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TORKEL 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
- Quick report
- Easily expandable for larger battery banks using TXL extra load units
- BVM cell monitor control integrated in the system

DESCRIPTION

Batteries in power plants and transformer substations must provide the equipment they serve with standby power in the event of a power failure. Unfortunately, however, the capacity of such batteries can drop significantly for a number of reasons before their calculated life expectancy is reached. This is why it is so important to check batteries at regular intervals, and the only reliable way of measuring battery capacity is to conduct a discharge test.

TORKEL™ 930 is used for battery systems ranging from 12 to 300 V – often encountered in switchgear and similar equipment. 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.

TORKEL 910 is very much the same as the TORKEL 930 but has lower charging current and some other limitations, see table below.

MODEL OVERVIEW

	TORKEL 910	TORKEL 930
Current (max)	110 A	220 A
BVM functionality	No	Yes
Charging measurement	No	Yes
Full report functionality	No	Yes

APPLICATION EXAMPLE

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

The TORKEL is connected to battery, the current and the voltage alarm level 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.

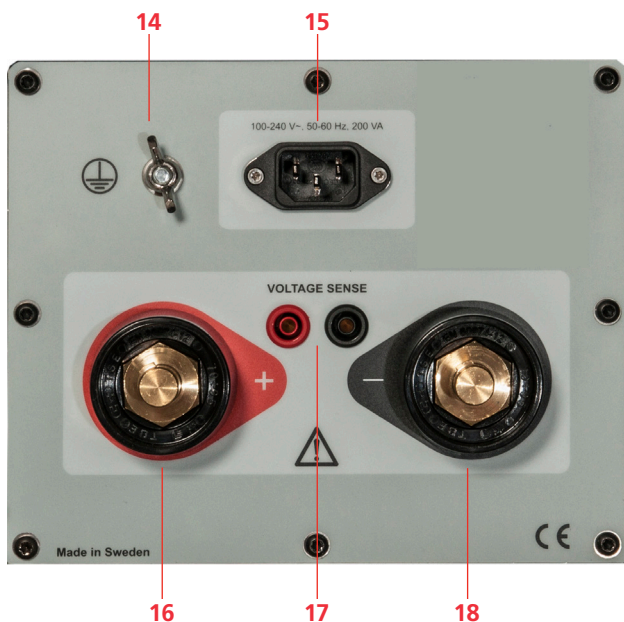
If the voltage drops so low that there is a risk for deep discharging the battery, TORKEL shuts down the test.


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 a USB-stick to a PC for evaluation and print out.

FEATURES AND BENEFITS

1. **TXL STOP**
Output used for stop discharging from an external device (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} ≤ 1V**
Input used to measure current in an external path by means of a clamp-on ammeter 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 the by turning it right
11. **Control knob**
For entering settings etc. Press to confirm a setting.
12. **Buzzer**
For alarms.
13. **ON/OFF switch**



14.  Protective 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

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.
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Temperature

<i>Operating</i>	0°C to +50°C (32°F to +122°F) Power derating at temperatures over +35°C (+95°F)
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<i>Storage & transport</i>	-40°C to +70°C (-40°F to +158°F)
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<i>Humidity</i>	5% – 95% RH, non-condensing
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Shock/Vibration/Fall

<i>Instrument only</i>	ETSI EN 300 019-2-7 class 7M2
<i>Instrument in transport case</i>	ISTA 2A

Altitude

<i>Operating</i>	3000 m (10000 ft)
<i>Storage</i>	10000 m (33000 ft)

<i>Encapsulation class</i>	IP20
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CE-marking

<i>LVD</i>	IEC61010-1:2010 & IEC61010-2-030
<i>EMC</i>	IEC61326-1

General

<i>Mains voltage</i>	100 – 240 V AC, 50/60 Hz
<i>Power consumption</i>	200 W (max)
<i>Power interruption</i>	40 ms (max)
<i>Protection</i>	Thermal cut-outs, automatic overload protection

Dimensions

<i>Instrument</i>	519x315x375 mm, (20.5" x 12.4" x 14.7")
<i>Transport case</i>	670x400x510 mm, (26.4" x 15.7" x 20.1")
<i>Weight</i>	19.5 kg (43.0 lbs) 31.9 kg (70.3 lbs) with transport case
<i>Display</i>	7" LCD, Capacitive touch screen
<i>Available languages</i>	English, French, German, Spanish, Swedish

