HealthyPhoton

Model：QC750-Touch™

Integrated Current & TEC Driver for QCLs with Touchscreen

Date	Note
2018/11/13	V1.0
2020/02/22	V1.1

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1. Introduction

HealthyPhoton introduced a new generation of QCL driver that integrates a newly designed touch screen UI, which greatly facilitates user operations and measurement. The independently developed circuit features extremely low current noise and temperature drift. The all-in-one driver includes a heat sink unit, TEC temperature controller and low noise current drive. It supports external analog signal modulation and displays real-time working status on the touch screen. Considering the high cost of the QCL chip, our specially designed maximum current soft clamping can avoid damage to the laser chip caused by large currents in an unexpected situation. The driver also has a variety of protection mechanisms to maximize the security of the QCL chip. The product is stable, reliable, and suitable for various QCL systems in laboratories or field deployment.

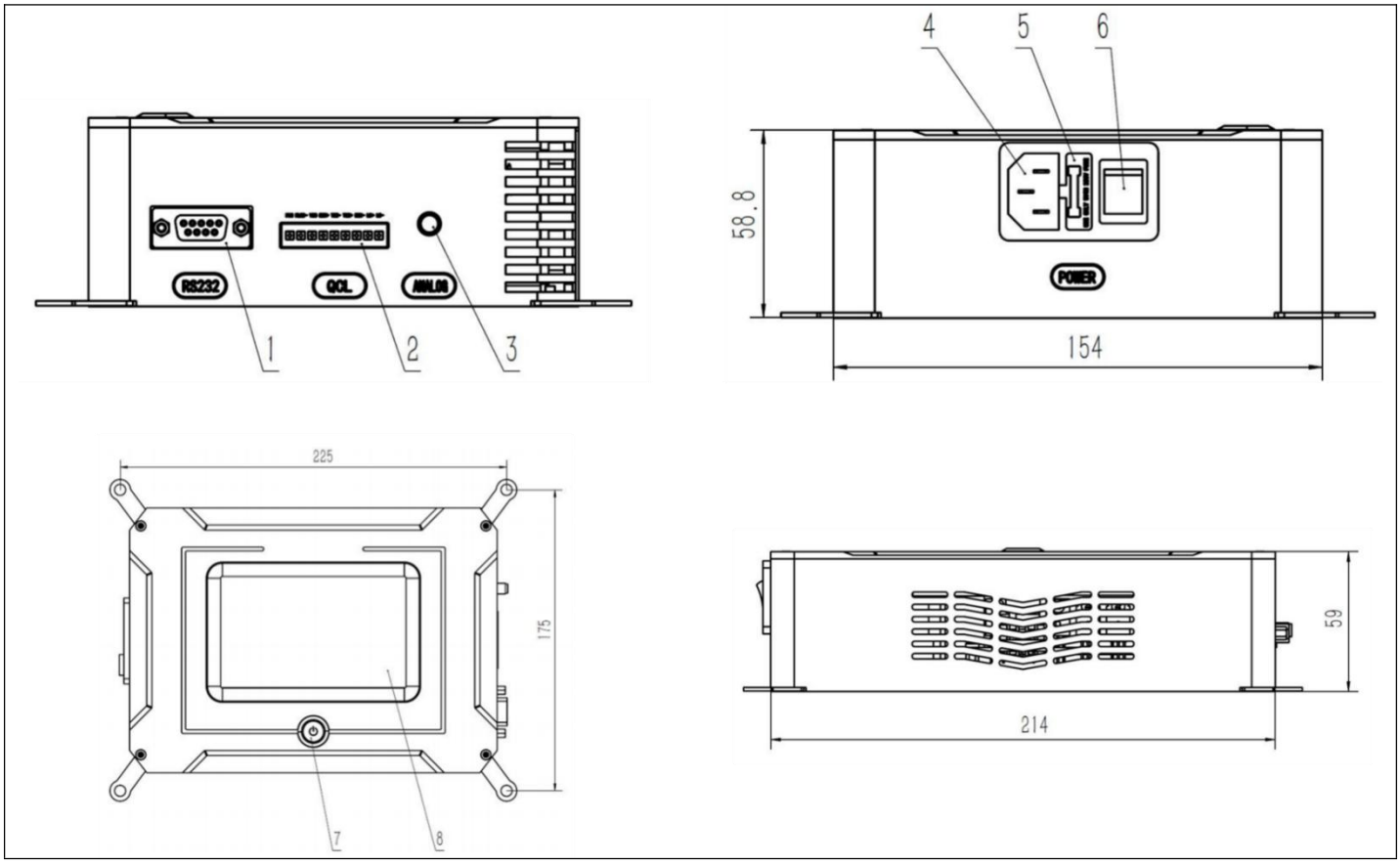
2. Product Description

- All-in-one module includes both current driver and temperature controller;
- Linear output to TEC greatly extends the Peltier device lifetime;
- Output protection mechanisms ensure the safety of QCL chip: adjustable current clamp, output ramp start, overvoltage and undervoltage protection, over-temperature protection and short circuit output protection;
- Maximum current soft clamping avoids damage to the laser chip caused by large currents;
- UI display is convenient for user operation and measurement;
- It is easy to setup and fully compatible with HealthyPhoton's QCL module.

Current Drive	
Driving current	0 - 750mA
