

A Higher Level of Performance



Data Sheet

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## Sultan Sonar System

Sludge and Submerged Interface Level Measurement



For more information, please visit >  
[www.hawkmeasurement.com](http://www.hawkmeasurement.com)

## Overview

### Sultan Sonar System



## Principle of Operation

The HAWK Sultan Sonar uses Advanced Sonar Technology to measure and control Waste Water Clarifiers and Thickeners. The system is easy to use and the innovative design provides critical plant control to optimize performance.

In the water, wastewater industry process conditions will vary greatly between a primary sedimentation tank, secondary / final clarifier and a gravity thickener. Thickener bed levels, secondary RAS blanket, flocculent blanket etc, all have different densities and the water above these interface levels are subject to different process conditions that change.

### To optimize performance in each interface application under all process environments:

HAWK has developed a powerful low frequency transducer to penetrate through the suspended solids and capable of measuring the sludge bed level at the bottom of a clarifier or the lightest flocculent layer.

### To optimize performance under all process environments in each interface application:

HAWK uses one transducer with a frequency and power level that is applicable to the density of the interface and process conditions expected in the tank. HAWK can guarantee performance for controlling pumps etc, rather than for monitoring purposes only.

## Value Added Benefits

- Improved efficiency and control of the treatment process
- Fully automated plant systems with reliable sludge blanket level monitoring
- Advanced warning of biological upset or hydraulic imbalance
- Reduced maintenance with 5 year cleaning mechanism warranty (no blades to replace)
- Reduced site operational costs significantly with improved process control for downstream operations
- Improved health and safety on site with compliance to OSHA regulations (no manual dips required).

## Primary Application Areas

### Water & Wastewater:

- Primary Sedimentation – Blanket level
- Secondary and Final Clarifiers – RAS Blanket layer
- Sequential Batch Reactors – Blanket monitoring (floating sonar)
- Lagoons – Sludge Bed Level
- Lamella Clarifier – Sludge Bed Level
- Filtration
- Gravity Filtration
- Gravity Settling.

## Features

- User friendly configuration to track specific densities
- Tune Sensor to 5 preset factory densities or fine tune to the required density in-situ
- Sonar transducer developed to optimize detection of heavy and light density interfaces
- Easy calibration to track specific density interfaces, eg: RAS blanket - 4g/l, floc / fluff layer - 1g/l, Bed 10g/l+
- Industrial scum cleaning mechanisms that do not require maintenance
- No wiper blade assemblies
- 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 from HAWK Service Engineer
- 5 Relay alarms
- 1640 feet (500 metre) separation possible between transducer and Sultan Sonar transmitter.

# Typical Applications

Sultan Sonar System



Area	Functions
<b>Water Treatment Plant</b>	
Primary Sedimentation Tank	Floc level / sludge blanket level
Sludge Thickener Tank	Sludge bed level / suspended solids / floc level
Calcium Hydroxide Reactor	Sand / pellet bed level
Sodium Hydroxide Reactor	Sand / pellet bed level
<b>Sewage Treatment Plant</b>	
Primary Sedimentation Tank	Sludge blanket level
Secondary / Final Clarifier	RAS blanket level / rag/pinfloc layer / suspended solids
Sludge Thickener Tank	Sludge bed level / suspended solids
“DAF” Tank	Sludge bed level / floating sludge level
Sequential Batch Reactor (SBR)	Settling bed level / RAS blanket level
<b>Industrial (food, paper etc.)</b>	
Primary Sedimentation Tank	Sludge blanket level
Secondary Clarifier Tank	RAS blanket level / suspended solids / rag/pinfloc layer
Thickener Tank	Sludge bed level / clarity suspended solids / floc level
Sequential Batch Reactor (SBR)	Settling blanket level / RAS bed level
Carbon Column	Carbon bed level

