Installation, Operation, and Maintenance Manual

Welker® Manual Insertion Probe Instrument Regulator

Model

IRM-4SS

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.

13839 West Bellfort
Sugar Land, Texas 77498-1671
U.S.A.
Tel.: (800) 776-7267
Tel.: (281) 491-2331
Fax: (281) 491-8344
www.welkereng.com

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1. GENERAL

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 in the USA or 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.

Notes, Warnings, and Cautions

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

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

WARNING **Warnings alert users to a specific procedure or practice that, if not followed correctly, could cause personal injury.**

1.2 Description of Product

The Welker Probe Instrument Regulator is designed to serve as a probe and a regulator combination while minimizing the Joule-Thomson effect by design. Supply enters through the tip of the probe and is regulated to a reduced pressure and immediately passes through thermal exchange fins before exiting the flowing stream in the pipeline. The body houses the output adjustment and spring along with output port, gauge port, and safety relief port.

This probe can be manually inserted and or retracted without interfering or venting pressure within 500 PSIG.

SPECIFICATIONS

1.3 Specifications

NOTE

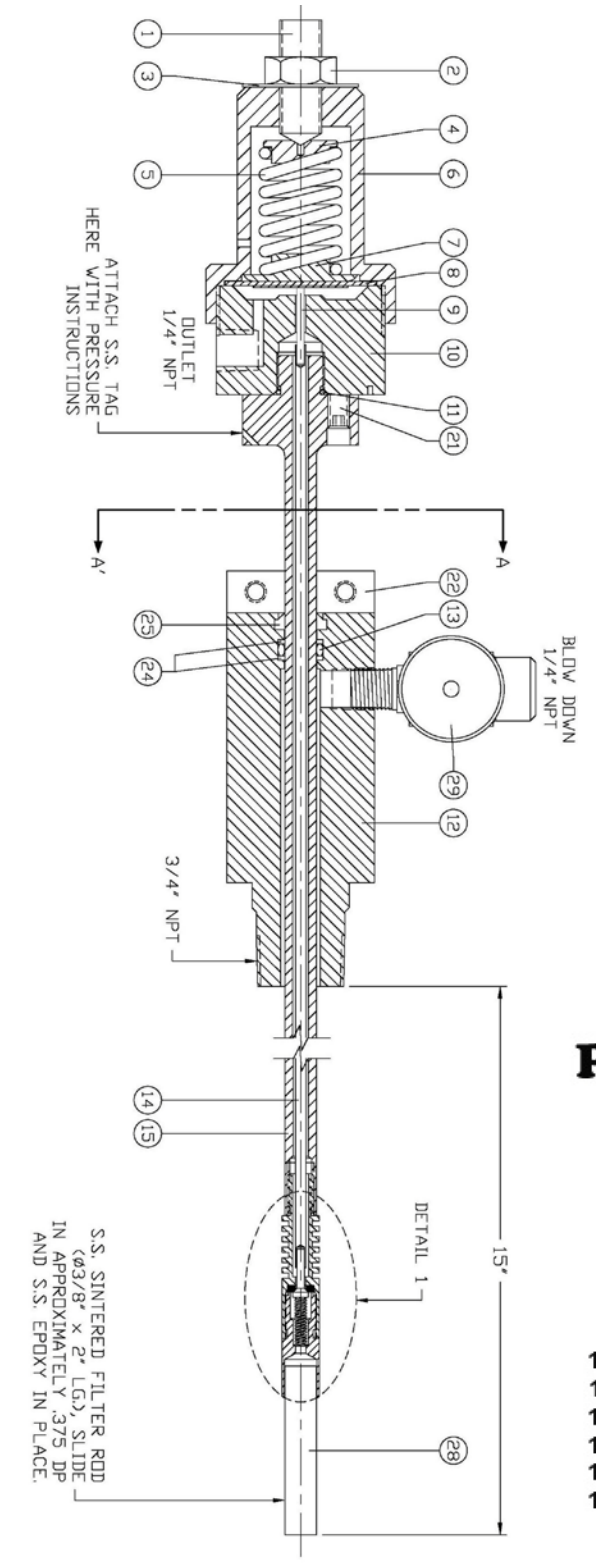
The specifications listed in this Section are generalized for this equipment. Welker can modify the equipment according to your company's needs. However, please note that **the specifications may vary depending on the customization of your product.**

