Integrated Smart Temperature Module

Core Product Perception

I. Product Definition

Anhui Qidianjia's integrated smart temperature modules are a series of intelligent measurement and control products developed by Anhui Qidian Automation Technology Co., Ltd. to meet the needs of industrial field temperature monitoring and control. These modules integrate temperature sensing, signal acquisition, signal conditioning, standard signal output, and digital communication into a single unit. This product line encompasses multiple subcategories, forming a comprehensive matrix of temperature measurement solutions:

1. Integrated Temperature Transmitter Module

A functional module that integrates a temperature sensor (resistance temperature detector or thermocouple) with a signal transmission circuit. It adopts a solid-state module design for direct installation inside the sensor junction box, featuring an ultra-compact design with dimensions of φ44 × 18 mm. Its core function is to convert temperature signals within the range of -200°C to +1600°C into a standard two-wire 4–20 mA DC current signal, which can be transmitted directly to display units, controllers, recorders, or DCS/PLC systems.

2. Multi-Channel Intelligent Temperature Acquisition Module (DIN Rail Mount)

This is a standalone, cabinet-mounted signal conditioning module designed for installation on a 35 mm DIN rail. It is available in multi-channel configurations, including 2, 4, 6, 8, 10, 12, and 16 channels. Its core function is to isolate and amplify field signals from resistance temperature detectors (PT100/PT1000) or thermocouples, then convert them into standard DC signals that are linearly proportional to temperature for output to the control system. It also supports various digital communication protocols, including RS485, RS232, Wi-Fi, and Ethernet.

3. Temperature Sensor Accessories

These include PT100 platinum resistance temperature sensors (suitable for high-precision measurement in low- to medium-temperature environments), various thermocouple types such as K, S, E, J, T, R, B, and N (covering a range from ambient to ultra-high temperatures), as well as stainless steel sheathed tubes, junction boxes, and other supporting components.

Summary of Core Features

1. High-Precision Temperature Acquisition: Equipped with a 24-bit AD conversion chip, offering a temperature measurement resolution of 0.01°C and an accuracy of ±0.1°C
2. Multi-Sensor Compatibility: Supports resistance temperature detectors (RTDs) such as PT100, PT1000, Cu50, and Cu100, as well as thermocouples of types K, J, B, S, T, E, N, and R
3. Multi-Channel Synchronous Acquisition: Supports simultaneous data acquisition across 2 to 16 channels, with a default sampling rate of 10 Hz (10 times per second for all channels)
4. Standard Signal Output: Supports various output formats, including 4–20 mA, 0–10 mA, 0–20 mA, 1–5 V, and 0–5 V
5. Digital Communication Networking: Supports various communication interfaces, including Modbus RTU/ASCII protocols, isolated RS-485 communication, RS-232, Ethernet ports, and Wi-Fi
6. Intelligent Compensation and Filtering: Built-in automatic cold-junction temperature compensation (for thermocouples), wire resistance compensation, and digital filtering algorithms
7. HART Protocol Support: Intelligent models support the HART communication protocol, enabling remote configuration, self-diagnosis, and monitoring
8. Local Display: Optional LCD, LED, or analog pointer local display units
9. Wide-Temperature Industrial-Grade Design: Operating temperature range of -40°C to +85°C; rigorously tested in high- and low-temperature test chambers
10. Safety Protection: Features overvoltage/overcurrent protection, reverse connection protection, and watchdog protection against system lockups

II. Working Principle

Layman's Explanation

The Qidianjia All-in-One Smart Temperature Module can be thought of as a "temperature translator"—its job is to accurately "translate" the physical quantity of temperature, which is "invisible, intangible, and unreadable" in industrial settings, into standard electrical or digital signals that control systems can "understand, process, and act upon."

