

Electromagnetic Receiver Topside ATEX Operating Manual

The 3002X 3003X system is a 22Hz
Electromagnetic Receiver ATEX compliant
system for use in Zone 1 areas for pig
locating and tracking onshore and offshore



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**CHALLENGE
ACCEPTED**

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1. GENERAL DESCRIPTION

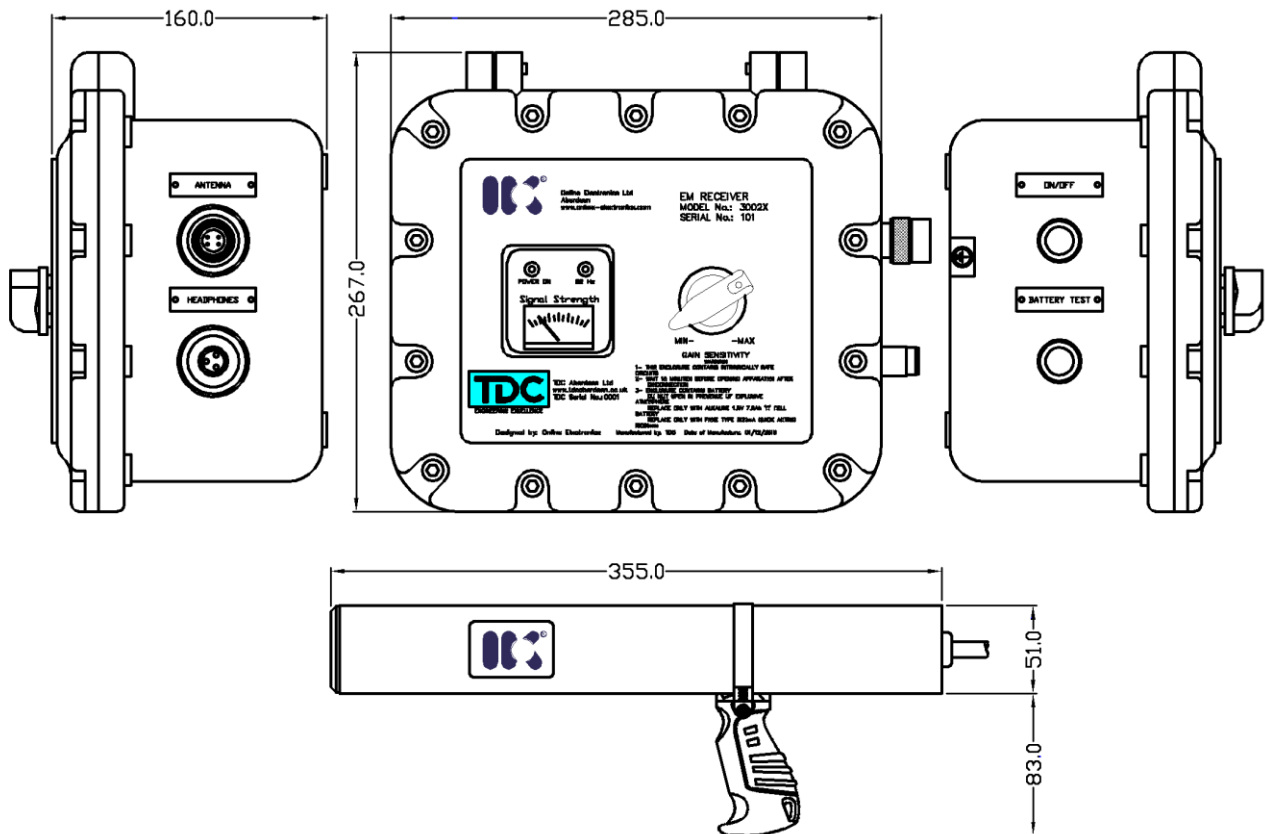
Online Electronics’ versatile 3002X Electromagnetic Receiver is ATEX compliant for use in Zone 1 areas. It can operate as a pig locator or as a pig signaller in pipelines onshore and offshore. The system can be used to find lost and stuck pigs, to confirm a pig has left or arrived at a required location and can be used to monitor the movement of a pig.

The 3002X system consists of three main components: the 22Hz transmitter which is fitted within the body of a pig, the 3002X EM receiver and the 3003X antenna.

