SMLG - Universal programmable converter

- **An intelligent new generation converter with small dimensions. With its low price, it competes with analogue converters.**
- **Galvanic separation between the input and output**
- **One converter for all standard resistance sensors and thermocouples**
- **24 bit A/D conversion**
- **4 to 20 or 20 to 4 mA linear output signal (passive two-wire circuit)**
- **Damping time constant selectable within a range of 0.3 up to 30 s**
- **Option of user linearization from a custom file**
- **Only 17.5 mm module width**

Application:
This programmable measuring converter is designed to convert industrial signals from resistance thermometers or thermocouples into a unified industrial signal of 4 to 20 mA.
The converter is equipped with galvanic separation between the input and output.

Description:
The SLMG is a microprocessor-controlled measuring converter with digital signal processing.
The input signal is converted via a 24-bit A/D converter into a digital signal that is modified according to the user's needs.
Through 14-bit D/A conversion, the measured value is converted into an output current signal of 4 to 20 mA.
The converter is designed to be mounted onto a DIN rail. Using a PC, the user can set the type of output signal (e.g. Pt100, Pt1000, Ni100, Ni1000, thermocouple), the range of the input signal for the current output, input signal linearization or make specific modifications to the output signal (conversion specified by a table, etc.). The output signal can be set to a standard 4 to 20 mA or the reverse 20 to 4 mA.
By default, the converted signal is delivered in a pre-programmed state in accordance with the customer's configuration requests.
For custom programming, WINDOWS-based software, including a programming interface, can be supplied.

TECHNICAL DATA

Input signal:	see table 1
Sensor connection:	see fig. 1
Current flowing through the resistance sensor:	approx. 0.2 mA
Linearization:	set via a program
Output signal:	4 to 20 mA (option of reversing to 20 to 4 mA)
Indication of interrupted wiring or sensor:	undercurrent < 3.9 mA or overcurrent > 22 mA (25 mA max. current) (selected during the customer's configuration)
Time constant:	0.3 to 30 sec (programmable)
Converter supply voltage:	9 to 30 VDC
Maximum value of load resistance in a current loop:	Rz = (Vs-9) / 0.020 [Ω, V]
Galvanic separation between the input and output	1.5 kV AC 1 minutes
Effect of changes in supply voltage (ČSN EN 60770):	<0,005 % / 1V
Effect of changes in load resistance (ČSN EN 60770):	< 0,005 % / 100 Ω
Errors (according to ČSN EN 60770-1 ED2):	
Pt, Ni	max. ±(0,1% + 0,1 °C) -four-wire sensor connection *)
	max. ±(0,1% + 0,15 °C) -three-wire sensor connection *)
Thermocouple E, J, K, L, T	max. ± (0.1% + 0.15 °C)- without cold end compensation *)
Thermocouple B, S, R, N	max. ± (0.1% + 0.2 °C) - without cold end compensation *)
R, potentiometer	max. ±(0,1% + 50 mΩ) *)
U	max. ±(0,1% + 50 µV) *)
cold end compensation error:	max ±0,5 °C
Temperature dependence (ČSN EN 60770-1 ED2):	
Pt, Ni	max. ±(0,01% + 0,01 °C)/K *)
Thermocouple E, J, K, L,	max. ±(0,01% + 0,01 °C) /K *)
Thermocouple B, S, R, N	max. ±(0,01% + 0,02 °C)/K *)
R, potentiometer	max. ±(0,01% + 5 mΩ)/K *)
U	max. ±(0,01% + 5 µV)/K *)

