

PA 33

Measuring Transducers

Version 1.0



The PA33 transducers measure quantities in single-phase as well three-phase low- or high-voltage power systems, such as voltage, current, power, power factor, total harmonic distortion, and frequency. Quantities values can be both read via communication interface and transmitted to the transducer analog outputs. Furthermore, the transducers can be equipped with two digital outputs for quantity state indication.

The transducer's measuring inputs comprise three voltage inputs of nominal range 230 V_{eff} and three fully isolated current inputs of nominal range 5 or 1 A_{eff} (from instrument current transformer outputs).

The transducers are designed for DIN-bar mount (EN50022, bar width 35mm, transducer width 5M=87 mm).

The transducers can be equipped with :

- an RS485 or RS232 communication port that can be used to set up the transducer and for a host system to remotely monitor the values measured
- two analog outputs of 4(0) - 20 mA current loop character
- two galvanically isolated digital outputs (relay contacts, solid state relays, SSR) that can be preprogrammed as binary signal outputs (alarms)

State of the transducer is indicated with two LED-diodes.

A transducer that has the optional communication port can be set up and remotely monitored using the Envis.Daq program.

Connection

It is necessary to connect an auxiliary supply voltage in the range as declared in technical specifications table to the **AUX V** terminals **L** and **N**. The supply voltage must be connected via a disconnecting device (switch - see installation diagram). It must be situated directly at the instrument and must be easily accessible by the operator. The disconnecting device must be labelled as the disconnecting device of the equipment. A circuit breaker at the nominal value of 1A may be used for the disconnecting device; however its function and position must be clearly marked (symbols „O" and „I" according to EN 61010 - 1).

Measured phase-to-neutral voltages connect to terminals **L1**, **L2** and **L3**; the neutral&protective conductor connect to terminal **PEN**. Measured voltages must be protected, e.g. by 1A fuse.

Current signals from the current transformers at the nominal value of 5 or 1 A_{eff} must be connected to a pair of terminals **I1k**, **I1l**, **I2k**, **I2l**, **I3k**, **I3l**. It is necessary to observe their polarity (terminals k, l).

Analog outputs are connected to terminals **A1+**, **A1-**, **A2+**, **A2-**. Digital outputs are connected to terminals **O1+**, **O1-**, **O2+**, **O2-**.

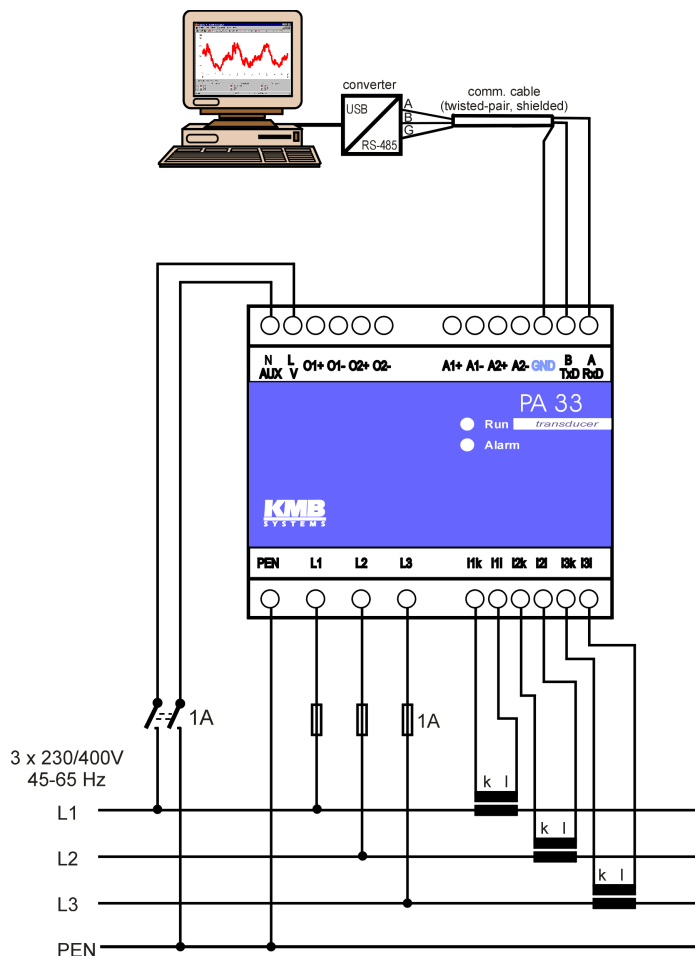
RS 485 communication link is connected to terminals **A** and **B** ; the communication cable shield should be connected to the **GND** terminal. At the link end nodes, installation of termination resistors is recommended.

