sonepar
Powered *by* **Difference**

masibus

# Isolator's & Transmitter's





## What is Signal Isolator

A signal isolator or signal converter is a signal conditioning device used to interface process signals with other control / monitoring ( PLC / DCS / Recorder / Indicator / HMI etc) devices. It Isolates / Converts / Splits / Amplifies the incoming signal to the output devices. Signal isolators ensure a stable and accurate signal output by offering superior resistance to electro-magnetic interference.

(A Barrier is generally used in hazardous areas . It reduces loop current below to safe level where it can not cause any spark. An Isolator is generally used to interface signals having different common mode voltages)

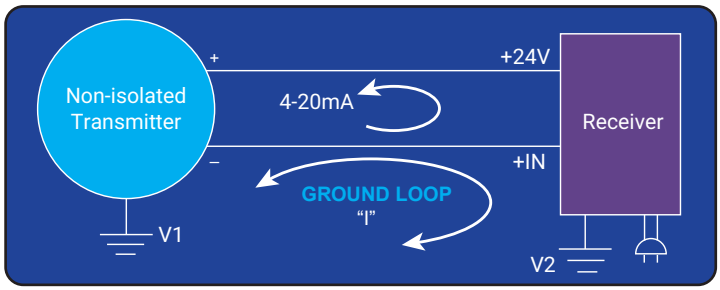
## Why Isolator is Needed

Signal Isolators are required for the electrical isolation , essential for safety , to eliminate erratic measurements caused by ground loops . It splits one signals to many to be fed to different systems, to amplify field signals , step down high voltage signals to a safer level , protection against EMI noises & cross talk elimination. In a nutshell , signal Isolator is required to break the galvanic path between the two grounds . It protects the system from surge / high transient voltage generated from switching inductive loads, lighting etc.

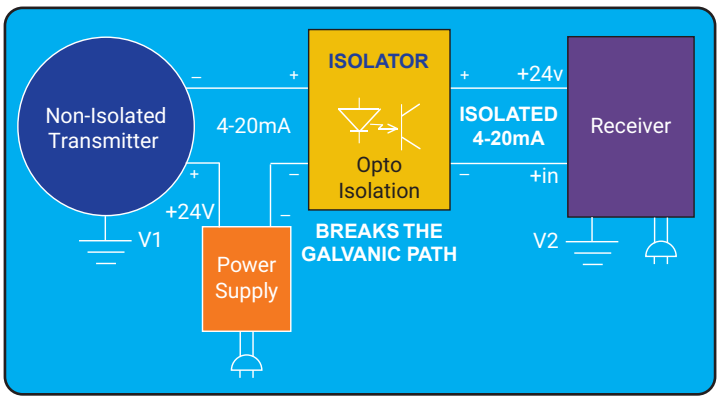
## Risk of Non-Isolated Signals

- Non-Isolated signals can damage the Costly DCS/PLC IO card
- It also causes the false measurement due to ground loops.
- Lighting/surges generated by switching loads may travel from field side to control systems and possibilities are it may damage the control systems.
- There is risk of cross talk between two field signals if they are non-isolated.
- Non-Isolated field signals are EMI susceptible that causes error in measurements

**A ground loop forms when the voltages at two ground points in a loop are at different potentials**




**A signal isolator "breaks" the galvanic path between two grounds.**




## Where all Isolator is Required

- **VFD Panels:** Protect the DCS/PLC IO modules from extraneous high voltage noises generated by VFDs
- **Automation Panels:** Interface and protects the DCS and PLC IO modules from fields signals
- **Instrumentation Panels:** Signal conversion, amplification and signal splitting application
- To convert 2-wire signals into 4-wire in PLC panels
- Signal isolation and conversion in MCC/PCC panels

# Isolator Products

**9000C**
(Slim Signal Isolator)
Single (SOP) & Dual (DOP) Output

**9000Ex-1/9000Ex-2**
(One/ Two Channel Intrinsically Safe Transmitter Power Supply/ Isolated Barrier/ Signal Isolator)

**9000Ex-31/9000Ex-32**
(Intrinsically Safe Smart Current Driver)

**9000E**
(One/ Two Channel Signal Isolator)

**9000L**
(Signal Isolator Single/Dual Output)

**9000U+**
(Signal Isolator Single/Dual Output)

## Technical Specification

| Models | 9000C-S | 9000C-M | 9000U+ | 9000U+M | 9000L | 9000L-M | 9000E | 9000Ex-1<br>9000Ex-2 | 9000Ex-31<br>9000Ex-32 |
|---|---|---|---|---|---|---|---|---|---|
| SOP (Single Input, Single Output) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| DOP (Single Input, Dual Output) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✗ |
| Dual Channel | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✓ | ✓ | ✗ |
| HART Pass | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| Fixed Input /Ouput (mA/V) | ✓ | ✗ | ✓ | ✗ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Switch Selectable Input/Ouput (mA/V) | ✗ | ✓ | ✗ | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Drift/Year (<0.1% of FS) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Power Supply (20 - 265V DC/AC) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ |
| Power Supply (20 - 35V DC) | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| Transmitter Power Supply | ✓ | ✓ | ✓ | ✓ | ✗ | ✗ | ✓ | ✓ | ✗ |
| 3-Port Isolation | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| CE Mark | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Intrinsically Safe | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✓ | ✓ |
| Temperature Coefficient (≤100 ppm/°C) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| CMRR (>100dB) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| NMRR (>70dB) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| LFD Detection | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✓ |
| Response Time | ≤50mSec. | | | | | | ≤50µSec. | | ≤100mSec. |
| Accuracy | ± 0.1% of FS | | | | ± 0.25% of FS | | ± 0.1% of FS | | |
| Operating Temperature | 0 to 55 °C | | | | | | -20 to 60 °C | | |
| Width | 12.5mm/17.5mm | | 35 mm | | | | 17.6 mm | | |

