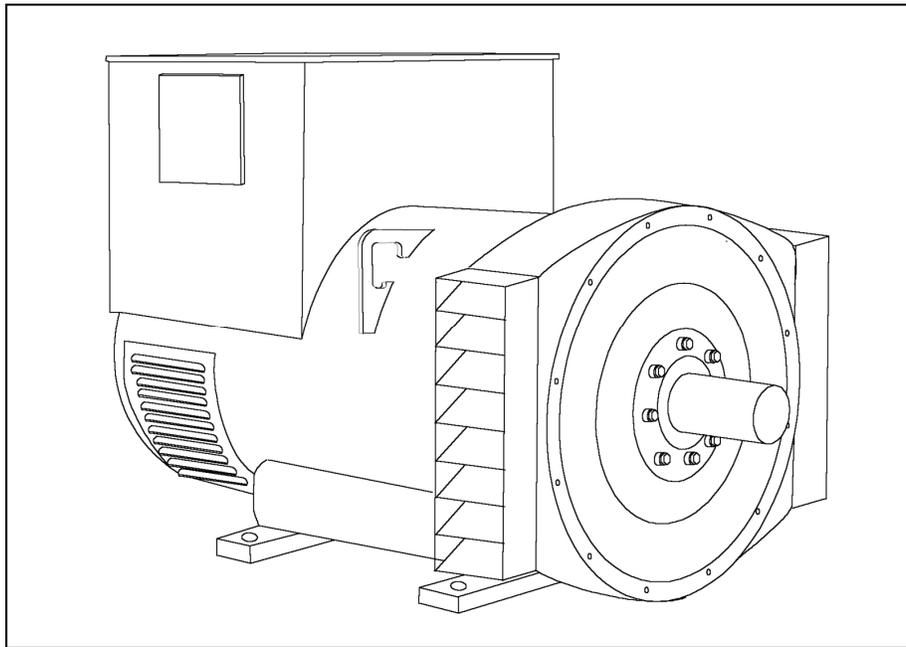


# STAMFORD<sup>®</sup>

**HCM534F - Winding 25**

Technical Data Sheet



**SPECIFICATIONS & OPTIONS****STANDARDS**

Marine generators may be certified to Lloyds, DnV, Bureau Veritas, ABS, Germanischer-Lloyd or RINA. Other standards and certifications can be considered on request.

**VOLTAGE REGULATORS****MX341 AVR - STANDARD**

This sophisticated Automatic Voltage Regulator (AVR) is incorporated into the Stamford Permanent Magnet Generator (PMG) control system, and is standard on marine generators of this type.

The PMG provides power via the AVR to the main exciter, giving a source of constant excitation power independent of generator output. The main exciter output is then fed to the main rotor, through a full wave bridge, protected by a surge suppressor. The AVR has in-built protection against sustained over-excitation, caused by internal or external faults. This de-excites the machine after a minimum of 5 seconds. An engine relief load acceptance feature can enable full load to be applied to the generator in a single step. If three-phase sensing is required with the PMG system the MX321 AVR must be used.

We recommend three-phase sensing for applications with greatly unbalanced or highly non-linear loads.

**MX321 AVR**

The most sophisticated of all our AVRs combines all the features of the MX341 with, additionally, three-phase rms sensing, for improved regulation and performance.

Over voltage protection is built-in and short circuit current level adjustments is an optional facility.

**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, when in parallel with the mains. 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 waveform distortion.

**TERMINALS & TERMINAL BOX**

Standard generators are 3-phase reconnectable with 12 ends brought out to the terminals, which are mounted on a cover 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.

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%.

**DE RATES**

All values tabulated on page 6 are subject to the following reductions

5% when air inlet filters are fitted.

3% for every 500 metres by which the operating altitude exceeds 1000 metres above mean sea level.

3% for every 5°C by which the operational ambient temperature exceeds 50°C.

Note: Requirement for operating in an ambient exceeding 60°C must be referred to the factory.

