

OpreX™ Analyzers

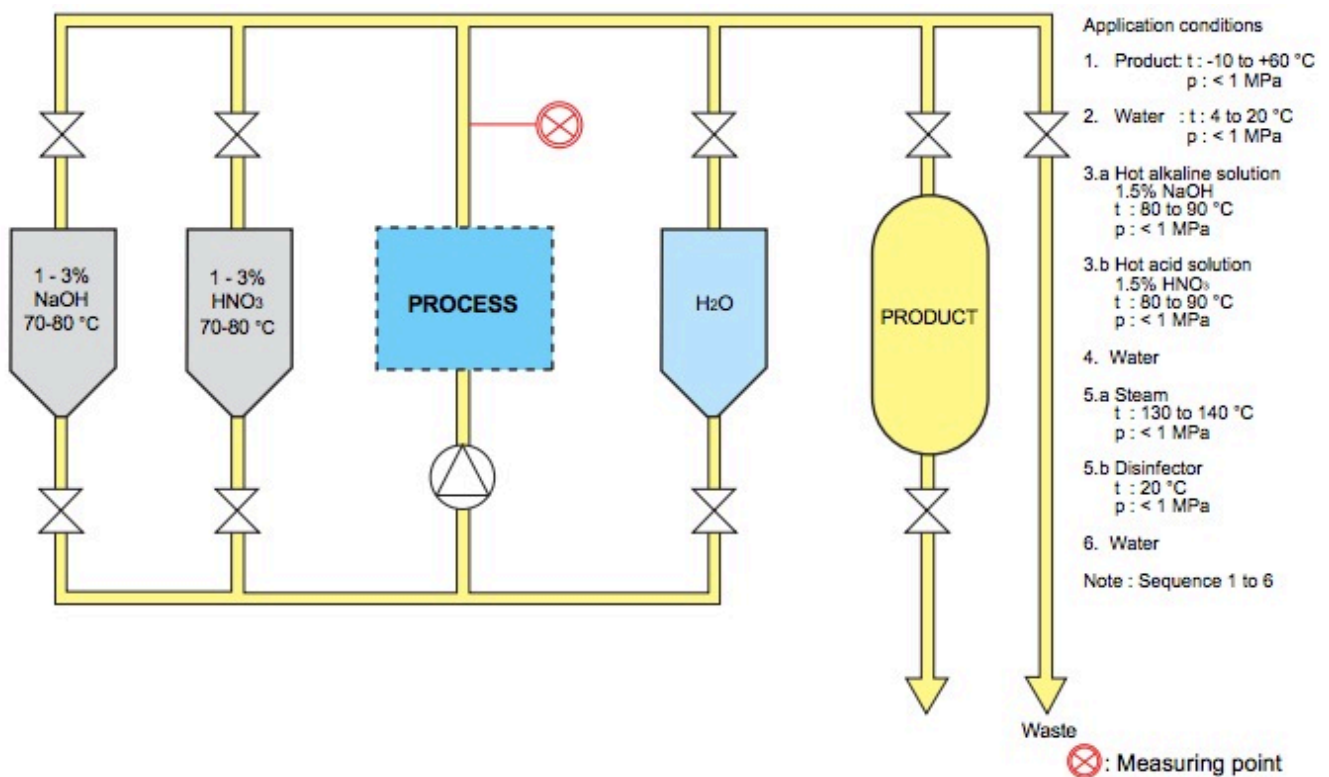
Measuring the Electric Conductivity by use of Clean-in-Place (CIP) System

Application Note

Introduction

In the manufacturing process of Pharmaceutical, Chemical and Food & Beverage industries, the cleaning and sterilization of tanks and piping are done with various cleaning solutions, fresh or hot water and steam after manufacturing products. Clean- In-Place (CIP) is the system designed for automatic cleaning and disinfecting. The recovery of cleaning solutions contributes significantly to reduce chemical costs and wastewater processing costs.

Yokogawa FLXA202/FLXA21 inductive conductivity transmitter has earned a reputation in the recovery of cleaning solutions because it can take measurements with good boundary surface precision over a wide range.

