LX-80

Non-Contact Level Meter
User Manual

Starting Point

Thank you for purchasing Geolux LX-80 non-contact water level meter! We have put together the experience of our engineers, the domain knowledge of our customers, the enthusiasm of our team, and the manufacturing excellence to deliver this product to you.

You may freely rely on our field-proven radar technology. The use of top-quality components and advanced signal processing algorithms ensures that Geolux level meter can be used in various applications and environments.

Although we are certain that you are more than capable of connecting the level meter to your system, we have created this User Manual to assist you in setting up and using Geolux level meter device.

Should there be any questions left unanswered, please feel free to contact us directly:

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1. Introduction

Geolux LX-80 level meter uses radar technology to provide precise contactless measurement of level. Contactless radar technology enables quick and simple sensor installation above the water surface, and requires minimum maintenance. This functionality is achieved by transmitting an electromagnetic wave in 80 GHz frequency range (W) and measuring the frequency shift of the electromagnetic wave reflected from the water surface.

Measured distance between sensor and target object is proportional to the frequency difference between transmitted FMCW signal and received FMCW signal due to the Doppler Effect. Radar transmits linear chirp in frequency range between 77 GHz and 81 GHz. As the distance between the radar and water increases, so does the difference between transmitted and received frequency, enabling the level meter to precisely determine the level of sensor in relation to the water. Due to the modulation and detection process in the sensor very precise measurements can be achieved and sensor is not dependent on the air temperature, humidity or other parameters of the environment.

The level meter is available in several models, starting with LX-80-8, able to detect objects at distances ranging from 0,1 m to 8,0 m with accuracy of 3 mm, LX-80-15 operating at the range of up to 15 m and LX-80-30 operating up to 30 m. Basic model does measurements with frequency of 1Hz, although a faster model is available, doing 10 measurements per second (10 Hz).

2. Electrical Characteristics

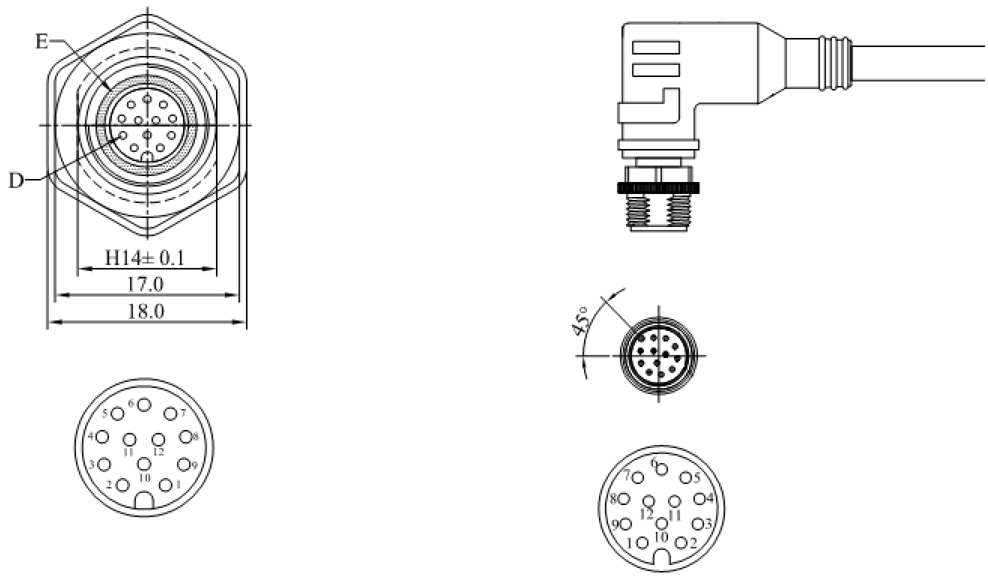
The electrical characteristics of the Geolux LX-80 level meter are given in the Table 1.

Table 1. Electrical characteristics

Parameter	MIN	TYP	MAX	Unit
Communication interface:				
RS-232 interface speed	9600		115200	bps
RS-485 interface speed	9600		115200	bps
Radar Sensor				
Frequency	77.000		81.000	GHz
Radiated power (EIRP)				dBm
Beam-width (3dB) – Azimuth		12		°
Beam-width (3dB) – Elevation		12		°
Power supply voltage	9,0	12,0	27,0	V
Power		1800		mW
Operational temperature range	-40		+85	°C
Measurement range	0,1		8 / 15 / 30	m
Accuracy		3		mm
Resolution			1	mm
Ingress Protection Rating	IP68			
Mechanical		ϕ65 x H55		mm

3. Connector Pin-Out

The level meter uses robust IP66 circular M12 connector with 12 positions and the mating cable is also delivered with the level meter. The connector and cable details are shown on Picture 1. The Table 2 gives detailed description for each pin.



