On Receipt of AP 120F-0202-1. Remove this Chap. Cancelled Now →

Chapter 8

TEMPERATURE STEP FUNCTION UNIT, ULTRA, TYPE QE2232

LIST OF CONTENTS

	Para.		Para.
Introduction	1	**Circuit description**	12
Description	5	**Servicing**	15
Function of switch, controls, plug and socket	9	*Insulation resistance test*	16
Principles of operation	10	*Continuity*	17
Step function facility	11	*Resistance*	18

LIST OF ILLUSTRATIONS

	Fig.		Fig.
Temperature step function unit, Ultra Type QE2232	1	*Typical test connections*	3
Internal view of temperature step function unit, Type QE2232	2	*Circuit diagram of temperature step function unit, Type QE2232* ...	4

LEADING PARTICULARS

Temperature step function unit, Ultra, Type QE2232 ...	*Ref. No.* 5G/3678
Dimensions	7 *in.* × 1¾ *in.* × 3 *in.* (*excluding cable*)
Weight	1½ *lb* (*including cable*)

Introduction

1. The Temperature Step Function Unit, Type QE2232 (figs. 1 and 2) is designed for use with the Jet Pipe Temperature Control Amplifier Test Equipment, Type QE2230, in the testing of jet pipe temperature control amplifiers having positive and negative transient feedback loops.

2. The unit is inserted between the amplifier under test and the test equipment, when a simulated temperature change facility is required, to test the amplifier transient response characteristics.

3. The simulated temperature signal is generated in the test equipment, Type QT223 and the temperature change simulated by the temperature step function unit can be in a positive or negative direction depending on the settings of the controls.

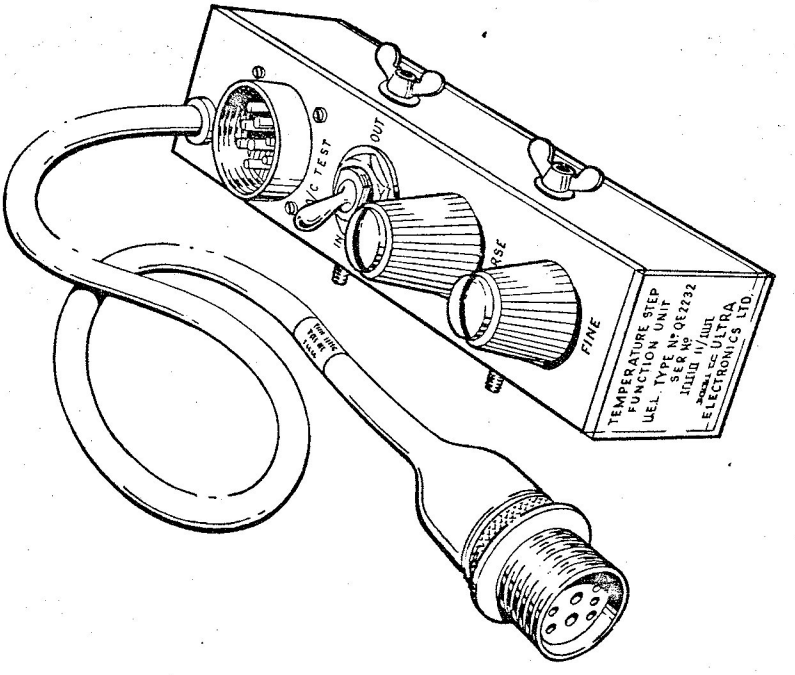

Fig. 1. Temperature step function unit, Ultra, Type QE2232

4. Chromel/Alumel compensation is continued through the unit to the measuring circuit in the test set, Type QT223 so that the cold junction compensation facility, provided within the test set, Type QT223, is preserved and manual correction is rendered unnecessary. The unit has been designed to utilise the voltage drop across fixed and variable resistors in preference to a feedback battery which would require periodic replacement and automatic muting.

DESCRIPTION

5. The unit is contained in an aluminium alloy case through which pass two fixing screws having wing nuts secured to one end. The screws are used to secure the unit to the side of the test set Type QT223, which is part of the test equipment, Type QE2230, described in A.P.4343K, Vol. 1, Sect. 10, Chap. 1.

