Water quality monitoring

Multiparameter measuring systems for ground and surface water

Measuring parameters
- water level
- temperature
- conductivity
  - total dissolved solids (TDS)
  - salinity
  - density
- dissolved oxygen
  - oxygen saturation
- pH value
- redoxpotential
- ammonia
- nitrate
- chloride
- ammonium
- sodium
- calcium
- fluoride
- potassium
- chlorophyll a
- cyanobacteria
- rhodamine WT
- turbidity
  - total suspended solids (TSS)

Electric contact meter KLL-Q-2
FlashCom-2/LogCom-2
Measuring in spring discharges
stationary online
MPS-Checker-2

MPS-K16 Qualilog-16
MPS-D8 Qualilog-8
MPS-PTEC Dipper-PTEC

measuring in ground water
online-measuring in ground water
measuring station
measuring in surface water
## MPS- Multiparameter sensors MPS-PTEC / -D8 / -K16 and MPS-Qualilog -8 / -16

Equipped with up to 12 sensors, by which 16 different water quality parameters can be measured, the SEBA multiparameter sensors provide reliable informations about the conditions at the measuring site.

The multiparameter sensors MPS represent the consequent further development of the SEBA multiparameter product line. The calibration will be performed via user friendly software SEBAConfig. The Availability of high data quality is the base for proper evaluation of the hydrological enviroment.

To display the measured values the MPS sensors can be combined with the SEBA electric contact meter (mainly for ground water) or with the SEBA MPS-Checker (mainly for surface water). Continuously monitored measuring sites can be equipped with SEBA data loggers with or without data transmission (e.g. Unilog) or with integrated logger.

Designed for robust use in the field the sensors perform under roughest conditions like e.g. in tropic, arid and arctic enviroments. Rugged and ready for all uses in the field they measure with optimum precision. SEBA sensors stand out due to high long-term stability (optical sensors) together with low maintenance requirements and can be used as stationary or mobile sensors.

<table>
<thead>
<tr>
<th>MPS-PTEC</th>
<th>Digital multiparameter sensors with RS485-output and sensors for measuring water level, temperature, conductivy and salinity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dipper-PTEC</td>
<td>Digital multiparameter sensor with integrated data logger and sensors for measuring water level, temperature, conductivy and salinity</td>
</tr>
<tr>
<td>MPS-D8</td>
<td>Digital multiparameter sensors with RS485-output and up to 8 electrodes in a stainless steel case</td>
</tr>
<tr>
<td>Qualilog-8</td>
<td>See MPS-D8 but additionally with integrated data logger</td>
</tr>
<tr>
<td>MPS-K16</td>
<td>Digital multiparameter sensors with RS485-output and up to 12 electrodes in a robust plastic case</td>
</tr>
<tr>
<td>Qualilog-16</td>
<td>See MPS-K16 but additionally with integrated data logger</td>
</tr>
</tbody>
</table>

for depths of up to 500m (dependent on used electrodes)

MPS-PTEC
Dipper-PTEC
MPS-D8
Qualilog-8
MPS-K16
Qualilog-16

with antifouling coating
## Product overview

### Multiparameter sensors

<table>
<thead>
<tr>
<th>Parameter</th>
<th>MPS-PTEC</th>
<th>Dipper-PTEC</th>
<th>MPS-D8</th>
<th>Qualilog-8</th>
<th>Qualilog-16</th>
</tr>
</thead>
<tbody>
<tr>
<td>water level (pressure)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>temperature</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>conductivity</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>- total dissolved solids TDS</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>- salinity</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>- water density</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>oxygen</td>
<td>- oxygen saturation</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>pH</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>redox</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>ammonia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nitrate *</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>chloride *</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>ammonium *</td>
<td></td>
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<td></td>
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<tr>
<td>sodium *</td>
<td></td>
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<td></td>
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<tr>
<td>calcium *</td>
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<td></td>
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<tr>
<td>fluoride *</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>potassium *</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fluorometer for chlorophyll or cyanobacteria or rhodamine WT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>signal at water contact (KLL)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>turbidity</td>
<td>- total suspended solids TSS</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

