

# TORKE<sup>L</sup> 900/910/930/ 950-series Battery Load Unit

**Megger**<sup>®</sup>

技术咨询和询价：010-68940148



- Batteries can be tested in service
- Dynamic discharge technology – full power at all voltages
- Safety in all details, e.g. detection of blocked airflow
- Real time monitoring during test
- Easy report function and calibration
- Easily expandable for larger battery banks using TXL extra load units
- Battery cell monitor control integrated in the system
- Can be used with Lead-Acid, Ni-Cd and other battery types

## 康高特-MEGGER TORKE<sup>L</sup> 900 TORKE<sup>L</sup> 910 , TORKE<sup>L</sup> 930 , TORKE<sup>L</sup> 950 电池放电测试系统 DESCRIPTION

The TORKE<sup>L</sup>™ 900 series is used to perform load/discharge testing which is the only way to determine battery systems actual capacity. Together with the optional cell voltage logger, BVM, connected directly to the TORKE<sup>L</sup> 900, it becomes a complete, stand-alone, discharge test system.

TORKE<sup>L</sup> comes in three models, 910, 930 and 950, see table below.

The high discharge capacity of TORKE<sup>L</sup> gives the opportunity to shorten the test time. Discharging can take place at up to 220 A, and if higher current is needed, two or more TORKE<sup>L</sup> units or extra load units, TXL, can be linked together. Tests can be conducted at constant current, constant power, constant resistance or in accordance with a pre-selected load profile.

Testing can also be carried out without disconnecting the battery from the equipment it serves. Via a DC clamp-on probe, TORKE<sup>L</sup> measures the total battery current while regulating it at a constant level. Battery systems can be plus or minus grounded or free floating.

The test results can be presented and edited on a PC using the included PC software "TORKE<sup>L</sup> Viewer".

### MODEL OVERVIEW

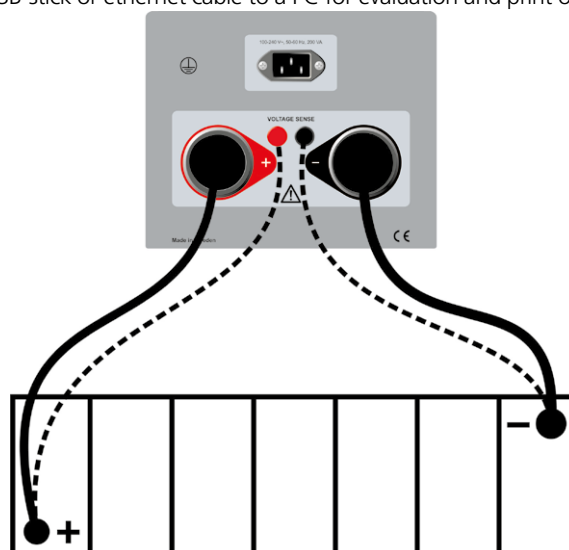
| TORKE <sup>L</sup>        | 910   | 930   | 950   |
|---------------------------|-------|-------|-------|
| Current (max)             | 110 A | 220 A | 220 A |
| Voltage (max)             | 300 V | 300 V | 500 V |
| BVM functionality         | No    | Yes   | Yes   |
| Charging measurement      | No    | Yes   | Yes   |
| Full report functionality | No    | Yes   | Yes   |

## 康高特-MEGGER TORKE<sup>L</sup> 900 TORKE<sup>L</sup> 910 , TORKE<sup>L</sup> 930 , TORKE<sup>L</sup> 950 电池放电测试系统 APPLICATION EXAMPLE

The TORKE<sup>L</sup> is connected to battery, the current and the voltage alarm levels are set. After starting the discharge, TORKE<sup>L</sup> keeps the current constant at the preset level. When the voltage drops to a level slightly above the final voltage, TORKE<sup>L</sup> issues an alarm.

If the voltage drops so low that there is a risk for deep discharging the battery, TORKE<sup>L</sup> shuts down the test. If the power supply is interrupted the test will continue when power is restored.

All values are stored in TORKE<sup>L</sup> and can easily be transferred via an USB-stick or ethernet cable to a PC for evaluation and print out.



Separate sensing cables (dashed lines) should be used to get accurate voltage measurements to offset the voltage drop caused by long current cables and/or high current.

