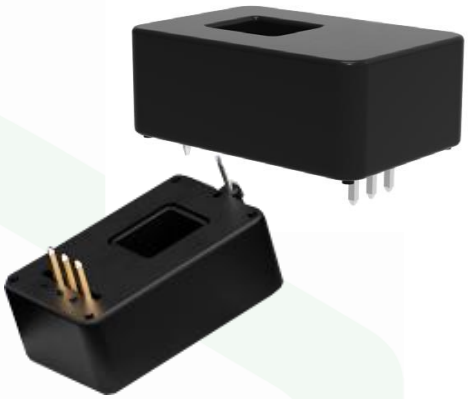
# OTS-XX

## Technical Specification

### Isolated , High Bandwidth Open Loop sensor OTS-20-25-32-40-50

The OTS series current sensor is an isolated, open-loop device designed for high bandwidth applications, making it ideal for measuring DC, AC, pulse, and mixed current signals. The OTS series is available in various models with current detection ranges of 20A, 25A, 32A, 40A, and 50A. It features a perforated design and a PCB mounting system that simplifies the threaded installation of MC4-type photovoltaic connectors. This makes it particularly suitable for use in compact photovoltaic inverter applications.



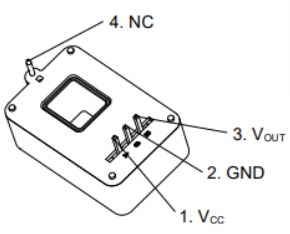
**Features** :

- **Fast response time 1µs typical**
- **Fixed bias voltage and sensitivity**
- **Low temperature drift: bias voltage and sensitivity**
- **Primary and secondary electrical isolation**
- **High bandwidth: 500 kHz typical**
- **On board through-hole design, compatible with MC4**

**Applications:**

- AC Speed controller
- Photovoltaic Inverter
- Photovoltaic combiner box
- SMPS Switching Power Supply
- Electric Welder Power supply

| Part Number | Rated nominal current $I_{PN}$ (A) | Measuring Range $I_{PM}$ (A) | Supply Voltage Vcc (V) | Sensitivity S (mV/A) |
|---|---|---|---|---|
| **OTS-20** | 20A | ±20 A | 5 | 100 |
| **OTS-25** | 25A | ±25 A | 5 | 80 |
| **OTS-32** | 32A | ±32 A | 5 | 62.5 |
| **OTS-40** | 40A | ±40A | 5 | 50 |
| **OTS-50** | 50A | ±50 A | 5 | 40 |




| Pin No | Pin Name | I/O | Function |
|---|---|---|---|
| **1** | Vcc | P | Power supply |
| **2** | GND | P | GND |
| **3** | $V_{OUT}$ | AO | Analog Output voltage |
| **4** | NC | - | No Internal connection |

AO: Analog Output
P : Power supply



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## - ENVIRONMENTAL AND MECHANICAL CHARACTERISTICS

| Parameter | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Operating temperature | $T_A$ | -40 | - | +105 | °C |
| Storage temperature | $T_{STG}$ | -40 | - | +105 | °C |
| Solder temperature /10 s | $T_{LEAD}$ | - | - | 260 | °C |
| Weight | m | - | 6 | - | g |

