

A Higher Level of Performance



Data Sheet

## Sultan

### Acoustic Wave Series

Level, Flow, Positioning, Collision Protection



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

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# Overview

## Sultan Acoustic Wave Series



## 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
- PoE (Power over Ethernet)

## Certifications

ATEX, IECEx, CSA, CE.

## 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, Modbus, Profibus PA, Profibus DP, Foundation Fieldbus, DeviceNet, Modbus over Ethernet TCP/IP, Wi Fi, PoE, Bluetooth
- 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

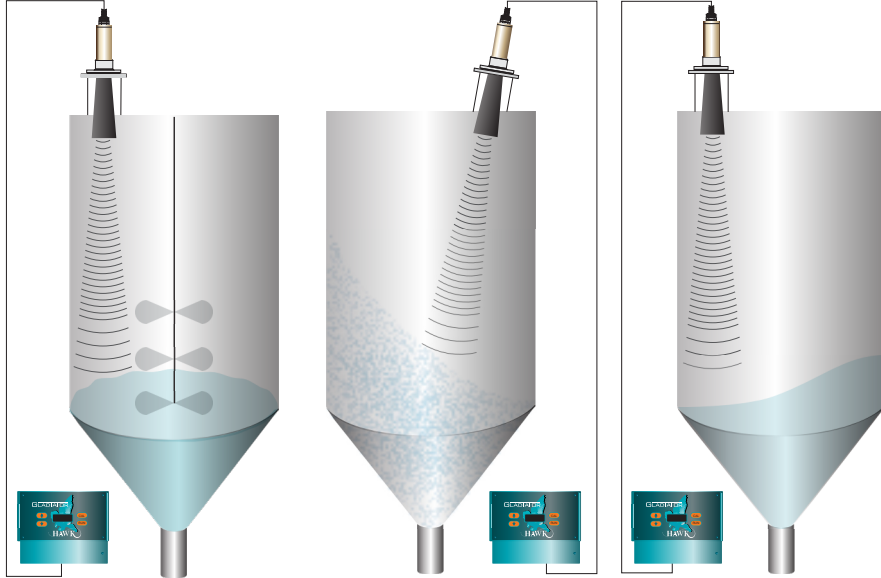
Sultan Acoustic Wave Series



## Conical Shape Vessels

## Horizontal Cylindrical / Tanks

## Stockpiles, Stackers, Reclaimers



## Solids Vessels

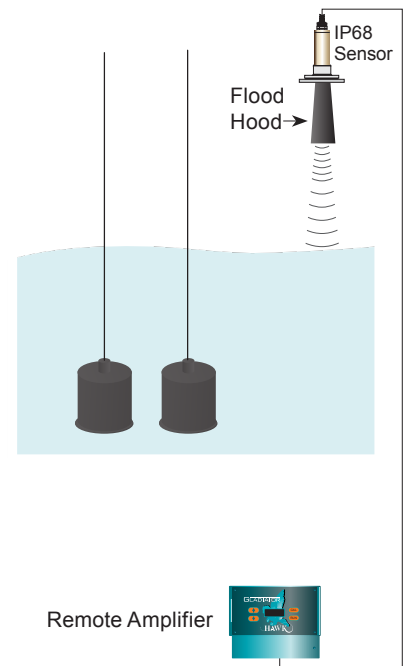
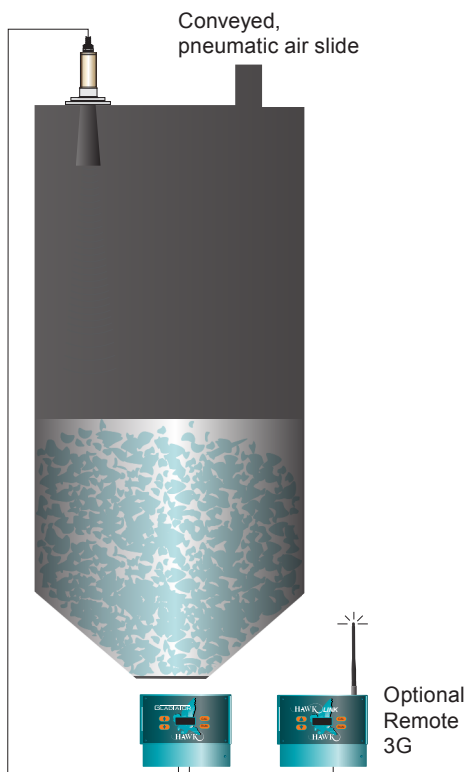
High / Low / Continuous level  
(Granular / Powder)

