A Higher Level of Performance

Sultan Acoustic Wave Series

Level, Flow, Positioning, Collision Protection

Data Sheet

Sultan
Acoustic Wave Series

Level, Flow, Positioning, Collision Protection

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

The SULTAN 234 emits a high powered Acoustic Wave transmit pulse which is reflected from the surface of the material being measured. The reflected signal is processed using specially developed software to enhance the correct signal and reject false or spurious echoes.

The transmission of high powered Acoustic Waves ensures minimal losses through the environment where the sensor is located. Due to the high powered emitted pulse, any losses have far less effect than would be experienced by traditional ultrasonic devices. More energy is transmitted hence more energy is returned. Advanced receiver circuitry is designed to identify and monitor low level return signals even when noise levels are high. The measured signal is temperature compensated to provide maximum accuracy to the outputs and display.

Function

The Sultan 234 is a non intrusive Acoustic Wave transmitter with flexibility, used for measuring level of liquids, slurries and solids.

Universal Supply

- 2 Wire Loop Powered
- 3 Wire DC
- 4 Wire AC / DC.

Certifications

ATEX, IECEx, CE, CSA.

Primary Areas of Application

- Dirty / dusty / build up prone applications
- Self Cleaning sensor face requires no maintenance.
- Water / Wastewater:
  - River Level, Wet Wells, Inlet Screens, Tanks, Sumps, Pump Stations, Water Towers, Dams, Basin Levels, Chemical Storage.
- Mining:
  - Crushers, Surge Bins, Ore Passes, Conveyor Profile, Blocked Chute, Stockpile, Stackers, Reclaimers, Storage Silos, etc.
- Power Stations:
  - Boiler Bunkers, Raw Coal Bunkers, Ash Pits, Fly Ash Silos, etc.
- Others:
  - Food, Cement, Plastics, Grain, Chemicals, Paper, Irrigation, Quarries.

Features

- Non contact measurement
- High Power even with two wire loop supply
- Low cost per point
- Wide range of communications: GosHawk, HART, Profibus PA, Profibus DP, Foundation Fieldbus, DeviceNet, Modbus over Ethernet TCP/IP, Wi Fi
- Pump Control x5 pumps
- Auto compensation for dust, steam and losses
- Protection class IP67, NEMA 4x (IP68 Transducer)
- Programmable fail safe mode
- 3G remote setup options / configuration
- Differential and average level control (2 transducers).
Typical Applications
Sultan Acoustic Wave Series

Conical Shape Vessels
Horizontal Cylindrical / Tanks
Stockpiles, Stackers, Reclaimers

Solids Vessels
High / Low / Continuous level
(Granular / Powder)

Storage Tanks
High / Low / Continuous level
(Liquid / Chemical)

Sewage Wet Well
High / Low / Continuous level
Up to 5 Pumps

Conveyed, pneumatic air slide
Optional Remote 3G
Remote Amplifier
IP68 Sensor
Flood Hood

Typical Applications
Sultan Acoustic Wave Series
All cones must protrude into the main volume of the vessel by at least 50 mm (2 inches) past the lower end of the mounting nozzle.

### Cone / Transducer Dimensions Table

<table>
<thead>
<tr>
<th>Sensor Frequency</th>
<th>Selected Flange</th>
<th>A (mm)</th>
<th>B (mm)</th>
<th>C (mm)</th>
<th>D (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 kHz</td>
<td>10”</td>
<td>236</td>
<td>10.0</td>
<td>455</td>
<td>17.9</td>
</tr>
<tr>
<td>10 kHz</td>
<td>10”</td>
<td>236</td>
<td>10.0</td>
<td>455</td>
<td>17.9</td>
</tr>
<tr>
<td></td>
<td>8”</td>
<td>195</td>
<td>8.0</td>
<td>280</td>
<td>11.1</td>
</tr>
<tr>
<td>15 kHz</td>
<td>10”</td>
<td>236</td>
<td>10.0</td>
<td>455</td>
<td>17.9</td>
</tr>
<tr>
<td></td>
<td>8”</td>
<td>195</td>
<td>8.0</td>
<td>280</td>
<td>11.1</td>
</tr>
<tr>
<td>20 / 30 kHz</td>
<td>4”</td>
<td>98.5</td>
<td>4.0</td>
<td>280</td>
<td>11.0</td>
</tr>
<tr>
<td>30 / 40 / 50 kHz</td>
<td>4”</td>
<td>98.5</td>
<td>4.0</td>
<td>280</td>
<td>11.0</td>
</tr>
</tbody>
</table>

