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 signal 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

**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
## Technical Specification

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<td>≤50mSec.</td>
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<td>≤50μSec.</td>
<td>≤50μSec.</td>
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<td>≤50μSec.</td>
<td>≤50μSec.</td>
<td>≤50μSec.</td>
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<tr>
<td>Accuracy</td>
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<td>± 0.25% of FS</td>
<td>± 0.1% of FS</td>
<td>± 0.25% of FS</td>
<td>± 0.1% of FS</td>
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<td>Width</td>
<td>12.5mm/17.5mm</td>
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</table>
Features

- Compact DIN-Rail mount design of 35mm with one or two-channel option
- Highly stable against temperature variation, Drift ≤ 50 PPM
- 2 wire & 4 wire transmitter configuration option available
- High response time ≤ 50μS
- BEST IN CLASS ACCURACY, ≤ 0.1% of full span
- HART pass-through available with 2-wire transmitter supply configuration
- Low power consumption, ≤ 1.3 W per channel with TPS, ≤ 0.7 W per channel without TPS & low cost per channel
- 2KV three-port Isolation

Process Industries Application

2-Wire HART Transmitter → 4-20 mA TPS → Input+ → 4-20 mA TPS → Output- → Ch.1
2-Wire HART Transmitter → 4-20 mA TPS → Input+ → 4-20 mA TPS → Output- → Ch.2

9000LE → 4-20 mA Output+

DCS → Touch-Screen Panel (HMI) → Power Supply → DCS

VFD Application

Touch-Screen Panel (HMI) → Data Cable → 9000LE

DCS → 4-20mA Speed Signal to VFD

9000LE → 4-20mA RPM

9000LE → Power Cable → Motor

From 480 VAC Power Source → Circuit Breaker → Power Cable
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.

**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

**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.

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**9000U-HDE- Voltage Deviation Transducer**
### Signal Conditioner Offerings

#### 9000C Signal Isolator

**Features**
- Available in Aux Powered (AP) and Loop Powered (LP) options
- 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
- HART pass through model

#### 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

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#### 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

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#### Best Fit for VFD Application

[Diagram showing connections between DCS, 9000L Signal Isolator-DOP, VFD Drive, and PLC]

- Speed
- 4-20mA
- 9000L Signal Isolator-DOP
- 4-20mA
- PLC
- RPM
- Application For VFD Drive
- 4-20mA
2-Wire 9000C HART 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

9000C Application: Instrumentation Panel
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.

**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

**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.

**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.
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.

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**Critical Parameters of Temperature Transmitter**

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

HT7S11S
Humidity and Temperature Transmitters

DPT7S10
Differential Pressure Transmitter

TPT-20
Tap Position Transmitter

UT-94
Universal Transmitter

SGT-18
Load Cell Transmitter

TT7S00-HR
2-Wire Transmitter

TT7S10-D
Strain Gauge Transmitter

TT7S10-XP
(Single Compartment)
(Loop Powered Temperature Transmitter with Display)

TT7S10-XP
(Dual Compartment)

TT7S10-H
TT7S10
TT7S11S
Isolated & Programmable Temperature Transmitters
<table>
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<td>Thermocouple (E, J, K, T, N)</td>
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<tr>
<td>Thermocouple (B, R, S)</td>
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<tr>
<td>Temp-co</td>
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<tr>
<td><strong>Response time</strong></td>
</tr>
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</table>

- ±2.5% (0 to 90% RH) ±3.5% (90 to 100% RH), ±0.6 ºC
- ±2 Pa: +/- 0.5% Span +/- 2 Pa/mmWC
- ±0.2 Pa/mmWC
- ±0.5% Span +/- 0.2 mWC
- ±0.1 % of Full span ±1 digit
DPT7S10
Differential Pressure Transmitter
Features
- Wide loop supply voltage range from 10VDC to 36VDC
- Custom built LCD 4-digit display
- Configurable unit measurement in mmWC / Pa
- Available in compact and light weight design for easy and simple wall mount installation
- Configurable by front keypad (Available in device with display)

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)
TT7S
Isolated & Programmable Temperature Transmitters

Features
- Universal input (RTD, Thermocouple, Ohm, mV)
- Full three port isolation
- Linearized Output
- Highly accurate
- Fully Programmable for input type & range

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 downside

TPT-20
Tap Position Transmitter

Features
- Micro controller based design
- Compact DIN-Rail mounting
- 4 digit red digital display for tap position
- Easy configuration using keys & display
- Programmable tap number upto 100

TT7S10-D/TT7S10-XP
Loop Powered Temperature Transmitter with Display

Features
- Universal input (RTD, Thermocouple, Ohm, mV)
- Available in below options
  - TT7S10-D: DIN-Rail mount with 0.3", 4 digit LED display
  - TT7S10-XP: 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
SGT-18
Load Cell Transmitter

Features
- Selectable load cell input ranges
- 5 digit 0.56" LED display
- Local cell excitation voltage selectable from 5 to 15V DC (Factory set)
- Tare adjustment through keypad/I0
- User selectable gross and net values for retransmission output
- RS-485 interface (Optional) for connecting PLC/DCS

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
Masibus Automation And Instrumentation 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

Sharjah  
**Address:** A2-102, SAIF Zone, PO Box 120145 Sharjah, UAE  
**E-mail:** sharjahall@masibus.com  
**Ph. No.:** +971 65574650

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

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

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

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

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

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

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

Sonepar India Pvt. Ltd.

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, M Mannathur, Thiruvarur, Chennai, Tamil Nadu, 602002, India

Aurangabad  
**Address:** FP-42, Five Star Industrial Area, Shendra MDC, 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

E-mail: communications@soneparindia.com  
Website: www.soneparindia.com

Sales Service: TOLL FREE (India)  
1-800-233-2273

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