**Maximum amount of measured parameters:**

- MPS-PTEC: 6
- Dipper-PTEC: 6
- MPS-D8: 13
- Qualilog-8: 17
- Qualilog-16: 17

### Technical data

<table>
<thead>
<tr>
<th>Sensor type</th>
<th>MPS-PTEC</th>
<th>Dipper-PTEC</th>
<th>MPS-D8</th>
<th>Qualilog-8</th>
<th>MPS-K16</th>
<th>Qualilog-16</th>
</tr>
</thead>
<tbody>
<tr>
<td>diameter [mm]</td>
<td>22</td>
<td>22</td>
<td>48</td>
<td>48</td>
<td>89</td>
<td>89</td>
</tr>
<tr>
<td>basic length [mm]</td>
<td>300</td>
<td>300</td>
<td>493</td>
<td>493</td>
<td>572</td>
<td>572</td>
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<tr>
<td>+ plug-in system [mm]</td>
<td>+81</td>
<td>+81</td>
<td>+185</td>
<td>+185</td>
<td>+185</td>
<td>+185</td>
</tr>
<tr>
<td>+ turbidity [mm]</td>
<td>+185</td>
<td>+185</td>
<td>+185</td>
<td>+185</td>
<td>+185</td>
<td>+185</td>
</tr>
<tr>
<td>basic weight [kg]</td>
<td>0,4</td>
<td>0,4</td>
<td>2,1</td>
<td>2,1</td>
<td>2,5</td>
<td>2,5</td>
</tr>
<tr>
<td>+ plug-in system [kg]</td>
<td>+0,3</td>
<td>+0,3</td>
<td>+0,3</td>
<td>+0,3</td>
<td>+0,3</td>
<td>+0,3</td>
</tr>
<tr>
<td>+ turbidity [kg]</td>
<td>+0,95</td>
<td>+0,95</td>
<td>+0,95</td>
<td>+0,95</td>
<td>+0,95</td>
<td>+0,95</td>
</tr>
<tr>
<td>sensor body Ø</td>
<td>1.4539</td>
<td>1.4539</td>
<td>1.4404</td>
<td>1.4404</td>
<td>PVC-U</td>
<td>PVC-U</td>
</tr>
<tr>
<td>pluggable</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>output</td>
<td>RS485 4,20mA SDI12 Modbus</td>
<td>RS485 4,20mA SDI12 Modbus</td>
<td>RS485 4,20mA SDI12 Modbus</td>
<td>RS485 4,20mA SDI12 Modbus</td>
<td>RS485 4,20mA SDI12 Modbus</td>
<td>RS485 4,20mA SDI12 Modbus</td>
</tr>
<tr>
<td>supply voltage</td>
<td>4-15 VDC</td>
<td>4-15 VDC</td>
<td>4-15 VDC</td>
<td>4-15 VDC</td>
<td>4-15 VDC</td>
<td>4-15 VDC</td>
</tr>
<tr>
<td>- with optical sensors</td>
<td>-</td>
<td>-</td>
<td>8-15 VDC</td>
<td>8-15 VDC</td>
<td>8-15 VDC</td>
<td>8-15 VDC</td>
</tr>
</tbody>
</table>

*Calculated parameter

1) For battery compartment the first 80 cm 2" are necessary.

At the parameters (No. 8 - 14) marked with * the pH- or redox-electrode has to be implemented constantly, because these values are needed as reference.
Decisive customer advantages

- **High flexibility**: Connection facility to different terminal devices for mobile and/or stationary application

- **Intelligent modular system**: Individual retrofitting of further parameters within a series anytime possible

- **New optical sensor technology**: Measurement of dissolved oxygen, cyanobacteria, chlorophyll a and rhodamine WT

- **Quick and uncomplicated exchange**: of exhausted electrodes

- **Compact design**: Useable in pipes with minimum 1½” and 4” (MPS-K) diameter

Accessories

- **Calibration liquids and replacement sensors**
- **Anti-Fouling**
- **Cleaning of electrodes with wiper** for MPS-K16 and Qualilog 16

- **Signal converter**
  - RS 485 - 4-20 mA

- **RS 485 - Modbus**

- **RS 485 - SDI 12**

- **Calibration stand**

- **Flow-through vessel**

- **Evaluation software DEMASvis**
  - DEMASvis is an elaborate software solution for visualization and editing of measurement results:
  - Graphics and lists at a glance!
  - Input option for comments
  - Automatic correction of hydrographs and lists via check values
Application variants

