P0290

BACOENG Vacuum Pump and Manifold Gauge Set User Manual

Please Read Carefully Before Use

Retain This Manual for Future Reference

User Manual

Disclaimer

- Please read this disclaimer thoroughly and carefully before continuing with the rest of this manual.

- **As-Is Condition**

- This BACOENG product is provided and sold “as is,” without any express or implied warranties, including, but not limited to, implied warranties of merchantability or fitness for a particular purpose.

- **Product Modifications**

- Any modification, alteration, or unauthorized change made to BACOENG products will void any applicable warranties and may cause property damage or personal injury. BACOENG shall not be responsible for any damage, loss, or injury resulting from such modifications or alterations.

- **Legal Compliance**

- Customers are responsible for ensuring that their use of BACOENG products complies with all applicable laws and regulations in their respective jurisdictions. BACOENG assumes no responsibility for any violation of laws or regulations arising from the use of its products.

- **Proper Use**

- Always use BACOENG products strictly in accordance with the instructions provided in the accompanying manuals. Failure to follow these instructions may

result in personal injury or property damage. Assembly, installation, operation, maintenance, and repair of BACOENG products should always be performed by a qualified and competent person. Regular maintenance must be carried out throughout the service life of the product. It is your responsibility to keep the product in proper working condition and to ensure it operates as intended. Always wear suitable personal protective equipment.

- **Third-Party Products**

- BACOENG shall not be liable for any damage, loss, or injury resulting from the use of third-party products together with BACOENG products. Customers should refer to the relevant instructions, guidelines, and warranties, if any, provided by the third-party manufacturer.

- **Limitation of Liability**

- BACOENG shall not be liable for any direct, indirect, punitive, incidental, special, or consequential damages, including damage to property or injury to persons, arising from or related to the use or misuse of BACOENG products. Under no circumstances shall BACOENG's total liability exceed the purchase value of the products sold.

- This disclaimer represents the full extent of BACOENG's obligations regarding BACOENG products. If any part of this disclaimer is found to be void, invalid, unenforceable, or unlawful, including, but not limited to, the warranty disclaimers, liability disclaimers, and limitations of liability stated above, the invalid or unenforceable provision shall be replaced by a valid and enforceable provision that most closely reflects the original intent. The remaining provisions shall continue to remain in full force and effect.

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1. Safety Information

1.1 General Instructions

- This product is not intended for use by persons under 18 years of age.
- Read all instructions carefully before setup, operation, and maintenance. Follow all instructions strictly during setup, use, and maintenance. Failure to do so may result in serious property damage or personal injury.
- Using incompatible refrigerants may damage the product and create safety hazards.
- This product is not a toy. Do not use it carelessly, improperly, or for amusement.
- Any use not specifically described in this manual may create hazards and may void all express or implied warranties.

- These instructions provide a general introduction to this product. For task-specific procedures, also refer to the service manual provided by the manufacturer of your A/C system.

1.2 Workspace Safety

- Always keep the work area clean, organized, and well lit. Cluttered or poorly lit areas increase the risk of accidents.

- Always ensure that the work area is adequately ventilated. Servicing refrigerant systems in enclosed or poorly ventilated spaces may cause harmful vapor buildup and other serious hazards.

- Never place flammable materials, explosives, or heat sources in the work area. Fireworks, open flames, sparks, and similar hazards may cause fire or explosion.

- Limit access to the work area as needed to prevent interference and reduce the risk of injury.

1.3 Personal Safety

- Do not use this product while tired or under the influence of alcohol, drugs, or medication that may impair judgment or coordination.

- Do not allow this product to be used by children, persons without proper HVAC training, persons unfamiliar with this product or the compatible A/C system, or anyone whose physical or mental condition prevents safe operation.

- Always keep bystanders, children, and pets away from the work area during operation.

- Always wear ANSI- or OSHA-approved personal protective equipment (PPE), including respiratory, eye, and hand protection. Refrigerant may irritate the eyes, nose, throat, and skin, and may cause frostbite, irregular heartbeat, loss of consciousness, or even death. Hearing protection is also required due to the noise produced by the vacuum pump during operation.

- Any assistants or other persons permitted near the work area must wear equivalent PPE.

1.4 Electrical Safety

- Always inspect the vacuum pump power cord for damage before evacuation. Never use any electrical device with a damaged or defective power cord. Replace the power cord only with an identical or approved replacement.

- Use the vacuum pump only with a stable, compatible, and properly grounded power supply.

