Frequency Signal Converter

1 Product Overview

1.1 Product Definition

The Qidian WS1528 gray-cased frequency transmitter is an industrial-grade, three-terminal isolated frequency signal conditioning module that linearly converts field frequency / pulse signals (OC: Open Collector, PS: Sine/Square Wave) into standard analog signals such as 4-20mA, 0-5V, and 0-10V. It provides signal isolation, noise immunity, long-distance transmission, and system compatibility, and is specifically designed for industrial automation applications in the power, metallurgy, petrochemical, and equipment manufacturing sectors.

1.2 Operating Principle

1. Signal Acquisition: Receives OC/PS-type frequency pulses (0–50 Hz, 1 kHz, 10 kHz, etc.), with selectable input voltage ranges of 0–5 V, 0–24 V, or 220 VAC.
2. Isolation and Conditioning: Three-port electrical isolation (input, output, and power supply; 1500 VDC/1 min) blocks ground loops and electromagnetic interference (EMC compliant with GB/T 18268.1).
3. Linear Conversion: High-precision ADC + MCU processing ensures a strictly linear mapping between frequency and analog output, with an accuracy of 0.3%–0.5% and a response time of <200 ms.
4. Standard Output: Drives PLCs, DCS systems, and digital displays; current output load ≤500 Ω; voltage output load ≥10 kΩ.

1.3 Core Value

Signal Standardization: Unifies non-standard frequencies into industrial standard signals, resolving cross-device interface incompatibility.

1. Strong Interference Resistance: Three-terminal isolation + EMC protection ensures stable transmission in harsh industrial environments and prevents false triggering.
2. Safety Isolation: High/low voltage isolation and explosion-proof adaptation for hazardous area signals enhance system electrical safety.
3. Plug-and-Play: DIN rail mounting, wide temperature range (-20 to 55°C), low power consumption (≤1W), enabling rapid deployment without debugging.
4. High Adaptability: Multiple input/output combinations and customizable measurement ranges, covering applications such as speed, flow, and pulse measurement.

II. Product Specifications

2.1 Basic Electrical Specifications

Input Type: OC (Open Collector), PS (Sine Wave / Square Wave)
Input Frequency: 0–50 Hz / 0–1 kHz / 0–10 kHz / Custom (up to 100 kHz)
Input Amplitude: A: 0–5 V / B: 0–24 V / C: 220 VAC / Custom
Output Signal: A: 0–5 V / B: 0–10 V / C: 0–10 mA / E: 4–20 mA
Accuracy: 0.3% (typical), 0.5% (standard)
Temperature Coefficient: ≤100 ppm/°C
Response Time: <200 ms
Input Impedance: ≥100 kΩ
Output Load: Current: ≤500 Ω; Voltage: ≥10 kΩ

2.2 Isolation Performance Parameters

Isolation Type: Three-terminal full isolation (Input - Output - Power Supply)
Dielectric Strength: 1500 VDC/1 min (or 2000 VAC/1 min)
Insulation Resistance: ≥100 MΩ @ 500 VDC
Electromagnetic Compatibility: Complies with GB/T18268.1 (IEC61326-1)

2.3 Power Supply & Power Consumption Parameters

Supply Voltage: DC 24V ±10% (12V optional)
Power Consumption: ≤0.72W (typical), ≤1W (maximum)
Power Indicator: PWR (green LED, steady on = normal)
Alarm Indicator: ALM (red LED, steady on = fault / overload)

2.4 Environmental Parameters

Storage Temperature: -40°C to +85°C
Operating Temperature: -20°C to +55°C
Relative Humidity: 5%–95% RH (non-condensing)
Protection Rating: IP20 (enclosure)
Vibration / Shock: Compliant with IEC 60068-2-6 / IEC 60068-2-27

2.5 Physical Specifications

Mounting Method: 35mm DIN standard rail (T-slot)
Dimensions: L × W × H = 110mm × 22.5mm × 47mm (ultra-slim 18mm width)
Weight: Approx. 120g
Enclosure Material: Gray flame-retardant ABS+PC alloy (UL94 V-0)
Terminals: Plug-in spring terminals, compatible with 0.5–2.5mm² cables
Color: Standard industrial gray (oil-resistant, anti-aging)

