WELKER

INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

WELKER® CLEANFLOW™ F-31

DRAWING NUMBER
AD285CX
AD285CX.1
AD285CY
AD285CY.5

MANUAL NUMBER
IOM-045

REVISION
Rev. D, 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® CleanFlow™ F-31. 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 CleanFlow™ F-31 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 CleanFlow™ F-31, 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 may have additional requirements and specifications that are not listed in this manual.*

1.2 Product Description

The Welker® *CleanFlow™ F-31* is designed to properly condition natural gas or instrument air for use as a pneumatic instrument supply. The system incorporates filters to remove unwanted elements from the instrument supply. With four (4) Welker® F-31 Filters/Dryers, the CleanFlow™ F-31 is two dehydration assemblies in one: a primary and a backup. The two (2) filters in the primary dehydration assembly operate simultaneously, increasing the flow rate. In the event both primary filters become obstructed and require maintenance, the two (2) filters in the backup dehydration assembly can be put into service, reducing interruption to service.

Welker® may custom design the CleanFlow™ F-31 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: CleanFlow™ F-31 Specifications	
Products	Natural Gas and Instrument Air
Materials of Construction	316/316L Stainless Steel, Buna, Carbon Steel, and PTFE Others Available
Maximum Allowable Operating Pressure	1500 psig @ -20 °F to 100 °F (*103 barg @ -28 °C to 37 °C*)
Connections	**Drains:** ¼" FNPT **Inlet:** 1½" FNPT **Outlet:** 1½" FNPT
Flow Rate	Up to 300 scfm
Nominal Filter Rating	3 Micron
Filter Media	Silica Gel and Activated Charcoal
Feature	Four (4) Welker® F-31 Filters/Dryers
Options	Differential Pressure Gauge Outlet Pressure Gauge

