



ELECSO TECO
Temperature Measuring System

2 channels, up to digital 32 sensors, MODBUS RS485 interface

1. Introduction

TECO terminal, is a portable, handheld module used for acquisition, visualization and data archiving (from firmware 00.04) with multipoint temperature measurement system. The compact, battery-operated device is equipped with an LCD display and keyboard navigation.

TECO device can be used for the direct measurement of 1-Wire probes enabling the simultaneous operation of two independent probes (up to 32 sensors simultaneously). The terminal can be used directly at the object, in the office or control room, by placing the terminal adapter on the wall. However note, that the distance from the probe does not exceed 100 meters of the connection. The device has the function of communication in the MODBUS protocol (in full mode). With this feature you can easily build an extensive network of measurement (up to 1200m), extending the ranges to hundreds of sensors with visualization on a PC or a PLC controller.

2. Technical parameters

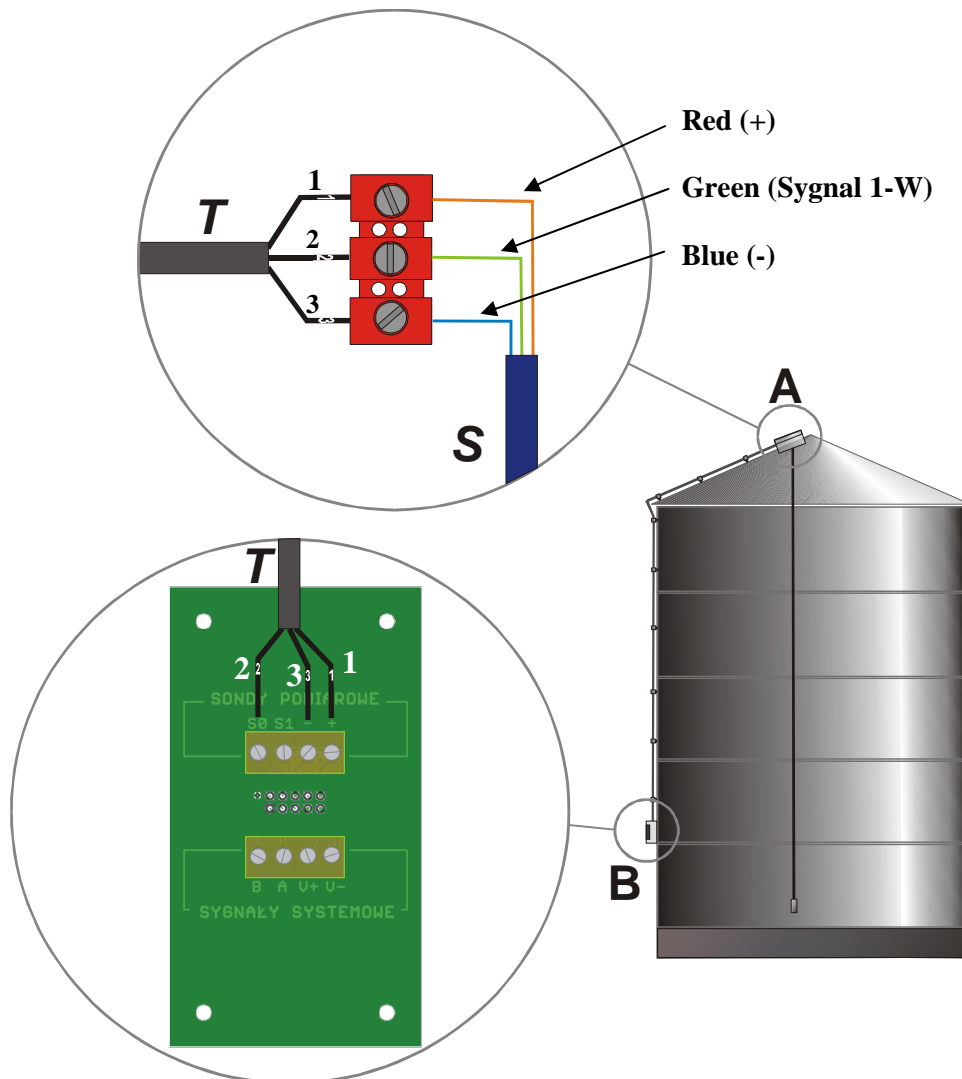
Terms of operation

- Operating Temperature: -40°C to +75 °C
- Humidity: 5 to 90% non-condensing
- Power supply: 9V battery (type 6F22 / 6LR61), or an external 9V DC power supply.

