

TORCEL 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
- BVM cell monitor control integrated in the system

DESCRIPTION

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

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

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

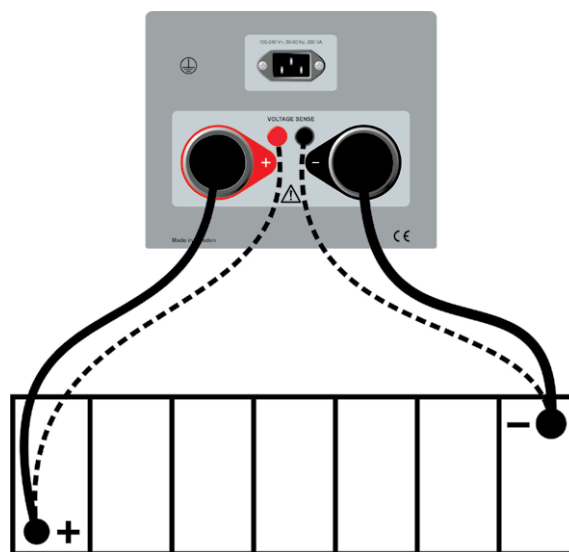
The test results can be presented and edited on a PC using the included PC software "TORCEL Viewer".

MODEL OVERVIEW

TORCEL	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

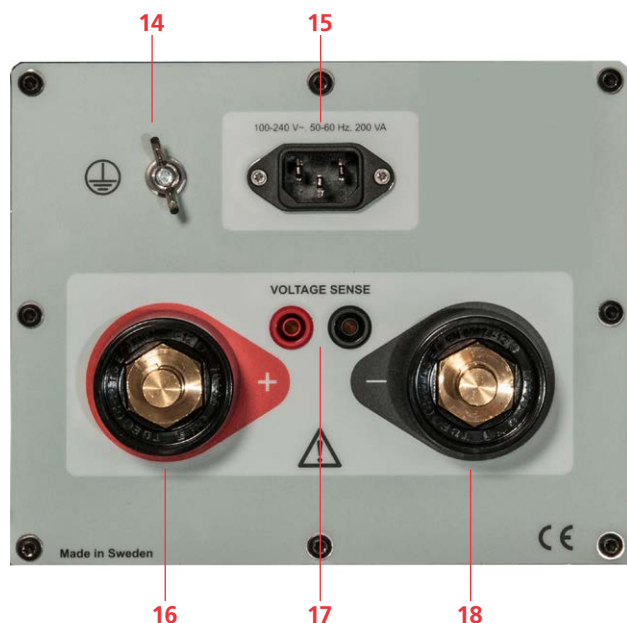
The TORCEL is connected to battery, the current and the voltage alarm levels are set. After starting the discharge, TORCEL keeps the current constant at the preset level. When the voltage drops to a level slightly above the final voltage, TORCEL issues an alarm. If the voltage drops so low that there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

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 ≤ 1V**
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 service of the instrument.
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).

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 IEC61010-1:2010 & IEC61010-2-030

EMC IEC61326-1

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
 37 kg (82 lbs) incl. large transport case

Display 7" LCD, Capacitive touch screen

Available languages English, French, German, Spanish, Swedish

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

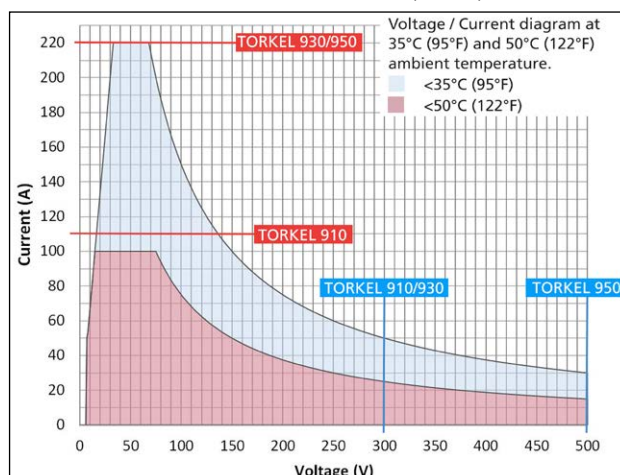
Inaccuracy ±0.1% of reading ±1 digit

Load section

Battery voltage 7.5 V 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 V DC, 0.28 A, 28 V DC, 8 A, 250 V AC, 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