## - SPECIFICATIONS:

**$T_A$ = 25°C , $V_{CC}$ = ± 5V , $CV_{CC}$ = 0.1µF , $N_P$ =1 turn unless otherwise noted**

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **ELECTRICAL DATA** | | | | | | |
| Supply Voltage | Vcc | - | 4.75 | 5 | 5.25 | V |
| Current Consumption | Icc | - | - | 3.5 | 5 | mA |
| Power-on time | $t_{ON}$ | $I_P$ =0A, no load $V_{OUT}$ | - | 0.1 | - | ms |
| **ANALOG OUTPUT** | | | | | | |
| Output Impedance | $Z_{OUT}$ | f = 1 Hz ~ 1 KHz | - | 1 | - | Ω |
| Output load resistance | $R_L$ | - | 4.7 | 100 | - | kΩ |
| Output load capacitance | $C_L$ | No sustained oscillation | - | 220 | - | pF |
| Output linear range | $V_{OUTR}$ | - | 0.5 | - | 4.5 | V |
| Output voltage | $V_{OUT}$ | - | $V_{OFF}$ + S x $I_P$ / 1000 | | | V |
| Noise | $V_N$ | DC ≈ 1MHz | - | 25 | - | $mV_{PP}$ |
| **DYNAMIC RESPONSE** | | | | | | |
| Step response time | tR | 90% of $I_{PN}$ | - | 1 | - | µs |
| Delay time | tD | 500 kHz sine | - | 0.5 | - | µs |
| Bandwidth | BW | -3dB | - | 500 | - | kHz |



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## - ISOLATION CHARACTERISTICS:

| Parameter | Symbol | Value | Unit | Comment |
|---|---|---|---|---|
| Withstand isolation voltage | $V_{ISO}$ | 4 | KV | AC 50 Hz/1min<br>$V_{TEST} = V_{ISO}$, t = 60s (qualification)<br>$V_{TEST}$ = 4.3 kV, t = 10s (100% production) |
| Clearance | $d_{CL}$ | 8 | mm | Shortest distance through air |
| Creepage distance | $d_{CP}$ | 8 | mm | Shortest path along the body |
| Case material | - | UL94-V0 | - | |

## - RATINGS:

| Parameter | Symbol | Min | Max | Unit | Comment |
|---|---|---|---|---|---|
| Supply voltage (not destructive) | $V_{CC}$ | -0.3 | 6.5 | V | $V_{CC}$ - GND pin |
| Output voltage (not destructive) | $V_{OUT}$ | -0.3 | Vcc + 0.3 | V | $V_{OUT}$ – GND pin |
| ESD (Human body model) | $V_{HBM}$ | 4 | - | kV | - |

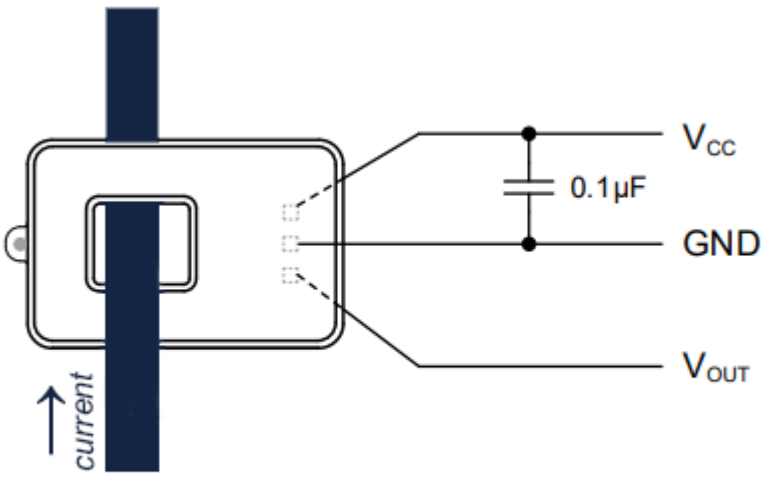


Figure 2. Typical application circuit



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## - OTS-20

Unless otherwise noted : $T_A$ = 25 °C, $V_{CC}$ = 5 V, $CV_{CC}$ = 0.1 µF, $N_P$ = 1turn

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Primary nominal current | $I_{PN}$ | | - | 20 | - | A |
| Measurement Range | $I_{PM}$ | | -20 | - | 20 | A |
| Sensivity | S | | - | 100 | - | mV/A |
| Offset voltage | $V_{OFF}$ | | 2.48 | 2.5 | 2.52 | V |
| Accuracy | $X_G$ | $T_A$ = 25°C | -1 | - | 1 | % $I_{PN}$ |
| | | $T_A$ = -40°C~+105°C | -2.5 | - | 2.5 | % $I_{PN}$ |
| Linearity error | εL | - | - | 0.5 | 1 | % $I_{PN}$ |
| Hysteresis voltage | $V_{OH}$ | @IP=0 A , ±$I_{PM}$ | -20 | - | 20 | mV |