- Do not use damaged outlets, 3-prong to 2-prong adapters, ungrounded extension cords, or extension cords with an insufficient wire gauge for the pump's electrical load.

- If power is interrupted during operation, unplug the vacuum pump immediately and keep it disconnected until power is restored.

- Do not move or carry the vacuum pump by pulling on the power cord.

- Do not attempt to disassemble, alter, or repair the power cord.

- Keep the vacuum pump dry. Do not operate it with wet hands or in highly humid environments. Do not rinse the entire pump with tap water, immerse it in water, or expose it to rain.

- If any electrical component becomes wet, disconnect the pump from power immediately and allow it to dry completely before resuming use.

- Disconnect the vacuum pump from power before performing any maintenance or repair. If testing or other procedures require power to be restored, wear insulated hand protection throughout the entire process.

1.5 Operational Safety

- Before each use, check that all parts of this product are intact, properly installed, and securely tightened.

- Never operate this product if any component is damaged or shows signs of malfunction. Repair or replace defective parts before further use. Use only identical or authorized replacement parts.

- Always turn off the A/C system before performing evacuation with this product.

- Avoid all direct contact with vacuum pump oil. If oil contacts the skin, remove contaminated clothing and rinse the affected area with plenty of water. If oil contacts the eyes, flush immediately with plenty of water for at least 15 minutes and seek medical attention. Never swallow vacuum pump oil, as it may cause fatal injury.

- Always use the correct attachments and connections. Incorrect connections may cause serious equipment damage or personal injury.
- Always perform leak tests on both this product and the A/C system before charging. Repair any leaks promptly and confirm that the system is leak-free before proceeding.
- Do not charge the A/C system beyond the pressure range specified in the system's service manual.
- Stay alert, pay close attention to the task, and use sound judgment when operating this product.
- If you experience symptoms such as headache, dizziness, or nausea during use, stop work immediately and move to fresh air. Do not resume work until proper ventilation has been provided.
- Do not leave this product unattended while it is connected to power, the A/C system, or a refrigerant can.
- Use extreme caution when disconnecting quick couplers and hoses after use. They may still contain pressurized refrigerant.
- Do not operate the vacuum pump without the specified oil, or with oil of an unsuitable viscosity.
- Do not operate the vacuum pump if the oil appears cloudy or contaminated.
- Do not operate the vacuum pump with the oil inlet open or the drain cap loose.
- During operation, always keep the oil level between the MIN and MAX marks on the reservoir window. Do not overfill the reservoir, and do not allow the pump to run without sufficient oil.
- Do not clean or maintain this product with harsh abrasives or corrosive chemicals.
- Never disassemble the vacuum pump or manifold gauge set unless you have proper professional training.
- Only trained technicians should access or service internal components.
- Dispose of this product in accordance with all applicable local and national laws and regulations.

2. Specifications

Note: Negative pressure readings are shown in inches of mercury (inHg), which are approximately equal to one-half of the corresponding psi value.

Input Voltage & Frequency	110(V) AC, 60 Hz	
Rated Power	¼ HP	186 W
Evacuation Speed	3.6 cfm	0.10 m³/m
Oil Capacity	8.8 fl. oz.	250 mL
Dimensions	11.02×4.72×9.45 (in.)	28×12×24 (cm)
Net Weight	12.35 lb.	5.6 kg

Gauge Set

Compatible Refrigerant		R134A,R22,P410A,R12	
Low Pressure Gauge	Pressure Range	−30* to 350 (psi)	−1 to 25 (bar)
High Pressure Gauge	Pressure Range	-30 to 760 (psi)	-1 to 53 (bar)
Hoses	Length	4.9 ft.	1.5 m
	Max. Pressure	4000 psi	276 bar
Net Weight		4.9 lb.	2.2 kg

3. Package List

编号	名称	图	数量
A	Vacuum Pump		×1
B	Pressure Gauge Set		×1
C	Vacuum Pump Oil		×1
D	Dual-Purpose Hose (Yellow)		×1
E	Low-Pressure Hose (Blue)		×1

F	High-Pressure Hose (Red)		×1
G	5/16" SAE Female to 1/4" SAE Male 90° Elbow Adapter		×1
H	Hook		×1
I	Valve Core Removal Tool		×1
J	Accessory Kit		×1
K	Bag		×1

Not Included but Required or Recommended

- Refrigerant Can
- Flathead Screwdriver
- Dust Mask
- Micron Gauge
- Funnel
- Safety Goggles
- 4 mm Hex Wrench

Refrigerant may irritate the eyes, nose, throat, and skin. It may also cause frostbite, irregular heartbeat, loss of consciousness, or even death. Inadequate preparation may increase the risk of accidents and result in serious consequences.

