

TORKEL 900-series

Battery Load Unit

Megger[®]



- 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 TORKEL™ 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 TORKEL 900, it becomes a complete, stand-alone, discharge test system.

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

The high discharge capacity of TORKEL 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 TORKEL 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, TORKEL 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 "TORKEL Viewer".

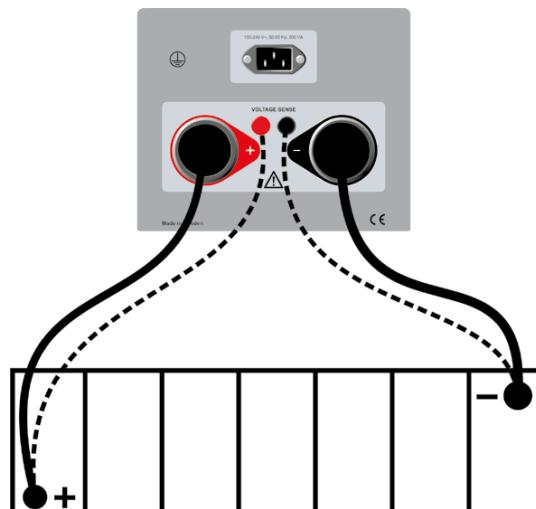
MODEL OVERVIEW

TORKEL	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 TORKEL is connected to battery, the current and the voltage alarm levels are set. After starting the discharge, TORKEL keeps the current constant at the preset level. When the voltage drops to a level slightly above the final voltage, TORKEL issues an alarm. If the voltage drops so low that there is a risk for deep discharging the battery, TORKEL shuts down the test. If the power supply is interrupted the test will continue when power is restored.

All values are stored in TORKEL 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.

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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



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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 >10mV

Time measurement

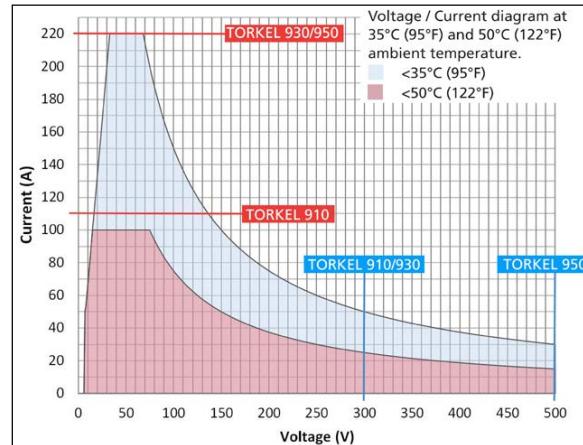
Inaccuracy ±0.1% of reading ±1 digit

Load section

Battery voltage 7.5 V3) to 300 V1) / 500 V2)

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 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, 28VDC, 8A, 250VAC, 8A

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

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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	210x353x600 mm (8.3" x 13.9" x 23.6")
Instrument	710 x 310 x 520 (28" x 12.2" x 20.5")
Transport case	Instrument 13 kg (29 lbs) 21,4 kg (47 lbs) with transport case
Weight	

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	100 A	27.6 V	12	2.3 V
	78.5 A	21.6 V	12	1.8 V
TXL850	100 A	55.2 V	24	2.3 V
	78.5 A	43.2 V	24	1.8 V
TXL865	93.7 A	248.4 V	108	2.3 V
	73.4 A	194.4 V	108	1.8 V
TXL870	50.1 A	248.4 V	108	2.3 V
	39.2 A	194.4 V	108	1.8 V
TXL890	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	200 A	27.6 V	12	2.3 V
	156 A	21.6 V	12	1.8 V
TXL850	200 A	55.2 V	24	2.3 V
	156 A	43.2 V	24	1.8 V
TXL865	49.2 A	248.4 V	108	2.3 V
	38.5 A	194.4 V	108	1.8 V
TXL870	50.1 A	124.2 V	54	2.3 V
	39.2 A	97.2 V	54	1.8 V
TXL890	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	300 A	27.6 V	12	2.3 V
	235 A	21.6 V	12	1.8 V
TXL850	300 A	55.2 V	24	2.3 V
	235 A	43.2 V	24	1.8 V
TXL865	115 A	13.8 V	6	2.3 V
	90 A	10.8 V	6	1.8 V
TXL870	100 A	124.2 V	54	2.3 V
	74.8 A	97.2 V	54	1.8 V
TXL890	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



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 TORKEL 800 / 900-series. For BVM and TORKEL 800 series it works for controlling, data management and report handling. For TORKEL 900-series only for data management and reporting.

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INCLUDED ACCESSORIES – TORKEL 910

Cable set



Cable set (GA-00550)

Ground Cable



Ground Cable (GC-30060)

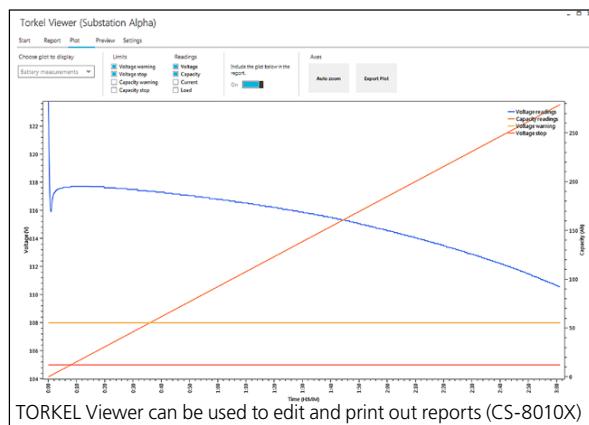
INCLUDED ACCESSORIES – TORKEL 930/950

Cable set



Cable set (GA-09550)

TORKEL Viewer



TORKEL Viewer can be used to edit and print out reports (CS-8010X)

TORKEL Viewer is a free software, download at www.megger.com

(search "TORKEL900" and submenu "Software").

Open the file and follow the instructions.

Please note that TORKEL Viewer can only be used with TORKEL930 and TORKEL950.

For TORKEL910, TORKEL 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.	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		
Cable set		
2x3 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, 2x3m, 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**, Size: 670x400x510 mm, (26.4x15.7x20.1")

2) Transport case **Large**, Size: 795x400x510 mm, (31.3x15.7x20.1")



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