1.4 Equipment Diagrams

Figure 1: Connections Diagram – Standard CleanFlow™ F-31

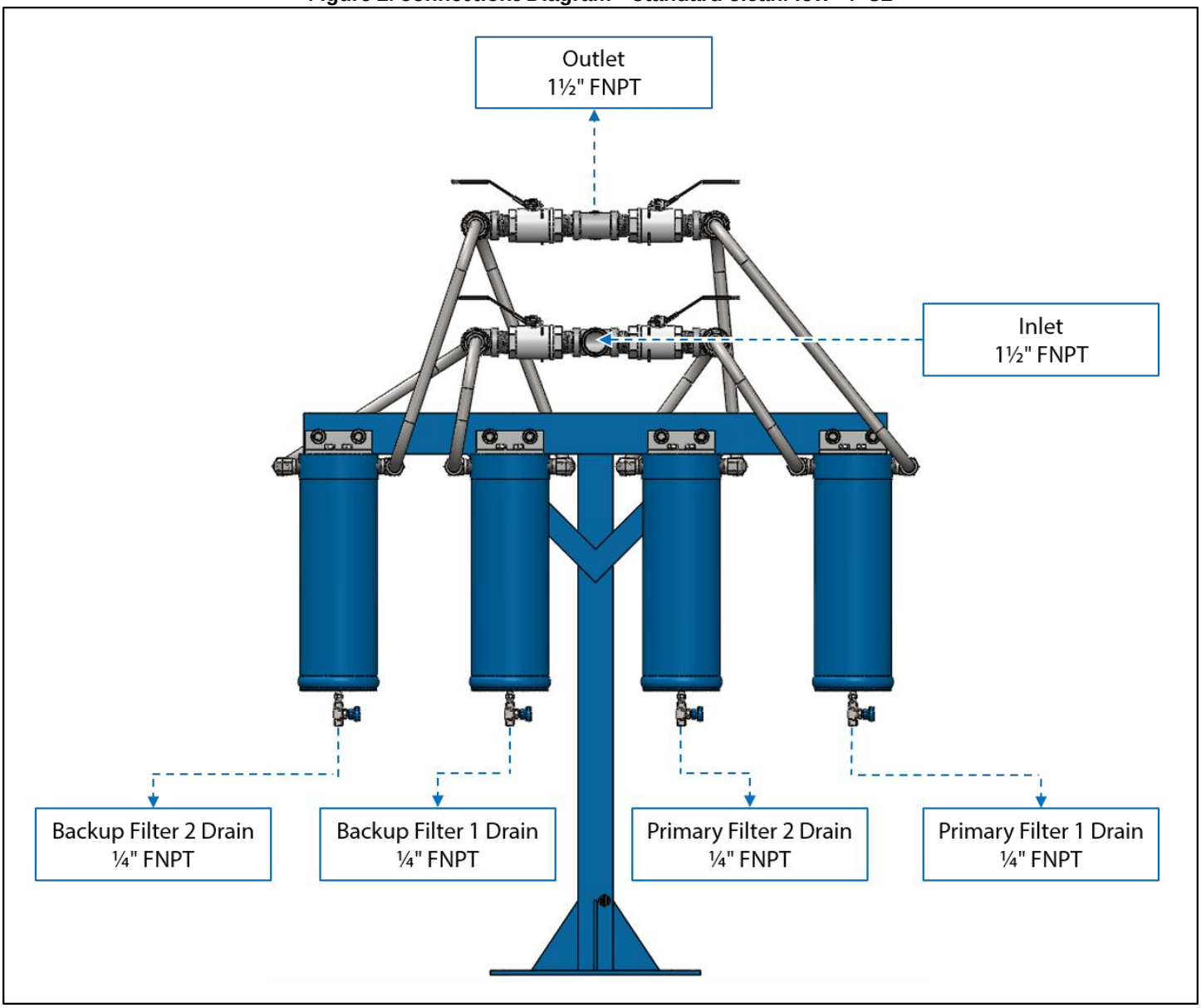


Figure 2: Connections Diagram – CleanFlow™ F-31 With Optional Differential Pressure Gauge

