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DRY EVO MINT 13

DEHUMIDIFIER



OPERATING INSTRUCTIONS

Read the instructions carefully before operating the appliance or carrying out maintenance work. Observe all the safety instructions; failure to do so may lead to accidents and/or damage. Store these instructions in a safe place for future reference.

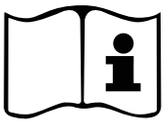
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Appliance is filled with flammable gas R290.



Before installing and using the appliance, read the owner manual.



Before installing the appliance, read the installation manual.

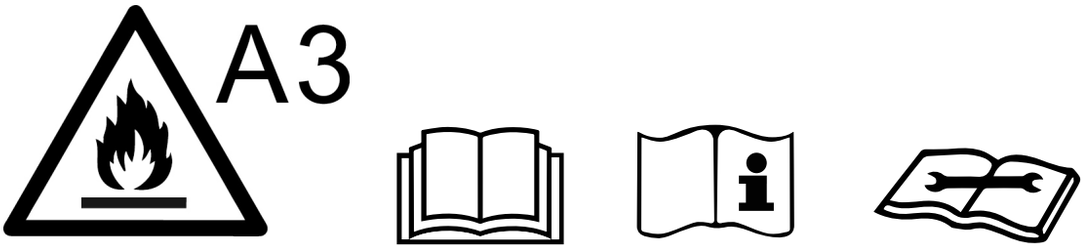


Any repairs you need, contact the nearest authorized Service Centre and strictly follow manufacturer's Service Manual.

THE REFRIGERANT R290

- To realize the function of the air conditioner unit, a special refrigerant circulates in the system. The refrigerant is the fluoride R290 - GWP (Global warming potential) = 0.02. This refrigerant is flammable and inodorous. It can lead to explosions under certain conditions, however the flammability of this refrigerant is very low and it can be ignited only by fire.
- Compared to other common refrigerants, R290 is a non-polluting refrigerant with no harm to the ozonosphere and a no effect upon the greenhouse effect. R290 has very good thermodynamic features which lead to a really high energy efficiency. The units therefore need less filling.

Warning:
Do not try to accelerate the defrosting process or to clean the appliance in different ways other than those recommended by the manufacturer.
Should repair be necessary, contact your nearest authorized Service Centre.
Any repairs carried out by unqualified personnel may be dangerous.
The appliance has to be stored in a room that doesn't have any continuously operating ignition sources. (for example: open flames, an operating gas appliance or an operating electric heater.)
Do not pierce or burn.
Appliance has to be installed, used and stored in a room with a floor area larger than 4 m^2.



GENERAL OPERATING AND SAFETY INSTRUCTIONS

- This appliance is a highly efficient dehumidifier, designed for domestic use only!
- Use this dehumidifier only as outlined in this manual. Any other use not recommended by the manufacturer may cause fire, electric shock or malfunctions.
- The unit contains refrigerant; keep it vertical at all times.
- Once you have opened the unit, keep it vertical to allow the refrigerant to stabilise and wait two hours before operating it.
- Ensure that the required voltage and frequency (220-240V~/50Hz) match the available power source.
- Fuse Type: 4T, 3N, 334, 250V, the electricity passing through the fuse cannot be greater than 2A (refer to the data indicated on the product data label).
- This appliance can be used by children aged from 8 years and above and people with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.
- Children shall not play with the appliance.
- Cleaning and user maintenance shall not be made by children without supervision.
- Make sure the plug is inserted fully. Do not use multiple adapters.
- Do not touch the plug with wet hands. Make sure the plug is clean.
- Children aged between 3 and 8 years must only be able to turn the appliance on/off, provided that the appliance has been placed in its normal operating position, that instructions have been given on how to use the equipment safely, and that its risks have been understood.
- Children aged between 3 and 8 years must not be able to plug in, adjust, clean or perform any maintenance on the appliance.
- Disconnect the mains power when the appliance is not in use or during cleaning operations. Keeping the appliance plugged in may cause electric shocks or accidents.
- To disconnect the appliance, turn off the unit by pressing the POWER button and remove the plug from the socket. Only pull on the plug. Do not pull the cord.

