WATTCRAFTS

Precision Tools for Powerful Ideas

User Manual

Pouch cell holder

Wattcrafts Engineering Ltd. 12/03/2025 Version 1.2

Disclaimer

The information contained in this manual is provided for the purpose of operating and maintaining this Product. While every effort has been made to ensure the accuracy and completeness of this manual, Wattcrafts Engineering Ltd. assumes no responsibility for errors, omissions, or inaccuracies.

This product is designed for use by qualified personnel who are trained in its proper handling and application. Users are responsible for understanding and following all safety guidelines and instructions provided in this manual. Failure to adhere to these instructions may result in damage to the product, property, or personal injury.

Wattcrafts Engineering Ltd. shall not be liable for any direct, indirect, incidental, or consequential damages arising out of the use, misuse, or inability to use this product. Modifications, alterations, or repairs to the product not expressly approved by Wattcrafts Engineering Ltd. will void any warranty and may result in unsafe operation.

All specifications and features of the product are subject to change without prior notice. The user is responsible for ensuring that they are using the most up-to-date version of this manual.

By using this product, the user agrees to the terms of this disclaimer.

Manufacturer and customer service

WATTCRAFTS ENGINEERING LTD.

46 ST. ELMO AVENUE

SA1 8DP

SWANSEA, UK

Email: info@wattcrafts.com

Website: www.wattcrafts.com

1. Product description

Pouch Cell Holder for advanced battery testing

Our Pouch Cell Holder is designed to improve repeatability and expand control of parameters in battery measurements, serving the needs of both research laboratories and industry. This versatile device offers a practical solution for testing pouch cells, combining functionality with user-friendly design.

We've prioritized practicability and accuracy, enabling consistent, reliable testing across various applications - from experimental research to standardized aging measurements and cycle life estimation. The holder features a streamlined, stable 4-point Kelvin connection to tabs, ensuring precise electrical measurements. Included soft pads accommodate small imperfections, thickness variations, and potential cell swelling during long-term cycling, maintaining testing consistency and reliability.

The compact, robust aluminium construction with wide range of tab contact spacing provides a stable platform for diverse pouch cell sizes and configurations. Two sets of screws allow fitting of cells with different thicknesses, particularly beneficial for prototyping high-energy or solid-state cells. The holder's straightforward assembly process saves time, allowing you to focus on your research rather than equipment setup. Additionally, its compatibility with our growing range of attachment modules means you can expand its functionality as your testing requirements evolve.

Whether you're conducting long-term cycling tests, short-term performance evaluations, or specialized pressure-dependent studies, this Pouch Cell Holder provides a reliable foundation for your battery R&D efforts. It's the smart choice for researchers and industry professionals seeking a balance of quality, versatility, and value in their testing equipment.

2. Specification

- Material: Aluminium alloy, Stainless Steel
- max. force: 5kN
- max. pouch cell size: 80 x 80 mm
- Allowed tab spacing range: 14 mm - 60 mm (same side)
- Tab connection width: 45 mm (opposite sides)
- Product size: 110 x 110 x 32 mm (h = 52 mm with springs)
- Weight: 1500g
- 4-point (Kelvin) banana connection (4 mm)
- Max. temperature: 70°C

Product includes:

- Base with electrical contacts (4 mm banana sockets)
- Top frame
- 2x Force transfer plate
- 2x soft pad
- 3 sets of 5 springs with different spring rates (k):
    - k = 18 N/mm (max. force = 925 N) **(green)**
    - k = 58.5 N/mm (max. force = 1815 N) **(yellow)**
    - k = 288 N/mm (max. force = 5400 N) (brown)
- sets of screws

