



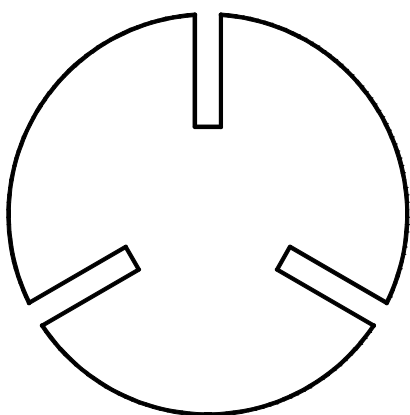
**VACUUM
TECHNOLOGY**



***OPERATING AND MAINTENANCE
INSTRUCTIONS***

(Translation of the original instructions)

***VACUUM PUMPS WITH RECIRCULATING
LUBRICATION SYSTEM***



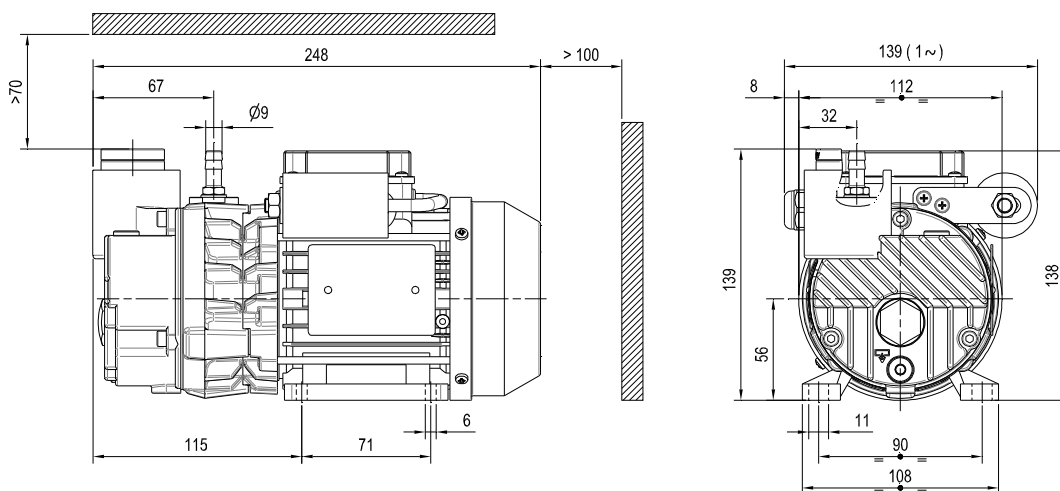
***LC.2
LC.4
LB.5
LB.6
LB.8
LC.12
LC.20***

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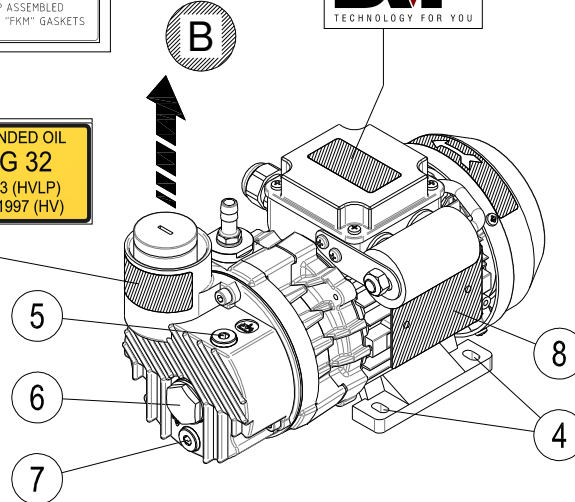
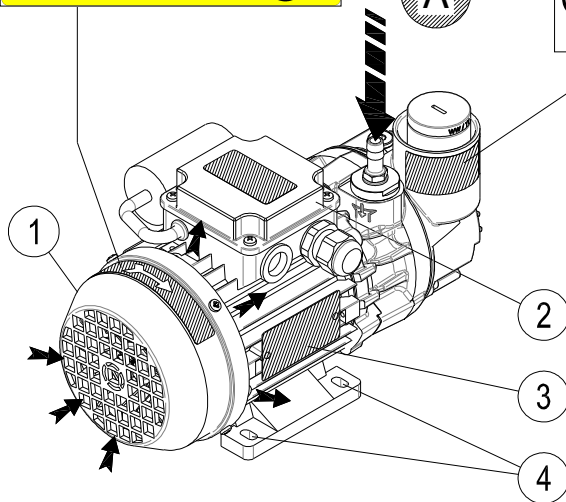
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3.3 DIMENSIONS AND CHARACTERISTICS

