ELITEX

LOW-SPEED CENTRIFUGE, FLOW L35

Please read the User Manual carefully before use, and follow all operating and safety instructions

User Manual

English

User Manual

EN

Instrument Name

Preface

Thank you for purchasing our product. Users should read this manual carefully, follow the instructions and procedures, and be aware of all preventive measures when using this instrument.

Service

If help is needed, you can always contact your dealer or Labbox via **www.labbox.com**.

Please provide the customer service representative with the following information:

- Serial number
- Description of the problem
- Your contact information

Warranty

This instrument is guaranteed to be free from defects in materials and workmanship under normal use and service for a period of 24 months from the date of invoice. The warranty is extended only to the original purchaser and shall not apply to any product or parts that have been damaged due to improper installation, improper connections, misuse, accidents, or abnormal conditions of operation.

For claims under the warranty, please contact your supplier.

Safety Reminder

Common safety precautions

Carefully read the following safety precautions for a thorough understanding.

- Follow the instructions and procedures described in this manual to operate this centrifuge safely.
- Carefully read all safety messages in this manual and the safety instructions on the instrument.
- Safety messages are labelled as indicated below. They are in combination with signal words of “WARNING” and “CAUTION” with the safety alert symbol to call your attention to items or operations that could be dangerous to you or other persons using this instrument. The definitions of signal words are as follows:

WARNING: Personal Danger

Warning notes indicate any condition or practice, which if not strictly observed, could result in personal injury or possible death.

CAUTION: Possible damage to instrument

Caution notes indicate any condition or practice, which if not strictly observed or remedied, could result in damage or destruction of the instrument.

NOTE: Notes indicate an area or subject of special merit, emphasizing either the product’s capability or common errors in operation or maintenance.

- Do not operate this centrifuge in any manner not described in this User manual. When in doubt or have any troubles with this centrifuge, ASK FOR HELP.
- The precautions described in this User manual are carefully developed to cover all the possible risks. However, it is also important that you are alert for unexpected incidents. Be careful operating this centrifuge.

WARNING:

- This centrifuge is not explosion-proof. Never use explosive or flammable samples.
- Do not install the centrifuge in or near places where inflammable gases are generated or chemicals are stored.
- Do not place dangerous material within 30cm around the centrifuge.
- Make sure to prepare necessary safety measures before using samples that are toxic, radioactive or contaminated with pathogenic micro-organisms at your own responsibility.
- If the instrument, rotor and/or accessories have been contaminated by solutions with toxic, radioactive or pathogenic materials, clean it according to the decontamination procedure that you are specified.
- If you require services at site, please sterilize and decontaminate it in advance, and then notice the service centre involved in the details of the particular materials.
- Do not handle the power cord or turn on or off the POWER switch with wet hands to avoid electrical shocks.
- For safety purposes, do not enter within 30cm around this centrifuge while it is in operation.
- While the rotor is rotating, never forcedly release the door lock.
- Unauthorized repairs, disassembly, and other services to the centrifuge except by our service centre are strictly prohibited.

CAUTION

- This centrifuge must be located on one firm and level table.
- Make sure the centrifuge is horizontal before running.
- Make sure the angle between the door and cover is greater than 70 degrees when open the door.
- Be careful not put your fingers or hands between the door and cover when the door off.
- Do not move or relocate this centrifuge while it is running.
- If fluid spills in the rotor chamber, please promptly clean and dry with a dry cloth to avoid sample contamination.
- Ensure to remove any objects and fragments of the tubes dropped inside the rotor chamber before running this centrifuge.
- Cautions on rotors

(1) Always check for corrosion and damages on the rotor surface before using it. Do not use the rotor if an abnormality is found.

(2) Do not set the centrifuge speed beyond the maximum speed allowed by the rotor kit (rotor or adapter). Make sure to run below the maximum speed allowed.

(3) Do not exceed the allowable imbalance.

(4) Use the rotor and tubes within their actual capacities.

(5) If the rotor is attached with a lid, ensure it is tightened before operation.

- If any abnormal condition occurs during operation, please stop it immediately and contact our service center. Notify the service center is a warning code if displayed.
- Vibrations are likely to damage the centrifuge, contact our service center if abnormality observed.

