AC400D-Dual

AC Recycle & Recharge Machine

USER MANUAL

Service and support

Tel: 443-380-0088

Web: www.bludee.com

7090 GOLDEN RING RD STE107, ROSEDALE, MD 21237

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INTRODUCTION

Thank you for choosing the Bludee AC400D-Dual Recycle and Recharge Machine.

This unit is engineered to enhance technician efficiency and streamline air-conditioning service operations. Designed for professional workshops, the AC400D-Dual supports both R-134a and HFO-1234yf refrigerants, minimizing downtime and maximizing service flexibility.

The system features:

- Dual refrigerant tanks for seamless switching without manual replacement

- Low-loss changeover (<1.76 oz) with deep internal evacuation to prevent cross-contamination

- Quick-access load cell unlocking for simplified maintenance

- Built-in self-diagnostics and USB upgrade capability for long-term reliability

While the AC400D-Dual supports technician-level maintenance, Bludee recommends that service and calibration be performed by qualified personnel to ensure optimal performance and safety.

For technical support, maintenance assistance, or refrigerant handling inquiries, please contact Bludee Support at 443-380-0088 or visit www.bludee.com.

GENERAL SAFETY

The storage cylinder in this unit contains liquid refrigerant. Overfilling can lead to an explosion. Do not disable the overfill safety feature and always keep the cylinder on the load cell platform during operation.

Operators must thoroughly read this manual before using the equipment. Incorrect operation may result in improper A/C service, damage to the vehicle's A/C system, or equipment failure.

Use only cylinders recommended and supplied by Bludee for this equipment.

Avoid inhaling refrigerant or oil vapor/mist. Refer to the material safety data sheets (SDS) on refrigerant and oil packaging.

Switch off and disconnect the power cable from the main supply before removing any covers or servicing the equipment to prevent electric shock, which can be dangerous or fatal.

Never use compressed air for leak testing the unit or vehicle A/C system.

Wear safety goggles and gloves to protect eyes and skin from refrigerant contact, which can cause frostbite or blindness. In case of accidental contact, rinse the affected area with plenty of fresh water and seek medical attention immediately.

Avoid using extension cords with a copper core diameter less than 14 AWG.

Keep gasoline and other flammable substances away from the equipment.

Always operate the unit in a well-ventilated area, away from artificial heat sources.

Safety Symbols Key

Symbol	Description
⚠️	**Warning**: Indicates a risk of injury or equipment damage.
⚡	**Electrical Hazard**: Risk of electric shock; disconnect power before servicing.
🥽	**Protective Equipment**: Wear safety goggles and gloves during operation.
🧯	**Fire Hazard**: Keep flammable substances away from the machine.
📜	**SDS Reference**: Consult Material Safety Data Sheets for refrigerant/oil handling.

Bilingual Warnings (English/Spanish)

- **English**: Overfilling the storage cylinder can cause a violent explosion.
  Spanish: Llenar en exceso el cilindro de almacenamiento puede causar una explosión violenta.
- **English**: Wear safety goggles and gloves to prevent refrigerant-related injuries.
  Spanish: Use gafas de seguridad y guantes para prevenir lesiones relacionadas con el refrigerante.

Refrigerant and Oil Disposal

To comply with EPA regulations (40 CFR Part 279) and local laws:

1. Store recovered refrigerant in approved containers for on-site recycling or transfer to an EPA-approved reclamation facility.
2. Dispose of used oil and filter-driers at certified hazardous waste facilities. Contact your local waste management authority for locations.
3. Maintain a log for all disposal activities at least 3 years per EPA Section 609, including:
   - Date of disposal
   - Type and amount of refrigerant/oil
   - Disposal facility name and address

Sample EPA Maintenance Log Template:

Date	Refrigerant Type	Amount (lb)	Recovered	Oil Disposed (fl oz)	Filter-Drier Replaced	Disposal Facility
MM/DD/YYYY	R-134a/HFO-1234yf				Yes/No	

Note: For disposal guidance, contact Bludee at 443-380-0088 or visit www.bludee.com.

U.S. Regulatory Compliance

This equipment must comply with U.S. Environmental Protection Agency (EPA) regulations under Section 609 of the Clean Air Act for refrigerant recovery and recycling equipment used in motor vehicle air conditioning systems. Key requirements include:

- **Certification**: The AC400D-dual meets SAE J2788 (for HFO-1234yf) and SAE J2210 (for R-134a) standards, ensuring at least 95% refrigerant recovery efficiency and minimal cross-contamination.

- **Technician Training**: Operators must be certified under an EPA-approved Section 609 program to handle refrigerants. Uncertified personnel must not operate this equipment.
- **Refrigerant Handling**: Recovered refrigerants must be stored in approved containers and either recycled on-site using EPA-certified equipment or sent to an EPA-approved reclamation facility. Venting refrigerants into the atmosphere is prohibited.
- **Recordkeeping**: Maintain records of refrigerant recovery, recycling, and disposal as required by EPA regulations, including the amount of refrigerant recovered and the condition of the filter-drier.
- **Equipment Maintenance**: Regular maintenance, including filter-drier replacement and leak checks, must be performed to comply with EPA standards and prevent refrigerant emissions.

Failure to comply with these regulations may result in fines or penalties. For detailed guidance, refer to the EPA's website at www.epa.gov/section609.

California Regulations and Proposition 65 Warning

Proposition 65 Warning: This product may expose you to chemicals, including R-134a, HFO-1234yf, and compressor oils (PAG/POE), which are known to the State of California to cause cancer, birth defects, or other reproductive harm. For more information, go to www.P65Warnings.ca.gov. Always wear protective gear, operate in a well-ventilated area, and use spark-free tools to minimize exposure and fire risk, especially when handling HFO-1234yf.

California Refrigerant Regulations: In California, the AC400D must comply with the California Air Resources Board (CARB) regulations for refrigerant management. Operators must:

- Use CARB-certified equipment for R-134a (SAE J2210) and HFO-1234yf (SAE J2843) recovery and recycling.
- Maintain detailed records of refrigerant recovery, recycling, and disposal for both R-134a and HFO-1234yf, as per CARB requirements.
- Ensure technicians are EPA Section 609-certified and trained in California-specific refrigerant handling protocols, including precautions for HFO-1234yf's mild flammability (A2L classification).
- Use only approved containers for R-134a and HFO-1234yf storage and disposal. For further details, visit www.arb.ca.gov or contact Bludee at 443-380-0088.

SPECIFICATIONS

Dimensions:

- Packaged: 28 × 26 × 47 inches
- Unpacked: 24 × 23.4 × 42.3 inches

Input Power:

- AC110V ±10%, 60 Hz

Operating Conditions:

- **Operating Temperature**: 32–104°F (0–40°C)
- **Humidity**: <80% non-condensing
- **Storage Temperature**: -4–140°F (-20–60°C)

Pre-Ventilation: After the power switch is turned on, the machine performs a 30-second ventilation before powering on.

Compressor Power: 3/8 HP

Average Gas-State Refrigerant Recovery Speed: 0.55 lb/min (through charge/suction port)

Recovery Rate: 96%

Vacuum Pump Capacity: 4.24 cfm, non-sparking

Vacuum Leak Test: 1–60 minutes

Accuracy of Gas Cylinder Load Cell: ±0.35 oz

Capacity of Dual Gas Cylinders: 22 lb (one for R-134a, one for HFO-1234yf)

New Oil Bottle Capacity: 8.45 fl oz

Used Oil Bottle Capacity: 8.45 fl oz

Cooling System: Dual condensers and cooling fans (one for R-134a, one for HFO-1234yf)

Max. Pressure: 290 psi

Charge Speed: 4.4 lb/min (max.)

