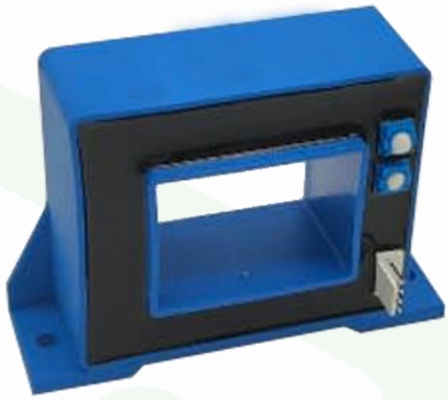
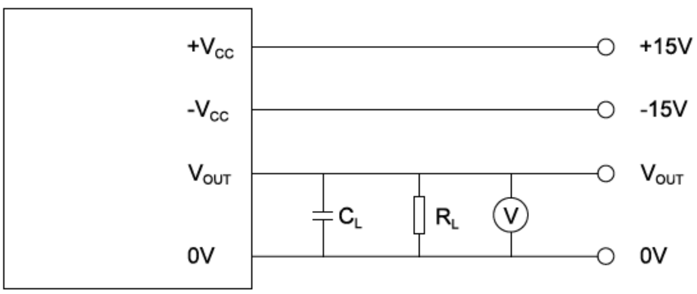
Current Transducer VCS-C-500M3

Features :

- **Low temperature coefficient**
- **Galvanic isolation**
- **High immunity to external interference**
- **Excellent linearity**
- **Light weight design**



The VCS-C-500M3 is an open-loop current sensor designed for the accurate measurement of DC, AC, pulsed currents, and arbitrary waveform currents. It ensures galvanic isolation between the primary and secondary circuits, making it ideal for applications where precision and safety are paramount.
Its rectangular shape allows it to be integrated into the smallest spaces, making it suitable for busbars with dimensions up to 40.5 mm x 30.5 mm.



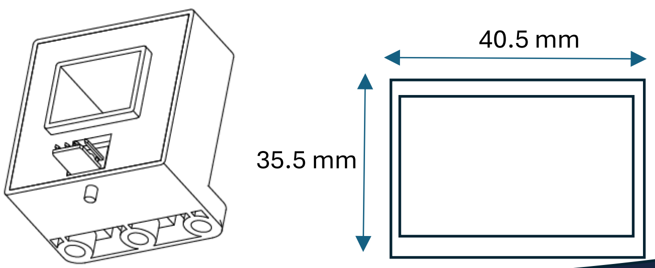
Applications :

- **DC motor drives**
- **Inverter and variable frequency drives (VFD)**
- **Uninterruptible power supplies (UPS)**
- **Power supplies for welding application**
- **Switching power supplies**

Part Number	Primary Nominal Current	Pimary Current Measuring Range
VCS-C-500M3	**500A**	**±1500 A**

Application Domaine:

- Industrial



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SPECIFICATIONS:

T_A = +25°C , V_{CC} = ± 15V , R_L = 10 KΩ , unless otherwise noted

Parameter	Symbol	Condition	Min	Typ	Max	Unit
ELECTRICAL DATA						
Primary nominal r.m.s Current	I_{PN}		-	500	-	A
Primary Current measuring range	I_{PM}		-1500	-	1500	A
Output Voltage	V_{OUT}	V_{OE} + S × I_P	-	±4	-	mV
Sensitivity	S	Ip=0 To ± I_{PN}	-	8.00	-	mV/A
Supply Voltage	Vcc	±5%	-	±15	-	V
Current Consumption	Ic	I_P=0	-	±25/-5	-	mA
Load Resistance	R_L	Ip=0 To ± I_{PN}	1	10	-	KΩ
Load Capacitance	C_L	Ip=0 To ± I_{PN}	-	100	-	pF
STATIC PERFORMANCE DATA						
Linearity Error	ε_L	T_A = -40 °C to +105 °C, I_P = 0 to ±I_{PN}	-	±0.2	-	% I_{PN}
Accuracy	X_G	T_A = +25 °C, I_P = 0 to ±I_{PN}	-1	±0.5	1	% I_{PN}
		T_A = -40 °C to +40 °C, I_P = 0 to ±I_{PN}	-2	±0.5	2	
		T_A = +40 °C to +85 °C, I_P = 0 to ±I_{PN}	-3	-	1	
		T_A = +85 °C to +105 °C, I_P = 0 to ±I_{PN}	-4.5	-	1	
Sensitivity Error	ε_S	T_A = -40 °C to +85 °C, I_P = 0 to ±I_{PN}	-2	-	2	%
Symmetry	ε_{SYM}	T_A = -40 °C to +105 °C, I_P = 0 to ±I_{PN}	99	100	100	%
Hysteresis	V_{OH}	I_P = ±I_{PN} → 0	-10	±5	10	mV
Electric Offset	V_{OE}	T_A = +25 °C, I_P = 0	-20	±10	20	mV
		T_A = -40 °C to +85 °C, I_P = 0	-35	±20	35	
		TA = +85°C to +105 °C,IP= 0	-40	±20	40	
DYNAMIC PERFORMANCE DATA						
Response Time	Tr	di/dt > 50 A/µs, 10% to 90% of IPN		5	-	µs
Bandwidth	BW	-3 dB	DC	25	-	kHz

