



Application notes energy meters

Topic: Limits for energy meters

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Environmental conditions

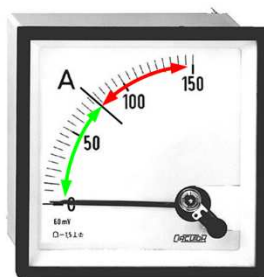
For installation and safe operation of SBC energy meters following points should be considered:



The energy meters must be operated in a suitable environment, for example in a cabinet.



To ensure the high measuring accuracy, the devices may only be used at temperatures between -25°C ... $+55^{\circ}\text{C}$.



Through the compact design of the device, the maximum measured current must not be exceeded.



To prevent short circuits in the meter because of moisture / condensation, the meter must be acclimated 30 minutes to the new environment.

Connecting/wiring an energy meter

Choosing the correct materials and tools reduces the heating of the terminals.

- Cross-sections must match the current
- Use ferrules for the cables
- Use the correct screw driver
- Apply the correct tightening torque

For attaching ferrules we recommend crimp pliers from Knipex (No. 97 53 09). The square shape of the sleeve after compression is suitable for the screw terminals of the SBC energy meters

We recommend the following screwdriver blade for SBC energy meters:

- For L / N terminals: Pozidriv Nbr.1 or combination Pozidriv / slot Nbr.1
- For the terminals S0/Interface: Pozidriv Nbr.0



Screwdriver with torque function
e.g. PB8320 Swisstools



Knipex (Art.Nr 97 53 09)



Pozidriv/Slot combination



Pozidriv only

Heating of the terminals

Energy meter ALE3

Load: 65A

Tightening torque 1Nm

Stranded wire directly into terminal box



Ambient temperature: 20.16°C

Max. temperature at the terminal: 83.43°C

Temperature difference: 63.27°C

Energy meter ALE3

Load: 65A

Tightening torque 2Nm

Stranded wire with ferrules



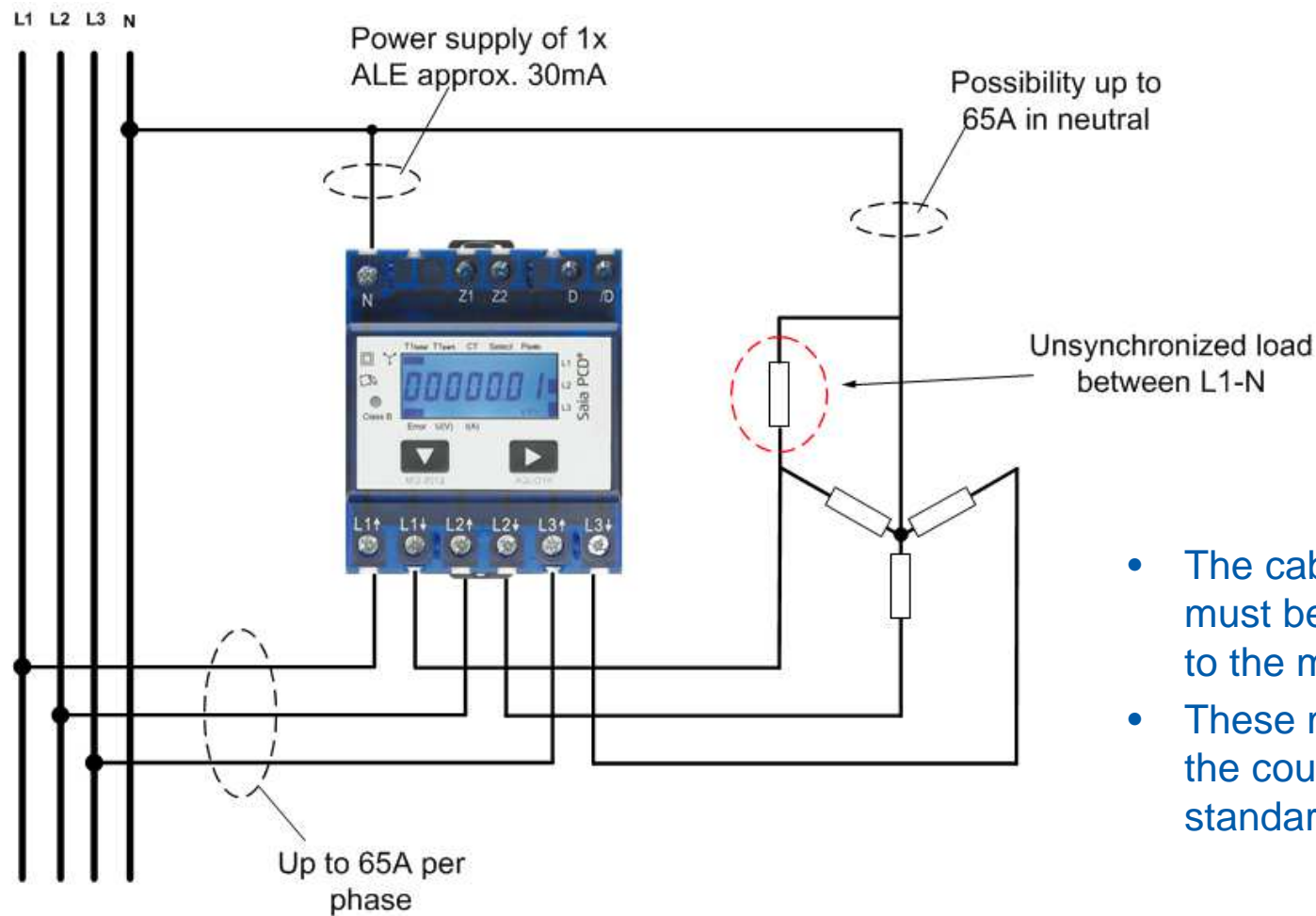
Ambient temperature: 22.50°C

Max. temperature at the terminal: 79.42°C

Temperature difference: 56.92°C

The use of ferrules and the correct tightening torque of the screws is important so that the screw does not heat up to much!

