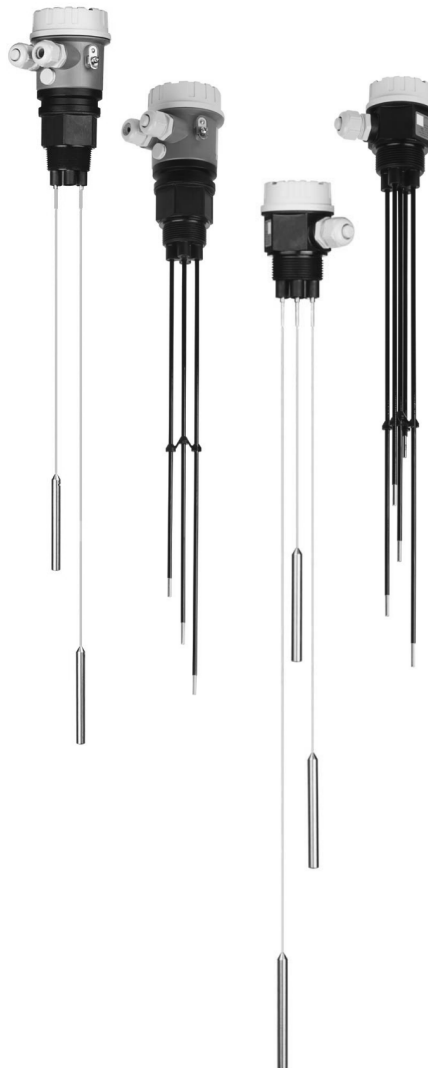


Level Limit Detection in Liquids

liquipoint T FTW 31, FTW 32

Level limit switch for multiple point detection in conductive liquids



Applications

Liquipoint T sensors are used in conductive liquids (as of $10 \mu\text{S}/\text{cm}$) for determining level limits.

Depending on the number of measuring points (up to 5 rods or ropes), measuring tasks such as overspill protection, dry running protection, two-point control of pumps or multiple point detection can be implemented for an existing process connection.

Your benefits

- Detect up to five level limits with one probe
- Two-point control and additional maximum and minimum detection
- Option between rod or rope version for optimum adaptation to the application
- Flexible instrumentation:
 - with built-in electronic insert, either transistor or relay output for 2 or 3 rod/rope probes
 - for connection to a separate transmitter power supply unit
- No calibration required; standard setting for the most common conductive liquids
- No moving parts in the tank:
 - long service life
 - reliable operation with no wear or blockages
- WHG approval
- Four measuring ranges can be set 100Ω , $1 \text{ k}\Omega$, $10 \text{ k}\Omega$, $100 \text{ k}\Omega$
- Cost-effective probe for conductive liquids
- Electronic inserts for:
 - NAMUR output
 - Relais output
 - Transistor output

Endress + Hauser

The Power of Know How



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Function and system design

Measuring principle

An alternating voltage exists between the rod probes in an empty tank.

As soon as the conductive liquid in the tank creates a connection between the ground probe rod and, for example, the maximum probe rod, a measurable current flows and the Liquipoint T switches. With level limit detection, the Liquipoint T switches back as soon as the liquid clears the maximum probe. With two-point control, the Liquipoint T does not switch back until the MAX and MIN probe is cleared.

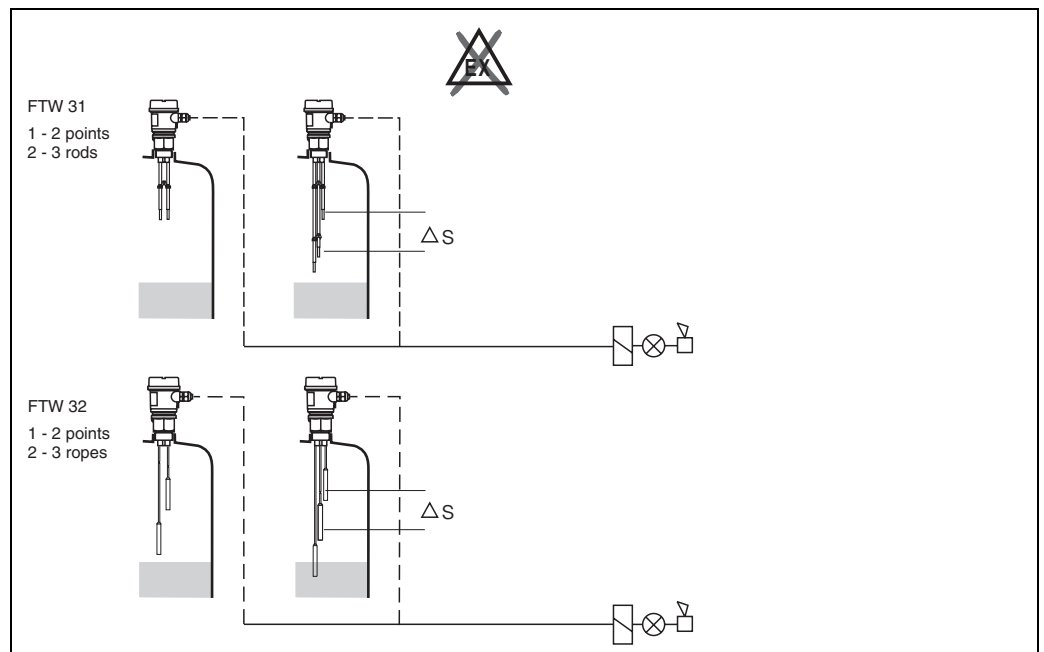
Using alternating voltage prevents corrosion of the probe rods and electrolytic destruction of the product. The material used for the tank walls is not important for measurement because the system is designed as a closed potential-free circuit between the probe rods and the electronics. There is absolutely no danger if the probe rods are touched during operation.

Measuring system

Probes with integrated electronic insert (compact-instrument version)

The measuring system consists of:

- FTW 31, FTW 32 with two/three rods or ropes and an electronic insert
- Control units, switches or signal transmitters, e.g. process control systems PLC, relays, etc.



L00-FTW3xxxx-14-05-xx-en-001

Independent of the tank material



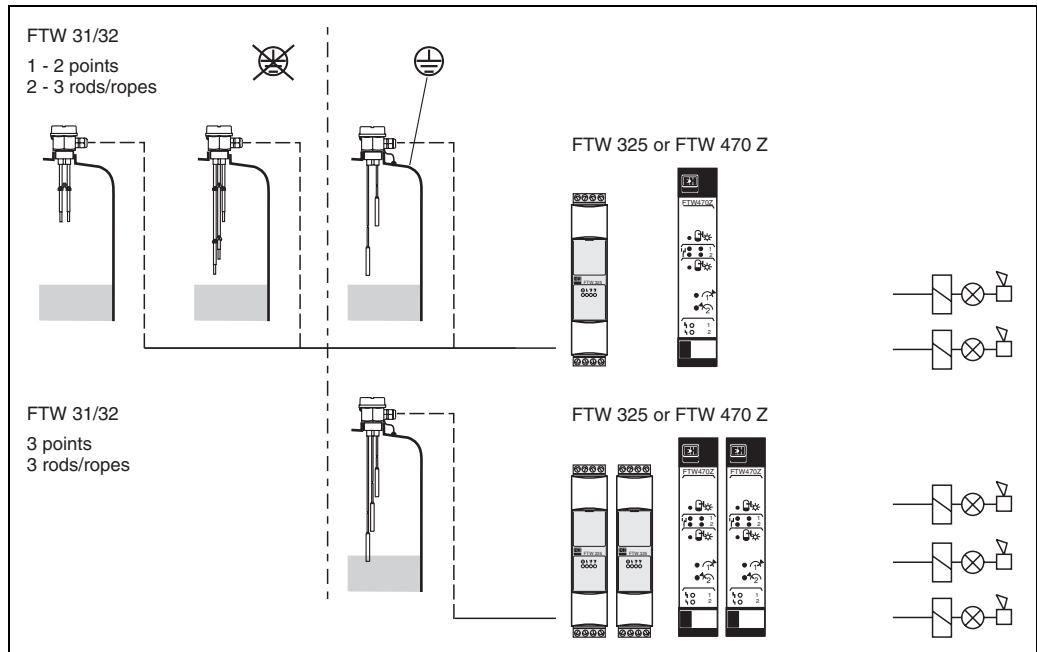
Note!

The compact-instrument version with three probes or rods is always used in Δs mode.

Probes without integrated electronic insert (separate-instrument version) for one or two point detection respectively

The measuring system consists of:

- FTW 31, FTW 32 with two/three rods or ropes
- Nivotester FTW 325 or FTW 470 Z
- Control units, switches or signal transmitters, e.g. process control systems PLC, relays, etc.



