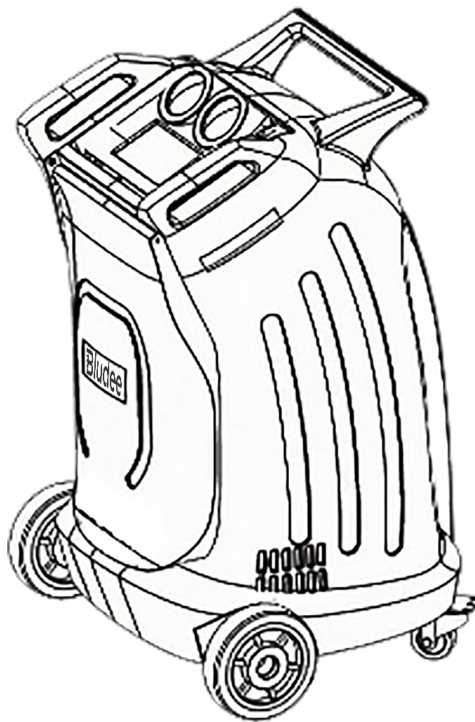


AC900

User manual



Service and support: 443-380-0088

www.bludee.com

Description: Recover, recycle, and recharge machine for use with 1234yf equipped air conditioning systems.

Product Information

Record the serial number and year of manufacture of this unit for future reference. Refer to the product identification label on the unit for information.

Serial Number: _____

Year of manufacture: _____

DISCLAIMER: Information, illustrations, and specifications contained in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without obligation to notify any person or organization of such revisions or changes. Further, Bludee shall not be liable for errors contained herein or for incidental or consequential damages (including lost profits) in connection with the furnishing, performance, or use of this material. If necessary, obtain additional health and safety information from the appropriate government agencies, and the vehicle, refrigerant, and lubricant manufacturers.

INDEX

Specifications	2
General safety guide	3
Component identification	4
Function operation and description	7
First operation.....	8
1. Unlock tank load cell.....	8
2. Tank fill	8
Operating procedure	9
Recovery function	9
Evacuation function.....	9
Refrigerant charging function.....	9
Tank fill	10
Flushing function.....	11
Automatic function mode	11
System setting.....	12
Calibration:	12
Air purge:.....	12
Database:	12
Unit settings:.....	12
Empty container weight set	12
Component test:	12
Operation record:.....	12
Owner information:	12
Machine Maintenance	13
Changing solenoid or spool seals	13
Vacuum pump oil change	13
Main filter-drier replacement.....	13
Compressor oil change	15
Oil vessel filter-drier replacement	14
Calibration of load cells, pressure transducer and temperature sensor.....	15
Caring for your equipment	16
FAQs regarding COR (Compressor oil recovery):	16
Packing list	19

