



Signal Isolator

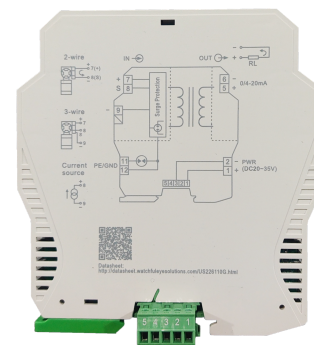
POWERED BY MAGNETIC ISOLATION FOR SAFER,
CLEANER CONNECTIONS

Paperless Datasheet

In support of environmental sustainability, WatchfulEye provides digital datasheets accessible via a QR code laser-marked on the product housing. Scan the QR code or visit the link below to download the latest datasheet:
<http://datasheet.watchfuleyesolutions.com/US226110G.html>

Model & Ordering Code

Model	Ordering Code	Surge Protective	Input 0/4–20mA	Output 0/4–20mA	Load (RL)	UPC/EAN Code
WTH-SC/mA/11G	US226110G	Yes	1	1	$\leq 800\Omega$	81914032496
WTH-SC/mA/11	US226110	–				81914032526
WTH-SC/mA/12G	US226120G	Yes	1	2	$\leq 300\Omega$	81914032502
WTH-SC/mA/12	US226120	–				81914032519





Signal Isolator

Description

The WTH-SC/mA series signal isolator is an analog signal isolation device used between industrial field instruments and control room equipment. It receives single-channel analog current input signals and outputs isolated single-channel or dual-channel linear current signals, while enhancing electrical isolation performance among the input, output, and power supply. It effectively solves field signal interference and surge intrusion issues in industrial automation systems, ensuring stable and reliable operation.

Features

1. Strong anti-interference capability: Highly integrated circuitry and high-performance transformers significantly reduce external electromagnetic interference.
2. High conversion accuracy: Uses electromagnetic isolation technology for efficient signal conversion with an output accuracy of 0.1% F.S.
3. Easy installation and wiring: 35 mm DIN-rail mounting with plug-in terminals for convenient installation and wiring.
4. Low power consumption and excellent heat dissipation: Low-power design and convection vent structure minimize heat generation and enhance cooling.
5. Multiple safety protection mechanisms: Includes load distribution protection, power reverse-polarity protection, power-on surge protection, and surge suppression.

WTH-SC/mA Series Technical Data

Input Current	0/4–20mA
Input Impedance	$\leq 50\Omega$
Loop Supply Voltage / Max Current	17.5–25V / $\leq 35\text{mA}$
Output Current	0/4–20mA
Rated Power Supply	24V DC $\pm 10\%$ / 20–35V DC
Power Reverse Protection	Supported
Power Consumption (24V supply, 20mA output)	$\leq 60\text{mA}$ / $\leq 1.5\text{W}$ @1 output, $\leq 75\text{mA}$ / $\leq 1.8\text{W}$ @2 output
Output Accuracy (20°C)	0.1% F.S. @20mA
Temperature Drift	0.005% F.S./°C
Response Time	0.5 ms to reach 90% of final value
Isolation Voltage (Power/Input/Output)	1500V AC, 1 min
Insulation Resistance (Power/Input/Output)	$\geq 100\text{M}\Omega$, 500V DC
EMC Compliance	IEC 61326–1
DIN Rail EN60715	35mm top-hat rail
Power Supply Method	Terminal power supply via wiring
Applicable Devices	2-wire / 3-wire transmitters, current loops
Surge protective model with suffix "G", 6kV/5kA (1.2/50 μ s & 8/20 μ s)	

