Quickstart

Sultan
Acoustic Wave Series

Level, Flow, Positioning, Collision Protection

For more information, please visit >
www.hawkmeasure.com

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This is a Quickstart for the Sultan series.

A full version manual can be downloaded from www.hawkmeasure.com
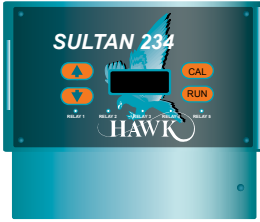
Remote Amplifier

Panel Mount Remote Amplifier

10kHz Remote Transducer
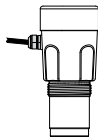
Flange

Cone
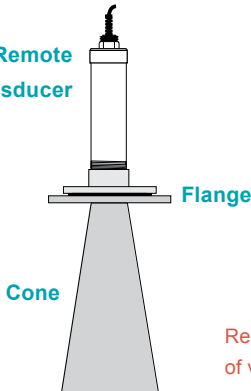
40kHz Remote Transducer

Remote systems consist of an amplifier and separate transducer of varying size & shape depending on frequency

50kHz SMART Unit

30kHz Integral Unit

SMART & Integral units combine both the amplifier and transducer functions in a single housing

AWR234 Remote Amplifier

1 Remove red cap (including cardboard).

2 Screw the flange assembly fully down onto the cone (as far down as it will go until the parts are tightly fastened).

Note! Direction of flange, smallest ring this way up ↑

3 Screw the transducer tightly down onto the flange and cone assembly.

4 Tighten the locking ring down to the flange to fix the components in place.

COMPLETE ASSEMBLY (appearance above flange may differ for integral and smart units).

User mountings should only connect to the larger (lower) isolated mounting flange. No other part of the sensor assembly should touch any other structure or object.

Sultan Remote Units

The Sultan Remote amplifier has wiring information printed inside the flip lid of the unit.

Unscrew the lower flip lid to access the wiring terminals.

Ensure your power source is deactivated before handling power wires.

Pass cables through the cable entry gland before wiring into the terminal block.

To connect a wire, remove the required terminal block with pliers place the wire in firmly screw down the connection. The transducer terminals are labeled by colour on the PCB.
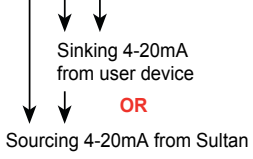
If you are connecting HawkLink communications, connect the blue wire to B and the white wire to A. The black wire can be connected to the DC- or GND terminal next to A.

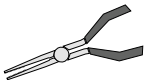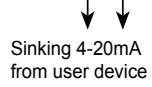Tighten cable entry gland(s) and cover to ensure sealing is effective.

234 wire version

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
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
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'.

2 wire version

Test In	⏚	COMMS		Shld	Shld
		A	B		
7	8	9	10	11	12
1	2	3	4	5	6
RED	BLACK	BLUE	WHITE	+	−
TRANSDUCER				4-20mA	

Sinking 4-20mA from user device

Use long nose pliers to extract terminals

Sultan Integral Units

The Sultan Integral unit has wiring information printed inside the flip lid of the unit.

Unscrew the lid to expose the facia.

The lid can be snapped back to allow easier access for wiring. When finished, first re-snap the double hinge into position before closing the lid. The top half of the facia is a flip cover which exposes the wiring terminals.

Ensure your power source is deactivated before handling power wires.

Pass cables through the cable entry gland before wiring into the terminal block.

To connect a wire, push down on the button above the terminal with a small flat head screwdriver and place the wire in the terminal. Release the pressure on the button to close the terminal and then pull on the wire to check that it is secure.

If you are connecting HawkLink communications, connect the blue wire to B and the white wire to A. The black wire should be connected to the Shld terminal.

Tighten cable entry gland(s) and cover to ensure sealing is effective.

234 wire version

RELAY 1			COMMS			RELAY 2		
NC	COM	NO	A	B	Shld	NC	COM	NO

L1   N   ⏚   −   +   Is   Test In   −   +

AC-In   4-20mA   DC-In

Sinking 4-20mA
from user device

OR

Sourcing 4-20mA
from Sultan

2 wire version

COMMS		
A	B	Shld

−   +   Test In

4-20mA

Sinking 4-20mA
from user device

Ensure that any unused cable gland entries are plugged or sealed.

Sultan Panel Mount Units

The Sultan Panel Mount has wiring information printed on the back of the unit.

Terminal blocks can be removed during installation to allow easier wire connection. Take care to return them to the correct position.

Ensure your power source is deactivated before handling power wires.

