Model Number	
300-0650-00	405nm 4mW TE Cooled Module
Specification	
Wavelength	405nm ±10nm
Output Power	4.0mW (adjustable)
Power Stability	<1%
Beam Size	4.4 x 1.4 mm
Beam Divergence	0.4 x 0.6 mrad
RMS Noise	<1%
Operating Voltage	+6.5V ±0.1V DC
Operating Current	2.5A maximum (laser diode 500mA maximum)
Ambient Temp. Range	+10°C to +30°C (non-condensing)
Temperature Stability	±0.05°C
Setpoint Temp Range	+18°C to +25°C (factory set to +18°C)
Analogue Modulation	0Hz to 10KHz, low=100% high= approx 0%
Digital Modulation	50Hz to 1MHz, TTL input - low=100%, high=approx 0%
Mechanical	38mm ±0.1mm diameter, 165mm length



Laser Safety

The light emitted from these devices has been set in accordance with IEC60825. However, staring into the beam, whether directly or indirectly, must be avoided. IEC60825 classifies laser products into three different categories depending on light emitted, wavelength and eye safety.

CLASS II
"Caution", visible laser light less than 1.0mW. Considered eye safe, normal exposure to this type of beam will not cause permanent damage to the retina.

CLASS IIIR
"Danger", visible laser light between 1.0mW and 5.0mW. Considered eye safe with caution. Focusing of this light into the eye could cause some damage.

CLASS IIIB
"Danger", infrared (IR), and high power visible lasers considered dangerous to the retina if exposed.

NB: It is important to note that while complying with the above classifications, unless otherwise stated, our laser diode products are not certified and are designed solely for use in OEM products. The way in which the device is used in the final product may alter its original design classification, and it is the responsibility of the OEM to ensure compliance with the relevant standards.

the **Laser Diode** specialists

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Issue B:08/03



user guide

temperature controlled module

Part Number: 300-0650-00

the **Laser Diode** specialists

temperature controlled module

Product Information

The 300-0650-00 temperature controlled module incorporates a 405nm 4mW laser diode, laser driver / temperature control electronics, heatsink, internal cooling fan and collimating optic in a robust, compact industrial housing. Features include safety interlock, analogue and digital modulation, analogue power control and an RS232 interface.

Please read the user instructions carefully before operating the 300-0650-00 temperature controlled module.

Operation

Connect the 9 way 'D' connector to the mating connector on the module back panel. Power connections are made via the red, (+6.5V), and black, (0V), wires. The module is activated via the ON/OFF switch on the rear panel. When activated, the module will stabilise the temperature of the internal laser diode to the setpoint temperature (factory set to 18° C), however the laser will not operate unless the interlock is enabled. With power connected to the module, the green "POWER" LED will flash if the interlock is disabling the laser. If the green "POWER" LED is continuously ON then this indicates that the laser is active. The red "TEMP OK" LED will illuminate when the laser diode temperature has reached the setpoint temperature ± 0.1° C. Whilst the module is stabilising the laser diode temperature, the laser power will be reduced to approximately 5% of full power until the temperature is in the range of ± 0.5° C of the setpoint temperature, at which time the laser power will then increase to full power.

Temperature Setpoint

This is factory set to 18° C. It can be adjusted to any temperature between 18 and 25° C by inserting a small adjuster into the hole marked "SETPOINT TEMP" on the module housing and adjusting the internal trimmer. The setpoint temperature can be read via the RS232 interface using the report command - see heading "RS232 Interface".

Temperature Limits

Operation of the laser diode outside the temperature limits of 10 to 30° C will cause the laser diode to be turned off, (to prevent damage). This will be indicated by the red "TEMP OK" LED flashing. In this condition the module should not be operated until the laser diode temperature is within the specified range.

Tube Temperature

Heat generated by the laser diode and cooling process is radiated by the module tube.

CAUTION - The tube may feel warm to the touch and at higher ambient temperatures could feel HOT to the touch.

