

# **pHX / ReX**

**pH- / Redox  
Sensor**

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## **1. Introduction**

pHX / ReX are used to measure pH or Redox potential in water and wastewater treatment plants and other industrial applications.

## **2. A few words about this manual**

This manual details installation procedures and operational features of the Cerlic pH and Redox sensors. Menu navigation and technical data for the BB2 control box can be found in the BB2 service manual.

## **3. Design**

The pHX / ReX sensors are manufactured in SIS2343 (316SS) stainless steel and PVC. The sensors are mounted using PVC clamps. An adjustable stainless steel slide rail holder is available as an option as well as equipment for automatic cleaning.

The sensor has a fixed, shielded 10 m (33') cable used for signal transmission between the sensor and the BB2 control box.

## **4. Measuring principle**

pH is normally measured with an electrode where pH is expressed as a function of voltage. Today's electrodes often contain both a measuring electrode and a reference electrode, which in combination provide a voltage in linear proportion to the pH value. Electrodes internally combined with a reference and measuring cell are divided into two categories: gel electrodes and refillable electrodes. The gel electrode is the simpler and less expensive type. There are a number of different types of refillable electrodes for different applications, each with different internal solutions that are to be added at regular intervals. Cerlic provides a gel-filled glass electrode.

The temperature of the calibration buffer and the media to be measured can be entered in BB2 to compensate for the temperature dependence of the electrode. All settings are made in the central unit BB2 using a self-instructing menu controlled by just three keys. The output signal is frozen when you switch to menu mode so that the output signal will not change during procedures such as a re-calibration.

The BB2 has two 4-20 mA outputs, and relay outputs for alarm and cleaning of the electrode.

The current pH/mV is continuously displayed in a window, maximum, minimum and average values for the last 24 hours can be obtained by pressing two buttons.

## 5. Unpacking the Sensor

The unit has been tested and approved before delivery from the supplier. Please check to confirm that no visible damages occurred during shipment.

### Damages

If damages occurred during shipment, immediately contact UPS or other truck line as well as your Cerlic representative. The shipment can be returned only after contact has been made with Cerlic.

### Packaging

The original packaging is designed to protect the equipment and should be used for storage or if the goods must be returned.

### Content

Please check that the content corresponds to your order and packing list.

Every shipment should include:

- Sensor w/ 10 m (33ft) cable

### Optional parts for pHX / ORP Sensor:

- Slide rail mounting bracket for 28 mm Sensors P/N 11205264
- Flushing system 1 meter excl. solenoid valve P/N 11205612  
Flushing system 2 meter, excl. solenoid valve P/N 11205903
- Solenoid valve 220V for flushing P/N 11705516A  
Incoming hose Ø16mm (5/8") , to sensor Ø 6mm (1/4")  
Solenoid valve 110V for flushing P/N 11705916B
- Aluminum handrail mounting plate predrilled for BB2  
and solenoid valves w/ u-bolts P/N 10305532
- 1,5 m (5 ft) extension cable with pug-in connectors. P/N 20805752  
10 m (33 ft) extension cable with plug-in connectors. P/N 20805510  
30 m (98 ft) extension cable with pug-in connectors. P/N 20850727
- Connection box for two sensors to one BB2 control box  
with 1m (3 ft.) cable to connect to BB2 P/N 11505748
- Connection box for four sensors to one BB2 control box  
with 1m (3 ft.) cable to connect to BB2 P/N 11505785
- PH electrode, Teflon, excl. cable P/N 21850825
- ReX electrode, excl. cable P/N 21803401
- Cable for pH/ORP-electrode 1 meter P/N 20803393
- Cable for pH/ORP-electrode 2 meter P/N 20850717