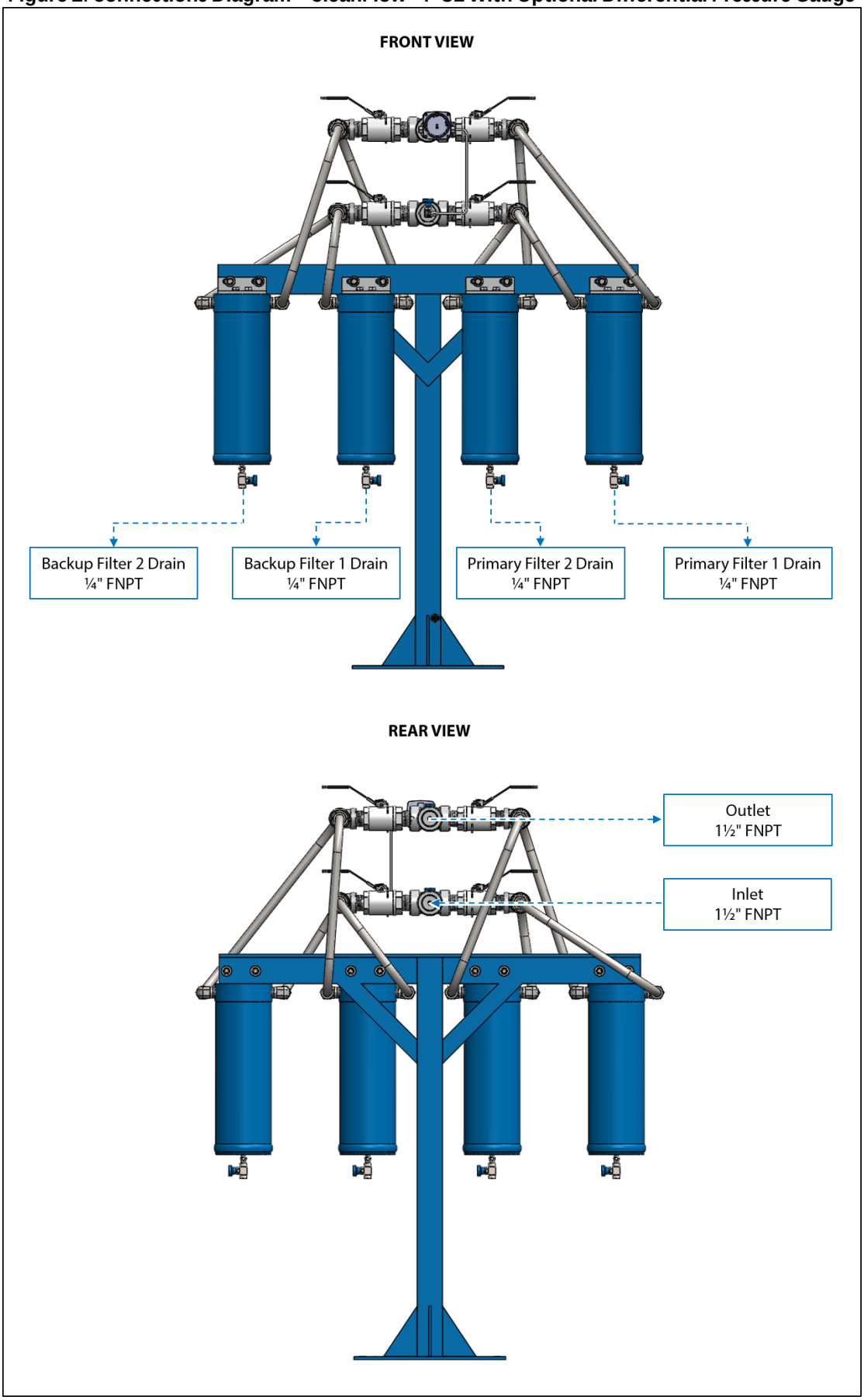
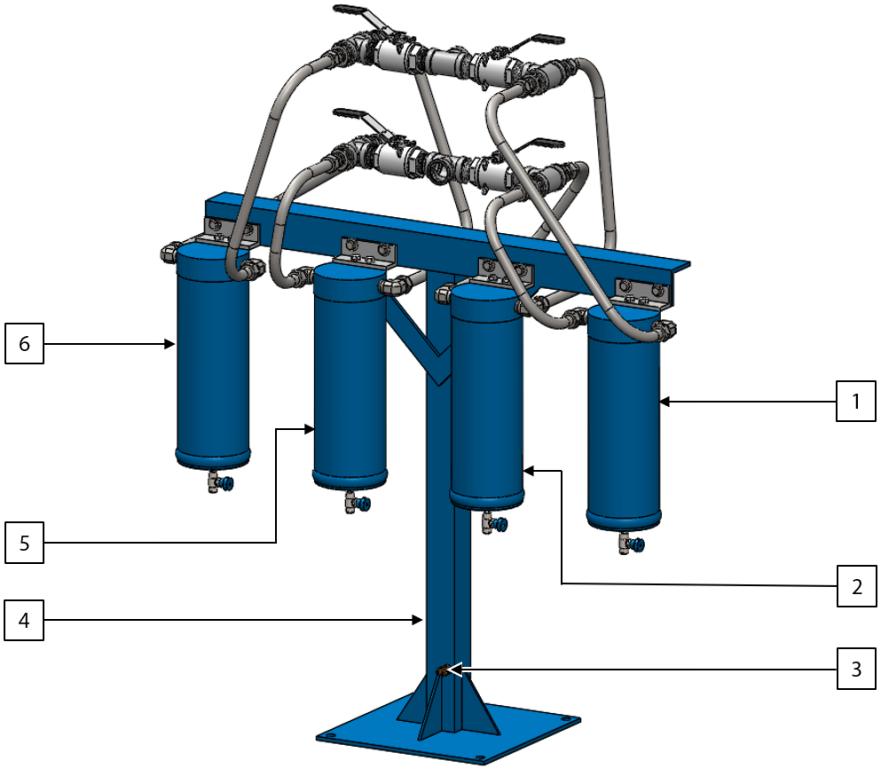
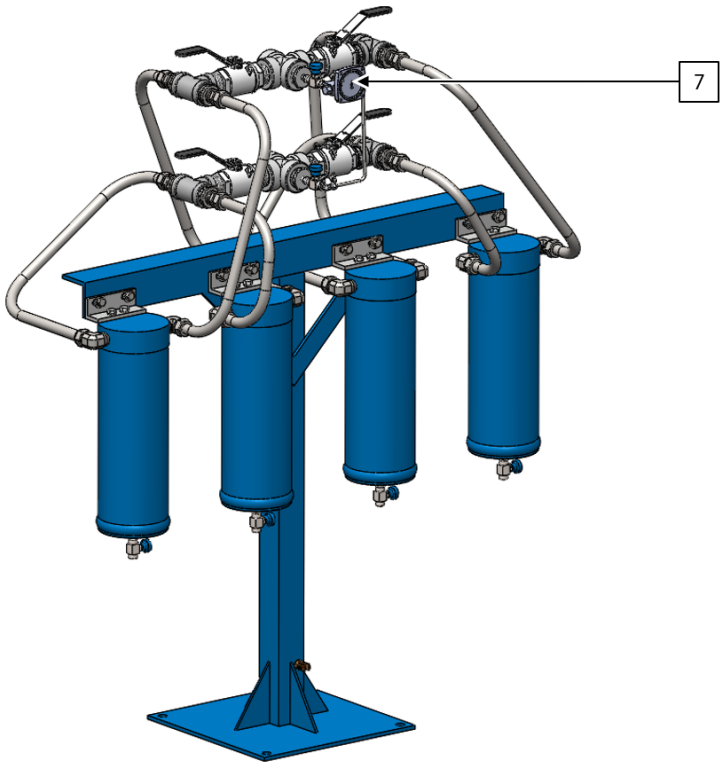