*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 typical of product range.*

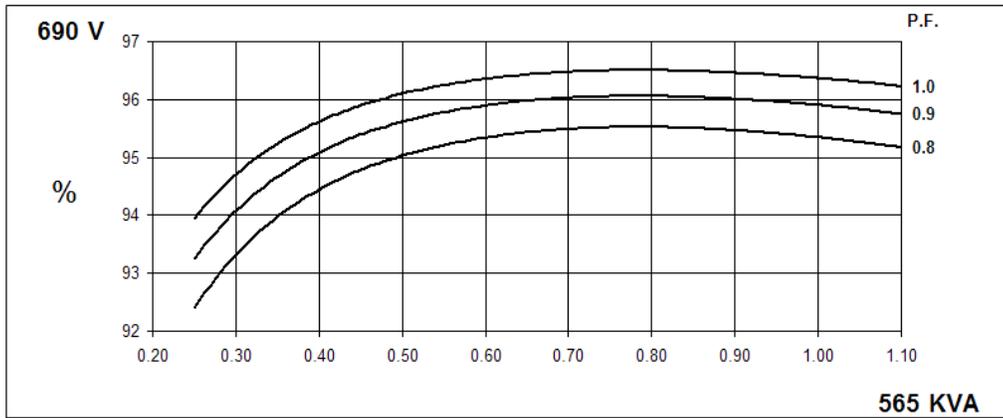
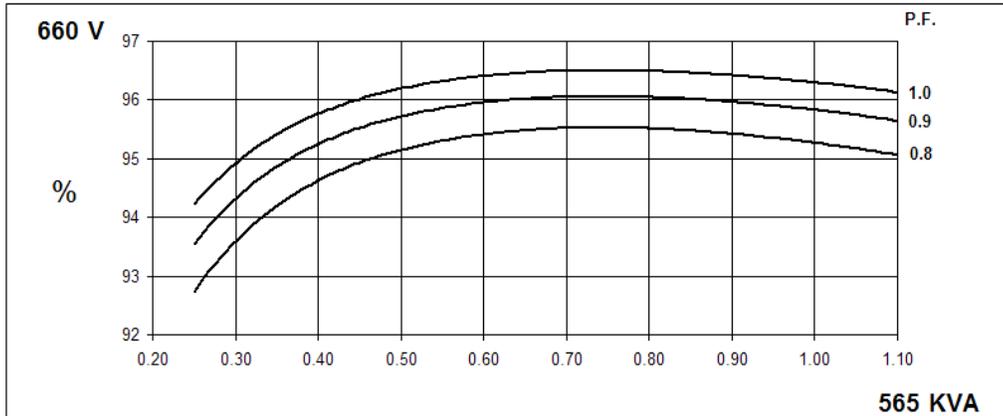
# HCM534F

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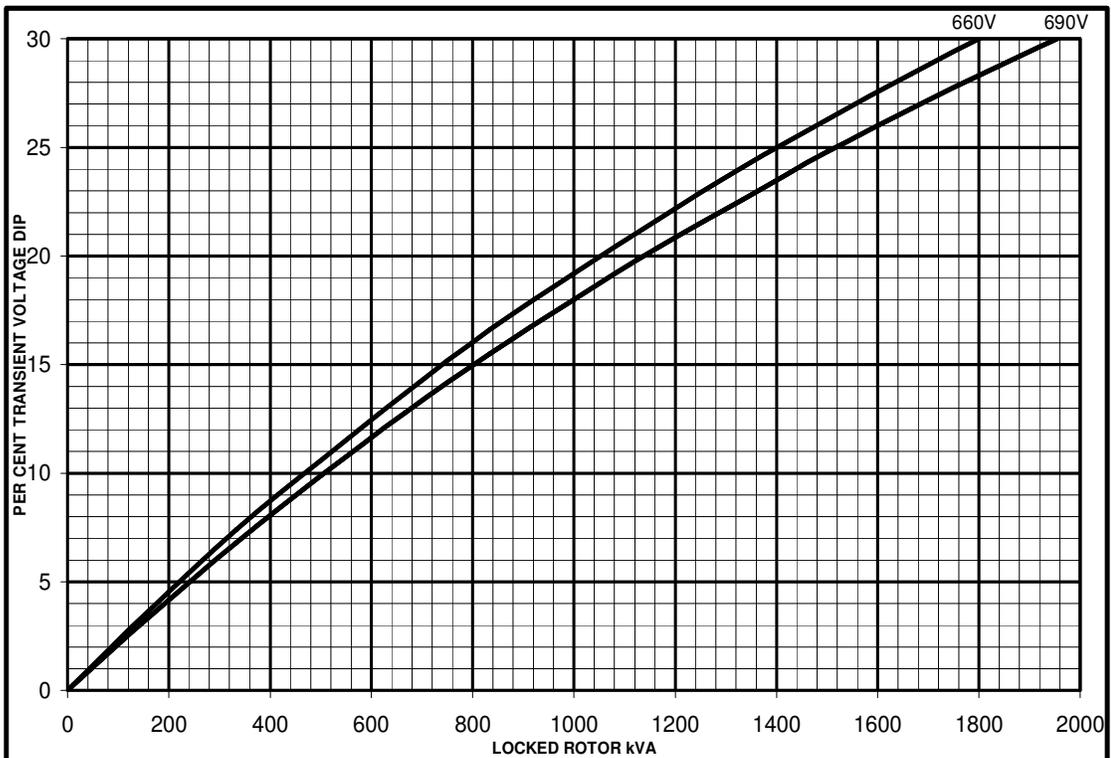
## WINDING 25