Display: 7-inch LCD touch screen

Printer: Thermal printer

Pressure Gauges:

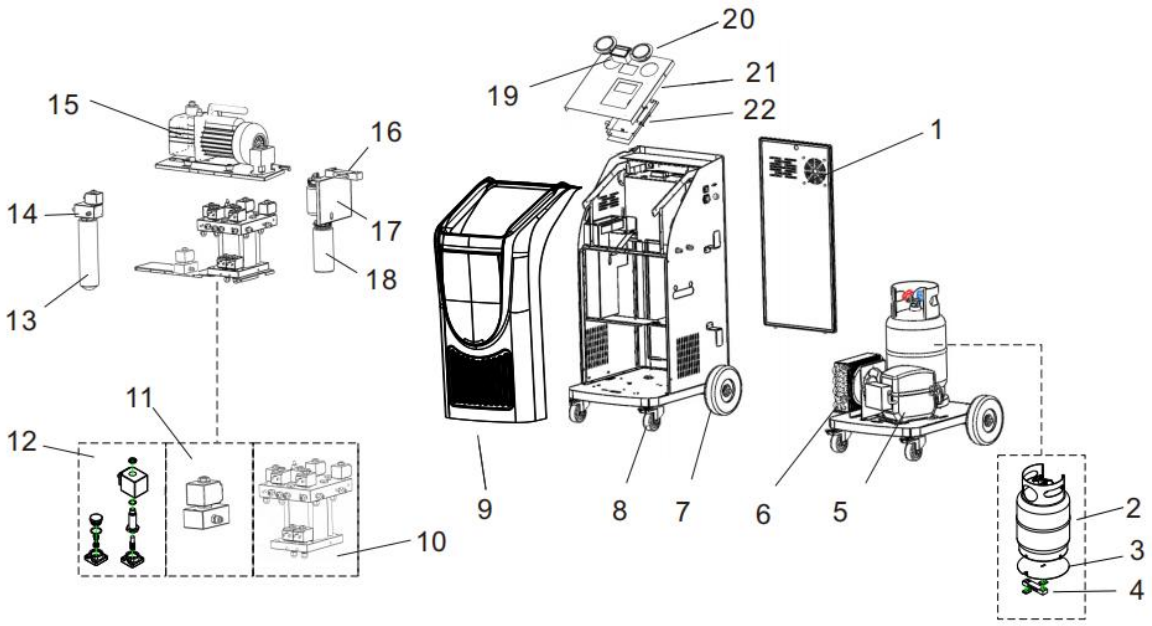
- High Pressure: -14.5 psi to 580 psi
- Low Pressure: -14.5 psi to 319 psi

Automatic Maintenance Reminder: The filter-drier is designed to desiccate and recycle 220 lb of refrigerant. When the filter-drier life expires, the machine locks automatically, requiring maintenance, including filter-drier replacement, pump lubrication oil replacement, solenoid spool washer replacement, and leak testing.

Compatibility: Suitable for fuel, hybrid, or electric vehicles

Optional Feature: Built-in HFO-1234yf refrigerant identifier (accuracy: 0.1%, identification time: 120 seconds)

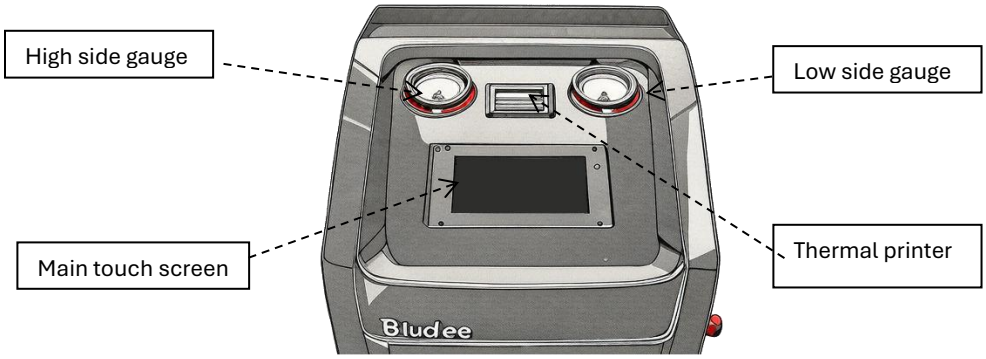
SYSTEM COMPONENT AND LOCATION



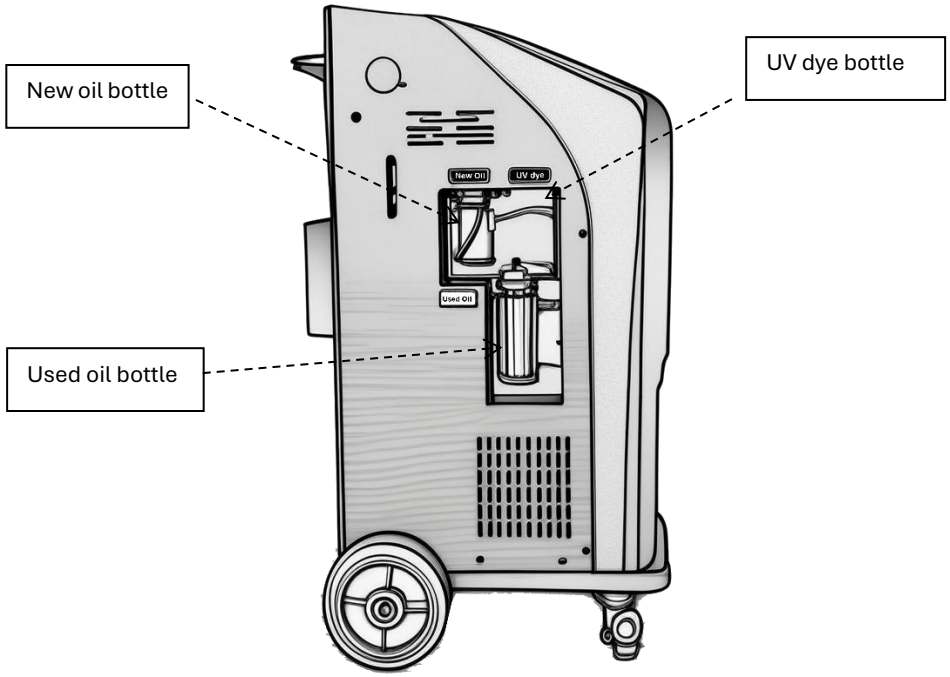
1） Back cover	2） Refrigerant gas cylinder	3) Gas cylinder support plate
4） Gas cylinder load cell	5） Compressor	6） Condenser and cooling fan(optional)
7） Rear wheel	8） Front wheel	9） Front cover(plastic)
10) Manifold assembly 1	11） UV manifold	12） Assembly of solenoid valve and check valve
13） Drier-filter	14） Manifold 2	15） Vacuum pump
16） Oil bottle load cell	17） Oil bottle support	18） Oil bottles
19） Printer	20） Pressure gauges	21) Upper cover
22） PCA		

Component	**Description**	**Location**
HP Gauge	Displays high-pressure readings (-14.5 to 580 psi)	Front panel
Touch Screen	7-inch LCD for operation and settings	Front panel
LP Gauge	Displays low-pressure readings (-14.5 to 319 psi)	Front panel
Vacuum Pump	4.24 cfm, non-sparking, for system evacuation	Internal, rear access
HFO-1234yf Tank	Stores HFO-1234yf refrigerant, 22 lb capacity	Right side
R-134a Tank	Stores R-134a refrigerant, 22 lb capacity	Left side

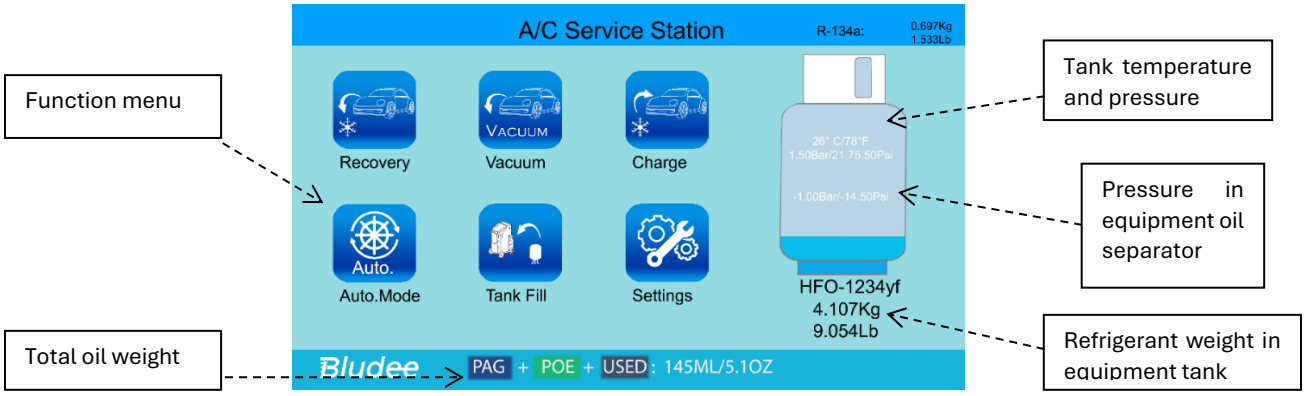
Identifier Filter	Filters HFO-1234yf gas (optional)	Internal, left side
Identifier Oil Separator	Separates oil during identification (optional)	Internal, left side
New Oil Vessel	Holds fresh oil (PAG/POE), 8.45 fl oz	Front, right
HFO-1234yf Tank Gauge	Displays HFO-1234yf tank pressure	Right side
Used Oil Vessel	Collects recovered oil, 8.45 fl oz	Front, left
Non-Condensable Purge Valves	Purges non-condensable gases for each tank	Left/right sides
R-134a Tank Gauge	Displays R-134a tank pressure	Left side
Power Switch	Controls main power	Rear panel
Coupler Connect Fittings	Connects R-134a/HFO-1234yf hoses	Front ports



