

WARRANTY CERTIFICATE FOR THE HEATING CABLE



TWIN-CONDUCTOR
HEATING CABLE
ZUBR DC CABLE

SELLER

THE LENGTH OF THE HEATING CABLE · M
POWER · W
RESISTANCE · OHM
DATE, SIGNATURE, FULL NAME OF THE SELLER

BUYER

THE ADDRESS OF THE HEATING CABLE INSTALLATION
DATE, SIGNATURE, FULL NAME OF THE BUYER

Due to the use of high-quality materials and modern technologies, the warranty period for the ZUBR DC Cable twin conductor mat is 25 years. These warranty obligations are valid if the terms of the warranty obligations are observed. A mandatory condition of the guarantee is the presence of the signature of the buyer and the seller.

INSTRUCTION

INSTALLATION AND OPERATION

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Thank you for choosing the ZUBR heating cable. Please read this document carefully before beginning installation.

1. Purpose

ZUBR DC Cable twin-conductor heating cable is designed for installation at the construction stage, when the screed is not yet done.

The specific power of the ZUBR cable is 17 W/m, which ensures perfect comfort and even distribution of heat over the entire surface of the floor. The ZUBR cable can be laid with different steps and accordingly provide different specific power per m². For main heating we recommend choosing a power in the range of 170–200 W/m², for an additional one — 120–160 W/m².

Finishing coatings to which the heating cable is suitable:

- ceramic tile, porcelain stoneware, natural stone;
- laminate, provided that the maximum power of the floor is up to 160 W/m², and the temperature underfloor heating not higher than 27 °C;
- vinyl laminate, provided that the maximum power of the floor is up to 140 W/m², and the temperature of the warm floor is not higher than 27 °C.

Laminate and vinyl laminate must have appropriate certificates and manufacturer's marks that inform about the purpose of the product for use with electric underfloor heating.

Spaces where the ZUBR heating cable can be laid:

- residential premises: bathroom, kitchen, balcony, loggia, hallway in apartments and houses;
- non-residential premises: garages, warehouses, sauna, swimming pool, greenhouses, etc.

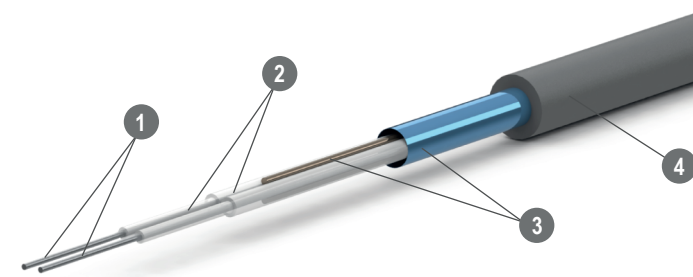
2. Characteristics of the ZUBR heating cable

Each ZUBR cable section consists of a heating cable and a cold end, which are hermetically sealed connected through a coupling. Inside the coupling, the two heating cores and the screen are clearly fixed on their own places thanks to a special dielectric insulator.

Таблица 1. Technical characteristics of the ZUBR heating cable

Cable type	twin-conductor shielded
Cable diameter	5 mm
Specific power	17 W/m
Length of the connecting conductor	2,5 m Can be extended up to 30 m with copper conductor 3×1,5mm
Nominal supply voltage	230 V ~ 50 Hz
Maximum temperature	80 °C
Peak temperature	95 °C
Water protection class	IP X7
Insulation voltage test	2 500 V alternating current

Other technical characteristics of your specific heating cable section are indicated on the packaging (rated power, length of each individual heating cable section and area range, for which this section is suitable).



- 1 Two heating conductors.** The presence of two heating conductors allows for even distribution of temperature and ensures long-term operation of the warm floor.
- 2 Double layer FEP (fluoroethylene propylene) and HDPE (high-density polyethylene) insulation.** The double-layer insulation on each conductor provides reliable protection for the cable during installation, especially when bending. The separate insulation of each heating conductor allows for free movement inside the wire, ensuring the durability of the structure.
- 3 Screen (two galvanized copper wires + aluminum and PET foil)**
- 4 The outer shell is made of PVC with a thickness of 1 mm**
- 5 The strictly uniform thickness of the outer shell ensures the absence of thin places throughout cable length for uniform heating.**

3. Installation and security requirements

In case of violation of any of the listed requirements, the manufacturer withdraws its warranty obligations. The heating cable must be adopted in accordance with ZUBR recommendations.