- Do not bend, drag or twist the cord, or apply force to remove it.
- **Do not operate the unit if its cable or plug are damaged**; doing so can cause fires or electric shock. If the power cord is damaged, it must be replaced by a service centre.
- Do not place heavy objects on top of the appliance.
- To prevent water spills, empty the water tank before moving the appliance.
- Do not tilt the dehumidifier onto one side or turn it upside down, as the water which runs out could damage the appliance.
- Do not operate the unit on unstable or sloping surfaces: water leaks can cause it to malfunction or cause excessive vibration and running noise.
- The dehumidifier must be positioned at least 50 cm away from the wall or other obstacles, so that the heat can dissipate correctly.
- Close all open windows to maximise dehumidification efficiency.
- Do not insert objects or sharp instruments into the air outlet grille.
- Do not cover the air intake and outlet grilles in any way.

WARNING!

In the event of an anomaly, switch the appliance off and unplug it immediately. Do not dismantle, repair or modify this product freely.

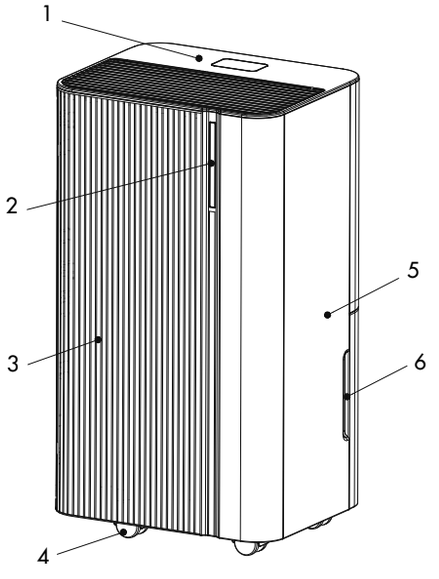
In the event of a malfunction, contact the aftersales service centre directly.

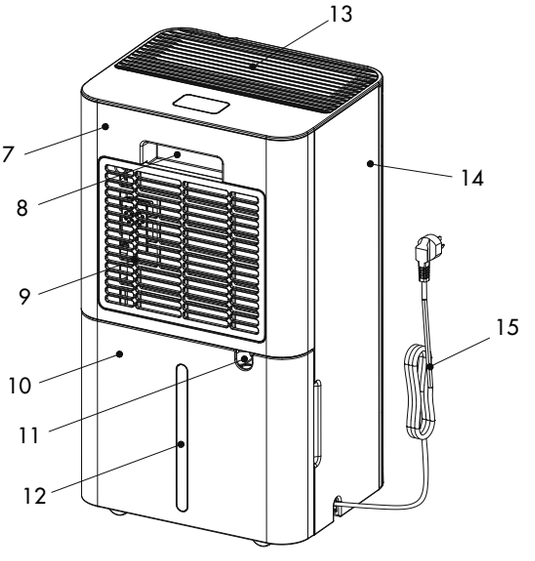
Do not immerse the power cord, plug or any other part of the appliance in water or other liquids.

- Do not expose the dehumidifier to direct sunlight.
- Keep the appliance well away from sources of heat which could cause plastic parts to become warped.
- Do not spray insecticides, oils or paints near the appliance; doing so may damage its plastic parts or start a fire.
- Keep flammable gases and oils away from the appliance!
- Do not move the appliance while it is operating; doing so can cause leaks and malfunction.
- In the event of interference with other electrical appliances, place the two products at a minimum distance of 70 cm.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

- Children should be supervised to ensure that they do not play with the appliance.

