TORKEL 820
Battery Load Unit

- **Lightweight**
- **Expandable system**
- **Rugged and reliable for field use**
- **Test without disconnecting the battery from the equipment it serves**

Description

During a power outage, crucial telecommunication and radio equipment must be kept operating by batteries. However, the capacity of such batteries can drop significantly for a number of reasons before their calculated life expectancy is reached. Battery capacity should thus be checked to prevent expensive downtime in the event of a power failure.

The most reliable way to determine battery capacity is to conduct a discharge test. The TORKEL™820 features a unique design that combines efficiency with portability. Using TORKEL 820 you can discharge 24 and 48 V batteries at a current of 270 A, and 12 V batteries at 135 A. Moreover, two or more TORKEL 820 units and/or extra load units, TXL, can be linked together if you need higher current. Discharging proceeds at constant current, constant power or constant resistance, or in accordance with a pre-selected load profile.

The TORKEL 820 issues a warning and/or shuts down the test automatically when a) the voltage has dropped to a certain level, b) discharging has continued through a certain time interval or c) a certain amount of capacity has been dissipated.

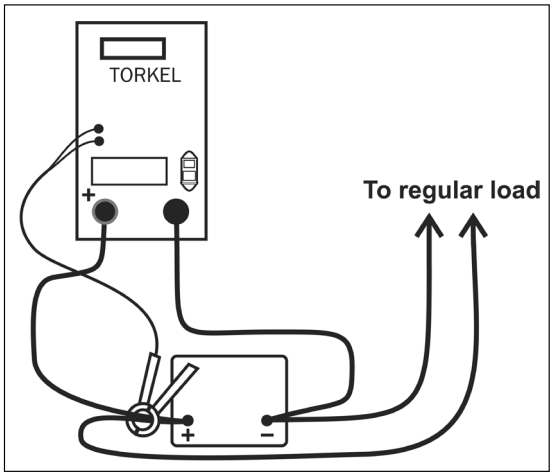
Features and benefits

1. **Display**
2. **External measurement input** used to measure current in an external path by means of a clamp-on ammeter or a current shunt.
3. **Keys** for operation and settings.
4. **Alarm output** equipped with a relay contact for triggering an external alarm device.
5. **Start/Stop input** used for starting and stopping discharging from an external device. Galvanically isolated.
6. **Indicating lamps**. Operating, Stop/Limit
7. **TXL output** used for control of TXL Extra Loads. Galvanically isolated.
8. **Serial port** used for connection to a PC or other controlling equipment.
9. **Voltage controlled circuit breaker** that connects / disconnects the loading circuits in TORKEL from the battery.
10. **Positive current connection** for battery being tested.
11. **Input for sensing voltage** at the battery terminals.
12. **Negative current connection** for battery being tested.
13. **Mains connector,** equipped with ON/OFF switch.

Application example

Testing can be carried out without disconnecting the battery from the equipment it serves. Via a DC clamp-on ammeter, TORKEL 820 measures total battery current while regulating it at a constant level.

The TORKEL 820 is connected to battery, the current and the voltage alarm level are set. After starting the discharge TORKEL 820 keeps the current constant at the preset level. When the voltage drops to a level slightly above the final voltage, TORKEL 820 issues an alarm. If the voltage drops so low that there is a risk for deep discharging the battery, TORKEL shuts down the test. The total voltage curve and the readings taken at the end of the test are stored in TORKEL 820. Later, using the TORKEL Win program, you can transfer these readings to your computer for storage, printout or export. If your PC is connected to TORKEL 820 during the test, TORKEL Win builds up a voltage curve on the screen in real time and displays the current, voltage and capacity readings. You can also control the test using TORKEL Win.



Specifications TORKEL 820

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	2006/95/EC
EMC	2004/108/EC

General

Mains voltage	100 – 240 V AC, 50/60 Hz
Power consumption	150 W (max)
Protection	Thermal cut-outs, automatic overload protection
Dimensions	
Instrument	210 x 353 x 700 mm (8.3" x 13.9" x 27.6")
Transport case	265 x 460 x 750 mm (10.4" x 18.1" x 29.5")
Weight	22.3 kg (49.2 lbs) 40.4 kg (89.1 lbs) with accessories and transport case
Display	LCD
Available languages	English, French, German, Spanish, Swedish

Measurement section

Current measurement

Display range	0.0 – 2999 A
Basic inaccuracy	±(0.5% of reading +0.2 A)
Resolution	0.1 A

Internal current measurement

Range	0 – 270 A

Input for clamp-on ammeter

Range	0 – 1 V
mV/A-ratio	Software settable, 0.3 to 19.9 mV/A
Input impedance	>1 MΩ

