



*Installation, Operation, and
Maintenance Manual*

***Welker[®] Probe Mounted Bypass Sample System[®]
Model
LSSM-1P-SYS***

***Drawing No.: LS3094
Manual No.: IOM-147***

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[®] Probe Mounted Bypass Sample System, *LSSM-1P-SYS*. 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 Belfort
Sugar Land, TX 77498-1671
(281) 491-2331 - Office
(800) 776-7267 - USA Only
(281) 491-8344 - Fax
<http://www.welkereng.com>

TABLE OF CONTENTS

<u>1.</u>	<u>SPECIFICATIONS</u>	<u>3</u>
1.1	INTRODUCTION	3
1.2	DESCRIPTION OF PRODUCT	3
1.3	SPECIFICATIONS	4
1.4	SYSTEM DIAGRAMS	4
<u>2.</u>	<u>INSTALLATION & OPERATIONS</u>	<u>6</u>
2.1	BEFORE YOU BEGIN	6
2.2	INSTALLATION	6
2.3	OPERATIONS	8
<u>3.</u>	<u>MAINTENANCE</u>	<u>9</u>
3.1	BEFORE YOU BEGIN	9
3.2	MAINTENANCE	9
<u>APPENDIX</u>		<u>10</u>
REFERENCED OR ATTACHED WELKER® IOMS		10
REFERENCED OR ATTACHED BUY-OUT IOMS		10
REFERENCED OR ATTACHED DRAWINGS		10

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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® Probe Mounted Bypass Sample System (*LSSM-1P-SYS*) is a sampling system that utilizes a positive displacement pump to take a representative sample of product at pipeline conditions and pump the sample into a sample container. This is a complete sampling system, which includes a sample pitot probe, an instrument regulator with relief valve and gauge, a 4-way electronic solenoid valve actuator, and a constant pressure sample cylinder.

A pneumatically-operated LSSM-1 sample pump is connected to a pitot probe located in the product line. When the sample pump is actuated, the sample pump piston retracts and product is pulled into the pump. The reverse actuation at the 4-way solenoid allows product to be pumped from the pump into the sample container.

Used correctly, the LSSM-1P-SYS will provide the user with an accurate and representative sample of product as presented to the pump.

Welker® may custom design the LSSM-1P-SYS Probe Mounted Bypass Sample System to suit the particular application and specifications of each customer.

