

A Higher Level of Performance



Data Sheet

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## Gladiator

### Vibration Smart Switch Series

A level switch for liquids and solids



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

# Overview

## Gladiator Vibration Smart Switch Series



The **Gladiator Smart Vibration Switch** is a third generation, state-of-the-art level probe, designed to operate in tough industrial environments.

### 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
- Interface Detection
- Pump control.

### Function

Point level switch for liquids, solids and slurries.

### Primary Areas of Application

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

### Features

- Suitable for a wide range of solids and liquids
- Heavy duty construction
- Simple '1-minute' setup
- Remote sensor or Integral 'all in one' types
- Relay outputs: Integral probe (1) Remote (2)
- Remote test function
- Adjustable ON and OFF delays (0-20 sec)
- Modbus, GosHawk
- Remote 3G Connection option
- Remote amplifier to probe separation up to 500m (1640ft)
- Bright visual status indication on probe
- Independent housing alignment after mounting thread locked

# Typical Applications

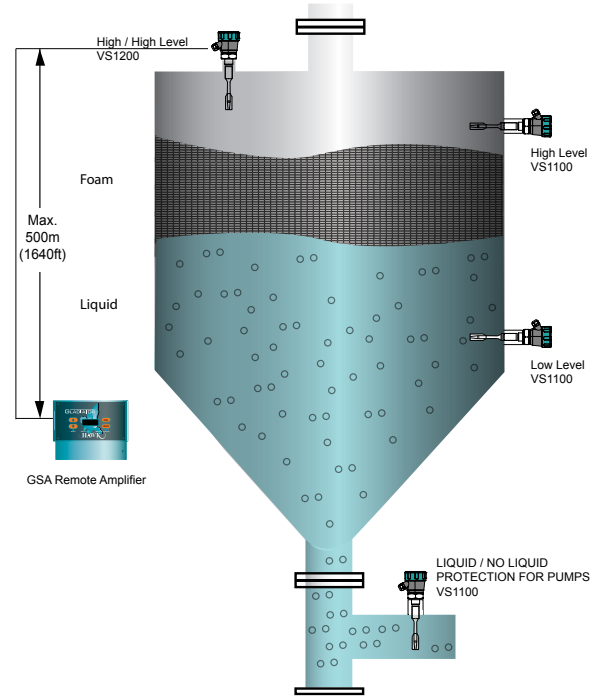
Gladiator Vibration Smart Switch Series



## Level switch in liquid tank



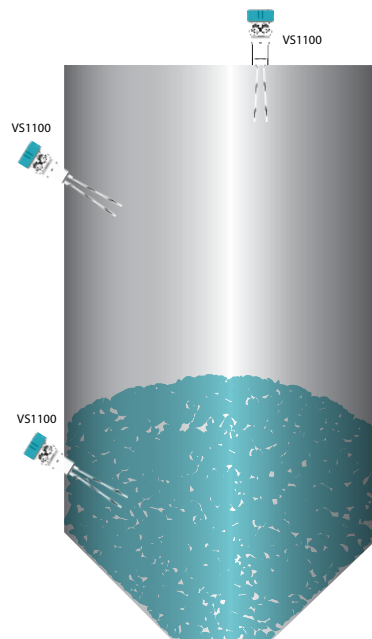
## High and low liquid level switch in tanks



