

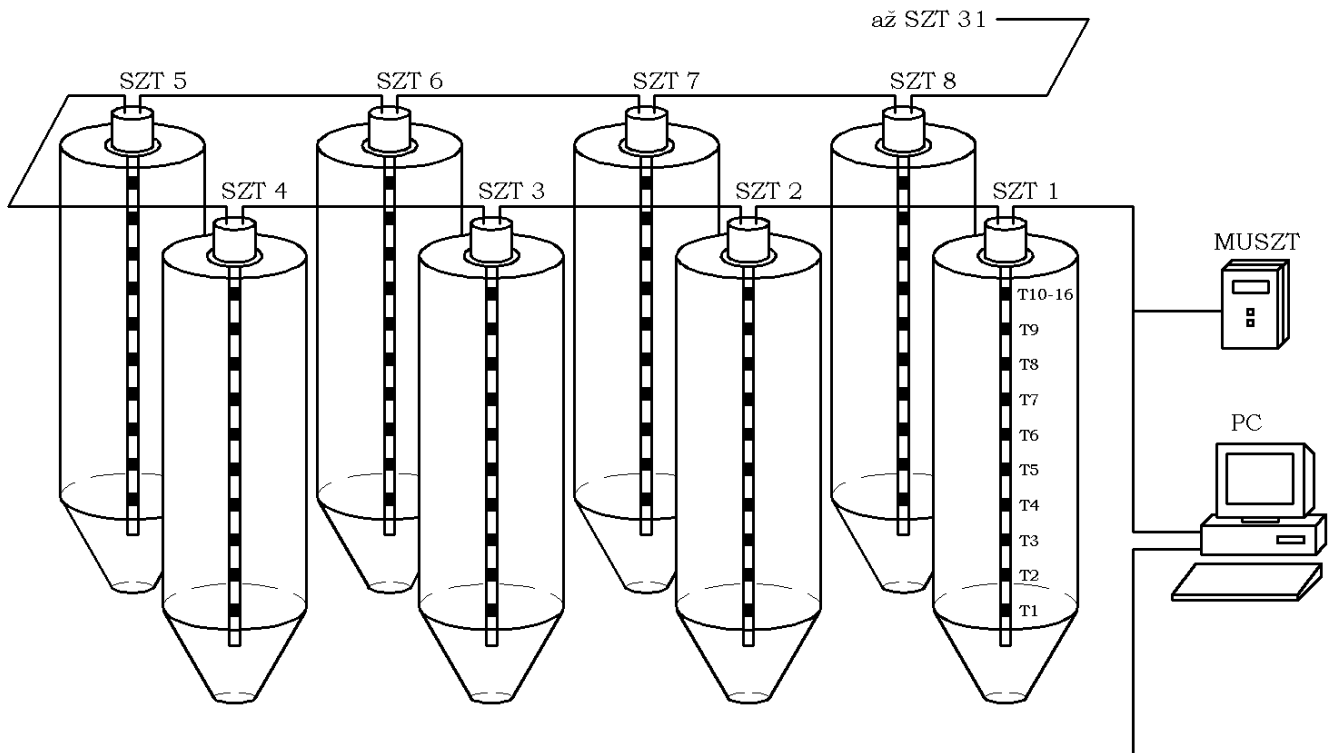
SZT – system for temperatures measuring in bins and silos

The STZ measuring system is used for temperatures measuring in individual bins of grains, seeds fodder mixtures etc. The uninterrupted temperature monitoring of content in bins ensures the safe and high-quality storing.

Continuous temperature monitoring of the stored material in silos provides a completely safe storing in appropriate quality.

This means that when the allowed temperature for storing or its gradient is exceeded, than the monitoring system alerted the operator to carry out an appropriate action.

The whole monitoring system is consisted by a series of thermometers SZT, the possible length up to 45 meters, which are equipped by measuring cables with a set of temperature sensors and evaluation electronics.



Instructions for the installation

SZT thermometers should be mounted at a safe distance from the embankment opening; it shouldn't be in directly contact with the stored material. It must be remembered that at the place of the installation of STZ shouldn't be any obstacles, such as braces or they must be removed. The lower end of the thermometer must be high enough above the moving mechanisms to prevent its capture or damage.

According to the producer of STZ, the measuring cable shouldn't reach to a discharging conical part, because There may be happened a inappropriate excessive abrasion.

