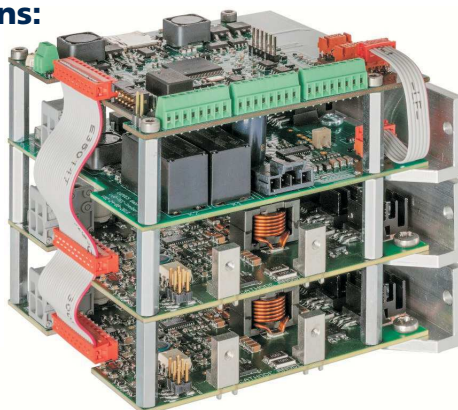




## LuOcean Driver Kit with Digital Interface

### 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:

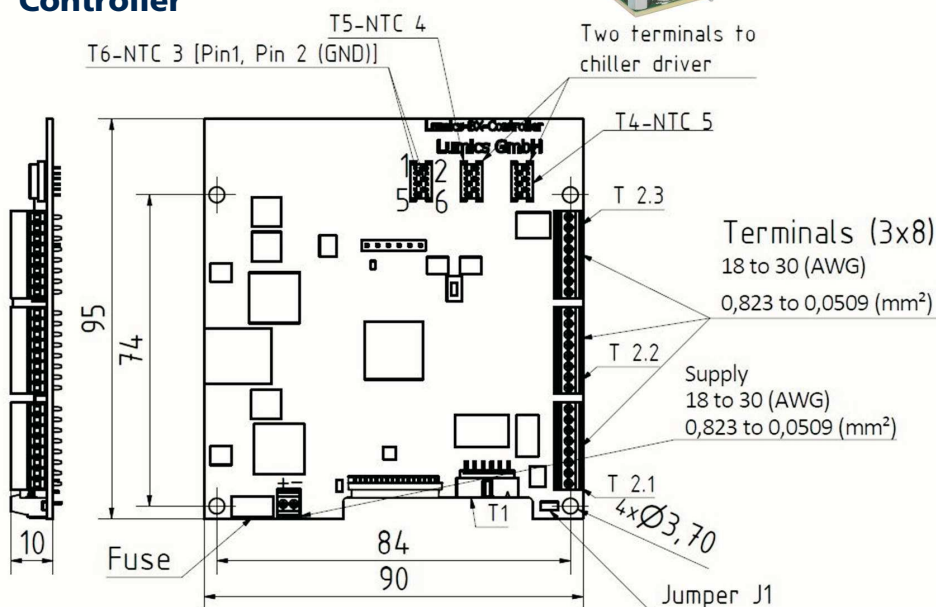
The LuOcean™ driver kit is designed for OEM manufacturers requiring a digital interface to the LuOcean™ diode laser series. It provides current, sensor and temperature control together with the optional chiller unit. The standard RS232 programming interface and build-in protective features provide the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

