

TCC-01**Grain silos temperature monitoring system**

- **Simplicity of system installation and adjustment**
- **Using of digital temperature sensors**
- **Absence of additional power supply cables**

Grain monitoring system is used at grain storage and treatment enterprises for ensuring of safety grain storage technological process and maintenance of grain qualitative indicators.

Grain temperature monitoring is primary importance task during storage of grain. Late detection of fire-fanging zones is able to bring enormous loss for your company.

TCC-01 system is intended for periodical temperature measurement in grain silos by using temperature cables and portable indication and control unit TCC-IU/01 type. Each temperature cable has several monitoring points. The quality of temperature cables and quality of monitoring points in it is specified by contract.

TCC-01 system is intended for farmer solutions.

System set

The main devices of system are following: indication and control unit TCC-IU/01 type, stationary connection and power supply unit TCC-CU/06 and/or TCC-CU/07 and temperature cables.

Supply set

TCC-01 system set may consist of:

- indication and control unit TCC-IU/01 - 1 pc.
- connection and power supply unit TCC-CU/06 - up to 100 pcs.
- connection and power supply unit TCC-CU/07 - up to 35 pcs.
- temperature cable - up to 100 pcs.

The system set, temperature cables length, quantity of sensors in temperature cable are specified by contract.

Design and operating principle

Temperature cable

Thermometry cable arrangement include special whole sheath. Inside protection sheath from high density polyethylene (HDPE) is incorporated metal carrying rope.

Thermometry cable has several temperature sensors installed at regular intervals. Tiny converters (sensors) of temperature DS18B20 type of «Dallas Semiconductor» company (USA) are used. The sensors are three wires connected in parallel to lead-in cable. Thermometry cable has thimbles for fastening to silo roof pegs (upper thimble) and for lower fastening avoided temperature cable free sagging (lower thimble).

Stationary connection and power supply unit

Stationary connection and power supply unit TCC-CU is unit in hermetic case of high-impact polystyrene, equipped with:

- connector for indication and control unit connection;
- switch for monitoring temperature cable choice (for TCC-CU/07 only);
- glands for temperature cable lead-in cables;
- terminals for temperature cable lead-in cables connection.

Stationary connection and power supply unit ensures connection of indication and control unit to monitoring temperature cable and power supply line shot circuit protection.

There are two modifications of stationary connection and power supply unit:

- TCC-CU/06 – for one temperature cable connection;
- TCC-CU/07 – for connection up to 12 temperature cables.

Indication and control unit

Indication and control unit TCC-IU/01 is used for readout from connected temperature cable sensors. The unit is portable device in hermetic plastic case, equipped with:

- liquid-crystal two-row 16 symbol display;
- connector for connection to connection and power supply unit;
- push-buttons for power supply switch in and control.

Information about measured temperature in monitored point, maximum value of temperature from all points monitored by connected temperature cable, failures of system is indicated on the display.

Indication and control unit has autonomous power supply from 4 standard elements AA type.

Installation instructions

Stationary connection and power supply units should to be rigid installed near a silo 1.5 m from ground and protected against solar radiation, atmospheric precipitation and dust.

Temperature cables are installed according to silo temperature cables location diagram with mandatory observance temperature cable numbers. Number of temperature cable is indicated near upper fastening point of temperature cable.

Construction of temperature cable fastening in upper point should be robust, load stabile and to rule out the possibility of spontaneous demounting of temperature cable.

Temperature cable fastening in lower point should be robust and to rule out the possibility of free sagging of temperature cable, as it may be cause of temperature cable break. We advise to use tightening screws for ensuring this requirement.

