

1. General Information

Description

This document explains the operating principle of the Model 12-64 Basic Flow Switch and the 8-66 Basic Level/Interface Switch. The following pages also present the recommended procedures for the installation, operation, maintenance, and troubleshooting of the Model 12-64 Basic and the Model 8-66 Basic switches.

The Model 12-64 Basic is an instrument that is capable of detecting liquid, gaseous or slurry environments. The Model 8-66 Basic is an instrument that is capable of detecting liquid level at a single point or can also detect media interfaces. The instruments have field adjustable alarm set points for control of the media.

Sensing Element

The operational part of the sensing element is the sensing point. The sensing point consists of 3 thermowells (hollow tubes). Two of the thermowells are welded together. One of the welded thermowells contains a heater and the other contains a Resistance Temperature Detector (RTD). The third thermowell contains a reference RTD for measuring the media temperature. There is a delta R (ΔR) difference between the active and reference RTD resistances. See Figure 1-1 for the sensing point arrangement.

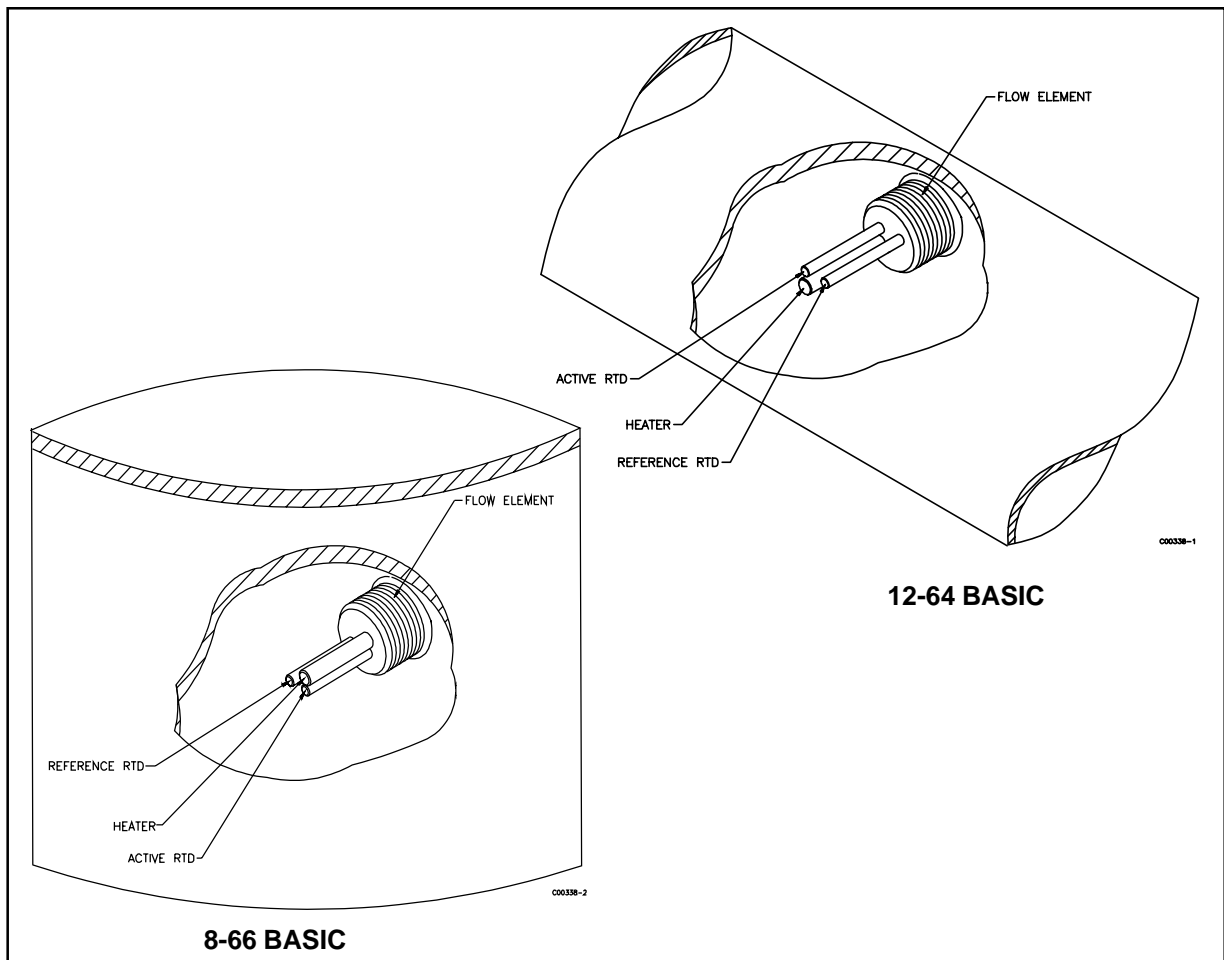


Figure 1-1. Process Installation Showing the Sensing Point

When the sensing point is in a media that is not flowing (or dry), the media density across the thermowells is low, causing the active RTD to be at a higher temperature than the reference RTD. In this case, the DR is at its largest value. When the media starts to flow (or is wet) across the sensing point, the media density across the thermowells increases, conduction and convection cools the active RTD in proportion to the density of the fluid, and the DR decreases.

Control Circuit

The basic functions of the control circuit are to provide power to the sensing element, measure the DR between the two RTDs, condition the sensing point signals, and provide relay alarm contacts for customer uses.

A double pole double throw (DPDT) relay is available in the instrument for connections to the customer alarm systems. The relay coil can be set for either energized or de-energized when there is either flow (wet) or no flow (dry) of the process media. [The factory set condition is the coil being de-energized at no-flow (dry).]

The place where the relay changes state will vary depending on the type of media as well as air or liquid turbulence. Therefore the instrument has a field adjustable alarm set point.

Specifications

- **Service:**
 - 12-64 - Liquid, gas or slurry flow detection.
 - 8-66 - Point liquid level or interface detection.
- **Process Connections:**
 - 1 inch male NPT.
- **Insertion Length:**
 - 1.2 inch (30mm) or 2.0 inch (51mm) U-length.
- **Material of Construction:**
 - All wetted surfaces are 316 series stainless steel with nickel braze per process specifications AMS 4777.
- **Alarm Set Points:**
 - Setable to any value within the indicated flow range, (for 12-64). Setable to any interface value, (for 8-66). 5mV hysteresis.
- **Time Response:**
 - 10 to 300 seconds.
- **Flow Rate (12-64 only):**
 - Minimum: .010 ft/sec (.003 m/sec) in oil,
 - Maximum: 125 ft/sec (38 m/sec) in air.
- **Electrical Connection:**
 - 1 inch female NPT
- **Relay Rating:**
 - DPDT contacts rated at 2A at 115 Vac.
- **Power Input:**
 - 100-132 Vac, 50/60 Hz, 6 watts maximum. 230 Vac or 24 Vdc are optional power inputs.
- **Local Enclosure:**
 - NEMA 4X (approximately equal to IP66) and suitable for hazardous locations.
- **Operating Temperatures:**
 - Sensing element: -100^o to +350^oF (-73^o to +177^oC).
 - Control circuit: -40^o to +140^oF (-40^o to +60^oC).
- **Operating Pressure:**
 - To 3000 psig (207 bar).
- **Approvals:**
 - FM, CSA and CE / CENELEC.