The entire workflow can be broken down into the following five key steps:

Step 1: Temperature Sensing (Signal Acquisition)

The temperature-sensitive element (sensor) comes into direct contact with the medium being measured (liquid, gas, or solid surface). When the ambient temperature changes:

Resistance-type (e.g., PT100): The resistance of the platinum wire increases linearly as the temperature rises (resistance is 100 Ω at 0°C); for every 1°C change in temperature, the resistance changes by approximately 0.385 Ω

Thermocouple type (e.g., Type K): A slight millivolt-level thermoelectric potential is generated at the junction of two different metals due to a temperature difference (the Seebeck effect), with a measurement range of -200°C to +1800°C

Step 2: Signal Conditioning (Amplification and Conversion of Weak Signals)

The raw signal output by the sensor is extremely weak (millivolt-level voltage or minute changes in resistance), and the module's internal pre-amplifier circuit processes it professionally:

Resistance Thermometer Path: An R/V conversion circuit converts the change in resistance into a change in voltage → A linear compensation circuit corrects for nonlinear errors → A stable "temperature-voltage" correspondence signal is output

Thermocouple Path: An automatic cold-junction temperature compensation circuit eliminates the influence of ambient temperature on the measurement → The signal undergoes pre-amplification and filtering → Linearization processing corrects the thermocouple's nonlinear characteristics

Step 3: High-Precision Digital Conversion
The conditioned analog signal enters a 24-bit high-precision AD conversion chip, which converts the analog voltage signal into high-precision digital data at a sampling rate of 10 times per second (10 Hz), with a resolution of up to 0.01°C, ensuring precise quantification of temperature data.

Step 4: Intelligent Processing and Optimization
The module's built-in microprocessor performs multiple layers of intelligent processing on the digitized temperature data:
Digital Filtering: A built-in high-performance digital filtering algorithm effectively filters out noise signals such as electromagnetic interference and voltage fluctuations common in industrial environments, ensuring stable temperature readings without fluctuations.
Lead Resistance Compensation: Automatically compensates for the impact of sensor cable resistance on measurement results, maintaining highly consistent readings regardless of whether the cable length is 1 meter or 100 meters.
Temperature Drift Compensation: Automatically corrects measurement drifts caused by changes in ambient temperature.

Step 5: Standardized Output and Communication
The processed temperature data is output in two ways:
Analog Output: A standard two-wire 4–20 mA DC current signal (or 0–10 mA, 0–5 V/1–5 V voltage signals) is output via a V/I conversion circuit. This signal can be directly connected to the analog input ports of control systems such as PLCs and DCSs, offering long transmission distances and strong interference resistance
Digital Communication Output: Temperature data is uploaded to host computers, configuration software, or cloud platforms via RS485/RS232/Ethernet/Wi-Fi interfaces using Modbus RTU/ASCII/TCP protocols, supporting remote monitoring, data logging, and intelligent interlocking

Workflow Diagram

1. Temperature of the measured medium → Sensor detection (resistance/potential change) → Signal conditioning (amplification/filtering/compensation)
2. → High-precision 24-bit AD conversion → Intelligent processing (digital filtering/lead resistance compensation/drift correction)
3. → Standard signal output (4–20 mA/RS-485/Wi-Fi) → PLC/DCS/host computer/cloud platform

III. Core Values
1. Precise Sensing to Ensure Process Quality
Equipped with a 24-bit high-resolution AD conversion chip, it achieves a temperature measurement accuracy of ±0.1°C and a resolution of 0.01°C, enabling precise detection of even the slightest temperature fluctuations. In applications with stringent temperature accuracy requirements—such as temperature control for chemical reaction vessels, food sterilization, and pharmaceutical constant-temperature processes—it ensures the precise execution of process parameters, directly guaranteeing product quality consistency and yield rates.

2. Strong Interference Resistance, Stable and Reliable Data
A triple-protection system comprising a built-in digital filtering algorithm, isolated RS485 communication, and epoxy resin potting effectively withstands harsh conditions in industrial environments, such as electromagnetic interference, voltage fluctuations, and vibration and shock. Even in complex power, metallurgical, and chemical environments, it enables continuous and stable data acquisition, eliminating data jumps and loss.

3. Flexible Networking, Reduced Engineering Costs
Supports 2 to 16-channel synchronous data acquisition. Multiple devices can be daisy-chained via the RS485 bus (with a maximum communication distance of 1,200 meters), allowing a single module to cover multiple temperature measurement points. Compatible with the Modbus standard protocol, it can directly interface with various mainstream PLCs, DCS systems, and configuration software (such as MCGS, Configure King, ForceControl, WINCC, etc.) available on the market. No additional adaptation or modification is required, significantly reducing system integration complexity and wiring costs.

