



## Sultan Acoustic Wave Series

### Description

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

The transmission method of Acoustic Waves ensures minimal losses through the environment where the sensor is located. Remote, Integral & SMART units are available. The SULTAN can operate as a 2, 3 or 4 wire system.

### Points of Difference

#### HAWK's Acoustic Wave Transducers - Self Cleaning

The Sultan Acoustic Wave is a low frequency acoustic device with a "self cleaning" capability.

The self cleaning pressure wave, produced with each pulse of the transducer, removes water and dust fines from the face of the diaphragm of the transducer.

They are not affected by the dielectric characteristics in the environment that they work in.

#### Why Use Acoustic Wave?

##### Advantages

- The low frequency transmitter can operate in harsh conditions. It is:
  - Immune to dust, particles in suspension, fog, rain or repose angle changes on the stockpile
  - Self-cleaning and ensures that the face of the units always remains clean
  - Can use Flexible Polyurethane cones that are immune to rock impacts etc.

### 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 high accuracy.

### Primary Areas of Application

- Dirty dusty and 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 Profiles, Blocked Chutes, Stockpiles, Stackers, Reclaimers, Storage Silos, etc.

#### Power Stations:

Boiler Bunkers, Raw Coal Bunkers, Ash Pits, Fly Ash Silos, etc.

### Others Industries:

Food, Cement, Plastics, Grain, Chemicals, Paper, Irrigation, Quarries.

### Features

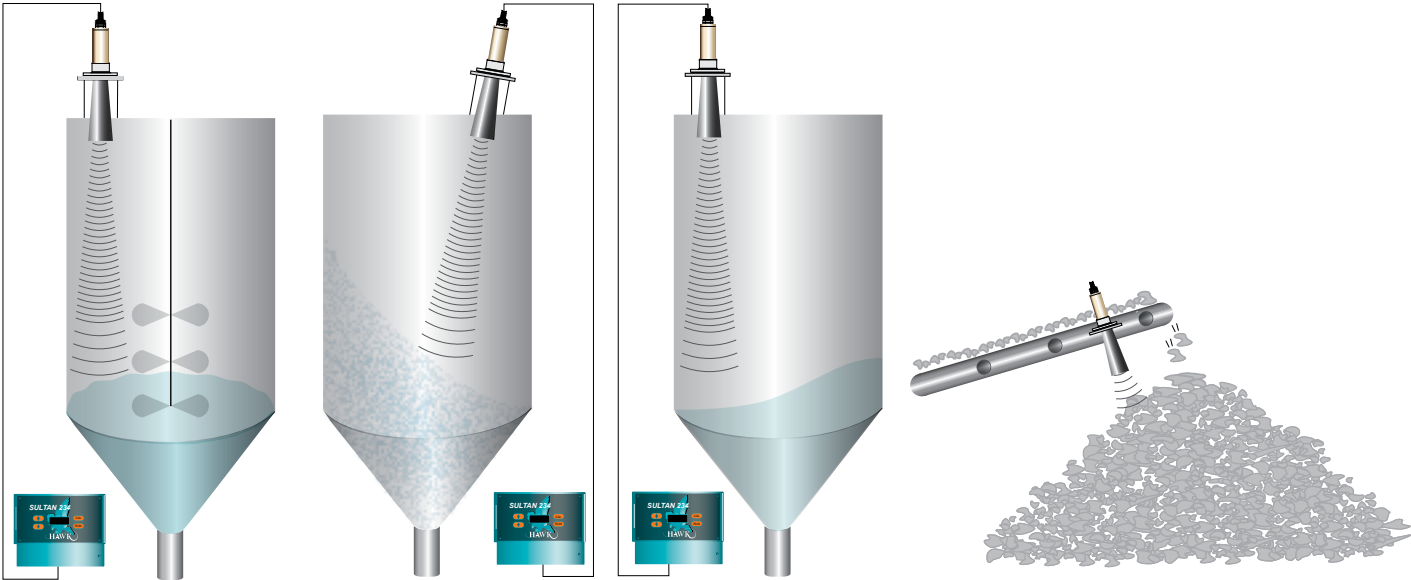
- Non contact measurement
- High Power even with two wire loop supply
- Low cost per point
- Wide range of communications: DeviceNet, GosHawk, HART, Modbus, Profibus DP, Foundation Fieldbus & Profibus PA
- Pump Control x5 pumps
- Auto compensation for dust, steam and losses
- Protection class IP67, NEMA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





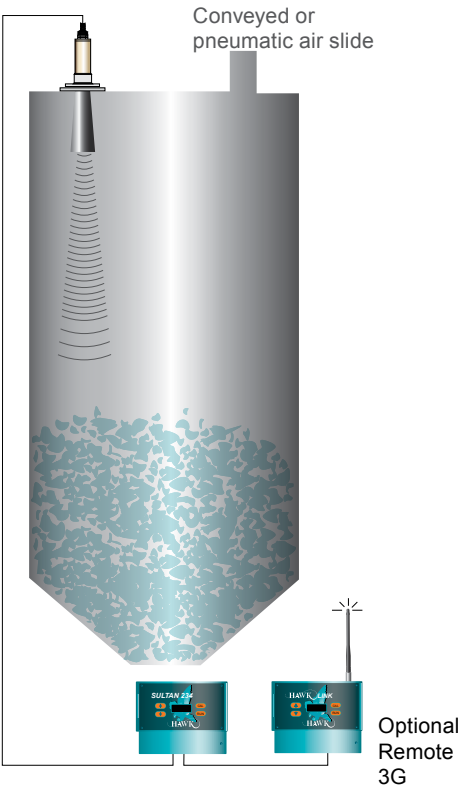
# Typical Applications

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



## Solids Vessels

High / Low / Continuous level  
(Granular / Powder)



