

iBeam smart PT

Ultra-Compact Pigtailed Diode Laser



405 nm

445 nm

488 nm

515 nm

640 nm

660 nm

785 nm

Confocal Microscopy
Digital Photo Finishing
Disc Mastering
Flow Cytometry
Inspection
Metrology
Microlithography
Microplate Readout
Prepress, Computer-To-Plate
Retina Scanning

Key Features

Key features of iBeam smart PT

- Highest power single-mode pigtailed diode laser
- Ultimate long-term power stability via patent pending COOL^{DC} technology
- Active thermal control of opto-mechanics for best stability and reliability
- True one-box OEM package
- High performance, low noise laser diode driver incorporating μ -processor and RS 232 control
- Feedback-Induced Noise Eraser (FINE)
- Optional digital modulation with up to 250 MHz

iBeam smart PT	Units	405	445	488	515	640	660	785
Wavelengths	nm	405	445	488	515	640	660	785
Wavelength range	nm	± 4	± 5	+ 1 /- 5	± 5	+ 5 /- 3	± 3	± 5
Fiber coupled output power	mW	60	30	50	20	80	75	70

COOL^{DC}-Technology DuraCalibrated OEM Diode Lasers



Aligning and focusing a laser beam to ultra tiny single mode fibers (down to core diameters of 2.5 μm) with highest efficiency is utmost challenging: Laser pointing fluctuations, deviations in the beam path and smallest thermal or mechanical drifts in the fiber mounting can contribute to a significant loss of fiber coupling efficiency and thus in output power. Up to now manual realignment by a trained person was required to recalibrate the laser output power from time to time.

TOPTICA's unique solution for high power single-mode permanently fiber coupled lasers is the COOL technology (**C**onstant **O**ptical **O**utput **L**evel). This patent pending fiber coupling concept is new, because it does not use any mechanical micro adjustable parts, which normally are the first to shift due to varying ambient conditions (e.g. temperature changes or vibrations). All major optical components are solidly mounted and the optical micro alignment is unsusceptible to mechanical and thermal distortions or translations.

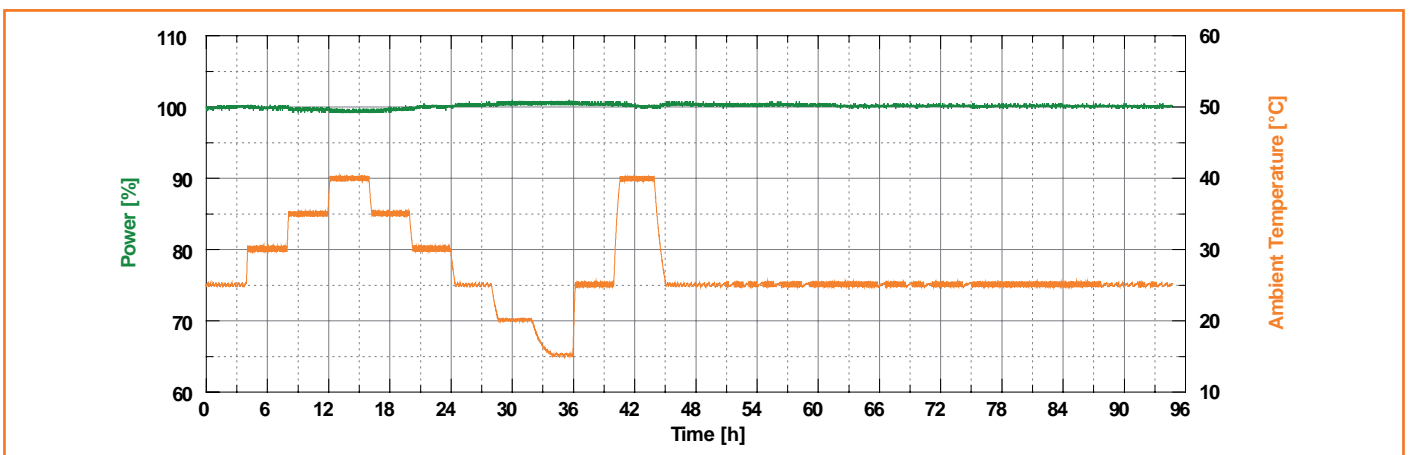
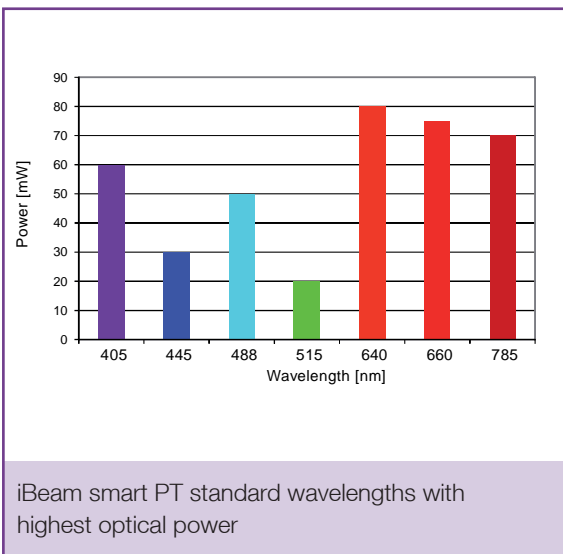
- DuraCalibrated solution for compact OEM diode lasers
- Factory set to permanent fiber coupling efficiency of higher than 50 %
- Unsusceptible to thermal fluctuations between 15 and 40 °C
- Unsusceptible to extensive mechanical disturbances
- Drop shipment warranty: Laser immediately in spec after unpacking



