ALTERNATE VOLTAGE CONVERTER Z202

GENERAL FEATURES

The Z202 module measures the alternate voltage input value and converts it into a current or voltage signals output.
The instrument stands out for its precision class and its high input impedance. These are its general features:

- Alternate voltage input 10..490 Vac in 41 preset scales, which can be selected by terminals/Dipswitches.
- Each scale can be set and extended to the next one, and it's possible to calibrate the instrument on any full-scale in the continuous range of 0…500 Vac, without either over-setting the fixed capacities, or opening the instrument (multi-rev trimmer accessible from front panel).
- Simultaneous output in current (0/4..20 mA active/passive) and in voltage (0/1..5 V or 0/2..10 V).
- High precision and linearity: 0.25%.
- Wide range of frequency input (10 Hz..1 kHz).
- Extremely short settling time (<30 ms).
- 3750 V galvanic isolation between voltage input and the other terminals.
- 1500 V isolation between the output terminals and the power supply terminals.
- Power ON indication by the panel LED.
- Possibility to use the instrument as a microammeter (500 µAfs R=5 Ω).
- Wide range of power supply AC/DC , including operation on 12 V batteries.

TECHNICAL FEATURES

Power supply:	9..40 V_{DC} (free polarity) or 19..28 V_{AC} 50..400 Hz. The module was specifically designed to operate also on 12 V batteries. Insulation toward the output terminals: 1500 V. Protection 400 W/ms.
Consumption:	<1.5 W at full load; about 60mA @ 12Vdc.
Voltage input:	Alternate voltage (1) 0..500 Vac; see the capacity selection table. Input impedance: 2000 Ω/V. Frequency: 10 Hz..1 kHz. Insulation toward the power supply/output terminals: 3750 V.

Current output:	Active or passive 0..20 mA or 4..20 mA setup via DIP-switchs(2). Maximum load resistance: 600 ohm. Protection 400 W/ms.			
Voltage output:	Continuous voltage: 0..5 V, 1..5 V, 0..10 V or 2..10V selected by DIP-switch(2). Minimum load resistance: 2500 ohm. Protection 400 W/ms.			
Precision (3) @ 25ºC:			***CMR***	***Others (1)***
35..400 Hz (4)	0.2 %om	0.05 %ots	>60 dB	0.02% o.s.
10 Hz..1 kHz (4)	0.3 %om	0.15 %ots	>55 dB	0.02% o.s.
Thermal stability:	100 ppm/K.			
Response time:	For a stepped variation: 30 ms from 10 to 90%.			
Operating temperature:	Temperature: 0..60°C , Max humidity 30..90% at 40°C non-condensing.			
LED signals:	Power ON (green).			
Protection:	IP20.			
Weight, dimensions:	140 g, 100 x 112 x 17.5 mm.			
Overvoltage measurement Class:	CAT III up to 300 Vac towards ground. CAT II up to 300 Vac towards ground.			
Conform to CE standards:	The module complies with the following standards: EN61000-6-4 (electromagnetic emission, industrial environment). EN61000-6-2 (electromagnetic immunity, industrial environment). EN61010-1 (safety).			

Note:
(1): A medium voltage value (Vcc) up to 10% dm is tolerated; higher values decrease precision and can cause damages.
(2): The selection of starting offset scale (4 mA and 1 or 2V) is common for the two current/voltage outputs.
(3): These acronyms apply: om = of measurement, ots = of the scale.
(4): The precision values are indicated for a sinusoidal signal with distortion of <1%, on current reading 4..20 mA; errors on the other output scales are increased as follows: by 0.05% for zero offset (0 mA, 0 V), by 0.17% on fs 5 V and by 0.1% on fs 10 V.
The precision indicated in the table can, on request, be provided on another specified scale.
Remember that the instrument indicates the average adjusted value in relation to the RMS value.

PRELIMINARY WARNINGS

Before carrying out any operation it's mandatory to read all the content of this user Manual. Only electrical-skilled technicians can use the module described in this user Manual. Only the Manufacturer is authorized to repair the module or to replace damaged components.
No warranty is guaranteed in connection with faults resulting from improper use, from modifications or repairs carried out by Manufacturer-unauthorised personnel on the module, or if the content of this user Manual is not followed.

CAUTION!
BEFORE YOU ATTEMPT USING THE DIP-SWITCHES, MAKE SURE THAT YOU HAVE DISCONNECTED ALL CIRCUITS AT DANGEROUS VOLTAGE.

