



INSTALLATION, OPERATION, AND MAINTENANCE MANUAL
WELKER LIQUID ELIMINATOR

MODEL
LE-2

DRAWING NUMBER
AD691CK

MANUAL NUMBER
IOM-227

REVISION
Rev. 0, 3/2/2020

TABLE OF CONTENTS

	SAFETY	3
1.	PRODUCT INFORMATION	4
1.1	Introduction	4
1.2	Product Description	4
1.3	Specifications	4
1.4	Equipment Diagram	5
2.	INSTALLATION & OPERATION	6
2.1	Before You Begin	6
2.2	Installation and Operation	6
3.	MAINTENANCE	8
3.1	Before You Begin	8
3.2	Maintenance	9
3.3	Troubleshooting	10
	APPENDIX	11
	A: Referenced or Attached Documents	11

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 Belfort Street
Sugar Land, TX 77498

SECTION 1: PRODUCT INFORMATION

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, centripetal force and a replaceable cartridge assembly separates free liquids from the sample stream. The separated free liquids drain from the LE-2, allowing the dry gas stream to flow to the analyzer.

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

1.3 Specifications



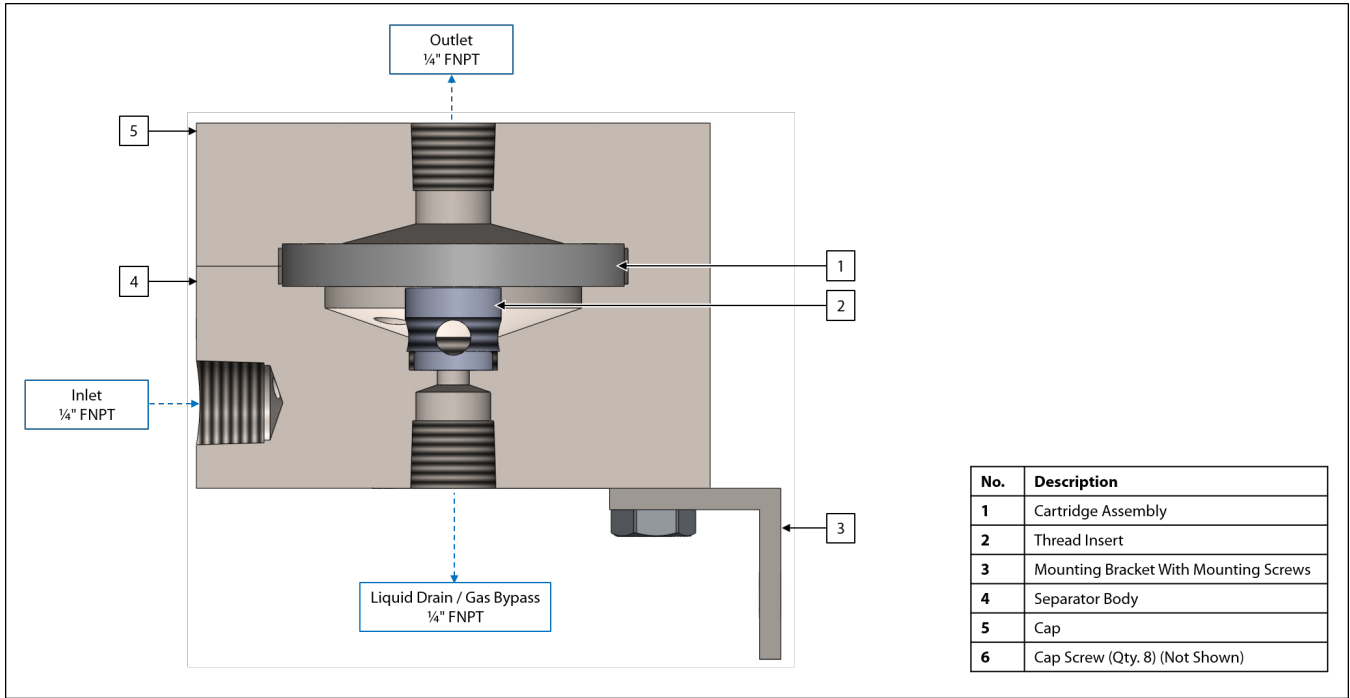
The specifications listed in this section are generalized for this equipment. Welker can modify the equipment according to your company's needs. **Please note that the specifications may vary depending on the customization of your equipment.**

