

CALSCAN

reliable
temperature pressure
& flow measurement

Badger+

Downhole Memory Recorder

The Badger is our toughest and most durable tool. Deep wells are a difficult environment for a wireline operator to work on. Mistakes happen and the Badger is designed to maximize the chance of its survival.

How tough? Customers can modify their TCP (Tubing Conveyed Perforating) drop bar and attach a Badger inline. With proper setup, nine times out of ten the tool will survive the drop and perforation.

When the tool does need service you can count on our experienced technicians to quickly diagnose and get the tool back in your hands. Turn around time is typically less than two weeks after we have received the tool at our factory in Canada.

Fault Tolerant Memory Design: The failure of one memory chip or block of memory will not result in the complete loss of a section of data.

Smart Sample: The Badger can be set to sample at a fast sample rate, such as one second, and only store if the pressure has changed by a specified amount or if a set amount of time has passed. This is useful for finding maximum pressures during medium duration tests to avoid running out of memory.

Surface Readout (SRO): The Badger can be configured to communicate via electric line to a Hawk 9000 surface recorder. This allows for quick real-time access of the data without pulling the tool.

Fast External Wet Temperature: When doing leak detection and other downhole testing tasks where response time is critical, the optional external temperature probe allows for a much quicker response to temperature changes compared to the standard internal sensor. Available standalone in a temperature only tool or as a triple sensor with pressure.

Long Term Testing: Long term battery life is highly dependent on downhole temperature. The Badger can run for a year on one AA lithium cell for downhole temperatures less than 75°C at a one minute sample rate.

High Speed Download: The Badger+ can download at 68000 samples/minute, which is over four times faster than the old Badger.

Calibration: The Badger is calibrated on a primary deadweight, not another pressure sensor. This is the most accurate and repeatable method for calibration. All tools are calibrated starting from 0°C, not room temperature. This allows accurate pressure measurements even in shallow wells where the temperature near surface is below 20°C.

Shock Resistant Design: The housing is made of durable 718 Inconel™ and designed to protect the electronics from downhole impacts.

Field Reporting: Calwin, our windows interface software allows the operator to make quick field gradient reports and custom graphing with annotation. Graphs can be saved for later editing and can be exported in PDF format.



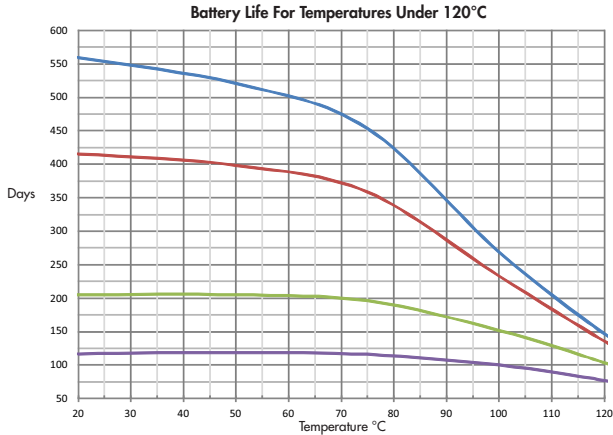
Badger+ Specifications

Battery

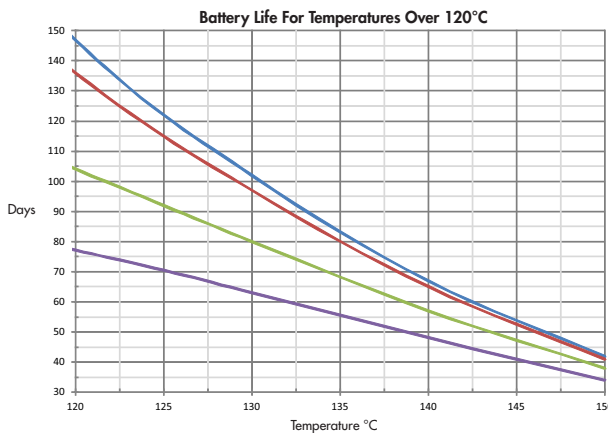
Lithium AA-Cell PMX150 for temperatures from 0°C to 150°C
 Lithium AA-Cell 150LR for temperatures from 0°C to 150°C

