



Level



Pressure



Flow



Temperature



Liquid
Analysis



Registration



Systems
Components



Services



Solutions

Technical Information

Nivotester FTR325

1-channel switch amplifier for the
microwave barrier Soliwave M



Area of application

The Nivotester FTR325 is suitable as a 1-channel switch amplifier for the Soliwave M microwave barrier. You can use the FTR325 for level detection for any type of solids or for control and counting tasks for packaged goods.

Associated apparatus for the microwave barrier with intrinsically safe circuits.

Advantages at a glance

- High level of operational safety through line monitoring up to the sensor
- LED display of operating and switching state
- Selectable pick up and/or drop out delay of the switching output
- Compact housing for easy inline mounting on standard rack rails
- Easy wiring via pluggable terminal block connectors

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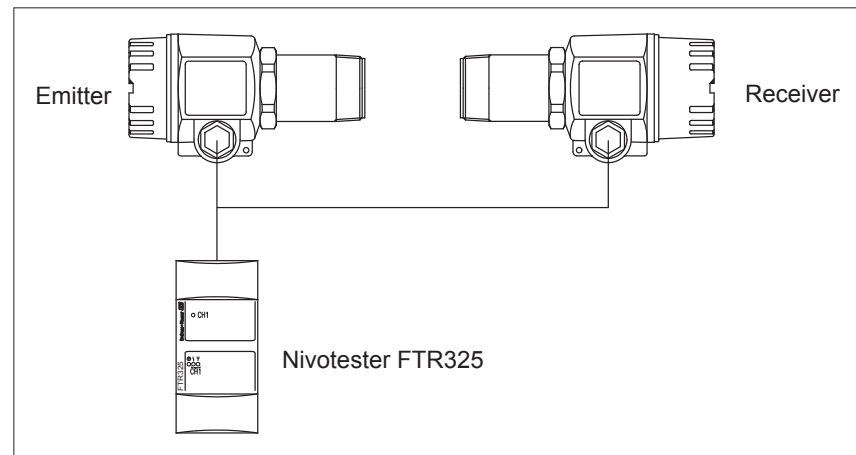
Function and system design

Measuring principle

The Nivotester FTR325 monitors the Soliwave M microwave barrier's open collector output and uses a relay (change-over gate) to provide this output for many user applications. An LED displays the switching state of the relay. Problems such as a cable breakage are also displayed.

The input on the Nivotester FTR325 is galvanically isolated from main power and output. It is connected to the microwave barrier via a three-wire cable (ring or star wiring), whereupon the Nivotester provides distribution (intrinsically safe circuit, DC) voltage to the microwave barrier.

Measuring system



The complete measuring system for limit detection consists of:

- an emitter FQR50,
- a receiver FDR50 and
- an evaluator Nivotester FTR325

Optical or acoustic signalers, contactors, relays, solenoids etc. may be connected to the Nivotester.

Limit switch signal function

The appropriate setting for the limit switch signal function (see page 9) ensures that the relay for signal output and fault is always activated (fail-safe mode) in idle state.

In combination with the Soliwave M microwave barrier the following secure modes are possible:

- The relay drops out when the switch point is reached (microwave barrier interrupted), a fault occurs or the distribution voltage fails.
- The relay drops out when the switch point is underrun (microwave barrier uninterrupted), a fault occurs or the distribution voltage fails.

Function monitoring system

The Nivotester FTR325 is equipped with a function monitoring system for improved fail-safe operation. A fault is indicated by an LED, the fault relay falls off.

In combination with the microwave barrier Soliwave M FQR50/FDR50-C* and -D* resp. the Nivotester FTR325-B* and -D* resp. can recognise the following faults and use an LED to indicate them:

- Breakage in the power supply cable to the emitter FQR50
- Microwave barrier power input (emitter FQR50 and/or receiver FDR50) too high
- Short-circuit (emitter FQR50, receiver FDR50 or wiring)

Manual function monitoring can be carried out by pushing the test button.

