metocean telematics

NOVATECH™ iBCN

User Manual

Iridium / GPS Satellite Beacon

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Model No. 1: MMI-513-00000

Model No. 2: MMI-613-00000

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PCB Integration User manual applies to the following models:

Model Number	Description
MMI-513-00000	Iridium Beacon, 7500m
MMI-613-00000	Iridium Beacon, 12000m

Information contained in this manual is subject to regular updates and changes.

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1. Safety Information

1.1 Pressure Case

As with any sealed pressure case, the contents could be under pressure due to a battery or seal failure. This could expel the batteries when either end cap of the case is removed.

To be safe, always point the end being opened away from you during opening. The end caps are designed to vent internal pressure as they are being removed.

If venting is heard during end cap removal, stop removal until venting has stopped.

If a battery is trapped in the case take extreme care, there could be a pressure buildup behind it and the battery could be expelled at any time.

1.2 Outdoor Use Only

WARNING – OUTDOOR USE ONLY!

DO NOT operate indoors. Unit is Equipped with GPS and Iridium communications and require a direct view of the sky to receive satellite signals.

2. Introduction

The iBCN is a self-contained submersible Iridium/GPS Satellite Beacon designed to assist in the location and recovery of underwater oceanographic equipment.

There are two models of the iBCN available depending on the depth requirements.

Model Number	Description
MMI-513-00000	Iridium Beacon, 7500m
MMI-613-00000	Iridium Beacon, 12000m

The standard model, iBCN, may be submerged for long periods to depths of 7500 meters (24,600ft) while the iBCN Infinity may be submerged to depths of 12000 meters (39,360ft).

The iBCN may be configured to not attempt transmission when submerged to conserve battery power.

Conductivity water sense and GPS satellite checks are the configurable methods available to determine submergence.

The iBCN may be disabled by attaching a magnet to the indicated location on the head assembly for extended power savings. At the surface the iBCN transmits its GPS position at a pre-configured interval.

There are various power options available for the iBCN to accommodate various mission life and size requirements.

This manual covers the iBCN product line including accessories:

- iBCN – Iridium Beacon, 7500m (9x CR123A)
- iBCN Infinity – Iridium Beacon, 12000m (9x CR123A)
- iBCN-7 – Iridium Beacon, 7500m (7x "D" Alkaline/Lithium)
- iBCN-3 – Iridium Beacon, 7500m (3x "D" Lithium only)
- iBCN-RH – Iridium Beacon Remote Head using non-iBCN NOVATECH battery pack (6x "C" tube)
- iBCN-RH2 – Iridium Beacon Remote Head using iBCN battery packs
- iBCN-OEM – Iridium Beacon Electronics only

3. Quick Start

1. Remove the magnet prior to attaching the head assembly to the battery tube unless a delayed activation is needed. For the –RH and –RH2 versions (Remote Head), confirm power is applied to the head assembly.
2. Insert batteries into the battery tube and attach the head assembly to the battery tube.
3. Check that the head assembly at the end of the Pressure Case is secure, clockwise tight.

NOTE: Successful operation of the iBCN relies on maintaining a water tight seal. When closing the unit, position the beacon so that the O-ring is held in place by gravity. This can prevent the O-ring from being dislodged and improperly sealing the beacon. Please refer Section 7.4 and Section 7.5 for information regarding O-ring maintenance.

4. Optionally, establish a Bluetooth serial connection to the beacon if modifications to the configuration are required.

NOTE: See Section 6.4 for assistance with setting up a Bluetooth connection.

5. Confirm the iBCN is transmitting Iridium messages by using an Iridium message detector like the MetOcean Telematics iON Iridium Detector.
6. **iBCN IS READY TO BE DEPLOYED!**

4 Installation

Various installation factors can affect the performance of the iBCN. Install the unit in a location that will ensure that, at the surface, the head assembly will be vertical and well out of the water.

Keep the antenna above and clear of metal obstructions. Nearby metal can absorb some of the RF energy.

4.1 Alternative Power Options

The iBCN typically uses a 9 x CR123A Lithium battery tube; however, other power options are available for the head assembly.

Refer to the MetOcean Mission Life Estimator for details on the mission life of the various power options.

http://metocean.com/lifetimeestimator/

The iBCN-OEM head assembly is a modular component that may be used in different power configurations as outlined below:

Configuration	Power Source	Dimensions	Mass
iBCN	9x CR123A cells	Ø 2.2" x 15.5"	810g
iBCN Infinity	9x CR123A cells	Ø 2.63" x 15.4"	960g
iBCN-7	7x D Alkaline cells (Lithium available)	Ø 2.2" x 20.75"	3550g (Alk) 3200g (Li)
iBCN-3	3x D Lithium cells	Ø 2.2" x 11.25"	1500g

Configuration	Power Source	Dimensions	Mass
iBCN-RH	6x C Alkaline cells (Lithium available)	Ø 3.5" x 4.0" + Ø 1.75" x 21.5"	2700g
iBCN-RH2	9x CR123A cells	Ø 2.2" x 15.5"	810g
iBCN-RH2-M7	7x D Lithium cells (Lithium available)	Ø 2.2" x 20.75"	3550g (Alk) 3200g (Li)
iBCN-RH2-M3	3x D Lithium cells	Ø 2.2" x 11.25"	1500g
iBCN-OEM	Custom Power	Ø 2.2" x 2.21"	220g

Table 1: MMI Power Configurations

4.2 Antenna

The iBCN is supplied with a dual band combined GPS and Iridium patch antenna. It is integrated inside the head assembly, pre-tuned at the factory, and is not user serviceable.

4.3 Pressure Case

When mounting the pressure case, take care to prevent any side loading on the head assembly. Over time, side loading on this part could cause a leak.

NOTE: To minimize corrosion, NEVER mount the pressure case directly to metal. Isolate the pressure case by wrapping it with vinyl tape or a similar material at the contact points.

5 Operating Instructions

5.1 On/Off

The device may be forced to the low-power Sleep mode by actuating the magnetic reed switch, located on the head assembly (identified by a circle or flat surface) with an externally placed magnet.

The device is **ON** by default when power is applied and the magnet is used to force the assembled beacon to Sleep for extended power savings.

Figure 1: Magnet Placement on Head Assembly

5.2 Batteries

The iBCN has several battery power options available.

Install batteries with the positive terminal towards the head assembly.

The circuit is reverse polarity protected. Rechargeable batteries are not recommended.

Always remove batteries when the iBCN is not in use. Please refer Section 7.2 for battery change details.

