Model 5000

# Advanced Laser Diode Drivers

## Key Features

- *Low noise, highly stable 500 mA, 3 A, and 6 A outputs*
- *Unsurpassed 16-bit resolution and accuracy*
- *Complete laser diode characterization (L,V,I)*
- *Programmable photodiode responsivity displays power in Watts*
- *Internal function generator programmable from 200 Hz–300 kHz*
- *External modulation in both constant current (ACC) and constant power (APC) modes*
- *LOCKOUT dial button disables control knob*
- *Complete laser diode protection features built in to every unit*
- *Standard IEEE-488 and RS-232C interfaces with LabVIEW drivers included*

The **5000 Series Laser Diode Drivers** are advanced current sources based on the technology found in our 6000 and 8000 Series products. Full 16-bit control and characterization of your laser diodes is attainable via the IEEE-488 or RS-232C interfaces. LabVIEW drivers are included with the computer interfaces as a standard feature on all 5000 Series units.

All pertinent laser diode parameters $I_o$, $I_m$ or $P_o$, and $V_f$ are simultaneously presented on the two line alphanumeric LCD display. Power in Watts is displayed when the responsivity of the monitor photodiode is programmed into the unit.

Incorrect settings are prevented during the setup mode to protect the laser diode. When power is turned off all program settings are saved. In addition, several different setups can be saved and recalled to facilitate multiple control and test requirements.

During operation the front panel inputs can be disabled by pushing the Lockout dial button located below the control knob. This prevents any inadvertent changes in the output by accidental movement of the control knob.

An internal function generator is included that is programmable from 200 Hz–300 kHz in either a sinewave or squarewave output. This provides a convenient means to generate datacom and telecom test tones for system evaluation.

External analog modulation is also included allowing you to modulate the output current using other waveforms and frequencies. Modulation is available in both the constant current (ACC) and constant power (APC) modes.

Complete laser diode protection is provided including transient detection and filtering, intermittent contact protection, independent current limit and power limit settings, multiple output shorting circuits, and a slow turn on sequence. In addition, our shielded cables protect against radiated energy from outside equipment resulting in the lowest noise output to the laser diode.

# Specifications

| | 5005 | 5030 | 5060 |
|---|---|---|---|
| **Laser Output** | | | |
| Output Current Range (mA) | 0–500 | 0–3000 | 0–6000 |
| Output Current Resolution (mA) | 0.0076 | 0.0458 | 0.0916 |
| Output Current Accuracy[1] | ±(0.03% + 15 µA) | ±(0.03% + 90 µA) | ±(0.03% + 180 µA) |
| Compliance Voltage (V) | 7 | 5 | 5 |
| Temperature Coefficient (ppm FS/°C) | | <50 | |
| Short-Term Stability (1 h) (ppm FS) | | <10 | |
| Long-Term Stability (24 h) (ppm FS) | | <50 | |
| Noise/Ripple (rms) (µA)[2] | | | |
| Hi BW | <8.0 | <15 | <25 |
| Lo BW | <4.0 | <10 | <20 |
| **Current Limit** | | | |
| Range (mA) | 0–500 | 0–3000 | 0–6000 |
| Resolution (mA) | | 1 | |
| Accuracy (mA) | ±2 | ±4 | ±6 |
| **Internal Function Generator** | | | |
| Waveforms | | Sinewave, Squarewave | |
| Frequency Range[3] | | 200 Hz–300 kHz | |
| Squarewave Duty Cycle | | 50 ±5% | |
| Independent Output Set Points | | $I_{max}$, $I_{min}$ | |
| **Analog Modulation** | | | |
| Input Range, Input Impedance | | 0–10 V, 10 kΩ | |
| Transfer Function (mA/V) | 50 | 300 | 600 |
| Bandwidth (3dB ±10%), Hi (APC mode only) (kHz) | DC to 350 | DC to 100 | DC to 100 |
| Bandwidth (3dB ±10%), Lo (APC mode) (kHz) | | DC to 10 | |
| Bandwidth (3dB ±10%) (APC mode) (Hz) | | DC to 20 | |
| **Photodiode Input** | | | |
| Monitor Current Range (mA) | 0–5 | 0–20 | 0–20 |
| Monitor Current Stability (24 h) | | ±0.02% FS | |
| Monitor Current Accuracy[1] | ±(0.004% + 0.5 µA) | ±(0.004% + 1 µA) | ±(0.004% + 1 µA) |
| Temperature Coefficient | | <0.02% FS/°C | |
| Photodiode Reverse Bias | | 0–5 V ±10% | |
| **Measurement Display** | | | |
| Output Current Range (mA) | 0–500.00 | 0–3000.0 | 0–6000.0 |
| Output Current Resolution (mA) | 0.01 | 0.1 | 0.1 |
| Output Current Accuracy[1] | | ±(0.02% + 20 µA) | |
| Forward Voltage Range (V) | 0.000–7.000 | 0.000–5.000 | 0.000–5.000 |
| Forward Voltage Resolution (mV)[4] | | 10 | |
| Forward Voltage Accuracy[1] | | ±(0.005% + 1 mV) | |
| Photodiode Current Range (µA) | 5–5,000 | 15–20,000 | 15–20,000 |
| Photodiode Current Resolution (µA) | | 0.1 | |
| Photodiode Current Accuracy[1] | ±(0.01% + 0.5 µA) | ±(0.01% + 1 µA) | ±(0.01% + 1 µA) |
| PD Response Range (µA/mW) | | 0.00–600.00 | |
| PD Response Resolution (µA/mW) | | 0.01 | |
| Optical Power Range (mW) | 0.00–500.00 | 0.00–3000.0 | 0.00–6000.0 |
| Optical Power Resolution (mW) | | 0.01 | |

