MICROCOM

Simply More

NEMOS N100+

Battery powered GSM Data logger

User manual

Rev 2402

"Simplicity is the ultimate form of sophistication."
– Leonardo da Vinci

Warning

1. This system has been developed to be installed by professionals, not by end users. If you have any doubts about any technical aspect, please consult with our experts.

2. Our commitment to innovation in both software and hardware is ongoing. However, despite our best efforts to document our products properly, discrepancies between the product and some of its specifications may occur by mistake. Therefore, if you have any questions or observations, please contact us at the following email address: microcom@microcom.es.

3. Communications based on the GSM network are extraordinarily reliable. Nevertheless, we advise against using our equipment in critical systems unless some type of redundancy related to the communication network has been planned, as it may exceptionally become unavailable.

4. "Life Support": This unit is not designed for use in systems where human life depends. That is, in devices whose malfunction may endanger human life.

5. Our responsibility regarding the equipment will be limited to its repair or replacement under the terms established in the warranty.

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Content

1 Introduction

Welcome to the user manual for the NEMOS N100+, a GSM technology-powered data acquisition device that operates on batteries and is designed for use in manholes and flood-prone environments. This manual aims to provide you with the necessary instructions for the effective installation and operation of the device.

General Features

The NEMOS N100+ has been developed with the goal of facilitating district monitoring and remote reading of large water consumers in an efficient and straightforward manner. It is available in three different configurations to suit various needs:

1. N100+: Equipped with 2 digital inputs.
2. N102+: Includes 2 digital inputs and 2 analog inputs.
3. N110+: Features 2 digital inputs and an integrated pressure probe.

Communication Technology

This device incorporates state-of-the-art communication technologies such as NB-IoT and CAT.M1, while maintaining compatibility with the 2G network. This ensures broad coverage and prepares the equipment for future network upgrades. The built-in dipole antenna, with a performance exceeding 90%, ensures excellent signal reception, even in underground conditions.

Interface and Diagnostics

To facilitate communication and diagnostics, the NEMOS N100+ features a Bluetooth radio. This feature allows for adjustments and maintenance to be carried out from an accessible location, without the need to enter confined spaces such as manholes.

Battery life and Maintenance

Thanks to its low-power design and the use of high-capacity lithium batteries, the NEMOS N100+ offers a battery life of up to 5 years with standard usage. Battery and SIM card replacements can be easily performed without tools, minimizing downtime and simplifying maintenance.

Additional Resources

For more detailed information about the configuration and programming of the NEMOS N100+, we invite you to visit our website at microcom360.com, where you will find the complete configuration manual and the necessary software.

2 Product description

LED Status Indicators: The Nemos N100+ integrates two LED indicators: the **GSM LED** and the **ERR LED**. These LEDs display the device's status, showing the level of coverage and any potential errors detected. The LEDs are only active while the device is in wake mode.