## 9000Ex-1/9000Ex-2 - Signal Isolator

### Features

- Intrinsically safe Associated Device
- Compact DIN-Rail mount design of 17.6mm width
- 2W transmitter input with HART Pass
- High KV 3 port isolation of each channel
- High Accuracy, low drift, low temperature effect
- Input and Output well protected
- Fast response suits all applications
- Low power dissipation

PESO Certified

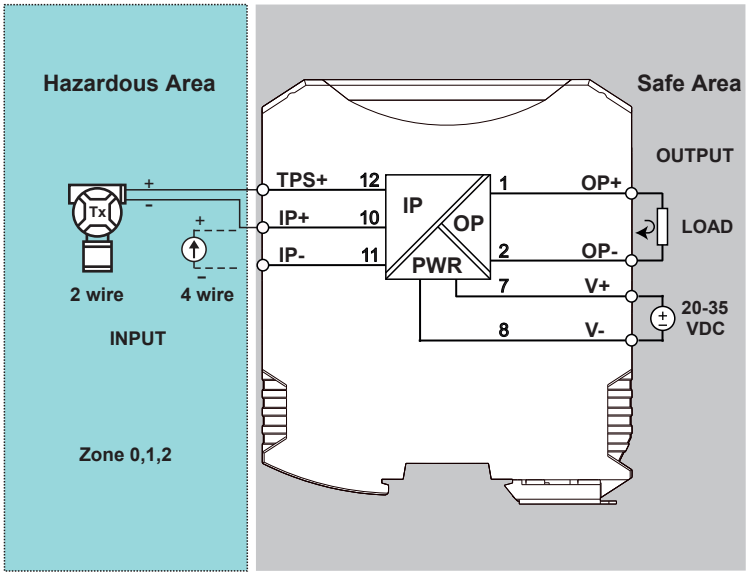

**9000Ex-1/9000Ex-2**

**[Ex ia Ga] IIC**

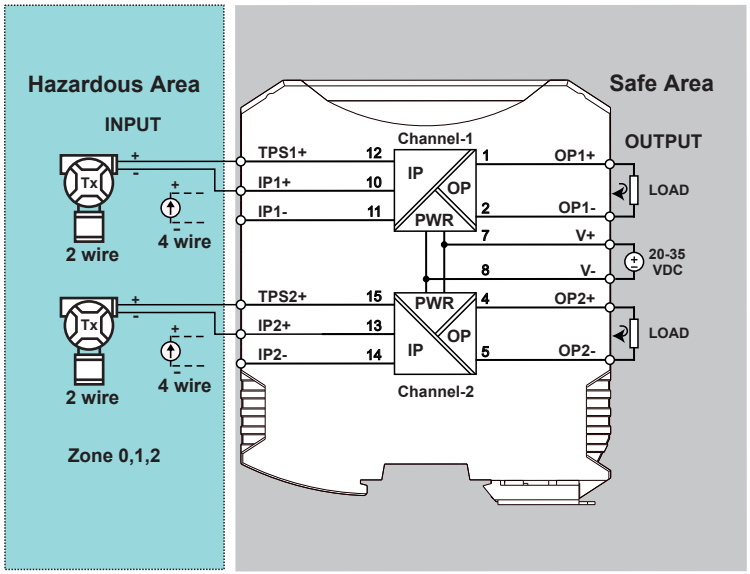
PESO Approval No.: A/P/HQ/GA/104/5522
Ex Standards Complied: IS/IEC 60079-0:2017
IS/IEC 60079-11:2011

## Connection Diagram

**9000Ex-1**




**9000Ex-2**




## 9000Ex-31/9000Ex-32 Smart Current Driver

### Features

- Intrinsically safe Associated Device
- Line fault detection (LFD)
- Compact DIN-Rail mount design of 17.6mm width
- High Accuracy, low drift, low temperature effect
- Low power dissipation
- Bi-Directional HART communication between the hazardous and non-hazardous area
- High KV 3 port isolation

PESO Certified


**9000Ex-31/9000Ex-32**

**[Ex ia Ga] IIC**

PESO Approval No.: A/P/HQ/GA/104/5532
Ex Standards Complied: IS/IEC 60079-0:2017
IS/IEC 60079-11:2023

