INSTRUCTIONS

HVAC/R
Service Products

REFCO

ENVIRO-DUO
4686353
ENVIRO-DUO-OS
4687035

Instruction Manual
Two-Piston-Recovery Station

Bedienungsanleitung
Zwei-Kolben-Absauggerät

Mode d'emploi
Station de recuperation à double piston

Istruzioni per l'uso
Unità di recuperso a due pistoni

Manual de instrucciones
Estación de recuperación de dos pistones

CE

OPERATING INSTRUCTIONS

ENVIRO-DUO / ENVIRO-DUO-OS
Safe for R-32, R-1234yf

Contents

1. General Information

Thank you for purchasing the ENVIRO-DUO(-OS) Refrigerant Recovery Machine!
ENVIRO-DUO(-OS) combines an innovative refrigerant gas compression system with a rugged, moulded case that is designed to offer maximum protection from damage during transit and normal handling.
With normal use and with care as prescribed in this Manual, your ENVRIO-DUO(-OS)
will give you years of trouble-free operation.

Safety First!

When found on the machine, this international symbol is intended to alert the user to the presence of important operating, safety and maintenance (servicing) instructions in this manual. As used in the Manual, it is intended to draw your attention to critical items.
It is important to read this entire manual and be familiar with its contents before using the machine!

The ENVIRO-DUO(-OS) is a Recovery Machine for a broad range of refrigerants. Recovering refrigerants into a separate storage cylinder involves a process of gas compression, resulting in high pressures within the machine, the connecting hoses and the storage cylinder. High-Pressure systems must always be treated with care and respect to prevent careless accidents.

Product Safety:

The ENVIRO-DUO(-OS) has been designed to meet the

requirements of the Standard for Refrigerant Recovery Machines, AHRI and CE certification.
If an approved cylinder with overfill is not available always use an approved scale to monitor the cylinders capacity. Additionally, approved refrigerant hoses must be used which have shut-off devices within 300 mm of the ends to reduce the likelihood of refrigerant leakage to the atmosphere when changing cylinders or setups.

Responsibility:

A qualified technician who has been properly trained in the care and use of such equipment and in the recovery process itself must only operate the ENVIRO-DUO(-OS).

- The operation instructions are part of the product and must be stored in close proximity to the ENVIRO-DUO(-OS) where they should be readily accessible to qualified personnelat all times.
- The qualified personnel must have carefully read and understood the operating instructions prior to operating the device.
- The manufacturer shall not be liable for any damage whatsoever arising through improper use, failure to comply with these operating instructions, assignment of inadequately qualified personnel, or unauthorised modification of the ENVIRO-DUO(-OS).

- The General Terms and Conditions as set out in the sales documentation shall apply.
- Subject to the technical modifications.

Key to symbols

WARNING!

… indicates a potentially hazardous situation that could result in serious injury or death if not avoided.

DANGER!

… indicates electrical hazard. Failure to comply with these safety instructions may result in serious injury or death.

2. Safety

WARNING!

Before setup and operation of the device, ensure that it is not damaged in any way. Failure to comply could result in serious physical injury and/or material damage.

DANGER!

Risk of death by electrocution.

2.1 Personnel Qualifications

WARNING!

Risk of injury through use by unqualified personnel! Improper handling of the device can lead to serious personal and material damage.

- The activities described in these operating instructions should only be carried out by skilled personnel in possession of the qualifications outlined below.
- Keep unqualified personnel away from hazardous areas.

Skilled personnel

Skilled personnel are workers who, through their specialist training and operational knowledge of the recovery machine, are capable of carrying out the described work and independently identifying potential hazards.

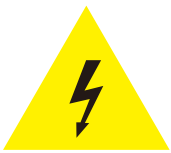
ONLY QUALIFIED SERVICE PERSONNEL SHOULD OPERATE THIS UNIT. MOST STATES AND COUNTRIES, MAY REQUIRE THE USER TO BE LICENSED. PLEASE CHECK WITH YOUR LOCAL GOVERNMENT AGENCY.

2.2 Special Hazards

Before starting the Equipment assure that it is well grounded.
Risk of serious injury and death!

