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Продовольственная и сельскохозяйственная организация Объединенных Наций
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Viale delle Terme di Caracalla, 00153 Rome, Italy Fax: +39 0657053152 Tel: +39 0657051 www.fao.org

Our Ref.: Your Ref.:

EXPERT CONSULTATION ON THE MARKING OF FISHING GEAR

ROME, ITALY, 4 – 7 April 2016

Venue, FAO HQ Mexico Room

NEW TECHNOLOGIES FOR MARKING OF FISHING GEAR

New Technologies for Marking of Fishing Gear

Appendices

Radio Frequency Identification Tags

Savi

Specification Sheet

Savi Data-Rich Tag (ST-654)

The Savi ST-654 high performance, data-rich active RFID tag is suited for various applications, including the tracking of shipping containers, vehicles and other large assets.

Available with 128 Kbytes of programmable memory, the ST-654 can hold a variety of data, from simple IDs linked to a server database, to detailed shipment manifests. The ST-654 is constructed to survive harsh environments and to provide reliable data to RFID readers. The ST-654 supports 400 feet (122 m) of RFID communications range and delivers real-time asset information to guide supply chain operations.

The ST-654 employs state-of-the-art power management technologies that extend the life of its replaceable battery up to five years. The ST-654 can be installed permanently via fixed hardware, or temporarily using Pressure Sensitive Tape (PST) or a magnetic mounting bracket equipped with high-strength rare earth magnets.

Specifications

Model Numbers	
ST-654-031	Baseline data-rich tag
ST-654-031 CN:MB	Data-rich tag with mounting bracket
ST-654-031 CN:MM	Data-rich tag with magnetic mount
ST-654-031-NSN	NSN baseline data-rich tag with label
ST-654-031-NSN CN:MB	NSN data-rich tag with mounting bracket and label
ST-654-031-NSN CN:MM	NSN data-rich tag with magnetic mount and label

Physical	
Dimensions	6.2 x 2.1 x 1.1 in. (15.8 x 5.4 x 2.8 cm)
Weight:	3.8 ounces (108 g)
Color:	Green
Beeper:	Audible beeper for tag location

Environmental	
Temperature:	-32°C to +70°C Operating; -40°C to +85°C Storage
Humidity:	95% Non-Condensing
Vibration & Shock:	MIL-STD-810F
Weatherproofing:	IP64
Manufacturing:	RoHS Directive 2002/95/EC

Wireless (UHF Transceiver)	
Frequency:	433.92 MHz at 0.6 mW peak EIRP, FSK Modulated
Range:	400 ft. (122 m) operating read/write range (outdoors, non-obstructed)
Protocols:	ISO 18000-7, EchoPoint

Savi Data-Rich Tag (ST-654)

Features:

- ISO 18000-7 compliant active RFID tag
- 128 Kbytes of database memory enables tag to support multiple applications
- 400 ft. (122 m) of range for wake-up, collections and RF read/write
- Replaceable battery with typical five year life
- Supports innovative low frequency technology for more precise locating capabilities
- Supports USB for reading and writing
- FCC, ETSI, HERO and RoHS certified

Benefits of Savi's Low Frequency (LF) Technology

Savi products support LF technology, which allows users to locate assets with greater precision. Savi's LF solution does this by focusing the tag wake-up field so that tags are not read multiple times, thus conserving tag battery life. Savi's LF Signposts can capture assets passing through a chokepoint at speeds up to 60 mph (97 kph). Robust and scalable, Savi's LF solution tracks assets and items throughout the supply chain effectively and automatically.

Specifications (continued)

Wireless (LF Receiver)	
Frequency:	123 kHz
Range:	Up to 12 ft. (3.6 m) from Savi SP-651-211 Long Range Signpost or Savi SP-652-211 Signpost Reader
Protocol:	EchoPoint
Power	
Battery Type:	3.6 V lithium, replaceable by user without tools
Battery Life:	Approximately 5 years at 2 collections per day
Digital	
Database Memory:	128 Kbytes on-board non-volatile memory
Wired Interface:	USB 1.1, USB 2.0
Approvals	
Radio Type Approval:	FCC Part 15, ETSI, EN 300 220 (433.92 MHz)
EMC & Immunity:	ETSI, EN 301 489
Ordnance:	HERO Certified, ARDEC rating of 1 in. (2.5 cm)

CONTACT US

To learn more about the full range of Savi's solutions, please email us at info@savi.com or visit www.savi.com.

About Savi

Savi Technology provides enterprises and organizations with unique and critical insight through the Savi Sensor Based Analytics Platform. The platform gives enterprises the ability to access, analyze and learn from new data in ways previously impossible, yielding streamlined operations, enhanced security and dramatically improved enterprise decision-making. Savi is headquartered in Alexandria, VA, with operations in Lexington, KY and around the world. Savi was recently named a 2013 Computerworld Honors Laureate for the economic improvements its technology has provided to several countries in Africa. Savi has more than 100 domestic and foreign issued patents covering a variety of technologies and is an active participant in several industry standards bodies including ISO 18000-7. For more information visit www.savi.com.

AIS Position Markers

em-trak

PROFESSIONAL STANDARD RELIABILITY

Product Code: 417-0001

I100

AIS IDENTIFIER

WWW.EM-TRAK.COM

Compliant with International AIS specifications

em-trak

THE AIS I100 IDENTIFIER IS A FULLY INTEGRATED BATTERY POWERED AIS TRANSCEIVER IDEAL FOR SMALL VESSEL TRACKING.

EM-TRAK I100 PRODUCT OVERVIEW

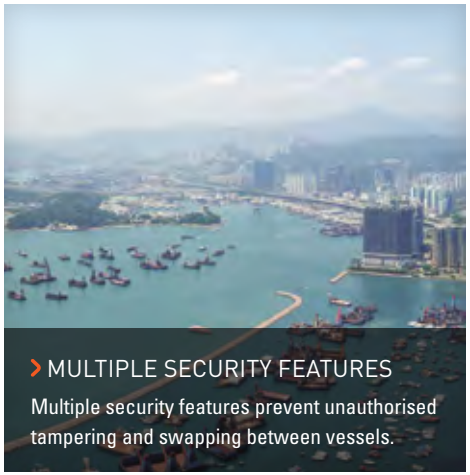
- Transmits full AIS message
- Shock, vibration and water proof
- Internal battery or vessel power
- Multiple built in security features

INTEGRATED ANTENNAS

High performance GPS and VHF antennas sealed inside toughened outer shell.

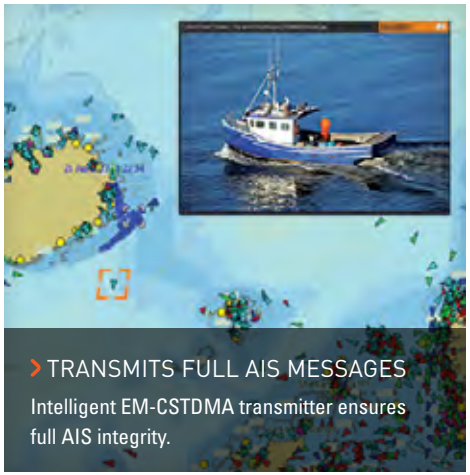
BATTERY OR VESSEL POWER

Over 5 days continuous operation on battery or connect to vessel power.



MULTIPLE SECURITY FEATURES

Multiple security features prevent unauthorised tampering and swapping between vessels.



TRANSMITS FULL AIS MESSAGES

Intelligent EM-CSTDMA transmitter ensures full AIS integrity.

KEY FEATURES

The em-trak AIS I100 IDENTIFIER is a low cost vessel tracking solution specifically designed for national or regional fleet tracking. It is easily fitted to the smallest boat, even those with no on board power due to its internal rechargeable battery, and will enable it to be constantly and accurately tracked. Multiple security features prevent tampering or unauthorised movement between vessels.

After fifteen years of creating marine electronics products we understand the environment within which our products must operate. The I100 Identifier is a ruggedised fully integrated AIS transceiver which is simple to install and use and has been specifically designed, engineered and manufactured for long term continuous use in even the most extreme marine environments.

- Both VHF and GPS antennas integrated within a security sealed, toughened outer shell
- Shock, vibration and waterproof (IP68)
- Configurable transmit intervals
- Secure easy fit bracket system
- Internal rechargeable battery – with a minimum 5 day continual operational life
- Multiple anti-tamper alert features, including unauthorised removal
- Intelligent high performance AIS transceiver, configurable for EM-CSTDMA or EM-SOTDMA operation
- Configurable emergency rescue/panic alert feature
- Tested and certified compliant with IEC AIS Class B transmit specifications

OPTIONS

The I100 Identifier offers a wide range of optional features and functionality including:

- Encryption
- Vessel movement log
- Geo-fence alert system
- Field programming & data capture kit

FEATURE HIGHLIGHTS

SECURE & RELIABLE

Each Identifier has a matched bracket. Inserting the Identifier into the bracket activates the unit. When removed the unit is deactivated and it will not work in another bracket. This ensures deployment integrity.

INTERNAL BATTERY POWER

The Identifier contains a long life rechargeable battery which is quickly charged using the included charging dock. If connected to the vessel power supply, the battery acts as a back up in the event of vessel power loss and provides 5 days operational life.

ALSO IN THE RANGE

AIS Class A

AIS Class B

AIS Antenna Splitter

AIS Receiver

AIS SART

em-trak

To download technical data sheets and find out more use the QR code or visit **www.em-trak.com**

EM-TRAK – COMMITTED TO VESSEL SAFETY & SECURITY

With over twenty five years of product design and engineering heritage our products offer the very best in quality engineering, reliability, usability and operational performance. To achieve this unique mixture of quality and performance we develop and deploy the most advanced core technologies coupled with proven professional standard product design.

EM-TRAK WARRANTY & SUPPORT

Em-trak is committed to providing the highest level of customer service. Our comprehensive global warranty ensures that in the unlikely event of a problem it will be resolved to your full satisfaction in the shortest possible time.

Further information about our warranty programme and instant advice and support for all our products can be obtained from our web site www.em-trak.com or your local authorised em-trak dealer.

The em-trak I100 is an aid to navigation and must not be relied upon to provide accurate navigation information. AIS is not a replacement for vigilant human lookouts and other navigation aids such as Radar. The performance of the I100 may be seriously impaired if not installed as instructed in the user manual, or due to other factors such as weather and or nearby transmitting devices. Compatibility with other systems may vary and is reliant on the third party systems recognizing the standard outputs from the I100. em-trak reserves the right to update and change these specifications at any time and without notice.

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EM-TRAK I100 FEATURES & SPECIFICATION

DIMENSIONS & WEIGHT

- 350mm x 63mm max diameter
- 250g (Identifier unit only)
- Mounting bracket min / max pole diameter: 25mm to 55mm

GPS RECEIVER (AIS INTERNAL)

- IEC 61108-1 Ed. 2.0 compliant 50 channel receiver
- WAAS / EGNOS enabled for improved position accuracy

POWER

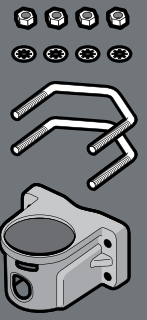
- Built in 2100mAh Lithium-Ion battery pack
- Up to 5 days operating time (depending on configured reporting rate)
- Charge time: 5 hours
- Charging dock supplied with universal input
- AC adapter

CERTIFICATION

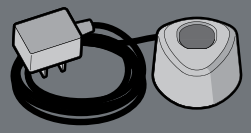
- IEC60945 Edn 4.0 'Protected' category IEC standard, environmental requirements
- ITU-RM.1371-3
- Universal AIS Technical Characteristics
- IEC61108-1
- CE marking under R & TTE directive for Europe

WHAT'S IN THE BOX

Identifier



Vessel bracket and fixings



Charger

EM-TRAK DEALER

WWW.EM-TRAK.COM

a xylem brand

AIS Marking and Tracking Buoy 4950A

The AIS Drifter Buoy is designed to mark and track oil spill and other floating objects.

The marker buoy is designed for easy deployment in an event and its robust design allows for launch from 30 meters height, i.e. helicopter or platforms.

The buoy is to be dropped around a detected oil spill and will mark and track the drift of the spill. For larger spills several buoys can be used at the same time to mark the spill area.

The buoy can also be fixed to other objects for temporary marking. When the buoy is deployed it provides position, drift speed and direction on the AIS screens.

The buoy transmits its position, drift speed and drift direction directly from the buoy to the surrounding ships. This is done by using existing AIS system, ship to ship or in this case buoy to ship. With this system you do not need internet access, satellite receiver on ship or software to receive information. The AIS system is VHF based with no transition cost compared to satellite transition system where you have to pay to connect and transmit data. By using the AIS system all ships in the coverage area will see the buoy and can then assist. You are not dependent on one particular ship with special infrastructure onboard.

The AIS Marking and Tracking Buoy is developed based on specifications according to the requirements from The Norwegian Clean Sea Association for Operating Companies (NOFO).

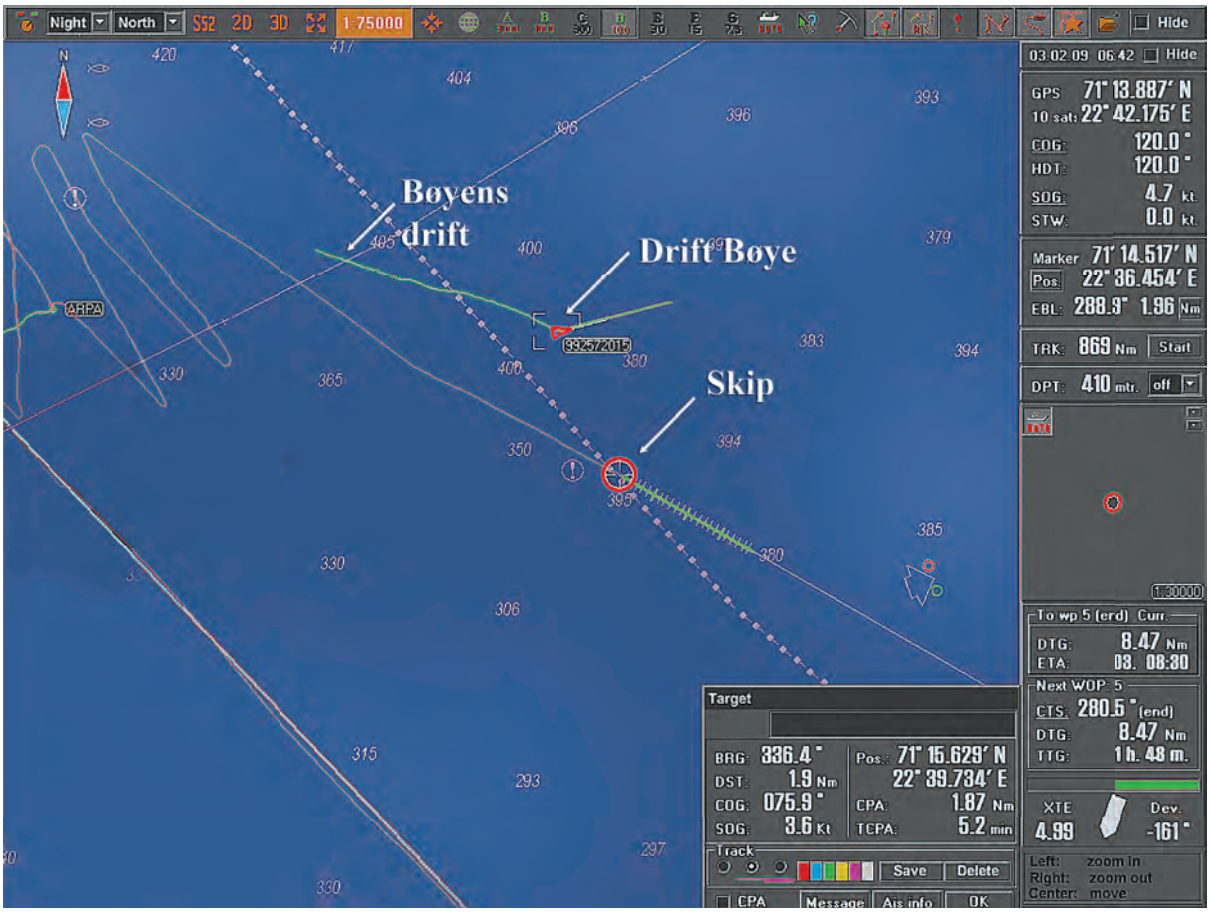
Information from the buoy is transferred by AIS and displayed on the electronic chart system onboard any vessel that has up-to-date ECDIS software according to IMO standards.

The buoy is proven after extensive tests in the North Sea as well as in the Barents Sea.

In the Barents sea the buoy showed excellent performance and the data were picked up well outside the specified range in wave heights of 10 meters.

Specifications

Communication:	AIS Class B transponder
Information:	position, speed and heading
Drop launch:	max 30 meters
Transmitting Range:	
Buoy to Ship:	7 - 10Nm
Buoy to Base Station:	25+Nm
Weight:	8 kg
Dimensions:	30 cm in diameter
Operation time:	7 days
Operation:	ON/OFF plug
Battery:	NiCd Rechargeable
Charging time:	8 hours
MMSI Number:	The number to be provided by customer from the country's authority.



Visit our Web site for the latest version of this document and more information
www.aadi.no

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xylem
Let's Solve Water

a xylem brand

TECHNICAL DESCRIPTION

TD 294

Operating manual

AIS Marking and Tracking Buoy

Rev.	Date	By	Description
1.0		Stian Larsson Georg Nygård	First revision.

Document change record

Contents

CHAPTER 1 Introduction

1.1 Purpose and scope

The purpose of this document is to describe how to operate and maintain the AIS Marking and Tracking Buoy.

1.2 References

ProAIS. A PC program from True Heading which can be uploaded from http://trueheading.se/en/aisctrx and used for functional testing of the AIS Marking and Tracking Buoy.

PC/buoy cable, cable 0975286. Connection between PC and the AIS Marking and Tracking Buoy. The cable is necessary to use ProAIS.

1.3 Definition of terms

AIS	Automatic Identification System
AIS Class A and B	Class “A” transponders used on commercial ships has many features not needed by recreational users. Class “B” standard offers most of the benefits of the class “A” to a more affordable price. All large commercial vessels including ferries, cargo and passenger ships carry AIS class A.
COG	Course over ground
LED	Light Emitting Diode
MMSI Number	The number to be provided by customer from the country’s authority
SOG	Speed over ground

CHAPTER 2 Description

2.1 How the AIS Marking and Tracking Buoy is working

AIS Marking Buoy is designed to quick and easy be able to mark up an oil spill or an object at sea. Robust design allows it to be dropped from a helicopter, a ship or a platform. The buoy can, for example, be dropped in an oil spill and will continuously report the position by means of the AIS system. In case of a larger oil spill several buoys can be deployed in the edges of the spill so that the drifting and the spread can be observed.

The buoy can also be linked to other objects for temporary marking.

The buoy sends position, drifting speed and direction to surrounding vessels equipped with AIS systems. This means that all necessary infrastructures including radio frequencies, message types, receipt and presentation of data is already in place. That way most ships can follow the AIS Marking Buoys.

CHAPTER 3 Charging the AIS Marking and Tracking Buoy

3.1 Contents of the storage box

In the storage box you will find:

1 or 2	AIS Marker Buoy
1 or 2	Charger (230V AC / 12V DC)
1	AIS Marker Buoy User's Manual (This Manual)
1	Short form user guide (see Appendix 1 and 2)

3.2 Charge the batteries

Connect charger to the mains, wait for the LED to light yellow and then connect charger to the connector on the AIS Marking and Tracking Buoy. The LED (light emitting diode) will be yellow before the fast charge starts and the LED changes to orange. When the batteries are fully charged the charger will go into a top-off charge mode before it goes over to trickle charge mode. During top-off charge the LED will be green with short intermittent yellow light. When the top-off charge is completed, the charger will go into trickle charge mode and the LED will be green.

CHARGE CYCLE AND LED INDICATIONS

LED indicator	Mode
Yellow	Battery not connected
Yellow	Battery initialization and analysis
Orange	Fast charge
Green with intermittent yellow flash	Top-off charge
Green	Trickle charge. The battery is fully charged.
Alternating orange - green	Error

3.3 Recommended charging procedure

- On regular basis. Charge the batteries on regular basis, for example every month. Also see 0.
- Before deployment. Always make sure the batteries are charged before deployment.

CHAPTER 4 Functional test to ensure proper operation

4.1 Before deployment

Before deployment the AIS Marker Buoy should have a functional test to ensure proper operation. This can be done by placing the AIS Marker Buoy outdoors with a clear line of sight to the GPS satellites and then activated.