# TORKEL 900-series Battery Load Unit

**Megger**<sup>®</sup>

## FEATURES AND BENEFITS

1. **TXL STOP**  
Output used for stop discharging from an external device (e.g. TXL). Galvanically isolated.
2. **SERVICE**  
Connector for service purposes only.
3. **ALARM**  
Output equipped with a relay contact for triggering an external alarm device.
4. **DC OUT**  
9 V output for external current clamp.
5. **IEXT ≤ 1 V**  
Input used to measure current in an external path by means of a clamp-on probe or a current shunt.
6. **Display**  
Touch screen 7"
7. **BVM1, BVM2**  
USB connections for BVM units.
8. **USB connection**  
For USB memory stick.
9. **Ethernet connection**  
For reports connected to PC
10. **EMERGENCY STOP**  
Push to stop.  
Reset by turning it clock-wise
11. **Control knob**  
For entering settings etc. Press to confirm a setting.
12. **Buzzer**  
For alarms.
13. **ON/OFF switch**



14. Protective ground (earth) conductor terminal
15. **MAINS**  
Connector for mains supply.
16. **+**  
Connection terminal (+) for the battery (or other DC source).
17. **VOLTAGE SENSE**  
Input for sensing voltage at the battery terminals.  
Impedance to the battery current terminals is >1 MΩ.
18. **-**  
Connection terminal (-) for the battery (or other DC source).

## TORKEl 900-series Battery Load Unit

### SPECIFICATIONS TORKEl 900-SERIES

Specifications are valid at nominal input voltage and an ambient temperature of +25°C, (77°F). Specifications are subject to change without notice.

#### Environment

**Application field** The instrument is intended for use in high-voltage substations and industrial environments.

#### Temperature

**Operating** 0°C to +50°C (32°F to +122°F)  
Power derating at temperatures over +35°C (+95°F)

**Storage & transport** -40°C to +70°C (-40°F to +158°F)

**Humidity** 5% – 95% RH, non-condensing

#### Shock/Vibration/Fall

**Instrument only** ETSI EN 300 019-2-7 class 7M2

**Instrument in transport case** ISTA 2A

#### Altitude

**Operating** 3000 m (10000 ft)

**Storage** 10000 m (33000 ft)

**Encapsulation class** IP20

#### CE-marking

**LVD** 2014/35/EU

**EMC** 2014/30/EU

**RoHS** 2011/65/EU

#### General

**Mains voltage** 100 – 240 V AC, 50/60 Hz

**Power consumption** 200 W (max)

**Power interruption** 40 ms (max)

**Protection** Thermal cut-outs, Automatic overload protection, Emergency stop button

**Dimensions** 519x315x375 mm, (20.5" x 12.4" x 14.7")

**Weight** 19.5 kg (43.0 lbs) instrument  
31.9 kg (70.3 lbs) incl. standard transport case  
39,2 kg (86,4 lbs) incl. large transport case and cables