## Storage Tanks

High / Low / Continuous level  
(Liquid / Chemical)

## Sewage Wet Well

High / Low / Continuous level  
Up to 5 Pumps



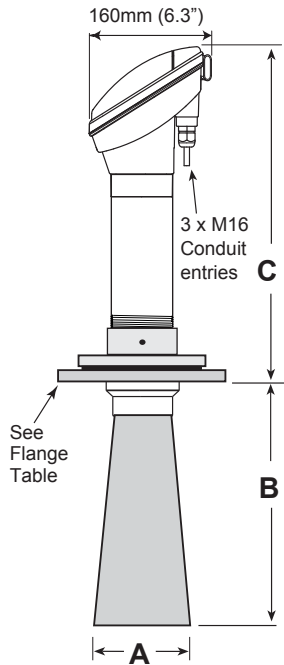
# Dimensions

Sultan Acoustic Wave Series

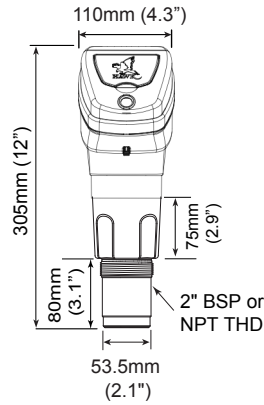


## Integral Units

### Standard Type

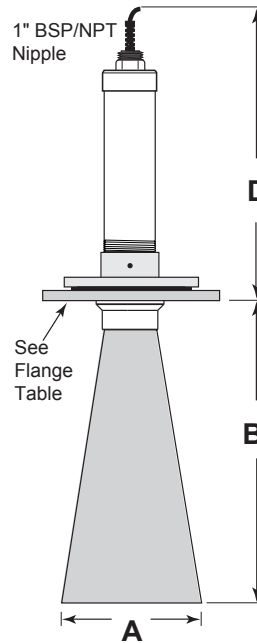


### Compact Type (2" BSP / NPT)

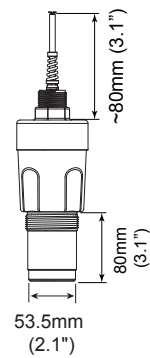


## Remote Transducers

### Standard Type



### Compact Type (2" BSP / NPT)

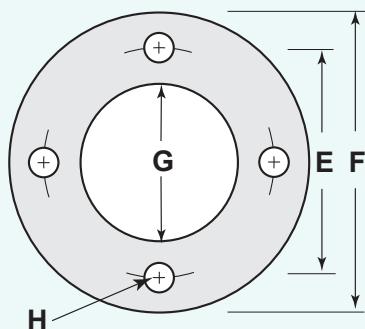


All cones must protrude into the main volume of the vessel by at least 50 mm (2 inches) past the lower end of the mounting nozzle.

Cone / Transducer Dimensions Table

Sensor Frequency	Selected Flange	A		B		C		D	
		mm	in.	mm	in.	mm	in.	mm	in.
5 kHz	10"	236	10.0	455	17.9	840	33.1	750	29.5
	8"	195	8.0	280	11.1	540	21.3	450	17.7
10 kHz	10"	236	10.0	455	17.9	540	21.3	450	17.7
	8"	195	8.0	280	11.1	540	21.3	450	17.7
15 kHz	10"	236	10.0	455	17.9	440	17.3	350	13.8
	8"	195	8.0	280	11.0	440	17.3	350	13.8
20 / 30 kHz	4"	98.5	4.0	280	11.0	390	15.4	300	11.8
30 / 40 / 50 kHz	4"	98.5	4.0	280	11.0	350	3.8	260	10.2

