

## Redefining Measurement

# ID 3000 Series – Picosecond Lasers

Compact, easy to use and versatile sources of telecom-band, NIR, visible and UV photons

The ID 3000 Series is a cost-effective solution offering high-quality picosecond-pulsed laser light under long-term and maintenance-free operation. Both free space and fibre-coupled versions are available to handle virtually any optical application.

An ID 3000 Series laser can be used with IDQ single-photon detectors and Time Controller Series to enrich a range of high-speed and high-sensitivity time-correlated single-photon counting (TCSPC) applications, from quantum photonics and quantum information, super-resolution microscopy, time-resolved spectroscopy, to the field-testing of optical fibres.



**Use the ID 3000 Series Picosecond Laser to enhance your experiments today.**

## Key Features & Benefits

- ▶ Optical pulses typically shorter than 30 ps (at least < 50 ps)
- ▶ Continuously tuneable repetition rate, from pulse-on-demand up to 40 MHz
- ▶ Ultra-low timing jitter < 4 ps rms
- ▶ Remote operation available via RS-232 or USB 2.0 connection
- ▶ Maintenance-free 24/7 operation
- ▶ Free space or fibre-coupled laser emission
- ▶ In-stock models: 1550 nm and 1310 nm sources
- ▶ Available wavelengths: 375 nm to 1550 nm

## New

- ▶ Even shorter laser pulses, on demand
- ▶ Available in a range of wavelengths, from UV to the telecom C-band

## Applications

- ▶ QKD and quantum communication
- ▶ Quantum computing and quantum optics
- ▶ TCSPC, photoluminescence and spectroscopy
- ▶ Fluorescence Lifetime IMaging (FLIM)
- ▶ Single-photon detector characterization
- ▶ Optical Time Domain Reflectometry (OTDR)
- ▶ Light Detection And Ranging (LIDAR)

## Picosecond pulses on demand

The ID 3000 Series of compact, versatile and easy-to-use picosecond-pulsed lasers

These lasers are based on high-reliability semiconductor laser diodes operated in gain-switched mode, emitting laser pulses typically shorter than 30 ps across a broad segment of the electromagnetic spectrum (UV to telecom C-band, 375 nm to 1550 nm).

Each ID 3000 laser source operates as a laser head working in tandem with a laser controller, where multiple laser heads can be interchanged with a single controller. The laser head is pre-tuned to a particular wavelength (see Table 1), and can be operated out-of-the-box within minutes through the controller's user-friendly interface.

The on-demand picosecond pulses of the laser head — combined with the ultra-low timing jitter of the ID 3000's laser controller — allow for unparalleled precision and control in your experimental setup within such a compact device.

### VERSATILE DESIGN

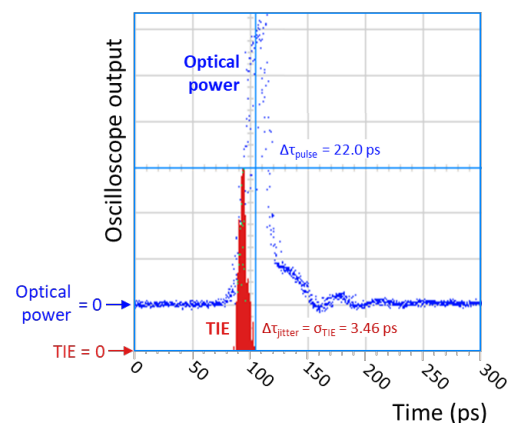
- ▶ Pulse-on-demand operation up to 40 MHz
- ▶ Remote operation: you can control via RS-232 or USB 2.0 connection
- ▶ Robust design: functions maintenance-free under 24/7 industrial operation

### ULTRAFAST LASER PULSES

The gain-switched operation of the semiconductor laser diode allows emission of ultrafast optical pulses from 20 to 110 ps pulse width with ultra-low timing jitter.

### ULTRA-LOW JITTER

- ▶ The ID 3000's timing jitter is ultra-low: typically lower than 4 ps
- ▶ This ultra-low measured jitter is only an upper limit of the timing jitter, as it includes jitter contributions from the measuring electronics
- ▶ Pulse-tuning mode minimizes the effects of after-pulsing



Optical pulse profile and timing interval error (TIE) from a 1550nm ID 3000 laser. Pulse width  $\Delta\tau_{pulse}$  is calculated as the FWHM of the optical pulse profile. Timing jitter  $\Delta\tau_{jitter}$  is calculated as the standard deviation of fluctuations in the detected optical pulse arrival time (the TIE), at 50% amplitude of the pulse's leading edge.

