

Technical Specification

Board Mount Precision Current Transducer: KHTC – 250

The KHTC series is a close loop current sensors is designed for precise electronic measurement of **DC, AC, pulsed, and mixed currents**, providing galvanic isolation between the primary (high-power) and secondary (electronic) circuits.



General Features:

- **Rated Current Range:** 100A, 150A, 200A, 250A.
- **Galvanic Isolation:** Reliable separation between primary and secondary circuits for enhanced safety.
- **Low Power Consumption:** Ideal for energy-efficient applications.
- **Compact Design:** Suitable for environments with limited space.
- **Proportional Output:** Accurate and linear output signal corresponding to the measured current.

Main Applications:

- Power inverters.
- Electric vehicle (EV) power systems.
- Industrial electronics and motor control.
- Renewable energy systems, such as solar panels and wind turbines.

Key Advantages:

- **Exceptional Accuracy:** High linearity ensures reliable measurements in demanding environments.
- **Durability:** Resistant to electromagnetic interference and harsh environmental conditions.
- **Versatility:** Broad compatibility with various electronic system configurations.

Technical Specifications:

- **Supply Voltage:** 5V $\pm 5\%$.
- **Operating Temperature Range:** -40°C to $+85^{\circ}\text{C}$.
- **Isolation Voltage:** Up to 4 kV. At (50 Hz, 1mn)
- **Output Signal:** Analog.

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Features :

- High accuracy
- Excellent linearity
- Low temperature coefficient
- Fast response time
- Galvanic isolation
- RoHS & REACH compliant

Applications:

- Solar inverter
- Direct-current dynamo
- Uninterruptible power supplies (UPS)
- Switched model power supplies (SMPS)
- Variable frequency drive (VFD)

Part Number	Rated nominal current I_{PN} (A)	Measuring Range I_{PM} (A)	Supply Voltage V_{CC} (V)
KHTC-100	100A	±300 A	5 ±5%
KHTC-150	150A	±450 A	5 ±5%
KHTC-200	200A	±500 A	5 ±5%
KHTC-250	250A	±500A	5 ±5%

Parameters Definition and Formula

1) Output Voltage

$$V_{OUT} = V_{OFF} + S \times I_P$$

V_{OUT} stands for current sensor output voltage at given primary current, V_{OFF} stands for offset voltage, S stands for sensitivity, I_P stands for primary current.

2) Accuracy

$$X_G = \max_{I_P \in [-I_{PN}, I_{PN}]} \left(\frac{(V_{OUT} - V_{REF}) - (S \times I_P)}{S \times I_{PN}} \times 100\% \right)$$

I_{PN} stands for nominal primary current.

3) Hysteresis

$$V_{OH} = \max \Delta H$$

ΔH is the maximum residual output current between full scale positive and negative nominal current.

4) Offset Voltage

$$V_{OE} = V_{OUT}(@ I_P = 0) - V_{REF}$$

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- ENVIRONMENTAL AND MECHANICAL CHARACTERISTICS

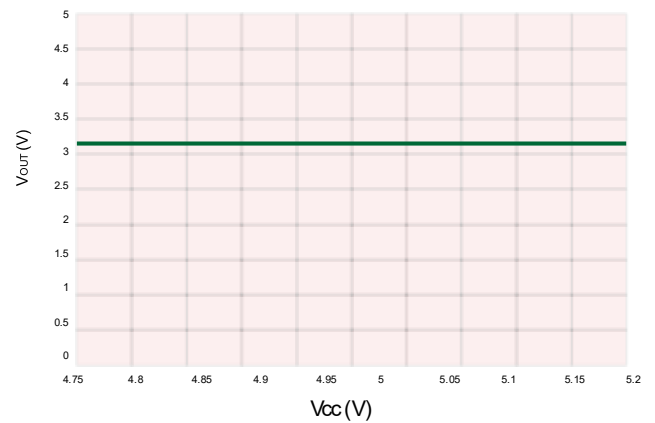
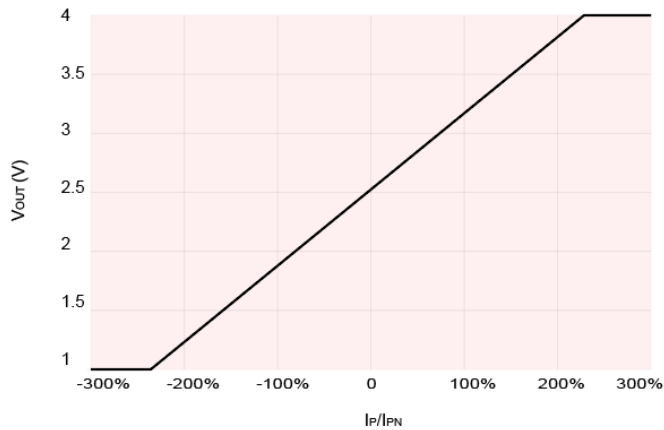
Parameter	Symbol	Min	Typ	Max	Unit
Dielectric Strength	V _D	-	4	-	KV (50Hz, 1mn)
Insulation Resistance	R _{IS}	-	1000	-	MΩ
Creepage Distance	d _{CP}	-	22	-	mm
Clearance	d _{CL}	-	14.5	-	mm
Ambient Operating Temperature	T _A	-40	...	+85	°C
Ambient Storage Temperature	T _{STG}	-50	...	+105	°C
Mass	m	-	85	-	g

