BRUSH ELECTRICAL MACHINES LTD

GENERATOR AND AVR GENERAL DATA

SECTION	QC. 48
SUB SECT.	01
PAGE	1 of 1

CONTRACT NO. 09/50228	DES. ENG. N WAKELING	DATE: 23 SEPT 92
SERIAL NO. 09/50228/01	TEST ENG. S. HART	DATE: 1/10/92.
CTC 016	CUSTOMER: JBE - DALAN IRAN	

GENERATOR

Machine Contract No.	01/38426A
Frame	BDAX7-193P
Rating	23237 kVA
P.F.	0.8
Volts	11 000
Amps	1200
Frequency	3000
Operating Chart No.	HEP 9113
C.T. Ratio	1800/5 A
Nominal P.T. Secondary Volts	11000/110V

Excitation Data

PMG Frequency 400Hz O/C Volts 225

	N/L Cold	F/L Hot	3754A S/C
Exciter Field Current	1.8A	4.5A	9.7

Exciter Field Resistance 4.0Ω Cold 5.57Ω Hot

EXCITATION SYSTEM

AVR Contract Nos.	09/50228
AVR System	SINGLE MAVR
Circuit Diagram	9620360
SUAVR Fitted	~~YES~~/NO
D.C. Supply Voltage	125V
MAVR Card Fitted	YES/~~NO~~

	MAIN	STAND BY	NOTES
Control	✓		Frequency 50Hz
Excitation Limiter	✓		Temp. Comp. ~~required~~/not required
P F Control	✓		
Hand Power			
Auto Power	✓		
Excitation Monitor	✓		Temp. Comp. ~~required~~/not required
Volts Monitor	✓		

Auxiliary Rack A9615046

Contract Test Specification

Non-Standard Features NONE

BRUSH ELECTRICAL MACHINES LTD

MAVR

TESTS WITH TEST GENERATOR

BASIC AVR

SECTION QC. 48

SUB SECT. 3

PAGE 1 of 2

CONTRACT NO: 09/50228	DES. ENG. N Wabeling	DATE:
SERIAL NO: 09/50228/01	TEST ENG. S. HART	DATE: 1/10/92.
CTC 016	CUSTOMER	
MAVR TYPE B9602941/57	MOD	

1. Check AVR connections to Drawing.....9620360..... SH
2. Check manual regulator control:(see sub-sect.13 Page 1). SH
3. Check AVR stability at rated voltage on 'Auto' control. SH
4. Check AVR 'Auto' control range: SH

	SENSING VOLTS
RATED VOLTAGE SETTING (100%)	110V 50Hz
MINIMUM SETTING (75% to 90%)	96.05V
MAXIMUM SETTING (110% to 125%)	132.3V

5. Check diode failure indicator by pressing test pushbutton. SH
6. Check 'soft start' i.e. less than 5 volts overshoot on build up (this requires 2 mins. re-set time with the excitation switched off). SH
7. Check frequency fall off operative, or, if frequency is incompatible with test rig, check that the FFO has been set correctly on bench test. SH

PMG FREQUENCY	400 Hz

	REQUIRED	ACTUAL
KNEE POINT FREQUENCY	42.5 ±2 Hz	43.0HZ

8. Set 'If Limit' to give required short circuit excitation. SH

	REQUIRED SETTING	ACTUAL SETTING
SHORT CIRCUIT EXCITATION	9.7 ±2½%	9.7A

9. Check parallel running operation (Q.C.C.) SH

10 Set 'over excitation' SH

	REQUIRED SETTING			ACTUAL SETTING	
	~~0°C~~	~~40°C~~	*	~~0°C~~	~~40°C~~
SET LEVEL X 1	6.6A		± 1%	6.6A	

* Temperature compensation facility, if used.

BRUSH ELECTRICAL MACHINES LTD	MAVR TESTS WITH TEST GENERATOR BASIC AVR (Cont..)	SECTION QC.48 SUB SECT. 3 PAGE 2 of 2

CONTRACT NO. 09/50228	DES. ENG. N Wakeling	DATE:
SERIAL NO. 09/50228/01	TEST ENG. S. HART	DATE: 1/10/92.
CTC 016	CUSTOMER:	

Signature

11. Set time delay of 'Over Excitation':

	REQUIRED % - SECONDS		ACTUAL % SECONDS
TIME DELAY	235	± 10%	232.8% sec

SH

12.* Set 'Under Excitation' Xd & Xe to maximum and check stability of operation.

