

# INSTRUCTIONS

HVAC/R  
Service Products



**RL-2**  
**RL-4**  
**RL-8**

**Instruction Manual**  
**REFCO Rotary vane vacuum pumps**  
**115V - 60 Hz**

REFCO Manufacturing Ltd.  
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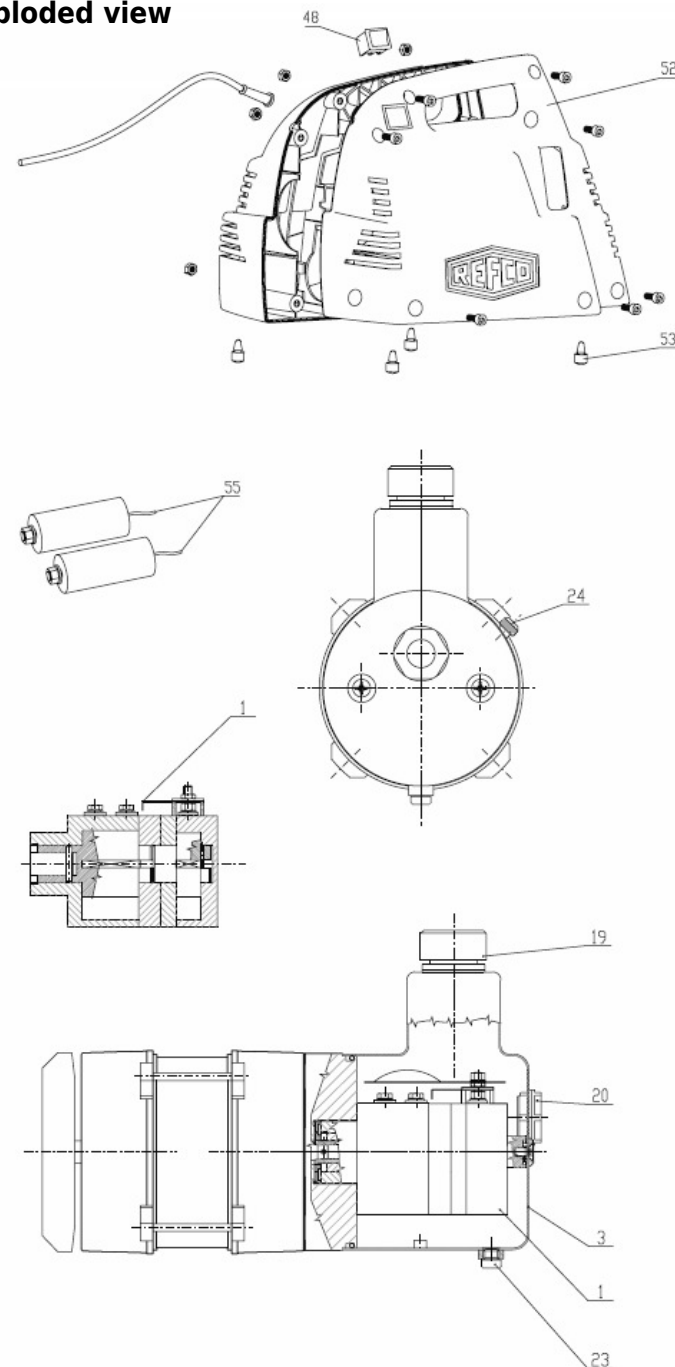
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**Exploded view**



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## RL vacuum pumps

Thank you for choosing a REFCO vacuum pump. We are proud of each and every REFCO product and are dedicated to ensuring our products always perform reliably.

The design of the vacuum pump ensures that the requirements of the relevant CE directives and standards are fulfilled. Reading the following operating instructions thoroughly and following our recommendations will give you important information for the smooth operation and maintenance of your pump and help to prolong its lifespan.




### Please observe the warning signs!

-  They are indicated by this symbol: This international symbol warns of hazards which could lead to serious injury or material damages.

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### Important safety notices

-  **Before working with the vacuum pump, please read the instruction manual carefully. This manual contains important information regarding the smooth operation, maintenance and disposal of the vacuum pump.**
-  **The vacuum pump should only be operated on a fused power supply and must be correctly earthed.** If the mains cable is damaged or cut through during operation, do not touch the cable and unplug the mains plug immediately. The device should never be used with a damaged cable.
-  **REFCO products have been specially designed and manufactured for use by trained refrigeration installation engineers. Because of the high pressures and the chemical and physical gases used in refrigeration systems, REFCO cannot be held responsible or liable for any accidents, injuries or deaths arising from the use of their products. REFCO explicitly states that their products must only be sold to professionally-trained experts.**

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## Use of the pump

The REFCO vacuum pumps have been especially designed and manufactured for the evacuation of closed vessels and units in the field of refrigeration and air-conditioning. The pump must always be operated by a qualified professional technician!