1. Specifications

Maximum speed	3500rpm(100-3500rpm), increment:100rpm	2500rpm(100-2500rpm), increment:100rpm
Speed accuracy	±20rpm	±20rpm
Maximum RCF	2260×g	1150×g
Maximum capacity	12×15 mL+12×10 mL； 36×7mL； 12×15mL； 6×50mL	4×96×0.5mL
Rotor types	Swing out rotor	Swing out rotor
Timer	30s -99min59s/HOLD	30s -99min59s/HOLD
Driving Motor	Brushless DC motor	Brushless DC motor
Acceleration/Deceleration	1↑/6↓	1↑/6↓
Power	200W	200W
Power requirements	Single-phase, 110V-240V, 50Hz/60Hz	Single-phase, 110V-240V, 50Hz/60Hz
Dimensions（mm）	(L) 481,5 × (W) 414 × (H) 235,5	(L) 481.5 ×（W）414 × (H) 253.5
Weight	15kg	15kg
Additional features	Speed/RCF switch, Pulse operation, LCD display of runtime status, buzzer notification & alert	Speed/RCF switch, Pulse operation, LCD display of runtime status, buzzer notification & alert

2. Declaration of Conformity

Construction in accordance with the following safety standards:

- EN61010-1
- EN61010-2-020

Construction in accordance with the following EMC standards:

- EN61326-1/FCCPart15SubpartB/IECS 001

Associated EU guidelines:

- EMC-guidelines:2004/108/EC
- Instrument guidelines:2006/95/EC

This ISM device complies with Canadian ICES-001.

Changes or modifications not expressly approved by the party responsible for compliance could prevent the user's authority to operate the equipment.

NOTE: This centrifuge has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the centrifuge is operated in a commercial environment. The centrifuge generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the user manual, may cause harmful interference to radio communications. Operation of centrifuge in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference.

3. Required Operational Condition

3.1 Basic operational Conditions

1. Power: Single-phase, 110V-240V,50Hz/60Hz.
2. Ambient temperature: 5℃ ~ 40℃.
3. Relative humidity: ≤ 80%.
4. No vibration and airflow around.

5. No electric dust, explosive and corrosive gases around.

3.2 Transport and storage conditions.

1. Storage temperature: -40℃ ~ 55℃.
2. Relative humidity: ≤ 93%.

4. Installation

This section describes the instructions that you should abide when installing the centrifuge to ensure your safety and the optimum performance. Before moving the centrifuge, the rotor must be removed.

WARNING:

- Improper power supply may damage centrifuge.
- Make sure the power source conforms to the required power supply before connecting.

4.1 Location

1. Place the centrifuge on a firm, flat and level table, ensure the four feet of this centrifuge stand on the table firmly. Avoid installing on the slippery surface or surface prone to vibration.
2. Ideal ambient temperature is 20℃±5℃, avoid placing the centrifuge in direct sunlight if temperature exceeds 30℃.
3. Keep clear of the centrifuge at least 10cm on both sides and at least 30cm behind it to guarantee the cooling efficiency.

4. Keep away from heat or water to avoid sample temperature issues or centrifuge failures.

WARNING:

- To avoid electrical shocks, ensure your hands are dry when touching the power cord.
- This centrifuge must be grounded properly.

4.2 Connection of the power cord and grounding

A minimum 10A outlet providing sufficient ground is required, and this must meet with local safety requirements.

5. Structure

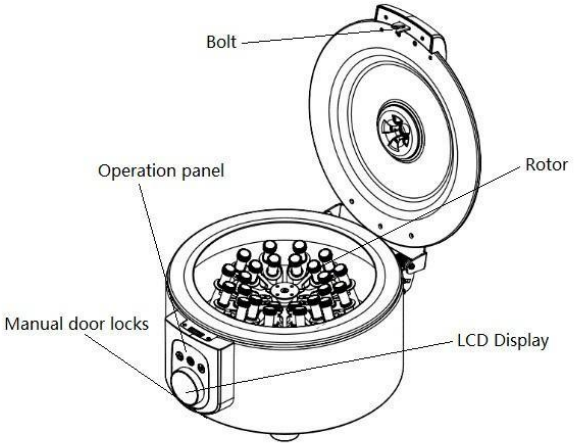

Figure 5 Front view of the centrifuge

6. Rotor Preparation

6.1 Prepare the samples

6.2 Inject the samples into tubes.

CAUTION

- Do not overload samples into the centrifuge which will cause leaking.
- Do not exceed the actual capacity allowed in the user manual.

