Flexi-Pinger
ALP-365 Series
Acoustic Locator
Pingers

ALP-365
ALP-365/EL
ALP-365/SW

USER'S Manual

January, 2002
Revision A
(P/N 006222)

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Preface

This user's manual provides the necessary information needed to operate and maintain the Benthos ALP-365 Series Acoustic Locator Pingers. The manual covers the following models:

- **ALP-365** – The base model
- **ALP-365/EL** – The base model ALP-365 configured in a longer housing for additional batteries and extended operating life.
- **ALP-365/SW** – The base model ALP-365 configured in a flashlight-style housing featuring both a manual ON/OFF switch and a water-activated ON/OFF switch.

If this is the first time using the ALP-365 Series Acoustic Locator Pingers, please read the entire manual to become familiar with the unit's operation before deployment. The manual is divided into four sections:

Section 1 Introduction describes the pinger and its typical uses.

Section 2 Specifications lists general specifications for all standard ALP-365 Series Acoustic Locator Pingers.

Section 3 Deployment covers unpacking, battery installation and pinger configuration for the ALP-365 Series Acoustic Locator Pingers. The section concludes with brief notes on pre-deployment and maintenance.

Section 4 Warranty Information.

Proprietary Information

Changes

Benthos reserves the right to make changes to meet new specifications at any time without incurring any obligation to modify previously installed units. This manual is provided for informational and reference purposes only and is subject to change without notice.

Notes and Cautions

Where applicable, special notes and cautions are presented as follows:

⇛ **Note:** A reminder to check that certain criteria are met before proceeding further in a step or sequence.

⚠ **Caution:** A reminder that dangerous consequences could result if certain recommended procedures are not followed.

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Section 1 Introduction

1.1 Overview

The Benthos ALP-365 Series Acoustic Locator Pingers, offer a versatile array of low-cost sub-sea acoustic markers (Figure 1). Each model in the series features user-selectable transmit frequencies, acoustic outputs and pulse repetition rates, and provides a consistent reliable beacon to locate underwater instrumentation, geographical features, structures and sites.

