

# Online ENGINE

## 1200 SERIES ACOUSTIC PINGER OPERATING MANUAL

The 1200 Series Pingers are high specification pingers used for pig tracking and other subsea marking and location Functions, intended for use in pipelines above 12"

Online Electronics Ltd  
Online House  
Blackburn Business Park  
Woodburn Road, Blackburn  
Aberdeen  
AB21 0PS  
UK  
+44 (0)1224 714 714  
[www.online-electronics.com](http://www.online-electronics.com)  
[sales@online-electronics.com](mailto:sales@online-electronics.com)



| <b>CONFIGURATION INFORMATION</b> |  |
|----------------------------------|--|
| MODEL:                           |  |
| SERIAL NUMBER:                   |  |
| FREQUENCY:                       |  |
| ACOUSTIC POWER:                  |  |
| PULSE LENGTH:                    |  |
| PING RATE 1 (DR/BWGP CLOSED):    |  |
| RATE 1 BATTERY LIFE AT +5°C:     |  |
| PING RATE 2 (DR/BWGP OPEN):      |  |
| RATE 2 BATTERY LIFE AT +5°C:     |  |
| SPECIFIED ON PRESSURE:           |  |
| SPECIFIED OFF PRESSURE:          |  |



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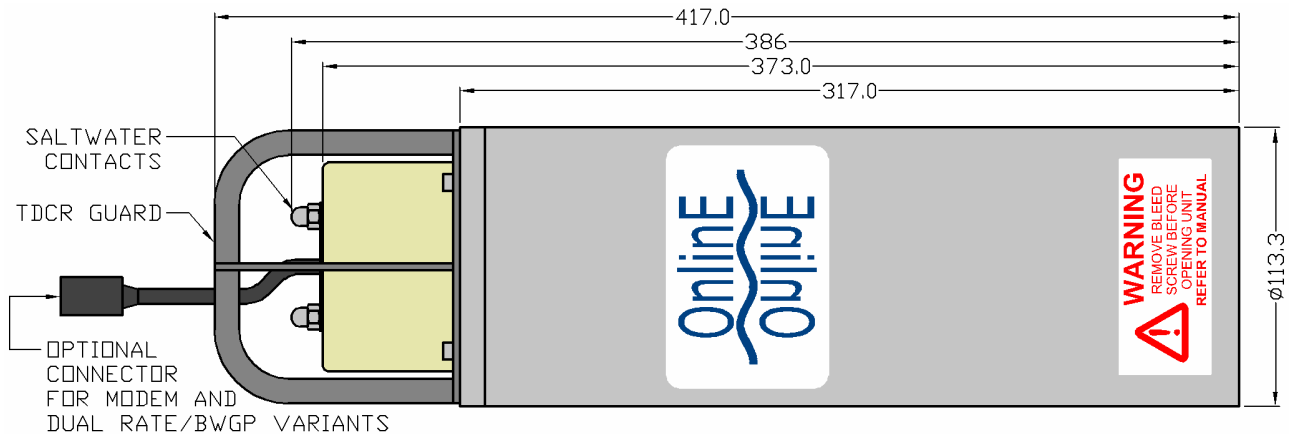
# 1. GENERAL DESCRIPTION

The 1200 Series Pingers are high specification, microprocessor controlled acoustic transmitters developed for use as advanced PIG transmitters and for other subsea marking and location functions.

A 1200 Series Pinger may be fitted to a PIG for use in offshore, fluid filled pipelines. The acoustic signal generated by the pinger is exceptionally powerful and stable and allows the PIG location to be established from the surface using an acoustic receiver and hydrophone (e.g. OEL 2001). The exact location can then be established using a directional receiver such as the diver operated OEL PR1, or ROV mounted OEL 2001RS/2401 system.

The 1200 Series Pingers are highly configurable and their performance and functionality can be tailored to meet specific customer requirements. For example, if two pingers are required to operate in close proximity to one another, different frequencies can be configured during manufacture to allow for differentiation between their transmissions.

The 1200 Series Pingers are capable of sending acoustic transmissions over several km, although the effective range is dependent upon the specific configuration, mounting arrangement, and environmental conditions.



**FIGURE 1: 1200 SERIES PINGER**

The standard 1200 Series model can produce up to 20W of acoustic power at a single operating frequency in the range of 9-18 kHz (configured at time of manufacture). In addition to the standard model, a number of alternative configurations are available that offer additional functionality and/or performance:

**MEDIUM AND HIGH FREQUENCY OPTIONS:** Medium frequency and high frequency options are available with frequencies in the range of 24-30 kHz and 30-40 kHz respectively (configured at time of manufacture).

**HIGH POWER OPTION:** High power configurations are available with an acoustic power output of 60W. This can provide an increase in range of between 10% and 25% dependent on the configured frequency.

