

DESCRIPTION:

The CTH-100 is the Clamp-On (also called Split-Core) current transducer for measurement of DC, AC and pulsed currents, with the galvanic isolation between the primary circuit and the secondary circuit. The CTH product series provides current transducers for the nominal measured currents in the range of 100A to 10kA. The CTH-100 is configured for the nominal measured (primary) current of 100A.

CTH-100 current transducers consist of two parts: transducer head and transducer electronics, connected with the multi-paired shielded cable of up to 10m length.

The transducer head encloses two magnetic split-cores, with the two high resolution Hall sensors for the differential magnetic measurement around the current carrying conductor.

For the elimination of the remanent magnetic field in the split-cores, the CTH-100 utilizes an advanced degaussing (demagnetization) process. A pushbutton is available at the front panel of the transducer for the initialization of the degaussing process. A dedicated LED indicates that the transducer output is not valid (LED is red) during the demagnetization process.



Figure 1: CTH-100 Configuration

FEATURES:

- Measurement of DC, AC and pulsed currents, $I_{PN} = 100$ A (I_{PN} – nominal primary current)
- Frequency bandwidth from DC to 3kHz (total accuracy < 0.1%)
- Clamp-On (Split-Core) for easy installation; the installation does not require an interruption of the primary current circuit
- Closed loop current transducer using the high resolution Hall sensors
- Superior total accuracy <0.1%
- Excellent linearity
- Very small offset
- Very low temperature offset drift in the temperature range of -40°C ÷ +70°C
- Very high immunity to the external interference
- Clean recovery from very high transient overload
- Differential output at BNC connector
- Head aperture diameter (max. conductor diameter) 20mm

TYPICAL APPLICATIONS:

- Power Electronics
- Motor & Generator Control
- Electromechanical Systems
- Battery Charging
- Transit & Off Road Vehicles
- Process Control

 ABSOLUTE MAXIMUM RATINGS ^{(1) (2)}:

In accordance with the absolute maximum rating system (IEC60134).

Symbol	Parameter	Min.	Typ.	Max.	Units	Remarks
T_{stg}	Storage Temperature	-40		+100	°C	
T_{amb}	Ambient Temperature	-40		+70	°C	
T_B	Busbar temperature	-40		+100	°C	

⁽¹⁾ "Absolute Maximum Ratings" indicate the limits beyond which a damage to the device may occur. Operating Ratings indicate the conditions for which the device is functional, but does not ensure the performance limits specified.

⁽²⁾ The output is short-circuit protected.

WARNING: Stresses beyond those listed under "Absolute maximum ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification are not implied. Exposure to absolute maximum rating conditions for extended periods may affect the device reliability.

RECOMMENDED OPERATING CONDITIONS:

Symbol	Parameter	Min.	Typ.	Max.	Units	Remarks
T_{amb}	Ambient Temperature	-40	+25	+70	°C	
V_{ac}	Supply Voltage	90		264	V_{ac}	

ELECTRICAL CHARACTERISTICS:

 At $T_A = 25^\circ\text{C}$, $R_M = 5\Omega$ (built in resistor)

	Symbol	Min.	Typ.	Max.	Units	Conditions
Supply Voltage	V_{SUP}		230		V_{AC}	
Primary nominal current rms	I_{PN}			100	A	
Max. primary current / measurement range	I_{PM}			150	A	
Secondary winding resistance	R_S			13.5	Ω	Each secondary winding
Number of secondary turns	N_S		1000			Each winding
Sensitivity (differential output)	S		10		mV/A	
Electrical offset current	I_{OE}		± 0.05		A	$T=25^\circ\text{C}$
Magnetic offset current due to the core hysteresis	I_{OM}		± 0.02		A	-After $3 \times I_{\text{PN}}$ -The polarity depends on the polarity of I_{PN}
Conductor position	Centre					
Sensitivity error	ϵ_G	-0.10		0.10	% of N_S	$T=25^\circ\text{C}$
Linearity error	ϵ_L	-0.03		0.03	% of I_{PN}	$T=25^\circ\text{C}$
Overall accuracy at I_{PN}	X_C	-0.08		0.08	% of I_{PN}	$T=25^\circ\text{C}$ Note 1
Frequency bandwidth	BW		3		kHz	$X_C < 0.1\%$ of I_{PN}
Conductor position	Out of centre, max. to the cores					
Sensitivity error	ϵ_G	-0.70		0.70	%	$T=25^\circ\text{C}$
Linearity error	ϵ_L	-0.40		0.40	% of I_{PN}	$T=25^\circ\text{C}$
Overall accuracy at I_{PN}	X_C	-0.15		0.15	% of I_{PN}	$T=25^\circ\text{C}$ Note 1
Conductor position	Skewed, max. to the cores (40°)					
Sensitivity error	ϵ_G	-0.85		0.85	%	$T=25^\circ\text{C}$
Linearity error	ϵ_L	-0.85		0.85	% of I_{PN}	$T=25^\circ\text{C}$
Overall accuracy at I_{PN}	X_C	-0.20		0.20	% of I_{PN}	$T=25^\circ\text{C}$ Note 1
External field immunity						
Sensitivity to the external magnetic field	S_E		0.1		% of S	Note 2,3
	S_E		0.1		% of S	Note 2,4

