ESCO™ DR-203

Registrátor teploty s tiskárnou,
bezdrátový přenos mezi čidly a kabinou

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1. FEATURES

The DR-203 recorder is designed to monitor temperature, during transport of goods and their storage in truck or car refrigerators, cold chain and product stores. The thermograph has been designed and manufactured in accordance with the applicable European standards for the transport and storage of food products. Thanks to it, food companies and carriers can monitor, archive and document the temperature at every stage of the food supply and storage chain. The device meets the requirements of
the European Union Directive 92/1/EWG and the European Commission Regulation no. 37/2005. The recorder also meets the standards PN-EN 12830:2002 and PN-EN 13485:2002. The set includes a manufacturer calibration certificate. A calibration certificate in accordance with EN ISO/IEC 17025 is available at an additional cost.

2. DESCRIPTION OF FUNCTIONING

The recorder is made in a small, ergonomic housing with a modern graphical display and a built-in thermal printer. It is powered by a built-in battery that allows you to work without a charger for 48 hours. Thanks to these features and wireless communication with measurement sensors, the device is fully mobile and comfortable in everyday use. The set includes a car holder for mounting the device in the driver's cabin and a car charger.
The recorder has 4 temperature measurement channels and 4 signaling channels for door opening by the 1400mAh (removable) battery with power supply from vehicle installation 12...24V DC ±10%(battery life minimum one year). Each wireless sensor has a built-in temperature probe and the ability to connect the door open sensor. For each wireless sensor, you can also connect a one additional temperature probe via a 10mb cable sensor (Cable sensor DR203). As a result, the wireless sensor can, for example, be mounted directly in the refrigeration chamber and measure the ambient temperature and, in addition, the second temperature can be measured by a cable probe inserted into the refrigerator compartment or another fridge. After connecting the door limit sensor, each chamber door open and close operate can be signaled and recorded. Sensors are designed to work in hard environmental conditions (low temperatures, high humidity) with IP-65 protection. Cable probes with stainless steel measuring tips allow direct food contact.
DR-203 is designed to monitor and record temperature. Built-in non-volatile memory allows you to record 125,000 measurements points (memory: 3 years at the memorization frequency of 15 minutes). The interval for saving data to the memory can be set in the range from 1 min to 24 hours. When the memory is full, the recorder works in a loop, the oldest samples are overwritten by new measurements points.
The recorder can work in one of two modes:
- continuous registration
- registration of deliveries (only during the course)

In the first mode, the device records the measurements all the time and can save data even after switching off the recorder (if the Auto-OFF parameter set = NO) or loss of communication with radio sensors. It is possible thanks to the sensor's cache memory (1000 measurements points), which saves the data to it's own memory and sends it after regaining communication with the recorder.
In the second case, the registration data process is switched on and off with the every start and stop button operate, which simultaneously marks the start and end of the course.
During operation, the recorder indicates the current temperature of the sensors, time and alarm thresholds messages. After pressing the info button, you can display the state of the sensors. The built-in menu allows for a wide configuration of the device:
- temperature alarm thresholds for each sensor
- sound signaling of alarms
- entering the names of sensors and user descriptions in the header and footer of the print report by built in printer
- choosing a language, setting the date, time and time zone
- selection of the registration method and it's parameters
- bluetooth communication settings

The parameters menu is divided into two groups:
- basic for the driver
- advanced for the service department

Access to the service department menu can be password protected. After entering the password, the memory data can be deleted and all parameters settings can be restored to the factory settings.

3. TECHNICAL DATA

Measurement channels:	4 temperature channels 4 signal door channels (normally closed or open)	
Connection with sensors:	wireless radio communication 868MHz range up to 100m in open space (standard antenna) range up to 200m in open space (additional optional antenna)	
Measurement range:	-50,0...+99,9°C	
Measurement accuracy:	±0,3°C in the range: -20...+50°C: , in the remaining ±0,5°C	
Data storage:	125 000 measuring points wireless sensor memory: 1000 measuring points	
Freq. data registration:	1min...24hours	
Data at the freq. of 15 minutes:	3 years, non-volatile memory	
Functions:	printout of current reports printout of delivery reports printout of historical reports continuous registration or courses copying data to portable USB media cooperation with a smartphone (Bluetooth) sending data to the server SMS notification PDF reports by e-mail GPS location automatic change of summer time, time zones temperature and door opening alarms sound signaling editing user data on the printout password to access the service menu restoring factory settings, deleting data	
Communication interface:	USB 2.0 micro type B, optional: Bluetooth 4.0 class 2	
Display:	graphic OLED with backlight	
Printer:	thermal, printing speed 80 mm/s, thermal paper with a roll width of 57 mm, a roll with a diameter of 35 mm	
Power consumption:	during registration of 40mA, while printing to 3A	
Application data:	**Recorder DR-203:**	**Wireless sensor:**
Degree and protection class, working conditions:	IP-30, housing for assembly in the driver's cabin, -20...50°C	IP-65, hermetic housing -50...99.9°C
Power supply:	1400mAh battery removable power supply 12...24V DC ±10% from vehicle installation or attached car charger work without charger up to 48h	3.6V LS14500 battery 2600mAh size AA (R6) or A (R23) replacement battery lifetime min. 1 year
Dimensions and weight:	Xxx	Xxx
Menu and print language:	Polish, English, German, French, Italian, Spanish, Czech, Slovak, Croatian, Romanian, Russian, Ukrainian	
Compatibility:	EU Directives: 2014/30/EC ; 2014/35/EC; 2014/53/EU; 92/1/EU Norms: EN-61326-1:2013; EN-61326-2-1:2013; EN-61010-1:2010; EN-301489-1 V1.9.2:2011; EN-12830:1999; EN 13486:2002	

4. SET CONTAINS.

- DR-203 temperature recorder
- wireless sensor with built-in temperature probe and the possibility of connecting a second temperature probe on the cable and a door opening sensor
- instruction manual /warranty card
- thermal paper roll (width 57 mm, diameter 30 mm)
- universal car charger for 12V/24V cigarette lighter
- car holder for mounting the recorder in the cabin

