USER MANUAL

HP-BLU Series | Bluetooth® Wireless High Power Detectors

gentec-e·o
PARTNERS for ACCURACY

WARRANTY

The Gentec-EO HP-BLU Laser Power Detector carries a one-year warranty (from date of shipment) against material and/or workmanship defects when used under normal operating conditions. The warranty does not cover recalibration, or damages related to misuse.

Gentec-EO will repair or replace at our option any HP-BLU which proves to be defective during the warranty period, except in the case of product misuse.

Any attempt by an unauthorized person to alter or repair the product will void the warranty.

The manufacturer is not liable for consequential damages of any kind.

In the case of a malfunction, contact your local Gentec-EO distributor or the nearest Gentec-EO office to obtain a return authorization number. Return the material to the address below.

Contacting Gentec Electro-Optics Inc.

Gentec Electro-Optics, Inc.
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Québec, QC
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Tel: (418) 651-8003
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CLAIMS

To obtain warranty service, contact your nearest Gentec-EO agent or send the product, with a description of the problem, transportation and insurance prepaid, to the nearest Gentec-EO agent. Gentec-EO Inc. assumes no risk for the damage in transit. Gentec-EO Inc. will, at its option, repair or replace the defective product free of charge or refund your purchase price. However, if Gentec-EO Inc. determines that the failure is caused by misuse, alterations, accident or abnormal condition of operation or handling, you will be billed for the repair and the repaired product will be returned to you, transportation prepaid.

SAFETY INFORMATION

Do not use the HP-BLU if the device or the detector looks damaged, or if you suspect that the HP-BLU is not operating properly.

This device is water-cooled. Water-cooling must be installed before operating the device. Refer to the instructions for more information. The user must wait for the device to cool before handling after laser power is applied. The surface of the detector gets very hot and there is a risk of injury if it is not allowed to cool down.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Caution: Changes or modifications not expressly approved in writing by Gentec Electro-Optics Inc. may void the user's authority to operate this equipment.

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1. HP-BLU LASER DETECTOR

1.1. INTRODUCTION

To obtain full performance from HP-BLU, we recommend that you read this manual carefully.

The HP-BLU laser detectors are a variant of the HP series of high-power laser detectors, which also include a wireless (Bluetooth) signal output. These specialized instruments provide accurate optical power measurements for demanding high power applications. Using Gentec-EO proprietary calorimetric measurement, excellent accuracy is attained across a wide range of laser powers. For convenience, the power measurements can be transmitted wirelessly to your PC, removing the necessity of running a long wire. The HP-BLU is powered by an internal, long-lasting lithium-ion battery that can last for 24 hours of operation before needing to recharge.

The Gentec-EO HP-BLU series power detector family includes HP100A-4KW-HE-BLU, HP60A-15KW-GD-BLU and HP100A-12KW-HD-BLU, HP125A-15KW-HD-BLU.

When relevant, the same specifications apply to beam dump versions: BD-4KW-HE and BD-12KW-HD.

-        The HP100A-4KW-HE-BLU detector has dimensions of 127 mm x 127 mm and an aperture of 100 mm Ø.
-        The HP100A-4KW-HE-TUBE-BLU detector has dimensions of 127 mm x 127 mm and a back-reflection reducing tube with an aperture of 70 mm Ø.
-        The HP60A-15KW-GD-BLU detector has dimensions of 153 mm x 153 mm and an aperture of 60 mm Ø.
-        The HP100A-12KW-HD-BLU detector has dimensions of 127 mm x 127 mm and an aperture of 100 mm Ø.
-        The HP100A-12KW-HE-TUBE-BLU detector has dimensions of 127 mm x 127 mm and a back-reflection reducing tube with an aperture of 70 mm Ø.
-        The HP125A-15KW-HD-BLU detector has dimensions of 153 mm x 153 mm and an aperture of 125 mm x 125 mm.

The high-power surface absorber sensors are designed for use at high average power densities.

The HP detectors can measure between
-        100 W and 4 kW of average power for HP100A-4KW-HE-BLU & HP100A-4KW-HE-TUBE-BLU
-        500 W and 15 kW of average power for HP60A-15KW-GD-BLU
-        300 W and 12 kW of average power for HP100A-12KW-HD-BLU & HP100A-12KW-HD-TUBE-BLU
-        500 W and 15 kW of average power for HP125A-15KW-HD-BLU
         For lower power, consult Gentec-EO.

Easy software upgrade

Keep in touch with the latest improvements to our user-friendly software. You can download the latest software version anytime from our website www.gentec-eo.com and install it on your PC.

1.2. INCLUDED WITH YOUR HP-BLU

Each HP-BLU comes with a Bluetooth USB dongle and a 5-meter USB cable.

1.3. DESCRIPTION OF MAIN FEATURES

1.3.1. USB connector

The USB connector allows using the HP-BLU on a PC. It is a USB type B connector on the HP-BLU. The PC interface, PC-Gentec-EO, features statistical calculation, graphics displays and data logging options. It also gives real time measurement of the cooling flow rate and temperature.

