EURAX UI 505
Combined transducer for AC current and AC voltage

Plug-in module in Euro-format

CE

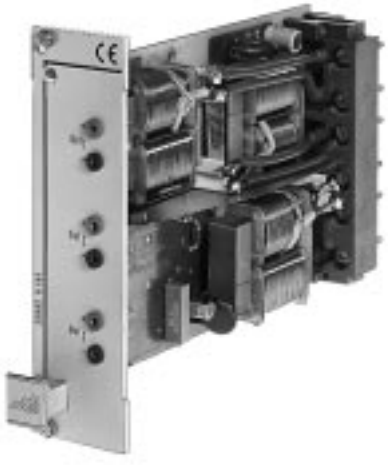


Fig. 1. EURAX UI 505 for measuring of 3 AC currents, front plate width 7 TE.

Fig. 2. EURAX UI 505 for measuring of 3 AC voltages, front plate width 7 TE.

Application

The transducers EURAX UI 505 (Figs. 1 and 2) are intended to simultaneous converts of up to 3 sinusoidal AC currents or voltages. Output signals available are load-independent DC currents proportional to the measured quantity.

Features / Benefits

- Up to 3 measuring inputs: AC currents and/or AC voltages, sine waveform, arithmetical mean measured, calibration to RMS value

Measured variables	Measuring range limits
AC currents	0 … 0.5 to 0 … 10 A
AC voltages	0 … 20 to 0 … 660 V

- Up to 3 measuring outputs: DC current signal (load-independent) or DC voltage signal
- Self-powered / Less wiring expense
- Low power consumption / Smaller CT's and VT's can be used
- Manufactured in SMD technology / Compact and reliable
- Laser trimmed / Virtually no accuracy variation between units
- The device fulfils the protection requirements of the EMC guidelines (89/336/EWG). The device bears the CE symbol for EMC
- Mechanical design of the transducer: Plug-in module 7 TE (35.2 mm) for 19″ rack-mounted case

Layout and mode of operation

The transducer consists of one PCB containing – depending on type and duty – 1 to 3 transducers working independently one from another.

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 data sheet BT 901 Le).

The measured variable I or 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, receiving its power supply from the measuring input, converts this quantity into a load-independent DC output signal.

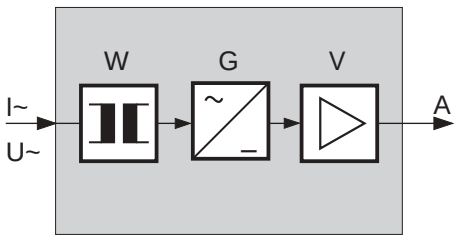


Fig. 3. Block diagram for a function unit.

EURAX UI 505
Combined transducer for AC current and AC voltage

Technical data

General

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

Measuring principle: Rectifier

Measuring input E

Nominal frequency f_N: 50 or 60 Hz

Nominal input current I_N (measuring range end value) ① ③ : 1, 1.2, 5 or 6 A

Nominal input voltage U_N (measuring range end value) ② ③ : $100/\sqrt{3}$, $110/\sqrt{3}$, $120/\sqrt{3}$, 100, 110, 116.66, 120, 125, 133.33, 150, 250, 400 or 500 V

Own consumption at nominal frequency 50 Hz:

Full output value I_{AN} [mA]	per current input [VA]	per voltage input [VA]
1	0.8	0.8
5	1.8	1.2
10	2.2	1.5
20	2.5	1.8

Overload capacity:

Measured quantity I_N, U_N	Number of applications	Duration of one application	Intervals between two successive applications
1.5 × I_N	continuously	---	---
2 × I_N	10	10 s	10 s
10 × I_N	5	3 s	5 min.
40 × I_N	1	1 s	---
1.5 × U_N	continuously	---	---
2 × U_N	10	10 s	10 s
4 × U_N	1	2 s	---

Measuring output A

Output variables: Load-independent DC current I_A
or
DC voltage output U_A (not superimposed)

Standard ranges of I_A ☒: 0…1, 0…5, 0…10 or 0…20 mA
Burden voltage 15 V
External resistance

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

I_{AN} = Full output value

Standard ranges of U_A ⑤: 0…10 V
External resistance ≥ 200 kΩ/V

Current limit under overload: ≤ 1.5 × I_{AN} for current output
approx. 30 mA for voltage output

Voltage limit under $R_{ext} = \infty$: < 24 V

Output current ripple: ≤ 0.5% p.p.

Response time: < 300 ms

Accuracy data (according 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 to 100% at current measurement
20 to 100% at voltage measurement

Frequency: f_N ± 2%

Distortion factor: < 0.5%

External resistance: 0 – R_{ext} max.

