SK08-WAQ	Water Quality — pH, ORP	Product Group 1
KNX, Indoor / Outdoor, IP54/65	Document: 3200_ex_SK08-WAQ.pdf	Article No.

KNX Sensor / Controller
Galvanic isolated instrumentation amplifier and bus couple unit for measurement and control of the water quality indicators, pH and ORP.

For monitoring and control of the water quality in aquariums, swimming pools, ponds and service water systems.

For indoor / outdoor and damp room applications, IP54/65

	SK08-WAQ	KNX Sensor / controller for water quality Plastic housing: (115 x 65 x 55) mm without Measuring Electrode Units Measuring Electrode Units (see rubric Z, Components / Replacment Parts)	30802000

SK08-WAQ-MES	Water quality — pH, ORP	Product Group 10
KNX, Indoor / Outdoor, IP54/65	Document: 3200_ex_SK08-WAQ.pdf	Article No.

	SK08-WAQ -MES	KNX Sensor / controller for water quality Plastic housing: (115 x 65 x 55) mm with Measuring Electrode Units included Operating temperature: 0 .. +50°C	30802001

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2.1 Application Description

Operating Principals and Areas of Application

The production series S8 uses sensors and controllers for a number of physical and chemical measurements for indoor and outdoor areas.

The measuring system **SK08-WAQ** records the electrochemical measurements of pH level (concentration of hydrogen) and ORP (Oxidation / Reduction Potential, or Redox Potential).
These measurements are important for etermining the water quality of swimming pools, aquariums, ponds, service water systems, etc.

The measuring electrodes provide voltages with levels of a few mV, which depends on the electrochemical value.
This voltage is amplified in a high-impedance amplifier (> 500GOhm), digitally converted and sent to the KNX bus.

A galvanic isolation is installed between the electrodes and the KNX bus in order to avoid electrical ring currents.
All commercially available pH and ORP electrodes can be used, provided that they are combination electrodes.
Their shieldings can be interconnected.
There are an optional input for a temperature sensor (PT1000) and two potential-free contact inputs.
When the temperature sensor is used, a temperature compensation of the pH-value is carried out.
When the controllers are used, chemicals or fresh water can be added automatically.
Using the limits makes it possible to inform the maintenance staff.
The external measurement electrodes must be connected via BNC sockets that are located at the side of the casing.
The plug contacts must be kept absolutely free from grease and dust in order to maintain the necessary high input resistances.
The protective caps should fit closely after installation.

The electrodes must be checked and calibrated at regular intervals. Should deviations occur more frequently and the time it takes the display to show a data change becomes longer, the sensors should be changed.

For further information on pH values see http://en.wikipedia.org/wiki/PH
For further information on ORP see http://en.wikipedia.org/wiki/Reduction_potential

KNX sensors are set up using the ETS (KNX Tool Software) with the associated application program.
The device is delivered unprogrammed.
All functions are parameterized and programmed by ETS.
The controller can be switched on or off by activation or locking via the KNX bus.

Functions

Measured data pH-Wert und ORP (redox potential)

- Two-position controller with switching and pulsed 1 Bit output for pH and ORP
- Pulsed controller output for chemical and fresh water input
- PI controller with static 8 Bit or pulse-width modulated 1 Bit output for pH and ORP
- Measured Value can be periodically displayed or when value changes
- Adjustable periodic sending of control variable (parameterized)
- All controllers with release and lock function (parameterized)
- Threshold alarm for upper and lower thresholds
- Auxiliary quantity for changing the set point or threshold via the bus
- Calibration of the sensors (1 point and 2 point calibration)
- reset to factory settings available
- Operating time counter with threshold and reset
- Additional inputs for one Temperature sensor and two dry contacts

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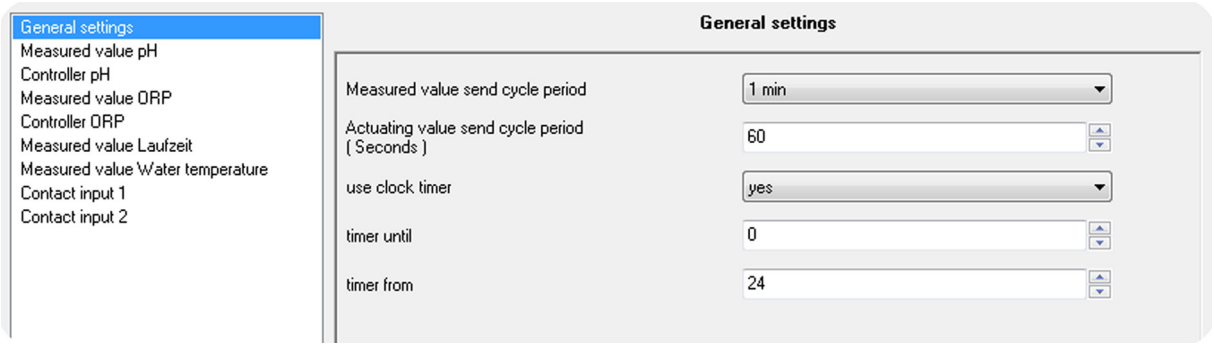
2.2 KNX Parameter

2.2.1 General Settings



General Settings - SK08-WAQ

Parameter	Setting	Description
Measured value send cycle period	1 .. 120 minutes	The transmission period of the measurement values that are to be sent cyclically. In the parameter set „Measured value x“ you can determine if the measurement values are sent periodically.
Actuating value send cycle period (Seconds)	10 .. 250	The transmission period of the correcting variables of the controller that are to be sent cyclically. In the parameter set „Controller x“ you can determine if the measurement values are sent periodically.
Use clock timer	• No • Yes	When the timer is used, two additional parameters (timer from / to) and the objects 58 „device time“ and 59 „device date“ are available.