## - OTS-25

Unless otherwise noted : $T_A$ = 25 °C, $V_{CC}$ = 5 V, $CV_{CC}$ = 0.1 µF, $N_P$ = 1turn

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Primary nominal current | $I_{PN}$ | | - | 25 | - | A |
| Measurement Range | $I_{PM}$ | | -25 | - | 25 | A |
| Sensivity | S | | - | 80 | - | mV/A |
| Offset voltage | $V_{OFF}$ | | 2.48 | 2.5 | 2.52 | V |
| Accuracy | $X_G$ | $T_A$ = 25°C | -1 | - | 1 | % $I_{PN}$ |
| | | $T_A$ = -40°C~+105°C | -2.5 | - | 2.5 | % $I_{PN}$ |
| Linearity error | εL | - | - | 0.5 | 1 | % $I_{PN}$ |
| Hysteresis voltage | $V_{OH}$ | @IP=0 A , ±$I_{PM}$ | -20 | - | 20 | mV |



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## - OTS-32

Unless otherwise noted : $T_A$ = 25 °C, $V_{CC}$ = 5 V, $CV_{CC}$ = 0.1 µF, $N_P$ = 1turn

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Primary nominal current | $I_{PN}$ | | - | 32 | - | A |
| Measurement Range | $I_{PM}$ | | -32 | - | 32 | A |
| Sensivity | S | | - | 62.5 | - | mV/A |
| Offset voltage | $V_{OFF}$ | | 2.48 | 2.5 | 2.52 | V |
| Accuracy | $X_G$ | $T_A$ = 25°C | -1 | - | 1 | % $I_{PN}$ |
| | | $T_A$ = -40°C~+105°C | -2.5 | - | 2.5 | % $I_{PN}$ |
| Linearity error | εL | - | - | 0.5 | 1 | % $I_{PN}$ |
| Hysteresis voltage | $V_{OH}$ | @IP=0 A , ±$I_{PM}$ | -20 | - | 20 | mV |

## - OTS-40

Unless otherwise noted : $T_A$ = 25 °C, $V_{CC}$ = 5 V, $CV_{CC}$ = 0.1 µF, $N_P$ = 1turn

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Primary nominal current | $I_{PN}$ | | - | 40 | - | A |
| Measurement Range | $I_{PM}$ | | -40 | - | 40 | A |
| Sensivity | S | | - | 50 | - | mV/A |
| Offset voltage | $V_{OFF}$ | | 2.48 | 2.5 | 2.52 | V |
| Accuracy | $X_G$ | $T_A$ = 25°C | -1 | - | 1 | % $I_{PN}$ |
| | | $T_A$ = -40°C~+105°C | -2.5 | - | 2.5 | % $I_{PN}$ |
| Linearity error | εL | - | - | 0.5 | 1 | % $I_{PN}$ |
| Hysteresis voltage | $V_{OH}$ | @IP=0 A , ±$I_{PM}$ | -20 | - | 20 | mV |



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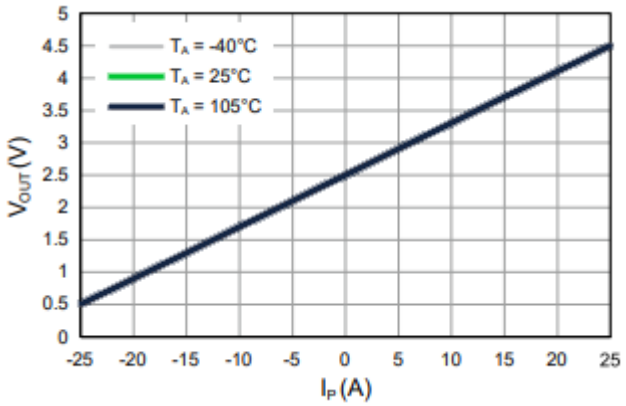
## - OTS-50

