

P5228 Automatic Electroless Nickel Controller

For Electroless Plating Process Control System



Product Features

- Based on a 24-bit high resolution A/D converter
- Automatic sampling analysis and auto-calibration
- Measuring cycle time adjustable
- Indicator light & flash buzzer
- 2 stages abnormal & shutdown alarm
- Self-diagnosis & friendly calibration setting
- User friendly graphical interface
- Highly stable and accurate with wide measuring range
- 7" LCD color touch panel display
- Reagents free and cost saving
- Simultaneously display parameters of Nickel, pH, temperature and analysis cycle time
- Language support in English and Chinese
- Automatic data storage with capacity up to 5000 historical records. (User could expend memory by using 32GB/64GB flash disk.)

Application

In the electroplating industry, nickel sulfate solution is the main raw material for nickel electroplating and chemical nickel plating. The solution is dark green color. The color depth of the solution depends upon the concentration. The P5228 Nickel Analyzer is designed for monitoring the nickel-plating bath at all times, available to ensure that when the nickel concentration and/or pH fall below their pre-set values, a control unit will command the auto-dosing system to accurately replenish dosage whenever might be required and maintain the optimal pH value and concentration in anytime.

Operational Principle

Following **Beer-Lambert Law**, it states that the quantity of light absorbed by a substance dissolved is directly proportional to the concentration of the substance and the path length of the light through the solution. The Nickel ion (Ni-) electrolyte solution can absorb the visible light from specific LED wavelength. We follow this photometric method for determining Nickel concentration in plating bath.

Both pH and temperature are important factors in the plating process. Electron-transfer reactions could change pH value, in addition, it could affect the stability of the plating solution and the morphology of the coating, which ultimately affects the quality of the electroplated finished product. As regard to the significance of temperature, the analyzer is equipped with a cooling device to cool down the heat of Nickel sample, in order to protect the mechanical parts (such as measuring cell and detection module) from overheating.

For Electroless Plating Process Control System

Symbol	Component Name	Function & Description
A	Control Unit	● A monitor of nickel concentration, pH, and temperature, and a control of auto-dosing system in anytime
B	USB port	● For system update and data download. User could also expend memory by using 32GB/64GB flash disk
C	Manual calibration switch	● A simple step to allow user calibrate manually
D	Manual calibration switch	● A simple step to allow user calibrate manually
E	pH electrode	● pH electrode be stored in the recommended pH storage solution cup which is refilled with KCl.
F	Photometer module	● A compact unit that comprising the optical system (including the LED light sources and narrow band optical interference filter) and the entire measuring cell.
G	Bubble removal device	● A device that can physically remove bubbles from the fluid during system operation. This will eliminate false detection readings.
H	Electrostatic grounding device	● To protect the appliances and persons from surges in electricity. This is optional, can be added according to customer needs.
I	Cooling device	● Use a condenser to cool down the heat of Nickel sample, to protect the mechanical parts (such as measuring cell and detection module) from overheating.
J	Pre-treatment device	● A ball filter that can get rid of unwanted substance in the fluid, such as metal powders or debris, to protect the mechanical parts (such as measuring cell and detection module) from damage.
K	Sampling pump	● A sampling pump that can command the sample precisely and efficiently to the measuring cell.
L	Chemical dosing pump	● 5 connection points are available for replenishment of nickel dosage and pH solution

P5228 Automatic Electroless Nickel Controller

For Electroless Plating Process Control System

Specification

Function	Nickel concentration, pH, temperature monitor and control for electroless Nickel plating process
Model	P5228
Installation	Freestanding Type
Housing	IP65
Dimensions	H740* W550* D335mm
Range	Ni+:0-10 g/L, pH: 0-14, Temperature: 0-100°C
Accuracy	Ni+: $\pm 0.5\%$ of F.S. Range, pH: ± 0.01 , Temperature: $\pm 0.2^\circ\text{C}$
Resolution	Ni: 0.01g/L, pH: 0.01, Temperature: 0.1°C
Response Time	Real time and continuous monitoring
Data Log	Simultaneously display parameters of Nickel, pH, temperature, and analysis status, nickel usage cycle, nickel adding volumes.
Pump control	Up to 5 chemical dosing pumps and 1 sampling pump
Shutdown Alarm	Abnormal detection of concentration, pH value and temperature (adjustable of high and low-point)
Light source / detector	Special LED with approx. 3 years of life span. Photodiode
Calibration	Automatic calibration. Can switch to manual calibration, high- and low- point.
Principle	24 bit high resolution A/D converter; high integrated SMD Technology, 24 bit AD-Converting. Signal filtration, simulation of the stability of wiring
Display	7" LCD color touch panel display
Self-Diagnosis	The system is continuously self-diagnosis. The error management helps to identify problems. (Display errors and save historical data)
Sample Conditions	<ul style="list-style-type: none">• Sample temperature: a condensation device is equipped to cool down the sample and control temperature under 40 °C• Sample flow: Continuous, 25 to 230 ml/min• Sample connection: use external pump connect with 4.75mm Teflon tube• Suspended solids: 200 micron or less
Environmental Conditions	<ul style="list-style-type: none">• Ambient operating temperature: 0 – 40 °C• Ambient operating humidity: Up to 95 % RH non-condensing
Electrical Conditions	Power supply ranges: 115 / 230 VAC, 50 / 60 Hz · < 500 Watt
Analog Outputs	1 isolated current output, 4-20mA range. With option of RS485
Alarms / Relay outputs	8 relays: <ul style="list-style-type: none">• 1 sampling control relay• 1 analysis alarm relay• 1 failure alarm relay• 5 connection points for fully user-assignable relays