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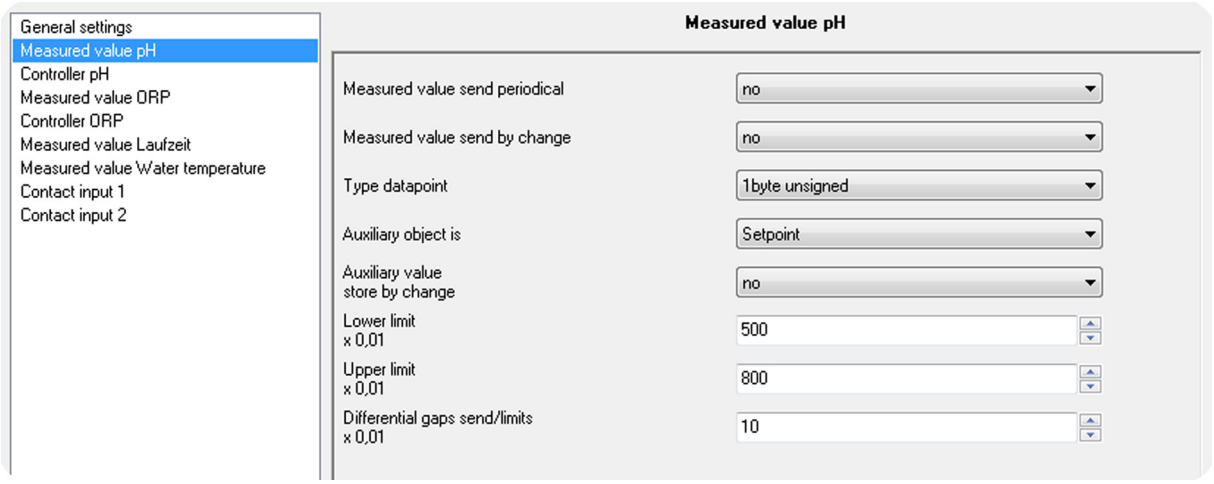
General Settings - SK08-WAQ (continue)

Parameter	Setting	Description
Timer from Timer until	0 .. 24 hour	The controller output can be locked depending on the time of day. The time in which the controller is unlocked must be entered here. In the parameter set „Controller x“ you can determine if the timer function is to be used for a specified controller.

2.2.2 Measured Value pH



Measured Value pH - SK08-WAQ

Parameter	Setting	Description
Measured value send cyclical	• No • Yes	The transmission period can be parameterized in the parameter set „General Settings“.
Measured value send by change	• No • Yes	The necessary change can be set in the parameter „Differential gab send / limits“.
Type datapoint	• 1-Byte unsigned • 2-Byte float • 4-Byte float	Measured Data Output and Auxiliary Data are defined concurrently.
Auxiliary object is	• Setpoint • Upper limit • Lower limit	Every controller has an auxiliary object which can control either the set point of the controller or the limit values.
Auxiliary value store by change	• No • Yes	When the auxiliary data is changed the new value is carried over to EEPROM and saved in case of a bus voltage breakdown. This should be used only when the data is not frequently changed as EEPROM has only a limited memory cycle.

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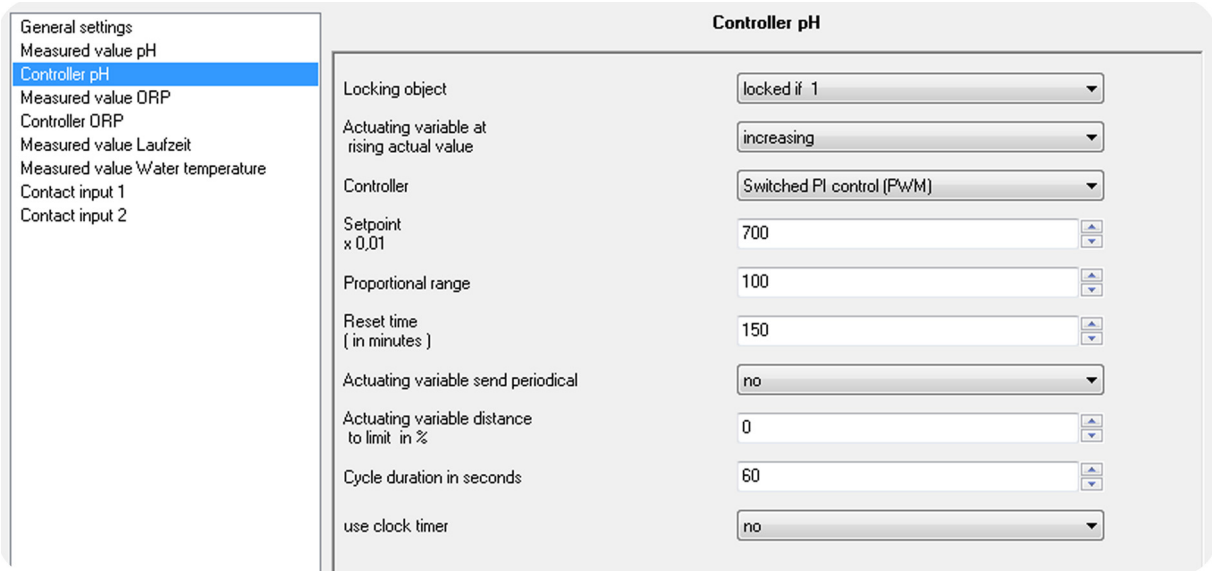
Measured Value pH - SK08-WAQ (continue)