### Standard ANSI/DN/JIS Flange Dimensions

<table>
<thead>
<tr>
<th>Size</th>
<th>Flange Type</th>
<th>E (PCD)</th>
<th>F (OD)</th>
<th>G (ID)</th>
<th>H (Hole)</th>
<th>No. Holes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td></td>
</tr>
<tr>
<td>4”</td>
<td>FA4 ANSI class 150</td>
<td>190.5</td>
<td>7.5</td>
<td>229</td>
<td>9.0</td>
<td>100 4</td>
</tr>
<tr>
<td></td>
<td>FD4 DIN100 PN10/16</td>
<td>180</td>
<td>7.1</td>
<td>220</td>
<td>8.7</td>
<td>100 4</td>
</tr>
<tr>
<td></td>
<td>FJ4 JIS B2220-1984 10kg</td>
<td>175</td>
<td>6.9</td>
<td>210</td>
<td>8.4</td>
<td>100 4</td>
</tr>
<tr>
<td>6”</td>
<td>FA6 ANSI class 150</td>
<td>241.5</td>
<td>9.5</td>
<td>279</td>
<td>11.0</td>
<td>150 6</td>
</tr>
<tr>
<td></td>
<td>FD6 DIN150 PN10</td>
<td>240</td>
<td>9.4</td>
<td>285</td>
<td>11.2</td>
<td>150 6</td>
</tr>
<tr>
<td></td>
<td>FJ6 JIS B2220-1984 10kg</td>
<td>240</td>
<td>9.4</td>
<td>280</td>
<td>11.0</td>
<td>150 6</td>
</tr>
<tr>
<td>8”</td>
<td>FA8 ANSI class 150</td>
<td>298.5</td>
<td>11.8</td>
<td>343</td>
<td>13.5</td>
<td>200 8</td>
</tr>
<tr>
<td></td>
<td>FD8 DIN200 PN10</td>
<td>295</td>
<td>11.6</td>
<td>340</td>
<td>13.4</td>
<td>200 8</td>
</tr>
<tr>
<td></td>
<td>FJ8 JIS B2220-1984 10kg</td>
<td>290</td>
<td>11.4</td>
<td>330</td>
<td>13.0</td>
<td>200 8</td>
</tr>
<tr>
<td>10”</td>
<td>FA10 ANSI class 150</td>
<td>362</td>
<td>14.3</td>
<td>406</td>
<td>16.0</td>
<td>250 10</td>
</tr>
<tr>
<td></td>
<td>FD10 DIN200 PN10</td>
<td>350</td>
<td>13.7</td>
<td>395</td>
<td>16.0</td>
<td>250 10</td>
</tr>
<tr>
<td></td>
<td>FJ10 JIS B2220-1984 10kg</td>
<td>355</td>
<td>14.0</td>
<td>400</td>
<td>15.7</td>
<td>250 10</td>
</tr>
</tbody>
</table>
### Dimensions & Wiring Diagrams

**Sultan Acoustic Wave Series**

#### Remote Amplifier

![Remote Amplifier Diagram](image)

#### AWR Remote Transmitter

**AWR2**

- **COMNO**
- **RELAY 1**
- **RELAY 2**
- **RELAY 3**
- **RELAY 4**
- **RELAY 5**

**COMMS**

- 4-20mA
- TRANSDUCER
- **AC-In**

Sourcing 4-20mA from Sultan

Sinking 4-20mA from user device

*AC-In is replaced by 36-60VDC with Power Input Option 'C'.*

**AWR234**

- **COMNO**
- **RELAY 1**
- **RELAY 2**
- **RELAY 3**
- **RELAY 4**
- **RELAY 5**

**COMMS**

- 4-20mA
- TRANSDUCER
- **AC-In**

Sourcing 4-20mA from Sultan

Sinking 4-20mA from user device

*AC-In is replaced by 36-60VDC with Power Input Option 'C'.*

#### AWI Integral Transmitter

**AWI234**

- **COMMS**
- **RELAY 1**
- **RELAY 2**

**COMNO**

- 4-20mA
- TRANSDUCER
- **AC-In**

Sourcing 4-20mA from Sultan

Sinking 4-20mA from user device

**AWI2**

- **COMNO**
- **RELAY 1**
- **RELAY 2**

**COMMS**

- 4-20mA
- TRANSDUCER
- **AC-In**

Sourcing 4-20mA from Sultan

Sinking 4-20mA from user device

**Sultan Remote Units With Ethernet**

- **Unit with External Ethernet Connector**
- **Unit with Internal Ethernet Connector**