Measurement section

Current measurement

<i>Display range</i>	0.0 to 2999.0 Arms
<i>Basic inaccuracy</i>	±(0.5% of reading +0.1 A)
<i>Resolution</i>	0.1 A

Internal current measurement

Range	
<i>TORHEL 910</i>	0 to 110 A
<i>TORHEL 930</i>	0 to 220 A

Input for clamp-on ammeter

<i>Range</i>	0 to 1000 mV DC
<i>mV/A-ratio</i>	0.30 mV/A to 100.00 mV/A
<i>Input impedance</i>	>1 MΩ

Voltage measurement

<i>Voltage</i>	0 to 300 V DC
<i>Inaccuracy</i>	±(0.5% of reading +0.1 V DC)
<i>Resolution</i>	0.1 V

Time measurement

<i>Basic inaccuracy</i>	±0.1% of reading ±1 digit
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Storage of measured values

<i>Time</i>	>24 h
<i>Time interval</i>	Automatic at voltage change

Load section

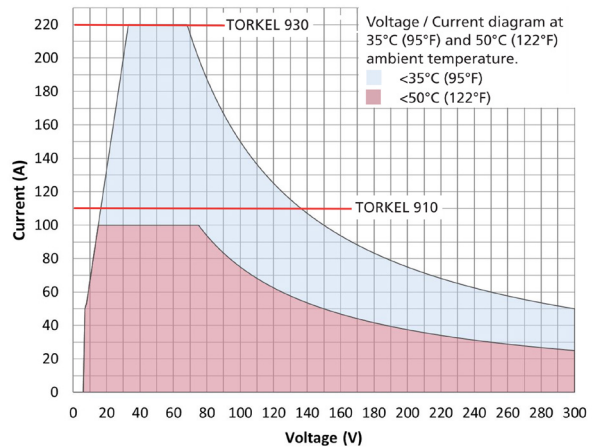
<i>Battery voltage</i>	12 to 270 V (min 7.5 V, max 300 V)
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Max. current

<i>TORHEL 910</i>	110 A
<i>TORHEL 930</i>	220 A

<i>Max. power</i>	15 kW
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<i>Load patterns</i>	Constant current, constant power, constant resistance, current or power profile
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Constant I

Range	
<i>TORHEL 910</i>	0 to 110.0 A
<i>TORHEL 930</i>	0 to 220.0 A
<i>Inaccuracy</i>	±(0.5% +0.2 A)
<i>Resolution</i>	0.1 A
<i>Ripple</i>	±0.4 A

Constant R

<i>Range</i>	300 mΩ to 3 kΩ
<i>Inaccuracy</i>	±0.5%
<i>Resolution</i>	100 mΩ

Constant P

<i>Range</i>	0 to 15 kW
<i>Inaccuracy</i>	±1% + 50 W
<i>Resolution</i>	10 W
<i>Ripple</i>	±200 W

Inputs

+	300 V
-	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	
<i>Relay contact</i>	28 V DC, 8 A, 240 V AC, 8 A Devices higher than Cat II must not be attached

TXL STOP

<i>Relay contact</i>	250 VDC, 0.28 A, 28VDC, 8A, 250V AC, 8A
9 V DC	9 V DC, 100 mA

Communication ports

<i>BVM1 and BVM2</i>	USB connection for BVM units
<i>USB</i>	USB connection for USB memory
<i>SERVICE</i>	For service of the instrument

OPTIONAL ACCESSORIES

Extra loads



- Three extra loads available: TXL830, TXL850 and TXL870

Cables



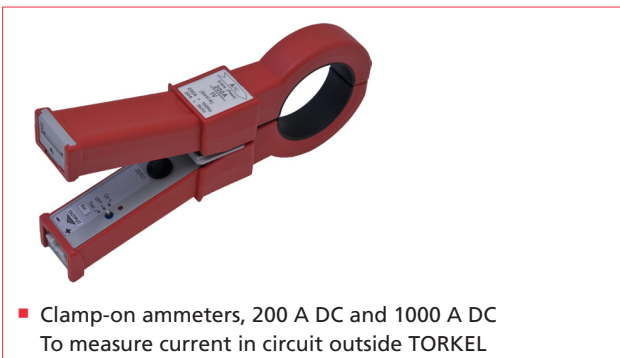
- Cable set (GA-00554)