- Ensure the battery is fully charged
- Disconnect the Charger
- Mount the antenna (screw connection). Do not use any tools; tighten by hand.
- Connect the ON/OFF plug to activate the AIS Marker Buoy

AIS data from the marker buoy will normally be received on the vessel's AIS system within minutes. When data is received AIS Marker Buoy is ready for deployment.
Since AIS Marker Buoy is a Class B transponder messages from the buoy will not have priority in the AIS system. It might appear that receiving the position information from buoy does not get through at first attempt. Therefore the buoy should be active until it pops up on the vessel's AIS receiver (depending on dipswitch settings). If the buoy does not pop up see “troubleshooting”.

4.2 Once every month

As the AIS Marking and Tracking Buoy is not often used it may be appropriate to have a regular routine to test the functionality, such as every month. Follow the above procedure 4.1.

Important note

There is one connector on the surface of the buoy enclosure which serves three different functions:

1. The ON/OFF plug attached to the buoy will activate the buoy when connected. Must always be connected before the buoy is deployed.
2. The charging cable and the charger are needed to charge the internal buoy batteries. As long as this plug is connected no transmission will take place.
3. The PC/buoy cable is used for communication between PC and the buoy. The plug connected to the buoy will also activate the buoy according to the dipswitch settings like the ON/OFF plug explained above.

CHAPTER 5 Deployment and pick-up

5.1 Deployment of AIS Marking and Tracking Buoy

AIS Marker Buoy is designed to withstand being thrown from the vessel's deck, but it is recommended that one always deploys the buoy as careful as possible and at the lowest possible height. 5 meters causes less chance of damage than 30 meters.

- Make sure the buoy is fully charged (see chapter 2.3
- Disconnect the charger
- Mount the antenna (screw connection). Do not use any tools; tighten by hand.
- Connect the ON/OFF plug to activate the buoy

5.2 Pickup of AIS Marking and Tracking Buoy

An AIS Marker Buoy is most easily picked up from a small boat. Do not grip or lift the buoy using the antenna. Use the rope hanging on the side of the buoy to lift. A landing net might be useful during the pickup process.
Always clean the buoy immediately after pickup. The buoy can be cleaned using soap and a cloth or soft brush. Then wipe the water and any soap remains. Set buoy to be charged.

- Disconnect the ON/OFF plug to deactivate the buoy
- Remove the antenna
- Place the buoy in the storage box, and connect the charger

- Terminate charging when LED is solid green. The battery is fully charged.

CHAPTER 6 Technical Information

6.1 Specifications

Communication	AIS Class B transponder
Information	Position, speed and heading
Drop height	Maximum 30 meter
Transmitting Range	Buoy to Ship: 7-10Nm Buoy to Base Station: 25+Nm
Weight	8,5 kg
Dimensions	30 cm in diameter
Operation time (typical)	6 days
Operation	ON/OFF plug
Battery type	NiMH Rechargeable
Charging time	Maximum 4 hours depending on level of discharge
Battery voltage	13,4V
Battery capacity	12000 mAh

CHAPTER 7 Disassemble and reassemble the two hemispheres

The AIS Marking and Tracking Buoy has to be disassembled for the following reasons:

- Exchange of internal battery
- Exchange of internal battery fuse
- Adjustment of timer settings

7.1 Disassemble

1. Unscrew 8 off M5 screws (5mm Unbrako, 8mm hex-spanner
2. Separate the two hemispheres
3. Battery and fuse are located in the lower hemisphere. Remove inside cover plate to access.

NB! Do not use any sharp tool

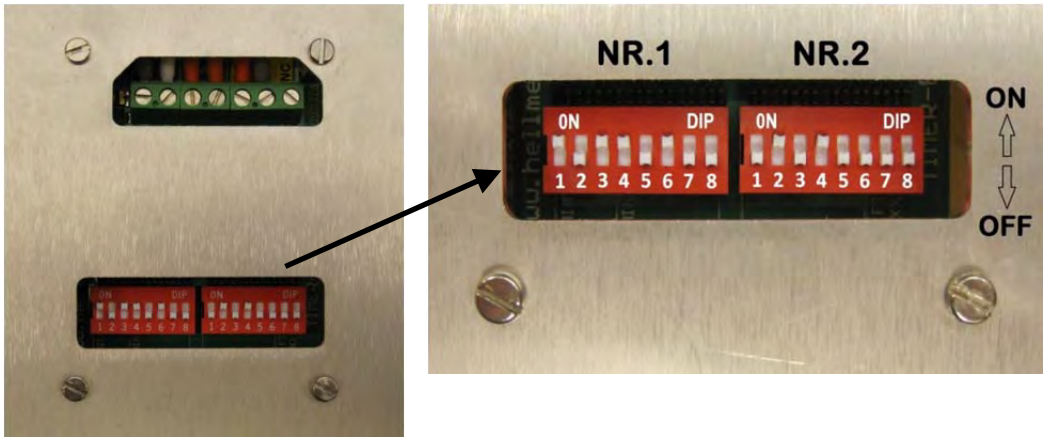
7.2 Reassemble

1. Check and clean gasket and gasket groove.
2. Mount spheres together and tighten screws in diagonal pattern. Torque screws to 2 Nm.

To avoid stresses in the plastic material ensure that both nuts and screws has rivets against the hemispheres. Torque screws to 2Nm using an appropriate Torque wrench.

CHAPTER 8 Setting Timers for AIS transponder to be active

For disassembling instructions see above.



Dipswitch NR.1			
Sw	Name/ Function	Setting	
1	Sec/Min	ON*	**Default settings**
2	"Tim"	OFF*	
3	"Togle"	ON*	
4	Sec/Min	ON*	
5	1	OFF	Timer sequence **ON**-time
6	2	ON	
7	4	OFF	
8	16	OFF	

Dipswitch NR.2			
Sw	Name / Function	Setting	
1	1	OFF	Timer **TOTAL** sequence time
2	2	ON	
3	4	OFF	
4	8	ON	
5	16	OFF	
6	32	OFF	
7	FF/FT	OFF*	**Default settings**
8	PIN(X)	OFF*	

NB!

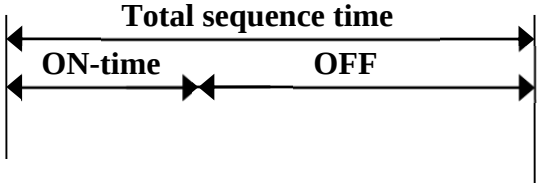
Do not change default setting marked with *****

(This setup gives timer settings in minutes)

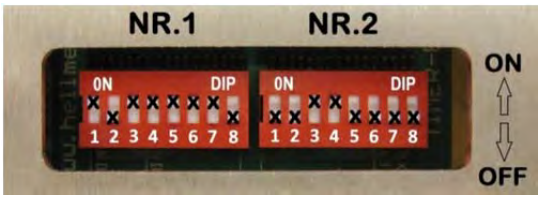
Timer sequence **ON**-time:

Is the time the AIS-transponder is active

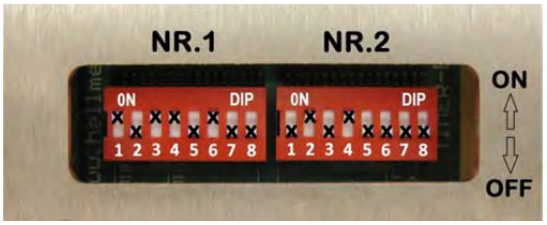
Timer **TOTAL** sequence time:



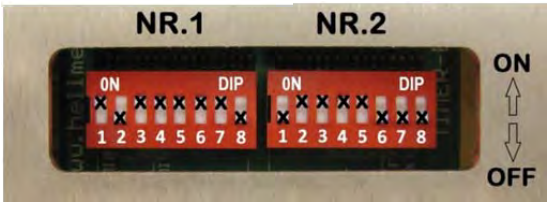
Operational time for different timer setup				
Total sequence time	**Sequence ON-time**	**Operational time (approx.)**	**Buoy name broadcasted**	Setup(see picture below)
12	7	2,0 days	X	Pict. 1
10	2	6,5 days		Pict. 2
30	7	6,5 days	X	Pict. 3
60	7	11 days	X	Pict. 4



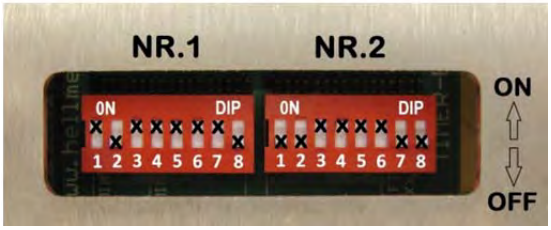
Picture 1



Picture 2



Picture 3



Picture 4

CHAPTER 9 Trouble shooting

For trouble shooting using PC you will need:

- Cable for connection between PC serial port and the AIS Marker Buoy. The cable has to be ordered from Aanderaa Data Instruments. (For computers with only USB ports, use serial RS-232 to USB converter**).**
- The PC program ProAIS from True Heading. The program can be uploaded from this link: http://www.trueheading.se/en/aisctrx

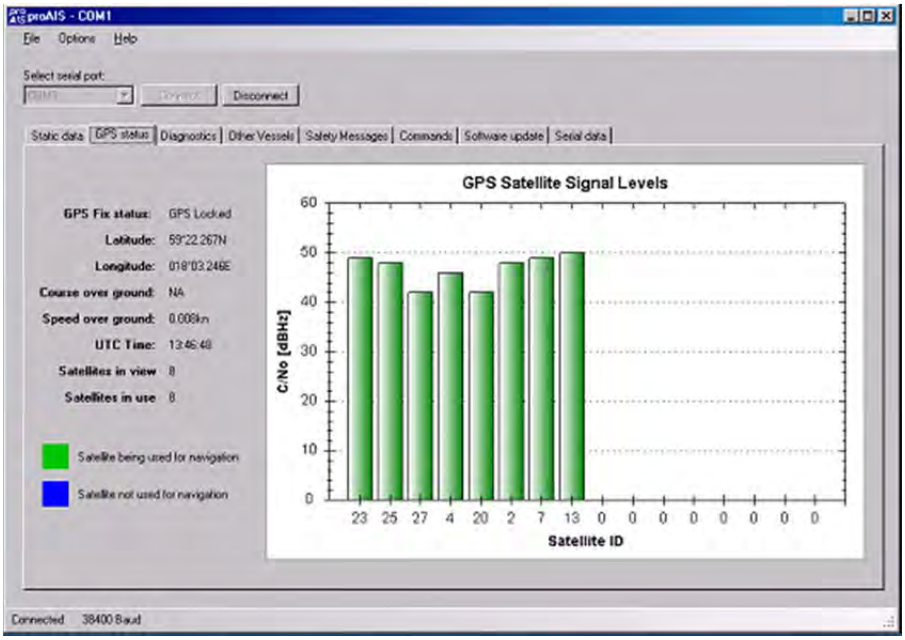
Install the Pro-AIS program on the PC, and connect PC and AIS Marker Buoy with the cable.
Start the Pro-AIS program and choose correct Serial port and press connect.

In the ProAIS program under the Static tab:

- Check that ship's name is OK
- Check that MMSI number is OK (This can only be changed by AADI)

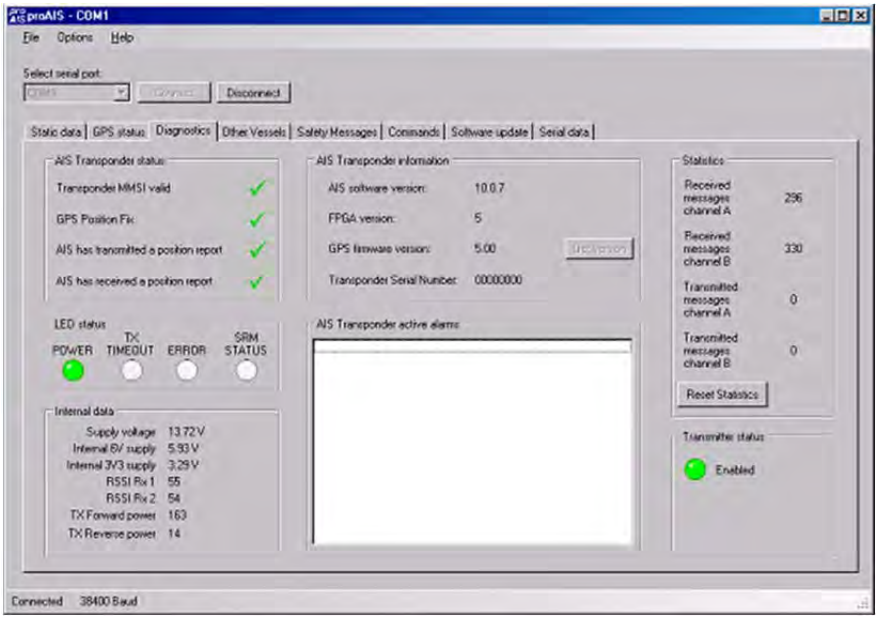
In the ProAIS program under the GPS status tab:

- The GPS levels for most of the satellites should be higher than 40.
- The GPS fix bars should be green within 1 minute.



In the ProAIS program under the Diagnostics tab:

- Check for received messages in the statistics frame
- Check supply voltage 12V (10-15V), Internal 6V og internal 3,3V
- Check for active alarms
- About 30 seconds after GPS fix is established the AIS Marker Buoy should start to send data. The Transmitter status light will indicate transmission by turning to green and Transmitted messages channel A & B will start counting up
- When transmitting data; Check that the TX forward level is higher than 100 and TX Reverse level is lower than 20
- High TX Reverse level (more than 70) might cause an alarm to be set and the buoy will not send data.



Important note:

The ProAIS PC program will only receive data from the buoy as long as the internal buoy power is switched on.

If for example the dipswitches described in CHAPTER 8 is set for a total sequence time of 10 minutes of which the buoy is active in 2 minutes, then the buoy will be active (power on) during the two first minutes after you have connected the communication cable to the buoy.

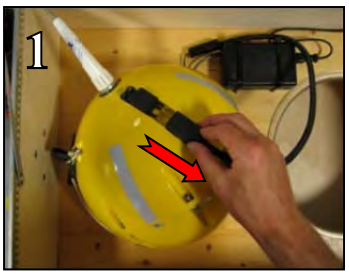
After 2 minutes the power will be switched off leaving the ProAIS program without new data. If you need more time using the ProAIS program the cable must be disconnected from the buoy contact and then replaced again. Then you will have another two minutes of operation.

ENGLISH

Appendix 1. Deployment and pickup

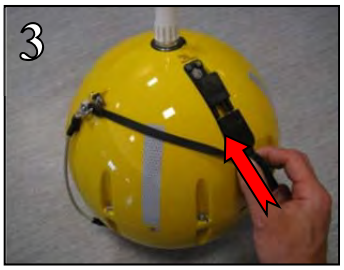
Deployment of the buoy

1. Disconnect the charger cable.



2. Connect the antenna.

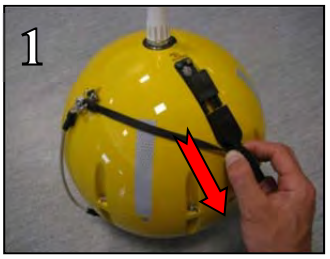
3. Connect the ON/OFF plug.



Note! When the battery has been fully charged, the buoy can operate for typical 6 days.

Retrieval of the buoy

1. Disconnect the ON/OFF plug.



2. Disconnect the antenna.

3. Place the buoy in the storage box and connect the charger cable.

Note! Always clean the buoy immediately after retrieval.

The battery is fully charged after max 4 hours or when the Status LED is green.

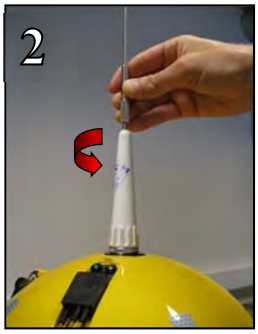
NORSK

Appendix 2. Bøyeutsetting og opptak

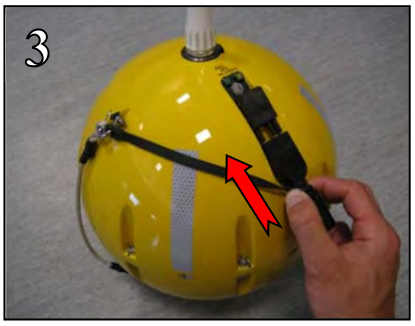
Utsetting av bøyen

1. Koble fra batteriets ladeplugg.

2. Skru på antennen.



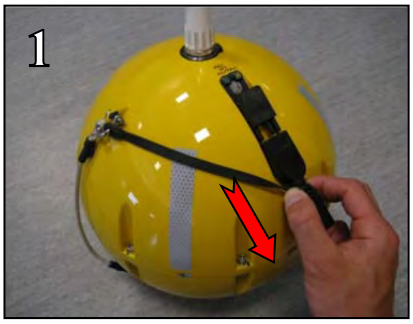
3. Koble til ON/OFF pluggen.



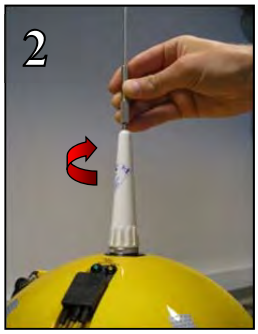
NB! Når batteriet har blitt fulladet, kan bøyen typisk operere i 6 dager.

Opptak av bøye

1. Koble fra ON/OFF pluggen.

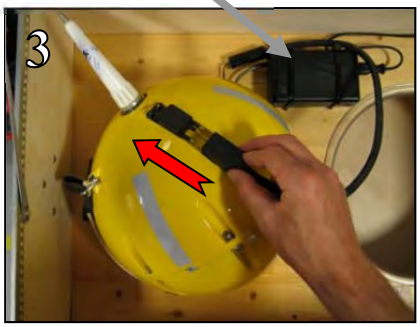


2. Skru av antennen.



3. Plasser bøyen i lagringsboksen, og koble i pluggen til batteriladeren.

Status LED



NB! Rengjør alltid bøyen etter endt utsetting.

NB! Batteriet er fulladet etter maks 4 timer eller når Status LED er grønn.

Appendix 3. AIS messages used by the AIS Marker Buoy

Four messages are defined for class B units of which the AIS drifter buoy is using two, message 18 and message 24.

Message 18: Standard Class B CS Position Report

This message is sent every 3 minutes where *speed over ground* (SOG) is less than 2 knots, or every 30 seconds for greater speeds.

Message 18 includes: MMSI, SOG, longitude, latitude, COG, true heading, time

Message 24: Class B CS Static Data Report

This message is sent every 6 minutes, the same time interval as for Class A transponders. Because of its length, this message is divided into two parts (Part A and B), sent within one minute of each other.

Message 24 Part A includes: MMSI, name of MMSI registered ship.

Message 24 Part B includes: MMSI, type of ship.

Note that this message was defined after the original AIS specifications, so some Class A units may need a firmware upgrade to be able to decode this message.

The AIS Marking and Tracking Buoy is activating the internal class B AIS transponder by switching the battery power on and off. Thus the sending of messages is changed from the standard description above.

Message 18 is sent every time the AIS transponder inside the buoy is switched on. That means typically every 10 minutes.

Message 24 is only sent after at least 6 minutes of continuous operation. Normal AIS Marker Buoy operation requires battery saving and the unit is typically active for 2 minutes at a time. Therefore, if the buoy is set to be active for less than 7 minutes in a total sequence time (controlled by dipswitches) message 24 will not be sent.