Ensure terminals are open by screwing counter clockwise with a flat head screwdriver. Place the exposed wires into the open terminals and tighten until firm.
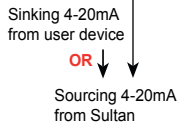
The transducer terminals are labeled by colour on the back panel.

If you are connecting HawkLink communications, connect the blue wire to B and the white wire to A. The black wire can be connected to the DC- or GND terminal next to A.
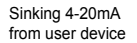
234 wire version

Sinking 4-20mA from user device

OR

Sourcing 4-20mA from Sultan

2 wire version

Sinking 4-20mA from user device

Sultan SMART Units

The Sultan SMART unit has wiring information printed inside the lid of the unit.

Screw Cap Version

Unscrew the lid to expose the terminals. It is recommended you remove the terminal block from the unit before wiring - to do this, insert a screw driver into one of the middle terminals to lever the block out.

Pass the cables through the cable entry gland before wiring in to the terminal block.

Ensure the terminal is open by screwing counter clockwise with a flat head screwdriver. Place the exposed wires into the open terminals and tighten until firm. Insert the block back into the unit when wiring is complete. Press firmly on the plug in terminal block to ensure it is fully home.

If you are connecting HawkLink communications, connect the blue wire to B and the white wire to A. The black wire can be connected to the DC- terminal next to B.

Tighten cable entry gland(s) and cover to ensure sealing is effective.

IP68 Sealed Cable Version

Connect the free ends of the cable following the wire colours as shown in the terminal diagrams.

AWSTA version

		PURPLE	WHITE	BLUE	BLACK		GREEN	YELLOW
⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘
		Test In	A	B	−		−	+
				COMMS			4-20mA	

Sinking 4-20mA
from user device
(loop powered)

AWSTC version

BROWN	ORANGE	PURPLE	WHITE	BLUE	BLACK	RED		
⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘
COM	N / O	Test In	A	B	−	+		
RELAY				COMMS	DC in			

AWSTD version

| BROWN	ORANGE	PURPLE	WHITE	BLUE	BLACK	RED	GREEN	YELLOW
⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘
COM	N / O	Test In	A	B	−	+	−	+
RELAY				COMMS	DC in		4-20mA	

Sinking 4-20mA
from user device

When connecting the 4-20mA output to a user device such as a PLC input, DCS or indicator, use a voltmeter to check the field wires to be used for the 4-20mA signal. If DC voltage around 24V is present, use sinking connection. If no voltage is present, use sourcing connection.

SOURCING Type Output

Sultan output is sourcing current and provides voltage to drive a passive load, PLC input, indicator or other user device.

Voltage free user device
RL Max 270Ω
4-20mA
Use shielded cable
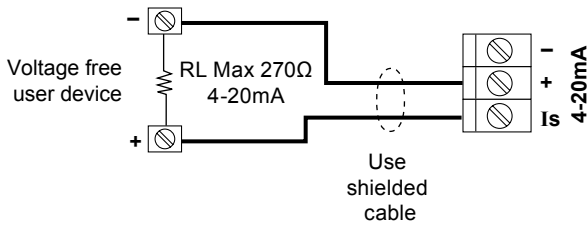
NOTE:
Isolated current output can be made common with +DC or GND if required.
(e.g. RL – connected to GND)

SINKING Type Output (also 2 wire loop powered)

Sultan output is sinking current. Voltage to drive current loop must be provided by PLC, indicator, other user device or external DC supply.

User device including +24VDC source
Use shielded cable
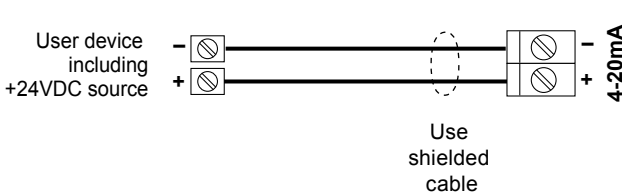
NOTE:
RL Max = 750Ω if user DC Supply 24V.

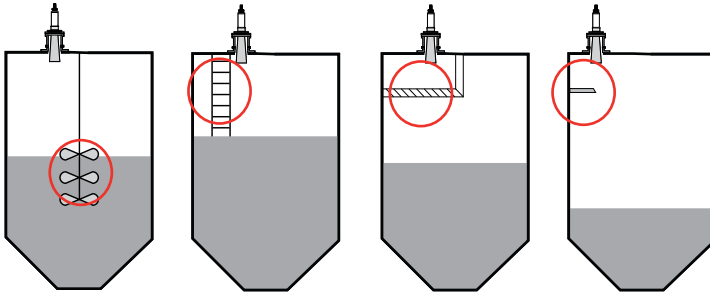For further connection options see Sultan manual.