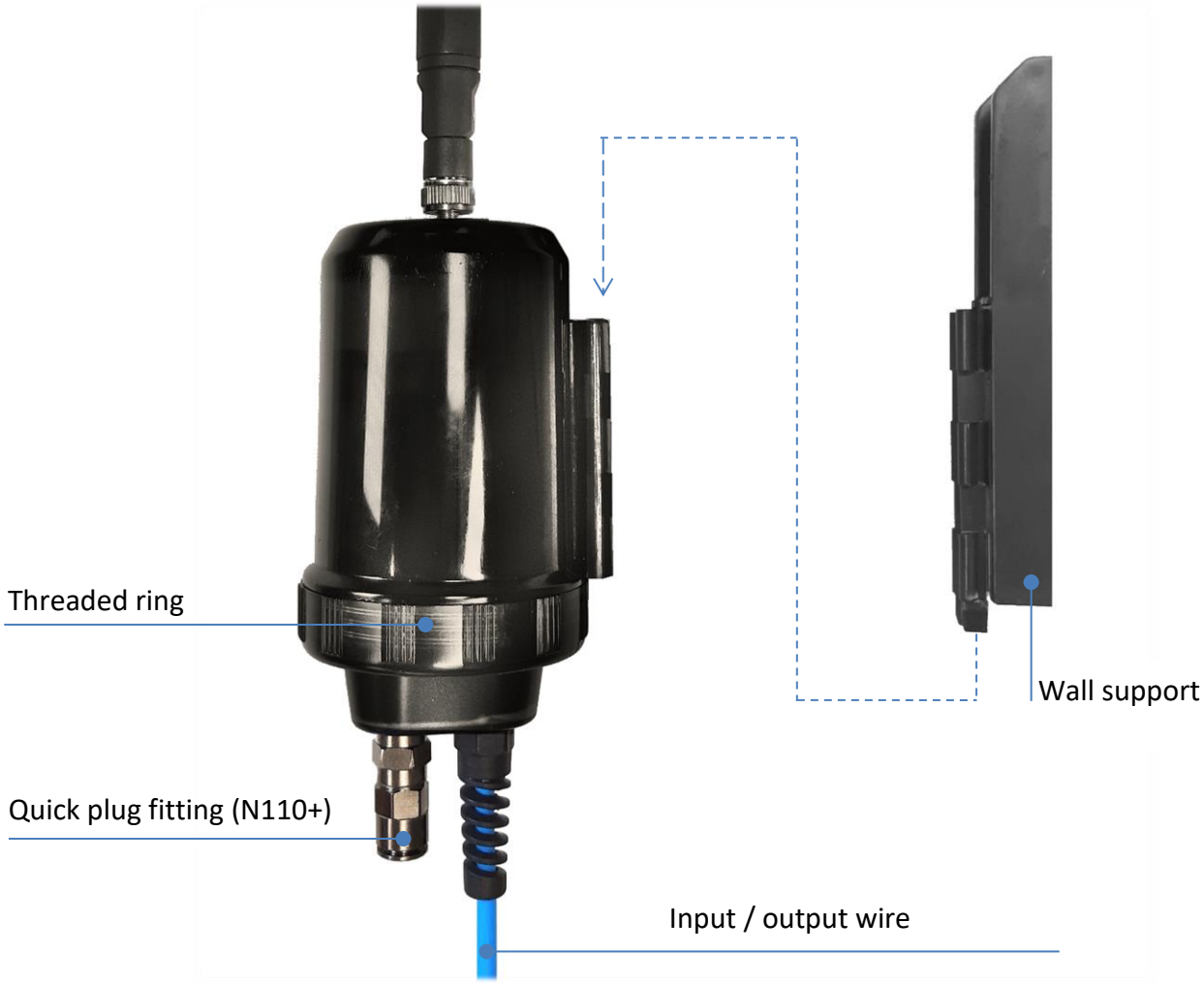
Antenna Connector: SMA-type antenna connector.

REED Contact: Allows the device to be awakened by placing a magnet near the indicated spot for 5 seconds. Upon waking, the device will activate the LEDs, the GSM modem, and the Bluetooth for 10 minutes.

Status LED interpretation

Red LED blink*	Green LED blink	Yellow LED blink	Meaning
0	Solid	0	Device connected via Bluetooth
1/2	0	0	GSM modem not registered
1/2	1	0	GSM modem registered, insufficient signal strength
1/2	2	0	GSM modem registered, fair signal strength
1/2	3	0	GSM modem registered, good signal strength
1/2	4	0	GSM modem registered, excellent signal strength
1/2	5	0	GSM modem registered, excellent signal strength
1/2	0	1	Hardware failure
1/2	0	2	SIM card not present.
1/2	0	3	SIM card locked by PIN or PUK.

* Red GSM LED: **1**= Device not available for Bluetooth connection. **2** = Device available for Bluetooth connection.



Lower side of the enclosure has different features for each Nemos N1XX+ version.

N100+: Single electrical hose without connector.

N102+: Single electrical hose with IP68 connector.

N110+: Single electrical hose without connector + Quick plug fitting for Ø 8 mm tube for pressure input.

N100+ N102+ N110+

3 Operation

3.1 Wake-up and energy management

In the NEMOS N100+, designed to offer extended battery life, it is crucial to carefully manage the available energy. To maximize battery life, the device operates by default in sleep mode, a low-power configuration where the GSM modem and the main CPU are turned off, limiting communication with the device. In this state, only the reading of the digital inputs remains active.