Picture 1. Level meter connectors

Table 2. Connector and cable pin-out

Pin No.	Wire Color	Pin Name	Pin Description
1	White	GND	This pin should be connected to the ground (negative) pole of the power supply.
2	Brown	+Vin	The power supply for the Radar Level Sensor is provided on this pin. The Radar Level Sensor power supply voltage must be in the range 9 VDC to 27 VDC, and the power supply must be able to provide at least 0,65W.
3	Green	RS232 – TxD	RS-232 data transmit signal.
4	Yellow	RS232 – RxD	RS-232 data receive signal.
5	Grey	GND	Signal ground.
6	Pink	CAN – H	CAN2.0B high signal. *(optional)*
7	Blue	CAN – L	CAN2.0B low signal. *(optional)*
8	Red	V+	Output power supply (=Vin) for supply of external optional equipment and for use with analog 4-20mA output
9	Orange	RS485 – D-	RS-485 data transmitter/receiver low signal.
10	Dark Red	RS485 – D+	RS-485 data transmitter/receiver high signal.
11	Black	SDI-12	SDI-12 communication interface *(optional)*
12	Purple	4 – 20 mA Output	Analog 4 – 20 mA output

3.1. Serial RS-232 interface

Serial RS-232 interface is implemented as standard PC full-duplex serial interface with voltage levels adequate for direct connection to PC computer or other embedded device used for serial RS-232 communication.

In case RS-232 interface is connected to standard DB-9 PC connector, TxD line (green wire) is connected to pin 2 and RxD (yellow wire) is connected to pin 3. For proper operation of serial interface additional connection of signal GND (grey wire) is required on pin 5 of the DB-9 connector.

Optionally Geolux can supply cable with DB-9 connector connected to the cable but this must be specified as option on order of the sensors.

Several communication protocols are available, and custom on request. Details of communication protocols are described later in this manual.

3.2. Serial RS-485 interface

Serial RS-485 interface is implemented as standard industrial half-duplex communication interface. Communication interface is short-circuited and overvoltage internally protected. Depending on the receiving device interface can be used with only two wires (D+ dark red wire & D- orange wire) or in some cases ground connection (signal GND gray wire) is also required. For more details please consult receiver specification.

Most common communication protocol used with RS-485 interface is Modbus-RTU, but other protocols are also available. Details of communication protocols are described later in this manual.

3.3. CAN communication interface *(optional)*

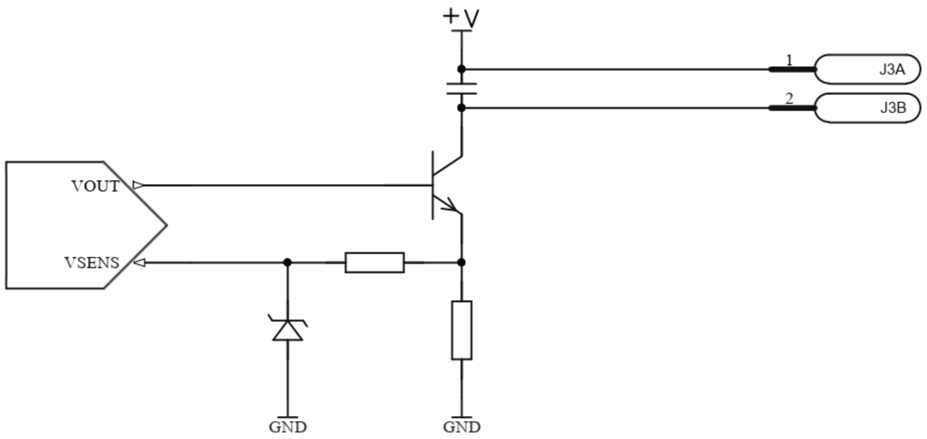
CAN communication interface is optional communication interface that can be used for special applications. This interface is higher speed interface (up to 1Mbps) than other serial communication interfaces so enables additional data transfer not possible with RS-232 and RS-485 interfaces.

