

## TECHNICAL DATASHEET

## EMT-50CP4

Product Code : 10700050031200001

Board-mount precision current sensor, open-loop Hall-effect, digitally calibrated and compensated

The EMT-50CP4 is a board-mount precision current sensor powered by a high-sensitivity, programmable Hall IC, factory-calibrated and compensated through software to ensure high accuracy in the measurement of DC, AC and pulsed currents up to 50 A. It provides galvanic isolation between the primary and secondary circuits.

Part of the ADISENS EM-EMT-EMK series (through-hole primary conductor terminals, 4-pin EMT pinout), it delivers a proportional analog output voltage centred on a 2.5 V offset, with a measuring range of  $\pm 150$  A and support for 1, 2 or 3 primary turns for range scaling.

**50 A**

Rated nominal current

 **$\pm 150$  A**

Measuring range

**4 kV**

Dielectric strength

 **$< 2 \mu\text{s}$** 

Typ. response time

## ENGINEERING VALUE

**Galvanic isolation** — reliable separation between primary and secondary circuits.

**Low temperature coefficient and excellent linearity** — typical linearity error 0.3% of IPN, accuracy  $\pm 1\%$  at 25°C.

**Fast response time** — typ.  $< 2 \mu\text{s}$  reaction and step-response time, 250 kHz bandwidth.

**Good dv/dt immunity and extended measuring range** for unipolar measurement.

## BEST-FIT APPLICATIONS

**Motor drives** — AC variable speed and servo motor drives, static converters for DC motor drives.

**Power supplies** — switched-mode power supplies (SMPS), UPS, welding power supplies.

**Photovoltaic inverters** — DC/AC solar inverter stages for photovoltaic power-conversion systems.

**Energy** — battery-supplied applications.

## Compliance and warranty markings

**RÖHS**  
COMPLIANT

Standards:

IEC 61010-1

EN 50178

## Electrical and performance data

Condition:  $V_{CC} = 5.0\text{ V}$ ,  $N_P = 1$ ,  $R_L = 10\text{ k}\Omega$ ,  $T_A = 25^\circ\text{C}$ , unless specified.

| Parameter                       | Symbol  | Condition                                         | Min. | Typ.             | Max. | Unit          |
|---------------------------------|---------|---------------------------------------------------|------|------------------|------|---------------|
| Primary nominal current         | IPN     | -                                                 | -    | 50               | -    | A             |
| Measurement range               | IPM     | -                                                 | -150 | -                | 150  | A             |
| Supply voltage                  | VCC     | -                                                 | 4.75 | 5                | 5.25 | V             |
| Consumption current             | IC      | -                                                 | -    | 15+IP            | -    | mA            |
| Current turns                   | NP      | -                                                 | -    | 1, 2, 3          | -    | -             |
| Offset voltage                  | VOFF    | Output @ 0 A                                      | 2.48 | 2.5              | 2.52 | V             |
| Electrical offset voltage       | VOE     | 100% tested, $V_{OUT}-V_{REF}$ @ 0 A              | -    | 5                | -    | mV            |
| Output voltage @ IPN            | VFS     | -                                                 | -    | $VOFF \pm 0.625$ | -    | V             |
| Output voltage @ IPM            | VFSM    | -                                                 | -    | $VOFF \pm 1.875$ | -    | V             |
| Theoretical sensitivity         | Gth     | 0.625 V @ IPN                                     | -    | 12.5             | -    | mV/A          |
| Linearity error, 0 to IPN       | $\xi_L$ | Tested @ $25^\circ\text{C}$                       | -    | 0.3              | -    | % of IPN      |
| Reaction time @ 10% of IPN      | tra     | -                                                 | -    | <2               | -    | $\mu\text{s}$ |
| Step response time @ 90% of IPN | tr      | -                                                 | -    | <2               | -    | $\mu\text{s}$ |
| Bandwidth                       | BW      | -3 dB                                             | -    | 250              | -    | kHz           |
| Noise, DC–10 kHz / DC–100 kHz   | Vnoise  | -                                                 | -    | 5 / 6            | -    | mVpp          |
| Accuracy @ RT                   | X       | @ $25^\circ\text{C}$                              | -1   | -                | 1    | % of IPN      |
| Accuracy                        | X       | $T_A = -40^\circ\text{C}$ to $+105^\circ\text{C}$ | -1.5 | -                | 1.5  | % of IPN      |

