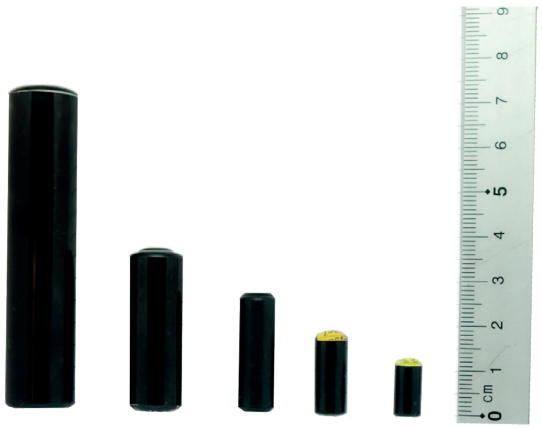
ACOUSTIC TRANSMITTER

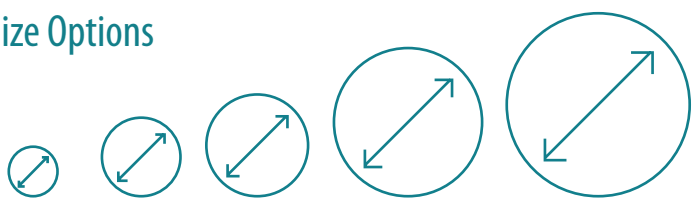
ESSENTIALS

The Thelma Biotel transmitters are energy efficient and versatile platforms developed for a wide range of studies on aquatic species and submerged equipment. The various transmitters are produced in five sizes: 6, 7, 9, 13 and 16 . Transmitter lengths depend on the possible addition of sensors, output power and the desired active lifetime.

In addition to the range of standardized, off-the shelf products, the transmitters are highly customizable in both hardware and software. The sensors available are depth, temperature, acceleration (activity), inclination (tilt angle), mortality (tilt angle), conductivity in fresh water and salinity in salt or brackish water. The various transmitters are produced in five main transmitter diameter sizes: 6.3 mm, 7.3 mm, 9 mm, 12.7 mm, and 16 mm, referred to as size 6, 7, 9, 13 and 16. All sensor combinations are available down to the smallest size, except for the conductivity and salinity products which have a minimum size of 9. The transmitters can be programmed to utilize any carrying frequency between 63-77 kHz, and at any transmitting interval. For fish studies and equipment compatibility, 69 kHz is most commonly used.



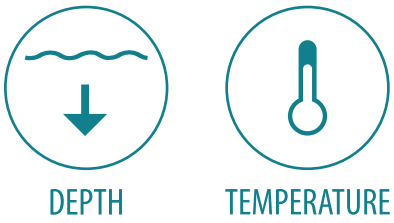
Size Options



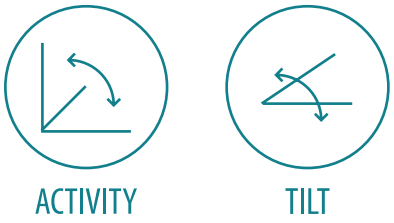
6 mm 7 mm 9 mm 13 mm 16 mm

SPECIFICATIONS

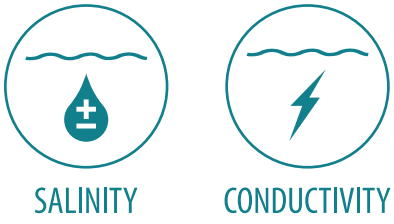
Sensor Options



DEPTH TEMPERATURE



ACTIVITY TILT



SALINITY CONDUCTIVITY

MORTALITY

THELMABIOTEL
www.thelmabiotel.com

TRANSMIT POWER

The acoustic element is chosen specifically to maximize the emitting power while still fitting into the transmitter. Listed below is the measured transmitted power for Thelma Biotel transmitters. Note that the range of transmitters can be problematic to estimate accurately as the acoustic conditions varies from site to site, environmental circumstances and sensitivity of receiver equipment. Thelma Biotel will assist in finding the right transmitter size for your study.

TRANSMITTER SIZE	TRANSMITTE POWER
6	137-139 dB re 1 uPa at 1m
7	139-141 dB re 1 uPa at 1m
9	142-147 dB re 1 uPa at 1m
13	150-153 dB re 1 uPa at 1m
16	157-160 dB re 1 uPa at 1m

SERIAL NUMBERS

All Thelma Biotel transmitters come with a coloured label at the top or bottom of the transmitter marked with the serial number. The serial number on each transmitter corresponds with the serial number found in the related delivery note. Please see your delivery note regarding the individual transmitter data.

STORAGE

If the transmitters are not going to be used immediately upon arrival, we propose to inspect that all transmitters are de-activated. Place a hydrophone/receiver close to the transmitters and check that no signals are received within the maximum transmission delay period.

Storage at low temperatures (i.e. in refrigerator) may have a positive effect on the battery life. It is however not recommended to store batteries at temperatures below 0°C. The transmitter will consume some power while in storage. This will have some effect on battery lifetime, depending on transmitter type and specification.

TRANSMISSION INTERVAL & TRANSMIT COLLISIONS

Coded transmitters generally transmit an ID and optional sensor value at a pseudo-randomly selected time between a pre-set minimum and maximum time delay. The delay times can be chosen freely to optimize for battery life or data rate. It may also be set to a fixed interval, and this interval can be used as a secondary identifier.

Random transmission times is implemented to avoid repeated code collisions. Collisions occur when two transmitters transmit at the same time. The rate of collisions will increase with the transmitter density and increased rate of transmissions. The transmitting interval will also affect the battery lifetime of the transmitters.

Our TBR receivers differentiate between several power levels and store the strongest transmits even though there are overlapping, weaker signals present. They also support multiple frequency channels which can space tags and reduce collisions overall.

Contact Thelma Biotel for further details and advice regarding your proposed study.

THELMABIOTEL
www.thelmabiotel.com

GLOBAL UNIQUE ID

Open Protocol carries a system where each transmitter is identified with a unique identifier consisting of Transmit Number, Transmit Protocol and Transmit Frequency. The identifiers are given in the documentation following the delivery of transmitters, and is easily matched with the data collected at the different acoustic receiver loggers which are make up the global research network.

The Global Unique ID system for Open Protocol produces unique identifiers. All protocols require the starting point of the transmit numbers to be at one, and thus the existence of equal transmit numbers will occur from time to time. However, this does not affect the unique identification, as both protocol and frequency are needed to conclude the identifier (e.g., two global unique ids can look like: 5127 +S64K +69 kHz and 5127 + S64K + 73 kHz). In the example above, even if the transmit numbers are the same, the difference in the frequency will differentiate them and make them unique. See examples in the tables below:

Table 1. Transmitter unit data

TRANSMITTER (SERIAL NUMBER)	TRANSMITTER TYPE
0BC35127	AT-LP7
0BC35127	AT-LP7
C47K5130	HP16
C47K5130	HP16

Table 2. Detection data, unique identifiers

TRANSMIT (ID) NUMBER	PROTOCOL	FREQUENCY (kHz)
5127	S64K	69
5127	S64K	73
7481	OPi	69
7481	S64K	69