5. INSTALLATION DESCRIPTION.

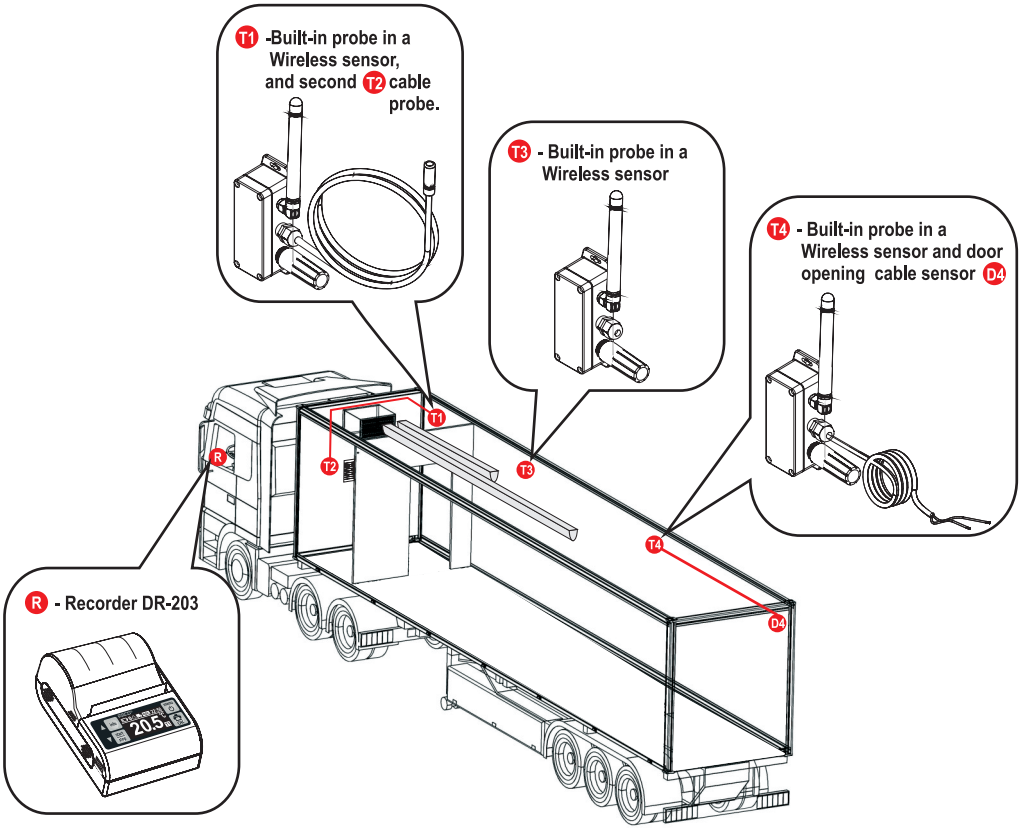
5.1 SAFETY RULES.

Please read the instruction manual carefully before installation.
Any damage caused by not following these instructions causes the warranty/guarantee to be lost! In the event of any material losses, the manufacturer bears no responsibility! In the case of damage to property caused by improper use of the device, the manufacturer bears no responsibility!

Dear customer, the following safety rules apply to health protection describe the correct use of the product and instructions for use.

→ For safety reasons, rebuilding or modification of the product isn't allowed
→ Repairs may only be carried out by the manufacturer or specialized workshops
→ The recorder and charger can be operated only in dry interiors. The devices can not be dampened or wet. Otherwise there is a risk of failure
→ Don't use the charger unattended. Despite the built-in safety system, problems can not be ruled out when charging the battery
→ When the device isn't used for a long time, remove the battery from the recorder and disconnect the charger from the power source. Then store the battery and charger in a clean and dry place. Please remember that the car charger draws energy even when there is no device connected to it. When not in use, disconnect it to avoid discharging the battery
→ A lithium-ion battery was used to power the recorder. The battery can not be dampened or wet. Protect the battery from heat and direct sunlight. Do not short circuit the battery electrically or throw it in a fire. There is a danger of explosion and fire!
→ Charge the batteries at least once every 3 months. Otherwise, the battery life will be shortened
→ The 3.6V lithium-thylium battery was used to power the sensor. Do not short circuit the battery electrically or throw it in a fire. There is a danger of explosion and fire!
→ Always insert the battery in accordance with the polarity (plus/+ and minus/-) given on the battery and sensor board
→ The recorder is maintenance-free, never dismantle it yourself (except when inserting/removing the battery during storage)
→ Use soft, clean and dry material for cleaning
→ Data security: before any changes to the configuration of parameters in the service menu, you must back up the data to an external portable data memory. The manufacturer isn't responsible for data loss, caused by incorrect settings or improper use. The producer also doesn't accept claims regarding data loss or consequential damages of the device
→ The recorder should work in conditions of ambient temperature in the range from -20°C to 50°C and relative humidity in the range from 10% to 90%
→ The holder with the recorder can be mounted on the windshield only when it does not cover the driver's view. When mounting the holder, choose a place so that the handle does not pose a threat also during a road incident
→ Don't mount the recorder within the range of work of the airbags.

Example of installation and arrangement of measuring sensors:



Thanks to the built-in thermal printer, you can document the temperature registration process during transport and provide a report for the recipient of goods or control services. DR-203 allows you to print three types of report:
- printout of current temperature measurement readings
- report on the last delivery of the goods
- historical report from any period of time

The built-in USB port allows you to download data from the recorder's memory to a pendrive. In addition, the recorder can be equipped with a Bluetooth interface for communication with mobile devices. Free application for mobile devices, allows for easy operation of the device from the smartphone screen. The application allows you to monitor temperature, signal alarms, implement courses, send SMS notifications and send PDF reports to e-mail. It also gives the possibility of sending information about the GPS location and measurement data to a remote server, called "cloud" www.escomonitor.com

Thanks to this, through the web browser, it is possible to monitor and manage the fleet of vehicles. Cloud allows you to view the temperature, location of vehicles and their routes, temperature alarm thresholds and automatic generation of PDF reports by e-mail and sending SMS notifications.

5.2 UTILIZATION

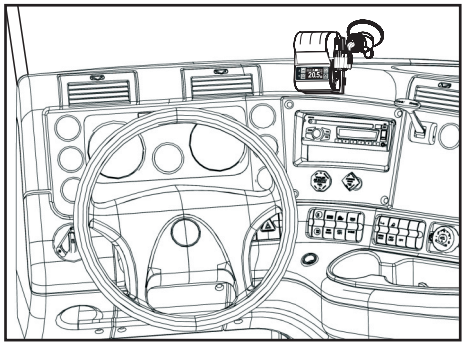
Dispose of the product at the end of its operation in accordance with applicable legal regulations. In accordance with European Directive 2002/96/WE and the Act on Waste Electrical and Electronic Equipment, this label indicates the ban on the placement of used electronic equipment together with other household waste. Return the worn device to the appropriate storage point, or send it to us, because dangerous components in the device may be a threat to the environment.

Li-ion Batteries and accumulators containing harmful substances. Used batteries and accumulators can be taken away free of charge to the appropriate storage point, to us or wherever batteries and accumulators are sold.

Thanks to this, you meet legal requirements and contribute to the protection of the environment!

5.3 INSTALLATION AND CONNECTION OF THE RECORDER.

The recorder has been designed for use in the driver's cab. The kit includes a car holder for mounting on the front or side window of the car. When mounting the bracket, select the appropriate mounting location, following the instructions below:

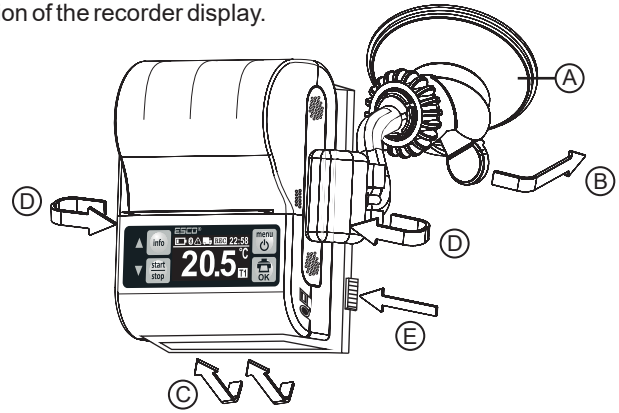


- do not cover the driver's field of vision
- do not mount the set within the range of the operation of the airbags
- do not attach the set too close or opposite the head so that it doesn't pose a threat during a road incident

ASSEMBLY:

Press the suction cup (A) in the designated area, to the front or side window of the car, making sure that the suction cup and glass are clean, without any traces of water or other contaminants. Then move the locking lever (B) towards the glass.

