

Read all the following information and instructions prior to installing and operating the equipment.
Failure to comply with these instructions could result in bodily injury or property damage.



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INTRODUCTION

An automatic, self-cleaning strainer requires a control system to provide flexibility and optimize performance of the straining operation. A number of standard options are available or specify a custom designed control system.

This manual will define the installation requirement, operation, and maintenance of the Eaton control system.

RECEIVING, HANDLING AND INSPECTION

The control panel, backwash arm and motor and accessories have been packed in a separate container but shipped with the strainer. This provides protection from damage during transit and also provides for ease of storage if the controls are not installed immediately. When first received the following must be done:

1. Unpack and inspect for damage.
2. Report any damage to carrier immediately.
3. If controls are not installed at this time, refer to Storage Instructions.

STORAGE INSTRUCTIONS

Repack all components in the original carton and reuse all protective packaging. Store all components in an indoor, clean, and dry environment. Protect from temperature extremes. Mark cartons to protect from handling abuse.

STRAINER MODE OF OPERATION CONTINUOUS BACKWASH

This is the most effective way to keep the strainer element “clean” and have the least pressure loss. Continuous element washing can be accomplished with a minimum of control devices. However, it offers no flexibility of operation when there are significant changes in flow volume or solids content of the fluid.

The “drain” line requires a blow-down/drain valve which may be manually operated. Normal valve position is CLOSED.

The backwash line requires a backwash valve which may be manually operated on the backwash line. Normal valve position is FULL OPEN.

The backwash motor requires a motor starter. Furnish with overload protection and fused disconnect.

STRAINER MODE OF OPERATION AUTOMATIC BACKWASH (TIMED CYCLE)

The preferred mode of operation for a self-cleaning strainer is one where the control system will permit both intermittent and continuous backwash as required by operating conditions.

The “drain” line requires a blow-down/drain valve which may be manually operated. Normal valve position is CLOSED.

The backwash line requires a backwash valve, either electrically or pneumatically operated on the backwash line. This valve should operate only in the FULL OPEN or FULL CLOSED position.

A fully adjustable differential pressure switch is furnished to detect the increase of pressure across the strainer. It will activate a backwash cycle independent of the time-controlled sequence. NOTE: Set switch at 2psi over the observed clean pressure drop.

Eaton provides a control panel, containing all necessary relays, timers, lights, switches, etc. This will initiate and monitor the intermittent backwash cycles.

VALVE SELECTION

Several important factors to consider when selecting the necessary valves.

Valve Type: Gate, plug, and butterfly valves can be used. However, ball valves provide the most advantages. Ball valves, when “Full Open” provide a uniform and straight flow path minimizing pressure loss. Since only 90° rotation of the stem is required to go from “Fully Closed” to “Fully Open” motorized operators are easily adapted and provide short cycle times.

Valve Material: Iron, bronze, steel, and stainless steel are the most common. Select valve and trim material that will not corrode or react with the process fluid or the environment.

Pressure Rating: Select the valve class with a pressure rating equal to or greater than the system design pressure.

Connection: Select a valve with end connections (flanged, threaded, etc.) that will provide ease of maintenance and trouble-free service.

STRAINER MODE OF OPERATION
CONTINUOUS BACKWASH

Several valves are required for various applications. Ball valves of the proper size, end connection, material, and pressure rating are recommended for these services.

Manually operated valves are best suited for “blow-down” and “chamber drain” service. They may also be used for continuous backwash service.

For timed cycle backwash, the valve should be operated by an electric or pneumatic valve actuator.

Larger size strainers require both a “blow-down drain” and a “chamber drain” for the body.

The table below lists the service functions and sizes of valves for standard strainers.

Model 596

| Size | Backwash | Chamber Drain |
|------------|----------|---------------|
| 2", 3", 4" | 1" | 3/4" |
| 6", 8" | 1 1/2" | 3/4" |

Model 2596

| Size | Backwash | Chamber Drain |
|------------|----------|---------------|
| 10" to 16" | 1" | 3/4" |
| 18" to 30" | 3" | 2" |
| 36" | 6" | 3" |

ELECTRIC ACTUATORS

The required actuator size depends on the backwash valve torque requirements. The motors are “shaded pole” or “split capacitor” type.