While using the electrical wire, the wire must be well connected and grounded.
Risk of serious injury and death!

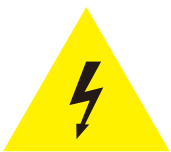
Only a qualified electrician should perform wire connection according to the technical standard and circuit diagram.
Risk of serious injury and death!



Be sure the power is off before examining or repairing the recovery unit. Risk of serious injury and death!

Use only authorized refillable refrigerant tanks. The Unit requires the use of recovery tanks with a minimum working pressure of 40 bar (580psi). Do not overfill the recovery tank. Tank is full at 80% capacity. There should be enough space for liquid expansion. Overfilling of the tank may cause a violent explosion.

Be sure that any room where work is being conducted is thoroughly ventilated.



When using an extension cord, the cord should be a minimum of 1.5 mm^2(15 awg) and no longer than 7.5 m. Otherwise Voltage may drop and damage the compressor! The cable must be completely unrolled.

Input pressure of the unit should not exceed 26 bar (377 psi).

Only keep unit in a horizontal position, otherwise unexpected vibrations, noise or abrasions may occur.

Avoid exposing the equipment to the sun or rain.

USE CAUTION WHEN OPERATION OUTDOORS. Be certain that the power cord, the cylinder overfill safety cord and the unit itself are not placed in water or other potentially dangerous locations. While the ENVIRO-DUO(-OS) is very safe to operate, using in environments such as hard rain or sand and dust storms must be avoided.

This equipment should be used in locations with mechanical ventilation providing at least four air changes per hour and the equipment should be located at least 50 cm above the floor.

2.3 Labels / Safety Markings

Identification plate

⚠ SAFETY INSTRUCTIONS

- This unit should be operated only by qualified operators!
- Read all safety, operating guidelines and instructions carefully before starting the unit.
- Always operate the unit with safety goggles and protective gloves.
- Only a refillable recovery tank with a minimum working pressure of 45 bar should be used. In case of 80% O.F.P. a scale must be used to avoid overfilling the recovery tank.
- This equipment should be used in locations with mechanical ventilation providing at least 4 air changes per hour or the equipment should be located at least 50cm above the floor.
- Do not use this equipment in the vicinity of spilled or open containers of gasoline.
- Use a 3-wire extension cord with a minimun cross-section of 1.5mm^2 and a length of no more than 7.5m, ensure reliable grounding.
- The inlet pressure must not exceed 26 bar.

HVAC/R Service Products

REFCO

REFCO Manufacturing Ltd.
Industriestrasse 11
6285 Hitzkirch - Switzerland

Model: ENVIRO-DUO
Item No.: 4686353
Spec.: 230V, 50/60Hz, 0.75kW

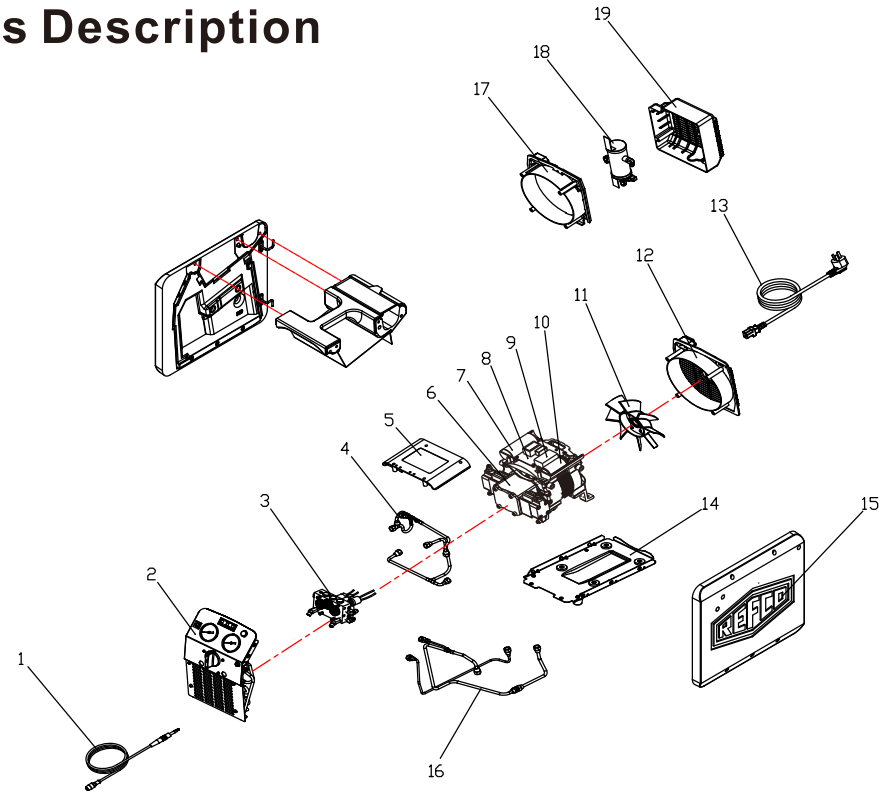
Serial No.:

CE

3. Technical Specifications

Refrigerant			
Category III	R-12, R-134a, R-401C, R-406A, R-500, R-1234yf		
Category IV	R-22, R-401A, R-401B, R-402B, R-407C, R-407D, R-408A, R-409A, R-411A, R-411B, R-412A, R-502, R-509		
Category V	R-402A, R-404A, R-407A, R-407B, R-410A , R-507, R-32		
Power	220-240V CA 50-60 Hz		
Motor	0.75 kW		
Motor Speed	1450rpm@50Hz		
Current	5A@50Hz		
Compressor	Oil-less, Air-cool, Piston		
High Pressure Protection	38.5bar/3850kPa (558psi)		
Recovery Speed	Category III	Category IV	Category V
Liquid	3.00 Kg/min	3.50 Kg/min	3.50 Kg/min
Push/Pull Mode	7.50 Kg/min	8.50 Kg/min	9.50 Kg/min
Sound pressure level	LpA ≤ 70 dB(A)		
Ambient Temperature	0°C-40°C/32-104°F		
Dimensions ENVIRO-DUO Dimensions ENVIRO-DUO -OS	400mm(L)×250(W)mm×345mm(H) 450mm(L)×250(W)mm×345mm(H)		
Net Weight ENVIRO-DUO Net Weight ENVIRO-DUO -OS	15.8 kg 17.0 kg		

