Data Sheet

ORCA
Sonar System
Sludge and Settling Level Interface Monitoring

For more information, please visit >
www.hawkmeasurement.com
**Principle of Operation**

The ORCA Sonar Series transducer emits a high powered low frequency pulse, which is reflected from the interface density selected.

The reflected signal is processed using specially developed software algorithms, that eliminate lighter floating densities and stratified layers, allowing measurement of Bed or RAS levels. It can be calibrated to measure lighter densities such as the hindered / free settling layer & floc or one of the outputs could be used for a “Clarity” output, similar to a basic turbidity transmitter measuring solids in suspension.

**Function**

The ORCA Series Sonar, sludge blanket and interface controller, consists of a microprocessor based transmitter, with easy menu driven programming via keypad, PC or 3G modem. The ORCA controller works together with appropriate sonar transducer and transducer cleaning mechanism.

**Primary Areas of Application**

**Mining / Process:**

- Concentrate Thickeners
- Tailings Thickeners
- Hi-Rate Thickeners
- Paste Thickeners
- Deep Cone Thickeners
- Thickeners
- CCD’s
- Settling Ponds / Lagoons
- Water Treatment
- Carbon Columns.

**Features**

- Dual independent analogue outputs to track two different interfaces, or clarity simultaneously, with the one sonar sensor
- Easy calibration to track specific density interfaces, eg: floc / fluff layer - 1g/l, Bed 10g/l+
- Industrial scum cleaning mechanisms, that do not require maintenance
- No wiper blade assemblies
- Control room graphics of tanks and interfaces via GosHawk II
- Wide range of communications: Modbus, HART, Foundation Fieldbus, DeviceNet, Profibus DP and Profibus PA
- 3G remote support capability for calibration, commissioning or technical back-up
- 3 programmable relays.
Technological Breakthrough for ORCA Sonar Transducer Range

HAWK has released the “fourth generation” sonar transducers, designed to increase the overall power, penetration and calibration density range of thickeners and CCD’s. HAWK has recognized that when monitoring thickeners and CCD’s, further penetration of the Bed level interface was necessary, to provide a wider density calibration range for the sonar transmitter.

The ORCA sonar transducer will allow the following improved capability in Thickeners and CCD’s when monitoring Bed level.

1. Greater penetration through the clarified level & the free settling zone
2. Penetration into the hindered settling zone dependent on frequency
3. The compacted zone can also be monitored using the second analogue output or one of the communication options.

The ORCA sonar transmitter can monitor two (2) different densities from one sonar transducer simultaneously - typically bed level and the hindered / settling density to be targeted with chemical dosing.

Mining Thickener

Typical Bed Level Control

**Typical Applications**

<table>
<thead>
<tr>
<th>Area</th>
<th>Functions</th>
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</thead>
<tbody>
<tr>
<td>Mining / Mineral processing</td>
<td>Blanket level / clarity suspended solids / stratified floc layers</td>
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<tr>
<td>Clarifier Tank</td>
<td>Sludge bed level / clarity suspended solids / stratified floc layers</td>
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<tr>
<td>Thickener Tank</td>
<td>Sludge bed level / clarity suspended solids / stratified floc layers</td>
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<tr>
<td>CCD’s Tank</td>
<td>Sludge bed level / clarity suspended solids / stratified floc layers</td>
</tr>
<tr>
<td>Settling Ponds</td>
<td>Sludge bed level</td>
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<tr>
<td>Industrial (food, paper etc.)</td>
<td>Sludge blanket level</td>
</tr>
<tr>
<td>Primary Sedimentation Tank</td>
<td>RAS blanket level / clarity suspended solids / rag / pin floc layer</td>
</tr>
<tr>
<td>Secondary Clarifier Tank</td>
<td>Sludge bed level / clarity suspended solids / floc level</td>
</tr>
<tr>
<td>Thickener Tank</td>
<td>Sludge bed level / floating sludge level</td>
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<tr>
<td>“DAF” Tank</td>
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<tr>
<td>Sequential Batch Reactor (SBR)</td>
<td>Setting blanket level / RAS bed level</td>
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<tr>
<td>Carbon Column</td>
<td>Carbon bed level</td>
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</tbody>
</table>
Remote Enclosure

Rail Base Plate

ORCA Remote Wiring

Consult user manual for additional dimensional & wiring options
**ORCA Remote Electronics**

**OSIR**
- Sonar Level Transmitter, 3 relay alarms, Modbus
- Power Supply
  - B 24-30 VDC
  - D 90-250VAC and 24-30VDC

**Additional Communications**
- X 1 x 4-20mA
- Y 2 x 4-20mA
- I 1 x 4-20mA, HART
- J 2 x 4-20mA, HART
- E 2 x 4-20mA with Modbus over Ethernet
- B 2 x 4-20mA with Modbus over Bluetooth
- R 2 x 4-20mA with Modbus over Wi-Fi
- W Modbus
- P Profibus DP
- A Profibus PA
- F Foundation Fieldbus
- D DeviceNet
- X This field is intentionally left blank

