

Unicont SPb Ltd

Universal digital repeater DR-109

Technical Documentation

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1. General Information

Universal digital repeater DR-109 is intended for indication of digital data NMEA 0183 received through serial interfaces RS-232 or RS-422.

The device provides cyclic display up to three kinds of the data on the built-in LED indicator. The rate of turn value (ROT) can be displayed independent of a general data on the built-in LED bar.

2. Delivery Set

1. Universal digital repeater DR-109	1 piece
2. Bracket for deck-top and overhead mounting	1 piece
3. Plugs MG-16	2 pieces
4. Caps	2 pieces
5. Operation manual	1 piece

3. Performance specifications

Electrical specifications:

Power voltage	9,5..18,0 / 18,0..36,0 VDC
Power consumption	5 W
Protection against reverse polarity of power voltage and short circuit.	
Galvanic isolation from power circuit.	

General specification:

Overall dimensions	206,0 mm × 190,0 mm × 41,5 mm
Storage temperature	-55..+75°C
Working temperature	-25..+55°C
Weight no more than	2 kg

Interfaces specification:

Interface number	2 (RS-232 and RS-422/485)
Maximum baud rate	up to 115200 bps
Propositions:	\$xxDBK, \$xxDBT, \$xxDPT, \$xxHDG, \$xxHDT, \$xxMTW, \$xxMWV, \$xxROT, \$xxRSA, \$xxVBW, \$xxVDR, \$xxVHW, \$xxVTG, \$xxVLM, \$xxVPW, \$xxVWR, \$xxZDA, \$xxZFO, \$xxZTG, \$xxWCV

Display's specification:

LED display for indication current active NMEA 0183 data type.
LED display for unit's of current data type indication.
LED display for indication current value of active NMEA 0183 data type.
LED bar for independent indication rate of turn (ROT).
Built-in dimmer.

4. Device's Installation

DR-109 design provide following types of the device's mounting: wall mounting, panel mounting, deck-top and overhead mounting.

Holes on a back of the case are used for installation on a wall (see Figure 1). Also place plugs in the holes on a bottom of the device's case.

For panel mounting:

- Make rectangular cutout in panel and mounting holes according to the drawing (see Figure 1).

For deck-top or overhead installation it is necessary to execute the following steps:

- Place plugs to the holes on a back of the device's case.
- Attach brackets to the holes on a back of the device's case.
- Make holes for brackets in a mounting place.
- Install device with brackets in the prepared holes.

See Figure 3 for detail information.

Terminal blocks on the PCB provide wires connection from external devices (such as power supply unit, NMEA 0183 data source) to the device.

Opposite to each terminal block input's function and the names of contacts is written (see Figure 2).

NMEA 0183 data source using serial interface RS-232 for data transmission is connected to the terminal "RS-232".

NMEA 0183 data source using serial interface RS-422/485 for data transmission is connected to the terminal "RS-422".

Warning! NMEA 0183 data source connection probably only to one of two interfaces of the device (RS-232 or RS-422/485).

Power source 18..36 VDC is connected to the terminal block "POWER" Do not care about power voltage polarity.

