



INSTALLATION, OPERATION, AND MAINTENANCE MANUAL
WELKER LIQUID ELIMINATOR

MODEL
LE-2

DRAWING NUMBER
AD691B0

MANUAL NUMBER
IOM-061

REVISION
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IMPORTANT SAFETY INFORMATION

READ ALL INSTRUCTIONS



Notes emphasize information and/or provide additional information to assist the user.



Caution messages appear before procedures that could result in damage to equipment if not observed.



Warning messages appear before procedures that could result in personal injury if not observed.

This manual is intended to be used as a basic installation and operation guide for the Welker Liquid Eliminator, LE-2. For comprehensive instructions, please refer to the IOM Manuals for each individual component. A list of relevant component IOM Manuals is provided in Appendix A of this manual.

The information in this manual has been carefully checked for accuracy and is intended to be used as a guide for the installation, operation, and maintenance of the Welker equipment described in this manual. Correct installation and operation, however, are the responsibility of the end user. Welker reserves the right to make changes to this manual and all products in order to improve performance and reliability.

BEFORE YOU BEGIN

Read these instructions completely and carefully.

IMPORTANT - Save these instructions for local inspector's use.

IMPORTANT - Observe all governing codes and ordinances.

Note to Installer - Leave these instructions with the end user.

Note to End User - Keep these instructions for future reference.

Installation of this Liquid Eliminator is of a mechanical nature.

Proper installation is the responsibility of the installer. Product failure due to improper installation is not covered under the warranty.

If you received a damaged Liquid Eliminator, please contact a Welker representative immediately.

Phone: 281.491.2331

Address: 13839 West Bellfort Street
Sugar Land, TX 77498

1.1 Introduction

We appreciate your business and your choice of Welker products. The installation, operation, and maintenance liability for this equipment becomes that of the purchaser at the time of receipt. Reading the applicable *Installation, Operation, and Maintenance (IOM) Manuals* prior to installation and operation of this equipment is required for a full understanding of its application and performance prior to use.*

If you have any questions, please call Welker at 1-281-491-2331.

**The following procedures have been written for use with standard Welker parts and equipment. Assemblies that have been modified may have additional requirements and specifications that are not listed in this manual.*

1.2 Product Description

The Welker *LE-2* Liquid Eliminator is designed to protect an analyzer from damage and contamination by removing liquids from gas samples.

As gas enters the *LE-2*, any free liquids present are separated from the sample stream by centripetal force, a copolymer filter element, and a screen and then returned through the drain valve.

Welker may custom design the LE-2 to suit the particular application and specifications of each customer.

1.3 Specifications



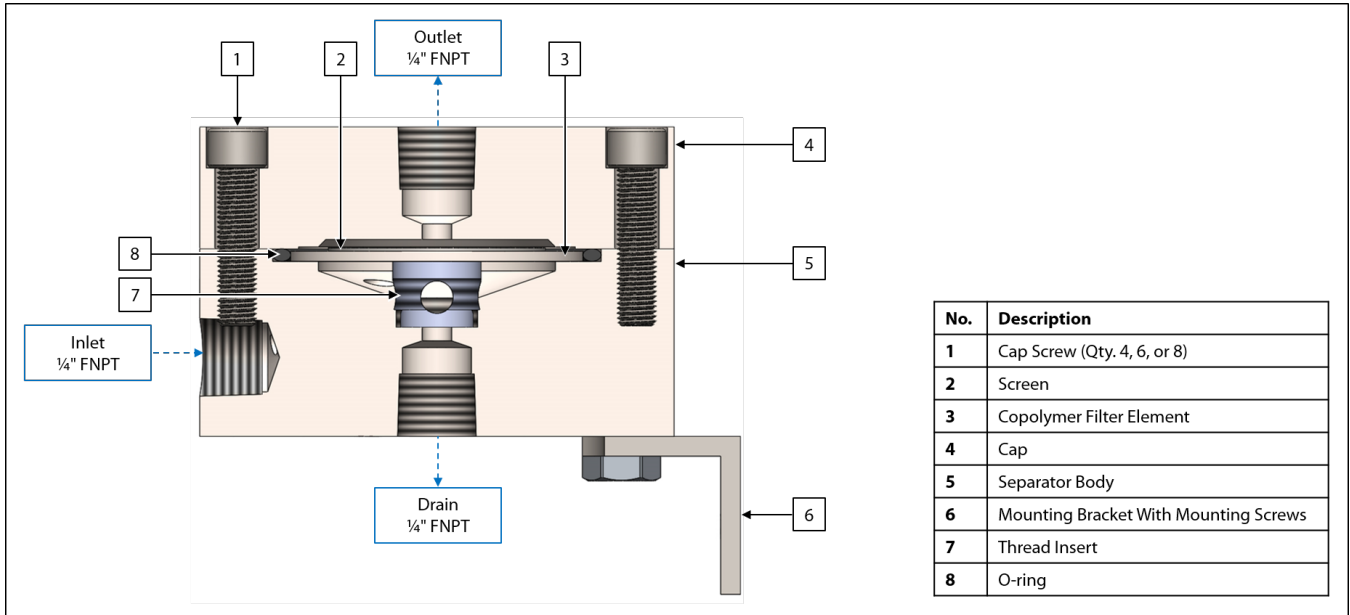
The specifications listed in this section are generalized for this equipment. Welker can modify the equipment according to your company's needs. **Please note that the specifications may vary depending on the customization of your equipment.**

