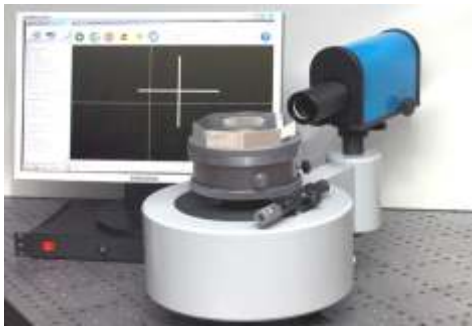
Digital Goniometers



Purpose and field of application

Digital goniometers G-D (models G-1D, G-3D, G-5D) (hereinafter – goniometers) are intended for two-plane measurements of angles formed by a solid body's flat surfaces capableof reflecting light beams.

Field of application: machine-building industry, instrument-making industry, optical mechanics industry, research investigation, testing, calibration and verification laboratories, and standardizing centers.

Description

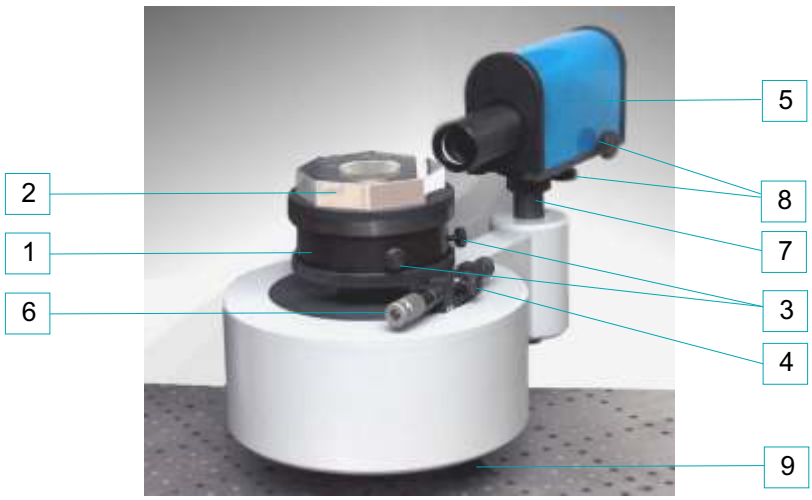
The functional concept of the digital goniometer G-D may be described as follows: the object of measurement is placed on the platen which is mechanically connected to the rotor of the optical encoder. During the rotation of the platen around the vertical axis, at the moments when the normals to the object's reflecting surfaces coincide with the optical axis of the biaxial digital autocollimator, the latter outputs signals. The number of pulses generated by optical encoder is calculated between these output signals. Such number of pulses is proportional to the value of the measured angle. The count of the optical encoder is relative but referencing to the position of the specific reference marker provides for the unified origin of reading.

On the vertical plane the value of the measured angle is determined as proportional to the difference of the current and zero readings of the autocollimator along the vertical coordinate.

The autocollimator's and the optical encoder's signals are transferred to the electronicmodule which converts them into data capable of being processed and displayed by a PC.

Structurally goniometers consist of the optomechanical unit and the electronic unit. A PC with the *Goniometer* software package runs such goniometers and processes and outputs data about measurements.