**AWI**

- **COMMS**
- **RELAY 1**
- **RELAY 2**

**COMNO**

- 4-20mA
- TRANSDUCER
- **AC-In**

Sourcing 4-20mA from Sultan

Sinking 4-20mA from user device
## Sultan Remote Transmitter

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWR2</td>
<td>Remote 2 Wire, No relays, 12-30VDC only, Modbus</td>
</tr>
<tr>
<td>AWR234</td>
<td>Remote 2 / 3 / 4 Wire, 5 relays, Modbus</td>
</tr>
</tbody>
</table>

### Housing

<table>
<thead>
<tr>
<th>S</th>
<th>Polycarbonate</th>
</tr>
</thead>
</table>

### Power Supply

<table>
<thead>
<tr>
<th>B</th>
<th>12-30VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>36-60VDC</td>
</tr>
<tr>
<td>U1</td>
<td>12-30VDC and 90-260VAC</td>
</tr>
</tbody>
</table>

### Additional Communications

<table>
<thead>
<tr>
<th>S1</th>
<th>No additional communication (5 relays, Modbus)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>4-20mA analogue</td>
</tr>
<tr>
<td>H2</td>
<td>4-20mA analogue with HART 2 wire</td>
</tr>
<tr>
<td>I1</td>
<td>4-20mA analogue with HART Isolated 4 wire</td>
</tr>
<tr>
<td>A</td>
<td>Profibus PA</td>
</tr>
<tr>
<td>P1</td>
<td>Profibus DP</td>
</tr>
<tr>
<td>F</td>
<td>Foundation Fieldbus</td>
</tr>
<tr>
<td>D1</td>
<td>DeviceNet</td>
</tr>
<tr>
<td>E1</td>
<td>4-20mA with Modbus over Ethernet TCP/IP</td>
</tr>
<tr>
<td>G1</td>
<td>4-20mA with Modbus over Wi-Fi</td>
</tr>
</tbody>
</table>

*This option is no longer available*

| X  | Option no longer available                                                  |

### Approval Standard

<table>
<thead>
<tr>
<th>X</th>
<th>Not Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>i0</td>
<td>IECEx Zone 0 Ex ia IIA T4 IP67 Tamb -20°C to 70°C</td>
</tr>
<tr>
<td>A0</td>
<td>ATEX Grp II Cat 1 GD IP67 EEx ia IIA T4</td>
</tr>
<tr>
<td>i20</td>
<td>IECEx Zone 20 DIP A20 TA85C IP68 Tamb -20°C to 75°C</td>
</tr>
<tr>
<td>A20</td>
<td>ATEX Grp II Cat 1 D T85°C IP67 Tamb -20°C to 75°C</td>
</tr>
<tr>
<td>A22</td>
<td>ATEX Grp II Cat 3 GD T85°C IP67 Tamb -40°C to 70°C</td>
</tr>
<tr>
<td>GP</td>
<td>CSA Equip Class 2; Pollution deg 2; Tamb -20°C to 75°C (Ordinary Locations)</td>
</tr>
<tr>
<td>RN</td>
<td>CSA Class I; Div 1/2; Group D; Zone 0; AEx / Ex ia IIA; T4</td>
</tr>
</tbody>
</table>

### Position Slave / Crane Master

<table>
<thead>
<tr>
<th>X</th>
<th>Not Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS</td>
<td>Position Slave</td>
</tr>
<tr>
<td>CM</td>
<td>Crane Master</td>
</tr>
</tbody>
</table>

**AWR234**

<table>
<thead>
<tr>
<th>S</th>
<th>U</th>
<th>X</th>
<th>X</th>
<th>X</th>
<th>X</th>
<th>X</th>
</tr>
</thead>
</table>

1. Model AWR234 only
2. Model AWR2 only
3. Model AWR2 only. Communication Option W, X, H only
4. Power supply option ‘B’ only
Sultan Remote Transducer 3” and 3.5”

