Overboard Recovery Communications Apparatus (ORCA®) RX-102 Receiver User's Manual

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For technical support, contact BriarTek at 703-548-7892 or through our website at www.briartek.com.

Introduction

ORCA® (Overboard Recovery Communications Apparatus) is a personal water-activated man overboard (MOB) alarm system developed by BriarTek Incorporated and utilized by the US Department of Defense and other mariners. The alarm system includes a transmitter, receiver and direction finder. The RX-102 receiver is a single channel VHF (121.5 MHz) receiver with an embedded microprocessor and push button interface. The RX-102 is designed to receive a signal from an ORCA® transmitter. When an ORCA® transmitter is activated, the transmitter emits a radio frequency (RF) signal. A visual and audible (100 dB) alarm on the receiver sounds upon receipt of this signal indicating the identity of the MOB. If the transmitter is not disabled within one (1) minute, it will begin transmitting a signal that is processed by the direction finder, providing a continuous bearing to the MOB.

RX-102 Parts Overview

A - Liquid Crystal Display (LCD)

B - Backlight (Yellow)

C - Clear MOB (Red)

D - Silence (Green)

E - Piezoelectric Buzzer

F - Serial Connector

G - Antenna Jack

H - Power Jack

I – Volume Control

J - Power On/Off

K - Fuse Holder

L - Helical Antenna

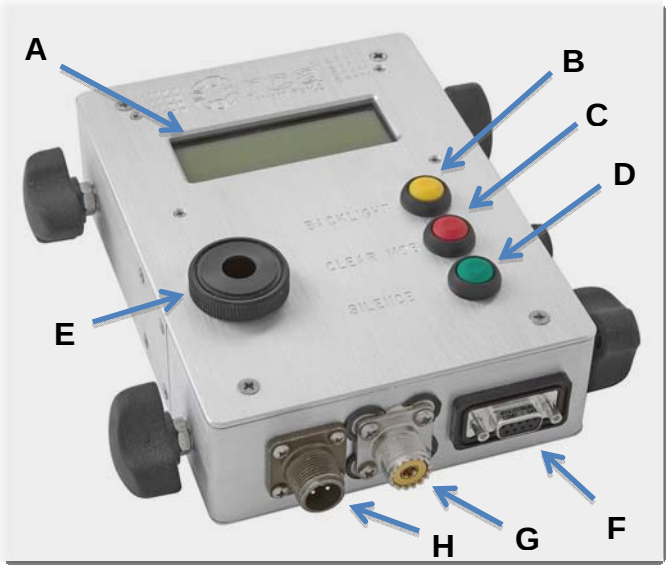


Figure 1. RX-102

Figure 2. RX-102 (top end view)

Figure 3. RX-A102 Antenna

RX-102 Operating Instructions

Activation and Receiver Display

a. When a transmitter from own ship is activated, an alarm signal (continuous warble) is sounded at the receiver buzzer. The vessel identification and transmitter serial number are displayed on the LCD.

b. When a transmitter from another vessel is activated and within range, an alarm signal (chirp) is sounded and the vessel identification as well as the serial number of the transmitter, is displayed on the LCD.

c. When an alarm signal is received, whether own ship or other vessel, line 4 will indicate the transmitter's battery strength, "Good" or "Weak."

d. Received Signal Strength Indication (RSSI) is also displayed on line 4 of the LCD. RSSI is a measure of the field strength (radio waves at 121.5MHz), at the antenna input.

NOTE

RSSI is not a measure of beacon signal strength.

This indicator is useful for several reasons: It can help determine if a non-ORCA® signal is interfering with the operation of the ORCA® system. It can help to diagnose problems with the ORCA® equipment, such as broken antenna cables.

NOTE

RSSI is expressed in negative numbers, -141dBm being the weakest and -10 dBm being the strongest signal. Typically if no systems are interfering with the ORCA® system and there are no beacons turned on, the background signal strength level will be between -130 and -110 dBm. If the background RSSI is stronger than -90 dBm (-10dBm > RSSI > -90 dBm), then the ORCA® beacon will not be able to be received except in very close proximity to the ship.

