Datasheet

OL0050-HSBS-422

Highly sensitive optical spectroscopy within a range of 360nm to 1000nm

Article No: 0110300050060720

Safety instructions and warnings

This measuring instrument must not be used if the safety of personnel depends on the correct functioning of the measuring instrument in the associated application (no safety component in accordance with the EU Machine Directive).

Installation, replacement and maintenance of the measuring instrument must only be performed by qualified personnel.

Make sure to carefully read the manual before operating the measuring instrument and the related software for the first time!

Technical Data

Voltage supply	4.7V … 28V, with reverse polarity protection
Power input	135mA@4.7V, 125mA@5V, 75mA@9V, 55mA@12V, 32mA@24V
Connection	24-pin ribbon cable, RM 2.54mm
Wavelength range	Calibrated for 360nm – 1000nm, Usable range <350nm – >1060nm
Number of effective pixels	approx. 395
Pixel resolution	~2nm/pixel
Optics	Lens system, focus ∞, 9mm Ø
Integration time	100us - >60s, Simultaneous loading of all pixels (electronic shutter)
Electronic system	16 bit ADC
Calibration (basic configuration)	Wavelength calibration

Optical resolution	<7nm FWHM
Digital Out	LIGHTSOURCE SHUTTER DOUT1 DOUT2
Digital In	TRIGGER
Communication	RS422, 230400 baud ASCII-based protocol
Averaging	1 – 16 Full spectra are stored internally and are also accessible
Casing	Plastic, glass fiber reinforced, painted black
Weight (without cable)	220g
Temperature range	Storage -40°C - +60°C Operation 0°C - +40°C
Type of protection	IP30

Intended use

The optical miniature spectrometer OL0050 has been designed for use as an OEM module and for the application within a protected environment. It is intended for analyzing light coupled into the entrance optics within a wavelength range of 360nm to 1000nm. The wavelength range that can actually be captured goes significantly beyond those values on both ends of the spectrum, but has not been verified in the default basic configuration.

In the basic configuration, the instrument delivers a measurement value for each pixel of the implemented detector. The result is proportional to both the adjustable integration time and to the optical power at the wavelength assigned to that pixel. The wavelength calibration of the individual pixels has already been considered in the basic configuration!

The entrance optics provides a very small aperture angle. Its mechanical design enables safe and reproducible coupling of a wide range of accessories. For more information, please refer to the specific datasheets.

The dark currents of the individual pixels have to be detected using a command in the form of an internal offset for the following measurements. When the integration time changes, the so-called DARK measurement has to be repeated. This requires taking appropriate measures on the application side to ensure that the entrance optics is blacked out completely, as the instrument does not incorporate an internal shutter! For this purpose, it is recommended to use the same averaging as for the actual measurements. It is advisable to also repeat the DARK measurement whenever significant temperature changes occur.

Only two parameters are relevant for an individual measurement: integration time and averaging. Averaging can comprise up to 16 measurements. The internal hardware ensures that these individual measurements are precisely timed and that each individual spectrum can also be read out subsequently as required.

The serial RS422 interface supports a data rate of 230400 baud. The terminating resistor in the RX line can be switched off, if required. However, it should normally be active. The communication signals can be transferred over distances of several hundred meters using suitable cables. Due to the very wide input voltage range, the same applies to the voltage supply, as long as the voltage limits at the instrument itself are observed. Make sure to also follow the notes below.

It is possible to use a USB interface for the power supply of OL0050 and for communication. For this purpose, we recommend using our OL0072 adapter which installs the miniature spectrometer as a standard COM port and registers the correct current consumption.

The PC tool included in the scope of supply only uses documented commands (firmware update excluded) and ultimately serves as a reference for the end users' implementations on the basis of our comprehensive documentation and communication examples.

Information on installation, commissioning and use

- The measuring instrument has been designed for the use as an OEM module and for application within a protected environment.