-  This pump should only be operated by qualified personnel. Suitable protective equipment like gloves, goggles and safety footwear should be worn when working with refrigeration systems.



-  The vacuum pump should not be exposed to rain, or used in wet or damp conditions.
-  The vacuum pump **must only be used** in the field of refrigeration and air-conditioning and must not be used, built in or mounted into other appliances and applications.
-  The vacuum pump **must not be used** as a compressor or to build up pressure with air or other gases.
-  The vacuum pump **must not be operated** in flammable environments or places where explosive gas could be present.
-  The vacuum pump **must not be used** in connection with aggressive liquids and gases such as i.e. ammonia or pure oxygen which could cause damage to parts and components of the pump.
-  Combustible refrigerants such as i.e. R600a, R600, R290, must be vented through the exhaust to the outside of buildings by means of a venting hose (see accessories).
-  The vacuum pump **must not be used** to pump liquids such as i.e. water, fuels, oils, beverages, other liquid food, liquid refuse or faeces.

### Set up operation/transport

The vacuum pumps supplied without electrical plug must be equipped with an electrical triple-pole plug according to the norms and regulations of the country where the vacuum pump will be used. The plug must be fitted by a trained professional. The electrical power supply, with which the vacuum pump will be run, must be in accordance with the voltage and frequency indicated on the rating plate of the vacuum pump. The vacuum pump must only be connected to a fused electric installation.

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The vacuum pump is supplied without oil filling. Prior to the first operation the vacuum pump must be filled to half level of the oil sight glass (Pos. 20) with the oil provided (DV-44/DV-45). The oil is being filled in through the port of the oil mist filter (Pos. 19).

- ⚠ Only fill oil up to half level of the oil sight glass. Refit the oil mist filter (Pos. 19) after filling.
- ⚠ Remove the flare cap from the intake port to start the pump (with model RL-8 also turn the ball valve to open position). Connect the charging hose to the intake port as soon as the pump motor reaches full speed.
- ⚠ Running the pump without being connected to a system and pulling vacuum will result in extensive exhaust of oil mist through the oil mist filter.
- ⚠ Carry the vacuum pump on the designated handle only.
- ⚠ Keep the pump levelled and secured during transport to avoid oil spillage. Oil spillage could cause damage to the electric motor.

## Electric data

The electric data is mentioned under „technical data“ on page 9 of this manual.

## Technical description

The REFCO vacuum pumps RL-2, RL-4, RL-8 are rotary vane type vacuum pumps. The pump is cooled internally by a mechanical impeller during operation. A fitted oil mist filter allows oil back flow into the oil circulation system of the pump head. The gas ballast valve prevents the build-up of condensation inside the oil box and the pump head. The motor is protected by a thermocouple which turns the pump off automatically if overheated.

- ⚠ Caution! The motor will restart automatically after a cooling period of approximately 20 minutes.

## Contents of delivery of standard execution RL-2, RL-4, RL-8

- Vacuum pump oil DV-44/DV-45
- Instructions of use

The RL-8 is in addition equipped with a ball valve to isolate the pump from a system.

- ⚠ The pumps are supplied without oil filling. The must be filled with the oil provided prior to the first operation.

**Option:** Intake port with anti-back flow to prevent oil sucks back in case of an accidental shut off of the pump or power cut.

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Intake port **with** back flow prevention:

For RL-2:	RL-2-307-RS	4663786
For RL-4:	RL-4-307-RS	4663336
For RL-8:	RL-8-307-RS	4664244

## Other accessories

Vacuum gauge with ball valve:  
For vacuum pumps RL-2, RL-4, RL-8: RL-VAC 4663981  
Special hose to vent combustible refrigerant from closed environments:  
Available for RL-2, RL-4: 10859-CL-197-Y-SP 9881865

## Note

Please note the minimal operating temperatures for the vacuum pumps are described under „technical data“ on page 8 of this manual. If the environmental temperatures are below the minimal rates the pump may take several seconds or minutes until the motor runs on full speed and the pump can develop its full capacity.

- ⚠ Always turn off and disconnect power before moving or servicing the REFCO vacuum pumps.
- ⚠ The vacuum pump and especially the front cover can reach **temperatures of up to 70°C/160°F** during operation.