Influence effects (maxima) included in basic error

Linearity error: ± 0.3%

Frequency f_N ± 2%: ± 0.3%

Dependence on external resistance Δ R_{ext} max.: ± 0.1%

Distortion factor (K < 0.5%): ± 0.2%

Additional errors

Temperature influence (–25…+ 55 °C): ± 0.5% / 10 K

Frequency influence 45 – 200 Hz: ± 0.5%

Stray field influence 0.5 mT: ± 0.2%

Distortion factor influence (K < 10%): ± 0.4 · K (%)

Influence of range exceeding at 1.2 × I_N resp. U_N: ± 0.25%

Influence of common-mode voltage 220 V, 50 Hz or 10 V, 1 MHz: ± 0.2%

① *to* ⑤ *see Section "Special features"*

HF surge voltage influence	
acc. to IEC 255-4 Class III, 2.5 kV, 1 kV, 200 Ω 1 MHz, 400 Hz	± 2.0%
acc. to ANSI/IEEE C 37.90 - 1978 2.5 kV, 150 Ω 1 MHz, 50 Hz	± 1%

Installation data

Mechanical design:	Plug-in module in Euro format, 100 × 160 mm (see Section “Dimensional drawing”)
Space needed:	Front plate width 7 TE (35.2 mm)
Front plate colour:	Grey RAL 7032
Designation:	EURAX UI 505
Mounting position:	Any
Electrical connections:	32-pole plug to DIN 41 612, pattern F and 6-pole plug (contact fitting see Section “Electrical connections”)
Coding:	By coding pins, removed/not removed, see 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 EN 60 529
Test voltage:	4 kV, 50 Hz, 1 min.

Environmental conditions

Climatic rating:	Climate class 3Z acc. to VDI/VDE 3540
Operating temperature:	–25 to + 55 °C
Storage temperature:	–40 to + 70 °C
Relative humidity of annual mean:	≤ 75%

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 device fulfils the protection requirements of the EMC guidelines (89/336/EWG). The device bears the CE symbol for EMC.

EURAX UI 505
Combined transducer for AC current and AC voltage

Table 2: Specification and ordering information

Order Code 505 –			
Features, Selection	*SCODE	no-go	
1. Mechanical design			
2) Plug-in module for 19˝ rack-mounted case			2 . . . . .
2. Duties			
A) I 0 0 (1 current measurement I1)	AK		. A . . . . .
B) I I 0 (2 current measurements I1 and I2)	BL		. B . . . . .
C) I I I (3 current measurements I1, I2 and I3)	CM		. C . . . . .
D) U 0 0 (1 voltage measurement U1)	DK		. D . . . . .
E) U U 0 (2 voltage measurements U1 and U2)	EL		. E . . . . .
F) U U U (3 voltage measurements U1, U2 and U3)	FM		. F . . . . .
G) U 0 I (1 voltage measurement U1 and 1 current measurement I3)	GN		. G . . . . .
H) I I U (2 current measurements I1, I2 and 1 voltage measurement U3)	HM		. H . . . . .
J) U U I (2 voltage measurements U1, U2 and 1 current measurement I3)	JM		. J . . . . .
3. Nominal frequency			
1) 50 Hz			. . 1 . . . .
2) 60 Hz			. . 2 . . . .
4. Measuring range I1 resp. U1 (measuring input)			
1) 0 … 1 A		DEFGJ	. . . 1 . . .
2) 0 … 1.2 A		DEFGJ	. . . 2 . . .
3) 0 … 5 A		DEFGJ	. . . 3 . . .
4) 0 … 6 A		DEFGJ	. . . 4 . . .
9) Non-standard [A] _____ 0 … 0.50 to 0 … 10 (1)		DEFGJ	. . . 9 . . .
A) 0 … 100/√3 V		ABCH	. . . A . . .
B) 0 … 110/√3 V		ABCH	. . . B . . .
C) 0 … 120/√3 V		ABCH	. . . C . . .
D) 0 … 100 V		ABCH	. . . D . . .
E) 0 … 110 V		ABCH	. . . E . . .
F) 0 … 116.66 V		ABCH	. . . F . . .
G) 0 … 120 V		ABCH	. . . G . . .
H) 0 … 125 V		ABCH	. . . H . . .
J) 0 … 133.33 V		ABCH	. . . J . . .
K) 0 … 150 V		ABCH	. . . K . . .
L) 0 … 250 V		ABCH	. . . L . . .
M) 0 … 400 V		ABCH	. . . M . . .
N) 0 … 500 V		ABCH	. . . N . . .
Z) Non-standard [V] _____ 0 … 20.00 to 0 … 660 (2)		ABCH	. . . Z . . .

