

Instruction manual

**2280 Swing Fork
with relay output**



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Observe instruction manual

The instruction manual is part of the product and an important element within the safety concept.

- ▶ Read and observe the instruction manual.
- ▶ Always have the instruction manual available at the product.
- ▶ Pass on the instruction manual to all subsequent users of the product.

1 Intended use

The tuning fork switch is used for level measuring and for detecting the limit level of liquids.

2 About this document

This document contains all necessary information for the installation, operation and maintenance of the product.

3 Safety and responsibility

- ▶ Only use the product as intended, see intended use.
- ▶ Do not use the product if it is damaged or faulty. Throw out the product immediately if it is damaged.
- ▶ Make sure that the piping system has been installed professionally and that it is inspected regularly.
- ▶ The product must only be installed by persons who have the required training, knowledge and experience.
- ▶ Regularly train personnel on all questions pertaining to the locally accepted regulations on occupational safety and environmental protection, especially on pressure-retaining pipelines.

The personnel is responsible for the following measures:

- ▶ Know, understand and follow the instruction manual and the advices therein.

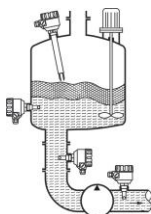
4 Scope of delivery

- ▶ 2280 Tuning fork switch with relay output
- ▶ Instruction manual
- ▶ 1 x gasket, 2 mm thick, made of KLINGER OILIT (for G1" process connection only)
- ▶ 2 x 3-pole connector plugs (3 x 3-pole connector plugs when 2 output relays)
- ▶ 2 x M20 x 1.5 cable entry

5 Transport and storage

- ▶ Protect the product against external force during transport (impact, stroke, vibrations, etc.).
- ▶ Transport and/or store the product in unopened, undamaged original packaging.
- ▶ Protect the product from dust, dirt and moisture, as well as heat and ultraviolet radiation.
- ▶ Make sure that the product has not been damaged by either mechanical or thermal influences.
- ▶ Check the product for transport damage before assembly.

6 Function



The tuning fork switch is used for level measuring and for detecting the limit level of liquids. Example: overflow prevention, no-load protection, pump control.

The product can be installed in several ways.

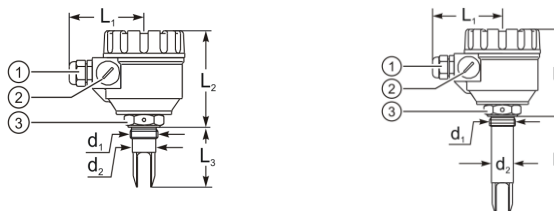
- ▶ When mounting laterally the position of the fork needs to be taken into account!
- Can be used for the following liquids:
- ▶ Low viscosity: Mounting in any position (horizontal, vertical, diagonal).
 - ▶ High viscosity: Vertical mounting exclusively (from the top), as otherwise the tuning fork frees up only with difficulty.

7 Technical specifications

Data	Values
Model	2280-S-xxxT-X
Wetted parts	stainless steel 1,4571 [X6 CrNiMoTi 17122]

Data	Values	
Housing material	Plastic: PBT fiberglass-reinforced, hardly inflammable (DuPont®)	
Medium temperature	-40 to +130 °C	
Ambient temperature	-30 to +70 °C	
Max. operating pressure	40 bar	
Installation length	short version 69 mm standard version 125 mm	
Medium density	≥ 0.7 kg/dm ³	
Medium viscosity	≤ 10.000 mm ² /s (cSt)	
Delay time	upon covering	≤ 0.5 s
	upon freeing up	≤ 1 s (see Delay time - Viscosity)
Switching status display	two-color LED	
Setting min./max. safety	with switch selectable	
Output	SPDT relay, 250 VAC, 8 A, AC 1	
Electr. connection/wire cross-section	2 x M20 x 1.5, wire Ø 6 - 12 mm / 0.75 - 2.5 mm ²	
Supply voltage	20 - 255 VAC and 20 - 60 VDC	
Power input	1.2 - 17 VA _{AC} ; < 3 W _{DC}	
Protection against accidental contact	Class I	
Protection rating	IP67 (NEMA 6)	
Weight	0.95 kg + 1.2 kg/m	
Storage conditions	Ambient temperature	-25 to +60 °C
	Relative humidity	max. 98 %