The NEMOS N100+ can exit sleep mode and reactivate all its functions automatically under certain conditions:

1. **Digital input alarm activation:** If an alarm is detected on any of the digital inputs, the device will leave sleep mode, activate GSM communications, and proceed to notify the alarm according to the established settings.
2. **Timer expiration:** Preprogrammed actions on the timers will be executed, even if the device is in sleep mode.
3. **Activation of the magnetic reed contact:** By placing a magnet near the mark on the top of the device for 5 seconds, the NEMOS N100+ will wake up and perform various actions:
    - Send a data dump to the Zeus server.
    - Activate the GSM modem for 10 minutes, allowing communication via GSM or SMS during this time.
    - Enable Bluetooth connection, making it possible to connect the device via Bluetooth for 10 minutes.

These features ensure that the NEMOS N100+ not only conserves energy efficiently but also remains highly functional and responsive to operational needs without compromising its overall performance.

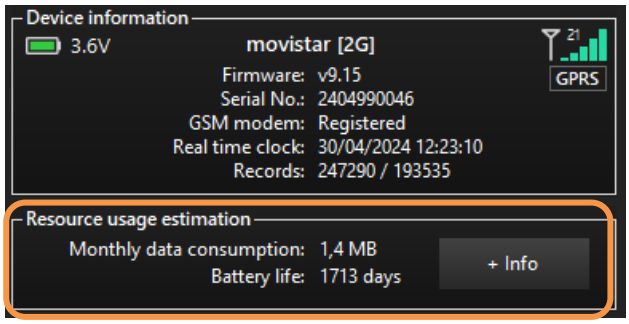
3.2 Battery life

Typical battery life:

Signals	Log frequency	Transmission frequency	Battery life*
1 or 2 flowmeters	5 minutes	24 hours	5 years

* Test Conditions: Temperature 20ºC, RSSI: -93dBm, data sent to Zeus server via GPRS

Any configuration that deviates from the specified settings will have a direct impact on the battery life, particularly more frequent data transmission. To estimate the battery life for your specific case, use the resource usage estimation tool on the MicroConf software.



4 Handling

This section provides instructions on how to handle the equipment.

4.1 Opening the Nemos N100+

1. Unscrew the ring from the base.

2. Carefully separate the cover from the body, maintaining a straight and linear trajectory.

	The cover is attached to the electronic board that contains the battery and will come off together with it.

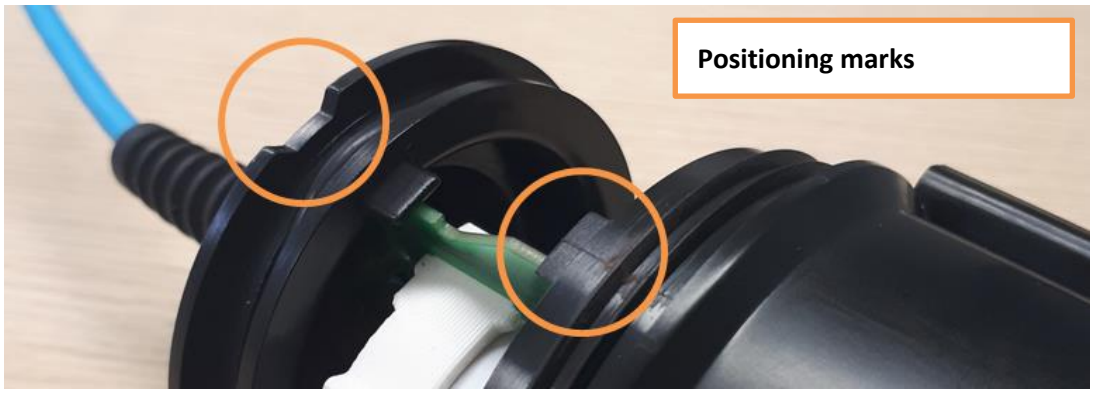
Note on wall mount:
To release the device from the wall mount, simply press with two fingers on the triggers located at the back near the threaded ring.

4.2 Closing the Nemos N100+

It is essential that you follow the instructions for closing the device. Failures in sealing due to non-compliance with these instructions will not be covered under warranty.

1. Insert the electronic board containing the battery and SIM card into the body of the device until the positioning marks are properly aligned. To do this correctly, ensure that:
   - The positioning marks are aligned.
   - The electronic board is inserted along the guide rails.

