

# FSM200LT/10PPM 高精度电流传感器

## High-precision current sensor



### 超高精度电流测试解决方案 High accuracy current testing solutions

在诸多工业/实验室应用场景中，广泛采用非接触式电流传感器对交/直流电流进行高精度测量。飞轩推出的磁通门电流传感器具有高精度、高带宽及高稳定性等特点。同时，可针对用户需求提供适用于不同应用场景的产品定制化服务。

In many industrial/laboratory applications, non-contact current sensors are widely used to measure AC/DC current with high accuracy. The fluxgate current sensor introduced by Feixuan has the characteristics of high precision, high bandwidth and high stability. At the same time, it can provide customized product services for different application scenarios according to user needs.

在高精度电流测试领域，飞轩作为国内优秀的传感器供应商，为医疗行业、电力测试行业、轨道交通、科研实验室电流测量等提供了优质的解决方案。区别于传统的霍尔式电流传感器，飞轩磁通门系列电流传感器采用磁通门技术，主要面向高精度交/直流电流及脉冲电流的测试和测量领域；一次、二次电流实现电气隔离，带有工作正常指示及过载自恢复功能，有较高的安全可靠。高性能、高性价比的产品很好的满足了用户的需求，提供的传感器量程从 5A 到 24000A，准确度从 1ppm 到 1000ppm 的 AC/DC 电流传感器。

In the field of high-precision current testing, Feixuan, as an excellent sensor supplier in China, provides high-quality solutions for the medical industry, power testing industry, rail transit, scientific research laboratory current measurement, etc. Different from the traditional Hall type current sensor, the fluxgate series current sensor adopts fluxgate technology, mainly for high-precision AC/DC current and pulse current testing and measurement field; The primary and secondary currents achieve electrical isolation, with normal working indication and overload self-recovery function, with high safety and reliability. High-performance, cost-effective products well meet the needs of users, providing sensor ranges from 5A to 24000A, accuracy from 1ppm to 1000ppm AC/DC current sensors.

### 产品特性 Product characteristics

磁通门技术，高精度、高稳定性电流测量 Fluxgate technology, high precision, high stability current measurement

应用于非接触式场合，易于安装 For non-contact applications, easy to install

极低的温度系数 Very low temperature coefficient

低偏置电流 Low bias current

具有饱和检测及自恢复功能 It has the function of saturation detection and self-recovery

高带宽，最高可达 DC~800kHz(@±3dB) High bandwidth, up to DC~800kHz(@±3dB)

### 应用领域 Application field

新能源领域：锂电池化成分容、电池充放电测试系统反馈器件、电机测试等

New energy field: lithium battery components, battery charging and discharging test system feedback devices, motor testing, etc

粒子加速领域：高准确度电源的采样反馈器件

Particle acceleration field: Sampling feedback devices for high accuracy power supplies

医疗行业：MRI 的电源采样反馈

Medical industry: Power sampling feedback for MRI

轨道交通领域：变流器等高准确度、大电流的测试

Rail transit field: converters and other high accuracy, high current testing

实验室应用：配合功率分析仪进行高准确度功率测量、对计量级别电流进行可靠测试

Laboratory application: High accuracy power measurement with power analyzer, reliable testing of metering level current

仪器仪表领域: 仪器仪表中电流测量的反馈器件

Instrumentation field: Feedback devices for current measurement in instrumentation

#### 安全特性 Safety feature

| 参数<br>(Parameter)                          | 符号<br>(Symbol) | 单位<br>(Unit) | 最小<br>(Min) | 标称<br>(Type) | 最大<br>(Max) | 备注<br>(Comment) |
|--------------------------------------------|----------------|--------------|-------------|--------------|-------------|-----------------|
| 耐受电压<br>Withstand voltage                  | $U_d$          | kV           | --          | 2.5          | --          | 50/60Hz, 1min   |
| 瞬态隔离电压<br>Transient isolation voltage      | $T_s$          | kV           | --          | 5            | --          |                 |
| 相对漏电起痕指数<br>Relative leakage marking index | $CTI$          | V            | --          | 600          | --          | 无冷凝             |

#### 一般特性 General feature

| 参数<br>(Parameter)                     | 符号<br>(Symbol) | 单位<br>(Unit) | 最小<br>(Min) | 标称<br>(Type) | 最大<br>(Max) | 备注<br>(Comment) |
|---------------------------------------|----------------|--------------|-------------|--------------|-------------|-----------------|
| 工作温度范围<br>Operating temperature range | $T_A$          | °C           | -25         | --           | 60          |                 |
| 储存温度范围<br>Storage temperature range   | $T_s$          | °C           | -40         | --           | 85          |                 |
| 相对湿度<br>Relative humidity             | $RH$           | %            | 10          | --           | 80          | 无冷凝             |
| 质量<br>Quality                         | $m$            | kg           | --          | 0.1          | --          |                 |

