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Packwise Smart Cap
Instruction manual

Version: BA_SC1_V03_ENG

Imprint

Packwise GmbH
Antonstr. 25
01097 Dresden

phone: +49 (0) 351 8967 5090
mail: service@packwise.de

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1. General information about Packwise Smart Cap

1.1. Performance description

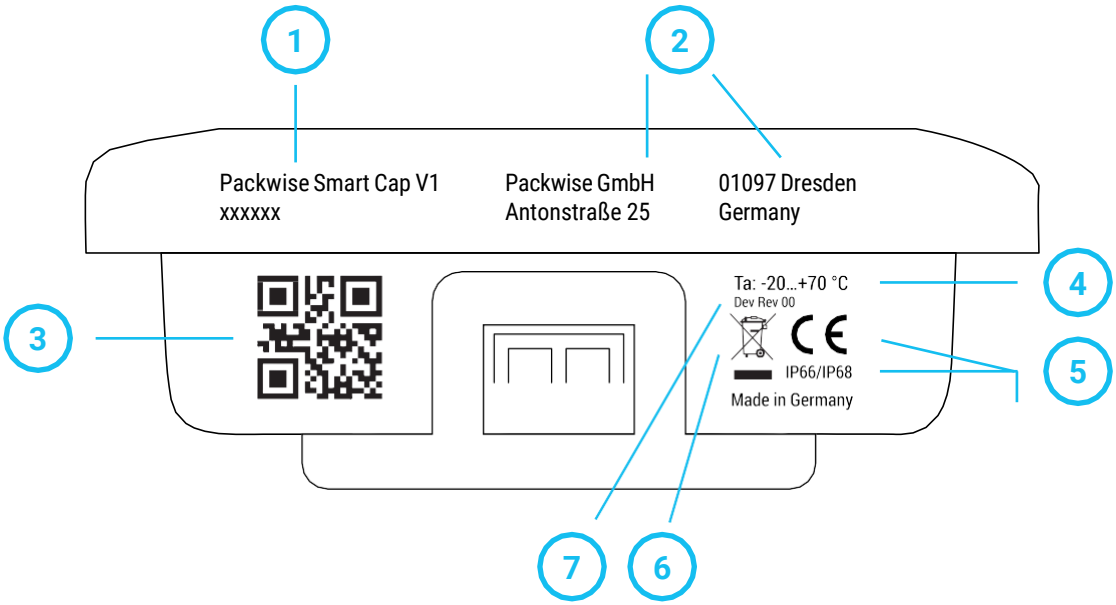
The Packwise Smart Cap is a battery-powered sensor for filling level and temperature measurement, as well as location and position determination of mobile and stationary liquid containers or their filling goods.

The transmission of sensor readings via mobile radio enables stand-alone use of the Packwise Smart Cap for remote monitoring. The Packwise Smart Cap measures and transmits the collected measurement data outside and inside buildings in the 27 EU countries and supports the cross-border use of mobile containers. Via mobile radio, the collected measurement data is encrypted and transmitted to the Packwise Cloud and displayed in the **Packwise Flow** web application.

Packwise Flow offers you a wide range of possibilities for optimizing and automating your processes and setting up new processes. You can access Packwise Flow at https://packwiseflow.de/login.

1.2. Device data on the nameplate

The nameplate shown in the figure contains exemplary device-specific information.



No.	Description
1	Serial number of the device
2	Address of the distributor
3	QR code to call up the product URL
4	Operating temperature
5	Certifications (IP class, CE marking, production location)
6	Disposal label
7	Revision

1.3. Modifications to the device

User modifications to the Packwise Smart Cap are not permitted. If modifications are necessary, contact Packwise.

1.4. Operating instructions

The operating instructions and other documents are available for download at https://packwise.de/downloads/.

If you have any questions, please contact: service@packwise.de

2. Safety instructions

This chapter lists general safety instructions that apply as basic rules of conduct when handling the Packwise Smart Cap.

2.1. Presentation of the warnings

If there are risks of danger to persons or damage to the device, these are indicated by warnings. They precede the instruction to perform an action which may result in a risk of damage.

