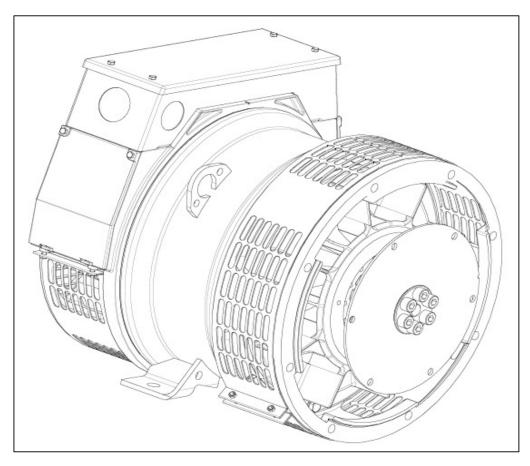


PM044D - Technical Data Sheet Winding 06



# PM044D



## **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 REGULATOR**

#### AS480 AVR

With this self-excited system the main stator provides power via the AVR to the exciter stator. The high efficiency semiconductors of the AVR ensure positive build-up from initial low levels of residual voltage.

The exciter rotor output is fed to the main rotor through a three-phase full-wave bridge rectifier. The rectifier is protected by a surge suppressor against surges caused, for example, by short circuit or out-of-phase paralleling. The AS480 will support limited accessories, RFI suppession remote voltage trimmer and for the P1 range only a 'droop' Current Transformer (CT) to permit parallel operation with other ac generators.

The AVR is can be fitted to either side of the generator in its own housing in the non-drive end bracket.

#### **Excitation Boost System (EBS)**

The EBS is a single, self-contained unit, attached to the nondrive end of the generator.

The EBS unit consists of the Excitation Boost Controller (EBC) and an Excitation Boost Generator (EBG). Under fault conditions, or when the generator is subjected to a large impact load such as a motor starting, the generator voltage will drop. The EBC senses the drop in voltage and engages the output power of the EBG. This additional power feeds the generator's excitation system, supporting the load until breaker discrimination can remove the fault or enable the generator to pick up a motor and drive the voltage recovery.

#### 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

Dedicated Single Phase generators have 4 ends brought out to the terminals, which are mounted at the non-drive end of the generator. A sheet steel terminal box contains provides ample space for the customers' wiring and gland arrangements. Alternative terminal boxes are available for customers who want to fit additional components in the terminal box.

#### 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  $60 \,^{\circ}$ 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.





## WINDING 06

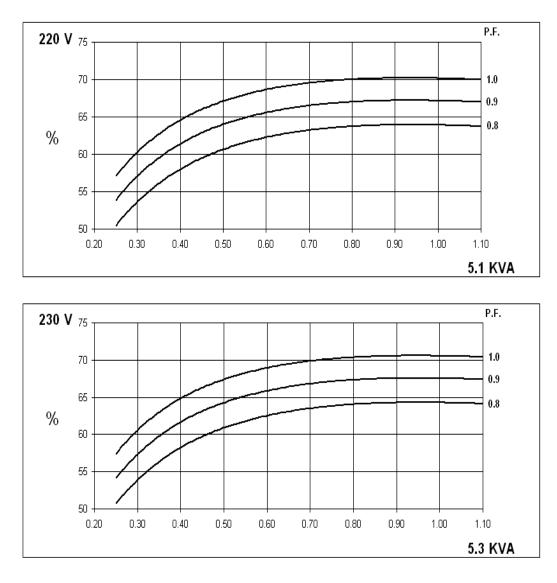
CONTROL SYSTEM	STANDARD AS480 AVR (	SELF EXCI	TED)						
VOLTAGE REGULATION	± 1.0 %								
SUSTAINED SHORT CIRCUIT	SELF EXCITED MACHINES DO NOT SUSTAIN A SHORT CIRCUIT CURRENT								
CONTROL SYSTEM	AS480 AVR WITH OPTIO	NAL EXCIT	ATION BOOST S	SYSTEM (EBS)					
SUSTAINED SHORT CIRCUIT	REFER TO SHORT CIRCU	UIT DECRE	MENT CURVE (	page 5)					
INSULATION SYSTEM	CLASS H								
PROTECTION	IP23								
RATED POWER FACTOR	0.8								
STATOR WINDING	SINGLE LAYER CONCENTRIC								
WINDING PITCH	TWO THIRDS								
WINDING LEADS	4								
STATOR WDG. RESISTANCE	0.823 Ohms AT 22 °C SERIES CONNECTED								
ROTOR WDG. RESISTANCE	0.437 Ohms at 22℃								
EXCITER STATOR RESISTANCE	17.5 Ohms at 22 ℃								
EXCITER ROTOR RESISTANCE	0.211 Ohms PER PHASE AT 22 ℃								
EBS STATOR RESISTANCE	12.9 Ohms at 22 ℃								
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 LINEAR LOAD < 5.0%								
MAXIMUM OVERSPEED	2250 Rev/Min								
BEARING DRIVE END	BALL. 6309-2RS (ISO)								
BEARING NON-DRIVE END	BALL. 6306-2RS (ISO)								
	1 BEA		2 BEARING						
	WITH EBS	WITH	OUT EBS	WITH EBS		WITHOUT EBS			
WEIGHT COMP. GENERATOR	75 kg	7	3.3 kg	78 kg		76.3 kg			
WEIGHT WOUND STATOR	24 kg		24 kg	24 kg		24 kg			
WEIGHT WOUND ROTOR	26.31 kg		24.61 kg 27.5			25.62 kg			
WR <sup>2</sup> INERTIA	0.0893 kgm <sup>2</sup> 0		376 kgm <sup>2</sup>	0.0895 kgm <sup>2</sup>		0.0878 kgm <sup>2</sup>			
SHIPPING WEIGHTS in a crate	92 kg	9	0.3 kg	101 kg	101 kg 99				
PACKING CRATE SIZE	71 x 51 :	x 67 (cm)		-	71 x 51 x 67 (cm)				
TELEPHONE INTERFERENCE	THF	<2%	TIF<50						
COOLING AIR		0.135 m³/se	286 cfm						
VOLTAGE SERIES	220		230		240				
VOLTAGE PARALLEL	110		115		120				
kVA BASE RATING FOR REACTANCE VALUES	5.1		5.3		5.5				
Xd DIR. AXIS SYNCHRONOUS	1.77		1.68		1.60				
X'd DIR. AXIS TRANSIENT	0.18		0.17		0.16				
X"d DIR. AXIS SUBTRANSIENT	0.11		0.11		0.10				
Xq QUAD. AXIS REACTANCE	0.84		0.80		0.77				
X"q QUAD. AXIS SUBTRANSIENT	0.18		0.18		0.17				
XL LEAKAGE REACTANCE	0.07		0.06		0.06				
X2 NEGATIVE SEQUENCE	0.16		0.15		0.14				
X <sub>0</sub> ZERO SEQUENCE	0.08		0.0	)7	0.07				
REACTANCES ARE SATURAT	ſED	VALUES A	RE PER UNIT A	T RATING AND VO	OLTAGE	INDICATED			
T'd TRANSIENT TIME CONST.	ANSIENT TIME CONST. 0.006 s								
	0.002 s								
T'do O.C. FIELD TIME CONST. Ta ARMATURE TIME CONST.	0.15 s								
SHORT CIRCUIT RATIO	0.007 s 1/Xd								
			1/2	NU					