A standard 5-meter USB cable is supplied with the HP-BLU. If a longer cable is required, please contact Gentec-EO for more information.

The USB power adapter (201221) can be ordered with the required AC plug: USA (201222), UK (201223), Europe (201224) and Australia (201225).

1.3.2. Bluetooth

To use the Bluetooth signal, the supplied Bluetooth USB dongle must be plugged in a computer. Verify that the HP-BLU is on by looking at the LED. If the LED is flashing with the blue colour rapidly, this means that the HP-BLU is ready to be connected to a computer. If not, press the button on the HP-BLU to turn it on. Please refer to section 1.3.6 for button description and section 1.3.7 for LED description. Please see figure 3 for the location of the on/off button.

Figure 3 Location of the on/off button

On the computer, start the PC-Gentec-EO software. Once PC-Gentec-EO is started, click on the small arrow below the "Connect" button located in the top left corner of the user interface. Please see figure for a visual representation of the connect with Bluetooth button. On the small drop-down menu that opens, click on "Select device BT interface". On the menu that pops up, select the HP-BLU device. After a short time, the software should display the power measurement and the blue LED will flash slowly.
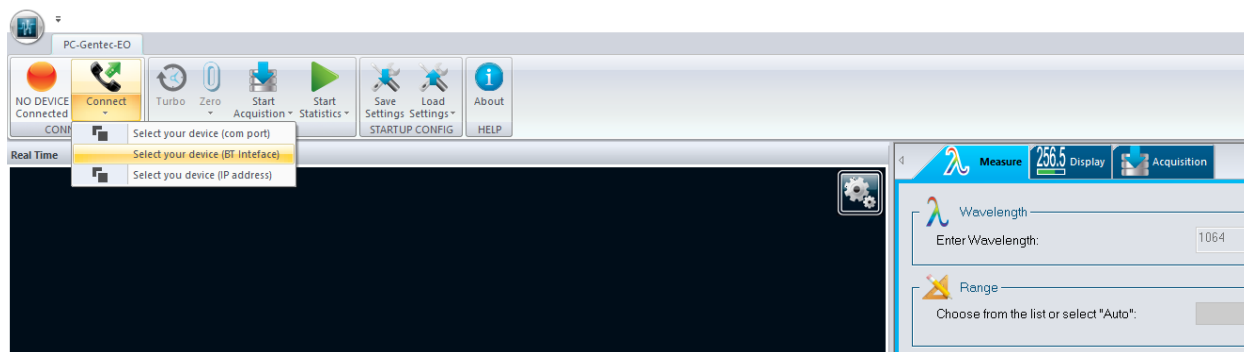

Figure 4 PC-Gentec-EO, connect with Bluetooth

1.3.3. Button

The button turns the HP-BLU on and off. The button needs a press of at least 1 second to register. The button also has a device reset feature in the infrequent event of a HP-BLU malfunction. To use the reset feature of the button, the button needs to pressed for more than 6 seconds. Please be patient as the device might need up to 1 minute to recover during reset.

1.3.4. LED

The HP-BLU possesses two LEDs, one red and one blue. The blue LED describes the connection status while the red LED describes the battery charging status and alarm states. When the blue LED is flashing rapidly, this means that the HP-BLU is looking for a connection. When the blue LED is flashing slowly, this means that the HP-BLU is connected to a device. When the blue LED is off, it means that the HP-BLU is off.

For the red LED there are three possible states. When the red LED is on and not flashing, it means that the battery is charging. When the red LED is flashing, it means that an alarm condition has happened. Please see section 1.3.10 for details on alarm conditions. When the red LED is off, it means that the battery is not charging and that no alarm condition has occurred.

1.3.5. Water-cooling

The fluid used to cool the HP-BLU must be clean water.

Water fittings and tubing:
- The HP is equipped with 3/8'' OD tube push to connect fittings.
- It must be used with plastic pressure tube systems (like PE tubes).
- The fittings are not compatible with copper or stainless-steel tubes.

The metric version of the HP is supplied with an adapter kit (201993) for 10 mm OD tube.
- The kit contains two push to connect 3/8'' to 10 mm tube adapters and two 3/8'' coupling tube stems.
- The coupling stem is inserted between the HP and the adapter.

Note: The tube size is written on the adapter output (10mm or 3/8).

Water quality:
- The HP series cooling fluid must be water. Do not use glycol or other additives that change the coolant's heat capacity.
- Use filtered (< 50µm) water to avoid any residue.
  Gentec-EO can provide an external water filter if water quality is an issue. Please ask for part number 202290 (Metric) or 202984 (Imperial).
  Note: The water filter provided by Gentec is a chemical-resistant filter. However, it is not compatible with mineral acids.
- The resistivity of the water must be over 100 kOhm/cm.
  Distilled water can be used, but it is not recommended to use highly deionized ultra-pure water because the water cavity is not completely inert.
  A bare copper version is available for 10kW and 12 kW versions, contact Gentec-EO for details.
- If an algicide must be used in the chiller, we recommended Optishield Plus or equivalent.
- If chloride is present in the system, the concentration should not exceed 25 PPM and the PH must be maintained between 6.0 and 8.0. (Low PH will remove the protective oxide layer)

Water temperature:
- The cooling water can be between 15 and 25°C but must always remain above the dew point.
- The ideal set point is 20.0°C, at which temperature the HP is calibrated.
- Water temperature stability is very important since variations (1 to 60 seconds) in the temperature can be interpreted as laser power fluctuation.
- Regulate the temperature with a chiller or a re-circulator.
- The water temperature can be monitored with the PC-Gentec-EO software.