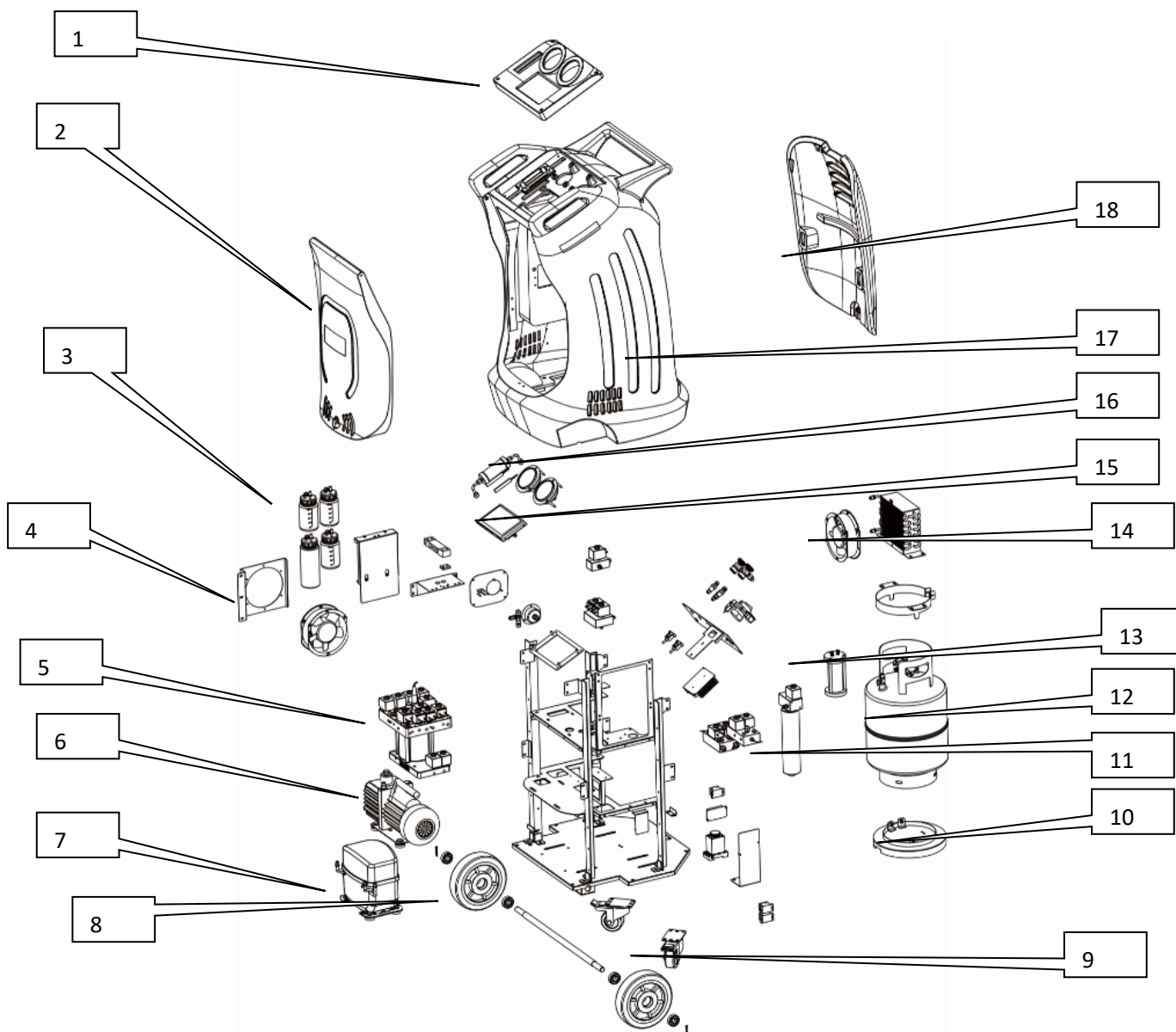
Specifications

- Dimension: Package in crate 720*670*1170mm (29"x26"x47"); Unpacked machine 630*560*1075mm (24"x22"x46")
- Power supply: AC110V±10%~60Hz
- Compressor power: 3/8HP
- **Patented SRR (Supreme Recovery Rate) system, guarantees over 99% recovery rate achieved in very short recovery time.**
- Vacuum: pump capacity: 120L(32Gal)/min
- Evacuation time selection: 2-240min,
- Vacuum leak test time selection: 0-30min.
- Electronic oil injection: 3 separate vessels, 250ml capacity for PAG /POE/UV, high transparency
- Used oil vessel: 400ml capacity, high transparency
- Refrigerant charging speed: 1Kg/Min.
- High capacity spin on filter-dryer: 600ml capacity:
- Accuracy of refrigerant cylinder load cell: ±10g
- Accuracy of oil containers load cells: ±3g (For better oil injection accuracy, ±1g, please order optional function of individual load cell for each oil vessel)
- Refrigerant cylinder: 10KG, with heater.
- Machine maximum working pressure: 20bar.
- Display: 7" touch screen, powered by android platform.
- Gauges: High side -1bar~30bar, Low side -1bar~16bar,
- Digitally displayed cylinder pressure and temperature
- Vehicle A/C database included, with additional user database input.
- Thermal printer
- Electronically controlled air purge.
- Electronically monitoring and displaying system service intervals.
- **Flush function: Unidirectional or bi-directional, time selection: 10-60 min.**
- **Individual load cell for each oil vessel, to make higher accuracy of oil injection: ±1g.**
- **AC900 is for 1234yf refrigerant.**

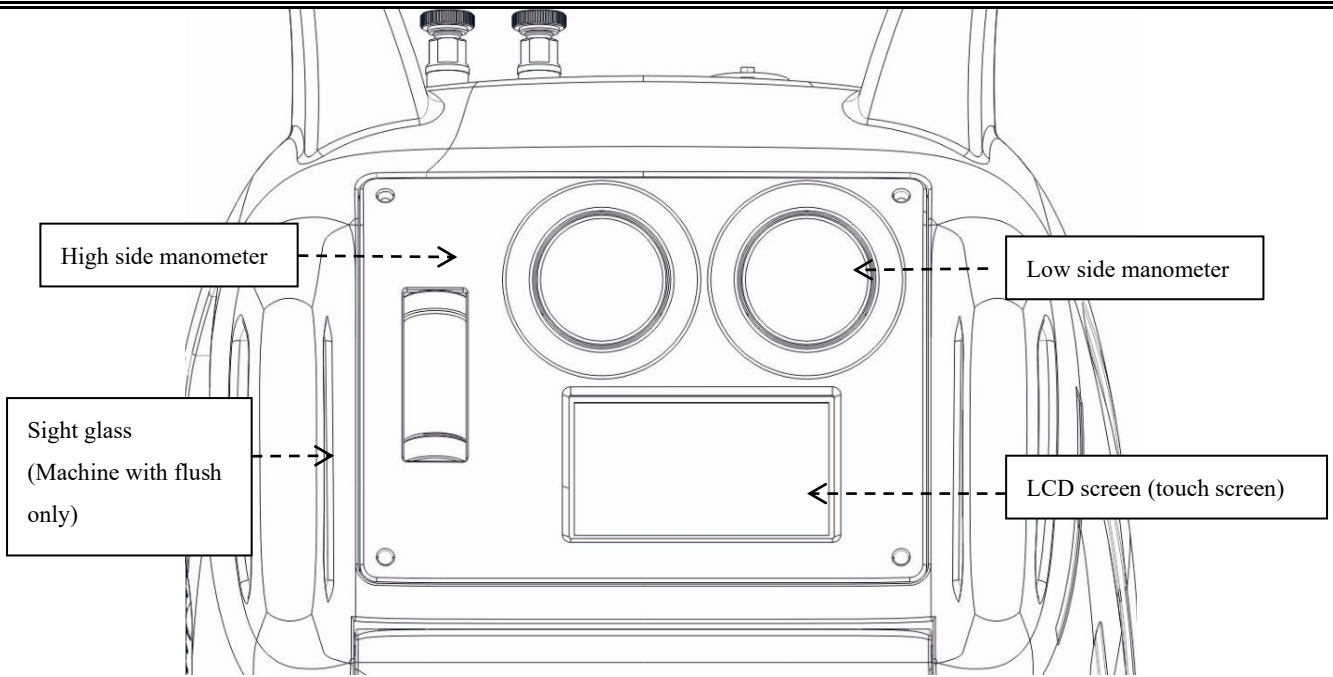
General safety guide

- **This equipment must only be operated by qualified technicians.**
- Read the instruction manual carefully before operating this equipment. If there is anything you do not fully understand, please contact your distributor or manufacturer. We like to help.
- The refrigerant storage cylinder contains liquid refrigerant under high pressure. Overfilling of the storage cylinder may cause violent explosion. Do not disable the overfill safety protection of this machine. Always keep the cylinder on the load cell platform whenever the machine is operating.
- Only use cylinder which is supplied with this equipment or recommended by the manufacturer.
- Always use this machine in a well-ventilated area, avoid inhaling refrigerant and/or oil vapors, always read material safety instructions of refrigerant and oil packaging, for related warning and care.
- Always switch off the machine and disconnect the power cable before removing any covers or servicing this machine, to avoid electric shock which can be fatal.
- Never use compressed air to test for leaks on vehicle or this equipment!
- Wear safety goggles and gloves to protect eyes and skin from contact with refrigerant. Liquid refrigerant when it comes in contact with the human skin or eyes will cause frostbite and/or blindness. If accidental contact is made with eyes or skin, wash the affected area with plenty of water immediately and contact a doctor if required.
- Avoid using the machine in very hot or flammable areas.
- Store the machine in a well ventilated cool area when not in use.
- Keep gasoline or other flammable substances away from the equipment.
- ***For the 1234yf machine, once a leak is detected in the unit, switch off the equipment by pressing the Emergency stop button and contact your distributor or service dealer.***

