terneo | Technical data sheet, installation and operation manual

SNEG + VOL

smart control of heating

The terneo sneg + VOL thermostat effectively and economically ensures the clearing of the roof and gutters from snow and ice, as well as prevents the formation of dangerous icicles.

The terneo sneg thermostat operates based on data from two sensors: the R10 air temperature sensor and the VOL precipitation sensor. When the air temperature reaches the set range, the thermostat will start checking for precipitation, and only after confirmation will it turn on the heating.

The VOL precipitation sensor for gutters detects the presence of precipitation based on the moisture resistance on its sensitive contacts and displays this resistance on the thermostat screen in relative units. The higher the moisture content, the lower the resistance value. Once the precipitation sensor detects a resistance of 500 units or less, it will activate the heating. The resistance level at which the heating is activated can be adjusted in the menu (the factory default is 500 units).
As soon as the resistance rises above the set value (more than 500 units), the thermostat will continue heating for the set Postheating time to completely remove the remaining precipitation from the gutter surface.

The operation logic based on resistance is as follows:

- Resistance above 999 units: no precipitation detected.
- Resistance from 999 to 500 units: there is a possibility of precipitation. If the temperature on the sensor surface drops below 10 °C, the thermostat will activate internal heating to melt solid precipitation and accurately measure their resistance.
- Resistance below 500 units: heating is activated.

The terneo sneg thermostat can function without the VOL precipitation sensor: heating will be triggered based on the air temperature without considering the presence of precipitation.

IN THE BOX

Thermostat	1 piece
Temperature sensor	1 piece
Precipitation sensor	1 piece
Technical data sheet, installation and operation manual, warranty card	1 piece

TECHNICAL DATA

Thermostat terneo sneg	
Adjustment range	upper.: 0...10 °C lower: –20...–1 °C
Maximum load current (for category AC-1)	16 A
Rated load capacity (for category AC-1)	3 000 VA
Resistance measurement range precipitation sensor	10...990 kOhm
Input voltage	230 V ±10 %
Temperature hysteresis	0,1...10 °C
Temperature sensor (R10)	NTC thermo-resistor 10 kOhm at 25 °C
Sensor connecting cable length	4 m
Number of combinations under heat, no less than	50 000 cycles
Number of combinations without heating, no less than	20 000 000 cycles
Degree of protection GOST14254	IP20
Range of measured temperatures	–30...+75 °C
Precipitation sensor vol	
Ambient temperature	–40...+80 °C
Measured temperature range	–30...+75 °C
Sensor connecting cable length	10 m
Internal temperature sensor	NTC thermo-resistor 10 kOhm at 25 °C
Internal heating capacity	5 W ±5 %
Degree of protection GOST14254	IP68
Dimensions ±2 mm	133 x 31 x 15 mm
Gross brutto mass of the set	1,070 kg ±10 %

INSTALLATION

Important! Before starting the installation and use of the thermostat, please read this document in its entirety. This will help you avoid potential hazards, errors, and misunderstandings.

The stat is designed for indoor installation. The ingress risk of moisture or liquid into the place of installation must be minimized.

The ambient temperature during installation must be between –5...+ 45 °C. The installation height of the thermostat should be in the range 0,5...1,7 m above the floor level.

The thermostat is installed in a special box, which allows conducting easy installation and operation.

Cabinet should be equipped with standard mounting rail 35 mm width (DINrail). The appliance takes in width of three standard modules on 18 mm.

The thermostat is installed and activated after installation and inspection of the voltage.

To protect against short-circuit in the load circuit the circuit breaker (CB) has to be installed before installing the thermostat. The circuit breaker is installed in the gap of phase conductor, as shown in the Wiring 1.

