



CUBE

Diode Laser System

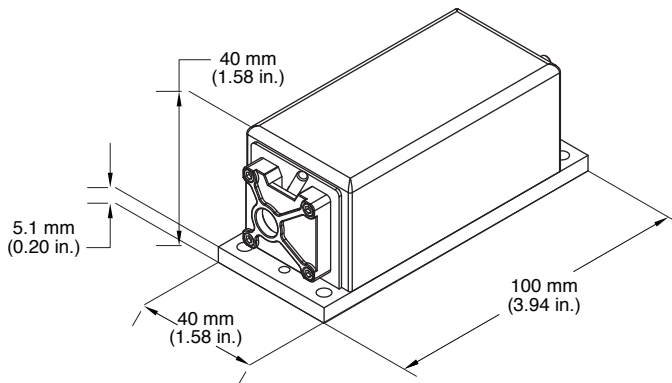


Features

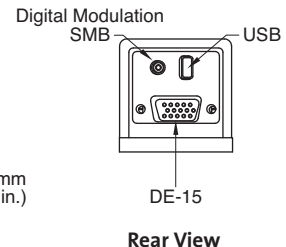
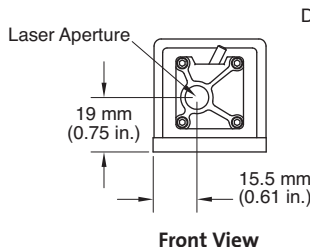
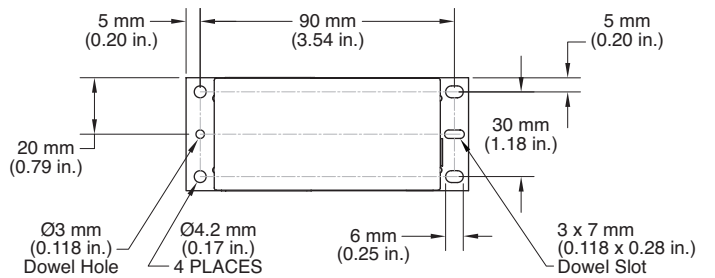
- Compact and modular OEM design
- Superior beam quality
- Minimal laser output RMS noise
- Complete CDRH safety features for scientific and laboratory use
- TEC temperature-stabilized and conductively cooled through baseplate
- Analog and digital modulation
- USB and RS-232

Mechanical Specifications

Laser Head



Top View



Superior Reliability & Performance

CUBE

Diode Laser System

System Specifications

| CUBE | 375-16C | 405-50C | 405-100C |
|---|--------------------------------|---|----------|
| Part Number | 1112774 | 1174298 | 1142279 |
| Wavelength ¹ (nm) | 375 | 405 | 405 |
| Output Power ² (mW) | 16 | 50 | 100 |
| Beam Diameter at 1/e ² (mm)(typical) | 1.1 | 1.4 | 1.4 |
| Beam Divergence (mrad)(typical) | 0.5 | 0.4 | 0.4 |
| M ² (ModeMaster beam quality) ³ | ≤1.3 | ≤1.3 | ≤1.2 |
| Beam Asymmetry ³ | | <1:1.2 | |
| Laser Drive Modes | Digital, Analog and PC Control | | |
| Digital Modulation | | | |
| Maximum Bandwidth (MHz) | | 150 | |
| Rise Time (10% to 90%) (nsec) | | <2 | |
| Fall Time (10% to 90%) (nsec) | | <2 | |
| Modulation Depth (extinction ratio) | | >1,000,000:1 at 0 Hz, >250:1 at 150 MHz | |
| Analog Modulation | | | |
| Maximum Bandwidth (kHz) | 70 | | 350 |
| Rise or Fall Time (10% to 90%) (µsec) | <5 | | <1 |
| Modulation Depth (extinction ratio) | | >10,000:1 | |
| Laser Enable Control Input | | | |
| Maximum Bandwidth (kHz) | | 130 | |
| Rise or Fall Time (10% to 90%) (µsec) | | <1 | |
| Modulation Depth (extinction ratio) | | ∞, complete On/Off | |
| RMS Noise | | | |
| 20 Hz to 10 MHz | ≤0.15% | | ≤0.1% |
| 10 MHz to 500 MHz | | <1.0% | |
| Long-Term Power Stability (8 hours) | | <±2% | |
| Warm-Up Time (minutes) | | <5 | |
| Spatial Mode (far field) | | TEM ₀₀ | |
| Pointing Stability (µrad/°C) | | <6 | |
| Polarization Ratio ⁴ | | Min. 100:1, Vert. ±5° | |
| Static Alignment Tolerances ⁵ | | | |
| Beam Position (mm) | | <1 | |
| Beam Angle (mrad) | | <5 | |
| CDRH Laser Classification | | Class IIIb | |
| ESD Protection ⁶ | | 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 660 with 652 to 665 nm range, and CUBE 785 ±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 1000-4-2, 1995.