Device combinations

The following equipment combinations are possible:

- Nivotester FTR325-B* (ATEX II (1)G [Ex ia] IIC and ATEX II (1)D [Ex iaD] resp.) with FQR50/FDR50-C* (ATEX II 1/2G Ex ia IIC T4 and ATEX II 1/2D Ex iaD 20/21 IP66 T98°C resp.)
- Nivotester FTR325-D* (IECEX [Zone 0] [Ex ia] IIC and IECEX [Ex iaD] resp.) with FQR50/FDR50-D* (IECEX Zone 0/1 Ex ia IIC T4 and IECEX Ex iaD 20/21 IP66 T98°C resp.)

The following equipment combinations are impossible:

- Nivotester FTR325-A* (non hazardous area) with FQR50/FDR50-C* (ATEX II 1/2G Ex ia IIC T4 and ATEX II 1/2D Ex iaD 20/21 IP66 T98°C resp.)
- Nivotester FTR325-A* (non hazardous area) with FQR50/FDR50-D* (IECEX Zone 0/1 Ex ia IIC T4 and IECEX Ex iaD 20/21 IP66 T98°C resp.)
- Nivotester FTR325-B* (ATEX II (1)G [Ex ia] IIC and ATEX II (1)D [Ex iaD] resp.) with FQR50/FDR50-A* (non hazardous area)
- Nivotester FTR325-B* (ATEX II (1)G [Ex ia] IIC and ATEX II (1)D [Ex iaD] resp.) with FQR50/FDR50-B* (ATEX II 1/2D IP66 T102°C)
- Nivotester FTR325-B* (ATEX II (1)G [Ex ia] IIC and ATEX II (1)D [Ex iaD] resp.) with FQR50/FDR50-D* (IECEX Zone 0/1 Ex ia IIC T4 and IECEX Ex iaD 20/21 IP66 T98°C resp.)
- Nivotester FTR325-D* (IECEX [Zone 0] [Ex ia] IIC and IECEX [Ex iaD] resp.) with FQR50/FDR50-A* (non hazardous area)
- Nivotester FTR325-D* (IECEX [Zone 0] [Ex ia] IIC and IECEX [Ex iaD] resp.) with FQR50/FDR50-B* (ATEX II 1/2D IP66 T102°C)
- Nivotester FTR325-D* (IECEX [Zone 0] [Ex ia] IIC and IECEX [Ex iaD] resp.) with FQR50/FDR50-C* (ATEX II 1/2G Ex ia IIC T4 and ATEX II 1/2D Ex iaD 20/21 IP66 T98°C resp.)

Input

Measured variable

A limit signal is generated when the microwave barrier is either interrupted or uninterrupted, depending on the type of limit signal selected.

Input signal

- FTR325 input:
 - Soliwave M microwave barrier
 - input galvanically isolated from power supply
 - intrinsically safe circuit

Output

Output signal

- Relay output:
 - galvanically isolated from power supply
 - a potential-free switching contact for the limit signal
 - a potential-free switching contact for fault notification
- Breaking capacity for relay contacts:
 - U~ max. 253 VAC
 - I~ max. 2 A (AC)
 - P~ max. 500 VA (cos $\phi \geq 0.7$)
 - U- max. 40 VDC
 - I- max. 2 A (DC)
 - P- max. 80 W
- Service life: min. 10^5 switching operations at max. contact load
- Function indicators: LEDs for
 - On (green)
 - Limit signal (yellow)
 - Fault (red)