SERVICE For service of the instrument

1) TORKEl 910 and 930

2) TORKEl 950

OPTIONAL ACCESSORIES

Extra loads



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

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 IEC61010-1:2010

EMC IEC61326-1

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 265x460x750 mm (10.4" x 18.1" x 29.5")

Weight 13 kg (29 lbs) 21.4 kg (47 lbs) with transport case

Cable sets

for TXL830/850 2 x 3 m (9.8 ft), 70 mm², 270 A, with female plug/clamp. Max. 100 V. 5 kg (11 lbs)

for TXL865/870/890 2 x 3 m (9.8 ft), 25 mm², 110 A, with female plug/lug. Max. 480 V. 3 kg (6.6 lbs)

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
28 V max	78.5 A	21.6 V	12	1.8 V
TXL850	100 A	55.2 V	24	2.3 V
56 V max	78.5 A	43.2 V	24	1.8 V
TXL865	93.7 A	248.4 V	108	2.3 V
260 V max	73.4 A	194.4 V	108	1.8 V
TXL870	50.1 A	248.4 V	108	2.3 V
280 V max	39.2 A	194.4 V	108	1.8 V
TXL890	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
TXL830	200 A	27.6 V	12	2.3 V
28 V max	156 A	21.6 V	12	1.8 V
TXL850	200 A	55.2 V	24	2.3 V
56 V max	156 A	43.2 V	24	1.8 V
TXL865	49.2 A	248.4 V	108	2.3 V
260 V max	38.5 A	194.4 V	108	1.8 V
TXL870	50.1 A	124.2 V	54	2.3 V
280 V max	39.2 A	97.2 V	54	1.8 V
TXL890	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
TXL830	300 A	27.6 V	12	2.3 V
28 V max	235 A	21.6 V	12	1.8 V
TXL850	300 A	55.2 V	24	2.3 V
56 V max	235 A	43.2 V	24	1.8 V
TXL865	115 A	13.8 V	6	2.3 V
14 V max	90 A	10.8 V	6	1.8 V
TXL870	100 A	124.2 V	54	2.3 V
140 V max	74.8 A	97.2 V	54	1.8 V
TXL890	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.

OPTIONAL ACCESSORIES

BVM - Battery Voltage Monitoring



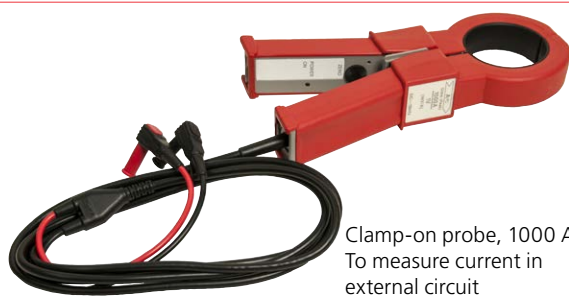
Enables automatic battery cell voltage logging during capacity tests
Up to 2x120 units can be used (Daisy-chain)
For complete information see the BVM data sheet

Sensing leads



Sensing lead set (GA-00210)

Clamp-on-probe



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

Extension cables



Extension cable set (GA-00552)



Extension cable set, high rating (GA-09552)

INCLUDED ACCESSORIES – TORKEL 910

Cable set



Cable set (GA-00550)

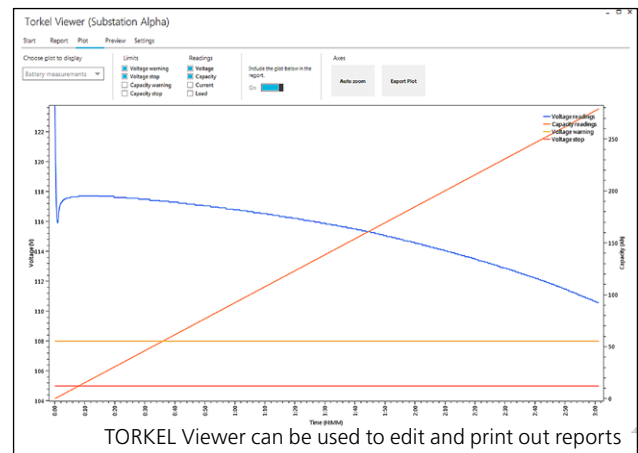
INCLUDED ACCESSORIES – TORKEL 930/950

Cable set



Cable set (GA-09550)