Hardware features:

- Support up to 32 temperature sensors
- 2 measuring channels with a measurement accuracy of 0.5 ° C with resolution 0,0625°C (direct presentation with resolution of 0.1 ° C)
- Archive size - 7 current measurements
- Measuring range: -40 ° C to +125 ° C
- Supported network physical layer EIA-485 with MODBUS RTU protocol
- Modbus Addressing: 1-247
- Short-circuits protection
- ESD Protection
- Supply voltage monitoring
- Currents monitoring
- 2x8 char LCD display
- Dimensions: 92 x 57 x 22 [mm]

3. Electrical diagrams



The above figure shows the wiring diagram of the probe cable (S) to the adapter placed on the object (B). This is done using a small flat screwdriver. The probe cable should be connected with a numbered cable (T) inside the culvert roof (A), using the ankle or electrical connector. Designation of probe wires and “SONDY POMIAROWE” signals:

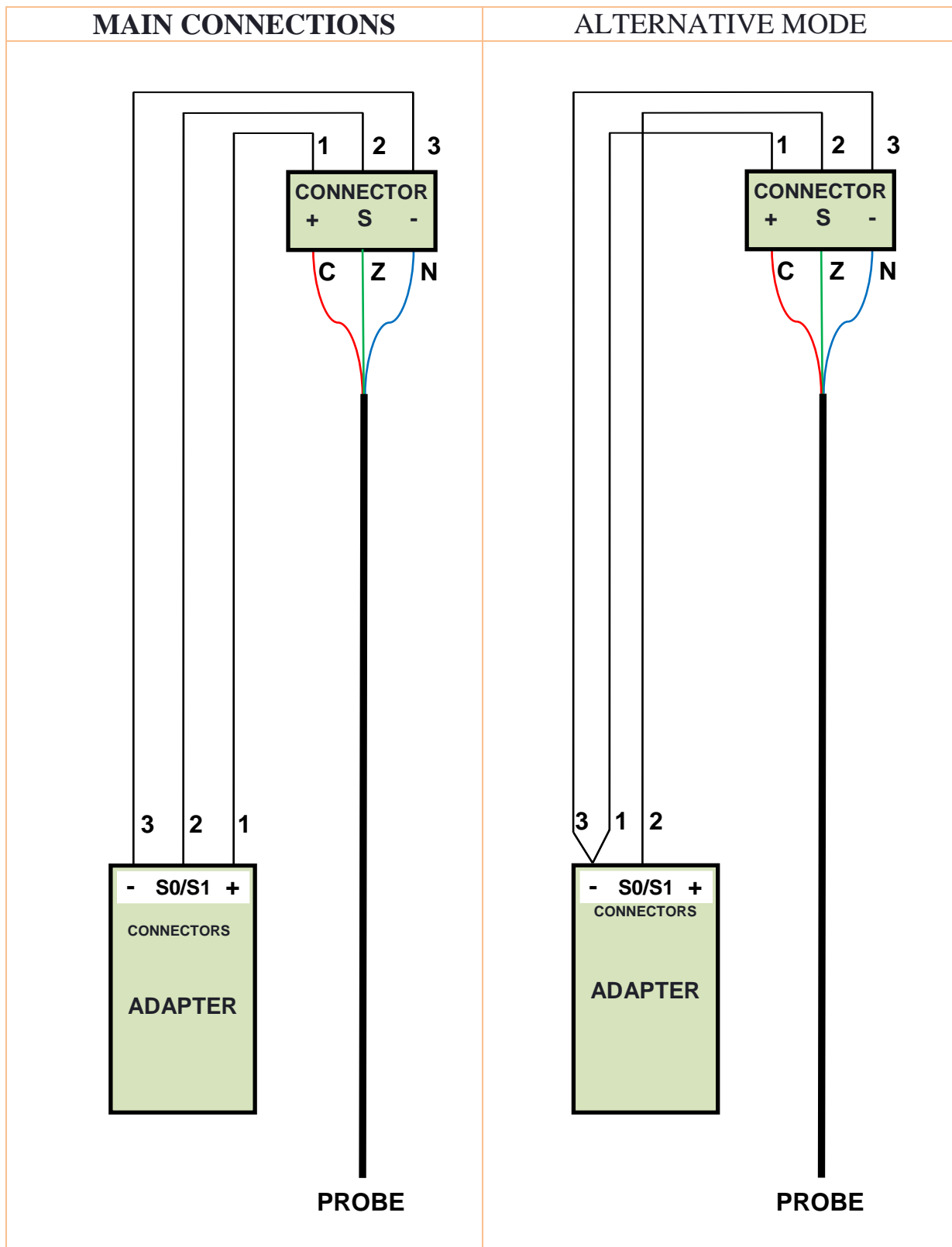
- Red wire: + (power positive)
- Green wire: S0 or S1 (transmission data wire)
- Blue wire: - (power negative)