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Diode Laser System

System Specifications

| CUBE | 445-40C | 488-50C |
|---|---|-----------------------|
| Part Number | 1069418 | 1174040 |
| Wavelength ¹ (nm) | 445 | 488 |
| Output Power ² (mW) | 40 | 50 |
| Beam Diameter at 1/e ² (mm)(typical) | 1.1 | 1 |
| Beam Divergence (mrad)(typical) | 0.6 | 1 |
| M ² (ModeMaster beam quality) ³ | ≤1.2 | ≤1.1 |
| Beam Asymmetry ³ | <1:1.2 | <1:1.1 |
| Laser Drive Modes | Digital, Analog and PC Control | |
| Digital Modulation | | |
| Maximum Bandwidth (MHz) | 125 | 150 |
| Rise Time (10% to 90%) (nsec) | | <2 |
| Fall Time (10% to 90%) (nsec) | | <3 |
| Modulation Depth (extinction ratio) | >1,000,000:1 at 0 Hz, >250:1 at 150 MHz | |
| Analog Modulation | | |
| Maximum Bandwidth (kHz) | | 350 |
| Rise or Fall Time (10% to 90%) (μsec) | | <1 |
| Modulation Depth (extinction ratio) | | >10,000:1 |
| Laser Enable Control Input | | |
| Maximum Bandwidth (kHz) | | 130 |
| Rise or Fall Time (10% to 90%) (μsec) | | <1 |
| Modulation Depth (extinction ratio) | | ∞, complete On/Off |
| RMS Noise | | |
| 20 Hz to 10 MHz | ≤0.1% | ≤0.2% |
| 10 MHz to 500 MHz | | <1.0% |
| Long-Term Power Stability (8 hours) | | <±2% |
| Warm-Up Time (minutes) | | <5 |
| Spatial Mode (far field) | | TEM ₀₀ |
| Pointing Stability (μrad/°C) | | <6 |
| Polarization Ratio ⁴ | | Min. 100:1, Vert. ±5° |
| Static Alignment Tolerances ⁵ | | |
| Beam Position (mm) | <1 | ≤0.5 |
| Beam Angle (mrad) | <5 | <15 |
| CDRH Laser Classification | | Class IIIb |
| ESD Protection ⁶ | | Level 4 |

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⁶ Electro-Static Discharge Standard IEC 1000-4-2, 1995.

