

Precision flexible alternating current probes of type **FCP2x21** and **FCP3x21** operate on the principle of Rogowski coil designed to measure alternating current up to 6 000 A (FCP3x21).

Current probes of type **FCP 2x21** can be used as AC current sensors for multimeters, scopemeters, current and power measuring apparatus.

Current probes of type **FCP 3121** (single-phase) and **FCP 3321** (three-phase) are designed for usage with measuring equipment which is able to use I<sup>2</sup>C communication for accessing software calibration parameters stored in probe's internal EEPROM memory.

**Highlights**

- Quick and easy access to the measured current.
- No additional error for wire position.
- Symmetric flexible shielding for excellent suppression of strange electric fields
- Symmetric sensor coil for excellent suppression of strange magnetic fields
- Low noise, dual gain, high CMRR amplifier with precision integrator
- Low output impedance
- Super flexible sensor cable Ø 6 mm
- Application tailored sensor cable sensitivity and frequency range (*optional*).

**Available types**

**Types with hardware calibration**

| Type      | Phases | Class |
|-----------|--------|-------|
| FCP 2121C | 1      | 0,2   |
| FCP 2121D | 1      | 0,5   |
| FCP 2121P | 1      | 1,0   |
| FCP 2321C | 3      | 0,2   |
| FCP 2321D | 3      | 0,5   |
| FCP 2321P | 3      | 1,0   |

**Types with software calibration**

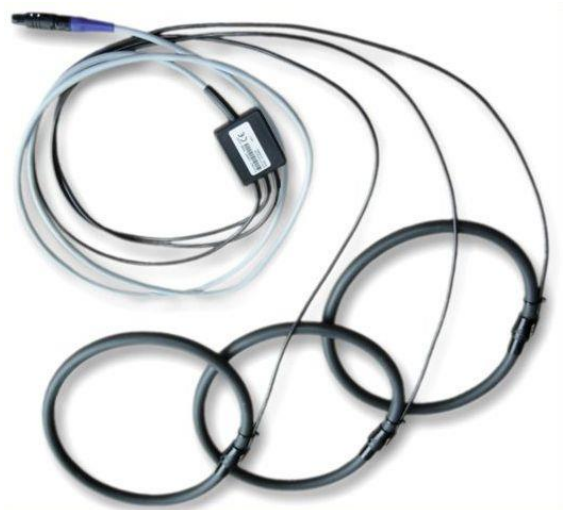
| Type      | Phases | Class |
|-----------|--------|-------|
| FCP 3121C | 1      | 0,2   |
| FCP 3121D | 1      | 0,5   |
| FCP 3121P | 1      | 1,0   |
| FCP 3321C | 3      | 0,2   |
| FCP 3321D | 3      | 0,5   |
| FCP 3321P | 3      | 1,0   |



Flexible Current Probe FCP 2x21



Flexible Current Probe FCP 2x21



Three-phase current probe FCP 3321D for connecting to WS 2320

## Technical data

| General parameters  | FCP 2x21   | FCP 3x21  |
|---|--|---|
| <b>Basic frequency</b>  | 40 Hz ... 70 kHz                                 |   |
| <b>Working frequency (3dB) <sup>1</sup></b>                                   | 20 Hz .. 50 kHz                                  | 0,8 Hz .. 50 kHz  |
| <b>Gain <sup>1</sup></b>  | 1 mV/A   | 1 mV/A & 100 mV/A   |
| <b>Measuring range (crest factor &lt;1.5 at basic frequency) <sup>1</sup></b> | 1 A ... 10 kA                                    | 1 A ... 6 kA  |
| <b>Output voltage</b>   | ± 15 V (No load)                                 | ± 4,5 V peak  |
| <b>Peak di/dt</b>   | -  | 20 A/μs   |
| <b>Operating/Test voltage (sensor cable without coupling area)</b>            | 600 V/ 2 kV                                      | -   |
| <b>Operating/Test Voltage (signal cable and coupling area)</b>                | 600 V/ 2 kV                                      |   |
| <b>Output to earth voltage</b>  | 30 V max.  |   |
| <b>Safety</b>   | EN 610010-1, 600V                                |   |
| <b>EMC</b>  | EN 61326:1998                                    |   |
| <b>Load resistance</b>  | ≥ 1kΩ  |   |
| <b>Operating temperature</b>  | -20 ... +60 °C                                   |   |
| <b>Storage temperature</b>  | -20 ... +60 °C                                   |   |
| <b>Weight of electronics</b>  | approx. 50 g                                     | approx. 100 g   |
| <b>Size of electronics</b>  | 65 x 65 x 27 mm                                  | 50 x 40 x 25 mm   |
| <b>Power supply</b>   | External Voltage Source 9 – 36 V DC <sup>2</sup> |   |
| <b>Consumption</b>  | <1.5 W   | approx. 50 mA/phase   |
| <b>Output connection</b>  | Terminal Block                                   | OEM (output, supply, I <sup>2</sup> C control) <sup>1</sup> ;<br>WS (Working standard connector) <sup>1</sup> |

