WELKER

# INSTALLATION, OPERATION, AND MAINTENANCE MANUAL FOR WELKER® GAS SAMPLER PUMP

**PART or MODEL**
GSS-1

**DRAWING NUMBER**
AD104BO

**MANUAL NUMBER**
IOM-019

**REVISION**
Rev. D, 08/23/2024

# TABLE OF CONTENTS

# SAFETY

## 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 of operation guide for the Welker® Gas Sampler Pump, Model GSS-1 For further information and instructions, please refer to the* Installation, Operation, and Maintenance *(IOM)* Manuals *for each individual component. A list of relevant component* IOM Manuals *is provided in the* Appendix *to 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 inspectors' 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 Gas Sampler Pump 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 Gas Sampler Pump, 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 might have additional requirements and specifications that are not listed in this manual.*

## 1.2 Product Description

The Welker® *GSS-1* Gas Sampler Pump is a self-purging, true positive displacement pump. With its Vanishing Chamber™ collection head, the GSS-1 is designed to extract—aided by a sampler probe—a representative sample of the flowing product from the center one-third of the pipeline and pump it into a sample cylinder. This manual is written with the assumption that the GSS-1 is part of a complete system. Typically, such a system is used in flare gas sampling applications (see *Figure 1* for an example of such a system). However, it can be used for other gas sampling applications.

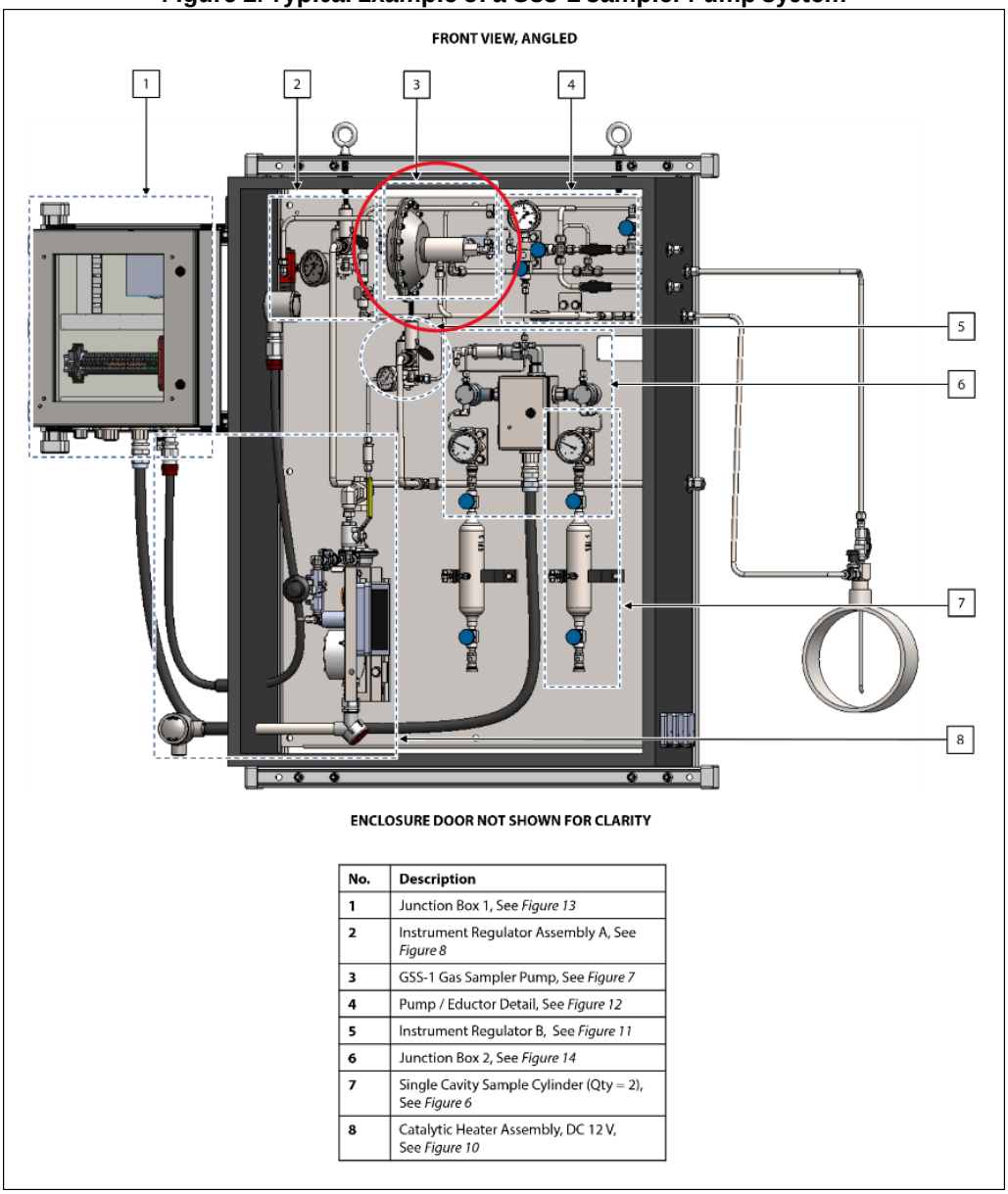
The GSS-1 is designed to be installed close to and above the sample point, thereby eliminating long tubing runs and sample lag time, which can interfere with the ability to ensure truly representative sample grabs. Minimizing the distance between the product source and the collection head, GSS-1 placement, combined with design, ensures quality sample grabs. With every actuation, pressure is applied to the GSS-1's standard Vanishing Chamber™ collection cup, collapsing the cup completely and fully displacing the trapped sample into the sample cylinder.