Sensing leads



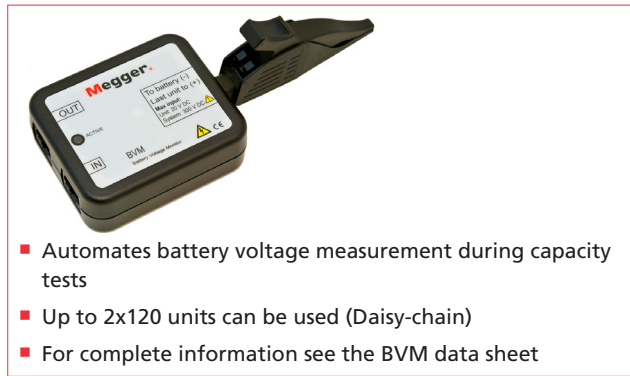
- Sensing lead set (GA-00210)

Clamp-on ammeters



- Clamp-on ammeters, 200 A DC and 1000 A DC
To measure current in circuit outside TORHEL

BVM - Battery Voltage Monitoring



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

INCLUDED ACCESSORIES

Cable sets

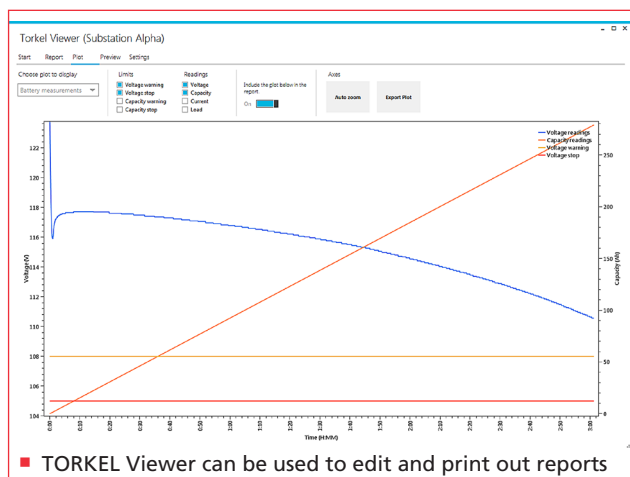


- Cable set GA-00550 for TORHEL 910



- Cable set GA-09550 for TORHEL 930

TORHEL Viewer



- TORHEL Viewer can be used to edit and print out reports

ORDERING INFORMATION

Item	Art. No.	
TORKEL 910		
Incl. accessories:		
Mains cable		
Cable set, 2 x 3 m, 25 mm ²	GA-00550	
USB memory stick		
Transport case, total weight including TORKE L (no cables) <32 kg (70 lbs)	GD-00954	CS-19190
TORKEL 930		
Incl. accessories:		
Mains cable		
Cable set, 2 x 3 m, 70 mm ²	GA-09550	
TORKE L Viewer		
USB memory stick		
Transport case, total weight including TORKE L (no cables) <32 kg (70 lbs)	GD-00954	CS-19390

Item	Art. No.
Optional accessories	
Transport case for TORKE L and standard cables	GD-xxxx
TXL830 Extra load	
Incl. Cable set GA-00554 (max 28 V), Transport case	BS-59093
TXL850 Extra load	
Incl. Cable set GA-00554 (max 56 V), Transport case	BS-59095
TXL870 Extra load	
Incl. Cable set GA-00550 (max 280 V), Transport case	BS-59097
Cable set for TXL830 and TXL850	
2 x 3 m, 70 mm ² , with cable lug. Max 100 V, 270 A Weight: 5.0 kg (11 lbs)	GA-00554
Cable set for TXL870	
2 x 3 m, 25 mm ² , with cable clamp. Max 480 V, 110 A. Weight: 3.0 kg (6.6 lbs)	GA-00550
Sensing lead set	
Cable set for measuring voltage at battery terminals. 2 x 5 m (16.4 ft)	GA-00210
DC clamp-on ammeter, 200 A	
To measure current in circuit outside TORKE L	XA-12992
DC clamp-on ammeter, 1000 A	
To measure current in circuit outside TORKE L	XA-12990
BVM	
<i>Including:</i> Dolphin clips, Power & signal connector, Power supply, 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