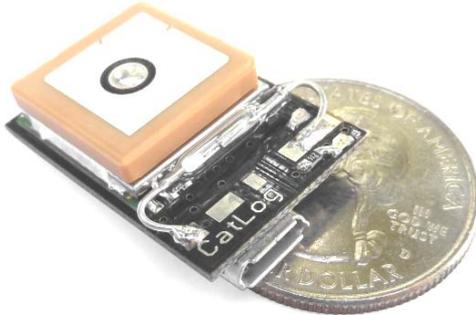


Overview



Used in thousands of GPS tags and collars around the world CatLog became the standard GPS/GNSS data recorder for wildlife bio-tagging.

The device will record the position in an adjustable time interval. The movement profile can later be displayed on a map or exported to use with other software.

Generation 2 of the CatLog has been specifically optimized for scientific use while still maintaining an excellent performance to cost balance.

Its low power consumption combined with small dimensions, low weight and high accuracy makes it an ideal device for domestic and wildlife animal observation.

Optimized for scientific use, CatLog offers the following features:

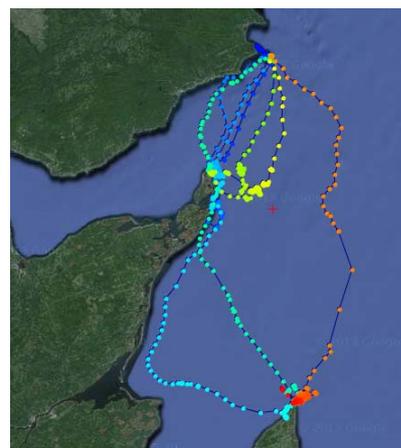
- Magnetic switch to activate and deactivate it
- Choice of different enclosures to withstand seawater and tough conditions
- Optimized weight and operation time by scalable battery size
- Lots of configuration options to get the best results for your project needs.
- Retrieval option
- Advanced scheduler (dual time table)



The recorded data is stored in an open text format that can be used by most 3rd party programs.

However, CatLog has also its own visualization software. This allows the user to analyze the recorded data as well as to apply multi-level filters or export only certain portions of the whole data set.

It also allows visualizing position accuracy estimates which is one specific feature of the Gen2 CatLog.



- ✓ Free consultation
- ✓ Customization according to project needs
- ✓ Free data recovery of damaged units

Contact details:

Web: www.perthold.de

Mail: [engineering \(a\) perthold.de](mailto:engineering(a)perthold.de)

Phone: +1-469-726-9889

Functional Features

The CatLog GPS logger offers a large number of features to get a maximum of field operation time and handling convenience:

Logistics

- Each device can be named by the user – no more confusion with lost markings
- Simplified setup - copy one configuration to all your devices.
- Automatic batch processing to work through a high number of devices in short time

Handling

- Option to prevent device from getting manually turned off improves reliability in the field.
- Automatic start at defined date – the device will be in energy conserving deep sleep mode until a certain date.

Energy supply

- Works with different battery chemistries with adjustable shutdown thresholds.
- Advanced power management allows operating from renewable energy sources. The device will automatically resume operation once batteries are recharged.

Logging

- Asynchronous (standard) or synchronous logging mode. Synchronous logging is required if positions of multiple devices need to be considered at the same time.
- Logging of additional data (temperature, time to position fix [TTF], PDOP, velocity)

Operation

- Advanced scheduler function that defines operation in hourly or daily patterns. It also enables the use of different recording intervals, e.g. have an energy conserving recording during the night and a higher recording interval during daytime.
- Adjustable timeout in case of unfavorable reception conditions will help preserve energy. Handy for animals that are under water or underground for certain times. Backup logging event is possible in such cases to not miss a position. Or the device can be turned off for a certain period after detecting problematic reception conditions.
- Options to balance accuracy versus energy consumption.
- Speed triggered logging interval. Switches to a fast interval when an adjustable speed threshold is exceeded.

Recovery

- Recovery feature after defined date – allows easy retrieval in a colony or in a known migration area. This function can also trigger a separation unit.

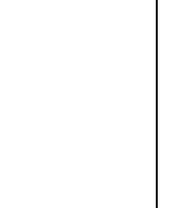
CatLog Gen 2 GPS/GNSS Logger

Datasheet v5

Perthold Engineering LLC

Enclosures

Our satellite positioning solution is very modular. There is a selection of different enclosures to fit the project needs. The table below will give you an overview of enclosure styles and their typical characteristics.