Control panel



Left view



Main screen

Initial Setup Checklist:

Step	Action	Completed (✓)
1	Unpack and inspect components	
2	Place machine on level surface, 32–104°F environment	
3	Connect to AC110V ±10%, 60 Hz grounded outlet	
4	Verify HP/LP gauges and oil vessels	
5	Connect and secure HP/LP hoses	
6	Initialize system and set language/units	
7	Unlock load cells	
8	Fill with refrigerant and oil	
9	Perform component test and leak check	

INITIAL MACHINE SETUP

Proper setup of the AC400D-dual is critical to ensure safe and efficient operation. Follow these steps to prepare the machine for use:

1. **Unpacking and Inspection**
    - Carefully unpack the machine and verify that all components, including hoses, couplers, oil vessels, and power cables, are included and undamaged.
    - Check for any visible damage to the machine's exterior, gauges, or touch screen. Report any issues to Bludee support at 443-380-0088 or visit www.bludee.com.
2. **Placement**

- Position the machine on a flat, stable surface in a well-ventilated area, away from heat sources, flammable materials, or direct sunlight.
- Operate in temperatures 32–104°F (0–40°C); avoid direct sunlight to prevent overheating.
- Ensure a minimum clearance of 12 inches around the machine for proper ventilation and access to service ports.
- Verify that the machine is level to ensure accurate load cell readings.

3. **Power Connection**
   - Connect the machine to a grounded power outlet matching the specified input power (AC110V ±10%, 60 Hz).
   - Use a power cord with a minimum 14 AWG copper core. Avoid using extension cords unless necessary, and ensure they meet the same AWG requirement.
   - Confirm that the power switch is in the OFF position before plugging in the machine.
4. **Initial Component Check**
   - Inspect the high-pressure (HP) and low-pressure (LP) gauges for proper function and ensure they are at zero when no pressure is applied.
   - Verify that the new and used oil vessels are empty and securely installed.
   - Check that the R-134a and HFO-1234yf refrigerant tanks are properly seated on their load cell platforms.
5. **Hose and Coupler Setup**
   - Connect the HP and LP service hoses to the respective ports on the machine. Ensure connections are tight to prevent leaks.
   - Attach the appropriate R-134a or HFO-1234yf couplers to the service hoses, ensuring compatibility with the refrigerant type to be used.
   - Store hoses securely when not in use to avoid damage.
6. **System Initialization**
   - Turn on the power switch and allow the machine to perform its 30-second pre-ventilation cycle.
   - Follow the on-screen prompts on the 7-inch LCD touch screen to select the language and set the unit to imperial measurements (see “System Settings”).
   - If equipped with a refrigerant identifier, set the altitude in feet (see “Set Altitude”).
7. **Load Cell Unlocking**
   - Remove the two lock bolts securing the load cells of the dual tanks, as described in the “Unlock Load Cells” section.

- Store the bolts in a safe location for use during future transportation.

8. **Refrigerant and Oil Preparation**
    - Fill the machine with R-134a and/or HFO-1234yf refrigerant as outlined in the "Fill Equipment with Refrigerant" section. Use PAG 46/100/150 for R-134a fuel vehicles; POE for HFO-1234yf hybrids. Consult database for exact viscosity.
    - Ensure the new oil vessel is filled with the appropriate refrigeration oil (e.g., PAG for fuel vehicles or POE for hybrid/electric vehicles).
9. **Verification**
    - Perform a component test (see "Component Test") to ensure all solenoids, the vacuum pump, and the compressor are functioning correctly.
    - Check for leaks in the hose connections and tank fittings using a refrigerant leak detector compliant with SAE J2791 standards.
    - Confirm that the filter-drier life is displayed on startup and note the remaining capacity (see "Regular Maintenance and Reset").

Warning: Failure to properly set up the machine may result in inaccurate refrigerant handling, equipment damage, or non-compliance with EPA regulations. Only EPA Section 609-certified technicians should perform the setup.

TANK DIGITAL SCALE CALIBRATION

This procedure outlines the steps to calibrate the digital scale inside the machine tank using a 1 kg calibration weight for either an R134a or HFO-1234yf cylinder.

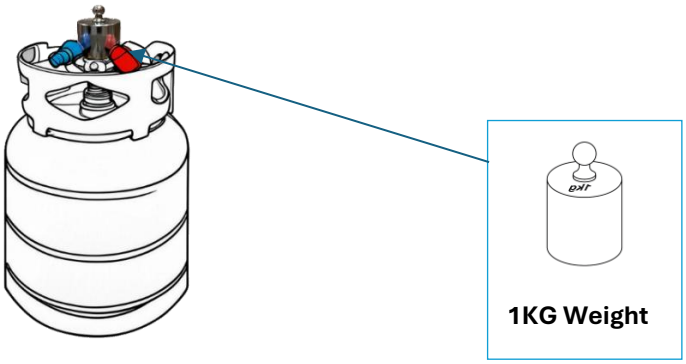
Prerequisites

- **Calibration Weight**: Prepare a certified 1 kg calibration weight. Do not use any other weight, as this will cause calibration failure or inaccurate.
- Ensure the machine is on a flat, stable, and level surface, free from vibrations or air drafts.
- Power on the machine and allow the scale to warm up as per the manufacturer's recommendation (typically 15–30 minutes).
- Do not place any weight on the scale until prompted by the system.

- No additional wire, cable, or anything else attached to the tank.

Calibration Steps

1. **Access Calibration Mode**:
    - Navigate the machine's **System Settings** menu.
    - Select **Calibration**.
    - Choose either **R134a Cylinder** or **HFO-1234yf Cylinder** based on the cylinder type in use.
2. **Place Calibration Weight**:
    - Wait for the system to display the message: **"Please place 1KG weight on top of the tank",** then click OK."
    - **Important**: Do not place 1 kg weight on the tank before this message appears, as it will cause the calibration to fail.



    - Once the message is displayed, carefully place the certified 1 kg weight on top of the tank.
    - Press **OK** on the system interface to proceed.
3. **Complete Calibration**:
    - Allow the scale to stabilize and process the calibration.
    - Once the system confirms calibration is complete, carefully remove the 1 kg weight from the tank.
    - **Note**: Do not remove the tank itself during this procedure.
4. **Verification**:
    - Go back to front page to check the weight
    - To verify scale accuracy, place a 1 kg test weight on the platform, then remove it.
    - Observe the displayed value to ensure the system registers the correct weight change.
5. **Documentation**:

- Record the calibration details (date, time, cylinder type, and confirmation of 1 kg weight used) in the machine's maintenance log.
- If required, attach a calibration label to the machine indicating the calibration date and next due date.

Important Notes

- Use only a certified 1 kg calibration weight. Using any other weight will result in calibration weight inaccurate.
- Ensure the weight is placed only after the system prompts with the message to avoid errors.
- The tank remains in place throughout the procedure; do not remove it.
- If calibration fails, check for environmental factors (e.g., vibrations, uneven surface) or consult the machine's manual for troubleshooting.
- Perform calibration as part of initial setup and at regular intervals as specified by the manufacturer.

OIL BOTTLE SCALE CALIBRATION

This procedure outlines the steps to calibrate the digital scale module located on top of the used or new oil bottle. The scale supports a frame that attaches all oil bottles together, with the frame hanging from the scale at the top. The calibration weight must be placed at the bottom of the metal frame connected to the used or new oil bottle.

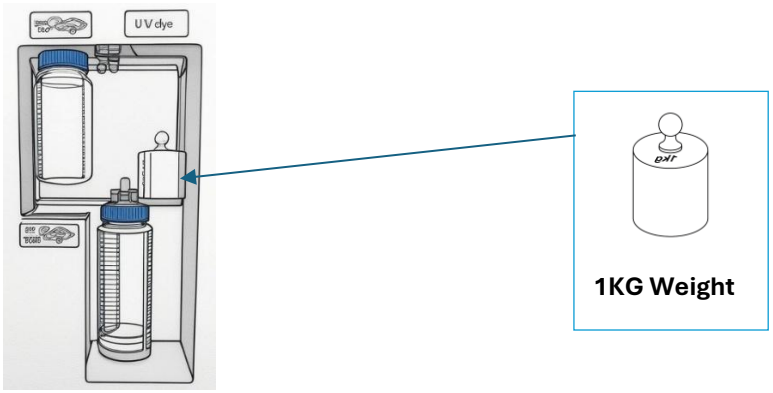
Prerequisites

- **Calibration Weight**: Prepare a certified 1 kg calibration weight. Do not use any other weight, as this will cause calibration failure.
- Ensure the machine is on a flat, stable, and level surface, free from vibrations or air drafts.
- Do not place any weight on the frame or scale until prompted by the system.

