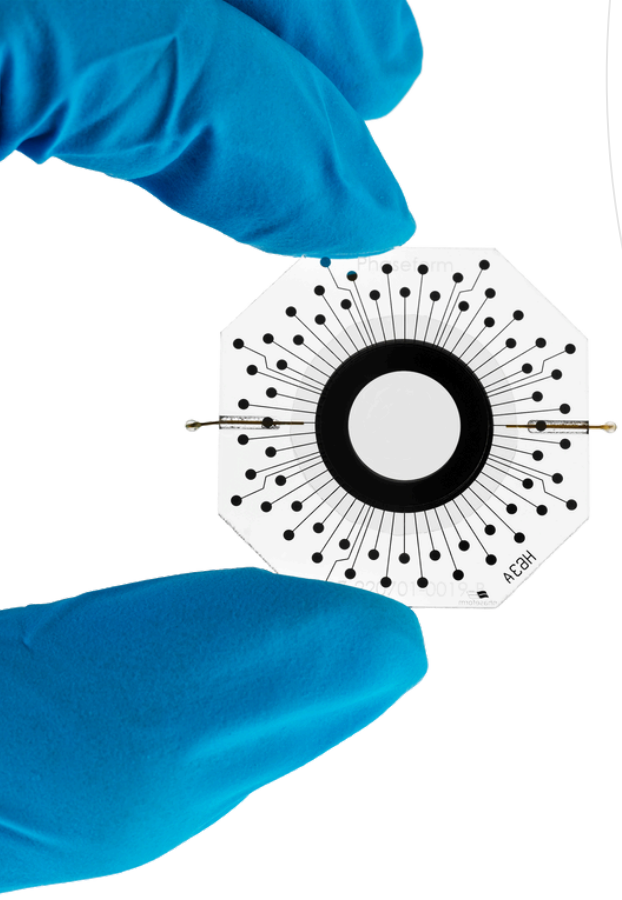


DELTA 7[10]

TRANSMISSIVE WAVEFRONT MODULATOR

DPP TECHNOLOGY

The Delta 7 is based on the Deformable Phase Plate (DPP) technology, exclusively developed by Phaseform GmbH. DPP is composed of a fluidic chamber, enclosed by a thin membrane, which is deformed by electrostatic force. The force is generated by a 2D array of transparent electrodes embedded within the optical aperture of the DPP. The sophisticated optofluidic design of the 10 mm aperture DPP enables gravity-neutral performance for orientation-independent, high-quality wavefront modulation.

KEY FEATURES

Complex wavefront modulation
63 electrodes enabling replication of up to the 7th radial order of Zernike polynomials (>35 modes) with high fidelity

Straightforward system integration
Compact housing compatible with standard 30 mm cage systems by rods, lens tubes, and post assemblies

Linear & hysteresis-free response
Electrostatic actuation suited for open-loop wavefront control

Remarkable optical quality
Active best flat with an induced RMS wavefront error of less than λ/40

Polarization-independent
Wavefront modulation independent of the light polarization for maximized efficiency

phaseform

SPECIFICATIONS

GENERAL

Modulator type	Optofluidic DPP (Deformable Phase Plate), electrostatically actuated
Clear aperture diameter	10 mm
Number of actuators	63
Number of actuators across aperture diameter	7
Connectivity	USB 2.0
Operating system	Windows, Linux, and macOS
Driving software	SDK and GUI available in Python. Wrapper to execute Python functions in Matlab.

OPTICAL

Wavefront RMS error of best flat	< 15 nm (orientation independent)
Maximum peak-to-valley of the generated wavefronts	> 7 µm
Maximum spatial frequency of the correction	7th radial order of Zernike modes
Optical transmission (VIS-NIR version)	400 nm - 1700 nm 80% at λ=500 nm
Wavefront RMS drift	< 5% after 60 min
Laser Induced Damage Threshold (LIDT)	10 W/cm² for 10s @ 1070 nm CW
Nominal operation laser power	Factory calibrated for < 100 mW CW (over full optical aperture)

Included in the Delta 7 package Driving electronics, control software, cables, manual

SPECIFICATIONS, CONT.

MECHANICAL

Thickness (within clear aperture)	0.87 mm
Response time (best flat to maximum deformation)	< 40 ms
Hysteresis	< 1%
Linearity	> 92%
Mounting capability	30 mm cage system rods, SM1 tubing, and ∅=1/2" post
Connector cable length	1.5 m