Audible Alarm - When the receiver detects the FM signal emitted by the transmitter, the buzzer emits a 100 dB (max) audible alarm. The audible alarm will continue to sound until either the transmitter is turned OFF, sending an "All Clear" signal to the receiver; or the Silence button is pressed.

Volume - The receiver's volume can be adjusted to 1 of 2 settings using the volume control toggle switch.

Visual Alarm Display

a. The LCD is a 4 x 20 character display.

b. If no ORCA® signal is present -

   Line 1: “Scanning”

   Line 4: RSSI

b. If ORCA® signal is detected -

   Line 1: Vessel ID; transmitter serial number

   Line 4: ORCA® transmitter battery strength (“Battery Good/Weak”); RSSI

Backlight Button (Yellow) - During low light or no-light situations, press the Backlight button (B) to illuminate the LCD. Press the Backlight button again to turn off illumination.

NOTE

Pressing Backlight button during "darken ship" operations is not recommended due to interference with night vision.

Clear MOB Button (Red) - Press the Clear MOB button to remove ID(s) from receiver’s memory. This function is provided to allow the user the ability to remove the ID information from the receiver in the event it did not receive the "All Clear" from a transmitter after a successful rescue or during testing.

Silence Button (Green) - Press the Silence button to silence the audible alarm.

Installation Notes

The installation notes provided herein are intended to serve as a guide only. They do not serve as material required for the certification of technicians for the installation, repair or alteration of the ORCA® system.

a. General

   The RX-102 is typically installed in the pilothouse and should be mounted in a location so that the audible alarm is easily heard, the push buttons are easily accessible and the LCD is readable by watch standers.

b. Mounting the receiver

   The receiver should be mounted to a fiddleboard or part of the super structure such as a bulkhead. Mount the receiver brackets using appropriate fasteners (self-tapping screws or 1/4x20 machine screws with locknuts/washers). The receiver brackets are designed with slots to allow for flexibility in mounting the receiver. Once the brackets are securely mounted, secure the receiver to the brackets by inserting the threaded mounts (4) into each of the bracket side slots (2 each x 2 brackets). Finally, adjust the angle of the

receiver by tilting forward or back as desired and thread the knobs (4) onto each of the threaded mounts until snug.

c. Power connection

Twelve or twenty four volts DC is required to provide power to the system. An optional battery backup will supply power to the receiver for 1 hour in the event power to the circuit is lost.

d. General

The receiver antenna should be located in an elevated location (above the pilothouse or vessel's mast) to ensure that the ORCA® signal is received. The higher the antenna is mounted, the better range can be expected. In addition, to avoid signal loss caused by excessive cable length, the coaxial cable length between the RX 102 receiver and antenna should not exceed 150 feet.

e. Mounting the receiver antenna

The receiver antenna is over molded to a 90° stainless steel bracket and coaxial cable. The bracket has 2 holes which are used for securing to a foundation (see RX-102 Antenna specifications for hole dimensions). The foundation should be a similar metal as the super structure or mast to which the foundation is being welded. A UHF connector is supplied with the antenna/cable. For cable assembly and installation instructions, follow the guidance provided in the Receiver Antenna/Cable Install Guide located on the BriarTek website.

Maintenance And Troubleshooting

Inspection

a. Inspect receiver for excessive wear.

b. Check for salt buildup at the coaxial cable connector to the receiver, as this may indicate saltwater intrusion at the antenna mount connector.

c. Inspect antenna and antenna mount for excessive wear.

d. If any parts are broken, missing or excessively worn, replace as necessary.

Testing - Ensure antenna is connected to UHF coaxial antenna connector and receiver is plugged into power source. With one individual at the receiver to observe receiver alarm, and a second individual operating the transmitter from the bow or stern (whichever is further from the antenna) of the vessel, perform operational test of the RX-102 as follows:

NOTE

Record transmitter serial number for the test. Serial number is located on side of transmitter.

