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

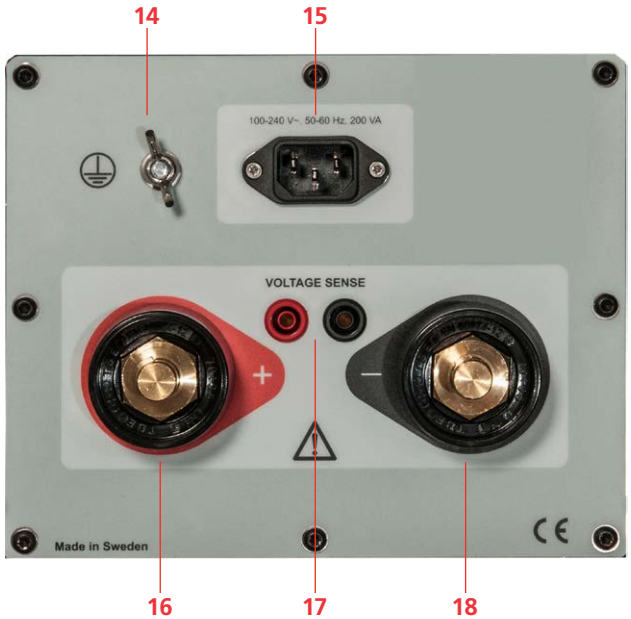
Testing can be carried out without disconnecting the battery from the equipment it serves. Via a DC clamp-on ammeter, TORKEL measures total battery current while regulating it at a constant level.

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 an 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 ≤ 1 V**
   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

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

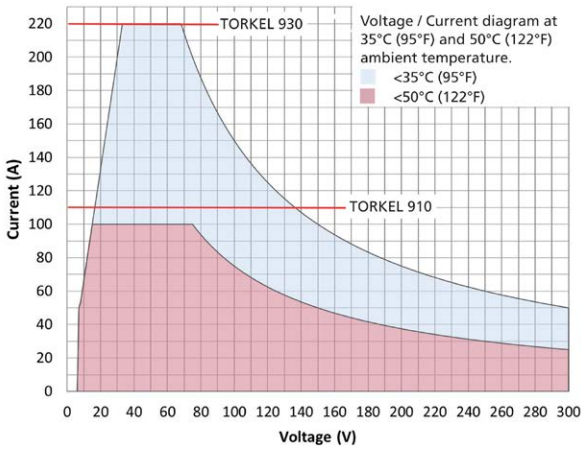
Mains voltage	100 – 240 V AC, 50/60 Hz
Power consumption	200 W *(max)*
Power interruption	40 ms (max)
Protection	Thermal cut-outs, automatic overload protection
Dimensions	
Instrument	519 x 315 x 375 mm, (20.5" x 12.4" x 14.7")
Transport case	670 x 400 x 510 mm, (26.4" x 15.7" x 20.1")
Weight	19.5 kg (43.0 lbs) 31.9 kg (70.3 lbs) with 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 Arms
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	0 to 220 A
Input for clamp-on ammeter	
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 300 V DC
Inaccuracy	±(0.5% of reading +0.1 V DC)
Resolution	0.1 V
Time measurement	
Basic inaccuracy	±0.1% of reading ±1 digit
Storage of measured values	
Time	>24 h
Time interval	Automatic at voltage change

Load section

Battery voltage	12 to 270 V (min 7.5 V, max 300 V)
Max. current	
TORKEL 910	110 A
TORKEL 930	220 A
Max. power	15 kW
Load patterns	Constant current, constant power, constant resistance, current or power profile



Constant I	
Range	
TORKEL 910	0 to 110.0 A
TORKEL 930	0 to 220.0 A
Inaccuracy	±(0.5% +0.2 A)
Resolution	0.1 A
Ripple	±0.4 A
Constant R	
Range	300 mΩ to 3 kΩ
Inaccuracy	±0.5%
Resolution	100 mΩ
Constant P	
Range	0 to 15 kW
Inaccuracy	±1% + 50 W
Resolution	10 W
Ripple	±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	
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, 100 mA

Communication ports

BVM1 and BVM2	USB connection for BVM units
USB	USB connection for USB memory
SERVICE	For service of the instrument

OPTIONAL ACCESSORIES

Extra loads

- Three extra loads available: TXL830, TXL850 and TXL870

BVM

- Automates battery voltage measurement during capacity tests
- "Daisy-chain" design allows expandability up to 120 units
- High accuracy and stability for precise data collection
- For complete information see the BVM data sheet

Cables

- Cable set (GA-00554)

Sensing leads

- Sensing lead set (GA-00210)

Clamp-on-ammeters

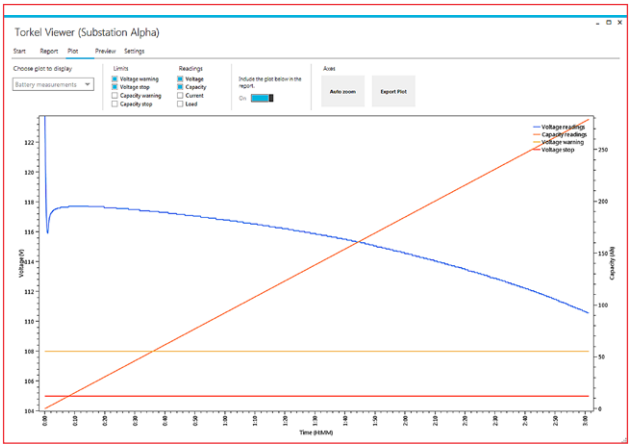
- Clamp-on ammeters, 200 A DC and 1000 A DC
- To measure current in circuit outside TORKEL

INCLUDED ACCESSORIES

Cable set

- Cable set GA-09550

TORKEL Viewer



- The included PC software TORKEL Viewer can be used to edit and print out reports.

ORDERING INFORMATION

Item	Art. No.
TORKEL 910	CS-19190
TORKEL 930	CS-19390
Included accessories	
Mains cable	
Cable set, 2 x 3 m, 70 mm², GA-09550	
TORKEL Viewer (Not for TORKEL 910)	
USB memory stick	
Transport case	
Optional accessories	
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 mm², 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 mm², with cable clamp. Max 480 V, 110 A. Weight: 3.0 kg (6.6 lbs)	GA-00550

Item	Art. No.
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 TORKEL	XA-12992
DC clamp-on ammeter, 1000 A To measure current in circuit outside TORKEL	XA-12990
BVM *Including*: 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

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Megger