Installation, Operation, and Maintenance Manual

Welker® Heated Instrument Regulator

Model

HR-1T

Drawing No.: AD822BX
Manual No.: IOM-151

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 above. Correct operating and/or installation techniques, however, are the responsibility of the end user. Welker® reserves the right to make changes to this and all products in order to improve performance and reliability.

This manual is intended to be used as a basic installation and operation guide for the Welker® Heated Instrument Regulator, *HR-1T*. For comprehensive instructions, please refer to the IOM Manuals for each individual component. A list of relevant component IOM Manuals is given in the Appendix section of this manual.

13839 West Bellfort
Sugar Land, TX 77498-1671
(281) 491-2331 - Office
(800) 776-7267 - USA Only
(281) 491-8344 - Fax
http://www.welkereng.com

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Section 1:

SPECIFICATIONS

1.1 INTRODUCTION

We appreciate your business and your choice of Welker® products. The installation, operation, and maintenance liability for this product becomes that of the purchaser at the time of receipt. Reading the applicable *Installation, Operation, and Maintenance (IOM) Manual* 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 1-800-776-7267 (USA) or 1-281-491-2331.

Notes, Cautions, and Warnings

Notes emphasize information or set it off from the surrounding text.

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

Warnings are alerts to a specific procedure or practice that, if not followed correctly, could cause personal injury.

*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 DESCRIPTION OF PRODUCT

The Welker® Heated Instrument Regulator is designed to provide a conditioned sample stream to instrumentation at proper temperature and pressure.

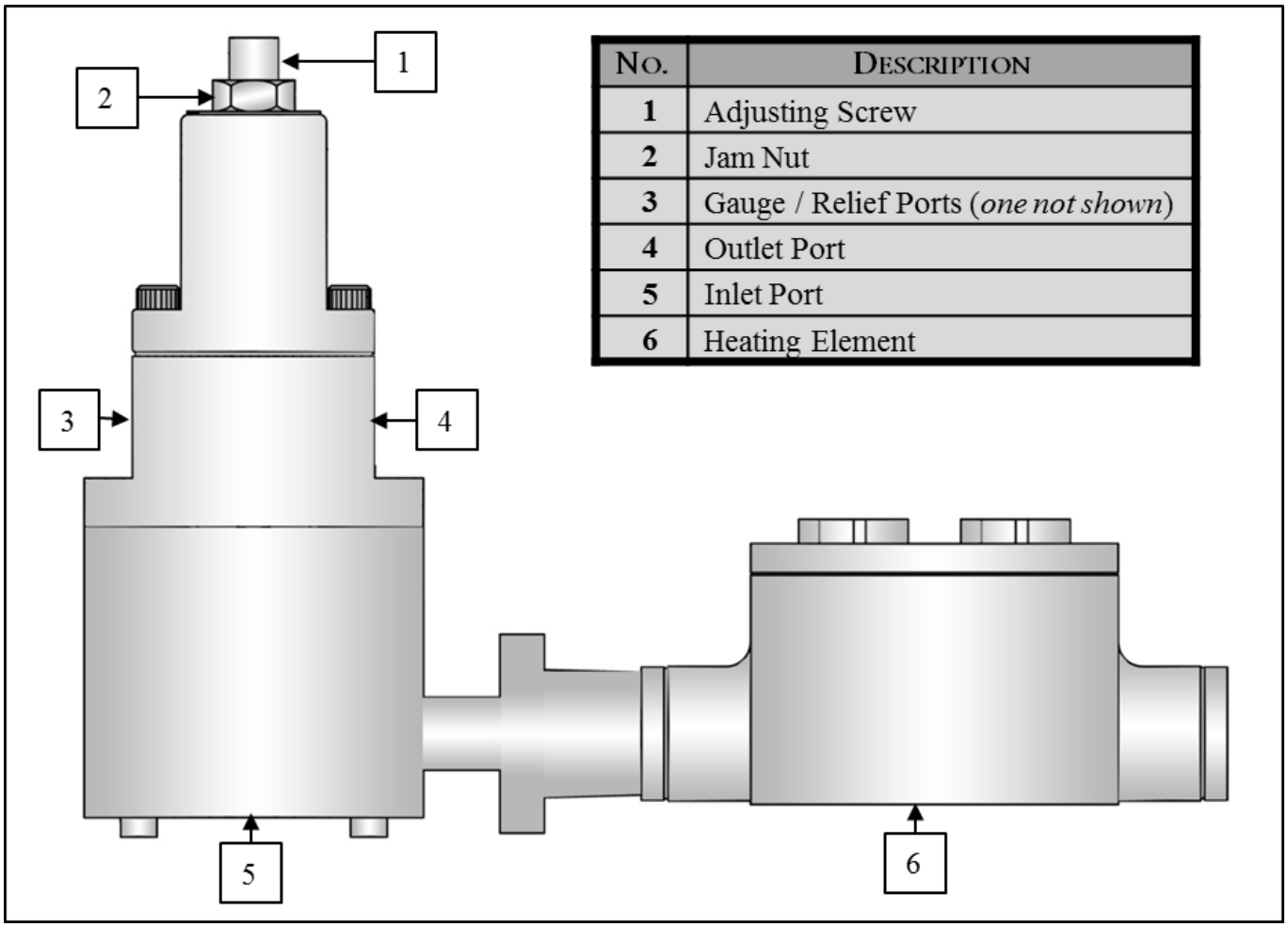
The heated regulator heats product prior to decreasing the pressure to help compensate for the natural temperature drop that occurs during regulation, which is known as the Joule-Thomson effect.

