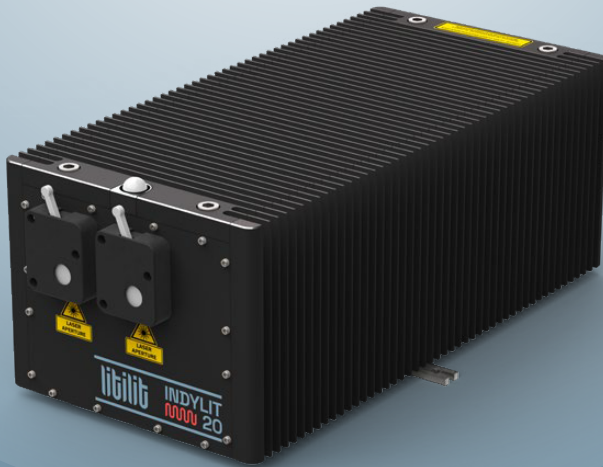


# litilit

# INDYLIT 20

Industrial Femtosecond Laser for Material Processing  
1030/515 nm, 400 fs – 2 ps, 20 W, 100 kHz – 1 MHz



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## ROBUST DESIGN AND NO MAINTENANCE

### FEATURES

- Extremely robust and stable
- Adjustable repetition rate, pulse duration, power
- High pulse energy and clean pulse shape
- Passively air cooled
- Maintenance-free & turn-key
- Protected against dust

### APPLICATIONS

- Material microprocessing
- Ophthalmology
- Semiconductor and electronics
- Display manufacturing
- Battery manufacturing
- Stainless steel black and color marking

# INDYLIT 20

The Indylit 20 is the highest average power and most efficient passively air-cooled femtosecond laser on the market. If you need a reliable femtosecond laser that is maintenance-free, turn-key and has exquisite optical parameters – look no further!

The laser features an innovative and patented passive cooling design, ensuring high stability of the optical parameters such as pulse duration, beam pointing, and power. Indylit 20 mechanical construction can withstand almost everything you can throw at it. It is even protected against the dust!

Built-in optional second harmonics (SH) module provides wavelength extension enabling even wider range of material processing applications.

## SPECIFICATIONS

Model	Indylit 20	Indylit 20 SH <sup>1)</sup>
Central wavelength	1030 ± 2 nm	515 ± 1 nm
Average power <sup>2)</sup>	> 13 W @ 100 kHz > 18 W @ 1 MHz (Typ 20 W @ 1 MHz)	> 7 W @ 100 kHz > 3 W @ 1 MHz
Max. pulse energy <sup>2)</sup>	> 130 µJ	> 70 µJ
Pulse duration	< 400 fs	
Pulse duration tunability	400 fs – 2 ps	N/A
Switch time between outputs	< 1 s	
Internal pulse repetition rate	100 kHz – 1 MHz, o 30 kHz in burst mode	
Pulse picker	integrated	
Triggering mode	Pulse picker control via TTL gate	
Burst length	1...12 pulses	
Max. energy in burst	> 500 µJ	> 200 µJ
Power attenuation <sup>3)</sup>	100 – 1%	
Beam quality	$M^2 < 1.2$	
Beam circularity <sup>4)</sup>	> 0.90	> 0.85
Beam diameter (at 1/e <sup>2</sup> level)	2.6 ± 0.3 mm	2.2 ± 0.3 mm
Polarization	Linear horizontal, > 200:1 extinction	
Prepulse contrast	> 1:1000	
Post pulse contrast	> 1:100	