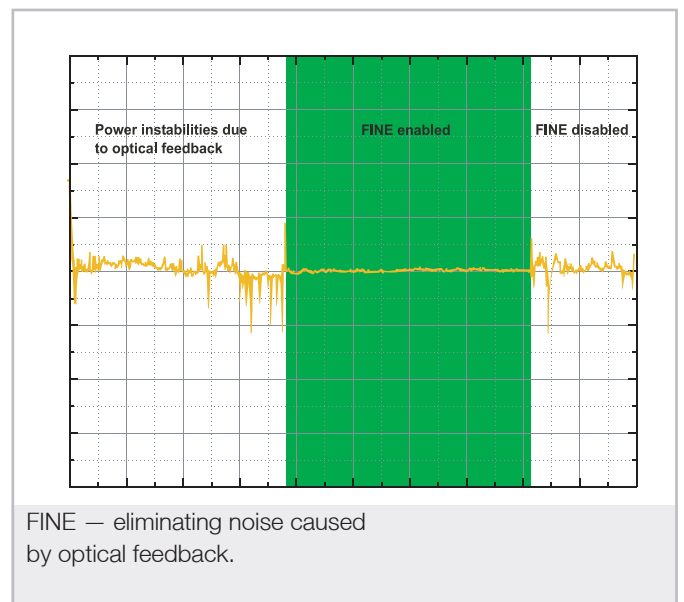
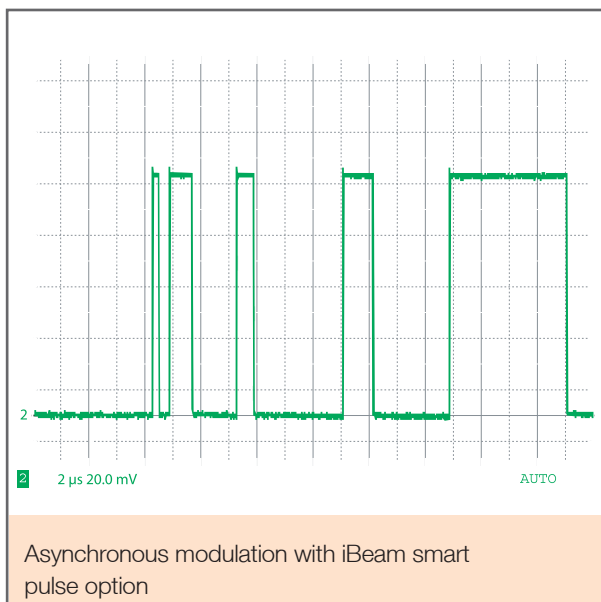
Specifications

