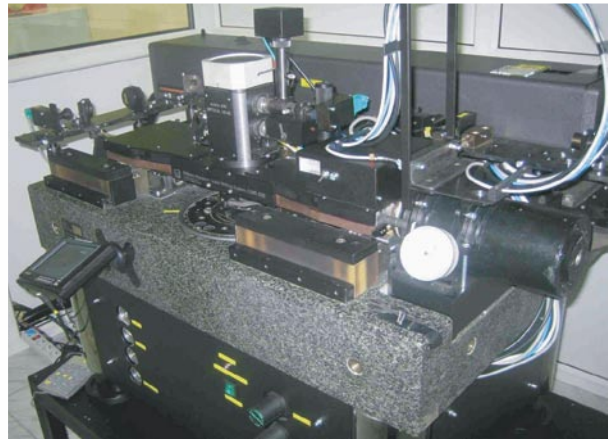


# CLWS-200

## Circular laser writing system CLWS-200

Laser pattern generator CLWS-200 is used for manufacturing of binary amplitude masks of computer-synthesized holograms with arbitrary topology, multi-level diffractive optical elements with arbitrary topology, precision circular scales for angular encoders and limbs. Laser writing system CLWS-200 is intended for direct laser writing of diffractive structures on chromium and photoresist films. Writing process is carried out in polar coordinates system. The radial displacement unit with optical writing head, angular coordinate unit and laser beam power control unit are fixed on granite plate placed on table. The laser beam power control unit stabilizes and modulates laser power in a range of 1:10000 by means of two acousto-optic modulators. There is also a mechanical shutter, which helps to avoid exposure of the photoresist during break in writing. The optical writing head mounted on the radial displacement unit includes autofocus subsystem with focusing objective (N.A.= 0.65, in base version), CCD camera, illuminator, photodetectors for control of writing beam power and light reflected by recording layer. The objective forms a light spot with diameter about 0.6  $\mu\text{m}$  (FWHM at 488nm) on a substrate covered by recording material. The optical substrate is fixed on a spindle by vacuum holder. Angular position of the substrate is measured by angular optical encoder, which is used for rotation speed stabilization as well. The linear air-bearing stage is moved by means of a computer-controlled linear motor. The stage displacement is measured by the precision laser interferometer. The system is computer controlled using a set of special cards and software running under Windows™. It is recommended to install the System in a clean room with temperature stabilization on the anti-vibration table and ground floor.



Laser writing system CLWS-200 includes:

- ♦ Optomechanical unit (radial displacement unit with optical writing head, angular coordinate unit, laser beam power control unit) on granite table
- ♦ Computer and control software
- ♦ Rack with electronic control units
- ♦ User-defined documentation
- ♦ Argon ion laser Innova 70 (Coherent, USA)

### Main specifications

Writing spot diameter, $\mu\text{m}$ (at FWHM)	0.65
Writing laser wavelength, nm	458-514*
Writing field diameter, mm	200 (max. 225)
Spindle rotation speed, rpm	300-900
Accuracy of radial coordinate, $\mu\text{m}$	Better then 0.1 *
Accuracy of angular coordinate, (rms) ang. sec	1.5 *
Writing pitch, mm	0.1- 1
Writing time for arbitrary binary pattern per 100 cm <sup>2</sup> at: <ul style="list-style-type: none"><li>• Addressable grid: 0.5 <math>\mu\text{m}</math></li><li>• Radial range of writing: 0-56.5 mm</li><li>• Rotation speed: 900 rpm</li></ul>	Approx. 4.2 hours
Writing time for circular binary pattern with 100 mm diameter	Approx. 1.5-2 hours
Minimal time for substrate mounting and adjustment, min	1-10
Allowable substrate unflatness, mm per inch of diagonal	1.3
Substrate thickness, mm	1.5-15 *
Substrate loading	Handle
Recording material: - for binary structures - multi-level structures	Cr-films, Photoresist films.
Operation temperature range	21 $\pm$ 1°C
Temperature tolerance during writing process for obtaining guaranteed accuracy	$\pm$ 0.1 °C
Dimensions of optomechanical unit (LxHxW) without writing laser/ weight	1.1x0.7x0.7 m <sup>3</sup> /400kg

\* - base version.

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