A Higher Level of Performance

Manual

Gladiator

Vibration Smart Switch Series

A Level Switch for Liquids and Solids



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PROPRIETARY NOTICE

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WARNING

This instrument contains electronic components that are susceptible to damage by static electricity. Proper handling procedures must be observed during the removal, installation, or handling of internal circuit boards or devices:

Handling Procedure:

1. Power to unit must be removed prior to commencement of any work.
2. Personnel must be grounded, via wrist strap or other safe, suitable means, before any printed circuit board or other internal devices are installed, removed or adjusted.
3. Printed circuit boards must be transported in a conductive bag or other conductive container. Boards must not be removed from protective container until the immediate time of installation. Removed boards must be placed immediately in a protective container for transport, storage, or return to factory.

Comments:

This instrument is not unique in its content of ESD (electrostatic discharge) sensitive components. Most modern electronic designs contain components that utilize metal oxide technology (NMOS, CMOS, etc.). Experience has proven that even small amounts of static electricity can damage or destroy these devices. Damaged components, even though they appear to function properly, exhibit early failure

The Gladiator Smart Vibration Switch is a third generation, state-of-the-art level probe, designed to operate in tough industrial environments. The forks of the vibration switch are driven to vibrate like a 'tuning fork'. When material touches the forks, their vibration is changed and output will switch in response. The output has adjustable hysteresis and delays for 'on' or 'off' switching.

A test function is available to remotely confirm the probe integrity by switching the relay contacts. The Gladiator Smart Switch Series includes communications capability for remote adjustment, control and monitoring.

Principle of Operation

A stainless steel tuning fork is driven by piezo ceramic elements, causing it to vibrate at its resonant frequency. When the material to be detected covers the fork, vibrations are damped. The changed vibration is sensed electronically, and the processed signal is used to switch a relay for indication or control purposes.

Typical Uses

- Failsafe high-level / low-level alarm
- High-level alarm
- Low-level alarm
- Solids in liquid interface detection
- Pump control.

Function

Point level switch for liquids, solids and slurries.

Primary Areas of Application

- Brewing
- Cement
- Chemical
- Dairy
- Edible oil
- Fertilizer
- Food & Beverage
- Glass
- Mining & Metals
- Oil & Gas
- Packaging
- Paint
- Paper
- Pharmaceutical
- Plastics
- Power Generation
- Refining
- Semiconductor
- Sugar
- Textile
- Water & Wastewater

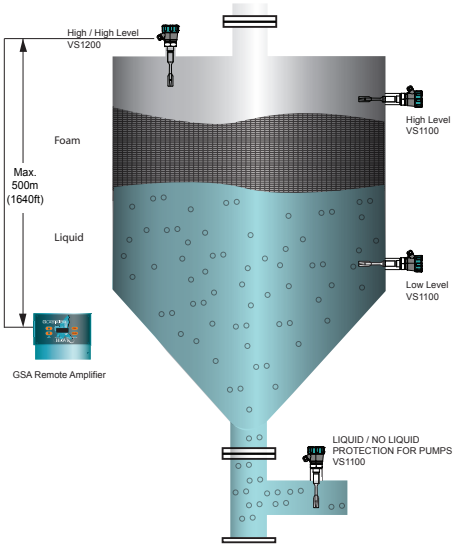
Features

- Suitable for a wide range of solids, liquids and solids in liquid interfaces
- Simple '1-minute' setup
- Heavy duty construction
- Remote sensor or Smart 'all in one' types
- Relay outputs: Smart probe (1) Remote (2)
- Remote test function
- Adjustable ON and OFF delays (0-20 sec)
- Remote GSM Connection option
- Remote amplifier to probe separation up to 500m (1640 ft)
- Bright visual status indication on probe
- Independent housing alignment after mounting thread locked

Level switch in liquid tank



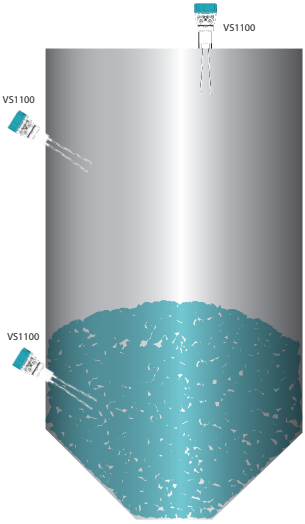
High and low liquid level switch in tanks



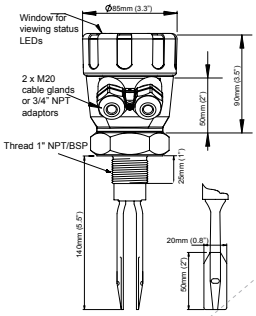
Level switch in a plastic pellet silo



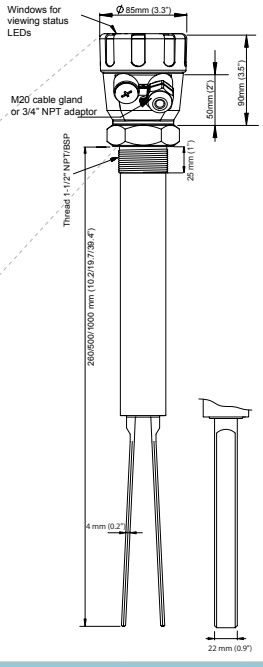
High and low level switch in hopper

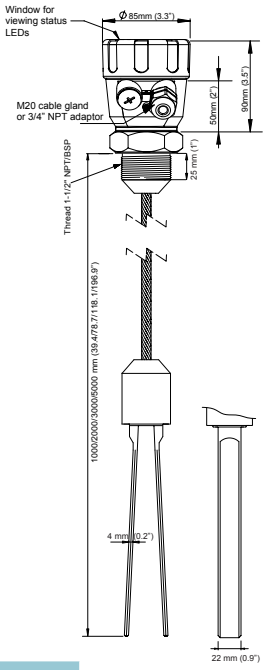


Liquid Probe

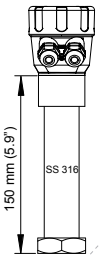


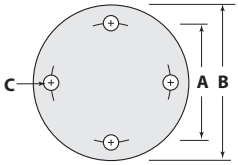
Solid Probes





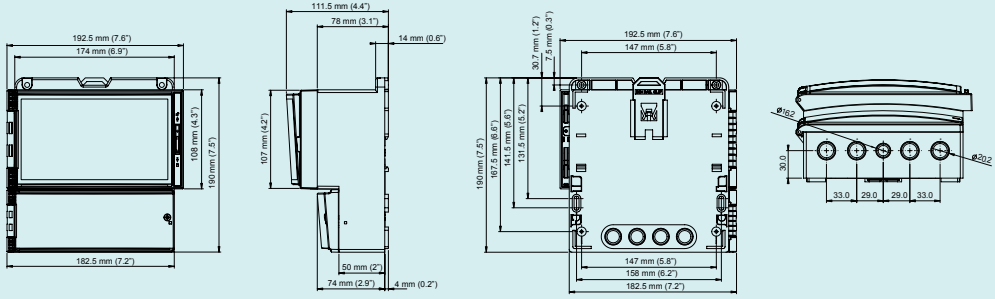
Temperature Extension Option





Flange Dimensions - 50mm (2")			
	A	B	C
ANSI (Class 150)	120.7 4.75"	152.4 6"	19.1 0.75"
DIN (PN40)	125 4.9"	165 6.5"	18 0.7"
JIS (10K)	120 4.7"	155 6.1"	19 0.75"

Remote Amplifier



Probes can be mounted from above or from the side of a vessel..