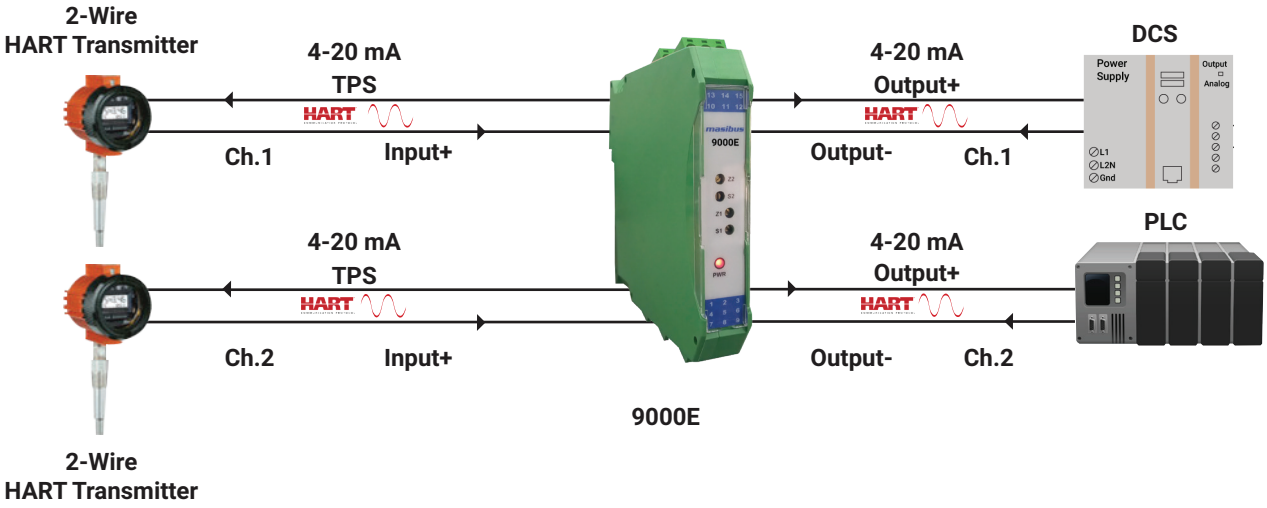
# 9000E- Signal Isolator

## Features

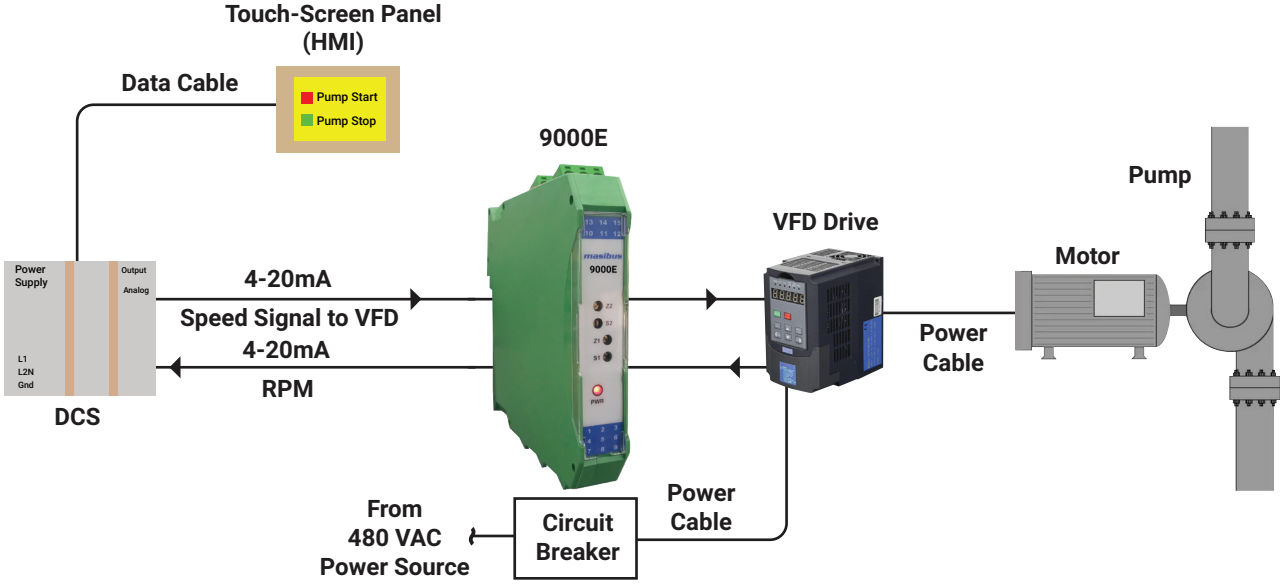
- Compact DIN-Rail mount design of 17.6mm width
- 2W transmitter input with HART Pass
- High KV 3 port isolation
- High Accuracy, low drift & low temperature effect
- Input and Output well protected
- Fast response suits all applications
- High CMRR and NMRR
- Slim design for one/two channels


9000E

## Process Industries Application




## VFD Application



# Signal Conditioner Offerings

## 9000C
## Signal Isolator

### Features

- Extended universal power supply range: 20V to 265V DC or AC
- Slim DIN-Rail mount design of 12.5mm for single output and 17.5mm for dual output
- Rugged & accurate 4 wire and 2 wire Isolator
- Up to 2 outputs with short circuit protection
- CE certified model option

