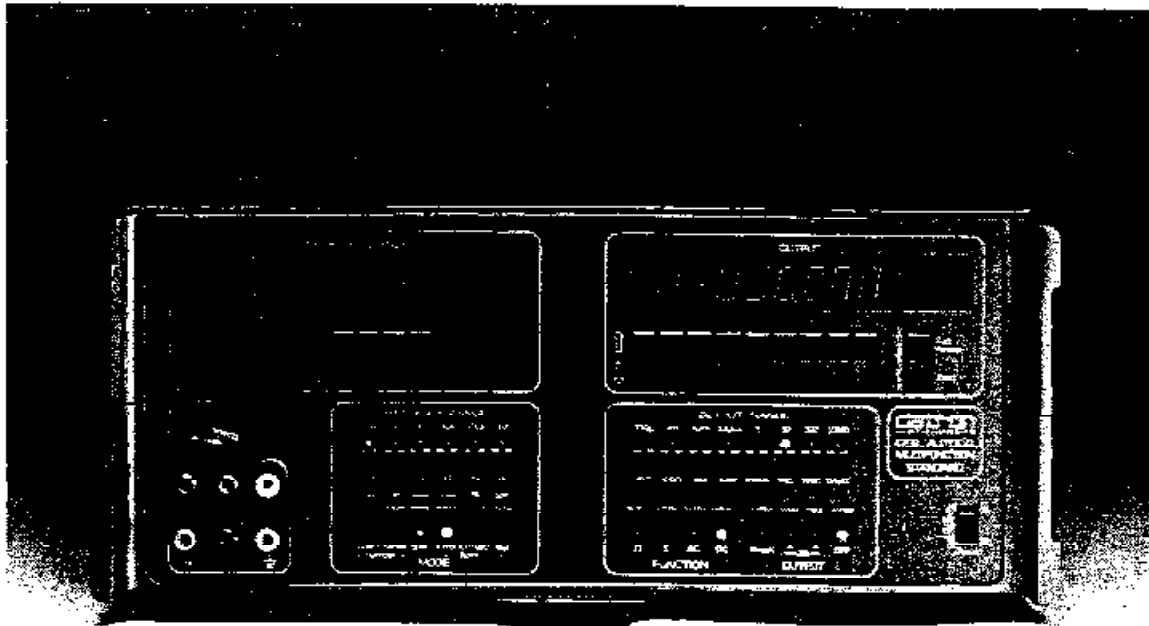


# SECTION 1

## THE DATRON 4708

### AUTOCAL MULTIFUNCTION STANDARD



General View of Datron 4708 Autocal Multifunction Standard

## Introduction

The Datron 4708 Autocal Multifunction Standard is a high-precision calibrator which features exceptionally high stability and full systems capability. It is characterized by a wide-range coverage of DC Voltage, AC Voltage, DC Current, AC Current and Resistance functions in a single unit.

The basic instrument consists of a mainframe to which the various output options may be added.

Option 10 (factory-fitted) provides a DC Voltage function.

Option 20 (factory-fitted) provides an AC Voltage function.

Option 30 (factory-fitted) adds calibration sources of DC Current, AC Current and Resistance.

The 4708 incorporates a reference module which maintains a high accuracy specification over the ambient temperature range of  $23^{\circ}\text{C} \pm 10^{\circ}\text{C}$ . A high level of stability is achieved by use of super-selected reference components and ultra-stable gain-defining resistors. The 'Autocal' feature ensures that its 24-hour specifications are usable; not merely figures of merit.

The 4708 uses a microprocessor for control management, simplifying its use in complex manual operations, such as calibration of high-quality digital multimeters. The IEEE 488 interface provides a comprehensive remote programming capability, allowing programmed calibration of the 4708 itself.

## Standard and Optional Facilities

### DC Voltage Ranges

By fitting Option 10, the instrument provides DC Voltage calibration facilities in eight decade ranges from  $\pm 100\mu\text{V}$  to  $\pm 1000\text{V}$ . 100% overrange is incorporated, except on the  $\pm 1000\text{V}$  range (see page 3-3), when the output is limited to 1100V.

### AC Voltage Ranges

By fitting Option 20, the instrument provides AC Voltage calibration facilities in seven decade ranges from 1mV to 1000V. 100% overrange is incorporated, except on the 1000V range (see page 3-3), when the output is limited to 1100V.