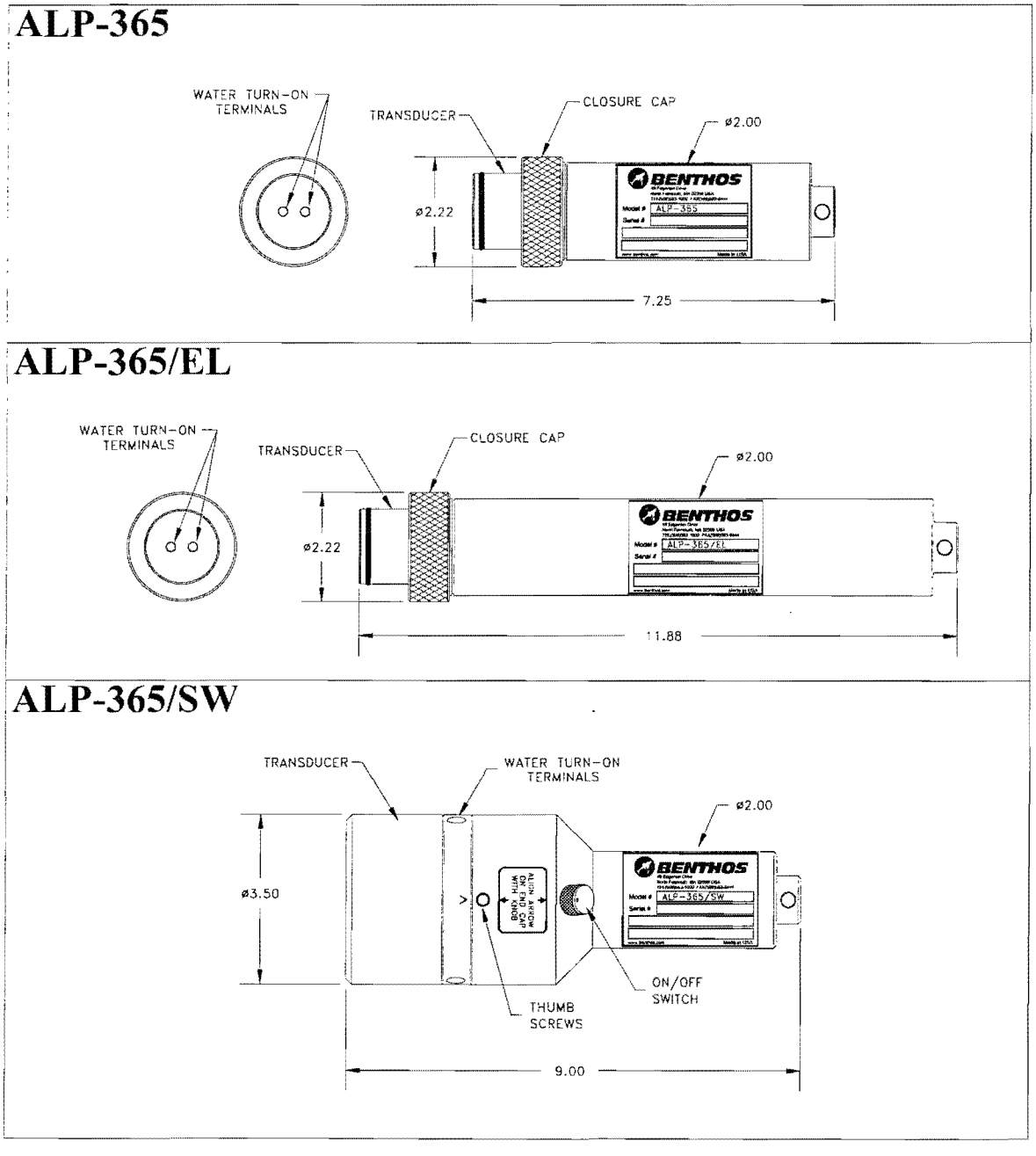

Figure 1 The Benthos ALP-365 Series Acoustic Locator Pingers

1.2 External Construction

The ALP-365 Series Acoustic Locator Pingers are small, self-contained acoustic beacons housed in cylindrical, hard-anodized aluminum pressure housings. A removable end-cap assembly includes a transducer and two terminals for the pinger's water-activated switch. The ALP-365/SW has a manual switch on the housing in addition to the water-activated switch in the end-cap assembly.

The ALP-365 Series have two different end-cap styles:

- On the **ALP-365** and the **ALP-365/EL**, the end cap is attached to the housing with a threaded Delrin closure cap.
- On the **ALP-365/SW**, the end cap is attached to the housing with three thumbscrews.

With both styles, the end cap can be easily removed to provide access to the battery clips and electronics mounted on the inside of the end cap. A drill-through flange at the other end of the ALP-365 is provided for tethering the pinger to instrumentation or an anchor.

The product label affixed to the housing lists the unit's model number and serial number.

1.3 Internal Construction

The internal components include an electronics assembly and connections for 9-Volt batteries mounted on a single printed circuit board. Two Customer-supplied 9-Volt batteries power the ALP-365 and the ALP-365/SW and six Customer-supplied 9-Volt batteries power the ALP-365/EL. There are three user selectable hardware settings also located on the printed circuit board, acoustic output, repetition rate and transmit frequency, providing the flexibility needed for many applications. Instructions for battery installation and hardware settings are given in Section 3.2.

1.4 Series Models

Base Model - The base model **ALP-365** features a range of selectable operating frequencies and repetition rates. This general-purpose pinger is suited for applications such as long-term deployment on offshore moorings.

Extended Life - The **ALP-365/EL** is an ALP-365 with an extended housing that accommodates four additional batteries. The additional batteries triple the operating life of the pinger.

Manual Switch - The **ALP-365/SW** includes both the water-activated switch on the end cap and a manual ON-OFF switch mounted on the housing. A jumper on the circuit board determines the switch used to activate the unit.

Section 2 Specifications

Table 1 Model ALP-365 Specifications	
Transmit Frequency	Factory-set and user-selectable at: 25 kHz to 40 kHz in 0.5 kHz increments
Acoustic Output	Factory-set and user-selectable at: 162 dB re 1 µPa @ 1 meter; 0.125 W 168 dB re 1 µPa @ 1 meter; 0.5 W 174 dB re 1 µPa @ 1 meter; 2.0 W 177 dB re 1 µPa @ 1 meter; 5.0 W
Transmit Pulse Length	4 milliseconds
Transmit Repetition Rate	Factory-set and user-selectable at: 0.512 seconds 1.024 seconds 2.048 seconds
Operational Depth	2,460 feet (750 meters)
Dimensions	7.25 in (18.5 cm) long 2.0 in (5.1 cm) diameter
Weight	1.5 pounds (0.68 kg) in air 0.5 pound (0.23 kg) in water
Power	Two 9-Volt alkaline or lithium batteries (Customer supplied)
Operating Life	Varies depending on battery type, acoustic output and repetition rate; see Table 4.
Specifications are subject to change.	

