



Instrumentation

Position Indication



Course Objectives

1. Describe the role of switches and relays in process control.
2. Identify common switch types including: toggle, limit, proximity, vibration, and process variable switches.
3. Describe use of switches to initiate system responses including: alarm, shutdown, autostart, and bypass.
4. Identify position indicators on P&IDs.
5. Identify process sensors on P&IDs.
6. List safety concerns related to position indicators and other sensors.



Key Terms (Define the following)

Switches - _____

"Normal" state - _____

HOA - _____

Relays - _____



Principles

Switch Categories	
Sensed Variable	System Response
Fluid Pressure	Alarm
Temperature	Shutdown
Fluid Flow	Autostart
Material Level	Bypass
Object Position	
Torque	
Object Proximity	
Vibration	
Toggle/Hand-operated	

Relay Functions

- pass information
- conversion
- amplification/"boosting"
- selection
- computation



Questions

1. A switch that is used to trigger an alarm if a process material level in a tank falls to a very low level would be considered normally-open.
 - True
 - False

2. Pressure switches often use _____ deformation pressure-sensing elements to detect fluid pressure.

3. _____ defines the pressure change necessary to activate and reset a switch.

4. What do “paddle” wheel switches detect in a vessel?
 - Liquids
 - Gases
 - Solids
 - Vacuum

5. Switches output a variable signal to regulate a controlled variable.
 - True
 - False

6. Which switch detects the presence of an object without physically touching it?
 - Limit
 - Torque
 - Vibration
 - Proximity