TORKEL Viewer



ORDERING INFORMATION

Item	Art. No.	Item	Art. No.
TORHEL 910		Cable set	
Incl. transport case Standard ¹⁾ and accessories:		2 x 3 m, 25 mm ² , female/clamp. 110 A. 3.0 kg (6.6 lbs) GA-00550	
Mains cable		Extension cable	
Cable set, 2 x 3 m, 25 mm ²	GA-00550	Extension for GA-00550, 2 x 3 m, 25 mm ² , male/female GA-00552	
Soft case for cables	GD-00360	Cable set, high rating	
	CS-19190	2 x 3 m, 70 mm ² , female/fork. 270 A. 5.0 kg (11 lbs) GA-09550	
Incl. transport case Large ²⁾ and accessories:		Extension cable, high rating	
Mains cable		Extension for GA-09550, 2 x 3 m, 70 mm ² , male/female GA-09552	
Cable set, 2 x 3 m, 25 mm ²	GA-00550	Sensing lead set	
	CS-19191	For measuring voltage at battery terminals. 2 x 5 m (16.4 ft) GA-00210	
TORHEL 930		DC clamp-on probe, 1000 A	
Incl. transport case Standard ¹⁾ and accessories:		To measure current in external circuit XA-12991	
Mains cable		BVM	
Cable set, 2 x 3 m, 70 mm ²	GA-09550	Incl. Dolphin clips, Power & signal connectors, Power supplies, Connection cables and Carrying case	
Soft case for cables	GD-00360	BVM150 , System of 16 BVM units CJ-59092	
TORHEL Viewer	CS-8010X	BVM300 , System of 31 BVM units CJ-59093	
USB memory stick	HF-10020	BVM600 , System of 61 BVM units CJ-59096	
	CS-19390	BVM special 600 V , System of 46 BVM units ³⁾	
Incl. transport case Large ²⁾ and accessories:		Incl. Dolphin clips, Power & signal connectors, Opto couplers, Power supplies, Connection cables and Carrying case. CJ-59198	
Mains cable		BVM, Single unit	
Cable set, 2 x 3 m, 70 mm ²	GA-09550	Incl. Control cable black RJ45 0.5 m (1.6 ft) CJ-59090	
TORHEL Viewer	CS-8010X	Extension cable	
USB memory stick	HF-10020	Extension lead for connecting BVM unit to battery, 0.5 m (1.6 ft) 04-30050	
	CS-19391	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 TORHEL Win application on a computer.	
TORHEL 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	GD-00360		
TORHEL 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		
TORHEL Viewer	CS-8010X		
USB memory stick	HF-10020		
	CS-19591		
Optional accessories			
Transport case Large for TORHEL and standard cables GD-00955			
TXL830 Extra load			
Incl. Cable set GA-09550, Control cables 2 x 2 m, Transport case GD-00055 BS-59093			
TXL850 Extra load			
Incl. Cable set GA-09550, Control cables 2 x 2 m, Transport case GD-00055 BS-59095			
TXL865 Extra load			
Incl. Cable set GA-09550, Control cables 2 x 2 m, Transport case GD-00055 BS-59096			
TXL870 Extra load			
Incl. Cable set GA-00550, Control cables 2 x 2 m, Transport case GD-00055 BS-59097			
TXL890 Extra load			
Incl. Cable set GA-00550, Control cables 2 x 2 m, Transport case GD-00055 BS-59099			

1) Transport case **Standard**, GD-00954
 Size: 670 x 400 x 510 mm, (26.4 x 15.7 x 20.1")
 Weight incl. TORHEL (no cables) 31.9 kg (70 lbs)



2) Transport case **Large**, GD-00955, with space for cable set GA-00550
 Size: 795 x 400 x 510 mm, (31.3 x 15.7 x 20.1")
 Weight incl. TORHEL and cables 35 kg (77 lbs).

SWEDEN

Megger Sweden AB
 Box 724
 SE-182 17 Danderyd
 SWEDEN
 T. +46 8 510 195 00
 F. +46 8 510 195 95
 E. seinfo@megger.com

TORHEL900-series_DS_en_V06a

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