4. Product Diagram

Refer to the product diagram supplied with this manual.

5. Preparation

5.1 Clearing the Work Area

5.1 Before starting, make sure the work area meets the following requirements:

- No bystanders, children, or pets are present.
- Any assistants nearby are wearing the required PPE.
- The area is well lit and properly ventilated, while still being adequately protected from weather and outdoor elements.
- The area is clean, organized, and free of clutter that may interfere with the work or create safety hazards.
- The area is free of flammable materials, explosives, and heat sources, including fireworks, open flames, sparks, and similar hazards.

5.2 Putting on Proper PPE

Breathing, eye, and hand protection are Recommended PPE: required and should meet the standards

Not Included by ANSI (American National Standards

Institute) or OSHA (Occupational Safety

and Health Administration). Hearing protection is also necessary for the use of the vacuum pump.

5.3 Checking This Product

After unpacking and before setup or operation, check that all parts of this product are present, intact, and in proper working condition.

If any part is damaged, missing, broken, or defective, contact your local dealer or contractor for an identical replacement before use.

Using this product with missing, damaged, non-identical, or unauthorized parts may create serious safety hazards.

5.4 Getting Familiar with Your A/C System

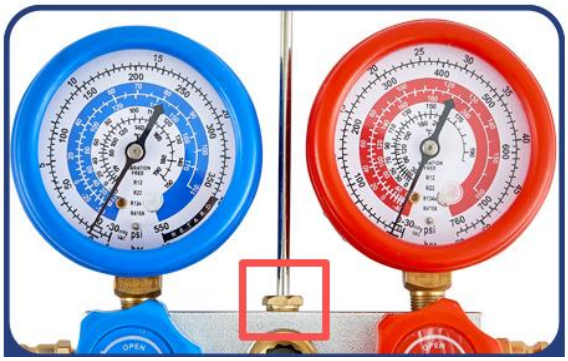
For safe and proper operation, make sure you understand your A/C system and have received sufficient training before using this product.

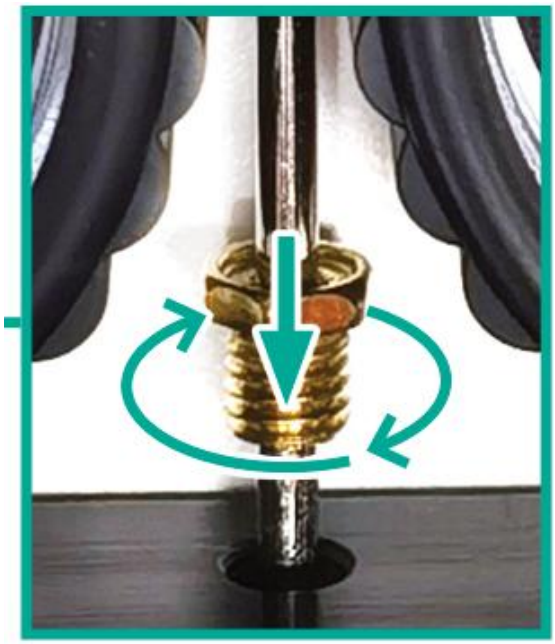
Lack of knowledge or training may lead to equipment failure, incorrect operation, accidents, or personal injury.

6. Initial Setup

6.1 Installing the Hook

- Attach the hook to the center hole of the manifold gauge set .
- Slide the locking nut downward and tighten it securely into place.
- Hang the gauge set by the hook as needed during use.





6.2 Connecting the Pressure Hoses to the Gauge Set

- Turn the knobs on the manifold gauge set fully clockwise to completely close both the low-pressure (LP) and high-pressure (HP) valves.
- Remove the protective caps from the valve ports located below the knobs.
- Wrap the port threads with the provided sealing tape .
- Make sure the tape does not block the port openings.
- Connect the pressure hoses to the corresponding valve ports.
- Do not interchange the two color-coded hoses. They are not interchangeable.
- Use the hose ends without copper cores inside for this connection.
- Connect the blue LP hose to the port below the blue LOW knob.
- Connect the red HP hose to the port below the red HIGH knob.
- Tighten the connections securely using the locking nuts on the hoses.