Style	ThermoSeal Self Seal	ThermoSeal Sealed	Hard-Shell Resin potted	Hard-Shell Box	Tube	Leg Attach	Belt Clip	Eartag
Example Picture								
Water resistant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dive proof	Yes <100m	Yes <50m	Yes <500m	Yes < 10m	Yes <2m	No	No	No
Weight	L	L	M	M	H	L	M	L
Size	S	S	M	S/M	L	S	M	S
Stability	L	L	H	H	H	M	M	L
Battery capacity	Low <1Ah	Low <1Ah	Medium <2Ah	Medium <2Ah	High 3-15Ah	Low <0.5Ah	Low <1Ah	Solar
Costs	L	L	M/H	M	M/H	L/M	L/M	M
Best use	Birds, Penguins	Birds, Penguins	Seal, Dolphin, Reptiles, Turtle	Dogs, cats, raptor birds	Livestock, Cattle, Sheep, Hogs, Fleet surveillance	Kiwi, Chicken	Persons	Cattle, Sheep
Attaching method	Glue, cable ties	Glue, cable ties	Glue, cable ties	Harness, collar, cable ties	Harness, collar, steel rings	Velcro tie	Belt	Pin

L = Low, M=Medium, H=High
 S= Small, M=Medium, L=Large

Specification

Device weight and dimensions	Electronics without battery and enclosure																												
	<table border="1"> <thead> <tr> <th>Antenna Type</th> <th>Connector</th> <th>Switch</th> <th>Weight</th> <th>Size</th> </tr> </thead> <tbody> <tr> <td>Ceramic Patch</td> <td>Magnetic</td> <td>Y</td> <td>5.8g</td> <td>27 x 20 x 7 mm</td> </tr> <tr> <td>Small Patch</td> <td>Magnetic</td> <td>Y</td> <td>4.8g</td> <td>27 x 20 x 8 mm</td> </tr> <tr> <td>Small Patch</td> <td>Pin Row</td> <td>N</td> <td>3.9g</td> <td>27 x 20 x 8 mm</td> </tr> <tr> <td>Chip antenna</td> <td>Pin Row</td> <td>N</td> <td>2.1g</td> <td>30 x 21 x 4mm</td> </tr> </tbody> </table>	Antenna Type	Connector	Switch	Weight	Size	Ceramic Patch	Magnetic	Y	5.8g	27 x 20 x 7 mm	Small Patch	Magnetic	Y	4.8g	27 x 20 x 8 mm	Small Patch	Pin Row	N	3.9g	27 x 20 x 8 mm	Chip antenna	Pin Row	N	2.1g	30 x 21 x 4mm			
Antenna Type	Connector	Switch	Weight	Size																									
Ceramic Patch	Magnetic	Y	5.8g	27 x 20 x 7 mm																									
Small Patch	Magnetic	Y	4.8g	27 x 20 x 8 mm																									
Small Patch	Pin Row	N	3.9g	27 x 20 x 8 mm																									
Chip antenna	Pin Row	N	2.1g	30 x 21 x 4mm																									
Battery	Rechargeable Lithium Polymer																												
	<table border="1"> <thead> <tr> <th>Capacity</th> <th>Operation**</th> <th>Dimension*</th> <th>Weight</th> </tr> </thead> <tbody> <tr> <td><160mAh</td> <td>tbd</td> <td>tbd</td> <td></td> </tr> <tr> <td>160mAh</td> <td>30h</td> <td>30 x 20 x 4mm</td> <td>+4g</td> </tr> <tr> <td>380mAh</td> <td>80h</td> <td>35 x 25 x 5mm</td> <td>+7.3g</td> </tr> <tr> <td>450mAh</td> <td>100h</td> <td>50 x 25 x 5mm</td> <td>+9.8g</td> </tr> <tr> <td>750mAh</td> <td>160h</td> <td>40 x 30 x 7mm</td> <td>+16g</td> </tr> <tr> <td>3000mAh</td> <td>650h</td> <td>n/a</td> <td>+50g</td> </tr> </tbody> </table> <p>* for reference only, actual size depends on available cells ** based on 30s capture interval, 3D lock, LED on</p>	Capacity	Operation**	Dimension*	Weight	<160mAh	tbd	tbd		160mAh	30h	30 x 20 x 4mm	+4g	380mAh	80h	35 x 25 x 5mm	+7.3g	450mAh	100h	50 x 25 x 5mm	+9.8g	750mAh	160h	40 x 30 x 7mm	+16g	3000mAh	650h	n/a	+50g
Capacity	Operation**	Dimension*	Weight																										
<160mAh	tbd	tbd																											
160mAh	30h	30 x 20 x 4mm	+4g																										
380mAh	80h	35 x 25 x 5mm	+7.3g																										
450mAh	100h	50 x 25 x 5mm	+9.8g																										
750mAh	160h	40 x 30 x 7mm	+16g																										