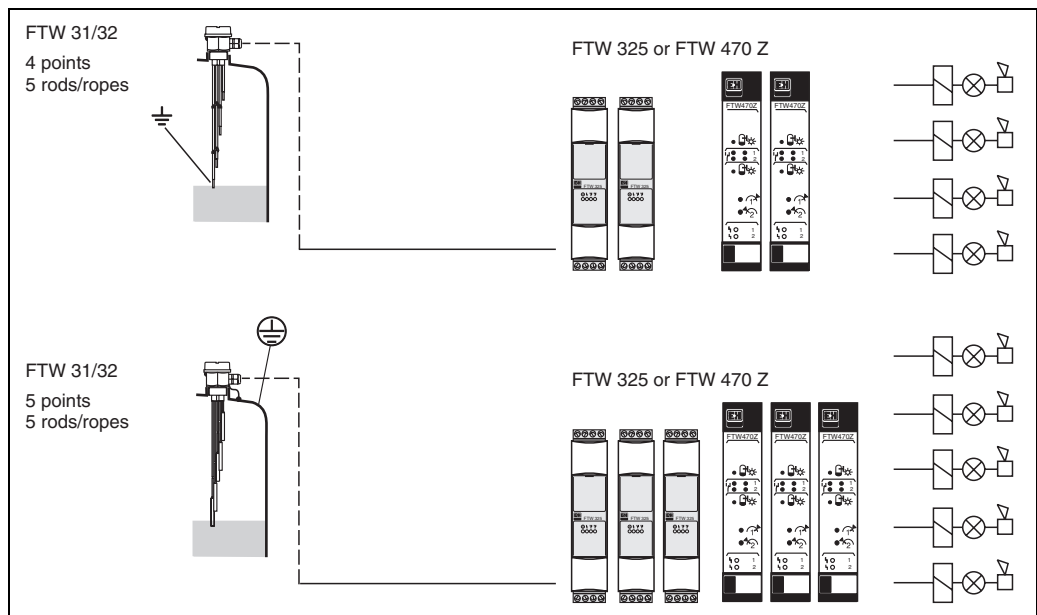
L00-FTW3xxxx-14-05-xx-en-002

Switch points dependent on the tank material

Probes without integrated electronic insert for multiple point detection

The measuring system consists of:

- FTW 31, FTW 32 with five rods or ropes
- Two Nivotester FTW 325 or FTW 470 Z
- Control units, switches or signal transmitters, e.g. process control systems PLC, relays, etc.



L00-FTW3xxxx-14-05-xx-en-003

Switch points dependent on the tank material

Input

Measured variable	Resistance change between two conductors caused by the presence or absence of a conductive product.
Measuring range (application)	The measuring range is dependent on the mounting location of the probes. Rod probes can have a max. length of 4000 mm and rope probes up to 15 000 mm.
Input signal	Probes covered => a measurable current is flowing between the probes. Probes uncovered => there is no measurable current flowing between the probes.


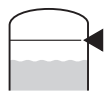

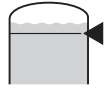


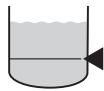



Output

Electronic insert FEW 52 (DC-PNP)

Output signal

Three-wire direct current version

Preferred in conjunction with programmable logic controllers (PLC).
Positive signal at the switch output of the electronics (PNP).
The output is blocked after the level limit is reached.

Fail-safe mode	Switch point	Output signal	rd
Max. 		^{*1} $L+ \xrightarrow{I_L} 3$	^{*3} 
		^{*2} $1 \xrightarrow{< 100 \mu A} 3$	^{*4} 
Min. 		$L+ \xrightarrow{I_L} 3$	
		$+ \xrightarrow{< 100 \mu A} 3$	

L00-FTW3xxxx-15-05-xx-en-001

^{*1} = load current (connected); ^{*2} residual current (disconnected); ^{*3} LED not lit; ^{*4} LED lit
See also *Electrical connection* on page 8.

If the probe is covered and the red LED flashes continuously, the next more sensitive measuring range has to be set. This ensures a safe switch point even if the conductivity of the medium varies slightly.

Fail-safe mode

Selecting the correct fail-safe mode ensures that the output always runs in quiescent current fail-safe.

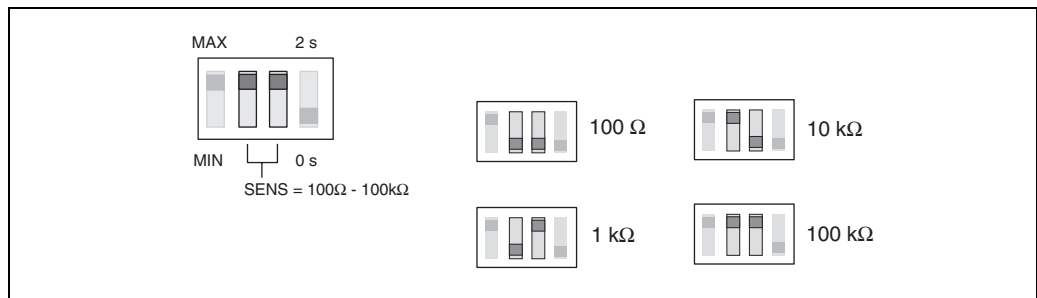
- Maximum fail-safe: the output voltage is 0 V if the switch point is exceeded (probe covered), a fault occurs or the power supply fails.
- Minimum fail-safe: the output voltage is 0 V if the switch point is undershot (probe uncovered), a fault occurs or the power supply fails.

Switching delay

A switching delay of 2.0 s can be activated or deactivated via a DIL switch.
If the switching delay is set to 0 s, the device switches after approx. 0.3 s.

Measuring ranges

A total of four measuring ranges (100 Ω; 1 kΩ; 10 kΩ; 100 kΩ) can be set via two DIL switches (SENS). The setting on delivery is 100 kΩ.



L00-FTW3xxxx-15-05-xx-xx-001

Signal on alarm

In the event of a power failure or a damaged probe: < 100 μA

Load

The load is switched via a transistor (PNP).
 Cycled overload and short-circuit protection, continuous ≤ 200 mA (short-circuit proof).
 Residual voltage at transistor at $I_{max} < 2.9 V$

Electronic insert FEW 54 (relay)

Output signal

AC/DC connection with relay output

When connecting a device with high inductance, a spark barrier must be fitted to protect the relay contact. A fine-wire fuse (load-dependent) protects the relay contact in the event of a short-circuit. Both relay contacts switch simultaneously.

Fail-safe mode	Switch point	Output signal	rd
Max. 		*1	*3
		*2	*4
Min. 		*1	*3
		*2	*4

L00-FTW3xxxx-15-05-xx-en-002

*1 = relay energised; *2 relay de-energised; *3 LED not lit; *4 LED lit
 See also Electrical connection on page 9.

If the probe is covered and the red LED flashes continuously, the next more sensitive measuring range has to be set. This ensures a safe switch point even if the conductivity of the medium varies slightly.

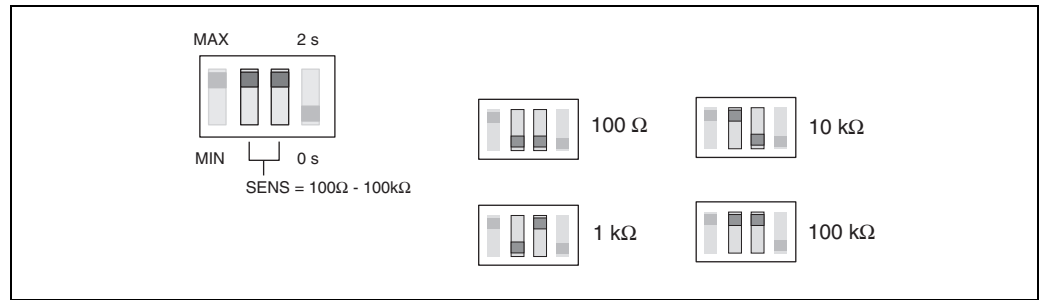
Fail-safe mode

Selecting the correct fail-safe mode ensures that the relay always runs in quiescent current fail-safe.

- Maximum fail-safe: the relay de-energises when the switch point is exceeded (probe covered), a fault occurs or the power supply fails.
- Minimum fail-safe: the relay de-energises when the switch point is undershot (probe uncovered), a fault occurs or the power supply fails.

Measuring ranges

A total of four measuring ranges (100 Ω; 1 kΩ; 10 kΩ; 100 kΩ) can be set via two DIL switches (SENS). The setting on delivery is 100 kΩ.



L00-FTW3xxxx-15-05-xxxx-001

Switching delay

A switching delay of 2.0 s can be activated or deactivated via a DIL switch. If the switching delay is set to 0 s, the device switches after approx. 0.3 s.

Signal on alarm

Output signal in the event of a power failure or a damaged probe: relay de-energised.

Load

Loads are switched via 2 potential-free change-over contacts.

I~ max. 4 A, U~ max. 253 V;

P~ max. 1000 VA, cos φ = 1, P~ max. 700 VA, cos φ > 0.7;

I– max. 4 A to 30 V, I– max. 0.2 A to 150 V.

When connecting a functional extra-low voltage circuit with double insulation in accordance with IEC 1010: the sum of the relay output and power supply voltages is max. 300 V.