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2. TYPICAL OUTPUT CHARACTERISTICS

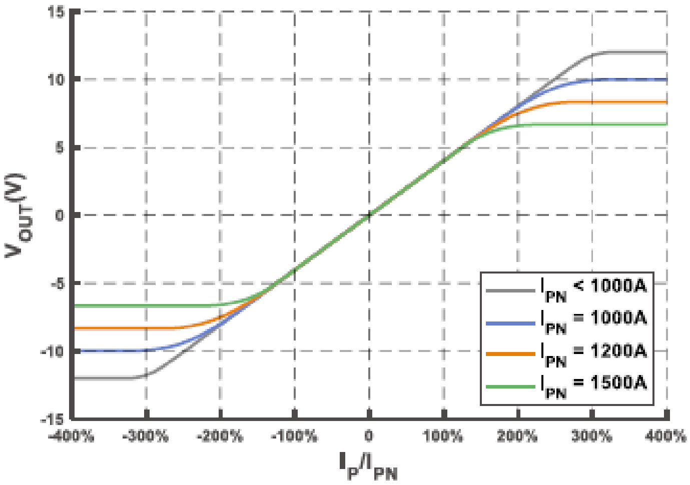

Figure 1. Output Voltage vs Primary Current

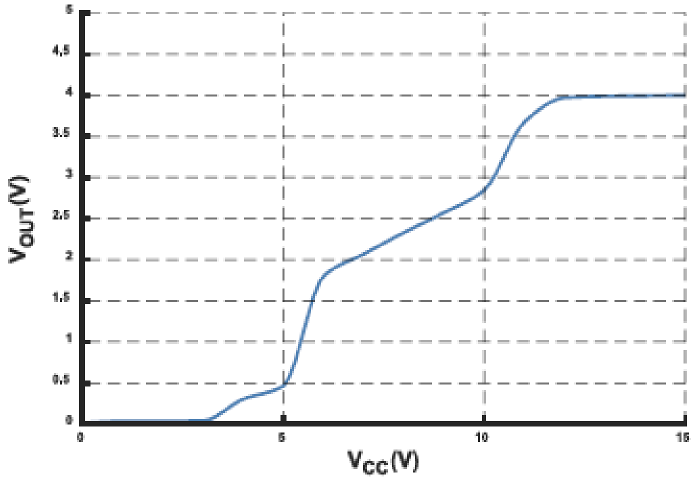

Figure 2. Output Voltage vs Supply Voltage (@$I_P = I_{PN}$)

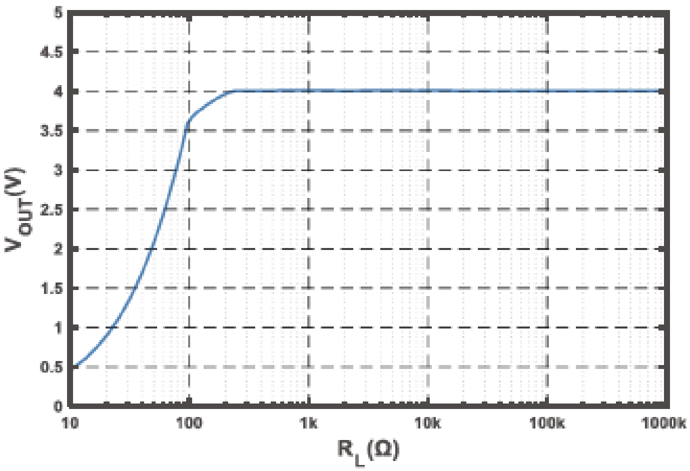

Figure 3. Output Voltage vs Load Resistance (@$I_P = I_{PN}$)