Table 2 Model ALP-365/EL Specifications	
Transmit Frequency	Factory-set and user-selectable at: 25 kHz to 40 kHz in 0.5 kHz increments
Acoustic Output	Factory-set and user-selectable at: 162 dB re 1 µPa @ 1 meter; 0.125 W 168 dB re 1 µPa @ 1 meter; 0.5 W 174 dB re 1 µPa @ 1 meter; 2.0 W 177 dB re 1 µPa @ 1 meter; 5.0 W
Transmit Pulse Length	4 milliseconds
Transmit Repetition Rate	Factory-set and user-selectable at: 0.512 seconds 1.024 seconds 2.048 seconds
Operational Depth	2,460 feet (750 meters)
Dimensions	11.88 in (30.2 cm) long 2.0 in (5.1 cm) diameter
Weight	2.25 pounds (1.0 kg) in air 1 pound (0.45 kg) in water
Power	Six 9-Volt alkaline or lithium batteries (Customer supplied)
Operating Life	Varies depending on battery type, acoustic output and repetition rate; see Table 4.
Specifications are subject to change.	

Table 3 Model ALP-365/SW Specifications

Transmit Frequency	Factory-set and user-selectable within three bands at: Low frequency: 9 kHz to 14 kHz in 0.5 kHz increments Mid frequency: 15 kHz to 24 kHz in 0.5 kHz increments High frequency: 25 kHz to 40 kHz in 0.5 kHz increments
Acoustic Output	Factory-set and user-selectable at: 162 dB re 1 µPa @ 1 meter; 0.125 W 168 dB re 1 µPa @ 1 meter; 0.5 W 174 dB re 1 µPa @ 1 meter; 2.0 W 177 dB re 1 µPa @ 1 meter; 5.0 W
Transmit Pulse Length	4 milliseconds
Transmit Repetition Rate	Factory-set and user-selectable at: 0.512 seconds 1.024 seconds 2.048 seconds
Operational Depth	3,280 feet (1,000 meters)
Dimensions	9.0 in (22.9 cm) long 2.0 in (5.1 cm) handle diameter 3.5 in (8.9 cm) end-cap diameter
Weight	3.5 pounds (1.6 kg) in air 1 pound (0.45 kg) in water
Power	Two 9-Volt alkaline or lithium batteries (Customer supplied)
Operating Life	Varies depending on battery type, acoustic output and repetition rate; see Table 4.
Specifications are subject to change.	

Table 4 ALP-365 Series Operating Life versus Acoustic Output

Acoustic Output	ALP-365 and ALP-365/SW Two 9-Volt Batteries		ALP-365/EL Six 9-Volt Batteries	
	Alkaline	Lithium	Alkaline	Lithium
Operating at 0.512 Second Repetition Rate				
162 dB	20 days	45 days	60 days	135 days
168 dB	10 days	20 days	30 days	60 days
174 dB	3 days	6 days	9 days	18 days
177 dB	1 day	2 days	3 days	6 days
Operating at 1.024 Second Repetition Rate				
162 dB	24 days	55 days	72 days	165 days
168 dB	15 days	30 days	45 days	90 days
174 dB	6 days	12 days	18 days	36 days
177 dB	2 days	4 days	6 days	12 days
Operating at 2.048 Second Repetition Rate				
162 dB	26 days	60 days	78 days	180 days
168 dB	20 days	45 days	60 days	135 days
174 dB	10 days	20 days	30 days	60 days
177 dB	4 days	8 days	12 days	24 days
These specifications are based on a pinger transmitting a 4 millisecond pulse (±10%) at the specified repetition rate and transmitting between 25 kHz and 40 kHz.				
Specifications are subject to change.				

Section 3 Deployment

3.1 Unpacking and Inspection

Each ALP-365 Series Acoustic Locator Pinger is packed in cushioning material and shipped in a sealed cardboard carton. Every effort is made at the factory to pack the equipment to prevent damage during shipment.

The pinger is shipped without batteries and is set to the operating parameters specified by the Customer or randomly set if not specified.

As with any sophisticated electronic equipment, Benthos products should be handled with a reasonable amount of care during unpacking, transporting and storing.