Galvanic isolation




All input channels, output channels and relay contacts are galvanically isolated from each other.

Electronic insert FEW 58 (NAMUR)













Output signal

For connecting to isolating amplifiers acc. to NAMUR (IEC 60947-5-6)

Output signal jump from high to low current on limit (**H-L-edge**).

-  = lit
-  = flashes
-  = unlit

L00-FTL5xxxx-07-05-xx-xx-002

Fail-safe circuit	Level	Output signal	LEDs
Max.		+ 2.2 ... 6.5 mA → 1	 
		+ 0.4 ... 1.0 mA → 1	 
Min.		+ 2.2 ... 6.5 mA → 1	 
		+ 0.4 ... 1.0 mA → 1	 

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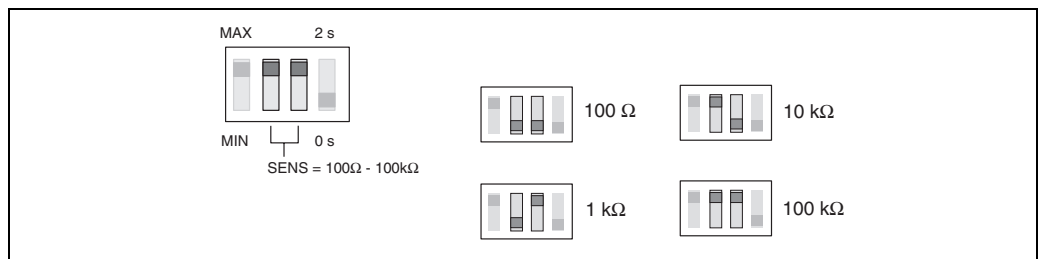
Fail-safe mode

Selecting the correct fail-safe mode ensures that the relay always runs in quiescent current fail-safe.

- Maximum fail-safe: the output signal is < 1.0 mA when the switch point is exceeded (probe covered), a fault occurs or the power supply fails.
- Minimum fail-safe: the output signal is < 1.0 mA when the switch point is undershot (probe uncovered), a fault occurs or the power supply fails.

Measuring ranges

A total of four measuring ranges (100 Ω; 1 kΩ; 10 kΩ; 100 kΩ) can be set via two DIL switches (SENS). The setting on delivery is 100 kΩ.



L00-FTW3xxxx-15-05-xx-xx-001

Switching delay

A switching delay of 2.0 s can be activated or deactivated via a DIL switch. If the switching delay is set to 0 s, the device switches after approx. 0.3 s.

Load

Refere to "Technical Data" date sheet of the connected isolating amplifier acc. to NAMUR (IEC 60947-5-6)

Cable monitoring

For probes without an electronic insert, an additional printed circuit board must be installed in the housing, which enables cable monitoring. It is always switched or connected between rod/rope 1 and 2.



Note!
When using switching units (transmitters) that do not support cable monitoring, these must be removed.

Power supply

Electrical connection (wiring diagrams)

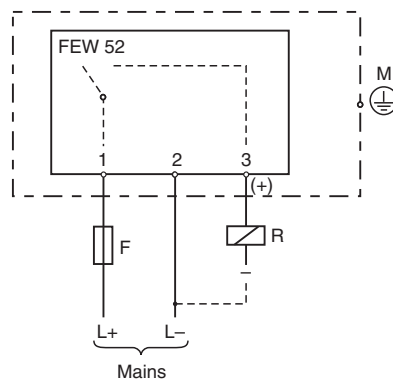
Compact instrumentation with FEW 52

Transistor circuit for load

The load connected to terminal 3 is switched by a transistor, contactless and therefore without bouncing. In normal switching status, terminal 3 has a positive signal. The transistor is blocked in the event of a level alarm or a power failure.

Protection against voltage peaks

When connecting a device with high inductance, always connect a voltage limiter.



Connecting the FEW 52 electronic insert.

L00-FTW3xxxx-04-05-xx-en-001

- F: Fine-wire fuse 500 mA, semi-time lag
- M: Ground connection to protective earth

Power supply (FEW 52)

- Supply voltage: $U = 10.8 \text{ V} \dots 45 \text{ V}$
- Load connection: open collector; PNP
- Switching voltage: max. 45 V
- Connected load, continuous: max. 200 mA
- Protected against reverse polarity

Power consumption

- $P < 1.1 \text{ W}$

Current consumption

- $I < 25 \text{ mA}$ (without load)

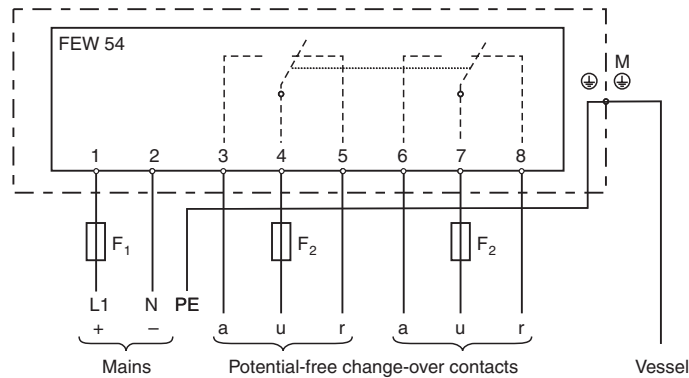
Compact instrumentation with FEW 54

Relay contact circuit for load

The connected load is switched via potential-free relay contacts (change-over contact). In the event of a level alarm or a power failure, the relay contacts break the connections between terminals 3 and 4 and terminals 6 and 7. The relays always switch simultaneously.

Protection against voltage peaks and short-circuits

When connecting a device with high inductance, fit a spark barrier to protect the relay contact. A fine-wire fuse (load-dependent) can protect the relay contact in the event of a short-circuit.



L00-FTW3xxxx-04-05-xc-en-002

Connecting the FEW 54 electronic insert.

- F_1 : Fine-wire fuse 500 mA, semi-time lag
- F_2 : Fine-wire fuse to protect the relay contact, load-dependent
- M: Ground connection to protective earth (PE)

Power supply (FEW 54)

- Supply voltage: U_{\sim} 20 V...55 V DC or U_{\sim} 20 V...253 V AC, 50/60 Hz
- Peak inrush current: max. 2 A, max. 400 μ s
- Output: two potential-free change-over contacts
- Contact load capacity: U_{\sim} max. 253 V, I_{\sim} max. 4 A, U_{\sim} 30 V/4 A; 150 V/0.2 A

Power consumption

- $P < 2,0$ W

Current consumption

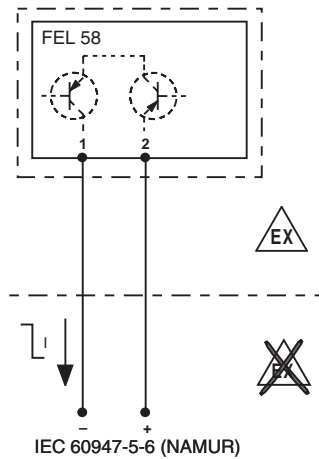
- 60 mA

Compact instrumentation with FEW 58

To be used with isolating amplifiers acc. to NAMUR (IEC 60947-5-6)
 Output signal jump from high to low current on limit (**H-L-edge**).

Signal transmission on a two-wire line:
 H-L-edge 2.2 ... 6.5 mA / 0.4 ... 1.0 mA

When using a multiplex the cycle time must be set to a minimum of 2 s.



Connecting the FEW 58 electronic insert.

L00-FTW3xxxx-04-05-xx-en-005

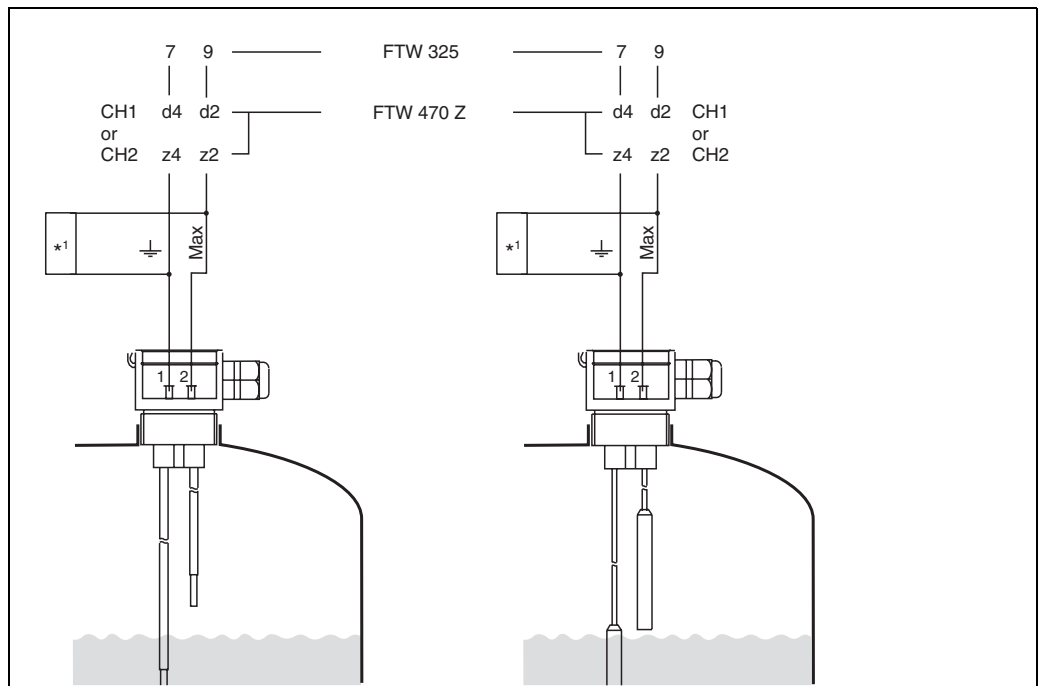
Power supply (FEW 58)