Points to consider when mounting:

A. Material infeed clearance

Install the probe away from the infeed to minimize the influence of build-up and impact forces, and to avoid false triggering from product flow.

B. Wall clearance

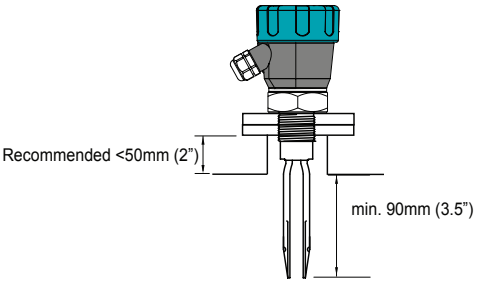
Install the probe far enough away from the wall to prevent the forks from coming into contact with the vessel wall. Avoid creating a confined area where material could build-up over time.

See note ②

C. Nozzle clearance

Ensure that the probe forks do not come into contact with the mounting nozzle.

Correct Mounting in a Nozzle



D. Top mounting

When top mounting, ensure adequate clearance is provided between forks and the wall. Avoid creating a confined area where material could build-up over time. In the case of cable probe versions, ensure enough clearance is provided between the forks and wall to allow for build-up of material occurring on the wall.

See note ②

E. Side mounting

It is highly recommended to install any side mounted probe at a downward angle of 30-45º. Use a protection plate for side mounting where the probe may be subject to impact, strain or collapsing material.

F. Bottom mounting

Bottom mounting is not recommended. Only mount from the bottom if no build-up of material occurs. If low level mounting is required, suitable options are shown in the diagram on next page.

CORRECT MOUNTING NOTES:

(Refer to diagram on next page)

① Select correct probe for high temperature applications.

Allow adequate air flow for cooling extensions dissipate heat.

INCORRECT MOUNTING NOTES:

② Incorrect mounting because the probe is too close to the wall or roof. Material may build-up between the probe and the vessel.

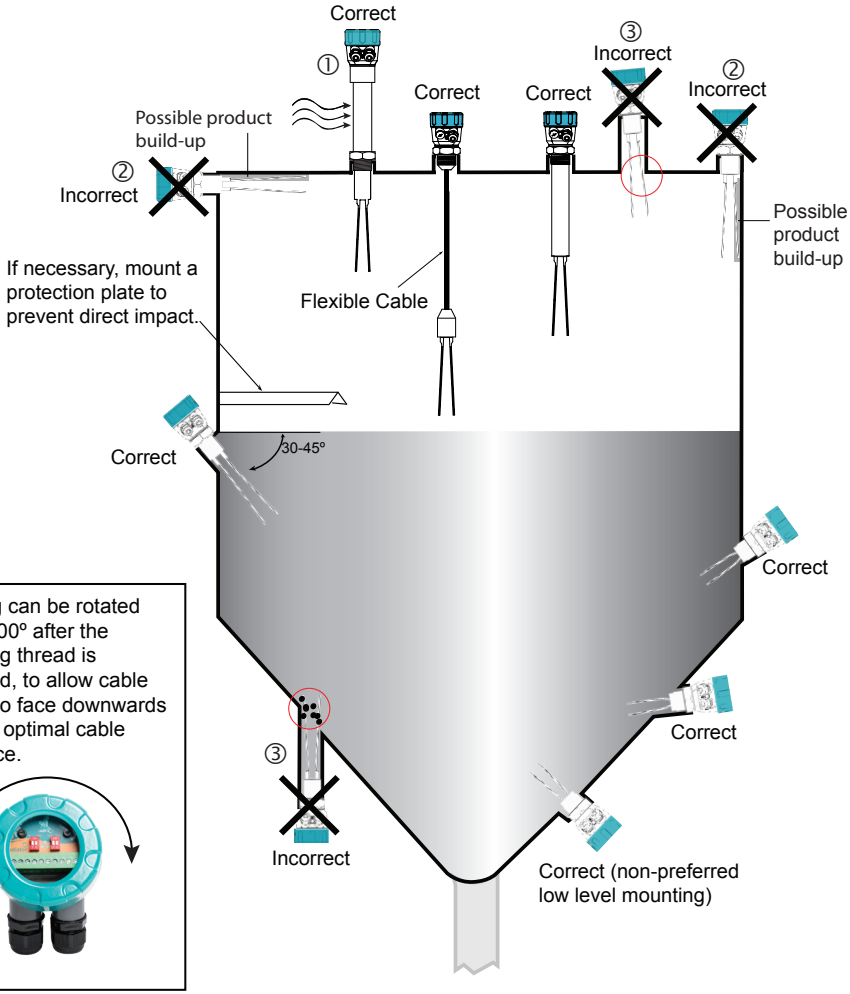
③ Incorrect mounting because the probe is touching the nozzle. The probe forks must not touch the nozzle or any part of the vessel. Build-up must not bridge from the forks to the nozzle, or between the forks.

Mounting

Probes can be mounted from above or from the side.

Use a protection plate for side mounting where the probe may be subject to impact damage.

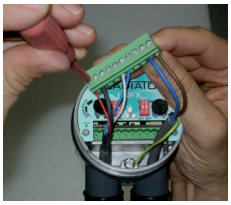
Install the Probe far enough away from the vessel wall to prevent the forks from coming into contact with the wall, and prevent build-up of product between the forks and the wall over time.

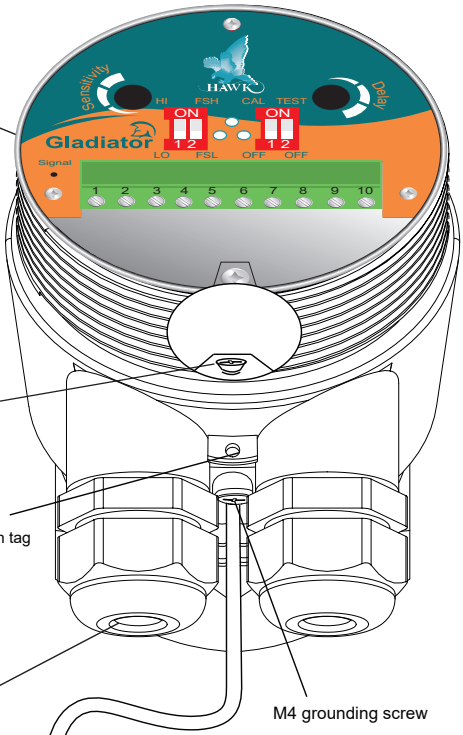


Housing can be rotated within 200° after the mounting thread is tightened, to allow cable entries to face downwards or allow optimal cable clearance.

Integral Probe Wiring

Remove Plug-In terminal block for easier wiring.





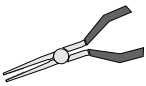
The AC earth/ground cable must be connected to the ground screw inside the housing when using AC power.

Hole for securing of optional identification tag

If only one cable is used for both power and output signal, then the second entry port must be plugged or blinded. Every Smart unit is supplied with two M20 glands (or 3/4"NPT adaptors) mounted on the unit and one blind plug loose.

Ground the housing to vessel, if vessel is metallic. Ground the housing to plant ground, if vessel is non-metallic.

