

Current Sensor

Model Number:

CM4A 1000 H03



For the electronic measurement of current: DC, AC, pulsed..., with galvanic insulation between the primary and the secondary circuit.

Features

- ◇ Closed loop (compensated) current sensor using the Hall effect
- ◇ Galvanic insulation between primary and secondary
- ◇ Insulating plastic case recognized according to UL 94-V0
- ◇ Very good linearity
- ◇ High accuracy
- ◇ Very low offset drift over temperature
- ◇ No insertion loss
- ◇ Standards:
 - IEC 60664-1:2020
 - IEC 61800-5-1:2022
 - IEC 62109-1:2010

Applications

- ◇ AC variable speed and servo motor drives
- ◇ Uninterruptible Power Supplies (UPS)
- ◇ Static converters for DC motor drives
- ◇ Switch Mode Power Supplies (SMPS)
- ◇ Power supplies for welding applications
- ◇ Battery management
- ◇ Wind energy inverter
- ◇ Test and detection devices

Safety

This sensor must be used according to IEC 61800-5-1.

This sensor must be used in electric/electronic equipment with respect to applicable standards and safety requirements in accordance with the manufacturer's operating instructions.

Caution, risk of electrical shock!



When operating the sensor, certain parts of the module can carry hazardous voltage (e.g., Primary busbar, power supply). Ignore this warning can lead to injury and/or cause serious damage. This sensor is a built-in device, whose conducting parts must be inaccessible after installation.

A protective housing or additional shield could be used.

Main supply must be able to be disconnected.

Absolute maximum ratings(not operating)

Parameter	Symbol	Unit	Value
Supply voltage	V_C	V	± 25.2
Primary conductor temperature	T_B	°C	100
ESD rating, Human Body Model (HBM)	V_{ESD}	kV	4

✘ Stresses above these ratings may cause permanent damage.

Environmental and mechanical characteristics

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Ambient operating temperature	T_A	°C	-40		85	
Ambient storage temperature	T_S	°C	-45		105	
Mass	m	g		470		

✘ Exposure to absolute maximum ratings for extended periods may degrade reliability.

Insulation coordination

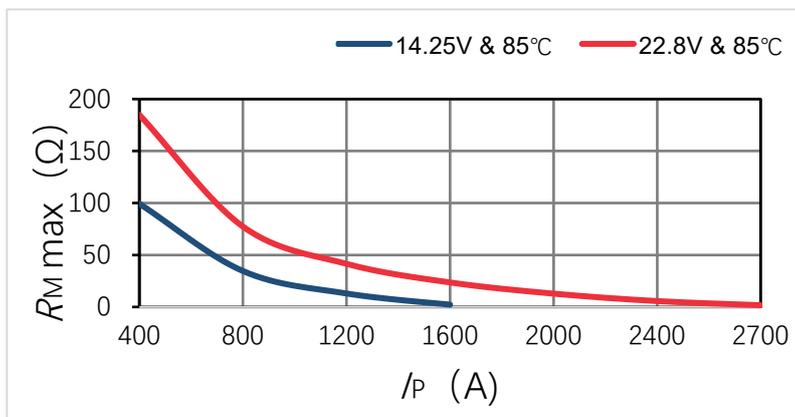
Parameter	Symbol	Unit	Value	Comment
Rms voltage for AC insulation test @ 50Hz, 1min	V_d	kV	4.5	
Impulse withstand voltage 1.2/50µs	V_w	kV	8.4	
Clearance (pri.- sec.)	d_{Cl}	mm	16.6	
Creepage distance (pri.- sec.)	d_{Cp}	mm	17.4	
Comparative tracking index	CTI	PLC	Group I	
Application example	-	-	1000V	Reinforced insulation, according to IEC 61800-5, IEC 62109-1
Application example	-	-	1500V	Basic insulation, according to IEC 61800-5, IEC 62109-1