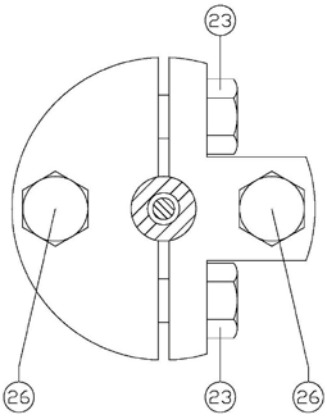
Table 1

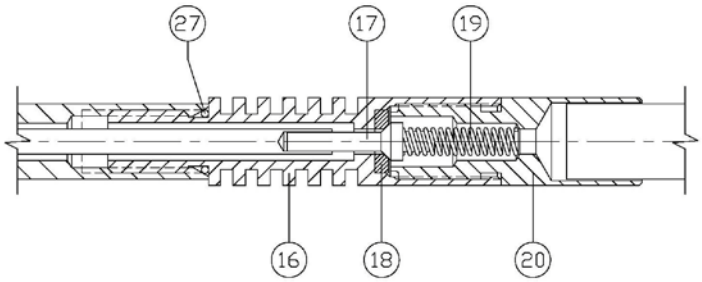
Specifications	
Products	Natural gas or other gases or liquids compatible with the materials of construction
Materials of Construction	316 Stainless Steel, Viton® , PTFE (others available)
Insertion Length	18" (457mm) Standard {others available in 1" (25.4mm) increments}
Viscosity Range	0.009cp to 2,000cp @68° F (20° C
Sample Outlet Connection	$^{1}/_{4}$" NPT
Pipeline Connection	$^{3}/_{4}$" or 1" NPT
Products	Natural gas or other gases or liquids compatible with the materials of construction
Maximum Allowable Operating Pressure*	2,160 PSIG @ -20° F to 100° F (148 bar @ -29° C to 37° C)
Insertion Pressure*	Manual insertion and retraction up to **500 PSIG ONLY.** Operating pressure can then be increased to 2,160 PSIG MAX.
Output Range*	0-100 psi @ -20° F to 100 ° F (0-6 bar @ -29° C to 37° C)

* Maximum allowable pressures and output ranges may be lower depending on specifications of the pipeline connection device.

SPECIFICATIONS







Welker® Manual Insertion Probe Instrument Regulator

1 Adjusting Screw
2 Jam Nut
3 Spring Range Disk
4 Spring Guide
5 Spring
6 Spring Housing
7 Bottom Spring Guide
8 Diaphragm Assembly
9 Contact Rod
10 Body
11 O-Ring
12 Lubricator Body
13 O-Ring
14 Push Rod
15 Outer Shaft Extension
16 Thermal Exchange Fins
17 Poppet
18 Seat
19 Spring
20 Seat Retainer
21 Hex Sock Set Screw
22 Lock Down Collar
23 Hex Sock Cap Screw
24 Back Up
25 Wiper
26 Hex Head Machine Screw
27 O-Ring
28 Filter
29 Valve M/F

2. INSTALLATION INSTRUCTIONS

2.1 General

After unpacking the unit, check it for compliance and for any damages that may have occurred during shipment.

N NOTE

Claims for damages caused during shipping must be initiated by the receiver and directed to the shipping carrier. Welker is not responsible for any damages caused from mishandling by the shipping company.

N NOTE

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

2.2 Important Information

- The most common cause for repairs to an adjustable probe occurs when the pipeline isolation valve closes on the probe while the probe is still inserted into the pipeline. Avoid this practice.
- Operate the unit slowly and smoothly when inserting and retracting the unit to avoid unnecessary slamming.
- Avoid rough handling of the probe and unnecessary bending of the probe shaft. The shaft has a polished surface that travels through a seal.
- The entire instrument should be treated with care.