3000mAh	650h	n/a	+50g																										
Enclosure	<table border="1"> <thead> <tr> <th>Type</th> <th>Weight***</th> </tr> </thead> <tbody> <tr> <td>ThermoSeal (Sealed shrink tubing)</td> <td>+2 g (Patch) +1.3 g (Chip)</td> </tr> <tr> <td>Epoxy resin</td> <td>+11g (380mAh) +14g (750mAh)</td> </tr> <tr> <td>Tube</td> <td>+55g</td> </tr> <tr> <td>Boxes, hard shell</td> <td>Varies</td> </tr> </tbody> </table> <p>*** may vary with battery size</p>	Type	Weight***	ThermoSeal (Sealed shrink tubing)	+2 g (Patch) +1.3 g (Chip)	Epoxy resin	+11g (380mAh) +14g (750mAh)	Tube	+55g	Boxes, hard shell	Varies																		
Type	Weight***																												
ThermoSeal (Sealed shrink tubing)	+2 g (Patch) +1.3 g (Chip)																												
Epoxy resin	+11g (380mAh) +14g (750mAh)																												
Tube	+55g																												
Boxes, hard shell	Varies																												
Operation temperature	-20 to +60 degrees Celsius (based on Lithium Polymer chemistry)																												
Dive depth	See enclosure matrix. Note: no position under water or under ground																												
Activation	Magnetic switch, automatic start timer, mechanical switch (optional)																												
Status visualization	2 LED lights (can be turned off for concealed operation)																												
GNSS chipset	MediaTek 33 (66 Channel, -165dbm)																												
Satellite System	GPS, GLONASS (optional)																												
Coordinate System	WGS84																												
Position accuracy	5-10m																												
Position logging interval	Adjustable 5s – 24h. Weekly scheduling mode available. 2 different logging intervals																												
Recorded data	Time, position, altitude, HDOP, PDOP, temperature, TTFF, speed, Signal strength SNR																												
Storage capacity	Up to 400.000 positions. (110.000 pos below hardware version 5)																												
Interface	Serial USB																												
Operating system	Windows, Mac OS (using Windows VM)																												
Export data format	CSV (Excel), GPX, Text																												
Internal parameters																													
Supply voltage	3.0 – 4.1V																												
Max. current draw	40mA																												
Charge current	Adjustable by hardware																												
Shutdown voltage	Adjustable by software																												

Firmware Version and Supported Features

Feature	Firmware version							
	3.0	3.1	6.0	6.2	6.3	Tbd	Tbd	Tbd
Scheduler with 2 different interval settings	✓	✓	✓	✓	✓			
Delayed start, recovery mode after certain date	✓	✓	✓	✓	✓			
Adjustable battery thresholds (shutdown, restart)	✓	✓	✓	✓	✓			
Blackout option if no position could be acquired	✓	✓	✓	✓	✓			
Logging of additional data (temperature, time to position fix [TTF])	✓	✓	✓	✓	✓			
Charge while in operation	✓	✓	✓	✓	✓			
Speed triggered interval	✓	✓	✓	✓	✓			
Realtime Position Synchronization	-	✓	✓	✓	✓			
Faster logging interval <5s	-	-	✓	✓	✓			
Firmware update capability	-	-	-	✓	✓			
Satellite Signal-Noise-Ratio recording	-	-	-	-	✓			
GNSS movement modes selection	-	-	-	-	✓			

We offer the service to update your devices to the latest firmware version (as far as hardware version permits)

Recorded Positions vs. Battery Capacity

tbd.