DESCRIPTION OF THE APPLIANCE

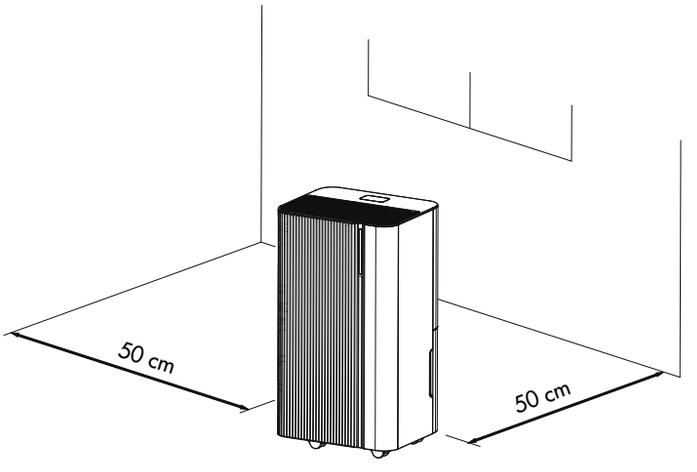




1. Control panel
2. Colored LED with humidity sensor
3. Front panel
4. Castors
5. Right side panel
6. Water tank latch
7. Rear panel
8. Handle
9. Air inlet and dust filter
10. Water tank
11. Continuous condensate drainage hole
12. Water tank level indicator
13. Air outlet
14. Left side panell
15. Power cord

PRE-OPERATING CHECKS AND OPERATIONS

The following space must be maintained to ensure the operating efficiency of the dehumidifier.



APPLIANCE START-UP

Place the product on a flat and stable heat-resistant surface, at least 1 metre away from flammable or heat-sensitive materials and 50 cm away from walls or other obstructions.

Make sure the water tank is in the correct position.

Connect the power cord to a suitable electric socket (220-240V~/50Hz).

Turn the appliance on with POWER on the control panel. The unit emits a sound signal and is in standby, the colored LED strip on the side lights up. The display shows the humidity % detected in the room, therefore set a humidity % lower than at least 3% compared to that in the room to make the dehumidifier work.

The dehumidifier is designed to operate at ambient temperatures from + 5°C to + 35°C.

When the symbol flashes on the dehumidifier's control panel, it indicates that the unit is defrosting; this is not a malfunction. Dehumidifiers work by cooling the air to condense moisture (which turns into water and collects in the tank).

However, when the ambient temperature drops to about 10°C or lower, the cold surface of the dehumidifier's internal evaporator coil may begin to form frost or ice. This frost buildup can block airflow and reduce dehumidification efficiency over time.

To prevent this, the dehumidifier is equipped with an automatic defrost function: when frost is detected on the coil, the unit temporarily stops normal dehumidification, switches to defrost mode to dissolve the frost (the dissolved frost will still be discharged into the water tank), and the symbol will flash to indicate that the process is ongoing.

The defrost cycle typically lasts from a few minutes to about 30 minutes (depending on the amount of frost formed). The compressor stops, but the fan continues to run. Do not interrupt the defrost cycle or disconnect the power. Once the frost has completely dissolved, the dehumidifier will automatically resume normal operation, and the symbol will stop flashing and return to its solid state.

It is recommended not to use the dehumidifier if the ambient temperature is below 5°C.

Do not remove the tank when the unit is in operation.

If you wish to make continuous draining of condensate, follow the instructions in the dedicated paragraph.

OPERATING PRECAUTIONS

The dehumidifier starts only if the humidity level in the room is higher than 3% the set one.

The dehumidifier will continue to operate until the set humidity level is reached, except for any interruptions due to filling the tank.

When the water tank is full, the compressor stops running immediately and dehumidification stops; the fan stops after 3 minutes. Empty the tank and reposition it: after carrying out these operations, the unit will start operating again.

ATTENTION:
After each interruption of operation, at least 3 minutes must elapse before the dehumidifier restarts: this startup delay protects the compressor from damage.
If, on the other hand, the humidity% set is higher than that present in the room, the dehumidifier will not start.

