

EURAX 1I/U1

Multiple transducer for AC current and voltage

Plug-in module in Euro format



Application

The EURAX 1I/U1 (Fig. 1) converts 1 up to 3 sine wave AC current or AC voltage into 1 to 3 output signals that can serve several receiving instruments such as indicators, recorders, alarm units etc.

Features / Benefits

- Up to 3 measuring inputs: AC currents and/or AC voltages, sine waveform, arithmetical mean value measurement, calibration to rms with sine wave form

Measured variables	Measuring range limits
AC currents	0...0.01 to 0...10 A
AC voltages	0...10 to 0...650 V

- Up to 3 measuring outputs: DC current signal (load-independent) or DC voltage signal
- Low power consumption / Smaller CT's and VT's can be used
- The device fulfils the protection requirements of the EMC guidelines (89/336/EWG) / The device bears the CE symbol for EMC. See "Table 1: Electromagnetic compatibility"
- Mechanical design of the transducer: Plug-in module 11 TE (55.58 mm) for 19" rack-mounted case



Fig. 1. Multiple transducer EURAX 1I/1I, 1U/U1, front plate width 11 TE.

Layout and mode of operation

The module consists of two printed circuit boards, one accommodating the measuring unit and the other the power pack. Both PCB's are joined together stackwise and form a plug-in module with the common front plate. Depending on the instrument type, each measuring and power pack unit accommodates 1 to 3 transducers operating independently of each other. Common to them is only the primary feed of the power supply.

Arranged on the front plate are the grip, inscription and on request test sockets for field indicator. On the back of the module is a DIN 41 612 F plug. For connecting to current transformers there is a special shorting triplug available (for description see datasheet BT 901 Le).

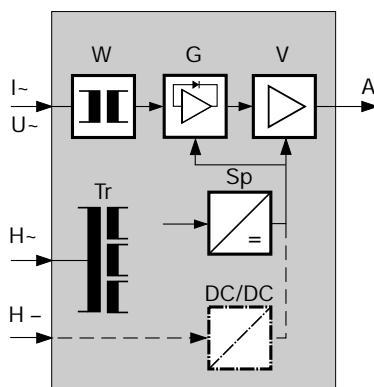


Fig. 2. Block diagram for a function unit.

The measured variable I/U AC is isolated from the electronics by the transformer W, and is rectified and smoothed in the rectifier unit G following. The output amplifier V amplifies this quantity and converts it into the load-independent DC output signal A.

With AC power supply the supply is processed by a mains transformer with three isolated secondary windings.

With DC power supply a DC/DC converter provides the necessary isolation between the primary and secondary sides of the power supply.

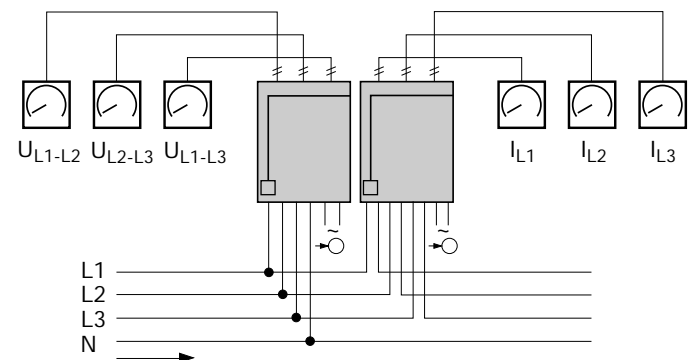


Fig. 3. Measuring current and voltage with an EURAX 1I/1I and 1U/U1 in an unbalanced load 4-wire, 3-phase network.

