

# 4-CHANNEL MODULE OF ANALOG INPUTS SM2 TYPE



## 1. APPLICATION

The SM2 4-channel module of analog inputs is destined to convert standard signals, resistance or temperature signals into numerical data accessible through the RS-485 or RS-232 port by means of the MODBUS protocol.

The measurement is carried out independently on four channels, galvanically insulated between themselves. RS-485 and RS-232 output ports are galvanically insulated from input signals and supply. The programming of the module is possible by means of the RS-485 or RS-232 port.

In the set of SM2 module there is the connecting lead, to connect with the PC computer (RS-232).

**The SM2 module realises following functions:**

- mathematical operations in channels and between measuring channels,
- conversion of measured or calculated quantities on the base of individual linear characteristics,
- storage of maximal and minimal values for each channel, independently for each channel,
- programming of the measurement averaging time,
- servicing of RS-485 and RS-232 interfaces in MODBUS protocol, both in ASCII and RTU mode.
- change of the OC type output state in the base of set up alarm values.

## 2. TECHNICAL DATA

### INPUTS:

**Depending on the execution code for individual channels:**

- voltage measurement 0...10 V input resistance > 1 MΩ
- current measurement 0...20 mA input resistance < 10 Ω
- resistance measurement 0... 400 Ω
- Pt100 (- 200... + 850)°C

Current flowing through the Pt100 sensor < 250 μA

Resistance of leads connecting the resistance thermometer with the module max 20 Ω/wire

Pt100 characteristic acc. to EN 60751+A2

### OUTPUTS:

- **open collector (OC)**  
voltageless of OC type with npn transistor  
(maximal load 25 mA)  
range of added voltages: 5...24 V d.c.
  - **digital**
    - a) **RS-485 interface**

transmission protocol	MODBUS
ASCII	8N1, 7E1, 7O1
RTU	8N2, 8E1, 8O1, 8N1
baud rate	2400, 4800, 9600, 19200 bauds
address	1... 247
    - b) **RS-232 interface**

transmission protocol	MODBUS
RTU	8N1
baud rate	9600 bauds
address	1
- maximal response time to the query frame 300 ms.

**Basic error** 0.1% of measuring range

**Additional error from ambient temperature changes** ± (0.1% of range /10K)

**Measurement averaging time** min 100 ms (programmable)  
the sampling frequency of the input is 1 kHz (averaged measurement)

### Rated operation conditions:

- supply voltage depending on the execution code 85... 253 V a.c./d.c.  
20... 50 V a.c./d.c.
- supply voltage frequency 40... 440 Hz
- ambient temperature -10...23...55°C
- storage temperature -25...+85°C
- relative humidity < 95% (no condensation)
- preheating time 10 min

### Sustained overload:

- resistance thermometers 1%
- measurement of voltage, current and resistance 10%

### Short-duration overload (3 s):

- voltage input 10 Un
- current input 10 In

### Ensured protection grade acc. to EN 60529:

- through the housing IP 40
- electrical connections IP 20

**Dimensions** 45 × 120 × 100 mm

**Weight** < 0.3 kg

**Fixing** on a 35 mm rail

**Power consumption** < 4 VA

**Resistance against decays** acc. to EN 61000-6-2

### Electromagnetic compatibility:

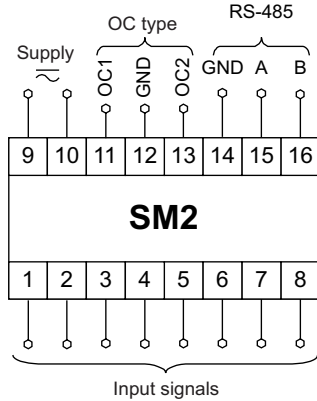
- immunity acc. to EN 61000-6-2
- emission acc. to EN 61000-6-4
- additional error from electromagnetic hazard < 0.2%

