REFRIGERANT RECOVERY/RECYCLE/EVACUATION AND RECHARGE UNIT

TO BE OPERATED BY QUALIFIED PERSONNEL ONLY

MODELS
AR300
AR300A
AR300E
AR312
AR312A

OPERATION MANUAL
UNIT CONSISTS OF:

- AR300 Series Mach 1 Automotive Refrigerant Recovery/Recycling/Evacuation and Recharge Machine
- 2 Stage 6 cfm/142 lpm Vacuum Pump
- 50 lbs/27.2 liter Recovery Cylinder
- All necessary Refrigerant hoses
- Low and High Side R-134a Couplings (AR300/AR300A/AR300E)
- Low and High Side R-12 Service Valves (AR312/AR312A)
- Virgin tank transfer adapters (AR300/AR300A/AR300E)
- Operation Manual

END USER TO PROVIDE:
R-12 and R-134a Refrigerant
OEM specified A/C system oils

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AR300 SPECIFICATIONS

Dimensions .................................................. 20" (51cm) wide x 30" (76 cm) deep x 50" (127cm) high
Weight (w/o tank & vacuum pump) .... 140 lbs (85 kgs)
Operating Range ................................. 40°F (4°C) to 120°F (49°C)
Refrigerant ........................................ (AR300/AR300A/AR300E) R-134a
......................................................... (AR312/AR312A) R-12
Cylinder Capacity ................................ 50 lb recovery tank
Empty Tank Weight* ............................. 27.8 lbs (12.48 kg)
Maximum Refrigerant Weight* .......... 38.0 lbs (15.87 kg)
Vacuum Pump ....................................... 2 stage 6 cfm/142 lpm Vacuum pump
Power Source ..................................... 115 VAC 60Hz (AR300/AR312)
............................................................. 220-240 50/60 Hz (AR300A/AR300E/AR300S)
Power Consumption ........................... 485 W
Moisture Size/Capacity ................. 650 ccm / 60 ml of water
Scale Resolution ............................. 10 g / 0.25 ounces
Pressure Gauge ............................. Class1.6

*CPS SUPPLIED TANKS, FOR OTHER TANKS PLEASE SEE TANK MANUFACTURERS SPECIFICATIONS
Thank you for purchasing the CPS Mach 1 AR300 series unit. CPS is dedicated to give you the fastest and most reliable equipment to meet all your mobile A/C service requirements. In doing this CPS has integrated its latest technology and incorporated state of the art features while improving reliability and speed.

The AR300 is a single circuit Refrigerant Handling machine. The AR300 is for R-134a and AR312 is for R-12. The unit automatically recovers, recycles, evacuates and recharges. Simply hook up the service hoses, choose the operation and allow the unit to perform its job until it automatically shuts off.

The AR300 utilizes a single pass (coalescing and distillation) recycling system, which means that when the AR300 recovers it also recycles. Thus the recovery tank always contains the cleanest refrigerant possible for future use.

The Mach 1 AR300 utilizes a 3/4 hp. compressor, non-restrictive control valves and large ported solenoid valves to make it one of the fastest refrigerant handling systems in its class.

The AR300 utilizes a unique compressor assist charging method that does not require a heater blanket. This gives the unit one of the fastest recharge rates of up to 3.0 lbs/1.5 kg per minute. The unit will even notify you if there is not enough refrigerant in the recovery tank to perform the charging operation!

THE FOLLOWING ARE ADDITIONAL FEATURES:

- Integrated Manifold Gauge Set. Visually see how the mobile A/C system is operating.
- A highly accurate electronic charge scale has been integrated into the AR300 control system.
- Microprocessor Integrated hour meter give the user immediate information on the status of the moisture filtration system.
- Tank overfill protection is provided by the electronic scale software and hardware.
- Automatic high-pressure shut-off with microprocessor indicator.
- Use your country’s approved recovery cylinder. The software allows the user to set up the proper tank and refrigerant parameters.
- Modular component design and a hinge front panel allow for easy service access.
- Built in Oil and/or Dye vacuum injection with a 16 oz (480 ml) reservoir.
- The unit has the ability to recharge large amounts of refrigerants.
- One bolt-external filter access system allows the user to change the filter core in less than 5 minutes.
- Replace only the filter core. This will greatly reduce the maintenance cost of filter changes.
- The control valves utilize CPS’s fully ported Teflon valves.
- Heavy-duty construction, powder coated steel cabinet mounted onto a 1" (2.5 cm) tubular steel wrap around frame.
- 10"/25cm pneumatic rear wheels and 4"/10cm swivel casters give this unit excellent maneuverability under the worst of conditions.
- Recovers and Evacuates through both the high and low side service hoses.
- 2 stage, 6cfm vacuum pump for faster evacuations.

To help you get a good start, please continue to carefully read the balance of this manual. This manual contains important information on the proper procedures for operating this equipment. Please pay close attention to the safety information, WARNINGS, and CAUTIONS provided throughout this manual. ALWAYS REMEMBER “SAFETY FIRST”.
GENERAL SAFETY INSTRUCTIONS

ONLY QUALIFIED SERVICE PERSONNEL SHOULD OPERATE THIS UNIT. MOST STATES, COUNTRIES, PROVINCES, ETC... MAY REQUIRE THE USER TO BE LICENSED. PLEASE CHECK WITH YOUR LOCAL GOVERNMENT AGENCY.