Table 1: LE-2 Specifications

Application	Liquid Removal
Products	Gases Compatible With the Materials of Construction
Materials of Construction	304 Stainless Steel, 316/316L Stainless Steel, Delrin®, and Viton® Others Available
Maximum Allowable Operating Pressure	316/316L Stainless Steel: 1440 psig @ -20 °F to 120 °F (99 barg @ -28 °C to 48 °C) Aluminum: 1000 psig @ -20 °F to 120 °F (68 barg @ -28 °C to 48 °C) Delrin®: 300 psig @ -20 °F to 120 °F (20 barg @ -28 °C to 48 °C) Monel®: 1440 psig @ -20 °F to 120 °F (99 barg @ -28 °C to 48 °C) With Flow Meter: 100 psig @ -20 °F to 120 °F (6 barg @ -28 °C to 48 °C)
Connections	Inlet: ¼" FNPT Outlet: ¼" FNPT (Standard) or ½" FNPT Drain: ¼" FNPT
Filter Media	25 Micron Copolymer Filter Element 304 Stainless Steel Mesh Screen
Options	Chembar Coating Drain Valve Mounting Bracket Sulfinert®-Treated Sample Exposed Parts CRN Certification

1.4 Equipment Diagram

Figure 1: LE-2 Diagram



SECTION 2: INSTALLATION & OPERATION

2.1 Before You Begin



After unpacking the unit, check the equipment for compliance and any damage that may have occurred during shipment. Immediately contact a Welker representative if you received damaged equipment.



When sealing fittings with PTFE tape, refer to the proper sealing instructions for the brand used.

2.2 Installation and Operation

1. Ensure that the cap screws are tightened.
2. Mount the LE-2 as close to the sample point as possible.



The LE-2 must be installed vertically with the drain pointing down.

3. Using ¼" tubing, connect from the outlet on the customer sample probe to the inlet port of the LE-2.
4. Using ¼" tubing, connect from the outlet port of the LE-2 to the downstream instrumentation.



It may be necessary to install a regulator and heater between the outlet of the LE-2 and the downstream instrumentation to ensure the gas sample stream is provided at the temperature and pressure required for the instrumentation. A heater is recommended to recover heat lost during regulation to help maintain the gas phase of the sample stream.

5. Using ¼" tubing, connect a device to the drain port of the LE-2 to collect any liquids separated from the sample stream. This device should be compatible with the maximum allowable operating pressure (MAOP) of the LE-2.



If no collection device is connected to the drain port, thread a valve into the port.

6. Begin product flow to the LE-2 to put it into service.
7. As necessary, periodically open the drain valve and allow separated liquids to drain. If liquids drain from the LE-2, the LE-2 should be cleaned. See *Section 3.2, Maintenance*, for instructions on cleaning the LE-2.

3.1 Before You Begin

1. **Welker recommends that the unit have standard maintenance every six (6) months under normal operating conditions and any time liquid is present in the copolymer filter element or at the product outlet.** In cases of severe service, dirty conditions, excessive usage, or other unique applications that may lead to excess wear on the unit, a more frequent maintenance schedule may be appropriate.
2. Prior to maintenance or disassembly of the unit, it is advisable to have a repair kit available for repairs of the system in case of unexpected wear or faulty seals.



New seals supplied in spare parts kits should be lightly lubricated before being installed to ease the installation of the seals and reduce the risk of damage when positioning them on parts. Wipe excess lubricant from the seals, as it may adversely affect analytical instrument results.