Tighten these connections using the hoses' locking nuts.

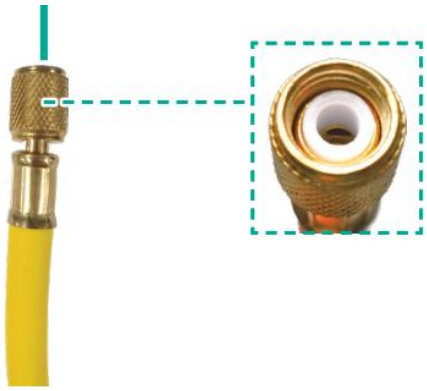
7. Operation

7.1 Evacuation

Before proceeding, confirm again that your A/C system has been completely turned off.

7.1.1 Connecting the Dual-Purpose Hose to the Gauge Set

- Remove the protective cap from the dual-purpose port located in the center of the manifold gauge set。
- Connect a micron gauge (not included) to the center port and the yellow dual-purpose hose . Use additional adapters if required.
- Tighten all connections securely.



- Connecting the Dual-Purpose Hose to the Vacuum Pump
- Locate the 1/4 in. gas inlet on the vacuum pump.
- Unscrew and remove the inlet cap.
- Connect the copper-core end of the yellow hose to the gas inlet.
- Tighten the connection securely using the hose locking nut.

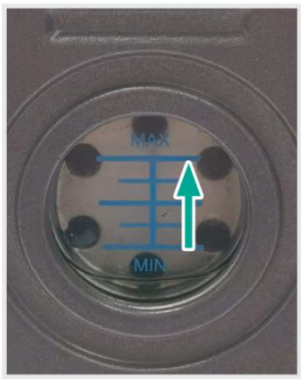
7.1.2Filling the Oil Reservoir

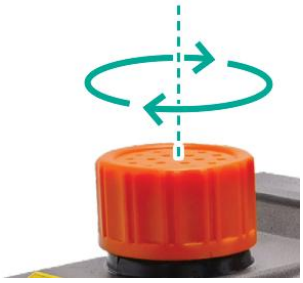
Never operate the vacuum pump without the provided vacuum pump oil or a proper equivalent. Failure to use the correct oil may damage the pump, create safety hazards, and void all express or implied warranties.

- Place the vacuum pump on a clean, firm, flat, level, nonflammable, and nonslip surface.
- Retighten the oil drain cap using a 4 mm hex wrench (not included).
- Unscrew and remove the filter to expose the oil inlet.
- Carefully add the vacuum pump oil until the oil level in the reservoir window is between the MIN and MAX marks. To avoid spills, use a funnel (not included) that fits the oil inlet.
- Reinstall and tighten the filter.

Warnings:

- Vacuum pump oil is flammable and must be kept away from open flames, sparks, and other ignition sources.
- Never swallow vacuum pump oil or allow it to contact bare skin.





7.1.3 For home A/C systems that use R410A refrigerant:

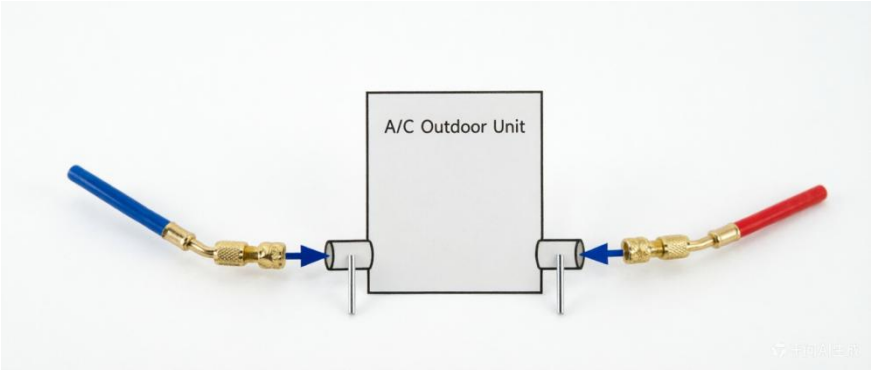
Wrap the male threads of the 1/4" male to 5/16" female adapters a.b.Attach the two adapters' male ends to the blue and red hoses' angled ends, then fullytighten the connections by hand.

Connect the blue hose with the adapter to the suction line service port on the A/CC.

outdoor unit, then fully tighten the connections by hand.

Connect the red hose with the adapter to the liquid line service port on the A/Cd.

outdoor unit, then fully tighten the connections by hand.