115 VAC, 10 Hz actuator motors are standard, other voltages are available.

The standard actuators require simple wiring from the control panel to the actuator (see Fig 2).

PNEUMATIC ACTUATORS

A double-acting piston design that uses a clean air supply of 40-125 psi pressure, powers the actuator properly.

Using an electric signal, a solenoid pilot valve controls the air supply to the actuator.

Most actuators have pipe thread connections (NPT) located so that the solenoid valves may be mounted with minimal tubing runs.

Customer must run wiring and conduit from the control panel terminals to the solenoid valve (see Fig 2).

Piping (or tubing) is required from the solenoid valve to the air supply system (this is customer scope of supply).

The solenoid pilot valve must be piped to the actuator so that the backwash valve will close when there is no electric power to the solenoid.

SAMPLE OPERATION
USING 3-WAY SOLENOID VALVE

Power On: Air supply from the pilot valve to actuator is “Open” but vent is “Closed.”

Power Off: Air supply to actuator is “Closed.” Vent connection is “Open.”

DIFFERENTIAL PRESSURE SWITCHES
SWITCH DESCRIPTION
(SINGLE OR DUAL ELEMENT)

A diaphragm type differential control with single switch is standard. It initiates a backwash cycle whenever a high differential pressure drop occurs across the strainer. A dual element switch is optional where operation requires the first switch to initiate the backwash cycle. The second switch activates on further increasing differential pressure and energizes a visual or audible alarm, calling for operator assistance.

DIFFERENTIAL PRESSURE SWITCHES

The differential pressure switch easily mounts on the control panel supports or attached to a bracket that is welded to the strainer body.



CAUTION: Never drill into the strainer body to mount instrumentation or support brackets.



CAUTION: Welding brackets to cast iron units is not recommended and should be avoided.

The switch is piped to the pressure connections furnished on the inlet/discharge nozzles of the strainer as shown in Fig 1. Customer must supply and run wiring and conduit between the differential pressure switch and the control panel. See Fig 2 for wiring connections.

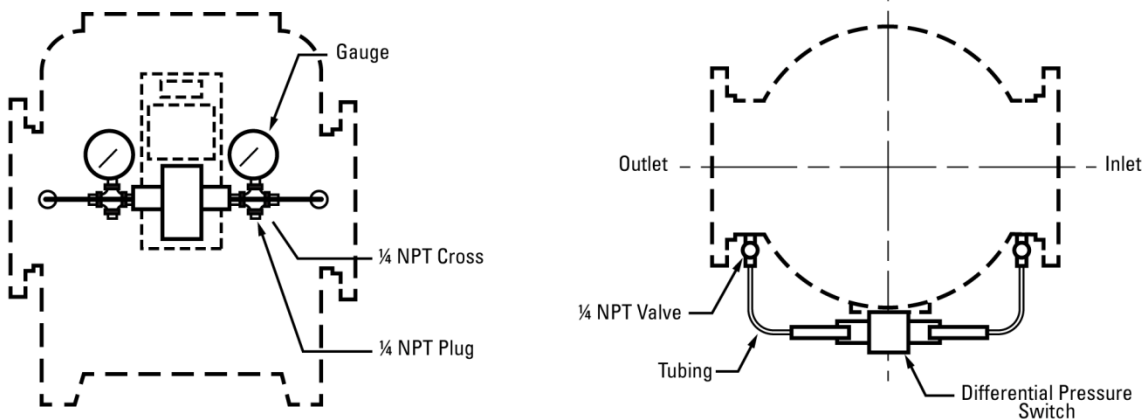
DIFFERENTIAL SWITCH ADJUSTMENT

While it is possible to use other equipment than what is described below, any installation should have the items described here.