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Diode Laser System

System Specifications

| CUBE | 635-30E | 640-40C | 640-100C |
|---|--------------------------------|---|----------|
| Part Number | 1069410 | 1069417 | 1150205 |
| Wavelength ¹ (nm) | 635 | 640 | 640 |
| Output Power ² (mW) | 30 | 40 | 100 |
| Beam Diameter at 1/e ² (mm)(typical) | 1 x 3.8 | 1 | 1 |
| Beam Divergence (mrad)(typical) | 0.8 x 0.3 | 1 | 1 |
| M ² (ModeMaster beam quality) ³ | ≤1.2 | ≤1.2 | ≤1.2 |
| Beam Asymmetry ³ | 1:3.8 | <1:1.2 | <1:1.2 |
| Laser Drive Modes | Digital, Analog and PC Control | | |
| Digital Modulation | | | |
| Maximum Bandwidth (MHz) | | 150 | |
| Rise Time (10% to 90%) (nsec) | | <2 | |
| Fall Time (10% to 90%) (nsec) | | <2 | |
| Modulation Depth (extinction ratio) | | >1,000,000:1 at 0 Hz, >250:1 at 150 MHz | |
| Analog Modulation | | | |
| Maximum Bandwidth (kHz) | | 350 | |
| Rise or Fall Time (10% to 90%) (µsec) | | <1 | |
| Modulation Depth (extinction ratio) | | >10,000:1 | |
| Laser Enable Control Input | | | |
| Maximum Bandwidth (kHz) | | 130 | |
| Rise or Fall Time (10% to 90%) (µsec) | | <1 | |
| Modulation Depth (extinction ratio) | | ∞, complete On/Off | |
| RMS Noise | | | |
| 20 Hz to 10 MHz | | ≤0.1% | |
| 10 MHz to 500 MHz | | <1.0% | |
| Long-Term Power Stability (8 hours) | | <±2% | |
| Warm-Up Time (minutes) | | <5 | |
| Spatial Mode (far field) | | TEM ₀₀ | |
| Pointing Stability (µrad/°C) | | <6 | |
| Polarization Ratio ⁴ | | Min. 100:1, Vert. ±5° | |
| Static Alignment Tolerances ⁵ | | | |
| Beam Position (mm) | | <1 | |
| Beam Angle (mrad) | | <5 | |
| CDRH Laser Classification | | Class IIIb | |
| ESD Protection ⁶ | | 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 660 with 652 to 665 nm range, and CUBE 785 ±10 nm.

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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.

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System Specifications

| CUBE | 660-60C | 660-100C | 685-40C |
|---|--------------------------------|---|---------|
| Part Number | 1094060 | 1130061 | 1184303 |
| Wavelength ¹ (nm) | 660 | 660 | 685 |
| Output Power ² (mW) | 60 | 100 | 40 |
| Beam Diameter at 1/e ² (mm)(typical) | 1.4 | 1 | - |
| Beam Divergence (mrad)(typical) | 0.6 | 1 | - |
| M ² (ModeMaster beam quality) ³ | | ≤1.2 | |
| Beam Asymmetry ³ | | <1:1.2 | |
| Laser Drive Modes | Digital, Analog and PC Control | | |
| Digital Modulation | | | |
| Maximum Bandwidth (MHz) | | 150 | |
| Rise Time (10% to 90%) (nsec) | | <2 | |
| Fall Time (10% to 90%) (nsec) | | <2 | |
| Modulation Depth (extinction ratio) | | >1,000,000:1 at 0 Hz, >250:1 at 150 MHz | |
| Analog Modulation | | | |
| Maximum Bandwidth (kHz) | | 350 | |
| Rise or Fall Time (10% to 90%) (µsec) | | <1 | |
| Modulation Depth (extinction ratio) | | >10,000:1 | |
| Laser Enable Control Input | | | |
| Maximum Bandwidth (kHz) | | 130 | |
| Rise or Fall Time (10% to 90%) (µsec) | | <1 | |
| Modulation Depth (extinction ratio) | | ∞, complete On/Off | |
| RMS Noise | | | |
| 20 Hz to 10 MHz | | ≤0.1% | |
| 10 MHz to 500 MHz | | <1.0% | |
| Long-Term Power Stability (8 hours) | | <±2% | |
| Warm-Up Time (minutes) | | <5 | |
| Spatial Mode (far field) | | TEM ₀₀ | |
| Pointing Stability (µrad/°C) | | <6 | |
| Polarization Ratio ⁴ | | Min. 100:1, Vert. ±5° | |
| Static Alignment Tolerances ⁵ | | | |
| Beam Position (mm) | | <1 | |
| Beam Angle (mrad) | | <5 | |
| CDRH Laser Classification | | Class IIIb | |
| ESD Protection ⁶ | | 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 660 with 652 to 665 nm range, and CUBE 785 ±10 nm.

