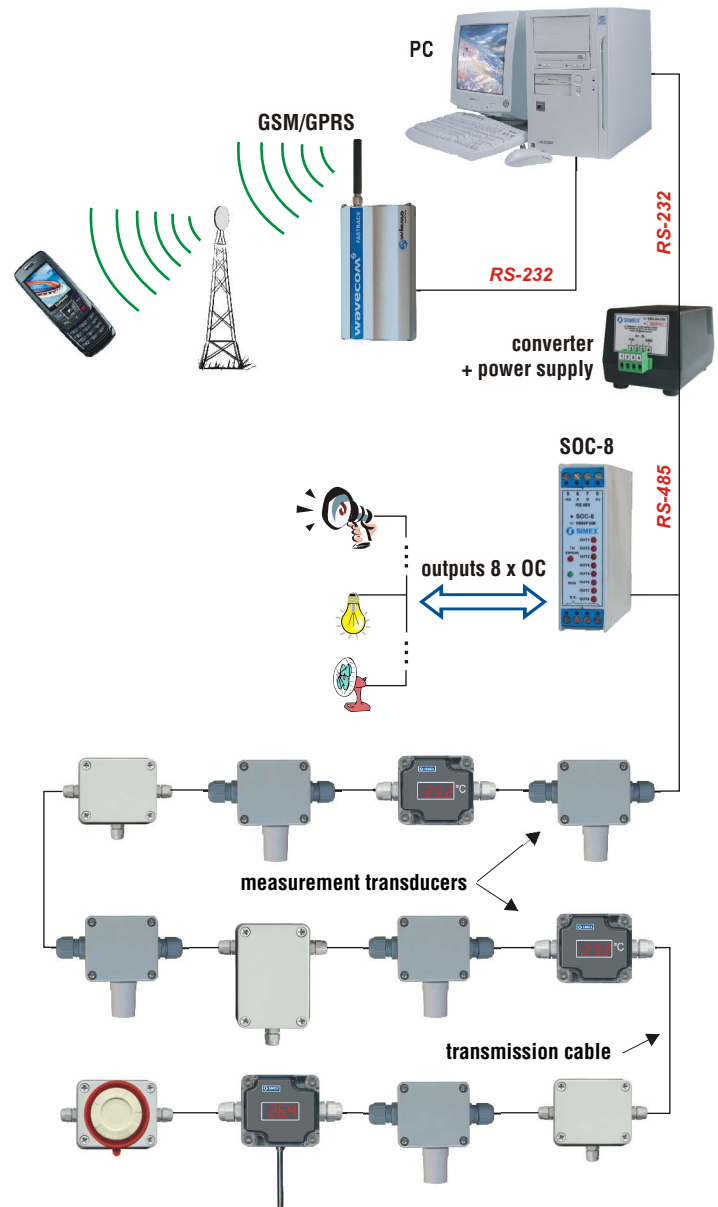# Temperature and Humidity Recording System **TRS**

- ⇒ **collecting, recording and storing data of temperature and humidity**
- ⇒ **possibility of connecting between 1 and 127 measuring points**
- ⇒ **two types of software: basic and advanced enabling GSM/GPRS and alarm function**
- ⇒ **easy-to-assemble and operate**

PC

GSM/GPRS

RS-232

RS-232

converter + power supply

SOC-8

RS-485

outputs 8 x OC

measurement transducers

transmission cable

The **TRS** Temperature and Humidity Recording System is a computer measurement system. Its basic tasks include: collecting, recording and displaying data on temperature and humidity eg. in cold stores, production halls, etc. Main elements of the system are: measuring and indicating devices, data transmission cable, protocol converter with a power supply and recording software. Optionally we also recommend using an surge protector to protect the computer and devices plugged into a common electrical power source. The control software allows connection of GSM module to PC and sending reports (eg. alarm state report). User definable ALARM STATES are related in free way to thresholds/ /failures of measurement devices. There is possibility of individual enabling/disabling of reporting of any ALARM STATE and fully configurable signalling of ALARM STATES by digital outputs (SOC-8), short text message SMS (GSM) or sound signal (TRS-B1a). At present the TRS System includes: ambient temperature transducer (**TRS-01a**), temperature transducer to work with a Pt100 sensor (**TRS-02a**), temperature and humidity transducer (**TRS-04a**), ambient temperature transducer with display (**TRS-11a**), wall mounted indicator (**TRS-10a**), additional power supply (**TRS-09a**) and sound signal device (**TRS-B1a**).

