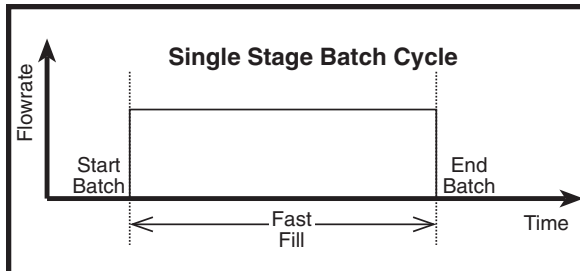


KEP **TECH TIP**

Control Techniques for Minimizing Batch Overrun

A flow batch controller is a special purpose instrument intended for use with a flow sensor and a control valve to dispense a desired amount of a fluid into a container, tank, or vehicle. In some cases fluid temperature may also be used to estimate density, based on fluid properties stored in the batch controller.

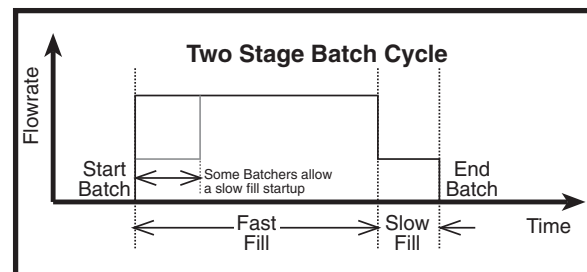


The basic single-stage batch cycle is illustrated above. In this case the operator begins by entering the desired amount of fluid to be dispensed into a batch quantity setpoint on the instrument. When the Start button is pushed the valve opens and begins filling the vessel. The flow sensor measures the flow rate and sends a signal to the batcher. The batcher then compares the total amount delivered and closes the valve after the specified quantity has been dispensed.

Batch overrun is the amount of fluid dispensed which is greater than the setpoint specified by the operator, and typically

results from the delay in valve closure. The two most common techniques used to minimize batch overrun are "batch overrun compensation" and "two-stage batching".

Some batchers include a compensation feature that can be enabled by the operator. These instruments "learn" the amount of batch overrun and then seek to turn the batch off "early", based on the average amount of batch overrun.



Two-stage batching uses two valves, one slow-fill and one fast-fill, to reduce the flow rate just before the batch ends, thereby reducing the amount of overrun. The user can also enter the pre-warn value for the slow fill at the end of the batch. In conjunction with two-stage batching, a "slow fill" rate may also be used at the beginning of the process to prevent splashing, and then switch to fast-fill. With this approach, the operator may enter the amount of fluid to be dispensed during the slow-fill.

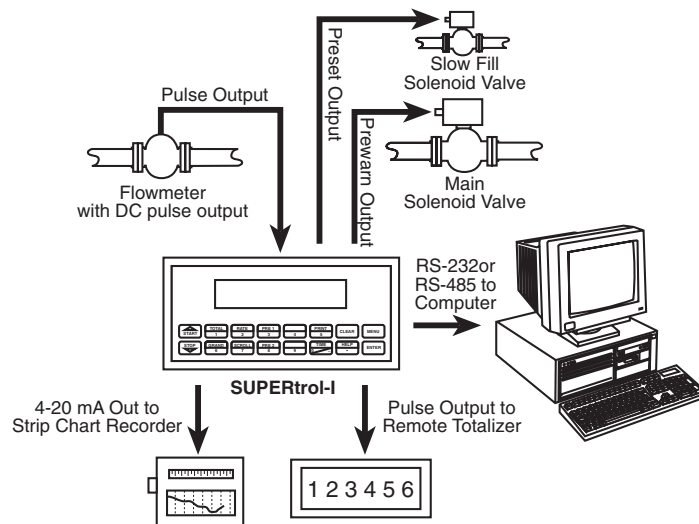
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KEP *TECH TIP*

Control Techniques for Minimizing Batch Overrun

Specifying Your Batch Control System



Flow batch controllers offer a variety of convenient and useful features. When specifying this type of instrument, the following functions should be evaluated.

Maximum Batch Preset is a safety feature that limits the maximum batch size the operator may enter, and is intended to eliminate large operator entry errors.

Batch Auto Restart may be used in applications where the same size container will be filled repeatedly. A programmable time interval is allowed for the removal of the previously filled container and the repositioning of the next container.

Flow Time Out or Security automatically stops a batch when a loss of flow signal is encountered for longer than a user-programmed time while a batch is in progress. It is intended to prevent a spill in the event of a failed flow sensor.

Overrun Alarm Detection generates an alarm if the batch quantity has exceeded the desired batch size by more than the allowed limit. It is intended as a safety measure to notify the user of a malfunctioning valve that has failed to close on command.

Programmable Drain Time lets the operator program a time period to delay the print of batch record to allow for the draining of a fluid into a vessel.

Print on End of Batch automatically creates a print out when a batch has been completed, by sending a report from a RS-232 port to a local printer. Many batchers also support the generation of a transaction print out. A transaction print may be generated manually by pressing a PRINT key, or automatically. The format of the print out and the information that it contains are generally user-selectable.

Remote Start/Stop/Clear Capability is included with many batchers. This feature allows for wiring remote switches or contact closure.

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