3.3.1 Model: LC.2 – LC.4



RECOMMENDED OIL
ISO VG 32
DIN 51524/3 (HVLP)
ISO 11158:1997 (HV)



A	Intake
B	Air outlet
1	Motor fan guard
2	Terminal board

3	Information plate
4	Attachment point
5	Oil filler plug
6	Oil sight glass

7	Oil drain plug
8	Motor rating plate
①	Only present on special versions

TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS		LC.2		LC.4	
		50 Hz	60 Hz	50 Hz	60 Hz
Inlet capacity	m³/h	2	2,5	4	4,8
Final pressure (Abs.)	mbar - hPa	10		2	
Max inlet pressure for water vapour	mbar - hPa	- - - -			
Max water vapour pumping rate	kg/h	- - - -			
Motor power	kW (1~ / 3~)	0,12 / 0,12	0,15 / 0,15	0,12 / 0,12	0,15 / 0,15
Nominal r.p.m.	n/min	2800	3300	2800	3300
Noise level (UNI EN ISO 2151) (K 3dB)	dB(A)	48	52	48	52
Weight	kg (1~ / 3~)	5,4 / 5,4			
Type of oil	cod. DVP	BV32 (SW40)			
Oil quantity	dm³	0,065			
Pump Intake / Outlet		Ø9mm (1/8"G) / - - -			
Continuous-duty working renge (Abs.)	mbar - hPa	500 ÷ 10		- - - -	
Operating temperature (room temp. 20°C)	°C	50 ÷ 55	55 ÷ 60	50 ÷ 55	55 ÷ 60
Required room temp. for place of installation	°C	12 ÷ 40			
Ambient temperature for storage/transport	°C	-20 ÷ 50			
MAX humidity / altitude		80% / 1000m a.s.l. *			

(*) Please contact the Manufacturer if environmental conditions are different from those prescribed.

5 OPERATING INSTRUCTIONS

5.1 OPERATION

Checks to be performed before start-up:

- The pump is supplied without any oil in it. Use the supplied oil or an oil lubricant indicated on the identification plate of this pump (see ch. 3.3) or, alternatively, an alternative lubricant of another brand but with similar characteristics;
- Make sure the pump outlet is not obstructed by fittings.

WARNING



A quantity of oil that exceeds the necessary quantity may cause the clogging of oil separators and damage to the pump or to the electric motor.

Operation without lubricant causes serious damage to the pump.

5.1.1 FILLING THE OIL TANK



WARNING



When filling the oil tank never exceed allowed maximum level.

- Undo the oil filler plug;
- Pour oil in the tank up to mid-range of the oil sight glass;
- Close the filler plug
- Remove all oil spills from the pump and/or floor.

5.1.2 START-UP



HAZARD

The pump may reach high temperatures when operating.

After start-up, the pump may run slower than the regular rpm if room temperature is lower than allowed as seen on the technical data table. It may also run lower if the oil is contaminated or the supply voltage is lower than the required voltage as indicated on the motor rating plate.

If nominal rpm is not reached within a few seconds, the thermal switch fitted to protect the pump must trip (installation required in paragraph "Wiring").

WARNING



If water vapour should be taken in, take the pump to a steady temperature by leaving it to run for approximately 30 minutes with the suction inlet closed and the system containing the water vapour isolated before starting the work cycle.

