# MTS Systems Corporation

14000 Technology Drive
Eden Prairie, MN 55344-2290

# Certificate of Calibration



MTS Systems

Certificate Number: ACT3-494

System: US2.43227 Site: 50000

Customer Name: EUCENTRE Location: Eden Prarie Country Code: USA

**Equipment**

Device Type: Length Model: 244.41 Serial No.: 10356315B

Controller/Conditioner Model: 493.25 Serial No.: 02011575

Readout Device Model: 493.02 Serial No.: 1453236 Channel: Displacement

**Defined and documented measurement assurance techniques or uncertainty analyses are used to verify the adequacy of the measurement processes.**

**Calibrations are performed with standards whose values and measurements are traceable to the National Institute of Standards and Technology.**

**When parameter(s) are certified to be within specified tolerance(s), the measured value(s) shall fall within the appropriate specification limit and the uncertainty of the measured value(s) shall be stated and provided to the customer for evaluation.**

**CALIBRATION INFORMATION**

As Found: In Tolerance Max. Error As Found: 0.31 % Calibration Date: 28-Oct-11

As Left: In Tolerance Max. Error As Left: 0.31 % Calibration Due: 28-Oct-12

Tolerance: +/-1.0% of Range

Calibration Procedure: Integration Calibration

Full Scale Ranges: 260 mm

Note:

**STANDARDS USED FOR CALIBRATION**

| MTS Asset Number | Manufacturer | Model Number | Description | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| 20269 | Fluke | 189 | DMM | 10-Jun-11 | 8-Jun-12 |
| 20276 | Fluke | 80T-150UA | Temp Probe | 24-May-11 | 24-May-12 |
| 18830A | Optodyne (19200) | p1083 | Laser | 14-Jul-11 | 13-Jul-12 |

Certified by: Issued on: 28-Oct-11

ACS Version: 8.1

ACSRepRevW-Checkout

DBH 10-Feb-10

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# Calibration Report



MTS Systems

Report Number: ACT3-494

System: US2.43227 Site: 50000

Customer Name: EUCENTRE Location: Eden Prarie Country Code: USA

**Equipment**

Device Type: Length Model: 244.41 Serial No.: 10356315B

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Readout Device Model: 493.02 Serial No.: 1453236 Channel: Displacement

**Procedure**

MTS Procedure: Integration Calibration ACS Version: 8.1

Calibration has been performed in accordance with: (none)

Method of Verification:

**Calibration Equipment Asset No.**

Dead Weight Set: HighLevel Board: LowLevel Board: Standard Asset No.: 18830A

DW Compensation: DMM: 20269 Digital Indicator: Lower Limit:

Temperature Readout: 20276 Additional Equipment: Standardizer:

**Conditions**

Ambient Temperature: 76.40 °F Polarity(+): Extension Bidirectional: Cable Length: 150 Feet

| | | | | |
|---|---|---|---|---|
| **In Tolerance** | X | **As Found:** | X | **Tolerance: +/-1.0% of Range** |
| **Out of Tolerance** | | **As Adjusted:** | | **As Found System Condition:** **Good** |

**Conditioner Parameters**

Excitation: 10.0000 Delta K: Zero Offset: 0.0000 Multiplier: Phase: 7.03838

Cal Factor: Positive: Negative: Range Gain: PreAmp Gain: 2 Post Amp/FineGain: 1.53387 Polarity: Inverted

**Calibration Data** **Range:** 1

**Extension** **Resolution:** 0.001 **Full Scale:** 260

Report Units: mm 0.0000

| Applied Percent of Full Scale Length | Series 1 Indicated Reading Ascending | Series 1 Indicated Reading Descending | Series 1 Errors Units Error Asc | Series 1 Errors Percent Error Asc | Series 1 Errors Units Error Desc | Series 1 Errors Percent Error Desc | Series 2 Indicated Reading Ascending | Series 2 Indicated Reading Descending | Series 2 Errors Units Error Asc | Series 2 Errors Percent Error Asc | Series 2 Errors Units Error Desc | Series 2 Errors Percent Error Desc | Repeatability Percent Error Asc | Repeatability Percent Error Desc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0.000 | 0.017 | 0.000 | 0.00 | 0.017 | 0.01 | | | | | | | | |
| 10 | 26.089 | | 0.089 | 0.03 | | | | | | | | | | |
| 20 | 52.412 | | 0.412 | 0.16 | | | | | | | | | | |
| 40 | 104.700 | | 0.700 | 0.27 | | | | | | | | | | |
| 50 | 130.690 | | 0.690 | 0.27 | | | | | | | | | | |
| 60 | 156.810 | | 0.810 | 0.31 | | | | | | | | | | |
| 70 | 182.710 | | 0.710 | 0.27 | | | | | | | | | | |
| 80 | 208.160 | | 0.160 | 0.06 | | | | | | | | | | |
| 90 | 233.950 | | 0.050 | -0.02 | | | | | | | | | | |
| 100 | 259.980 | | 0.020 | -0.01 | | | | | | | | | | |

**Retraction** **Range:** 1

Report Units: mm

| Applied Percent of Full Scale Length | Series 1 Indicated Reading Ascending | Series 1 Indicated Reading Descending | Series 1 Errors Units Error Asc | Series 1 Errors Percent Error Asc | Series 1 Errors Units Error Desc | Series 1 Errors Percent Error Desc | Series 2 Indicated Reading Ascending | Series 2 Indicated Reading Descending | Series 2 Errors Units Error Asc | Series 2 Errors Percent Error Asc | Series 2 Errors Units Error Desc | Series 2 Errors Percent Error Desc | Repeatability Percent Error Asc | Repeatability Percent Error Desc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0.000 | 0.005 | 0.000 | 0.00 | 0.005 | 0.00 | | | | | | | | |
| -10 | -25.853 | | 0.147 | -0.06 | | | | | | | | | | |
| -20 | -51.885 | | 0.115 | -0.04 | | | | | | | | | | |
| -40 | -104.500 | | 0.500 | 0.19 | | | | | | | | | | |
| -50 | -130.680 | | 0.680 | 0.26 | | | | | | | | | | |
| -60 | -156.660 | | 0.660 | 0.25 | | | | | | | | | | |
| -70 | -182.780 | | 0.780 | 0.30 | | | | | | | | | | |
| -80 | -208.800 | | 0.800 | 0.31 | | | | | | | | | | |
| -90 | -234.440 | | 0.440 | 0.17 | | | | | | | | | | |
| -100 | -260.580 | | 0.580 | 0.22 | | | | | | | | | | |

Errors at Zero are computed in % of Range

Uncertainty of the calibration data supplied is equal to or less than the greater of, ±0.25% of reading or ±50µ inches, for a confidence level of 95%

Out of Tolerance in % column

This report shall not be reproduced except in full, without the written approval of the laborator

Calibrations are performed with standards whose values and measurements are traceable to the National Institute of Standards and Technolog

Notes: Non-Linearized data.

Performed By: Ben Baird Test Technician Date: 28-Oct-11

Signature:

ACSRepRevW-Checkout
DBH 10-Feb-10