SmartSeries LB 414 short instructions:
Configuration as high or low level switch
Setup a “SmartSeries LB 414 Density” as high or low level switch

The SmartSeries LB 414 Density measurement system can be configured in a way that it can also be used as a high or low level alarm switch. In order to setup the system please follow this user guide.

Prerequisites

Follow the instructions of the main user manual (part no. 56927BA2) and connect the relay output (Relay contact (SPDT) with max. 24 V switching voltage, at 5 A max. current and 5AT fuse) of the detector. According to the manual mount the detector and source on the vessel.

Step by step instructions

1. To be sure the system not pre-configured in a wrong way a “factory reset” should be performed.
   Device Setup | Setup | System | Factory Reset

   It is recommended to use the “Quick Start Wizard” to setup the needed parameters, however, it is possible to configure the detector without it. Leave all parameters at default unless specified differently.

   The following instructions focus on the manual setup. All parameters will be also requested by the Wizard.

2. Set up date and time (needed for decay compensation).
   Device Setup | Setup | System | Date/Time

3. Set up correct nuclide (Co-60 or Cs-137)
   Device Setup | Setup | Calibration | Cal Settings | Nuclide

4. Setup “Density” as measurement mode.
   Device Setup | Setup | Calibration | Cal Settings | Measurement Mode

5. Select “Multi-point” as calibration method.
   Device Setup | Setup | Calibration | Cal. Method

6. Set up “SGU” as density unit.
   Device Setup | Setup | System | Units | Density

7. Read-in (or enter) Background count rate.
   Device Setup | Setup | Calibration | Cal. Background
8. Read-in (or enter) count rates in calibration table.
   Device Setup | Setup | Calibration | Cal. Table
   a. Point 1, Density 1.0 – count rate for empty vessel
   b. Point 2, Density 2.0 – count rate for full vessel

9. Set up measuring range.
   Device Setup | Setup | Calibration | Cal. Settings
   a. LRV (Lower Range Value): 1.0 SGU
   b. URV (Upper Range Value): 2.0 SGU

10. Use a time constant of 20s (or if known better any other value)*.
    Device Setup | Setup | Signal Condition | Damping

11. Perform a calibration.
    Device Setup | Setup | Calibration | Calibrate
    If the Wizard was used it will end at this point asking if calibration should be performed. This should be approved.

12. Set up and activate process value alarm (PV Alarm).
    Device Setup | Setup | Alarms | Process Alarm
    a. If configured as low level switch:
       i. Set Alarm PV LL (Primary Value Lower Limit) to 1.5 SGU
       ii. Set Alarm PV UL (Primary Value Upper Limit) to 3.0 SGU
    b. If configured as high level switch:
       i. Set Alarm PV LL (Primary Value Lower Limit) to 0.0 SGU
       ii. Set Alarm PV UL (Primary Value Upper Limit) to 1.5 SGU
    c. Set up PV Alarm Hysteresis to 0.05 SGU.
    d. Set up diagnostic behavior of PV Alarm to “Out of Spec / Signaling”.

13. Activate functionality of relay: Set relay switch function to “Failure OOS”.
    Device Setup | Setup | Outputs | Relay DO | Relay Assign
    You can now use the LB 414 Density as a high or low level switch.

* The recommended time constant is depending on the count rate for empty vessel. It can be calculated by the formula: time constant = 1250 / count rate for empty vessel. If the container is under high gas pressure or if significant wall caking is to be expected it is recommended to increase the calculated time constant by a factor of three.
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