2.3 Installation Instructions

N NOTE

The preferred location for installation into the pipeline is in a straight Section of inlet piping before the flowing stream is subjected to turns and impingements that can produce aerosols. Aerosols can contaminate the sample being taken.

1. Determine the amount of insertion travel desired by measuring from the top of the pipeline isolation valve to the middle one-third of the pipeline (See Figure 1).
2. With the probe on a flat surface, slide the probe shaft through the pipeline connection until the desired insertion length is obtained.

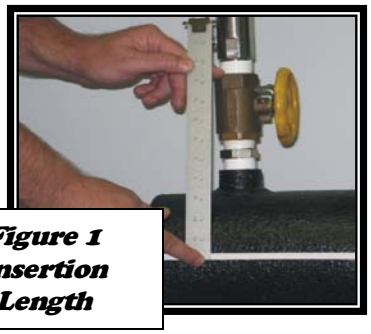


Figure 1 Insertion Length

2.3 Installation Instructions (Continued)

3. With a wrench, tighten the lock collar to the insertion shaft firmly.
4. Completely retract the probe shaft.
5. Install the probe assembly to the pipeline isolation valve.
6. Close the appropriate pipeline valves in order to depressurize the pipeline to 500 PSI or lower for probe installation.
7. Open the pipeline isolation valve.
8. Insert the probe by pushing directly down on the probe valve using both hands for stability.
9. Use tubing to connect from the outlet port on the regulator to the inlet of the instrument.
10. Install the lock down bolts (Part 26).
11. Check for leaks.
12. Connect a gauge to the gauge port in the regulator.
13. If necessary, follow steps in number 14 of this Section, using a safe auxiliary gas supply to set the relief valve to the proper pressure. If relief is preset, skip to number 15 of this Section.

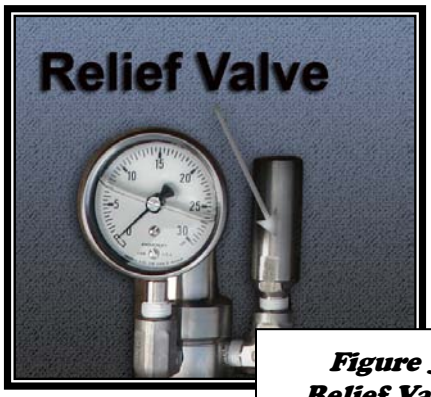


Figure 3
Relief Valve

14. *Set the Relief Valve (RV-1) (Figure 3*):

N NOTE

If requested, Welker can preset Welker relief valves prior to shipment.

- Use a hex wrench to adjust the spring tension in the relief valve for positive shut-off.
- Adjust the relief to the desired set point.

N NOTE

Some models will vent to atmosphere, while others can be piped to another system if required.

- The relief valve is now in operation.

15. Connect the set relief valve to the relief valve port in the regulator.

2.3 Installation Instructions (Continued)

16. Make sure the pipeline is providing pressure to the regulator. The gauge should read pipeline pressure.

17. Set the Instrument Regulator to desired pressure setting:

- Turn the inlet supply to pressurize the regulator inlet.
- Loosen or tighten the adjusting screw until the gauge reads the desired pressure for outlet (See Figure 2).
- Tighten the jam nut (Part 2) on the adjusting screw (Part 1) to secure it into place.
- The regulator is now in operation.

18. The probe is now in service. Pipeline can now be restored to full operating pressure.

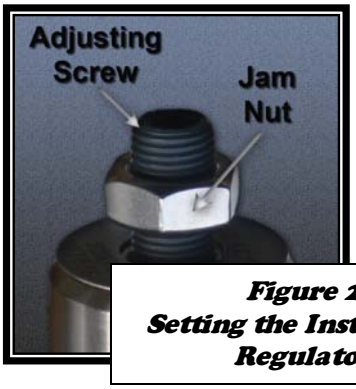


Figure 2
Setting the Instrument Regulator

2.4 Retracting the Probe

1. Loosen the jam nut (Part 2), and turn the adjusting screw counterclockwise until there is no output from the regulator.

