

Online ENGINE

ELECTROMAGNETIC RECEIVER SELF-CONTAINED DIVER OR ROV HELD OPERATING MANUAL

The 3012 system is a robust, practical and operator friendly 22Hz
Electromagnetic Receiver which functions as a stand-alone pig locator
or signaller for a variety of subsea applications

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Checked

Date

(IF APPLICABLE)

(IF APPLICABLE)

Approved



Date

Rev	Date	By	Summary of change
A00	08/08/17	BG	CR00485: Was 3012 MANUAL RevA09. CR00380 Address change. CR00499 Front Cover update.
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COMMENTS:

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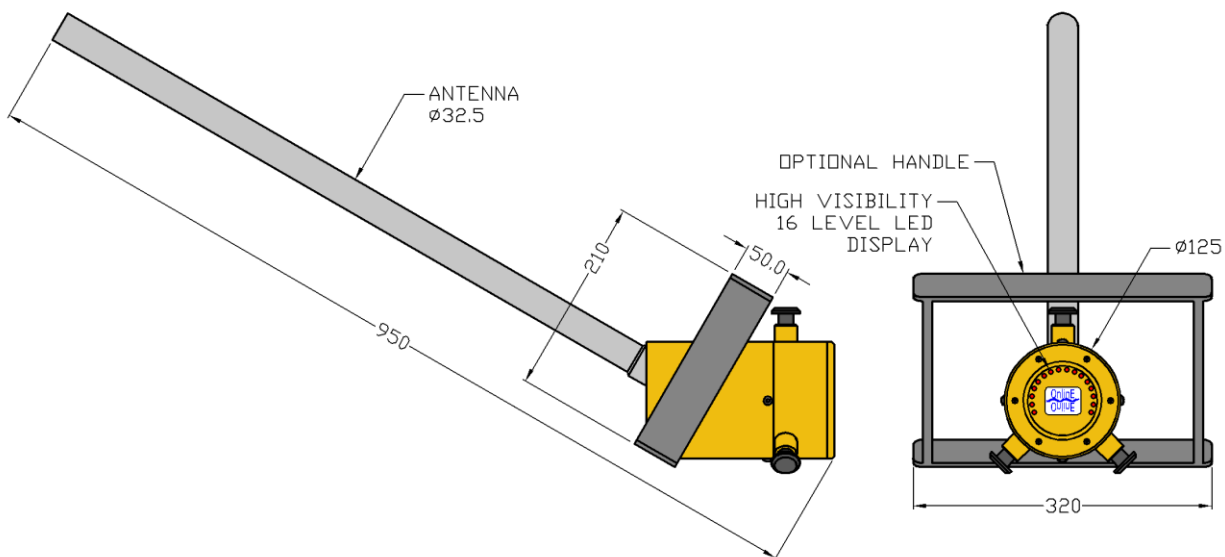
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1. GENERAL DESCRIPTION

The 3012 Subsea Electromagnetic (EM) Receiver is a robust, practical and operator friendly receiver which functions as a standalone pig locator or signaller for a variety of subsea applications. The 3012 receiver can be operated by either ROV or diver to locate stuck pigs or monitor the movements of pigs fitted with 22Hz EM transmitters.

Detection through pipeline walls in excess of 40mm thick is possible dependent on several factors including the type of transmitter used, distance between antenna and transmitter, pig design, pig speed, pipeline diameter, pipeline material and background EM noise levels. Please contact OEL to discuss the most effective configuration.



The receiver uses a high visibility and easy to interpret circular array of 16x LEDs to indicate the instantaneous level of received signal. The unit is powered from an internal battery pack and all controls can be operated subsea or on the surface meaning that the unit requires no interfacing with other equipment to bring signals or power to the surface.

The 3x simple push button controls allow the unit to be turned on and off, sensitivity to be increased or decreased, and the battery status checked.

Several additional options are available such as custom handles and mounting arrangements. Please contact Online Electronics to discuss any additional requirements.