In case, that the STZ must be firmly anchored, or to use weights is needed. It is necessary to specify this facts during the order submitting so that we can make a technical adjustments of the STZ in our production ie. Extend the free ends of supporting ropes.

This method of anchoring due to the possibility of large strain on silo roof is not recommended.

It can be used only in specific cases. **However it must consulted with the producer!**

If we use more STZs in one silo/bin (large diameter), it may occur during the filling of a material to problems with pushing the end of STZ to the silos wall, from this reason it is possible to anchor a flexible hinge in the following way:

The measuring cable is allowed to be anchored by the flexible overhand with adhesive tape. Overhand flexible means nylon rope or hair. This material during fulfilment is stable and therefore there is no danger due to breaking or its damage.

In any case, It is not allowed to make an anchoring by a steel components.

It is unacceptable to close a measuring cable by a cable clamp or other metal clip!

Improper anchoring damages measuring cable!

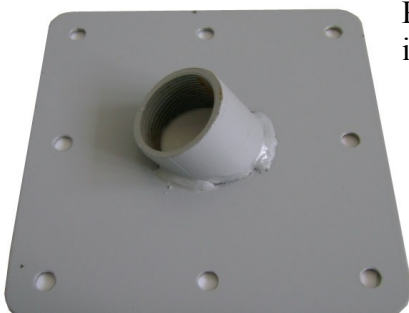
In case of doubt do not hesitate to contact the producer!

The head is mounted into the flange, on which the threaded sleeve G 1 1/2" is welded. Normally we supply flanges with dimensions 100 x 100 or 200 x 200 mm.

During the installation of STZ into the flange, it is necessary to hold the STZ during the tightening, bottom part of head with electronics compartment (under clamp)! Never tight the STZ by holding of body electronic compartments, it may cause a leaks around the joint and damages of the STZ.



Picture: flange for the installation on a sloping roof.



Picture: Head of STZ with flange for the installation on flat roof.

In head with electronics components, the bags with moisture absorber are stored. These, in case that head is opened, should be storage in a dry (eg. in a plastic bag) and before closing them, put them back to device. All power cables must be properly sealed in cable glands!

If the device is placed in direct sunlight and rain, it is necessary to mount the cap of head protection roof, which is part of the device!



Main parts of thermometer SZT:

zámek lana
s upevňovacím
závitem

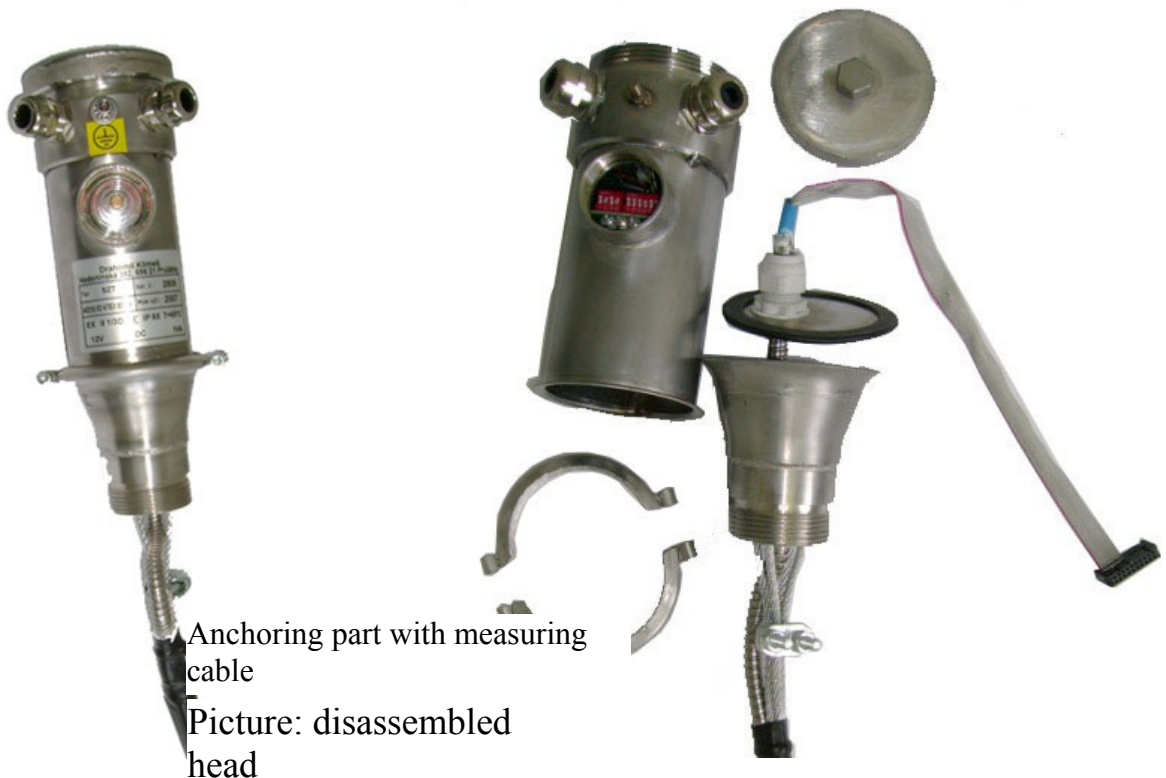
Head with electronics

The head is completely made of stainless steel. Under the cover of head is a junction box.

cover

tělo
elektronické
části

Head with
electronics



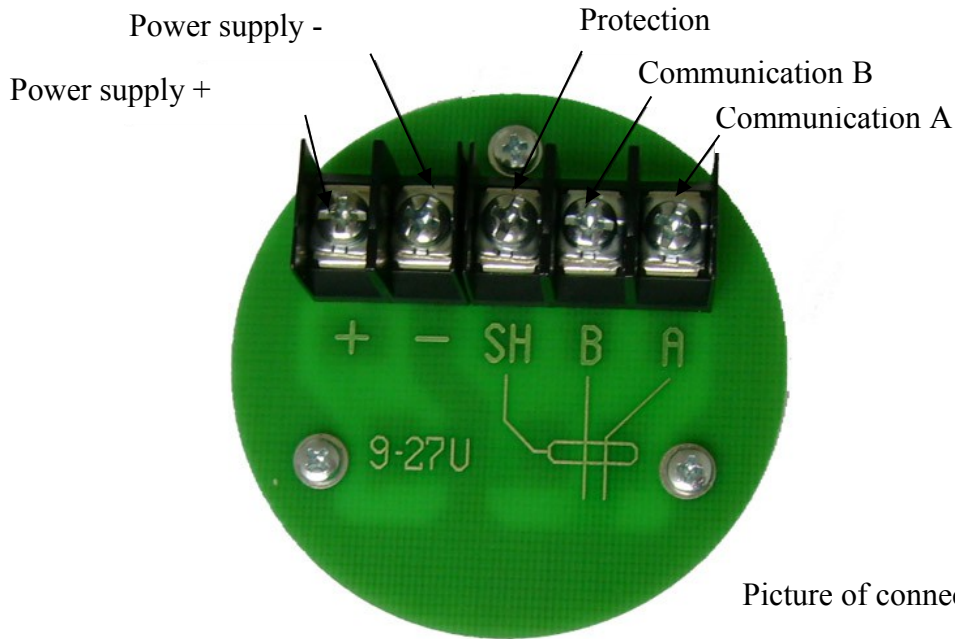
Anchoring part with measuring
cable

Picture: disassembled
head

In the case of equipment failure, it is not necessary to disassemble from the roof of bins / silo whole device (STZ) - the head can be separable removed, it is fixed by clamp connection, it means that it can be very easily replaced.