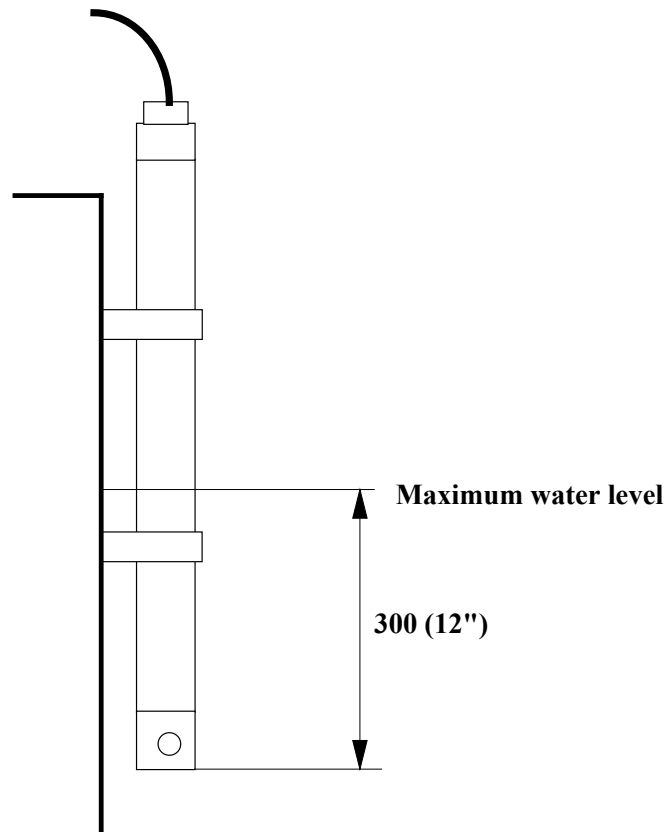
## 6. Installing the Sensor

The sensor is installed with the enclosed mounting brackets, which are screwed onto the wall of the flume or tank (see figure 1). An optional adjustable slide rail holder is available. The electrode should be placed deep enough so that it always stays in the measuring media, even when the level varies (see figure 1). The measuring ability of the electrode is influenced negatively if the column of liquid to be measured is too large. For water, the column should not exceed 300 mm (12").

For applications where the level varies greatly, a mounting kit with a float ball should be used. Take care to mount the mounting kit in such a manner that it is easily accessible in conjunction with calibration.

It is best to place the cable to the mounting kit in conduit to protect the cable from physical damage. Reserve a free section of the cable next to the sensor so that you can remove it in conjunction with calibration.

The mounting sensor should be mounted in a vertical position. In some applications it may be desirable to mount the mounting kit at a certain angle. The angle from the horizontal plane should be greater than or equal to 45°.



**Figure 1: Installing the Mounting Kit in a Flume**

## Connections

Connect the sensor to the BB2 central unit using the attached cable. If needed, the cable can be extended using extension cables. Several sensors can be connected to one BB2 using Y-splitter or junction box. See “Technical description” for details.

## Installation hints

- The electrode should be placed deep enough so that it always stays in the measuring media

## Starting Up

Connect the supply voltage. Remove the small plastic protector from the electrode probe.

- If the electrode has been in the protector for an extended period of time, salt crystals may need to be rinsed away with water.
- If the electrode has holes for refilling, the electrolyte inside the electrode should be checked and refilled. The level should be at least 1 cm (1/2") below the refilling hole. (NOTE! This does not apply to gel electrodes.)
- Place the electrode in a buffer of pH 7.00 for approx. 2 hours (does not apply to Redox).

## 7. Removing the sensor

The sensor is removed in the following steps:

- Disconnect the sensor cable from the BB2 and the flushing hose from solenoid.
- Clean the sensor with a brush or clean cloth. Do not use a wire brush!
- Dismount the electrode.
- Mount the protective cap (or a small plastic bag) on the sensor cable connector.
- Blow compressed air through the flushing hose to get rid of the water in the hose and the sensor.

## 8. Mounting the electrode

In order to mount an electrode the sensor must be opened in both ends. At the cable end, the electronics of the sensor is mounted to the black PVC-top. Care must be taken in order not to damage the circuit board. Both ends are easiest opened by carefully turning and pulling at the same time.

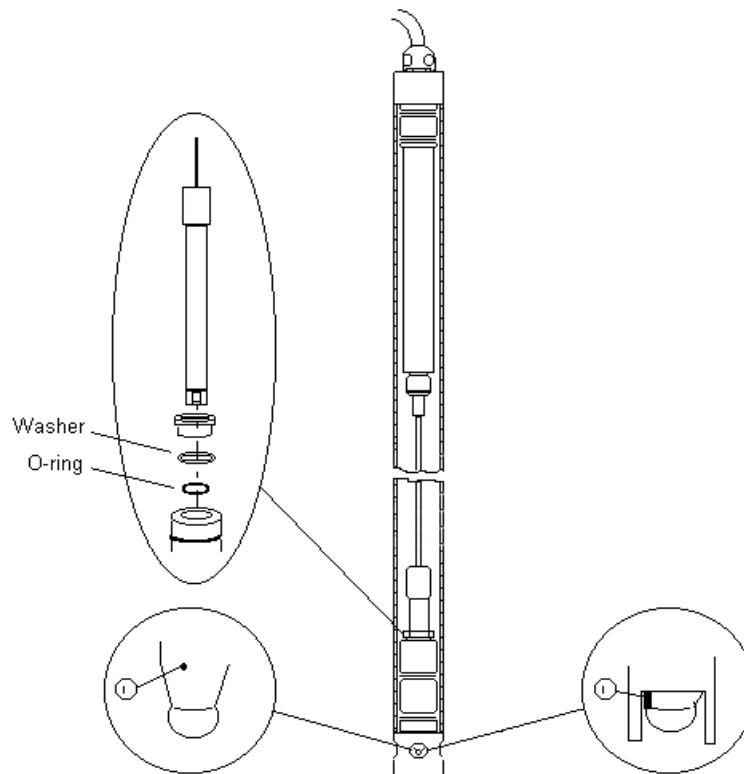
The electrode is mounted in the electrode holder by taking the enclosed nut, washer and O-ring and threading them onto the electrode. Adjust the electrode position so that the small ceramic part (marked 1 in figure 2) on the lower part of the electrode is in contact with the measuring media. Then tighten the nut with your hand.

