



Serving the Petroleum and Natural Gas Industry

*Installation, Operation, and Maintenance Manual*

***Welker<sup>®</sup> Stainless Steel Filter/Instrument Regulator***

***Model  
FIR-1 Series***

The information in this manual has been carefully checked for accuracy and is intended to be used as a guide to operations. Correct operating and/or installation techniques, however, are the responsibility of the end user. Welker Engineering Company reserves the right to make changes to this and all products to improve performance and reliability.

***Welker Engineering Company***

P.O. Box 138

Sugar Land, Texas 77478-0138

U.S.A

Tel.: (800) 776-7267

Tel.: (281) 491-2331

Fax: (281) 491-8344

[www.welkereng.com](http://www.welkereng.com)

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# **1. General**

## **1.1 Introduction**

We appreciate your business and your choice of Welker Engineering Company products. The Installation, Operation and Maintenance liability for this product becomes that of the purchaser at the time of receipt. Reading the applicable IO&M Manual prior to installation and operation of this equipment, is required so that you have a full understanding of its application and performance prior to commencement of use. If you have any questions, please call 1-800-776-7267 or 281-491-2331 in the USA.

The Welker<sup>®</sup> FIR-1 series instrument regulator with filter is designed for instrumentation packages. The regulator is non-relieving and it is recommended for use with a relief valve on the downstream flow, such as the Welker<sup>®</sup> RV-1 or RV-3 series relief valves.

## **1.2 Specifications**

1.2.1 The FIR-1 series is designed for 0-2000 PSI inlet range, and 0-100 outlet. Each regulator will have an outlet spring range tag under the jam nut indicating which range spring is in the spring housing.

The outlet spring ranges available are as follows:

0 - 25 psi	Yellow
0 - 50 psi	Green
20 - 100 psi	Red

Regulators are supplied with a Kel-f seat.

The FIR-1 series regulator is supplied with a diaphragm for 0-100 outlet ranges.

The diaphragm allows for more sensitivity at lower outlet pressures.

## 2. Operating Instructions

### 2.1 Start-Up and Sequence of Operation

2.1.1 After unpacking the unit, check it for compliance and any damages which may have occurred during shipment.

**NOTE:** Claims for damages caused during shipment must be initiated by the receiver to the carrier. Welker Engineering Company is not responsible for any damages caused from mishandling by the shipping company.

**NOTE:** When sealing fittings with PTFE tape, refer to the proper sealing instructions for the tape used.

To place into operation, the following steps should be followed:

2.1.2 The regulator has 3 ports on the regulator body. The 3 ports are marked as outlet and relief/gauge.

2.1.3 The base of the filter has 2 ports. One port is the inlet supply, and the other is the drain port.

2.1.4 Install a relief in the relief port and tube from the outlet port to the solenoid (solenoid, port P). A gauge should be installed on the  $\frac{1}{8}$ " NPT gauge port.

2.1.5 Open supply to the unit.

2.1.6 Loosen the jam nut on the adjusting screw and, by using a hex key wrench, set the regulator to the required pressure by turning the adjusting screw. Then, tighten the jam nut to hold the setting.

2.1.7 Set the relief valve.

2.1.8 Unit is now ready for operation.

### 3. Maintenance Instructions

#### 3.1 General

Prior to maintenance or disassembly of the unit, it is advisable to have a repair kit handy for the system in case of encountering unexpected wear or faulty seals.

**We recommend that the unit have bi-annual maintenance under normal operating conditions. In the case of severe service, dirty conditions, excessive cycling usage or other unique applications that may subject the equipment to unpredictable circumstances, a more frequent maintenance schedule may be appropriate.**

Disassembly should be done in as clean an environment as possible. New seals supplied in spare parts kits are not lubricated. They should be lightly coated with lubrication grease (silicone grease or other) before they are installed into the equipment. This helps in the installation of the seals while reducing the risk of damage when positioning them on the parts. After the seals are installed, some additional lubrication can be applied to shafts or cylinder inner diameters to allow smooth transition of parts.

The following tools will be required:

- 12” adjustable wrench
- 6” adjustable wrench
- 8” channel lock pliers
- hex wrench, sizes  $\frac{5}{32}$ ”,  $\frac{3}{16}$ ”,  $\frac{1}{4}$ ”, and  $\frac{3}{8}$ ”
- Lubricant to apply to all o-ring seals when reassembling.

## **3.2 Disassembly**

**NOTE:** Maintenance for the FIR-1 should be performed only after the unit has been isolated from all pressure.

To change the range spring or diaphragm, the following steps should be followed:

- 3.2.1 Loosen the jam nut and back-off on the adjusting screw.
- 3.2.2 Unscrew the spring housing.
- 3.2.3 Replace the spring and/or diaphragm. The diaphragm has a stainless steel pad, and this should face the regulator body (i.e., the poppet).
- 3.2.4 Be sure top and bottom spring guides are in place on spring, and replace the spring housing firmly, hand tight.

## **3.3 Reassembly**

To replace the seat, poppet or filter, the following steps should be followed:

- 3.3.1 Remove the lower crown nut and seal. Replace the seal during reassembly.
- 3.3.2 Remove the filter base and cylinder. Replace the o-ring on the base and lubricate with silicone grease or equivalent.
- 3.3.3 Remove the filter element. Replace, if necessary, during reassembly.
- 3.3.4 Use an adjustable wrench and remove the adapter from the regulator base.  
Replace the o-rings on the adapter.
- 3.3.5 Remove the spring and poppet. Examine the poppet bevel for damage and replace, if necessary.

- 3.3.6 To remove the seat, carefully pick out with knife or pointed instrument. The center hole of the seat has a beveled edge. Examine this surface carefully for trash or scratches which will prevent positive shut-off. Handle the seat carefully as it is easily damaged.
- 3.3.7 Replace the seat and be sure that the beveled side of the seat faces the poppet for sealing.
- 3.3.8 Replace the poppet and spring into the regulator body.
- 3.3.9 Replace the adapter and tighten securely.
- 3.3.10 Replace the filter element and cylinder.
- 3.3.11 Replace the filter base, seal and crown nut and tighten securely.
- 3.3.12 Make sure all ports are clean.
- 3.3.13 Unit is now ready to be installed and reset.

**NOTE:** Filter elements that are available:

- 10 micron linear polyethylene
- 35 micron linear polyethylene