2. SPECIFICATIONS

GENERAL

Battery life at 5°C	30 days
Battery type	10.5V Alkaline pack BATT-112190
External pressure rating	300bar
Receiver Centre Frequency	22Hz
-6dB Bandwidth	7Hz

MATERIALS:

Housing material	ALLOY BRONZE CA104 EN 12163
Endcap material	ALLOY BRONZE CA104 EN 12163
Bleedscrew material.....	ALLOY BRONZE CA104 EN 12163
Window material	ACRYLIC
Endcap o-rings.....	2x BS 50-243 NBR70 with 2x BS 250-243 PTFE BURs
Window o-ring	1x BS 50-236 NBR70 / 1x BS 50-237 NBR70
Bleedscrew o-ring.....	1x BS 50-008 NBR70

DIMENSIONS:

Length	950mm
Width (with optional handle).....	320mm
Weight in air.....	13kg

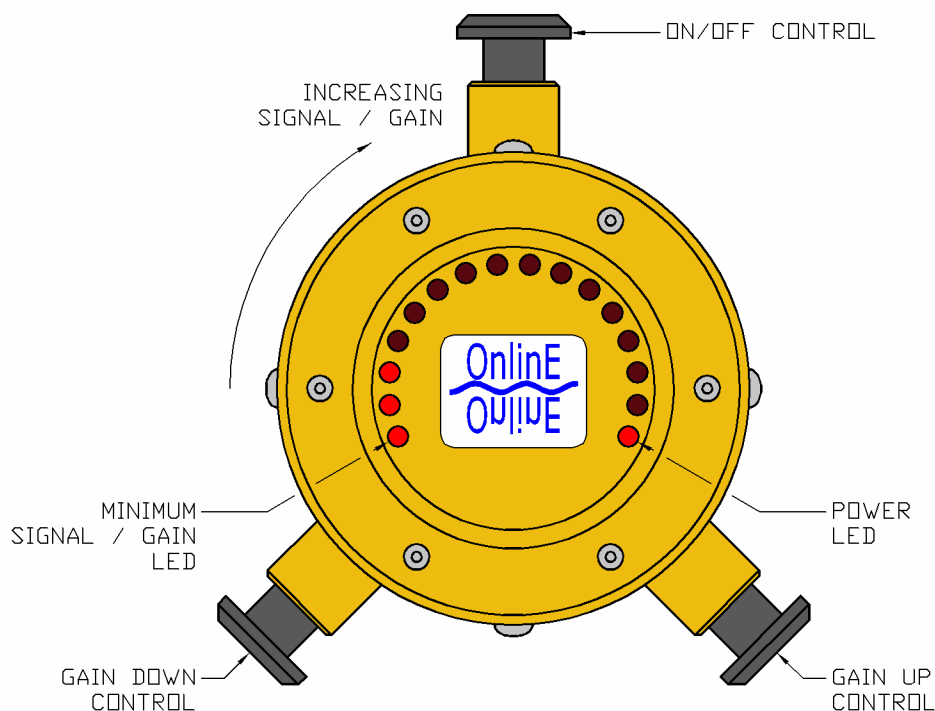
3. OPERATION

NOTE 1: DO NOT EXPOSE TO AGGRESSIVE SOLVENTS OR CHEMICALS WHICH COULD BE HARMFUL TO THE HOUSING, NITRILE RUBBER O-RINGS, THE ACRYLIC WINDOW OR CONNECTORS.

NOTE 2: OPENING OF THE UNIT SHOULD ONLY TAKE PLACE IN A CLEAN, DRY, LABORATORY ENVIRONMENT.

NOTE 3: TO PREVENT THE FORMATION OF CONDENSATION WITHIN THE UNIT, ALLOW THE UNIT TO STABILISE WITHIN THE LABORATORY ENVIRONMENT FOR A MINIMUM OF 6 HOURS PRIOR TO OPENING.

NOTE 4: ALWAYS LOOSEN THE BLEEDSCREW TO RELIEVE ANY INTERNAL PRESSURE PRIOR TO OPENING.



3.1. TURNING ON

To turn the unit on simply press and hold the ON/OFF control button until all LED's are extinguished (approx. 5 seconds). The POWER LED on the right will remain illuminated to indicate that the unit is ON. The receiver sensitivity will default to maximum. To prevent the unit from being accidentally turned off, the ON/OFF control can be unscrewed from the housing at this point and stored away safely for future use.

The receiver will now start showing the presence of any 22Hz signal it detects with the minimum signal indicated by the leftmost LED and maximum signal indicated by the rightmost LED. The display is updated several times every second to show instantaneous changes in the signal.

