



INSTALLATION, OPERATION, AND MAINTENANCE MANUAL
WELKER ESSENTIALS™ GAS SAMPLER

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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 Essentials™ Gas Sampler. 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 Essentials™ Gas Sampler is of a mechanical and electrical 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 Essentials™ Gas Sampler, 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 *Essentials™ Gas Sampler* is a low-cost sampler designed to extract samples from the center one-third ($\frac{1}{3}$) of a pressurized gas pipeline and collect them in a connected sample cylinder. Its high durability and low maintenance requirements make it the ideal sampler for remote field locations.

The *Essentials™ Gas Sampler* is comprised of a sample probe, Welker IR-7 Instrument Regulator, Welker MPS-2 Micropurge Sample Pump, and solenoid. The compact design of this probe mounted sampler eliminates long tubing runs and sample lag time. By minimizing the distance between the product source and the MPS-2, the *Essentials™ Gas Sampler* ensures quality sample grabs. With every actuation, pressure is applied to the top of the MPS-2 piston, fully displacing the trapped sample into the sample cylinder.

The *Essentials™ Gas Sampler* can be connected to a Programmable Logic Controller (PLC) or other signal control system to operate the solenoid. Alternatively, the *Essentials™ Gas Sampler* can be supplied with a Welker 6Tc Timer/Controller, which is capable of operating the solenoid for timed or proportional to flow sampling.



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

*Welker may custom design the *Essentials™ Gas Sampler* 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: Essentials™ Gas Sampler Specifications

Products Sampled	Natural Gas and Other Gases Compatible With the Materials of Construction
Materials of Construction	316/316L Stainless Steel (Wetted Parts), Anodized Aluminum (Non-wetted Parts), Polycarbonate (Enclosure), PTFE, Teflon®, and Viton®
Maximum Allowable Operating Pressure	1440 psig @ -20 °F to 120 °F (99 barg @ -28 °C to 48 °C)
Connections	Pipeline: ¾" MNPT Sample Outlet: ¼" MNPT
Regulator Output Range	50–100 psig (3–6 barg)
Insertion Length	8"
Insertion Diameter	¾"
Electrical Connection	DC 6 V DC 12 V DC 24 V (Standard)
Sample Volume	0.25 cc
Operation	Piston-Operated Pump
Enclosure Dimensions	10" x 8" x 4" (Height x Width x Depth)
Features	Polycarbonate Enclosure With Clear Cover Purge Manifold Solenoid Welker IR-7 Instrument Regulator With Relief and Pressure Gauge Welker MPS-2 Micropurge Sample Pump
Option	Welker 6Tc Timer/Controller