Model
AWRT  Acoustic Wave Remote Transducer

Transducer Frequency

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 kHz</td>
<td>30 kHz for applications up to 15 m for 3” (Cone required[^1])</td>
</tr>
<tr>
<td>20 kHz</td>
<td>20 kHz for applications up to 20 m, 3” only (Cone required[^1])</td>
</tr>
<tr>
<td>15 kHz</td>
<td>15 kHz for applications up to 30 m, 3” only (Cone required[^1])</td>
</tr>
<tr>
<td>10 kHz</td>
<td>10 kHz for applications up to 40 m, 3.5” only (Cone required[^1])</td>
</tr>
<tr>
<td>9 kHz</td>
<td>9 kHz Positioning / Position Slave applications up to 180 m (Cone required[^1])</td>
</tr>
<tr>
<td>5 kHz</td>
<td>5 kHz for applications up to 60 m, 3.5” only (Cone required[^1])</td>
</tr>
<tr>
<td>4 kHz</td>
<td>4 kHz Positioning / Position Slave applications up to 180 m (Cone required[^1])</td>
</tr>
</tbody>
</table>

Process Temperature - Facing Material Selection

<table>
<thead>
<tr>
<th>Material</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyolefin</td>
<td>80°C (176°F)</td>
</tr>
<tr>
<td>Teflon</td>
<td>80°C (176°F)</td>
</tr>
<tr>
<td>Titanium</td>
<td>80°C (176°F)</td>
</tr>
</tbody>
</table>

Transducer Housing Material

<table>
<thead>
<tr>
<th>Material</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Polypropylene</td>
<td>4</td>
</tr>
</tbody>
</table>

Back Cap Mounting Thread Standards

<table>
<thead>
<tr>
<th>Standard</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>Not Required (Standard Flange Mount)</td>
</tr>
<tr>
<td>TB</td>
<td>BSP</td>
</tr>
</tbody>
</table>

Back Cap Mounting Thread Sizes

<table>
<thead>
<tr>
<th>Size</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>30^a</td>
<td>3” BSP</td>
</tr>
<tr>
<td>50^a</td>
<td>3.5” BSP</td>
</tr>
</tbody>
</table>

Approval Standard

<table>
<thead>
<tr>
<th>Standard</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>Not Required</td>
</tr>
<tr>
<td>I0</td>
<td>IECEx Zone 0 Ex ia IIA T4 IP67 Tamb -20°C to 70°C</td>
</tr>
<tr>
<td>A0</td>
<td>ATEX Grp II Cat 1 GD IP67 EEEx ia IIA T4</td>
</tr>
<tr>
<td>I1</td>
<td>IECEx Zone 1 Ex mb II IP68 T5(Tamb -20°C to 65°C) T6(Tamb -20°C to 50°C)</td>
</tr>
<tr>
<td>A1</td>
<td>ATEX Grp II Cat 2 GD EEEx m II IP68 T5(Tamb -20°C to 65°C) T6(Tamb -20°C to 50°C)</td>
</tr>
<tr>
<td>I20</td>
<td>IECEx Zone 20 DIP A20 TA85C IP68 Tamb -20°C to 75°C</td>
</tr>
<tr>
<td>A20</td>
<td>ATEX Grp II Cat 1 D T85°C IP67 Tamb -20°C to 75°C</td>
</tr>
<tr>
<td>A22</td>
<td>ATEX Dust (Grp II Cat 3 D T85C IP67)</td>
</tr>
<tr>
<td>GP</td>
<td>CSA Equip Class 2; Pollution deg 2; Tamb -20°C to 75°C (Ordinary Locations)</td>
</tr>
<tr>
<td>RN</td>
<td>CSA Class I; Div 1/2; Group D; Zone 0; AEEx / Ex ia IIA; T4</td>
</tr>
<tr>
<td>KN</td>
<td>CSA Class II; Div 2; Group F&amp;G; Class III; T6 T85 for Tamb -20°C to 75°C</td>
</tr>
<tr>
<td>QN</td>
<td>CSA Class II; Div 1; Group E, F&amp;G; Ex mb II; T5(T100) for Tamb -20°C to 65°C; T6(T85) for Tamb -20°C to 50°C</td>
</tr>
</tbody>
</table>

Connection

<table>
<thead>
<tr>
<th>Connection</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>IP68 Sealed unit with cable</td>
</tr>
</tbody>
</table>

Cable Length

<table>
<thead>
<tr>
<th>Length</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 m</td>
<td>6 m cable</td>
</tr>
<tr>
<td>15 m</td>
<td>15 m cable</td>
</tr>
<tr>
<td>30 m</td>
<td>30 m cable</td>
</tr>
<tr>
<td>50 m</td>
<td>50 m cable</td>
</tr>
</tbody>
</table>