The customer-supplied solenoid can be connected to a Programmable Logic Controller (PLC) or other signal control system to operate the GSS-1 (*Figure 1* shows a good example of such a setup).

For this manual, the term "PLC," or "Programmable Logic Controller," will be used to refer to the PLC, DCS, or other signal control system used by the customer to activate and operate the solenoid.

The GSS-1's diaphragm motor is intended to be actuated by process gas. However, in locations where the process gas is toxic or corrosive—not clean and dry—the GSS-1 can be configured for actuation by an auxiliary instrument air supply. In that case, instead of actuating the pump, the excess process gas is hot-looped back to the pipeline.

**Figure 1: Typical Example of a GSS-1 Sampler Pump System**




| No. | Description |
|---|---|
| 1 | Junction Box 1, See *Figure 13* |
| 2 | Instrument Regulator Assembly A, See *Figure 8* |
| 3 | GSS-1 Gas Sampler Pump, See *Figure 7* |
| 4 | Pump / Eductor Detail, See *Figure 12* |
| 5 | Instrument Regulator B, See *Figure 11* |
| 6 | Junction Box 2, See *Figure 14* |
| 7 | Single Cavity Sample Cylinder (Qty = 2), See *Figure 6* |
| 8 | Catalytic Heater Assembly, DC 12 V, See *Figure 10* |

The GSS-1 Sampler Pump does not require an external inert gas supply for actuation when installed as in *Figure 1*. The system depicted in *Figure 1* can use pipeline gas for actuation pressure or, optionally, it can use an external inert gas supply.

*Welker® might custom design the GSS-1 Gas Sampler Pump to suit the particular application and specifications of each customer.*

### 1.3 Specifications

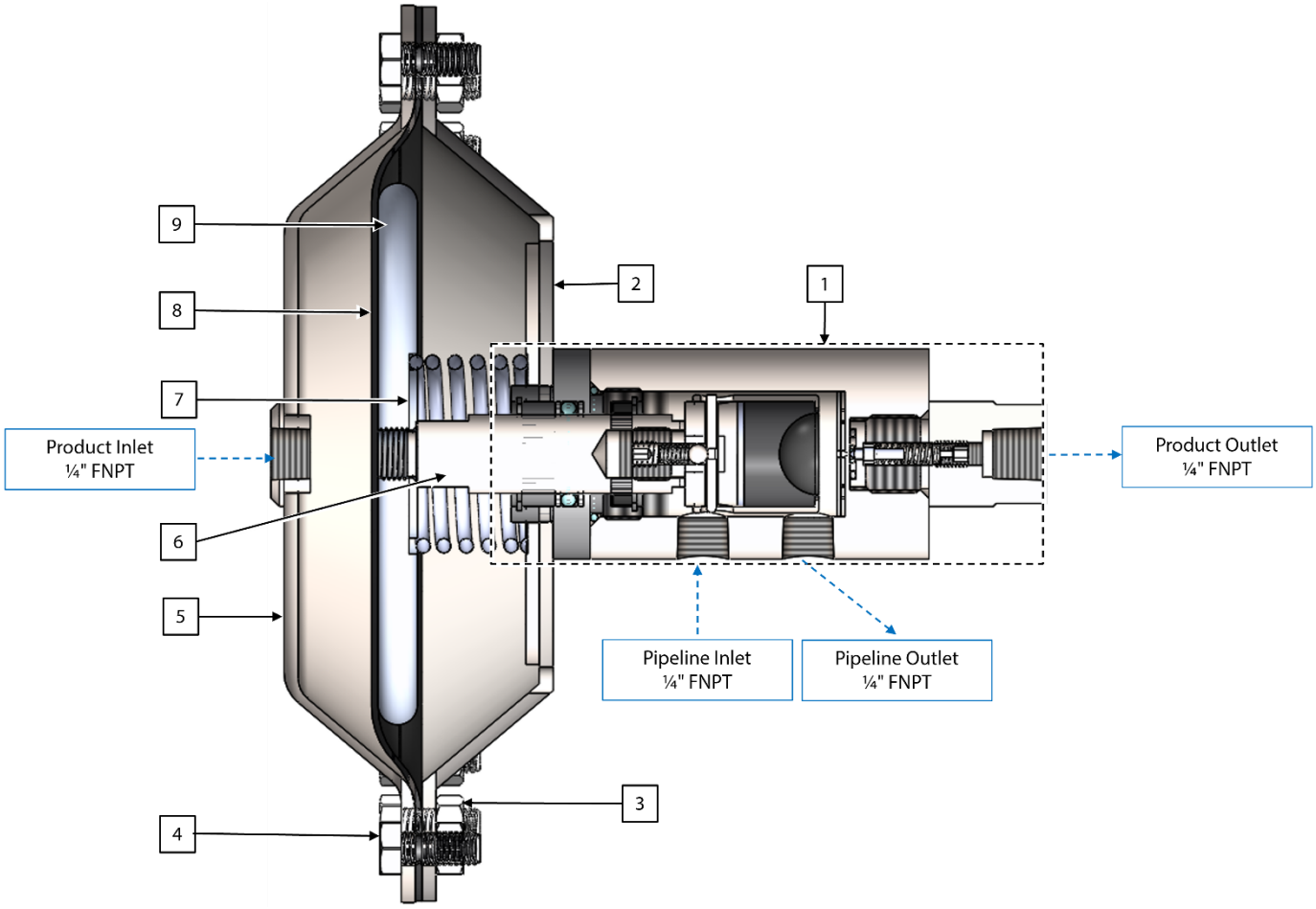
The specifications listed in this section are generalized for this equipment. Welker® can modify the equipment according to your company's needs. **Please note that the specifications may vary depending on the customization of your equipment.**