If desired, two measuring probes can be connected to single adapter. Power wires of both probes connect to “+” and “-“ connectors parallel. Green wires of probes connect to S0 and S1 separately.

The "SYGNALY SYSTEMOWE" connectors, are reserved for the EIA-485 network and don't connect anything to them.

3.1 Schematic of system

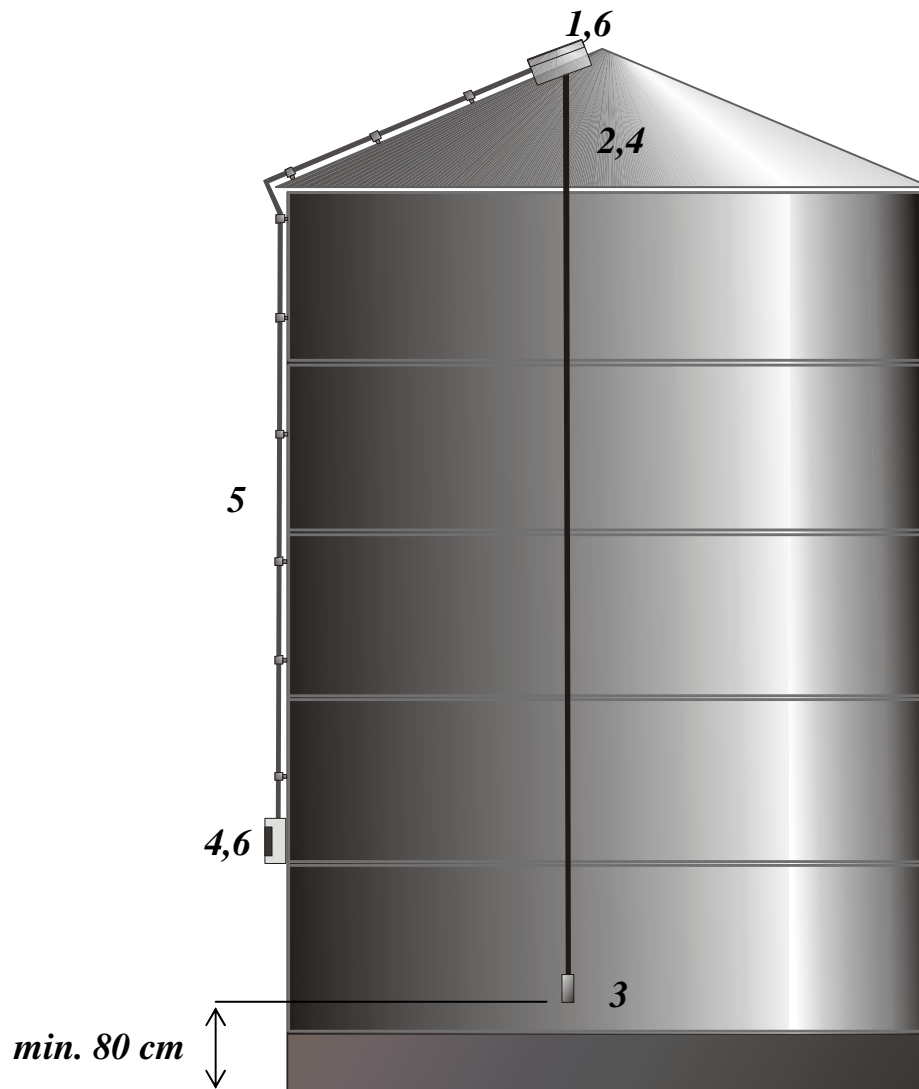
Wire collors : C – Red, Z – Green, N - Blue