Necessarily

- **Fill in the scheme of laying a warm floor on p. 16;**
- **Fill out the Resistance Measurement Protocol on p. 18;**
- The heating cable must be connected by a qualified electrician in accordance with all requirements of DBN and PUE;
- The heating cable must be grounded in accordance with the current rules of PUE and DBN;
- A thermostat must be connected to control the warm floor;
- To protect a person from damage by electric current leakage is mandatory
- install the PZV (protective shutdown device);
- To protect against a short circuit in front of the thermostat in the electrical panel an automatic switch is installed;
- To protect against voltage drops, use appropriate automation.

Forbidden

- **Shorten, lengthen, subject to mechanical tension and stretching of the heating element part of the heating section;**
- **Turn on the heating sections folded into a bay;**
- Damage the integrity of the connecting coupling and insulation of the heating cable;
- Drive nails, dowels, screws into the surface of the warm floor;
- Use a damaged heating cable;
- Use the heating cable at ambient temperature below -5 °C;
- Connect the cable to the electrical network, the voltage of which does not correspond to the nominal one value of 230 V ~ 50 Hz;
- Perform work with the power supply turned on;
- Cover the warm floor with thick carpets and other insulating materials, put furniture on it without legs and without an air gap under them.

Recommended

- Mark the heating cable in the switchboard with warning signs inscriptions or symbols.

4. Selection of the cable section

Calculation of cable power

The section of the heating cable is usually selected according to the formula:

Cable power [W] = «free» area [m²] x specific power [W/m²], where

1. «Free» area is the area of the heated floor free of stationary devices and furniture.

Calculate the area, excluding places occupied by furniture, plumbing, refrigerator, laundry car, shower cabin, bathtub, toilet, etc.

2. Desired specific power per m².

Based on the purpose of the warm floor, the specific power for additional heating is usually determined is chosen in the range of 120–160 W/m², for the main heating — 170–200 W/m².

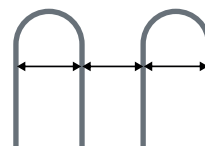
We also recommend taking into account:

- heat loss of the room (large panoramic windows, uninsulated rooms below or above yours premises);
- purpose of the premises: residential, non-residential (for non-residential premises, specific power, as a rule, is chosen lower);
- type of floor covering. For example, for laminate, the maximum permissible power is 160 W/m², for a vinyl floor — 140 W/m². More details in the table. 2

Table 2. Recommendations for the selection of specific power

Floor material coverage	Additional heating	Main heating
Tile, stone	120–160 W/m ²	170–200 W/m ²
Laminate for underfloor heating	Maximum permissible power 160 W/m ² A mandatory condition is temperature underfloor heating 27 °C or lower	-
Vinyl laminate for underfloor heating	Maximum permissible power 140 W/m ² A mandatory condition is temperature underfloor heating 27 °C or lower	-

Calculation of the stacking step



The ZUBR heating cable can be mounted using mounting tape with a laying step in multiples of 2.5 cm, for example 7.5 cm, 10 cm, 12.5 cm or 15 cm. At the same time, you can combine different steps laying to ensure the desired specific capacity of the warm floor. The maximum step between the turns of the cable should not exceed 20 cm, so that unheated zones or «heat zebbras» do not form.

To calculate the laying step, use the formula:

$$\text{Laying step [cm]} = \frac{\text{«free» area [m}^2\text{]}}{\text{cable length [m]}} \times 100$$

Below in the table you can get information about the length of the ZUBR cable section you have chosen.

For ZUBR heating cable:

- at a step of 7.5 cm, we get a power of 228 W/m², which corresponds to the main heating;
- at a step of 10 cm, we get a power of 170 W/m², which corresponds to the main heating;
- at a step of 12.5 cm, we get a power of 136 W/m², which corresponds to additional heating;
- at a step of 15 cm, we get a power of 113 W/m², which is suitable for floor heating.