- Carefully inspect the pinger for physical damage when unpacked, and report any such damage to the freight carrier and to the Benthos sales office at (508) 563-1000.
- Pay particular attention to make sure that:
  - The seal between the top end cap and the pressure housing is intact.
  - There are no gouges or defects in the transducer or pressure housing itself.
  - The information on the product label tag affixed to the pinger matches the Customer's requested specifications.
  - If the ALP-365 is to be stored for an extended period, do not install the batteries.

3.2 Pinger Setup

Preparing the ALP-365 Series Acoustic Locator Pingers for deployment involves:

Step 1 Transmit Frequency Selection
Step 2 Acoustic Output Selection
Step 3 Repetition Rate Selection
Step 4 Activation Switch Selection
Step 5 Battery Installation

Check all switch, push-on-jumper settings and battery connections before use to ensure the settings best match the deployment application.

Follow these procedures to open the unit:

- Remove the transducer end cap.
  - For an **ALP-365** or an **ALP-365/EL**, unscrew the Delrin closure cap by turning it counterclockwise.
  - For an **ALP-365/SW**, remove the three thumbscrews holding the end cap to the housing.

⇒ **Note:** Make sure the unit is thoroughly dried before removing the end cap.

⚠ **Caution:** Never use a screwdriver or other prying device to separate the end cap from the housing. Damage to the end cap or housing could result in leakage when deployed.

- Gently slide the electronics and battery assembly out of the housing.
- Note the location of the push-on-jumpers and switches for setting the operating parameters (Figure 2).

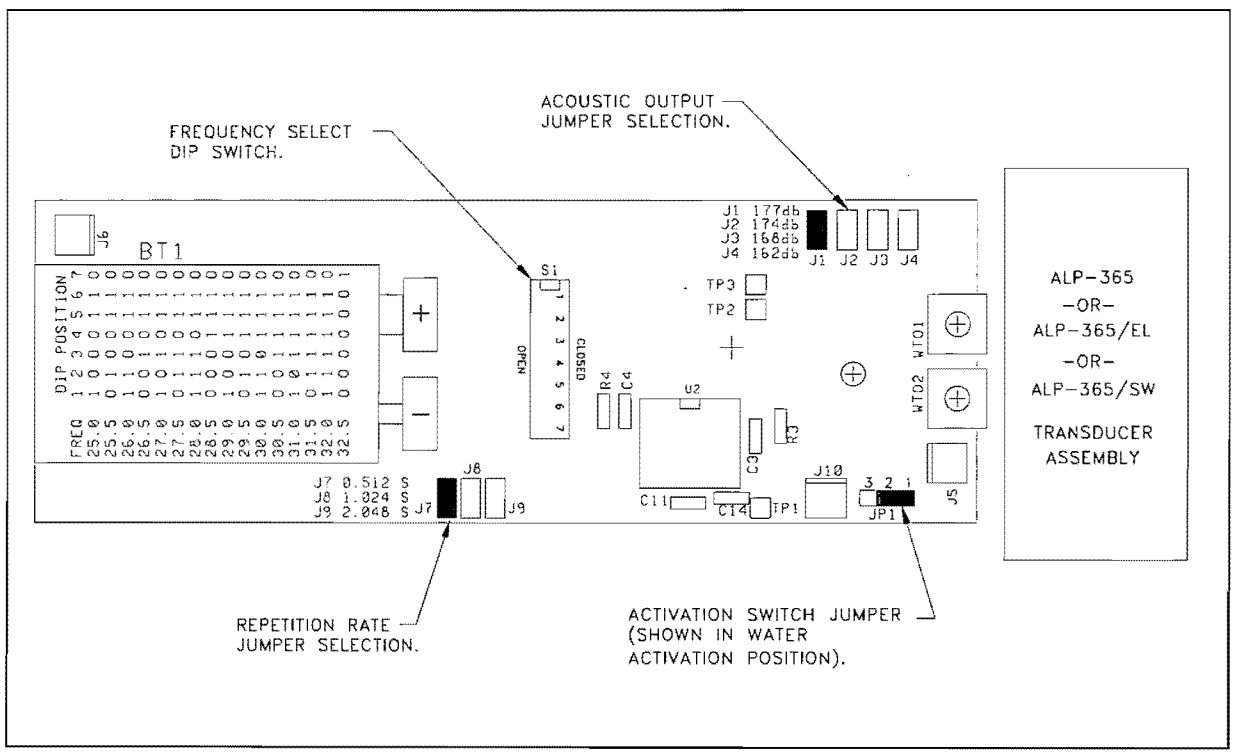

Figure 2 The ALP-365 Series Hardware Settings

Step 1 Transmit Frequency Selection

The ability to select the ALP-365 transmit frequency eases compatibility with specific receivers or differentiates the pinger from others deployed in the area. The frequency is set with the seven-switch DIP on the circuit board adjacent to the transducer (see Figure 2).