Mounting Accessories

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>Not Required</td>
</tr>
<tr>
<td>CS^a</td>
<td>End Cap Cable Suspension</td>
</tr>
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</table>

Software Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>Not Required</td>
</tr>
<tr>
<td>FP^a</td>
<td>Fast Pulsing</td>
</tr>
<tr>
<td>PS</td>
<td>Position Slave (Requires Position Slave Amplifier)</td>
</tr>
</tbody>
</table>

Part Numbering

Sultan Acoustic Wave Series

---

[^1]: See Transducer / Cone / Flange combination table
[^2]: Transducer Frequency 04, 05, 09, 10 only
[^3]: Transducer Frequency 10, 15, 20, 30 only
[^4]: Transducer Frequency 15 only
[^5]: Transducer Frequency 15, 20, 30 only
[^6]: Transducer Frequency 04, 05, 09, 10
[^7]: Transducer Frequency 30, 20 only
### Sultan Remote Transducer 2"

<table>
<thead>
<tr>
<th>Model</th>
<th>AWRT</th>
<th>Acoustic Wave Remote Transducer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transducer Frequency</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 50             | 50kHz | for liquid applications up to 5m (Cone required)
| 40             | 40kHz | for liquid applications up to 7m (Cone required)
| 30             | 30kHz | for liquid applications up to 11m (Cone required)

**Process Temperature - Facing material selection**

- T: Tefzel 80°C (176°F)

<table>
<thead>
<tr>
<th>Transducer Housing Material</th>
<th>6</th>
<th>Tefzel</th>
</tr>
</thead>
</table>

**Thread Standard**

- TB: BSP
- TN: NPT

**Thread Size**

- 20: 2” thread

**Approval Standard**

- X: Not Required
- i0: IECEx Zone 0 Ex ia IIA T4 IP67 Tamb -20°C to 70°C
- A0: ATEX Gp II Cat 1 GD IP67 EEx ia IIA T4
- i1: IECEx Zone 1 Ex mb II IP68 T5(Tamb -20°C to 65°C) T6(Tamb -20°C to 50°C)
- A1: ATEX Gp II Cat 2 GD EEx m II IP68 T5(Tamb -20°C to 65°C) T6 (Tamb -20°C to 50°C)
- i20: IECEx Zone 20 DIP A20 TA85C IP68 Tamb -20°C to 75°C
- A20: ATEX Gp II Cat 1 D T85°C IP67 Tamb -20°C to 75°C
- A22: ATEX Gp II Cat 3 GD T85°C IP67 Tamb -40°C to 70°C
- GP: CSA Equip Class 2; Pollution deg 2; Tamb -20°C to 75°C (Ordinary Locations)
- RN: CSA Class I; Div 1/2; Group D; Zone 0; AEx/Ex ia IIA; T4
- KN: CSA Class II; Div 2; Group F&G; Class III; T6 T85 for Tamb -20°C to 75°C
- QN: CSA Class II; Div 1; Group E, F&G; Ex mb II; T5(T100) for Tamb -20°C to 65°C; T6(T85) for Tamb -20°C to 50°C

**Connection**

- C: IP68 Sealed unit with cable

<table>
<thead>
<tr>
<th>Cable Length</th>
<th>6m cable</th>
<th>15m cable</th>
<th>30m cable</th>
<th>50m cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>6</td>
<td>15</td>
<td>30</td>
<td>50</td>
</tr>
</tbody>
</table>

**Mounting Accessories**

- X: Not Required
- CS: Cable Suspension on end cap

**Software Options**

- X: Not Required

<table>
<thead>
<tr>
<th>Model</th>
<th>AWRT</th>
<th>T</th>
<th>6</th>
<th>TB</th>
<th>20</th>
<th>X</th>
<th>6X</th>
<th>X</th>
<th>X</th>
</tr>
</thead>
</table>

1 See 'Transducer / Cone / Flange combination table
Sultan Integral 3” and 3.5”

**Model**
- AWI2  Integral 2 Wire, No relays, Modbus
- AWI234  Integral 2 / 3 / 4 Wire, 2 relays, Modbus

**Housing**
- S  Valox 357U

**Power Supply**
- B  12-30VDC
- U¹ 12-30VDC and 90-260VAC

**Transducer Frequency**
- 30  30kHz for applications up to 11m for 2” and 15m for 3” (Cone required⁶)
- 20  20kHz for applications up to 20m, available in 3” only (Cone required⁶)
- 15  15kHz for applications up to 30m, available in 3” only (Cone required⁶)
- 10  10kHz for applications up to 40m, available in 3.5” only (Cone required⁶)
- 09  9kHz for Positioning / Position Slave applications up to 180m (Cone required⁶)
- 05  5kHz for applications up to 60m, available in 3.5” only (Cone required⁶)
- 04  4kHz for Positioning / Position Slave applications up to 180m (Cone required⁶)

