



INSTALLATION, OPERATION, AND MAINTENANCE MANUAL
WELKER® INSTRUMENT REGULATOR

MODEL

IR-7

DRAWING NUMBER

AD884C0

MANUAL NUMBER

IOM-044

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® Instrument Regulator, IR-7. 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 Instrument Regulator 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 Instrument Regulator, 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® IR-7 Instrument Regulator is designed to provide an output pressure adequate for downstream instrumentation that is unable to sustain high pressures. The input pressure is reduced as the supply travels through the input to the output. To further protect the equipment being supplied with the regulated product, the filter element on the cartridge assembly of the IR-7 provides 40 micron filtration to remove unwanted elements. The IR-7 comes equipped with two (2) sets of inlet and outlet ports to allow for multiple connection configurations.

Welker® may custom design the IR-7 to suit the particular application and specifications of each customer.

1.3 Specifications



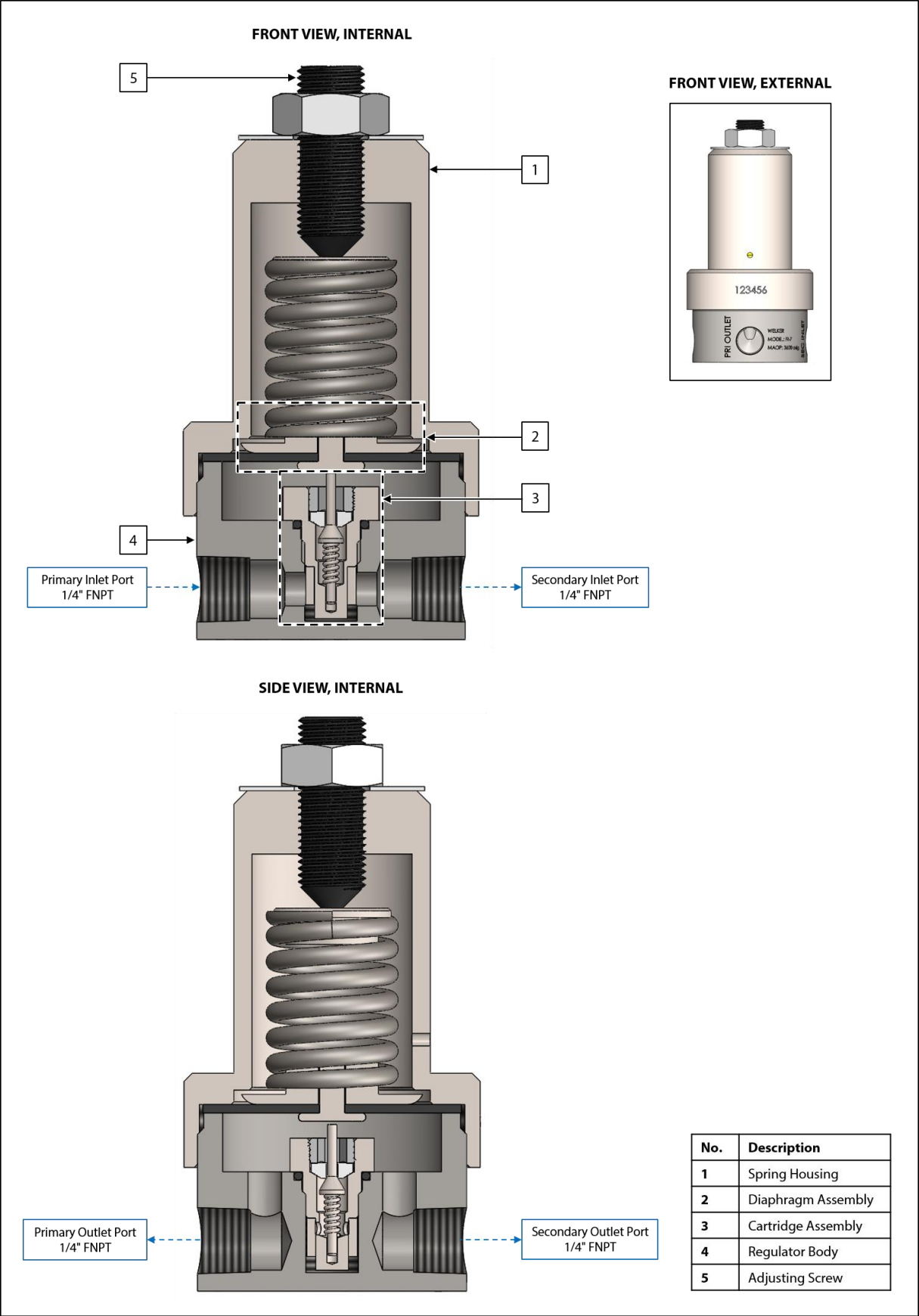
The specifications listed in this section are generalized for this equipment. Welker® can modify the equipment according to your company's needs. **Please note that the specifications may vary depending on the customization of your equipment.**

