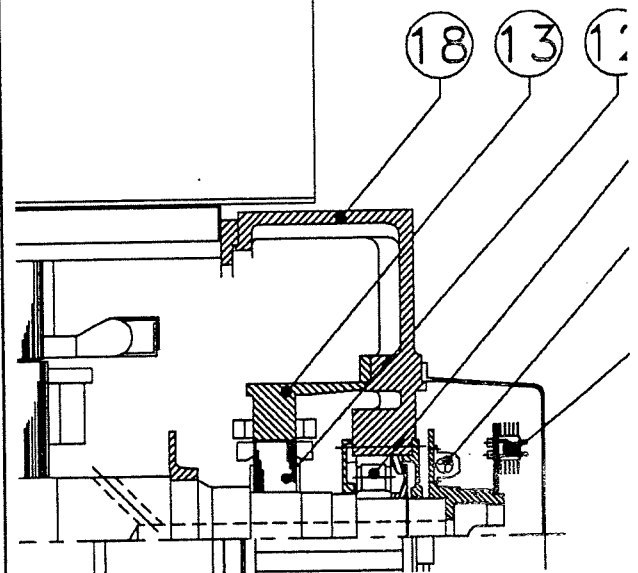


## SYNCHRONOUS ALTERNATOR

Serial number : 164738

Type : LSA 52 VL9 /4P  
Power : 1500 KVA  
Voltage : 6600 V  
Frequency : 50 Hz  
Power factor : 0,8  
Speed : 1500 RPM



## ALTERNATORS

Instruction manual

## VOLUME CONTENTS

section	0	Volume contents Foreword
section	1	Generator Data sheet Spare parts list
section	2	Test report (including A.V.R. Data sheet and adjustment)
section	3	Generator Service manual
section	4	Automatic Voltage Regulator manual
section	5	Attached drawing Attached special notice

## FOREWORD

### WARNING

#### GENERAL

This installation and maintenance manual concerns a complete range of machines.

Section 1 of this manual "Data sheet "  
enables you to identify the constitutive elements of your particular machine

# Generator unit Service Manual

## Section 1

### 1. TECHNICAL DATA AND PERFORMANCE

#### 1.1 General characteristic

Project	6027 343 Barry P.S. Wales	<b>Excitation</b>	
Type	LSA52 VL9 / 4p	Excitation	Brushless
Serial Nr	164 738	Voltage regulation	shunt
Synchronous	Triphased		
Connections	Star	<b>Protections stator</b>	
Rated output	1500 KVA	Space heater (W)	500
Voltage	6600 V	under (V)	220
Frequency	50 Hz	Stator winding sensor	6 PT100
Power Factor	0.8		
Polarity	4		
Speed	1500 RPM		
Machine protection	IP 23		
Insulation	F		
Temperatue rise	F		
Generator air gap	4 mm		
Exciter air gap	1 mm		
Ambient temperature	40 °C		
Cooling	IC 0 A1		
Weight of rotor	1667 Kg		
Total weight	4960 Kg		

#### 1.2 Roller/ball bearing technical data

	Drive End side	Non drive End side
Type	6232 MC3	NU 1028 MC3
PERIODICITY OF GREASING		
(at least once each 6 months)		
Quantity of grease (gr)	70	70
Each (hours)	2800	2800



Société Commerciale des Ateliers de Constructions Electriques d'Orléans


**ACEO**

PROCES VERBAL D'ESSAIS  
TEST REPORT

Client: L. S. ANGLETERRE Commande 602 23 43 Destination: F. G. WILSON  
 Customer: Order BARRY POWER STATION WALES  
 Alternateur synchrone triphasé à: 50 Hz Type: LSA52 VL9-4P  
 Synchronous alternator threephased at:

Excitateur Type ESB315.80-12P Volts: 80 Amp: 140 Schémas SH184 0850-1E  
 Exciter Schematics S4186 4288-1B  
S4187 6729-1A  
SH1890023J S4186 8059-1B

Date d'essai Date test	N° de Cde Order Nr	N° machine Machine Nr	Nbre de pôles Nr of poles	Vitesse Speed tr/min - rpm	Puissance Power kVA	Tension Voltage V	Intensité Current A	Cos φ P.F.
12/09/97	164738	1	4	1500	1500	6600	131.2	0.8

RESISTANCE DES ENROULEMENTS EN Ω RESISTANCE OF WINDINGS IN Ω		EQUILIBRE DES TENSIONS VOLTAGE BALANCE 3X6600V		Type <u>CT: 3xT2</u> Position: <u>150-5A-65VA</u>	
A froid - Cold: <u>24.5°C</u>		ORDRE DES PHASES PHASES SEQUENCE <u>UTE</u>		COMPOUND Type: <u>3X100325</u> Position: <u>3</u>	
Stator Stator		ROTATION <u>UAVAW1</u> 		REGULATEUR type <u>RG10-3F</u> REGULATOR No <u>220</u>	
U1U2 0,2349 V1V2 0,2352 W1W2 0,2351		SONDES <u>100Ω AT 0°C</u> SENSORS <u>STATOR: 6</u>		STATOR No: <u>164738-A</u> ROTOR No: <u>164738-1</u>	
Roue polaire - Rotor <u>0,3415</u>		RESIST. RECHAUF. ANTICOND. HEATER <u>220V 500W</u> <u>100,5Ω</u>		R/I = <u>188Ω</u> <u>480x50 = 493 A</u> <u>486</u>	
Induit d'excitateur Exciter armature <u>0,02099</u> <u>0,02093</u> <u>0,02081</u>		PLAGE DE TENSION VOLTAGE RANGE <u>6600V ± 10%</u>		ICC/AN SCC/RC <u>3,7</u> REMANENT REMANENCE <u>962 V</u>	
Induct. excit. - Exciter field <u>11.657</u>					

