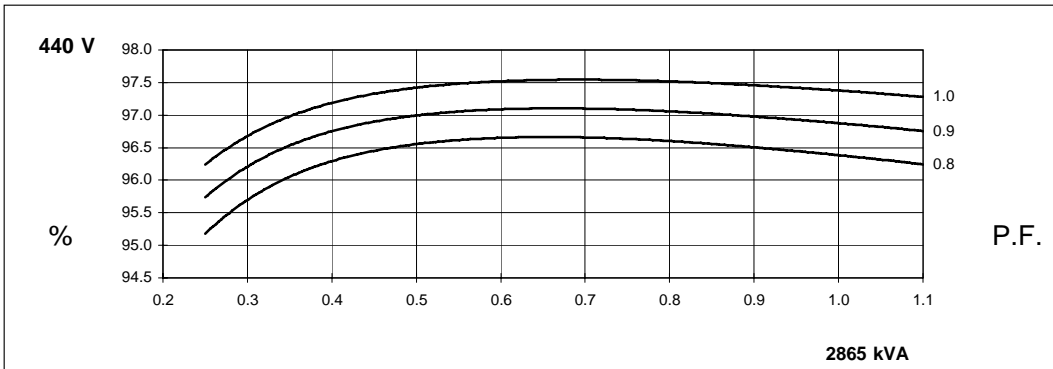
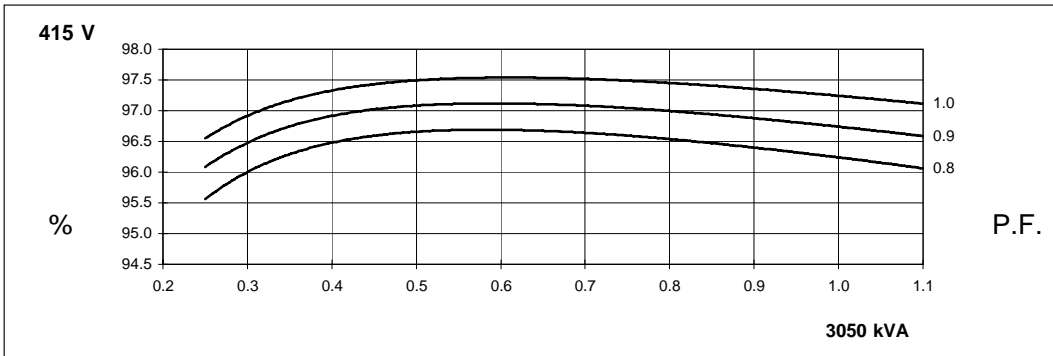
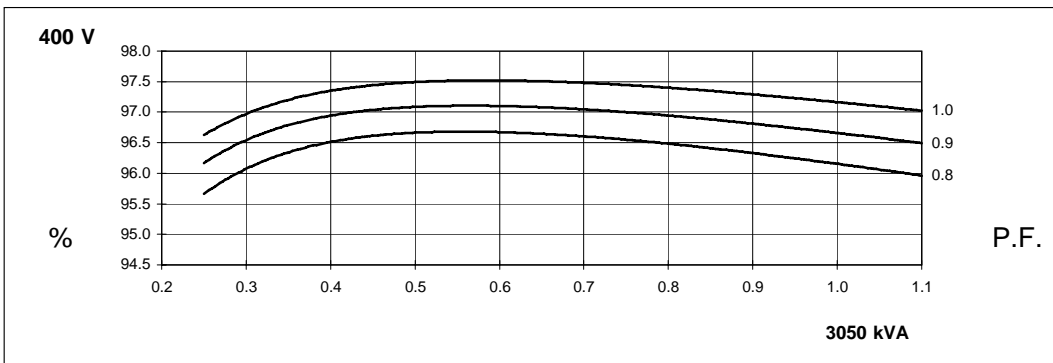
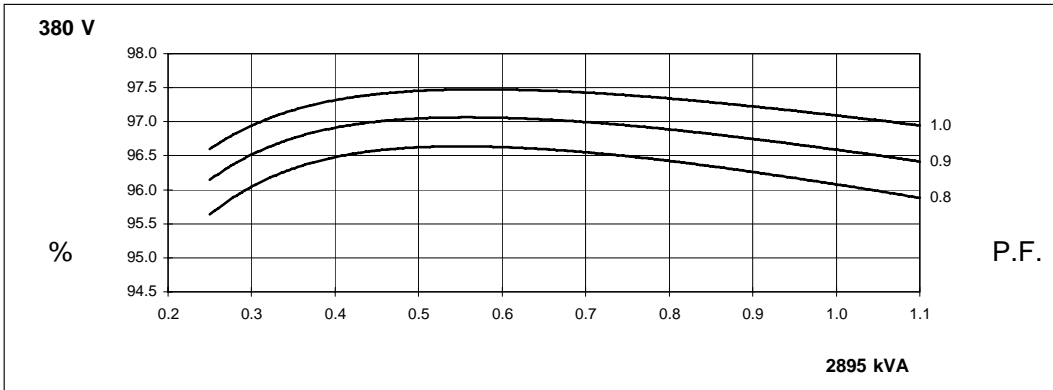
# FRAME LV 804 T WINDING 12

