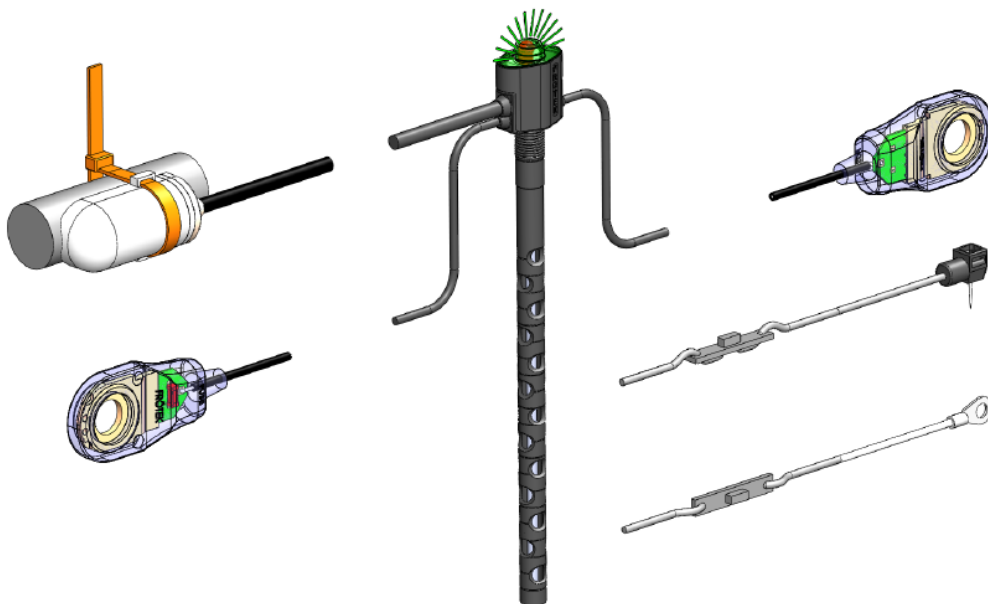


Frötek Water Level Indicators





FRÖTEK WATER LEVEL INDICATORS

The FRÖTEK Level Indicator is a product intended to indicate the battery electrolyte level of lead-acid batteries during operation. Basically, it consists of a housing with an optical alarm system onto which a long bar with external insulation is mounted in such a way that this bar, if inserted through a battery lid, touches the electrolyte. Furthermore, at least one or, depending on the model concerned, several cables for voltage supply or signal transmission are connected to the housing.

Functions and Features:

Basic Functions: When the FLI has contact with the electrolyte, it flashes green. When it has no contact, the signal will go out in case of the basic-model, or, in case of the Advanced Ad-model, a red flashing signal will appear.

Level verification: Prior to each flashing of the LED, the FLI will perform a level check. In order to achieve this, the unit tries to run a test current of $I \approx 25\text{mA}$ for a period of approx. $t = 380 \mu\text{s}$.









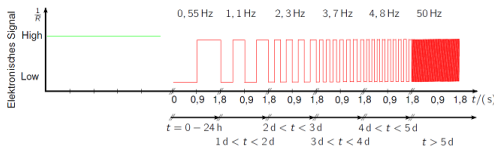

If this is possible, the contact to the electrolyte is deemed secured and the green LED will flash.

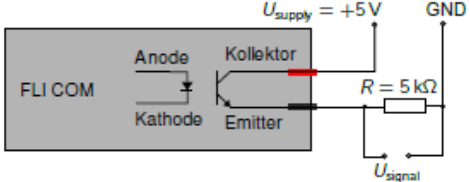
If not, the LED will go out or emit red flashes. This program step is to prevent creepage current causing false indications. If contact is made only through creepage, then the signal indicating a low electrolyte level will be emitted. This applies also for the FLI, which will normally not emit red flashes.

