

# UV-Photometer FlowMissio-C



## manual

Version: 3.0

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## 1 Change history

Date	Version	Changed by	Comment
31.03.00	1.0	S. Rau	Build
30.08.00	1.0	S. Rau	Exchange of silica gel
19.11.01	1.1	S. Rau	Translation
29.06.11	1.2	S. Rau	Update
20.05.14	3.0	Paravia	Update Controller Board

## 2 Symbols Overview



Meaning:

Failure to observe the mentioned instructions can result in an injury of the user.



Meaning:

Failure to observe the mentioned instructions can result in a damage of the device.



Meaning:

Instructions are to be observed for the regular operation.

\*

Meaning:

Optional functions, not available for every device

### 3 General description

The flow process photometer FlowMissio-C is a double-beam photometer for the control of fresh and process water and other liquids at 254 nm. The photometer is outstandingly suitable for control of water quality in water plants or in production processes.

An internal sensor is measuring the power of the lamp and an external sensor the transmitted power of lamp. Transmission is calculated out of power ratio. A calibration factor allows the setup of the value of a calibration solution. The instrument comprises a 4-20 mA analog output, is menu driven and controlled via touch switches. For process controlling two variable switch thresholds are available.

The photometer is designed for an absorption path length of 50 mm. The graphical display shows the measured transmission and transmission for other pre-selectable absorption path length. Furthermore the absorption coefficients are displayed.

Two threshold values can be set and read out by external PLC contact.



Operate the FlowMissioC with closed housing only. The radiation of the UVC-lamp inside is harmful. Only trained technical personnel may open the equipment!

UV radiation is harmful for humans, animal and plant. Consider the protection regulations. Scattered light could lead to damages of the retina. Keep the transparent cover always closed.

## 4 Important Notes



The operation manual is to be read completely prior to the startup and operation of the system.



Before opening the system it has to be disconnected from the power supply and the absence of voltage is to be checked.



The system is equipped with UV-C lamp. There is a risk of photochemical damage of the eye, erythema and skin cancer. The operating staff is to be trained appropriately.

For protection of the operating staff, do not look into the lamp and do not expose the skin to UV radiation.

## 5 Installation

Please read the operating instructions carefully, before taking the equipment in action. Consider particularly the connection of the clamps (see chapter: Connections ). A wrong connection can lead to damages at the equipment

Connect water inlet and water outlet.

Then connect clamps and mains.

After the power on of the equipment the following start logo appears:



Afterwards the transmission measurement is started. The internal and the external sensor are simultaneous measuring. This results in stable measuring values already during warming-up of the lamp. So warming-up phase of 90 s is short, but recommended.

## 6 Operation

After the first measurement the display shows the actual transmission:

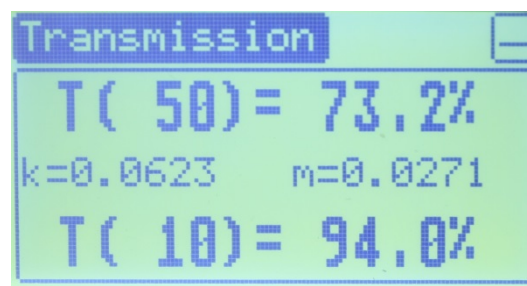


This value is directly determined using the two sensor signals.

Use the cursor keys  $\leftarrow$ ,  $\rightarrow$  to change screens.



Screen 2, showing thresholds



Screen 3, showing calculated transmission and extinction coefficients

In screen 2 the threshold values are shown in lower left and upper left corner. Upper left corner shows threshold 1, lower left corner shows threshold 2. Inverted text highlights reached thresholds.

In the upper right corner the threshold are indicated with a two line pictogram. Again: upper line indicates threshold 1, lower line indicates threshold 2. In this example the threshold 2 is reached.

In screen 3 the measured transmittance in percent is displayed as  $T ( XX)$ . This value is directly determined using the two sensor signals.

The extinction coefficient  $k$  on the left side and the decadic extinction coefficient  $m$  on the right side are shown as well.

The calculated transmittance is shown as  $T ( XX)$  on the bottom for an adjustable layer thickness. In the example above this layer thickness is 10 mm.

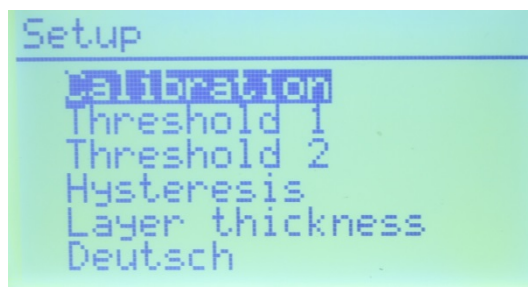
The formulas for these calculations are shown in chapter Calculations.