Recorded Positions vs. Interval Rate

tbd.

Control Center Software

Have full control of your devices! CatLog Control Center runs on both Windows and Mac OS platforms (using Windows VM).

Load and save settings, optimized workflow if you have to deal with high number of devices. Sophisticated and Industry first battery simulator allows you to find the optimal settings for your project needs.

The screenshot displays the CatLog GPS Control software interface. The main window includes a top navigation bar with 'Connect', 'COM 4', and 'Refresh' buttons. Below this are fields for 'Hardware Version', 'Software Version', and 'Serial Nr.', all showing 'n/a'. The central area is divided into several sections:

- Device Name:** CatLog
- Capture Interval:** 0 h 2 m 30 s
- GPS Timeout:** 300 seconds
- Number of positions before log:** 0
- When no position available:**
 - 2nd chance after 0 seconds delay
 - Disable GPS for 0 seconds
 - Log also if no position
- Log additional:**
 - Temp
 - TTF
 - Speed
 - PDDP
- Scheduler Settings:** A table showing a weekly schedule for UTC times 00 to 23. The columns are labeled Su, Mo, Tu, We, Th, Fr, Sa, All. The schedule shows 'A' (Active) for most times and 'B' (Battery) for times 05-10 and 13-14.
- Advanced Settings:**
 - No Turning OFF once enabled
 - LED lights disabled
 - Circular Logging
 - 3D Lock required
 - Enable Scheduler
 - Synchronous Mode
 - Speed triggered interval if speed > 20 knots then use interval 8 sec
 - Delayed start from date: 12 h 1 d 1 m 16 y
 - Stop recording after: 12 h 30 d 5 m 16 y
 - Recovery from date: 12 h 30 d 6 m 16 y
 - Recovery Action interval: 60 seconds
 - Advanced Syncmode

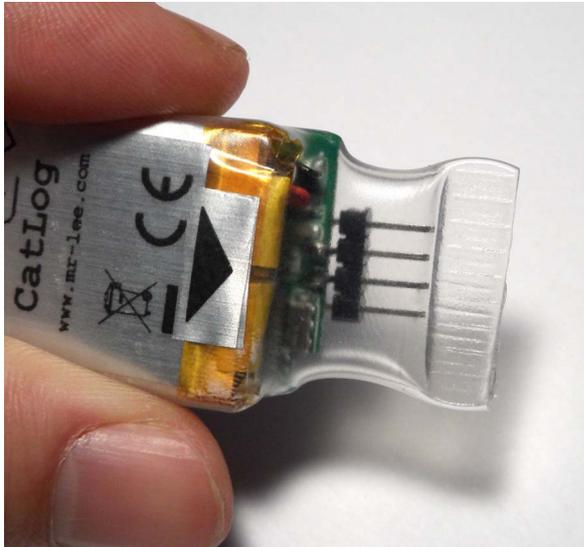
A 'Battery Simulator' window is overlaid on the right side of the main window. It contains the following settings:

- Battery:** Capacity (nominal) 450 mAh, Lithium Polymer selected.
- Reception Condition:** Perfect (open sky all time) selected.
- Temperature:** Always above freezing temperature selected.
- Simulation:** Show realtime (slow) checked. Capacity remaining: 22 mAh, Time: 10 days, 7 hours, 45 minutes, Positions: 7320, TTF: 10s.

Buttons for 'Start' and 'Close' are visible at the bottom of the Battery Simulator window.

ThermoSeal Enclosure

One key feature of the CatLog-S is the ThermoSeal enclosure that offers the best environmental protection for the least weight. It is a special heat shrink tubing with outstanding characteristics.



ThermoSeal™ Features:

- Provides reliable water tightness and is absolutely corrosion and pressure resistant.
- Reusable seal, just heat it up to open it and seal it again with heat !
- Sufficient wall thickness to mechanically protect the device
- Sticks to tape for universal deployment
- Allows to create special attachment fixtures
- Cheap, clean, economic, simple !

