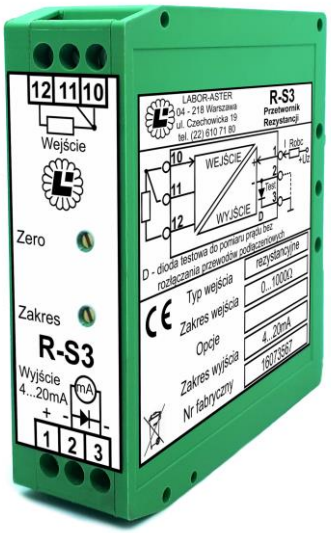
LABOR – ASTER

INDUSTRIAL AUTOMATION

AC 083
QMS

TWO-WIRE RESISTANCE CONVERTER
type R-S3

- **Measurement of resistance or potentiometer position**
- **All circuits mutually separated**
- **Compensation of line resistance change – three or four-wire sensor connection**
- **Control of output 4…20mA current loop**



APPLICATION:

Two-wire converter **R-S3** is design to convert resistance changes of a sensor to current 4…20mA signal. Output current signal can be converted to voltage signal by using external 250Ω resistor. The converter provides galvanically separation of input and output circuits. Using separation eliminates any influence of plant interferences to cooperation with data collection system, recorder.

The converter can be used as:

- linear conversion of resistance changes: $f = k * \Delta R$,
- linear conversion of temperature changes for resistance sensors $f = k * \Delta T$,
- conversion of potentiometer position

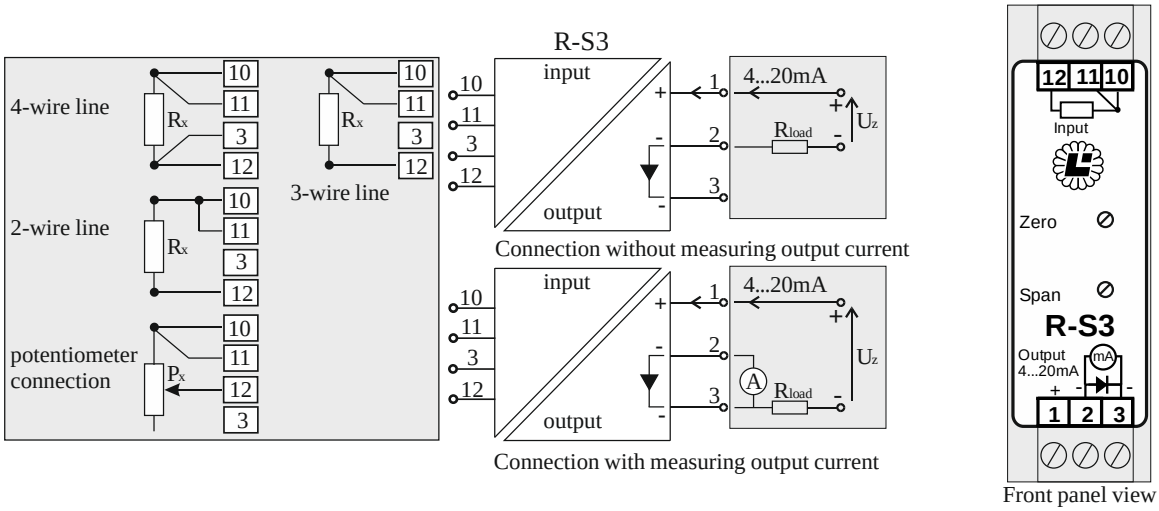
The R-S3 converter, when using three-wire sensor connection, provides total compensation of the influences of line parameters changes to measurement results.

When requested the converter can be made in version for four-wire connection of a sensor.

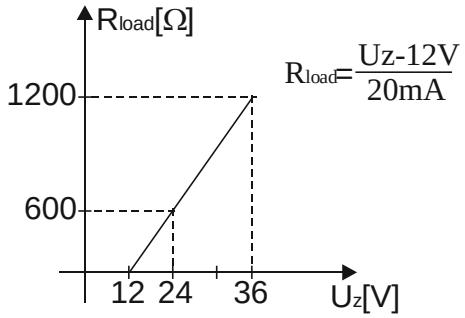
The user can correct the settings of the beginning and the gain with potentiometers “ZERO” and “SPAN” placed in the front panel.