CAN interface is disabled in default sensor version and for additional features using CAN interface please contact technical support.

3.4. Analog 4 – 20 mA output

Analog current 4 – 20 mA output is provided for easier compatibility with older logging and control systems. Output is implemented as current sink architecture with common ground. Maximal voltage applied to the sink can go up to 30 VDC providing greater flexibility in connection of the sensor to PLCs, loggers, or data concentrators.

Signal range and function for 4 – 20 mA analog output can be configured in setup application so the sensor will be able to signal best suitable value range with available current range. Current step in the sensor is 0,3 µA limiting resolution possible for the value signaling and care has to be taken in the setup of minimal value to be represented by 4 mA and maximal value to be represented by 20 mA, so the resolution is sufficient for the system requirements.



3.5. SDI-12 Interface *(optional)*

SDI-12 interface is widely used communication interface in hydrology applications. Such interface is characterized with only one communication wire, slow speed communication and possibility for very long communication cables.

For hydrological applications SDI-12 communication interface is possible as option and instrument is natively able to communicate directly with SDI-12 receivers.

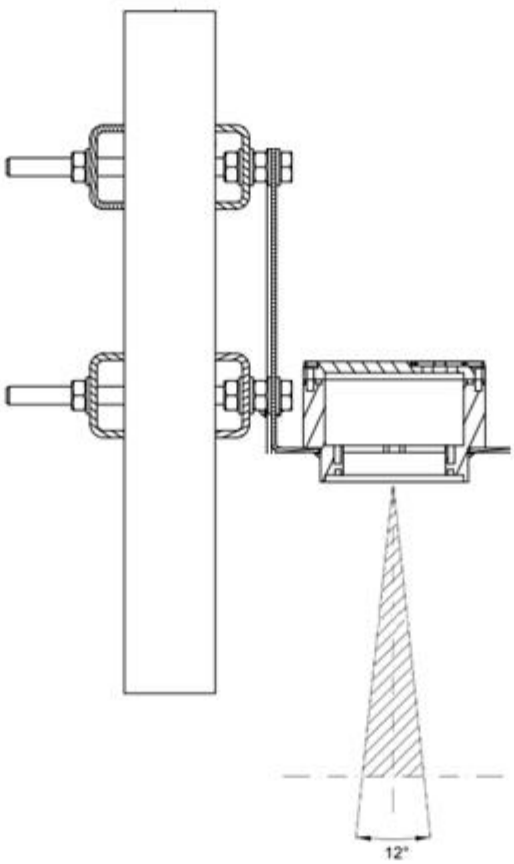
4. Installing Level Meter

The level meter must be installed above the water surface, pointing directly towards the water surface. Minimum height above water surface must be 0,1m but it is recommended to keep height above the water surface of 1 meter or higher and up to the measurement range of the device. Sensor should be directed at a 90° angle towards the water.

When mounting LX sensor care must be taken that direct non-obstructed line to the water surface is available. Any close object in vicinity of the sensor can reduce accuracy and introduce offsets in measurements.

Vibrations of the mounting structure can also affect measurements and should be reduced by any applicable means.

Picture 2 shows how the radar should be positioned relative to the water surface.



Picture 2. Installing level meter

Instrument radar beam covers a circular area on the water surface and works best when water surface is calm and not wavy because flat surfaces reflect radar beams the best. As radar beam is defined by 3 dB width angle, the diameter of the pattern on the water surface is dependent on the distance of the water surface to the instrument. Calculation of the size of circular pattern on the water surface is calculated and presented in the table below the text.

Height [H]	R [m]
0.3 m	0.06
0.5 m	0.11
1 m	0.21
2 m	0.42
3 m	0.63
4 m	0.84
5 m	1.05
6 m	1.26
7 m	1.47
8 m	1.68
9 m	1.89
10 m	2.10
11 m	2.31
12 m	2.52
13 m	2.73
14 m	2.94
15 m	3.15

Water surface direct below the sensor should be clean of vegetation, rocks, sand deposition or other obstacles that could affect measurement. Distance measuring sensor in the instrument is designed to detect and eliminate obstacles from the distance measurement signal spectrum but algorithm has limits and ability to discard obstacles are even more limited in presence of vibration on the instrument mounting. The best results will be achievable if measurement location is selected in the recommended way.

