

Table of contents

- 1 General information / safety**
 - 1.1 Important preliminary information
 - 1.2 Application
 - 1.3 Performance and applicabilities
 - 1.4 Safety
 - 1.5 Supply connections
 - 1.6 Emissions
- 2 Transportation and intermediate storage**
- 3 Product information**
 - 3.1 General description
 - 3.2 Construction and method of operation
 - 3.3 Dimensions / weights / centres of gravity
- 4 Erection and assembly**
 - 4.1 Permissible ambient conditions
 - 4.2 Space requirements
 - 4.3 Foundation
 - 4.4 Erection
 - 4.5 Installation
- 5 Commissioning / operation / shut down**
 - 5.1 Operation
 - 5.2 Operating and ancillary means
 - 5.3 Commissioning, start-up, venting
 - 5.4 Adjustment and control
 - 5.4.1 Check of diaphragm monitoring display
 - 5.4.2 Diaphragm rupture
 - 5.5 Shut down
 - 5.6 Dismantling and return transportation
- 6 Maintenance and repairs**
 - 6.1 Maintenance
 - 6.2 Repairs
 - 6.3 Dismantling / assembly
 - 6.4 Filling, venting, adjustment
- 7 Faults; symptoms , remedial action**

1 General information / safety

1.1 Important preliminary information

Refer to operating instruction B 0.100.1.

1.2 Application

This operating instruction applies to

**Sandwich diaphragms of plastics
in diaphragm pump heads M9.. type LC – LEWA ecosmart®**

made by LEWA GmbH.

The LEWA works number is stated in the technical data sheet and on the name plate of the LEWA ecosmart® - metering pump.

Type of diaphragm monitoring:

with pressure gauge (visual) ¹⁾

with pressure switch ²⁾

¹⁾ The indicating range of the pressure gauge should be 20% above the setting pressure of the pressure limiting valve.

²⁾ For design of pressure switch refer to technical data sheet.



The diaphragm monitoring units listed are suitable for hazardous areas.

1.3 Performance and applicabilities

Refer to operating instruction B 0.100.1.

1.4 Safety

Refer to operating instruction B 0.100.1.

1.5 Supply connections

Refer to operating instruction B 0.100.1.

1.6 Emissions

Refer to operating instruction B 0.100.1.

2 Transportation and intermediate storage

Refer to operating instruction B 0.100.1.

3 Product information

3.1 General description

Refer to operating instruction B 0.100.1.