**STAMFORD | AvK**

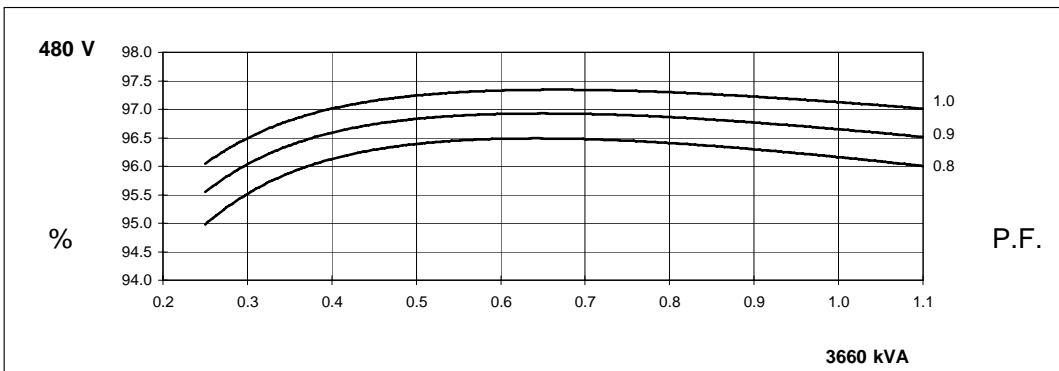
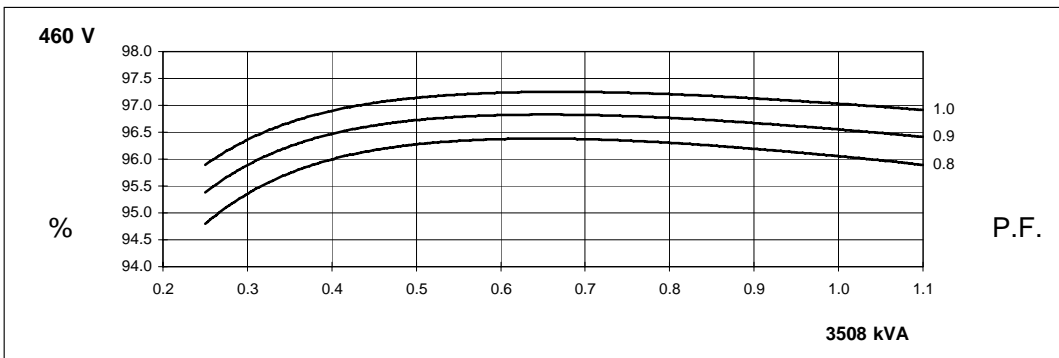
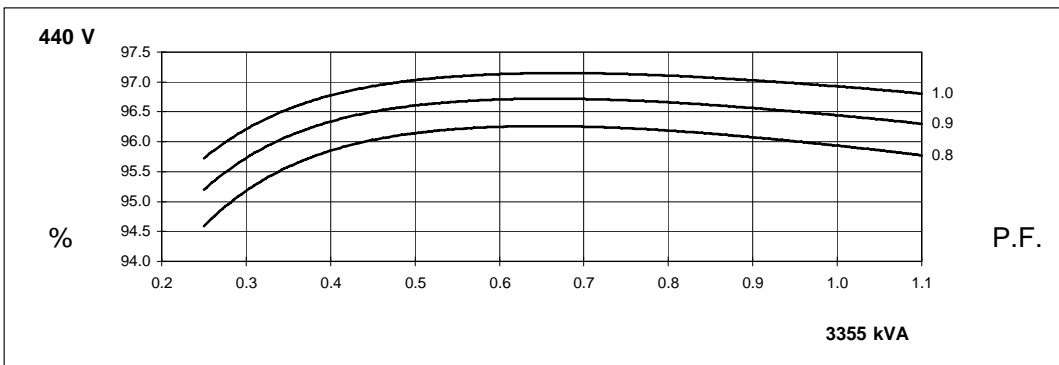
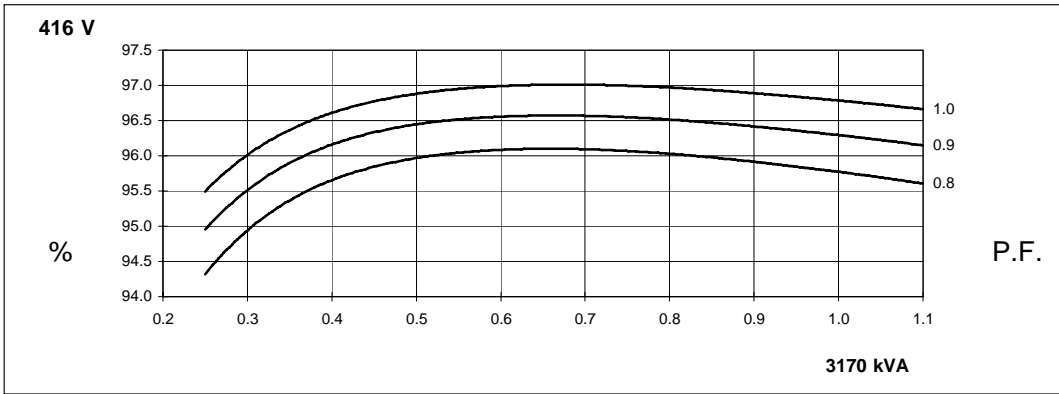
RATINGS	REFER TO SALES AND SERVICE BRIEFING							
MAXIMUM ALTITUDE	1000 METRES ABOVE SEA LEVEL							
MAXIMUM AMBIENT TEMPERATURE	40° C							
CONTROL SYSTEM SERIES 3	SEPARATELY EXCITED BY P.M.G.							
A.V.R.	FULL WAVE RECTIFIED							
VOLTAGE REGULATION	± 0.5% WITH 4% ENGINE GOVERNING							
SUSTAINED SHORT CIRCUIT	REFER TO SHORT CIRCUIT DECREMENT CURVES OF THIS SECTION							
INSULATION SYSTEM	CLASS H							
PROTECTION	IP23 STANDARD							
RATED POWER FACTOR	0.8							
STATOR WINDING	DOUBLE LAYER LAP							
WINDING PITCH	2/3							
WINDING LEADS	6							
R.F.I. SUPPRESSION	BS EN 50081/2-1/2 VDE 0875G VDE 0875N For other standards apply to the factory							
WAVEFORM DISTORTION	NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 3.0%							
MAXIMUM OVERSPEED	2250 Rev/Min							
BEARING DRIVE END	ISO 6232 C3							
BEARING NON DRIVE END	ISO 6324 C3							
EFFICIENCY	REFER TO EFFICIENCY CURVES OF THIS SECTION							
FREQUENCY	50Hz				60Hz			
TELEPHONE INTERFERENCE	THF < 2%				TIF < 50			
COOLING AIR	3.2 m <sup>3</sup> /sec				3.7 m <sup>3</sup> /sec			
VOLTAGE STAR (Y)	380	400	415	440	416	440	460	480
kVA BASE RATING FOR REACTANCE VALUES	2895	3050	3050	2865	3170	3355	3508	3660