**PRESSURE SWITCH OPTION:** 1200 Series Pingers can be configured with a mechanical pressure switch that can be used to activate the transmitter once the external pressure exceeds a set threshold value (typically 3 to 5 bar). For example, a 1200 Series Pinger configured with a pressure switch could be installed inside a 'wet' pipeline at atmospheric pressure, several weeks before it is required to activate. The Pinger would only activate once the pipeline internal pressure reached the threshold value.

**DUAL RATE/BWGP OPTION:** 1200 Series Pingers may be fitted with an MCIL6F connector that allows them to be interfaced with external equipment for use as long range, remote alarms. For example, a 1200 Series Pinger may be interfaced with an OEL BWGP (Break Wire Gauge Plate) and used to indicate damage to the BWGP over several km.

**MODEM OPTION:** 1200 Series Pingers may be fitted with an MCIL6F connector that allows them to be interfaced with external equipment for use as long range, robust, low data rate modems for remote monitoring applications. For example, a 1200 Series Pinger may be interfaced with an OEL 6000 subsea logger and used to transmit pressure readings every 1 minute over several km.

## 2. 1200 SERIES PINGER SPECIFICATIONS

**REFER TO THE PAGE 2 OF THIS MANUAL FOR THE SPECIFIC CONFIGURATION OF THE PINGER ACCOMPANYING THIS MANUAL.**

### GENERAL:

Battery Type..... Custom 31.5V Alkaline Battery Pack, BATT-11200  
 Acoustic Output Power .....20W ±3dB (High power 60W option available)  
 Range .....Up to 8km (Dependent on configuration, mounting and environmental conditions)  
 Beam Pattern..... Omni-directional ±3dB  
 Frequency ..... Pre-Configured within 9-18 kHz (24-30 kHz and 30-40 kHz options available)  
 Pulse Length .....1msec to 200msec  
 Ping Rate.....From 1 ping every second, to 1 ping every 10 seconds)  
 Operating Temperature Range .....-2°C to +54°C  
 External Pressure Rating ..... 3000m / 300bar  
 Weight in Air..... 11.5kg

### MATERIALS:

Housing material .....2205 DUPLEX STAINLESS STEEL  
 Endcap material .....2205 DUPLEX STAINLESS STEEL  
 Bleedscrew material..... 316 STAINLESS STEEL  
 Transducer material..... PEEK / PU  
 O-ring material .....NBR70

### 2.1. BATTERY LIFE EXAMPLES:

The following table shows the battery lifetimes for typical configurations of a 1200 Series Pinger at +5°C. Please note that the acoustic power, pulse length and ping rate all affect the battery life and can be tailored to meet specific project requirements. Please contact Online Electronics for more information.

| Ping Rate              | 20W              |                   | 60W              |                   |
|------------------------|------------------|-------------------|------------------|-------------------|
|                        | 5ms Pulse Length | 10ms Pulse Length | 5ms Pulse Length | 10ms Pulse Length |
| <b>1 Ping Every 1s</b> | 79 days          | 40 days           | 27 days          | 13 days           |
| <b>1 Ping Every 2s</b> | 152 days         | 79 days           | 53 days          | 27 days           |
| <b>1 Ping Every 3s</b> | 219 days         | 116 days          | 79 days          | 40 days           |
| <b>1 Ping Every 4s</b> | 279 days         | 152 days          | 104 days         | 53 days           |
| <b>1 Ping Every 5s</b> | 337 days         | 185 days          | 128 days         | 66 days           |

### **3. OPERATION**

**NOTE 1 - DO NOT EXPOSE THE UNIT TO AGGRESSIVE SOLVENTS OR CHEMICALS WHICH COULD BE HARMFUL TO THE HOUSING, PU TRANSDUCER, NITRILE RUBBER O-RINGS OR CONNECTORS.**

**NOTE 2 – THE UNIT SHOULD ONLY BE OPENED IN A CLEAN, DRY, LABORATORY ENVIRONMENT.**

**NOTE 3 - TO PREVENT THE FORMATION OF CONDENSATION WITHIN THE UNIT, ALLOW THE TEMPERATURE OF THE UNIT TO STABILISE WITHIN A 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.**

**NOTE 5 – ALL SUBSEA CONNECTIONS MUST BE TERMINATED OR BLANKED PRIOR TO DEPLOYMENT.**

#### **3.1. FUNCTION TEST**

An acoustic receiver system (such as the OEL 2001 Acoustic Receiver and hydrophone) is required in order to function test a 1200 Series Pinger. Note: Units with the pressure switch option cannot typically be function tested on-site, as they require external pressure to activate.

