



Service life of Hydrochloric Acid (HCL) electrochemical sensor under different application environment

1. In the environment with constant presence of Hydrochloric Acid (HCL) gas

Detection principle of HCL electrochemical sensor: During use, the active substances in the sensing electrode will be consumed, resulting in the signal drop of the sensor and the shortened service life, which is called a consumable electrochemical sensor. Long-term exposure to the HCL atmosphere will greatly affect the service life. To maintain normal service life, only short-term exposure to measure HCL gas concentration is allowed, and the sensor shall remain in fresh air environment once the measurement is completed.

For example, the sensitivity of HCL sensor from a manufacturer in the market is $0.4\mu\text{A}/\text{ppm}$, and its theoretical detection life is $15000\text{ppm}\cdot\text{h}$. According to the environmental concentration and detection time, the calculated life is as follows. It should be noted that the service time here is h/day, which belongs to intermittent contact (electrochemical gas sensors are generally designed for intermittent detection of target gases and are not suitable for continuous detection applications, especially for those applications involving high gas concentration or extreme humidity and temperature).

Environment HCL Concentration	Sensor Expose Duration (h/day)	Sensor Life (day)
50ppm	2	150
25ppm	2	300
10ppm	8	187.5
5ppm	24	125

Note: The actual service life of the sensor is also closely related to the application environment. HCL gas is a strong acid gas, it is not recommended to use electrochemical sensors for testing in high concentration environment for a long time. When not in use, the sensor or the instrument equipped with the sensor shall be placed in the fresh air environment.