

Transducers for Current, Voltage requiring Auxiliary Supply

A1U 2.2
V1U 2.2
AUD2.2
VUD2.2
AUE2.2
VUE2.2
TUA 2.2

*transducer case
width 22.5 mm*



Application

The transducers of the **2.2 series** convert existing currents or voltages polarity-true into a load independent DC current or an impressed DC voltage. The output signal can be indicated, recorded and/or used for controlling directly at the test point or in measuring facilities located far away.

The range of transducers includes types for sinusoidal resp. **non-sinusoidal AC signals** as well as **DC signals**.

It is possible to connect more than one indicator, recorder, controller, computer etc. to the output circuit provided the total impedance does not exceed the rating.

Power supply is effected by a separate auxiliary voltage input. Input, output and auxiliary voltage input are **galvanically isolated from each other**. The outputs are **short-circuit proof** and **safe against idling**.

The transducers comply with safety requirements and are tested for interference immunity.

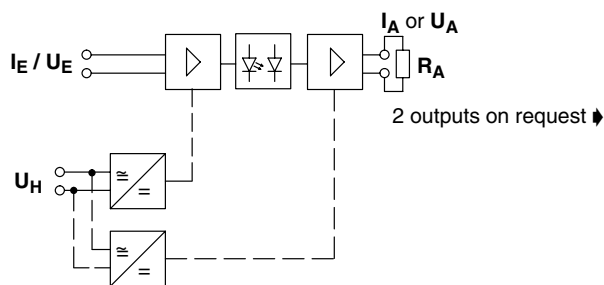
The transducers are designed to be mounted in machines/systems. Regulations for installation of electrical systems and equipment have to be observed.

Operating Principle

Current measurement is effected by means of a shunt, voltage measurement by means of a voltage divider.

The signal will then be galvanically isolated from input via an optical path and converted into a proportionally impressed DC voltage or into a load independent DC current proportional to the input signal.

Block Circuit Diagram



General Data

case details	projecting case clamping to TH 35 DIN rail according to DIN EN 60 715
material of case	ABS/PC black self-extinguishing to UL rating 94 V-0
terminals	screw-terminals
wire cross-section	4 mm ² max.
enclosure code	IP 40 case IP 20 terminals
dielectric test	2210 V all circuits to case, 3536 V all circuits to each other
operating voltage	300 V (rated voltage phase to zero)
class of protection	II
measurement category	CAT III
pollution level	2
dimensions WxHxL	22.5 mm x 80 mm x 115 mm
weight	approx. 0.12 kg

Inputs

Device	input quantities ↗	rated input value
A1U 2.2	sinusoidal AC current *)	$I_{EN} = 200 \mu\text{A} - 5 \text{ A}$
V1U 2.2	sinusoidal AC voltage *)	$U_{EN} = 60 \text{ mV} - 519 \text{ V}$
AUD 2.2	DC current	$I_{EN} = 200 \mu\text{A} - 5 \text{ A}$
VUD 2.2	DC voltage	$U_{EN} = 60 \text{ mV} - 300 \text{ V}$
AUE 2.2	non-sinusoidal AC current (true RMS value) *)	$I_{EN} = 200 \mu\text{A} - 5 \text{ A}$
VUE 2.2	non-sinusoidal AC voltage (true RMS value) *)	$U_{EN} = 60 \text{ mV} - 519 \text{ V}$
TUA 2.2	DC standard signals ↗	$I_{EN} = 20 \text{ mA}$ $U_{EN} = 60 \text{ mV}, 10 \text{ V}$