Switching frequency

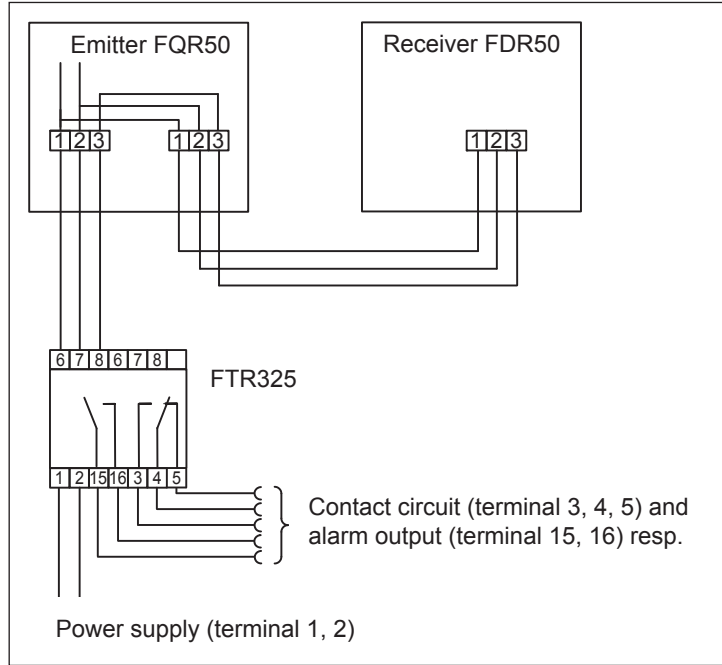
max. 2 Hz

Power supply

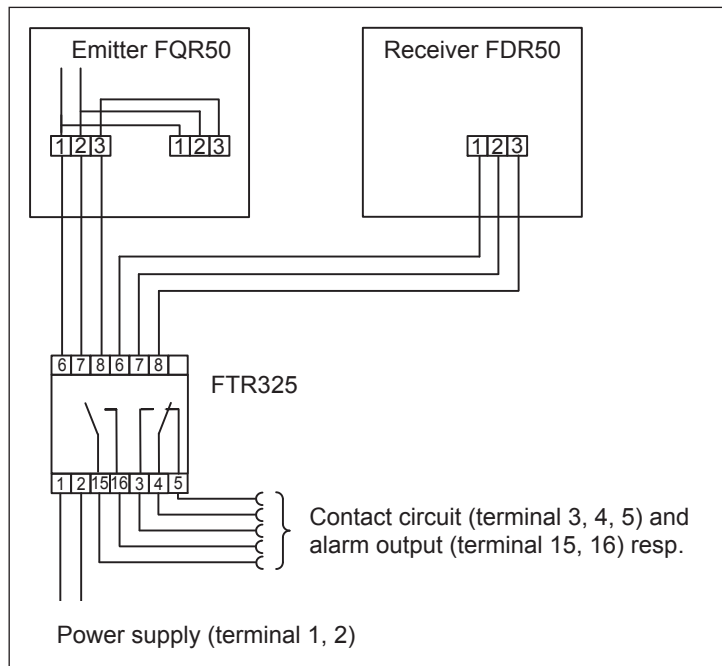
Electrical connection

When connected to the Nivotester FTR325 a Soliwave M microwave barrier can be wired via a choice of ring or star connection. The required backup power is provided by the FTR325.

Ring wiring



Star wiring



Supply voltage

- AC voltage model
 - Voltage range: 85 .. 253 VAC, 50/60 Hz
- DC voltage model
 - Voltage range: 20 .. 30 VAC / 20 .. 60 VDC
 - Reverse voltage protection

Internally there is a micro-fuse built into the supply voltage circuit so that only one fuse for short circuits in the feed line to the FTR325 must be upstream.

Cable specification

FTR325-B* with FQR50/FDR50-C* and FTR325-D* with FQR50/FDR50-D* resp.:

- Off-the-shelf installation cable, 3-conductor, non-shielded
- Resistance: $15 \Omega/\text{km} \leq R' \leq 150 \Omega/\text{km}$
- Inductance: $0.4 \text{ mH}/\text{km} \leq L' \leq 1 \text{ mH}/\text{km}$
- Capacitance: $45 \text{ nF}/\text{km} \leq C' \leq 200 \text{ nF}/\text{km}$
- Length of spurs max. 1000 m (IIC) and 5000 m (IIB) respectively