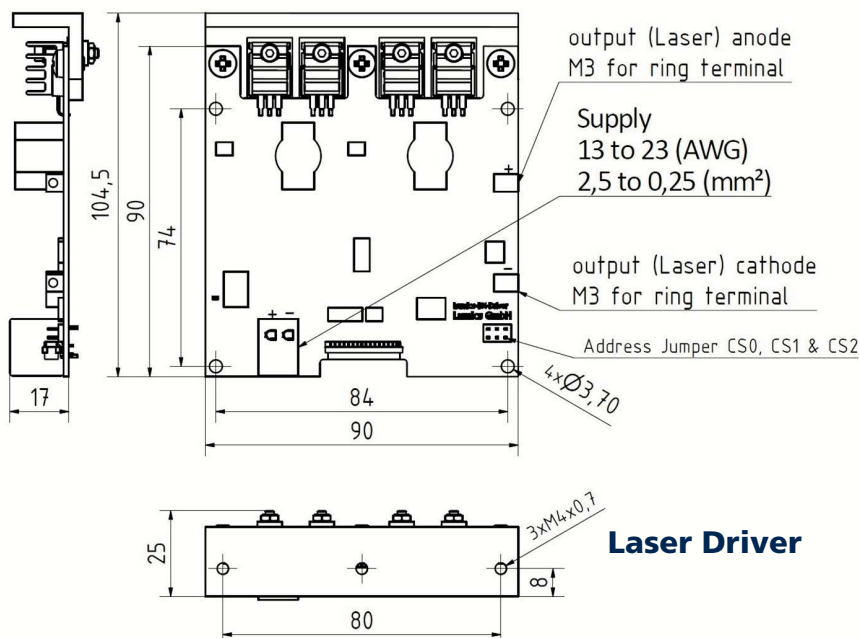


#### Controller Terminal T1 Description

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	



**We manufacture diode lasers.**

## General Characteristics (ambient condition)

Parameter / Conditions	Symbol	Min	Typ	Max	Unit	LuOcean Diode Laser Application
<b>Diode Laser Driver Output Voltage Range</b>						
Input voltage on DC supply terminal	V <sub>in</sub>		48		V	M4
Output voltage on laser terminal	V <sub>out</sub>	14		36	V	
Input voltage on DC supply terminal	V <sub>in</sub>		36		V	P2
Output voltage on laser terminal	V <sub>out</sub>	11		27	V	
Input voltage on DC supply terminal	V <sub>in</sub>		24		V	Mini 8
Output voltage on laser terminal	V <sub>out</sub>	8		18	V	
Input voltage on DC supply terminal	V <sub>in</sub>		12		V	Mini 4
Output voltage on laser terminal (1)	V <sub>out</sub>	1.5		8	V	
<b>General Characteristic Diode Laser Driver</b>						
Output current on laser terminal	I <sub>out</sub>	0.5		28	A	
Efficiency lower for smaller diode laser currents	h	77		90	%	
Output Current Ripple (10- 600) KHz	I <sub>rms</sub>		0.1	0.2	A	
Rise Time full current range	t <sub>rise</sub>		0.1		ms	
Current Overshoot (2)	I <sub>err</sub>		0	5	%	
Current Accuracy (dc to 5 kHz) (3)	I <sub>acc</sub>		+2	+5	%	
Pulse width single current driver	P <sub>w</sub>	500			µs	
Minimum pulse phase delay between two synchronized pulses	P <sub>w</sub>	100			µs	
Pulse duty cycle	P <sub>dc</sub>	1		99	%	
<b>Laser Power Control Mode of the driver kit</b>						
Laser power control accuracy full operating temperature range (4)	Pop			10	%	Driver Kit Firmware >2.0 and LuOcean series
<b>Controller</b>						
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 <sub>fan</sub>		14 or 26		V	
Fan current for optional heat sink with fan	I <sub>fan</sub>			0.7	A	
Interlock Signal	V <sub>interlock</sub>	11	12	13	V	
Laser shut down delay after external interlock signal	td <sub>delay</sub>			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

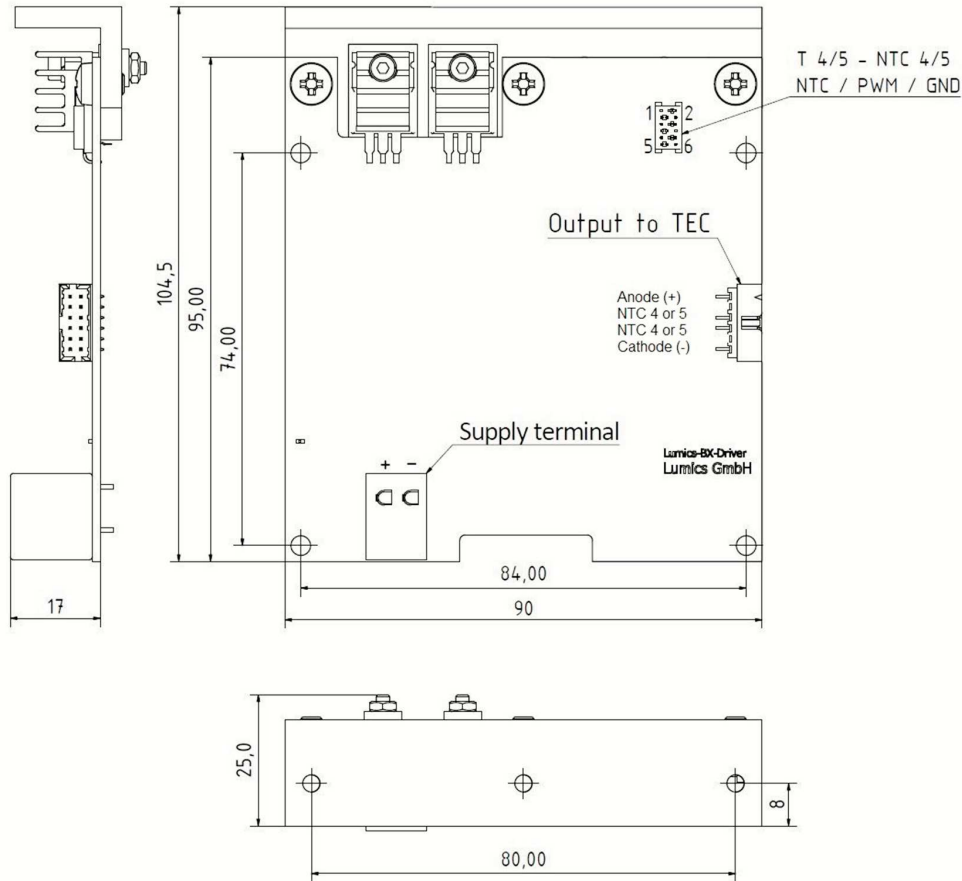
## General Parameters

Parameter	Symbol	Min	Typ	Max	Unit
Storage temperature (1)	T <sub>s</sub>	-10		55	°C
Ambient operation temperature (1)	T <sub>op</sub>	0		45	°C
Humidity / non-condensing atmosphere				80	%
Compliance (4)		ROHS / UL94V-0 / EMC certificate according to EN 55011			
<b>Controller</b>					
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				
<b>Laser Driver</b>					
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				
<b>Further Options</b>					
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.

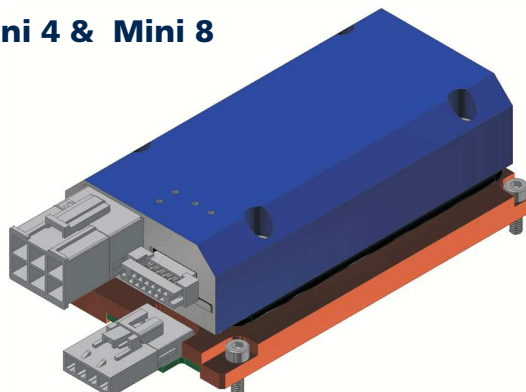
## Chiller Driver for Thermo Electric Coolers (TEC)



## General Characteristics (ambient condition) Chiller Driver

Parameter / Conditions	Symbol	Min	Typ	Max	Unit
<b>Chiller Driver Output Voltage Range</b>					
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
$I_{ripple}$ 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)	$T_{set}$		$\pm 2$		°C
Settling time of temperature at 100% thermal load change (1)	$T_{reg}$		10		s
<b>Terminals</b>					
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 heat sink attached to the hot side of the chiller unit must provide a sufficient performance to dissipate the thermal load of the laser module					

## Chiller Unit for LuOcean Mini 4 & Mini 8



**We manufacture diode lasers.**