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 Teflon®
Maximum Allowable Operating Pressure	1440 psig @ -20 °F to 300 °F (99 barg @ -28 °C to 148 °C)
Maximum Allowable Outlet Flow Rate	4200 cc per Minute (Resulting in Approx. 2 psid on Filter Element)
Connections	Inlet: ¼" FNPT Outlet: ¼" FNPT Drain: ¼" FNPT
Filter Media	25 Micron Copolymer Filter Element 304 Stainless Steel Mesh Screens
Feature	Replaceable Cartridge Assembly

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 horizontally with the drain pointing down.



Welker recommends installing a regulator and heater between the sample point and inlet of the LE-2 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.



DO NOT exceed the maximum allowable flow rate through the filter element.

3. Using ¼" tubing, connect from the outlet on the customer regulator to the inlet port of the LE-2.
4. Using ¼" tubing, connect from the outlet port of the LE-2 to the analyzer.
5. Using ¼" tubing, connect a valve to the liquid drain / gas bypass port of the LE-2 to continuously vent and drain any liquids separated from the sample stream.



Welker can install a rotameter with valve to the liquid drain / gas bypass port if requested at the time of order.



Welker recommends installing a Welker Bypass Recovery System to the liquid drain / gas bypass port.

6. Begin product flow to the LE-2 to put it into service.

7. Slightly open the drain valve to allow separated liquids to drain and ensure fresh gas is presented to the analyzer. If liquids are present at the cartridge assembly or at the product outlet, the cartridge assembly must be replaced. See *Section 3.2, Maintenance*, for instructions.



Liquids must drain at a minimum of 20 cc per minute to prevent liquid backup inside the LE-2.



The liquid drain / gas bypass flow rate will vary by application. A minimum of 500 cc per minute is required for proper drainage.

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 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.