**Process Temperature - Facing material selection**
- S²  Polyolefin 80°C (176°F)
- T³  Teflon 80°C (176°F)
- Y⁴  Titanium 80°C (176°F)

**Transducer Housing Material**
- 4  Polypropylene

**This option is no longer available**
- X  Option no longer available

**Additional Communication**
- S¹  No additional communications (2 relays, Modbus)
- X  4-20mA analogue
- H⁵  4-20mA analogue with HART 2 wire
- I¹  4-20mA analogue with HART Isolated 4 wire
- A  Profibus PA
- F  Foundation Fieldbus

**Approval Standard**
- X  Not Required
- i0⁶  IECEx Zone 0 Ex ia IIA T4 IP67 Tamb -20°C to 70°C
- A0⁶  ATEX Grp II Cat 1 GD IP67 EEEx ia IIA T4
- i20⁶  IECEx Zone 20 DIP A20 TA85C IP68 Tamb -20°C to 75°C
- A20⁶  ATEX Grp II Cat 1 D T85°C IP67 Tamb -20°C to 75°C
- A22  ATEX Grp II Cat 3 GD T85°C IP67 Tamb -40°C to 70°C

**Software Options**
- X  Not Required

| AWI234 | S | U | 10 | S | 4 | X | X | X | X | X | X |

¹ Model AWI234 only
² Transducer Frequency 04, 05, 09, 10 only
³ Transducer Frequency 10, 15, 20, 30 only
⁴ Transducer Frequency 15 only
⁵ Model AWI2 only. Communication Option W, X, H only
⁶ See Transducer / Cone / Flange combination table
**Sultan Integral 2”**

**Model**
- AWI2: Integral 2 Wire, No relays, 12-30VDC only, Modbus
- AWI234: Integral 2 / 3 / 4 Wire, 2 relays, Modbus

**Housing**
- S: Valox 357U

**Power Supply**
- B: 12-30VDC
- U: 12-30VDC and 90-260VAC

**Transducer Frequency**
- 50 kHz for liquid applications up to 5m (Cone required)
- 40 kHz for liquid applications up to 7m (Cone required)
- 30 kHz for liquid applications up to 11m (Cone required)

**Process Temperature - Facing material selection**
- T: Tefzel 80°C (176°F)

**Transducer Housing Material**
- 6: Tefzel

**Thread Standards**
- TB: BSP
- TN: NPT

**Mounting Thread Sizes**
- 20: 2” thread

**Additional Communication**
- S: No additional communications (2 relays, Modbus)
- X: 4-20mA analogue
- H: 4-20mA analogue with HART 2 wire
- I: 4-20mA analogue with HART Isolated 4 wire
- A: Profibus PA
- F: Foundation Fieldbus

**Approval Standard**
- X: Not Required
- i0: IECEx Zone 0 Ex ia IIA T4 IP67 Tamb -20°C to 70°C
- A0: ATEX Grp II Cat 1 GD IP67 EEx ia IIA T4
- i20: IECEx Zone 20 DIP A20 TA85C IP68 Tamb -20°C to 75°C
- A20: ATEX Grp II Cat 1 D T85°C IP67 Tamb -20°C to 75°C
- A22: ATEX Grp II Cat 3 GD T85°C IP67 Tamb -40°C to 70°C

**Software Options**
- X: Not Required

---

AWI234 S U 40 T 6 TB 20 X X X

---

1. Model AWI234 only
2. Model AWI2 only
3. Model AWI2 only. Communication Option W, X, H only
4. See Transducer / Cone / Flange combination table
### Flange Selection

<table>
<thead>
<tr>
<th>F</th>
<th>Flange Dimension Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>ANSI</td>
</tr>
<tr>
<td>D</td>
<td>DN</td>
</tr>
<tr>
<td>J</td>
<td>JIS</td>
</tr>
</tbody>
</table>

#### Flange Sizes
- **2N**: Matches 2” NPT threaded units
- **2B**: Matches 2” BSP threaded units
- **3**: 3” acoustically isolated flange
- **4**: 4” acoustically isolated flange
- **6**: 6” acoustically isolated flange
- **8**: 8” acoustically isolated flange
- **10**: 10” acoustically isolated flange

