

CERTIFICATE OF CONFORMANCE

ISSUED BY: STARRETT KINEMETRIC ENGINEERING, INC.

DATE OF ISSUE: 5/20/2024

CERTIFICATE NUMBER: 17653-1



26052 MERIT CIRCLE, SUITE 103
LAGUNA HILLS, CA 92653-7004
949-348-1213 TELEPHONE
949-582-8040 MAIN FAX

CUSTOMER INFORMATION

Wells Technology Inc.
4885 Windsor Ct. NW
Bemidji, MN 56601
UNITED STATES OF AMERICA

SALES ORDER NUMBER: N/A

PURCHASE ORDER NUMBER: 25324

EQUIPMENT INFORMATION

MODEL: · AVR300-Z-M3-3LED
SERIAL NUMBER: · AVR-0498-7318-0424
DESCRIPTION: VIDEO BASED MEASUREMENT SYSTEM

CALIBRATION INFORMATION

AS FOUND: Not applicable
AS LEFT: Passed
CALIBRATION LOCATION: Wells Technology Inc.

CALIBRATION UNCERTAINTY: 2.302E-3
CALIBRATION METHOD: CALIBRATION WAS PERFORMED IN ACCORDANCE WITH STARRETT KINEMETRIC ENGINEERING, PROCEDURE 1000 0019 AND PROCEDURE 8107. THIS CALIBRATION COMPLIES WITH ISO/IEC 17025.
REPORT: THE RESULTS OBTAINED ARE SET OUT IN THE FOLLOWING DOCUMENTS.

SIGNATURE: _____ 

THIS CERTIFICATE PROVIDES TRACEABILITY OF MEASUREMENT TO RECOGNIZED NATIONAL STANDARDS, AND TO UNITS OF MEASUREMENT REALIZED AT THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY OR OTHER RECOGNIZED NATIONAL STANDARDS LABORATORIES. THIS CERTIFICATE MAY NOT BE REPRODUCED OTHER THAN IN FULL, EXCEPT WITH THE PRIOR WRITTEN APPROVAL OF STARRETT KINEMETRIC ENGINEERING. RESULTS RELATED ONLY TO THE ITEM(S) CALIBRATED. ANY NUMBER OF FACTORS MIGHT CAUSE THE CALIBRATION ITEM TO DRIFT OUT OF CALIBRATION BEFORE THE RECOMMENDED INTERNAL HAS EXPIRED.



MACHINE SERIAL NUMBER: AVR-0498-7318-0424

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MACHINE INFORMATION

MODEL: AVR300-Z-M3-3LED
DESCRIPTION: STARRETT VIDEO BASED METROLOGY SYSTEM
SERIAL NUMBER: AVR-0498-7318-0424
TYPE OF CALIBRATION PERFORMED: NON LINEAR ERROR CORRECTION (NLEC)
PRIOR CALIBRATION DATE: N/A
CALIBRATION FREQUENCY: 12 MONTHS
DATE OF CALIBRATION: 5/20/2024
RECOMMENDED RECALIBRATION DATE: 5/19/2025

ENVIRONMENTAL CONDITIONS

TEMP / HUMIDITY GAGE Omega OM-24
THERMOMETER MEASUREMENT UNCERTAINTY: +/-0.2°C
THERMOMETER N.I.S.T. TRACEABILITY NUMBER: RGcp2014-0016
Hygrometer MEASUREMENT UNCERTAINTY: 1%RH
SERIAL NUMBER: 1800170
STARTING AMBIENT TEMPERATURE (°F): 74.0
ENDING AMBIENT TEMPERATURE (°F): 74.0
STARTING HUMIDITY (%RH): 37
ENDING HUMIDITY (%RH): 37