### Safety requirements acc. to EN 61010-1 standard:

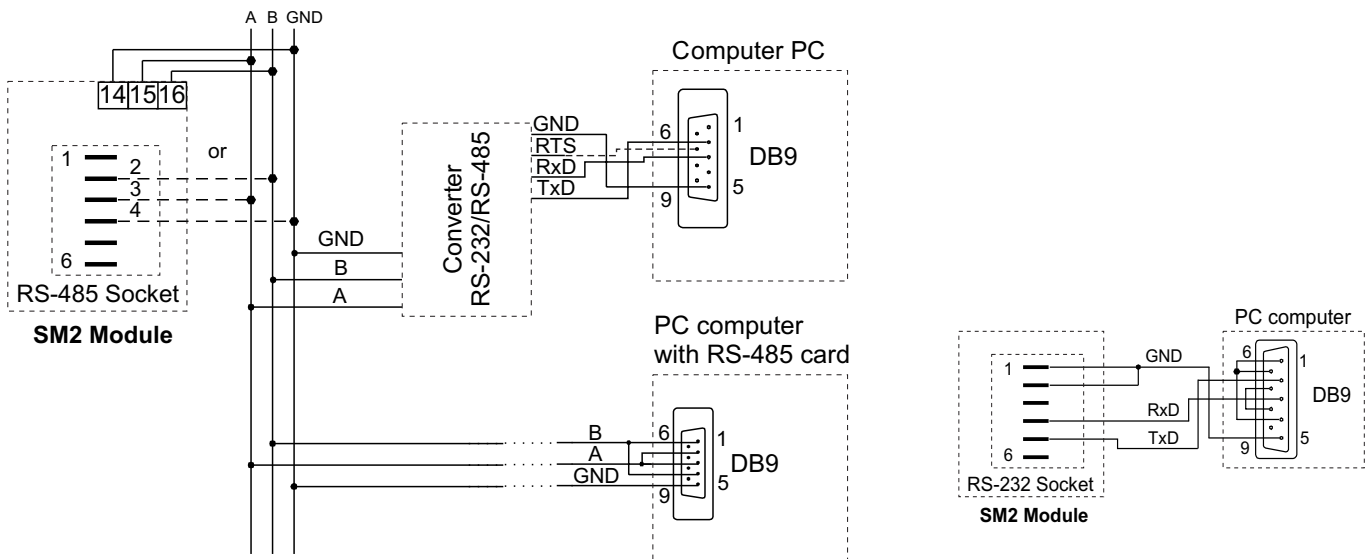
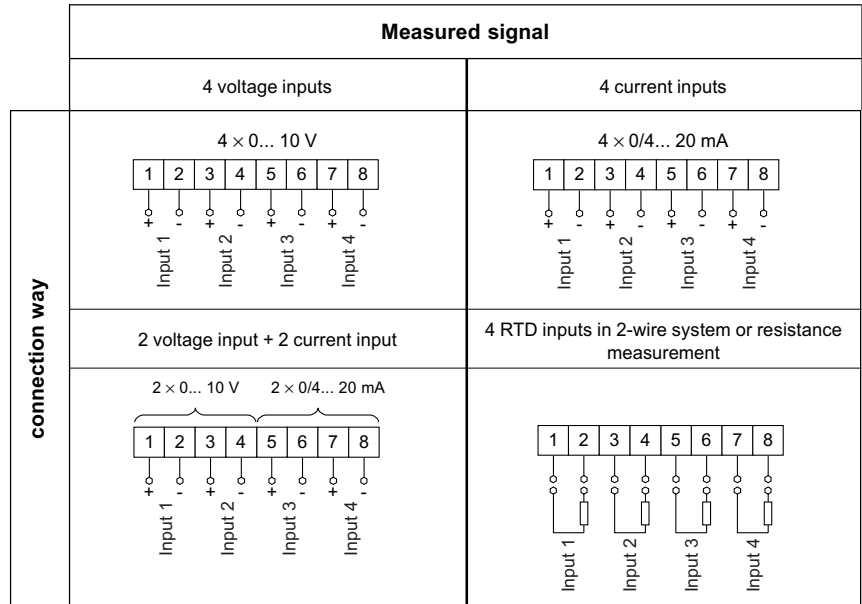
- installation category III
- pollution grade 2
- phase-to-earth working voltage:
  - supply 300 V
  - input 50 V
  - output 50 V

### 3. EXTERNAL CONNECTION DIAGRAMS

**Connection way of external signals**



**Connection way of input signals**



### 4. ORDERING CODES

SM2 Module	XX	X	X
<b>Input signal*:</b>			
4 voltage inputs            0...10 V .....	00		
4 current inputs            0/4...20 mA .....	01		
2 voltage input + 2 current input    0...10V + 0/4...20 mA .....	02		
4 resistance or Pt100 inputs    Pt100 or resistance < 400 Ω .....	03		
on order** .....	XX		
<b>Supply:</b>			
85... 253 V a.c./d.c. ....	1		
20... 50 V a.c./d.c. ....	2		
on order ** .....	X		
<b>Acceptance tests:</b>			
without additional requirements .....	0		
with an extra quality inspection certificate .....	1		
acc. to customer's agreement** .....	X		

### EXAMPLE OF ORDER

When ordering, please respect successive code numbers.

Code: **SM2 01 1 1** means:

- SM2** - 2-channel module of analogue inputs,
- 01** - module with 4 current inputs 0/4...20 mA,
- 1** - supply voltage: 85...253 V a.c./d.c.
- 1** - with an extra quality inspection certificate

\* Possible version of a cheaper module with a smaller quantity of inputs. Possible compounding of input kinds (e.g. 1 voltage and 3 current inputs)

\*\* Code numbers must be agreed with the manufacturer.