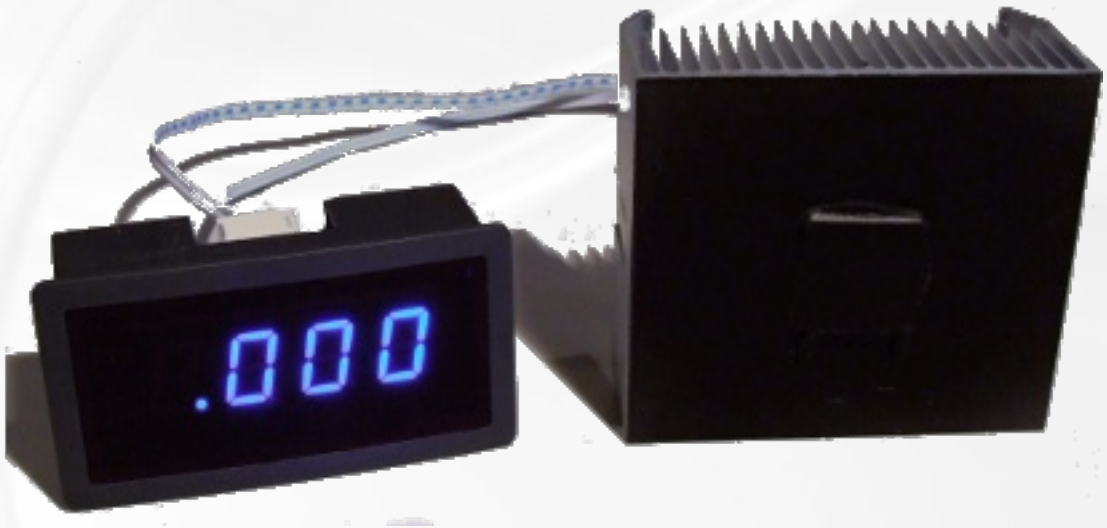
BLUEFAN.NL

Custom Lasers - Optics - Power meters - Laser Diode Drivers - Advanced Test Loads
Lab Service - Measurement - Calibration - Adjustment - Repair - Modification



BLUEFAN
BASIC LPM MK II

Instruction Manual

V1.1

Thank you!

For choosing a Bluefan product. Please read this manual to familiarize yourself with your new LPM and to avoid errors in using it.

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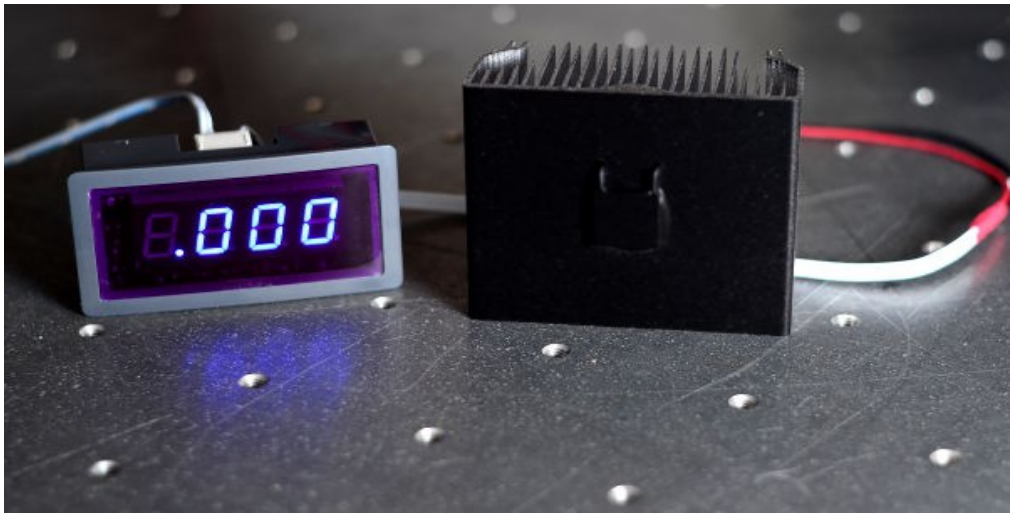


General Description

The Bluefan Basic LPM consists of two parts, a readout and a sensor. These cannot be interchanged as they are calibrated as a pair.

Readout

The readout is a 3 1/2 digit display. The displayed value is the optical power in watts. It's bright blue LED's are still properly readable while wearing most types of laser safety eye-wear. The 9V batteries connect to the readout. The laser power meter is turned on or off by connecting or disconnecting the battery.

Sensor

The sensor is a wafer type thermopile with a special delicate coating designed to have a high spectrally flat absorption. It relies on the Seebeck effect where a voltage difference across two conducting materials is depending on the temperature. The optical power of the laser is converted to heat by absorption.

Specifications

The specifications of the laser power meter are listed below:

Power measurement range	2W
Resolution	1mW
Noise level	<2mW
Accuracy	5%*
Spectral flatness	5%
Spectral range	400-1100nm
Rise time (0%-90%)	20s
Measurement speed	2 measurements/s
Active surface	15x15mm
Sensor dimensions	77x67x34mm
Readout dimensions	79x42x30mm
Maximum power density	40W/cm2
Maximum total applied power	4W
Maximum peak power (2 minutes)**	6W
Power supply	9V battery (12V max)

*: Calibration is done at 445nm

**: The maximum peak power may only be exceed 2 minutes long every 10 minutes of operation.

How to setup your Basic LPM

The Basic LPM has an easy working principle, just connect a 9V battery to the battery connector and you LPM is up and running.