DANGER - this unit’s recovery tank contains liquid refrigerant. Overfilling of the recovery tank may cause a violent explosion resulting in severe injury or even death. Do not disable the overfill safety features. Always make sure the correct tank is on the scale.

DANGER - Only use the recovery tank provided with this unit. See distributor for replacement tanks.

DANGER - Avoid breathing refrigerant vapors and lubricant vapor or mist. Breathing high concentration levels may cause heart arrhythmia, loss of consciousness, or even cause suffocation.

CAUTION - all hoses may contain liquid refrigerant under pressure. Contact with refrigerant may cause frostbite or other related injuries. Wear proper personal protective equipment such as safety goggles and gloves. When disconnecting any hose, please use extreme caution.

CAUTION - avoid breathing refrigerant vapors and/or lubricant mist. Exposure may irritate eyes, nose, throat, and skin. Please read the manufacturers Material Safety Data Sheet for further safety information on refrigerants and lubricants.

CAUTION - to reduce the risk of fire, avoid the use of extension cords thinner than NO. 14 awg. (1.5 mm²) to prevent the overheating of this cord please keep length to a minimum.

CAUTION - do not use this equipment in the vicinity of spilled or open containers of gasoline or other flammable substances. Make certain that all safety devices are functioning properly before operating the equipment.

Make sure that recovery tank is placed on the load cell platform at all times. Failure to do so will disable certain safety features of this unit. The non-used tank should be placed on its holder.

Always disconnect power source when servicing this equipment.
1. Carefully unpackage the AR300.

2. Find the box marked “Open Me First”. Open and remove contents.

THE CONTENTS ARE AS FOLLOWS:

- Red 8 ft R-12 service hose w/high side service valve, Blue 8 ft R-12 service hose w/low side service valve for AR312  
  - Red 8 ft R-134a service hose w/high side couplers, Blue 8 ft R-134a service hose w/low side couplers for AR300
- 8 oz of vacuum pump oil
- 6 foot 115 volt power cord
- Operation Manual
- Two Virgin Tank Adapters (R-134a units only):  
  - 1/4 SAE x R-134a low side coupler,
  - 1/2 ACME x R-134a low side coupler
- Two 3/16 Cotter Pins

3. Pull the Back Wheel as far as it will move. It should move about 1 1/2”. Place the provided Cotter pin into the hole through the axle just behind the wheel hub. Repeat this procedure for the other side. This will extend the wheelbase to 23”.

4. Attach the Blue 8 ft service hose w/Low Side Service valve onto the low side manifold fitting just below the Low Side Pressure Gauge and Valve. Place the Low Side Service valve onto the adapter on the back of the unit for storage.

5. Attach the Red 8 ft service hose w/High Side Service valve onto the high side manifold fitting just below the High Side Pressure Gauge and Valve. Place the High Side Service valve onto the adapter on the back of the unit for storage.

6. Place the Storage tank onto the center of the Scale platform.

7. Open both storage tank valves to purge nitrogen from tank before connecting hoses. Connect the vapor hose (from back of unit) onto the storage tank vapor ports. Connect the blue purge hose (from the back of the unit) to the auxiliary service port on the top of the tank. Make sure the purge hose is equipped with a Schrader core depressor. Do not hook up with the liquid hose at this time.

8. Add oil to the Vacuum Pump. Make sure the vacuum pump power switch is in the “ON” position, the vacuum pump hose is properly connected and the vacuum pump valve is open (if equipped). Also check that the vacuum pump power cord is properly plugged into the receptacle on the back of the unit. Read vacuum pump manual for further maintenance issues.

9. If desired, please add OEM recommended A/C oil and/or dye to the Oil Injection Bottle. Do not use Oil Injection Valve unless bottle is filled above the 2 oz mark.

10. The next step will be to evacuate the AR300 Refrigerant Circuits and Storage Tank.

a) Attach the provided power cord to the electrical inlet. Turn power switch to “I” (On) position.

Note: From step 7, open both storage tank valves to purge nitrogen from tank before connecting hoses. Failure to do this may not allow the AR300 to operate in the VACUUM mode.

b) Connect the Blue service hose to the liquid port on the storage tank. Note: For the AR300/AR300A use the 1/4” female flare to Low Side R-134a adaptor on the liquid port to properly connect the blue service coupling. Open all tank valves.

c) Push the MODE key. Push the “+” key until Mode 2 “VACUUM” shows up on the LCD. Push the “SET” key to select VACUUM mode.

d) Following the directions on the LCD for the VACUUM mode. Program the VACUUM time for at least 20 minutes.

e) Once the vacuum pump begins to operate, it should be visually noticed that manifold and purge gauges should fall into a vacuum. Repeat if necessary.

f) Once complete, disconnect the service hose from the purge port. Connect the purge hose to the purge port on the storage tank. Make sure it is equipped with a Schrader core depressor.