Seal temperature range: 160-200 degrees Celsius (320 – 390 Fahrenheit)

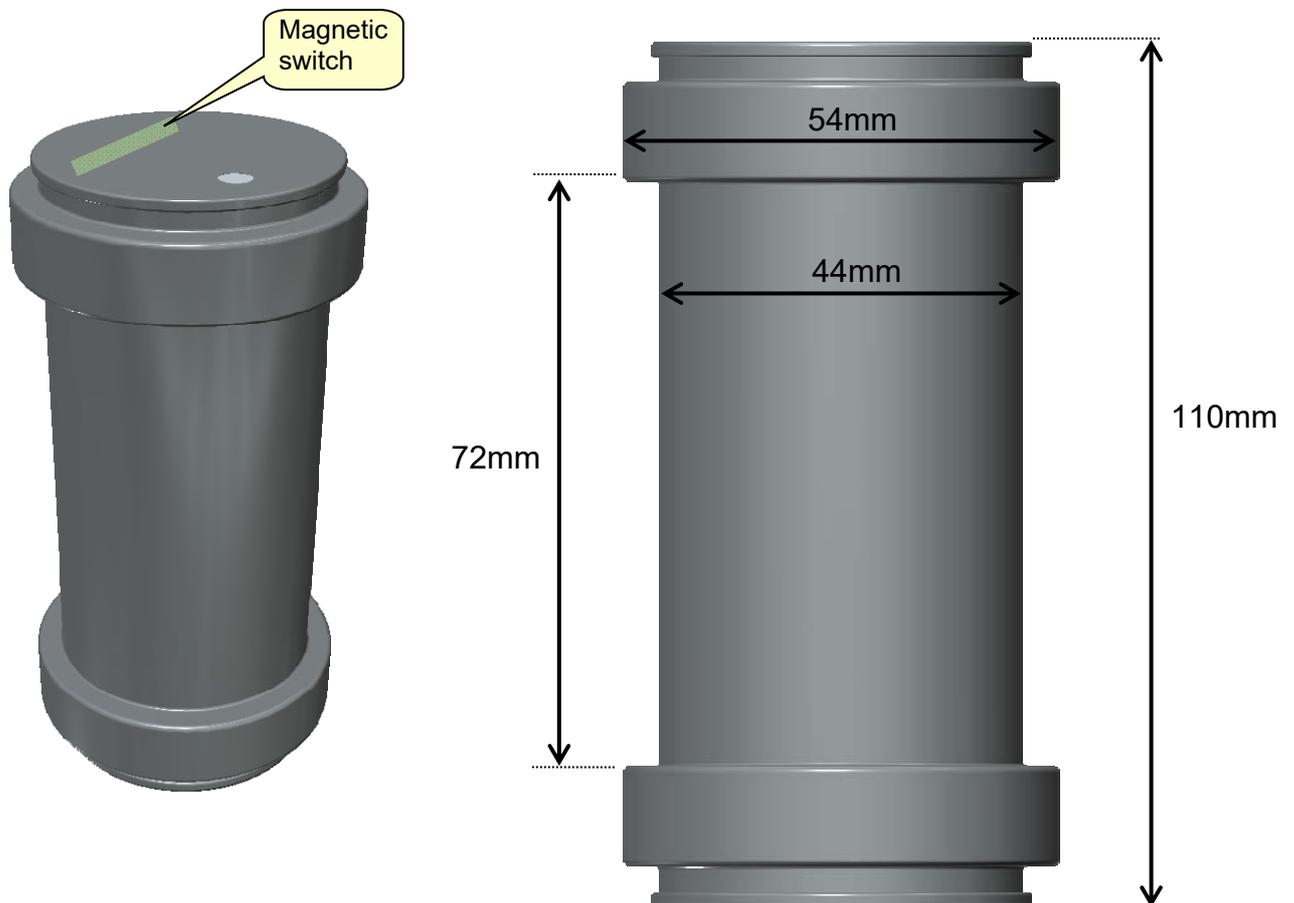


Process description is part of the CatLog-S User Manual.