1.4 Equipment Diagrams

Figure 1: Standard Essentials™ Gas Sampler Diagram

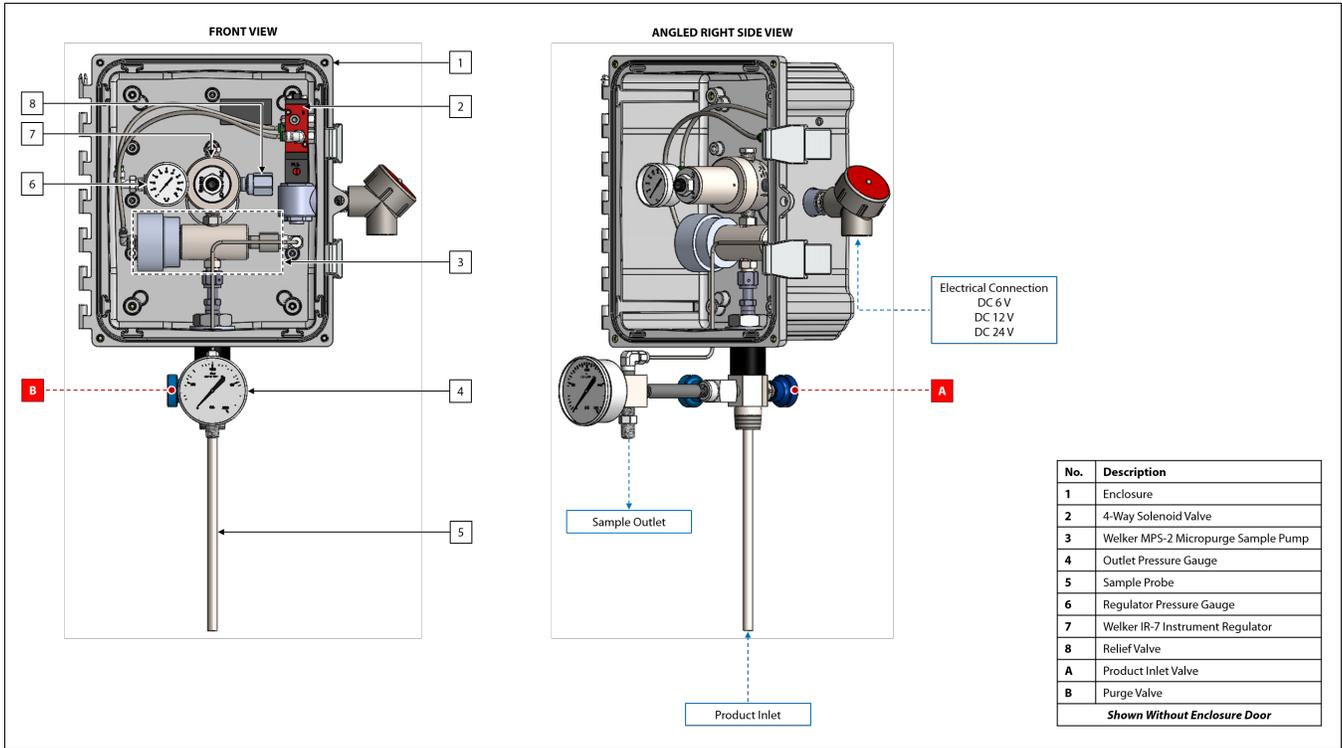
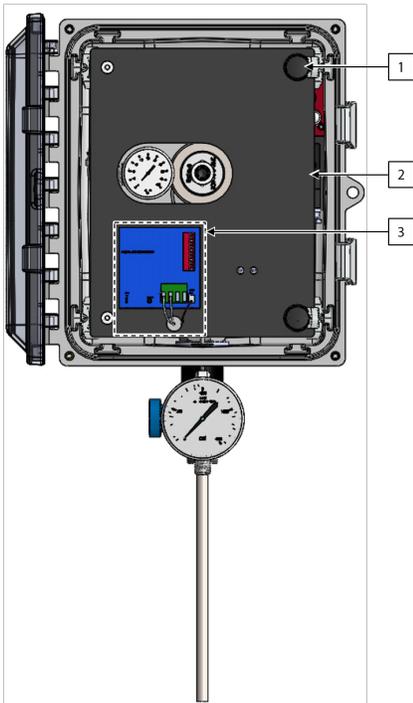
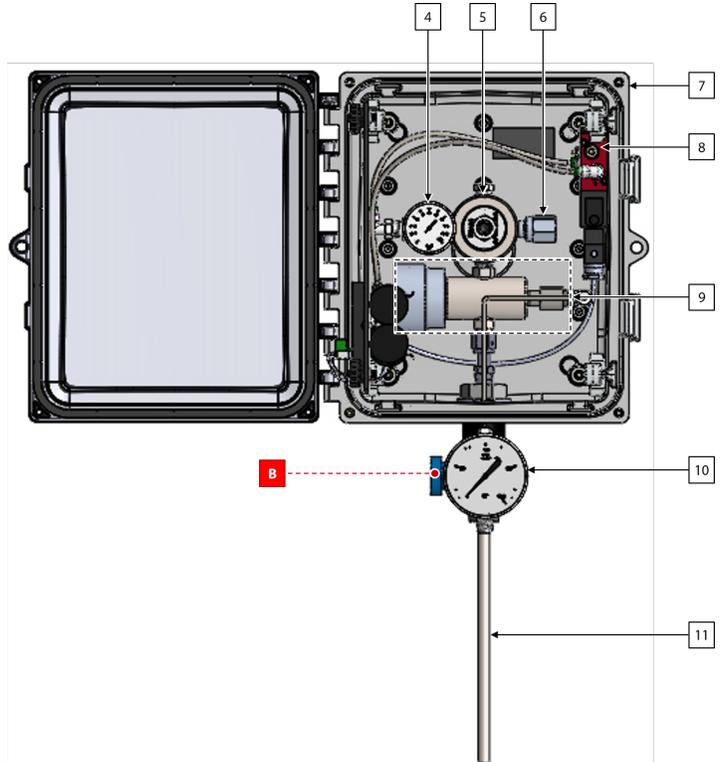


Figure 2: Essentials™ Gas Sampler With Optional Welker 6Tc Timer/Controller

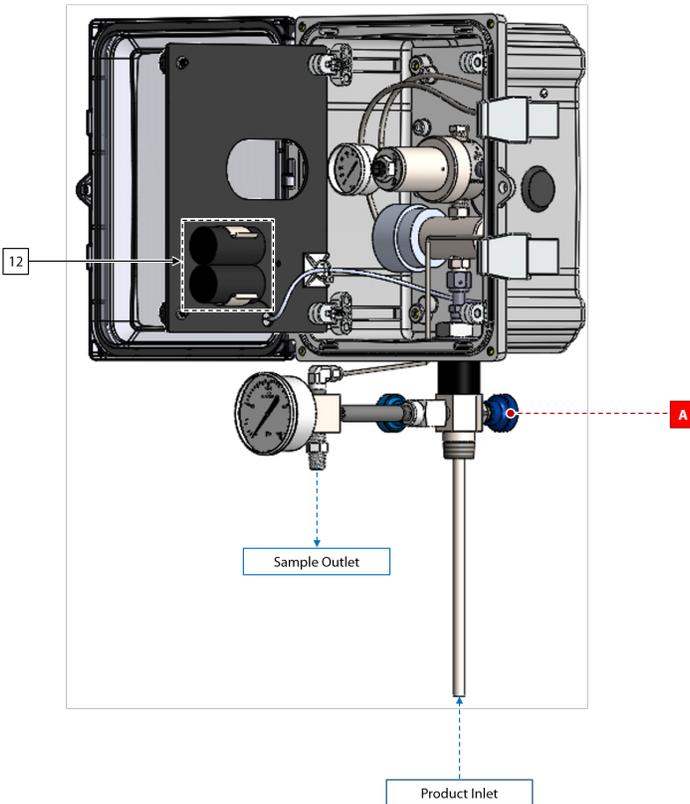
FRONT VIEW, TIMER PANEL



FRONT VIEW, BACK PANEL



ANGELED RIGHT SIDE VIEW



No.	Description
1	Timer Panel Knob (Qty. 2)
2	Timer Panel
3	Welker 6Tc Timer/Controller
4	Regulator Pressure Gauge
5	Welker IR-7 Instrument Regulator
6	Relief Valve
7	Enclosure
8	4-Way Solenoid Valve
9	Welker MPS-2 Micropurge Sample Pump
10	Outlet Pressure Gauge
11	Sample Probe
12	Lithium Battery Pack and Holder
A	Product Inlet Valve
B	Purge Valve

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.



All electrical connections must meet local and national electric codes, and excessive weight added to the conduit run must be supported.