EURAX 11/U1

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Technical data

General

Measured quantity: AC current or AC voltage sinusoidal
Arithmetical mean measured, calibration to rms with sinus form

Measuring principle: Active rectifier

Measuring input E \rightarrow

Nominal frequency f_N (6): 50 or 60 Hz

Nominal input current I_N
(full range end value) (5): Any value between 0.5 and 5 A

Nominal input voltage U_N
(full range end value): Any value between 10 and 500 V

Consumption: < 50 mVA per current circuit
 $U_N \cdot 2$ mA per voltage circuit

Sensitivity: < 0.05% of full range end value

Overload capacity:

Measured variable I_N, U_N	Number of applications	Duration of one application	Interval between two successive applications
$2 \times I_N$	continuously	---	---
$20 \times I_N$	5	10 s	5 min.
$60 \times I_N^1$	1	1 s	---
$1,5 \times U_N$	continuously	---	---
$2 \times U_N$	10	10 s	10 s
$4 \times U_N$	1	2 s	---

¹ but max. 300 A

Measuring output A \rightarrow

Output variables
(7), (8) and (9): Load-independent DC current I_A
or
load-independent DC voltage U_A

Nominal values of I_A (7): 0...1, 0...5, 0...10, 0...20 or 4...20 mA

Burden voltage 15 V

$$R_{\text{ext max.}} [\text{k}\Omega] = \frac{15 \text{ V}}{I_{\text{AN}} [\text{mA}]}$$

I_{AN} = End output current value

Nominal value of U_A (9): 0...10 or 1...5 V
Load capacity 20 mA

Current limit under overload: I_A max. approx. 25 mA

Output current ripple (10): < 2% p.p.

Time behaviour: Time constant < 60 ms
Response time < 200 ms

(5) to (10) see "Table 3: Special features"

Accuracy (acc. to DIN/IEC 688-1)

Reference value: Input end value

Basic accuracy: Class 0.5

Reference conditions

Ambient temperature 23 °C, ± 5 K

Input 0...120%

Frequency $f_N \pm 10\%$

Distortion factor < 0.5%

Power supply $U_{\text{HN}} \pm 15\%$ (AC)
 $U_{\text{HN}} 24...110$ V (DC) – 15...+ 33%

External resistance: 0 – $R_{\text{ext max.}}$ for current output resp.
 $I < 20$ mA for voltage output

Influence effects (maxima)

(included in basic error)

Linearity error $\pm 0.2\%$

Frequency $f_N \pm 10\%$ $\pm 0.1\%$

Dependence on external resistance $\Delta R_{\text{ext max.}}$ $\pm 0.1\%$

Power supply influence ΔU_H max. $\pm 0.1\%$

Distortion factor ($K < 0.5\%$) $\pm 0.2\%$

Additional errors

Temperature influence
(– 25...+ 55 °C) $\pm 0.5\% / 10$ K

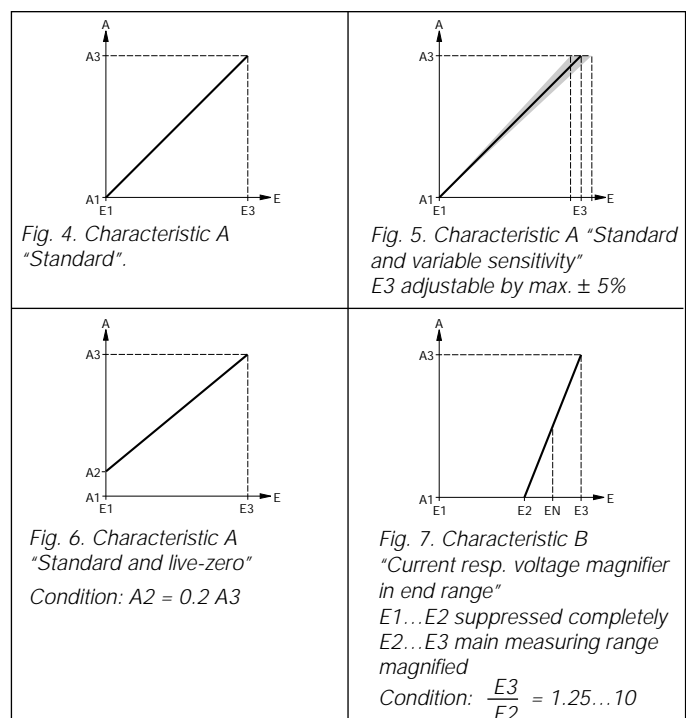
Frequency influence
45 – 200 Hz $\pm 0.5\%$

