



Signal Isolator

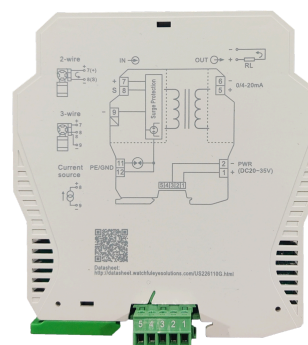
POWERED BY INPUT COMPATIBILITY FOR RELIABLE SIGNAL INTERFACING

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/US226510G.html>

Model & Ordering Code

Model	Ordering Code	Surge Protective	Input Dry+NAMUR	Output Relay Contact	UPC/EAN Code
WTH-SC/Dry+NAMUR/11G	US226510G	Yes	1	1	811914032540
WTH-SC/Dry+NAMUR/11	US226510	–			811914032533
WTH-SC/Dry+NAMUR/12G	US226520G	Yes	1	2	811914032564
WTH-SC/Dry+NAMUR/12	US226520	–			811914032557



Signal Isolator

Description

The WTH-SC/Dry+NAMUR series signal isolators provide reliable isolation for dry contacts and NAMUR proximity sensors in industrial automation systems. They ensure stable and reliable transmission of switching signals between field devices and control systems, even in electrically noisy industrial environments.

The isolators accept single-channel dry contact or NAMUR sensor inputs and provide isolated relay contact outputs. Relay-based physical isolation between input, output, and power supply effectively suppresses electromagnetic interference, eliminates ground loops, and protects against surge transients.

This series is ideally suited for NAMUR sensor applications as well as general-purpose dry contact signal isolation in process control, DCS, and PLC systems.

Features

- **High Noise Immunity:** Relay-based physical isolation combined with advanced filtering effectively suppresses electromagnetic interference, ground loops, and surge transients, ensuring stable and reliable transmission of dry contact and NAMUR sensor signals in harsh industrial environments.
- **High-Precision Signal Detection:** Optimized threshold detection circuitry for NAMUR sensors (1.2 mA / 2.1 mA) and dry contacts delivers fast response, jitter-free switching, and accurate state recognition while minimizing false triggering.
- **Comprehensive Line Fault Detection (LFD):** Integrated lead break and short-circuit monitoring for NAMUR inputs, with LED status indication and optional alarm output, enables rapid fault identification and reduced system downtime.
- **Easy Installation and Wiring:** Supports 35 mm DIN-rail mounting and plug-in terminals for simple and convenient installation and field wiring.
- **Low Power Consumption and Efficient Heat Dissipation:** Low-power circuit design combined with convection-ventilated housing minimizes heat generation and enhances thermal performance for long-term reliability.

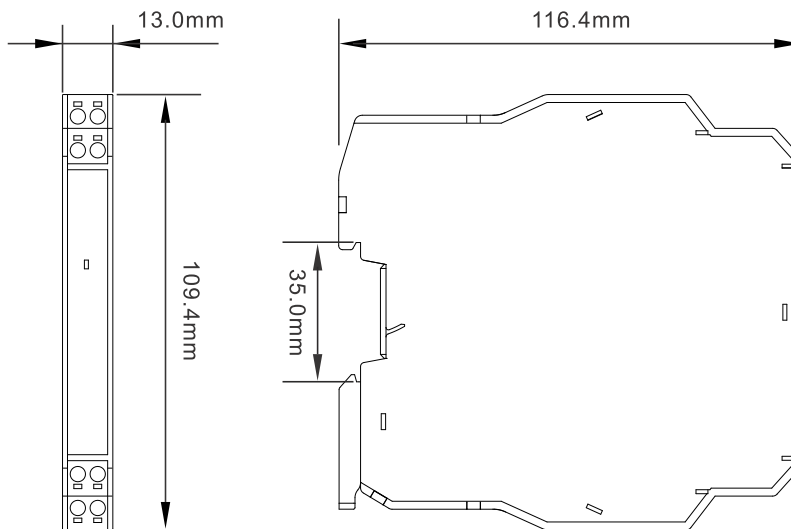
WTH-SC/Dry+NAMUR Series Technical Data

Input	Dry contacts, NAMUR sensors, Supervised dry contacts
Non-load Voltage	8V DC
Short-circuit Current	8mA
Switching Hysteresis	0.2mA
Switching Threshold "0" (Blocking)	< 1.2 mA
Switching Threshold "1" (Conductive)	> 2.1 mA
Rated Power Supply	24V DC $\pm 10\%$ / 20–35V DC
Output	Relay Contact (1 or 2 channels)
Rated Load	2A @ 250V AC / 30V DC
Dielectric Strength	1500VAC, 1 min. (Input / Output / Power Supply)
Current Consumption	≤ 30 mA (24 V DC)
Electrical life	100,000 Operations at Rated Load
DIN Rail EN60715	35mm top-hat rail
Power Supply Method	Terminal power supply via wiring
Surge protective model with suffix "G", 6kV/5kA (1.2/50 μ s & 8/20 μ s)	