If you have an electrode, which does not have a hard-wired cable, the protective cover on top of the electrode should be removed and the enclosed plug-in cable should be used to connect the electrode and the electronics.

Feed the cable through the sensor tube, and mount the electrode holder in the tube. Be careful not to damage the sealing.

Connect the cable to the electronics, and mount the electronics in the tube. It is easier to get the cable in place if the tube is turned so the cable gets curled. Be careful not to damage the sealing or the cable.

If the electrode cannot be immersed into the measuring media before it is put to use, the electrode's small, plastic protective cover should be filled with a buffer solution of pH 7.





**Figure 2: Mounting the electrode**

## 9. Cleaning

The sensor can be equipped with a flushing nozzle. The nozzle is used to direct the cleaning liquid supplied through a ¼” hose that is mounted along the sensor housing to flush the electrode. A solenoid valve that is wired to a relay in the BB2 control box controls the air or liquid. Water is recommended for flushing in aeration basins.

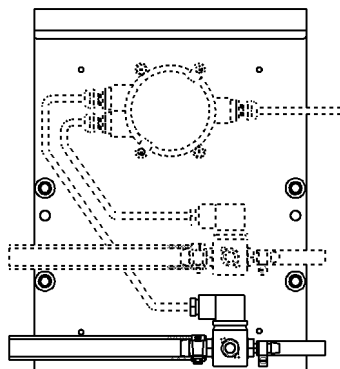
Flushing must be activated in the “Settings” menu in the BB2 control box:

- Select the transmitter in the Main Menu by using the  or  buttons.
- Press ENTER for approximately five seconds to enter the Transmitter Menu.
- Use the arrows to select “Cleaning” and press ENTER.
- In the “Cleaning” submenu,
- If the sensor is to be cleaned as master, i.e. it has its own relay, then set the “Cleaner” setting to “flush”, specify the cleaning interval in minutes, and the flush time in seconds. If the sensor is to be cleaned as a slave, along with another sensor, these parameters are set for the sensor being the master.
- If needed, specify the extra freeze time in seconds.
- If the sensor shall be cleaned as master, specify the relay to be used according to the wiring inside the control box. For example, if the solenoid is wired to relay #1, select “#1” for flushing. If the sensor is to be cleaned as a slave, specify “Along #1” or “Along #2” depending on what relay the master sensor uses.
- For sensors configured as masters, “Next time” displays the next time flush will be activated, pushing ENTER will set it to current time and those start cleaning.

**NOTE!** Pay attention to the requirements for protection against backflow, according to the EN 1717 standard for drinking water devices. If possible, use plant reuse water or effluent water for cleaning.

### Mounting plate for cleaning solenoid valves

To provide an easy mounting of solenoid valves for the built-in flushing nozzles Cerlic offers a predrilled Aluminum handrail mounting plate. The Mounting plate is fixed to the rail using two u-bolts.



**Mounting plate P/N 10305533 for one or two solenoids, outside US version P/N 11705516A (11705516 B US Version) and a connection box P/N 11505748.**



## 10. Maintenance

pHX / ReX sensors are easy to maintain. An electrode maintenance schedule should be kept, listing when it is removed and cleaned. When this is done, the electrode should be checked against a known buffer solution. If the control value does not match, a re-calibration should be made.

Use distilled water for cleaning.

Regularly check that the mounting kit does not get damp or wet inside during cleaning and other activities. Also check that the electrode is correctly mounted in its holder to avoid leaking.

### Error messages

<u>Window text</u>	<u>Problem</u>	<u>Solution</u>
Unknown buffer	The smart calibration does not recognize the current buffer from the signal of the electrode	<ul style="list-style-type: none"> <li>• Use standard buffers 4.00, 7.00, and 10.00.</li> <li>• Broken sensor, electronic components, or cable connection..</li> </ul>
Same Buffer	During calibration the pHX does not perceive a difference of buffers.	<ul style="list-style-type: none"> <li>• Make sure that you use two different buffers during calibration.</li> <li>• The electrode may be broken.</li> <li>• The electronic components in the sensor may be broken.</li> </ul>

### Broken Electrode

Lightning or static discharges during thunder storms may cause damage to the electrode, and could also damage the signal amplifier. The electrode is the most exposed point since it is in direct contact with the water and, consequently, the ground connection for a discharge.


