

# Batching Tutorial

**What is a Flow Batch Controller?** A special purpose instrument which is intended to be used in conjunction 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 the temperature may also be used to estimate the fluid density from stored fluid properties.

**How does a Batcher Work?** The basic batcher is illustrated in the figures below. The operator begins by entering the desired amount of fluid to be dispensed into a batch quantity set-point on the instrument. The Start button is pushed. The valve opens and the vessel begins filling. The flow sensor sends the flow signal to the batcher. The batcher compares the amount delivered and shuts the valve when the desired amount has been dispensed.

**What is batch overrun and how do I prevent it?** Batch overrun is the term given for the amount of fluid dispensed which is greater than the setpoint which was entered. Batch overrun results from the delay in the valve closing. Two techniques are used to minimize batch overrun. See Batch Overrun Compensation and Two Stage Batching.

**Batch Overrun Compensation-** This technique uses a feature in some batchers which "learn" the amount of batch overrun and then seek to turn the batch off "early" by the average amount of the batch overrun. This feature may be enabled or disabled in some models.

**Two Stage Batching-** This technique for reducing Batch Overrun uses two valves, one slow fill and one fast fill, to reduce the flow rate just before the batch ends to reduce the amount of overrun. The user can enter the prewarn value for the slow fill at the end of the batch.

**Slow Fill-** This is a technique used in conjunction two stage batching where a vessel is initially filled at a slow rate to prevent splashing before the fast fill begins. The user can enter the amount of fluid to be filled during the slow fill.

**Count Mode-** In general, a batcher may be configured to either count from 0 up to the batch quantity or to count down from the batch quantity to 0.

**Maximum Batch Preset-** This is a safety feature which places a limit on the maximum batch size the operator may enter. It is intended to eliminate large operator entry errors.

**Batch Auto Restart-** This is a capability which may be used in some applications where the same size container will be filled repeatedly. A programmable time is allowed for the removal of the previously filled container and the repositioning of the new empty container between batches.

**Flow Time Out or Security-** This is a safety feature which 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.

**Drain Time-** This is a feature in some batchers which delays the print of batch record for a user programmable time to permit draining of a fluid into the receiving vessel.

**Printing Capability-** Many batchers support the generation of a transaction printout. Usually a RS-232 port is provided which may be connected to a printer. A transaction print may be generated manually by pressing a PRINT key, or automatically. The format of the printout and the information which it contains are usually selectable by the user.

**Print on End of Batch-** This is a capability to automatically create a print out when a batch has been completed by sending out a report on a RS-232 port to a local printer.

**Overrun Alarm Detection-** This is a safety feature which 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 which has failed to close on command..

**Remote Start/Stop/Clear Capability-** Many batchers have provisions for wiring remote switches or contact closure such that a remote operator or system can control the starting and stopping of a batcher.

