

What is Isolation ?

Isolation

Isolation in a signal conditioner means not having a direct electrical connection (or low impedance path) between two or more points (or circuits). The two primary components used in signal conditioners to provide isolation are transformers and optical couplers. Both devices transmit signals from one circuit to the other (via the transfer of magnetic or optical energy), and both have very high impedance paths from input to output. There are two main reasons why you might need isolation:

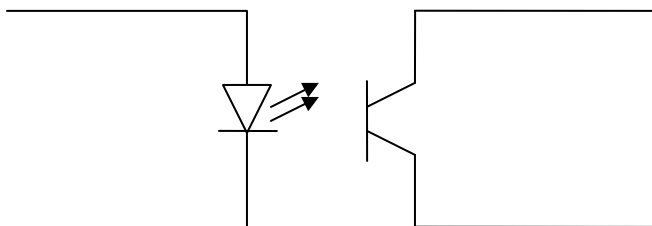
- To break up potential ground loops and
- To protect equipment from high voltage surges and spikes .

Breaking the Galvanic Path

The first and foremost duty of an isolator is to break the galvanic path between circuits that are tied or “grounded” to different potentials. A galvanic path is defined as a path in which there is a direct electrical connection between two or more electrical circuits that allow current to flow. Breaking this galvanic path can be accomplished by any number of means including electromagnetic, optic, capacitive, inductive and even acoustic methods. With most industrial measuring equipment, the two prevalent methods chosen for galvanic isolation are optical and transformer.

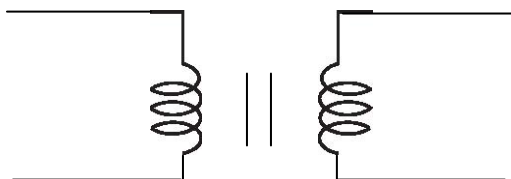
Optical Isolation—

Isolation with Opto Coupler Figure 1



Optical isolation (Figure 1) uses light to transfer a signal between elements of a circuit. The opto-coupler or opto-isolator is usually self-contained in a small compact module that can be easily mounted on a circuit board. An optical isolation circuit is comprised of two basic parts: a light source (usually a LED- Light Emitting Diode, acting as the transmitter) and a photo-sensitive detector (usually a phototransistor, acting as the receiver). The output signal of the opto-coupler is proportional to the light intensity of the source. The insulating air gap between the LED and the phototransistor serves as the galvanic separation between the circuits, thus providing the desired isolation between two circuits at different potentials. Optical isolation has better common-mode noise rejection, is usually seen in digital circuits, is not frequency sensitive, is smaller, and can sometimes provide higher levels of isolation than transformer isolation.

Transformer Isolation—

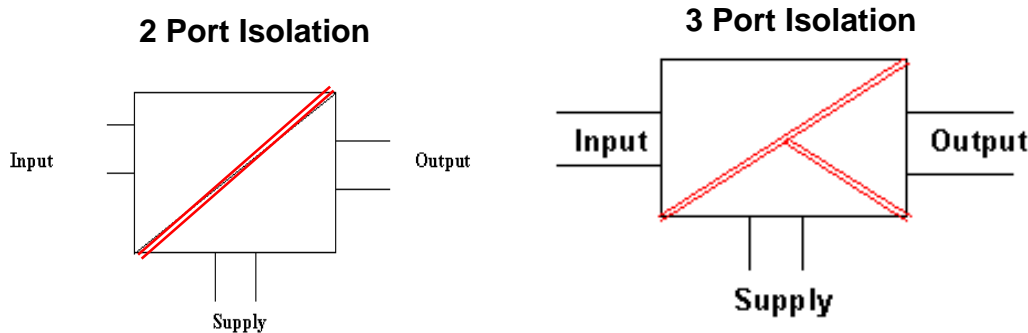


Isolation with Transformer Figure 2

Transformer isolation (Figure 2), often referred to as electromagnetic isolation, uses a transformer to electromagnetically couple the desired signal across an air gap or non-conductive isolation gap. The electromagnetic field intensity is proportional to the input signal applied to the transformer. Transformers are very efficient and fast at transferring AC (alternating current) signals. Since many process control signals are DC, they must be electrically “chopped” into an AC signal so they can pass across the transformer. Once passed, they have to be rectified and amplified back into the desired DC signal output.