CONTROL SYSTEM	SEPARATELY EXCITED BY P.M.G.		
A.V.R.	MX321	MX341	
VOLTAGE REGULATION	± 0.5 %	± 1.0 %	With 4% ENGINE GOVERNING
SUSTAINED SHORT CIRCUIT	REFER TO SHORT CIRCUIT DECREMENT CURVES (page 5)		
INSULATION SYSTEM	CLASS H		
PROTECTION	IP23		
RATED POWER FACTOR	0.8		
STATOR WINDING	DOUBLE LAYER LAP		
WINDING PITCH	TWO THIRDS		
WINDING LEADS	12		
STATOR WDG. RESISTANCE	0.01 Ohms PER PHASE AT 22°C SERIES STAR CONNECTED		
ROTOR WDG. RESISTANCE	2.16 Ohms at 22°C		
EXCITER STATOR RESISTANCE	17 Ohms at 22°C		
EXCITER ROTOR RESISTANCE	0.092 Ohms PER PHASE AT 22°C		
R.F.I. 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%		
MAXIMUM OVERSPEED	2250 Rev/Min		
BEARING DRIVE END	BALL. 6220 (ISO)		
BEARING NON-DRIVE END	BALL. 6314 (ISO)		
	1 BEARING	2 BEARING	
WEIGHT COMP. GENERATOR	1685 kg	1694 kg	
WEIGHT WOUND STATOR	805 kg	805 kg	
WEIGHT WOUND ROTOR	684 kg	655 kg	
WR <sup>2</sup> INERTIA	10.033 kgm <sup>2</sup>	9.7551 kgm <sup>2</sup>	
SHIPPING WEIGHTS in a crate	1775 kg	1780 kg	
PACKING CRATE SIZE	166 x 87 x 124(cm)	166 x 87 x 124(cm)	
TELEPHONE INTERFERENCE	THF<2%	TIF<50	
COOLING AIR	1.035 m <sup>3</sup> /sec 2202 cfm		
VOLTAGE SERIES STAR	660	690	
VOLTAGE PARALLEL STAR	330	345	
VOLTAGE SERIES DELTA	380	400	
kVA BASE RATING FOR REACTANCE VALUES	565	565	
X <sub>d</sub> DIR. AXIS SYNCHRONOUS	2.25	2.05	
X' <sub>d</sub> DIR. AXIS TRANSIENT	0.12	0.11	
X'' <sub>d</sub> DIR. AXIS SUBTRANSIENT	0.08	0.08	
X <sub>q</sub> QUAD. AXIS REACTANCE	1.88	1.71	
X'' <sub>q</sub> QUAD. AXIS SUBTRANSIENT	0.19	0.18	
X <sub>L</sub> LEAKAGE REACTANCE	0.03	0.03	
X <sub>2</sub> NEGATIVE SEQUENCE	0.13	0.13	
X <sub>0</sub> ZERO SEQUENCE	0.07	0.06	
REACTANCES ARE SATURATED		VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED	
T' <sub>d</sub> TRANSIENT TIME CONST.	0.08 s		
T'' <sub>d</sub> SUB-TRANSTIME CONST.	0.012 s		
T' <sub>do</sub> O.C. FIELD TIME CONST.	2.5 s		
T <sub>a</sub> ARMATURE TIME CONST.	0.019 s		
SHORT CIRCUIT RATIO	1/X <sub>d</sub>		