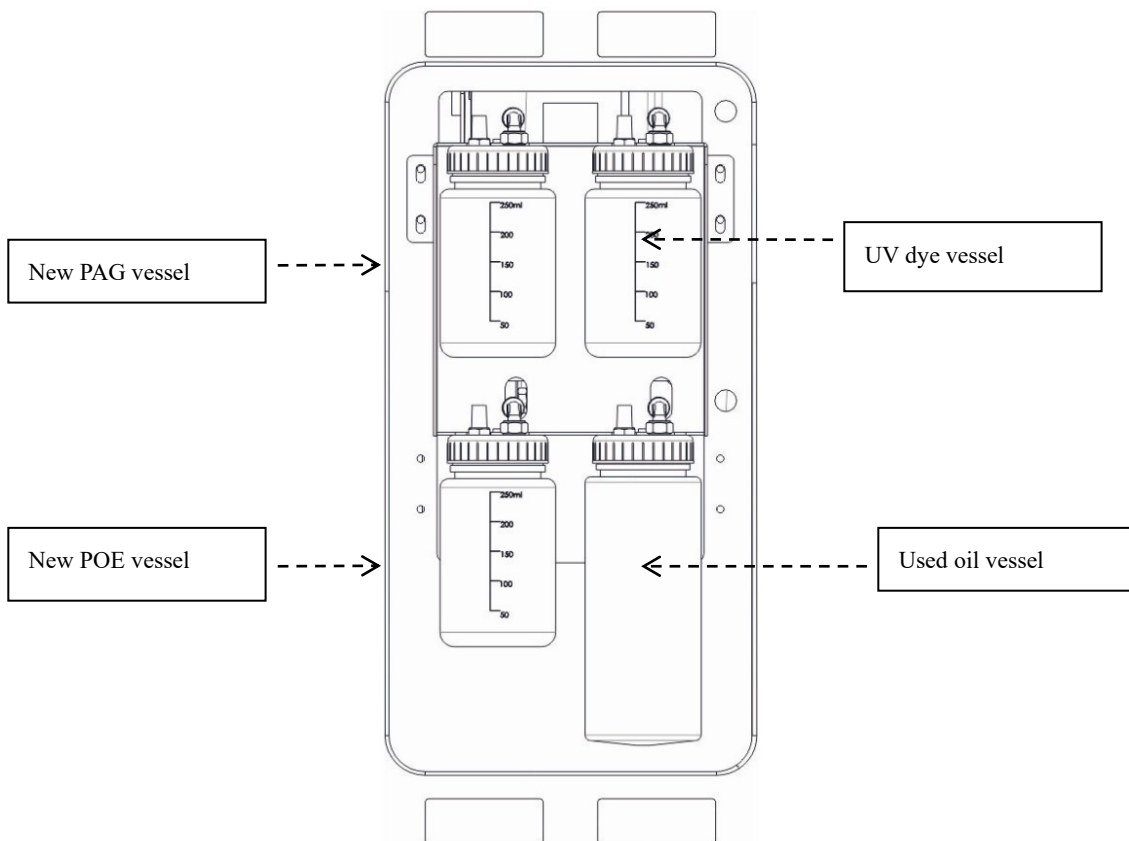
Component identification



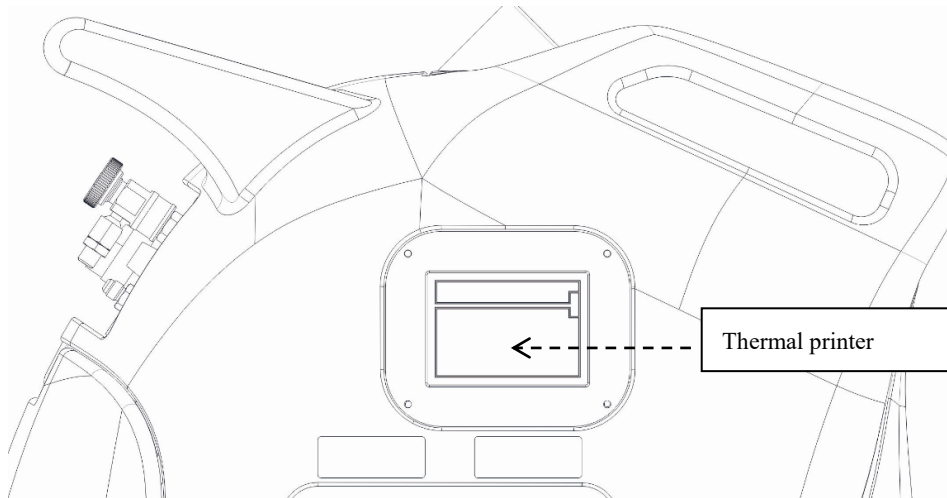
1) Panel	2) Front cover	3) Oil vessels
4) Ventilation fan	5) Manifold and solenoid assembly	6) Vacuum pump
7) Compressor	8) Front wheel	9) Rear wheel
10) Gas tank support	11) Filter-drier	12) Gas storage tank
13) Oil accumulator (flush oil accumulator)	14) Condenser & fan	15) LCD display
16) Manometers	17) Plastic housing	18) Rear cover



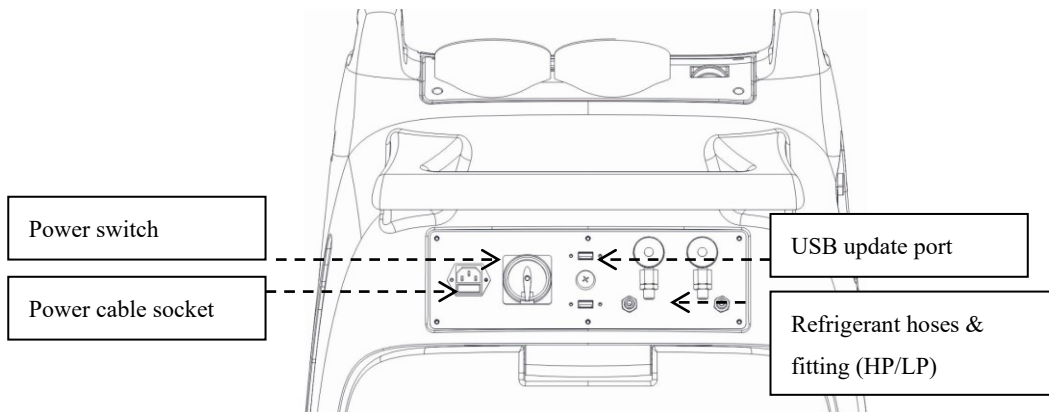
Front View, upper part (Control panel)