The following warnings are used in this documentation:

⚠ WARNING

Nature and source of danger

This safety notice warns about a potentially hazardous situation that will result in serious injury or death.

⚠ ATTENTION

Nature and source of danger

This safety notice warns about a potentially dangerous situation that may result in minor or moderate injury.

NOTE

Nature and source of danger

This safety notice warns about damage to the device.

2.2. Intended use

The Packwise Smart Cap is a battery powered sensor for filling level and temperature measurement as well as location and position determination of mobile and stationary liquid containers or their filling goods.

2.3. Improper use

The measured values are for the user's orientation only. The measured values of the sensors are subject to various environmental influences and may deviate from the real values. Faulty measurements cannot be ruled out. The measured values are therefore not intended to trigger critical processes based on the sensor data, e.g. overflow stop. The manufacturer is not liable for damage caused by improper or non-intended use.

2.4. General safety instructions

Read the instructions before installation and keep them within immediate reach.

2.5. Safety instructions for operation

- The Packwise Smart Cap must not be operated in an explosive environment.
- The Packwise Smart Cap may only be used in a technically perfect condition.
- If any damage occurs, stop using the device immediately and contact Packwise.
- The Packwise Smart Cap must always be firmly seated on the container. Improper attachment may result in the Packwise Smart Cap falling off the container when moved, causing personal injury, environmental damage and property damage.

2.6. Safety instructions for the battery used

- The battery is installed so that it is not accessible to the user.
- The battery must not be dismantled and charged.
- The battery may only be replaced by the manufacturer or a person authorized by the manufacturer.

2.7. Personal qualification

The Packwise Smart Cap may only be handled by authorized and qualified personnel.

2.8. Area relevant for approval

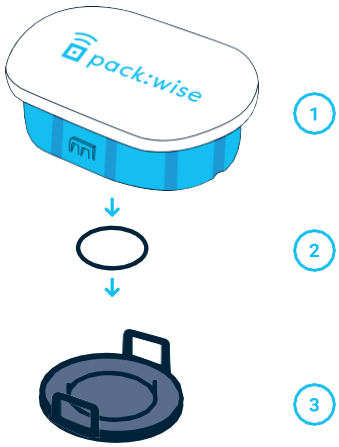
If the Packwise Smart Cap is to be used in areas where approval is required, it must be checked before use whether the device has the appropriate approval. This information can be found on the nameplate, see section "1.2. Device data on the nameplate" on page 8.

2.9. IT security

The Packwise Smart Cap can be turned on and off with the supplied magnet. Moving the Packwise Smart Cap triggers a measurement and transmission process. No further changes to the operating mode can be made on the Packwise Smart Cap directly. The operating mode of the Packwise Smart Cap is set via the **Packwise Flow** web application. The acquired measured values are stored and processed in encrypted form on the device. The encrypted data is transmitted to the Packwise Cloud Platform via mobile networks.

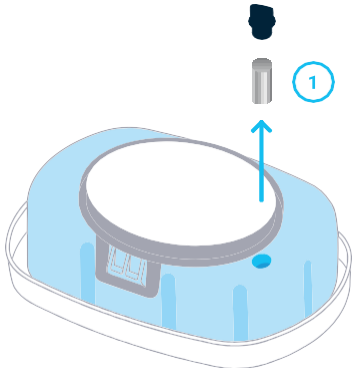
3. Structure and function

3.1. Overview



No.	Name	Description
1	Packwise Smart Cap	Consists of an IP66/IP68 protected housing containing the battery, the sensor package, the SIM card and all other relevant components.
2	O-ring	Prevents moisture from entering the gap between the Packwise Smart Cap and the locking plate.
3	Locking plate with adhesive pad	Is firmly glued to the container to be monitored.

3.2. Rear view



No.	Name	Description
1	Position of the magnet and rubber stopper	By removing the magnet, the Packwise Smart Cap is activated. Inserting the magnet deactivates the Packwise Smart Cap..