6.3 Keep the tubes balance

- Although the centrifuge can accept sample balancing by eye, we recommend that you keep this centrifuge in a well-balanced condition to extend its life expectancy.
- Never intentionally run the centrifuge under unbalanced condition even though the allowable imbalance is not exceeded

6.4 Inspect the rotor

Check the rotor for corrosion or scratches before using.

CAUTION

- If any abnormality such as corrosions or scratches is found, stop using the rotor and contact our service center.

6.5 Symmetrically load centrifuge tubes in rotor

CAUTION

- Make sure the rotor lid is securely fixed on the rotor, as well as the rotor and shaft are tightened. Otherwise, the rotor may be moved off while rotating and cause damage of the centrifuge and rotor.
- Firmly tighten the rotor door with rotor.

7. Operation

CAUTION

- Do not push or lean against the centrifuge while it is running.
- Do not run the centrifuge when fragments or sample solutions are left in the centrifuge chamber. Always keep the centrifugal chamber clean.
- If the centrifuge makes strange noise during operation, stop it immediately and contact our service center. Notify them of the warning code if displayed.

7.1 Normal Operation

Turn on the power switch, centrifuge will start self-diagnostic checks.

7.1.1 Load and replace the rotor

CAUTION

- Attach the rotor to the rotor shaft. Ensure the rotor is in position and connected with the shaft, tightening the locking nut to secure the rotor with shaft, to prevent the rotor damaging the centrifuge.
- Ensure the rotor lid is firmly tightened to the rotor.

- Load the rotor to shaft to ensure rotor is in position until it connected with the shaft.
- You should feel a „click" when the rotor is properly loaded to the shaft. If not, there may be something USER MANUAL 10 stuck between the rotor and the shaft. Double check and clean it if necessary.
- Rotate the rotor slightly with your fingers to check if the rotor vibrates. If so, reinstall the rotor again.
- Rotate the nut clockwise using the wrench to tighten the rotor to the shaft firmly.
- Close the rotor lid, firmly tighten clockwise the lid to the rotor and ensure it is

in position. Close the door and then start running.

- The method of removing the rotor is as same as the above mentioned by turning the locking nut counterclockwise.

7.1.2 Set the operation parameters

Click the key  to enter the parameter setting interface, click the key  again to switch the parameter, the parameter can be adjusted by rotating the knob, the right rotation increases, the left rotation decreases, no operation for 5 seconds and then exit the setting interface.

Centrifugal force/RPM toggle: Click on the key  , when displayed  above the speed parameter it indicates the RPM, when displayed  above the speed parameter it indicates the centrifugal force.

1. Set the speed
   - The speed unit is rpm and the speed range is 100-3500 rpm with a minimum step of 100 rpm.
   - When the speed parameter is selected, the speed logo flashes.
   - The minimum speed adjustment is 100rpm with a minimum step of 100 rpm.
   - Turn the parameter knob clockwise to increase the value, counterclockwise to decrease the value.
   - There is a circulating function to increase/decrease the speed values. Rotate the parameter key clockwise to change settings from small → large → maximum → minimum.
   - Rotate the parameter key anticlockwise to change settings from large → small → minimum → maximum.

2. Set the time
   - When the time parameter is selected, the time mark starts flashing.
   - Rotate the parameter key to set running time from 10 s to 99min59s.

- When time displays HD, this is a continuous running mode.

3. Set acceleration and deceleration

- Press key , acceleration value flash, press the again, the value will be increasing. the value will change from 1 to 6, then from 6 to1.
- Press key , deceleration value flash, press the again, the value will be increasing. the value will change from 1 to 6, then from 6 to 1. 1 deceleration: free braking; 1deceleration: the slowest deceleration; 6deceleration: the fastest deceleration.