4. System installation

Suggested order of assembly:

1. Installation of roof culvert.
2. Installation of protective pipe with probe (see section 4.1 on page 6)
3. Installation of the weight on the pipe (see Section 4.1.3 p.8)
4. Installing the adapter box on the object.
5. Installation of protective tube with numbered cable on the silo, using self-drilling screws.
6. Electrical connections.



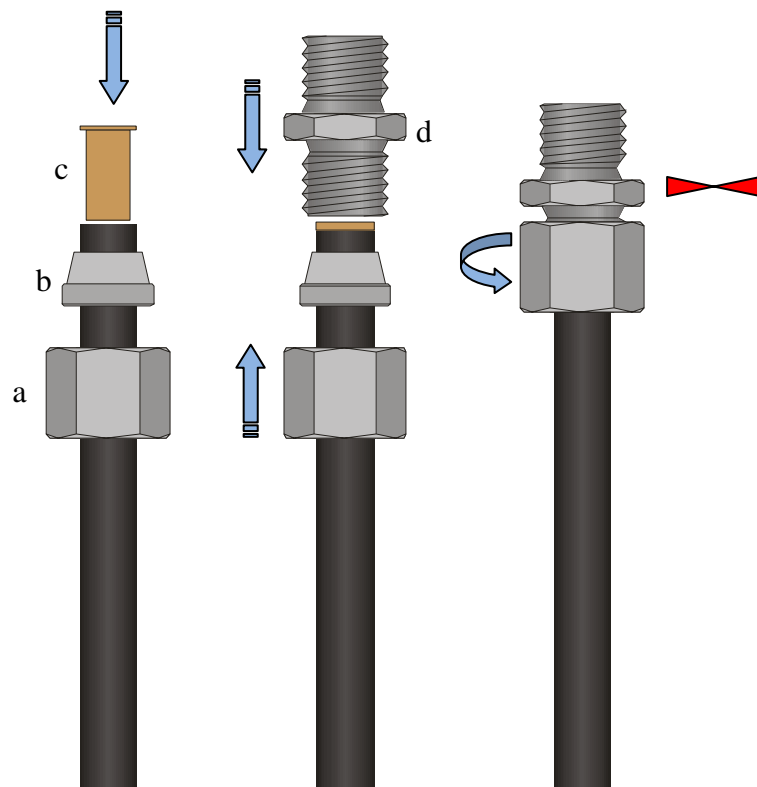
4.1 Instalation of probe pipe

The bellow figure shows the sequence of assembly of probe pipe to the construction of the silo.

Needed tools:

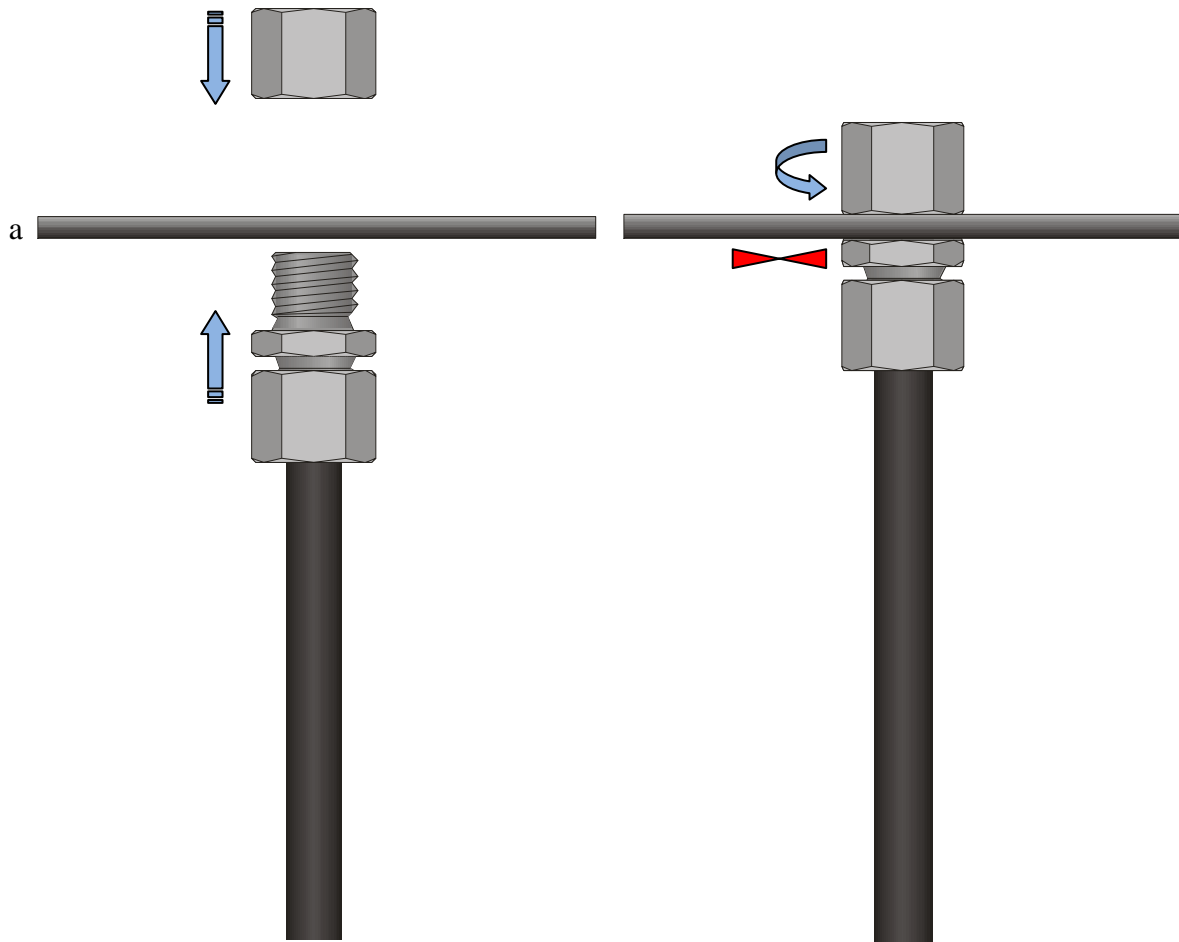
- Flat wrench 19mm

4.1.1 Assembly



1. Put on the pipe:
 - nut (a)
 - cone (b)
2. Push the en tire bushing (c) it to the pipe
3. Slide the nipple (d) to the nut (a)
4. Block the nipple and tighten the nut with the strongest moment.