1.3 SPECIFICATIONS

Table 1: HR Specifications	
Compatible Products	Natural Gas and Natural Gas Liquids
Application	Liquid: Vaporization of sample stream Gas: Reduce retention time, regulate heat
Materials of Construction	316 Stainless Steel, Viton®, PTFE
Connections	1/4" Product Inlet and Outlet 1/4" Gauge Port 1/2" Relief Valve Port
Maximum Allowable Operating Pressure	5000 psi @ -20 to 120°F (344.7 bar @ -28.9 to 48.9°C)
Electrical Connections	Voltage: 120 VAC
Explosion-proof Box Hazardous Area Certification	Class 1 Group B, C, D Class II Group E, F, G Class III

1.4 SYSTEM DIAGRAM

Figure 1: System Diagram



No.	Description
1	Adjusting Screw
2	Jam Nut
3	Gauge / Relief Ports (*one not shown*)
4	Outlet Port
5	Inlet Port
6	Heating Element

Refer to Figure 1 and Drawing AD822BX throughout this manual.

Section 2:

INSTALLATION & OPERATIONS

2.1 BEFORE YOU BEGIN

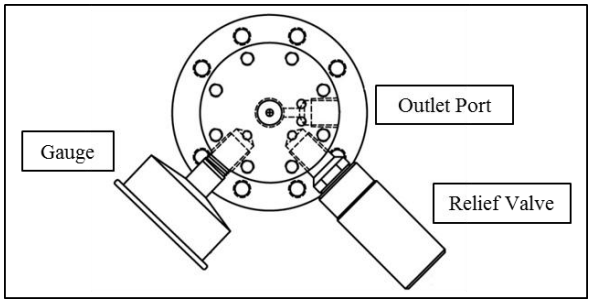
After unpacking the unit, check the equipment for compliance and for any damage that may have occurred during shipment. **Claims for damage caused during shipping must be initiated by the receiver and directed to the shipping carrier.** Welker® is not responsible for any damage caused by mishandling by the shipping company.

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

2.2 INSTALLATION & OPERATIONS

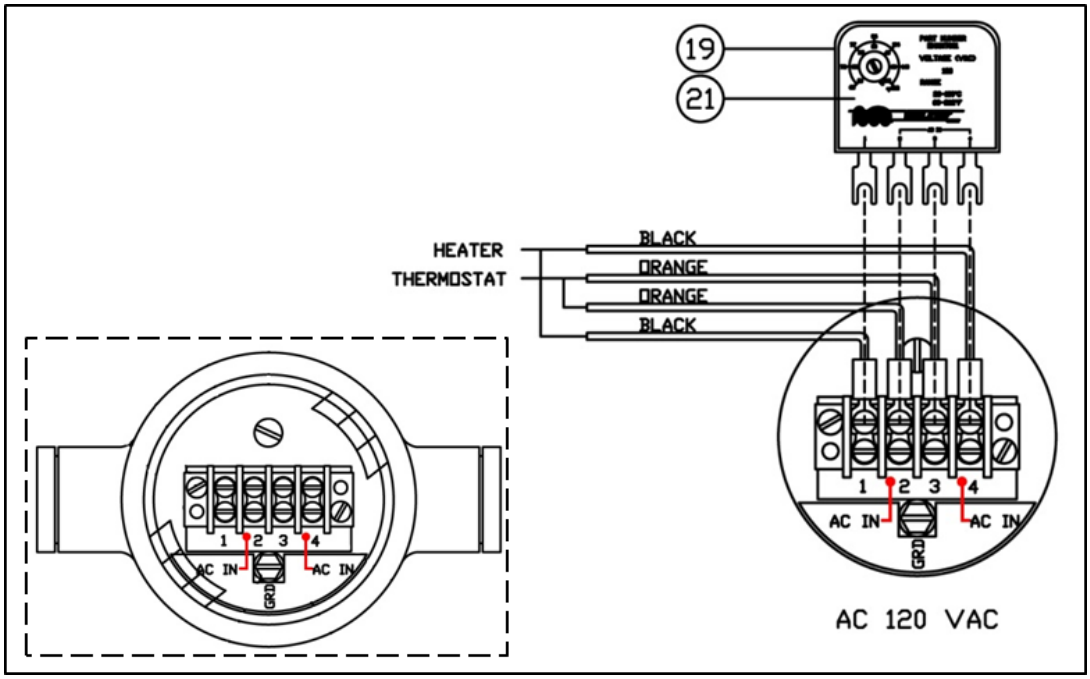
1. Install a relief valve and gauge in the appropriate ports (*Figure 2*). Welker® will pre-install relief valves and gauges if requested at time of order.