TEST EQUIPMENT USED

LINEAR CALIBRATION STANDARD SERIAL NUMBER: 8736A0005

CALIBRATION DUE DATE: 9/26/2024
MEASUREMENT UNCERTAINTY: ±1.0µm
N.I.S.T. TRACEABILITY NUMBER 683/287989-16

GAUGE BLOCK SERIAL NUMBER M9X009 (1), CSF9(2), VAH005(3), M9X009(4)
SET NUMBER 1

CALIBRATION DUE DATE: 6/20/2024
MEASUREMENT UNCERTAINTY: .0025L+.25 µm
N.I.S.T. TRACEABILITY NUMBER 685-O-0000034696-21

GRID CALIBRATION STANDARD SERIAL NUMBER: 7998A0102

CALIBRATION DUE DATE: 6/1/2024
MEASUREMENT UNCERTAINTY: ±1.0µm
N.I.S.T. TRACEABILITY NUMBER 683/287989-16



REPEATABILITY RESULTS

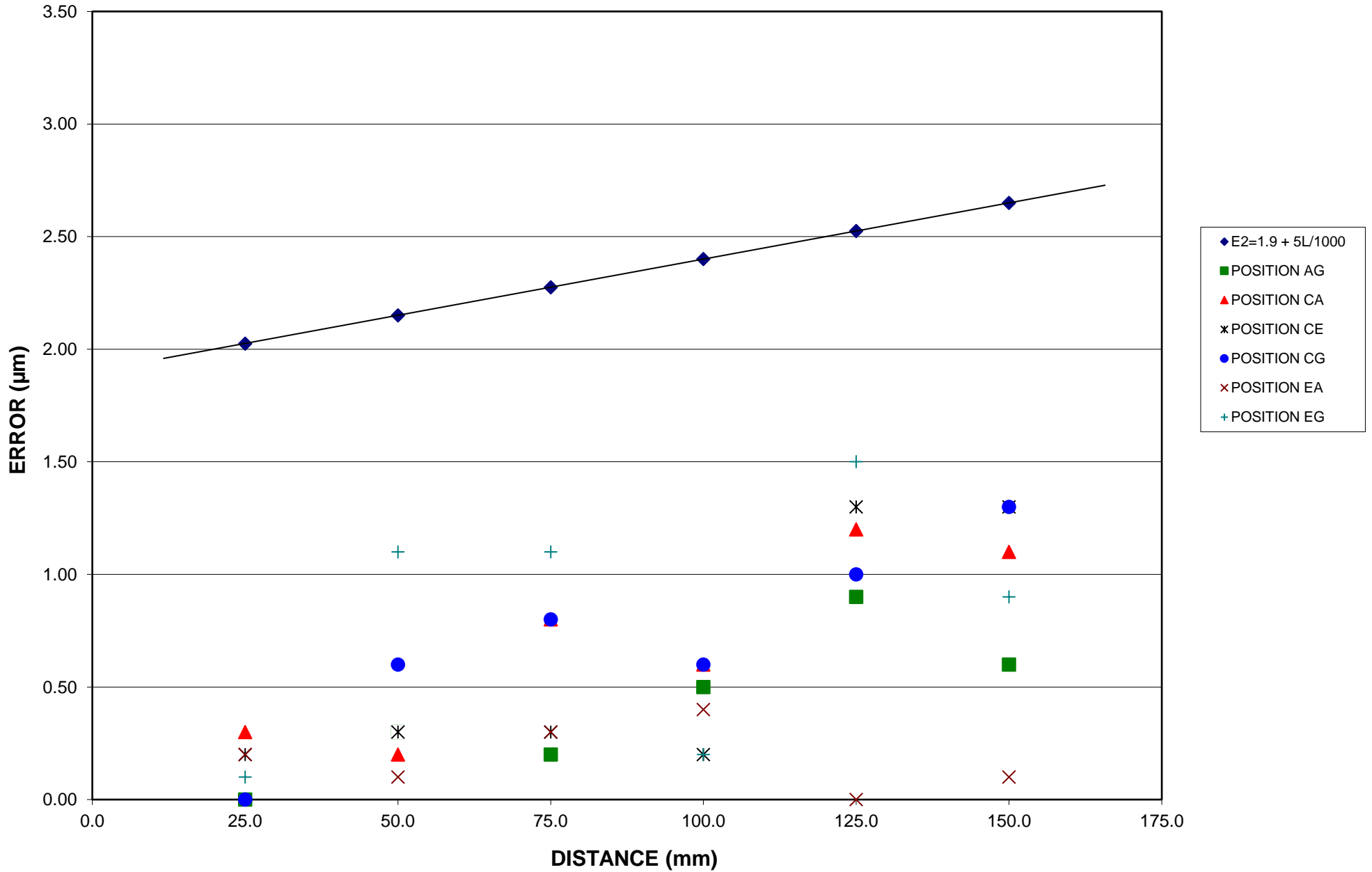
AXIS POSITION (mm)	MEASURED FIDUCIAL LOCATION		
	X	Y	Z
POSITIVE DIRECTION X & Y AXES			
RUN 1	0.0000	0.0000	
RUN 2	-0.0001	0.0005	
RUN 3	0.0000	0.0003	
RUN 4	0.0001	0.0003	
RUN 5	-0.0002	0.0001	
RUN 6	0.0000	0.0003	
RUN 7	0.0000	0.0002	
RUN 8	0.0000	0.0003	
RUN 9	-0.0001	0.0004	
RUN 10	-0.0001	0.0003	
REPEATABILITY (µm)	0.30	0.50	
NEGATIVE DIRECTION X & Y AXES			
RUN 1	0.0000	0.0000	
RUN 2	0.0001	0.0001	
RUN 3	0.0000	0.0001	
RUN 4	0.0000	0.0001	
RUN 5	0.0000	0.0002	
RUN 6	0.0000	0.0002	
RUN 7	0.0000	0.0001	
RUN 8	0.0000	0.0001	
RUN 9	0.0001	0.0003	
RUN 10	0.0001	0.0001	
REPEATABILITY (µm)	0.10	0.30	
POSITIVE DIRECTION Z-AXIS			
RUN 1			0.0000
RUN 2			0.0009
RUN 3			0.0013
RUN 4			0.0011
RUN 5			0.0005
RUN 6			0.0007
RUN 7			0.0005
RUN 8			0.0003
RUN 9			0.0009
RUN 10			0.0018
REPEATABILITY (µm)			1.80