Refer to "Technical Data" data sheet of the connected isolating amplifier acc. to NAMUR (IEC 60947-5-6)

Signal on alarm

- Output signal with damaged sensor: < 1.0 mA

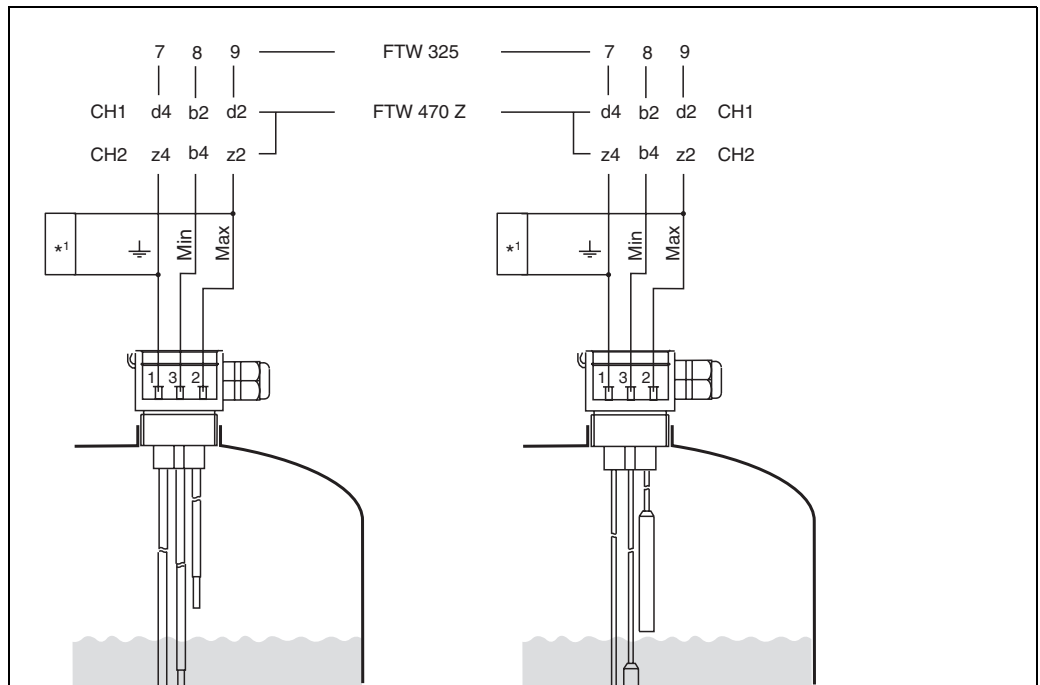
Separate instrumentation for two-rod or two-rope probes with cable monitoring



*1 Printed circuit board for cable monitoring

The power supply and evaluation are provided by switching units, e.g. Nivotester FTW 325 or FTW 470 Z

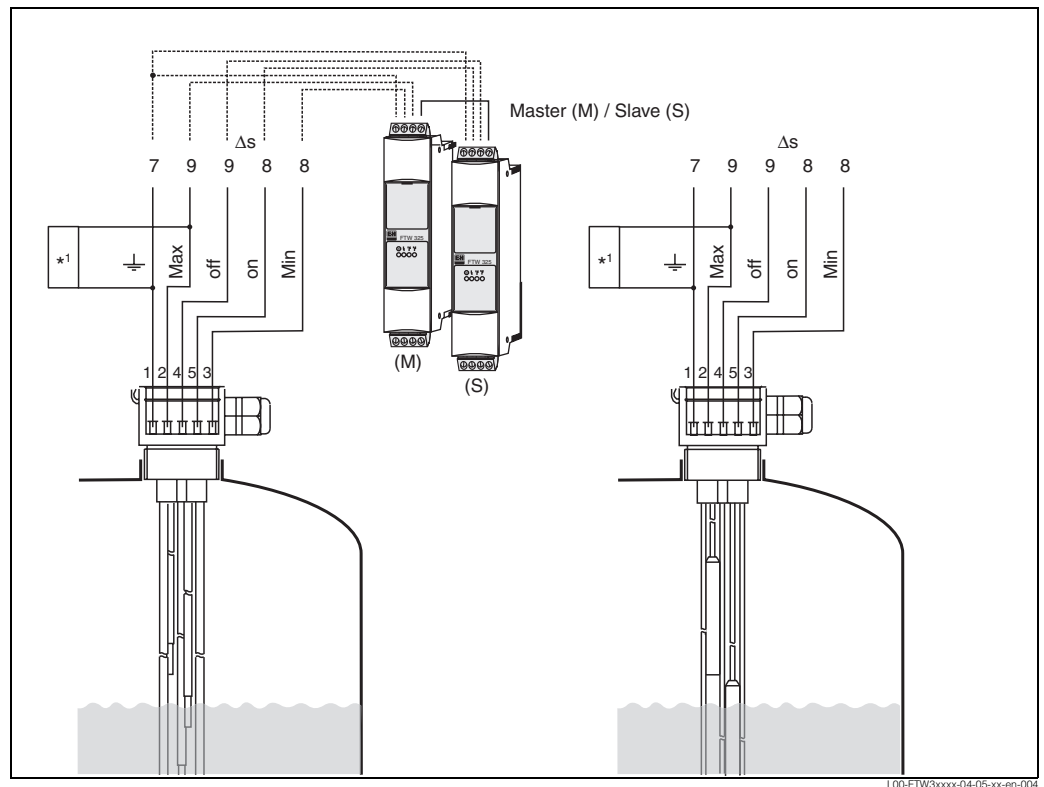
Separate instrumentation for three-rod or three-rope probes with cable monitoring



*1 Printed circuit board for cable monitoring

The power supply and evaluation are provided by switching units, e.g. Nivotester FTW 325 or FTW 470 Z

Separate instrumentation for five-rod or five-rope probes with cable monitoring



*1 Printed circuit board for cable monitoring
 The power supply and evaluation are provided by switching units, e.g. Nivotester FTW 325 or FTW 470 Z

Cable entry

M 20x1.5

- Degree of protection: IP66
- Quantity in F24 housing: 1 (separate-instrument version)
- Quantity in F16 housing: 2 (compact-instrument version)

NPT 1/2"

- Quantity in F24 housing: 1 (separate-instrument version)
- Quantity in F16 housing: 2 (compact-instrument version)
- Conductor cross-section (including wire end sleeve): 2.5 mm

Cable specifications

Use a commercially available cable (25 Ω per wire).

Accuracy with built-in electronic insert

Reference operating conditions	<ul style="list-style-type: none"> • Ambient temperature: 23 °C • Medium temperature: 23 °C • Medium viscosity: medium must release the probe again (drain off). • Medium pressure p_e: 0 bar • Probe installation: vertically from above
Measuring error	+/- 10 % at 100 Ω - 100 k Ω +/- 5 % at 1 k Ω - 10 k Ω
Repeatability	+/- 5 % at 100 Ω - 100 k +/- 1 % at 1 k - 10 k
Hysteresis	- 10% for the MAX probe, in reference to the switch point. Δs ϕ υνχτιον δεαχτιπατεδ.
Switch-on delay	< 3 s
Influence of ambient temperature	< 0,05 %/K

Installation conditions

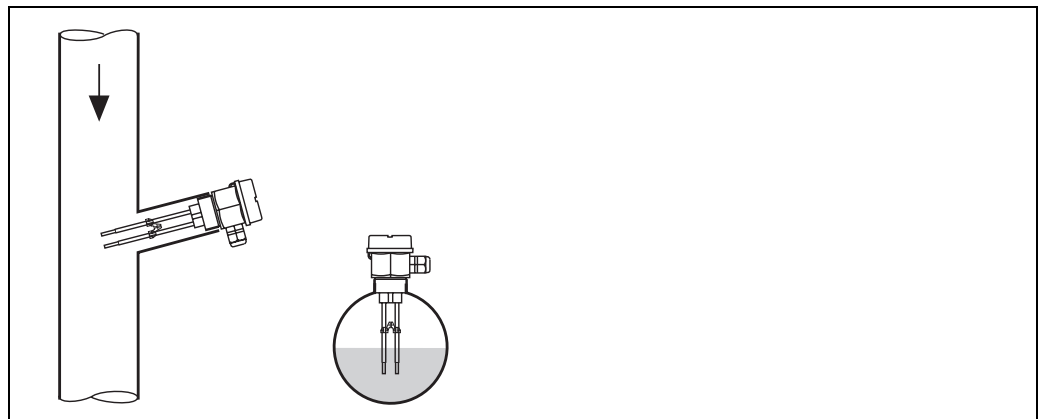
Installation instructions

Mounting location

The rod and rope probes are mounted predominantly in tanks made of plastic or metal.

