CSM Current Clamp

Type 20 A | 200 A | 500 A | 1,000 A

Product Description

In combination with e.g. AD4 IG1000 measurement modules, CSM Current Clamps allow high-precision current measurements up to ±1,000 A (Type 1,000 A) with sampling rates of up to 1 MHz.

One AD4 IG1000 MiniModule can thereby measure up to four currents simultaneously. Alternatively, up to four voltages can be measured synchronously in the conventional way. This provides the means to perform power measurements as well.

The current clamp used, ensures galvanic isolation between the test configuration and the measurement system. It is therefore also applicable for high-voltage applications.

Keyfeatures

- Integrated supply module
- Ready-to-connect solution for current measurements up to ±1,000 A
- TEDS support according to standard IEEE 1451.4
- High flexibility due to uncomplicated & swift attachment of the sensor
- Applicable for 48 V on-board power supply systems and high-voltage environments

Scope of delivery

- CSM Current Clamp
- Supply module
- Cabling (ready-to-connect)

Technical data

Current clamp

Type designation	20 A_20	200 A_20	500 A_20	500 A_50	1,000 A_50
Technical data valid as of revision	B000				
Nominal current (for permanent operation)	20 A DC or AC RMS	200 A DC or AC RMS	500 A DC or AC RMS	500 A DC or AC RMS	1,000 A DC or AC RMS
Input measurement range [1]	up to ±40 A DC	up to ±400 A DC	up to ±770 A DC	up to ±1,000 A DC	up to ±1,700 A DC
Sensitivity	±100 mV/A	±10 mV/A	±4 mV/A	±4 mV/A	±2 mV/A
Output resistance	50 Ω (±10 Ω)				
Threshold frequency	2 MHz	700 kHz	500 kHz	200 kHz	100 kHz
Maximum cable diameter	20 mm			50 mm	
TEDS support	according to standard IEEE 1451.4				

Error of measurement [2]					
Positioning error of measuring cable	max. ±0.1 % of measured value			max. ±0.2 % of measured value	
Error caused by external magnetic field	max. ±50 mA		max. ±100 mA	max. ±150 mA	
Temperature coefficient	max. ±0.01 %/°C				
Temperature error	max. 1 mA/°C	max. 10 mA/°C	max. ±25 mA/°C		max. 50 mA/°C

Frequency [3]	Amplitude	Phase-error	Amplitude	Phase-error	Amplitude	Phase-error	Amplitude	Phase-error	Amplitude	Phase-error
DC	±0.2 % rdg. ±10 mA	-	±0.2 % rdg. ±40 mA	-	±0.2 % rdg. ±100 mA	-	±0.2 % rdg. ±100 mA	-	±0.2 % rdg. ±200 mA	-
up to 100 Hz	±0.2 % rdg. ±2 mA	±0.1°	±0.2 % rdg. ±20 mA	±0.1°	±0.2 % rdg. ±50 mA	±0.1°	±0.2 % rdg. ±50 mA	±0.1°	±0.2 % rdg. ±100 mA	±0.1°
100 Hz to 500 Hz	±0.3 % rdg. ±4 mA	± 0.2°	±0.3 % rdg. ±40 mA	± 0.2°	±0.3 % rdg. ±100 mA	± 0.2°	±0.3 % rdg. ±100 mA	± 0.2°	±0.5 % rdg. ±200 mA	± 0.2°
500 Hz to 1 kHz	±0.5 % rdg. ±4 mA	±0.5°	±0.5 % rdg. ±40 mA	±0.5°	±0.5 % rdg. ±100 mA	±0.5°	±0.5 % rdg. ±100 mA	±0.5°	±1.0 % rdg. ±200 mA	±0.5°
1 kHz to 5 kHz	±1.0 % rdg. ±4 mA	±1.0°	±1.0 % rdg. ±40 mA	±1.0°	±1.0 % rdg. ±100 mA	±1.0°	±1.0 % rdg. ±100 mA	±(0,5× f kHz)°	±2.0 % rdg. ±200 mA	±(0,7× f kHz)°
5 kHz to 10 kHz	±1.5 % rdg. ±4 mA	±1.5°	±1.5 % rdg. ±40 mA	±1.5°	±1.5 % rdg. ±100 mA	±1.5°	±1.5 % rdg. ±100 mA	±(0,5× f kHz)°	±5.0 % rdg. ±200 mA	±(0,7× f kHz)°
10 kHz to 20 kHz	±2.0 % rdg. ±4 mA	±(0.5+ 0.1 × f kHz)°	±5.0 % rdg. ±40 mA	±(0.5+ 0.1× f kHz)°	±5.0 % rdg. ±100 mA	±(0.15× f kHz)°	±5.0 % rdg. ±100 mA	±(0.5× f kHz)°	±30.0 % rdg. ±200 mA	±(0,7× f kHz)°
20 kHz to 50 kHz	±2.0 % rdg. ±4 mA	±(0.5+ 0.1× f kHz)°	±5.0 % rdg. ±40 mA	±(0.5+ 0.1× f kHz)°	±5.0 % rdg. ±100 mA	±(0.15× f kHz)°	±10.0 % rdg. ±250 mA	±(0.5× f kHz)°	±30.0 % rdg. ±200 mA	±(0,7× f kHz)°