**THREE PHASE EFFICIENCY CURVES**



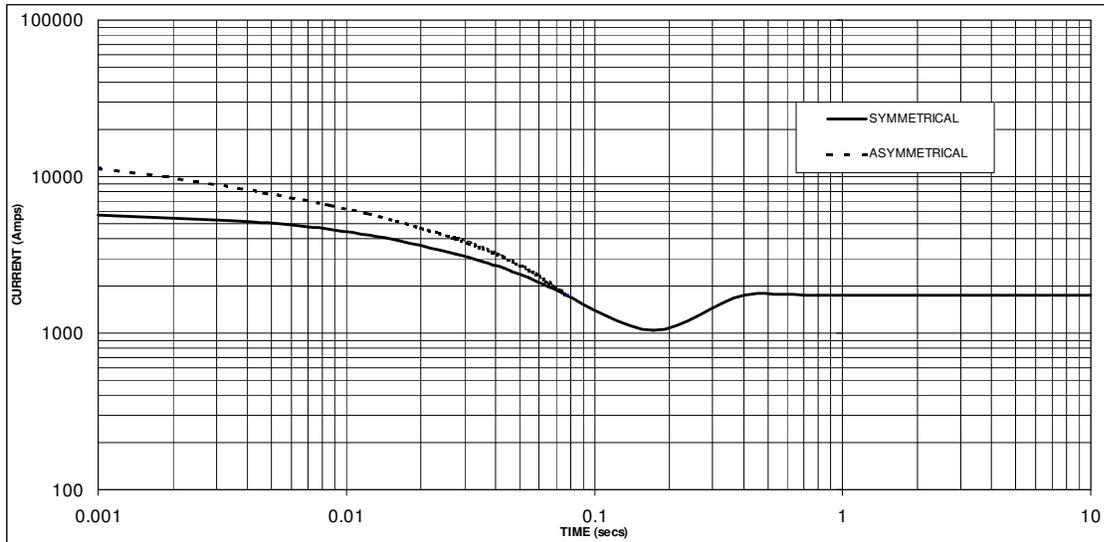
**Locked Rotor Motor Starting Curve**



**HCM534F**  
Winding 25

**STAMFORD**

**Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed  
Based on star (wye) connection.**



Sustained Short Circuit = 1740 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 :

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

# HCM534F

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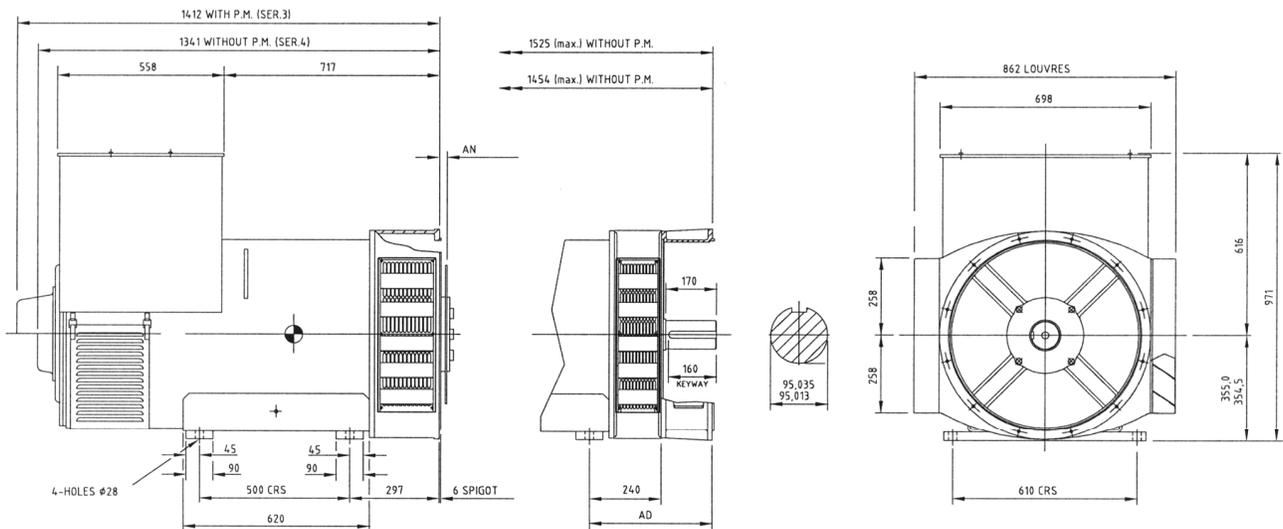
Winding 25 / 0.8 Power Factor

**50Hz**

## RATINGS

Class - Temp Rise	Cont. B - 70/50 °C		Cont. F - 90/50 °C		Cont. H - 110/50 °C	
Series Star (V)	660	690	660	690	660	690
Parallel Star (V)	330	345	330	345	330	345
Series Delta (V)	380	400	380	400	380	400
kVA	440	440	505	505	565	565
kW	352	352	404	404	452	452
Efficiency (%)	95.5	95.5	95.4	95.5	95.3	95.3
kW Input	369	369	423	423	475	474

## DIMENSIONS



COUPLING DISC	AN
SAE 16	25.4
SAE 18	15.87
SAE 21	0

ADAPTOR	AD
SAE 00	410
SAE 0	410
SAE 1/2	390
SAE 1	390

**STAMFORD**

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