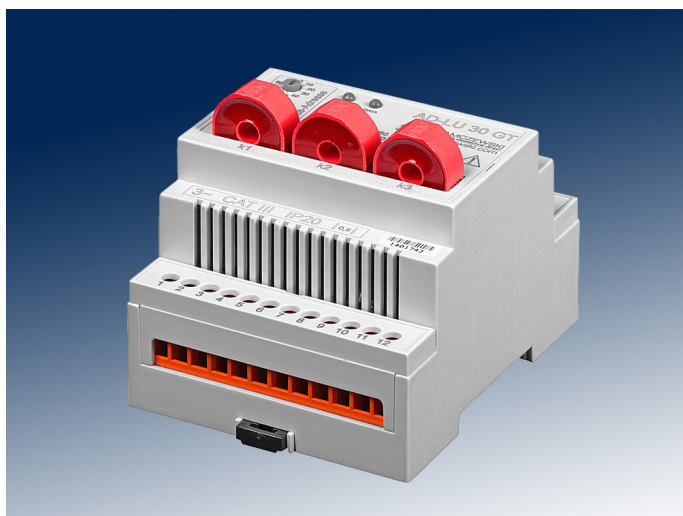# Power Measurement
AD-LU 30 GT

Description

The digital power measuring converter AD-LU 30 GT measures all magnitudes of the three-phase network (current, voltage, energy, effective power, reactive power and apparent power..) and makes this data available via a RS485 bus. The unit is therefore optimally suitable for integration in energy management systems. 3- or 4-conductor networks can be measured. 4-wire networks can be loaded balanced or unbalanced, whereby 3-wire networks can only be measured balanced. The AD-LU 30 GT supplies itself via its measuring voltage L1. The current measuring is carried out with the bushing transformer mounted at the front. For measuring high voltages or currents, external converters can be fitted in series at any time. A Modbus-RTU protocol is run via the RS485 bus interface, whereby the AD-LU 30 GT represents a Modbus slave. The bus address is set via the rotary coding switch mounted at the front, this way several of these measuring units can be switched at one bus and can be interrogated from one central point. The AD-LU 30 GT can also be read and parameterized via the available AD-Studio. Two LEDs at the front signal the operating condition and the RS485 data traffic. The compact type of construction and the high performance ability, with simultaneous low energy consumption, allows usage in almost any application.

Application

A typical usage is in energy management systems for balancing and determining the energy distribution.

Specific characteristics

- current measurement through current transformer
- power supply by measuring voltages
- address setting via rotary coding switch
- recording of all sizes of the three-phase system
- parameter setting via AD-Studio

Business data

Order number

AD-LU 30 GT	digital power meter

Accessory

AD-MM 400	TFT-Display

Technical specifications

Current-inputs (I1...I3)

Measuring ranges	0 ... 1 A AC; 0 ... 5 A AC; 0 ... 20 A AC
Max. conductor diameter	4,8 mm

Voltage-inputs (L1...L3)

Measuring range	80 ... 253 V AC
Input resistance	ca. 500 kOhm

RS485-Bus

Software protocol	Modbus-RTU
Data format	19200, e, 8, 1
Max. bus users	99
Bus termination	120 ohms both sides at the end
Max. length of bus	500 m (no stubs)
Cable	twisted and shielded

Supply

Voltage range AC	80 ... 253 V AC, 50/60 Hz (see voltage-inputs)
Nominal voltage AC	230 V AC
Power consumption	max. 3 VA

Transfer behavior - in reference to the current value

Basic accuracy	< 0,5 % (class 0.5)
Temperature influence	80 ppm/K
Response time	< 2 s

Housing

Dimensions (WxHxD)	71x90x70 mm
Type of protection	IP 20
Connection method	screw clamp
Terminals, wire cross section	2,5 mm² flex wire / 4 mm² one wire
Bolting torque terminals	0,6 Nm
Skinning length	6 mm
Weight	~ 170 g
Manner of fastening	35 mm DIN rail 35mm