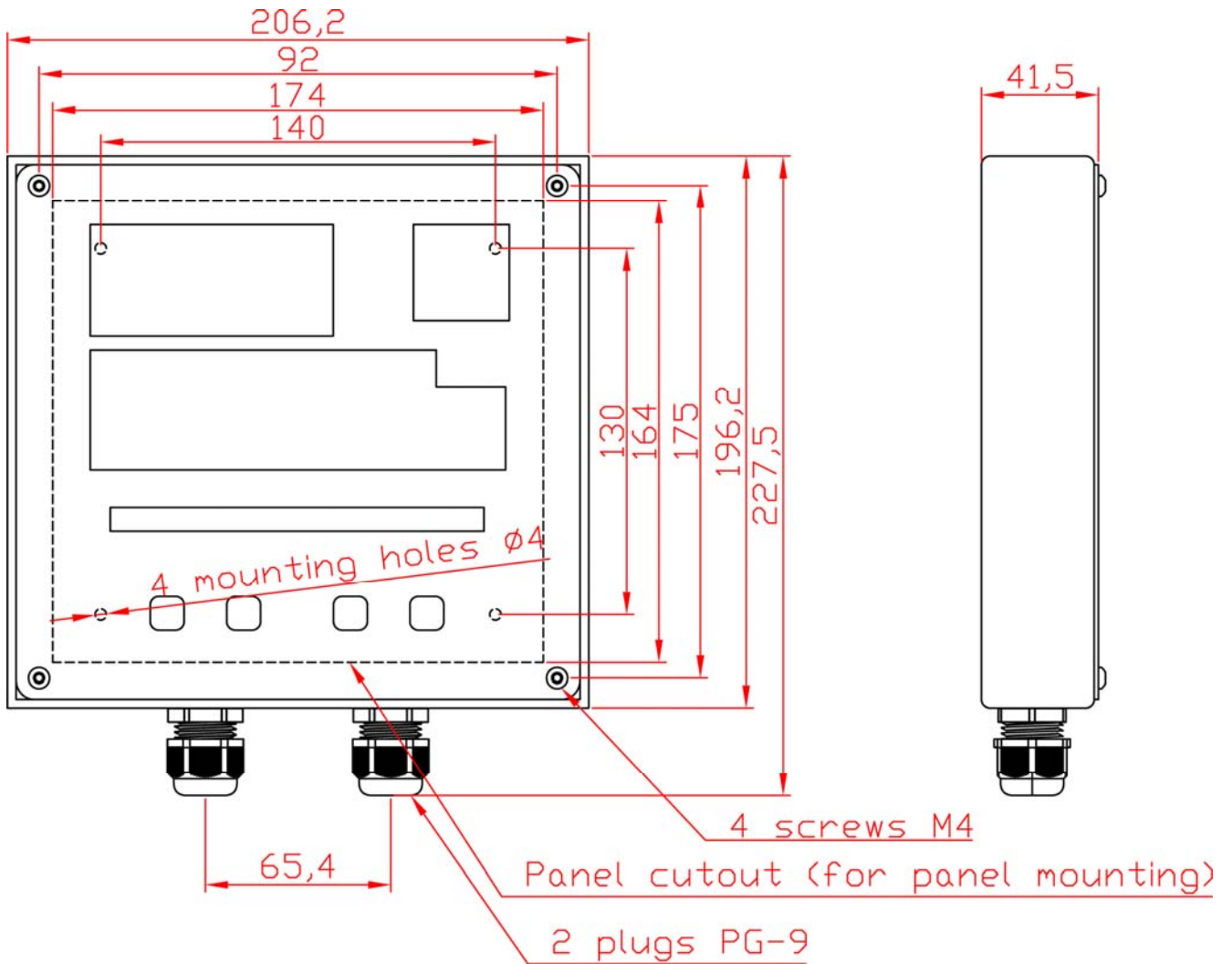


Figure 1 DR-109 dimension drawing.