2. Depressurize the pipeline to 500 PSI or lower, and disconnect any tubing from the probe assembly.

3. Firmly grasp the probe valve.

4. Push down on the valve while loosening the lock down bolts (Part 26).

5. Slowly let the probe retract.

CAUTION

Make sure that the probe is completely retracted before proceeding.

6. Close the pipeline isolation valve.

NOTE

If the probe is being withdrawn from the pipeline to run a pig, stop at step 6 of this Section.

7. Remove the probe assembly from the pipeline isolation valve.

8. The probe assembly is now ready for maintenance or to be moved to another location.

3. MAINTENANCE

3.1 General

Prior to maintenance or disassembly of the unit, it is advisable to have a repair kit handy for the system in case of unexpected wear or faulty seals. All maintenance and cleaning of the unit should be done on a smooth, clean surface.

NOTE

We recommend that the unit have annual maintenance under normal operating conditions. In the case of severe service, dirty conditions, excessive cycling usage, or other unique applications that may subject the equipment to unpredictable circumstances, a more frequent maintenance schedule may be appropriate.

NOTE

New seals supplied in spare Parts kits are not lubricated. They should be lightly coated with lubrication grease (Dow Corning 111 [DC 111] or equivalent lubricant) before they are installed into the equipment. This helps with the installation of the seals while reducing the risk of damage when positioning them on the parts.

CAUTION

Maintenance on the instrument regulator should not be performed until the regulator has been isolated from all pressure.

Recommended Tools

It would be advisable to have the following tools available for maintenance of the unit; however, tools used will vary depending on probe model.

- Small hex key set
- 6" adjustable wrench
- 10" adjustable wrench
- 10" channel lock pliers
- Fine grit sandpaper
- Flat blade screwdriver

MAINTENANCE

3.2 Instrument Regulator Maintenance (*See Figure 3*)

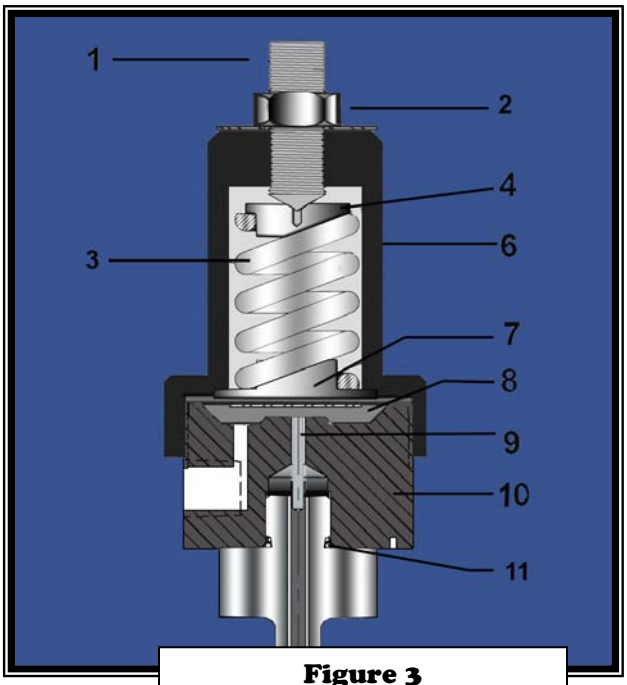


Figure 3
Instrument Regulator

1. Follow instructions in Section 2.2 to retract the probe and remove the instrument from the pipeline.
2. Disconnect the instrument from the regulator outlet port
3. Loosen the adjusting nut (Part 2) on the adjusting screw (Part 1).
4. Loosen the adjusting screw to relieve tension on the spring (Part 3).
5. **Disassemble Diaphragm Assembly:**
   a) Unscrew the spring housing (Part 6) and remove.
   b) Remove the top spring guide (Part 4) and the spring (Part 3).
   c) Remove the bottom spring guide (Part 7).
   d) Remove the diaphragm assembly (Part 8). Inspect for wear, and replace if necessary.
   e) Set the diaphragm back into place.
   f) Set the bottom spring guide back into place on top of the diaphragm.
6. Set the spring (Part 3) back into place.
7. Set the top spring guide (Part 4) back into place on top of the spring.
8. Reattach the spring housing (Part 6) securely. Hand-tighten the housing.
9. Proceed to Section 3.3 for relief valve maintenance.