Slight up to moderate surface waviness will affect the measured signal level, usually reducing SNR (Signal to Noise Ratio) but will most probably not affect measurement accuracy. Strong turbulent flow with high water waviness will reduce accuracy due the unpredictability of the water surface but averaging effect along the radar beam covered surface will happen and will reduce oscillations. If measured level is highly turbulent, length of the radar filter can be adjusted to filter out most, if not all the turbulences.

4.1. Measurement through materials (containers)

Geolux LX-80 instrument uses microwave radar for distance measurement and as microwave signal is passing through most of dielectric (non-conductive) materials very easy it is possible to mount radar outside of the container to measure level of the liquid inside of the container. Dielectric materials used in industry and buildings: ABS, PVC, Nylon, Teflon, Polycarbonate, Plexiglas, Polyamide, Polypropylene etc. are very suitable for microwave level measurement from out of the containers. In such application instrument can be placed above the container and pointed to the liquid inside the container below the sensor. Care should be taken to avoid reflections, vibrations and all other negative effects like in all other applications.

4.2. Rain and wind

Geolux LX-80 instrument has integrated internal software filters to filter out effects of rain, fog or wind for radar distance sensor. These filters however have some limitations. Majority of measurement inaccuracies caused by environmental factors can be solved by proper sensor installation.

For rain and snow suppression, the most effective solution is to mount the radar so that it points directly at water. As rain or snow fall, they affect the water surface, so it isn't as reflective as usually, thus reducing the SNR. However, our devices are tested and calibrated in a way, so they detect the surface even under heavy rainfall.

Influence of the wind on the accuracy is in most cases small and can be neglected. The only exception is strong wind as it will create surface waves and turbulences which can be detected as a shift in level. As mentioned above, length of radar filter can be adjusted to compensate for this.

4.3. Interference and multiple radars

Distance measurement radar is operating in W-band from 77 GHz to 81 GHz with linear frequency modulation, modulating signal continuously in the mentioned frequency range. To get interference between two or more sensors it will be required to keep central frequencies very precise just like in surface velocity radar and additionally timing synchronization of radar should be kept in range of 25 ns to each other. Such synchronization is very complex to achieve so the interference probability between several radars on the same location is very small.

It is possible that some wideband radiation sources can introduce small and impulse interference for the short period of time, but this should not, or it is very unlikely to affect measurements reported by radar sensor.

4.4. Fogging and evaporation

Generally, radar sensors are not affected by fog or evaporation of water unless very heavy evaporation is present and water density in the air is very high.

The best solution for the distance measurement is in most cases to increase average period to get better average distance value. As evaporation is naturally very turbulent event with significant difference in density over the surface area and in time, averaging of the distance measurement spectrum is solving the problem of accuracy in such conditions.

4.5. Reflections

Water is very reflective medium for the radar waves and most of the power transmitted from radar transmitter will be reflected from the water surface. Reflections of the radar transmitted power beam follow the same physical laws as in optics and every time radar beam hits the surface part of the power is reflected away from the radar, part of the power is reflected towards the radar and only a small part of power is absorbed by the water. Depending on the surface roughness and incident angle ratio between power reflected in the direction away from the radar and direction back towards the radar can significantly vary. As incident angle for radars in fixed, only the roughness is determining the ration in our case.

In the case of level meter where incident angle of transmitted radar beam to the water is around 90° most of the power is reflected to the sensor and only small portion of the transmitter power will be dispersed in all directions. Ratio between power reflected to the sensor and power dispersed in all directions is dependent on the surface roughness but in general it is very small amount of the energy that is dispersed, and it is very unlikely that dispersed energy will cause additional multipath problems due to the more reflections from surrounding objects.

5. Data Interface

Geolux LX-80 level meter offers multiple data interfaces, in order to make the integration of the device with existing SCADA/telemetry systems easy.

5.1. Serial RS-232 interface

Serial RS-232 interface is used for direct connection of a single level meter unit with the computer. The serial interface is used both for retrieving live level measurements and for configuration of the level meter device. Geolux provides PC application for unit configuration and level monitoring free of charge.

Default communication parameters are:

Bitrate:	115200 bps
Data bits:	8
Stop bits:	1
Parity:	None

A NMEA-like communication protocol is used to deliver level measurements over RS-232 interface. Detailed description of the protocol is given in the Chapter 6 of the User Manual.

