- when it has to be right

Leica Geosystems

Leica Geosystems
Calibration Certificate Metrology Gold

Calibration Certificate Metrology Gold with measurement values issued by Accredited Calibration Laboratory SCS 0079

Product	AT500	**Certificate No.**	20410-20251204
Article No.	577440	**Inspection Date**	December 4, 2025
Serial No.	971665	**Order No.**	4100534
Equipment No.		**PO No.**	

Issued by
Accredited Calibration Lab. SCS 0079
Leica Geosystems AG
CH-9435 Heerbrugg
Switzerland

Ordered by
Friedrich Kurz GmbH
c/o Hexagon - Distribution Stephan Herhert
Walter-Zapp-Strasse 4
35578 Wetzlar
Deutschland

Status After Inspection

Customer

Compliance
The Calibration Certificate Gold with measurement values is issued by the Accredited Calibration Laboratory SCS 0079. The accreditation (SCS 0079) is in accordance with the standard ISO/IEC 17025 and is granted by the Swiss Accreditation Service (SAS). The Swiss Accreditation Service is a member of the International Laboratory Accreditation Cooperation (ILAC) and signatory of the Mutual Recognition Agreement (MRA) which assures international acceptance of the calibration certificates.

The test equipment used is traceable to national standards or to recognized procedures.
This is established by our Quality Management System, audited by SAS (Swiss Accreditation Authority) to ISO/IEC 17025.

Certificate

We hereby certify that the product described has been tested with the following result:

☑ Compliance — The test results are within the specification of the product.

☐ **Non-Compliance** — The test results are not within the specification of the product.

Note: The statement of compliance has been taken without consideration of the measurement uncertainty ("shared risk").

Leica Geosystems AG — December 4, 2025

Jan Bank
Head of Calibration Lab. Laser Tracker

Holger Strack
Quality Management

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Specifications

a) + b)	Maximum deviation (MPE) of a spatial length ($E_{Vol:0:LT,MPE}$) and location (two face) measurement ($L_{Dia.2x1:P\&R:LT,MPE}$) :		
	Observed at a distance of	$E_{Vol:0:LT,MPE}$	$L_{Dia.2x1:P\&R:LT,MPE}$
	1.5 m	≤ ± 0.030 mm	≤ ± 0.051 mm
	6.0 m	≤ ± 0.072 mm	≤ ± 0.104 mm
	10.0 m	≤ ± 0.106 mm	≤ ± 0.151 mm
	20.0 m	≤ ± 0.191 mm	≤ ± 0.271 mm

c) + d)	Absolute Distance Meter	
	Test Item	Maximum Deviation
	Maximum deviation (MPE) of the ADM Offset (e_{R0})	≤ ± 0.010 mm
	Absolute Distance Meter (ADM) Scale	≤ ± 0.3 ppm

e)	Embedded Meteo Station	
	Test Item	Maximum Deviation
	Temperature	≤ ± 0.3 °C
	Pressure	≤ ± 1.0 hPa
	Relative Humidty	≤ ± 10.0 % r.H.

Test Results

a) + b)	Maximum observed deviation of a spatial length ($E_{Vol:0:LT}$) and location (two face) measurement ($L_{Dia.2x1:P\&R:LT}$) :		
	Observed at a distance of	$E_{Vol:0:LT}$	$L_{Dia.2x1:P\&R:LT}$
	1.5 m	0.013 mm ± 0.009 mm *)	0.011 mm ± 0.006 mm *)
	6.0 m	-0.020 mm ± 0.009 mm *)	0.019 mm ± 0.006 mm *)
	10.0 m	0.018 mm ± 0.009 mm *)	0.041 mm ± 0.006 mm *)
	20.0 m	0.068 mm ± 0.009 mm *)	0.056 mm ± 0.006 mm *)

c) + d)	Maximum observed deviation of ADM Measurements	
	Test Item	Maximum Deviation
	Maximum deviation of the ADM Offset (e_{R0})	0.003 mm ± 0.007 mm *)
	Absolute Distance Meter (ADM) Scale	-0.1 ppm ± 0.03 ppm *)

e)	Maximum observed deviation of Embedded Meteo Station	
	Test Item	Maximum Deviation
	Temperature	0.0 °C ± 0.06 °C *)
	Pressure	0.0 hPa ± 0.7 hPa *)
	Relative Humidty	0.6% r.H. ± 2.5 % r.H. *)

Measurement Uncertainty

*) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EA-4/02.

