

# Specifications<sup>1</sup>

## LASER CURRENT SOURCE

| MODEL NUMBER                                  | LDC-3714B        | LDC-3724B        | LDC-3744B        |
|---|------------------|------------------|------------------|
| <b>DRIVE CURRENT OUTPUT</b>                   |                  |                  |                  |
| Output Current Range:                         | 0–50mA           | 0–100mA          | 0–200mA          |
| Setpoint                                      |                  |                  |                  |
| Resolution:                                   | 1µA              | 2µA              | 4µA              |
| Accuracy:                                     | ±0.05% of FS     | ±0.05% of FS     | ±0.05% of FS     |
| Compliance Voltage:                           | 0–10V adjustable | 0–10V adjustable | 0–10V adjustable |
| Temperature Coefficient:                      | <50ppm/°C        | <50ppm/°C        | <50ppm/°C        |
| Short-Term Stability (one-hour): <sup>2</sup> | <20ppm           | <20ppm           | <20ppm           |
| Long-Term Stability (24-hour): <sup>3</sup>   | <40ppm           | <40ppm           | <40ppm           |
| Noise and Ripple (rms) <sup>4</sup>           |                  |                  |                  |
| High Bandwidth Mode (rms):                    | <1.5µA           | <1.5µA           | <4µA             |
| Low Bandwidth Mode (rms):                     | <1.5µA           | <1.5µA           | <2µA             |
| Transients                                    |                  |                  |                  |
| Operational: <sup>5</sup>                     | <2mA             | <2mA             | <3mA             |
| 1 kV EFT:                                     | <5mA             | <5mA             | <8mA             |
| Surge: <sup>6</sup>                           | <8mA             | <8mA             | <12mA            |

## COMPLIANCE VOLTAGE ADJUST

|             |       |       |       |       |       |       |
|-------------|-------|-------|-------|-------|-------|-------|
| Range:      | 0–10V | 0–10V | 0–10V | 0–10V | 0–10V | 0–10V |
| Resolution: | 50mV  | 50mV  | 50mV  | 50mV  | 50mV  | 50mV  |
| Accuracy:   | ±2.5% | ±2.5% | ±2.5% | ±2.5% | ±2.5% | ±2.5% |

## DRIVE CURRENT LIMIT SETTINGS

|             |          |         |         |         |          |          |
|-------------|----------|---------|---------|---------|----------|----------|
| Range:      | 1–50.5mA | 1–101mA | 1–202mA | 1–505mA | 1–2020mA | 1–4040mA |
| Resolution: | 0.25mA   | 0.5mA   | 1mA     | 2.5mA   | 10mA     | 20mA     |
| Accuracy:   | ±0.5mA   | ±1mA    | ±2mA    | ±5mA    | ±20mA    | ±40mA    |

## PHOTODIODE FEEDBACK

|                                |                 |                 |                 |                 |                 |                 |
|--------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Type:                          | Differential    | Differential    | Differential    | Differential    | Differential    | Differential    |
| Photodiode Reverse Bias:       | 0–5V adjustable | 0–5V adjustable | 0–5V adjustable | 0–5V adjustable | 0–5V adjustable | 0–5V adjustable |
| Photodiode Current Range:      | 5 to 5000µA     | 5 to 5000µA     | 5–5000µA        | 5–5000µA        | 5–10,000µA      | 5–10,000µA      |
| Output Stability: <sup>7</sup> | 0.02%           | 0.02%           | 0.02%           | 0.02%           | 0.02%           | 0.02%           |
| Setpoint Accuracy:             | ±0.05% of FS    | ±0.05% of FS    | ±0.05% of FS    | ±0.05% of FS    | ±0.05% of FS    | ±0.05% of FS    |

## EXTERNAL ANALOG MODULATION

|                              |             |             |             |             |              |              |
|------------------------------|-------------|-------------|-------------|-------------|--------------|--------------|
| Input:                       | 0–10V, 1 kΩ | 0–10V, 1 kΩ | 0–10V, 1 kΩ | 0–10V, 1 kΩ | 0–10V, 1 kΩ  | 0–10V, 1 kΩ  |
| Transfer Function:           | 5mA/V       | 10mA/V      | 20mA/V      | 50mA/V      | 200mA/V      | 400mA/V      |
| Bandwidth (3dB) <sup>8</sup> |             |             |             |             |              |              |
| High Bandwidth:              | DC to 1MHz  | DC to 1MHz  | DC to 1MHz  | DC to 1MHz  | DC to 250kHz | DC to 250kHz |
| Low Bandwidth:               | DC to 15kHz | DC to 15kHz | DC to 15kHz | DC to 15kHz | DC to 10kHz  | DC to 10kHz  |