## Level switch in a plastic pellet silo



## High and low level switch in hopper

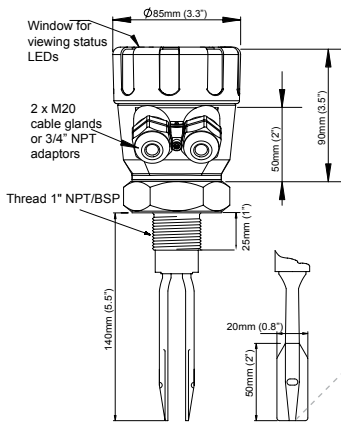


# Dimensions

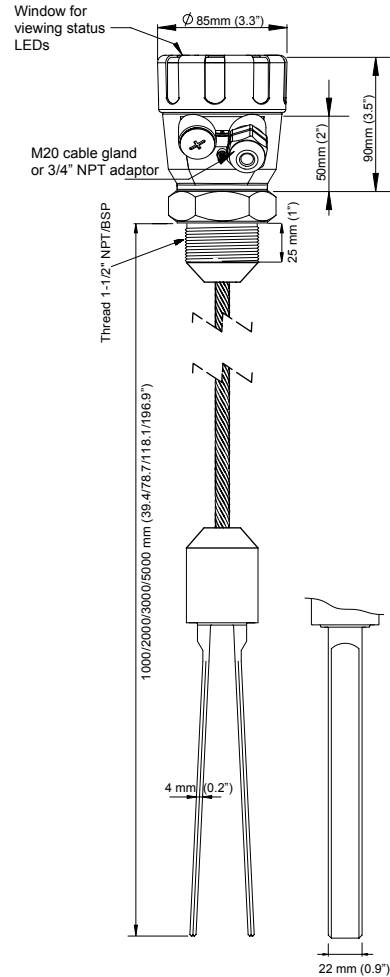
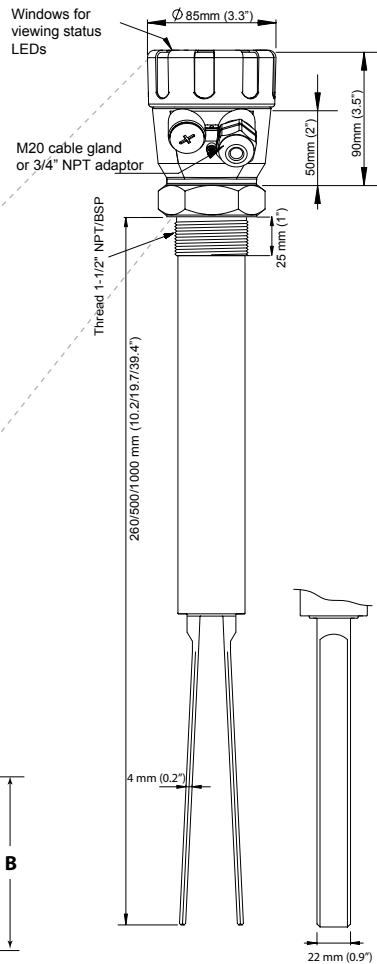
## Gladiator Vibration Smart Switch Series