3.2 Construction and method of operation

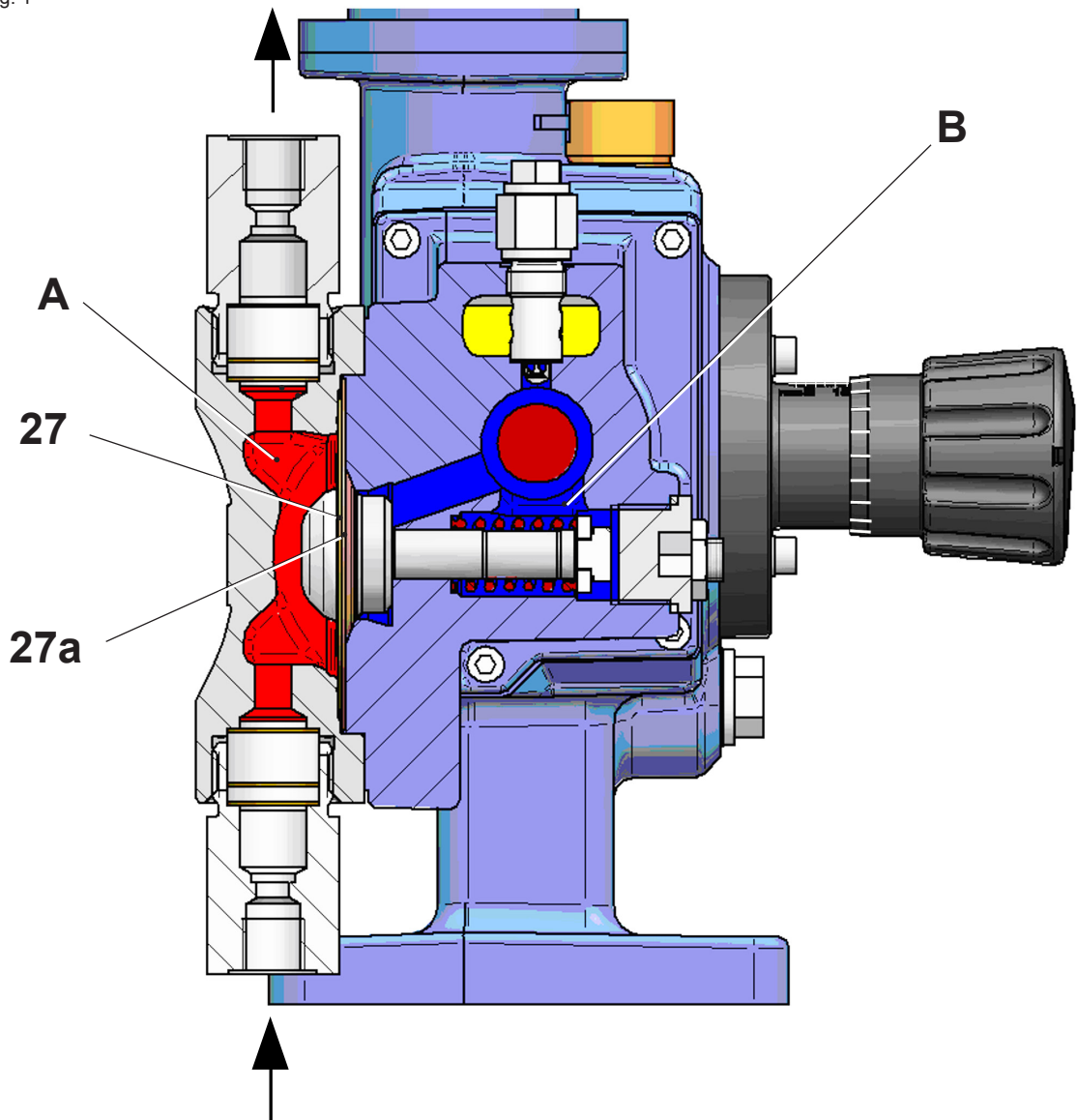
(refer to figure 1)

Sandwich diaphragm of plastics (PTFE).

Two diaphragms (27) and (27a) placed on top of each other separate the operating chamber (**A**) from the pressure chamber (**B**). The two diaphragms are coupled with each other mechanically by the diaphragm retainer and hydraulically by a charge of intermediate fluid.

If one of the two diaphragms is damaged, fluid conveyed or lubricant will get into the diaphragm intermediate space.

Fig. 1



At the next discharge stroke this fluid is forced through a non-return valve (integrated into item 601, refer to sectional drawing LEWA ecosmart® - metering pump LC into the diaphragm monitoring unit and signals diaphragm damage.

A mesh installed between the diaphragms accelerates this process.

Diaphragm monitoring by pressure gauge:

In case of diaphragm damage fluid will flow through the non-return valve into the, up to then, unpressurized chamber of the diaphragm monitoring unit. This causes the pressure in the chamber to rise up to the operating pressure of the LEWA ecosmart® - metering pump. This pressure rise is displayed visually at the pressure gauge.

Diaphragm monitoring by pressure switch:

A diaphragm separates the pressure switch from the chamber in the diaphragm monitoring unit. In case of diaphragm rupture the fluid flowing in is pressing against the diaphragm and so operates the contact.

3.3 Dimensions / weights / centres of gravity

Refer to operating instruction B 0.100.1.

4 Erection and assembly

4.1 Permissible ambient conditions

Refer to operating instruction B 0.100.1.

4.2 Space requirements

4.3 Foundation

4.4 Erection

When sensors with visual display are used the LEWA ecosmart® metering pump must be installed so that the display is easily visible.



For dangerous fluids connect a hose to the hose nipple with integrated drain screw (7, see sectional drawing "Diaphragm monitoring") so that the fluid can be drained safely when opening the vent screw.

4.5 Installation

Refer to operating instruction B 0.100.1.

5 Commissioning / operation / shut down

5.1 Operation

Refer to operating instruction B 0.100.1.

5.2 Operating and ancillary means

Refer to operating instruction B 0.100.1.

5.3 Commissioning, start-up, venting

During start-up excess intermediate fluid can be displaced into the diaphragm monitoring unit during the first strokes and cause an incorrect triggering of the monitoring unit. In these cases excess intermediate fluid or air should be drained/vented at the diaphragm monitoring device.

For this purpose please follow the procedure described in section 6.4.

