

Conductive Limit Detection *nivotester FTW 520 Z*

Limit detection and two-point control in tanks containing liquids in hazardous areas



Nivotester FTW 520 Z in
Minipac row housing for
snap-in mounting on a
35 mm standard rail.

Operating Principle

The Nivotester supplies a small alternating current* voltage to the vessel via the input signal cable. The cable is connected to the metal vessel or a ground sensor and to the measuring sensor.

A voltage drop occurs as soon as the electrically conductive material touches the measuring probe. An amplifier then activates the relay in the Nivotester.

* AC power is used to prevent electrolytic decomposition of the sensors and the material.

Fail-Safe Mode

For **maximum** fail-safe mode or overspill protection, the relay de-energises,

- when the measuring probe for maximum level is touched by the material
- if the cable between the Nivotester and probe is short-circuited
- if the cable between the Nivotester and probe is interrupted (with local electronics for cable monitoring in the probe only)

For **minimum** fail-safe mode, the relay de-energises,

- when the probe is free of material
- if the cable between the Nivotester and probe is interrupted

The relay always de-energises on power failure.

Indication

The front panel of the Nivotester has LEDs to indicate the following status:

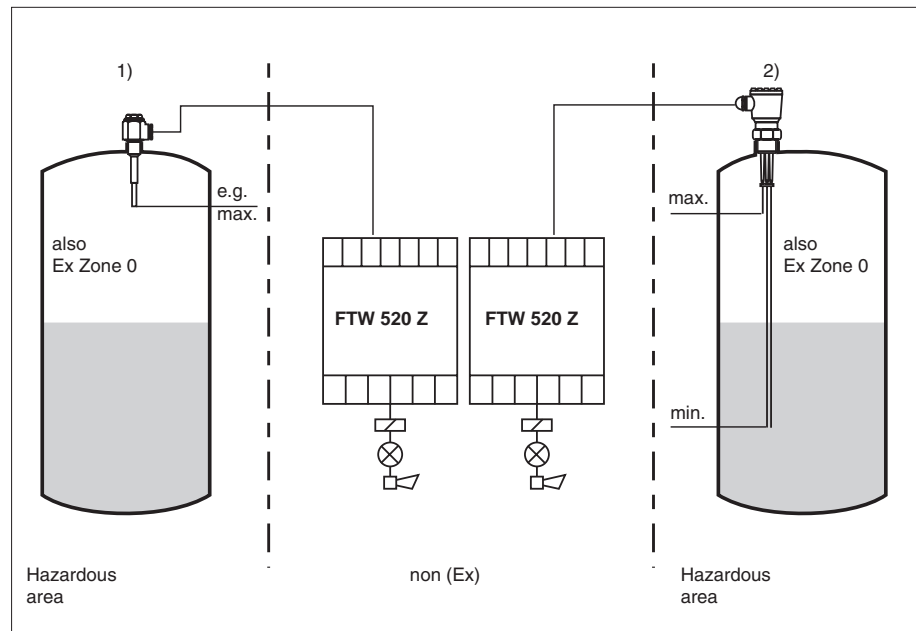
- stand-by
- relay energised or de-energised
- fault indication for cable breakage

Endress + Hauser

The Power of Know How



Conductive Measuring System



The wide range of probes ensures complete compatibility to the measurement task.

For limit detection with turbulent liquid surfaces, 2 probes are recommended (two-point detection).

If the Nivotester FTW 520 Z is used for overspill protection, then a probe with local electronics for maximum detection is to be used for monitoring the cable for breakage.

The most important applications of the Nivotester FTW 520 Z:

- Limit detection with minimum or maximum fail-safe mode; also for overspill protection
- Two-point control

Features

Mechanical Construction

Nivotester FTW 520 Z in a Minipac housing is ideal for control panel mounting. It is compact and allows row mounting on a symmetrical 35 mm standard rail. The plug-in terminal blocks at the front simplify the electrical connections.

- For single mounting, Endress+Hauser supplies accessories for wall mounting.
- A protective housing with IP55 protection and a transparent cover is available.

The switches and adjusters for calibration are located behind the folding front panel. They are easily accessible and are also protected against unauthorised access. The rear of the front panel has pictograms which allow the instrument to be calibrated without an operating manual.