NOTE

Before beginning full system testing, notify pilothouse and other ORCA®-equipped vessels within range that testing of the ORCA® system will occur.

a. If receiver is not already on, turn on receiver at rocker switch.

b. Press the backlight (yellow) button to illuminate LCD. Press backlight button again to turn off LCD illumination.

c. Activate ORCA® transmitter (if using a TX-103 transmitter, rotate the manual switch from the OFF position to the ON position. If using a TX-104 transmitter, short the two water contacts using a 5"-10" long wire or submerge transmitter in saltwater until transmitter DML illuminates).

a. Ensure RX-102 LCD displays the serial number of the transmitter.

b. After the RX-102 audible alarm activates, toggle the volume switch between low and high.

c. Press the Silence (green) button to silence the alarm.

d. Deactivate ORCA® transmitter (if using a TX-103 transmitter, rotate the manual switch from the ON position to the OFF position; if using a TX-104 transmitter, align the antenna tip with the round recess on the face of the transmitter until the DML stops illuminating).

e. Ensure LCD displays “All Clear MOB ####" on line 1 and “Batt. Good/Weak” on line 2.

f. Activate ORCA® transmitter. Remove battery from transmitter. Press Clear MOB (red) button. Observe LCD displays “Clearing MOB list. Erasing. Please Wait. Done”.

Troubleshooting **-** In the event of equipment malfunction, perform troubleshooting procedures:

a. Power failure:

(1) Ensure power switch is turned ON.

(2) Ensure receiver is connected to power source:

- Check power at power supply / battery backup (if installed) using voltmeter.

- Check power at power panel.

(3) Inspect fuse in fuse holder.

If receiver still fails to turn on, replace receiver.

b. Receiver does not receive signal from ORCA® transmitter:

(1) Ensure UHF antenna cable connector is securely fastened to antenna jack.

(2) Trace antenna cable for broken/frayed wire.

(3) Ensure antenna is securely mounted to bracket and connected to cable.

If receiver still fails to receive signal from ORCA® transmitter, replace receiver.

c. Receiver does not display “Scanning” during normal scanning mode (no transmitter activated):

Turn OFF receiver at Power On/Off rocker switch; wait 5 seconds and turn ON.

If receiver still displays “Scanning”, replace receiver.

d. RSSI consistently displays -90 dBm or stronger:

(1) Determine if there are any active emitters transmitting at/near 121.5 MHz. If so, turn off emitters.

(2) Observe RSSI.

(3) If RSSI is still reading strong, determine if emitters from another source (ship or ground-based) are active.

If above troubleshooting steps do not address the problem and the receiver has been put in service within the past year, contact BriarTek. Provide the following information:

- Ship Name
- Time observed (number of days or hours)
- Which radiating systems were being used at the time (e.g. Navigation Radar)
- Ship's general location/operating area