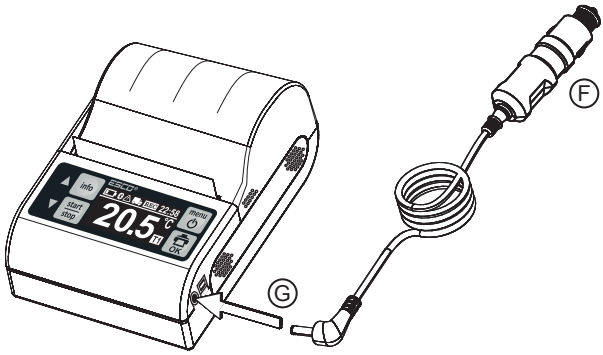
After mounting the bracket on the glass, unlock the lower support (C) and place the recorder between the two jaws (D) of the bracket. Then snap the DR-203 with the jaws so that it is rigidly placed and that it does not slide out while driving. Use the two knobs to adjust the viewing angle, position and direction of the recorder display.



Turn the knobs so that the handle doesn't unlock and doesn't move while driving. After some time of use, re-tighten the knobs and tighten the clamping jaws and make sure that the recorder is properly mounted.

At any time, the recorder can be removed from the holder by releasing the (E) unlocking button.

CONNECTION:
The kit includes a universal car charger, connected to the cigarette lighter socket. The charger can be connected to the cigarette lighter socket, both 12V and 24V.

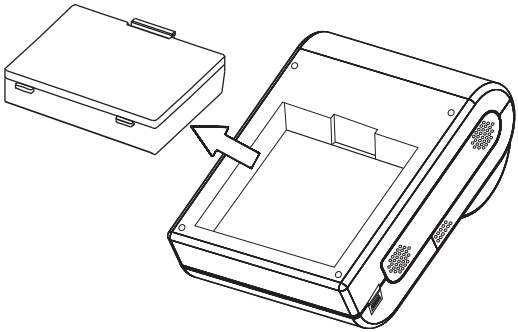


First insert the car charger (F) into the cigarette lighter socket. The charger power LED will light up. Then insert the miniature round plug into the power socket (G) on the right side of the recorder. The device is ready for work. To turn on the recorder press button menu for 3 seconds.

If the charger is not connected, the battery symbol on the display flashes.
If the charger is connected, the battery symbol in the display does not flash.The first charging of the battery recorder should last for a minimum of 3 hours. The battery symbol informs about the state of charge of the recorder. The device should not be completely discharged the battery life may be reduced.

It is forbidden to connect chargers, phones and other mobile devices to the micro USB socket on the left side of the DR-203 recorder!
This socket is intended only for transferring data to a USB flash drive (pendrive)

BATTERY
When the device is not used for a long time, remove the battery from the recorder and disconnect the charger from the power source. To remove the battery, turn the recorder to the other side. Press the latch in the middle of the case and remove the battery from the device. Keep the battery and charger in a clean and dry place.



Read the safety rules for battery and car charger in point 5.1

6. INSTALLATION AND CONNECTION OF SENSORS.

DESCRIPTION:

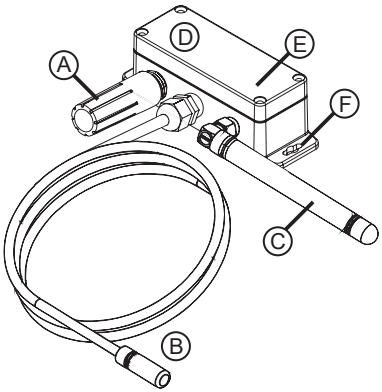
The recorder has 4 temperature measurement channels and 4 signaling channels for door opening operation. Temperature sensors are connected to the recorder wirelessly. Each wireless sensor has a built-in temperature probe. Additionally, it has the possibility of connecting the door opening signaling sensor and the second temperature probe on

CONSTRUCTION:

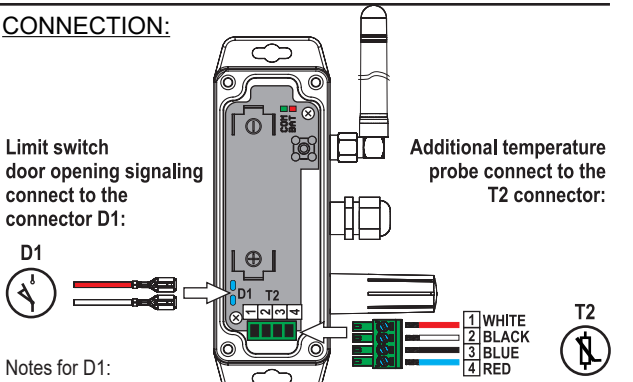
- (A) built-in temperature sensor
- (B) additional temperature probe on a cable with a length of 10m
- (C) radio antenna
- (D) hermetic housing with room for battery and wire connectors
- (E) signaling diodes on the board:

COM (green): radio communication
BAT(red): low battery

- (F) mounting brackets



CONNECTION:



Notes for D1:
- polarity of wires does not matter
- female connectors 2.8 x 0.8 mm
- use a two-core cable with a cross-section of min. 0,5 mm2 and length up to 30m

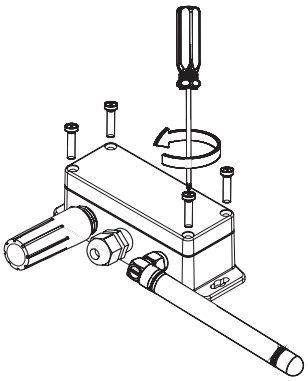
Notes for T2:
- polarity is important
- sensor cable with a length of 10mb extension allowed up to 20mb using a cable with screen and 26AWG section

SIGNALING OF DIODES:

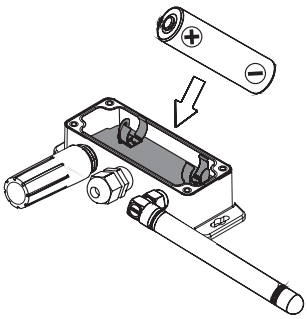
COM (green)	BAT (red)
- blinks once at startup after inserting the battery	- blinks once at startup after inserting the battery
- every 60 sec. blinks once (communication OK)	- every 60 sec. blinks once (low battery voltage)
- every 60 sec. blinks twice (communication lost)	

BATTERY REPLACEMENT (if the red LED flashes every 60 sec.):

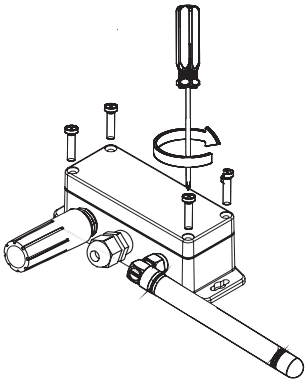
(1) unscrew 4 screws and remove the housing cover

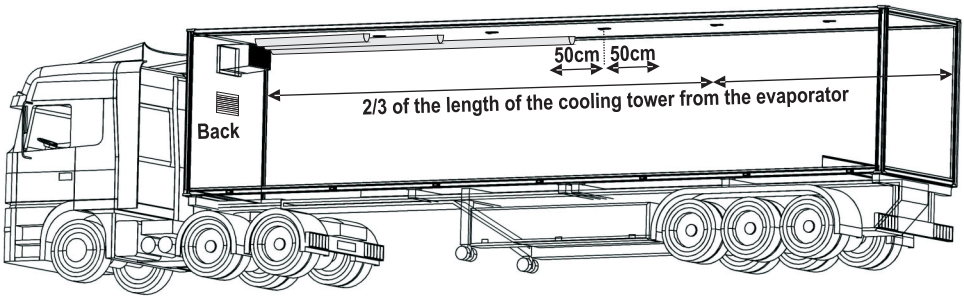


(2) mount a new battery in the holder, paying attention to the correct one polarity (the negative pole is on the side of the antenna)