Stray field influence 0,5 mT $\pm 0.2\%$

Long-time drift per year $\pm 0.3\%$

Distortion factor influence
($K < 10\%$) $\pm 0.4 \cdot K$ (%)

Output characteristic



Power supply → ○

AC voltage (13): 24, 115 or 230 V
± 15%, 42 to 70 Hz
Power input approx. 6 VA

DC voltage (14): See "Table 3: Special features"

Installation data

Mechanical design: Plug-in module in Euro format, 100×160 mm (see section "Dimensional drawing")

Space requirement: Front plate width 11 TE (55.58 mm)

Front plate colour: Grey RAL 7032

Mounting position: Any

Electrical connections: 32-pole plug acc. to DIN 41 612, design F and 6-pole current plug (contact layout acc. to section "Electrical connections")

Weight: Approx. 0.6 to 0.75 kg, acc. to type

Regulations

Impulse withstand voltage acc. to IEC 255-4, Cl. III: 5 kV, 1.2/50 μs, 0.5 Ws
Common-mode and differential-mode between any terminals

Electrical standards: Acc. to DIN 57 410

Housing protection: IP 00 acc. to IEC 529

Test voltage: 2 kV, 50 Hz, 1 min.
between electrically insulated circuits

Environmental conditions

Climatic rating: Climate class 3Z acc. to VDI/VDE 3540, but temperature continuously – 25 to + 55 °C.

Relative humidity ≤ 75% annual mean (application class HVE acc. to DIN 40 040)

Storage temperature: – 40 to + 70 °C

(13) and (14) see "Table 3: Special features"

Table 1: Electromagnetic compatibility

The basic standards EN 50 081-2 and EN 50 082-2 were taken in account

Conducted interference from the instrument	EN 55 011	Group 1, Class A
HF radiation from complete instrument	EN 55 011	Group 1, Class A
Electrostatic discharge	IEC 1000-4-2	Direct: ± 8 kV air Indirect: ± 4 kV contact
HF field influence on instrument	IEC 1000-4-3	80 MHz ... 1000 MHz: 10 V/m, 80% AM 1 kHz (ITU frequencies, 3 V/m)
Transient (Burst) via connections	IEC 1000-4-4	± 2 kV, 5/50 ns, 5 kHz, > 2 min. capacitively coupled
HF interference via connections	IEC 1000-4-6	0.15 to 80 MHz: 10 V, 80% AM 1 kHz (ITU frequencies, 3 V)

The limits given in the standards mentioned are observed. During the interference test, occasional impairment of operating behaviour was permitted. The device fulfils the protection requirements of the EMC guidelines (89/336/EWG). **The device bears the CE symbol for EMC.**

Table 2: Specification and ordering information

Order Code 579 –			
Features, Selection	*SCODE	no-go	
1. Mechanical design 2) Plug-in module for 19" rack-mounted case			

