

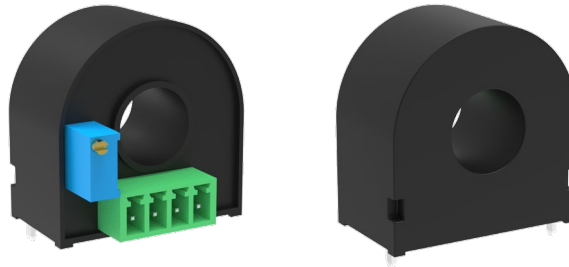
## Current Sensor

### Model Number

FR7V 0.005 H00

FR7V 0.01 H00

FR7V 0.20 H00



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

### Features

- ✧ Current sensor based on fluxgate technology
- ✧ Output voltage
- ✧ Insulating plastic case recognized according to UL 94-V0
- ✧ High accuracy
- ✧ Very low zero temperature drift
- ✧ Standards:
  - IEC 60664-1:2020
  - IEC 61800-5-1:2022
  - IEC 62109-1:2010

### Applications

- ✧ Residual current measurement
- ✧ Photovoltaic inverter (no transformer type) leakage current measurement
- ✧ Leakage protection of photovoltaic arrays
- ✧ Detects leakage of stacked DC power supplies
- ✧ Failure mode detection of current sources
- ✧ Symmetrical fault detection (e.g. at inverter output)

## Safety

The sensor must be used according to IEC61800--5-1.

The sensor must be used in electric/electronic equipment with respect to applicable standards and safety requirements in accordance with the following manufacture'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                  | $\pm 18$ |
| Primary conductor temperature | $T_B$  | $^{\circ}\text{C}$ | 100      |

✘ Stresses above these ratings may cause permanent damage.

## Environmental and mechanical characteristics

| Parameter                     | Symbol | Unit               | Min | Typ | Max | Comment |
|-------------------------------|--------|--------------------|-----|-----|-----|---------|
| Ambient operating temperature | $T_A$  | $^{\circ}\text{C}$ | -10 |     | 70  |         |
| Ambient storage temperature   | $T_S$  | $^{\circ}\text{C}$ | -40 |     | 85  |         |
| Mass                          | $m$    | g                  |     | 28  |     |         |

✘ 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   | 3          |                                                                           |
| Clearance(Pri.-sec.)                           | $d_{Cl}$ | mm   | 7.2        |                                                                           |
| Creepage distance(Pri.-sec.)                   | $d_{Cp}$ | mm   | 7.2        |                                                                           |
| Comparative traking index                      | $CTI$    | PLC  | Group IIIa |                                                                           |
| Application example                            | -        | -    | 300V       | Reinforced insulation, according to IEC 61800-5-1, IEC 62109-1CATIII, PD2 |
| Application example                            | -        | -    | 600V       | Basic insulation, according to IEC 61800-5-1, IEC 62109-1CATIII, PD2      |

## Electrical data

## FR7V 0.005 H00

※ With  $T_A = 25^\circ\text{C}$ ,  $V_C = \pm 12\text{V}$ , output voltage reference  $R_L = 10\text{k}\Omega$ . Unless otherwise noted,

| Parameter                                        | Symbol          | Unit       | Min      | Typ       | Max      | Comment              |
|--------------------------------------------------|-----------------|------------|----------|-----------|----------|----------------------|
| Primary nominal residual current effective value | $I_{PN}$        | mA         |          | $\pm 5$   |          |                      |
| Primary residual current measuring range         | $I_{PM}$        | mA         | -7       |           | 7        |                      |
| Supply voltage                                   | $V_C$           | V          | $\pm 12$ |           | $\pm 15$ | @5%                  |
| Current consumption                              | $I_C$           | mA         |          |           | 25       | @ $I_{PN}=0\text{A}$ |
| Nominal output voltage                           | $V_{OUT}$       | V          |          | $\pm 5$   |          |                      |
| Load resistance                                  | $R_L$           | k $\Omega$ | 10       |           |          |                      |
| Theoretical sensitivity                          | $G_{th}$        | V/A        |          | 1000      |          |                      |
| Temperature of G                                 | $TCG$           | mV/k       |          | $\pm 1.5$ |          | @-10°C~70°C          |
| Electrical offset voltage                        | $V_{OE}$        | mV         | -50      | $\pm 20$  | 50       |                      |
| Temperature coefficient of $V_{OE}@I_P=0$        | $TCV_{OE}$      | mV/k       |          | $\pm 1.5$ |          | @-10°C~70°C          |
| Linearity error 0... $I_{PN}$                    | $\varepsilon_L$ | %          | -1       | $\pm 0.5$ | 1        |                      |
| Accuracy@ $I_{PN}$                               | $X$             | %          | -1       | $\pm 0.5$ | 1        |                      |
| Response time@ 90% of $I_{PN}$                   | $t_r$           | ms         |          | 500       |          |                      |
| Frequency bandwidth                              | $BW$            | kHz        |          | DC        |          |                      |