Table 3. Assortment of ZUBR heating cable

Power, W	Length, m	Installation area, m ²		
		136 W/m ² step 12,5 cm	170 W/m ² step 10 cm	228 W/m ² step 7,5 cm
140	8	1,0	0,8	0,6
170	10	1,3	1,0	0,8
210	12,5	1,6	1,3	0,9
270	16	2,0	1,6	1,2
345	20	2,5	2,0	1,5
440	25,5	3,2	2,6	1,9
565	32	4,0	3,2	2,4
620	37	4,6	3,7	2,8
720	42	5,3	4,2	3,2
890	52	6,5	5,2	3,9
970	56	7,0	5,6	4,2
1 070	63	7,9	6,3	4,7
1 210	71	8,9	7,1	5,3
1 340	79	9,9	7,9	5,9
1 500	89	11,1	8,9	6,7
1 670	97	12,1	9,7	7,3
2 010	117	14,6	11,7	8,8
2 550	149	18,6	14,9	11,2

Calculation examples

Example 1

The total area of the bathroom is 8 m², the «free» area is 6 m². We lay the main thing heating for the room — 170 W/m². We calculate the required power of the heating cable:

$$6 \text{ m}^2 \times 170 \text{ W} = 1020 \text{ W or } 1,020 \text{ Kw}$$

We select the cable closest in power from the ZUBR DC Cable assortment Table 2 — 1,070 kW, 63 m long. We calculate the laying step:

$$\frac{6 \text{ m}^2}{63 \text{ m}} \times 100 = 9,5 \text{ cm}$$

Since the laying step must be a multiple of 2,5 cm, the obtained value is rounded up to 10 cm. That is, in this case, the cable is laid in steps of 10 cm per 6,3 m².

Example 2

The total area of the bathroom is 8 m², the «free» area is 6 m². We lay the main thing heating for the room — 200 W/m². We calculate the required power of the heating cable:

$$6 \text{ m}^2 \times 200 \text{ W} = 1200 \text{ W or } 1,2 \text{ kW}$$

We select the cable closest in power from the ZUBR DC Cable assortment Table 2 — 1,21 kW, 71 m long. We calculate the laying step:

$$\frac{6 \text{ m}^2}{71 \text{ m}} \times 100 = 8,5 \text{ cm}$$

The obtained value is not a multiple of 2,5 cm, so in this case it is necessary to alternate turns with different laying steps of 7,5 cm and 10 cm.

5. Planning the layout scheme for the heating cable

Before installing the heating cable, it is important to carefully plan its placement, following the basic installation rules:

- lay the cable evenly in a snake, without intersections and at the same distance, which is equal to laying step;
- cable turns should not go under sanitary ware, furniture without legs, household appliances with small whether there is no air gap under it;
- the cable must be laid out in such a way that it does not cross the heating and hot pipes water supply, temperature and damping seams. If necessary, the heating zone should be divided into several and use separate sections of the heating cable for each zone.