Left view, lower part



Left View, upper part



Back View, upper part

Function operation and description

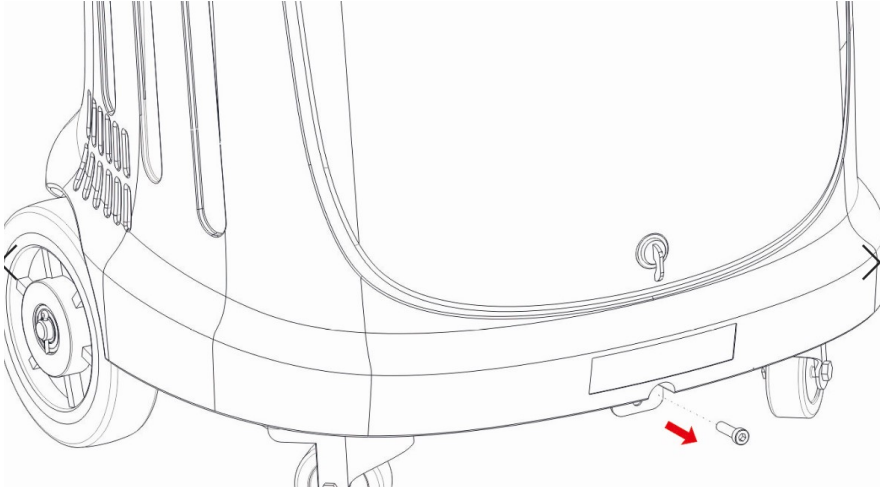
Main functions	Recovery	Recovers and purifies refrigerant from automotive A/C system and it is then stored into the machine internal storage cylinder for re-use.
	Evacuation	Further removes air, debris, and moisture from the vehicle A/C system after recovery, with vacuum leak detection test.
	Charging	Electronically charges the selected amount of refrigerant into the vehicle A/C system
	Oil/dye injection	Electronically injects the pre-set or selected amount of oil and/or dye into the vehicle A/C system.
	Tank fill	Transfers liquid refrigerant from an external cylinder to the machine internal storage cylinder.
	Flushing	With this unique patented COR system, the machine will completely recover compressor oil, with which moisture and foreign particles are also recovered from the vehicle A/C system. When the technician selects forward flushing, the machine will pump high temperature and high-pressure refrigerant to A/C system in the direction of normal refrigerant flow (the refrigerant flows from the vehicle compressor low side and is recovered back from the high side during its cycle) or bi-directional flushing (refrigerant flows in both forward and reverse directions). All compressor oil in the vehicle A/C system and foreign particles can be extracted, and then discharged into the used oil vessel.
	Fully automatic function selection	The machine will perform all the selected functions in a fully automatic sequence. The machine will stop automatically once all the selected functions or functions have been completed.
System. settings	Language	Selecting language to suit.
	Calibration	Calibrate refrigerant cylinder load cell, oil vessels load cells, pressure transducer, and temperature sensor. <i>A dynamic password is needed to perform this function.</i>
	Electronic air purge	Purges any non-condensable from refrigerant storage cylinder. The machine also performs automatic non-condensable each time it is switched on.
	Vehicle database	The machine stores a large number of vehicle makes and models, of the manufacturer recommended refrigerant and oil charge quantities, additional data can be added manually by the technician.
	Operating record	The machine records and stores the operations the machine has performed; this data can be retrieved and also can be transferred to text file. <i>A dynamic password is needed to perform this function.</i>
	Unit settings	Selecting metric or imperial units of measurement.
	Tare weight setting	Set empty refrigerant cylinder or refrigeration oil zero (tare) weight.
	Component test	Activate or des-activate each electronic component to make help analyze work status. <i>A dynamic password is needed to perform this function.</i>

First operation

1. Unlock tank load cell

Unlock the load cell platform, by removing the safety locking **bolt** as shown below and save the bolt for future use.

PLEASE NOTE, whenever transporting the machine, re-fit the safety locking bolt to avoid damage to the load cell, when travelling on bad road surfaces.



2. Tank fill

Use the adaptor fitting, to connect either HP or LP service hose (blue or red) to external refrigerant cylinder **liquid port** which you will be transferring the refrigerant from. If the refrigerant cylinder has only,

One valve and one port, invert the cylinder as shown below. If the cylinder has,

Two valves one port, leave the cylinder upright and open the liquid valve only, if the cylinder has,

Two valves and two ports, connect the adaptor to the liquid port, leave the cylinder upright and open liquid valve on the cylinder. Set the amount of refrigerant to be transferred into the machine storage cylinder, once the selected amount of refrigerant has been transferred, the machine will instruct the technician to close the liquid valve on the storage cylinder. The machine will then recover the refrigerant left in the service hose which is connected to the transfer cylinder and it will then stop automatically. For more details please refer to “Tank fill” in the operating procedure chapter.

It is recommended to maintain 4-6kg refrigerant in the equipment refrigerant storage tank.

Operating procedure

Recovery function

For the HFO-1234yf system, refrigerant identification is firstly processed if the machine is equipped with the internal refrigerant identifier, if not fitted with a refrigerant identifier, it will remind the technician to process such identification with a separate identifier. Only when the purity of refrigerant is above 98% the recovery is allowed or should be allowed to proceed.

Check and empty the used oil vessel before the recovery process is initiated.

The recovery process removes refrigerant from the vehicle A/C system, until a vacuum degree is reached. During this process, the refrigerant is purified from any moisture, oil, and foreign particles. The processed refrigerant is then stored in the internal storage cylinder of the machine, ready for re-use. If any oil is recovered during this process, the oil will be discharged into the used oil vessel. The amount of oil if any, will be displayed and recorded. ***At the end of recovery the machine performs SRR (Supreme Recovery Rate) by charging high temperature gas state refrigerant into vehicle A/C system through one A/C service port and recover the heated refrigerant from other port. This greatly helps recover all refrigerant trapped in compressor oil (especially when the low temperature is formed in A/C during recovery operation), to achieve over 99% supreme recovery rate. No time-consuming recovery pause is needed.***

Note: The amount of refrigerant recovered from each operation is monitored and recorded, for filter-drier life expiration monitoring. The machine filter-drier is capable of purifying up to 100KG of recovered refrigerant with average contamination (refrigerant cylinder filling is not included in the filter life calculation), and upon reaching the filter-drier life expiration the machine will not be able to be powered up before the machine is serviced (filter-drier change, calibration, vacuum pump oil change and o-ring/washer change etc.) and reset.

