Gx Smart Cap

Integrated Bluetooth Smart Cap

Technical specification

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IMPACX

Doc. Ver	Date	Modified by	Changes
1.0	20 Sep 2022	Alexander	First draft
2.0	29 Jan 2023	Alexander	General updates

1 Table of contents

2 Scope

2.1 Abstract

Drinking enough water each day is crucial for many reasons: to regulate body temperature, keep joints lubricated, prevent infections, deliver nutrients to cells, and keep organs functioning properly. Being well-hydrated also improves sleep quality, cognition, and mood.

Smart Cap device on the top of a bottle can help you deeper understand and track the hydration issue relative to your body.

2.2 The purpose of the Cap

The Smart Cap is invented to monitor a liquid volume over a long time period, and it would give GX's customers great insight into how to improve the hydration of a body.

2.3 What the Cap is

The Smart Cap is an integrated device that combines mechanical and electronic smart solutions.

This is a rechargeable battery-operated device. The battery is powering the device for more than a week. A battery can be charged by a charging adaptor. There is a cable with a universal USB type A connector and a magnetic connector on the Gx Cap side.
The Smart Cap measures the volume of a liquid in a bottle upon drinking action. The measured raw data is processed by the cap and sent via Bluetooth wireless communication to a mobile device. A mobile application can show this received and logged data in various combinations.
The smart Cap has 21 multicolor LEDs used for various indications and notifications.

2.4 Environmental conditions

Smart caps have electronic components that are protected from environmental conditions both external and internal.
External conditions (outside world) include durability, sun protection, temperature, mechanical damage.
Internal conditions (inside the bottle) include durability, temperature, mechanical damage and waterproof.

3 Applicable Documents

3.1 Applicable Documents

- Electrical Schematic Diagram
- Mechanical drawing
- User Manual
- Appropriated data sheets

4 Requirements

4.1 Interface definition

- Bluetooth Low Energy (BLE) – for communication
- 5Vdc – for charging
- Push button

5 Characteristics

5.1 Volume measurement

The product measures a distance from a cap to a surface of a liquid into a bottle and calculates a liquid's volume.

Parameter	Value	Notes
Range	0…910 mL	
Overall Accuracy (typically)	± 50 mL	
Overall Accuracy (Min/Max)	- 70 mL/+60mL	
Lighting conditions	Up to 5 kLux equivalent sunlight	
Operation method	Water level measurement	

5.2 Communication

The product can communicate using a Bluetooth wireless communication connection.

Bluetooth communication parameters:

Parameter	Value	Notes
Communication type	Bluetooth low energy (BLE)	
Bluetooth version	V5.2	
Transmission power	Up to 3dBm	
Transmission Range	up to 30 feet (10 meters)	
Operation method	Advertising (Beacon), Connection	
Comply with regulations	ETSI EN 301 489-1 V2.1.1 (2017-02) ETSI EN 301 489-17 V3.1.1 (2017-02) ETSI EN 300 328 V2.2.2 (2019-07) FCC Part 15 Subpart B and C	

FCC ID: 2AZ2T-GXCAP2

This device complies with part 15 of the FCC Rules.

Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes/modifications to this equipment are not allowed and could void the user's authority to operate the equipment.

5.3 Battery

Parameter	Value	Notes
Model	Li-Ion	
Nominal Voltage [V]	3.7	
Rated Capacity [mAh]	250	
Chemistry	Lithium	
Operation Temperature (Min/Max)	-10°C ÷ 50°C	
PCM (protection circuit module)	Built-in	
Self-Discharge at 23°C (typically)	<2% / month	
Comply with regulations	IEC 62133	

6 Mechanical structure

6.1 Mechanical parts

The product includes following parts:

- Electronic circuit with attached battery
- Plastic enclosure to protect the electronic circuit

6.2 Mechanical view

The diameter of the product is 65mm.