3. Safety precautions

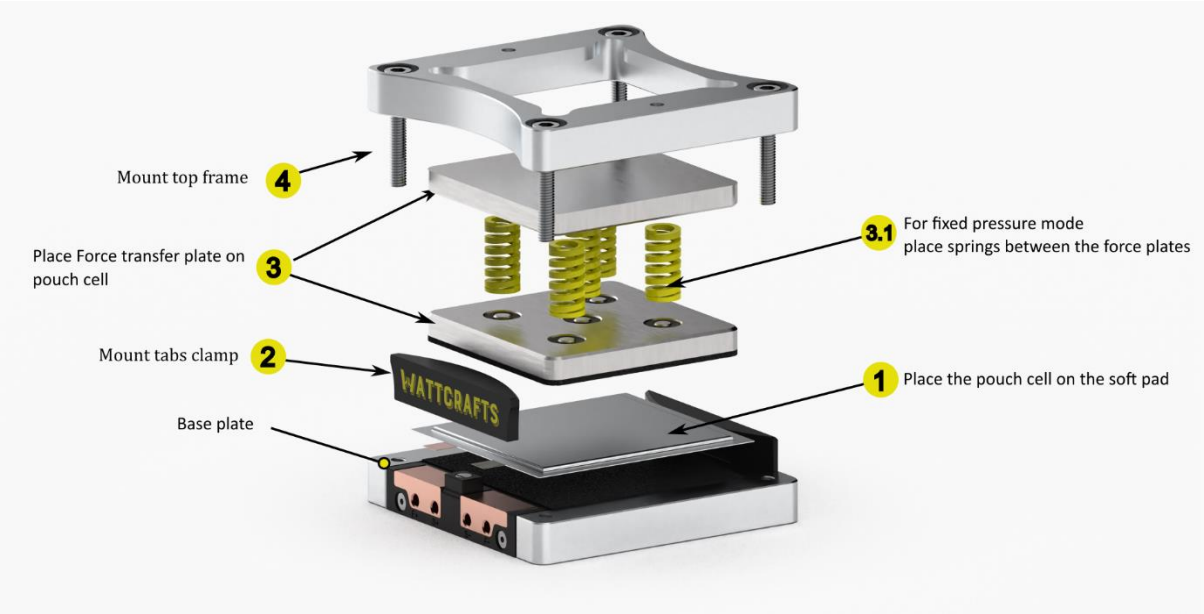
Use proper safety precautions when working with batteries in pouch cell format. The pouch seal may break due to various causes, such as defect, internal pressure increase, heat etc. This can cause release (including rapid release) of hazardous substances. Wear protective glasses and gloves to protect you against substances that may be accidentally released. Beware that battery cells subject to high currents can heat up to high temperatures, particularly the electrical contacts.

Regularly inspect electrical contacts for corrosion and remove any oxidation products if deemed required with fine sandpaper.

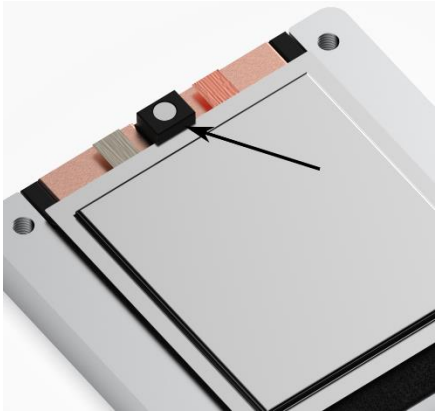
4. Operation

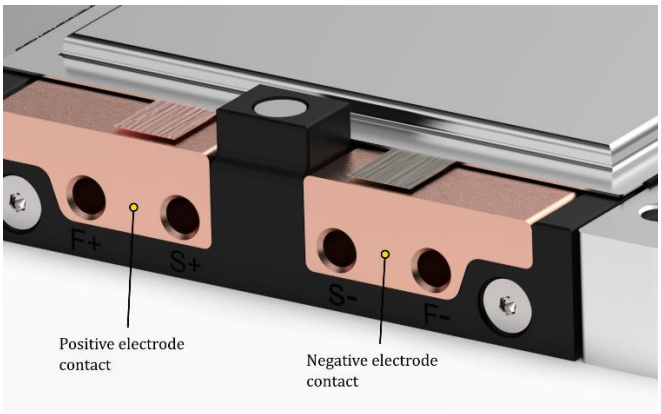
4.1 Assembly

For assembly of the holder follow the below procedure.



1. Place the pouch cell on the soft pad of the base plate. Align the top cell edge (with tabs) to the plastic cubic block (see below). Make sure that the cell is placed on the correct side to ensure right polarization.





2. Mount the tabs clamp on the electrical contacts to hold the cell in place.
3. Place force transfer place on top of the pouch cell

3.1 For fixed pressure mode, place springs between the force plates. For fixed thickness mode don't use the springs and place second force plate directly on the first one.

4. Mount top frame. Make sure to tighten the screws in sequence a little bit at a time to achieve even force on each side. Provided flat springs will balance the applied force to certain degree, but high differences can result in unhomogenus force distribution.

If in doubt, good practice is to measure the gap between top frame and base plate in each corner.

4.2 Fixed thickness and fixed pressure modes

Fixed thickness

The holder can be operated in 2 modes: fixed thickness (gap) or fixed pressure (force). In the former, no springs are used. The cell thickness is constrained during cycling and internal volume changes are reflected in changes in applied compression force. This can be monitored with Force Sensor Module (see 4.3). This mode replicates well real life conditions, where cells are permanently mounted in module or pack and volume changes are only accommodated by flexible pads.

Fixed pressure

The product includes 3 sets of springs that can be used for fixed pressure mode, i.e. to dampen the effect of cell volume changes and maintain stable compression forces throughout cycling. In this mode, the thickness changes can be monitored with Thickness Sensor Module.