Model	Indylit 20	Indylit 20 SH <sup>1)</sup>
Beam divergence (full angle)	< 1 mrad	
Beam pointing (RMS) <sup>5)</sup>	< 20 $\mu$ rad	
Beam pointing vs temperature	< 20 $\mu$ rad/° C	
Power stability (RMS) <sup>6)</sup>	< 1%	< 2%
Pulse energy stability (RMS) <sup>7)</sup>	< 1%	< 2%
Warm-up time (cold start)	< 30 min	
Warm-up time (warm start)	< 3 min	
Laser control interface	CAN, USB	
Operating voltage	24V, 25A (100...240 V AC, 47...63 Hz to 24V AC/DC converter included)	
Average power consumption (after warm-up)	300 W	
Maximal power rating	700 W	
Operating temperature	18 – 32 ° C <sup>8)</sup>	
Humidity	non condensing	
Transportation/storage temperature	-20 – +70 ° C	
Dimensions:		
Laser head (L x W x H)	498 x 248 x 194 mm	
Control unit (L x W x H)	449 x 370 x 140 mm	
AC/DC converter (L x W x H)	250 x 125 x 60 mm	
Umbilical length	3 $\pm$ 0.1 m	
Cooling:		
Laser head	air (passive), optionally - water	
Control unit	forced air (fans)	

<sup>1)</sup> Indylit 20 SH model has also 1030 nm output with the same specifications as Indylit 20 model. The outputs can be switched by GUI interface or CAN command.

<sup>2)</sup> Please refer to the power and energy vs. pulse repetition rate curves for typical values.

<sup>3)</sup> Attenuation can be controlled by a few different methods: a) by PC user interface, b) by CAN register, c) by analog input (0 – 1 V, rise time < 1  $\mu$ s). Beam quality specifications are maintained down to 10% power level.

<sup>4)</sup> Defined as the worst case ellipticity along the z-scan ( $\pm 5 \times \text{Rayleigh}$ ) of the beam.

<sup>5)</sup> Measured during 8 h operation starting 30 minutes after warm-up. Environmental temperature stability within  $\pm 1$  ° C.

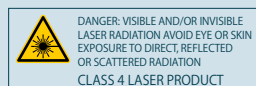
<sup>6)</sup> Measured with integration time of 1 s at the same conditions as (5).

<sup>7)</sup> Measured within 10 s time interval for at least 1000 pulses.

<sup>8)</sup> Higher operational temperature is available on request. Please contact LITILIT for details.

<sup>9)</sup> Technology is protected by international patents: LT6261 (B); JP6276471 (B2); US10038297 (B2); EP3178137; DK3178137 (T3); CN106575849 (B); PL3178137 (T3); LT6639 (B); LT2020 563

**CE RoHS**

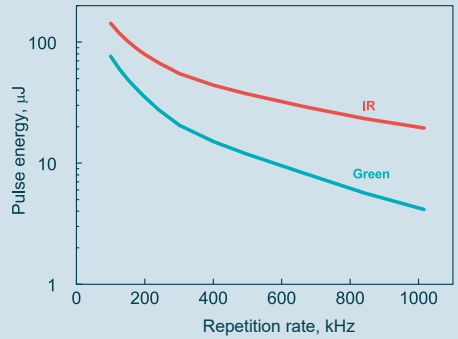


# INDYLIT 20

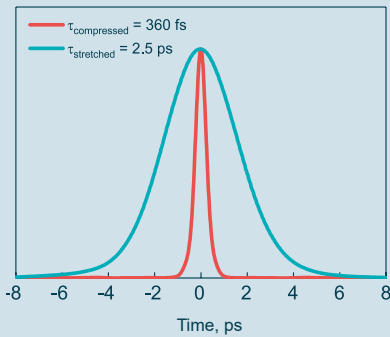
## PERFORMANCE



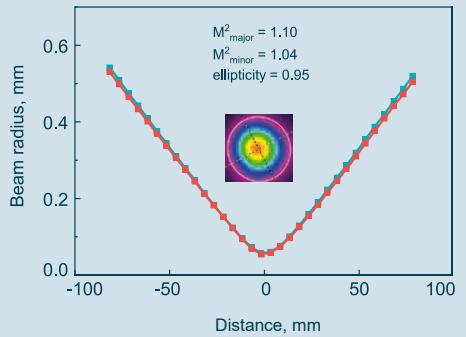
Average power dependence on the pulse repetition rate for infrared and green (SH option) output