Voltage measurement

Display range 0.0 – 60 V	
Basic inaccuracy	±(0.5% of reading +0.1 V)
Resolution	0.1 V

Time measurement

Basic inaccuracy	±0.1% of reading ±1 digit

Load section

Battery voltage	10 – 60 V DC
Max. current	270 A
Max. power	15 kW
Load patterns	Constant current, constant power, constant resistance, current or power profile
Current setting	0-270.0 A (2999.9 A) [1]
Power setting	0-15.00 kW (299.99 kW) [1]
Resistance setting	0.1-2999.8 Ω
Battery voltage range	2 ranges, selected automatically at start of test
Stabilization (For internal current measurement)	±(0.5% of reading + 0.5 A)

	Battery voltage	Highest permissible current	Resistor element (Nominal values)
Range 1	10 – 27.6 V	270 A	0.069 Ω
Range 2	10 – 55.2 V	270 A	0.138 Ω

1) Maximum value for a system with more than one load unit

Inputs, maximal values

EXTERNAL CURRENT MEASUREMENT EXTERNAL CURRENT	1 V DC, 300 V DC to ground. Current shunt should be connected to the negative side of the battery
START/STOP	Closing/opening contact Closing and then opening the contact will start/stop Torkel. It is not possible to keep the contacts in closed position.
Delay until start	200 – 300 ms
Stop delay	100 – 200 ms
Battery	60 V DC, 500 V DC to ground
VOLTAGE SENSE	60 V DC, 500 V DC to ground
SERIAL	< 15 V
ALARM	250 V DC 0.28 A 28 V DC 8 A 250 V AC 8 A

Outputs, maximal values

START/STOP	5 V, 6 mA
TXL	Relay contact
SERIAL	< 15 V
ALARM	Relay contact

Discharging capacity, examples

Final voltage	Constant current	Constant power
12 V battery (6 cells) [2]		
1.80 V/cell (10.8 V)	0 – 121 A	0 – 1.31 kW
1.75 V/cell (10.5 V)	0 – 117 A	0 – 1.23 kW
1.67 V/cell (10.0 V)	0 – 110 A	0 – 1.10 kW
24 V battery (12 cells) [2]		
1.80 V/cell (21.6 V)	0 – 270 A	0 – 5.8 kW
1.75 V/cell (21.0 V)	0 – 266 A	0 – 5.59 kW
1.60 V/cell (19.2 V)	0 – 241 A	0 – 4.63 kW
48 V battery (24 cells) [2]		
1.80 V/cell (43.2 V)	0 – 270 A	0 – 11.6 kW
1.75 V/cell (42.0 V)	0 – 270 A	0 – 11.3 kW
1.60 V/cell (38.4 V)	0 – 259 A	0 – 9,9 kW

2) 2.15 V per cell when test starts

Optional accessories

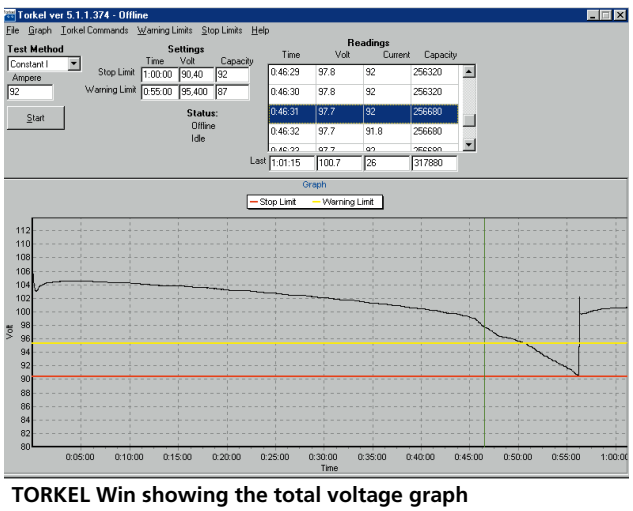
TXL

These resistive extra loads do not perform any regulating functions. They are designed for use together with TORKEL Battery Load Units. Their purpose is to provide higher load currents for use in constant current or constant power tests. Together, TORKEL and the TXL Extra Loads form a system that can discharge batteries with currents of up to several kA. TXL Extra Loads are connected directly to the battery, and TORKEL measures the total current using a clamp-on ammeter.
TXL Extra Loads are shut down automatically when TORKEL is stopped.

