

# Ultra-Low Noise Current Controller LQpro-140

## Low Noise Current Controller LQpro-400



TECHNISCHE  
UNIVERSITÄT  
DARMSTADT

Institut für Angewandte Physik

Laser und Quantenoptik

Prof. Dr. Thomas Walther

Schloßgartenstr. 7  
D-64289 Darmstadt

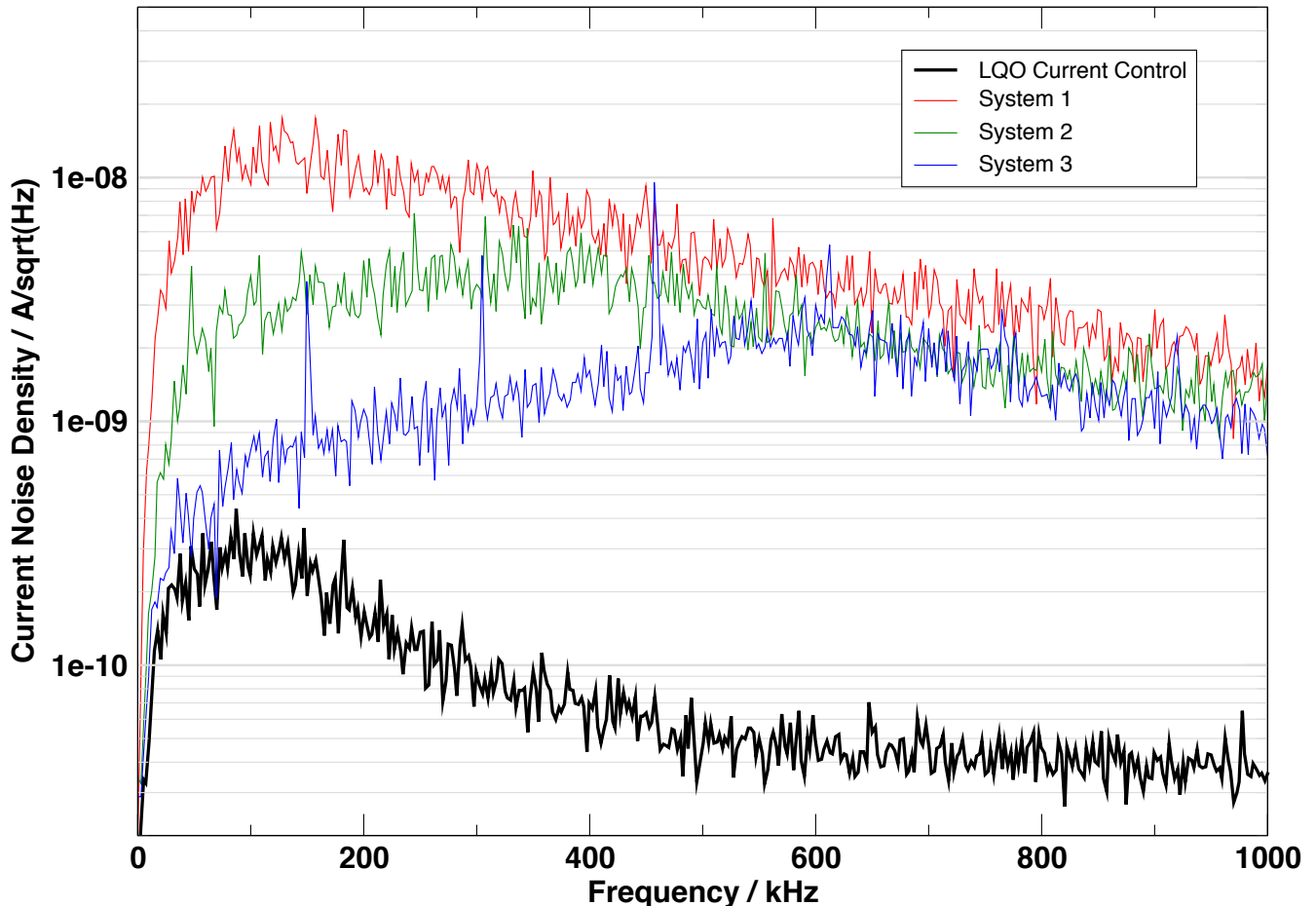
Tel. +49 6151 16 - 20830  
Fax +49 6151 16 - 20834  
thomas.walther@physik.tu-  
darmstadt.de



- Laser diode current controller
- Low noise
- Stable operation
- Modulation capabilities
  - Slow modulation over full scale
  - Simultaneous slow/fast modulation
  - Suitable for Pound-Drever-Hall stabilization
- Four layer board
- SMD technology
- Other currents/voltages upon request
- 19" Rack assembly incl. power supply available

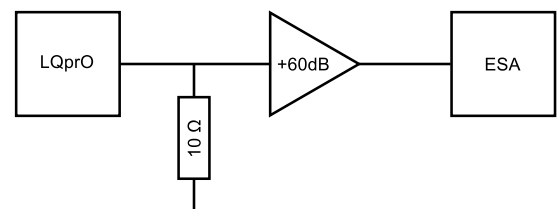
Parameters	Ultra-Low Noise	Low Noise	Units	Remarks
Output Current Range	0 – 140	0 – 400	mA	Other Currents on request
Output Current Resolution	22.4	64	$\mu$ A	
Output Current Accuracy	0.1	0.1	% FS	
Laser Output Compliance Voltage	1.7 – 2.9	1.7 – 2.9	V	Other Voltages on request
Temperature Coefficient	< 25	< 85	ppm FS/°C	
Output Current Short-Term Stability	< 0.9	< 0.9	ppm FS	10 minutes
Output Current Long-Term Stability	< 3.3	< 3.3	ppm FS	1 hour
Output Current RMS Noise	< 21	< 60	nA	10 kHz – 100 kHz
	< 92	< 265	nA	10 kHz – 1 MHz
Output Current Noise density	< 300	< 850	$\text{pA}/\sqrt{\text{Hz}}$	10 kHz – 1 MHz
Current Limit Range	0 – FS	0 – FS	mA	
Current Limit Resolution	70	200	$\mu$ A	
Current Limit Accuracy	0.1	0.1	% FS	
Display Resolution	0.1	1	mA	
External Analog Modulation Input Impedance	1k	1k	Ohm	Slow Mod
	50	50	Ohm	Fast Mod
External Analog Modulation Input Range	-10 – 10	-10 – 10	V	Slow Mod
	-10 – 10	-10 – 10	V	Fast Mod
External Analog Modulation Transfer Function	8 – FS	12 – FS	mA/V	Slow Mod (Adjustable)
	1	1	mA/V	Fast Mod
External Analog Modulation Bandwidth (3 dB)	200	200	kHz	Slow Mod depending on Laser Diode
	up to 150	up to 150	MHz	Fast Mod depending on Laser Diode
Display Type	LCD Backlit	LCD Backlit		

## Noise characteristics of the LQprO-140



Noise characteristics of the LQprO 140 compared to some commercial systems as measured with the setup pictured to the right.

The current sources were setup to drive a resistive load of 10 Ohms at a current of 100 mA. In order to suppress noise from being picked-up by the cables, a CAT7 Cable was used to connect the current sources to the load. The noise was amplified using a high-speed voltage Amplifier (Femto HSA-Y-1-60) with a gain of +60 dB and then measured using an ESA (HP 8951A). A baseline measurement was subtracted from the spectra in order to characterize only the noise of the current source under test.



*Set-up for noise measurements*