

TOR KEL 900-series Battery Load Unit



- 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

DESCRIPTION

The TOR KEL™ 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 TOR KEL 900, it becomes a complete, stand-alone, discharge test system.

TOR KEL comes in three models, 910, 930 and 950, see table below.

The high discharge capacity of TOR KEL 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 TOR KEL 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, TOR KEL measures the total battery current while regulating it at a constant level. Battery systems can be plus or minus grounded or free floating.

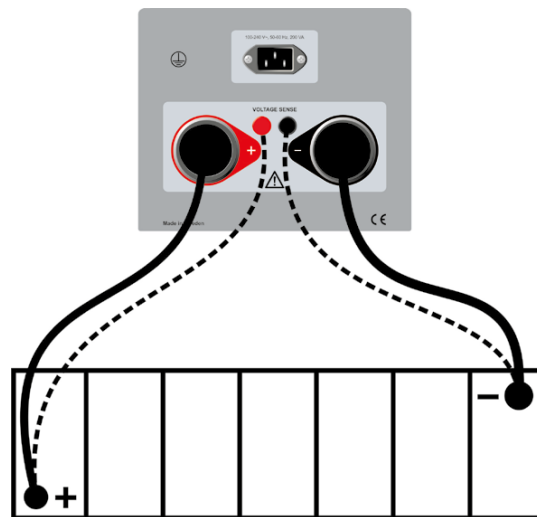
The test results can be presented and edited on a PC using the included PC software "TOR KEL Viewer".

MODEL OVERVIEW

TOR KEL	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

APPLICATION EXAMPLE

The TOR KEL is connected to battery, the current and the voltage alarm levels are set. After starting the discharge, TOR KEL keeps the current constant at the preset level. When the voltage drops to a level slightly above the final voltage, TOR KEL issues an alarm. If the voltage drops so low that there is a risk for deep discharging the battery, TOR KEL shuts down the test. If the power supply is interrupted the test will continue when power is restored. All values are stored in TOR KEL and can easily be transferred via an USB-stick or ethernet cable to a PC for evaluation and print out.

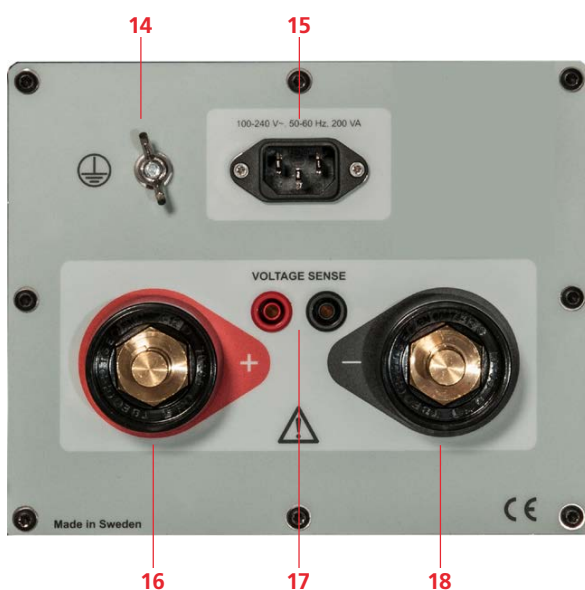



Separate sensing cables (dashed lines) should be used to get accurate voltage measurements to offset the voltage drop caused by long current cables and/or high current.

TOR KEL 900-series Battery Load Unit

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. **I_{EXT} ≤ 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 clockwise
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).

TOR KEL 900-series Battery Load Unit

SPECIFICATIONS TOR KEL 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

TOR KEL 910 0 to 110 A

TOR KEL 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

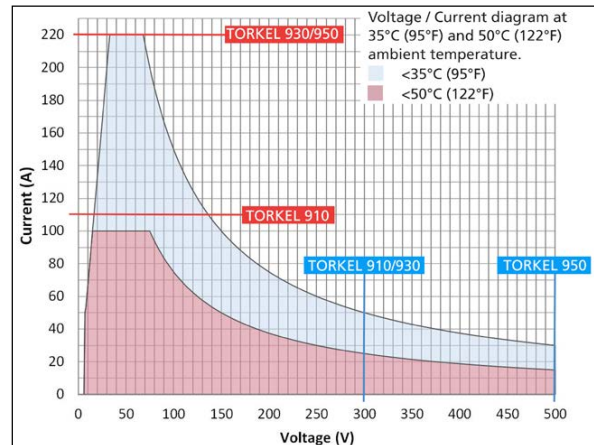
Inaccuracy ±0.1% of reading ±1 digit

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

TOR KEL 910 0 to 110.0 A

TOR KEL 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 V¹⁾ 7.5 to 500 V²⁾

- 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) TOR KEL 910 and 930 2) TOR KEL 950

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

TOR KEL 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 210 x 353 x 600 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.
TXL830	28 V	300 A	8.3 kW
TXL850	56 V	300 A	16.4 kW
TXL865	260 V (98 A max)	117 A	25.5 kW
TXL870	280 V (56 A max)	112 A	15.8 kW
TXL890	480 V (32 A max)	62 A	15.4 kW

Internal resistance, 3-position selector

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

Maximal currents, 3-position selector¹⁾

Position 1

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

Position 2

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

Position 3

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

1) The data examples apply to lead batteries.

