



TORKELE 820™

Battery Load Unit
Programma® Products

TORKEL 820™ – Telecom



Battery Load Unit

During a power outage, crucial telecommunication and radio equipment must be kept operating by batteries. Unfortunately, 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 TORTEL 820™ Battery Load Unit features a unique design that combines efficiency with portability. Using TORTEL 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 TORTEL 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.

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.

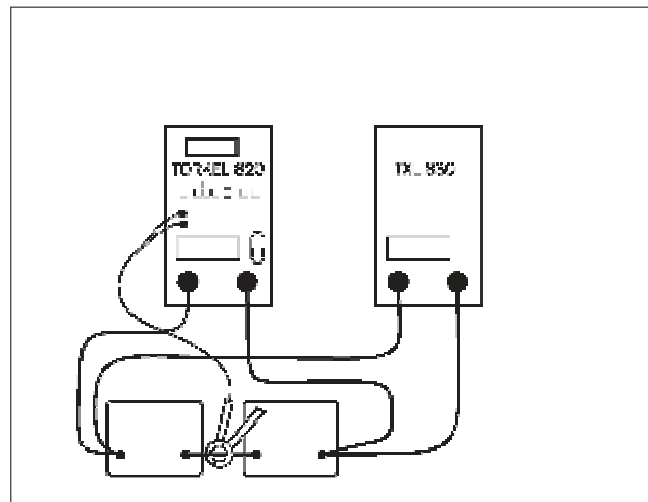
Application example

IMPORTANT!

Read the User's manual before using the instrument.

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

1. Connect TORQUEL 820 to battery.
2. Set the current and start discharging. TORQUEL 820 keeps the current constant at the preset level.
3. When the voltage drops to a level slightly above the final voltage, TORQUEL 820 issues an alarm.
4. If the voltage drops low enough so that there is risk of deepdischarging the battery, TORQUEL 820 shuts down the test. The total voltage curve and the readings taken at the end of the test are stored in TORQUEL 820. Later, using the TORQUEL Win program which runs on a PC under Windows®, you can transfer these readings to your computer for storage, printout or export. If your PC is connected to TORQUEL 820 during the test, TORQUEL 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 TORQUEL Win.



TORQUEL 820 and the extra load TXL 830

Specifications TORDEL 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

<i>Application field</i>	The instrument is intended for use in high-voltage substations and industrial environments.
<i>Temperature</i>	
<i>Operating</i>	0 °C to +40 °C (32 °F to +104 °F)
<i>Storage & transport</i>	-40 °C to +70 °C (-40 °F to +158 °F)
<i>Humidity</i>	5% – 95% RH, non-condensing

CE-marking

<i>LVD</i>	Low Voltage Directive 73/23/ EEC am. by 93/68/EEC
<i>EMC</i>	EMC Directive 89/336/EEC am. by 91/263/EEC, 92/31/EEC and 93/68/EEC

Standards

<i>Safety standards</i>	IEC 61010-1:2001 Incl. national dev. for US and CA EN 61010-1:2001
<i>EMC standards</i>	EN 61326: 1997+A1:1998+A2:2001

General

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

Measurement section

Current measurement

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

Internal current measurement

<i>Range</i>	0 – 270 A
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Input for clamp-on ammeter

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

Voltage measurement

Display range 0.0 – 60 V

<i>Basic inaccuracy</i>	±(0.5% of reading +0.1 V)
<i>Resolution</i>	0.1 V

Display range 0.0 – 500 V

<i>Basic inaccuracy</i>	±(0.5% of reading +1 V)
<i>Resolution</i>	0.1 V

Time measurement

<i>Basic inaccuracy</i>	±0.1% of reading ±1 digit
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Load section