III. Application-Specific Selection Guide

3.1 Key Selection Criteria

Input Signal: Type (OC/PS), Frequency Range, Voltage Amplitude
Output Signal: 4–20 mA (preferred)/0–5 V/0–10 V
Power Supply: 24 V DC (industrial standard)
Isolation: Three-terminal isolation required (standard across the WS1528 series)
Environment: Temperature, Humidity, EMC Rating
Certifications: CE (Export), SIL (Functional Safety)

3.2 Industry Application Selection Table

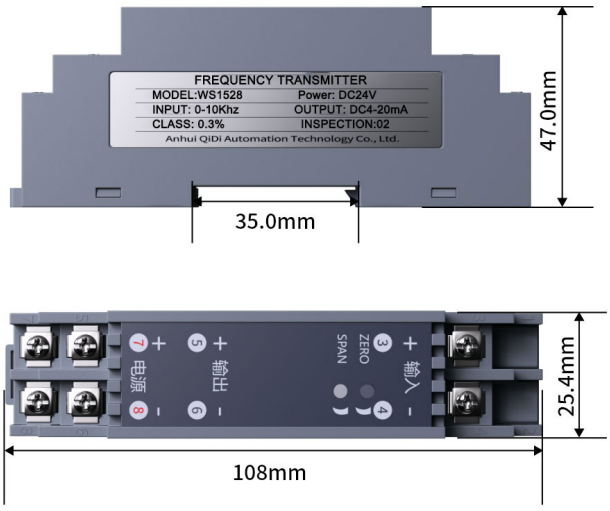
Power / Grid: Generator speed, power frequency monitoring
Metallurgy / Mining: Belt scale, flowmeter, roller conveyor speed
Petrochemicals: Hazardous area pulse isolation, pump speed
Equipment Manufacturing: Motor speed, encoder signal
Cement / Building Materials: Weighing scales, feeder pulses

3.3 Common Selection Pitfalls

☒ Focusing only on frequency without considering input voltage (incorrect selection of 5V/24V/220V may burn out the module)
☒ Connecting current output to a load exceeding 500Ω (signal attenuation, distortion)
☒ Using non-isolated modules as substitutes for three-terminal isolated modules (high on-site interference, system insecurity)
☒ Selecting a narrow temperature range (-20~55°C is standard for industrial use; do not substitute with 0-50°C)

3.4 Customization Recommendations

Special measurement ranges (0-20 kHz/50 kHz/100 kHz)
Dual-channel input / dual-channel output
Special power supply (12V/48V)
Special output (RS485-Modbus)
Extended temperature range (-40~85°C), enhanced EMC, SIL2 certification



4 Installation and Commissioning Specifications

4.1 Pre-installation Preparation

Verify that the model, input/output, power supply, and measurement range match the information on the nameplate.

Inspect the exterior for damage and ensure the terminals are intact.

Tools: Phillips screwdriver, wire strippers, multimeter

Environment: Dry, free from strong electromagnetic interference, and within the specified temperature range

4.2 Standard Installation Procedure

Snap the WS1528 onto a 35mm DIN rail and secure the latches

Mount the rail inside the control cabinet, ensuring adequate heat dissipation space (≥20mm)

Wire according to the wiring diagram: Power → Input → Output; strictly distinguish between terminals

Ground the cable shield at one end to minimize interference

4.3 Wiring Diagram (Standard 6-Terminal)

1+, 2-: Frequency signal input (+/-)

3+, 4-: 24V DC power supply (+/-)

5+, 6-: Analog signal output (+/-)

4.4 Power-On and Commissioning Procedure

Connect power first: PWR green LED stays on → Normal

Input a standard frequency signal (e.g., 1 kHz/5 V)

Measure the output with a multimeter: It should correspond linearly (e.g., 4–20 mA)

Fine-tune any deviation: Use a small screwdriver to adjust the zero-point/full-scale potentiometer (if present)