- SPECIFICATIONS: T_A = 25°C , V_{CC} = ± 5V , R_L = 10kΩ unless otherwise noted

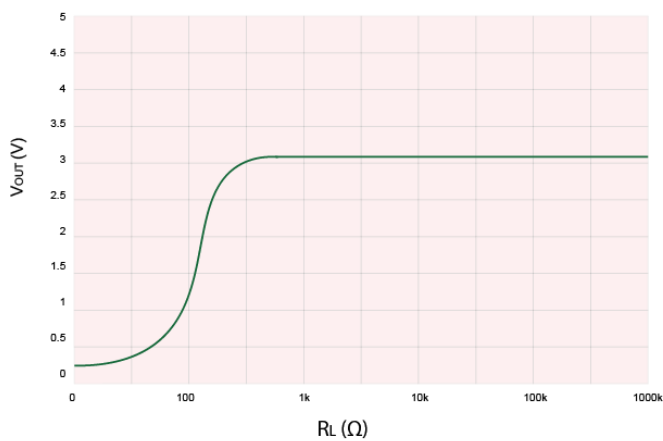
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Primary nominal current	I _{PN}		-	250	-	A
Measurement Range	I _{PM}		-500	-	+500	A
Sensivity	S		-	2.7	-	mV/A
Supply Voltage		± 5%	-	5	-	V
Offset voltage	V _{OFF}		-	2.5	-	V
Accuracy	X _G	I _P = 0 to ±I _{PN}	-0.8	-	+0.8	% I _{PN}
		T _A = 85 °C, I _P = 0 to ±I _{PN}	-1.4	-	+1.4	
Linearity error	ε _L	I _P = 0 to ±I _{PN}	-	±0.15	-	% I _{PN}
Reference Output Voltage	V _{REF}		2.485	2.5	2.515	V
Output Voltage	V _{OUT}	I _P = 0 to ±I _{PM}	-	V _{OFF} + S × I _P	-	V
Current Consumption	I _C	I _P =0	-	16	-	mA
Symmetry	ε _{SYM}	T _A = -40 °C to +85 °C, I _P = 0 to ±I _{PN}	99	100	101	%
Offset Error	V _{OE}	T _A = +25 °C, I _P = 0	-	-	5	mV
Response Time	t _R	di/dt > 50 A/μs, 10% to 90% of I _{PN}	-	1	-	μs
Bandwidth	BW	-3 dB	DC	300	-	kHz

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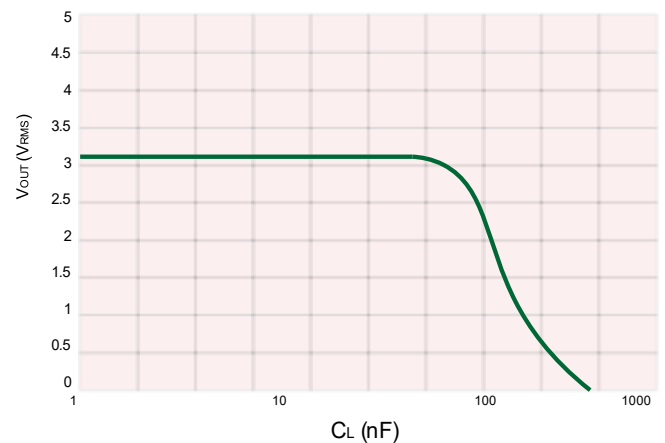
Typical Output Characteristics



Output Voltage vs Primary Current



Output Voltage vs Supply Voltage (@ $I_P=I_{PN}$)