*) also for use on transformer

frequency range	48 ... 62 Hz ↗
crest factor (AUE/VUE 2.2)	≤ 4 (peak value / rms value)
input resistance	V1U 2.2 VUD 2.2 $U_{EN} > 20 \text{ V}$ VUE 2.2 $U_{EN} > 30 \text{ V}$ TUA 2.2 $U_{EN} = 60 \text{ mV}$ approx. 2 k Ω /V
	VUD 2.2 $U_{EN} \leq 20 \text{ V}$ VUE 2.2 $U_{EN} \leq 30 \text{ V}$ TUA 2.2 $U_{EN} = 10 \text{ V}$ approx. 33 k Ω /V
power consumption	$I_E \cdot 0.1 \text{ V}$ on current input U_E^2 / R_E on voltage input
operating voltage	max. 519 V AC, max. 300 V DC

	current input	voltage input
measuring range	0 ... I_{EN}	0 ... U_{EN}
AUD/VUD 2.2 option ↗	$-I_{EN} \dots 0 \dots +I_{EN}$	$-U_{EN} \dots 0 \dots +U_{EN}$
modulation range	1.2 I_{EN}	1.2 U_{EN}
overload limit	1.2 I_{EN} continuously 10 I_{EN} max. 1 s	1.2 U_{EN} continuously 2 U_{EN} max. 1 s

Outputs

current output

output current	I_A	load independent DC current (0 ... 20 mA) ↗
rated current	I_{AN}	0 ... 20 mA or 4 ... 20 mA
load range	R_A	0 ... 12 V / I_{AN}
current limitation		to 120 ... 150% of end value

voltage output

output voltage	U_A	impressed DC voltage (0 ... 12 V) ↗
rated voltage	U_{AN}	0 ... 10 V or 2 ... 10 V
load	R_A	$\geq 4 \text{ k}\Omega$

current/voltage output

load error	$\leq 0.1\%$ based on 50% load change
residual ripple	$\leq 1\%$ _{rms}
response time	approx. 500 ms or optionally approx. 250 ms (not for AUE/VUE 2.2) approx. 100 ms (not for AUE/VUE 2.2)
idling voltage	$\leq 15 \text{ V}$

Also, bipolar output quantities are possible using power supply units **H4** and **H5** (e.g. $-20 \dots 0 \dots 20 \text{ mA}$).

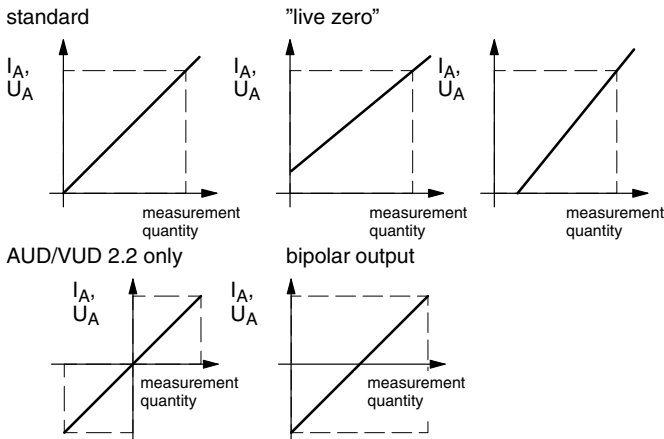
Input and outputs are galvanically isolated.

↗ extras on request

Transducers for Current, Voltage requiring Auxiliary Supply

Conversion Characteristics

examples



Auxiliary Supply

power supply unit	auxiliary voltage	power consumption
H1 *)	230 V~ (195 ... 253 V), 48 ... 62 Hz	< 6 VA
H2	115 V~ (98 ... 126 V), 48 ... 62 Hz	< 3.5 VA
H3	24 V= (20 ... 72 V)	< 3 VA
H4	20 ... 100 V= resp. 15 ... 70 V~	< 3 VA
H5	90 ... 357 V= resp. 65 ... 253 V~	< 3 ... 6 VA

*) standard

Galvanic isolation between input, output and auxiliary voltage

Accuracy at Reference Conditions

accuracy class 0.5 ($\pm 0.5\%$ of end value)
class 0.2 ($\pm 0.2\%$ of end value) only for DC transducers on request

temperature coefficient $\leq 0.01\%/K$

valid for standard products and a life-period of 1 year maximum

reference conditions

- auxiliary voltage $U_{HN} \pm 5\%$, (50 Hz for AC)
- load $0.5 R_{A \max} \pm 1\%$ for current output
 $R_{A \min} \pm 1\%$ for voltage output
- frequency 50 ... 60 Hz (for A1U/V1U/AUE/VUE 2.2)
- wave form sine curve, distortion factor $\leq 0.1\%$ (for A1U/V1U/AUE/VUE 2.2)
- ambient temperature $23^\circ C \pm 1K$
- warm-up ≥ 5 min