1.3 SPECIFICATIONS

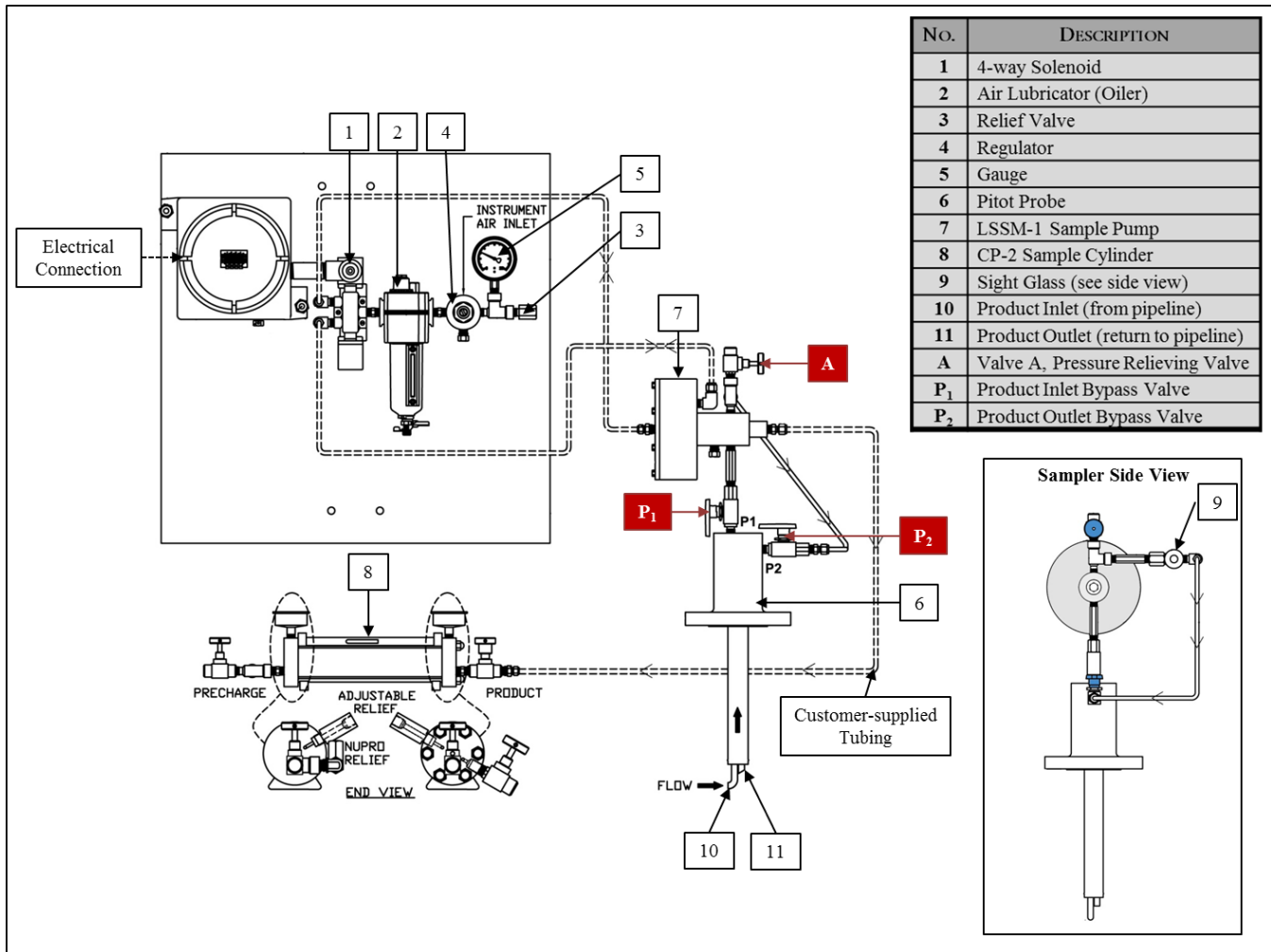


The specifications listed in this section are generalized for this equipment. Welker® can modify the equipment according to your company’s needs. However, **please note that the specifications may vary depending on the customization of your product.**

Table 1: System Specifications	
Products Sampled	Liquids compatible with materials of construction
Materials of Construction	316/316L Stainless Steel, Viton®, PTFE, Kalrez® collection head, Carbon Steel Panel
Connections	¼” NPT
Maximum Allowable Operating Pressure	720 psi @ -20° to 100°F (50 bar @ -29° to 38°C)
Electrical Connection	24VDC in Class I, Div. II Explosion-proof Junction Box

1.4 SYSTEM DIAGRAMS

Figure 1: System Diagram



REFER TO *FIGURE 1* AND *DRAWING LS3094* THROUGHOUT THIS MANUAL.

