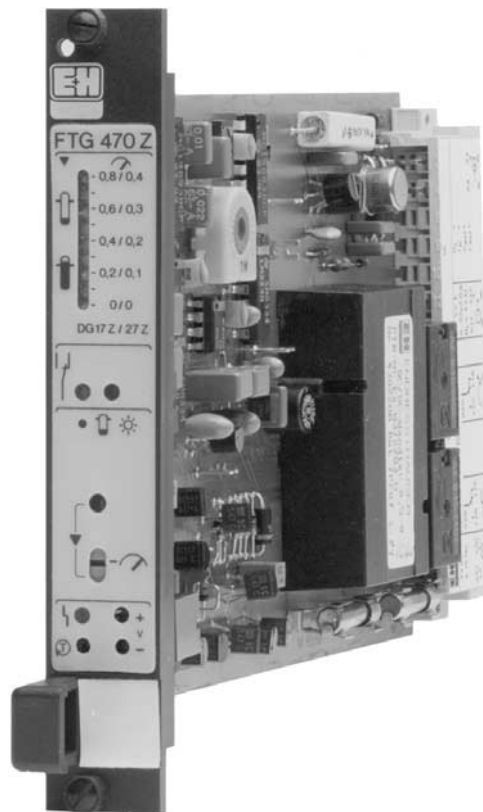


Radiometric Level Measurement *gammapiilot FTG 470 Z*

**Safety level limit detector for bulk solids
and liquids**
For applications in non-hazardous areas



Application

The Gammapiilot FTG 470 Z provides non-invasive level detection in containers (mixers, reactors, hoppers, silos, tanks) with inflammable, poisonous or aggressive bulk solids and liquids. Typical applications are acid tanks, boiling apparatus, cement silos, ballast silos, cyclones, cupolas, rotary furnaces, agitators and mixers.

The measuring system is mounted outside the container and does not come into contact with the product. There is thus no danger of the product or container becoming radioactive, so that the system can be safely used in food applications. The source is an encapsulated, low activity radionuclide which emits gamma radiation only.

Features and Benefits

- Reliability and accuracy ensured by a point source (PTB-tested) and special detector
 - = Safe limit detection free of material property influences
- Self-monitoring with alarm relay
 - = Added safety and explicit information for the user
- Approved as overspill protection (VbF, WHG Germany)
 - = No clean-up costs
- Signal transmission by interference-free pulse-frequency modulation (PFM)
 - = Cost-saving use standard installation cables
- Up to 21 instruments fit into a 19" RACKSYST rack
 - = Saves space and costs
- Retrofitting in existing 19" systems
 - = Simple extension or modification of existing equipment

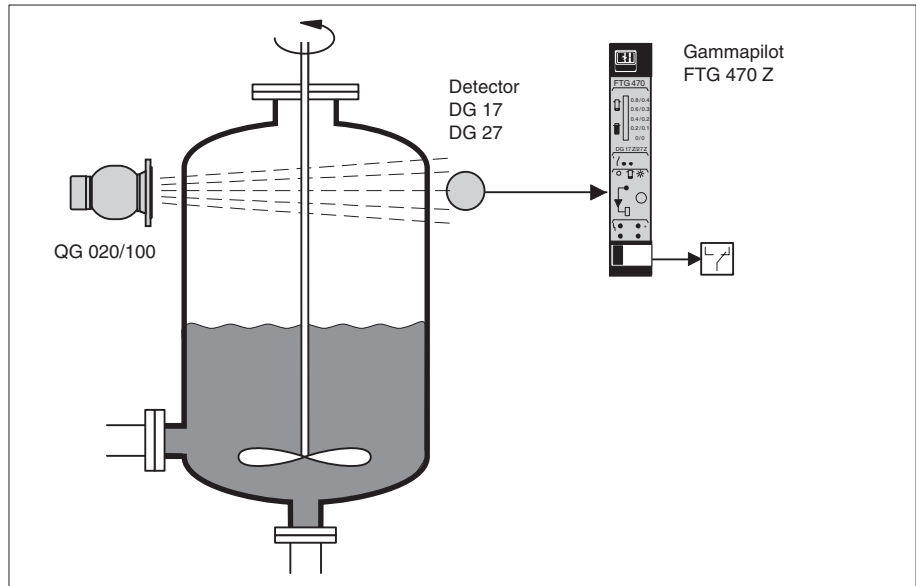
Endress + Hauser

The Power of Know How



Measuring System

Measuring system for level limit detection with detector DG 17 / DG 27



System Components

The complete measuring system comprises:

- Gammapiilot FTG 470 Z transmitter
- source container QG 20/100 with radionuclide Co 60 or Cs 137
- detector DG 17 or 27

Contactors, solenoids and signal equipment can be connected to the potential-free relay changeover contact of the Gammapiilot FTG 470 Z. For installation of the detector see TI 197F