Type designation	20 A_20		200 A_20		500 A_20		500 A_50		1,000 A_50	
Frequency[3]	Amplitude	Phase-error	Amplitude	Phase-error	Amplitude	Phase-error	Amplitude	Phase-error	Amplitude	Phase-error
50 kHz to 100 kHz	±5.0 % rdg. ±10 mA	±(0.5+ 0.1× f kHz)°	±10.0 % rdg. ±100 mA	±(0.5+ 0.1× f kHz)°	±15.0 % rdg. ±250 mA	±(0.15× f kHz)°	±30.0 % rdg. ±250 mA	±(0.5× f kHz)°	-	-
100 kHz to 300 kHz	±10.0 % rdg. ±10 mA	±(0.5+ 0.1× f kHz)°	±15.0 % rdg. ±100 mA	±(0.5+ 0.1× f kHz)°	±30.0 % rdg. ±250 mA	±(0.15× f kHz)°	-	-	-	-
300 kHz to 500 kHz	±15.0 % rdg. ±10 mA	±(0.5+ 0.1× f kHz)°	±30.0 % rdg. ±100 mA	±(0.5+ 0.1× f kHz)°	-		-	-	-	-
500 kHz to 1 MHz	±30.0 % rdg. ±10 mA	±(0.5+ 0.1× f kHz)°	-	-	-		-	-	-	-

Operating and storage conditions		
Operating temperature range	-40 °C to +85 °C	
Relative humidity	up to 80 % (non-condensing)	
Operating altitude	max. 2,000 m above sea level	
Pollution degree	2	
Dimensions (W × H × D)	approx. 153 × 67 × 25 mm	approx. 238 × 116 × 35 mm
Safety	EN 61010-2-032:2012	
EMC	EN 61326-1:2013	
RoHs	EN IEC 63000:2018	

[1] For a duration of max. one minute at an operating temperature from -40 °C to + 40 °C

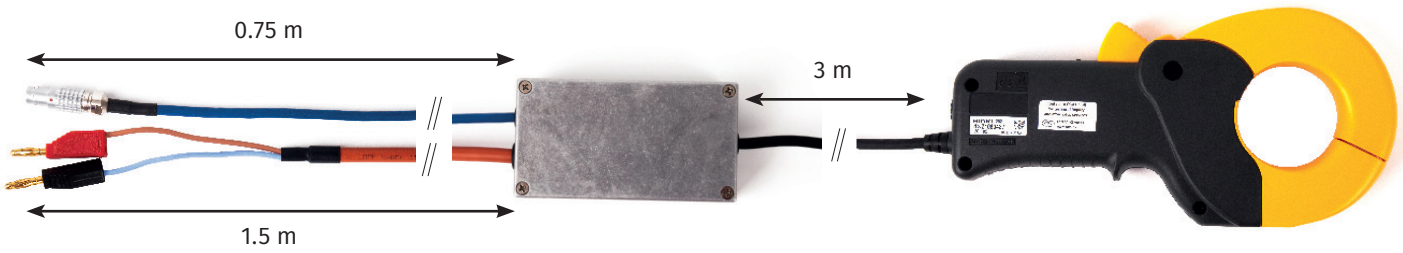
[2] Valid within the operating temperature range of 0 °C to + 40 °C. Please see HIOKI sensor datasheet for further information.