## Flanges



### FLANGE TYPE:

- A = ANSI Flange
- J = JIS Flange
- D = DIN Flange

Standard ANSI/DN/JIS Flange Dimensions

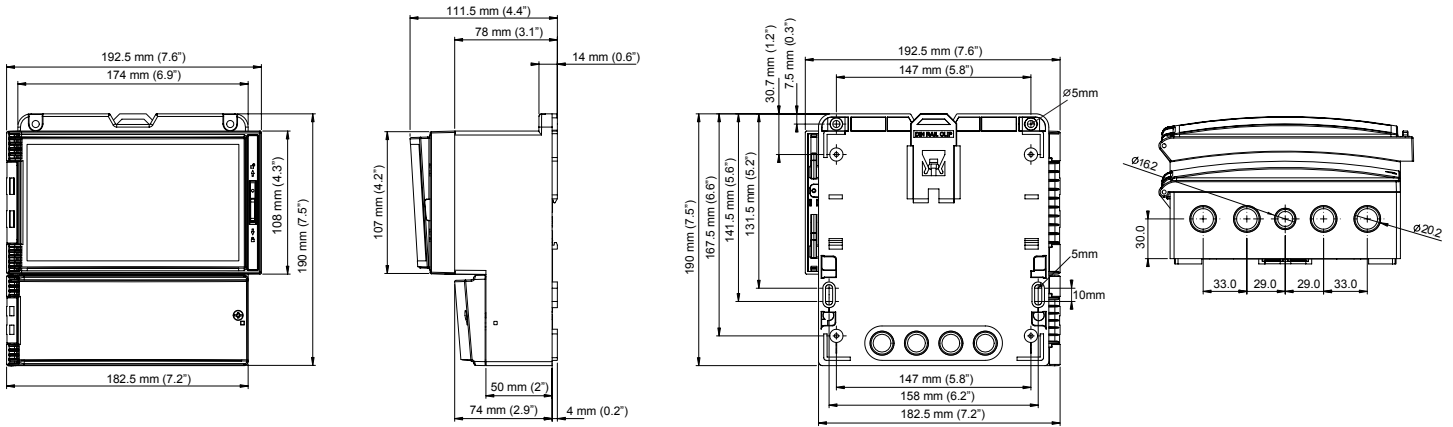
Size	Flange Type	E (PCD)		F (OD)		G (ID)		H (Hole)		No. Holes
		mm	in.	mm	in.	mm	in.	mm	in.	
4"	FA4 ANSI class 150	190.5	7.5	229	9.0	100	4	19	0.75	8
	FD4 DIN100 PN10/16	180	7.1	220	8.7	100	4	18	0.71	8
	FJ4 JIS B2220-1984 10kg	175	6.9	210	8.4	100	4	19	0.75	8
6"	FA6 ANSI class 150	241.5	9.5	279	11.0	150	6	22	0.87	8
	FD6 DIN150 PN10	240	9.4	285	11.2	150	6	23	0.91	8
	FJ6 JIS B2220-1984 10kg	240	9.4	280	11.0	150	6	23	0.91	8
8"	FA8 ANSI class 150	298.5	11.8	343	13.5	200	8	22	0.85	8
	FD8 DIN200 PN10	295	11.6	340	13.4	200	8	22	0.85	8
	FJ8 JIS B2220-1984 10kg	290	11.4	330	13.0	200	8	19	0.91	12
10"	FA10 ANSI class 150	362	14.3	406	16.0	250	10	25	1.02	12
	FD10 DIN200 PN10	350	13.7	395	16.0	250	10	23	0.85	12
	FJ10 JIS B2220-1984 10kg	355	14.0	400	15.7	250	10	25	0.99	12

# Dimensions & Wiring Diagrams

Sultan Acoustic Wave Series



## Remote Amplifier



## AWR Remote Transmitter

### AWR234

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
Is	+	-	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