To set the transmit frequency, set the DIP switch for the selected frequency as specified in one of the following tables:

Table 5 ALP-365, ALP-365/EL and the ALP-365/SW high band frequencies

Table 6 ALP-365/SW mid band frequencies

Table 7 ALP-365/SW low band frequencies

Table 5 ALP-365, ALP-365/EL and ALP-365/SW High Band Transmit Frequency DIP Switch Settings

kHz	*Switch 1*	*Switch 2*	*Switch 3*	*Switch 4*	*Switch 5*	*Switch 6*	*Switch 7*
40.0	Closed	Closed	Closed	Closed	Open	Open	Closed
39.5	Open	Closed	Closed	Closed	Open	Open	Closed
39.0	Closed	Open	Closed	Closed	Open	Open	Closed
38.5	Open	Open	Closed	Closed	Open	Open	Closed
38.0	Closed	Closed	Open	Closed	Open	Open	Closed
37.5	Open	Closed	Open	Closed	Open	Open	Closed
37.0	Closed	Open	Open	Closed	Open	Open	Closed
36.5	Open	Open	Open	Closed	Open	Open	Closed
36.0	Closed	Closed	Closed	Open	Open	Open	Closed
35.5	Open	Closed	Closed	Open	Open	Open	Closed
35.0	Closed	Open	Closed	Open	Open	Open	Closed
34.5	Open	Open	Closed	Open	Open	Open	Closed
34.0	Closed	Closed	Open	Open	Open	Open	Closed
33.5	Open	Closed	Open	Open	Open	Open	Closed
33.0	Closed	Open	Open	Open	Open	Open	Closed
32.5	Open	Open	Open	Open	Open	Open	Closed
32.0	Closed	Closed	Closed	Closed	Closed	Closed	Open
31.5	Open	Closed	Closed	Closed	Closed	Closed	Open
31.0	Closed	Open	Closed	Closed	Closed	Closed	Open
30.5	Open	Open	Closed	Closed	Closed	Closed	Open
30.0	Closed	Closed	Open	Closed	Closed	Closed	Open
29.5	Open	Closed	Open	Closed	Closed	Closed	Open
29.0	Closed	Open	Open	Closed	Closed	Closed	Open
28.5	Open	Open	Open	Closed	Closed	Closed	Open
28.0	Closed	Closed	Closed	Open	Closed	Closed	Open
27.5	Open	Closed	Closed	Open	Closed	Closed	Open
27.0	Closed	Open	Closed	Open	Closed	Closed	Open
26.5	Open	Open	Closed	Open	Closed	Closed	Open
26.0	Closed	Closed	Open	Open	Closed	Closed	Open
25.5	Open	Closed	Open	Open	Closed	Closed	Open
25.0	Closed	Open	Open	Open	Closed	Closed	Open

Table 6 ALP-365/SW Mid Band Transmit Frequency DIP Switch Settings

kHz	*Switch 1*	*Switch 2*	*Switch 3*	*Switch 4*	*Switch 5*	*Switch 6*	*Switch 7*
24.0	Closed	Closed	Closed	Closed	Open	Closed	Open
23.5	Open	Closed	Closed	Closed	Open	Closed	Open
23.0	Closed	Open	Closed	Closed	Open	Closed	Open
22.5	Open	Open	Closed	Closed	Open	Closed	Open
22.0	Closed	Closed	Open	Closed	Open	Closed	Open
21.5	Open	Closed	Open	Closed	Open	Closed	Open
21.0	Closed	Open	Open	Closed	Open	Closed	Open
20.5	Open	Open	Open	Closed	Open	Closed	Open
20.0	Closed	Closed	Closed	Open	Open	Closed	Open
19.5	Open	Closed	Closed	Open	Open	Closed	Open
19.0	Closed	Open	Closed	Open	Open	Closed	Open
18.5	Open	Open	Closed	Open	Open	Closed	Open
18.0	Closed	Closed	Open	Open	Open	Closed	Open
17.5	Open	Closed	Open	Open	Open	Closed	Open
17.0	Closed	Open	Open	Open	Open	Closed	Open
16.5	Open	Open	Open	Open	Open	Closed	Open
16.0	Closed	Closed	Closed	Closed	Closed	Open	Open
15.5	Open	Closed	Closed	Closed	Closed	Open	Open
15.0	Closed	Open	Closed	Closed	Closed	Open	Open
14.5	Open	Open	Closed	Closed	Closed	Open	Open