1. Welker recommends that the probe be installed in the top of the pipe and inserted into the center one-third ($\frac{1}{3}$) of the pipeline in a location where the product is well-mixed and will yield an accurate and representative sample.
2. The sample probe should be located in the least turbulent area of the flowing stream (i.e., not in a header or blow-down stack and away from obstructions, elbows, and partially closed valves).

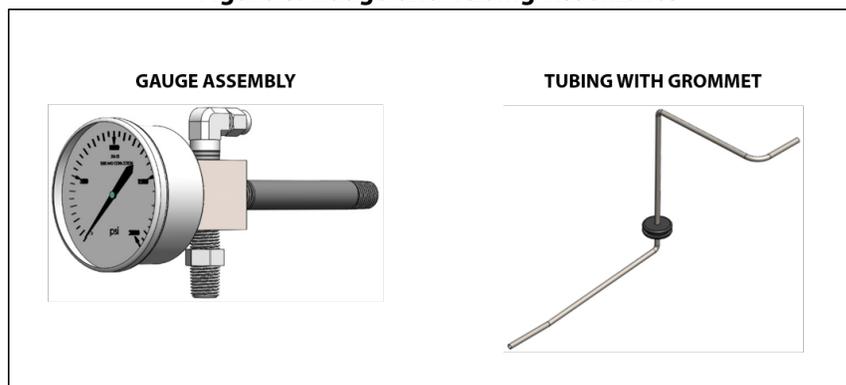
2.2 Preparing for Installation

To watch a short video of these instructions, scan the QR code below or go to welker.com/videos/EssentialsGasSampler_AssemblyInstructions.mp4.



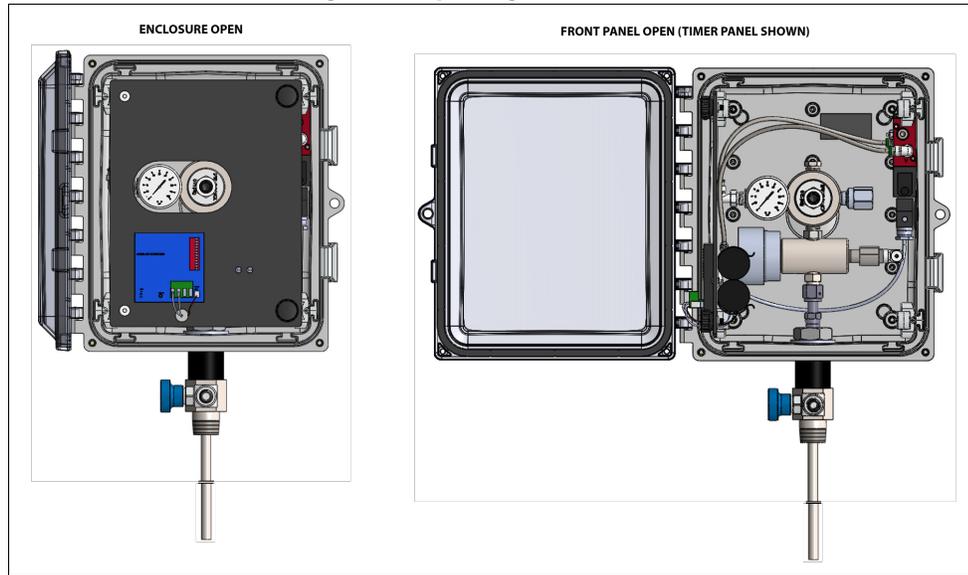
1. Prior to installing the Essentials™ Gas Sampler to the pipeline, the gauge assembly and sample outlet tubing must be installed (*Figure 3*).

Figure 3: Gauge and Tubing Assemblies



2. Lay the Essentials™ Gas Sampler on a smooth, clean surface.
3. Undo the enclosure clasps and open the enclosure door (*Figure 4*).

Figure 4: Opening the Enclosure

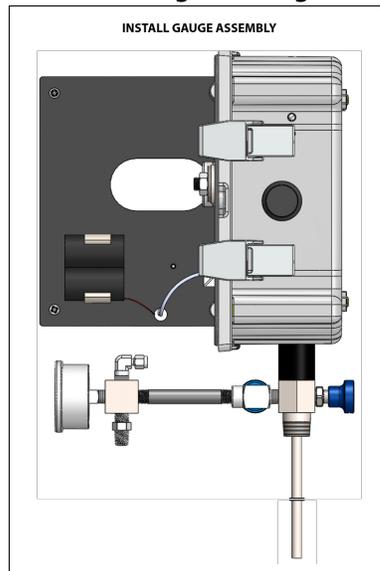


4. If applicable, turn the knobs on the front panel counterclockwise to loosen them, and then open the front panel (*Figure 4*).

Gauge Assembly

5. Wrap the exposed threads on the gauge assembly with PTFE tape (*Figure 3*).
6. Install the gauge assembly to purge valve B (*Figure 5*).