Tubular Enclosure Type 1

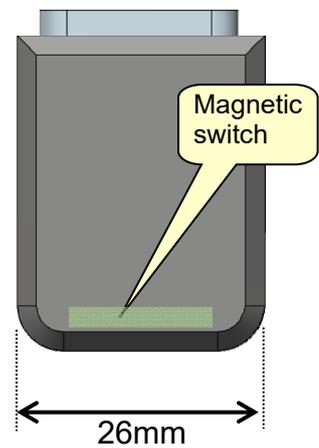
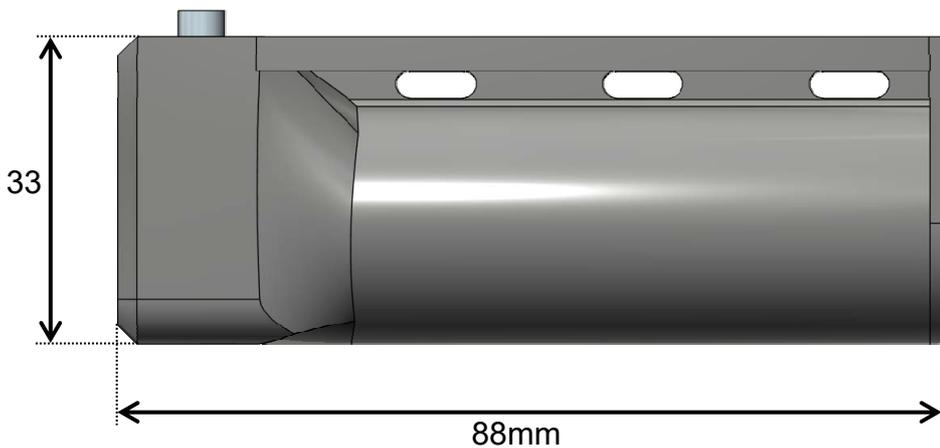
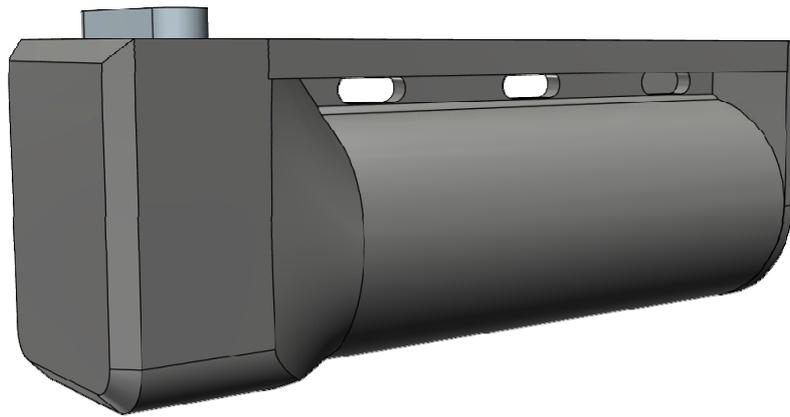
Rigid and waterproof for extremely long operation. Typically used for fleet monitoring or livestock movement analysis. Battery capacity 3000, 6000 or 9000mAh. 15000mAh feasible with slightly wider enclosure.