Table 1: IR-7 Specifications

Products	Gaseous Fluids or Liquids Compatible With the Materials of Construction
Materials of Construction	316/316L Stainless Steel, PCTFE or PTFE, and Viton® Others Available
Maximum Allowable Inlet Pressure	3600 psig @ -20 °F to 120 °F (248 barg @ -28 °C to 48 °C)
Connections	Primary Inlet: ¼" FNPT Primary Outlet: ¼" FNPT Secondary Inlet: ¼" FNPT Secondary Outlet: ¼" FNPT
Output Range	0–25 psig (0–1.7 barg) 0–50 psig (0–3.4 barg) 20–100 psig (1.3–6.8 barg) 75–200 psig (5.1–13.7 barg)
Flow Coefficient (C_v)	A: 0.07 B: 0.06
Filtration	40 Microns
Operation	Diaphragm-Operated
Options	Body Porting Pressure Gauge Relief Valve CE Compliance NACE Compliance

1.4 Equipment Diagram

Figure 1: IR-7 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

1. As necessary, install a pressure gauge to the appropriate secondary inlet or outlet port (*Figure 1*).
2. As necessary, install a relief valve to the secondary outlet port (*Figure 1*).
3. Using ¼" tubing, connect from the product supply to the primary inlet port of the IR-7 (*Figure 1*).



DO NOT turn on the product supply at this time. Turning on the product supply before the relief has been set could overpressurize the regulator.

4. Install customer-supplied ¼" tubing or other fittings to the primary outlet port of the IR-7 (*Figure 1*).

2.3 Setting the Regulator

- 1. Use a safe auxiliary gas supply to set the relief valve to the proper pressure. Refer to the *Installation, Operation, and Maintenance (IOM) Manual* for the relief valve for instructions on setting the relief.



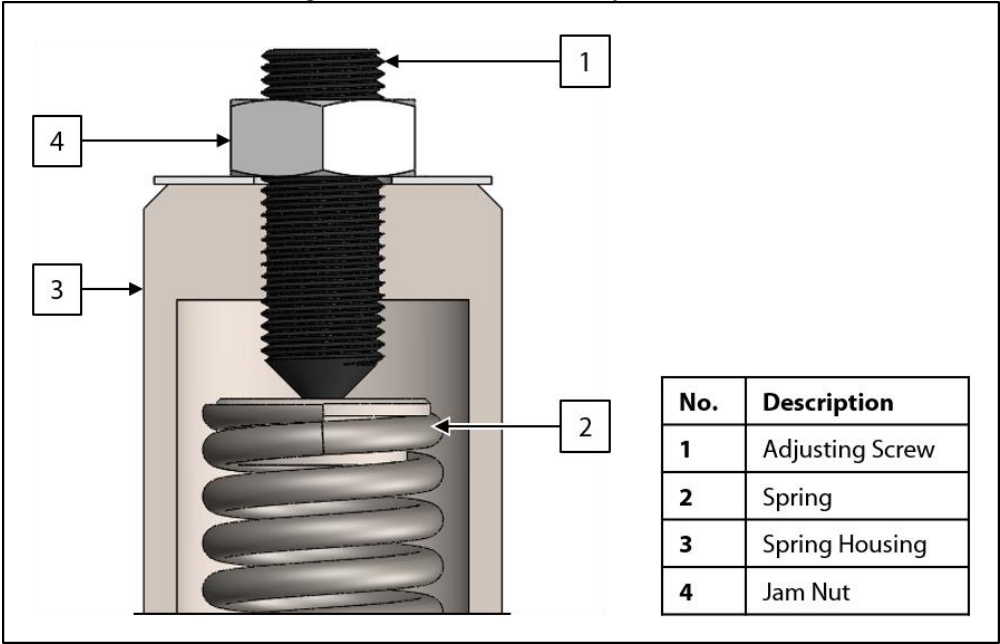
If the IR-7 is used to set the relief valve, DO NOT exceed the output pressure range of the IR-7.