When used as a pig locating system, the 3002X can firstly be used to find the general location of the pig and can then determine the exact location by detecting the inherent magnetic “null spot” of the transmitter. This procedure typically allows the location of the pig to be determined with an accuracy of a few centimetres.

The 3002X receiver is housed in an ATEX IECEx, Zone 1 Aluminium explosive proof enclosure. Features include an audio output socket which allows the operator to listen to the received signal using the supplied ATEX certified headset. The audio output is derived directly from the received 22Hz signal, allowing the operator to detect subtle changes in the received signal level. An analogue meter fitted to the front of the unit indicates the received 22Hz signal level. Controls consisting of an ON/OFF button, a GAIN SENSITIVITY knob and a BATTERY TEST button.

The 3003X antenna is supplied in a polished 316 stainless steel housing with a 10m cable assembly pre-fitted with a ROTA connector and has two red LED indicators encased in clear Epoxy at the rear of the unit. The pistol grip can be removed if required.



2. SPECIFICATIONS

3002X EM RECEIVER

Battery life 35 hours
Battery type 2x ALKALINE 1.5V 7.8Ah C Cells (DURACELL ID1400 recommended)
Temperature range..... -20°C to 54°C (-4°F to +129°F)
Housing material Aluminium
Weight 13kg (28.7lbs)

3003X EM ANTENNA

Temperature range..... 0°C to 40°C (+32°F to +104°F)
Housing material316 Stainless Steel (NACE STD MR075-2002)
Weight (including 10m Cable) 4kg (8.8lbs)

3. RULES FOR SAFE OPERATION

⚠ WARNING: The Special Conditions for Safe Use for the 3002X EM RECEIVER and 3003X EM ANTENNA as detailed in Section 9 CERTIFICATION APPENDIX must be followed at all times.

⚠ WARNING: Any operation involving explosive atmospheres is potentially hazardous. No person should use this equipment unless fully aware of the potential hazards of working in explosive atmospheres. The purchaser of this system is responsible for the training and competence of operators and the manner in which it is used. This manual should be read through and understood before operation so that the operator is familiar with the equipment. Contact Online Electronics Ltd immediately should any difficulty arise in the use of this system.

⚠ WARNING: The 3003X EM ANTENNA is only for connection to the 3002X EM RECEIVER.

⚠ WARNING: The 3002X EM RECEIVER contains intrinsically safe circuits. DO NOT open when an explosive atmosphere may be present.

⚠ WARNING: Replace all batteries at the same time. NEVER install used batteries. NEVER install a mix of new and used batteries. USE ONLY new batteries from the same package or manufacturing batch. DO NOT mix different brands or types of batteries. ALWAYS observe correct battery polarity. New batteries should be installed before each deployment.

⚠ WARNING: Replace only with fuse type 500mA, Quick Acting, 5x20mm.

⚠ WARNING: Do not expose to aggressive solvents or chemicals which could be harmful to the HOUSINGS, CONNECTORS or any other parts of the equipment.

⚠ WARNING: The connector protective caps should be fitted immediately following separation from the 3003X antenna and headset.

⚠ CAUTION: Opening of the equipment should take place in a clean laboratory environment.

⚠ CAUTION: Allow 15 minutes from disconnection before opening the 3002X EM RECEIVER.

⚠ CAUTION: Renew silicon grease every time the 3002X EM RECEIVER is opened.

4. 3002X OPERATION

Familiarise yourself with all of the rules for the safe operation of this equipment as described in Section 3 RULES FOR SAFE OPERATION.

- The ON/OFF button situated on the left hand side of the enclosure is used to turn the unit ON and OFF. The 3002X unit should always be switched off after use by pressing the ON/OFF button. When the unit is off, there should be no deflection on the analogue meter and all LEDs should be off.
- The analogue meter situated on the top of the enclosure displays the 22Hz received signal and an indication of battery lifetime remaining. The analogue display increases from left to right.
- The BATTERY TEST button is situated on the left hand side of the enclosure adjacent the ON/OFF button. To test the remaining battery lifetime, press and hold this button.
- The GAIN SENSITIVITY knob is situated on the top of the enclosure. To increase the GAIN SENSITIVITY turn the knob clockwise and to decrease the GAIN SENSITIVITY turn the knob anti clockwise.
- The HEADSET and ANTENNA connections are situated on the right hand side of the enclosure. The connection process is described in Section 4.1 FUNCTION TEST.