Calibration Steps

1. **Access Calibration Mode**:
    - Navigate the machine's **System Settings** menu.
    - Select **Calibration**.
    - Choose either **Oil Load Cell** based on the bottle type being calibrated.
2. **Place Calibration Weight**:
    - Wait for the system to display the message: **"Please place 1KG weight on oil bottle frame,** then click OK."
    - **Important**: Do not place the 1 kg weight before this message appears, as it will cause the calibration to fail.

- Once the message is displayed, carefully place the certified 1 kg weight at the bottom of the metal frame connected to the used or new oil bottle.



- Press **OK** on the system interface to proceed.

3. **Complete Calibration**:
   - Allow the scale to stabilize and process the calibration.
   - Once the system confirms calibration is complete, carefully remove the 1 kg weight from the bottom of the metal frame.
   - **Note**: Do not remove the frame, bottles, or any other components during this procedure.
4. **Verification**:
   - Go back to front page to check the weight
   - To verify scale accuracy, place a 1 kg test weight on the platform, then remove it.
   - Observe the displayed value to ensure the system registers the correct weight change.
5. **Documentation**:
   - Record the calibration details (date, time, bottle type, and confirmation of 1 kg weight used) in the machine's maintenance log.
   - If required, attach a calibration label to the machine indicating the calibration date and next due date.

Important Notes

- Use only a certified 1 kg calibration weight. Using any other weight will result in calibration inaccurate.
- Ensure the weight is placed only after the system prompts with the message to avoid errors.
- The frame and bottles remain in place throughout the procedure; do not remove them.
- If calibration fails, check for environmental factors (e.g., vibrations, uneven surface) or consult the machine's manual for troubleshooting.

- Perform calibration as part of initial setup and at regular intervals as specified by the manufacturer.

SYSTEM FUNCTION OVERVIEW

Function	Description
Recovery	Recovers and purifies refrigerant from the vehicle A/C system to the equipment tank.
Vacuum	Evacuates air and moisture from the A/C system. Prompts manual oil injection upon completion.
Charge	Charges refrigerant from the equipment gas cylinder to the vehicle A/C system.
Tank Fill	Transfers liquid refrigerant from an external storage cylinder to the equipment cylinder.
Auto Mode	Performs selected functions (recovery, vacuum, charge) in a fully automatic sequence, stopping upon completion.
System Settings	Configures language, calibration, database, units, empty container weight, component testing, altitude, and owner information.

PRE-SERVICE SETUP

Before each operational session, perform the following tasks to ensure the AC400D is ready:

1. **Visual Inspection**:

   Inspect the machine for physical damage, loose connections, or signs of refrigerant leaks. Use a SAE J2791-compliant leak detector to check hose connections and tank fittings

2. **Oil Bottle Verification**:
   - Confirm the new oil vessel contains the correct PAG oil viscosity (46, 100, or 150) for the vehicle's R-134a system and POE for HFO1234yf. Refer to the database for specifications.
   - Ensure the used oil bottle is empty to collect recovered oil

3. **Ambient Temperature Check**:
   - Verify the ambient temperature is within 32–104°F (0–40°C) using a thermometer. Both reference tables are available on the left side or right side of the machine, next to tank gauges.

4. **Hose Condition Check**:
   - Inspect HP/LP service hoses for cracks, wear, or degradation. Replace damaged hoses to prevent refrigerant leaks, which impact EPA compliance.

5. **Power Supply Stability**:
   - Confirm the power supply is stable at AC110V ±10%, 60 Hz, using a voltage meter. Unstable power can damage electronics during R-134a operations.

6. **Unlock Tank Load Cell**:

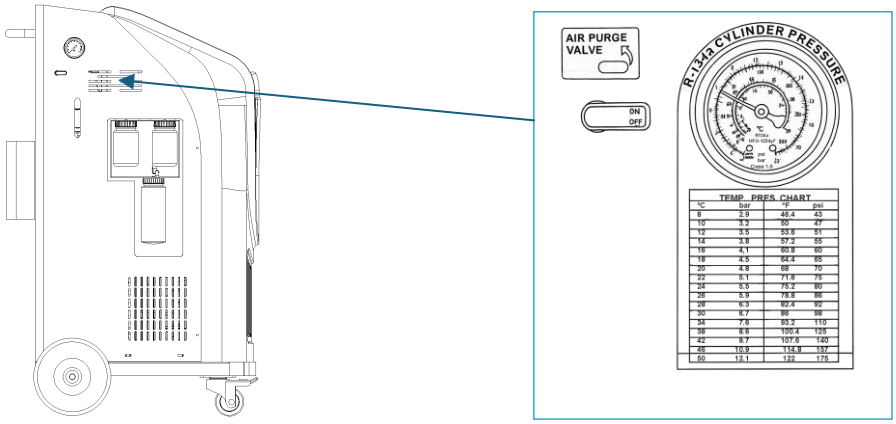
   Remove the safety locking bolt securing the gas cylinder load cell (see “Unlock Tank Load Cell”).

7. **Tank Fill :**

   Ensure 4.4–13.2 lb (4–6 kg) of R-134a is in the internal cylinder. Follow “Tank Fill” instructions if needed.

8. **Non-Condensable Air Purge**:

Purging non-condensable gases removes air and other non-refrigerant gases from the internal refrigerant tanks to maintain refrigerant purity and ensure optimal A/C system performance. This procedure, required monthly or after tank filling, prevents excessive pressure buildup and ensures compliance with EPA regulations. The AC400 may perform an automatic purge (if equipped) or a manual purge using the purge valves located on the left and right sides of the machine, guided by the pressure-temperature chart.



- **Manual Purge Valve**:
  - Locate the purge valve (see “Component Identification”)
  - Refer to the R-134a pressure-temperature chart below and purge until the tank pressure matches the expected value for the ambient temperature.

R-134a Pressure-Temperature Chart:

Temperature (°F)	Pressure (psi)
32	28.8
77	78.7
104	124.2

- **Automatic Air Purge (Optional)**: The machine purges non-condensable gases within 10 minutes based on ambient temperature and tank pressure.

For machines equipped with Auto Air Purge, the system will automatically purge air as needed during operation.

If you prefer to perform air purge manually, navigate to System Settings and select Air Purge to initiate the process.

⚠ Regular air purging helps maintain refrigerant purity and system performance.

⚠ **Warning**: Over-purging can result in refrigerant loss, impacting EPA compliance. Monitor the tank gauge carefully.

9. Drain Oil Separator and Replace Oil Filter (For Machines with Refrigerant Identifier)

Drain the oil separator if oil is visible. Replace the oil filter annually or when oil stains are visible.

10. Select Refrigerant

Upon startup, the machine prompts the user to select the refrigerant type (two options: r134a; HFO 1234yf). If the selected type differs from the previous operation, the machine service couplers need to replace and then automatically recovers refrigerant from internal pipelines, performs a deep internal evacuation, and switches to the selected refrigerant interface. This process may take 10 minutes or more.

Note: Ensure the selected refrigerant matches the vehicle's refrigerant to prevent contamination of equipment tanks. To switch refrigerants, power off and restart the machine, then select the desired refrigerant type.

⚠ **Warning**: Before this internal evacuation switch, you must keep both internal tank valves open. Don't plug service hoses into vehicles or external tanks during the evacuation process.

OPERATING PROCEDURE

Cold Weather Operation Tips

For operations in cold climates (<50°F):

- Extend recovery pause time to 5–7 minutes to ensure complete refrigerant extraction, as R-134a vaporizes slowly at low temperatures.
- Increase evacuation time by 5–10 minutes to remove moisture effectively.
- Use the heater band to maintain R-134a flow during recovery and charging
- Store the machine in a heated area when not in use to prevent component freezing.

Recovery

Before initiating recovery, empty the used oil vessel to ensure accurate oil separation and prevent overflow.

- Connect Service Hoses

– Attach high and low side hoses to the vehicle's A/C ports.

– Ensure valves are opened.

- Select the "Recovery" function from the main menu and press ENTER to begin.

- The machine will extract refrigerant from the vehicle's A/C system until a vacuum is achieved.