## 7 Settings

To enter main menu press the ✓ key.

Use the four cursor keys ◀, ▶, ▲, ▼ and the center ok key (✓) to navigate through the menu. Inverted text highlights the selected menu item.

To confirm the selected function press the ✓ key.



If you press the ◀ key on the menu, you will be back in the measurement mode.

### 7.1 Calibration (formerly reference value)

This submenu option allows you to recalibrate the FlowMissio. Fill the cuvette with the reference liquid (e.g. distilled water) of known transmission for calibration. Don't start recalibration before measurements are stable.

Use ◀, ▶, ▲ and ▼ keys to set desired reference value. Confirm with ✓ to start the recalibration. The FlowMissio determines a calibration factor for the actual measurement made to achieve the reference value. This calibration factor is stored and you are back in the main menu.

Press ◀ for 2 seconds to abort calibration.

### 7.2 Threshold 1 and 2

This menu option permits successive changing of the threshold levels for the two external switching PLC contacts. Use ◀, ▶, ▲ and ▼ keys to set desired value. Confirm with ✓ or press ◀ for 2 seconds to abort.

### 7.3 Hysteresis

This menu option permits successive changing of the hysteresis. Use ◀, ▶, ▲ and ▼ keys to set desired value. Confirm with ✓ or press ◀ for 2 seconds to abort.



Theshold and hysteresis values change the external PLC contacts. A contact is active if transmission is higher than **threshold value plus hysteresis value** and stays active until transmission is lower than **threshold value minus hysteresis value**.



## 7.4 Layer thickness

This submenu permits configuration of the layer thickness for transmittance calculation. A change of the layer thickness is possible from 1 mm to 999 mm in 1 mm steps.

## 7.5 Language

Language can be set to English or German with ✓ key.

# 8 Calculations

The UV photometer FlowMissio C is a two-ray photometer. It consist of a UVC lamp and two detection channels. The first detection channel is measuring constantly the lamp power  $I_{Lamp}$ . The second detection channel is measuring constantly the transmitted lamp power  $I_{Trans}$ . Using these two values the transmission  $T(50)$  is calculated:

$$T(50) = c * \frac{I_{Trans}}{I_{Lampe}}$$

The constant  $c$  is a calibration factor, which is determined in the menu reference value (see Calibration (formerly reference value)). During production this value is set to one.

The extinction coefficient  $k$  is calculated from the transmission  $T(50)$  using the following formula:

$$k = \frac{-\ln(T(50))}{d}$$

In this formula  $d$  is the thickness of the cuvette in centimeter.

The calculation of the decadic extinctions coefficient uses the logarithm rule  $\lg(x) = \lg(e) * \ln(x)$ . Only the extinction coefficient must be multiplied by  $\lg(e)$  and the result is the decadic extinction coefficient  $m$ .

For the calculation of the transmission  $T(x)$  for an adjustable layer thickness  $dx$  (in cm) the following formula is used:

$$T(x) = e^{\frac{\ln(T(50)) * dx}{d}}$$

## 9 Maintenance and service

The UV photometer FlowMissio C does not require a lot of maintenance and care servicing. The assigned UV lamp should be changed after 2000 operation hours (2 ½ months).

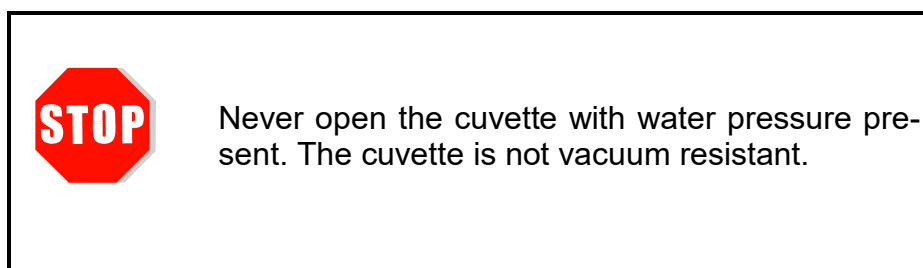
### 9.1 Exchange of the UV-lamp

Switch-off the supply voltage for the photometer. Open the transparent cover and flip it to the side. The lamp insert is attached at the right hand side of the housing. Open the two retaining screws and pull the module out. Put the new module into the guidance and fasten it with the retaining screws. Check the calibration with distilled water and recalibrate if necessary (see Calibration (formerly reference value)).