(3) screw in again, solidly 4 screws on the housing cover





ASSEMBLY AND DISTRIBUTION OF SENSORS:

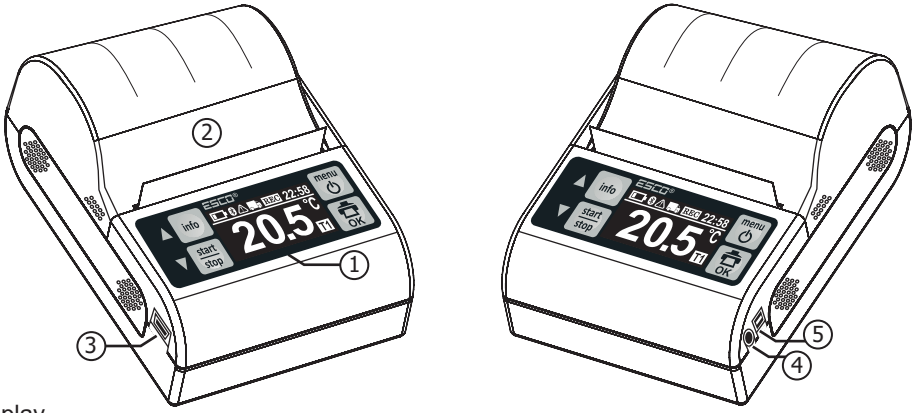
Depending on the construction and function of the vehicle, the type of installation is selected (for example: wireless sensors with built-in temperature probes or additionally temperature probes connected on the cable), number and location of temperature measurement points and logic signals from the door. This is a very important aspect regarding reliable temperature monitoring during transport and food storage. According to the guidelines of GDP (Good Distribution Practice)
and the HACCP system, it is necessary to identify the threats of too high or low temperatures that may break the so-called cold chain and locate critical control points, their necessary number and critical conditions that will allow later setting of alarm thresholds in the recorder menu. The location of the measurement sensors should be preceded by the mapping of the cooling chamber with the determination of the temperature distribution, checking the effectiveness of the cold store and the final assessment of the risk analysis, which will allow the optimal selection of their location and number. The following assembly notes should be taken into consideration when analyzing and making decisions:

sensors are adapted to work in hard environment conditions (low temperatures, high humidity)
→ with IP-65 enclosure protection
to keep the housing tight, it is forbidden to make additional mounting holes. It is also important to firmly tighten the housing cover, and the cables of additional sensors, lead out of the
→ housing
through a cable gland
→ measuring tips of additional cable probes are made of stainless steel and allow direct contact with food
the standard range of wireless sensors in open terrain is 100m. When installing the sensor inside an insulated cold room with walls and partitions made of metal, which constitute a screen, for a radio signal, the propagation of radio waves is very limited and the distance for propercommunication between the recorder and the sensors decreases. This is not a problem
→ when used in delivery trucks and trucks with integrated refrigeration. However, when used in vehicles with a trailer or trailer, an optional long-range antenna must be used
→ sensors should be installed in ventilated areas, not exposed to mechanical damage
→ when loading or unloading goods
sensors should be installed min. 50 cm from the cold room lighting sources
it is recommended to install min. 1 temperature sensor for each refrigeration chamber, in the
→ upper part of the room, in place of 2/3 of the evaporator chamber length and additionally a temperature sensor (optional cable probe) on the return of air
→ attach the wireless sensor to the wall in the holes of the mounting brackets using two screws or screws with a diameter of 3mm
→ for mobile cold rooms, refrigerators and other places exposed to additional mechanical damage, it is recommended to use temperature probes on the cable
→ the cable probe should be connected to the T2 connector in the wireless sensor according to color markings given in the description "CONNECTION" in point 5.4
the cable probe is a 10m cable. It is allowed to extend the cable to 20mb using a three-core cable with a screen with a minimum 26AWG (0.14 mm2). The wires and the screen should be

→ to signal the opening of the chamber door, connect to the input D1 of the wireless sensor, a two- core cable with a thickness of min. 0.5mm2, the limit sensor should be installed in the door. When the door is opened, the limit switch contacts close or open and sends the status change
signal to the recorder. The door alarm configuration is available in the service menu. The door limit switch is available as an accessory. The sensor cables do not require polarity of the wires

The signaling of door opening is to consist only in shorting or opening the digital input circuit D1, not on transferring voltage! When using this input for signaling aggregate operation or defrost cycles, special care should be taken to ensure that no signaling circuit is energized

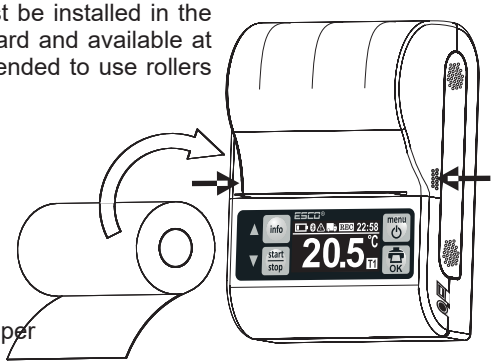
7. RECORDER CONSTRUCTION.



① Display
② printer compartment with space for thermal paper
③ micro USB port for data transfer
④ power socket
⑤ Service socket (not used)

8. INSTALLATION OF PAPER.

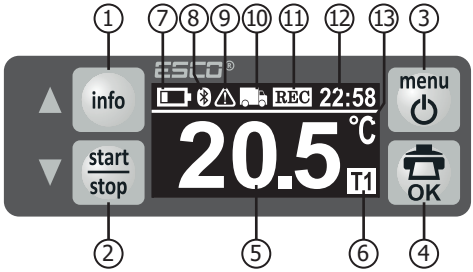
The kit includes a roll of thermal paper that must be installed in the printer. Thermal paper used for printing is standard and available at points of sale with paper products. It is recommended to use rollers with a width of 57 mm and a diameter of 35 mm.



Paper installation method:
1. open the printer cover
(grab in places marked with arrows)
2. place a roll of paper in the printer compartment
(right part of the thermal paper) and pull it out
about 3 cm of paper over serrated printer's knife
3. close the printer door by controlling to make paper
he left the printer correctly
4. tear off the protruding end of the paper using the casing mounted on it
serrated cutting knife

Thermal paper is "single-sided" and must be correctly installed in the printer. If, after starting printing, the printout is invisible, install the paper so that it unwinds from the other side.

9. FRONT PANEL.



① Info button *(UP and more)*

② delivery button (*DOWN and decreasing*)
press 3 sec. to disable/enable registration
(only in the "Delivery" registration mode)

③ menu button (*LEFT and cancel*)
press 3 sec. to turn on/off recorder

④ print button (*RIGHT and accept*)

⑤ the temperature measurement value

⑥ the temperature sensor number

⑦ battery voltage level indicator
flashing: the charger is not connected
lights up: charger connected

⑧ Bluetooth communication indicator
blinking: waiting for connection
lights up: connected

⑨ temperature exceeding alarm
Symbol 1 indicates which door are open

⑩ delivery of goods (the course is on)

⑪ temperature registration started

⑫ current time

⑬ temperature unit

10. CONFIGURATION.

After completing the recorder installation, the device must be configured.
The parameters menu is divided into two groups:
- basic menu for the driver
- advanced menu for the serviceman

10.1. MENU OPERATION.

To start menu configuration press "menu" button. Next using the keyboard buttons, configure the device following the instructions below:

◄ menu — press to cancel the changes and to exit one level up in the menu. While text editing press to move to the editing of previous character.