To protect a people against electric shock leakage is installed the SSD (safety shutdown device). For working of SSD the heating cable screen must be grounded (connected to the protective conductor PE) or, if there is two-wire network, it is necessary to make protective neutral earthing. That is to connect the screen to a zero before SSD.
The thermostat terminals are designed for a wire with section not more than 2,5 mm². To reduce the mechanical loads on the terminals it is desirable to use a soft wire. The ends of the wires must be cleaned and crimped with ferrules with insulation. The wires are tightened in the terminals using a screwdriver with a blade width no more than 3 mm. The screwdriver with a blade width more than 3 mm can cause mechanical damage to the terminals. This may result in the loss of right for warranty.

To increase the service life of the relay, it is necessary for the thermostat to switch the current not more than 2/3 of the maximum current specified in the passport. Otherwise, use a contactor designed for this current (Wiring 2).

The contactor is also used to control the 3-phase load. Wiring 3 shows the possible option of connecting a contactor for controlling a 3-phase load with a 230 V coil, and wiring 4 — with a 400 V coil.

WIRING

The supply voltage (230 V ±10 %, 50 Hz) is applied to terminals 9 (phase, L) and 10 (zero, N).

The thermostat supports operation with two types of air temperature sensors: analog (r10) or digital (d18).

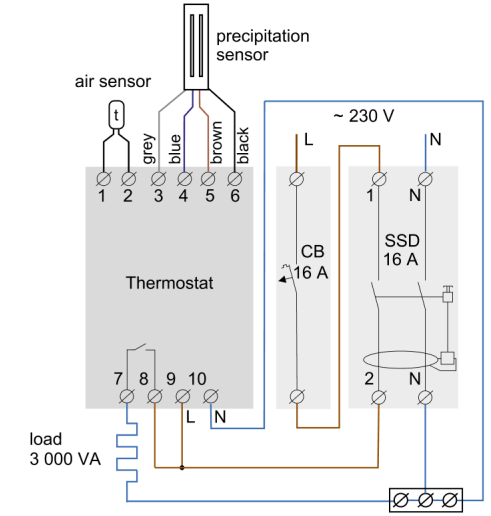
The supplied analog temperature sensor (r10) is connected to terminals 1 and 2. The colors of the wires do not matter when connecting.

The thermostat also supports operation with a digital temperature sensor (d18). To connect a digital sensor, connect the white wire to terminal 1 and the blue wire to terminal 2. In the thermostat menu, be sure to change the sensor type to d18 (Menu table).

To control the load, use terminals 7 and 8 (relay). The relay used in the thermostat has a «dry» normally open contact, i.e. the relay contacts are not galvanically connected to the power supply circuits.

The sensor VOL is connected to the terminals of the thermostat as follows:

- grey (VOL sensor temperature) — terminal 3;
- blue (precipitation sensor) — terminal 4;
- brown (common) — terminal 5;
- black (heater) — terminal 6.



Wiring 1. Connection of the circuit breaker and SSD

WARRANTY TERMS

The warranty for devices is valid for 36 months from the date of sale, provided that the instructions are followed. The warranty period for products without a warranty certificate is counted from the date of production.

If your device is not working properly, we recommend that you first read the section «Possible problems». If you cannot find an answer, contact Service Center, in most cases, these actions resolve all issues.

If you continue to have issues with the device, please, contact the General distributor in your area or the store where you purchased the device. If your device is defective due to our fault, we will repair or replace it under warranty within 14 business days.

Please see the full text of the warranty and the data you need to send to your Service Center on the website https://www.ds-electronics.company

terneo

SERVICE CENTER CONTACT
+38 (091) 481-91-81
Viber Whats App Telegram
support@dse.com.ua

WARRANTY CARD

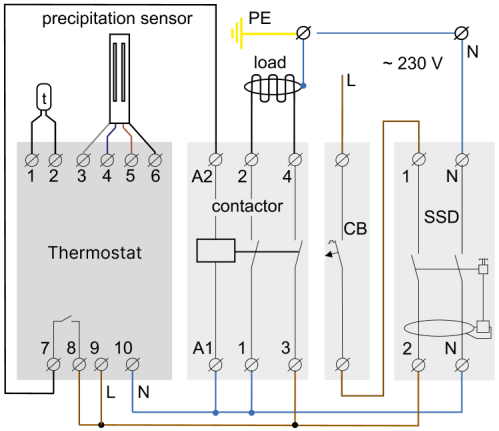
serial №:

date of sale:

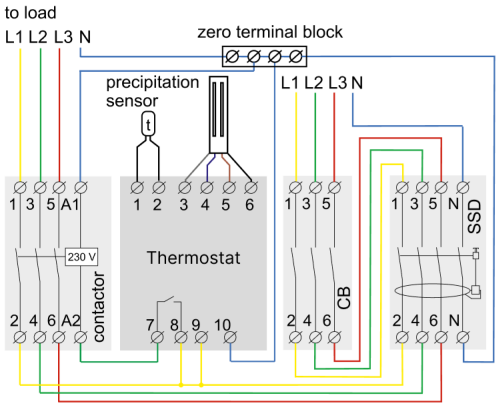
a seller,
a seal:

place of a seal

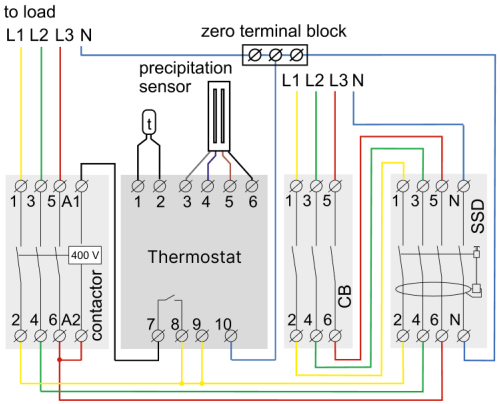
an owner
contact for a
service center:



Wiring 2. Connection via contactor



Wiring 3. A possible option for controlling 3-phase load with a 230 V contactor coil



Wiring 4. A possible option for controlling 3-phase load with a 400 V contactor coil

Air temperature sensor installation

The air temperature sensor is installed on the wall or under the roof edge so that it is not exposed to sunshine, rain and snow, and there is the possibility of unobstructed replacement in case of malfunction or damage (Fig. 1).

If necessary, it is allowed to shorten and increase the sensor connecting wires (separate cable not more than 20 m with a cross section of more than 0,75 mm²). The power wires should not be located near the sensor connection wire — they can cause interference.

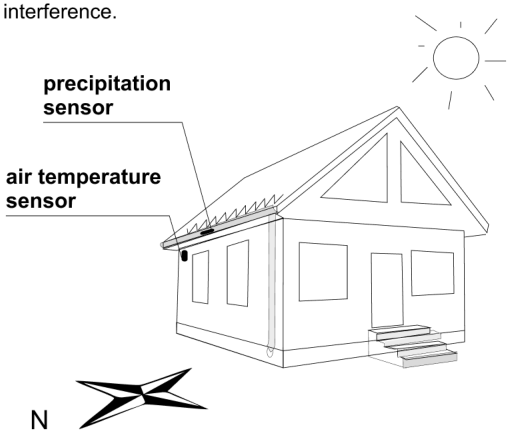


Figure 1. Air temperature sensor installation

Precipitation sensor installation

The VOL sensor is designed for installation in the gutter of a downspout.

If necessary, the sensor cable can be extended up to 40 meters. For example, using an intermediate mounting box or a simple extension with sealed connections, such as heat-shrink tubes with adhesive.

Placement and installation rules for the VOL sensor:

- It is better to position the precipitation sensor on the northern or northwest side of the structure.
- The sensor is installed in the gutter. It is desirable for it to be located where the most snow and ice accumulate.
- The installation location should be as close as possible to the center of the roof surface drainage.
- Place the sensitive element of the sensor facing upward ensure a strictly horizontal position.
- The edge of the roof should be directly above the sensor so that the melting water falls onto its surface.
- The sensor should be securely attached to gutter.
- The precipitation sensor should be located in the section heated by the cable (see Figure 2).

