

WHITE PAPER

MVpulseHP

Technical Explanation and Instructions for easy handling of the MVpulseHP



Pulse Control Features

The MVpulseHP driver electronics automatically monitors and controls the pulse modulation function. Within the factory preset limits of duty cycle and pulse length, the modulation control reliably detects rising and falling edges so that the laser signal follows the modulation signal. If the user applies a higher duty cycle or a longer pulse length to the modulation input of the laser which would exceed the factory preset maximum parameter, the driver electronics will limit the pulse length automatically. Refer to the examples below

$t_{m,on}$ | $t_{m,off}$ | $k_{m,dc}$ Modulation signal: on time | off time | duty cycle
 $t_{p,on}$ | $k_{p,dc}$ Laser signal factory preset: maximum on time | maximum duty cycle
 $k_{m,dc} = \frac{t_{m,on}}{t_{m,on} + t_{m,off}}$ Calculation duty cycle

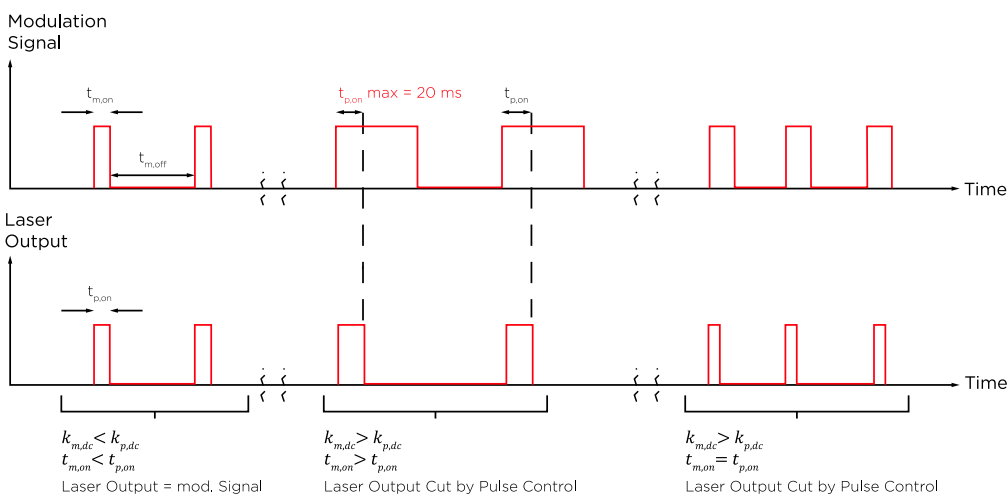


Figure 1: Pulse scheme modulation input versus laser output with standard operation within factory preset parameters and versus laser output.

Maximum Time for $t_{p,on}$ is 20 ms

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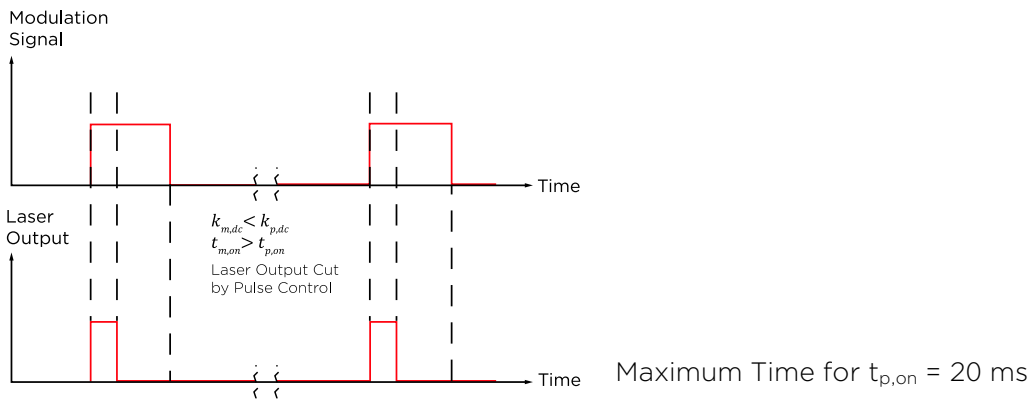


Figure 2: Pulse scheme modulation input versus laser output with pulse length control by factory preset maximum pulse length for a use case with long $t_{m,off}$

The duty cycle and pulse function is factory set but will be aligned with your applications e.g. your camera settings. In case the indicated pulse function does not meet your expectations we are happy to discuss alternative programming.