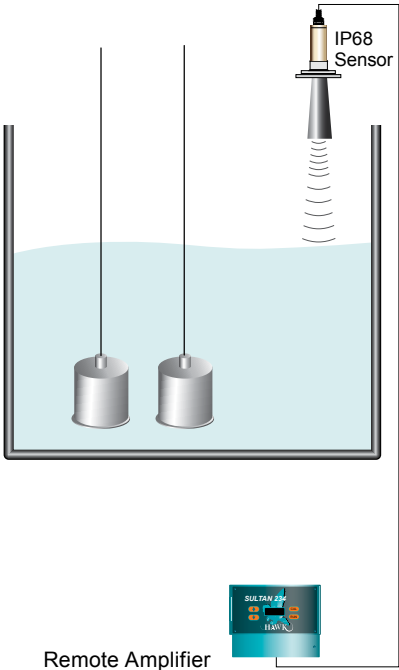
## Storage Tanks

High / Low / Continuous level  
(Liquid / Chemical)



## Sewage Wet Well

High / Low / Continuous level and central  
of up to 5 Pumps





## Application Reference - Sultan Acoustic Wave



### Self-Cleaning Acoustic Level Monitoring for Iron Ore Truck Dump With Water Sprays.

#### Application Problem

The client at a large Iron Ore export mine, had problems with radar level transmitters that were being used to monitor level in the truck dump, for controlling the apron feeder and providing a signal to the truck drivers as to when to dump. These Radar Transmitters were being affected by the wet conditions, as well as the iron ore fines buildup over the transmitters. The environmental conditions caused intermittent faults to occur with high downtime costs.

Radar technology is affected by high dielectric buildup (wet iron ore) and therefore was not the correct choice of technology for the application.

#### Solution

We installed a low frequency Acoustic transmitter as replacement technology. Acoustic technology is not affected by the wet environment, and the self-cleaning pressure wave produced with each pulse of the transducer removed water and fines from the face of the transducer.

With Acoustic transducers, it is important to size the transducer frequency according to the environment that the instrument must work in, rather than the actual range of the application. The 10 kHz transducer has a practical operating range of over 50m (165ft) measuring solids, but the operating range of the Truck Dump was only 15m (50ft). The pressure wave self-cleaning effect, increases as you go down the frequency spectrum. The visual effect of water being removed from the transducer, by an atomising effect, is seen more with the lower frequency 15 kHz, 10 kHz and 5 kHz transducers.

We also utilised a polyurethane / rubber focalizer cone, that improved cleaning and provided better immunity to physical breakage.

The Sultan Range of Acoustic transmitters were supported by the remote HawkLink diagnostic module, that allowed direct factory support.

#### Ordering Information

1 x AWRT10S4XXXC15XX	Remote 10 kHz Transducer
1 x AWR234SUXXXX	Remote Sultan Transmitter
1 x FA10A-4	Mounting Flange 10-00" ANSI
1 x C10-10-8	Rubber / Polyurethane Focalizer Cone



## Application Reference - Sultan Acoustic Wave



### Self-Cleaning Acoustic Level Transmitters, For Continuous Measuring of Lime Powder Silos and Lime Slurry Makeup Vessels.

#### Application Problem

The client had intermittent problems with the supplied radar transmitters for the two vessels, measuring Lime Powder in the silo and Lime Slurry in the makeup vessel. The client was using Lime, as a means of correcting the pH of the return process water at a Coal Washery.

Lime powder, was conveyed into the Silo, using lean phase pneumatic air from the delivery truck. Transporting Lime powder through an airline causes friction and increases the temperature inside the silo. This creates condensation in the top of the silo. Lime is very hygroscopic in nature and the powdered form will take moisture in readily. Any transducers or probes mounted, in the top of the vessel, get coated in Lime powder, which solidifies over time. This causes passive Radar transmitters or high level probes to prematurely fail.

#### Solution

We installed low frequency Acoustic Transducers in the silo and makeup vessel. The self-cleaning Acoustic technology, produces high amplitude pressure waves with each pulse, that prohibits the Lime powder from building up on the operating diaphragm. We used rubber / polyurethane focalizer cones to enhance the cleaning action and to minimise the operating beam angle of the transducers.

The Lime silo, used the more powerful 10 kHz transducer, to provide continuous level control even when the Lime is being "blown" into the silo, creating high dust and turbulence levels. The Lime makeup vessel, was smaller in depth and we supplied a 20 kHz transducer, to counter buildup issues from froth and foam floating on the slurry surface. Both instruments were free of buildup in the focalizer cone and on the diaphragm.

The Sultan Acoustic Transmitter system, comes with a Mine related application selectable menu, to minimise calibration and to simplify the commissioning.

#### Ordering Information

##### Lime Silo:

1 x AWR234SUXXXX  
Remote Sultan Transmitter  
1 x AWRT10S4XXXC15XX  
Remote 10 kHz Transducer  
1 x C10-10-8  
Rubber / Polyurethane Cone  
1 x FA10A-4  
Flange 10-00" ANSI

##### Lime Makeup Vessel:

1 x AWR234SUXXXX  
Remote Sultan Transmitter  
1 x AWRT20T4XXXC15XX  
Remote 20 kHz Transducer  
1 x C04-8  
Rubber / Polyurethane Cone  
1 x FA4A-4  
Flange 4-00" ANSI