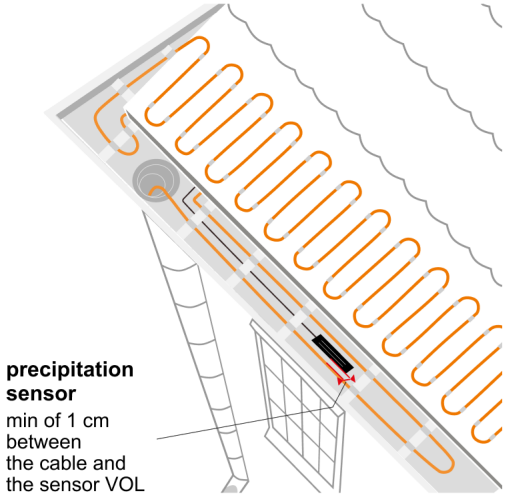
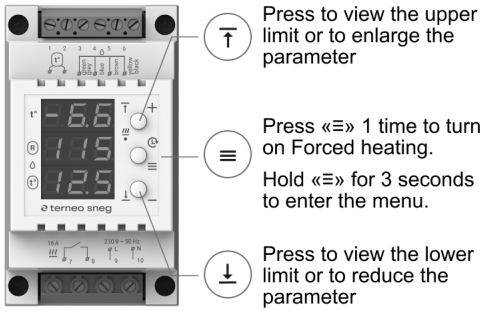
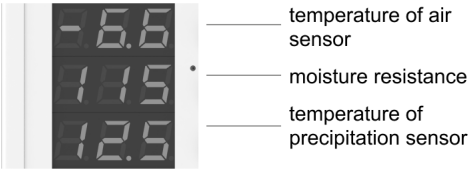


Figure 2. Placement of the precipitation sensor and heating cable in the gutter

IMPORTANT! Do not allow the surface of the sensor to be contaminated with leaves, branches or other foreign objects that may interfere with the detection of precipitation.

EXPLOITATION





Switching on

Apply the voltage to terminals 9, 10. Within 3 sec will be displayed on the screen «888». Then the temperature of the air and precipitation sensors will be indicated. The work of the load (of the heating system) will be signaled by a red indicator light.

In the absence of moisture on the surface of the precipitation sensor (resistance at the sensor terminals above 999 units), the thermostat will output — «drY».

Temperature range

(factory settings: upper limit 5 °C, lower –15 °C)
To view the upper temperature limit, press briefly «+», the lower limit — «–». The flashing limit value can be changed with the buttons «+» or «–».

10 sec after the last buttons pressing or short pressing «≡», the thermostat switches to the normal operation mode.

Forced Heating

(factory settings 3 hours)
To activate press the «≡» button. The middle screen will display the remaining time until the end of the heating cycle.

Use the «+» and «–» buttons to change the Forced Heating time in the range from 30 minutes to 9 hours in 15 minute increments. To turn it off, press «≡».

Load operating time counter

To view, press the «≡» button for 6 seconds. Displays the time (hours/minutes) using a moving line. To reset the counter, press «–» while viewing it.

Allows you to calculate the energy consumption by multiplying the operating time by the load power and the tariff.

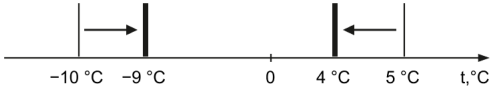
Reset to factory settings

Hold down the three buttons for 12 sec. After releasing the buttons, the thermostat resets all settings to the factory settings, the screen displays «dEF».

Menu

- To enter the menu, press the «≡» button for 3 sec
- To move through the menu, press the «≡» button. All menu items are described on the next page.
- Use the «+» and «–» buttons to change the parameters. The first press causes the parameter to blink, the next press changes it.

10 seconds after the last button press, the device returns to the normal operating mode.