Battery Life PMX150

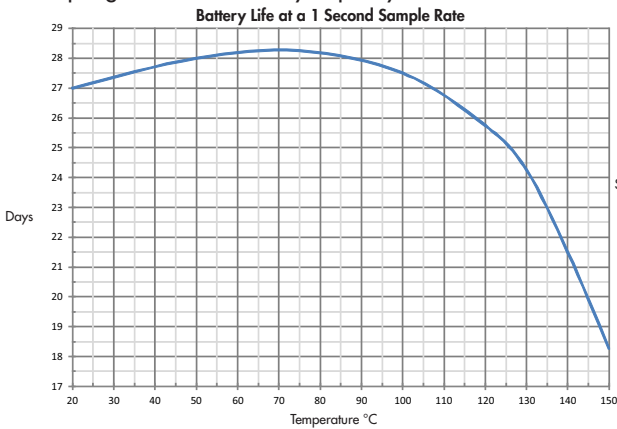
The life on a battery is temperature and sample rate dependent.



Battery chemistry and self discharge above 120°C is the dominant factor on long term tests. For longer tests use a 150LR Battery or a Badger LT that has a larger battery.

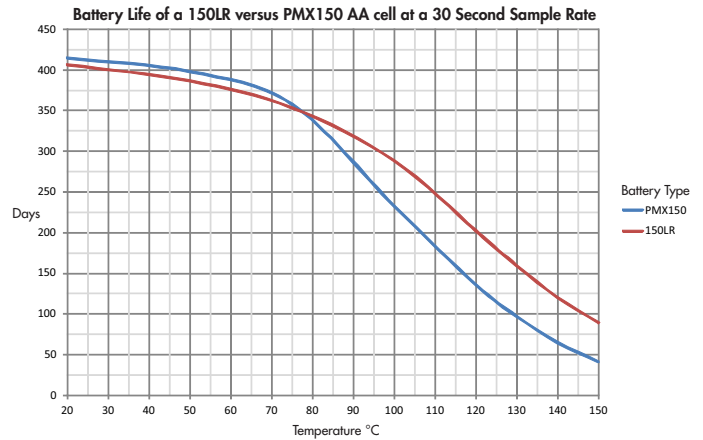


Fast samples fill the memory quickly, consider using smart sampling to extend memory capacity.

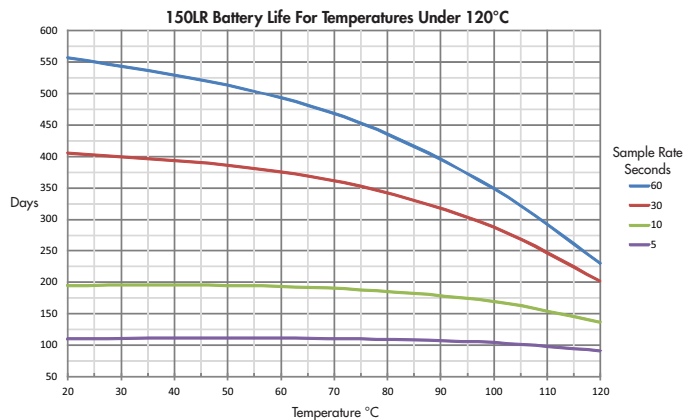


Battery Life 150LR

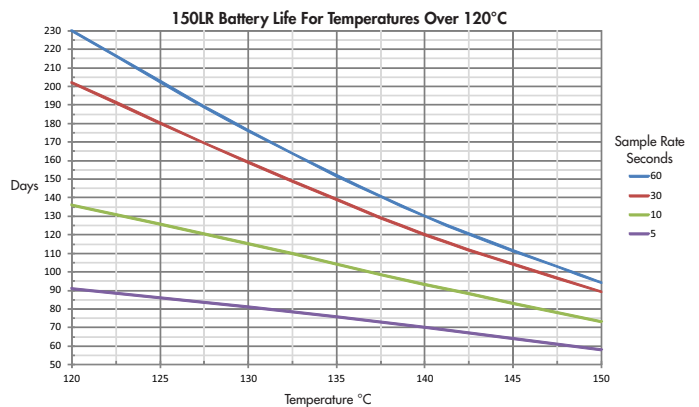
The 150LR though more expensive than the standard PMX150 battery has a superior life at temperatures above 75°C on mid to longer term tests. This is due to reduced self discharge.



If the battery life is still not long enough look at the Badger LT which is designed for long term tests.