8 Dimensions



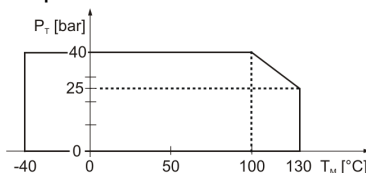
Short version

Standard version

1	2 x M20 x 1.5 (gland)	L ₁	89 mm	L ₄	125 mm
2	2 x NPT 1/2" (gland)	L ₂	111 mm	d ₁	BSP 1" / NPT 1"
3	Hexagonal collar SW41	L ₃	69 mm	d ₂	Ø 28 mm

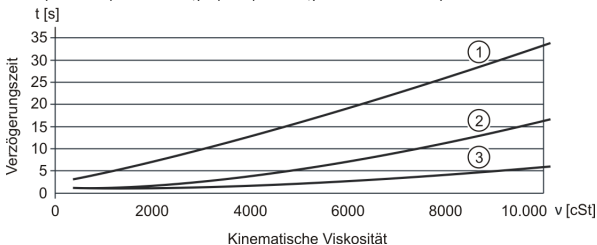
9 Graphs

Temperature - Pressure



Delay time - Viscosity

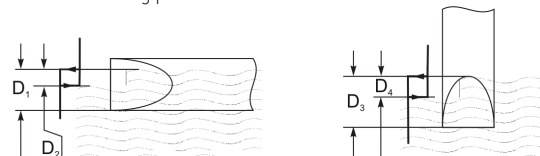
Delay time upon freeing up depending on the viscosity of the medium:



1	Fully immersed	2	Semi-immersed	3	Only tip immersed
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Switching point, switching hysteresis

The switching point and the switching hysteresis are subject to the density of the medium and the mounting position.



D ₁	~14 mm	D ₃	~13 mm
D ₂	~3 mm	D ₄	~4 mm

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10 Installation

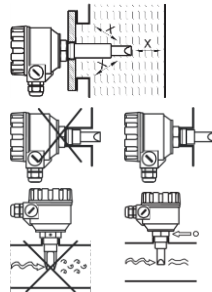
Checking the installation conditions

- ▶ Are the working pressure and temperature values being observed?

Checking the mounting position

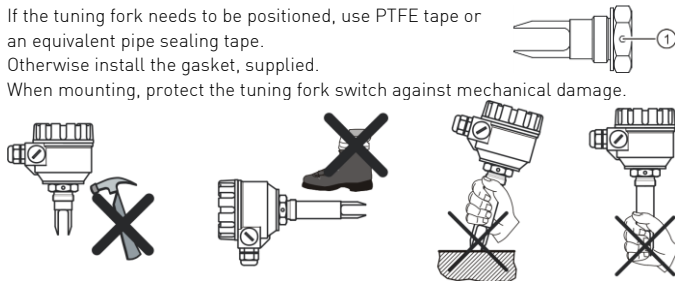
The tuning fork switch can be mounted at almost any angle in the tank. The requirements are as follows:

- ▶ The liquid can flow out of the sensor gap.
- ▶ Turbulence from around inlet/outlet valves or agitators must be avoided.
- ▶ The distance between the sensor gap and tank walls (other fittings in the tank) must be at least $x = 5$ mm to ensure that no pockets of air or liquid can form.
- ▶ The threaded guide should stop as flush with the wall of the tank as possible to ensure that no pockets of air or liquid can form.
- ▶ When mounting on pipes, the sensor gap must always be aligned in parallel with the direction of flow.



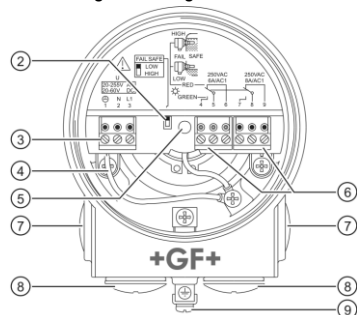
Mounting the tuning fork switch mechanically

- ▶ Make sure that the thread in the tank is free of contamination.
- ▶ If the tuning fork needs to be positioned, use PTFE tape or an equivalent pipe sealing tape. Otherwise install the gasket, supplied.
- ▶ When mounting, protect the tuning fork switch against mechanical damage.