OSOP

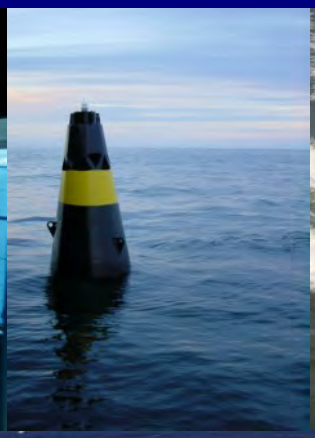
Distributor of Xylem Products

WEB www.osop.com.pa
E-MAIL sales@osop.com.pa

xylem
Let's Solve Water

AIS CARBON IDENTIFIER

AIS Vessel tracking device


Track your vessel using AIS IDENTIFIER

LEISURE

SECURITY

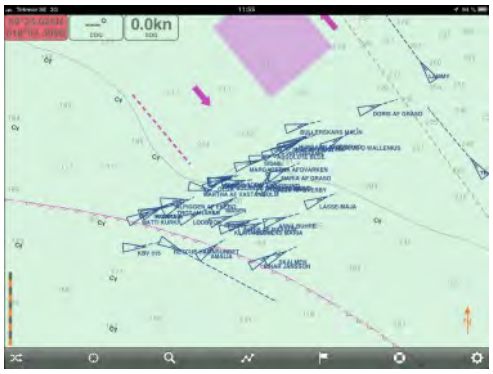
COMMERCIAL

SAFETY

TRUE HEADING

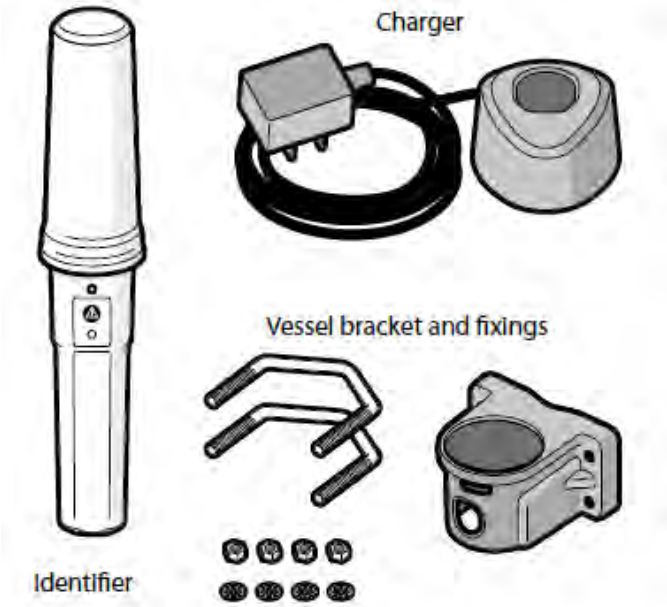
FEATURES

A truly unique product, AIS CARBON Identifier offers an innovative vessel tracking solution. Fully integrated GPS and VHF antennas as well as a long-life battery enables Identifier to offer a fully integrated AIS solution.



AIS CARBON Identifier is the world's lowest cost secure AIS solution with passive and active security functionality maintaining the integrity of AIS. A unique, True Heading, transmit and receive functionality enable compliance with both CSTDMA and SOTDMA transmit protocols. Advanced core technology ensures low power consumption, yet maintains maximum range.

PRODUCT SPECIFICATIONS



GPS receiver (AIS internal)
• IEC 61108-1 Ed. 2.0 compliant 50 channel receiver
• WAAS / EGNOS enabled for improved position accuracy

User interface
• Status LED
• SOS button with configurable messaging

Data interfaces
• Single TTL level serial interface for configuration
• Batch configuration can be performed at manufacture on request

Connectors
• Charge and configuration contacts are built into the base of the Identifier

VHF transceiver
• Transmitter x 1
• Receiver x 1
• Frequency: 156.025 to 162.025 MHz in 25kHz steps
• Output power: 1W EIRP
• Channel bandwidth: 25KHz
• Channel step: 25KHz
• Modulation modes: 25KHz GMSK (AIS, transmit only)
• Bit rate: 9600 b/s (GMSK) and 1200 b/s (FSK)
• Receiver sensitivity: <-107dBm (carrier sense only)

Environmental
• IEC 60945 'Exposed' category
• Waterproof to IPx6 and IPx7
• Operating temperature: -15°C to +55°C

Physical
• Dimensions: 350mm x 63mm max. (H x D)
• Weight: 250g (Identifier unit only)
• Mounting bracket min / max pole diameter: 25mm to 55mm

Power
• Built in 2100mAh Lithium-Ion battery pack
• Up to 5 days operating time (depending on configured reporting rate)
• Charge time: 5 hours
• Charging dock supplied with universal input AC adapter

The Identifier has been carefully developed with technology to operate in a Carrier Sense ('CS') manner within the AIS system as envisaged by the International Maritime Organisation defined AIS system. It effectively behaves exactly like a Class B in regard to managing the AIS slot map, therefore ensuring the integrity of the AIS system. However, the Identifier does not conform to any of the specific existing IEC AIS standards and therefore does not carry any international approvals. The Identifier will require local approval by the relevant authorities. True Heading will provide all necessary technical support to assist in this process, and justify the integrity of the Identifier within the AIS system.

True Heading Dealer

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182 32 DANDERYD
SWEDEN
Phone +46 8 6222660
Fax +46 54593910
info@trueheading.se

CE FC

www.trueheading.se

2013-06-25

Matsutec®

AIS Fishing Net Tracking Buoy

MODEL:HAB-80

Feature:

- Long time battery, more than 240 house each time
- Smart GPS antenna module allows an excellent GPS signal receiving
- Stable and reliable RF performance
- High-level waterproofing protection up to IPX7
- Self developed AIS Fishing Net Tracking Buoy, allows you to get an accurate location at night, in rain, and fog.

Proved Performance

- Up to 10nm from a ship with AIS A or B transponder

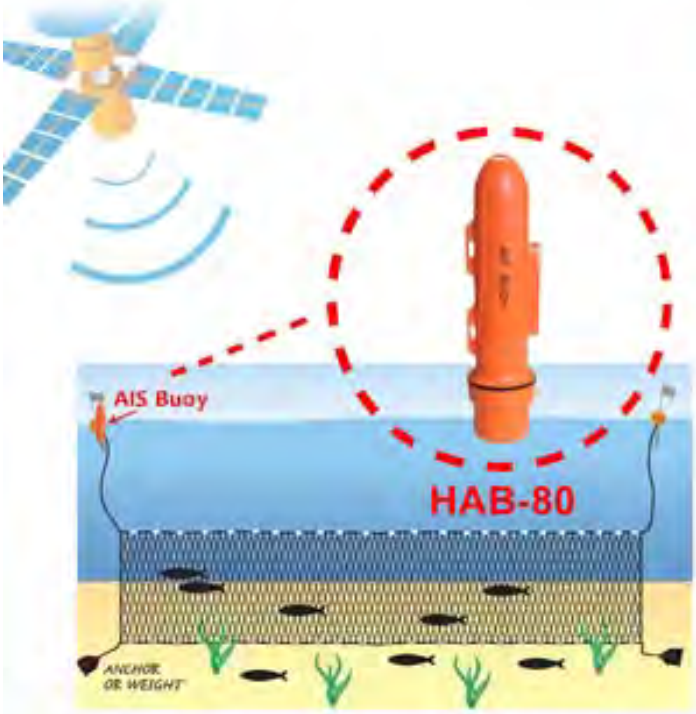
NEW VERSION

Innovation for marine

Application

Wanting for an accurate location of your fishing net? Wanting to save your time and fuel to find your net?

Self developed AIS Fishing Net Tracking Buoy, allows you to get an accurate location at night, in rain, and fog. Don't worry about losing your fishing net anymore!



HAB-80 AIS Fishing Net Tracking Buoy unit uses advanced AIS technology to transmit the combined data that include the unique ID and the position of a net. And the data can be received effectively by the vessel equipped with AIS device, then easily recognized and find back the nets with HAB-80. Also it can avoid collision accidents by other boats.

Specification

Standards:

IEC62287-1: 2006-03
IEC60945: 2002
ITU-R M.1371-2

Position update:	every 3 minutes
Working frequency:	161.975MHz / 162.025MHz
Output power:	34.8dBm±1.5dBm
Channel bandwidth:	25 KHz
Modulation mode:	GMSK
Bit Rate:	9600b/s±50ppm(GMSK)
Dimension:	330 mm x 90mm
Weight:	0.5 KGS
Battery:	8.4V, 4000mAh; rechargeable
Working time:	More than 240 hours
Antenna:	Built-in VHF/GPS antenna
GPS Module:	IEC61108-1 standard
Working Environment:	-20C – 55C
Waterproofing:	IPX7

Equipment List:

HAB-80 Tracking Buoy unit
Battery recharger

Matsutec®

Radio Buoys

KOSDAQ
LISTED COMPANY

WWW.SAMYUNGENC.COM

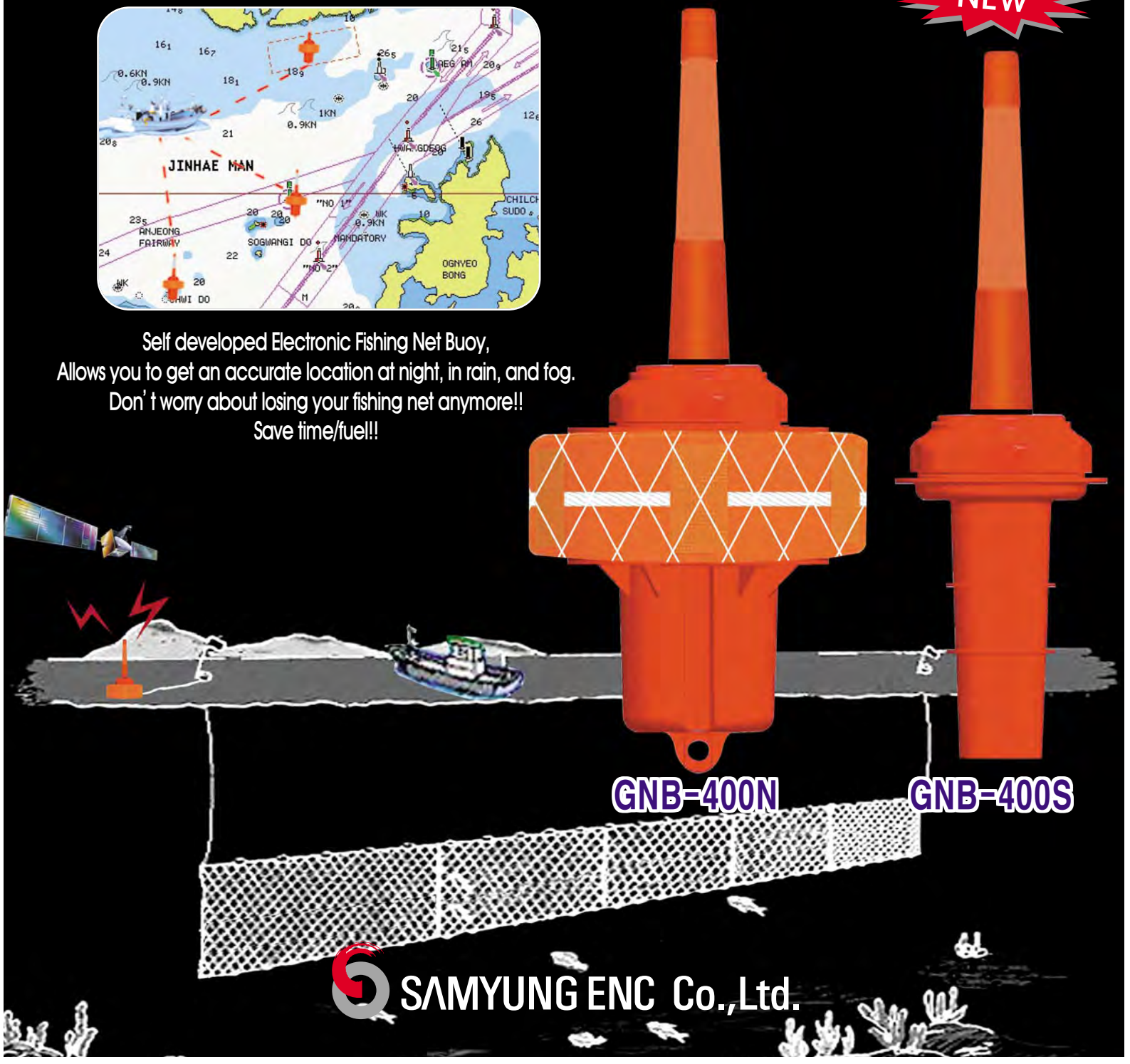
Electronic Fishing Net Buoy

GNB-400S/N

Wanting for an accurate location of your fishing net?
Wanting to save your fuel and time?

NEW

Self developed Electronic Fishing Net Buoy,
Allows you to get an accurate location at night, in rain, and fog.
Don't worry about losing your fishing net anymore!!
Save time/fuel!!



SAMYUNG ENC Co.,Ltd.

Electronic Fishing Net Buoy
Model : GNB-400S/N

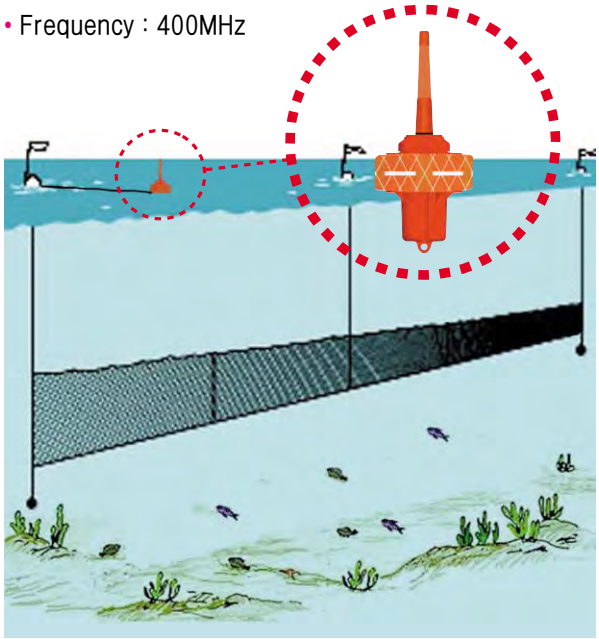
FEATURES

- GPS Smart antenna module allows an excellent GPS signal receiving
- Auto or manual operation
- Equipped with self-diagnosis and test
- Long hours of use with high capacity battery (14 or 28Ah)
- Automatic message gets sent when battery needs to be replaced after checking the remaining of battery
- Perfectly waterproofed up to 10m underwater

SPECIFICATIONS

General

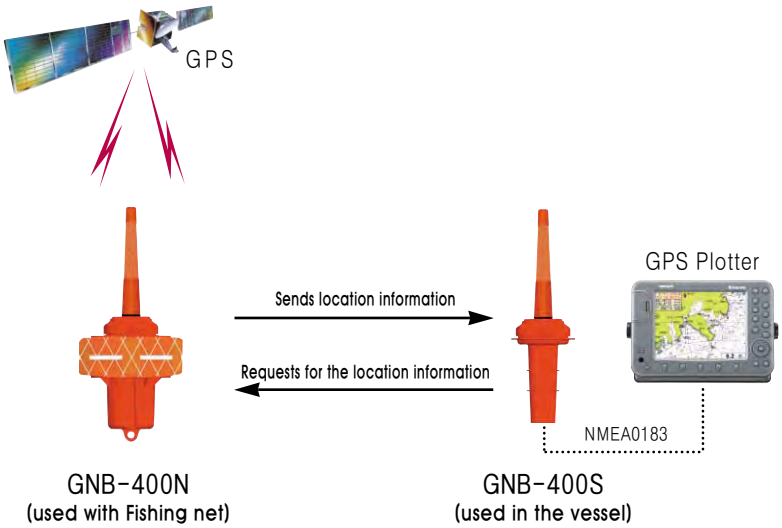
- Housing material : PC/ABS Alloy, ASA
- Operating Temperature : -20℃~+50℃, Storing Temperature : -30℃~+70℃
- Battery : Li-SOCL2
- Antenna : Nondirectional whip antenna
- Operating time : 14 or 28Ah
- Frequency : 400MHz



What is Electronic Fishing Net buoy?

GNB-400 fishnet management system is an Electronic Buoy equipped with GPS. It displays the exact location information and I.D. number on the GPS Plotter. This equipment monitors, prevents the loss, saves the fuel, and shortens the time to collect fishing net. This equipment allows you to find the location of fishing net more efficiently by shortening the time.

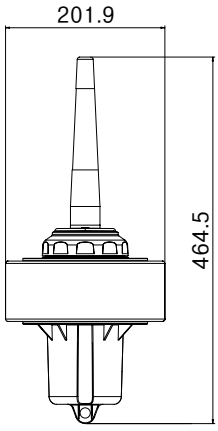
CONFIGURATION



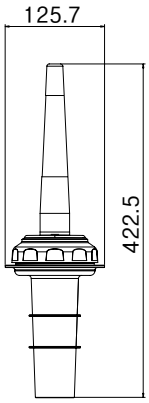
GNB-400N
(used with Fishing net)

GNB-400S
(used in the vessel)

DIMENSIONS



GNB-400N



GNB-400S

* Specification is subject to change without notice

SAMYUNG ENC Co.,Ltd.

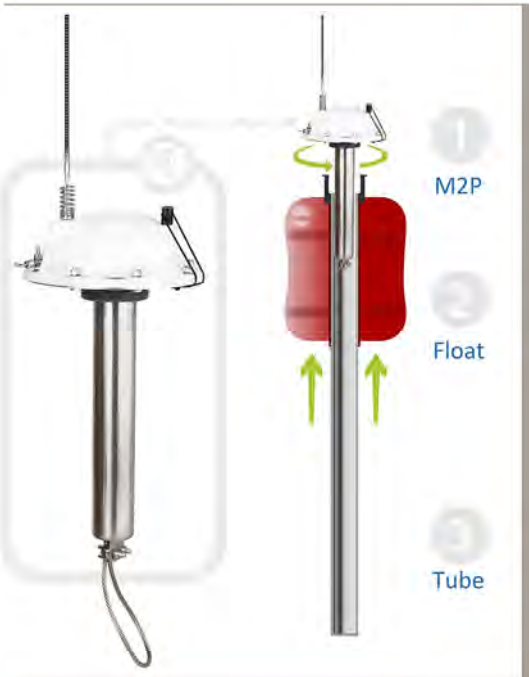
Head Office : 1123-17, Dongsam-Dong, Youngdo-Gu, Busan, Korea, 606-083
Tel : 82-51-601-5532(Rep.) Fax : 82-51-413-4446
A/S Center : 65-20, 2-Ga Namhang-Dong, Yungdo-Gu, Busan, Korea, 606-032
Tel : 82-51-601-5570~4(Rep.) Fax : 82-51-416-5515
Http : //www.samyungenc.com

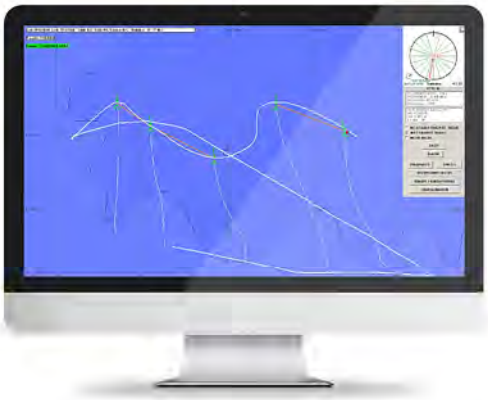
ISO 9001:2000 / KS A 9001:2001
Certificate No. : RQM0645

M2P

GPS radio buoy

- Watertight, resistant and reliable buoy for monitoring longline fishing gear
- Transmits encrypted messages via radio
- 50 miles range



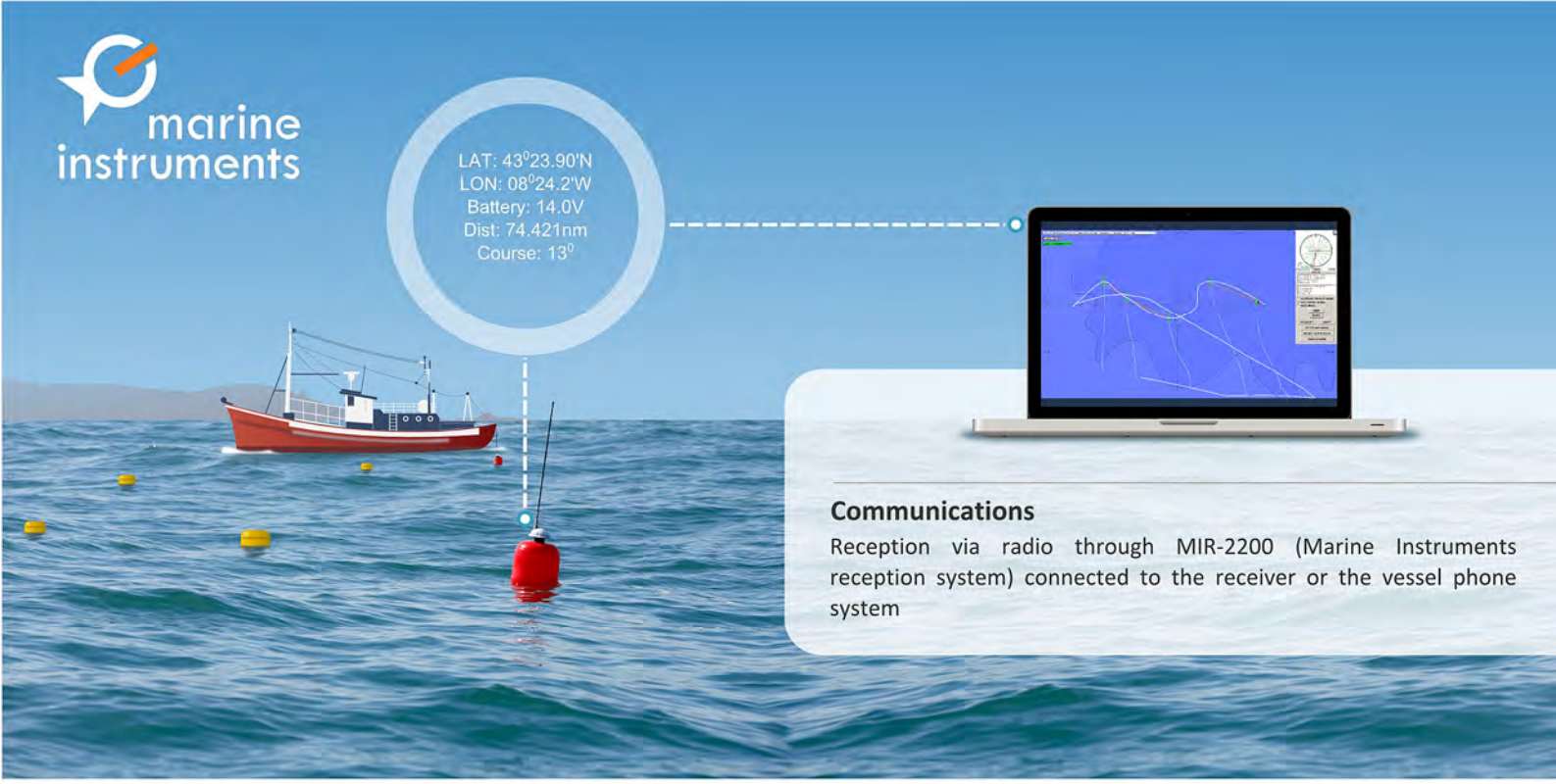


- The buoy reports data on:
  - **GPS** position and tracking
  - **Battery** level
- New **lid with epoxy**: watertight and resistant to pressure.
- Submersible up to **100 meters** depth.
- **Encrypted messages** to increase security.
- Transmissions every **5, 10 or 15 minutes.** User- configurable.
- **No** communications **cost.**
- **Flash** for location.
- Battery with up to **8 days autonomy.**
- **New individual intelligent charger** with indicators of charge included with each buoy.
- **Proprietary software,** MSB Palangre (for surface longline) and MSB Cacea (for bottom longline) free with each buoy.