These are examples of common INCORRECT mountings which can prevent the unit from operating correctly.
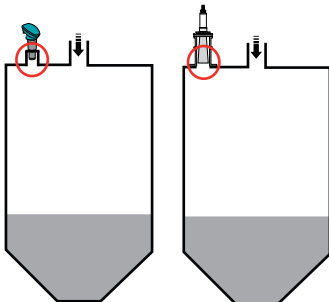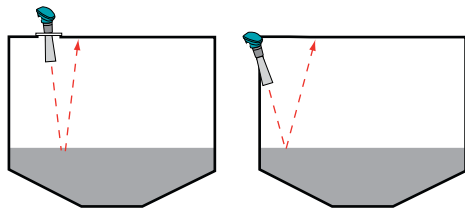
Do **NOT** mount near infeed
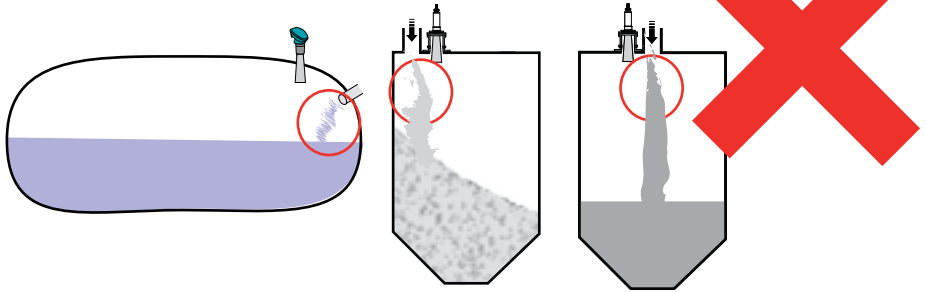
Do **NOT** mount over or adjacent to **any** obstacles

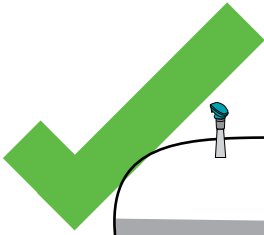Do **NOT** mount cone or transducer face above roofline
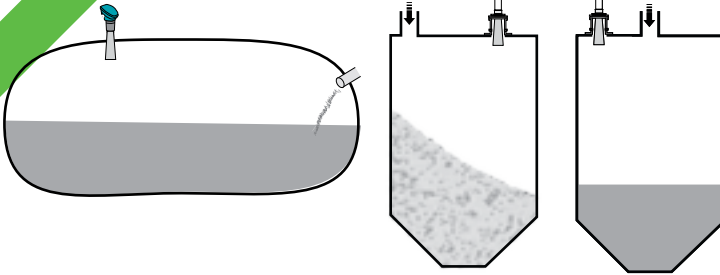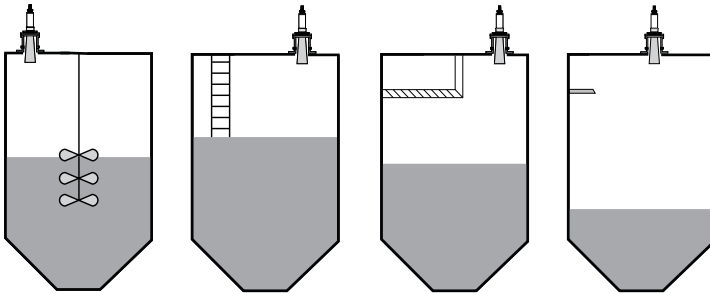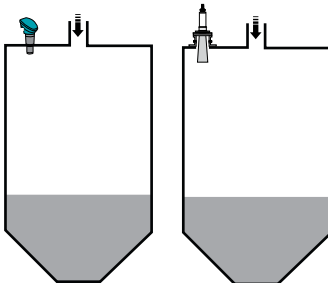
Do **NOT** mount on angle in liquid applications
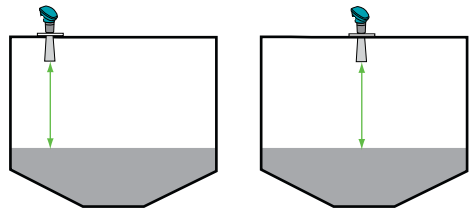
Mount away from infeed

Mount away from all obstacles

Mount cone / transducer face within the vessel

Mount perpendicular to liquids

Amplifier

Select a suitable mounting position that is protected from direct sunlight. If necessary, utilize a sun hood (Hawk supplies purpose made sun hoods). Observe the minimum and maximum temperature limits (-20°C/-4°F to 60°C/140°F) Do not mount near sources of electrical noise such as high current cables, motor starters, or variable speed drives. Avoid mounting in high vibration areas such as handrails and rotating plant. Use rubber absorption mounts if mounting in light vibration areas. Protect the PCB assembly before knocking out the cable and conduit entry holes.