Water flow rate:

- ▶ Flow rate stability is very important since the measured power is directly proportional to water flow. Variation (1 to 60 seconds) in the flow rate can be interpreted as laser power fluctuation.
- ▶ The flow rate must be adjusted with a valve. A lower flow rate causes a slower response while increasing the signal to noise ratio. A higher flow rate causes a faster response, reducing signal to noise ratio.
- ▶ The water flow rate can be monitored with the PC-Gentec-EO software.

Note: The water pressure at the HP input must never exceed 60 psi / 413 kPa.

Note: All these parameters should remain in the range stated in the specifications.

1.3.6. Anticipation algorithm

The HP-BLU relies on a calorimetric relation to determine the laser power. This principle provides precise measurement but it has the drawback of having a slow response. To compensate for the slow response, HP-BLU provides an anticipation algorithm in the firmware that gives a much faster response. Usually, the anticipation algorithm reduces the rise time of the power measurement as described in the HP user manual. The only drawback of using the anticipation algorithm is an elevated noise floor.

The anticipation algorithm can be enabled and disabled in the software or with the serial commands. If your application needs faster measurement, it is recommended to enable the anticipation algorithm. If your application needs the most precise measurement possible, then the anticipation algorithm should be disabled. By default, the anticipation algorithm is on.

1.3.7. Alarms

The HP-BLU can detect 3 kinds of faults. It can detect an over-temperature condition on the device housing f the water-cooling is insufficient, a low battery charge and it can detect water leaks on the internal PCB.

If one of the fault conditions is detected, the red LED will flash rapidly. The flashing can only stop when the device is power cycled. If the alarm condition is still there, the flashing will continue.

To clear an over-temperature problem, the water-cooling flow must be increased (within range specification) or the HP-BLU must be given time to cool down. To remove water on the PCB error, the only thing you can do is wait until the water has evaporated. Please do not use your Blu HP detector if there is water on the PCB. The drying time will vary with ambient air humidity and temperature but 24 hours should work. To clear the low battery charge alarm, please charge the HP BLU with a USB cable.

1.4. SPECIFICATIONS

The following specifications are based on a one-year calibration cycle, an operating temperature of 18 to 28°C (64 to 82F) and a relative humidity not exceeding 80%. The HP-BLU comes in different model for different power range and they are the same model as the HP product.

The different models of HP-BLU share the same specifications as the HP plus a few more which are included in table 3. For example, a HP100A-4KW-HE-BLU will have the same specification as the HP100A-4KW-HE plus the ones listed in table 3. To access the HP100A-4KW-HE specification, please refer to the HP user manual.

Table 1 Table of specifications

	HP-…-BLU
USB communication	USB 2.0 compliant, 2 W power
Measurement sampling rate	10 Hz
Battery run time	24 hours
Battery recharge time	4.5 hours 0-80 % in 2.5 hours
Wireless range	30 m outdoors Indoor: 1 to 2 rooms, depending on wall thickness
USB Bluetooth dongle	Included with HP-BLU purchase
Regulatory compliance	CE, FCC, IC, MIC (Japan), Bluetooth SIG[1], ROHS
Lithium battery transport compliance	UN: Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, ST/SG/AC.10/11/Rev.6/Amend.1 Section 38.3[2]

Specifications are subject to change without notice

[1] The Bluetooth® word mark and logos are registered trademarks owned by the Bluetooth SIG, Inc. and any use of such marks by Gentec-EO is under license. Other trademarks and the trade names are those of their respective owners.

[2] UN38.3 certificate available upon request.

2. OPERATING INSTRUCTIONS

First, install the PC-Gentec-EO software on your computer, along with the BLU drivers. Please find the latest version on our website (www.gentec-eo.com) in the Resources/Download Center section.

After the download is completed, follow the instructions of the installer for both PC-Gentec-EO software and the BLU drivers. The PC might need to reboot after installation.

2.1. INSTALLING THE USB DRIVER

Plug the HP-BLU into a USB port on the PC. If the PC supports USB 1.1, Windows detects the new device and prompts you for the software drivers. A window will open that says "Found New Hardware – USB Device" and after a few moments, the "Found New Hardware Wizard" will appear.

The BLU drivers are available on our website (www.gentec-eo.com) in the Resources/Download Center section

At the end of this process, a new serial COM port will be added to the list of communication ports. It may be used as any other serial port. The COM port will then be listed in the PC-Gentec-EO software.

Verify COM Port

To verify the USB installation and find the COM port number, open the device manager and scroll down to **Ports (COM & LPT)** and double click that line. One of the options should be:

Power/Energy Monitor (COM#)

Note the COM port number, you will need it for the next step.