Note: If the machine stops recovering during the function and displays **high pressure**, it may have excessive air build-up in the storage cylinder. Then air purge needs to be performed by entering “system setting” or by turning off/on the machine to make the machine perform an automatic air purge.

Evacuation function

Select “**Vacuum**”, evacuation is performed to remove air and moisture from the vehicle A/C system, ready for oil injection. Evacuation time can be set from 2 to 240 minutes, and vacuum leak test time can be set from 0 to 30 minutes.

Refrigerant charging function

In Charge function, oil injection (if selected) and refrigerant charging are processed. Either PAG or POE can be selected to be injected, with the amount set by technician or selected via the database. UV injection can also be selected. Oil/UV injection is processed through the high side. Refrigerant charge amount can be set by the technician, or by selecting car make and model in the database. Refrigerant can be charged through the high side, low side or high and low side.

Note, UV injection amount can NOT exceed 5% of system oil volume.

Note, vehicle A/C system should be switched on and engine running when charging through the low side of the vehicle A/C system.

Note, if charging is selected from **the** high and low sides simultaneously, care must be taken. After charging function is completed and before starting the engine and switching on the A/C system, turn the compressor hub several times by hand to expel any liquid refrigerant that may have accumulated in the compressor compression chambers during the charging

process. **Not performing this process can damage or destroy the compressor.**

When oil/UV injection is selected, the evacuation function must be performed first. If the vehicle A/C system is not in a vacuum state, oil or dye injection can NOT be performed, and the machine will display a warning.

Hose flush, if hose flush is selected (highly recommended), the process will flush the oil from the wall of the service hoses and internal pipelines, to make sure the new oil to be injected is not contaminated with the previous oil injected. This process will take about 5 minutes.

Pre-charge leak test, if selected, after around 15% of the total amount of refrigerant selected is charged in to the vehicle A/C system, the technician is asked to perform a leak test with a reliable electronic leak detector. If no leaks are detected, the charge function can be completed by charging the remainder 85% of refrigerant selected. Otherwise, the process should be stopped to fix the leak.

Hose purge, hose purge is selected in charge function (default), to charge the full amount of refrigerant selected. Some refrigerant will be left in the discharge hose (high side service hose) either at charge function or at A/C diagnosis with vehicle A/C on. Follow the instruction displayed on the touch screen to purge the remainder of refrigerant left in the discharge hose into the vehicle A/C system. This will make sure that 100% of the selected amount of refrigerant is fully charged into the vehicle A/C system.

Tank fill

For the HFO-1234yf system, refrigerant identification is firstly processed if the machine is equipped with an internal refrigerant identifier, if not fitted with a refrigerant identifier, it will remind the technician to process such identification with a separate identifier. Only when the purity of refrigerant is above 98% the recovery is allowed or should be allowed to proceed.

Select **Tank fill** to fill or add refrigerant into machine storage cylinder. It is recommended to maintain 4-6 kg refrigerant in the machine internal cylinder at all times, to guarantee better charging and flushing operations. During the refrigerant cylinder filling process and once the selected amount of refrigerant has been transferred, the machine will display to the technician to **close the hand valve on the external cylinder**; the machine will then recover the rest of refrigerant which is left in the transfer service hose and internal pipelines.

If the sum of volume of refrigerant in the internal cylinder (for example, there is already 4kg in the internal cylinder) and the tank fill value (for example, tank fill set at 4kg) exceeds 7KG (70% allowable maximum capacity), the machine will not proceed with the selected operation and an alarm will be displayed.

Please note: The amount of refrigerant which is transferred from the external cylinder to the internal cylinder is not calculated on the filter expiration life duration.

Flushing function

- **Important:** With patented COR (Compressor Oil Recovery) system, this function recovers over 99% compressor oil from A/C system, compared to less than 5% oil recovered with normal recovery function, to fulfill thorough refrigerant & oil replacement. Compressor oil replacement with this function is considered A/C master job, thus it is highly recommended to get well trained before job is started. As quick guidance to this function, please contact your local distributor to get FAQs regarding COR.

Please note, empty used oil vessel before starting this operation.

For the HFO-1234yf system, refrigerant identification is firstly processed if the machine is equipped with an internal refrigerant identifier, if not fitted with a refrigerant identifier, it will remind the technician to process such identification with a separate identifier. Only when the purity of refrigerant is above 98% the recovery is allowed or should be allowed to proceed.

Flushing function is performed to completely extract compressor oil from A/C system, thus all contaminants such as acidified substances, moisture and other foreign particles in the vehicle A/C system will also be extracted.

Forward and bi-directional flush can be selected. Forward flush means charge liquid refrigerant from A/C low side and at the same time recover from the high side (same as A/C normal flow). Bi-directional flush means during flushing function, refrigerant flows in forward direction and reverse direction (reverse direction means charge from high side and recover from low side, in reverse from normal A/C flow), each direction lasts certain period of time. Flush time can be set corresponding to refrigerant amount in system. For example, A/C system with 500g refrigerant, flush time is recommended to be set at **30 minutes**, while **60 minutes** can be set for system with 1kg or more refrigerant. Flushing refrigerant will be recovered and purified automatically, at the end of the flushing process and stored in to the storage cylinder, ready for re-use.

Bi-directional flush is more efficient in extracting compressor oil than forward flushing, especially for dual A/C system.

For some A/C system equipped with evaporator solenoids or electronic expansion valves, which are normally closed when the vehicle A/C is off, it is recommended to activate the solenoid and TX valves with proper diagnostic scanner or remove and bridge these valves with the appropriate bridging fittings. Not performing the above, refrigerant flow is restricted and flushing efficiency can be affected.

For a multi-flow condenser, the oil in the condenser may not be flushed out completely.

Note: Instead of counting whole amount of refrigerant recovered after flush (large amount of liquid refrigerant is charged into A/C system from equipment internal cylinder), and the same amount of refrigerant will be recovered in to equipment cylinder after flushing is completed. The recovered amount is displayed on the screen at the end of the operation. For filter-drier life, the machine will only calculate the refrigerant amount difference between pre-flush and after-flush for filter-drier life (this amount is not displayed on the screen).