## 9000U+
## Signal Isolator

### Features

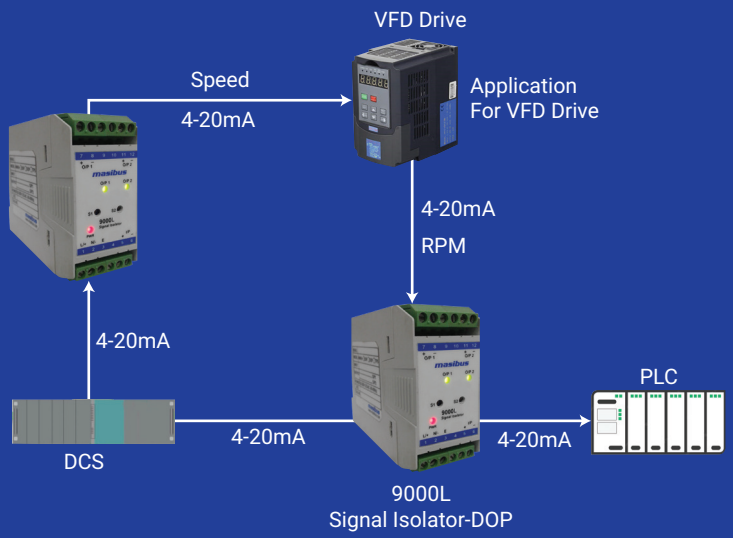
- Rugged & accurate 4 wire isolator
- Switch option for 0/4-20mA, 0/1-5V and 0-10V I/O selection
- Extended universal power supply range: 20V to 265V DC or AC
- 2.0KVAC three port isolation
- Wide zero & span adjustment limits
- Front calibration facility via multiturn trimpot

## 9000L- Signal Isolator

### Features

- Compact DIN-Rail mount design of 35mm for single and dual output
- 1.5 KV AC three port isolation
- Up to 2 outputs with short circuit protection
- High CMRR and NMRR
- High output load driving capability

## Best Fit for VFD Application



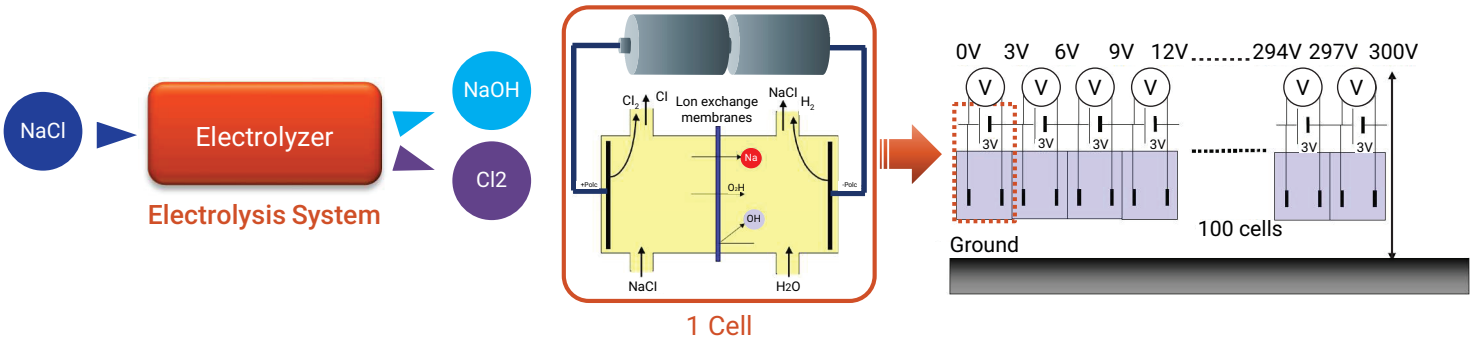
## Cell Voltage Monitoring with Voltage Deviation Transducer for Electrolyzer

Caustic soda and hydrochloric acid produced in electrolyzer plants, are fundamental materials used in varieties of industries i.e. chemicals, pharmaceuticals, petrol-chemicals, pulp & papers, etc. Proper control of the process brings you stabilized quality of products with the vast operational profit.

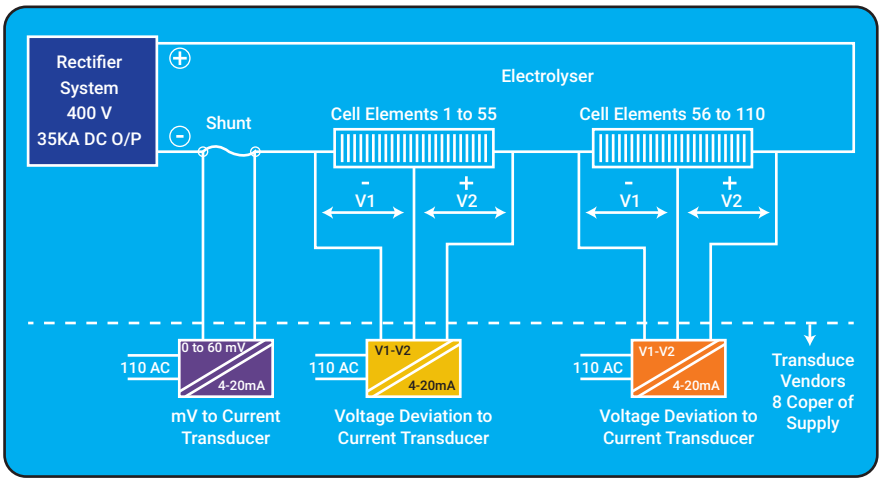
Caustic soda (NaOH) and Chlorine (Cl2) are generated by the electrolysis of Salt (NaCl). Electrolyzer is used to produce these fundamental materials.

The latest technology of this electrolysis system called “Electrolyzer” is used in Ion exchange membranes.

Ion exchange Membranes in electrolyzer is called "cell". An electrolysis bath is consisted of many cells. Cells are connected by series connection to each other. A Cell has life time, so it should be maintained periodically by monitoring the Cell Voltage.