Electrical Construction

The electronics are safely isolated from the power supply and from the output relay contacts. This prevents potential coupling and allows the probes to be used in explosion-hazardous area Zone 0.

Electrical Connection

The terminal block for the power supply and the output relays are located below the front panel. The terminal block for the intrinsically safe probe circuit is located above the front panel. This ensures the required minimum distance between intrinsically and non-intrinsically safe circuits.

Probe:

Probes can be connected with standard screened installation cable. Two-point control requires three wires, limit detection, two. Ground the screening at both ends. If this is not possible, then at the probe end only. Observe all regulations concerning explosion protection when laying cables!

Maximum permissible values for cable resistance R_L , cable capacitance C_L (and cable length L) depend on the calibration range selected (and calibration value R_M).

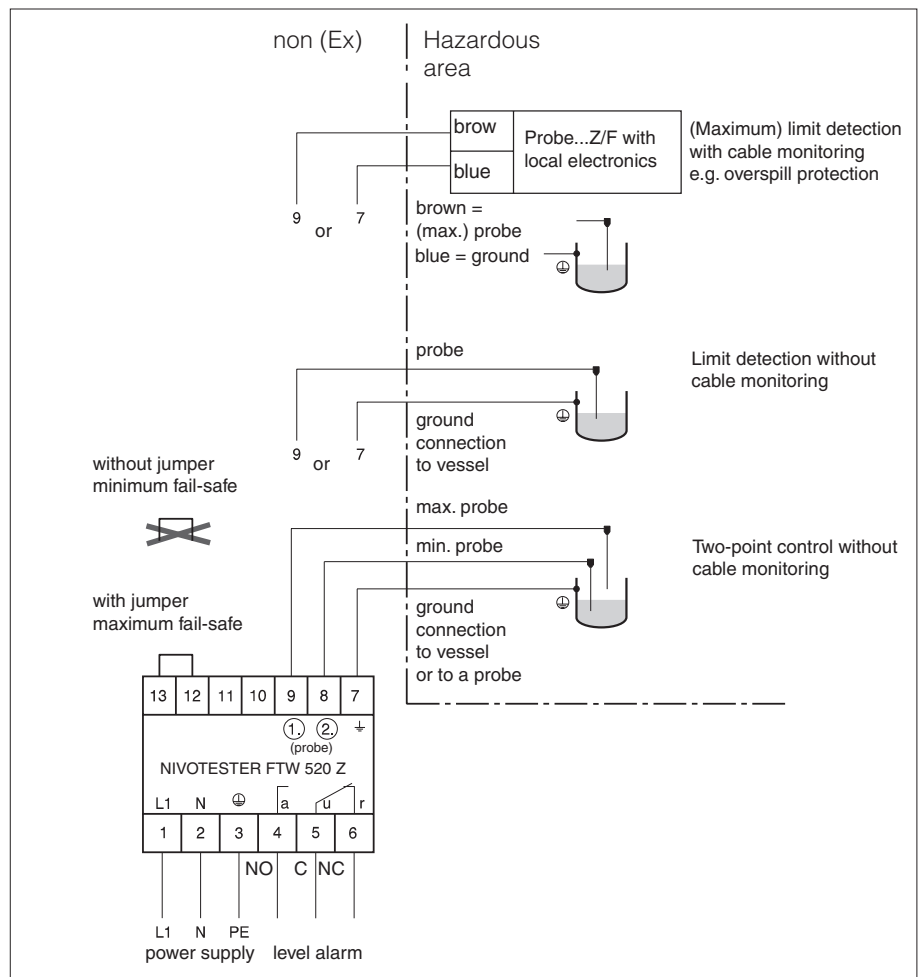
For R_L :

- Range I ($R_M < 700 \Omega$), R_L max. 12.5 Ω /core
- Range II and III ($R_M > 700 \Omega$), R_L max. 25 Ω /core

For C_L and L :

- with cable monitoring:
 - Range I and II ($R_M < 6 \text{ k}\Omega$) C_L max. 50 nF, L max. 500 m
 - Range III ($R_M > 6 \text{ k}\Omega$), C_L max. 30 nF, L max. 300 m

The capacitance values are for non-explosion hazardous areas. Values for explosion hazardous areas are stated in the certificate of conformity.