If a Welker® relief valve is used, Welker® can set the relief valve prior to shipment if noted at the time of order.

- 2. Turn ON the product supply to pressurize the inlet of the IR-7 (*Figure 1*).

Figure 2: Outlet Pressure Adjustment



- 3. Loosen or tighten the adjusting screw until the IR-7 pressure gauge reads the desired outlet pressure (*Figure 2*).
- 4. Tighten the jam nut on the adjusting screw to secure the adjusting screw at the desired outlet pressure (*Figure 2*).
- 5. The IR-7 is now operational.
- 6. If the diaphragm leaks or restricted flow is observed during operation, the cartridge assembly must be replaced (*Figure 4*). See *Section 3.2, Maintenance*, for instructions on replacing the cartridge assembly.

SECTION 3: MAINTENANCE

3.1 Before You Begin

1. **Welker® recommends that the unit have standard yearly maintenance under normal operating conditions.** 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.

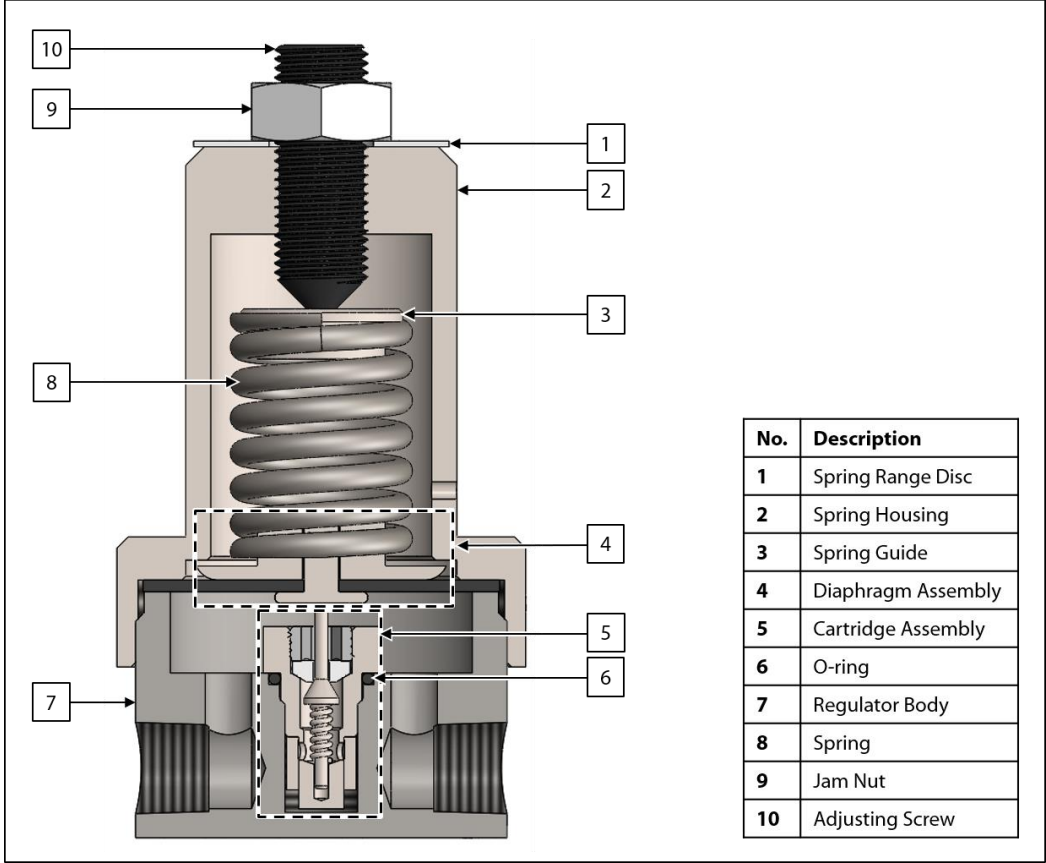
3. All maintenance and cleaning of the unit should be performed on a smooth, clean surface.
4. Welker® recommends having the following tools available for maintenance. Please note that the exact tools required may vary by model.
 - a. 1/4" Hex Key
 - b. Crescent Wrench
 - c. Socket Wrench With 5/8" Socket