Measurement Principle

A source container is mounted on one side of the vessel and a detector on the other. When switched on, the gamma radiation emitted by the source passes through the walls of the vessel and the product. The detector converts the incoming radiation into current pulses, which are transmitted to the Gammapiilot. This evaluates the signal

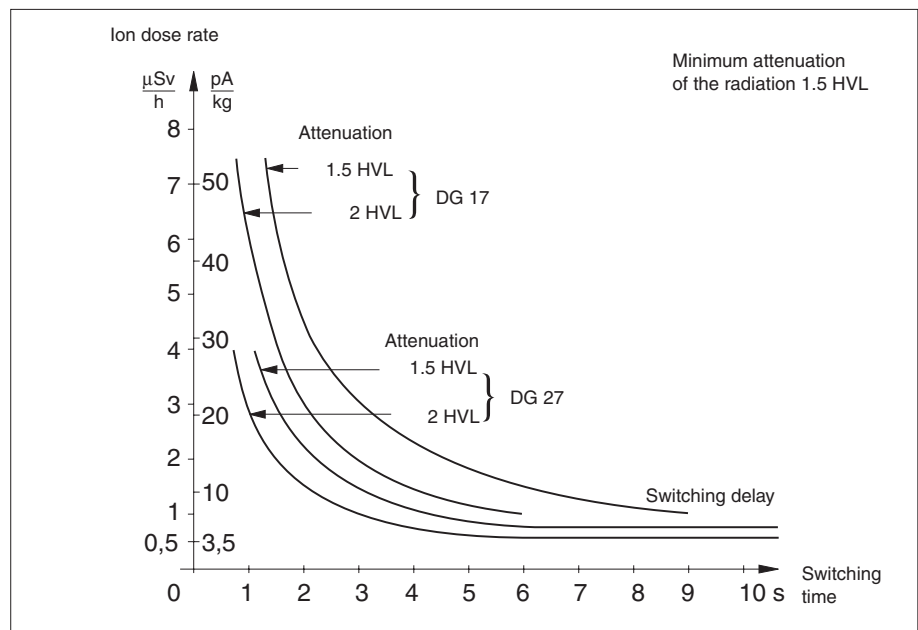
and switches the output relay as appropriate.

When the product in the vessel rises above the beam path, the radiation is attenuated to the maximum degree, and the output relay switches. The relay can be operated in minimum or maximum safety mode.

The Gammapiilot FTG 470 Z also monitors the function of the detector (including the counting tube), the two-wire circuit to the detector, and all connections and essential components of the input circuit.

During operation, the instrument indicates the dose rate at the detector, the status of the relay and the product level with respect to the limit value. The alarm relay and a LED on the front panel control show the functional status.

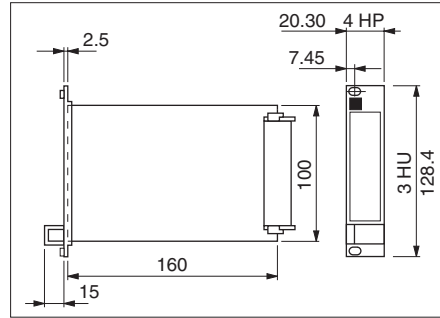
Switching delay as a function of detector, ion dose rate at the detector and the attenuation by the product



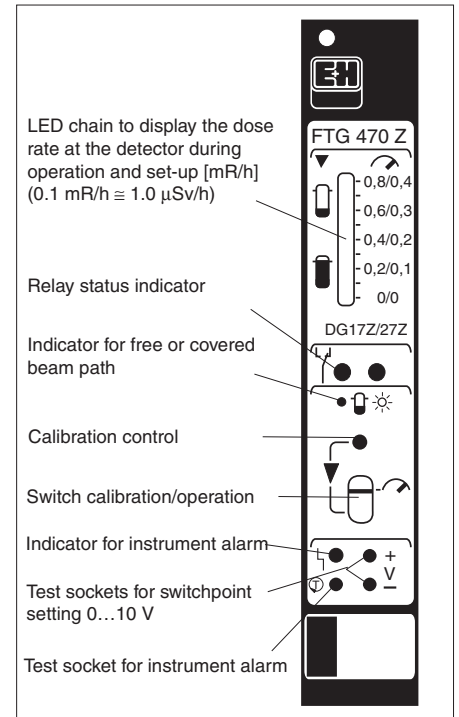
Construction

The Gammapiilot is designed as a 4HP RACKSYST plug-in card. All controls required for calibration are arranged on the front panel and are easy to see and operate.

Up to 21 Gammapiilots can be fitted into a RACKSYST rack. Instruments for standard applications can be inserted side-by-side without gaps or partitions. Each individual instrument is supplied with 24V direct voltage via a built-in galvanic isolation.