Physical damage to the electrode usually makes measuring impossible. Make sure that neither electrode nor cable is damaged.

### Incorrect Measurements

<u>Problem</u>	<u>Solution</u>
Dirty electrode	– Clean with distilled water
Insufficient or poor reference solution in the electrode	– Refill/change reference solution (only for refillable electrodes)
Change of "slope" due to age	– Recalibration – Re-activation (new reference solution) only for refillable electrodes
Old electrode which gives slope <93%	– Change electrode

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## 11. Sensor display

By simultaneously pressing  and ENTER you alter between BB2 main menu and the sensor information display for the selected sensor. pHX / ReX has two information pages, the first one shows in addition to the measured value, Max, Min, and average values for the last 24 hours. The values are based on hour values which means they may jump when a new hour starts and the oldest is skipped. The second information display shows the date of the last calibration (pHX only) and the date the electrode was changed.

## 12. Menu for Sensors

### Menu for pHX

#### Settings

<b>Tag</b>	Name of the sensor (10 characters) shown in the main display.
<b>I-Time</b>	Integration time or dampening - can be set up to 999 seconds. Normal value is 5-10 seconds.
<b>Decimals</b>	"1", or "2", number of decimals to show the measured value (only pH)
<b>Reset Day</b>	"Yes", or "No", Yes resets the day calculation of min- max- and average.
<b>Analog</b>	"None", "Out1", "Out2", "Out3", "Out4", "Out1+2", or "Out3+4". Pick which analog output(s) to be used with sensor

#### Calibrate

<b>Take sample</b>	No, "Smart", or "manual". Refer to chapter 10 for details.
<b>Cal Temp</b>	Temperature at which calibration was done.
<b>Measure Temp</b>	Temperature of measured media.
<b>Slope %</b>	Shows the current condition of the electrode. A value between 93% and 102% is acceptable.
<b>Sample #1 pH</b>	Actual pH for the first buffer.
<b>Sample #2 pH</b>	Actual pH for the second buffer.
<b>Calibrated</b>	Date of last air calibration
<b>New eletcr.</b>	Date when electrode was last changed. Push ENTER to edit the date, then ENTER again to store it.

#### Cleaning

	Press ENTER to go to Cleaning program
<b>Cleaner</b>	"None", "Flush", or "Brush". Do not select "Brush" since this does not exist for this sensor
<b>Interval min</b>	0-999 minutes, time between cleaning cycles
<b>Length sec</b>	0-999 seconds, duration of flushing cycle
<b>Freeze sec</b>	0-999 seconds, extra freeze time of output signal after a flushing cycle
<b>Relay</b>	"-", "#1", "#2", "Along #1", or "Along #2". Select relay to operate solenoid for flush cycle if this sensor is a master with its own relay, or relay used by master if this sensor is a slave. These are the same relays used for "Alarm relay" below
<b>Next time</b>	The next scheduled cleaning time. Pushing "Enter" on this line will set the time to current time and start a cleaning cycle. This could be used to test the "Flush" cycle.

**Scale / Alarm**

<b>Max</b>	Measured value corresponding to 100%, equal to 20 mA output signal (or 4 mA if 20-4 mA is used).
<b>Min</b>	Measured value corresponding to 0%, equal to 4 mA output signal (or 20 mA if 20-4 mA is used).
<b>Hi-Alarm</b>	Level that activates an alarm when exceeded, 0 = not in use.
<b>Low-Alarm</b>	Level that activates an alarm when underpassed, 0 = not in use.
<b>Alarm Relay</b>	"- " #1", "#2", or "#1 and #2". Check that the relay is not being used for cleaning

**System**

<b>Type</b>	Type of sensor, read only
<b>Serial</b>	Serial number of the sensor, read only
<b>SoftW</b>	Software version of the sensor, read only
<b>Info</b>	Press "ENTER" to go to "info" read only menu. <u>This menu is for Cerlic internal use.</u>
<b>MS 1 mV</b>	Millivolt value for the first calibration point
<b>MS 2 mV</b>	Millivolt value for the second calibration point
<b>pH 1</b>	pH for the first calibration point
<b>pH 2</b>	pH for the second calibration point
<b>RV 0 mV</b>	Raw value for 0 mV
<b>RV 200 mV</b>	Raw value for 200 mV
<b>Ch1</b>	Raw value
<b>MS mV</b>	Electrode output in millivolt
<b>pH</b>	Current measure value
<b>Samp/s</b>	Number of samples per second
<b>Service</b>	Not accessible for users.