**Table 1: Welker® GSS-1 Sampler Pump Specifications**

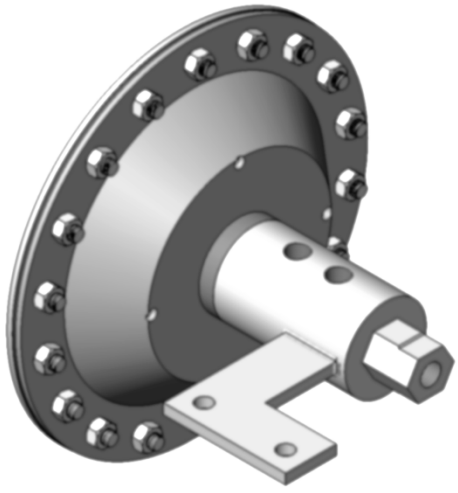
| | |
|---|---|
| **Product Sampled** | Natural Gas or Other Gases Compatible With the Materials of Construction |
| **Materials of Construction** | 316/316L Stainless Steel |
| **Maximum Allowable Operating Pressure** | 2,160 psig @ -20 °F to 250 °F (*148.92 barg @ -28.88 °C to 121.11 °C*) |
| **Minimum Diaphragm Housing Pressure** | 35–65 psig (*2.41–4.48 barg*) |
| **Maximum Suggested Diaphragm Housing Pressure** | 65 psig (*4.48 barg*) |
| **Sample Outlet Connection** | ¼" FNPT (Standard) |
| **Utility Requirements** | **Pneumatic:** Pipeline Dry Natural Gas or Inert Gas Supply |
| **Poppet Spring Ranges** | 0–50 psig (*0–3.44 barg*)<br>0–400 psig (*0–27.57 barg*)<br>500–1000 psig (*34.47–68.94 barg*)<br>0–1800 psig (*0–124.10 barg*) |
| **Sample Grab Sizes** | .22 cc<br>.5 cc<br>1.0 cc<br>1.5 cc |
| **Sample Grab Rate** | Up to 30 Grabs per Minute |
| **Operation** | Diaphragm-Operated |
| **Mounting** | Bracket (Optional) |
| **Approximate Weight** | 8 lb |
| **Approximate Dimensions** | 7 3/8″ x 8½″ x 8½″ (Length x Width x Height) |
| **Features** | Can Be Used in Hazardous Areas, as Applicable |
| **Options** | Bracket<br>High-Temperature Operation (MAOT = 400 °F (*204 °C*)) |

## 1.4 Equipment Diagrams

**Figure 2: Welker® GSS-1 Gas Sampler Pump Connections Diagram**




**Welker® GSS-1 Gas Sampler Pump, With Optional Bracket**



| No. | Description |
|---|---|
| 1 | Detail A, See *Figure 3* |
| 2 | Lower Diaphragm Case |
| 3 | Hex Head Nut (Qty = 18) |

| No. | Description |
|---|---|
| 4 | Hex Head Bolt (Qty = 18) |
| 5 | Upper Diaphragm Case |
| 6 | Shaft |

| No. | Description |
|---|---|
| 7 | Return Spring |
| 8 | Diaphragm |
| 9 | Diaphragm Plate |

# SECTION 2: INSTALLATION & OPERATION

## 2.1 Before You Begin

After unpacking the Welker® GSS-1 Gas Sampler Pump, check it for compliance and any damage that might have occurred during shipment. Immediately contact a Welker® representative if you received a damaged unit.

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

Installation instructions are written assuming the GSS-1 Gas Sampler Pump will be part of a complete sampler system. If only the GSS-1 Gas Sampler Pump is purchased, a complete system should be constructed in a manner compatible with the instructions that follow.

The sample probe should be located in the least turbulent available area of the flowing pipeline product stream—NOT in a header or blow-down stack and away from obstructions, elbows, or partially closed valves. The sample probe should be installed such that it reaches into the center one-third ($^1/_3$) of the pipeline.

