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LDC-3700 SERIES CONTROLLER SPECIFICATIONS

Laser Current Source Specifications

Model Number	LDC-3714		LDC-3724		LDC-3744	
DRIVE CURRENT OUTPUT[1]						
Output Current Range:	0 to 50 mA	0 to 100 mA	0 to 200 mA	0 to 500 mA	0 to 2000 mA	0 to 4000 mA
Set-Point Resolution:	1 uA	2 uA	4 uA	10 uA	40 uA	80 uA
Set-Point Accuracy (% of FS):	±0..05%	±0.05 %	±0.05 %	±0.05 %	±0.1 %	±0.1 %
Compliance Voltage:	7V	7 V	6.5 V	6.5 V	5 V	5 V
Temperature Coefficient:	<50 ppm/°C	<50 ppm/°C	<50 ppm/°C	<50 ppm/°C	<100 ppm/°C	<100 ppm/°C
Short-Term Stability (1 hr.)[2]:	<20 ppm	<20 ppm	<20 ppm	<20 ppm	<20 ppm	<20 ppm
Long-Term Stability (24 hr.)[3]:	<40 ppm	<40 ppm	<40 ppm	<40 ppm	<40 ppm	<40 ppm
Noise and Ripple (µA rms)[4]						
High Bandwidth Mode:	<2 µA	<2 µA	<4 µA	<4 µA	<10 µA	<15 µA
Low Bandwidth Mode:	<1 µA	<1 µA	<2 µA	<2 µA	<5 µA	<5 µA
Transients						
Operational[5]:	<2 mA	<2 mA	<2 mA	<2 mA	<4 mA	<4 mA
1kV EFT/Surge[6]:	<5 mA/< 8 ma	<5 mA/< 8 ma	<8 mA/< 8 ma	<8 mA/< 8 ma	<10 mA/< 8 ma	<10 mA/< 8 ma
DRIVE CURRENT LIMIT SETTINGS						
Range:	0 to 50.5 mA	0 to 101 mA	0 to 202 mA	0 to 505 mA	0 to 2020 mA	0 to 4040 mA
Resolution:	0.25 mA	0.5 mA	1 mA	2.5 mA	10 mA	20 mA
Accuracy:	±0.5 mA	±1 mA	±2 mA	±5 mA	±20 mA	±40 mA
PHOTODIODE FEEDBACK						
Type:	Differential	Differential	Differential	Differential	Differential	Differential
PD Reverse Bias :	0 - 5V, adjustable	0 - 5V, adjustable	0 - 5V, adjustable	0 - 5V, adjustable	0 - 5V, adjustable	0 - 5V, adjustable
PD Current Range :	5 to 5000 uA	5 to 5000 uA	5 to 5000 uA	5 to 5000 uA	5 to 10000 uA	5 to 10000 uA
Output Stability[7]:	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
Accuracy, setpoint (% of FS):	±0.1%	±0.1%	±0.1%	±0.1%	±0.1%	±0.1%
EXTERNAL ANALOG MODULATION						
Input:	0-10V, 10kohm	0-10V, 10kohm	0-10V, 10kohm	0-10V, 10kohm	0-10V, 10kohm	0-10V, 10kohm
Transfer Function:	5 mA/V	10 mA/V	20 mA/V	50 mA/V	200 mA/V	400 mA/V
Bandwidth (3dB)						
High Bandwidth[8]	DC to 750 kHz	DC to 300 kHz	DC to 500 kHz	DC to 200 kHz	DC to 250 kHz	DC to 100 kHz
Low Bandwidth:	DC to 20kHz	DC to 10kHz	DC to 10kHz	DC to 4kHz	DC to 5 kHz	DC to 5kHz
TRIGGER OUTPUT						
Type:	TTL					
Pulse Width:	10 uS					
Rise Time:	x					
Delay	12 mS					
MEASUREMENT (DISPLAY)[9]						
Output Current Range:	0 to 50.000 mA	0 to 100.00 mA	0 to 200.00 mA	0 to 500.00 mA	0 to 2000.0 mA	0 to 4000.0 mA
Output Current Resolution:	0.001 mA	0.002 mA	0.01 mA	0.01 mA	0.1 mA	0.1 mA
Output Current Accuracy:	± 0.05% FS	± 0.05% FS	± 0.05% FS	± 0.05% FS	± 0.1% FS	± 0.1% FS
Photodiode Current Range:	0 to 5,000 µA	0 to 5,000 µA	0 to 5,000 µA	0 to 5,000 µA	0 to 10,000 µA	0 to 10,000 µA
Photodiode Current Resolution(uA):	1 µA	1 µA	1 µA	1 µA	1 µA	1 µA
Photodiode Current Accuracy:	± 2 µA	± 2 µA	± 2 µA	± 2 µA	± 4 µA	± 4 µA
PD Responsivity Range(uA/mW)[10]	0.00 to 1000.00	0.00 to 1000.00	0.00 to 1000.00	0.00 to 1000.00	0.00 to 1000.00	0.00 to 1000.00
PD Responsivity Resolution(uA/mW):	0.01	0.01	0.01	0.01	0.01	0.01
Optical Power Range(mW):	0.00 to 50.00	0.00 to 100.00	0.00 to 200.00	0.00 to 500.00	0.00 to 5000.0	0.00 to 5000.0
Optical Power Resolution(uW):	0.01	0.01	0.01	0. 1	0.1	0.1
Forward Voltage Range:	0.000 to 7.000	0.000 to 7.000	0.000 to 7.000	0.000 to 7.000	0.000 to 5.000	0.000 to 5.000
Forward Voltage Resolution:	1 mV	1 mV	1 mV	1 mV	1 mV	1 mV
Forward Voltage Accuracy[11]:	± 2 mV	± 2 mV	± 2 mV	± 2 mV	± 2 mV	± 2 mV