RS 232 communication link is connected to terminals **RxD**, **TxD** and **GND**.

WARNING ! The **PEN** terminal is internally connected with the **A1-** and **A2-** analog outputs and the **GND** terminal of the communication interface !

The maximum cross section of the conductors to the terminals is 2,5 mm².

Fig. 1 : Transducer connection example



At Aron connection, the L2 current is not connected.

Function

After supply voltage powerup, internal diagnostic is executed. Then the green "Run" LED starts flashing, indicating operation of the transducer and the transducer starts to convert the measured values according to the settings. The "Alarm" LED indicates a malfunction of the unit and stays off in normal state.

Current loop analog outputs have standardized character and can be connected to various recording devices, PLCs, etc.

Digital outputs can be used, for example, for indication of exceeding of selected measured quantity preset level.

Configuration and setup of a transducer that does not have the optional communication port must be specified in the purchase order; then they can be installed and used only. Behaviour of outputs of transducers equipped with a communication line can be set using Envis.Daq program by user any time.

Setup

Transducers without a communication interface are preset by manufacturer according the user's order. It comprises CT ratio, voltage connection type - directly or through VTs and its ratio, analog outputs ranges, digital outputs trigger levels etc.

Transducers equipped with a communication interface can be set by user. For this, download and instal the Envis.Daq program from the manufacturer's website (www.kmbsystems.eu). After connecting your transducer to a PC then you can set both communication line and analog and digital outputs parameters. Control quantities can be as follows :

- any phase or line voltage, equivalent three-phase voltage, voltage unbalance
- any phase current, equivalent three-phase current value
- any phase or three-phase active / reactive / apparent power
- any phase or three-phase power factor (PF)
- frequency
- other quantities on request

All values are calculated from definition integral formulas and get "true RMS" effective values.

Model Marking

PA 33 -H 1 A2 RI / 4 - 1.3P/3P

Type	U/I Phase No. :	U_{NOM}	I_{NOM}	Analog outputs	Digital outputs	Comm. link	Firmware version / Setting
PA... basic type	33 ... 3U+3I 11 ... 1U+1I 30 ... 3U+0I 03 ... 0U+3I 10 ... 1U+0I 01 ... 0U+1I	... $U_{NOM}= 230\text{ V}$ -H... $U_{NOM}= 100\text{ V}$... $I_{NOM}= 5\text{ A}$ -1... $I_{NOM}= 1\text{ A}$	A0 ... none A1 ... one A2 ... two	... none RR ... 2x relay RI ... 1x relay + 1xSSR II ... 2x SSR	... none 2 ... RS 232 4 ... RS 485	see Firmware Version Table

