Technical
Information
TI 176F/00/en

Conductive Limit Detection
nivotester FTW 420

Limit detection and two-point control in tanks containing liquids

Nivotester FTW 420
in Minipac row housing
for snap-in mounting on
a 35 mm standard rail.

Operating Principle

The probe and the electrically conductive vessel wall act as two electrodes. As soon as electrically conductive material touches the probe, a weak alternating current is generated. An amplifier then actuates the relay in the Nivotester. At the same time a red LED indicates the position of the relay.

The fail-safe mode is selected by a jumper.
Maximum fail-safe: The relay de-energises when the probe is touched by the material or on power failure.
Minimum fail-safe: The relay de-energises when the probe is uncovered or on power failure.

Features and Benefits

- Economical limit switch for electrically conductive liquids
- Minipac housing snaps on the 35 mm standard rail for easy mounting
- Simple to connect and change by plug-in terminal blocks at the front of the Minipac housing
- Electronics are galvanically isolated from the power supply and from the output relay. Parasitic voltages are avoided

Endress + Hauser
The Power of Know How

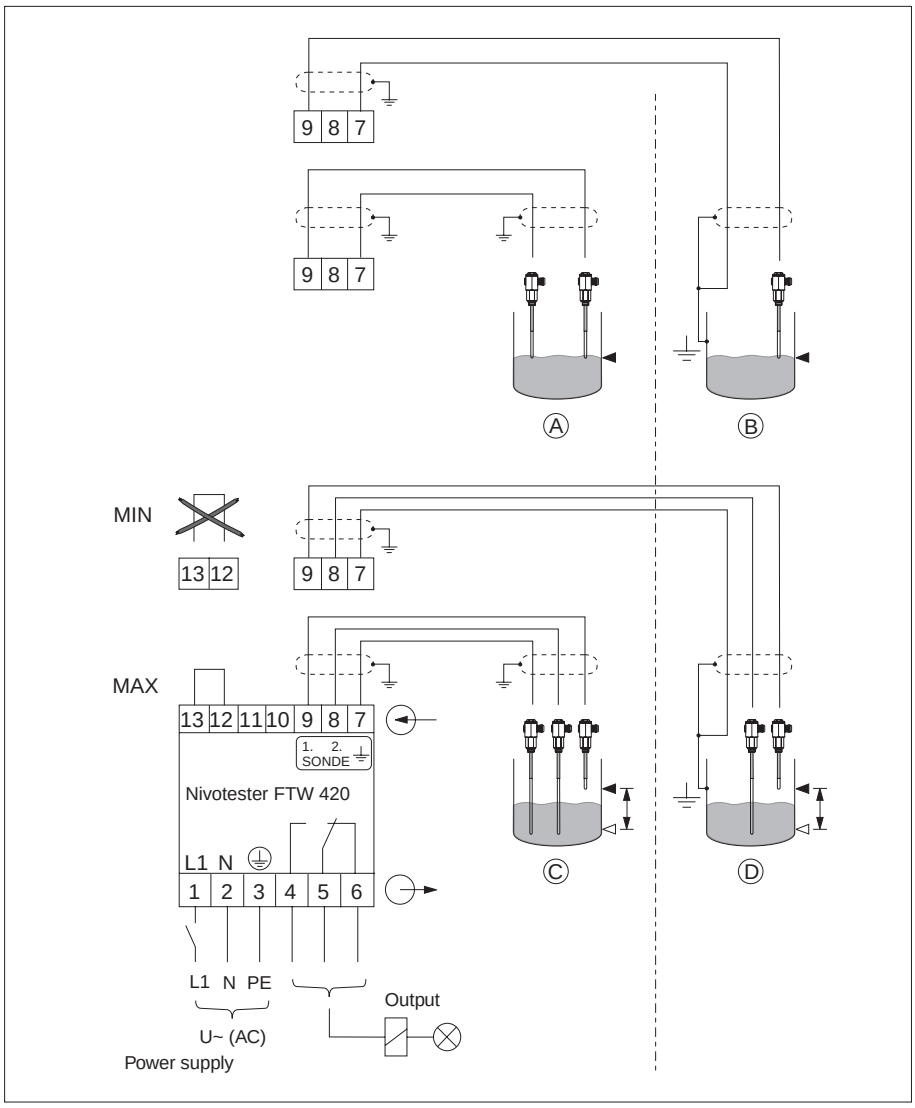
Conductive Measuring System

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

When delivered the instrument is calibrated to a standard detection range of 6 kΩ…50 kΩ and does not have to be adjusted.

Two probes are recommended for limit detection with turbulent liquid surfaces (two-point detection).

Relays, contactors or solenoid valves for control systems or alarms can be connected to the output of the Nivotester FTW 420.



Electrical connection

Ⓐ Limit detection in a plastic vessel
Ⓑ Limit detection in a steel vessel
Ⓒ Two-point control in a plastic vessel
Ⓓ Two-point control in a steel vessel

MIN = Minimum fail-safe, Terminals 12, 13 are not connected

MAX = Maximum fail-safe, Terminals 12–13 are connected

Note:
Terminals 3 and 7 are **not** connected internally.