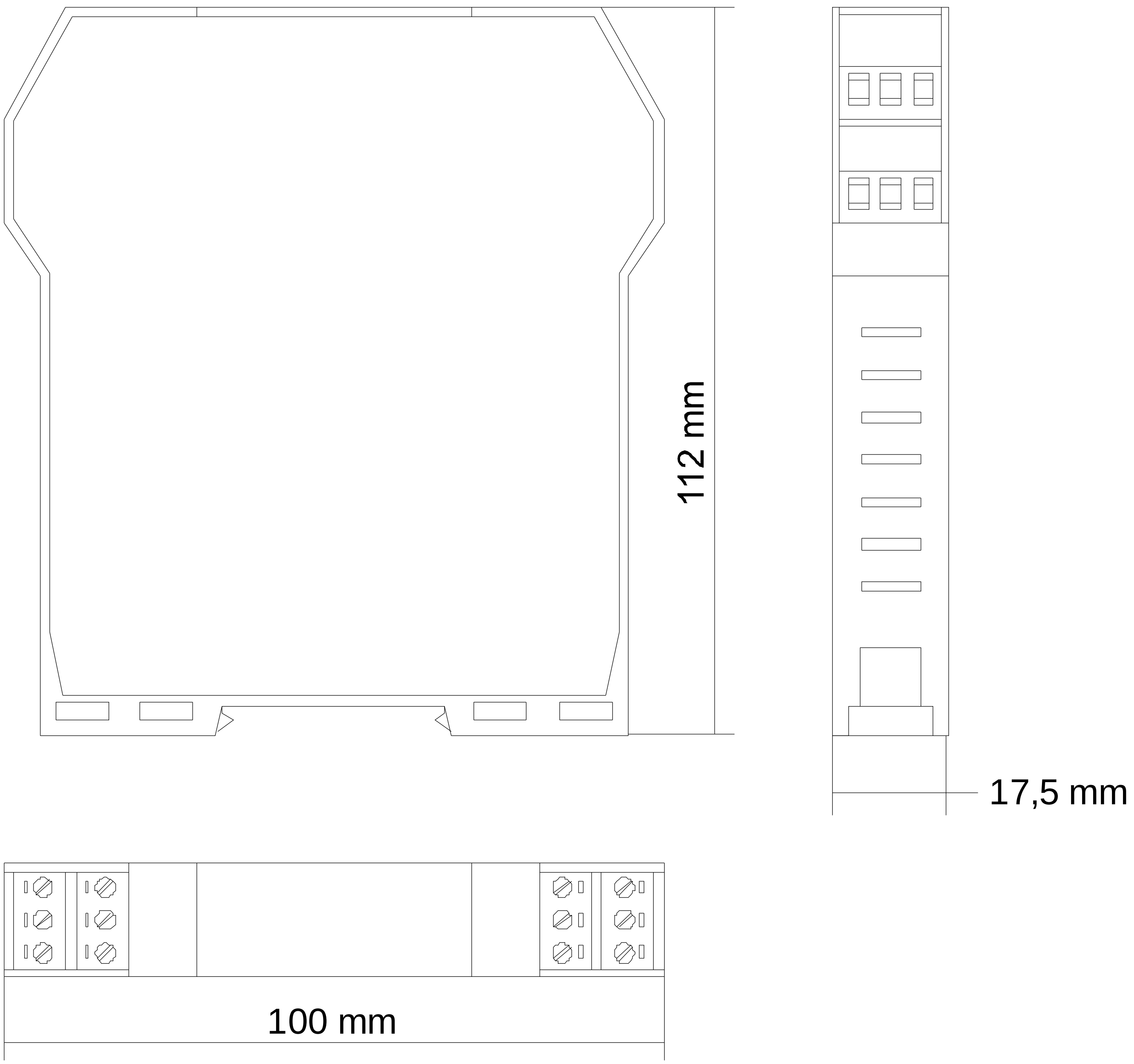
CAUTION!
BEFORE MAKING ANY CONNECTION TO THE INSTRUMENT, MAKE SURE THAT YOU HAVE DISCONNECTED ALL CIRCUITS AT DANGEROUS VOLTAGE.

CAUTION!
THE TRIMMER ADJUSTMENT MUST BE CARRIED OUT WITH THE INSTRUMENT DISCONNECTED FROM ALL VOLTAGE DANGEROUS CIRCUITS OR USING AN INSULATED SCREWDRIVER.