Piping (partially filled)

Two-rod probes can be used in piping as, for example, dry running protection for pumps.

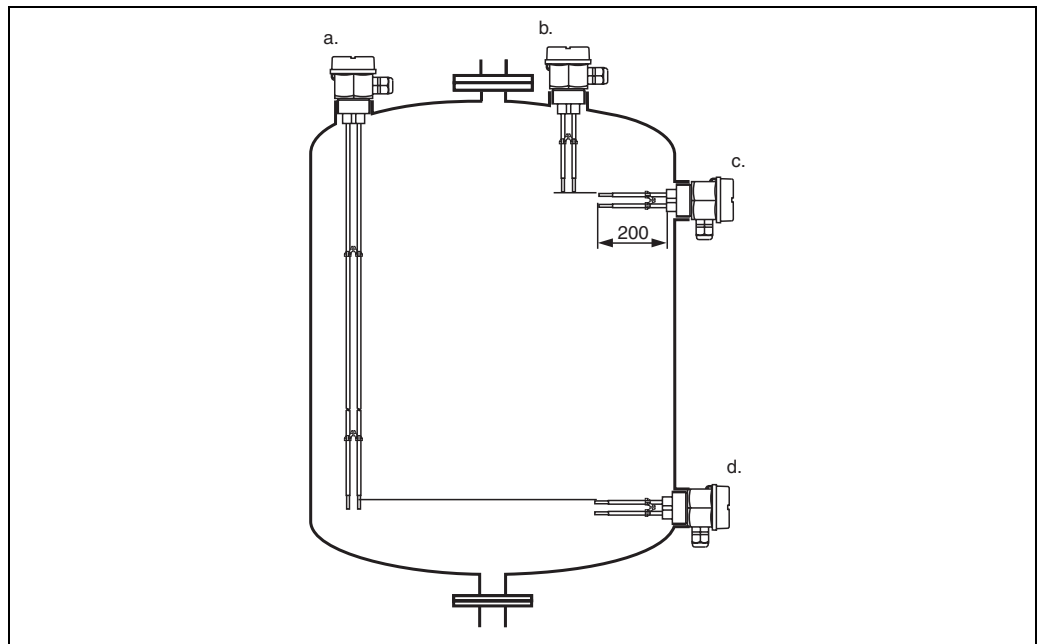


L00-FTW3xxxx-11-05-xx-xx-001

Orientation

Rod probes (Dimensions in mm)

Level limit detection for standard applications in tanks made of plastic or metal.

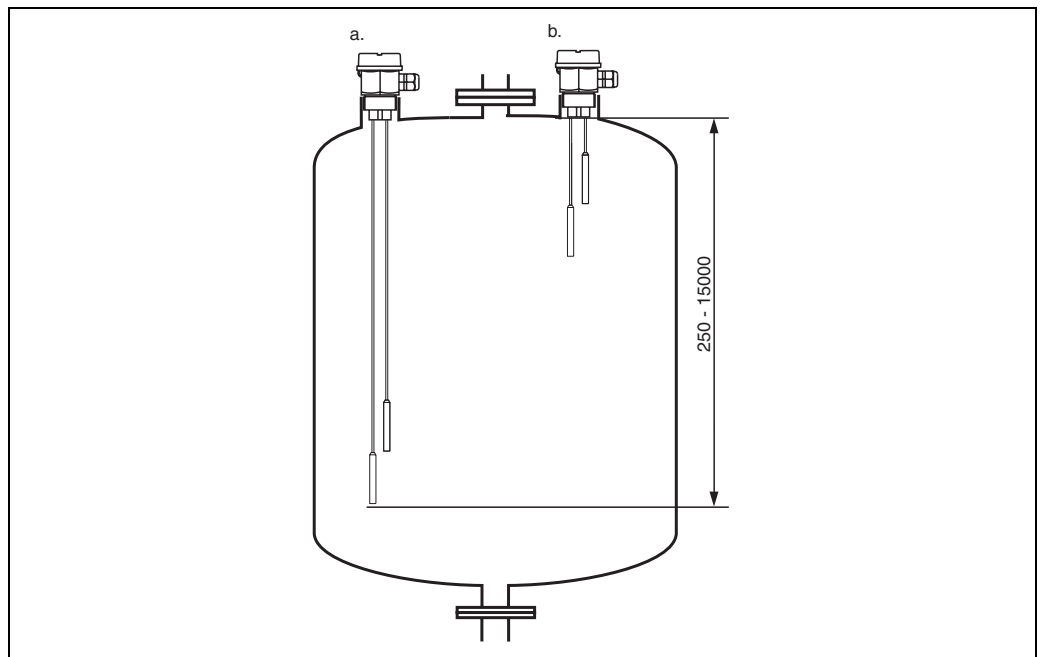


L00-FTW3xxxx-11-05-xxx-xx-002

- a. Vertical mounting, minimum detection; Probe length set to the level limit required; Rods must not come into contact with the tank.
- b. Vertical mounting, maximum detection; Probe length set to the level limit required
- c. Lateral mounting, maximum detection; Maximum probe length 200 mm (only applies to two-rod probes).
- d. Lateral mounting, minimum detection; Maximum probe length 200 mm (only applies to two-rod probes).

Rope probes (Dimensions in mm)

Level limit detection for standard applications in tanks made of plastic or metal.

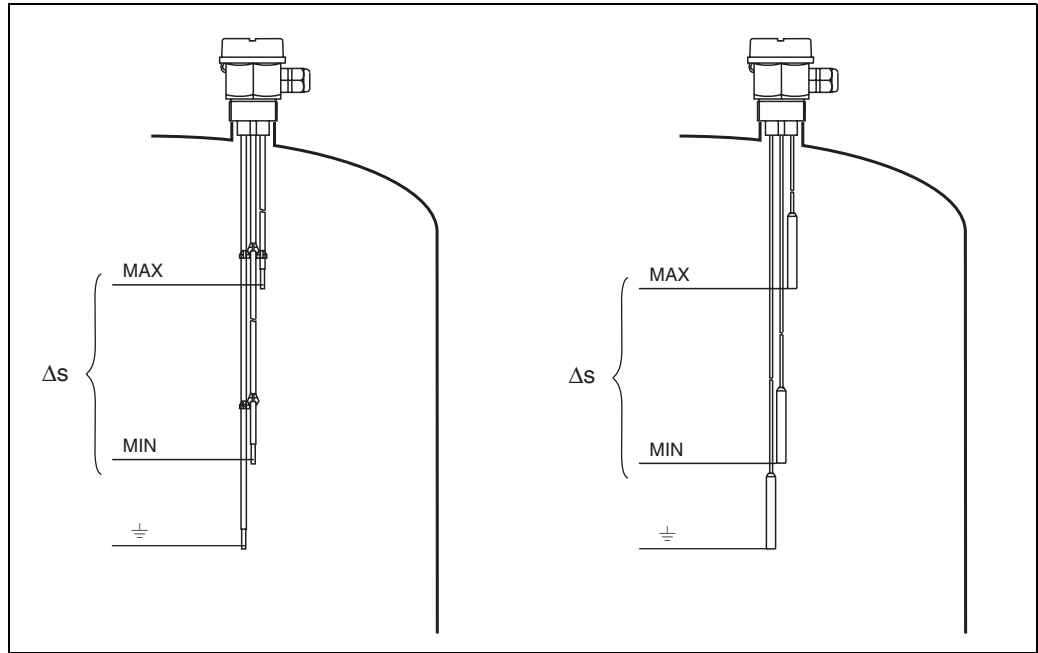


L00-FTW3xxxx-11-05-xxx-xx-003

- a. Vertical mounting, minimum detection; Rope length set to the level limit required; Rope ends must not come into contact with the tank
- b. Vertical mounting, maximum detection; Rope length set to the level limit required