*) errors listed in percentages are relative to the range

TAB. 1: INPUT SIGNAL

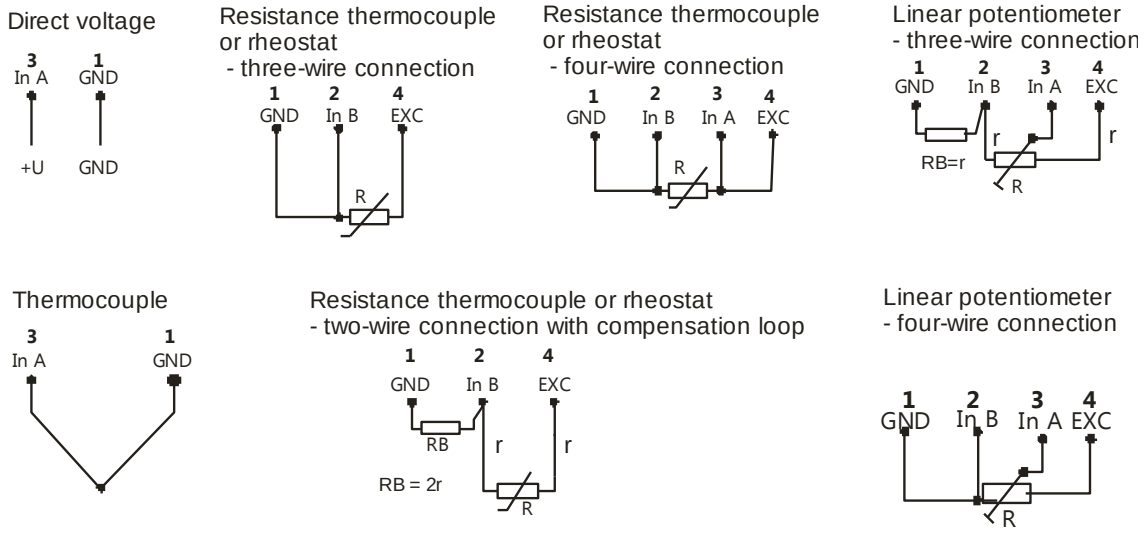
TYPE	MEASURING RANGE	MIN. RANGE	NOTE
RESISTANCE TEMPERATURE SENSORS:			
PT100 (0.003850)	-200 to +850 ° C	25 °C	4, 3 or 2-wire connection
Pt1000 (0.003850)	-200 to +850 °C	25 °C	4, 3 or 2-wire connection
Ni100 (0,00618; 0,00500)	-70 to +250 °C	20 °C	4, 3 or 2-wire connection
Ni1000 (0,00618; 0,00500)	-70 to +250 °C	20 °C	4, 3 or 2-wire connection
RESISTANCE TRANSMITTERS:			
POTENCIOMETER	20 to 4000 Ohm		4 or 3-wire connection
RHEOSTAT	0 to 4000 Ohm	20 Ohm	4 or 3-wire connection or 2-wire with a compensation loop
THERMOCOUPLES:			
B (PtRh30 - PtRh6)	+100 to +1820 °C	500 °C	guaranteed accuracy: +500 to +1820 ° C
E (NiCr - CuNi , ch - ko)	-200 to +1000 °C	100 °C	guaranteed accuracy: -200 to 0 °C; -50 to +200 °C; 0 to +1000 °C
J (Fe-CuNi)	-100 to +1200 °C	100 °C	guaranteed accuracy: -100 to 0 °C; -50 to +200 °C; 0 to +1200 °C
K (NiCr - Ni, ch - a)	-200 to +1370 °C	100 °C	guaranteed accuracy: -200 to 0 °C; -50 to +200 °C; 0 to +1370 °C
N (NiCrSi - NiSi)	-200 to +1300 °C	200 °C	guaranteed accuracy: -200 to 0 °C; -50 to +200 °C; 0 to +1300 °C
L (Fe - CuNi, Fe - ko)	-200 to +900 °C	100 °C	guaranteed accuracy: -200 to 0 °C; -50 to +200 °C; 0 to +800 °C
R (PtRh13-Pt)	0 to +1760 °C	500 °C	guaranteed accuracy: +100 to +1760 ° C
S (PtRh10-Pt)	0 to +1760 °C	500 °C	guaranteed accuracy: +100 to +1760 ° C
T (Cu-CuNi, Cu-ko)	200 to +400 °C	100 °C	guaranteed accuracy: -200 to 0 °C; -50 to +200 °C; 0 to +400 °C
VOLTAGE:			
	0 to 10 mV	2 mV	INA input against GND
	0 to 64 mV	20 mV	INA input against GND

OPERATING CONDITIONS OF THE EQUIPMENT

Ambient temperature: -20 to +80°C
Relative humidity: < 95 % (no condensation)
Atmospheric pressure: 84 to 107 kPa
Cover: IP40 housing, IP10 clamps
Permissible conductor cross-section: 0.35 mm^2 to 1.5 mm^2

Resistance to the interference (EMC): ČSN EN 61000 - 4 - 3 (wide-band field, level 3), criterion B
ČSN EN 61000 - 4 - 6 (cable interference, level 2), criterion A
ČSN EN 61000 - 4 - 6 (cable interference, level 3), criterion B

Fig. 1: SLMG input connection



When connecting RTD sensors into a two-wire circuit clamp, 1 and 2 must be electrically connected

Fig. 2: connecting the SLMG to a circuit:

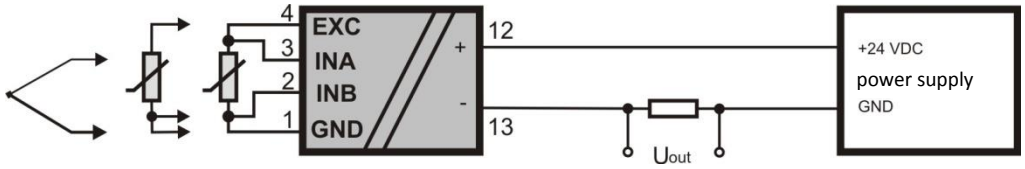
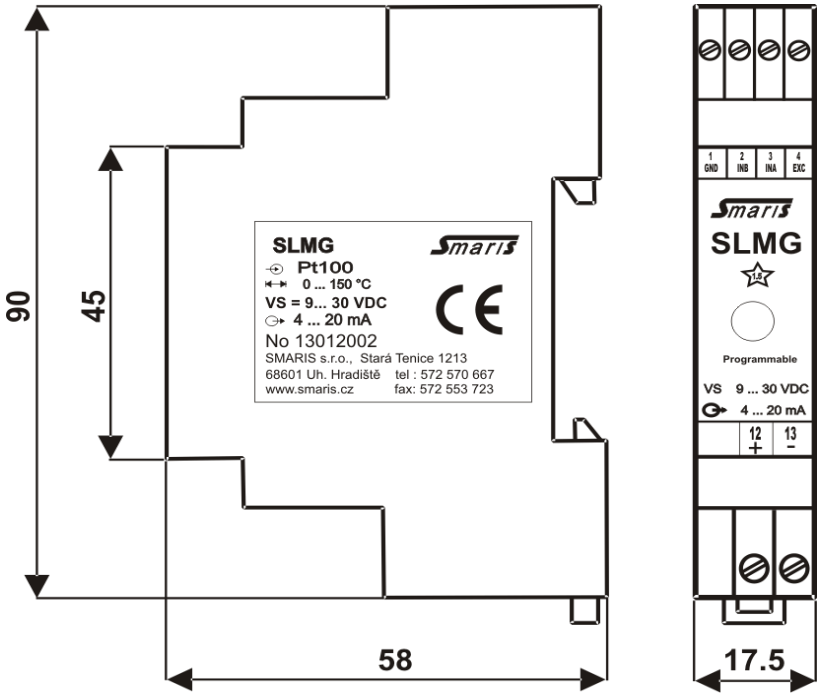


Fig. 3: dimensions



Operating instructions for the SLMG universal programmable converter

The input configuration can be programmed via a PC and the supplied interface that is fitted with a 2.5 mm JACK connector. This programmable connector can be inserted into the slot on the front panel of the converter. During programming, the converter must be connected to a power supply (9 to 24 VDC).

The user program for the SLMG can be downloaded as a text file (.txt). In order for the program to function as an application, the user needs to rename its extension to .exe.

Programming the SLMG converter:

(during programming, the converter must be connected to a power supply of 9 to 30 VDC)

a basic configuration can be programmed via the interface:

- **type of input** (Pt100, Pt1000, Ni100, Ni1000, rheostat, potentiometer, thermocouple)
- **type of sensor connection** (important for resistance inputs)
- **input signal range** (e.g. 0…250 °C, or 0…600 °C in Pt100)
- request to **linearize** the input signal
- **type of emergency signalling** for an analogue output (protection against overcurrent, undercurrent, off)

How to write for:

Type	Version
SLMG	Version for resistance thermal sensors, thermocouples, potentiometer and rheostat
SLMG-RTD	Version for resistance thermal sensors

Code	Input signal	
1	Pt100 (3850)	
2	Pt1000 (3850)	
3	Ni100 (6180)	
4	Ni100 (5000)	
5	Ni1000 (6180)	
6	Ni1000 (5000)	
7	Potentiometer	Only for SLMG
8	Rheostat	Only for SLMG
9X	Thermocouple, X=B,E,J,K,N,L,R,S,T	Only for SLMG
10	Voltage of 0 to 10 mV	Only for SLMG
11	Voltage of 0 to 64 mV	Only for SLMG
N	Not programmed	

Measuring range	Lower and upper measuring range according to TAB. 1
xxx - yyy	Intended measuring range according to TAB.1
N	Not programmed

Code	Time constant
0,3	Standard value
Xx	Value between the range of 0.3 to 30s
N	Not programmed

Code	Input specification
-	three-wire connection of RTD sensors and a potentiometer
4D	four-wire connection of RTD sensors and a potentiometer

SMLG-RTD	1	0-150	0,3	-	**Example order**

The converter can be ordered according to the above table in a pre-programmed state or without programming (all parameters will be programmed by the customer). In this case, a PM25 programming interface and end-user software must be ordered.