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MODEL BRT6000 BURN WIRE RELEASE/ TRANSPONDER



OPERATING AND MAINTENANCE MANUAL

**MODEL BRT6000
BURN WIRE RELEASE/TRANSPONDER**

REV. B, October 26, 2007

Standard Commercial Warranty

All equipment manufactured by ORE Offshore is warranted against defective components and workmanship for repair at the plant in Wareham, Massachusetts, free of charge for a period of one year after shipment. Shipping costs are to be borne by the customer. Malfunction due to improper use is not covered in this warranty and ORE Offshore disclaims any liability for consequential damage resulting from defects in the performance of the equipment. No product is warranted as being fit for a particular purpose and there is no warranty of merchantability. This warranty applies only if: (i) the items are used solely under the operating conditions and in the manner recommended in Seller's instruction manual, specifications, or other literature; (ii) the items have not been misused or abused in any manner or repairs attempted thereon; (iii) written notice of the failure within the warranty period is forwarded to Seller and the directions received for properly identifying items returned under warranty are followed; and (iv) the return notice authorizes Seller to examine and disassemble returned products to the extent Seller deems necessary to ascertain the cause for failure. The warranties expressed herein are exclusive. There are no other warranties, either express or implied, beyond those set forth herein, and Seller does not assume any other obligation or liability in connection with the sale or use of said products. Any product or service repaired under this warranty shall be warranted for the unexpired portion of the original warranty period only.

Equipment not manufactured by ORE Offshore is supported only to the extent of the original manufacturer's warranties.

Return Procedure

It is necessary to obtain from ORE Offshore a Returned Material Evaluation (RME) number prior to returning equipment. This is to assist tracking and arrival recognition. Follow the procedure listed below when returning U.S. origin goods to prevent delays and additional costs on Returned American Goods.

New Import Procedure/Returned American Goods

1. All shipments must be accompanied by two copies of your commercial invoice showing value of material and any reason for return.
 - * Whenever possible, please send copies of original export shipping documents with the consignment.
2. If the value is over \$1,000.00, the following shipper's oath must be sent with the invoices. (This can be typed on the invoice or on a separate letterhead.)

"I, _____, declare that the articles herein specified are, the growth, produce, or manufacture of the United States; that they were exported from the United States; From the Port of _____, on or about _____; that they are returned without having been advanced in value or improved in condition by any process of manufacture or any other means, that no drawback, bounty, or allowance has been paid or admitted thereof.

Signed _____"
3. If more than one part per consignment, a packing list must also accompany the shipment. It is acceptable to combine the commercial invoice and packing list as long as the contents of each carton are clearly numbered and identified on the commercial invoice.
4. Consign all air freight shipments to ORE Offshore in care of Intercontinental Air Frt., Inc., Logan Int'l Airport, East Boston, Mass. 02128.
5. If the equipment is property of ORE Offshore please insure for full value.
6. Route via Logan International Airport only as the final destination.
7. Mail one invoice, packing list and copy of airway bill to ORE Offshore upon shipment.
8. Please refer to issued Returned Material Evaluation number on all documents and correspondence.
9. Air freight must be prepaid on all returns.

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1. GENERAL INFORMATION

1.1 Introduction

This manual describes the ORE Offshore Model Burn Wire Release / Transponder. This system utilizes ORE Offshore's Binary Acoustic Command System (BACS) and to operate it requires either the Model 8011AT/8011M Acoustic Command/Ranging Transceiver or the Model AMD200 Deck unit. The BRT6000 can be used to release oceanographic moorings and bottom frames or can be used for long baseline transponder navigation. In addition to these typical applications there are a number of specialized uses for these systems, such as controlling the opening and closing valves in underwater systems and as emergency recovery systems.

The Binary Acoustic Command System (BACS) provides 12,000 possible command codes. The releases have an enable/disable command for controlling the transponder function as a standard feature. When disabled the transponder will not reply when interrogated. The Release commands will cause the BRT6000 to apply a voltage to the appropriate burn wire output pins on the bulkhead connector. The release commands can be sent and will cause a release whether the system is enabled or disabled. The enable and disable function only controls the transponder section.

1.2 Specifications

Mechanical Specifications:

Depth rating (working):	19600 ft.	(6000 m.)
Housing O.D.	- 4.960 in.	(12.60 cm.)
Overall length	- 24.5 in.	(62.23 cm.)
Housing length	- 18.0 in.	(45.72 cm.)
Material	- 7075 Aluminum Hard Anodized	

Acoustic Specifications:

Commands:

Sensitivity: 80 dB re 1 uPa.

Signal to noise-spectrum-level ratio: ≥ 36 dB re root Hz.

