



INSTALLATION, OPERATION, AND MAINTENANCE MANUAL
WELKER® GUARDIAN 2

DRAWING NUMBERS

AD836CO
AD836CP

MANUAL NUMBER

IOM-168

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® Guardian 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 Guardian 2 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 Guardian 2, please contact a Welker® representative immediately.

Phone: 281.491.2331

Address: 13839 West Bellfort 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® *Guardian 2* is designed to protect analyzers from contamination and damage by removing liquids from gas samples and preventing the flow of liquid to the analyzer.

The *Guardian 2* achieves its dual defense design by combining the Welker® LE Liquid Eliminator with the Welker® ALS-4 Analyzer Liquid Shutoff. As gas enters the LE, liquids are separated from the sample stream by centripetal force, a filter element, and a screen. Gravity drains the separated liquids away from the analyzer. The gas must then pass through the ALS-4, the final line of analyzer defense. Gas flows freely through the ALS-4, but if liquid is present, the internal floating ball will seal, shutting off product flow to the analyzer.

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

1.3 Specifications



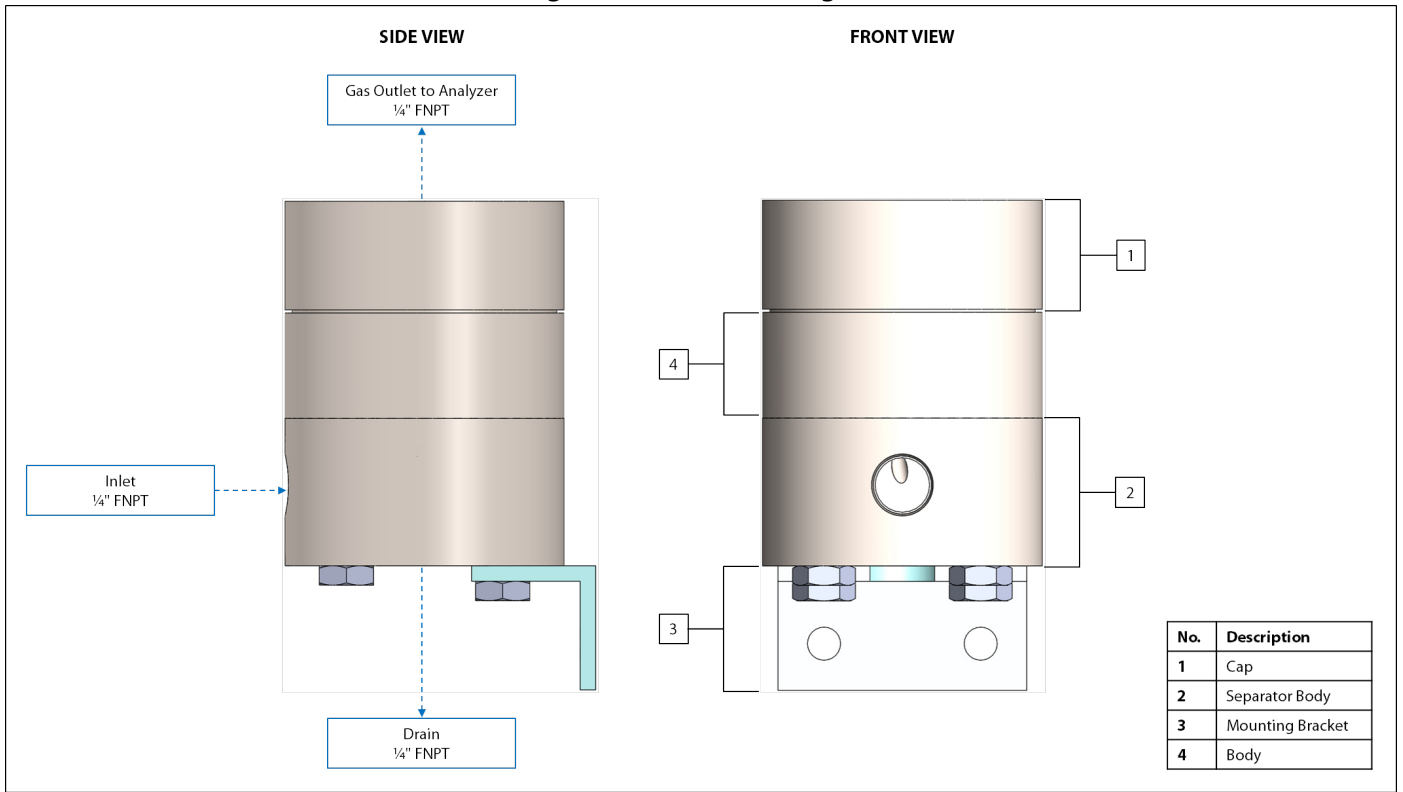
The specifications listed in this section are generalized for this equipment. Welker can modify the equipment according to your company's needs. **Please note that the specifications may vary depending on the customizations of your equipment.**