## Electrical data

## FR7V 0.01 H00

※ With  $T_A = 25^\circ\text{C}$ ,  $V_C = \pm 12\text{V}$ , output voltage reference  $R_L = 10\text{k}\Omega$ . Unless otherwise noted,

| Parameter                                        | Symbol          | Unit       | Min      | Typ       | Max      | Comment              |
|--------------------------------------------------|-----------------|------------|----------|-----------|----------|----------------------|
| Primary nominal residual current effective value | $I_{PN}$        | mA         |          | $\pm 10$  |          |                      |
| Primary residual current measuring range         | $I_{PM}$        | mA         | -17      |           | 17       |                      |
| Supply voltage                                   | $V_C$           | V          | $\pm 12$ |           | $\pm 15$ | @5%                  |
| Current consumption                              | $I_C$           | mA         |          |           | 25       | @ $I_{PN}=0\text{A}$ |
| Nominal output voltage                           | $V_{OUT}$       | V          |          | $\pm 5$   |          |                      |
| Load resistance                                  | $R_L$           | k $\Omega$ | 10       |           |          |                      |
| Theoretical sensitivity                          | $G_{th}$        | V/A        |          | 1000      |          |                      |
| Temperature of G                                 | $TCG$           | mV/k       |          | $\pm 1.5$ |          | @-10°C~70°C          |
| Electrical offset voltage                        | $V_{OE}$        | mV         | -50      | $\pm 20$  | 50       |                      |
| Temperature coefficient of $V_{OE}@I_P=0$        | $TCV_{OE}$      | mV/k       |          | $\pm 1.5$ |          | @-10°C~70°C          |
| Linearity error 0... $I_{PN}$                    | $\varepsilon_L$ | %          | -1       | $\pm 0.5$ | 1        |                      |
| Accuracy@ $I_{PN}$                               | $X$             | %          | -1       | $\pm 0.5$ | 1        |                      |
| Response time@ 90% of $I_{PN}$                   | $t_r$           | ms         |          | 500       |          |                      |
| Frequency bandwidth                              | $BW$            | kHz        |          | DC        |          |                      |