11. The next step is the procedure to add new refrigerant to the AR300 recovery tank.

a) Turn the power switch to “I” (On) position.

b) Push the MODE key. Use the “+” or “-” keys to scroll to Mode 8 REFILL. Push “SET” key.

c) Follow directions on LCD. Note: To speed up the refill process, turn the Virgin Supply Tank upside down to make sure that liquid refrigerant is being recovered. The unit will automatically shut off at a predetermined level (26.5lbs).

d) Once the refill is complete, push the “STOP” key. Check purge gauge for tank pressure.

12. The following is how to change the language on the LCD.

a) Turn the power switch to “I” (On) position.

b) Push the MODE key. Use the “+” or “-” keys to scroll to Mode 2 “VACUUM” shows up on the LCD. Push the “SET” key to select VACUUM mode.

c) Follow directions on LCD. Note: To speed up the refill process, turn the Virgin Supply Tank upside down to make sure that liquid refrigerant is being recovered. The unit will automatically shut off at a predetermined level (26.5lbs).

d) Once the refill is complete, push the “STOP” key. Check purge gauge for tank pressure.

ENGLISH
STOP-NO  SET-YES

b) If English is your language choice push the “SET” key. To scroll to other languages, push the “STOP” key.

Congratulations,
The Mach1 model AR300 series is now ready for service use.
Please refer to the rest of this manual for proper operating instructions.
1. Tank Pressure Gauge – used to monitor the R-134a Recovery Tank Pressure
2. Low Side Pressure Gauge and Valve – with Valve closed, measure Auto A/C low side pressure.
3. High Side Pressure Gauge and Valve – with Valve closed, used to measure Auto A/C high side pressure.
4. Purge Switch Power Switch – used to purge NCG’s from R-134a Recovery Tank
5. Main Power Switch
6. LCD Display – used to instruct and inform the user of the AR300 operation
7. Key Pad – used to program the operation of the AR300
   a. MODE Key - input key to start mode selection right after Refrigerant Selection.
   b. lb/kg Key - input key to select units of weight measurement.
   c. STOP Key - used as an input key during operation. Can also be used to abort the operation of the unit while running in modes 1 through 8. Can also be used to abort during the programming sequence.
   d. + ARROW Key - used as an input key to scroll through operational modes. Also used as input key to increase program times and charge weights. Also used to select refrigerant mode and other programming selections.
   e. - ARROW Key - same as + ARROW Key, except reverse scroll and decreases program time and charge weight.
   f. SET Key - used as an input key to select operational mode. Also used as an input key during programming.
1. Hose Holders
2. Scale or Load Cell
3. Recovery Tank
4. Fan
5. IEC Electrical Connection
6. Circuit Breaker
7. High Pressure Reset
8. Sight glass
9. Oil Injector
10. Liquid Hose
11. Vapor Hose
12. Purge Hose
13. Vacuum Pump Hose
14. Vacuum Pump
15. Vacuum Pump Receptacle
16. Filter Shell
17. Oil Drain Bottle
18. Printer Connection
Connect the correct Refrigerant service hoses to the automobile a/c system to be serviced.
Open the High and Low Side Service Fittings (fittings at the end of the service hoses).
With the AR300 Manifold valves closed, you can run the automobile a/c system and determine operating pressures. The unit is equipped with Min/Max gauge indicators.

The AR300 is a microprocessor driven unit. Most of the operating instructions are contained on the LCD. Simply choose the desired function of the unit and follow the directions on the LCD. The following are the basic keystrokes to run this unit:

- Turn the Power switch to “I” (On) position. Open all Tank Valves.
- The LCD message should now read

```
PUSH MODE KEY
XX LBS XX.XX OZ
```

Note: The 2nd line will display the current refrigerant weight in the recovery cylinder. Push “MODE” key.

- The LCD screen now reads

```
1 RECOVER/RECYCLE - <or SET or> +
```

Push the “+” or “-” keys to scroll through the different modes. Once the desired operation is displayed, push the “SET” key.

The different modes are as follows:

1. Mode 1 - Recovery/Recycle
2. Mode 2 - Vacuum/Injection
3. Mode 3 - Charge
4. Mode 4 - Full Cycle
5. Mode 5 - Vacuum/Charge
6. Mode 6 - Quick Charge
7. Mode 7 - Liquid Flush
8. Mode 8 - Refill
9. Mode 9 - Maintenance
   A. Mode 9A - Air Purge
   B. Mode 9B - Filter Change
   C. Mode 9C - Re-zero scale
   D. Mode 9D - Refrigerant Management

Follow the directions on the LCD for each mode. The following pages will discuss each mode.
AR300 OPERATION MODES

START UP
Turn Main Power Switch to the “ON” position. A few diagnostic messages may appear. After about 5 seconds the LCD will read:

CURRENT FILTER
LIFE 3000 MINS

After a few more seconds, the LCD message now reads:

PUSH MODE KEY
XX LBS XX.XX OZ

Note: The 2nd line will display the current refrigerant weight in the recovery cylinder. If metric weights are required, push the “LB/KG” key to select units of measure.

Push “MODE” key.

The LCD screen now reads:

1 RECOVER/RECYCLE
- <or SET or> +

Push the “+” or “-” keys to scroll through the different modes. Once the desired operation is displayed, push the “SET” key.

