

# LABOR – ASTER

## INDUSTRIAL AUTOMATION



AC 083  
QMS

### RMS TRANSDUCER OF HIGH AC/DC CURRENT OR VOLTAGE type **U-S2A**

- **Smart current or voltage transducer:**
  - current RMS up to  $5A_{AC/DC}$
  - voltage RMS up to  $750V_{AC/DC}$
- **Frequency band: 5kHz for error 1%**
- **Wide range of supply voltage**  
 $18...350V_{DC}/18...230V_{AC}$
- **Galvanic separation between input, output and supply circuits**
- **High accuracy, digital linearization**
- **Standard output signal**
- **Standard time constant  $\tau=1s$  (95% of steady state after  $T=3\tau=3s$ ) or 0.2s or 50ms**



#### APPLICATION:

Transducer **U-S2A** is designed to measure AC/DC current or voltage and convert it into standard output signal. AC, AC+DC or DC current or voltage signal processing is performed according to the RMS value algorithm:

$$U(RMS) = \frac{\sqrt{\int f^2(t) dt}}{T}$$

Max. current in steady state flowing through internal shunt is up to 5A. For measuring greater currents user have to use current transformer or external shunt. Max. temporary overload is 25A for 1 sec.

By analogy – for measuring greater voltage than  $750V_{AC}$ , voltage transformer is necessary.

All the circuits (input, output and supply) are mutually galvanically separated.

For advanced user the calibration procedure is also available.

#### BASIC TECHNICAL PARAMETERS:

Input signal AC and DC

voltage RMS	-	max range 0...750V
current RMS	-	max range 0...5A
overload max	-	1.2 x continuous range current
temporary overload for internal shunt	-	max 25A for 1s
peak ratio	-	2 x measuring range
Input signal shape	-	alternating (DC+AC)
Sample frequency	-	100kHz
Input resistance	-	depending on range
current input	-	~ 0.02Ω for 5A
voltage input	-	≥ 2 MΩ for 230V
Input signal measurement band	-	3Hz ... 10 kHz

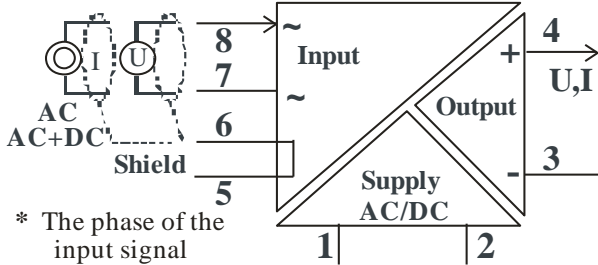
Output signal	-	any standard : 0/4...20mA, 0...10V or other
Load resistance	-	for 0/4...20mA - max. 750Ω for 0...10V - ≥ 2kΩ
Accuracy	-	0,2% for f=1kHz 1% for f=5kHz 5% for f=15kHz
Nonlinearity	-	±0.025%
Temperature drift	-	0.006% / °C
Error due to load resistance changes	-	0.05% / FS
Galvanic separation "Zero" and "Range" regulation	-	2kV between all circuits in range ±6.6% with potentiometers on the front panel
Correct operation indicator	-	LED on the front panel
Digital filter time constant	-	standard 1s or other specified in order code (check page 2)
Power supply	-	18 ... 350 V <sub>DC</sub> / 1.5 W 18 ... 230 V <sub>AC</sub> / 1.5 VA
Housing	-	on rail 22.5 x 99 x 114.5mm
Housing protection level	-	IP 20
Working condition	-	ambient temperature -10...55 °C relative humidity - up to 95%

**FUNCTIONAL DESCRIPTION:**

The transducer measures the input signal, converts it according to preset parameters and calculates the output signal.

Green LED informs that transducer is supplied and processor operates properly.

There are two potentiometers on the front panel, which can be used for calibrating “Zero” and “Range”. It is advised to use auto-calibration button for reference voltage, if input signal is AC (RMS analysis) .