X <sub>d</sub> DIRECT AXIS SYNCHRONOUS	2.84	2.70	2.51	2.10	3.11	2.95	2.82	2.70
X' <sub>d</sub> DIRECT AXIS TRANSIENT	0.207	0.197	0.183	0.153	0.227	0.215	0.206	0.197
X'' <sub>d</sub> DIRECT AXIS SUB-TRANSIENT	0.151	0.144	0.134	0.112	0.166	0.157	0.150	0.144
X <sub>q</sub> QUADRATURE AXIS REACTANCE	1.91	1.82	1.69	1.41	2.10	1.99	1.90	1.82
X'' <sub>q</sub> QUAD. AXIS SUB-TRANSIENT	0.283	0.269	0.250	0.209	0.310	0.293	0.281	0.269
X <sub>L</sub> LEAKAGE REACTANCE	0.090	0.086	0.080	0.067	0.099	0.094	0.090	0.086
X <sub>2</sub> NEGATIVE PHASE SEQUENCE	0.219	0.208	0.193	0.161	0.240	0.227	0.217	0.208
X <sub>0</sub> ZERO PHASE SEQUENCE	0.028	0.027	0.025	0.021	0.031	0.029	0.028	0.027
REACTANCES ARE SATURATED	VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED TO IEC60034 TOLERANCES							
T <sub>d</sub> TRANSIENT TIME CONSTANT	0.190							
T'' <sub>d</sub> SUB-TRANSIENT TIME CONSTANT	0.015							
T' <sub>do</sub> O.C. FIELD TIME CONSTANT	4.400							
T <sub>a</sub> ARMATURE TIME CONSTANT	0.072							
SHORT CIRCUIT RATIO	1/X <sub>d</sub>							
STATOR WINDING RESISTANCE (L-N)	0.000439							
ROTOR WINDING RESISTANCE	1.500							
EXCITER STATOR FIELD RESISTANCE	17.50							
EXCITER ROTOR RESISTANCE (L-L)	0.076							
PMG STATOR RESISTANCE (L-L)	3.800							
	RESISTANCE VALUES ARE IN OHMS AT 20° C							
NO LOAD EXCITATION VOLTAGE	15.0							
FULL LOAD EXCITATION VOLTAGE	63.0							