MODE 1. - RECOVER/RECYCLE

The Recover/Recycle mode would be chosen to recovery refrigerant from an Auto A/C system that needs a refrigerant containing component replaced such as a compressor, evaporator, orifice tube, condenser, etc....

When LCD screen reads:

OPEN HI & LO MNFD VALVES. PUSH START

Push the “START” key. The LCD will now read:

1 RECOVERING
XX LBS XX.XX OZ

The AR300 is now recovering refrigerant. The 2nd LCD line records the amount of refrigerant recovered.

When the AR300 reaches the EPA required vacuum level, the LCD will read: 90 sec time delay for gasing.

1 DONE PUSH STOP
XX LBS XX.XX OZ

Push “STOP” to return to Refrigerant Selection Screen. Do not forget to measure the A/C oil in the oil drain bottle for future re-injection.

MODE 1 RECOVER/RECYCLE is now complete.
MODE 2. - VACUUM/INJECTION

The VACUUM/INJECTION Mode would be chosen to remove air and moisture from an Auto A/C system that has been open to atmosphere.

Scroll until the LCD screen reads:

2 VACUUM/INJECTN - <or SET or> +

Push the “SET” key. The LCD will now read:

OPEN HI & LO MNFD VALVES. PUSH START

Push the “START” key. The LCD will now read:

SELECT VAC TIME USE+ or -KEYS

Push the “+” or “-” key until the desired vacuum time is programmed.

XXX MIN PUSH SET

Push the “SET” key. The LCD will now read:

RUN VAC HLD TIME? YES+ NO-

The Vacuum Hold Time is a feature to see if the A/C system will hold a vacuum over a programmed amount of time. This feature can be bypass by push “-” key. Once the “-” key is pushed, the VACUUM /INJECTION Mode will begin.

If “+” key pushed the LCD will now read:

SELECT VAC HLD TIME USE+ or -KEYS

Push the “+” or “-” key until the desired vacuum hold time is programmed:

Push the “START” key to start the VACUUM /INJECTION Mode.

XXX MIN PUSH SET

During this Mode the LCD timer will count down the remaining Evacuation time.

2 VACUUMING A/C XX:XX TO GO

When the timer reaches zero, the Evacuation Mode will end and the LCD will now read:

2 VACUUM DONE PUSH STOP

Push the “STOP” key.

OPTION 1.

If the Vacuum Hold feature was programmed, the LCD will read:

READ AND RECORD VAC LEVEL PUSH SET

Push SET key, the LCD will read:

4 VAC HOLD TIME XX:XX TO GO
When the Vacuum Hold time reaches zero, the LCD will read:

**READY FOR MANUAL INJECT PUSH STOP**

If the Vacuum Level is maintained, push the “SET” key. When the SET key is pushed, the LCD will read the message below and continue with MODE 2 operation. If Vacuum Level is lost, push the STOP key twice to abort this Mode. Find leak and try again.

The LCD will now read:

**READY FOR MANUAL INJECT PUSH STOP**

Inject A/C oil back into the mobile A/C at this time. This must be followed up by the CHARGE Mode to allow the liquid refrigerant to carry the injected oil back to the A/C.

Push the “STOP” key. The LCD will return to the Refrigerant Selection Screen.

MODE 2 VACUUM/INJECTION is now complete.

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**MODE 3. - CHARGE MODE**

The CHARGE would be chosen to recharge a mobile A/C system after it has been properly evacuated. NOTE: Air and/or moisture in an A/C system can cause premature failure of A/C system components.

Scroll until the LCD screen reads:

**3 CHARGE**

- <or SET or> +

Push the “SET” key. The LCD will now read:

**OPEN HI & LO MNFD VALVES. PUSH START**

Push the “SET” key. The LCD will now read:

**USE+ or -KEYS SELECT CHARGE WG**

Push the “+” or “-” key until the desired charge amount is programmed.

**XX kg XXXg PUSH START**

Push the “START” key to start the CHARGE Mode. During this Mode the LCD will display the amount charged.

**3 CHARGING**

XX kg XXXg

Once the amount displayed equals the charged amount, the LCD will read:

**3 DONE PUSH STOP**

XX kg XXXg

Push the “STOP” key. The LCD will return to the Refrigerant Selection Screen.

MODE 3 CHARGE is now complete.
MODE 4. – FULL CYCLE

The FULL CYCLE is commonly used at quick lube facilities where no leaks or repairs are required, but the A/C system seems to be undercharged.

Scroll until the LCD screen reads:

3 CHARGE
- <or SET or> +

Push the “SET” key. The LCD will now read:

OPEN HI LO MNFD VALVES. PUSH START

Push the “START” key. The LCD will now read:

SELECT VAC TIME
USE+ or -KEYS

Push the “+” or “-” key until the desired vacuum time is programmed.

XXX MIN
PUSH SET

Push the “SET” key. The LCD will now read:

RUN VAC HLD TIME?
YES+ NO-

The Vacuum Hold Time is a feature to see if the A/C system will hold a vacuum over a programmed amount of time. This feature can be bypass by push “-” key. If the “-” key is pushed go to RUN OIL INJECTION screen below.