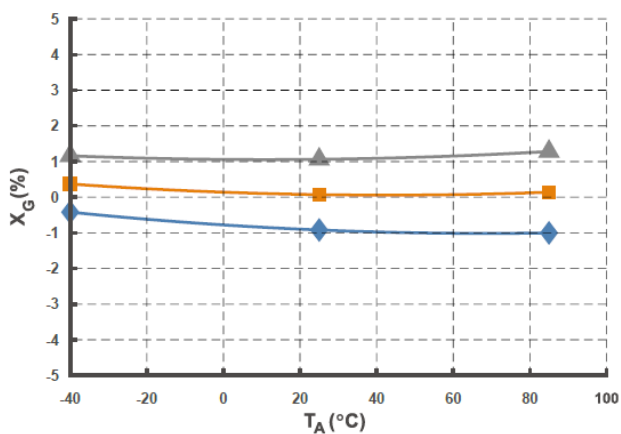


Output Voltage vs Load Resistance (@ $I_P = I_{PN}$)

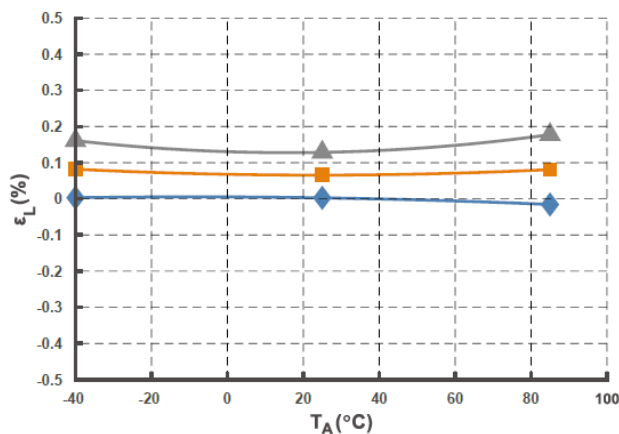
Output Voltage vs Load Capacitance (@ $I_P = I_{PN}$)