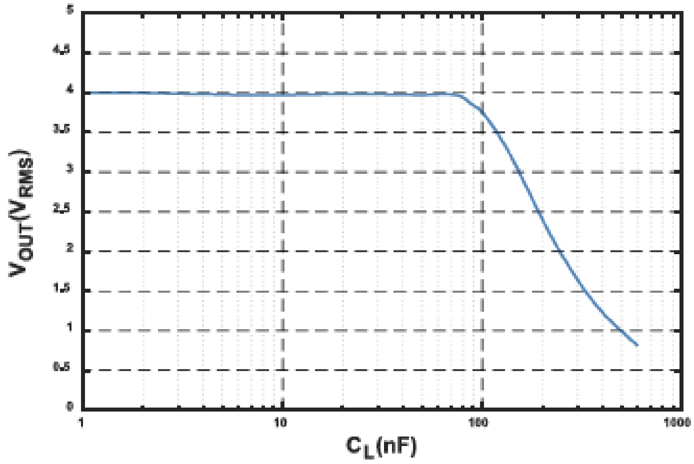

Figure 4. Output Voltage vs Load Capacitance (@$I_P = I_{PN}$)

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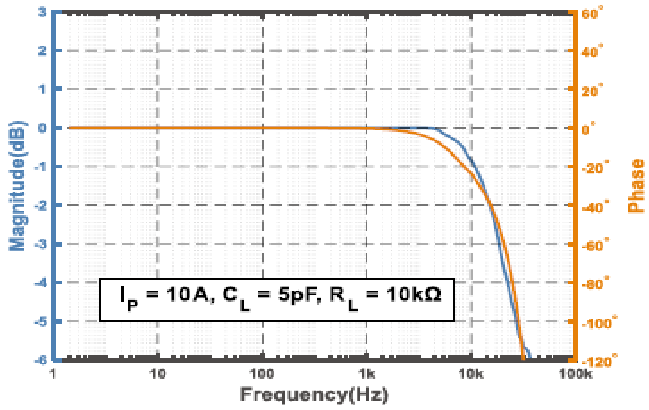

Figure 5. Bode Plot

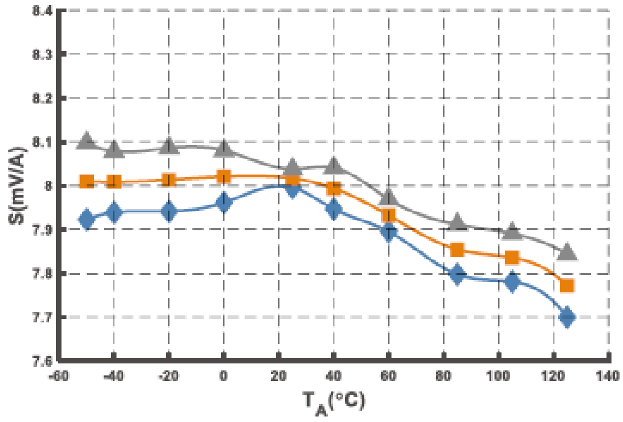

Figure 12. Sensitivity (@I_{PN} = 500 A)