Parameter	Setting	Description
Lower limit x 0,01	0 .. 1400	If the measured value corresponds with the preset value, the object 5 „Output, Lower Limit pH“ will be set. pH value (Please mind the factor !)
Upper limit x 0,01	0 .. 1400	If the measured value corresponds with the preset value, the object 4 „Output, Upper Limit pH“ will be set. pH value (Please mind the factor !)
Differential gab send / limits x 0,01	0 .. 1400	To reduce the bus load when a value is changed and to avoid multiple switching between measured data and thresholds, a hysteresis between pH 0,02 and pH 0,1 should be used.

2.2.3 Controller pH



Controller pH - SK08-WAQ

Parameter	Setting	Description
Locking object	• locked if 1 • locked if 0	When using the Locking object 7 „Input, enable/lock pH“ the controller output is deactivated. The lock function can be set up for „release“ or „lock“.
Actuating value by ascending actual value	• increasing • decreasing	The actuating direction of the controller can be adapted to the characteristics of the controlled system.

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Controller pH - SK08-WAQ (continue)

Parameter	Setting	Description
Controller	• Steady PI Controller • Switched PI Controller (PWM) • Two-Position Controller • Two-Position Controller Pulsed	The different controller types and the corresponding parameters are described in chapter *2.4 Notes* .
Setpoint (x 0,01 °C)	0 .. 1400	Setpoint setting pH value (Please mind the factor !)
Proportional range (x 0,01 °C)	0 .. 1400	see chapter *2.4 Notes* - General Rules for Adjusting the PI Parameter
Reset time (in minutes)	0 .. 255	see chapter *2.4 Notes* - General Rules for Adjusting the PI Parameter
Actuating value send cyclical	• No • Yes	The cycle period is set in „General Settings“.
Actuating value distance to limit in %	0 .. 50	When the lower threshold is surpassed 0% is set, when the upper threshold is surpassed 100% will be set. This is important for actuators which do not operate reliably at threshold levels.
Cycle duration in seconds	0 .. 65535	Total time of On and Off state.
Differential gab Cotroller x 0,01	0 .. 1400	see chapter *2.4 Notes* - Two-Positon Control (Please mind the factor !)
Duty cycle in %	0 .. 50	duty cycle = pulse duration / cycle duration x 100 see chapter *2.4 Notes* - Two-Positon Control with Pulsed Output
Use clock timer	• No • Yes	The use of the clock timer can be enable / disable for each channel separately.

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2.2.4 Measured Value ORP

Measured Value ORP - SK08-WAQ

Parameter	Setting	Description
Measured value send cyclical	• No • Yes	The transmission period can be parameterized in the parameter set „General Settings“.
Measured value send by change	• No • Yes	The necessary change can be set in the parameter „Differential gab send / limits“
Type datapoint	• 2-Byte signed • 2-Byte float • 4-Byte float	Measured Data Output and Auxiliary Data are defined concurrently.
Auxiliary object is	• Setpoint • Upper limit • Lower limit	Every controller has an auxiliary object which can control either the set point of the controller or the limit values.
Auxiliary value store by change	• No • Yes	When the auxiliary data is changed the new value is carried over to EEPROM and saved in case of a bus voltage breakdown. This should be used only when the data is not frequently changed as EEPROM has only a limited memory cycle.
Lower limit mV	-1200 .. 1200	If the measured value corresponds with the preset value, the object 12 „Output, Lower Limit ORP“ will be set.
Upper limit mV	-1200 .. 1200	If the measured value corresponds with the preset value, the object 11 „Output, Upper Limit ORP“ will be set.
Differential gab send / limits mV	-1200 .. 1200	To reduce the bus load when a value is changed and to avoid multiple switching between measured data and thresholds, a hysteresis should be used.