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

### AWR2

Test In		COMMS		Shld	
⊕	⊖	B	A	Shld	Shld
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	8	9	10	11	12
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5	6
RED	BLACK	BLUE	WHITE	+	-
TRANSDUCER		4-20mA			

Sinking 4-20mA from user device

## AWI Integral Transmitter

### AWI234

RELAY 1			COMMS			RELAY 2		
NC	COM	NO	A	B	Shld	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"/>
16	17	18	19	20	21	22	23	24
<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
L1	N	⊕	-	+	Is	Test In	-	+
AC-In			4-20mA			DC-In		

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

### AWI234

With Comms Option 'B' (Bluetooth)

RELAY 1			Test In			RELAY 2		
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"/>	
16	17	18	19	20	21	22	23	
<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	
A	B	Shld	-	+	Is	-	+	
COMMS			4-20mA			DC-In		

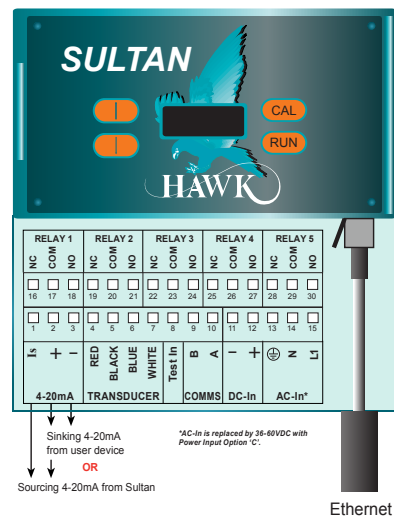
Sinking 4-20mA from user device  
OR  
Sourcing 4-20mA from Sultan

### AWI2

COMMS		
A	B	Shld
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19	20	21
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3
-	+	Test In
4-20mA		

Sinking 4-20mA from user device

## AWR Remote Unit With Ethernet



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

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

Ethernet



### Sultan Remote Transmitter

#### Model

AWR2 Remote 2 Wire, No relays, 12-30VDC only, Modbus

AWR234 Remote 2 / 3 / 4 Wire, 5 relays, Modbus

#### Housing

S Polycarbonate

#### Power Supply

B 12-30VDC

C<sup>1</sup> 36-60VDC

U<sup>1</sup> 12-30VDC and 90-260VAC

#### Additional Communications

S<sup>1</sup> No additional communication (5 relays & Modbus only)

X 4-20mA analogue

H<sup>2</sup> 4-20mA analogue with HART 2 wire

I<sup>1</sup> 4-20mA analogue with HART Isolated 4 wire

A Profibus PA

P<sup>1</sup> Profibus DP

F Foundation Fieldbus

D<sup>1</sup> DeviceNet

E<sup>1</sup> 4-20mA with Modbus over Ethernet TCP/IP

R<sup>1</sup> 4-20mA with Modbus over Wi Fi

B<sup>1</sup> 4-20mA with Bluetooth

C<sup>1,4</sup> 4-20ma with Modbus and PoE (Power over Ethernet)

#### This option is no longer available

X Option no longer available

#### Approval Standard

X Not Required

i0<sup>3</sup> IECEx Zone 0 Ex ia IIA T4 IP67 Tamb -20°C to 70°C

A0<sup>3</sup> ATEX Grp II Cat 1 GD IP67 EEx ia IIA T4

i20<sup>3</sup> IECEx Zone 20 DIP A20 TA85C IP68 Tamb -20°C to 75°C

A20<sup>3</sup> 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

GP<sup>4</sup> CSA Equip Class 2; Pollution deg 2; Tamb -20°C to 75°C (Ordinary Locations)