NOTE: Following disconnecting the head assembly from the batteries, wait for a period of two minutes before reconnecting. This period of time is required to let the circuit fully discharge and ensures that the device will function optimally.

5.3 Test Operation

The following quick test verifies that the iBCN in standard configuration is functioning properly:

1. Turn device ON by attaching power source (battery tube) and ensuring the magnet is removed. For the –RH version (Remote Head), confirm power is applied to the head assembly.
2. Confirm the iBCN is transmitting Iridium messages by using an Iridium message detector like the MetOcean telematics iON Iridium Detector.
3. Alternatively, verify the transmitted data has been received and processed by the configured data delivery option. This step validates the Iridium modem provisioning setup and messages are being delivered properly.
4. **iBCN IS READY TO BE DEPLOYED!**

6 Operation

The iBCN is primarily intended for locating and recovering free drifting or moored, surface or submerged assets at sea.

After being turned on, the iBCN can be submerged where it is deactivated by detecting submergence. The iBCN can be deployed underwater for up to 24 months.

The iBCN may be configured to use a GPS Satellite Check to determine when the beacon has surfaced. While submerged, the iBCN will not detect any GPS signal and this is used to power down the electronics to conserve battery power.

The sampling of GPS signal is a user-configurable option to adjust surface response time while maintaining suitable mission life.

The iBCN (7500 meter version only) is also equipped with a conductivity sensor to monitor submergence state. This is a lower power method of detecting the surface compared to the GPS Satellite Check method.

The sensor samples for a period of one second at the same interval as the GPS interval to a maximum of 5 minutes.

NOTE: It may take up to 5 minutes after surfacing for the first sensor sampling to occur. Depending on sea conditions it may take a few intervals before the iBCN realizes it has surfaced and begins to transmit its location.

The recommended short interval of 2-5 minutes can be used for all deployments using conductivity water sense to get notified about the location of your asset.

The iBCN can be reconfigured via Over-The-Air (OTA) commands to lengthen the GPS/Reporting interval to conserve battery power and limit data usage if necessary or to shorten the interval for retrieval.

Due to specifics of the Iridium communication scheme, the iBCN is able to receive incoming commands only when it sends reports out or is scheduled to perform a Mailbox check.

The surfaced iBCN will continue to send its GPS position messages until it is manually turned off, the battery pack is depleted, or it returns back to the submerged position.

The following flow chart outlines the activation sequence and timing of the iBCN operation.

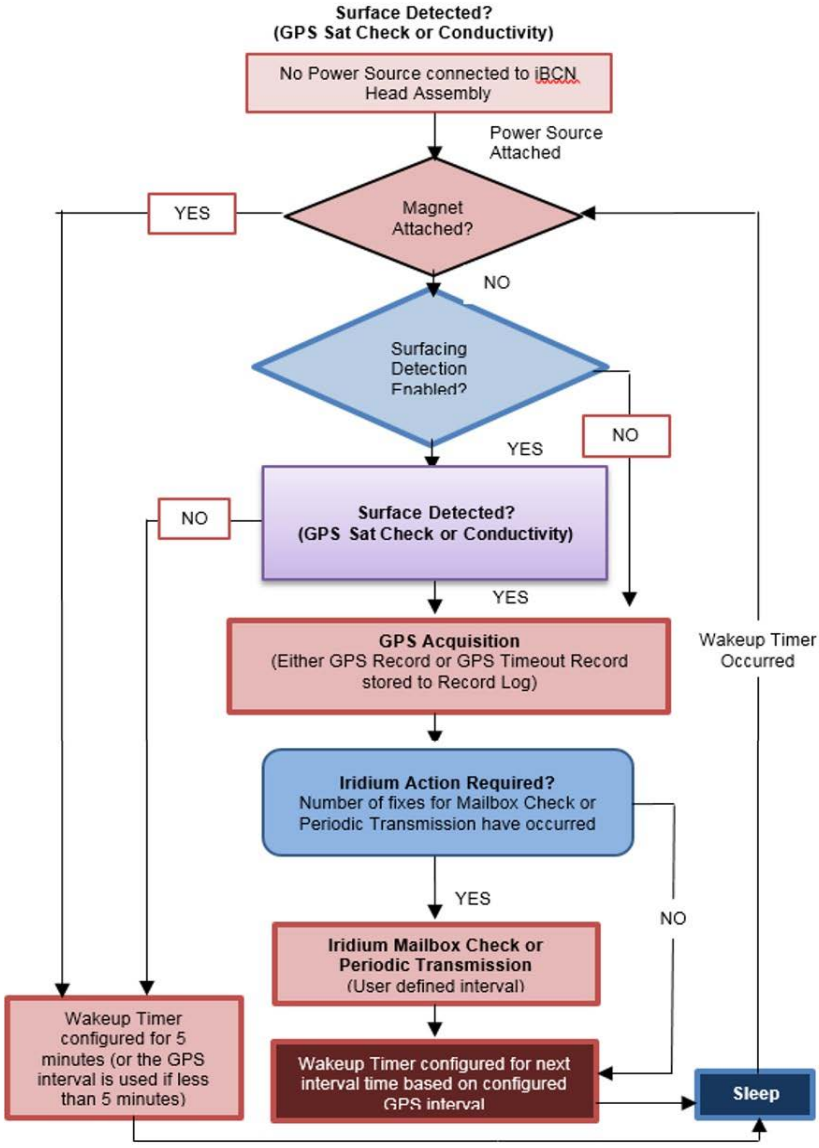

Figure 2: iBCN Activation Sequence

6.1 Operating Notes

The Bluetooth connection is available for at least 10 minutes upon initial power-up of the device with the magnet removed.

Each Bluetooth command sent to the device resets the Bluetooth timeout period extending the connection time. The Bluetooth connection is shut down after the connection time expires to conserve power.

To re-activate the Bluetooth connection, the power source must be removed and re-attached. It is important to leave the power source disconnected for at least 2 minutes before reconnecting to ensure a fresh power-up sequence otherwise the Bluetooth connection may not be enabled.

The default configuration GPS interval is 5 minutes with a transmission occurring at every interval. This is a rapid reporting behavior that is useful during testing and initial deployment.

Re-configuration using the local Bluetooth connection or MetOcean LiNC Web-based platform Over-The-Air interface is recommended to extend mission life.

The iBCN starts in a "Test Mode" upon initial power-up that will transmit GPS location every 5 minutes for 1 hour regardless of the pre-configured intervals.

After "Test Mode" expires, the iBCN will continue to operate based on the pre-configured intervals.