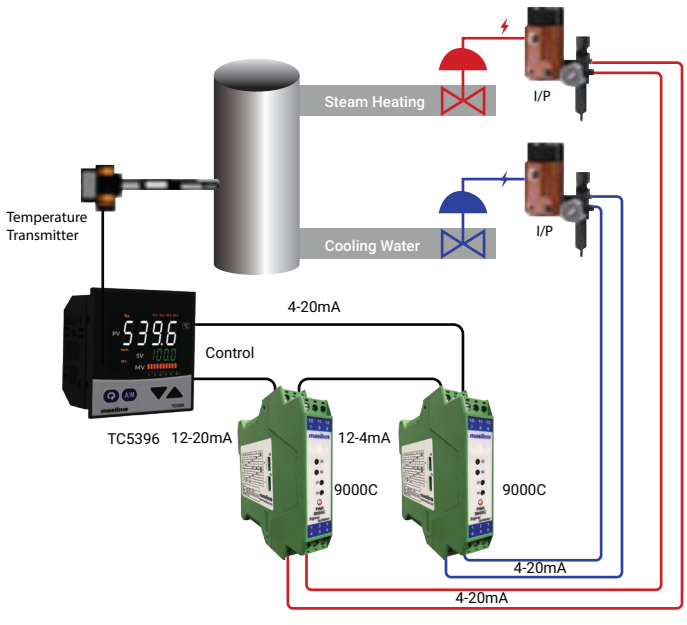



## 9000U-HDE- Voltage Deviation Transducer

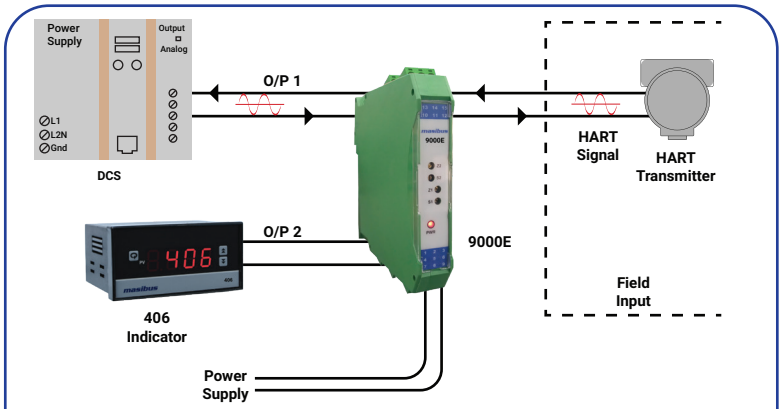



**9000U-HDE**

## 9000C Application: Instrumentation Panel




## 9000E PLC/DCS Panel with HART Application

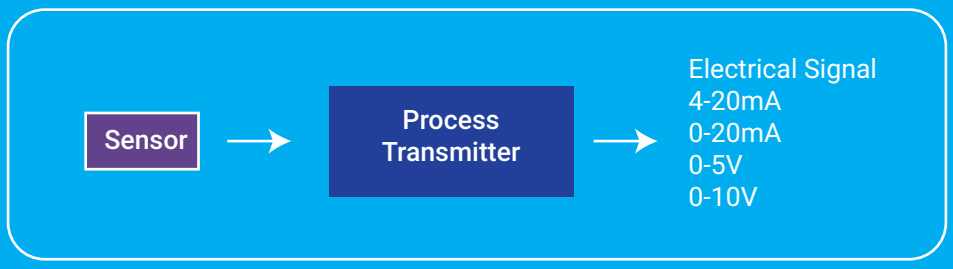



### 9000E Signal Isolator

- Its built-in HART pass-through allows valuable HART data to be read on either side of the unit
- Dual output option available
- Allows to isolate safety Instrumented System (SIS) from process control

## What is Transmitter ?

Transmitter is a device which converts the signal produced by a sensor into a standard instrumentation signal representing a process variable being measured and controlled. The standard electrical signals are 4 to 20 mA or 1 to 5 volts. Transmitters are highly used in the process industries.




## Why are Transmitters Required ?

- Signal Conversion of sensor raw signal into electrical signals
- Robust Signal Transmission by use of signal conditioning, linearization & isolation
- Minimize maintenance cost, simplify the engineering design and cost optimization
    - By eliminating longer Sensor cables
    - Use standard 4-20mA I/P Card at DAQ/DCS
- Protection against EM and RF noises
- Suppress the unwanted noise with the help of digital filter.

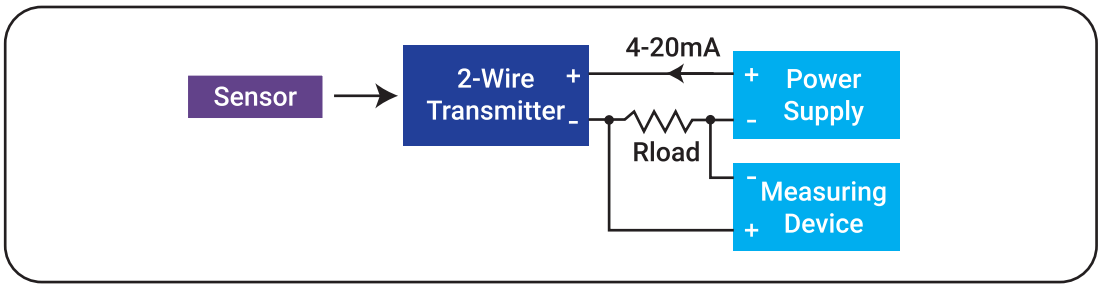
## Sources of Signal Interference

- Capacitive Coupling
    - Shielding-cable spacing- Twisted pair
- Magnetic Coupling
    - Twisted pair-Cable spacing- Eliminate ground loops-shield grounding- Isolation
- Ground Loops
    - Correct shield grounding-Isolation
- Over-Voltage and Transients
    - Shielding-Isolation-Equipment selection- Cable spacing
- EMI/RFI
    - Shielding-Twisted pair -Equipment selection

