

## CALIBRATORS

### MODEL 4950



# Multifunction Transfer Standard

- Supports all Datron Calibrator Models
- Transfers Traceability Directly to Calibrator Output Terminals
- Supports all Calibrator Ranges and Functions
- Designed for Transport Applications
- Provides On-Site Calibration to Reduce Calibrator Downtime

Increasing performance levels of today's multifunction calibrators are placing such demands on traditional calibration methodology that users are now being forced to higher level standards along with cumbersome manual transfer devices, in order to obtain uncertainties which align with the performance needs of the calibrator and its workload.

Today's technology now allows a different approach; advanced instrument design techniques and improved component performance have enabled Datron to produce the model 4950, a self-contained programmable transfer standard, capable of fully traceable high accuracy calibration of the latest range of high performance multifunction calibrators.

The model 4950 Multifunction Transfer Standard (MTS) is a compact microprocessor controlled instrument specifically designed for stability under transport conditions. It provides an independent means of checking the calibration of a calibrator and periodically travels to a

remote standards laboratory for certification. On its return, the results of the certification can be used to measure and adjust the calibrator outputs.

The MTS provides all the measurement functions required to calibrate a multifunction calibrator. Its optimized performance envelope is restricted to pre-defined measurement points, each of which are separately calibrated.

The instrument contains no physically adjusted circuit elements; calibration corrections are stored in two non-volatile memories designated "Baseline" and "Certified". Baseline calibration constants are determined at manufacture and remain stored within the instrument for life, enabling its long term performance to be monitored. Certified calibration constants are stored during comparison to standards for the specific calibration of the subject calibrators.

The 4950 is designed to be used in either of two modes. In one, the 4950 is "owned" by a higher level standards laboratory. The *Certified* calibration stores are calibrated to higher level standards at the standards laboratory before the 4950 is transported to the calibrator site. The outputs of the calibrator are compared to the 4950 on each range of each function, in order to determine whether the calibrator is within the required specification at the end of its previous calibration cycle. The calibrator outputs are then calibrated to the *Certified* calibration stores. The 4950 is then returned to the higher level standards laboratory and rechecked against the measurement standards used to calibrate the *Certified* calibration stores prior to shipment to the calibrator site. This process 'closes the measurement loop', providing the highest confidence in the integrity of the transfer.

Alternatively, the 4950 may be "owned" by the calibrator owner. In this case, the *Baseline* calibration stores of the 4950 are

compared with the calibrator prior to shipment to the higher level standards laboratory. At the standards lab, the *Certified* calibration stores are calibrated to higher level standards and the 4950 returned to the calibrator site. Before these new *Certified* stores are used to calibrate the calibrator, the *Baseline* calibration stores are re-compared with the calibrator outputs. By comparing the pre-shipment and post shipment *Baseline* measurements ("closing the measurement loop"), it is possible to determine whether the 4950 has travelled successfully. If all is well, then the *Certified* calibration stores in the 4950 are used to calibrate the calibrator.

The 4950 is supplied with a software package that runs on an industry standard PC in the Windows 3 environment. The user interface consists of a mouse, pull-down menus and graphical windows to guide the user through the calibration process. The entire procedure is automated, reducing the task from days of a skilled engineer's time to just a few hours on an automated system. In addition to considerable time saving, automation provides a more repeatable process and is less prone to human error. The output of the software package is in an ASCII format compatible with most wordprocessors, or Microsoft's Excel spreadsheet package. Standard statistical techniques can then be applied to measurement data to generate percentage confidence limits for the reported measurement uncertainties, or adjust the uncertainties reported to reflect a desired confidence level.

**SPECIFICATIONS**

**DC Voltage**

**Transfer Stability:** 30 days, 23°C ± 1°C, at stated levels ±10% (±ppmR):

|            |   |
|------------|---|
| ±100 mV:   | 3 |
| ±1V:       | 2 |
| ±10V, 19V: | 1 |
| ±100V:     | 2 |
| ±1000V:    | 2 |

**True RMS AC Voltage**

**Transfer Stability:** 30 days, 23°C ± 1°C, at stated levels ±10% and stated frequencies ±1%

**1mV, 10mV and 100mV**

|  |           |
|--|-----------|
| 10Hz, 20Hz, 30Hz, 40Hz, 55Hz (±10%), 300Hz, 1kHz, 10kHz, 20kHz, 30kHz: |           |
|  | 20 + 1µV  |
| 50kHz:   | 30 + 1µV  |
| 100kHz:  | 50 + 2µV  |
| 300kHz:  | 100 + 2µV |
| 500kHz:  | 200 + 2µV |
| 1MHz:  | 300 + 2µV |