6. The front panel of the unit carries th following controls, plug and cable.

(1) SW1, the SET STEP IN/OU switch.

(2) RV1, the SET STEP, FINE poten tiometer.

(3) RV2, SET STEP, COA poten tiometer.

(4) A/C TEST plug PL1 for connectio of the unit to the amplifier under test vi the test cable, Type QY2212.

(5) Cable with socket SKT1 attached t the free end for connection to test se Type QT223.

7. The entry cable, to the free end of whic a socket (SKT1) is attached, is wired insid the unit directly to the plug PL1 on the fror

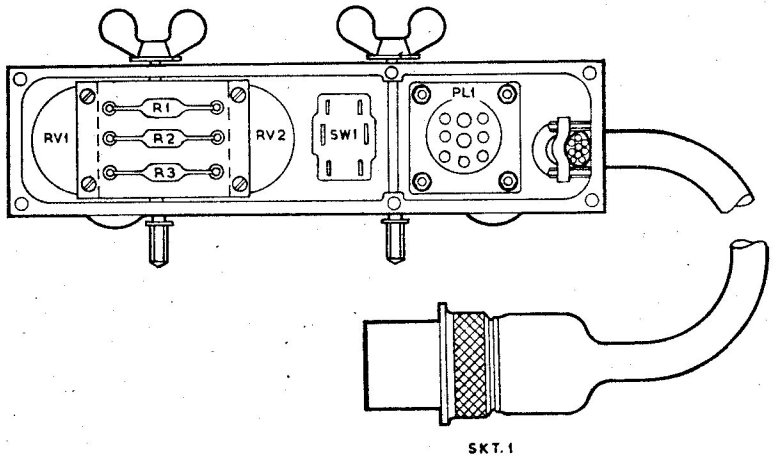

Fig. 2. Internal view of temperature step function unit, Type QE2232

panel except for the wire from pin D on the socket. This wire is connected to the two-way switch SW1 and then via resistor on a tag board and two potentiometers on the front panel to pin D on plug PL1.

8. The wires in the cable from pins 1 and 2 are made of Chromel and Alumel respectively as they are the compensating leads used to feed the simulated temperature signal to the test set QT223. The signal can thus be accurately measured under conditions of temperature difference in the testing circuit. Other internal wiring is made with copper conductors.

Functions of controls, plug and socket

9. The functions of the controls, plug and socket are as follows:—

(1) SET STEP, IN/OUT switch (SW1)–This switch is used to give a rapid change in the simulated temperature signal, which is supplied to the amplifier under tests. This change is used when checking the amplifier response time.

(2) SET STEP FINE and COARSE controls (RV1 and RV2)—These controls are used to set the level of the change in signal mentioned above.

(3) Plug PL1 (A/C TEST)—This plug is used to connect the unit to the amplifier under test, via the cable Type QY2212 which is part of test equipment, Type QE2230.

(4) Socket SKT1—This socket is attached to the free end of the cable passing through the front panel and is used to connect the unit to test set Type QT223.

PRINCIPLES OF OPERATION

10. The amplifier under test is normally connected to the test set, Type QT223 by means of the cable Type QY2212. The temperature step function unit is connected in series with the amplifier under test and the

test set, Type QT223. A typical aircraft test layout is illustrated in fig. 3.

Step function facility

11. All the connections from the test set, Type QT223 thus pass through the step function unit to the amplifier. The connection that carries the simulated temperature signal derived from the test set is connected to the SET STEP switch. When the SET STEP switch is set to IN a variable resistive load is inserted in this signal line. The resistance of this load can be adjusted by the SET STEP, FINE and COARSE controls, on the step function unit, to reduce or increase the simulated temperature signal by the required amount. When the SET STEP switch is returned to OUT the temperature signal is instantaneously returned to its original value. This sudden change in signal level results in a corresponding change in amplifier output, the rate of change of the output being used to determine the time response of the amplifier.