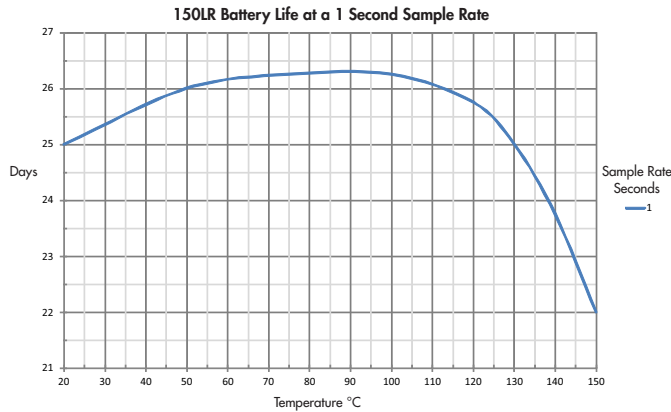


Battery chemistry and self discharge above 120°C is the dominant factor on long term tests.



Badger+ Specifications

Self discharge is less of a factor with fast sample rates as tests are typically shorter. Fast samples also fill the memory quickly, consider using smart sampling to extend memory capacity.



Memory

Badger+

Standard Mode: 2 088 960 samples

Smart Sample Mode: 1 392 640 samples

Badger+ with Triple Sensor

Standard Mode: 1 523 710 samples

Smart Sample Mode: 1 117 380 samples

Badger+ with External (Wet) Temperature Only

Standard Mode: 3 352 160 samples

Sample Rate

Minimum Rate at maximum resolution: 1 sample/second

Minimum Rate: 1 sample/0.33 second

Environmental

Temperature Range

Standard: 0°C to 150°C

Sensor Specifications

Pressure

Type: Silicon Crystal, Sapphire, Piezoelectric

Range: 750, 1500, 3500, 6000, 10000, 15000 psig

Accuracy: $\pm 0.024\%$ Full Scale for Standard Temperature Range

Resolution: $\pm 0.0003\%$ Full Scale

Resolution during smart sample: $\pm 0.0012\%$ Full Scale

Pressure Drift: Highly dependent on ambient well conditions and proper tool maintenance

< 0.005 % full scale/year for temperatures < 85°C

< 0.010 % full scale/year for temperatures < 125°C

< 0.024 % full scale/year for temperatures < 150°C

See Badger HT for Temperature above 150°C

Temperature

Type: Platinum RTD

Accuracy: $\pm 0.5^\circ\text{C}$

Repeatability: $< \pm 0.02^\circ\text{C}$

Resolution: $< 0.001^\circ\text{C}$

Drift: $< 0.1^\circ\text{C}/\text{year}$

Housing

Housing Material: 718 Inconel™ (UNS N07718)

Housing Diameter: 1.25 inches (31.75mm)

Housing Length: 21 inches (533.4mm) to 24 inches (609.6mm)