Figure 5: Installing the Gauge Assembly

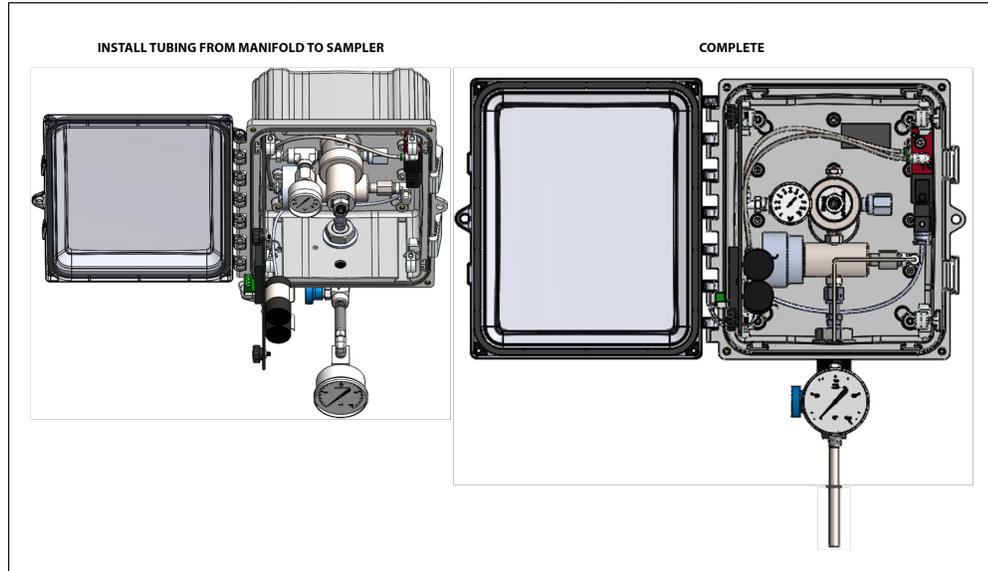


7. Using a crescent or pipe wrench, tighten the gauge assembly. Ensure that the pressure gauge face is upright and that the tube elbow is on top.

Tubing Assembly

8. Thread the tubing assembly through the open port in the bottom of the enclosure (*Figure 6*). Note the straight run of the tubing should exit the bottom of the enclosure, as this end of the tubing connects to the gauge assembly.

Figure 6: Installing the Tubing Assembly



9. Fit the grommet of the tubing assembly firmly in the port in the bottom of the enclosure to seal the port.
10. Insert each end of the tubing assembly into the appropriate tube elbow.



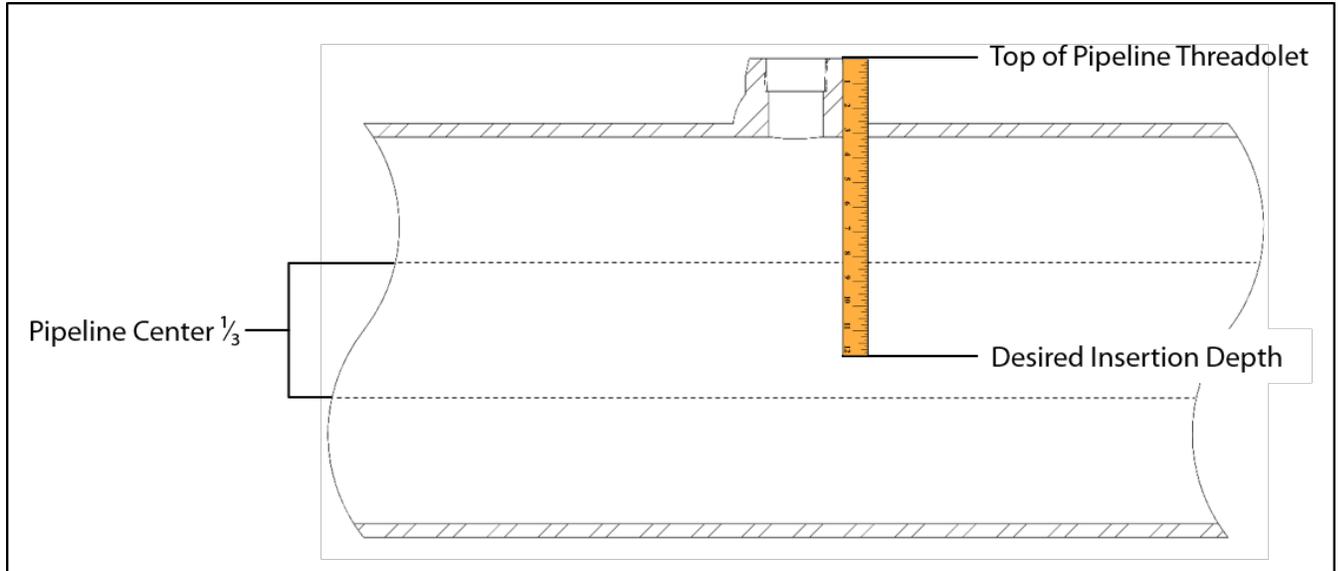
The bottom of the tubing assembly should connect to the tube elbow in the gauge assembly.
The top of the tubing assembly should connect to the tube elbow at the sample outlet of the Welker MPS-2 Micropurge Sample Pump.

11. Use a wrench to tighten the ends of the tubing into the tube elbows.

Determining Insertion Depth

12. Prior to installation, the length the sample probe will need to travel inside the pipeline must be determined. Measure the distance from the top of the pipeline threadolet to the desired insertion depth (e.g., the center one-third ($\frac{1}{3}$) of the pipeline) (*Figure 7*). This will be the insertion length.

Figure 7: Determining the Insertion Depth



13. Beginning at the tip of the sample probe, measure along the probe to the desired insertion depth (*Figure 1* or *Figure 2*). Use a felt tip pen to mark this point.
14. Using tubing cutters, remove the excess tubing at the marked point, and then file and smooth the cut edge of the sample probe.
15. The Essentials™ Gas Sampler is now ready to be installed to the pipeline.

2.3 Installation

1. Depressurize the pipeline.



The pipeline must be depressurized prior to installing and removing the unit.

