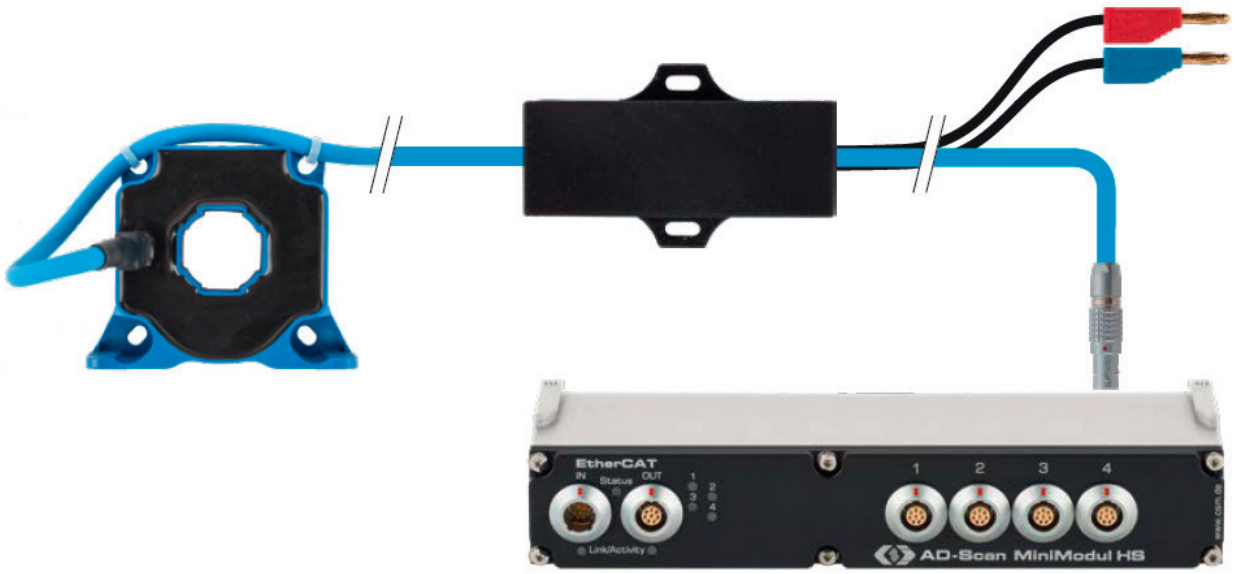
LEM Sensor Packages

Technical Information



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Product disposal/recycling

If this symbol (crossed-out wheeled bin) appears on the device, this means that the European Directive 2012/19/EU applies to this device.

The correct disposal of old equipment will protect the environment and people from possible negative consequences.

Become familiar with local regulations for separate collection of electrical and electronic equipment.

Follow local regulations and do not dispose of old equipment with household waste.

Contact information

CSM offers support for its products over the entire product life cycle. Updates for the individual components (e.g. documentation, configuration software and firmware) are made available on the CSM website. To keep up to date, it is therefore recommended that you check the download area of the CSM website for updates at least once a month.

Contents

1 Technical Information

1.1 To which LEM sensor packages does this document apply?

NOTE!
The information in this document applies to all LEM sensor packages as of revision **B**. ☞ If there are questions concerning the configuration of LEM sensor packages with older revision numbers, please contact CSM Support.

For current measurements in conjunction with LEM sensor packages, it is recommended to use AD4 ECAT MiniModules of type "IG", as this type of measurement module is particularly suitable for measuring low voltages.

1.2 General information

In combination with AD4 ECAT MM series measurement modules, LEM sensor packages can be used to measure currents up to ±1,250 A (LEM LF 1010-S). The LEM current transducer is equipped with a membrane sleeve that supports centric positioning of the cable in the sensor to minimize measurement errors.

An AD4 ECAT MiniModule can measure up to four currents synchronously. The current transducer of the LEM sensor package provides galvanic isolation between the test setup and the measurement technology.