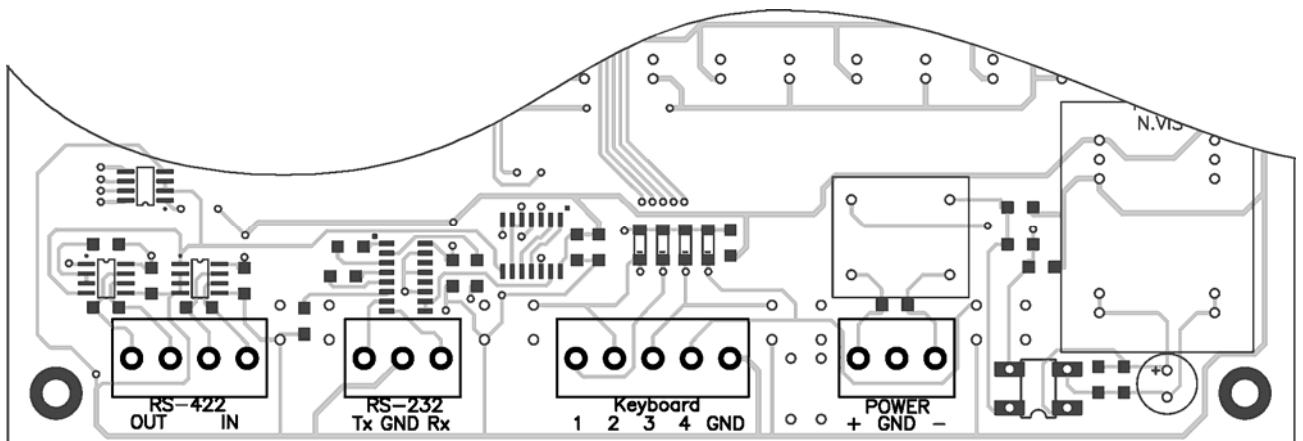


Figure 2 Terminal blocks arrangement on DR-109 PCB.

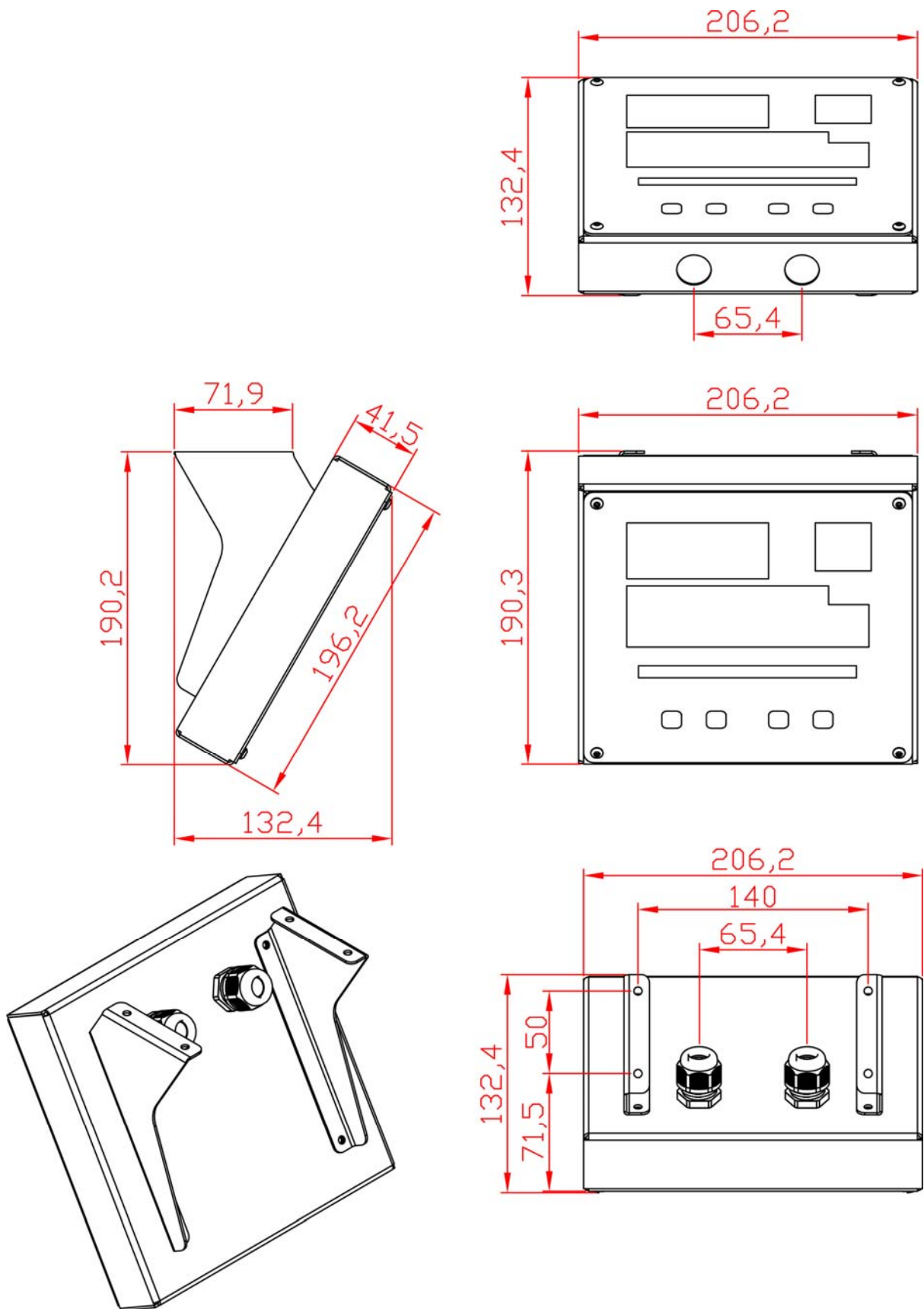


Figure 3 Drawing of the device's installation on the brackets.

