

## Introduction

Process liquid analyzers such as pH meters, conductivity meters, ORP meters, and density meters play an important role at electrolysis plants in the control of concentrations of various process solutions. This requires both precision and stability under harsh conditions that include highly corrosive substances, high temperatures, and many impurities.

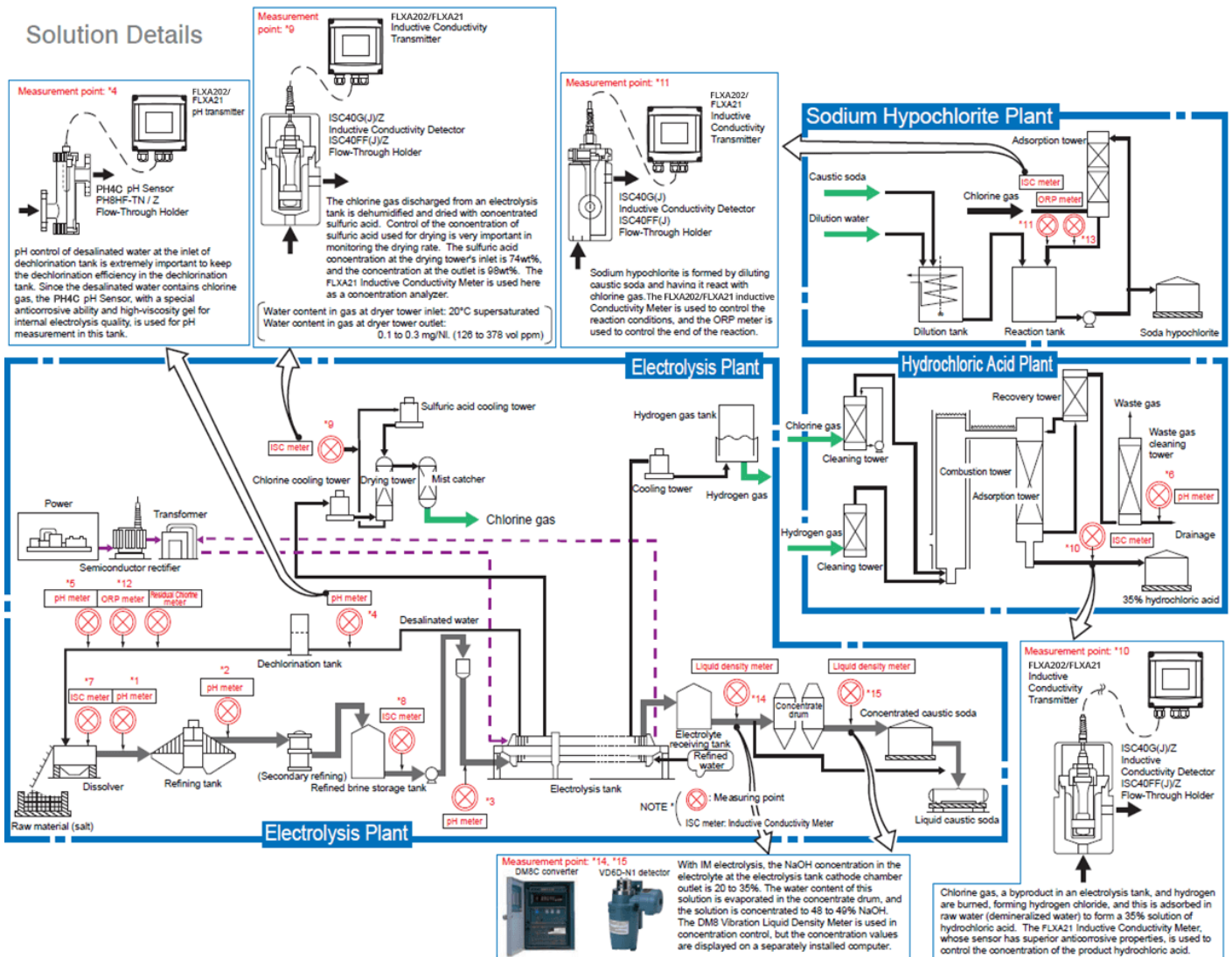
## Expected Benefits

- Ensures stable, continuous measurement in heavily contaminated liquids
- Reduces operating costs
- Eliminates the need for manual cleaning

## List of Analyzers

Type	Measurement point	Objective
pH meter	1) Supersaturated brine at raw salt dissolver outlet *1	pH control for impurity removal in brine Control value: 10.8 to 11.0 pH
	2) Refined brine *2	Control of precipitation of impurities Acid range
	3) Brine at electrolysis tank inlet *3	pH control of electrolysis tank brine inflow: 3 to 6 pH
	4) Return brine at electrolysis tank outlet *4	Efficiency control in dechlorination tank Acid range
	5) Desalinated water at dechlorination tank outlet *5	Desalinated water control
	6) Hydrochloric acid plant drainage *6	Drainage control
Conductivity meter	1) Supersaturated brine at electrolysis tank outlet *7	Brine concentration control: concentration: 300 to 320 g/l
	2) Refined brine *8	Refined brine concentration control
	3) Sulfuric acid concentration used for drying in chlorine gas drying line *9	Concentration control of recovered sulfuric acid: approximately 74 %
	4) Hydrochloric acid concentration in hydrochloric acid plant *10	Hydrochloric acid concentration control: approximately 35 wt%
	5) Sodium hypochlorite concentration in a soda hypochlorite plant *11	Sodium hypochlorite concentration control: Available chlorine: 10 to 15 % Residual caustic soda: 0.1 to 1% (approximately 10 g/l)
Oxidation reduction Potential (ORP) meter	1) Desalinated water at dechlorination tank outlet *12	Confirmation of dechlorination reaction
	2) Soda hypochlorite plant adsorption tank outlet *13	End control of caustic soda chlorination reaction
Vibration type liquid density meter	1) Anode solution at electrolysis tank outlet *14	Anode solution caustic soda concentration control
	2) Caustic soda concentration at concentrate drum outlet *15	Product caustic soda concentration control