M4 grounding screw



User pliers to extract terminal blocks

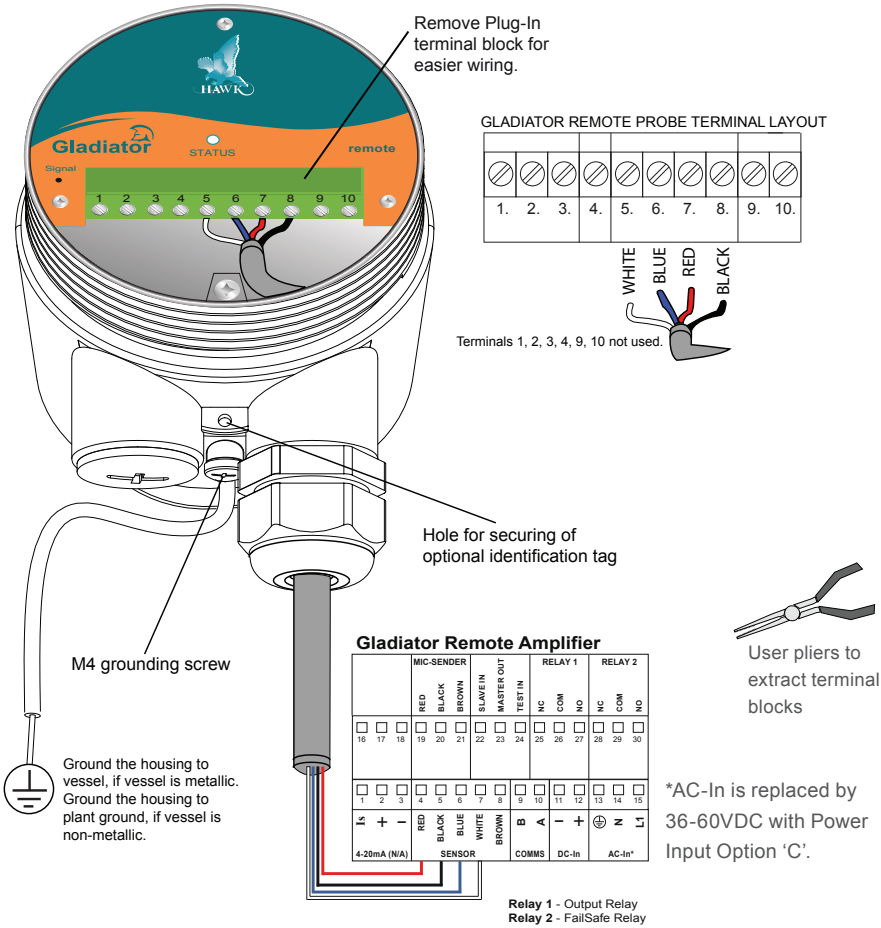
Terminal Layout - Output Option S (SPDT)

RELAY				COMMS		DC-IN		AC-IN	
NC	COM	NO	Test	A	B	+	-	N	L1
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
				RS 485		12-30Vdc		80-265Vac	

Terminal Layout - Output Option D (DPDT)

RELAY						DC-IN		AC-IN	
NC1	COM1	NO1	NC2	COM2	NO2	+	-	N	L1
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
						7-30Vdc		80-265Vac	

Remote Probe to Amplifier Wiring



Cable type between Amplifier and Probe

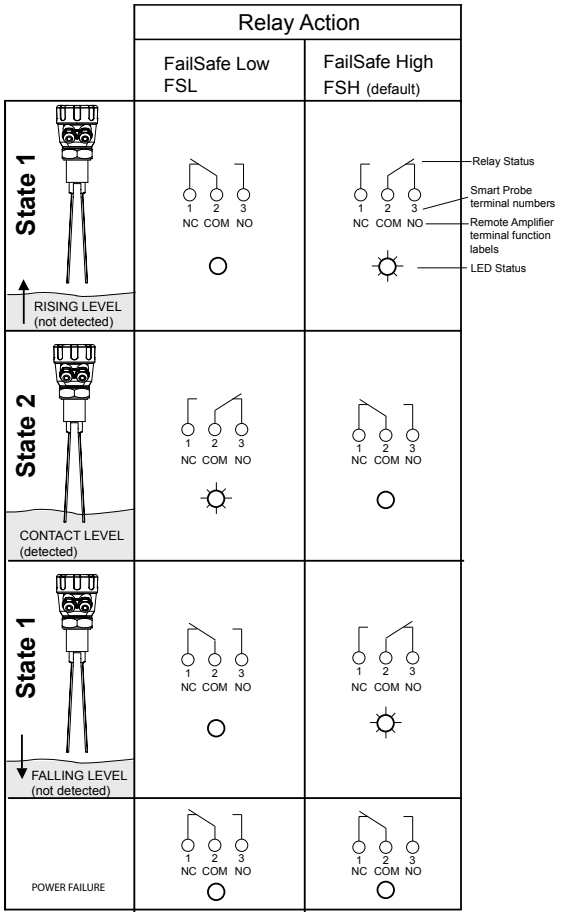
- Cable type between Amplifier and Probe
- 4 conductor shielded twisted pair instrument cable
- Conductor size dependent on cable length
- BELDEN 3084A, DEKORON or equivalent
- Max: BELDEN 3084A = 500m (1640ft)
- Max: DEKORON IED183AA002 = 350m (1150 t).

Relay Functions

Level Switch Contact Action

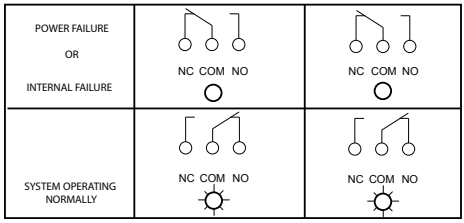
Relay - for Smart Probe version
(Set Relay Action selection switch - page 13)

Relay 1 - for Remote Version
(Set 'Relay Action' parameter - page 20)



FailSafe Switch Contact Action

Relay 2 - Remote version only.
For Smart Probes the 'Test' terminal can act as a solid state output with a similar function (*see page 12*).

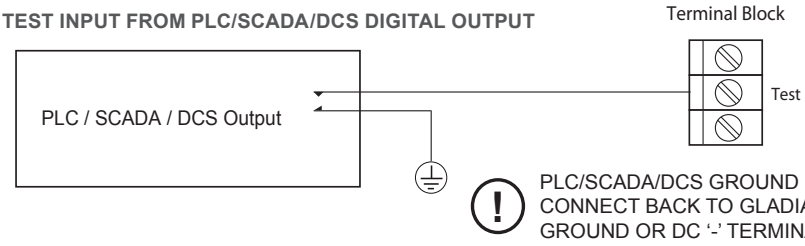


Test Terminal Function Selection (SPDT Only)

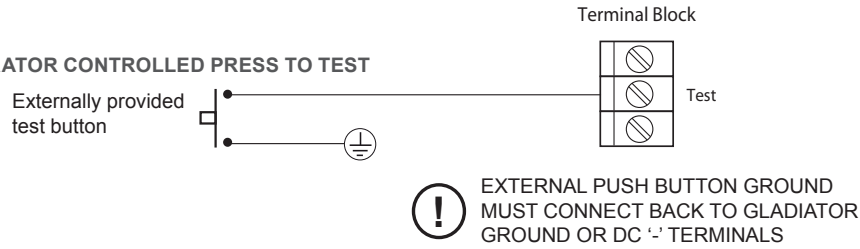
Test input mode

Test switch must be in 'TEST' (ON) position on Smart Probe - function always enabled on Remote Amplifier. Test terminal acts as an input for remote testing of the instrument's switching function. Used to check for malfunction of unit from a remote position, PLC, SCADA etc.