Figure 3: CleanFlow™ F-31 Diagram

STANDARD CLEANFLOW™ F-31



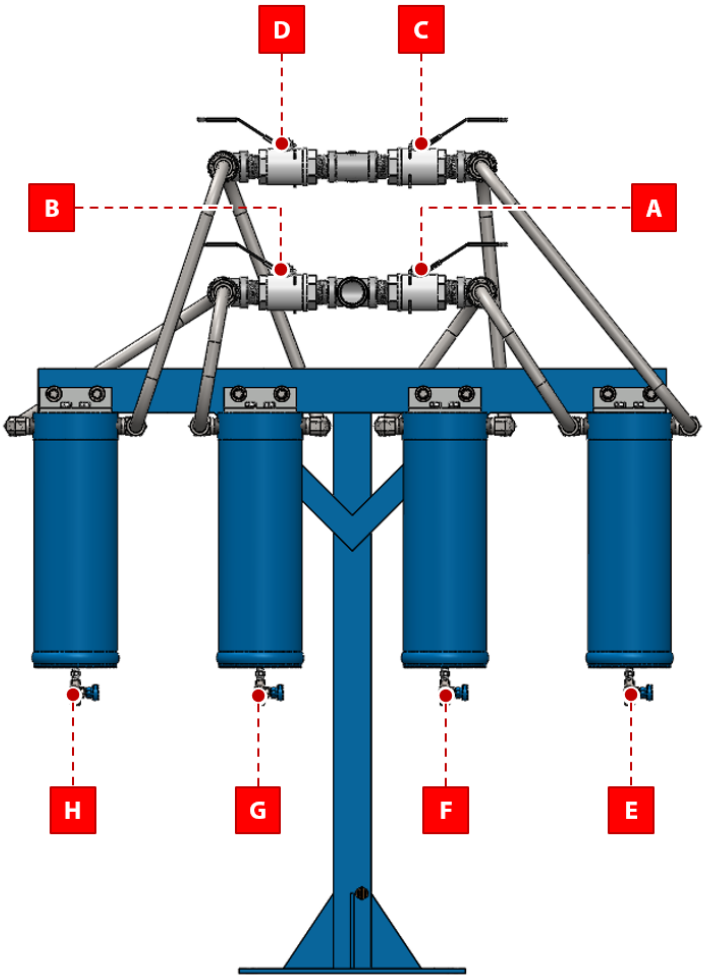
CLEANFLOW™ F-31 WITH OPTIONAL EQUIPMENT



No.	Description
1	Primary Filter 1 (Welker F-31 Filter/Dryer)
2	Primary Filter 2 (Welker F-31 Filter/Dryer)
3	Grounding Lug
4	Pipe Stand
5	Backup Filter 1 (Welker F-31 Filter/Dryer)
6	Backup Filter 2 (Welker F-31 Filter/Dryer)
7	Differential Pressure Gauge (Optional)