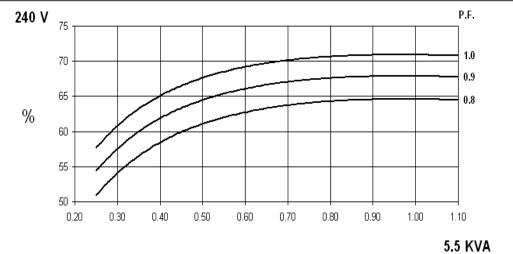


# PM044D

Winding 06

## SINGLE PHASE EFFICIENCY CURVES

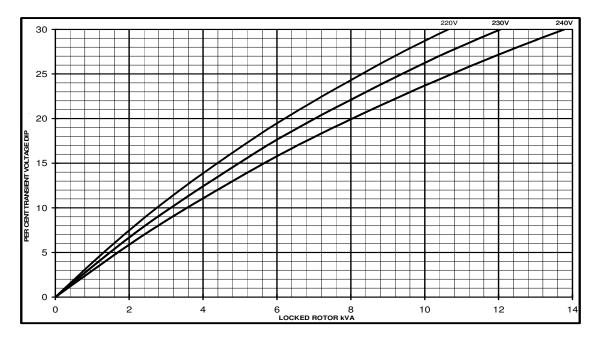




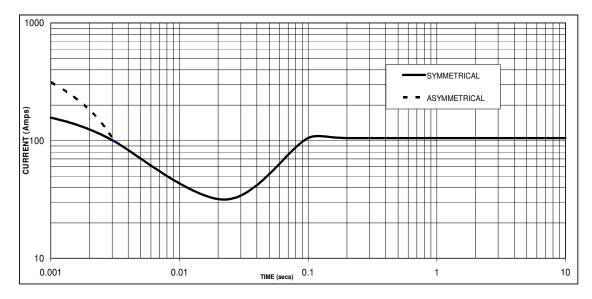


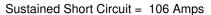
PM044D

Winding 06 Locked Rotor Motor Starting Curve



Short Circuit Decrement Curve. No-load Excitation at Rated Speed Based on series connection.





Note

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
220V	X 1.00
230V	X 1.05
240V	X 1.09

The sustained current value is constant irrespective of voltage level

# **STAMFORD**

# **PM044D**

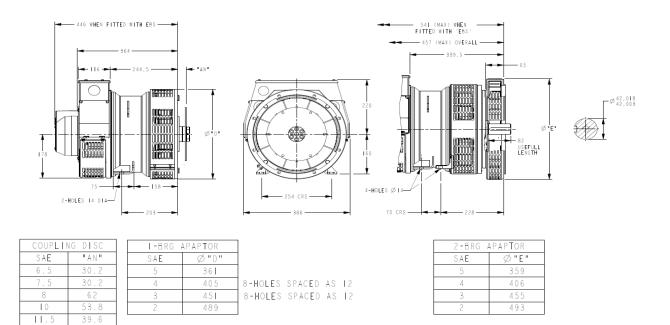
Winding 06 / 0.8 Power Factor

60	Hz
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## RATINGS

Class - Temp Rise	Cont. E - 65/50 ℃			Cont. B - 70/50 ℃		Cont. F - 90/50 <i>°</i> C			Cont. H - 110/50 ℃			
Series (V)	220	230	240	220	230	240	220	230	240	220	230	240
Parallel (V)	110	115	120	110	115	120	110	115	120	110	115	120
kVA	3.9	4.1	4.2	4.1	4.2	4.4	4.6	4.8	5.0	5.1	5.3	5.5
kW	3.1	3.3	3.4	3.3	3.4	3.5	3.7	3.8	4.0	4.1	4.2	4.4
Efficiency (%)	63.5	63.9	64.1	63.7	64.0	64.3	63.9	64.3	64.5	63.9	64.3	64.6
kW Input	4.9	5.1	5.2	5.1	5.3	5.5	5.8	6.0	6.2	6.4	6.6	6.8

## DIMENSIONS



STAMFORD

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