6.2 Configuration

The iBCN configuration consists of 6 operating parameters.

GPS Position Interval – This interval sets the timing for GPS position acquisitions. Positions are stored into the internal memory log. Minimum setting is 2 minutes with a maximum setting of 2 days.

Number of Intervals per Transmission – This setting sets the number of GPS Position Intervals to occur before transmitting the data.

The default setting is 1, which transmits the data upon each GPS Position acquisition. However, multiple GPS positions can be accumulated and transmitted together to reduce power usage.

Number of Intervals per Mailbox Check – This setting sets the number of GPS Position Intervals to occur before polling the Iridium network for incoming messages. A mailbox check is similar to a transmission however no data is sent from the iBCN.

This allows the iBCN to be responsive to incoming configuration commands without having to always transmit data. The default setting is 1.

Transmit GPS Location Only – When this check box is enabled, only the most recent GPS fix will be transmitted.

All other GPS and other mission data, such as battery status and Iridium Timeout events will be logged to memory.

They will be available via download in a direct connection to the device. If this mode is disabled, all data not transmitted will begin to be sent on the next transmission interval.

NOTE: Disabling this mode during a deployment may result in additional data charges and battery consumption.

Reset Reporting Index – This can be applied from the Record Log tab in the Product Configurator software or via OTA.

If the iBCN is transmitting historic data that is not required, issuing the Reset Reporting Index command will set the Reporting Index to the current record.

The iBCN will then only transmit new information from that point forward. This means that only data acquired after this reset will be transmitted.

Older data will be retained in memory for user download.

NOTE: Resetting the reporting index does not affect the User Download index. User downloads will start from the last record downloaded by the Product Configurator software.

Surfacing Setting – This setting controls how the iBCN detects the surface:

With the Surfacing Setting set to Always On, the iBCN will attempt GPS acquisition and Iridium transmissions at the configured intervals regardless of being submerged.

The GPS acquisition will timeout after 5 minutes if no GPS position is determined and the Iridium transmission will timeout after 3 minutes.

With the Surfacing Setting set to GPS Satellite Check, the iBCN will enable the GPS receiver for 20 seconds every 5 minutes to determine if satellites are in view.

This feature relies on GPS satellites signal not present while submerged versus GPS satellite signal being available when surfaced.

The iBCN will attempt GPS acquisitions and Iridium transmissions at the configured intervals only when surfaced.

The GPS Satellite Check method of Surfacing detection will consume more power than the Conductivity Water Sensor but provides an alternative surface detection method that may be better suited to high sea state environments where splash over is a concern with the Conductivity Sensor.

With the Surfacing Setting set to Water Switch Enable, the iBCN will sample the conductivity water sensor every 5 minutes (or at the GPS Interval if configured to less than 5 minutes).

It will remain in low-power Sleep mode and not acquire or transmit while submerged. This Conductivity Water Sense option is only available on the 7500 meter rated iBCN.

6.3 Iridium Satellite Communication

The iBCN uses Iridium Short Burst Data (SBD) mode for transmitting data.

During transmission, the modem remains powered until a successful transmission occurs, or 180 seconds have elapsed.

Should the transmission time-out the data set will remain buffered and sent during the following transmission cycle.

The configuration of the iBCN may be changed using Over-The-Air (OTA) commands. These commands may be issued by the Metocean LiNC web-based platform or customized solutions may be developed (contact support@metocean.com for further details).

A battery status event will be logged to the Record Log after every 10 Iridium transmissions. This battery information may be useful for understanding battery usage during and after the deployment.

6.4 BlueTooth® Communication

The configuration of the device is controlled through the Configurator Software Tool or the JouBeh Asset Website. The device uses a BlueTooth® serial connection to interface with the software tool. Prior to using the Configurator Software, a BlueTooth® connection must be established with the device.

The BlueTooth® interface on the device is activated upon power-up, with the magnet removed, for a period of 10 minutes. If there is no connection established during this time, the BlueTooth® interface is disabled until the next power cycle event.

1. Remove magnet from the iBCN OEM head and disconnect power for a minimum of 2 minutes.
2. Install batteries to power-up the device.
3. Add the Device to the PC's BlueTooth® Devices. The Beacon appears as **MMI-XXX** Bluetooth® Device. Select **MMI-XXX** device and click ***Next***

