

DESCRIPTION

The automatic 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 cylinders piloted by individual 4-way solenoid valves. A rotary type cylinder provides force to move a flow diverter assembly from station to station while a second rotary type cylinder actuates the drain valve. The system is control by a microcontroller which is housed in a Nema 4 enclosure. An HMi touch panel display is used to communicate with the controller.

SPECIFICATIONS

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: 115 VAC / 230 VAC (factory set) at 50/60 Hz.

CONNECTIONS: Air: 1/2" NPTI

INSTALLATION INSTRUCTIONS

- 1) Connect the air supply line (customer supplied) to the air filter/regulator port (1/2" NPTI) mounted on the control panel.
- 2) Connect the incoming single-phase electrical supply to the panel mounted disconnect switch inside the automation enclosure. Please reference the units wiring diagram for the proper terminal connections for the line and neutral wires. Ground connects to the ground \equiv terminal mounted on the face of the switch.

INSTALLATION CHECKLIST

Complete this checklist before operating the system:

- Verify that the input power wiring is attached correctly to the main disconnect switch mounted inside the enclosure.
- 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 115 volts or 230 volts (single phase VAC).

START-UP VERIFICATION and OPERATION

Before circulating fluids through the filter system, start the system dry and verify the following:

- 1) Turn the main power switch to the ON position (located on the enclosure door). Along with the illumination of the GREEN (power status) light, the display should show the main screen (image 1).
- 2) Touch the **ON/OFF** button (lower left hand corner of screen). The status box on Image 1 will change from OFF to ON. If the flow diverter is not in the home position, the pneumatic drive assembly will index the flow diverter until it reaches home position. The status box in Image 1 will read HOMING.
- 3) Touch the **Clean** button. The status box should show CLEAN. At this time, the pneumatic drive assembly will index the flow diverter to the first station. The butterfly valve on the drain will open for the clean duration, allowing the station to backwash, and then close. The flow diverter will now index to the next station. After the system cycles thru each station and the flow diverter reaches the home position the status will return to ON.

MAIN SCREEN

The top of the main screen (Image 1) will display the status states of the filter (Table 1). When the timed clean function is activated it will show a countdown to the next cleaning cycle in minutes. If a manual or differential pressure clean cycle is performed the time interval will reset to the Clean Interval time setting. If the Clean Interval time setting is set to zero this timer will be disable and "0 min" will be displayed (Image 2).

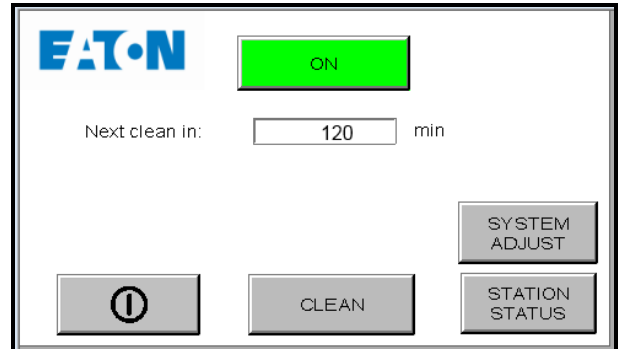


Image 1: Display showing main screen

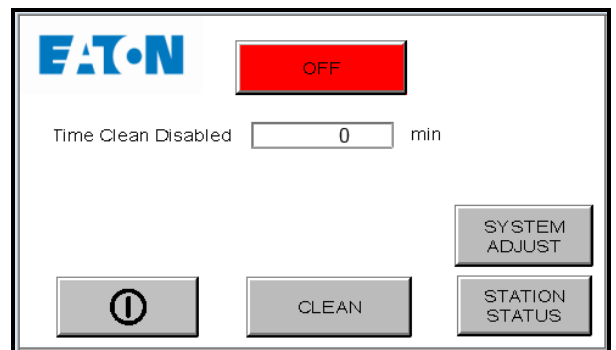


Image 2: Display showing parameter adjustment screen

ON	Controller is On
CLEAN	Cleaning Cycle is running
HIGH DP	Fault Due to High DP
HOMING	Diverter was not in home position at start-up and is searching for the Home Position.
HOME LOST	Diverter cannot find the home position.
STATION LOST	Diverter cannot find station.
HOME STUCK	Diverter cannot leave the Home Position
STATION STUCK	Diverter cannot leave a station position.
OFF	Controller is Off (See warning box below)

Table 1: Status states that can be display on main screen. (For the Siemen's Controller the states have their own display box that is grayed out when not in use.)



