

# CTL200 - Digital butterfly laser diode controller



Koheron CTL200 is the digital version of the popular [CTL100 analog laser controller](#). It drives up to 200 / 400 / 600 mA laser current with a current noise density of only 230 / 450 / 670 pA/√Hz. The CTL200 fits in a 75 mm x 75 mm square, uses a single 5.9 V supply, and can operate between 0 and 50°C. The CTL200 is conduction-cooled. It comes with an aluminum base plate and a zero insertion force socket for easy mounting. The CTL200 is also available in a [screw terminal version](#).

## Specifications

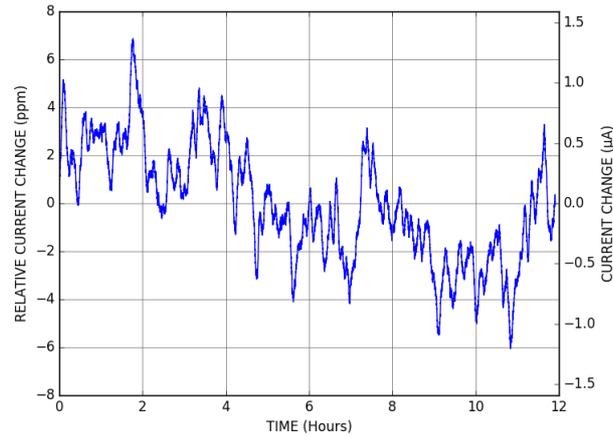
CTL200 laser controller is available for type 1 lasers (CTL200-1-) and type 2 lasers (CTL200-2-).

	B-200 (200 mA)	B-400 (400 mA)	B-600 (600 mA)
<b>Current driver</b>			
Laser current	5 - 225 mA	10 - 450 mA	15 - 675 mA
Laser current resolution	5 $\mu$ A	10 $\mu$ A	15 $\mu$ A
Compliance voltage at max. current	3.0 V	3.0 V	2.9 V
RMS noise (10 Hz - 1 MHz)	220 nA <sub>rms</sub>	430 nA <sub>rms</sub>	650 nA <sub>rms</sub>
Current noise density (1 kHz)	230 pA/ $\sqrt$ Hz	450 pA/ $\sqrt$ Hz	670 pA/ $\sqrt$ Hz
1/f corner noise	100 Hz	100 Hz	100 Hz
Temperature coefficient	35 ppm/ $^{\circ}$ C	35 ppm/ $^{\circ}$ C	35 ppm/ $^{\circ}$ C
Slow start (90 % setpoint)	5000 ms	5000 ms	5000 ms
Modulation gains	250 $\mu$ A/V, 2.5 mA/V, 25 mA/V	500 $\mu$ A/V, 5 mA/V, 50 mA/V	750 $\mu$ A/V, 7.5 mA/V, 75 mA/V
3 dB modulation bandwidth	10 MHz	10 MHz	10 MHz
AC modulation cutoff frequency	80 kHz	80 kHz	80 kHz
<b>TEC controller</b>			
Maximum current	1.15 A	1.15 A	1.15 A
Compliance voltage	$\pm$ 3 V	$\pm$ 3 V	$\pm$ 3 V
Temperature stability	0.002 $^{\circ}$ C/ $^{\circ}$ C	0.002 $^{\circ}$ C/ $^{\circ}$ C	0.002 $^{\circ}$ C/ $^{\circ}$ C
<b>Laser power monitor</b>			
Photodiode current	0 - 2.5 mA	0 - 2.5 mA	0 - 2.5 mA
<b>Other</b>			
Outside Dimensions	75 mm x 85 mm x 27 mm	75 mm x 85 mm x 27 mm	75 mm x 85 mm x 27 mm
Weight	104 g	104 g	104 g
Supply voltage	5.7 V to 6.5 V	5.7 V to 6.5 V	5.7 V to 6.5 V
Operating temperature	0 $^{\circ}$ C - 50 $^{\circ}$ C	0 $^{\circ}$ C - 50 $^{\circ}$ C	0 $^{\circ}$ C - 50 $^{\circ}$ C
Compatible lasers	Floating diodes / anode-grounded	Floating diodes / anode-grounded	Floating diodes / anode-grounded

## Current driver

### Current stability

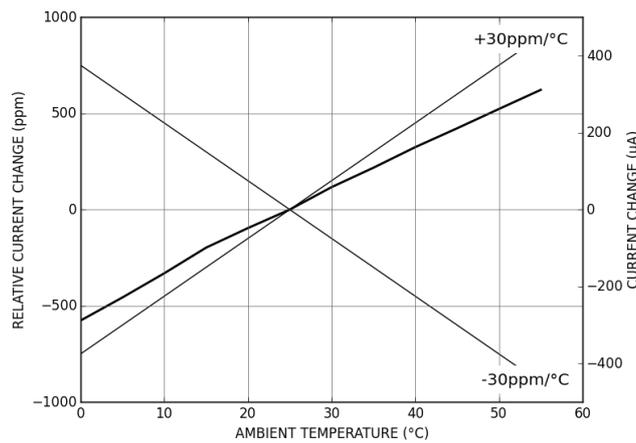
Current stability is depicted in the following figure showing a 12-hour long evolution of current at 25  $^{\circ}$ C ambient temperature. A controller with 200 mA laser current (B-200) set at 200 mA was used for this measurement.



Current is stable within  $\pm 10$  ppm.

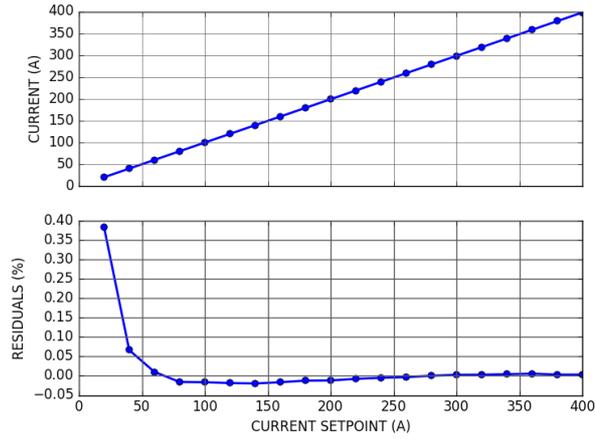
### Temperature coefficient

The figure below shows the current variation of the controller for the 600 mA laser current version (B-600) operated at 550 mA for different ambient temperatures between 0 and 55 °C. The current is measured using a high precision 5  $\Omega$  resistor and a 7.5-digit digital voltmeter. Temperature coefficient is below 30 ppm/°C.



### Current linearity

CTL200 controllers are calibrated at 21 °C by measuring the voltage across a high-precision 5  $\Omega$  resistor with a 7.5-digit digital voltmeter. Here is a typical result for the calibration for the 400 mA laser current version (B-400):



Relative residuals from a linear fit show that linearity is better than 0.1% for currents above 50 mA.

## Modulation

The CTL200 laser diode controller features a DC modulation which controls the current setpoint input with 10 MHz bandwidth. An AC input provides direct laser diode RF modulation for frequencies above 100 kHz.