REGULATION WITHOUT DROOP												
Charge Load	U (V)	I (A)	K	W1	W2	P (KW)	Cos φ	I Rotor (A)	I Exc. (A)	I ROSTER (A)	H2	
100%	6600	131.2	11	37.9	78.2	1200	0.8	154	346	2.90	50	
75%	6600	98.4	11	23.2	58.7	900	0.8	126	275	2.20		
50%	6600	65.6	11	15.4	39.1	600	0.8	101.2	217	1.47		
100%	6600	105	11	54.5	54.6	1200	1	101	215	2.35		
75%	6600	79.7	11	40.9	40.9	900	1	84.8	178	1.77		
50%	6600	52.5	11	27.2	27.3	600	1	71	145	1.24		
NO LOAD	6600	-	-	-	-	-	-	57.5	1.15	-	∇	

DROOP ADJUSTED AT 3% FOR // OPERATION (PERM. SHORT)  
 2nd FUNCTION ADJUSTED FOR P.F. = 0.86 CIRCUIT WITH  
 CT TYPE GB = 4.1-1A-12VA AVR = 400 A  
 EXCITATION BOARD P700 PS 1390023JMP02 GREASING CARRIED OUT

SURVITESSE - OVERSPEED 1800 tr/min - rpm 2 min

ESSAI DE RIGIDITE DIELECTRIQUE A CHAUD PENDANT 1 MINUTE DIELECTRIC RIGIDITY TEST IN HOT CONDITIONS FOR 1 MINUTE		RESISTANCE D'ISOLEMENT INSULATION RESISTANCE	
Entre stator et masse sous Between stator and ground under	<u>14200</u> Volts	Stator - Stator	<u>&gt; 5000</u> MΩ
Entre roue polaire et masse sous Between rotor and ground under	<u>20000</u> Volts	Roue polaire - Rotor	<u>&gt; 1000</u> MΩ
Entre excitateur et masse sous Between exciter and ground under	<u>1000</u> Volts	Excitateur - Exciter	<u>&gt; 1000</u> MΩ
		Exciter	<u>10 MP</u>
		Essai sur Tested by	<u>HARANT - H</u>



Société Commerciale des Ateliers de Constructions Electriques d'Orléans  
**ACEO**

CARACTERISTIQUE EN COURT CIRCUIT / SHORT CIRCUIT CHARACTERISTIC  
DETERMINATION DES PERTES / LOSSES DETERMINATION  
DETERMINATION DU RENDEMENT / EFFICIENCY DETERMINATION

Client: L.S. ANGLETERRE Commande: 602 7343 Destination: EG WILSON

Customer: Order BARRY POWER STATION, WALES

Alternateur synchrone triphasé à: 50 Hz Type: LSA 52VL9-4P

Synchronous alternator threephased at:

Excitateur Type ESB 315-80-12P Volts: 80 Amp: 140 Schémas S4184 0850-1C  
Exciter Schematics S4186 4708-1B S4187 6729-1A S4188 8059-1B

SH1890023J

Date d'essai Date test	N° de Cde Order Nr	N° machine Machine Nr	Nbre de pôles Nr of poles	Vitesse Speed tr/min - rpm	Puissance Power kVA	Tension Voltage V	Intensité Current A	Cos φ P.F.
12/09/97	166738	1	4	1500	1500	6600	131,2	0,8

Caractéristique en court circuit Short circuit characteristic			Moteur/Motor		Pertes/Losses				
I (A)	I Rotor (A)	I Exc (A)	U (V)	I (A)	P (W)	c (W)	b (W)	c (W)	P - (a+b+c) Pertes - Losses (W)
131,2	104	203	265	265	49735			564	49171
98,4	78	203	206	206	41818			399	41419
65,6	52	203	179	179	36337			301	36036
32,8	26	203	161	161	32683			244	32439
0	0	202	157	157	31714			232	31482
Pertes à vide Losses at no load									
ERN	I <sub>20</sub> (A)	I <sub>Exc</sub> (A)							
6600	57	202	222	222	44844			463	44381
13	0	202	157	157	31714			232	31482
Alternateur désaccouplé Alternator coupling disconnected									21000

DETERMINATION DU RENDEMENT PAR PERTES SEPARÉES  
DETERMINATION OF THE EFFICIENCY BY SEPARATE LOSSES METHOD

Charge/Load	R (Ω) 115 °C			
	100%	75%	50%	Cos φ
Pertes Joule stator-supplémentaires Stator copper losses-supplementaries	17689	9937	4554	
Pertes à vide totales (fer-mécaniques) Total losses at no load (iron-mechanical)	23381	23381	23381	
Pertes Joule excitation roue polaire Main field excitation copper losses R = 0,4605	10921	7310	4716	
Pertes Joule induit exciteur Exciter armature copper losses R = 0,05228	673	450	291	
Pertes Joule excitation exciteur Exciter field copper losses R = 75,720	188	119	74	
Somme des pertes Total losses	52852	41192	33016	
Puissance utile Output power	1200000	900000	600000	
Puissance absorbée Absorbed power	1252852	941192	633016	
Rendement en % Efficiency in %	9578	9560	9478	
Pertes fer - iron losses	12899			
Pertes mécaniques - Mechanical losses	10482			

Checked and tested by: ...