Position the sensor on a flat stable surface. The sensor area is sensitive, do not allow the sensor to fall on it's front surface. The sensor should be placed away from heat sources, air flows or drafts, these affect the measurement. Please do not touch the sensors active surface or attempt to clean it

How to measure with your Basic LPM

For accurate measurements the sensor should be allowed to reach thermal equilibrium. Letting the sensor sit for 10 minutes allows any temperature difference to even out. If the sensor is directly used it will drift towards it's equilibrium which affects measurement accuracy. Do not handle the sensor with your hands.

The laser to be measured should be pointed to the center of the active surface for the best accuracy. The power density should not exceed 40W/cm^2 or 4W in total. A peak power of 6W is allowed for a maximum of 2 minutes every 10 minutes. The display will only go up to 1.999W, higher powers do not register but may damage the sensor.

Defocussing a laser can lower the power density and reduce the chance of damaging the sensors coating. This can be done as long as the beam stays in the center and does not fall on the edges of the sensor.

The laser should not be placed very close to the sensor surface as the sensor also picks up heat radiation. Ambient light or heat radiation is also picked up. A constant source will register as an offset which needs to be subtracted from the measurement.

The sensor has a 20 second rise time from 0 to 90%, this means that after 20 seconds the indicated value is 90% of the actual value. Letting the reading stabilize further will give the actual power.

Maintenance

Battery replacement

The Bluefan Basic LPM has a dropout voltage of 8.4V maximum. Typically below 7.7 the measurement start being affected. By then the display is already much less bright than at 9V. Below 7.7V the readout may not stabilize anymore and have irregular brightness. At that point the readout will read 5% high typically.

Calibration

Each Bluefan Basic LPM is precisely calibrated and comes with a Calibration Certificate. The calibration is for a complete laser power meter setup, readouts and sensor cannot be exchanged without a recalibration. The calibration should not be altered by the user.

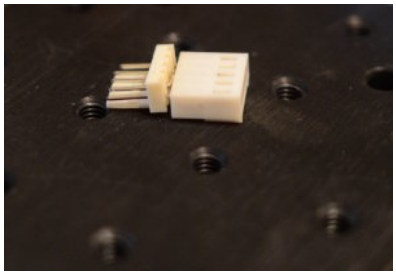
Calibration accuracy is degraded if the sensor surface is damaged or dirty. The sensor surface is a delicate special coating which cannot be cleaned without it's calibration accuracy being degraded. Dust should be gently blown off by clean air. Wiping the dust off very gently with a dry lens paper is also possible. Do not touch the sensor surface. Using cleaning solvent will damage the coating!

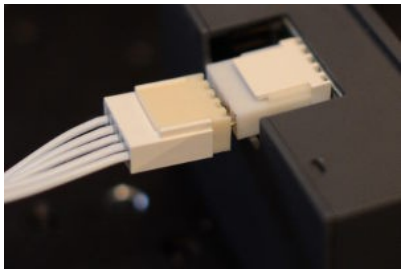
Excessive power or power density will damage the surface. Consider the power meter to be out of calibration if the sensor surface is discolored or if the white surface beneath the coating is visible. If possible laser beams should be spread out across the sensor surface, taking care not to clip the beam of the edge of the active surface.

Dust or dirt may burn onto the sensor surface. The surface should be kept clean and dust free. Periodic calibration will keep your power meter accurate. If needed the sensor can be re-coated. Contact Bluefan for calibration and re-coating possibilities.

1021A Range Extender

The optional 1021A range extender is a small feedthrough plug that connects between the readout and the cable assembly. The Range Extender attenuates the reading by a factor of 10. This allows the unit to read up to it's maximum allowed power of 4W continuous, 6W peak. As the reading is lower by a factor of 10 the resolution is higher by a factor of 10, giving a 10mW resolution.





Warranty

Bluefan warrants each instrument of its manufacture to be free from any defects in material and workmanship. Our obligation under this warranty is limited to service or adjustments on any instrument returned to the Bluefan lab for that purpose, and to the replacement of any defective parts thereof. This warranty covers instruments within one year after the shipping date to the original purchaser. Should the instrument show any defects, the instrument must be returned prepaid by the original purchaser for inspection. If it is determined that the defect has been caused by misuse or abnormal conditions of operation, repairs will be billed at cost after submitting an estimate to the purchaser.

Any damage due to misuse of the product or by any attempt to alter or repair the product by an unauthorized person is not covered by this warranty. Calibration or other services are not covered under the warranty unless specifically agreed. Bluefan is not liable for consequential damages of any kind, the warranty only covers the instrument and no sequential costs. Customers should contact Bluefan before returning any instrument.

Contact

Bluefan will always keep it's contact information up to date of the Bluefan website. You can always email Bluefan at coherentwave@gmail.com

Please send an email for the return shipping address should you need any services for your laser power meter.