4.1.2 Probe pipe installation to the construction of the silo



1. Put the nipple into the construction hole (a)
2. Block nipple and tighten the nut.

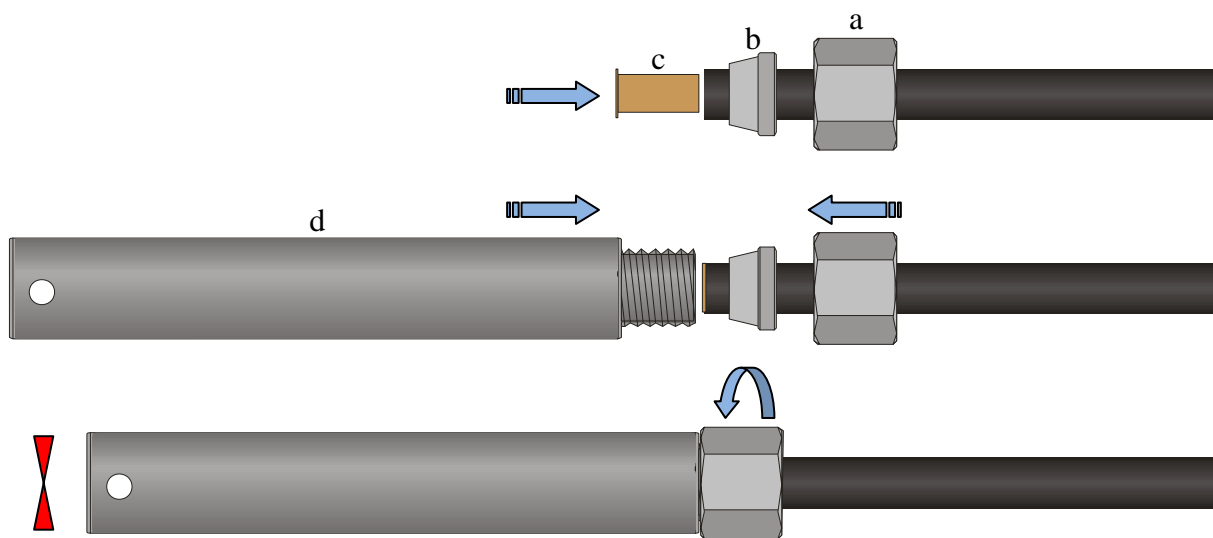
The probe with pipe can be mounted to the roof structure or other facility designed for that purpose.

4.1.3 Installation of the weight of probe pipe

The following figure shows the sequence of assembly of the end pieces of probe pipe.

Needed tools:

- Flat wrench 19mm
- Screwdriver 5-6mm for weight blocking



1. Cut the pipe to the appropriate length. The end of pipe have to be on 0.8m above the bottom of the silo...

2. Put on the pipe:

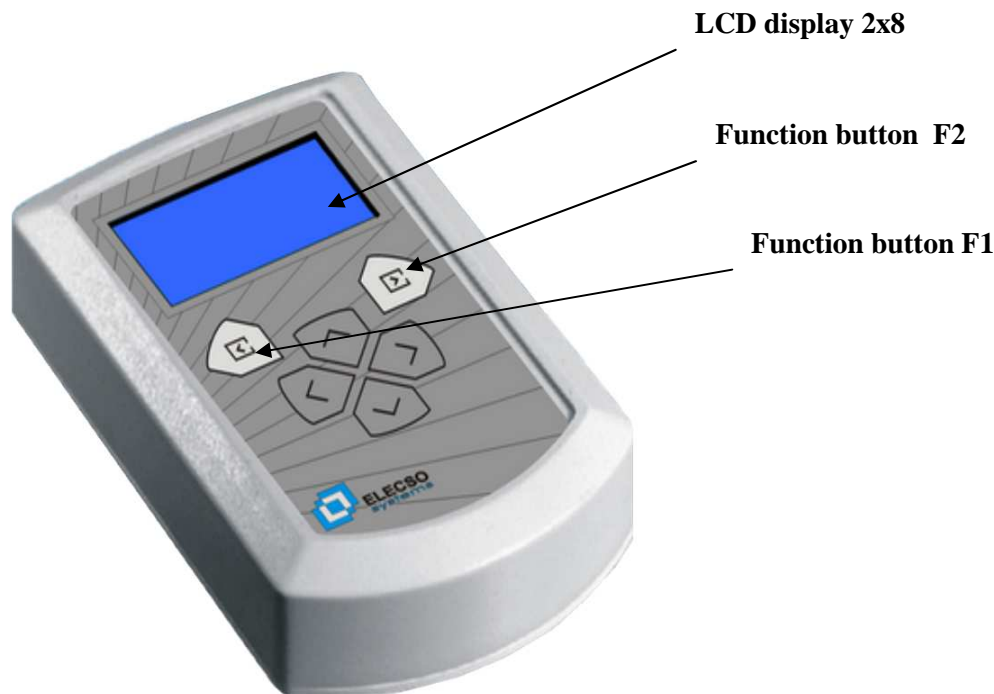
- nut (a)
- cone (b)

3. Push the entire bushing (c) into the pipe

4. Slide the weight (d) to the nut (a)

5. Block the nipple and tighten the nut with the strongest moment.

5. Operating - TECO device



5.1 Measurement - performance and visualization

In order to perform measurements just open the door of adapter and connect the TECO device, inserting it directly into the adapter connector. This will turn-on the device. On the display system show information about the distributor and the firmware version of the module. The terminal will check the number of connected probes and start temperature measuring.

