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Technical Information

FTW360 compact pump protector

Conductive Limit Detection
Dry run protection for pumps



Applications

Detection of liquids in a piping on the suction side of a pump for dry run protection.
It operates in all electrically conductive liquids, sludges and pastes that do not form an insulated build-up on the wall of the piping (e.g. oil film).
The unit is also suitable for minimum or maximum detection in tanks.

Your Benefits

The simple and reliable solution for

- adhesive or viscous products with an electronic ring to protect against error switching due to conductive build-up on the wall of the pipe
- various products in the same pipeline, e.g. pineapple concentrate, mashed apple, ground beet
- max. operating temperature 100 °C
- max. cleaning temperature 130 °C, for ½ h
- max. pressure 10 bar

The universal electronics for AC voltages 19...253 V and DC voltages 19...200 V as well as a potential-free change-over contact at the output ensure problem-free electrical connection.

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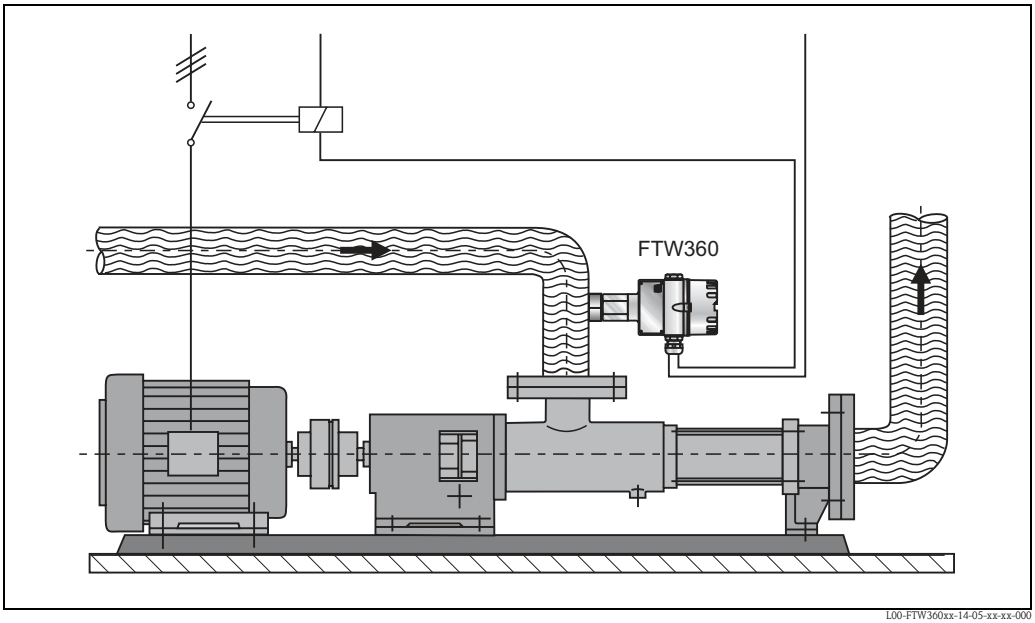
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Measuring System

The complete measuring system consists of the FTW360 compact pump protector and a separate protector for switching the pump on and off.
Small pumps using single phase AC current can be directly connected to the FTW360.



Inlet detection and motor control for dry run pump protection

Function

A low AC voltage is present at the electrode in the piping.
When a conductive liquid touches the electrode, then a small current flows through an amplifier which activates the output relay of the FTW360.
An active electronic protective ring automatically compensates for any conductive build-up so that the FTW360 still reliably switches when the electrode is free from liquid but build-up remains.

Dual operating mode

Max (when first delivered):
The output relay de-energises when the electrode is free or on power failure.

Min:
The output relay de-energises when the electrode is covered or on power failure.

Adjustable switching delay τ

Error switching due to moving air pockets can be prevented.

Start-up key (option)

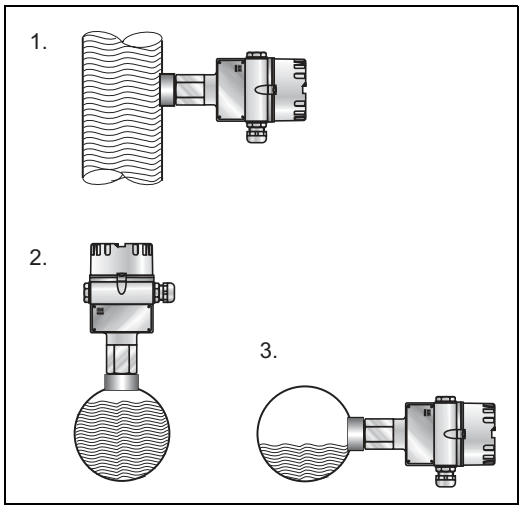
The pump can start with an empty suction pipe until it is full enough for the FTW360 to operate the pump.

