

# CALSCAN

precision  
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.



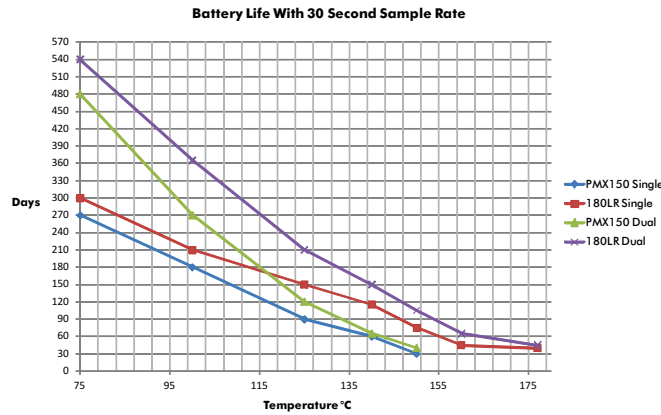
# Specifications

## Battery

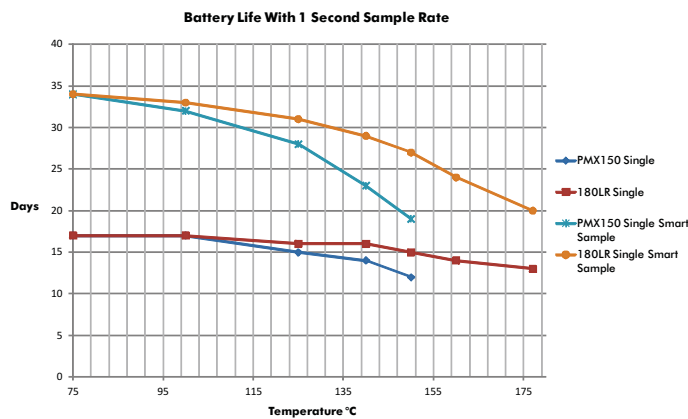
Lithium AA-Cell PMX150 for temperatures from 0°C to 150°C  
 Lithium AA-Cell 180LR for temperatures from 50°C to 180°C

## Battery Life

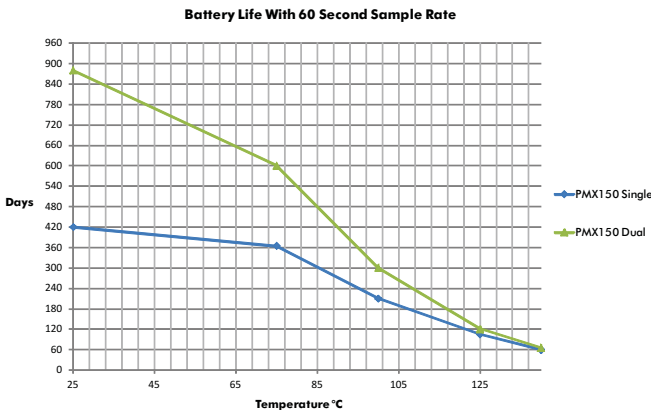
The life on a battery is temperature and sample rate dependent. Battery chemistry and downhole temperature are the dominant factors above 120°C on long term tests due to battery self discharge.



Fast samples drain the battery quickly. Consider using smart sampling to extend battery life as well as memory.



Long term tests of over a year are possible with one minute sample rates and temperatures less than 75°C



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

E-mail: [sales@calscan.net](mailto:sales@calscan.net)  
 Website: [www.calscan.net](http://www.calscan.net)  
 Phone: (780) 944-1377  
 4188 93 Street, Edmonton, Alberta, T6E 5P5

## 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  
 Extended: 0°C to 177°C

## Sensor Specifications

### Pressure

Type: Silicon Crystal, Sapphire, Piezoelectric  
 Range: 750, 1500, 3500, 6000, 10000, 15000 psig  
 Accuracy: ± 0.024% Full Scale for Standard Temperature Range  
 Accuracy: Ask for details for Extended Temperature above 150°C

Resolution: ± 0.0003% Full Scale

Resolution during smart sample: ± 0.0012% Full Scale

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

Ask for details for Extended Temperature above 150°C

### Temperature

Type: Platinum RTD  
 Accuracy: ± 0.5°C  
 Repeatability: < ± 0.02°C  
 Resolution: < 0.001°C  
 Drift: < 0.1°C/year

## Housing

Housing Material: 718 Inconel™ ( UNS N07718 )  
 Housing Diameter: 1.25 inches (31.75mm)  
 Housing Length: 24 inches (609.6mm)