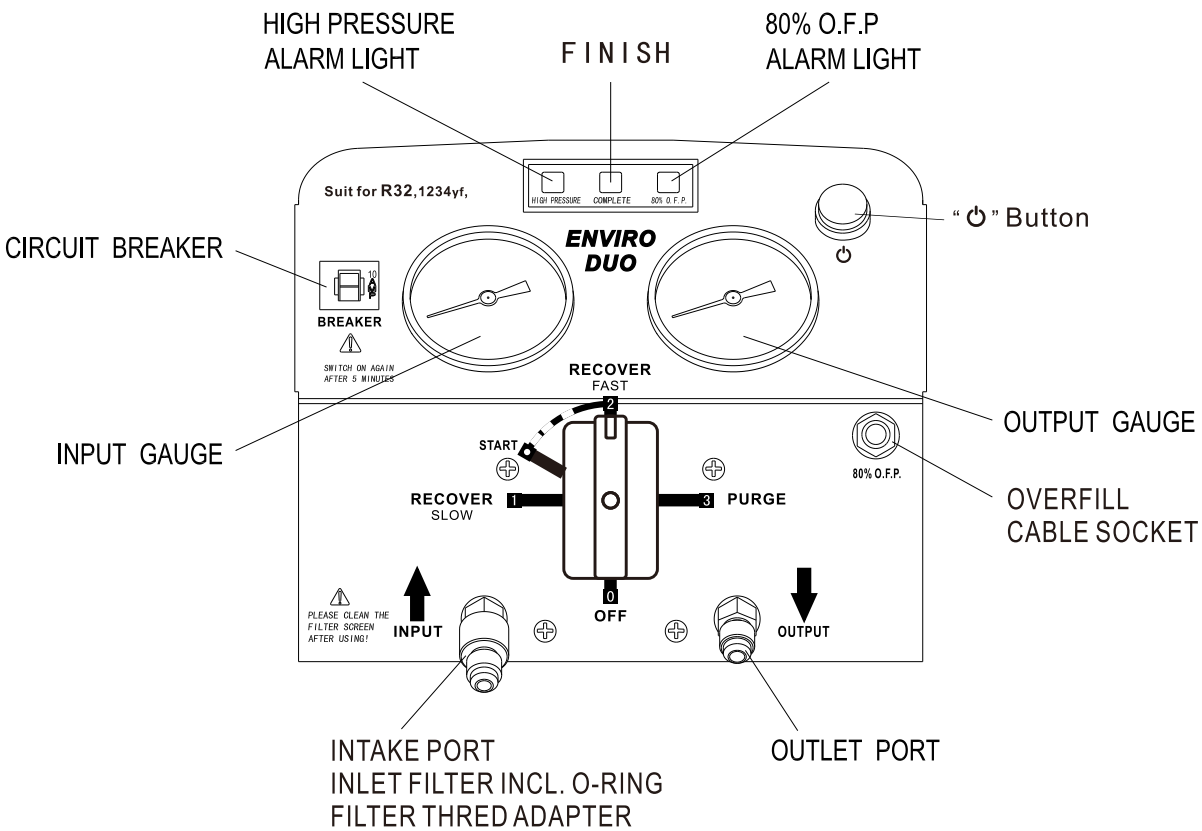
4. Parts Description



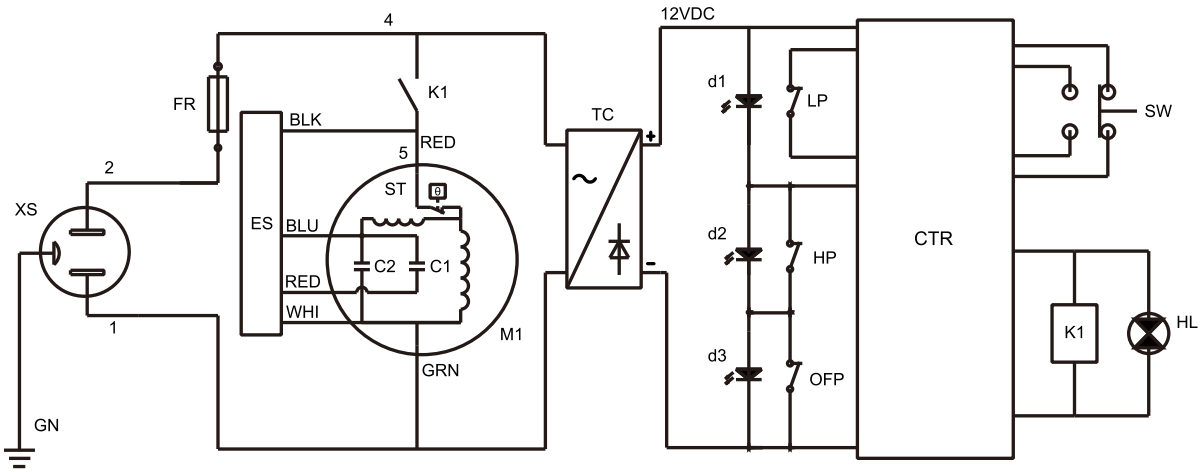
No.	Component	No.	Component
1	O.F.P Cable	11	Fan
2	Front Panel	12	Fan Cover
3	Control Valve	13	Power Supply Cord
4	Copper Pipes	14	Base
5	Junction Box Cover	15	Cover
6	Compressor	16	Copper Pipes*
7	Running Capacitor	17	Oil Separator Fan*
8	Circuit Board	18	Oil Separator*
9	Electronic Starter	19	Oil Separator Back Cover*
10	Starting Capacitor		