**Figure 2: Recommended General Arrangement
(Top View - Probe Mounted in Side of Pipeline)**

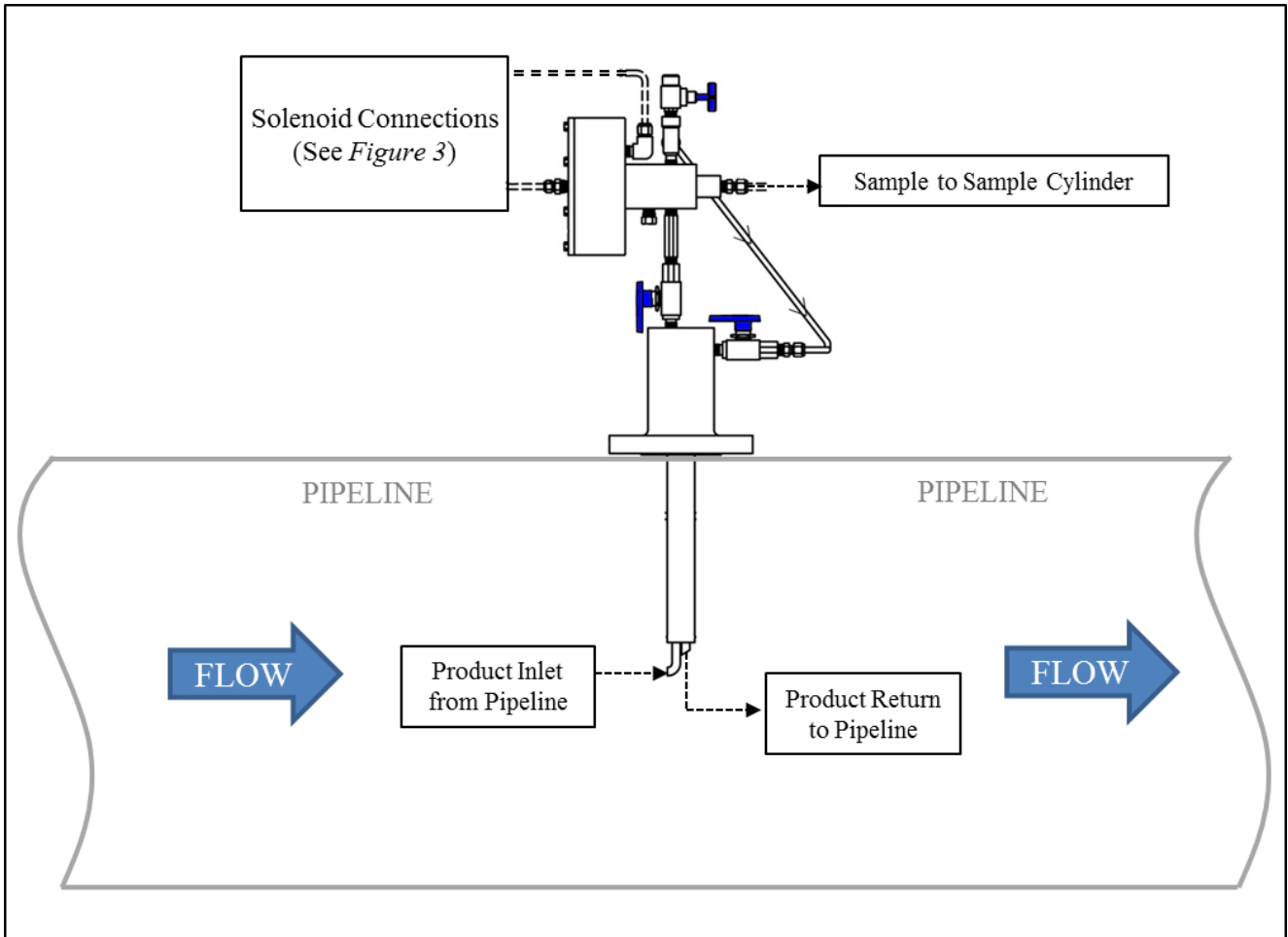
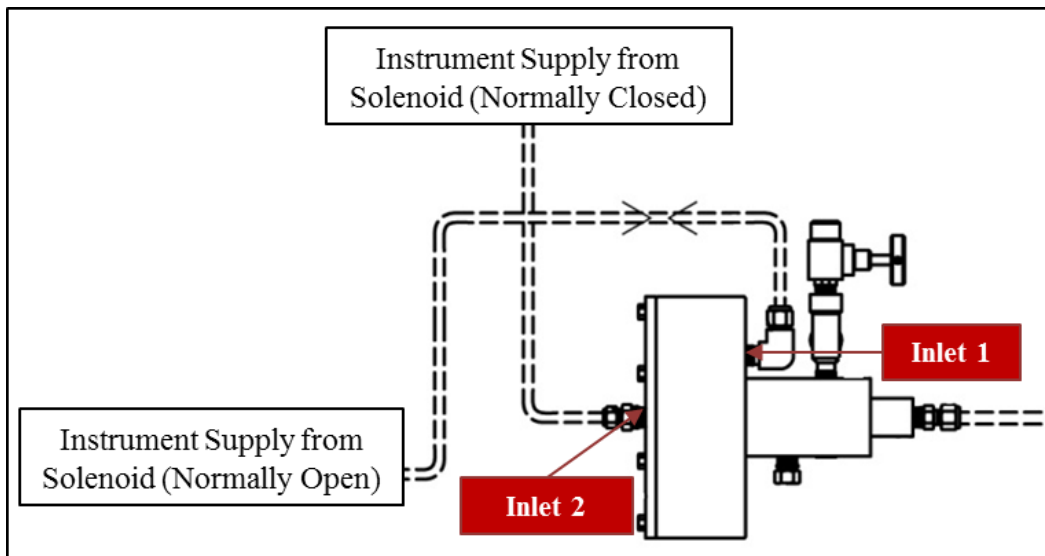


