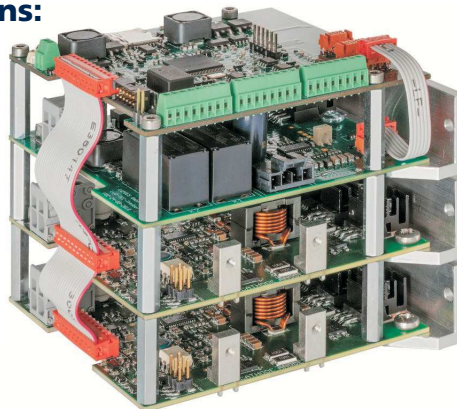


LuOcean Driver Kit with Digital Interface

Features & Functions & Options:

- Full digital control
- Current range up to 28 A
- Pilot on/off & intensity control
- Pulse width down to 100µs
- Duty cycle range 1% to 99%
- Switch for turning off laser diode after error/interlock
- Shut down in case of overheating
- Fan & heat sink for laser/chiller driver



Description:

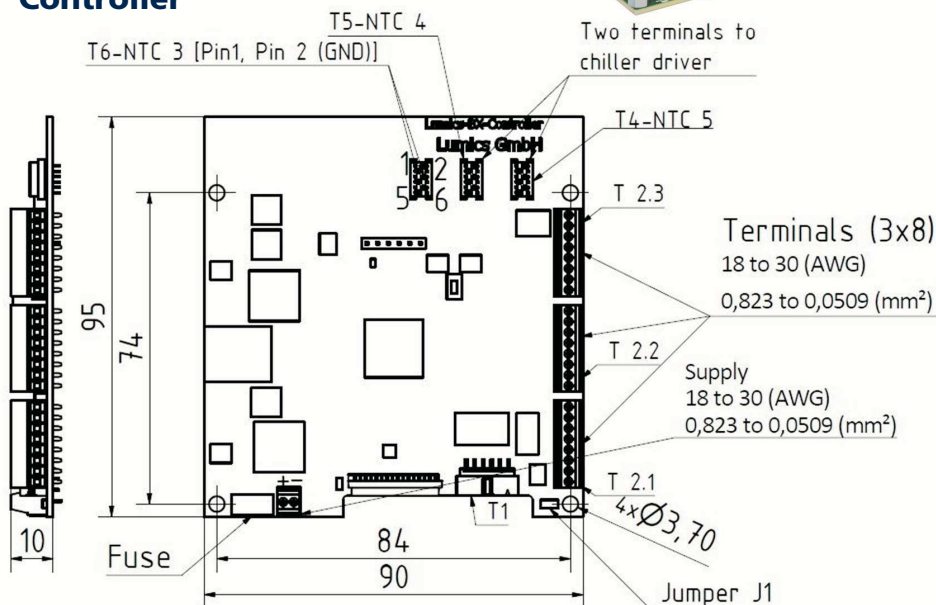
The LuOcean™ driver kit is designed for OEM manufacturers requiring a digital interface to the LuOcean™ diode laser series. It provides current, sensor and temperature control together with the optional chiller unit. The standard RS232 programming interface and build-in protective features provide the opportunity to simplify development and manufacturing.

Benefits:

- Laser short circuit protection
- External interlock signal
- Digital access to all laser module sensors
- Full laser diode protection
- External analog synchronisation
- Synchronizing up to 8 LD and 2 TEC drivers
- Variable configuration

Drawing (Dimension)