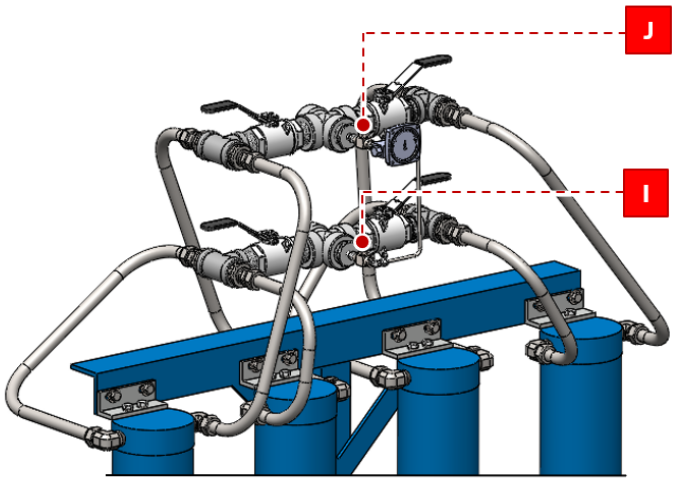
Figure 4: CleanFlow™ F-31 Valve Diagram

STANDARD CLEANFLOW™ F-31



No.	Description
A	Primary Dehydration Assembly Inlet Valve
B	Backup Dehydration Assembly Inlet Valve
C	Primary Dehydration Assembly Outlet Valve
D	Backup Dehydration Assembly Outlet Valve
E	Primary Filter 1 Drain Valve
F	Primary Filter 2 Drain Valve
G	Backup Filter 1 Drain Valve
H	Backup Filter 2 Drain Valve
I	Inlet Pressure Valve (Optional)
J	Outlet Pressure Valve (Optional)

CLEANFLOW™ F-31 WITH OPTIONAL EQUIPMENT



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.

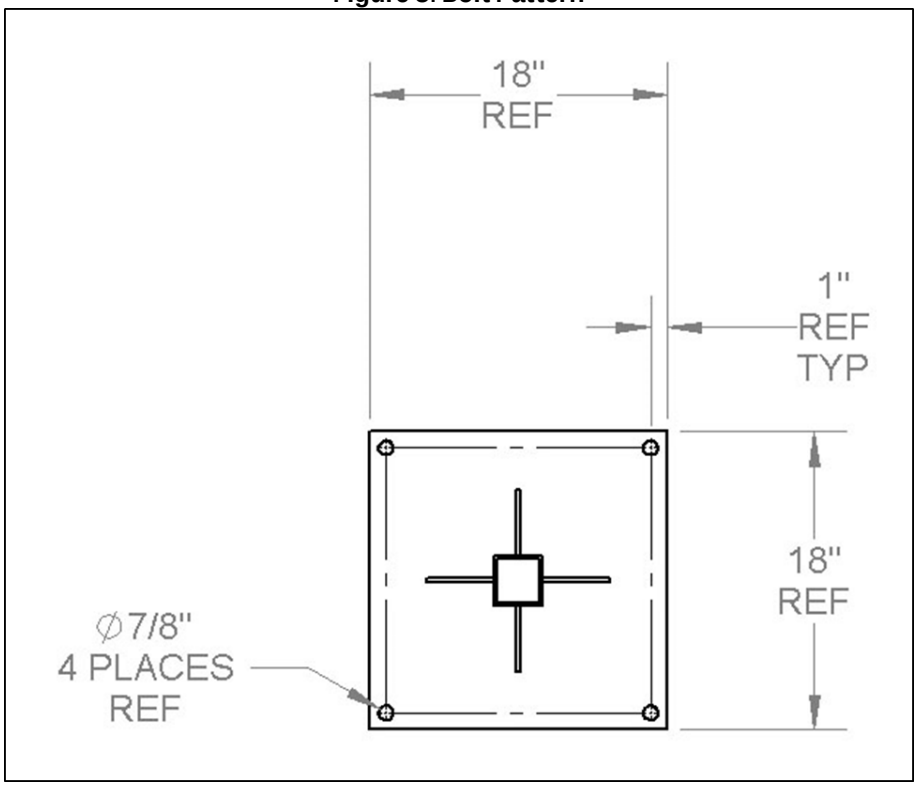
When sealing fittings with PTFE tape, refer to the proper sealing instructions for the brand used.