- Equipment to be furnished by customer:
- 2 calibrated pressure gauges
- 2 gauge valves with drain
- 2 tees, tubing, and fittings
- All items suitable for 1/4" NPT connections

Install all equipment as shown in Fig 1. Open the gauge valves and record the pressure readings at inlet/discharge of strainer operating at rated flow. The difference in reading is the "Normal" pressure drop across the system. Close both gauge valves. Set switch at "Normal Plus 2 psi" using the adjustment screw at the calibrated scale. To simulate a high differential pressure, carefully vent the "outlet" side gauge valve only. Note the pressure difference at which the switch is "activated." Using the adjustment screw on top of the switch, adjust until switch activates at the proper set point. The "High" alarm setting (optional) should be set at "Normal Plus 4 psi." Special applications may require other settings than those given above. Switch should be re-calibrated at least every 6 months.

Figure 1



Note: Gauges and piping shown are furnished by customer.
The differential pressure switch connection marked "high" should be connected to the inlet nozzle of the strainer.

CONTROL PANEL DESCRIPTION

The ACS Series Control Panel is a rugged electro-mechanical unit made with industrial grade components and suitable for outdoor (NEMA 4) installation. The enclosure houses all components, is compact in size (12" x 12" x 7 3/8") and is offered in three configurations:

ACS-I: Basic, standard requires 120VAC input. All auxiliary equipment furnished by others.

ACS-II: All standard features and includes motor and starter for backwash arm.

ACS-III: All standard features plus motor starter for backwash motor and transformer for 575V, 460V or 220V

The ACS line of control panels allows operation either in the Manual or Auto modes. In the Manual mode, the strainer will continuously backwash. In the Auto mode, the strainer is allowed to backwash according to the preset timing cycle or when the differential pressure switch is activated.



NOTE: The customer determines the timing cycle length and changes it as required.

The control logic protects the strainer from sudden high quantities of solids or an improperly adjusted timer cycle. Whenever the differential pressure switch is activated, it overrides the timer circuit and opens the backwash valve.



NOTE: An On-Off cycling of the backwash valve will occur.

If frequent activation of the differential pressure switch is evident, the timer cycle must be re-set to backwash more often.

The panel door locates the selector switch and the indicating lights. The weatherproof rating is maintained as long as the lamp lenses are not broken and are not removed.

CYCLE TIMER SEQUENCE

To aid in understanding the electrical schematic (See Fig 2), the following description and definitions are provided:

Switching ON: B/W valve is closed

Switching OFF: B/W valve is open

Place the selector switch in the Auto position. This energizes the coil of the timer relay (TR1) and starts the countdown of its off delay cycle. Because (TR1) contacts have not changed position, the backwash valve remains open. When point (t2) is reached, the delay cycle has just expired and relay (TR1) contacts change position and the close circuit to the backwash valve is energized.

Therefore, the B/W valve closes. During the time period (t2-t3) the valve remains closed. At point (t3), the relay contacts change position again and the B/W valve opens.

For period (t3-t4), the backwash continues. At point (t4) the relay contacts change position and the B/W valve closes. Now at point (t5) the differential pressure switch activates. Through the control relay (CR- 1) the coil of timer relay (TR1) is de-energized. The (TR1) contacts change position and the B/W valve opens.

Period (t1-t12) and (t3-t4) may last from 30 seconds to 10 plus minutes; period is customer adjustable. Period (t2- t3) and (t4-t5) may last from 10 minutes to 16 plus hours. This period is customer adjustable.

ACS Panels include the following Standard Features: Solid State Timer Relay, fully adjustable knob control for both on and off cycles. Off Delay (backwash): 30 to 600 seconds. On Delay (no backwash): 10 to 1000 minutes.

Control Relay rated for 10 amps, DPDT contacts, plug-in type connection provides over-ride control and customer alarm signal contacts.