2.2. QUICK MEASUREMENT PROCEDURE

This section will show you how to make a laser power with HP-BLU.

Quick power and energy measurement procedure:
1. Install the PC-Gentec-EO software on your PC. Also install the BLU drivers.
2. Install the HP-BLU on an optical stand.
3. Connect your water-cooling tubing to the HP-BLU. Ensure a sufficient flow and that the water pressure does not exceed 60 PSI.
4. Press the HP-BLU button and verify that the LED is flashing a blue colour.
5. Start the PC-Gentec-EO software. Click on the arrow blow the "Connect" button, then click on "select your device (BT interface)". On the list that appears on the screen select your HP-BLU device.
6. Check that the flow and temperature displayed on the screen is within specifications for your model of HP-BLU.
7. With the HP-BLU out of the laser beam path, press the Zero button in the PC-Gentec-EO interface.
8. Put the HP-BLU into the laser beam path. Leave it there for a few minutes, until it has reached an equilibrium temperature. The entire laser beam must be within the sensor aperture. Do not exceed maximum specified densities, energies or powers. For the most accurate measurement, spread the beam across 60% to 80% of the sensor area.

3. USER INTERFACE

Please refer to the PC-Gentec-EO manual for more information concerning the user interface. The manual can be downloaded on our website at https://www.gentec-eo.com/resources/download-center.

4. SERIAL COMMUNICATION

4.1. DESCRIPTION

The HP-BLU can communicate through a serial terminal application with its USB interface or RS-232 interface. It is not possible to use serial communication with the Bluetooth interface.

The USB class used by HP-BLU USB is a CDC, or Communications Device Class. This means it shows up in the host PC as a COM port, but it is not a classic COM port, rather a true full speed USB port. You can talk to it as if it were an RS232 port, and take advantage of faster speeds offered by USB. Follow the Windows prompts to install the USB drivers. The USB drivers are fully tested and digitally signed by Microsoft.

Open the appropriate port in your software with standard COM port tools. None of the port settings matter since they are irrelevant, so leave them at whatever default they are in. It's a real USB connection.

4.2. SETTING UP COMMUNICATION TO THE HP-BLU

4.2.1. Verify the COM Port

To verify the USB installation and find the COM port number, click:

Start → Settings → Control Panel → System → Device Manager

Scroll down to **Ports (COM & LPT)** and double click that line. One of the options should be

Power/Energy Monitor (COM#)

Note the COM port number, you will need it for the next step.

4.2.2. Connect the HP-BLU

You may use any serial communication software that you are familiar with. Our instructions are for HyperTerminal because it is widely available on PCs with Windows. The installation of HyperTerminal will not be covered in this manual.

Start HyperTerminal.

To save communication settings, enter a name for the connection. In the drop-down menu for "**Connect using**" select the COM port that the USB driver was installed on (Section 4.2.1). Select **OK**.

Input the following settings into the communications parameter window that appears next.

Table 2 HP-BLU COM Port Settings

	USB	RS232
Bits per second	Any setting will work	115200
Data bits	Any setting will work	8
Parity	Any setting will work	None
Stop bits	Any setting will work	1
Flow control	Any setting will work	None

Click **OK** to begin entering serial commands in the HyperTerminal window.

The commands you type will not appear in the HyperTerminal window unless you set up HyperTerminal to do so. Only the response from the HP-BLU will be displayed. If you prefer to see the commands you are typing on the HyperTerminal window click the **File** menu and execute the following sequence:

File → Properties → Settings → ASCII setup → "**Echo typed characters locally**" **→ OK**

In the HyperTerminal window, type ***VER.** If the response is the version of your HP-BLU, you are successfully connected and ready for serial command action.

In some cases, the HP-BLU has connection problems that can be solved by adding a character delay. To adjust this delay, click the File menu and execute the following sequence:

File → Properties → Settings → ASCII setup → "**Character delay**": add a few milliseconds of delay **→ OK**

When you end the session, HyperTerminal asks if you want to save your settings. To avoid inputting the communication parameters again in the future, save by clicking Yes. Clicking on the session name will open the connection using the saved settings. To avoid re-entering the string of commands, put a shortcut to this file on your desktop: search for the file name, select the file. Right click and select Shortcut in the drop-down menu.

4.3. SERIAL COMMAND FORMAT

Commands are sent as text strings. The response will either be data or an empty string.

All text commands must begin with a trigger character (*). Without the (*) character, nothing will happen. You do not need to end with a line-feed and/or a carriage-return. Parameters must NOT be separated by spaces. Characters must be capitalised.

In case of an error, the reply string is one of the following:

"Invalid Command"

4.4. LIST OF SERIAL COMMANDS FOR THE HP-BLU

The following table contains all the serial commands for the HP-BLU.