5.2. Serial RS-485 interface

Serial RS-485 interface is used for connecting multiple level meters to a single data logger. RS-485 interface uses a different protocol then the protocol used over RS-232 interface, in order to allow multiple level meters connected on a single RS-485 bus. The main difference from the protocol used over RS-232 interface is that the level measurements are not reported automatically, but are instead reported only after being requested by the master device (data logger unit). LX-80 supports Modbus protocol over RS-485 bus. Detailed description of the protocol is given in the Chapter 6 of this User manual.

Default communication parameters are:

Bitrate:	9600 bps
Data bits:	8
Stop bits:	1
Parity:	Even

6. Data Protocols

Geolux LX-80 L level meter supports the following data protocols:

- NMEA-like protocol on RS-232 interface that constantly outputs the detected current level and averaged level based on the last 24 (parameterable) readings
- Servicing protocol on RS-232 interface for configuring the unit
- Request-response protocol (Modbus) on RS-485 interface that allows multiple units to be used on a single RS-485 bus

Support for additional protocols is available upon customer request.

6.1. NMEA protocol (RS-232)

NMEA protocol is based on the standard protocol family widely used by the navigation equipment. NMEA protocol is sentence oriented, and is capable of sending multiple sentences with different information. The sentence content is designated by the starting keyword which is different for each sentence type. NMEA sentences are terminated with the checksum which makes this protocol extremely reliable. NMEA protocol is singe-direction protocol: data is only transmitted from the level meter.

At RS-232 interface the device periodically outputs following data sentences:

Level measurement report

$LVX,L1,L2<CR><LF>

$LVX: The keyword sent on the beginning of each detection report. This sentence is sent whenever there is detected level.

L1: Current detected level (in mm)
L2: Average detected level (in mm)

6.2. Servicing protocol (RS-232)

The servicing protocol is used to retrieve and modify device operating parameters. Various device settings, such as unit system and filtering parameters are configured using this protocol. Since NMEA protocol is one way (it only outputs the data), the servicing protocol is always active.

To make radar configuration easy, Geolux provides a Configurator utility application. Regular users do not need to be concerned about the servicing protocol used between the Configurator utility and the level meter device. The Configurator utility is described in the Chapter 7 of this manual.

The servicing protocol listens on RS-232 serial port for incoming requests, and on each received request, it will answer back.

The following requests are recognized by the servicing protocol:

Change serial number

#set_serial_number=<>

Sets the serial number, which is up to six printable ASCII characters.

Change serial baud rate

#set_baud_rate=9600
#set_baud_rate=38400
#set_baud_rate=57600
#set_baud_rate=115200

Changes the device serial baud rate.

Change modbus ID

#set_modbus_id=<1-255>

Changes the device modbus ID. Accepts integer values.

Change modbus baud rate

#set_modbus_baud_rate=9600
#set_modbus_baud_rate=19200
#set_modbus_baud_rate=38400
#set_modbus_baud_rate=57600
#set_modbus_baud_rate=115200

Changes the device modbus baud rate.

Change modbus parity

#set_modbus_parity=0
#set_modbus_parity=1
#set_modbus_parity=2

Changes the device modbus parity. 0=no parity, 1=odd parity, 2=even parity.

Change modbus stopbits

#set_modbus_stopbits=1
#set_modbus_stopbits=2

Changes the device modbus stopbit.

Change moving average filter

#set_frame_number=<1-32>

Changes the window length (in samples) for moving average filter. Accepts integer values.

Change IR filter

#set_IR_constant=<0-1>

Changes the constant used by IR filter. Accepted values are floating point using decimal point between 0 and 1.

Change measurement offset

#set_level_offset=<0->

Changes level offset. Accepted values are floating point using decimal point in meters. Calibrated and should not be changed unless necessary.

Change amplitude threshold

#set_amplitude_threshold=<0->

Changes the minimum spectrum amplitude threshold for peak to be detected. Peaks under this value will not be detected. Accepts integer values.

Change deadzone settings

#set_deadzone_min=<0->
#set_deadzone_max=<0->

Changes the deadzone of the sensor. Objects under deadzone min and over deadzone max will not be registered. Accepted values are floating point using decimal point in millimeters.