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Calibration Certificate Metrology Gold - Appendix

Calibration Certificate Gold with measurement values issued by Accredited Calibration Laboratory SCS 0079

Test Procedure

Spatial Length Measurement and Location (two face) Measurement
The spatial length measurements and location (two-face) measurements, are carried out on a calibrated scale bar, based on the test procedure described in ISO 10360-10:2021 Annex E.

ADM Frequency
The modulation frequency of the distance meter is checked against a calibrated rubidium frequency.

ADM Offset
The determination of the distance meter zero point offset is based on the principle of distance measurements in all combinations of an unknown base line (inside / outside comparison of three stations).

Embedded Meteostation (Temperature / Pressure / Humidity)

The reported measurement results are derived by comparison to a calibrated reference meteo station.

Reference Equipment

a) Spatial Length Measurement

Carbon Scale Bar 2300mm	Serial No: SPM-21-139	Cal. No.: L250522AB2

c) Distance Repeatability Measurement (ADM)

Rubidium Frequency	Serial No: 121413	Cal. No.: 33542
ADM Offset: AT500	Serial No: 971665	Cal. No.: 20410-20251204

e) Embedded Meteostation (Temperature / Pressure / Humidity)

Reference Thermometer	Serial No: 23040052	Cal. No.: SCS_T7191
Reference Manometer	Serial No: 23010036	Cal. No.: SCS_D0821
Reference Mano-Hygrometer	Serial No: 23010036	Cal. No.: SCS_F2333n

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Measurement Report

a) Spatial Length Measurement

Inspection Date:	December 4, 2025	Temperature:	21.1 °C
Inspected by:	FRCH	Pressure:	963.0 hPa
		Humidity:	32.0 % r.H.
Product:	Serial No:	Reflector:	Leica RRR 1.5"
AT500	971665	Serial No:	38397,38375,28132

Spatial Length Measurement

Distance to System [m]	Scale Bar orientation	Test Length	Reference Length [1] [mm]	Measured Length [mm]	Error ($E_{Vol:0:LT}$) [mm]	Tolerance ($E_{Vol:0:LT,MPE}$) [mm]	Tolerance Used
1.5	Horizontal, 0.5 m elevated	A - B	1149.999	1150.011	0.013	± 0.030	43%
		A - C	2299.845	2299.848	0.003	± 0.028	11%
		B - C	1149.846	1149.838	-0.008	± 0.030	28%
	Horizontal, 0°	A - B	1149.999	1150.008	0.009	± 0.029	32%
		A - C	2299.845	2299.848	0.003	± 0.027	12%
		B - C	1149.846	1149.841	-0.005	± 0.029	17%
	Horizontal, 90°	A - B	1149.999	1149.999	0.000	± 0.029	2%
		A - C	2299.845	2299.847	0.002	± 0.027	6%
		B - C	1149.846	1149.849	0.003	± 0.029	9%
	Vertical	A - B	1149.999	1150.006	0.008	± 0.029	26%
		A - C	2299.845	2299.853	0.008	± 0.027	29%
		B - C	1149.846	1149.847	0.001	± 0.029	4%
6.0	Vertical	A - B	1149.999	1149.978	-0.020	± 0.072	28%
		A - C	2299.845	2299.844	-0.001	± 0.072	2%
		B - C	1149.846	1149.866	0.020	± 0.072	28%
10.0	Horizontal	A - B	1149.999	1150.017	0.018	± 0.106	17%
		A - C	2299.845	2299.851	0.006	± 0.106	6%
		B - C	1149.846	1149.835	-0.011	± 0.106	10%
20.0	Horizontal	A - B	1149.999	1150.066	0.068	± 0.191	35%
		A - C	2299.845	2299.849	0.004	± 0.191	2%
		B - C	1149.846	1149.784	-0.062	± 0.191	33%

