

## Chapter 8

# SWITCHBOX, GENERATOR CONTROL, TYPE 1Y, No. 2 (E.E. Type AE7007)

### LIST OF CONTENTS

	Para.		Para.
Introduction ... ..	1	Meters ... ..	36
Description ... ..	3	Relay contact volt drop tests ... ..	37
Operation ... ..	12	Time of operation of underspeed time delay ... ..	38
Consider a two channel system under normal operating conditions		Wiring check ... ..	39
Run up procedure ... ..	13	Undervoltage unit ... ..	40
Shut down procedure ... ..	17	Transformer-rectifier output check ... ..	41
Consider a two channel system under fault conditions ...		Blocking rectifier polarity ... ..	42
Overvoltage fault ... ..	19	Overvoltage unit characteristic ... ..	43
Undervoltage fault ... ..	23	Operating time ... ..	44
Incorrect phase sequence ... ..	25	Mutual reactor ... ..	45
Line to line faults and line to earth faults	26	Undervoltage time delay ... ..	46
Open circuits ... ..	28	Differential protection unit ... ..	47
Abnormal excitation faults during paralleling ... ..	29	Master relay ... ..	48
Installation ... ..	31	Paralleling relay ... ..	49
Servicing ... ..	32	Exciter control relay ... ..	50
Testing ... ..	33	Field flashing relay ... ..	51
Supplies ... ..	35	Lock-out relay ... ..	52
		Suppression diodes ... ..	53
		Insulation test ... ..	54

### LIST OF TABLES

	Table		Table
Relay contact drop tests ... ..	1	Wiring check ... ..	3
Wiring check ... ..	2	Suppression diodes test ... ..	4

### LIST OF ILLUSTRATIONS

	Fig.		Fig.
Switchbox, generator control, Type 1Y, No. 2 ... ..	1	Generator over excited ... ..	4
Wiring diagram ... ..	2	Overvoltage test circuit ... ..	5
Balanced load condition ... ..	3	Differential protection test circuit ... ..	6
		Insulation test method ... ..	7

### LEADING PARTICULARS

Switchbox, generator control, Type 1Y, No. 2 ...	Ref. No. 5CW/6943
System ... ..	200V, 3-phase, 400 c/s
Weight ... ..	16 lb.

RESTRICTED

## Introduction

1. The generator control switchbox, Type 1Y, No. 2 is designed for use in a single or multi-channel generating system. The control functions include:

- (1) Connection of the generator to its loads in conjunction with the flight engineers' ON/OFF switch. (This is achieved automatically as soon as the frequency and voltage are of correct value, if the switch is left in the ON position).
  - (2) Connection of the generator to the synchronizing busbars, in conjunction with the paralleling switch for parallel operation.
  - (3) Protection against under voltage faults, over voltage faults, line to line faults, line to earth faults, incorrect phase sequence, and abnormal excitation during paralleling.
2. The protection circuits incorporate time delays where necessary to prevent "nuisance tripping" during transient conditions due to load switching.

## DESCRIPTION

3. The unit is enclosed by a pressed steel cover which is secured at the plug end with cheesehead screws. The chassis, to which the feet are bolted, accommodates all the electrical components fitted in the unit.
4. Immediately behind the plugs assembled on six anti-vibration mounts is a relay Type AE 5356. Known as the exciter control relay (E.C.R.) this takes the form of a

rectangular box hermetically sealed against variations in atmospheric conditions and containing pressurized nitrogen for spark suppression. The relay has close and trip coils which interrupt or connect the exciter field circuit, and which complete the trip coil circuit of the "G" magnetic switch, which connects the generator to the main busbars. Various interlocks are provided for use in the protection circuits.

5. Two transistorized static sensing units, Type AE 5630, are fitted to the chassis immediately behind the E.C.R. and are used in this unit for creating time delays for under-voltage and overvoltage transients.

6. At the side of the time delay units is a Type AE 5713 mutual reactor fitted to the chassis by means of a bracket pressed out of the chassis and attached with bolts and washers. The function of the reactor is to provide detection of excitation faults which may occur during parallel operation and load switching. The reactor is basically a transformer with an air gap in its iron circuit causing a phase difference between primary current and secondary voltage of approximately 90 degrees. The reactor is wholly encapsulated and has four terminals which are visible from the top.

7. Behind the mutual reactor are two sealed plug-in type relays. The relay sockets are secured to the chassis, the relays plugged in, and the relays locked together with a clamping bracket and rubber packing piece. One relay (FF/2) is used as an interlock in the E.C.R. coil circuit and the other functions as a

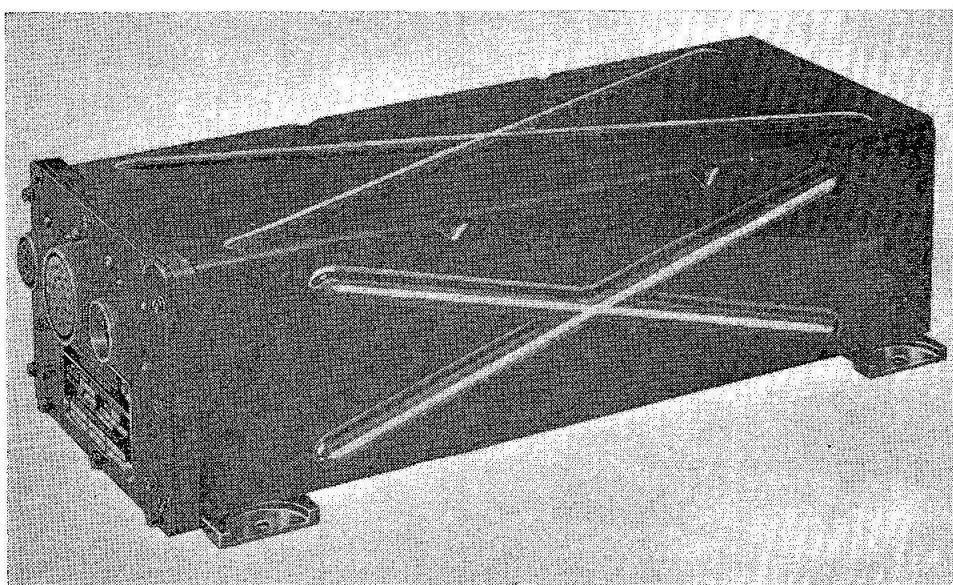


Fig. 1. Switchbox, generator control, Type 1Y, No. 2

**RESTRICTED**