Load testing: Connect to a PLC or instrument to confirm stability

4.5 Installation Taboos

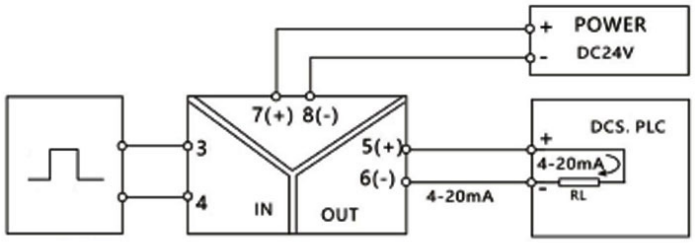
☒ Reversing power supply polarity (will damage the module)

☒ Input overvoltage / overfrequency (exceeding rated amplitude / frequency)

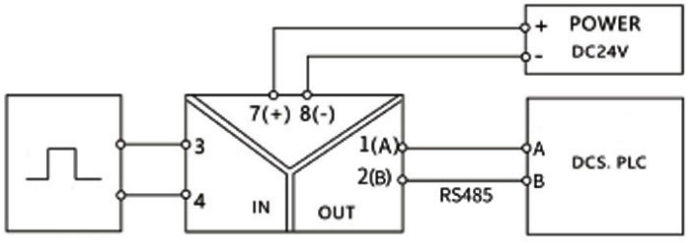
☒ Output short circuit (prolonged short circuit in the current output may burn out the chip)

☒ Running high-voltage (220VAC) and low-voltage cables in the same bundle

☒ Unprotected use in environments with moisture, dust, or corrosive gases



0-10V/4-20mA Output



RS485 Output

5 Recommendations for Daily Use & Operation and Maintenance

5.1 Key Points for Daily Inspections

Status of the PWR/ALM indicator (Solid green = Normal; Red = Fault)

Module Temperature (slightly warm to the touch is normal; hot to the touch is abnormal)

Terminals: No looseness, no burn marks, no unusual odors

Output Signal: Stable, no fluctuations, no drift

5.2 Scheduled Maintenance Plan (Recommended Intervals)

Weekly: Visual inspection of indicator lights, wiring, and environment

Monthly: Verify output accuracy with a multimeter (against standard frequency)

Quarterly: Tighten terminals, remove dust, check shield grounding

Annually: Comprehensive accuracy calibration, insulation resistance test (≥100 MΩ)

5.3 Long-Term Maintenance Tips

Keep the control cabinet well-ven**tilated, dry, and at a stable temperature**

Keep strong interference sources (inverters, contactors) at least 30 cm away from the module

Route input/output cables in separate channels with reliable shielding

During long-term inactivity: Power on and warm up for 30 minutes per quarter to prevent moisture and oxidation

5.4 Parameter Backup & Adjustment

Record model, input/output, range, and calibration values

Mark potentiometers after calibration to prevent accidental adjustment

6 Troubleshooting & Emergency Procedures

6.1 List of Common Faults, Causes, & Solutions

Fault 1: PWR indicator is off

Causes: Power supply not connected, reversed polarity, voltage out of range, power supply failure

Solution: Check the 24V power supply, polarity, and voltage (21.6–26.4V); replace the power supply

Fault 2: ALM Red Light Remains On

Cause: Input out of range, output short circuit/overload, internal module failure

Solution: Verify input frequency/amplitude, check for output short circuits, power cycle, return to manufacturer

Fault 3: No Output / Output is 0

Cause: No input signal, reversed input polarity, open output circuit, module failure

Solution: Check input signal and wiring, inspect output circuit, replace module for testing

Fault 4: Output Drift / Instability

Causes: Sudden temperature changes, interference, loose connections, accuracy drift

Solution: Tighten terminals, improve grounding, shield against interference, recalibrate

Fault 5: Accuracy Out of Tolerance

Causes: Not calibrated, overheating, input attenuation, load exceeding limits

Solution: Calibrate with standard signal, control temperature, check for input attenuation, ensure load ≤500Ω

6.2 After-Sales Repair Guidelines

Record: Model, serial number, fault symptoms, operating conditions, error codes

Contact: Anhui Qidian Customer Service +86-XXX-XXXXXXX / Technical Support

Return for Repair: Disconnect power, remove terminals, clean, and return in secure packaging

Warranty: 12-month warranty (excluding damage caused by human error)