## Menu for ReX

### Settings

<b>Tag name</b>	Name of the sensor (10 characters) shown in the main display.
<b>I-Time</b>	Integration time or dampening - can be set up to 999 seconds. Normal value is 5-10 seconds.
<b>Analog</b>	"None", "Out1", "Out2", "Out3", "Out4", "Out1+2", or "Out3+4". Pick which analog output(s) to be used with sensor

### Calibrate

<b>Adjust</b>	"No", "Reset" or "Set". Automatic offset adjustment.
<b>Offset</b>	Offset for the electrode.
<b>@Buffer</b>	Buffer used for adjustment, saved during the automatic offset adjustment.
<b>ORP mV</b>	Current reading.
<b>New eletcr.</b>	Date when electrode was last changed. Push ENTER to edit the date, then ENTER again to store it.

### Cleaning

	Press ENTER to go to Cleaning program
<b>Cleaner</b>	"None", "Flush", or "Brush". Do not select "Brush" since this does not exist for this sensor
<b>Interval min</b>	0-999 minutes, time between cleaning cycles
<b>Length sec</b>	0-999 seconds, duration of flushing cycle
<b>Freeze sec</b>	0-999 seconds, extra freeze time of output signal after a flushing cycle
<b>Relay</b>	"-", "#1", "#2", "Along #1", or "Along #2". Select relay to operate solenoid for flush cycle if this sensor is a master with its own relay, or relay used by master if this sensor is a slave. These are the same relays used for "Alarm relay" below
<b>Next time</b>	The next scheduled cleaning time. Pushing "Enter" on this line will set the time to current time and start a cleaning cycle. This could be used to test the "Flush" cycle.

### Scale / Alarm

<b>Max</b>	Measured value corresponding to 100%, equal to 20 mA output signal (or 4 mA if 20-4 mA is used).
<b>Min</b>	Measured value corresponding to 0%, equal to 4 mA output signal (or 20 mA if 20-4 mA is used).
<b>Hi-Alarm</b>	Level that activates an alarm when exceeded, 0 = not in use.
<b>Low-Alarm</b>	Level that activates an alarm when underpassed, 0 = not in use.
<b>Alarm Relay</b>	"-" "#1", "#2", or "#1 and #2". Check that the relay is not being used for cleaning

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**System**

<b>Type</b>	Type of sensor, read only
<b>Serial</b>	Serial number of the sensor, read only
<b>SoftW</b>	Software version of the sensor, read only
<b>Info</b>	Press "ENTER" to go to "info" read only menu. <u>This menu is for Cerlic internal use.</u>
<b>RV 0 mV</b>	Raw value for 0 mV
<b>RV 1000 mV</b>	Raw value for 1000 mV
<b>Ch1</b>	Raw value
<b>ORP mV</b>	Current reading in millivolt
<b>Samp/s</b>	Number of samples per second
<b>Service</b>	Not accessible for users.

### 13. Calibration

The sensor is shipped pre-calibrated, but since all electrodes are different, the sensor must be calibrated with its electrode to give a good measurement. The electrode degrades by time and calibrations shall be done regularly following a maintenance schedule. The time between calibrations varies with the applications, it is usually between one and ten weeks. It is important that the sensor has been switched on for about 30 minutes prior to the calibration in order to stabilize.

#### Calibrating pH

For a pH calibration there are two alternatives: smart or manual. Irrespective of the type of calibration you chose, you need two pH buffers which both have a common, known temperature.

For a smart calibration you need two different buffer solutions with pH 4.00, 7.00, or 10.00.

For a manual calibration, two different buffer solutions can be used irrespective of the buffer value.

Remove the sensor and, if necessary the electrode as well, but make sure that the electrode is still connected to the signal amplifier. Make sure that you have at least 2 standard buffers available with pH 4.00, 7.00 or 10.00 of a known temperature (it is best to pour the buffers into plastic cups).

- Enter the sensor menu. The output is frozen when the menu is opened.
- Open the “Calibrate” menu.
- Select "Calibrate", then "Smart" or "Manual" and press ENTER.
- A window pops up and asks for the buffer temperature. Enter the temperature and press ENTER
- BB2 will say "Put the electrode in buffer 1". Spray the electrode using clean water, then immerse it in the first buffer, and press ENTER.
- The text will say "Waiting for stable signal xxx,x mV", xxx,x is the millivolt signal from the electrode. By pressing ENTER you can select to abort the calibration or to accept the value shown.
- If smart calibration is used and BB2 recognizes the buffer, BB2 will suggest a pH value showing the text "Accept smart calibration pH X.X". You can choose to accept the value or to change it manually.
- If manual calibration is used BB2 will always ask for the value of the buffer, enter the value and press ENTER.
- BB2 will now tell you "Put the electrode in buffer 2". Spray the electrode using clean water, then immerse it in the second buffer, and press ENTER.
- The text will say "Waiting for stable signal xxx,x mV", xxx,x is the millivolt signal from the electrode. By pressing ENTER you can select to abort the calibration or to accept the value shown.