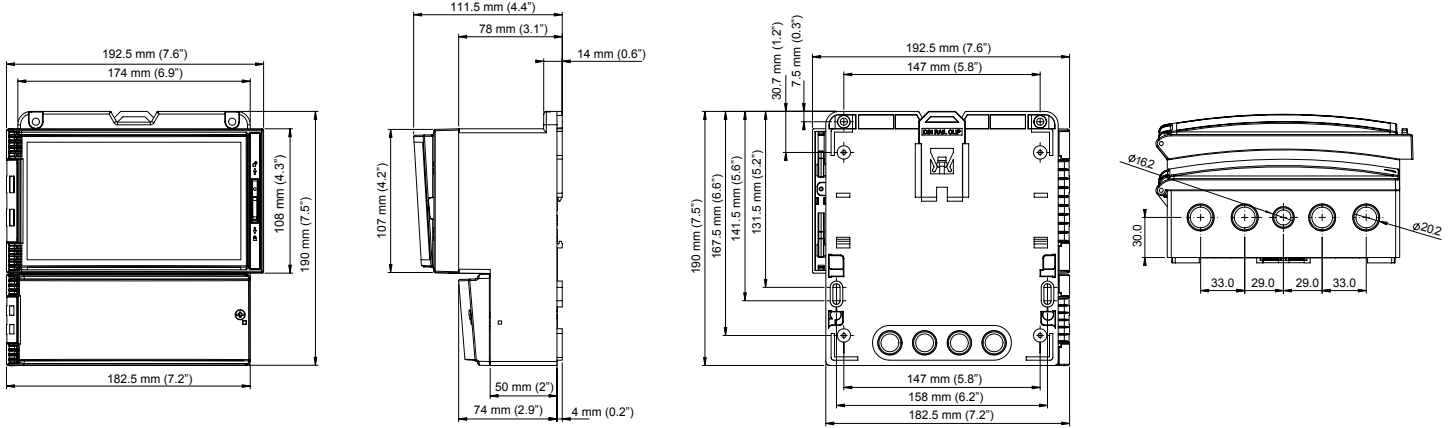


# Specifications

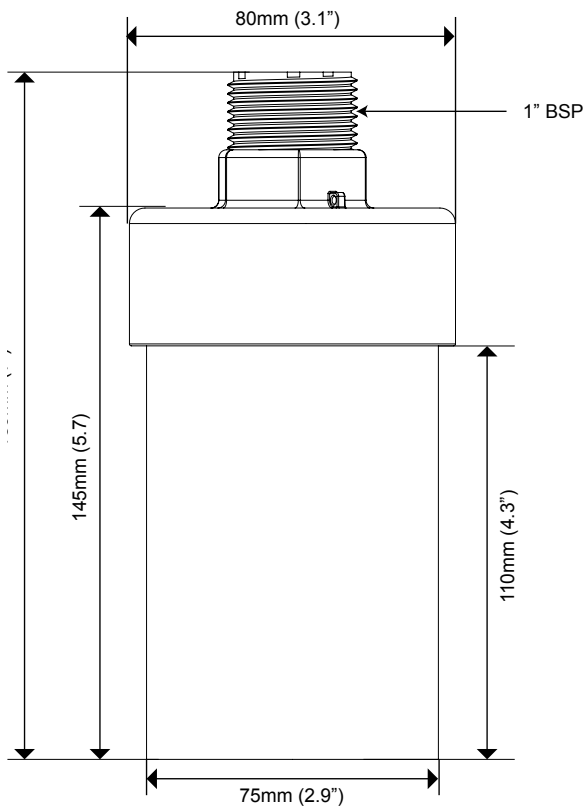
Sultan Sonar System



## AWR234 Remote Amplifier



## Remote Transducer

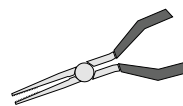


## AWR234 Wiring

RELAY 1			RELAY 2			RELAY 3			RELAY 4			RELAY 5		
NC	COM	NO	NC	COM	NO	NC	COM	NO	NC	COM	NO	NC	COM	NO
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
I <sub>s</sub>	+	-	RED	BLACK	BLUE	WHITE	Test In	B	A	-	+	⊕	N	L1
	4-20mA		TRANSDUCER					COMMS		DC-In		AC-In*		