3.3. Functional principle

The Packwise Smart Cap measures and transmits the following parameters using an integrated sensor package:

- The **filling level** is determined by a radar sensor using *Pulsed Coherent Radar*. This method is used to determine the distance between the Smart Cap and the liquid, which is converted into the filling level with a container-specific bearing chart.
- The **location** is determined by three different technologies:
  - Global Navigation Satellite System (GNSS)
  - Wi-Fi positioning
  - Cell tower triangulation
- The **movement** of the Packwise Smart Cap is detected by an acceleration sensor. It detects the movement of the device in the X-, Y- and Z-axis.
- The **ambient temperature** is measured by a digital temperature sensor.

3.4. Transmission of measured values

Depending on the availability of the mobile technologies (GSM/ LTE, etc.), the determined values are transmitted wirelessly via the mobile network. The 2G (GSM), LTE-CAT-M1 or NB-IoT (LTE-CATNB1) standards are used. By supporting different standards, connectivity can also be ensured in remote areas and across borders in the 27 EU countries.
Detailed information on the transmission of measured values can be found in section "11.3 Connectivity (transmission of measured values)" on page 27.

3.5. Battery information

The battery is not accessible to the user. The operating time can be strongly influenced by the selected operating mode.
The main factors influencing the operating time are:

- the number of measurement and sending cycles.
- the type and availability of the mobile radio connection.
- the type and number of activated functionalities.
- the ambient temperature.

The battery level is determined mathematically and technically and displayed in the **Packwise Flow** web application. The determined battery level is only a guide value. You can be informed by e-mail if the battery level falls below a critical value. See also section "11.4 Battery" on page 27.

4. Delivery and Storage

The Packwise Smart Cap is assembled when delivered. The locking plate and O-ring are packed separately with the Packwise Smart Cap.

4.1. Scope of delivery

Quantity	Name
1	Packwise Smart Cap
2	Locking plate
1	O-ring
1	Installation Guide

4.2. Storage and transport conditions

- Storage temperature: -20°C bis ~+60°C
- Avoid direct sunlight
- Avoid mechanical shocks
- Store in dry, dust-free environment
- Do not store in potentially explosive areas

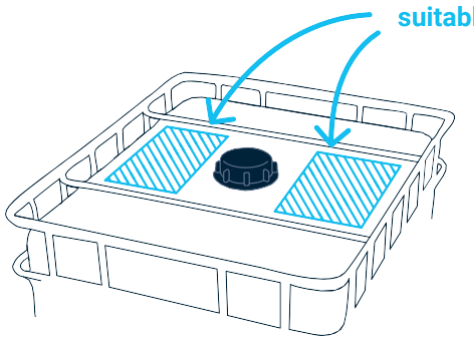
5. Installation and activation

The Packwise Smart Cap is assembled when delivered and can be attached to the container immediately.

5.1. Environmental conditions

- The Packwise Smart Cap must not be operated in a potentially explosive environment.
- Ambient temperature: -20 °C bis +70 °C.

5.2. Positioning the Packwise Smart Cap



The Packwise Smart Cap should be attached to the top of the IBC within the area marked in blue, between the edge and lid of the container, as shown in the picture.

5.3. Preparing the mounting surface

Before installing the Packwise Smart Cap, make sure that the chosen surface is free of dust, dirt or moisture.

1. Clean the chosen surface with a suitable cleaning agent.
2. Dry the surface.

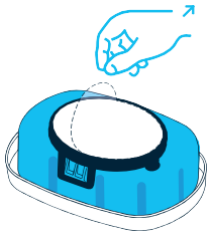
5.4. Attaching the Packwise Smart Cap with the locking plate

BEST PRACTICE

To start measuring the parameters immediately after the installation, activate the Packwise Smart Cap before mounting, see section "5.7. Activating the sensor and putting it into operation" on page 20.

Please note! The Packwise Smart Cap **must** be attached to the container within 1 minute after activation. After 1 minute the measurements start and the radar sensor is calibrated.