5. Device Operation

Device DR-109 receives NMEA 0183 data through one of two serial interfaces RS-232 and RS-422/485. Extracted values (according with user settings) from received data displays on built-in LED display.

Device receives NMEA 0183 data with rate of turn value (ROT) independently of user settings and displays it on built-in LED bar.

If user chooses indication more than on one type of NMEA message, then received data displays cyclically with user's interval.

Also DR-109 provides amplification and duplication NMEA 0183 data. Received data from the port's input are duplicated to a port's output.

The output voltage for the phase and reference channels may be selected by two methods:

6. Device Tuning (Functions Description)

Default Mode

In default mode the device displays received data on built-in LED display.

If DR-109 receives no data, or long interruption of data reception occurred, then strings "----" is displayed on the bottom LED indicator. Normal indication will resumed after data reception.

In default mode device's keys provides following functions:

SEL	Switching to the next type of NMEA data (if user had selected indication more than one NMEA message).
▲ (Dimmer)	Increasing display's brightness
▼ (Dimmer)	Decreasing display's brightness
SET (Menu)	Long pressing provides switching to the device's main menu

Main Menu Mode

User can choose one of two menu items in main menu: device's adjustment or loading of stored profile. Device displays "MN" on the upper indicator in this mode. Current menu item is displayed on the bottom indicator.

Device's keys provides following functions in this submenu:

SEL	Exit from the main menu (switching to the default mode).
▲ (Dimmer)	Menu item selection.
▼ (Dimmer)	
SET (Menu)	Switching to the selected submenu.

Menu items description:

Hand	Switching to the device's adjustment submenu
Load	Switching to the loading of stored profile submenu

Loading Of Storage Profile Submenu

String "LD" is displayed on the upper LED indicator when device operates in this mode and the selected number of the memory cell with stored profile is displayed on the bottom LED indicator. If device's memory of stored profiles is empty, then device returns to the main menu.

Device's keys provides following functions in this submenu:

SEL	Exit to the main menu.
▲ (Dimmer)	Number of memory cell with stored profile selection.
▼ (Dimmer)	
SET (Menu)	Loading of stored profile from the memory cell.

Warning! Device returns to the default mode at once after loading profile.

Device's adjustment submenu

User can create device's settings profile in this mode and save it in non-volatile memory.

Current item of device's settings is displayed on the upper indicator and the selected value of this item is displayed on the bottom indicator.

Device's keys provides following functions in this submenu:

SEL	Submenu item selection (cyclic switching between all items).
▲ (Dimmer)	Current item's value selection.
▼ (Dimmer)	
SET (Menu)	Saving selected value of the current item.

Warning! When user switch to tuning of receiving NMEA message

When you switch to tuning of receiving NMEA message, system of indication will be changed: number of the message at cyclic switching is displayed on the bottom indicator; and name of the NMEA message is displayed on the upper indicator.

Menu items description:

RS	Input interface selection. Available values: 232 - interface RS-232 422 - interface RS-422/485
BR	Baudrate selection. Available values (kBods): 4.8, 9.6, 19.2, 28.7, 38.4, 56.0, 57.6, 115.2
SBC	Data bits, stop bits and parity selection Available values: 8 1 0 - 8 data bits, 1 stop bit, no parity 8 2 0 - 8 data bits, 2 stop bits, no parity 8 1 1 - 8 data bits, 1 stop bit, even parity 8 1 2 - 8 data bits, 1 stop bit, odd parity
d-1	First displaying NMEA message selection. See. "Tuning of receiving NMEA message"
d-2	Second displaying NMEA message selection. See. "Tuning of receiving NMEA message"
d-3	Third displaying NMEA message selection. See. "Tuning of receiving NMEA message"
BAR	ROT bar's resolution. (degrees per minture per one segment). Available values: 1.5 and 4.5
CDD	Time interval of switching to next message at cyclic indication. Available values: 0..20. Zero value means switching absence (user have to force switching to the next message by pressing "SEL" button).
SV	Memory cell number in which current profile will be saved. Available values: 0..10. Zero value means that profile will not be saved in the memory cell (but profile will be saved as default device's profile)
OUT	Press "SET" button to exit in the main menu.