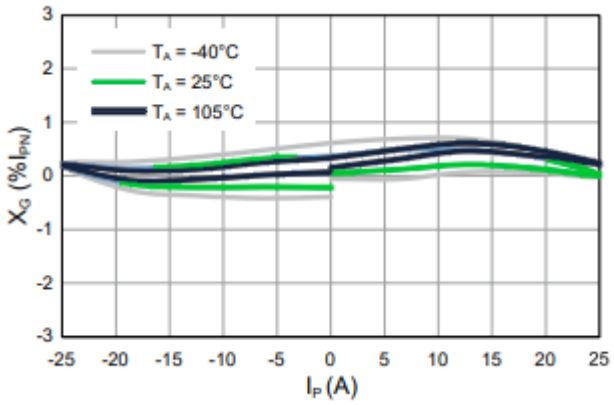
Unless otherwise noted : $T_A$ = 25 °C, $V_{CC}$ = 5 V, $CV_{CC}$ = 0.1 µF, $N_P$ = 1turn

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Primary nominal current | $I_{PN}$ | | - | 50 | - | A |
| Measurement Range | $I_{PM}$ | | -50 | - | 50 | A |
| Sensivity | S | | - | 40 | - | mV/A |
| Offset voltage | $V_{OFF}$ | | 2.48 | 2.5 | 2.52 | V |
| Accuracy | $X_G$ | $T_A$ = 25°C | -1 | - | 1 | % $I_{PN}$ |
| | | $T_A$ = -40°C~+105°C | -2.5 | - | 2.5 | % $I_{PN}$ |
| Linearity error | εL | - | - | 0.5 | 1 | % $I_{PN}$ |
| Hysteresis voltage | $V_{OH}$ | @$I_P$=0 A , ±$I_{PM}$ | -20 | - | 20 | mV |

## - TYPICAL CHARACTERISTICS




Output Voltage Vs Primary Current




Accuracy vs Primary Current



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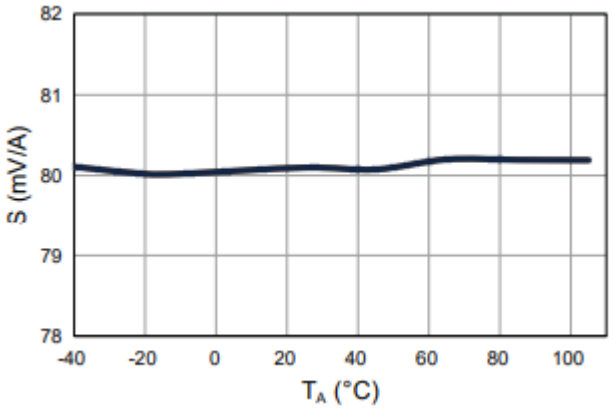
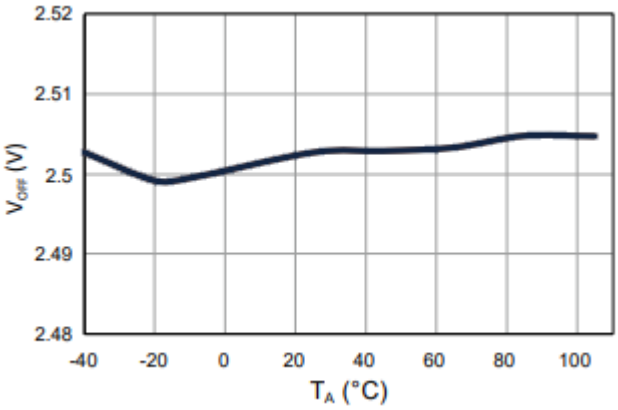
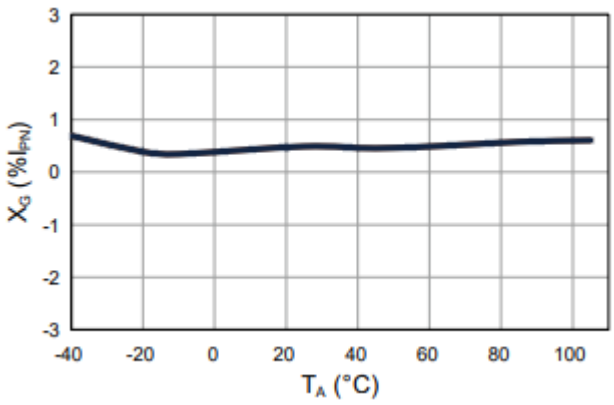