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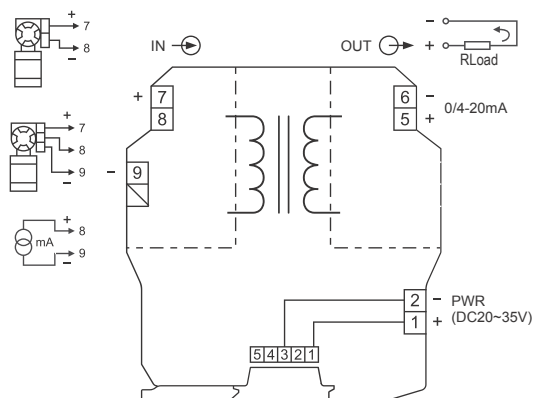
Powered by Magnetic Isolation for Safer, Cleaner Connections

The WTH-SC/mA Series utilizes advanced magnetic isolation technology to provide reliable galvanic isolation between input, output, and power supply circuits. By transferring signals through magnetic coupling rather than direct electrical connections, the isolator effectively eliminates ground loops, reduces electrical noise, and minimizes the impact of common-mode interference.

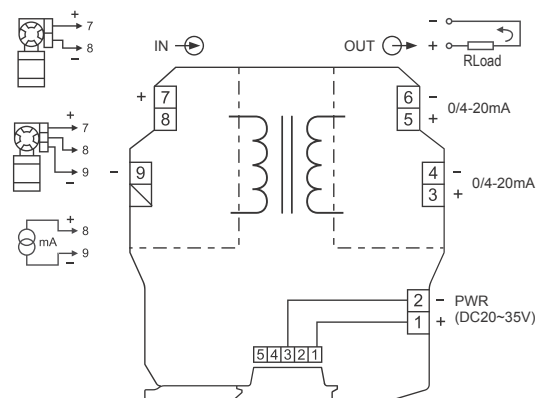
Compared with non-isolated signal transmission, magnetic isolation helps improve signal integrity and measurement accuracy, particularly in electrically noisy industrial environments. The technology also enhances system safety by preventing fault voltages and transient disturbances from propagating between connected devices. As a result, PLCs, DCS systems, transmitters, sensors, and other critical control equipment can operate with greater stability, reliability, and protection.

The combination of high isolation performance, fast response, and long-term reliability makes magnetic isolation an ideal solution for industrial automation, process control, power generation, water treatment, and other demanding applications where signal quality and system uptime are essential.