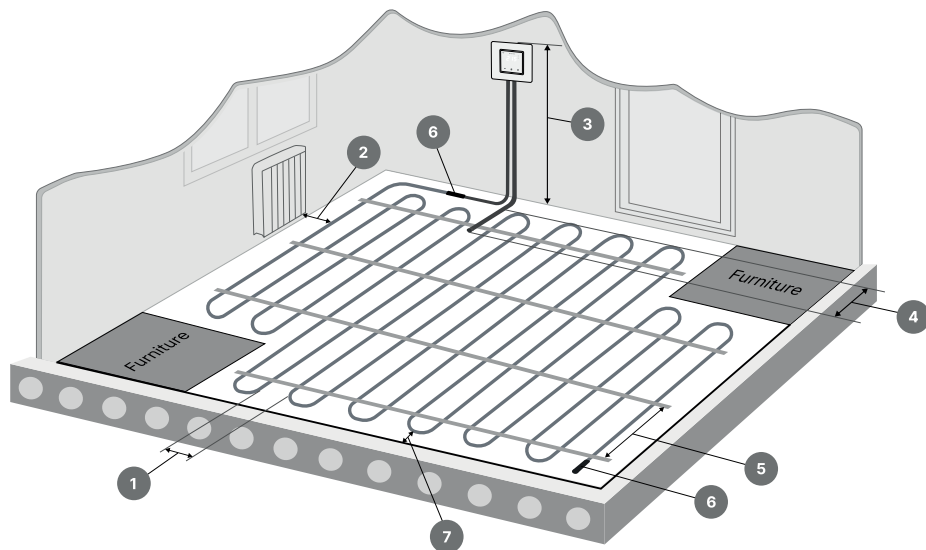


Fig.1 Butt for laying the heating cable

- 1 **Laying length 7,5 cm, 10 cm, 12,5 cm, 15 cm.**
- 2 **Stand between the cable and the heating pads and pipes**, the scorching area should be at least 20–25 cm.
- 3 **Thermostat** is a non-viscous, invisible storage system with a warm base for support comfortable temperature. Place it in a place inaccessible to the fall of the breeze at a height of 1,4–1,5 m above the level of the substrate. To save energy, use it victoriously Smart Wi-Fi thermostat, for example terneo sx.
- 4 **The temperature sensor** is located in the installation pipe between the cable turns and at a distance of 0,4–0,5 m in front of the heating zone.
- 5 **The mounting stitch** allows you to see a consistent cable laying length that is a multiple of 2,5 cm. The stitches are fastened to the base using additional flowers and dowels. Stand between the stitches 0,5–1 m.
- 6 **Cable coupling**: connection and end.
- 7 **The distance from the cable to the walls** and other garden structures must be at least 5 cm.

Fold the laying diagram

Based on all the rules and recommendations, create a laying plan for your warm sublays and fix the placement of all elements on side 16. The laying scheme is bound the washing machine for the Viconnian distiller of their guaranteed crops. You'll need it in an hour the next day's work and the search for possible harm.

6. Preparation for installation

6.1. Necessary materials and tools

A mounting tube

Designed for the installation and protection of the temperature sensor of the thermostat. The end of the tube must be closed with a plug or insulating tape to prevent any solution from entering it.

A mounting tape

To calculate the required length of the mounting tape, the «free» area must be multiplied by 2. For example, 5 m² of «free» area requires 10 m of mounting tape.

Tools

- screwdriver, pliers, nippers, assembly knife, scissors, tape measure;
- perforator, hammer;
- multimeter (ohmmeter);
- megohmmeter.

6.2 Surface preparation

The base of the floor where the cable will be laid must be free of debris, dust, dirt, and sharp objects.

The floor surface should be horizontal. This is necessary so that when pouring the screed height was the same, and the heating was uniform. If the floor surface is not horizontal, level it with the help of leveling construction mixtures. It is recommended to prime the floor surface, then adhesion to the next layer will be better.

6.3 Preparation of the hole for the thermostat

Make a hole in the wall for the mounting box for the thermostat and make a vertical one groove to the floor. Bring the «cold» ends of the heating cable to the mounting box, the connecting wire of the sensor and connect them to the thermostat.

Before installation:

- check that the ambient temperature is within acceptable limits for cable installation 6...36 °C;
- measure the resistance of the section of the cable coiled in the bay. Compare it with the nominal resistance indicated on the cable tag, the resistance error can be within -5 / +10%;
- enter the actual resistance in the Measurement Report on page 18.

7. Installation

7.1 Thermal insulation

Installation of the insulation is mandatory for premises located on the first floor, above the garage, basement, unheated room, arches, etc. In other cases, thermal insulation can be mounted as desired, but its presence allows:

- increase the efficiency of underfloor heating;
- reduce heat loss of the room;
- save electricity.

Place thermal insulation with a thickness of 20 mm or more on a flat and prepared floor surface. The thicker the layer of thermal insulation, the less heat loss will be in the room.

Variants of heat-insulating material for underfloor heating:

1. Styrofoam with a density of at least 20 kg/m³;
2. Extruded polystyrene foam.

If it is not possible to place thermal insulation with a height of more than 20 mm, as a last resort use foamed polyethylene with a thickness of 5–7 mm.

It is not recommended to use thermal insulation materials with a metal coating, such as aluminum foil.

To avoid pressing the heating cable into the surface of the thermal insulation, use one in two ways:

1. first fill it with a thin fireproof screed (7–10 mm) and then mount the cable, using mounting tape;
2. lay a metal mesh on the thermal insulation and then mount the cable using clamps.

Waterproofing. Placement of waterproofing is mandatory for rooms with high humidity.