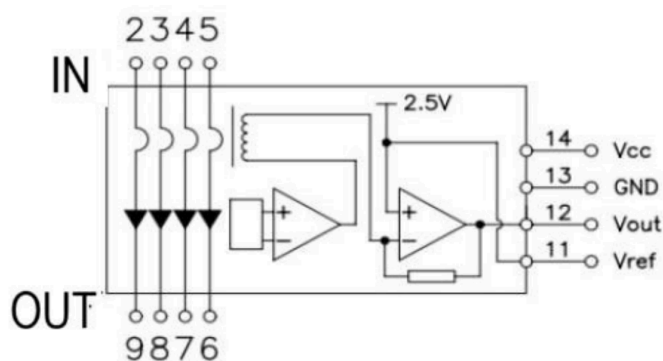
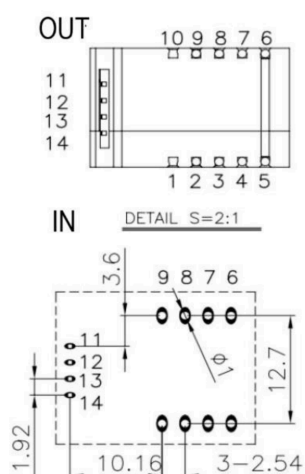
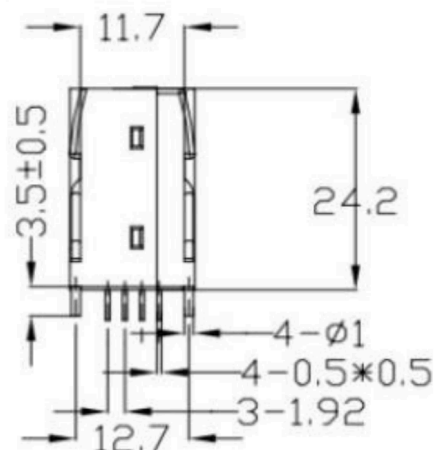
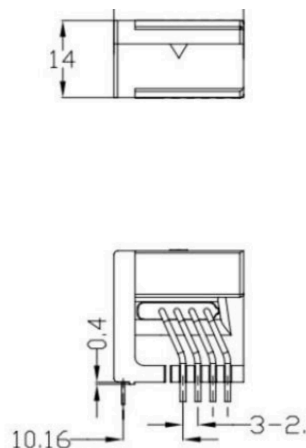
## Isolation, environmental and mechanical characteristics

| Parameter                                                | Symbol | Value        | Unit             | Comment                                           |
|----------------------------------------------------------|--------|--------------|------------------|---------------------------------------------------|
| Impulse withstand isolation voltage 1.2/50 $\mu\text{s}$ | VW     | 6            | kV               | -                                                 |
| Dielectric strength                                      | VD     | 4            | kV               | AC 50 Hz / 1 min                                  |
| Clearance                                                | dCL    | 9.5          | mm               | Shortest distance through air                     |
| Creepage distance                                        | dCP    | 9.5          | mm               | Shortest path along the body                      |
| Electrical clearance                                     | dCe    | 6.1          | mm               | When mounted on PCB with recommended layout (EMT) |
| Case material                                            | -      | UL94-V0      | -                | -                                                 |
| Operating temperature                                    | TA     | -20 ... +105 | $^\circ\text{C}$ | -                                                 |
| Storage temperature                                      | TSTG   | -40 ... +125 | $^\circ\text{C}$ | -                                                 |
| Mass                                                     | m      | 13           | g                | -                                                 |

| Ordering information |                   |                                 |
|----------------------|-------------------|---------------------------------|
| Part number          | Product code      | Rated current / measuring range |
| EMT-50CP4            | 10700050031200001 | 50 A / $\pm 150\text{ A}$       |

The specified measurement performance is achieved only when the sensor is used within the stated electrical, thermal and load conditions.

