

V9 Coded Transmitters



Implantable transmitter for small and juvenile species

The **V9 coded tag**, 9 mm in diameter, was developed to provide researchers with the means to track and determine the behaviour patterns of small and juvenile fish. The V9 tag can function as a simple pinger giving location only, or can be equipped with depth and/or temperature sensors. V9 coded transmitters operate at 69 kHz and can be detected by all VEMCO 69 kHz receivers.

As one of our smaller tags, V9s have been successfully implanted in salmon smolts as small as 150 mm fork length and feature rounded ends for better implant retention.

Coded Mode

“Coded” pingers 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 and sensor data, if applicable. 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 IDs available on a single frequency.



Available with both depth and/or temperature sensor options

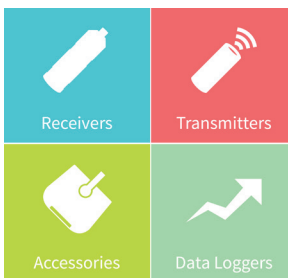
V9 Coded Tag Sensor Options

For research requiring temperature and depth information, V9 tags can be equipped with temperature (V9T), depth (V9P) or both temperature and depth (V9TP). V9P pressure transmitters are available in the following full scale pressure options: 17, 34, 68, 136, 204 and 290 meters. V9T 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.)

Physical Specifications

	Battery Option:	1L	1H	2L	2H
V9	Length (mm)	24	24	27.5	27.5
	Weight in air (g)	3.6	3.6	4.5	4.5
	Weight in water (g)	2	2	2.7	2.7
	Power Output (dB re 1uPa @1m)	146	151	146	151
V9P/V9TP	Length (mm)	–	–	31	31
	Weight in air (g)	–	–	4.9	4.9
	Weight in water (g)	–	–	2.8	2.8
	Power Output (dB re 1uPa @1m)	–	–	146	151
V9T	Length (mm)	–	–	29	29
	Weight in air (g)	–	–	4.6	4.6
	Weight in water (g)	–	–	2.8	2.8
	Power Output (dB re 1uPa @1m)	–	–	146	151

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



Tel: (902) 450-1700
Fax: (902) 450-1704

www.vemco.com

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

This tag can detect and report certain fault conditions in the pressure sensor. A raw unscaled data value of 0 indicates a problem was detected and no pressure measurement is available. This value will never occur in normal operation. Please contact VEMCO.

Pressure Sensors (at room temperature)		
Max Depth	Accuracy	Resolution
17 m	±0.5 m	0.075 m
34 m	±0.5 m	0.15 m
68 m	±1 m	0.3 m
136 m	±1 m	0.6 m
204 m	±1 m	0.9 m
290 m	±2 m	1.28 m

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 V9 depends on battery size [1 or 2] power output [high or low], the delay between ping trains [in seconds], and the types of sensors included. The table below shows the estimated battery life for the V9-2L and V9-2H transmitter battery options using the most common delay settings. Note that V9 tags 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 (sec)	V9-2L	V9-2H	V9P-2L	V9P-2H
60	512	197	335	130
120	889	366	537	234
180	912	520	675	324

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. Tags can be programmed for shorter lives, if required. Please contact VEMCO for more information regarding battery life or other battery options and 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	61	H	60
Step 4	ON	203	L	120

When finished LOOP back to Step 4. Estimated tag life in this example is 274 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 61 days. This allows a researcher to release and track the animals during a 61 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 203 days. This allows a researcher the ability to track the animals for 203 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.