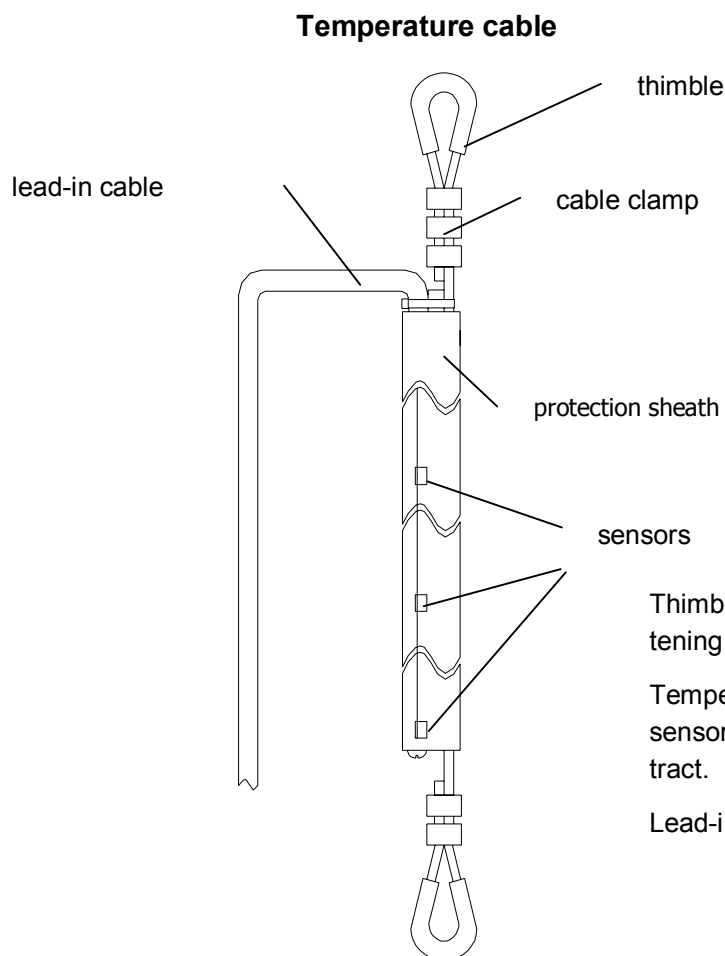
Screens of lead-in cables should be earthed when temperature cables with screen used.

Lead-in cables laying and connection to stationary connection and power supply units are executed according to diagram (see further) with a glance of following requirements:

- use glands for entrance of cables into silo constructions;
- cable from temperature cable to stationary connection and power supply unit should not be lay near high-current cables at distance less than 300 mm;
- lead-in cable should have free loop with radius not less than 80-100 mm between first fastening and temperature cable for possibility movement of temperature cable fastenings during grain loading and unloading;

- cable should be lay on cables constructions and surely fastening by cable ties;
- fastening of cable to silo constructions is allowed if them are motionless and do not have sharp edges;
- do not use extra force when connect lead-in cable wires to terminals of stationary connection and power supply unit.

Dimensions

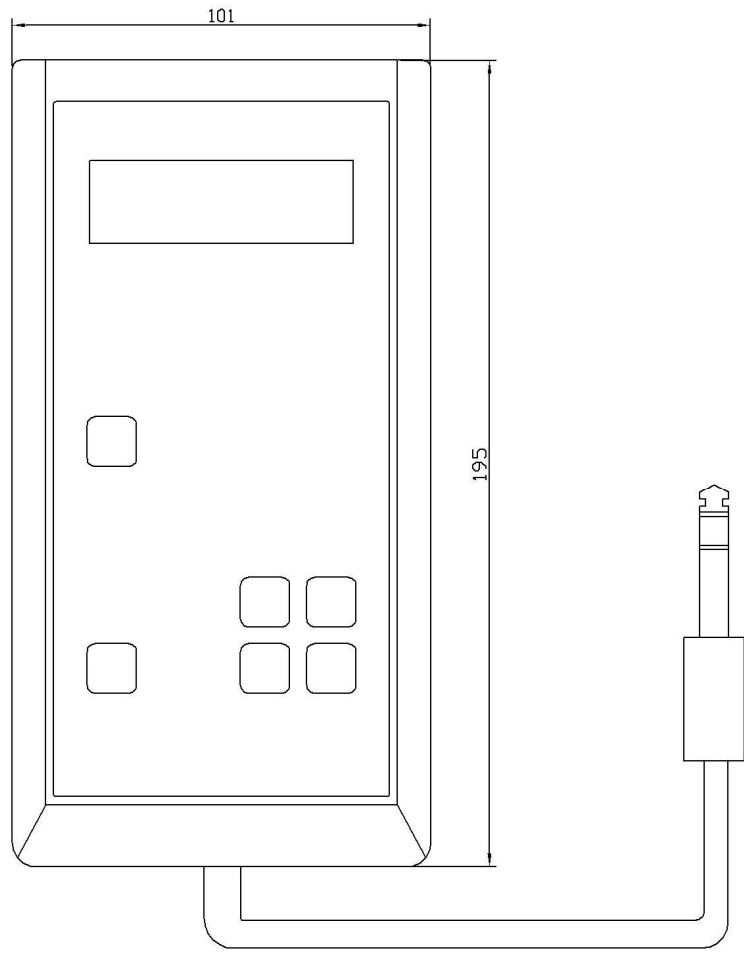


Thimble of temperature cable is intended for fastening peg with diameter 14 mm.

