Calibrating electronic humidity sensors

Calibrating the humidity sensors in incubators can be tricky.

However, if the machine has electronic humidity sensors a saturated solution of a specific chemical compound, presented to the sensor in a sealed container, will give an accurate and predictable reading which can be used to calibrate the machine.

Saturated solutions of different salts will, depending on the temperature, always give the same reading on an electronic humidity sensor. Two of these compounds are suitable for use to calibrate setter or hatcher electronic humidity sensors at incubation/ hatcher temperatures (98-100°F). Magnesium nitrate hexahydrate [Mg(NO3)2.6H2O] will read 50% and sodium chloride [NaCl] will read 75% RH. If the machine shows a wet bulb temperature, rather than a percentage RH, then the predicted reading will alter slightly depending on the air (dry bulb) temperature in force at the time of calibration.

The table below shows what to expect at different dry bulb temperatures for both chemicals. Correct preparation of the solution is very important. Too much or insufficient water addition will give inaccurate results. Salts should be of consistent purity, ideally laboratory grade.

Steps:

1. **Fill the sensor protection bottle quarter full with the dry salt. Prepare a syringe full of water.**
2. **Add a small amount of water to the salt and shake well.**
3. **When the salt becomes sticky (it will stick to the bottle) the solution is ready to use. Turn off the humidity alarm of the machine.**
4. **Screw the bottle to the fitting above the humidity sensor. The humidity reading will stabilize once the salt solution has reached incubation temperature (about an hour).**
5. **Once the humidity becomes stable, calibrate your sensor to the expected value for the machine temperature at the time (see Table).**
6. **Remove the bottle to finish calibration, turn on the alarm and run the machine normally. Humidity will shortly start showing actual level. One batch of solution can be used for five machines.**

It is good practice to repeat this calibration every set for single stage machines and every month for multi-stage machines.

DRY BULB TEMPERATURE (actual machine temperature)	APPROXIMATE WET BULB TEMPERATURE (°F)	
	Sodium Chloride	Magnesium Nitrate Hexahydrate
100	92.5	83.5
99.5	92.0	83.0
98.5	91.0	82.2
98.0	90.5	81.8