2. Tighten the threaded ring.

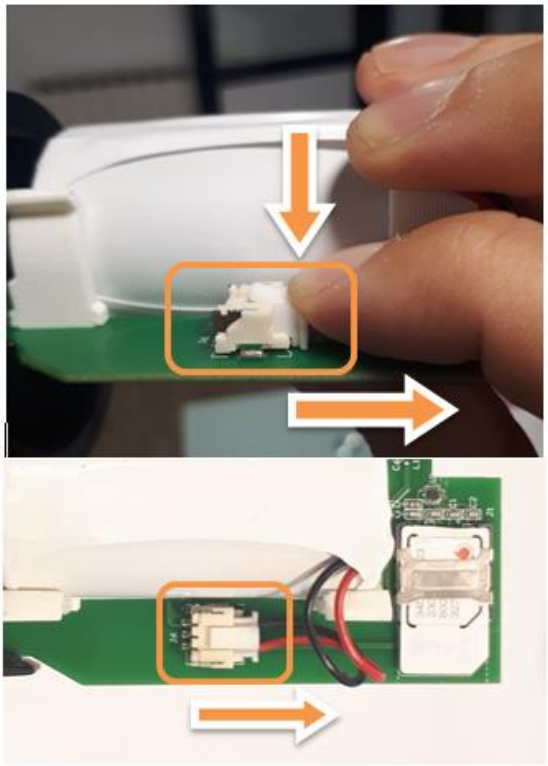


4.3 SIM card installation

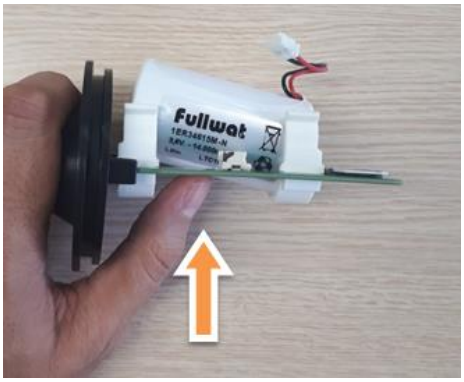
1. Open the device and separate the cover from the body.
2. Insert the SIM card as shown in the figure.
3. Close the device as recommended in "Closing the Nemos N100+" section.

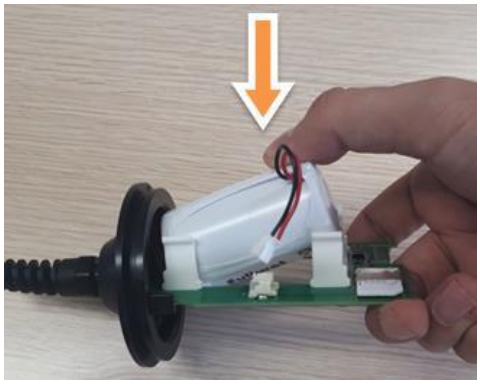
> The SIM card inserted in the Nemos N100+ must have the **PIN code request disabled**.

4.4 Battery replacement



1. Open the device and remove the electronic panel that contains the battery.
2. Disconnect the battery from the electronic board. Press on the back of the plug to disconnect it.
3. Remove the battery from the battery holder. To do this, apply pressure on the bottom of the battery.
4. Install the new battery by applying pressure on the top of the battery.
5. Connect the battery to the electronic board.
4. Close the device as recommended in the "Closing the Nemos N100+" section.





4.5 Plug / unplug circular connector on N102+

The NEMOS N102+ is equipped with an IP68 waterproof connector, designed to ensure a secure and water-resistant connection. Below are the procedures for correctly connecting and disconnecting this connector.

Plug

1. **Alignment**: Locate the indicative marks on both ends of the connector. These marks must be perfectly aligned to ensure a proper connection.

2. **Insertion:** Once the marks are aligned, push the ends of the connector firmly towards each other until you hear an audible click. This sound indicates that the connector is securely and correctly assembled.

Unplug

1. **Locating the grip area:** Identify the area specifically marked for disconnection on the connector.

2. **Extraction:** Firmly hold the indicated area and gently pull to separate the connector components. No tools or excessive force are required for this operation.

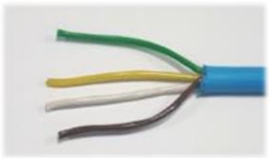
4.6 Antenna Installation

The Nemos is supplied with a high-performance detachable antenna. It is essential to install it before starting the device.