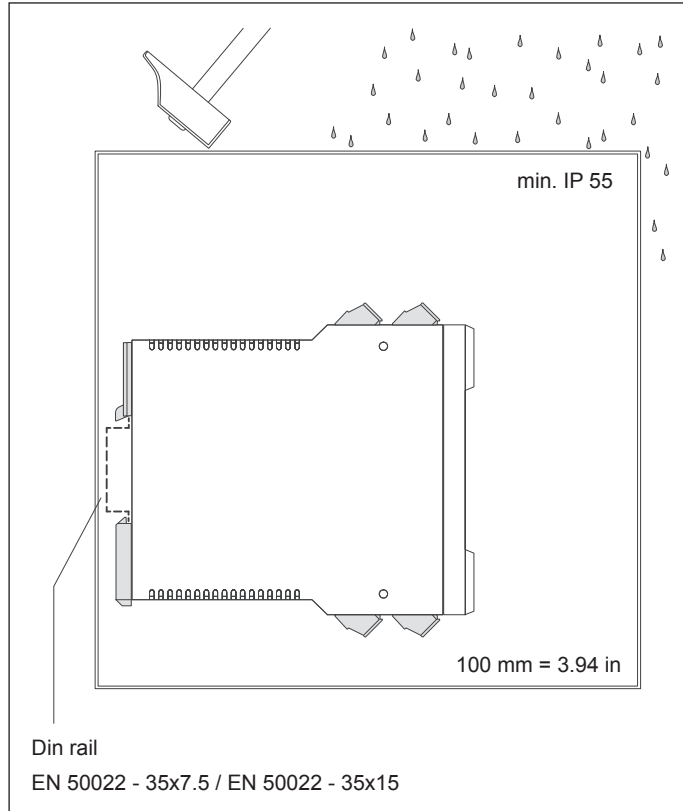
Power consumption

max. 1.75 W

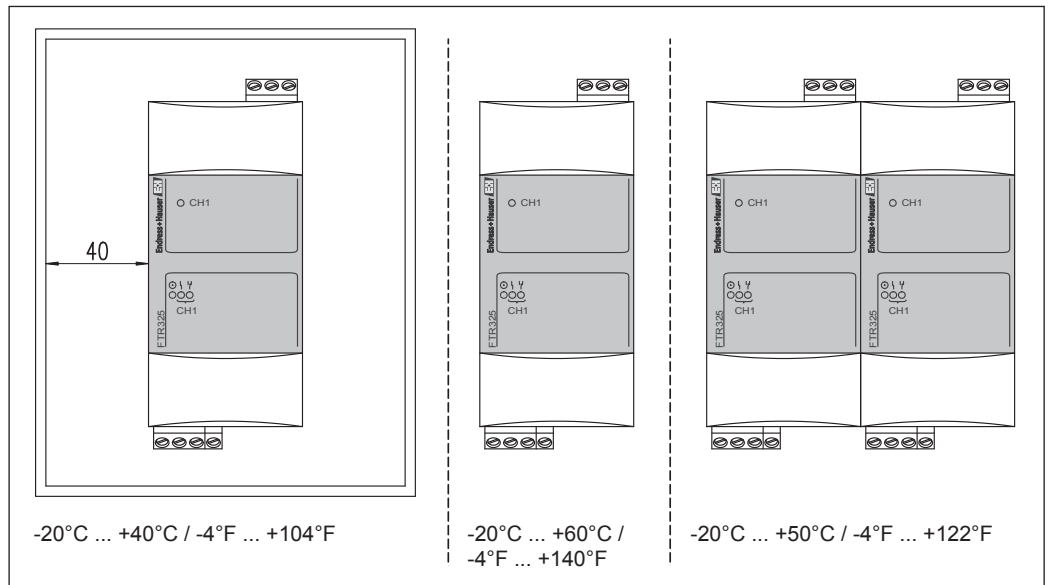
Installation

Installation instructions

The Nivotester FTR325 is mounted upright on a DIN rail (TS 35 as per EN 50022). A protective case (IP 66, see accessories) is available for external installation.



