TERMA BATTERY CELL TESTER – TBCT12

FOR APPLICATIONS THAT REQUIRE METICULOUS ACCURACY AT LOWER CURRENTS THE TBCT12 PROVIDES A MAXIMUM CURRENT OF 12.5A.

TBCT12 Key Features Description

Self-Calibration Capability

Each channel in the system can self-calibrate the voltage measurement mechanism by utilizing a precision voltage reference in the device. This allows for automated voltage calibration on command without user intervention. Current calibration is done using a traditional calibration kit and requires user intervention to perform.

Built-in Snapshot

Each channel has the capability of capturing quick snapshots of the output current and voltage to provide deep diagnostic capabilities of the battery cell. This snapshot is fully programmable and can be triggered automatically during the test run.

Built-in Direct Current Internal Resistance (DCIR)

Each channel has the capability to perform a DCIR function automatically and provide the calculated results. A minimum pulse of 2msec is guaranteed.

Built-in EIS

The system can also perform EIS to give detailed data on the state of health of the cell. This powerful Feature can be used without adding any additional external testing hardware. EIS specifications:

- Plug and play integration with TBCT, integration to cell tester workflows
- AC Output Current range: 10A (p-p)
- Frequency range: 1 mHz – 10 kHz
- Battery Impedance: 0.1 mΩ– 100 mΩ
- Fast measurement with multi-sine excitation
- Accuracy of impedance measurement < 1% (of measured values)
- Voltage input resolution (AC) <2 mV
- Voltage input resolution (DC) <0.5 mV
- Voltage measurement Accuracy (DC) <0.225 mV
- Cable impedance compensation

Built-in Cyber-Security

- Operating system updates (Debian based for Embedded controller)
- Authentication Authorization for GUI
- Encrypted sensitive information:
- Security Related Telemetry
- Remote Connections
- User management
  - Configure user and passwords access
- Firewalling
- Accounts for different roles, Admin, Developer, Tester,
- Debug UART Protection
- Virus scanner installation and execution

TBCT12 performance and feature levels

The TBCT12 model is available in three feature levels: Basic, Standard and Premium.

Basic
- Covers all cycling testing scenarios
- High voltage and current accuracy
- EtherCAT and Ethernet
- Basic Snapshot per channel included
  - Voltage and current measurement per channel
  - Up to 4096 samples per snapshot per signal.
  - Fixed sampling rate of 10kHz
  - Voltage and current setpoints for triggering snapshot

Standard
All Basic features plus:
- Minimum output voltage reduced to 650mV
- RS485 interface

Premium
All Standard features plus:
- Minimum output voltage reduced to 250mV
- Full Snapshot per channel included
  - Voltage, current, temperature, analog-in and analog-out measurement per channel[1]
  - Up to 4096 samples per snapshot per signal.
  - Configurable sampling rate from 100Hz up to 100kHz
  - Voltage, current, temperature, analog-in and analog-out setpoints for triggering snapshot[2]
- Built in self-calibration, increasing the lifetime of the accuracy
- Cybersecurity package

[1] Available in Q2 2025
[2] Available in Q2 2025

TERMA
ALLIES IN INNOVATION

TBCT12 key features

	Basic	Standard	Premium
Max. Voltage Per Channel	Up to 10VDC	Up to 10VDC	Up to 10VDC
Voltage Accuracy	1mV	1mV	1mV
Current Accuracy	0.05% FS 12.5mA	0.03% FS 7.5mA	0.01% FS 2.5mA
Voltage Resolution	150µV	150µV	150µV
Current Resolution	300µA	300µA	300µA
EtherCAT	Yes	Yes	Yes
Ethernet	Yes	Yes	Yes
Cards Parallelization[3]	Yes	Yes	Yes
CC, CV, CP Modes	Yes	Yes	Yes
Remote Voltage Sense	Yes	Yes	Yes
Dynamic Profiles Mode	No	Yes	Yes
Thermistors Per Device	-	32	64
RS485 (Full Duplex) Per Device	-	8	16
Graphical User Interface and open API	Yes	Yes	Yes
Snapshot Per Channel	Basic	Basic	Full
Cyber Security Package	No	No	Yes
Self-Calibration Per Channel	No	No	Yes
DCIR Capability	Yes	Yes	Yes
EIS Capability[4]	No	No	Yes

[3] same type of channels in the same device only
[4] Available not earlier than Q1/2025

TERMA
ALLIES IN INNOVATION

Detailed Specifications

Static Performance

Maximum Number of Channels Per Rack	256
Number of Possible Parallel Channels (parallel only possible with channels in same device)	8
Operation Modes	CC, CV, CP
Max. Power per channel	125W
Current range	±12.5A
Voltage Range	0 - 10V
Efficiency	Up to 95%

Measurement

Measurement		Basic	Standard	Premium
Current	Resolution	300µA	300µA	300µA
	Accuracy	12.5mA	7.5mA	2.5mA
Voltage	Resolution	150µV	150µV	150µV
	Accuracy	1mV	1mV	1mV
Temperature	Accuracy	0.1°C	0.1°C	0.1°C
Data acquisition	EtherCAT	up to 1kHz	up to 1kHz	up to 1kHz
	Ethernet	up to 1kHz (bandwidth dependent)	up to 1kHz (bandwidth dependent)	up to 1kHz (bandwidth dependent)

Waveform Measurement Built-in Snapshot

Digitizing Rate Range	100 – 100KSamples/Sec
Default Digitizing Rate	10 KSamples/Sec
Memory	4096 samples

Dynamic Performance

Current Rise/Fall Time (10-90%)	< 1.8msec
Time from Minus to Maximum Current	< 2.0msec

Safety

Isolation AC Input	1.0 kV AC Input to Chassis / 1.0 kV AC to DC Output
Isolation UUT Input	1.0kV Channel to Chassis for all channels 150VDC isolation channel-to-channel for 12.5 channels in same channel group (channel groups are channels: 1-8, 9-16, 17-24, 25-32, 33-40, 41-48, 49-56, 57-64). 500VDC isolation between channels of different groups
Safety Interlocks	Emergency Stop, External User Input
Internal Protection	Over- Current (OC) Under-Voltage (UV) Over-Voltage (OV) Over-Power (OP) Over-Temperature
Programmable Safety	Over/Under- Current (OC/UC) Over/Under-Voltage (OV/UV) Over/Under-Power (OP/UP) Over-Temperature

TERMA
ALLIES IN INNOVATION