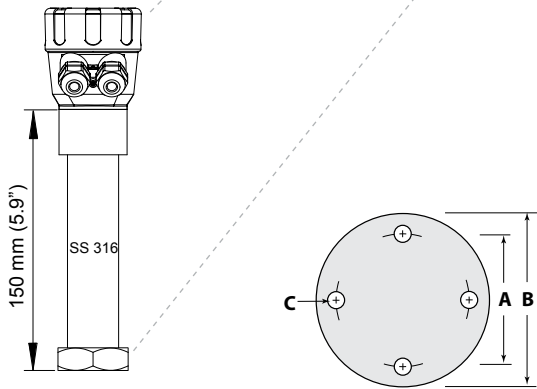
### Liquid Probe



### Solid Probes



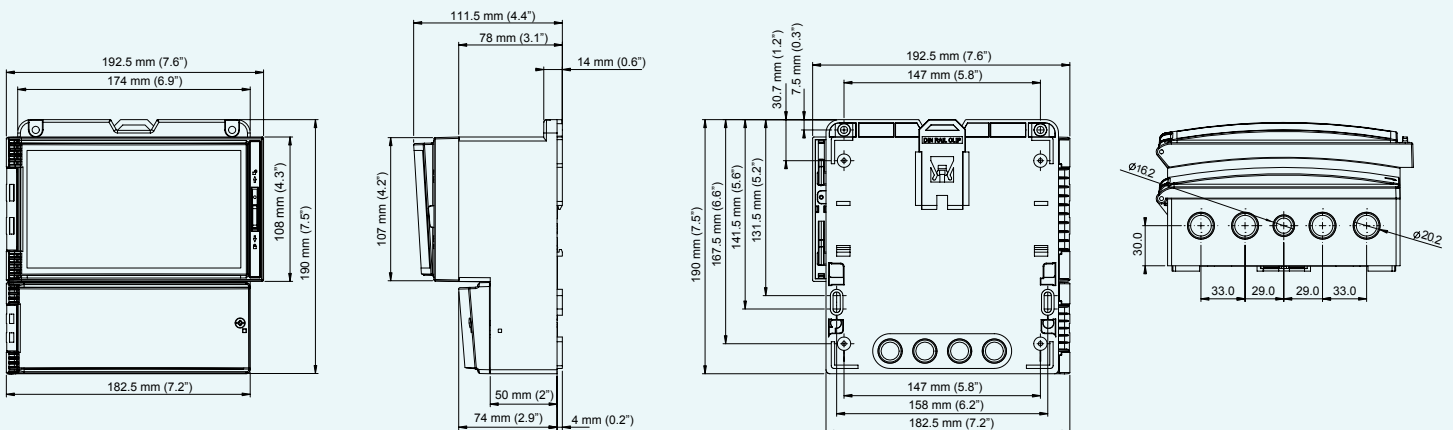
### Temperature Extension Option



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





### Integral Probe Wiring

Remove Plug-In terminal block for easier wiring.



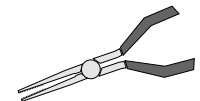
The AC earth/ground cable must be connected to the ground screw inside the housing when using AC power.

Hole for securing of optional identification tag

M4 grounding screw

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.



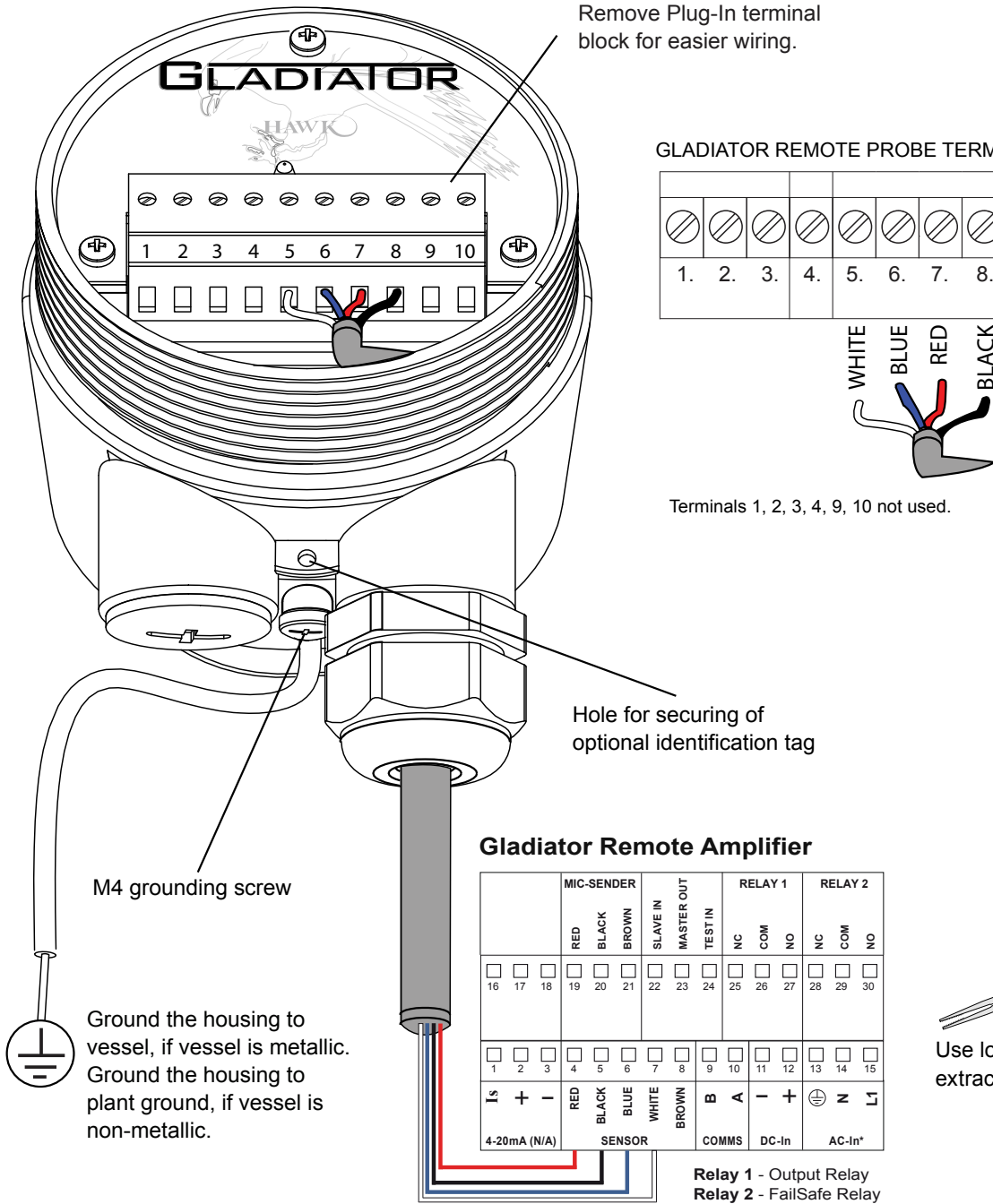
Use long nose pliers to extract terminals