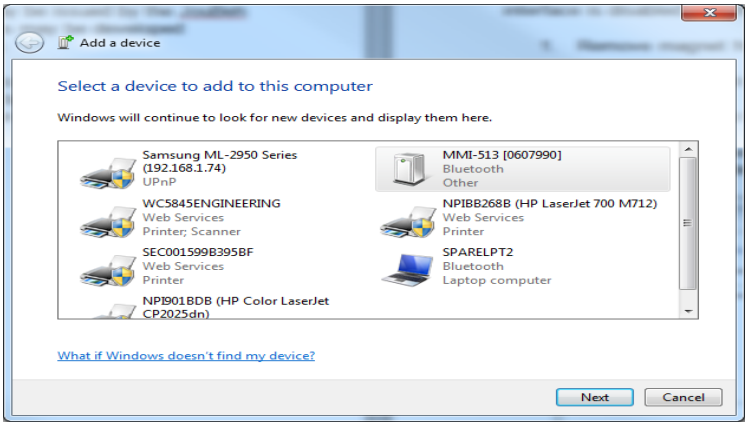

Figure 3: Adding a Bluetooth Device

4. Select **Enter the device's pairing code** to setup the Bluetooth® link and click ***Next***

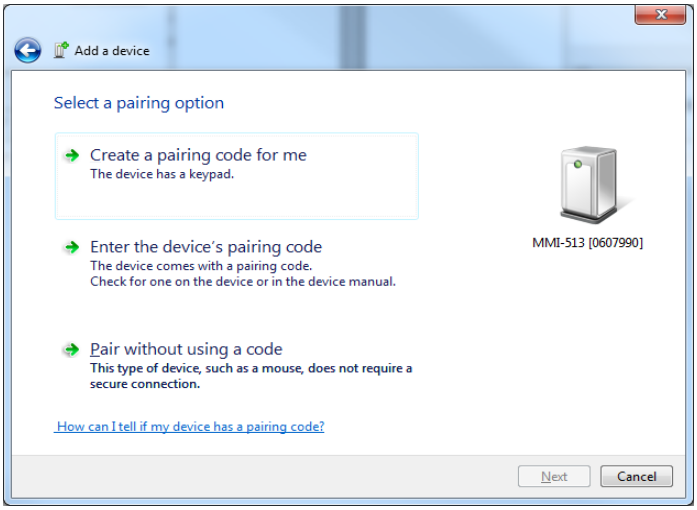

Figure 4: Select Pairing Code Option

5. Enter the pairing code **0000** and click ***Next***

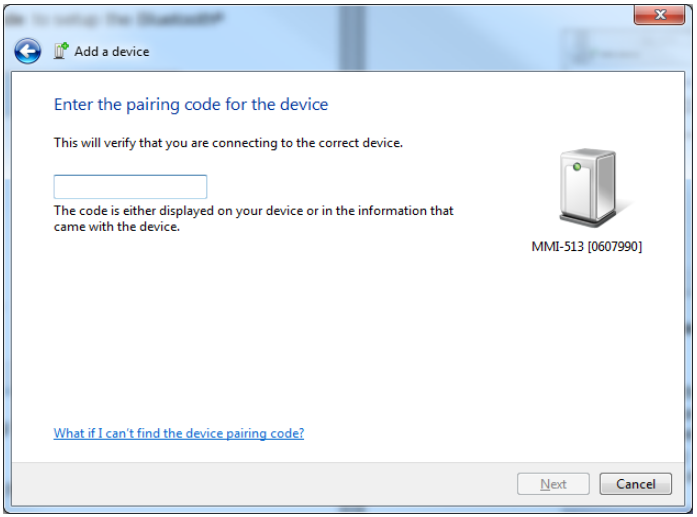

Figure 5: Enter Pairing Code

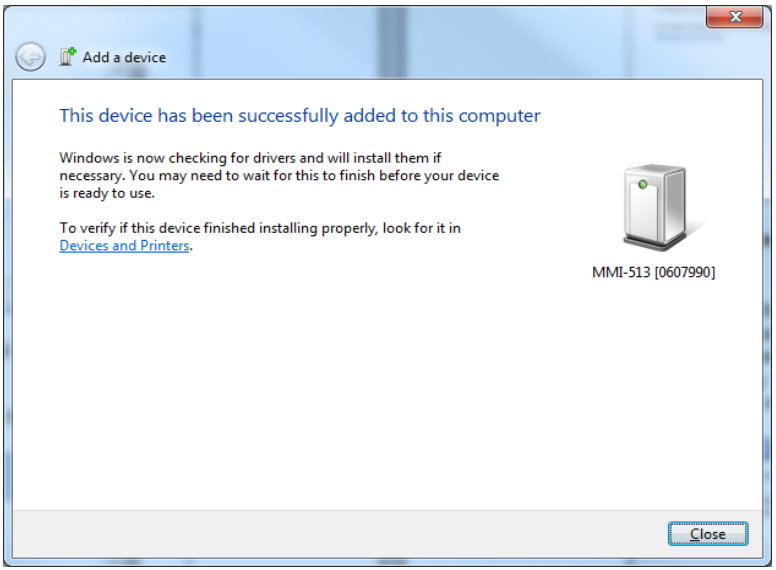

Figure 6: Bluetooth Connection Established

Once the system installs the communication drivers and assigns a COM port, the connection to the device is established and the Software Tool may be used.

For any future connections on your computer simply powering up the iBCN will allow bluetooth connection as the pairing information will be saved.

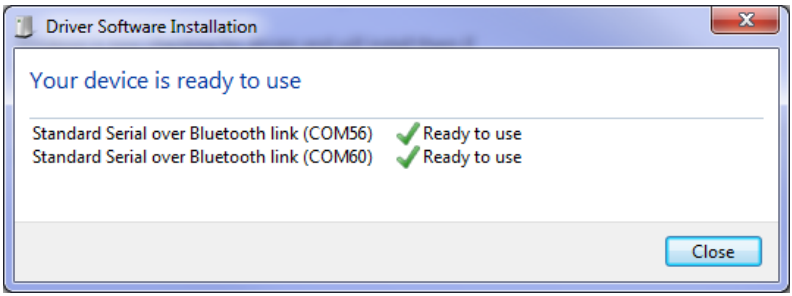

Figure 7: Pairing Complete with COM port assigned

NOTE: The Bluetooth Interface is only activated on the device for 10 minutes. If no connection is established within that time, the device must be power cycled (remove and re-attach battery pack) to attempt a new connection. Remember to allow several minutes between removing power and re-applying power to allow the circuit to fully discharge.

6.5 Configurator Software Tool

The Configurator Software Tool may be used with an established Bluetooth connection to the Iridium Mini-Beacon. The software tool displays device status, read/write device configuration, as well as downloading of the internal record log.

Once the software is connected, the main dialog screen displays the device status information as shown below.

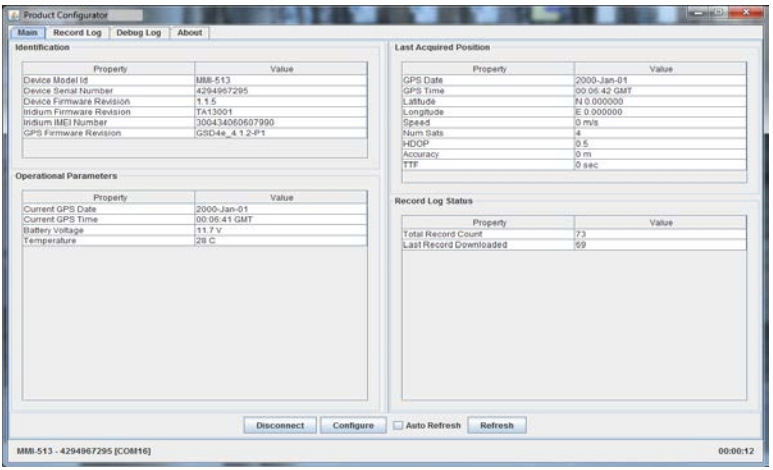

Figure 8: Configurator Software Tool

Device Configuration may be accessed and modified by clicking the "Configure" button. A summary area is displayed to provide feedback on the configuration parameters.