If, after following the instructions for starting the dehumidifier, the dehumidifier does not start and the (POWER) symbol does not light up, or the dehumidifier stops without reason, check that the condition of the plug and the power cord are good. Once this is done, wait 10 minutes and then restart the dehumidifier.

If, even after 10 minutes, the dehumidifier does not start, or if the cable or the plug are damaged, switch off the dehumidifier and contact a technical assistance center.

WARNING:
When the dehumidifier is running, the compressor produces heat and the appliance emits warm air into the room. The room temperature will therefore tend to increase. This is completely normal.

SWITCHING OFF THE DEHUMIDIFIER

To turn the dehumidifier off press the POWER button. This shuts off power to the unit.
Unplug the appliance if you do not intend to use it for some time.

HOW TO ELIMINATE CONDENSATE

The water extracted from the air can be collected in the provided front tank.

When the tank is full, not inserted or not correctly inserted, the full tank LED turns on display and the unit beeps at the end of which the unit turns off. The LED strip located on the front panel of the device turns red.

To switch off the appliance, press the POWER button and wait a few seconds.

1. Carefully pull out the tank, following the direction of the arrow. (Fig.1)
2. Empty the tank and dry it thoroughly. (Fig.2)
3. Reposition the tank
4. Press the POWER button again to turn on the unit.

If the full tank LED remains lit even after emptying the tank, check that the float, which is inside the tank, is correctly positioned.

Make sure not to damage the float, otherwise the unit will not automatically stop working when the water tank is full, and the water could leak out and risk wetting the floor and damage the appliance.

Do not use the drainage pipe when you want to collect the condensate in the tank, otherwise the water could come out from the pipe.

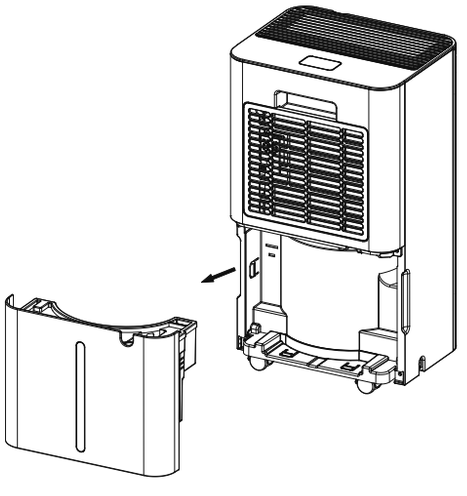


Fig.1

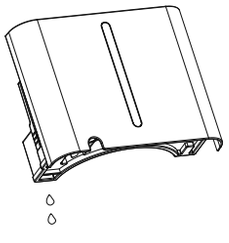


Fig.2

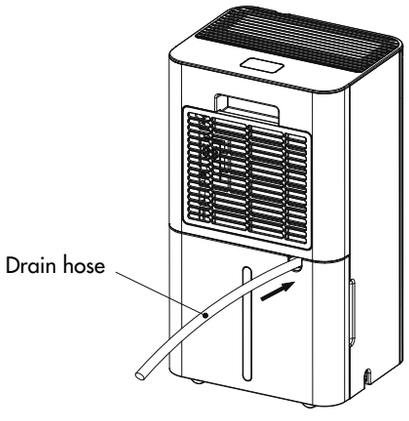
CONTINUOUS CONDENSATE DRAINAGE

The water can be continuously drained when using a PVC hose with an inner diameter of 11 mm and 1 meter lenght (supplied).