iBeam smart PT	Units	405	445	488	515	640	660	785
Optical specifications								
Wavelengths*	nm	405	445	488	515	640	660	785
Wavelength range	nm	± 4	± 5	+ 1 /- 5	± 5	+ 5 /- 3	± 3	± 5
Fiber coupled output power	mW	60	30	50	20	80	75	70
Power stability (drift over 24 h @ room temperature ± 5°C)	%	± 2						
RMS noise (10 Hz – 10 MHz)	%	< 0.2						
Long-term output power average	%/1000 h	≤ 5	≤ 5	≤ 2	≤ 2	≤ 2	≤ 2	≤ 2
Ellipticity	%	< 10						
M ²		< 1.1						
Polarization ratio (typ.)		> 100 :1; Linear						
Polarization orientation tolerance	Degrees	± 3						
Fiber specifications								
Fiber output connector		FC/AFC (8° angled) standard, others like FC/PC, FC/APC or SC on request						
Fiber cable length (typ.)	m	2						
Fiber cable type		3 mm Kevlar reinforced PVC						
Fiber minimum bend radius	mm	40						
Fiber type		single mode, polarization maintaining						
Fiber numerical aperture (5%) (typ.)		0.07	0.06	0.06	0.06	0.11	0.11	0.12
Mode field diameter	μm	3.0	3.0	3.5	3.5	4.2	4.2	4.5
Electronic specifications								
Digital modulation (option)								
Supported digital signal levels		TTL						
Maximum digital modulation frequency	MHz	250						
Rise/Fall time (10% – 90%)	ns	< 1.5						
Digital modulation extinction ratio		> 1000 : 1						
Analog modulation								
Maximum analog modulation frequency	MHz	1						
Analog modulation extinction ratio		10 ⁶						
Electronic shutter								
Rise/Fall time	μs	40/10						
Extinction ratio		∞ (complete off)						
General and environmental specifications								
Qualified		CE						
RoHS compliancy		yes						
CDRH qualification		Class IIIb						
ESD protection		Level 4						
Digital communication interface		RS 232, ≤ 115.200 baud						
DC input requirements		12 V DC, < 2 A						
Power consumption	W	< 18 (typ. < 6)						
Maximum heat dissipation of head (baseplate at 50°C)	W	< 12						
Warm-up time	min	< 5						
Operating temperature range	°C	15 .. 40						
Storage temperature range	°C	-10 .. 60						
Operating relative humidity (non-condensing)	%	< 90						
Dimensions laser head (L x W x H)	mm ³	145 x 40 x 40						
Dimensions laser head with fiber minimum bend radius (L x W x H)	mm ³	195 x 40 x 40						
*Other wavelengths on request								