2.2 Installation and Operation

Welker® recommends installing a pressure gauge upstream and downstream of the CleanFlow™ F-31.

1. Secure the pipe stand according to the bolt pattern to the floor or ground (*Figure 5*).

Figure 5: Bolt Pattern



2. Connect a grounding wire to the grounding lug near the base of the pipe stand to safely ground the CleanFlow™ F-31 (*Figure 3*).
3. Ensure that all valves on the CleanFlow™ F-31 are closed (*Figure 4*).
4. Connect the inlet of the CleanFlow™ F-31 to a pressurized pneumatic supply source (*Figure 1* or *Figure 2*).
5. Connect the outlet of the CleanFlow™ F-31 to the inlet port of the instrument to be supplied with the conditioned natural gas or instrument air (*Figure 1* or *Figure 2*).
6. Open the valve of the pressurized pneumatic supply source to begin supply flow to the CleanFlow™ F-31.
7. Open primary dehydration assembly inlet valve A and primary dehydration assembly outlet valve C (*Figure 4*).

8. If the CleanFlow™ F-31 is equipped with the optional differential pressure gauge, slowly open inlet pressure valve I and outlet pressure valve J simultaneously (*Figure 4*).
9. If a valve is installed between the CleanFlow™ F-31 and the instrument to be supplied with the conditioned natural gas or instrument air, open that valve to allow the pneumatic supply to reach the instrument.
10. The unit is now operational.

If a pressure drop is noticed on a downstream pressure gauge or on the optional differential pressure gauge, it may be an indication that the primary filters are not functioning and that the backup filters need to be put into service. Maintenance on the primary filters may be required.

SECTION 3: MAINTENANCE

3.1 Before You Begin

1. **Welker® recommends that the unit have standard yearly maintenance.** Based on the operating conditions and/or site requirements, adjustments to the maintenance schedule may be necessary.
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. 12" Wrench
    b. 24" Wrench
    c. Rubber Pipe Wrench With a Minimum Diameter of 7"
    d. Seal Pick

3.2 Maintenance

1. Determine how quickly free liquids accumulate in the primary filters by frequently opening primary filter 1 drain valve E and primary filter 2 drain valve F (*Figure 4*).
2. If the CleanFlow™ F-31 is equipped with the optional differential pressure gauge, close inlet pressure valve I and outlet pressure valve J prior to performing maintenance to protect the gauge from damage (*Figure 4*).

Maintenance on Primary Dehydration Assembly While Maintaining Supply to the Instrument

