



## Universal measuring transducer with Ethernet interface

with HTTP, TCP/IP, Modbus-TCP protocol  
with 11 bipolar configurable analog outputs  
2 limit value or pulsed outputs

Type:  
**Multi-E11-MU**



### Application

The measuring transducer Multi-E11-MU is used for the simultaneous transformation and isolation of current, voltage, frequency, active and reactive power, apparent power and the power factor for sinusoidal quantities into 11 impressed direct current and direct voltage signals. The measurement is possible in alternating current systems and 3-wire or 4-wire three-phase power systems with same or any load.

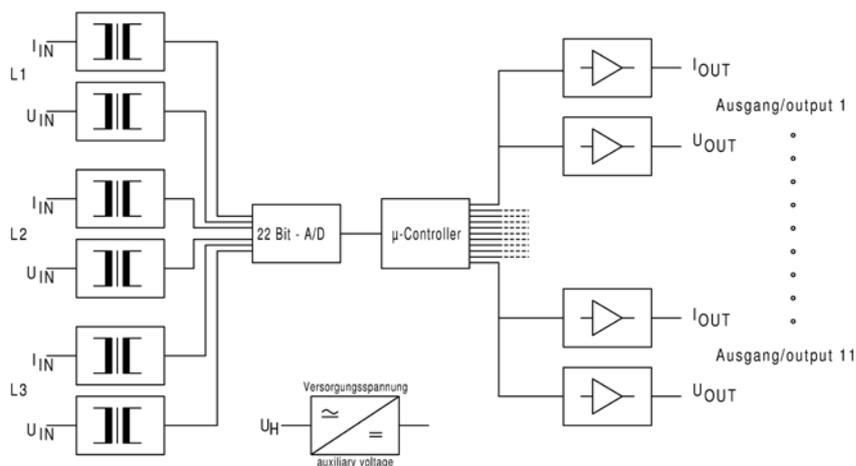
The 29 measurands may be displayed, stored and configured via a 10 Mbit/sec Ethernet LAN interface at the PC. Up to 13000 series of measured values may be stored in the internal memory of the measuring transducer. Furthermore, the measuring results may be displayed via web browser or be read and further processed via HTTP, TCP/IP or Modbus-TCP protocol. Two further outputs may be used as limit value or pulsed outputs. The switching status of the limit value or pulsed outputs is indicated by 2 LEDs.



### Function

The parameters to be measured are sent to a 22 bit A/D converter with a sample rate of >20 kSPS via current and voltage transformers and are then further transmitted to a microcontroller which calculates the required values for the outputs from the measured parameters. The output values for current and voltage are rms-values. The frequency is calculated from the period of the voltage signal of phase L1. The active powers are calculated from the products of the samples of current and voltage of the three phases. The calculations of the reactive power of the three phases are done using the product of the samples of the currents and the 90° offset voltage signals. The apparent power is the sum of the products from the three rms-values of current and voltage.

The power factors are calculated from the apparent power values and the active power values. The output amplifiers supply impressed direct current and direct voltage signals. The output signals are galvanically isolated from the input signals and the auxiliary voltage, but linked to each other via a common ground wire. The outputs are no-load proof and short-circuit proof. The two limit value and pulsed outputs are galvanically isolated from all inputs and outputs and the auxiliary voltage. An auxiliary voltage is required.



### Types and variants

<b>Multi-E11-MU</b>	incl. software download and LAN cable
<b>Surcharge</b>	Connection to hall-effect or flexible current transformers