Typically, the Welker® GSS-1 Gas Sampler Pump is installed using a single sample probe. Its unique self-purging feature uses pipeline gas for the instrumentation supply source. This thus purges the sample line prior to each sample grab. However, if instrument air (i.e., inert gas) will be used for the instrument supply, the sampler should be installed with a pitot probe or with two (2) single probes. If two (2) single probes are used, one should be located upstream and the other should be located downstream of a moderate pressure drop such as an orifice plate or control valve. This will create a hot loop for the sampler that will allow a "real-time" sample to be taken with each new actuation.

## 2.2 Installation

1. Locate the GSS-1 as close to the sample point as practical and above the pipeline probe. Welker® recommends locating the GSS-1 within three (3) feet of the probe.
2. The sample probe valve should be a large-ported valve—that is, a fully opening ball valve, a block valve, or a similar valve.
3. After the GSS-1 is mounted and the probe is installed, connection can be completed.
4. The sample cylinder should be located as close to the GSS-1 as possible.
5. If using a single cavity sample cylinder, the inline relief of the GSS-1 should be set at approximately 100 psig above maximum line pressure (see *Section 4, Inline Relief Instructions*).
6. If using a constant pressure sample cylinder, the inline relief of the GSS-1 should be set at approximately 200 psig and the cylinder must first be pre-charged (see *Section 4, Inline Relief Instructions*).
7. Pre-charging a constant pressure cylinder with a pre-charge gas can be accomplished one of the following three ways:
    a. Connect the cylinder pre-charge valve to the pipeline.
    b. Connect the cylinder pre-charge valve to an extra port on the sampler probe.

By using pipeline pressure as the source of pre-charge pressure for the constant pressure sample cylinder, the sample will be maintained at actual pipeline pressure.

    c. Auxiliary pre-charge gas (i.e., nitrogen).

If a constant pressure sample cylinder is used, refer to the instructions sent with the cylinder for complete details on pre-charging the cylinder. For a listing of Welker Constant Pressure Cylinders and their respective *Installation, Operation, and Maintenance* (IOM) *Manuals*, see the *Appendix* to this manual.

8. Remove the cover or dome for manifold identification, where applicable.
9. Using small-diameter stainless steel tubing (¼" OD) tube from the probe to the inlet port of the manifold (labeled "inlet") or the NPT connection directly on the GSS-1 body itself. Where a hot loop or pitot probe is employed, tube to $P_2$ as previously discussed in the final note in *Section 2.1, Before You Begin*. The tubing should always slope downward from the GSS-1 to the probe and be free of sags and loops.

Nothing—such as filters, drips, or regulators—should be installed between the probe and the inlet of the GSS-1. These could have an adverse effect on the integrity of the sample. In addition, make sure that all fittings are tight and NPT connections are PTFE taped or doped.

10. Using $^1/_8$" stainless steel tubing, connect from the sample outlet port on the manifold, if applicable, or on the standard relief cap on the GSS-1 (*Figure 3*) to the sample inlet valve on the sample cylinder. If the GSS-1 is part of a system, the connection could already be in place and require perhaps only a quick-connect hook-up.
11. Close all valves on the sample cylinder.
12. If the GSS-1 will be actuated by an inert gas supply, tube the regulated inert gas supply to the port on the rear of the diaphragm pump (60 to 65 psig maximum).
13. Connect the power supply to the mode of actuation of the GSS-1.
14. If electronics are provided, reference the installation and operating instructions for the particular model supplied.
15. For GSS-1 models that are controlled from a customer-furnished remote controller, connect the remote controller output voltage signal to a solenoid valve that has been added to the GSS-1.
16. The GSS-1 is now ready to be put into operation.

## 2.3 Preparing for Operation

When pressurizing the system, always open pipeline valves SLOWLY.

All connections must be checked carefully for leaks at full line pressure. No leaks are acceptable within the sampling system.

1. All valves are still closed on the GSS-1 and the sample cylinder.
2. For constant pressure cylinders, proceed to the section titled *Constant Pressure Cylinders*. For single cavity sample cylinders, proceed to the section titled *Single Cavity Sample Cylinders*.

### Constant Pressure Cylinders

1. Slowly open the pipeline gas supply valve to the pre-charge side of the constant pressure cylinder. If using nitrogen to pre-charge, open the nitrogen bottle valve and the valve on the cylinder and allow pressure to fill the pre-charge side of the cylinder. This allows pre-charge pressure to be supplied to the cylinder and forces the piston to the product side, if it is not already there.
2. Open the product inlet valve on the constant pressure cylinder.
3. When the cylinder is pressurized to an acceptable pressure, leave the valve open to allow for gas compression as the cylinder is filled with sample. Check for leaks and repair or replace as necessary.
4. Close the product inlet valve on the constant pressure cylinder.
5. Open the pipeline isolation valve on the probe that leads from the pipeline to the GSS-1.
6. Ensure there are no leaks between the probe, GSS-1, and the constant pressure cylinder.