- When the micron gauge reads less than 500 microns, close the LP valve by turning its knob COMPLETELY clockwise. Your A/C system should be fully cleared.

- Flip the power switch to O, turning off the pump.

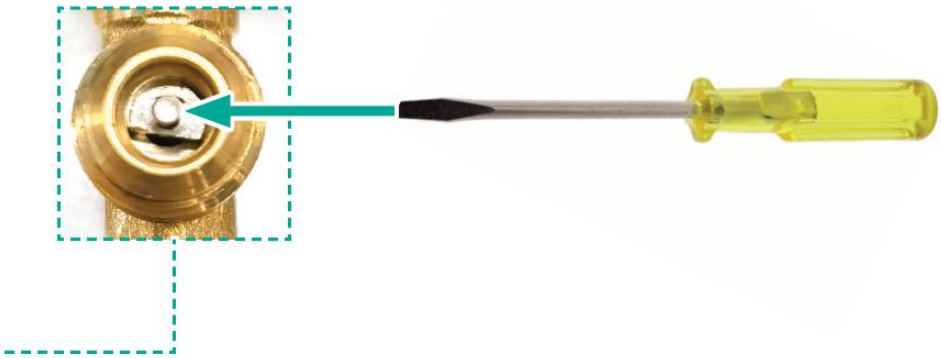
- Charging without performing a leak test first may create safety hazards.
- Start the A/C system and set it to the maximum cooling setting and highest fan speed.
- Locate the red HP quick coupler connected to the HP service port of the A/C system.
- Turn the knob on the red HP quick coupler fully clockwise to open the HP service port.
- Open the HP valve by turning the red HIGH knob fully counterclockwise.
- Observe the pointer on the red HP gauge.
- If the pointer remains steady, no leak is indicated.
- After confirming that there are no leaks, close the HP valve by turning the red HIGH knob fully clockwise.

service port using the red **HIGH** coupler.

7.1.4 Charging Your A/C System

Before charging:

- Start charging ONLY after confirming that there are NO leaks.
- DO NOT overcharge the A/C system.
- Consult the specifications for your A/C system before charging. Confirm the recommended pressure that indicates a full charge.



If the pressure gauges read above 0 psi before charging, unscrew the cap above the dual-purpose port and press the valve core inside until excess air is fully released and the readings return to the proper state.

- Locate the blue LP quick coupler connected to the LP service port of the A/C system.

- Turn the knob on the blue LP quick coupler fully clockwise to open the LP service port.

- Open the LP valve by turning the blue LOW knob fully counterclockwise. Charging should begin.

- Watch the sight glass on the manifold gauge set. Make sure refrigerant continues to flow and does not run out during charging.

Turn its knob completely clockwise, opening the service port.

- Open the LP valve by turning the blue LOW knob completely counterclockwise. Charging should begin.

- Pay attention to the window of the pressure gauge set. Ensure that refrigerant is continuously flowing through and does NOT run out midway.

Notes:

- A small amount of refrigerant may remain in the can even when the sight glass shows no visible flow. If necessary, gently shake the can while holding it upside down, then check the sight glass again.

- If the refrigerant runs out before charging is complete, close the LP valve as described in Step 5 before attaching the tap to a new can.

- Refrigerant cans MUST be disposed of in accordance with all applicable

laws and regulations.

- When the LP gauge reaches the recommended pressure, close the LP valve by turning the blue LOW knob fully clockwise. Charging should stop.

- Loosen the locking nuts and disconnect the three hoses from the can tap, quick couplers, and manifold gauge set.

- Always disconnect this product from power and from the A/C system before performing any maintenance. Failure to do so may result in accidents, equipment damage, or personal injury.

- For tests or other procedures that require power or system connections to be restored, wear insulated hand protection, as well as ANSI- or OSHA-compliant respiratory and eye protection.

- Take care not to scrape, cut, or abrade the hoses. Do not drop the vacuum pump or manifold gauge set onto hard or rough surfaces.

- For home A/C systems that use R410A, R22, or R404A refrigerant:

Connect the yellow hose's angled end to your refrigerant tank (not included), and fully tightenthe connection.

8.1 Cleaning

After each use, remove debris, dust, and oil from the external surfaces of the vacuum pump, manifold gauge set, hoses, and other accessories as needed.