RN<sup>3,4</sup> CSA Class I; Div 1/2; Group D; Zone 0; AEx / Ex ia IIA; T4

#### Position Slave / Crane Master

X Not Required

PS<sup>1</sup> Position Slave

CM<sup>1</sup> Crane Master

**AWR234 S U X X X X**

<sup>1</sup> Model AWR234 only

<sup>2</sup> Model AWR2 only

<sup>3</sup> Model AWR2 only. Communication Option W, X, H only

<sup>4</sup> Power supply option 'B' only



### Sultan Remote Transducer 3" and 3.5"

#### Model

AWRT Acoustic Wave Remote Transducer

#### Transducer Frequency

- 30 30kHz for applications up to 15m for 3" (Cone required<sup>1</sup>)
- 20 20kHz for applications up to 20m, 3" only (Cone required<sup>1</sup>)
- 15 15kHz for applications up to 30m, 3" only (Cone required<sup>1</sup>)
- 10 10kHz for applications up to 40m, 3.5" only (Cone required<sup>1</sup>)
- 09 9kHz Positioning / Position Slave applications up to 180m (Cone required<sup>1</sup>)
- 05 5kHz for applications up to 60m, 3.5" only (Cone required<sup>1</sup>)
- 04 4kHz Positioning / Position Slave applications up to 180m (Cone required<sup>1</sup>)

#### Process Temperature - Facing material selection

S<sup>2</sup> Polyolefin 80°C (176°F)

T<sup>3</sup> Teflon 80°C (176°F)

#### Transducer Housing Material

- 4 Polypropylene

#### Back Cap Mounting Thread Standards

X Not Required (Standard Flange Mount)

TB BSP

#### Back Cap Mounting Thread Sizes

X Not Required (Standard Flange Mount)

30<sup>5</sup> 3" BSP

50<sup>6</sup> 3.5" BSP

#### Approval Standard

X Not Required

i2A IECEx Zone 20/21 Ex ta/tb IIIC T85C Da/Db Tamb -20°C to 62°C (back cap options 'X' only)

i2B IECEx Zone 21 Ex tb IIIC T85C Db Tamb -20°C to 62°C

i2C IECEx Zone 21/- Ex tb/- IIIC T85C Db/- Tamb -20°C to 62°C

A2A ATEX Grp II Cat 1/2 D Ex ta/tb IIIC T85°C Da/Db Tamb -20°C to 62°C (back cap options 'X' only)

A2B ATEX Grp II Cat 2 D Ex tb IIIC T85°C Db Tamb -20°C to 62°C

A2C ATEX Grp II Cat 2/- D Ex tb/- IIIC T85°C Db/- Tamb -20°C to 62°C

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

i1 IECEx Zone 1 Ex mb II IP68 T5(Tamb -20°C to 65°C) T6(Tamb -20°C to 50°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)

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 Dust (Grp II Cat 3 D T85C IP67)

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 and 1" BSP connection

CN IP68 Sealed unit with cable and 1" NPT connection

#### Cable Length

6 6m cable

15 15m cable

30 30m cable

50 50m cable

#### Mounting Accessories

X Not Required

CS<sup>7</sup> End Cap Cable Suspension

#### Software Options

X Not Required

FP<sup>7</sup> Fast Pulsing

PS Position Slave (Requires Position Slave Amplifier)

<sup>1</sup> See Transducer / Cone / Flange combination table

<sup>2</sup> Transducer Frequency 04, 05, 09, 10 only

<sup>3</sup> Transducer Frequency 10, 15, 20, 30 only

<sup>4</sup> Transducer Frequency 15 only

<sup>5</sup> Transducer Frequency 15, 20, 30 only

<sup>6</sup> Transducer Frequency 04, 05, 09, 10

<sup>7</sup> Transducer Frequency 30, 20 only

AWRT 10 T 4 X X X C 6 X X



### Sultan Remote Transducer 2"

#### Model

AWRT Acoustic Wave Remote Transducer

#### Transducer Frequency

- 50 50kHz for liquid applications up to 5m (Cone required<sup>1</sup>)
- 40 40kHz for liquid applications up to 7m (Cone required<sup>1</sup>)
- 30 30kHz for liquid applications up to 11m (Cone required<sup>1</sup>)

#### Process Temperature - Facing material selection

- T Tefzel 80°C (176°F)

#### Transducer Housing Material

- 6 Tefzel

#### 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 Grp 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 Grp 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 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
- 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

