Miniature Retroreflector Interferometer

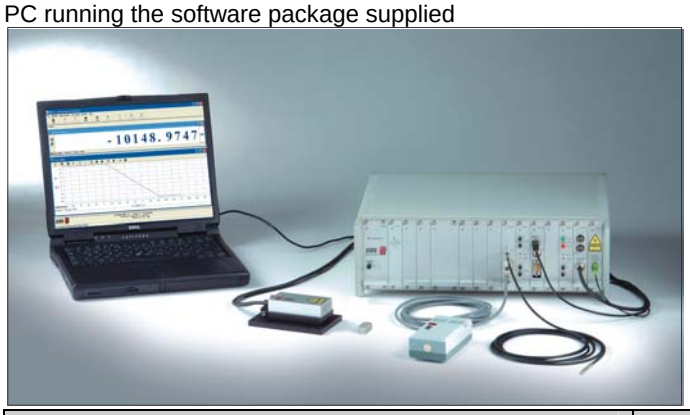
MI-Series

SIOS
Meßtechnik GmbH

Design and Operation

Our MI-Series miniature interferometers equipped with triple-faceted retroreflectors are precision length measurement instruments designed for incorporation into customer supplied systems, and are readily adapted to suit a wide variety of experimental setups and tasks. The miniaturized sensor head and triple-faceted retroreflector allow for their employment as permanently installed metrological systems. The fiberoptic coupled sensor head provides major benefits in many types of applications and makes the overall metrological systems more versatile. The miniature interferometer converts motions of the triple-faceted retroreflector into optical interference signals that are transmitted to the opto-electronic signal processing/power supply unit for processing and output as lengths. A HeNe laser serves as the light source for the miniature interferometer and is frequency stabilized on models with large dynamic ranges. Compensation of environmental influences form the basis for high metric precisions and are achieved through the correction of laser wavelengths.

The instruments themselves are free of linearity errors. Instrument operation and display of measurement results are controlled either through a separate keypad/display unit or a PC running the software package supplied



Major Performance Features

- Ultraprecise length measurement instruments
- Versatile instruments for incorporation into customer supplied systems, readily adaptable to suit a wide variety of tasks, easy to align
- Allows high retroreflector translation rates
- Insensitive to retroreflector angular misalignments
- Fiberoptic coupled sensor head
- Causes no thermal interference
- Employs signal-acquisition/transmission hard-ware immune to electromagnetic interference
- Employs a HeNe Laser with high frequency stability as a length standard
- Corrects for variations in laser wavelength caused by ambient conditions

Applications

- Precision laser interferometric length measure-ment instruments for incorporation into single/ multi-axis translation stages, microscope stages, machine tools, or positioning systems
- Positioning single/ multi-axis machine beds
- Calibrating machine tools or coordinate-measurement machines
- Angular measurements
- Handling precision length measurement tasks in research and development work

Technical Data		Model MI 60	Model MI 150	Model MI 5000
Measurement range	mm	60	150	5,000
Metric resolution, standard	nm	1	1	1
optionally	nm	0.1	0.1	0.1
Nominal laser wavelength	nm	632.8	632.8	632.8
Laser frequency stability (after warm-up)		3×10^{-7}	3×10^{-7}	2×10^{-8}
Laser warm-up period	min	1	1	10 - 20
Operating temperature range	°C	15 - 30	15 - 30	15 - 30
Maximum retroreflector translation rate	mm/s	600	600	600
Dimensions (H x W x D):				
Sensor head	mm	22 x 50 x 100	22 x 50 x 100	22 x 50 x 100
Retroreflector	mm	13 x 30 x 15	13 x 30 x 15	13 x 30 x 15
Optoelectronic signal processing/ Power supply unit (OPU)	mm	150 x 450 x 400	150 x 450 x 400	150 x 450 x 400
Keypad/display unit	mm	48 x 190 x 138	48 x 190 x 138	48 x 190 x 138
Mass:				
Sensor head	g	200	200	200
Retroreflector	g	12	12	12
OPU	g	9,500	9,500	9,500
Keypad/display unit	g	630	630	630
Interface: serial		RS 232 C	RS 232 C	RS 232 C
optionally		USB	USB	USB
Fiberoptic cable length from sensor head to OPU	m	3, option. up to 25	3, option. up to 25	3, option. up to 25
Supply-line voltage	VAC	100 - 240	100 - 240	100 - 240
Supply-line frequency	Hz	47 - 60	47 - 60	47 - 60

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