[3] rdg. = reading (of measured value)

Supply module

Type designation	20 A_20	200 A_20	500 A_20	500A_50	1,000 A_50
Power supply	Externally, through U_{Bat} of the vehicle with active reverse polarity protection				
Minimum	10 V DC (-10 %)				
Maximum	32 V DC (+10 %)				
Power consumption					
Maximum	6 W	7.5 W	9 W		
Output voltage	±12 V				
Connectors					
Power supply	Banana plugs				
Output (to measurem. module)	LEMO 1B, 8-pole, code G				
Cable lengths					
to power supply	1.5 m				
to current clamp	3.0 m				
to measurement module	0.75 m				
Measurement range recommended	±5 V (AD4 IG1000 MiniModule)				
Housing					
Operating temperature range	-40 °C to +85 °C				
Protection class	IP65				
Dimensions (W × H × D)	approx. 111 × 60 × 31 mm				

Connection diagram (CSM current clamp)



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ECM AB (Sweden)
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Certified Integrated Quality and Environmental Management System
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- TEDS support according to standard IEEE 1451.4
- High flexibility due to uncomplicated & swift attachment of the sensor
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Shipping content

- CSM Current Clamp
- Supply module
- Cabling (ready-to-connect)

Technical data

Current clamp

Type designation	20 A_20	200 A_20	500 A_20	500 A_50	1,000 A_50
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Sensitivity	±100 mV/A	±10 mV/A	±4 mV/A	±4 mV/A	±2 mV/A
Output resistance	50 Ω (±10 Ω)				
Threshold frequency	2 MHz	700 kHz	500 kHz	200 kHz	100 kHz
Maximum cable diameter	20 mm			50 mm	
TEDS support	according to standard IEEE 1451.4				

Error of measurement[2]					
Positioning error of measuring cable	max. ±0.1 % of measured value			max. ±0.2 % of measured value	
Error caused by external magnetic field	max. ±50 mA		max. ±100 mA	max. ±150 mA	
Temperature coefficient	max. ±0.01 %/°C				
Temperature error	max. 1 mA/°C	max. 10 mA/°C	max. ±25 mA/°C		max. 50 mA/°C