4.1. FUNCTION TEST

At least 24 hours prior to deployment, any personnel who are to be involved in the operation of the receiver should review this entire manual and be given time to practice operating the transmitter and receiver system by completing a function test. By familiarizing themselves with the system operation prior to deployment, the chances of a potentially costly operator error are greatly reduced. Providing the function test has been completed successfully, deployment can proceed.

1. Connect the 3003X antenna to the 3002X receiver unit as follows:
 - Remove the protective caps on the 3002X antenna socket and 3003X cable connector plug. Note: The 3002X Antenna socket has a locking mechanism which is released by pushing the external locking collar toward the main receiver housing.
 - Line up the groove on the 3003X cable connector plug with the key on the 3002X socket, hold back the socket locking collar and insert the plug. Release the collar to lock the connectors in place.
2. Connect the accompanying ATEX certified headphones to the receiver as follows:
 - Remove the protective cap on the headphone socket. The locking collar for this connection is located on the headphone cable connector and has to be pushed away from the blanking cap for the cap to be released.
 - Line up the groove on the 3002X socket connector with the key on the headphone cable connector plug, hold back the plug locking collar and insert the plug into the socket. Release the collar to lock the connectors in place.
3. Switch on the receiver by pressing the ON/OFF button on the left side of the unit. The "Power On" LED should illuminate to indicate that the unit is on. The "22Hz LED" on the front panel and the antenna LEDs will also illuminate for a short time.

4. Press and hold the battery test button. If the meter shows 50% or less, the batteries should be replaced. Refer to Section 5 BATTERY REPLACEMENT of this manual for battery replacement instructions. Release the BATTERY TEST button.
5. Turn sensitivity to approximately half scale using the GAIN SENSITIVITY control on the front of the unit.
6. Confirm that the SIGNAL indicated is less than 30% (assuming that the receiver is in a typical, electrically quiet, environment). If more than 30% signal is received then it indicates that there is a source of 22Hz electrical noise nearby and the sensitivity of the 3002X may need to be reduced or the 3003X antenna moved away from the source.
7. Pick up the 3003X antenna and shake it. This should cause peaks in the received signal due to the antenna picking up its' own movement within the earths' magnetic field. For this reason NEVER wave the 3003X antenna around while trying to detect a pig, hold it as still as possible, for best results place it on the ground. This is normal and is a side effect of using magnetics for pig location and tracking.
8. If available, a 22Hz test transmitter should always be used to confirm full functionality.
9. Place the transmitter approximately 5m from the 3003X antenna and turn on in pulsing mode. For maximum signal, orientate the 3003X antenna parallel to the transmitter. Vary the SENSITIVITY of the 3002X receiver to achieve the cleanest signal. Note that more sensitivity is not always best, if there is significant background noise and the sensitivity is too high then the transmitter signal can be lost in the background noise.
10. Adjust the SENSITIVITY until the analogue meter shows roughly half scale deflection. Move the 3003X antenna closer to the transmitter and confirm that the signal level has increased. Likewise, move the 3003X antenna further away from the transmitter and confirm that the signal level has decreased. For each measurement, the 3003X antenna should be parallel to the transmitter and should be held as stationary as possible.
11. Start moving away from transmitter, stopping at intervals of a metre. At each interval re-adjust the 3002X SENSITIVITY to achieve the cleanest signal. Keep moving away until the transmitter can no longer be detected. Notice that as the signal gets weaker it may be necessary to place the 3003X antenna on the ground to be able to increase the 3002X SENSITIVITY enough to pick up the transmitter signal without picking up movement of the antenna.
12. Notice that if the antenna is moved ahead or behind the transmitter as if you were walking along a pipeline containing the transmitter the signal decreases. The antenna should always be used in this parallel orientation to find the rough location of a transmitter within a pipeline.