Signal Isolator

Dimensions



3D File Download

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

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

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

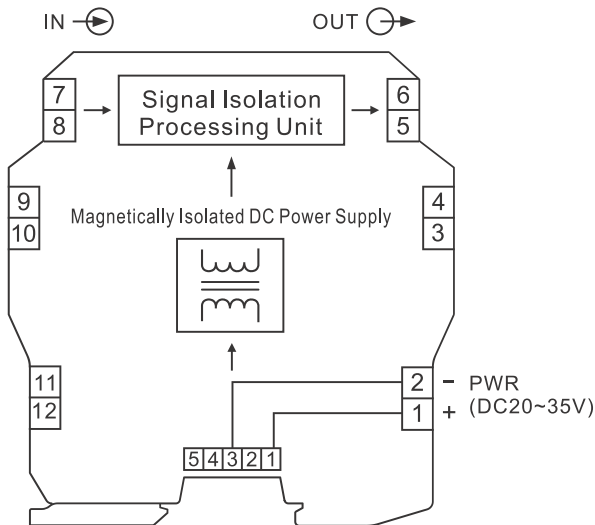
WTH-SC/***/12: http://www.watchfuleyesolutions.com/wth_rar/3D/WTHSC-101-111.stp.zip

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

Magnetically Isolated DC Power Supply

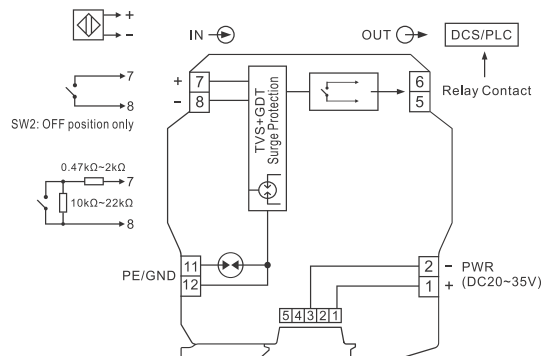


The signal isolator is powered by an external DC supply. However, the input power is not directly used for the internal signal processing and output circuits. Instead, it first passes through a high-performance magnetically isolated DC/DC power module, which provides complete galvanic isolation and generates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

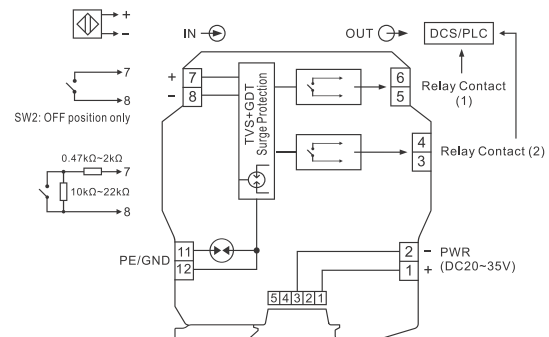
This magnetically isolated power design achieves full electrical isolation between the external power supply and the isolator's output circuitry. It effectively blocks noise, surges, and ground potential differences from the power side from affecting the output signal, resulting in a cleaner, more stable,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