#### Cable Length

- 6 6m cable
- 15 15m cable
- 30 30m cable
- 50 50m cable

#### Mounting Accessories

- X Not Required
- CS Cable Suspension on end cap

#### Software Options

- X Not Required

**AWRT 30 T 6 TB 20 X C 6 X X**

<sup>1</sup> 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
- U<sup>1</sup> 12-30VDC and 90-260VAC

#### Transducer Frequency

- 30 30kHz for applications up to 11m for 2" and 15m for 3" (Cone required<sup>6</sup>)
- 20 20kHz for applications up to 20m, available in 3" only (Cone required<sup>6</sup>)
- 15 15kHz for applications up to 30m, available in 3" only (Cone required<sup>6</sup>)
- 10 10kHz for applications up to 40m, available in 3.5" only (Cone required<sup>6</sup>)
- 09 9kHz for Positioning / Position Slave applications up to 180m (Cone required<sup>6</sup>)
- 05 5kHz for applications up to 60m, available in 3.5" only (Cone required<sup>6</sup>)
- 04 4kHz for Positioning / Position Slave applications up to 180m (Cone required<sup>6</sup>)

#### Process Temperature - Facing material selection

- S<sup>2</sup> Polyolefin 80°C (176°F)
- T<sup>3</sup> Teflon 80°C (176°F)

#### Transducer Housing Material

- 4 Polypropylene

#### This option is no longer available

- X Option no longer available

#### This option is no longer available

- X Option no longer available

#### Additional Communication

- S<sup>1</sup> No additional communications (2 relays, Modbus)
- X 4-20mA analogue
- H<sup>5</sup> 4-20mA analogue with HART 2 wire
- I<sup>1</sup> 4-20mA analogue with HART Isolated 4 wire
- A Profibus PA
- F Foundation Fieldbus
- E<sup>1</sup> 4-20mA with Modbus over Ethernet TCP/IP
- R<sup>1</sup> 4-20mA with Modbus over Wi Fi
- B<sup>1,7</sup> 4-20mA with Bluetooth
- C<sup>1,7</sup> 4-20mA with Modbus and PoE (Power over Ethernet)

#### Approval Standard

- X Not Required
- i2C IECEx Zone 21/- Ex tb/- IIIC T85C Db/- Tamb -20°C to 62°C
- A2C ATEX Grp II Cat 2/- D Ex tb/- IIIC T85°C Db/- Tamb -20°C to 62°C
- i0<sup>5</sup> IECEx Zone 0 Ex ia IIA T4 IP67 Tamb -20°C to 70°C
- A0<sup>5</sup> ATEX Grp II Cat 1 GD IP67 EEx ia IIA T4
- i20<sup>5</sup> IECEx Zone 20 DIP A20 TA85C IP68 Tamb -20°C to 75°C
- A20<sup>5</sup> 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

<sup>1</sup> Model AWI234 only

<sup>2</sup> Transducer Frequency 04, 05, 09, 10 only

<sup>3</sup> Transducer Frequency 10, 15, 20, 30 only

<sup>4</sup> Transducer Frequency 15 only

<sup>5</sup> Model AWI2 only. Communication Option W, X, H only

<sup>6</sup> See Transducer / Cone / Flange combination table

<sup>7</sup> Power Supply option 'B' only



### 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<sup>1</sup> 12-30VDC and 90-260VAC

#### Transducer Frequency

- 50 50kHz for liquid applications up to 5m (Cone required<sup>6</sup>)
- 40 40kHz for liquid applications up to 7m (Cone required<sup>6</sup>)
- 30 30kHz for liquid applications up to 11m (Cone required<sup>6</sup>)

#### 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<sup>1</sup> No additional communications (2 relays, Modbus)
- X 4-20mA analogue
- H<sup>2</sup> 4-20mA analogue with HART 2 wire
- I<sup>1</sup> 4-20mA analogue with HART Isolated 4 wire
- A Profibus PA
- F Foundation Fieldbus
- E<sup>1</sup> 4-20mA with Modbus over Ethernet TCP/IP
- R<sup>1</sup> 4-20mA with Modbus over Wi Fi
- B<sup>1,7</sup> 4-20mA with Bluetooth
- C<sup>1,7</sup> 4-20mA with Modbus and PoE (Power over Ethernet)