The following table shows a comparison of the speed of Acc and Dec in Level 1-6: (relative error ±10%)

Level	Acc(0-3500rpm)	Dec(0-3500rpm)
1	20s	100s
2	-	60s
3	-	50s
4	-	30s
5	-	25s
6	-	20s

7.1.3 Start the operation

1. Click the Run button to start running, the rotor reaches the set speed and *starts timing, the time shows the remaining running time. Modify the running parameters, click the key , it will return to the interface of preparation mode, displaying the set running parameters, click to make the icon of the parameter to be modified flashing, the parameter can be adjusted by rotating the knob, the right rotation will increase, the left rotation will decrease, no operation will returnto the normal running state after 5 seconds, and continue to run according to the new*

parameter.

2. Warning display

- If an error occurs during the operation, the centrifuge will brake to stop automatically and display the error code on the time/display area.

7.1.4 End the operation

1. The centrifuge stops when the run time expires or when the key  is pressed.

- When the rotor stops rotating, centrifuge will start beeping to alert the operation has finished.

2. Open the door

- When the RPM drops to 0, the top cover can be opened by pressing the key or flicking the unlocking toggle to the right.
- After finishing the operation, the program will store the setting parameters of this operation and will recall these parameters after the restart of the program.

3. Open the door and take out the rotor and samples.

8. Maintenance

8.1 Cleaning

CAUTION

- If do not follow the recommended instructions for cleaning or disinfecting may damage the centrifuge.

1. Centrifuge

- If the centrifuge is exposed to ultraviolet rays for a long time, the colour of the doors may be changed, or the label may come off. After using, cover the centrifuge with a piece of cloth to protect it from direct exposure.
- If the centrifuge needs cleaning, clean it with a cloth or sponge moistened with

a neutral detergent solution.

- Sterilize the centrifuge by wiping with a cloth moistened with 70% ethanol solution.

2. Rotor chamber

CAUTION

- Do not directly pour water, neutral detergent or disinfectant solution into the rotor chamber. Otherwise, fluids may leak into the drive units and cause corrosion or deterioration to the bearings.

- If the rotor chamber needs cleaning, clean with cloth or sponge moistened with a neutral detergent solution. Sterilize the centrifuge by wiping with a cloth moistened with 70% ethanol solution.

3. Drive shaft

- We recommend regular maintenance for drive shaft. You can wipe the drive shaft with soft cloth and then apply a thin coat of silicon grease.

4. Door

- Clean and sterilize the door using the same method as the step (1) above.

5. Rotor

- To prevent corrosion, remove the rotor from rotor chamber. If not in use for a lone term, then detach the rotor lid and turn upside down to dry the tube holes and keep clean.
- For sample leaks in the rotor, rinse the rotor with water. Apply a thin coat of silicon grease to the rotor when it is completely dry.
- The rotor should have regular maintenance; it is recommended to clean it every 3 months to ensure tube and rotor holes keep clean and then apply a thin coat of silicon grease.

6. Drain

- The centrifuge is equipped with a drainpipe for excess water. Drain off water when water is in drainpipe.

8.2 Consumables

Replaceable wearing parts listed below. It is recommended to replace these according to this table.

Item.	Replacement parts	Replacement conditions
1	Rubber block of temperature sensor	Cracked
2	Seal ring of centrifuge chamber	Cracked

8.3 Routine inspection

1. Check that if the centrifuge is on a firm flat and table level, ensure the four feet stand on the table firmly.

2. Check if the centrifuge grounded properly: Use multi-meter to check if there is short circuit between the power cord grounding pin and the motor shaft. If yes, indicate grounded properly; if there is open circuit, you need to check failure reason first and make troubleshooting before using it.

9. Troubleshooting

9.1 Possible problems and solutions

This centrifuge has a self-diagnostic function. If a problem occurs, an error/warning code will be displayed on the time display screen, and the operator can determine the malfunction with the warning code below.

9.2 How to open the door

9.2.1 In the case of power on

CAUTION

- The door just can be opened while the power on and rotor stops rotating.

1. Turn on the POWER switch, the door lock will be released automatically.
2. The door lock will be released automatically once the operation is finished.
3. It is available to release the door by pressing key Door once the rotor stops.

9.2.2 In the case of power outage

The door cannot be opened automatically if there is a power outage. It is available to be opened manually.

1. Ensure the rotor has stopped rotating.

   Listen carefully to ensure no rotating sound can be heard.

2. Insert a hexagonal spanner (same as the rotor spanner) into the unlocking hole on the right side of the centrifuge, rotate 180° clockwise and the cover can be opened.

