

Acceptance/Reverification with reference to VDI/VDE 2634, Part 3

General Data

System: ATOS Q 255 MV100
Serial number: 210221
Serial number left camera lens: 15428794
Serial number right camera lens: 15429033
Serial number projector lens: 2720013
Measuring volume: MV100 (100x70x60) mm
Software version: ZEISS INSPECT 2023_Service_Pack_5 Rev. 87
Date of the test (yyyy-mm-dd): 2025-05-12
Inspector: Jeppe Harder Plauborg
Measurement temperature: 21.2 °C

Artifact

General

Name: Z5152
Artifact type: PSA400
Sphere pair: L4-R4
Calibration date (yyyy-mm-dd): 2024-07-18
Calibration ID: 36561/D-K-15007-01-00/2024-07
Calibration laboratory: Carl Zeiss Industrielle Messtechnik GmbH
Calibration temperature: 20.0 °C
Expansion coefficient for sphere spacing: $4.00 \cdot 10^{-6} \text{ K}^{-1}$
Expansion coefficient for diameter: $10.50 \cdot 10^{-6} \text{ K}^{-1}$

Basic dimensions

Sphere spacing: 55 mm
Diameter left sphere: 12 mm
Diameter right sphere: 12 mm

Calibrated nominal dimensions

Sphere spacing: 55.07030 mm
Diameter left sphere: 12.00530 mm
Diameter right sphere: 12.00540 mm

Measurement Parameters

Measurement Settings

Number of exposure times:	1
Min. fringe contrast:	15 gray values
State: Avoid points at strong brightness differences?:	Yes
State: Avoid Triple Scan points?:	No
State: Avoid Triple Scan points at strong brightness differences?:	Yes
Max. residual:	0.20 pixel
Depth limitation mode:	Automatic depth limitation
Corner mask size:	0
Measurement resolution:	Full resolution

Settings of Checks

State: Check "Sensor movement"?:	Yes
Max. sensor movement:	0.10 pixel
State: Check "Lighting change"?:	Yes

Sensor Calibration

General

Calibration date:	2025-05-12 10:43
Measurement temperature:	21.1 °C

Calibration Object

Calibration object type:	Panel (Triple Scan)
Calibration object name:	CP40/100/31929
Test distances:	168.51116 / 168.50925 mm
Reference temperature:	20.0 °C
Expansion coefficient:	$6.94 \cdot 10^{-6} \text{ K}^{-1}$

Calibration Settings

Focal length (camera):	50.00 mm
Focal length (projector):	27.00 mm
Light intensity:	100%
Snap mode:	Double snap
Max. residual gray value adjustment:	0.050

Calibration Result

Calibration deviation:	0.029 pixel (Quality check: Good)
Projector calibration deviation:	0.037 pixel (Quality check: Good)
Projector calibration deviation (optimized):	0.022 pixel
Camera angle:	28.41 °
Height variance:	60.0894 mm
Measuring volume:	114 x 80 x 60 mm

Acceptance/Reverification Test

General

Number of test positions (measurement series): 3
Nominal diameter of left sphere with temperature correction: 12.00545 mm
Nominal diameter of right sphere with temperature correction: 12.00555 mm
Nominal sphere spacing with temperature correction: 55.07056 mm

Parameter Probing Error Form, Left Sphere

Pos ²⁾	M ³⁾	P ⁴⁾	Min. deviation	Max. deviation	Range of deviation	Probing error form (sigma)
1	10	38992	-0.0020 mm	0.0020 mm	0.0040 mm	0.0006 mm
2	10	34772	-0.0019 mm	0.0019 mm	0.0038 mm	0.0006 mm
3	10	34134	-0.0020 mm	0.0019 mm	0.0039 mm	0.0006 mm

Parameter Probing Error Form, Right Sphere

Pos ²⁾	M ³⁾	P ⁴⁾	Min. deviation	Max. deviation	Range of deviation	Probing error form (sigma)
1	10	41064	-0.0028 mm	0.0029 mm	0.0057 mm	0.0009 mm
2	10	36597	-0.0027 mm	0.0027 mm	0.0054 mm	0.0008 mm
3	10	35879	-0.0029 mm	0.0029 mm	0.0057 mm	0.0009 mm

Parameter Probing Error Size, Left Sphere

Pos ²⁾	M ³⁾	P ⁴⁾	Diameter (actual)	Diameter (nominal) ¹⁾	Probing error (size)
1	10	38992	12.0078 mm	12.0055 mm	0.0023 mm
2	10	34772	12.0069 mm	12.0055 mm	0.0014 mm
3	10	34134	12.0063 mm	12.0055 mm	0.0008 mm

Parameter Probing Error Size, Right Sphere

Pos ²⁾	M ³⁾	P ⁴⁾	Diameter (actual)	Diameter (nominal) ¹⁾	Probing error (size)
1	10	41064	12.0078 mm	12.0056 mm	0.0023 mm
2	10	36597	12.0064 mm	12.0056 mm	0.0008 mm
3	10	35879	12.0058 mm	12.0056 mm	0.0003 mm

Sphere Spacing Error

Pos ²⁾	M ³⁾	Sphere spacing (actual)	Sphere spacing (nominal) ¹⁾	Sphere spacing error
1	10	55.0683 mm	55.0706 mm	-0.0023 mm
2	10	55.0695 mm	55.0706 mm	-0.0010 mm
3	10	55.0686 mm	55.0706 mm	-0.0020 mm

Parameter Length Measurement Error

Pos ²⁾	M ³⁾	Length (actual)	Length (nominal) ¹⁾	Length measurement error
1	10	67.0769 mm	67.0761 mm	0.0009 mm
2	10	67.0774 mm	67.0761 mm	0.0013 mm
3	10	67.0758 mm	67.0761 mm	-0.0003 mm

¹⁾ With temperature correction

²⁾ Test position

³⁾ Number of measurements

⁴⁾ Number of points

Summary Acceptance/Reverification Test

Parameter	Maximum deviation	Limit
Probing error form (sigma)	0.0009 mm	0.0030 mm
Probing error (size)	0.0023 mm	0.0060 mm
Sphere spacing error	-0.0023 mm	0.0070 mm
Length measurement error	0.0013 mm	0.0130 mm