**Display** 7" LCD, Capacitive touch screen

**Available languages** Czech, English, French, German, Romanian, Russian, Spanish, Swedish

**Number of test files** 30 (max)

**Test time** 240 h (max)

#### Measurement section

##### Current measurement

**Display range** 0.0 to 2999.0 A

**Basic inaccuracy** ±(0.5% of reading +0.1 A)

**Resolution** 0.1 A

##### Internal current measurement

###### Range

**TORKEl 910** 0 to 110 A

**TORKEl 930/950** 0 to 220 A

##### Input for clamp-on probe

**Range** 0 to 1000 mV DC

**mV/A-ratio** 0.30 mV/A to 100.00 mV/A

**Input impedance** >1 MΩ

##### Voltage measurement

**Voltage** 0 to 500 V DC

**Inaccuracy** ±(0.5% of reading +0.1 V DC)

**Resolution** 0.1 V

**Sample rate** 10 Hz, Values are saved when change is >10 mV

#### Time measurement

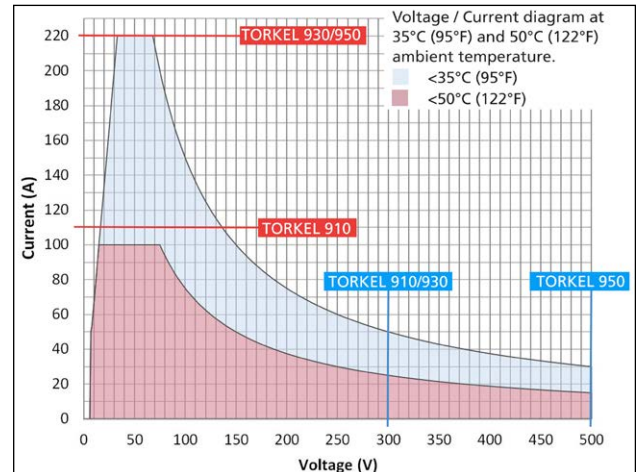
**Inaccuracy** ±0.1% of reading ±1 digit

#### Load section

**Battery voltage** 7.5 V(3) to 300 V(1) / 500 V(2)

**Power** 15 kW (max)

**Load patterns** Constant current, constant power, constant resistance, current or power profile



#### Constant I

##### Range

**TORKEl 910** 0 to 110.0 A

**TORKEl 930/950** 0 to 220.0 A

**Inaccuracy** ±(0.5% +0.2 A)

**Resolution** 0.1 A

**Ripple** max 0.5 A peak

#### Constant R

**Range** 300 mΩ to 3 kΩ

**Inaccuracy** ±1% typical

**Resolution** 100 mΩ

#### Constant P

**Range** 0 to 15 kW

**Inaccuracy** ±1% typical

**Resolution** 10 W

#### Inputs

**+** 7.5 to 300 V<sup>(1)</sup> 7.5 to 500 V<sup>(2)</sup>

**-** 0 V

**I EXT ≤ 1 V** 1 V DC, 300 V DC to ground

**VOLTAGE SENSE** Impedance to the current terminals is >1 MΩ

#### Outputs

##### ALARM

**Relay contact** 28 V DC, 8 A, 240 V AC, 8 A  
Devices higher than Cat II must not be attached

##### TXL STOP

**Relay contact** 250 VDC, 0.28 A, 28 VDC, 8 A, 250 VAC, 8 A  
**9 V DC** 9 V DC, ±7% max 100 mA

#### Communication ports

**BVM1 BVM2** USB connection for BVM units

USB connection for USB memory

For reports connected to PC

1) TORKEl 910 and 930 2) TORKEl 950

3) On sw from R02G. Min voltage is 2V

# TORHEL 900-series Battery Load Unit

## SPECIFICATIONS TXL830/850/865/870/890

Specifications are valid at nominal input voltage and an ambient temperature of +25°C, (77°F). Specifications are subject to change without notice.

### Environment

**Application field** The instrument is intended for use in high-voltage substations and industrial environments.

### Temperature

**Operating** 0°C to +40°C (32°F to +104°F)  
**Storage & transport** -40°C to +70°C (-40°F to +158°F)

**Humidity** 5% – 95% RH, non-condensing

### CE-marking

**LVD** 2014/35/EU  
**EMC** 2014/30/EU  
**RoHS** 2011/65/EU

### General

**Mains voltage** 100 – 240 V AC, 50/60 Hz  
**Power consumption** 75 W (max)  
**Protection** Thermal cut-outs, automatic overload protection  
**Dimensions**  
**Instrument** 210x353x600 mm (8.3" x 13.9" x 23.6")  
**Transport case** 710 x 310 x 520 (28" x 12.2" x 20.5")  
**Weight** Instrument 13 kg (29 lbs) 21,4 kg (47 lbs) with transport case

## Load section

|               | Voltage (DC) max. | Current max. | Power max. |
|---------------|-------------------|--------------|------------|
| <b>TXL830</b> | 28 V              | 300 A        | 8.3 kW     |
| <b>TXL850</b> | 56 V              | 300 A        | 16.4 kW    |
| <b>TXL865</b> | 260 V (98 A max)  | 117 A        | 25.5 kW    |
| <b>TXL870</b> | 280 V (56 A max)  | 112 A        | 15.8 kW    |
| <b>TXL890</b> | 480 V (32 A max)  | 62 A         | 15.4 kW    |