Note:

1 - calculated based on equation (2)

2 - DC current through the external conductor: 100A

3 - See figure 2, a distance between the CTH-100 head and an external conductor is 90mm

4 - See figure 3, no distance between the CTH-100 head and an external conductor

$$X_C = \sqrt{I_{\text{OE}}^2 + (\epsilon_G \cdot \frac{I_{\text{PN}}}{N_S})^2 + (\epsilon_L \cdot \frac{I_{\text{PM}}}{N_S})^2 + I_{\text{OM}}^2} \quad (1)$$

$$X_C (\% \text{ of } I_{\text{PN}}) = 100 \cdot \frac{\sqrt{I_{\text{OE}}^2 + \left(\epsilon_G \cdot \frac{I_{\text{PN}}}{N_S}\right)^2 + \left(\epsilon_L \cdot \frac{I_{\text{PM}}}{N_S}\right)^2 + I_{\text{OM}}^2}}{I_{\text{PN}}} \quad (2)$$

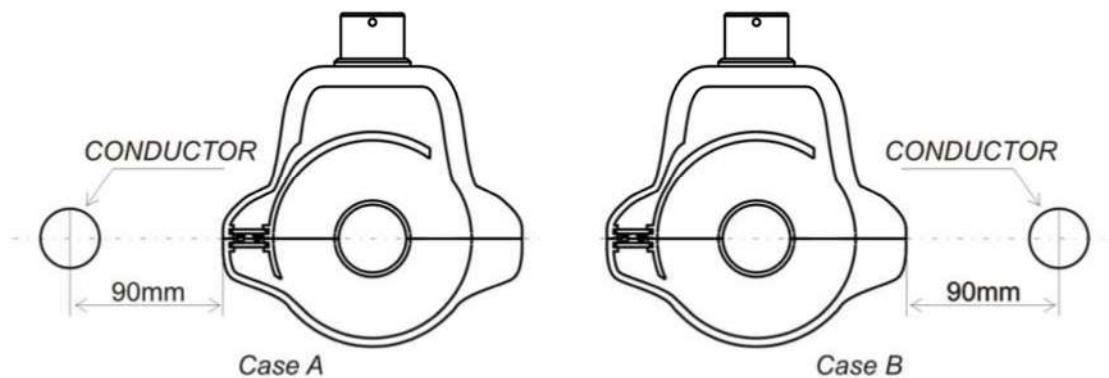


Figure 2: Position of an external conductor (carrying the current of 100A) near the CTH-100 head

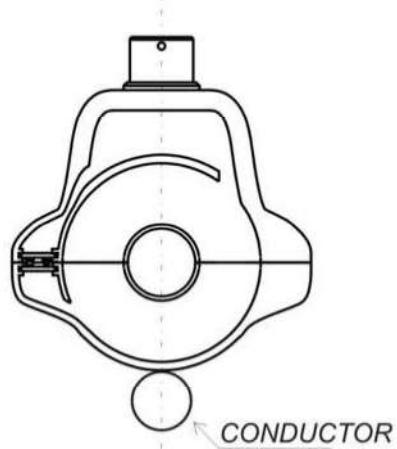


Figure 3: Position of an external conductor (carrying the current of 100A) along the CTH-100 head