Figure 2: Port Diagram



2. With the customer-supplied electric power turned OFF, connect the leads to the explosion-proof box with heater (*Figure 3*).

Figure 3: Electrical Diagrams



3. Turn the adjustment knob on the thermostat to the desired temperature.
4. Secure the cover of the explosion proof box and cable gland.
5. Connect tubing from the instrument supply to the inlet port of the HR.
6. Connect tubing from the outlet port of the HR to the instrument to be regulated.

Welker® recommends this tubing be insulated and heat-traced.

7. Turn on the instrument supply to pressurize the HR inlet.
8. Loosen the jam nut on the adjusting screw.
9. Turn the adjusting screw clockwise to adjust the outlet pressure.
10. Tighten the jam nut when the desired outlet pressure has been set.
11. Refer to the *Installation, Operation, and Maintenance Manual* for the appropriate relief valve to set the relief valve.
12. Check the system for leaks. Repair as necessary.
13. Turn the electrical power ON to begin operation of the HR. Allow at least 30 minutes for the HR to warm to the desired temperature.

Section 3:

MAINTENANCE

3.1 BEFORE YOU BEGIN

1. **Welker® recommends that the unit have biannual 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 are not lubricated. They should be lightly coated with lubrication grease before installation. Welker® recommends Dow Corning 111 [DC 111] or an equivalent lubricant for use with this unit.

3. All maintenance and cleaning of the unit should be done on a smooth, clean surface.

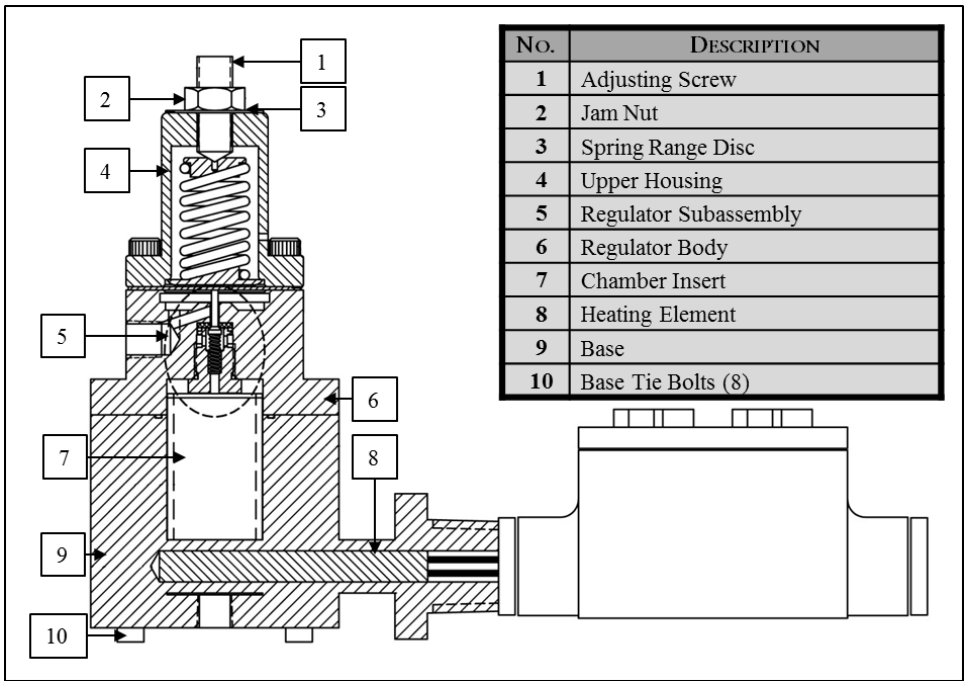
3.2 MAINTENANCE

1. Turn off the instrument supply to depressurize the HR.
2. Turn the electrical power OFF.

The heated regulator will be HOT after use. Allow approximately 30 minutes for the regulator to cool down prior to performing maintenance.