- If smart calibration is used and BB2 recognizes the buffer, BB2 will suggest a pH value showing the text "Accept smart calibration pH X.X". You can choose to accept the value or to change it manually.
- If manual calibration is used BB2 will always ask for the value of the buffer, enter the value and press ENTER.
- The second buffer is not accepted if it is less than 1 pH from buffer 1, if so the second calibration will be repeated.
- When the calibration is finished the slope is shown in the display. "Slope XX%". This gives an indication of the shape of the electrode. A good electrode will have a slope between 93 and 102 %
- Press ENTER to finish the calibration.

### **Adjusting ORP**

The ORP sensor is not calibrated, an offset adjustment is done instead. The offset adjustment can be done in two ways automatic or manual. Irrespective of the way you chose, you need a buffer with a known potential.

Remove the sensor and, if necessary the electrode as well, but make sure that the electrode is still connected to the signal amplifier. Wipe clean the electrode before adjustment.

- Spray the electrode using clean water, then immerse it in the first buffer, and wait for a stable reading.
- Enter the sensor menu. The output is frozen when the menu is opened.
- Open the "Calibrate" menu, then select "Adjust", chose "Set" and press ENTER.
- A window pops up asking for the ORP potential. Enter it and then press ENTER. BB2 will calculate the difference and use it as offset.

### **14. Scaling**

The "Scale / Alarm" menu allows the user to set the high and low boundaries for a 4-20mA output signal. In addition, this menu allows the user to set high and low alarms values that can be used to notify when solids have reached critical points.

**Max** sets the 20 mA point output

**Min** sets the 4 mA point output (may be a negative value for special applications)

**High-Alarm** sets the High Alarm set point

**Low-Alarm** sets the Low Alarm set point



## 15. Technical data pHX / ReX

<b>pHX</b>	P/N 11305552
Material	
Tube and electrode holder:	SIS2343 (316SS)
Top	PVC
Dimensions	Ø 28 x 1085 mm (Ø 1.1" x 43")
Weight	1.8 kg (4 lbs)
Process connection	Immersion sensor
Max immersion depth	30 cm (12")
Max temperature	60°C (140°F)
Measuring principle	Electrode 12mm
Cable, connection	5-pin M12-plug
Cable, length	10 m (33 ft)
Cable, material	Polyurethane
Enclosure	IP65
<b>ReX</b>	P/N 11305598
Tube and electrode holder:	SIS2 (343316SS)
Top	PVC
Dimensions	Ø 28 x 1085 mm (Ø 1,1" x 43" )
Weight	1.8 kg (4 lbs)
Process connection	Immersion sensor
Max immersion depth	30 cm (12" )
Max temperature	60°C (140°F)
Measuring principle	Electrode 12mm
Cable, connection	5-pin M12-plug
Cable, length	10 m (33 ft )
Cable, material	Polyurethane
Enclosure	IP65

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**Certificate of conformity:**

The pHX and ReX sensors along with their central unit BB2 are in conformance with the following EC Directive(s) when installed in accordance with the installation instructions contained in the product documentation:

73/23/EEC                      Low Voltage Directive as amended by 93/68/EEC  
89/336/EEC                    EMC Directive as amended by 92/31/EEC and 93/68/EEC

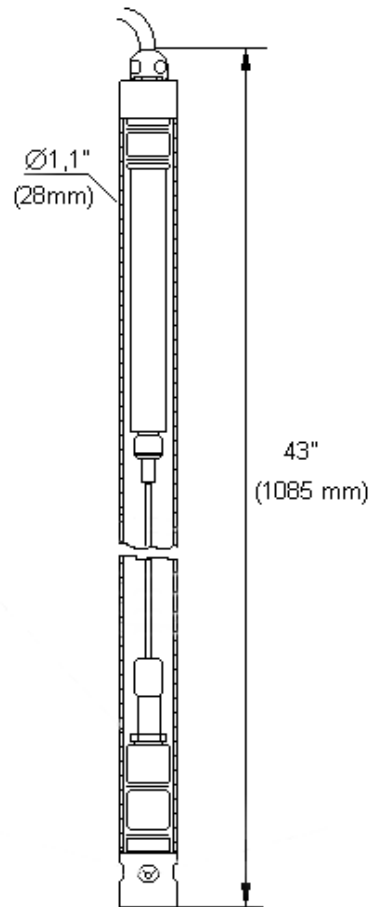
The following standards and/or technical specifications have been applied:

EN 61000-6-4:2001        Electromagnetic compatibility (EMC) Part 6-4  
Generic standards – Emission standard for industrial environments

