

Introduction

The TN PNF provides cost effective on-off control of circuits. It is mounted externally on tanks, bins, hoppers, pipes, chutes, or other vessels to sense the level of liquids, slurries, and solids. A relay contact output can control high or low level, or operate alarms to signal level changes.

The TN PNF consists of two components: an energy source in a steel-jacketed housing and the detector/electronics. It operates on the principle of gamma ray attenuation. The gamma energy source emits a narrow beam of energy which passes through the vessel walls to the detector. When process material is in the beam path, the energy is attenuated and not all of it reaches the detector. If the process material is not in the beam path, the detector receives an unattenuated amount of energy. The amount of energy at the detector is "counted" by the electronics. As the count rate falls below (for high level) or goes above (for low level) a predetermined reference, the output relay is energized.

Reliability

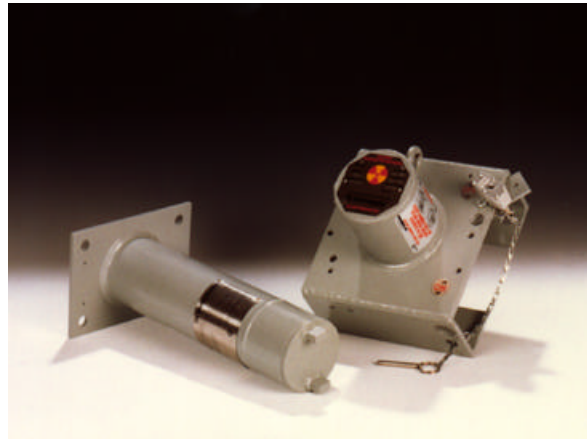
Reliability is the dominant theme of the Texas Nuclear PNF level switch. The Geiger-Mueller tube detector has a long history of trouble free service.

System Features

The TN PNF measures level across a variable distance, depending upon the application, using digital techniques. The source housing shields the source and confines the energy to a small beam. Source size and housing type are determined by application requirements.

Since there are no varying voltage or current levels to be amplified, low signal rates are no problem. Each individual pulse from the detector is counted and accumulated to make high and low decisions, usually allowing source sizes to be as much as 10 times lower than those required by analog designs.

The response time can be set in the field. In



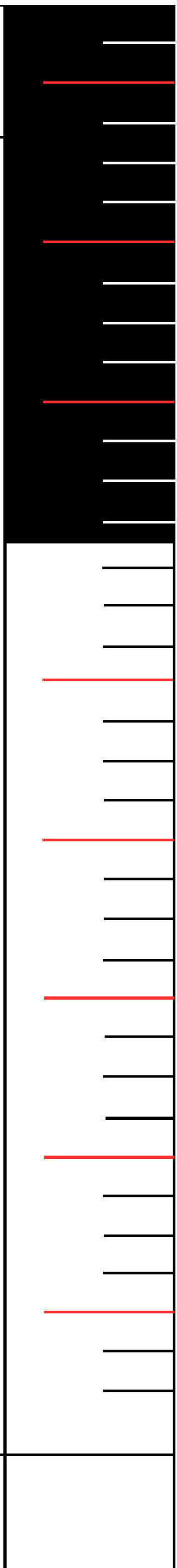
Features and Benefits

- ◆ Non-contacting, non-invasive high or level indication
- ◆ Highly reliable and rugged
- ◆ Digital technology
- ◆ Simple installation and easy setup
- ◆ Two year warranty
- ◆ FM approved for hazardous areas
- ◆ Unaffected by process variables such as pressure, temperature, viscosity or density

general, a long response time can be used to prevent short term uncertainties due to process variations in the area where level is being monitored, and also to allow the use of the minimum source size. Response times of .5 seconds to several minutes can be provided.

The source shutter can be locked in the OFF position for installation, shut-downs, shipment, etc.