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2.2.5 Controller ORP

Controller ORP - SK08-WAQ

Parameter	Setting	Description
Locking object	• locked if 1 • locked if 0	When using the Locking object 14 „Input, enable / lock ORP“ the controller output is deactivated. The lock function can be set up for „release“ or „lock“.
Actuating value by ascending actual value	• increasing • decreasing	The actuating direction of the controller can be adapted to the characteristics of the controlled system.
Controller	• Steady PI Controller • Switched PI Controller (PWM) • Two-Position Controller • Two-Position Controller Pulsed	The different controller types and the corresponding parameters are described in chapter *2.4 Notes*
Setpoint mV	-1200 .. +1200	Setpoint setting
Proportional range mV	-1200 .. +1200	see chapter *2.4 Notes* - General Rules for Adjusting the PI Parameter
Reset time (in Minuten)	0 .. 255	see chapter *2.4 Notes* - General Rules for Adjusting the PI Parameter
Actuating value send cyclical	• No • Yes	The cycle period is set in „General Settings“.
Actuating value distance to limit in %	0 .. 50	When the lower threshold is surpassed 0% is set, when the upper threshold is surpassed 100% will be set. This is important for actuators which do not operate reliably at threshold levels
Cycle duration in seconds	0 .. 65535	Total time of On and Off state
Differential gab Cotroller (in mV)	-1200 .. +1200	see chapter *2.4 Notes* - Two-Positon Control (Please mind the factor !)
Duty cycle in %	0 .. 50	duty cycle = pulse duration / cycle duration x 100 see chapter *2.4 Notes* - Two-Positon Control with Pulsed Output
Use clock timer	• No • Yes	The use of the clock timer can be enable / disable for each channel separately.

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2.2.6 Measured Value Operating Time

The runtime of the sensors pH / ORP is important to control the calibration of the electrodes.
Limits can be configured as alarm objects for recalibration.

Measured Value Operating Time - SK08-WAQ

Parameter	Setting	Description
Measured value send cyclical	• No • Yes	The transmission period can be parameterized in the parameter set „General Settings“.
Measured value send by change	• No • Yes	The necessary change can be set in the parameter „Differential gab send / limits“
Lower limit (x 100) Hours	0 .. 9999	If this value is reached, a recalibration is recommended. The calibration periods differ depending on the manufacturer of the electrodes and the operating conditions. The usual value of most manufacturers is 2000 hours. It is recommended to consult the data sheet provided by the manufacturer.
Upper limit (x 100) Hours	0 .. 9999	If this value is reached, recalibration is mandatory. The calibration periods differ depending on the manufacturer of the electrodes and the operating conditions. The usual value of most manufacturers is 4000 hours. It is recommended to consult the data sheet provided by the manufacturer.

Sensor Calibration

The electrodes must be calibrated at the time of installation, when the electrodes are changed and at regular intervals depending on the electrode and the application. Two objects control the calibration: the calibration key and the calibration value.
Different calibration functions have different keys and the calibration values are added up by reception.
A calibration value of 0 resets the calibration and enables an evaluation of the condition of the sensor. The measured data of the electrodes are temperature-dependent, thus the calibration should occur at the expected standard temperature if no temperature sensor is used.

Sensor Calibration - SK08-WAQ

Point of Calibration		Key	Calibration Value
pH Zero Offset	pH 7,00	0xA0 ($160_{dec.}$)	x 100 ***)**
pH Transconductance	pH **X**	0xA1 ($161_{dec.}$)	x **[** **(** $\mathbf{X}_{setpoint}$ - $\mathbf{X}_{actuating\ value}$ **)** / **(** 7 - $\mathbf{X}_{setpoint}$ **)** x (-300) **]** pH
ORP Zero Offset	0 mV	0xA2 ($162_{dec.}$)	x 1 mV ***) **)**

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Sensor Calibration - SK08-WAQ (continue)

Point of Calibration	Key	Calibration Value
ORP Transconductance **X** mV	0xA3 ($163_{dec.}$)	x **[** **(** **(** $X_{setpoint}$ - $X_{actuating\ value}$ **)** / $X_{setpoint}$ **)** x 3000 **]** mV

***)** A calibration value of 0 resets the calibration, from 0 several values are accumulated.
****)** As a rule, zero point ORP can be disregarded.

Examples

1) Use the buffer solution pH 7, determine the measured value and wait for a stable result. If the value is 7,12 , write 0xA0 on the calibration key and -12 on the calibration value. If the value 6.92 , write 0xA0 on the calibration key and 8 on the calibration value.Check if the value is actually 0,00 (± 0,01).
2) Use the buffer solution pH4, determine the measured value and wait for a stable result. If the value is 4,09 , write 0xA1 on the calibration key and 9 for the calibration function. If the value is 3,90 , write 0xA1 on the calibration key and -10 for the calibration function. Check the value.
3) For standard applications skip the calibration of ORP zero offset because it rarely changes.
4) Use a testing solution 470mV redox (or any other different from 0 mV) and go to 2.
5) Write 0xAF (175_{dec}) on the calibration key to reset the operating time counter.