Attach the Packwise Smart Cap as shown below:



1. Pull off the adhesive protective foil.

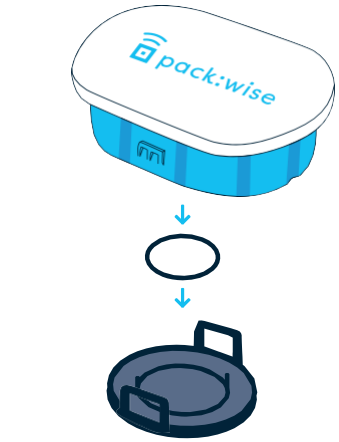
2. Press the Packwise Smart Cap firmly onto the chosen location on the container and hold for 3 seconds.

3. Wait for 15 to 20 minutes for the adhesive to dry, to prevent later detachment.

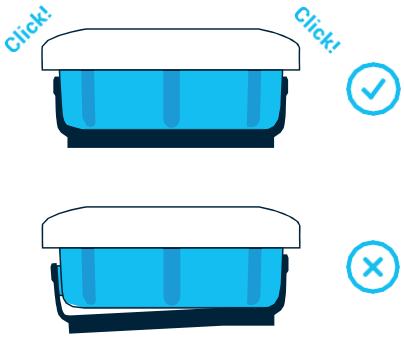
Complete adhesive strength is achieved after 24 hours. After the drying time, the locking plate is firmly fixed to the container.

5.5. Inserting the Packwise Smart Cap on a mounted locking plate

If a locking plate is already installed on the container, insert the Packwise Smart Cap as shown below:



1. Insert the o-ring into the locking plate.
2. Place the Packwise Smart Cap on the locking plate and press firmly until it snaps in.



Make sure that the sensor has snapped on both sides.

5.6. Detaching the Packwise Smart Cap from a mounted locking plate

Carefully remove the Packwise Smart Cap from the click mechanism using a flat-bladed screwdriver.

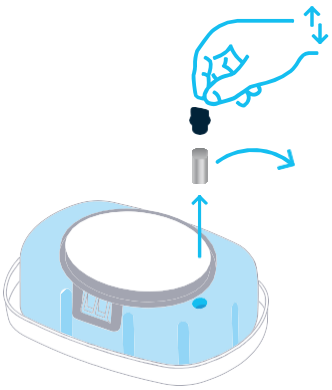
NOTE

The locking clip can break off

- Carefully remove the Packwise Smart Cap from the click mechanism using a suitable tool e.g. flat-bladed screwdriver.
- Only by qualified personnel.

5.7. Activating the sensor and putting it into operation

To start the measurements and the data transmission, the sensor has to be activated as shown below:



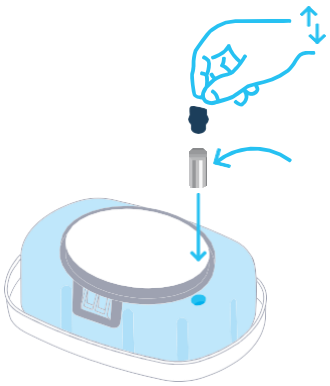
1. Remove the rubber stopper from the bottom side of the device.
2. Take out the magnet inside to activate the sensor.
3. Place back the rubber stopper.
4. Place Packwise Smart Cap on the locking plate.
5. Put the magnet aside and store it so you can deactivate the device again at a later time.

IMPORTANT

The Packwise Smart Cap **must** be attached to the container within 1 minute after activation. After 1 minute the measurements start and the radar sensor is calibrated to the environment.

5.8. Deactivating the sensor and putting it out of operation

Before deactivating the Packwise Smart Cap, **first** contact the responsible operator to avoid possible process interruptions.



1. Take the Packwise Smart Cap out of the locking plate.
2. Remove the rubber stopper from the bottom side of the device.
3. Insert the magnet.
4. Place back the rubber stopper.

The Packwise Smart Cap is deactivated. The transmission of measured values is stopped.

6. Operation

There are no other operating options on the Packwise Smart Cap directly - apart from activation and deactivation.

The adjustment of the transmission intervals as well as the activation and deactivation of functions is carried out exclusively via the web application **Packwise Flow**.

6.1. Measurements during operation

The Packwise Smart Cap is a stand-alone solution that records parameters without the need to install any other operating equipment.