Cable cross sections in the application



- The cable cross-sections must be chosen according to the maximum current.
- These must comply with the country-specific standards!

The screw terminals support the following cable cross-sections:

SBC 1ph energy meter: up to 6mm²

SBC 3ph energy meter: 1.5mm² to 16mm²

Quality of the mains

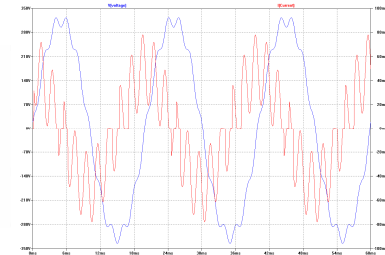
The power quality affects the quality of the measurement. Harmonics disturb the measurement accuracy and can reduce the life of the energy meter.

With combination of harmonic frequencies high currents can be induced in the capacitive power supply. The power supply is designed to operate at 50Hz. It is important to ensure that the limit values of the harmonics are not exceeded.

Sources of harmonics

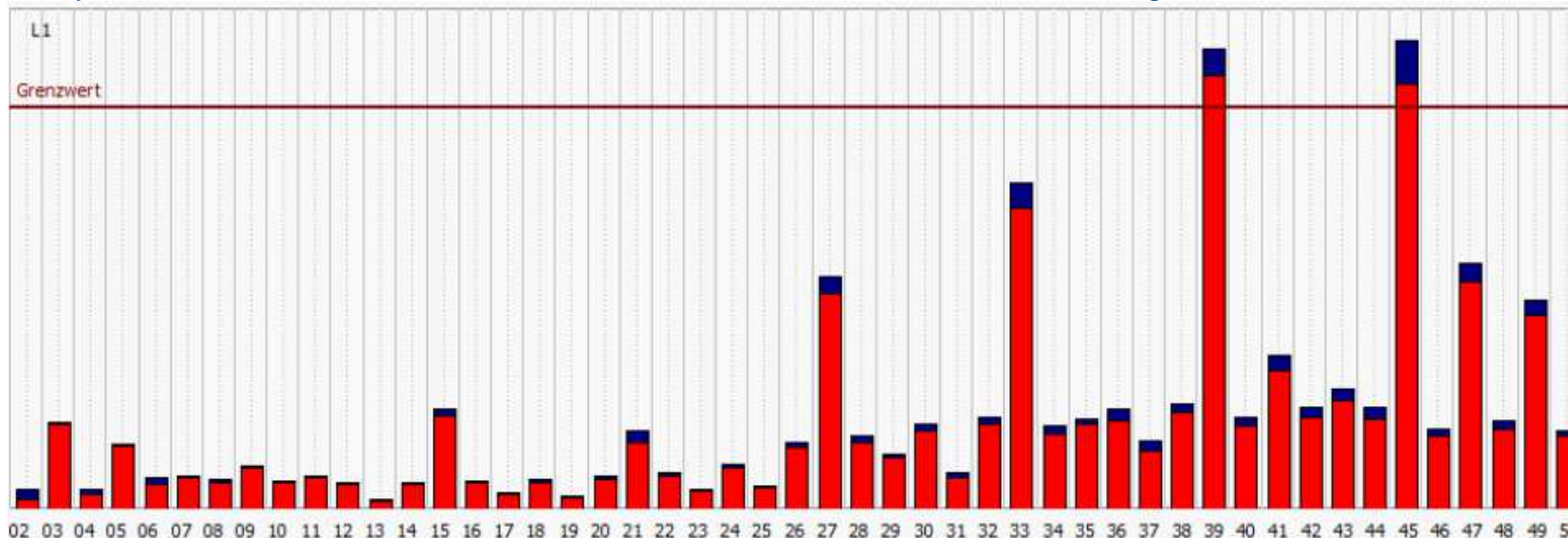


Pulsed power supplies
FL tubes



Sine wave with harmonics
50Hz, 230V / 150Hz, 5V /
500Hz, 20V

Analysis of the harmonics of a continuous measurement with the limit value according to the standard EN50160/IEC61000-2-2



Use of energy meters with photovoltaic systems

Key points for energy meters which are operated with photovoltaic systems:

- The temperature of the energy meter in the installation shall be secured and must be within the specified range -25°C ... $+55^{\circ}\text{C}$.
- The power quality of the inverter must comply with the limits.
- For the use of energy meters with a photovoltaic system it is important to ensure that the country specific regulations are complied with.

Further Reading

We recommend the book «Grid-connected photovoltaic system» by VDE.

ISBN 978-3-8022-1052-5



Calculating the MTBF values

As a basis for calculating the MTBF values, the Siemens SN29500 standard was used.

Calculated values for SBC energy meters:

At 25°C, the MTBF values are:

Energy meter without communication interface:	410 years
Energy meter with communication interface:	200 years

At 55°C, the MTBF values are:

Energy meter without communication interface:	130 years
Energy meter with communication interface:	80 years