4.2. APPROXIMATE TRANSMITTER LOCATION

Set the sensitivity to maximum (GAIN SENSITIVITY knob fully clockwise) and position the 3003X antenna as close as possible and parallel to the pipeline/pig launcher. Starting at one end, move along the pipeline/pig launcher, stopping at 2m intervals to check for a signal. If no signal is detected continue along the pipeline until a signal is detected either through the earpiece, analogue display or the 22Hz LED. Once a signal has been detected move another step along the pipeline and check the signal. If it is stronger, continue another step until the signal begins to drop off. Once the signal drops off, lower the sensitivity and take half a step back up the pipeline. Repeat this process until you reach the minimum sensitivity level where you can still pick up the signal. This should give you the approximate location of the transmitter.

4.3. ACCURATE TRANSMITTER LOCATION

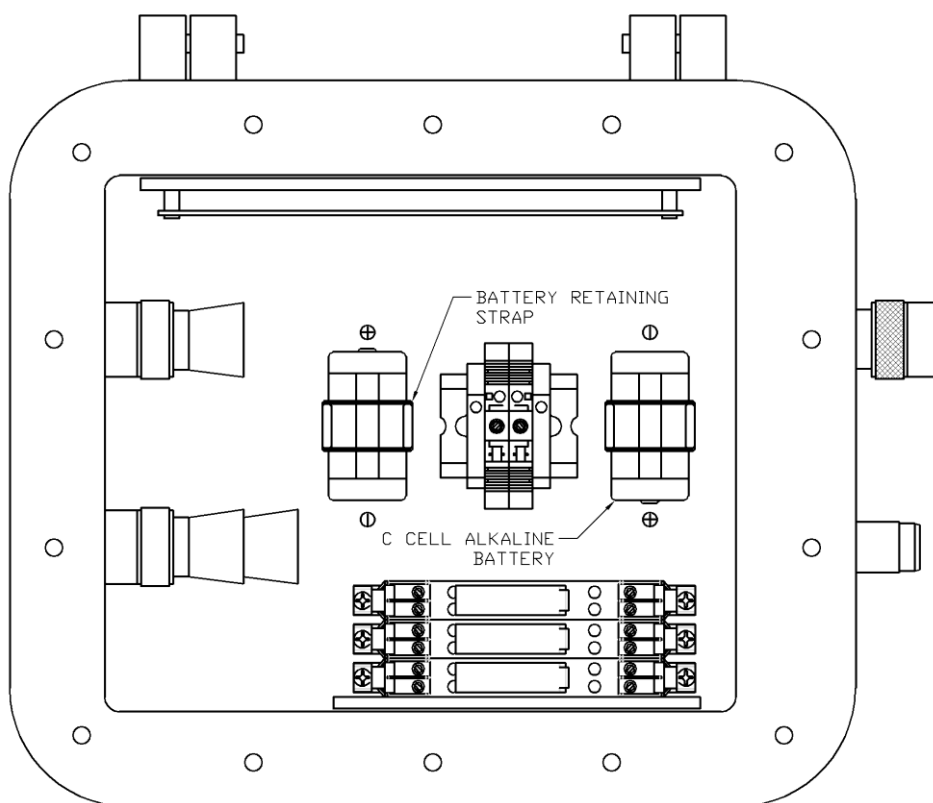
Once the approximate location of the transmitter has been determined, set the sensitivity to maximum, and point the 3003X antenna towards where you think the transmitter is (so the central axis of the 3003X antenna is perpendicular to that of the transmitter), at a distance of approximately 1m. Maintain this separation and orientation and slowly move the 3003X antenna along the pipeline in the vicinity of the transmitter. The signal through the earpiece should be relatively loud, but should drop off significantly as you pass the inherent "Null Spot" of the transmitter before coming back again as you continue along the pipeline. This drop off occurs when the unit is pointing directly at the transmitter and gives its accurate location. If a strong signal is being received, but the null spot cannot be found, try reducing the sensitivity and/or increasing the separation between the antenna and the pipeline.

5. BATTERY REPLACEMENT

Familiarise yourself with all of the rules for the safe operation of this equipment as described in Section 3 RULES FOR SAFE OPERATION.

While the 3002X receiver is ON press and hold the BATTERY TEST button. The analogue meter will give an indication of the battery level. If the level is less than 50% then the batteries should be replaced. To replace the batteries follow the steps below.