If the GSS-1 was purchased to be used with a constant pressure cylinder, the inline relief is factory set at 200 psig. This can be verified by the gauge on the cylinder when the valve is opened. There will be a 200 psig pressure differential between the gauge reading on the cylinder and the gauged pressure on the pipeline. If this setting is incorrect, see instructions to properly set the inline relief (*Section 4*).

7. After the product inlet valve on the constant pressure cylinder is opened, check for leaks and tighten any fittings that are leaking. In addition, repair or replace as necessary.

If the constant pressure cylinder is equipped with a product purge valve, open it to purge the tubing for approximately 3–5 seconds, then close. When possible, plug the purge valve when not in use.
If the constant pressure cylinder is not equipped with a product purge valve, Welker® recommends that a "T" and valve be used just prior to the inlet valve to provide a purge system.

8. The system is now ready to begin the sampling timing cycles with the selected control system.

**Single Cavity Sample Cylinders**

1. Remember that the GSS-1 inline relief must be set at a minimum of 100 psig above maximum line pressure (see *Section 4*). Slowly open the pipeline isolation valve on the probe leading to the GSS-1.

If the GSS-1 was purchased to be used with a single cavity sample cylinder, the relief is required to be set higher than the maximum pipeline pressure in order to eliminate pre-filling the cylinder as well as bleed by the relief.

2. Mount the standard cylinder in the vertical position.
3. Slowly open the bypass valve on the sampler manifold. Using a leak check solution, check for leaks. Tighten any fittings that are leaking. In addition, repair or replace as necessary.
4. Purge the tubing between the GSS-1 and the cylinder by cracking the tube fitting on the cylinder inlet or by using a bypass manifold. Follow company procedure for preparing the standard cylinder for use or, if using a Welker® Single Cavity Cylinder, refer to the *Installation, Operation, and Maintenance* (IOM) *Manual* for that product (listed in *Appendix A* to this manual).
5. Open the product inlet valve on the sample cylinder.
6. The system is now ready to begin the sampling timing cycles with the selected control system.

**Welker® GSS-1 Gas Sampler Pump**

1. The inert gas supply should be set to 60–65 psig.
2. To test the sample system, proceed as follows:
    a. If applicable, make sure the bypass valve is closed on the manifold assembly.
    b. Close the product inlet valve on the sample cylinder.
    c. Actuate the diaphragm pump.
    d. Observe the gauge on the GSS-1 manifold base, if applicable, or connect a gauge to the outlet of the pump.
3. Bleed the test pressure off. Open the product inlet valve on the sample cylinder.
4. The GSS-1 is ready for operation.

# 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 might lead to excess wear on the unit, a more frequent maintenance schedule might be appropriate.
2. **Maintenance should be done in as clean a work area as possible.**
3. Prior to maintenance or disassembly of the unit, it is advisable to have a repair kit available for repairs to the system in case of unexpected wear or faulty seals.


Maintenance should be performed on the GSS-1 ONLY after it has been isolated from the pipeline and all pressure has been vented.

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, because it might 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.

Disassemble and reassemble the GSS-1 with care. The GSS-1 is a precision instrument and should be handled accordingly.

2. Welker® recommends having the following tools available for maintenance. Please note that the exact tools required might vary by model.
    a. Adjustable Pliers
    b. Hex Key Set
    c. Seal Pick
    d. Snap Ring Pliers
    e. Wrench (½")
    f. Wrench (6" Adjustable)