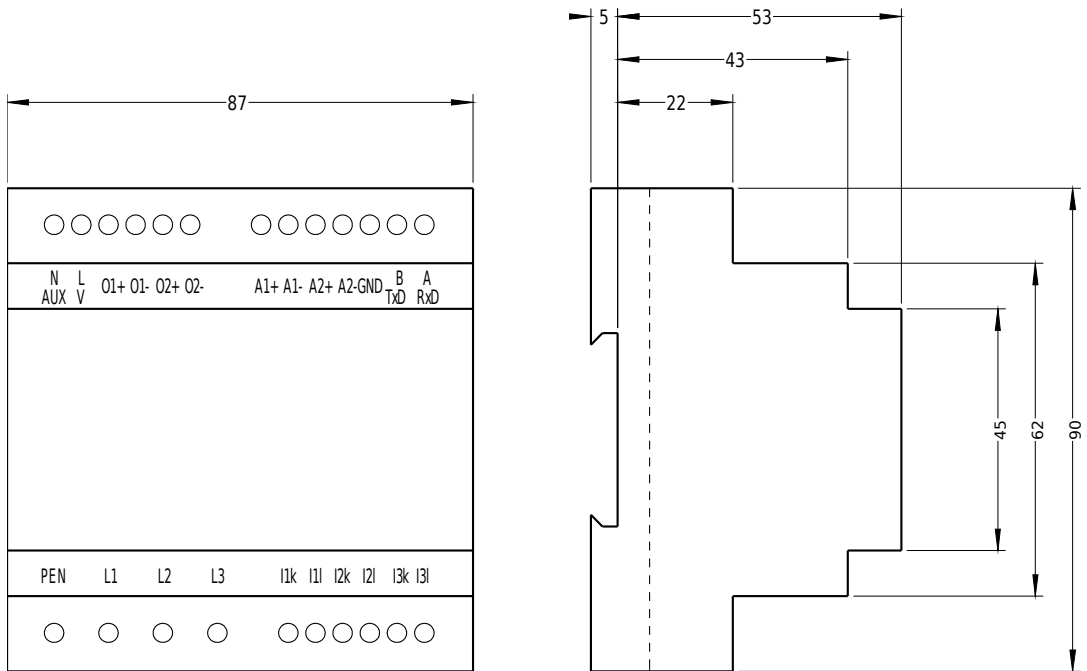
Firmware Version Examples Table

Firmware version	Transmitted quantity	Value at 0/4 mA	Value at 20 mA
1.3P / 3P	A1 : 3-p active power A2 : dtto	4 mA ... 0 W dtto	20 mA ... $3 \times U_{NOM} \times I_{NOM}$ (PF=1) dtto
2.P1 / P2	A1 : L1 phase active power A2 : L2 phase active power	4 mA ... 0 W dtto	20 mA ... $U_{NOM} \times I_{NOM}$ (PF=1) dtto
3.unb / ULLequ.	A1 : voltage unbalance A2 : equivalent 3-phase L-L voltage	4 mA ... 0 % 4 mA ... 0 V	20 mA ... 100 % 20 mA ... 500 V

Technical Specifications

auxiliary supply voltage	230 V _{AC} ± 10% / 50 Hz
power	3 VA
overvoltage class and pollution level	III / 2 – in compliance with IEC EN 61010-1
connection	galvanically isolated
measured voltage standard (U _{nom} = 230 V _{AC}) „-H“/option (U _{nom} = 100 V _{AC})	3 ÷ 285 V _{AC} / 5 ÷ 500 V _{AC} (phase / line) 2 ÷ 125 V _{AC} / 3 ÷ 215 V _{AC} (phase / line)
voltage measurement accuracy	± 1%
input impedance	660 kΩ (L _i – PEN)
connection	wye (star)
permanent overload (IEC 258)	2 times nominal (that is 1,000 / 570 V)
surge overload	4 times nominal for one second (that is 2,000 / 1,140 V)
frequency	45 ÷ 65 Hz
frequency measurement accuracy	± 0.1%
measured current standard (I _{nom} = 5 A _{AC}) „-1“/option (I _{nom} = 1 A _{AC})	0.02 ÷ 7 A _{AC} 0.005 ÷ 1.4 A _{AC}
current measurement accuracy	± 1%
input power	< 0.25 VA (R _i < 10 mΩ)
input wiring	galvanically isolated
permanent overload (IEC 258)	14 A _{AC}
surge overload	70 A _{AC} for one second
active power (P _{nom} = 3 * U _{nom} * I _{nom} W)	range limited by measurement voltage and current ranges
active power measurement accuracy	± 2 %
power factor (accuracy)	0.00 ÷ 1.00 (± 2%)
analog output – range	programmable to 0 or 4 mA ÷ 20 mA
maximum load	500 Ω
conversion / settlement time	10 ms for error <1%
converted signal evaluation window length	10 ms ÷ 1 s
number, type	2, non-isolated, negative wire connected to PEN terminal
digital output - type	relay contact or solid state switch
max. load	relay : 5A / 250V _{AC} , 30V _{DC} / 125VA SSR : 100V / 0.3A
number, type	2, galvanically isolated
communication port	RS 485 or RS 232, non-isolated, common wire connected to PEN terminal
operating environment	class C1 in compliance with IEC 654-1
operating temperature	-25 to 60°C
storage temperature	-40 to 85°C
operating and storage humidity	< 95% – noncondensing conditions
EMC – emission	EN 50081-2 EN 55011, class A , EN 55022, class A (not for residential environments)
EMC – resistance	EN 61000-6-2
protection rating	IP 20
dimensions	DIN-rail mounted, 87 x 90 mm
mass	0.3 kg

Physical



Warranty Certificate

Warranty period of 24 months from the date of purchase is provided for the instrument, however, no longer than 30 months from the day of dispatch from the manufacturer. Problems in the warranty period, provably because of faulty workmanship, design or inconvenient material, will be repaired free of charge by the manufacturer or an authorized servicing organization.

The warranty ceases even within the warranty period if the user makes unauthorized modifications or changes to the instrument, connects it to out-of-range quantities, if the instrument is damaged due to ineligible or improper handling by the user, or when it is operated in contradiction with the technical specifications presented.

Type of product: **PA**..... Serial number:.....

Date of dispatch: Final quality inspection:

Manufacturer's seal:

Date of purchase: Supplier's seal: