Example of a typical uniPS system

COMPUTER / TABLET

Control Software
(Default or Customer-Tailored)

POWER SUPPLY & CONTROL UNIT

Laser's Main Control / Communication Board

Digital Delay Generator

Laser Diode Driver

AC/DC Power Supply

Capacitor Board

TEC Controller(s)

LASER HEAD

Laser Diode

EKSPLA ELECTRONICS

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REV. 260107

Laser Power Supply & Control Unit

uniPS SERIES

Front panel view

The uniPS series is a 19" rack-mount power supply with optional control-unit configurations, which serves as a platform that integrates and extends the capabilities of Ekspla's open-frame uniLDD laser diode drivers. The uniPS power supply combines uniLDD laser diode drivers with a wide range of complementary electronic modules, including AC–DC power supplies, the laser's main control/communication board, a digital delay generator, TEC controllers, and other Ekspla-designed hardware.

When equipped with the control-unit options, the uniPS includes features such as an integrated laser main control/communication board (Lazserv OEM) and an eight-channel digital delay generator (SY4000 OEM), both operated via the Ekspla Control software. This software manages all control, monitoring, and communication with the laser system modules, eliminating the need for customers to develop their own PC software. LabVIEW drivers are available upon request, enabling straightforward integration into laboratory automation and data-acquisition environments. The user interface and functionality can also be customized by Ekspla to meet specific customer requirements.

The uniPS platform is modular, allowing hardware modules to be added or removed and software to be expanded or upgraded as needed, providing flexibility to meet individual system power and operational requirements.

FEATURES

- *Current range* ***from 10 A to 1200 A***
- *Compliance voltage range* ***from 1 V to 600 V***
- *Current stability of < **0.1%** pk to pk*
- *Current ripple of < **0.1%** pk to pk*
- *Average output power **up to 6 kW***
- *Protections:*
  - *current transient (overload) protection;*
  - *open circuit shut-down;*
  - *over temperature shut-down;*
  - *power voltage brownout (voltage dip) shut-down;*
  - *interlock shut-down*
- *Can be controlled via analog and digital (CAN, RS232) interfaces*
- *Optional integrated AC-DC power supplies, laser's main control/communication board, digital delay generators, TEC controllers, and other Ekspla-designed hardware*
- *Control unit options (integrated control/communication board +8 independent output channel digital delay generator board, tailor-made laser system control software). LabVIEW drivers available upon request*
- *Customer-tailored front and back panel connector layout as well as unit's outer dimensions*

MODEL CODING SCHEME

uniPS-A-QCW-300-1200-PWR-CU2-T2-LSF

- Power supply series
- Cooling type
  - C → conductive
  - A → forced-air
- Operation mode (hardware based)
  - CW → continuous-wave
  - QCW → quasi-continuous-wave (pulsed)
- Maximum compliance voltage, V
- Maximum current, A
- Integrated AC-DC power supply
  - PWR → yes
  - — → nothing
- Integrated control unit option
  - CU1, CU2 → yes
  - — → nothing
- Amount of enabled TEC channels
  - Tn → n-channel bidirectional TEC control
  - — → nothing
- Customer-tailored laser system control software
  - LSF → yes
  - — → nothing

APPLICATIONS

Optimal for powering and controlling diode-pumped solid-state laser systems employed in industrial, medical, scientific, and defense fields. The most common applications include:

- Inertial confinement fusion
- Laser diode burn-in systems
- Parallel laser processing
- Directed energy

SPECIFICATIONS [1]