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Order Code 579 –			
Features, Selection		*SCODE	no-go
2. Type, duties			
A) Type 1I/1I: 1 current measurement		AK	
B) Type 1I/1I: 2 current measurements		BL	
C) Type 1I/1I: 3 current measurements		CM	
D) Type 1U/U1: 1 voltage measurement		DK	
E) Type 1U/U1: 2 voltage measurements		EL	
F) Type 1U/U1: 3 voltage measurements		FM	
G) Type 1I/U1: 1 current and 1 voltage measurements		GL	
H) Type 1I/U1: 2 current and 1 voltage measurements		HM	
3. Nominal frequency ⑥			
1) 50 Hz			
2) 60 Hz			
X) (1x) non-standard [Hz]			LM
Y) (2x) non-standard [Hz]			KM
Z) (3x) non-standard [Hz]			KL
Lines X to Y: ≥ 16.67 to 500			
4. Input E1 (measuring input) ③ ⑤			
1) Standard 0...0.50 to 0...5 A [A]			DEF
2) Non-standard 0...0.01 to 0...< 0.50 or 0...> 5 to 0...10 A [A]			DEF
9) E2...E3 [A]		J	DEF
A) Standard 0...10.00 to 0...500 V [V]			ABCGH
B) Non-standard 0...> 500 to 0...650 V [V]			ABCGH
Z) E2...E3 [V]		J	ABCGH
Lines 1, 2, A and B: Meas. range for characteristic A, Fig. 4, 5 and 6			
Lines 9 and Z: Measuring range for characteristic B, Fig. 7			
Specify range (E2...E3), e.g. 96...120 V			
5. Input E2 (measuring input) ③ ⑤			
0) Not provided for input E2			LM
1) Standard [A]			EFGK
2) Non-standard [A]			EFGK
9) E2...E3 [A]		J	EFGK
A) Standard [V]			BCHK
B) Non-standard [V]			BCHK
Z) E2...E3 [V]		J	BCHK
Limit values and references see feature 4 "Input E1"			
6. Input E3 (measuring input) ③, ⑤			
0) Not provided for input E3			M
1) Standard [A]			FHKL
2) Non-standard [A]			FHKL
9) E2...E3 [A]		J	FHKL
A) Standard [V]			CKL
B) Non-standard [V]			CKL
Z) E2...E3 [V]		J	CKL
Limit values and references see feature 4 "Input E1"			



A
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D
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Y
Z
1
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9
A
B
Z
0
1
2
9
A
B
Z
0
1
2
9
A
B
Z

③, ⑤ and ⑥ see "Table 3: Special features"

Order Code 579 -			
Features, Selection	*SCODE	no-go	
7. Output signal 1 (measuring output) ⑦, ⑧, ⑨			
1) 0...10 V, $R_{ext} \geq 500 \Omega$			
2) 1...5 V, $R_{ext} \geq 250 \Omega$	N		
9) Non-standard 0 ...1.00 to 0...15 [V] <input type="text"/>			
A) 0... 1 mA, $R_{ext} \leq 15 k\Omega$			
B) 0... 5 mA, $R_{ext} \leq 3 k\Omega$			
C) 0...10 mA, $R_{ext} \leq 1.5 k\Omega$			
D) 0...20 mA, $R_{ext} \leq 750 \Omega$			
E) 4...20 mA, $R_{ext} \leq 750 \Omega$	N		
Z) Non-standard 0...> 1.00 to 0...< 20 [mA] <input type="text"/>			
Lines 1, 9, A to D and Z: Output signals for characteristic A, Fig. 4 and 5 and characteristic B, Fig. 7			
Lines 2, 9, E and Z: Output signals for characteristic A, Fig. 6			
8. Output signal 2 (measuring output) ⑦, ⑧, ⑨			
0) Not provided for output 2			LM
1) 0...10 V, $R_{ext} \geq 500 \Omega$			K
2) 1... 5 V, $R_{ext} \geq 250 \Omega$	N		K
9) Non-standard 0 ...1.00 to 0...15 [V] <input type="text"/>			K
A) 0... 1 mA, $R_{ext} \leq 15 k\Omega$			K
B) 0... 5 mA, $R_{ext} \leq 3 k\Omega$			K
C) 0...10 mA, $R_{ext} \leq 1.5 k\Omega$			K
D) 0...20 mA, $R_{ext} \leq 750 \Omega$			K
E) 4...20 mA, $R_{ext} \leq 750 \Omega$	N		K
Z) Non-standard 0...> 1.00 to 0...< 20 [mA] <input type="text"/>			
References see feature 7 "Output signal 1"			
9. Output signal 3 (measuring output) ⑦, ⑧, ⑨			
0) Not provided for output 3			M
1) 0...10 V, $R_{ext} \geq 500 \Omega$			KL
2) 1... 5 V, $R_{ext} \geq 250 \Omega$	N		KL
9) Non-standard 0 ...1.00 to 0...15 [V] <input type="text"/>			KL
A) 0... 1 mA, $R_{ext} \leq 15 k\Omega$			KL
B) 0... 5 mA, $R_{ext} \leq 3 k\Omega$			KL
C) 0...10 mA, $R_{ext} \leq 1.5 k\Omega$			KL
D) 0...20 mA, $R_{ext} \leq 750 \Omega$			KL
E) 4...20 mA, $R_{ext} \leq 750 \Omega$	N		KL
Z) Non-standard 0...> 1.00 to 0...< 20 [mA] <input type="text"/>			
References see feature 7 "Output signal 1"			