Check the appropriate oil level (half level of sight glass) and make sure that there is enough oil. Should the oil be cloudy, dark or contaminated, or should the oil level have increased without refilling, change the oil immediately.

Ensure that the air intake of the impeller fan at the back of the pump is not covered with any objects or cloths etc. Preventing the air flow through the pump can lead to an automatic motor shut off by the thermo couple.

- ⚠ **Caution! Automatic restart after cooling time of approx. 20 minutes.**

## Service/Oil change

The main service point of a vacuum pump is the oil. Vacuum pump oil must be changed at least after every 20 hours of service or whenever the oil in the sight glass is cloudy or dark. The oil must be changed immediately after an evacuation of a heavily contaminated system. Residue of moist/water in the oil may cause corrosion and damage to the vacuum pump.

- ⚠ Contaminated oil may damage the vacuum pump.

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## Change of oil

- Run the pump until operating temperature has been reached. Turn the pump off and disconnect from mains.
- Unscrew the oil mist filter (Pos. 19)
- Drain oil through drain plug (RL-4/RL-8 Pos. 23) or through opening for oil mist filter (model RL-2 does not have an oil drainage plug and the oil must be drained through opening of oil mist filter).
- Connect pump to the mains again and turn on. Let the pump run for 10-15 seconds with open intake port in order to drain oil residue in the pump head.
- Turn the pump off and disconnect from the mains.
- Drain possible oil residue.
- Remount oil drain plug (Pos. 23).
- Refill with oil to half level of sight glass.
- Refit oil mist filter (Pos. 19). Let the pump run for a few seconds.



If the oil has been strongly contaminated the oil change procedure must be repeated after a run time of 30 minutes in order to assure that all waste particles inside the pump have been washed out with the oil.

In order to achieve best performance with the REFCO vacuum pumps only use REFCO oils DV-44, DV-45, DV-46, DV-48 or REFCO ester oil.



Waste oil must be disposed of according to the rules and regulations which apply in the country of use of the pump.

Further service work than oil change has to be executed by a specialised company.

## Trouble shooting

Condition	Possible problem	Solution
Pump does not run on full speed	Oil temperature too low	Put the pump in warmer environment/room
	Unsuitable oil - too thick	Change with REFCO oil
	Pump dirty	Change oil
	Motor winding defective	Call customer service
	The connection cable is too long	Use a shorter connection cable
	Supply voltage is too low	Pump is designed to work at +/- 10% of the supply voltage
Motor does not start at all	Defective capacitor	Change capacitor Call customer service
	Switch defective	Replace switch
	Motor too hot	Let it cool down
	Cable defective	Replace cable

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Condition	Possible problem	Solution
Motor drones but does not run, Pump locked up	Oil heavily contaminated	Change pump head Call customer service
Motor runs $\Rightarrow$ no performance	Broken clutch pin	Call customer service
Oil spillage on oil mist filter	Pump overfilled with oil	Adjust oil to half level of sight glass, drain additional oil
Extensive oil mist from oil mist filter	Pump pressure = atmospheric pressure	Oil mist will disappear as soon as a certain vacuum has been reached
Oil not visible in sight glass	Not enough oil in pump	Top up with oil
Oil cloudy or dark	Contaminated oil	Change oil
Not enough vacuum	Gas ballast open	Close gas ballast valve Call customer service
	Loose cap on intake port	Screw the cap on tightly
	O-ring in the intake port cap is faulty	Replace O-ring
	Oil level too low	Refill oil
	Oil is muddy (cloudy) or contaminated	Change oil
	Pipe leaking	Check pipe, seal it
	Pump is worn out after lengthy use	Repair or replace pump
Motor noisy	Bearings worn out Defective fan impeller	Call customer service Change impeller
	Defective ventilator	Replace ventilator
Pump loses oil	Leaking gasket of oil box	Change O-ring
	Oil draining screw leaking	Replace oil draining screw
	Leaking gasket of sight glass	Change sight glass
	Leaking gaskets box screws	Change gaskets of oil of screws
	Leaking shaft seals	Call customer service

## Warranty

REFCO grants a 24 month warranty period. Damage caused due to improper use, lack of service as described in this manual, use of the pump for other applications as the designated ones, use of unsuitable vacuum pump oil or opening and dismantling the pump during warranty period by the user will lead to loss of warranty. For repairs during the warranty period the vacuum pump must be returned to the seller at owners cost.