Installation

Mount in a vertical or horizontal pipe using a short welded boss on the suction side of the pump.
The mounting position determines the switchpoint; see figures.
Avoid long bosses so that no build-up can form and that the electrode is free immediately the liquid level falls.
Screw in the FTW360 by the hex nut only, not by the housing.

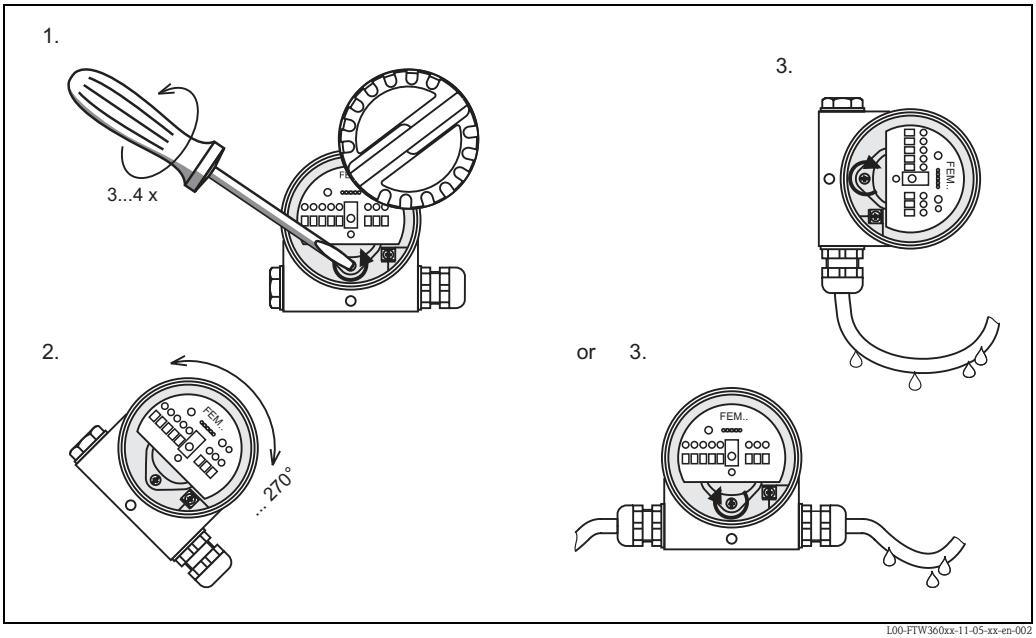
Mounting

1. Above the pump in a vertical pipe (recommended).
2. Above in a horizontal pipe;
   The pump is switched off even with a slight reduction in flow.
3. Laterally in a horizontal pipe;
   The pump is switched off even with a partially filled pipe.



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Positioning the cable entry



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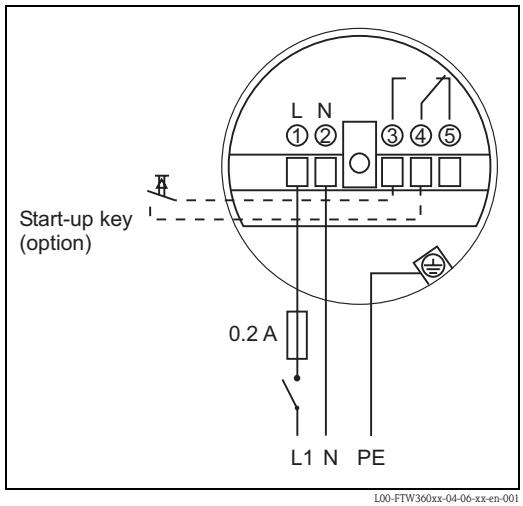
Electrical Connection

The protective earth (PE) must be connected to the protective earth connection (⏚) in the housing.

Note that relay function depends on the operating mode and the level.

A spark arrester should be used to protect the relay contact if instruments with high inductivity are connected to the FTW360 (e.g. contactors, magnetic valves).