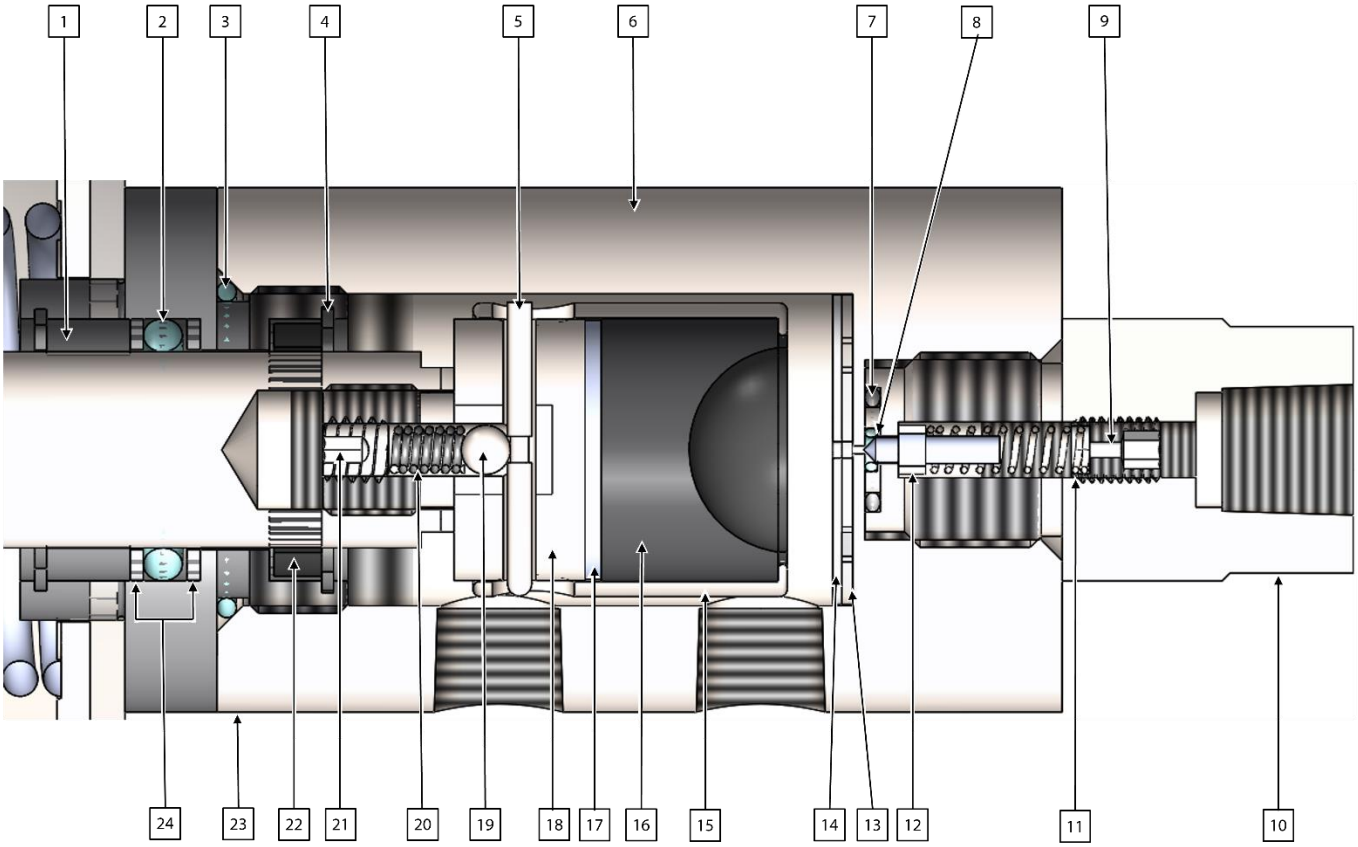
### 3.2 Maintenance

1. Close the pipeline isolation valve and vent all pressure in the entire system.

> Check valves for leaks and repair as necessary during reinstallation.

2. Disconnect the instrument supply (either pipeline gas or inert gas supply) tubing from the GSS-1 body.
3. Relieve and disconnect all tubing from the GSS-1 to the sample cylinder.

**Figure 3: GSS-1 Gas Sampler Pump – Detail A**

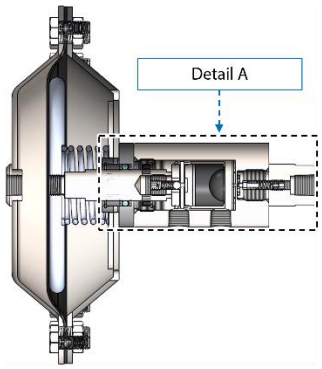



| No. | Description |
|---|---|
| 1 | GSS-1 Bearing |
| 2 | O-Ring |
| 3 | O-Ring |
| 4 | Snap Ring |
| 5 | Adapter Pin |
| 6 | Body, Gas |
| 7 | O-Ring |
| 8 | O-Ring |

| No. | Description |
|---|---|
| 9 | Spring Adjuster |
| 10 | Standard Relief Cap |
| 11 | Poppet Spring |
| 12 | RV-2 Poppet |
| 13 | Kel-F Seal, Spider |
| 14 | Vacuum Breaker Disc, Metal |
| 15 | Head Shield |
| 16 | Collection Head |

| No. | Description |
|---|---|
| 17 | Non-Extrusion Disc |
| 18 | Collection Head Adapter |
| 19 | Ball Bearing |
| 20 | Spring |
| 21 | Set Screw |
| 22 | Jacket Seal |
| 23 | Backup Ring |
| 24 | Snap Ring |