WARNING: When the PLC is off, only the PLC control is disabled. The green power light will still be illuminated to indicate that all electrical circuits are powered. Use caution when working on the system in this mode to prevent electrical shock. The ON/OFF button is not intended to be a replacement for following proper lockout procedures.

FAILURE TO FOLLOW THIS WARNING MAY LEAD TO DEATH OR SEVERE INJURY.

Below is a description of each button function on the main screen (Image 1).

- A. **Ⓞ** The **ON/OFF** power button – See warning box to the right. Turns the PLC ON and OFF. In the event of power failure, the operator will have to turn the system back ON. To reset the system and clear all error messages, turn the system OFF and back ON.
- B. **CLEAN** button – Allows the operator to initiate a manual cleaning sequence. When the button is touched, CLEAN will be displayed in the status box.
- C. **SYSTEM ADJUST** button – Touching this button will display the parameter adjustment screen. This is where changes can be made to the clean and purge sequences.
- D. **STATION ADJUST** button – Touching this button will display the station adjustment screen. This is where stations may be enabled or disabled.

PARAMETER ADJUSTMENTS

Parameter adjustments can be made by touching the button at the right of the field you want to change. The numeric keypad (Image 5) will appear and allow you to enter a new number. The range that can be entered is displayed in red.

Below is a description of each button function on the Parameter Adjustment screen (Image 3).

- A. **Clean Interval (m)** – The Clean Interval is the amount of time between automatic cleaning cycles. Clean strokes will automatically occur based on this. Units are in minutes and it is preset to 120 minutes. **Setting this value to zero (0) will disable the timed clean function.**
- B. **Clean Duration (s)** – The Clean Duration is the amount of time each station backwashes (cleans) during a cleaning cycle. Units are in seconds and it is preset to ten seconds.
- C. **Station Pause (s)** – Station Pause is the pause between stations during the cleaning cycle. Units are in seconds and it is preset to two seconds.
- D. **Clean Start Delay (s)** – Clean Start Delay is the delay between the initiation of the cleaning cycle and when the first station valves actuates. The backwash in process relay (RL2) is energized during this period. Units are in seconds and is preset to five seconds.
- E. **DP Start Delay (s)** – DP Start Delay is the amount of time the signal from the differential pressure switch must be present prior to initiating a cleaning cycle. Units are in seconds and is preset to five seconds.
- F. **Main Screen** button – Touching this button will return the user to the Main Screen (Image 1).

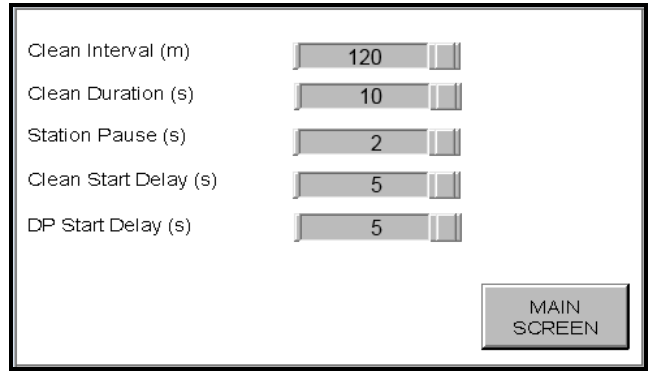


Image 3: Display showing parameter adjustment screen

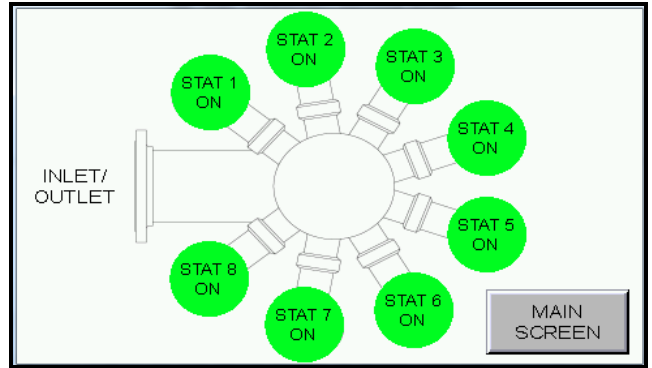


Image 4: Station Status screen

STATION STATUS

The Station Status screen (Image 4) allows the operator to place stations online and offline. Pressing the button for the station to be modified will enable and disable that station. Pressing the Main Screen button will return to the Main screen and pressing Next Screen or Previous Screen button will cycle to the next or previous set of stations.