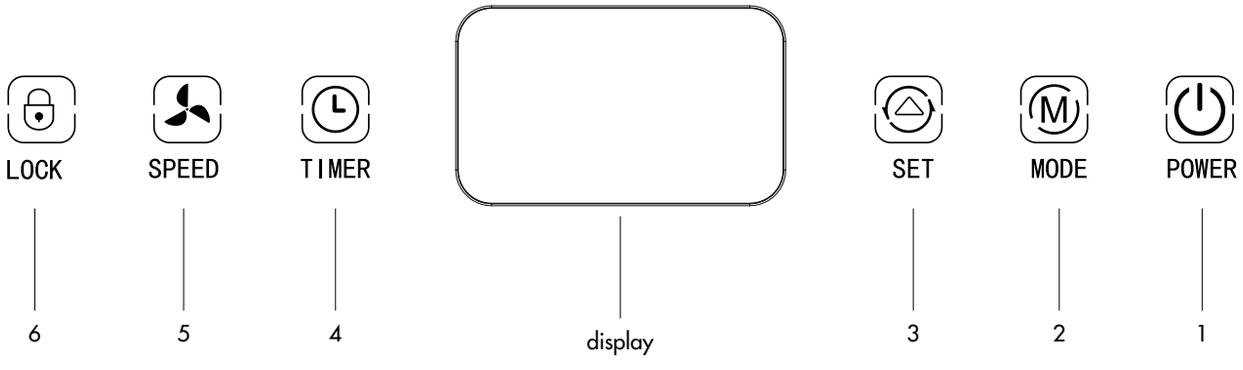
Turn off the appliance and remove the plug before connecting the hose.

Connect the tube to the condensate drain hole securely and prepare a container that can hold the water. The tube must be connected without bends or bends, to facilitate an easy drainage of the condensate, and must be positioned at a greater height than the drain hole.

When disconnecting the hose, prepare a container to collect any residual water that may leak out of the hose.



CONTROL PANEL



1. Power button
2. Mode button
3. Set button
4. Timer button
5. Speed button
6. Lock button

1. POWER BUTTON

After connecting the appliance to the power supply, the machine goes into stand-by mode, then press this button to turn on the dehumidifier, the red LED located under the button remains on during operation. All the LEDs on the control panel light up, by default the fan speed is high, and the set % humidity is 50%.
Press this button to turn off the unit, the LEDs on the control panel turn off, the compressor stops while the fan continues to run for approximately 30 seconds before turning off.

2. MODE BUTTON

Press this button to select the operating mode in the following circular sequence: Auto - Laundry. To select Sleep mode long press Mode button. The corresponding LEDs on the display will light up according to your selection.

- Auto mode: Press the Mode button on the control panel to select the automatic mode, which regulates the operation of the appliance based on the % humidity detected in the room.
  When the humidity in the room is greater than or equal to 3% of the set value, the fan and the compressor start working after 3 seconds.
  On the other hand, when the humidity in the room is less than or equal to 3% of the set value, the compressor

stops while the fan continues to operate for a short period of time. The LED lights up on the display.

In Auto mode, you can adjust the fan speed with the SPEED button and the humidity level with the SET button. After setting the desired humidity, the display will return to showing the % of humidity in the room.

- **Laundry mode**: Press the Mode button to activate the laundry mode, the icon lights up on the display. The unit operates continuously regardless of the humidity level, therefore it is not possible to adjust the % of humidity while it's possible to adjust the fan speed.
- **Sleep Mode**: Long press the Mode button on the control panel to activate this function, the icon lights up on the display. If no selection is made on the control panel within 10 seconds, the Power LED and Sleep LED on the display gradually turn off, while all LEDs on the control panel and display turn off. The fan speed changes from high to low. To reactivate the illumination, press any button on the control panel. Press the Mode button again to deactivate this function.
  The other functions in Sleep mode work like Auto mode.
  When the humidity in the room is less than or equal to 57%, the compressor stops, while the fan continues to operate for about 30 seconds before switching off.
  When the humidity in the room is greater than or equal to 63%, the fan starts to operate, while the compressor starts to operate after about 3 seconds.

In Sleep mode, it is not possible to adjust the fan speed but it is possible to adjust the humidity level. In this mode, the error code is shown on the display and when the water tank is full, the appliance does not go into alarm by emitting the sound signal, but it lights up on the FL display to indicate the need to empty the water tank.