## Internal resistance, 3-position selector

|               | Position 1 | Position 2 | Position 3 |
|---------------|------------|------------|------------|
| <b>TXL830</b> | 0.275 Ω    | 0.138 Ω    | 0.092 Ω    |
| <b>TXL850</b> | 0.55 Ω     | 0.275 Ω    | 0.184 Ω    |
| <b>TXL865</b> | 2.65 Ω     | 5.05 Ω     | 0.12 Ω     |
| <b>TXL870</b> | 4.95 Ω     | 2.48 Ω     | 1.24 Ω     |
| <b>TXL890</b> | 14.10 Ω    | 7.05 Ω     | 3.52 Ω     |

## Maximal currents, 3-position selector<sup>1)</sup>

### Position 1

|               | Current | Voltage | Cells | Cell voltage |
|---------------|---------|---------|-------|--------------|
| <b>TXL830</b> | 100 A   | 27.6 V  | 12    | 2.3 V        |
| 28 V max      | 78.5 A  | 21.6 V  | 12    | 1.8 V        |
| <b>TXL850</b> | 100 A   | 55.2 V  | 24    | 2.3 V        |
| 56 V max      | 78.5 A  | 43.2 V  | 24    | 1.8 V        |
| <b>TXL865</b> | 93.7 A  | 248.4 V | 108   | 2.3 V        |
| 260 V max     | 73.4 A  | 194.4 V | 108   | 1.8 V        |
| <b>TXL870</b> | 50.1 A  | 248.4 V | 108   | 2.3 V        |
| 280 V max     | 39.2 A  | 194.4 V | 108   | 1.8 V        |
| <b>TXL890</b> | 32.3 A  | 469.2 V | 204   | 2.3 V        |
| 480 V max     | 26.0 A  | 367.2 V | 204   | 1.8 V        |

### Position 2

|               | Current | Voltage | Cells | Cell voltage |
|---------------|---------|---------|-------|--------------|
| <b>TXL830</b> | 200 A   | 27.6 V  | 12    | 2.3 V        |
| 28 V max      | 156 A   | 21.6 V  | 12    | 1.8 V        |
| <b>TXL850</b> | 200 A   | 55.2 V  | 24    | 2.3 V        |
| 56 V max      | 156 A   | 43.2 V  | 24    | 1.8 V        |
| <b>TXL865</b> | 49.2 A  | 248.4 V | 108   | 2.3 V        |
| 260 V max     | 38.5 A  | 194.4 V | 108   | 1.8 V        |
| <b>TXL870</b> | 50.1 A  | 124.2 V | 54    | 2.3 V        |
| 280 V max     | 39.2 A  | 97.2 V  | 54    | 1.8 V        |
| <b>TXL890</b> | 35.2 A  | 248.4 V | 108   | 2.3 V        |
| 480 V max     | 27.8 A  | 194.4 V | 108   | 1.8 V        |

### Position 3

|               | Current | Voltage | Cells | Cell voltage |
|---------------|---------|---------|-------|--------------|
| <b>TXL830</b> | 300 A   | 27.6 V  | 12    | 2.3 V        |
| 28 V max      | 235 A   | 21.6 V  | 12    | 1.8 V        |
| <b>TXL850</b> | 300 A   | 55.2 V  | 24    | 2.3 V        |
| 56 V max      | 235 A   | 43.2 V  | 24    | 1.8 V        |
| <b>TXL865</b> | 115 A   | 13.8 V  | 6     | 2.3 V        |
| 14 V max      | 90 A    | 10.8 V  | 6     | 1.8 V        |
| <b>TXL870</b> | 100 A   | 124.2 V | 54    | 2.3 V        |
| 140 V max     | 74.8 A  | 97.2 V  | 54    | 1.8 V        |
| <b>TXL890</b> | 70.5 A  | 248.4 V | 108   | 2.3 V        |
| 250 V max     | 55.2 A  | 194.4 V | 108   | 1.8 V        |

1) The data examples apply to lead batteries.

# TORTEL 900-series Battery Load Unit

## OPTIONAL ACCESSORIES

### Extra loads



Five extra loads available:  
TXL830, TXL850, TXL865,  
TXL870 and TXL890

### BVM - Battery Voltage Monitoring



Enables automatic battery cell voltage  
logging during capacity tests  
Up to 2x120 units can be used (Daisy-  
chain) For complete information see  
the BVM data sheet

(CJ0062XX)

### Clamp-on-probe



Clamp-on probe, 1000 A DC  
To measure current in  
external circuit

(XA-12991)

### Cable set Torkel 930/950



Cable set (GA-00545)

### Extension cables



Extension cable set (GA-00552)



Extension cable set, high rating (GA-09552)

### Sensing leads



Sensing lead set (GA-00210)

### Software

PowerDB is a PC software for BVM and TORTEL 800 / 900-series.  
For BVM and TORTEL 800 series it works for controlling, data  
management and report handling. For TORTEL 900-series only for  
data management and reporting.