## Solution Details



## Solution Details

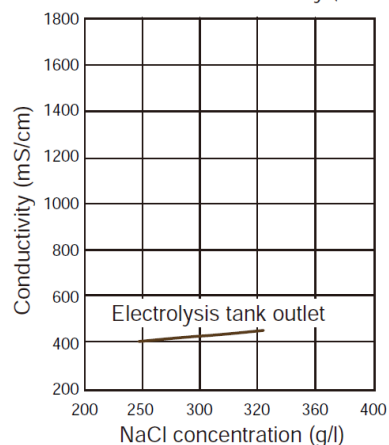
## Conclusion

Yokogawa process solution analyzers deliver stable, long-term measurements under the harsh conditions present in electrolysis plants. The FLXA202/FLXA21 Inductive Conductivity Meter is specially designed to detect the concentrations of hydrochloric acid, sulfuric acid, and caustic soda. The PH4C pH Sensor for Chemical Processes can measure pH in a wide variety of processes.

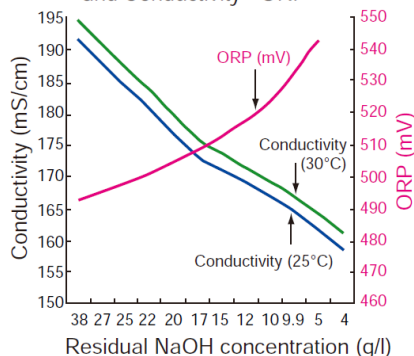
## Field Data

Each graph shows a correlation between concentration and conductivity at measurement points, the numbers of which correspond to the ones in the previous page. The ISC inductive conductivity meter's range can be specified, thereby allowing high-resolution measurements in the target concentration range.

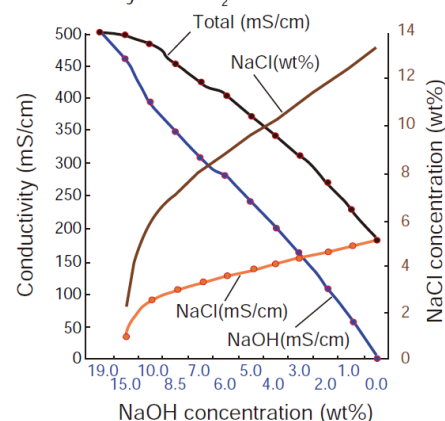
Measurement point: \*7  
NaCl concentration - Conductivity (60 °C)



Measurement point: \*11, \*13  
NaOCl Plant  
Residual NaOH Concentration and Conductivity - ORP

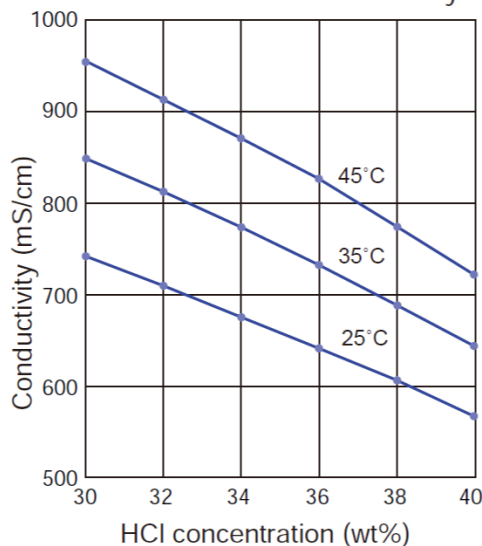


Measurement point: \*11  
NaOCl Plant  
Conductivity when  $\text{Cl}_2$  is adsorbed in NaOH

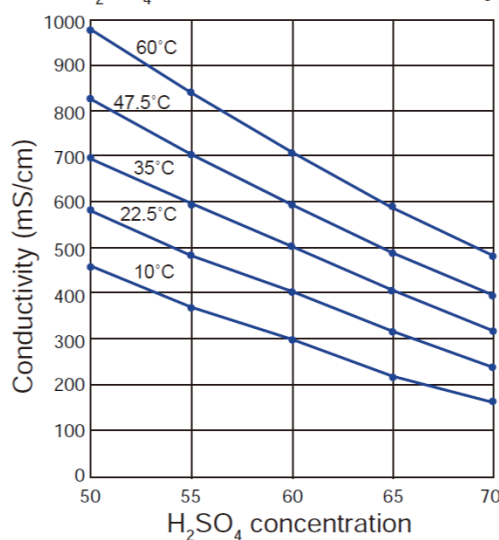


The correlation between concentration and conductivity is largely affected by solution temperature. The ISC inductive conductivity meter provides automatic temperature compensation using the build-in temperature sensor.

Measurement point: \*10  
HCl Concentration - Conductivity



Measurement point: \*9  
 $\text{H}_2\text{SO}_4$  Concentration - Conductivity



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[Ed:04, Dec. 2020]