Battery capacity	Weight
3Ah	135g
6Ah	190g
9Ah	240g
15Ah	350g



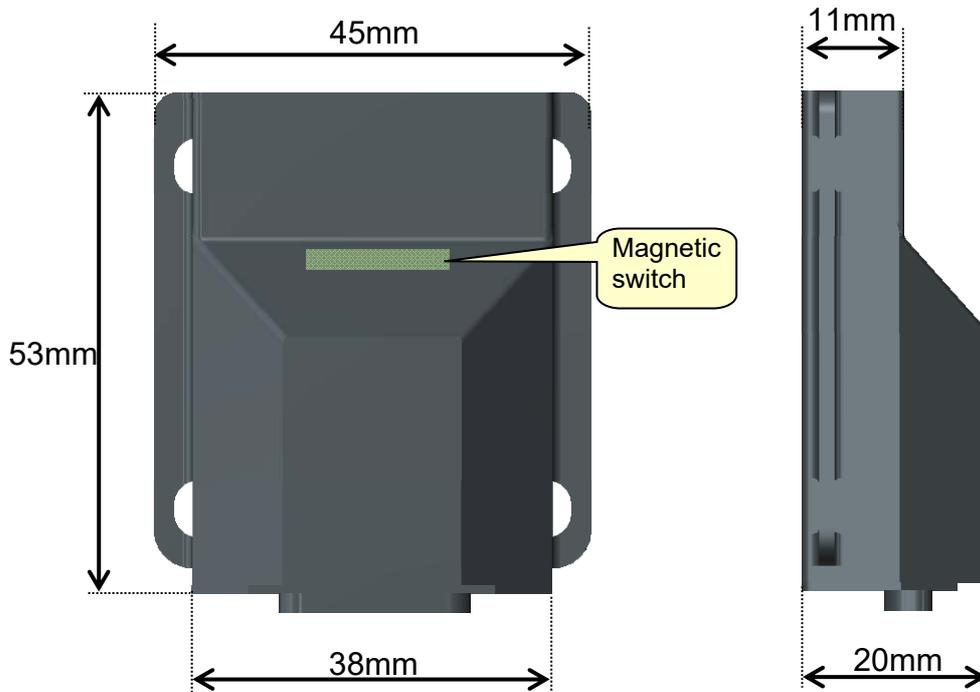
Tubular Enclosure Type 2

Compact and waterproof for collar attachment using cable ties. Typically used on dogs and small livestock. Battery capacity 4000mAh. Weight 100g.



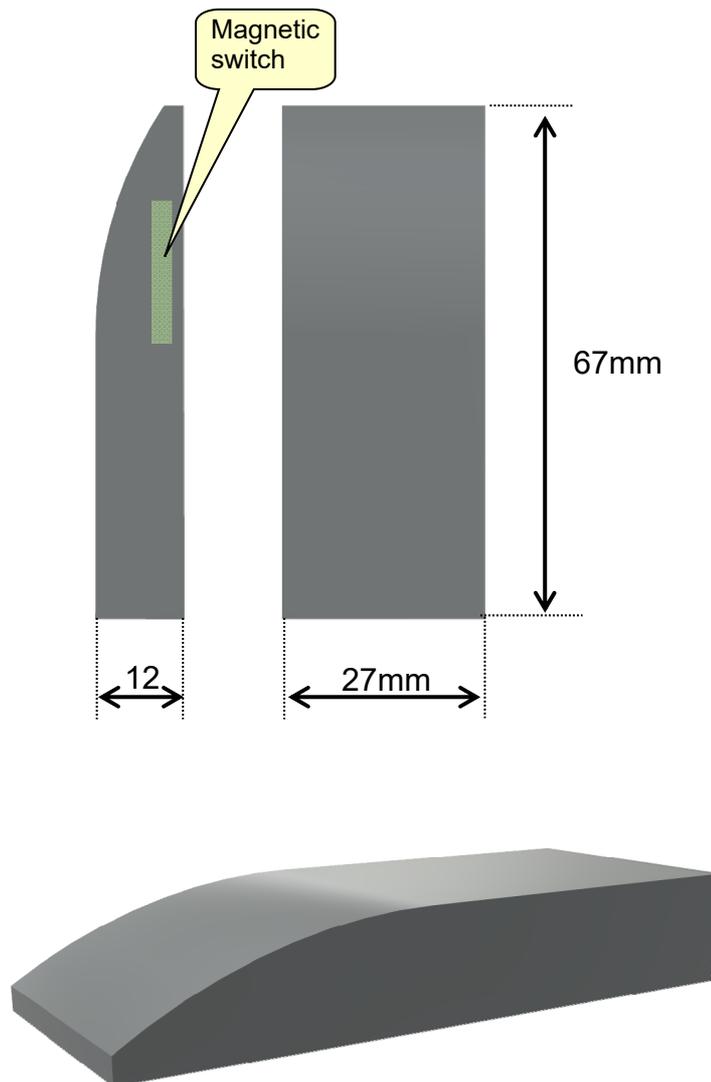
Epoxy Filled Enclosure 1

Resin filled enclosures are mainly used on deep diving animals such as penguins or seals when a high abrasion stress is combined with water immersion. The device shown below has 1200mAh battery integrated. Enclosure is filled with epoxy potting material. Device weight 50g. Customization for other sizes/shapes is possible.



Epoxy Filled Enclosure 2

Resin filled enclosures are mainly used on deep diving animals such as penguins or seals when a high abrasion stress is combined with water immersion. The device shown below has 800mAh battery integrated. Design goal was to reduce water drag and device height. The enclosure is filled with epoxy potting material. Device weight <40g. Customization for other sizes/shapes is possible.