If you lay two separate cables for the power supply and relay contact, mount the second cable gland (supplied) or, for the FTW360 with start-up key, a Y-gland.



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With the FTW360 with start-up key for the pump, Terminals 3 and 4 are connected when the key is pressed.

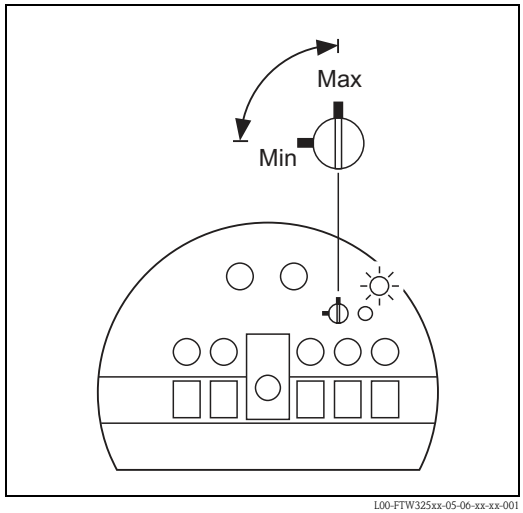
Calibration

Carry out all adjustments on the electronic insert when the instrument is opened and switched on.

Warning!
Danger from electric shock!
The calibration rotary switch is near the high-voltage power connections. These are hazardous if touched.
Use only an approved electric screwdriver insulated right up to the blade. Blade width 3...4 mm.

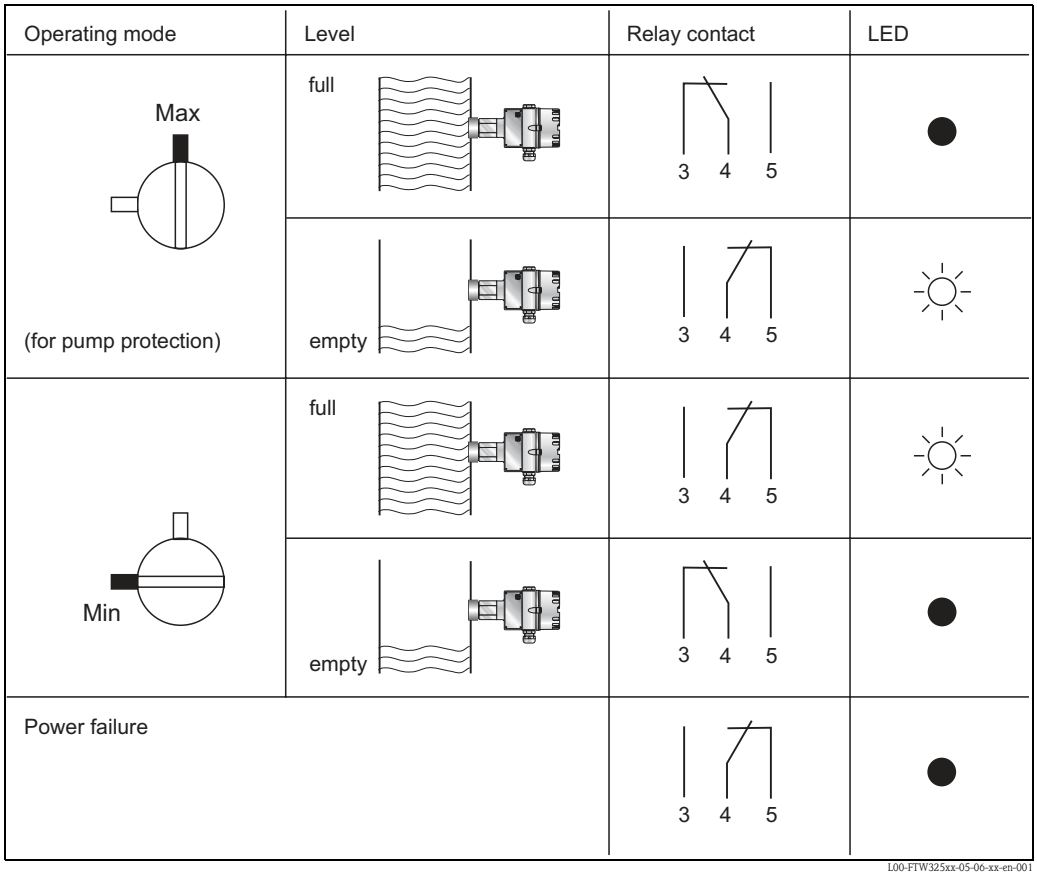
Selecting the operating mode

For function see figure to the left.
Turn switch to "Max" or "Min".
The switch snaps in every 90°.