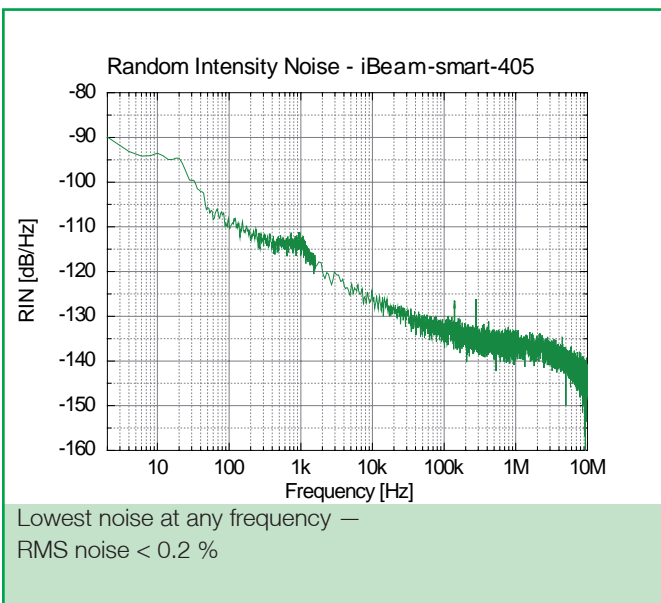
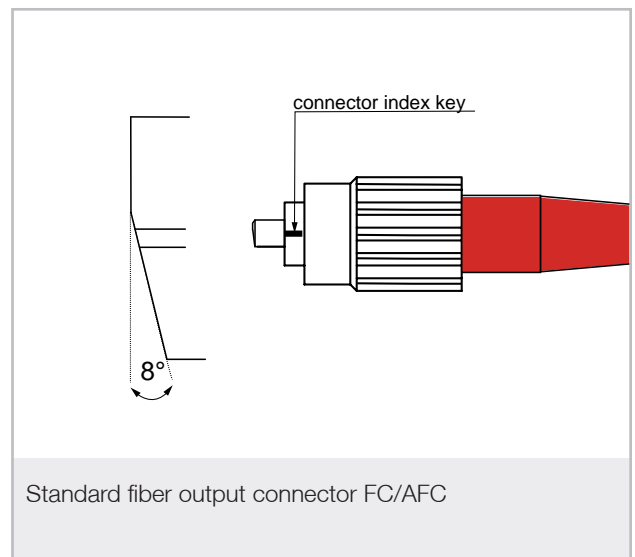
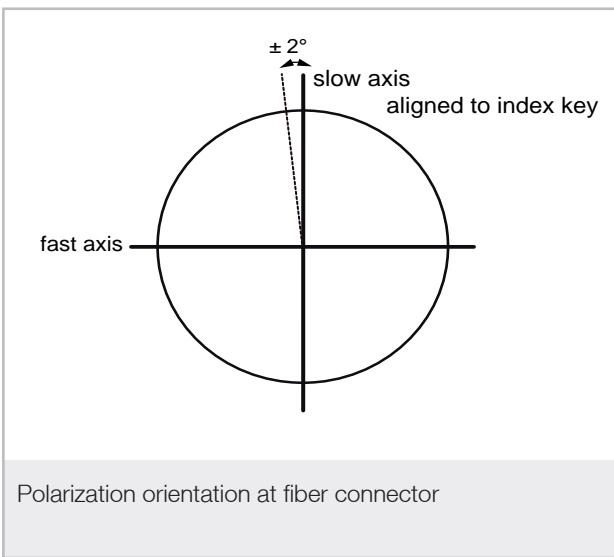
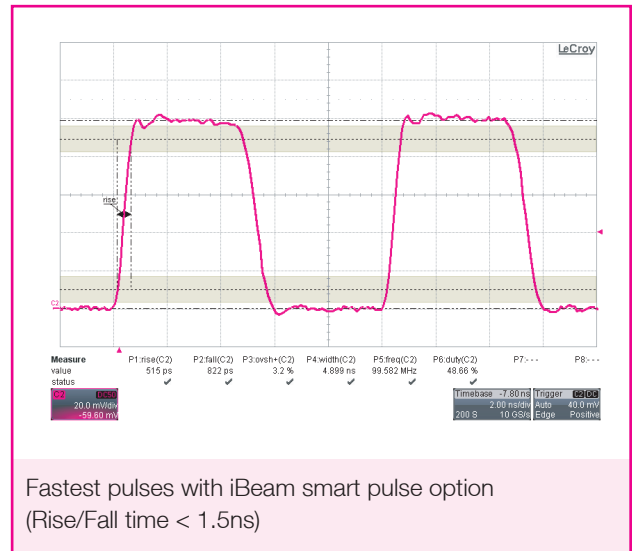
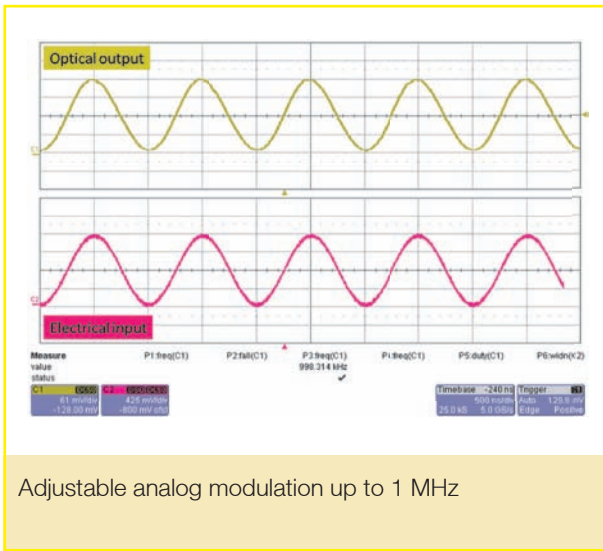
Smart Engineering – Pure Performance



