

CUBE

Diode Laser System

The Coherent CUBE laser is a compact, all-in-one laser system leveraging laser diode technologies to create a high-performance, high-quality laser beam. CUBE lasers, with the industry standard 40 mm x 100 mm footprint, offer large 1+ mm beam diameters and feature wavelengths from 375 nm to 730 nm with output power as high as 100 mW.

The CUBE laser has an internal processor to support the USB and RS-232 interface as well as analog and digital I/O. With multiple modulation options the CUBE laser can be operated in a Continuous-Wave (CW) mode, Analog Modulation, Digital Modulation, and a combined Analog + Digital Modulation.

FEATURES & BENEFITS

- Compact and modular OEM design
- Superior beam quality
- Minimal laser output RMS noise
- Complete CDRH safety features for scientific and laboratory use
- TEC temperature-stabilized and conductively cooled through baseplate
- Analog and digital modulation
- USB and RS-232

APPLICATIONS

- Confocal Microscopy
- DNA Sequencing
- Flow Cytometry
- Medical Imaging and Instrumentation



SPECIFICATIONS	CUBE 375-16C	CUBE 405-50C	CUBE 405-100C	CUBE 445-40C	CUBE 488-50C
Part Number	1112774	1286998	1287002	1069418	1174040
Wavelength ¹ (nm)	375	405	405	445	488
Output Power ² (mW)	16	50	100	40	50
Beam Diameter at 1/e ² (mm) (typical)	1.1	1.4	1.4	1.1	1.3
Beam Divergence (mrad) (typical)	0.5	0.4	0.4	0.6	0.6
M ² (ModeMaster beam quality) ³	<1.3	<1.3	<1.2	<1.2	<1.2
Beam Asymmetry ³	<1:1.2	<1:1.2	<1:1.2	<1:1.2	<1:1.2
Laser Drive Modes	Digital, Analog, and PC Control				
Digital Modulation					
Maximum Bandwidth (MHz)	150	150	150	125	125
Rise Time (10% to 90%) (nsec)			<2		
Fall Time (10% to 90%) (nsec)	<2	<2	<2	<3	<3
Modulation Depth (extinction ratio)	>1,000,000:1 at 0 Hz, >250:1 at 150 MHz				
Analog Modulation					
Maximum Bandwidth (kHz)	70	350	350	350	350
Rise or Fall Time (10% to 90%) (µsec)	<5	<1	<1	<1	<1
Modulation Depth (extinction ratio)	>10,000:1	>10,000:1	>10,000:1	>10,000:1	>10,000:1
Laser Enable Control Input					
Maximum Bandwidth (kHz)	130	130	130	130	130
Rise or Fall Time (10% to 90%) (µsec)	<1	<1	<1	<1	<1
Modulation Depth (extinction ratio)	∞, complete On/Off	∞, complete On/Off	∞, complete On/Off	∞, complete On/Off	∞, complete On/Off
RMS Noise (%)					
20 Hz to 10 MHz	<0.15	<0.1	<0.1	<0.1	<0.1
10 MHz to 500 MHz	<1.0	<1.0	<1.0	<1.0	<1.0
Long-Term Power Stability (%) (8 hours)	<±2	<±2	<±2	<±2	<±2
Warm-Up Time (minutes)	<5	<5	<5	<5	<5
Spatial Mode (far field)	TEM ₀₀	TEM ₀₀	TEM ₀₀	TEM ₀₀	TEM ₀₀
Pointing Stability (µrad/°C)	<6	<6	<6	<6	<6
Polarization Ratio ⁴	Minimum 100:1, Vertical ±5°				
Static Alignment Tolerances ⁵					
Beam Position (mm)	<1	<1	<1	<1	<1
Beam Angle (mrad)	<5	<5	<5	<5	<5
CDRH Laser Classification	Class IIIb	Class IIIb	Class IIIb	Class IIIb	Class IIIb
ESD Protection ⁶	Level 4	Level 4	Level 4	Level 4	Level 4

¹ Laser-to-laser tolerance. All lasers ±5 nm except CUBE 640-40 with 635 to 642 nm range, CUBE 640-100 with 635 to 644 nm range, CUBE 647-100 with 646 to 651 nm range, CUBE 660 with 652 to 665 nm range, and CUBE 730 ±10 nm.

² Output power is variable via RS-232, USB or analog interface from 1% to 100%. Specifications are valid for 100% power. Recommended power range is 70% to 100% power.

³ M² and Beam Asymmetry measured with ModeMaster with 90/10 clip levels.

⁴ Polarization measurement is max/min. power with polarizer at 32 in. from laser with LM-2 power head at 37 in. from laser.

⁵ Static alignment tolerances are relative to the right bottom edge (in beam direction).