**portable systems**

- HDA-Tablet
- HDA-Pro
- Notebook
- KLL-Q-2
- Checker-2

- MPS-K16 Qualilog-16
- MPS-D8 Qualilog-8
- MPS-PTEC Dipper-PTEC

**stationary systems**

- LogCom-2/FlashCom-2
- Unilog
- UniLog-Light
- UnilogCom

- MPS-K16
- MPS-D8
- MPS-PTEC
## Application examples

### portable systems for ground water

The SEBA electric contact meter **KLL-Q-2** is a unique mobile field laboratory for measuring water quality at ground water measurement sites with minimum 2” diameter.

- compact design
- easy handling
- quick and precise capture of different parameters until max. 500 m depth
- integrated data logger (optional)

For monitoring of deep drillings SEBA has developed a mobile winch system with electrical drive. The multiparameter sensor is able to measure, display and record water quality and water quality profiles until a depth of 800m.

Special solution with electrical winch

### portable systems for storage reservoirs

With the electric contact meter **KLL-Q-2** water quality and water quality profiles can be measured comfortably in reservoirs or lakes.

- compact design
- easy handling
- quick and precise capture of different parameters until max. 500 m depth
- integrated data logger (optional)

### portable systems for rivers

The SEBA multiparameter system **Checker-2** was developed as mobile field laboratory especially for determination of parameters which are significant for water quality in lakes, rivers, channels and sea.

- compact design
- easy handling
- quick and precise capture of different parameters
- integrated data logger (optional)
## Application examples

### Stationary systems in ground water

Monitoring of ground water quality becomes more and more important globally. By using SEBA multi-parameter sensors together with data logger (e.g. LogCom-2 or FlashCom-2) water quality can be monitored network-independent continuously, online (GSM/GPRS) or offline.

Primarily measured parameters:
- water-level
- temperature
- conductivity
- salinity
- pH value
- nitrate etc.

### Stationary systems in storage reservoirs

Permanent measurement of water quality in lakes and storage reservoirs is mostly performed by means of moored buoys or pontoons. The multiparameter sensor is dangled at a certain water depth, the complete electronics is installed waterproof in the buoy. The power supply with solar cells allows permanent monitoring of water quality with constant data transmission (GSM / GPRS or radio).

Primarily measured parameters:
- water-level
- temperature
- conductivity
- oxygen
- pH value
- chlorophyll a
- nitrate etc.

### Stationary systems in rivers

Together with the continuously measuring low-maintenance SEBA multiparameter sensors, automatic warning systems are installed which display the water quality in real time.

Real time water quality measuring are positioned at strategic locations on rivers, e.g. to determine forbidden discharge, to document misconduct, to set off the alarm and therefore to secure water protection.

Primarily measured parameters:
- water-level
- temperature
- conductivity
- oxygen
- pH value
- ammonium etc.

### Stationary systems in channels

The monitoring of water quality in irrigation channels is essential nowadays. Polluted and saline water damages plants and could cause crop failures. Selected parameters of water quality will be documented. SEBA multiparameter sensors in connection with data acquisition and transmission systems Wasserqualitäten dokumentiert und ggfls. Alarme bei Grenzüberschreitungen ausgelöst.

Primarily measured parameters:
- water-level
- temperature
- conductivity
- oxygen
- pH value
- ammonium etc.
### Technical data of electrodes