Table 3 Serial commands list

Command	Command Name	Description
DATA ACQUISITION		
*CVU	Query Current Value	Gets the current power measurement in ASCII
*CAU	Send Continuous Transmission of Data	Sends the power measurement in ASCII or binary to the serial port at the rate set by the data sampling setting
*CSU	Stop the CAU Command	Stops the *CAU output
SETUP		
*PWC	Set Personal Wavelength Correction in nm	Specifies the wavelength in nm
*PWM	Set Personal Wavelength Correction in microns	Specifies the wavelength in microns
*GWL	Get Wavelength	Returns the wavelength in nm
CONTROL		
*ANE	Set Anticipation	Turns the anticipation algorithm on
*AND	Clear anticipation	Turns the anticipation algorithm off
*GAN	Get Anticipation Status	Returns the anticipation status
*SOU	Set Zero Offset	Zeroes the reading
*COU	Clear Zero Offset	Undoes the zeroing of the reading for a power detector
*GZO	Get Zero Offset	Returns the zero-offset power value
*MUL	Set User Multiplier	Sets the multiplier value
*GUM	Get User Multiplier	Returns the current multiplier value
*OFF	Set User Offset	Sets the offset value
*GUO	Get User Offset	Returns the current offset value
INSTRUMENT AND DETECTOR INFORMATION		
*VER	Query Version	Gets firmware version of the monitor
*TMP	Query Temperature	Retrieves HP-BLU casing temperature
*STS	Query Status	Retrieves the HP-BLU status structure
*ST2	Query Extended Status	Returns the extended status table
*GFW	Query firmware version	Return firmware identification number

All text commands must begin with a trigger character (*) and do not require a line-feed or a carriage-return.
All parameters must NOT have a space between the command and the list of parameters, nor between the parameters themselves. The characters must be capitalised.

4.5. DETAILED DESCRIPTION OF THE SERIAL COMMANDS FOR HP-BLU

4.5.1. Data Acquisition

*CVU - Query Current Value

This command is used to query the three values that are currently being measured by the monitor. The three values are the power measurement in Watts, the water temperature at the intake pipe in °C, and the water flow in litres per minute (LPM).

Command	Parameters	Answer
CVU	**None**	**Power measurement, water input temperature, water flow**

 Examples

For example, a 506.601 W reading at 23.081 °C and 6.163 LPM

would be displayed like this:

Command: *CVU	Answer: Pw= 506.6 Ti= 23.081 F= 6.163

*CAU - Send Continuous Transmission of Data

This command is used to send the measurement data continuously (see command *CVU). The data will arrive at 10 Hz. The command *CSU stops the continuous transmission of measurement data.

Command	Parameters	Answer
CAU	**None**	**Power measurement, water input temperature, water flow**

 Examples

For example, a reading of 506.601 W at 23.081 °C and 6.163 LPM would be displayed like this until the command *CSU is sent:

Command: *CAU	Answer: Pw= 506.6 Ti= 23.081 F= 6.213\<CR>\<LF> Pw= 504.8 Ti= 23.120 F= 6.152\<CR>\<LF> Pw= 506.9 Ti= 23.121 F= 6.168\<CR>\<LF> Pw= 507.1 Ti= 23.098 F= 6.122\<CR>\<LF> Pw= 505.9 Ti= 23.085 F= 6.118\<CR>\<LF> Pw= 506.8 Ti= 23.113 F= 6.315\<CR>\<LF> …

*CSU - Stop the CAU Command

This command is used to stop the real time transfer enabled by the CAU command.

Command	Parameters	Answer
CSU	None	ACK

4.5.2. Setup

*PWC - Set Personal Wavelength Correction in nm

This command is used to specify the wavelength in nm being used on the HP-BLU. The internal memory contains measured spectral data for a wide range of wavelengths. A valid value is set between the lowest and highest wavelengths supported by the device, and it should not be a floating-point value. The input parameter must have 5 digits. If the desired wavelength does not have 5 digits you must enter a zero-padded number. For example, to set the wavelength at 514 nm, you must enter 00514.

Specifying zero as a wavelength or providing an out-of-bound value as a parameter has no effect.

Command	Parameters	Answer
PWC	Wavelength nm (5 digits)	Active wavelength and correction factor

Default: Calibration wavelength, (typically 1064 nm, varies with the HP-BLU model)

Example

The following example sets the wavelength to 1550 nm.

Command: *PWC01550	Answer: Wavelength = 1550.000000 nm, factor = 1.000000<CR><LF>

*PWM - Set Personal Wavelength Correction in microns

This command is used to specify the wavelength in microns. The internal memory contains measured spectral data for a wide range of wavelengths. A valid value is set between the lowest and highest wavelengths supported by the device. The input parameter must have 5 digits and can be a floating-point value. If the desired wavelength does not have 5 digits you must enter a zero-padded number. For example, to set the wavelength at 10.6 micron, you must enter 010.6. Please note that the resolution is limited as follow:

Wavelength Range	Resolution limit
Less than 100 μm	10 nm
Greater than 99.99 μm or less than 1000 μm	100 nm
Greater than 999.9um	1 μm

Specifying zero as a wavelength or providing an out-of-bound value as a parameter has no effect.

Command	Parameters	Answer
PWM	Wavelength μm (5 digits)	Active wavelength and correction factor

Default: Calibration wavelength, (typically 1064 nm, varies with the HP-BLU model)

Example

The following example sets the wavelength to 25 microns (25000 nm).