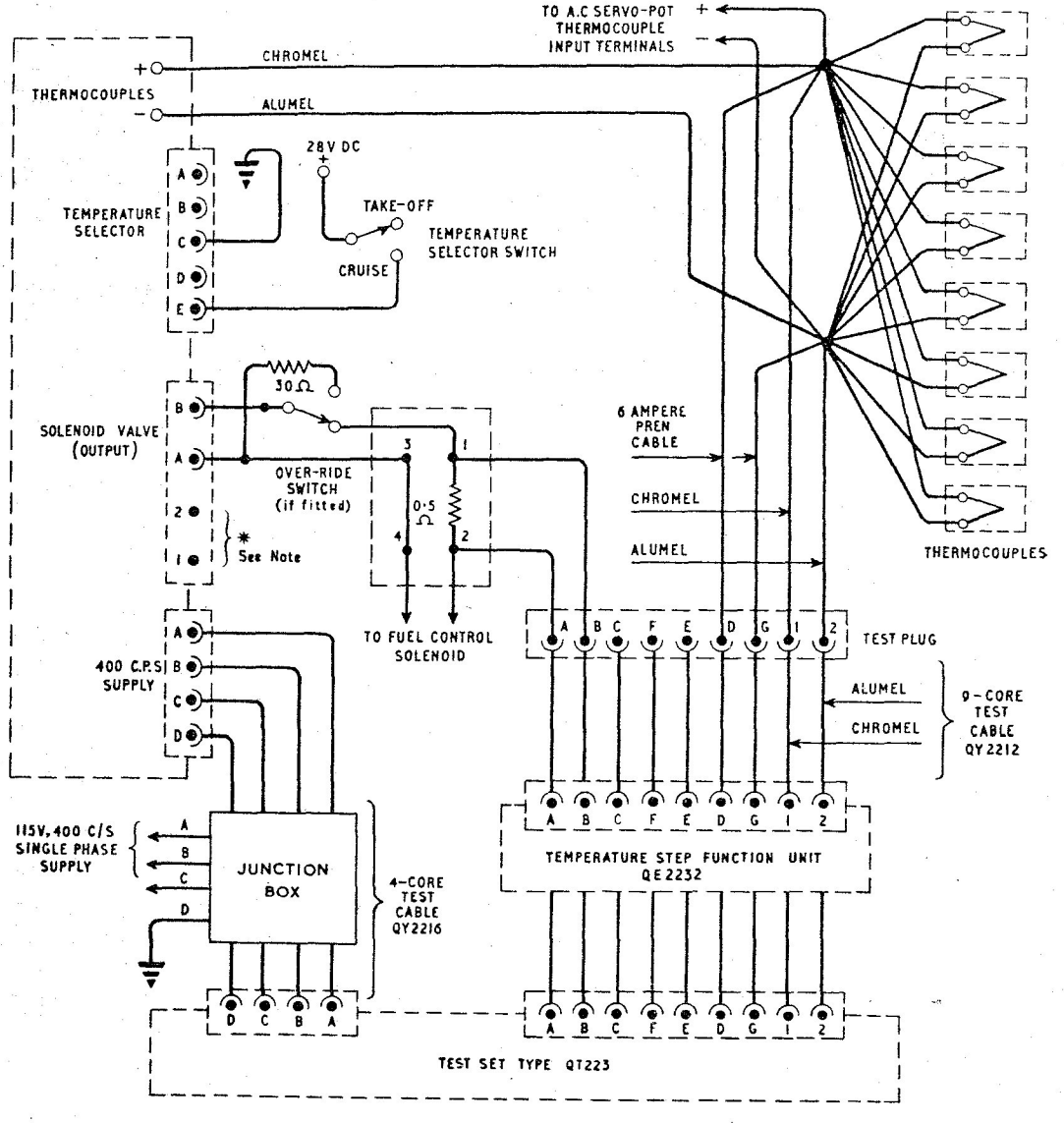

Fig. 3. Typical test connections

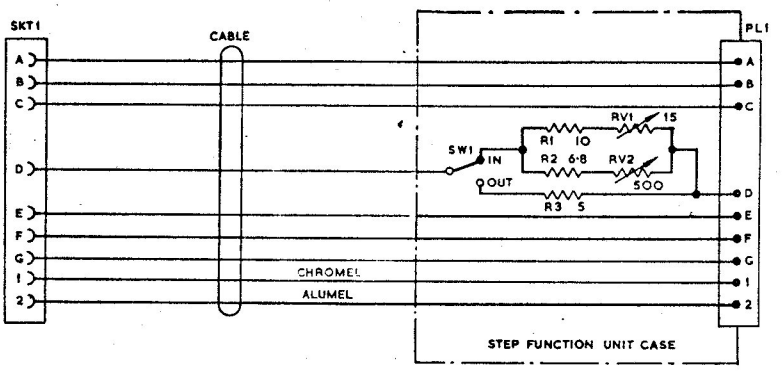

Fig. 4. Circuit diagram of temperature step function unit, Type QE2232

CIRCUIT DESCRIPTION

12. A circuit diagram of the unit is illustrated in fig. 4. It will be seen that the unit acts merely as a junction box for the test connections between the test set, Type QT223 and the amplifier except for the signal entering the unit at pole D of SKT1. This signal is the simulated temperature input to the amplifier from the test set.

13. It will be seen that, with SW1 set to OUT, the temperature signal is fed, via R3, to pole D of PL1 and thence to the amplifier. Under these conditions, the potential developed across R3 is constant and depends on the signal current. When SW1 is set to IN, however, the resistor chain comprising RV1, RV2, R1 and R2 is connected in circuit instead of R3. The potential difference between SKT1–D and PL1–D is thus reduced or increased by an amount dependent on the settings of RV1 and RV2. RV1 and RV2 can, therefore, be set to give a specified change of temperature signal which can be measured at the test set, Type QT223. When SW1 is returned to OUT, the temperature input to the amplifier rises or falls from the pre-set value to that originally set by the test set, Type QT223.

14. The lines between SKT1–1 to PL1–1 and SKT–2 to PL1–1 are of chromel and alumel respectively. This ensures that temperature compensation is maintained from the amplifier terminals, through to the test set.

SERVICING