For operation in this mode longer screws (included) should be used. The springs shall be placed between the force plates. The springs work best in 20% - 80% range of max. force they can handle, depending on the spring constant. The included sets are:

Green

Spring constant k = 18 N/mm

max. total force = 925 N

Yellow

Spring constant k = 58.5 N/mm

max. total force = 1815 N

Brown

Spring constant k = 288 N/mm

max. total force = 5400 N

4.3 Operation with Force Sensor Module

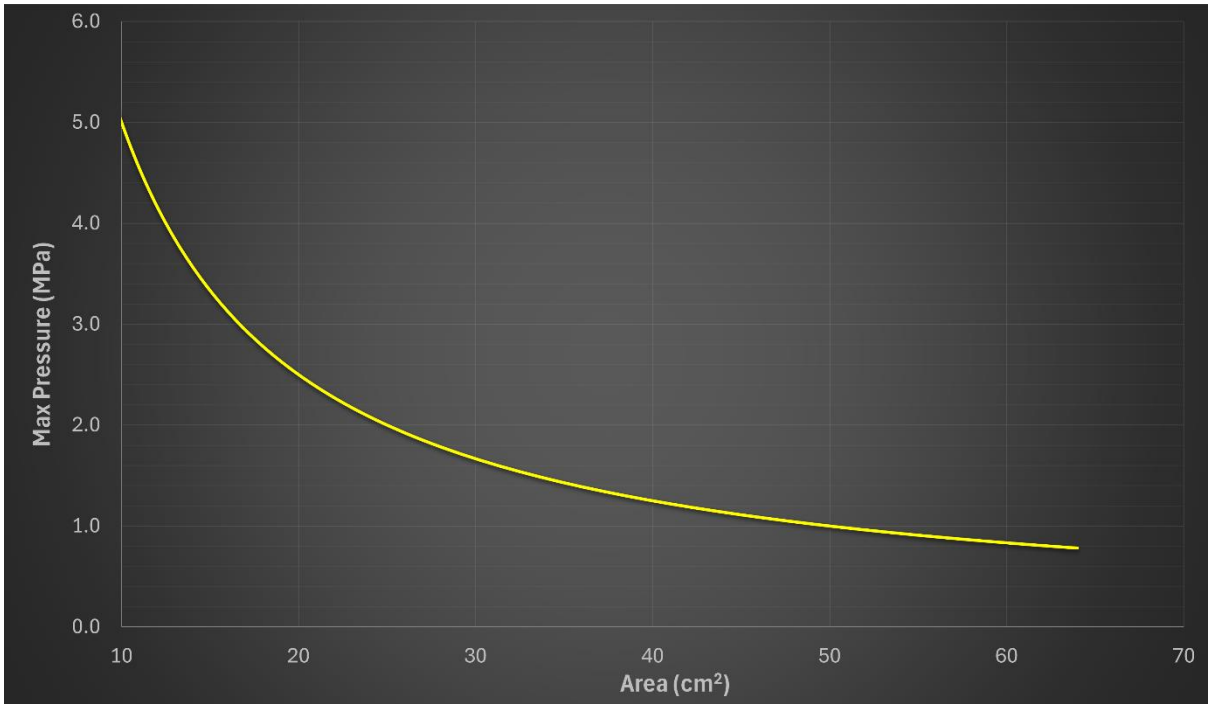
Testing capabilities of Pouch Cell Holder can be expanded with our Force Sensor Module attachment. This module enables precise pressure control and in-situ monitoring, crucial for simulating real-world conditions and studying pressure effects on battery performance. The module can be used to set initial pressure and then removed, allowing one module to service multiple holders - an efficient solution for labs with multiple testing stations.

To use Force Sensor Module, mount it into the Top frame of Pouch Cell Holder. It is recommended to do this before tightening the 4 screws (step 4 above). This way the initial pressure can be monitored during the assembly. However, the Force Sensor Module can be attached to the holder at any stage, even during cycling or after finished measurement to check the current pressure applied to the cell.

After assembly the module can be removed and used for another holder or left attached and used to monitor the pressure evolution in the cell during operation.

For more information on operation of Force Sensor Module please refer to its User Manual.

The graph represents the highest pressure (i.e. 5kN force) that can be applied to the cell, depending on the cell size.



Note:

If you need to apply higher pressure please contact us at info@wattcrafts.com

5. Warranty

Wattcrafts Engineering Ltd. warrants that the product is free from defects in materials and workmanship under normal use for a period of 12 months from the date of purchase. During the warranty period, if the product is found to be defective, Wattcrafts Engineering Ltd. will, at its discretion, repair or replace the product at no charge to the customer.

This warranty does not cover:

- Damage resulting from misuse, abuse, accidents, or unauthorized modifications.
- Wear and tear from normal usage.
- Products that have been altered or repaired by unauthorized personnel.
- Damage caused by improper installation or failure to follow the instructions in the manual.

To make a warranty claim, please contact Wattcrafts Engineering Ltd. at info@wattcrafts.com with a description of the issue.

This warranty is non-transferable and is limited to the original purchaser. It is provided in lieu of any other warranties, express or implied, including any implied warranty of merchantability or fitness for a particular purpose.

Wattcrafts Engineering Ltd. liability under this warranty is limited to the repair or replacement of the product. In no event shall Wattcrafts Engineering Ltd. be liable for any indirect, incidental, or consequential damages arising from the use of this product. This Limited Warranty shall be governed by and construed in accordance with the laws of England and Wales.