* ENVIRO-DUO-OS only

5. Instruction of Operation Panel



6. Electrical Diagram



ITEM	Graphics Code	Description
1	XS	Power Outlet
2	FR	Overload Protection Device
3	ES	Electronic Starter
4	M1	Compressor Motor
5	C1	Start Capacitor
6	C2	Running Capacitor
7	ST	Motor Thermal Protectors
8	TC	Electronic Transformer
9	HP	High Pressure Switch

ITEM	Graphics Code	Description
10	LP	Low Pressure Switch
11	OFP	80% O.F.P. Switch
12	d1	Green indicator
13	d2,d3	Red indicator
14	SW	Power Button
15	HL	Indicating Lamp
16	CT	RControl Module
17	K1	Relay

7. Operation

1. Do not mix different refrigerants together in one tank, or they cannot be separated or used.
2. The switch should be at“Position 0”before operation. All the valves must be closed, the input and output fittings should be covered with protective caps when the unit is not in operation. The air moisture is harmful to the recovery result and will shorten the life span of the unit.
3. A filter drier should always be used and should be replaced frequently. And each type of refrigerant must have its own filter. For the sake of ensuring the normal operation of the unit, please use the filter specified by our company. High quality filter drier will bring high quality services.

4. Special caution is needed when recovering from a burnt system. In this case two dry filters are required.

5. The unit has an internal high pressure shut-off switch. If the pressure inside the system is above 38.5 bar, the compressor will automatically shut off the power. To restart the compressor, please lower the internal pressure.

When high pressure protection is installed, please find out the cause and deal with it before restarting the unit. Cause of high pressure protection and trouble shooting:

a. The input value of the refrigerant tank is closed – open the valve to solve the problem.

b. The connecting hose between the recovery unit and refrigerant tank is stuck – close all the valves and replace the connecting hose.

c. The temperature of the refrigerant tank is too high, therefore pressure is too high – give it some time to cool down and the pressure will come back to normal.

d. The unit has an internal low pressure shut-off switch and delay circuit. If the pressure inside the system is below -2.5 ~-6.8 psi for 20 seconds, the unit will automatically shut off and the green alarm light will switch on. When the unit completes recovery and purge operation, there is no pressure in the intake port. Therefore the unit can only run for 20 seconds after restart.

When the input pressure is above 0.8 bar (11 psi), the unit will run continuously.

e. This unit can be used together with an overfill level sensor. Please connect the recovery unit and the tank with the 80% O.F.P. cable (item 1 in the PARTS DIAGRAM). If the liquid refrigerant reaches 80% capacity of the tank, the recovery unit will automatically shut off and the red alarm light will switch on (80% O.F.P. ALARM). Before restart please replace the tank.

f. If the refrigerant tank has no float level sensor, please take the 80% O.F.P. cable off. Otherwise the recovery unit can not start. In this case, an electric scale is required to monitor the recovered refrigerant amount.

g. In order to gain maximum recovery speed, a hose with inner diameter bigger than 4 mm and shorter than 1.5 m is recommended.

h. While recovering large amounts of liquid, use the Push/Pull Mode.

I. After recovering, make sure there is no refrigerant left in the unit. Read the purge operation carefully. Liquid refrigerant remaining in the unit may be expanded and damage the components.

j. If the unit is to be stored or not used for any length of

time, we recommend that it be completely evacuated of any residual refrigerant and purged with dry nitrogen.

k. A connection hose with check valve is recommended, it can prevent refrigerant loss.

l. The intake port is equipped with filter screen; please wash it frequently to keep it clean.

m. If it is difficult to start the unit, please turn the switch two rounds to balance the internal pressure and make it easier to start the unit.

n. The low pressure gauge shows the pressure of the intake port of the compressor and the high pressure gauge shows the pressure of the outlet port.

o. After using, please turn the knob to “position 0”.