Change 4-20mA settings

#set_analog_min=<0->
#set_analog_max=<0->

Changes the range in which 4-20mA output reports values of the sensor. Minimum value is reported as 4mA and maximum value is reported as 20mA. Both values are accepted as floating point, in millimeters.

Retrieve current device status

#get_info

Requests the current device status. Here is an example status output:

```
# device_type:999
# firmware:16
# serial_number:000000
# modbus_id:2
# baud_rate:115200
# rs485_baud_rate:9600
```

```
# rs485_parity:2
# rs485_stopbits:1
# level_range:15360.000000
# level_resolution:7.500000
# level_offset:0.100000
# deadzone_min:0.200000
# deadzone_max:15.360000
# averaging_frame_number:24
# spectrum_amplitude_threshold:15
# IR_constant:0.250000
# FFT_size:4096
# chirp_slope_rate:40
# ramp_duration:100
# sampling_rate:8191
# number_of_samples:777
# RX_gain:34
# active_TX_antenna:1
```

6.3. Modbus Protocol (RS-485)

The unit responds to Modbus requests over RS-485 dana line. The baud rate is configured through the PC application, and 1 stop bit, even parity, 8 data bits configuration is used.

Modbus registers that are accessed by Modbus protocol are 16-bit (2-byte) registers. Any number of registers can be read or written over Modbus.

Modbus is a request-response protocol where a master (such as datalogger) sends out requests, and slave devices (such as LX-80 sensor) responds. The request and response format, with example is given in tables 3-6.

In each request, the master can either ask the slave to retrieve value of one or more registers, or the master can set the value of one or more registers. Each register holds one 16-bit value.

Table 3. Master request format

Name	Addr	Fun	Data start Addr		Data#of regs		CRC16	
Length	1 byte	1 byte	2 bytes (H,L)		2 bytes (H,L)		2 bytes (L,H)	
Example	0X01	0X03	0X00	0X00	0X00	0X01	0X84	0X0A

Table 4. Request example

Name	Content	Detail
Address	0X01	Slave address (Sensor id)
Function	0X03	Read slave info

Data start Addr	0X00	The address of the first register to read (HIGH)
	0X00	The address of the first register to read (LOW) – Sensor ID reg
Data of regs	0X00	High
	0X01	Low (read only 1 register)
CRC16	0X84	CRC Low
	0X0A	CRC High

Table 5. Slave (sensor) response format

Name	Addr	Fun	Byte count	Data		CRC16	
Length	1 byte	1 byte	1 byte	2 bytes(H,L)		2 bytes(L,H)	
Example	0X01	0X03	0X02	0X00	0X01	0X79	0X84

Table 6. Response example

Name	Content	Detail
Address	0X01	Slave address (Sensor id)
Function	0X03	Read slave info
Data length	0X02	Data length is 2 bytes
Data	0X00	Data high byte
	0X01	Data low byte, means ID is 1
CRC16	0X79	CRC Low
	0X84	CRC High

The table 7 defines the data returned by the unit when the master requests register read. The table 8 defines how to write device configuration. Rows highlighted in blue denote the important values measured by the sensor. Rows highlighted in green denote operating parameters that could be changed in the field.

Table 7. Retrieving data from the sensor

Fun	Data Addr	Data Length	Data Range	Details
0X03	0x0001	2 bytes	0 – device range[mm]	Current level measurement
	0x0002	2 bytes	0 – device range[mm]	Average level measurement
	0x0003	2 bytes	0 → 9600 1 → 38400 2 → 57600 3 → 115200 0xFF → other/error	RS-232 baud rate
	0x0004	2 bytes	1 - 255	Modbus ID
	0x0005	2 bytes	0 → 9600 1 → 19200	RS-485 baudrate (Modbus)