1 All values relate to a one-hour warm-up period at room temperature, 25 °C.
2 Over any 1-hour period, half-scale output.
3 Over any 24-hour period, half-scale output.
4 Measured optically from resulting intensity noise of a laser diode, with a 150 Khz BW detector.
5 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)
6 Into a one ohm load.
7 Maximum monitor photodiode current drift over any 30 minute period. Assumes zero drift in responsivity of photodiode.
8 50% modulation at mid-scale output.
9 Displayed on LDC-37X4 mainframe front panel "LASER" section
10 Responsivity value is user-defined and is used to calculate the optical power.
11 Voltage measurement accuracy while driving calibration load. Accuracy is dependent upon load used.

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Temperature Controller Specifications[1]

Temperature Control

Temperature Control Range[2]	-99 °C to +199 °C -20 °C to +70 °C with typical 10K thermistor	
Thermistor Set Point Resolution and Accuracy[3]		
Temperature	Resolution	Accuracy
-20 °C to +20 °C	±0.1 °C	±0.2 °C
+20 °C - +50 °C	±0.2 °C	±0.2 °C
LM335 and AD590 Set Point and Resolution Accuracy[4]		
-20 to +50°C	±0.1 °C	±0.1 °C
Short Term Stability (1 hour)[5]	±0.004 °C or better	
Long Term Stability (24 hour)[6]	±0.01 °C or better	

Temperature Sensor

Sensor Type	
Thermistor:	NTC 2-wire
IC Temperature Sensor	AD590 current type; LM335 voltage type
Usable Thermistor Range	25 Ω to 450 kΩ, typ.
LM335 Sensor	
Voltage Output[7]	V(25 °C) = 2980 mV; V_T = 10 mV/°K
Bias	1 mA
AD590 Current	
Current Output[7]	I(25 °C) = 298.2 µA; I_T = 1 µA/°K
Bias	+8 VDC
Thermistor Sensing Current	10 µA or 100 µA (user selectable)
Temperature Calculation Methods	AD590 or LM335 calibrated with two-point method. Thermistors are calibrated by storing three constants of the Steinhart-Hart equation in internal non-volatile memory.
Thermistor:	$1/T = (C1 * 10^{-3}) + (C2 * 10^{-4})(\ln R) + (C3 * 10^{-7})(\ln R)^3$ (T in Kelvin)
LM335:	T = C1 + C2 * (V / (10 mV/°K) - 273.15)
AD590:	T = C1 + C2 * (I / (1 µA/°K) - 273.15

TEC Output

Output Type	Bipolar constant current source
Compliance Voltage	4 Volts at 4 Amps
Short Circuit Output Current	4 Amps
Output Current Accuracy	± 0.040A
Maximum Output Power	16 Watts typical
Current Limit Control Range	0 - 4A
Current Limit Accuracy	±0.050
Ripple / Noise[8]	< 1 mA rms