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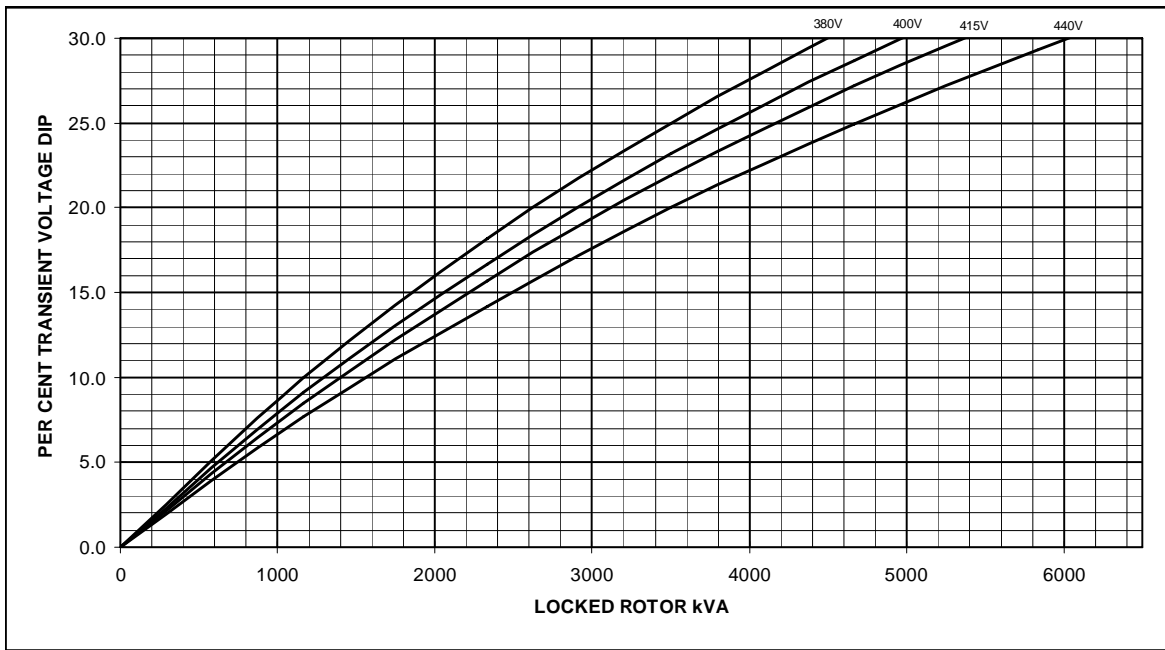
THREE PHASE EFFICIENCY CURVES