1.3 Design and connections

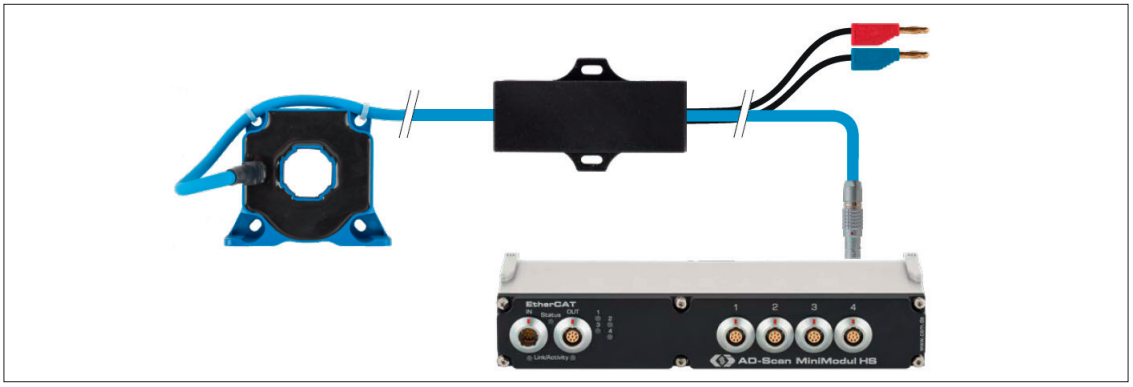

Fig. 1-1: LEM LF 310-S sensor package with AD4 ECAT MiniModule

Connection	Length	Connection/plug
Power supply $U_{Battery}$ = 9 – 36 V	1.5 m	banana plugs
Sensor	3.0 m	firmly connected to the sensor
AD4 ECAT MiniModule	0.75 m	LEMO 1B 8-pole, code G

1.4 Connecting LEM sensor packages

	NOTE!
	There is an arrow on the top of the current transducer (Fig. 1-2, ①) which indicates the direction of flow of the primary current I_p. If the current in the HV cable flows in the opposite direction to the arrow on the top of the sensor, the current output is inverted.

	The LEM sensor package can be operated with a supply voltage of 9 - 36 V and is equipped with active reverse polarity protection. The maximum power consumption depends on the LEM sensor package used. → *See "LEM Sensor Package" datasheet for further information.*

Measuring the current I_P using a LEM sensor package

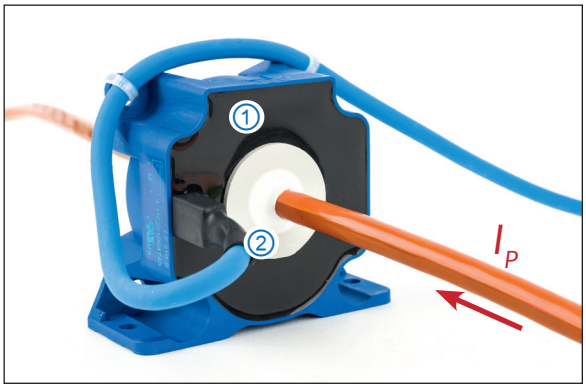

Fig. 1-2: Measuring the current I_p using a LEM sensor package

☞ Feed the HV cable whose current is to be measured through the membrane sleeve (Fig. 1-2, ②) in the current transducer in the direction of the arrow (Fig. 1-2, ①).

☞ Connect the LEM sensor package to your AD4 ECAT MiniModule.

☞ Connect the banana plugs to the power supply.

1.5 Measurement channel settings in CSMconfig

NOTE!
A LEM sensor package is powered by an external power supply. The sensor excitation provided by the measurement module is therefore not required and can be disabled in the channel configuration dialog (Fig. 1-3, ①).

1.5.1 Configuring the measurement channel by reading in the TEDS data

A LEM sensor package is equipped with a TEDS chip (IEEE 1451.4). The TEDS chip comprises the data for the two-point scaling of the LEM sensor package and the setup data for the AD ECAT measurement module.

NOTE!
Depending on whether the data from the TEDS chip is to be read in automatically or entered manually, either the option "Automatic" or "Manual" has to be selected in the **TEDS Mode** selection menu of the **TEDS related settings** section. ☞ If in doubt, check the TEDS-specific settings in the **Program Settings** dialog.

☞ Start **CSMconfig** and open the channel configuration dialog for the measurement channel connected to the LEM sensor package.