2.2.7 Measured Value Water Temperature

Measured Value Water Temperature - SK08-WAQ

Parameter	Setting	Description
Measured value send cyclical	• No • Yes	The transmission period can be parameterized in the parameter set „General Settings“.
Measured value send by change	• No • Yes	The necessary change can be set in the parameter „Differential gab send / limits“.
Type datapoint	• 1-Byte signed • 2-Byte signed • 2-Byte float • 4-Byte float	Measured Data Output and Auxiliary Data are defined concurrently.
Lower limit (x 0,01 °C)	-9999 .. +9999	If the measured value corresponds with the preset value, the object 26 „Output, Lower Limit Water temperature“ will be set. (Please mind the factor !)
Upper limit (x 0,01 °C)	-9999 .. +9999	If the measured value corresponds with the preset value, the object 25 „Output, Lower Limit Water temperature“ will be set. (Please mind the factor !)
Measured value shift (x 0,01 °C)	-32768 .. +32767	A calibration / offset adjustment of the sensors can occur when the measured displacement is offset due to cable length or other known external influences. (Please mind the factor !)

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Measured Value Water Temperature - SK08-WAQ (continue)

Parameter	Setting	Description
Differential gab send / limits (x 0,01 °C)	0 .. 1000	To reduce the bus load when a value is changed and to avoid multiple switching between measured data and thresholds, a hysteresis should be used. (Please mind the factor !)

2.2.8 Contact Input 1

Contact Input 1 - SK08-WAQ

Parameter	Setting	Description
Measured value send cyclical	• No • Yes	The transmission period can be parameterized in the parameter set „General Settings“.
Messwert senden bei Änderung	• No • Yes	A change of the switching input 1 will (not) be transmitted.

2.2.9 Contact Input 2

Contact Input 2 - SK08-WAQ

Parameter	Setting	Description
Messwert Zyklisch senden	• No • Yes	The transmission period can be parameterized in the parameter set „General Settings“.
Measured value send by change	• No • Yes	A change of the switching input 2 will (not) be transmitted.

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2.3 KNX Objects

Objects - SK08-WAQ

No.	Label	Data Point Type				Function
0	Input, calibration	DPT	5.010	unsigned value	1 Byte	Calibration object
1	Input, calibration	DPT	6.010	signed value	1 Byte	Calibration value
2	Output, measured value pH	DPT		adjustable		Measured value
3	Input, auxiliary value pH	DPT		adjustable		Auxiliary value
4	Output, upper limit pH	DPT	1.002	Bool	1 Bit	Exceeding limit
5	Output, lower limit pH	DPT	1.002	Bool	1 Bit	Undercut limit
6	Output, controller pH	DPT		adjustable		Manipulated variable
7	Input, enable / lock pH	DPT	1.001	Switch	1 Bit	enable / lock
8	Output, status pH	DPT			1 Byte	Status
9	Output, measured value ORP	DPT		adjustable		Measured value
10	Input, auxiliary object ORP	DPT		adjustable		Auxiliary value
11	Output, upper limit ORP	DPT	1.002	Bool	1 Bit	Exceeding limit
12	Output, lower limit ORP	DPT	1.002	Bool	1 Bit	Undercut limit
13	Output, controller ORP	DPT		adjustable		Manipulated variable
14	Input, enable / lock ORP	DPT	1.001	Switch	1 Bit	enable / lock
15	Output, status ORP	DPT			1 Byte	Status
16	Output, measured value Term	DPT	7.001	unsigned value	2 Byte	Measured value
17	Input, auxiliary object Term	DPT	7.001	unsigned value	2 Byte	Auxiliary value
18	Output, upper limit Term	DPT	1.002	Bool	1 Bit	Exceeding limit
19	Output, lower limit Term	DPT	1.002	Bool	1 Bit	Undercut limit
23	Output, measured value Temperature	DPT				Measured value
25	Output, upper limit Temperature	DPT	1.002	Bool	1 Bit	Exceeding limit
26	Output, lower limit Temperature	DPT	1.002	Bool	1 Bit	Undercut limit
30	Output, measured value S1	DPT	1.001	Switch	1 Bit	Port S1
37	Output, measured value S2	DPT	1.001	Switch	1 Bit	Port S2
58	Equipment time	DPT	10.001	Time of day	3 Byte	Time
59	Equipment date	DPT	11.001	day of month	3 Byte	Date

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Object Description - SK08-WAQ

No.	Label	Description			
8 15	Output, status pH Output, status ORP	The values of the individual bits are added and transmitted to the bus. The status functions monitor the controller status for purposes of reporting and troubleshooting.			
		Status:	Bit-No.	Hexadecimal	Decimal
		upper limit too large	0	0x01	1
		lower limit underrun	1	0x02	2
		setpoint not equal to zero	2	0x04	4
		lock activ	3	0x08	8
		auxiliary is stored	4	0x10	16
		timer activ	5	0x20	32

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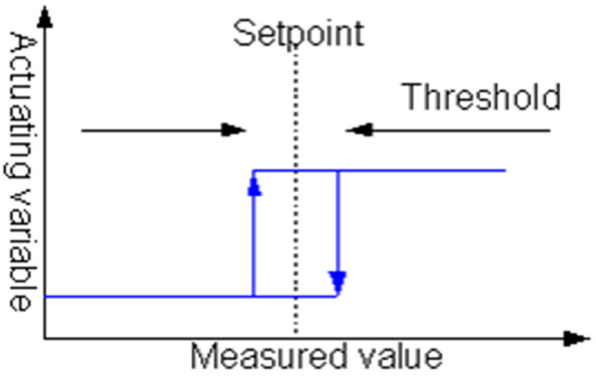
2.4 Notes

Controller models available are the PI controller or a two-position controller. Both controllers are equipped with pulsed output.
The pulsed two-position controller works with constant duty cycle, which like the cycle duration is parameterized.
The duty cycle of the pulsed PI controller is variable and depends on the control variable (pulse-width modulation).

Two-Position Control

Two-position control is a very simple way of controlling.
Once the actual value (± half the switching difference) exceeds or falls below the set point a switch-on or switch-off command is sent to the bus.
Set the differential gap large enough to keep bus load to a minimum and configure the differential gap small enough to avoid extreme actual value fluctuations.

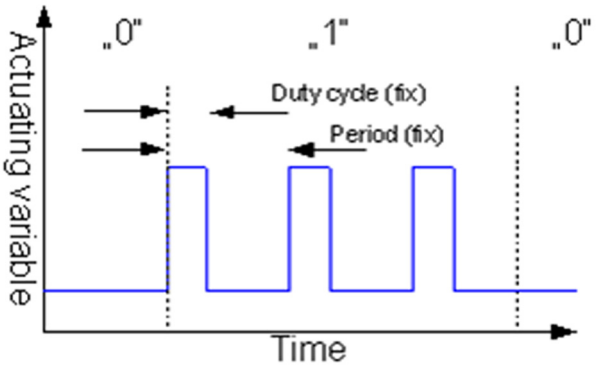
The two-position controller is parameterized using the set point and the switching threshold.



Two-Position Control with Pulsed Output

The controller works analogous to the two-position controller.
The actuating variable emits pulses with fixed duty cycle.

When the control variable reaches 40% in a cycle time of 10 minutes it will repeatedly turned on for 4 minutes and turned off for 6 minutes.



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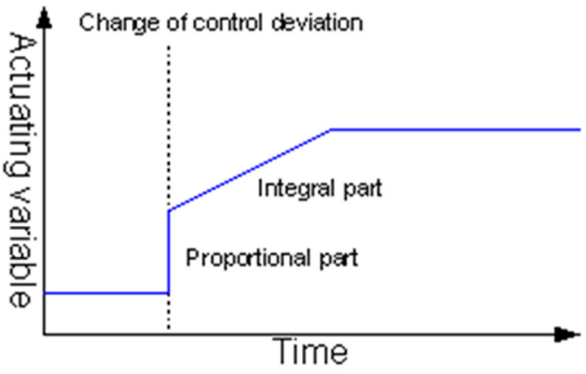
Continuous PI Control

To understand a PI controller one should think of an algorithm consisting of a proportional and integral part.
By combining these two parts it is possible to get a quick and exact adjustment of the actuating variable.

The controller calculates the control variable every second.
It can constantly be updated and is displayed periodically (value parameterized) by the PI controller.

Through the integral part an offset is adjusted to 0 over a certain period of time.

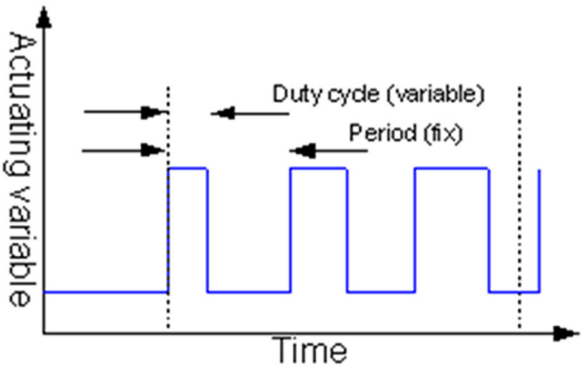


Continuous PI Control with Pulsed Output (PWM)

The controller works analogous to the PI controller, but the actuating variable emits pulses with a variable duty cycle.

PWM control sets the cycle duration of the transmission interval.
This allows a permanent on and off within the cycle time, which reaches an average valve position.

The duty cycle is determined indirectly via the integration time.



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General Rules for Adjusting the PI Parameter

The reset time must be significantly larger than the delay time of the control system.
The proportional area corresponds to the reinforcement of the control circuit.
The smaller the proportional area, the larger the reinforcement is.
.

Parameters	**Effect**
Low Proportional Area	Quick adjustment to the setpoint. Strong overshoot when setpoint is compensated (continuous oscillation possible).
High Proportional Area	Slow correction of control deviations. No or few overshoots.
Short Integration Time	Rapid correction of control deviations. Danger of continuous oscillation.
Long Integration Time	Slow correction of control deviations. Little danger of overshoots or continuous oscillation.

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2.5 Product Page

The KNX Sensor **SK08-WAQ** water quality is a sensor / controller from the S8 device series for detection and control of the following values: pH-value, redox potential, and water temperature.

The sensor / controller has two extemely high-resistant inputs to connect combination electrodes for pH-value and redox potential. The inputs are galvanically isolated from the KNX bus so that no ground loops can occur. In addition, there are two potential-free contact inputs available. Electrodes of a variety of manufacturers can be used for different applications. As an accessory, Arcus-EDS offers a set of electrodes produced by the manufacturing company Hanna that is suitable for general applications.

The device has an integrated KNX bus coupler and does not require additional voltage.

The transducer is located in a high-strength, extremely robust stable impact ABS plastic housing. Cover and base have a revolving groove and tongue system with neoprene gasket. The housing is IP54/65.

In the application software, there are different controllers available for the measurement values “pH-value“ and “redox potential“: two-point or PI controllers with steady or pulsed outputs.

Article-No.: 3080200x

SK08-WAQ SK08-WAQ-MES
Water Quality Controller / Sensor with pH Value and ORP Recording
(Single-Rod Measuring Cell included)

Further functions are included, such as the upper and lower limits as well as an auxiliary object for each limit. These can be switched to the setpoint values or to the limits. The sensor registers the runtime since the last calibration. It can be used as alarm function when the limit is exceeded. The calibration of the probes is carried out via the KNX bus and by using two calibration objects. Setting the pH-value probe is usually carried out as 2-point calibration, and the redox potential as 1-point calibration.

The sensor is configured with ETS (KNX Tool Software) and the application program. Controlling functions such as signal threshold and diverse adjustments are set using ETS (KNX Tool Software).

Areas of Application

- Monitoring the water quality in aquariums, swimming pools, ponds and service water systems
- Controlling sanitizing systems

Applicable Sensors
Single-rod measuring cell for pH value and redox potential

Measuring Range pH:	0 .. 14
Measuring Range ORP:	-1200 .. 1200mV
Measuring Range Water Temperature:	-20 .. 100°C
Operating Temperature Transducer:	-20 .. +55°C
Storage Temperature Transducer:	-20 .. +85°C

Ambient temperature electrodes according to manufacturer’s specifications

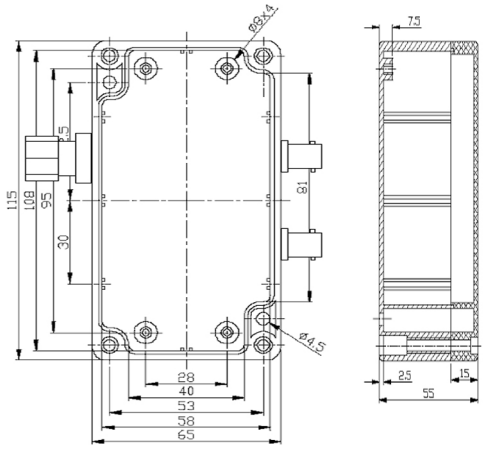
Measuring Amplifier
From KNX bus, isolated high-impedance (> 500GΩ) inputs with shared 0-potential.

BNC Bayonet Coupler

Entrance Area pH:	-600 .. 600mV
Entrance Area ORP/Redox potential:	-1200 .. 1200mV

Use
Electronic measuring equipment for flat surfaces, orientation of electrode connectors on bottom Electrodes according to manufacturer’s specifications

Protection System Casing Transducer:	IP54/65



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2.6 Technical Data

Technical Data - SK08-WAQ

Measured Data	pH value (concentration of hydrogen ion) ORP (redox potential) Operating time in hours
Sending Options	no sending, cyclical sending when change occurs
Parameter	Cyclical sending with variable periods, sending when change occurs with hysteresis
Object type ph	1-Byte unsigned, 2-Byte float, 4-Byte float
Object type ORP	2-Byte signed, 2-Byte float, 4-Byte float
Object type Laufzeit	2-Byte unsigned
Object type Wassertemperatur	1-Byte signed, 2 Byte signed, 2 Byte-float, 4 Byte-float
Object type Kontakteingänge	1-Bit bool
Controller Modi	Steady PI controller Switched PI controller (PWM) Two-Position controller Two-Position controller Pulsed
Parameter Steady PI controller	Setpoint, reset time, proportional factor, controller mode
Parameter Switched PI controller (PWM)	Setpoint, reset time, proportional factor, controller, cycle duration, threshold pitch
Parameter Two-Position controller	Setpoint, differential gap, controller mode
Parameter Two-Position controller Pulsed	Setpoint, differential gap, controller mode , cycle duration, duty cycle
Lock Function	All controller parameterizable as enable or lock
Controller Variables Output	depends on Controller Modi 1-Byte unsigned, 1-Bit Switch
Setpoint value send cyclical	None or 10-250 seconds, parameterizable
Limits: pH, ORP, operating time, water temperature	Lower limit, Upper limit
Auxiliary value	Setpoint, Upper limit or Lower limit
Bus power failure	Saving changed auxiliary quantities, parameterizable
Calibration	pH 7 - Zero pH X - Transconductance ORP X - Transconductance Operating Time - Reset

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Technical Data - SK08-WAQ (continue)