Example applications

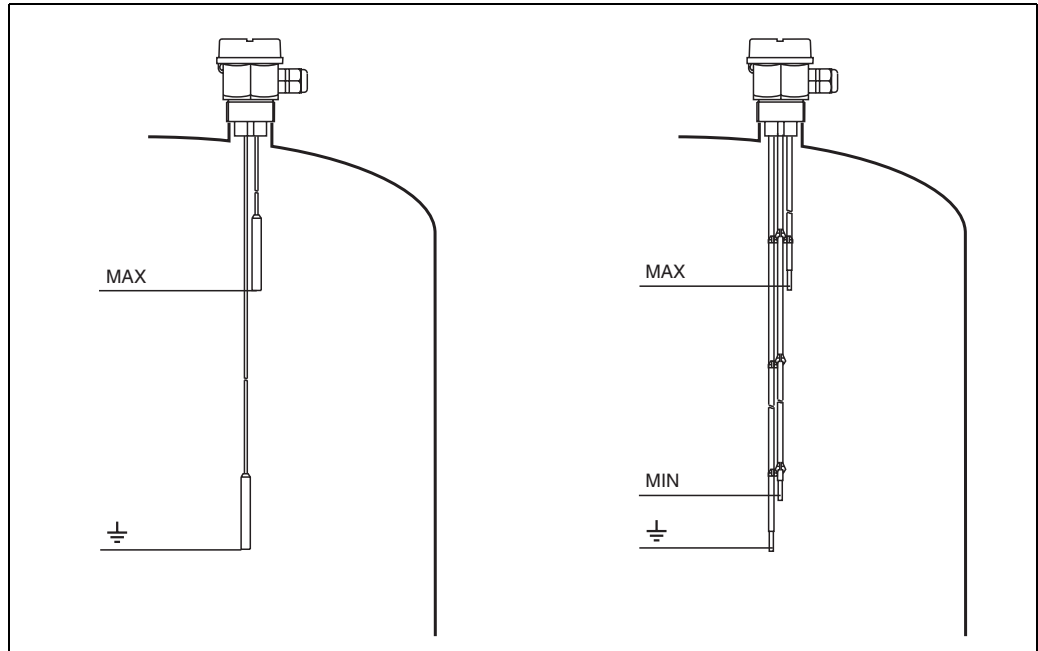
Level limit detection (standard applications)



L00-FTW3xxxx-15-05-xx-xx-002

Two-point control (Δs) e.g. pump control

Level limit detection (standard applications)



L00-FTW3xxxx-15-05-xx-xx-002

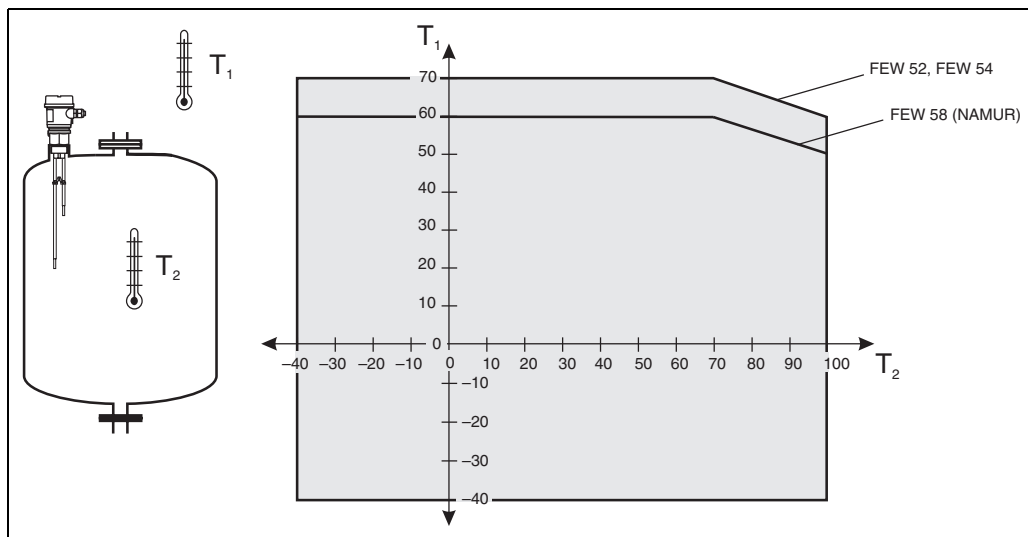
*Level limit detection (MAX),
maximum and minimum detection for compact-instrument devices only possible with Δs .*

Environment

Ambient temperature range	Non-hazardous area -40 ... 70 °C -40 ... 60 °C (for FEW 58 NAMUR)
Storage temperature	-40 ... 80 °C
Climate class	Tropicalised as per DIN EEC 68, part 2-38
Degree of protection	IP66
Shock resistance	Practical test
Vibration resistance (at min. rod length)	DIN 60068-2-64 / IEC 68-2-64: 20 ... 2000 Hz, 1 (m/s ²)/Hz
Electromagnetic compatibility	<ul style="list-style-type: none"> • Interference Emission to EN 61326, Electrical Equipment Class B • Interference Immunity to EN 61326, Annex A (Industrial) • Use for separate-instrumented probes a screened cable between the probe and the switching unit. <p>For installation instructions for screened cables and general instructions for EMC inspection conditions of E+H devices, see also TI 241F.</p>

Process conditions

Medium temperature limits Permissible ambient temperature T_1 at the housing as a function of the measuring material temperature T_2 in the vessel:



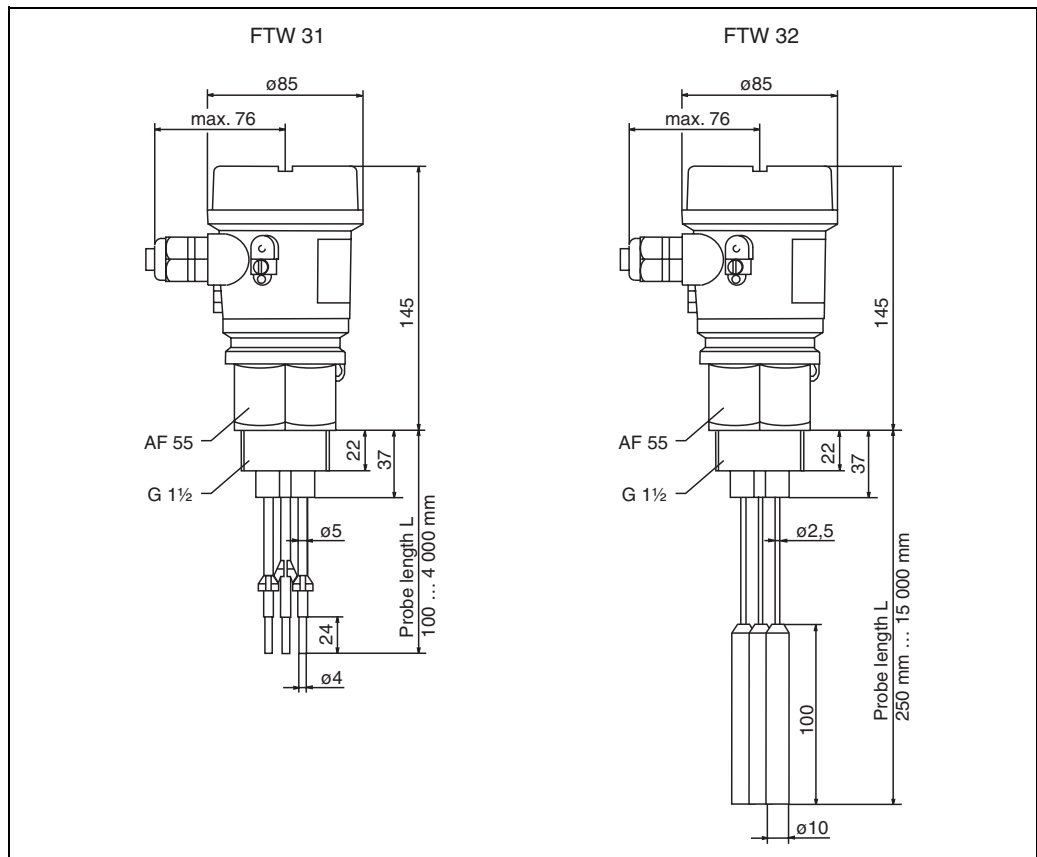
Note!
For separately instrumented devices (without FEW 5?) there are no restrictions in the indicated temperature range.