3 Position Selector Switch for mode selection (off-on-auto)

3 Indication Lights, red: high differential pressure, amber: unit is backwashing, green: power is on.

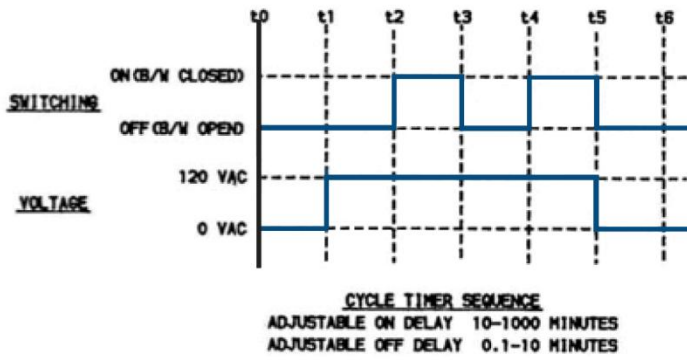
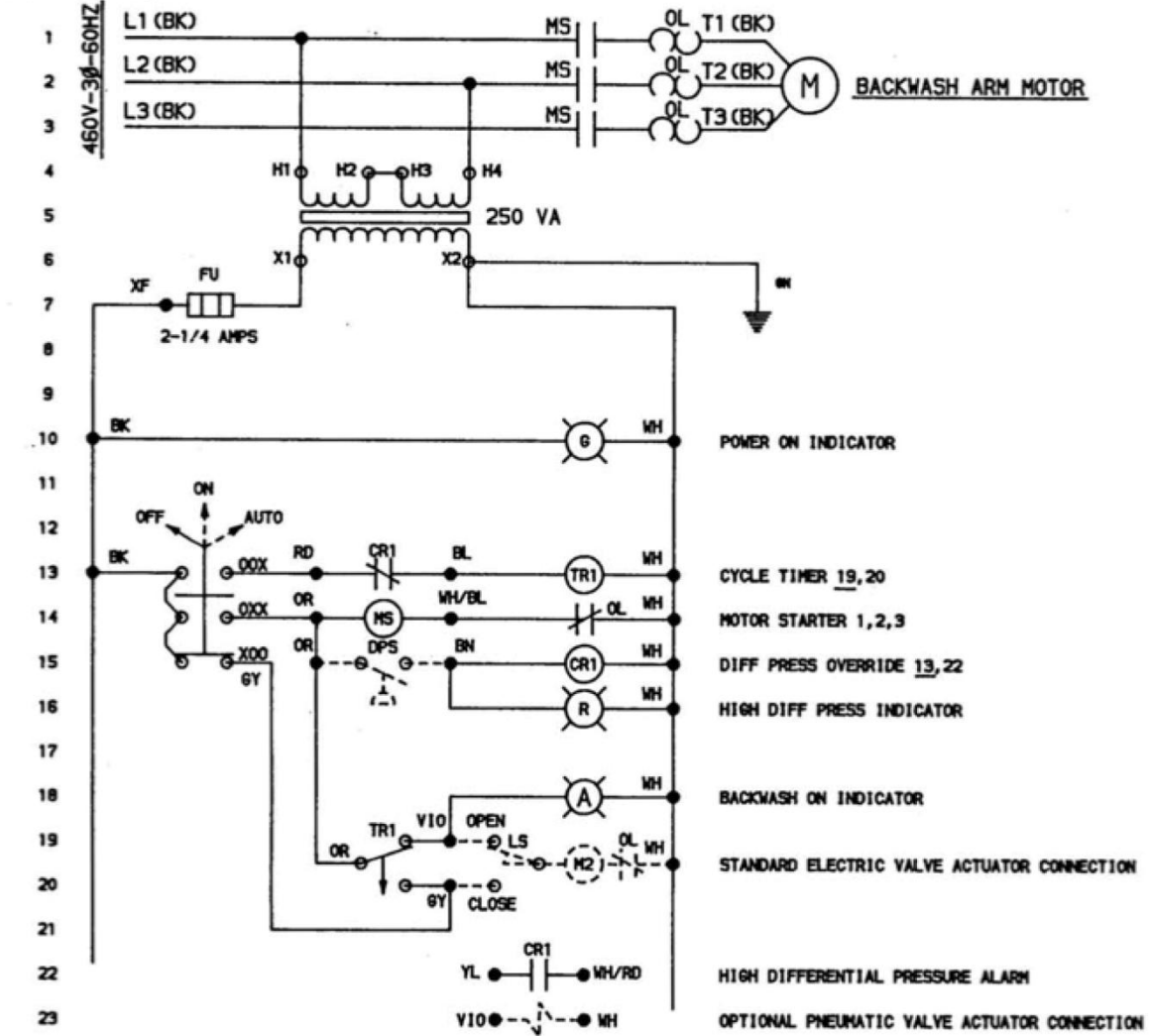
Differential Pressure Override protects strainer from unusual high solids loading and incorrectly set wash cycles.