TEC Display(Measurement)[9]

TE Current Range	4.000 A
Temperature Range[10]	-99.9 °C to 199.9 °C
Current Resolution	0.001 Amps
Current Display Accuracy	±0.040 Amps
Temperature Resolution	0.1 °C
Temperature Display Accuracy	±0.2 °C
Thermistor Resistance Resolution:	
10 µA setting	0.01 kΩ
100 µA setting	0.001 kΩ
Thermistor Resistance Accuracy	
10 µA setting	±0.05 kΩ
100 µA setting	±0.005 kΩ

TEMPERATURE CONTROLLER NOTES:

1. All values relate to a one hour warm-up period.
2. Software limits of range. Actual range possible depends on the physical load, and thermistor type and TE module used.
3. Accuracy figures are quoted for a typical 10 kohm thermistor and 10 uA thermistor current setting. Accuracy figures are relative to the calibration standard. Both resolution and accuracy are dependent upon the temperature control loop paramaters, sensor calibration and thermal load.
4. Accuracy depends upon the sensor model selected, the calibration standard, and the temperature control loop paramaters, sensor calibration and thermal load.
5. Over any 1 hour period, half-scale output, controlling an LDM-4412 mount @ 25 °C, with a 10 kohm thermistor and a thermistor current of 100 uA.
6. Over a 24 hour period, half-scale output, controlling an LDM-4412 mount @ 25 °C, with a 10 kohm thermistor and a thermistor current of 100 uA.
7. Nominal temperature coefficients, I_t and V_t, apply over the rated IC temperature sensor range.
8. RMS noise measured into a 1 ohm load at 1A up to 150 Khz
9. Displayed on LDC-37X4 front panel TEC display.
10. Software limits of Display range.

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General LDC-3700 Specifications

Connectors

Photodiode Monitor and Current Source Connectors:	9-pin, D-connector, for LASER output
External Modulation Connector	BNC, instrumentation amplifier input
Temperature Controller:	15-pin D-connector, for TEC output and thermistor input

GPIB INTERFACE

Meets ANSI/IEEE Std 488.1-1987
Meets ANSI/IEEE Std 488.2-1987

General

Size (H x W x D)	5.0" x 13.9" x 13.6", 127 mm x 353 mm x 345 mm
Weight	
LDC-3714	approx 22.5 lbs (10.2 kg)
LDC-3724	approx 22.5 lbs (10.2 kg)
LDC-3744	approx 25 lbs (11.3 kg)
Power Requirements	100 - 115 VAC, 220 - 240 VAC, 48 - 66 Hz
Temperature	0 to +50 °C operating; -40 to +70 °C storage
Humidity	< 90 % relative humidity, non-condensing.
Laser Safety Features:	Keyswitch, interlock and output delay (meets CDRH US21 1040.10)
LASER Display type:	5-digit, green LED
TEC Display type:	5-digit, green LED

AVAILABLE OPTIONS AND ACCESSORIES

Options and accessories available for the LDC-3700 Series Controllers include the following:

DESCRIPTION	MODEL NUMBER
Rack mount flange kit (enables installation into a standard 19 inch wide rack)	**136**
Temperature Controlled Laser Diode Mount	**LDM-4407**
Temperature Controlled Laser Diode Mount (available with collimating assembly)	**LDM-4412**
Dil Laser Diode low cost Mount	**LDM-4982**
Butterfly Laser Diode low cost Mount	**LDM-4894**
High Power Laser Diode Mount	**LDM-4442**
Current Source Interconnect Cable (unterminated)	**301S**
Current Source Interconnect Cable (terminated)	**303S**
TEC Interconnect Cable (unterminated)	**501S**
TEC Interconnect Cable (terminated)	**505S**
Calibrated 10 KΩ Thermistor	**510**
Uncalibrated 10 KΩ Thermistor	**520**
Uncalibrated AD590LH IC Temperature Sensor	**530**
Uncalibrated LM335AH IC Temperature Sensor	**540**
RTD Temperature Sensor Converter	**599**

Other Laser Diode Mounts and Thermistor models are available. Please contact ILX Lightwave for information on additional options for your applications.

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