### Communication:

USB or serial via Interface Box  
 USB Download Speed: 68000 sample/minute

### Programming and Reporting

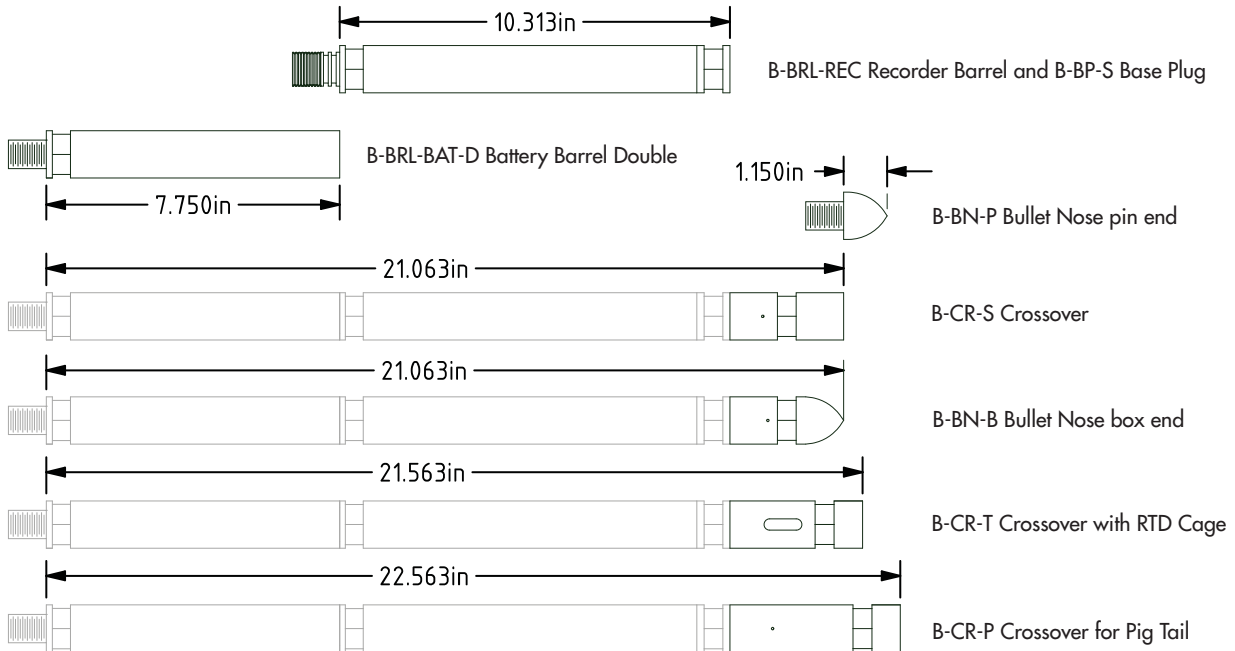
Calwin for Windows XP/Vista/Win7

### Tool Options

Extended Temperature to 177°C  
 Triple Sensor with pressure and external (wet) temperature  
 External (wet) temperature only

# Badger+

## Overall Dimension



## Part Numbers

Badger Standard	B-Pxxxxx-S	Red Tube Single PMX150	B-BAT-150
Badger Triple Tool	B-Pxxxxx-TRI	Red Tube Single 180LR	B-BAT-180
Badger Temp Tool	B-Pxxxxx-TMP	Single PMX150	BM-BAT-150
Badger Permanent SRO	B-Pxxxxx-PRM	Single 180LR	BM-BAT-180
	Pressure Range: xxxxx in PSI	SRO GO E-Line adapter 1 7/16"	B-SRO-GO-144
	Extended Temp 177°C: add -E	SRO Tube Wire Fishneck 1/4"	B-SRO-FISH-250
Battery Barrel Double	B-BRL-BAT-D	SRO Tube Wire Fishneck 1/8"	B-SRO-FISH-125
Battery Barrel Single	B-BRL-BAT-S	SRO Tube Wire Cablehead	B-SRO-CH
Electronic Barrel	B-BRL-REC	SRO Tube Wire 1/8" fittings	B-SRO-SWA-125
Base Plug	B-BP-S	SRO Tube Wire 1/4" fittings	B-SRO-SWA-250
Temperature Tool Base Plug	B-BP-TMP	SRO Transmitter	B-SRO-TRAN
Triple Tool Base Plug	B-BP-TRI	Sensor/Thread Grease 142g	BM-GR-101G-S
Sensor Protection Disk	B-BP-DISK	Sensor/Thread Grease 454g	BM-GR-101G-L
Sensor Screen	B-BP-SCR	Badger Battery Barrel O-ring 50 pack Dupont Viton V711 75-115	B-O-V711-75-115-Q50
Bullet Nose with Pin End	B-BN-P	USB/Serial Interface Box	I-S-USB
Bullet Nose with Box End	B-BN-B	Battery Tester	BM-BTST
Crossover Sub	B-CR-S	Carrying Case	B-CASE
Crossover Sub with RTD Cage	B-CR-T		
Crossover Sub for Pig Tail	B-CR-P		
PigTail Buffer Tube	B-PIG		



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