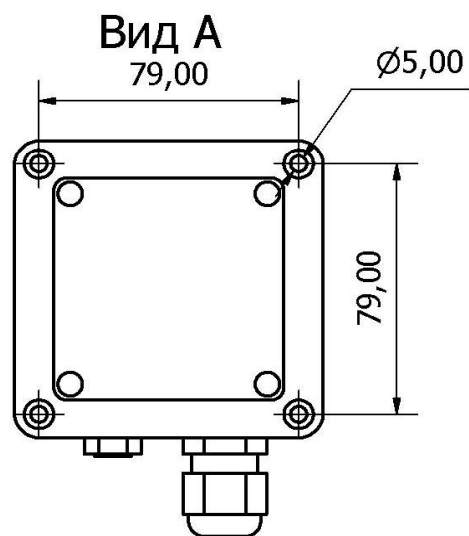
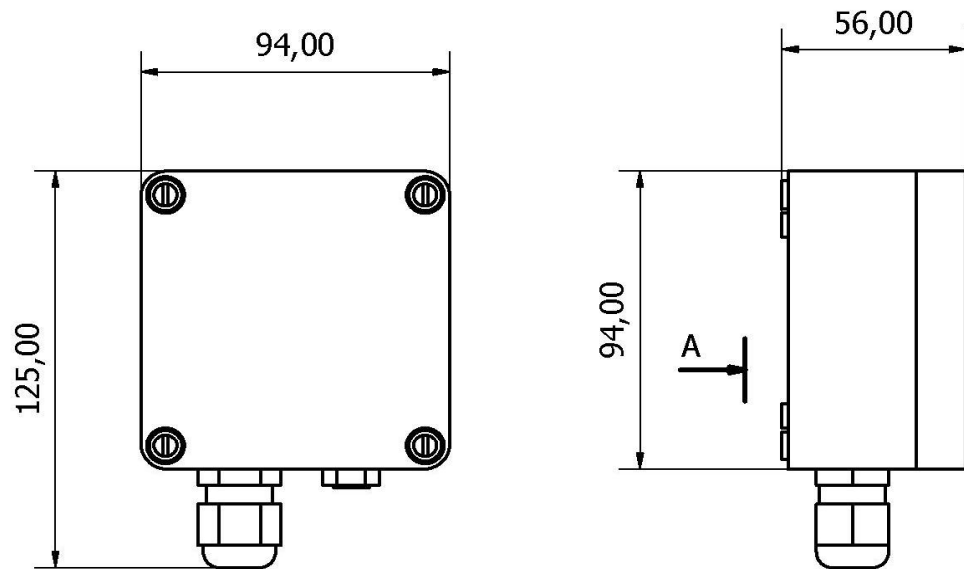
Temperature cables length and distance between sensors in temperature cable are specified by contract.

Lead-in cable length is specified by contract.