- When using the threaded tripod socket, make sure to avoid exerting excessive force on the attachment point at the casing. Be careful not to screw in the tripod screw more than 5.5mm into the instrument.

- When using the instrument with your own software, please be aware that improper use of commands concerning the internal file system involves the risk of calibrations etc. being lost or falsified. Only use documented commands and contact the manufacturer in case of any doubt.

- The coupling of light using unsuitable accessories can lead to unstable or non-reproducible results. This applies in particular to the use of POF polymer optical fibers! The use of these optical fibers is perfectly allowed and in many cases even reasonable for cost concerns! However, especially with applications where these fiber optics are moved or their position is altered between a calibration and later use, strong variations in the results are likely to occur!

- Please make sure never to tighten the screws in the optics for the fixing of accessories more firmly than required for the safe attachment and only use suitable tools for this purpose.

- Make sure to avoid touching the glass lens of the entrance optics. Only use the approved materials for cleaning the lens.

- When using the three mounting bores in the casing, please make sure not to exert a force greater than required for the secure attachment of the casing.

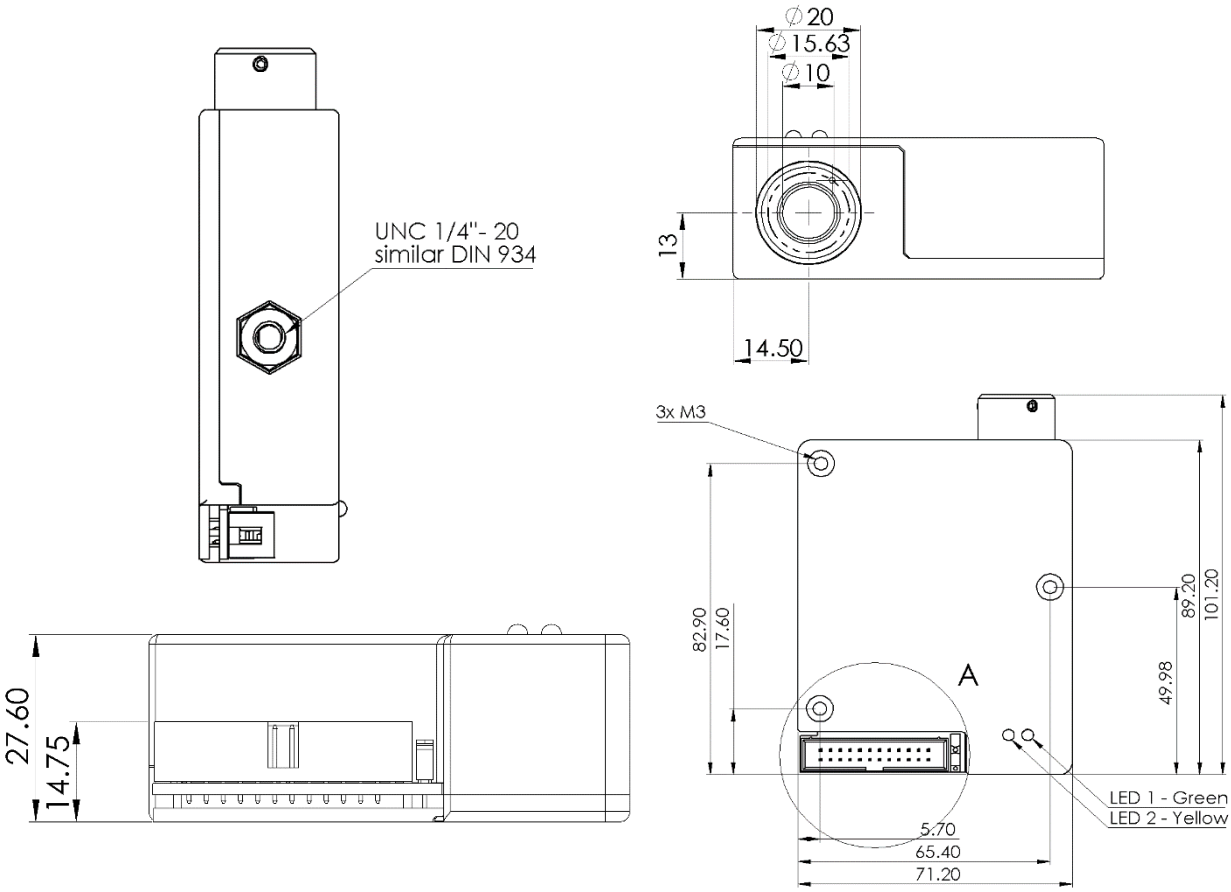
- Only use a 24-pin ribbon cable socket for establishing the electrical connection to the instrument. Only use the pins and signals described below. Do not use the pins designated as ‘NC’ as they are partly reserved for specific functions. Improper use can lead to the destruction of the instrument!