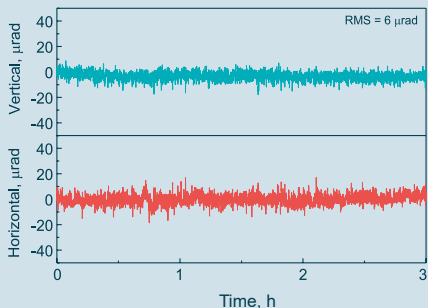
Pulse energy dependence on the pulse repetition rate for infrared and green (SH option) output



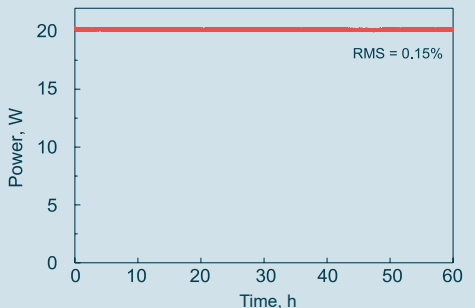
Pulse autocorrelation traces of optimally compressed and maximally stretched pulses at  $130 \mu\text{J}$  pulse energy and 100 kHz repetition rate



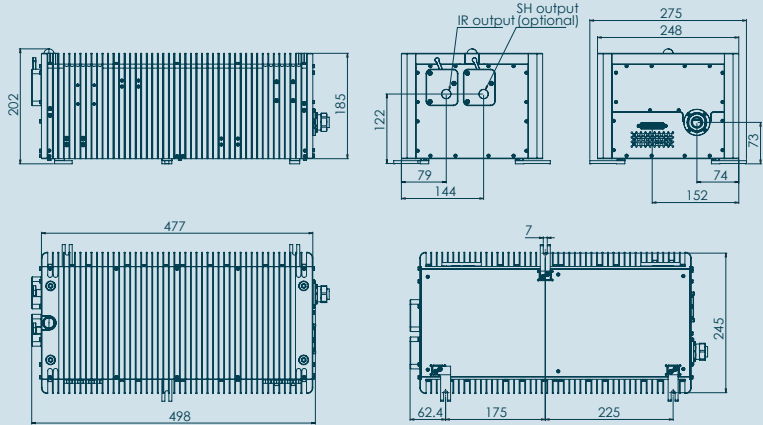
Beam z-scan measurement and beam profile in far field



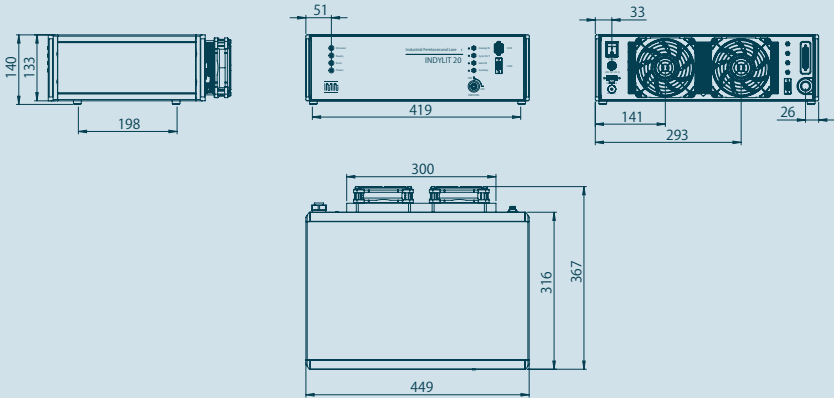
Long term beam pointing measurement



Long term output power stability



Drawing of Indylit 20 laser head (in mm)



Drawing of Indylit 20 laser control unit (in mm)