## FR7V 0.20 H00

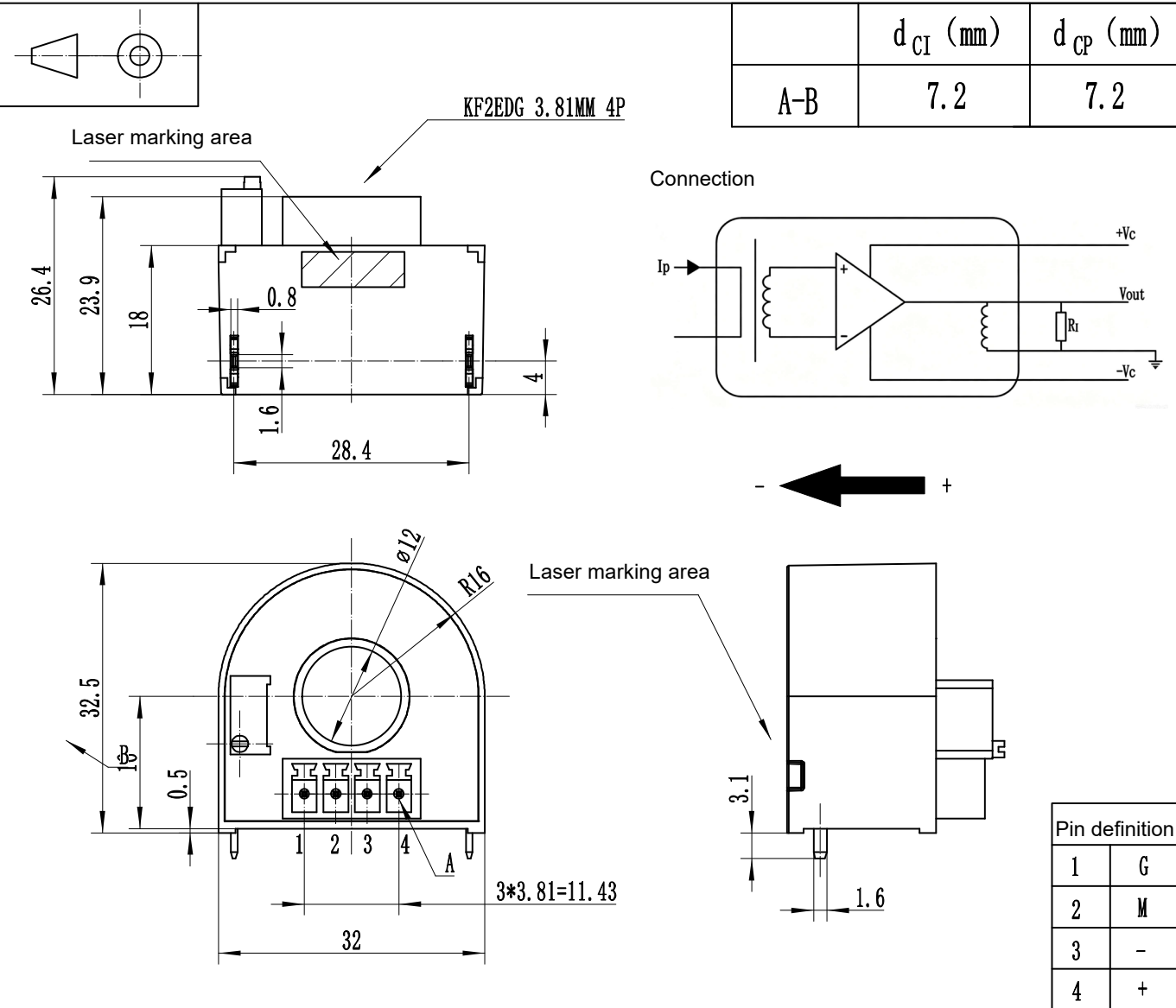
※ With  $T_A = 25^\circ\text{C}$ ,  $V_C = \pm 12\text{V}$ , output voltage reference  $R_L = 10\text{k}\Omega$ . Unless otherwise noted,

| Parameter                                        | Symbol          | Unit             | Min      | Typ       | Max      | Comment              |
|--------------------------------------------------|-----------------|------------------|----------|-----------|----------|----------------------|
| Primary nominal residual current effective value | $I_{PN}$        | mA               |          | $\pm 200$ |          |                      |
| Primary residual current measuring range         | $I_{PM}$        | mA               | -300     |           | 300      |                      |
| Supply voltage                                   | $V_C$           | V                | $\pm 12$ |           | $\pm 15$ | @5%                  |
| Current consumption                              | $I_C$           | mA               |          |           | 25       | @ $I_{PN}=0\text{A}$ |
| Nominal output voltage                           | $V_{OUT}$       | V                |          | $\pm 5$   |          |                      |
| Load resistance                                  | $R_L$           | $\text{k}\Omega$ | 10       |           |          |                      |
| Theoretical sensitivity                          | $G_{th}$        | V/A              |          | 25        |          |                      |
| Temperature of G                                 | $TCG$           | mV/k             |          | $\pm 1.5$ |          | @-10°C~70°C          |
| Electrical offset voltage                        | $V_{OE}$        | mV               | -50      | $\pm 20$  | 50       |                      |
| Temperature coefficient of $V_{OE}@I_P=0$        | $TCV_{OE}$      | mV/k             |          | $\pm 1.5$ |          | @-10°C~70°C          |
| Linearity error 0... $I_{PN}$                    | $\varepsilon_L$ | %                | -1       | $\pm 0.5$ | 1        |                      |
| Accuracy@ $I_{PN}$                               | $X$             | %                | -1       | $\pm 0.5$ | 1        |                      |
| Response time@ 90% of $I_{PN}$                   | $t_r$           | ms               |          | 500       |          |                      |
| Frequency bandwidth                              | $BW$            | kHz              |          | DC        |          |                      |

FR7V H00 SERIES

CHIPSENSE

Dimensions (in mm. 1 mm = 0.0394 inch)



Mechanical characteristics

Remarks

- ✧

General tolerance

$\pm 0.3\text{mm}$

✧

Connection of secondary

KF2EDG 3.81MM 4P

✧

Primary hole

$\Phi 12\text{mm}$
- ✧

When  $I_p$  flows in the direction of the arrow, the voltage output is positive.
- This is a standard model. For different applications (measurement, secondary connections...), please contact CHIPSENSE.