Command: *PWM025.0	Answer: Wavelength = 25000.000000 nm, factor = 1.000000<CR><LF>

*GWL - Get Wavelength

This command returns the wavelength setting in nm.

Command	Parameters	Answer
GWL	**None**	**Returns the wavelength in nm**

Example

Command: *GWL	Answer: 1064.000000 nm<CR><LF>

4.5.3. Control

*ANE - Set Anticipation

This command is used to enable the anticipation algorithm. Please see section 1.3.9 for more details on the anticipation algorithm and how it affects the power measurement.

Command	Parameters	Answer
ANE	**None**	**None**

Default: On

Example

The following example sets the anticipation On.

Command: *ANE	Answer:

*AND – Clear Anticipation

This command is used to disable the anticipation algorithm. Please see section 1.3.9 for more details on the anticipation algorithm and how it affects the power measurement.

Command	Parameters	Answer
AND	**None**	**None**

Default: On

Example

The following example sets the anticipation Off.

Command: *AND	Answer:

*GAN - Get Anticipation Status

This command returns the anticipation status.

Command	Parameters	Answer
GAN	None	on or off

Example

Command: *GAN	Answer: Anticipation on<CR><LF>

*SOU - Set Zero Offset

This command subtracts the current value from all future measurements the moment the command is issued to set a new zero point.

Command	Parameters	Answer
SOU	None	Zero value

Example

Command: *SOU	Answer: Zero value = 253.120000 W<CR><LF>

*COU - Clear Zero Offset

This command undoes the zero offset command to set the zero point at zero.

Command	Parameters	Answer
COU	None	Zero value

*GZO - Get Zero Offset

This command returns the zero offset power value.

Command	Parameters	Answer
GZO	None	Zero Value

Example

Command: *GZO	Answer:	Zero Value = 1619.352000 W<CR><LF>

*MUL - Set User Multiplier

This command is used to set the value of the user-specified multiplier. Note, the multiplier cannot be set at 0.

Command	Parameters	Answer
MUL	8-character numerical value	Multiplication factor

Default: 1

Example

The following example sets multiplier = 33

Command: *MUL00000033 Or *MUL3.3000e1	Answer: Multiplication factor = 33.000000<CR><LF>

*GUM - Get User Multiplier

This command returns the multiplier value.

Command	Parameters	Answer
GUM	None	Current multiplier value

Example

Command: *GUM	Answer: Multiplication factor = 33.000000<CR><LF>

*OFF - Set User Offset

This command is used to set the value of the user-specified offset.

Command	Parameters	Answer
OFF	8-character numerical value	None

Default: 0

Example

The following example sets the offset to 500 W

| Command: | *OFF500.0000 or *OFF5.0000e2 | Answer: Offset factor = 500.000000<CR><LF> |

The other option available is the zero offset. The zero offset operation is done first, before the User Multiplier and User Offset are added to the calculation.

*GUO - Get User Offset

This command returns the offset value.

Command	Parameters	Answer
GUO	**None**	**Current offset value**

Example

| Command: *GUO | Answer: Offset factor: 500.000000<CR><LF> |

4.5.4. Instrument and Detector Information

*VER - Query Version

This command is used to query the device to get information about the firmware version and the HP-BLU model.

Command	Parameters	Answer
VER	**None**	**Version and device type**

Example

| Command: *VER | Answer: HP-BLU100A-12KW-HD Version 1.00.00<CR><LF> |

*TMP - Query Casing temperature

This command is used to query the HP casing temperature.

Command	Parameters	Answer
TMP	**None**	**Casing temperature in Celsius degree**

Example

Command: *TMP	Answer: Casing temperature = 24.073441 deg C <CR><LF>

*STS - Query Status

This command is used to query the device to get information about the following characteristics:
- Set Wavelength
- Anticipation algorithm state (enabled or disabled)
- User offset value (default 0)
- User multiplier value (default 1)
- Detector model

Command	Parameters	Answer
STS	**None**	**A hexadecimal structure described in the table below.**

The first byte represents the validity of the structure: 0 represents a valid line while 1 is the end of the structure. The next 4 bytes represent the address line and the last 4 bytes are the actual value. The values are written on 32 bits, which means that all the values are written on two lines. The first line represents the LSB and the second line represents the MSB.

The following table shows the output with an HP100A-12KW-HD

Table 4 STS command data structure

Hexadecimal Structure			Converted Value	Definition
Valid	Address	Value		
:0	0000	0002	2	Reserved
:0	0001	0428	1064	Set wavelength in nanometer
:0	0002	0001	1	Anticipation algorithm enable
:0	0003	0000	0	Reserved
:0	0004	0000	0	Reserved
:0	0005	0000	0	Reserved
:0	0006	0000	0	Reserved
:0	0007	0000	0	Reserved
:0	0008	0000	0	Reserved
:0	0009	3F80	0	Reserved
:0	000A	5048	P H	Detector name (swap the two characters)
:0	000B	3031	0 1	Detector name (swap the two characters)
:0	000C	4130	A 0	Detector name (swap the two characters)
:0	000D	312D	1 -	Detector name (swap the two characters)
:0	000E	4B32	K 2	Detector name (swap the two characters)
:0	000F	2D57	- W	Detector name (swap the two characters)
:0	0010	4448	D H	Detector name (swap the two characters)
:0	0011	0000	0	Reserved
:0	0012	0000	0	Reserved
:0	0013	0000	0	Reserved
:0	0014	0000	0	Reserved
:0	0015	0000	0	Reserved
:0	0016	0000	0	Reserved
:0	0017	0000	0	Reserved
:0	0018	0000	0	Reserved

:0	0019	0000	0	Reserved
:1	0000	00 00		End of structure

*GFW – Return firmware version

Returns the version number of the firmware installed in the U-Link.