Environmental conditions

Ambient temperature	-10 ... 50 °C
Storage and transport	-10 ... 70 °C (no condensation)

EMC

Product family standard	EN 61326-1 [1]
Emitted interference	EN 55011, CISPR11 Cl. B, Gr. 1

Electrical safety requirements

Product family standard	EN 61010-1
Overvoltage category	II
Pollution degree	2
Safety measurement	EN 61010-2-030
Measurement category	CAT III

Galvanic isolation, test voltages

Grid side to RS485-Bus	4 kV, 50 Hz (1 min.)
Grid side to control elements	4 kV, 50 Hz (1 min.)

Protection circuits

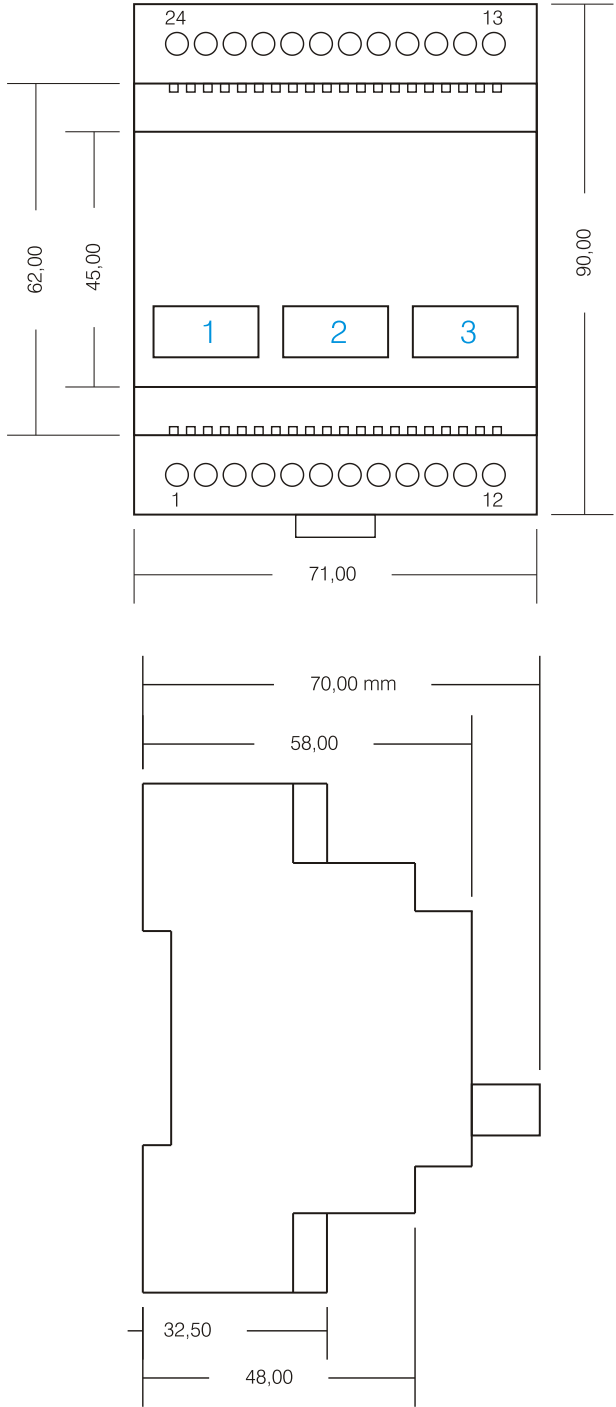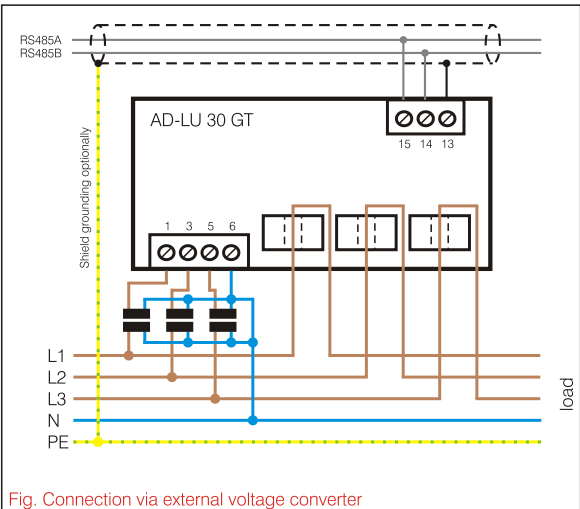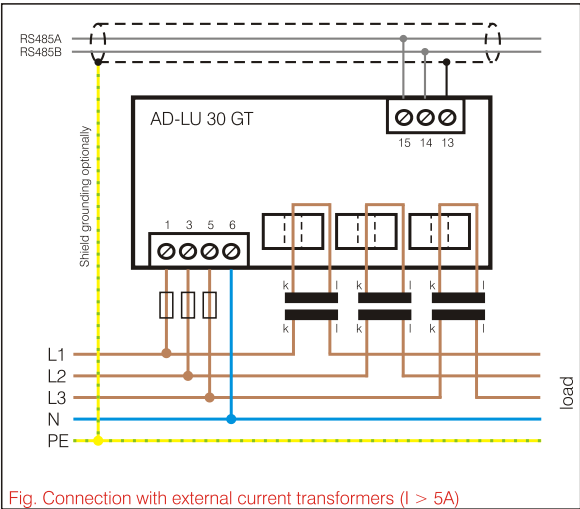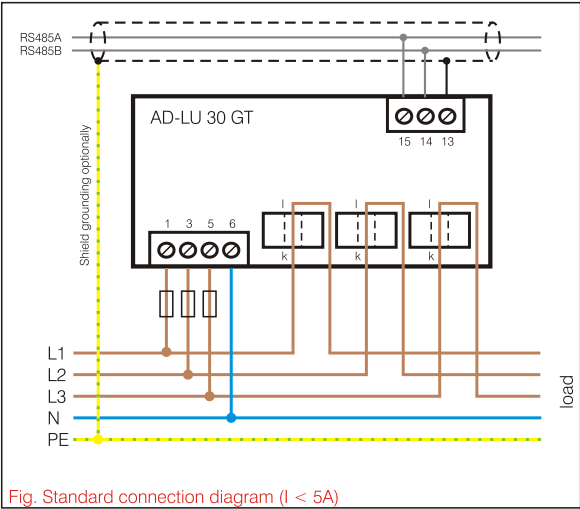|	
Input	electrical surge protection
RS485-Bus	electrical surge protection
Power supply	protection against over-temperature, over-voltage and over-current