4. Industrial-Grade Durability, Suitable for Extreme Environments
Features an industrial-grade wide-temperature hardware design (operating temperature range: -40°C to +85°C), wide-voltage power supply (7–30 V DC), IP65 protection rating, and explosion-proof certification (dIIBT4/dIIBT5/CT4/CT6). It has undergone rigorous testing in high- and low-temperature test chambers. It operates reliably in harsh outdoor environments, high-temperature workshops, and flammable and explosive hazardous areas.

5. Intelligent Operation and Maintenance, Enhancing Management Efficiency
Supports remote configuration and self-diagnostic functions via the HART protocol, allowing users to remotely configure module parameters, monitor device status, and calibrate measurement accuracy through host computer software. Combined with a watchdog hardware protection circuit, it enables 24-hour uninterrupted, unattended operation, reducing the frequency of manual inspections and lowering O&M costs.

6. One-Stop Product Portfolio to Meet All Application Scenarios
From integrated temperature transmitters (plug-and-play on-site) to multi-channel DIN-rail data acquisition modules (for centralized control within cabinets), from single-point temperature measurement to large-scale 16-channel data acquisition, and from wired RS485 to wireless WiFi transmission, Qidianjia offers a comprehensive temperature measurement product portfolio covering applications across all industries, including heating, ventilation, and air conditioning (HVAC); cold chain logistics; chemical processes; power and energy; and smart manufacturing.

Key Challenges and Solutions

Challenge 1: Severe electromagnetic interference in industrial environments causes temperature data to fluctuate and be inaccurate
Q: There are numerous motors, variable frequency drives, and welding equipment in the factory workshop, and the temperature data is always unstable and fluctuating. What can be done?
A: The Qidianjia smart temperature module features a built-in high-performance digital filtering algorithm that effectively filters out various types of noise signals, such as electromagnetic interference and voltage fluctuations; It employs an isolated RS485 communication protocol (optical isolation + DC-DC isolation, with 1,500 V surge protection), providing dual safeguards for data transmission stability at both the hardware and software levels. Additionally,

the module's internal circuitry is encapsulated using an epoxy resin potting process, further isolating it from external interference and ensuring stable, non-fluctuating temperature readings even in complex industrial environments.

Pain Point 2: Long Sensor Cabling Distances Lead to Measurement Errors Due to Signal Attenuation

Q: If the temperature measurement point is far from the control cabinet (tens or even hundreds of meters away), will cable resistance cause inaccurate temperature readings?

A: The Qidianjia module is equipped with proprietary automatic cable resistance compensation technology. Whether installed at a short distance of 1 meter or a long distance of 100 meters, the collected values remain highly consistent without the need for additional debugging or calibration. We also recommend using three-wire PT100 sensors with the module, as the three-wire configuration itself effectively compensates for errors caused by wire resistance. If you opt for an integrated temperature transmitter solution, the transmitter is installed directly inside the sensor junction box and outputs a standard 4–20 mA current signal, fundamentally eliminating signal attenuation issues caused by long-distance transmission.

Challenge 3: Complex and Costly Wiring for Multi-Point Temperature Measurement

Q: A project has dozens of temperature measurement points. Do we really need to run separate wires from each point to the control cabinet? The wiring and labor costs are too high.

A: The Qidianjia multi-channel temperature acquisition module supports simultaneous data collection across 2 to 16 channels, allowing a single module to cover multiple temperature measurement points. Multiple devices can be daisy-chained via the RS485 bus (with a maximum communication distance of 1,200 meters); dozens of modules can be connected in series using just a single twisted-pair bus cable, significantly reducing wiring volume and installation costs. When paired with the Wi-Fi or Ethernet versions, wireless data transmission is also supported, further simplifying on-site wiring.

Pain Point 4: Incompatibility Between Different Control System Interfaces, Leading to Integration Difficulties

Q: We use Siemens PLCs on-site, and some systems use domestic SCADA software. Can the modules be compatible with both?