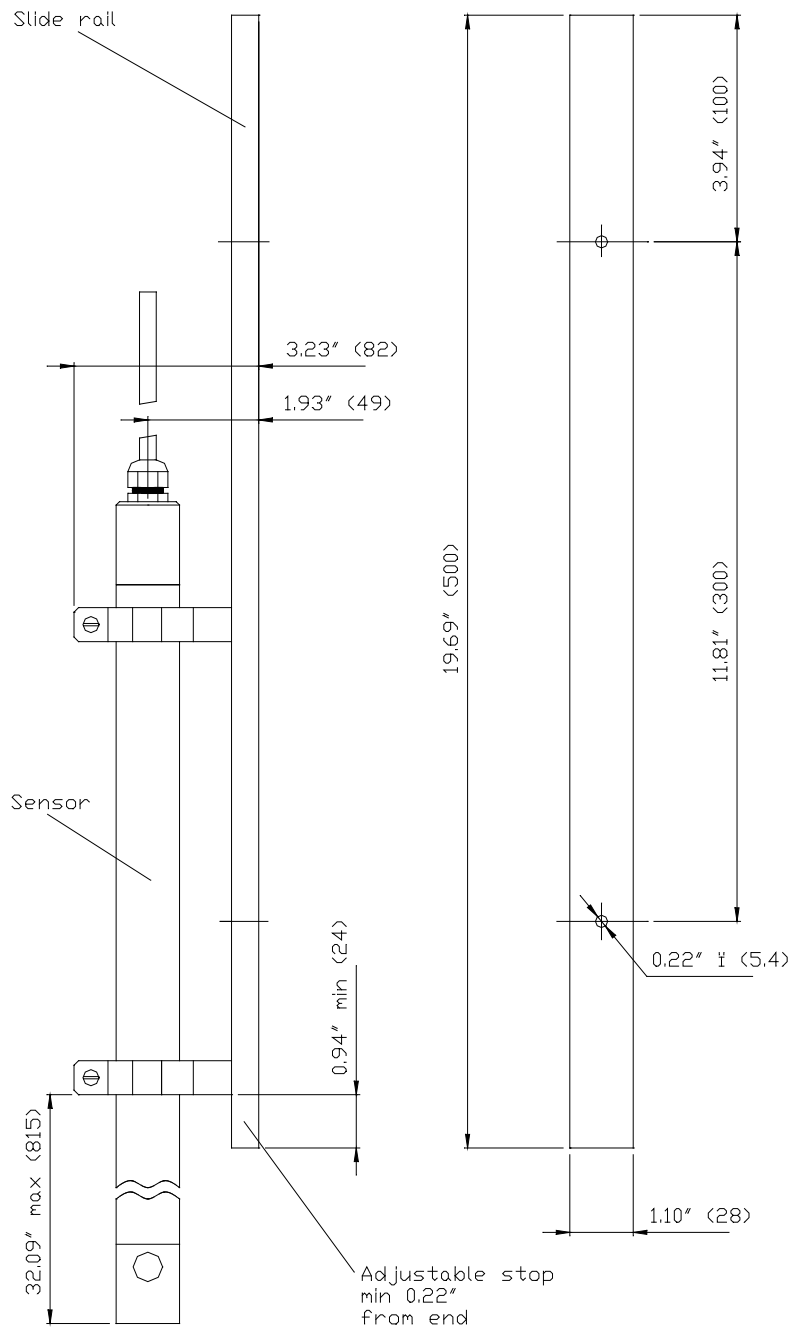
EN 61000-6-2:2001        Electromagnetic compatibility (EMC) Part 6-2  
Generic standards - Immunity for industrial environments

EN 61010-1:2001         Safety requirements for electrical equipment for measurement, control, and laboratory use

16. Dimensions



## Appendix 1, Optional slide rail holder



## Appendix 2, pH as a function of mV

The pH-value is the negative logarithm of the hydrogen ion concentration, and it is directly related to the proportion of hydrogen ions  $H^+$  to hydroxide ions  $OH^-$  in the media. The pH-electrode measures excess or deficit of the hydrogen ions and gives a proportional millivolt signal as output. The signal is 59,16 mV per 1 pH at 77°F. In clean water there is a total balance between hydrogen ions and hydroxide ions, the output from the electrode is 0.0 mV and pH is 7. The millivolt signal is measured by pHX and the corresponding pH is calculated in BB2.

mV	pH	$H^+$ ions, Mol/l	$OH^-$ ions, Mol/l	Example
414	0	1	0,000000000000001	
355	1	0,1	0,00000000000001	
296	2	0,01	0,0000000000001	Coca Cola
237	3	0,001	0,00000000001	
177	4	0,0001	0,0000000001	Orange juice
118	5	0,00001	0,000000001	
59	6	0,000001	0,00000001	Milk
0	7	0,0000001	0,0000001	Clean water
-59	8	0,00000001	0,000001	Blood
-118	9	0,000000001	0,00001	
-177	10	0,0000000001	0,0001	
-237	11	0,00000000001	0,001	
-296	12	0,000000000001	0,01	
-355	13	0,0000000000001	0,1	
-414	14	0,000000000000001	1	Sulfa

### Appendix 3, pH temperature dependency

The output from a pH-electrode varies with the temperature in a predictable way. The size of the variation depends on both the temperature and the pH being measured.