Clearances



Environment

- Ambient temperature range**
- - 20°C ... + 60°C (if installed individually)
 - - 20°C ... + 50°C (if installed in-line without clearance spaces)
 - - 20°C ... + 40°C (if installed in protective case)

Note!

If possible mount devices so that they are not subjected to direct sunlight. This applies especially to use in warmer climates.

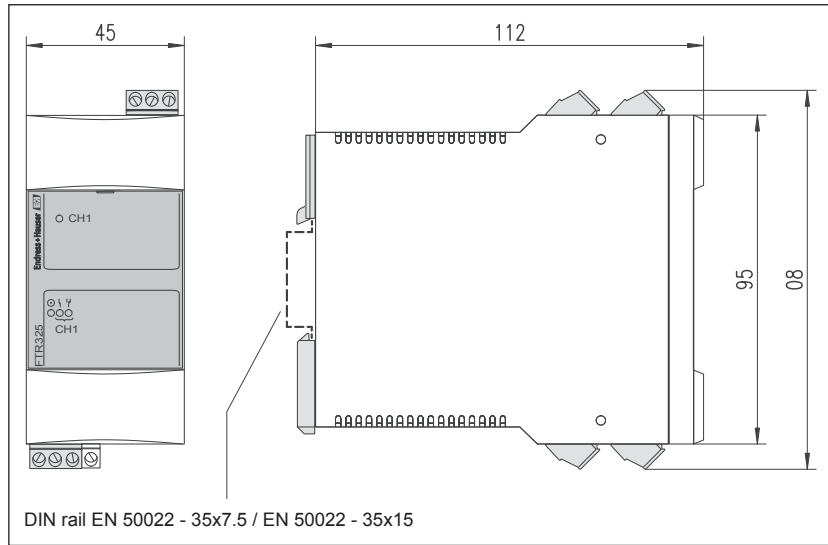
- Storage temperature**
- - 20°C ... + 85°C (preferably at + 20°C)

- Degree of protection**
- IP 20

- Electromagnetic compatibility (EMC)**
- Interference Emission to EN 61326, Electrical Equipment Class B
 - Interference Immunity to EN 61326, Appendix A (Industrial)