#### Flange Mounting Position
- **A**: Cone Mounted (standard)
- **C**: Angled flange piece only

### Cone Selection

<table>
<thead>
<tr>
<th>C</th>
<th>Focaliser Cone</th>
</tr>
</thead>
<tbody>
<tr>
<td>02N</td>
<td>C04 cone for 2” NPT transducer</td>
</tr>
<tr>
<td>02B</td>
<td>C04 cone for 2” BSP transducer</td>
</tr>
<tr>
<td>04</td>
<td>4” cone for 20kHz and 3” 30kHz transducers</td>
</tr>
<tr>
<td>08-15</td>
<td>8” cone for 15kHz</td>
</tr>
<tr>
<td>08-10</td>
<td>8” cone for 10kHz</td>
</tr>
<tr>
<td>10-15</td>
<td>10” cone for 15kHz</td>
</tr>
<tr>
<td>10-10</td>
<td>10” cone for 10kHz and 9Hz</td>
</tr>
<tr>
<td>10-05</td>
<td>10” cone for 5kHz and 4kHz</td>
</tr>
</tbody>
</table>

#### Cone Material
- **4**: Polypropylene
- **7A**: Carbon Fibre. Includes matching ANSI Flange (4”, 8” or 10”)
- **7D**: Carbon Fibre. Includes matching DN Flange (4”, 8” or 10”)
- **7J**: Carbon Fibre. Includes matching JIS Flange (4”, 8” or 10”)
- **8**: Polyurethane

### Transducer / Cone / Flange Combination Table

<table>
<thead>
<tr>
<th>Transducer</th>
<th>Cone</th>
<th>Flange Option 1</th>
<th>Flange Option 2</th>
<th>Flange Option 3</th>
<th>Flange Option 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 / 40kHz</td>
<td>C02</td>
<td>F_3A</td>
<td>F_4A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30kHz</td>
<td>C02</td>
<td>F_3A</td>
<td>F_4A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30kHz (T4)</td>
<td>C03-4-Z</td>
<td>F_3A</td>
<td>F_4A</td>
<td>F_6A</td>
<td>F_8A-4-C4</td>
</tr>
<tr>
<td>Back Cap</td>
<td></td>
<td>F_4A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mount (TB30)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20kHz</td>
<td>C03-4-Z</td>
<td>F_3A</td>
<td>F_4A</td>
<td>F_6A</td>
<td>F_8A-4-C4</td>
</tr>
<tr>
<td>Back Cap</td>
<td></td>
<td>F_4A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mount (TB30)</td>
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</tr>
<tr>
<td>15kHz</td>
<td>C04</td>
<td>F_4A</td>
<td>F_6A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Back Cap</td>
<td></td>
<td>F_4A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mount (TB30)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 / 10kHz</td>
<td>C08</td>
<td>F_8A</td>
<td>F_10A</td>
<td>F_6D50-4</td>
<td></td>
</tr>
<tr>
<td>Back Cap</td>
<td></td>
<td>F_8A</td>
<td>F_10A</td>
<td>F_6D50-4</td>
<td></td>
</tr>
<tr>
<td>Mount (TB50)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 / 5kHz</td>
<td>C08</td>
<td>F_8A</td>
<td>F_10A</td>
<td>F_6D50-4</td>
<td></td>
</tr>
<tr>
<td>Back Cap</td>
<td></td>
<td>F_8A</td>
<td>F_10A</td>
<td>F_6D50-4</td>
<td></td>
</tr>
<tr>
<td>Mount (TB50)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Accessories

**HAWKLink Data Modem**

<table>
<thead>
<tr>
<th>Model</th>
<th>Power Supply</th>
<th>Network Type</th>
<th>Sim Card</th>
<th>Not Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>HLR</td>
<td>B 12-30VDC</td>
<td>U 12-30VDC and 90-260VAC</td>
<td>S3 Australian Sim Card expires after 3 month</td>
<td>S12 Australian Sim Card expires after 12 month</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G3 3G Autoband</td>
<td></td>
<td>X Not Required</td>
</tr>
</tbody>
</table>

**HAWKLink USB PC connector for GosHawkII**

**SUNHOOD**

Junction Box for twin Transducer applications

**CA-TXCC-R-C15**: 15m cable
**CA-TXCC-R-C30**: 30m cable
**CA-TXCC-R-C50**: 50m cable
**CA-TXCC-R-C100**: 100m cable

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1. Important: See Transducer / Cone / Flange combination table for valid part combinations
2. See 'Flange Dimension Standards' table for full Flange specification

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**Part Numbering**

*Sultan Acoustic Wave Series*
Specifications
Sultan Acoustic Wave Series

Frequency
- 4kHz, 5kHz, 9kHz, 10kHz, 15kHz, 20kHz, 30kHz, 40kHz, 50kHz
(4kHz & 9kHz are special long range versions).