**1V and 10V**

|  |     |
|--|-----|
| 10Hz, 20Hz, 30Hz, 40Hz, 55Hz (±10%), 300Hz, 1kHz, 10kHz, 20kHz, 30kHz: | 10  |
| 50kHz:   | 20  |
| 100kHz:  | 30  |
| 300kHz:  | 70  |
| 500kHz:  | 100 |
| 1MHz:  | 200 |

**19V**

|       |    |
|-------|----|
| 1kHz: | 10 |
|-------|----|

**100V**

|  |    |
|--|----|
| 10Hz, 20Hz, 30Hz, 40Hz, 55Hz (±10%), 300Hz, 1kHz, 10kHz, 20kHz, 30kHz: | 10 |
| 50kHz:   | 20 |
| 100kHz:  | 30 |
| 200kHz:  | 50 |

**700V**

|         |    |
|---------|----|
| 100kHz: | 50 |
|---------|----|

**1000V**

|  |    |
|--|----|
| 55Hz (±10%), 300Hz, 1kHz, 10kHz, 20kHz, 30kHz: | 15 |
|--|----|

**DC Current**

**Transfer Stability:** 30 days, 23°C ± 1°C, at stated levels ±10% (±ppm)

|         |    |
|---------|----|
| ±100µA: | 7  |
| ±1mA:   | 7  |
| ±10mA:  | 7  |
| ±100mA: | 7  |
| ±1A:    | 15 |
| ±10A:   | 20 |

**AC Current**

**Transfer Stability:** 30 days, ±1°C, at stated levels ±10% and stated frequencies ±1%

**100µA**

|   |     |
|---|-----|
| 10Hz, 20Hz, 30Hz, 40Hz, 55Hz (±10%), 300Hz, 1kHz: | 100 |
| 5kHz:   | 200 |
| 10kHz:  | 600 |

**1mA, 10mA, 100mA & 1A**

|   |     |
|---|-----|
| 10Hz, 20Hz, 30Hz, 40Hz, 55Hz (±10%), 300Hz, 1kHz: | 60  |
| 5kHz:   | 100 |
| 10kHz:  | 300 |

**10A**

|   |      |
|---|------|
| 10Hz, 20Hz, 30Hz, 40Hz, 55Hz (±10%), 300Hz, 1kHz: | 200  |
| 5kHz:   | 300  |
| 10kHz:  | 600  |
| 20kHz:  | 1000 |

**Resistance**

**Transfer Stability:** 30 days, ±1°C, at stated levels ±10%

|   |     |
|---|-----|
| 1Ω:   | 14  |
| 3Ω:   | 10  |
| 10Ω & 19Ω:  | 5   |
| 30Ω, 100Ω, 190Ω, 300Ω, 1kΩ, 1.9kΩ, 3kΩ, 10kΩ & 19kΩ:3 |     |
| 30kΩ, 100kΩ & 190kΩ:                                  | 5   |
| 300kΩ, 1MΩ & 1.9MΩ:                                   | 8   |
| 3MΩ, 10MΩ & 19MΩ:                                     | 12  |
| 30MΩ & 100MΩ:   | 180 |

**Computer requirements for**

**Software System:**

**Minimum:** PC compatible with 80286 processor (12MHz), 4MBytes RAM, DOS 3.31 or later, 20MBytes hard disk, mouse, keyboard, VGA monitor (color or monochrome), 3.5 inch or 5.25 inch floppy disk, 9-pin dot matrix printer, Microsoft Windows version 3.0

**Recommended:** As above, except 80386DX processor (25MHz), DOS 5.0, VGA color monitor, 40MByte hard disk, Laser printer.

**GENERAL**

**Calibration:** Twin Calibration stores: "Baseline" and "Certified", calibrated from front panel or remote interface.

**Remote Programming:** IEEE-488.2

**Environmental:**

Operating temp: 0°C to +50°C.

Storage temp: -40°C to +70°C.

**Dimensions:** 88 mm (3.5 in.) X 427 mm (16.8 in.) X 487 mm (19.2 in.)

**Weight:** 13.5 kg (30 lb).

**Power:** 90 - 145 Vac or 187 - 292 Vac, 46 Hz-66 Hz, 37VA.

**OPTIONS**

**80: 115V 60 Hz Line Operation**

**81: 115V 50 Hz Line Operation**

**90: Rack Mounting Kit**

**95: Rack Mount Slides**

**ACCESSORIES**

**4953: 10A Current Shunt**

**ORDER INFORMATION**

**Model 4950 (includes dedicated input lead, control software set, IEEE interface card, two IEEE interface cables, ruggedized transit case)**

**Option 80**

**Option 81**

**Option 90**

**Option 95**

**Accessory 4953**

**Factory/FOB: Indianapolis, IN & Norwich, England**

*For complete specifications or a demonstration contact your nearest Wavetek representative (page 146).*