Command	Parameters	Answer
GFW	**None**	**Version number**

Example

Command: *GFW	Answer: NIG = 105377, Firmware version = 1.00.00 RC6

4.6. ERROR MESSAGES

Error	Comment
Invalid command	Command is invalid. Please check spelling and if the letters are uppercase.

5. DECLARATION OF CONFORMITY

Application of Council Directive(s):   2014/30/EU   The EMC Directive

$C\!\in$

Manufacturer's Name: Gentec Electro Optics, Inc.
Manufacturer's Address: 445 St-Jean Baptiste, suite 160
                                              (Québec), Canada   G2E 5N7

European Representative Name: Laser Components S.A.S.
Representative's Address: 45 bis Route des Gardes
                                              92190 Meudon (France)

Type of Equipment: Laser detector
Model No.:   HP-BLU
Year of test & manufacture: 2019

Standard(s) to which Conformity is declared:
EN61326-1 (2013) Radiated Emissions Heavy Industrial Standard
EN61326-1 (2013) Conducted Emissions Heavy Industrial Standard
EN61326-1 (2013) Power Line Harmonics Heavy Industrial Standard (RS232 Version)
EN61326-1 (2013) Power Line Voltage Fluctuation & Flicker Standard (RS232 Version)

Table 5 Product standards

Test Name Standards	Test Specifications	Minimum Performance Criterion Required	EUT Serial Number	Results
Conducted Emissions FCC part 15 (2018) subpart B	Class A 150kHz-30MHz	N/A	Labcem#2340	Pass
			Labcem#2341	N/A
Radiated Emissions FCC part 15 (2018) subpart B	Class A 30MHz-1GHz	N/A	Labcem#2340	Pass
			Labcem#2341	Pass
Conducted Emissions ICES-003 (2016)	Class A 150kHz-30MHz	N/A	Labcem#2340	Pass
			Labcem#2341	N/A
Radiated Emissions ICES-003 (2016)	Class A 30MHz-1GHz	N/A	Labcem#2340	Pass
			Labcem#2341	Pass
Conducted Emissions CISPR11 (2015) A1 (2016)	Group 1 - class A 150kHz-30MHz	N/A	Labcem#2340	Pass
			Labcem#2341	N/A
Radiated Emissions CISPR11 (2015) A1 (2016)	Group 1 - class A 30MHz-1GHz	N/A	Labcem#2340	Pass
			Labcem#2341	Pass
Electrostatic Discharge Immunity IEC61000-4-2 (2008)	Contact: ±4kV Air: ±2kV, ±4kV, ±8kV	B	Labcem#2340	Pass
			Labcem#2341	Pass
Radiated Electromagnetic Field Immunity IEC61000-4-3 (2006) A1 (2007) A2 (2010)	80MHz-1000MHz: 10V/m 1.4GHz-2GHz: 3V/m 2GHz-2.7GHz: 1V/m	A	Labcem#2340	Pass
			Labcem#2341	Pass
Electrical Fast Transient Immunity IEC61000-4-4 (2012)	Power: ±2kV / 5kHz I/O Ports: N/A Communication Ports: N/A	B	Labcem#2340	Pass
			Labcem#2341	N/A

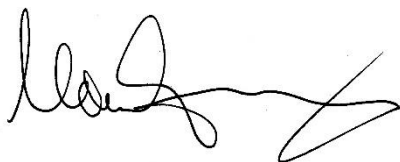| Test Name Standards	Test Specifications	Minimum Performance Criterion Required	EUT Serial Number	Results
Surge Immunity IEC61000-4-5 (2014)	Power: ±2kV L-PE / ±1kV L-L I/O Ports: ±1kV / N/A Communication Ports: ±1kV / N/A	B	Labcem#2340	Pass
			Labcem#2341	N/A
Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields IEC61000-4-6 (2013)	Power: 3V I/O Ports: N/A Communication Ports: N/A	A	Labcem#2340	Pass
			Labcem#2341	N/A
Power Frequency Magnetic Field Immunity IEC61000-4-8 (2009)	Continuous Field: 30A/m / 50Hz & 60Hz	A	Labcem#2340	Pass
			Labcem#2341	Pass
Voltage Dips, Short Interruptions and Voltage Variation Immunity on AC Input IEC61000-4-11 (2004)	Voltage dips: 0%Un during 1 cycle	B	Labcem#2340	Pass
	Voltage dips: 40%Un during 10 cycles (at 50 Hz)	B	Labcem#2340	Pass
	Voltage dips: 40%Un during 12 cycles (at 60 Hz)	C	Labcem#2340	Pass
	Voltage dips: 70%Un during 25 cycles (at 50 Hz)	C	Labcem#2340	Pass
	Voltage dips: 70%Un during 30 cycles (at 60 Hz)	C	Labcem#2340	Pass
	Short interruptions: 0%Un during 250 cycles (at 50 Hz)	C	Labcem#2340	Pass
	Short interruptions: 0%Un during 300 cycles (at 60 Hz)	C	Labcem#2340	Pass