Controller

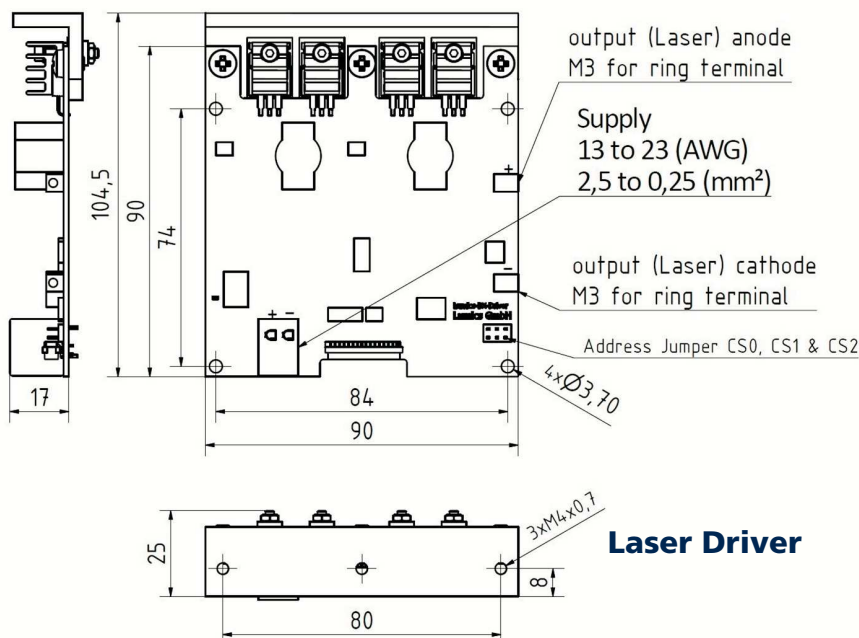


Controller Terminal T1 Description

Pin	Term.	Sensor/Control Function	Terminal
1	T1	Vs = 12 V for Fiber sensor / Monitor diode cathode	
2	T1	Fiber sensor 1 signal - In	
3	T1	GND	
4	T1	Fiber sensor 2 signal - In	
5	T1	Monitor diode signal 1 - In	
6	T1	Pilot laser (3/5) V (50 mA) 8 V / 100 mA - Out	
7	T1	Monitor diode signal 2 - In	
8	T1	GND (Pilot) or humidity sensor or digital bus	
9	T1	GND (NTC)	
10	T1	Pilot intensity control (0-5)V, pilot off =5V	
11	T1	NTC1 - In	
12	T1	NTC2 - In or digital bus	

Controller Terminal T2 Description

Pin	Term.	Sensor/Control Function	Terminal
1	T2.1	RS232-TX signal - OUT	
2	T2.1	RS232-RX signal - In	
3	T2.1	GND RS232 (serial interface common, floating)	
4	T2.1	Interlock signal - In	
5	T2.1	Interlock supply - Out (12V or 24 V)	
6	T2.1	no connection	
7	T2.1	GND	
8	T2.1	Interlock on - LED Out (3.3V)	
1	T2.2	Laser driver 1 on - LED out (3.3V)	
2	T2.2	Laser driver 2 on - LED out (3.3V)	
3	T2.2	Laser driver 3 on - LED out (3.3V)	
4	T2.2	Laser driver 4 on - LED out (3.3V)	
5	T2.2	Laser driver 5 on - LED out (3.3V)	
6	T2.2	Laser driver 6 on - LED out (3.3V)	
7	T2.2	Laser driver 7 on - LED out (3.3V)	
8	T2.2	Laser driver 8 on - LED out (3.3V)	
1	T2.3	GND	
2	T2.3	Pulse Sync In	
3	T2.3	GND	
4	T2.3	Pulse Sync Out	
5	T2.3	GND	
6	T2.3	no connection	
7	T2.3	Fan (GND) laser driver	
8	T2.3	Fan (+) laser driver	



Laser Driver

We manufacture diode lasers.

General Characteristics (ambient condition)

Parameter / Conditions	Symbol	Min	Typ	Max	Unit	LuOcean Diode Laser Application
Diode Laser Driver Output Voltage Range						
Input voltage on DC supply terminal	V _{in}		48		V	M4
Output voltage on laser terminal	V _{out}	14		36	V	
Input voltage on DC supply terminal	V _{in}		36		V	P2
Output voltage on laser terminal	V _{out}	11		27	V	
Input voltage on DC supply terminal	V _{in}		24		V	Mini 8
Output voltage on laser terminal	V _{out}	8		18	V	
Input voltage on DC supply terminal	V _{in}		12		V	Mini 4
Output voltage on laser terminal (1)	V _{out}	1.5		8	V	
General Characteristic Diode Laser Driver						
Output current on laser terminal	I _{out}	0.5		28	A	
Efficiency lower for smaller diode laser currents	h	77		90	%	
Output Current Ripple (10- 600) KHz	I _{rms}		0.1	0.2	A	
Rise Time full current range	t _{rise}		0.1		ms	
Current Overshoot (2)	I _{err}		0	5	%	
Current Accuracy (dc to 5 kHz) (3)	I _{acc}		+2	+5	%	
Pulse width single current driver	P _w	500			µs	
Minimum pulse phase delay between two synchronized pulses	P _w	100			µs	
Pulse duty cycle	P _{dc}	1		99	%	
Laser Power Control Mode of the driver kit						
Laser power control accuracy full operating temperature range (4)	Pop			10	%	Driver Kit Firmware >2.0 and LuOcean series
Controller						
Supply Voltage / Current without fan		12 / <0.8		48 / <0.2	V/A	
Single shot and pulse train with up to 1000 pulses		yes				
Current read back, sample rate				2	ms	
Voltage read back, sample rate				2	ms	
Maximum phase shift per number of synchronized pulses				20	µs	
Maximum phase jitter between synchronized pulses				20	µs	
RS232 Baud rate				9600 or 115200		
RS232 Data Format				8 Data Bit / no parity / 1 Stop Bit		
Fan voltage setting for optional heat sink with fan	V _{fan}		14 or 26		V	
Fan current for optional heat sink with fan	I _{fan}			0.7	A	
Interlock Signal	V _{interlock}	11	12	13	V	
Laser shut down delay after external interlock signal	td _{delay}			200	µs	