Rúa dos Padróns nº4 (Vial 3). Parque Empresarial Porto do Molle.
36350 Nigrán, Pontevedra [SPAIN]. [T] +34 986 366 360.

marineinstruments@marineinstruments.es
www.marineinstruments.es

marine instruments



Communications

Reception via radio through MIR-2200 (Marine Instruments reception system) connected to the receiver or the vessel phone system

Technical features

Frequency of transmission
26 MHz

Battery
Rechargeable through the antenna

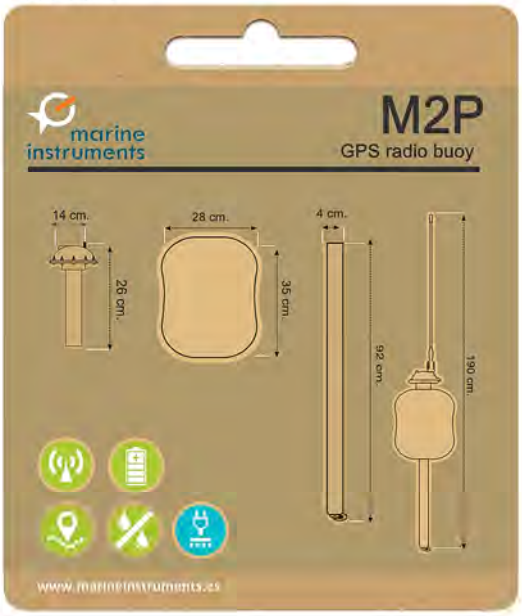
Weight
Buoy: 2,6 Kg **Tube:** 3,5Kg.

Working temperature
0ºC a + 50ºC

Depth
100 m.

Range
50 miles

Dimensions



Accesory

MIP-C
Multiple charger

- Allows the **independent and simultaneous charge** of four M2P buoys.
- Approximate charging time: **9 hours**.
- **Individual LEDs** to indicate the charging status of each buoy.
- **Battery maintenance current** to avoid battery discharge.
- **Stainless steel** high quality stand.

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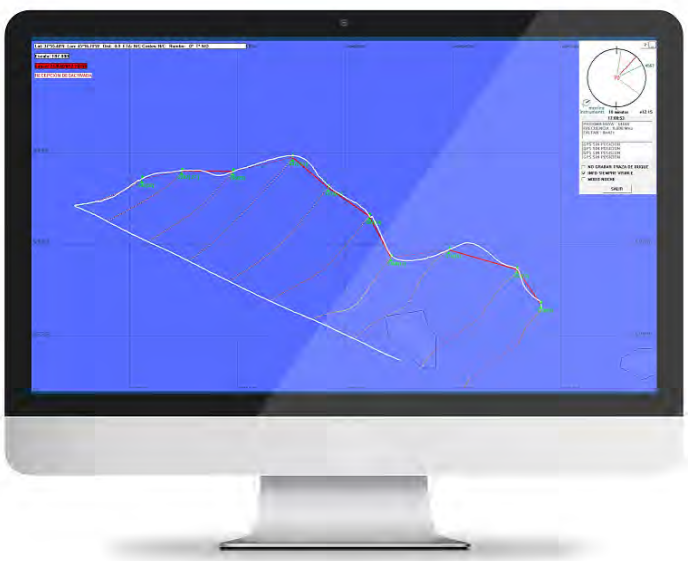
www.marineinstruments.es

marine instruments

MBP

GPS radio buoy

- Radio buoy for monitoring longline fishing gear
- Long-lasting battery
- Water temperature measurement



- The buoy reports data on:
  - Position and **GPS** tracking
  - **Battery** level
  - **Temperature**
- Transmissions via radio every **5, 10 or 15 minutes**. User-configurable.
- **No communications cost.**
- **Encrypted messages** to increase security.
- Long lasting battery: Up to **3 weeks of autonomy** with transmissions every 10 minutes.
- Up to **50 miles** range.
- Great resitance and durability. **Protection rubber** to avoid impacts and breakage.
- **Easy storage** on board. Does not need float or tube.

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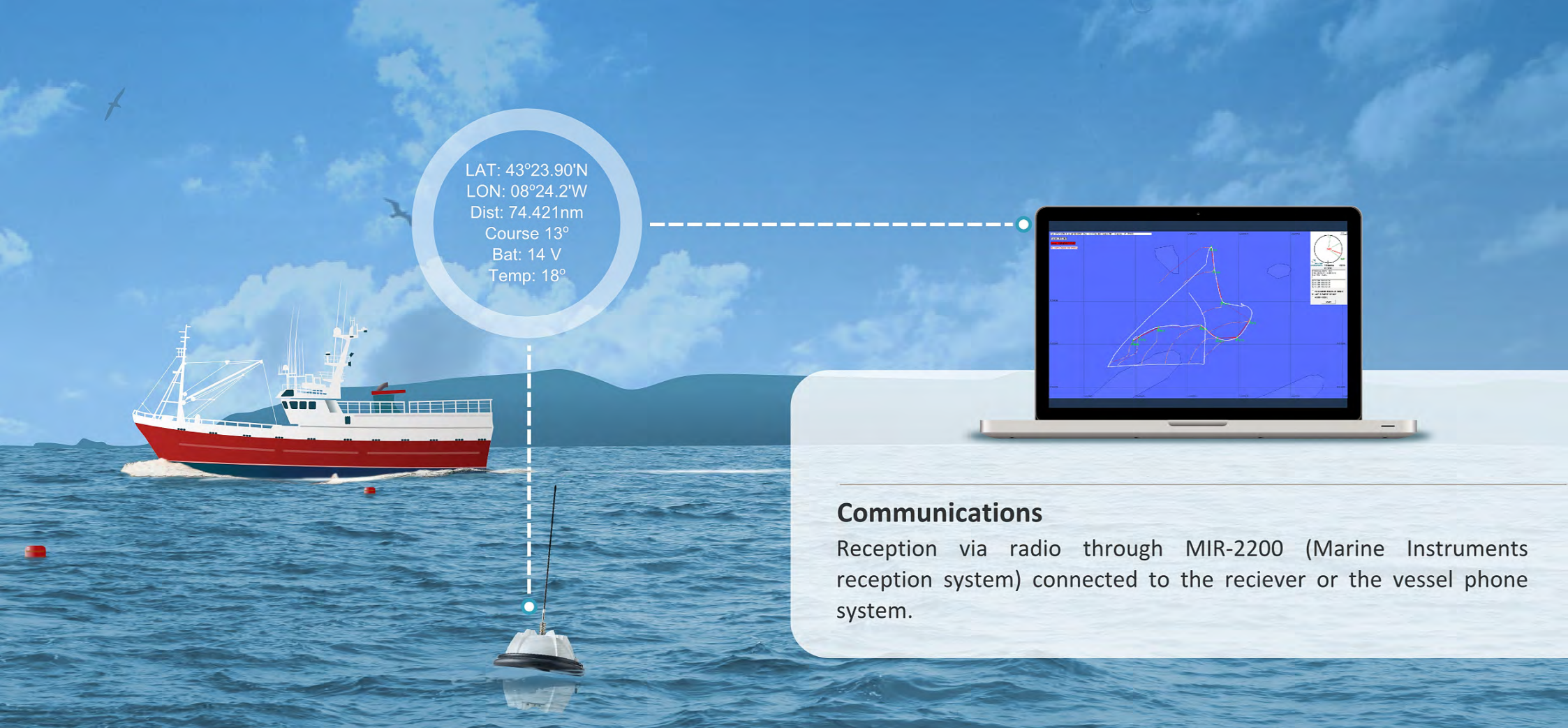
marineinstruments@marineinstruments.es
www.marineinstruments.es



Communications

Reception via radio through MIR-2200 (Marine Instruments reception system) connected to the reciever or the vessel phone system.

Technical features

Frecuency of transmission
26 MHz

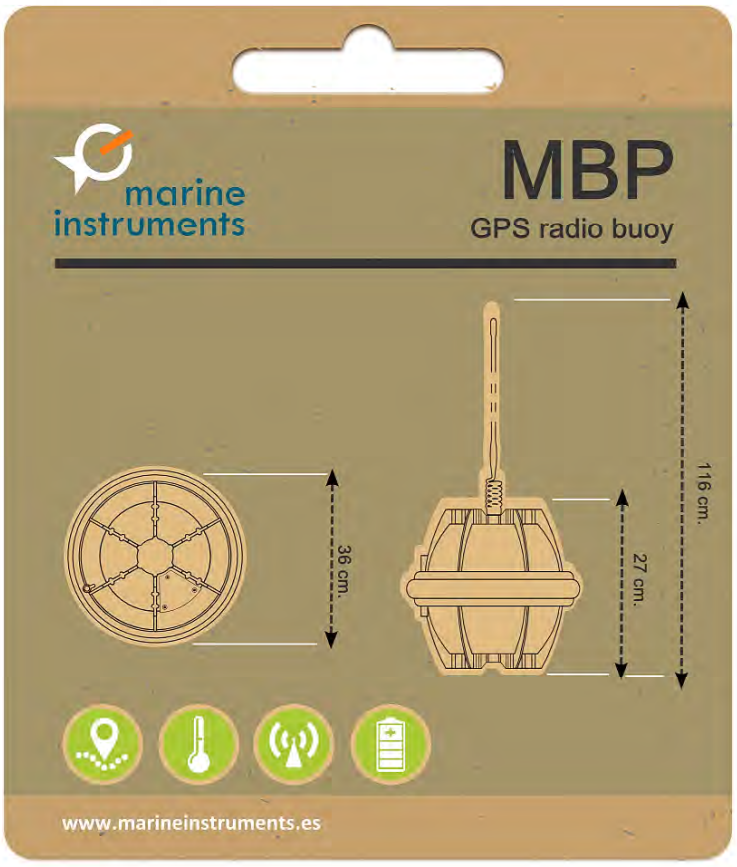
Battery
Rechargable through the antenna.

Weight
6,2 Kg.

Working temperature
0°C a + 50°C

Range
50 miles

Dimensions



- **Individual intelligent charger** with battery level indicator included with each buoy.
- **Flash** for night/day location.
- **Configurable** through the buoy's antenna.
- Approximate charging time: **9 hours**.
- **Propietary software (MSB Palangre) free** with every buoy.
- The MSB Palangre helps to improve efficency on board with its **automatic tracking of the longline.**
- The software shows the positions of the buoys, the route of the vessel and the estimated time of arrival to the buoys in **C-MAP charts.**

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嘉藤牌太陽能浮標
KTS Solar Buoy Series

- 體積小、重量輕、結構強、施放容易。
- 內建LED閃光燈，夜間不需再加裝任何LED(閃光)燈。
- 船上現有設備如：方探、選頻呼出機或KATO NSR-K800 GPS浮標接收機均可使用。

- Built-in LED strobe light.
- Operational with existing equipment,such as ADF,calling machine,and Kato NSR-K800 GPS buoy Reception Unit.
- Smaller,compact design compared to conventional Radio Buoy.Lightweight,easy to handle.

太陽能浮標系列（Solar Buoy Series）：

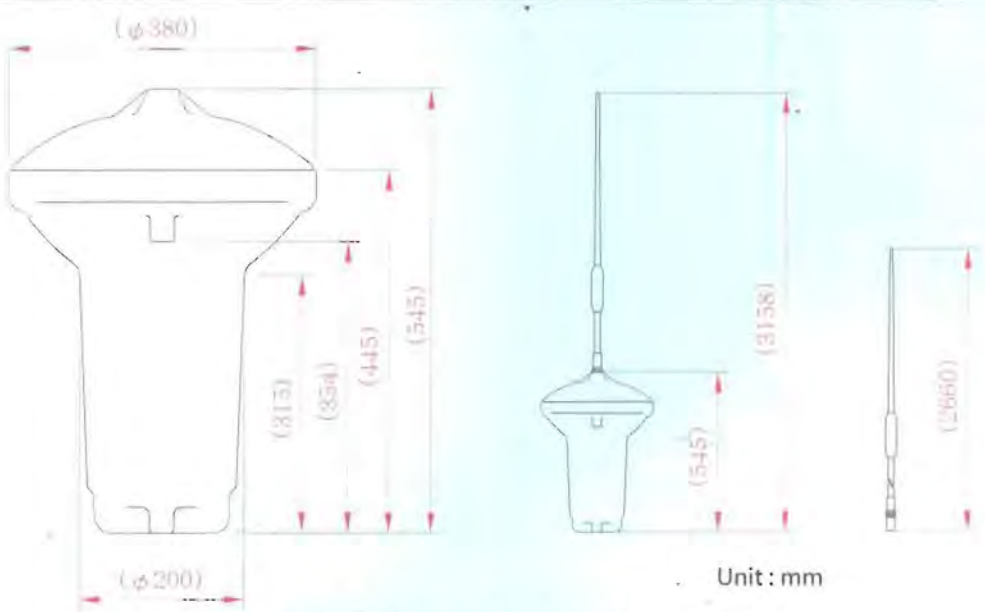
1.無線電浮標（Radio Buoy）：型號 KTS-1R

2.遙控電浮標（Sel-Call Buoy）：型號 KTS-1C

3.衛星定位浮標（GPS Buoy）：型號 KTS-1G

規格：

- Output Power：3-6W（Standard 標準 6W）
- Transmitting Frequency：2001~4000KHZ
- Effective Range：150 N.M.
- Call Selection System：4 Tone Signal Series
- Power Source：DC-12V
- Antenna Length：2660mm
- Antenna Weight：0.9KG
- Buoy Weight：15.6KGS
- Total Weight：16.5KGS

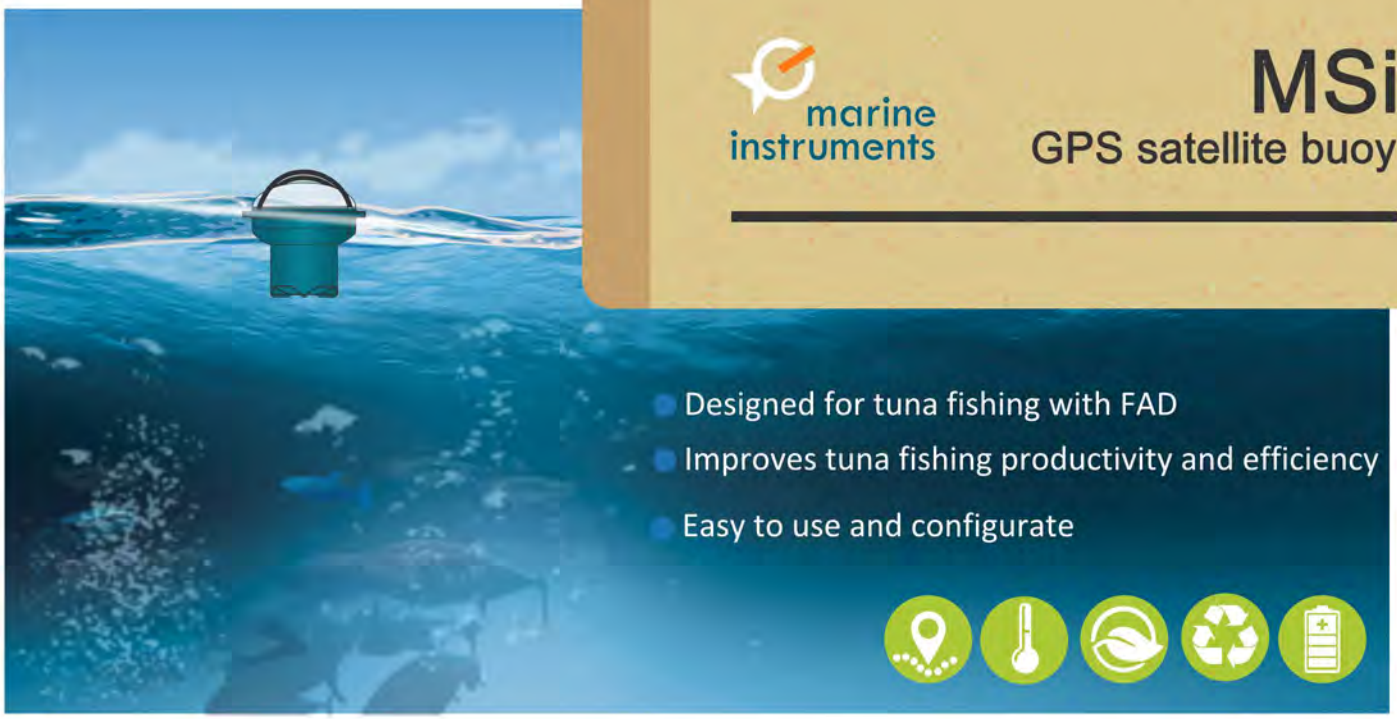


尺寸及外觀圖(Dimension & Outside View)

嘉藤電氣股份有限公司
高雄市前鎮區千富街241巷26號
電話: +886 7 8314266
傳真: +886 7 8315041
電郵: kato.buoy@msa.hinet.net

KATO ELECTRONIC CO., LTD.
No. 26, Lane 241, Qianfu St, Chienchen Dist,
Kaohsiung, Taiwan, R.O.C.
Tel:+886-7-8602067~68 Fax:+886-7-8315041
E-mail: kato.buoy@msa.hinet.net

MSi
GPS satellite buoy



- Designed for tuna fishing with FAD
- Improves tuna fishing productivity and efficiency
- Easy to use and configurate

- Buoy for the **location and tracking** of the FAD.
- **Iridium** satellite communications. Global coverage.
- **Flat rate** on communications for cost-effectiveness
- **Easy to use,** perfect for those starting to use FAD on their tuna fishing operations.
- Competitive price.
- The buoy reports data on **GPS position, water temperature and battery level.**
- Set-up of different operation modes through telecommand:

MODE	MESSAGES	TIME BETWEEN MESSAGES	DURATION
Stand-by	2 Positions	12 hours	Until mode change
Search	1 Position	3 hours	12 hours
Flash	1 Message	15 minutes	1 hour
Poll	1 Message	Instant	Once

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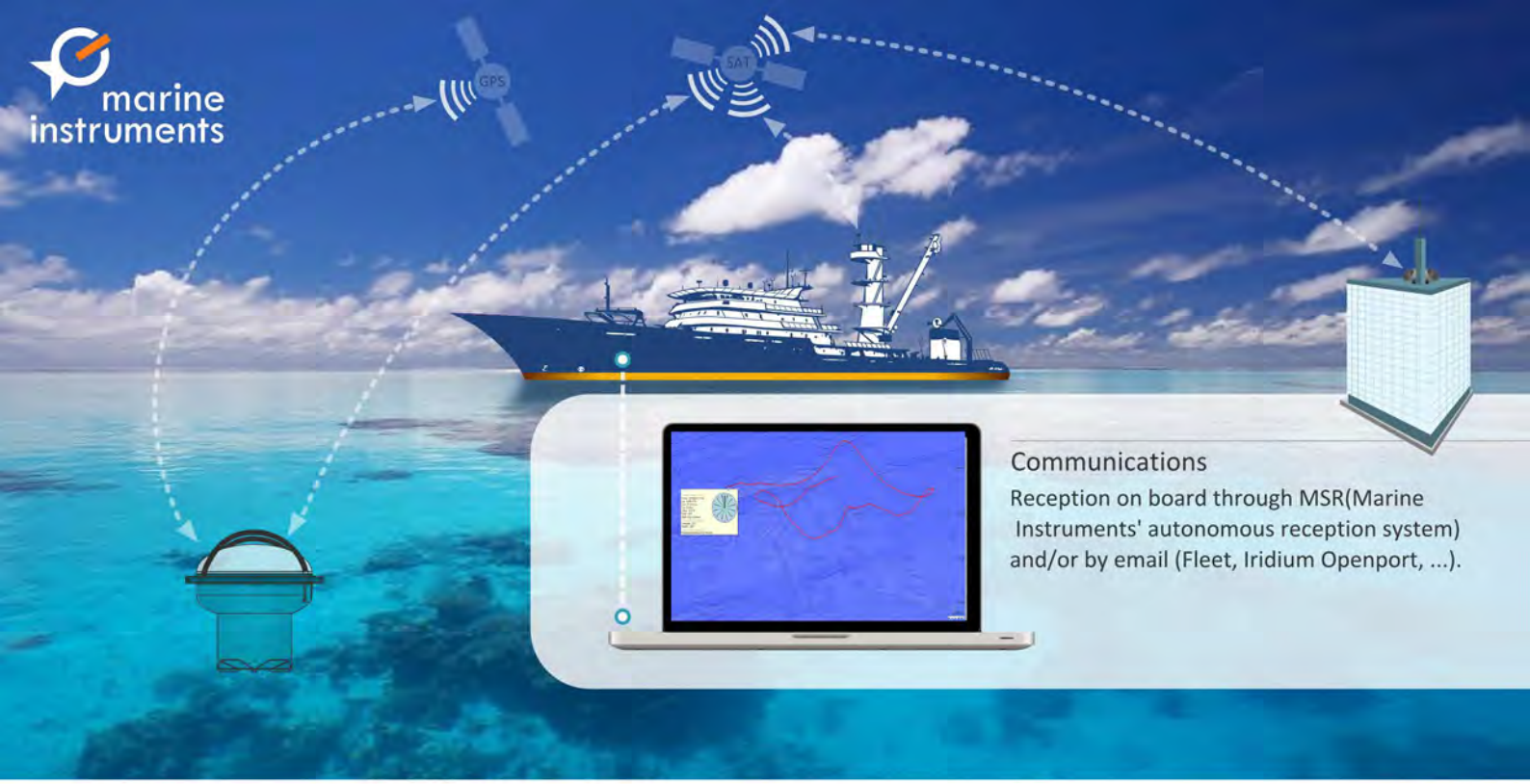
36350 Nigrán, Pontevedra [SPAIN]. [T] +34 986 366 360.
marineinstruments@marineinstruments.es
www.marineinstruments.es



Communications

Reception on board through MSR(Marine Instruments' autonomous reception system) and/or by email (Fleet, Iridium Openport, ...).

Technical features

Battery
Solar rechargeable battery.
Back-up alkaline pack.

Weight
6,6 Kg.

Reserve of buoyancy
6 litres.

Operating temperature
0 °C to +40 °C.

Dimensions

- Developed for the marine environment: best results in the market for **reliability and durability.**
- Red and white **flash** for night/day location.
- **Unlimited battery life:** solar panels and ecological security alkaline pack, lead free.
- Compatible with **MAXSEA, ORBMAP** and **CATSAT.**

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嘉藤電氣股份有限公司

KATO ELECTRONIC CO., LTD

Professional Fishing Buoy Manufacturer

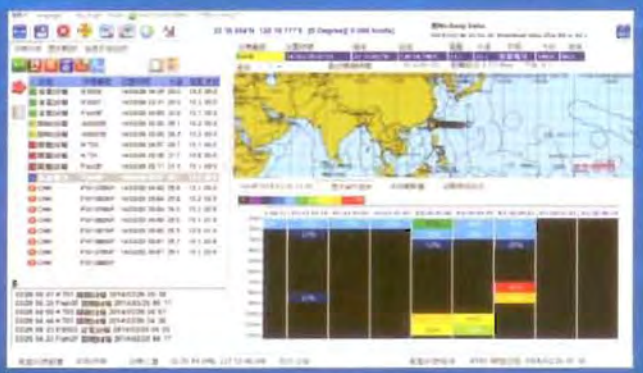
全系列專業太陽能衛星浮標製造商

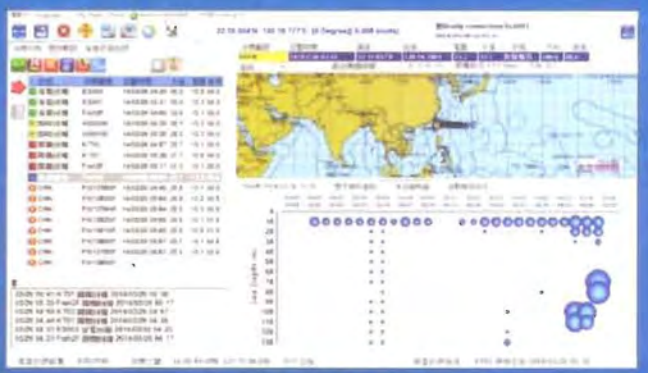
Sounder Schedule Programmable!
Communication Device Flexible!
Remote-Controllable by Head Office!
User-Interface Friendly!
No Battery Consumption!
Compact Design !

可自訂魚探發射時程
船端資料接收設備彈性化
船公司可遙控管理浮標
操作介面使用簡易
使用太陽能、無電池消耗
特殊材質設計、堅固耐用

KT-800F Satellite Buoy
(with Echo Sounder)

KT-800SF Satellite Buoy
(with Echo Sounder)





SBS-02 Buoy Management Software(操控軟體)

www.radiobuoy.com

KT-800F/KT-800SF Echo Sounder Buoy

The KT-800F/KT-800SF Satellite Echo Sounder Buoy is specifically designed for Purse seiner fishing fleets to improve the productivity and efficiency of tuna fishing activities. It can be moored on driftwood or any floating objects (FADs), and provides the real time data to the fishing vessels.

KT-800F/KT-800SF 衛星魚探浮標是針對大型圍網船隊作業需求所設計，主要目的在增加漁撈作業之效能與生產力。此浮標可繫綁在浮木或任何漂流物及人工魚礁上，並提供即時浮標資訊及魚探訊息給作業船隻。

The KT-800F/KT-800SF Satellite Echo Sounder Buoy is built-in one SkyWave's IsatM2M terminal and one scientific echo-sounder, which can provide reliable data massages via Inmarsat satellite communications with low total cost. It is also equipped with solar panels and rechargeable battery, temperature sensor, 4 powerful LED flashlights and magnetic switch. There are 3 optional frequenies of KT-800F/KT-800SF echo sounder buoy: 50KHz / 75KHz / 200KHz. Out-put power is 150W. Depth Range is 5-120metres.

KT-800F/KT-800SF 衛星魚探浮標內建 Skywave 衛星終端及高品質魚探模組，以低廉的成本提供高信賴度的衛星數據通信及魚探資料。同時此系列浮標配有太陽能充電板、可充式膠體電池、溫度感應器、強效 LED 閃光燈及磁性開關。魚探頻率分為 50KHz / 75KHz / 200KHz 三種。測深深度由 5 米至 120 米。輸出功率為 150W.

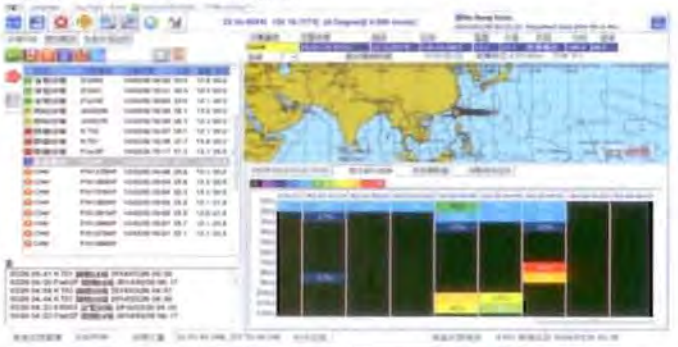
Data Communication

There are several optional ways to get data from buoys. All the buoy data will be forwarded to Kato's server. And our SBS-02 buoy management software system will download all the information by the Inmarsat Mini C, FBB or Iridium communication devices which available on the vessels.

本系統可採多種方式獲得浮標資料，船端可使用 Inmarsat Mini C、FBB 以及銥衛星系統接收浮標資訊。SBS-02 浮標操控軟體會透過上述衛星通信方式自動連結到本公司地面站伺服器將資料下載至船端工業電腦，並顯示在螢幕上。

SBS-02 Buoy Management Software System includes GPS receiver, industrial PC and reliable software(SBS-02) under Windows which has been specially developed to process data transmitted by KT-800F/KT-800SF buoys. Once the data received by reception system, all the information (Buoy ID, Longitude and Latitude of buoys, water temperature, remaining battery voltage, UTC time) and echo sounder information will be displayed on the monitor automatically.

SBS-02 浮標操控系統包含一組 GPS 接收器、工業級電腦及 SBS-02 視窗版操控軟體。此系統軟體專為 KT-800F 系列浮標資料傳輸而設計。一旦此系統接收到浮標資訊(浮標編號、經緯度、表層水溫、電池殘餘電量、UTC 時間、魚探資訊)，系統將自動將上述資料顯示在 SBS-02 電子海圖上，並可存取歷史紀錄並運算所需資料。



KT-800F/KT-800SF Technical Characteristics(衛星魚探浮標規格)

	KT-800F	KT-800SF
Diameter (外徑)	Maximum 460mm Minimum 230mm	Maximum 380mm Minimum 200mm
Height (高度)	333 mm	260 mm
Weight (重量)	13 Kg	11 Kg
Material (材質)	Polypropylene Copolymer	Polypropylene Copolymer
Protocol (通信協定)	Inmarsat D+	Inmarsat D+
Frequency(頻率)	TX:1625.5 to 1660.5, RX:1525 to 1559 MHz	TX:1625.5 to 1660.5, RX:1525 to 1559 MHz
Operating temperature	-10° C ~ +70° C	-10° C ~ +70° C
Coverage Area (衛星覆蓋)	Global(全球)	Global(全球)
Watertightness (耐壓)	1 bar (10M)	1 bar (10M)
Power Source (電源供應)	12VDC(Solar Panel/Rechargeable Battery)	12VDC(Solar Panel/Rechargeable Battery)

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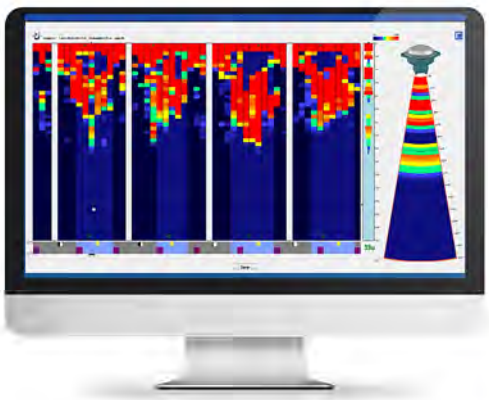
E-Mail: kato.buoy@mas.hinet.net Website: www.radiobuoy.com

marine instruments

M3i
Sounder buoy



- Buoy with **50 Khz echo sounder** to detect fish underneath the FAD.
- **Continuous soundings.** Soundings every 5 minutes, 24 hours a day (288 soundings/day)
- **Real time sounder** data processing within the buoy. Only the best soundings are sent, for cost-efficiency.
- In addition to sounder data, reports its **GPS position, water temperature** and **battery level.**
- Safe and confidential communications via **Iridium. Flat rate** for cost-effectiveness.
- Set-up of different operation modes through telecommand:

MODE	TIME BETWEEN MESSAGES	DURATION	SOUNDINGS PER MESSAGE
Stand-by	12 hours	Ongoing	6
Search	3 hours	12 hours	3
Recovery	15 minutes	2 hours	1
Flash	15 minutes	1 hour	1
Poll	Instant	Once	Up to 7

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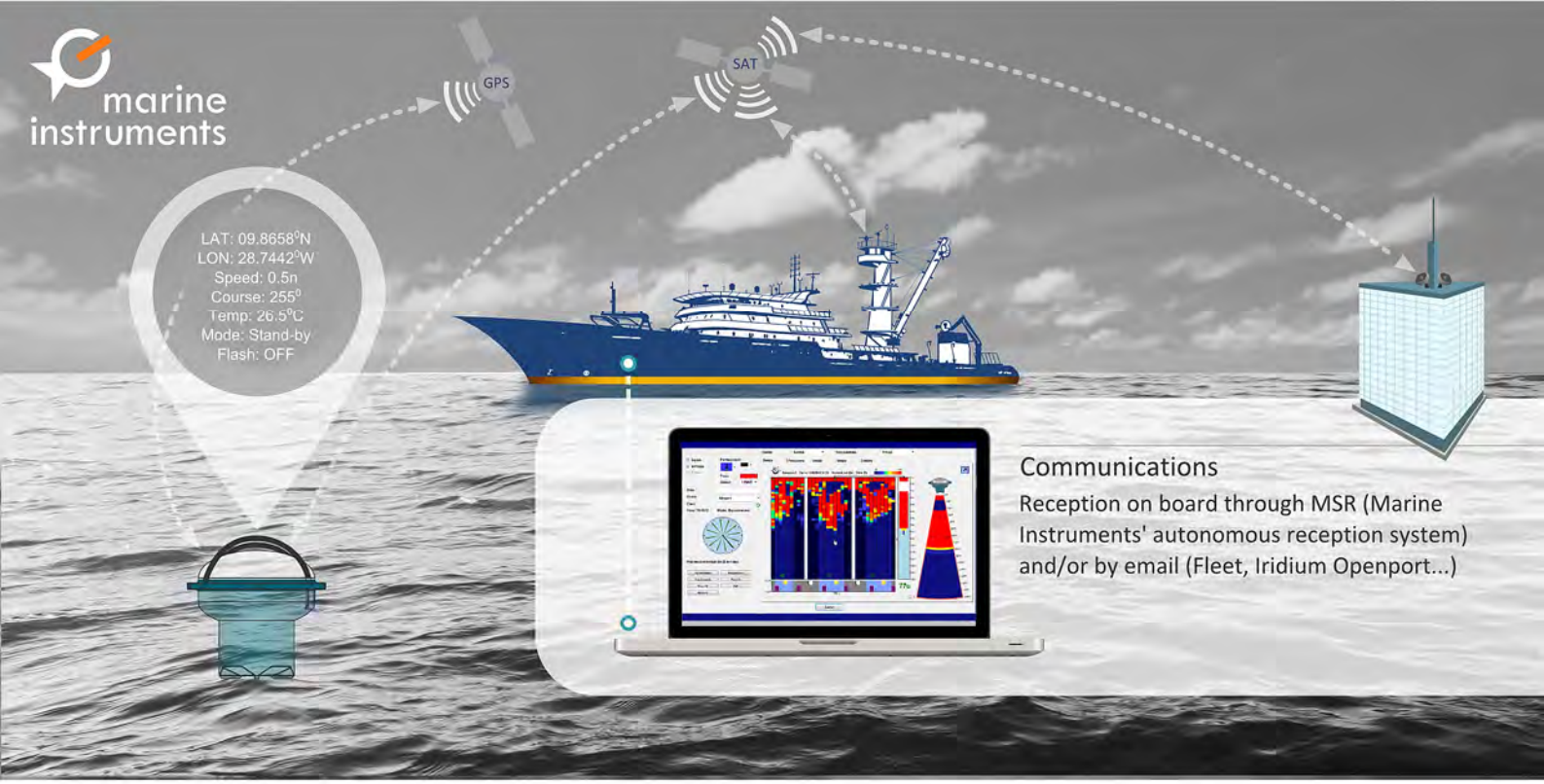


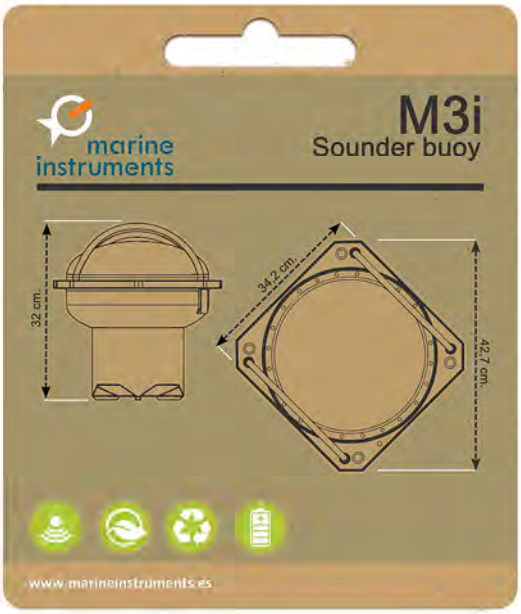
Communications

Reception on board through MSR (Marine Instruments' autonomous reception system) and/or by email (Fleet, Iridium Openport...)

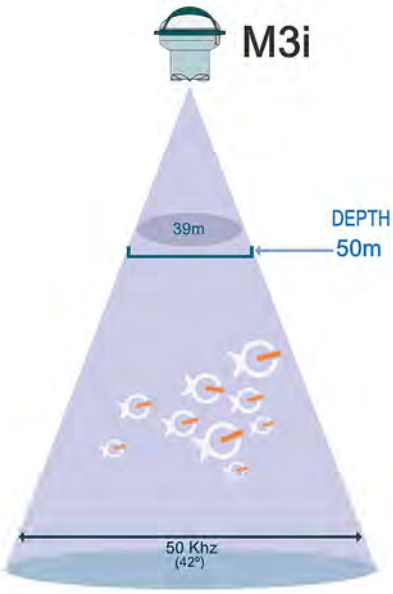
Technical Features

Echo sounder	50 KHz
Power	500 W
Reserve of buoyancy	6 litres
Weight	6.9 Kg.
Resolution per layer	3 m.
Blind area	6 m.
Range	150 m.

