Analysis of Alloy Resistor Applications in Precision Instrumentation

I. Multi-channel data acquisition instrument

Application Circuits: Analog signal acquisition circuit, current/voltage detection circuit, high-precision measurement circuit

Application Analysis: This type of product focuses on "multi-channel data acquisition," requiring precise capture of analog signals such as strain, temperature, current, power, and voltage.

The high precision (low tolerance) and low temperature coefficient (TCR) characteristics of alloy resistors ensure data accuracy by reducing errors caused by resistor self-heating and ambient temperature changes when acquiring large current or small voltage signals. Simultaneously, the high power density of alloy resistors meets the requirements for long-term stable operation of the data acquisition instrument, preventing resistor burnout.

II. 2D/3D line laser measuring instrument

Application Circuit: Laser emission module power supply circuit, current drive circuit, signal feedback adjustment circuit

Application Analysis: Line laser measuring instruments rely on a highly stable laser source output (requiring precise control of the laser diode's drive current) and need to adjust the power in real time through a signal feedback circuit to ensure measurement accuracy (emphasizing "ultra-high precision measurement").

The alloy resistor can be used as a current sensing resistor, connected in series in the laser drive circuit to accurately monitor the drive current magnitude and provide feedback to the control chip for closed-loop adjustment.

III. Fully Automatic Image Analyzer,High Magnification Fully Automatic Image Analyzer

Application circuits: Lens drive motor control circuit, light source adjustment power supply circuit, displacement positioning feedback circuit.

IV. Laser marking machine, laser engraving machine, laser printing machine

Application Circuits: Laser tube driver power supply circuit, high-frequency current sampling circuit, power regulation circuit

Application Analysis: The core requirement of laser-based equipment is stable laser power output (directly affecting marking/engraving accuracy), and the laser tube's drive current needs precise control.Alloy resistors are used as high-precision current sensing resistors.

V. Sensor products (displacement sensors, pressure sensors, flow/level sensors)

Application Circuits: Sensor signal amplification circuit, power supply voltage regulation circuit, signal calibration circuit

Application Analysis: Alloy resistors can be used as voltage divider resistors or load resistors for signal calibration and voltage regulation, or as overcurrent protection components to prevent sensor damage due to excessive current.