1) Reference length temperature corrected
Temperature at calibration of Scale Bar: 20.3 °C
Actual temperature at Laser Tracker calibration: 21.1 °C

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Measurement Report

b) Location (two face) Measurement

Inspection Date:	December 4, 2025	Temperature:	21.1 °C
Inspected by:	FRCH	Pressure:	963.0 hPa
		Humidity:	32.0 % r.H.
Product:	Serial No:	Reflector:	Leica RRR 1.5"
AT500	971665	Serial No:	38397,38375,28132

Location (two face) Measurement

Distance to System [m]	Position	Error ($L_{Dia:2x1:P\&R:LT}$) [mm]	Tolerance ($L_{Dia:2x1:P\&R:LT,MPE}$) [mm]	Tolerance Used
1.5	A	0.007	± 0.051	13%
	B	0.011	± 0.045	23%
	C	0.005	± 0.050	9%
	A	0.006	± 0.050	12%
	B	0.008	± 0.044	18%
	C	0.005	± 0.050	11%
	A	0.009	± 0.050	18%
	B	0.006	± 0.044	13%
	C	0.004	± 0.050	7%
	A	0.008	± 0.049	17%
	B	0.007	± 0.044	16%
	C	0.005	± 0.051	10%
6.0	A	0.004	± 0.104	4%
	B	0.019	± 0.103	18%
	C	0.003	± 0.104	3%
10.0	A	0.005	± 0.151	3%
	B	0.041	± 0.150	27%
	C	0.004	± 0.151	3%
20.0	A	0.042	± 0.271	16%
	B	0.056	± 0.271	21%
	C	0.049	± 0.271	18%

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Measurement Report

c) Absolute Distance Measurement (ADM): Zero Point Offset

Inspection Date:	December 4, 2025	Temperature:	20.9 °C
Inspected by:	FRCH	Pressure:	964.0 hPa
		Humidity:	32.0 % r.H.
Product:	Serial No:	Reflector:	Leica RRR 1.5"
AT500	971665	Serial No:	38631

Absolute Distance Meter (ADM) Zero Offset R_0

	Measured [mm]	Active [mm]	Error e_{R0} [mm]	Tolerance [mm]	Tolerance Used
ADM Zero Offset R_0	-0.187	-0.184	0.003	± 0.010	34%

d) ADM Distance Measurement: Scale and Repeatability

Inspection Date:	December 4, 2025	Temperature:	21.1 °C
Inspected by:	CETO	Pressure:	963.0 hPa
		Humidity:	32.0 % r.H.
Product:	Serial No:	Reflector:	Leica RRR 1.5"
AT500	971665	Serial No:	38631

ADM Scale

ADM Scale [ppm]	Tolerance [ppm]	Tolerance Used
-0.082	± 0.3	27%

ADM Repeatability **)

Distance (approximate) [m]	Expanded Standard Deviation (k=2) ADM Repeatability(10 samples) [mm]	Tolerance [mm]	Tolerance Used
1.6	± 0.0026	± 0.005	53%
5.0	± 0.0022	± 0.005	45%
10.0	± 0.0005	± 0.005	9%
20.0	± 0.0016	± 0.005	33%
40.0	± 0.0015	± 0.005	29%
60.1	± 0.0034	± 0.005	69%
80.0	± 0.0028	± 0.005	55%

**) Test result not in scope of Accredited Laboratory

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Measurement Report

e) Embedded Meteostation (Temperature/Pressure/Humidity)

Inspection Date: December 3, 2025
Inspected by: CETO

Product: AT500
Serial No: 971665

Results

Test Item	Reference value	Actual value	Error	Tolerance	Tolerance Used
Temperature Object	-	-	-	-	-
Temperature Air	21.2 °C	21.1 °C	-0.03 °C	± 0.3 °C	8%
Pressure	965.2 hPa	965.2 hPa	0.00 hPa	± 1.0 hPa	0%
Relative Humidity	32.4 %	33.0 %	0.60 %	± 10.0 %	6%

Note: Accuracy of Air Temperature and Relative Humidity is valid with connected external Air temperature sensor only.

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