

AFR Semi-Auto Control Installation, Operation & Maintenance

Description 1
 Specifications 1
 Service Requirements 1
 Materials of Construction 1
 Connections 1
 Design Temperature/Pressure 1
 Airborne Noise Emissions 1
 Installation 1
 Connect Air Supply 1
 Connect Electrical Supply 1
 Transportation 1
 Securing to Foundation 1
 Checklist 1
 Commissioning Procedure 2
 Operation 2
 Operational Modes 2
 Filtering 2
 Backwash 2
 Control Logic 2
 Troubleshooting 2
 Symptoms 2
 Possible Faults 2

the unit was ordered. It is the customer's responsibility to ensure material compatibility.

Connections

Air supply: 1/2" NPTI (standard)

Design Temperature/Pressure

- Temperatures vary based on elastomer type. Maximum temperature for elastomers: Buna N 225 °F (107 °C), EPT (Nordel) 300 °F (149 °C), Viton® 350 °F (176 °C)
- Design Pressure is 250 PSIG. Maximum differential pressure is 150 PSID

Airborne Noise Emissions
<70 dB(A) During normal operation

Installation

This document applies to the installation of the filter unit controls. See additional instructions for the installation of the filter vessel.

Connect Air Supply

1. Connect the air supply line (customer supplied) to the air filter/regulator port (1/2" NPTI).

Connect Electrical Supply

1. All wiring and power connections need to meet local electrical code requirements.
2. No holes have been provided in the automation enclosure for incoming wiring. A hole (or holes) in the enclosure will need to be made in a suitable location to receive incoming electrical wiring. Protect internal components from metal chip and debris when making any holes and connections.
3. Reference Electrical Schematic to wire system components to customer supplied control system

Transportation

Move the filter system as close as possible to the installation site before it is removed from the crate or skid. Position the filter frame on a prepared, level foundation. Level the filter frame before it is anchored to the foundation.

Securing to Foundation

Anchor the enclosure stand to the foundation using the three 5/8" diameter anchor holes located at the base of the stand.

Checklist

- Verify that all service connections are secure and meet local codes.
- Verify that the system components are wired correctly to the customer supplied control system (loop check).
- Verify that the incoming automation electrical supply is the proper voltage. Improper voltage will cause serious damage to the filter's electrical systems. The proper voltage is factory set at 24VDC or 120 VAC
- Verify air supply connections and proper air pressure/volume

Description

The AFR tubular unit consist of up to eight stations connect to an inlet and outlet manifold in a circular configuration. This filter system is equipped with two pneumatic double acting actuators piloted by individual 4-way solenoid valves. A rotary type actuator provides force to index a flow diverter assembly from station to station while a second rotary type actuator actuates the drain valve. The system is controlled using a system supplied by the end user.



Warning: The use of Teflon® tape is not recommended for all pipe connections. Teflon® tape tends to break off and clog orifices. Electrical supply voltage must match the automation enclosure rating. Incorrect supply voltage will cause damage and may cause injury.

To prevent electrical shock, follow proper safe work procedures when working on electrical circuits.

Specifications

This lists the general control specifications for a typical backwashing semi-automatic filter system.

Service Requirements

Air: minimum 60 psig (4 bar), maximum 116 psig (8 bar) at 5.0 CFM (140 dm³/m). Clean, dry, non-lubricated.
 Electrical: 24VDC or 120VAC (factory set).

Materials of Construction

All wetted materials are type 316/316L stainless steel. The material selection for this vessel was based on the information provided when

Commissioning Procedure

1. Inspect the piping connections to the filter. Verify that the inlet connection on the filter is connected to the pipe containing the incoming process fluid. Repeat this procedure for the outlet and purge connections.
2. All isolation valves to the filter should be closed. If there is a bypass loop around the filter, that loop should be closed to prevent back flushing dirty process fluid into the filter.
3. Open the isolation valve for the outlet piping.
4. If this filter was supplied with a control package, turn on the power to the filter system controls.
5. Open the inlet isolation valve to allow approximately 25% of the flow to reach the filter.



Notice: Opening the inlet valve to the fully open position without proper ramping will cause particles to become wedged into the filter media. If this happens, the filter media will have to be removed and cleaned manually.

6. Over the next ½ hour, slowly introduce more of the flow until you reach 100%. You may want to manually initiate a purge during this time to ensure that piping debris is cleaned from the unit.

Operation



Warning: Mechanical and/or electrical hazards may exist.