1) ± (x% reading + Fixed Error)
2) True rms, 3 Hz–300 kHz, 1/2 FS scale, resistive load
3) Output current may begin to roll-off at higher frequencies
4) Resolution is display limited to 10 mV. GPIB/RS-232 has full resolution.

# Specifications

| | |
|---|---|
| **LCD Display** | |
| Display Type | 2-line by 20 character alphanumerical |
| Display Backlighting | Green LED |
| Display Controls | Brightness, contrast |
| Laser Diode On Indicator | Green LED indicates laser diode is on |
| Power Requirements | 90–132, 198–250 VAC, 50–60 Hz |
| Chassis Ground | 4 mm banana jack |
| Size (H x W x D) [in. (mm)] | 3.5 (88) x 8.5 (215) x 12 (305) |
| Mainframe Weight [lb (kg)] | 6.5 (2.9) |
| Operating Temperature | 0°C to 40°C <70% relative humidity non-condensing) |
| Storage Temperature | -20°C to + 60°C <90% relative humidity non-condensing |
| Laser Safety Features | Output On/Off keyswitch, interlock, output delay (meets CDRH US21 CFR 1040.10) |
| **Connectors** | |
| GPIB | 24-pin IEEE-488 |
| RS-232C | 9-pin male D-sub |
| Output Connectors Interlock/Photodiode | 9-pin female D-sub |
| Output Connectors External Photodiode | BNC |
| Output Connectors Modulation | BNC |

## Related Products

*Newport 5000 Series Drivers are complemented in performance and value by our Model 3040 Temperature Controllers and our complete line of Temperature Controlled Mounts and Telecom Mounts for laser diodes.*

*Model 5005 Rear Panel*

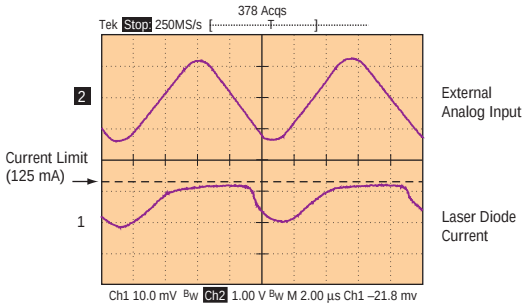
# Ordering Information

| Model | Description |
|---|---|
| 5005 | Laser Diode Driver (500 mA) |
| 5030 | Laser Diode Driver (3.0 A) |
| 5060 | Laser Diode Driver (6.0 A) |

# Accessories

| Model | Description |
|---|---|
| 500-02[1] | Laser Diode Driver Cable |
| 500-04[1] | LDD/Mount Cable |
| 35-RACK | Rack Mount Kit |

1) Please see page 64 for cable diagrams.




*Limit circuitry unconditionally prevents laser diode current from exceeding limiting setting independent of operating mode even during external analog modulation.*