Fuse Protected Panel Circuits, All components protected from overload. Fuse rating is 2.3 amps (ACS-3 panel) and 3.0 amps (others).

| | |
|-------------------------|----------|
| Control circuit wiring" | 18 gauge |
| Power circuit wiring: | 14 gauge |

**TYPICAL ELECTRIC SCHEMATIC OF CONTROL PANEL
(ACS-3 IS SHOWN)**

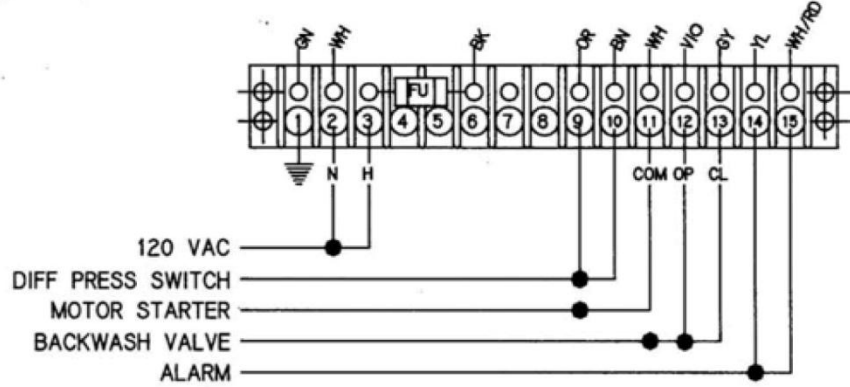