A: Absolutely. Qidianjia's smart temperature modules provide both analog output (4–20 mA/0–5 V) and digital communication output (Modbus RTU/ASCII/TCP protocols). The analog output can be directly connected to the analog input cards of any PLC brand; the digital communication is compatible with all major industrial control systems on the market, including PLCs from Siemens, Mitsubishi, and Omron, as well as SCADA software such as MCGS, Zoufang Wang, Likong, and WINCC. It also supports secondary development in LabVIEW, making it extremely versatile.

Pain Point 5: Equipment is prone to damage in harsh environments such as high temperatures, corrosion, and explosive atmospheres

Q: Our application is in a chemical industry explosion-proof zone. Can the temperature module operate safely in such a hazardous environment?

A: Qidianjia temperature modules are specifically designed for harsh industrial environments. The products have an IP65 protection rating, and their explosion-proof ratings cover dIIBT4, dIIBT5, CT4, and CT6; some explosion-proof products have already obtained CCC certification for explosion-proof equipment. The internal circuitry is sealed using an epoxy resin potting process, providing shock resistance, moisture resistance, and corrosion resistance. The module operates within a temperature range of -40°C to +85°C and has been rigorously tested in high- and low-temperature test chambers, ensuring long-term stable operation in extreme environments.

Pain Point 6: Difficult Post-Installation Maintenance; Troubleshooting Equipment Failures Is Time-Consuming and Labor-Intensive

Q: The temperature modules are installed on-site, and troubleshooting issues is very cumbersome. Is there a way to perform remote diagnostics?

A: Qidianjia's smart temperature modules support the HART communication protocol. Using a handheld device or a host PC, you can remotely perform operations such as model identification, scale factor setting, range adjustment, variable monitoring, calibration, and maintenance—all without having to visit the site to open the module's casing. The modules also feature a built-in watchdog hardware protection circuit that automatically monitors operating status 24 hours a day. In the event of an anomaly, the system automatically recovers, preventing equipment downtime. When combined with Modbus communication, the host computer can monitor real-time information for each channel—including temperature values, output current, and device status—enabling predictive maintenance.

 Summary: The core value of Anhui Qidianjia's integrated smart temperature module can be summarized as: "Accurate measurement, stable transmission, reliable connectivity, rugged durability, and manageable operation." Based on high-precision 24-bit AD conversion, backed by multi-layered anti-interference technology, bridged by standardized communication interfaces, shielded by industrial-grade protection design, and extended by intelligent remote operation and maintenance, it provides a one-stop, end-to-end solution for temperature monitoring in industrial settings.

Key Product Specifications & Detailed Specifications

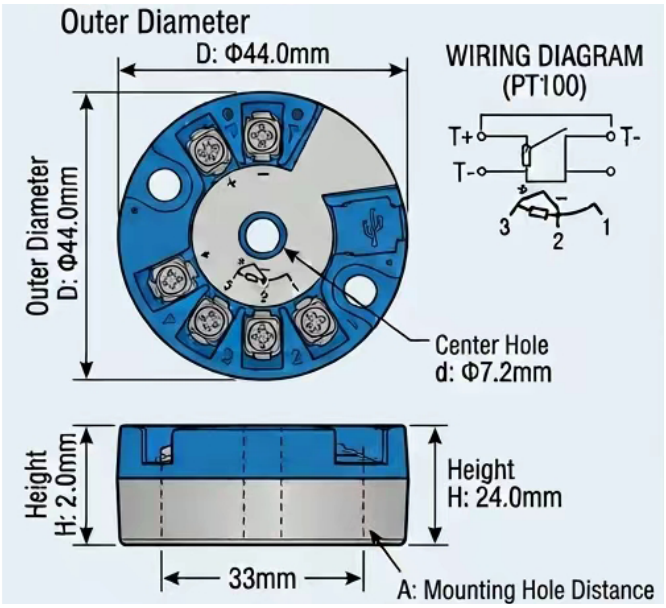
I. Basic Electrical Parameters
1. Input Signal: PT100, Cu50 thermistors; supports two-wire/three-wire connections; maximum sensor lead resistance ≤ 100 Ω
2. Measurement Range: PT100: -200 to +850 °C; Cu50: -50 to +150 °C; K / E /J /T / B / R / S / N range is freely configurable via software
3. Output Signal: Selectable from 4–20 mA, 0–5 V, 0–10 V, or RS485 (Modbus-RTU); standard single-channel output
4. Output Load: Current output RL ≤ 500 Ω; voltage output RL ≥ 10 kΩ
5. Measurement Accuracy: 0.5% F.S. (optional 0.2% F.S. high-precision version)
6. Temperature Drift: 0.005% F.S./°C (-20°C to +55°C)
7. Response Time: ≤0.8 s
8. Fault Diagnosis: Outputs 3.8 mA when below the lower range limit; outputs 20.5 mA when above the upper range limit; outputs 22 mA in case of sensor disconnection
9. EMC (Electromagnetic Compatibility): GB/T 18268 (IEC 61326-1) industrial EMC standard; common-mode interference immunity
10. Signal Characteristics: Digitally calibrated, no mechanical potentiometers; zero and full-scale points can be calibrated via software