8. Recovery Method

1. Turn the switch to “position 1”.

2. Correctly and firmly connect the hoses.
(See connection drawing)

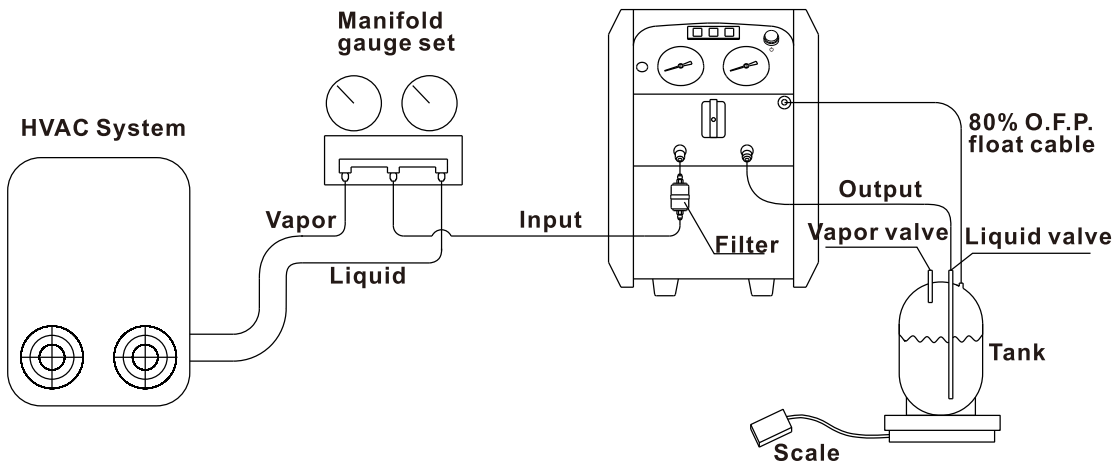
3. Connect the unit to the right power supply (as shown on the name plate), turn the power on to start the unit.

4. Push the START button to run the unit.

5. Open the valve of the refrigerant tank.

6. Open the liquid valve on the manifold gauge.

7. Slowly turn the switch to “position 2” for faster recovery.



Notice:

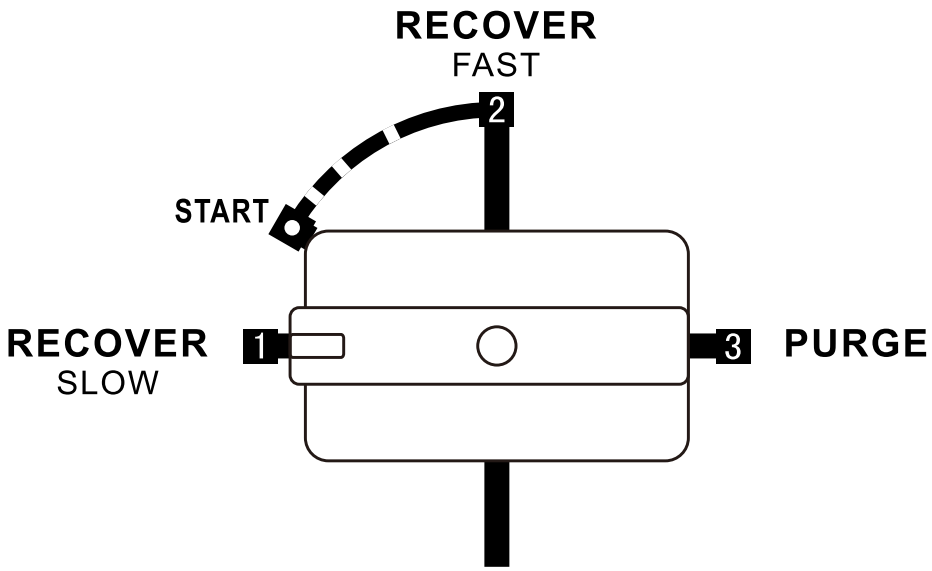
a. If liquid impacting occurs in the compressor when at “position 2”, please turn the knob to “position start” slowly. The reading of low pressure gauge will decrease until the impacting stops, but the pressure should be above “0”, because the intake port cannot intake when the pressure is 0.
If it is difficult to start or restart after power off, please turn the knob to position “START” and then turn on the power.

b. If the knob is turned to “position 1” and the unit is running, a stable recovery of liquid refrigerant can occur, but at a lower recovery rate. If liquid impacting

occurs in the compressor when at “position 1”, slowly turn the knob clockwise to position “start”. The reading of low pressure gauge will decrease until the impacting stops. The pressure should be above “0”, because it cannot intake if the pressure is “0”.