Receiver type: Hard-limited (2000 Hz/330 Hz Bandwidths)

Coding:

General to 8000 series - Binary FSK

Allowed tone pairs (6)

Pair No.	"0"	"1"
1	9.5 kHz	9.9 kHz
2	9.5	10.3
3	9.5	10.7
4	9.9	10.3
5	9.9	10.7
6	10.3	10.7

Structure: Two successive 8 bit words with a 5 sec. interval between them. Each word comprised of 8 bits from a 16 bit command. The 16 bit command is a 15, 11 block cyclic code with an overall parity bit appended to the end to form a 16, 11 code with a minimum Hamming distance of 4 bits. Additionally, two transitions are required within each word, and no repetitions of words are allowed in a command.

Pulse width: 22 mSec.

Period: 250 mSec.

Total Command Time: 9 Sec.

Total lock out time: 14 Sec. re beginning

Total command capacity per tone pair: 2000 or 12000
commands for the 6 tone pairs.

Standard Command Functions:

Release 1

Release 2

Disable Transponder

Enable Transponder

Option 1 (aborts both release 1 & 2)

Transponder:

Sensitivity - 80 dB re 1 uPa.

Signal to noise-spectrum-level ratio: ≥ 44 dB re root Hz for jitter
 $< \pm 0.5$ mSec. (3 Sigman). Jitter = ± 0.1 mSec. for noise-free
field.

Interrogate frequency: 9 or 11 kHz (Standard)

Post-filter bandwidth: 330 Hz.

Minimum interrogate pulse width: 5 mSec.

Reply frequency: Default 12 kHz (switch selectable)

Reply source level: 190 dB re 1 uPa. @ 1 m.

Reply pulse width: 10 mSec

Turnaround time delay: 12.5 mSec standard.

Lockout time: 1.0 Sec.

Environmental:

Temperature operating: -10 deg. C to +40 deg. C.

Storage without batteries: -20 deg. C to +85 deg. C.

2. INSTALLATION AND OPERATION

2.1 Introduction:

This section contains the information relative to the basic set up and operation of the Model BRT6000 Burn Wire Release Transponder. The user is referred to the specific information sheet that shipped with the unit, for details of his specific equipment. This sheet includes commands, and transponder frequencies for the particular release.

2.2. Housing and Release Preparation and Care:

Disassembly Procedure: Access to Internal Components. Access to any portion of the electronics or mechanical assemblies is achieved simply by removing the 2 Polyethylene closure rods which hold in the end caps. To remove the rods simply grasp either end of the rod and slide the rod out.



The internal pressure of the unit is not atmospheric. The BRT6000 systems are shipped with 12PSIA (-3PSIG) of dry nitrogen. This reduces moisture in the housing and helps to seat the O-rings. Equalization of pressure by removal of the purge port plug will be necessary to gain entry into the instrument.

DANGER!! If the underwater unit has been deployed, there is the possibility of leakage and internal pressurization of the housing. If the housing is pressurized, be sure to exercise extreme caution when relieving the pressure. The violent motion of some parts can result in personal injury.

DISASSEMBLY:

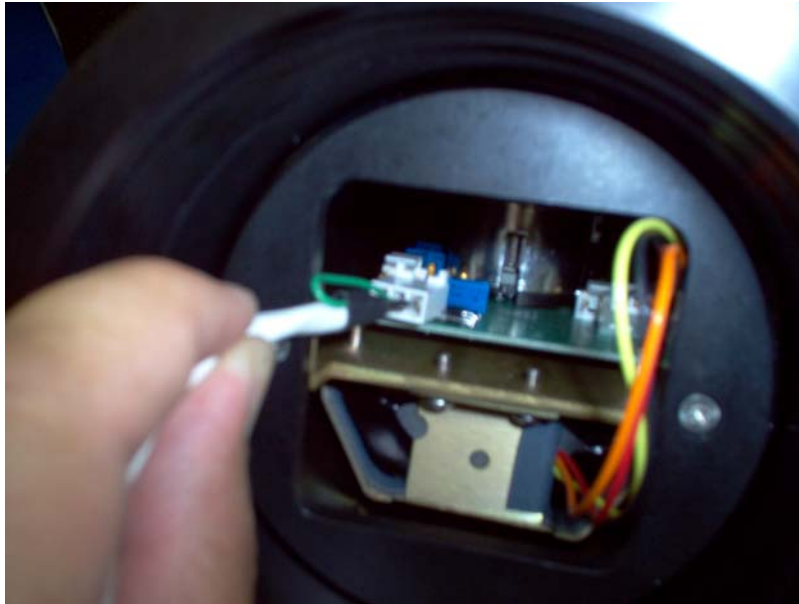
The disassembly procedure is as follows:

Equalize pressure by removing the purge port plug. Remove the Polyethylene retaining rods. By using the groove in the transducer end cap to hold on to carefully pull the transducer end cap out of the housing. If necessary a rubber coated tool can be used in the notch to pry the end cap up slightly.