TEST INPUT FROM PLC/SCADA/DCS DIGITAL OUTPUT



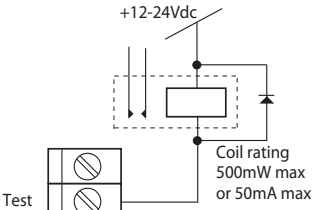
OPERATOR CONTROLLED PRESS TO TEST



FAILSAFE OUTPUT MODE (Test switch must be in the 'OFF' position - default setting)

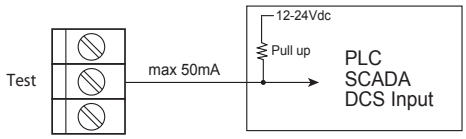
Test terminal will provide an output which is able to switch an external failsafe relay or PLC/SCADA/DCS input. During normal system operation this terminal will internally switch a solid state (transistor) output to ground (or DC '-'). If power fails or an internal system failure occurs, the terminal will act as an open circuit.

To switch an external relay



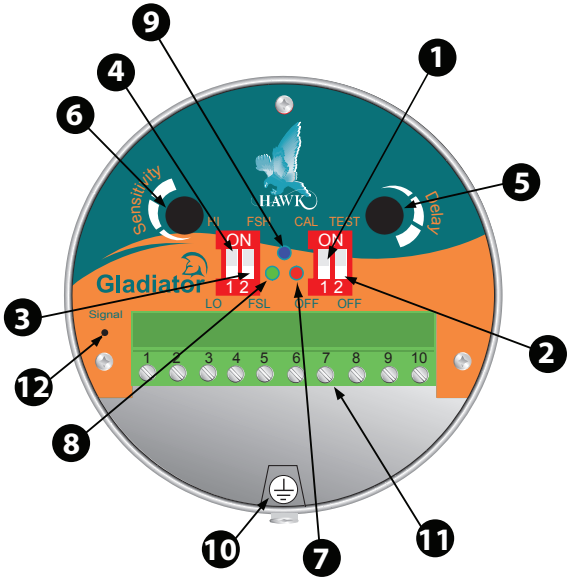
Relay will turn on during normal system operation or off in failed or unpowered conditions.

To a PLC input



Input will detect '0' state during normal system operation, or '1' in failed or unpowered conditions.

Smart Probe Functionality Layout



Functionality Description (bold is default)

1. Mounting Calibration switch CAL/**OFF**
2. Test input function select TEST/**OFF**
3. Relay action selection switch
   FSH - FailSafe High
   FSL - FailSafe Low
4. **HI** / LO sensitivity switch
5. Delay Potentiometer (0-20 sec) (Default 0 sec. at minimum position)
6. Sensitivity Potentiometer Default **50% = 12 o'clock**
7. RED LED: Relay status
   ON when relay coil is energised
8. GREEN LED: Power / Status
   Blinks to indicate the functioning is correct and no media is detected.
   Continuously ON when media is detected.
9. BLUE LED:
   Blinking indicates calibration function is on.
   Continuously ON indicates failed calibration.
10. AC Ground - must be used for AC powered installations
11. Removable terminal block - plug in type
12. Signal voltage test point

Smart Probe Version (Single Level and Interface Level)

1. Mount the unit in its actual position.

(See mounting procedure - pages 6-7)

- Make sure that external ground wire is connected between the outside ground screw on the Gladiator housing and the roof/wall/side of the silo/tank/vessel/chute. (For non metallic tanks make sure that external ground wire is connected between the same outside ground screw on the housing and the general plant ground potential).

2. Check where the actual level is relative to the probe

- For **Single Level** units, make sure that product is not touching the probe forks. For **Interface Level** units, the probe should be submerged in the liquid.

3. Turn the power on

- The green LED will either stay on for 2 seconds then begin flashing or stay on permanently to indicate operation.

4. Select the required relay contact action

- The Relay can switch 'ON' or 'OFF' as the product approaches the probe and switch 'ON' or 'OFF' in response to an instrument failure *(for details see page 13).*
- Set the relay action selection switch position (FSL or FSH) depending on your requirements.

5. Cancel influence of mounting and/or build up

- For **Single Level** units, do not proceed with this step unless the product is not touching the probe forks.
- For **Interface Level** units, the probe must be submerged in the liquid and not making contact with the solids interface.
- Switch the Mounting Calibration switch to 'CAL' (ON) position.
- The Blue LED will blink to indicate that mounting calibration is now in progress.
- Wait for at least 10 sec. then switch the mounting calibration switch to 'OFF' position.
- The Blue LED should turn off after a short time.
- The Blue LED will stay on if there was a calibration error.
- If this is the case, please check that the probe is not touching the product or the mounting, then try the calibration again.
- If mounting calibration was successful the blue LED should be off and the Green LED should blink every 2 sec.
- Unit is now able to cancel influence of mounting and/or build-up and probe history has been cleared.

Smart Probe Version (Single Level and Interface Level)

6. Select the sensitivity

There are two adjustments controlling the sensitivity of the switch point:

6.1. The 'HI/LO' sensitivity switch is used to set your unit depending on the specific gravity/bulk density of the product to be measured. This switch sets the range of adjustment possible with the sensitivity potentiometer.

- If the material to be detected has a low specific gravity/bulk density - set the switch to 'HI' (ON) - default.
- If material to be detected has a high specific gravity/bulk density - set switch to 'LO'
- If you are not aware of the specific gravity/bulk density of your material – set the switch to 'HI' (ON) - default.

6.2 The sensitivity potentiometer

- Set the potentiometer according to your requirements.
- A 9 o'clock setting will cover the majority of instances - for the remaining instances, turning the potentiometer clockwise will increase sensitivity.
- Increasing sensitivity maybe necessary if the product is not detected when touching the probe.

7. Select the time delay

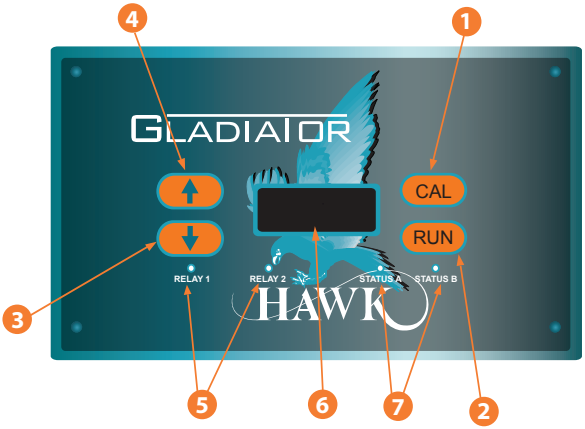
- Set the required delay using the Delay potentiometer (Default is 0.1 sec. at minimum position).
- Turn the potentiometer clockwise if any delay is required.
- Maximum rotation is ¾ of a revolution.
- Max delay is 20 sec.
- The selected delay will be used for both an ON delay and an OFF delay.*