Mechanical construction

Design, dimensions



Weight

- 0.3 kg

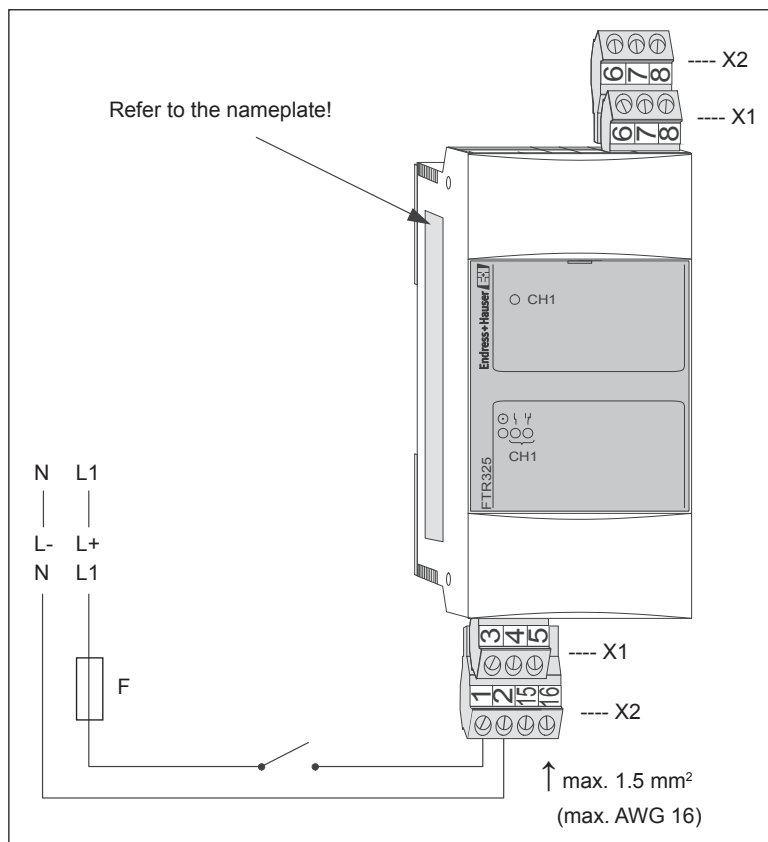
Material

- Housing:
 - Polycarbonat, Polyamid PA6
 - Color (main part): Light grey, RAL 7035

Housing

- Housing: In-line case (Minipac shape) made of plastic

Terminals



The four plug terminals are a part of the device.

Human interface

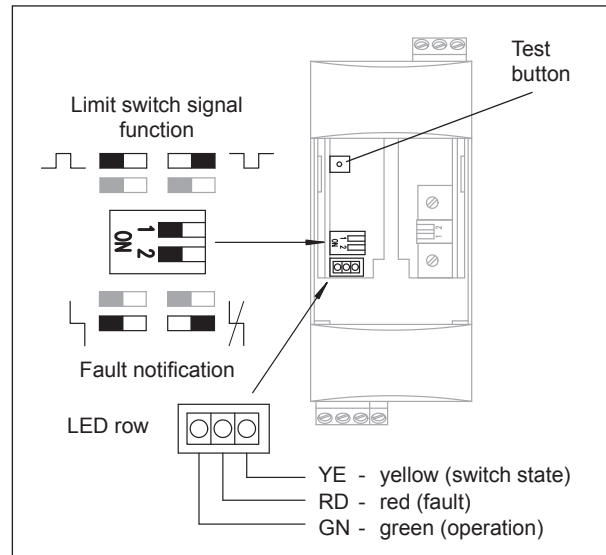
Control concept

Onsite adjustments using switches and potentiometers behind the hinged face plate.

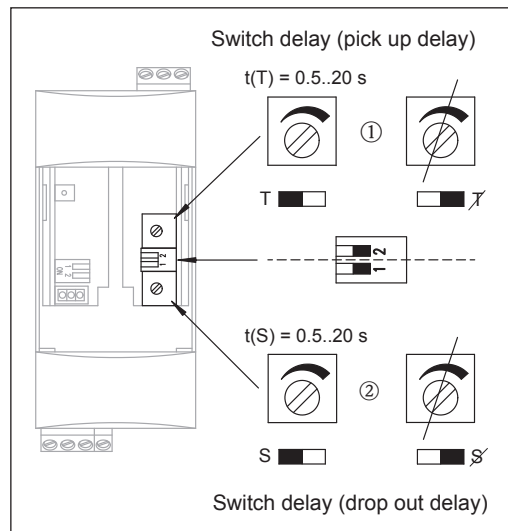
Display elements

- Green LED: operational state
- Yellow LED: switching state
- Red LED: fault

Operating elements



- Limit switch signal function:
 - Switches the limit switch relay on or off when the microwave barrier is either interrupted or uninterrupted, depending on the type of limit signal selected.
 - Optical indication of switching state via yellow LED
- Fault notification:
 - When activated, switches on the fault relay when a fault occurs
 - Optical indication of a fault via red LED
- Test button:
 - Simulation of a fault when fault notification switched on
 - Simulation of a limit signal when fault notification is switched off (for uninterrupted microwave barrier)



- Switch delay (pick up delay):
 - When switch delay activated limit switch relay switches on pick up delay after time $t(T)$
 - Adjustable time: $t(T) = 0.5 \dots 20 \text{ s}$

- Switch delay (drop out delay):
 - When switch delay activated limit switch relay switches off drop out delay after time $t(S)$
 - Adjustable time: $t(S) = 0.5 \dots 20 \text{ s}$

Note:

The switching frequency (maximum 2 Hz) is given by the microwave barrier Soliwave M.