Menu	Hold the «≡» button for 3 sec	Screen	Notes
Postheating time factory settings 2 h range from 30 min to 9 h, in 15 min increments.	Press the «≡» button to move through the menu		Postheating is necessary to completely remove any precipitation that may have remained on the heated surface. Select how long the heating will continue after the precipitation sensor detects a moisture level above the set value (more than 500 units). Press «≡» 2 times to reset the post-warming.
Correction of air temperature on the screen factory settings 0 range ±5 °C, step 0,1 °C	1 time		If necessary, correct the temperature display on the thermostat screen.
The resistance level of moisture at which the thermostat will activate the load factory settings 500 units range 10-990 units, step 10 units	2 times		This factory setting is designed to optimize snowmaking in urban areas. However, if the snowmaking system is located in an environmentally friendly area that has low levels of precipitation salinity, this setting may need to be increased. When the moisture level measured by the device falls below the value specified in this menu section, the snowmaking system will automatically switch on. The logic of the resistance-based operation of the thermostat is described in detail on (page 1).
Timer for automatic shutdown of the snow melting system factory settings 36 hours range 1–240 hours, step 1 hour	3 times		This function protects against excessive and prolonged operation of the snow melting system without your supervision. If the system operates continuously for 36 hours, the thermostat will stop heating to draw your attention to potential blockage of the moisture sensor surface by leaves, gravel, etc. It also safeguards against excessive energy consumption.
Hysteresis Hysteresis is the difference between the activation and deactivation temperatures of the load. Therefore, the thermostat will start checking for precipitation on the OSA sensor when the temperature is not just within the set temperature range but closer to 0 °C by the size of the hysteresis. factory settings 1 °C, range 0,1...10 °C, step 0,1 °C	4 times		By default hysteresis 1 °C and a temperature range. −10 °C to +5 °C. With these settings the thermostat will start checking for precipitation when the temperature is within the rangeof −9 °C to +4 °C and stop when the temperature goes beyond −10 °C to +5 °C.  If the hysteresis size is selected larger than the range, the thermostat will recalculate the hysteresis. For example, with a hysteresis of 3 °C and a range of −1...0 °C, the hysteresis will be recalculated as 1/2 = −0.5 °C.
Start with increased sensitivity It is necessary if you turned off the device or lost power, and during this time a lot of precipitation fell on the detector surface. factory settings is «oFF» to enable, select «on»	5 times		We recommend enabling Sensitive Start when starting the device. To effectively remove precipitation, the thermostat will temporarily increase the Moisture Resistance Level to 950 units for 1 hour. The function will be signaled by flashing «SSt» on the second screen once every 5 seconds. After an hour, the thermostat will resume operation according to the user settings.
Selecting the type of air sensor factory settings — 10r (analog sensor) Can be changed to d18 (digital sensor)	6 times		By default, the supplied r10 sensor is selected. If you change the sensor to a digital sensor, select d18.

SERVICE INFORMATION

To enter the Service information, press and hold the «≡» button for the specified number of seconds.

Power relay operating time counter

To view, hold down the «≡» button for 18 seconds.The operating time is displayed in hours (not reset).

Power relay operation counter

To view, hold down the «≡» button for 24 seconds (not reset).

Counter of thermostat restarts

To view, hold down the «≡» button for 30 seconds (not reset).

Firmware version

To view, press and hold the «≡» button for 12 sec. The version is displayed as a moving line. The manufacturer reserves the right to update the firmware in order to improve the device's characteristics.

POSSIBLE PROBLEMS, CAUSES AND WAYS TO OVERCOME THEM

At turning on neither indicator nor screen do not shine

Possible cause: there is no power supply voltage.

It is necessary to: ensure supply voltage presence. If there is voltage, then please contact the Service.

The load does not work according to the settings, the first screen displays «oht»

The temperature inside the housing exceeded 80 °C, the Protection from internal overheat worked. If the temperature inside the device exceeds 80 °C, the thermostat will disconnect the load and once the temperature normalizes to 65 °C, it will resume operation.

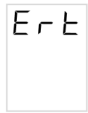
If the Protection feature is triggered more than 5 times consecutively, the thermostat will enter a locked state until the temperature drops below 65 °C and one of the buttons is pressed. This measure is intended to draw the users attention to the potentially dangerous situation.