Data is exchanged and facility devices are supplied by means of a four-conductor screened **transmission cable** (maximum length: 1 km) connecting all system devices to the computer. Up to 127 devices can be connected to the system and thanks to this we can reduce the number of "cable routes", which is a basic factor that increases costs. Data between transducers operating to the RS-485 industrial standard and the office computer equipped with the RS-485 standard, are exchanged by means of the **protocol converter with power supply** (**SRS-2/4-Z16-B1a**). We placed the measuring converter power supply in one casing to make assembly as easy as possible.

The System is mainly used in the food industry: in meat, fish and milk processing plants as well as in all other places where continuous measurement and recording of temperature and humidity are required. The standards impose an obligation to record temperature in rooms with controlled temperature and to store the data for more than 2 - 3 years (depending on the industry).

Computer Communication

The **SimCorder** software is used for the computer communication system. The basic task of this application is to collect data from a network of scattered measuring devices, to store results in a database, present them in tables and diagrams as well as to create and print reports.
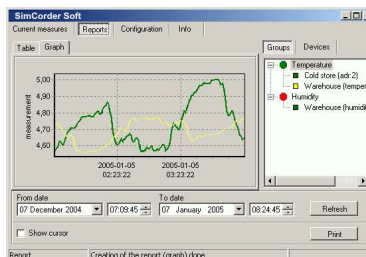
SimCorder Soft application offers:

- temperature and humidity recording from a long period of time,
- data displaying in the form of a diagram,
- report generation within a specified period of time.

During operation, results of measurements are presented in the form of a diagram. On the right side of the diagram there are controls that enable definition of data presented in the diagram and determination of a starting and ending dates of presented data. The user may select from the list those devices whose measurements will be presented in the diagram.

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Type	TRS-01a	TRS-02a	TRS-04a
TRS Recording System	Ambient Temperature Transducer	Temperature Transducer	Temperature and Humidity Transducer

General characteristics

	TRS-01a	TRS-02a	TRS-04a
	The **ambient temperature transducer** is a basic device of the TRS System. It is designed particularly to measure temperature in rooms where food products are manufactured and stored. It is equipped with Modus RTU communication bus. It has a small plastic casing. It measures temperature within the range of -40°C to +85°C.	The **temperature transducer** is designed for multipoint measurement of temperature by means of a standard Pt100 sensor. In particular it is designed for use with bayonet sensors to be used, for example, in smoke-houses. It may be used with any Pt100 sensors. This module features very good compensation of effect of connection cable resistance on the result of temperature measurement. Non-linear characteristics of the sensor is digitally linearized. The module is equipped with Modbus RTU communication bus.	The **temperature and humidity transducer** is designed for multipoint temperature and humidity measurement systems. In particular it is used for measuring conditions in rooms where food products are manufactured and stored. The module is equipped with Modbus RTU communication bus.

Technical data

	TRS-01a	TRS-02a	TRS-04a
Supply voltage	typically 10 VDC (9 VDC - 12 VDC)	typically 10 VDC (9 VDC - 12 VDC)	typically 10 VDC (9 VDC - 12 VDC)
Power consumption During operation During Modbus transmission	4,2 mA up to 60 mA	12 mA 65 mA	4,2 mA up to 60 mA
Temperature sensor Measurement range Measurement error	Semiconductor integrated circuit -40°C to +85°C within the range -10°C to +50°C: ±0,5°C	Pt 100 sensor -50°C up to +550°C ±0,2%	Semiconductor integrated circuit -40°C up to +70°C ±0,5°C
Humidity sensor Measurement range Accuracy Linearity Hysteresis Repeatability Stability	————————	————————	0% RH up to 100% RH ±2% RH (at 25°C, non-condensing) ±0,5% RH (typically) ±1,2% RH ±0,5% RH ±1% RH (at 50% RH, within 5 years)
Number of modules in 1 network	maximum 127	maximum 127	maximum 127
Communication interface	RS-485 / Modbus RTU / 9600 bit/sek.	RS-485 / Modbus RTU / 9600 bit/sek.	RS-485 / Modbus RTU / 9600 bit/sek.
Working temperature **Storing temperature**	-40°C up to +85°C -40°C up to +85°C	-40°C up to +85°C -40°C up to +85°C	-40°C up to +70°C (non-condensing) -40°C up to +85°C
Fastening	to wall, 2 M3 bolts	to wall, 2 M3 bolts	to wall, 2 M3 bolts
Connection cable	4 conductors (2 supply conductors + 2 data transmission conductors)	4 conductors (2 supply conductors + 2 data transmission conductors)	4 conductors (2 supply conductors + 2 data transmission conductors)
Protection level	IP 65 (ABS casing) IP 30 (sensor)	IP 65	IP 65 (ABS casing) IP 30 (sensor)
Casing dimensions (LxWxD) Without chokes With chokes	63 x 58 x 35 mm 103 x 92 x 35 mm	80 x 82 x 55 mm 130 x 105 x 55 mm	63 x 58 x 35 mm 103 x 92 x 35 mm
Remarks		Acceptable connection cord resistance: up to 20 Ω in each cord!	**Do not exceed the temperature range of 0 - 70°C.** The module should not be used where water vapour condensation occurs.