## Picosecond pulses on demand

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### LASER SPECIFICATIONS

Type	Output	Wavelength	Spectral width	Pulse width	Peak power	Avg. power
DFB	FC/APC	1550 ± 10 nm	< 0.5 nm	< 50 ps <sup>(a)</sup>	> 20 mW	> 0.02 mW
DFB	Free space	1550 ± 10 nm	< 0.5 nm	< 50 ps <sup>(a)</sup>	> 40 mW	> 0.04 mW
DFB	FC/APC	1310 ± 10 nm	< 0.5 nm	< 50 ps <sup>(a)</sup>	> 20 mW	> 0.02 mW
DFB	Free space	1310 ± 10 nm	< 0.5 nm	< 50 ps <sup>(a)</sup>	> 40 mW	> 0.04 mW
FP	Free space	1060 ± 20 nm	< 10 nm	< 50 ps	> 200 mW	> 0.5 mW
FP	FC/APC	940 ± 20 nm	< 10 nm	< 50 ps	> 80 mW	> 0.2 mW
FP	Free space	940 ± 20 nm	< 10 nm	< 50 ps	> 200 mW	> 0.5 mW
FP	FC/APC	850 ± 15 nm	< 7 nm	< 50 ps	> 80 mW	> 0.2 mW
FP	Free space	850 ± 15 nm	< 7 nm	< 50 ps	> 200 mW	> 0.5 mW
FP	FC/APC	690 ± 15 nm	< 7 nm	< 50 ps	> 80 mW	> 0.2 mW
FP	Free space	690 ± 15 nm	< 7 nm	< 50 ps	> 200 mW	> 0.6 mW
FP	FC/APC	665 ± 15 nm	< 7 nm	< 45 ps	> 80 mW	> 0.3 mW
FP	Free space	665 ± 15 nm	< 7 nm	< 45 ps	> 200 mW	> 0.6 mW
FP	FC/APC	635 ± 15 nm	< 7 nm	< 70 ps	> 80 mW	> 0.3 mW
FP	Free space	635 ± 15 nm	< 7 nm	< 70 ps	> 200 mW	> 0.8 mW
FP	FC/APC	510 ± 15 nm	< 10 nm	< 110 ps	> 40 mW	> 0.2 mW
FP	Free space	510 ± 15 nm	< 10 nm	< 110 ps	> 100 mW	> 0.6 mW
FP	FC/APC	480 ± 20 nm	< 10 nm	< 80 ps	> 60 mW	> 0.3 mW
FP	Free space	480 ± 20 nm	< 10 nm	< 80 ps	> 150 mW	> 0.8 mW
FP	FC/APC	440 ± 20 nm	< 5 nm	< 70 ps	> 100 mW	> 0.3 mW
FP	Free space	440 ± 20 nm	< 5 nm	< 70 ps	> 250 mW	> 0.7 mW
FP	FC/APC	405 ± 15 nm	< 5 nm	< 45 ps	> 160 mW	> 0.4 mW
FP	Free space	405 ± 15 nm	< 5 nm	< 45 ps	> 400 mW	> 1.0 mW
FP	FC/APC	375 ± 10 nm	< 5 nm	< 45 ps	> 160 mW	> 0.3 mW
FP	Free space	375 ± 10 nm	< 5 nm	< 45 ps	> 400 mW	> 0.6 mW

<sup>(a)</sup> Pulse widths typically less than 30 ps

Table 1: The available models and options for the ID 3000 Series Picosecond Lasers. Note that all lasers have a maximum repetition rate of 40 MHz.

## GENERAL SPECIFICATIONS

<b>Optical</b>	
Pulse repetition rate <sup>(b)</sup>	Pulse-on-demand (0 Hz to 40 MHz)
Frequency resolution	1 @ 50 Hz
Beam quality, TEM	$M^2 < 1.2$
Polarization extinction ratio	> 20 dB (unpolarized fibre)
Timing jitter, rms	< 4 ps
<b>Mechanical/Electrical/Environmental</b>	
Laser output	Free-space or single-mode fibre
Output fibre length	1 m FC/APC
Warm-up time	< 10 minutes
Operation temperature	15 – 35 °C
Storage temperature	-15 – 60 °C
On/off cycles	> 10,000
Lifetime	> 10,000 hours
Power supply requirements	12 VDC/3A or 100-264 VAC, 47-63 Hz
Power consumption	< 30 W
Laser head dimensions (W x H x L)	95 mm x 31 mm x 181 mm
Laser head weight	0.45 kg
Control unit dimensions (W x H x L)	326 mm x 88 mm x 235 mm
Control unit weight	2.5 kg
<b>Interface</b>	
Trigger in <sup>(b)</sup>	TTL or $\pm 5$ V @ 50 $\Omega$ (BNC)
Trigger in delay	Free space: < 50 ns Fibre: < 60 ns
Trigger out (synchronization)	+ 5 V @ 50 $\Omega$ (BNC)
Interlock	2.5 mm mono TS (jack connector)
External communication	USB 2.0 or RS-232

<sup>(b)</sup> Pulse-on-demand with external trigger. Internal trigger >25 Hz

**WARNING**  
CLASS 1 LASER PRODUCT  
CLASSIFIED PER IEC 60825-1, ED 3.0, 2014



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