Figure 3: Close-Up of Sampler to Solenoid Connections



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

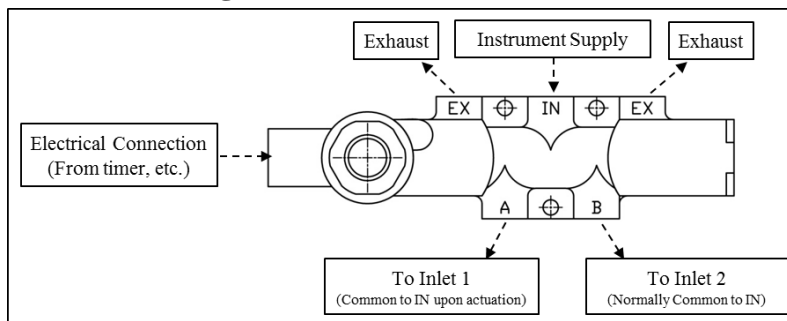
1. Mount the pitot probe onto the pipeline flange connection. Ensure that Valves P₁ and P₂ are closed prior to mounting the probe. The probe should be installed with the long probe inlet upstream of the shorter probe outlet (*Figure 2*).



Welker[®] recommends the probe be connected to the side of the pipe and inserted into the center one-third (1/3) of the pipeline in a location where the product is well-mixed and will yield an accurate and representative sample.

2. Mount the panel as near as possible to the pitot probe and sample pump, using U-bolts to connect the panel to the pipeline.
3. Mount the cylinder bracket as near as possible to the panel, using U-bolts to connect the bracket to the pipeline.
4. Place the cylinder securely onto the cylinder bracket.
5. The cylinder should be pre-charged to approximately pipeline pressure.
6. The cylinder relief should be set at 50 to 100 psi above pipeline pressure.
7. Refer to the *Installation, Operation, and Maintenance Manual* for the appropriate sample container for any additional installation instructions.
8. Connect 1/4" diameter tubing from the sample outlet port of the sample pump to the sample cylinder inlet.
9. Connect an instrument air supply (e.g., clean, dry instrument air) to the instrument air supply inlet. The instrument supply port of the solenoid should be common with (normally open to) Inlet 1 on the sample pump (*Figures 3 & 4*).

Figure 4: Solenoid Connections



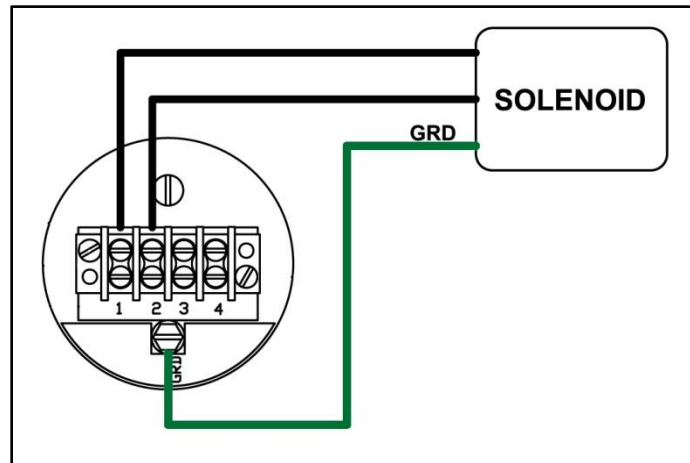
10. Set the instrument supply to at least 30 to 40 psi.
11. Connect all customer-supplied tubing as shown in Figure 1 and Drawing LS3094.
12. Connect any necessary electrical devices (e.g., RTU, flow computer, timer, totalizer, etc.) to the 4-way solenoid at the electrical box (*Figure 5*). Refer to the *Installation, Operation, and Maintenance Manual* for the appropriate electrical device(s) for any additional installation or set-up instructions.



For this manual, the term “electrical control” will be used to refer to the flow computer, timer, or other signal control system used by the customer to activate and operate the solenoid.

13. Ground the panel and electrical box (*Figure 5*).

Figure 5: Electrical Connections



14. Set the electrical control to actuate using the following calculation in order to fill the cylinder to 80%. Use Equation 1 and either Equation 2 or 3 according to the type of sampling to be done.