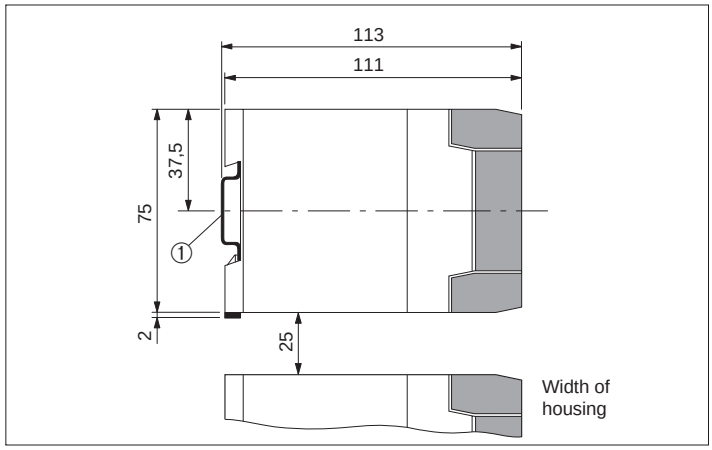
Electrical Connection

The terminal block for the power supply and the output relay are located below the front panel. The terminal block for the signal input cable connecting the probes and for the fail-safe circuit is located above the front panel.

Connecting the Power Supply
See Technical Data for power supply versions.
A fine-wire fuse is built into the instrument so that no special fuse needs to be connected.

Connecting the Probes
Standard sreened installation cable can be used for the signal input cables connecting the probes.
Two-point control requires three wires, limit detection, two.
Ground the screening at both ends.
If this is not possible, then at the Nivotester FTW 420.
General notes on installation for strong interference see Technical Information TI 241F/00/en.

Technical Data



① Mounting with standard rail EN 50022–35x7.5 or EN 50022–35x15

Minimum distance between upper and lower row of instruments 25 mm.

General specifications

Manufacturer	Endress+Hauser
Designation	Nivotester FTW 420
Function	Limit switch for electrically conductive liquids
Scope of delivery	Nivotester FTW 420
Accessories	Wall mounting: top hat rail, 35 mm symmetrical Protective housing: for two 50 mm wide Minipac instruments

Input

Signal input	Electrically isolated from the output and from the power supply
Adjustable range	approx. 100 Ω to approx. 50 kΩ in 3 overlapping ranges
Probe connection	2-wire screened cable for limit detection 3-wire screened cable for two-point control
Electromagnetic compatibility	Interference Emission to EN 61326, Electrical Equipment Class B Interference Immunity to EN 61326

Output

Output	1 relay with potential-free changeover contact (Overvoltage category II)
Switching capacity	max. 4 A at AC: max. 250 V max. 500 VA at cos φ > 0.7 at DC: max. 50 W to 250 V max. 100 W to 48 V
Switching delay	< 1 s
Function display	Red LED on the front panel for relay status

Auxiliary energy

Power connection	AC; For versions see Product Structure on Page 4. Tolerances each –10 %...+15 %
Power consumption	approx. 4,5 VA
Cable cross-section	1 x 0.5 mm^2 to 1 x 2.5 mm^2 or 2 x 0.5 mm^2 to 2 x 1.5 mm^2
Cable	Cable capacitance C_L: max. 30 nF Cable length L: max. 300 m
Connection	Terminals: removable terminal blocks, Without terminals: flat plug 0.8 x 6.3 as per DIN 46 244

Environmental conditions

Temperature ratings	Storage: –20 °C…+80 °C Single mounting: –20 °C…+60 °C Row mounting without gap: –20 °C…+50 °C Protective housing IP 55 (2 units): –20 °C…+40 °C
Ingress protection	Housing: IP 40, DIN 40 050 Terminals: IP 20, DIN 40 050

Mechanical construction

Housing	Row housing (Minipac format), in light grey plastic, Blue front panel Weight: approx. 0,3 kg
Mounting	With standard rail: EN 50022–35 x 7.5 or EN 50022–35 x 15

Product Structure

Nivotester FTW 420

Certificate, Approval

R Instrument for powering in non-hazardous area

Version

0 Minipac housing, 50 mm wide with terminal blocks

9 Others

Power supply

J 240 V, 50/60 Hz
A 230 V, 50/60 Hz
G 127 V, 50/60 Hz
F 115 V, 50/60 Hz
B 110 V, 50/60 Hz
C 48 V, 50/60 Hz
K 42 V, 50/60 Hz
D 24 V, 50/60 Hz
Y Others

Output

0 Potential-free changeover contact

Calibration range

A Calibration range: 0…50 kΩ
Factory-set 6 kΩ

B Calibration range: 0…1.5 kΩ
Factory-set 0.7 kΩ

Y Others

FTW 420 – [ ][ ][ ][ ][ ] Product designation

How to Order

- ❏ Product description for Nivotester FTW 420 as Product Structure
- ❏ Probe type, length
- ❏ Accessories

Supplementary Documentation

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

Endress+Hauser
GmbH+Co.
Instruments International
P.O. Box 2222
D-79574 Weil am Rhein
Germany

Tel. (0 76 21) 9 75-02
Tx 7 73 926
Fax (0 76 21) 9 75-3 45
http://www.endress.com
info@ii.endress.com

Endress+Hauser
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