ELEQ mastering electricity worldwide

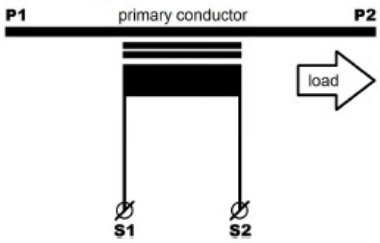
Whitepaper
Current and voltage measurements

To gain insight into energy currents and energy quality it is important to measure both the current and the voltage.

The current is measured per phase of a field. This can be the supply field or the outgoing fields. Depending on the type of electrical installation and the meter used, the voltage is measured at one point in the installation. After all, the current on the supply field and the outgoing fields is different, but, under normal circumstances, the voltage is the same. However, in case the loss of voltage on an outgoing field has to be detected as well, it is necessary to measure the voltage on all outgoing fields.

Current measurements

A current transformer is generally used to measure the current in an electrical installation. The current to be measured in the primary conductor is accurately transformed to a lower standard value via a current transformer. This lower value is often 1 A or 5 A. The benefit of using a current transformer is that the primary conductor is not connected directly to the meter. The current transformer provides a safe galvanic separation between the electrical installation and the meter.



Voltage measurement

To connect the measuring voltage, most meters have a special measuring voltage connection or a combined measuring and supply voltage connection. These inputs are usually suitable for 230 V phase/zero and 400 V phase/phase.

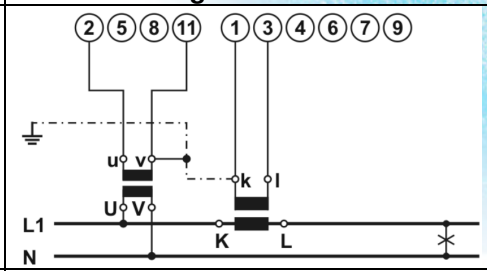
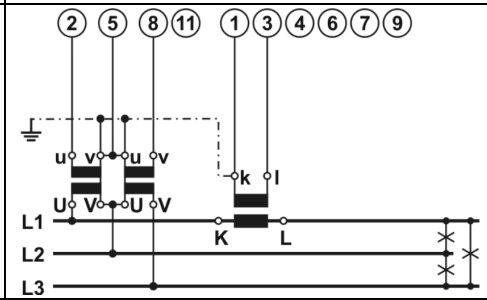
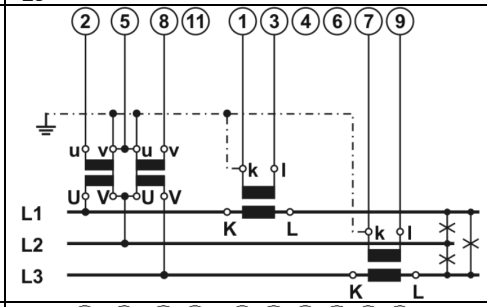
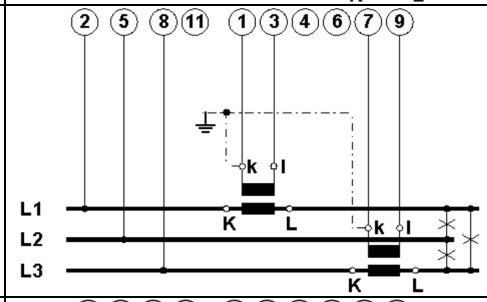
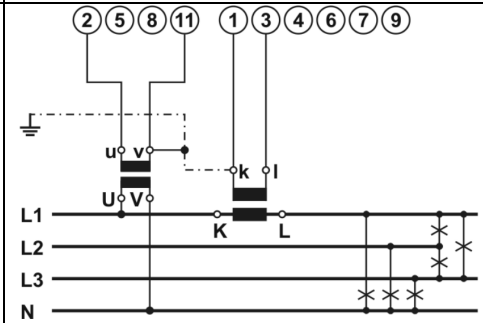
This makes connecting the measuring voltage appear to be a simple matter, unfortunately this is not the case. Splitting the mains voltage in an electrical installation for measuring purposes involves more dangers than is usually expected. This is in contrast to the current measurement input, where the current transformer ensures a safe connection.

In addition to the maximum nominal voltage value, the short-circuit power and voltage peaks must also be taken into account when disconnecting the power supply. The measuring circuit must be sufficiently short-circuit proof to withstand the short-circuit power of the electrical installation.

The following page shows various possible wiring diagrams.

Please feel free to call ELEQ at +31 (0)521 533 333 for more information or send an email to info@eleq.com

For more information on short-circuit power and voltage surges please refer to the 'Short-circuit power and short-circuit resistance' and 'Transient overvoltage' white papers. For more information on a safe Voltage Tap please refer to the 'Safe Voltage Tap' white paper.

System/ connection	Terminal assignment
Single-phase connection 1b (1W)	
Three-phase threewire connection with balanced load 3b (1W3)	
Three-phase threewire connection with unbalanced load 3u (2W3)	
Three-phase threewire direct connection 3u (2W3)	
Three-phase four wire connection with balanced load 4b (1W4)	
Three-phase four wire connection with unbalanced load 4u (3W4)