SH

13. Set 'Under Excitation' Xd control at 0 KW:

SET POINTS	REQUIRED SETTING		ACTUAL SETTING
SENSING VOLTAGE	110V 50HZ		114.7V
SENSING CURRENT	1.12A	± 2%	1.17A

SH

14. Set 'Under Excitation' Xe control by resistance:

	REQUIRED SETTING		ACTUAL SETTING
Xe POTENTIOMETER RESISTANCE	9Ω	± 2½%	9 ohms.

SH

15. Check the motorised volts setting pot operation limit switches, and self centering (if applicable).

16. Record all pot settings.

QCC: MAX.

Xd: 4.6.

Xe: 3.4.

OE Delay : 1.2.

SH.

17. Check links fitted as detailed on sub-sect 8 page 1.

SH

NOTE: * Requires on site adjustment.

HAWKER BRUSH BRUSH ELECTRICAL MACHINES SUDDEN	MAVR TESTS WITH TEST GENERATOR POWER FACTOR CONTROL CARD	SECTION QC.48 SUB. SECT. 5 PAGE 1 of 1

CONTRACT NO. 09/50228	DES.ENG. N Wakeling	DATE
SERIAL NO. 09150228/01	TEST ENG. S. HART	DATE 1/10/92.
CTC.016	CUSTOMER	

Signature

1. Fit Links LK.2 and 3 (I sin Ø), LK.6 and 8 (Local) and LK.9 or fit links LK.1 and 4 (Cos Ø) LK.6 and 8 (Local) and LK.9 (See Sub-Section 8 Page 1). SH

2. Set the 'Level' pot to 4.5 and parallel the set. Select 'P.F. Control' mode and optimise the response of control by variation of the gain and slug pots (see note). SH

3. Check the unit operates so that the set P.F. or VAR's is controlled to a constant level as the power is varied. SH

4. Select 'VAR' shed and check that the VAR's are controlled to zero independent of set KW (if Applicable). SH

5. Check links fitted as detailed on Sub-Section 8 page 2. SH

6. Set the level pot to 3.0 SH.

NOTE: The gain and slug pots may require on site adjustment.

HAWKER BRUSH BRUSH ELECTRICAL MACHINES SIDDELEY	MAVR TESTS WITH TEST GENERATOR VOLTS MONITOR CARD (Where applicable)	SECTION QC.48 SUB. SECT. 6 PAGE 1 of 1

CONTRACT NO. 09/50228	DES.ENG. N Wakeling	DATE
SERIAL NO. 09/50228/01	TEST ENG. S.HART	DATE 1/10/92
CTC.016	CUSTOMER	

Signature

1. Set 'Under Voltage' Level:

	Required Setting		Actual Setting
Under Volts Level	93.5	±1%	93.5V

SH

2. Set 'Under Voltage' Time Delay:

	Required Setting		Actual Setting
Time Delay (% - Sec)	10	±10%	10.0%-sec

SH

3. Set 'Over Voltage' Level:

	Required Setting		Actual Setting
Over Volts Level	126.5	±1%	126.5V

SH

4. Set 'Over Voltage' Time Delay:

	Required Setting		Actual Setting
Time Delay (%- Sec)	20	±10%	20.5%-sec.

SH

5. Check 'Under Voltage Over-Ride' by reducing the set speed to 50% of nominal and checking that no 'UV Trip' is given. SH

6. Record time delay pot settings:

Over Volts.....0.9.....

Under Volts.....0.6..... SH

7. Check links fitted as detailed in Sub-Section 8 Page 2. SH

BRUSH ELECTRICAL MACHINES LTD

MAVR

TESTS WITH TEST GENERATOR

EXCITATION MONITOR CARD (where applicable)

SECTION QC. 48

SUB SECT. 7

PAGE 1

CONTRACT NO. 09/50228	DES. ENG. N Wakeling	DATE:
SERIAL NO. 09/50228/01	TEST ENG. S. HART.	DATE: 1/10/92.
CTC.016	CUSTOMER:	

Signature

1. Set 'Over Excitation':

	REQUIRED SETTING			ACTUAL SETTING	
	~~0°C~~	~~40°C~~	*	~~0°C~~	~~40°C~~
SET LEVEL x 1	6.93		± 1%	6.93A	

SA

* Temperature compensation facility, if used.