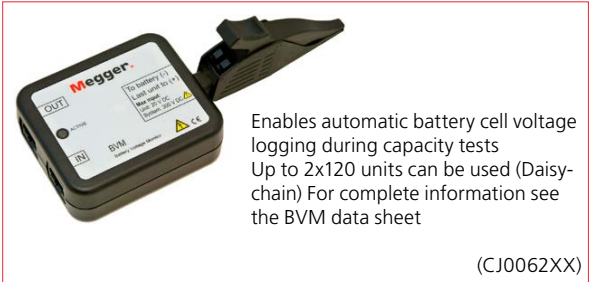
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OPTIONAL ACCESSORIES

Extra loads



BVM - Battery Voltage Monitoring



Sensing leads



Clamp-on-probe



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.

Cable set Torkel 930/950



Extension cables

TORKEK 900-series Battery Load Unit

INCLUDED ACCESSORIES – TORKEK 910

Cable set



Ground Cable

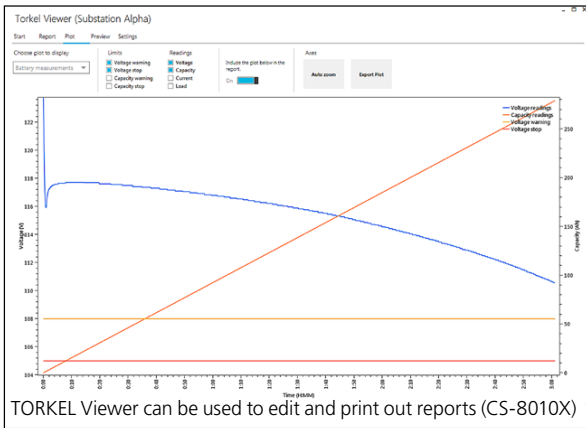


INCLUDED ACCESSORIES – TORKEK 930/950

Cable set



TORKEK Viewer



TORKEK Viewer is a free software, download at www.megger.com (search "TORKEK900" and submenu "Software"). Open the file and follow the instructions.

Please note that TORKEK Viewer can only be used with TORKEK930 and TORKEK950.

For TORKEK910, TORKEK 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.
TORKEL 910	
Incl. transport case Standard ¹⁾ and accessories:	
Mains cable	
Cable set, 2 x 3 m, 25 mm ²	GA-00550
Soft case for cables	2012-180
	CS-19190
Incl. transport case Large ²⁾ and accessories:	
Mains cable	
Cable set, 2 x 3 m, 25 mm ²	GA-00550
	CS-19191
TORKEL 930	
Incl. transport case Standard ¹⁾ and accessories:	
Mains cable	
Cable set, 2 x 3 m, 70 mm ²	GA-09550
Soft case for cables	2012-180
TORKEL Viewer	CS-8010X
USB memory stick	HF-10020
	CS-19390
Incl. transport case Large ²⁾ and accessories:	
Mains cable	
Cable set, 2 x 3 m, 70 mm ²	GA-09550
TORKEL Viewer	CS-8010X
USB memory stick	HF-10020
	CS-19391
TORKEL 950	
Incl. transport case Standard ¹⁾ and accessories:	
Mains cable	
Cable set, 2 x 3 m, 70 mm ²	GA-09550
Soft case for cables	2012-180
TORKEL Viewer	CS-8010X
USB memory stick	HF-10020
	CS-19590
Incl. transport case Large ²⁾ and accessories:	
Mains cable	
Cable set, 2 x 3 m, 70 mm ²	GA-09550
TORKEL Viewer	CS-8010X
USB memory stick	HF-10020
	CS-19591
Included in all models above:	
Ground cable, 5 m (16 ft) 2.5 mm ²	GC-30060
Optional accessories	
Transport case Standard , for TORKEL (no cables)	GD-00954
Transport case Large for TORKEL and standard cables	GD-00955
TXL830 Extra load	
Incl. Cable set GA-09550, 2x3 m 70 m ² *)	BS-59093
TXL850 Extra load	
Incl. Cable set GA-09550, 2x3 m 70 m ² *)	BS-59095
TXL865 Extra load	
Incl. Cable set GA-00550, 2x3 m 25 m ² *)	BS-59096
TXL870 Extra load	
Incl. Cable set GA-00550, 2x3 m 25 m ² *)	BS-59097
TXL890 Extra load	
Incl. Cable set GA-00550, 2x3 m 25 m ² *)	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 ² , female/clamp. 110 A. 3.0 kg (6.6 lbs)	GA-00550
Extension cable	
Extension for GA-00550, 2x3 m, 25 mm ² , male/female	GA-00552
Cable set	
2x3m, 50 mm ² , female/clamp 220 A. 5.0 kg (11 lbs)	GA-00545
Cable set, high rating	
2 x 3 m, 70 mm ² , female/fork. 270 A. 5.0 kg (11 lbs)	GA-09550
Extension cable, high rating	
Extension for GA-09550, and GA-00545, 2 x 3 m, 70 mm ² , 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 ³⁾	
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 TORKEL 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")



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