II. Isolation Performance Parameters
1. Isolation Architecture: **Three-terminal electrical isolation for input, output, and power supply**
2. Dielectric Withstand Voltage: 1500 V AC / 1 min (between input ↔ output, input ↔ power supply, and output ↔ power supply)
3. Insulation Resistance: ≥100 MΩ @ 500 V DC
4. Isolation Function: Breaks ground loops, suppresses high common-mode interference in the field, and protects downstream PLC/DCS data acquisition cards
5. Leakage Current: <0.1 mA (under withstand voltage test conditions)

III. Power Supply & Power Consumption Parameters
1. Supply Voltage: DC 10–32 V, **typical supply voltage DC 24 V ±10%**
2. Full-Load Power Consumption: Single-channel output module ≤45 mA (DC 24 V supply, 20 mA full-scale output)
3. Power Distribution Output: The module **has no sensor power distribution output**; it only acquires passive signals from RTDs; power is supplied via a safety barrier for explosion-proof applications
4. Power Supply Protection: Built-in reverse polarity protection, inrush surge protection, and overvoltage protection

IV. Environmental Adaptation Parameters
1. Operating Temperature: -40°C to +85°C (module body, installed inside the sensor junction box)
2. Storage Temperature: -45°C to +90°C
3. Relative Humidity: 5%–95% RH, no condensation or dew formation
4. Protection Rating: IP40 (module board only; the entire unit achieves IP65 when installed in a metal junction box)
5. Explosion-Proof Rating: Explosion-proof version **Ex ia IIC T4 Ga (intrinsically safe)**; compatible with **QD-67 series isolated safety barriers** for use in Zone 0/1 hazardous locations; standard version is non-explosion-proof
6. Vibration Resistance: 10–2000 Hz, ≤0.2 g; suitable for pipeline vibration conditions

V. Physical Parameters
1. Mounting Method: Round clip-in installation; snaps directly into the aluminum junction box of an integrated temperature transmitter (compatible with standard temperature sensor heads)
1. Dimensions (Diameter × Thickness): Φ44 mm × 24 mm
> Dimension Diagram Notes:



2. Net Weight: Approx. 35 g
3. Housing Material: Flame-retardant PCB substrate; components feature moisture-resistant coating; no plastic housing (bare circular-clip module)
4. Protection Details: PCB coated with triple protection (moisture-proof, mildew-proof, salt-fog-proof); insulated terminal isolation; suitable for outdoor use or inside damp junction boxes

Scenario-Based Selection Guide

1. Key Selection Criteria:
1. Signal Type: Confirm whether the on-site sensor is a PT100 or Cu50 thermoresistor, and select the appropriate two-wire or three-wire input version. The output signal must be compatible with the downstream PLC or DCS system; options include 4–20 mA, 0–5 V, 0–10 V, and RS-485 Modbus-RTU;

2. Number of Channels: The standard QDHS05 features a single-channel input and a single-channel output. For scenarios requiring data acquisition from multiple measurement points, evaluate a solution involving multiple modules connected in parallel;

3. Power Supply: The module is powered by 24 V DC by default. Ensure the power supply in the control cabinet is stable, with the voltage maintained within the range of 10–32 V DC;

4. Explosion-proof requirements: Use the standard QDHS05 for general, non-explosive environments; for flammable and explosive hazardous areas, use the QDHS05 explosion-proof version in conjunction with the QD-67 series isolation safety barriers;

5. Installation Environment: Ensure the module is placed inside the temperature probe junction box. Evaluate ambient temperature, humidity, dust, vibration, and salt fog; prioritize the three-proof coated version for humid or coastal environments.