Figure 2



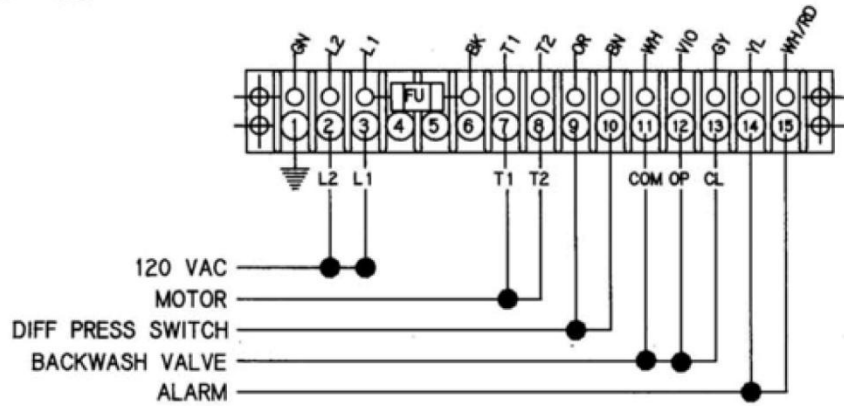
INTERCONNECTION TERMINAL DIAGRAM

Figure 3

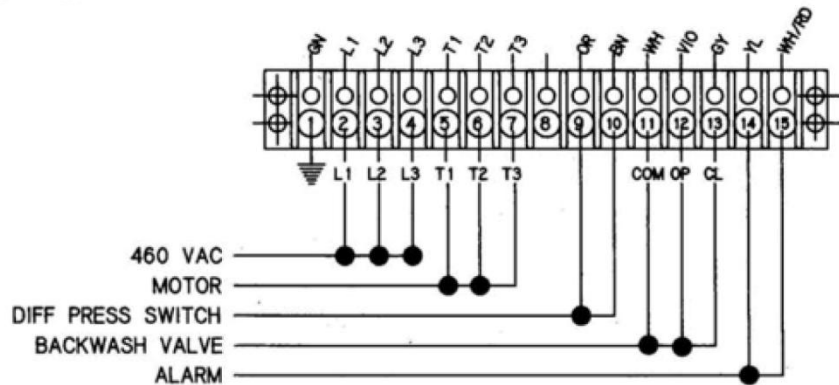
ACS-1



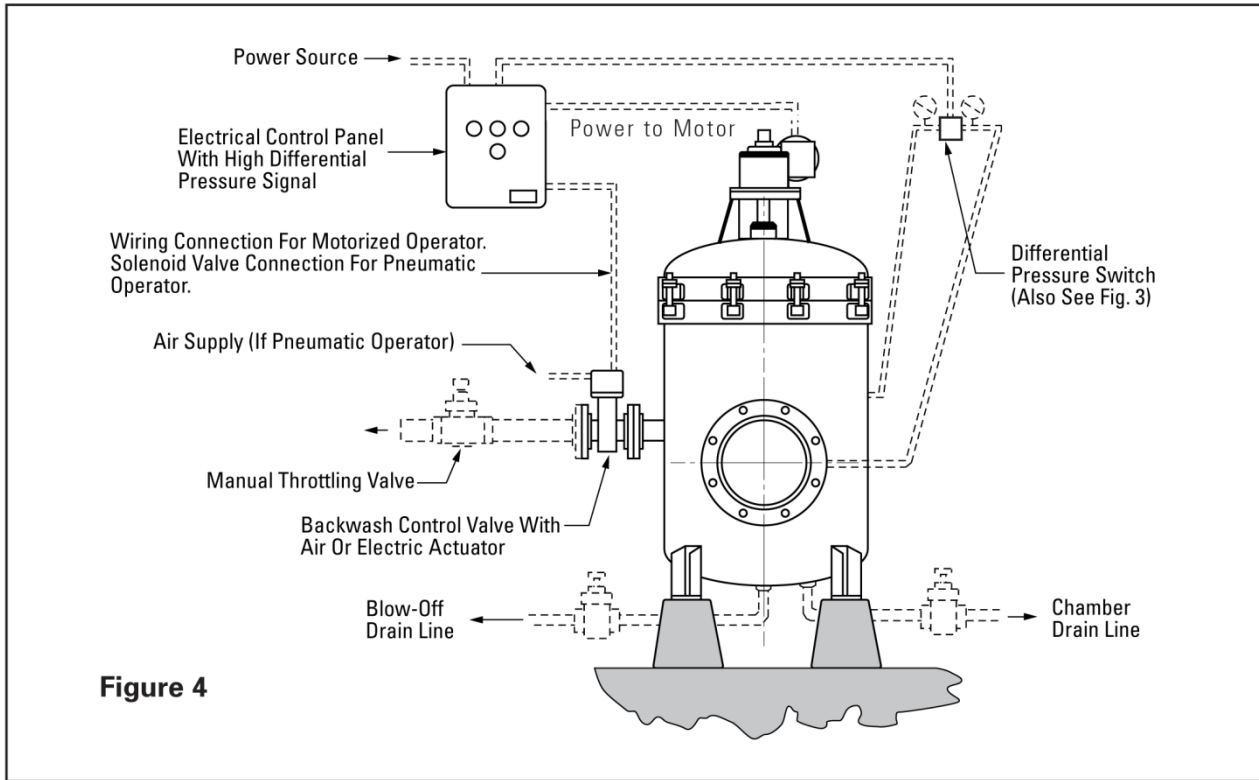
ACS-2



ACS-3



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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 PART 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.