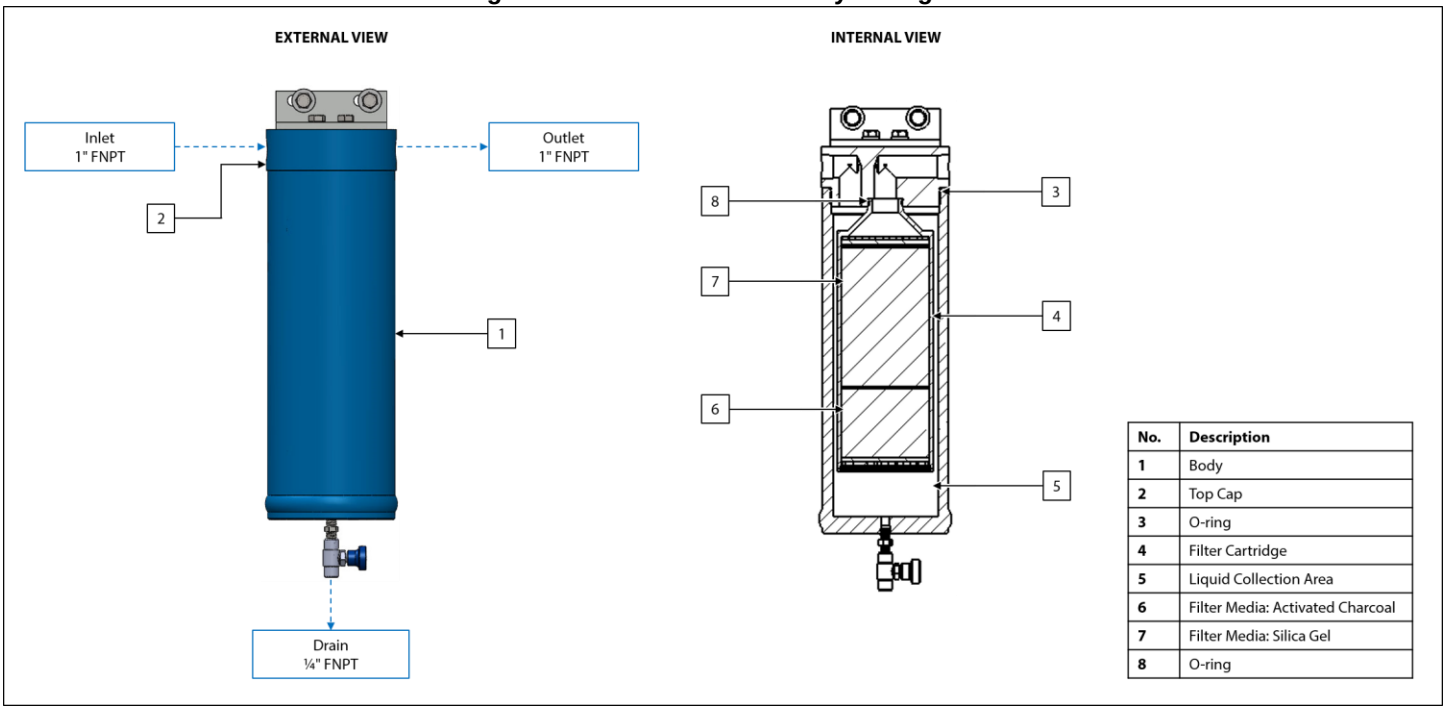
To maintain supply to the instrument while performing maintenance on the primary dehydration assembly, the backup dehydration assembly must be put into service.

3. Close primary dehydration assembly inlet valve A and primary dehydration assembly outlet valve C, and then open backup dehydration assembly inlet valve B and backup dehydration assembly outlet valve D (*Figure 4*). This will put the backup dehydration assembly into service.
4. Slowly open primary filter 1 drain valve E and primary filter 2 drain valve F to vent any pressure remaining in the primary dehydration assembly (*Figure 4*).

STOP

The filters/dryers must be depressurized prior to performing maintenance on the dehydration assembly.

Figure 6: Welker® F-31 Filter/Dryer Diagram



No.	Description
1	Body
2	Top Cap
3	O-ring
4	Filter Cartridge
5	Liquid Collection Area
6	Filter Media: Activated Charcoal
7	Filter Media: Silica Gel
8	O-ring

Primary Filter 1

5. Unscrew the body of primary filter 1 from the top cap (*Figure 3* and *Figure 6*).
6. If necessary, replace the O-rings in the top cap (*Figure 6*).
7. Remove and replace the filter cartridge (*Figure 6*).
8. Apply a small amount of anti-galling compound or thread lubricant to the top cap threads.
9. Screw the body onto the top cap.
10. Close primary filter 1 drain valve E (*Figure 4*).

Primary Filter 2

11. Unscrew the body of primary filter 2 from the top cap (*Figure 3* and *Figure 6*).
12. If necessary, replace the O-rings in the top cap (*Figure 6*).
13. Remove and replace the filter cartridge (*Figure 6*).
14. Apply a small amount of anti-galling compound or thread lubricant to the top cap threads.
15. Screw the body onto the top cap.
16. Close primary filter 2 drain valve F (*Figure 4*).
17. Leak check the seal between the body and top cap on primary filter 1 and primary filter 2 to ensure that a tight seal has been formed.
18. Open primary dehydration assembly inlet valve A and primary dehydration assembly outlet valve C, and then close backup dehydration assembly inlet valve B and backup dehydration assembly outlet valve D (*Figure 4*). This will return the primary dehydration assembly to service.
19. If maintenance will be performed on the backup dehydration assembly, continue to step 20. If maintenance will not be performed on the backup dehydration assembly and the CleanFlow™ F-31 is equipped with the optional differential pressure gauge, slowly open inlet pressure valve I and outlet pressure valve J simultaneously (*Figure 4*).

