

These two pictures show identical sensors installed on the same application for the same time duration. One sensor has periodic cleaning applied and is in excellent condition with many years life still remaining. The other has not been cleaned, it has a high reference resistance, slow response and will soon be unserviceable.

## pH CONTROL AND WASH SYSTEM FOR 2 - WIRE TRANSMITTER USING CONTROLLER WITH PLC FUNCTION

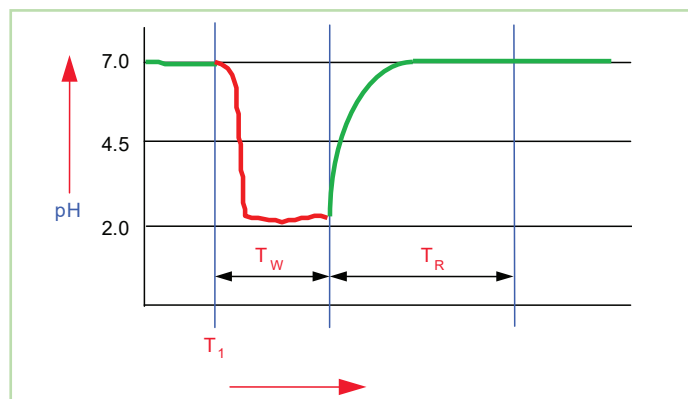
### Overview

pH wash systems are a requirement for many industries where electrode fouling is common place. Large amounts of deposits form over a period of time preventing the sensors performing correctly. This results in measurement loss and repeated expensive electrode replacement. It is difficult to apply wash systems to 2 wire transmitters due to hazardous area restrictions therefore incorporating the wash function within a control device outside the hazardous area provides a cost effective solution.

### Application Outline

A perennial issue encountered in process pH measurements is the coating of the electrode surface by a component of the process fluid. In order to function correctly a pH electrode needs to make a good contact to the liquid it is measuring. Any deposit forming on the electrode forms a barrier between the electrode sensing surface and the fluid being measured, depending on the type and degree of deposit it will at least slow the response and, in time, prevent the electrode functioning at all. The ramifications of this for users are significant:-

- Slow measurement response
- Inaccurate measurement results
- Increased maintenance costs
- Increased consumable costs
- Increased incidence of unavailability
- No confidence in the measured result



Frequency  $T_1$  - The time interval between cleaning.

Duration  $T_w$  - The length of time cleaning solvent is applied.

Recovery  $T_R$  - The length of time taken for the applied cleaning chemical to dissipate.

## APPLICATION NOTE



Automatic cleaning systems are able to ensure clean electrodes by regularly and frequently cleaning in situ, if performed effectively, this results in fast, accurate measurements which need minimal maintenance and will use a minimum of consumables.

Many different cleaning systems are available (brushes, wipers, ultrasonic etc), one of the most successful is wash cleaning which periodically sprays the electrode with a solvent selected to remove the deposit. In order for the cleaning to be successful the frequency, duration and recovery time need to be established to suit the application.

### Solution

2-wire pH transmitters like the Yokogawa Flexa cannot power relays, which would be used to start the wash system, due to the requirements of hazardous areas, as such supporting a wash system is not possible.

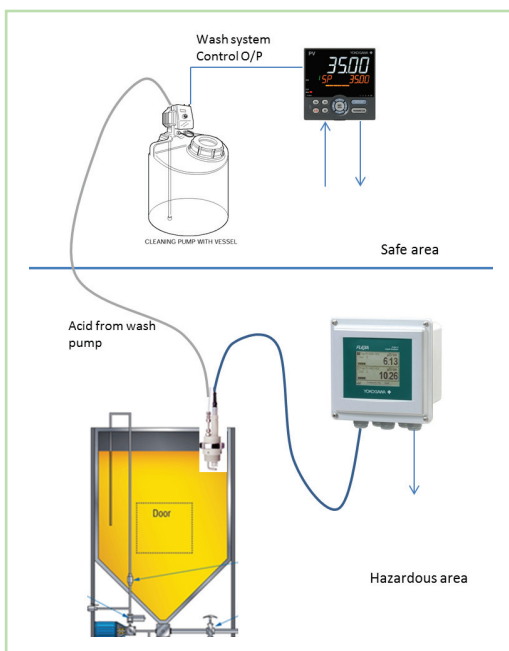
Using the UT35A Controller product with in-built ladder functionality allows a wash system to be created outside the pH transmitter, along with the added benefit of providing pH control. The UT35A can be mounted in a safe area and using barriers the wash system can be operated. The ladder function within the UT35A controller allows the interval timer, wash cycle timer and recovery timer to be utilized and for the 4-20mA pH signal to be held during the wash and recovery periods. By holding the value during the wash cycle and the recovery period, interruption to the process is avoided.



The UTAdvanced Controller series has ladder functionality built in as a standard function. This allows a wide variety of applications to be solved with a simple programming technique.

### Conclusion

Many pH applications require a wash system to prevent electrode fouling. By extending the capability of wash systems to 2-wire transmitters using the UT35A, Yokogawa provide a cost effective solution for pH applications where a wash system was not previously practical. This reduces operating expenditure by extending the life of electrodes and reducing downtime due to poor readings or loss of service.



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