Activation of the Packwise Smart Cap automatically initiates the first measurement and data transfer. The measured values appear in the **Packwise Flow** platform no later than 10 minutes after activation of the sensor.

Further measurements are automatically generated at a predefined time interval and transmitted to the **Packwise Flow** platform.

The measurement and transmission interval can be adjusted on Packwise Flow.
Note that an increased measurement and transmission interval shortens the battery life.
See section "11.4 Battery" on page 27.

If the specified values for acceleration and temperature are fallen below/exceeded a set threshold, the device automatically sends a notification regardless of the transmission interval.

6.2. Reading measured values

The measured values can be read in the **Packwise Flow** web application. Both current and historical data can be called up here. The transmission of the data includes the following parameters:

- Filling level
- Location
- Movement
- Temperature

7. Malfunctions

Malfunctions in the operation of the Packwise Smart Cap cannot be diagnosed or corrected on the Packwise Smart Cap. If you notice incorrect data on the **Packwise Flow** platform, check the device for correct installation.

1. Check the tight fit of the locking plate on the container.
2. Check that the Packwise Smart Cap is correctly snapped onto the locking plate.

In case of incorrect data despite correct attachment:

1. Deactivate the Packwise Smart Cap by inserting the magnet.
2. Activate the Packwise Smart Cap by removing the magnet.

Contact Packwise Support or - if available - your in-house contact person for the use of the Packwise Smart Cap.

8. Maintenance and care

The Packwise Smart Cap is maintenance-free.

8.1. Checking Packwise Smart Cap

The Packwise Smart Cap and locking plates should be checked regularly for tight fit and damage. In case of damage, see section "9. Repair and shipping" on page 24.

8.2. Firmware-Update

A firmware update is performed by Packwise GmbH and takes place via the mobile connection. The update process is only performed with a sufficiently good GSM or LTE-Cat M1 mobile connection. The update is held back until a good connection is established. If the connection is not good enough, the operator will be asked to move the Packwise Smart Cap to a location with a good connection. The current firmware version of your device is displayed on **Packwise Flow**.

IMPORTANT

The first temperature measurement after a firmware update can deviate strongly from the ambient temperature. The system will become stable after approx. 60 minutes.

9. Repair and Shipping

Repair of the Packwise Smart Cap by the user is not possible and not permitted.

⚠ WARNING

Fire hazard due to damaged batteries

Visibly damaged devices must not be repaired or shipped by the user.

- Should damage occur, stop use immediately.
- Contact Packwise to discuss how to proceed further.
- Do not ship the device until you have consulted the manufacturer, see chap. "12.2. Contact data" on page 28.

For detailed information regarding returns, send an email to service@packwise.de or contact your account manager.

10. Deactivation and disposal

10.1. Deactivation

1. Remove the Packwise Smart Cap from the locking plate.
2. Insert the magnet on the bottom side of the device to deactivate the measurements.
3. Remove the locking plate from the container if it is no longer needed.

10.2. Disposal

The Packwise Smart Cap must be disposed of in an environmentally friendly manner in accordance with the applicable laws.

- The Packwise Smart Cap must not be disposed of with household waste.
- Disposal is subject to the Directive 2006/66/EC of the European Parliament and of the Council on batteries and accumulators.
- Devices with batteries that cannot be removed by the end user must be handed in at a collection point for electrical devices or returned to the distributor.
- In this case, the recyclers of the electrical equipment are obliged to remove and properly dispose of the batteries and accumulators.

10.3. Shipping for disposal

⚠ WARNING

Fire hazard due to damaged batteries.

- Visibly damaged devices must not be shipped.
- Deliver damaged devices directly to a collection point for electrical devices.