Parts List

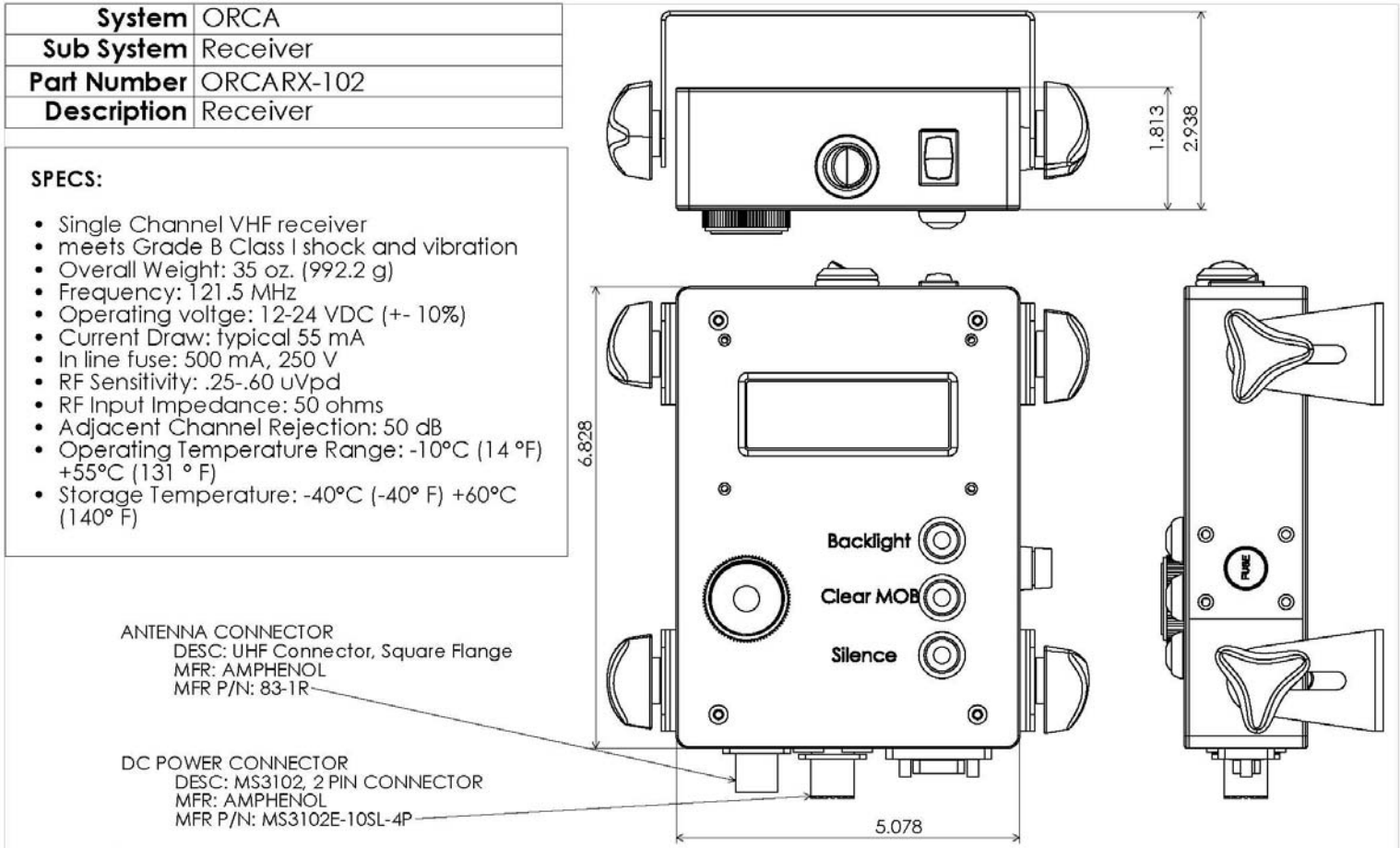
System	Subsystem	Part Number	Component Description (Nameplate Data)	Mfr
ORCA	Receiver	ORCARX-102	**Receiver:** 100 db audible alarm; touchscreen LCD; hardened enclosure; mounting bracket; 121.5 MHz; power requirement - 12 VDC	BriarTek
ORCA	Receiver	ORCARX-A102	**Receiver antenna:** Overmolded helical antenna with mounting bracket and Heliax cable; includes UHF connector	BriarTek

Specifications

System	ORCA
Sub System	Receiver
Part Number	ORCARX-102
Description	Receiver

SPECS:

- Single Channel VHF receiver
- meets Grade B Class I shock and vibration
- Overall Weight: 35 oz. (992.2 g)
- Frequency: 121.5 MHz
- Operating voltge: 12-24 VDC (+- 10%)
- Current Draw: typical 55 mA
- In line fuse: 500 mA, 250 V
- RF Sensitivity: .25-.60 uVpd
- RF Input Impedance: 50 ohms
- Adjacent Channel Rejection: 50 dB
- Operating Temperature Range: -10°C (14 °F) +55°C (131 ° F)
- Storage Temperature: -40°C (-40° F) +60°C (140° F)



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DIMENSIONS ARE IN INCHES
TOLERANCES: ±0.005
FRACTIONAL ±
ANGULAR: MACH ± BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±
MATERIAL
FINISH
NEXT ASSY | USED ON
APPLICATION
DO NOT SCALE DRAWING

	NAME	DATE
DRAWN		
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		
COMMENTS:		

BriarTek, Inc.