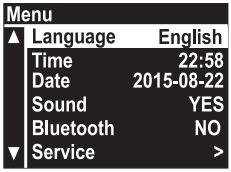
▲ info ▼ start stop — Press to change the parameter values and to switch between the parameters in the menu.

► OK — Press to start editing parameter or to confirm changes, while text editing move to editing next character

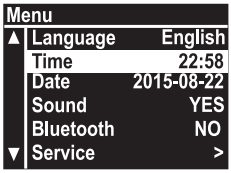
10.2. BASIC MENU.

The basic menu is intended for the driver who will use the device daily. It contains basic settings necessary for convienient use. This menu is not protected by a password.

10.3. SCHEME AND DESCRIPTION OF THE BASIC MENU PARAMETERS.

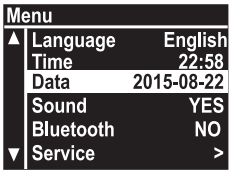


Select the language



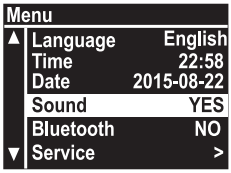
Set the time

⚠ When the recorder has stored data in the memory, the change of back time is blocked to prevent overwriting and loss of data. First, archive the data via USB or Bluetooth, and then delete the memory in the service menu of the recorder. Then you will be able to set a time earlier than the current one.

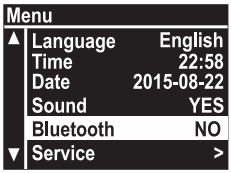


Set the date

⚠ When the recorder has stored data in the memory, the change of back date is blocked to prevent overwriting and loss of data. First, archive the data via USB or Bluetooth, and then delete the memory in the service menu of the recorder. Then you will be able to set a date earlier than the current one.

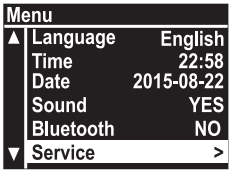


Temperature and door-opening alarms sound signalisation



Bluetooth communication

(parameter is visible only in the devices equipped with Bluetooth)

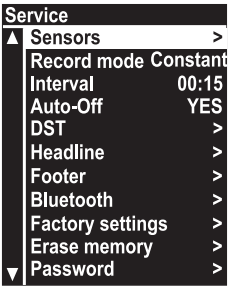


Entering the service menu

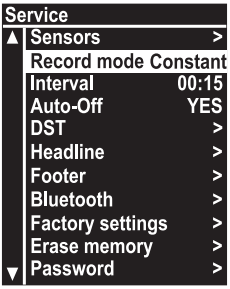
Access to the service menu can be protected by a password.To enter to the service menu you have to give a correct password and press ‘OK.’button.

When password is set to 0000 access to the service menu is unprotected.

10.4. SCHEME AND DESCRIPTION OF SERVICE MENU.



Addition/removal and configuration of sensors (see section 10.5)

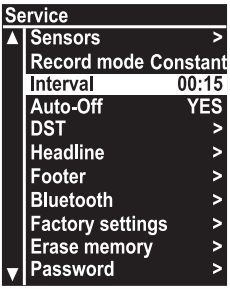


Operation mode of the recorder.

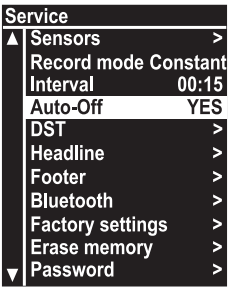
There are two operation modes:

Constant:	Delivery:
- records data continuously - recording is signalled with icon REC - recording the time of load/unload by pressing button start stop - after the load start, drive is signalled with icon - If you want the sensors to save data themselves after turning off the recorder: see section "Auto-OFF"	- records data only during the delivery - delivery and recording process starts/ends manually by pressing start stop button for 3 seconds - delivery and data recording signalled with icons and REC

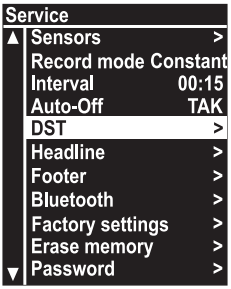
In both operation modes data is saved in a memory with a capacity of 125,000 measurements. If memory is full recorder overwrites the oldest measurements. Sensors have their own memory with a capacity of 1000 measurements. If they lose radio communication with a recorder they save data in their own cache memory (in a loop). After the connection is restored they send overdue data to the recorder.

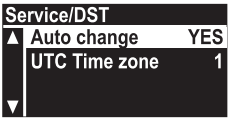


Recording interval(frequency of data saving).
Setting range: 00:01...23:59 min:hour.



Auto-OFF=YES - after turning off the recorder, the sensors go into sleep mode and they do not save the data.
Auto-OFF=NO - after turning off the recorder, the sensors are still saving data in their cache memory. Sensor's cache memory can hold 1000 measurements. When cache memory is full, sensor overwrites the oldest data with the newest measurements.
After turning on the recorder and restoring the communication, the sensors send overdue data to the recorder.

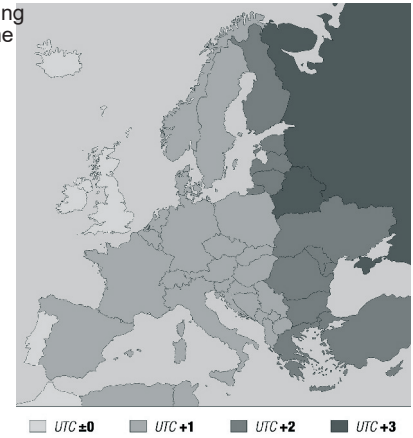


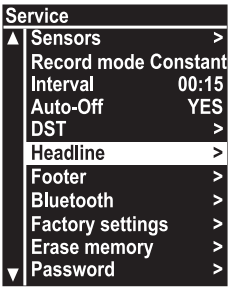


Daylight saving time and time zone setting

Automatic change of time from winter to summer and vice versa.

Set the UTC time zone for your area (see map).

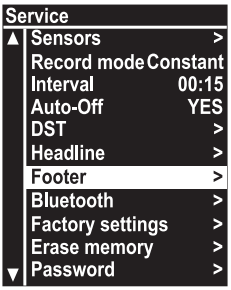




Header text

Headline - text on the begining of each printout in which user can place information, e.g company name and adress, vehicle registration number. Maximum 4 lines of text, 19 characters each line. Depending on the chosen language, you can use entire alphabet. Starting with lowercase letters, then capital letters, numbers and finally special characters.

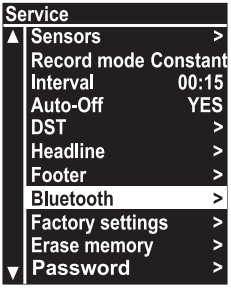
Use **up/down** button to chose a character.
Press **OK** to move to next character edition.
Press **menu** to back to edition of previous character.
When you finish press **OK** for 3 seconds to save data.

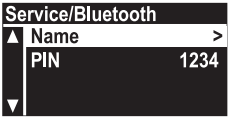


Footer text

Footer - text at the bottom of each printout, under the place for a signature, in which you can place additional user information, e.g Driver's first and last name, advertising slogan or carrier's website adress. Maximum 4 lines of text, 19 characters each line. Depending on the chosen language, you can use entire alphabet. Starting with lowercase letters, then capital letters, numbers and finally special characters.