## Terminology

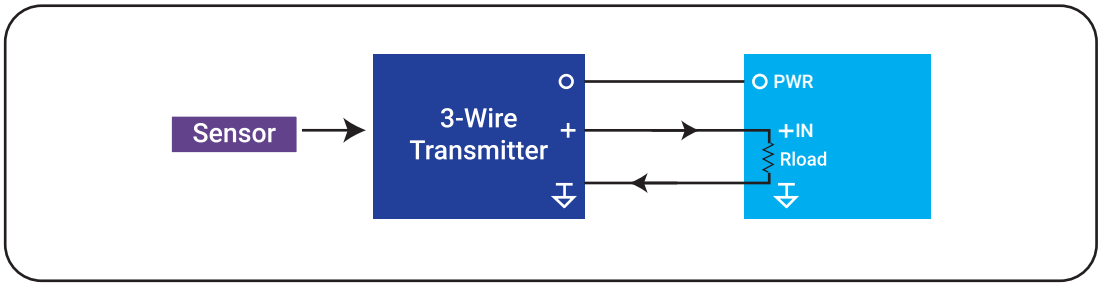
**What is 2-Wire Transmitters (Loop Power Transmitters):**

This configuration supplies power and 4-20mA signal over a two wire loop connection between the transmitter and the control panel. These two wires are used to power the transmitter and also to transmit the output signal.



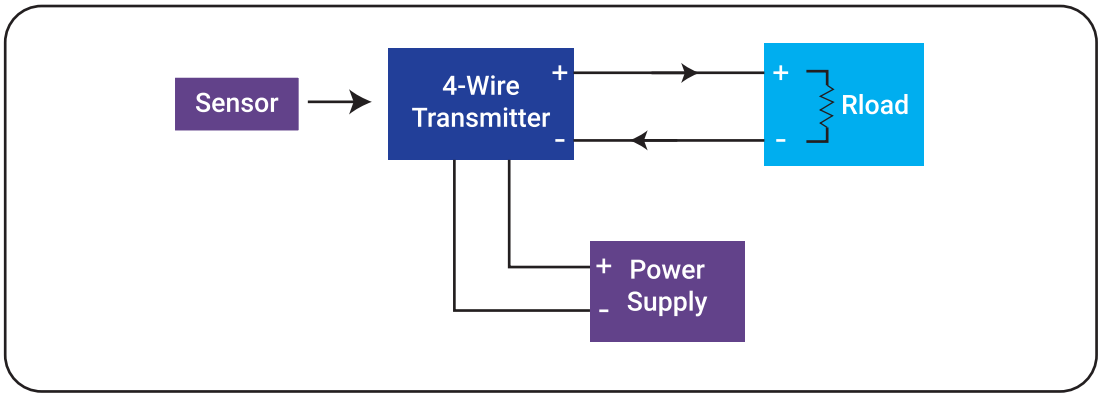

**3-Wire Transmitters:**

The 3-wire transmitter would transmit the data signal and the power with respect to the common ground.Three-wire transmitters are energized by the supply voltage in the transmitter. In this transmitter, the current loop can also be operated on a measuring instrument that has high input impedance.




**4-Wire Transmitters:**

In 4- wire transmitter, two wires are used for the data signal and two wires for the power supply. 4 wire transmitters are powered by the external power supply at the transmitters. The 4-20mA signal flows through two separate cable cores between the transmitter and control panel.

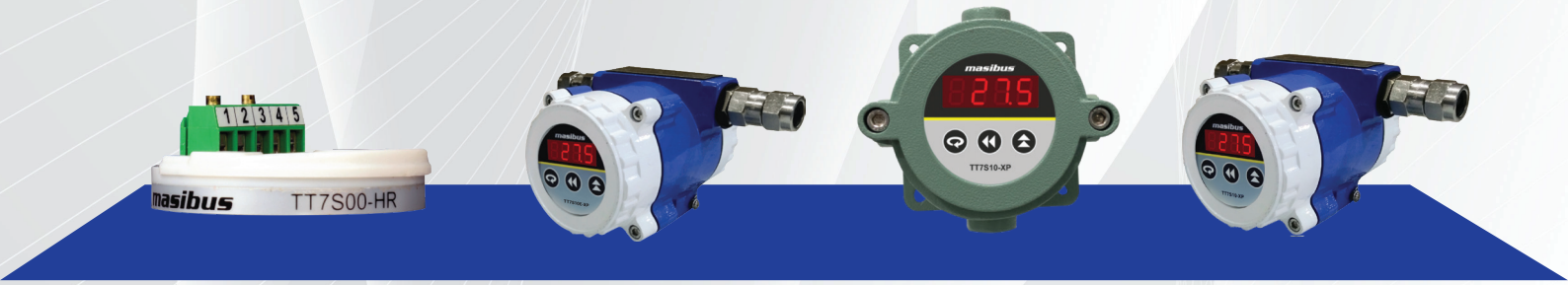



## Critical Parameters of Temperature Transmitter

| | | |
|---|---|---|
| Isolation Level | Accuracy | Drift / Stability |
| Temperature Coefficient | Response Time | MTBF |
| Minimum Operating Voltage | Operating Temperature | Ingress Protection |
| Input Types & Ranges | Minimum span | RTD: Excitation Current, Lead Resistance |
| Thermocouple: Burn-out current | Configuration & Calibration | CMRR/NMRR |

