

# APL2100 SERIES



APL210x series amplifiers are designed to produce up to 2200 mJ picosecond pulses. High pulse energy, excellent pulse-to-pulse energy stability, superior beam quality makes APL210x series picosecond amplifiers well suited for applications like OPCPA pumping, non-linear optics and others. Ekspla can offer a seeder meeting customer's requirements.

### Regenerative amplifier / Power amplifier design

APL210x series amplifiers are designed to be seeded by external seeding source. Diode pumped regenerative amplifier ensures amplification of seed signal to stable mJ level pulse for amplification in linear amplifiers. Advanced beam shaping ensures smooth, without hot spots beam spatial profile at the laser output. Low light depolarization level allows high efficiency generation of up to 4th harmonic with optional build-in harmonic generators.

### Build-in harmonic generators

Angle-tuned DKDP crystals harmonic generators mounted in temperature stabilized heaters are used for second, third and fourth harmonic generation.

Harmonic separation system is designed to ensure high spectral purity of radiation and direct it to the output ports.

### Simple and convenient laser control

For customer convenience the amplifier can be controlled through remote control pad or USB interface. The control pad features a backlit display that is easy to read even while wearing laser safety eyewear. Alternatively, the amplifier can be controlled from personal computer with supplied software for Windows™ operating system. LabVIEW™ drivers are supplied as well.

### APL2100 series available models

| Model   | Features  |
|---------|---|
| APL2101 | Delivers 200 mJ, 90 ps pulses at up to 10 Hz repetition rate  |
| APL2103 | Delivers 300 mJ, 90 ps pulses at up to 10 Hz repetition rate  |
| APL2105 | Delivers 550 mJ, 90 ps pulses at up to 10 Hz repetition rate  |
| APL2106 | Delivers 1000 mJ, 90 ps pulses at up to 10 Hz repetition rate |
| APL2107 | Delivers 2200 mJ, 90 ps pulses at up to 10 Hz repetition rate |

## High Energy Picosecond Amplifiers

### FEATURES

- ▶ Diode pumped regenerative amplifier
- ▶ Seeding of regenerative amplifier with customers super-continuum seeding source
- ▶ Wide selection of seeders available
- ▶ Flashlamp pumped power amplifier
- ▶ Advanced beam shaping for high pulse energy
- ▶ Thermally induced birefringence compensated design for high pulse repetition rates
- ▶ Low jitter synchronisation pulses for streak camera triggering with 10 ps rms jitter (optional)
- ▶ Water-water heat exchanger for cooling of pump chambers
- ▶ Remote control pad
- ▶ Control through CAN or USB interface (RS232 is optional)
- ▶ Optional temperature stabilized second, third and fourth harmonic generators

### APPLICATIONS

- ▶ OPCPA pumping
- ▶ OPG/OPA pumping
- ▶ Other spectroscopic and nonlinear optics applications...