Operating Voltage
- 12 - 30VDC (residual ripple no greater than 100mV)
- 90 - 265VAC 50 / 60Hz
- 12-30VDC & 36-60VDC

Power Consumption
- <10VA @ 240VAC
- <6W @ 48VDC

Analogue Output
- 4 - 20mA

Communications
- GosHawk, HART, Modbus (RS485), Profieldus PA, Profieldus DP, DeviceNet, Foundation Fieldbus, Modbus over Ethernet TCP/IP, Modbus over Wi-Fi
- Multidrop Modbus mode can address 1 - 250 units over 4 wires.

Relay Output: (2) Integral (5) Remote
- Form ‘C’ (SPDT) contacts, rated 0.5A at 240VAC non-inductive
- All relays have independently adjustable dead bands
- Remote failsafe test facility for one relay.

Blanking Distance
- 50kHz: 0.25m (10"")
- 30kHz: 0.35m (14“)
- 15kHz: 0.60m (24“)
- 5 / 4 kHz: 1.5 m (59“)

Maximum Range
- 5m (16ft) 50kHz liquids
- 7m (22ft) 40kHz liquids
- 11m (33ft) 30kHz liquids
- 20m (65ft) 20kHz liquids / slurries, 10m (33ft) solids
- 30m (98ft) 15kHz liquids / slurries, 20m (65ft) solids
- 60m (165ft) 10kHz liquids / slurries, 40m (165ft) powders / solids
- 60m (196ft) 5kHz liquids / slurries / powders / solids
- 180m (588ft) 4 / 9 kHz for extended range positioning applications

Resolution
- 1mm (0.04") 50, 40, 30,20, 15, 10, 5kHz
- 4mm (0.2") 9, 4kHz.

Sensor Accuracy
- +/- 0.2% of measured range.

Operating Temperature
- Integral System -40°C (-40°F) to 80°C (176°F)
- Remote Electronics -40°C (-40°F) to 80°C (176°F)
- Remote Transducer -40°C (-40°F) to 80°C (176°F).

Enclosure Sealing
- Integral System IP67
- Remote Electronics IP65 (NEMA 4x)
- Remote Transducer IP68.

Cable Entries
- Integral: 3 x M16 Glands
- Remote: 3 x 20mm, 1 x 16mm knock outs.

Mounting
- ANSI, JIS or DIN Flange
- 4 in / 100mm to 10 in / 250mm
- 2 in BSP Thread / NPT Thread.

Typical Weight
- Sultan System with appropriate flange and cone

Frequency  kg  lb
- 4 or 5kHz Transducer  13  28.6
- 9 or 10kHz Transducer  10  22.0
- 15kHz Transducer  8  17.6
- 20 or 30kHz (3") Transducer  3  6.6
- 30, 40 or 50kHz (2") Transducer  1  2.2

Configuration  kg  lb
- Remote Amplifier with 6m cable  1  2.2
- Remote Amplifier with 15m cable  3  6.6
- Remote Amplifier with 30m cable  6  13.2
- Remote Amplifier with 50m cable  10  22.0

Wi-Fi Specifications
- Wireless Standard: 802.11 b/g/n
- Frequency Range: 2.412GHz-2.484GHz
- Security: WEP/WPA-PSK/WPA2-PSK
- Encryption: WEP64/WEP128/TKIP/AES
- Certificate: FCC/CE

Hawk Measurement Systems
(Head Office)
15 - 17 Maurice Court
Nunawading VIC 3131, AUSTRALIA
Phone: +61 3 9873 4750
Fax: +61 3 9873 4538
info@hawk.com.au
For more information and global representatives: www.hawkmeasure.com

Hawk Measurement
90 Glenn Street
Suite 100B, Lawrence, MA 01843, USA
Phone: +1 888 HAWKLEVEL (1-888-429-5538)
Phone: +1 978 304 3000
Fax: +1 978 304 1462
info@hawkmeasure.com
Represented by:

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