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Function of relay and LED depends on the level and operating mode selected

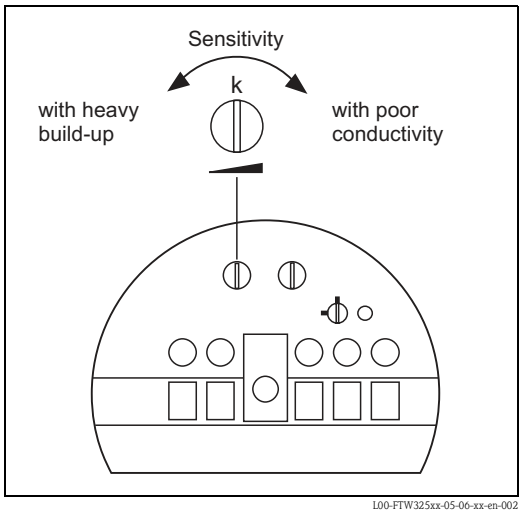


– "Max" operating mode (when first delivered): Relay energised with full pipe or tank; recommended for pump protection
– "Min" operating mode: Relay energised with empty pipe or tank

Adjusting sensitivity k

It is factory set so that the instrument switches with common aqueous liquids and those that cause build-up.
It therefore only has to be adjusted under extreme conditions.

The following describes the "Max" operating mode.



– If the FTW360 does not switch when the electrode is covered (= piping full), then turn the rotary switch k slowly clockwise until the red LED goes out.
– If the FTW360 does not switch when the electrode is free (=piping empty), e.g. due to strong build-up, then turn the rotary switch k slowly anticlockwise until the red LED lights up.

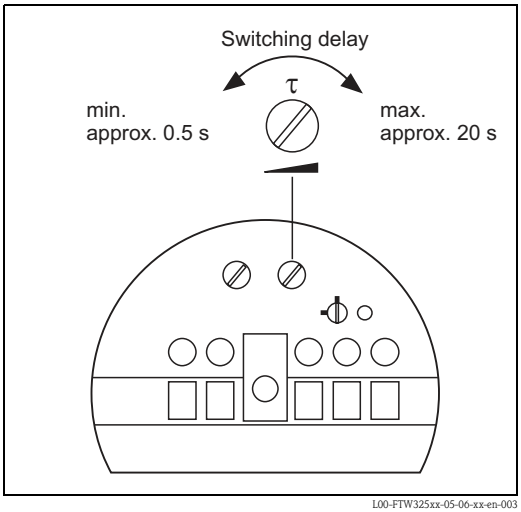
The LED function is reversed for the "Min" operating mode.

Adjusting the switching delay τ (When first delivered: approx. 0.5 s when the sensor is free or covered)

Increase the switching delay if large air pockets may be present in the flow.
This is especially recommended if the FTW360 is mounted in a horizontal pipe.

The rotary switch can be turned through approx. 270° with no hard stop for a range of approx. 0.5 s to 20 s.

Turning clockwise:
Switching delay is increased.



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– For "Max", switching delay is increased only when the probe is freed.
– For "Min", switching delay is increased only when the probe is covered.

To reset to the factory setting, turn the rotary switch anticlockwise through one complete turn.

Sensitivity k and switching delay τ should be adjusted during operation if required.

Technical Data

Operating Data

- Conductivity of liquids: min. 10 μS
- Operating temperature in pipe: –20 °C…+100 °C (0…210 °F)
- Cleaning temperature: max. 130 °C (270 °F), max. ½ h
- Operating pressure: max. 10 bar (150 psi)
- Ambient temperature: –20 °C…+60 °C (0…140 °F)
- Protection to DIN 40050: IP66

Materials

- Housing: Aluminium, coated with epoxy resin
- Threaded boss: 1.4571 (AISI 316Ti)
- Insulation: Teflon
- O-ring: Viton

Electromagnetic Compatibility

- Immunity to EN 50082-2 and industrial standard NAMUR, at a field strength of 10 V/m
- Emission to EN 50081-1