Electrical data

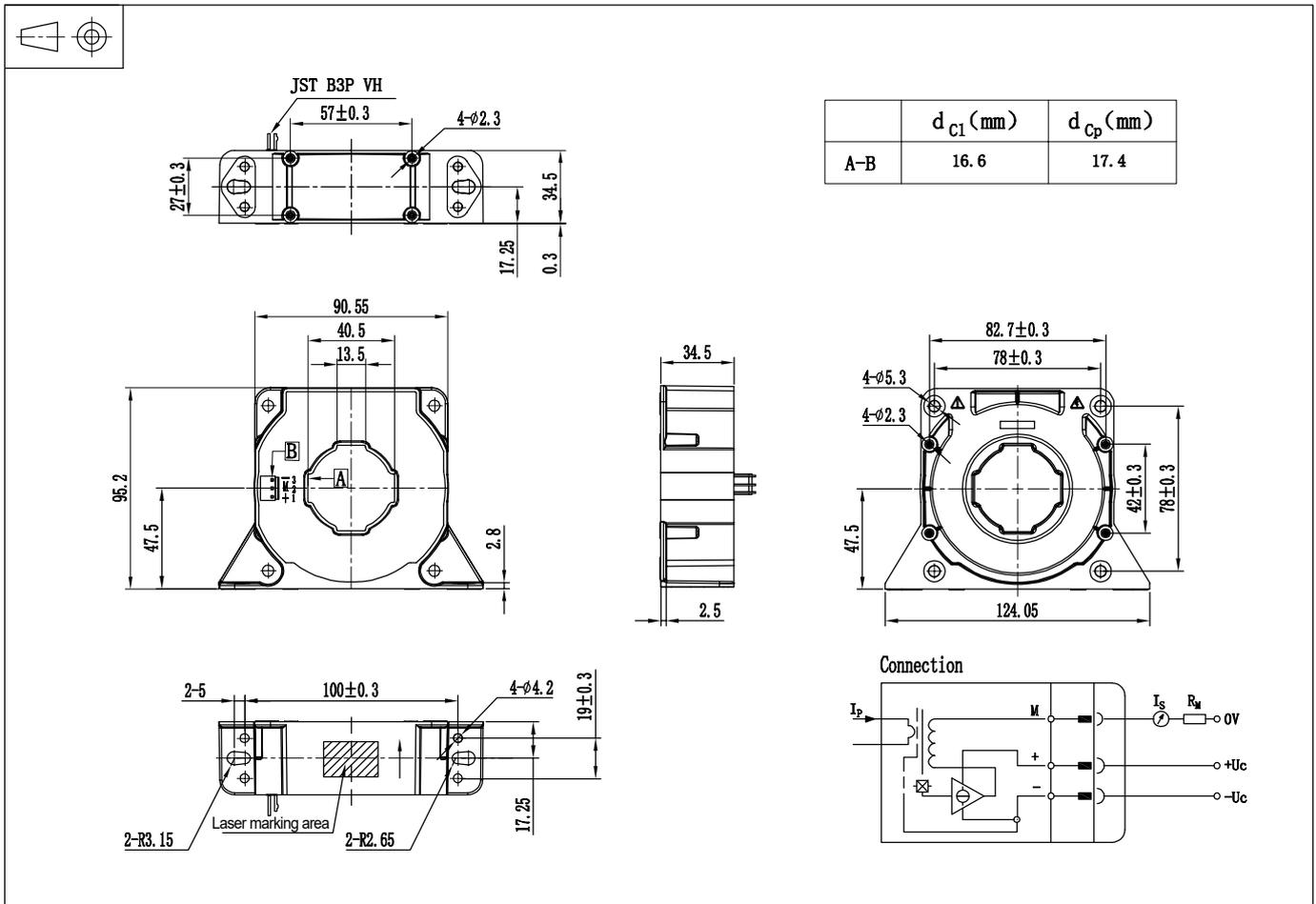
※ With $T_A = 25^\circ\text{C}$, $V_C = \pm 24\text{V}$, $R_M = 20\Omega$, unless otherwise noted.

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal rms current	I_{PN}	A	-1200		1200	
Primary current, measuring range	I_{PM}	A	-1800		1800	
Measuring resistance	R_M	Ω	-	-	-	$V_C = \pm 24\text{V}; T_A = +85^\circ\text{C};$ $R_M = 1\Omega$ For other details, please check Figure 1.
Secondary nominal rms current	I_{SN}	mA	-300		300	
Secondary coil resistance	R_S	Ω			23.2	$R_S(T_A) = R_S \times (1 + 0.004 \times (T_A + \Delta\text{temp} - 25))$ Estimated temperature rise@ I_{PN} is $\Delta\text{temp} = 15^\circ\text{C}$
Secondary current, measuring range	I_S	mA	-450		450	
Number of secondary turns	N_S	-		4000		
Theoretical sensitivity	G_{th}	mA/A		0.25		
Supply voltage	V_C	V	± 15	± 24		@ $\pm 5\%$
Current consumption	I_C	mA		$40 + I_S$		
Offset current	I_O	mA	-0.2		0.2	
Thermal drift of offset current	I_{OT}	mA	-0.5		0.5	@ $-40^\circ\text{C} \sim 85^\circ\text{C}$
Residual current@ $I_P=0$ after I_{PN}	I_{OM}	mA	-0.1		0.1	
Sensitivity error	\mathcal{E}_G	%	-0.2		0.2	Exclusive of I_{OE}
Linearity error 0... I_{PN}	\mathcal{E}_L	% of I_{PN}	-0.1		0.1	Exclusive of I_{OE}
Accuracy@ I_{PN}	X	% of I_{PN}	-0.3		0.3	Exclusive of I_{OE}
Response time@ 90% of I_{PN}	t_r	μs			1	
Frequency bandwidth(-1dB)	BW	kHz			150	

Figure 1:



Dimensions (in mm. 1 mm = 0.0394 inch)



Mechanical characteristics

- ◇ General tolerance ± 0.5 mm
- ◇ Primary hole $\Phi 38$ mm
- or
- ◇ Sensor vertical fastening 40 mm x 13 mm
2pc $\Phi 5.3$ mm through hole
2pc M5 metal screw

- Recommended fastening torque 1.2 N•m ($\pm 10\%$)
- or
- Recommended fastening torque 4pc $\Phi 4.2$ mm through hole
4pc M4 metal screw
1.2 N•m ($\pm 10\%$)

- ◇ Connection of secondary JST B3P VH
- ◇ Sensor horizontal fastening 4pc $\Phi 5.3$ mm through hole
4pc M5 metal screw

- Recommended fastening torque 1.2 N•m ($\pm 10\%$)

Remarks

- ◇ When I_p flows in the direction of arrow, the current output is positive.
- ◇ Temperature of primary conductor should not exceed 100°C .
- ◇ Dynamic performances (di/dt and response time) are best with a single bar completely filling the primary hole.

This is a standard model. For different applications (measurement, secondary connections...), please contact CHIPSENSE.