Dimensions in mm



Front panel
Gammapiilot FTG 470 Z

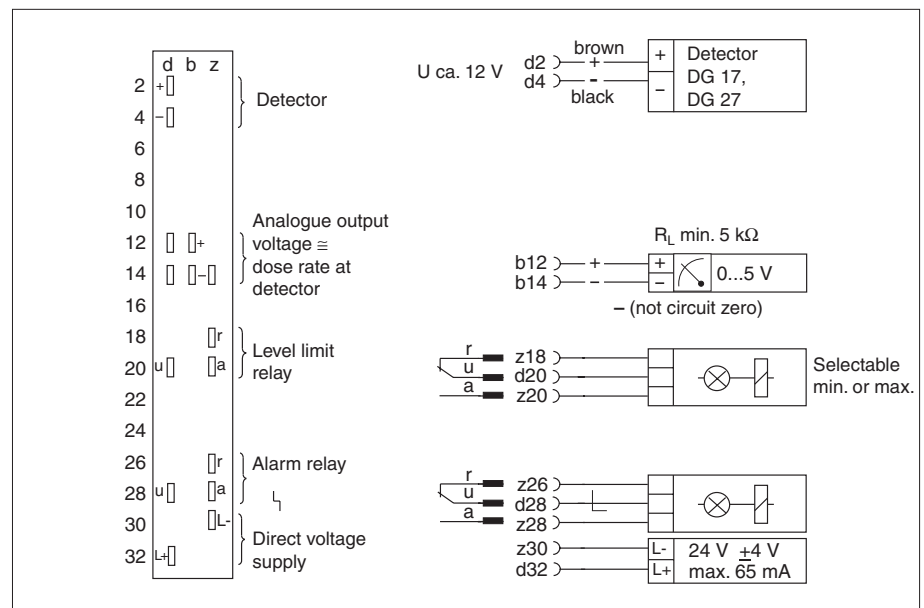
Electrical Connection

The Gammapiilot has a male multipoint connector (DIN 41 612, Form F), see below. It requires a 24 V direct voltage supply.

The DG 17 or DG 27 detector is connected via two cores of a standard installation cable, max. 25 Ω per core.

The limit and alarm relays both have a potential-free changeover contact, i.e. 3 external connections.

A voltage signal of 0...5V, proportional to the dose rate at the detector, is also provided.



Pin assignment of the
Gammapiilot FTG 470 Z

Technical Data

General Specifications

Manufacturer	Endress+Hauser GmbH+Co.
Instrument designation	Gammapiilot FTG 470 Z

Technical Data (continued)

Function and System Design

Measurement principle	Gamma radiation passes through the vessel and is detected and converted into electrical impulses by the detector. The Gammapiot evaluates this signal and switches the relay when the beam is blocked by the product.
Modularity	Gammapiot FTG 470 Z, source container QG 20/100, detector DG 17/27 (Z)
Cable	Detector – FTG 470: two-core installation cable, max. 25 Ω per core
Signal transmission	Pulse frequency modulation (PFM)

Input

Measured variable	Dose rate at detector as indicator of the attenuation of radiation by product
Minimum attenuation of radiation	1.5 HVL
Galvanic isolation	isolated from all other circuits

Output

Limit value and alarm relays	One relay each with potential-free changeover contact, max. 250 V, max. 2,5 A, max. 300 VA at $\cos \varphi > 0,7$. Limit relay operable in min. or max. failsafe mode as required
Direct voltage signal	0...5 V, corresponding to dose rate at detector, 0...57 pA/kg, R_L min. 5 k Ω
Minimum switching delay	see figure on page 2, delay factor freely selectable from 1...6

Operating Conditions

Ambient temperature	0...+60 °C
Ingress protection	Front panel IP 20, card IP 00
Electromagnetic Compatibility (EMC)	Interference Emission to EN 61326, Electrical Equipment Class B Interference Immunity to EN 61326, Annex A (Industrial) and NAMUR Recommendation NE 21 (EMC) Use a screened cable between the sensor and transmitter. Refer to TI 241F for installation instructions pertaining to screened cables and general instructions on EMC test conditions for E+H equipment.

Mechanical Construction

Design	Plug-in card, Europa format, for 19" assembly rack as per DIN 41 494
Connector	Male multipoint connector to DIN 41 612, Form F
Weight	0.2 kg

Power Supply

Supply voltage	24 VDC \pm 4 VDC
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Certificates and Approvals

Overspill protection	to VbF and WHG (Germany)
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Supplementary Documentation

Gammapiot FTG 470 Z	Operating Instructions BA 089F/00/e
Detector DG 17 (Z), DG 27 (Z)	Technical Information TI 197F/00/en
Source Container QG 020/100	Technical Information TI 264F/00/en (Standard) Technical Information TI 194F/00/en (Chemical, Euro and Swedish Design)
Gamma Sources	Technical Information TI 213F/00/e

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