Recommended tools:

- Soft dry brush

- Soft damp cloth

- ANSI- or OSHA-compliant compressed air

Cleaning precautions:

- Always avoid direct high-pressure spraying.
- Do not flush or soak this product.
- Never use abrasive or caustic cleaners.

8.2 Replacing the Vacuum Pump Oil

Monitor the oil through the reservoir window. If the oil becomes cloudy or contaminated, replace it as follows:

- Make sure the oil is warm.
- If you are unsure, run the pump for approximately 10 minutes to warm the oil sufficiently. Turn off and unplug the pump before continuing.
- Unscrew the oil drain cap using a 4 mm hex wrench (not included).
- Hold the carrying handle and tilt the pump downward to drain the oil into a suitable container.
- Once the reservoir is empty, reinstall and tighten the drain cap.

8.3 Inspection

After each use, inspect the vacuum pump, manifold gauge set, hoses, and other accessories for wear, damage, or malfunction.

Repair or replace any defective parts before further use.

- Do not disassemble the vacuum pump or manifold gauge set unless you have proper professional training.
- Only trained technicians should repair internal components.
- Never use non-identical or unauthorized replacement parts.
- Any unauthorized modification may void all express or implied warranties.

8.4 Storage

If this product will not be used for an extended period, clean all components, seal all ports with their protective caps, place the components in the included case and bag , and store everything in a location that is:

- Clean, cool, and dry
- Away from flammable materials, explosives, corrosive substances, and heat sources
- Inaccessible to children and pets
- Protected against unauthorized use
- Well protected from weather and outdoor elements

9. Troubleshooting

Problem: The vacuum pump does not turn on or shuts off automatically.

Possible solutions:

- Make sure the power source is working properly.
- Firmly reconnect the power cord to both the power source and the pump inlet.
- Check the power cord for damage. If damage is found, contact your local dealer or contractor for an identical replacement.
- Pry open the fuse box and inspect the fuse inside. If the fuse is burnt, replace it with a new F6AL250V fuse and FULLY resolve the cause BEFORE resuming use.
- Move the pump to a warmer location and wait for a while before restarting it.
- The thermal protector will shut off the pump if the motor reaches 160°F (70°C). Wait approximately 15 minutes for the motor to cool down before restarting the pump.

Problem: Oil leaks from the vacuum pump.

Possible solutions

- Retighten the oil drain cap.
- Make sure the pump is placed on a flat and level surface.

Problem: Smoke comes out of the filter.

Possible solution:

- This is normal and requires NO repair. To reduce smoke emission, make sure all connections are secure and keep the oil level between the MIN and MAX marks on the reservoir window.

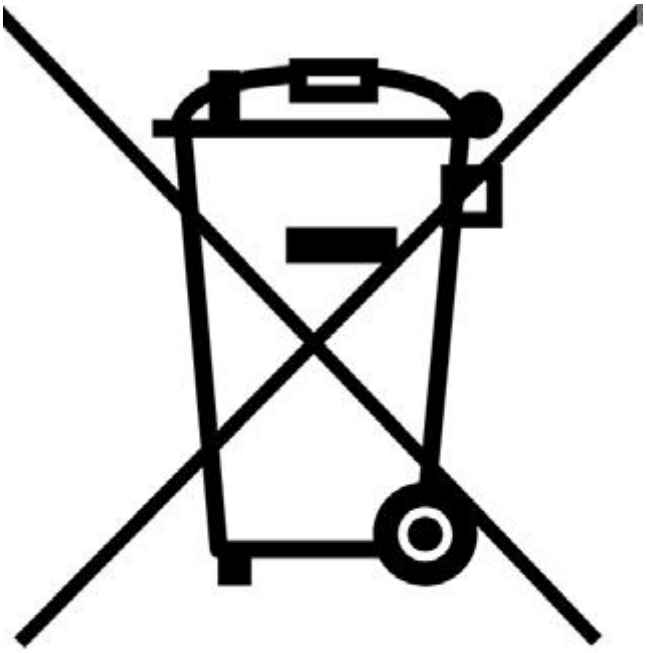
10. Disposal

Electrical products should NOT be disposed of together with household waste.

In the EU and the UK, under European Directive 2012/19/EU on waste electrical and electronic equipment and its implementation in national laws, used electrical products must be collected separately and disposed of at designated collection facilities.

Similar disposal and recycling regulations may apply in Australia, Canada, the United States, and other regions. Contact your local authorities or dealer for proper disposal and recycling guidance.

Thank you for choosing BACOENG products. If you have any questions or need further assistance, please contact us。



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