## TRIGGER OUTPUT

|              |      |      |      |      |      |      |
|--------------|------|------|------|------|------|------|
| Type:        | TTL  | TTL  | TTL  | TTL  | TTL  | TTL  |
| Pulse Width: | 13µs | 13µs | 13µs | 13µs | 13µs | 13µs |
| Delay:       | 12ms | 12ms | 12ms | 12ms | 12ms | 12ms |

## MEASUREMENT (DISPLAY)

|                         |                   |                   |                   |                   |                   |                   |
|-------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Output Current          |                   |                   |                   |                   |                   |                   |
| Range:                  | 0–50.000mA        | 0–100.00mA        | 0–200.00mA        | 0–500.00mA        | 0–2000.0mA        | 0–4000.0mA        |
| Resolution:             | 0.001mA           | 0.002mA           | 0.01mA            | 0.01mA            | 0.1mA             | 0.1mA             |
| Accuracy:               | ±0.05% FS         | ±0.05% FS         | ±0.05% FS         | ±0.05% FS         | ±0.1% FS          | ±0.1% FS          |
| Photodiode Current      |                   |                   |                   |                   |                   |                   |
| Range:                  | 0–5000µA          | 0–5000µA          | 0–5000µA          | 0–5000µA          | 0–10,000µA        | 0–10,000µA        |
| Resolution:             | 1µA               | 1µA               | 1µA               | 1µA               | 1µA               | 1µA               |
| Accuracy:               | ±2µA              | ±2µA              | ±2µA              | ±2µA              | ±4µA              | ±4µA              |
| Photodiode Responsivity |                   |                   |                   |                   |                   |                   |
| Range: <sup>9</sup>     | 0.00–1000.00µA/mW | 0.00–1000.00µA/mW | 0.00–1000.00µA/mW | 0.00–1000.00µA/mW | 0.00–1000.00µA/mW | 0.00–1000.00µA/mW |
| Resolution:             | 0.01µA/mW         | 0.01µA/mW         | 0.01µA/mW         | 0.01µA/mW         | 0.01µA/mW         | 0.01µA/mW         |
| Optical Power           |                   |                   |                   |                   |                   |                   |
| Range:                  | 0.00–101.00mW     | 0.00–101.00mW     | 0.00–505.00mW     | 0.00–505.00mW     | 0.00–5050.0mW     | 0.00–5050.0mW     |
| Resolution:             | 0.01mW            | 0.01mW            | 0.01mW            | 0.01mW            | 0.1mW             | 0.1mW             |
| Forward Voltage         |                   |                   |                   |                   |                   |                   |
| Range:                  | 0.000–10.000V     | 0.000–10.000V     | 0.000–10.000V     | 0.000–10.000V     | 0.000–10.000V     | 0.000–10.000V     |
| Resolution:             | 1mV               | 1mV               | 1mV               | 1mV               | 1mV               | 1mV               |
| Accuracy: <sup>10</sup> | ±2mV              | ±2mV              | ±2mV              | ±2mV              | ±2mV              | ±2mV              |

## CURRENT SOURCE NOTES

- All values after a one-hour warm-up period at room temperature, 25°C.
- Over any one-hour period, half-scale output.
- Over any 24-hour period, half-scale output.
- Measured optically, evaluating noise intensity of a laser diode into a photodetector with 150kHz bandwidth.
- Maximum output current transient resulting from normal operational situations (e.g., power on-off, current on-off), as well as accidental situations (e.g., power line plug removal).
- Maximum output current transient resulting from a 1000V power-line transient spike. Tested to ILX Lightwave Technical Standard #LDC-00196.
- Maximum monitor photodiode current drift over any 30 minute period. Assumes zero drift in responsivity of photodiode.
- 50% modulation at mid-scale output. Higher bandwidth is possible with smaller modulation signal.
- Responsivity value is user-defined and is used to calculate the optical power.
- Four-wire voltage measurement. Voltage measurement accuracy while driving calibration load. Accuracy is dependent upon load used and length of cable.

# LDC 3700B Series

## Laser Diode Controllers

# LDC 3700B Series

## Laser Diode Controllers

### Specifications<sup>1</sup>

#### TEMPERATURE CONTROL

| MODEL NUMBER                                  | ALL MODELS         |                       |
|---|--------------------|-----------------------|
| Temperature Control Range: <sup>2</sup>       | -100°C to 199°C    |                       |
| Thermistor Setpoint:                          | -100°C to 199°C    |                       |
| Resolution and Accuracy                       | Resolution         | Accuracy <sup>3</sup> |
| -20°C to 20°C:                                | 0.1°C              | ±0.2°C                |
| 20°C to 50°C:                                 | 0.2°C              | ±0.2°C                |
| AD590 & LM335 Setpoint <sup>4</sup>           |                    |                       |
| -20°C to 50°C:                                | 0.01°C             | ±0.1°C                |
| Short-Term Stability (one-hour): <sup>5</sup> | ±0.004°C or better |                       |
| Long-Term Stability (24-hours): <sup>6</sup>  | ±0.01°C            |                       |