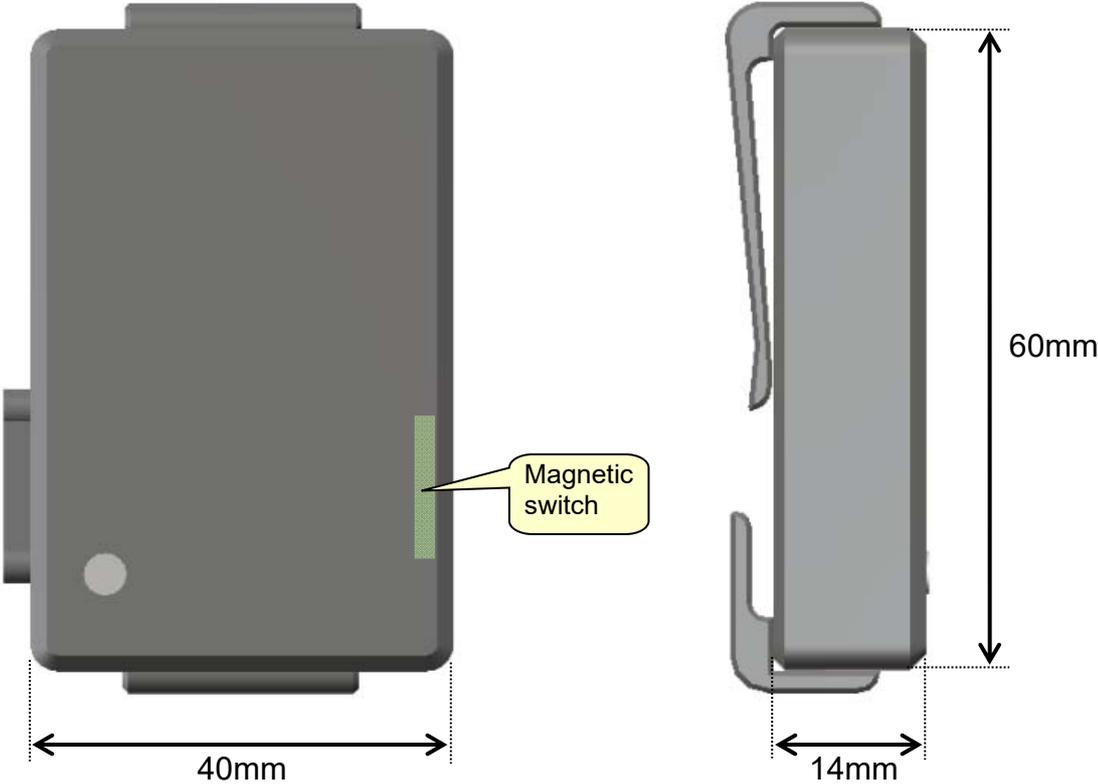
Leg Attach Enclosure

For medium to large walking birds like Kiwi and Chicken. The handle is attached to the leg and keeps the enclosure at distance. The shown device weights 20g with 250mAh battery.



Belt Clip Enclosure

Attaches to a belt worn by a person. Hermetically sealed, slim, rigid, no control elements. Due to dual clip design the device can't get lost. Device shown below has 800mAh battery.



© 2011-2022 Perthold Engineering LLC

Email: info@mr-lee.com

Web: www.mr-lee.com

Not to be reproduced in whole or part for any purpose without written permission of Perthold Engineering.

Information provided is believed to be accurate and reliable. These materials are provided by Perthold Engineering as a service to its customers and may be used for informational purposes only. Perthold Engineering assumes no responsibility for errors or omissions in these materials, nor for its use.

Perthold Engineering reserves the right to change specification at any time without notice.

These materials are provided "as is" without warranty of any kind, either expressed or implied, relating to sale and/or use of Perthold Engineering products including liability or warranties relating to fitness for a particular purpose, consequential or incidental damages, merchantability, or infringement of any patent, copyright or other intellectual property right.

Perthold Engineering further does not warrant the accuracy or completeness of the information, text, graphics or other items contained within these materials. Perthold Engineering shall not be liable for any special, indirect, incidental, or consequential damages, including without limitation, lost revenues or lost profits, which may result from the use of these materials.

Perthold Engineering products are not intended for use in medical, life-support devices, or applications involving potential risk of death, personal injury, or severe property damage in case of failure of the product.