Maintenance on Backup Dehydration Assembly While Maintaining Supply to the Instrument

To maintain supply to the instrument while performing maintenance on the backup dehydration assembly, the primary dehydration assembly must be put into service.

20. If the CleanFlow™ F-31 is equipped with the optional differential pressure gauge, ensure that inlet pressure valve I and outlet pressure valve J are closed (*Figure 4*).
21. Ensure that backup dehydration assembly inlet valve B and backup dehydration assembly outlet valve D are closed and that primary dehydration assembly inlet valve A and primary dehydration assembly outlet valve C are open (*Figure 4*).
22. Slowly open backup filter 1 drain valve G and backup filter 2 drain valve H to vent any pressure remaining in the backup dehydration assembly (*Figure 4*).

STOP

The filters/dryers must be depressurized prior to performing maintenance on the dehydration assembly.

Backup Filter 1

23. Unscrew the body of backup filter 1 from the top cap (*Figure 3* and *Figure 6*).
24. If necessary, replace the O-rings in the top cap (*Figure 6*).
25. Remove and replace the filter cartridge (*Figure 6*).
26. Apply a small amount of anti-galling compound or thread lubricant to the top cap threads.
27. Screw the body onto the top cap.
28. Close backup filter 1 drain valve G (*Figure 4*).

Backup Filter 2

29. Unscrew the body of backup filter 2 from the top cap (*Figure 3* and *Figure 6*).
30. If necessary, replace the O-rings in the top cap (*Figure 6*).
31. Remove and replace the filter cartridge (*Figure 6*).
32. Apply a small amount of anti-galling compound or thread lubricant to the top cap threads.
33. Screw the body onto the top cap.
34. Close backup filter 2 drain valve H (*Figure 4*).
35. Leak check the seal between the body and top cap on backup filter 1 and backup filter 2 to ensure that a tight seal has been formed.
36. Maintenance is now complete. If the CleanFlow™ F-31 is equipped with the optional differential pressure gauge, slowly open inlet pressure valve I and outlet pressure valve J simultaneously (*Figure 4*).

3.3 Troubleshooting

Table 2: CleanFlow™ F-31 Troubleshooting

Issues	Possible Causes	Solutions
Supply from the CleanFlow™ F-31 has dropped or is insufficient.	The inlet and outlet valves of the dehydration assembly are not open or are not open fully.	If operating the primary dehydration assembly, fully open primary dehydration assembly inlet valve A and primary dehydration assembly outlet valve C. If operating the backup dehydration assembly, fully open backup dehydration assembly inlet valve B and backup dehydration assembly outlet valve D.
	One or more filters is clogged or filled with liquid.	Open the drain valve on each filter to drain any accumulated free liquids.
The optional differential pressure gauge is not reading pressure.	The inlet and outlet valves of the differential pressure gauge are not open.	Open inlet pressure valve I and outlet pressure valve J.
	The differential pressure gauge is wrapped or damaged.	If the gauge is wrapped, reset the gauge. If the gauge is damaged, replace the gauge. Contact Welker® for service options.

APPENDIX A: REFERENCED OR ATTACHED DOCUMENTS

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

- IOM-046: Welker® F-4, F-5, F-19, F-23, and F-31 Filters/Dryers
- IOM-105: Welker® NV-1 and NV-2 Instrument Valves

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

- Metso Automation Series 5H & 5HW Value-Line® ¼" – 2" (DN 6 – 50) 2-Piece High-Pressure Ball Valves (Welker® IOM-V244)
- WIKA Differential Pressure Gauges Magnetic-Piston Sensing Element Type 700.04 (Welker® IOM-V193)

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

- Assembly Drawing: AD285CX (Standard CleanFlow™ F-31)
- Assembly Drawing: AD285CX.1 (Standard CleanFlow™ F-31)
- Assembly Drawing: AD285CY (CleanFlow™ F-31 With Optional Differential Pressure Gauge)
- Assembly Drawing: AD285CY.5 (CleanFlow™ F-31 With Optional Differential Pressure Gauge)

NOTES

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

welker.com