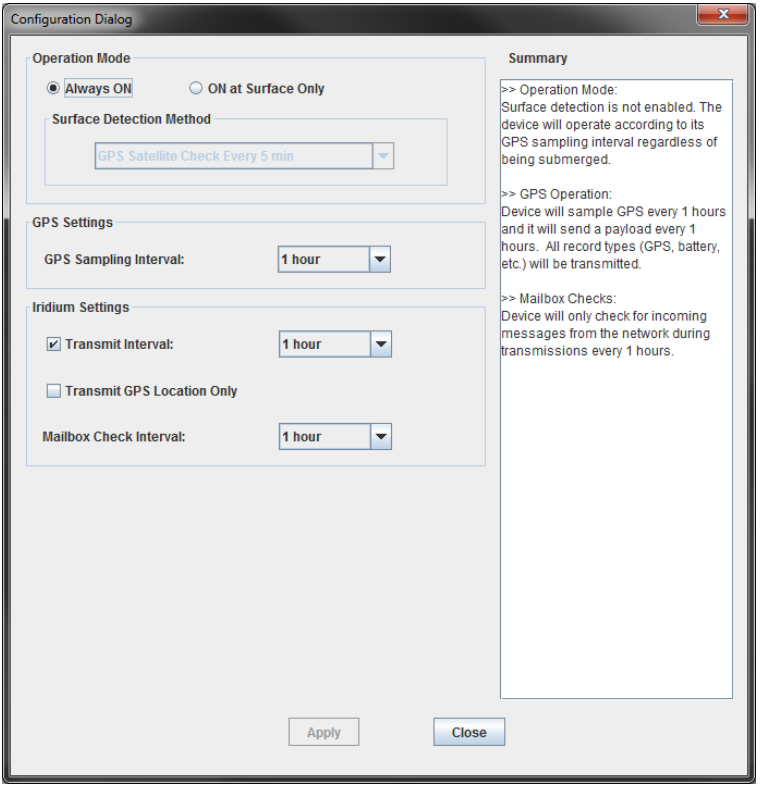

Figure 9: Configuration Dialog

6.6 Transmission Data Format

The following tables define the data formats of transmitted position reports from the iBCN.

Position Reporting – multiple reports (up to 195 bytes)
CMD_TYPE = 0x01 CMD_SUB_TYPE = 0xFD

Data Name	Value	Start Byte	Start Bit	Bit Length
CMD_TYPE	0x01	1	8	8
CMD_SUB_TYPE	0xFD	2	8	8
SEQ_NUM	0x00	3	8	8
T_POSITION_REPORT		4	8	128
… (up to 12 T_POSITION_REPORTs per packet)	…	…	…	…
T_POSITION_REPORT		179	8	128

Table 2: Multiple Position Report Packet Format

The T_POSITION_REPORT data format is 16 bytes in length defined as the following:

Data Name	Min	Max	Start Byte	Start Bit	Bit Length	Unit	Decoding Equation
GPS Time	0	2^{32}	1	8	32	sec	y = x
Record Type	0	1	5	8	1		y = x 1 = GPS Record 0 = Event Record (see ICD for more details)

The following fields only apply to the GPS Record Type.							
Reserved	0	1	5	7	1		y = x
Number Sats Visible	3	10	5	6	3	sats	y = x + 3
HDOP	0	3.5	5	3	3		y = 0.5x
GPS Latitude	-90	90	6	8	32	deg	y = 0.000001 x - 90
GPS Longitude	-180	180	10	8	32	deg	y = 0.000001 x - 180
Speed	0	255	14	8	8	m/s	y = x
GPS Fix Accuracy	0	255	15	8	8	m	y = x
Time to Fix	0	255	16	8	8	sec	y = x

Table 3: T_POSITION_REPORT Data Format

Other data commands are available for advanced communication with the iBCN. Please refer MetOcean Telematics *TD-14-014-iBCN Interface Control Document* for further information.

NOTE: Event records are similar length as GPS records with event specific data. Refer to the Interface Control Document for further information on Event records.

7. Maintenance

There are no user serviceable parts in the Pressure Case. Return the unit to the factory for repairs.

7.1 Regular Maintenance

- Rinse thoroughly with fresh water after every use
- Always remove batteries when not in use
- Always use fresh batteries
- Protect "O" ring surface from damage
- Replace worn or damaged "O" rings
- Keep batteries and electronics dry

7.2 Battery Change

The iBCN series have a variety of battery options, as listed below.

Configuration	Battery Type
iBCN Beacon, 7500m	9 x CR123A Lithium Cells
iBCN Infinity Beacon, 12000m	9 x CR123A Lithium Cells
iBCN-RH Beacon, 7500m	6 x 'C' Alkaline Cells/Lithium Cells
iBCN-7 Beacon, 7500m	7 x 'D' Alkaline/Lithium Cells
iBCN-3 Beacon, 7500m	3 x 'D' Lithium Cells
iBCN-RH2 Beacon, 7500m	9 x CR123A Lithium Cells
iBCN-RH2-M7 Beacon, 7500m	7 x 'D' Alkaline/Lithium Cells
iBCN-RH2-M3 Beacon, 7500m	3 x 'D' Lithium Cells

Table 4: Battery Options

It is highly recommended in all cases that these batteries be accessed and changed through the bottom end of the beacon. Install fresh batteries with the positive terminal towards the head assembly as shown in Figure 10. Please ensure that the insulating plastic tube remains within the pressure case during installation.

NOTE 1: Cycling power to the head assembly will result in the device defaulting to the ON state, unless the Magnet is attached

NOTE 2: Following disconnection of the head assembly from the batteries, wait for a period of two minutes before reconnecting. This period of time is required to let the circuit fully discharge and ensures that the device will function optimally.

Figure 10: Bottom End Caps Removed For Battery Change

NOTE:

The batteries are vulnerable to damage if the battery tube experiences a large vertical shock.

The batteries may deform under these conditions and provide intermittent power to the head assembly.

Replace any damaged batteries to ensure the device will function optimally.

Lithium batteries are not safe to use after suffering an impact. Any configuration using lithium batteries must have its batteries replaced following an impact.

Damaged lithium batteries must be disposed of according to local regulations.

NOTE:

The iBCN enclosure is physically connected to the ground/negative power input. This is an important consideration for remote mount installations where the power source may not be referenced to the chassis ground and may cause electrical ground faults in the parent system.

7.3 iBCN-7 Battery Change

The iBCN-7 battery pack is particularly sensitive to impact and vibration. If impact and vibration are predicted during the deployment of a iBCN-7 beacon it is suggested that contact wave springs be installed between D cells in the battery tube.

For your convenience, six (6) wave springs (MetOcean part # 101756) are included with the iBCN-7.