Screw the antenna onto the connector at the top of the Nemos, applying moderate torque. No tools are required.

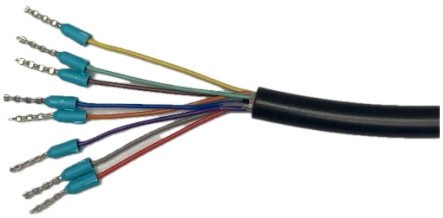
4.7 Wiring for N100+ / N110+: List of Available Inputs

Signal	Description	Color
DO	Digital input 0	Green
D1	Digital input 1	Yellow
GND	Ground	White
GND	Ground	Brown



4.8 Wiring for N102+. List of Available Inputs

Signal	Description	Color
DO	Digital input 0	Yellow
D1	Digital input 1	Green
A0	Analog input 0	Brown
A1	Analog input 1	Blue
O0	Power output 0	Orange
O1	Power output 1	violet
GND	Ground	Grey
GND	Ground	Red

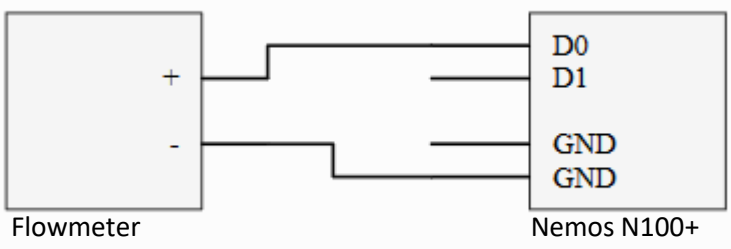


DIGITAL INPUT NOTICE:

- All digital signals are activated by contact with the ground. Unused signals should be left unconnected.
- Depending on the configured sampling rate of either 64 Hz or 256 Hz, the minimum required pulse width for input will be 18 milliseconds or 5 milliseconds, respectively.

4.9 Connecting a Digital Flow Meter to N100+ / N110+

Below, the connection of a digital flow meter with a potential-free output (reed contact or optocoupler) connected to digital input 0 (D0) of the Nemos N100+ is shown.

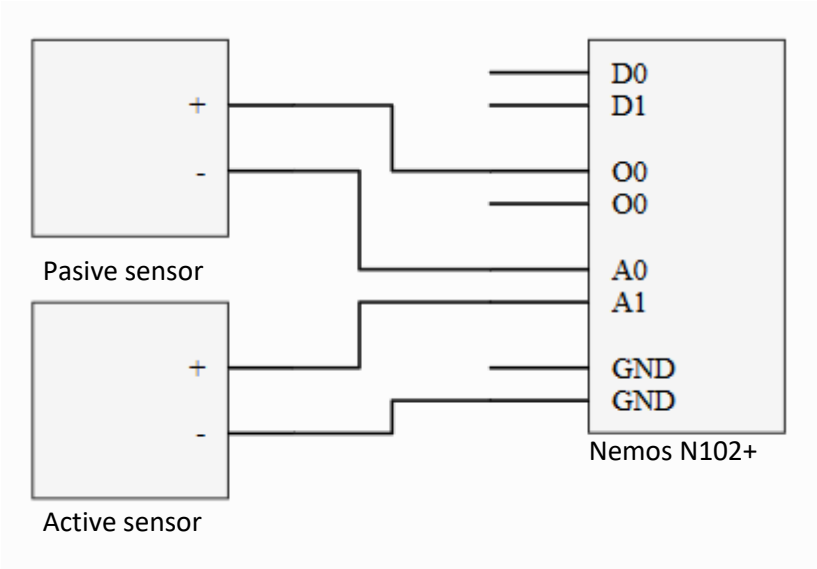


4.10 Connecting Active and Passive Analog Probes to N102+

Below are the instructions for connecting both a passive probe, powered directly from the NEMOS N102+, and an active probe, which is powered externally.

Connection of 4/20mA passive sensor: The passive sensor is connected by utilizing the NEMOS N102+'s capability to supply power directly to the probe. For this, the voltage output O0 is used to power the sensor, and the input A0 is used to read the current in the loop.