3.2 Maintenance



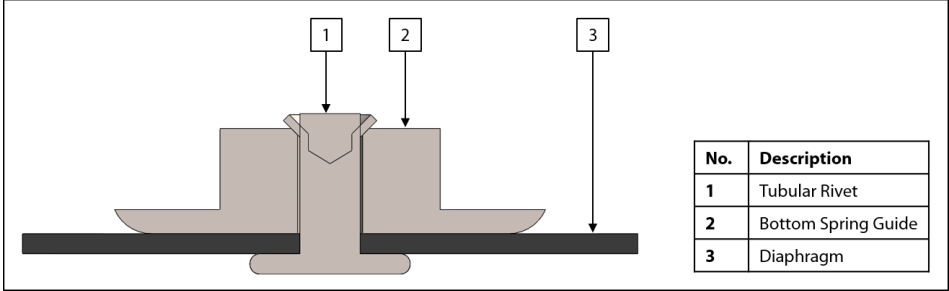
Maintenance should not be performed on the IR-7 until the IR-7 has been isolated from all pressure.

Figure 3: Maintenance Diagram



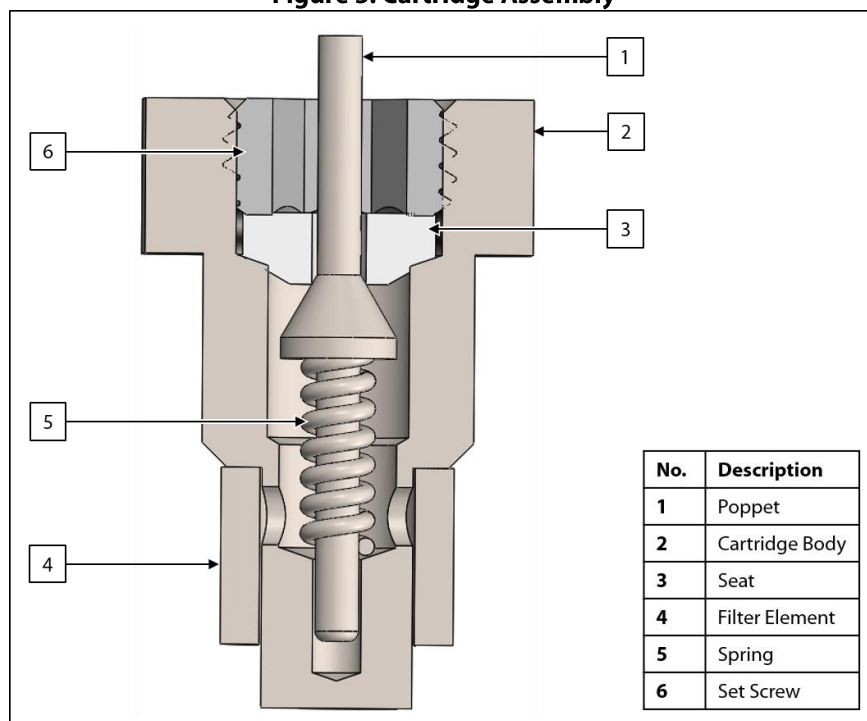
- 1. Turn OFF the product supply to the primary inlet of the IR-7 (Figure 1).
- 2. Disconnect the product supply from the primary inlet port of the IR-7 (Figure 1).
- 3. Disconnect the customer-supplied tubing or other fittings from the primary outlet port of the IR-7 (Figure 1).
- 4. Loosen the jam nut on the adjusting screw (Figure 2 and Figure 3).
- 5. Loosen the adjusting screw to relieve tension on the spring (Figure 2 and Figure 3).
- 6. Unscrew the spring housing from the regulator body (Figure 3).
- 7. Remove the spring guide and spring (Figure 3).