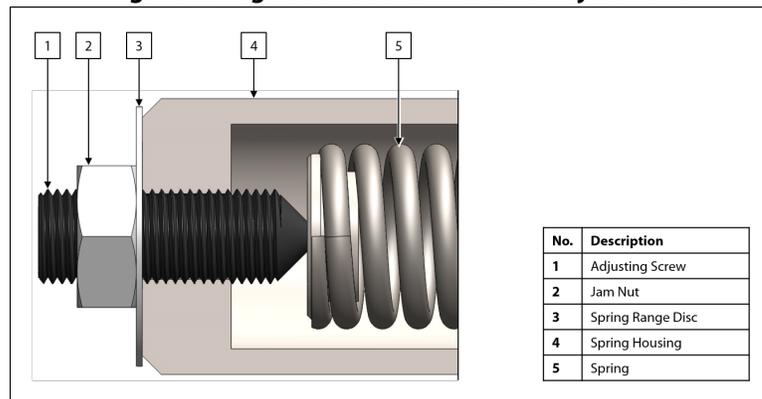
2. Ensure that product inlet valve A and purge valve B are closed (*Figure 1 or Figure 2*).
3. Wrap the threads of the threaded pipeline connection with PTFE tape.
4. Install the Essentials™ Gas Sampler to the mating connection on the pipeline and tighten.
5. If a timer or controller will be used to operate the solenoid, connect from the customer-supplied timer or controller to the solenoid.
6. If a Programmable Logic Controller (PLC) will be used to operate the solenoid, make the appropriate electrical connections between the PLC and the solenoid.



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

7. The Welker IR-7 Instrument Regulator comes factory-set to 50 psig and is equipped with a relief valve pre-set to 85 psig to relieve pressure and protect the equipment in the case of a seal leak or regulator failure. To adjust the regulator setting, loosen the jam nut, and then loosen or tighten the adjusting screw until the regulator pressure gauge reads the desired outlet pressure (*Figure 8*). Holding the adjusting screw with a wrench, tighten the jam nut to secure the adjusting screw at the desired outlet pressure.

Figure 8: Regulator Outlet Pressure Adjustment



8. The sample cylinder may now be installed.

Installing the Sample Cylinder



A Welker SC Single Cavity Cylinder is recommended for use with this unit.

9. Ensure that the inlet and outlet valves on the sample cylinder are closed.
10. Install the inlet valve of the sample cylinder to the sample outlet on the Essentials™ Gas Sampler (*Figure 1 or Figure 2*).
11. Installation is now complete.

2.4 Start-Up Procedures

1. Ensure that all valves on the Essentials™ Gas Sampler and sample cylinder are closed.
2. Pressurize the pipeline.

Testing the Essentials™ Gas Sampler

3. Open product inlet valve A on the sample probe (*Figure 1 or Figure 2*). Check for leaks and repair as necessary.
4. Verify that the outlet pressure gauge reads zero (0) psig (*Figure 1 or Figure 2*). This reading indicates that the inline relief is holding and that sample cannot flow to the sample cylinder. If the inline relief does not need to be adjusted, continue to step 5. If the inline relief requires adjustment, proceed to *Section 3.3, Adjusting the Inline Relief*.



The inline relief comes factory-set to 1100 psig. The inline relief should not require adjustment unless pipeline pressure drops below 400 psig or maintenance is performed on the inline relief.

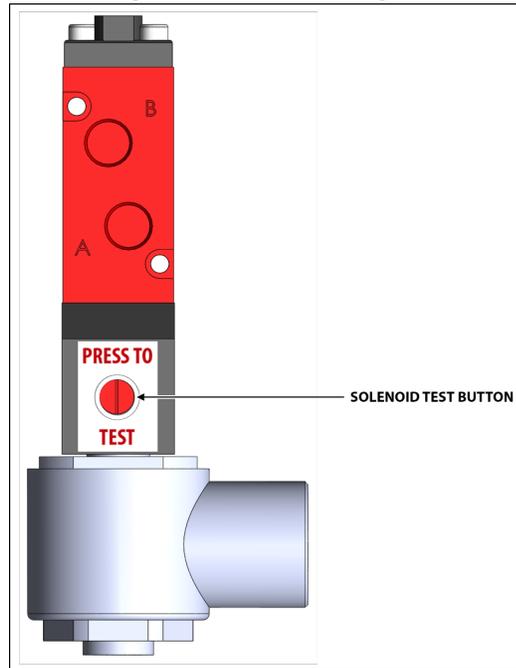


When sampling into a Welker SC Single Cavity Cylinder, the pressure gauge should read 0 psig at start-up.

5. Verify the setting of the regulator. The regulator should be set to approximately 50 psig.
6. Open purge valve B and the inlet valve on the sample cylinder (*Figure 1 or Figure 2*). Check for leaks and repair as necessary.
7. Close purge valve B and the inlet valve on the sample cylinder (*Figure 1 or Figure 2*).

8. Using a flat head screwdriver, press and release the solenoid test button eight to ten (8–10) times to actuate the MPS-2 and build pressure (*Figure 9*). With each actuation, a slight pressure increase should be observable on the outlet pressure gauge.

Figure 9: Solenoid Diagram



Do not leave the solenoid test button in the locked position, as this will prevent the controller from actuating the solenoid.



Do not actuate the solenoid too rapidly, as it requires enough time to actuate and reset.

9. Open purge valve B and allow the MPS-2 to build pressure (*Figure 1* or *Figure 2*).
10. Once pressure on the outlet pressure gauge has risen to pipeline pressure, close purge valve B (*Figure 1* or *Figure 2*).
11. Using a flat head screwdriver, press and release the solenoid test button every 5 seconds to actuate the MPS-2 and build pressure (*Figure 9*). With each actuation, a pressure increase should be observable on the outlet pressure gauge.
12. If pressure is holding, continue to step 13. If pressure has dropped, check for leaks and repair as necessary. If an increase in pressure is observed without manually actuating the solenoid, the inline relief may need to be adjusted; proceed to *Section 3.3, Adjusting the Inline Relief*. If pressure has increased up to pipeline pressure without actuating the solenoid, the O-ring in the inline relief may have failed; proceed to *Section 3.2, Maintenance*.
13. Open the outlet valve on the sample cylinder to relieve test pressure, and then close the outlet valve.