Table 1: Guardian 2 Specifications

Products	Gases Compatible With the Materials of Construction
Materials of Construction	304 Stainless Steel, 316/316L Stainless Steel, Aluminum, Teflon®, and Viton®
Maximum Allowable Operating Pressure	Standard: 1440 psig @ -20 °F to 100 °F (99 barg @ -28 °C to 37 °C) High Pressure: 2500 psig @ -20 °F to 100 °F (172 barg @ -28 °C to 37 °C)
Connections	Drain: ¼" FNPT Inlet: ¼" FNPT Outlet: ¼" FNPT
Filtration	Nominal 25 Micron Internodal Distance
Features	Welker® ALS-4 Analyzer Liquid Shutoff Welker® LE Liquid Eliminator

1.4 Equipment Diagram

Figure 1: Guardian 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. Mount the Guardian 2 as close to the sample point as possible.



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

2. Connect the product supply to the inlet port of the Guardian 2 (*Figure 1*).
3. Connect the outlet port of the Guardian 2 to the analyzer (*Figure 1*).
4. Connect a device to the drain port to collect any liquids separated from the sample stream. This device should be compatible with the maximum allowable operating pressure (MAOP) of the unit.



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

5. Begin product flow to the Guardian 2 to put it into service.
6. As necessary, periodically open the drain valve and allow separated liquids to drain. If liquids drain from the Guardian 2, the Guardian 2 should be cleaned. See *Section 3.2, Maintenance*, for instructions on cleaning the Guardian 2.
7. When liquid reaches the ALS and flow to the analyzer is shut off, the Guardian 2 must be maintained. See *Section 3.2, Maintenance*, for instructions on maintaining the Guardian 2.

3.1 Before You Begin

1. **Welker recommends that the unit have standard maintenance every six (6) months under normal operating conditions, anytime liquid is present in the copolymer filter element, and anytime flow to the analyzer is shut off.** 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.