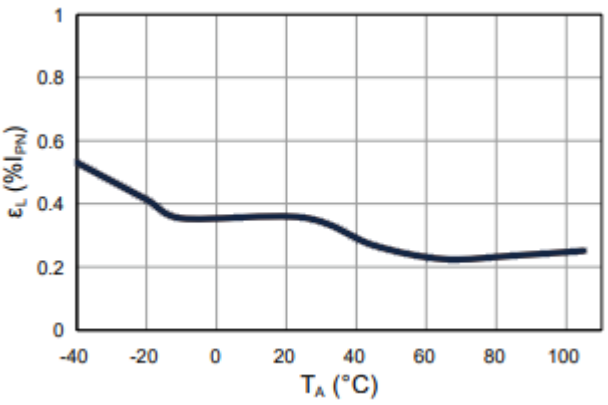

Sensitivity vs Ambient Temperature



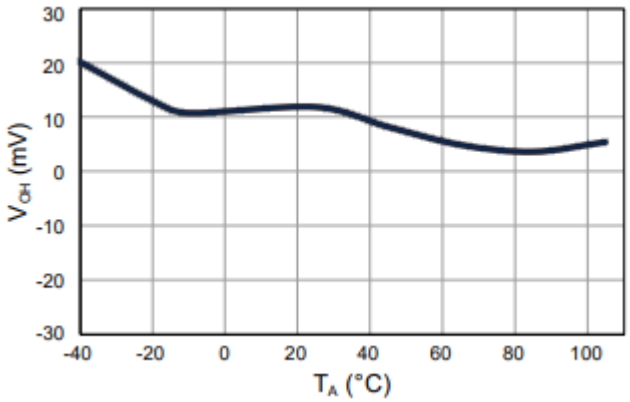

Offset Voltage vs Ambient Temperature



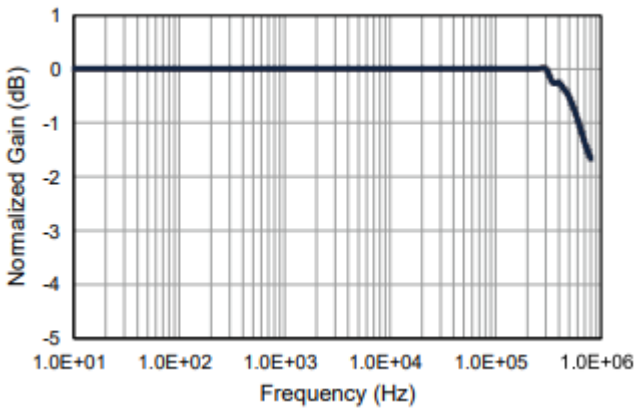

Accuracy vs Ambient Temperature




Linearity Error vs Ambient Temperature