Panel Mount

• Select a suitable position within a panel layout which allows clearance around the outside of the front panel of the unit and also behind the panel for clearance around the screw fixing clamps used to retain the unit.

• Ensure that sufficient space is available behind the panel to accommodate the depth of the amplifier housing, and also allow cable bend clearance for wiring to the terminals on the rear of the amplifier.

• Mark and cut a 90x90mm (3.54x3.54") square cut out through the panel in the desired position.

• Insert the Sultan amplifier through the panel and install supplied screw clamps into the slotted holes in the amplifier housing.

• Tighten the screws until just firm to secure the amplifier in place.

• Connect wiring as required to the correct terminals on the removable rear panel connectors. When plugging connectors in to the rear panel, ensure that they are re-installed in the correct position.

Transducer

Selecting a suitable position to mount the transducer on the vessel is the single MOST IMPORTANT step. Please read all of the installation guide and contact your Hawk representative if you have any doubts or questions. The transducer face MUST be at least the blanking distance away from highest product level in the vessel.

Use common sense when selecting the transducer mounting position. **A clear line of sight from the transducer to the product being monitored is required.**

Take into account the change in material shape and level. The acoustic pulse must reflect back to the transducer.

Incorrect Mounting

Failure to mount the unit suitably can result in incorrect measurement and may cause process issues such as overfilling or damage to critical components.

Process Conditions

Ensure the process conditions within the vessel such as temperature, pressure and chemical composition of contents are within the specifications Sultan unit. The unit should not normally come into contact with the measured content.

Minimum Insertion

The transducer face or cone must be at least 50mm (2 inches) inside the tank.

If the transducer needs to be mounted above the roof line, use an appropriate standpipe or nozzle.

Nozzle mount

Flush mount

Stand pipe mount
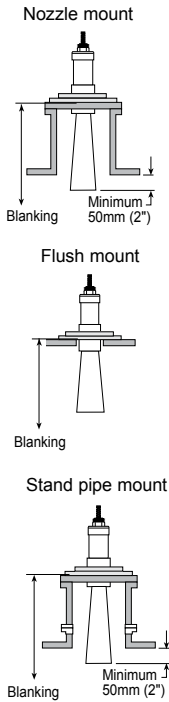
Moisture Seal

Sultan Integral and Smart units have cable glands with a moisture seal which must be tightened around the cable. Any unused glands must be plugged and sealed.

Transducer Location

It is vital that the Transducer has a clear view of the product surface at all times and is kept **away from the inflow** to avoid interference.

Blanking Distance

The unit will ignore any echoes and will never measure within its Blanking distance.

Minimum values must be respected. Where possible use the conservative values and increase this distance by 50% if there is foam, dust, steam, or condensation in the vessel being monitored. *(Refer to Blanking Distance table.)*

If using a flange mounting, use a rubber or neoprene gasket and washers. If using a nipple mounting, ensure that the mounting bracket is **>6mm (0.24 in) from the rear** of the transducer. Do not over tighten the lock nuts.

Blanking Distance		Minimum	Nominal	Conservative
Transducer Frequency				
AWRT50	50kHz	0.25m (10")	0.3m (1ft)	0.35m (1.2ft)
AWRT40	40kHz	0.3m (1ft)	0.35m (1.2ft)	0.4m (1.3ft)
AWRT30	30kHz	0.35m (1.2ft)	0.4m (1.3ft)	0.5m (1.6ft)
AWRT20	20kHz	0.45m (1.5ft)	0.6m (2ft)	0.7m (2.2ft)
AWRT15	15kHz	0.6m (2ft)	0.7m(2.2ft)	1.0m (3.2ft)
AWRT10	10kHz	0.75m (2.5ft)	1.1m (3.6ft)	1.3m (4.2ft)
AWRT5	5kHz	1.0m (3.2ft)	1.5m (4.9ft)	1.8m (5.9ft)

Always use conservative nominated distances if possible.