Table 7 ALP-365/SW Low Band Transmit Frequency DIP Switch Settings

kHz	*Switch 1*	*Switch 2*	*Switch 3*	*Switch 4*	*Switch 5*	*Switch 6*	*Switch 7*
14.0	Closed	Closed	Open	Closed	Closed	Open	Open
13.5	Open	Closed	Open	Closed	Closed	Open	Open
13.0	Closed	Open	Open	Closed	Closed	Open	Open
12.5	Open	Open	Open	Closed	Closed	Open	Open
12.0	Closed	Closed	Closed	Open	Closed	Open	Open
11.5	Open	Closed	Closed	Open	Closed	Open	Open
11.0	Closed	Open	Closed	Open	Closed	Open	Open
10.5	Open	Open	Closed	Open	Closed	Open	Open
10.0	Closed	Closed	Open	Open	Closed	Open	Open
9.5	Open	Closed	Open	Open	Closed	Open	Open
9.0	Closed	Open	Open	Open	Closed	Open	Open

Step 2 Acoustic Output Selection

Selecting the acoustic output provides flexibility for multiple applications where low power, long life is needed or high power and shortened life is required. The pinger's acoustic output level is set by connecting one of the four jumpers (**J1** through **J4**) located at the end of the board near the transducer (Figure 2). Table 8 gives the resulting output for each push-on-jumper position.

⇒ **Note:** Increasing power level significantly reduces the battery life (see Table 4).

- Use the push-on-jumper to connect the appropriate pins.

Table 8 Acoustic Output Setting

Series	Jumper Position			
	J1	**J2**	**J3**	**J4**
All	177 dB	174 dB	168 dB	162 dB

Step 3 Repetition Rate Selection

Selecting the repetition rate provides the flexibility to increase the interval between pulses to extend the battery life or, if battery life is not an issue, decrease the interval for quicker receiver updates. The pinger's repetition rate is set by connecting one of the three jumpers (**J7** through **J9**) located at the edge of the board near the battery terminals (Figure 2). The resulting repetition rate for each jumper position is given in Table 9.

⇒ **Note:** Increasing the repetition rate reduces the battery life (see Table 4).

- Use the push-on-jumper to connect the appropriate pins.

Table 9 Repetition Rate Setting

Series	Jumper Position		
	J7	**J8**	**J9**
All	0.512 seconds	1.024 seconds	2.048 seconds

Step 4 Activation Switch Selection

The ALP-365 Series Acoustic Locator Pingers have two modes of activation that are easily set by moving a push-on jumper located on **JP1** on the electronic assembly (Figure 2).

Water-Turn-On: **All Series** - The water turn on mode allows the unit to activate only when submerged in water and turn off when removed from the water. Refer to Figure 1 for the location of the water-turn-on terminals.

Battery/Switch: **ALP-365 and ALP-365/EL** - Activating the unit when the batteries are installed reduces the corrosion build up on the water-turn-on terminals for long term deployments. Verify the hard-wired jumper was installed in location **J10** on the board before selecting (Figure 2).

ALP-365/SW - Activating the unit by rotating the switch reduces the corrosion build up on the water-turn-on contacts for long term deployments and can be activated/deactivated underwater by a diver.

The resulting switch activation for each jumper position is given in Table 10.

- Use the push-on-jumper to connect the appropriate pins.

Table 10 Activation Switch Setting

Series	JP1 Jumper Location	Activation Mode
ALP-365 & ALP-365/EL	Pins 1 & 2	Water-Turn-On
	Pins 2 & 3	Battery
ALP-365/SW	Pins 1 & 2	Water-Turn-On
	Pins 2 & 3	Switch

Step 5 Battery Installation

ALP-365 Series pingers are shipped without batteries.

Follow these procedures to install the batteries:

- Clip in the alkaline or lithium 9-Volt batteries (Figure 3).
  - Install two batteries for the **ALP-365** or the **ALP-365/SW**.
  - Install six batteries for the **ALP-365/EL**.