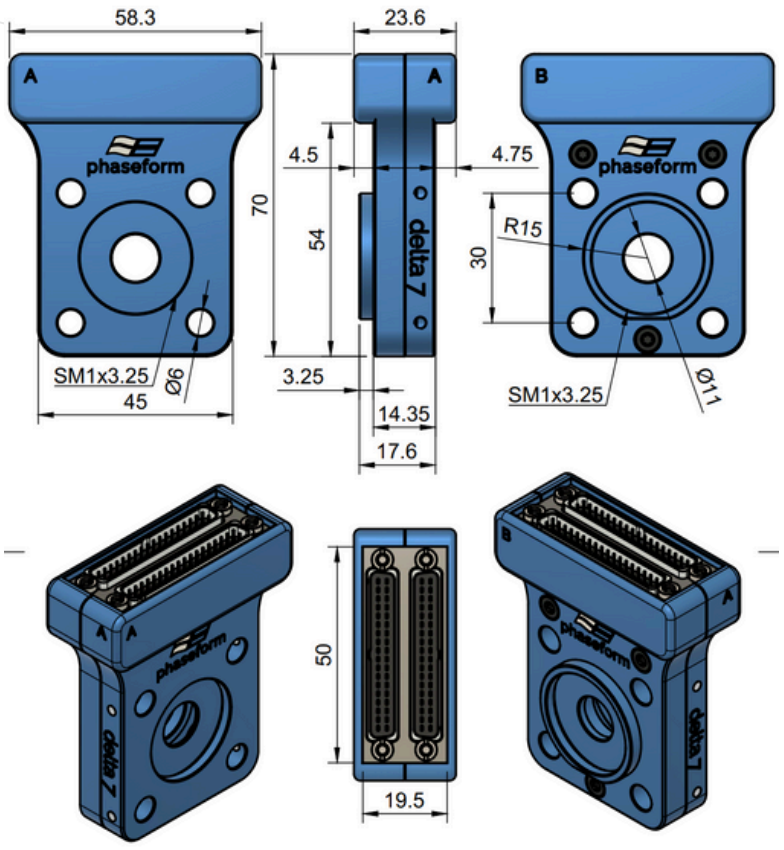
ELECTRICAL

Actuator voltage	up to 295 V DC
Maximum power consumption	< 9 W
Power supply	120/230 VAC, 2.5 phono plug (included)

THERMAL

Storage temperature	10 °C to 35 °C
Operating temperature	20 °C to 25 °C

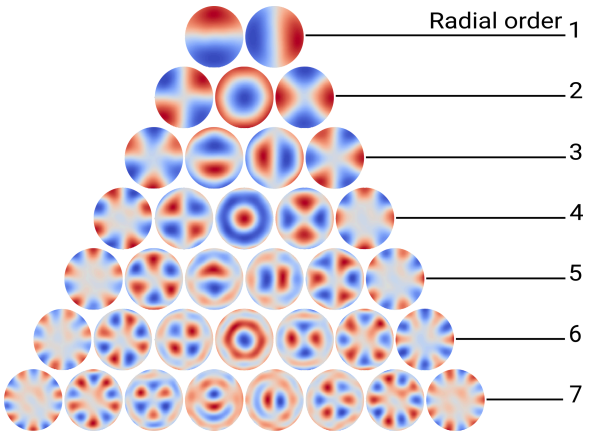
OPTICS HOUSING MECHANICAL DRAWINGS



GENERATED ZERNIKE MODES IN OPEN LOOP

Max amplitude RMS, peak-to-valley, and purity of generated Zernike modes

Z (n,m)	RMS [µm]	PV [µm]	Purity [%]	Z (n,m)	RMS [µm]	PV [µm]	Purity [%]
Z (1,-1)	2	7	98	**Z (5,3)**	0.15	0.7	82
Z (1,1)	2	7	97	**Z (5,5)**	0.15	0.9	90
Z (2,-2)	1	3.8	96	**Z (6,-6)**	0.1	0.8	83
Z (2,0)	1	3.8	96	**Z (6,-4)**	0.07	0.5	70
Z (2,2)	1	3.8	96	**Z (6,-2)**	0.07	0.5	77
Z (3,-3)	0.5	2.5	94	**Z (6,0)**	0.1	0.6	77
Z (3,-1)	0.5	1.7	94	**Z (6,2)**	0.07	0.5	73
Z (3,1)	0.5	1.7	93	**Z (6,4)**	0.07	0.5	70
Z (3,3)	0.5	2.5	95	**Z (6,6)**	0.1	0.8	77
Z (4,-4)	0.25	1.3	93	**Z (7,-7)**	0.07	0.6	74
Z (4,-2)	0.25	1.1	88	**Z (7,-5)**	0.07	0.5	70
Z (4,0)	0.25	1.2	91	**Z (7,-3)**	0.07	0.5	70
Z (4,2)	0.25	1.1	86	**Z (7,-1)**	0.07	0.5	70
Z (4,4)	0.25	1.3	94	**Z (7,1)**	0.07	0.5	70
Z (5,-5)	0.15	0.9	90	**Z (7,3)**	0.07	0.5	70
Z (5,-3)	0.15	0.7	84	**Z (7,5)**	0.07	0.5	70
Z (5,-1)	0.15	0.8	80	**Z (7,7)**	0.07	0.6	78
Z (5,1)	0.15	0.8	80				



*Purity is defined as the fraction of the target Zernike mode relative to the root-sum of all modes

DISCLAIMER

All specifications are preliminary and subject to change without notice. No representation or warranty, either expressed or implied, is made as to the reliability, completeness, or accuracy of this specification sheet.

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