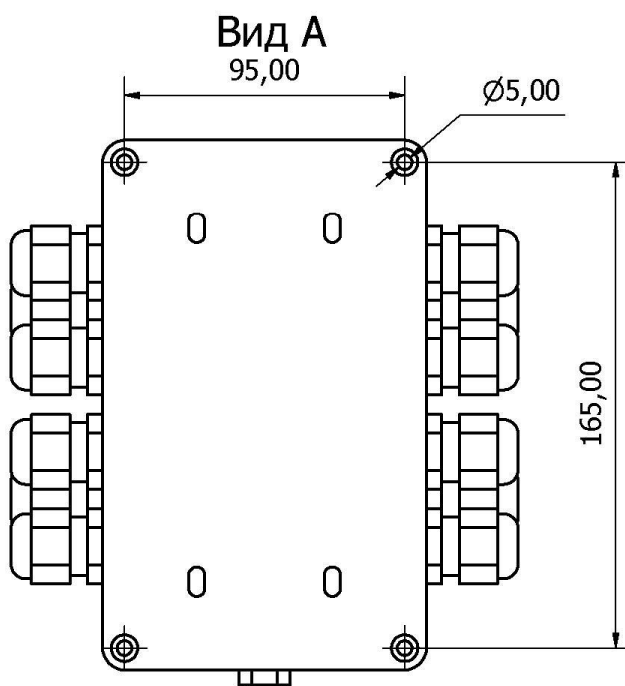
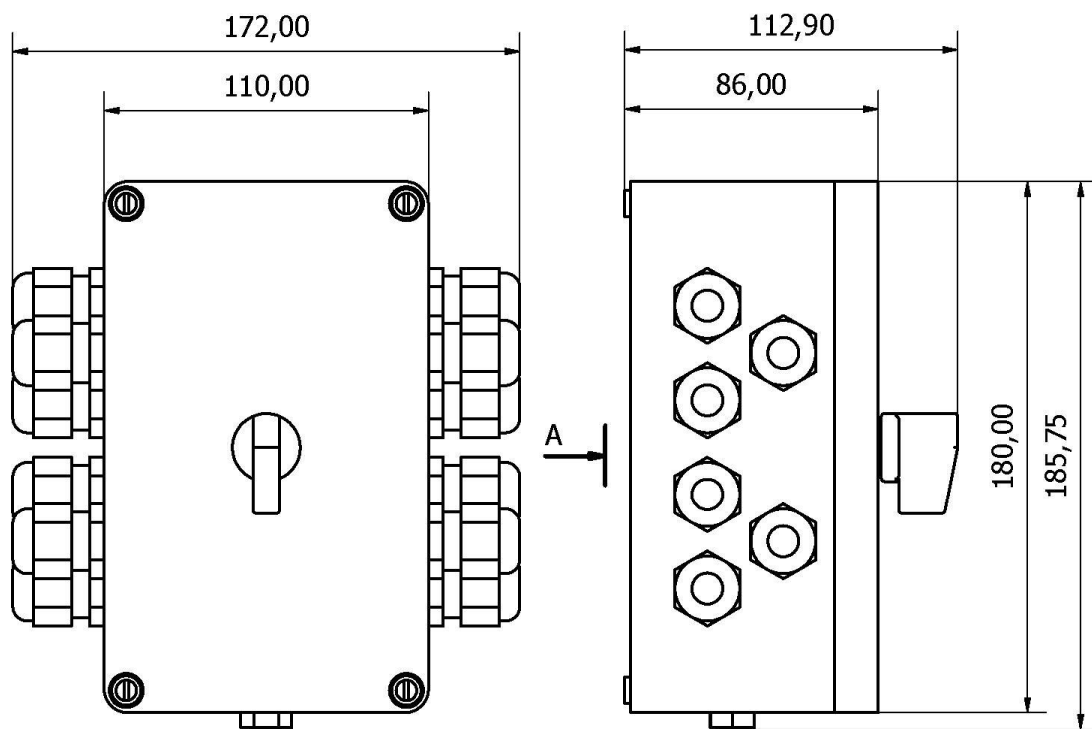
Indication and control unit TCC-IU/01