⁶ Electro-Static Discharge Standard IEC 61000-4-2:2008.

SPECIFICATIONS	CUBE 640-40C	CUBE 640-100C	CUBE 647-100C
Part Number	1069417	1150205	1190357
Wavelength ¹ (nm)	640	640	647
Output Power ² (mW)	40	100	100
Beam Diameter at 1/e ² (mm) (typical)	1.0	1.0	1.0
Beam Divergence (mrad) (typical)	1.0	1.0	1.0
M ² (ModeMaster beam quality) ³	<1.2	<1.2	<1.2
Beam Asymmetry ³	<1:1.2	<1:1.2	<1:1.2
Laser Drive Modes	Digital, Analog, and PC Control		
Digital Modulation			
Maximum Bandwidth (MHz)	150	150	150
Rise Time (10% to 90%) (nsec)	<2	<2	<2
Fall Time (10% to 90%) (nsec)	<2	<2	<2
Modulation Depth (extinction ratio)	>1,000,000:1 at 0 Hz, >250:1 at 150 MHz		
Analog Modulation			
Maximum Bandwidth (kHz)	350	350	350
Rise or Fall Time (10% to 90%) (μsec)	<1	<1	<1
Modulation Depth (extinction ratio)	>10,000:1	>10,000:1	>10,000:1
Laser Enable Control Input			
Maximum Bandwidth (kHz)	130	130	130
Rise or Fall Time (10% to 90%) (μsec)	<1	<1	<1
Modulation Depth (extinction ratio)	∞, complete On/Off	∞, complete On/Off	∞, complete On/Off
RMS Noise (%)			
20 Hz to 10 MHz	<0.1	<0.1	<0.1
10 MHz to 500 MHz	<1.0	<1.0	<1.0
Long-Term Power Stability (%) (8 hours)	<±2	<±2	<±2
Warm-Up Time (minutes)	<5	<5	<5
Spatial Mode (far field)	TEM ₀₀	TEM ₀₀	TEM ₀₀
Pointing Stability (μrad/°C)	<6	<6	<6
Polarization Ratio ⁴	Minimum 100:1, Vertical ±5°		
Static Alignment Tolerances ⁵			
Beam Position (mm)	<1	<1	<1
Beam Angle (mrad)	<5	<5	<5
CDRH Laser Classification	Class IIIb	Class IIIb	Class IIIb
ESD Protection ⁶	Level 4	Level 4	Level 4

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⁶ Electro-Static Discharge Standard IEC 61000-4-2:2008.

SPECIFICATIONS	CUBE 660-60C	CUBE 660-100C	CUBE 730-30C
Part Number	1094060	1130061	1178855
Wavelength ¹ (nm)	660	660	730
Output Power ² (mW)	60	100	30
Beam Diameter at 1/e ² (mm) (typical)	1.4	1.0	1.2
Beam Divergence (mrad) (typical)	0.6	1.0	0.9
M ² (ModeMaster beam quality) ³	<1.2	<1.2	<1.2
Beam Asymmetry ³	<1:1.2	<1:1.2	<1:1.2
Laser Drive Modes	Digital, Analog, and PC Control		
Digital Modulation			
Maximum Bandwidth (MHz)	150	150	150
Rise Time (10% to 90%) (nsec)	<2	<2	<2
Fall Time (10% to 90%) (nsec)	<2	<2	<2
Modulation Depth (extinction ratio)	>1,000,000:1 at 0 Hz, >250:1 at 150 MHz		
Analog Modulation			
Maximum Bandwidth (kHz)	350	350	350
Rise or Fall Time (10% to 90%) (μsec)	<1	<1	<1
Modulation Depth (extinction ratio)	>10,000:1	>10,000:1	>10,000:1
Laser Enable Control Input			
Maximum Bandwidth (kHz)	130	130	130
Rise or Fall Time (10% to 90%) (μsec)	<1	<1	<1
Modulation Depth (extinction ratio)	∞, complete On/Off	∞, complete On/Off	∞, complete On/Off
RMS Noise (%)			
20 Hz to 10 MHz	<0.1	<0.1	<0.1
10 MHz to 500 MHz	<1.0	<1.0	<1.0
Long-Term Power Stability (%) (8 hours)	<±2	<±2	<±2
Warm-Up Time (minutes)	<5	<5	<5
Spatial Mode (far field)	TEM ₀₀	TEM ₀₀	TEM ₀₀
Pointing Stability (μrad/°C)	<6	<6	<6
Polarization Ratio ⁴	Minimum 100:1, Vertical ±5°		
Static Alignment Tolerances ⁵			
Beam Position (mm)	<1	<1	<1
Beam Angle (mrad)	<5	<5	<5
CDRH Laser Classification	Class IIIb	Class IIIb	Class IIIb
ESD Protection ⁶	Level 4	Level 4	Level 4

1 Laser-to-laser tolerance. All lasers ±5 nm except CUBE 640-40 with 635 to 642 nm range, CUBE 640-100 with 635 to 644 nm range, CUBE 647-100 with 646 to 651 nm range, CUBE 660 with 652 to 665 nm range, and CUBE 730 ±10 nm.