2. Set 'Over Excitation' Time Delay:

	REQUIRED DELAY		ACTUAL DELAY
TIME DELAY (%-Sec)	300	± 10%	297.8 %-sec

SA

3. Set 'Under Excitation' Xd Control at OKW:

SET POINT	REQUIRED SETTING		ACTUAL SETTING
SENSING VOLTS	110V 50Hz		114.7V
SENSING CURRENT	1.18	± 2%	1.23A

SA

4. Set 'Under Excitation' Xe Control by Resistance:

	REQUIRED SETTING		ACTUAL SETTING
Xe POTENTIOMETER RESISTANCE	9Ω	± 2½%	9 ohms.

SA

5. Record 'Under and Over Excitation' pot settings,

Xd: 4.2

Xe: 3.5

O.E. Delay : 1.9

SA

6. Check Links fitted as detailed in sub-sect 8 page 1.

SA.

Note: The 'Slug UE' Control may require on site adjustment.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16 17	18 19	20 21	22 23	24 25	26 27	28	A1 B1	A2 B2	PCB Batch Data MOD Ref.	LOP/MOD	Stock No.
Control Card	X	—	X	—	X	X	X	X	—	X	—	—	—	—	X	X	—								CC-19215	9611592	19/15162
																—	—								4	T	
Excitation Limiter	—	—		X	—	X	—	X	—	—	—	X													TCR9212	9615175	19/15163
																									3	F	
P F Control	X	—	—	X	—	X	—	X	X																TCR9212	9602943	29/34452
																									3	I	
Volts Monitor	X	X	X																						TCR9216	9602947	19/15156
																									5	P	
Excitation Monitor	X	X	X	—	—	—	—	X																	TCR9216	9608488	19/15161
	—	—																							1	I	
Backboard																									CC-19130	9606532	19/15088
																									2	D	
Back Panel	—	—	X	X				X					X	X		—	—	X	—	—	X				TCR9130	9606529	19/15087
																—	—	X	—	—	—				1	E	
Transformer				X																					—	9602782	—
																									—	D	
Electrical Hand Control PCB	—	X			X	X	X								X	—							X	X	TCR9116	9607087	19/15041
																							—	—	4	J	
MAVR RACK																									—	9602941	19/15079
																									—	57	
AUTO POWER																									TCR9212	9602933	19/15153
																									5	H	
FIXED FRONT PANEL																									—	9604568	19/15090
																									—	E	
AUXILIARY RACK																									—	9615046	29/34293.
																									—		

Customer's Representation _____ Date 3/11/92

Inspecting Agency's Representation _____ Date _____

Authorised by/Test Quality Manager _____ Date 3-11-92

Test Engineer Sig. _____

CONTRACT NO. 09/80228

SERIAL NO. 09/80228/01

CTC 016

CUSTOMER:

DES. ENG. N. Dalling DATE

TEST ENG. S. Hart. DATE 1/10/92.