V.8.04.1

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Type	TRS-11a	TRS-10a	TRS-B1a
TRS Recording System	Ambient Temperature Transducer with Display	Wall Mounted Indicator	Sound Signal Device

General characteristics

TRS-11a: The **TRS-11a ambient temperature transducer with a display** is designed for multipoint temperature measurement within the range of -40°C up to +85°C. It is particularly designed to measure temperature in rooms where food products are manufactured and stored. A display located on the front panel enables the reading of current temperature and autonomous operation of the module (without a computer system). It is equipped with Modbus RTU communication bus.

TRS-10a: The **TRS-10a wall mounted indicator** is designed to display digital values and short, 4-letter messages. This superior system makes the display flicker when a displayed value is not refreshed. It is a slave device that communicates with the Master device via RS-485 interface with Modbus RTU protocol. The indicator is dedicated to the TRS Temperature Recording System, yet it can cooperate with any superior system equipped with RS-485 link with Modbus RTU protocol.

TRS-B1a: The **TRS-B1a sound signal device** is designed to signal events with a sound or light. It is controlled by means of RS-485 link, which allows for activating of the sound signal (a buzzer with variable tone) and/or light signal (a flickering diode). The module is dedicated to the TRS Temperature Recording System and it is equipped with Modbus RTU communication bus. It can be used with other systems where the communication is consistent with the Modbus RTU standard.

Technical data

	TRS-11a	TRS-10a	TRS-B1a
Supply voltage	typically 10 VDC (9 VDC - 12 VDC)	typically 10 VDC (9 VDC - 12 VDC)	typically 10 VDC (9 VDC - 12 VDC)
Power consumption During operation During Modbus transmission	up to 30 mA up to 80 mA	up to 30 mA up to 80 mA	9.5 mA in standby 70 mA while signalling up to 60 mA when signalling switched off
Temperature sensor Measurement range Measurement error	Semiconductor integrated circuit -40°C to +85°C within the range -10°C to +50°C: ±0,5°C	————————	————————
Display	4 digits 9 mm high, increased brightness	4 digits 9 mm high, increased brightness	————————
Number of modules in 1 network	maximum 127		
Communication interface	RS-485 / Modbus RTU / 9600 bit/sek.		
Working temperature **Storing temperature**	-40°C up to +85°C -40°C up to +85°C		
Fastening	to wall, 2 M3 bolts		
Connection cable	4 conductors (2 supply conductors + 2 data transmission conductors)		
Protection level	IP 65 (ABS casing) IP 40 (sensor)	IP 65 (casing)	IP 65 (casing)
Casing dimensions (LxWxD) Without chokes With chokes	64 x 58 x 35 mm 103 x 78 x 35 mm	63 x 58 x 35 mm 103 x 58 x 35 mm	64 x 58 x 90 mm 103 x 65 x 90 mm
Remarks			

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# Complementary devices of TRS system

TRS-09a

- **supporting power supply of TRS system**
- **current efficiency 200 mA**

TRS-09a is a supporting power supply for the TRS System which supplies stabilized direct voltage 11,5V.
It can work in two modes: as a controlled supply (switched on with external voltage 7-12V) or a non-controlled supply. The configuration is selected by means of a link. Current efficiency is 200 mA.
The supply is resistant to output voltage short circuit. The device is located in a casing that completely protects it against dust or low pressure streams of water.