Connection of 4/20mA active sensor: For an active sensor, which is powered by an external power source, the connection to the NEMOS N102+ is done differently. The connection must be established between the ground terminal (GND) and input A1 of the device.



5 Commissioning

The NEMOS N100+ is supplied with the battery disconnected. To start the operation of the device, it is essential to connect the battery, following the instructions provided in the "4. Equipment Installation" section of this manual.

Before starting the datalogger, it is crucial to perform an appropriate configuration. This process is carried out using the MicroConf software, a universal configuration tool designed to simplify the initial setup and updates of the device.

For detailed instructions on how to use this software, we invite you to consult the user manual available on our website at microcom360.com. Here you will find all the guides and resources necessary to ensure a successful and effective configuration of the NEMOS N100+

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6 Specifications

GENERAL				
Power	Lithium primary cell. 3,6 V, 14 Ah			
IP	IP68 @ 2 meters for 100 days			
Operating temperature	-20 °C to +75 °C			
GSM Modem	Version	Model	FCC ID	Bands (**MHz)**
	2G/NB-IoT	Quectel BG95-M3	XMR201910BG95M3	GSM / (E)GPRS: 850/900/1800/1900 Cat.M1 / Cat.NB1: Bands 2, 3, 4, 5, 8, 12, 13, 20, 26, 28
Real time clock	Yes. Automatic synchronization to NTP server			
Local communication	Bluetooth LE (4.0)			
Enclosure material	Polycarbonate			

DIGITAL INPUTS	
Quantity	2. All of them compatible with flowmeters
Compatibility	potential-free contact
Activation	Contact to ground
Sampling frequency	64 Hz / 256 Hz

INBUILT PRESSURE SENSOR (N110+)	
Quantity	1
Range	10 / 20 Bar
Sampling frequency	Low power mode: 1 Hz Transient detection mode: Adaptative, up to 128 Hz
Precision	0,4%

ANALOG INPUTS (N102+)	
Quantity	2
Type	4/20mA current loop
Precision	0,2%
Resolution	12 bits
Impedance	125Ω

POWER OUTPUTS (N102+)	
Quantity	2
Voltage	15 or 20v. Set in software
Power	0,8W

7 Warranty

1- MICROCOM guarantees this product to be free from defects in materials and workmanship for 5 years. However, MICROCOM's only obligation under this warranty shall be to repair or replace at no charge any part of the equipment which MICROCOM deems defective after inspection, only under the conditions listed below:

a) That the defects have been brought to the attention of MICROCOM, in writing, within five years from the date of purchase of the equipment.

b) That the equipment has not been maintained, repaired, or altered by anyone not previously approved or authorized by MICROCOM.

c) That the equipment has been used in a proper and normal manner, and has not been altered or misused, nor has it been involved in an accident or damaged by a fortuitous act or any other similar catastrophic incident.

d) The purchaser, whether the DISTRIBUTOR or a customer of the DISTRIBUTOR, shall pack and send or deliver the equipment to MICROCOM's factory in Irún, Spain, within a maximum of 30 days after MICROCOM has received written notification of the defect. Transport to MICROCOM will be at MICROCOM's expense within the Spanish national territory.

e) MICROCOM's liability is limited to the repair or replacement of any part of the equipment at no charge, if MICROCOM's examination reveals that such part was defective due to material or manufacturing failure.

1.1.- The DISTRIBUTOR or customers of the DISTRIBUTOR may send the equipment directly to MICROCOM if they are unable to repair the equipment themselves, even though the DISTRIBUTOR has been approved to make such repairs and has agreed with the customer to carry them out as covered by this limited warranty.

1.2.- In the event that products must be returned to MICROCOM for a warranty-covered repair, the DISTRIBUTOR must contact MICROCOM in advance of shipping to receive a Return Materials Authorization "RMA" number

Disposal of Waste Electrical and Electronic Equipment (applicable in the European Union and other countries with selective collection systems). The symbol on the product or its packaging indicates that this product should not be treated as household waste. Instead, it must be handed over to an authorized collection center for the recycling of electrical and electronic equipment. By ensuring that this product is disposed of properly, you will help prevent potential negative impacts on the environment and human health that could otherwise be caused by improper waste handling of this product. Recycling the materials will help to conserve natural resources. For more detailed information, we invite you to contact your local city office, waste disposal service, or the retailer where you purchased the product