WARNING



Make sure the pump is working at the allowed pressure value and do not leave the pump running for a long time with the suction inlet completely open.

HAZARD



Full r.p.m. pump operation must be without vibration or unusual noise. If these are present, stop the pump immediately, search for the cause and eliminate it.

5.1.3 STOP

The pump must be stopped by cutting off the power supply.

If the pump is to be powered off, let it run with closed intake for about 30 minutes first.

This will eliminate any moisture inside the intake chamber and avoid rotor oxidation.

In the case of long machine downtime, completely empty the pump to avoid hazards of frost during cold weather or corrosion due to possible chemical alteration of the stagnant liquid in the pump.

5.1.4 PUMPING WATER VAPOUR

While operating in the presence of water vapour, the pump takes in a mixture of air and water which enters the pump and therefore also the oil tank.

The aspirated water vapour is expelled by the heat generated by the pump during operation. On models LB.5, LC.12 and LC.20 there is an integrated regulating ballast which ensures the constant flow of ambient air from the pumping room, allowing the expulsion of aspirated water vapour before it condenses into the lubricating oil.

Therefore, if water vapour is present, it is essential that before the work cycle is started the pump must reach its operating temperature – this is achieved by running it for about 30 minutes with the suction inlet closed and isolating it from the user system.

6 MAINTENANCE

6.1 GENERAL WARNINGS

For good maintenance:

- Immediately verify the causes of any malfunctions (excessive noise, overheating, etc.);
- Pay particular attention to safety devices;
- Make use of all documentation provided by the manufacturer (instruction manuals, wiring diagrams, etc.);
- Use only appropriate tools and original spare parts.

In the event of a failure to understand the information or procedures contained in this chapter, contact D.V.P. Vacuum Technology s.p.a. for clarification before proceeding.

HAZARD



Do not perform any type of operation, modification and/or repair of any kind, except for those listed in this manual.



Only trained or authorised personnel have the necessary expertise to perform tasks with the technique appropriate for intervention.



HAZARD

All maintenance operations must be carried out with the pump disconnected from any power sources. Do not operate the pump until it has reached a temperature that is not dangerous for the operator.



HAZARD

If pump maintenance has been performed in a manner inconsistent with instructions, with non-original spare parts or otherwise so as to impair its integrity or modify its characteristics, D.V.P. Vacuum Technology s.p.a. will be released from any liability relating to the safety of persons and malfunction of the pump.

6.2 MAINTENANCE TABLE

The following table shows all required periodic operations to maintain pump efficiency.

OPERATION TYPE	FREQUENCY	OPERATOR QUALIFICATION
Check the oil level	24 h	
Change oil	500 h	
Clean motor fan guard and clean pump	1000 h	
Change the air exhaust filter	2000 h	
Change vanes	10000 h	

Shorter maintenance intervals may be required according to operating conditions (high temperature of intake gases, intake gases containing condensable vapours, etc.).

6.2.1 CHECK OIL LEVEL

Check that oil level is at mid-range of the oil sight glass. If not, see instructions in the following paragraph.

Check oil conditions. When dark or cloudy, oil has been contaminated by intake substances and must be changed.

6.2.2 CHANGE OIL

Change oil as follows:

- let the pump run with closed suction intake for about 10 minutes first so oil will become thinner;
- stop the pump and disconnect it from the mains;
- undo the oil filler plug;
- get a container large enough to hold all oil and open the oil drain plug;
- drain out all oil;
- close drain plug and fill in fresh oil through the filler plug up to mid-range on the oil sight glass;
- close the oil filler plug;
- connect to mains again and verify correct rotation direction of the pump (see chapt. 3.3.);
- let the pump run with closed intake for a few minutes and then, if necessary, top up oil if necessary.


HAZARD

Wear appropriate personal protection equipment to perform said operations.


HAZARD

Comply with local regulations regarding the collection and disposal of used or polluted oil.