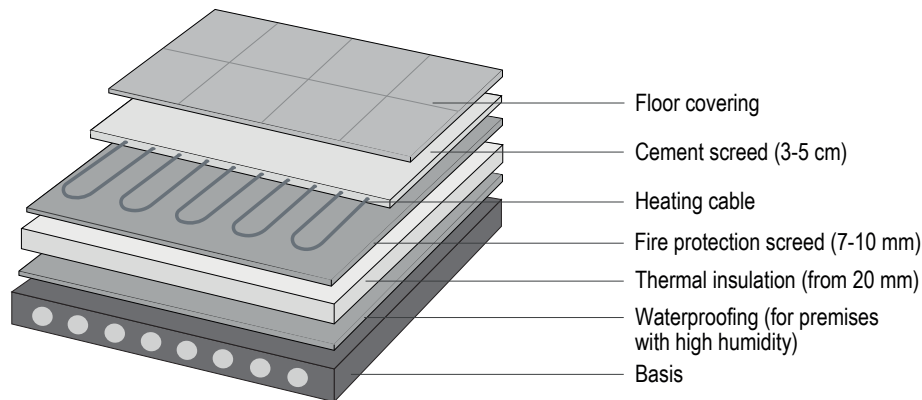


Fig. 2. The principle of laying the heating cable

7.2 Laying the heating cable

Attach the mounting tape to the floor surface using nails or construction dowels 6 mm. The distance between the strips of mounting tape should be 0,5–1 m.

Bring the «cold» end of the cable to the location of the thermostat and secure it using mounting tape.

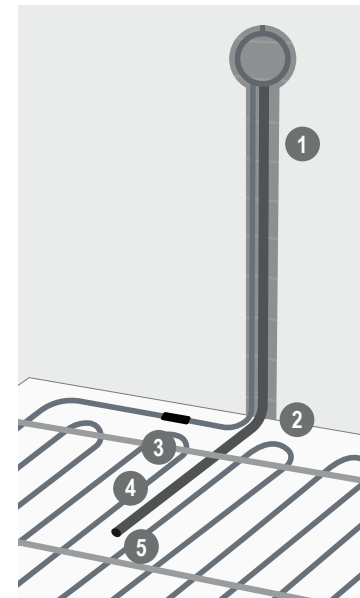
Lay out the cable according to your layout scheme and fix it with the help of a mounting bracket ribbons. The bends of the cable loops should be smooth, without breaks and strong tension. Radius the bend of the cable should be at least 3,75 cm.

Measure the resistance again and add to the Protocol on p. 18.

Forbidden

- Step on or cover the mounted cable to avoid mechanical damage;
- Plug in the cable in the bay without unwinding it, even for a short time;
- Use the heating cable in places exposed to large mechanical forces loads or shocks.

7.3 Installation of the thermostat and temperature sensor



- 1 Make a strobe 1,4–1,5 m high in the wall and place the temperature sensor in it in the assembly room tubes.
- 2 Bends of the tube should not interfere free movement of the sensor in case of replacement.
- 3 Fasten the sensor in the mounting tube by using mounting tape.
- 4 The sensor is installed at an equal distance between heating cable loops. For correct measure the temperature of the floor sensor into the heating zone by 0,4–0,5 m.
- 5 Seal the end of the tube for preventing the solution from getting on the sensor. Make sure the sensor is at the end tubes.

When pouring the screed, lift the end of the tube, so that the temperature sensor is located as possible closer to the floor surface. If the thickness of the screed smaller than the diameter of the tube, make under the tube groove.

Shorten or lengthen the connecting wires of the sensor as necessary. Made with a separate cable no more than 20 m.

Connect the 230 V power supply to the thermostat, taking into account that the wiring is standard (copper wire) withstands the following load currents:

- 1,5 mm² — 10 A;
- 2,5 mm² — 16 A;
- 4,0 mm² — 25 A

7.4 Screed

The heating cable is poured with a cement-sand solution 3–5 cm thick or concrete with a fine fraction of crushed stone (no more than 10 mm). We recommend adding to the solution softener. You can also use construction mixtures, adhesives or self-leveling solutions. It is unacceptable to use light concrete as a filling.

It is extremely important that the solution has a sufficiently liquid consistency that the cable is completely poured and air cavities did not form around it, which can later cause local overheating of the cable.