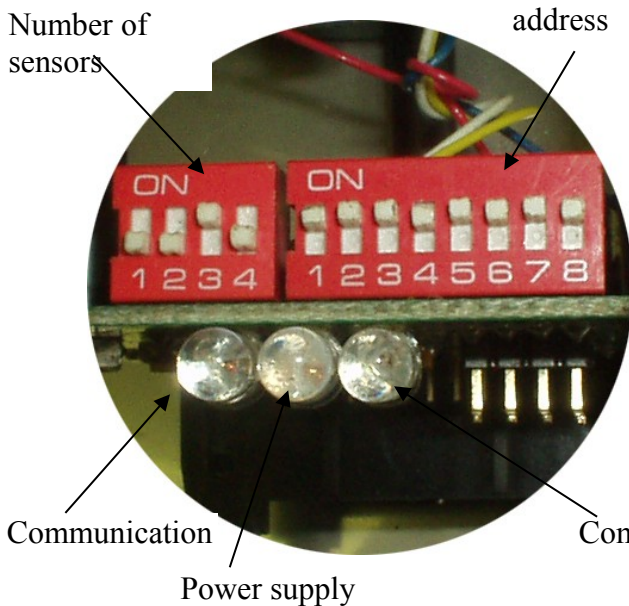
Description of measuring electronics

Electronics board serves to temperature – sensors data transmission on serial communications line. Electronics includes microprocessor with analog/digital inverter and communications interface RS 485. At the appeal from higher system (data logger or PC) electronics send out on the line RS 485 all temperatures measured in its thermometer. In the electronics board are LED diodes denoting the presence of supply voltage and transmission on line RS 485. Into the PSL connector is connected measuring cable. At the four-figure DIP switch is set number of temperature-sensors in the cable, at the eight-figure DIP switch is set address of lines RS 485 (range from 001 to 255)

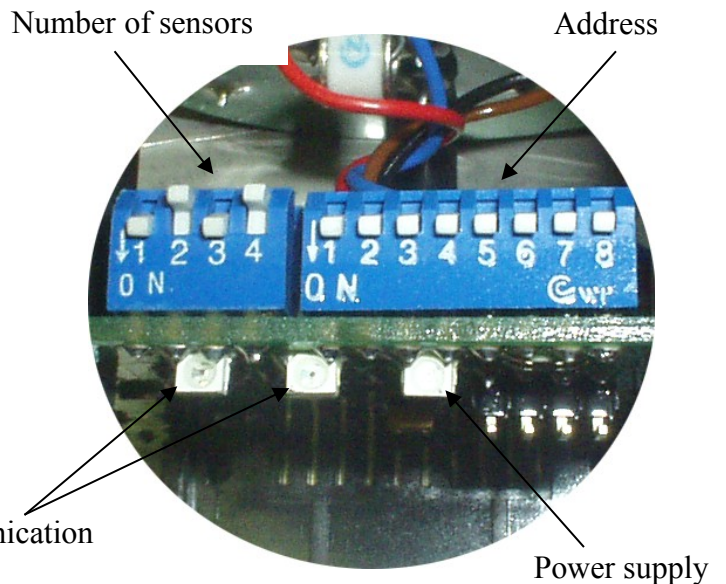


Picture of connection terminal

DIP switches and indicating LEDs are placed in screw-sight of the device. After setting it is important to tighten the sight so enough to prevent a penetration of moisture into the device!



obr. version 2007



obr. version 2009

Temperature sensor cable:

Thermometer is consisted by two steel cables with a diameter of 5 mm and steel conduit, which are sealed in plastic.

In temperature sensor cables (steel conduit), which has a diameter of 10mm is inserted measuring cable kit with set of temperature sensors.

The measuring cable is easily removable even when silo / bin is completely full !

A small cross section of the thermometer and using of plastic in high quality with good sliding characteristic, it ensures a minimum loading of silo roof !



Technical parameters of STZ:

Length	max. 45 m
Number of temperature sensors	max. 16 pcs
Protection	IP 65
Electronic power voltage	9 up to 27V DC / 0,02A
Weight	complete head 2 kg, cable 0,4 kg/m
Temperature limit for cable	-30 up to +70°C,
Certificate	Ex II 1/2D T = 60° C

Thermometer SZT, the version with lower head

A special version of the thermometer, with a low head, which is suitable for installation in limited spaces of the concrete roof of the silo (eg, under tin lids).