GLADIATOR SMART PROBE TERMINAL LAYOUT

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



### Remote Probe to Amplifier Wiring



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

**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 (1640 ft)  
Max: DEKORON IED183AA002 = 350m (1150 ft)

# Relay Functions

Gladiator Vibration Smart Switch Series



## Relay Functions

### Level Switch Contact Action

**Relay** - for Integral Probe version  
(Set Relay Action selection switch)

**Relay 1** - for Remote version  
(Set Relay Action parameter)

		Relay Action	
		FailSafe Low FSL	FailSafe High FSH (default)
<b>State 1</b>  RISING LEVEL (not detected)	 1 2 3 NC COM NO	 1 2 3 NC COM NO LED Status	
	 CONTACT LEVEL (detected)	 1 2 3 NC COM NO	
<b>State 1</b>  FALLING LEVEL (not detected)	 1 2 3 NC COM NO	 1 2 3 NC COM NO LED Status	
	POWER FAILURE  1 2 3 NC COM NO	 1 2 3 NC COM NO LED Status	

### Fail-Safe Switch Contact Action

**Relay 2** - Remote version only.

For Integral Probes the 'Test' terminal can act as a solid state output with a similar function.

POWER FAILURE OR INTERNAL FAILURE  1 2 3 NC COM NO	 1 2 3 NC COM NO LED Status
SYSTEM OPERATING NORMALLY  1 2 3 NC COM NO	 1 2 3 NC COM NO LED Status