Note

- (1) Lower voltage than 4V results in current over shoot of >20%. It is recommended to add Si schottky diodes in series with the laser diode to increase to driving voltage
- (2) Current overshoot is about 40µs long and increases with lower driving voltage.
- (3) Accuracy between 1A and maximum current
- (4) The laser driver provides a power control mode with firmware >2.0 (available in Q4 2019) when a complete driver kit with chiller driver and chiller unit pre-configured for LuOcean series laser module is ordered

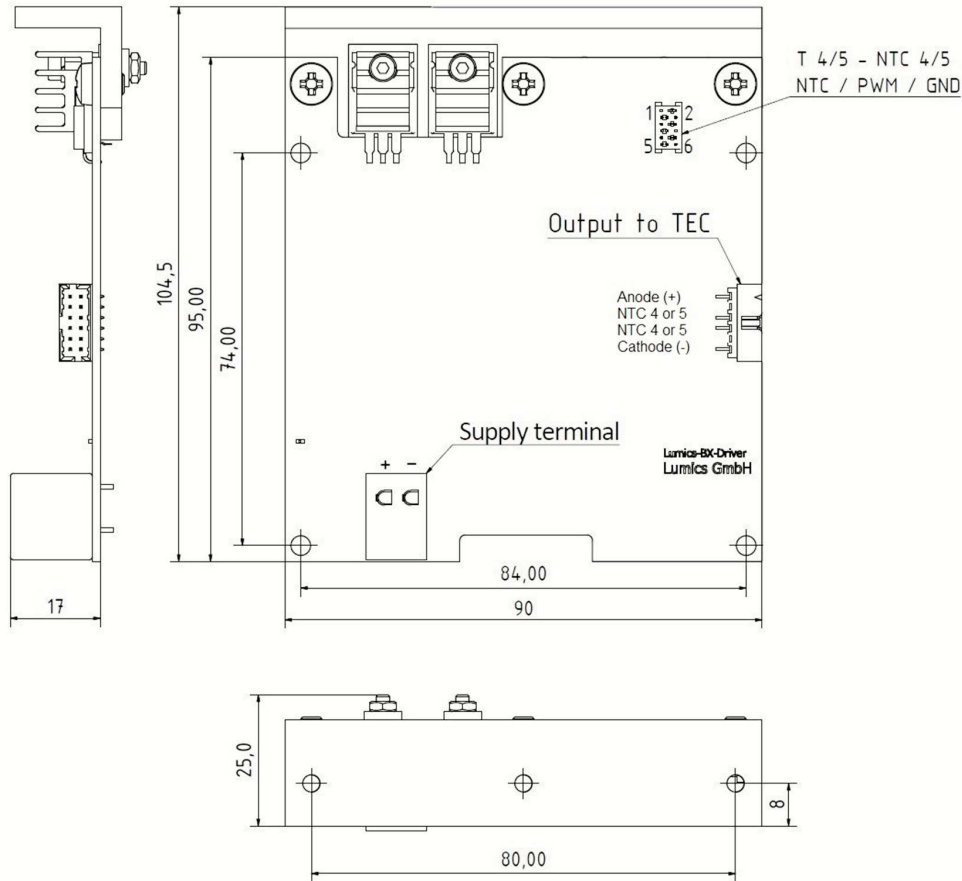
General Parameters

Parameter	Symbol	Min	Typ	Max	Unit
Storage temperature (1)	T _s	-10		55	°C
Ambient operation temperature (1)	T _{op}	0		45	°C
Humidity / non-condensing atmosphere				80	%
Compliance (4)		ROHS / UL94V-0 / EMC certificate according to EN 55011			
Controller					
Cooling		convection cooling only			
Signal & control interface terminal 1 to laser module	12 pin double row flat cable socket				
Signal & control Interface terminal 2 to external devices	3x8 way screw terminal block				
Fuse in a box , type	Littlefuse 0154002Dr				
Laser Driver					
Cooling optional (heat sink and type (convection or forced air cooling) depends on thermal load, total thermal resistance of build-in heat sink	10K/W				
To diode laser one 2 way	M3 screw terminal block, type Würth electronic 7461101				
To power supply one 2 way push in clamp terminal block for up to 2.5 sq.mm or 10 AWG , type	Wago 2624-1102				
Fuse 30A SMD , type	Schurter 3403.0289.23				
Further Options					
Interface cable to LuOcean diode lasers					
Chiller packages for LuOcean diode lasers on request					
Heat sink with fan for laser driver depending on electrical power supplied					

Notes:

- (1) Operating temperature and rel. humidity must be chosen in a way that the dewpoint of humid air is below the temperature of the board to avoid condensing of water.
