LEAFLET 7/55

INDICATOR, TEMPERATURE, TYPE 5196-FORM 1

SANGAMO WESTON

MAINTENANCE MANUAL

MODEL S.196 FORM 1 - INDICATOR TEMPERATURE

This manual complies with British Civil Airworthiness Requirements, Section A, Chapter A6-2. The technical accuracy of this manual has been verified and is certified correct.

Signed. A. P. Rickards

Date: September 1969

A.R.B. Design Approval No. AD/1147/47

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MAINTENANCE MANUAL

REVISION RECORD

The introduction of any amendment or revision not certified in accordance with British Civil Airworthiness Requirements Section A, Chapter A6-2, will invalidate the statement of certification on Page 1. Amendments or revisions embodied in this manual, which have been certified under an approved authorisation other than that applicable to the initial certification must be recorded on separate record sheets.

Revision No.		Date of Issue	Incorporated by:	Date	Remarks
1		May 1965	Sangamo Weston Ltd.	May 1965	Para. 4B revised
2		Sept. 1969	Sangamo Weston Ltd.	Sept. 1969	Page 1 revised and Page 5, Para. 12
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MAINTENANCE MANUAL

MODEL S.196 FORM 1 - TEMPERATURE INDICATOR

1. Description and operation

A. Description

Model S.196 Form 1 is a circular scale indicator which is designed for use with an external nickel-chromium/nickel-aluminium thermocouple for measurement of temperature. The range of a particular variant of the indicator and details of its scale, are given in the appropriate addendum to this manual.
The indicator is, basically, a permanent magnet, moving coil, d.c. millivoltmeter. The movement is fitted with a bimetal coil which compensates for variations in circuit e.m.f. caused by changes in ambient temperature.
The indicator is housed in a 2 in. dia., sealed, flangeless case. Connections to the indicator are via two shrouded terminals at the rear of the case which is also fitted with a pointer adjuster.

B. Operation

The pointer deflection is proportional to the thermocouple output e.m.f. applied to the indicator. The outer end of the bimetal coil used for e.m.f. compensation engages with the free end of one of the control springs of the indicator. A change in ambient temperature will cause the bimetal coil to move the free end of the control spring and thus the pointer. The torque ratio of the control springs and the torque of the bimetal coil are arranged to compensate for the loss or gain of thermal e.m.f. generated by the couple formed at the point where the copper nickel lead connection is made to the moving coil. An increase in ambient temperature increases this thermal e.m.f. which causes a current to flow in the opposite direction to the current produced by the millvolt input, with the result that the pointer (when no compensation is provided) indicates a figure below the true value of the external thermocouple temperature. The bimetal coil which is affected also by the change in ambient temperature moves to compensate for this loss and the pointer indicates the true temperature of the external thermometer.

2. Unpacking

Self-evident.

3. Acceptance checks

Examine the indicator through the polythene bag for damage to the glass and case.

4. Storage instructions

A. Conditions

(1) It is recommended that the indicator be retained in its original packing throughout the storage period and kept in a place remote from any process emitting fumes which may damage the packing materials or the indicator.

(2) The indicator should be stored under conditions where the humidity does not exceed 50% and the temperature is within the range -20°C. to +50°C.

B. Limiting period

Provided that the storage conditions have been fulfilled, the shelf life of the indicator is five years. After this period it should be checked as detailed in the Overhaul manual, and if found satisfactory repacked and returned to storage.

5. Check before installation

The following checks must be made before an indicator is installed.

(1) Visually examine the indicator for signs of damage to the glass or case.

(2) Ensure that the glass is clean and secure.

(3) If the indicator is suspect, it must be checked as detailed in the Overhaul manual.

6. Installation

The indicator must be installed as detailed in the Aircraft manual.

7. Checks after installation

After installation the indicator must be checked as detailed in the Aircraft manual. Also actuate the equipment associated with the indicator and ensure that a satisfactory deflection is indicated.