Disable the power supply by disconnecting the connector from the battery pack to the main board. Then disconnect the transducer cable.

NOTE: The cable from the electronics to the transducer is short (12 inches (30 cm.) or less). To prevent parting the cable, always remove the top (transducer) end cap first, and disconnect the transducer from the electronics. CAUTION: High voltage is present at this connector when the unit transmits reply bursts.



Carefully slide the electronics assembly out of the housing by pulling on the other end cap. Take care not to scratch the O-ring surfaces. See figure 1.

CAUTION:

The ends and bore of the housing are O-ring seating surfaces. They must be protected while the unit is disassembled. Any scratches will impair the performance of the O-rings and may result in leaks.

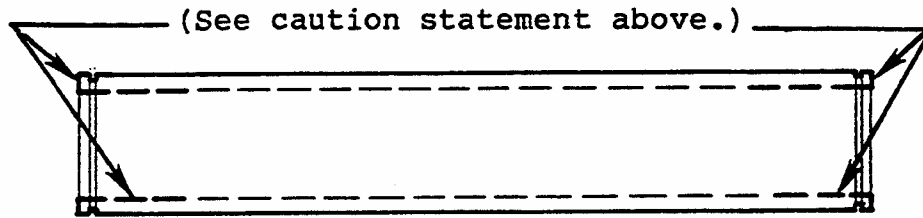


Figure 1.

Assembly:

Installing End Cap Assemblies:

Prepare the sealing surfaces for assembly by cleaning with a lint-free towel or swab, moistened if needed with alcohol. Inspect for scratches or nicks which will impair the O-ring efficiency. Apply a Very light coat of O-ring lubricant (i.e., Dow Corning 4 Compound) to the piston surface (inside housing where the O-ring makes contact) to aid sliding insertion of the piston seal. Inspect the O-rings for damage or manufacturing flaws such as tears, dimples or inclusions in the rubber. Lightly coat the O-rings with O-ring lubricant. Protect O-rings when stretching them over large diameters (i.e., cover diameter. with plastic sleeve).

Slip the electronics into the housing. After the electronics is in the housing and before the transducer end cap is inserted, connect the transducer cable and then the battery.

CAUTION:

Do not pinch or damage wires when inserting assembly into the housing. There are large diameter plates in the electronics assembly which will not allow clearance for cables or connectors.

Carefully press the piston seal into the housing. The backup O-ring is properly aligned if it enters the housing before the O-ring while the curved side of the backup ring faces the O-ring.

The end cap is secured to the housing by gently inserting the Polyethylene retaining rods into the grooves designed for them. Slide the rod all the way through until it protrudes from the other end of the groove.

Observe the same O-ring preparation procedures for the transducer end cap as for the electronics end cap. Connect the transducer lead then connect the battery pack connector to the main board before inserting the end cap. Use the same procedure to install the retaining rod.

If the user elects to perform an air acoustic test, it should be performed at this point, before purging. It is advisable to perform an air acoustic test before purging.

CAUTION:

Do not exceed -3 PSIG while purging the housing.

An excess vacuum can damage batteries.

Leak Detection and Condensation Prevention

ORE BRT6000 systems are provided with a 5/16-inch diameter purging port in the bottom end cap. The recommended procedure for preparation of the instrument atmosphere is as follows:

After checking that all other ports are sealed, draw a near 12 PSIA (-3 PSIG) vacuum via the purging port. Verify with a gauge that the release holds the vacuum. Backfill with dry nitrogen then draw a near 12 PSIA (-3 PSIG) vacuum. Quickly insert the purging plug before the -3 PSIG vacuum is lost. If the environment where the release was assembled was very humid then repeat the purging procedure 2 to 4 times before replacing the plug, to remove all moisture.

NOTE

It is essential that the aluminum housing material be isolated from any dissimilar metal.

3.0 Release Function:

When the appropriate command is decoded the system will apply the power from the battery stack to the correct pin for that command. Release command 1 applies voltage to pin 2 of the end cap connector. Release command 2 applies voltage to pin 3 of the end cap connector. Pin 1 of the end cap connector is ground.

4.0 Air Acoustic Tests.

Always perform an air acoustic test of the commands and interrogate the instrument after assembling to assure proper working order. Every time the instrument is powered up, prior to deployment it is recommended that a complete air acoustic test be performed. Place the speaker or transducer about 6 to 12 inches from the underwater unit transducer when sending commands. The position of the transducers relative to one another may need to be adjusted to allow commands to get through in air. Ranges will not be accurate in air; these systems are designed to operate in water. The speed of sound in air can cause errors in command decoding and prevents accurate ranging however the systems can be tested in air. Test all functions of the system by sending each command and verifying that the state changes according to the command including status reply.