Sinking 4-20mA from user device  
OR  
Sourcing 4-20mA from Sultan

\*48VDC Sultan version will have these terminals marked as the 30-48VDC input



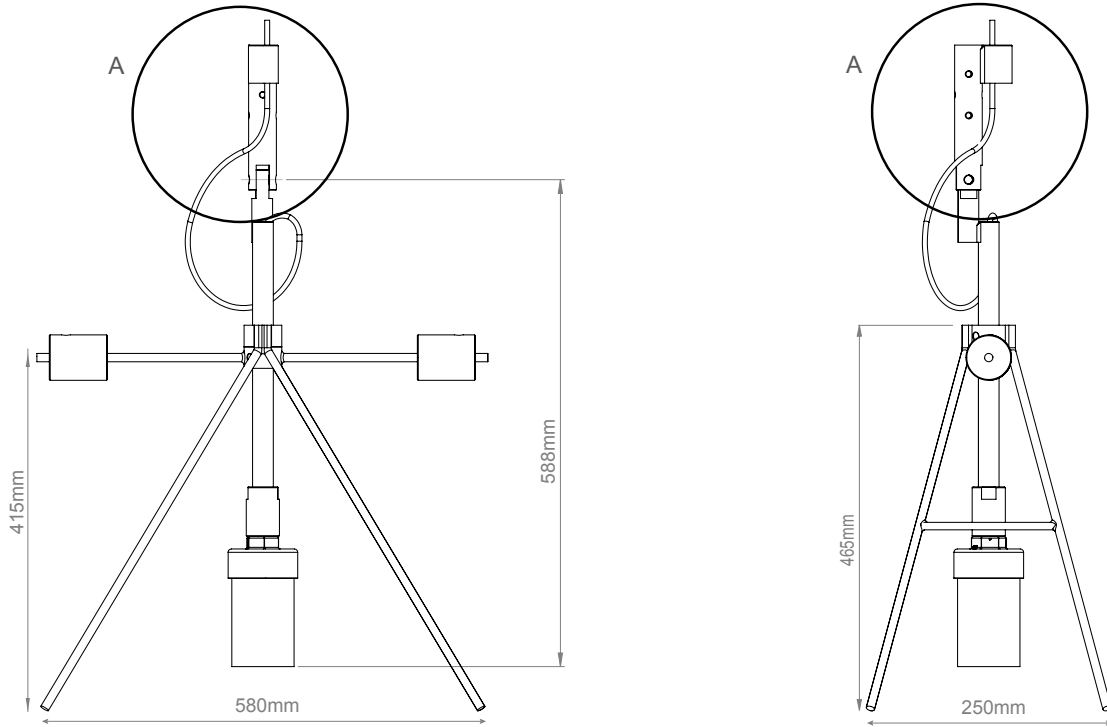
Use long nose pliers to extract terminals