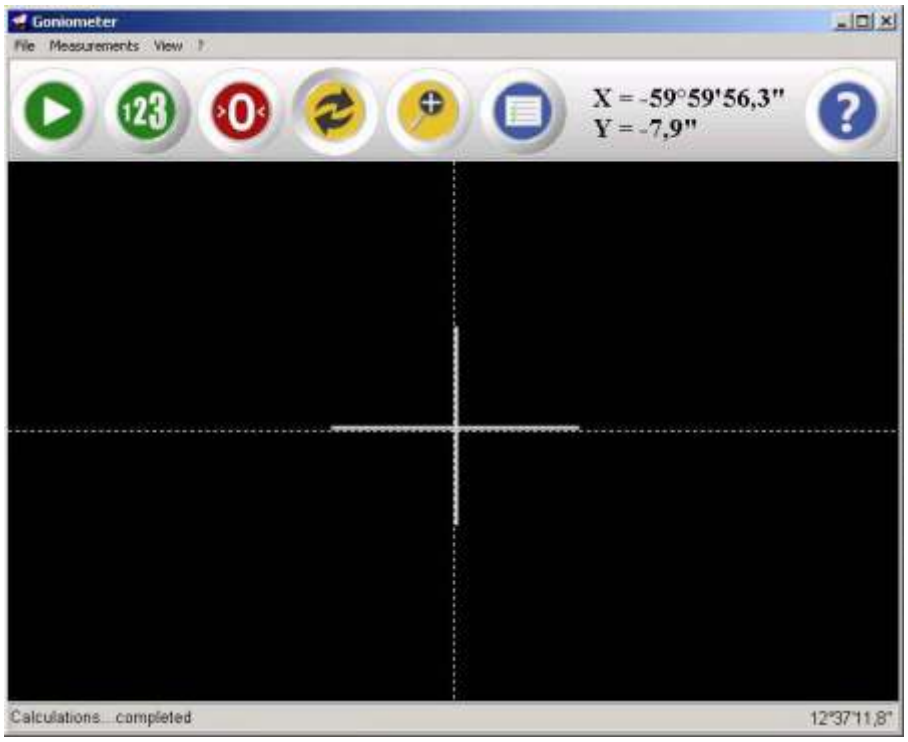
The optomechanical unit includes the optical encoder, the platen for positioning the measured object and the autocollimator optically connected to it. The electronic unit includes the power-supply source, the board for acquisition of the autocollimator's output signals and the optical encoder interface board.



Goniometer

The metered measure 2 is placed on the adjusted table 1. Adjustment of the table is performed using two adjustment screws 3. The fixing screw 4 serves for fixing the positions of metered measure. The micrometer screw 6 is used for fine adjustment of the face of metered measure within the autocollimator's field of view. The autocollimator 5 is installed on the stand 7 with adjustable height and it is equipped with adjusting screws 8. The optomechanical unit may be set in the horizontal plane using to preset feet 9.

The *Goniometer* software package provides for angle measuring and displaying angle measurement readings by the digital goniometer along the two coordinates. On a horizontal plane measurements are carried out on the basis of information input from optical encoder received via the interface board and the video-data input received from the CCD-matrix of the autocollimator's camera recorder via the video-image acquisition board. On a vertical plane measurements are only carried out on the basis of the input received from the CCD-matrix. The *Goniometer* software package relies on the fast binary decade exchange with the optical encoder interface via a USB 2.0 port.



Goniometer software

The operational algorithm of the *Goniometer* software package consists in determining the number of the optical encoder's markers from the reference marker to the marker corresponding to the first *N1* limb position (when the autocollimation marker enters the range of vision and the first face of the object of measurement is noted). Then, the autocollimation image's displacement *m1* from the zero grid is determined followed by the determination of the number of the optical encoder's markers from the reference marker to the marker corresponding to the limb's second position *N2* (when the next face of the object of measurement is noted) and the next autocollimation image's displacement *m2* from the zero grid is determined. The value of the measured angle is determined from the difference between the number of markers for the second position and the number of markers for the first position taking into account the autocollimation images' displacement from the zero grid.

Technical characteristics	
Description	**Values**
Angle measurement range on a horizontal plane (angular degrees)	0..360
Angle measurement range on a vertical plane (arc minutes), at least	±15
Angle measurements acceptable absolute error limits (arc seconds) for the G-1D model only for the G-3D model only for the G-5D model only	 ±1 ±3 ±5
Max. overall dimensions (mm): - optomechanical unit - electronic unit	 610×300×350 260×200×80
Max. weight, kg	40
Mains supply voltage, V	220±22
Mains supply frequency, Hz	50±1
Relative air humidity, %	65± 15
Ambient temperature, °C	20±2
Average useful life expectancy (years), at least	5

Scope of supply	
Optomechanical unit	1 pcs
Electronic unit	1 pcs
PC (at request)	1 pcs
Connecting cables' kit	1 kit
A CD with the Goniometer software package	1 package
User's guide	1 pcs
Certificate	1 pcs

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