5.0 Status Reply

Upon receiving a valid command the instrument will return a series of pings which are an indication of the status of the tilt sense switch. The tilt switch is considered horizontal or “upright” when the housing is lying in a horizontal position with the end cap connector in the 6 O-clock location (down). The 2 possible status replies are:

Upright: 15 pings at a 1 second rate.

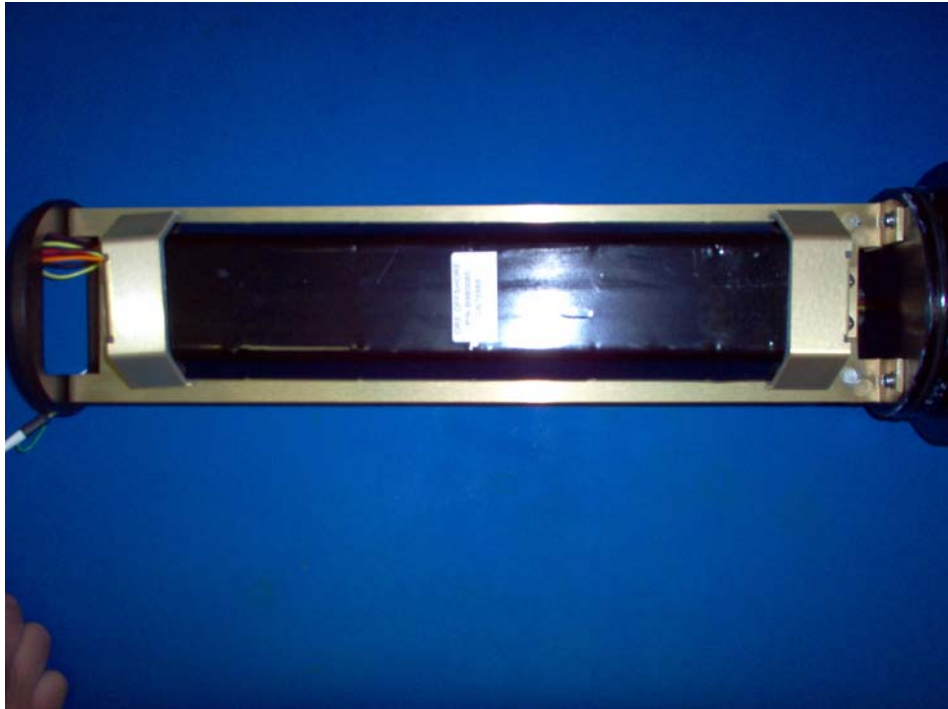
Tilted: 7 pings at a 1 second rate.

6.0 Battery Replacement:

Remove the electronics chassis from the housing according to the disassembly procedure. Make sure that the battery connector is disconnected from the board

and remove the brackets which hold the battery pack to the aluminum plate. Discard the old battery. Install the new battery and replace the brackets which hold it in. Route the battery connection in such a way that it will not be crushed when assembling the electronics in to the housing. After replacing the batteries, the user is advised to perform an air acoustic check of the release. Assemble the electronic chassis in the release housing.

It is recommended that a Tie Wrap be added around the middle of the battery pack to help support it when the system is on its side. The tie wrap should go around the battery pack and the aluminum plate but not around the board. The tie wrap should be placed so that it goes around the battery pack where it will be on the internal cells not at a joint between them.



7.1 Battery replacement considerations.

These releases are high performance instruments and it is presumed that they are employed to recover high value oceanographic instruments and data. For this reason extreme care must be exercised in choosing replacement batteries. ORE Offshore makes considerable effort to test various batteries and to provide control

of the manufacture of replacement batteries for its equipment. The user should exercise extreme care in selecting replacement battery packs. The particular manufacturer's cell discharge characteristics and repeatability should be known. The date of manufacture and the history of shipping and storage should be known if not controlled; batteries should not be used if the use by date has passed. Cleanliness and careful inspection techniques should be employed when assembling the batteries into welded packs. Careful attention should be paid to purging the housing so as not to leave air or moisture inside before storage or deployment.

8.0 Anode Replacement.

The Zinc anode which is mounted on the end cap of the system is there to protect the aluminum housing and end caps from corrosion. It is important to replace this anode after each long term deployment or after a significant size reduction when used for short term deployments. Be sure to include the plastic washer and grease the stud when installing the anode.

8.0 Customer Support.

Customer support is available 24 hours a day 7 Days a week. The telephone number to reach us is available on our web site WWW.ORE.COM.