

TiPA

Single-Shot Autocorrelator for Pulse-Front Tilt and Pulse Duration Measurements

FEATURES

- 30 fs – 1 ps pulse duration range
- 500 – 2000 nm wavelength range
- Measures pulse-front tilt
- Compact and portable design
- Hi-speed 12-bit CCD camera
- Pulse-analysis software for pulse duration measurements

TiPA is an invaluable tool for alignment of ultrashort pulse laser systems based on the chirped pulse amplification technique. Its unique design allows monitoring and measuring of the pulse duration as well as the pulse front tilt in both vertical and horizontal planes. TiPA is a straightforward and accurate direct pulse-front tilt measurement tool. Operation of TiPA is based on non-collinear second harmonic (SH) generation, where the spatial distribution of the SH beam contains information on the temporal shape of the fundamental pulse. This technique combines low background and single-shot measurement capability. The basic idea is that two replicas of a fundamental ultrashort pulse pass non-collinearly through a nonlinear crystal, in which SH generation



takes place. SH beam's width and tilt in a plane perpendicular to propagation provide information about the pulse duration and pulse front tilt. The SH beam is sampled by the included CCD camera. TiPA comes with a user-friendly software package, which provides on-line monitoring of incoming pulse properties.

PERFORMANCE SPECIFICATION

Wavelength range	500 – 530 nm	530 – 700 nm	700 – 2000 nm
Temporal resolution	~500 fs/mm		
Measurable pulse width	40 – 120 fs	40 – 1000 fs	30 – 1000 fs
Minimum pulse energy	single-shot mode: ~30 – 100 μ J @ 1 – 10000 Hz integration mode: ~1 – 5 nJ @ 1 – 1000 kHz		
Detector	CCD		

CCD SPECIFICATIONS

Maximum resolution	1296 (H) \times 964 (V)
Pixel size	3.75 μ m \times 3.75 μ m
Analog-to-Digital converter	12 bits
Spectral response ¹⁾	0.35 – 1.06 μ m
Power consumption from USB bus	2 W (max) at 5 V

¹⁾ With glass window.

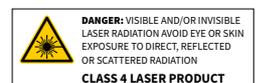
TiPA MODELS ¹⁾

Model	Operation wavelength
AT1C1	700 – 900 nm
AT2C1	900 – 1100 nm
AT5C3	500 – 2000 nm

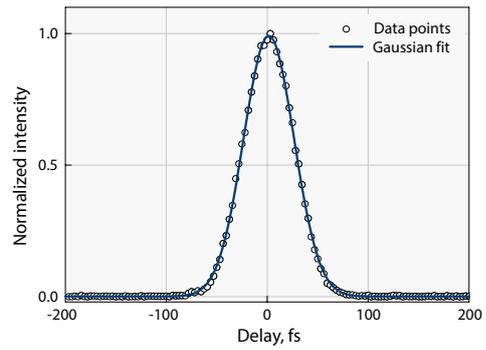
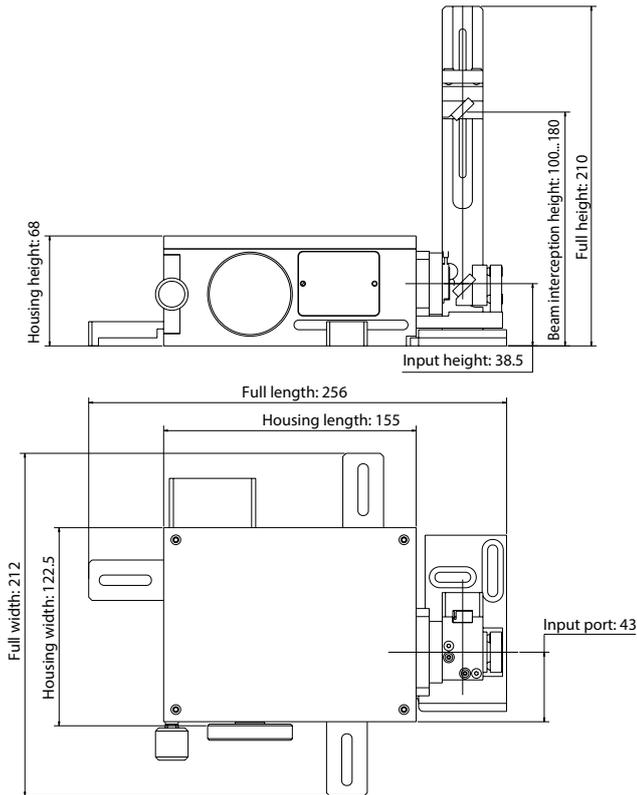
¹⁾ Non-standard models available on request.

DIMENSIONS

General dimensions of the housing	123 (W) \times 155 (L) \times 68 (H) mm
Recommended area for fixing	212 (W) \times 256 (L) mm
Beam interception height	100 – 180 mm



OUTLINE DRAWINGS



Sample autocorrelation with data fitting.
TOPAS Idler Autocorrelation at 1700 nm
(40 fs pump)

MEASUREMENT INFO

Gaussian Width:	18.8 px – 58.8 fs
FWHM Width:	19.2 px – 59.8 fs
Gaussian Pulse Duration:	41.6 fs
Sech ² Pulse Duration:	38.2 fs
Pulse Tilt:	-0.210 deg

View of the TiPA software window

CCD control and info panels on the left; image captured by CCD – middle; processed time profile of the image with Gaussian fit, and processed space profile of the image – right top and bottom respectively.