5.4 Adjustment and control

5.4.1 Check of diaphragm monitoring display



During the following work steps small amounts of the fluid conveyed can escape! Strictly observe the safety- and disposal instructions of the fluid conveyed!

Check of signal:

If a diaphragm rupture is displayed after a longer period of operation, the diaphragm monitoring device must be vented in order to find out whether a diaphragm rupture has actually occurred.

This check is required, since the diaphragm layers are more and more pressed together and settle due to the pressure in the course of time. This might result in intermediate fluid being pressed into either the indication or the sensor. This can lead to an indication error.

With some fluids, above all liquid gases, small amounts of the fluid can diffuse through the diaphragm. After a certain time this could lead to a signal being tripped without any diaphragm damage.



Please take suitable measures against squirting out intermediate fluid or fluid conveyed (personal protective equipment)!

Use hose nipple with integrated drain screw (7, see sectional drawing "Diaphragm monitoring") and hose. Strictly observe the safety- and disposal instructions of the fluid conveyed!

- Slightly loosen hose nipple with integrated drain screw (7, see sectional drawing "Diaphragm monitoring").
- Doing so, excess air, excess intermediate fluid or fluid conveyed is discharged.
- After a few metering strokes close diaphragm monitoring again by tightening the hose nipple with integrated draining screw.



In order to assure a safe and reliable diaphragm monitoring the hose nipple with integrated drain screw (7, see sectional drawing "Diaphragm monitoring") must be tightened hard!

5.4.2 Diaphragm rupture

Diaphragm rupture has actually occurred when rupture is signalled again soon after the check (see 5.4.1).

Replacement of diaphragm: See operating instruction for the diaphragm pump head.

5.5 Shut down

Refer to operating instruction B 0.100.1.

5.6 Dismantling and return transportation

Refer to operating instruction B0.100.1.

6 Maintenance and repairs

6.1 Maintenance

The diaphragm monitoring unit does not require any maintenance.

6.2 Repairs

6.3 Dismantling / assembly



During dismantling small amounts of the fluid conveyed can exit!

Please take suitable measures against squirting out intermediate fluid or fluid conveyed (personal protective equipment)!

Use hose nipple with integrated drain screw (7, see sectional drawing "Diaphragm monitoring") and hose. Please strictly observe the safety- and disposal instructions for the fluid conveyed!

Refer to operating instruction "Diaphragm pump head".

6.4 Filling, venting, adjustment

The sandwich diaphragm of the M9.. series for LEWA *ecosmart*[®] - metering pumps type LC need **not** be filled. The ex-works supply of the diaphragm pack contains the optimum, precisely measured volume of intermediate fluid.

For venting during commissioning (see section 5.3) the following work steps can be carried out:



Please take suitable measures against squirting out intermediate fluid or fluid conveyed (personal protective equipment)!

Use hose nipple with integrated drain screw (7, see sectional drawing "Diaphragm monitoring") and hose.

Strictly observe the safety- and disposal instructions for the fluid conveyed!

- Slightly loosen the hose nipple with integrated drain screw (7, see sectional drawing "Diaphragm monitoring").
- This will relieve the possible excess air resp. intermediate fluid from the diaphragm monitoring unit.
- After a few metering pump strokes retighten the hose nipple again.



In order to assure a safe and reliable diaphragm monitoring the hose nipple with integrated drain screw (7, see sectional drawing "Diaphragm monitoring") must be tightened hard!

In order to check the triggered diaphragm monitoring after a longer operating period please proceed as described in section 5.4.

7 Faults; symptoms , remedial action

Fault	Possible cause	Remedial action
Diaphragm damage indicated shortly after start-up of the LEWA <i>ecosmart</i> [®] -metering pump.	Creeping of the diaphragm is forcing intermediate fluid into the sensor (see 5.3).	Open the hose nipple with integrated drain screw for a short period to relief the pressure in the sensor (refer to section 6.4).
	Heat expansion of fluid and gas in the sensor is triggering the display.	
	Leakages at the clamping areas.	Check torque of screws and re-tighten if required. Open the hose nipple with integrated drain screw for a short period to relief the pressure in the sensor (refer to section 6.4).
Diaphragm damage indicated during operation (see 5.4.2).	Diaphragm damage.	Replace diaphragm.
	Diffusion at the diaphragm or seal.	In case of repeat incorrect indication by diffusion please consult the LEWA service department.