2. Selection Guidelines for Industry Applications:
1. Chemical Industry: For temperature measurement of media in storage tanks and pipelines where flammable and explosive gases are present, the QDHS05 explosion-proof model is recommended, paired with the QD-67 safety barrier. The three-terminal isolation design eliminates ground loop interference, and the built-in three-proof coating resists on-site moisture and corrosion;

2. Power Industry: For temperature data acquisition in thermal power plants, district heating networks, and electrical distribution rooms—where electromagnetic interference is strong—select the standard QDHS05 isolated model. Prioritize the 4–20 mA output to ensure stable transmission of temperature signals and withstand electromagnetic noise from variable frequency drives and high-voltage equipment;

3. Metallurgical industry: Temperature measurement on pipelines and furnace components. In environments with high vibration and severe temperature fluctuations, the QDHS05 three-proof version is recommended. The module's compact circular connector design fits various temperature junction boxes, resists vibration, and ensures long-term measurement stability;

4. Pharmaceutical industry: Temperature measurement in clean pipelines and reactors. In cleanrooms without explosion hazards, the standard QDHS05 is selected. With a signal accuracy of 0.5% F.S., it can be upgraded to a high-precision 0.2% version as needed to meet GMP process data recording requirements;

5. In the smart manufacturing industry—for temperature measurement in automated production lines, HVAC systems, and equipment housings, with data acquisition via PLCs in control cabinets—the standard QDHS05 is recommended. The RS485 digital output option facilitates networked data collection across multiple measurement points.

3. Common Selection Pitfalls:
1. Ignoring isolation levels: Some customers focus solely on accuracy and neglect isolation specifications, selecting non-isolated versions for high-interference environments, which causes signal drift and value fluctuations. The QDHS05 employs three-terminal isolation; in operating conditions with common-mode interference, it should not be substituted with a non-isolated model;

2. Selecting the wrong signal range: Setting the full scale directly based on the equipment's maximum temperature, when the actual operating temperature occupies only a very small portion of the range, amplifies the relative measurement error. It is recommended to set the range so that the actual operating temperature occupies 60%–80% of the full scale;

3. Neglecting load matching: In current-output applications, a load exceeding 500 Ω at the output end causes signal distortion; in voltage-output applications, a load less than 10 kΩ at the output end will pull down the output signal. The load of the downstream data acquisition equipment must be calculated in advance during the selection phase;

4. Incorrect selection of general-purpose models in explosion-proof environments: Purchasing the standard QDHS05 directly for hazardous areas without configuring an intrinsically safe barrier poses a significant safety hazard. For explosion-proof applications, the explosion-proof version must be specified and paired with the corresponding safety barrier.

4. Customization Recommendations:
1. Special signal customization: For customers requiring special scale sensor inputs, custom fault alarm output values, or specific RS485 addresses and communication parameters, software configuration customization is available;

2. Customization for non-standard operating conditions: For environments with high salt fog, strong vibration, or ultra-wide temperature ranges, we can provide customized thickened three-proof coatings, reinforced terminals, and adjusted temperature drift specifications for the module;

3. Multi-channel integration solutions: For scenarios requiring simultaneous temperature measurement at multiple points, the QDHS05 is a single-channel circular card module. We can provide complete, pre-configured multi-module solutions that are uniformly factory-calibrated and equipped with multi-channel safety barriers, thereby reducing the workload associated with individual on-site debugging.

Installation and Commissioning

I. Pre-Installation Preparation

Check Components: Verify that the QDHS05 module, PT100/Cu50 thermoresistors, cables, junction box, and seals are intact and undamaged.
Environmental Check: Confirm that the temperature, humidity, and vibration levels inside the enclosure comply with the module specifications; keep the module away from strong heat sources.
Tool List: Phillips screwdriver, multimeter, signal calibrator, wire strippers.
Safety Precautions: **Work with power disconnected**; in explosion-proof areas, comply with intrinsically safe installation standards.