Possible cause: internal overheating of the thermostat, which can lead to: poor contact in the terminals of the thermostat, high ambient temperature, exceeding the power of the switched load, or the cross section of the wires for connection is incorrect-ly selected.

It is necessary to:

- check the tightening of power wires in the terminals of the thermostat,
- make sure that the power of the switched load does not exceed the permissible one,
- the cross section of the wires for connection is selected correctly.

The first screen displays «Ert» every 5 sec



Possible cause: a break or short circuit of the internal overheating sensor. Internal overheating is not monitored.

It is necessary to: send the thermostat to the service center.

The first screen displays «OC» or «SC». Load does not work according to settings

open circut — air sensor circuit break

short circut — short circuit of the air sensor circuit

Check the air temperature sensor:

- correctness of the sensor connection;
- the sensor circuit;
- no damage to the sensor connection wire;
- the absence of closely passing power wires;
- absence of power wires passing close to the sensor;
- make sure that the temperature is within the measurement range (see Technical Data);
- if the problem cannot be solved, contact the Service Center.

Operation of the thermostat in case of damage to the air temperature sensor. The temperature will be controlled by the temperature of the VOL precipitation sensor.

The thermostat will independently turn on the indoor heating every hour for 20 minutes and turn it off for 40 minutes.

The air temperature will be controlled by the temperature of the internal precipitation sensor. The thermostat will supply load in the presence of precipitation and a temperature of 10 °C during 20 minutes of sensor heating or within −20...−1 °C during 40 minutes of heating off.

The second screen displays «OC» or «SC». Precipitation is not determined, internal heating of VOL sensor does not work

open circut — drop of precipitation sensor circuit

short circut — short circuit of precipitation sensor circuit

It is necessary to:

- check the correctness of connection
- the circuit of the precipitation sensor
- the absence of damage to the connecting wire of the sensor, the absence of close power wires,
- make sure that there are no contaminants on the sensor surface.

If the problem cannot be resolved, contact the Service Center, otherwise the thermostat will continue without detecting moisture.

The second and third screens show «OC» or «SC». Precipitation is not detected

open circut — open circuit of the moisture circuit and the internal VOL temperature sensor or no sensor

short circut — short circuit of the temperature sensor circuit in the precipitation sensor

Possible cause: incorrect connection of the precipitation sensor, damage to the sensor circuit or temperature is beyond the measured limits (see Technical data).

It is necessary to: check the VOL sensor and the integrity of its cable. Connect the backup internal temperature sensor — green-white wire (Fig. 4.2). If the problem cannot be resolved, contact the Service Center.

The thermostat operates in case of damage to the temperature sensor in the VOL sensor. The heating of the VOL sensor will be activated for 20 minutes every hour. The load will be activated if there is precipitation and the air temperature is within the specified limits.

Every 5 sec the bottom screen displays «Err», the load is working, the heating of the precipitation sensor is not working

Cause: break of the heater of the moisture sensor.

It is necessary to: check the moisture sensor and the integrity of its cable. Damage is determined if it is impossible to heat the precipitation sensor to 10 °C for more than 6 hour. If the problem persists, contact the Service Center.

The thermostat operates in case of damage to the VOL sensor heating element. The thermostat will activate the load if the sensor VOL detects precipitation and the air temperature falls within the specified limits.

To restore the thermostat to normal operation, either activate Forced Heating or restart the thermostat (turn off and then turn on the power to the thermostat).

The second screen displays «Err», the load and heating of the precipitation sensor do not work

Cause: the VOL sensor detects precipitation for a longer duration than the time you have set in the Timer for automatic shutdown of the snow melting system (refer to page 9). By default, the timer is set to stop the heating after 36 hours of continuous snow melting system operation.

It is necessary to:

- Check if the VOL sensor is not obstructed by leaves, branches, or other debris and clean its surface. To restore the thermostat to normal operation, either activate Forced Heating or restart the thermostat (turn off and then turn on the power to the thermostat).
- If precipitation is indeed occurring for an extended period and you wish to continue the operation of the snow melting system, you will need to increase the time in the Timer for automatic shutdown of the snow melting system.