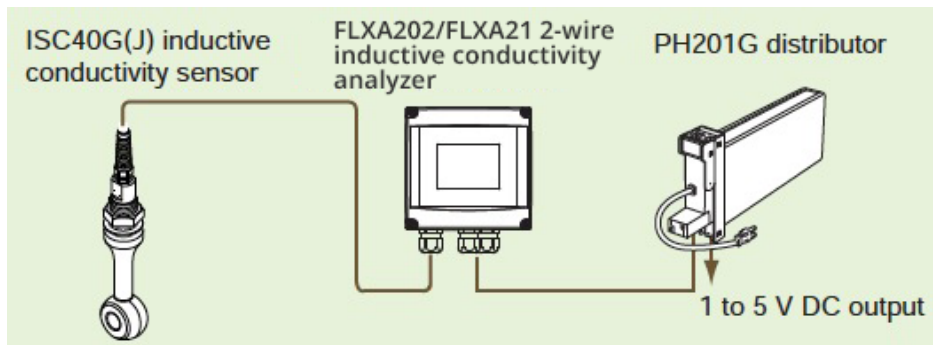


CIP Process Flow

Expected Benefits

- Optimizes cleaning and sterilizing application for tanks and piping by use of CIP
- Reduces operating costs

Process Overview



CIP systems depend on the process differentiations of Pharmaceutical, Chemical and Food & Beverage. In addition, the cleaning solutions and chemicals are different. The chemicals that are generally used are hypochlorous acid, caustic soda, and nitrous acid. In a cleaning solution recovery

system, the process lines and piping are cleaned with an initial cleaning solution. After that, the cleaning solution is cleaned with fresh water. The cleaning solution is recovered at that point, but since it gradually becomes diluted with fresh water, recovery is discontinued and the solution is discharged through a drainage line when the concentration of the cleaning solution drops below the standard value. The cleaning with different solutions or fresh water, the recovery of the cleaning solution, and the discharge of waste solution are repeatedly carried out. In addition, sterilization with steam or cleaning with distilled water or de-ionized water is performed as a final step in some cases.

Solution Details

Measurement system	
2-wire inductive conductivity system	
Sensor	ISC40G(J)
Flow-through type holder	ISC40FF(J)
Transmitter	FLXA202-D-B-D-AB-C5-NN-A-N-LA-J-NN
Dedicated distributor for transmitter	PH201G-A□*B

Utilities

FLXA202 inductive conductivity transmitter	
Power supply voltage:	17 - 40 V DC (from distributor)
PH201G distributor	
Power supply:	100 V: 20 to 130 V DC / 80 to 138 V AC, 47 to 63 Hz
	220 V: 120 to 340 V DC / 138 to 264 V AC, 47 to 63 Hz
Power consumption:	24 V DC: approx. 200 mA
	100 V AC: approx. 7 VA
	220 V AC: approx. 11 VA

Notes

Temperature range of transmitter is -20 to 140° C

Field Data

1. Process Conditions

	Concentration (%)	Temperature (°C)	Pressure MPa
Water	-	4 to 20	0 to 1
NaOH solution	1 to 5	80 to 90	0 to 1
HNO ₃ solution	1 to 5	80 to 90	0 to 1
Steam	-	below 130	0 to 1

2. Features of ISC Inductive Conductivity Meter used in a CIP Process

1. Improved precision in boundary surface measurement.

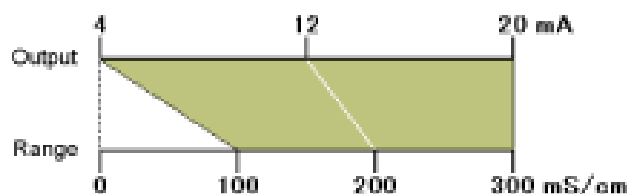
(a) Equipped with a zero-suppression function according to output signal

* Zero suppression

Example:

Output: 4 to 20 mA DC

Range: 100 to 300 mS/cm



Zero-suppression function

(b) One sensor can handle a minimum span of 100µS/cm and a maximum span of 1999 mS/cm.

2. Steam sterilization capability

Measurements can be performed at process solution temperatures of -10 to 130° C and pressures no greater than 2 MPa {20 kgf/cm²}

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YOKOGAWA ELECTRIC CORPORATION

World Headquarters

9-32, Nakacho 2-chome, Musashino-shi, Tokyo 180-8750, JAPAN

<http://www.yokogawa.com/an/>



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