



V7 Coded Transmitters

Implantable transmitter for salmon smolt and juvenile species

The **V7 coded transmitter**, 7 mm in diameter, was developed to provide researchers with the means to track the behaviour patterns of small and juvenile fish. This tag is particularly suited for seamless monitoring of salmon smolt migrations. V7 coded transmitters operate at 69 kHz and can be detected by all VEMCO 69 kHz receivers. V7s can be used to help meet the challenges of tracking large numbers of fish over large areas.

Coded Mode

“Coded” pingers send acoustic pulse trains that are infrequent and random about an average delay. This pulse train includes an ID number which permits identification of the specific tag.

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 (>1,000,000) of unique tags available.

V7 Coded Tag Sensor Options

For research requiring temperature and depth information, V7 tags can be equipped with temperature (V7T), depth (V7P) or both temperature and depth (V7TP). V7P pressure transmitters are available in the following full scale pressure options: 17, 34, 68, 136 and 204 meters. V7T 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.



| 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 |
| 17m | ±0.5 m | 0.075 m |
| 34m | ±0.5 m | 0.15 m |
| 68 m | ±1.0 m | 0.3 m |
| 136 m | ±1.0 m | 0.6 m |
| 204 m | ±1.0 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.

Physical Specifications

| Model: | V7-2L | V7-2H | V7-4L | V7-4H | V7TP-2L | V7TP-2H | V7TP-4L | V7TP-4H |
|--|-------|-------|-------|-------|---------|---------|---------|---------|
| Length (mm) | 19.5 | 21.5 | 21.5 | 21.5 | 22 | 22 | 24 | 24 |
| Diameter (mm) | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Weight in air (g) | 1.5 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 2 | 2 |
| Weight in water (g) | 0.7 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 1.1 | 1.1 |
| Power Output (dB re 1 uPa @ 1m) | 137 | 141 | 137 | 141 | 137 | 141 | 137 | 141 |

Stated tag lengths are nominal. Small manufacturing variations can be expected. Due to the small size of the V7s, there is greater manufacturing variation than with our larger tags. V7s are individually screened to ensure they meet the power output stated. Some tags will have higher output power. Range test tags are chosen to be close to the minimum specification to ensure range tests are adequate.

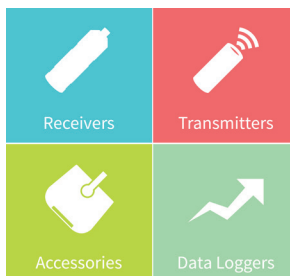


Now Available with Temperature and/or Depth Sensors

High and low power options now available

Enables tracking and 3D VPS studies of smaller animals

V7TP specifications and information are preliminary and subject to change without notice



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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 V7 coded tag depends on battery type/size (either 2 or 4), power output (high (H) or low (L)), the delay between code transmissions (in seconds), and the types of sensors included. The larger the battery, the greater the life and/or power output. Larger batteries increase transmitter length and weight. The table below shows the estimated battery life for the V7-2L, -2H, -4L and -4H transmitter battery options using the most common delay settings. Note that V7 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 (secs) | V7-2L | V7-2H | V7-4L | V7-4H |
| 60 | 125 | 45 | 181 | 64 |
| 120 | 213 | 82 | 307 | 119 |
| 180 | 281 | 117 | 404 | 168 |

For sensor battery life estimates, please contact VEMCO.

Notes: The transmission rate varies randomly $\pm 50\%$ 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.

The table above is for our most popular nominal delay settings. Please contact VEMCO for more 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 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 (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 | 30 | L | 60 |
| Step 4 | ON | 110 | L | 120 |

When finished LOOP back to Step 4. Estimated tag life in this example is 250 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 switched to the OFF status since the location of the animals is known.

Step 3: The tag is programmed to turn ON in LOW power mode with a nominal delay setting of 60 seconds for a period of 30 days. This allows a researcher to release and track the animals during a 30 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 110 days. This allows a researcher the ability to track the animals for 110 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.