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Measuring range</th>
<th>Accuracy</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>water level</strong></td>
<td>0-10, 20, 50, 100, 200m&lt;br&gt;0...100/200 mWss&lt;br&gt;Temperature: -5...50°C</td>
<td>+/- 0.1% of end of measuring range</td>
<td>0.002%</td>
</tr>
<tr>
<td><strong>temperature</strong></td>
<td>Temperature: -5...50°C&lt;br&gt;Pressure: 0...500 mWss</td>
<td>+/- 0.1°C</td>
<td>0.01°C</td>
</tr>
<tr>
<td><strong>conductivity</strong></td>
<td>0...200 mS&lt;br&gt;Temperature: -5...50°C&lt;br&gt;Pressure: 0...500 mWss</td>
<td>+/- 1 µS/cm (&lt; 200 µS/cm)&lt;br&gt;+/-.5% (&gt; 200 µS/cm)</td>
<td>0.001 mS/cm</td>
</tr>
<tr>
<td><strong>total dissolved solids (TDS)</strong></td>
<td>0...200 000 mg/l&lt;br&gt;Temperature: -5...50°C&lt;br&gt;Pressure: 0...500 mWss</td>
<td>+/- 0.2 (0...16)&lt;br&gt;+/-.8% (&gt;16)</td>
<td></td>
</tr>
<tr>
<td><strong>salinity</strong></td>
<td>0...70&lt;br&gt;Temperature: -5...50°C&lt;br&gt;Pressure: 0...500 mWss</td>
<td>+/- 0.1% of end of measuring range</td>
<td>0.1%</td>
</tr>
<tr>
<td><strong>water density</strong></td>
<td>968...1060 g/l&lt;br&gt;Temperature: -5...50°C&lt;br&gt;Pressure: 0...500 mWss</td>
<td>+/- 0.5% of end of measuring range</td>
<td></td>
</tr>
<tr>
<td><strong>oxygen (amperometric)</strong></td>
<td>0...40 mg/l&lt;br&gt;Temperature: 0...50°C&lt;br&gt;Pressure: 0...100 mWss</td>
<td>+/- 0.02 mg/l (0...2 mg/l)&lt;br&gt;+/-.1% of measured value (&gt;2 mg/l)</td>
<td>0.01 mg/l</td>
</tr>
<tr>
<td><strong>oxygen (optic)</strong></td>
<td>0...25 mg/l (bei 25°C, 1013 hPa)&lt;br&gt;0...40 mg/l (bei 3°C, 1013 hPa)&lt;br&gt;Temperature: -5...50°C&lt;br&gt;Pressure: 0.120 mWss</td>
<td>+/- 0.02 mg/l (0...2 mg/l)&lt;br&gt;+/-.1% of measured value (&gt;2 mg/l)</td>
<td>0.001 mg/l</td>
</tr>
<tr>
<td><strong>oxygen saturation</strong></td>
<td>0...400% saturation&lt;br&gt;Temperature: 0...50°C&lt;br&gt;Pressure: 0...100 mWss</td>
<td>+/- 0.5% of end of measuring range</td>
<td></td>
</tr>
<tr>
<td><strong>pH</strong></td>
<td>0...14 pH&lt;br&gt;Temperature: 0...50°C&lt;br&gt;Pressure: 0...200 mWss</td>
<td>+/- 0.1 pH&lt;br&gt;0.01 pH</td>
<td></td>
</tr>
<tr>
<td><strong>redox (ORP)</strong></td>
<td>-1200 mV...+1200 mV&lt;br&gt;Temperature: 0...50°C&lt;br&gt;Pressure: 0...200 mWss</td>
<td>+/- 10 mV&lt;br&gt;0.1 mV</td>
<td></td>
</tr>
<tr>
<td><strong>ammonia</strong></td>
<td>0.01...17000 mg/l&lt;br&gt;Temperature: 0...50°C&lt;br&gt;Pressure: 0...5 mWss</td>
<td>+/- 0.2 mg/l (24h) (0...10 mg/l)&lt;br&gt;+/-.2% of measured value (24h) (&gt;10 mg/l)</td>
<td>0.01 mg/l</td>
</tr>
<tr>
<td><strong>nitrate</strong></td>
<td>0.4...6000 mg/l&lt;br&gt;Temperature: 0...40°C&lt;br&gt;Pressure: 0...200 mWss</td>
