

KEP TECH TIP

Batch Control Using Analog Output

Using 4-20mA Output To Control Valve Positioner

The SUPERtrol-1 (ST1) batch controller includes a feature allowing the 4-20mA output to be used to control analog valve positioners. In order to use this feature several menu settings need to be entered during set up. The settings that are used for this function are as follows:

INSTRUMENT TYPE

BATCH selected

SELECT VALVE TYPE

Anlg (Analog)

SLOW FILL RATE

The user specified flow rate for the slow start of fill and slow end of fill portion of the batch cycle (In a batching application with an analog control valve positioner).

FULL FILL RATE

The user specified flow rate for the fast fill portion of a batch cycle (In a batching application with an analog control valve positioner).

SLOW START QUANTITY

The Slow Start Quantity is a function that allows an amount to be entered for a Slow Start up. During a batch process the Analog Output will compute a value that corresponds to the Slow Flow Rate and will continue to produce this signal value until the totalizer reaches the Slow Start Quantity value. Once this value is reached the Analog Output will compute a value that corresponds to the Full Fill Rate value.

PRESET (PRE 1)

The Preset value controls the batch size. The batch cycle will complete when the totalizer reaches this PRE 1 value.



PREWARN (PRE 2)

The Prewarn value controls the slow down of flow near the end of the batch cycle. The Prewarn value is entered as the number of units before the final Pre 1 value in which the Analog Output will compute the value corresponding to the Slow Fill Rate. (example: If PRE 1 is set to 100 gallons, enter PRE 2 value of 10 to reduce the slow fill beginning at 90 gallons)

ANALOG OUTPUT USAGE

Val (Valve)

ANALOG OUTPUT RANGE

4-20mA

LS ANALOG OUTPUT

Low Scale setting for Analog output. Usually set to 0. When flow rate is 0 Analog Output is 4mA for closed valve.

FS ANALOG OUTPUT

Full Scale setting for Analog output. This is set to the maximum flow rate as specified by your flowmeter. If/when the flow rate reaches this value the Analog Output is 20mA for fully opened valve.

Kessler-Ellis Products

10 Industrial Way East • Eatontown, NJ 07724
Phone: 800-631-2165 • 732-649-7100 • Fax 732-649-7099
<https://www.kep.com>

Sample Application Filling 50 Gallon Drums

In this sample application the ST1 is set up as a batcher and the maximum flow rate is 35 GPM. When a batch is started we want the first 5 gallons to be filled at a slow fill rate. Then 40 gallons will be filled at the full (fast) flow rate. And the last 5 gallons will be filled at the slow flow rate. The settings for this applications are as follows:

INSTRUMENT TYPE

BATCH selected

SELECT VALVE TYPE

Anlg (Analog)

SLOW FILL RATE

3.5 GPM (10% of maximum flow rate 35 GPM)

FULL FILL RATE

28 GPM (80% of maximum flow rate 35 GPM)

SLOW START QUANTITY

5 Gallons (Slow fill rate for first 5 gallons)

PRESET (PRE 1)

50 (Final preset for batch size of 50 gallons)

PREWARN (PRE 2)

5 (The prewarn is 5 gallons so the final slow fill rate will begin at 45 gallons)

ANALOG OUTPUT USAGE

Val (Valve)

ANALOG OUTPUT RANGE

4-20mA

LS ANALOG OUTPUT

0 (4mA for closed valve)

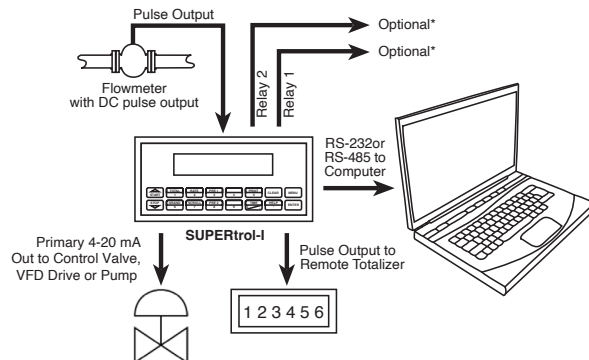
FS ANALOG OUTPUT

35 (Corresponds to maximum flow rate)

BATCH CYCLE OPERATION

1. START is initiated, Analog Output computes value that corresponds to 3.5 GPM and opens the valve 10%
2. Totalizer increments value in Gallons and when 5 gallons is reached Analog Output computes value that corresponds to 28 GPM and opens the valve 80%
3. Totalizer continues to increment at the full fill rate until 45 Gallons is reached. Analog Output computes value that corresponds to 3.5 GPM and reduces the valve opening to 10%
4. The slow fill rate of 3.5 GPM continues until 50 is reached. The Analog Output drops to 4mA which closes the valve and the batch cycle is complete.

TYPICAL BATCHER APPLICATION WITH ANALOG OUTPUT CONTROLLING CONTROL VALVE



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