Purging the Sample Cylinder



Welker recommends that the sample cylinder be cleaned or purged prior to each sample batch to remove any air and/or old product from the system and prevent cross-contamination between samples.

14. Purge the sample cylinder using the fill and empty method or the continuous purge method as described in Gas Processors Association (GPA) Standard 2166-86, *Obtaining Natural Gas Samples for Analysis by Gas Chromatography*.
15. Once the sample cylinder has been purged using the chosen method, ensure that there is no pressure in the sample cylinder and that the outlet valve on the sample cylinder and purge valve B are closed.

Preparing for Sampling

16. As necessary, program the Welker 6Tc Timer/Controller (Figure 2). Refer to the *Installation, Operation, and Maintenance (IOM) Manual* for the 6Tc for instructions on setting the 6Tc.
17. As necessary, set the PLC to the desired sampling frequency based on the sampling actuation equations provided (Figure 10).

Figure 10: Gas Sampling Equations

Gas Sampling, Proportional to Flow Collection
<p>Equation 1: Number of Samples Needed</p> $\text{Number of Samples Needed to Fill to 100\%} = \frac{\text{Cylinder Size (cc)}}{\text{Bite Size (cc)}}$
<p>Equation 2: Proportional-to-Flow</p> $\text{Volume of Flow Between Sample Grabs} = \frac{\text{Batch Size (Total Volume to be Sampled)}}{\text{Number of Samples Needed (Eq. 1)}}$
<p>Use Equation 1 to determine the number of actuations needed. Use Equation 2 to determine how often (after what volume of flow) to take each sample.</p>
Gas Sampling, Timed Collection
<p>Equation 1: Number of Samples Needed</p> $\text{Number of Samples Needed to Fill to 100\%} = \frac{\text{Cylinder Size (cc)}}{\text{Bite Size (cc)}}$
<p>Equation 2: Timed Sampling</p> $\text{Time Between Sample Grabs} = \frac{\text{Total Time in Sample Period}}{\text{Number of Samples Needed (Eq. 1)}}$
<p>Use Equation 1 to determine the number of actuations needed. Use Equation 2 to determine how often (after what amount of time) to take each sample.</p>



Note that the sample volume of the Essentials™ Gas Sampler is 0.25 cc.

18. Prior to beginning sampling procedures, ensure that purge valve B is closed and that the sample cylinder is empty.
19. The Essentials™ Gas Sampler is now operational.

2.5 Sampling Procedures

1. Ensure that the outlet pressure gauge reads zero (0) psig (*Figure 1 or Figure 2*). As necessary, open purge valve B to relieve test pressure.
2. Ensure that purge valve B is closed (*Figure 1 or Figure 2*).
3. Ensure that the inlet valve on the sample cylinder is open and that the outlet valve on the sample cylinder is closed.
4. Close the enclosure door and secure it using the clasps.
5. Activate the controller to begin sampling.
6. Continue sampling until the desired volume of sample has been obtained.

Removing the Sample Cylinder

7. De-energize the solenoid to stop actuating the MPS-2 and halt sampling.
8. Close the inlet valve on the sample cylinder.
9. Loosen the tube fitting on the inlet of the sample cylinder to allow the trapped gas to vent, and then tighten the tube fitting.
10. Disconnect the sample cylinder from the sample outlet.
11. Tag the sample cylinder and prepare it for transportation to the testing laboratory in accordance with company policy.

3.1 Before You Begin

1. **Welker recommends that the unit have standard maintenance every year or after 15,6000–24,000 strokes 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.



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. Adjustable Wrench
 - b. Hex Key Set
 - c. Seal Pick

3.2 Maintenance



If maintenance on the valves or probe is required, the Essentials™ Gas Sampler must be isolated from pipeline pressure and removed from the pipeline before maintenance can be safely performed.



Prior to performing maintenance, the Essentials™ Gas Sampler must be isolated from pipeline pressure. However, the Essentials™ Gas Sampler does NOT need to be removed from the pipeline to perform **standard** maintenance.

1. Close product inlet valve A and purge valve B to isolate the Essentials™ Gas Sampler from pipeline pressure (*Figure 1* or *Figure 2*).
2. Turn OFF electrical power to the system and carefully remove all electrical connections.
3. Depressurize and disconnect the tubing from all components requiring maintenance.
4. For complete and proper maintenance on system components, refer to their respective *Installation, Operation, and Maintenance (IOM) Manual*. A list of components is available in *Appendix A, Referenced or Attached Documents*, in this manual.
5. After performing necessary maintenance on system components, reconnect all instrument tubing.
6. Maintenance is now complete. See *Section 2.3, Installation*, and *Section 2.4, Start-Up Procedures*, for instructions on returning the Essentials™ Gas Sampler to operation.



If maintenance is performed on the MPS-2, the inline relief needs to be reset. Welker recommends setting the inline relief to 1100 psig unless pipeline pressure drops below 400 psig. See *Section 3.3, Adjusting the Inline Relief*, for instructions on setting the inline relief.

3.3 Adjusting the Inline Relief



The inline relief is designed to allow product to flow in one direction only. Acting as a check valve, the inline relief will ensure that sample pumped into the sample cylinder cannot flow back to the pipeline even if pipeline pressure drops.



The inline relief comes factory-set to 1100 psig. The inline relief should not require adjustment unless pipeline pressure drops below 400 psig or maintenance is performed on the inline relief.



To increase spring tension and raise the relief set point, turn the spring adjuster clockwise.
To decrease spring tension and lower the relief set point, turn the spring adjuster counterclockwise.