Equation 1: Number of Samples Needed

$$\text{Number of Samples Needed to Fill to 80\%} = \frac{\text{Cylinder Size (cc)} * 0.8}{0.5}$$

Equation 2: Proportional-to-Flow

$$\text{Amount of Flow Between Sample Grabs} = \frac{\text{Total Volume of Flow During Sample Period}}{\text{Number of Samples Needed (Eq. 1)}}$$

Equation 3: Samples over Time

$$\text{Time Between Sample Grabs} = \frac{\text{Total Time in Sample Period}}{\text{Number of Samples Needed (Eq. 1)}}$$

15. Ensure that the valve opening to vent to atmosphere is pointed away from the operator, in order to protect the operator from any relieved product or pressure. If the opening faces toward the operator, install an elbow on the valve opening to point away from the operator.

2.3 OPERATIONS

1. Begin with all valves on the system closed.
2. Open Valves P₁, P₂, and the cylinder inlet valve to begin product flow through the system.
3. Check the sight glass to ensure product flow.
4. Open the cylinder inlet valve.
5. With product flowing, open the cylinder purge valve. Allow all air to be purged from the cylinder. When product becomes visible, close the cylinder purge valve.
6. Open the instrument air supply.
7. Activate the electrical control to actuate the solenoid. The solenoid should be actuated for 2 to 4 seconds for each sample grab.
8. Allow the cylinder to fill to 80%.



Never fill the cylinder to above 80% capacity. Allow at least 20% room for product expansion should the cylinder be exposed to increased temperatures.

9. Deactivate the electrical control when the cylinder has been filled to 80%.
10. Close Valves P₁, P₂, and the cylinder inlet valve.
11. Open Valve A to relieve any remaining pressure in the line.
12. Disconnect the cylinder and remove it from the cylinder bracket. Label and prepare the cylinder for transportation and/or laboratory analysis according to company policy.
13. Refer to the *Installation, Operation, and Maintenance Manual* for the cylinder for further instructions on mixing, transporting, and/or cleaning the cylinder.

Section 3:

MAINTENANCE

3.1 BEFORE YOU BEGIN

1. **Welker® recommends that the unit have annual 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. During system operation, check for leaks and repair as necessary.
2. Prior to performing any maintenance on the system, ensure that all valves are closed.
3. If performing maintenance on the pitot probe, the probe will need to be removed from the pipeline. For any other maintenance, disconnect the necessary equipment from the probe.
4. Refer to the *Installation, Operation, and Maintenance Manual* for the LSSM-1 Sample Pump to perform any routine or necessary maintenance on the sample pump.
5. Refer to the *Installation, Operation, and Maintenance Manual* for the CP-2 Cylinder to perform any routine or necessary maintenance on the sample cylinder.
6. Refer to the *Installation, Operation, and Maintenance Manual* for the PP-2FX Pitot Probe to perform any routine or necessary maintenance on the pitot probe.
7. Refer to the *Installation, Operation, and Maintenance Manual* for the Norgren® Air Lubricator to perform any routine or necessary maintenance on the air lubricator/oiler. Oil may need to be added routinely to ensure the oiler continues functioning properly.
8. Refer to the *Installation, Operation, and Maintenance Manual* for the Versa® 4-Way Solenoid to perform any routine or necessary maintenance on the solenoid. Oil from the oiler should reduce wear on the solenoid, resulting in a less frequent maintenance schedule for the solenoid.
9. Refer to the *Installation, Operation, and Maintenance Manual* for the Norgren® Regulator to perform any routine or necessary maintenance on the regulator.

APPENDIX

ATTACHED DOCUMENTS:

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

- IOM-029: LSSM-1 Liquid Sample Pump
- IOM-101: PP-2FX Pitot Probe
- IOM-013: CP-2GM Constant Pressure Cylinder

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

- L73M, L73C: Norgren[®] Air Lubricator (Oiler) (Welker IOM-V013)
- V&T Series: Versa[®] Solenoid (Welker IOM-V026)
- R83: Norgren[®] Regulator (Welker IOM-V014)

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

- System Drawing with Electrical Diagram: LS3094
- Sample Pump Assembly Drawing: AD659CH
- Pitot Probe Assembly Drawing: AD843BB
- Sample Cylinder Assembly Drawing: AD071CW



13839 West Bellfort
Sugar Land, TX 77498-1671
Phone: (281) 491-2331
Fax: (281) 491-8344
Toll Free: (800) 776-7267
Web Page: www.welkereng.com