1. Ensure the unit is switched off.
2. Unscrew the 14 off M8x25 cap screws (using a 6 mm AF Hex key), and carefully remove the lid of the 3002X receiver.
3. Referring to the graphic below, remove the rubber retaining straps from the clips holding the 2x Alkaline C Cells in place on the bottom of the unit.
4. Insert the replacement batteries, observing the correct polarity and replace the rubber retaining straps. Only use C Cell battery types. Always replace all of the batteries; **NEVER** use a mix of new and used batteries. **NEVER** mix brands of batteries.
5. Renew the silicone grease around the housing perimeter and carefully refit the lid of the 3002X. Secure in place with 14 off M8x25 cap screws (using a 6 mm AF Hex key), taking care not to use excessive force.
6. Switch on the Unit and check the battery level by holding down the "BATTERY TEST" button. The analogue meter should show full scale deflection.
7. Switch the 3002X unit off using the "ON/OFF" button. When the unit is off, there should be no deflection on the analogue meter and all LEDs should be off.



3002X HOUSING WITH COVER OPENED

6. ROUTINE MAINTENANCE AND STORAGE

Familiarise yourself with all of the rules for the safe operation of this equipment as described in Section 3 RULES FOR SAFE OPERATION.

Frequent inspections should be made. A schedule for maintenance checks should be generated according to the environment and frequency of use but should be regular enough to ensure the equipment continues to operate in the designed manner. It is recommended that it should be at least once a year.

External parts of the equipment should be periodically cleaned using fresh water to ensure that deposits are not allowed to accumulate. Avoid the use of aggressive chemicals.

Check flame paths / threads on the enclosure body and lid for signs of corrosion or damage. If badly pitted or damaged, replace the relevant component.

All components that are replaced must be in accordance with the manufacturers' specifications. Failure to use such components may invalidate the certification/approval and may make the equipment dangerous.

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

7. WARRANTY

Online products are guaranteed for one year from the date of purchase. Goods should be returned, transportation pre-paid, to Online Electronics Limited.

There is no charge for parts or labour should any product require repair due to a manufacturing deficiency during the guarantee period.

In the event of a manufacturing deficiency, the inward transportation costs will be repaid to the client.

8. DISPOSAL OF UNIT

Online Electronics Ltd takes its responsibilities under the WEEE Regulations extremely seriously and has taken steps 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 with 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 it correctly at the end of its life.

When buying a new product you will have the possibility to return, free of charge, another end of life product of equivalent type that has fulfilled the same functions as the supplied equipment. These items may be deposited at: Online Electronics Ltd, Woodburn Road, Blackburn Business Park, Blackburn, Aberdeen, AB21 0PS, UK.

Alternatively, to arrange a collection of any waste electrical equipment, obligated to OEL please telephone WeeeCare on **0844 800 2004**.

9. CERTIFICATION APPENDIX

EQUIPMENT: 3002X EM RECEIVER

MANUFACTURER: **Online Electronics Ltd**
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Blackburn Business Park
Blackburn
Aberdeen
AB21 0PS
UK
Tel: +44 (0) 1224 714 714
Web: www.online-electronics.com

SPECIAL CONDITIONS FOR SAFE USE:

1. The enclosure contains intrinsically safe circuits.
2. The enclosure contains batteries.
3. Wait 10 minutes before opening apparatus after disconnection.
4. Do not open when an explosive gas atmosphere may be present.
5. Replace only with ALKALINE 1.5V 7.8Ah C Cells (DURACELL INDUSTRIAL ID1400 recommended).
6. Replace only with fuse type 500mA, Quick Acting, 5x20mm.
7. Renew silicone grease every time cover is opened.

EQUIPMENT: 3003X EM ANTENNA

MANUFACTURER: **Online Electronics Ltd**
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NOTIFIED BODY NUMBER: 2812

ATEX CERTIFICATE: TRL 08 ATEX 21159X

MARKINGS:  II 2 G Ex ib IIC Gb T4

APPLICABLE STANDARDS: EN60079-0:2012+A11:2013
EN60079-11:2012

SPECIAL CONDITIONS FOR SAFE USE:

1. The equipment is only for connection to the Online Electronics 3002X EM Receiver (ATEX compliant device).
2. If connected to an Online Electronics 3002X EM Receiver, then the safety barrier which the 3003X antenna is connected to should be connected to the negative terminal of the 3002X battery and does not require an external earth connection. See EN60079-14 16.2.3.