## Technical data

<b>Input</b>	Input variables	Alternating current and voltage, frequency, active power, reactive power apparent power and power factor in alternating current systems, 4-wire and 3-wire 3-phase power systems with same and any load, unidirectional and bidirectional energy direction, configurable	
	Rated current	2 A and 6 A	
	Current range	0,3-10 A, configurable	
	Rated voltage	100-750 V	
	Voltage range	40-750 V, configurable	
	Rated frequency	50 Hz	
	Frequency range	40-80 Hz	
	Energy consumption	per current path 0,06 VA with 1A, 0,3 VA with 5 A per voltage path 0,02 VA with 100V, 1 VA with 750 V	
	Overload permanent	voltage max. 750 V, current max. 12 A	
	High surge load	voltage 1000 V 1 s, current 240 A 1 s	
<b>Analog outputs</b>	Output variables	double output	
	Rated values current	0-10 mA, 0-20 mA, 4-20 mA, configurable	
	Rated load current	< 500 Ω	
	Rated values voltage	0-5 V, 0-10 V, 2-10 V, configurable	
	Rated load voltage	> 750 Ω	
	Polarity	4 x unipolar or bipolar, configurable, 7 x unipolar	
<b>Limit value and pulsed outputs</b>	Type	Open collector, (NPN-Transistor)	
	Operating voltage	5-24 V DC, max. 30 V DC	
	Operating current	max. 40 mA	
	Pulse length	ca. 40 ms	
	Hysteresis	ca. 4 % of set limit value	
	Accuracy	± 1 % of full scale	
<b>Transfer behavior</b>	<b>Caution!</b>	<b>The valence of the pulses must be divided by the transmission ratio (K<sub>N</sub>) of the current and voltage transformers used!</b>	
	Accuracy	± 0,5 % (at power factor ± 0,5 % in the range >25 % of apparent power = U x I <sub>Nom</sub> x 1,732, with apparent power <25 % the accuracy is ± 1 %, below 10 % of apparent power, (power factor is not measured)	
	Current influence	< 0,5 % with 0,15 to 2-fold rated current	
	Frequency influence	< 0,3 % within frequency range	
	Phase angle influence	< 0,5 % with ± 90°	
	Temperature range	-15 °C to +20 °C to +30 °C to +55 °C	
	Temperature influence	< 0,2 % at 10 K	
	Auxiliary voltage influence	no	
	Load influence	no	
	External magnetic field influence	no (up to 400 A/m)	
	Residual ripple	< 100 mV <sub>ss</sub>	
	Response time	ca. 200 ms (power factor approx. 600 ms)	
	Open circuit voltage	max. 24 V	
	Current limiting	max. 2-fold in case of overload	
	Test voltage	4 kV between output and auxiliary voltage, 5,2 kV between input to output and input to auxiliary voltage, 2 kV between limit value or pulsed output to output	
	<b>Caution!</b>	<b>The Ethernet LAN interface is galvanically connected to the outputs!</b>	
	<b>Auxiliary voltage</b>	Wide range power supply	10-30 V AC + DC, 5 VA or 60-265 V AC + DC, 5 VA (please specify at order)
	<b>Dimensions</b>	Housing	Housing D (135 mm wide) Page A 1
<b>Weight</b>		850 g	
<b>Installation</b>	Fastening	Snap-on fastening on top hat rail 35 mm acc. to DIN EN 60 715	
	Electrical connection	Screw terminal max. 4 mm <sup>2</sup>	

### Calibration

The measuring transducer is factory-calibrated. The calibration should be renewed in the manufacturer's plant every two years

### Configuration

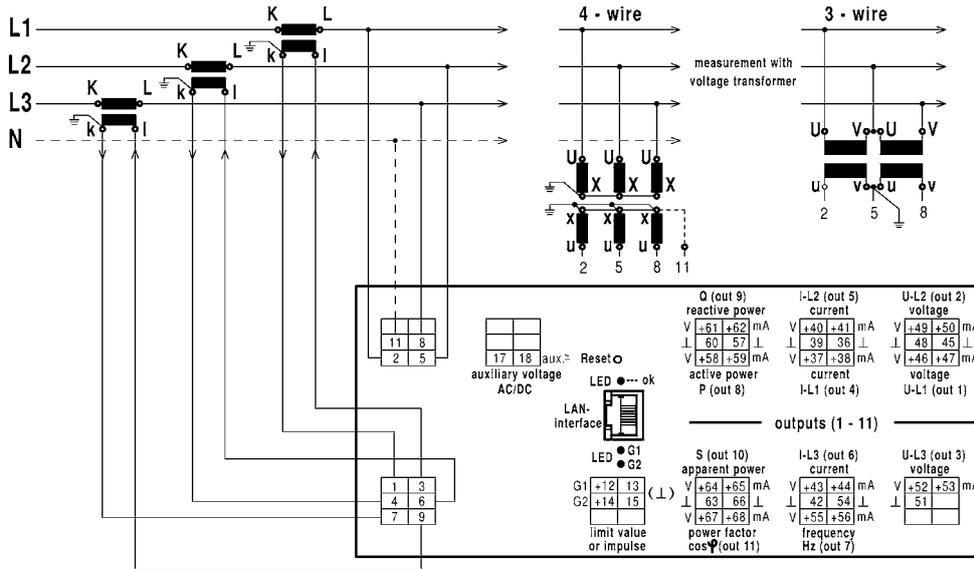
The measuring transducer is configured in the factory if the required data are known. A re-configuration is possible at any time. This will require the related software (download from [www.mueller-ziegler.de](http://www.mueller-ziegler.de)) and a PC. The measuring transducer and the PC must be connected to each other using a LAN cable (accessory).