1. Ensure that the bleedscrew on the rear of the pinger is fitted, do not over-tighten.
2. Activate the pinger by closing the saltwater links using the mechanical link provided, or by simply bridging the links with bare fingers. Note: if using the mechanical link to bridge the contacts, the heat shrink will need to be removed beforehand. If the pinger frequency is approximately 20 kHz or less, then the acoustic transmission should be audible without using a receiver.
3. Set the frequency of the acoustic receiver system to match the frequency of the pinger (refer to Page 2 of this manual), set the receiver sensitivity to maximum and position the hydrophone approximately 30cm from the front of the pinger (in air). With the pinger activated, confirm that transmitted signal is being picked up by the acoustic receiver. If a 2001 Acoustic Receiver System is being used, the signal reading should be at approximately 50% of the maximum level.
4. Ensure that acoustic pulses are received by the acoustic receiver system at the correct ping rate (refer to Page 2 of this manual).
5. If a pinger with the Dual Rate/BWGP option is being tested, then either the first or second ping rate will be transmitted, depending on whether the DR/BWGP contact is open or grounded (for more information, see SECTION 3.6 below). If the wrong ping rate is being transmitted, this would suggest that the external equipment is either damaged or not connected properly. If this happens, contact OEL for advice before initiating any investigation process.

Disclaimer – Any investigation without taking advice could potentially damage the pinger/external equipment.

6. Providing the correct ping rate and signal level have been measured as above, then the system operation has been verified and the function test is complete.

## **3.2. IN PIG INSTALLATION**

The pinger transducer must be left protruding from the PIG body to minimise attenuation of the acoustic transmission.

1. Ensure that the bleedscrew on the rear of the pinger is fitted, do not over tighten.
2. Place the pinger within the cavity of the PIG and ensure that it is secure and cannot move around.
3. Wedging blocks of PU should be used as required to reduce any movement or vibration of the pinger within the pig. Note: The wedging blocks should only be in contact with the pinger body, not the transducer.
4. The transducer head must be protected against physical impact.
5. Ensure that there is adequate access for water to flood the saltwater links if the mechanical link is not going to be used.
6. If the pinger is fitted with an external connector then it MUST be terminated or blanked.

## **3.3. BATTERY REPLACEMENT**

Online Electronics assume a pessimistic battery capacity to calculate a stated battery lifetime which is typically 5% to 10% lower than what will be achieved during normal operation. Operating temperature will have a significant effect on the lifetime achieved. The lifetime achieved at +20°C will typically be at least 10% more than what will be achieved at +5°C.

1. The unit should only be opened in a clean, dry, laboratory environment.
2. To prevent the formation of condensation within the unit, allow the temperature of the unit to stabilise within the laboratory environment for a minimum of 6 hours prior to opening.
3. Remove the bleedscrew on the rear of the unit to relieve any internal pressure. Place the bleedscrew somewhere clean and safe, where it will not be lost or contaminated.
4. Remove the 2 off M5x12 countersunk screws holding the endcap onto the housing.
5. Carefully remove the endcap from the housing. Ensure that the O-ring seals are protected from damage and contamination while the unit is open.
6. Replace the battery pack. Ensure all wires are installed neatly and protected from accidental damage.
7. Examine the O-ring seals for any signs of damage or contamination. Replace and/or lubricate with silicone grease as necessary.
8. Ensure that all the O-rings are in place, refit the endcap to the housing and screw in the 2 off M5x12 countersunk screws.
9. Refit the bleedscrew taking care not to over-tighten.



### **3.4. DEPLOYMENT**

Prior to deployment, the following checks should be completed:

1. At least 24 hours prior to deployment, any personnel who are to be involved in the operation of the pinger should review this entire manual and be given time to practice operating the pinger and receiver system by completing a function test as described in SECTION 3.1 above. By familiarizing themselves with the system operation prior to deployment, the chances of a potentially costly operator error are greatly reduced.
2. Refer to Page 2 of this manual for the expected battery lifetime and ensure that it is adequate for the planned duration of operations.
3. Ensure that the bleedscrew on the rear of the unit is properly fitted (do not over-tighten).
4. If the pinger is fitted with an external connector then it must be terminated or blanked.
5. It is recommended that the pinger is activated by bridging the saltwater links with the mechanical link provided, however the pinger will activate if the saltwater links are flooded with a conducting fluid such as water. If using the mechanical link to bridge the contacts, the heat shrink will need to be removed beforehand.
6. Perform a function test using a 2001 Acoustic Receiver (See SECTION 3.1 above). Providing the function test has been completed successfully, deployment can proceed.