You can find detailed information on the different setting options in the KA00205F/97/A6 operating instructions.

Certificates and approvals

CE approval

The Nivotester FTR325 fulfils the legal requirements of the EC directives. The manufacturer confirms the successful examination of the equipment by using the CE mark.

Ex approval

ATEX II (1)G [Ex ia] IIC (Certification no. BVS 07 ATEX E 148 X)
 ATEX II (1)D [Ex iaD] (Certification no. BVS 07 ATEX E 148 X)
 IECEx [Zone 0] [Ex ia] IIC (Certification no. IECEx BVS 09.0007X)
 IECEx [Ex iaD] (Certification no. IECEx BVS 09.0007X)

Other standards and guidelines

Directive 1999/05/EC annex 3.1 (a and b) and the directives 73/23/EEC and 89/336/EEC found in there

Ordering information

Ordering information Nivotester FTR325

10	Approval:		
	B	ATEX II (1)G [Ex ia] IIC	
		ATEX II (1)D [Ex iaD]	
	D	IECEx [Zone 0] [Ex ia] IIC	
		IECEx [Ex iaD]	
	Y	Special version, to be specified	
20	Model:		
	1	DIN rail mounting, b = 45 mm	
	9	Special version, to be specified	
30	Power supply:		
	A	85 - 253 VAC, 50/60 Hz	
	E	20 - 60 VDC	
		20 - 30 VAC, 50/60 Hz	
	Y	Special version, to be specified	
40	Output:		
	1	1x level SPDT + 1x alarm/level SPST	
	9	Special version, to be specified	

FTR325 -

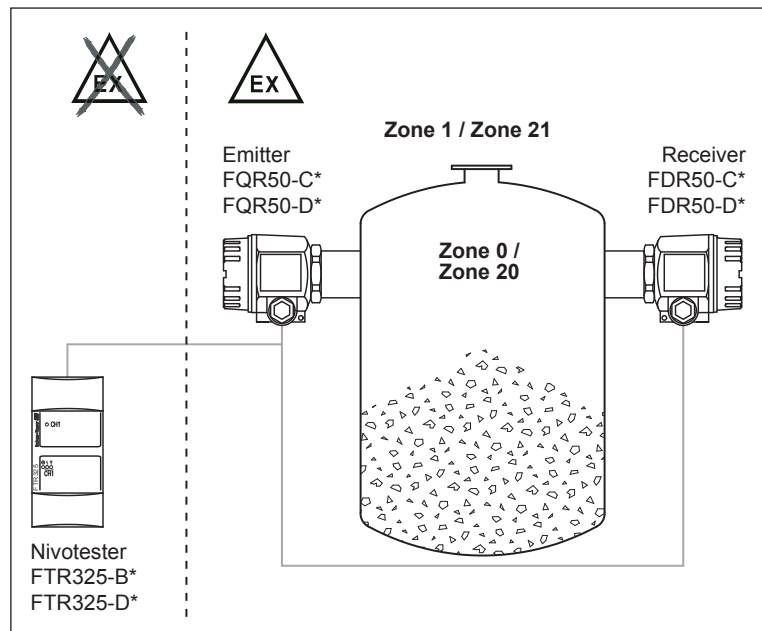
Notes on product structure

The following equipment combinations are possible:

- Nivotester FTR325-B* (ATEX II (1)G [Ex ia] IIC and ATEX II (1)D [Ex iaD] resp.) with FOR50/FDR50-C* (ATEX II 1/2G Ex ia IIC T4 and ATEX II 1/2D Ex iaD 20/21 IP66 T98°C resp.)
- Nivotester FTR325-D* (IECEx [Zone 0] [Ex ia] IIC and IECEx [Ex iaD] resp.) with FOR50/FDR50-D* (IECEx Zone 0/1 Ex ia IIC T4 and IECEx Ex iaD 20/21 IP66 T98°C resp.)