# Transmitter Products

**HT7S11S**
Humidity and Temperature Trasmitters




**TT7S00-HR**
2-Wire Transmitter

**TT7S10E-XP**
Temperature Transmitter

**TT7S10-XP**
(Single Compartment)

**TT7S10-XP**
(Dual Compartment)

**(Loop Powered Temperature Transmitter with Display)**


**UT-94**

**TT7S10-H**

**TT7S10**

**TT7S11S**

Isolated & Programmable Temperature Transmitters

# Transmitter Offerings


TT7S10E-XP

## TT7S10E-XP
## Ex-Proof Temperature Transmitter with 4–20mA & HART

### Features

- Explosion-proof design - suitable for wall or 2" pipe mounting
- Supports Thermocouples, Pt-100 RTD, mV, and Resistance/Potentiometer
- Standard 4-20mA output in 2-wire mode
- Programmable via touch keys, HART modem, or Windows-based mTRAN software
- Built-in Zero/Span adjustment, sensor break detection, and reverse polarity protection
- Advanced features like digital filtering, linearized output, and NAMUR NE43 compliance

HT7S11S

## HT7S11S
## Humidity and Temperature Transmitter

### Features

- Wide loop supply voltage range from 10VDC to 36VDC
- Custom built LCD display
- Configurable temperature unit measurement in celsius/ fahrenheit/kelvin
- Available in wall and duct mount
- Configurable by front keypad (Available in device with display)

## RH/ T Transmitter and DP Transmitter for Clean Room Application

# Transmitters Offerings

TT7S11S

TT7S10

## TT7S
## Isolated & Programmable Temperature Transmitters

### Features

- Universal input (RTD, Thermocouple, Ohm, mV)
- Full three port isolation
- Linearized Output
- Fully Programmable for input type & range
- Reverse polarity protection
- Sensor break detection
- Fast response time: <500 ms
- Windows based mTRAN software for configuration, calibration & monitoring

## TT7S00-HR
## 2-Wire Transmitter Pt-100 input

### Features

- Multi-range design
- Output linear to temperature
- Analog linearized for 0.1% linearity
- Sized for DIN B heads and bigger
- Sensor break selection for upscale or downscale
- Flat and compact housing
- Automated Testing and calibration check
- Highly accurate


TT7S10-H


TT7S00-HR

# Transmitters Offerings

TT7S10-XP
(Single Compartment)

TT7S10-XP
(Dual Compartment)

## TT7S10-XP
## Loop Powered Temperature Transmitter with Display

### Features

- Universal input (RTD, Thermocouple, Ohm, mV)
- Wall or 2" pipe mount Ex-proof transmitter with touchsense keys
- 0.56", 4 digit LED display in single compartment
- 0.39", 4 digit LED display in dual compartment
- 1.5 KV RMS isolation between input & output
- Linearized output
- Highly accurate
- Fully Programmable for input type & range
- User configurable digital filter
- Easy configuration using front keys and software


UT-94

## UT-94
## Universal Transmitter

### Features

- Compact DIN-Rail mounting
- Digital display
- Easy configuration using keys & display
- Micro controller based transmitter
- Measuring parameters: RTD, TC, mV, V, mA, Ω
- Upto two re-transmission output
- Two relay output (Optional)
- Modbus protocol on RS-485 (Optional)
- Square root extraction for linear input type
- Highly accurate

# Technical Specification

| Models | | TT7S00-HR | TT7S10 | TT7S10-H |
|---|---|---|---|---|
| Supply | Loop Powered | ✓ | ✓ | ✓ |
| | Aux Powered | ✗ | ✗ | ✗ |
| Input | Factory Set Fixed (Pt-100) | ✓ | ✗ | ✗ |
| | Universal | ✗ | ✓ | ✓ |
| | Humidity and Temperature | ✗ | ✗ | ✗ |
| | Differential Pressure | ✗ | ✗ | ✗ |
| | Tap | ✗ | ✗ | ✗ |
| | Strain Gauge/Load Cell | ✗ | ✗ | ✗ |
| Output | Display | ✗ | ✗ | ✗ |
| | Dual Analog Output | ✗ | ✗ | ✗ |
| | Relays | ✗ | ✗ | ✗ |
| Mounting | Head Mount | ✓ | ✗ | ✓ |
| | DIN Rail Mount | ✗ | ✓ | ✗ |
| | Wall Mount | ✗ | ✗ | ✗ |
| | Duct Mount | ✗ | ✗ | ✗ |
| Enclosure | Ex-Proof | ✗ | ✗ | ✗ |
| Communication | Modbus-RTU | ✗ | ✓ | ✓ |
| | HART | ✗ | ✗ | ✗ |
| Isolation | Isolated Transmitter | ✗ | ✓ | ✓ |
| Accuracy | PT100 | ±0.1 % of span | 0.1% of FS, ± 1° | 0.1% of FS, ± 1° |
| | Thermocouple (E,J,K,T,N) | – | 0.1% of FS, ± 1° | 0.1% of FS, ± 1° |
| | Thermocouple (B, R, S) | – | 0.25% of FS, ± 1° | 0.25% of FS, ± 1° |
| | Linear, Potentiometer | – | 0.25% of FS, ± 1° | 0.25% of FS, ± 1° |
| | RHT | – | – | – |
| Temp-co | | ≤150 PPM/°C | ≤150 PPM/°C | ≤150 PPM/°C |
| Response time | | ≤0.2 Sec. | ≤500 mSec. | ≤500 mSec. |