Connection Diagram



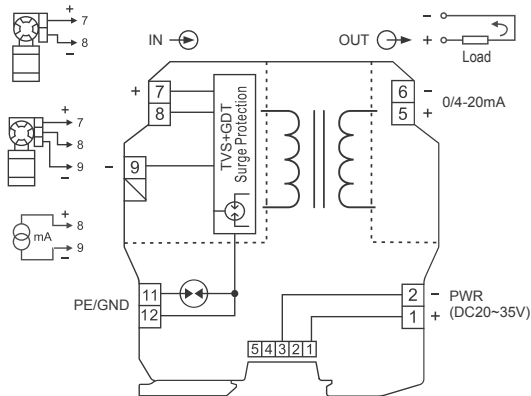
WTH-SC/mA/11



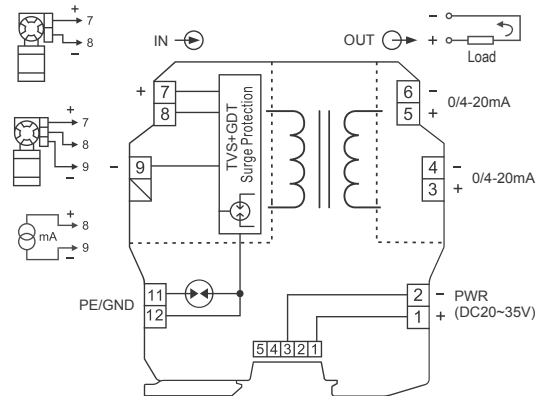
WTH-SC/mA/12

Signal Isolator

Built-in Surge Protection



WTH-SC/mA/11G



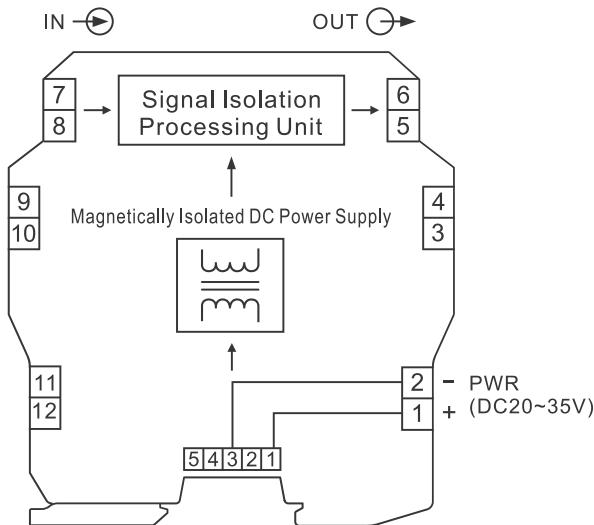
WTH-SC/mA/12G

Unlike standard signal isolators, the surge-protected models integrate both signal isolation and transient surge protection in a single compact device. The built-in protection circuit helps safeguard PLCs, DCS systems, transmitters, sensors, and other sensitive instrumentation from lightning-induced surges, switching transients, and electrical disturbances commonly found in industrial environments.

By combining isolation and surge protection in one module, the design reduces wiring complexity, saves valuable DIN rail space, lowers installation costs, and improves overall system reliability. With surge protection rated up to 6kV / 5kA, the device helps minimize unexpected downtime and extends the service life of connected equipment.

Signal Isolator

Magnetically Isolated DC Power Supply



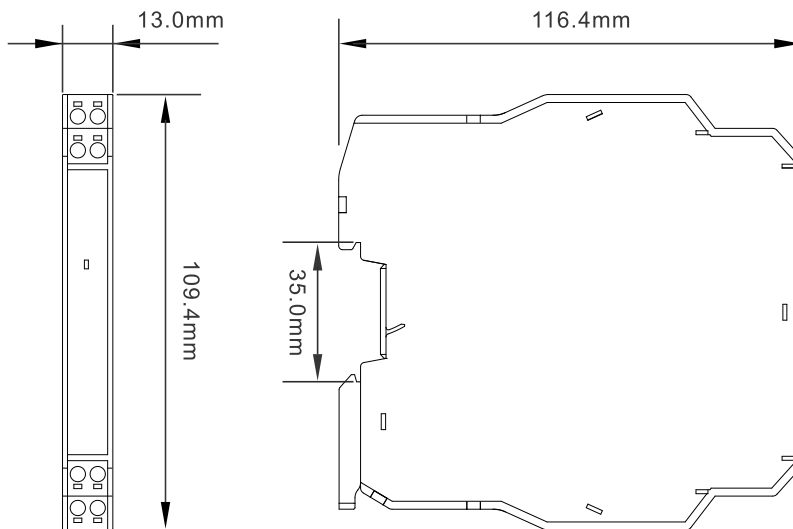
The signal isolator is powered by an external DC supply. However, the input power is not directly used for the internal signal processing and output circuits. Instead, it first passes through a high-performance magnetically isolated DC/DC power module, which provides complete galvanic isolation and generates an isolated internal power source before supplying the signal conditioning and output stages.

This magnetically isolated power design achieves full electrical isolation between the external power supply and the isolator's output circuitry. It effectively blocks noise, surges, and ground potential differences from the power side from affecting the output signal, resulting in a cleaner, more stable, and highly reliable output signal. This architecture significantly enhances the overall anti-interference capability and operational stability of the system.