BRUSH ELECTRICAL MACHINES

MAVR AND AUXILIARY RACK

TEST WITH TEST GENERATOR

LINK INFORMATION AND RECORDS

SECTION QC 48

SUB SECT. 8

PAGE 2

BRUSH ELECTRICAL MACHINES LTD	MAVR TESTS WITH TEST GENERATOR AND AUXILIARY RACK	SECTION QC. 48 SUB SECT. 13 PAGE 1

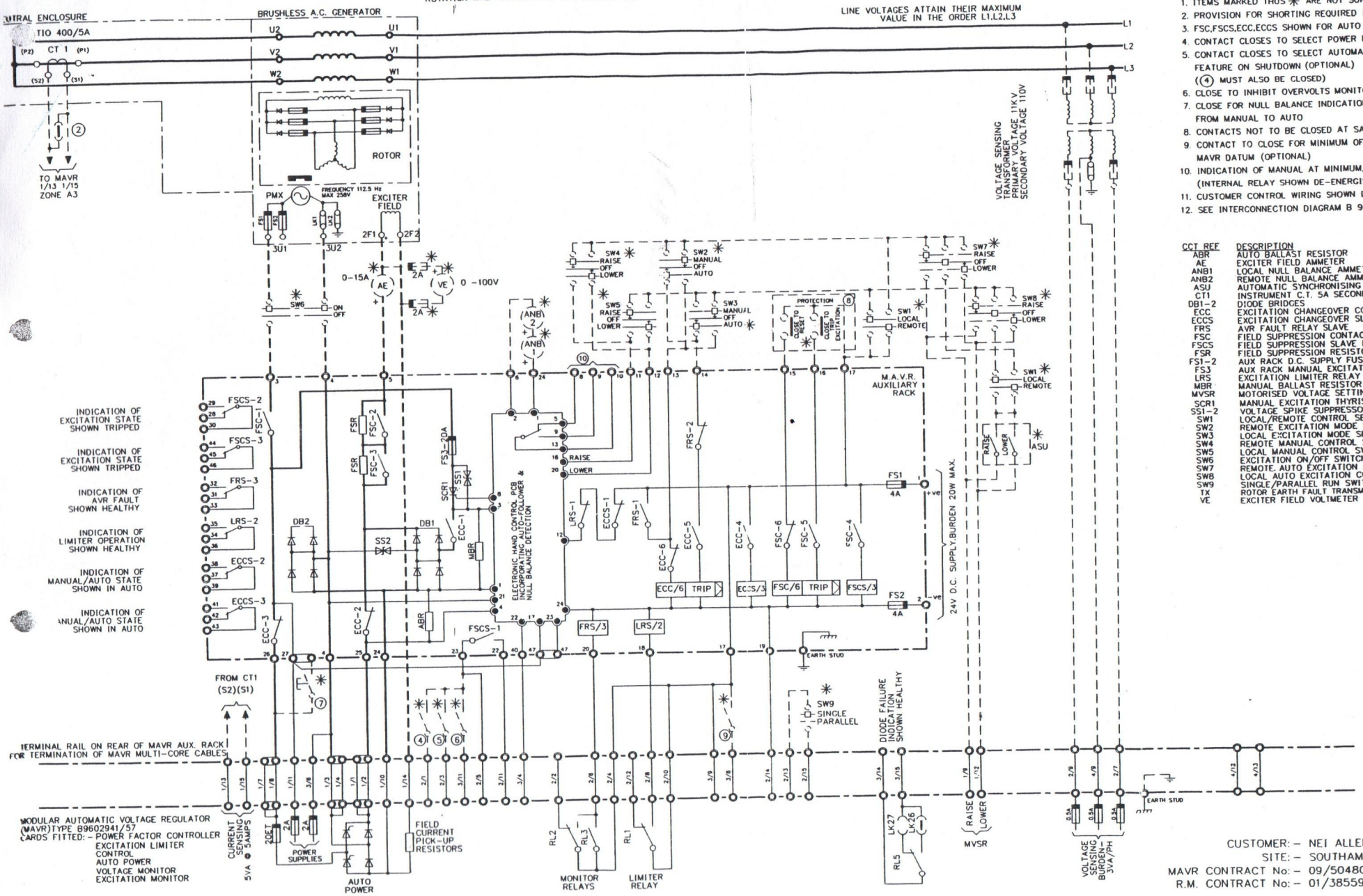
CONTRACT NO. 09/50228	DES. ENG. N Wakeling	DATE:
SERIAL NO. 09/50228/01	TEST ENG. S. HART.	DATE: 1/10/92.
CTC 016	CUSTOMER:	

		Signature
1.	Check Manual Control Remote operation.	SH
2.	Check Manual Control Reset to Zero on loss of p.m.g. supply.	SH
3.	Check operation of Auto-follower. Transfer to manual gives change in line voltage of less than 5%.	SH
4.	Check operation of Null Balance section.	SH
5.	Check Excitation Switch and Transfer Mode.	SH
6.	Check Field Suppression Contactor operation.	SH
7.	Check Change-over operation of single or twin system by operation of monitors.	SH
8.	Check Logic and Relay Slaves.	SH
9.	Check that full load excitation is available in manual using 'hot' exciter field resistance.	SH