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Technical data	RL-2	RL-4	RL-8
Capacity l/min (cfm)	40 (1.35)	76 (2.7)	180 (6.4)
End vacuum with closed gas ballast valve at 20°C 68°F	0.02 mbar (15 microns)		
Minimal oil temperature for motor start up	+5°C / 41°F	+5°C / 41°F	+2°C / 36°F
Intake port SAE	1/4"	1/4"+3/8"	1/4"+3/8"
Gas ballast	Yes	Yes	Yes
Oil mist filter	Yes	Yes	Yes
Oil back flow prevention	optional	optional	Yes
Oil capacity ml (pt)	125 (0.25)	250 (0.5)	500 (1.0)
Sound pressure level emissions LpA	LpA ≤ 70dB (A)		
Power supply	115V / 60Hz		
Motor kW/Umin	0.16/2400	0.19/2400	0.37/2800
Measurements mm (LxWxH) inch	271x167x195 10.6x6.6x7.6	301x152x204 11.8x6x8	360x220x250 14x8.6x9.8
Weight kg (lbs)	3.8 (8.4)	5.56 (12.2)	11.8 (26)

## Spare parts

Pos.	Reference	Description	Part No.
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### Spare parts for RL-2

3.....	RL-2-3000.....	Oil box complete with gaskets.....	4661589
20.....	RL-2-3011.....	Oil sight glass complete.....	4661597
19.....	RL-4-303.....	Oil mist filter complete.....	4495471
24.....	RL-2/4-3060..	Gas ballast valve complete.....	4661423
53.....	RL-8-4071.....	Rubber pads (4 pcs).....	4507631
55.....	RL-2-406 115V-60HZ.....	Capacitor (2 pcs).....	4661040
48.....	RL-4-415.....	On-Off switch.....	4496770
52.....	RL-2-4000.....	Housing complete (2 parts).....	4661538
1.....	RL-2-2A.....	Vacuum stage overhauled complete with gasket in exchange.....	4661482
1.....	RL-2-2A.....	Vacuum stage overhauled complete with gasket without exchange.....	4661482
.....	RL-1-1000.....	Gasket set.....	4668419

### Spare parts for RL-4

3.....	RL-4-3000.....	Oil box complete with gaskets.....	4507674
20.....	RL-4-3011.....	Oil sight glass complete.....	4507682
23.....	RL-4-310.....	Oil drain plug with gasket.....	4496761
19.....	RL-4-303.....	Oil mist filter complete.....	4495471
24.....	RL-2/4-3060..	Gas ballast valve complete.....	4661423
53.....	RL-8-4071.....	Rubber pads (4 pcs).....	4507631
55.....	RL-4-406-KS 115V-60HZ.....	Capacitor (2 pcs).....	4661058
48.....	RL-4-415.....	On-Off switch.....	4496770
52.....	RL-4-4000.....	Housing complete (2 parts).....	4661474

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Pos.	Reference	Description	Part No.
1.....	RL-4-2A.....	Vacuum stage overhauled complete with gasket in exchange.....	4661954
1.....	RL-4-2A	Vacuum stage overhauled complete with gasket without exchange.....	4661954
.....	RL-4-1000.....	Gasket set.....	4668427

### Spare Parts for RL-8

3.....	RL-8-3000.....	Oil box complete with gaskets.....	4507607
20.....	RL-8-3011.....	Oil sight glass complete.....	4507615
23.....	RL-4-310.....	Oil drain plug with gasket.....	4496761
19.....	RL-8-303.....	Oil mist filter complete.....	4507445
24.....	RL-8-3060.....	Gas ballast valve complete.....	4507623
53.....	RL-8-4071.....	Rubber pads (4 pcs).....	4507631
55.....	RL-8-406-60uF	Capacitor (2 pcs).....	4660680
48.....	RL-4-415.....	On-Off switch.....	4496770
52.....	RL-8-4000.....	Housing complete (2 parts).....	4507640
1.....	RL-8-2A.....	Vacuum stage overhauled complete with gasket in exchange.....	4507658
1.....	RL-8-2A.....	Vacuum stage overhauled complete with gasket without exchange.....	4507658
.....	RL-8-1000.....	Gasket set.....	4668436

## Spare Parts

⇒ To avoid damage or reduced pump performance, please make sure to use the appropriate REFCO replacement parts and components. Please indicate pump type and serial number (see name-plate) when ordering spare parts.

## Environmental issues

The vacuum pump has been developed for long term use. REFCO takes energy saving and environmental impact into account when procuring materials and manufacturing its products.

REFCO Manufacturing Ltd. feels responsible for all its products throughout their entire lifespan and has therefore been certified in accordance with DIN EN ISO 14001 : 2004.

When decommissioning the device, users should observe the disposal regulations applicable in their country.

Oil and other components must be disposed of in an environmentally-friendly manner.

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