1. Start with the 7 cell battery tube empty with neither top or bottom cap installed.
2. With the battery tube in a vertical position on a flat surface, insert batteries from the top of the tube with a wave spring in between each cell.
3. As the batteries and wave springs are being installed, ensure that each wave spring is seated around the positive tab of the battery before loading the next battery.
4. With all batteries and wave springs in the tube positioned correctly, install the top cap to the top of the tube and securely fasten the screws.
5. Carefully flip the battery tube placing the top of the tube against the flat surface. As this is done, it is important to not disrupt the battery positioning and placement of the wave springs.
6. Place the bottom cap on the tube and press into place so that both O-rings are recessed into the tube. This requires a significant amount of force to press the bottom cap in place. The cap needs to be pressed in far enough so that the screws can engage the tube.
7. Secure the bottom cap screws in a circular pattern to fully engage the bottom cap into the tub

7.4 "O" Ring Facts

The main problem with "O" rings is that over time they can take a "set" shape. They lose their original round shape and they become slightly flattened resulting in less compressibility.

Reduced compressibility can lead to a water leak. The best way to prevent a problem is to service the "O" rings before every deployment.

Some of the main factors that can cause a "set" are:

- High storage temperature (exceeding 40°C) over time will cause the rubber to harden.
- Exposure to sunlight and ozone will cause the "O" ring to deteriorate and stiffen.
- Temperature does not have to be that cold for an "O" ring to lose a great deal of its flexibility. At 4°C, an "O" ring has stiffened significantly.
- "O" rings must be lightly lubricated with silicone-based grease. We recommend "Parker Super O Lube".
- A typical seal failure results in a very small amount of water, not a flooded case. Most seal failures occur near the surface.
- The "O" ring becomes less flexible as the rubber ages.
- If you are operating or storing at low temperature, it makes it even more important to service the "O" ring regularly.

7.5 "O" Ring Maintenance

MetOcean Telematics strongly recommends that "O" rings be serviced on a regular basis to ensure a reliable seal.

Remove and lubricate at least once a year, preferably more often, and replace every two years or sooner.

With regular maintenance, "O" rings will be very reliable and trouble free. It has been, however, our observation that most "O" rings are neglected for years and expected to perform at the extremes of their design limits.

There are multiple "O" rings that require service on the iBCN. The following table outlines the "O" rings used on the various models of the device.

Lubricate "O" rings slightly with silicone grease; the recommended grease is Parker Super O Lube.

Model	Interface	O-ring Specification	MetOcean Part #
iBCN or iBCN Infinity	Head Assembly to Battery Tube	M1.5x22 – DURO 90	106460
	End Cap to Battery Tube	M1.5x22 – DURO 90	106460
iBCN-OEM	Head Assembly bottom	M1.5x22 – DURO 90	106460
iBCN-RH	Head Assembly to Remote Base	M1.5x22 – DURO 90	106460
	Bulkhead to Battery Case	2-218 – DURO 70	H00595
	Battery Case to Pressure Switch	2-218 – DURO 70	H00595

iBCN-7 or iBCN-3	Head Assembly to Battery Tube	M1.5x22 – DURO 90	106460
	Upper Cap of Battery Tube	2X 2-026 – DURO 70	106324
	Lower Cap of Battery Tube	2X 2-026 – DURO 70	106324
iBCN-RH2 iBCN-RH2	Head Assembly to Remote Base	M1.5x22 – DURO 90	106460
	Bulkhead to Battery Case	2-218 – DURO 70	H00595
	End Cap to Battery Tube	M1.5x22 – DURO 90	106460
iBCN-RH2-3 or iBCN-RH2-7	Head Assembly to Battery Tube	M1.5x22 – DURO 90	106460
	Head Assembly to Remote Base	M1.5x22 – DURO 90	106460
	Upper Cap of Battery Tube	2X 2-026 – DURO 70	106324
	Lower Cap of Battery Tube	2X 2-026 – DURO 70	106324

Table 5: O-Ring Index

7.6 Corrosion Prevention

Corrosion is a problem common to all metals used in the ocean. To help minimize corrosion the iBCN is constructed using all titanium housing.

NOTE: DO NOT mount the beacon directly against metal. Isolate the pressure case by wrapping it with vinyl tape or similar at the contact points.

8. Licensing Requirements

The Iridium/GPS Satellite beacon uses the 9603 Iridium certified SBD modem and requires no radio station license to operate it.

The 9603 Iridium modem contains transmitter module:

FCC ID: Q639603

IC: 4629A-9603

The 9603N Iridium modem contains transmitter module:

FCC ID: Q639603N

IC: 4629A-9603N

9. Warranty

MetOcean Telematics products are designed and manufactured to the highest standards and deliver high-quality performance, ease of use and ease of installation.

If you encounter any difficulties while using your product, we recommend that you first consult the user manual or the information in the website, where you may find the required information.

In the unlikely event of a failure of the product, MetOcean Telematics will arrange for your product to be serviced, free-of-charge when you inform us of the defects within the warranty period, provided the product was used in accordance with the user manual.

9.1 Warranty Terms

MetOcean Telematics guarantees this product to be free from defective materials and workmanship and agrees to remedy any such defects for a period of 1 year commencing from the date of purchase, unless specified otherwise, subject to the following conditions:

The warranty does not apply if:

- Repairs or product modifications have been carried out by unauthorized service organisations or persons
- Model number or product number has been altered or made illegible
- Unauthorised removal or reinstallation of the equipment
- Unauthorised modification, misuse, neglect, accidents of nature, or shipping

9.2 Service Terms

MetOcean Telematics obligation under this warranty is limited to repairing or replacing (at MetOcean Telematics option) products that have been returned prepaid to MetOcean Telematics. MetOcean Telematics will return warranted equipment by surface carrier, prepaid.

This warranty, and MetOcean Telematics obligation there under, is in lieu of all other warranties, expressed or implied otherwise, including warranties of suitability and fitness for a particular purpose. MetOcean Telematics is not liable for consequential damages.