Magnetic Hysteresis Voltage vs Ambient Temperature




Frequency Response



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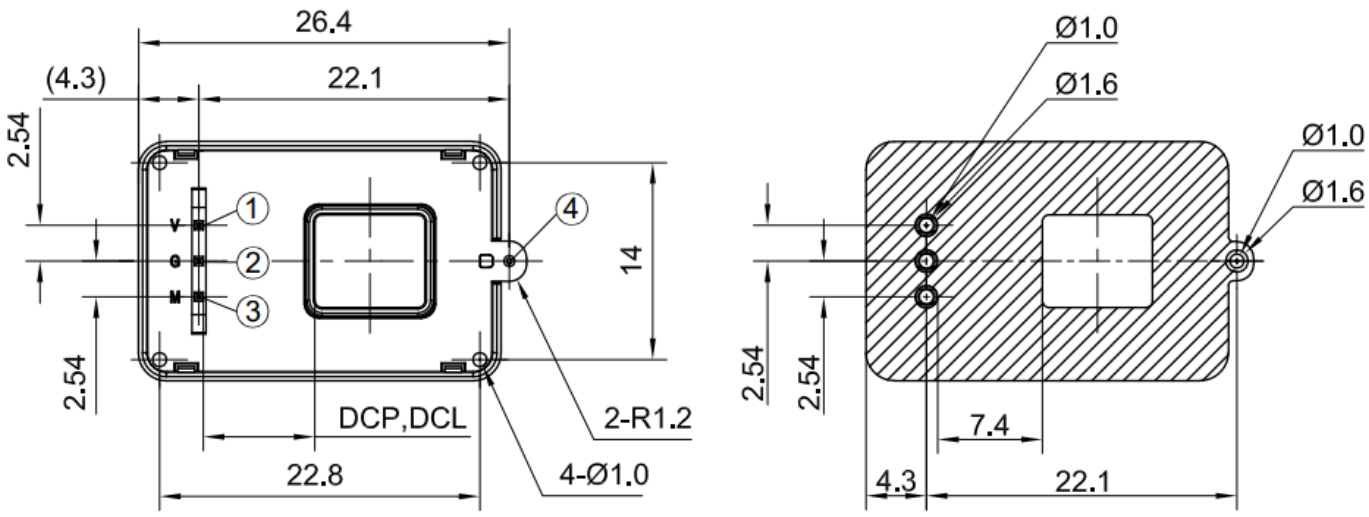
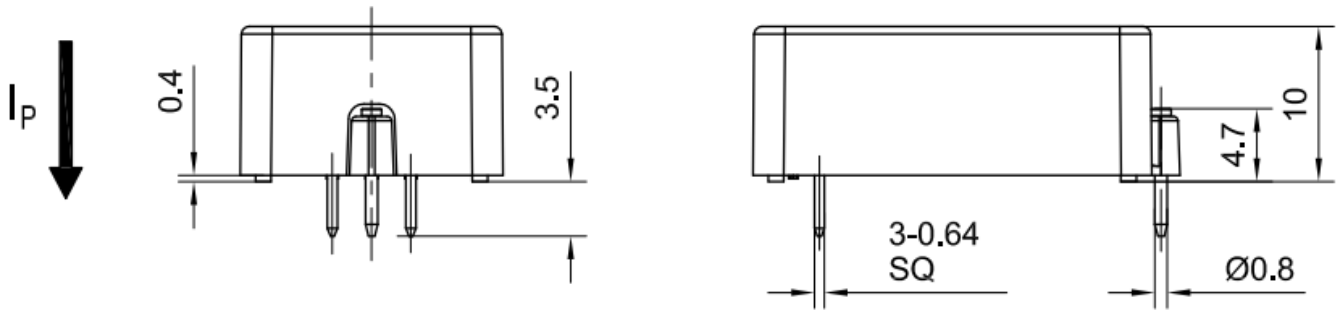
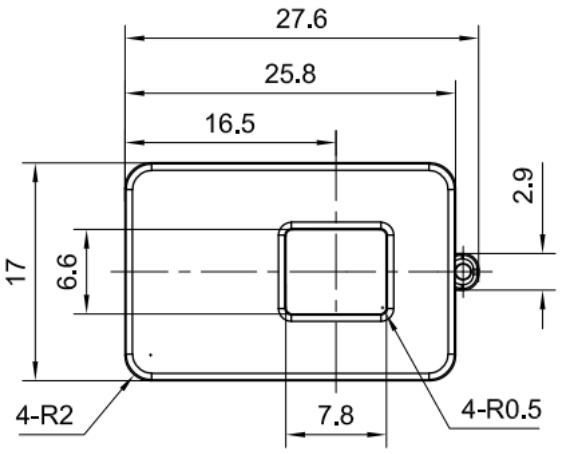
## DIMENSION