## TORHEL 900-series Battery Load Unit

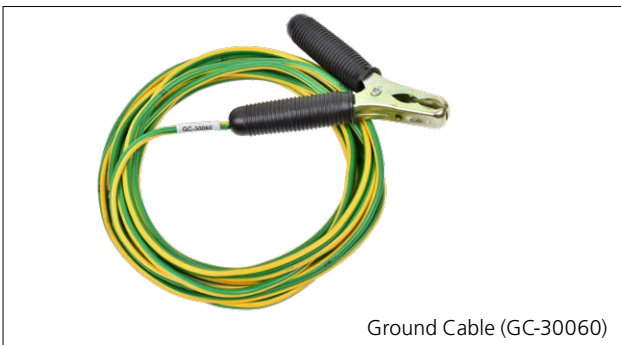
### INCLUDED ACCESSORIES – TORHEL 910

#### Cable set



Cable set (GA-00550)

#### Ground Cable



Ground Cable (GC-30060)

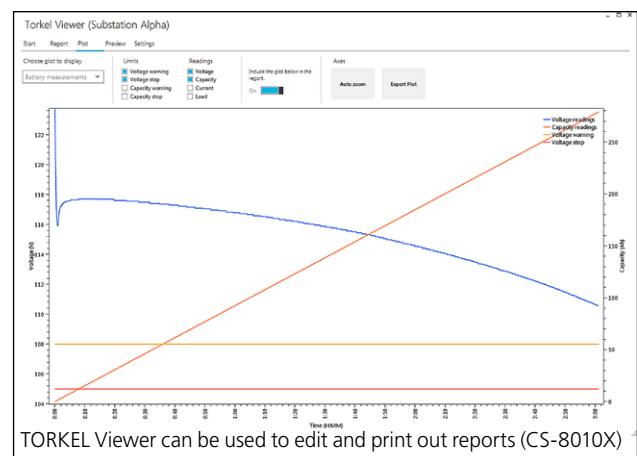
### INCLUDED ACCESSORIES – TORHEL 930/950

#### Cable set



Cable set (GA-09550)

#### TORHEL Viewer



TORHEL Viewer is a free software, download at [www.megger.com](http://www.megger.com) (search "TORHEL900" and submenu "Software"). Open the file and follow the instructions.

Please note that TORHEL Viewer can only be used with TORHEL930 and TORHEL950.

For TORHEL910, TORHEL Viewer cannot be used. A payable license fee for FW upgrade is needed. (E.g. material number CS-90010, "Upgrade Torkel 910 to 930")

## ORDERING INFORMATION

### Item Cat. No.

#### TORHEL 910

Incl. transport case **Standard**<sup>1)</sup> and accessories:

|                                        |          |          |
|----------------------------------------|----------|----------|
| Mains cable                            |          |          |
| Cable set, 2 x 3 m, 25 mm <sup>2</sup> | GA-00550 |          |
| Soft case for cables                   | 2012-180 | CS-19190 |

Incl. transport case **Large**<sup>2)</sup> and accessories:

|                                        |          |          |
|----------------------------------------|----------|----------|
| Mains cable                            |          |          |
| Cable set, 2 x 3 m, 25 mm <sup>2</sup> | GA-00550 | CS-19191 |

#### TORHEL 930

Incl. transport case **Standard**<sup>1)</sup> and accessories:

|                                        |          |          |
|----------------------------------------|----------|----------|
| Mains cable                            |          |          |
| Cable set, 2 x 3 m, 70 mm <sup>2</sup> | GA-09550 |          |
| Soft case for cables                   | 2012-180 |          |
| TORHEL Viewer                          | CS-8010X |          |
| USB memory stick                       | HF-10020 | CS-19390 |