10. Specifications

Average Transmit Power	1.6 W
Receiver Sensitivity	-117 dBm
Frequency Range	1616 MHz to 1626.5 MHz
Battery Life	1 year of daily transmissions after a subsea deployment of 1.5 years.
GPS	48-channel L1 SiRFstarIV™ receiver
Data Storage	Storage for up to 1 million records
Batteries	iBCN: 9x CR123A Lithium iBCN Infinity: 9x CR123A Lithium iBCN-7: 7x D Alkaline cell iBCN-7: 7x D Lithium cell iBCN-3: 3x D Lithium cell iBCN-RH: 6x C cell (or custom) iBCN-RH2: 9x CR123A Lithium iBCN-7-A-RH2: 7x D Alkaline cell iBCN-7-L-RH2: 7x D Lithium cell iBCN-3-L-RH2: 3x D Lithium cell
Operating & Storage Temperature	-30°C to +70°C Operating -40°C to +85°C Storage
Ocean Depth Rating	iBCN: 7,500 meters (24,600 feet) iBCN Infinity: 12,000 meters (39,360 feet)

ON/OFF Control	Magnetic reed switch Water sensor or GPS Satellite check for activation	
Antenna	Integrated dual band GPS/Iridium ceramic patch	
Connectivity	Iridium SBD Communication Bluetooth SPP (Serial Port Profile)	
Weight	iBCN-OEM	220g
	iBCN	810g
	iBCN Infinity	960g
	iBCN-7	3550g (alkaline) 3200g (lithium)
	iBCN-3	1500g (lithium)
	iBCN-RH	600g (RH assembly) 1900g (battery pack) 200g (cable)
	iBCN-RH2	600g (RH assembly) 810g (battery pack) 200g (cable)
	iBCN-7-x-RH2	600g (RH assembly) 3200g (bp lithium) 3550g (bp alkaline) 200g (cable)
	iBCN-3-L-RH2	600g (RH assembly) 3200g (bp lithium) 200g (cable)
	iBCN-OEM	110g

Weight (in water)	iBCN	505g
	iBCN Infinity	650g
	iBCN- 7	2450g (alkaline) 2100g (lithium)
	iBCN-3	910g (lithium)
	iBCN-RH	360g (RH assembly) 1200g (battery pack) 50g (cable)
	iBCN-RH2	360g (RH assembly) 1200g (battery pack) 50g (cable)
	iBCN-7-x-RH2	360g (RH assembly) 2675g (bp lithium) 3025g (bp alkaline) 50g (cable)
	iBCN-3-L-RH2	360g (RH assembly) 1500g (bp lithium) 50g (cable)
Dimensions	iBCN-OEM	2.21” (from sealing surface) Ø 2.2” Max Diameter
	iBCN	15.5” Overall Length Ø 1.13” Tube Diameter
	iBCN Infinity	15.4” Overall Length Ø 1.13” Tube Diameter
	iBCN-7 &RH2	20.75” Overall Length Ø 2.0” Tube diameter
	iBCN-3 &RH2	11.25” Overall Length Ø 2.0” Tube Diameter
	iBCN-RH & RH2	21.5” Battery Tube Ø 1.75”Tube Diameter 4.0” Remote Head Length Ø 3.5” Flange Diameter

10.1 iBCN-OEM Specifications

Voltage	Positive: 7V – 28VDC through contact spring Negative: 0VDC through chassis threading
Power	Sleep <20uA (7V – 28VDC) GPS Location Acquisition 280mW (24mA @ 12V), typical time to fix: <60 seconds Iridium SBD Transmission • Average: 1600mW (135mA @ 12V), typical time to transmit: <15 seconds • Peak: Short 10 millisecond high current pulses during transmission (up to 1000mA @ 12V)
Thread	13/16-20 Unified National Thread, min 3/8" deep
Sealing Surface	Min Ø1.05" area, min surface finish 32µin

Figure 11: iBCN-OEM Specifications

10.2 iBCN Dimensions

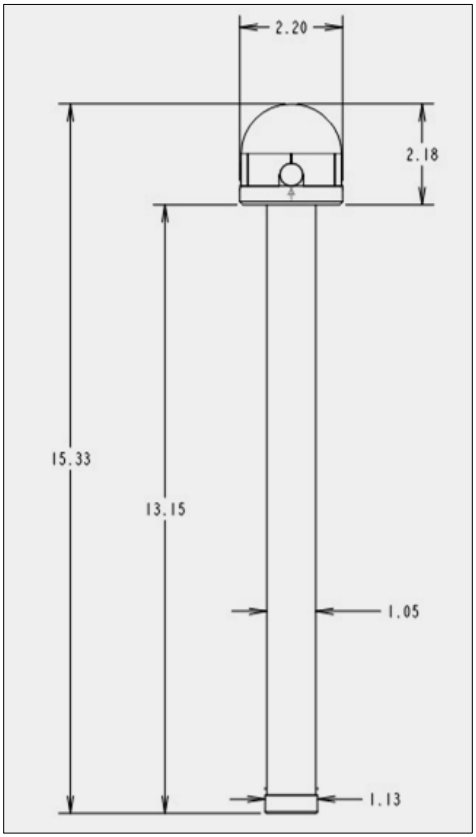

Figure 12: iBCN – Iridium Beacon, 7500m (9x CR123A cells)

Applicable Model
MMI-513-12000

10.3 iBCN Infinity Dimensions

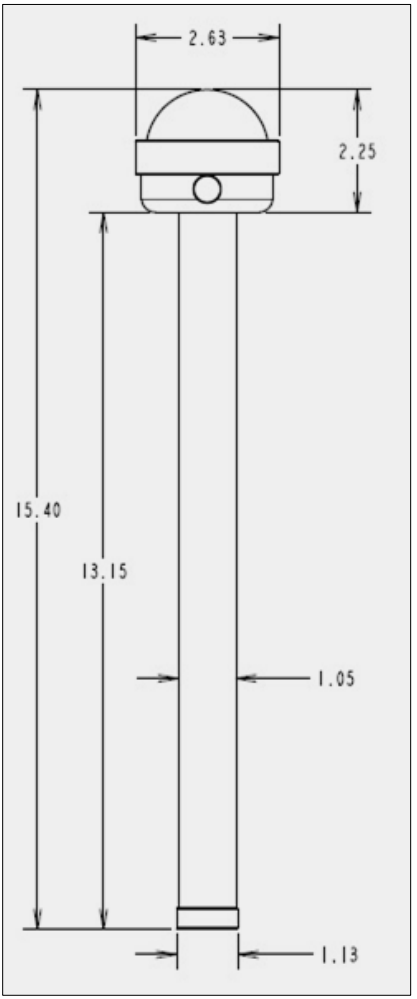

Figure 13: iBCN Infinity – Iridium Beacon 12000m (9x CR123A cells)