Dimensions



- **Unlimited battery life:** solar panels and ecological security alkaline pack, lead-free.
- Specially developed for the marine environment: best results in the market for **reliability and durability.**
- Red and white **flash** for night/day localization.
- Compatible with **MAXSEA, ORBMAP and CATSAT.**



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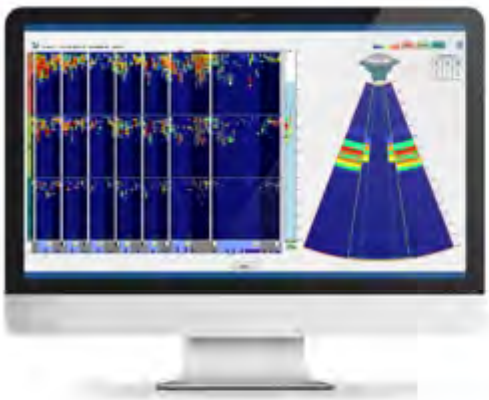
M4i

Tri-frecuency sounder buoy

- Sustainable and effective fishing
- Help in discriminating species
- Help in estimating size and quantity
- Highly configurable



- First buoy on the market with **tri-frequency sounder (50, 120 and 200 KHz).**
- **Continuous soundings.** Every 5 minutes, 24 hours a day (288 soundings/day).
- Images in **high and low definition.**
- **Real time sounder** data processing within the buoy. Only the best soundings are sent, for cost-efficiency.
- **Storage of past soundings:** sent to customer upon request.
- Safe and confidential communications via **Iridium. Flat rate** for cost-effectiveness.
- Set-up of different operation modes through telecommand:

MODE	TIME BETWEEN MESSAGES	DURATION	SOUNDINGS PER MESSAGE
Stand-by	12 hours	Ongoing	6
Search	3 hours	12 hours	3
Recovery	15 minutes	2 hours	1
Flash	15 minutes	1 hour	1
Poll	Instant	Once	Up to 7

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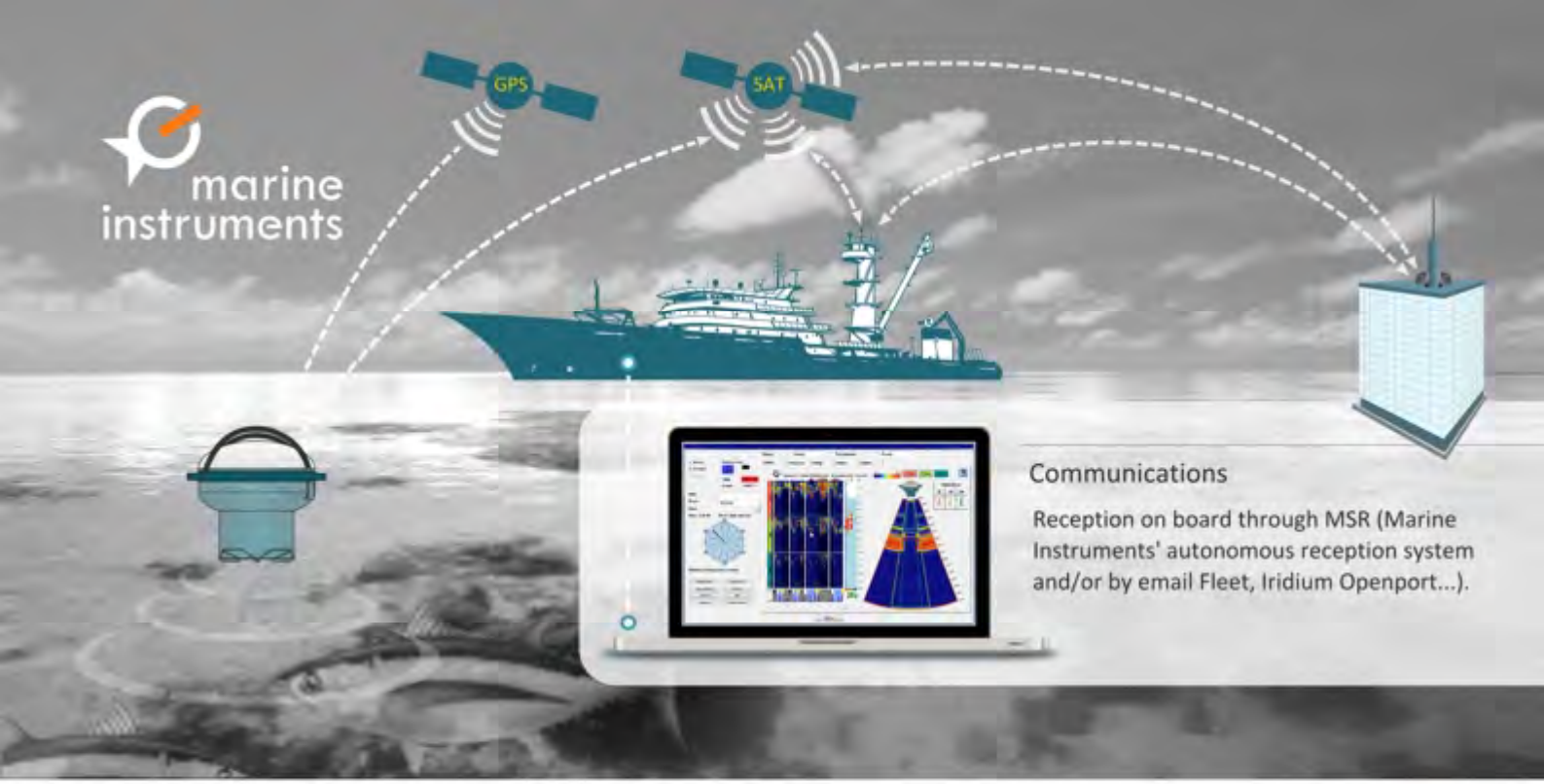


Communications

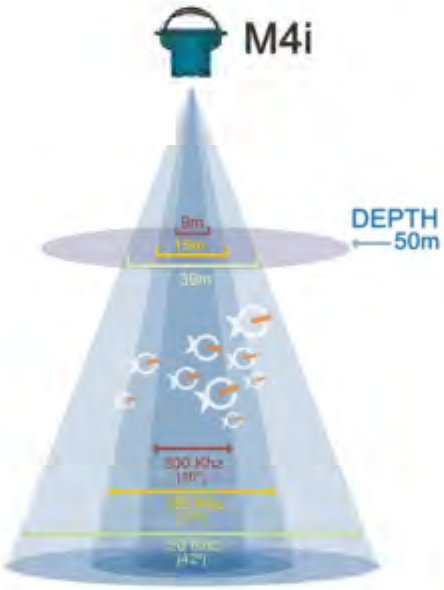
Reception on board through MSR (Marine Instruments' autonomous reception system and/or by email Fleet, Iridium Openport...).

Technical Features

Echo sounder	50 KHz, 120 KHz, 200 KHz
Power	500 W
Reserve of buoyancy	6 litres
Weight	5,6 Kg.
Resolution per layer	0,6 m. - High definition 3,0 m. - Low definition
Blind area	3 m.
Range	3 m. to 150 m.

Dimensions

- **Unlimited battery life:** solar panels and ecological security alkaline pack, lead-free.
- Red and white **flash** for night/day location.
- **Reduced dimensions and weight.** No airfreight restrictions.
- Specially developed for the marine environment: best results in the market for **reliability and durability.**
- Compatible with **MAXSEA, ORBMAP and CATSAT.**
- **Angle data on buoy list** to rule out incorrect soundings.



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Lights

- High intensity LEDs
- Programmable intensity, flash rate, synchronization and daylight switch

Tron ML-series

JOTRON

www.jotron.com

Tron ML-series

For marking of fishing equipment such as nets and long line equipment, buoys, seismic cables, anchor chains and moorings, fish farms, oil cables and offshore installations.

The Tron ML-series has high intensity LEDs with several enhanced features implemented. They can be activated through programming of:

- Light-intensity
- Flash-rate
- Synchronization (and master/slave)
- Daylight switch (with adjustable ambient light level for ON/OFF)

- **Tron ML-100** is powered by 3 Alkaline D-sized battery cells, total of 4.5 VDC
- **Tron ML-200** is powered by a special high capacity battery pack at 4.5 VDC
- **Tron ML-300** uses external 10-27 VDC

The Tron ML-series has a module-based construction, making them user-friendly during any service and repair.

The Tron ML-series replaces the previous MF-marking light series from Jotron.

Tron ML-100 is mechanical identical with previous marking lights MF-1111 LED, MF-1112 and MF-1111B powered by 3 Alkaline D-sized battery cells.

Tron ML-200, based on the Tron ML-series EI-unit in combination with the aluminum tube from previous MF-1114 series, is the new long-life operation 4.5 VDC marking light.

Tron ML-300 will replace the previous MF-1117, 1118 and 1119 - and has the same mechanical "foot-print".

Tron ML-EI unit, 4.5 VDC and 10-27 VDC
The Tron ML-series EI-unit is used in all the Tron ML-series of marking lights with different programming.

Tron ML-100

Tron ML-300

Tron ML-EI unit

Tron ML-200

Tron ML-Master
Syncronization master for use with the Tron ML-series.

Syncronization master current drain @ 4.5 VDC = 20 mA.
Expected operation with ML-100 battery 3 x 1.5 VDC D-sized battery cells = 32 days.
Expected operation with ML-200 battery-pack (X-91585) = 225 days.

SPESIFICATIONS/TYPES:	Tron ML-100	Tron ML-200	Tron ML-300
Material housing	ABS	Aluminium	ABS
Material lens	Lexan	Lexan	Lexan
Light system	LED (white, yellow or red)	LED (white, yellow or red)	LED (white, yellow or red)
Light intensity (Red LED 5-Cd only)	5- or 15-Cd (Candela)	5- or 15-Cd	5- or 15-Cd
Surface range	2 or 3 NM (nautical miles)	2 or 3 NM	2 or 3 NM
Waterproof	Down to 500 meters	Down to 100 meters	IP-68 5m/1hour
Operation time @ 0-degrees C*			
Current drain approx.			
Activation switch	Magnet/reed and daylight-sensor	On/Off by daylight-sensor only	On/Off by daylight-sensor only
Flash-rate	25-flash/min	25 flash/min or Oc Y 2s	25 flash/min or Oc Y 2s or fixed
Software programming	Flash rate, intensity, sync, daylight switch	Flash rate, intensity, sync, daylight switch	Flash rate, intensity, sync, daylight switch
Power/battery-type	4.5 VDC, 3 x Alkaline D-size battery cells	4.5 VDC special battery-pack	10-27 VDC external power
Lens colour	White	White	White
LED colour standard	White or yellow	White or yellow	White or yellow
LED colour option	Red	Red	Red
Dimensions approx.	Length: 335 mm / Ø: 100 mm	Length: 1615 mm / Ø: 70/50 mm	Length: 155 mm / Ø: 100 mm
Fixing option	Floater Jotron part.no X-98885	Various floaters	Rigid-mounting

Jotron ML-type and LED Colour	Candela MA= Modified Allard	Power DC-Voltage	Flash ON time	Flash OFF time	Flashes / min	Current drain @ 20°C [mA]	Peak current @ 20°C [mA]	Operation [hours]
Tron ML-100 / ML-200 White	6 Cd	4,5V (13500 mAh / 13500 mAh x 7)	0,5 s	1,9 s	25	17	67	800 / 5500
Tron ML-300 White	6 Cd	12V (120 Ah)**	0,5 s	1,9 s	25	11	35	10600
Tron ML-300 White	18 Cd	12V (120 Ah)**	0,5 s	1,9 s	25	23	90	5200
Tron ML-300 White	6 Cd	24V (120 Ah)**	0,5 s	1,9 s	25	8	19	15000
Tron ML-100 / ML-200 Yellow	6 Cd (MA =5 Cd)	4,5V (13500 mAh / 13500 mAh x 7)	0,5 s	1,9 s	25	28	121	470 / 3300
Tron ML-200 Yellow	6 Cd (MA =5 Cd)	4,5V (13500 mAh x 7)	1,25 s	0,75 s	Oc Y 2s	76	121	1200
Tron ML-200 Yellow	18 Cd (MA =15 Cd)	4,5V (13500 mAh x 7)	1,25 s	0,75 s	Oc Y 2s	202	320	460
Tron ML-300 Yellow	6 Cd (MA =5 Cd)	12V (120 Ah)**	0,5 s	1,9 s	25	17	63	7000
Tron ML-300 Yellow	18 Cd (MA =15 Cd)	12V (120 Ah)**	1,25 s	0,75 s	Oc Y 2s	93	145	1300
Tron ML-300 Yellow	18 Cd (MA =15 Cd)	24V (120 Ah)**	1,25 s	0,75 s	Oc Y 2s	51	78	2300
Tron ML-100 Red	6 Cd	4,5V (13500 mAh)	Fixed					220
Tron ML-100 Red	6 Cd	24V (120 Ah)**	Fixed					

** External battery

Agent/Distributor:

v.A

www.jotron.com

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MARKING FLASHERS

JOTRON

www.jotron.com

MARKING FLASHERS

MF-1112, MF-1111B, MF-1111 LED, MF-1114 MARKING FLASHER

For marking of different types of fishing equipment such as nets, long line equipment, buoys, seismic cables, anchor chains or moorings, fish farms, oil cables and offshore installations.

SPESIFICATIONS

	MF-1112	MF-1111-B	MF-1111 LED	MF-1114
Material battery case:	ABS	ABS	ABS	ABS/Aluminium
Material lens:	Lexan	Lexan	Lexan	Lexan
Light system:	Xenon strobe	Bulb	LED Bulb	Xenon Strobe
Light output:	36.000 Pk lumen			36.000 Pk lumen
Surface range:	10 km	3,6 km	3,6 km	10 km
Waterproofing:	Down to 500m	Down to 500m	Down to 500m	Down to 500m
Endurance continous operation @ 0 degrees C:	Approx 175 hrs	Approx 460 hrs	Approx 1500 hrs	Approx 2300 hrs
Current drain, approx:	70mA average	26mA average	8mA average	38mA average
Activation swtich:	Magnetic through case and daylight	Magnetic through case and daylight	Magnetic through case and daylight	Only daylight switch
Flash rate:	25	12	12	12
Battery type (alkaline), voltage	3x D-cell, 1.5V	3x D-cell, 1.5V	3x D-cell, 1.5V	P/n 91585, 4,5V
Lens colour standard:	Clear	Clear	Clear	Clear
Lens colour optional:	Amber, green, red	Amber, green, red	Amber, green, red	Amber, green, red
LED colour:			White, amber, green, red	
Dimensions:	Length 335 mm Diameter 100 mm	Length 335 mm Diameter 100 mm	Length 335 mm Diameter 100 mm	Length 1620 mm Diameter 100 mm
Weight (w.out battery)	450 g	450 g	450 g	2600 g
Weight battery:				3100 g
Nato stock number:	6230-25-127-7786			6230-25-114-1985
Fixing options:	Velcro strap, Floater	Velcro strap, Floater	Velcro strap, Floater	Floater
Diameter floater:	190 mm	190 mm	190 mm	500 mm
Weight floater incl light and battery:	1,650 kg	1,650 kg	1,650 kg	20 kg

v.C

Agent/Distributor:

www.jotron.com

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MARKING FLASHERS
LIFEBUOY LIGHTS

JOTRON

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MF-1112, MF-1111B, MF-1111 LED, MF-1114 MARKING FLASHER

For marking of different types of fishing equipment such as nets, long line equipment, buoys, seismic cables, anchor chains or moorings, fish farms, oil cables and offshore installations.

Tron 4F, Tron 5F LIFEBUOY LIGHT

The light will follow the lifebuoy when thrown over board. In water it will automatically start flashing. Turns off automatically when turned upside down and are designed to float high in the water.

SPESIFICATIONS

	MF-1112	MF-1111-B	MF-1111 LED	MF-1114
Material battery case:	ABS	ABS	ABS	ABS/Aluminium
Material lens:	Lexan	Lexan	Lexan	Lexan
Light system:	Xenon strobe	Bulb	LED Bulb	Xenon Strobe
Light output:	36.000 Pk lumen			36.000 Pk lumen
Surface range:	10 km	3,6 km	3,6 km	10 km
Waterproofing:	Down to 500m	Down to 500m	Down to 500m	Down to 500m
Endurance continous operation @ 0 degrees C:	Approx 175 hrs	Approx 460 hrs	Approx 1500 hrs	Approx 2300 hrs
Current drain, approx:	70mA average	26mA average	8mA average	38mA average
Activation swtich:	Magnetic through case and daylight	Magnetic through case and daylight	Magnetic through case and daylight	Only daylight switch
Flash rate:	25	12	12	12
Battery type (alkaline), voltage	3x D-cell, 1.5V	3x D-cell, 1.5V	3x D-cell, 1.5V	P/n 91585, 4,5V
Lens colour standard:	Clear	Clear	Clear	Clear
Lens colour optional:	Amber, green, red	Amber, green, red	Amber, green, red	Amber, green, red
LED colour:			White, amber, green, red	
Dimensions:	Length 335 mm Diameter 100 mm	Length 335 mm Diameter 100 mm	Length 335 mm Diameter 100 mm	Length 1620 mm Diameter 100 mm
Weight (w.out battery)	450 g	450 g	450 g	2600 g
Weight battery:				3100 g
Nato stock number:	6230-25-127-7786			6230-25-114-1985
Fixing options:	Velcro strap, Floater	Velcro strap, Floater	Velcro strap, Floater	Floater
Diameter floater:	190 mm	190 mm	190 mm	500 mm
Weight floater incl light and battery:	1,650 kg	1,650 kg	1,650 kg	20 kg

SPESIFICATIONS

	Tron 4F	Tron 5F
Material battery case:	Polyethylene	Polyethylene
Material lens:	Lexan	Lexan
Light system:	Xenon strobe	Bulb
Light output:	36.000 Pk lumen	2,6 Cd
Surface range:	10 km	3,6 km
Drop tested from:	30 m height	30 m height
Endurance continous operation @ 0 degrees C:	Approx 29 hrs	Approx 40 hrs
Current drain:	210	150
Activation swtich:	Automatic sealed inversion	Automatic sealed inversion
Flash rate:	60	60
Battery type (alkaline), voltage	3x C-cell, 1.5V	3x C-cell, 1.5V
Lens colour standard:	Clear	Clear
Dimensions:	Length 300 mm Diameter 90 mm	Length 335 mm Diameter 100 mm
Weight (w.out battery)	240 g	215 g
Nato stock number:	6230-25-119-9799	

Agent/Distributor:

www.jotron.com

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MARKING FLASHERS
LIFEBOAT LIGHTS

JOTRON

www.jotron.com

MF-1117, MF-1118, MF-1119 MARKING FLASHER

Requires external power, 12-24V. Simple installation due to flange at the bottom of the lights which has 4 fixing holes for mounting bolts.

Tron 1127 LIFEBOAT LIGHT

Position light and interior light for lifeboats and rescue boats. Accepted at free fall rescue boats from 30 m height. Requires external power, 12-30 VDC. A steady halogen powered light.

SPESIFICATIONS



	MF-1117	MF-1118	MF-1119
Material battery case:	ABS	ABS	ABS
Material lens:	Lexan	Lexan	Lexan
Light system:	Xenon strobe	Xenon strobe	Xenon Strobe
Light output:	36.000 Pk lumen	36.000 Pk lumen	36.000 Pk lumen
Surface range:	10 km	10 km	10 km
Waterproofing:	Splash proof	Splash proof	Splash proof
Current drain:	90mA	20mA	5mA + (1mA x flash/min)
Activation swtich:	Non	Customers own and daylight	Customers own and daylight
Flash rate:	90	16	Programable as "morse" code
Battery type, voltage:	External, 12-24VDC	External, 12-24VDC	External, 12-24VDC
Lens colour standard:	Clear	Amber	Amber
Lens colour optional:	Amber, green, red	Clear, green, red	Clear, green, red
Dimensions:	Length 150 mm Diameter 100 mm	Length 150 mm Diameter 100 mm	Length 150 mm Diameter 100 mm
Weight:	700 g	700 g	700 g
Neoprene cable length:	5 m / 2 leads	5 m / 2 leads	5 m / 2 leads

SPESIFICATIONS

	Tron 1127
Material battery case:	ABS
Material lens:	Lexan
Light system:	Halogen Bulb
Light intensity	More than 4.3 Cd
Light emission	Steady
Waterproofing:	IP68
Current drain:	1 A/12V - 0.5/24V approx
Activation swtich:	Customers own. Optional integrated ON/OFF switch
Battery type, voltage:	External, 12-30VDC
Lens colour standard:	Clear (white for interior light)
Dimensions:	Length 152 mm Diameter 60 mm
Weight:	800 g
Neoprene cable length:	5 m / 2 leads
Designed according to the following specifications:	IMO MSC48(66) and measured according to IMO MSC81 (70). Meets IEC 60945 electrical emission and immunity specification.
Approvals:	MED 96(98) & MED 98(85)

Agent/Distributor:

www.jotron.com

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Re-location Devices

Benthos
Location & Recovery

Acoustic Locator Pingers

- TRACK
- LOCATE
- RECOVER
- WATER ACTIVATED
- FIELD PROVEN
- EXTREME CONDITIONS

TELEDYNE
BENTHOS
Everywhereyoulook™

Pingers are used to mark underwater equipment or locations. They are generally about the size of a flashlight and can be attached to any mooring. The unit pings continuously when in the water. To recover a mooring, a diver or ROV is sent with a device to "listen" for, and home-in on, the pinger sound.

ALP-365 is an advanced acoustic device designed for versatility in the offshore environment. Its electronics are protected by a rugged aluminum housing to insure long life under extreme conditions. Water activated.