Warning! If user had no press "SET" button after value changing, then changed value will not be saved. If user had exit to main menu without saving profile, then old device's configuration will be loaded.

Tuning of receiving NMEA message

Tuning of receiving NMEA message is provided by "d-1", "d-2" and "d-3" menu items. User can select required NMEA message by buttons "▲" and "▼". After, user can press "SET" button to save selected value.

Some NMEA messages have inside submessages therefore user have to select one of them. Additional number of submessage will be displayed to the right of a message's number in this case.

After submessage selection, user has to press "SET" to save choice.

See list of NMEA messages and submessages which can be processed by the device:

DBK (Depth Below Keel)	
d-x1	Depth, feet
d-x2	Depth, meters
d-x3	Depth, fathoms
DBT (Depth Below Transducer)	
d-x1	Depth, feet
d-x2	Depth, meters
d-x3	Depth, fathoms
DPT (Depth And Offset from Transducer)	
d-x1	Depth, meters
d-x2	Offset from transducer, meters
HDG (Heading, Deviation And Variation)	
d-x1	Magnetic sensor heading, degrees
d-x2	Magnetic deviation, degrees (d-x21 - easterly, d-x22 - westerly)
d-x3	Magnetic variation, degrees (d-x31 - easterly, d-x32 - westerly)
HDM (Heading - Magnetic)	
HDT (Heading - True)	
MTW (Water Temperature)	
MWV (Wind Speed And Angle)	
d-x1	Wind angle (d-x11 - relative, r-x12 - true)
d-x2	Wind speed (d-x11 - K, d-x12 - M, d-x13 - N)
ROT (Rate Of Turn)	
RSA (Rudder Sensor Angle)	
VBW (Dual Ground/Water Speed)	
d-x1	Longitudinal water speed
d-x2	Transverse water speed
d-x3	Longitudinal ground speed
d-x4	Transverse ground speed
VHW (Water Speed And Heading)	
d-x1	Degrees true
d-x2	Degrees magnetic
d-x3	Knots
d-x4	Kilometers
VLW (Distance Traveled Through Water)	
d-x1	Total cumulative distance
d-x2	Distance since reset
VPW (Speed Measured Parallel To Wind)	
d-x1	Knots
d-x2	Meters per second
VTG (Track Made Good And Ground Speed)	
d-x1	Track degrees (true)
d-x2	Track degrees (magnetic)
d-x3	Speed knots
d-x4	Speed kilometers per hour
VWR (Relative Wind Speed And Angle)	
d-x1	Wind direction magnitude in degrees (d-x11 - left, d-x12 - right)
d-x2	Speed knots

d-x3	Speed meters per second
d-x4	Speed kilometers per hour
ZDA (Time And Date)	
d-x1	Local zone minutes description
d-x2	Date (month and day)
d-x3	Year
ZFO (UTC & Time From Origin Point)	
d-x1	Universal Time Coordinated (UTC)
d-x2	Elapsed time
ZTG (UTC And Time To Destination Point)	
d-x1	Universal Time Coordinated (UTC)
d-x2	Time remaining
VDR (Set And Drift)	
d-x1	Degrees true
d-x2	Degrees Magnetic
d-x3	Knots (speed of current)
WCV (Waypoint Closure Velocity)	

Notice: x - number of the NMEA message at cyclically displaying.

Warning! User can select “OFF” value when he select NMEA message. It provides string idle and string will not be used at cyclically displaying. If user select “OFF” value then next strings will not be available for configuration (for example: “OFF” value of “d-2” means that “d-3” is not used too).