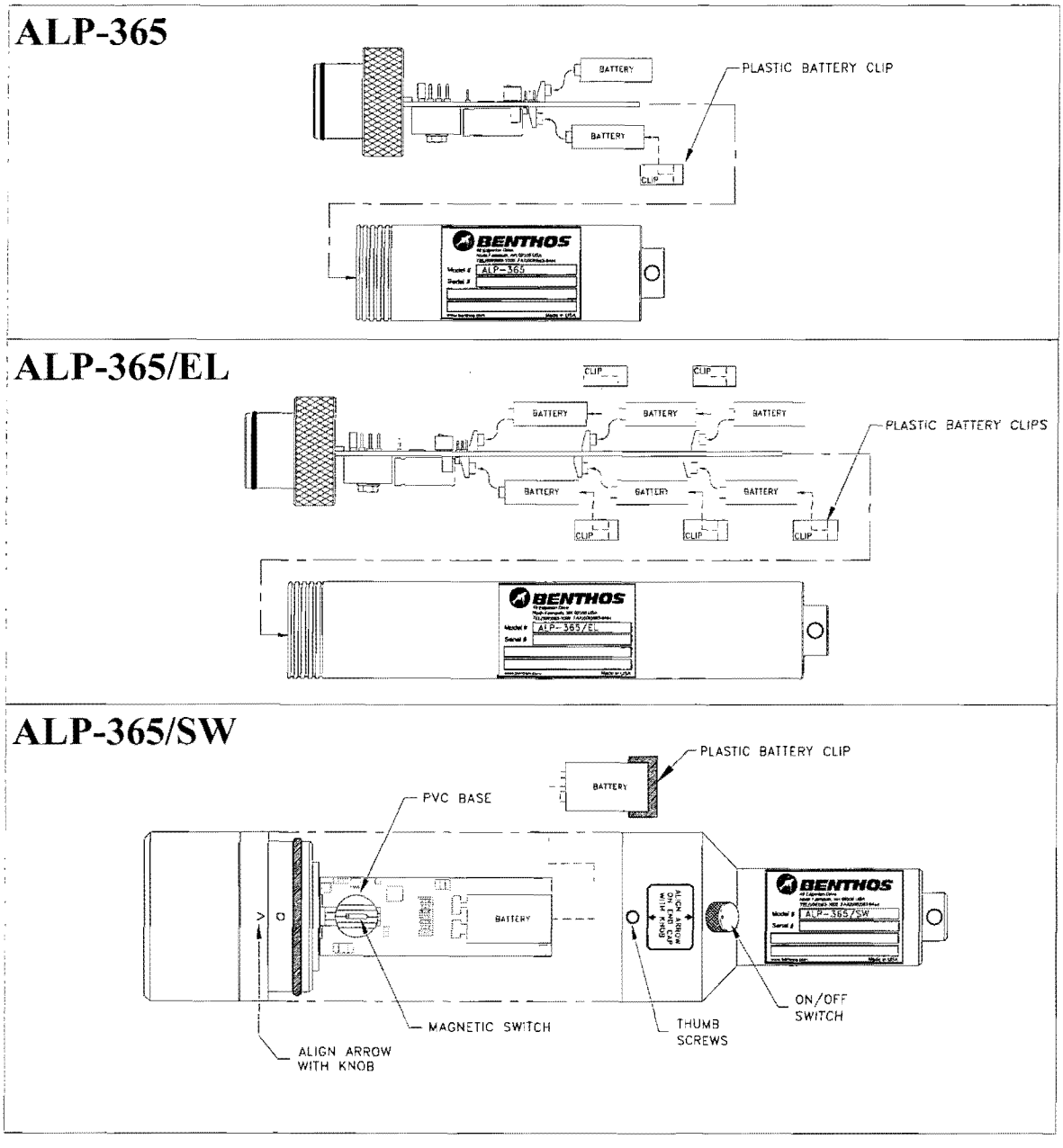

Figure 3 The ALP-365 Series Battery Installation

- Position the plastic battery clip(s) onto the battery (The clips are held to the board via O-rings during shipment).
  - Install the one battery clip on the recessed battery for the **ALP-365** or the **ALP-365/SW** to prevent the battery from unplugging (Figure 3).
  - Install the 5 battery clips on the recessed batteries for the **ALP-365/EL** to prevent the batteries from unplugging (Figure 3).
- Verify the foam disk is in place inside the base of the housing.