Technical Specification

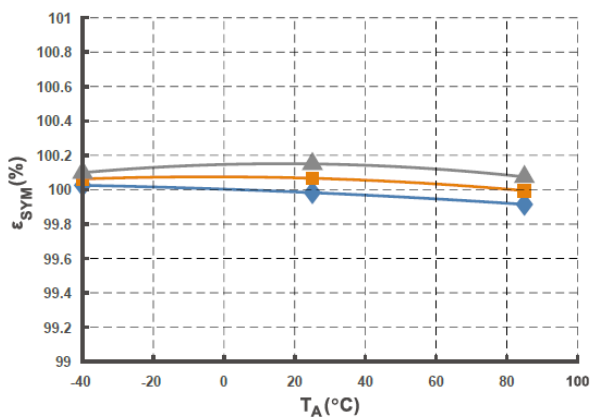
Typical Temperature Characteristics



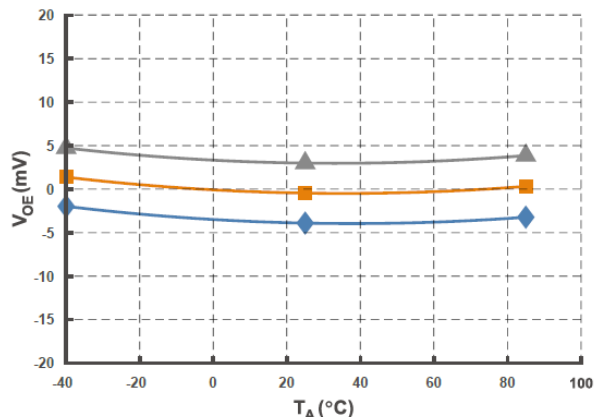
- Accuracy



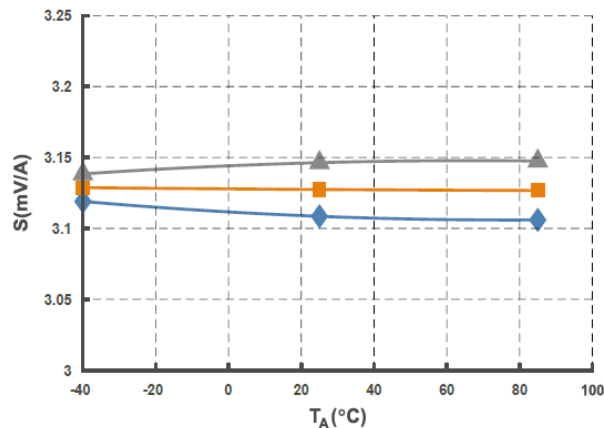
- Linearity Error



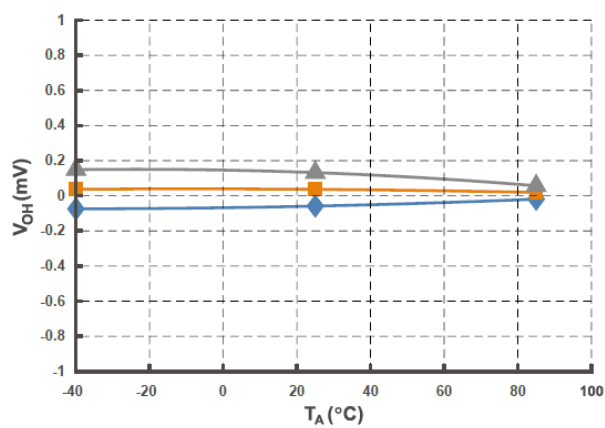
- Symmetry



- Offset Error



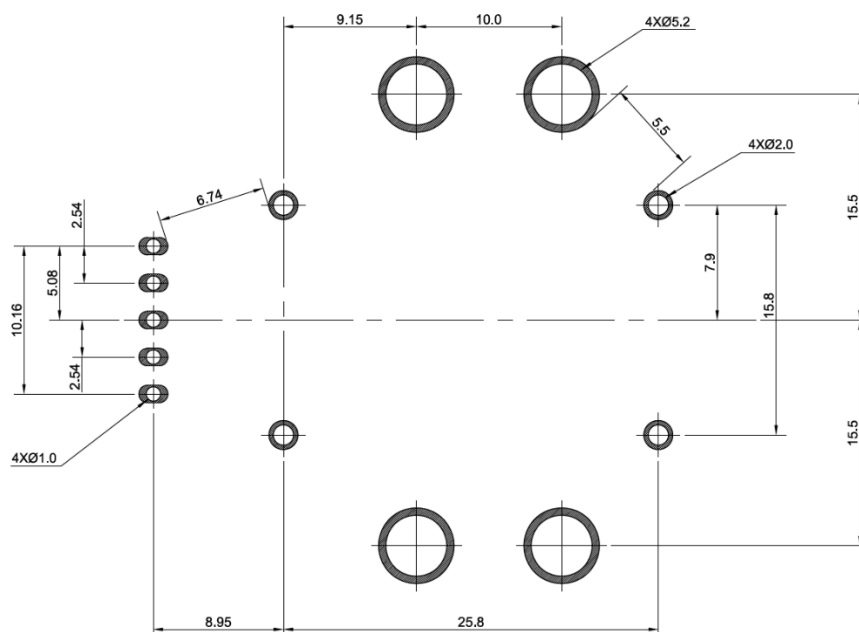
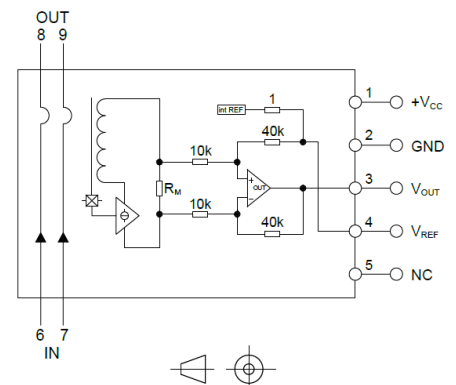
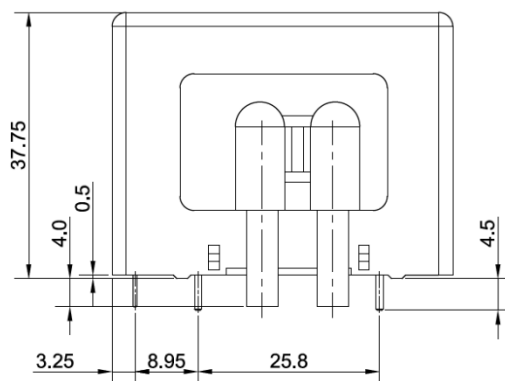
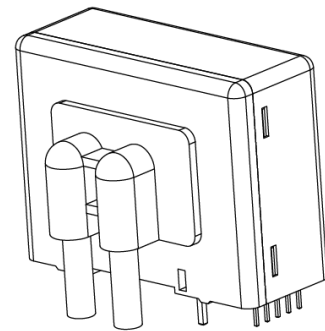
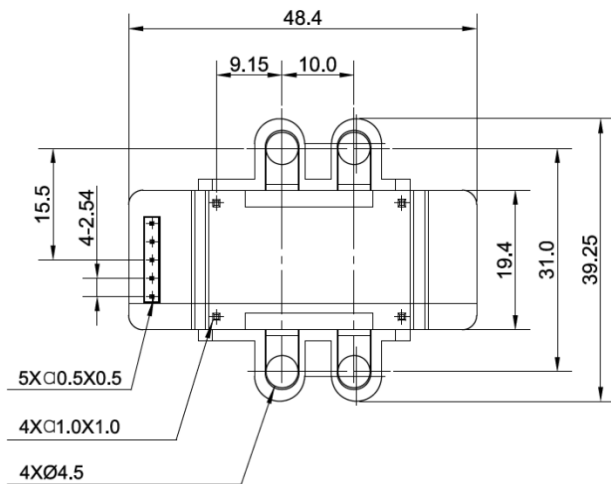
- Sensitivity