To exclude cracking of the screed during operation, it is additionally possible use a reinforcing mesh and a damping tape, which is placed on the perimeter of the room between the wall and the floor.

Forbidden

- Use a heating cable without a tie;
- Destroy the screed;
- Turn on the warm floor until the screed is completely hardened.

Measure the resistance again (no need to wait for the screed to fully cure!) to check integrity cable and insulation. Add to the Protocol on p. 18.

Lay the finishing coating for the floor.

8. Turning on and operating the system

Connect the thermostat to the heating cable:

The shield of the heating cable (yellow-green wire) must be connected to the ground. Two heating rooms connect the wires (blue and brown wires) to the thermostat.

If you need to connect two or more heating sections to the thermostat, connect them wires of all sections and wires from the thermostat in a separate junction box. In this case, be sure to note that the total power of all heating sections should not exceed the maximum permissible power of the thermostat. Connecting several sections of the cable to the thermostat/contactors are carried out in parallel.

You can turn on the warm floor only after the screed has completely hardened. For cement and sand screeds need 28 days for complete hardening according to the DBN, for building mixtures the term complete hardening is indicated on the package.

Check the electrical connection and turn on the thermostat at 26-28 °C, first heating may take 5-50 hours. We ask you to be patient and give the system quality time the first time warm the room. After reaching the set temperature, set the desired comfortable temperature. Do not cover the warm floor with thick carpets and carpets on a rubber base – this may cause the cable to overheat.

Recommendations for choosing a comfortable temperature in case of use warm floor as the main heating

In order to save electricity costs, we recommend that in the cold season of the year to maintain a minimum floor temperature throughout the day. Constant maintenance of the minimum temperature, even when no one is in the room, will be more effective than turning it off underfloor heating with subsequent heating of the system from scratch.

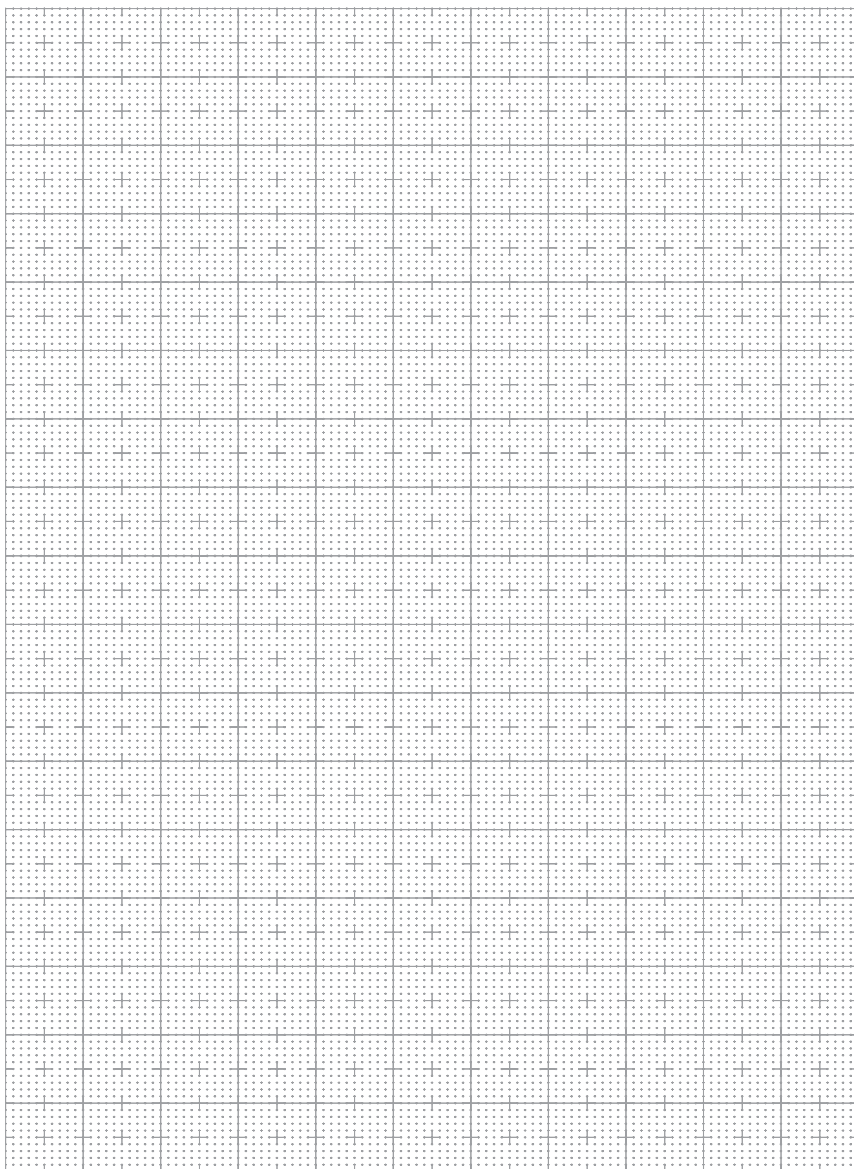
9. Layout scheme of the underfloor heating