Automatic function mode

Please note, empty used oil vessel before starting this operation.

In automatic function mode, the machine runs recovery, evacuation, vacuum test if selected, oil injection, dye injection and refrigerant charge in sequence, with data of each operation preset by technician.

System settings

Input password 111111 to enter “System. Setting”. In system setting, Language, Calibration, Air purge, Database, Operation record, Unit set, Empty container weight set, Component testing and owner information will be displayed or reconfigured.

Calibration: Even though the machine is equipped with calibration weight for quick and easy calibration, it is recommended to have professional technician only to perform calibration of load cells, pressure transducer and temperature sensor. To access calibration, special password is needed. Please contact your equipment supplier or manufacturer, to receive the special password.

Warning: *Not calibrating the machine correctly can have serious consequences on the machine and/or vehicle A/C system.*

Air purge: Each time the machine is switched on, it will purge air (non-condensable) automatically if necessary, based on the pressure-temperature nature of refrigerant. Also, the technician can purge air (non-condensable) any time manually by accessing “Sys. Setting” - “Air purge”.

Database: The technician can access database of refrigerant, oil volume of different car makes and models. If the technician can not find information of some car model in the database, they can add such information manually. Once a car model information is added, in future such information will be displayed while the technician selects “charge through database” in “charge” function.

Unit settings: To set metric or imperial unit of measurement.

Empty container weight set:

The total load cell reading equals the sum of empty container weight and net refrigerant/oil content value. Thus, increase/decrease empty container weight, can correspondingly decrease/increase refrigerant/oil value displayed in the main operation interface.

Component test:

The technician can activate and deactivate different electrical component of the machine. This is for quick and easy diagnosis and troubleshooting.

Please note:

Only qualified technician (with special password) is allowed to access this function, not performing this test correctly could cause damage to the machine or injury to the operator.

Operation record:

Machine operations are recorded and saved, the technician can access this information.

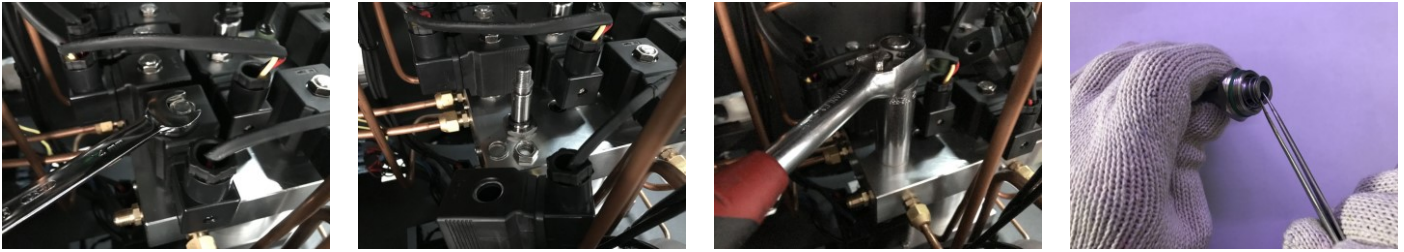
Note: Contact the distributor or manufacturer to receive a dynamic matching code to access this function.

Owner information:

The technician can change password and input their company name and contact information in this function. Please remember well your new password, or the use of the machine will be restricted. The contact information you input will be automatically printed, when you select “print” after any function or service job is completed.

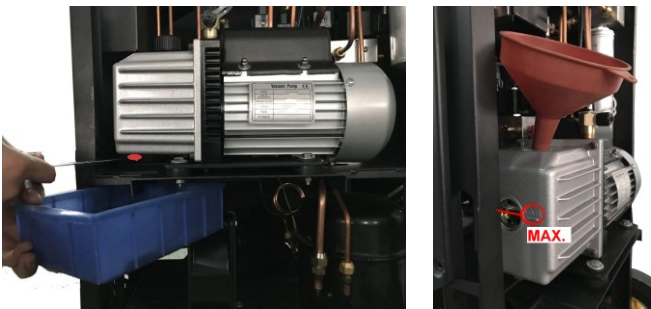
Machine Maintenance

Changing solenoid plunger or spool seals



Vacuum pump oil change

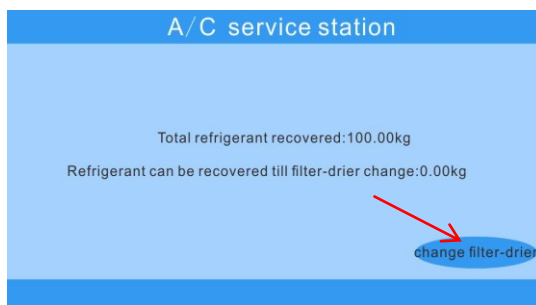
It is recommended to change vacuum pump oil every time you change filter-drier. By removing front cover, you will have easy access to vacuum pump oil drain port, beneath the pump. After draining the old oil, re-fill the vacuum pump with new oil. Note the level line at the side of the vacuum pump, to fill proper quantity of oil.



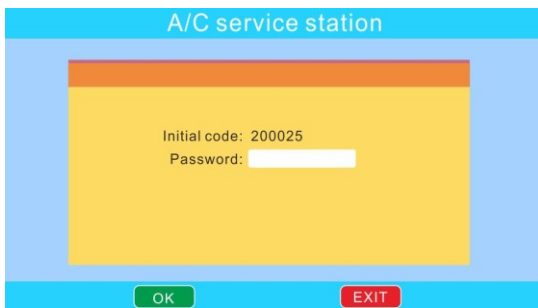
Main filter-drier replacement

Once a total of 100KG of refrigerant has been recovered, the machine automatically shuts down and reminds the technician to replace the filter-drier. It is recommended to service the machine at your convenience after a total of 100KG of refrigerant has been recovered.

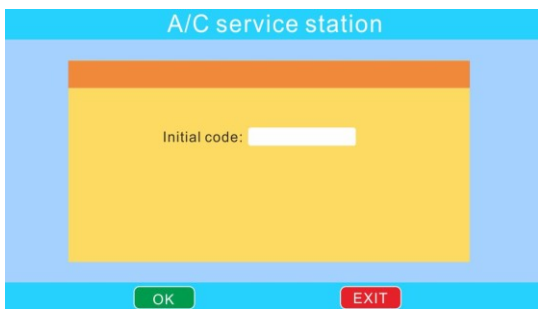
After you input password to access AC900 app, you can select “change filter-drier” when the following interface is displayed, see below,



The machine will display to input dynamic matching code (Please contact your equipment distributor or manufacturer to receive the code), as following interface:



Then you are asked to input filter-drier code (each filter-drier from the factory has an individual code) in the following interface:



DO NOT press “Reset service interval time” button at the following interface.