<i>Battery voltage</i>	10 – 60 V DC
<i>Max. current</i>	270 A
<i>Max. power</i>	15 kW
<i>Load patterns</i>	Constant current, constant power, constant resistance, current or power profile
<i>Current setting</i>	0-270.0 A (2999.9 A) ¹⁾
<i>Power setting</i>	0-15.00 kW (299.99 kW) ¹⁾
<i>Resistance setting</i>	0.1-2999.8 Ω
<i>Battery voltage range</i>	2 ranges, selected automatically at start of test
<i>Stabilization (For internal current measurement)</i>	±(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	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.
<i>Delay until start</i>	200 – 300 ms
<i>Stop delay</i>	100 – 200 ms
<i>Battery</i>	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

12 V battery (6 cells) ²⁾

<i>Final voltage</i>	<i>Constant current</i>	<i>Constant power</i>
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



Cable set, GA-00554

Ordering information

TORKEL 820

Complete with:
Cable set GA-00554
Transport case GD-00054

Art.No.

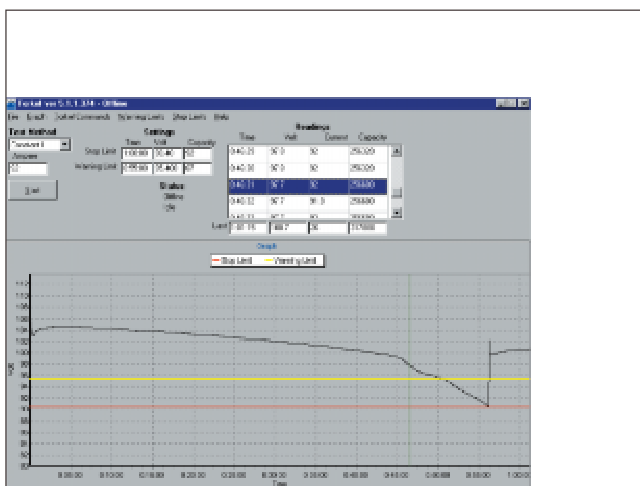
BS-49092

Optional accessories

See section "Battery Testing Accessories"

Battery testing accessories

Item	Description	TORTEL 820	TORTEL 840/860	Art. No.
TORTEL Win	PC software <ul style="list-style-type: none"> Shows the complete voltage curve Last recorded time, voltage, current and discharged capacity Scroll-window for all recorded values Remote control of TORTEL Report functions 			
<i>TORTEL Win</i>		X	X	BS-8208X
TXL units	Extra loads These resistive extra loads do not perform any regulating functions. They are designed for use together with TORTEL Battery Load Units. Their purpose is to provide higher load currents for use in constant current or constant power tests. Together, TORTEL 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 TORTEL measures the total current using a clamp-on ammeter. TXL Extra Loads are shut down automatically when TORTEL is stopped.			
<i>TXL830</i>	TXL830 is intended for 24 V systems. Complete with cable set GA-00554 and transport case GD-00054. A DC clamp-on ammeter must be used to enable TORTEL 820 to measure the total current.	X		BS-59093
<i>TXL850</i>	TXL850 is intended for 48 V systems. Complete with cable set GA-00554 and transport case GD-00054. A DC clamp-on ammeter must be used to enable TORTEL 850 to measure the total current.	X	X	BS-59095
<i>TXL870</i>	TXL870 is intended primarily for 125 and 240 V battery systems. Complete with cable set GA-00550 and transport case GD-00054. A DC clamp-on ammeter must be used to enable TORTEL 870 to measure the total current.		X	BS-59097
Cable sets				
<i>Cable set for TXL830 and TXL850</i>	2 x 3 m, 70 mm ² , with cable lug. Max 100 V 270 A. Weight: 5.0 kg (11 lbs)	X	X	GA-00554
<i>Extension cable set, 110 A</i>	2 x 3 m, 25 mm ² . Max 480 V. Weight: 3.0 kg (6.6 lbs)		X	GA-00552
<i>Sensing lead set</i>	Cable set for measuring voltage at battery terminals. 2 x 5 m (16.4 ft)	X	X	GA-00210
Clamp-on ammeter				
<i>DC clamp-on ammeter, 200 A</i>	To measure current in circuit outside TORTEL	X	X	XA-12792
<i>DC clamp-on ammeter, 1000 A</i>	To measure current in circuit outside TORTEL	X	X	XA-12790



