Product description
The CSM LEM Sensor Packages combined with measurement modules of the AD4 ECAT MM series allow very precise measurements of electrical currents up to ±1,250 A (max. 800 A RMS continuously) with signal frequencies up to 200 kHz (LEM LF 1010-S).

An AD4 ECAT MiniModule can measure up to four electrical currents synchronously. Alternatively, up to four voltages can be measured synchronously. It is therefore also possible to measure electrical power.

The applied current transducer ensures galvanic isolation between test object and measurement system and is thus suitable for high-voltage applications.

Shipping content
- LEM Sensor Package
- Sensor LEM LF 210-S/SP3 | LEM LF 310-S | LEM LF 1010-S
- Signal conditioning
- Cabling (ready to be connected)

Key features
- Precise measurements on electrical components in vehicles for the optimization of power and fuel consumption
- Ready-to-use solution for current measurements up to ±1,250 A with sensor LEM LF 1010-S
- Prepared for TEDS support according to IEEE 1451.4
- High accuracy and frequency bandwidth (200 kHz) even at ±1,250 A measurement current (LEM LF 1010-S)
- Fast and synchronous (< 1 µs) current measurements (e.g. of all three phases)
- Possible use in 48 V on-board supply systems and high-voltage environments
## Technical data

<table>
<thead>
<tr>
<th>Type designation</th>
<th>LEM LF 210-S/SP3 Sensor Package</th>
<th>LEM LF 310-S Sensor Package</th>
<th>LEM LF 1010-S Sensor Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical data valid as of revision</td>
<td>B001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notice

Technical data of LEM sensor according to manufacturer specification:

- [https://s.csm.de/lf210-s](https://s.csm.de/lf210-s)
- [https://s.csm.de/lf310-s](https://s.csm.de/lf310-s)
- [https://s.csm.de/lf1010-s](https://s.csm.de/lf1010-s)

### Nominal current

- **for continuous operation**
  - up to 100 A RMS
  - see section "Product variants"
  - max. 300 A RMS
  - max. 800 A RMS

### Measurement range

- up to ±200 A
  - see section "Product variants"
- ±500 A
- ±1,250 A

### Threshold frequency

- 100 kHz
- 100 kHz
- 200 kHz

### Measurement uncertainty

- Internal shunt: max. ±0.02 % of measured value, 5 ppm/K
- LEM sensor: details see LEM Specification
- TEDS support: prepared according to IEEE 1451.4

### Power supply

- externally powered via $U_{Bat}$ of the vehicle with active reverse polarity protection
- Minimum: 9 V DC
- Maximum: 36 V DC

### Power consumption

- Minimum:
  - 1.5 W
  - at 0 A ("idle")
- Maximum: 5.1 W

- Maximum:
  - 1.5 W
  - 1.8 W
- Maximum:
  - 6.0 W
- Maximum:
  - 6.0 W

### Output voltage

- ±5 V at measurement range

### Recommended measurement range

- ±5 V (AD4 ECAT MM Series)

### Housing

- signal conditioning only
- see section "Connection scheme"
- Protection class: IP67 (potted)
- Dimensions ($w \times h \times d$): approx. 30 × 25 × 90 mm

### Connectors

- Power supply: banana plugs
- Output (to module): LEMO 1B, 8-pole, code G

### Operating and storage conditions

- signal conditioning only
- see section "Connection scheme"
- Operating temperature range: -40 °C to +85 °C

[www.csm.de](http://www.csm.de)
The EtherCAT® measurement module AD4 IG1000 of the AD4 ECAT MM Series features a maximum measurement data rate of 1 MHz per channel and has been designed for the acquisition of very fast analog signals in the fields of automotive measurement technology.

The protocol converter XCP-Gateway is especially designed for the CSM EtherCAT® measurement module series and has been developed for measurement tasks with numerous measurement channels and high measurement data rates. XCP-Gateway is available in two versions: „Basic“ and „pro“. XCP-Gateway pro features two CAN interfaces to be used for connecting CSM’s CAN-based measurement modules and to integrate them into the measurement data protocol XCP-on-Ethernet.