Environmental

- climatic suitability climatic class 3 to VDE/VDI 3540 sheet 2
- operating temperature range $-10 \dots +55^\circ C$
- storage temperature range $-25 \dots +65^\circ C$
- relative humidity $\leq 75\%$ annual average, non-condensing

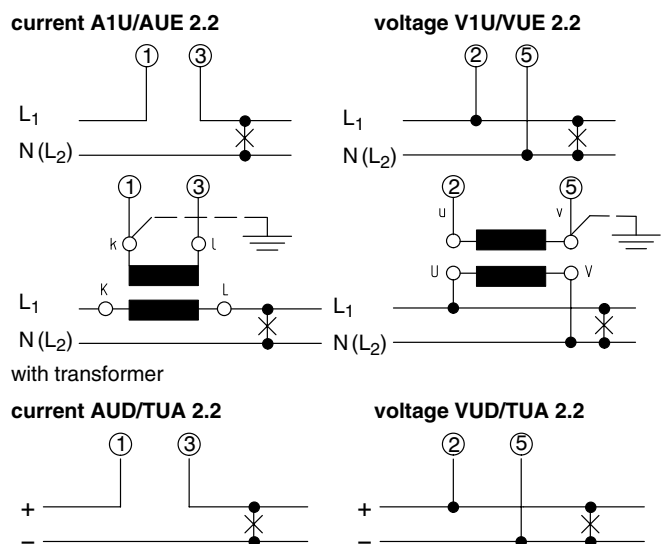
Rules and Standards

- DIN EN 60 529 Enclosure codes by housings (IP - code)
- DIN EN 60 688 Electrical measuring transducers converting AC quantities into analog or digital signals
- DIN EN 60 715 Dimensions of low voltage switching devices: standardized DIN rails for mechanical fixation of electrical devices in switchgears
- DIN EN 61 010-1 Safety requirements for electrical measuring, control and laboratory equipment Part 1: General requirements
- DIN EN 61 326-1 Electrical equipment for measurement, control and laboratory use – EMC requirements Part 1: General requirements (IEC 61 000-4-3 evaluation criterion B)
- VDE/VDI 3540 sheet 2 Reliability of measuring and control equipment (classification of climates for equipment and accessories)

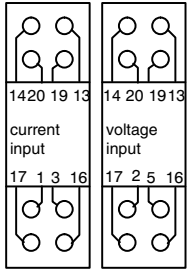
Options

- measuring range **AUD 2.2** $-I_{EN} \dots 0 \dots +I_{EN}$ **VUD 2.2** $-U_{EN} \dots 0 \dots +U_{EN}$
- input **TUA 2.2** selectable from standard input ratings via jumpers located behind front panel
- output selectable from standard output ratings via jumpers located behind front panel

Connections



Terminal Assignment



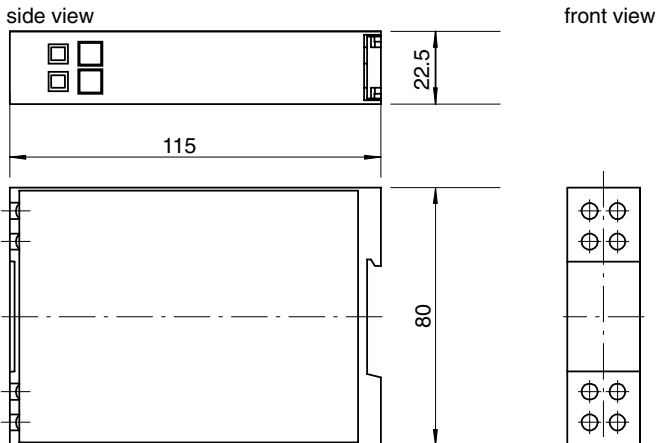
T.	Function	T.	Function
1	I_E (+)	19	U_A, I_A (+)
3	I_E (-)	20	U_A, I_A (-)
2	U_E (+)		dual output:
5	U_E (-)	13	U_A (+)
16	U_H L1(+)	14	U_A (-)
17	U_H N (-)	19	I_A (+)
		20	I_A (-)
			I_A current output
			U_A voltage output

I_E current input
 U_E voltage input

U_H auxiliary voltage input

The terminal numbering correspond to details in the connection diagrams (to DIN 43 807).