°C	°F	PH	pH	pH	pH	pH	pH	pH	PH	pH	pH	pH	pH
5	41	2.30	3.24	4.18	5.12	6.06	7.00	8.06	9.12	10.18	11.24	12.30	13.36
15	59	2.15	3.12	4.09	5.06	6.03	7.00	8.03	9.06	10.09	11.12	12.15	13.18
25	77	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00
35	95	1.85	2.88	3.91	4.94	5.97	7.00	7.97	8.94	9.91	10.88	11.85	12.82
45	113	1.70	2.76	3.82	4.88	5.94	7.00	7.94	8.88	9.82	10.76	11.70	12.64
55	131	1.55	2.64	3.73	4.82	5.91	7.00	7.91	8.82	9.73	10.64	11.55	12.46
65	149	1.40	2.52	3.64	4.76	5.88	7.00	7.88	8.76	9.64	10.52	11.40	12.28
75	167	1.25	2.40	3.55	4.70	5.85	7.00	7.85	8.70	9.55	10.40	11.25	12.10
85	185	1.10	2.28	3.46	4.64	5.82	7.00	7.82	8.64	9.46	10.28	11.10	11.92
95	203	0.95	2.16	3.37	4.58	5.79	7.00	7.79	8.58	9.37	10.16	10.95	11.74

At pH 7 or 78°F the temperature error is zero. If temperature or pH changes the temperature error is calculated using the following formula: 0.03 pH-difference / pH / 10°C. pHX has a built in compensation for the temperature error provided that the correct temperature of calibration buffers and measured media is entered..

## Appendix 4, Support information

Before calling Cerlic Support, please collect the following information and have it at hand.

**Company** \_\_\_\_\_


**Name** \_\_\_\_\_

**Phone** \_\_\_\_\_

**E-mail** \_\_\_\_\_

**Sensor Type** \_\_\_\_\_




**Position / Tag** \_\_\_\_\_

First go to the BB2 menu, it is accessed by pressing  and ENTER at the same time for five seconds. Select “System” and press.

**Version** \_\_\_\_\_

**Serial** \_\_\_\_\_

**Box temp** \_\_\_\_\_

Leave the BB2 menu by pressing  and ENTER at the same time. Use  or  to select the sensor in the main display. Go to the sensor menu, it is accessed by pressing ENTER for five seconds. Select “System” and press ENTER.

**Type** \_\_\_\_\_

**Serial** \_\_\_\_\_

**SoftW** \_\_\_\_\_

Select “Info”, then press “ENTER” to go to the “info” menu.

**MS 1 mV** \* \_\_\_\_\_

**MS 1 mV** \* \_\_\_\_\_

**pH 1** \* \_\_\_\_\_

**pH 2** \* \_\_\_\_\_

**RV 0 mV** \_\_\_\_\_

**RV 200 mV** \* \_\_\_\_\_

**RV 1000 mV** \*\* \_\_\_\_\_

**Ch1** \_\_\_\_\_

**MS mV** \* \_\_\_\_\_

**ORP mV** \*\* \_\_\_\_\_

**pH** \* \_\_\_\_\_

\* = only for pHX.    \*\* = only for ReX.

Leave the BB2 menu by pressing  and ENTER at the same time.

## Appendix 5, Setup information

This sheet can be used to document the setup of a sensor.

**Sensor Type** \_\_\_\_\_

**Position / Tag** \_\_\_\_\_

In the System sub menu of the sensor menu the following information can be collected.

**Serial** \_\_\_\_\_

**SoftW** \_\_\_\_\_

In the Settings sub menu of the sensor menu the following parameters can be set.

**I-time** \_\_\_\_\_

**Decimals** \* \_\_\_\_\_

**Analog** \_\_\_\_\_

In the Cleaning sub menu of the sensor menu the following parameters can be set.

**Cleaner** \_\_\_\_\_

**Cleaning interval** \_\_\_\_\_

**Cleaning length** \_\_\_\_\_

**Cleaning relay** \_\_\_\_\_

\* = only for pHX.

In the Scale / Alarm sub menu of the sensor menu the following parameters can be set.

**Max** \_\_\_\_\_

**Min** \_\_\_\_\_

**High alarm** \_\_\_\_\_

**Low alarm** \_\_\_\_\_

**Alarm Relay** \_\_\_\_\_

Leave the BB2 menu by pressing  and ENTER at the same time.