ALP-365/EL offers all the same features and user options as the standard ALP-365 but with extended battery life. Using six 9 V alkaline or lithium batteries, it can operate up to 180 days in extreme conditions. Water activated.

TELEDYNE BENTHOS
Everywhereyoulook™

SPECIFICATIONS

	ALP-365	ALP-365/EL
Frequency	25 to 40 kHz in .5 kHz increments (user selectable)	25 to 40 kHz in .5 kHz increments (user selectable)
Acoustic Output re 1µPa@1m (Acoustic Power)	162 dB (.125W) 168 dB (.5W) 174 dB (2W) 177 dB (5W)	162 dB (.125W) 168 dB (.5W) 174 dB (2W) 177 dB (5W)
Pulse Length	4 ms	4 ms
Pulse Repetition	2 pulse/sec, 1 pulse/sec, or 1 pulse/2 sec (user selectable)	2 pulse/sec, 1 pulse/sec, or 1 pulse/2 sec (user selectable)
Housing	Aluminum	Aluminum
Weight in Air	.68 kg (1.5 lbs)	1.0 kg (2.25 lbs)
Dimensions	Length: 18.42 cm (7.25 in); Diameter 5.08 cm (2.0 in)	Length: 30.2 cm (11.88 in); Diameter 5.08 cm (2.0 in)
Power Source	Two 9V alkaline or two 9V lithium batteries. Customer supplied	Six 9V alkaline or six 9V lithium batteries. Customer supplied
Battery Life	Pulse repetition dependent. 0.125W: 20-26 days 9V alkaline; 45-60 days 9V lithium 0.5W: 10-20 days 9V alkaline; 20-45 days 9V lithium 2W: 3-10 days 9V alkaline; 6-20 days 9V lithium 5W: 1-4 days 9V alkaline; 2-8 days 9V lithium	Pulse repetition dependent. 0.125W: 60-78 days 9V alkaline; 135-180 days 9V lithium 0.5W: 30-60 days 9V alkaline; 60-135 days 9V lithium 2W: 9-30 days 9V alkaline; 18-60 days 9V lithium 5W: 3-12 days 9V alkaline; 6-24 days 9V lithium
Depth Rating	750 m (2,460 ft)	750 m (2,460 ft)
Notes		

ELP-362A is a small, rugged underwater pinger rated to full ocean depth. Its compact size makes it ideal for use on ROVs, AUVs, ordnance and equipment recoveries. It can withstand extreme shock, vibration, pressure and temperature. Water activated.	**ELP-362A/PL** offers the same features as the ELP-362A but with activation by power loss through an external connector. Best suited for use on ROVs or AUVs and will automatically activate when a vehicle loses power. Only operates when submerged in water and will not turn on at surface when vehicle is shut down. No other power loss pinger is as compact, rugged and deep rated.	**DPL-275** is our most advanced system for locating and tracking underwater pingers. The DPL-275 steers users to pingers operating between 5 and 80 kHz. It can be used as a diver-held unit or converted to a surface unit.	**DPL-275XS** offers the same features as DPL-275 but can be used from a surface vessel.
			
37.5 kHz (±1kHz)	37.5 kHz (±1kHz)	5-80 kHz, 2 kHz bandwidth	5-80 kHz, 2 kHz bandwidth
160.5 dB (.125W)	160.5 dB (.125W)	Hydrophone directivity: typically 30° between 3 dB limits	Hydrophone directivity: typically 30° between 3 dB limits
9 ms	9 ms	n/a	n/a
1 pulse/sec	1 pulse/sec	n/a	n/a
Aluminum	Aluminum	PVC	PVC
190 g (6.7 oz)	233 g (8.2 oz)	3.08 kg (6.8 lbs)	3.08 kg (6.8 lbs)
Length: 12.50 cm (3.92 in); Diameter: 3.30 cm (1.3 in)	Length: 12.83 cm (5.05 in); Diameter: 3.30 cm (1.3 in)	Length: 27 cm (10.63 in); Diameter: 11.4 cm (4.5 in)	Length: 27 cm (10.63 in); Diameter: 11.4 cm (4.5 in)
7.2V lithium battery	7.2V lithium battery	10.8V rechargeable NiCad battery pack	10.8V rechargeable NiCad battery pack
>30 days	>30 days	16 hours per 12-hour charge	16 hours per 12-hour charge
6096 m (20,000 ft)	6096 m (20,000 ft)	183 m (600 ft)	183 m (600 ft)
		Comes complete with compass, bone conduction earphone, rechargeable battery pack with charger, operation manual, and water-tight, shock-resistant carrying case.	Comes complete with compass, bone conduction earphone, rechargeable battery pack with charger, operation manual, surface conversion kit and water-tight, shock-resistant carrying case.

Transponders offer a versatile array of subsea acoustic markers for relocation, which respond when interrogated.

UAT-376 is a general purpose, acoustic ranging/bearing device for underwater applications. Operating in the mid-range frequency band of 20- 35 kHz, it is designed to be used with a variety of diver, ROV/AUV, and ship-installed acoustic interrogator applications.

UAT-376/EL is a general purpose, acoustic ranging device for underwater applications. The stretch housing design accommodates additional batteries for longer deployments.

DRI-267 Dive Ranger Interrogator employs advanced acoustic technology to guide users to underwater sites marked with underwater acoustic transponders. Designed primarily for divers, it can also be converted to a surface unit by using the optional ACU-266 Surface Conversion Kit. (Contact Benthos for information on ACU-266)

Frequency	Receive: 26 kHz; Transmit: 25, 27, 28, 29, 30, 31, 32 kHz	Receive: 26 kHz; Transmit: 25, 27, 28, 29, 30, 31, 32 kHz	Receive: 25, 27, 28, 29, 30, 31, 32 kHz (user selectable). Transmit: 26 kHz
Acoustic Output re 1μPa@1m (acoustic Power)	180 dB (8W)	180 dB (8W)	184 dB (20W)
Pulse Length	5 ms	5 ms	5 ms
Pulse Repetition	Receiver turn-around time: 20 ms from interrogation; transmit lockout time: 246 ms	Receiver turn-around time: 20 ms from interrogation; transmit lockout time: 246 ms	1 pulse/sec or 1 pulse/2 sec (user selectable)
Housing	Aluminum	Aluminum	PVC
Weight in Air	.68 kg (1.5 lbs)	1 kg (2.25 lbs)	3.4 kg (7.5 lbs)
Dimensions	Length: 18.42 cm (7.25 in); Diameter: 5.08 cm (2.00 in)	Length: 30.2 cm (11.88 in); Diameter: 5.08 cm (2.00 in)	Length: 30.5 cm (12.0 in); Diameter: 11.4 cm (4.5 in)
Power Source	Two 9V alkaline or 9V lithium batteries	Six 9V alkaline batteries or 9V lithium batteries	10.8 V rechargeable NiCad battery pack
Battery Life	Alkaline: 4 months or 150,000 replies Lithium: 8 months or 300,000 replies	Alkaline: 12 months or 450,000 replies Lithium: 24 months or 900,000 replies	12 hours per 12-hour charge
Depth Rating	750 m (2,460 ft)	750 m (2,460 ft)	183 m (600 ft)
Notes			24 kHz receive frequency available

TELEDYNE
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A Teledyne Marine Systems Company

GEARFINDER 700

For quick and efficient location of your gear –

Get the Gearfinder

Every Year Fishers World-wide Lose Millions in Lost Fishing Gear!

Have you ever stopped to consider how much money you've spent replacing lost fishing gear?

Or...

How much valuable time and fuel costs you've wasted trying to locate your fishing gear during foggy or adverse weather conditions?

If you are like most fishers, you have had to accept the loss of time and money as part of the price of doing business. However, these enormous costs need not be incurred any longer.

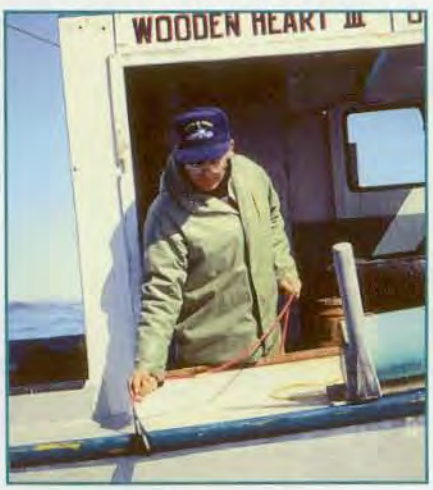
Introducing – the Gearfinder 700. Professionally engineered, designed and tested, the Gearfinder will quickly and efficiently locate your fishing gear during day-to-day fishing operations or whenever your gear should become lost.

The Gearfinder has been developed to meet the demands of fishers worldwide. Ruggedly built from the highest quality materials to withstand the toughest of conditions and weather at sea, the Gearfinder will provide you with years of trouble-free service.

The Gearfinder is made of three separate parts, a command unit, a hydrophone and a subsea transponder. Functioning together, they provide you with a unique acoustic gear locator device.

THE GEARFINDER SYSTEM

The compact command unit affixed to your ship's bridge controls the system. The LCD has large print and is backlit for ease of reading. Data is displayed in graphic and digital formats.

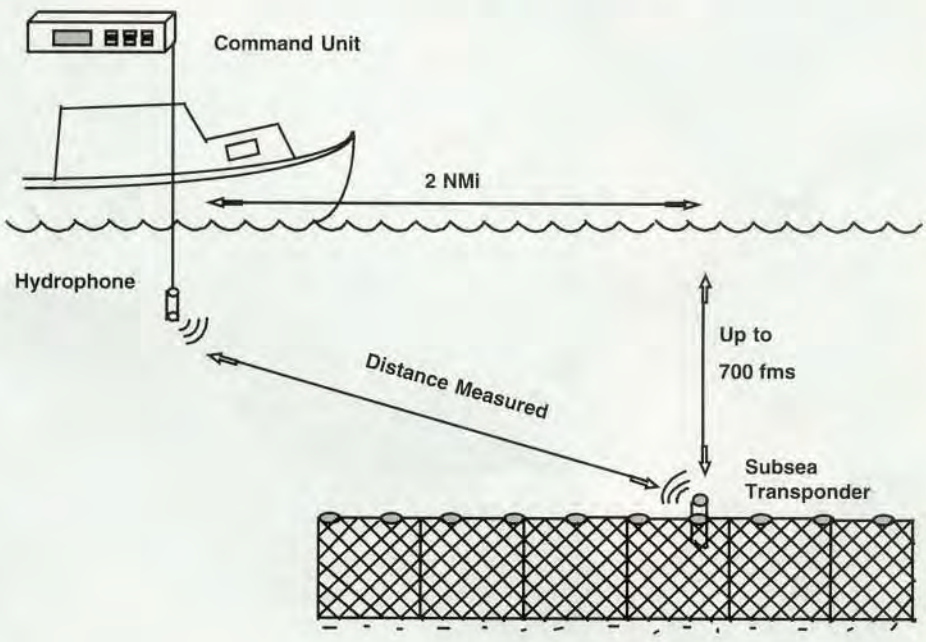


Linked to the command unit is a hydrophone equipped with cable. Once lowered into the sea, it transmits a coded acoustic signal and then listens for a response from your underwater gear.

The subsea transponder attached to your gear listens continuously for its unique identification code. Once it receives its code from the hydrophone, it transmits back. The return time of the signal is used to calculate the distance between your ship and your gear.

How the Gearfinder Operates

GEARFINDER 700



The Gearfinder system is very easy to use.

Simply:

- Turn the master switch to the "on" position;
- Press the up-down keys on the six-button keypad to highlight the letter and digits that are your unique identification number; then
- Press the start-stop key to begin the search process.

Immediately data will appear on the command unit's screen in both graphic and digital formats.

Once you receive a signal from your underwater gear, range will be automatically calculated. To account for depth, press the "C range" key to obtain the corrected range.

Location can be obtained by using triangulation or by observing range changes.

Benefits of the Gearfinder System

The Gearfinder offers you many benefits: The Gearfinder:

- Helps you reduce gear losses
- Speeds up gear recovery in routine fishing operations
- Provides you with an affordable and cost–effective retrieval system
- Contributes to viable fishing operations
- Minimizes effects of fishing operations on the environment
- Follows responsible fishing practices

- AccèsBoutique

News > **PRESENTATION OF THE D.L.S SYSTEM**

PRESENTATION OF THE D.L.S SYSTEM

HOW TO USE

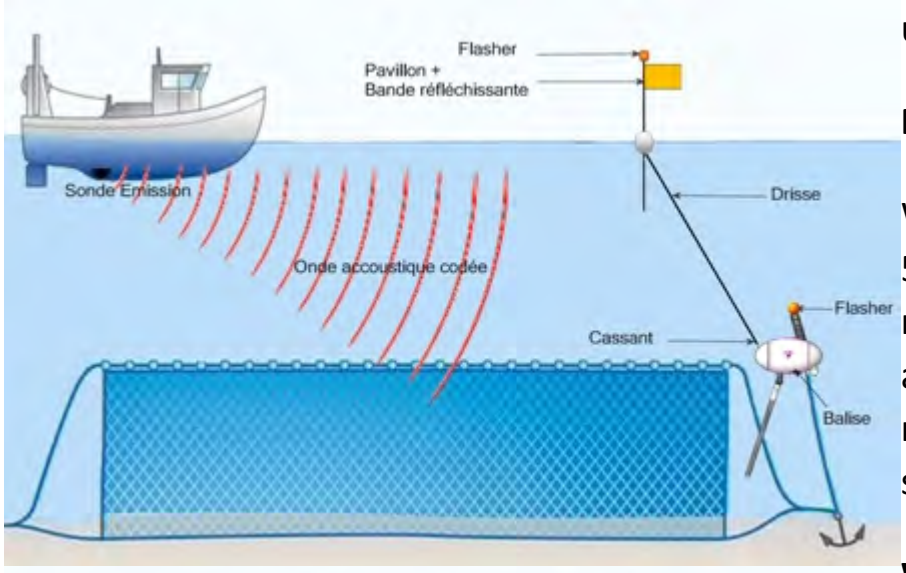
The fisherman puts his fishing gear into the water, quite normally, as if using his usual buoys… but these are replaced by our DLS buoys.

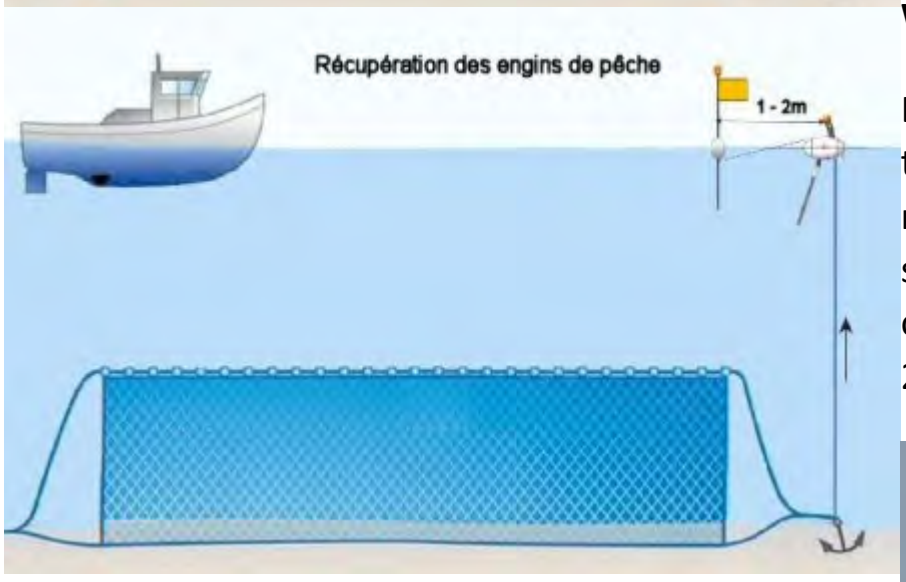
At the launch, the fisherman considers the depth and reduces his length, to keep his DLS buoys at about 15-20m below the surface.

Also, during the installation of his fishing gear, the fisherman notes the “Way Points”, to identify the location of his DLS buoys. His DLS case saves the GPS coordinates of each of his DLS buoys.

Returning to the fishing site, fisherman transmits the DLS acoustic code for the buoy he wants to rise to the surface to retrieve his gear.

Once the DLS buoy back to the surface, the fisherman gets his fishing gear, as





usual.

RANGE

With a range of about 500m., the DLS buoy receives the acoustic signal and triggers the mechanism to rise to the surface

WATER CONDITION

Like any acoustic system, triggering distances are nevertheless related to the state and the temperature of the water (minimum 200m. / maximum 1100m.)

WINDS & CURRENTS

The DLS buoy with all its elements (keel and mast) is able to hold a high stability in deep water or surface, until 5 knots currents, and winds until 100 km/h (instructions from manufacturer).

SECURITY

Our DLS buoys have “Safety devices” :

- A LED lights in case of waterway (water / moisture inside of the buoy). In this case of internal water, the buoy is triggered automatically, and rises to the surface.

- Another LED lights when the battery is too low. It warns that the battery is too low, and therefore it is useless to put the DLS buoy in the water. Likewise, when the buoy is immersed, the processor evaluates the battery. Once it reaches the critical triggering threshold, the DLS buoy rises up to surface.

IMPORTANT IMPACT (ALDFG)

Our DLS system will have a very important impact on the serious problem of abandoned, lost or otherwise discarded fishing gear (ALDFG).

Various United Nations General Assembly resolutions now provide a mandate for, and indeed require, action to reduce ALDFG and marine debris in general. Consequently, the United Nations Environment Program (UNEP) and the Food and Agriculture Organization of the United Nations (FAO) entered into an agreement to carry out a study in relation to ALDFG, in order to raise awareness of the extent of the problem and to recommend action to mitigate the problem of ALDFG by flag states, regional fisheries management bodies and organizations, and international organizations, such as UNEP, the International Maritime Organization (IMO) and FAO.

The impacts of the ALDFG are considered and include :

- continued catching of target and non-target species (such as turtles, seabirds and marine mammals) ;
- alterations to the benthic environment ;
- navigational hazards ;
- beach pollution by debris and garbage ;
- introduction of synthetic material into the marine food ;

- introduction of alien species transported by ALDFG ;
- and various costs related to clean-up operations and impacts on business activities.

In general, gillnets and pots / traps are most likely to “ghost fish” while other gear, such as trawls and longlines, are more likely to cause entanglement of marine organisms, including protected species, and habitat damage.

Our DLS will help to protect fishing gear and thereby reduce ALDFG.

CONCLUSION

This DLS system has all the assets to attract boaters and commercial fishermen :

1°) DLS demonstrates
- Great innovation,
- Respect of the Environment,
- Simple using and practical, to remain faithful to its customary,
- Good value cheap.

2°) DLS will help reduce the ADLFG (abandoned, lost or otherwise discarded fishing gear).

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Tel : 00 (33) 475 83 75 61 - Fax : 00 (33) 475 83 01 94

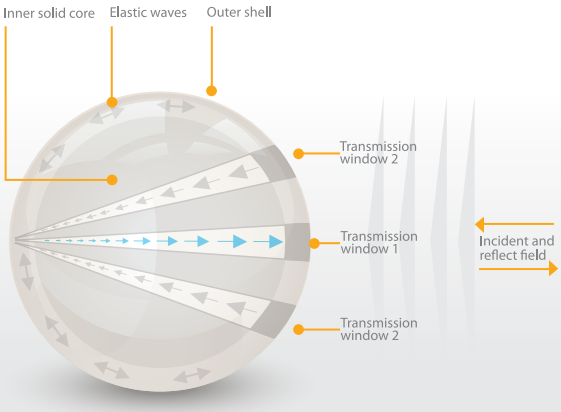
SALT®
Subsea Asset Location Technologies Ltd

Pioneers of the SonarBell®
Email info@cesalt.co.uk | www.cesalt.co.uk

SonarBell®

Asset Location Has Never Been Easier

What is SonarBell®



SonarBell® operates by focusing and reflecting sound energy, much as a lens or mirror can focus light and just like a lens or mirror, SonarBell® is a completely passive device.

By focusing and re-radiating the sound energy back in the direction from whence it came, a 200mm SonarBell® can deliver the same sonar target strength as a 2m diameter metal sphere whilst being relatively light weight and easy to handle.

However, unlike other technologies used for asset location SonarBell® does not suffer from either the "now you see it, now you don't" of corner reflectors nor does it require the battery replacement cycle of transponders.

Exploiting Defence Technology for wider benefit

Subsea Asset Location Technologies (SALT) Ltd is a 'spin out' company from the UK Ministry of Defence's, Defence Science and Technology Laboratory (Dstl) and was formed to make this military derived technology available to a wider market.

