WELKER

# INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

## WELKER® FILTER DRYER

**MODEL**
F-4

**DRAWING NUMBERS**
AD042C[ ]
AD054C[ ]

**MANUAL NUMBER**
IOM-046

**REVISION**
Rev. H, 08/14/2024

## TABLE OF CONTENTS

# 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® Filter Dryer, F-4. 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 Filter Dryer 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 Filter Dryer, 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® *F-4* Filter Dryer is designed to filter and dry natural gas to prepare it for use as an instrument supply.

As gas flows through the F-4, water, aerosols, odorant, and liquid hydrocarbons are removed by the filter media, thus cleaning and drying the gas for use by downstream pneumatic controllers or other instruments.

*Welker® may custom design the F-4 to suit the particular application and specifications of each customer.*

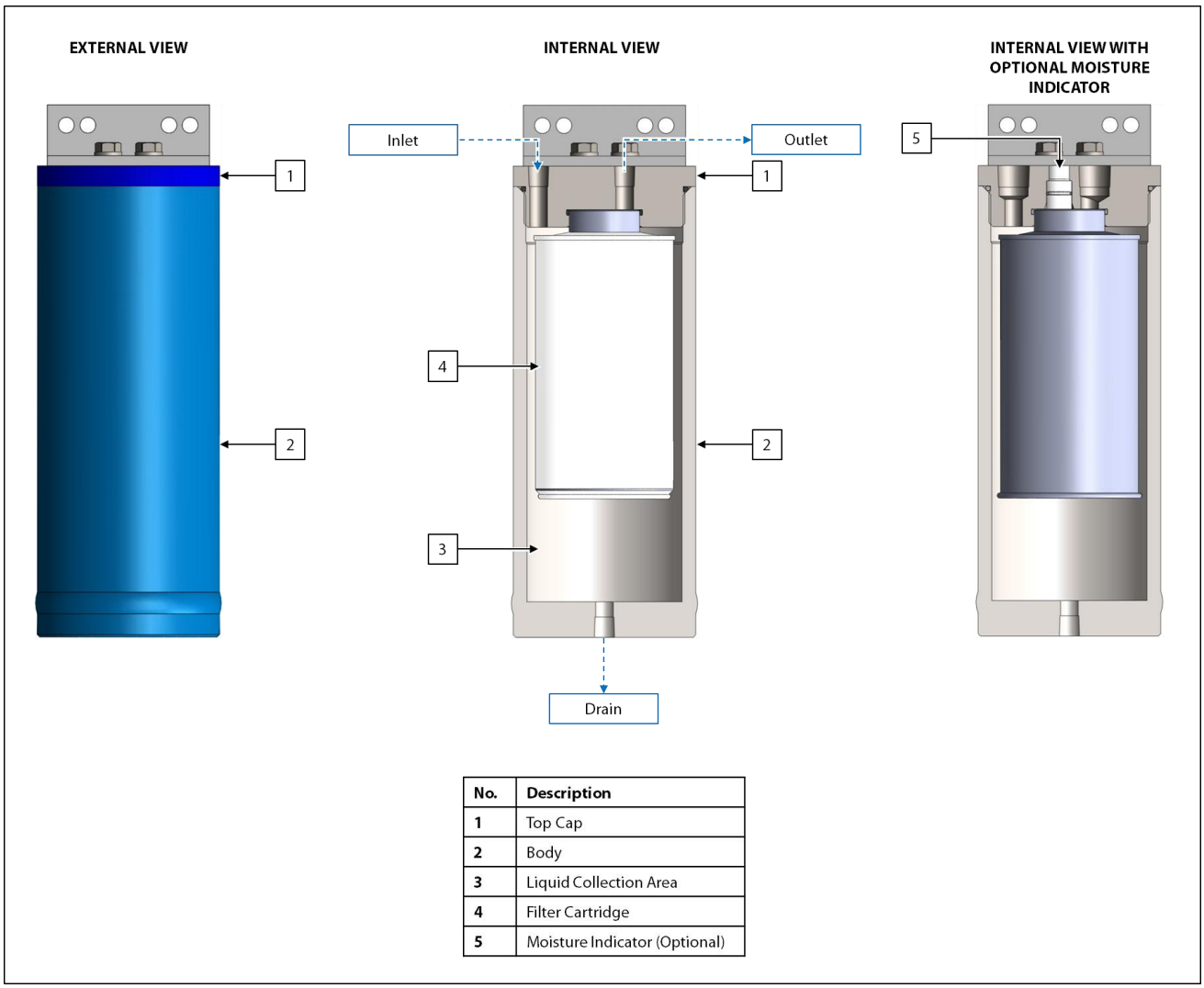
## 1.3 Specifications

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: F-4 Specifications | |
|---|---|
| **Products** | Natural Gas and Instrument Air |
| **Materials of Construction** | Buna, Carbon Steel, and PTFE<br>Others Available |
| **Maximum Allowable Operating Pressure** | **Standard:** 1500 psig @ -20 °F to 120 °F (*103 barg @ -28 °C to 48 °C*)<br>**HP:** 2160 psig @ -20 °F to 120 °F (*148 barg @ -28 °C to 48 °C*)<br>**XHP:** 3000 psig @ -20 °F to 120 °F (*206 barg @ -28 °C to 48 °C*) |
| **Maximum Allowable Temperature** | 200 °F (*93 °C*) |
| **Connections** | ¼" FNPT (Standard)<br>½" FNPT<br>¾" FNPT<br>1" FNPT |
| **Flow Rate** | Up to 50 scfm |
| **Nominal Filter Rating** | 3 Micron |
| **Filter Media** | ⅔ Silica Gel, ⅓ Activated Charcoal<br>⅔ Sulfur-Gon™, ⅓ Molecular Sieve<br>⅔ Sulfur-Gon™, ⅓ Silica Gel<br>50% Silica Gel, 50% Activated Charcoal<br>50% Silica Gel, 50% Molecular Sieve<br>50% Silica Gel, 50% Sulfur-Gon™<br>75% Sulfur-Gon™, 25% Molecular Sieve<br>100% Activated Charcoal<br>100% Molecular Sieve<br>100% Shredded PTFE<br>100% Silica Gel (Standard)<br>100% Sulfur-Gon™<br>Others Available |