BASIC TECHNICAL PARAMETERS

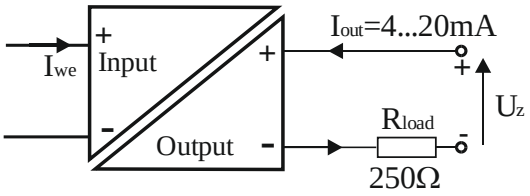
Input signal:		
resistance changes ΔR	-	1...10 000Ω
Pt100, Ni100	-	ΔTmin=20°C
Pt500	-	ΔTmin=5°C
Pt1000	-	ΔTmin=2.5°C
potentiometer position	-	ΔRmin=1Ω
Output signal	-	current loop 4...20mA supplied from the outside with voltage Uz
Supply voltage Uz of the current loop 4...20mA	-	12...36V
Sensor measurement current	-	0,4mA
Load resistance	-	max 600Ω for Uz=24V Rload=(Uz-12V)/20mA
Class	-	0,1%
Nonlinearity		
$f = k * \Delta R$	-	±0,05%
$f = k * \Delta T$	-	±0,1%
Possible linearization	-	any non-linearity
Temperature drift		
ΔR>10Ω	-	0,01%/°C
ΔR≤10Ω	-	0,02%/°C
Error due to load resistance and suppy Uz changes	-	±0,02%/V
Time constant	-	0.1s or as agreed: 0,05....1s
Sensor connection	-	2-, 3-, or 4-wire line
Line resistance		
2-wire	-	≤ 5% of range ΔR
3- or 4-wire	-	≤ 30Ω one wire
Galvanic separation	-	between input and output circuits
Isolation voltage test	-	2kV, 50Hz or equivalent
Measurement ranges	-	as agreed
Rail housing	-	width 22.5 mm height 79 mm depth 74 mm
protection level	-	IP40
mounting	-	universal rail clamp
Safety requirements		PN-EN 61010-1:2002
EMC requirements		PN-EN 61000-6-1 PN-EN 61000-6-3



Diode allowing measuring output current is unavailable for version with 4-wire input.



Load resistance calculation method



Achiving voltage output signal method

HOW TO ORDER:

R-S3-__-__-__-__

L - rail housing
P - wall housing

4 - four-wire sensor connection

Input range
P1...P23 - sensor Pt according to table 1
N1...N11 - sensor Ni according to table 2
R_{min} /R_{max} - min/max value of potentiometer resistance

L - with linearization
BL - without linearization

Order example: two-wire resistance converter, input Pt100, range 0...200°C, linearization type: R-S3-L-P7-L

Working conditions:
- Ambient temperature - storing: -30°C...+60°C
- Ambient temperature - working: -25°C...+60°C
- Relative humidity: max 90%, no water vapor condensation
- Ambient atmosphere: free from dust and aggressive fumes

Production and distribution: **LABOR – ASTER**
Poland, 04-218 Warsaw, ul. Czechowicka 19
tel. +48 22 610 71 80 ; +48 22 610 89 45; fax. +48 22 610 89 48
e-mail: biuro@labor-automatyka.pl labor@labor-automatyka.pl ; **http://** www.labor-automatyka.pl

 Issue 07/2024

Table 1. Pt100

Range number	Range °C	Sensor's nonlinearity [%]
P1	0.....25	+0.11
P2	0.....40	+0.12
P3	0.....60	+0.22
P4	0...100	+0.39
P5	0...120	+0.46
P6	0...150	+0.57
P7	0...200	+0.76
P8	0...250	+0.96
P9	0...300	+1.16
P10	0...400	+1.58
P11	0...550	+2.22
P12	50...150	+0.38
P13	100...320	+0.87
P14	100...400	+1.2
P15	200...320	+0.49
P18	200...400	+0.81
P17	300...550	+1.06
P18	-10... +40	+0.18
P19	-20... +20	+0.16
P20	-30... +60	+0.34
P21	-30.. +150	+0.69
P22	-100...+50	+0.62
P23	-220...+50	+1.37
Other ranges according to order		

Table 2. Ni100

Range number	Range °C	Sensor's nonlinearity [%]
N 1	0.....25	-0.67
N 2	0.....40	-1.1
N 3	0.....60	-1.6
N 4	0...100	-2.8
N 5	0...120	-3.5
N 6	0...150	-4.5
N 7	50...150	-3.0
N 8	-10... +40	-1.4
N 9	-20... +20	-1.15
N 10	-30... +60	-2.5
N 11	-30.. +150	-5.2
Other ranges according to order		