### 9.2 Cleaning of the cuvette

Only the cuvette is sensitive to impurities. It should be cleaned regularly at least with each lamp change. To clean the cuvette, switch off the supply voltage. Ensure that the cuvette is pressure-free.

Avoid a vacuum during removing the water from the cuvette. Always keep the water inlet open.



Disconnect the plug from the sensor. Open thereafter the four knurled nuts at the cuvette. Now, you can remove the sensor plate.

Clean the two windows and the cuvette. Check the sealings. Sealings with the smallest damage have to be exchanged. Assemble the cuvette in reverse order again. Bolt the knurled nuts and attach the connector to the sensor.

Test tightness of the cuvette and test the calibration.

### 9.3 Exchange of the silica gel

Silica gel is inside the housing. This prevents the window from getting misty.

For the exchange of the desiccant the housing must be opened. To open the housing turn the screw on the right hand side of the housing approx. 90° counterclockwise. Now you can flip the front housing with the cuvette to the left. Remove the bags with the desiccant from the housing. These bags are fastened with cable straps to the housing. This is only a transport lock. The cable straps must be cut to remove the bags.

Put new desiccant into the housing. The function of the bags will remain longer, if you put more bags into the housing. Now close the housing again. Be sure the housing is closed and no cables are jammed. Also note that the transparent front cover should always be closed. Close the cable inlets at the terminal box when no cable attached.

This prevents humidity from entering the housing and the windows from getting misty.

## 10 Technical data

### 10.1 Device

Device number	: 830701
Dimensions	: approx. 400 x 250 x 340
Weight	: 12.1 kg
Operating temperature	: 0 to 40 °C
Housing	: IP65
Signal output	: 2 voltage free commutators 250V/1A
Analog output	: 4 - 20 mA, 20mA=110%
Power supply	: 100 - 240 V / 50 60 Hz / 500 mA

### 10.2 Lamp

Lamp	: low pressure Mercury vapor lamp, ozone free
Power	: 4 Watt
Current	: 30 mA
Lifetime	: about 2000 h
Running voltage	: 150 V
Initial voltage	: 190 V

### 10.3 Connections

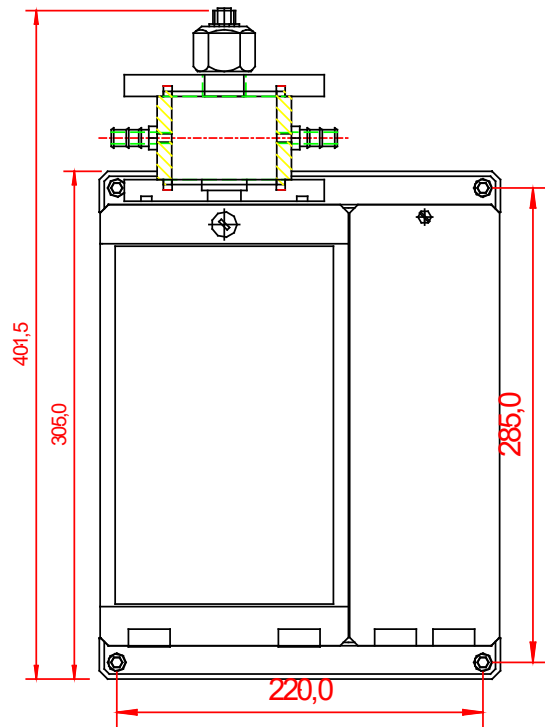
X1		
	1	PE
	2	L1
	3	N
X2		
	1	PE
	2	NO theshold 1 (similar: alarm)
	3	NC theshold 1 (similar: alarm)
	4	Alarm
	5	NO theshold 2 (similar: Pre-alarm)
	6	NC theshold 2 (similar: Pre-alarm)
	7	Pre- alarm
X3		
	1	PE
	2	4-20 mA High = 0-110%
	3	4-20 mA Low
X4	RS232	1200Baud, 8 Data, 1 Stop, None
	1	Transmit Data (TxD – connect with Pin 2 at PC)
	2	Receive Data (Rxd – connect with Pin 3 at PC)
	3	Ground (Ground – connect with Pin 5 at PC)

## 10.4 Spare parts

Description	Order number
Lamp insert	93070101
Sealing set cuvette	93070102
Silica gel	93070103
UVCS Sensor	810312

Subject to changes

### 10.5 drawing



Schlauch DN11