3. SET BUTTON

Press this key to display the setting % of humidity. Press this key again to adjust the desired humidity from 30% to 80% in 5% steps.
After making the adjustment, the set % will flash on the display for 3 seconds, thus confirming the successful setting, the display will then go back to showing temperature in the room.
By holding this button down for 3 seconds, the temperature in the room is shown on the display.
This button can be used also to set the Timer from 0 to 24 hours, each adjustment corresponds to 1 hour.

4. TIMER BUTTON

Press this button to program switching on (if the unit is off) or switching off (if the unit is on) from 0 to 24 hours. Each time the button is pressed, the adjustment interval corresponds to 1 hour, and it is possible to view the set time on the display. The LED on the display stays on during the set time interval. It is always possible to view the set time by pressing the Timer button, then the display will return to showing the humidity level detected in the environment. To deactivate the Timer, "00" must appear on the display (it flashes 4 times) or press Timer button again, and the Timer symbol on display will switch off.

5. SPEED BUTTON

Press this button to adjust the fan speed in the following circular sequence: High - Low
The corresponding LEDs light up on the display according to the selection made.
The fan speed can be adjusted in Laundry and Auto modes, while in Sleep mode it's not possible to adjust it.

6. CHILD LOCK BUTTON

Press this button for 3 seconds to activate the control panel lock function, the LED on the display lights up, and it is no longer possible to make selections on the control panel. Press this button again for 3 seconds to deactivate this function, the LED goes out.
When the appliance is switched off, the child lock function is automatically deactivated.

MEMORY FUNCTION

The dehumidifier keeps the last settings selected before switching off or black out.

COLORED LED STRIP

On the front panel of the dehumidifier there is a LED strip which colors differently according to the level of humidity detected in the environment:
Blue = Ambient humidity lower than 45%
Green = Ambient humidity between 45% and 65%
Red = Ambient humidity higher than 65%
If the following error codes E1, E2, CL, CH, FL appear on the display, the front LED will be red (for error codes, refer to the troubleshooting section).
When the ambient humidity is ≤ 20% RH, 20% RH will be displayed and the unit will stop working for self-protection.
When the ambient humidity exceeds 90% RH, 90% RH will be displayed and the machine will continue to work normally.

CARE AND MAINTENANCE

Cleaning the external surface

Warning: Always remove the plug from the socket before cleaning the dehumidifier, otherwise electric shock or malfunction may occur.
Warning: Do not wet or immerse the dehumidifier in water otherwise electric shock may occur.
Use a soft, damp cloth to clean the outside of the dehumidifier.
Do not use solvents, petrol, xylene, talcum powder and brushes: they could damage the surface or the color of the case.

Cleaning the water tank

It is advisable to remove the tank every two weeks to prevent the formation of mold and bacteria. Fill the water tank with clean water and a small amount of detergent, empty and rinse it.

Cleaning the dust filter located on the air inlet

The dust filter has an important function in retaining the main allergens.
Cleaning the dust filter should be done every two weeks of operation.
The function of the filter is to filter the dust or dirt present in the air, therefore if the filter is blocked by dust the electricity consumption will be higher than normal.

1. Remove the filter by releasing it from its seat, following the direction of the arrow (Fig.1).
2. Gently clean the filter with a vacuum cleaner to remove dust. If necessary, wash the filter with warm soapy water DO NOT USE ALCOHOL, BENZENE OR OTHER AGGRESSIVE PRODUCTS (Fig.2).
Leave the filter to dry naturally, then insert it back into its housing (Fig.3).
Do not use hair dryer or fire to dry the filter.
Do not use sponges or brushes to clean the filter as they can damage it.
3. Replace the filter and resume normal operation of the appliance.

Do not use the dehumidifier without the filter, because the dust could affect the efficiency of the evaporator and cause higher energy consumption.