# Dimensions & Mounting

Sultan Sonar System

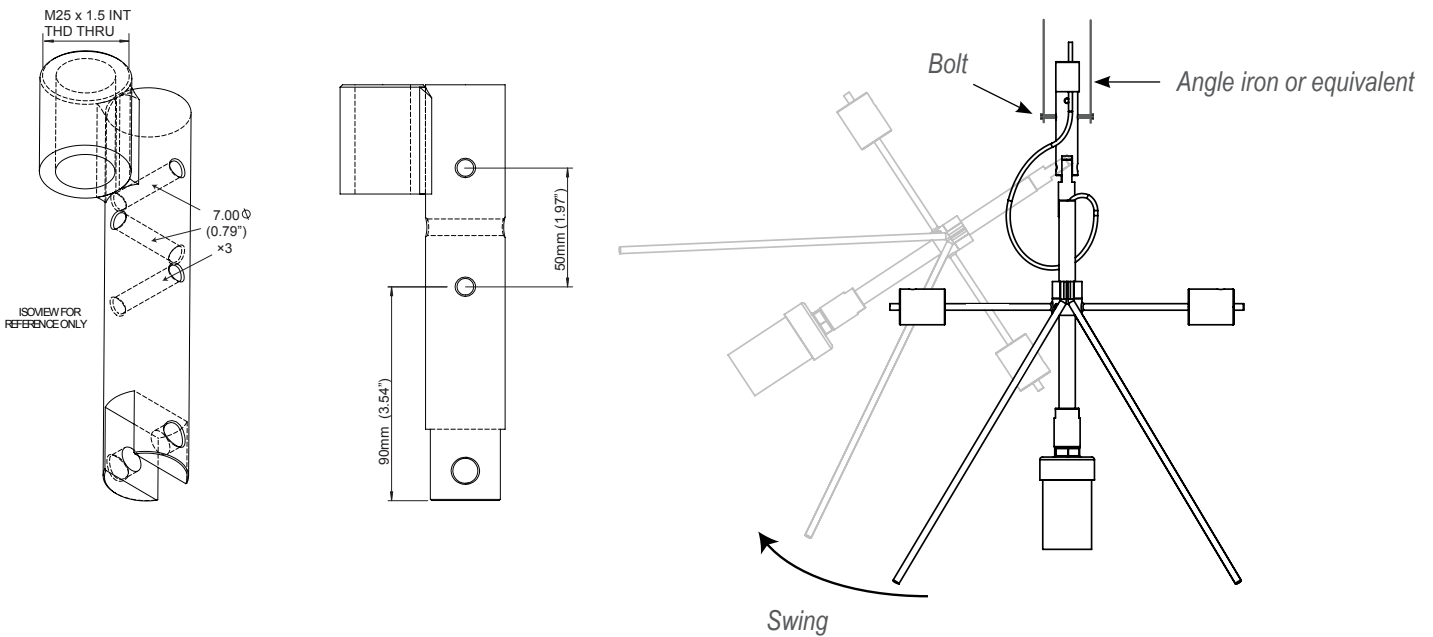


## Impact Plate



## Mounting Connection (A)

The top of the Impact Plate has 3 x 7mm bolt holes which can be secured to an angle iron or equivalent bracket. The Impact Plate is designed to swing parallel with the counter weights. The surface sweeper must come in contact with the legs of the Impact Plate which swings the bracket lifting the transducer out of the liquid. When the sweeper has cleared, it will drop back in and use the counter weights to re-center.





## Remote Amplifier

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### Model

AWR234 Remote 3 / 4 Wire, 5 SPDT relays, Modbus

### Housing

S Polycarbonate

### Power Supply

B 12-30VDC

C 36-60VDC

U 12-30VDC and 90-260VAC

### Additional Communications

S 5 x SPDT relays

X 4-20mA analogue

I 4-20mA analogue with HART Isolated 4 wire

A Profibus PA

P Profibus DP

F Foundation Fieldbus

D DeviceNet

E 4-20mA with Modbus over Ethernet TCP/IP

G 4-20mA with Modbus over Wi Fi

### Accessory

X Not Required

### Approval Standard

X Not Required

A22 ATEX Grp II Cat 3 GD T85°C IP67 Tamb -40°C to 70°C

GP (Power Supply option 'B' only) CSA Equip Class 2; Pollution deg 2; Tamb -20°C to 75°C (Ordinary Locations)

### Additional Software

X Not Required

AWR234 S U X X X X



### Remote Sonar Transducer

**AWRTS** Sultan Sonar Transducer

**Transducer**

002	151kHz
003	300kHz
004	450kHz
005	700kHz

**Facing & Housing material**

- S4 Full fiberglass version (max 50°C / 122°F)
- SH Full fiberglass version (max 50°C / 122°F)