3. To perform maintenance on the relief valve, unscrew the relief valve from the relief valve port and refer to the *Installation, Operation, and Maintenance Manual* for the relief valve.
4. Loosen the jam nut and back off the adjusting screw.
5. Disconnect the tubing from the inlet port.
6. Disconnect the tubing from the outlet port.

Figure 4: Maintenance Overview Diagram



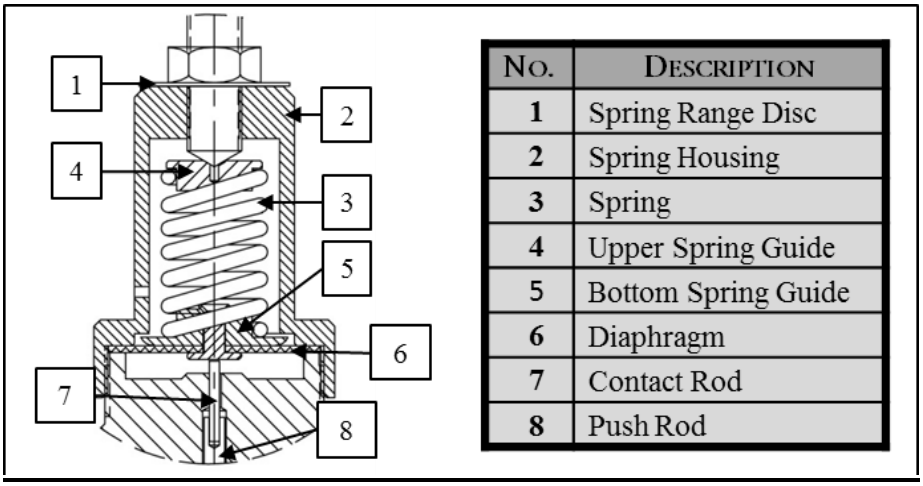
No.	Description
1	Adjusting Screw
2	Jam Nut
3	Spring Range Disc
4	Upper Housing
5	Regulator Subassembly
6	Regulator Body
7	Chamber Insert
8	Heating Element
9	Base
10	Base Tie Bolts (8)

Upper housing maintenance (*Figure 5*):

When reassembling the upper housing, HAND-TIGHTEN ONLY.

7. Remove the upper housing from the regulator body.
8. Remove the diaphragm, bottom spring guide, spring, and upper spring guide.
9. Ensure that the spring is in good condition.
10. Place the spring back onto the upper spring guide.
11. Place the spring and upper spring guide back into the spring housing.
12. Fit the bottom spring guide into the base of the spring.
13. Reinstall the diaphragm. The metal pad should face down toward the opening, and should face the regulator body when reinstalled.
14. Reinstall the spring housing to the regulator body. The unit is now ready for installation and operation.

Figure 5: Upper Housing Maintenance Diagram

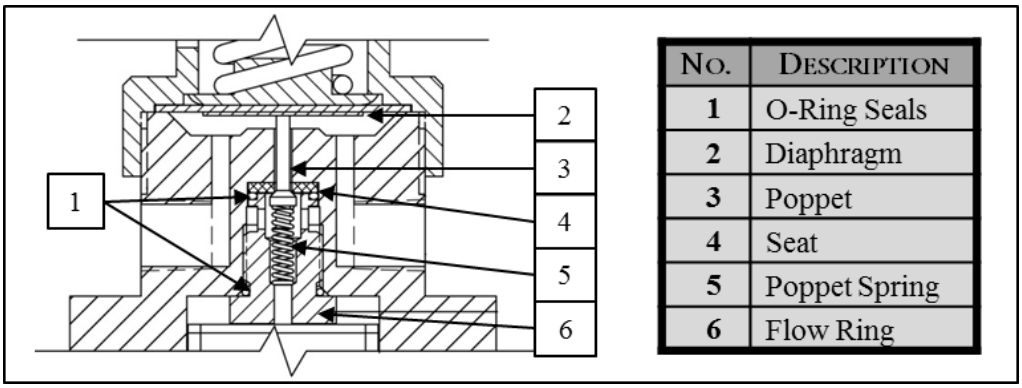


No.	Description
1	Spring Range Disc
2	Spring Housing
3	Spring
4	Upper Spring Guide
5	Bottom Spring Guide
6	Diaphragm
7	Contact Rod
8	Push Rod