9620274 | ISSUE B | FIRST ANGLE PROJECTION

GENERATOR TERMINALS ARE SHOWN FOR ANTI-CLOCKWISE ROTATION WHEN LOOKING ON THE EXCITER END

LINE VOLTAGES ATTAIN THEIR MAXIMUM VALUE IN THE ORDER L1,L2,L3



NOTES:-

1. ITEMS MARKED THUS ✳ ARE NOT SUPPLIED BY BEM LTD
2. PROVISION FOR SHORTING REQUIRED IF MAVR DISCONNECTED
3. FSC,FSCS,ECC,ECCS SHOWN FOR AUTO WITH FIELD SUPPRESSED
4. CONTACT CLOSES TO SELECT POWER FACTOR CONTROL CARD
5. CONTACT CLOSES TO SELECT AUTOMATIC VAr SHED FEATURE ON SHUTDOWN (OPTIONAL) (④ MUST ALSO BE CLOSED)
6. CLOSE TO INHIBIT OVERVOLTS MONITOR IN PARALLEL (OPTIONAL)
7. CLOSE FOR NULL BALANCE INDICATION DURING TRANSFER FROM MANUAL TO AUTO
8. CONTACTS NOT TO BE CLOSED AT SAME TIME
9. CONTACT TO CLOSE FOR MINIMUM OF 60s TO RESET MAVR DATUM (OPTIONAL)
10. INDICATION OF MANUAL AT MINIMUM, SHOWN "NOT AT MINIMUM" (INTERNAL RELAY SHOWN DE-ENERGISED)
11. CUSTOMER CONTROL WIRING SHOWN DASHED
12. SEE INTERCONNECTION DIAGRAM B 9620275

CCT REF	DESCRIPTION
ABR	AUTO BALLAST RESISTOR
AE	EXCITER FIELD AMMETER
ANB1	LOCAL NULL BALANCE AMMETER 500-0-500μA
ANB2	REMOTE NULL BALANCE AMMETER 500-0-500μA
ASU	AUTOMATIC SYNCHRONISING UNIT
CT1	INSTRUMENT C.T. 5A SECONDARY
DB1-2	DIODE BRIDGES
ECC	EXCITATION CHANGEOVER CONTACTOR
ECCS	EXCITATION CHANGEOVER SLAVE RELAY
FRS	AVR FAULT RELAY SLAVE
FSC	FIELD SUPPRESSION CONTACTOR
FSCS	FIELD SUPPRESSION SLAVE RELAY
FSR	FIELD SUPPRESSION RESISTOR
FS1-2	AUX RACK D.C. SUPPLY FUSES
FS3	AUX RACK MANUAL EXCITATION FUSE
LRS	EXCITATION LIMITER RELAY SLAVE
MBR	MANUAL BALLAST RESISTOR
MVSR	MOTORISED VOLTAGE SETTING RHEOSTAT
SCR1	MANUAL EXCITATION THYRISTOR
SS1-2	VOLTAGE SPIKE SUPPRESSORS
SW1	LOCAL/REMOTE CONTROL SELECTOR SWITCH
SW2	REMOTE EXCITATION MODE SELECTOR SWITCH
SW3	LOCAL EXCITATION MODE SELECTOR SWITCH
SW4	REMOTE MANUAL CONTROL SWITCH
SW5	LOCAL MANUAL CONTROL SWITCH
SW6	EXCITATION ON/OFF SWITCH
SW7	REMOTE AUTO EXCITATION CONTROL SWITCH
SW8	LOCAL AUTO EXCITATION CONTROL SWITCH
SW9	SINGLE/PARALLEL RUN SWITCH
TX	ROTOR EARTH FAULT TRANSMITTER
VE	EXCITER FIELD VOLTMETER

CUSTOMER:- NEI ALLEN LTD/ CCA BOVIS
SITE:- SOUTHAMPTON
MAVR CONTRACT No:- 09/50480/SRH/IEP
R.M. CONTRACT No:- 01/38559A

| | | |