(1) *and* (2) *see Section “Special features”*

Order Code 505 –

Features, Selection	*SCODE	no-go	
5. Output signal 1 (measuring output)			
1) 0 … 10 V, $R_{ext} \geq$ 200 kΩ/V			1 . . . .
9) Non-standard [V] 0 … 0.060 to 0 … < 10, $R_{ext} \geq$ 200 kΩ/V (5)			9 . . . .
A) 0 … 1 mA, $R_{ext} \leq$ 15 kΩ			A . . . .
B) 0 … 5 mA, $R_{ext} \leq$ 3 kΩ			B . . . .
C) 0 … 10 mA, $R_{ext} \leq$ 1.5 kΩ			C . . . .
D) 0 … 20 mA, $R_{ext} \leq$ 750 Ω			D . . . .
Z) Non-standard [mA] 0 … > 1.00 to 0 … < 20 (4)			Z . . . .
6. Measuring range I2 resp. U2 (measuring input)			
0) Not provided for measuring input I2 resp. U2		BCEFHJ	. 0 . . . . . .
1) 0 … 1 A		ADEFGJ	. 1 . . . . . .
2) 0 … 1.2 A		ADEFGJ	. 2 . . . . . .
3) 0 … 5 A		ADEFGJ	. 3 . . . . . .
4) 0 … 6 A		ADEFGJ	. 4 . . . . . .
9) Non-standard [A] 0 … 0.50 to 0 … 10 (1)		ADEFGJ	. 9 . . . . . .
A) 0 … 100/$\sqrt{3}$ V		ABCDGH	. A . . . . . .
B) 0 … 110/$\sqrt{3}$ V		ABCDGH	. B . . . . . .
C) 0 … 120/$\sqrt{3}$ V		ABCDGH	. C . . . . . .
D) 0 … 100 V		ABCDGH	. D . . . . . .
E) 0 … 110 V		ABCDGH	. E . . . . . .
F) 0 … 116.66 V		ABCDGH	. F . . . . . .
G) 0 … 120 V		ABCDGH	. G . . . . . .
H) 0 … 125 V		ABCDGH	. H . . . . . .
J) 0 … 133.33 V		ABCDGH	. J . . . . . .
K) 0 … 150 V		ABCDGH	. K . . . . . .
L) 0 … 250 V		ABCDGH	. L . . . . . .
M) 0 … 400 V		ABCDGH	. M . . . . . .
N) 0 … 500 V		ABCDGH	. N . . . . . .
Z) Non-standard [V] 0 … 20.00 to 0 … 660 (2)		ABCDGH	. Z . . . . . .
7. Output signal 2 (measuring output)			
0) Not provided for output 2		BCEFHJ	. . 0 . . . . .
1) 0 … 10 V, $R_{ext} \geq$ 200 kΩ/V		ADG	. . 1 . . . . .
9) Non-standard [V] 0 … 0.060 to 0 … < 10, $R_{ext} \geq$ 200 kΩ/V (5)		ADG	. . 9 . . . . .
A) 0 … 1 mA, $R_{ext} \leq$ 15 kΩ		ADG	. . A . . . . .
B) 0 … 5 mA, $R_{ext} \leq$ 3 kΩ		ADG	. . B . . . . .
C) 0 … 10 mA, $R_{ext} \leq$ 1.5kΩ		ADG	. . C . . . . .
D) 0 … 20 mA, $R_{ext} \leq$ 750 Ω		ADG	. . D . . . . .
Z) Non-standard [mA] 0 … > 1.00 to 0 … < 20 (4)		ADG	. . Z . . . . .