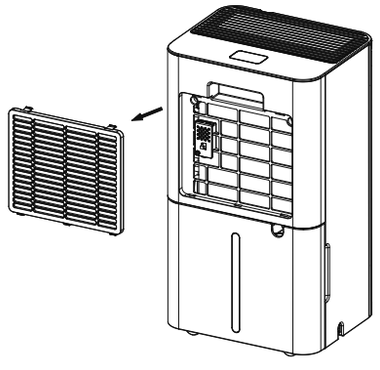


Fig.1

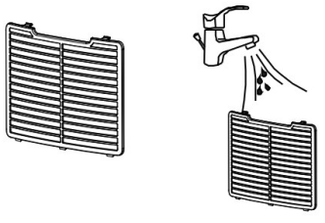


Fig.2

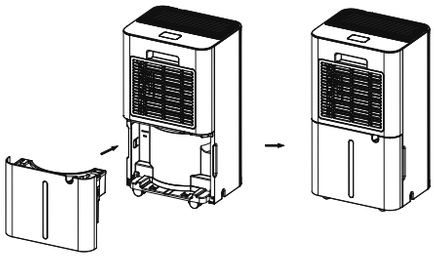


Fig.3

CONSERVATION AND STORAGE

If the unit is not used for a long period of time, it is necessary to carry out the following operations before storing it.

1. Turn off the device with the Power button and unplug the power cord from the power outlet.
2. Eliminate the water deposited in the water tank and dry it thoroughly
3. Clean the air filter and let it dry completely
4. Place the power cord in the water tank
5. Replace the filter
6. Store the device in an upright position and in a cool, dry and ventilated place.

Troubleshooting

In the event of malfunctions, before contacting an Authorized Service Centre, check the table below to see if it is possible to solve some problems:

Problem	Possible cause	Solution
The dehumidifier is not working	The temperature is above 35 ° C or below 5 °C. The internal tank is full. The plug it's not correctly connected The humidity in the room is at least 3% lower than that set	The appliance does not work at these temperatures Empty the tank and position the tank correctly. Connect the plug. Set the humidity% lower than 3% compared to that in the room
The noise increases suddenly during operation	The unit is placed on an uneven surface. The air filter is clogged	Place the unit on a level and stable surface. Clean the filter
Reduced dehumidification effect	The filter is full of dust. The air inlet and outlet are blocked	Clean the filter. Remove objects blocking the air inlet and outlet.
E1- E2	Humidity sensor problem	Contact a service center to replace the sensor
CL CH	Low ambient temperature protection below 5°C Protection for high ambient temperature above 39°C	The protection system is activated and the dehumidifier stops
FL	Full water tank alarm	Empty the water tank

REGULATION (EU) N. 573/2024 - F-GAS

DRY EVO MINT 13
The unit contains R290, a natural greenhouse gas with global warming potential (GWP) = 0.02 - Kg. 0.045 = 0.0000009 Tonn CO_2 equiv. Do not release R290 into the atmosphere.



INFORMATION FOR CORRECT DISPOSAL OF THE PRODUCT IN ACCORDANCE WITH THE EUROPEAN DIRECTIVE 2012/19/EU

At the end of its working life this equipment must not be disposed of as an household waste. It must be taken to special local community waste collection centres or to a dealer providing this service. Disposing of electrical and electronic equipment separately avoids possible negative effects on the environment and human health deriving from an inappropriate disposal and enables its components to be recovered and recycled to obtain significant savings in energy and resources. In order to underline the duty to dispose of this equipment separately, the product is marked with a crossed-out dustbin.

Aptitude requirement for maintenance man (repairs. should be done only be specialists).

- Any person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorises their competence to handle refrigerants safely in accordance with an industry recognised assessment specification.
- Servicing shall only be performed as recommended by the equipment manufacturer. Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supevision of the person competent in the use of flammable refrigerants.

Safety preparation work

The maximum refrigerant charge amount is shown on the following table a
(Note: Please refer to the nameplate for the charging quantity of R290).

Room area (m^2)	4	11	15
Maximum charge (kg)	<0.152	0.225	0.304

Table a - Maximum charge (kg)

Security checks

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimised. For repair to the refrigerating system, the following precautions shall be complied with prior to conducting work on the system.