Power Supply

- Universal connection: U~ 19...253 V or U- 19...200 V
- Power consumption: max. 3,5 VA

Output

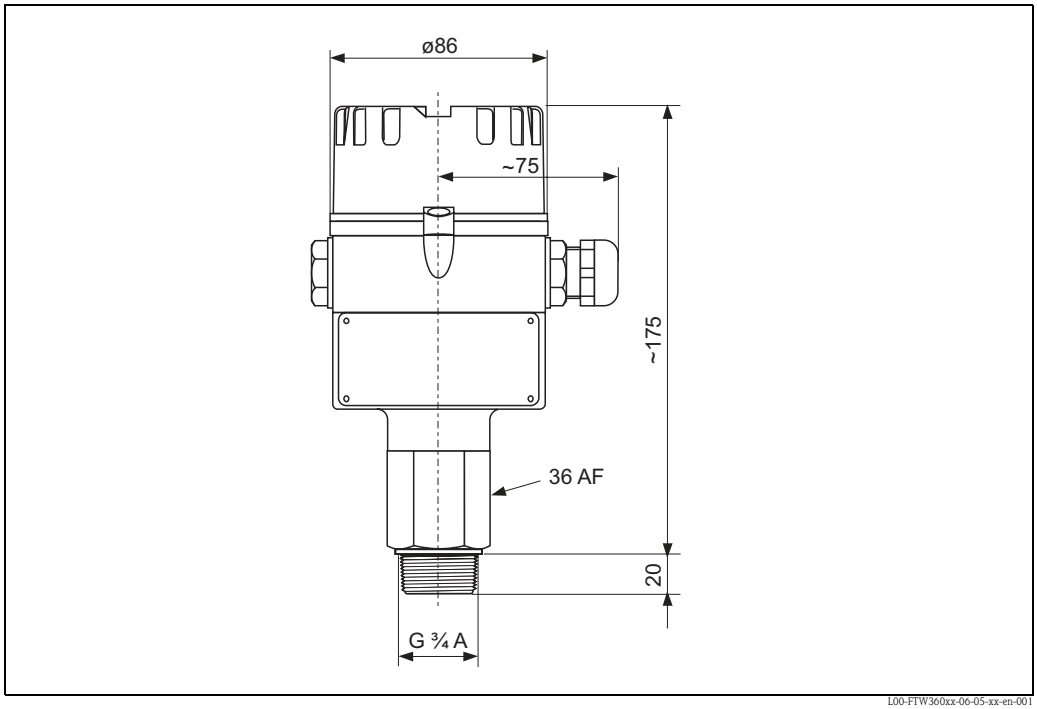
- Relay output: potential-free change-over contact
- Switching power with AC:
  max. 253 V, max. 6 A,
  max. 1500 VA at cos φ =1
  max. 750 VA at cos φ ≥ 0,7
- Switching power with DC:
  max. 30 V, max. 6 A,
  max. 125 V, max. 0,2 A

$I_{max.}$ in dependence of the temperature

- Maximum values of the supply voltage/the current over the relay contacts versus the ambient and process temperature:

Supply voltage	Ambient temperature	Process temperature	Current over relay contact
48 V	60 °C	100 °C	6,0 A
110 V	60 °C	100 °C	6,0 A
200 V	40 °C 60 °C	60 °C 100 °C	6,0 A 4,0 A
225 V	24 °C 40 °C 60 °C	24 °C 60 °C 100 °C	6,0 A 4,0 A 2,0 A
250 V	24 °C 40 °C	24 °C 60 °C	4,0 A 2,0 A

Dimensions



L00-FTW360xx-06-05-xx-en-001

Ordering information

Product structure

Design						
FTW360	Pump protector					
10	**Process Connection, Material, Insulation**					
	G1	Thread ISO228	G ¾ A,		316Ti, PTFE	
	Y9	Special version				
20		**Welded Boss**				
		X	without welding piece			
		9	Special version			
30			**Housing, Cable Gland**			
			H	Polyester	F10,	M20, IP66
			J	Aluminium	F6,	M20, IP66
			Y	Special version		
40				**Electronic Insert**		
				A	without electronic insert	
				D	with FEW24,	21...250 V AC, 20...200 V DC, potential-free relay
				Y	Special version	
50					**Options**	
					1	without accessories
					2	Start push button mounted in gland
					9	Special version
FTW360-						Complete product designation

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