Draw the layout diagram: indicate the distance from the heating cable to the walls, furniture, sanitary equipment, the location of the thermostat and sensor, connecting and end coupling, «cold» end and direction of laying the cable, mark the stacking step and power.

This scheme will be useful for you during the next construction works and the search for possible malfunctions.

Scheme of laying a warm floor

NOTICE: The correct drawing of this drawing during the installation of the underfloor heating system is mandatory for the fulfillment of warranty obligations.



heating cable



mounting tube sensor



connecting and end clutch



sensor temperature



thermostat

10. TERMS AND CONDITIONS OF WARRANTY OBLIGATIONS

1. If during the warranty period a defect appears in the product due to its imperfection design, violation of manufacturing technology or low-quality materials, the manufacturer guarantees performing a free warranty repair of a defective product (or its part) if the buyer complies with the recommendations and requirements set forth in the Installation Instructions and exploitation.
2. The warranty does not apply to products installed and operated in violation of the Instructions for installation and operation, regardless of the cause of the defect.
3. The warranty does not apply to products with malfunctions that occurred as a result of significant violations of the technical requirements stipulated in the Installation and Operation Instructions, in vol including the instability of electrical network parameters.
4. The warranty does not cover products that have been damaged due to accidents or negligence handling and storage, as well as for those reasons that arose during the transportation of the product. The risk of accidental breakage or damage to the product passes to the buyer from the moment his confirmation of its acceptance.
5. If during the warranty period any part(s) of the product will be replaced by a part(s), which are not recommended for use or the quality characteristics of which do not meet the requirement for of the product, and also, if the product was repaired by a person not authorized to do so, the seller has the right to immediately terminate the warranty without additional notice to the buyer.
6. This warranty gives the buyer the sole exclusive right to repair (replacement) before the manufacturer the product, its parts (n) and no other rights, including the full responsibility of the buyer in case of accidental or unavoidable damage.
7. Examination of the defective product and the heating system as a whole to identify them compliance with the requirements of the installation and operating instructions is made by the manufacturer followed by drawing up an act on the causes of the identified defect. Seller's decision for the results of the examination are final.
8. Warranty repair of the product is performed by the service center or a person authorized by it.
9. We recommend entrusting the repair of the heating system only to organizations that are engaged in the field of its activity by carrying out such works.
10. For all product warranty issues, please contact your local dealer.

Manufacturer: ELEKTRA WŁODZIMIERZ NYC WITOLD NYC SPÓŁKA JAWNA,
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tel. +38 (044) 228-73-46, www.ds-electronics.com.ua

RESISTANCE MEASUREMENT PROTOCOL

The resistance measurement is performed 3 times to ensure the integrity of the heating cable. The resistance error can be within $-5 / +10$ %. **NOTICE: Completion of this protocol is mandatory for the fulfillment of warranty obligations.**

Length of the ZUBR DC heating cable, in meters _____

BEFORE INSTALLING THE CABLE

date of measurement _____

resistance of the heating core, Ohm _____

signature, and full name of the person who did the measurement

AFTER INSTALLING THE CABLE

date of measurement _____

resistance of the heating core, Ohm _____

resistance between the heating core and the screen, Ohm _____

signature, and full name of the person who did the measurement

AFTER THE SCREED IS Poured

date of measurement _____

resistance of the heating core, Ohm _____

resistance between the heating core and the screen, Ohm _____

signature, and full name of the person who did the measurement