- Inspect the O-ring and O-ring surface before screwing the end cap on. Lubricate the O-ring with a light coat of O-ring lube (silicone or barium grease).

- Gently slide the electronics and battery assembly into the housing

  - For the **ALP-365** or the **ALP-365/EL**, gently screw the Delrin closure cap onto the housing until the closure is finger-tight.

⚠ **Caution:** Take care to avoid scratching the O-ring surface or cross-threading the Delrin closure cap.

  - For the **ALP-365/SW**, re-install the three screws that secure the end cap to the housing. Verify the proper switch alignment of the **ALP-365/SW** (Figure 3).

⚠ **Caution:** Take care to avoid scratching the O-ring surface. The unit will not turn on if the switch is not aligned properly.

3.3 Pre-Deployment Check

Check the pinger operation before deployment using a Benthos APR-272B Acoustic Pinger Receiver, a DPL-275A Diver-operated Pinger Locator or other compatible receiver equipment.

Check the pinger operation as follows:

- Set the shipboard or diver-operated receiving equipment to the pinger's transmit frequency selected in Step 1 under Section 3.2 Pinger Setup.

- If the Activation Switch is in Water-Turn-On Mode:

  - Verify the pinger end cap is properly secured to the housing.

  - Suspend the pinger over the side of the vessel or immerse it in a bucket of water to activate the pinger.

  - Immerse the test transducer in the same water as the pinger (place it next to the water bucket, if an in-air transducer being used) to verify the pinger is transmitting.

- If the Activation Switch is in the Battery/Switch Mode:

  - **ALP-365** and **ALP-365/EL**: Place the test in-air transducer next to the pinger to verify the pinger is transmitting (the water-turn-on test can also be performed).

- **ALP-365/SW:** Turn the knob on the housing to the ON position and place the test in-air transducer next to the pinger to verify the pinger is transmitting (the water-turn-on test can also be performed).

- If the ALP-365 does not operate according to specification, take these steps:
  - Verify there are no objects between the pinger and the locating equipment hydrophone that would obstruct the acoustic transmission.
  - Check the battery and jumper connections (see Section 3.2), and test again.
  - If the unit is still not functioning properly, call Benthos, Inc. (508) 563-1000.

3.4 Maintenance

The Benthos ALP-365 Series Acoustic Locator Pingers are factory set and shipped ready for use. No maintenance is required other than cleaning the unit and replacing the batteries.

At the conclusion of each deployment, take these steps to assure continued reliable performance from the ALP-365 Series Acoustic Locator Pingers:

- Rinse the pinger with fresh water after each use.
- Clean the Water-Turn-On contacts thoroughly (use water or a solvent safe for PVC) and inspect the contacts for excessive corrosion. Contact Benthos if the contacts need to be replaced.
- Remove the transducer end cap and gently slide out the electronic assembly.

⇒ **Note:** Make sure the unit is thoroughly dried before removing the end cap.

- Remove the batteries if the pinger will be stored for a week or more.
- Replace the batteries when needed. If the remaining battery life is unknown to meet the deployment life, replace them with new.
- Clean and inspect the O-ring and O-ring surfaces. Replace the O-ring if it is nicked, cracked or gouged.
- Lubricate the O-ring with a light coat of silicone or barium grease.
- Store the pinger in a dry area when not in use.

If spare parts or technical assistance is required, contact Benthos at (508) 563-1000.

Section 4 Warranty

LIMITED WARRANTY. Benthos warrants that the products sold hereunder shall be free from defects in materials and workmanship under normal use and service when correctly installed, used and maintained for a period of 12 months from date of shipment from Benthos. Purchaser's receipt of any product delivered hereunder shall be an unqualified acceptance of and a waiver by Purchaser of the right of Purchaser to make a claim with respect to such product unless Purchaser gives Benthos notice of any claim within 12 months after the receipt of such product. This warranty is limited to repair or replacement of the said product at Benthos' option, F.O.B the Benthos plant in North Falmouth, Massachusetts, providing the product was not abused or operated other than in accordance with the Benthos instruction manuals. Since all Benthos oceanographic instruments are pressure tested to rated depth prior to shipment, Benthos does not assume responsibility for any damage due to leakage or implosion. Benthos reserves the right to modify its warranty at any time, in its sole discretion. THIS LIMITED WARRANTY IS NOT TRANSFERABLE.

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