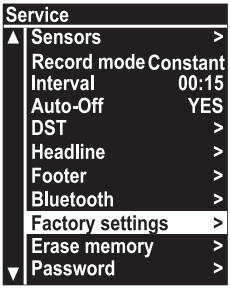
Use **up/down** button to chose a character.
Press **OK** to move to next character edition.
Press **menu** to back to edition of previous character.
When you finish press **OK** for 3 seconds to save data.



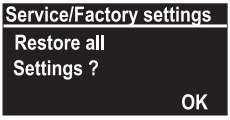


Bluetooth configuration (parametr is visible only in the devices with Bluetooth module installed).

Name of the recorder seen in a network and PIN code necessary to pair with a mobile device.
Default PIN code is: 1234. It can be edited by the user.

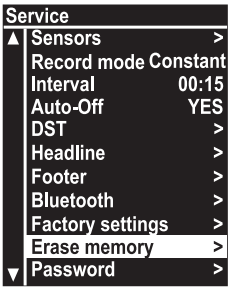


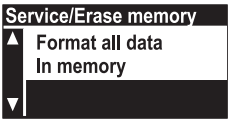
Default settings restoration.
To restore device to the default settings press **OK**, to cancel press **menu** button.



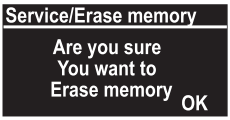
After pressing **OK** a message, as seen on left, will appear.
To restore device to the default settings press **OK**, to cancel press **menu** button.

After pressing **OK** the process of restoring will start. Settings will be restored to default. Data memory, printout counter and time/date settings will be saved.

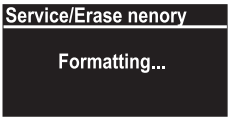




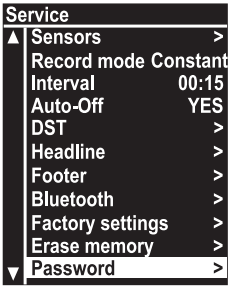
Memory removal.
To remove all memory data press **OK** , to cancel press **menu** button.



After pressing **OK** a message, as seen on left, will appear. To remove all memory data press **OK** to cancel process press **menu** button.



After pressing **OK** the process of data removal will start. Data will be lost irrevocably.



Service menu access password
When password is set to 0000 access to service menu is unlocked and does not require a password to enter to the menu.

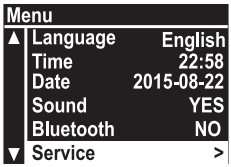
Data security: before any change to the parameters in the service menu, please make a safety backup of the data on an external data carrier. Producer is not responsible for data loss caused with a incorrect setting in the service menu, improper use of the device and accidential data removal by an unauthorized persons. Does not accept claims regarding data loss or consequential damages.
Protecting access to the service menu with an unique password is highly recommended.

10.5. ADDING, REMOVING AND CONFIGURING OF SENSORS.

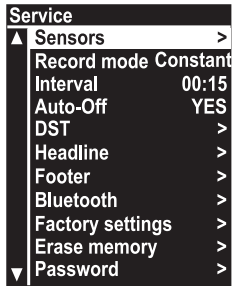
ADDING SENSORS:

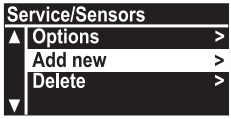
Recorder has 4 measuring channels. It can operate with 4 temperature sensors,no matter they are wireless sensors or additional cable probes. You can pair the device with 4 independent wireless
sensors or or e.g. 2 wireless sensors and 2 additional cable probes.. Before pairing the sensors with the recorder, run the sensors and connect them accordingly to paragraph 5.4 then follow the

Sensor will not be visible in radio network, if it ever has been previously paired with another recorder. To pair the sensor with a new device, please remove the battery out of the sensor

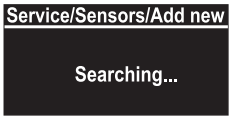


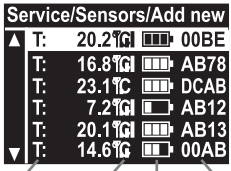
Run user's menu and go to the service menu. If the access to the menu is protected - enter a password and confirm pressing 'OK.'.





Go to 'Sensors' section, then 'Add' and start searching sensors in the network with a button'OK' Searching lasts around 1 minute and it is signalled by following message:





Measurement Range Battery Adress

After completing the recorder will display a list of all available sensors. Example on the left.

Check the sensor's number and choose the one you want to add by pressing **OK**.

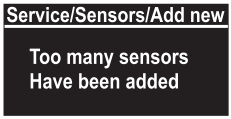
If it is wireless sensor with data stored in the cache memory, the following message will appear:

Confirm with 'OK'or cancel the download of uneccesaryprevious data with '**menu**' button.

After adding a sensor the device will go back to the list of sensors. Add another sensor and follow the process as above or exit the add list using 'menu' button.

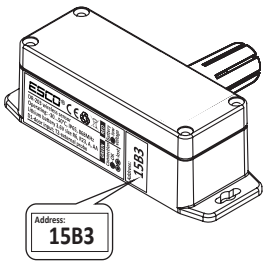
If the sensor you would like to add is not on the list please check the battery, diod signalisation, cable probe connection or possibly reset the sensor by removing a battery for 3 minutes. Try to restart searching.

After adding 4 sensors, following message will appear:



Exit sensor adding function with '**menu'** button**.**

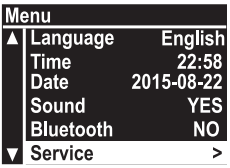
Sensor's adress:



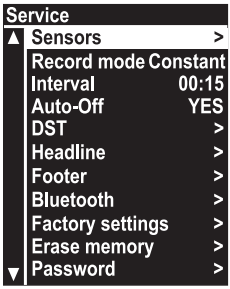
Each wireless sensor has an unique identification adress, which can be found on the label.
Cable probe has a number similar to wireless sensor to which it's connected. (First three numbers are the same, last one is higher by one value .

SENSOR CONFIGURATING:

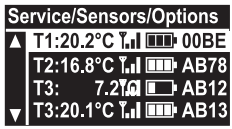
After completing adding of the sensors you have to configure them. Each sensor can be set with:
- measurement calibration
- two temperature alarm levelss (MIN and MAX)
- name
- door opening alarm



Open the user's menu and go to service menu. If the access is protected enter the password and confirm with "OK."button.

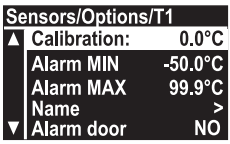


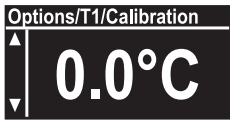
Then go to section ' Sensors' take option 'Edition' and press 'OK...'



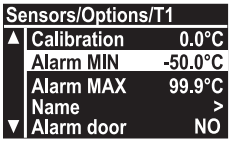
List of connected sensors will appear. Chose a sensor to configure and press 'OK..'.

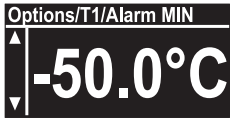
All sensor's parameters will be displayed.
Chose a parameter to configure and press "OK.'.