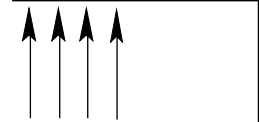
↑	↑	↑	
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9	.	.	.
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B	.	.	.
C	.	.	.
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Z	.	.	.
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	.	.	E
	.	.	Z

⑦, ⑧ and ⑨ see "Table 3: Special features"

EURAX 1I/U1

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Order Code 579 –								
Features, Selection				*SCODE	no-go			
10. Power supply (13), (14)								
1) 24 V, 50/60 Hz								
2) 115 V, 50/60 Hz								
3) 230 V, 50/60 Hz								
9) Non-standard 50/60 Hz [V]								
Z) 24...110 V DC, - 15/+ 33%								
Line 9: > 24 to 500								
11. Special features								
0) Without				Y				
1) With								
Without special features (line 0): Order code complete.								
With special feature (line 1): The features to be omitted must be marked hereafter with / (slant line) in the order code until reaching the required feature								
12. Two measuring ranges (for measuring input E) (1)								
Second measuring range for input:								
3) E1 [A]					DEFJY			
4) E2 [A]					EFGJKY			
5) E3 [A]					FHJKLY			
6) E1 and E2 [A]					EFGJKY			
7) E1 and E3 [A]					FHJKLY			
8) E2 and E3 [A]					FHJKLY			
9) E1, E2 and E3 [A]					FHJKLY			
A) E1 [V]					ABCGHJY			
B) E2 [V]					BCHKJY			
C) E3 [V]					CJKLY			
D) E1 and E2 [V]					BCHKJY			
E) E1 and E3 [V]					CJKLY			
F) E2 and E3 [V]					CJKLY			
G) E1, E2 and E3 [V]					CJKLY			
Limit values see feature 4 "Input E1"								
Possible only for characteristic A, Fig. 4, 5 or 6								
Condition: $\frac{\text{First measuring range}}{\text{Second measuring range}} > 1 \text{ to } \leq 3$								
13. Smaller residual ripple in measuring output (10)								
A) $(1x) \leq 0.5\%$ p.p. instead of $\leq 2\%$ p.p.					LMY			
B) $(2x) \leq 0.5\%$ p.p. instead of $\leq 2\%$ p.p.					KMY			
C) $(3x) \leq 0.5\%$ p.p. instead of $\leq 2\%$ p.p.					KLY			
Restriction: Not possible for nominal frequencies < 50 Hz, response time < 300 ms instead of 150 ms								



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(1), (10), (13) and (14) see "Table 3: Special features"

EURAX 11/U1

Multiple transducer for AC current and voltage

Nature of special features
Test sockets for field indicator (12) Fitted in front plate (voltage drop over millimeter ≤ 300 mV)
Power supply (13) with AC voltage any voltage between 24 and 500 V, $\pm 15\%$, 42...70 Hz, power input approx. 6 VA, other than the standard ranges 24, 115 or 230 V (14) with DC voltage 24 to 110 V, $-15 / +33\%$ power input approx. 4.5 W
Improved climatic rating (DIN 40 040) (15) Application class HVR instead of HVE (standard)