Safety instructions

Zone classification



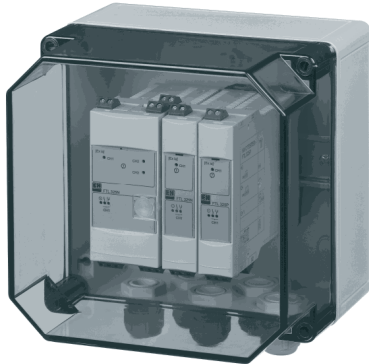
Safety notes for electrical equipment for potentially explosive atmospheres

- The following equipment combinations are allowed to operate in explosive area:
 - FTR325-B* with FQR50/FDR50-C* (see Safety Instructions XA00219F/97/A3)
 - FTR325-D* with FQR50/FDR50-D* (see Safety Instructions XA00484F/97/EN)
- Install the device according to the manufacturer's instructions and any other valid standards and regulations (e.g. EN/IEC 60079-14).
- Incorrect use of the device poses a danger.
- The device may be installed, hooked up and put into operation only by qualified and authorized persons with special attention paid to
 - the operating manual,
 - the relevant standards and
 - legal rules and regulations.
- The Nivotester can and may be serviced by the manufacturer only.

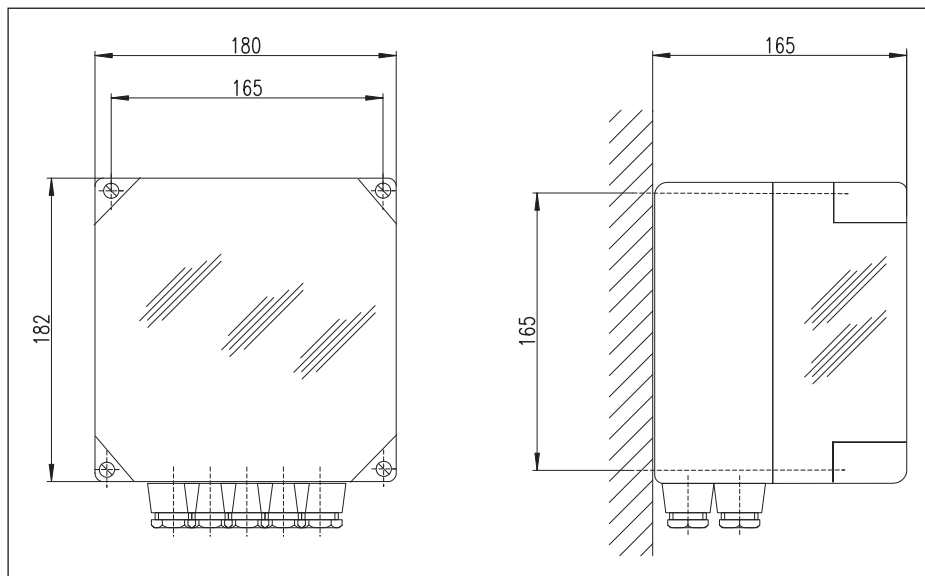
Accessories

Protective housing

A protective housing for field installation of top-hat rail devices e. g. Nivotester FTR325 is available. In this housing there is space for several top-hat rail devices (to a maximum installation width of 145 mm).



- Technical data
 - Order code: 52010132
 - Protection type (according to EN 60529): IP 66
 - Lower housing section: fibre-glass reinforced polycarbonate, grey
 - Upper housing section: polycarbonate, transparent
 - Seal: PU seal
 - Top-hat rail (EN 50022): galvanized
 - Cable entries: 5 pieces M20x1.5



Documentation

Operating instructions (KA)	Nivotester FTR325 KA00205F/97/A6
	Soliwave M FQR50/FDR50 KA00206F/97/A6
Technical informations	Soliwave M FQR50/FDR50 TI00378F/97/EN
Safety instructions	Soliwave M FQR50/FDR50-C* with the Nivotester FTR325-B* XA00219F/97/A3
	Soliwave M FQR50/FDR50-D* with the Nivotester FTR325-D* XA00484F/97/EN

Subject to modification

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