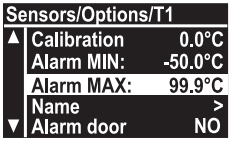


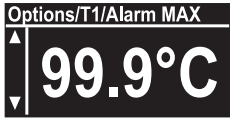
Calibration - when the value of measured temperature is different than real value you can calibrate the temperature sensor. Parameter value is added to the measured value.
- Value range: -10.0...+10.0°C



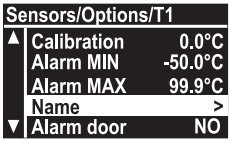


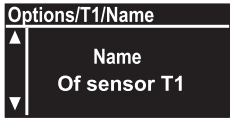
Alarm MIN - minimal temperature level. If the temperature reaches this level, the recorder will activate buzz alarm and an alarm will be displayed. Alarms will be saved in the memory and marked on the printout. Setting range: -





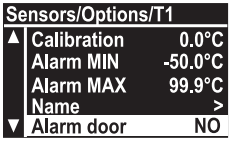
Alarm MAX - maximum temperature level. If the temperature reaches this level, the recorder will activate buzz alarm and an alarm will be displayed.Alarms will be saved in the memory and marked on the printout. Setting range: -50.0...+99.9°C

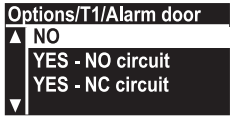




Name - user's description e.g. Rear sensor, fridge etc.

⚠ Using 'up/down' - chose a character
Using 'OK.' - edit next character.
Using 'Menu' edit previous character
Save description by pressing 'OK..' for 3 seconds

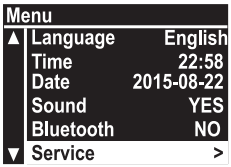




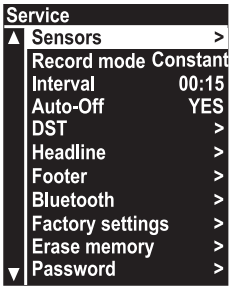
Door alarm -wireless sensor is equipped with door-opening sensor. Connect door sensor to logical input D1 with cables as in paragraph 5.4 and chose a circuit type:
- NO (normally opened) alarm after closing D1
-NC (normally closed) alarm after opening D1
NO - door sensor deactivated

DELETE SENSOR:

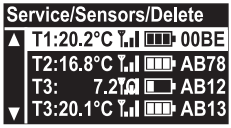
At the service menu level you can remove a sensor:



Open user's menu and go to the service menu. If menu is protected, enter the password and confirm using 'OK.'



Go to section 'Sensors' > Delete> OK.



The list of connected sensors will appear. Chose a sensor to delete using 'OK.'
A message will appear:

Confirm using 'OK.' or cancel deleting using 'menu' button.
After removing the sensor, you will be moved back to the list. Chose another sensor and follow the above instruction or exit deleting function using 'menu' button.

⚠ Data security: before any change to the parameters in the service menu, please make a safety backup of the data on an external data carrier. Producer is not responsible for data loss caused with a incorrect setting in the service menu, improper use of the device and accidential data removal by an unauthorized persons. Does not accept claims regarding data loss or consequential damages.
Protecting access to the service menu with an unique password is highly recommended.

11. PRINTING.

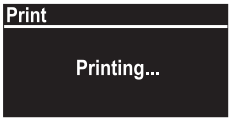
Due to built-in thermal printer you can document the process of temperature recording and have an evidence for the receivers or control services. You can print 3 types of printout reports:
- Present values (current measurements printout)
- Delivery report
- Historical report (report from a given time)

Data is printed chronologically, from the newest to the oldest measurements.

Current measurements printout

To print current measurements press OK .

Printing window will apeear (as on the left).
Choose option: **"Present values"** and press **OK.**
Recorder will start printing and display a message:



Delivery report.

If you are using a ‘delivery’ option (paragraph 12), you can print a last delivery report, without a need of entering a specific date and time.

To print a last delivery report press OK .

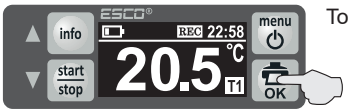
Printing window will apeear (as on the left).
Choose option: **"Delivery report"** and press **OK.**
Recorder will start printing and display a message:

If the delivery is still in progress (backlited), a report from the moment of load to the moment of printout report will be printed After completing the delivery a report from the load to the unload will be printed.

⚠ If the message ‘no data’ appears, this means there is no data of the delivery in the memory. To cancel the printing press ‘OK.’

Historical report

In this option recorder is printing data from a given time.



To print a historical report press OK .

Printing window will appear (as on the left).
Choose option: ‘Historical report’ and press ‘OK.’

Set start date using **up/down** buttons and press **OK**

Set start time using **up/down** buttons and press **OK**

Set end date using **up/down** buttons and press **OK**

Set end time using **up/down** buttons and press **OK**

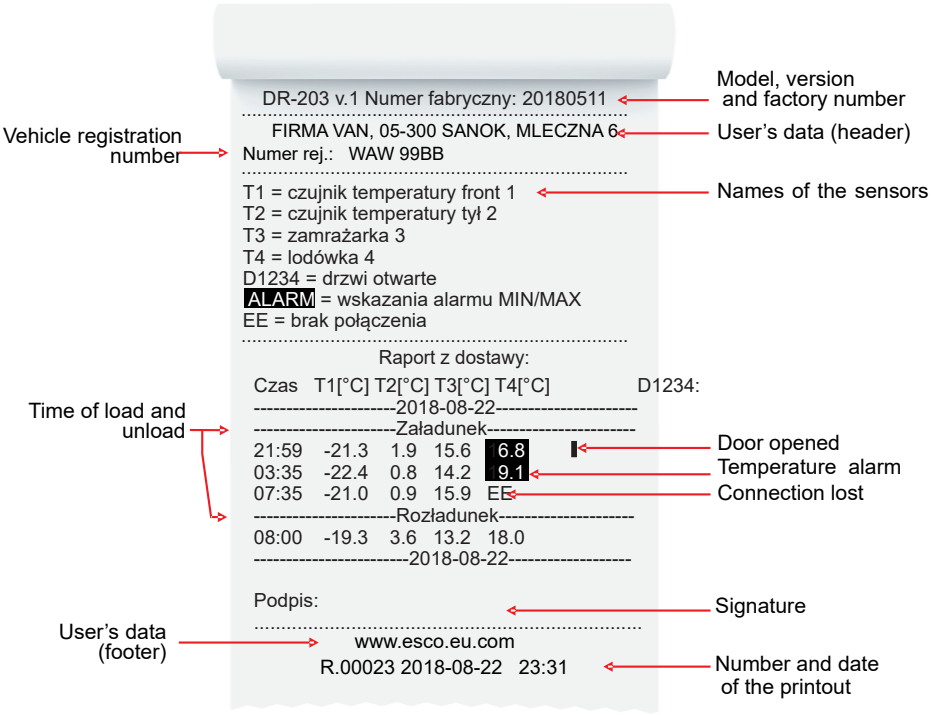
Recorder will start printing and display a message:

⚠ If the message ‘no data’ appears, this means there is no data of the chosen time in the memory. To cancel the printing press ‘OK..’