(1), (2), (4) *and* (5) *see section “Special features”*

EURAX UI 505
Combined transducer for AC current and AC voltage

Order Code 505 – | | | | | | | | |

Features, Selection	*SCODE	no-go	
8. Measuring range I3 resp. U3			
0) Not provided for measuring input I3 resp. U3		CFGHJ	0 . . . . .
1) 0 … 1 A		ABDEFH	1 . . . . .
2) 0 … 1.2 A		ABDEFH	2 . . . . .
3) 0 … 5 A		ABDEFH	3 . . . . .
4) 0 … 6 A		ABDEFH	4 . . . . .
9) Non-standard [A] _____ 0 … 0.50 to 0 … 10 (1)		ABDEFH	9 . . . . .
A) 0 … 100/√3 V		ABCDEGJ	A . . . . .
B) 0 … 110/√3 V		ABCDEGJ	B . . . . .
C) 0 … 120/√3 V		ABCDEGJ	C . . . . .
D) 0 … 100 V		ABCDEGJ	D . . . . .
E) 0 … 110 V		ABCDEGJ	E . . . . .
F) 0 … 116.66 V		ABCDEGJ	F . . . . .
G) 0 … 120 V		ABCDEGJ	G . . . . .
H) 0 … 125 V		ABCDEGJ	H . . . . .
J) 0 … 133.33 V		ABCDEGJ	J . . . . .
K) 0 … 150 V		ABCDEGJ	K . . . . .
L) 0 … 250 V		ABCDEGJ	L . . . . .
M) 0 … 400 V		ABCDEGJ	M . . . . .
N) 0 … 500 V		ABCDEGJ	N . . . . .
Z) Non-standard [V] _____ 0 … 20.00 to 0 … 660 (2)		ABCDEGJ	Z . . . . .
9. Output signal 3 (measuring output)			
0) Not provided for output 3		CFGHJ	. 0 . . . . .
1) 0 … 10 V, R_{ext} ≥ 200 kΩ/V		ABDE	. 1 . . . . .
9) Non-standard [V] _____ 0 … 0.060 to 0 … < 10, R_{ext} ≥ 200 kΩ/V (5)		ABDE	. 9 . . . . .
A) 0 … 1 mA, R_{ext} ≤ 15 kΩ		ABDE	. A . . . . .
B) 0 … 5 mA, R_{ext} ≤ 3 kΩ		ABDE	. B . . . . .
C) 0 … 10 mA, R_{ext} ≤ 1.5kΩ		ABDE	. C . . . . .
D) 0 … 20 mA, R_{ext} ≤ 750 Ω		ABDE	. D . . . . .
Z) Non-standard [mA] _____ 0 … > 1.00 to 0 … < 20 (4)		ABDE	. Z . . . . .
10. Special features			
0) Without	Y		. . 0 . . . .
1) With			. . 1 . . . .
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			

(1), (2), (4) *and* (5) *see Section "Special features"*

Order Code 505 –			
Features, Selection	*SCODE	no-go	
11. Measuring range adjustable ③ Admissible alteration of full scale output approx. ± 5% (variable sensitivity)			
A) I1 resp. U1		LMNY	A . . . . .
B) I1 and I2 resp. U1 and U2		KMNY	B . . . . .
C) U1 and I3		KLMY	C . . . . .
D) I1, I2 and I3 resp. U1, U2 and U3 resp. I1, I2 and U3 resp. U1, U2 and I3		KLNY	D . . . . .
12. Test sockets for field indicator ⑥			
A) With test sockets for output 1		LMNY	. A . . . . .
B) With test sockets for outputs 1 and 2		KMNY	. B . . . . .
C) With test sockets for outputs 1 and 3		KLMY	. C . . . . .
D) With test sockets for outputs 1, 2 and 3		KLNY	. D . . . . .
13. Safety current loop ⑦			
A) "Module withdrawn" with jumper on transducer PCB and 2 additional contacts on connector		Y	. . A . . . .

** Lines with letter(s) under "no-go" cannot be combined with preceding lines having the same letter under "SCODE".*

③ , ⑥ *and* ⑦ *see Section "Special features"*

Special features

Nature of special features

Measuring range

① Ranges between 0…0.5 and 0…10 A, besides the standard ranges 0…1, 0…1.2, 0…5 and 0…6 A

② Ranges between 0…20 and 0…660 V*, besides the standard ranges 0…100/$\sqrt{3}$, 0…110/$\sqrt{3}$, 0…120/$\sqrt{3}$, 0…100, 0…110, 0…116.66, 0…120, 0…125, 0…133.33, 0…150, 0…250, 0…400 and 0…500 V

* Restriction:
Overload capacity for nominal input voltages
U_N > 500 V

Measured quantity	Number of applications	Duration of one application	Intervals between two successive applications
1.5×500 V	contin.	—	—
2 ×500 V	10	10 s	10 s
4 ×500 V	1	2 s	—

Variable measuring range

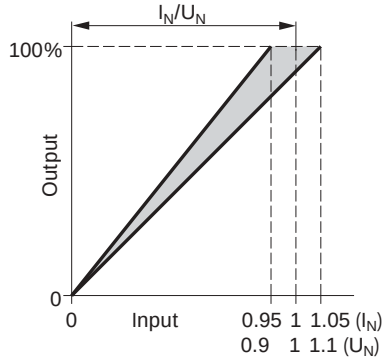
③ (Admissible alteration of full scale output, variable sensitivity, adjustable with potentiometer)

Adjusting range
0.95 … 1.05 · I_N (± 5%)
0.9 … 1.1 · U_N (± 10%)

Continuation "Variable measuring range" see on right column!