Regulator body maintenance (*Figure 6*):

15. Use a crescent wrench to loosen the flow ring.
16. Remove the flow ring, poppet spring, and poppet.
17. Ensure that the spring and poppet are in good condition. Replace as necessary.
18. Place the spring and poppet back into the flow ring, and set the flow ring aside.
19. Carefully pick the seal and seat out of the regulator body.
20. Ensure that the seat is in good condition. Replace as necessary.
21. Place the seat back into the regulator body.
22. Replace the seal.
23. Align the poppet with the seat and insert the poppet, poppet spring, and flow ring back into the regulator body.
24. Tighten the flow ring to the regulator body.
25. Screw or bolt the upper housing back onto the regulator body.

Figure 6: Regulator Subassembly Maintenance Diagram

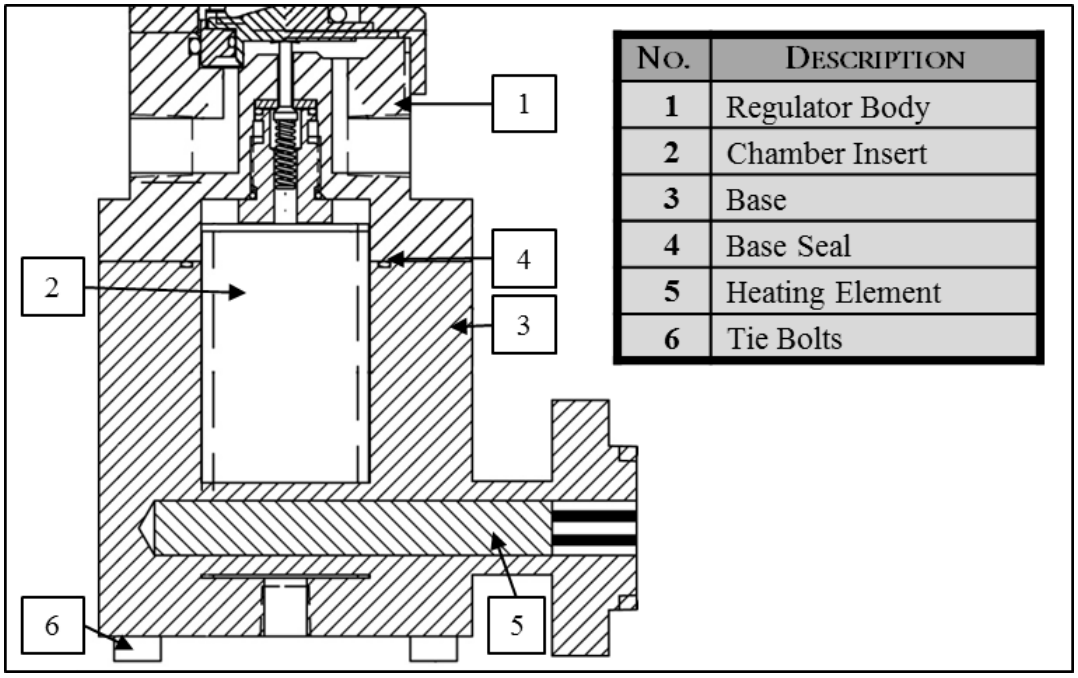


No.	Description
1	O-Ring Seals
2	Diaphragm
3	Poppet
4	Seat
5	Poppet Spring
6	Flow Ring

Base maintenance (*Figure 7*)

26. Remove the eight tie bolts from the bottom of the base.
27. Remove the regulator body from the base.
28. Replace the seal in the top of the base.
29. Remove and inspect the chamber insert. Ensure that the chamber insert is in good condition.
30. Place the chamber insert back into the base.
31. Bolt the regulator body back onto the base. Insert the tie bolts up through the base from the bottom. The unit is now ready for installation and operation.

Figure 7: Base Maintenance Diagram



No.	Description
1	Regulator Body
2	Chamber Insert
3	Base
4	Base Seal
5	Heating Element
6	Tie Bolts

APPENDIX

ATTACHED DOCUMENTS:

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

- IOM-033: RV-1 Relief Valve

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

- None

Welker® drawings and schematics suggested for use with this unit:

- Assembly Drawing: AD822BX

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