Incl. transport case **Large**<sup>2)</sup> and accessories:

|                                        |          |          |
|----------------------------------------|----------|----------|
| Mains cable                            |          |          |
| Cable set, 2 x 3 m, 70 mm <sup>2</sup> | GA-09550 |          |
| TORHEL Viewer                          | CS-8010X |          |
| USB memory stick                       | HF-10020 | CS-19391 |

#### TORHEL 950

Incl. transport case **Standard**<sup>1)</sup> and accessories:

|                                        |          |          |
|----------------------------------------|----------|----------|
| Mains cable                            |          |          |
| Cable set, 2 x 3 m, 70 mm <sup>2</sup> | GA-09550 |          |
| Soft case for cables                   | 2012-180 |          |
| TORHEL Viewer                          | CS-8010X |          |
| USB memory stick                       | HF-10020 | CS-19590 |

Incl. transport case **Large**<sup>2)</sup> and accessories:

|                                        |          |          |
|----------------------------------------|----------|----------|
| Mains cable                            |          |          |
| Cable set, 2 x 3 m, 70 mm <sup>2</sup> | GA-09550 |          |
| TORHEL Viewer                          | CS-8010X |          |
| USB memory stick                       | HF-10020 | CS-19591 |

Included in all models above:

Ground cable, 5 m (16 ft) 2.5 mm<sup>2</sup> GC-30060

#### Optional accessories

Transport case **Standard**, for TORHEL (no cables) GD-00954

Transport case **Large** for TORHEL and standard cables GD-00955

#### TXL830 Extra load

Incl. Cable set GA-09550, 2x3 m 70 m<sup>2</sup>\*) BS-59093

#### TXL850 Extra load

Incl. Cable set GA-09550, 2x3 m 70 m<sup>2</sup>\*) BS-59095

#### TXL865 Extra load

Incl. Cable set GA-00550, 2x3 m 25 m<sup>2</sup>\*) BS-59096

#### TXL870 Extra load

Incl. Cable set GA-00550, 2x3 m 25 m<sup>2</sup>\*) BS-59097

#### TXL890 Extra load

Incl. Cable set GA-00550, 2x3 m 25 m<sup>2</sup>\*) BS-59099

\*) Control leads 2 x 2 m (6.5 ft), Transport case.  
Mains cable

### Item Cat. No.

#### Cable set

2 x 3 m, 25 mm<sup>2</sup>, female/clamp. 110 A. 3.0 kg (6.6 lbs) GA-00550

#### Extension cable

Extension for GA-00550, 2x3 m, 25 mm<sup>2</sup>, male/female GA-00552

#### Cable set

2x3m, 50 mm<sup>2</sup>, female/clamp 220 A. 5.0 kg (11 lbs) GA-00545

#### Cable set, high rating

2 x 3 m, 70 mm<sup>2</sup>, female/fork. 270 A. 5.0 kg (11 lbs) GA-09550

#### Extension cable, high rating

Extension for GA-09550, and GA-00545, 2x3 m, 70 mm<sup>2</sup>, male/female GA-09552

#### Sensing lead set

For measuring voltage at battery terminals. 2 x 5 m (16.4 ft) GA-00210

#### DC clamp-on probe, 1000 A

To measure current in external circuit XA-12991

#### BVM

Incl. Dolphin clips, Power & signal connectors, Power supplies, Connection cables and Carrying case

**BVM150**, System of 16 BVM units CJ-59092

**BVM300**, System of 31 BVM units CJ-59093

**BVM600**, System of 61 BVM units CJ-59096

#### BVM special 600 V, System of 46 BVM units<sup>3)</sup>

Incl. Dolphin clips, Power & signal connectors, Opto couplers, Power supplies, Connection cables and Carrying case. CJ-59198

#### BVM, Single unit

Incl. Control cable black RJ45 0.5m (1.6 ft) CJ-59090

#### Extension cable

Extension lead for connecting BVM unit to battery, 0.5 m (1.6 ft) 04-30050

3) The TORHEL 950 can handle a maximum of 500 V. Battery systems over 500 V and up to 600 V can be tested with BVM and PowerDB application on a computer.

1) Transport case **Standard**, GD-00954

Size: 670 x 400 x 510 mm, (26.4 x 15.7 x 20.1")

2) Transport case **Large**, GD-00955

Size: 795 x 400 x 510 mm, (31.3 x 15.7 x 20.1")