THREE PHASE EFFICIENCY CURVES



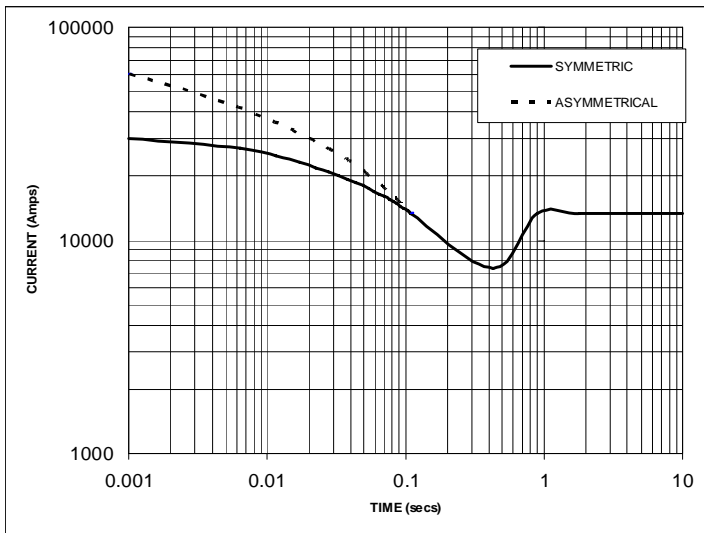
FULL WAVE RECTIFIED AVR  
 LOCKED ROTOR MOTOR STARTING CURVE



FRAME LV 804 T WDG 12 50Hz

Three Phase Short Circuit Decrement Curve  
 No- Load Excitation at Rated Speed

Based on series star (wye) connection



NOTE 1  
 THE FOLLOWING MULTIPLICATION FACTORS SHOULD BE USED TO ADJUST THE VALUES FROM CURVES BETWEEN THE 0.001 SECONDS AND THE MINIMUM CURRENT POINT IN RESPECT OF NOMINAL OPERATING VOLTAGE

VOLTAGE	FACTOR
380V	X 0.95
400V	X 1.00
415V	X 1.04
440V	X 1.10

THE SUSTAINED CURRENT VALUE IS CONSTANT IRRESPECTIVE OF VOLTAGE LEVEL

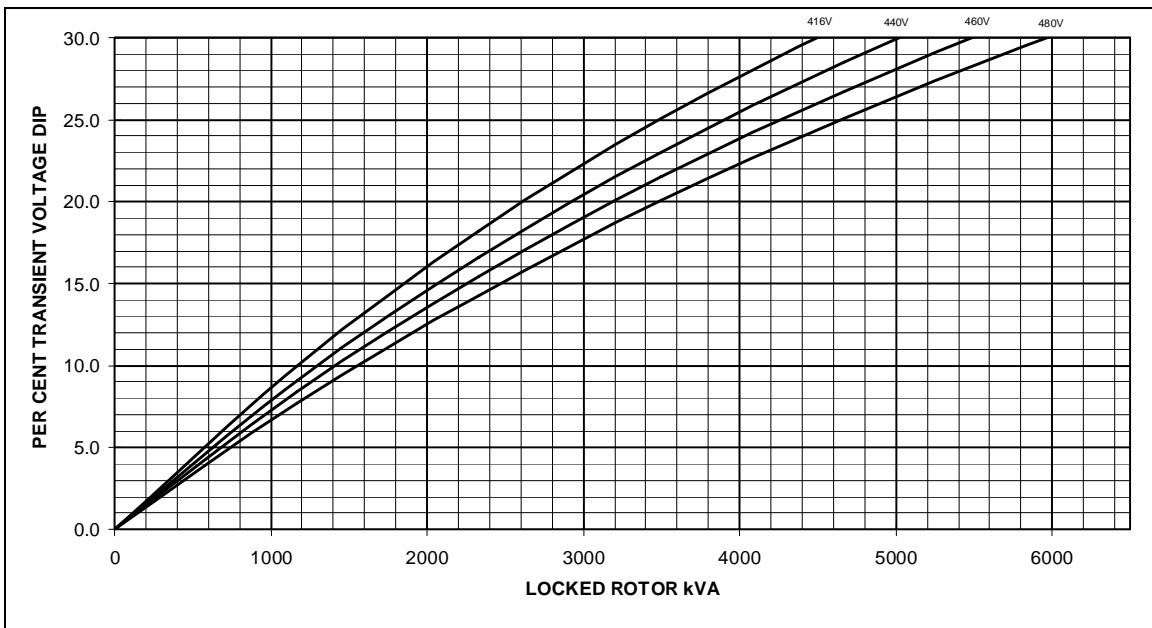
NOTE 2  
 THE FOLLOWING MULTIPLICATION FACTORS SHOULD BE USED TO CONVERT THE VALUES CALCULATED IN ACCORDANCE WITH NOTE 1 TO THOSE APPLICABLE TO THE VARIOUS TYPES OF SHORT CIRCUIT