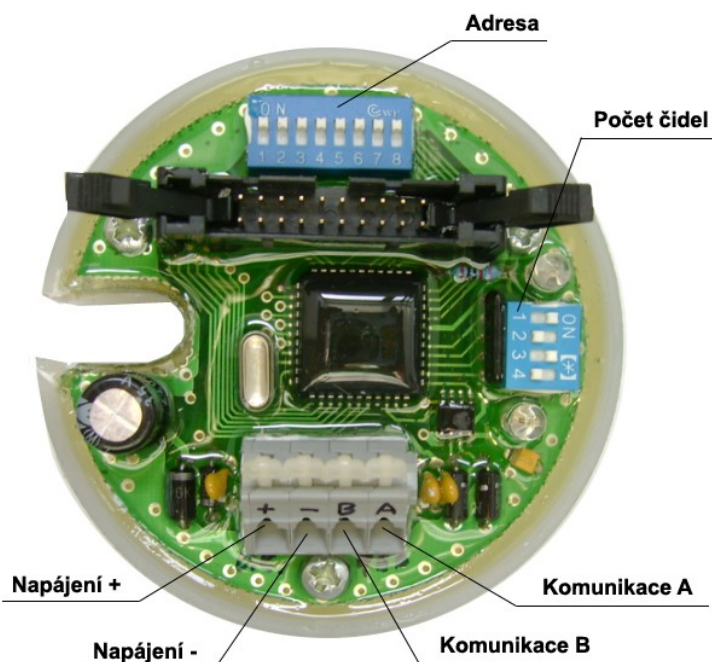


Diameter of head 90 mm
Height of head 80 mm
Diameter of flange 120 mm

Installation: making a hole of diameter 75 mm into the ceiling or roof and then properly anchor with three screws.

Electrical parameters are the same as the standard version SZT

Board electronics is a compact unit with a connector for measuring cable and the connector for communication and power supply.



Measuring switchboard MUSZT:

MÚSZT provides on its screen a cyclic displaying of measured temperatures. By using of the B button, you can change the speed of displaying. The display shows the number of cells, the number of sensors in the cell and measured temperatures.



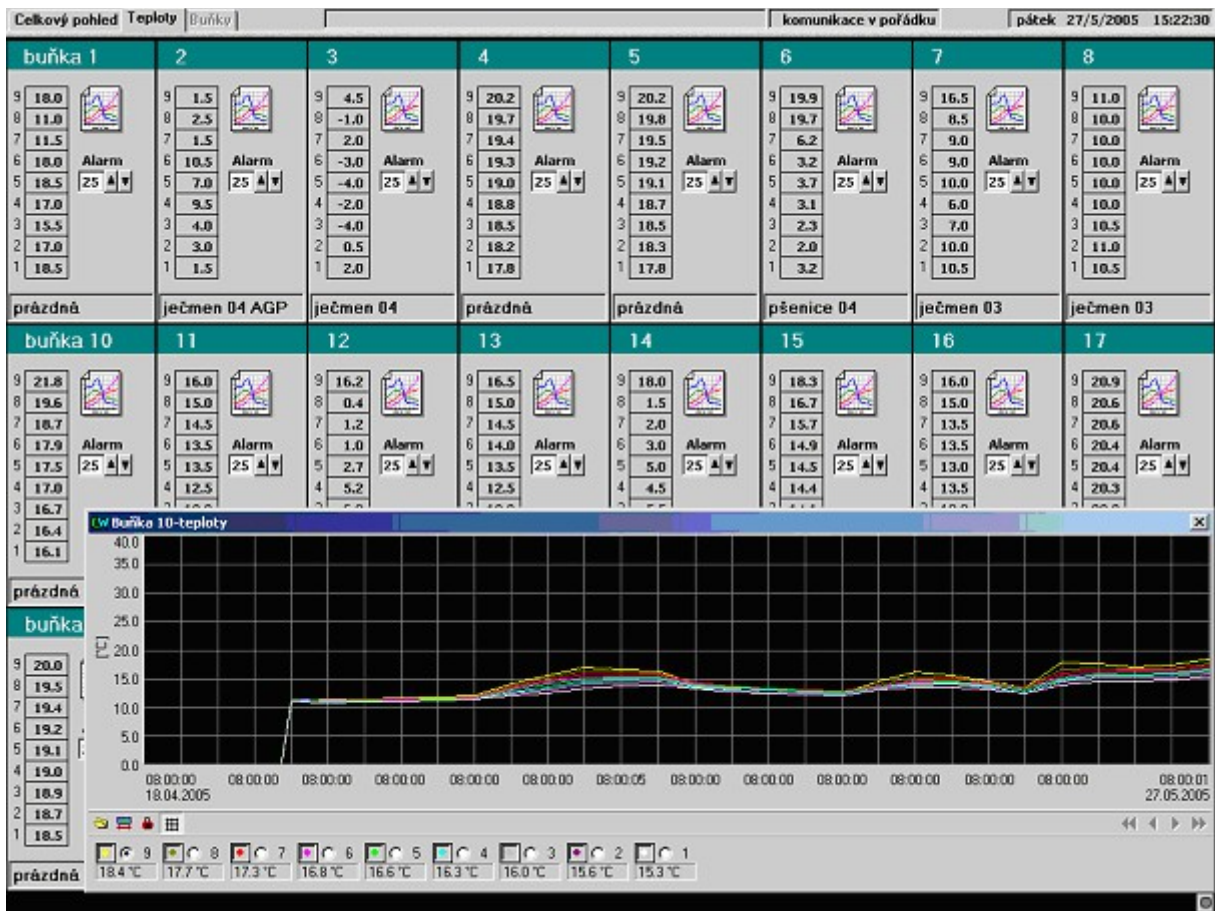
You can set the max. (limit) temperatures in the bins / silos. If the temperature is exceeded, then the alarm relay is switched on. This relay will be in on position until the fault acknowledgment by button A. The relay can be also programmed so that it can control the ventilation in the silo / bins.