An optional remote manual actuator is available for most source housings. This enables operation of the source shutter from a distance. An optional shutter indicator switch consisting of DPDT contacts provides remote indication of the source shutter position for greater safety.



Electronics

The standard electronics housing is constructed of painted steel to meet Nema 4 specifications. It is FM and CSA approved for hazardous area usage. An optional lightweight NEMA 4 aluminum housing is also available. For operation in areas where the ambient temperature will exceed 93°C (200°F), an optional water cooled housing is available. This housing incorporates a water jacket and two 6.4mm (.25 in.) female NPT fittings for water inlet and outlet. A minimum flow rate of 1 GPM is recommended.

System Test

In many applications level change is infrequent and a system test is needed to verify proper operation. For the high level test, simply close the source shutter to alarm. For low level operation the optional check source is recommended. The check source exposes the detector to a small amount of energy to activate an alarm. The check source is mounted in the detector housing and can be remotely actuated.

Specifications

Detector/Electronics

REPRODUCIBILITY:

± 6 mm (1/4 in.)*

RESPONSE TIME:

.5 seconds to several minutes*

PRODUCT TEMPERATURE:

Unlimited

AMBIENT TEMPERATURE:

Standard: -40°C to +94°C (-40°F to +200°F). Optional water cooled housing available for high temp. operation

DETECTOR TYPE:

Halogen quenched Geiger-Mueller tube

OUTPUT:

DPDT contacts (10 amps @115 volts)

POWER REQUIREMENTS:

115 or 220 VAC ± 15% @ 10VA, 50/60 Hz

DETECTOR HOUSING:

Standard is FM & CSA approved; Explosion proof Class I, Div 1, Gp B, C, & D; Class II, Div 1, Gp E, F, & G; Class III, Div 1 and NEMA 4. Optional lightweight and water cooled housings available

MOUNTING:

External; with customer supplied brackets. Shock mounting bracket available

SIZE:

Standard: 315 mm x 90 mm (15 in. x 3.5 in.)

WEIGHT:

7.7 kg (17 lbs)

FAIL SAFE:

Choice of either high level or low level fail safe operation

LIGHTWEIGHT DETECTOR HOUSING:

Aluminum construction with integral mounting bracket
Size is 283 mm X 152 mm X 152 mm
(11 in. X 6 in. X 6 in.)
Weight is 2 kg (4.5 lb)

Source and Source Housing

SOURCE:

Cesium-137 or Cobalt-60*

SOURCE SIZE:

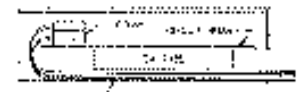
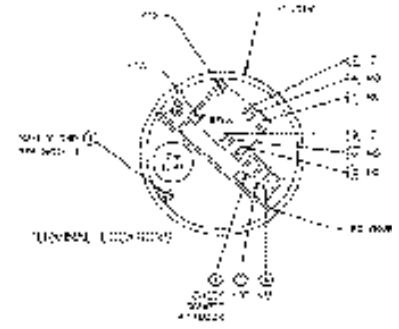
10mCi or greater

*SOURCE WEIGHT:

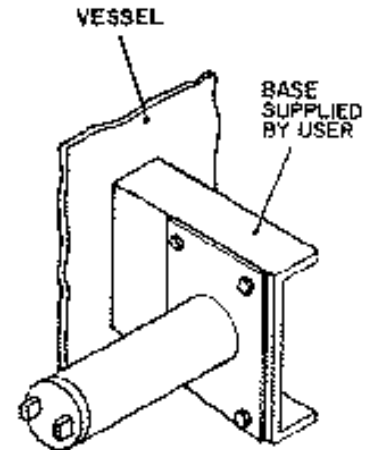
10 to 100 kg (20 to 225 lbs)
depending upon source size*

APPROVALS:

All source housings meet or exceed the safety requirements of the NRC and DOT, and various state agencies.



Wiring Diagram



* Exact value depends upon requirements of specific application.

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