- Work procedure
  Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.

- General work area
  All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided. The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.

- Checking for presence of refrigerant
  The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

- Presence of fire extinguisher
  If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO_2 fire extinguisher adjacent to the charging area.

- No ignition sources
  No person carrying out work in relation to a refrigeration system which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

- Ventilated area
  Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

- Checks to the refrigeration equipment
  Where electrical components are being changed, they shall be fit for the purpose and the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the

manufacturer's technical department for assistance.
The following checks shall be applied to installations using flammable refrigerants:

- The actual refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed;
- The ventilation machinery and outlets are operating adequately and are not obstructed;
- If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
- Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
- Refrigeration pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

- Checks to electrical devices

  Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.
  Initial safety checks shall include:
  - That capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
  - That no live electrical components and wiring are exposed while charging, recovering or purging the system;
  - That there is continuity of earth bonding.

- Repairs to sealed components

  During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation. Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to originai specification, damage to seals, incorrect fitting of glands, etc.
  - Ensure that the apparatus is mounted securely.
  - Ensure that seals or sealing materials have not degraded to the point that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

  NOTE: the use of silicon sealant can inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.

- Repair to intrinsically safe components

  Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use. Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall beat the correct rating. Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

- Cabling

  Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

- Detection of flammable refrigerants

  Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

- Leak detection methods

  The following leak detection methods are deemed acceptable for all refrigerant systems. Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant

employed, and the appropriate percentage of gas (25 % maximum) is confirmed. Leak detection fluids are suitable for use with most refrigerants but the use of detergents containing chiarine shall be avoided as the chiarine may react with the refrigerant and corrode the copper pipe-work. If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. For appliances containing flammable refrigerants, oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.

- Removal and evacuation

  When breaking into the refrigerant circuit to make repairs or for any other purpose conventional procedures shall be used. However, for flammable refrigerants it is important that best practice is followed since flammability is a consideration.

  The following procedure shall be adhered to:
  - remove refrigerant;
  - purge the circuit with inert gas; evacuate;
  - purge again with inert gas;
  - open the circuit by cutting or brazing.

  The refrigerant charge shall be recovered into the correct recovery cylinders. For appliances containing flammable refrigerants, the system shall be flushed with OFN to render the unit safe. This process may need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems. For appliances containing flammable refrigerants, flushing shall be achieved by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final OFN charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. This operation is absolutely vital if brazing operations on the pipe-work are to take place. Ensure that the outlet for the vacuum pump is not close to any ignition sources and that ventilation is available.

- Charging procedures

  In addition to conventional charging procedures, the following requirements shall be followed.
  - Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.
  - Cylinders shall be kept upright.
  - Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.
  - Label the system when charging is complete (if not already).
  - Extreme care shall be taken not to overfill the refrigeration system.

  Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

- Decommissioning

  Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of reclaimed refrigerant. It is essential that electrical power is available before the task is commenced.

  1. Become familiar with the equipment and its operation.
  2. Isolate system electrically.
  3. Before attempting the procedure, ensure that:
     - mechanical handling equipment is available, if required, for handling refrigerant cylinders;
     - all personal protective equipment is available and being used correctly;
     - the recovery process is supervised at all times by a competent person;
     - recovery equipment and cylinders conform to the appropriate standards.
  4. Pump down refrigerant system, if possible.
  5. If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
  6. Make sure that cylinder is situated on the scales before recovery takes place.
  7. Start the recovery machine and operate in accordance with manufacturer's instructions.
  8. Do not overfill cylinders. (No more than 80% volume liquid charge).
  9. Do not exceed the maximum working pressure of the cylinder, even temporarily.
  10. When the cylinders have been filled correctly and the process compieted, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
  11. Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and

checked.

- Labelling
  Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing flammable refrigerants, ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

- Recovery
  When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely. When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge are available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and assodated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs. The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt. The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders. If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

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