Laser Power Adjustment

Laser diode output power is factory set to maximum. It can be adjusted by inserting a small adjuster into the hole marked "POWER ADJUST" on the module housing and adjusting the internal trimmer. Note that internally the current supply to the laser diode has been limited to prevent damage due to over current.

Interlock

The interlock allows the external enabling and disabling of the laser diode.
Connection from the interlock pin (yellow wire) to unit 0V (green wire) = LASER ON,
NO connection to the interlock pin = LASER OFF.

Analogue and Digital Modulation

Analogue modulation is achieved by applying a voltage between pin 5, (white wire), and pin 7, (green wire), of the 9 pin D plug. When the applied voltage is 0V, the laser is on full power. As the voltage increases, laser power falls. In order to maintain a linear relationship between analogue input voltage and optical power output, it is necessary to carefully adjust the amplitude of the modulating signal such that the laser current always remains somewhere between threshold and the preset maximum value. Since the parameters of each laser diode are slightly different, it is recommended that the analogue voltage be adjusted whilst viewing the output with the aid of an optical detector and oscilloscope. Start by applying a voltage which varies between 0-1V, and adjust the amplitude and DC offset until the modulation depth is at a maximum without any distortion. Note that it may not be possible to achieve 100% modulation depth, ie the laser will not be fully off when the modulating signal is at a maximum.

Digital modulation may be aplied to the module via the SMB connector on the rear panel. In the case of digital modulation, the drive circuit operates by maintaining a constant average optical power. Consequently, the peak optical power is dependent on the duty cycle of the applied digital signal. As an example, for an unmodulated average power of 1mW, when a 50% duty cycle digital signal is applied, the laser actually switches between zero and 2mW.

If the duty cycle is reduced to 25%, then the peak power increases to 4mW. With this in mind, in order to use digital modulation correctly, care must be taken to ensure that the laser diode does not reach its preset current limit.

Lens Adjustment

The output beam is factory set for collimation, but it can be adjusted to suit your requirements. Insert the supplied tool into the front of the module and rotate to adjust output beam.

RS232 Interface

The module is equipped with an RS232 interface, allowing it to be controlled via a COM port on a PC. Connect the RS232 transmit, (brown wire), and RS232 receive, (violet wire), to the corresponding pins on the COM port. It is also necessary to connect 0V on the module to the RS232 signal ground on the COM port. Using "Hyperterminal" or equivalent software, the following settings should be used:

Bits per second	19200
Data bits	8
Parity	None
Stop bits	1
Flow control	None

Pressing "r" on the keyboard displays a status report of the module, which includes the sensor temperature, setpoint temperature and laser operating current. Other commands are also available. For information on these, please contact Photonic Products Ltd.

LED Signals

POWER LED - green
OFF = unit off
ON = unit on, laser active
FLASHING = unit on, interlock enabled

TEMPERATURE LED - red
OFF = laser temperature not stabilised
ON = laser temperature stabilised
FLASHING = temperature fault

Connections

(see figure 1 below)

SMB plug TTL modulation

9 way 'D' plug mounted on rear panel

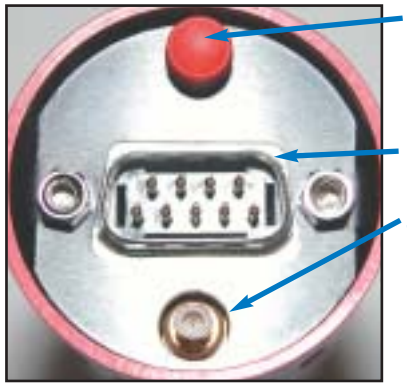
Pin 1	+6.5V (red wire)
Pin 2	+6.5V (red wire)
Pin 3	RS232 transmit (brown wire)
Pin 4	RS232 receive (violet wire)
Pin 5	Analogue input (white wire)
Pin 6	0V (black wire)
Pin 7	0V (green wire)
Pin 8	Interlock (yellow wire)
Pin 9	No connection

Laser Safety

The 300-0650-00 temperature controlled module is a CLASS 3R laser product.
CAUTION - use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

If you do not understand any of the instructions in this user guide, please contact Photonic Products Ltd.

Figure 1



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