6.2.3 CLEAN MOTOR FAN GUARD EAND CLEAN THE PUMP

Radiator, motor fan guard and the pump should be cleaned to remove any dust deposits.

This can be done using compressed air and a dry cloth.

Do not use fluids or substances other than those indicated.


HAZARD

Wear appropriate personal protection equipment to perform said operations.

6.2.4 CHANGE THE AIR EXHAUST FILTER

The air exhaust filter must be changed when it is damaged or clogged or when it has reached its authorised life as per Chap 6.2.

Only use original DVP filters from the Air Exhaust Filter Kit (see Chap.6.3). Use of parts other than those approved by DVP can cause deterioration of the pump.

The signs showing a filter is clogged or damaged are increased exhaust fumes, increased noise-level and consumption of electricity (see Chap.9 points C and E).

It is possible to measure the level of clogging of the oil separator filter by looking at the ΔP of the filter with the pump warm. On pumps equipped with a measuring point for ΔP it is possible to check the filter by attaching a gauge or the accessory code SIF.2 to it. For pumps without this facility a measuring instrument can be connected in place of the oil filler cap.

For a pump operating and with hot oil the filter is clogged if the value of ΔP is greater than 0.7bar (at sea level). If this is the case the oil separator filter must be replaced.

6.2.5 CHANGE VANES

The instructions for replacing vanes are available upon request.

6.3 SPARE PARTS

Use **Original Spare Parts** to replace pump parts.

When purchasing spare parts, always quote the serial number and model of the pump (these can be found on the identification plate) as well as the spare part purchase number.

DESCRIZIONE	LC.2	LC.4	LB.5	LB.6	LB.8	LC.12	LC.20
Air exhaust filter kit	K9601069	K9601070	K9601062	K9601058	K9601055	K9601064	K9601066
Maintenance kit	K9601069/1	K9601070/1	K9601062/1	K9601058/1	K9601055/1	K9601064/1	K9601066/1
Oil 0,25 dm³	8811025 (BV32) 8831025 (SW40)		8812025 (BV68) 8832025 (SW60)	8811025 (BV32) 8831025 (SW40)			
Oil 0,5 dm³	8811050 (BV32) 8831050 (SW40)		8812050 (BV68) 8832050 (SW60)	8811050 (BV32) 8831050 (SW40)			
Oil 1 dm³	8811100 (BV32) 8831100 (SW40)		8812100 (BV68) 8832100 (SW60)	8811100 (BV32) 8831100 (SW40)			
Oil sight glass	1105005		1105004	1105009		1105004	
Check valve	Fitted						

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9 TROUBLESHOOTING

DAMAGE	CAUSE	REMEDY
(A) The pump does not run	No voltage	Provide power supply
	Thermal switch has tripped	Identify reason and activate switch
	Room temperature is too low	Restore room temperature to allowed range
	Motor winding damaged	Contact Service Department
(B) The pump cannot reach stated vacuum	Low oil in tank	Top up oil
	Oil contaminated	Change oil
	Discharge clogged	Check couplings at outlet
(C) Pump is noisy	Air exhaust filter clogged	Change the air exhaust filter
	Bearings damaged	Contact Service Department
	Vanes worn out	Contact Service Department
(D) Pump runs hot	Oil is not the suitable type	Change oil
	Poor room ventilation	Install an auxiliary ventilator
	Motor fan broken	Contact Service Department
	Wrong power supply to motor	Check power supply
	Discharge clogged	Check couplings at outlet
(E) High oil consumption	High working pressure (close to atmospheric pressure)	Check oil level frequently
	Pump runs hot	See point "D"
	Air exhaust filter clogged	Change the air exhaust filter
(F) Pump does not maintain vacuum after power-off	Check valve damage (if fitted)	Contact Service Department
(G) Pump leaks oil	Tank screws or plugs loosened	Tighten screws or plugs
	Tank gaskets damaged	Contact Service Department
	Oil sight glass not tightened	Tighten the oil sight glass