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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.

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⁶ Electro-Static Discharge Standard IEC 1000-4-2, 1995.

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Diode Laser System

System Specifications

| CUBE | 685-40C | 730-40C | 785-40C |
|---|--------------------------------|---|---------|
| Part Number | 1184303 | 1178855 | 1069416 |
| Wavelength ¹ (nm) | 685 | 730 | 785 |
| Output Power ² (mW) | 40 | 30 | 40 |
| Beam Diameter at 1/e ² (mm)(typical) | 1 | 1.2 | 1.2 |
| Beam Divergence (mrad)(typical) | 1 | 0.9 | 1 |
| M ² (ModeMaster beam quality) ³ | | <1.2 | |
| Beam Asymmetry ³ | | <1:1.2 | |
| Laser Drive Modes | Digital, Analog and PC Control | | |
| Digital Modulation | | | |
| Maximum Bandwidth (MHz) | | 150 | |
| Rise Time (10% to 90%) (nsec) | | <2 | |
| Fall Time (10% to 90%) (nsec) | | <2 | |
| Modulation Depth (extinction ratio) | | >1,000,000:1 at 0 Hz, >250:1 at 150 MHz | |
| Analog Modulation | | | |
| Maximum Bandwidth (kHz) | | 350 | |
| Rise or Fall Time (10% to 90%) (µsec) | | <1 | |
| Modulation Depth (extinction ratio) | | >10,000:1 | |
| Laser Enable Control Input | | | |
| Maximum Bandwidth (kHz) | | 130 | |
| Rise or Fall Time (10% to 90%) (µsec) | | <1 | |
| Modulation Depth (extinction ratio) | | ∞, complete On/Off | |
| RMS Noise | | | |
| 20 Hz to 10 MHz | | ≤0.1% | |
| 10 MHz to 500 MHz | | <1.0% | |
| Long-Term Power Stability (8 hours) | | <±2% | |
| Warm-Up Time (minutes) | | <5 | |
| Spatial Mode (far field) | | TEM ₀₀ | |
| Pointing Stability (µrad/°C) | | <6 | |
| Polarization Ratio ⁴ | | Min. 100:1, Vert. ±5° | |
| Static Alignment Tolerances ⁵ | | | |
| Beam Position (mm) | | <1 | |
| Beam Angle (mrad) | | <5 | |
| CDRH Laser Classification | | Class IIIb | |
| ESD Protection ⁶ | | 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 660 with 652 to 665 nm range, and CUBE 685, 730 and 785 with ±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.

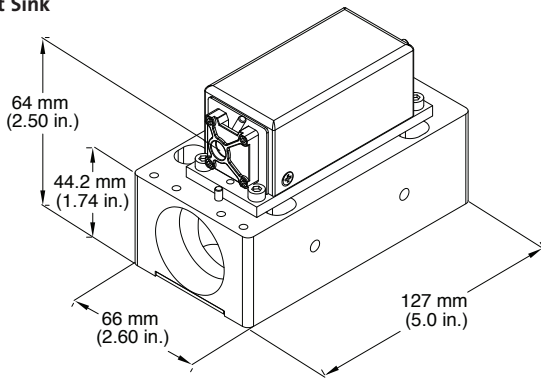
⁵ Static alignment tolerances are relative to the right bottom edge (in beam direction).

⁶ Electro-Static Discharge Standard IEC 1000-4-2, 1995.