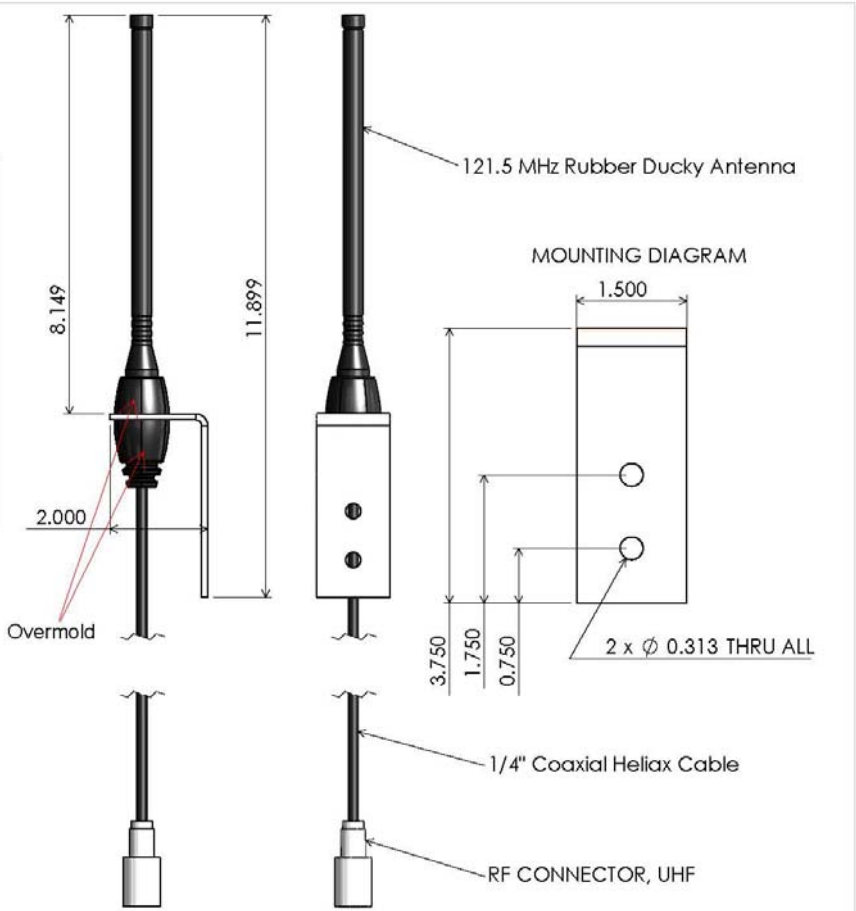
ORCARX-102

SIZE A | DWG. NO. | REV.
SCALE:1/5 | WEIGHT: | SHEET 1 OF 1

System	ORCA
Sub System	Receiver
Part Number	ORCARX-A102
Description	RX-102 Antenna

SPECS:

- Application: ship mounted receive antenna
- Operating frequency: 121.5 MHz
- Antenna Connector
  - DESC: UHF Connector
  - MFR: AMPHENOL RF
  - MFR P/N: 83-1SP-1050
- Coaxial Cable
  - DESC: HELIAX CABLE, 1/4", 50Ω
  - MFR: ANDREW
  - MFR P/N: FSJ1RN-50B
- Weights:
  - Antenna Element: 47 g
  - Bracket: 132 g
  - Overmold material: 37 g



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MATERIAL

FINISH

NEXT ASSY | USED ON

APPLICATION | DO NOT SCALE DRAWING

	NAME	DATE
DRAWN		
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		
COMMENTS:		

BriarTek, Inc.

ORCARX-A102

SIZE A | DWG. NO. | REV.

SCALE:1:5 | WEIGHT: | SHEET 1 OF 1

Warranty

BriarTek will provide a one-year warranty on the ORCA® man overboard alarm system following the date of original purchase.

If a component fails to function properly during its warranty period (one year), the manufacturer will proceed according to its warranty as follows:

BriarTek Inc. guarantees each product it distributes to be free from defective materials and workmanship and agrees to remedy any such defect, or to furnish a new or equal part in exchange (at its option) for a period of one year from the date the component is purchased. For an exchange of the product, please contact BriarTek at 703-548-7892 or on the web at www.briartek.com and a customer service representative will provide the necessary instructions.

This warranty is void if:

- any component has been subject to misuse or improper installation by a non-BriarTek employee, or has been repaired or altered by a non-BriarTek employee.
- any component fails to function properly after being put into service due to something other than defective materials or workmanship, i.e. excessive temperature, humidity or shock while component is in storage.

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