Table 5: Plug wiring with voltage measurement

Functions	Meas. inputs \ominus			Meas. outputs \ominus		
	d-	z-	Designation	d+	z-	Designation
1 voltage measurement	22	22	U	18	18	2
2 voltage measurements	32	32	U	28	28	1
	12	12	U	8	8	3
3 voltage measurements	32	32	U	28	28	1
	22	22	U	18	18	2
	12	12	U	8	8	3

Table 6: Plug wiring with current and voltage measurement

Functions	Meas. inputs \ominus			Meas. outputs \ominus		
	d-	z-	Designation	d+	z-	Designation
1 current measurement and 1 voltage measurement	1	2	I	8	8	3
	22	22	U	18	18	2
2 current measurements and 1 voltage measurement	5	6	I	28	28	1
	1	2	I	8	8	3
1 voltage measurement	22	22	U	18	18	2

Electrical connections

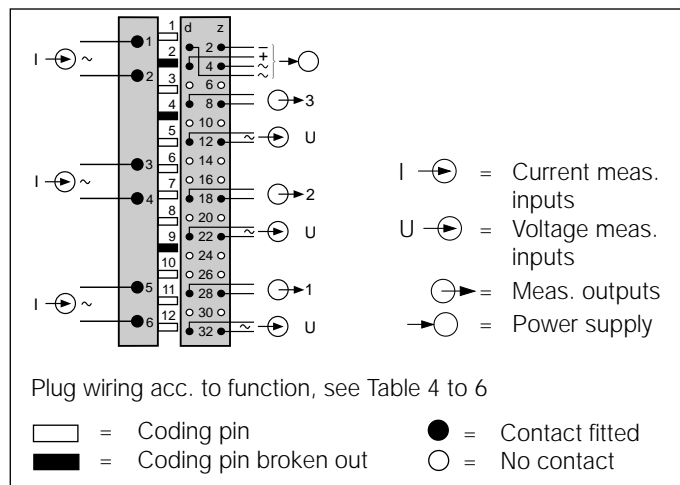


Table 4: Plug wiring with current measurement

Functions	Meas. inputs \ominus			Meas. outputs \ominus		
	d-	z-	Designation	d+	z-	Designation
1 current measur.	3	4	I	18	18	2
2 current measur.	5	6	I	28	28	1
	1	2	I	8	8	3
3 current measur.	5	6	I	28	28	1
	3	4	I	18	18	2
	1	2	I	8	8	3

Dimensional drawing

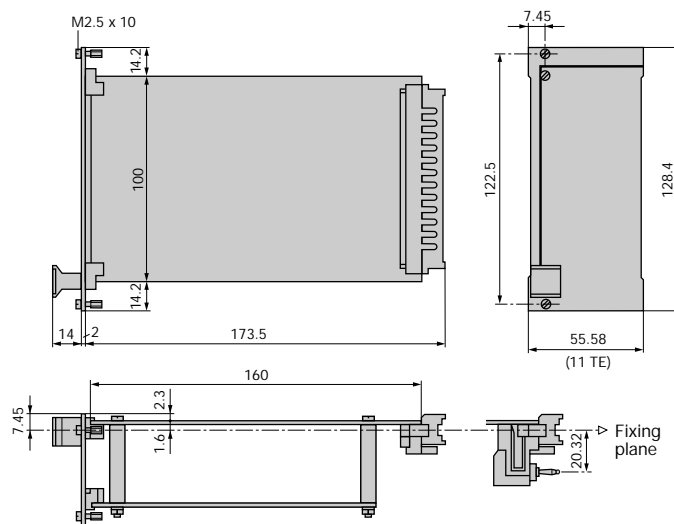


Fig. 8. EURAX11/U1, Front plate width 11 TE.