Nature of special features

Variable measuring range (continuation)



Output signal

④ Load-independent DC current I_A
Ranges between 0…1 and 0…20 mA, besides the standard ranges 0…1, 0…5, 0…10 and 0…20 mA

⑤ Non-impressed DC voltage U_A
Ranges between 0…60 mV and 0…10 V, besides the standard range 0…10 V

Output for field indicator

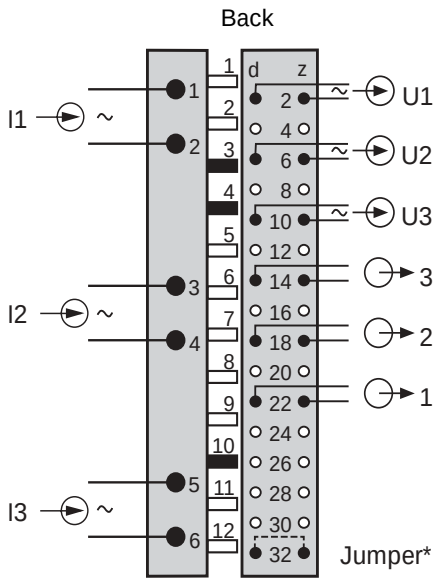
⑥ Test sockets fitted in front plate
(voltage drop over milliammeter ≤ 300 mV)

Safety current loop "module withdrawn"

⑦ with jumper on transducer PCB and 2 additional contacts on connector

EURAX UI 505
Combined transducer for AC current and AC voltage

Electrical connections



I = Current measuring inputs
U = Voltage measuring inputs
= Measuring outputs

Plug wiring acc. to function,
see tables 3 to 5

** A safety circuit may be looped via the jumper, for signalling "module unplugged" or "module not plugged in properly" (see feature 13).*

= Coding pin
= Coding pin broken out
● = Contact fitted
○ = No contact

Table 3: Plug wiring with current measurement

Functions	Meas. inputs ⊙ ~	⊙ ~	Designation	Meas. outputs d+	z-	Designation
1 current meas.	1	2	I1	22	22	1
2 current measurements	1	2	I1	22	22	1
	3	4	I2	18	18	2
3 current measurements	1	2	I1	22	22	1
	3	4	I2	18	18	2
	5	6	I3	14	14	3

Table 4: Plug wiring with voltage measurement

Functions	Meas. inputs d~	z~	Designation	Meas. outputs d+	z-	Designation
1 voltage measurement	2	2	U1	22	22	1
2 voltage measurements	2	2	U1	22	22	1
	6	6	U2	18	18	2
3 voltage measurements	2	2	U1	22	22	1
	6	6	U2	18	18	2
	10	10	U3	14	14	3

Table 5: Plug wiring with current and voltage measurement

Functions	Meas. inputs ⊙/ d~	⊙/ z~	Designation	Meas. outputs d+	z-	Designation
1 voltage meas. and 1 current meas.	2	2	U1	22	22	1
	5	6	I3	14	14	3
2 current meas. and 1 voltage measurement	1	2	I1	22	22	1
	3	4	I2	18	18	2
	10	10	U3	14	14	3
2 voltage measurements and 1 current meas.	2	2	U1	22	22	1
	6	6	U2	18	18	2
	5	6	I3	14	14	3

Dimensional drawing

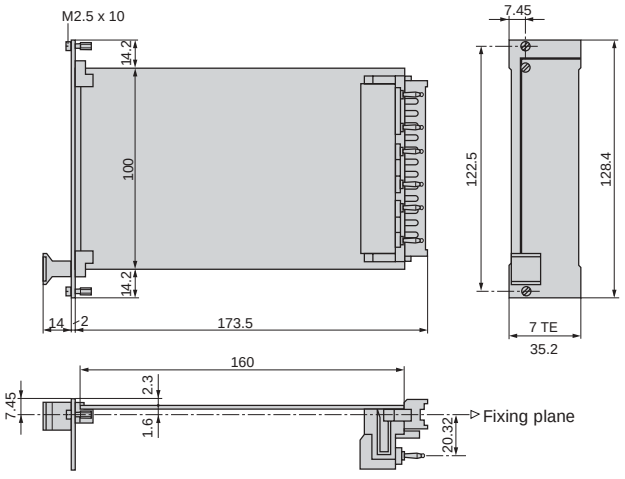


Fig. 4. EURAX UI 505, front plate width 7 TE.

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