[1] During checking, slight signal deviations are possible.

Power Measurement

AD-LU 30 GT

Block and wiring diagram

Fig. Standard connection diagram (I < 5A)

RS485A
RS485B

AD-LU 30 GT

15 14 13

1 3 5 6

Shield grounding optionally

L1
L2
L3
N
PE

load

Fig. Connection with external current transformers (I > 5A)

RS485A
RS485B

AD-LU 30 GT

15 14 13

1 3 5 6

Shield grounding optionally

k l k l k l
k l k l k l

L1
L2
L3
N
PE

load

Fig. Connection via external voltage converter

RS485A
RS485B

AD-LU 30 GT

15 14 13

1 3 5 6

Shield grounding optionally

L1
L2
L3
N
PE

load

Dimensions

24   13

62,00

45,00

90,00

1   2   3

1   12

71,00

70,00 mm

58,00

32,50

48,00

Hinweis:
Für die Messung symmetrischer Lasten kann das Gerät so umparametriert werden,
dass nur ein Stromwandler für die Messung notwendig ist.
In diesem Fall bitte die Strommessung mit Stromwandler 1 auf Phase L1 durchführen.

Power Measurement AD-LU 30 GT

Modbus Communication

The AD-LU 30 GT has a RS485 bus interface on which the Modbus RTU protocol is used. About this bus interface all measured data of the unit can be read out.

The default standard data format is 19200,e,8,1. Adaptation to a different data format is always possible.

data rate: 19200 baud (bits/s)	parity: even	data bit: 8	stop bit: 1

The bus address is set at the front mounted rotary switches. The address 0 is prohibited for bus. However, on this zero position the device always using the standard data format (19200, e, 8,1). The position 0 therefore represents a service position, can be used for example at incorrect parameterization.

The AD-LU 30 GT supports two Modbus functions. These are the functions **"Read Holding Registers" (0x03)** and **"Write Multiple Registers" (0x10)** . The function **"Read Holding Registers"** data can be read from the device and data is written with **"Write Multiple Registers"**. The individual register width is 16 bits.

Please refer to the Modbus specification for a detailed description of the Modbus communication. This is freely available online, but can also be obtained from the Adamczewski homepage.

The following Modbus data are accessible via the RS485 bus:

measurement reading:

start address	no. of registers	name	unit	data type	read	write
40801	2	active power L1	kW	7	1	0
40803	2	active power L2	kW	7	1	0
40805	2	active power L3	kW	7	1	0
40807	2	reactive power L1	kVar	7	1	0
40809	2	reactive power L2	kVar	7	1	0
40811	2	reactive power L3	kVar	7	1	0
40813	2	apparent power L1	kVA	7	1	0
40815	2	apparent power L2	kVA	7	1	0
40817	2	apparent power L3	kVA	7	1	0
40819	2	current L1	A	7	1	0
40821	2	current L2	A	7	1	0
40823	2	current L3	A	7	1	0
40825	2	voltage L1	V	7	1	0
40827	2	voltage L2	V	7	1	0
40829	2	voltage L3	V	7	1	0
40831	2	frequency	Hz	7	1	0
40833	2	total active power	kW	7	1	0
40835	2	total reactive power	kVar	7	1	0
40837	2	total apparent power	kVA	7	1	0
40839	2	power factor L1		7	1	0
40841	2	power factor L2		7	1	0
40843	2	power factor L3		7	1	0
40845	2	total power factor		7	1	0

List-parameters:

start address	no. of registers	name	unit	data type	read	write
42001	1	BAUDRATE	baud	3	1	1
42002	1	STOPBIT		3	1	1
42003	1	PARITY		3	1	1
42004	1	LOAD TYPE		3	1	1

Data-parameters:

start address	no. of registers	name	unit	data type	read	write
43001	2	FILTER	s	7	1	1
43003	2	PRIM_current	A	7	1	1
43005	2	SEC_current	A	7	1	1
43007	2	PRIM_voltage	V	7	1	1
43009	2	SEC_voltage	V	7	1	1
43011	2	MIN_load	%	7	1	1

Counters:

start address	no. of registers	name	unit	data type	read	write
43505	2	total energy KWH EXTRAKT	kWh	5	1	1
43507	2	total energy KWH INFEED	kWh	5	1	1
43509	2	total energy KVARH INDUCTIVE	kVarh	5	1	1
43511	2	total energy KVARH CAPACITIVE	kVarh	5	1	1
43513	2	total energy KVAH	kVAh	5	1	1
44001	2	counter operation hours	h	5	1	1
44013	2	counter load hours	h	5	1	1

Legend of the data types:

U08: 1	S08: 2	U16: 3	S16: 4	U32: 5	S32: 6	float: 7

Coding of the list-parameter (list index:value):

Baudrate	0:2400	1:4800	2:9600	3:14k4	4:19k2	5:28k8	6:38k4	7:57k6	8:76k8	9:115k2

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Stopbit	**0:**1	**1:**2									
Parität	**0:**even	**1:**odd	**2:**none								
load type	**0:**unbal.	**1:**bal.									