Electronic Protection (overheating)

The module has integrated electronic protection against overheating. This is activated when the temperature of the laser diode exceeds the factory preset maximum temperature of the laser diode. The switch-on and switch-off process of the electronic protection is subject to a hysteresis with a temperature difference of 5 Kelvin and is used for the cooling phase. If the temperature falls below the switch-on temperature after the electronic protection is triggered, the module switches on again automatically.

$T_{e,on} | T_{e,off}$ Over-temperature electronic protection: laser on | laser off
 $T_{e,off} - T_{e,on} = 5K$

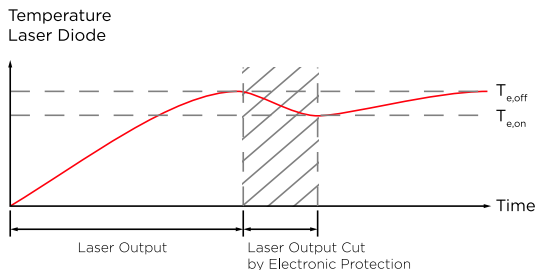
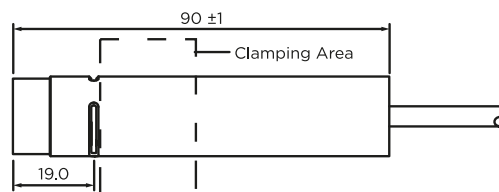


Figure 3: Scheme of laser diode temperature versus time with electronic protection by factory preset maximum laser diode temperature.

The pulse function is designed to avoid overheating of the laser diode. The risk of overheating can be further minimized by mounting / clamping the module according to the drawing and applying a metal clamping and a thermal paste. Allow adequate heat dissipation within your application.



Communication

The module provides an RS-232 with 0-5 V interface (RS485 optional) to read out parameters and change them. A specific serial number between 1 and 255 can be assigned to an MvpulseHP module by the user. The factory preset serial number is 1. With the RS485 option, the modules can be connected to a bus system and addressed via their specific serial number. The serial number must be assigned individually to each module before using it in the bus system during set-up of the bus.

RS-232/RS485 parameters:

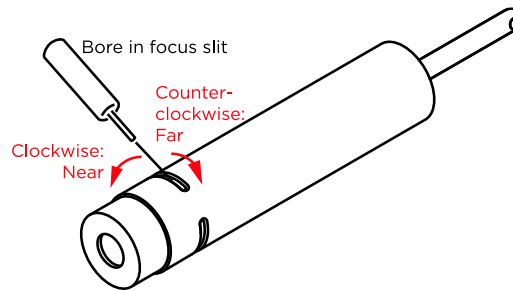
Baudrate = 115200 1/s
 Parity bit = None
 Data bit = 8
 Stop bit = 1
 Flow control = None

Command structure: All commands start either with “#” followed by the 3-digit serial number defined by the customer or with “#000”, which works for every module regardless of the serial number. All send commands end with the character NULL \0. Each response ends with the character \r.

Command	Explanation	Example	Answer	Explanation Answer
getldcurrent	returns the current through the laser diode of the last pulse in mA	#000getldcurrent	1300\r	1300mA
getldtemp	returns the temperature of the laser diode in °C*100	#000getldtemp	3400\r	34.0°C
getserial	returns the 3 digit serial number of the module	#000getserial	233\r	serial number 233
gethours	returns the duration the laser module was connected to a voltage supply in hours	#000gethours	3400\r	module was connected to power supply for 3400 hours
geterror	returns an error code	#000geterror	1\r	0: laser ok, 1: laser over temperature
setserial[1-255]	sets the serial number	#000setserial255	255\r	sets the serial number to 255

Focusing mechanism

The focal distance of the uniform laser line can be adjusted with the provided pin tool. Stick the pin into one of the holes of the inner ring and turn it clockwise/counterclockwise. The focal distance decreases/increases.



Installation and Operation

Attention! Please pay attention to the clamping area and refer to the data sheet while fitting the laser module. Clamping areas vary for different laser module types. Please take care of sufficient heat dissipation by clamping at the indicated position and using thermal paste on the surface overlap of module and mount. If you are unsure about mounting of the module under the applied condition (e.g. ambient temperature, surrounding equipment, etc.) please contact us.