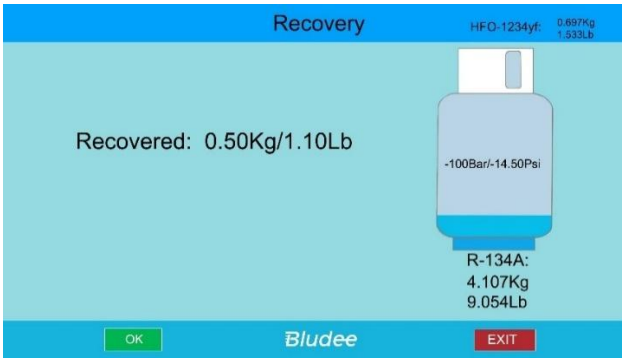
- During recovery, moisture, oil, and debris are automatically separated and filtered before the refrigerant is stored in the internal cylinder.

- Once recovery completes, leave the machine connected for at least 3 minutes to monitor for pressure rise. In colder climates, extend this duration to ensure accuracy.

- If no pressure increase is detected, recovery is complete.

- If pressure rises, the machine will repeat the recovery process to ensure full evacuation.

⚠️ Always verify refrigerant type and tank capacity before starting. Follow EPA guidelines for proper handling and disposal.



Note: For machines with an HFO-1234yf identifier, a 120-second gas identification is performed before recovery. Recovery proceeds only if HFO-1234yf concentration exceeds 98%; otherwise, it is prohibited, and the gas concentration is displayed after an internal vacuum.

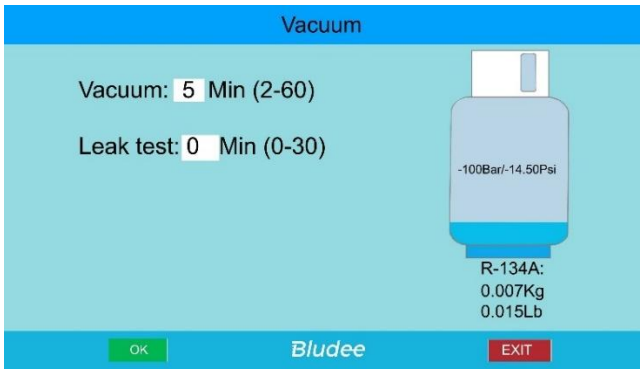
Vacuum

Warning: PAG oil is conductive and must not be used in hybrid/electric vehicles.

The vacuum process removes air, moisture, and residual gases from the vehicle's A/C system to prepare it for oil injection and refrigerant charging. Follow these detailed steps to ensure proper evacuation:

1. **Preparation**
    - Ensure the vehicle's engine and A/C system are off.
    - Connect the high-pressure (HP) and low-pressure (LP) service hoses to the vehicle's A/C system using the appropriate R-134a or HFO-1234yf couplers.
    - Verify that the service hose connections are secure and leak-free using a SAE J2791-compliant leak detector.
    - Check that the used oil vessel is empty to collect any oil extracted during the process.
    - Monitor the front gauge pressure. If there is pressure, the vacuum will stop and you must run the recovery.

2. **Access Vacuum Function**
    - From the main menu, select the “Vacuum” icon.
    - Set the vacuum time (recommended: 10–30 minutes, depending on system size and ambient conditions; longer times ensure thorough evacuation).
    - Confirm the settings by pressing “OK.”
3. **Vacuum Process**



    - The machine activates the vacuum pump to evacuate the A/C system.
    - Monitor the LP and HP gauges to ensure pressure drops to a vacuum state (below -14.5 psi). Target vacuum: 500 microns or lower for optimal moisture removal.
    - The system automatically stops when the set vacuum time is reached, or a stable vacuum is achieved.
    - Note: In cold climates (<50°F), extend vacuum time by 5–10 minutes to account for slower moisture evaporation.
    - If the vacuum level does not stabilize (e.g., pressure rises after stopping), check for leaks in the vehicle’s A/C system or service hoses using a leak detector and repair as needed before repeating the process.
4. **Oil Injection Manual [for some model]**
    - Upon Vacuum completion, the machine can do manual oil injections if the machine has manual oil injection switch.
    - For fuel vehicles, open the new oil vessel hand valve to inject the appropriate amount of PAG oil (refer to the vehicle’s service manual or the machine’s database for oil volume). Use a graduated oil injector for precision.
    - For hybrid/electric vehicles, oil injection through the machine is prohibited due to the risk of electrical issues with PAG oil. Use a specialized, non-conductive POE oil injector compatible with the vehicle’s specifications.
5. **Verification**
    - After vacuuming, leave the system connected for 3–5 minutes to perform a vacuum leak test. If the pressure rises, repeat the vacuum process or check for leaks.
    - Record the vacuum time and any oil injected in your EPA-required maintenance log.

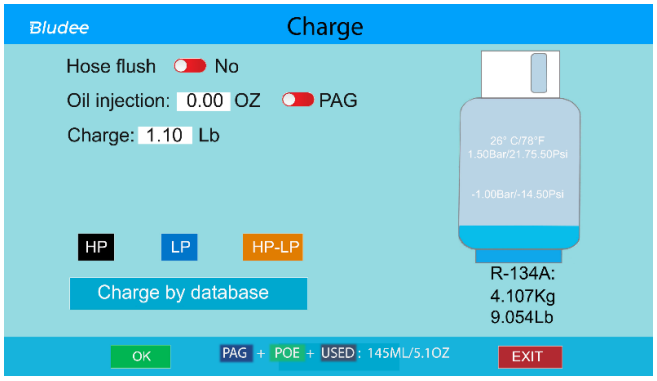
- If issues persist, refer to the “Main Troubleshooting” section or contact Bludee support at 443-380-0088 or www.bludee.com.

Warning: PAG oil is electrically conductive and can cause serious damage if used in hybrid/electric vehicles. Always verify the vehicle type and use the correct oil. Ensure the vacuum process is complete before proceeding to charging to avoid system contamination.

Charge

The charge process transfers refrigerant from the machine’s internal cylinder to the vehicle’s A/C system. Follow these detailed steps to ensure accurate and safe charging:

1. **Preparation**
   - Complete the vacuum process (see “Vacuum”) to ensure the A/C system is free of air and moisture.
   - Verify that the internal refrigerant tank (R-134a or HFO-1234yf) has sufficient refrigerant (8.8–13.2 lb) for charging. If low, perform a tank fill (see “Tank Fill”). If refrigerant is less than 4.4lb, it can’t charge.
   - Ensure the vehicle’s engine and A/C system are off unless specified.
   - Confirm that the HP and LP service hoses are securely connected to the vehicle’s A/C system with the correct couplers.
2. **Access Charge Function**
   - From the main menu, select the “Charge” icon and press “OK.”
   - Choose the charging mode:
     - **Normal Charging**: For fuel vehicles, with optional hose flushing.
     - **High Voltage Charging**: For hybrid/electric vehicles, with mandatory hose flushing to remove oil residue.



   - Set the charge amount:
     - Manually enter the amount (in ounces or pounds) based on the vehicle’s service manual.

- Or use the database (see “Database”) to select the refrigerant volume by car make and model.

- Set Oil Injection, PAG oil (46/100/150) or POE oil by manual input.

  Avoid over-injection to prevent clogging A/C components. Use a graduated injector for precision.

- Select the charging port: high side, low side, or both

  HP & LP are recommended for even distribution. It manually turns the compressor hub post-charge to expel liquid refrigerant.

  If charging via low side, turn on the vehicle A/C.

- Confirm settings by pressing “OK.”

3. **Hose Flushing (If Selected)**

   - For Normal Charging, hose flushing is optional to clear oil residue from the service hoses. If selected, the machine uses liquid refrigerant to flush the hoses, collecting residue in the used oil vessel.
   - For High Voltage Charging, hose flushing is mandatory to prevent oil contamination in hybrid/electric vehicle systems. The machine automatically flushes the hoses before charging.
   - Monitor the process on the touch screen and ensure the used oil vessel does not overfill.

4. **Charging Process**

   - The machine begins transferring refrigerant at a maximum speed of 4.4 lb/min.
   - Monitor the HP and LP gauges to ensure pressure remains within safe limits (see table below).
   - The machine stops automatically when the specified charge amount is reached.
   - If the charge is interrupted (e.g., due to low refrigerant or high pressure), address the issue (refer to “Main Troubleshooting”) and resume.

5. **Hose Purge**

   - After charging, perform a “Hose Purge” to transfer residual refrigerant in the service hoses to the vehicle’s A/C system, ensuring accurate charging.
   - Select “Hose Purge” from the charge menu and follow the on-screen prompts.
   - The machine recovers any remaining refrigerant into the internal tank to minimize loss.