Each full clockwise turn of the spring adjuster increases spring tension approximately 100 psig.

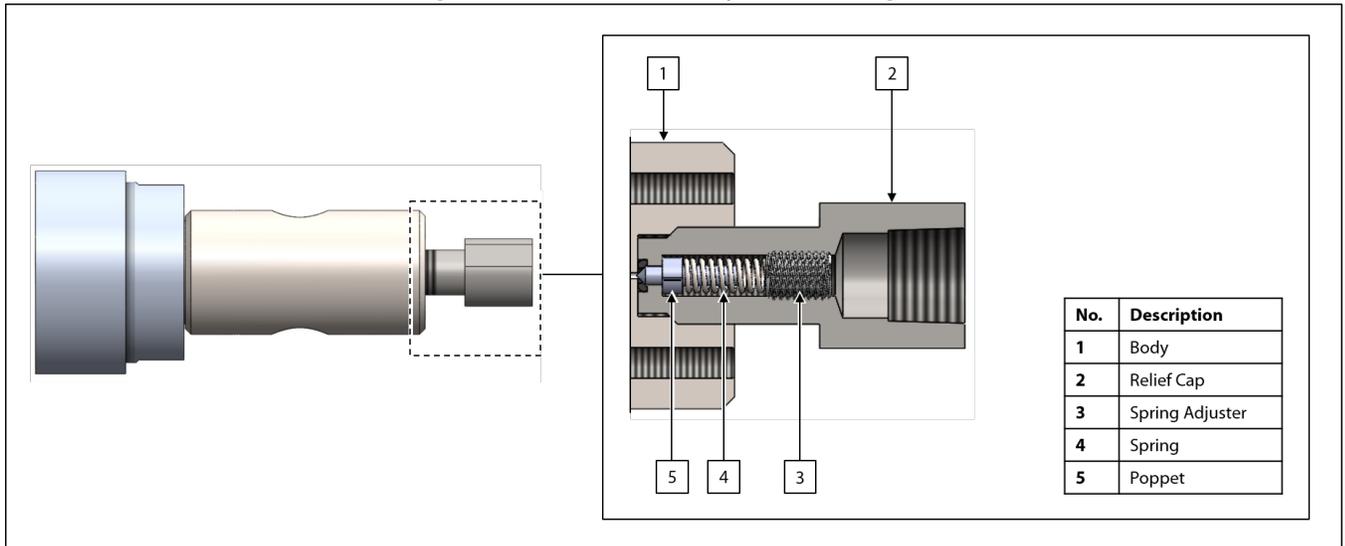


When sampling into a Welker SC Single Cavity Cylinder, the inline relief must be set to approximately 100 psig above pipeline pressure.



If the inline relief will be adjusted using pipeline product, continue to step 1.
If the inline relief will be adjusted using an auxiliary gas supply, proceed to step 9.

Figure 11: Inline Relief Adjustment Diagram



Using Pipeline Gas

1. Close product inlet valve A and depressurize the Essentials™ Gas Sampler (*Figure 1 or Figure 2*).
2. Disconnect tubing from the outlet of the MPS-2.
3. Open product inlet valve A to pressurize the Essentials™ Gas Sampler (*Figure 1 or Figure 2*).
4. If pressure is leaking past the inline relief, insert an L-shaped hex key through the relief cap, and then turn the spring adjuster clockwise until no gas bleeds through.
5. Turn the spring adjuster counterclockwise until some gas bleeds through.
6. Turn the spring adjuster clockwise until no gas bleeds through, and then turn the spring adjuster clockwise another full turn.



Ensure that at least half a turn remains on the spring adjuster, as too much tension will prevent the spring from contracting and releasing when the MPS-2 is actuated. To ensure that at least half a turn remains on the spring adjuster, Welker recommends turning the spring adjuster clockwise and counting each turn until the spring adjuster can no longer be turned; the spring adjuster can then be turned counterclockwise the appropriate number of turns.

7. Verify that the outlet pressure gauge reads zero (0) psig. This reading indicates that the inline relief is holding and that sample cannot flow to the sample cylinder. If the outlet pressure gauge reads partial pressure, the inline relief requires further adjustment; return to step 4. If the outlet pressure gauge reads pipeline pressure, purge valve B and/or the inline relief requires maintenance; see *Section 3.2, Maintenance*, for instructions on maintaining the inline relief.
8. Reconnect the tubing to the outlet of the MPS-2.

Using Auxiliary Gas

9. Ensure that a sample cylinder is installed to the Essentials™ Gas Sampler.
10. Remove the tubing connection on top of the gauge assembly (*Figure 3*).
11. Connect a customer-supplied auxiliary gas supply to the elbow on top of the gauge assembly.
12. Close product inlet valve A (*Figure 1* or *Figure 2*).
13. Disconnect the tubing from the outlet of the MPS-2.
14. Open purge valve B (*Figure 1* or *Figure 2*).
15. Adjust the auxiliary gas supply pressure to the desired inline relief setting, and then open the supply. This will pressurize the Essentials™ Gas Sampler.
16. If pressure is leaking past the inline relief, insert an L-shaped hex key through the relief cap, and then turn the spring adjuster clockwise until no gas bleeds through.
17. Turn the spring adjuster counterclockwise until some gas bleeds through.



Ensure that at least half a turn remains on the spring adjuster, as too much tension will prevent the spring from contracting and releasing when the MPS-2 is actuated. To ensure at least half a turn remains on the spring adjuster, Welker recommends turning the spring adjuster clockwise and counting each turn until the spring adjuster can no longer be turned; the spring adjuster can then be turned counterclockwise the appropriate number of turns.