II. Standard Installation Steps

1. Snap the QDHS05 circular module into the locking slots inside the aluminum junction box of the temperature sensor.
2. Distinguish between terminals: Power supply V+ / V-; RTD input terminals; signal output terminals (4–20 mA).
3. Grounding specifications: The shield of the signal cable must be **grounded at a single end on the control room side**; grounding at both ends is prohibited to eliminate ground loops.
4. Explosion-proof version: Intrinsically safe return cables must be routed separately and isolated from high-voltage circuits; use the QD-67 safety barrier.

III. Wiring Diagram Instructions

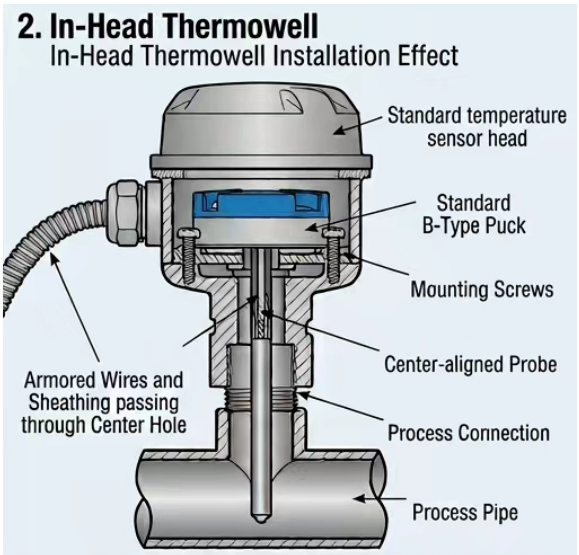
Refer to the standard wiring diagram, which indicates power supply positive and negative terminals, RTD three-wire/two-wire terminals, TC two-wire terminals, and analog output.
Isolated Type: Input, power supply, and output are isolated from each other; use shielded twisted-pair cable for signal transmission;
Correct vs. Incorrect Comparison: ☒ Single-end shield grounding, balanced line resistance for three-wire PT100; ☒ Shield grounded at both ends, high-voltage signal cables routed in the same conduit.

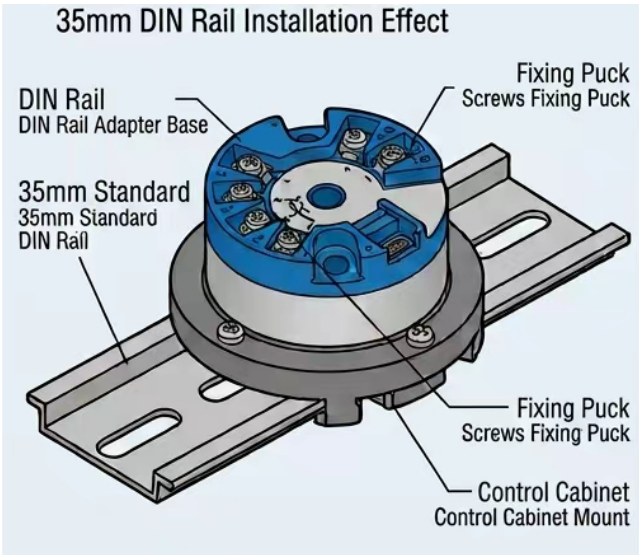
IV. Power-On Commissioning Procedure

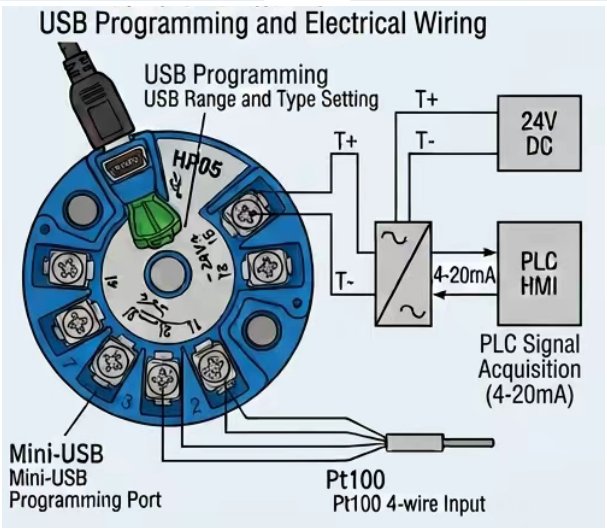
1. No-Load Test: With power off, verify all wiring and confirm there are no short circuits before applying power.
2. Signal Verification: Use a signal source to simulate a temperature signal and verify the 4–20 mA output and digital communication.
3. Indicator Light Status: Steady light = normal power supply; flashing light = communication or fault alarm.
4. Accuracy Calibration: Use the accompanying configuration software to set the measurement range and scale factor, then complete zero-point and full-scale calibration.