| Accuracy specifications  | FCP 2x21C                            | FCP 2x21D            | FCP 2x21P           | FCP 3x21C            | FCP 3x21D            | FCP 3x21P           |
|--|--------------------------------------|----------------------|---------------------|----------------------|----------------------|---------------------|
| <b>Amplitude gain error</b>                                    | < 0,2 % <sup>3</sup>                 | < 0,5 % <sup>3</sup> | < 1 % <sup>3</sup>  | < 0,2 % <sup>4</sup> | < 0,5 % <sup>4</sup> | < 1 % <sup>4</sup>  |
| <b>Phase error</b>   | < 0,05° <sup>3</sup>                 | < 0,1° <sup>3</sup>  | < 0,2° <sup>3</sup> | < 0,1° <sup>4</sup>  | < 0,3° <sup>4</sup>  | < 0,3° <sup>4</sup> |
| <b>Influence of current outside closed sensor cable</b>        | < 0,1 %                              | < 0,3 %              | < 0,5 %             | < 0,1 %              | < 0,3 %              | < 0,5 %             |
| <b>Gain TC</b>   | < 0,005 %/K                          | < 0,01 %/K           |                     | < 0,02 %/K           | < 0,05 %/K           |                     |
| <b>Linearity</b>   | < 0,01 % (differential nonlinearity) |                      |                     | < 0,01 %             |                      |                     |
| <b>Output DC offset</b>  | < 0,2 mV                             |                      |                     | < 0,1 mV             |                      |                     |
| <b>Influence of potential of adjacent conductor (at 50 Hz)</b> | < 1 μA/V                             |                      |                     | < 1 μA/V             |                      |                     |
| <b>Input noise (f &lt; 10Hz)</b>                               | < 300 mA                             |                      |                     | 12 mA <sub>RMS</sub> |                      |                     |

| Measuring head parameters                          | FCP 2x21         | FCP 3x21         |
|--|------------------|------------------|
| <b>Sensor cable length <sup>1</sup></b>            | 500 mm           | 500 mm           |
| <b>Sensor cable diameter / Minimum bend radius</b> | Ø 6 mm / Ø 50 mm | Ø 6 mm / Ø 20 mm |
| <b>Signal cable length <sup>1</sup></b>            | 1000 mm          | 1500 mm          |
| <b>Signal cable diameter</b>                       | Ø 4 mm           | Ø 4 mm           |

## Options

OEM cable output (FCP 3x21); Calibration kit (FCP 3x21); special cable lengths and/or gains on request

<sup>1</sup> Optional specification; <sup>2</sup> Power Supply should be Current limited for accidental polarity reversal / overvoltage to < 0.3 A; <sup>3</sup> Basic frequency range at 23 °C, current 0,002 \* I<sub>max</sub> to I<sub>max</sub>; <sup>4</sup> Basic frequency range at 25 °C, current > 100 mA, except 25 mm coupling area

## Ordering information

| FCP 2x21  | FCP 3x21   |
|---|--|
| <b>FCP xy2zp / SeCL / SiCL / MaxC</b><br><b>x</b> - calibration type: <b>2</b> – hardware<br><b>y</b> - number of phases: <b>1</b> or <b>3</b><br><b>2</b> - development series<br><b>z</b> - sensor cable diameter: <b>1</b> (Ø 6 mm)<br><b>p</b> - class: <b>C</b> (0,2%/0,05°), <b>D</b> (0,5%/0,15°) or <b>P</b> (1%/0,3°)<br><b>SeCL</b> .... sensor cable length [mm]<br><b>SiCL</b> ..... signal cable length [mm]<br><b>MaxC</b> ....maximal current [A] (default: 6000A) | <b>FCP xy2zp / SeCL / SiCL / MaxC / OutC</b><br><b>x</b> - calibration type: <b>3</b> - software<br><b>y</b> - number of phases: <b>1</b> or <b>3</b><br><b>2</b> - development series<br><b>z</b> - sensor cable diameter: <b>1</b> (Ø 6 mm)<br><b>p</b> - class: <b>C</b> (0,2%/0,1°); <b>D</b> (0,5%/0,3°) or <b>P</b> (1%/0,3°)<br><b>SeCL</b> .... sensor cable length [mm]<br><b>SiCL</b> .... signal cable length [mm]<br><b>MaxC</b> .... maximal current [A] (default: 6000A)<br><b>OutC</b> .... output connection ( <b>OEM</b> or <b>WS</b> ) |
| <b>Default configuration:</b><br><b>FCP 2x21p / 500 / 1000 / 6000</b>   | <b>Default configurations:</b><br><b>FCP 3121p / 600 / 1500 / 6000 / OEM</b><br><b>FCP 3321p / 600 / 1500 / 6000 / OEM</b>   |