

## ⇒ Highlights

PP Patent Protection

- Accuracy up to 0.2 % in amplitude and 0.1 ° in phase
- No additional error for wire position
- Symmetric flexible shielding<sup>PP</sup> for excellent suppression of strange electric fields
- Symmetric sensor coil<sup>PP</sup> for excellent suppression of strange magnetic fields
- Low noise, dual gain, high CMRR amplifier with precision integrator<sup>PP</sup>
- Low output impedance
- Two sensor cable versions: high voltage Ø 12.6 mm and super flexible Ø 6 mm
- Low cost models with software calibration in serial EEPROM available in single or three phase version
- Extremely long sensor cable<sup>PP</sup> for large structures like buildings, towers, masts etc. (*optional*)
- Application tailored<sup>PP</sup> sensor cable sensitivity and frequency range (*optional*)
- High frequency matched<sup>PP</sup> sensor coil for broad frequency band and surge current measurements (*optional*)
- Calibration kit available (*optional*)

## ⇒ Description

Precision Flexible AC Current Probes SymmProFlex® FCP 211x, FCP 311x and FCP 331x are current probes based on Rogowski principle designed to measure alternating current up to 3000 A, 6000 A, 12000 A or more.

Current Probes SymmProFlex® FCP 211x series can be used with any multimeter, scopemeter or other current or power measuring apparatus.

Current Probes SymmProFlex® FCP 311x (single-phase) and FCP 331x (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.



SymmProFlex® FCP 2110 with BNC output connector



SymmProFlex® FCP 2111 with Banana Socket Pair output connector

## ⇒ Available Models

### Models with hardware calibration:

Model	Phases	Class	Sensor Cable
FCP 2110C	1	0.2	Ø 12.6 mm
FCP 2110D	1	0.5	Ø 12.6 mm
FCP 2111D	1	0.5	Ø 6 mm
FCP 2110P	1	1.0	Ø 12.6 mm
FCP 2111P	1	1.0	Ø 6 mm

### Models with software calibration:

Model	Phases	Class	Sensor Cable	Model	Phases	Class	Sensor Cable
FCP 3110C	1	0.2	Ø 12.6 mm	FCP 3310C	3	0.2	Ø 12.6 mm
FCP 3110D	1	0.5	Ø 12.6 mm	FCP 3310D	3	0.5	Ø 12.6 mm
FCP 3111D	1	0.5	Ø 6 mm	FCP 3311D	3	0.5	Ø 6 mm
FCP 3110P	1	1.0	Ø 12.6 mm	FCP 3310P	3	1.0	Ø 12.6 mm
FCP 3111P	1	1.0	Ø 6 mm	FCP 3311P	3	1.0	Ø 6 mm

## ⇒ Technical Specification

General Parameters	
Basic Frequency	40 Hz .. 70 Hz
Working Frequency (3dB) *	0.8 Hz .. 50 kHz
Gain *	1 mV/A & 100 mV/A (FCP 211x)
Measuring Range (crest factor <1.5 @ Basic Frequency)	0.3 .. 3000 A & 0.1 .. 30 A (FCP 211x) 1 .. 6000 A (FCP 3x1x)
Output Voltage Maximum	± 4.5 V peak
Peak dl/dt	20 A/µs
Operating / Test Voltage <i>Sensor Cable except coupling area</i>	3 kV / 15 kV (FCP xx10) 600 V / 2 kV (FCP xx11)
Operating / Test Voltage <i>Signal Cable and coupling area</i>	600 V / 2 kV
Output to Earth Voltage	30 V max.
Safety	EN 610010-1, 600V
EMC	EN 61326:1998
Load Resistance	≥ 1 kΩ
Operating Temperature	-20 .. +60 °C
Storage Temperature	-20 .. +60 °C
Weight of electronics	Approx. 100 g
Size of electronics (L x W x H)	100 x 50 x 25 mm (FCP 211x) 50 x 40 x 25 mm (FCP 3x1x)
Power Supply	FCP 211x : Int. rechargeable accumulators (2xNiMH / AAA size) with built-in charger & low charge LED, Power Adapter (100 - 240 V <sub>AC</sub> / 5 V <sub>DC</sub> ) FCP 3x1x : External 5 V
Consumption	Approx. 100 mA (FCP 211x) Approx. 50 mA/phase (FCP 3x1x)
Output Connection	BSP - Banana Socket Pair 21 mm BPP - Banana Plug Pair 21 mm * BNC * OEM (output, supply, I <sup>2</sup> C control) * WS (Working Standard connector) *

Accuracy Specifications	FCP xx10C	FCP xx1xD	FCP xx1xP
Amplitude gain error **	<0.2 %	<0.5 %	<1 %
Phase error **	<0.1 °	<0.3 °	<0.3 °
Influence of Current outside closed Sensor Cable	<0.1 %	<0.3 %	<0.5 %
Gain TC	<0.02 %/K	<0.05 %/K	
Linearity	<0.01 %		
Distortion	<0.01 %		
Output DC Offset	<0.1 mV		
Influence of Potential of adjacent conductor (@50Hz)	<1 µA/V		
Input Noise (f<10Hz)	6 mA <sub>RMS</sub> (FCP xx10) 12 mA <sub>RMS</sub> (FCP xx11)		

\*\* Basic Frequency Range @ 25°C, current > 100 mA, except 25 mm coupling area  
\*\*\* FCP category C is available only in version xx10 (sensor cable Ø 12.6 mm)

Measuring Head Parameters	
Sensor Cable Length *	600 mm (FCP xx10) 300 mm (FCP xx11)
Sensor Cable Diameter / Minimum Bend Radius	12.6 mm / 60 mm (FCP xx10) 6 mm / 20 mm (FCP xx11)
Signal Cable Diameter	4 mm
Signal Cable Length *	1500 mm

Options
<ul style="list-style-type: none"> <li>Banana Plug Pair Output Connection (FCP 211x)</li> <li>BNC Output Connection (FCP 211x)</li> <li>OEM Cable Output</li> <li>Calibration Kit</li> <li>Special Cable Lengths and/or Gains on request</li> </ul>

\* Optional Specification

## ⇒ Ordering Information

FCP xy1zp / SeCL / SiCL / MaxI / OutC	Default configurations:
<p><b>x</b> ..... calibration type: <b>2</b> (=hardware) or <b>3</b> (=software)</p> <p><b>y</b> ..... number of phases : <b>1</b> or <b>3</b></p> <p><b>z</b> ..... sensor cable diameter: <b>0</b> (= 12.6 mm) or <b>1</b> (=6 mm)</p> <p><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°)</p> <p><b>SeCL</b> .... sensor cable length [mm]</p> <p><b>SiCL</b> .... signal cable length [mm]</p> <p><b>MaxI</b> .... maximal current [A]</p> <p><b>OutC</b> .... output connection (<b>BSP</b>, <b>BPP</b>, <b>BNC</b>, <b>OEM</b> or <b>WS</b>)</p>	<p><b>FCP 2110p</b> / 600 / 1500 / 3000 / BSP</p> <p><b>FCP 2111p</b> / 300 / 1500 / 3000 / BSP</p> <p><b>FCP 3110p</b> / 600 / 1500 / 6000 / OEM</p> <p><b>FCP 3111p</b> / 300 / 1500 / 6000 / OEM</p> <p><b>FCP 3310p</b> / 600 / 1500 / 6000 / OEM</p> <p><b>FCP 3311p</b> / 300 / 1500 / 6000 / OEM</p>