PCB layout




| | |
|---|---|
| 1 | $V_{CC}$ |
| 2 | GND |
| 3 | $V_{OUT}$ |
| 4 | NC |



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### 1. General Safety Warnings

- **Intended Use**: This transducer is designed for installation in electrical and electronic systems. It must be used in compliance with applicable international standards, such as **IEC 61010-1**, as well as local regulations and codes.
- **Applicable Standards**: The transducer must be operated according to the Adisens's operating instructions to ensure compliance with relevant safety standards, including:
    - **IEC 61010-1**: Safety requirements for electrical equipment for measurement, control, and laboratory use.
    - **EN 50178**: Safety requirements for electronic equipment for power installations.
- **Installation by Qualified Personnel**: Only qualified professionals, trained in handling high-voltage systems and electrical components, should install, commission, and maintain the transducer. Misuse or incorrect installation may result in electric shock, fire, or severe equipment damage.

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### 2. Electrical Shock Risk

- **Risk of Electric Shock**: This transducer operates in high-voltage environments. It must be handled with care to avoid direct contact with live electrical components. There is a risk of serious injury or death from electric shock if proper precautions are not taken.
- **Limited-Energy Secondary Circuits**: To ensure safe operation, this transducer must be used exclusively within limited-energy secondary circuits, as specified by **IEC 61010-1**, which governs the safe design of electrical circuits to reduce the risk of injury and electrical hazards.
- **Isolation Requirements**: This transducer provides galvanic isolation between the primary (high-power) and secondary (low-power) circuits. However, the device should not be assumed to provide absolute protection against electric shock. Always de-energize circuits before installation or maintenance.

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### 3. Installation Precautions

- **Environmental Conditions**: The transducer is designed to operate in controlled environments. Ensure that the operating temperature, humidity, and surrounding conditions comply with the transducer's specifications provided in the technical datasheet. Avoid exposure to moisture, corrosive environments, or areas prone to electrical interference.
- **Mounting**: Secure the transducer properly in a location that prevents movement or vibration during operation. Improper mounting may cause electrical arcing or contact with live components.
- **Grounding**: Ensure that the transducer is correctly grounded in accordance with the electrical system design. This will help prevent electric shock and improve system safety and performance.



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### 4. Operational Guidelines

- **Operating Limits**: Operate the transducer strictly within the specified voltage, current, and temperature ranges. Overloading the transducer beyond its rated capacity may result in equipment failure or create safety hazards.
- **Routine Maintenance**: Inspect the transducer regularly for signs of wear, damage, or abnormal operation. Discontinue use if any issues are detected and consult the manufacturer for replacement or repair.

### 5. Handling and Storage

- **Handling Precautions**: Avoid direct contact with transducer terminals during handling. Always handle the device with protective gear, including insulated gloves, to avoid accidental electric shock.
- **Storage Conditions**: Store the transducer in a clean, dry, and temperature-controlled environment. Prolonged exposure to harsh conditions may degrade performance and compromise safety.

### 6. Emergency Procedures

- **Power Disconnection**: In case of a malfunction, electrical fault, or other emergency, immediately disconnect the power supply to the transducer and seek professional assistance for inspection and repair.
- **First Aid**: If an electric shock occurs, follow established first aid protocols and seek emergency medical assistance immediately.

### 7. Disposal

- **Environmental Considerations**: Dispose of the transducer according to local regulations for electronic waste. Do not incinerate, and avoid disposing of the device in general waste, as it may contain hazardous materials.

### 8. Manufacturer's Support

For additional information, technical support, or to report any issues with the transducer, please contact un on contact@adisens.fr . Ensure that you have the model number, serial number, and installation details on hand for a prompt response.



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