| **Options** | Bypass<br>Drain Valve<br>Heavy Duty Filter Cartridge<br>Moisture Indicator<br>Regulator With Gauge and Relief<br>CE Compliance<br>CRN Alberta Certification |

## 1.4 Equipment Diagram

**Figure 1: F-4 Diagram**




| No. | Description |
|---|---|
| 1 | Top Cap |
| 2 | Body |
| 3 | Liquid Collection Area |
| 4 | Filter Cartridge |
| 5 | Moisture Indicator (Optional) |

## 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.

## 2.2 Installation and Operation

1. As necessary, mount the F-4 vertically to the desired location.
2. As necessary, plug or install a valve to the drain port (*Figure 1*).

Welker® recommends installing a Welker® NV-1 Instrument Valve to the drain port to ease draining and safe depressurization of the F-4.

3. As necessary, connect from the drain valve to a safe drainage location.
4. Using customer-supplied tubing, connect from the pneumatic supply source to the inlet of the F-4 (*Figure 1*).
5. Using customer-supplied tubing, connect from the outlet of the F-4 to the instrument to be supplied with the filtered natural gas or instrument air (*Figure 1*).
6. Slowly open the outlet valve on the pneumatic supply source. Check for leaks and repair as necessary.
7. If a valve is installed between the F-4 and the instrument to be supplied with the filtered natural gas or instrument air, open that valve to allow the pneumatic supply to reach the instrument.
8. The F-4 is now operational.

## 3.1 Before You Begin

1. **Welker® recommends that the unit have standard maintenance every six (6) months 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.

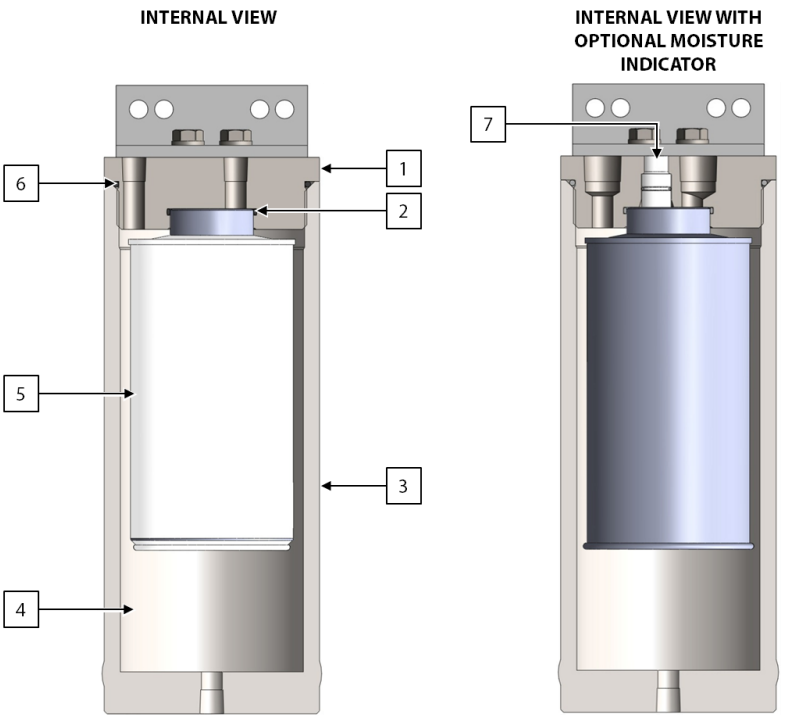
For sample-exposed seals, Welker® recommends non-hydrocarbon-based lubricants, such as Krytox®.
For non-sample-exposed seals, Welker® recommends either non-hydrocarbon-based lubricants or silicone-based lubricants, such as Molykote® 111.