For best results, the unit should be placed or mounted at a fixed, stable position with the antenna tube parallel to the expected orientation of the transmitter. Any significant movement of the unit will cause a disturbance to the signal as the antenna is moved in the Earths' magnetic field, particularly when the SENSITIVITY is set high.

3.2. TURNING OFF

To turn the 3012 OFF, simply press and hold the ON/OFF switch until the POWER LED on the right is extinguished (approx. 5 seconds). To prevent the unit from being accidentally turned ON, the ON/OFF control can be unscrewed from the housing and stored away safely for future use.

3.3. ADJUSTING GAIN/SENSITIVITY

The GAIN defaults to maximum when the 3012 is turned ON. To adjust the GAIN up or down, press the GAIN UP control or the GAIN DWN control. The GAIN setting will be indicated by the illumination of one of the 16x LED's where the leftmost LED indicates MINIMUM GAIN and the rightmost LED indicates MAXIMUM GAIN.

3.4. BATTERY STATUS

To show the 3012 BATTERY STATUS, simultaneously press and hold the GAIN UP and GAIN DOWN controls. The LED's will indicate the BATTERY STATUS. The leftmost LED indicating an EMPTY battery and the rightmost LED indicating a FULL battery. The battery should be replaced if the LED array is showing less than 50%.

3.5. FUNCTION CHECK

1. Turn ON a 22Hz transmitter in PULSING mode.
2. Place the 3012 parallel to the transmitter, approx. 5 metres away.
3. Turn on the 3012 and leave the sensitivity at the default, maximum setting. The 16x LED array should be indicating a signal presence. Adjust the 3012 GAIN DOWN until the LED array can be seen to be pulsing up and down in synchronisation with the EM transmitter.
4. EM transmitters have an inherent "null spot" detectable when the antenna axis is perpendicular to the transmitter axis and pointing at the centre of the transmitter. At the null spot the pulsing signal will be significantly weaker if not entirely lost. Moving the 3012 a few centimetres along the transmitter axis in either direction will cause the signal to increase dramatically. The 3012 GAIN normally need to be turned DOWN significantly in order to detect the null spot in air.

3.6. MOUNTING

2x M10 threaded holes, 12mm deep and 30mm apart, are provided in the bottom of the 3012 housing for mounting. Normally the receiver is supplied with a robust handle mounted on these holes which can easily be removed with a spanner.

For best results, the unit should be placed or mounted at affixed, stable position with the antenna tube parallel to the expected orientation of the transmitter. Any significant movement of the unit will cause a disturbance to the signal as the antenna is move in the earth's magnetic field, particularly when the sensitivity is set to HIGH.

3.7. ROV CONSIDERATIONS

The 3012 can be deployed while held by an ROV which can monitor the LED's using an on board camera. In most cases it will be impractical to try and operate any of the controls using the ROV manipulators while sub-sea, so it may be necessary to configure the gain setting before deployment. Usually the 3012 will be deployed with gain set to maximum.

The main potential problem is if the ROV generates significant electrical noise which interferes with the 22Hz EM signal being detected. Also any significant movement of the 3012 will cause a disturbance to the signal as the antenna is moved in the Earth's magnetic field. While trying to detect a 22Hz signal the ROV should remain stationary.

The following procedure can be used as a guide for deploying the 3012 with an ROV.

1. Before mounting the 3012 on the ROV, let the ROV operators carry out a function check of the unit following the procedure provided previously. This will confirm that the unit is functional as well as letting the ROV operators become familiar with the units operation.
2. Mount the 3012 on the ROV using the mounting holes provided or by gripping in the ROV manipulator. Try to locate the receiver as far away from any potential sources of electrical noise such as motors etc, as much as possible.
3. Turn the unit ON. The POWER LED on the right will remain illuminated to show the unit is ON. The receiver sensitivity will default to maximum. In an electrically quiet environment, no other LED's should be illuminated.
4. If possible, energise the ROV at this point and operate any ROV functions likely to produce electrical noise such as the thrusters, to gauge their effect on the 3012 receiver. If any of the ROV functions causes more than 10x LED's to illuminate, then one of the following approaches can be used to overcome the problem.
 - It may be possible to simply not use the "problem" ROV function (e.g. don't use a particular thruster which has been proven to cause EM noise) while trying to detect a 22Hz signal sub-sea.
 - It may be possible for the ROV to place the 3012 near the pipeline, move away and monitor the LED's from a distance.
 - As a last resort the sensitivity of the receiver can be reduced, but be aware, this will obviously make it less sensitive to the 22Hz signal which is to be detected.
5. Deploy the ROV and 3012 sub-sea. While sub-sea, the ROV should remain stationary when trying to detect any 22Hz signals. The approaches outlined above can be used to try and reduce the effect of noise originating from the ROV itself if necessary.