15. Reference should be made to the component location diagram, fig. 2, and to the circuit diagram, fig. 4.

Insulation resistance test

16. Using the Multimeter, Type 12889 on the $\Omega \times 100$ range, check that the resistance between the following points is not less than 20MΩ:—

(1) Between each pole of SKT1.

(2) Between each pole of PL1 and chassis.

Continuity

17. Using the Multimeter on the $\Omega \div 100$ range, check that continuity exists between the following points:—

SKT1	to	PL1
A		A
B		B
C		C
E		E
F		F
G		G

Resistance

18. (1) Using the Multimeter on the $\Omega \div 100$ range, check that the resistance

between the following points is within the limits stated:—

SKT1	to	PL1	Resistance
1		1	$0{\cdot}5\Omega \pm 0{\cdot}05\Omega$
2		2	$0{\cdot}2\Omega \pm 0{\cdot}02\Omega$

(2) Using the Multimeter on the $\Omega \div 100$ range, check that the resistance between SKT1–D and PL1–D, with SW1 set to OUT, is $5\Omega \pm 0{\cdot}5\Omega$.

(3) Set SW1 to IN and rotate SET STEP, FINE and COARSE controls fully counter clockwise. Using the Multimeter on the $\Omega \div 100$ range, check that the resistance between SKT1–D and PL1–D is $4\Omega \pm 0{\cdot}4\Omega$.

(4) Rotate the SET STEP, FINE and COARSE controls fully clockwise and check that the resistance between SKT1–D and PL1–D is $23{\cdot}8\Omega \pm 2{\cdot}4\Omega$.

(5) Check that rotation of the SET STEP, FINE and COARSE controls results in a smooth change of resistance between SKT1–D and PL1–D.

Printed for H.M. Stationery Office by McCorquodale Printers (Crewe) Ltd.
(22/6/64). 90448. Wt. 26414-3533. 875. 20/8/64. 375/6.