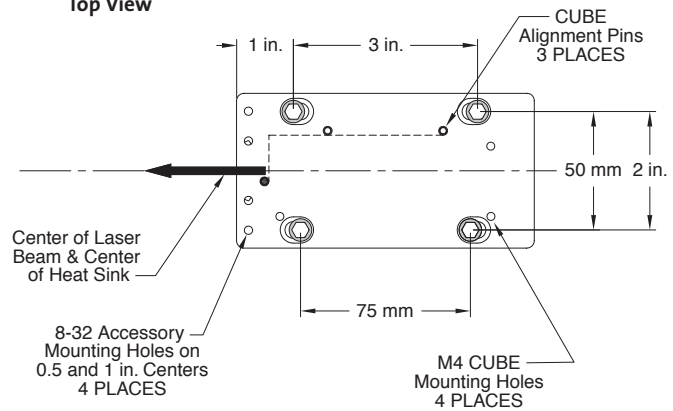
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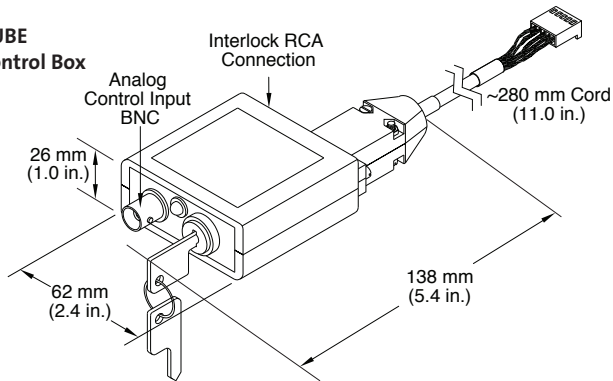
CUBE Heat Sink



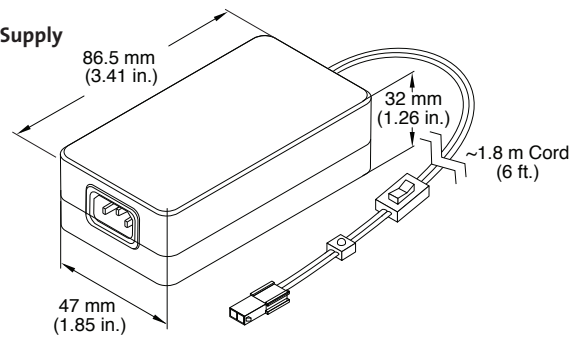
Heat Sink Top View



CUBE Control Box



CUBE Power Supply



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 | CUBE to control box, I/O, RS-232 and power |
| 1072454 | * CUBE Power Supply, 6 VDC, 2.5 amps | IEC320 input, 110V/220V, switch and LED |
| 1108906 | * CUBE USB Cable, 6 ft. (1.8m) | USB standard to mini for CUBE |
| 1039966 | * Control Box, CDRH, Keyswitch, Interlock | Control box for CUBE lasers. Included box, key, interlock RCA and cable. |
| 1080090 | Cable, Extension, DB-9 M/F, 6 ft. (1.8m) | Extension cable to extend control box or RS-232. M-F, DB-9. |
| 1040408 | * Plug, RCA | Interlock RCA plug for control box, non-shortcd |
| 1079890 | * CUBE Manual and Software | CUBE user manual and software CD for Windows 2000** and Windows XP** |
| 1108063 | * Power Cord, USA, 6 ft. (1.8m) | Power cord, USA plug style to IEC320 |
| 1116779 | CUBE Heat Sink Right Angle | CUBE right angle mount, 102 x 47 x 44 mm, same beam position with horizontal polarization |

* Included free with every CUBE system.

** Windows 2000 and Windows XP are registered trademarks of Microsoft Corporation.

CUBE

Diode Laser System

Utility and Environmental Requirements

| | |
|--|-----------------------------|
| Laser Head Operating Voltage | +4.8 to 6.5 VDC |
| Laser Head Operating Current | <2.5 amps |
| Baseplate Temperature Range ¹ | +10° to 50°C (50° to 122°F) |
| Maximum Heat Dissipation of Head (baseplate at 50°C) | 13W |
| Storage Temperature | -20° to 60°C (-4° to 140°F) |
| Power Supply ² (included) | |
| Operating Voltage ³ | 100 to 240 VAC, 50 to 60 Hz |
| Power Consumption | <15W |

| | 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 | 1.8m (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.



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.



www.Coherent.com

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