8. Test function (used to check for malfunction of unit from remote position, PLC, SCADA etc)

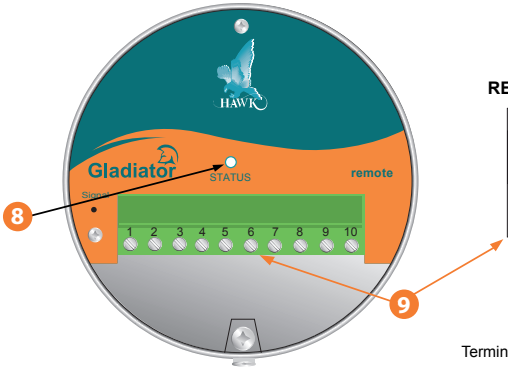
- Select the desired Test function by switching the 'Test' switch (Default = 'OFF').
- **TEST' (ON) Position:**
  - Test function is selected.
  - Test terminal (terminal number 4 of Smart probe) is used as an input to the unit.
  - The test function allows you to check the functionality of the unit.
  - Applying a ground wire to the Test terminal will change the state of the relay. It will hold this state until the ground is removed, then it will change back to the standard running mode.
  - If the unit was in a Fail mode then the relay will not change status.
- **'OFF' (Default) Position:**
  - Fail safe output function is selected.
  - Test terminal (terminal number 4 of Smart probe) will function as an open drain drive.
  - This can be used to drive a relay or an active low PLC input to detect a Fail condition.
  - In normal operation mode the Test terminal will output Zero Volts (Short to GND).
  - In Fail or unpowered mode the Test terminal will be open circuit.

**Setting of different time ranges for the delay potentiometer for ON delay and OFF delay is possible using a PC connected via GosHawk2 software. By default, both will have the same time adjustment range (20 sec max) and adjustment will result in equal ON delay and OFF delay.*

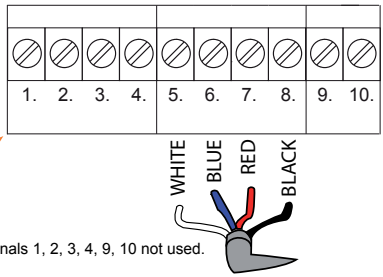
Remote Functionality Layout



1. Calibrate button
2. Run button
3. Down button
4. Up button
5. Relay status LEDs 1 and 2
6. Display (LCD with backlight)
7. Status LEDs A and B
   - Status A flashes with probe to amplifier communications
   - Status B has no function in this product



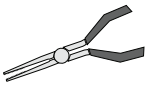
REMOVABLE REMOTE PROBE TERMINAL BLOCK



Terminals 1, 2, 3, 4, 9, 10 not used.

8. GREEN LED: Power / Status
   Blinks every 1/2 second to indicate that functioning is correct and no medium is detected.
   LED on continuously indicates correct functioning and media is detected.

9. Removable terminal block - plug in type



User pliers to extract terminal blocks

Remote Version

1. Mount the unit in its actual position.

(See mounting procedure - page 6-7)

- Make sure that external ground wire is connected between the outside ground screw on the Gladiator housing and the roof/wall/side of the silo/tank/ vessel/chute. (For non metallic tanks make sure that external ground wire is connected between the same outside ground screw on the housing and the general plant ground potential.)

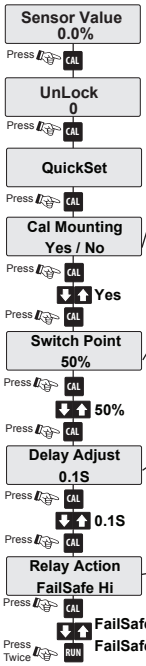
2. Check where the actual level is relative to the probe.

- Make sure that product is not touching the probe forks

3. Turn the power on

- The display will turn on and the failsafe relay will switch.
- The display will scroll through the following messages: Hawk, Amp SerialNo, Type, Amp Soft Ver, Device ID, SensorSerial, SensorModel, Sens SoftVer, Sensor Addrs, Gladiator System Amp
- The unit will then go into operational mode displaying 'Sensor Value' with a % value. This % value represents the changing vibration loss of the forks.

4. Simple "1-minute" Setup - Follow the flow chart



Cancel Influence of Mounting

Do not proceed with this step unless the product is not touching the probe forks.

Select 'Yes' to start the mounting calibration. 'Wait' will be displayed during the calibration for up to 30 seconds.

Unit is now able to cancel the influence of the mounting. The % reading has been zeroed with the existing process conditions and probe history log has been cleared.

Select the Switch point (sensitivity)

The output relay will switch at the entered % value. The default value of 75% will be suitable for detecting most media. For detection of products having low specific gravity/bulk density, select a lower % value and vice versa. A higher % value will require the product to cover more of the probe before switching will occur. When the level falls the relay will switch back at half of the entered switch point % value.

Select the Time Delay

Set the time to be used for both switch on and switch off delays.

Select the required relay action

The Relay can switch 'ON' or 'OFF' as the product approaches the probe and switch 'ON' or 'OFF' in response to an instrument failure. *For details see page 10.* Set the parameter to FailSafe Hi or FailSafe Low depending on your requirements.

Remote Amplifier

Entering Data

All software adjustments are achieved via the four PUSHBUTTONS on the front panel.



In Run Mode

(A) Press and hold - interrupts normal operations and allows access to software menu headings.

In Calibrate Mode

(B) Steps into a menu selection to allow editing (down one level)

(C) Saves selected value and moves onto the next menu item.



In Run Mode

(A) Scrolls up through operating diagnostics on display LCD.

In Calibrate Mode

(B) Scrolls up through software parameters when browsing the menus.

(C) Increases display value when editing a parameter.



In Run Mode

(A) Scrolls down through operating diagnostics on LCD display.

In Calibrate Mode

(B) Scrolls down through software parameters when browsing the menus.

(C) Decreases display value when editing a parameter.



In Run Mode

(A) Hides diagnostics if they are in view and returns to the standard running display.

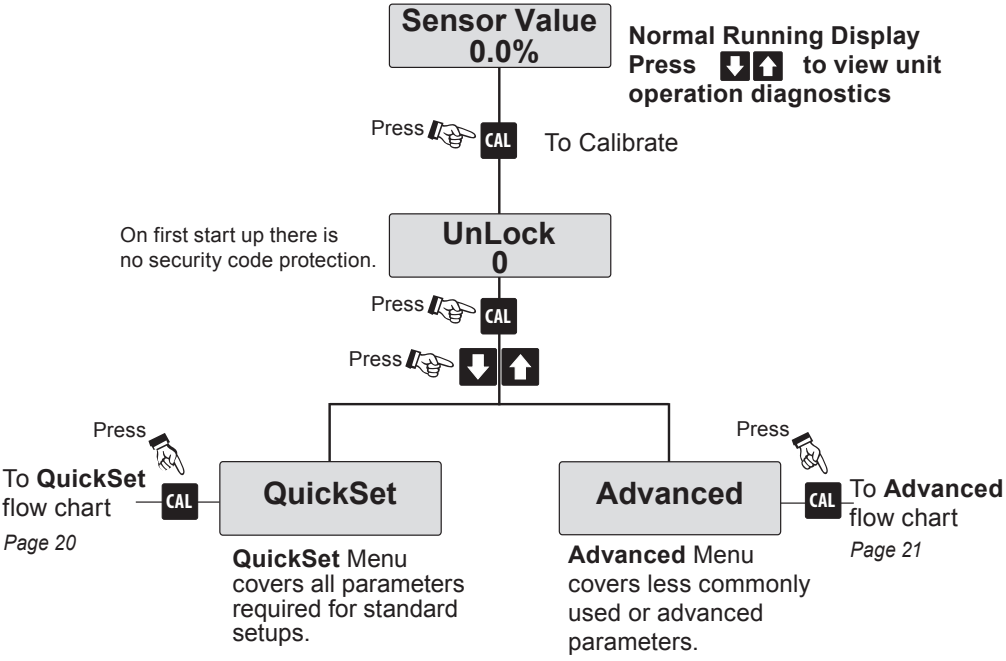
In Calibrate Mode

(B) Steps out of a menu or selection (up one level). Parameter value will be stored automatically when stepping up.