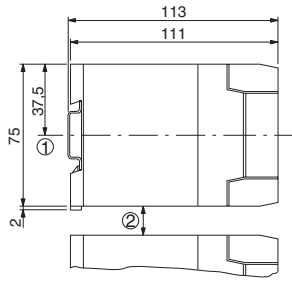


Supplementary Documentation

- ❑ Mounting accessories for Minipac instruments
Technical Information TI 009F/00/en
- ❑ Technical Information for partly insulated probes for limit detection and two-point control in electrically conductive media.

Electrical connection to the probes (for various applications), to the power supply and to the control and signalling units.

Technical Data



Dimensions in mm

- 1) Mounting with standard rail 35 x 7.5 or 35 x 15
- 2) Observe minimum distance between upper and lower row of instruments:
When using probes in hazardous area min. 50 mm.
When using probes in non-hazardous area min. 25 mm.

Construction:

- Housing: row housing (Minipac format) in light grey plastic, blue front panel
- Mounting: on standard rail to EN 50022-35 x 7.5 or EN 50022-35 x 15
- Width of housing: 50 mm
- Weight: approx. 0.3 kg
- Protection to DIN 40 050: housing IP40, terminals IP20

Permissible ambient temperatures:

- single mounting: -20 ... +60°C
- row mounting without gap: -20...+50°C
- in protective housing (2 units): -20...+40°C
- Storage temperature: -20...+80°C

Electrical connection:

- Terminals: removable terminal blocks, non-interchangeable, black, 6 or 7-pole
- Max. cable cross section: (fine-wire) 1 x 0.5 mm² to 1 x 2.5 mm² or 2 x 0.5 mm² to 2 x 1.5 mm²
- Power connection, AC: see Product Structure
- Consumption: approx. 3 VA

Signal input:

- Intrinsically safe [EEx ia] IIC, electrically isolated from output and from the power supply.
- Connection to the probes: two-wire for limit detection, three-wire for two-point detection
- Measuring signal: trapezoidal superimposed AC current, approx. 70 µA ... 1 mA
- Frequency: approx. 40 Hz
- Voltage U_s: approx. 0.1 V ... 3.6 V

Electromagnetic compatibility:

- Interference Emission to EN 61326, Electrical Equipment Class B
- Interference Immunity to EN 61326
- For general references to electromagnetic compatibility see TI 241F/00/en

Calibration ranges:

- I: approx. 100 Ω ... 700 Ω
- II: approx. 100 Ω ... 6 kΩ
- III: approx. 6 kΩ ... 50 kΩ (overlapping)
- Adjusters: 3 switches and one adjuster behind the front panel

Output:

- 1 relay with potential-free changeover contact
- Switching capacity: max. 4 A, max. 250 V AC
max. 500 VA at cos φ > 0.7
- Quiescent current fail-safe switching for minimum or maximum, selectable
- Switching hysteresis: approx. 10 % in Range I, approx. 5 % in Ranges II and III; or given by the difference in length between the maximum and minimum probes.
- Temperature coefficient of the switchpoint: < 0.1 %/K
- Switching delay: < 1 s
- Operating indicators: 3 LEDs on the front panel for stand-by, relay mode, fault indication.

Subject to modification

Product Structure

FTW 520 Z Nivotester

Certificate

- A ATEX II (1) G [EEx ia] IIC, WHG
- Y Special version

Version

- 0 MINIPAC, 50 mm, with detachable terminal block
- 1 MINIPAC, 50 mm, for flat plug
- 2 Weather proof MINIPAC, terminal block
- 3 Weather proof MINIPAC, for flat plug
- 9 Special version

Power supply

- A Power supply 230 V, AC, 50/60 Hz
- B Power supply 110 V, AC, 50/60 Hz
- C Power supply 48 V, AC, 50/60 Hz
- D Power supply 24 V, AC, 50/60 Hz
- F Power supply 115 V, AC, 50/60 Hz
- G Power supply 127 V, AC, 50/60 Hz
- J Power supply 240 V, AC, 50/60 Hz
- K Power supply 42 V, AC, 50/60 Hz
- L Power supply 100 V, AC, 50/60 Hz
- Y Special version

Switch output

- 0 1 relay, volt free SPDT
- 9 Special version

FTW 520 Z A | | | 0 Product designation

How to Order

- Product designation for Nivotester FTW 520 Z
- Probe type, length
- Probe with or without local electronics for cable monitoring
- Accessories

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