Technical data

Supply voltage: 230 V AC +10/-5%
Supply output voltage: 11,5 V ±5%
Control voltage: from 7 V to 12 V, max. 2 mA
Current efficiency: 200 mA
Working temperature: 0°C do +50°C
Storing temperature: -10°C do +70°C
Casing dimensions (LxWxD): 110 x 80 x 67 mm, 130 x 105 x 55 mm with chokes
Humidity: up to 90% without condensation
Weight: 365 g
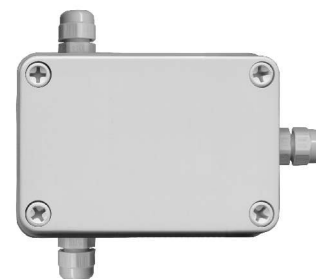
SRS-2/4-Z16-B1a

- **power supply for the system of measurement sensors**
- **RS-232/RS-485 standard converter**
- **galvanic separator of RS-232 and RS-485 circuits**
- **data recorder**

Recorder **SRS-2/4-Z16-B1a** is a two-processor device equipped with a real time clock powered with a lithium battery and flash nonvolatile memory (1 MB) to record approx. 40 000 measurements. After re-activating *SimCorder software* all recorded measurements are copied to a PC, and the recorder buffer is emptied.
Basic tasks of the device are:
- connection of the TRS System modules network with a PC equipped with RS-232 interface,
- automatic recording of measurements when the SimCorder software (or the computer) is switched off.

Recorder is delivered from a supporting external power supply with efficiency 0,8A / 12V DC.
RS-232/RS-485 interface converter: adjusted to the requirements of Modbus RTU protocol (transmission speed 9600 bits/sec). It ensures full galvanic insulation (optoinsulation) between RS-232 interface and RS-485 lines and it can work with any SIMEX devices equipped with a RS-485 standard link. It can also be used for the transmission between devices equipped with RS-485 interface and a computer with RS-232 link.

Technical data

Supply voltage: typical 12V DC
Supply output voltage: 10,5 V ±5%
Current efficiency: 0,5 A (maximum)
Galvanic separation: output of the supply and signals of RS-485 link from RS-232 link
RS-232 interface link: 1x 9 PIN Canon (RS-232), 1,3 m cable lenght
Transmission protocol: Modbus RTU
Transmission parameters: 9600/8/1/N
Working temperature: 0°C to +50°C
Storing temperature: -10°C to +70°C
Casing dimensions (LxWxD): 150 x 70 x 68 mm
Humidity: up to 90% without condensation
Weight: 365 g
Recorder memory: 1 Mb (approx. 40 000 measurements)
Remarks: built-in battery powered RTC clock

Fastrack Supreme FS20

- **GSM / GPRS external modem**
- **dual band GSM 900/1800 MHz**

Fastrack FS20 modem has proven itself for stable, reliable performance on wireless networks worldwide. Dual Band GSM/GPRS modem (EGSM900/1800 MHz) designed for data, fax, SMS and voice applications is fully type approved and fully compliant with ETSI GSM Phase 2. Offers two general purpose input/output access points to connect peripherals. Fully certified, the dual-band 900/1800 MHz Fastrack M1306B offers GPRS Class 10 capability, supports Open AT and IT protocols such as IP connectivity.
GSM supplementary services: Call Forwarding; Call Barring; Multiparty; Call Waiting and Call Hold; Calling Line Identity; Advice of Charge; USSD; Closed User Group; Explicit Call Transfer.

Technical data

Input voltage: 5,5V - 32V
Power consumption: 18 mA in idle mode
110 mA in communication GSM 900 @ 13,2V
80 mA in communication GSM 1800 @ 13,2V
Peak: 1,7A @ 5.5V
Memory: 4 MB Flash/ 512 MB SRAM
Communication interface: RS-232 i Audio through mini sub-D 15-pin connector supporting serial link autoshutdown controlled by software AT (GSM 07.07 i 07.05)
Baud rate: od 300 do 115,200 bit/s
Overall dimensions: 73 x 54 x 25 mm
Weight: 82 g

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