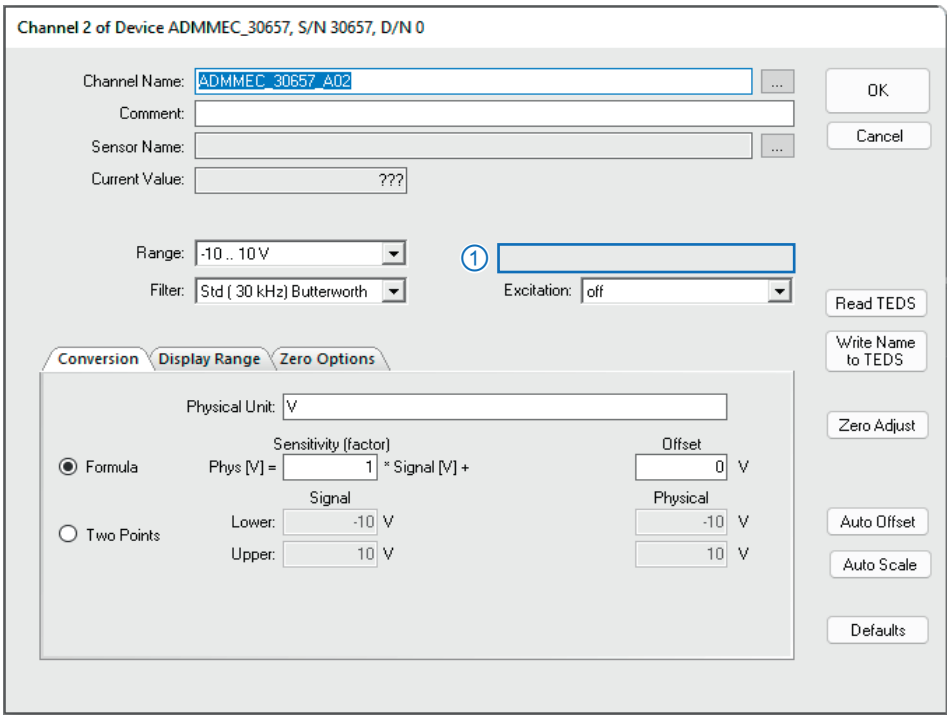

Fig. 1-3: Channel configuration dialog

☞ Click on **Read TEDS**.
⇨ The **Read TEDS** dialog opens.

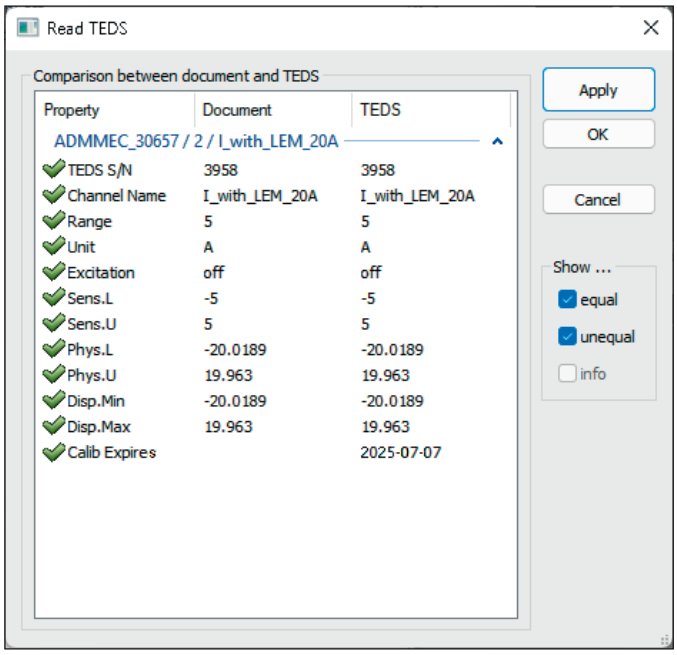

Fig. 1-4: **Read TEDS** dialog, differences between document settings and TEDS data

In the table, matches between the data stored in the TEDS and the settings in the configuration document are indicated by green check marks. Differences between the TEDS data and the settings in the configuration document are highlighted by a red "unequal" symbol.