18. Turn the spring adjuster clockwise until no gas bleeds through.
19. Verify that the outlet pressure gauge reads zero (0) psig. This reading indicates that the inline relief is holding and that sample cannot flow to the sample cylinder. If the outlet pressure gauge reads partial pressure, the inline relief requires further adjustment; return to step 16.
20. Reconnect the tubing to the outlet of the MPS-2.
21. Disconnect the customer-supplied auxiliary gas supply from the elbow on top of the gauge assembly, and then reconnect the tubing connection (*Figure 3*).

3.4 Troubleshooting

Table 2: Essentials™ Gas Sampler Troubleshooting

Issues	Possible Causes	Solutions
<p>The MPS-2 is not actuating properly.</p>	<p>The solenoid may not be operating properly.</p>	<p>Use the manual override button to check the solenoid and ensure proper operation. If the solenoid is operating improperly, refer to the <i>Installation, Operation, and Maintenance (IOM) Manual</i> for the solenoid.</p>
	<p>The solenoid test button may be in the locked position.</p>	<p>Use a flat head screw driver to unlock the solenoid test button.</p>
	<p>The stroke and exhaust times are too short.</p>	<p>Ensure that the pump cycle is no faster than every four (4) seconds.</p>
<p>The sample cylinder is not filling.</p>	<p>Product inlet valve A is closed.</p>	<p>Ensure that product inlet valve A is open.</p>
	<p>The inlet valve on the sample cylinder is closed.</p>	<p>Ensure that the inlet valve on the sample cylinder is open.</p>
	<p>There is a leak between the sample outlet and the sample cylinder.</p>	<p>Check all fittings from the sample outlet to the inlet valve on the sample cylinder for leaks. Repair as necessary.</p>
	<p>The inline relief setting is too high.</p>	<p>See <i>Section 2.4, Start-Up Procedures</i>, for instructions on setting the inline relief.</p>
	<p>The MPS-2 is unable to build pressure.</p>	<p>See <i>Section 2.4, Start-Up Procedures</i>, for instructions on testing the MPS-2 and ensuring that the sampler will build pressure.</p>
<p>The sample cylinder is filling too quickly.</p>	<p>The inline relief setting is not adequate.</p>	<p>See <i>Section 2.4, Start-Up Procedures</i>, for instructions on setting the inline relief</p>
	<p>The sampler may be set at a faster sampling frequency than desired.</p>	<p>Adjust the controller to sample at the desired rate. Ensure that the calculations used to determine the sample frequency are correct (<i>Figure 10</i>).</p>
<p>The regulator is leaking or flow is restricted.</p>	<p>The cartridge assembly must be replaced.</p>	<p>Install a replacement cartridge assembly to the regulator. Refer to the <i>Installation, Operation, and Maintenance (IOM) Manual</i> for the IR-7 for instructions.</p>
<p>The outlet pressure gauge reads pipeline pressure when adjusting the inline relief.</p>	<p>Purge valve B may be open.</p>	<p>Ensure that purge valve B is closed.</p>
	<p>The O-ring in the inline relief may have failed.</p>	<p>Replace the O-ring in the inline relief. Refer to the <i>Installation, Operation, and Maintenance (IOM) Manual</i> for the MPS-2 for instructions.</p>

APPENDIX A: REFERENCED OR ATTACHED DOCUMENTS

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

- IOM-002: Welker 6Tc Timer/Controller
- IOM-044: Welker IR-7 Instrument Regulator
- IOM-056: Welker MPS-2 Micropurge Sample Pump
- IOM-105: Welker NV-1 and NV-2 Instrument Valves
- IOM-146: Welker SC Single Cavity Cylinder

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

- McDaniel Controls, Inc. Stainless Steel Case Utility Gauges (Welker IOM-V274)
- Versa Products Company, Inc. C Series Solenoid Valves (Welker IOM-V041)
- Versa Products Company, Inc. CSG-4222-LA-XX-D012 Solenoid Valve (Welker IOM-V071)
- WIKA Instrument Corporation Bourdon Tube Pressure Gauges Type 232.53 and Type 233.53 (Welker IOM-V171)

Welker drawings and schematics suggested for use with this unit:

- Assembly Drawing: AD681BK (Standard Essentials™ Gas Sampler)
- Assembly Drawing: AD681BV (Essentials™ Gas Sampler With Welker 6Tc Timer/Controller)



The Essentials™ Gas Sampler is factory-set to operate on any gas pipeline with a working pressure between 400 and 1050 psig. If your application is outside these operating conditions, contact Welker for instructions on adjusting the Essentials™ Gas Sampler.

Preparing for Installation

1. Remove the Essentials™ Gas Sampler from the shipping container.
2. Install the gauge assembly to purge valve B.
3. Install the tubing assembly to connect the gauge assembly to the MPS-2.
4. As necessary, cut the sample probe to the desired insertion length (e.g., the center one-third ($\frac{1}{3}$) of the pipeline).

Installation

1. Install the Essentials™ Gas Sampler to the depressurized pipeline.
2. As necessary, connect the solenoid to the timer or controller.
3. As necessary, adjust the regulator setting.
4. Install the inlet valve of the sample cylinder to the sample outlet on the Essentials™ Gas Sampler.

Start-Up Procedures

1. With all valves shut, pressurize the pipeline.
2. Test the Essentials™ Gas Sampler.
3. Purge the sample cylinder.
4. Program the timer or controller to the desired sampling frequency.



The number of times the solenoid should be energized during the sample period to fill the sample cylinder is dependent on the cylinder volume, temperature, and the volume in associated fittings.

- To fill a 150 cc sample cylinder, energize the solenoid approximately 600–750 times.
- To fill a 300 cc sample cylinder, energize the solenoid approximately 1200–1500 times.
- To fill a 500 cc sample cylinder, energize the solenoid approximately 2000–2500 times.