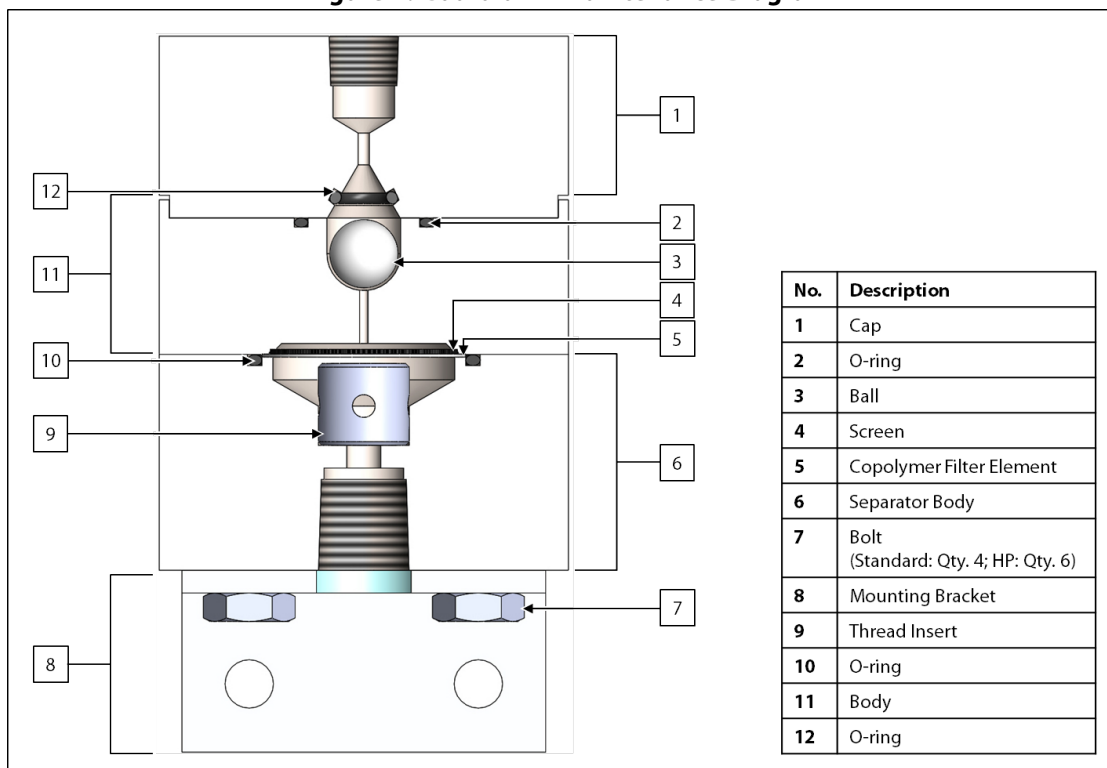
3. All maintenance and cleaning of the unit should be performed on a smooth, clean surface.
4. Welker recommends having the following tools available for maintenance. Please note that the exact tools required may vary by model.
 - a. Channel Lock Pliers
 - b. Seal Pick
 - c. Socket Set and Ratchet

3.2 Maintenance

1. Halt product flow to the Guardian 2.
2. Depressurize the Guardian 2. As necessary, open the drain valve to drain any separated liquids.
3. Disconnect all tubing from the Guardian 2.

Disassembly

Figure 2: Guardian 2 Maintenance Diagram



4. Unscrew the bolts from the Guardian 2.
5. Remove the cap from the body.
6. Remove the body from the separator body.

LE

7. Remove the screen, copolymer filter element, and O-ring from the separator body.
8. 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.

9. Replace the copolymer filter element.
10. Replace the O-ring.
11. Return the cleaned screen to the top of the copolymer filter element.

ALS-4

12. Replace the O-ring in the cap.



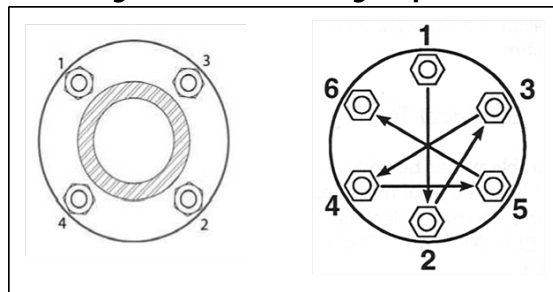
DO NOT lubricate the O-ring on which the ball seals (*Figure 2, #12*).

13. Replace the O-ring in the body.
14. Inspect the ball for scratches or wear. Replace as necessary.
15. Return the ball to the body.

Reassembly

16. Align the bolt holes in the cap with the bolt holes in the body, and then return the cap to the body.
17. Align the bolt holes in the body with the bolt holes in the separator body, and then reinstall the bolts following a cross-bolting sequence (*Figure 3*).

Figure 3: Cross-Bolting Sequence



18. The unit is now ready for installation. See *Section 2.2, Installation and Operation*, for instructions on installing the Guardian 2.

APPENDIX A: REFERENCED OR ATTACHED DOCUMENTS

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

- IOM-061: Welker® LE-2 Liquid Eliminator
- IOM-199: Welker® ALS-4 Analyzer Liquid Shutoff

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: AD836CO (Standard Guardian 2)
- Assembly Drawing: AD836CP (High Pressure Guardian 2)