☞ Click on **Apply** to read the data from the TEDS chip to the configuration document.

⇨ The **Read TEDS** dialog closes. The changed settings are displayed in the channel configuration dialog.

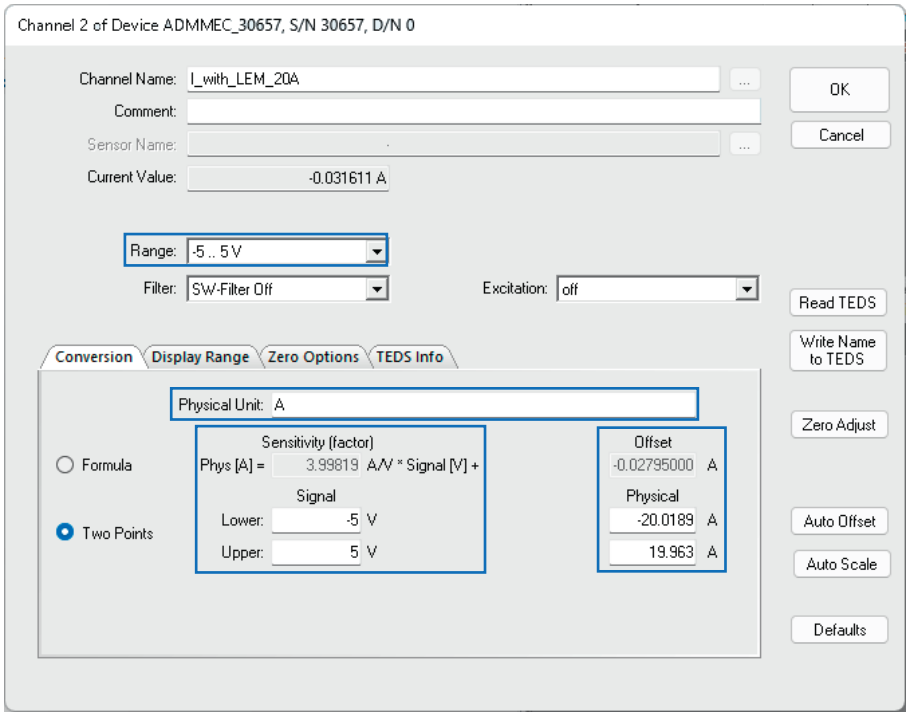

Fig. 1-5: Channel configuration dialog – TEDS settings adopted

→ *For further information, see the "Read TEDS" section in the CSMconfig online help.*

1.5.2 Configuring the measurement channel manually

The following section describes how to manually adjust the channel settings depending on the type of LEM sensor package being used.

☞ Start **CSMconfig** and open the channel configuration dialog of the measurement channel to which the LEM sensor package is connected.

