V9 / V9TP-180 kHz Coded Transmitters

Monitor movement and positioning activity of larger animals for up to two years

Transmitters

V9-180 tag now available with depth and temperature sensors!

The introduction of V9-180 kHz transmitters has expanded VEMCO's 180 kHz capability to include longer life tags that can be used on larger animals. 180 kHz tags have been used widely on a variety of fish species from salmon smolts to arctic cod to various reef species.

Why 180 kHz Frequency?

The V9, operating at 180 kHz, is designed to work well in both fresh and salt water. Choosing this frequency enabled VEMCO to develop a small, lightweight tag that operates well in marine environments. Tags with operating frequencies greater than 200 kHz are less effective in salt water. Depending on the conditions of your location, the V9-180 kHz tag can reach 300 metres range.

The V9-180 kHz Transmitter Allows You to:

- measure 2D and 3D position with very high precision
- conduct long-term studies of predator movements (up to two years)
- monitor movements of non-native fish species to understand their impact on the ecosystem and its inhabitants

Compatible with HR2 and VR2W-180kHz Receivers

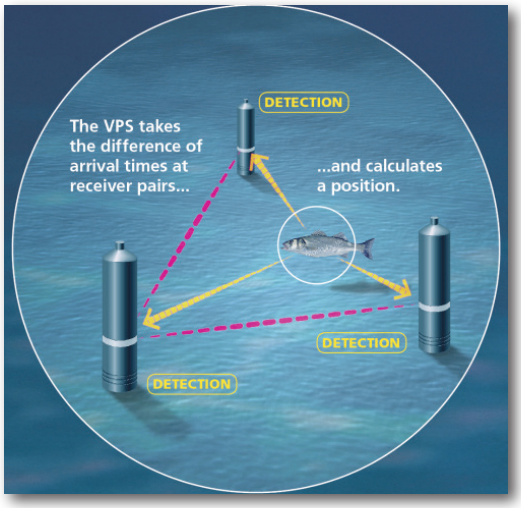
The V9-180 kHz tag works with VEMCO's new High Residence Receiver (HR2) as well as the VR2W-180 kHz receiver. The V9-180 kHz tag can also be detected by VEMCO's VR100 acoustic tracking receiver. The VR4-UWM, which is capable of long term deployments and communicating remotely to a surface modem, can detect both 69 kHz and 180 kHz transmitters. V9-180 kHz tags cannot be detected by a VR2W-69 kHz receiver. **Note that tags programmed with HR programming only, can only be detected by an HR2 receiver.**

Detect More Tags

Researchers can now tag and release many more fish simultaneously due to the detection capabilities of our new tag transmission systems. See the following page for more details on HR and PPM.

180 kHz Positioning Studies

If your research requires detailed movement data, the V9-180 kHz has flexible programming options that allows you to conduct long term positioning studies using our traditional VR2W-based VPS (VEMCO Positioning System).



Now with 3D fine scale positioning capability!

Receivers | Transmitters | Accessories | Data Loggers

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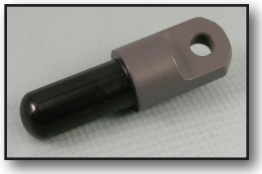
V9 Battery Life Examples

V9-2H			
Type	Nominal Delay (sec)	Life (days)	
		95%	50%
HR	5	500	570
PPM	30	580	635
HR/PPM	5/30	320	355

V9TP-2H			
Type	Nominal Delay (sec)	Life (days)	
		95%	50%
HR	5	335	385
PPM	30	445	520
HR/PPM	5/30	215	250

Please consult with VEMCO if you are considering 180 kHz products. We can help you fine tune your needs!

Range Testing, VPS Sync, and Reference and Sentinel Tags



The V9-180 kHz tag can be purchased with a convenient and permanent cap that allows for easy attachment to receiver lines. In addition, the long life and transmission flexibility of the V9-180 kHz tag makes it ideal for use as a syncronization tag to synchronize receiver clocks and as a reference tag to calibrate positioning accuracy within a 180 kHz VPS study. The V9-180 kHz tag also has the same acoustic power output as a V5 making it an excellent choice for 180 kHz range testing. To order a V9-180 kHz tag with an attachment cap, specify model V9-2x-180k-3.

VEMCO Tag Activator (VTA)

The VTA is a handheld device that enables users to quickly and easily activate 180 kHz transmitters. The manual on how to use the VTA can be found on the VEMCO website Downloads page. Note that the VTA model required by V9-180 kHz tags is VTA-180k-V9.

Programmable ON/OFF

VEMCO transmitters are available with programming options that allow users to take greater advantage of fish 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 (H) and nominal delay.

This is an example of how V9-180 kHz tag programming options can be utilized to provide a staged release tag behaviour.

Interval	Status	Time Days	Power (H)	Nominal Delay (sec)
Step 1	ON	1	H	30
Step 2	OFF	9		
Step 3	ON	45	H	30
Step 4	ON	600	H	60

Step 1: The tag is programmed to start in HIGH 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 switched 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 30 seconds for a period of 45 days. This allows a researcher to release and track the animals during a 45 day migration period through a given study area.

Step 4: The tag is programmed to stay ON in HIGH power mode with a nominal delay setting of 60 seconds for a period of 600 days. This allows a researcher the ability to track the animals for 600 days during what might be a more residency type setting.

Physical Specifications

Battery Option	V9-2H	V9TP-2H
Frequency (kHz)	180	180
Length (mm)	26.1	26.5
Diameter	9	9
Weight in air (g)	3.7	3.9
Weight in water (g)	2.0	2.2
Power Output (dB re 1uPa @1m)	143	143

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

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Pressure Sensors (from -5ºC to 40ºC)		
Max Depth	**Accuracy**	**Resolution**
17 m	± 0.5 m	0.07 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

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.

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

High Residence (HR) and Pulse Position Modulation PPM transmission schemes offer new ways of detecting your tagged animals! 180 kHz tags can transmit ID codes on HR and PPM virtually at the same time.

High Residence (HR)

HR represents a more aggressive transmission system that offers the ability to detect many more tagged animals at once compared to PPM (Pulse Position Modulation). Each HR ID code is embedded in each short ping transmitted by the tag. This allows the HR2 receiver to detect many IDs in a short period of time. When used with the new HR2 receiver, HR technology is also capable of very precise signal timing which makes HR ideal for anyone interested in accurate spatial positioning of many tagged animals in a short period of time or monitoring the movements of animals moving quickly through acoustic gates (i.e. river survival study).

Pulse Position Modulation (PPM)

PPM is a series of pings (typically 8) transmitted as a pattern that represents a unique ID code. A 180 kHz PPM ID is typically transmitted over a one to two second period. A randomized delay between transmissions permits the researcher to monitor many fish over time. PPM is a also a very reliable method for transmitting data meaning that error rates are very low, Therefore, researchers do not have to put a significant amount of effort into validating data. Typically, researchers can accept two transmissions within a short period of time as validation that the tagged animal is present.

Advantages of VEMCO's 180 kHz Product Line

- Two transmission systems (HR and PPM) in one tag provides flexibility for study designs and research objectives
- Two VPS systems in one - researchers can position the same fish with two coding systems (i.e. HR could have an advantage over PPM in specific conditions)
- Combine HR2 and VR2W-180 kHz receivers in the same study
- Real time monitoring of HR and PPM tags (HR2s)
- HR and PPM available in all 180 kHz tag models (V5, V7, V9)

VEMCO will soon publish application notes to provide researchers with field deployment tips and guidance on how to choose tag programming and design receiver layouts.

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