Kay-Ray 4790

CONTINUOUS GAMMA LEVEL SYSTEM

Introduction

The new Kay-Ray 4790 Continuous Gamma Level System raises the standard for non-contacting nuclear level measurement. The Kay-Ray 4790 utilizes microprocessor-based electronics, menu-driven operator interface, a rugged chamber design, and state-of-the-art HART communication protocol. These new technologies combine to deliver the most reliable and easy to use generally licensed continuous level system available today.

Gamma energy provides a simple, reliable, non-intrusive system to monitor and control the level of liquids, solids, or slurries, regardless of vessel size and shape. Because measurement occurs outside the containment vessel, the gamma system is not affected by high temperatures, high pressures, corrosives, abrasives, vapors, and dusts that could affect or even destroy intrusive measurement devices. This non-intrusive approach also eliminates the need for routine vessel entries that could endanger personnel or allow fugitive emissions.

Principle of Operation

Low level gamma energy is emitted in a controlled pattern from a source housing, through the vessel walls, to an ion chamber-based detector (maximum of four detectors) placed on the other side of the vessel. As the material in the vessel fills, the amount of gamma energy reaching the detector is partially blocked, creating a shadow-like impression on the detector. The microprocessor-based electronics mounted in the detector convert the gamma energy into a digital communication signal that is sent via a standard three-wire instrument cable to the level transmitter. The transmitter includes a menu-driven local display and an isolated 4-20 mA DC output signal for operator interface and level indication. All signal processing and system diagnostics are performed within the transmitter.



Features and Benefits

- Non-contacting and non-invasive design makes the Kay-Ray 4790 ideal for abrasive, corrosive, high pressure and high temperature applications
- NEMA 4X transmitter enclosure surrounds the HLT electronics. Simple, easy-to-use menu structure allows for set-up of Kay-Ray 4790 in minutes
- Sophisticated digital communications between detectors and transmitter insures trouble free operation. Should a failure occur, simple interrogation of the HLT allows for quick identification
- Hart Smart communications available to facilitate ease of set-up and calibration
- FMRC and CSA approvals for hazardous environments allows for installation in most environments
- The Kay-Ray 4790 operates from 90 to 264 VAC or 18 to 36 VDC offering several alternatives to fit your power needs
- With detector lengths ranging to 10 ft., a total span of 40 ft. is achievable

HLT TRANSMITTER

The H-Series Level Transmitter (HLT) is reliable, flexible and easy to use. Reliability is greatly enhanced due to the microprocessor-based electronics and digital communications between the detector and the transmitter. Digital signal processing eliminates the effects of vibration and electrical noise on the detector's raw output.

Software allows the user to select one of the predetermined engineering units (feet, inches, meters, centimeters, % full) or their own special unit of measure. The user can also select the use of a standard, or adaptive time constant to compensate for quick level tracking.Ease of calibration is derived from the menu-driven, "fill-in-the-blank" operator interface and backlit 4 line, 20 character per line LCD display. The menu driven prompts, displayed in English, quickly guide the user through the steps necessary to set-up, calibrate and operate the system. All the same calibration and communication functions can be performed remotely with HART communications. Users can even customize unique vessel shapes using a built-in ten-point calibration curve.

The NEMA 4X transmitter with FM and CSA approvals, is control room mountable, contains non-volatile memory, accepts multiple input power ranges, and the self-diagnostics continually update the system status to the HLT transmitter's LCD display. Should an error be detected, an asterisk will appear in the upper right corner of the display. The user simply presses the status key to display the error status message.

DETECTOR(S)

Because the detector is most often exposed to harsh process environments, a stainless steel detector with Factory Mutual (FM) and Canadian Standards Association (CSA) Explosion proof approvals is standard.

Specifications

System Performance

Accuracy:
±1% Span
Stability:
Drift less than 1.0% absolute radiation change per 6 months
Warranty:
Two years

Ion Chamber Detector(s):

Multi-detector:
Up to four (4) detectors may be used
Supply Voltage/Consumption:
Power supplied from HLT transmitter
Operating Temperature Range:
-13°F to 140°F (-25°C to 60°C)
Humidity:
10 to 95% RH non-condensing
Minimum Operational Radiation Field:
0.2 mR/hr
Enclosure:
ANSI 300 Series stainless steel
Connections:
Two ¾" NPT conduit entries
Output:
Single 3-wire instrument cable for digital communication to the HLT transmitter. In multi-detector installations, each detector is wired in parallel.
Interconnecting Cable:
Maximum length 2500 ft. (763m) between detector and transmitter. Standard three conductor, shielded. (Belden Model 9365)
Factory Mutual (FM) Approved for:
Explosion proof:
Class I, Division 1, Groups B, C, D
Dust-Ignition proof:
Class II, Division 1, Groups E, F, G
Non-incendive:
Class I, Division 2, Groups A, B, C, D
NEMA 4X
Canadian Standards Association (CSA):
Explosion proof:
Class I, Division I, Groups B, C, D
Class I, Division 2, Groups A, B, C, D
Dust-Ignition proof:
Class II, Division I, Groups E, F, G; Class III
Type 4 enclosure

HLT Transmitter:

Supply Voltage / Consumption:
90 to 264 VAC, 47 to 63 Hz/22 VA or 18 to 36 VDC/18 watts
Operating Temperature Range:
-4° to 140°F (-20° to 60°C)
Humidity:
10 to 95% RH non-condensing
Enclosure:
ABS plastic
Connections:
Three 0.875" (22.2mm) dia. holes to accept standard ½" NPT watertight conduit hubs
Output:
Optically isolated 4-20 mA, self-powered, 750 ohm maximum
Source Decay Compensation:
Cs-137, Co-60, Am-241, or none
Adjustable Damping:
1.0 to 1200 seconds
Adaptive Damping:
Field selectable on or off. Time constant adjustable 1.0 to 600 seconds in 1 second increments. Activation threshold adjustable from 1% to 100% of span.
Factory Mutual (FM) Approved for:
Non-incendive:
Class I, Division 2, Groups A, B, C, D
NEMA 4X
Canadian Standards Association (CSA):
Class I, Division 2, Groups A, B, C, D
Type 4 enclosure

Tagging:
The Model 4790 can be tagged per specific customer requirements.
Source Housing: 10 character SS tag
Detector: 10 character SS tag
Transmitter: A 16 character tag can be specified using the transmitter's LCD display

Programming:
HART Smart Model 275 communicator. Used to set up and calibrate gauge, and to enter data. Communicates with the Kay-Ray 4790 via the current loop. BEL202FSK standard.

ISO 9001
Certificate Number: 30085

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