



SINGLE UNIT MODEL TYPE “D” CONTROLLER

Description of the logic and operation - Standard control board for one EBS/SAF unit –
Allen-Bradley PLC (Micrologix-1000 16 I/O)

I/O list

INPUTS:

0. PDS (Pressure Differential Switch)
1. TLS (Top Limit Switch)
2. BLS (Bottom Limit Switch)
3. RESET
4. CONTINUOUS / TIMER / TEST
5. Overload
6. PAUSE
7. Ignore PD fault + Remote Reset
8. ON = SAF (Flush each direction)
OFF = EBS (Flush upstroke only)
9. ON = Output # 1 – FLUSHING ON
OFF = Output # 1 – END OF CYCLE

OUTPUTS:

0. PD Fault – (24 VAC)
1. Flushing On / End of Cycle
2. Fault Light
3. Solenoid Valve
4. CU (Contactor Up)
5. CD (Contactor Down)



Requests for Flush:

- PDS actuation (input # 0) A PD signal is recognized only if it lasts at least 3 seconds.
- Timer activation
- TEST button activation
- Continuous flush

Faults:

Mechanical Fault (Fault light blinks):

1. Motor Circuit Breaker of filter trips. Cancel by pressing appropriate CB button.
2. Both limit switches are disconnected.
3. Motor Time-out on filter. This occurs if the motor is activated and neither limit switch is reached within 35 seconds. Cancel by pressing RESET button.

General Fault (Fault light constant + Fault outputs #0 activated):

1. Any mechanical fault + request for flush.
2. Continuous PD signal for more than 15 minutes.

Motor Direction Fault (Fault light blinks):

This occurs when CD (contactor down) is ON and the TLS (top limit switch) signal is activated. The following procedure will rectify this situation:

1. Manually activate whichever CONTACTOR forces the driveshaft disk to rotate towards the halfway point between the two limit switches. This is done by pressing the plastic bridge on the contactor with a small screwdriver. Release the CU when the disk is halfway between the two limit switches.
2. Turn off power to the control panel and reverse any two phases to change direction of rotation. (In a DC controller, reverse the two wires to the motor).
3. Power up the controller and press the RESET button.

Note: Pressing the RESET button or turning power off and then back on without performing the above-mentioned instructions will NOT release the system from a fault condition!

Flush Procedure (for EBS filter) Input #8 = OFF:

1. Exhaust valve opens.
2. Five (5) second delay.
3. CU engages. Scanner spirals upward.
4. Controller awaits TLS signal. (If longer than 35 seconds, the filter faults.)
5. CU disengages and scanner stops – Exhaust valve closes – End of Cycle (output #1) engages for 5 seconds
6. Two (2) second delay.
7. CD engages. Scanner spirals downward (with exhaust valve closed)
8. Controller awaits BLS signal. (If longer than 35 seconds, the filter faults.)
9. CD disengages and scanner stops.



Flush Procedure (for SAF filter) Input #8 = ON:

1. Exhaust valve opens.
2. Five (5) second delay.
3. Either CU or CD engages (depending upon last flush cycle).
4. Controller awaits TLS or BLS signal (depending upon last flush cycle). (If longer than 35 seconds, the filter faults.)
5. Scanner stops – Exhaust valve closes – End of Cycle (output #1) engages for 5 seconds

End of Cycle (Input #9 = OFF) activates Output 1:

This configuration enables “daisy-chaining” an unlimited number of similar control panels and filters in series.

- Connect Output #1 of the first panel to Input #0 (PDS) of the second panel; Output #1 of the second panel to Input #0 (PDS) of the third panel and so on. If one of the panels is in PD FAULT, its PDS will still throughput the End of Cycle signal to the next panel. This ensures continuing operation of filters even when one of the panels or filters is out of service. The End of Cycle (EOC) output may also be used as a signal to a central control system (e.g. a SCADA system) that a flush cycle has taken place.

Flushing ON (Input #9 = ON) activates Output 1:

This configuration integrates the use of a downstream pressure regulating valve or peripheral pump during the flush cycle.

- Output #1 is activated 1 second before the beginning of the flush cycle. This short delay allows a timer and relay to activate the PAUSE circuit (input # 6) for the duration required by the regulating valve or peripheral pump.

RESET:

Pressing the RESET button activates the following:

- Cancel flush cycle – returning the scanner to the down, service position.
- Cancel all fault conditions.

PAUSE:

With Input #6 activated, the filter enters pause mode. The filter will ignore ANY request for flush until Input # 6 is released.

IGNORE PD FAULT – Input #7:

With Input #7 activated, the system will not shut down because of PD timed fault (as described in General Faults). The fault light will turn on but the filter will continue to flush and the fault relay will not be activated.

Releasing Input #7 will reset the PD fault function.



CONTINUOUS FLUSH:

Continuous flush is activated by one of the following:

- Continuous signal from the PDS (until the system faults after 20 minutes)
- Activation of Input #4 (Continuous Flush Selector) for longer than 12 seconds.

When the system is in the continuous flush mode, the exhaust valve remains open on the downstroke and the motor delay is reduced to two (2) seconds.

SPECIAL CHARACTERISTICS:

1. AUTOMATIC TRANSITION TO CONTINUOUS FLUSH (Restricted feature) -

If three (3) consecutive flush cycles occur with less than a five minute interval between each one, the system automatically enters CONTINUOUS FLUSH mode for 15 minutes.

Note: This characteristic requires a change in the PLC program - Coil (B3/72) B3:4/8 = ON.
System Default does not activate this feature.

2. EMERGENCY DOWN-STREAM VALVE CLOSURE (Restricted feature) – Output #1 closes a downstream control valve to perform a “power flush” under the following conditions:

- System performs AUTOMATIC TRANSITION TO CONTINUOUS FLUSH as described above.
- If a PD signal of duration longer than one (1) minute is received during this EMERGENCY FLUSH cycle, Output #1 will close the DownStream valve for five (5) minutes and continue “power flushing” for that length of time.
- If no PD signal is received for 1 ½ minutes after this “Power Flush” cycle is finished, the system will return to normal operation.
- If a PD signal is received during the 1 ½ minutes after the “Power Flush” cycle is finished, the system will shut down on PD FAULT.

Note: To activate the downstream control valve requires a change in the PLC program -
Coil (B3/73) B3:4/9 = ON.
System Default does not activate this feature.

3. CONTINUOUS FLUSH after PAUSE release (Restricted feature) – Release of Input #6 (Pause feature) automatically activates five (5) minutes of Continuous Flush (T4:35)

Note: This characteristic requires a change in the PLC program - Coil (B3/74) B3:4/10 = ON.
System Default does not activate this feature.