**TRANSDUCER CALIBRATION:**

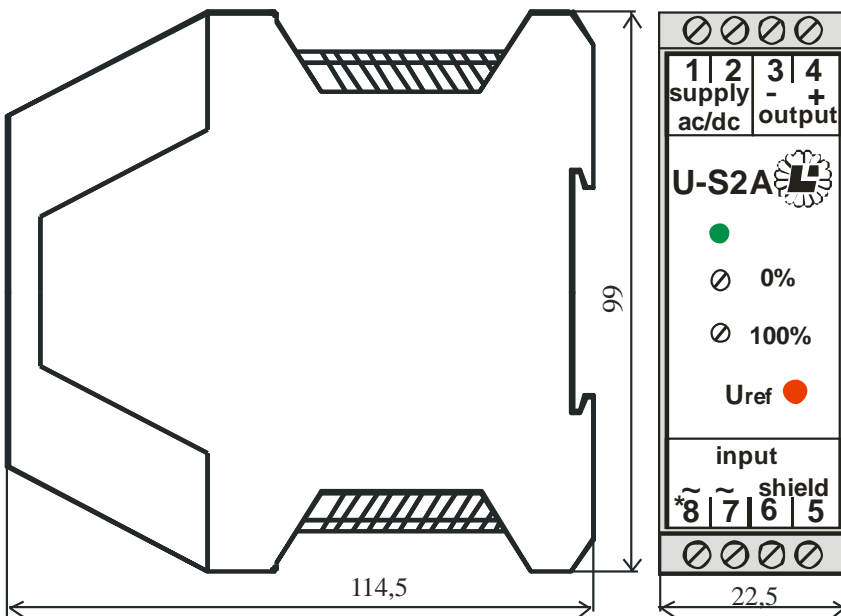
**WARNING:** The transducer is fabric calibrated. Incorrect calibration may cause malfunction.

For RMS AC signals, the calibration should start with setting the reference voltage in the way described below:

- Short the input terminals and push “Uref” button for 6s till the green LED starts blinking. For next 4s (LED still blinking) the transducer is being calibrated and then returns to normal operation.
- Calibration can be improved using “0%” and “100%” potentiometers. Provided that the signal connected to the input terminals is accurately set and measured.

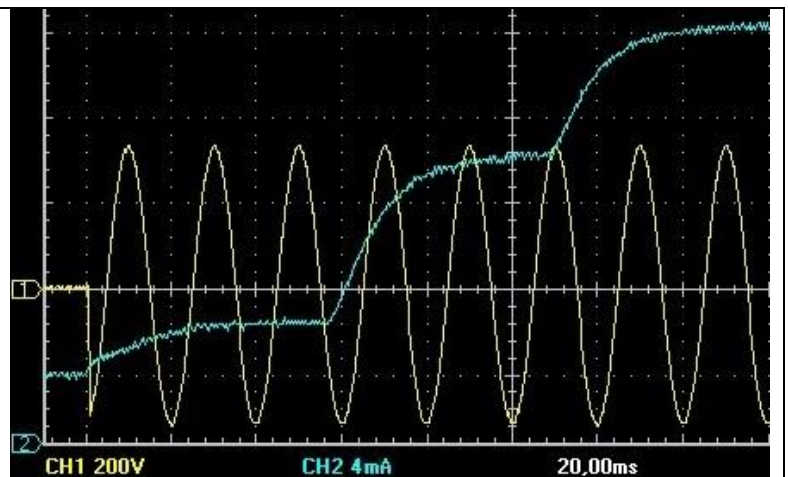
**Note:** Terminals 5-6 are used to connect the braided shield of the input signal cable. If the input signal (terminals 7-8) is not galvanically separated from the ground GND or PE terminals 5-6 (shield) cannot be connected to GND or PE. Terminals 5-6 can be connected to the braided shield of the input signal cable only if the braided shield is not connected to the ground GND or PE from the other side of this cable.

If in some point the shield is connected to the ground GND or PE connecting the shield to the terminals 5-6 can cause a **burn** (damage) of the input circuit when the measured signal is galvanically connected with power supply network e.g. 230Vac. This situation can occur when measuring voltage or current (shunt) in power grid without the use of transformers with separation.



**ORDERING : U-S2A-**

- Input range
- Output range (1...7)
  - 1 - 0...5mA, 2- 0...20mA
  - 3 - 4...20mA, 4- 0...5V
  - 5 - 0...10V, 6- 1...5V
  - 7- other (not typical)
- Input signal frequency band
- Time constant (1s, 0,2s, 50ms, other)



Oscillogram shows the 4-20mA output signal (blue) as a response to a unit step with 50Hz frequency of the input signal (white). This is the version with 50ms time constant. Full determination of the 4-20mA signal is after 140ms.

**ORDER EXAMPLE:** Transducer U-S2A, input 0÷230Vac, output 4÷20mA, frequency band 50Hz, time constant 50ms (95% of the steady state after 150ms): type **U-S2A-0..230Vac - 3 - 50Hz - 50ms**

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