	3 PHASE	2 PHASE L-L	1 PHASE L-N
INSTANTANEOUS	X 1.0	X 0.87	X 1.30
MINIMUM	X 1.0	X 1.80	X 3.20
SUSTAINED	X 1.0	X 1.50	X 2.50
MAX SUSTAINED DURATION	10 SEC	5 SEC	2 SEC

ALL OTHER TIMES ARE UNCHANGED

SUSTAINED SHORT CIRCUIT = 13427 Amps

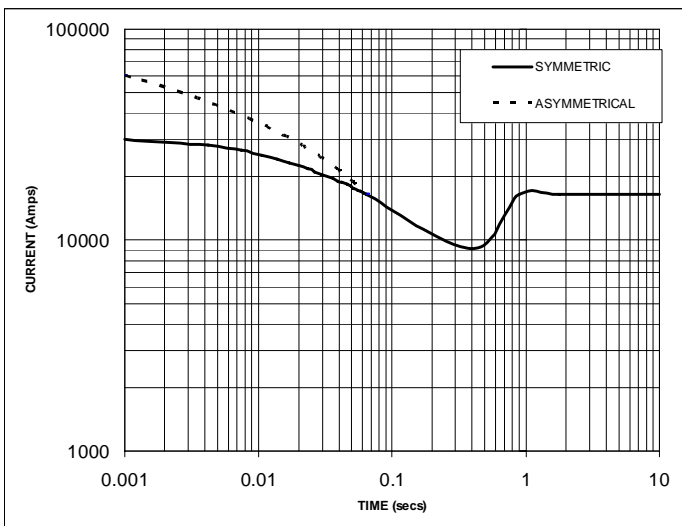
FULL WAVE RECTIFIED AVR  
 LOCKED ROTOR MOTOR STARTING CURVE



FRAME LV 804 T WDG 12 60Hz

Three Phase Short Circuit Decrement Curve  
 No- Load Excitation at Rated Speed

Based on series star (wye) connection



NOTE 1  
 THE FOLLOWING MULTIPLICATION FACTORS SHOULD BE USED TO ADJUST THE VALUES FROM CURVES BETWEEN THE 0.001 SECONDS AND THE MINIMUM CURRENT POINT IN RESPECT OF NOMINAL OPERATING VOLTAGE

VOLTAGE	FACTOR
416V	X 0.87
440V	X 0.92
460V	X 0.96
480V	X 1.00

THE SUSTAINED CURRENT VALUE IS CONSTANT IRRESPECTIVE OF VOLTAGE LEVEL

NOTE 2  
 THE FOLLOWING MULTIPLICATION FACTORS 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 1.0	X 0.87	X 1.30
MINIMUM	X 1.0	X 1.80	X 3.20
SUSTAINED	X 1.0	X 1.50	X 2.50
MAX SUSTAINED DURATION	10 SEC	5 SEC	2 SEC