### **3.5. PRESSURE SWITCH**

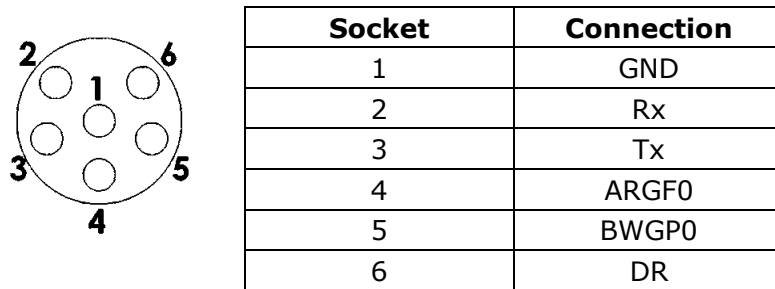
The 1200 Series (Pressure Switch) Pingers are fitted with a mechanical pressure switch (piston arrangement) which is configured at OEL to turn the unit ON or OFF when specified external pressure thresholds are crossed. Refer to the Page 2 of this manual for the pressure thresholds specified for this unit. Any applied pressure below the SPECIFIED OFF PRESSURE will guarantee that the unit will be OFF. Any applied pressure above the SPECIFIED ON PRESSURE will guarantee the unit will be ON. If a pressure between these two thresholds is applied then the unit may be ON or OFF. Note that all pressure thresholds are gauge pressures relative to atmospheric pressure (1bar absolute).

The pressure inlet is an M5 threaded hole visible on the outer circumference of the endcap and should not be blocked or covered.

The saltwater contacts on a pinger with a pressure switch are normally disconnected and thus do not need to be bridged for activation.

### 3.6. MCIL6 CONNECTOR

1200 Series Pingers with the Dual Rate, BWGP or Modem options incorporate an MCIL6 female subsea connector moulded into the transducer. The pinout for the MCIL6F is shown in FIGURE 2 below.



**FIGURE 2: CONNECTION SCHEME FOR STANDARD FEMALE MCIL6 CONNECTOR**

The MCIL6 connector allows a range of external equipment to be interfaced with the pinger. The pinger can then be used to perform a number of functions depending on its configuration and the nature of the external equipment. The following configurations are available:

#### 3.6.1. DR (DUAL RATE) CONFIGURATION

In this configuration, the pinger is programmed with two different ping rates and the external equipment uses the DR and GND pin to select between the two ping rates. If the DR contact is open, the pinger will transmit at Ping Rate 2, and if the DR contact is connected to ground, the transmitter will transmit at Ping Rate 1. Refer to Page 2 of this manual for the ping rates of the pinger supplied with this manual.

#### 3.6.2. BWGP (BREAK WIRE GAUGE PLATE) CONFIGURATION

In the BWGP configuration, the pinger is programmed with two different ping rates (as with the DR configuration) and is connected to an OEL BWGP via the BWGPO and GND pins on the MCIL6 connector. The BWGP is essentially a regular gauge plate with a closed loop of electrically conducting Break Wire embedded just inside its outer diameter. The gauge plate is designed such that the Break Wire will break when the gauge plate encounters a sufficiently large internal pipeline defect. Typically the BWGP will be designed to break with a radial deflection of the gauge plate of less than 1mm, depending on the design constraints. The pingers internal circuitry monitors the status of the BWGP and can detect a break in the wire, even if the gauge plate is flooded with saltwater. Once a break in the wire has been detected, the internal circuitry switches the pinger from Ping Rate 1 to Ping Rate 2 and latches in this state. Refer to the cover of this manual for the ping rates of the pinger supplied with this manual.

#### 3.6.3. MODEM CONFIGURATION

In the modem configuration, the external equipment is connected to the pinger via the Rx and GND pins. Whenever the external transmitter sends data to the pinger, the pinger transmits the data as a series of coded acoustic pulses.

## 4. ROUTINE MAINTENANCE AND STORAGE

**NOTE 1 - DO NOT EXPOSE THE UNIT TO AGGRESSIVE SOLVENTS OR CHEMICALS WHICH COULD BE HARMFUL TO THE HOUSING, PU TRANSDUCER, NITRILE RUBBER O-RINGS OR CONNECTORS.**

**NOTE 2 – THE UNIT SHOULD ONLY BE OPENED IN A CLEAN, DRY, LABORATORY ENVIRONMENT.**

**NOTE 3 - TO PREVENT THE FORMATION OF CONDENSATION WITHIN THE UNIT, ALLOW THE TEMPERATURE OF 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.**

**NOTE 5 – ALL SUBSEA CONNECTIONS MUST BE TERMINATED OR BLANKED PRIOR TO DEPLOYMENT.**

All Online Electronics Ltd products are designed to require 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 PU transducer, the nitrile rubber O-rings, 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 the battery pack disconnected.

## 5. WARRANTY

Online products are guaranteed for one year from the date of purchase. Goods should be returned; transportation prepaid, 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.

## 6. DISPOSAL OF UNIT

Online Electronics Ltd (OEL) 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 collected separately 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 opportunity 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, Online House, Blackburn Business Park, Woodburn Road, Aberdeen, AB21 0PS, UK.

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