Dimensions



(dimensions in mm)

Ordering Guide

type	Transducer for current and voltage		
A1U 2.2	sinusoidal AC current		
V1U 2.2	sinusoidal AC voltage		
	TRMS measurement		
AUE 2.2	non-sinusoidal AC current		
VUE 2.2	non-sinusoidal AC voltage		
	DC quantities		
AUD 2.2	DC current		
VUD 2.2	DC voltage		
TUA 2.2	isolating transducer for standard signals		
Input	A1U/AUE/AUD	V1U/VUE/VUD	TUA
10	0 ... 200 μ A	0 ... 60 mV	0 ... 20 mA
11	0 ... 20 mA	0 ... 1 V	0 ... 10 V
12	0 ... 0.5 A	0 ... 10 V	4 ... 20 mA
13	0 ... 1 A	0 ... 115 V	2 ... 10 V

14	0 ... 2 A	0 ... 230 V	0 ... 60 mV
15	0 ... 5 A	0 ... 400 V (V1U/VUE only)	-
00	special range **) (up to 5 A)	special range **) (up to 519 V AC, up to 300 V DC)	-
Input	AUD	VUD	
20	-200 ... 0 ... +200 μ A	-60 ... 0 ... +60 mV	
21	-20 ... 0 ... +20 mA	-1 ... 0 ... +1 V	
22	-0.5 ... 0 ... +0.5 A	-10 ... 0 ... +10 V	
23	-1 ... 0 ... +1 A	-115 ... 0 ... +115 V	
24	-2 ... 0 ... +2 A	-230 ... 0 ... +230 V	
25	-5 ... 0 ... +5 A	-	
00	special range up to ± 5 A or ± 300 V **)		
	Frequency range input		
F0	DC		
F16	15 ... 18 Hz ($16^{2/3}$ Hz)		
F50	48 ... 62 Hz (50/60 Hz *)		
F100	98 ... 102 Hz (100 Hz)		
F400	380 ... 420 Hz (400 Hz)		
Fxxx	special frequency **)		
	Output		
1	0 ... 20 mA		
4	4 ... 20 mA		
7	0 ... 10 V		
8	2 ... 10 V		
11	0 ... 20 mA and 0 ... 10 V		
14	4 ... 20 mA and 2 ... 10 V		
	special ranges		
2	0 ... 10 mA		
3	0 ... 5 mA		
5	-20 ... 0 ... 20 mA ***)		
9	-10 ... 0 ... 10 V ***)		
15	-20 ... 0 ... 20 mA and -10 ... 0 ... 10 V ***)		
0	to be specified **)		
	Accuracy		
0.5	$\pm 0.5\%$ of end value *)		
0.2	$\pm 0.2\%$ of end value (AUD/VUD/TUA 2.2 only)		
	Response time		
T1	500 ms *)		
T3	250 ms (not for AUE/VUE 2.2)		
T4	100 ms (not for AUE/VUE 2.2)		
	Auxiliary supply		
H1	AC 230 V (195 ... 253 V), 48 ... 62 Hz *)		
H2	AC 115 V (98 ... 126 V), 48 ... 62 Hz		
H3	DC 24 V (20 ... 72 V)		
H4	DC 20 ... 100 V / AC 15 ... 70 V		
H5	DC 90 ... 357 V / AC 65 ... 253 V		

*) standard

**) on request, please clearly add the desired specifications.

***) AUD/VUD only, available with H4 or H5 only

ordering example

V1U 2.2 14 F50 1 0.5 T1 H1

transducer for sinusoidal AC voltage, calibrated to 0 ... 230 V, 50/60 Hz, output 0 ... 20 mA, accuracy class 0.5, response time 500 ms, auxiliary voltage 230 V AC

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- specifications subject to change without notice; date of issue 08/14 -

