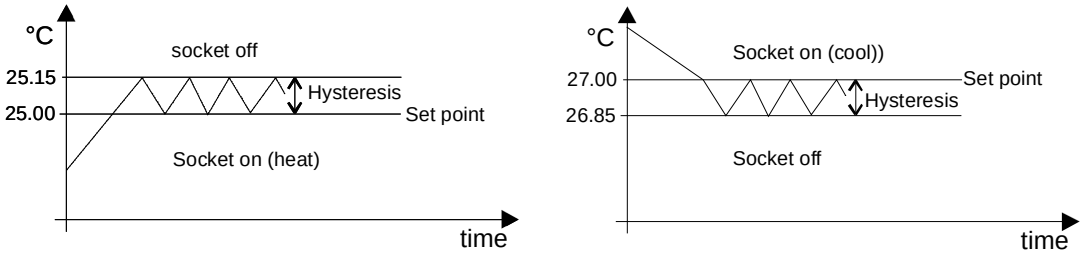
Tips and tricks

The control principle

The iks Aquastar operates under the principle of a “two-point controller”. This means that the control system activates a socket when a “set point” is reached. This then remains switched on until a second “switching point” is reached. The difference between these two points is known as “switch hysteresis”. If you want to programme a control process then you only have to enter the set point. The switch hysteresis (the second switching point) is automatically set by the system. This hysteresis is dependent on the module being used. The values can be found in the instruction manual of each module.

Example: The graph on the left below shows a temperature control process (heat). On the right is another temperature control process (cool).



The control principle

Salt content (Salinity) and density in seawater aquariums

The salinity expresses the sum of the concentrations of all salts contained in a sample of seawater. A differentiation is made between the “absolute salinity” and the “practical salinity” whereby the “absolute salinity” is the real total salt content of the water in question. As this value is found by the individual determination of the concentration of every single substance, and thus normally impossible to ascertain, the “practical salinity” is generally accepted in practice. This is defined on the basis of a standard seawater (the so-called “Copenhagen water”). The basis of the “practical salinity” used here and the calculated density derived from it comes from the arithmetical conversion of conductivity into salinity (relative to a reference temperature of 25°C) as carried out by the National Institute of Oceanography of Great Britain and UNESCO‘‘ in 1971. This conversion is based on Copenhagen water (standard seawater) in a salinity range of 20 to 40. Copenhagen water has a salinity of 35 from a calculated average composition from 135 seawater samples

As tables and graphs can be found in various specialist publications that refer to a variety of **reference temperatures** (but do not draw your attention to them explicitly), varying degrees of confusion resulted among considerable numbers of aquarium enthusiasts. To prevent you becoming a member of the group mentioned above, we have produced the following table:

Conductivity 20°	Conductivity 25°	Salinity 25°	Density 25°	Conductivity 20°	Conductivity 25°	Salinity 25°	Density 25°
36,2	40,0	25,6	1,0162	45,6	50,5	33,2	1,0219
36,6	40,5	25,9	1,0164	46,1	51,0	33,5	1,0222
37,1	41,0	26,3	1,0168	46,6	51,5	33,9	1,0225
37,5	41,5	26,7	1,0170	47,0	52,0	34,3	1,0228
38,0	42,0	27,0	1,0173	47,5	52,5	34,6	1,0230
38,4	42,5	27,4	1,0175	47,9	53,0	35,0	1,0234
38,9	43,0	27,7	1,0179	48,4	53,5	35,4	1,0236
39,3	43,5	28,1	1,0181	48,8	54,0	35,8	1,0239
39,8	44,0	28,4	1,0184	49,3	54,5	36,1	1,0241
40,2	44,5	28,8	1,0186	49,7	55,0	36,5	1,0245
40,7	45,0	29,2	1,0189	50,2	55,5	36,9	1,0247
41,1	45,5	29,5	1,0192	50,6	56,0	37,3	1,0250
41,6	46,0	29,9	1,0195	51,1	56,5	37,6	1,0253
42,0	46,5	30,3	1,0197	51,5	57,0	38,0	1,0256
42,5	47,0	30,6	1,0200	52,0	57,5	38,4	1,0258
42,9	47,5	31,0	1,0202	52,4	58,0	38,8	1,0262
43,4	48,0	31,3	1,0206	52,9	58,5	39,1	1,0264
43,8	48,5	31,7	1,0208	53,3	59,0	39,5	1,0268
44,3	49,0	32,1	1,0211	53,8	59,5	39,9	1,0270
44,7	49,5	32,4	1,0213	54,2	60,0	40,3	1,0273
45,2	50,0	32,8	1,0217				

Hints on calibration

For the purpose of calibration, many measurement electrodes require the most precise value possible of water temperature in the aquarium and of buffer solution temperature. It has already been mentioned in this manual that the bottles of calibration solutions can be left to float in the tank for a while until the temperatures have aligned themselves. There are, however, other methods for particularly cautious people.
To prevent the (tank-) water being contaminated by calibration solutions, a bowl of water can be suspended in the tank (instead of placing the bottles in the tank). The calibration solutions are then placed in this until their temperatures have aligned with that of the tank. This, after a certain amount of time, leads to identical temperatures of the tank and the calibration solutions, and direct contact with the aquarium water is effectively avoided.

The water temperature of the tank itself is usually held constant by heating or cooling and only changes very slowly (due to the relatively large quantity of water). The second method of determining the temperature involves the following procedure: Read the temperature of the aquarium water from the display and make a note of it. It will remain constant long enough for the purposes of calibration. Now (as in the previous example) place the bottles of calibration solution in a bowl that you have filled with water from the aquarium. Now wait until the temperatures have aligned themselves. Lay the temperature sensor in the bowl. The temperature of the aquarium water can now be entered manually and that of the calibration solutions automatically, via the temperature sensor. This prevents contact of even the smallest quantity of calibration solution with the aquarium water. Nevertheless, please don't forget to rinse and clean the sensor before putting it back in the tank.

Sensor care

The sensors are extremely sensitive instruments that do their job almost unnoticed. Nevertheless, it is still a good idea to check them from time to time to ensure that they continue to provide reliable measurement results.
A first step towards increasing their lifespan and reliability is to locate them in a position that is as dark as possible and where there is a lot of water movement. This minimises the appearance of algae. Redox sensors in particular are very allergic to contamination. They should be cleaned every few months VERY CAREFULLY with a soft paper tissue. The other sensors (depending on the type) can be rinsed carefully in (distilled) water or wiped clean (e.g. the temperature sensor).
Maintenance obviously also includes re-calibration at certain intervals as sensors age and cleansing involves mechanical wear.
And finally, please consider the comparison with a lightbulb: Sensors don't last forever either.

Measuring the water values

There is hardly any aquarium enthusiast who isn't convinced about the comprehensive measurement- and control possibilities that the ***iks aquastar*** provides. Nevertheless, at his point we would like draw attention to the fact that computers are "stupid" (this of course doesn't refer to the human know-how that's behind their development!) and can only do what they have been programmed to do. It is quite possible to cause an aquarium to "crash" with deliberately contradictory control functions. This can, however, also be achieved with more simple means and your ***iks aquastar*** is quite capable of making life with your aquarium a great deal easier. To use it sensibly, however, it's a good idea to think through what you want to do.
Please remember that every tank is different and presents different water values. It is therefore not possible to make direct comparisons nor necessary if a few values do not correspond 100% with the "standard" values. Not even in nature is (sea-) water identical everywhere - neither the period of illumination nor temperature nor water values. Just consider for a moment the difference between the North Sea and the Caribbean. It is unavoidable (at least to start with) that you will regularly have to measure your water values with tests available on the market. When you (and the inhabitants of your aquarium, in particular) are satisfied with your water values, make a note of the displayed data from the relevant measurement electrode of your ***iks aquastar***. Then, in future, you will have the means to see "at a glance" when changes (both positive and negative) occur. Because of the complex interaction of all factors, there is no point in trying to achieve "dream values" in one area when those in another have to suffer. It's labour, for example, to try to lower the pH-value to "8.2-Standard" from one of 8.27 in a stable tank by constantly "over-dosing" with CO2. By doing so you will just force other values to change - and not necessarily positively.
In such instances human instinctive feeling and experience is necessary.

Labelling the socket panels

It is obviously clearer if you number your socket panels. However, if you are quite certain about what has been allocated to each one, it is a good idea to note on a sticker or something similar which appliance has been connected (lamp, heating, CO2 supply etc.). Affix these labels to the plugs of the appliances too. Then, if you ever want to disconnect a particular appliance from the mains power, you can see at a glance which plug belongs to which socket. This is also useful if you are absent and want to explain to a friend on the telephone where something is to be plugged in or unplugged.
It's also not a bad idea to make a few notes, especially when several identical sensors are being used in different tanks.

Lunar-phase simulation

It's by all means possible to create a lunar-phase simulation (that has to be calculated on the basis of the day/night simulation) even though the main source of lighting comes from non-dimmable HQI- or HQL lamps. To do this, proceed as follows:
Connect a **dimmable** lamp that represents the moon (e.g. a yellow 25 to 40 Watt spotlamp) to a vacant **variable-output** socket. **Activate** the day/night simulation. **Do not**, however, **allocate a socket** "(--)" to it.
Activate this simulation in the lunar-phase simulation menu too and allocate a **variable-output** socket to it. Set the intensity of light at full moon (from the lamp) as you require (% of output when "on") and check with the **F2 key**. Now, when you pass control back over to the *iks aquastar* the main lighting will continue to be switched "only" on or off but the lunar phase will be realistically calculated and produced.

Controlling several tanks with one *iks aquastar*

As the *iks aquastar* has the ability to control timers, intervals, control processes etc. independently from one another, it also presents a low-priced means of controlling several tanks. Let's take the example of two freshwater tanks with different requirements in temperature, lighting, and pH-value (e.g. a discus fish tank and a perch tank). A simple and cheap way of doing this is to connect two socket panels, two temperature sensors and two pH-value sensors. To keep things clear, one socket panel is allocated to each tank. The lighting, the heating system and the CO2 supply is connected to each socket panel. The panels are then programmed for the respective tank. It is then possible, thanks to the socket-panel numbering. to recognise straightaway which module is applicable to which tank (e.g. Sockets 1-4 on Panel L1 for Tank A, Sockets 5-8 on Panel L2 for Tank B). And you even have two sockets left for further functions!
We hope you have many years of enjoyment with your iks aquastar and the aquariums you measure and control with it! We are always glad to hear suggestions, tips and tricks. Please write to us or simply send us an e-mail.
info@iks-aqua.com
Thank you!