If “+” key pushed the LCD will now read:

SELECT VAC HLD TIME
USE+ or -KEYS

Push the “+” or “-” key until the desired vacuum hold time is programmed:

XXX MIN
PUSH SET

Push the “SET” key or the “-” key from above, the LCD will read:

RUN OIL INJECTN?
YES+ NO-

The OIL INJECTION feature during the FULL CYCLE mode is used to allow the user to interrupt the full cycle operation right after vacuum to inject oil back into the A/C system. If the “+” key is pushed, the unit will notify the user when it is time to inject oil. This feature can also be bypass by push “-” key. Push either the “+” or “-” key to program this feature. The LCD display will now read:

USE+ or -KEYS
SELECT CHARGE WG

Push the “+” or “-” key until the desired charge amount is programmed.

XX kg XXXg
PUSH START

Push the “START” key to start the FULL CYCLE Mode. The LCD will now read:

1 RECOVERING
XX LBS XX.XX OZ

The AR300 is now recovering refrigerant. The 2nd LCD line records the amount of refrigerant recovered.
When the AR300 reaches the EPA required vacuum level, the unit will switch to Vacuuming (if vacuum time programmed).

During the vacuum operation the LCD timer will count down the remaining Evacuation time.

When the timer reaches zero, the Vacuum operation will end. There are two different options that could be programmed. If these options were not programmed, proceed to charge function of this mode.

**OPTION 1.**

If the Vacuum Hold feature was programmed, the LCD will read:

```
4 VACUUMING A/C
XX:XX TO GO
```

When the timer reaches zero, the LCD will read:

```
READ AND RECORD
VAC LEVEL PUSH SET
```

Push SET key, the LCD will read:

```
4 VAC HOLD TIME
XX:XX TO GO
```

If the Vacuum Level is maintained, push the “SET” key. When the SET key is pushed the unit will Either go into Option 2 if programmed or begin the Charge operation. If Vacuum Level is lost, push the “STOP” key twice to abort this mode. Find leak and try again.

**OPTION 2.**

If the Vacuum Hold feature was programmed, the LCD will read:

```
READY FOR MANUAL
INJECT PUSH STOP
```

If required, inject A/C oil back into the mobile A/C at this time.

Push the STOP key.

Once either or both options, have been completed, the unit will proceed into the charge function of this mode.

The LCD will read:

```
4 CHARGING
XX kg XXXg
```

Once the amount displayed equals the charged amount, the LCD will read:

```
4 DONE PUSH STOP
XX kg XXXg
```

Push the “STOP” key. The LCD will return to the Refrigerant Selection Screen.

MODE 4 FULL CYCLE is now complete.
MODE 5. – VACUUM/INJECTION/CHARGE

The Vacuum/Injection/Charge is commonly used to complete a service on an Auto A/C system that had a refrigerant containing component replaced such as a compressor, evaporator, orifice tube, condenser, etc....or other service that would have open the system to the atmosphere. This mode is the same as Mode 4, except it does not perform the recovery function.

IMPORTANT NOTE: DO NOT RUN THIS MODE IF MORE THAN 5 PSIG PRESSURE IS PRESENT IN THE AUTO A/C SYSTEM. THIS MODE OVERIDES THE VACUUM SWITCH THAT PREVENTS OPERATING THE VACUUM PUMP IF PRESSURE EXISTS IN AN A/C SYSTEM.

Scroll until the LCD screen reads:

5 VAC/INJ/CHARGE
- <or SET or> +

Push the “SET” key. The LCD will now read:

OPEN HI & LO MNFD VALVES. PUSH START

Push the “START” key. The LCD will now read:

SELECT VAC TIME
USE+ or - KEYS

Push the “+” or “-” key until the desired vacuum time is programmed.

XXX MIN
PUSH SET

Push the “SET” key. The LCD will now read:

RUN VAC HLD TIME?
YES+ NO-

The Vacuum Hold Time is a feature to see if the A/C system will hold a vacuum over a programmed amount of time. This feature can be bypass by push “-” key. If the “-” key is pushed, go to RUN OIL INJECTION screen below.

If “+” key pushed the LCD will now read:

SELECT VAC HLD TIME
USE+ or - KEYS

Push the “+” or “-” key to the desired vacuum hold time is programmed:

XXX MIN
PUSH SET

Push the “SET” key or the “-” key from above, the LCD will read:

RUN OIL INJECTN?
YES+ NO-

The OIL INJECTION feature during this mode is used to allow the user to interrupt the mode 5 operation right after vacuum to inject oil back into the A/C system. If the “+” key is pushed, the unit will notify the user when it is time to inject oil. This feature can also be bypass by push “-” key.

Push either the “+” or “-” key to program this feature. The LCD display will now read:

USE+ or - KEYS
SELECT CHARGE WG

Push the “+” or “-” key until the desired charge amount is programmed.

XX kg XXXg
PUSH START
AR300 OPERATION MODES

Push the “START” key to start the VACUUM/INJECTION/CHARGE Mode. The LCD will now read:

5 VACUUMING A/C
XX:XX TO GO

When the timer reaches zero, the Vacuum operation will end. There are two different options that could be programmed. If these options were not programmed proceed to charge function of this mode.

OPTION 1.