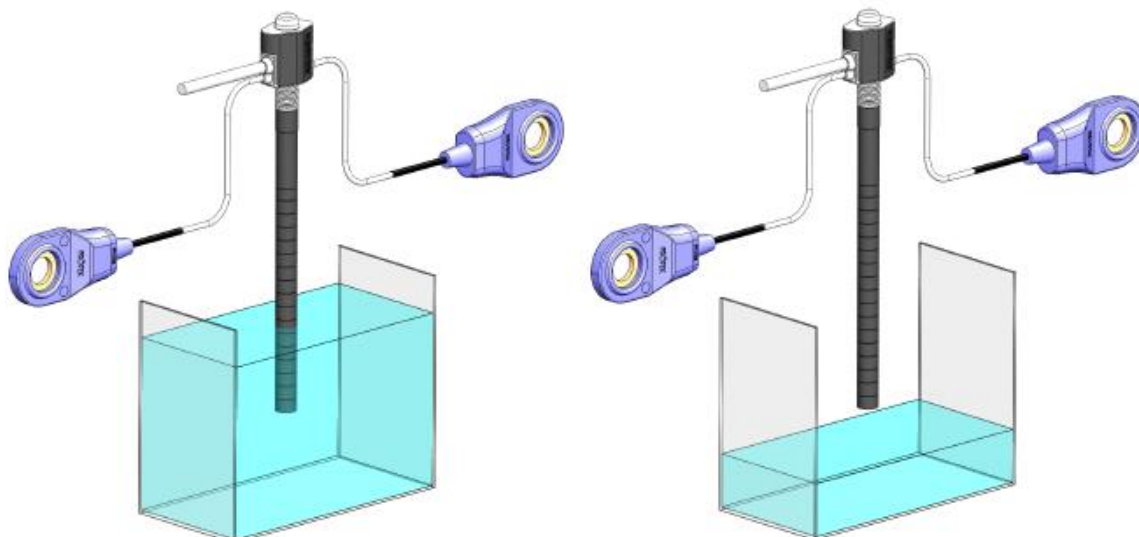
Spilling hysteresis function (Ad-models only): In order to avoid too frequent switching of the Ad-FLI, the switching behaviour are dampened by an asymmetric switching delay:





- Green LED flashes. Contact to the electrolyte interrupted. Switching to the red signal after 25-40 seconds
- Red LED flashes. Contact to the electrolyte is made. Switching to the green signal after 8-12 seconds


Permanent shortage of water indicator (Ad-models only): The longer contact to the electrolyte is interrupted, the faster the red LED of the Ad-FLI will start to flash. The following rule of thumb applies: "One Hz of flashing frequency for every day". After a period of approx. 5 days, the Ad-FLI will permanently emit red flashing signals.

Technical data							
		Basic Level Indicator		Advanced Level Indicator		Advanced Level Indicator with Remote display	
							
LED Indications	Level OK	Green		Green		Green	
	Fill now	No light		Red symmetrical pulse, depending on time 			
Voltage Tap Cable Length (I_{neg})		600 mm					
Second Voltage Tap Cable Length (I_{pos})		✗		200 mm			
Signal Cable Length (I_{remote})		✗		✗		2000 mm	
Assessment Voltage		12V					
Operating voltage		6 – 14V					
Assessment current		30 mA					
Average operating current		15 mA					
Fuse Current		125 mA					
Electrolyte Probe Current		25 mA					
Inverse Polarity Protection Limit		-50 V (-160 V for electronic version)					
Limit Resistance Level Detection		400 Ω					
Cable Assessment Voltage		250 V					
Cable Test Voltage		1,5 kV					

Max. Collector-Emitter Voltage	80 V (only applicable for electronic version)	 <p>Example of a circuit for the version(s) with electronic output</p>
Max. Emitter-Collector Voltage	6 V (only applicable for electronic version)	
Maximum Collector Current	50 mA (only applicable for electronic version)	
Typical Collector Current	5 mA (only applicable for electronic version)	
EMC-test passed according to	EN61326-1	
Operation Temperature Range	-20/85°C	
Standard probe length	140 mm	
Minimum remaining Electrode Length after Cut-Off	30 mm	
Assembly Hole Diameter	8 mm	
Lead Electrode Diameter	3 mm	
Non-Halogen	✓	
IP-class (EN60529)	- if using a terminal bolt without inspection hole : IP66 - if using a terminal bolt with inspection hole : IP36B - if using the pin-tap : IP65 - if using the ring lug (screw) tap: IP00 (the housing accords to IP66)	



Version	Ordering code	Description	Connection
	FS-SB-B	Basic Frötek Level Indicator	 Standard
	FS-AB-B	Advanced Frötek Level Indicator	
	FS-AR-B	Advanced Frötek Level Indicator with Remote Display	

Other Version	
Also available with electronic signal output • for these versions, please contact us	
Also available with other connections • for these versions, please contact us	
With voltage tap	
With cable lug M4	