8. Maintenance

The following checks should be made whenever the equipment associated with the indicator is inspected.

(1) Examine the indicator for security of mounting, tightness of electrical connections and cleanliness.

(2) Examine the indicator scale for discolouration and damage.

(3) Examine the glass for cleanliness, security and signs of damage.

9. Trouble shooting

The indicator has been manufactured using special techniques and it is recommended that it be returned to the manufacturer for overhaul in the event of failure. If this is not possible the instructions given in the Overhaul manual must be complied with.

10. Removal

The indicator should be removed as detailed in the Aircraft manual.

11. Bench checks

It is not necessary for any bench checks to be undertaken in order to achieve the specified overhaul period for the indicator.

12. Overhaul period "ON CONDITION"

NOTE: The term "On Condition" is applicable to systems/components on which airworthiness is determined by inspections, measurements and tests, or by other means specified, without extensive disassembly or renewal.

Inspections or checks of the aircraft indicator are scheduled at intervals shown in the aircraft maintenance schedule which will determine the repairs, replacements and refinishing needed to maintain the required airworthiness standard.

13. Return to manufacturer or base

When the indicator is returned to the manufacturer or base, a short history of the unit, with particular reference to any component which has had to be renewed in service, should be included in the package.

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ADDENDUM

MODEL S.196.1.17 - INDICATOR, TEMPERATURE 60/800°C

The information contained in the main section of the Maintenance manual for Model S.196 Form 1 is applicable to this Variant also. Additional details, applicable to Model S.196.1.17 only, are given in this addendum.

REVISION RECORD

Revision No.	Date of Issue	Incorporated by:	Date	Remarks
1	May 1965	Sangamo Weston Ltd	May 1965	Description and Calibration revised
2				
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ADDENDUM

MODEL S.196.1.17 - INDICATOR, TEMPERATURE 60/800°C

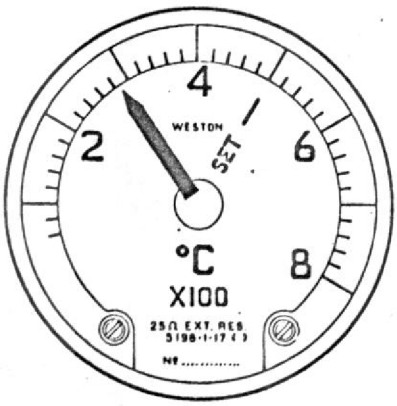

Fig.1 Model S.196.1.17

Description

Model S.196.1.17 temperature indicator has a range of 60°C to 800°C and is designed for use with a nickel-chromium/nickel-aluminium thermocouple which is built out to an external resistance of 25 ohms.

The scale presentation is illustrated in Fig.1. The scale markings are finished photogenically; the numerals, cardinals, division lines, the caption °C X100 and the lance pointer are all finished white against a matt black background. The setting up position of the indicator is marked by the word SET printed in green adjacent to the 500 cardinal.

Connections to the indicator are by means of two shrouded 4 B.A. thread screw terminals on the end plate. The positive terminal is of brass and is identified by a + sign; the other terminal is of copper-nickel alloy. A pointer adjuster is incorporated on the indicator end plate.