Applicable Model
MMI-613-12000

10.4 iBCN-3 Dimensions

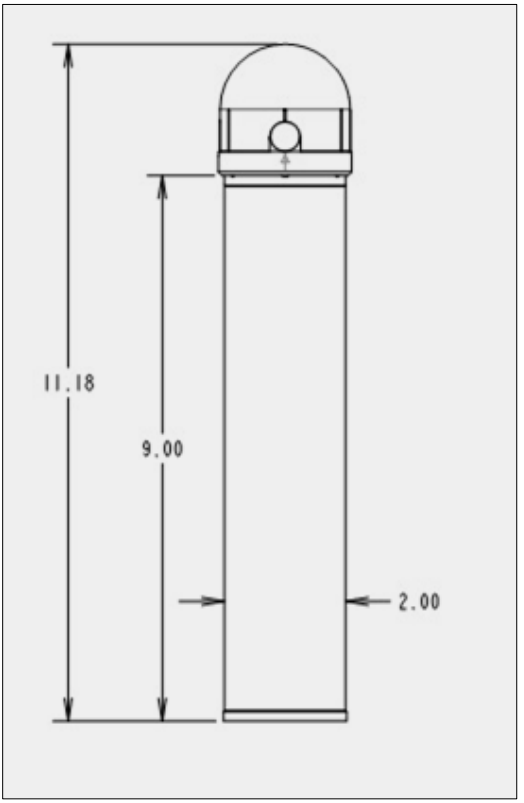

Figure 14: iBCN-3 – Iridium Beacon, 7500m (3x D cells)

Applicable Model
MMI-513-22000

10.5 iBCN-7 Dimensions

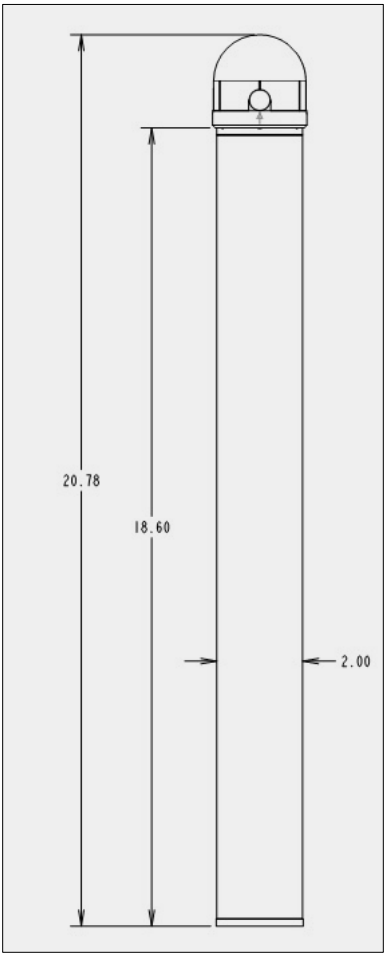

Figure 15: iBCN-7 – Iridium Beacon, 7500m (7x D cells)

Applicable Models
MMI-513-31000
MMI-513-32000

10.6 iBCN-RH-E Dimensions

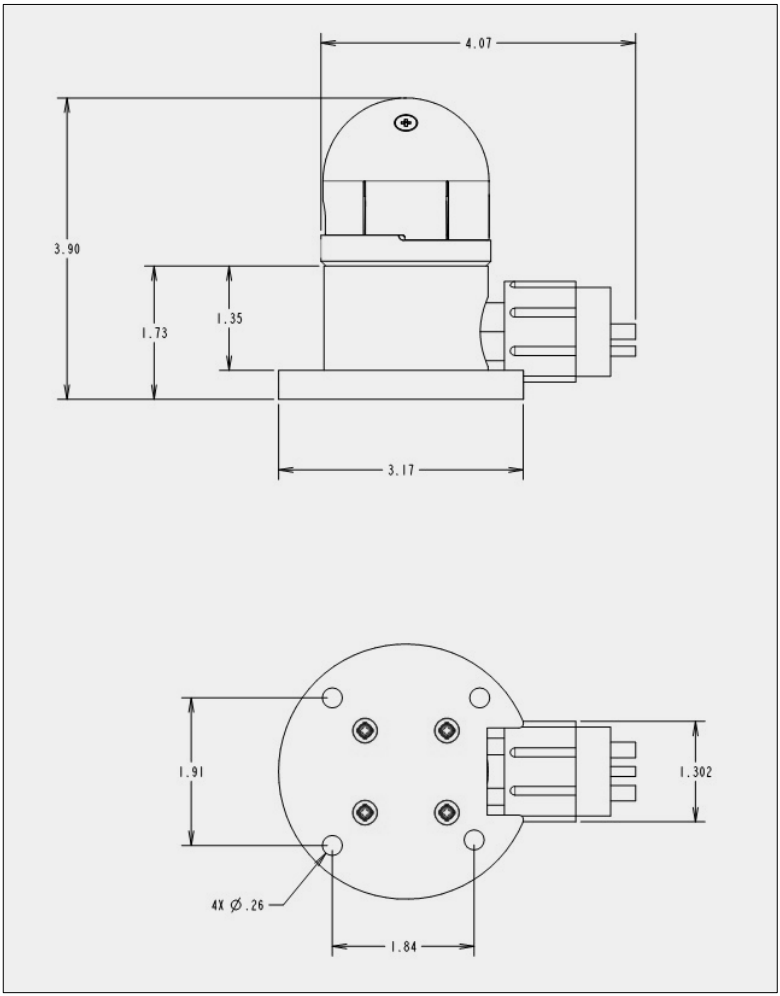

Figure 16: iBCN-RH – Iridium Beacon, 7500m (Remote Head)

Applicable Model
MMI-513-00100

10.7 iBCN-RH2-BP-CK Dimensions

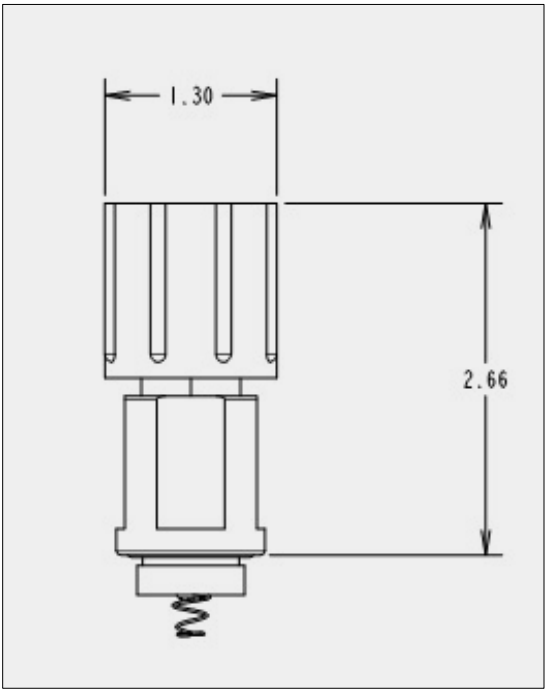

Figure 17: iBCN-RH2-BP-CK – Iridium Beacon Adapter

Applicable Model
MMI-500-00004

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