

Conductive Limit Detection

FTW 360 compact pump protector

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). It can be used for foodstuffs when flush-mounted using a welded boss (accessory).

The unit is also suitable for minimum or maximum detection in tanks.

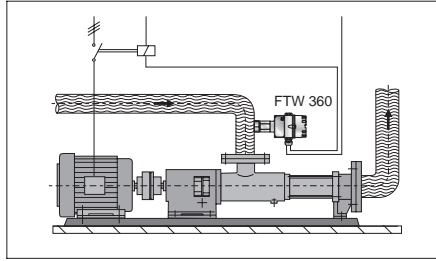
Features and Benefits

- 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.

Measuring System

Inlet detection and motor control for dry run pump protection



The complete measuring system consists of the FTW 360 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 FTW 360.

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 FTW 360. An active electronic protective ring automatically compensates for any conductive build-up so that the FTW 360 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 FTW 360 to operate the pump.

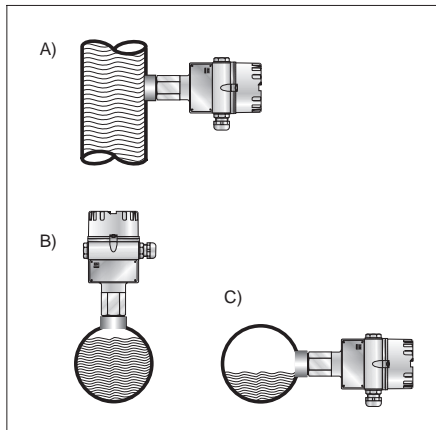
Installation

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.

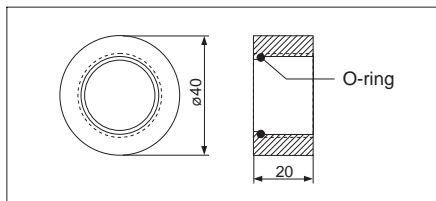
Screw in the FTW 360 by the hex nut only, not by the housing.

Mounting

- A) Above the pump in a vertical pipe (recommended).
- B) Above in a horizontal pipe; The pump is switched off even with a slight reduction in flow.
- C) Laterally in a horizontal pipe; The pump is switched off even with a partially filled pipe.

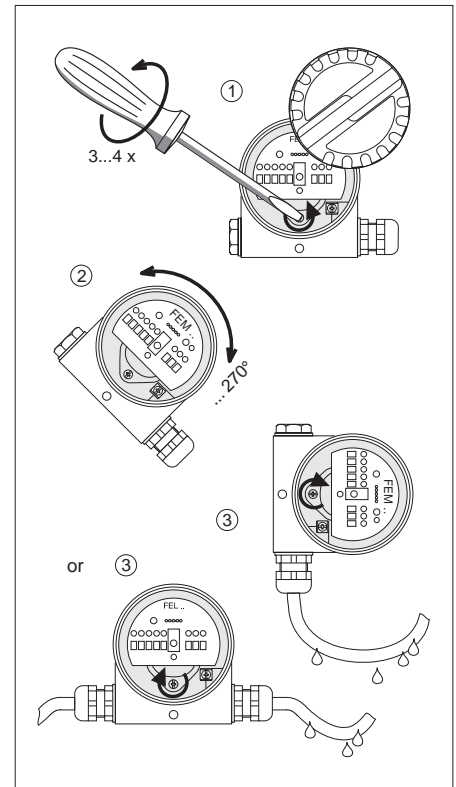


Use the welded boss 210808-1000 for flush mounting; Insert an O-ring only after welding.

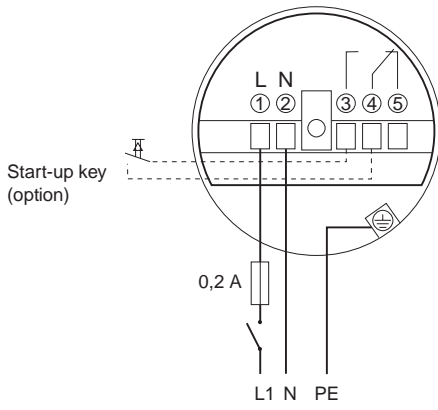


Accessory
Welded boss in 1.4571 (AISI 316 Ti) with O-ring in Viton®

Positioning the cable entry



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 FTW 360 (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 FTW 360 with start-up key, a Y-gland.

With the FTW 360 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.