Technical Support Chat

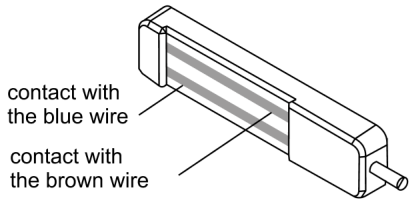
If you haven't found the answer, please contact our technical support engineer

@dselectronics_bot

CHECK THE OPERATION OF THE SENSOR

Check the moisture circuit for proper operation

Using an ohmmeter, check for contact between the blue and brown wires and the sensing elements on the sensor surface.



Check the resistance of the heater and the internal temperature sensor located inside the VOL sensor

The functionality is checked by measuring the resistance between the corresponding colors of the sensor wire.

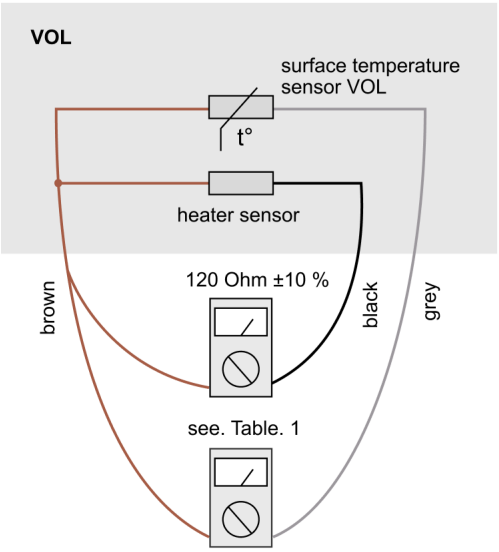


Table 1. Resistance of external temperature sensor at different ambient temperatures

5 °C	25950 Ω
10 °C	20189 Ω
20 °C	12538 Ω
30 °C	8035 Ω
40 °C	5298 Ω

SAFETY INSTRUCTIONS

To avoid injury and damage to the thermostat, carefully read and understand these instructions for yourself.

The installation of the thermostat should be carried out by a qualified electrician.

Do not connect 230 V mains voltage instead of the sensor (this will damage the thermostat).

Before starting the installation (disassembly) and connection (disconnection) of the thermostat, disconnect the power supply and follow the «Rules of an arrangement of Electric Installations».

Do not immerse the sensor with its connecting wire in liquid media.

Do not connect the thermostat to the power supply in a disassembled state.

Prevent liquid or moisture from coming into contact with the thermostat.

Do not expose the device to extreme temperatures (above 40 °C or below −5 °C) and high humidity.

Do not clean the thermostat using chemicals such as benzene and solvents.

Do not store or use the thermostat in dusty environments.

Do not attempt to disassemble or repair the thermostat yourself.

Do not exceed the maximum current and power limits.

Use surge protectors to protect against overvoltage caused by lightning discharges.

Keep children away from playing with a functioning device as it is dangerous.

ADDITIONAL INFORMATION

Please do not burn or dispose of the thermostat with household waste.

After the end of its service life, the product should be disposed of in accordance with applicable law.

The product is transported in packaging that ensures its preservation.

The thermostat can be transported by any kind of transportation (such as by car, plane, train or ship).

The manufacturing date is indicated on the back of the device, and there is no expiration date.

If you have any questions regarding this device, please contact the Service Center at the phone number provided in the Warranty Terms section.

terneo sneg
SnG.F3.03.6_2404

EMC Directive 2014/30/EU
Low Voltage Directive 2014/35/EU

Manufacturer and vendor: DS ELECTRONICS, LTD
Ukraine, 04136, Kyiv region, Kyiv, 1–3 Pivnichno-Syretska str.
Sales Department: +38 (091) 481-91-81, support@dse.com.ua
www.ds-electronics.company, instagram @terneo_official