

# HARDY INSTRUMENTS

## Application Tip: Sequential and Simultaneous Two-Speed Container Filling

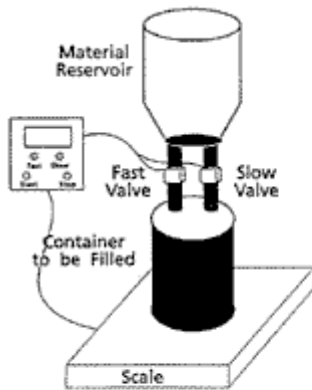


Figure 1. Typical Control Panel and Container Filling Example

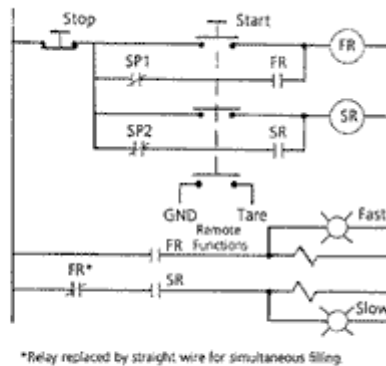


Figure 2. System Relay Logic

In figure 1, a standard Hardy Instruments weight controller or weigh module and some external relays, switches, buttons and indicators are used to fill a container on a scale. Material is allowed to fill the bag, drum, or can at high speed to a certain level, then slows down as it gets closer to the final cutoff point. The result is higher accuracy and the prevention of under or over filling.

The two standard setpoints for the instruments (except the HI 1756-WS) control the fast and slow (dribble) speeds (see figure 2) in the net mode and are set for positive values. Setpoint one switches to slow speed (zero preact value). Setpoint two stops the filling process (some preact value). By deleting the normally closed fast relay contact, (FR in series with the slow value), both values would be open, allowing product to flow during fast fill (see figure 1).

### SEQUENCE OF EVENTS (Sequential)

- 1) The container is placed on the scale and the start button pushed.
  - a) The instrument is tared to zero.
  - b) The external fast (FR) and slow (SR) relays are energized.
  - c) The fast valve opens and its indicator illuminates.
  
- 2) Setpoint one (SP1) is reached.
  - a) The fast relay de-energizes.
    - i) The fast valve closes and fast feed stops.
    - ii) The fast indicator turns off.
  - b) The slow relay energizes.
    - i) The slow valve opens and slow feed begins.
    - ii) The slow indicator illuminates.
  
- 3) Setpoint two (SP2) is reached (minus the preact value).
  - a) The slow relay de-energizes.
    - i) The slow valve closes.
    - ii) Slow feed stops.
    - iii) The slow indicator turns off.

- b) The cycle ends.
- 4) The container is removed.
- 5) Steps one through four are repeated, with a new container.

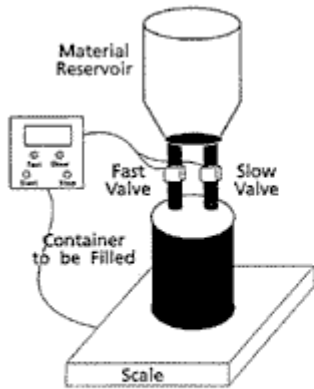


Figure 1. Typical Control Panel and Container Filling Example

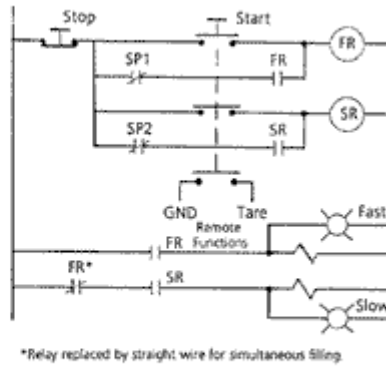


Figure 2. System Relay Logic

### SEQUENCE OF EVENTS (Simultaneous)

- 1) The container is placed on the scale and the start button is pushed.
  - a) The instrument is tared to zero.
  - b) The external fast (FR) and slow (SR) relays are energized.
  - c) The fast and slow valves open and its indicator illuminates.
  - d) Feeding begins.
- 2) Setpoint one (SP1) is reached.
  - a) The fast relay de-energizes.
    - i) The fast valve closes and fast feed stops.
    - ii) The fast indicator turns off.
- 3) Setpoint two (SP2) is reached (minus the preact value).
  - a) The slow relay de-energizes.
    - i) The slow valve closes.
    - ii) Slow feed stops.
    - iii) The slow indicator turns off.
  - b) The cycle ends.
- 4) The container is removed.
- 5) Steps one through four are repeated, with a new container.



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