INSTALLATION

The module is designed to be installed on a IEC EN 60715 DIN rail, and wired only by front terminals.
We suggest you to install the instrument vertically in order to let the air to flow in the module and pay attention to do not put any objects or cable duct that can obstruct the ventilation louvers.
Avoid fitting modules above equipment that generates heat; you are advised to fit them at the bottom of the panel or on the enclosing compartment.

OVERALL DIMENSIONS



INPUT FULL-SCALE PRE-SETTING

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The instrument withstands an overload of 200% for 10 s. Higher or prolonged overload values may damage instrument's input section. We therefore advise you to carefully check the settings before applying the measurement voltage, if necessary using an ohmmeter to measure the input resistance which should be Rin = 2 000 Ω· Range (V).

The range of the instrument is established by the positions of the DIP-switches SW2 (2 way) and SW3 (4 way) and by the choice of the input terminals. The table below shows the combinations useful for the preset capacity values.
The status of the DIP-switches is indicated by a series of "1" and "0", which, in that order respectively indicate "ON" (toward the front of the instrument) and "OFF" (toward the rear of the instrument).

Full-scale	***Terminals***	***SW2***	***SW3***
490 V (F)	9 (N), 12	00	1000
480 V	9 (N), 12	01	1000
470 V	9 (N), 12	01	1001
460 V	9 (N), 12	01	1011
440 V	9 (N), 12	10	1000
430 V	9 (N), 12	11	1000
420 V	9 (N), 12	11	1001
410 V	9 (N), 12	11	1011
390 V	9 (N), 12	10	1100
380 V	9 (N), 12	11	1100
370 V	9 (N), 11	00	1000
360 V	9 (N), 11	00	1001
350 V	9 (N), 11	00	1011
340 V	9 (N), 11	01	1011
320 V	9 (N), 11	00	1100
310 V	9 (N), 11	01	1100
300 V	9 (N), 11	01	1101
290 V	9 (N), 11	01	1111
270 V	9 (N), 11	10	1100
260 V	9 (N), 11	10	1101
250 V	9 (N), 11	11	1101

Full-scale	***Terminals***	***SW2***	***SW3***
240 V	9 (N), 11	11	1111
230 V	8 (N), 11	01	1001
220 V	8 (N), 11	01	1011
200 V	8 (N), 11	10	1000
190 V	8 (N), 11	11	1000
180 V	8 (N), 11	11	1001
170 V	8 (N), 11	11	1011
150 V	8 (N), 11	10	1100
140 V	8 (N), 11	11	1100
130 V	8 (N), 10	00	1000
120 V	8 (N), 10	00	1001
110 V	8 (N), 10	00	1011
100 V	8 (N), 10	01	1011
80 V	8 (N), 10	00	1100
70 V	8 (N), 10	01	1100
60 V	8 (N), 10	01	1101
50 V	8 (N), 10	01	1111
30 V	8, 10	10	1100
20 V	8, 10	10	1101
10 V	8, 10	10	1111
0 V (I)	8, 10	11	1111

(N): If one of the two wires is neutral or earth, connect it preferably to the indicated terminal.
(I) : This is useful if you wish to use the instrument as a microammeter (500 µA fs) or for range values below 10 V (SW3.1 open).
(F): Factory configuration.

If you turn OFF ("0" position) switch SW3.1, this introduces the adjustment effect of the trimmer, accessible from the front panel. This enables you to broaden each fixed scale by a value between 0 V (0 Ω completely ccw) and 25 V (50 kΩ completely cw). The trimmer resistance can be accessed on terminals 7 and 8. In this way you can find out by how many volts the scale was increased, by measuring this resistance with an ohmmeter and dividing the value by 2000 Ω/V.
The instrument can also be 'set' by applying the known voltage on the input terminals (as on the table) and adjusting the trimmer until you obtain the required reading. When the applied voltage exceeds 42 V, *you must use an insulated screwdriver*, because the insulation of the adjusting screws is not guaranteed.
See the examples in the next paragraph.