6. **Verification**

   - Start the vehicle’s engine and turn on the A/C system to test performance. Check for proper cooling and monitor gauge readings against the following targets (at 77°F ambient; adjust per temperature):

Pressure Targets:

Refrigerant	Low-Side Target (psi)	High-Side Target (psi)

R-134a	25–45	150–250
HFO-1234yf	30–50	160–260

- Use a leak detector to check connections for refrigerant leaks.
- Record the charge amount and any issues in your EPA-required maintenance log.
- If the A/C system does not perform correctly, refer to “Main Troubleshooting” or contact Bludee support at 443-380-0088 or www.bludee.com.

Warning: Ensure the correct refrigerant type is used to avoid system damage or contamination. Overcharging can cause high-pressure issues, and undercharging may reduce A/C performance. Only EPA Section 609-certified technicians should perform charging.

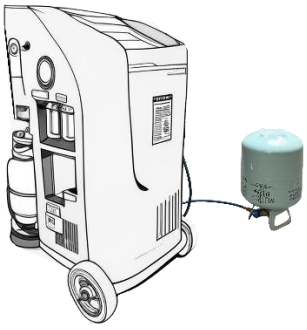
Tank Fill

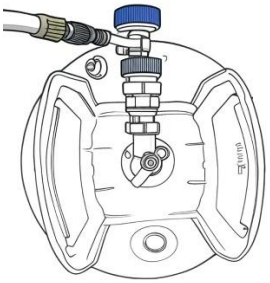
The tank fill process transfers liquid refrigerant from an external storage cylinder to the machine’s internal cylinder. Follow these detailed steps to maintain adequate refrigerant levels:

1. **Preparation**

   Warning: Do not proceed with tank fill if purity is <98%. Contamination can damage the machine or vehicle A/C system.

   - Verify the internal tank (R-134a or HFO-1234yf) has sufficient capacity for filling (maximum 17.6 lb, or 80% of the 22 lb tank capacity, minus the current amount). For example, if 4.4 lb is present, the maximum fill is 13.2 lb.
   - Obtain an external R-134a or HFO-1234yf cylinder approved by Bludee. Ensure it matches the selected refrigerant type to avoid contamination.
   - Connect the LP service hose (blue hose) to the external cylinder using the appropriate tank fitting (r134a P/N: BDE-LP1-134; 1234yf P/N: BDE-LP1-124). Secure all connections to prevent leaks.





   - Set the external cylinder valve to liquid output to enable faster filling.

   - For single-valve tanks, position the cylinder upside down during filling to ensure liquid delivery.

   - Monitor for vapor lock throughout the process to prevent flow interruption and ensure proper charging.

2. **Access Tank Fill Function**
    - From the main menu, select the “Tank Fill” icon.
    - Choose the refrigerant type (R-134a or HFO-1234yf) to match the external cylinder.
    - Enter the desired fill amount (minimum 1.1 lb, maximum based on remaining tank capacity).
    - Confirm settings by pressing “OK.”

3. **Refrigerant Identification (If Equipped)**
    - For machines with an HFO-1234yf identifier, the machine performs a 120-second gas identification before filling.
    - Filling proceeds only if the HFO-1234yf concentration exceeds 98%. If not, the machine displays the gas concentration and prohibits filling. Contact Bludee support at 443-380-0088 or www.bludee.com for assistance.
4. **Filling Process**
    - Open the external cylinder’s hand valve to begin transferring liquid refrigerant to the internal tank.
    - Monitor the touch screen for the fill progress and ensure the internal tank does not exceed 17.6 lb (80% capacity).
    - The machine automatically stops when the specified amount is reached, or the tank reaches maximum capacity.
    - If the fill stops prematurely, check for low refrigerant in the external cylinder, blockages in the hose, or machine errors (see “Main Troubleshooting”).
5. **Post-Fill Recovery**
    - The machine prompts the technician to close the external cylinder’s hand valve.
    - The system recovers residual refrigerant from the transfer hose and internal pipelines to minimize loss, storing it in the internal tank.
    - Disconnect the service hose from the external cylinder and store it securely.
6. **Verification**

- Check the internal tank's weight on the main menu to confirm the fill amount (maintain 8.8–13.2 lb for optimal performance).
- Inspect connections for leaks using a SAE J2791-compliant leak detector.
- Record the fill amount and external cylinder details in your EPA-required maintenance log.
- If issues arise, refer to "Main Troubleshooting" or contact Bludee support at 443-380-0088 or www.bludee.com.

Warning: Never overfill the internal tank beyond 17.6 lb, as this can cause overpressure and potential explosion. Ensure the correct refrigerant type is used to prevent contamination. Only EPA Section 609-certified technicians should perform tank filling.

7. Tank Fill vs Recovery

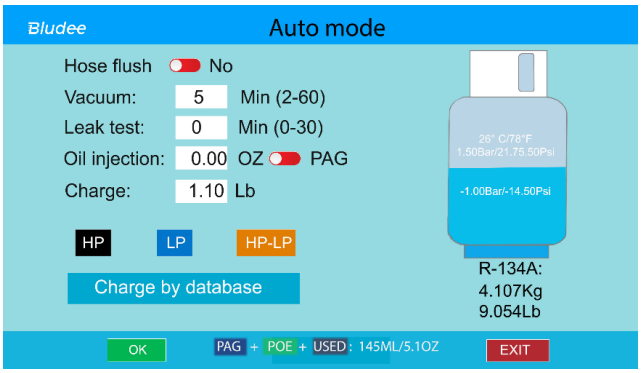
While Tank Fill and Recovery perform similar extraction functions, their purposes differ:

- Tank Fill allows the operator to specify the target amount of refrigerant to transfer into the internal cylinder. It is ideal for controlled filling based on system requirements.

- Recovery, by contrast, extracts all available refrigerant from the external tank or any source connected to the service hoses. It does not stop at the present quantity.

🔧 Tip: If your goal is to fully evacuate an external tank, select Recovery instead of Tank Fill.

Auto Mode



Auto Mode enables a complete, hands-free A/C service cycle, combining multiple functions into a single automated sequence. This mode is ideal for streamlining workflow and ensuring consistent service quality.

🔧 Pre-Operation Checklist

- Empty the used oil vessel to ensure accurate oil separation.
- Verify refrigerant type, tank capacity, and filter status.
- Confirm vehicle type (fuel or high-voltage) to select the correct charging mode.

🔄 Automated Service Sequence

Once "Auto Mode" is selected, the machine performs the following operations in sequence:

- Recovery – Extracts refrigerant from the vehicle system

- Vacuum – Evacuates air and moisture from A/C lines

- Oil Injection – Injects oil (for fuel vehicles only)

- Charging – Dispenses refrigerant to target weight

⚡ Charging Options:

- Normal Charging – For conventional fuel vehicles

- High Voltage Charging – For hybrid or electric vehicles

🔁 Hose flushing is optional for Normal Charging but mandatory for High Voltage Charging to prevent cross-contamination.

🧪 HFO-1234yf Identification (if equipped)

If refrigerant is present, the machine performs a 120-second gas analysis to verify purity.

- The process continues only if HFO-1234yf concentration exceeds 98%.

- If no refrigerant is detected, the system skips recovery and proceeds with vacuum, oil injection, and charging.

✅ Bludee Best Practices Integrated

- Automated leak detection and pressure monitoring are built into the cycle.

- EPA-compliant recovery and disposal protocols are followed.

- System prompts and alerts guide technicians through any required manual steps.

SYSTEM SETTINGS

Enter the password “111111” to access “System Settings,” where you can configure language, calibration, database, units, empty container weight, component testing, altitude, and owner information.

Language

Change the operating system language.

Calibration

Only qualified technicians should calibrate load cells. Calibration involves a simple, one-step process using a 2.2 lb weight.

Warning: Improper calibration can cause serious damage to the equipment or vehicle A/C system.

Database

Access the database of refrigerant/oil volumes for various car makes and models.

Unit Set

Select imperial units. The interface displays the values of the two tank load cells for diagnostic purposes.

Empty Container Weight Set

The load cell reading is the sum of the empty container weight and net refrigerant content. Adjusting the empty container weight inversely affects the displayed refrigerant value.

Component Test

Activate or deactivate electronic components for quick troubleshooting.