- The RS422 signals on pins 3, 4, 7 and 8 can cover distances of up to several hundred meters. As delivered, the sliding switch next to the ribbon cable socket is set in a way that a 120 Ohm terminating resistor is active between RX+ and RX-. When using short-distance connections, the terminating resistor may be switched off, e.g. to save energy. We especially recommend this when using our OL0072 USB adapter!

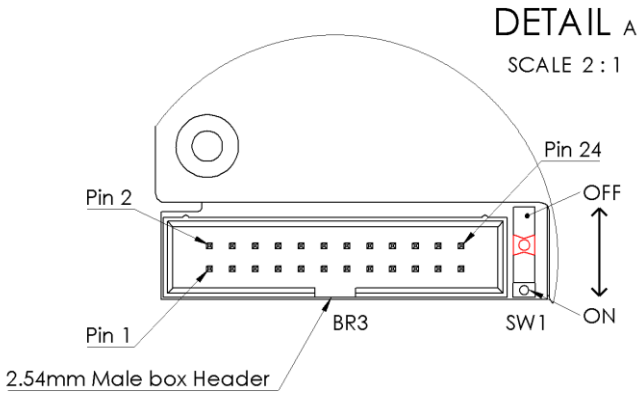
- To cover larger distances, please make sure to use so-called twisted pair cables, where 2 successive pin numbers each are paired, e.g. pin 1 and 2, pin 3 and 4, etc.

- The OL0050 miniature spectrometer does not incorporate order sorting filters!

Dimensions in mm



Pin assignments



Pin assignments

Description	Function
LED 1 - Green	Lights up while performing normal operations. During active integration time, the LED is off.
LED 2 - Yellow	Lights up during a communication sequence.
SW1	While switched on, a 120 Ohm terminating resistor is active between RX+ and RX-

Pin N	Bezeichnung	Pin N	Bezeichnung
Pin 1	GND	Pin 2	Power
Pin 3	RX-	Pin 4	RX+
Pin 5	GND	Pin 6	Power
Pin 7	TX-	Pin 8	TX+
Pin 9	GND	Pin 10	Power
Pin 11	NC	Pin 12	NC
Pin 13	NC	Pin 14	NC
Pin 15	NC	Pin 16	NC
Pin 17	NC	Pin 18	DOUT2 – Not implemented (Do not connect)
Pin 19	SHUTTER	Pin 20	TRIGGER – Not implemented (Do not connect)
Pin 21	LIGHTSOURCE	Pin 22	DOUT1 – Not implemented (Do not connect)
Pin 23	LED1 (Do not connect)	Pin 24	LED2 (Do not connect)

NC ≙ Not Connected

Options and accessories

Description	Function
OL0072	USB adapter for power supply and communication
OL0069	60mm integrating sphere, optimized for easy use at the workplace
OL0073	SMA adapter with integrated optics, focus ∞, index pin
OL0076-XX	Filter holder for diffusor, ND filter, color filter etc.
OL50CAL-XX	Factory calibration, e.g. to luminance or spectral irradiance