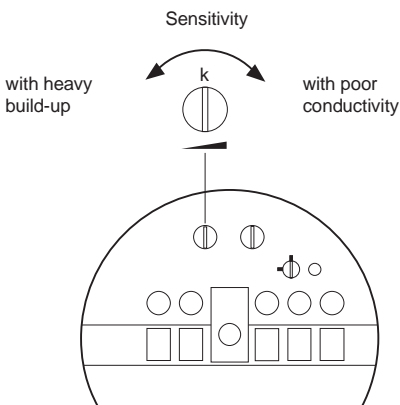
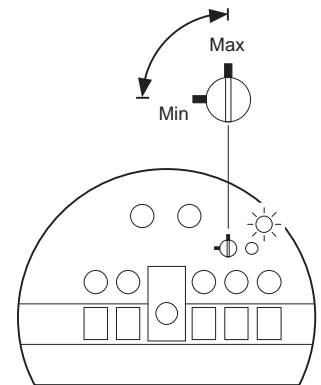
Selecting the operating mode
For function see figure to the left. Turn switch to "Max" or "Min". The switch snaps in every 90°.

Operating mode	Level	Relay contact	LED
 Max (for pump protection)	 full	 3 4 5	
	 empty	 3 4 5	
 Min	 full	 3 4 5	
	 empty	 3 4 5	
Power failure		 3 4 5	

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

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

"Min" operating mode: Relay energised with empty pipe or tank



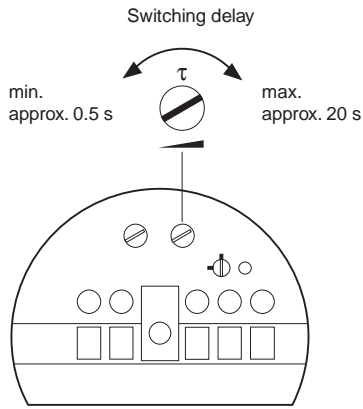
Adjusting sensitivity k

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 FTW 360 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 FTW 360 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 FTW 360 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.

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

Product structure FTW 360 Pump protector	
Process Connection /Material /Insulation G1 Thread G 3/4 A / 1.4571 / PTFE Y9 Other	
Welded Boss X None *)	
Housing / Cable Gland G Aluminium F6 housing, IP 66 Cable gland Pg 16	
Electronic Insert D FEW 24, U~ 19...253 V, U- 19...200 V Output: Relay with potential-free change-over contact	
Options 1 None 2 With start-up key for starting the pump	
FTW 360-	X G D Complete product designation
*) Accessory: Welded boss in 1.4571 with O-ring in Viton® for flush mounting of FTW 360. Order No. 210808-1000	
Welded boss for plastic pipes on request	

Operating Data

- Conductivity of liquids: min. 10 μ S
- Operating temperature in pipe: -20 °C...+100 °C (0...210 °F)
- Cleaning temperature: max. 130 °C (270 °F), max. 1/2 h
- Operating pressure: max. 10 bar (150 psi)
- Ambient temperature: -20 °C...+60 °C (0...140 °F)
- Protection to DIN 40050: IP 66

Materials

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

Output

- Relay output: potential-free change-over contact
- Switching power with AC: max. 253 V, max. 6 A, max. 1500 VA at $\cos \varphi = 1$ max. 750 VA at $\cos \varphi \geq 0,7$
- Switching power with DC: max. 250 V, max. 6 A, max. 200 W

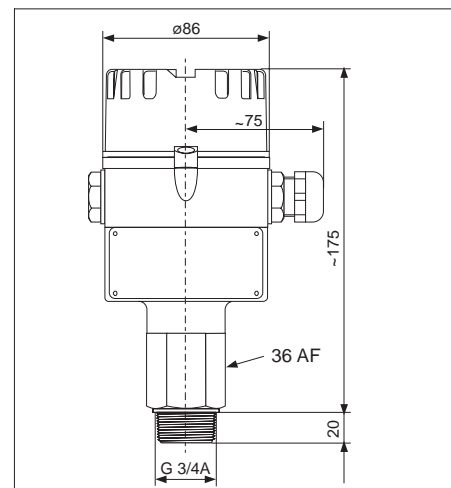
Power Supply

- Universal connection: U~ 19...253 V or U- 19...200 V
- Power consumption: max. 3.5 VA

Electromagnetic Compatibility

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

Dimensions in mm of FTW 360
 100 mm = 3.94 in



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