- (2) Fan voltage: one operation mode only at 12V when DC supply is 12V and two modes (14V/24V) for >=24V supply
- (3) External interlock must be a low current (<1mA) sourcing (mechanical) switch (e.g. door lock). Interlock 12(24)V for 12(>=24)V DC supply
- (4) Under evaluation.

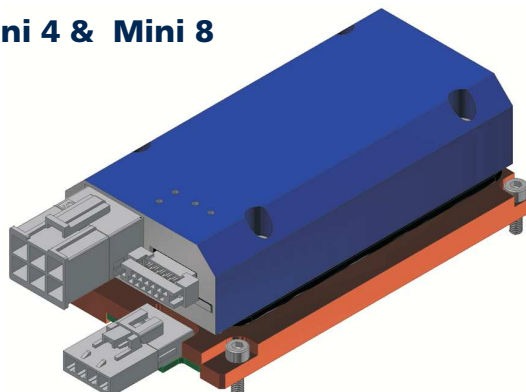
Chiller Driver for Thermo Electric Coolers (TEC)



General Characteristics (ambient condition) Chiller Driver

Parameter / Conditions	Symbol	Min	Typ	Max	Unit
Chiller Driver Output Voltage Range					
Input voltage on DC supply terminal	V_{in}		12		V
Output voltage on TEC terminal	V_{out}	2		8	V
Input voltage on DC supply terminal	V_{in}		24		V
Output voltage on TEC terminal	V_{out}	8		18	V
Input voltage on DC supply terminal	V_{in}		36		V
Output voltage on TEC terminal	V_{out}	11		27	V
Input voltage on DC supply terminal	V_{in}		48		V
Output voltage on TEC terminal	V_{out}	14		36	V
I_{Cw} output current on TEC terminal for whole output voltage range	I_{out}	1		14	A
I_{Cw} output current ripple on TEC terminal for whole output voltage range	I_{ripple}			10	%
Thermistor terminal (NTC) on controller board				10	KOhm
Accuracy of the temperature regulation at constant thermal load (1)	T_{set}		± 2		$^{\circ}C$
Settling time of temperature at 100% thermal load change (1)	T_{reg}		10		s
Terminals					
To chiller unit one 4 terminal block, type Molex 172310-1104_1X4_3.5MM_90GRAD, cathode / anode polarity as given for cooling operation of TEC (Molex Mega-Fit Female Crimp Terminal part No 1722533011, Molex Receptacle part no 172256-1104)					
To power supply one 2 way push in clamp terminal block for up to 2.5 sq.mm or 10 AWG, type Wago 2624-1102					
Note (1) The chiller unit and the heat sink attached to the hot side of the chiller unit must provide a sufficient performance					

Chiller Unit for LuOcean Mini 4 & Mini 8



We manufacture diode lasers.