F1 function key is used to switch the measuring channel, when to two probes are connected to the adapter. By briefly pressing the F1 button will appear on the LCD quantity of sensors in the probe and identify the highest measured value of the sensor in the probe.

By pressing the function key F2 will view the results of measurements of the other sensors in the probe. On the LCD display in addition to the temperature, is displayed graphic measuring point in the probe and indicated his number. This makes it easy to locate the places of increased temperatures.

**Note - TECO device can operate languages: polish, english and german.
Be sure, that You order TECO terminal with proper language version.**



Temperature reading is preceded by information about the connected probe, shown the number of sensors in the probe. In the absence of the connected probes, the message "No Sensors" will be displayed.

The module has two measurement channels. If one probe is connected, module will enter the measurements of the probe. If you connect two probes, the module will start the first measurements of the probe connected to channel A.



View – “No sensors”



View – “Reading 6 sensors”

After showing of information about the number of sensors in the probe, module will display measured temperatures - will start from the top of the sensor. Using the F2 key (short press) will switch to a lower sensor, while holding the F2 button for 1 second, trigger automatic switching sensors from the top to the bottom - this feature is supported from firmware version 00.05. By short pressing the F1 button will turn-off automatic mode switching.



Short press F1 for change the probe.



The TECO module identifies the probes by the letters "A" and "B" - flashing arrow symbol next to the letter indicates the possibility of transition to a operating of second probe. If the next letter is blinking symbol ":", it means, that only one probe is connected...

5.2 Measurement - saving and review archive

Measuring module ELECSO TECO has the ability to record measurements to his memory. In this way, the measurement results can be stored by creating archives, needed for the analysis of temperature changes over time. TECO device allows you to record up to 7 measurements. Depending on your needs, you can decide whether to archive measurements daily or in rarer intervals.

Please note that if the memory is full, each the new record, will delete the oldest measurement.

Archival measurements features are available for TECO modules with firmware versions from 00.04. The software version is displayed after power-on module. You can make free upgrade software after contact with technical support - e-mail: suport@elecso.pl

Recording of measurement data is possible only if probe is connected, during normal system operation. To save the measurement results, hold by approx. 3 seconds F2 button. "Save data – Yes / No" will be displayed.

- Pressing YES will be assigned to write data to memory, which will be confirmed by an appropriate message. After Whiting, the reader will return to normal operation.



Pressing button assigned to NO, will return to the normal operation of the module.

Overview archive measurement is available by long (approx. 3 seconds) button F1 pressing. For a moment you will see information about the number of stored data.



The "p" char opposite symbol of the measuring channel, shows, that they are archived temperatures, readed from the memory module.

In this mode the F2 key (short press) switches sensors. To switch archive on the day before, briefly press the F1 key.



It should be noted that the archive review always starts chronologically, from the youngest to the oldest measurements.

For exit from archive mode, use long pressing the F2 key - the module will return to normal operation.

Deleting the measurement data from the archive - if necessary, the user can delete the entire archive. To do this, during normal operation of the reader, press and hold both buttons F1 and F2. You will be prompted with a choice of YES / NO.

Delete the archive area will be confirmed by an appropriate message, then the module will enter normal operation.

6. Failures

In fault situations, the module displays an error messages, for example with probe malfunctions like short-circuit on the lines or improper probe wires connecting and for detection of very low power of supply voltage.



View - "Probe error"



View – "Low Battery"

Battery replacement should be performed after disassembly underside of the module housing, by unscrewing the 4 screws. To exchange, should be used alkaline battery series 6F22 / 6LR61, or any battery in this size.