Current drift (24hr @25℃)	<1mA
Max bias voltage	>15V
Current noise	<3uA
Analog modulation bandwidth	DC – 1MHz
Slow start time	3-4s
Current noise density (1kHz~100kHz@500mA)	<2 nA/(Hz)$^{1/2}$
TEC temperature controller	
Max TEC driving current	±4A

Max TEC driving voltage	6V
Max thermal power dissipation	48W
Temperature control range (fan cooling)	20 ~ 50℃ (no condensation)
Temperature control accuracy	0.01℃
Temperature control stability	0.01℃
Temperature sensor required	10 kΩ, 20 kΩ NTC thermistors
Analog modulation	
Input resistance	2 kΩ
Modulation coefficient	100mA/V ±1%
3dB bandwidth	DC – 1MHz
Max input voltage	±2.5V
General specifications	
Power supply	220 VAC (176-265 V),60W
Work temperature	10 ~ 40℃
Storage temperature	-10 ~ 85℃
Digital output	RS232
Analog output	9-pin QCL emitter connector (cable included)
HMI interface	LCD touchscreen display and control, alarm, and historical data storage
Dimension (L*W*H)	21.4×15.4×5.9 cm^3
Weight	<2kg

3. Mechanical Dimensions (Unit: mm)

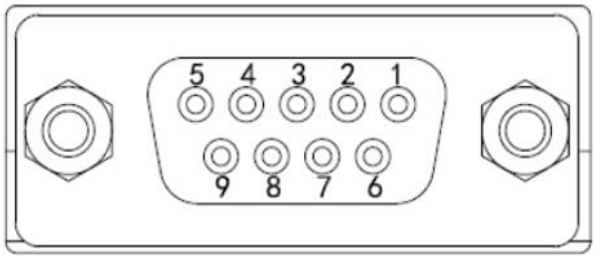


Port descriptions

PORT	NAME	DESCRIPTION
1	RS232	DB–9 female connector for RS-232
2	QCL	9-pin female connector for the QCL
3	ANALOG	Connector
4	Power Connector	
5	Power Fuse	Current rating: 5A
6	Power switch	Note: The red button must be switched to “1” for power supply
7	Drive switch	Note: The indicator light turns blue when the driver is turned on
8	LDC	

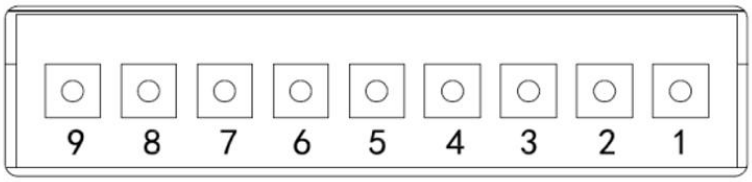
4. PIN Assignments

RS232 pin diagram and specifications



1/4/7/8/9/11	No connection
2	RX_232
3	TX_232
5/6	Signal ground

QCL pin assignments



1	Laser cathode
2	Laser anode
3	Thermistor, 10 kΩ/20 kΩ
4	TEC (+)
5	TEC (-)
6	Thermistor, 10 kΩ/20 kΩ
7	+5V, RedBeam (+)\Fan (+)
8	RedBeam (-)
9	Fan (-)