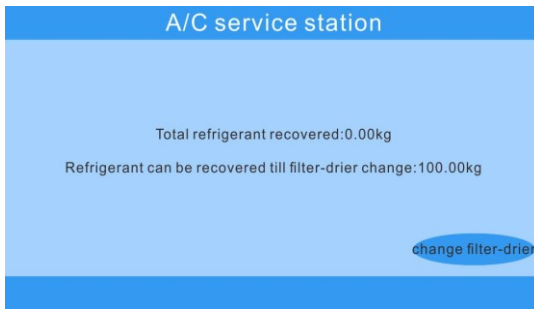


Please remove front cover and change filter-drier, drain and re-fill vacuum pump with oil, see images below, press “Reset service interval time” button.



Cleaning before installation

The filter-drier and vacuum pump oil replacement, is now completed. When you re-enter AC900 app you can see the amount of refrigerant left to be recovered (100KG).



Compressor oil change

Remove the recovery compressor from the machine by removing the suction and discharge pipes as shown below. Remove the 4 mounting bolts which fix the compressor to the chassis as shown below. Drain the oil from the suction port (from where the larger pipe was connected) by inverting the pump as shown below (drain oil) Add 480ml refrigeration oil as shown below. Re-fit compressor and pipes. Pressurize system and make leak test connections. This can be achieved by charging refrigerant in to the service lines, then select recovery and run recovery for 5 seconds and stop. This action will pressurize the internals of the machine, including the two pipes which were disconnected from the recovery compressor. By using a good reliable leak tester or soapy solution around the recovery pump fittings, you will be able to check for any possible leaking.

Remarks: *Compressor oil change is recommended if machine is used often for flush. Otherwise it is not a must for compressor oil change.*



Remove pipes and screws



Drain oil



Add oil

Calibration of load cells, pressure transducer and temperature sensor.

We suggest that only well-trained technicians gain access to the calibration and machine troubleshooting program. Please contact your distributor or manufacturer if you require assistance.

A calibration weight of 1KG is supplied with the machine.

Caring for your equipment

- Keep your equipment clean and well maintained at all times.
- Keep service hoses stored on the storage adapters when not in use, to avoid dirt and dust contaminating the internals of the couplers which will then end-up in the vehicle A/C system, which can cause serious system malfunction.
- Always clean vehicle A/C system service ports before connecting machine quick couplers on to the service ports.
- Keep the system stored in a clean area and away from direct sunlight and artificial heat source, when not in use.
- Perform regular services on the system as recommended by the manufacturer. Ignoring and skipping services will deteriorate the integrity of the machine.
- If the machine is used on badly contaminated A/C systems frequently, it is recommended that more frequent vacuum pump oil changes are made, and main filter replacements are performed. Contaminated vacuum pump oil will cause the internal corrosion of the vacuum pump, which eventually will cause the failure of the vacuum pump. A contaminated main filter will decrease the refrigerant purity.
- Do not bump or move the machine when the technician is in the process of charging a vehicle, this can affect the charging accuracy.
- If the machine is bumped or knocked down accidentally, make calibration again and check for possible leaking.
- **DO NOT** use compressed air to test for leaks.
- If the technician is not sure about the correct way of operating the machine, please do not hesitate to contact your distributor or manufacturer. We always like to help you.

FAQs regarding COR (Compressor oil recovery):

1. What kinds of workshops are suitable to do COR?

Although Bludee is striving for car manufacturers' approval for its COR system, we have not received any official acknowledgement yet. However, in China and Asian markets, it has been proven to be an efficient A/C maintenance method, the COR still needs to be known by more people outside Asia. Therefore, we recommend that you take good care of your COR job if you are new in this.

You need to be qualified in A/C or refrigerant handling, courageous in character and keen to innovative technologies. Most importantly, you need to read carefully the FAQs!

2. What is working principle of COR? Is it safe?

Liquid refrigerant is charged through one service port (for example LP) to dissolve compressor oil, meanwhile mixture of refrigerant and compressor oil is recovered from another port (for example HP). The refrigerant charged floods the A/C system with liquid refrigerant, and mixture of refrigerant and oil is recovered and separated in Bludee A/C system. During the operation the charging/recovery direction is periodically reversed, to make thorough oil dissolving and recovery. At the end of the function, all oil recovered is discharged to an oil vessel for proper disposal.

From above, COR ("flush" function of Bludee A/C machine) is very safe since no alien chemical is applied to A/C loop.

Besides, there is no extra pressure other than liquid refrigerant applied to A/C loop during COR process, it is not likely to make mechanical damage to A/C loop.

3. Is it necessary to replace automotive compressor oil?

In order to answer this question, we have to raise 3 other questions and propose 2 new issues in nowadays MAC system:

Q1: Does recovery & vacuuming evacuate MAC system completely?

The answer is NO. Humidity, acidified substances and un-qualified additives are mainly resolved or trapped in the compressor oil. Normal recovery and vacuum, leaving stained oil in the system, can NOT remove all the impurities in the system.

Q2: When an A/C part is replaced, does the technician know exactly how much oil loss because of the part replacement?

No. Although the technical training tells us that compressor oil remains in A/C loop in a certain percentage in compressor, condenser, filter-drier and evaporator. This percentage varies largely according to different car makes and models. Moreover, we have no idea how much the regular maintenance, repairing or leakage in the A/C loop may affect the compressor oil volume in the system.

Q3: In case of leakage, shall we refill some oil to A/C system? How much?

It is easy to understand that some quantity of oil needs to be refilled into A/C system when a leakage is found and fixed, since in many cases leaks are located by detecting oil stain or UV tracer, which means oil loss.

But without COR to clear the system, none can be certain of how much oil needing to be refilled into A/C system.

New issue1: R-1234yf refrigerant

This new refrigerant is known as low GWP (global warming potential) refrigerant. It is designed with a nature to be easily decomposed, thus to lower the greenhouse effect. However, R-1234yf is also easily decomposed if it meets air or some additives (low quality UV, leak stopper or cool booster etc.) in A/C loop. Generally, polymerization may happen if R-1234yf reacts with impurities in A/C loop, thus causes A/C failure or clogging. The gluey polymerized substances can NOT be evacuated by recovery or vacuum.