If the Vacuum Hold feature was programmed, the LCD will read:

READ AND RECORD
VAC LEVEL PUSH SET

Push SET key, the LCD will read:

5 VAC HOL TIME
XX:XX TO GO

When the Vacuum Hold time reaches zero, the LCD will read:

READ AND RECORD
VAC LEVEL PUSH SET

If the Vacuum Level is maintained, push the “SET” key. When the SET key is pushed the unit will either go into Option 2 if programmed or begin the Charge operation. If Vacuum Level is lost, push the “STOP” key twice to abort this mode. Find leak and try again.

OPTION 2.

If the Vacuum Hold feature was programmed, the LCD will read:

READY FOR MANUAL
INJECT PUSH STOP

If required, inject A/C oil back into the mobile A/C at this time.

Push the STOP key.

Once either or both options, have been completed, the unit will proceed into the charge function of this mode. The LCD will read:

5 CHARGING
XX kg XXXg

Once the amount displayed equals the charged amount, the LCD will read:

5 DONE PUSH STOP
XX kg XXXg

Push the “STOP” key. The LCD will return to the Refrigerant Selection Screen.

MODE 5 VAC/INJ/CHARGE is now complete.
**MODE 6. – QUICK CHARGE MODE**

The QUICK CHARGE would be chosen to top off an A/C system. The auto a/c system needs to be running to perform this function.

Scroll until the LCD screen reads:

![Quick Charge Menu](image)

Push the “SET” key. The LCD will now read:

![Close HI & LO MNFD VALVES. Push Set](image)

Push the “SET” key. The LCD will now read:

![Start AUTO A/C System. Push Set](image)

Push the “SET” key. The LCD will now read:

![Use + or - Keys Select Charge WG](image)

Push the “+” or “-” key until the desired charge amount is programmed.

![XX kg XXXg Push Start](image)

Push the “START” key to start the QUICK CHARGE Mode. During this Mode the LCD will display the amount charged.

![Open LO MNFLD VLVE XX kg XXXg](image)

Once the amount displayed equals the charged amount, the LCD will read:

![Quick Charge Complete – Repeat + Stop](image)

If the “-” key is pushed, this operation will be repeated.

If the “+” key is pushed, the LCD will return to the Refrigerant Selection Screen.

MODE 6 is now complete.

**MODE 7. – LIQUID FLUSH**

The LIQUID FLUSH would be chosen to flush the compressor oil from an Auto A/C system. This is usually done when retrofitting a car from R-12 to R-134a or another alternate refrigerant. When flushing, always use the refrigerant type contained in the Auto A/C system.

Scroll until the LCD screen reads:

![Liquid Flush Menu](image)

Push the “SET” key. The LCD will now read:

![Open HI & LO MNFD VALVES. Push Start](image)

Push the “SET” key. The LCD will now read:

![Use + or - Keys Select FLUSH TIME](image)

Push the “+” or “-” key until the desired charge amount is programmed.

![XXX MIN Push Set](image)

Push the “SET” key. The LCD will now read:

![Ready to Flush Push Start](image)

Push the “START” key to start the LIQUID FLUSH Mode. During this Mode the LCD will display the amount of FLUSH TIME remaining.
When the timer reaches zero, the LIQUID FLUSH cycle will end and the LCD will now read:

7 RECOVERING
PLEASE WAIT

The unit could take up to 45 minutes to recover the refrigerant used in flush. Please wait until LCD reads:

7 FLUSH DONE
PUSH STOP

Push the “STOP” key. The LCD will return to the Refrigerant Selection Screen.

MODE 7 LIQUID FLUSH is now complete.

MODE 8. - REFILL MODE

The REFILL Mode would be chosen to add more refrigerant to the recovery tank. This mode could be prompted directly from Mode 3, 4, or 5.

Scroll until the LCD screen reads:

8 REFILL
- <or SET or> +

Push the “SET” key. The LCD will now read:

OPEN LO MNFD VALVE.
PUSH SET

Push the “SET” key. The LCD will now read:

CONNECT LO SERVICE HOSE. PUSH SET

Push the “SET” key. The LCD will now read:

TO NEW REFRIGERANT TANK. PUSH START

For R-134a it will be necessary to use the enclosed adaptor(s) to connect to the New Refrigerant Tank. Push the “START” key to start the REFILL Mode. During this Mode the LCD will display the total refrigerant amount in the recovery tank. The unit will run the REFILL mode until one of the two conditions occur:

8 REFILL DONE
PUSH STOP

OR

7 NEW TANK EMPTY
PUSH STOP

If REFILL DONE condition occurs, that means the recovery tank has been fill to 70% of the Maximum Refrigerant amount allowed in the recovery tank (26lbs).

If NEW TANK EMPTY condition occurs, repeat this mode with a full New Refrigerant Tank attached. The previous one is empty.

Push the “STOP” key. The LCD will return to the Refrigerant Selection Screen.

MODE 8 REFILL MODE is now complete.
**MODE 9. - MAINTENANCE MODE**

The MAINTENANCE Mode is broken down into 4 maintenance procedures: 1- Air purge, 2- Filter Change, 3- Re-zero Scale, 4- Refrigerant Management. Please read the following to discuss each procedure.