Measurement data is saved at a fixed interval, and events such as loading / unloading, temperature alarm and door opening are saved as additional cells in memory. Overdue data from sensors, after regaining lost

communication, are added to the recorder's memory. Therefore, when printing, it happens that in one minute several events may occur and the sensor error is overwritten with the correct measurement, with the same time, because it was later downloaded from the sensor's cache memory after recovering the

EXEMPLARY PRINTOUT:

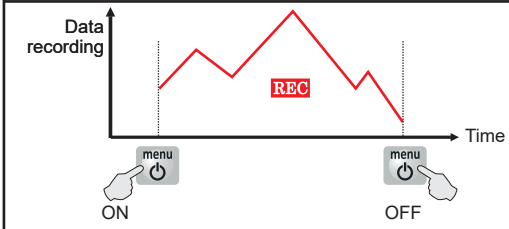


12. RECORD MODES AND DELIVERY FUNCTION.

Recorder operates in one of two recording modes (selection in the service menu), see p.10.4):

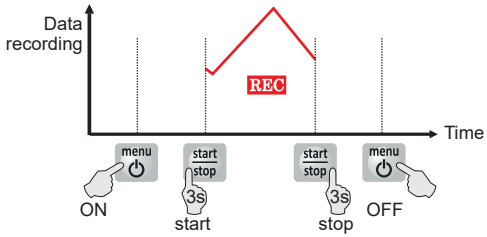
Constant recording:

In this record mode, device after starting, automatically records data and constantly save them There is no possibility to turn off the recording during work. Recording is signalled with icon REC



Delivery recording:

In this mode device does not record data automatically. User himself start and stops the process of data recording by pressing start stop button start/stop for 3 seconds
Recording is signalled with icon REC

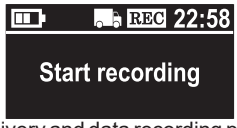


Delivery Function:

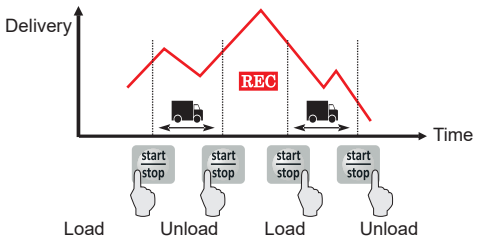
In the continuos mode data are saved constantly and delivery function is additionally used to record the start and end of delivery (Load and Unload) in order to later identification of the course in the printout. start stop
To register the start of delivery, press button
Icon will appear and message will be displayed:

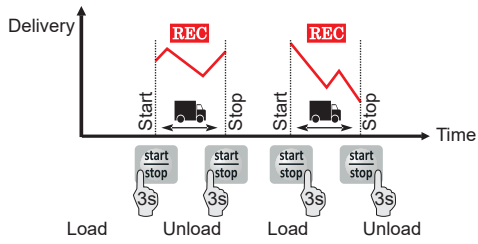
To register the end of the delivery, press start stop
Icon will go out and message will be displayed:

In the delivery mode, the start of recording is at the same time the begining of delivery(Load), and the stop of recording is the moment of the end of delivery(unload).
To start the delivery and start the data recording press 'start' button for 3 seconds start stop
Icons REC and a message will be displayed



To end the delivery and data recording press start stop
And hold the button for 3 seconds
Icons REC will go out and a message will appear:





While recording you can initiate an unlimited number of delivery, thanks to app for the mobile devices you can add additional comments to every load/unload. It allows you to easier identification of dates, type and places

13. TEMPERATURE ALARM.

There is a possibility to set the alarm levels(MIN and MAX) for each temperature sensor (see p. 10.4). Possible temperature setting: -50.0...+99.9°C
By default, the temperature alarm is deactivated because the alarm levels are set at the ends of measuring range.
After changing these settings and exceeding the limit, the recorder will activate sound signalling the icon ⚠ will flash and the alarm message will be

Sound signalling and alarm displaying can be disabled by pressing any button. Occured alarm states will be saved in the recorder's memoryand marked on the printout.
Alarm hysteresis is 1.0°C. For example, if Alarm MIN=10.8°C, it will turn on at 10.8°C, but it will turn off, when the temperature rises to 11.8°C and vice versa if the Alarm MAX=20.2°C, turns on at 20.2°C, but turns off when it drops to 19.2°C

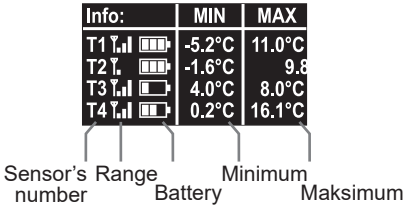
14. DOOR OPENING ALARM.

Wireless sensor is equipped with logical input to which a limit sensor, for signaling door opening ,can be connected. Connecting method is described (see 5.4), and the settings of the type of door opening circuit(NO / NC) are in the service menu (see 10.4)
While opening the door, connectors of limit sensor are opening or closing and they pass a signal of changing the position to the recorder. Recorder will turn on a sound signallisation for a moment

Icon with door number will be displayed (number of the wireless sensor to which the door opening sensor is connected). The event occured will be saved in the recorder's memory and marked on the printout.

15. INFO FUNCTION.

INFO function helps the user to quickly check the status of sensors and emergency situations. After pressin info the button a window will be



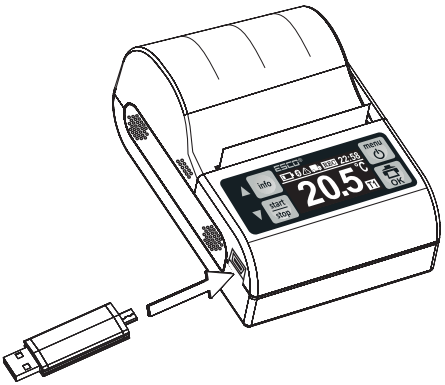
The information window will be displayed for 5 seconds, after which, if alarm states are active, alarm messages will be displayed. Then recorder will return to normal display mode. To quickly return to normal display mode press the **menu** button.

⚠ The MIN and MAX values are extreme values that have occured since the recorder was turned on. This values are for information purposes only and theyare not saved to the memory. (Do not confuse these values with the temperature threshold described in the paragraph 13).

16. USB DATA COPYING.

The built-in USB port allows you to save data from the recorder's memory to an external USB flash drive. Due to its dimensions, the recorder has a USB micro typ B connector. It is the same connector as the USB micro power connector in most mobile devices on the market. Please buy a memory card with a micro USB type connector, available in general sale, or alternatively a carrier with a standard USB connector

① In order to copy data please plug in a USB flash drive with micro connector to the recorder socket



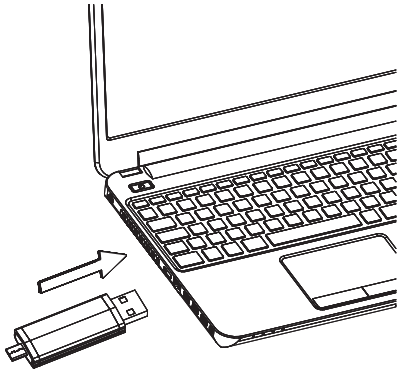
② Recorder will display a message:

Confirm pressing **OK**

③ Recorder will start data copying and a message will be displayed:

④ After completing a message will appear:

⑤ Remove a USB flash drive from the recorder and connect to a USB port on your computer



⑥ Open the disk in Windows Explorer. On the USB disk will be created the main DR-203 folder in which they will be created subfolders with individual ones serial numbers of recorders. In a single subfolder with factory number, TXT files will be saved with data with the date and time of creation.

It is forbidden to connect chargers, phones and other mobile devices to the micro USB socket of the recorder! This jack is intended only for transferring data to a USB stick (pendrive)

⑦ All the data from the recorder's memory will be saved in the TXT file. You can open the file with Excel. We recommend to archive the files on a separate drive.

Number of the record, date, time and measurements

Factory number

Door opened

Temperature alarm

Unload