Signal Isolator

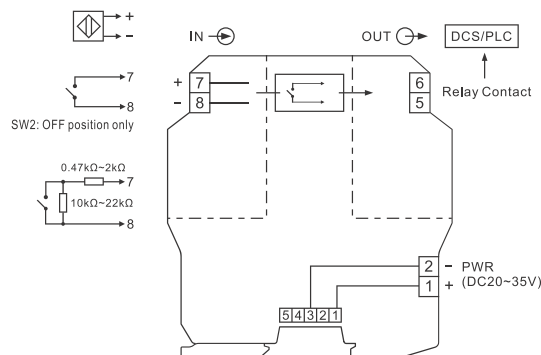
Connection Diagram



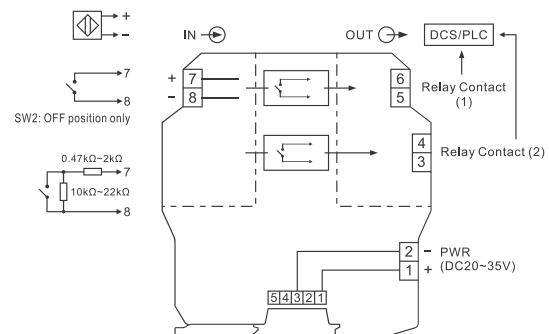
WTH-SC/Dry+NAMUR/11G



WTH-SC/Dry+NAMUR/12G



WTH-SC/Dry+NAMUR/11



WTH-SC/Dry+NAMUR/12

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



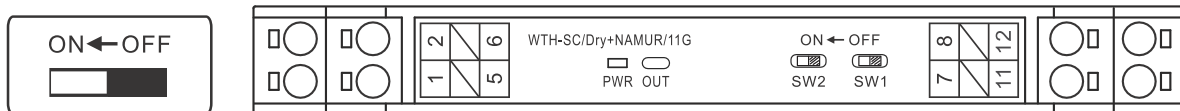
All pried open and peeled off



Installation complete

Signal Isolator

SW DIP Switch Settings on the Panel



SW1: Output Settings

SW2: Input Settings

Configured by SW1 (Normal / Inverse Phase)

SW1 is the Action Direction Setting Switch (DIP 1) of this Dry switch or NAMUR isolation switch amplifier. It allows users to configure the relationship between the input signal and the relay output, supporting two operating modes: Normal Phase and Inverse Phase. Configured by SW1 (Normal / Inverse Phase)

Note: This setting applies simultaneously to both OUT1 and OUT2. The two output channels cannot be configured with different phases independently.



Normal Phase (SW1 = OFF):

When the input sensor is activated (conductive), the output relay is energized (closed). Input and output states are consistent.



Inverse Phase (SW1 = ON):

When the input sensor is activated, the output relay is de-energized (open). Input and output states are opposite.

Signal Isolator

Configured by SW2 = OFF (Line fault detection disabled)

SW2 is the Line Fault Detection (LFD) setting switch.

Configured by SW2 = OFF (Line fault detection disabled)

This mode is suitable for Dry contacts, Supervised dry contacts, and NAMUR sensors when line fault monitoring is not required. When SW2 is set to the OFF position, the line fault detection function is disabled. This setting is typically used for floating switch contacts (dry contacts) without resistance circuit or in applications where line supervision is not needed.

Note: For safety-related applications or when using NAMUR sensors with line fault monitoring, SW2 must be set to ON.

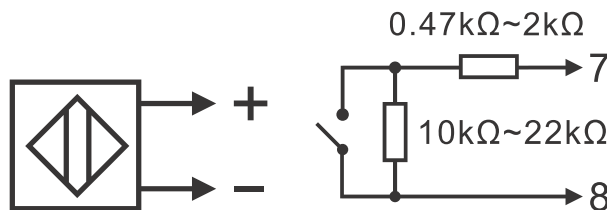


Note: SW2 must be set to OFF position only when using dry contacts.

Configured by SW2 = ON (Line fault detection enabled)

For NAMUR sensors or switches with resistance circuit, SW2 should be set to ON (Line fault detection enabled).

NAMUR sensors, Supervised dry contacts



SW2 is the Line Fault Detection (LFD) setting switch (DIP 2) of the isolation switch amplifier.

Configured by SW2 = ON (Line fault detection enabled)

When SW2 is set to the ON position, the line fault detection function is activated. The device continuously monitors the input circuit for cable breakage and short circuits.

- I. When the output relay is in the closed (energized) state, the blue LED lights up steadily.
- II. When the output relay is in the open (de-energized) state, the blue LED is off.
- III. When a line fault is detected at the input (abnormal line connection), the red LED lights up and stays constantly on, and the output relays switch to the safe de-energized (open) state.

This setting is recommended and mandatory for safety-related applications (SIL 2 / SIL 3) when using NAMUR proximity sensors or switch contacts with resistance circuit.

Note: SW2 must be set to ON when connecting NAMUR sensors or switches with resistance circuit to enable proper line fault monitoring. SW2 = OFF is only suitable for dry contacts.

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.



Signal Isolator

Certificates of Products

CE RoHS IEC 61643-11 IEC 61326-1



Signal Isolator

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

WatchfulEye offers a global 5-year quality warranty.

Activate Your 10-Year Warranty

Register this product within 90 days of purchase to receive:

- 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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