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

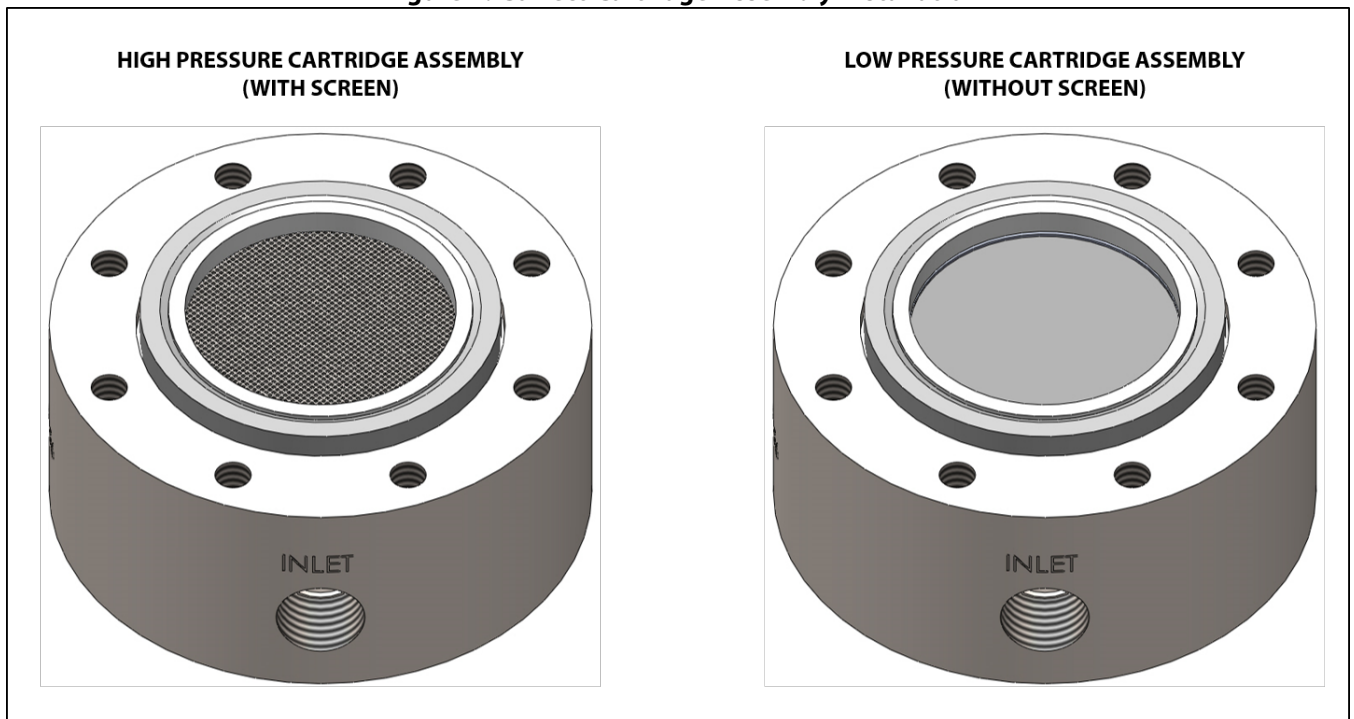
1. Halt product flow to the LE-2.
2. Depressurize the LE-2.
3. Disconnect all tubing from the LE-2.
4. Unscrew the cap screws from the LE-2.
5. Remove the cap from the separator body.
6. Remove the cartridge assembly from the separator body.
7. Using a solvent, clean the inside of the separator body and porting.



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.

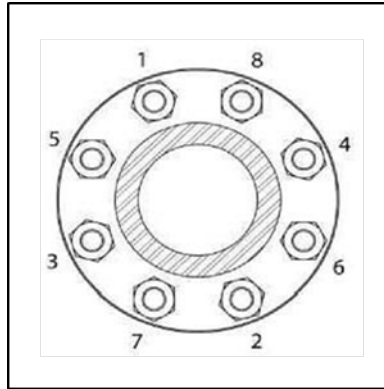
8. Install a replacement cartridge assembly to the separator body (*Figure 2*). Ensure that the grooved side of the cartridge body faces up to the outlet.

Figure 2: Correct Cartridge Assembly Installation



9. Align the screw holes in the cap with the screw holes in the separator body, and then return the cap to the separator body.
10. Following a cross-bolting sequence, install the cap screws to the cap of the LE-2 and tighten to 5 ft•lb (*Figure 3*).

Figure 3: Cross-Bolting Sequence



11. 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 flow through the LE-2 with the liquid drain / gas bypass valve open.	The filter element is dirty, saturated, and flooded by liquids.	Replace the cartridge assembly. See <i>Section 3.2, Maintenance</i> , for instructions. Do not exceed the maximum allowable flow rate through the filter element.
There is overflow through the LE-2 with the liquid drain / gas bypass valve open.	The filter element burst.	Replace the cartridge assembly. See <i>Section 3.2, Maintenance</i> , for instructions. Do not exceed the maximum allowable flow rate through the filter element.
Liquids are reaching the downstream analyzer.	The LE-2 is dirty, saturated, or was flooded by liquids.	Replace the cartridge assembly. See <i>Section 3.2, Maintenance</i> , for instructions. Ensure that the liquid drain / gas bypass valve is open.

APPENDIX A: REFERENCED OR ATTACHED DOCUMENTS

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

- None

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

- None

Welker drawings and schematics suggested for use with this unit:

- Assembly Drawing: AD691CK