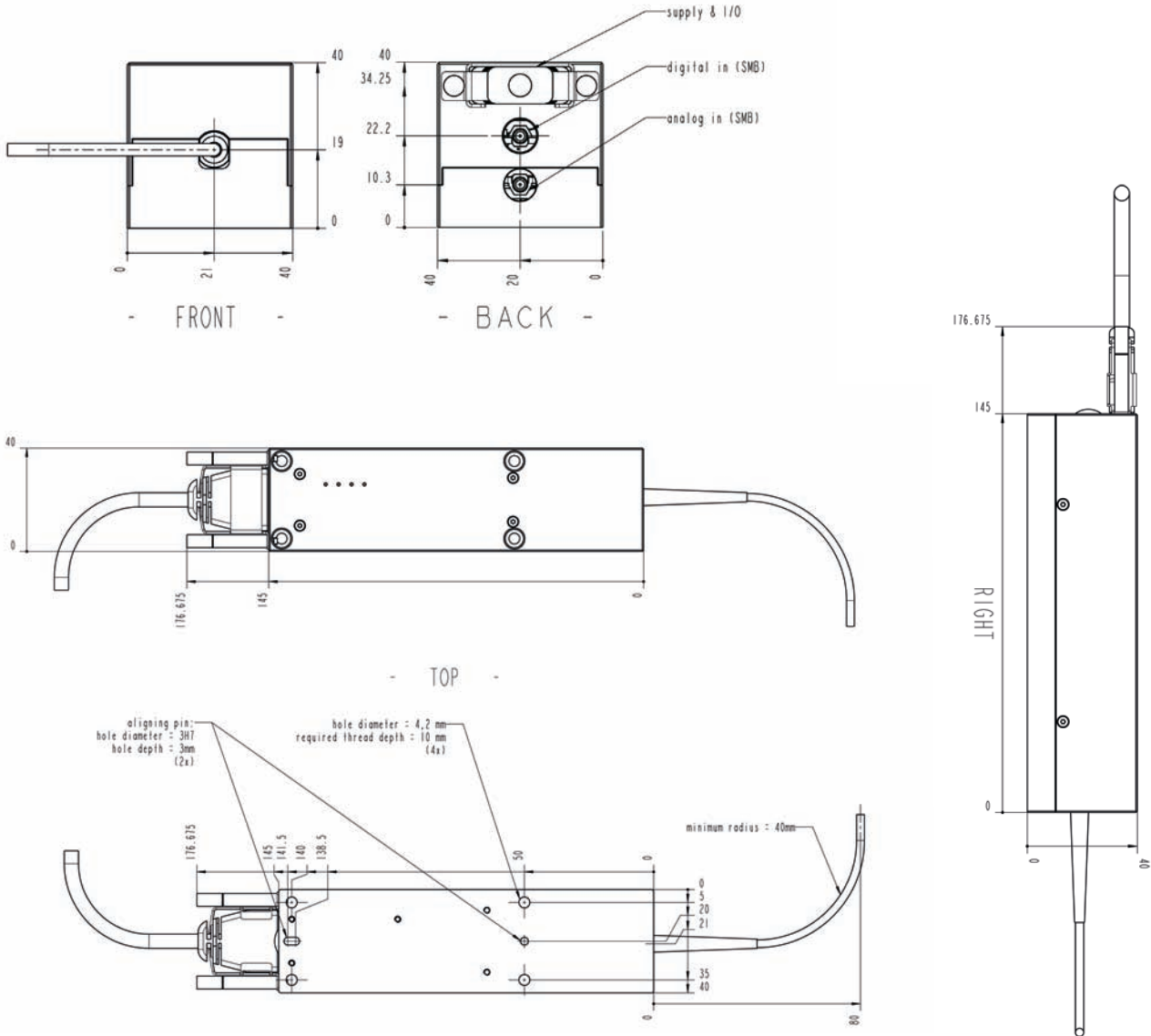
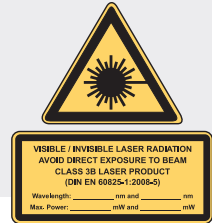
Fiber coupled power stability ($< 0.5\%$ over 24 h) even under changing ambient temperature



Smart Engineering – Pure Performance



Mechanical Drawings



All dimensions given in mm



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