7. Transportation and Storage

The device shall be stored in heated space at air temperature of +5 °C to +35 °C (maximum values of -55 °C to +70 °C), at relative humidity of air not exceeding 95 % at temperature of +25 °C and content of dust, oil, moisture and aggressive admixtures in the air not exceeding the norms envisaged by GOST 12.1.005-88 for the working zone of production areas.

The device shall be transported in transport container of the manufacturer in closed transport.

Means of transport:

- automobile and railway closed transport (covered wagons, universal containers)
- by air (in pressurized and heated bays of airplane)
- by sea (in dry service spaces).

The device shall be transported in accordance with the transport regulations in force for the particular transport.

During handling operations and transportations strictly observe the requirements of handling marks on boxes and do not allow bumps and impacts which can affect preservation and serviceability of the device.

Packed devices shall be reliably secured in vehicles.

After storage in stores or transportation at temperature below +10 °C the devices shall be unpacked only in heated spaces after keeping them unpacked in under normal climatic conditions for 12 hours.

8. Recycling

Do not recycle the packing of a new product, its parts with defects identified during its operation as well as the overage product as common household waste since they contain materials and raw materials suitable for their recovery.

Decommissioned and unused components should be delivered to a specialized waste collection center licensed by local authorities. You can also send the overage equipment to the manufacturer for its further recycling.

Proper recycling of the product components will prevent potential negative consequences for human health and the environment, as well as provide recovery of the product component materials while substantially saving on energy and resources.

The product does not endanger human life and health or the environment during and after its service life.

This product should be recycled following the requirements applicable to electronic equipment.



Products marked with a crossed-out recycle bin should be recycled apart from common household waste.

9. Warranty

The manufacturer guarantees the unit DR-109 complies with this manual provided that the operation, transportation and storage conditions are adhered to during the warranty period.

The unit's warranty period expires 24 months from the date of its shipping from the manufacturer's storehouse.

Within the warranty period, the owner is entitled for a free repair, or a replacement of a separate part, provided that the malfunction occurred through the manufacturer's fault.

Warranty repair is provided if the unit is submitted with the manufacturer's label and a legible serial number available on it, as well as this operating manual.

The manufacturer is not responsible and cannot guarantee the unit's operation:

1. After the warranty period is over;
2. In case of the failure to observe the unit's operation, transportation, storage and installation rules and conditions;
3. If the unit is in an unmarketable condition, or has a damaged body, and other causes beyond the manufacturer's control;
4. If self-made electrical devices were used.
5. If there was an attempt to repair the unit by a person who is not an authorized representative of the manufacturer.

If the owner loses this operating manual or the manufacturer's label with a serial number, the manufacturer shall not provide their copies, and the owner shall be divested of the right for a free repair during the warranty period.

Upon the warranty expiry, the manufacturer shall facilitate the repair of the unit at the owner's expense.

Note: in case of warranty repair, the unit's disassembling from the installation site and its delivery to the manufacturer's service center are done at the owner's expense.

Visit the manufacturer's website www.unicont.spb.ru (section "support/warranty") to find:

- forms to fill in claims,
- full warranty description;
- full description of the warranty service rendering procedure.

The manufacturer service center's address and contact details:

Unicont SPb, Ltd.

Bld. 26E Kibalchich Str., Saint Petersburg, 192174, Russia

tel.: + 7 (812) 622 23 10, +7 (812) 622 23 11

fax: +7 (812) 362 76 36

e-mail: service@unicont.spb.ru

10. DATE OF PACKING

Universal digital repeater	DR-109	№
name of article	designation	serial number

Packed Unicont SPb Ltd., Russia.
 Manufacturer

according to the requirements of the current technical documentation.

_____	_____	_____
post	signature	clarification of signature

year, month, day

11. ACCEPTANCE DETAILS

Universal digital repeater	DR-109	№
name of article	designation	serial number

was manufactured and accepted in accordance with the regulatory requirements of the state standards and applicable technical documentation, and is suitable for operation.

Quality control representative

Stamp	_____	_____
here	signature	clarification of signature

year, month, day

12. DATE OF COMMISSIONING

Universal digital repeater	DR-109	№
name of article	designation	serial number

The unit has been put into operation.

Date of installation: _____

Place of installation: _____

Person in charge of installation: _____