The auxiliary voltage must be connected to the measuring transducer. The various configuration options of the inputs and outputs are program-guided.

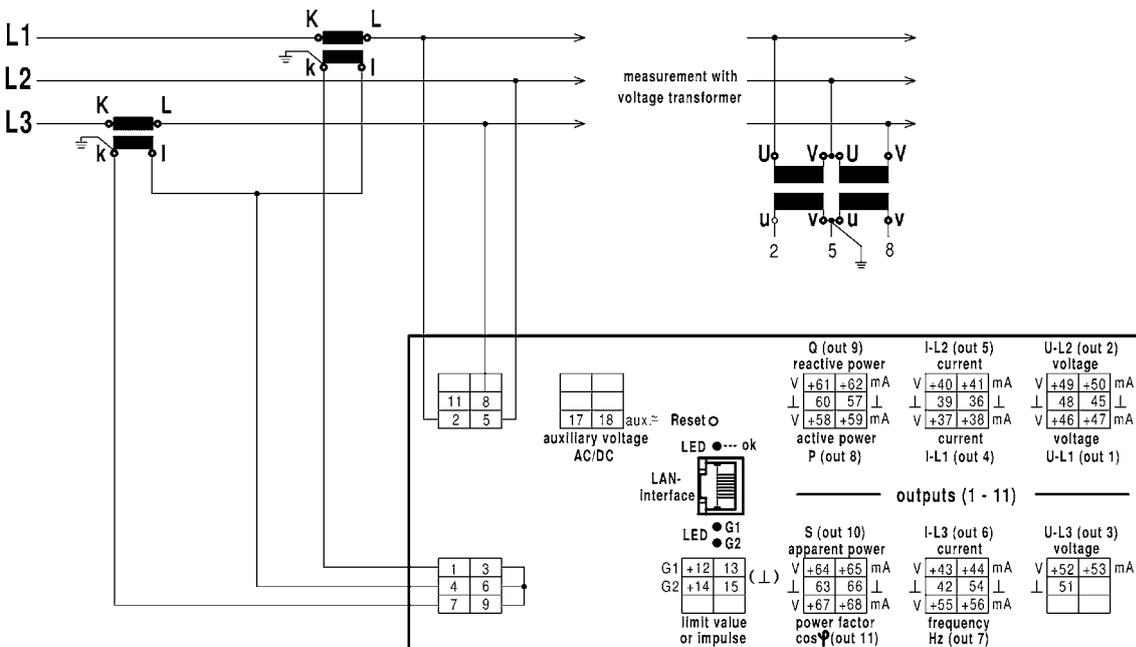


## Connection

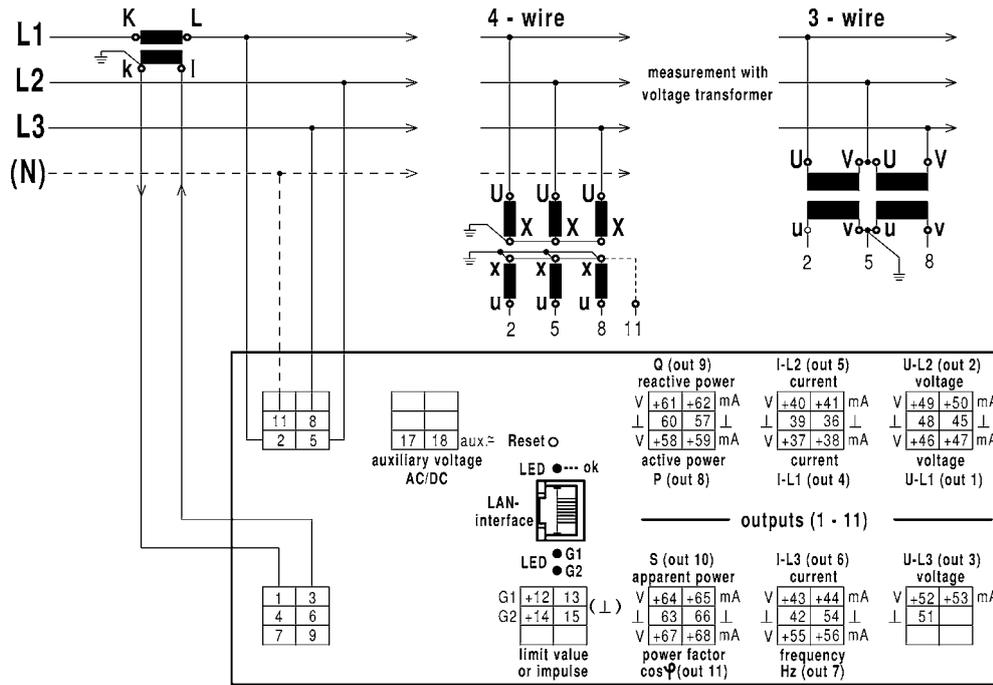
3-/ 4-wire 3-phase current, any load (inputs and outputs not used remain unconnected)



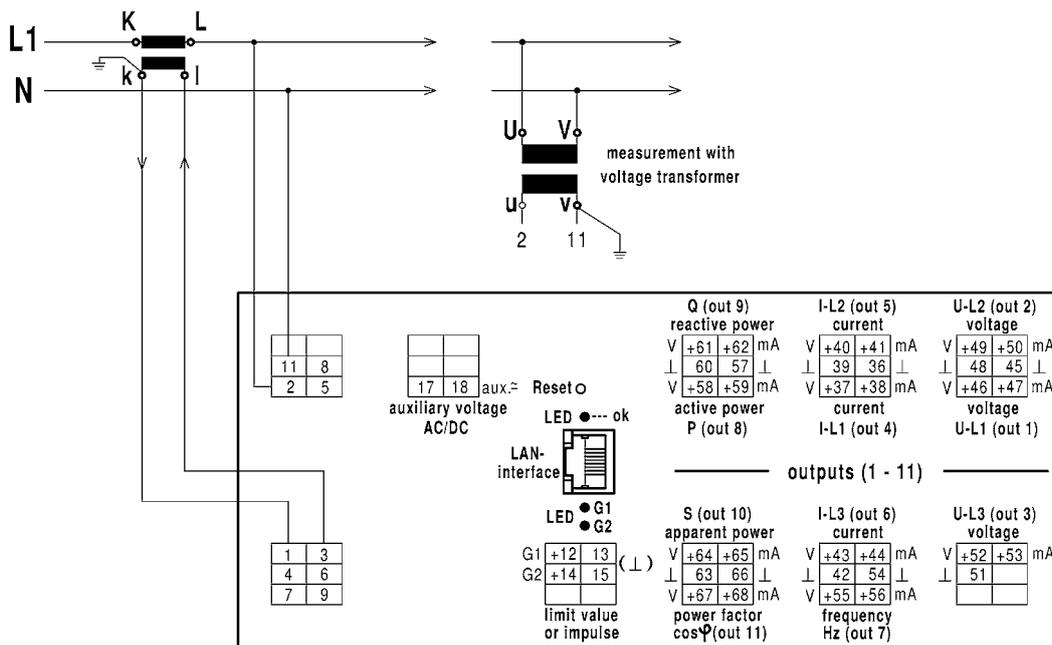
3-wire 3-phase current any load (inputs and outputs not used remain unconnected)



3- /4-wire 3-phase current same load (inputs and outputs not used remain unconnected)

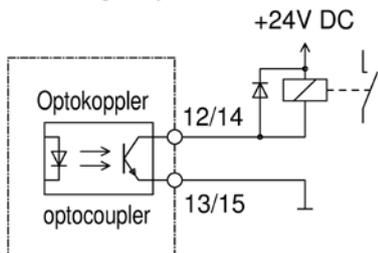


Alternating current (inputs and outputs not used remain unconnected)



Limit value or pulsed output G1 and G2

Schaltausgang mit externem Relais  
switching output with external relay



Impulsausgang mit Lastwiderstand  
pulse output with load resistor