Signal Isolator

Dimensions



3D File Download

WTH-SC/mA/11G: http://www.watchfuleyesolutions.com/wth_rar/3D/WTHSC-101-111.stp.zip

WTH-SC/mA/11: http://www.watchfuleyesolutions.com/wth_rar/3D/WTHSC-101-111.stp.zip

WTH-SC/mA/12G: http://www.watchfuleyesolutions.com/wth_rar/3D/WTHSC-111-111.stp.zip

WTH-SC/mA/12: http://www.watchfuleyesolutions.com/wth_rar/3D/WTHSC-101-111.stp.zip

Installation Specifications

Temperature Range	- 4° to 140°F (-20° to 60°C)
Relative Humidity	0% to 90% noncondensing
Maximum Operating Altitude	10,000 feet (3000m)
Terminal Cross Section	2.5mm ² / 12AWG
Stripping Length Contacts	0.3 inches (7-8mm)
Terminal Screw Torque	Max. 0.5Nm
Housing Material	Thermoplastic, UL94 V-0

Signal Isolator

Install DC bus terminals

When multiple signal isolators are arranged together, only one DC input needs to be connected from the DC bus terminal; it is not necessary to connect a separate DC power line for each module.



From the left side



From the right side



All pried open and peeled off



Installation complete

Signal Isolator

Functional Overview

A signal isolator is a signal isolation device used between field instruments and the control room in industrial environments. It transfers useful signals while cutting off harmful interference paths, protecting key equipment, and resolving “communication barriers” between different devices.

Main Functions of Signal Isolators:

1. Eliminating Ground Loop Interference

In complex industrial environments, instruments, PLCs, and DCS units may be distributed in different locations with different grounding points. Due to inconsistent ground potentials, a “ground potential difference” is formed, which generates additional current in the signal line—known as a ground loop current. This current superimposes onto the useful signal and causes distortion, such as signal drift, jumping, or instability.

The signal isolator uses optical or electromagnetic isolation to isolate input, output, and power, eliminating direct electrical connections between devices and completely removing ground loops.

2. Suppressing Electromagnetic Interference (EMI) and Surge

Industrial sites contain strong sources of electromagnetic interference (such as motors, inverters, and radio equipment), which can easily couple noise into signal lines. Lightning and power switching also create high-voltage surges. The isolator's high isolation strength and filtering circuits effectively suppress common-mode and differential-mode interference and block high-voltage surges from reaching sensitive devices like PLC analog input modules.

3. Protecting System Equipment

When abnormal high voltage (e.g., sensor short circuit or lightning) enters the signal line, the isolator is designed to fail first, sacrificing itself to protect expensive PLC/DCS control systems. This reduces maintenance costs and prevents system downtime.

4. Signal Conversion and Distribution

- Converts one signal type into another, e.g., converting a 4–20mA signal to 1–5V for receiving devices.
- Converts weak, nonlinear signals from thermocouples (TC) or RTDs into standard 4–20mA or 0–10V signals.
- Separates analog and digital components in HART protocol signals.
- Provides signal splitting (one input to two or more isolated outputs), allowing one 4–20mA signal to be used simultaneously by DCS and a VFD.

5. Solving Impedance Matching Issues

Some signal sources (such as certain sensors) have weak drive capability. Directly connecting them to a low-impedance load may cause signal attenuation or errors. Isolators offer high input impedance and low output impedance, ensuring proper matching and stable, accurate signal output.

These features make signal isolators essential components for improving the stability, reliability, and accuracy of industrial automation systems, especially in long-distance transmission, EMC-heavy environments, and multi-device signal distribution applications.



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Certificates of Products

CE RoHS IEC 61643-11 IEC 61326-1



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Version Update

V22.1: Added product description details and enhanced document formatting.

Download WatchfulEye Official App

Scan the QR code to access the WatchfulEye official website for product information and updates.



After-sale Services

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- 5-year standard warranty
- Additional 5-year free extended warranty

Customers are responsible for shipping, labor, and any incidental costs.

This warranty does not cover damage caused by misuse, improper installation, or unauthorized modifications.

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