Scroll until the LCD screen reads:

\[
\text{9 MAINTENANCE} - \text{<or SET or> +}
\]

Push “SET” key. The LCD will now read:

\[
\text{A AIR PURGE} - \text{<or SET or> +}
\]

Push the “+” or “-” keys to scroll through the different Maintenance modes.

**MODE 9A. Air Purge**
**MODE 9B. Filter Change**
**MODE 9C. Re-zero scale**
**MODE 9D. Refrigerant Management**

Once the desired operation is displayed, push the “SET” key.

**MODE 9A. AIR PURGE**

The AIR PURGE maintenance mode is used to remove Non-Condensable Gases (NCG’s) from the recovery tank. It is best to check in the morning or after a long period of non-operation. This will allow the refrigerant to stabilize.

Scroll until the LCD screen reads:

\[
\text{9 MAINTENANCE} - \text{<or SET or> +}
\]

Scroll again until the LCD screen reads:

\[
\text{A AIR PURGE} - \text{<or SET or> +}
\]

Push the “SET” key. The LCD will now read:

\[
\text{R-134a TEMP XX.X F}\]
\[
\text{R-134a PRESS XXX.X PSIG}
\]

Compare the LCD pressure reading with the R-134a tank pressure gauge on the control panel. If the Tank pressure gauge is higher than the LCD reading, hold down the AIR PURGE switch (on the control panel) until the gauge pressure falls below the LCD reading.

Push the “STOP” key. The LCD will return to the Refrigerant Selection Screen.

MODE 9A AIR PURGE is now complete.
MODE 9B. FILTER CHANGE

The FILTER CHANGE maintenance mode is used to change the solid core filter drier. You will need to purchase an ARXF filter from your CPS distributor. When the filter time has expired, the unit will need its filter replaced. The FILTER TIME is displayed when selecting the Refrigerant operation. The expected life of the filter is 3000 minutes (50 hours).

Scroll until the LCD screen reads:

9 MAINTENANCE
- <or SET or> +

Scroll again until the LCD screen reads:

B FILTER CHANGE
- <or SET or> +

Push the “SET” key. The LCD will now read:

OPEN HI & LO MNFD VALVES. PUSH START

Note: The unit should not be connected to an Auto A/C system.

Push the “START” key. The LCD will now read:

RECOVERING PLEASE WAIT

Once a vacuum has been achieved the LCD will now read:

REMOVE FILTER COVER
PUSH SET

See Figure 1a

Push the “SET” key. The LCD will now read:

REMOVE & REPLACE FILTER. PUSH SET

See Figure 1b and 1c

Push the “SET” key. The LCD will now read:

FILTER CHANGE
DONE. PUSH STOP

Push the “STOP” key. This will reset the filter time back to 3000 minutes. The LCD will return to the Refrigerant Selection Screen.

MODE 9B FILTER CHANGE is now complete.
MODE 9C. RE-ZERO SCALE

The RE-ZERO SCALE maintenance mode is used to tare the scale. This should be done about every 2 months to maintain accurate refrigerant weight in the recovery tank.

Scroll until the LCD screen reads:

![Image of 9 MAINTENANCE - <or SET or> +]

Scroll again until the LCD screen reads:

![Image of C RE-ZERO SCALE - <or SET or> +]

Push the “SET” key. The LCD will now read:

![Image of REMOVE TANK. PUSH SET]

Physically remove tank from scale.

Push the “SET” key. The LCD will briefly read:

![Image of RESETTING ZERO PLEASE WAIT]

Then:

![Image of REPLACE TANK. PUSH STOP]

Push the “STOP” key. The LCD will return to the Refrigerant Selection Screen. MODE 9C RE-ZERO SCALE is now complete.

IMPORTANT: Please check to see if the unit needs to be re-zeroed by returning to the “PUSH MODE” screen. The 2nd line will give the user the amount of refrigerant contained in the recovery tank. By removing the recovery tank from the scale, the weight reading should be the empty tank weight. For the AR300 this will be 27 lbs 8 oz (Note: a negative sign will proceed reading). If this reading is off by ±8 ounces, please repeat Mode 9C.

MODE 9D. REFRIGERANT MANAGEMENT

The REFRIGERANT MANAGEMENT maintenance mode is used to keep track of the refrigerant used by this equipment. There are 3 basic categories on how refrigerant is used by this machine: 1-amount recovered, 2- amount charged, and 3- amount new refrigerant added.

Scroll until the LCD screen reads:

![Image of 9 MAINTENANCE - <or SET or> +]

Scroll again until the LCD screen reads:

![Image of D REFR MANAGMENT - <or SET or> +]

Push the “SET” key. The LCD will now read:

![Image of TOTAL 134 RECOVERD XXLB XX.XXOZ]

Push the “SET” key. The LCD will now read:

![Image of TOTAL 134 CHARGED XXLB XX.XXOZ]

Push the “SET” key. The LCD will now read:

![Image of TOTAL 134 REFILLED XXLB XX.XXOZ]

Push the “SET” key. The LCD will now read:

![Image of RESET DATA? YES+ NO-]

Push the “-” key to save the data or push the “+” key to reset the data to zero. The LCD will return back to the Refrigerant Selection Screen.
OTHER ROUTINE MAINTENANCE ISSUES

VACUUM PUMP OIL - the Mach 1 AR300 is equipped with an external vacuum pump. It will be necessary to occasionally add additional vacuum pump oil. View the oil level through the sight glass provided on the vacuum pump.