For sample-exposed seals, Welker recommends non-hydrocarbon-based lubricants, such as Krytox®. For non-sample-exposed seals, Welker recommends either non-hydrocarbon-based lubricants or silicone-based lubricants, such as Molykote® 111.



After the seals are installed, the outer diameter of shafts and inner diameter of cylinders may be lubricated to allow smooth transition of parts.

3. All maintenance and cleaning of the unit should be performed on a smooth, clean surface.
4. Welker recommends having the following tools available for maintenance. Please note that the exact tools required may vary by model.
 - a. Hex Key Set
 - b. Disposable Gloves
 - c. Seal Pick
 - d. Small Adjustable Wrench

3.2 Maintenance

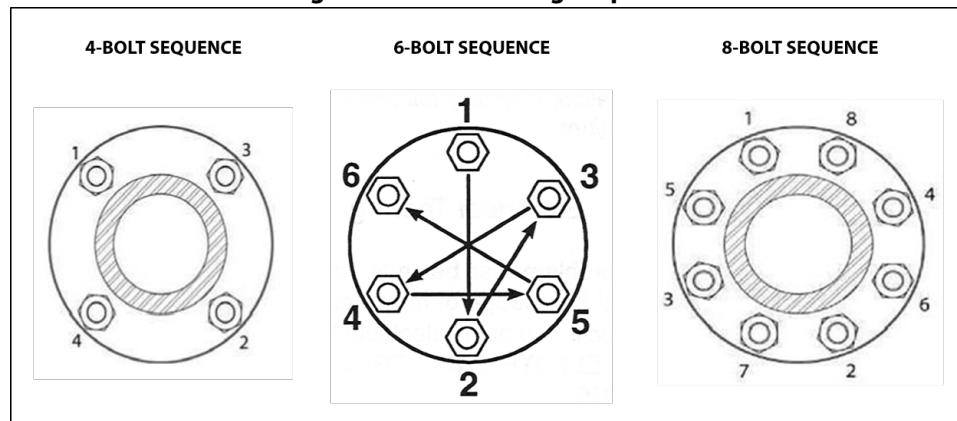
1. Halt product flow to the LE-2.
2. Depressurize the LE-2. As necessary, open the drain valve to drain any separated liquids.
3. Disconnect all tubing from the LE-2.
4. Unscrew the cap screws from the LE-2.
5. Remove the cap from the separator body.
6. Remove the screen, copolymer filter element, and O-ring from the separator body.
7. Using a solvent, clean the screen and the inside of the separator body.



Welker recommends using a solvent, such as rubbing alcohol, that does not leave a film when dry and will not adversely affect analytical instrument results.

8. Replace the copolymer filter element.
9. Replace the O-ring.
10. Return the cleaned screen to the top of the copolymer filter element.
11. Align the screw holes in the cap with the screw holes in the separator body, and then return the cap to the separator body.
12. Following a cross-bolting sequence, install the cap screws to the cap of the LE-2 (*Figure 2*).

Figure 2: Cross-Bolting Sequences



13. The LE-2 is now ready for installation. See *Section 2.2, Installation and Operation*, for instructions on installing the LE-2 and returning the unit to operation.

3.3 Troubleshooting

Table 2: LE-2 Troubleshooting		
Issues	Possible Causes	Solutions
There is little to no flow through the LE-2.	The LE-2 is dirty, saturated, or was flooded by liquids.	Clean the screen and replace the copolymer filter element. See <i>Section 3.2, Maintenance</i> , for instructions. The drain valve should be opened more frequently, if applicable.
Liquids are reaching the downstream analyzer.	The LE-2 is dirty, saturated, or was flooded by liquids.	Clean the screen and replace the copolymer filter element. See <i>Section 3.2, Maintenance</i> , for instructions. The drain valve should be opened more frequently, if applicable.

APPENDIX A: REFERENCED OR ATTACHED DOCUMENTS

Welker *Installation, Operation, and Maintenance (IOM) Manuals* suggested for use with this unit:

- IOM-105: Welker NV-1 and NV-2 Instrument Valves

Other *Installation, Operation, and Maintenance (IOM) Manuals* suggested for use with this unit:

- Dwyer Instruments, Inc. Series RM Rate-Master® Flowmeters (Welker IOM-V364)
- Swagelok Company Metering Valves S, M, L, and 31 Series (Welker IOM-V340)

Welker drawings and schematics suggested for use with this unit:

- Assembly Drawing: AD691BO