1. Check the Packwise Smart Cap for damage.
2. Always contact the manufacturer before shipping the device.

11. Technical data

11.1. Device characteristics

Characteristics	Value
Dimensions (WxHxD)	100 x 46 x 142 mm
Weight	300 g
Protection class	IP66/IP68

11.2. Ambient conditions

Characteristics	Value
Operating temperature	-20 °C to +70 °C
Storage temperature	-20°C to ~+60°C
Relative humidity	0 ... 95%

11.3. Connectivity (transmission of measured values)

Function	Value
Mobile connection	2G GPRS/EDGE 4G LTE-M1 (LTE Cat-M1) 4G LTE-NB1 (NB-IoT)
GNSS	GPS, Glonass, BeiDou, Galileo
Bluetooth	4.2
WLAN	IEEE 802.11 b/g/n
Firmware Updates	over the Air (FOTA)

11.4. Battery

Characteristics	Value
non-rechargeable battery	Battery Primary 3.7 V lithium thionyl chloride (Li-SOCl2) battery, composed of 1 (one) "D" size cell.
Battery life	Battery life depends on the type of use (measurement and transmission intervals) and environmental conditions (temperature, mobile connection and humidity). **Example:** Environmental conditions: 21°C and good GPS connection:

Transmission interval	Battery life in years
1 / Day	10,7 Years
3 / Day	4,3 Years
6 / Day	2 Years

12. Appendix

12.1. Order information

Packwise GmbH
Antonstr. 25,
01097 Dresden

Tel: +49 (0) 351 8967 5090
Email: service@packwise.de
Product Name: Packwise Smart Cap V1

12.2. Contact data

Packwise GmbH
Antonstr. 25,
01097 Dresden

Tel: +49 (0) 351 8967 5090
Email: service@packwise.de

12.3. Contact and support

Service	service@packwise.de
Support	support@packwise.de
Manual	https://packwise.de/download/

12.4. Declaration of Conformity

EU-Konformitätserklärung
EU-Declaration of Conformity

Wir / We Packwise GmbH
Antonstr. 25
01097 Dresden
Germany

erklären hiermit gegenüber unseren Kunden, dass das Produkt / herewith declare to our customers that the product

Beschreibung / Description: Smart Cap / IIOT Datenverarbeitungsgerät / Information Technology Equipment

Typenbezeichnung / Type designation: Packwise Smart Cap V1

die Bestimmungen folgender Richtlinien des Europäischen Parlaments und des Rates erfüllt / complies with the following European Directives of the European Parliament and of the Council

2014/53/EU RED vom 16. April 2014 über die Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die Bereitstellung von Funkanlagen auf dem Markt und zur Aufhebung der Richtlinie 1999/5/EG

2014/53/EU RED of 16 April 2014 on the harmonization of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC

2011/65/EU und 2015/863/EU RoHS des Europäischen Parlaments und des Rates vom 8. Juni 2011 zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten

2011/65/EU and 2015/863/EU RoHS of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment

Die Übereinstimmung des Produktes mit den Anforderungen der Richtlinie wird durch die technische Dokumentation sowie die Einhaltung folgender Normen nachgewiesen / The technical documentation and compliance with the listed standards below prove the conformity of the product with the requirements of the directives

EN 62368-1 : 2014/AC : 2015/A11 : 2017;
EN 62311 : 2008-09;
1999/519/EC : 1999-07
EN 301 489-17 V3.2.4 : 2020
EN 301 489-1 V2.2.3 : 2019
EN 301 489-3 V2.1.1 : 2019
EN 301 489-19 V2.1.1 : 2019
EN 301 489-1 V2.2.0 : 2017
Draft EN 301 489-52 V1.1.0: 2016
EN 301 489-1 V2.1.1 : 2017

Draft EN 305 550 V2.1.0 : 10-2017
EN 303 413 V1.1.1 : 06-2017
EN 301 511 V12.5.1 : 03-2017
EN 301 908-13 V13.1.1 : 11-2019
EN 300 328 V2.2.2:07 : 2019
EN 61000-4-2 : 2009
EN 61000-4-3 : 2006+A1 : 2008+A2 : 2010

CE-Zeichen erstmals angebracht im Jahr /
CE marking initially affixed in the year: 2021

Dresden, 25.01.2023

ppa. Felix Weger
Produktmanagement

Gesche Weger
Geschäftsführerin

pack:wise
digitize. manage. **match.**

Packwise GmbH
Antonstr. 25
01097 Dresden, Germany

+49 (0) 351 8967 5090
service@packwise.de
www.packwise.io