MÚSZT is produced either in a separate box or as a panel unit (square hole 80 x 80mm, depth 130mm)

PC connection:

Interconnection of thermometers must be carried out by using of a suitable communication cable for outdoor use (applications).

Thermometers SZT can be connected via RS485 with monitoring software on personal PC. In this case, the switchboard MÚSZT is not used. The communication interface and PC with monitoring software are available on the request.



THERMOMETER

Description of thermometer SZT communication (line 485)

Communication is based on ASCII code with following parameters:

8 data bits
1 stop bit
Parity none
speed 9600 bps

Measuring switchboard (master) send (call) “questions” regarding the temperatures in following form:

<AAA>

< - initial symbol (ASCII cod 3Ch)
A - address (hundreds)
A - address (tens)
A - address (ones)
> - terminator (ASCII cod 3Eh]

Thermometer answers in following form:

***AAA ZDJ.T ZDJ.T so on. ZDJ.T>**

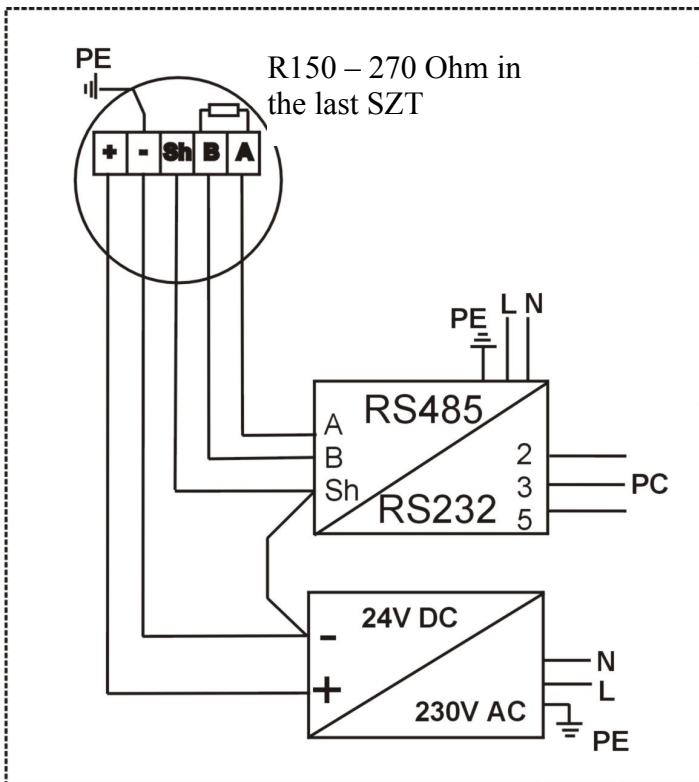
* - initial symbol (ASCII cod 2Ah)
A - address (hundreds)
A - address (tens)
A - address (ones)
 - gab (ASCII cod 20h)
Z - mark
D - temperature (tens)
 J - temperature (ones)
. - decimal point (ASCII cod 2Eh)
T - temperature (tens)
> - terminator (ASCII cod 3Eh)

If some termistor is fault faulty, then in particular position the ERROR is broadcasted.

The sequence of temperatures is set from the lowest to the highest point of the thermometer.