3.8. BATTERY REMOVAL

1. Opening of the unit should only take place in a clean, dry laboratory environment.
2. To prevent the formation of condensation within the unit, allow the unit to stabilise for 6 hours minimum within the laboratory environment prior to opening
3. Ensure that the 3012 is turned OFF.
4. LOOSEN THE BLEEDSCREW BENEATH THE ANTENNA ENTRY TO RELIEVE ANY INTERNAL PRESSURE.
5. Remove the 4x M5 Allen screws around the perimeter of the housing.
6. Carefully remove the display endcap from the housing. Ensure that the O-ring seals are protected from damage and contamination while the unit is open.
7. The 10.5V alkaline battery pack (BATT-11210) is located in the main housing and is connected to the display endcap via a large white 2W Molex connector. There is also a connection between the antenna and the display endcap which can be separated if required. Observe the position of the battery, connectors and wires before disturbing.
8. Replace the battery. Ensure all wires are installed neatly and protected from accidental damage as observed before.
9. Examine the O-ring seals for any signs of damage or contamination. Replace if necessary.
10. Re-assemble the unit following the above instructions in reverse.
11. TIGHTEN THE BLEEDSCREW.

4. MAINTENANCE

NOTE 1: DO NOT EXPOSE TO AGGRESSIVE SOLVENTS OR CHEMICALS WHICH COULD BE HARMFUL TO THE HOUSING, NITRILE RUBBER O-RINGS, THE ACRYLIC WINDOW OR CONNECTORS.

NOTE 2: OPENING OF THE UNIT SHOULD ONLY TAKE PLACE IN A CLEAN, DRY LABORATORY ENVIRONMENT.

NOTE3: TO PREVENT THE FORMATION OF CONDENSATION WITHIN THE UNIT ALLOW THE UNIT TO STABILISE WITHIN THE LABORATORY ENVIRONMENT FOR A MINIMUM OF 6 HOURS PRIOR TO OPENING.

NOTE4: ALWAYS LOOSEN THE BLEEDSCREW TO RELIEVE ANY INTERNAL PRESSURE PRIOR TO OPENING.

All Online Electronics Ltd products are designed to require the minimum maintenance. The housing should be cleaned using fresh water and cleaning agents as necessary. Do not use chemicals which could be damaging to the housing, the nitrile rubber O-rings, the acrylic window or any connectors.

If the unit is to be placed in storage for a long period of time, ensure the unit has been cleaned and disconnect the batteries.

5. WARRANTY

Online Electronic Ltd products are guaranteed for one year from the date of purchase. Goods should be returned transportation pre-paid to Online Electronics. There is no charge for parts or labour should any product require repair due to manufacturing deficiency during the guarantee period.

In the event of manufacturing deficiency, the inward transportation cost will be re-paid to the client.

6. DISPOSAL

Online Electronics Ltd takes its responsibilities under the WEEE Regulations extremely seriously and has a process in place to be compliant, in line with our Corporate and Social responsibilities.

In the UK, OEL has joined a registered compliance scheme, WeeeCare (registration number **WEE/MP3538PZ/SCH**).

Electrical and electronic equipment should never be disposed of in general waste, but must be separately collected for the proper treatment and recovery. The crossed out bin symbol placed on the product reminds you of the need to dispose of the unit correctly at the end of its life.

When purchasing a new product, you will have the possibility to return, free of charge, another end of life OEL product of equivalent type that has fulfilled the same functions as the supplied equipment. These items may be deposited at: Online Electronics Ltd, Online House, Woodburn Road, Blackburn Business Park, Blackburn, Aberdeen, AB21 0PS, UK. Alternatively, to arrange collection of any waste electrical equipment obligated to OEL, please telephone WeeeCare on **0844 800 004**