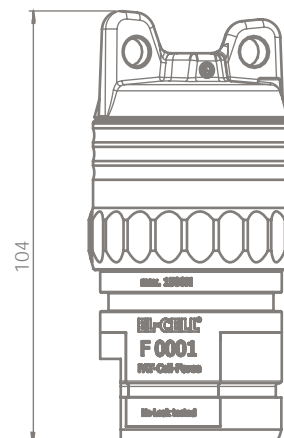
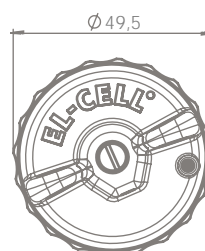




Dimensions in mm:



## PAT-Cell-Force

### Operando test cell for the adjustment and measurement of the mechanical force applied on the cell stack

The PAT-Cell-Force is a special operando test cell of the PAT series for the adjustment and measurement of the mechanical force applied on the cell stack. Thanks to the wide force range, the cell is suitable for both aprotic Li-ion battery chemistries with liquid electrolytes and solid state setups. The force on the cell stack can be set to up to 1500 N when assembling the cell and then monitored during the electrochemical cycle. Additional sensors allow for the simultaneous monitoring of gas pressure and temperature.

The modular PAT-Core concept warrants easy and efficient handling and enables 3-electrode measurements with a ring-shaped reference electrode when using liquid electrolytes. The PAT-Cell-Force is to be operated with an EL-CELL potentiostat like the PAT-Tester-x-8. All sensor signals are recorded and displayed in EL-Software.

Its advanced sealing concept with welded-in sensors and glass-to-metal sealed electrode feedthroughs make the PAT-Cell-Force perfect for stable long-term measurements. The PAT-Cell-Force is equipped with an electronic cell tag (PAT-Button) for automatic recognition in EL-Software.

#### Key Features

- Force adjustment and measurement, up to 1500 Newton
- Built-in temperature, force and gas pressure sensors
- Cableless connection via PAT socket, with electronic cell tag (PAT-Button)

#### Use Cases:

- Force adjustment during cell assembly
- Force measurement during the electrochemical cycle
- Additional monitoring of gas pressure and temperature
- 2- and 3-electrode setup with PAT-Core
- For aprotic chemistries with liquid and solid state electrolytes

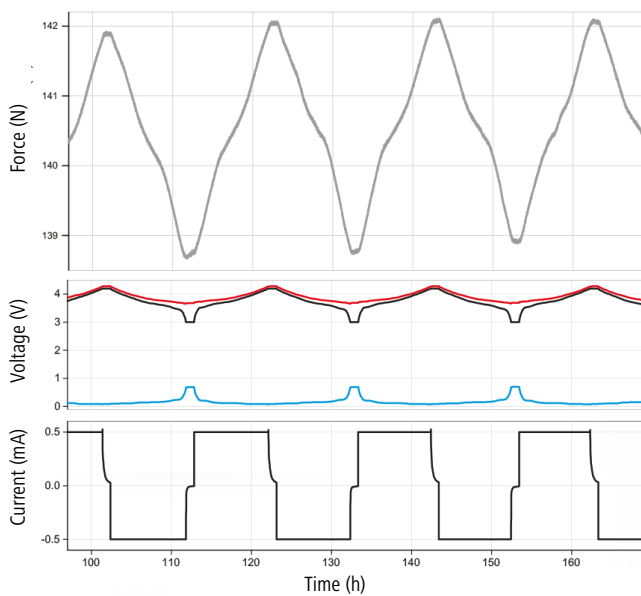
Product website:



### Specifications

Height	104 mm
Diameter	49.5 mm
Weight	0.8 kg
Separator diameter	21.6 mm
Electrode diameter	18 mm
Temperature sensor	-20 to 80 °C
Force sensor	up to 1500 Newton (up to 5.9 MPa at 18 mm electrode diameter)
Gas pressure sensor	0 to 3 bar abs.
Operational temperature	-20 to 80 °C

### Sample test results



#### Setup details:

Example: NCM 111 vs Graphite in LP30

Initial force on cell stack: 140 Newton (can be increased up to 1500 Newton)

Additionally gas pressure and temperature are monitored (not shown)

#### Devices in use:

- PAT-Cell-Force
- PAT-Tester-x-8
- PAT-Terminal-1 placed inside the glove box (to adjust initial stack force)
- PAT-Channel-1 placed inside a temperature chamber (for cycling)

### Sample setups



PAT-Cell-Force connected to a PAT-Tester-x-8 potentiostat for cycling.



PAT-Cell-Force connected to a PAT-Terminal-1 to adjust initial stack force. The PAT-Terminal-1 can also be used for cycling, if connected to a PAT-Controller-8.