9.3 Replacement of uses

1. There are two fuses, 250V, 12.5A time-delay type, size: Φ5×20.
2. The fuse holder is in the power inlet. Pull out the fuse holder from power inlet and replace the fuses if necessary.

10. Instructions of rotor and tube

CAUTION

- Read the instructions thoroughly, correct use rotor.
- Do not exceed the allowable maximum speed of rotor tube and adapters etc., be care that the allowable maximum speed of some adapters is lower than the rotor's maximum speed.

10.1 The rotor instructions

10.1.1 Notice

1. The centrifuge rotor can separate samples which density lower than 2.0g/ml, if the samples density is over 2.0g/ml, please calculate allowable speed depending on the following formula. Allow Speed (rpm)= Maximum speed×(2.0(g/ml)/Sample density (g/ml)) $^{1/2}$
2. To prevent corrosion, remove the rotor from rotor chamber if do not use for a long time, then detach the rotor lid and upside the rotor down to dry the tube holes.
3. If some samples leaked in the rotor hole, wash the hole with water, apply a thin coat of silicon grease on the rotor surface after drying.
4. It is necessary for a regular maintenance for rotor, recommend cleaning it each 3 months to keep cleaning of tube hole and shaft hole and then apply a thin coat of silicon grease on it.
5. When the machine runs with excessive current, the overcurrent protector will trip, at this time you need to press the overcurrent protector switch located at the bottom of the machine, the machine can be restored to use.

10.1.2 Autoclaving

- The rotor is manufactured in high-strength aluminium alloy material or stainless

still and can be autoclaved: 121℃ (1.0kg/cm^2), 20 minutes.

- But some adapters are made of plastics, these adapters can be deformed after *autoclaving, so you'd better use other disinfecting methods.*

10.1.3 Bio-safe seal ring

The rotor is sealed by bio-safe structures, achieved using three high-temperature rubber seal rings. The seal rings may fall off or age after several autoclaves, so they need to be replaced or re-installed. The replacement methods please refer to section 9.3.

10.2 Tubes

10.2.1 Cleaning and sterilizing tubes

Condition	Material		PA	PC	PP
Cleaning		Acid （pH5 or lower）	X	X	X
		Acid （higher thanpH5）	O	O	O
		Alkaline （higher than pH9）	O	X	O
		Alkaline （pH9or lower）	O	O	O
		Neutral （pH7）	O	O	O
		Warmwater (up to 70℃)	O	O	O
	Ultrasonic cleaning	Neutral detergent （pH7）	O	O	O
Sterilization	Autoclaving	115℃（0.7kg/cm2）30minutes	O	O	O
		121℃（1.0kg/cm2）20minutes	X	O	O
		126℃（1.4kg/cm2）15minutes	X	X	X
	Boiling	15 to 30minutes	O	O	O
	Ultraviolet sterilization	200-300nm	X	X	X

	Gas sterilization	Ethylene oxide	O	X	O
		Formaldehyde	O	O	O

PA: Polyallomer; PC: Polycarbonate; PP: Polypropylene

10.2.2 Cleaning PC tubes

PC materials are low in chemical resistance against alkaline solutions. Avoid using neutral detergents with pH higher than 9. Note that pH of some neutral detergents is still higher than 9 even if diluted according to the instruction in the maker's catalogue. Use detergent with its pH between 7 and 9.

10.2.3 Autoclaving PA, PC and PP tubes

PA begins softening at about 120 ℃, PC and PP at about 130 ℃. Autoclave PA tubes at 115℃（0.7kg/cm 2） for 30 minutes and PC and PP tubes at 121℃ (0.1kg/cm 2) for 20 minutes. If a certain temperature is exceeded, the tubes may be deformed.

When using a sterilizing chamber, please operate as follows:

1 Place tubes in vertical position, mouths upward. If tubes are placed sideways, they may deform into an oval shape due to gravity.

2 Remove screw nuts and inner covers to prevent from deformation or rupture.

3 Wait until the sterilizing chamber cools down to the room temperature before the tubes are removed.

10.2.4 Condition and life expectancy of tubes

The life expectancy of plastic tubes depends on the characteristics of samples, speed of the rotor used, and temperature applied, and so on. When the plastic tubes are used for centrifuge of ordinary aqueous samples (pH between 5 and 9), their life expectancies are defined as follows.