- ▶ Carefully push the tuning fork switch into the opening and tighten on the hexagonal collar (SW41) so that the gap is accurate. Use the marking (1) on the hexagonal collar as a guide.
- ▶ Check whether the connection is tight.
- ▶ Carefully turn the housing by hand (max. 300°) so that the glands are pointing in the direction desired.

Connecting the tuning fork switch electrically



2	Mode	5	LED status	8	M20 x 1.5 (glands)
3	Distribution	6	Output	9	Grounding screw
4	Connection to ground	7	½" NPT (glands)		

- ▶ Ensure that the voltage values for the tuning fork switch correspond to those for the system.
- ▶ Make sure that the connection cable is de-energized.
- ▶ Carefully screw the housing cover and the glands (7, 8) off and set them aside on a clean surface.

- ▶ Do **not** connect AC and DC voltages to a common cable.
- ▶ Do **not** connect low potential and supply voltages to a common cable.
- ▶ Thread the supply cable with outside diameter 8 – 15 mm in.
- ▶ Fasten the separate wires in the appropriate terminal sockets with screws.
- ▶ For the connection to ground use the grounding screw (9) on the housing or the internal ground connection (4).
- ▶ Position the glands in place and carefully tighten so that protection rating IP67 is assured.

Setting the mode

Voltage	Tuning fork	Switch	Mode		Output
			Safety	LED status	
On			High Alarm	Red	Released
			Low Alarm	Green	Operated
			High Alarm	Green	Operated
			Low Alarm	Red	Released
Interrupti on	Free or covered	High or Low	Off		Released

- ▶ Position the housing cover in place and carefully tighten so that protection rating IP67 is assured.
- ▶ Route the cables to the connection point and secure them at regular intervals using cable ties or similar.
- ▶ The tuning fork switch is operational once the supply voltage has been switched on.
- ▶ The switching process can be tested as follows:
 - Immerse the sensor in a beaker of water.
 - The switching output is switched.

11 Ordering information

Item No.	Type	Length	Description
159 300 240	2280-S-5WBT-1	69 mm	Stainless steel 1 SPDT relay, PBT housing, 1"
159 300 241	2280-S-5WBT-2	125 mm	
159 300 242	2280-S-5WNT-1	69 mm	
159 300 243	2280-S-5WNT-2	125 mm	

12 Dismantling

- ▶ Make sure that the connection cable is de-energized and can be freely rotated.
- ▶ Make sure that the tank is depressurized and has been drained to a level that is at least below that of the sensor mounting position.

CAUTION

Leakage of media harmful to health and the environment possible!

Risk of personal injury and damage to the environment caused by these media.

- ▶ Wear the protective clothing required.
- ▶ Collect leaking media and dispose of them pursuant to local regulations. Consult the safety data sheet.

13 Disposal

- ▶ Before disposing of the different materials, separate them into recyclables, normal waste and special waste.
- ▶ Comply with local legal regulations and provisions when recycling or disposing of the product, the individual components and the packaging.
- ▶ Comply with national regulations, standards and guidelines.

CAUTION

Parts of the product may be contaminated with media that are harmful to health and the environment meaning that simple cleaning is not sufficient!

Risk of personal injury and damage to the environment caused by these media.

Prior to disposing of the product:

- ▶ Collect leaking media and dispose of them pursuant to local regulations. Consult the safety data sheet.
- ▶ Neutralize any media residue that is present in the product.
- ▶ Separate materials (plastics, metals, etc.) and dispose of them pursuant to local regulations.



A product marked with this symbol must be sent for separate collection of electrical and electronic devices. If you have questions regarding the disposal of the product, please contact your national GF Piping Systems representative.

14 Disclaimer

The technical data are not binding. They neither constitute expressly warranted characteristics nor guaranteed properties nor a guaranteed durability. They are subject to modification. Our General Terms of Sale apply.