ALL OTHER TIMES ARE UNCHANGED

SUSTAINED SHORT CIRCUIT = 16509 Amps

**FRAME LV 804 T**  
**WINDING 12      0.8 Power Factor**

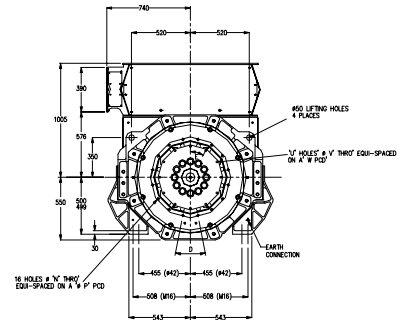
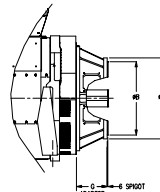
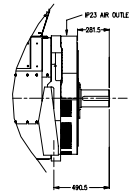
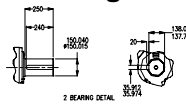
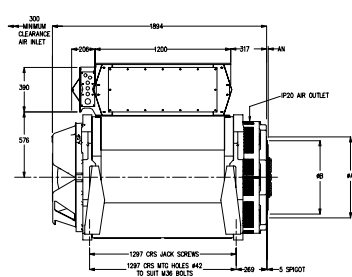


**RATINGS**

Class - Temp Rise		Cont. F - 105/40°C				Cont. H - 125/40°C				Standby - 150/40°C				Standby - 163/27°C			
<b>50Hz</b>	Star (V)	380	400	415	440	380	400	415	440	380	400	415	440	380	400	415	440
	kVA	2660	2800	2800	2630	2895	3050	3050	2865	3095	3260	3260	3065	3180	3350	3350	3150
	kW	2128	2240	2240	2104	2316	2440	2440	2292	2476	2608	2608	2452	2544	2680	2680	2520
	Efficiency (%)	96.2	96.3	96.3	96.4	96.1	96.2	96.2	96.4	95.9	96.0	96.1	96.3	95.9	96.0	96.1	96.3
	kW Input	2212	2327	2325	2182	2411	2538	2535	2378	2581	2716	2713	2547	2653	2792	2789	2618
<b>60Hz</b>	Star (V)	416	440	460	480	416	440	460	480	416	440	460	480	416	440	460	480
	kVA	2910	3080	3220	3360	3170	3355	3508	3660	3390	3590	3752	3915	3490	3690	3857	4025
	kW	2328	2464	2576	2688	2536	2684	2806	2928	2712	2872	3002	3132	2792	2952	3086	3220
	Efficiency (%)	95.9	96.0	96.1	96.2	95.8	95.9	96.1	96.2	95.7	95.8	95.9	96.1	95.6	95.8	95.9	96.0
	kW Input	2429	2566	2680	2793	2648	2798	2922	3045	2835	2998	3129	3261	2920	3082	3217	3354

**TYPICAL DIMENSIONS - Further arrangements available - please refer to factory**

P80 R/S/T CORES



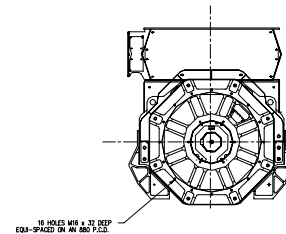
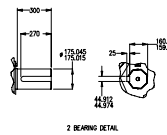
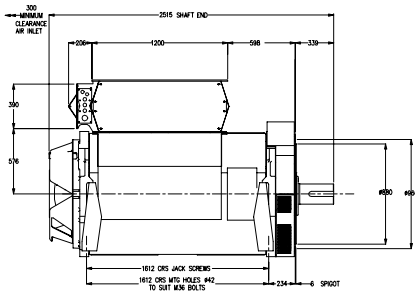
P80 R/S/T CORES 1-BRG ADAPTORS					
SAE	A	B	N	P	D
SAE 0	711	647.7	14	679.5	22.5"
SAE 00	883	787.4	14	851.0	22.5"

P80 R/S/T/W/X CORES 1-BRG COUPLING DISC						
SAE	AN	C	U	V	W	E
18	15.9	571.4	12	16.7	543.0	30"
21	0	673.0	12	16.7	641.3	30"
24	0	733.3	12	20.7	692.0	30"

P80 R/S/T/W/X CORES 2-BRG ADAPTORS		
SAE	A	G
P80 R/S/T	0	271.5
P80 R/S/T	00	271.5
P80 W/X	0	271.5
P80 W/X	00	329.0

P80 R/S/T/W/X CORES 2-BRG ADAPTORS					
SAE	A	B	N	P	D
SAE 0	711	647.7	14	679.5	22.5"
SAE 00	883	787.4	14	851.0	22.5"

P80 W/X CORES



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