**Approval Standard**

- X Not Required
- RN CSA Class I; Div 1/2; Group D; Zone 0; AEx/Ex ia IIA; T4
- GP CSA Equip Class 2; Pollution deg 2; Tamb -20°C to 75°C (Ordinary Locations)
- i0 IECEX Zone 0 (Ex ia IIA T4 IP68 Tamb -20°C to 70°C)
- A0 ATEX Grp II Cat 1 GD EEx ia IIA T4 IP68 (Tamb -20°C to 65°C)
- A1 ATEX Grp II Cat 2 GD EEx m II IP68 T5 (Tamb -20°C to 65°C) T6 (Tamb -20°C to 50°C)
- i1 IECEX Zone 1 (Ex mb II IP68 T5(Tamb -20°C to 65°C) T6 (Tamb -20°C to 50°C))
- A22 ATEX Grp II Cat 3 GD T85°C IP67 Tamb -40°C to 70°C

**Connection**

- C IP68 Sealed cable
  - 6 6m
  - 15 15m

Transducer Selection	Typical Applications		Typical % Solids
005 (700kHz)	Lighter layers		<1%
004 (450kHz)	Hindered / Settling layer	Floc	1-2%
004 (450kHz)	RAS	Floc	2-5%
003 (300kHz)	RAS	Bed	5-8%
002 (151kHz)	Bed / Dense Sludge		>8%

**AWRTS 002 S4 X C 6**

### Scum Cleaner

**IMPACT-PLATE:** Single direction auto scum cleaner (requires contact with surface sweeper)

**IMPACT-PLATE-2:** Dual direction auto scum cleaner (requires contact with surface sweeper)

### Accessories

**HAWKLink Data Modem**

HLR Remote stand alone HAWKLink system

**Power Supply**

- B 12-30VDC
- U 12-30VDC and 90-260VAC

**Network Type**

- G3 3G Autoband

**Sim Card**

- S3 3 month Australian Sim Card
- S12 12 month Australian Sim Card
- X Not Required

**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

**HLR U G3 S3**

Consult local representation for international sim card support.

# Specifications

## Sultan Sonar System



### Sonar Frequency Selection

- 151kHz
- 300kHz
- 450kHz
- 700kHz

### Operating Voltage

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

### Power Consumption

- <3W @ 24VDC
- <10VA @ 240VAC
- <4W @ 48VAC

### Analogue Output

- 4 – 20mA (750 Ohm@ 24VDC User Voltage supply) or Internal driven 250 Ohm.

### Communications

- GosHawk, Modbus, HART, Profibus DP, DeviceNet, Foundation Fieldbus, Profibus PA. TCP/IP Ethernet, Wi-Fi

### Relay Output

- 5 x Form 'C' (SPDT) contacts, rated 0.5A at 240VAC non-inductive
- All relays have independently adjustable dead bands

### Maximum Range

- 15m (50 ft)

### Blanking Distance

- 350mm

### Resolution

- 1mm

### Accuracy

- +/- 0.25%

### Operating Temperature

- Remote Electronics -40°C (-40°F) to 80°C (176°F)
- Sonar Transducer: -40°C (-40°F) to 50°C (122°F)

### Transducer Material

- FRP Fibreglass

### Impact Plate Material

- 316L Stainless Steel.

### Transducer / Transmitter Separation

- >500m

*Note: Must be BELDEN 3084A.*

### Display

- 2 line x 12 digit alphanumeric LCD.

### Memory

- Non-Volatile (No backup battery required)
- >10 years data retention.

### Enclosure Sealing

- Remote Electronics IP65 (Nema 4x)
- Remote Transducer IP68.

### Cable Entries

- Remote: 3 x 20mm, 1 x 16mm knock outs.

### Cable (Sonar Transducer)

- 4 conductor shielded twisted pair instrument cable
- Conductor size dependent on cable length
- BELDEN 3084A, DEKORON or equivalent
- Max: BELDEN 3084A = 500m (1640 ft)
- Max: DEKORON IED183AA002 = 350m (980 ft).

### Typical Weight

- Remote Electronics 1kg
- Remote Transducer 1kg
- Impact Plate 5kg.

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Additional product warranty and application guarantees upon request.

Technical data subject to change without notice.

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