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6 Electro-Static Discharge Standard IEC 61000-4-2:2008.

UTILITY AND ENVIRONMENTAL REQUIREMENTS		
Laser Head Operating Voltage (VDC)	+4.8 to 6.5	
Laser Head Operating Current (A)	<2.5	
Baseplate Temperature Range ¹	+10° to 50°C (50° to 122°F)	
Max. Heat Dissipation of Head (W) (baseplate at 50°C)	13	
Storage Temperature	-20° to 60°C (-4° to 140°F)	
Power Supply ² (included)		
Operating Voltage ³ (VAC)	100 to 240, 50 to 60 Hz	
Power Consumption (W)	<15	
	Dimensions (L x W x H)	Weight
Laser Head	100 x 40 x 40 mm (3.9 x 1.6 x 1.6 in.)	0.3 kg (0.7 lbs.)
Control Box	138 x 62 x 26 mm (5.4 x 2.4 x 1.1 in.)	0.12 kg (0.3 lbs.)
Power Supply	87 x 47 x 32 mm (3.4 x 1.9 x 1.3 in.)	0.22 kg (0.5 lbs.)
Head Cable	254 to 406 mm (10 to 18 in.)	0.08 kg (0.2 lbs.)
USB Cable	1.8 m (6 ft.)	0.1 kg (0.2 lbs.)
Heat Sink (optional)	127 x 66 x 44 mm (5 x 2.6 x 1.74 in.)	0.4 kg (0.9 lbs.)

¹ Non-condensing with laser diode TEC at set point of 22°C.

² On-off power switch and LED included in cord to laser head.

³ System includes USA-type power cord, IEC320 input connection.



CUBE ACCESSORIES		
1073840	CUBE Heat Sink Accessory	CUBE heat sink with fan, 127 x 66 x 44 mm
1079150	CUBE 2nd Emission Lamp	CDRH lamp for laser emission. Connects to CUBE I/O cable.
1072166	CUBE Interface Cable ¹	CUBE to control box, I/O, RS-232, and power
1072454	CUBE Power Supply ¹ , 6 VDC, 2.5 amps	IEC320 input, 110V/220V, switch, and LED
1108906	CUBE USB Cable ¹ , 6 ft. (1.8 m)	USB standard to mini for CUBE
1039966	Control Box ¹ , CDRH, Keyswitch, Interlock	Control box for CUBE lasers. Includes box, key, interlock RCA, and cable.
1080090	Cable, Extension, DB-9 M/F, 6 ft. (1.8 m)	Extension cable to extend control box or RS-232. M-F, DB-9.
1079890	CUBE Manual ¹ and Software ²	CUBE user manual and software CD for Windows XP ³ and Windows 7 (32-bit) ³
1108063	Power Cord ¹ , USA, 6 ft. (1.8 m)	Power cord, USA plug style to IEC320

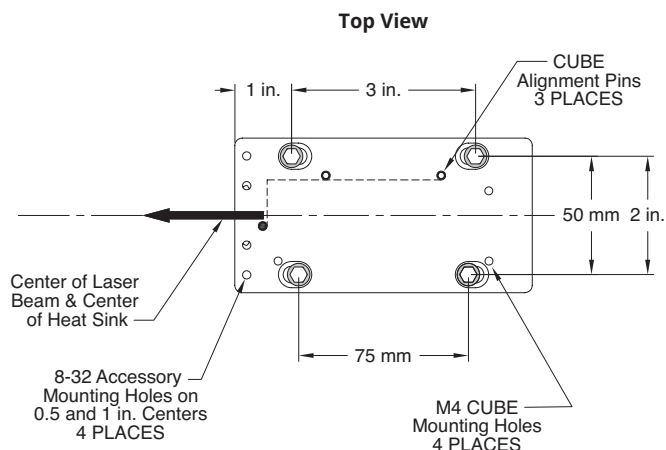
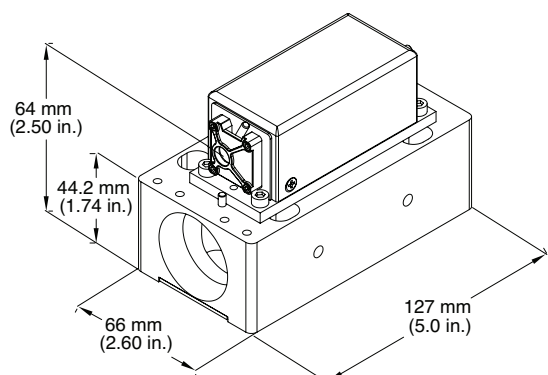
¹ Included at no additional charge with every CUBE system.