DIMENSIONS:

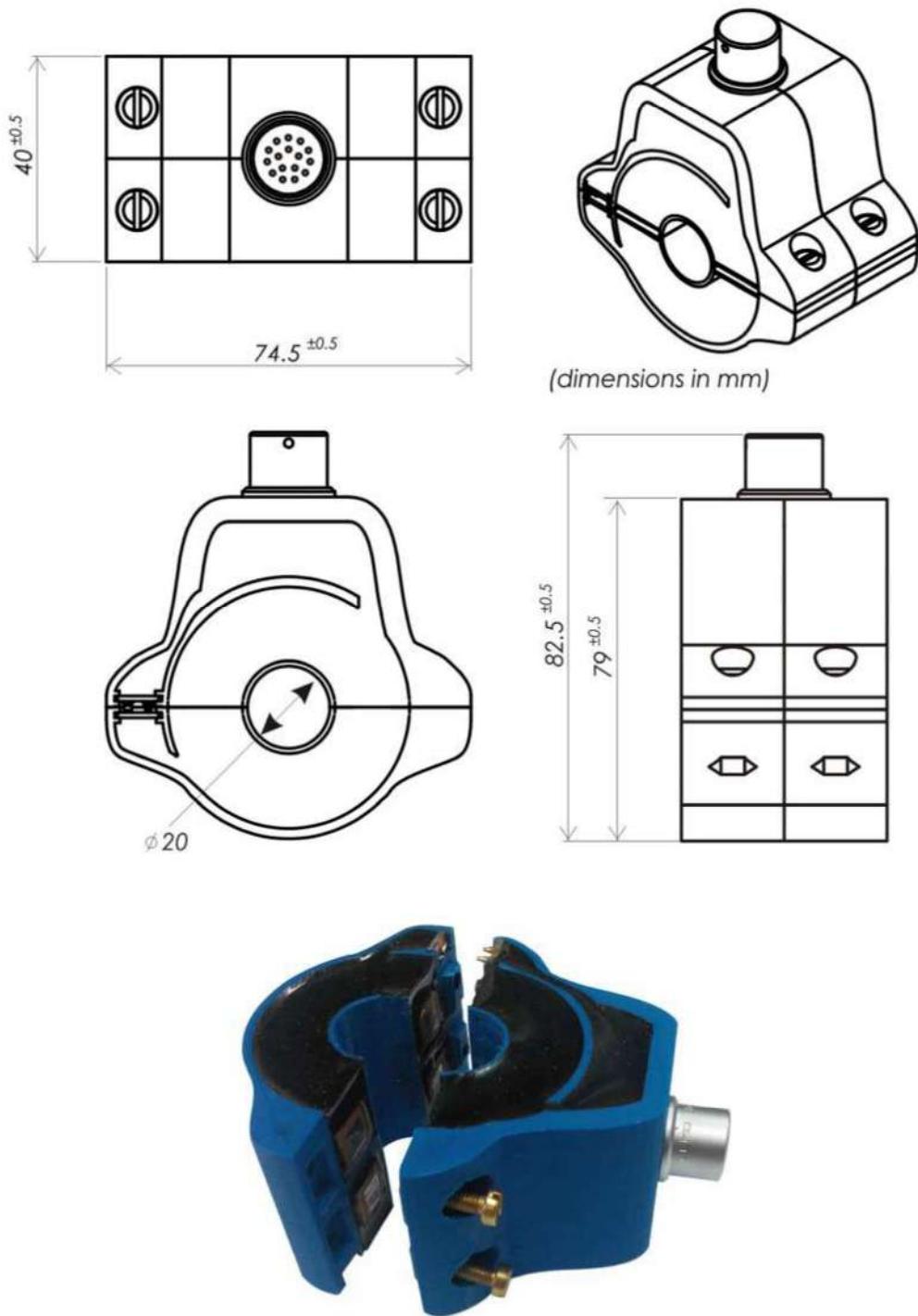


Figure 4: Dimensions of the CTH-100 current sensing head

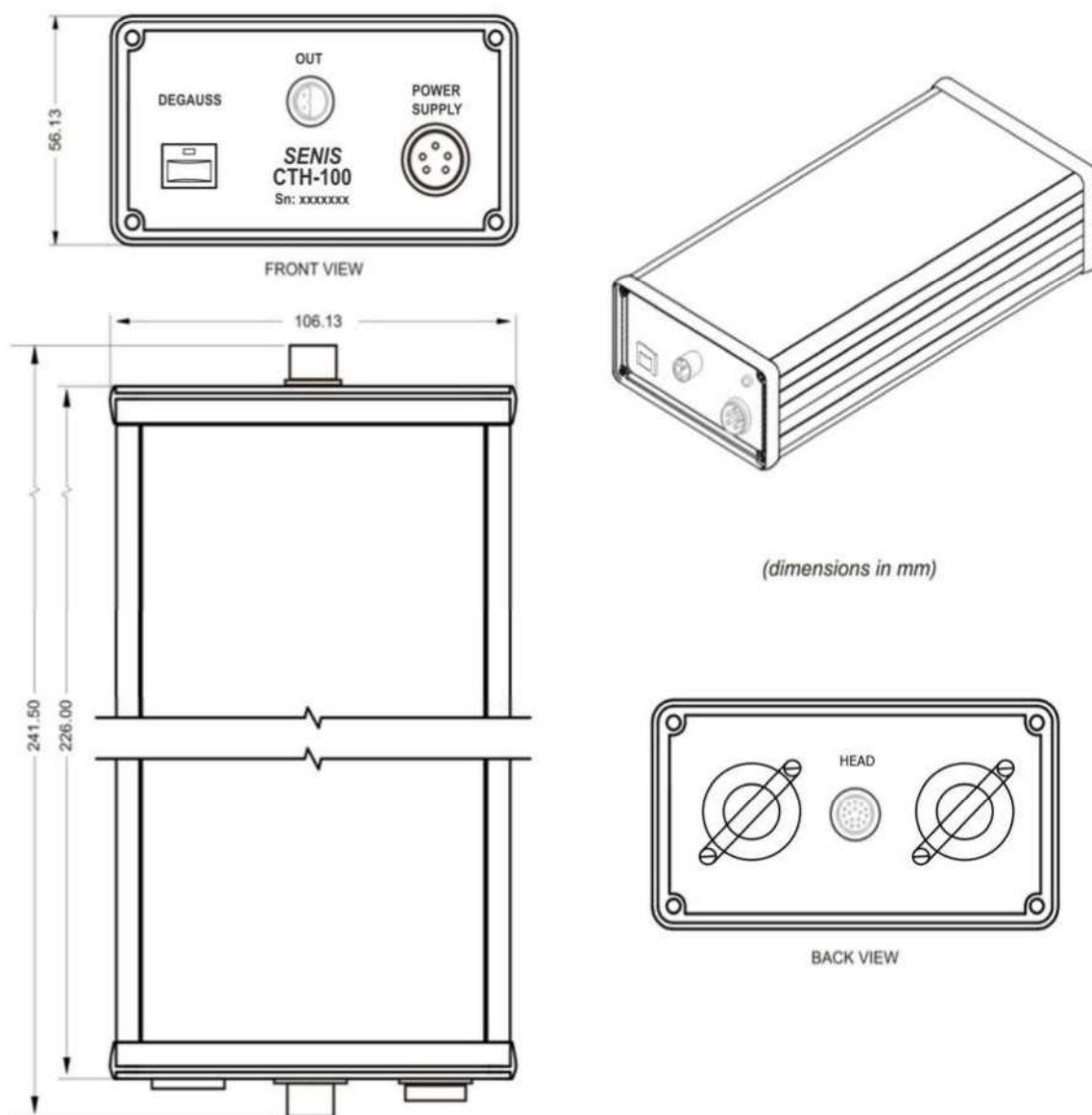


Figure 5: Dimensions of the CTH-100 electronic box

PACKAGING INFORMATION:

Packaging contains:

- CTH-100 transducer head
- CTH-100 transducer electronic box
- Cross connection cable between the head and the electronic box. The standard cable length is 2m (up to 10m can be provided on request)
- Power supply

The product is compliant with EU RoHS directives.