V. Installation Precautions

Never exceed the rated supply voltage; the supply voltage must not exceed 32 V DC.
Keep signal wires away from strong interference sources such as variable frequency drives and high-power motors.
In humid or outdoor environments, ensure the junction box is properly sealed and waterproof to prevent condensation from entering the module.







Recommendations for Daily Use & Operations and Maintenance

I. Key Points for Routine Inspections
--- Monitor the stability of signal output; observe whether the values collected by the PLC show any sudden changes or drift;
--- Check the temperature and humidity inside the junction box; inspect the seals for condensation;
--- Check the operating status of the indicator lights; for explosion-proof models, additionally verify the operating status of the safety barrier.

II. Periodic Maintenance Plan
--- Cleaning Frequency: Under normal operating conditions, clean dust accumulation inside the junction box quarterly; in harsh dusty or corrosive environments, clean monthly;
--- Wiring Inspection: Tighten terminals quarterly and check for oxidation or loose connections;
--- Accuracy Recalibration: Calibrate once a year under standard operating conditions; for high-precision, highly corrosive, or high-vibration environments, recalibration is recommended every six months.

III. Long-Term Maintenance Tips
--- Dust and Moisture Protection: Maintain the integrity of the junction box seal; in humid environments, use versions with triple-proof coating;
--- Interference Mitigation: Ground shielded cables at one end, and route signal wires and power cables in separate cable trays;
--- Protection in Extreme Environments: Reinforce the probe and junction box in high-vibration conditions; in explosion-proof environments, do not open the cover arbitrarily, and periodically verify the explosion-proof circuit.

Troubleshooting & Emergency Response

I. List of Common Faults
No output, measurement signal drift, abnormal indicator lights, out-of-limit alarm triggered, signal interference, distortion, or sudden changes.

II. Analysis of Fault Causes
Incorrect or loose connections at the terminal blocks; insufficient, reversed, or excessive supply voltage; downstream load exceeding limits; strong electromagnetic interference at the site; sensor damage; module hardware failure.

III. Step-by-Step Troubleshooting Methods
1. No Output: Use a multimeter to verify the 24 V DC power supply and check terminal connections; test the resistance of the RTD probe; rule out faults in the downstream data acquisition circuit; as a temporary measure, directly replace the module with a spare QDHS05 module.
2. Signal Drift / Value Deviation: Verify the measurement range parameters and tighten the terminal connections; check the shield grounding and confirm the load resistance; re-perform zero and full-scale calibration.
3. Abnormal Indicator Lights: Not lit = Power supply failure; Flashing = Sensor open circuit / short circuit alarm; Power cycle the unit and troubleshoot the probe circuit.
4. Alarm Triggered: An output of 3.8 mA indicates a sensor open circuit; 22 mA indicates out-of-range; inspect the probe and wiring, and correct the range setting.
5. Interference or Distortion: Keep signal wires away from power cables; ground the shield at a single point; verify that the module's three-terminal isolation is functioning properly.

IV. After-Sales Repair Guidelines
Fault Diagnosis: If the signal remains abnormal after completing wiring, power supply, and sensor checks, the fault is determined to be with the module itself.
Repair Process: Record the model number, operating conditions, and fault symptoms, then contact the manufacturer's technical support; for explosion-proof models, specify the explosion-proof version.
Warranty Coverage: 12-month warranty under normal operating conditions; the warranty does not cover damage caused by excessive pressure, water ingress, or unauthorized disassembly.

> Note: Power must be disconnected before servicing explosion-proof equipment; opening the cover in hazardous areas is strictly prohibited.