#### TEC OUTPUT<sup>7</sup>

|  |                                  |
|--|----------------------------------|
| Output Type:                           | Bipolar, constant current source |
| Compliance Voltage:                    | >8V DC                           |
| Maximum Output Current:                | 4.0A                             |
| Maximum Output Power:                  | 32W                              |
| Current Noise and Ripple: <sup>8</sup> | <1mA rms                         |
| Current Limit                          |                                  |
| Range:                                 | 0-4A                             |
| Setpoint Accuracy:                     | ±50mA                            |
| Control Algorithm:                     | Smart Integrator, Hybrid PI      |

#### TEMPERATURE SENSOR

|                             |  |
|-----------------------------|--|
| Types                       |  |
| Thermistor:                 | 2-wire NTC                                       |
| IC Temperature Sensor:      | AD590/LM335                                      |
| RTD Sensor: <sup>9</sup>    | Pt 100/Other 100Ω RTD                            |
| Thermistor Sensing Current: | 10/100μA   |
| Sensor Bias:                | AD590=8V,<br>LM335=1mA<br>RTD=0.8mA <sup>9</sup> |

#### TEMPERATURE CONTROL NOTES

- All values relate to a one-hour warm-up period.
- Software limits of range. Actual range possible depends on the physical load, thermistor type, and TE module used.
- Accuracy figures are quoted for a typical 10kΩ thermistor and 100μA current setting. Accuracy figures are relative to the calibration standard. Both resolution and accuracy are dependent upon the user-defined configuration of the instrument.
- Accuracy depends upon the sensor model selected, the calibration standard, and the user-defined configuration of the instrument.
- Over any one-hour period, half-scale output, controlling an LDM-4412 mount at 25°C, with 10kΩ thermistor, on 100μA setting.
- Over any 24-hour period, half-scale output, controlling an LDM-4412 mount at 25°C, with 10kΩ thermistor, on 100μA setting.
- Into a 1Ω load.

In keeping with our commitment to continuing improvement, ILX Lightwave reserves the right to change specifications without notice and without liability for such changes.

|                                     |  |
|-------------------------------------|--|
| Usable Thermistor Range:            | 25-450,000Ω  |
| Typical Sensor Output <sup>10</sup> |  |
| AD590 Current Output:               | I(25°C)=298.2μA,<br>I=1μA/K                            |
| LM335 Voltage Output:               | V(25°C)=2.73V,<br>V=10mV/K                             |
| RTD (Pt100) Resistance:             | R(25°C)=109.73Ω  |
| User Calibration:                   | Thermistor=Steinhart-Hart<br>IC Sensors, RTD=Two-point |

#### TEC MEASUREMENT (DISPLAY)

|                               | Range <sup>11</sup> | Resolution | Accuracy |
|-------------------------------|---------------------|------------|----------|
| Temperature:                  |                     |            |          |
| 10 μA Setting: <sup>12</sup>  | -100.0°C to 199.9°C | 0.01°C     | ±0.1°C   |
| 100 μA Setting: <sup>13</sup> | -100.0°C to 199.9°C | 0.01°C     | ±0.05°C  |
| Thermistor Resistance         |                     |            |          |
| 10 μA Setting:                | 0.00 to 450.00kΩ    | 0.01kΩ     | ±0.05%   |
| 100 μA Setting:               | 0.000 to 45.000kΩ   | 0.001kΩ    | ±0.05%   |
| TE Current:                   | -4.000 to 4.000A    | 0.001A     | ±0.04A   |

#### TEC VOLTAGE MEASUREMENT<sup>14</sup>

|                     |                     |
|---------------------|---------------------|
| Voltage Range:      | -10.0 to 10.0V      |
| Voltage Resolution: | 1mV                 |
| Voltage Accuracy:   | ±30mV <sup>15</sup> |

- Measured at 1A over bandwidth of 10Hz to 10MHz
- When ordered with TSC599 RTD Temperature Sensor Converter.
- Nominal temperature coefficients, I<sub>t</sub> and V<sub>t</sub>, apply over the rated temperature sensor range.
- Software limits of display range.
- Using a 100kΩ thermistor controlling an LDM-4412 mount over -30°C to 25°C.
- Using a 10kΩ thermistor, controlling an LDM-4412 mount over 0°C to 90°C.
- Voltage measurement is available only through the GPIB interface.
- Voltage measurement accuracy while driving calibration load. Accuracy is dependent upon load use.

 **ILX Lightwave**  
Laser Diode Instrumentation & Test Systems

P.O. Box 6310, Bozeman, MT 59771 • Fax:(406)586-9405

[www.ilxlightwave.com](http://www.ilxlightwave.com)

For information call

**1-800-459-9459**

International Inquiries: 406-556-2481  
email: sales@ilxlightwave.com



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