Canopus Signal Isolator will provide you most latest Opto-Isolation for better Isolation , Accuracy , CMR & Reliable. In transformer Isolator back EMF noise can damage the instrument where as in Opto Isolator will protect the instrument from back EMF noise.

Two-Port vs. Three-Port Isolation



Two common terms used within the process control industry with respect to isolation are two-port and three-port isolation. Isolation specifications often detail what the isolation levels are from input to output. This is often referred to as two-port (input-to-output) isolation, and is the appropriate specification for a 2-wire transmitter since it is powered from either its input or output terminals. However, many manufacturers fail to mention or outline the isolation details when their isolators are 4-wire (line/mains-powered) and require 24Vdc, 110Vac or 220Vac to operate its circuits. In these instances, you want to ensure that you have an isolator that has full three-port isolation. Three-port isolation is defined as input-to-output, power-to-input and power-to-output isolation. If the isolator is powered by a DC supply, many manufacturers use common signal wires between the output and the power input. In these situations you could have problems with common mode noise, or a failing switching power supply that could create unwanted output signal errors.

Canopus Signal converters / Isolators are used to get legacy signal types, such as 10-50mA (1 – 5 V), converted to a standard 4-20mA or some other signal type that is compatible with a particular receiving device (Figure 3)

Canopus Signal Converter cum Isolator

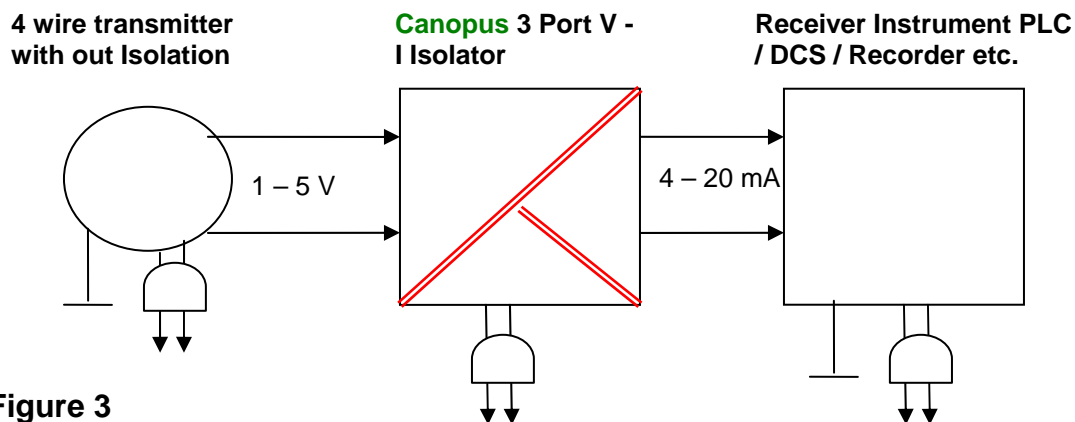


Figure 3

Analog Signal Conditioning & Isolation Modules (Analog Signal Isolator / Converter / Transmitter)



Features:

- Available in Single / Multi channel / Splitter types
- Fast response time (<1 ms)
- 3 port, 2 KV Isolation
- Accuracy + 0.2 % of FS
- Universal power supply 90-270 VAC, 50Hz
- Design conforms to IEC 61000-4-4 for EFT bursts and IEC 61000-4-5 for Surges
- Performance guaranteed from 0 -60 Deg C ambient temperature.

Applications

- Data Acquisition System.
- PLC / DCS Systems.

SIM -Mini - 1.0 Series :

Variants are divided into following types :

- DC Voltage Isolator
- DC Current Isolator
- PT 100 RTD Isolator
- Thermocouple Isolator
- AC Current Isolator (Transducer)
- AC Voltage Isolator (Transducer)
- Instrument Control Panel.
- AC / DC Drive Systems.
- Power Traducers