Ambient Temperature Electronic Measuring Equipment Casing	Operation: -20 .. +55 °C Storage: -20 .. +85°C
Ambient Humidity	0 .. 95% rH not condensating
Accuracy pH	± 0,1
Resolution pH	± 0,01
Accuracy OPR	± 10mV
Resolution OPR	± 1mV
Accuracy water temperature	± 1°C
Resolution water temperature	± 0,01°C
Operating Voltage	KNX bus voltage 21 .. 32VDC
Power Consumption	approx. 240mW (at 24VDC)
Auxiliary Supply	not required
Bus Coupler	integrated
Start-up with ETS	**ARC_S8.VD2 Product: S8-WAQ**
Curcuit Points	KNX 2-pole clamps (red / black)
Protection Class	IP54/65
Assembly Type Transducer	Assembly with 2 screws finery
Casing Transducer	ABS plastic grey
Casing Dimensions	(115 x 65 x 55) mm (L x W x H)
Article number without sonde	30801000
Article number with sonde	30801001
Electrode Set	Single-rod measuring cell, gel-filled, low-maintenance for standard applications pH: HI2114P-2 ORP: HI3214P-2
Electrode cable	2m with BNC plug
Article number	91110020
Temperature probe	PT1000 not included, please order separately, Price catalogue rubric Z

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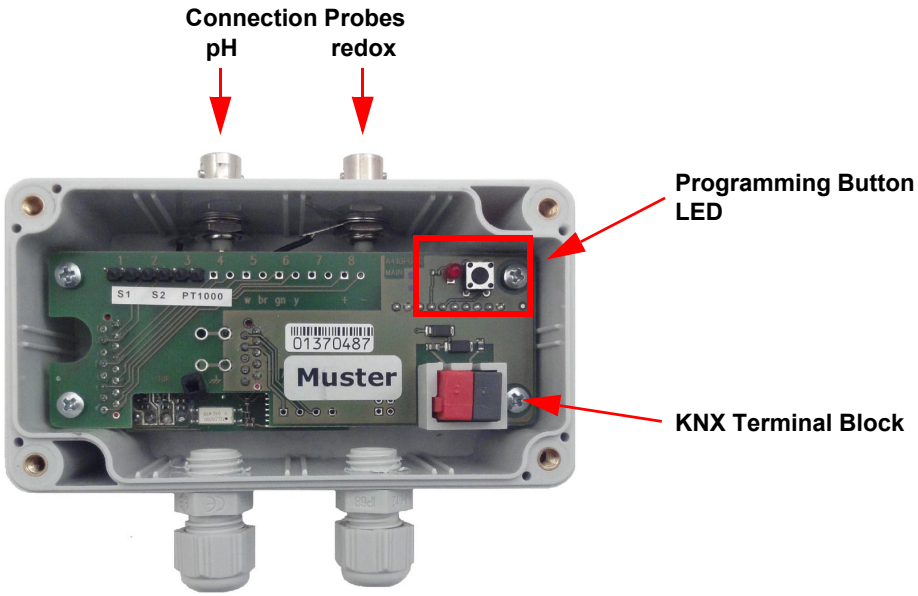
2.7 Startup

The KNX Sensor is set up using the ETS (KNX Tool Software) and the applicable application program.
The sensor is delivered unprogrammed.
All functions are programmed and parameterized with ETS.
Please read the ETS instructions.



SK08-WAQ Assembly View

For the initial set-up the sensors must be calibrated according to the application instructions. Afterwards, it is recommended to recalibrate every 3 to 6 months.

2.8 Assembly

The Sensor **SK08-WAQ** is for outdoor and (moist) indoor areas. It fulfills protection class IP54/65.
The sensor is attached to the wall with two screws
The transducer lid is opened by loosening the screws.

The external measuring electrode (single-rod measuring cell) cable is screwed into the side of the BNC case.
First attach the sensor to the wall or ceiling, then insert the KNX Bus cable into the cable gland on the side of the casing.
Detach the bus clamp from the device, attach the cable and replace the clamp onto the board.
After successfully programming the device, screw the cover back on.

When using the external temperature sensor or the dry contacts, the cable is inserted in an additional cable gland.

In order to fulfil IP54/65 protection class the gasket ring must be carefully placed in the lid.

Be careful not to damage the electronics with tools and cable heads.

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In Case of Bus Voltage Recurrence

All changes made using the help key for the KNX bus are saved if the device has been correctly parameterized.
The controller and outputs start with their current values and the ETS parameter settings are saved.

Discharge Program and Reset Sensor

In order to delete the programming (projecting) and to reset the module back to delivery status, it must be switched to zero potential (disconnect the KNX bus coupler).
Press and hold the programming button while reconnecting the KNX bus coupler and wait until the programming LED lights up (approx. 5-10 seconds).
Now you can release the programming button.
The module is ready for renewed projecting.
If you release the programming button too early, repeat the aforementioned procedure.

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Safety Regulations

Attention! Installation and mounting must be carried out by a qualified electrician.
The buyer/operator of the facility has to make sure that all relevant safety regulations, issued by VDE, TÜV and the responsible energy suppliers are respected. There is no warranty for defects and damages caused by improper use of the devices or by non-compliance with the operating manuals.

Warranty

We take over guarantees as required by law.
Please contact us if malfunctions occur. In this case, please send the device including a description of the error to the company's address named below.

Manufacturer

KNX arcus-eds electronic design services gmbh

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