### DC Current Ranges

By fitting Option 30, in conjunction with Option 10, the instrument can be used to calibrate DC Current in five decade ranges from 100 $\mu\text{A}$  to 1A. The Datron Model 4600 may be used to extend DC Currents to 11A.

### AC Current Ranges

By fitting Option 30, in conjunction with Option 20, the instrument can be used to calibrate AC Current in five decade ranges from 100 $\mu\text{A}$  to 1A. The Datron Model 4600 may be used to extend AC Currents to 11A.

### Resistance

By fitting Option 30, in conjunction with Option 10, the instrument can be used to calibrate resistance in eight decade ranges from 10 ohm to 100M ohm.

### Frequency

The output frequency of the 4708 extends from 10Hz to 1MHz in five overlapping decade ranges, at a resolution of 1% of nominal Frequency Range. Any five frequency values within the range of the instrument can be stored in volatile memory. For higher accuracy, five 'Spot Calibrated' frequency values per Output Range can be recalled from non-volatile memory storage.

### Autocal

All Datron AUTOCAL instruments are designed to make the removal of the covers for calibration unnecessary, as full routine calibration of all ranges and functions can be carried out from the front panel or over the IEEE 488 bus.

Accidental or unauthorized use of the calibration routine is prevented by a key operated switch on the instrument rear panel. The procedure for calibrating this instrument is contained in Section 8.

### Resolution and Accuracy

The maximum resolution is 7.5 digits with a facility for displaying the specified accuracy of any output voltage. The 4708 specifications are shown in Section 6.

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### Resolution and Accuracy

The maximum resolution is 7.5 digits with a facility for displaying the specified accuracy of any output resistance. The 4708 specifications are shown in Section 6.

### Output Deviation

A user may deviate the output voltage from the output display value by introducing a gain 'Error' within the general range  $\pm 10\%$ . Additionally, for DC functions, the output may be 'offset' by up to  $\pm 2\%$  of the range in use, or 200 $\mu\text{V}$ , whichever is greater.

### Remote Sense

The specified output voltage may be sensed at the load, using 4-wire connections. Remote or Local Sense is selectable from the front panel.

### Remote Guard

This facility allows the instrument's internal guard shields to be externally connected.

## Self-test

On power-up, the internal calibration memory is automatically checked. At any time when the output is off and not under remote control, a user may conduct a sequenced test of the displays, keyboard, safety circuitry and Reset function.

## Message Readout

Messages to the user are presented on the MODE display. The two main groups are:

### Fail

An internal fault condition has been detected.

### Error

A user has selected a task which is outside the instrument's capability.

## Systems Use

The instrument can form part of a system by means of the IEEE 488 standard digital interface. The method of connecting to the system controller and the command codes are described in Section 5.

## Safety

For protection of the user, safety trip circuits are incorporated to switch the OUTPUT OFF, in the event of instrument failures which might generate dangerous output voltages.

UNDER NO CIRCUMSTANCES SHOULD USERS TOUCH ANY OF THE OUTPUT, SENSE OR GUARD TERMINALS UNLESS THEY ARE FIRST SATISFIED THAT NO DANGEROUS VOLTAGE IS PRESENT.

## Optional Facilities

The available options for the 4708 are as follows:

- Option 10: DCV function
- Option 20: ACV function
- Option 30: DC Current, AC Current and Resistance functions
- Option 42: Rear output terminals  
(as a factory-fitted alternative to front panel terminals).
- NB: The rear output option is not recommended for best performance in calibrating high bandwidth, low level instruments.
- Option 90: Rack mounting kit

## Accessories:

The instrument is supplied with the following accessories:

Description	Part Number
Power Cable	920012
Set of Calibration keys	700068
User's Handbook	850245
Calibration and Servicing Handbook (2 volumes)	(Volume 1) 850246 (Volume 2) 850247

In addition the following accessories are available for use with the 4708 instrument:

Description	Part Number
RMK Rack Mounting kit (Option 90)	440094
Special Lead Kit	440070
Model 4600 Transconductance Amplifier	
Slave Mode Lead Kit (4600)	440151
Analog Lead Kit (4600)	440154

## Additional Documentation

The Calibration and Servicing Handbook contains information required to adjust and service the 4708 instrument. It contains detailed descriptions of the circuits, trouble shooting and calibration procedures, parts lists, layout drawings and circuit diagrams.