#### Approval Standard

- X Not Required
- i0<sup>3</sup> IECEx Zone 0 Ex ia IIA T4 IP67 Tamb -20°C to 70°C
- A0<sup>3</sup> ATEX Grp II Cat 1 GD IP67 EEx ia IIA T4
- i20<sup>3</sup> IECEx Zone 20 DIP A20 TA85C IP68 Tamb -20°C to 75°C
- A20<sup>3</sup> 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

<sup>1</sup> Model AWI234 only

<sup>2</sup> Model AWI2 only

<sup>3</sup> Model AWI2 only. Communication Option W, X, H only

<sup>6</sup> See Transducer / Cone / Flange combination table

<sup>7</sup> Power Supply option 'B' only

AWI234 S U 40 T 6 TB 20 X X X

# Part Numbering

Sultan Acoustic Wave Series



## Flange Selection

### F Flange

#### Dimension Standard

- A ANSI<sup>2</sup>
- D DN<sup>2</sup>
- J JIS<sup>2</sup>

#### 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<sup>1</sup>

- A Cone Mounted (standard)
- C Angled flange piece only

#### Flange Material

- 4 Polypropylene

**F A 4 A - 4**

#### Additional Flange Options<sup>1</sup>

- FA8A-4-C4** 8" ANSI, polypropylene **FA8D50-4** 6" ANSI, polypropylene
- FA10A-4-C4** 10" ANSI, polypropylene **FA10D50-4** 6" ANSI, polypropylene
- FA6D50-4** 6" ANSI, polypropylene

<sup>1</sup> Important: See Transducer / Cone / Flange combination table for valid part combinations

<sup>2</sup> See 'Flange Dimension Standards' table for full Flange specification

## Cone Selection

### C Focaliser Cone

#### Cone Type<sup>1</sup>

- 02N C04 cone for 2" NPT transducer
- 02B C04 cone for 2" BSP transducer
- 04 4" cone for 20kHz and 3" 30kHz transducers
- 08-15 8" cone for 15kHz
- 08-10 8" cone for 10kHz
- 10-15 10" cone for 15kHz
- 10-10 10" cone for 10kHz and 9Hz
- 10-05 10" cone for 5kHz and 4kHz

#### 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

**C 04 - 4**

#### Additional Cone Options<sup>1</sup>

- C04-4-ZOD90** C04-4 trimmed to fit 90mm ID nozzle.
- C03-4-Z** Cone and coupling to fit 72mm ID nozzle for 20kHz and 30kHz (T4).

## Aiming Flange Kits

### F Flange

#### Dimension Standard

- A ANSI
- D DN
- J JIS

#### Flange Sizes

- 4 4" / DN100
- 6 6" / DN150
- 10 10" / DN 200

#### Flange Type

- R Aiming Flange

#### Flange Material

- 4 Polypropylene

#### Matching Focaliser Cone / Transducer

C04	4" cone for 15/20kHz and 3" 30kHz	Cone not included
C08-15	8" cone for 15kHz	
C08-10	8" cone for 10kHz	
C10-15	10" cone for 15kHz	Cone is pre-fitted to Flange kit
C10-10	10" cone for 10kHz and 9Hz	
C10-05	10" cone for 5kHz and 4kHz	

#### Cone Material

- 4 Polypropylene
- 8 Polyurethane

**F A 10 R - 4 - C10-10 - 8**

# Part Numbering

## Sultan Acoustic Wave Series



### Accessories

#### HAWKLink Data Modem

##### Model

HLR Remote stand alone HAWKLink system

##### Power Supply

B 12-30VDC

U 12-30VDC and 90-260VAC

##### Network Type

G4 4G

##### Sim Card

S3 Australian Sim Card expires after 3 month

S12 Australian Sim Card expires after 12 month

X Not Required

**HLR U G3 S3**

HAWKLink USB PC connector for GosHawkII

#### HAWKLink-USB

Stainless Steel Sunhood

#### SUNHOOD

Junction Box for twin Transducer applications or cable extension

AWRT-JB-01

AWRT-JB-06 (includes 6m cable)