SOFTWARE UPDATE

Database Update

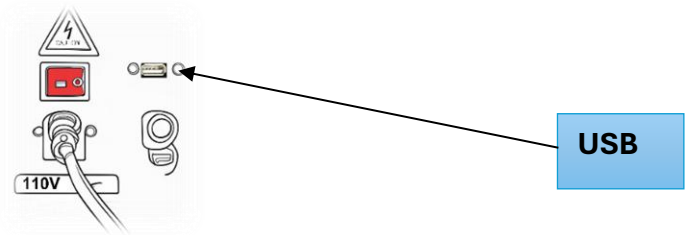
1. Unzip the received compressed file.

   dwin_set.zip

2. Copy the extracted folder to a USB disk (ensure it is the only file on the disk).

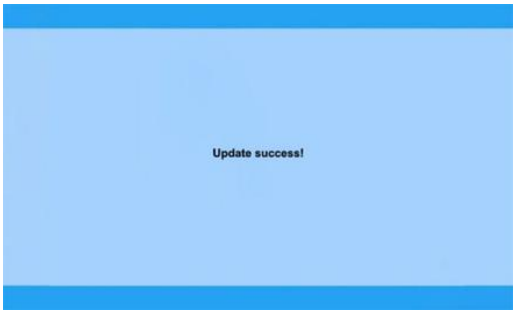
   DWIN_SET

3. Insert the USB disk into the machine's USB Type-A port.



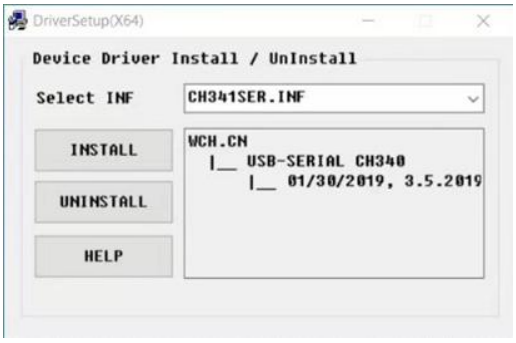
4. Turn on the machine to display the upgrade interface.

5. Upon successful upgrade, shut down, remove the USB disk, and restart the machine.

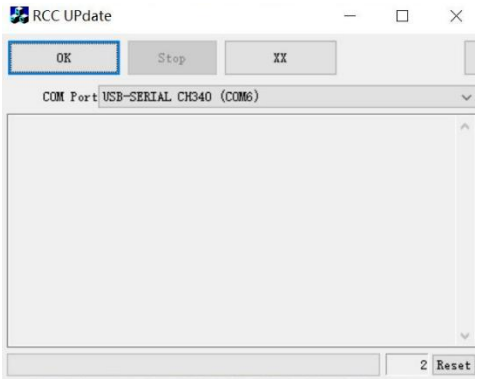


Main Program Update

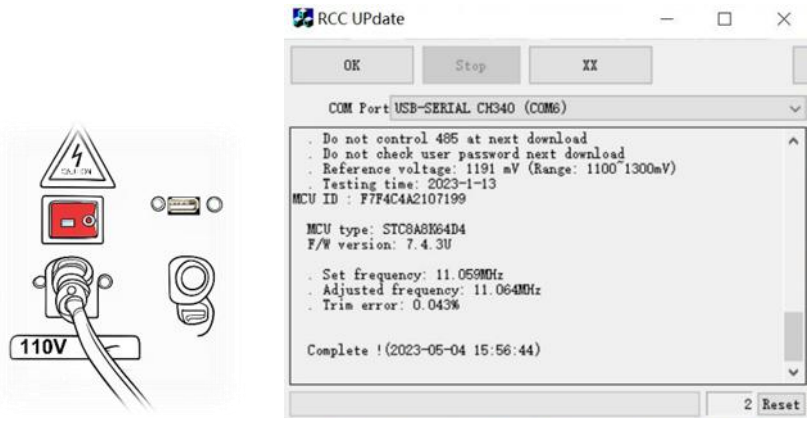
1. Install the “ch341ser” program on a computer.



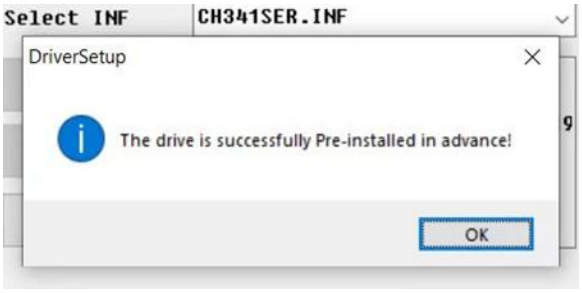
2. Run “AC400D 23.5.4.exe” on the computer.



3. Turn off the machine, insert the black update cable into the USB Type-B port, and select “OK” within 6 seconds.



4. A successful update is indicated on the interface.



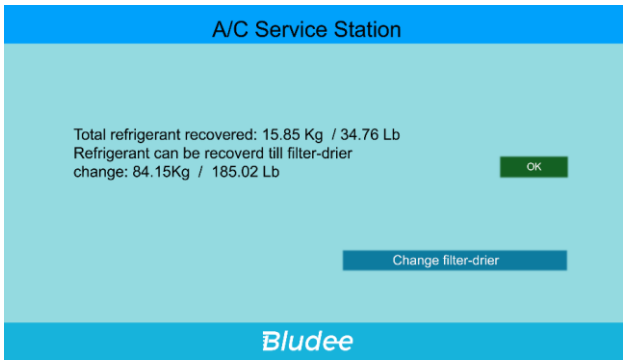
REGULAR MAINTENANCE AND RESET

To ensure optimal performance and compliance with EPA Section 609 regulations, the AC400D-dual requires regular maintenance, particularly when the filter-drier reaches its capacity of 220 lb of recovered refrigerant. The machine will lock and display a maintenance prompt when this limit is reached. Follow these detailed steps to perform maintenance and reset the system:

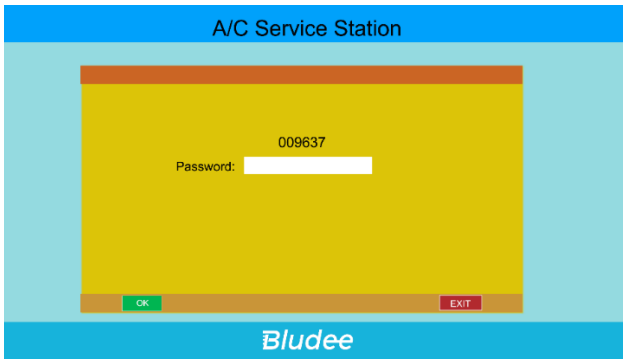
1. **Preparation for Maintenance**
    - **Check Filter-Drier Status**: Upon startup, the machine displays the remaining filter-drier capacity. If it indicates 220 lb of refrigerant has been processed, prepare for maintenance.
    - **Gather Supplies**: Obtain a replacement filter-drier, vacuum pump oil, solenoid spool washers, and o-rings from your Bludee distributor by calling 443-380-0088 or visiting www.bludee.com. Ensure the filter-drier is compatible with the AC400D-dual and has a valid code for reset.
    - **Safety Precautions**: Disconnect the power cable, wear safety goggles and gloves, and ensure the work area is well-ventilated.
2. **Filter-Drier Replacement**
    - Locate the filter-drier on the left side of the machine.
    - Close all tank valves (R-134a and HFO-1234yf) to prevent refrigerant loss.
    - Use a wrench to carefully remove the old filter-drier, collecting any residual oil in an approved container.
    - Install the new filter-drier, ensuring a tight seal to prevent leaks.

- Record the filter-drier replacement in your EPA-required maintenance log.

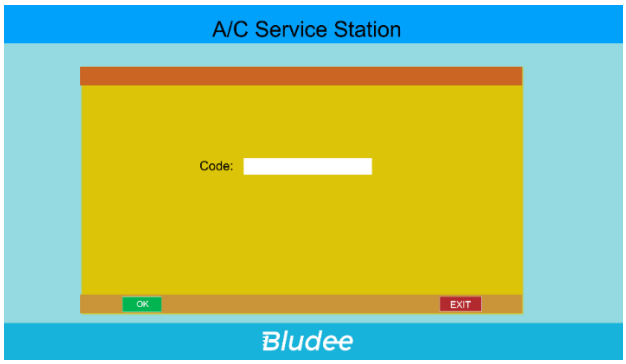
3. **Vacuum Pump Oil Replacement**
   - Locate the vacuum pump oil reservoir (refer to the “Equipment Description” for location).
   - Drain the old oil into an approved container for disposal, following local regulations.
   - Refill the reservoir with new vacuum pump oil to the centerline mark, using oil SAE30 or ISO100.
   - Check for leaks around the reservoir cap and tighten if necessary.
4. **Solenoid Spool Washer Replacement**
   - Identify solenoid valves #2, #5, #8, #9, and #11 (refer to “Main Troubleshooting” for locations).
   - Remove each solenoid from its valve base, following the instructions in the “Main Troubleshooting” section.
   - Replace the spool washers with new ones provided by Bludee, ensuring proper seating.
   - Reattach the solenoids, ensuring a secure and leak-free connection.
5. **Leak Testing**
   - Reconnect the power cable and turn on the machine.
   - Use Vacuum and check leak detect or perform a leak test by using a SAE J2791-compliant refrigerant leak detector on all connections, including hoses, tank fittings, and the new filter-drier.
   - If leaks are detected, tighten connections or replace faulty components and retest.
6. **System Reset Procedure**
   - When the filter-drier life expires, the machine displays a maintenance prompt with a unique number.
   - Contact your Bludee distributor at 443-380-0088 or visit www.bludee.com and provide the displayed number to obtain a dynamic password (passwords are unique for each reset).
   - Click “Change filter-drier” when the machine is powered on.