Conductivity	$\geq 10 \mu\text{S}$
Limiting medium pressure range	-1 ... 10 bar

Mechanical construction

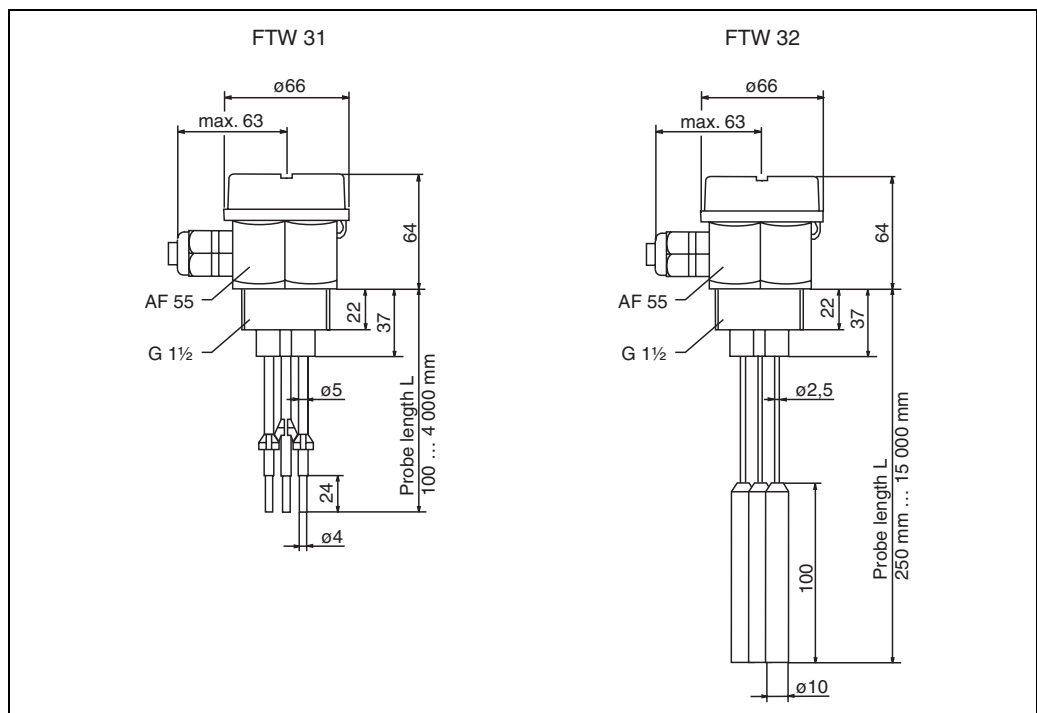
Design, dimensions

Rod and rope version with G 1 1/2" (compact-instrument version with electronic insert)



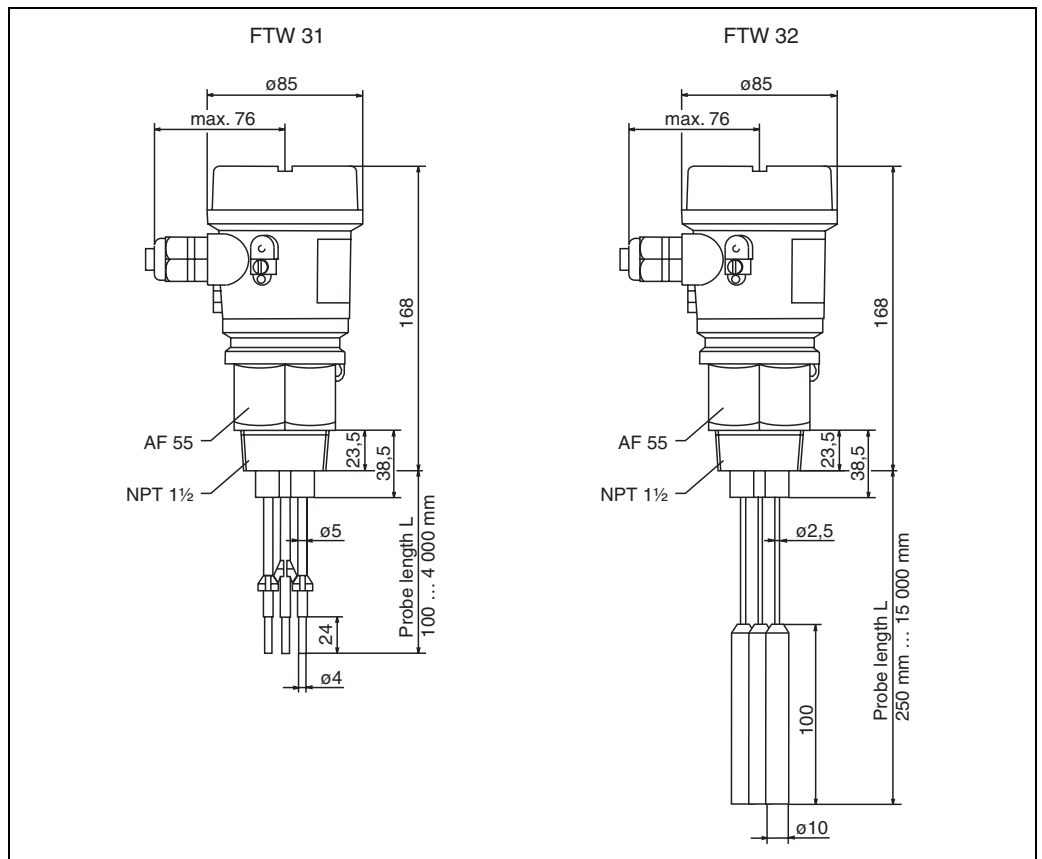
L00-FTW3xxxx-06-05-xx-en-001

Rod and rope version with G 1 1/2" (separate-instrument version without electronic insert)



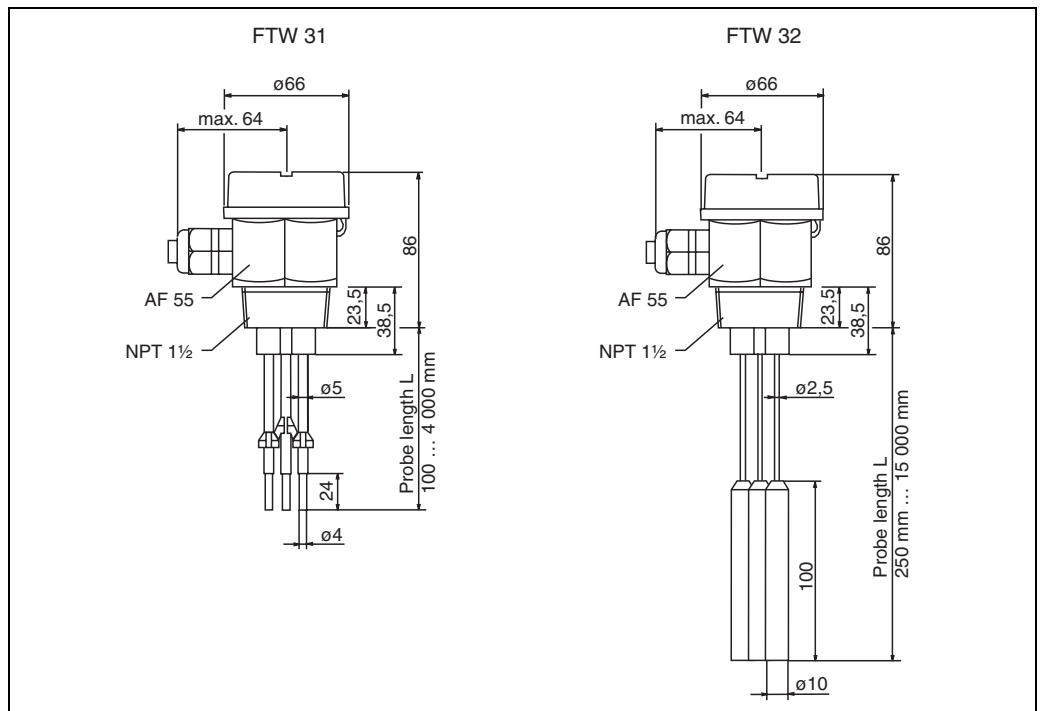
L00-FTW3xxxx-06-05-xx-en-002

Rod and rope version with NPT 1 1/2" (compact-instrument version with electronic insert)



L00-FTW3xxxx-06-05-xx-en-003

Rod and rope version with NPT 1 1/2" (separate-instrument version without electronic insert)



L00-FTW3xxxx-06-05-xx-en-004

Weight	Separate-instrument version
	<i>Rod, 1 m long</i>
	FTW 31 with 2, 3 or 5 rods (415 g; 530 g; 760 g)
	<i>Rope, 1 m long</i>
	FTW 32 with 2, 3 or 5 ropes (390 g; 470 g; 640 g)
	Compact-instrument version
<i>Rod, 1 m long</i>	
FTW 31 with 2 or 3 rods (600 g; 720 g)	
<i>Rope, 1 m long</i>	
FTW 32 with 2 or 3 ropes (710 g; 800 g)	

Material	Probes
	<i>Rods</i>
	<ul style="list-style-type: none"> • Rod: 1.4404 (316L) • Insulation: PP
	<i>Ropes</i>
	<ul style="list-style-type: none"> • Rope: 1.4571 (316Ti) • Insulation: FEP • Weight: 1.4435
	Housing
	<i>F24 (separate-instrument version)</i>
	<ul style="list-style-type: none"> • Housing: PPS • Cover: PBT
	<i>F16 (compact-instrument version)</i>
	<ul style="list-style-type: none"> • Housing: PBT • Cover: PBT • Adapter: PBT
Process connections	
<ul style="list-style-type: none"> • G 1 1/2 • NPT 1 1/2 	

Fitted electrodes	Rod probes
	<i>Compact-instrument version: 2 or 3 rods; Separate-instrument version: 2, 3 or 5 rods</i>
	<ul style="list-style-type: none"> • Diameter without insulation: 4 mm • Maximum rod length: 4000 mm • Minimum rod length: 100 mm • Thickness of insulation: 0.5 mm • Length of non-insulated area (tip of rod): 20 mm • Extraction forces (parallel probe rod): 1000 N