**Welker® GSS-1 Gas Sampler Pump, Showing Detail A**

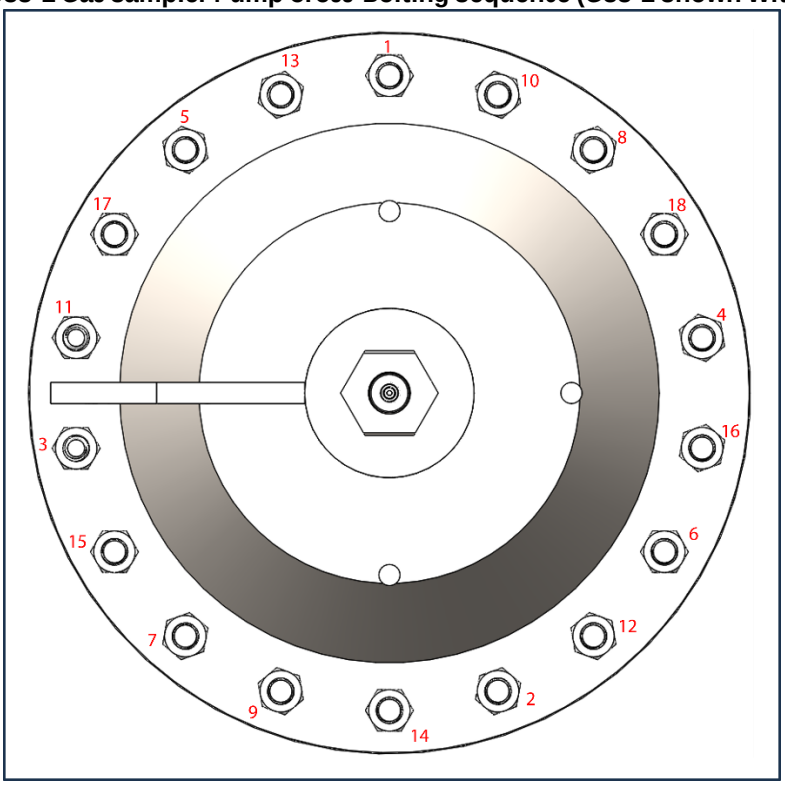


4. Unscrew the complete diaphragm housing from the GSS-1 body (see *Figure 3*).
5. To replace the collection head, push out the adapter pin—it is held in place by spring tension—and slip off the head shield (*Figure 3*).
6. Push the collection head out of the shield. The non-extrusion disc will come out first (*Figure 3*). If it is in good condition, it does not need to be replaced.

> All collection heads are marked on the back side with the size, compound, and durometer. Take note of what you are replacing. For example, K-70 1.0 is a 70-durometer Kalrez collection head, 1.0 cc in volume. Contact Welker® for other available compounds.

7. Lightly lubricate the inside surface of the shield and push in the new collection head (*Figure 3*). If necessary, replace the non-extrusion disc.
8. Slide the shield back onto the collection head. Then push the adapter pin back into place (*Figure 3*).
9. To replace the remaining seals, remove the hex head nuts (18) and bolts (18) that hold the lower diaphragm case together (*Figure 1*).
10. Separate the two halves and examine the diaphragm. If necessary, replace the diaphragm (*Figure 2*).
11. Hold on to the diaphragm plate. Using a wrench, unscrew the adapter from the shaft (*Figure 2*). Turn in a counterclockwise direction.
12. Carefully push the shaft through the lower diaphragm case until the diaphragm plate clears the case (*Figure 2*).
13. Pull the diaphragm plate and shaft out from the top (*Figure 2*).
14. Examine the shaft for damage. The shaft is polished and should be free of scratches and pits. Should it need replacing, put the diaphragm plate in a vise and remove the shaft with an adjustable wrench on the shaft flats. Replace and tighten securely.
15. From the body side of the lower diaphragm case, remove the snap ring and the variseal. When replacing the variseal, be careful not to damage it.
16. The ball bearing should not need replacing. However, should it need replacing, remove the snap ring from the opposite side of the diaphragm case and replace the bearing and/or seals (*Figure 3*).
17. Lubricate the shaft. Place the return spring in the center of the diaphragm case. Push the assembly back into the case, carefully guiding it through the seals. Securely replace the shield/shaft adapter (*Figure 2* and *Figure 3*).
18. Replace the diaphragm and install the upper diaphragm case and all nuts (18) and bolts (18). Cross-bolt the case (*Figure 4*) and then tighten all bolts securely.

**Figure 4: GSS-1 Gas Sampler Pump Cross-Bolting Sequence (GSS-1 Shown With Bracket)**



19. Replace the collection head assembly. This includes the head shield, collection cup, non-extrusion disc, and holding pin (*Figure 3*).
20. Reinstall the vacuum breaker disc and Kel-F seal into the gas body. Replace the disc and seal if necessary. These are free-floating in the body and need to be installed with the seal first, then the metal disc (*Figure 3*).

The collection head will seal against the metal vacuum braker disc.

21. Replace the seal around the male threads on the lower diaphragm case assembly. Then screw the lower diaphragm case back to the body (*Figure 3*). Hand-tighten only.
22. Replace the instrument tubing.
23. Proceed to *Section 4.4, Inline Relief Maintenance*.

### 3.3 Troubleshooting Guidelines

**Table 2: Welker® GSS-1 Gas Sampler Pump Troubleshooting Guidelines**

| Issues | Possible Causes | Solutions |
|---|---|---|
| **There is no sample.** | There is a leaking fitting or valve. | Leak check ALL connections. It is particularly crucial to leak check from the inline relief all the way through to the sample cylinder because any leaks there—even minuscule—will render the sample unrepresentative. Repair or replace the fitting or valve. |
| **There is no sample.** | The correct pressure is not being applied to the diaphragm. | Adjust to 60–65 psig and actuate long enough to get a full 60–65 psig on the sampler (approximately 3–4 seconds). Then deactivate and allow full spring return before the next actuation (approximately 2 seconds). |
| **The sample cylinder fills immediately when the probe valve is opened.** | The purge valve is open.<br><br>The inline relief is set too low.<br><br>The inline relief 003 O-ring (*Figure 3*) is damaged. | Close the purge valve and try again.<br><br>Reset the inline relief according to the instructions in *Section 4*.<br><br>Replace the O-ring and reset the inline relief (*Section 4*). |
| **The sample cylinder fills partially when the probe valve is opened.** | The inline relief is set too low or it is set for the wrong type of cylinder.<br><br>If using a Constant Pressure Cylinder, you do not need to be concerned. | Refer to *Section 4.3* if using a Constant Pressure Cylinder. For Constant Pressure Cylinders, the setting on the inline relief should be approximately 200 psig. When the probe valve is open, any pressure above 200 psig should appear on the Constant Pressure inlet gauge. Once you start sampling, the cylinder's inlet gauge should match the pre-charge gauge until or prior to the cylinder being full. Then you should remove the cylinder. Welker® recommends NOT FILLING the cylinder beyond 100%. |