Having spent many years reducing underwater sonar signatures, the scientists at Dstl turned their knowledge on its head to develop a passive device that was "as loud as possible" when exposed to an incoming signal and the SonarBell® concept was born.

SonarBell® The Facts

- Inert, stable and completely passive device
- Omni-directional
- No maintenance
- Can have single, multiple or broadband optimised response
- Visible at up to 2km dependant on frequency, size and sonar power
- Anti-fouling can be applied
- Easily deployed and recovered
- Individual calibration available
- SonarBell® is available in a range of sizes from 50 - 200mm diameter

SonarBell® The Future

SALT is working with sonar manufacturers to deliver passive asset location and identification through the creation of an acoustic "bar code".

Wide Ranging Sonar Compatibility

SonarBell® technology is compatible with all types of sonar from the highly sophisticated hull mounted sonar designed for mine-hunting and side-scan devices at one end of the scale to fish-finders and echo-sounders at the other. It works equally well with AUV/UUV and hand-held sonar for work done at close ranges.

In order to get maximum detection range SonarBell® can be tuned to deliver peak response at a single frequency or deliver a broader capability through multiple peaks or broadband response.

Military Applications for SonarBell®

The breadth of Military applications is already substantial and continues to grow as SALT undertakes bespoke development and capability demonstration work. Current applications include:

- Mine and asset location (SonarBell® units have a low non-acoustic signature)
- Underwater "Safe Passage" marking
- Ping by ping calibration of Swimmer Detection systems and operator training

Commercial Applicability of SonarBell®

SonarBell® changes the economic argument for marking valuable assets significantly.

- Currently an asset must be sufficiently valuable in order for an organisation to accept the on-going overhead of battery replacement associated with transponder marking.
- SonarBell® allows for long term asset marking without the overhead, thereby rendering economically viable the marking of assets that would otherwise not have been marked.
- Where SonarBell® is used to replace a transponder then capital expenditure and operating expenditure are both reduced.

Applying SonarBell® to deliver real world benefit

Pattern of 5 SonarBell® on the seabed

SonarBell® offers a truly unique commercial and military proposition to its users.

Commercial Applications of SonarBell®

- Fishing for net efficiency and equipment recovery
- ROV/AUV marking and navigation
- Hydrography, Oceanographic Survey
- Marking mine location
- Wellhead riser and pipeline path marking for Oil and Gas Industry
- Alert telecoms and offshore power generation providers of cable exposure

SALT®
Subsea Asset Location Technologies Ltd

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SALT
Subsea Asset Location Technologies Ltd

Product Specification Sheet

SonarBell® 50mm diameter

550 kHz optimized

Overview

This SonarBell® product is designed to provide years of service with only minimal maintenance. It is provided with a rigid connector or custom made net and a stainless connector to attach the SonarBell® to a secure point. To keep the net mounted SonarBell® suspended in the water column a small float (available from SALT Ltd) should be connected to provide buoyancy.

This SonarBell® is designed with a single, peak at the resonant frequency. It has a distinctive "Double-Echo" which is clearly visible on most sonars, allowing a very simple and unequivocal identification method for the item that has been marked.

SonarBell® is currently available in 50mm, 100mm and 200mm diameters.

Benefits

The major benefits of using SonarBell® are:

- Higher performance size for size than conventional passive markers allowing greater detection range;
- Distinctive return is easier to see;
- Near neutral buoyancy allows safer handling and deployment;
- Pressure equalised design which is not dangerous after being at depth;
- Environmentally friendly construction.

Specification

The specifications for this SonarBell® product are shown in the table below:

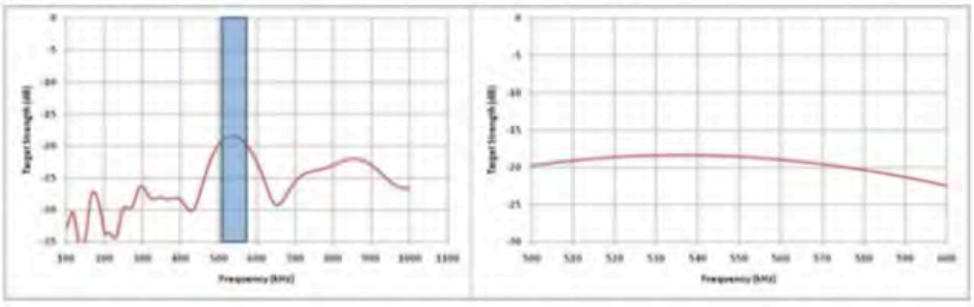
Parameter	SonarBell®
Product Code	SB50-P-550
Weight (in Air)	0.070Kg
Weight (in Seawater)	0.010Kg
Minimum temperature	-10°C
Maximum temperature	+60°C
Design life	>10 years
Maximum depth	>4,000m(Pressure equalized)
Optimal cleaning interval Location dependant	Annual

SonarBell® specifcation table

Options & Accessories

The following options are available for this product:

- Custom net (standard or inline) and connector;
- Magnetic clamp (for use with rigid connector);
- Anti-foul coating;
- Buoyancy float;
- Calibration certification;
- Weight bag and extension lanyards (2m or 5m);
- Robust, reusable carry case.



Broadband Response of 50mm SonarBell®

Narrowband Response of 550 kHz optimized
(All TS figures ±2dB)

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Registered in England: 06436264 | Email info@cesalt.co.uk | www.cesalt.co.uk

Product Specification Sheet

SonarBell® 100mm diameter

325 kHz optimized

Overview

This SonarBell® product is designed to provide years of service with only minimal maintenance. It is provided with a rigid connector or custom made net and a stainless connector to attach the SonarBell® to a secure point. To keep the net mounted SonarBell® suspended in the water column a small float (available from SALT Ltd) should be connected to provide buoyancy.

This SonarBell® is designed with a single, peak at the resonant frequency. It has a distinctive "Double-Echo" which is clearly visible on most sonars, allowing a very simple and unequivocal identification method for the item that has been marked.

SonarBell® is currently available in 50mm, 100mm and 200mm diameters.

Benefits

The major benefits of using SonarBell® are:

- Higher performance size for size than conventional passive markers allowing greater detection range;
- Distinctive return is easier to see;
- Near neutral buoyancy allows safer handling and deployment;
- Pressure equalised design which is not dangerous after being at depth;
- Environmentally friendly construction.

Specification

The specifications for this SonarBell® product are shown in the table below:

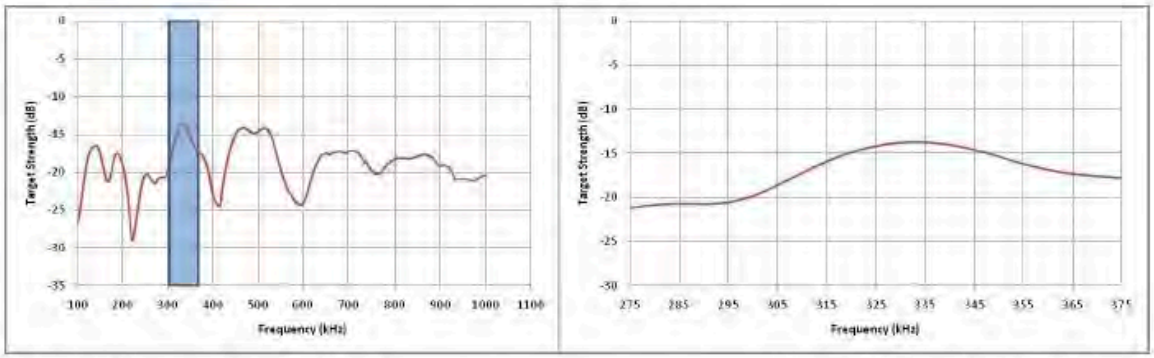
Parameter	SonarBell®
Product Code	SB100-P-325
Weight (in Air)	0.580Kg
Weight (in Seawater)	0.060Kg
Minimum temperature	-10°C
Maximum temperature	+60°C
Design life	>10 years
Maximum depth	>4,000m (Pressure equalized)
Optimal cleaning interval Location dependant	Annual

SonarBell® specifcation table

Options & Accessories

The following options are available for this product:

- Custom net (standard or inline) and connector;
- Rigid connector;
- Magnetic clamp (for use with rigid connector);
- Anti-foul coating;
- Buoyancy float;
- Calibration certification;
- Weight bag and extension lanyards (2m or 5m);
- Robust, reusable carry case.



Broadband Response of 100mm SonarBell®

Narrowband Response of 325 kHz optimized
(All TS figures ±2dB)

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SALT
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Product Specification Sheet

SonarBell® 100mm diameter

400 kHz optimized

Overview

This SonarBell® product is designed to provide years of service with only minimal maintenance. It is provided with a rigid connector or custom made net and a stainless connector to attach the SonarBell® to a secure point. To keep the net mounted SonarBell® suspended in the water column a small float (available from SALT Ltd) should be connected to provide buoyancy.

This SonarBell® is designed with a single, peak at the resonant frequency. It has a distinctive "Double-Echo" which is clearly visible on most sonars, allowing a very simple and unequivocal identification method for the item that has been marked.

SonarBell® is currently available in 50mm, 100mm and 200mm diameters.

Benefits

The major benefits of using SonarBell® are:

- Higher performance size for size than conventional passive markers allowing greater detection range;
- Distinctive return is easier to see;
- Near neutral buoyancy allows safer handling and deployment;
- Pressure equalised design which is not dangerous after being at depth;
- Environmentally friendly construction.

Specification

The specifications for this SonarBell® product are shown in the table below:

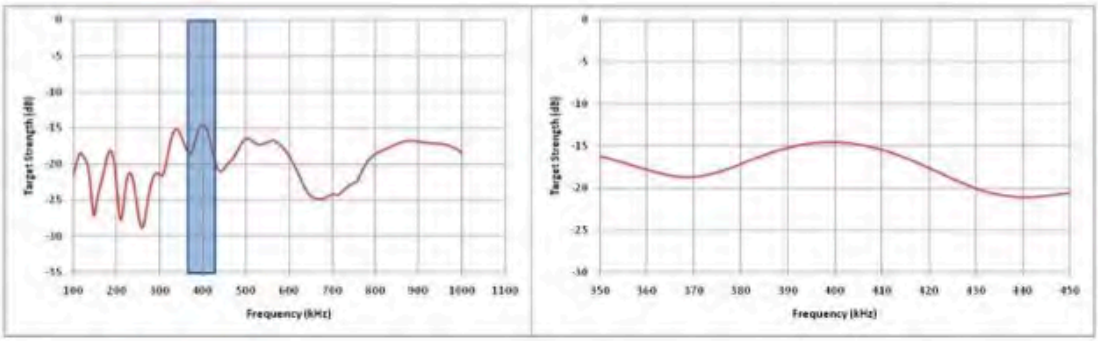
Parameter	SonarBell®
Product Code	SB100-P-400
Weight (in Air)	0.580Kg
Weight (in Seawater)	0.060Kg
Minimum temperature	-10°C
Maximum temperature	+60°C
Design life	>10 years
Maximum depth	>4,000m (Pressure equalized)
Optimal cleaning interval Location dependant	Annual

SonarBell® specifcation table

Options & Accessories

The following options are available for this product:

- Custom net (standard or inline) and connector;
- Rigid connector;
- Magnetic clamp (for use with rigid connector);
- Anti-foul coating;
- Buoyancy float;
- Calibration certification;
- Weight bag and extension lanyards (2m or 5m);
- Robust, reusable carry case.



Broadband Response of 100mm SonarBell®

Narrowband Response of 400 kHz optimized
(All TS figures ±2dB)

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Product Specification Sheet

SonarBell® 200mm diameter

120 kHz optimized

Overview

This SonarBell® product is designed to provide years of service with only minimal maintenance. It is provided with a rigid connector or custom made net and a stainless connector to attach the SonarBell® to a secure point. To keep the net mounted SonarBell® suspended in the water column a small float (available from SALT Ltd) should be connected to provide buoyancy.

This SonarBell® is designed with a single, peak at the resonant frequency. It has a distinctive "Double-Echo" which is clearly visible on most sonars, allowing a very simple and unequivocal identification method for the item that has been marked.

SonarBell® is currently available in 50mm, 100mm and 200mm diameters.

Benefits

The major benefits of using SonarBell® are:

- Higher performance size for size than conventional passive markers allowing greater detection range;
- Distinctive return is easier to see;
- Near neutral buoyancy allows safer handling and deployment;
- Pressure equalised design which is not dangerous after being at depth;
- Environmentally friendly construction.

Specification

The specifications for this SonarBell® product are shown in the table below:

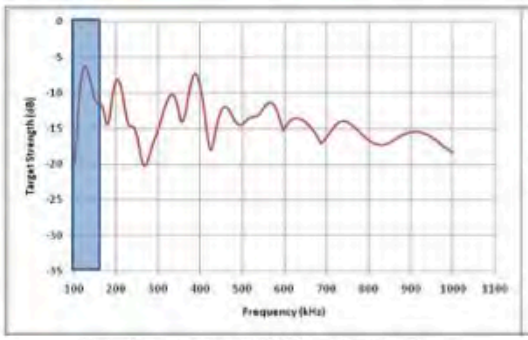
Parameter	SonarBell®
Product Code	SB200-P-120
Weight (in Air)	4.600Kg
Weight (in Seawater)	0.360Kg
Minimum temperature	-10°C
Maximum temperature	+60°C
Design life	>10 years
Maximum depth	>4,000m Pressure equalized)
Optimal cleaning interval Location dependant	Annual

SonarBell® specifcation table

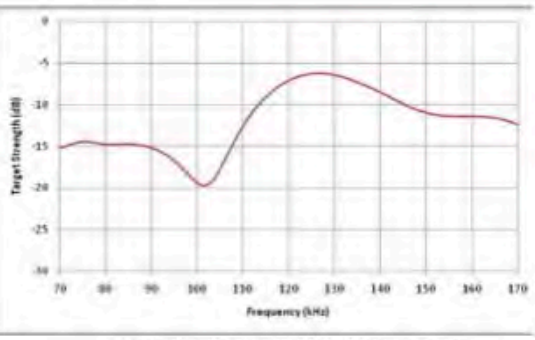
Options & Accessories

The following options are available for this product:

- Custom net (standard or inline) and connector;
- Rigid connector;
- Magnetic clamp (for use with rigid connector);
- Anti-foul coating;
- Buoyancy float;
- Calibration certification;
- Weight bag and extension lanyards (2m or 5m);
- Robust, reusable carry case.



Broadband Response of 200mm SonarBell®



Narrowband Response of 120 kHz optimized
(All TS figures ±2dB)

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Product Specification Sheet

SonarBell® 200mm diameter

325 kHz optimized

Overview

This SonarBell® product is designed to provide years of service with only minimal maintenance. It is provided with a rigid connector or custom made net and a stainless connector to attach the SonarBell® to a secure point. To keep the net mounted SonarBell® suspended in the water column a small float (available from SALT Ltd) should be connected to provide buoyancy.

This SonarBell® is designed with a single, peak at the resonant frequency. It has a distinctive "Double-Echo" which is clearly visible on most sonars, allowing a very simple and unequivocal identification method for the item that has been marked.

SonarBell® is currently available in 50mm, 100mm and 200mm diameters.

Benefits

The major benefits of using SonarBell® are:

- Higher performance size for size than conventional passive markers allowing greater detection range;
- Distinctive return is easier to see;
- Near neutral buoyancy allows safer handling and deployment;
- Pressure equalised design which is not dangerous after being at depth;
- Environmentally friendly construction.

Specification

The specifications for this SonarBell® product are shown in the table below:

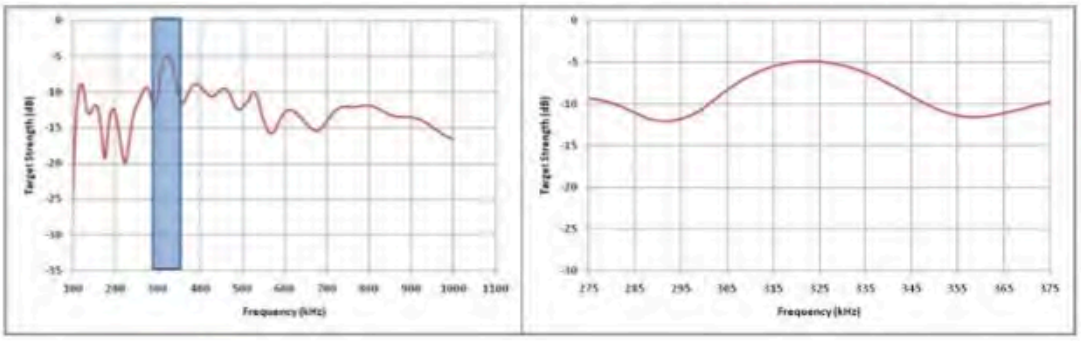
Parameter	SonarBell®
Product Code	SB200-P-325
Weight (in Air)	4.600Kg
Weight (in Seawater)	0.360Kg
Minimum temperature	-10°C
Maximum temperature	+60°C
Design life	>10 years
Maximum depth	>4,000m (Pressure equalized)
Optimal cleaning interval Location dependant	Annual

SonarBell® specifcation table

Options & Accessories

The following options are available for this product:

- Custom net (standard or inline) and connector;
- Rigid connector;
- Magnetic clamp (for use with rigid connector);
- Anti-foul coating;
- Buoyancy float;
- Calibration certification;
- Weight bag and extension lanyards (2m or 5m);
- Robust, reusable carry case.



Broadband Response of 200mm SonarBell®

Narrowband Response of 325 kHz optimized
(All TS figures ±2dB)

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Product Specification Sheet

SonarBell® 200mm diameter

450 kHz optimized

Overview

This SonarBell® product is designed to provide years of service with only minimal maintenance. It is provided with a rigid connector or custom made net and a stainless connector to attach the SonarBell® to a secure point. To keep the net mounted SonarBell® suspended in the water column a small float (available from SALT Ltd) should be connected to provide buoyancy.

This SonarBell® is designed with a single, peak at the resonant frequency. It has a distinctive "Double-Echo" which is clearly visible on most sonars, allowing a very simple and unequivocal identification method for the item that has been marked.

SonarBell® is currently available in 50mm, 100mm and 200mm diameters.

Benefits

The major benefits of using SonarBell® are:

- Higher performance size for size than conventional passive markers allowing greater detection range;
- Distinctive return is easier to see;
- Near neutral buoyancy allows safer handling and deployment;
- Pressure equalised design which is not dangerous after being at depth;
- Environmentally friendly construction.

Specification

The specifications for this SonarBell® product are shown in the table below:

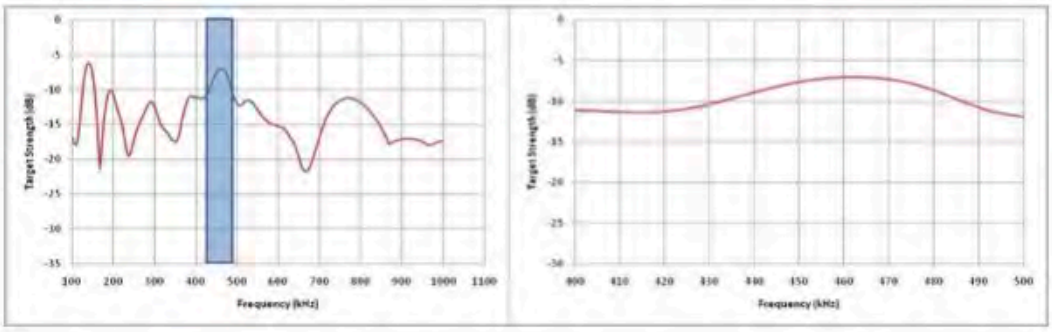
Parameter	SonarBell®
Product Code	SB200-P-450
Weight (in Air)	4.600Kg
Weight (in Seawater)	0.360Kg
Minimum temperature	-10°C
Maximum temperature	+60°C
Design life	>10 years
Maximum depth	>4,000m (Pressure equalized)
Optimal cleaning interval Location dependant	Annual

SonarBell® specifcation table

Options & Accessories

The following options are available for this product:

- Custom net (standard or inline) and connector;
- Rigid connector;
- Magnetic clamp (for use with rigid connector);
- Anti-foul coating;
- Buoyancy float;
- Calibration certification;
- Weight bag and extension lanyards (2m or 5m);
- Robust, reusable carry case.



Broadband Response of 200mm SonarBell®

Narrowband Response of 450 kHz optimized
(All TS figures ±2dB)

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