SOLID (Granular)

Aim transducer at point of outfeed.
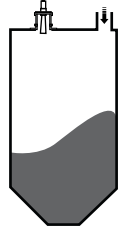
LIQUID

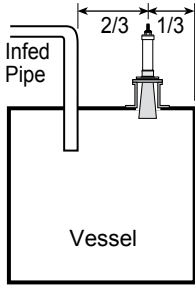Transducer should vertical

DUAL OUTFEED

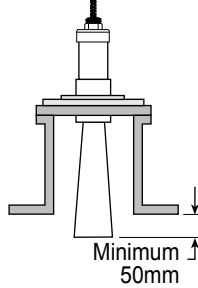Two transducers may require anti-crosstalk wiring setup (see manual)
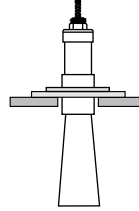
POWDER

Mount away from infeed

MOUNTING POSITION

2/3 1/3

Infed Pipe
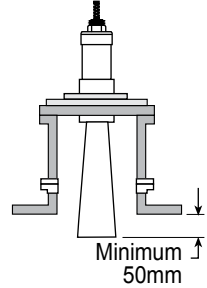
Vessel

NOZZLE MOUNT

Minimum 50mm

FLUSH MOUNT

STAND PIPE MOUNT

Minimum 50mm

2" VERSION

Correct

Vessel roof

min 20mm inside tank
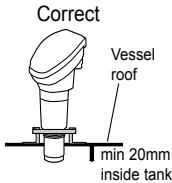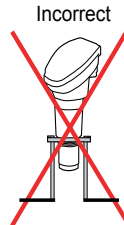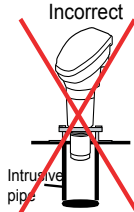
Threaded mounting should only be used where a flange/cone mounting is impossible.
Hawk recommends & supplies focaliser cones for all transducers.

Incorrect

Intrusive pipe

Incorrect

Face must not be inside mounting

After the unit has been installed, mounted and powered you can now enter the Quickstart settings to get the unit operational in your application conditions.

Be sure to enter settings for High & Low level, App Type, Fill Rate and Empty Rate of your vessel.

If you are unsure of your specific fill & empty speed enter a value you are sure is faster than your process.

All of the mentioned settings (except Blanking) are in the '**Quickset**' menu of the unit. You access this menu on the control pad by pressing **CAL** and entering Unlock code 0.

You may also need to set relay switch points. These are found in '**Output Adjustment**'. Relay alarms can be set on/off for hi/lo levels and failsafe.
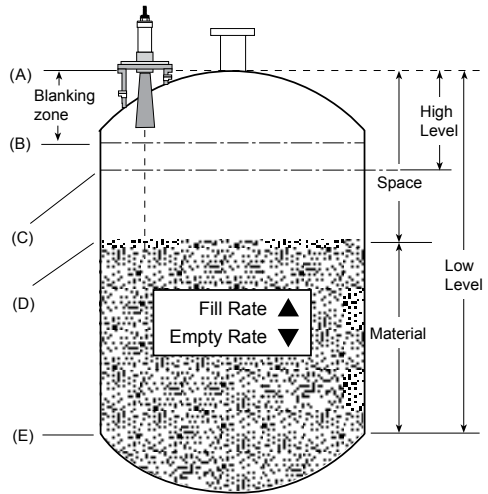
(A)	Transducer Face - Top of Flange
(B)	End of Blanking Zone
(C)	High Level or 100% (20mA) position.
(D)	Product Level being measured
(E)	Low Level or 0% (4mA) position.

High Level = Distance A to C
Low Level = Distance A to E

Quickset

Parameter	Description	Options			
Unit	Adjust displayed measurement unit	Inches	Feet	Meters	Centimeters
Low Level	Set Low level measurement point (4mA)	Adjustable			
High Level	Set High level measurement point (20mA)	Adjustable			
Failsafe	Set failsafe output & timer	20mA 4mA	LastKnown 20.20mA	3.80mA 3.50mA	Failtime (seconds)
App Type	Unit setup for specific application	Various			
FIll / Empty Speeds	Unit setup for application process speed	View	Fast / Med / Slow		Custom (units per hour)
DispMode	Set LCD measurement display mode	Space	Material	Matrl%	

Relay Actions

Sub-Menu	Description	Options
RlyL1 1-5	Adjust Relay switch point (L1 must be < L2)	Adjustable
RlyL2 1-5	Adjust Relay switch point (L2 must be > L1)	Adjustable

- Set Relay Parameters in Output Adjustment menu
- The two relay levels are RlyL1 and RlyL2
- The display will show RlyL1 1, the last 1 indicated the Relay number (eg 1 to 5)
- L1 and L2 distances are measured from the transducer face

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