## - Transmitters

| TT7S10-XP | TT7S10E-XP | TT7S11S | UT-94 | HT7S11S |
|---|---|---|---|---|
| ✓ | ✓ | ✗ | ✗ | ✓ |
| ✗ | ✗ | ✓ | ✓ | ✓ |
| ✗ | ✗ | ✗ | ✗ | ✗ |
| ✓ | ✓ | ✓ | ✓ | ✗ |
| ✗ | ✗ | ✗ | ✗ | ✓ |
| ✗ | ✗ | ✗ | ✗ | ✗ |
| ✗ | ✗ | ✗ | ✗ | ✗ |
| ✗ | ✗ | ✗ | ✗ | ✗ |
| ✓ | ✓ | ✗ | ✓ | ✓ |
| ✗ | ✗ | ✗ | ✓ | ✗ |
| ✗ | ✗ | ✗ | ✓ | ✗ |
| ✗ | ✗ | ✗ | ✗ | ✗ |
| ✗ | ✗ | ✓ | ✓ | ✗ |
| ✓ | ✓ | ✗ | ✗ | ✓ |
| ✗ | ✗ | ✗ | ✗ | ✓ |
| ✓ | ✓ | ✗ | ✗ | ✓ |
| ✓ | ✓ | ✓ | ✓ | ✓ |
| ✗ | ✓ | ✗ | ✗ | ✗ |
| ✓ | ✓ | ✓ | ✓ | ✓ |
| 0.1% of FS, ± 1° | ±0.5 °C | 0.1% of FS, ± 1° | 0.1% of FS, ± 1° | – |
| 0.1% of FS, ± 1° | ±0.6 °C | 0.1% of FS, ± 1° | 0.1% of FS, ± 1° | – |
| 0.25% of FS, ± 1° | ±1.5 °C | 0.25% of FS, ± 1° | 0.25% of FS, ± 1° | – |
| 0.25% of FS, ± 1° | ±0.020 mV for Linear (0 - 75mV).<br>±0.400 mV for Linear (0 - 500mV).<br>±1.5 Ω for Resistance (0 - 2500 Ω).<br>±0.008 mA for mA (0 - 20 & 4 - 20 mA) | 0.25% of FS, ± 1° | 0.25% of FS, ± 1° | – |
| – | – | – | – | ±2.5%<br>(0 to 90% RH)<br>±3.5%<br>(90 to 100% RH), ±0.6 °C |
| ≤150 PPM/°C | ≤100 PPM/°C | ≤150 PPM/°C | ≤100ppm/°C | – |
| ≤1 Sec. | ≤250 mSec. | ≤500 mSec. | ≤200 mSec. | 12 Sec. typically |

## Sonepar India Pvt. Ltd.

**Gandhinagar**
**Address:** B-30, G.I.D.C. Electronic Estate, Sector - 25, Gandhinagar - 382 024, Gujarat, India
**E-mail:** sales@masibus.com
**Ph. No.:** +91 9662042824

**Goa**
**Address:** C-6, Phase 1-A, Verna Industrial Estate, Verna, Salcette - 403722, Goa, India
**E-mail:** sales@masibus.com
**Ph. No.:** +91 9822135796

**Pune**
**E-mail:** sales@masibus.com
**Ph. No.:** +91 9689937234

**Bengaluru**
**E-mail:** sales@masibus.com
**Ph. No.:** +91 8732971943

**Chennai**
**E-mail:** sales@masibus.com
**Ph. No.:** +91 9725154195

**Delhi**
**E-mail:** sales@masibus.com
**Ph. No.:** +91 9909949742

**Hyderabad**
**E-mail:** sales@masibus.com
**Ph. No.:** +91 9909949062

**Kolkata**
**E-mail:** sales@masibus.com
**Ph. No.:** +91 9512003359

**Mumbai**
**E-mail:** sales@masibus.com
**Ph. No.:** +91 9689937234

**Gurgaon**
**Address:** Plot No. 229/239, Village - Kherki Daula, Sector 76, Gurugram, Haryana, 122004, India

**Kolkata**
**Address:** 503, Block 4B, Ecospace Business Park, Newtown, Rajarhat, Kolkata, West Bengal, 700160, India

**Chennai**
**Address:** Plot No. 1, Gokul Garden, Melnallathur, Thiruvallur, Chennai, Tamil Nadu, 602002, India

**Aurangabad**
**Address:** FP-42, Five Star Industrial Area, Shendra MIDC, Aurangabad, Maharashtra, 431201, India

**Panchkula**
**Address:** Plot No. 263, Industrial Area, Phase-II, Panchkula, Haryana, 134113, India

**Bhubaneshwar**
**Address:** Plot No. 443, 1st Floor, Saheed Nagar, Bhubaneshwar, Odisha, 751007, India

**Website: www.soneparindia.com**
**Website: www.masibus.com**
**E-mail: sales@masibus.com**

## Masibus Automation & Instrumentation FZC

**Sharjah**
**Address:** A2-102, SAIF Zone, PO Box 120145 Sharjah, UAE

**E-mail:** sharjahall@masibus.com
**Ph. No.:** +971 65574650