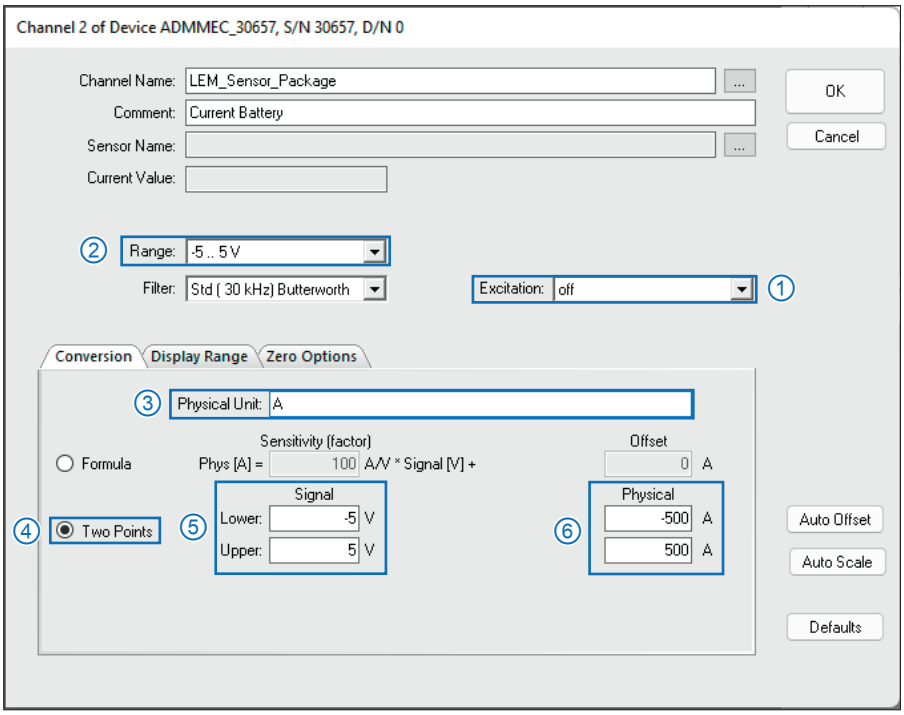

Fig. 1-6: Channel configuration dialog - settings for LEM LF 310-S sensor package

Setting the measurement range and scaling manually (two-point scaling)

The LEM sensor package converts the measured current I_p into an output voltage U_{Sensor}. To make sure that the voltage supplied by the LEM sensor package is correctly interpreted by the measurement module, some settings have to be adjusted. The following section shows which values have to be adjusted for the corresponding LEM sensor package in the channel configuration dialog (Fig. 1-6).

LEM sensor package	Nominal currrent	Signal (Fig. 1-6, ⑤)		Physical (Fig. 1-6, ⑥)	
		Lower	Upper	Lower	Upper
LEM LF 210-S/SP3_5	-5 A..5 A	-5 V	5 V	- 5 A	5 A
LEM LF 210-S/SP3_10	-10 A..10 A			- 10 A	10 A
LEM LF 210-S/SP3_20	-20 A..20 A			- 20 A	20 A
LEM LF 210-S/SP3_50	-50 A..50 A			- 50 A	50 A
LEM LF 210-S/SP3_100	-100 A..100 A			- 100 A	100 A
LEM LF 210-S/SP3_200	-200 A..200 A			- 200 A	200 A
LEM LF 310-S	-500 A..500 A			- 500 A	500 A
LEM LF 1010-S	-1250 A..1250 A			- 1250 A	1250 A

Tab. 1-1: LEM sensor packages - settings for two-point scaling

i	If there is a calibration certificate for the LEM sensor package, the corresponding values from the calibration certificate are to be used for **Physical	Lower** and **Physical	Upper** (Fig. 1-6, ⑥) instead of the values in Tab. 1-1.

Example: To be able to measure a rated current in the range of -500 A..500 A using a LEM LF 310-S, the following settings have to be adjusted:

- ☞ Go to **Range** (Fig. 1-6, ②) and select "-5..5 V".
- ☞ Go to **Physical Unit** (Fig. 1-6, ③) and enter an "A" for Ampere.
- ☞ Enable the **Two Points** option (Fig. 1-6, ④) to enter the scaling values.
- ☞ Enter the following values in section **Two Points**, **Signal** (Fig. 1-6, ⑤) and **Physical** (Fig. 1-6, ⑥):
  - **Signal | Lower**: -5 V
  - **Signal | Upper**: 5 V
  - **Physical | Lower**: -500 A
  - **Physical | Upper**: 500 A

NOTE!	
	If the LEM current transducer is exposed to a current multiple times without applying current to the measurement system, a permanent offset may occur ("Magnetic Offset Current", see manufacturer specification). ☞ Perform a zero adjustment before measurement. → *For more information, refer to the CSMconfig online help, section "Adjustment Options - Zero Adjustment".*

1.5.3 Transferring configuration data to the measurement module

NOTE!	
	After finishing the channel configuration, the configuration data has to be transferred to the measurement module.

- ☞ Open the device configuration dialog.
- ☞ Click on **Write to device**.
  - ⇨ A confirmation prompt is displayed.
- ☞ Click on **OK** to save the modified configuration to the measurement module.
  - ⇨ A message indicates the successful reconfiguration of the measurement module.

i	Further information on how to configure the module can be found in the user guide of the relevant AD measurement module or in the CSMconfig online help in section **Help	Overview**.

2 Appendix

2.1 List of figures

2.2 List of tables

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