Communication

USB via Interface Box

USB Download Speed: 68000 sample/minute

Programming and Reporting

Calwin for Windows Vista/Win7/Win8

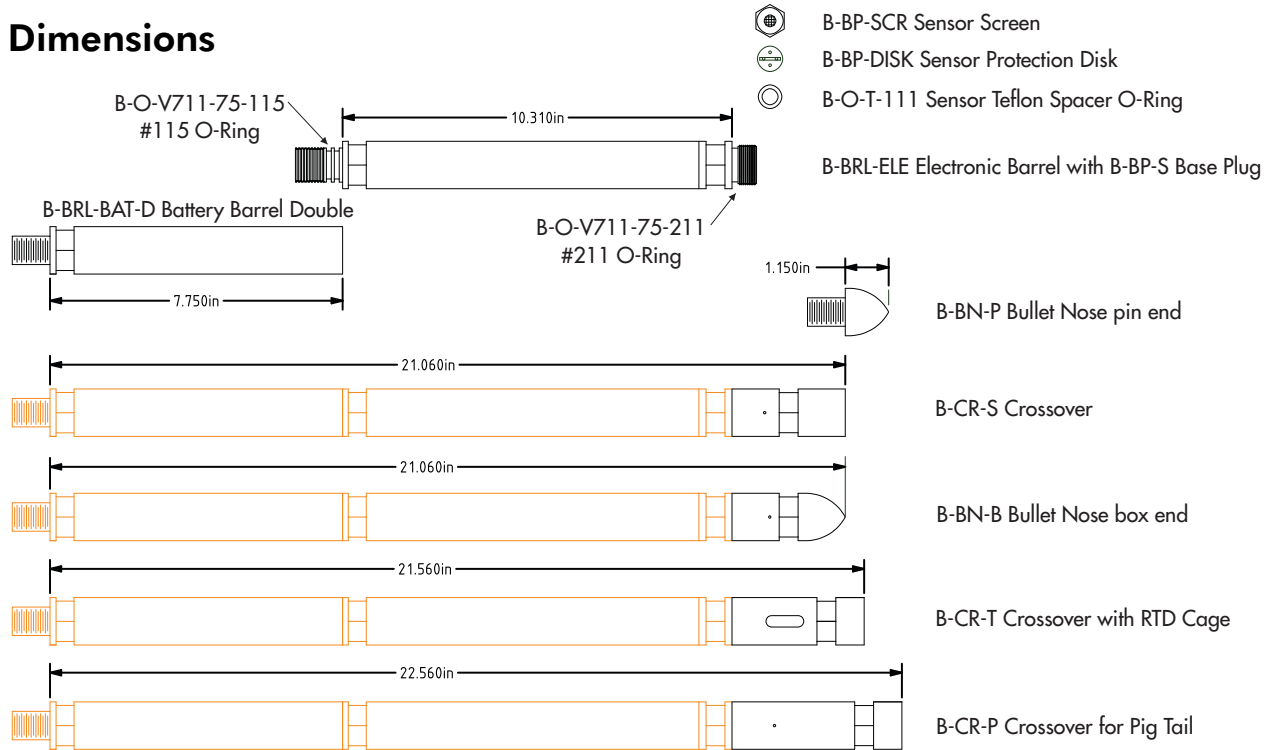
Tool Options

Triple Sensor with pressure and external (wet) temperature

External (wet) temperature only

Badger+ Specifications

Dimensions



All box and pin thread connections 3/4" Amerada (3/4" - 16 TPI UNF)
Barrel Diameter 1.25in

Part Numbers

Badger Standard	B-Pxxxxx-S	Red Tube Single PMX150	BAT-B-AA-150PMX
Badger Triple Tool	B-Pxxxxx-TRI	Red Tube Single 150LR	BAT-B-AA-150LR
Badger Temp Tool	B-Pxxxxx-TMP		
Badger Permanent SRO	B-Pxxxxx-PRM	SRO GO E-Line adapter 1 7/16"	B-SRO-GO-144
		SRO TEC Wire Fishneck 1/4"	B-SRO-FISH-250
		SRO TEC Wire Fishneck 1/8"	B-SRO-FISH-125
		SRO TEC Wire Cablehead	B-SRO-CH
		SRO TEC Wire 1/8" fittings	B-SRO-SWA-125
		SRO TEC Wire 1/4" fittings	B-SRO-SWA-250
		SRO Transmitter	B-SRO-TRAN-150
		Sensor/Thread Grease 142g	BM-GR-101G-S
		Sensor/Thread Grease 454g	BM-GR-101G-L
		Badger Battery Barrel O-ring 50 pack Dupont Viton V711 75-115	B-O-V711-75-115-Q50
		Badger Base Plug O-ring 50 pack Dupont Viton V711 75-211	B-O-V711-75-211-Q50
		USB Interface and Battery Tester Carrying Case	I-USB-BAT B-CASE
Battery Barrel Double	B-BRL-BAT-D		
Electronic Barrel	B-BRL-ELE		
Base Plug	B-BP-S		
Temperature Tool Base Plug	B-BP-TMP		
Triple Tool Base Plug	B-BP-TRI		
Sensor Protection Disk	B-BP-DISK		
Sensor Screen	B-BP-SCR		
Sensor Teflon Spacer O-ring 25 pack	B-O-T-111-Q25		
Bullet Nose with Pin End	B-BN-P		
Bullet Nose with Box End	B-BN-B		
Crossover Sub	B-CR-S		
Crossover Sub with RTD Cage	B-CR-T		
Crossover Sub for Pig Tail	B-CR-P		
PigTail Buffer Tube	B-PIG		



For warranty, calibration, replacement battery, and local distributor information contact:

E-mail: sales@calscan.net

Website: www.calscan.net

Phone: (780) 944-1377

4188 93 Street, Edmonton, Alberta, T6E 5P5

All specifications subject to change without notice rev 1v12