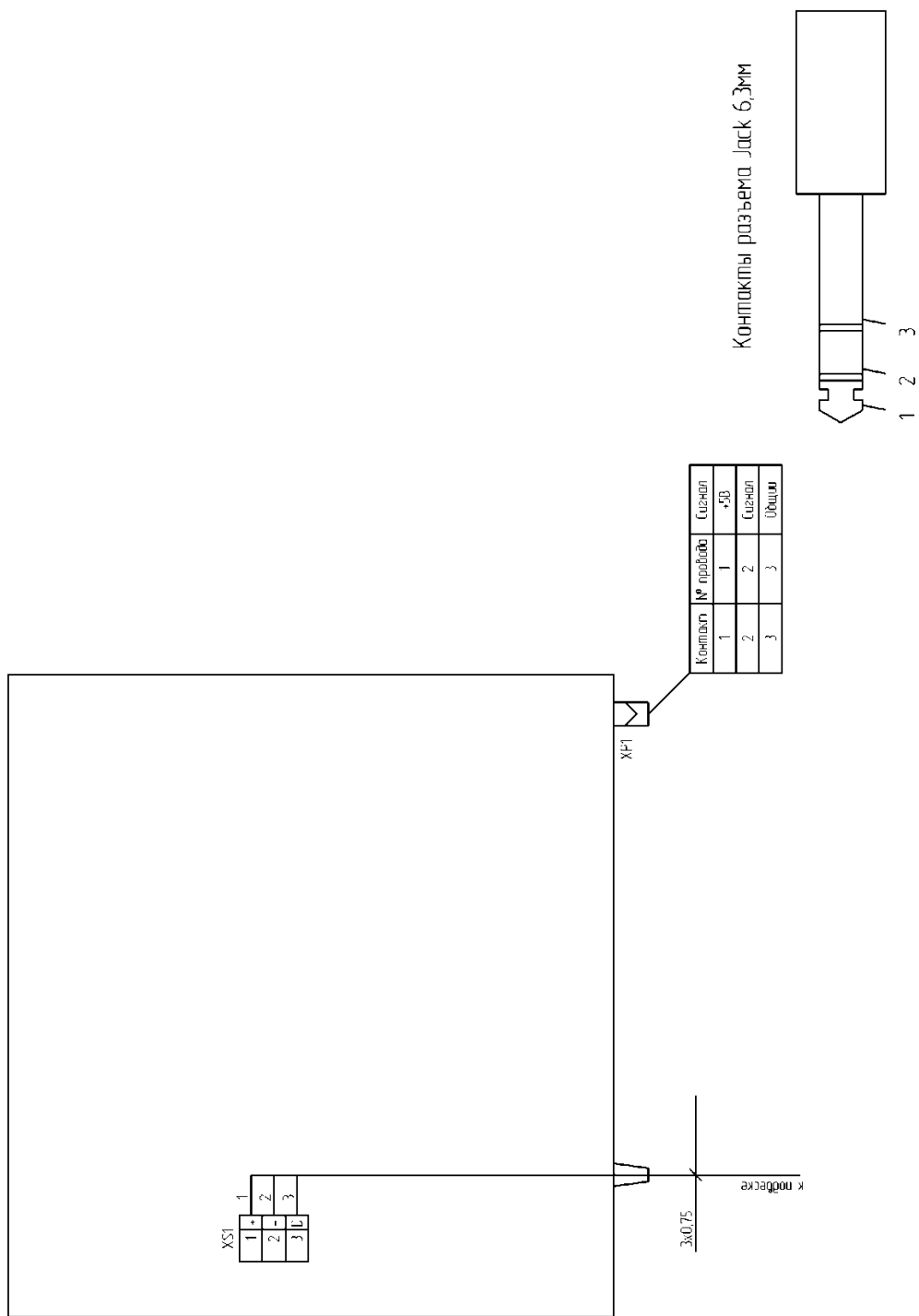
Connection and power supply unit TCC-CU/06



Connection and power supply unit TCC-CU /07



Connection and power supply unit TCC-CU /06. Electrical connection diagram



1 - Жилы кабеля сигнала экранировать - заземнить или штырьками

2 - Цветная маркировка жил кабеля СИЖЕН-Я

1 - красный (коричневый), 2 - синий (серый), 3 - белый (зеленый или желтый)

Technical data

Temperature cable

Measured temperature:	- 55...125 °C
Power supply:	5 VDC (from indication unit)
Protection Class:	IP55
Length:	4...30 m
Quantity of sensors:	1...32

Stationary connection and power supply unit TCC-CU/06

Quantity of connected temperature cables:	1
Power supply:	5 VDC (from indication unit)
Protection Class:	IP55
Weight:	0,7 kg
Environmental Temp.:	-30°C ... +45°C
Installation:	Vertical surface

Indication and control unit

Power supply:	4...9 VDC (4 elements AA)
Current Consumption:	макс. 130 mA
Protection Class:	IP 44
Environmental Temp.:	-10°C ... +45°C
Weight:	0.5 kg
Connection cable:	0,5 m

Stationary connection and power supply unit TCC-CU/07

Quantity of connected temperature cables:	12
Power supply:	5 VDC (from indication unit)
Protection Class:	IP55
Weight:	0,9 kg
Environmental Temp.:	-30°C ... +45°C
Installation:	Vertical surface