Model	uniPS	
OUTPUT SPECIFICATIONS		
Operation mode	CW [2]	QCW [3]
Compliance voltage range, min-max [4]	1 – 120 V	1 – 600 V
Current range, min-max	10 – 300 A	10 – 1200 A
Average power, max	6 kW	6 kW
Power conversion efficiency	90 – 98 %	
Current pulse amplitude stability	< 0.1 % pk to pk [5]	
Current ripple	< 0.1 % pk to pk [6]	
Current drift	< 0.2 % [7]	
Duty cycle	–	≤ 20 %
Repetition rate, max		≤ 5 kHz
Current rise time, typical		5 – 100 µs [8]
Current pulse duration, typical		up to 100 ms [9]
RMS current, max		300 A
Amount of functioning internal TEC control channels	as many as needed [10]	
TEC control current, min-max per channel	1 – 25 A standard, more – upon request	
TEC control voltage, min-max per channel	1 – 36 V, standard, more – upon request	
TEC control power, max per channel	350 W, standard, more – upon request	
INPUT SPECIFICATIONS		
DC power supply requirements (power stage), min typical	$U_{PS\ in\ min}$ (V) = $U_{uniPS\ out\ max}$ + 5 $P_{PS\ in\ min}$ (W) = $I_{uniPS\ out\ max}$ * $U_{uniPS\ out\ max}$ * duty cycle $_{max}$ / 100 % * 1.2	
AC mains requirements (power stage), typical	200 – 240 VAC, single phase, 50/60 Hz standard, other - upon request	
Control interfaces	analog, CAN & RS232 by default. USB, LAN & WLAN upon request	
Software	Ekspla's standard control software & protocol description included by default	
Protections	current transient (overload) protection; open circuit shut-down; over temperature shut-down; power voltage brownout (voltage dip) shut-down; interlock shut-down	
PHYSICAL CHARACTERISTICS		
Dimensions (W x H x D)	19'' x U3 x 435 mm standard, other size - upon request	
OPERATING REQUIREMENTS		
Cooling method	forced-air standard, conductive/water – upon request	
Operating ambient temperature	≤ 40 °C	
OPTIONS		
PWR	integrated AC-DC power supply option	
CU1	control unit, first option. Integrated Ekspla's laser control/communication board Lazserv OEM for additional USB, LAN, WLAN communication options, standard software	
CU2	control unit, second option. CU1 + integrated 8 independent output channel Ekspla's digital delay generator board SY4000 OEM. More information – page 25	
T#	number of independent TEC control channels	
LSF	customer-tailored laser system control software (default Ekspla Control software altered functionality & UI design wise)	
ACCESSORIES		
Output power cables	included upon request, custom dia and length	
Input power cables	included upon request, custom dia and length	
Control cables	included by default, custom length	
CAN-USB adapter	included upon request	

[1] Due to continuous improvement, all specifications are subject to change without notice. Parameters marked typical are not specifications. They are indications of typical performance and will vary with each unit we manufacture.

[2] Continuous-wave.

[3] Quasi-continuous-wave (also known as pulsed).

[4] Range between minimum and maximum limits. Not all maximal limits can be reached simultaneously.

[5] In ×0.5...×1 of max current range.

[6] DC...100 kHz bandwidth, in ×0.5...×1 of max current range.

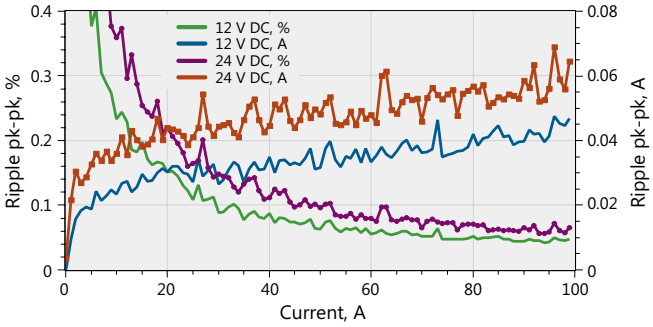
[7] Cold start, 8 h period, after 5 min. warm up.

[8] Factory software tuned upon customer's request.

[9] Factory software & hardware tuned upon customer's request.