TXL850

TORKEL Win PC software

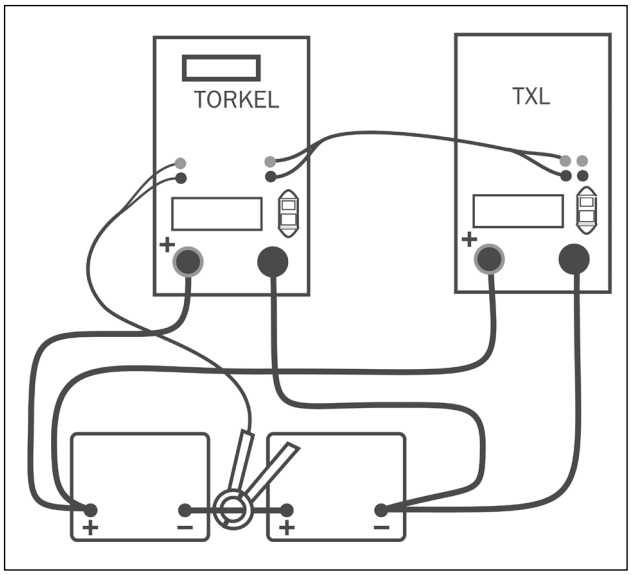
- Shows the complete voltage curve
- Last recorded time, voltage, current and discharged capacity
- Scroll-window for all recorded values
- Remote control of TORKEL
- Report functions



TORKEL Win showing the total voltage graph

Application examples with TORKEL/TXL systems

TORKEL and TXL can be combined into systems to match up for different battery capacities. Here is an example.



TORKEL and the extra load TXL

TORKEL / TXL - systems examples

Max. constant current (A)	Number of TORKEL-units	Number of TXL-units
TORKEL 820 + TXL830, 12 V battery (6 cells)[1]		
234	1	1
571	1	4
918	2	6
TORKEL 820 + TXL830, 24 V battery (12 cells)[1]		
495	1	1
1170	1	4
1890	2	6
TORKEL 820 + TXL850, 48 V battery (24 cells)[1]		
499	1	1
1189	1	4
1918	2	6

1) Discharge from 2.15 V to 1.8 V per cell

Specifications TXL830/850

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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	2006/95/EC
EMC	2004/108/EC

General

Mains voltage	100 – 240 V AC, 50/60 Hz
Power consumption	75 W (max)
Protection	Thermal cut-outs, automatic over-load protection
Dimensions	
Instrument	210 x 353 x 600 mm (8.3" x 13.9" x 23.6")
Transport case	265 x 460 x 750 mm (10.4" x 18.1" x 29.5")
Weight	13 kg (28.7 lbs) 21.4 kg (47.2 lbs) with transport case
Cable sets	
for TXL830/850	2 x 3 m (9.8 ft), 70 mm², 270 A, with cable lug. Max. 100 V. 5 kg (11 lbs)

Load section

	TXL830	**TXL850**
Max. voltage (DC)	28 V	56 V
Max. current	300 A	300 A
Max. power	8.3 kW	16.4 kW
Internal resistance, 3-position selector		
Position 1	**TXL830**	**TXL850**
Current	0.275 Ω	0.55 Ω
100 A	at 27.6 V (12 x 2.3 V)	at 55.2 V (24 x 2.3 V)
78.5 A	at 21.6 V (12 x 1.8 V)	at 43.2 V (24 x 1.8 V)
50.1 A	–	–
39.2 A	–	–
Position 2	**TXL830**	**TXL850**
Current	0.138 Ω	0.275 Ω
200 A	at 27.6 V	at 55.2 V (24 x 2.3 V)
156 A	at 21.6 V	43.2 V (24 x 1.8 V)–
Position 3	**TXL830**	**TXL850**
Current	0.092 Ω	0.184 Ω
300 A	at 27.6 V	at 55.2 V (24 x 2.3 V)
235 A	at 21.6 V	43.2 A (24 x 1.8 V)
100 A	–	–
78.4 A	–	–

Cable set, GA-00554

Ordering information

Item	Art. No.
TORKEL 820	
Complete with: Cable set GA-00554 Transport case GD-00054	BS-49092
Optional	
TORKEL Win PC software	BS-8208X
Extra loads	
TXL830	BS-59093
TXL850	BS-59095
Cable sets	
Cable set for TXL830 and TXL850 2 x 3 m, 70 mm², with cable lug. Max 100 V 270 A. Weight: 5.0 kg (11 lbs)	GA-00554
Sensing lead set Cable set for measuring voltage at battery terminals. 2 x 5 m (16.4 ft)	GA-00210
Clamp-on ammeters	
DC clamp-on ammeter, 200 A To measure current in circuit outside TORKEL	XA-12792
DC clamp-on ammeter, 1000 A To measure current in circuit outside TORKEL	XA-12790

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