8.When liquid recovery is finished, turn the switch to “position 2” for faster recovery.

9.The unit will automatically stop when recovery is finished, please start the purge operation now.



9. Self-Purge Method

1. ① Do not turn off the power when the “complete-light” turns green and unit stops running, please hit the reset button first, then turn the switch to “position 3” to start purge.
   ② If the ultimate vacuum meets your request but the unit is still running, please turn the switch to “position

3” to start purge directly.

2. When the required vacuum is reached, purging ends.

a. Close the valve on the refrigerant tank.

b. Close the check valves on the connecting hoses.

c. Close the liquid valve and gas valve on the manifold gauge.

d. Close the connecting valve between the refrigeration system and the manifold valve.

e. Turn the power off and disconnect all the external hoses.

f. Cap the intake port and the outlet port.

WARNING!

After each use the unit must be purged, to make sure there is no refrigerant left in the unit. Remaining liquid refrigerant may expand and damage the components.

10. Liquid Push / Pull Mode

When recovering more than 10 kgs of liquid refrigerant, Push/Pull is recommended.

WARNING

An electric scale needs to be used together with the

recovery unit to monitor the recover process. Once the siphon is started, it can overfill the recovery tank even if the tank is equipped with a float level sensor. The siphon can continue even if the machine is turned off. You must manually close the valves on the tank and the unit to prevent overfilling.

1. Turn the switch to “position 1”.

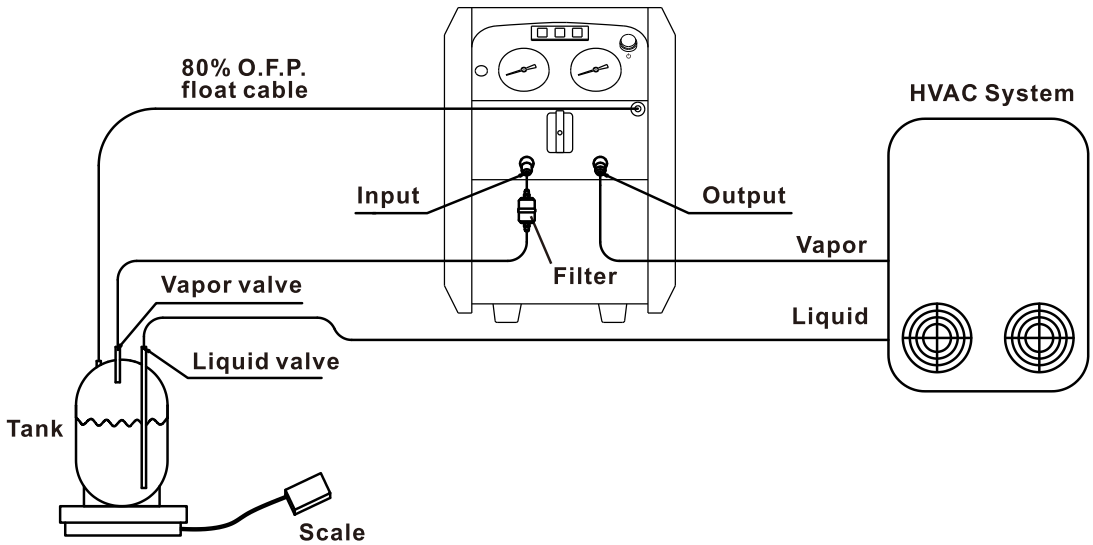
2. Correctly and firmly connect the hoses. (see connection diagram).

3. Turn the power on and hit the start button.

4. Open the gas valve and liquid valve of the refrigerant tank.

5. Turn the switch to “position 2” to start Push/Pull Mode operation recovery.

6. When the reading on the electric scale is not changing or changing very slowly, it means that the liquid recovery is finished, it is time for gas recovery. (The hoses need to be reconnected and please follow the purge operation to purge the gas refrigerant.)