SPECIFICATIONS <sup>1)</sup>

| Model  | APL2101                                 | APL2103 | APL2105             | APL2106                | APL2107                                 |
|--|---|---------|---------------------|------------------------|---|
| <b>Output energy</b>                                 |   |         |                     |                        |   |
| at 1064 nm   | 200 mJ                                  | 300 mJ  | 550 mJ              | 1000 mJ                | 2200 mJ                                 |
| at 532 nm <sup>2)</sup>                              | 100 mJ                                  | 150 mJ  | 250 mJ              | 500 mJ                 | 1100 mJ                                 |
| at 355 nm <sup>3)</sup>                              | 60 mJ                                   | 90 mJ   | 170 mJ              | 300 mJ                 | inquire                                 |
| at 266 nm <sup>4)</sup>                              | 20 mJ                                   | 30 mJ   | 60 mJ               | 100 mJ                 | inquire                                 |
| <b>Pulse energy stability (StdDev) <sup>5)</sup></b> |   |         |                     |                        |   |
| at 1064 nm   | 1.5 %                                   |         |                     |                        |   |
| at 532 nm  | 2.5 %                                   |         |                     |                        |   |
| at 355 nm  | 5 %                                     |         |                     |                        |   |
| at 266 nm  | 7 %                                     |         |                     |                        |   |
| Pulse duration (FWHM) <sup>6)</sup>                  | 90±10 ps                                |         |                     |                        |   |
| Pulse repetition rate <sup>7)</sup>                  | 10 Hz                                   |         |                     |                        |   |
| Triggering mode                                      | external                                |         |                     |                        |   |
| Spatial mode <sup>8)</sup>                           | super-Gaussian                          |         |                     |                        |   |
| Beam divergence <sup>9)</sup>                        | <0.5 mrad                               |         |                     |                        |   |
| Typical beam diameter <sup>10)</sup>                 | ~11 mm                                  |         | ~17 mm              |                        | ~24 mm                                  |
| Beam pointing stability <sup>11)</sup>               | <±60 µrad                               |         |                     |                        |   |
| Pre-pulse contrast                                   | >200 : 1                                |         |                     |                        |   |
| Polarization   | linear, >100 : 1                        |         |                     |                        |   |
| <b>INPUT</b>   |   |         |                     |                        |   |
| Wavelength   | 1064 nm                                 |         |                     |                        |   |
| Pulse duration range (FWHM)                          | 20 – 90 ps                              |         |                     |                        |   |
| Pulse repetition rate                                | 50 – 95 MHz                             |         |                     |                        |   |
| Average power  | >20 mW                                  |         |                     |                        |   |
| <b>PHYSICAL CHARACTERISTICS</b>                      |   |         |                     |                        |   |
| Laser head size (W×L×H)                              | 600 × 1500 × 350 mm                     |         | 600 × 1800 × 350 mm |                        | TBA                                     |
| Power supply size (W×L×H)                            | 550 × 600 × 1100 mm                     |         | 550 × 600 × 1230 mm |                        | TBA                                     |
| <b>OPERATING REQUIREMENTS</b>                        |   |         |                     |                        |   |
| Water service  | <12 l/min, below 20 °C                  |         |                     | <25 l/min, below 20 °C |   |
| Relative humidity                                    | 20–80 % (non condensing)                |         |                     |                        |   |
| Operating ambient temperature                        | 22±2 °C                                 |         |                     |                        |   |
| Mains voltage  | 208 or 230 V AC, single phase, 50/60 Hz |         |                     |                        | 208 or 230 V AC, three phases, 50/60 Hz |
| Power rating <sup>12)</sup>                          | <2 kVA                                  | <2 kVA  | <2.5 kVA            | <4.5 kVA               | <12 kVA                                 |

<sup>1)</sup> Due to continuous improvement, all specifications are subject to change. Parameters marked typical are illustrative; they are indications of typical performance and will vary with each unit we manufacture. Unless stated otherwise, all specifications are measured at 1064 nm and for basic system without options.

<sup>2)</sup> For APL210x-SH and APL210x-SH/FH options. Outputs are not simultaneous.

<sup>3)</sup> For APL210x-TH option. Outputs are not simultaneous.

<sup>4)</sup> For APL210x-SH/FH option. Outputs are not simultaneous.

<sup>5)</sup> Averaged from pulses, emitted during 30 sec time interval.

<sup>6)</sup> Optional 30 ps duration. Inquire for pulse energies.

<sup>7)</sup> Should be specified when ordering. Inquire for custom pulse repetition rates.

<sup>8)</sup> Gaussian fit >80%.

<sup>9)</sup> Full angle measured at the 1/e<sup>2</sup> level at 1064 nm.

<sup>10)</sup> Beam diameter is measured at 1064 nm at the 1/e<sup>2</sup> level.

<sup>11)</sup> Value measured from 300 shots.

<sup>12)</sup> Required current rating can be calculated by dividing power rating by mains voltage.



## OPTIONS

- ▶ **Option P30** provides  $30 \pm 3$  ps output pulse duration. Contact EKSPLA for pulse energy specifications.
- ▶ Optional seeder can be provided on request.

## ORDERING INFORMATION

**Note:** Laser must be connected to the mains electricity all the time. If there will be no mains electricity for longer than 1 hour then laser (system) needs warm up for a few hours before switching on.

## APL2105-P90-10-SH/TH/FH

|                             |                             |
|-----------------------------|-----------------------------|
| Model                       | Harmonic generator options: |
| Pulse duration:             | SH → second harmonic        |
| P90 → 90 ps                 | TH → third harmonic         |
| P30 → 30 ps                 | FH → fourth harmonic        |
| Pulse repetition rate in Hz |                             |