TORTEL Win showing total voltage curve



TXL870

Specifications TXL 830/850/870

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 Low Voltage Directive 73/23/EEC am. by 93/68/EEC

EMC EMC Directive 89/336/EEC am. by 91/263/EEC, 92/31/EEC and 93/68/EEC

General

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

Power consumption (max) 75 W

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 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)

for TXL870 2 x 3 m (9.8 ft), 25 mm², 110 A, with cable clamp/lug. Max. 480 V. 3 kg (6.6 lbs)

Load section

	<i>TXL830</i>	<i>TXL850</i>	<i>TXL870</i>
Max. voltage (DC)	28 V	56 V	140 V/280 V
Max. current	300 A	300 A	112 A at 140 V 56 A at 280 V
Max. power	8.3 kW	16.4 kW	15.8 kW

Internal resistance, 3-position selector

Position 1	<i>TXL830</i>	<i>TXL850</i>	<i>TXL870</i>
<i>Current</i>	0.275 Ω	0.55 Ω	4.95 Ω
<i>100 A</i>	at 27.6 V (12 x 2.3 V)	at 55.2 V (24 x 2.3 V)	–
<i>78.5 A</i>	at 21.6 V (12 x 1.8 V)	at 43.2 V (24 x 1.8 V)	–
<i>50.1 A</i>	–	–	at 248.4 V (108 x 2.3 V)
<i>39.2 A</i>	–	–	at 194.4 V (108 x 1.8 V)
Position 2	<i>TXL830</i>	<i>TXL850</i>	<i>TXL870</i>
<i>Current</i>	0.138 Ω	0.275 Ω	2.48 Ω
<i>200 A</i>	at 27.6 V	at 55.2 V (24 x 2.3 V)	–
<i>156 A</i>	at 21.6 V	43.2 V (24 x 1.8 V)–	–

Position 3	<i>TXL830</i>	<i>TXL850</i>	<i>TXL870</i>
<i>Current</i>	0.092 Ω	0.184 Ω	1.24 Ω
<i>300 A</i>	at 27.6 V	at 55.2 V (24 x 2.3 V)	–
<i>235 A</i>	at 21.6 V	43.2 A (24 x 1.8 V)	–
<i>100 A</i>	–	–	at 124.2 V (54 x 2.3 V)
<i>78.4 A</i>	–	–	at 97.2 V (54 x 1.8 V)

TORDEL / TXL systems – examples

TORDEL 820 + TXL830, 12 V battery (6 cells)¹⁾

<i>Max. constant current (A)</i>	<i>Number of TORDEL-units</i>	<i>Number of TXL-units</i>
234	1	1
571	1	4
918	2	6

TORDEL 820 + TXL830, 24 V battery (12 cells)¹⁾

495	1	1
1170	1	4
1890	2	6

TORDEL 820 + TXL850, 48 V battery (24 cells)¹⁾

499	1	1
1189	1	4
1918	2	6

TORDEL 840/860 + TXL830, 24 V battery (12 cells)¹⁾

670	2	2
1005	3	3

TORDEL 840/860 + TXL850, 48 V battery (24 cells)¹⁾

909	2	3
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TORDEL 840/860 + TXL870, 110 V battery (54 cells)¹⁾

188	1	1
532	2	4
845	2	8

TORDEL 840/860 + TXL870, 120 V battery (60 cells)²⁾

194	1	1
557	2	4
895	2	8

TORDEL 840/860 + TXL870, 220 V battery (108 cells)¹⁾

94	1	1
266	2	4
423	2	8

1) Discharge from 2.15 V to 1.8 V per cell

2) Discharge from 2.15 to 1.75 V per cell

Programma Electric AB
Eldarvägen 4
SE-187 75 TÅBY
Sweden

Tel +46 8 510 195 00
Fax +46 8 510 195 95
E-mail programma@ge.com
Internet www.gepower.com

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