(C) Returns to running mode from the top level menu.

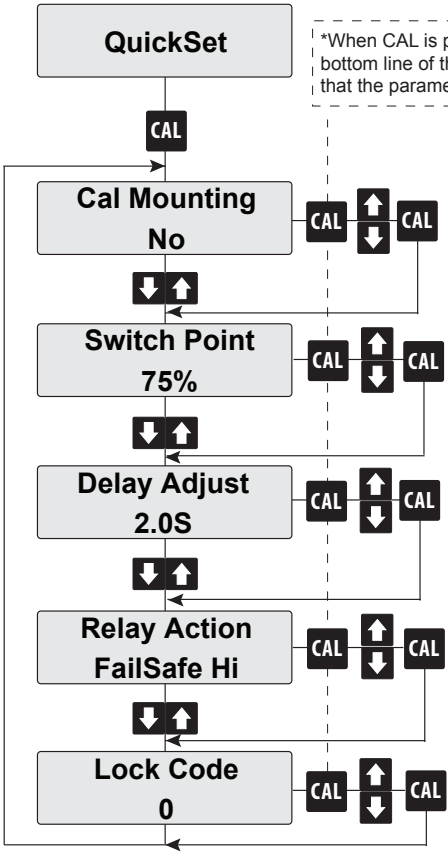
Software Tree

Software Version 7.14



Press RUN to return to normal operation

Quickset Menu



Calibrate mount will cancel the mounting influence and zero the % reading with the existing process conditions. Probe history log will be cleared. Vessel must be empty before calibration. Yes / No

Relay 1 will switch at the entered Switch Point value and switch back at half of this value. **Manual** will be displayed if you have set the parameter 'Switch Mode' to Manual in Advanced menu. The Manual setting can only be removed or adjusted from the Advanced menu.

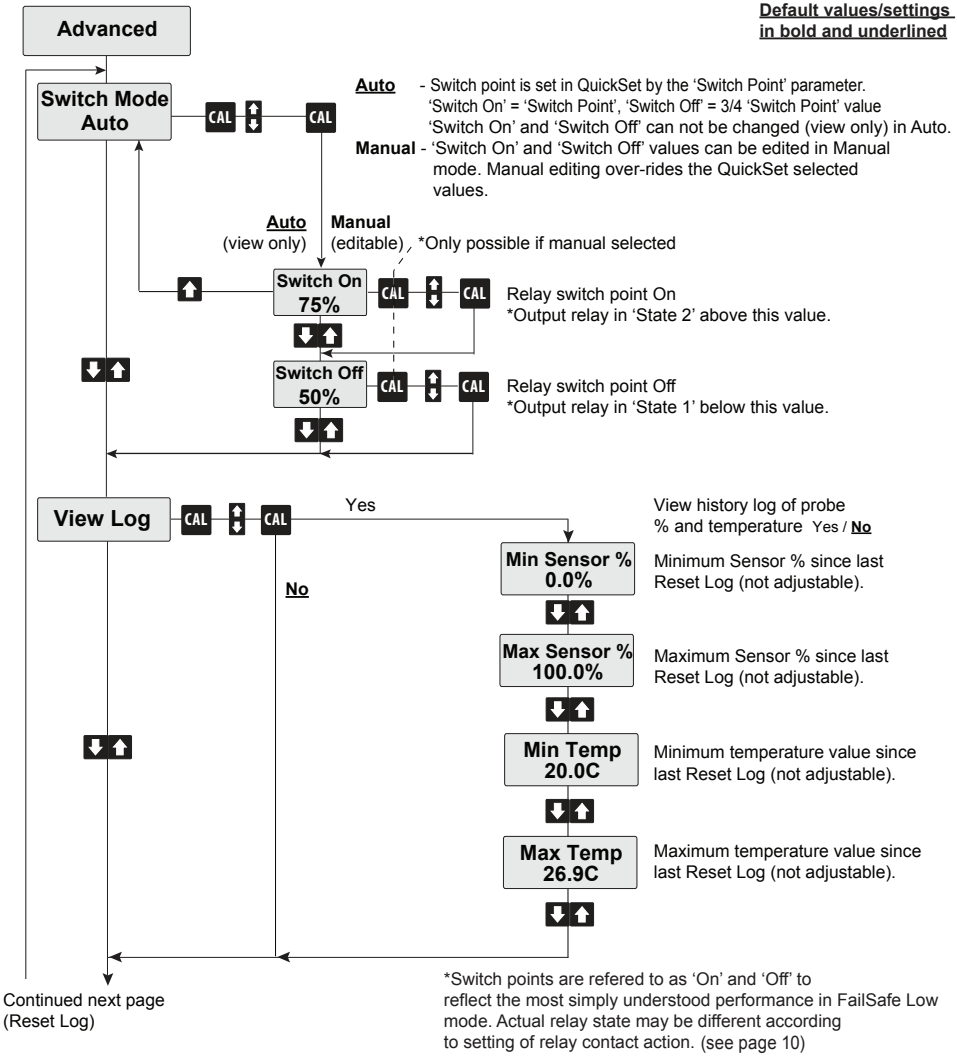
Set switch delay time 0.1-72.8sec

Relay Action (**FailSafe Hi** or FailSafe Low)