MAINTENANCE

3.3 Relief Valve (RV-1) Maintenance
(*See Figure 4*)

Figure 4
Relief Valve (RV-1D)

1. Isolate and depressurize the relief valve from the supply source.
2. Remove the relief valve from the supply.
3. Remove the spring adjuster, spring and ball.
4. If the spring is in good condition, it can be reused.
5. Check the ball for nicks and scratches and replace if necessary.
6. Unscrew the base from the spring housing and replace the seal (See Figure 5).

Figure 5
Seal

7. Screw the base and spring housing back together.
8. Drop the ball and spring into the spring housing.

N NOTE

The ball must rest on the seal. If the ball rests on the metal trim, then the relief will not seat.

9. Replace the spring adjuster.
10. The relief valve is ready to reinstall and reset.
11. Proceed to Section 3.4 for probe maintenance instructions

MAINTENANCE

3.4 Probe Maintenance Instructions

(*See Figure 5*)

1. Use a pair of channel lock pliers as a backup to hold the thermal fins (Part 16) while using another pair to remove the seat retainer (Part 20).

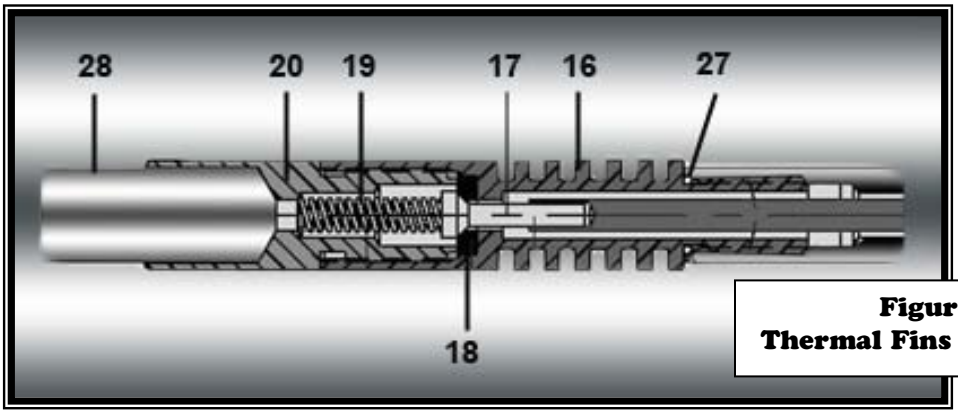


Figure 5
Thermal Fins & Retainer

2. Remove the poppet spring (Part 19) and the poppet (Part 17).
3. Use a pointed instrument to carefully pick the seat (Part 18) out of the body of the thermal fin.
4. Examine the poppet and the seat (Part 18) for scratches. If scratches are present, the part will need to be replaced.

CAUTION

Debris or scratches on either the poppet or the seat will prevent positive shut-off of the regulator.

5. Use solvent to clean the filter (Part 28) in the retainer.
6. Guide the poppet into the seat.
7. Replace the spring and seat retainer.
8. Tighten the seat retainer firmly.
9. Replace the O-ring (Part 27) on the shaft.
10. If there is a shaft extension, remove the extension from the thermal fins.
11. Reattach the thermal fins to the shaft. Tighten firmly.

CAUTION

When reattaching the base to the body, make sure that the contact rod and push rod are carefully installed and lined up correctly. The push rod should fit easily over the poppet and should not stack on top of it. If the rod is stacked on top of the poppet, the device will not be able to be reassembled properly.

13839 West Bellfort, Sugar Land, Texas 77498-1671
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