OUTPUT SIGNAL PRE-SETTING

The Z202 instrument simultaneously transmits a voltage and a current signal. The signal scales can be set with the double dip-switch SW1; specifically:

Switch 1	***Position***	***Effect***
SW 1.**1**	0 - OFF	The full scale of the voltage output is **5 V**
	1 - ON (F)	The full scale of the voltage output is **10 V**
SW 1.**2**	0 - OFF	The start of scale offset is disabled (scale **0**..20 mA, **0**..5/10 V)
	1 - ON (F)	The start of scale offset is enabled (scale **4**..20mA, **1**..5 or **2**..10V)

(F) : Factory configuration

EXAMPLES OF POSSIBLE CONFIGURATIONS

Here are two examples of possible configurations:

	Terminals	SW1	SW2	SW3
- INPUT Voltage 250 Vac - Outputs 4..20 mA and 1..5 V	9 (N) - 11	0-1	1-1	1-1-0-1
- INPUT Voltage 120 V - Outputs 0..20 mA and 0..10 V	8 (N) - 10	1-0	0-0	1-0-0-1

ELECTRICAL CONNECTIONS

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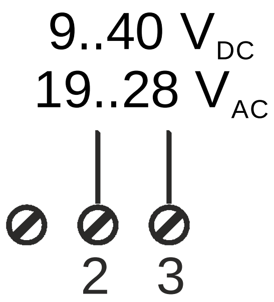
POWER SUPPLY

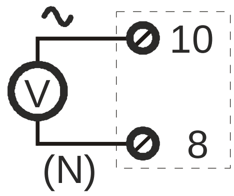
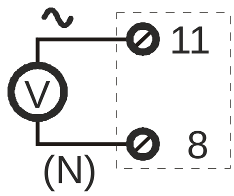
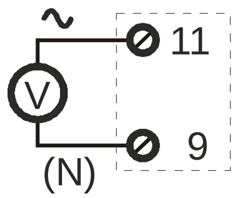
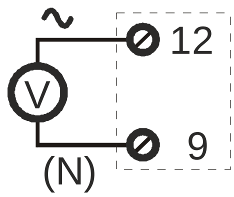
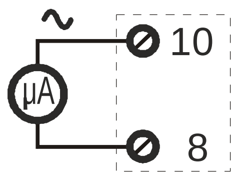


Power supply voltage must be in the range 9..40 V_{DC} (at any polarity), 19..28 V_{AC}; also see section; ***INSTALLATION INSTRUCTIONS.***

The upper limits must not be exceeded, to avoid serious damage to the module.

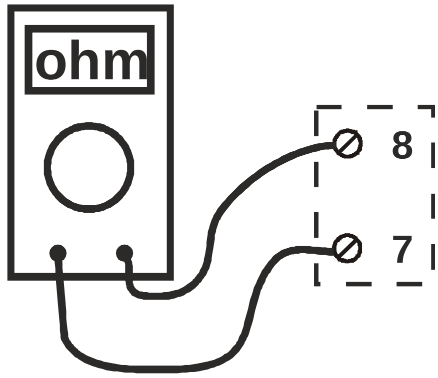
Protect the power supply source against possible damage of the module by using a fuse of suitable size.

CONNECTION OF ALTERNATE INPUT VOLTAGE

FULL-SCALE 10 .. 130 Vac	
FULL-SCALE 140 .. 230 Vac	
FULL-SCALE 240 .. 370 Vac	
FULL-SCALE 380 .. 490 Vac	
MICRO-AMMETER	

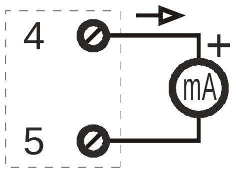
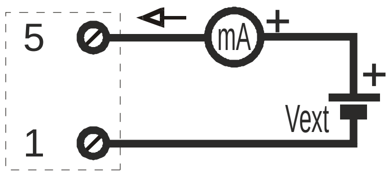
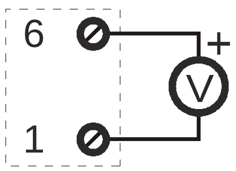
ADJUST OF FULL-SCALE

CAUTION!
THIS OPERATION MUST BE CARRIED OUT WITH POWER CUT TO THE INSTRUMENT AND WITH THE INPUT DISCONNECTED.



The full-scale can be increased by a value from 0 V to 25 V with respect to the rated value of the set full-scale.
The measurement in ohms divided by 2,000 provides the value to be added to the full-scale.
Example: if the reading is 30,000 ohm, the full-scale value is increased by 30,000 / 2,.000 = 15 V

CONNECTION OF OUTPUTS

	**CURRENT (ACTIVE CONNECTION)**
	**CURRENT (PASSIVE CONNECTION)**
	**VOLTAGE**

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