## Mechanical dimensions and connections



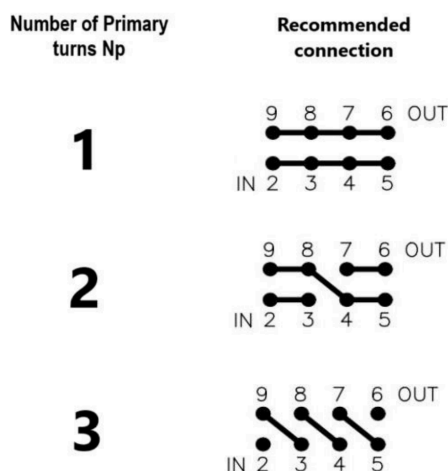
All dimensions are in millimetres. Board-mount package, primary conductor pin pitch 10.16 mm, secondary pin pitch 2.54 mm. Package outline and secondary-pin arrangement are shared across the EM-15/25/50, EMT-15/25/50 and EMK-15/25/50/75 calibres within the EMT pinout.

### Pin definition (EMT pinout, 4-pin primary)

| Pin no.    | Pin name | Description                                                    |
|------------|----------|----------------------------------------------------------------|
| 2, 3, 4, 5 | IN       | Primary conductor terminal, input side                         |
| 6, 7, 8, 9 | OUT      | Primary conductor terminal, output side                        |
| 11         | VREF     | Reference output voltage, 2.5 V typ.                           |
| 12         | VOUT     | Analog output voltage, $V_{OUT} = V_{OFF} + G_{th} \times I_P$ |
| 13         | GND      | Supply and signal ground (0 V)                                 |
| 14         | VCC      | Positive supply voltage, +5 V $\pm 5\%$                        |

## Number of primary turns and recommended connection

The primary current path can be routed for 1, 2 or 3 turns ( $N_p$ ) to extend the effective measuring range downward, by connecting the primary IN/OUT pins as shown below.



## Installation essentials

- Primary routing:** connect the primary conductor across the IN/OUT pins listed above; for 2 or 3 primary turns, route the conductor through the additional IN/OUT pin pairs as shown in the recommended-connection table, to extend the effective downward measuring range.
- Supply and output:** connect VCC/GND per pin definition; the analog output VOUT is referenced to VREF and centred on the VOFF offset voltage.
- Load:** the output stage is characterized with  $R_L = 10\text{ k}\Omega$ ; do not load VOUT beyond the specified conditions.
- Grounding:** ensure correct grounding of the secondary circuit in accordance with the electrical system design, to prevent electric shock and improve system safety and performance.

## Safety, compliance and quality information

### Safety information

The EMT-50CP4 is a component intended for installation in electrical and electronic systems by qualified personnel, in compliance with applicable international standards such as IEC 61010-1 and local regulations. This transducer operates in high-voltage environments and 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. It must be used exclusively within limited-energy secondary circuits as specified by IEC 61010-1. Galvanic isolation between primary and secondary circuits does not provide absolute protection against electric shock — always de-energize circuits before installation or maintenance.

### Compliance and environmental information

| Subject           | Information                                                                                                                                                           |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Electrical safety | Designed for integration into equipment assessed to applicable electrical-safety requirements, including IEC 61010-1, EN 50178 where relevant to the end application. |
| Materials         | Moulded plastic housing, UL94-V0. Further product material and flammability information is available from ADISENS on request.                                         |
| CE                | EU conformity information and the applicable Declaration of Conformity are available from ADISENS on request.                                                         |
| RoHS / REACH      | RoHS & REACH compliant. Product environmental declarations are available from ADISENS on request.                                                                     |
| Disposal          | Dispose of the product in accordance with local requirements for electrical and electronic equipment. Do not incinerate.                                              |

### Three-year commercial warranty



ADISENS provides a three-year commercial warranty from the date of delivery, subject to the applicable ADISENS warranty terms and conditions. The warranty does not cover incorrect wiring, operation outside specified ratings, unsuitable environmental exposure, unauthorized modification, mechanical damage or improper system integration.

### Document identification and control

| Document reference | Revision | Issue date     | Language | Product code      |
|--------------------|----------|----------------|----------|-------------------|
| FT-EMT-50CP4       | V1.0     | September 2026 | English  | 10700050031200001 |

*This document is maintained under the ADISENS quality-management document-control process. Always verify that the revision used is the latest version available from ADISENS. Specifications may be updated as part of continuous product improvement. The customer remains responsible for confirming suitability for the intended application.*