			2 → 38400 3 → 57600 4 → 115200 0xFF → other/error	

Fun	Data Addr	Data Length	Data Range	Details
0X03	0x0006	2 bytes	0 → no parity 1 stopbit 1 → no parity 2 stopbits 2 → odd parity 1 stopbit 3 → odd parity 2 stopbits 4 → even parity 1 stopbit 5 → even parity 2 stopbits default → even parity 1 stopbit	RS-485 parity and stopbits
	0x000A	2 bytes	900 - 65535	Device type; LX-80 → 999, 998
	0x000B	2 bytes	1 – 32 default: 24	Number of frames for average measurement
	0x000C	2 bytes	1 – 65535 default: 0	Minimum spectrum amplitude threshold, used for detecting peaks
	0x000D	2 bytes	0 – device range [mm] default → 0	Deadzone minimum in mm
	0x000E	2 bytes	0 – device range[mm] default → device range [mm]	Deadzone maximum in mm
	0x000F	2 bytes	0 – device range[mm] default → device range [mm]	4-20mA minimum value in mm
	0x0010	2 bytes	0 – device range[mm] default → device range [mm]	4-20mA maximum value in mm
	0x0011	2 bytes	0 – device range [mm]	Level measurement offset
	0x0012	2 bytes	0 – 1000	IR filter constant $IR_{const} = \frac{value_{int}}{1000}$
	0x0013	2 bytes	0 – 34	RX gain
	0x0014	2 bytes	1 – 3	Active TX antenna
	0x0015	2 bytes	2 printable characters	Serial number[0-1]
	0x0016	2 bytes	2 printable characters	Serial number[2-3]

	0x0017	2 bytes	2 printable characters	Serial number[4-5]
	0x0018	2 bytes		FW version

Table 8. Writing dana to the sensor

Fun	Data Addr	Data Length	Data Range	Details
0X06	0x0003	2 bytes	0 → 9600 1 → 38400 2 → 57600 3 → 115200 0xFF → other/error	RS-232 baud rate
	0x0004	2 bytes	1 - 255	Modbus ID
	0x0005	2 bytes	0 → 9600 1 → 19200 2 → 38400 3 → 57600 4 → 115200 0xFF → other/error	RS-485 baudrate (Modbus)
	0x0006	2 bytes	0 → no parity 1 stopbit 1 → no parity 2 stopbits 2 → odd parity 1 stopbit 3 → odd parity 2 stopbits 4 → even parity 1 stopbit 5 → even parity 2 stopbits default → even parity 1 stopbit	RS-485 parity and stopbits
	0x000B	2 bytes	1 – 32 default: 24	Number of frames for average measurement
	0x000C	2 bytes	1 – 65535 default: 0	Minimum spectrum amplitude threshold, used for detecting peaks
	0x000D	2 bytes	0 – device range [mm] default → 0	Deadzone minimum in mm
	0x000E	2 bytes	0 – device range[mm] default → device range [mm]	Deadzone maximum in mm
	0x000F	2 bytes	0 – device range[mm] default → device range [mm]	4-20mA minimum value in mm
	0x0010	2 bytes	0 – device range[mm]	4-20mA maximum value in mm

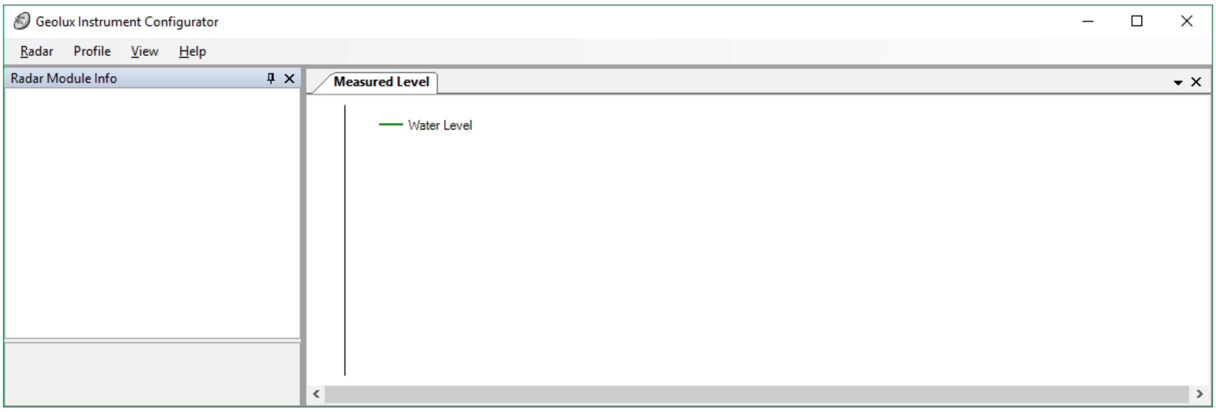
			default → device range [mm]	
	0x0011	2 bytes	0 – device range [mm]	Level measurement offset
	0x0012	2 bytes	0 – 1	IR filter constant $IR_{const} = \frac{value_{int}}{1000}$
	0x0015	2 bytes	2 printable characters	Serial number[0-1]