1. The backwash sequence should be activated to keep the differential pressure between the inlet and outlet of the filter below 15 PSID (103 kPa).
2. The filter unit is supplied with a valve (or valves) used to reverse the cleaning fluid flow across the filter element. Reference documents named in the Control Logic section of this document for proper operation/sequence.
3. If the filter element is removed from the unit, avoid high pressure washing from the inside of the element. This may force contaminants into the filter media and cause permanent blockage and/or element damage.
4. Always pressurize the unit slowly on start up and watch for leakage.
5. Monitoring of the differential pressure between the inlet and outlet pressures should be used to determine backwash duration and interval. Normal operation should exhibit low differential pressure.

Operational Modes

Filtering

The Filter mode is the normal operating mode and follows this process description:

1. Process fluid enters each unit through the inlet piping.
2. The flow is distributed to the filter element.
3. Debris gathers on the outside of the filter element as product flows through the screen to the outlet of the unit.

Backwashing

As debris gathers on the outside of the elements, the differential pressure will begin to rise. Once the differential pressure reaches 15

PSI, it is recommended that a backwash mode be initiated backwash be initiated. This will either happen manually or automatically.

The Backwash Sequence will take each Filter Vessel offline in sequence. The Index Solenoid Valve will energize to move the Diverter to the first Filter Vessel/Station allowing the inlet of the vessel to be connected to the Drain Header of the unit. Once at the first Station (as indicated by the Station Position Switch), the Drain Valve is opened, and Cleaning fluids are then diverted from the Outlet Manifold to dislodge and discharge accumulated debris collected on the outside of the Filter Element. The Filter Vessel is then placed back online, and after a short pause, the sequence continues to the remaining Filter Vessels/Stations.

Control Logic

Reference Control Philosophy (DOQ0000149-EN), Sequence Diagram (DOQ0000150-EN) and Logic Diagram (DOQ0000158-EN). Final system performance is responsibility of the end user. Automation hardware and software (including programming) is responsibility of end user.

Troubleshooting

Symptoms

- A** Actuator doesn't operate properly (Diverter or Drain Valve)
- B** Leakage at lid seal
- C** Leakage where diverter shaft passes through lid
- D** Reduction in flow rate or high differential pressure
- E** Drop in filtrate quality
- F** Home Position switch
- G** Station Position switch

Possible Faults

- A** Actuator doesn't operate properly
 - 1 No power
 - a Check to see if the filter system is receiving adequate power.
 - b Check to see if the filter system is set to the proper voltage.
 - c Check all wiring connections.
 - 2 No air
 - a Check to see if the filter system is receiving adequate air.
 - b Check for air leaks.
 - c Check to see if the air bleed valve is closed and the air block valve is open.
 - d Check to see if the air lines are connected to the correct ports.
 - 3 Actuator seals have been destroyed
 - a Order a factory repair kit and replace the seals.
 - 4 Faulty solenoid valve
 - a Check to see whether the manual override button on the solenoid valve actuates the cylinder
- B** Leakage at lid seal
 - 1 Loose lid nuts/bolts
 - a Tighten lid/nut bolts to

- 2 Dirty lid sealing surfaces
 - a Clean lid sealing surfaces
- 3 Damaged sealing surfaces
 - a Repair or replace filter station
- 4 Worn lid O-ring
 - a Remove and replace with factory lid O-ring
- C Leakage where diverter shaft passes through lid**
 - 1 Damaged or worn diverter shaft seal
 - a Inspect and replace the drive shaft seal
 - 2 Packing seal too loose
 - a Inspect packing seal bolts
- D Reduction in flow rate or high differential pressure**
 - 1 Dirty or damaged filter screen
 - a Inspect and clean or replace filter screen
 - 2 Flow, viscosity, or solids increase
 - a Consult factory
- E Drop in filtrate quality**
 - 1 High differential pressure
 - a Refer to reduction in flow rate or high differential pressure above
 - 2 Damaged filter screen O-rings
 - a Remove and replace with factory filter screen O-rings
 - 3 Damaged filter screen
 - a Remove and replace with factory filter screen
 - 4 Filter screen too coarse
 - a Consult factory for ability of filter system to accept a finer screen retention. Remove and replace with factory filter screen
- F Home Position switch**
 - 1 Position not being found
 - a Confirm switch is receiving proper power
 - b Confirm target gap
 - c Confirm wiring in panel
 - d Check cable connection at switch housing
- G Station Position switch**
 - 1 Position not being found
 - a Confirm switch is receiving proper power
 - b Confirm target gap
 - c Confirm wiring in panel
 - d Check cable connection at switch housing

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If you are interested in ordering spare parts or having service performed on your filter, please contact Customer Service.

Eaton reserves the right to change specifications, dimensions and model designations without prior notice.