7. Close the gas valve on the refrigerant tank and then turn the power off.

8. Close all the valves and disconnect all the external hoses. Connect the hoses according to the recovery operation to do the gas refrigerant recovery.

9. PURGE

WARNING!

When the reading on the electric scale shows that the refrigerant in the tank reaches 80% capacity, please turn the power off and close the valves on the tank.

11. Oil separator

If your recovery station is purchased with an oil separator (-OS), system oil can be separated from the recovered refrigerant. This is only possible while recovering the refrigerant as a vapour.

If refrigerant is recovered as a liquid, oil will go into the recovery cylinder.

After recovering 8 kgs (17.6 lbs), it is necessary to drain the oil form the oil separator. The recovery station cannot be under pressure, when the oil is drained from the oil separator.

12. FAQ and Trouble Shooting

Fault	Cause	Solution
Fan is not revolving	Mechanical damage	1.Replace the fan 2.Factory service is needed
Compressor doesn't work	1.Shut off by high pressure protection, red light ON 2.Low pressure protection, green light ON (recovery not finished) 3.80% O.F.P. cable not well connected	1.Lower the pressure of the unit 2.Check to see if the hoses are well connected 3.Check the connection 4.Turn the switch two rounds and stop at "position 1"
Compressor can't start (blocked)	1.External pressure is too high 2.Motor failure or other component damage	1.Turn the switch two rounds and point to "position 1" and then restart 2.Factory service is needed
Compressor starts but stops within a few minutes	1.High pressure protection caused by mis-operation shuts the unit off, ie: outlet valve closed, refrigerant tank valve closed	1.Read carefully the operation manual and follow the instructions while operating

Fault	Cause	Solution
Compressor starts but stops within a few minutes	2.Motor overload protections shuts the motor off 3.80% over filling protection, red light ON 4.Recovery finished, green light ON 5.Overload during liquid recovery process, light flashes ON and OFF 6.Circuit breaker shuts off	2.Give the motor some time to restart 3.Follow the purge operation to do the purging 4.Turn the switch two round and point to “position 1”, and then restart the unit 5.Turn the switch two rounds and stop at “position 1” while recovering liquid refrigerant 6.Cool the circuit breaker down and restart after 5 minutes
Low recovery speed	1.The pressure of the refrigerant tank is too high 2.Piston ring on the compressor is damaged	1.Cooling the tank down can help to bring down the pressure 2.Factory service is needed
Not enough vacuum	1.Hose connection loosened 2.Leakage of the unit	1.Tighten the connecting hoses 2.Factory service is needed

13. Maintenance

1. Your ENVIRO-DUO(-OS) will provide many seasons of reliable service if it is properly maintained. The actual maintenance requirements are minimal but important.

2. Keep the unit clean by wiping it down with a damp cloth to remove dirt, oils, etc. prior to storage for the day. Standard household detergent or isopropyl alcohol may be used if the unit is particularly dirty; in all cases, exercise care to prevent liquids from entering the unit. Gasoline and other solvents are to be avoided as they can damage the ENVIRO-DUO(-OS)'s plastic enclosure and they are hazardous.

3. Clean inlet particle filter regularly. Discard internal filter screen if it is heavily contaminated and replace with a new screen. Replace screen as per sketch for efficiency.

4. Ensure that the inlet and discharge ports are protected and kept clean by replacing the plastic caps after every use. For best results, keep a FILTER permanently connected to the INLET port and change it regularly.

5. Change HOSES periodically as they develop leaks and a build-up of contaminants over time. Change hoses at least once per season.

6. When performance declines it is likely that the compressor seals require replacing. This is normal with use and may occur after a year or two or more often, depending upon the conditions that are prevalent during the recovery operations. Contact your wholesaler for assistance in selecting the proper maintenance kit.

14. Service

DO NOT CHANGE any of the original components as the safety of the machine could be compromised. All service work must be performed at a REFCO approved facility in order to maintain the safety rating and the warranty, if applicable.

15. Recycling

For disposal, please bring your recovery machine to an official recycling location.