BLANK STATIONS

If an AFR unit is supplied with blank stations, instead of the full allotment of eight, the blank station can be turned off in the Station Status screen. The cleaning cycle will still advance to each station position but will not pause for the clean duration on the stations that are turned off.

FAULT MESSAGES

Below is a description of each fault message on the Eaton HMi operator interface. To reset the system and clear all fault messages and outputs, turn the system OFF and back ON.

- A. **HIGH DP** – When the system initiates four cleanings cycles due to differential pressure within 60 minutes, a fault is set and the message **HIGH DP** will flash on the display. Possible causes: plugged elements, insufficient clean duration or insufficient inlet pressure to properly clean the element.
- B. **STATION STUCK** – (Indexing Valve) When the diverter valve does not move from a station position. Possible causes: no air supply, limit switch malfunction, actuator shaft packing or actuator shaft wear plate. Cycle the PLC OFF and back ON (button F1) to clear the error. See the main AFR unit manual, 55095-EN, for parts and instructions.
- C. **HOME STUCK** - (Indexing Valve) When the diverter valve does not move from the home position. Possible causes: no air supply, limit switch malfunction, actuator shaft packing or actuator shaft wear plate. Cycle the PLC OFF and back ON (button F1) to clear the error. See the main AFR unit manual, 55095-EN, for parts and instructions.

- D. **STATION LOST** - (Indexing Valve) When the diverter valve moves but cannot find it next position. Possible causes: limit switch malfunction. Cycle the PLC OFF and back ON (button F1) to clear the error. See the main AFR unit manual, 55095-EN, for parts and instructions.
- E. **HOME LOST** – When the diverter cannot find home position. Possible causes: no air supply, limit switch malfunction, actuator shaft packing, actuator shaft wear plate. See the main AFR unit manual, 55095-EN, for parts and instructions.



Image 5: Numeric keypad

DIFFERENTIAL PRESSURE SWITCH ADJUSTMENT

The differential pressure switch senses a difference in pressure between the inlet and outlet piping. When the factory pressure preset has been reached, it triggers a cleaning sequence. The factory preset is 15 PSID (1 bar).

To adjust the preset, remove the DP switch cover and turn the hex-adjusting nut. Turn it clockwise to decrease the allowable differential pressure between the inlet and outlet piping. Turn the hex nut counterclockwise to increase the allowable differential pressure between the inlet and outlet piping. One flat turn ($1/6^{\text{th}}$ of a turn) of the hex-adjusting nut changes the setting by approximately 2 PSID (0.14 bar).

CUSTOMER INTERFACE

- A. **GENERAL FAULT (RL1)** – This relay is energized during normal operation. It will de-energize to indicate power loss, system is OFF, if the indexing valve has failed (HOME LOST or IND VLV faults) or if an excess differential pressure condition exists (if there are four differential pressure clean sequences in 60 minutes). See electrical schematic for connection details. The contact rating is 7A at 30 VDC or 110 VAC.
- B. **BACKWASH IN PROCESS (RL2)** – This relay is energized when the system is cleaning (backwashing). Reference the electrical schematic for contact connections. The contact rating is 7A at 30 VDC or 110 VAC.
- C. **REMOTE CLEAN START** – Use a momentary normally open dry contact across the remote start terminals to initiate a backwash. Reference the electrical schematic for contact connections.

WARRANTY

All products manufactured by Seller are warranted against defects in material and workmanship under normal use and service for which such products were designed for a period of eighteen (18) months after shipment from our factory or twelve (12) months after start up, whichever comes first. OUR SOLE OBLIGATION UNDER THIS WARRANTY IS TO REPAIR OR REPLACE, AT OUR OPTION, ANY PRODUCT OR ANY PARTS OR PARTS THEREOF FOUND TO BE DEFECTIVE. SELLER MAKES NO OTHER REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WE SHALL NOT BE LIABLE FOR CARTAGE, LABOR, CONSEQUENTIAL DAMAGES OR CONTINGENT LIABILITIES. OUR MAXIMUM LIABILITY SHALL NOT IN ANY EVENT EXCEED THE CONTRACT PRICE FOR THE PRODUCT.

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