   - Input the service code provided by the distributor or Bludee direct.



- Enter the 2nd code printed on the new filter-drier [all upper case].



- If the code is recognized, the machine will initiate a 60-second evacuation cycle to clear internal lines.
- Upon completion, the system resets, allowing another 220 lb of refrigerant to be recovered and charged.
- Verify the reset by checking the filter-drier life display on startup (it should show 220 lb remaining).

7. **Post-Maintenance Verification**
   - Perform a component test (see "Component Test") to ensure solenoids, vacuum pump, and compressor function correctly.
   - Run a test recovery cycle with a small amount of refrigerant to confirm proper operation.
   - Update maintenance records with the date, replaced components, and amount of refrigerant processed, as required by EPA regulations.

MAINTENANCE SCHEDULE:

Interval	Task
Daily	Empty used oil vessel
Monthly	Purge non-condensable gases
Annually	Replace oil filter (if equipped with identifier)

Every 220 lb Full service: replace filter-drier, pump oil, solenoid washers

Warning: Only EPA Section 609-certified technicians should perform maintenance and reset procedures. Improper maintenance may result in equipment failure, refrigerant leaks, or non-compliance with EPA regulations. Dispose of used oil and filter-driers in accordance with local and federal regulations.

MAIN TROUBLESHOOTING

Error Code	Malfunction	Reasons	Solution
005	Low Vacuum Degree	1. Insufficient vacuum pump oil. 2. Emulsified or dirty pump oil. 3. Plugged pump oil inlet. 4. Leakage in pump connections. 5. Worn components.	1. Add oil to the centerline. 2. Replace with new oil. 3. Clean oil inlet. 4. Check connections. 5. Maintain machine, replacing o-rings, washers, and seals.
-	Vacuum Pump Injects Oil	1. Excessive oil volume. 2. High entrance pressure.	1. Discharge excess oil. 2. Run Recovery function first.
-	No Display	1. Blown fuse (in power cable box or PCA). 2. Burnt PCA. 3. Loose power cable. 4. Faulty LCD.	1. Replace fuses. 2. Replace PCA. 3. Secure power cable. 4. Replace LCD.
-	Recovery Does Not Stop	1. Leakage in A/C or equipment pipeline. 2. Compressor failure. 3. Faulty pressure sensor. *Note*: Recovery may take longer in winter.	1. Perform leakage test per service manual. 2. Replace compressor. 3. Secure or replace pressure sensor.
-	No Change in Recovery Volume	1. No refrigerant in A/C system. 2. Gas cylinder load cell support screw not loosened. 3. Faulty load cell or PCA.	1. Stop recovery. 2. Unscrew protection screw (see “Operation Preparations”). 3. Calibrate or replace load cell or PCA.
005	Alarm 005 Despite Refrigerant in A/C	Low pressure switch plug disconnected from PCA.	Secure low pressure switch plug.
004	High Pressure Alarm 004 Without Excessive Gauge Pressure	1. High pressure switch plug disconnected. 2. Blocked pipeline from compressor exit.	1. Secure high pressure switch plug. 2. Inspect hoses and connections between compressor exit and tank blue hand valve.

-	No/Slow Charge	1. Insufficient refrigerant in equipment. 2. Charge line issue.	1. Fill equipment tank with more refrigerant. 2. Check charge line, including tank red valve, hose, solenoids #5, #9, #11, and HP/LP quick couplers.
-	Vacuum Pump Pressurized During Recovery	Poor seal between solenoid valve #8 and valve base.	Remove and clean solenoid #8 and valve base.
-	Suction in Used Oil Bottle During Vacuum	Poor seal between solenoid valve #2 and valve base.	Remove and clean solenoid #2 and valve base.

Note: Regular maintenance by qualified technicians significantly reduces machine failures. For unresolved issues, contact Bludee at 443-380-0088 or www.bludee.com.

WARRANTY AND REGISTRATION

The AC400D-dual comes with a 1-year limited warranty covering defects in materials and workmanship. To activate, register your machine at www.bludee.com/register within 30 days of purchase. For warranty claims or service, contact Bludee support at 443-380-0088 or visit www.bludee.com/support. Retain proof of purchase and maintenance records for warranty validation.

ACCESSORIES AND PARTS

Part Number	Accessory	Description
BDE-HOS-3MB	Low-Pressure Service Hose, 10ft, Blue	
BDE-HOS-3MR	High-Pressure Service Hose, 10ft, Red	
BDE-CPR-12H	High-Pressure Quick Coupler, HFO-1234yf	
BDE-CPR-12L	Low-Pressure Quick Coupler, HFO-1234yf	
BDE-CPR-13L	Low-Pressure Quick Coupler, R134a	
BDE-CPR-13H	High-Pressure Quick Coupler, R134a	
BDE-020-DF3	Dry Filter for AC400D	
BDE-020-G22	High-Pressure Gauge, 1.6	
BDE-020-G21	Low-Pressure Gauge, 1.6	
BDE-LP1-234	HFO-1234yf Low-Side Tank Adapter	
BDE-LP1-134	R134a Low-Side Tank Adapter	
BDE-020-1KG	1kg Calibration Weight	

BDE-025-B20	Oil Bottle, 200ml Capacity
BDE-025-B40	Oil Bottle, 400ml Capacity
BDE-022-80K	Digital Tank Scale, 80kg Capacity
BDE-022-CVB	Plastic Blue Front Cover for AC400D

Order accessories at www.bludee.com or call 443-380-0088.

GLOSSARY

- **Charge**: The process of transferring refrigerant from the machine's internal tank to the vehicle's A/C system to restore cooling capacity.
- **Cross-Contamination**: Mixing of different refrigerants (e.g., R-134a and HFO-1234yf) in the A/C system or machine, which can damage components and reduce efficiency.
- **Filter-Drier**: A component that removes moisture and contaminants from recovered refrigerant to ensure purity before storage or reuse.
- **Hose Flush**: A process using liquid refrigerant to clear oil residue from service hoses, preventing contamination.
- **Load Cell**: A precision sensor that measures the weight of the refrigerant tank to ensure accurate filling and charging.
- **Microns**: A unit of pressure (1 micron = 1/1000 mmHg) used to measure vacuum depth; 500 microns indicates a deep vacuum suitable for A/C system evacuation.
- **Non-Condensable Purge**: Removal of air or other non-refrigerant gases from the refrigerant tank to maintain purity and prevent system inefficiencies.
- **PAG Oil**: Polyalkylene glycol oil, used in R-134a fuel vehicle A/C systems; electrically conductive and unsuitable for hybrid/electric vehicles.
- **POE Oil**: Polyol ester oil, used in HFO-1234yf hybrid/electric vehicle A/C systems; non-conductive to prevent electrical issues.
- **Recovery**: The process of extracting refrigerant from a vehicle's A/C system into the machine's internal tank for recycling or storage.
- **Refrigerant Identifier**: An optional device that analyzes the purity of HFO-1234yf refrigerant to prevent contamination (e.g., ensures >98% purity).
- **SAE J2788**: A standard for HFO-1234yf recovery/recycling equipment, requiring at least 95% recovery efficiency and minimal cross-contamination.
- **SAE J2210**: A standard for R-134a recovery/recycling equipment, specifying performance and safety requirements.
- **Solenoid Valve**: An electromechanical valve that controls the flow of refrigerant or oil within the machine's internal systems.

- **Vacuum Pump**: A device that removes air, moisture, and residual gases from the A/C system to prepare it for charging; measured in cubic feet per minute (cfm).
- **Vapor Lock**: A condition where vaporized refrigerant in the transfer hose slows or stops liquid refrigerant flow during tank filling.