

## Humidity Measurement in Tantalum Capacitor Pyrolysis Furnaces

**Industry:** Electrical and Electronics  
**Product:** Zirconia Humidity Analyzer

### Introduction

In tantalum capacitor manufacturing, there is a steam pyrolysis process where tantalum pellets are decomposed by steam. Humidity control in this process is important to maintain product quality and improve yield.

Stable humidity measurement at high temperatures of 200 to 400 °C is required. The ZR402G/HS Direct In Situ Zirconia High Temperature Humidity Analyzer is easy to maintain as it requires no sampling system and utilizes a long life sensor with fast response. It is widely used in humidity instrumentation

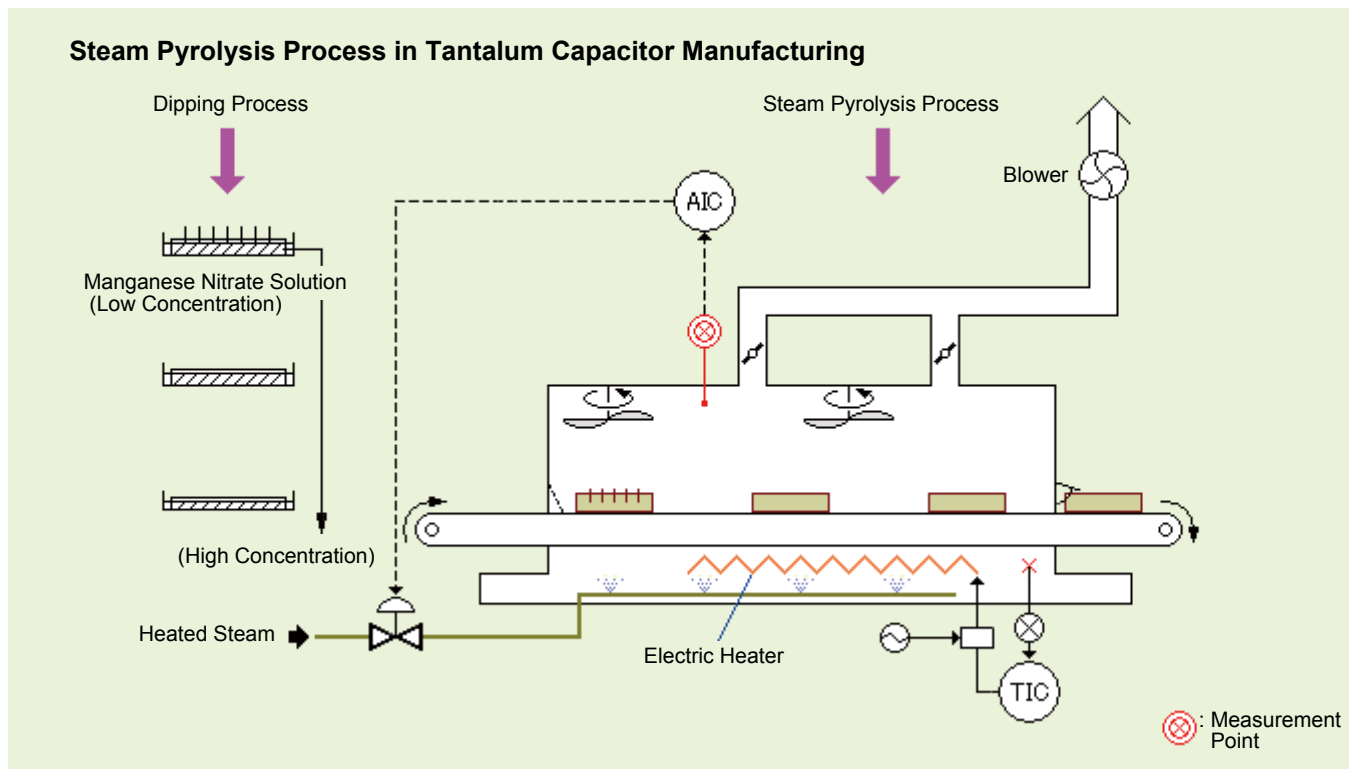
applications and has been well received in the marketplace.

### Expected Benefits

- Maintains the quality of the tantalum capacitor manufacturing process
- Ensures stable, continuous humidity measurement
- Reduces operating costs

### Process Overview

A tantalum pellet with an electrode plate applied is immersed in a manganese nitrate solution. This dipping process allows the manganese nitrate to penetrate the porous part of the pellet. After dipping, the pellet is forwarded to the pyrolysis process where the manganese nitrate is decomposed under high temperature and humidity conditions to form a manganese dioxide coating by the reaction  $Mn(NO_3)_2 \rightarrow MnO_2 + 2NO_2$ . These steps are repeated until the coating is sufficient. To improve the coating uniformity and yield, the humidity is controlled.



## Solution Details

### Field Data

#### Process conditions

Measurement point:	Inside the steam pyrolysis furnace
Temperature:	200 to 400 °C
Pressure:	10 to 20 Pa
Humidity:	25 to 80 vol%H <sub>2</sub> O
Dust:	None

#### Measurement system

##### Detector:

ZR22G-□□□-S-□-C-R-□-E-A/SV

##### Converter:

ZR402G-□-E-E-A/HS/□

##### Standard gas unit:

ZO21S-□-E\*A

### Utilities

Power supply:	rated voltage: 100 to 240 V AC
	operating voltage range: 85 to 264 V AC
	rated frequency: 50/60 Hz
	operating frequency range: 45 to 66 Hz
Power consumption:	approx. 100 VA (300 VA max.)

### Notes on Installation

- As the sensor inside a pyrolysis furnace is hot, it can be easily damaged if cooler water drips onto it. The sensor should be installed with the probe head pointing downward.