² CUBE PC Software only supports Windows OS in 32-bit for USB.

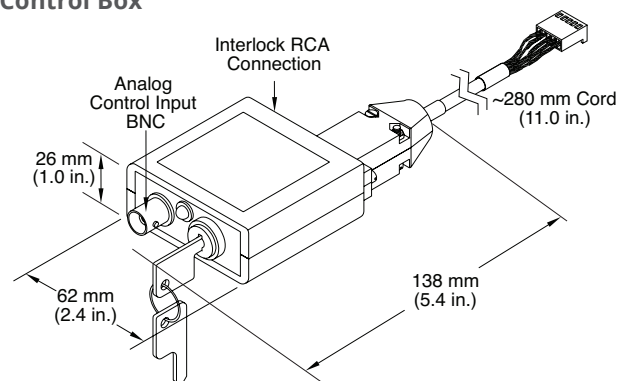
³ Windows XP and Windows 7 are registered trademarks of Microsoft Corporation.

MECHANICAL SPECIFICATIONS

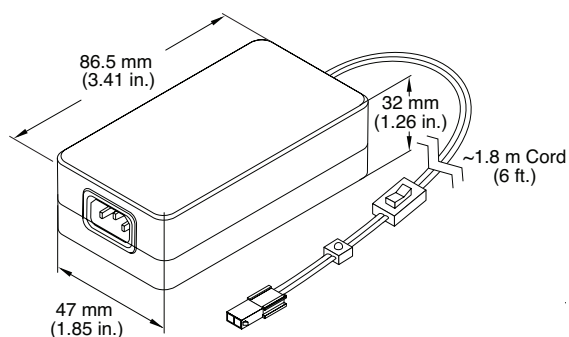
CUBE Heat Sink



CUBE Control Box

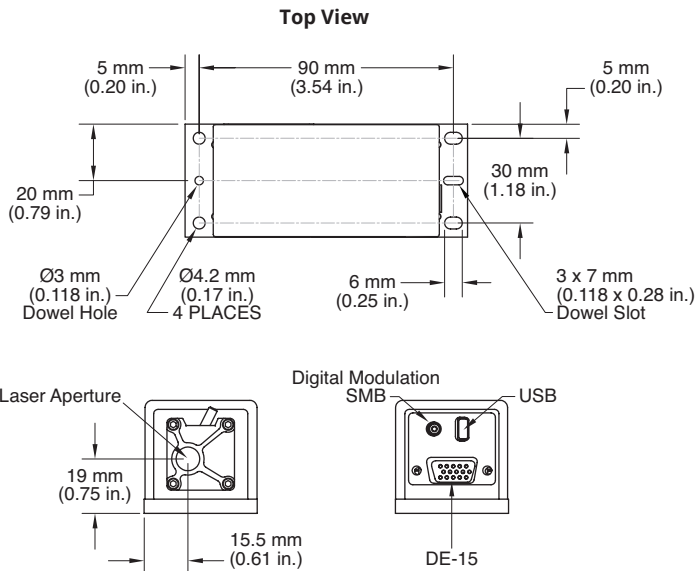
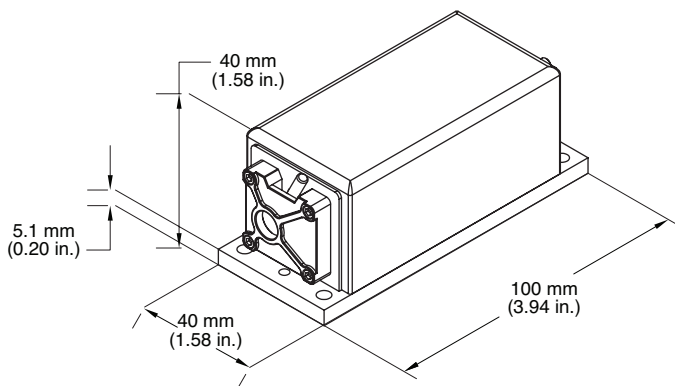


CUBE Power Supply



MECHANICAL SPECIFICATIONS

CUBE Laser Head



CUBE Laser with Included Accessories



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Coherent follows a policy of continuous product improvement. Specifications are subject to change without notice. Coherent's scientific and industrial lasers are certified to comply with the Federal Regulations (21 CFR Subchapter J) as administered by the Center for Devices and Radiological Health on all systems ordered for shipment after August 2, 1976.

Coherent offers a limited warranty for all CUBE Lasers. For full details of this warranty coverage, please refer to the Service section at www.coherent.com or contact your local Sales or Service Representative.
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