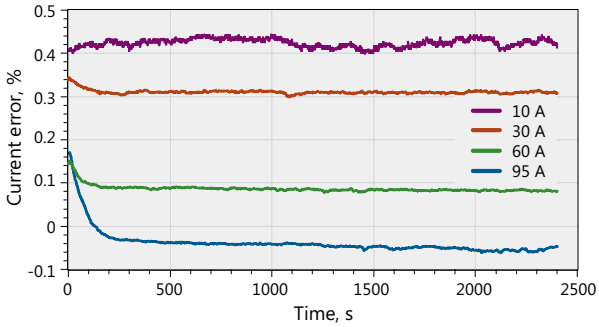
[10] Amount factory enabled upon customer's request.

TYPICAL PERFORMANCE EXAMPLE OF **uniLDD-A-CW** INTEGRATED INSIDE OF A **uniPS** POWER SUPPLY



uniLDD ripple current.

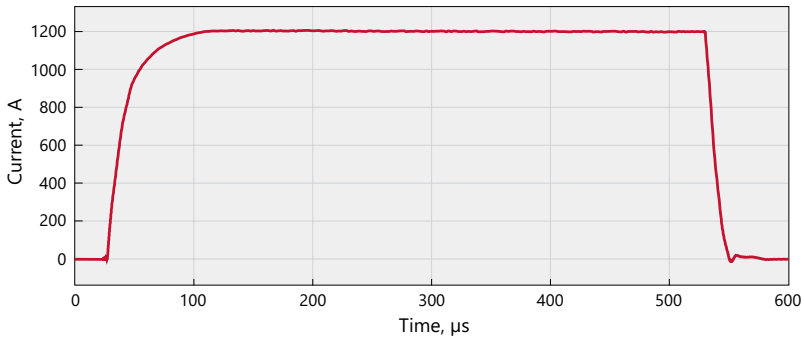
12 V and 24 V DC power, 2 V junction + 10 MΩ series R load



uniLDD current drift and long term stability.

From cold start for different currents

PEAK PERFORMANCE EXAMPLE OF **uniPS** POWER SUPPLY



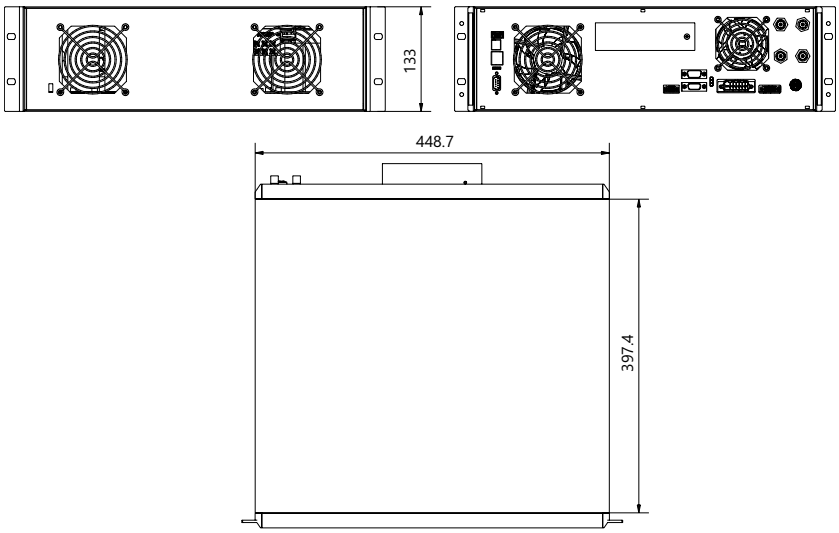
I_{out} 1195 A, U_{out} 473 V, PW 500 us, f 10 Hz, rise 36 µs, fall 14 µs, overshoot 0.7%

DRAWINGS & IMAGES

Front pannel view.

Back pannel view.
Default (no control unit options applied)

Example of uniPS power supply with all integrated control unit options (CU2)



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