**Remote Sonar Transducer**

**OSIRT**
- ORCA Sonar Transducer

**Transducer Strength**
- 3 Industrial / Mining

**Transducer Frequency**
- 02 (150kHz)

**Facing & Housing material**
- SH Full fiberglass high temperature version (max. 80°C 180°F)

**Approval Standard**
- X Not Required

**Connection**
- C IP68 Sealed with cable
  - 6 6m cable
  - 15 15m cable
  - 30 30m cable
  - 50 50m cable
- FRP Full transducer / pole FRP fibreglass encapsulation (requires OSIRMELxH) consult factory

**Mounting Extension Pipe**

**Mounting Extension**

**OSIRMEL**  Mounting Extension Stainless Steel Pipe

<table>
<thead>
<tr>
<th>Length</th>
<th>Description</th>
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<tbody>
<tr>
<td>2</td>
<td>2 meters</td>
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<tr>
<td>3</td>
<td>3 meters</td>
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<tr>
<td>4</td>
<td>4 meters</td>
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<tr>
<td>5</td>
<td>5 meters</td>
</tr>
<tr>
<td>H</td>
<td>Full transducer / pole FRP fibreglass encapsulation (consult factory)</td>
</tr>
</tbody>
</table>

**Automatic Scum Cleaner**

**OSIRSC**  Automatic Scum Cleaner

**Type**
- A Electric Actuator plus Mounting Bracket Kit
- D Floating Sonar. Electric Actuator plus Mounting Bracket Kit and Float
- E Impact Plate Dual Direction plus Mounting Bracket Kit
- S Jet spray cleaner kit with solenoid
- K Jet spray cleaner kit with solenoid plus Mounting Bracket Kit
- G Mounting Bracket Kit only

© ORCA Remote Electronics are fully compatible with Sultan Sonar Transducer models for lighter interface measurement with higher frequencies. Consult Sultan Sonar datasheet for more information.
CSA Approved Remote Sonar Transducer

AWRTSH  ORCA Sonar Transducer

Transducer Strength
3  Industrial / Mining

Transducer Frequency
02  (150kHz)

Facing & Housing material
SH Full fiberglass high temperature version
(max. 80°C 180°F)

Approval Standard
RN  CSA Class I; Div 1/2; Group D; Zone 0; AEx/Ex ia IIA; T4

Connection
C  IP68 Sealed with cable
   6  6m cable
   15 15m cable
   30 30m cable
   50 50m cable
   XXXX Not Required

Accessories / Parts

HAWKLINK USB PC connector for GosHawkII
HAWKLINK-USB

Stainless Steel Sunhood
SUNHOOD

Extra Cable (Belden 3084A)
CA-TXCC-R-C15  15m cable
CA-TXCC-R-C30  30m cable
CA-TXCC-R-C50  50m cable
CA-TXCC-R-C100 100m cable

Mounting Pipe - Transducer connection adapter
ADP-SS-SA-TC

Typical Complete System

1 x OSIRDYX  Remote Transmitter
1 x OSIRT302SHXC6  Remote Transducer
1 x OSIRSCA  Auto Scum Cleaner with Mounting Bracket Kit
1 x OSIRMEL3  Mounting Extension Pipe
Specifications

ORCA Sonar System

**Sonar Frequency Selection**
- 150kHz

**Operating Voltage**
- 90 - 260Vac 50 / 60Hz
- 24Vdc (min. 5A supply)
- Residual ripple no greater than 100mV.

**Power Consumption**
- <10VA @ 240Vac
- <10W @ 24Vdc.

**Analogue Output**
- Either single or dual analogue
- 1 x 4-20mA (isolated) 600 ohms max.
- 1 x 4-20mA (non isolated) 600 ohms max.

**Communications**
- GosHawk, HART, Modbus, Profibus DP, DeviceNet, Foundation Fieldbus, Profibus PA.

**Relay Output**
- 3 x s.p.d.t. 0.5amp / 240vac
- Form c. type non-inductive load
- Fully programmable.

**Maximum Range**
- 25 meters.

**Blanking Distance**
- 450mm: 150kHz.

**Resolution**
- 1mm.

**Accuracy**
- +/- 0.25%

**Operating Temperature**
- Remote Electronics: -40°C to 70°C
- Sonar Transducer FRP Fibreglass: -40°C to 80°C.
- Electronic Actuator: 0°C to 80°C (recommend cover / heating for sub zero environments).

**Transducer / Transmitter Separation**
- >500m
Note: Must be BELDEN 3084A

**Actuator / Transmitter Separation**
- Consult ORCA Manual for wiring information

**Cable (Sonar Transducer)**
- BELDEN 3084A.

**Sealing**
- Remote Electronics IP67
- Remote Transducer IP68.

**Cable Entries**
- Remote Electronics: 3 x 20mm 1 x 16mm.

**Typical Weight**
- Remote Electronics 1kg
- Remote Transducer 1kg
- Cleaning Mechanism 5kg.

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Additional product warranty and application guarantees upon request.
Technical data subject to change without notice.