TRANSMITTERS

V13 Coded Transmitter

Implantable transmitter for small and juvenile species

The V13 coded transmitter, 13 mm in diameter, was developed to provide researchers with the means to track and determine the behaviour patterns of small and juvenile fish. The V13 can function as a simple pinger for location only or can be equipped with sensors to include depth and/or temperature data. When V13 transmitters are used with the VR2 and/or VR3 receiver, they can help meet the challenges of tracking large numbers of fish over large areas. The V13 can also be tracked using the VR28, the VR100, or VR60 (with Option 07 version 2.01) receivers, or the VRAP system.

The V13 transmitter

Coded Mode

"Coded" transmitters send acoustic pings at 69 kHz that are infrequent and random about an average delay. This ping train includes an ID number which permits identification of the specific tag along with the sensor telemetry data.

For applications such as site residency studies and automated monitoring of migrations, coded transmissions are desirable because of significantly increased battery life and the large number of unique tags that can be used on a single frequency.

Physical Specifications

	Battery Option:	1L	1H
V13	Length (mm)	36	36
	Weight in air (g)	11	11
	Weight in water (g)	6	6
	Power Output (dB re 1uPa @1m)	147	156
V13TP	Length (mm)	45	45
	Weight in air (g)	12	12
	Weight in water (g)	6	6
	Power Output (dB re 1uPa @1m)	150	158

Stated tag length, weight and output power are nominal. Small manufacturing variations can be expected.

V13 Coded Tag Sensor Options

For research requiring temperature and depth information, V13 tags can be equipped with temperature, V13T, or depth, V13P, or both temperature and depth sensors, V13TP. V13P pressure transmitters are available in the following full scale pressure options: 50, 100 and 200 meters. V13T temperature transmitters are available in four temperature ranges: -5 to 35°C, -4 to 20°C, 0 to 40°C and 10 to 40°C. (See sensor tables on page 2 for accuracy and resolution details.)

Temperature Sensor		
Range	**Accuracy**	**Resolution**
-5 to 35 °C	±0.5 °C	0.15 °C
-4 to 20 °C	±0.5 °C	0.1 °C
0 to 40 °C	±0.5 °C	0.15 °C
10 to 40 °C	±0.5 °C	0.12 °C

Pressure Sensors (at room temperature)		
Max Depth	**Accuracy**	**Resolution**
50 m	±2.5 m	0.22 m
100 m	±5 m	0.44 m
200 m	±10 m	1.2 m

Available Frequencies

Coded V13 transmitters are available at 69 kHz (standard).

VEMCO

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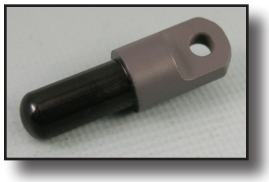
Range Testing Tag



Range testing tags can be provided, at the same output power as your proposed study, to be used to conduct in situ range testing. Range test tags are configured with a FIXED delay and an on-time of two weeks. This is a precautionary measure to ensure that the tag will expire within a reasonable period of time if accidentally dropped overboard. The tag on-time can be reset using the external magnet.

Expected Battery Life

The life span of the V13 depends on the power output (low or high), the delay between transmissions (in seconds), and the types of sensors included. The table below shows the estimated battery life for all V13 transmitters using the most common delay settings. Note that V13 pingers incur a small current drain prior to activation. Tag life will be reduced if tags are shelved for a significant period of time (months). Contact VEMCO for information.

Projected Battery Life (Days)		
Nominal Delay (seconds)	**V13-1L**	**V13-1H**
60	623	196
120	1117	373
180	1538	540

Notes: The transmission rate varies randomly ±50% about the nominal delay value. For example, a 120 second nominal delay indicates that the tag transmits randomly every 60 to 180 seconds.

The projected battery life is an estimate and users will experience a decrease in battery life if their tags are operating in extreme warm or extreme cold temperatures.

VEMCO transmitters are programmed to stop transmitting when they reach their stated battery life. This ensures that tags will operate at published specifications until expiration.

Tags can be programmed for shorter lives, if required.

Please contact VEMCO for additional information regarding battery life for other nominal delay settings.

Programmable ON/OFF

VEMCO transmitters are available with programming options that allow users to take greater advantage of the transmitter's behaviour over the life of their tags. In order to control the characteristics of their tags, users have the option of using between one to four programming steps to define the tags transmission: Status (ON/OFF), time interval, acoustic power level (L/H) and nominal delay.

This is an example of how tag programming options can be utilized to provide a staged release tag behaviour.

Interval	Status	Time (Days)	Power (L/H)	Nominal Delay (sec)
Step 1	ON	1	L	30
Step 2	OFF	9		
Step 3	ON	92	H	60
Step 4	ON	589	L	120

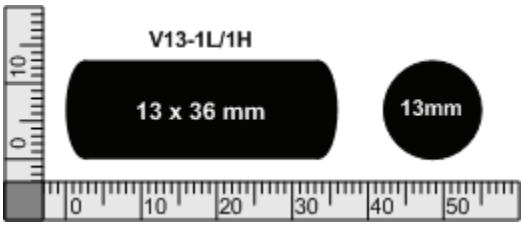
When finished LOOP back to Step 4. Estimated tag life in this example is 691 days.

Step 1: The tag is programmed to start in LOW power mode with a nominal delay setting of 30 seconds for a period of 1 day. This allows a researcher to activate a tag and have it transmit for 1 day during the surgical implantation phase of the study.

Step 2: The tag is programmed to turn OFF for a period of 9 days. In order to conserve battery life while the animals recover from surgery, the tags are switch to the OFF status since the location of the animals is known.

Step 3: The tag is programmed to turn ON in HIGH power mode with a nominal delay setting of 60 seconds for a period of 92 days. This allows a researcher to release and track the animals during a 92 day migration period through a given study area.

Step 4: The tag is programmed to stay ON in LOW power mode with a nominal delay setting of 120 seconds for a period of 589 days. This allows a researcher the ability to track the animals for 589 days during what might be a more residency type setting. Note the Loop control setting is set to Step 4 thus keeping the tag in the ON status until the tag reaches its battery end of life.



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