Frequency[3]	Amplitude	Phase-error	Amplitude	Phase-error	Amplitude	Phase-error	Amplitude	Phase-error	Amplitude	Phase-error
DC	±0.2 % rdg. ±10 mA	-	±0.2 % rdg. ±40 mA	-	±0.2 % rdg. ±100 mA	-	±0.2 % rdg. ±100 mA	-	±0.2 % rdg. ±200 mA	-
up to 100 Hz	±0.2 % rdg. ±2 mA	±0.1°	±0.2 % rdg. ±20 mA	±0.1°	±0.2 % rdg. ±50 mA	±0.1°	±0.2 % rdg. ±50 mA	±0.1°	±0.2 % rdg. ±100 mA	±0.1°
100 Hz to 500 Hz	±0.3 % rdg. ±4 mA	± 0.2°	±0.3 % rdg. ±40 mA	± 0.2°	±0.3 % rdg. ±100 mA	± 0.2°	±0.3 % rdg. ±100 mA	± 0.2°	±0.5 % rdg. ±200 mA	± 0.2°
500 Hz to 1 kHz	±0.5 % rdg. ±4 mA	±0.5°	±0.5 % rdg. ±40 mA	±0.5°	±0.5 % rdg. ±100 mA	±0.5°	±0.5 % rdg. ±100 mA	±0.5°	±1.0 % rdg. ±200 mA	±0.5°
1 kHz to 5 kHz	±1.0 % rdg. ±4 mA	±1.0°	±1.0 % rdg. ±40 mA	±1.0°	±1.0 % rdg. ±100 mA	±1.0°	±1.0 % rdg. ±100 mA	±(0,5× f kHz)°	±2.0 % rdg. ±200 mA	±(0,7× f kHz)°
5 kHz to 10 kHz	±1.5 % rdg. ±4 mA	±1.5°	±1.5 % rdg. ±40 mA	±1.5°	±1.5 % rdg. ±100 mA	±1.5°	±1.5 % rdg. ±100 mA	±(0,5× f kHz)°	±5.0 % rdg. ±200 mA	±(0,7× f kHz)°
10 kHz to 20 kHz	±2.0 % rdg. ±4 mA	±(0.5+ 0.1 × f kHz)°	±5.0 % rdg. ±40 mA	±(0.5+ 0.1× f kHz)°	±5.0 % rdg. ±100 mA	±(0.15× f kHz)°	±5.0 % rdg. ±100 mA	±(0.5× f kHz)°	±30.0 % rdg. ±200 mA	±(0,7× f kHz)°
20 kHz to 50 kHz	±2.0 % rdg. ±4 mA	±(0.5+ 0.1× f kHz)°	±5.0 % rdg. ±40 mA	±(0.5+ 0.1× f kHz)°	±5.0 % rdg. ±100 mA	±(0.15× f kHz)°	±10.0 % rdg. ±250 mA	±(0.5× f kHz)°	±30.0 % rdg. ±200 mA	±(0,7× f kHz)°

Type designation	20 A_20		200 A_20		500 A_20		500 A_50		1,000 A_50	
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300 kHz to 500 kHz	±15.0 % rdg. ±10 mA	±(0.5+ 0.1× f kHz)°	±30.0 % rdg. ±100 mA	±(0.5+ 0.1× f kHz)°	-		-	-	-	-
500 kHz to 1 MHz	±30.0 % rdg. ±10 mA	±(0.5+ 0.1× f kHz)°	-	-	-		-	-	-	-

Operating and storage conditions		
Operating temperature range	-40 °C to +85 °C	
Relative humidity	up to 80 % (non-condensing)	
Operating altitude	max. 2,000 m above sea level	
Pollution degree	2	
Dimensions (W × H × D)	approx. 153 × 67 × 25 mm	approx. 238 × 116 × 35 mm

Safety	EN 61010-2-032:2012
EMC	EN 61326-1:2013
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Maximum	32 V DC (+10 %)				
Power consumption					
Maximum	6 W	7.5 W	9 W		
Output voltage	±12 V				
Connectors					
Power supply	Banana plugs				
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Housing					
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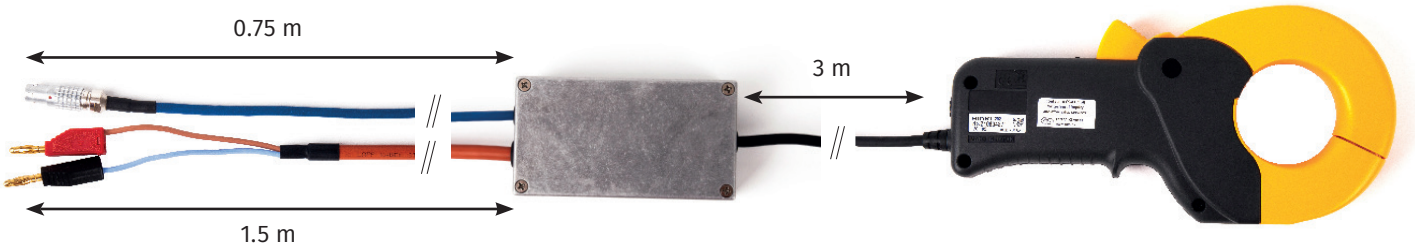
Connection diagram (CSM current clamp)



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