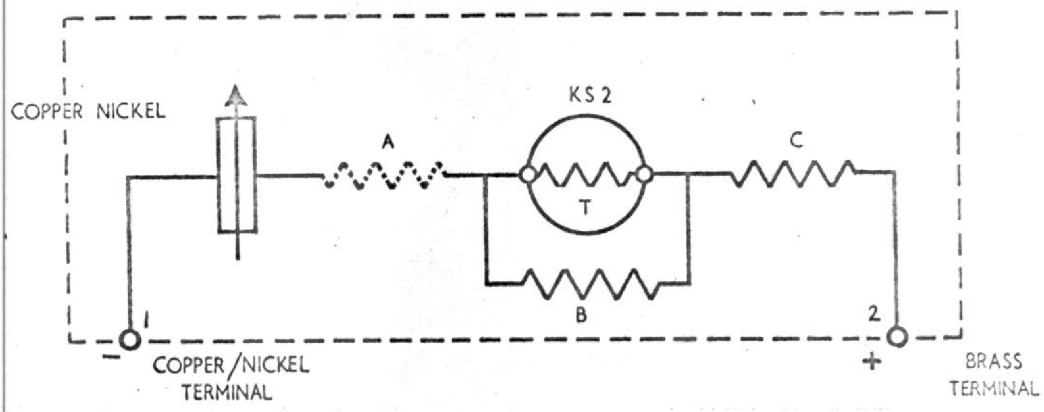

Fig.2 Circuit diagram

Calibration

(1) Connect the indicator into the circuit given in Fig.3.

(2) Apply the millivolt input equivalent to the SET mark (500°C) on the indicator scale and align the pointer to this position by means of the pointer adjuster.

(3) Check the calibration using the millivolt input values given in the following Calibration Table:

Indicator (°C)		Input (mV)
0		0
100		4.10
200		8.13
300		12.21
400		16.40
500	SET	20.65
600		24.91
700		29.14
800		33.30

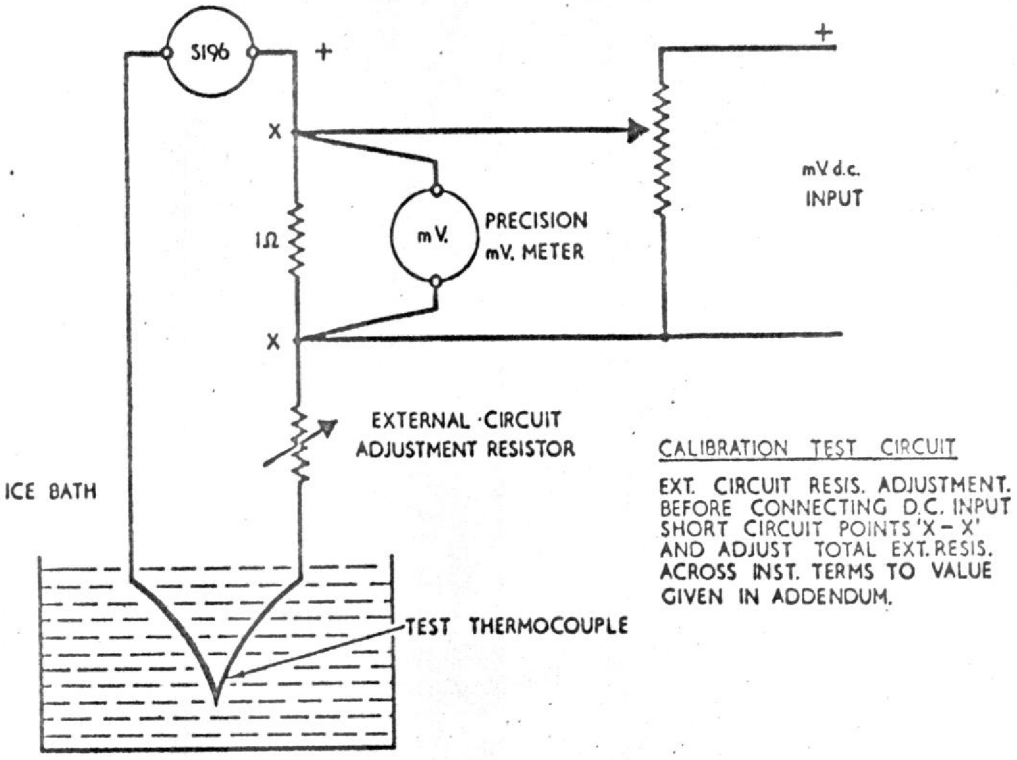

Fig.3 Calibration circuit diagram

Accuracy

The accuracy of the indicator is ±15°C within the effective range (300°C to 700°C) and ±40°C at other figured cardinals.