If it is noticed that the vacuum pump is not performing as it did when new, completely drain and refill with new vacuum pump oil. Contaminants in the vacuum pump oil will greatly affect the performance.

Use the recommended vacuum pump oil. Please read the vacuum pump operation manual for further maintenance details.

Periodically change the vacuum pump oil periodically. A good flag would be whenever the filter(s) are changed, also change the vacuum pump oil.

COMPRESSOR OIL - the compressors used in the AR300 are equipped with automatic oil return systems. No compressor oil maintenance should be required. The oil used on the AR312/AR312A is 3GS mineral oil. The oil used on the AR300/AR300A is PAG oil. Additional amounts can be added directly to the compressor suction port (refrigerant hose connection point).

END OF THE DAY MAINTENANCE - as a matter of precaution, close all recovery tank valves at the end of the day. Close all other valves. Please note that CPS does not take responsibility for lost refrigerant.

REPLACEMENT GAUGES & PARTS
54-100 / 16 Ounce Plastic Oil Bottle
30-736 / AR300 High Side Manifold Gauge
30-737 / AR300 Low Side Manifold Gauge
30-743 AR300E High Side Gauge
30-744 AR300E Low Side Gauge
74-092 / R-12 Tank Label
74-093 / R-134a Tank Label
74-099 / Tank Thermometer

REPLACEMENT HOSES
ARH6-A1 / AR300E Low Side Hose 1/4"
ARH7-A1 / AR300E High Side Hose 1/4"
ARH11-A1 / Tank Hose R-12 1/4"
ARH13-A1 / Vacuum Pump Hose
ARH16-A1 / Low Side Hose R-12
ARH17-A1 / High Side Hose R-12

RECOVERY TANKS & FILTERS
ARXC -AR300 Nylon Cover
ARXF-AR300 filter
AR134T-R-134 1/2" acme recovery tank 50 lb.
CRX350T-R-12 1/4" SAE recovery tank 50 lb.
CRX390T - High Capacity Recovery Tank 90 lb.
T27L-AR300E 27 Liter Recovery Tank

R-134a SERVICE COUPLERS
QCL14-R-134a Low Coupler 1/4"
QCH14-R-134a High Coupler 1/4"
QCL134-R-134a Low Coupler 14mm
QCH134-R-134a High Coupler 14mm

PRINTERS
ARXP115-AR300/Printer with cable
ARXP220 - AR300 Printer with cable 220 VAC
PROBLEM: The unit will only pull down to 0 pressure or a slight vacuum.

SOLUTION: Make sure the Oil Injection Valve is fully closed. If left open in the during the recovery operation, air will be pulled through the valve.

SOLUTION: Make sure that both the Low and High Side Service Hoses are leak tight.

PROBLEM: THE unit fails to charge the automobile. Message on LCD will read “CHECK CONNECTIONS”.

SOLUTION: Make sure that both tank valves are open. Also check that the liquid hose is connected to the liquid port of the tank. Check in-line ball valves on tank hoses.

SOLUTION: Make sure the High and Low Service valves are open.

PROBLEM: Weight inaccuracies.

SOLUTION: Do not move the unit when operating in the Recovery or Charge Mode. Moving the unit during operation will cause weight reading inaccuracies.

SOLUTION: Make sure the recovery tank is not touching the metal railing or back panel.

PROBLEM: In modes 3, 4, 5, and 6 after pushing the START key the LCD reads “LOW REFRIGERANT” and will not charge.

SOLUTION: The unit’s refrigerant tank needs to contain a minimum of 2.5 lbs plus the charge amount before charging. Use the refill procedure (Mode 8) to add additional refrigerant to the recovery tank.

PROBLEM: During mode 1, 3, 4, 5, 7 or 8 operation the unit is shut-off by the high-pressure switch. This should be noted by the LCD message “HIGH PRESSURE LIMIT”.

SOLUTION: Make sure that both tank valves are open. Check in-line ball valves on tank hoses. Push the HPCO reset button to reset unit.

PROBLEM: During mode 1, 4 or 7 the unit is shut-off by tank overfill safety system. The LCD message “TANK FULL” will note this condition.

SOLUTION: It will be necessary to charge approximately 5-10 lbs. into an empty refrigerant cylinder. Connect the High Side Service valve to the tank liquid port and the Low Side Service valve to the tank vapor port. Follow the directions for mode 3 CHARGE.
CPS guarantees that the MACH 1 is free of manufacturing and material defects for two years. If a component should fail during the guarantee period, it will be repaired or replaced (at our option) at no charge. This guarantee does not apply to components that have been altered, misused, or returned solely in need of field service maintenance. This repair policy does not include components that are determined to be beyond economical repair. A component being returned for warranty repair must be accompanied by an original bill of sale and customer contact information.

The load cell assembly is guaranteed for two year period.

This equipment has been certified by ETL/ITS to meet or exceed
SAE J 2210, J 2099 (AR300)
and SAE J 1991, J 1990 (AR312)
and UL 1963

CPS

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