- Hysteresis

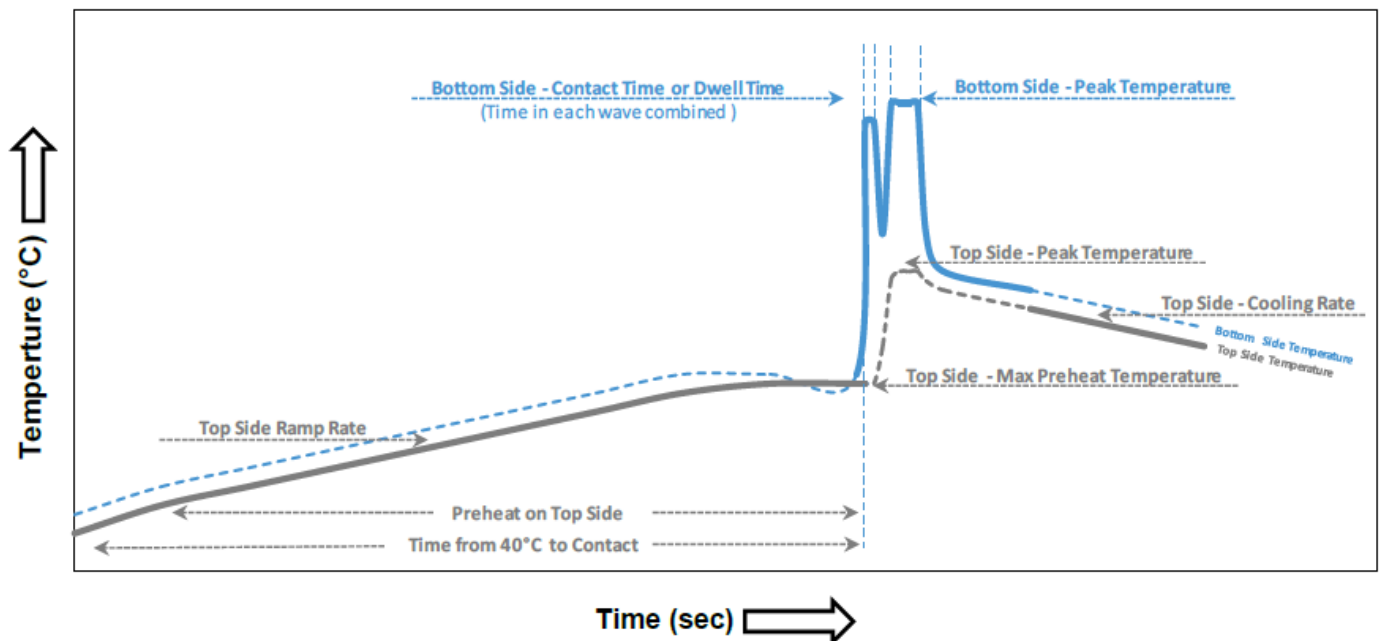
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Dimensions : Unit : mm , Tolerances for scales : ± 1 mm



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- 1) V_{OUT} is positive when the primary current (IP) is in the same direction as the arrow indication on the label and vice versa.
- 2) Improper connection may result in permanent damage of the sensor.
- 3) Wave soldering profile max temperature should be set no higher than 260°C for 10s.
 - a) Preheating spec: 130~160 °C for 60~90s.
 - b) Component through hole legs dwell time in solder wave maximum 10s



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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.

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.

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 us on contact@adisens.fr. Ensure that you have the model number, serial number, and installation details on hand for a prompt response.