For example: command from PC: **<001>**
response from thermometer: ***001 +31.2 +29.9 -05.6 ERROR +35.3>**

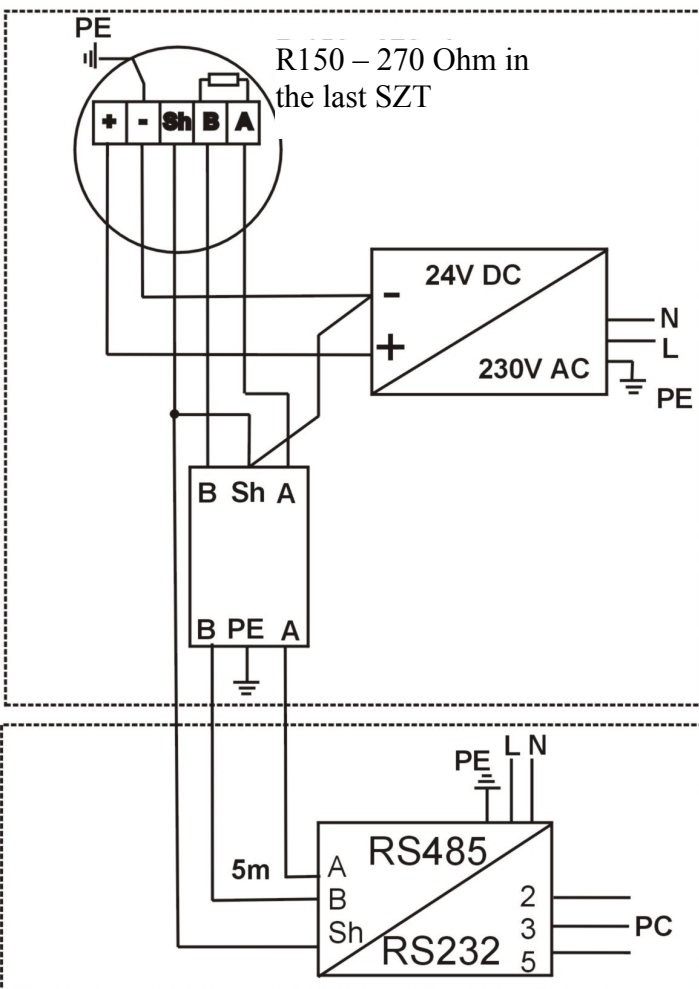
((at 5 sensors in the measuring cable is a total of 35 characters)



Zero potential power sources should be linked with a protective shield of the communication cable.

Terminating resistor must be always used if the length of communication cable reaches a length of several hundred meters.

The recommended connection, in the case that converter the RS485/RS232 and the power supply are located **near** the evaluation device (suchs as a **PC**).



The recommended connection, in the case that the power source is located more than 5m from RS485/RS232 converter and the evaluation device, eg a **PC**. In this case it is necessary to use a regular overvoltage protection.



SETTING DEVICE ADDRESS

Range of address is 001 up to 255 (it is set on DIP8, 1=msb,8=lsb)

For example: for address #6 will be DIP8 = 00000110 (for address #128 will be DIP8 = 10000000).

Address #	DIP8		Setting DIP8
001	00000001	ON OFF	8 1,2,3,4,5,6,7
002	00000010	ON OFF	7 1,2,3,4,5,6,8
003	00000011	ON OFF	7,8 1,2,3,4,5,6
↓	↓	↓	
006	00000110	ON OFF	6,7 1,2,3,4,5,8
↓	↓	↓	
128	10000000	ON OFF	1 2,3,4,5,6,7,8
↓	↓		
255	11111111	ON OFF	1,2,3,4,5,6,7,8 -

Setting number of sensors

Number of sensor decreased by 1 is set on DIP4

For example. for 5 sensors will be DIP4 = 0100 (for 1 sensor will be DIP4 = 0000).

Number of sensors	DIP4		Setting DIP4
1	0000	ON OFF	- 1,2,3,4
2	0001	ON OFF	4 1,2,3
3	0010	ON OFF	3, 1,2,4
4	0011	ON OFF	3,4 1,2
5	0100	ON OFF	2 1,3,4
6	0101	ON	2,4

		OFF	1,3
7	0110	ON OFF	2,3 1,4
8	0111	ON OFF	2,3,4 1
9	1000	ON OFF	1 2,3,4
↓	↓	↓	
16	1111	ON OFF	1,2,3,4 -