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. Large Rubber Pipe Wrench
    b. Seal Pick
    c. Strap Wrench

## 3.2 Maintenance

**Figure 2: F-4 Maintenance Diagram**




| No. | Description |
|---|---|
| 1 | Top Cap |
| 2 | O-ring |
| 3 | Body |
| 4 | Liquid Collection Area |
| 5 | Filter Cartridge |
| 6 | O-ring |
| 7 | Moisture Indicator (Optional) |

1. Determine how quickly condensation or free liquids accumulate in the F-4 by frequently draining the F-4.
2. Isolate the F-4. If the F-4 is not equipped with the optional bypass, close the outlet valve on the pneumatic supply source and shut down any instrumentation connected to the F-4. If the F-4 is equipped with the optional bypass, open the bypass valve, and then close the inlet and outlet valves on the F-4.
3. Drain the F-4 to vent any pressure remaining in the body.

The standard filter cartridge is not designed for high volume reverse flow; therefore, care should be taken to protect the filter cartridge during depressurization. Welker® recommends **slowly** opening the drain valve a quarter turn, waiting approximately five (5) seconds, and then **slowly** opening the drain valve completely until the F-4 is depressurized.

Failure to slowly depressurize the F-4 could result in the loss of filter media from the filter cartridge.

Welker® recommends installing a Welker® NV-1 Instrument Valve to the drain port to ease draining and safe depressurization of the F-4.

4. Unscrew the body from the top cap.
5. Unscrew the filter cartridge from the top cap.

6. If the F-4 is equipped with the optional moisture indicator and the moisture indicator has changed from blue to pink, the moisture indicator needs to be replaced. From the top of the top cap, push the moisture indicator out. Install a new moisture indicator with a new O-ring in its place.
7. If necessary, replace the O-rings in the top cap.
8. Install the replacement filter cartridge to the top cap.
9. Apply a small amount of anti-galling compound or thread lubricant to the top cap threads.

Welker® recommends Never-Seez® or an equivalent anti-galling compound for use with this unit.

10. Fully screw the body onto the top cap.
11. Maintenance is now complete. See *Section 2.2, Installation and Operation,* for instructions on returning the F-4 to operation.

### 3.3 Troubleshooting

**Table 2: F-4 Troubleshooting**

| Issues | Possible Causes | Solutions |
|---|---|---|
| **Supply pressure from the F-4 has dropped.** | The filter is clogged or filled with liquid. | Drain the F-4 to remove any accumulated free liquids. See *Section 3.2, Maintenance,* for instructions on maintaining the F-4. |
| **Filter media was lost from the filter cartridge during depressurization.** | The F-4 was depressurized too quickly and/or the reverse flow rate through the filter cartridge was too high during depressurization. | Install a Welker® NV-1 Instrument Valve to the drain port. To properly depressurize the F-4, **slowly** open the drain valve a quarter turn, wait approximately five (5) seconds, and then **slowly** open the drain valve completely until the F-4 is depressurized. |
| **The color of the optional moisture indicator has changed from blue to pink.** | The filter cartridge is saturated. | Replace the filter cartridge and install a new moisture indicator to the top cap. See *Section 3.2, Maintenance,* for instructions. |

## APPENDIX A: REFERENCED OR ATTACHED DOCUMENTS

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

- IOM-105: Welker® NV-1 and NV-2 Instrument Valves

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

- None

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

- Assembly Drawing: AD042C[ ] (Standard F-4)
- Assembly Drawing: AD054C[ ] (F-4 With Optional Moisture Indicator)

## NOTES

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