# SECTION 4: GSS-1 INLINE RELIEF INSTRUCTIONS

### 4.1 General Information

The function of the inline relief (Welker® RV-2 Relief Valve) is to act as a check valve and to assure that the GSS-1 pumps the product into the cylinder and that, once the sample is taken, it cannot return to the pipeline even if the pipeline drops in pressure. The relief is located in the standard relief cap at the end of the GSS-1 body. This relief is used both with single cavity and with constant pressure type cylinders.

### 4.2 For Single Cavity Cylinders

1. Ensure that the sample cylinder inlet valve is closed. Slowly open the pipeline isolation valve and allow full line pressure to flow to the GSS-1.
2. Insert a $^1/_8$" hex wrench inside the relief cap to the spring adjuster (*Figure 3*).
3. Adjust the spring tension to the point at which no gas is bleeding through the set screw.
4. Then turn the spring adjuster another full turn clockwise.

> Each full turn of the spring adjuster increases spring tension approximately 100 psig. The relief needs to be set approximately 100 psig above maximum line pressure.

5. Replace the tubing fitting and tighten the tubing.
6. If applicable, the gauge on the manifold should show 0 psig. This will assure that the relief is holding and that the GSS-1 must pump product into the cylinder.
7. Reopen the cylinder inlet valve.

### 4.3 For Constant Pressure Cylinders

1. Determine the maximum pipeline pressure. For example, it could be 750 psig.
2. Make sure the sample cylinder inlet valve is closed. Slowly open the pipeline isolation valve and allow full line pressure to flow to the GSS-1.
3. Insert a $^1/_8$" hex wrench inside the relief cap to the spring adjuster (*Figure 3*).
4. If the pipeline pressure is 200 psig or lower, adjust the spring setting to stop the gas from bleeding past the poppet.
5. Then replace the seal tubing fitting and reconnect the tubing.
6. If the pipeline pressure is above 200 psig, adjust the spring setting to allow all but approximately 200 psig to flow past the poppet.
7. Then replace the seal tubing fitting and reconnect the tubing.
8. Look at the gauge. If, for example, pipeline pressure is 750 psig, the gauge should read approximately 550 psig. If in this example it reads 650 psig, add more tension by turning the wrench one full turn clockwise. If the gauge reads 450 psig, relieve tension by turning the wrench one full turn counterclockwise. This might need to be repeated to reach an approximate relief setting of 200 psig.

> Keep in mind that a differential of only approximately 200 psig is needed because the relief acts only as a check valve in constant pressure applications.

### 4.4 GSS-1 Inline Relief Maintenance

1. Close the pipeline isolation valve and relieve pressure from the GSS-1.
2. Disconnect tubing and remove the relief cap (*Figure 3*) by unscrewing in a counterclockwise direction.
3. Remove the spring adjuster, poppet spring, and RV-2 poppet (*Figure 3*). Examine the poppet sealing surface for damage. If necessary, replace.
4. Replace the O-ring on the face of the relief cap.
5. Reassemble the pieces and thread the relief cap back into the body and tighten.
6. The relief is now ready to be reset.

# APPENDIX: REFERENCED OR ATTACHED DOCUMENTS

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

- IOM-011: Welker® Constant Pressure Cylinders With Tracker Tube
- IOM-012: Welker® Constant Pressure Cylinders With Tracker Tube (Non-Mixer)—Model CP-2G-HP
- IOM-013: Welker® Constant Pressure Cylinders With Tracker Tube and Gravity Mixer—Models CP2GM and CP5GM
- IOM-014: Welker® Constant Pressure Cylinder With Welker® Magnetic Indicator (With Gravity Mixer)—Model CP2GM-HP
- IOM-033: Welker® Relief Valve—Models RV-1, RV-2, RV-2CP, RV-3
- IOM-063: Welker® Constant Pressure Cylinders With Welker® Solid Indicator, Syringe T-Handle, or Vortex Mixer—Models CP2SI, CP5SI, CP35SI, CP2SY, CP5SY, CP35SY, CP2M, CP5M, CP35M
- IOM-115: Welker® Constant Pressure Cylinders–High Pressure With Welker® Solid Indicator, T-Handle, and Vortex Mixer—Model CP2M-HP
- IOM-146: Welker® Single Cavity Sample Cylinder—Model SC

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

- None

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

- Assembly Drawing: AD104BO (Welker® GSS-1 Gas Sampler Pump With FFKM Product Seals)

# NOTES

13839 West Bellfort Street
Sugar Land, TX 77498
Phone: 281.491.2331

welker.com