New issue2: Conductivity of electric and hybrid vehicles

It is known that as little as 1% substance with electric conductivity in the A/C loop may bring about danger to an electric or hybrid vehicle. That is why electric insulation is essential to E/H vehicle compressor oil. But we know anyway air permeates into A/C loop through rubber hoses or O-rings, although very slowly, and is trapped in the oil. And finally, the insulation of compressor oil will be effected.

Conclusions: COR is necessary to completely remove impurities in A/C loop, to clear oil in A/C loop thus to determine proper oil volume to inject, to remove polymerization formed in R-1234yf system, and to remove substances that cause electric insulation failure in electric or hybrid vehicles.

4. In order to completely recover the compressor oil, how much time shall be set for running flush function?

It is set according to the A/C system size. For a medium A/C, generally with 500g refrigerant, we recommend to set flush time at 30 minutes; While for a large A/C system, with 1KG refrigerant or more, we recommend to set flush time at 60 minutes.

For its extra-large system, bus A/C can NOT be serviced with COR by BLUDEE A/C machines.

5. What are the main risks of COR?

The main risk in COR is that, after flush function is run with BLUDEE A/C machine, nearly zero compressor oil remains in A/C loop. In this case if the compressor runs drastically, seizure could happen. To avoid this, it is recommended:

1. Before running flush function, make sure A/C is turned off before you switch off the engine (This is to avoid the

possible compressor seizure caused by fiercely fast engine speed at ignition) ;

2. After flush is run, compressor oil is injected and refrigerant is charged, switch on the engine, and then turn on A/C. Do NOT step on accelerator pedal in the beginning 3 minutes, leave the engine run at idle speed at least 3 minutes;
3. After the initial 3 minutes with special care, you can test the A/C performance as usual.

6. What is recommended to do COR with R-1234yf system?

As mentioned before, R-1234yf could react with aliens to create polymerized substances, which unfortunately do not dissolve with R-1234yf liquid refrigerant. However, polymer is soluble with R-134a. If you want to flush R-1234yf system with R-134a refrigerant, you need to have an R-1234yf recycling machine and an R-134a machine with COR function. Follow these steps:

1. Do recovery with R-1234yf machine;
2. Do vacuum with R-1234yf machine, at least 30 minutes;
3. Disconnect R-1234yf machine, connect R-134a machine with R-1234yf adapters;
4. Do COR with R-134a machine, with “flush” function;
5. Do vacuum with R-134a machine, at least 30 minutes;
6. Disconnect R-134a machine, connect R-1234yf machine;
7. Inject oil with R-1234yf machine;
8. Charge refrigerant with R-1234yf machine;
9. Make refrigerant identification to the vehicle A/C to make sure refrigerant is not cross-contaminated.

7. How much oil should be injected to A/C loop after COR?

After COR (flush function of BLUDEE A/C machine), compressor oil in A/C loop is cleared. Then you need consult to car manufacturer manual (In many cases the volume can be found in the sticker beneath engine hood) or BLUDEE database to get correct oil injection volume. Do NOT take volume of oil discharged in COR as standard oil injection volume.

If you cannot get oil volume neither in car manufacturer manual, nor in BLUDEE database, it is recommended to multiple 20% by refrigerant volume to get oil volume. For example, if a system has 450g refrigerant but does not have oil volume information, $20\% \times 450 = 90\text{ml}$ oil should be injected to the system. **Warning: The calculation method is recommended to use only when car manufacturer data is not available!**

8. In case that a compressor is replaced, what is recommended to do with COR?

As some compressor manufacturers' requirements, A/C loop must be flushed after replacement of compressor, otherwise warranty is affected. Take into account if a compressor is damaged by mechanical failure, metal powder mainly remains in compressor chamber, condenser and filter-drier. Thus, we recommend to replace not only damaged compressor, but also condenser and filter-drier.

After the replacement of compressor, condenser and filter-drier and new parts are mounted. Run “flush” function with BLUDEE machine, not only to remove the remaining small amount of oil with metal powder, but also to clear oil in A/C loop to inject same amount as car manufacturer's requirement.

After A/C being serviced, be sure to use BLUDEE C-400 refrigerant & oil checker to check the refrigerant and oil quality, to make sure the mixture of refrigerant and oil be transparent and non-discoloring. Then you can carry out A/C performance and deliver the car to the customer.

9. How much money should be charged for COR service?

It takes at least 1.5 hours to finish COR/vacuum/oil & refrigerant filling job and it is recommended to price the COR service 3-5 times higher than what you charge for normal recycling/recharging services. Also take into account that you need refill much more oil than normal recycling service.

Even though the charging rate seems relatively high, considering the extension of compressor life, the car owner can be largely benefited.

10. What are the additional suggestions?

1. You need to maintenance your COR machine more frequently than normal recycling/recharging machines. BLUDEE A/C machine has automatic service reminding function based refrigerant amount recovered, as local standards require, but COR is not counted in the service reminding even though it makes the load of equipment compressor much heavier. Maintain your machine for each 30 COR being serviced!

2. COR (“flush” function BLUDEE A/C machine) can remove humidity, acidified substances un-qualified additives and other impurities dissolved in the compressor oil, but it can NOT remove metal, rubber or crystallized particles. If these particles are suspected or witnessed to exist in A/C loop, please seek other solutions.

3. You can run COR to A/C system with refrigerant, or to empty system. The correct sequence of serving a car with BLUDEE A/C machine is: Flush (at ending the machine automatically recovers the refrigerant at supreme recovery rate), vacuum, charge (including oil injection and refrigerant charge).

4. For any situation, remember, BLUDEE loves to help: service@Bludee.com

Packing list

Serials Number	Name	Amounts	Package
ZT010044	AC900 main unit	1	
BZ030017	3m red service hose	1	
BA030016	3m blue service hose	1	
BZ130028	HP quick coupler	1	
BZ130029	LP quick coupler	1	
DZ160033	30A fuse	1	
DZ180034	Update cable with USB	1	
WJ010007	HP/LP block cap	2	
YS050014	Dust proof cover	1	
BZ130034	1KG calibration weight	1	
Varies for different market	Tank fill fitting	1	