Table 6 Performance criteria

Performance Criteria	Description
Criteria A	The DUT does not have any noticeable deviations in its performance before, during or after the application of the EMC test. If a range of performance is specified as normal operation, the DUT did not have any readings outside of this range before, during or after the application of the EMC test.
Criteria B	The DUT does not have any deviations of performance before or after the application of the EMC test, but during the application a deviation is noted that is not considered normal operation. When the EMC test is paused or completed the DUT recovered on its own and did not require any user intervention to return it to normal operation. If a range of performance is specified as normal operation, the DUT's performance was outside of this range during the application of the test, but recovered on its own and operated within its normal range after the application of the EMC test. No permanent damage occurred to the DUT or any AE as a result of the disturbance.

Performance Criteria	Description
Criteria C	The DUT was operating normally before the application of the EMC test, but during the application, the DUT stopped operating normally, and did not recover after the application of the EMC test until an operator intervened. This includes but is not limited to: - Power cycling the DUT, - Restarting the exercising software on the DUT, and - Unplugging and re-plugging the DUT or any AE The act of "recovering" the DUT must be something that could be accomplished by the customer with little training. No permanent damage occurred to the DUT or any AE as a result of the disturbance.
Additional Criteria	No incorrect data recorded while logging: HP-BLU measure wasn't affected by more than 1 % during test

I, the undersigned, hereby declare that the equipment specified above
conforms to the above Directive(s) and Standard(s).

Place: Québec (Québec)

Date: September 06, 2019

(President)

6. UKCA DECLARATION OF CONFORMITY

Application of Council Directive(s):   2014/30/EU   The EMC Directive

Manufacturer's Name: Gentec Electro Optics, Inc.
Manufacturer's Address: 445 St-Jean Baptiste, suite 160
                                     (Québec), Canada   G2E 5N7

European Representative Name: Laser Components S.A.S.
Representative's Address: 45 bis Route des Gardes
                                     92190 Meudon (France)

Type of Equipment: Laser detector
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			Labcem#2341	Pass
		B	Labcem#2340	Pass

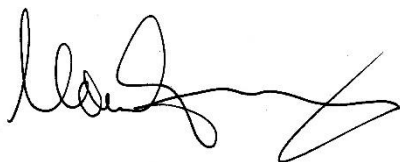| Test Name Standards	Test Specifications	Minimum Performance Criterion Required	EUT Serial Number	Results
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			Labcem#2341	N/A
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	Voltage dips: 70%Un during 25 cycles (at 50 Hz)	C	Labcem#2340	Pass
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	Short interruptions: 0%Un during 300 cycles (at 60 Hz)	C	Labcem#2340	Pass

Table 8 Performance criteria

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Additional Criteria	No incorrect data recorded while logging: HP-BLU measure wasn't affected by more than 1 % during test

I, the undersigned, hereby declare that the equipment specified above
conforms to the above Directive(s) and Standard(s).

Place: Québec (Québec)

Date: November 23, 2021

(President)

APPENDIX A – WEEE DIRECTIVE

Recycling and separation procedure for WEEE directive 2002/96/EC

This section is used by the recycling center when the detector reaches its end of life. Breaking the calibration seal or opening the device will void the HP-BLU's warranty.

The complete device contains:
　　　　1 HP-BLU detector
　　　　1 USB cable (USB model)
　　　　1 Calibration certificate

Separation

Paper: Manual and certificate
Plastic: Water connectors
Wires: USB cable and power supply plug
Printed circuit board: Inside the device
Aluminum and/or nickel-plated copper: Device enclosure
Brass: Water connectors fittings, flow meter and thermocouple fittings: Inside the detector
Steel and stainless steel: screws
Rubber: gasket inside the detector
Lithium Ion battery: Inside the detector
Lithium-metal battery: Inside the detector

Opening the Device

Remove all the screws on the outside of the HP-BLU.
Lift the aluminium cover.
Unplug all the wires connecting to the PCB and the screws holding the PCB in place.
Remove the Lithium battery taped on a plastic block.
Remove the lithium-metal battery (coin cell) on the PCB.
Remove the aluminium plate supporting the water connectors.
Remove the screw holding the plastic blocks.
Remove the washer under the plastic blocks.
Remove the thermocouple fitting on the plastic blocks.
Remove the water connector and the flow meter from the plastic blocks.
Remove the four back screws to open the backside of the water coolant circuit.
Remove the four front screws to remove the metal front cover.

All the parts are now disassembled