**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

#### Transducer / Cone / Flange Combination Table

• Each line represents fitting combinations. Flange Dimension Standard A, D or J replaces underscore ( \_ ) position

Transducer	Cone	Flange Option 1	Flange Option 2	Flange Option 3	Flange Option 4
50 / 40kHz	C02	F_3A	F_4A		
30kHz (T6)	C02	F_3A	F_4A		
30kHz (T4)	C03-4-Z	F_3A			
	C04	F_3A	F_4A	F_6A	F_8A-4-C4
Back Cap Mount (TB30)		F_4A	FA6A		
20kHz	C03-4-Z	F_3A			
	C04	F_3A	F_4A	F_6A	F_8A-4-C4
Back Cap Mount (TB30)		F_4A	F_6A		
15kHz	C04	F_4A	F_6A		
	C08	F_8A	F_10A	F_6D50-4	
	C10	F_8A	F_10A	F_6D50-4	
Back Cap Mount (TB30)		F_4A	F_6A		
9 / 10kHz	C08	F_8A	F_10A	F_6D50-4	
	C10	F_8A	F_10A	F_6D50-4	
Back Cap Mount (TB50)		F_6D50-4	F_8D50-4	F_10D50-4	
4 / 5kHz	C08	F_8A	F_10A	F_6D50-4	
	C10	F_8A	F_10A	F_6D50-4	
Back Cap Mount (TB50)		F_6D50-4	F_8D50-4	F_10D50-4	

Not Recommended

# 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
- 37 - 57VDC (PoE)

### Power Consumption

- <10VA @ 240VAC
- <6W @ 48VDC
- <3W @ 24VDC

### Analogue Output

- 4 -20mA
- Recommended 250 ohms with 24VDC supply, max. 750 ohms.

### Communications

- GosHawk, HART, Modbus (RS485), Profibus PA, Profibus DP, DeviceNet, Foundation Fieldbus, Modbus over Ethernet TCP/IP / Wi Fi / PoE / Bluetooth
- 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: 0.60 m (24")
- 5 / 4kHz: 1.5 m (59")
- 40kHz: 0.30m (12")
- 20kHz: 0.45m (17")
- 10 / 9kHz: 1.0 m (39")

### 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 / 9kHz | for extended range positioning applications      |

### Resolution

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

### Sensor Accuracy

- +/- 0.25% 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).

### Transducer / Amplifier Separation

- Up to 1000m using specified extension cable.

### Hawk Measurement Systems (Head Office)

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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.hawkmeasurement.com](http://www.hawkmeasurement.com)

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

### Cable

- 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).

### Maximum Operating Pressure

- +/- 7.5 PSI (+/- 0.5 Bar).

### Beam Angle

- |        |                   |                                      |
|--------|-------------------|--------------------------------------|
| • 7.5° | without focaliser | 50kHz / 40kHz / 30kHz                |
| • 4°   | with focaliser    | 50kHz / 40kHz                        |
| • 6°   | with focaliser    | 30kHz / 20kHz / 15kHz / 10kHz / 5kHz |
| • 10°  | with focaliser    | 9kHz / 4kHz                          |

### Display

- 2 line x 12 digit alphanumeric LCD.

### Memory

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

### Enclosure Sealing

- Integral System IP67
- Remote Transducer IP68.
- Remote Electronics: Rated IP65 (NEMA 4x). Designed for and tested to pass IP66 hose and IP67 submergence standards

### Cable Entries

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

### Mounting

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

### Typical Weight

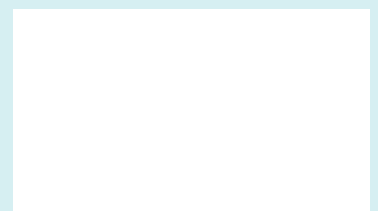
Sultan System with appropriate flange and cone

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

Represented by:



### Hawk Measurement

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