Figure 4: Diaphragm Assembly



- 8. Remove the diaphragm assembly (Figure 1, Figure 3, and Figure 4).
- 9. Inspect the diaphragm for wear (Figure 4). If the diaphragm shows signs of wear, the diaphragm assembly must be replaced.

Figure 5: Cartridge Assembly



10. Remove the cartridge assembly from the regulator body (*Figure 1, Figure 3, and Figure 5*).
11. If the diaphragm leaks or restricted flow is observed during operation, the cartridge assembly must be replaced (*Figure 1, Figure 3, Figure 4, and Figure 5*).
12. Replace the O-ring in the regulator body (*Figure 3*).
13. Install the cartridge assembly to the regulator body (*Figure 1 and Figure 3*).
14. Place the diaphragm assembly on top of the regulator body with the bottom spring guide facing up (*Figure 3 and Figure 4*).
15. Place the spring on the diaphragm assembly (*Figure 3 and Figure 4*). Ensure that the spring is sitting on the bottom spring guide.
16. Return the spring guide to the top of the spring (*Figure 3*).
17. Reinstall the spring housing to the regulator body (*Figure 3*).



When reassembling the upper housing, HAND-TIGHTEN ONLY.

18. The IR-7 is now ready for installation. See *Section 2.2, Installation* for instructions on installing the IR-7.

3.3 Troubleshooting Guidelines

Table 2: IR-7 Troubleshooting Guidelines

Issues	Possible Causes	Solutions
Regulator pressure is increasing uncontrollably.	The regulator cartridge may be leaking.	Examine the cartridge for leaks. Replace as necessary. Ensure there is adequate filtration upstream of the regulator. See <i>Section 3.2, Maintenance</i> , for instructions on replacing the cartridge.
The regulator flow rate is decreasing.	The regulator cartridge may be clogged.	Examine the cartridge for debris. Clean or replace as necessary. Ensure there is adequate filtration upstream of the regulator. See <i>Section 3.2, Maintenance</i> , for instructions on replacing the cartridge.
Regulator pressure on the outlet is high.	Inlet pressure may be connected to the outlet connection.	Ensure the inlet pressure is connected to a port labeled PRI Inlet or SEC INLET (<i>Figure 1</i>).
Regulator pressure increases before regulation is started.	Internal components are misaligned within the regulator.	Remove the spring housing and reassemble the internal components (<i>Figure 1</i> , <i>Figure 2</i> , and <i>Figure 3</i>). See <i>Section 3.2, Maintenance</i> , for instructions assembling the IR-7.
The regulator output pressure range is inadequate.	The spring within the spring housing is not sized correctly.	Replace the spring with an appropriately sized model. See <i>Section 3.2, Maintenance</i> , for instructions on replacing the spring.
The regulator is not achieving positive shutoff.	There may be debris or scratches on the poppet. There may be debris or scratches on the seat.	Examine the poppet for debris or scratches. Replace as necessary. See <i>Section 3.2, Maintenance</i> , for instructions on replacing the poppet. Examine the seat for debris or scratches. Replace as necessary. See <i>Section 3.2, Maintenance</i> , for instructions on replacing the seat.

APPENDIX A: REFERENCED OR ATTACHED DOCUMENTS

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

- IOM-033: Welker® RV-1, RV-2, RV-2CP, and RV-3 Relief Valve

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: AD884CO

NOTES



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