Level sensor products
Tank battery automation

Introduction

Automating oil and gas producers' tank batteries is greatly enhanced with deployment of the LevelMaster Intelligent Digital Level Sensor. The measurement reliability, life cycle and no-drift accuracy of the sensor is unsurpassed by competing technologies.

The LevelMaster allows for two floats to be used on the same sensor assembly to measure levels of two different density fluids in the same tank. Each float can accurately measure the level of its respective fluid over the full vertical range of the sensor. The standard RTD measures the temperature of the fluid at the load line, with custom applications at any location on the sensor.

Features

– Low cost
– Super low power
– Ultra high accuracy
– Single or dual level capability
– Standard RTD for fluid temperature
– 2' to 25' Lengths (.6 to 7.6 meters)
– Simple to install
– Simple one-time site calibration - SET IT AND FORGET IT
– Up to 16 LevelMasters can be connected in parallel on the same RS485 bus
– Up to 4 LevelMasters can be powered with a single optional intrinsic barrier board for Div 1, Group D service

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Monitoring

Three main methods are used to monitor one or two levels and the fluid temperature.

– Local display at the battery. Totalflow flow computers and RTUs display these readings, configured to the units needed - the most common being feet and inches and degrees Fahrenheit. All are capable of polling the LevelMasters to provide real time values.
– Remote data telemetry. The Totalflow device utilizes many forms of communication, such as radio, CD-PD, land and cellular phone lines to bring the real-time data to Totalflow's host system or a SCADA package. With the Totalflow Voice Alarm System (VAS), these values are available with a phone call.
– Historical LevelMaster data can be trended in all Totalflow flow computers and RTUs. These can be collected remotely or manually. Once stored in Totalflow's WinCCU software, the data is available as a spreadsheet or Access database to be imported to other software systems.

Alarming

Level and temperature alarms are standard on all Totalflow devices talking to the LevelMaster. Depending on the device, the following alarms are available. High, high/high and low, low/low alarms on

– Oil Level
– Water Level
– Temperature

To avoid undesirable toggling of an alarm, a deadband can be used to turn an alarm on at a specific level, but not turn off until a different level is present.

Outputs for the alarms are configurable, with the most common being:

– To a relay, causing a change of state of pumps, ESD (Emergency Shut-Down) systems, valves, or other devices.
– To a third party device, such as a PLC (programmed logic controller), stand alone alarm system, or others.
– Exception based alarms that can feed SCADA systems (with TDS32) or Totalflow's VAS system configured to contact a phone, answering machine, or beeper to announce the alarm condition.

Control

Automatic and operator initiated controls using changes in levels or temperature are utilized in LevelMaster applications.

Examples

Salt Water Disposal System

Multi-tanks are used to skim all the oil from produced water to avoid loss of product and, more importantly, to avoid plugging the disposal well perforations. Pumps to move the skim oil and water from the holding tanks are controlled by a LevelMaster and RTU. The water disposal pump is turned on and off based on the water level. This once labor-intensive manual operation is now done automatically.

Cascade Water Disposal System

Several batteries are tied to a single water disposal well - each with their own disposal pump. If a high level is detected at an intermediate battery, the batteries "upstream" of the problem must be shut in until the problem is solved. With the LevelMaster and a new feature in the VAS system, the pumper receives the alarm, determines which batteries to shut in, then calls the VAS system back and with a keypad shuts one or more batteries in - reversing the process when the problem is solved.

Detection of Liquid Transfer

By monitoring the rate-of-change on the LevelMaster's two floats, Totalflow RTUs can detect when liquid is transferring in or out of the tank. These events can be used to trigger such things as electronic run-ticket generation, unique data logging frequencies and exception based alarm generation. For redundant crosscheck of transfer status, valve position switches can also be monitored.

Additional data is available on the datasheet titled LevelMaster Custody Transfer Application.

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