# Mounting Examples

Gladiator Vibration Smart Switch Series

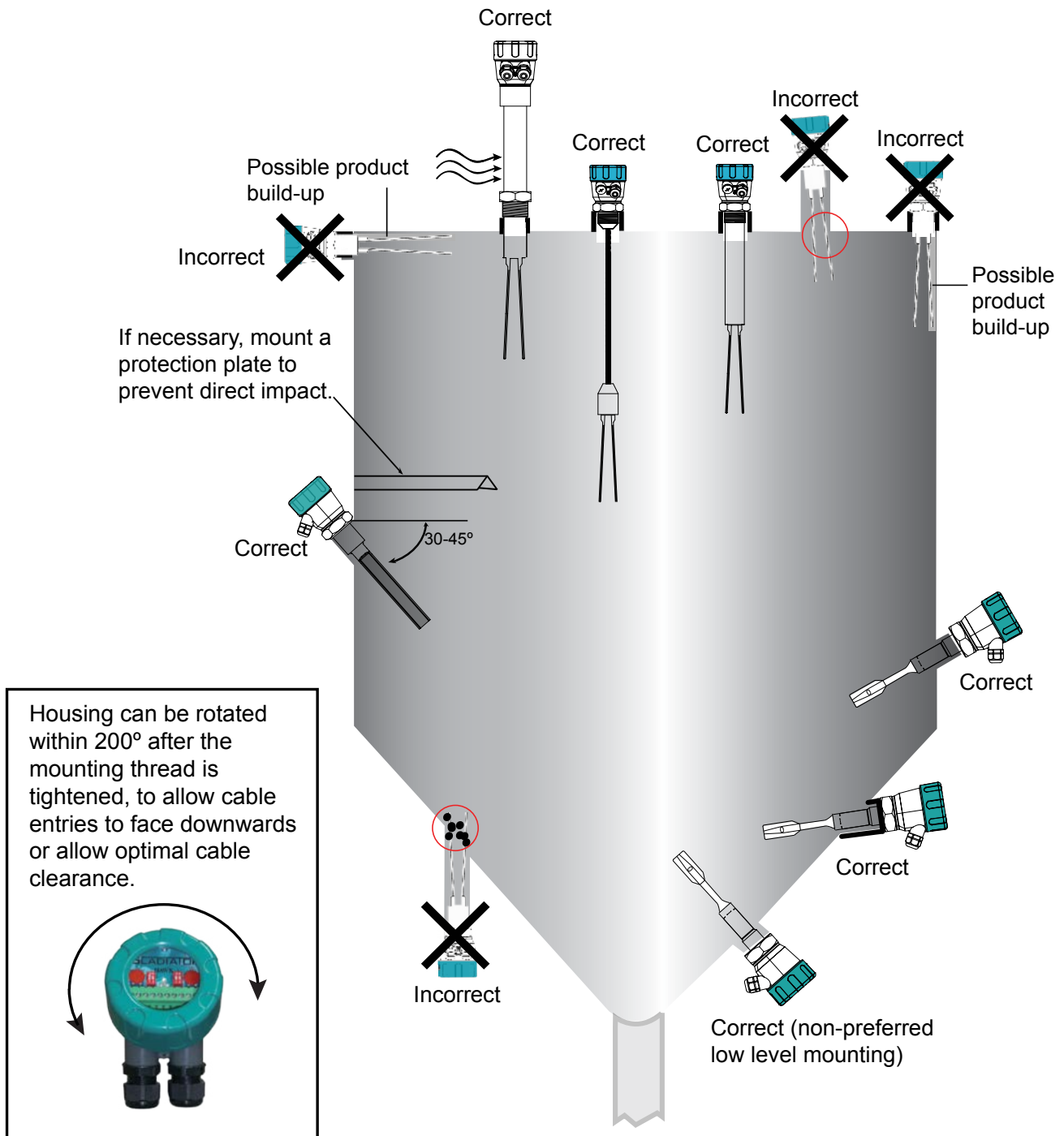


## Mounting

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.







### Integral Probe Version

#### VS1100 Gladiator Vibration Switch - Integral Probe

##### Power Supply

B 12-30 VDC

U 12-30VDC and 90-260VAC

##### Output Options

S Switch only, 1 level relay, Modbus

##### Housing

S Powder Coated Aluminium, 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

##### 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)

FD2 2" Flange DIN 50 (PN 40)

##### 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 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 min: P30 / C100 max P100 / C500)

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

**VS1100 B S S 1 1 S TN15 X P14**

# Part Numbering

Gladiator Vibration Smart Switch Series



## 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 Aluminium, 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

#### 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)

FD2 2" Flange DIN 50 (PN 40)

#### Approval Standard

X Not Required

A20 ATEX Grp II Cat 1/2 D Ex iaD A20 IP65 T100°C 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 min: P30 / C100 max P100 / C500)

P14 140 mm (5.5") rigid probe - 'Liquid' type only

P26 260 mm (10.2") rigid probe

P50 500 mm (19.7") rigid probe

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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 P14**

# Specifications

## Gladiator Vibration Smart Switch Series



### Operating Voltage

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

### Power Consumption

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

### Communications

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- 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

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- Form 'C' (SPDT) contacts, rated 5A at 240Vac resistive
- Remote failsafe test facility for one relay

### Vibration Frequency

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- Liquids 425Hz
- Solids 80Hz

### Measurement Capability

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

### Sensitivity

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

### Stability

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- 0.01% of reading / °C

### Operating Temperature

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- 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

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

\*Model dependent

### Cable type between Amplifier and Probe

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- 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

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- 2 BAR

### Display (Remote version only)

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- 2 line x 12 character alphanumeric LCD
- Backlight standard

### Memory - Remote

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

### Enclosure Sealing

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

### Cable Entries

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- 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

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- 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)

### Remote Test Input

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

# Contact

Gladiator Vibration Smart Switch Series



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

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