#### 电参数/Electrical characteristics

测试条件 (环境温度 25°C, 供电电压 ±15V) Test conditions (ambient temperature 25°C, supply voltage ±15V)

| 参数<br>(Parameter)                        | 符号<br>(Symbol) | 单位<br>(Unit) | 最小<br>(Min) | 标称<br>(Type) | 最大<br>(Max) | 备注<br>(Comment) |
|------------------------------------------|----------------|--------------|-------------|--------------|-------------|-----------------|
| 额定原边直流电流<br>Rated primary DC current     | $I_{PN\ DC}$   | A            | -200        | --           | 200         |                 |
| 额定原边交流电流<br>Rated primary AC current     | $I_{PN}$       | A            | --          | --           | 141         |                 |
| 测量范围<br>Measuring range                  | $I_{PM}$       | A            | -200        | --           | 200         |                 |
| 测量电阻<br>Measuring resistance             | $R_M$          | Ω            | 0           | --           | 25          |                 |
| 副边电流<br>Secondary side current           | $I_s$          | mA           | -100        | --           | 100         |                 |
| 过载能力 <sup>①</sup><br>Overload capacity ① | $\hat{I}_P$    | A            | -1000       | --           | 1000        | @100ms 脉冲       |
| 电流变比                                     | $K_N$          |              | --          | 1:2000       | --          |                 |

|                                                                                                                                                                                                                                                                             |                 |            |             |     |             |                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------|-------------|-----|-------------|---------------------|
| Current ratio                                                                                                                                                                                                                                                               |                 |            |             |     |             |                     |
| 供电电压<br>Supply voltage                                                                                                                                                                                                                                                      | $U_c$           | V          | $\pm 14.25$ | --  | $\pm 15.75$ |                     |
| 电流消耗<br>Current consumption                                                                                                                                                                                                                                                 | $I_c$           | mA         | --          | --  | 50          | 总消耗需累计 $I_s$        |
| 输出噪声 0...10Hz <sup>②</sup><br>Output noise 0... 10Hz <sup>②</sup>                                                                                                                                                                                                           | $V_{no}$        | ppm        | --          | --  | 5           |                     |
| 输出噪声 0...100Hz <sup>②</sup><br>Output noise 0... 100Hz <sup>②</sup>                                                                                                                                                                                                         |                 |            | --          | --  | 10          |                     |
| 输出噪声 0...1kHz <sup>②</sup><br>Output noise 0... 1kHz <sup>②</sup>                                                                                                                                                                                                           |                 |            | --          | --  | 50          |                     |
| 零点失调电流 <sup>②</sup><br>Zero offset current ②                                                                                                                                                                                                                                | $I_{0E}$        | %          | -0.01       | --  | 0.01        |                     |
| 温度漂移系数 <sup>②</sup><br>Temperature drift coefficient                                                                                                                                                                                                                        | $TCI_{0E}$      | ppm/K      | -10         | --  | 10          |                     |
| 零点偏置稳定性 <sup>②</sup><br>Zero bias stability ②                                                                                                                                                                                                                               |                 | ppm/month  | -25         | --  | 25          |                     |
| 线性度 <sup>②</sup><br>Linearity                                                                                                                                                                                                                                               | $\varepsilon_L$ | ppm        | -10         | --  | 10          |                     |
| 总体准确度 <sup>②</sup><br>Overall accuracy                                                                                                                                                                                                                                      | $X_G$           | %          | -0.01       | --  | 0.01        |                     |
| 电流跟随速度<br>Current following velocity                                                                                                                                                                                                                                        | $di/dt$         | A/ $\mu s$ | 100         | --  | --          |                     |
| 带宽 ( $\pm 3dB$ )<br>Bandwidth ( $\pm 3dB$ )                                                                                                                                                                                                                                 | $BW$            | kHz        | --          | 200 | --          | 小信号, @0.5% $I_{PM}$ |
| 注①:测试信号为单脉冲, 过冲后传感器会进入自恢复状态, 状态指示灯灭, 需要约 50ms 恢复到正常工作状态。<br>Note 1: The test signal is a single pulse. After overshooting, the sensor will enter the self-recovery state, and the status indicator will be off. It takes about 50ms to restore to the normal working state. |                 |            |             |     |             |                     |
| 注②:ppm 数据均参考副边输出信号满度对应的 $I_{PK}$ 。<br>Note 2 :ppm data refer to IPN corresponding to the subside output signal full degree.                                                                                                                                                 |                 |            |             |     |             |                     |

#### 接口定义 Interface definition

| 引脚 | 1    | 2                | 3   | 4    |
|----|------|------------------|-----|------|
| 定义 | -15V | I <sub>OUT</sub> | GND | +15V |

+15V、GND、-15V 为传感器供电接口; I<sub>OUT</sub> 为传感器输出接口

+15V, GND, and -15V are the power supply interfaces for the sensor. I<sub>OUT</sub> indicates the sensor output interface

#### 传感器使用注意事项 Remarks

- 原边电流与机身箭头指示方向一致时, 输出为正;

When the current on the primary side is consistent with the direction indicated by the arrow on the fuselage, the output is positive;

- 测量小电流时, 原边导体尽量置于线孔的中心位置;

When measuring small current, the primary conductor should be placed in the center of the line hole as far as possible;

- 本产品为标准品，若需其他变比或技术指标请与厂家联系；

This product is a standard product, if you need other ratios or technical indicators, please contact the manufacturer;

- 本公司保留对本手册修改的权利，恕不另行通知。

The Company reserves the right to amend this manual without prior notice.

#### 包装清单 Packing list

| 序号 | 名称    | 型号             | 数量 | 备注 |
|----|-------|----------------|----|----|
| 1  | 电流传感器 | FSM200LT/10PPM | 1  |    |

#### 传感器机械尺寸图 Mechanical dimensions of the sensor

单位: mm Unit: mm