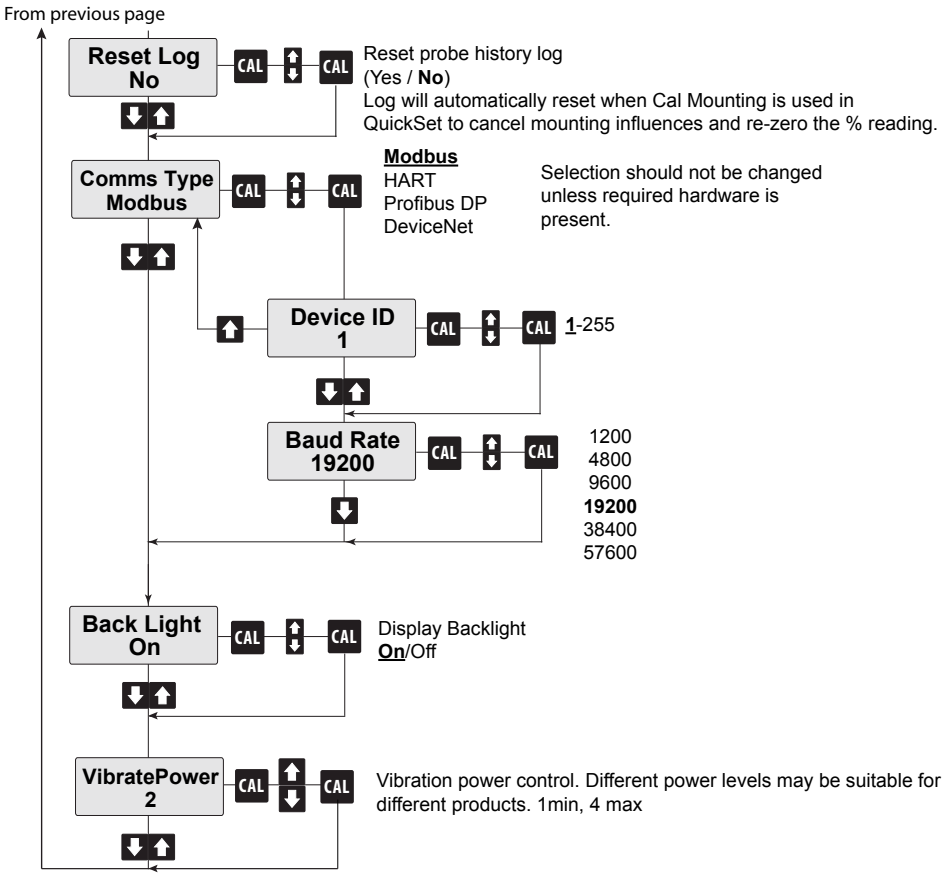
Security code lock
Adjustable 0-200
Default **0**

Default values/settings in bold and underlined

Advanced Menu



Advanced Menu

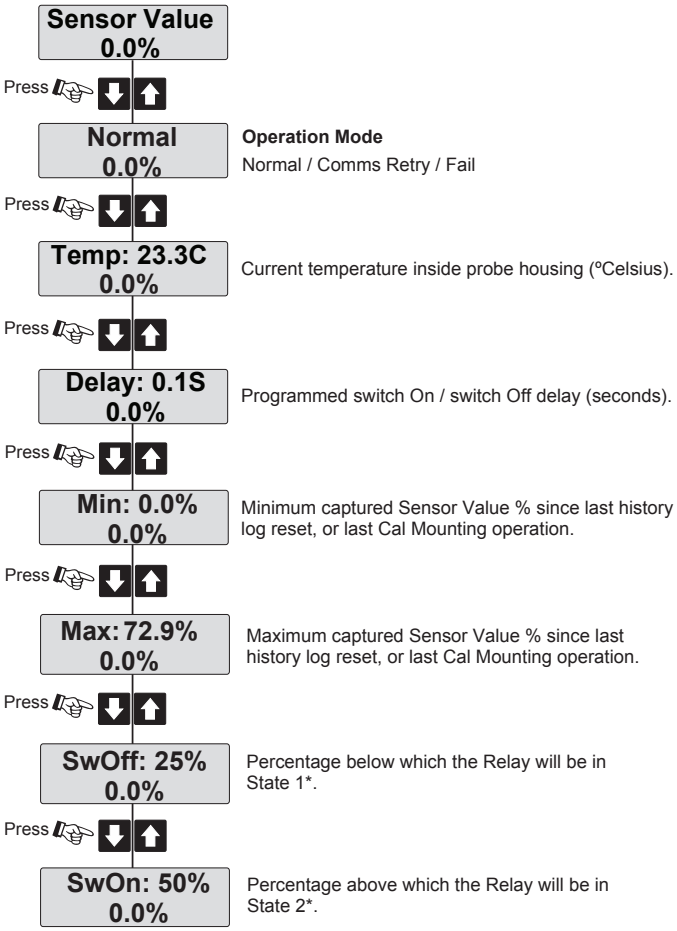


Diagnostic Displays (Remote type only)

The diagnostic displays appear on the top line of the LCD, after pressing the Up or Down push button when the Gladiator switch is in its normal running mode.

The diagnostics provide the user with valuable performance feedback on how the instrument is performing whilst in operation.

The measured reading Sensor Value (%) continues to be displayed on the second line of the LCD during diagnostic viewing on the top line. Output relays will continue to operate during diagnostic viewing.



Remote Version

Operation Setup Check

After final adjustment it is advisable to check the performance of the probe relative to your entered settings.

Ensure there is no mounting influence.

- When calibrating the mounting of the unit, there should be no product touching the probe forks, and the forks should not touch the vessel wall or be bridged to the wall or to one another by build-up. After calibrating the unit the Sensor Value (%) should read approximately 0.0% with no product touching the probe.
- Allow infeed to occur and note the Sensor Value (%) change (if there is any) - as the level makes contact with the forks the Sensor Value (%) number will increase and continue to increase as the product covers more of the forks.
- The Gladiator Vibration switch is capable of switching repeatably and reliably whenever a solid or liquid product comes into contact with the probe forks. Contact is required for detection to occur.
- The Sensor Value (%) will reach its maximum after the forks are covered - but the Switch Point can be set at any value less then the maximum. It is recommended to select the set point more than 10% below the maximum value seen with material fully covering the forks.
- For instance the following readings may occur

	Sensor Value (%)
Before filling	0.0%
Material contacts forks	96.5%
Material covers forks	285.7%

A. You may choose to leave the Switch Point at the default 50%. The Gladiator will switch reliably upon contact of the material to the forks.

B. You may choose to adjust the Switch Point to 100% to switch when the product contacts the forks and covers them a little more than in A above.

- By default the Switch Off is set at 1/2 of the Switch Point. You may wish to adjust this to a higher or lower number. This is adjustable in the Advanced Menu by selecting Switch Mode - Manual. You can then manually select your Switch On and Switch Off values.
- In general, you should not choose the Max Sensor % (Max) value nor the Min Sensor % (Min) value as the Switch Point.
- If possible, always have the Switch On % at a value of at least 10% less than the Max Sensor % (Max) value and Switch Off at least 10% more than the Min Sensor % (Min).
- If the % change on the display is too small then the Display Span parameter in the Advanced menu can expand the display resolution (select a larger number - smaller raw range) and vice versa. Changing the Display Span will change Switch Point value.

Integral Probe Version

VS1100 Gladiator Vibration Switch - Integral Probe

Power Supply

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

Output Options

- S 1 x SPDT Relay
- D 1 x DPDT Relay

Housing

- S Powder Coated Aluminum, Glass viewing window
- C 316 Stainless Steel, Glass viewing window

Process Temperature

- 1 80°C (176 °F)
- 2 Maximum 150°C (302 °F)

Version

- 1 Rigid probe
- 2 Flexible Cable with Probe (solid/powder version only)

Application Type

- L Liquid
- S Solid/Powder - 1.5” mounting only
- I Interface (Solids in Liquids) - 1.5” mounting only

Mounting

TN10	1” NPT Thread - Liquid type only	FA2	2” Flange ANSI (Class 150)
TB10	1” BSP Thread - Liquid type only	FA3	3" Flange ANSI (Class 150)
TN15	1.5” NPT Thread	FD2	2” Flange DIN 50 (PN 40)
TB15	1.5” BSP Thread	TC2	2” Tri-Clamp

Approval Standard

- X Not Required
- A20 ATEX Grp II Cat 1/2 D Ex tD A20 IP65 T100°C for Ta -20°C to 80°C
- i20 IECEx Zone 20 (Ex tD A20 IP65 T100°C Ta -20°C to 80°C
- A22 ATEX Grp II Cat 3 GD T75°C IP67 Tamb -40°C to 65°C