ACCURACY VALIDATION RESULTS

NOMINAL DISTANCE (mm)	25.0001	50.0001	75.0002	100.0002	125.0001	150.0001
ACCURACY SPECIFICATION (μm)	2.03	2.15	2.28	2.40	2.53	2.65
POSITION AG						
RUN 1	25.0000	50.0009	75.0001	100.0008	125.0012	150.0007
RUN 2	25.0000	50.0003	75.0003	100.0007	125.0007	150.0009
RUN 3	25.0005	50.0000	75.0010	100.0008	125.0011	150.0006
AVERAGE (mm)	25.0001	50.0004	75.0004	100.0007	125.0010	150.0007
MEASURED ACCURACY (μm)	0.00	0.30	0.20	0.50	0.90	0.60
POSITION CA						
RUN 1	24.9997	50.0003	75.0012	100.0008	125.0015	150.0012
RUN 2	24.9998	50.0002	75.0010	100.0007	125.0014	150.0011
RUN 3	25.0001	50.0004	75.0008	100.0009	125.0011	150.0014
AVERAGE (mm)	24.9998	50.0003	75.0010	100.0008	125.0013	150.0012
MEASURED ACCURACY (μm)	0.30	0.20	0.80	0.60	1.20	1.10
POSITION CE						
RUN 1	24.9999	50.0003	75.0005	100.0004	125.0014	150.0014
RUN 2	25.0000	50.0005	75.0007	100.0005	125.0016	150.0016
RUN 3	24.9999	50.0005	75.0005	100.0004	125.0014	150.0014
AVERAGE (mm)	24.9999	50.0004	75.0005	100.0004	125.0014	150.0014
MEASURED ACCURACY (μm)	0.20	0.30	0.30	0.20	1.30	1.30
POSITION CG						
RUN 1	25.0000	50.0004	75.0010	100.0006	125.0009	150.0017
RUN 2	24.9996	50.0011	75.0010	100.0003	125.0007	150.0011
RUN 3	25.0007	50.0008	75.0012	100.0015	125.0018	150.0014
AVERAGE (mm)	25.0001	50.0007	75.0010	100.0008	125.0011	150.0014
MEASURED ACCURACY (μm)	0.00	0.60	0.80	0.60	1.00	1.30
POSITION EA						
RUN 1	24.9999	50.0008	74.9998	100.0000	125.0003	150.0004
RUN 2	24.9996	50.0005	74.9996	99.9998	125.0001	150.0002
RUN 3	25.0004	49.9994	75.0004	99.9996	125.0001	150.0002
AVERAGE (mm)	24.9999	50.0002	74.9999	99.9998	125.0001	150.0002
MEASURED ACCURACY (μm)	0.20	0.10	0.30	0.40	0.00	0.10
POSITION EG						
RUN 1	24.9994	50.0009	75.0011	100.0001	125.0015	150.0006
RUN 2	25.0007	50.0015	75.0017	100.0007	125.0013	150.0013
RUN 3	25.0005	50.0013	75.0013	100.0006	125.0020	150.0012
AVERAGE (mm)	25.0002	50.0012	75.0013	100.0004	125.0016	150.0010
MEASURED ACCURACY (μm)	0.10	1.10	1.10	0.20	1.50	0.90

X-Y AXES ACCURACY VALIDATION RESULTS PLOT





MACHINE SERIAL NUMBER:

AVR-0498-7318-0424

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ACCURACY VALIDATION RESULTS

NOMINAL DISTANCE (mm)	25.4000	50.8000	76.2000	101.6000	127.0000	152.4000	177.8000
SPECIFICATION (µm)	2.63	2.75	2.88	3.01	3.14	3.26	3.39
VALIDATION							
RUN 1	25.3989	50.7996	76.1994	101.5989	127.0010	152.4001	177.8013
RUN 2	25.3997	50.8004	76.1990	101.5979	127.0017	152.4012	177.8005
RUN 3	25.3987	50.8018	76.1991	101.5987	127.0014	152.4007	177.8012
AVERAGE (mm)	25.3991	50.8006	76.1991	101.5985	127.0013	152.4006	177.8010
MEASURED ACCURACY (µm)	0.90	0.60	0.90	1.50	1.30	0.60	1.00

Z-AXIS ACCURACY VALIDATION RESULTS PLOT