<td>+/- 0.2 mg/l (24h) (0...40 mg/l)&lt;br&gt;+/-.5% of measured value (24h) (&gt;40 mg/l)</td>
<td>0.01 mg/l</td>
</tr>
<tr>
<td><strong>chloride</strong></td>
<td>1...35000 mg/l&lt;br&gt;Temperature: 0...50°C&lt;br&gt;Pressure: 0...200 mWss</td>
<td>+/- 0.2 mg/l (24h) (0...40 mg/l)&lt;br&gt;+/-.5% of measured value (24h) (&gt;40 mg/l)</td>
<td>0.01 mg/l</td>
</tr>
<tr>
<td><strong>ammonium</strong></td>
<td>0.2...18000 mg/l&lt;br&gt;Temperature: 0...40°C&lt;br&gt;Pressure: 0...10 mWss</td>
<td>+/- 0.2 mg/l (24h) (0...40 mg/l)&lt;br&gt;+/-.5% of measured value (24h) (&gt;40 mg/l)</td>
<td>0.01 mg/l</td>
</tr>
<tr>
<td><strong>sodium</strong></td>
<td>0.2...20000 mg/l&lt;br&gt;Temperature: 0...50°C&lt;br&gt;Pressure: 0...60 mWss</td>
<td>+/- 0.2 mg/l (24h) (0...40 mg/l)&lt;br&gt;+/-.5% of measured value (24h) (&gt;40 mg/l)</td>
<td>0.01 mg/l</td>
</tr>
<tr>
<td><strong>calcium</strong></td>
<td>0.5...40000 mg/l&lt;br&gt;Temperature: 0...40°C&lt;br&gt;Pressure: 0...10 mWss</td>
<td>+/- 0.2 mg/l (24h) (0...40 mg/l)&lt;br&gt;+/-.5% of measured value (24h) (&gt;40 mg/l)</td>
<td>0.01 mg/l</td>
</tr>
<tr>
<td><strong>fluoride</strong></td>
<td>0.2...20000 mg/l&lt;br&gt;Temperature: 0...40°C&lt;br&gt;Pressure: 0...10 mWss</td>
<td>+/- 0.2 mg/l (24h) (0...40 mg/l)&lt;br&gt;+/-.5% of measured value (24h) (&gt;40 mg/l)</td>
<td>0.01 mg/l</td>
</tr>
<tr>
<td><strong>potassium</strong></td>
<td>0.4...39000 mg/l&lt;br&gt;Temperature: 0...40°C&lt;br&gt;Pressure: 0...10 mWss</td>
<td>+/- 0.2 mg/l (24h) (0...40 mg/l)&lt;br&gt;+/-.5% of measured value (24h) (&gt;40 mg/l)</td>
<td>0.01 mg/l</td>
</tr>
<tr>
<td><strong>chlorophyll a (optical)</strong></td>
<td>0.01...500 µg/l&lt;br&gt;Chl a&lt;br&gt;Temperature: 2...50°C&lt;br&gt;Pressure: 0...600 mWss</td>
<td>+/- 3%</td>
<td>0.01 µg/l</td>
</tr>
<tr>
<td><strong>cyanobacteria (optical)</strong></td>
<td>2-40 000 ppb (PC)&lt;br&gt;0.15-750 ppb (PE)&lt;br&gt;Temperature: 2...50°C&lt;br&gt;Pressure: 0...600 mWss</td>
<td>+/- 3%</td>
<td>1 ppb (PC)&lt;br&gt;0.01 ppb (PE)</td>
</tr>
<tr>
<td><strong>rhodamine WT (optical)</strong></td>
<td>0.04...1000 µg/l&lt;br&gt;RWT&lt;br&gt;Temperature: 2...50°C&lt;br&gt;Pressure: 0...600 mWss</td>
<td>+/- 3%</td>
<td>0.01 µg/l</td>
</tr>
<tr>
<td><strong>turbidity (optical)</strong></td>
<td>0...1000 NTU&lt;br&gt;Temperature: 0...50°C&lt;br&gt;Pressure: 0...100 with wiper&lt;br&gt;0...200 without wiper</td>
<td>+/- 0.3 NTU (0...10 NTU)&lt;br&gt;+/-.5% (&gt;10 NTU)</td>
<td>0.01 NTU</td>
</tr>
<tr>
<td><strong>Total suspended solids (TSS)</strong></td>
<td>approx. 5 fold measured range turbidity mg/l&lt;br&gt;Temperature: 0...50°C&lt;br&gt;Pressure: 0...100 with wiper&lt;br&gt;0...200 without wiper</td>
<td>+/- 3%</td>
<td></td>
</tr>
</tbody>
</table>