Be operated at the maximum speed:

High quality tubes (PA、PC、PP): 30-50 operations

Ordinary tubes (PA, PC, PP): around 10 operations (Using in low speed can extend the tube life).

Life expectancy of tubes also depends on the pretreatment conditions such as cleaning and sterilization; lifetime can be cut down.

Notice: Do not use damaged or cracked tubes

11. Calculate Relative Centrifuge Force (RCF)

Relative Centrifuge Force (RCF) can be determined with the following calculation formula. RCF=1.118×r×n2×10-5

R—rotating radius, unit :cm ;n—rotating speed, unit: rpm

12. Warranty

12.1 Warranty for the centrifuge

This centrifuge is covered by a two-year warranty from the date of delivery, provided it has been properly operated and maintained.

12.2 Warranty for the rotor

The rotor is guaranteed for 5 years from the date of delivery upon manufacture. Please pay attention, do not use the rotor once it has been corrosion or fatigue damage. We do not guarantee this centrifuge and the rotor under the following conditions even if within the guarantee period expires:

1. Failures caused by incorrect installation.
2. Failures caused by rough or improper handling.
3. Failures caused by conveyance or relocation after installation.
4. Failures caused by unauthorized disassembly or modification.
5. Failures caused by using parts of the other companies, such as rotors and adapters.
6. Failures caused by natural disasters including fire, earthquakes and so on.
7. Consumables and parts have a limited guarantee period

13. After-sales Service

To ensure to operate centrifuge safely and efficiently, it is necessary for regular maintenance. If centrifuge has problems, do not attempt to repair it yourself. Contact our sales or service centre.

Note: The production date and service life information can be referred to the following content

Production date: See machine nameplate

Life and warranty

1. Under normal circumstances, the whole machine life is five years.
2. Centrifuge provides 2-year warranty from the manufacturer's delivery date.
3. The rotor is covered by a 5-year warranty from the manufacturer’s delivery date.

Note: The following conditions are not covered by the warranty:

1. Incorrect installation damage.
2. Incorrect operation damage.
3. Damage caused by handling or transportation.
4. Damage caused by unauthorized disassembly.
5. Damage caused by using non-original parts.
6. Damage caused by irresistible natural causes such as earthquakes and fire.
7. Accessories and consumables exceed the warranty period.

Nota importante para los aparatos electrónicos vendidos en España

Instrucciones sobre la protección del medio ambiente y la eliminación de aparatos electrónicos:

Los aparatos eléctricos y electrónicos marcados con este símbolo no pueden ser eliminados en forma de residuos urbanos.

De conformidad con la Directiva 2012/19/UE, los usuarios de la Unión Europea de aparatos eléctricos y electrónicos, tienen la posibilidad de devolver sus RAEE para su eliminación al distribuidor o fabricante del equipo después de la compra de uno nuevo. La eliminación ilegal de aparatos eléctricos y electrónicos es castigada con multa administrativa.

Remarque importante pour les appareils électroniques vendus en France

Informations sur la protection du milieu environnemental et élimination des déchets électroniques :

Les appareils électriques et électroniques portant ce symbole ne peuvent pas être jetés dans les décharges.
En réponse à la règlementation, Labbox remplit ses obligations relatives à la fin de vie des équipements électriques de laboratoire qu'il met sur le marché en finançant la filière de recyclage de ecosystem dédiée aux DEEE Pro qui les reprend gratuitement (plus d'informations sur www.ecosystem.eco).
L'élimination illégale d'appareils électriques et électroniques est punie d'amende administrative.

Nota importante per le apparecchiature elettroniche vendute in Italia

Istruzioni sulla protezione ambientale e sullo smaltimento dei dispositivi elettronici:

Le apparecchiature elettriche ed elettroniche contrassegnate con questo simbolo non possono essere smaltite come rifiuti urbani.
In conformità con la Direttiva 2012/19 / UE, gli utenti dell'Unione Europea di apparecchiature elettriche ed elettroniche hanno la possibilità di restituire i propri RAEE per lo smaltimento al distributore o al produttore di apparecchiature dopo averne acquistato uno nuovo. La rimozione illegale di apparecchiature elettriche ed elettroniche è punibile con una sanzione amministrativa.