Automatic Goniometer
G-03L

Purpose and field of application

Automatic Goniometer G-03L (hereinafter goniometer) is intended for automatic mode measurements of angles between normals to flat reflecting surfaces of straight angle's prismatic measures with reflection factor of at least 20 percent.

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 Automatic Goniometer G-03L may be described as follows: the measured prismatic measure positioned on the platen rigidly connected to the ring interferometer is subject to rotation with a constant rate of angular motion. At the moments when the normals to the measure's reflecting surfaces coincide with the optical axis of the interference null indicator, the latter outputs signals which determine the limits of the time span wherein the number of periods of the ring interferometer's output signal is counted. The value of the measured angle is determined from the ratio of the ring interferometer periods' number during the said time span the periods' number for the full turn of the ring interferometer. Structurally goniometer consists of the optomechanical unit and the electronic unit. A PC with the Goniometer software package runs goniometer and process and displays data about measurements.

The optomechanical unit includes the ring interferometer, the drive group, the platen for positioning the measured measure and the interference null indicator optically connected to it. The electronic unit includes the power-supply source, the interface board, the matching board and the data import board.

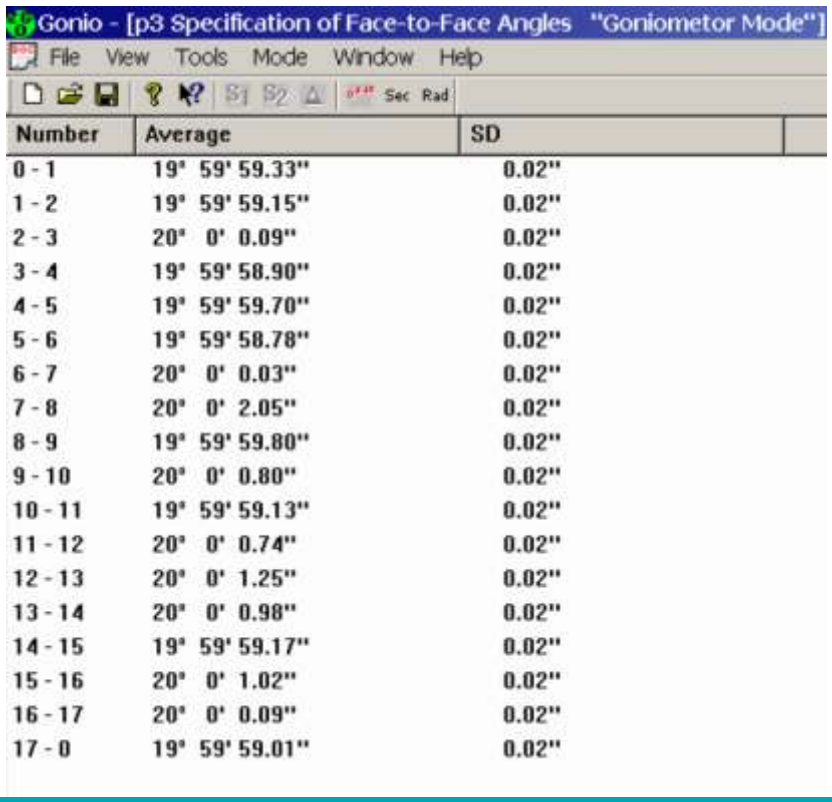
The angles are measured during several full turns of a continuously rotating measure. Measurement results are determined by statistical processing of the received data.

The Goniometer software works in the following manner:

As soon as the goniometer is switched on, its rotor starts rotating together with the ring interferometer and the object of measurement (the prismatic measure).

At each revolution of the goniometer's rotor, the electronic unit's interface board counts the number of pulses from the ring interferometer taking into account the applied temporal interpolation of the output signal. When the normal to the face of the rotating object of measurement and the optical axis of the null indicator coincide, the signals are generated which set the limits to the measurement. Then, the counters of the interface board count the number of ring interferometer's pulses between the pulses of the null indicator, while the interface board sends them via the RS-232 port (or a USB port) to the processing software. The data are subject to algorithmic correction by the software taking into account the rate of angular motion of the Earth and the latitude of the instrument's site.

Then, knowing the number of the ring interferometer's pulses for the 2π interval and knowing the number of the ring interferometer's pulses within the limits set by the null indicator (between the faces of the object of measurement), the software calculates the results of angular measurements which are subsequently displayed and arranged as a measurement report.



Number	Average	SD
0 - 1	19° 59' 59.33"	0.02"
1 - 2	19° 59' 59.15"	0.02"
2 - 3	20° 0' 0.09"	0.02"
3 - 4	19° 59' 58.90"	0.02"
4 - 5	19° 59' 59.70"	0.02"
5 - 6	19° 59' 58.78"	0.02"
6 - 7	20° 0' 0.03"	0.02"
7 - 8	20° 0' 2.05"	0.02"
8 - 9	19° 59' 59.80"	0.02"
9 - 10	20° 0' 0.80"	0.02"
10 - 11	19° 59' 59.13"	0.02"
11 - 12	20° 0' 0.74"	0.02"
12 - 13	20° 0' 1.25"	0.02"
13 - 14	20° 0' 0.98"	0.02"
14 - 15	19° 59' 59.17"	0.02"
15 - 16	20° 0' 1.02"	0.02"
16 - 17	20° 0' 0.09"	0.02"
17 - 0	19° 59' 59.01"	0.02"

Technical characteristics	
Description	**Values**
Angle measurement range (angular degrees)	0..360
Angle measurements acceptable absolute error limits (arc seconds) - during single-run measurements - during measurements of polygonal prisms with cross-calibration method	 ±0.3 ±0.08
Max. overall dimensions (mm): - optomechanical unit - electronic unit	 355×355×420 210×300×110
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
Autocollimator (at request)	1 pcs
Connecting cables' kit	1 kit
A CD with the Goniometer software package	1 kit
Spare parts, tools and accessories' kit	1 kit
User's guide	1 pcs
Certificate	1 pcs