

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 four main capsule diameters: 7.3 mm, 9 mm, 13 mm, and 16 mm. 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), conductivity in fresh water and salinity in salt or brackish water. All sensor combinations are available down to the smallest 7.3 mm diameter capsule, except for the conductivity and salinity products which have a minimum diameter of 9 mm. 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.

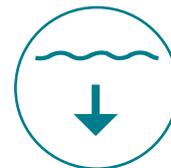


SERIAL NUMBERS

All Thelma Biotel transmitters come with a yellow label at the top or bottom of the transmitter. Here the top four digits reflect the production year and week. The last four digits show the transmitted ID. For transmitters with multiple sensor data more than one ID may be used. Please see your delivery note regarding the individual transmitters.

SPECIFICATIONS

Sensor Options



DEPTH



TEMPERATURE



ACTIVITY



TILT



SALINITY



CONDUCTIVITY

Size Options



7 mm

9 mm

13 mm

16 mm

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TRANSMIT POWER

The acoustic element in the transmitter is chosen specifically to maximize the emitting power while still fitting into the capsule diameter. 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
7.3 mm	139-141 dB re 1 uPa at 1m
9 mm	142-147 dB re 1 uPa at 1m
13 mm	150-153 dB re 1 uPa at 1m
16 mm	157-160 dB re 1 uPa at 1m

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 AND 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.