(P) Rigid Probe Length (C) Cable Length (custom lengths available)

- P05 50mm (2”) rigid probe - ‘Liquid’ type only
- P14 140 mm (5.5”) rigid probe - ‘Liquid’ type only
- P26 260 mm (10.2”) rigid probe
- P50 500 mm (19.7”) rigid probe
- P100 1000 mm (39.4”) rigid probe
- C100 1000 mm (39.4”) flexible cable - ‘Solid/Powder’ type only
- C300 3000 mm (118.1”) flexible cable - ‘Solid/Powder’ type only
- C500 5000 mm (196.9”) flexible cable - ‘Solid/Powder’ type only

VS1100	B	S	S	1	1	S	TN15	X	P26

Remote Version

Remote Amplifier

GSA Remote Gladiator System Amplifier

Housing

S Standard polycarbonate electronics housing

Power Supply

B 12-30VDC
C 36-60VDC
U 12-30VDC and 90-260VAC

Output Options (inc. Modbus)

S Switch only, 1 level relay, 1 failsafe relay

Approvals

X Not Required
A22 ATEX Grp II Cat 3 GD T75°C IP67 Tamb -40°C to 65°C

GSA	S	U	S

Remote Probe

VS1200 Remote Gladiator Vibration Probe

Housing

S Powder Coated Aluminum, Glass viewing window
C 316 Stainless Steel, Glass viewing window

Process Temperature

1 80°C (176°F)
2 150°C (302°F)

Version

1 Rigid Probe
2 Flexible Cable with Probe (solid/powder version only)

Application Type

L Liquid
S Solid/Powder - 1.5" mounting only
I Interface (Solids in Liquids) - 1.5" mounting only

Mounting

TN10 1" NPT Thread - Liquid type only
TB10 1" BSP Thread - Liquid type only
TN15 1.5" NPT Thread
TB15 1.5" BSP Thread
FA2 2" Flange ANSI (Class 150)
FA3 3" Flange ANSI (Class 150)
FD2 2" Flange DIN 50 (PN 40)
TC2 2" Tri-Clamp

Approval Standard

X Not Required
A20 ATEX Grp II Cat 1/2 D Ex iaD A20 IP65 T100C Ta -20°C to 80°C
i20 IECEx Zone 20 (Ex iaD A20 IP65 T100°C Ta -20°C to 80°C
A22 ATEX Grp II Cat 3 GD T75°C IP67 Tamb -40°C to 65°C

(P) Rigid Probe Length (C) Cable Length (custom lengths available)

P05 50mm (2") rigid probe - 'Liquid' type only
P14 140 mm (5.5") rigid probe - 'Liquid' type only
P26 260 mm (10.2") rigid probe
P50 500 mm (19.7") rigid probe
P100 1000 mm (39.4") rigid probe
C100 1000 mm (39.4") flexible cable - 'Solid/Powder' type only
C200 2000 mm (78.7") flexible cable - 'Solid/Powder' type only
C300 3000 mm (118.1") flexible cable - 'Solid/Powder' type only
C500 5000 mm (196.9") flexible cable - 'Solid/Powder' type only

VS1200	S	1	1	S	TN15	X	P26

Operating Voltage

- 7 - 30VDC (residual ripple no greater than 100mV)
- 80 - 265VAC 50/60Hz
- 36-60VDC

Power Consumption

- <0.8W @ 24VDC
- <6W @ 48VDC
- <5VA @ 240VAC
- <3VA @ 115VAC

Communications

- GosHawk, Modbus
- Remote version also with HART, Profibus DP and DeviceNet (options)
- Multidrop mode can address 1-250 units over 4 wires

Relay Output: (1) Integral (2) Remote

- Remote: 2 x Form 'C' (SPDT) contacts, rated 5A at 240Vac resistive
- Integral: 1 x DPDT or 1 x SPDT rated 5A at 240Vac resistive
- Remote failsafe test facility for one relay (SPDT only).

Vibration Frequency

- Liquids 425Hz
- Solids 80Hz
- Interface 137Hz

Measurement Capability

- Liquids - All liquids and many solids
- Solids - Solids, powder and some liquids

Sensitivity

- Liquids - 50 g/l
- Solids - 5 g/l

Stability

- 0.01% of reading / °C

Operating Temperature

- Remote electronics -40°C (-40°F) to 80°C (176°F)
- Integral Probe -40°C (-40°F) to 150°C (302°F)*
- Remote Probe -40°C (-40°F) to 150°C (302°F)*

Probe/Amplifier Separation

- Up to 500m (1640ft) using specified extension cable

Cable type between Amplifier and Probe

- 4 conductor shielded twisted pair instrument cable
- Conductor size dependent on cable length
- BELDEN 3084A, DEKORON or equivalent
- Max: BELDEN 3084A = 500m (1640ft)
- Max: DEKORON IED183AA002 = 350m (1150ft)

Maximum Operating Pressure

- 10 Bar (145psig)

Display (Remote version only)

- 2 line x 12 character alphanumeric LCD
- Backlight standard

Memory - Remote

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

Enclosure Sealing

- Integral Probe IP67
- Remote Electronics IP65 (NEMA 4x)
- Remote Probe IP67

Cable Entries

- BSP process mounting: 2 x M20 Glands
- NPT process mounting: 2 x 3/4" NPT threaded adaptors
- Remote: 3 x 20mm (0.8"), 1 x 16mm (0.6") knock outs

Mounting

- 1" NPT or BSP Thread - Liquid type only
- 1.5" NPT or BSP Thread - Solid/Powder type only
- 50mm (2") Flange (ANSI, DIN or JIS patterns available)
- 2" Tri-Clamp

Remote Test Input

- Press to test
  (used to check for malfunction of unit from remote position, PLC, SCADA etc)

**Model dependent*

HAWK, Since 1988

Hawk Measurement Systems Pty Ltd (HAWK) was established in 1988. It's founding members saw the universal requirement of various industries requiring improved process control and efficiency in their operations.

We Can Help

HAWK understands the difficulties customers face when seeking accurate level measurement. Every application is different, involving a multitude of environmental factors. This is where HAWK excels. Our aim is to ensure that customers feel comfortable with our technology, and are provided with long term and reliable solutions. We believe that a combination of application and product expertise, as well as forward thinking and proactive support policies are the foundation of successful customer-supplier relationships.

Progressive Technical Support

HAWK believes that the future of the Level Measurement Industry revolves around the quality of pre and post sales - support. Our aim is for all sales & support staff to be product experts, and more importantly application experts making our customers applications as efficient and consistent as possible.

Remote Innovation

HAWK understands the need for immediate technical assistance.

The HawkLink 4G communication device allows any computer with internet access and our free GosHawk diagnostic & calibration software; to dial in, calibrate, test, and check the performance of HAWK products. This innovative system allows our Global Support Team to assist with commissioning and after sales service of HAWK equipment worldwide. Measurement problems are addressed as they happen; not days or weeks later.

Knowledge Sharing

HAWK believes that knowledge sharing is key to creating long term relationships. Empowering our customers and our worldwide distribution network, whilst being available at all times to lend a helping hand, is the perfect recipe for long-term solutions and relationships. HAWK openly extends an invitation to share our 30 plus years of level measurement experience, and ensure that your day-to-day processes are efficient, understood, and always working.

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