Rope probes

Compact-instrument version: 2 or 3 rods; Separate-instrument version: 2, 3 or 5 rods

- Diameter without insulation: 1 mm
- Maximum rope length: 15000 mm
- Minimum rope length: 250 mm
- Thickness of insulation: 0.75 mm
- Weight length: 100 mm (not insulated)
- Weight diameter: 10 mm
- Extraction forces (parallel probe rod): 500 N

Human interface

Operating elements

FEW 52, FEW 54, FEW 58

One DIL switch for min/max position
 One DIL switch for 0 s or 2 s switching delay
 Two DIL switches for setting the measuring ranges 100 Ω, 1 kΩ, 10 kΩ, 100 kΩ

Display elements

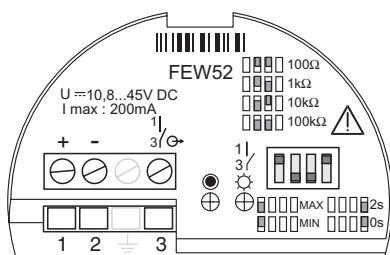
Separate-instrument version

Dependent on the connected switching unit (e.g. FTW 325 or FTW 470 Z)

Compact-instrument version

FEW 52

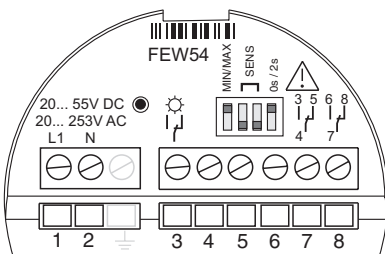
One red light emitting diode: fault message, switching status
 One green light emitting diode: operation



L00-FTW3xxxx-07-05-xx-xx-001

FEW 54

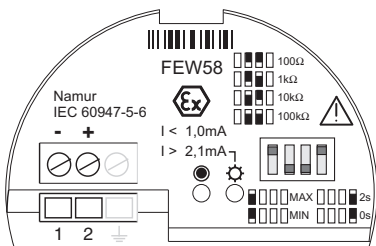
One red light emitting diode: fault message, switching status
 One green light emitting diode: operation



L00-FTW3xxxx-07-05-xx-xx-002

FEW 58

One yellow light emitting diode: fault message, switching status
 One green light emitting diode: operation

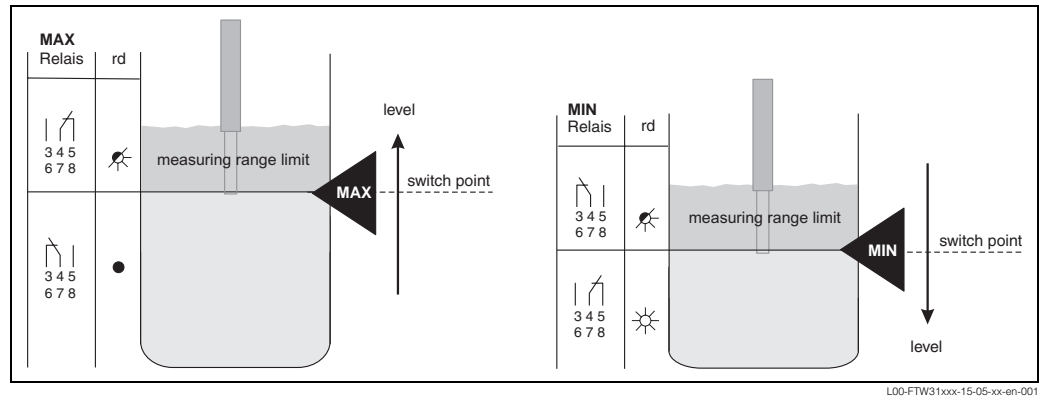


L00-FTW3xxxx-07-05-xx-xx-003



Note! For FEW 52, FEW 54

If the probe is covered and the red LED flashes continuously, the next more sensitive measuring range has to be set. This ensures a safe switch point even if the conductivity of the medium varies slightly.



L00-FTW31xxx-15-05-xx-en-001

Certificates and approvals

CE mark

The Liquipoint T meets the legal requirements of the EC directives. Endress+Hauser confirms that the device has been successfully tested by applying the CE mark.

Overspill protection

Approvals

- WHG
- Leak test (Leakage)

Other standards and guidelines

Other standards and guidelines that were observed during the design and development of the Liquipoint T FTW 31 and FTW 32.

- Low voltage equipment directive (73/ 23/ EEC)
- DIN EN 61010 part 1, 2001
Safety regulations for electrical equipment for measurement, control and laboratory use
Part 1: General requirements
- EN 61326
Electrical equipment for measurement, control and laboratory use EMC requirements

Ex-approvals

The Endress+Hauser sales office provides information on the currently suppliable Ex versions (ATEX EEx ia and ATEX EEx nA/C(L)). All data relevant for explosion protection can be found in separate Ex documentation (see: Supplementary Documentation on page 26). This can be viewed as necessary.

Type of protection

- [EEx ia] IIC (FEW 58)
- [EEx na/C(L)] IIC (FEW 52, FEW 54)

Ordering information

Liquipoint FTW 31

10	Certificates			
	A	Version for non-hazardous areas		
	B	Version for non-hazardous areas, WHG, Leakage detection		
	C	ATEX II 3 G EEx nA/C(L) IIC T6, WHG		
	D	ATEX II 2 G EEx ia IIC T6		
	Y	Special version		
20	Process connection and material			
	1	Threaded connection G 1 1/2", PPS		
	2	Threaded connection NPT 1 1/2", PPS		
	9	Special version		
30	Quantity and material of rods			
	A2	2 rods, 316L		
	A3	3 rods, 316L		
	A5	5 rods, 316L		
	Y9	Special version		
40	Length of probe L, 100 ... 4000 mm			
	A	mm L, probe length		
	B	inch L, probe length		
	C	1000 mm L, probe length		
	D	2000 mm L, probe length		
	Y	Special version		
50	Housing and cable entry			
	A	Plastic housing IP66, M20x1.5		
	B	Plastic housing IP66, NPT 1/2"		
	C	Plastic housing IP66, G 1/2"		
	Y	Special version		
60	Electronic insert			
	0	Without electronic insert		
	1	FEW 52/54 retrofit		
	2	FEW 52 output PNP 10.8 ... 45 V DC		
	4	FEW 54 relay output 20... 253 V AC, 20...55 V DC		
	8	* FEW 58 output NAMUR		
	9	Special version		
70	Additional equipment			
	A	Without additional equipment		
	Y	Sonderausführung		
FTW 31				complete product designation

* Available from autumn 2003

Liquipoint FTW 32

10	Certificates					
	A	Version for non-hazardous areas				
	B	Version for non-hazardous areas, WHG, Leakage detection				
	C	ATEX II 3 G EEx nA/C(L) IIC T6, WHG				
	D	ATEX II 2 G EEx ia IIC T6				
	Y	Special version				
20	Process connection and material					
	1	Threaded connection G 1 1/2", PPS				
	2	Threaded connection NPT 1 1/2", PPS				
	9	Special version				
30	Quantity and material of ropes					
	D2	2 ropes, 316Ti				
	D3	3 ropes, 316Ti				
	D5	5 ropes, 316Ti				
	Y9	Special version				
40	Length of probe L, 250 ... 15000 mm					
	A	mm L, probe length				
	B	inch L, probe length				
	Y	Special version				
50	Housing and cable entry					
	A	Plastic housing IP66, M20x1.5				
	B	Plastic housing IP66, NPT 1/2"				
	C	Plastic housing IP66, G 1/2"				
	Y	Special version				
60	Electronic insert					
	0	Without electronic insert				
	1	FEW 52/54 retrofit				
	2	FEW 52 output PNP 10.8 ... 45 V DC				
	4	FEW 54 relay output 20... 253 V AC, 20...55 V DC				
	8	* FEW 58 output NAMUR				
	9	Special version				
70	Additional equipment					
	A	Without additional equipment				
	Y	Special version				
FTW 32						complete product designation

* Available from autumn 2003

Accessories

Liquipoint T

Lock nut G 1 1/2"
Hexagon, AF 60
TN 52014146

Elektronic insert FEW 52
Output PNP 10.8 ... 45 V DC
PN 52017271

Elektronic insert FEW 54
Output Relais 20 ... 253 V AC, 20 ... 55 V DC
PN 52017272

Elektronic insert FEW 58
Output NAMUR (IEC 60947-5-6)
PN 52017273

Supplementary Documentation

Operating Instructions

- Liquipoint T
FTW 31, FTW 32 (separate-instrument version)
KA 203F/00
 - Liquipoint T
FTW 31, FTW 32 (compact-instrument version)
KA 204F/00
-

Certificates**WHG**

- Liquipoint T
ZE 043F/00

ATEX II 3G EEx nA/C(L) IIC T6

- Liquipoint T
XA 226F/00

ATEX II 2G EEx ia IIC T6

- Liquipoint T
XA 230F/00

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