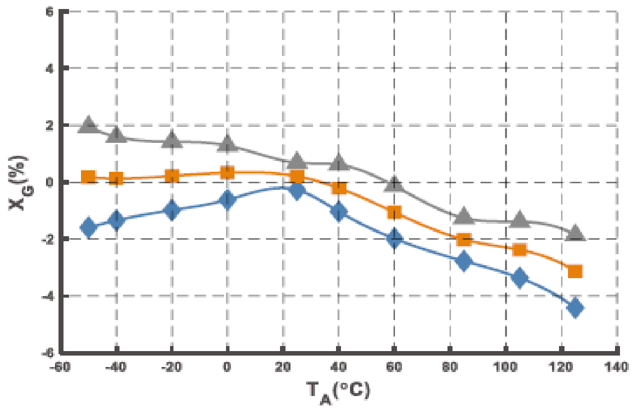

Figure 6. Accuracy

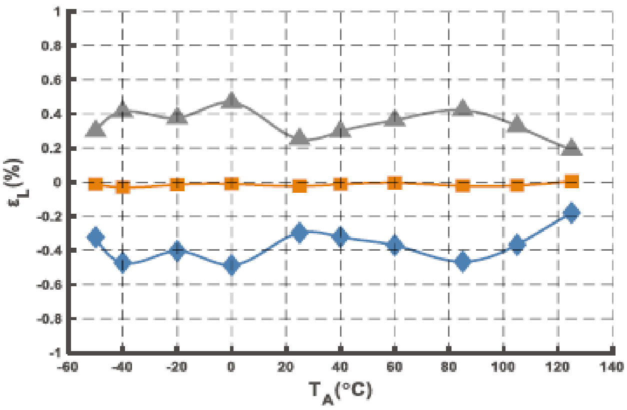

Figure 7. Linearity Error

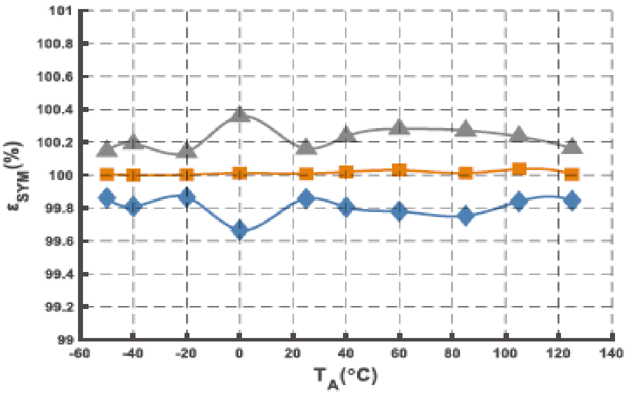

Figure 8. Symmetry

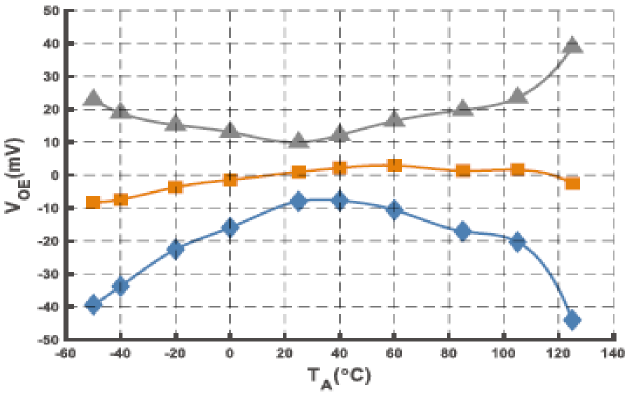

Figure 9. Electric Offset

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4. INSULATION AND ENVIRONMENTAL CHARACTERISTICS

Parameter	Symbol	Typical	Unit
Dielectric Strength	V_D	5	kV(50Hz, 1min)
Insulation Resistance	R_{IS}	1000	MΩ
Creepage Distance	d_{CP}	15	mm
Clearance	d_{CL}	7	mm
Ambient Operating Temperature	T_A	-40 to +105	°C
Ambient Storage Temperature	T_{STG}	-40 to +105	°C
Mass	m	320	g

5. PARAMETERS DEFINITION AND FORMULA

1) Output Voltage:

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

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

2) Accuracy

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

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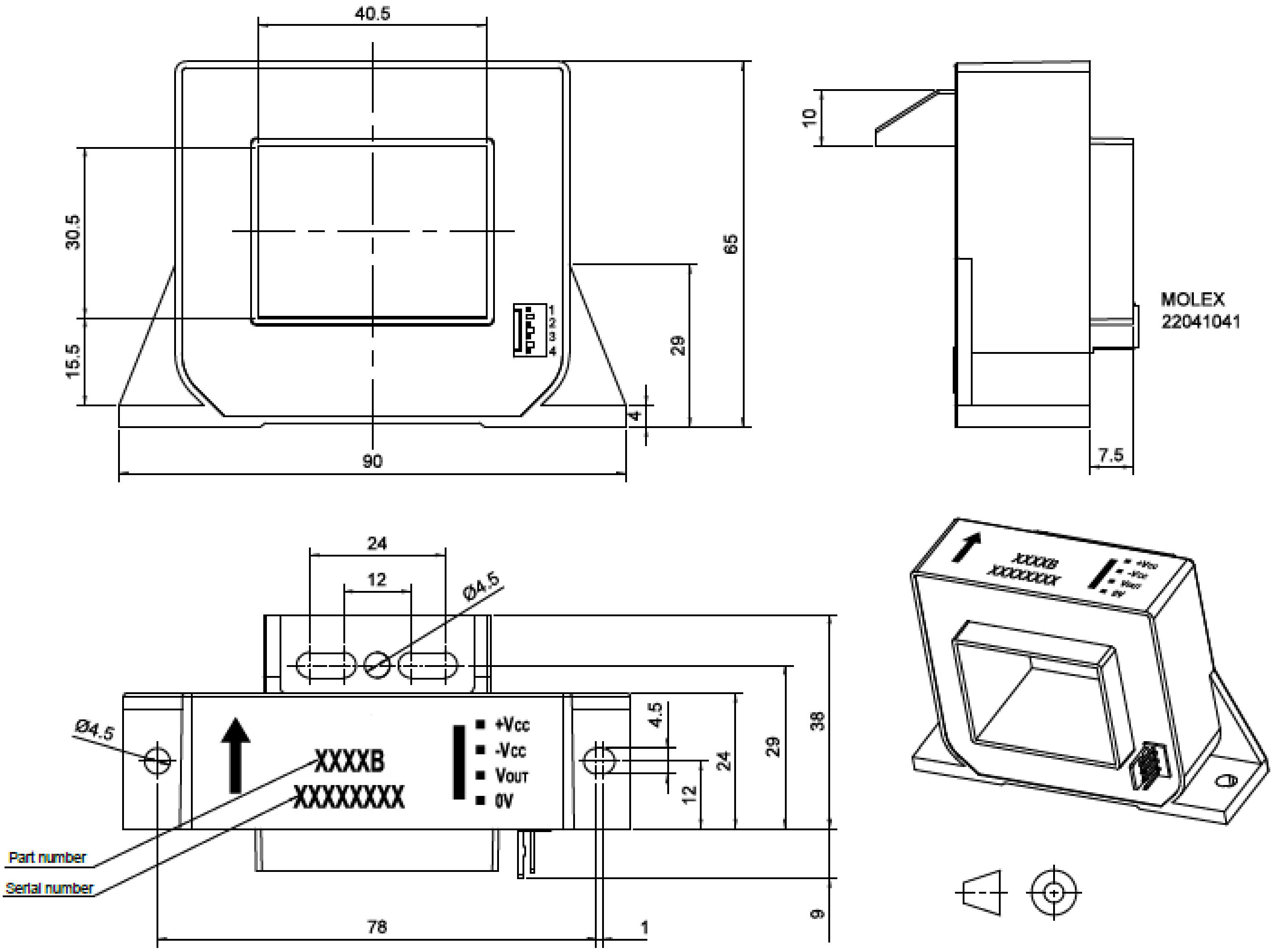
I_{PN} stands for nominal primary current

3) Sensitivity

$$S = \frac{V_{OUT(@ I_{PN})} - V_{OUT(@ -I_{PN})}}{2 \times I_{PN}}$$

$V_{OUT(@ I_{PN})}$ and $V_{OUT(@ -I_{PN})}$ stand for the voltage output at I_{PN} and $-I_{PN}$ respectively.

6. DIMENSIONS



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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

Mounting Recommendation

1. Mounting method: 1 × Φ 4.5 mm hole and 1 × Φ 4.5 mm slotted hole
   2 × M4 copper or SS304 screws (Recommended torque 1.2 N·m) Or
   1 × Φ 4.5 mm hole and 2 × Φ 4.5 mm slotted holes (Fixed to the busbar)
   3 × M4 copper or SS304 screws (Recommended torque 1.2 N·m)

2. Primary through hole dimensions: 40 mm × 30 mm

3. Secondary electrical connection: Molex 22041041 (old PN: Molex 5045-04A)
   Crimp Housing: Molex 22011042
   Crimping Terminal: Molex 08500113

- **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.

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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.

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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.

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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.

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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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