Fun	Data Addr	Data Length	Data Range	Details
0x06	0x0016	2 bytes	2 printable characters	Serial number[2-3]
	0x0017	2 bytes	2 printable characters	Serial number[4-5]

7. Radar Configurator Utility

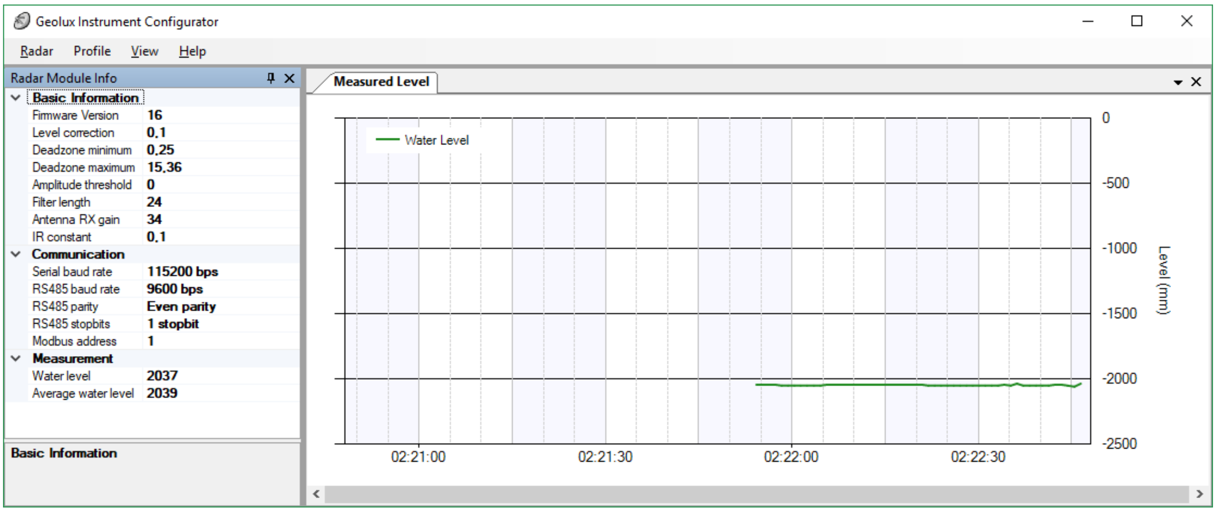
Geolux provides a user-friendly PC application for configuring the level meter operating parameters. Additionally, the Configurator Utility displays current level measurements.

When started, the Configurator Utility displays its main window. Initially, no level data is displayed, as the connection to the level meter device is not established.



Picture 3. Level Meter Configurator main window

To connect the Configurator utility with the level meter, connect your PC to the radar using an RS-232 serial cable connection. Then, select the *Radar → Connect* menu option in the Configurator Utility, and choose the appropriate COM port number. The Configurator will try to establish a data link between your PC and the level meter device. After the data link is established, active device parameters will be displayed, and the level measurements will be displayed:



Picture 4. Configurator main window with device connected

The utility window is divided into two panes, that can be manually re-arranged. The first panel (at the left part of the screen) is the Radar Module Info pane that displays the radar level meter information and operating parameters. Some of these parameters can be changed by editing the values directly inside the Radar Module Info pane. The following information is displayed:

Firmware version	the version of the firmware running in the radar sensor device
Level correction	correction in meters to be added to the detected level
Deadzone minimum	minimum detected distance
Deadzone maximum	maximum detected distance
Filter length	if moving average filter is used, select the averaging window length
Amplitude threshold	minimum spectrum amplitude necessary for peak detection
RX gain	the current gain value of the radar signal amplifier
IR constant	if IR is used, this value is used for the IR filter
Serial baud rate	the communication baudrate used for serial communication
RS485 baud rate	the communication baudrate used for RS485 communication
RS485 parity	parity used on the RS485 bus
RS485 stopbits	stopbits used on the RS485 bus
Modbus address	device address on the RS485 bus
Water level	water level in meters
Average water level	average water level in meters, using filter length

The second pane (in the right part of the window) displays the history graph showing the measured level in the last 30 minutes.

8. Mechanical Drawing